



Vario

Photovoltaic carrier systems

Engineered in Germany

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“From sunlight to energy” is an interesting and impressive way to produce renewable energy and to sustainably create and provide regular energy resources. For this reason, we at CWF, decided to make our contribution with the products and services of our company.

We are an established and dynamic company that offers a patented, high-quality carrier system for open-field photovoltaic installations.

Based on long-standing experience, we have developed carrier systems that are especially adapted to the requirements of open-field photovoltaic installations. Our aim is always to design a bearing, multi-adjustable and easy-to-install carrier system.

We have made it - down to the last detail!

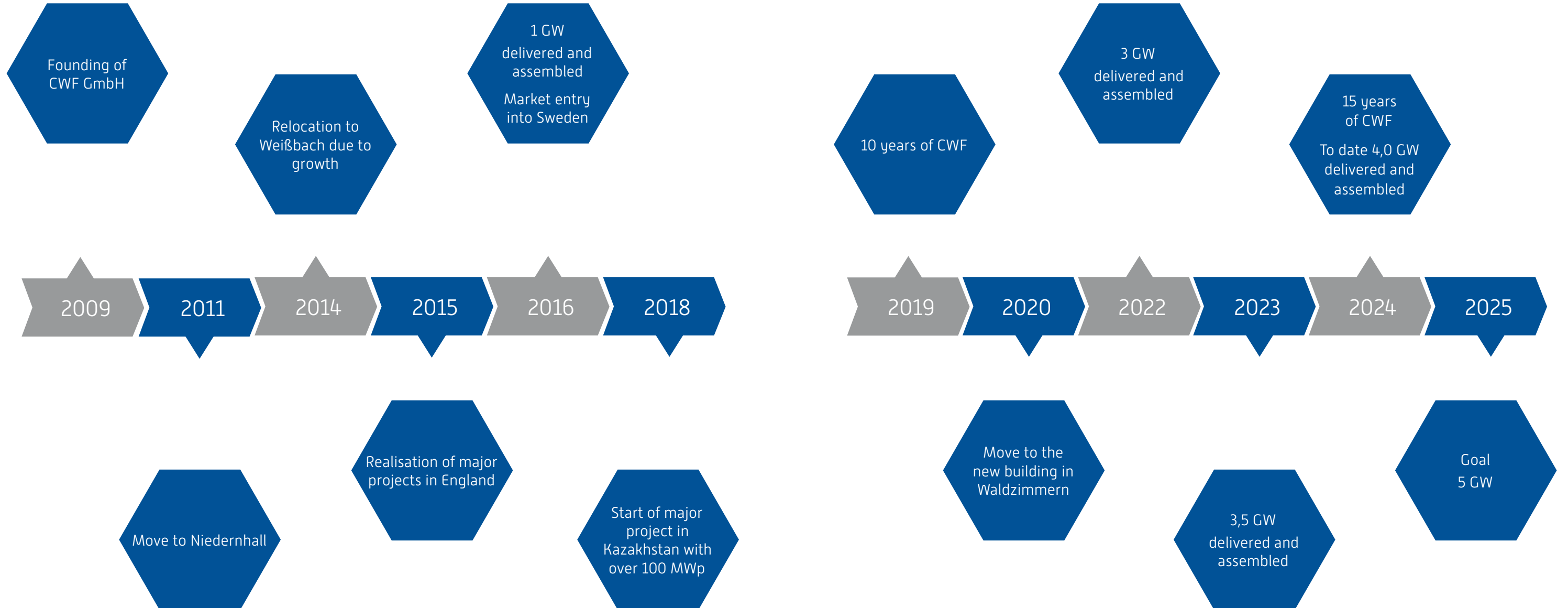
More than 4,0 gigawatt of carrier system for open-field photovoltaic installations worldwide are evidence of customer satisfaction and our ability to adapt our system to the market requirements.

Our services include:

- Customized consulting and planning (structural analysis, trial pile driving, etc.)
- Delivery and assembly of our carrier system



15 years of CWF GmbH



Vario Carrier systems

With our patented, multi-statically tested **Vario angle-adjustment system**, both Σ - and C mounting piles can be chosen. The angle-adjustment system is fixed with only 6 bolts.

