megasol

EUPD RESEARCH
TOP BRAND PV
MODULES
SWITZERLAND
2021

Easy Installation
Rooftop Photovoltaics

Rooftop Photovoltaic Systems

▼ School and sports facility in Bern | Double-glass modules with LAYUP Roof

Vision and vigour

Founder

Markus Gisler founded Megasol in 1993 in his youth. He directs the company as CEO and president of the administrative board. His vision led to the organic and continual development of Megasol and remains the driving force in everyday company life.

Markus Gisler, Founder and CEO

Vision

Solar modules by Megasol are intended as design material from which structures and pictures can be created. The integration of solar technology not only into buildings, but also into the living environment and consciousness of people, is the maxim.

Sites

The company consistently focuses on two locations. Development, administration and production are anchored in Deitingen SO, Switzerland. With a strong focus on customer proximity, individual design requirements can be met. Our factory in Ningbo, China, is specialized in large series and standard solutions.

Partnerships

The company has a wide network of architects, planning offices, investors, installers and operators. The company also fosters close partnerships with universities and both national and international research institutes.

▲ Olympic House | New IOC headquarters in Lausanne | Swiss Solar Prize 2020

Image: Swiss Solar Agency

The Megasol principle

Successful as a team

We managed to retain the start-up spirit: We are young, fast, and incredibly innovative. Today, we are Europe's most successful manufacturer of solar modules. In this context, our customers are the decisive factor because close cooperation and team efforts are what makes the difference for success. We know and appreciate each other. With many of our customers, we are on first-name terms, and lots of them have become our friends. We appreciate frank and open feedback. Many of our product innovations result from exactly suchlike feedback. Our doors and hearts are open to our clients – whether we meet on-site, have raclette together at our Deitingen headquarters or enjoy a drink at one of our tradeshow appearances.

These are our principles:

1 **Close contact to our customers, partners and friends**

> Direct contact to all stakeholders
> Support for layout, sales, and implementation/realisation
> Installation plans, ballasting plans, string plans
> Formalities (EIV, ESTI, EEA)
> On-site installation coaching
> System trainings, e.g. for inverters

2 **Fast and powerful systems**

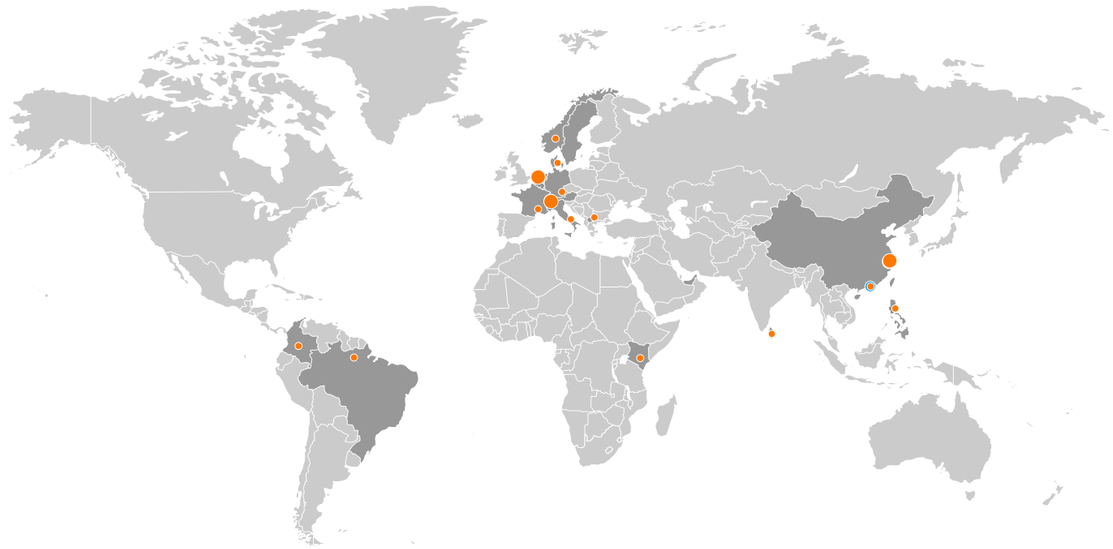
> Systems with few components that are smartly designed
> In-house developments focused on short installation times and maximum performance

3 **Everything from a single source**

> Solar modules, mounting structures, inverters, generator connection boxes, electric materials
> Integration of storage solutions, energy management and charging infrastructure for e-mobility
> Quick provision through our in-house logistics and processing centre
> Turn-key delivery to the construction site

▲ Pilatus Aircraft Factory | 1.05 MWp | Swiss and European Solar Prize 2018 | Image: Pilatus Aircraft Ltd.

Think big, start small



Factory in Deitingen, Switzerland

Development, production, sales, logistics and administration are located at our Deitingen headquarters. The heart of the site is the high-tech production facility, which specializes in medium-sized series and custom-made products. Our logistics centre is the largest warehouse for solar modules in Switzerland.

> Annual capacity of 80 megawatts
> Approx. 100 employees
> Fully automatic production line for glass-glass solar modules
> Industrial production of special modules in individual sizes and colours
> Customized mounting solutions

Sustainable production

From raw material extraction to the finished solar module, only renewable energies are used in the production process.
In Deitingen, the electricity required for production is generated on site using our own solar plant. Excess energy is fed into the grid more than 250 days a year.

> 1’000 MWh power consumption
> 1.2 MWp PV plant capacity
> 114% net self-sufficiency

Worldwide distribution network

Megasol can count on reliable partners and distributors worldwide: Germany, Austria, France, Italy, BeNeLux, Denmark, Sweden, Norway, Kosovo, UAE, Kenya, Brazil, Colombia, Sri Lanka and the Philippines.

Smart logistics

From individual spare parts to complete solar systems – hundreds of modules and components leave our Deitingen site every day. Thanks to our storage capacities that provide for up to 40'000 modules and 3'500 different items that are permanently available, we are highly flexible. Our partly-automated processing centre is responsible for customization and assembly processes. These are followed by commissioned delivery to the respective site. Our efficient logistics include warehouses in Ningbo (CN), Rotterdam (NL), and Deitingen (CH) and enables us to serve international markets as well.

Factory in Ningbo, China

Our second plant is located in Ningbo, a coastal city in the eastern Chinese province of Zhejiang.

> Annual capacity of 130 megawatts
> 140 employees, including 30 in research, development and quality assurance
> Fully automatic production line for standard high-performance modules
> Seamless material traceability and quality assurance
> Swiss warranty conditions

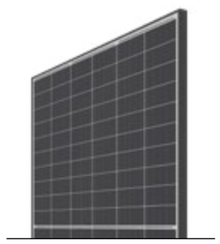
Solar modules

Framed high performance modules 12

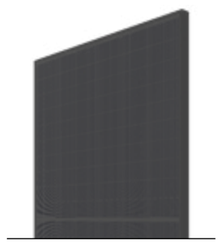
Properties

> Best price-performance ratio
> The most efficient cell layout for each application
> U-frame
> Swiss warranty
> Ex stock Deitingen

Structure



Mono HiR white U30b



Mono HiR Full Black U30b

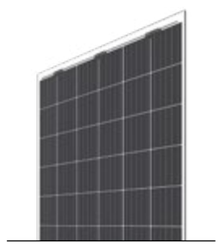
Frameless glass-glass modules 16

Properties

> *Swiss Made*
> Highest longevity
> Strongest performance
> High static load resistance
> Frameless

Structure

Mono HiR black GG3



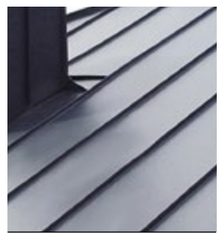
Mono HiR translucent GG3

Roof connection

Pitched roof 28

Recommendation

> Solid and proven systems
> Simple and efficient installation
> All roof coverings: tile, sheet metal, fibre cement etc.



Seam metal roof

Fibre cement roof

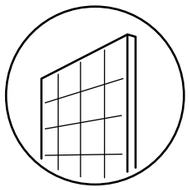
Flat roof 30

Recommendation

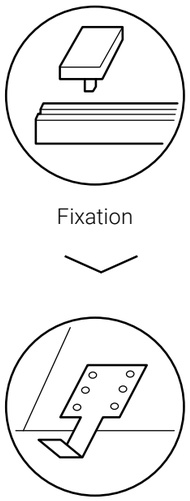
> High-speed installation
> Flatport Advanced: only 3 components
> Prevents roof membrane from damage
> Simple ballasting
> Ballasting plans

Flatport tray

Structure



Module



Fixation

Roof connection

HiR cell technology

Achieving a record-breaking cell efficiency of over 25%

The new proprietary cell technology

HiR (pronounced like the word "higher") is a proprietary cell technology from Megasol. HiR is based on n-type wafers, which for decades have proven to be the highest quality and most stable technology. The n-type HiR technology combines charge carrier selective contacts, so-called ultra-thin tunnel oxides (SiO_2), with a sophisticated multi-stack metallization and a multi-level anti-reflective coating.

The most power-stable modules in the world

n-type HiR solar modules have a much higher power stability compared to conventional PERC modules. n-type HiR modules have a significantly lower power degradation and are completely PID- and LID-free due to their design. This results from the fact that n-type HiR is completely insensitive to boron-oxygen complexes responsible for PID.

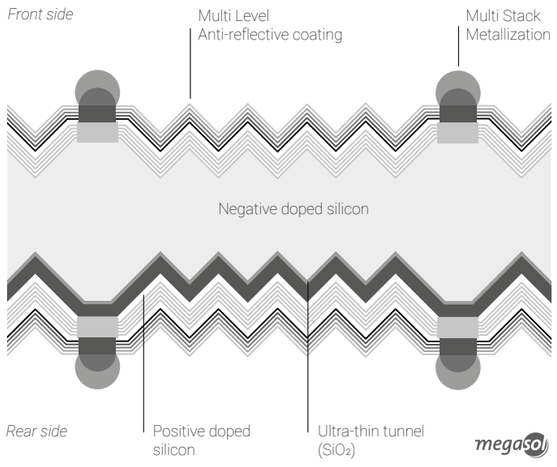
In the market, PERC modules with 4-5% power degradation due to PID or LID are also considered "PID-free". However, a 4-5% difference in yield can have a massive impact on the economic profitability of solar plants. n-type HiR modules have 0% PID and 0% LID and are thus the most power-stable modules in the world.

Better economic profitability and higher project yields

> n-type HiR modules have a very high power output combined with very compact dimensions. More yield per roof area leads to higher economic efficiency and better project yields.
> An optimal thermal coefficient and better low-light performance lead to more yield per kWp.
> All HiR modules are bifacial and have a significantly higher bifaciality factor (over 90% instead of the usual 70-75%).
> Considerably lower proportion of grey energy

How it works: simply explained

The ultra-thin tunnel oxide layer reduces recombination losses and thus significantly increases efficiency. The very fine front and rear contact grids guarantee ideal electrical current absorption capability with good solderability and conductivity thanks to their layers that have each been optimised for their respective characteristics. Thanks to the anti-reflective coating, which is not only classically single-layered but multi-layered, the reflection losses on the cell surface are minimised. At the same time, the cell surface appears darker (black), which makes it even more attractive for projects with high aesthetic requirements.



▲ Riverside Business Park Zuchwil | 36'000 m² | 5.76 MWp | Swiss Solar Prize 2016

High performance modules

Quick to install, budget-friendly, and highly profitable: our framed high performance modules are extraordinarily durable "workaholics".

Low investment

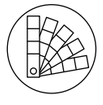
> Best market prices
> Project prices on request

Latest technology

> Highest efficiency levels (HiR)
> Nano-coated solar glass
> Optimized low-light performance

Wide product range

> Power classes
> Optics
> Cell geometries



Environmentally friendly

> Made with renewable power
> Energetic amortisation under 2 years
> Seamless traceability of all materials

Secure fixation

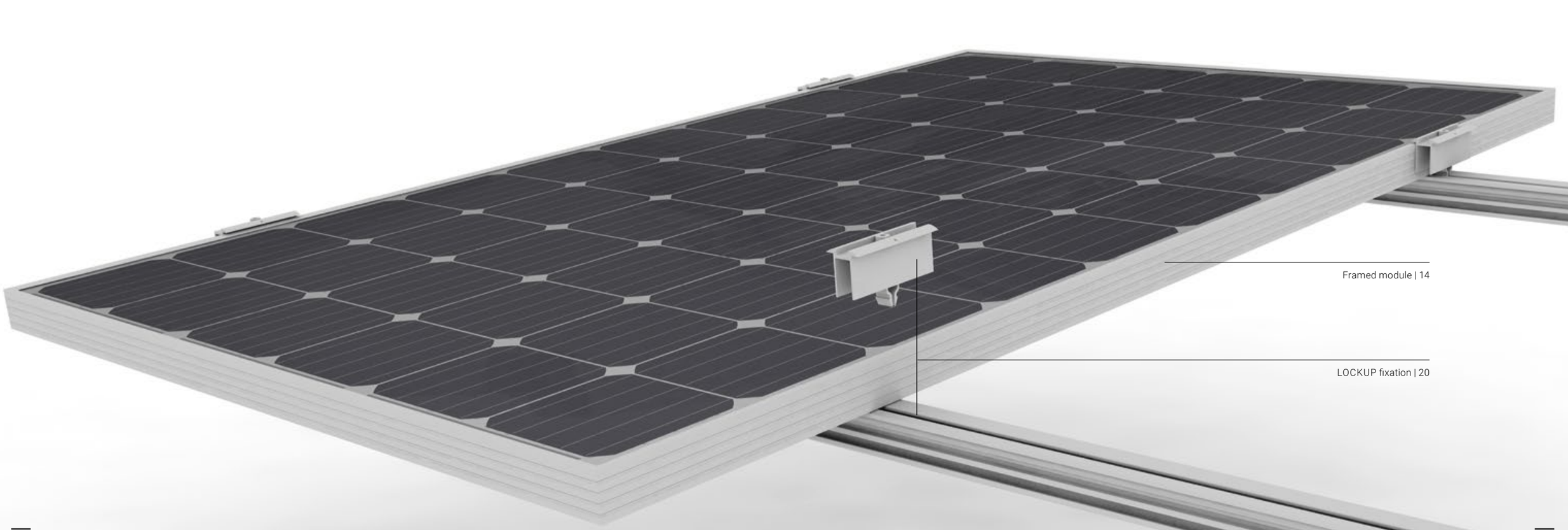
> LOCKUP module fixation 20

Wide range of applications

> The most efficient cell layout for each application
> Bifacial glass-glass

Swiss warranty

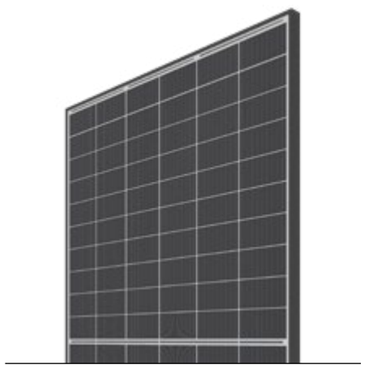
> 30 years linear performance warranty
> 15 years product warranty
> Produced at the Megasol plant in Ningbo



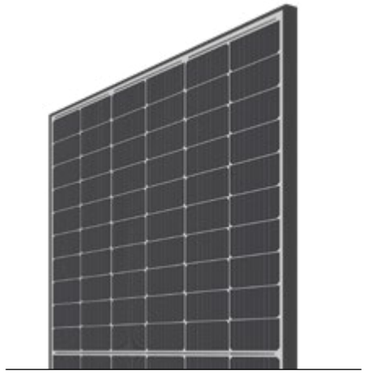
Module types

Framed high performance modules

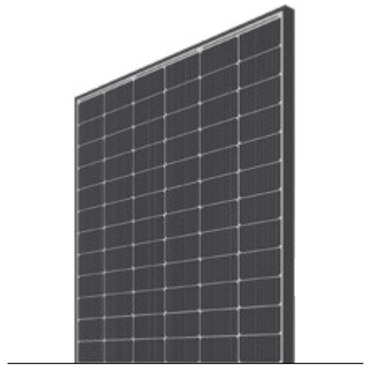
Mono HiR Bifacial HC120 G1 | Full Black optics
Cell type: n-type HiR G1 (158.75 mm)
Matrix: 120 half-cut cells
Frame: U30 black



Mono HiR Bifacial HC120 G1 | White
Cell type: n-type HiR G1 (158.75 mm)
Matrix: 120 half-cut cells
Frame: U30 black

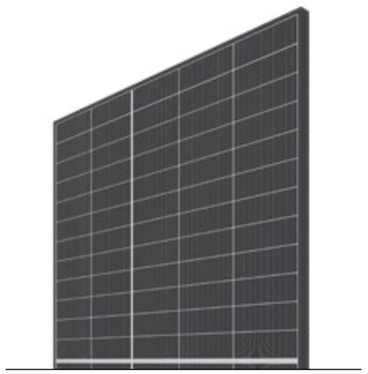


Mono HiR Bifacial HC120 M6 | White
Cell type: n-type HiR M6 (166 mm)
Matrix: 120 half-cut cells
Frame: U30 black



Mono HiR Bifacial M6 HC144 | White
Cell type: n-type HiR M6 (166 mm)
Matrix: 144 half-cut cells
Frame: U30 black

Mono HiR Bifacial M10 HC108 | Full Black optics
Cell type: n-type HiR M10 (182 mm)
Matrix: 108 half-cut cells
Frame: U30 black



Mono HiR Bifacial G12 TC120 | White
Cell type: n-type HiR G12 (210 mm)
Matrix: 120 triple-cut cells
Frame: U30 black

Technical specifications

Laminate structure: Glass-glass
Cell technology: n-type HiR (bifacial)
Cell size: 158.75mm (G1) / 166mm (M6) / 182mm (M10) / 210mm (G12)
Cell geometry: Full-square / Half-cut / Triple-cut
Frame: U-frame, aluminium, anodized natural or black
Front side: 2 mm TVG, high-transmission, nano-finished, antireflective
Back side: 2 mm TVG

Swiss warranty

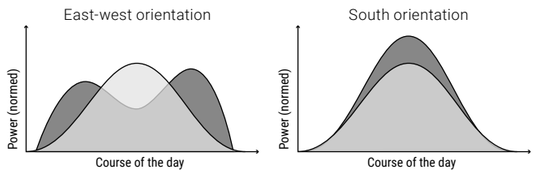
Product warranty: 15 years
Linear performance warranty: 30 years

Suitable mounting systems

> LOCKUP Roof (pitched roof)	20/28
> LOCKUP Flatport (flat roof)	20/30

Bifacial: power from reflections

> Double sided active cells
> Additional yields depend on the installation situation and the albedo (reflectivity) of the substrate



In east-west orientations, the rear produces most when the sun is flat. South facing bifacial plants generate their additional yield classically during the midday hours.

Potential bifacial gain

Low reflecting surface (e.g. grass, brick)	5-15%
Well reflecting surface (e.g. sand, bright gravel or paint)	15-25%
Highly reflecting surface (e.g. ice, snow)	25-35%

Swiss Premium modules

With a service life of over 50 years our *Swiss Made* glass-glass solar modules are particularly interesting for institutional investors.

Swiss quality

- 35 years linear performance warranty
- 15 years product warranty
- Made in Deitingen, Switzerland

Profitable investments

- Service life of more than 50 years
- Highest yields
- Lowest watt price per warranty year

Sustainable production

- Made with renewable power sources
- Energetic amortisation under 2 years
- Seamless traceability of all materials

Wide range of applications

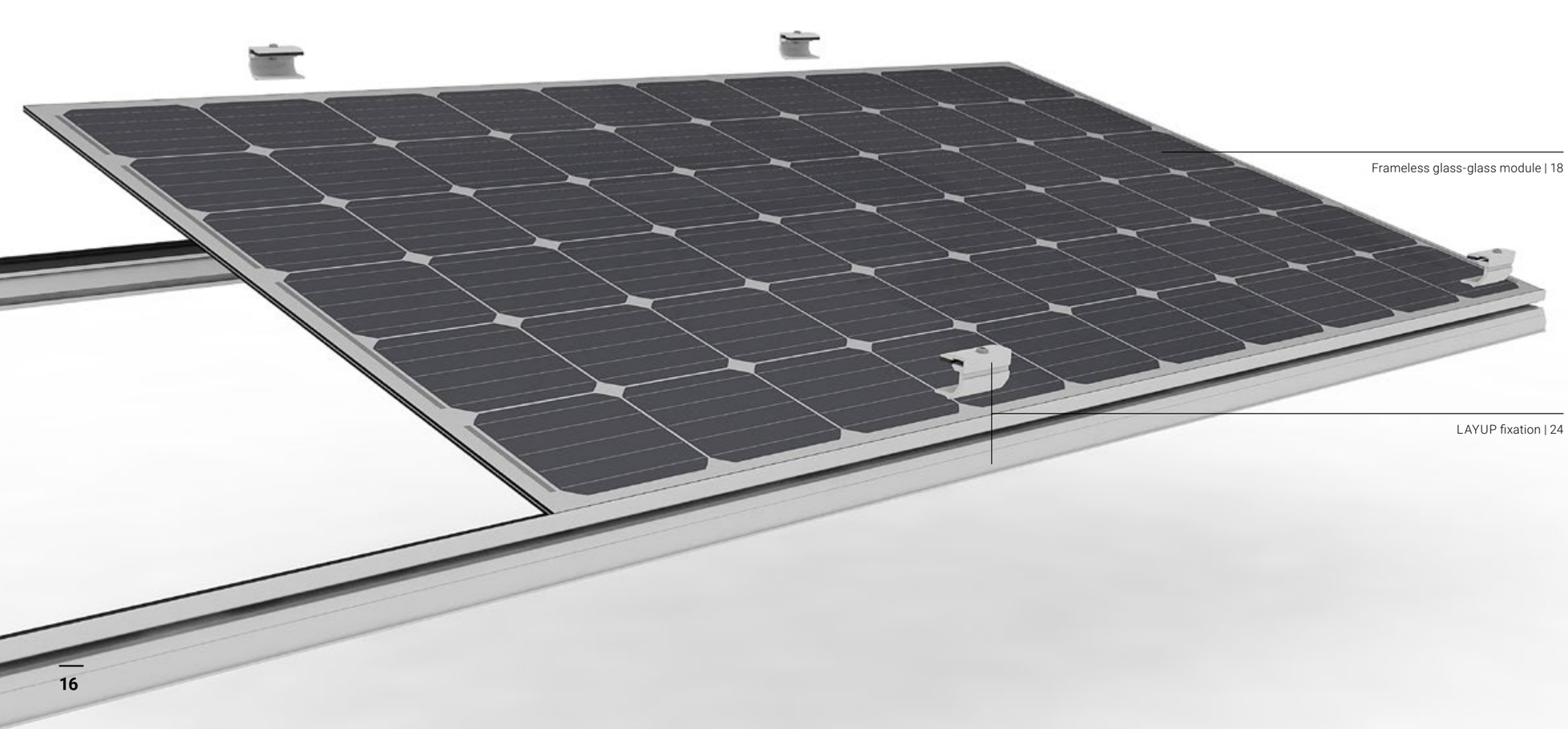
- Cell technologies
- Power classes
- Optics

LAYUP fixation

- Fast and easy
- CleanFrame effect
- Module clamps do not cover cells
- Extremely robust thanks to large contact surface

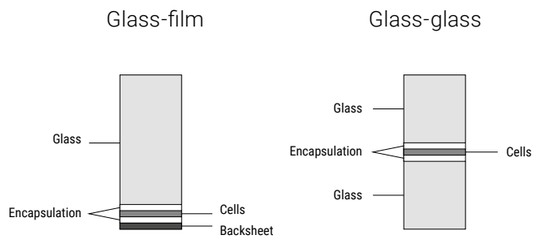
Outstanding stability

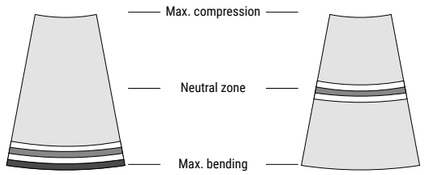
- Laminated safety glass (two laminated glasses)
- "Neutral zone" protects against microcracks
- Front and rear glass prevent steam penetration



Frameless glass-glass module | 18

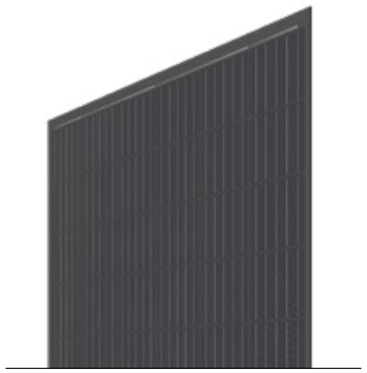
LAYUP fixation | 24



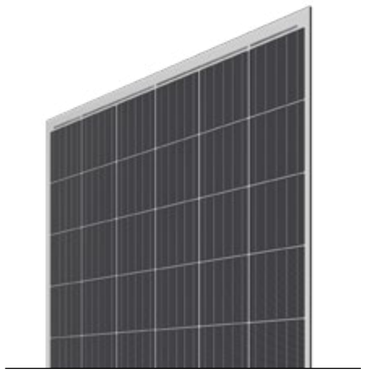


Module types

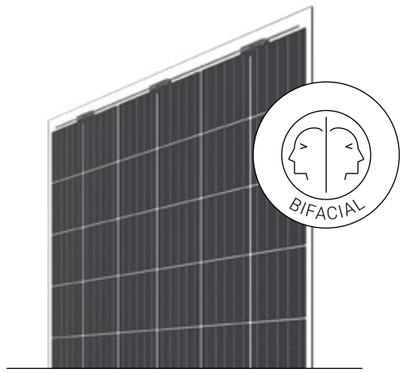
Frameless Swiss Premium modules



Swiss Premium GG3 | Black
2x 3.2mm solar glass
Frameless



Swiss Premium GG3 | White
2x 3.2mm solar glass
Frameless



Swiss Premium GG3 | Translucent
2x 3.2mm solar glass
Frameless

Technical specifications

Laminate structure: Glass-glass

Cell technology: n-type HiR (bifacial)

Cell size: 158.75mm (G1) / 166mm (M6) / 182mm (M10) / 210mm (G12)

Cell geometry: Full-square / Half-cut / Triple-cut / Custom

Frame: Frameless

Encapsulation material: EVA / PVB / POE

Glass thickness per pane: 1 - 12 mm

Hail resistance: Hail protection class 4 or 5

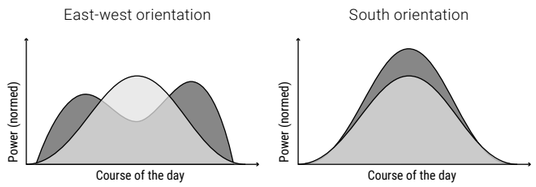
Fire protection: Top and back layer are made of heat-resistant glass. The component is considered to be non-combustible material as defined by the Cantonal Fire Insurances.

Suitable mounting systems

> LAYUP Roof (pitched roof) 24/28
> LAYUP Flatport (flat roof) 24/30

Bifacial: power from reflections

> Double sided active cells
> Additional yields depend on the installation situation and the albedo (reflectivity) of the substrate



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Potential bifacial gain

Low reflecting surface (e.g. grass, brick)	5-15%
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▲ Vortex Campus in Lausanne | High-performance modules with LOCKUP Flatport | 330 kWp | Image: Université de Lausanne

LOCKUP module fixation

The fixation system for framed high-performance modules that is fully compatible with components of leading manufacturers.

Two components

> Clamp
> Rail

Simple connection

> Fastening to roof connection by means of screws or cross connectors

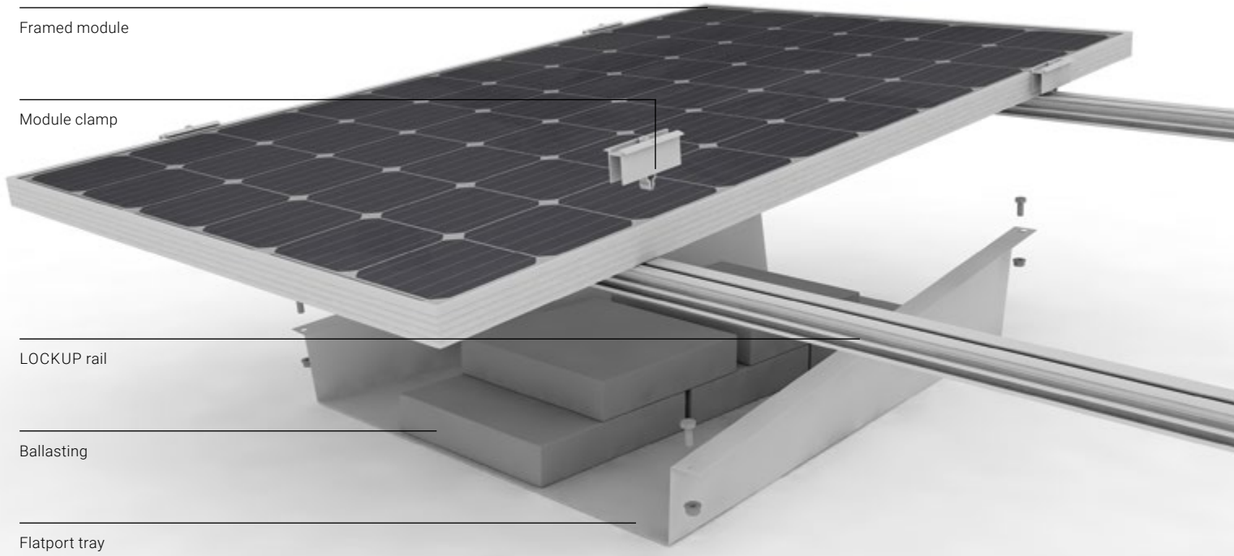
Secure fixation

> Click in
> Tighten with screwdriver

High compatibility

> All frames 30-40 mm
> Pitched roof and flat roof
> Compatible with all roof connections from Megasol, Schletter and K2

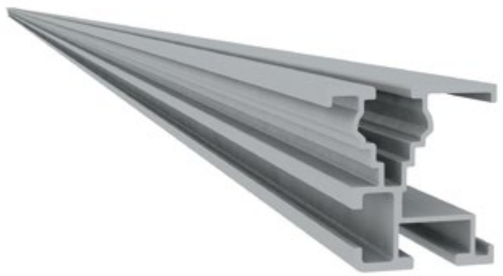
Pitched roof fixation



Flat roof fixation

LOCKUP components

Rails



3337.0330
LOCKUP rail 6650 mm

3337.0331
LOCKUP connector

3337.0332
LOCKUP support

Clamps

3231.0212
Module middle clamp
Rapid16, 30-40 mm
black

3231.0217
Module end clamp
Rapid16, 30-40 mm
black

3231.0211
Module middle clamp
Rapid16, 30-40mm
silver

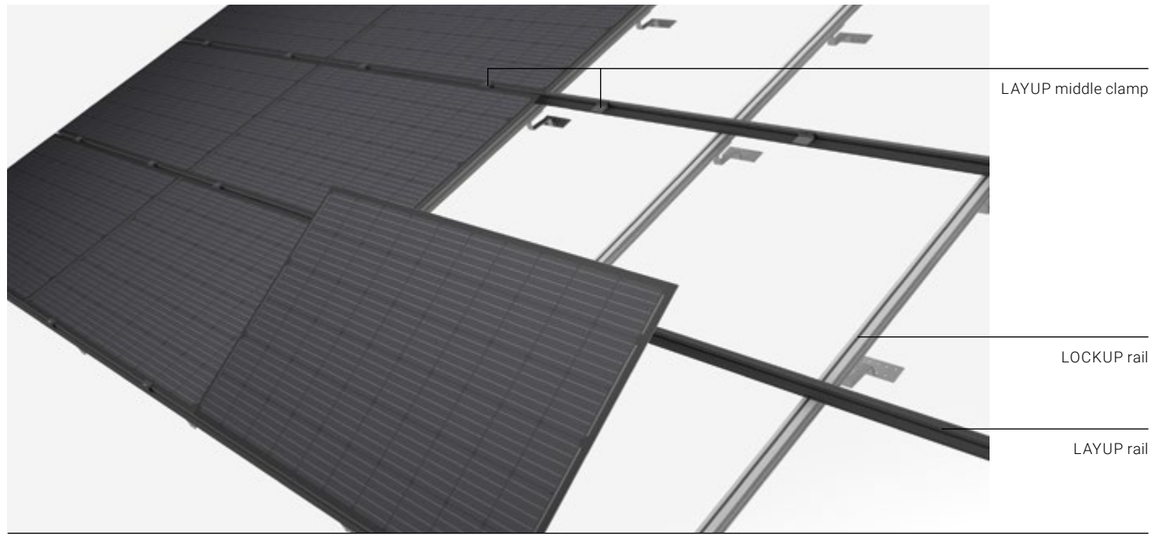
3231.0216
Module end clamp
Rapid16, 30-40mm
silver

3231.0128
Rapid cross connector

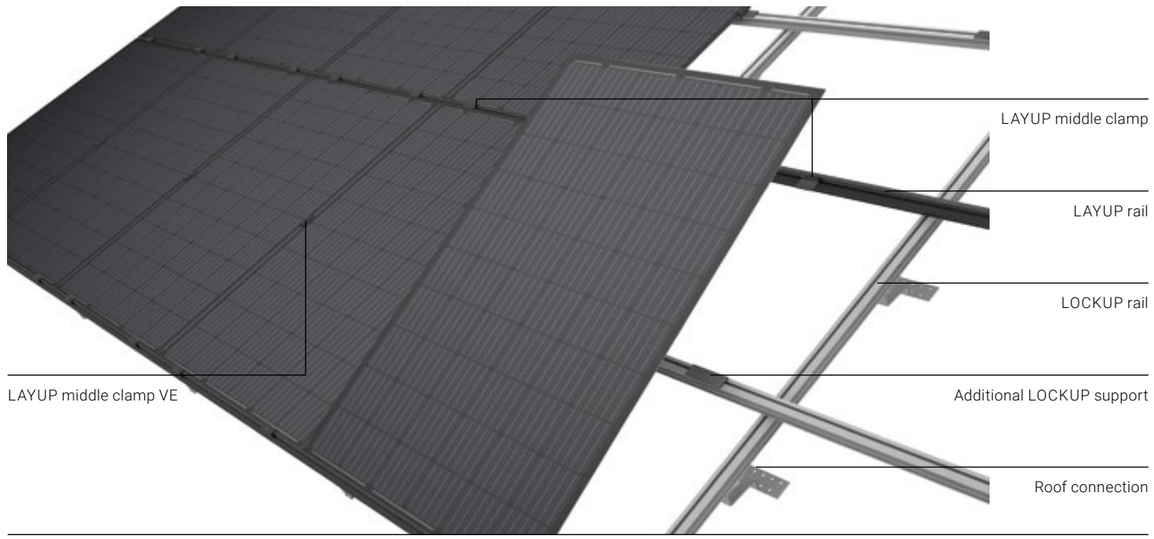
▲ Gefco Carport Courgenay | 43'000 m² | 6.84 MWp

LAYUP fixation

The mounting system for frameless glass-glass modules (monofacial or bifacial) that is fully compatible with components of leading manufacturers.



Landscape: horizontal installation



Portrait: vertical installation

Versatile application

> Monofacial or bifacial glass-glass modules
> Pitched roof, flat roof and facade
> Compatible with all roof connection points from Megasol, Schletter and K2

Elegant look

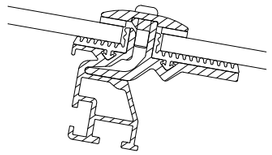
> Flush-mounted installation
> Without protruding frames (CleanFrame effect)

Three components

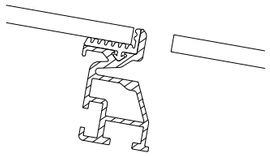
> LAYUP rail (black / classic aluminium)
> LAYUP clamps (black / classic aluminium)
> Cross connector or screw

Secure fixation

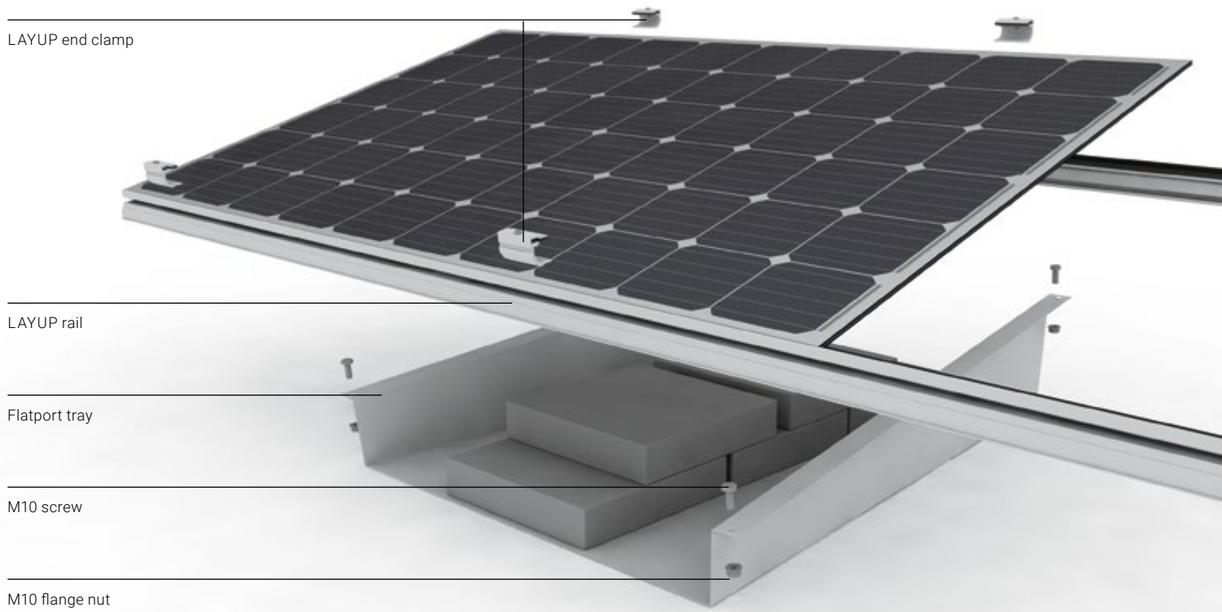
> Connection with screws or cross connectors
> Placed on the rail and secured with clamps
> High stability thanks to large contact surface



Cross section through clamp



Cross section next to clamp



LAYUP components

Rails

3337.0318
LAYUP rail 6700 mm black

3337.0319
LAYUP rail 6700 mm silver

3337.0310
LAYUP rail connector kit with screws

Clamps

3337.0308
LAYUP middle clamp kit black

3337.0301
LAYUP end clamp black

3337.0314
LAYUP middle clamp kit silver

3337.0309
LAYUP end clamp silver

Additional components (for portrait installation)

3337.0330
LOCKUP rail

3337.0332
LOCKUP support

3337.0342
LAYUP middle clamp VE black

3337.0341
LAYUP middle clamp VE silver

▲ Bobst Mex SA | 1.0 MWp

Pitched roofs

The well-elaborate connection points for pitched roofs can be perfectly combined with LOCKUP and LAYUP module fixations.

Wide range of applications

> The right solution for every roof covering
> For different static load requirements

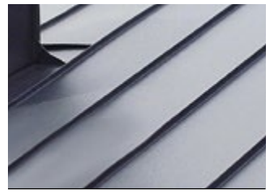
Simple combination

> Compatible with LOCKUP and LAYUP module fixations
> Cross connectors or screws

Sheet adapter

Components

Classic tile



Seam metal

Trapezoidal sheet

Corrugated roof

3231.0029
Roof hook Rapid2+ Max

3333.0046
Clamp 504 AL KK for seam metal

3337.0345
Sheet adapter kit

3231.0179
Fixation kit for corrugated roof
M12x300 KlickTop

3231.0036
Roof hook Rapid2+ MaxV

3337.0329
Stopper

Plain tile

Fibre cement

Prefa

3231.0024
Fixation kit for plain tile

3231.0010
Roof hook for fibre cement/Prefa

Flat roof

The easy-to-mount *Flatport* trays for flat roofs are the ideal base for LOCKUP and LAYUP module fixations.

Quick and gentle installation

> Upside-down procedure
> No punctual load on the roof membrane

All flat roof coverings

> Gravel / granulate
> Vegetated / bitumen

Simple ballasting

> Gravel or slabs
> Ballasting plan on request

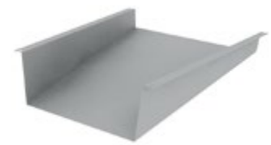
High longevity

> Corrosion resistant alloy
> 10 years material warranty

Simple combination

> Compatible with LOCKUP and LAYUP module fixations
> Quick fastening with screws

Components



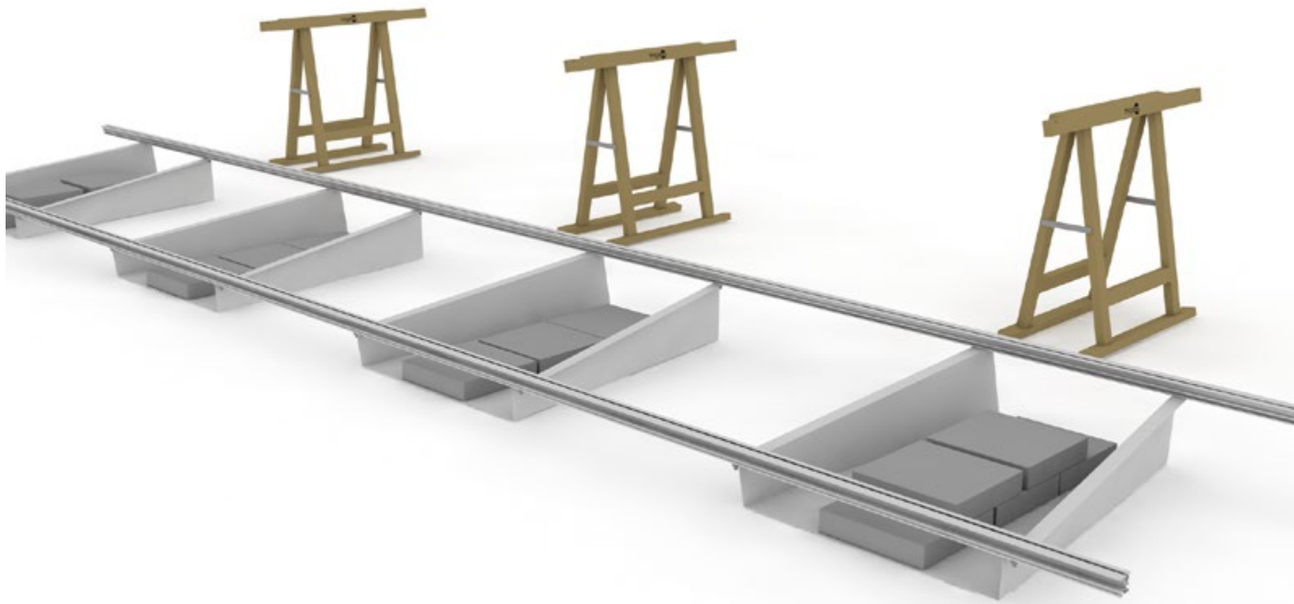
3337.0175
Flatport Advanced 6° 997.5

3231.0130
Hexagon screw M10x25

3231.0040 Flange nut M10
with locking teeth

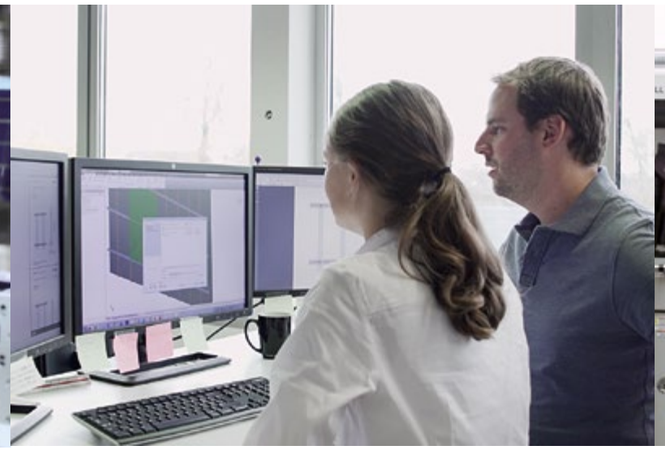
1 Place the LOCKUP rail on Megasol trestles and insert M10x25 hexagon screws into the rail.

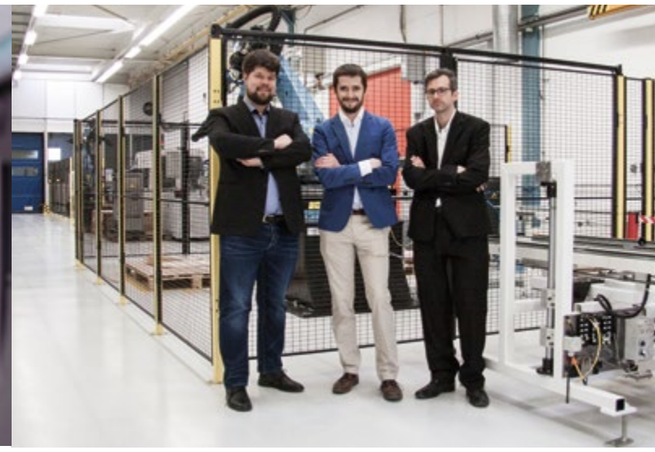
2 Place the Flatport trays upside down on the rails and tighten them with M10 flange nuts.



3 Turn the trays over with the rails, align them on the surface and ballast them.

Made in Deitingen



Development

We are committed to technological leadership in the field of all-in-one systems. Following this principle, we continuously drive the development forward. Megasol solar modules and mounting systems as well as our production processes are constantly analyzed and optimized. Our engineers, programmers and electrotechnicians closely cooperate to design and develop new products and the processes required to manufacture them.

Our test and research centre in Deitingen, Switzerland pools the entire expertise from planners and installers and shapes the development and advancement of new and existing products.

Optimizing performance

The nano-coated antireflective solar glass used for all products conducts the maximum amount of sunlight to the solar cells. Thanks to state-of-the-art spectral optimization, Megasol solar modules perform up to 15% better than customary modules under cloudy conditions and during dusk or dawn.

In-house test centre

Especially in high alpine environments, extreme heat or cold and the impact of snow and wind are particularly challenging for solar modules. The standard IEC test procedures do not account for these conditions.

Our test procedures are different – they exceed industry standards by far. An example: The IEC requires damp heat test procedures to cover 1'000 hours. Megasol increases this value by a factor of 10 to 10'000 hours.

At our Deitingen production site, we test: Damp-heat, shock freeze, UV lifetime, dynamic load and thermal cycle. Only top-quality materials that pass all tests without reservation are used to produce Megasol modules.

Certifications

The manufacturing processes are TÜV-tested and run in accordance with EN/IEC and ANSI/UL standards.

In-line testing

One production line is designed for medium-sized series, while the other is used to manufacture modules in a customer-specific design. Starting with precise controls of all semi-finished products, each step in the manufacturing process is subject to several controls.

Electroluminescence tests (3 times) as well as technical and optical controls accompany the entire manufacturing process up to the final flash test.

Traceability

All data from production can be viewed electronically at any time. This also includes information on the materials used, which can be traced back seamlessly to the raw material batch. Our high-performance solar cells consist of high-purity silicon – free of cadmium, rare earths and heavy metals.

Recycling

Our commitment with the Swiss foundation SENS and the European PV Cycle enables the reuse of almost 100% of the used material.

Top Brand PV

Every year, the market research institute EUPD Research identifies the most successful and strongest brands on the PV market. For the installers surveyed, Megasol ranks consistently among the most popular module manufacturers.

Megasol is an award-winning company. Many Swiss and European solar prizes and architectural awards testify to the trust that is placed in Megasol.

Services

Project support:
> Consulting / training
> Detailed design options
> Grid layout
> Connection details / interfaces
> String / inverter dimensioning
> After Sales

Formalities:
> EIV, ESTI, EEA

Development:
> Design / colour
> Samples / mock-ups
> Customized mounting solutions
> Integration of storage solutions, energy management, charging infrastructure for e-mobility

Values and cornerstones

Responsible actions form the cornerstone of the company. The aim is to create opportunities for others and therefore give back some of the success.

Social commitment

Megasol is committed to ecological and social sustainability projects in economically disadvantaged regions – for example Solafrica's *Solar Learning* initiative and the Women's Solar Project in Nicaragua. The commitment includes material supplies for specific projects or financial support, which benefit local vocational training and build up competent young talent in the solar sector.

Manufacturing and research site

Forward-looking and regular investments in the production site in Deitingen as well as close cooperations with universities and technology partners set the relevant signals and help to strengthen Switzerland as a centre of research and industry.

Corporate culture

Our corporate culture is based on a high degree of trust in the employees. Room for creativity and self-responsibility are the sources of its innovative strength and the continual development of the company. In China, the remuneration exceeds the local standard in terms of benefit-oriented promotion. All employees are provided with further training and language courses. The implementation of Swiss safety and health standards at both sites is a question of entrepreneurial conscience.

Political commitment

Despite enormous potential, photovoltaics require strong voices in politics. Through memberships in industry associations and interest groups, Megasol is involved in sustainable progress.

The focus in everyday life is on concrete steps: appearances at conferences, provision of comprehensive information material for voting and guided tours for schools and political parties – also for those who are traditionally critical of environmental issues.

▲ Erlenmatt East | Pioneering project with local energy supply | 850 kWp (in final development) | Watt d'Or 2019 | Image: Vistadoc, Peter Burri

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