Our cross beams are individually adapted to each module layout. The advantage here is that the loads are distributed evenly across the entire frame design. Besides, it is also possible to further stabilize the cross beams to avoid excessive vibrations in the case of weather storms. The system is suitable for both framed and frameless modules.

For the entire system we only use high quality, weather-resistant and durable materials and components.

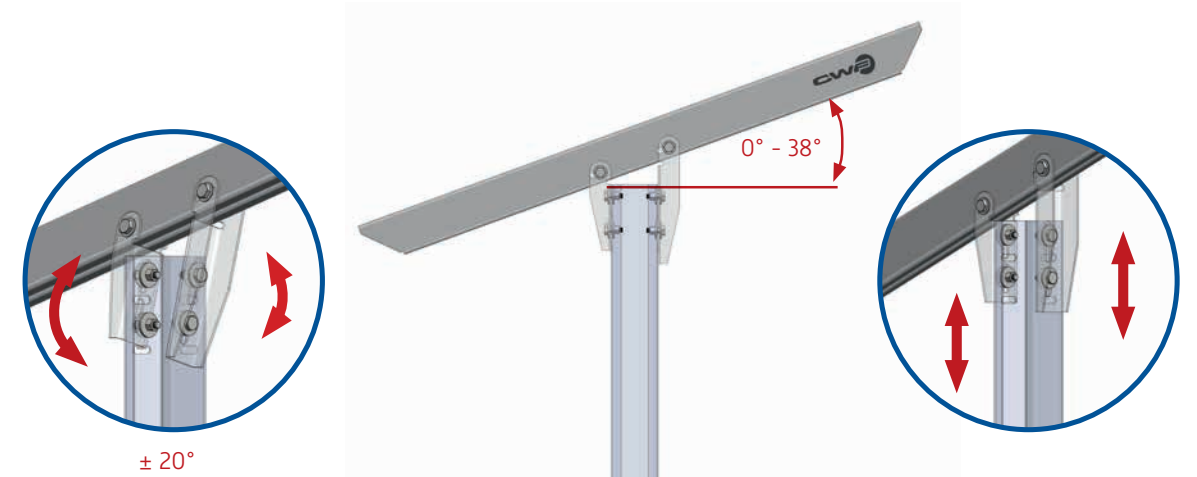
We at CWF want to leave nothing to chance as we want to make sure that your outdoor system withstands the forces of nature for at least 25 years.

Bifacial

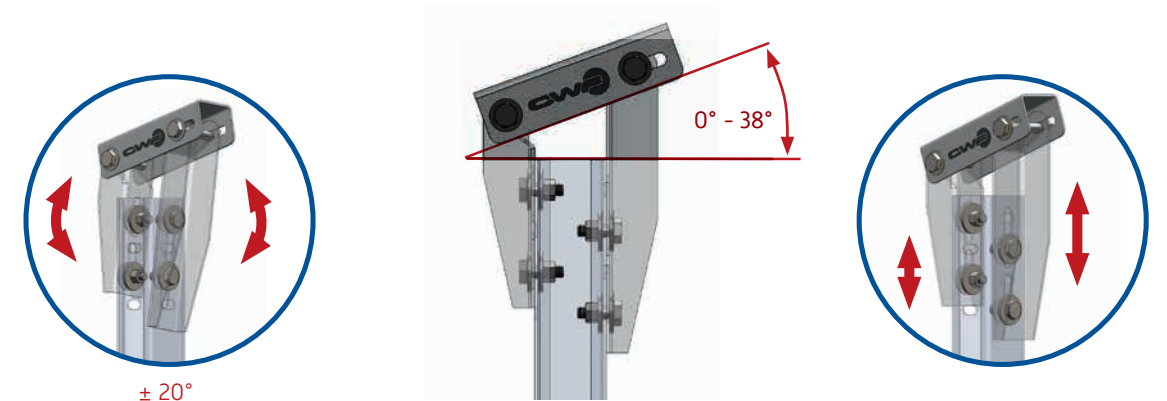
The CWF systems have only two horizontal beams. Compared to our competitors, we achieve the lowest self-shading!



Vario KS angle-adjustment system



Vario SMART angle-adjustment system



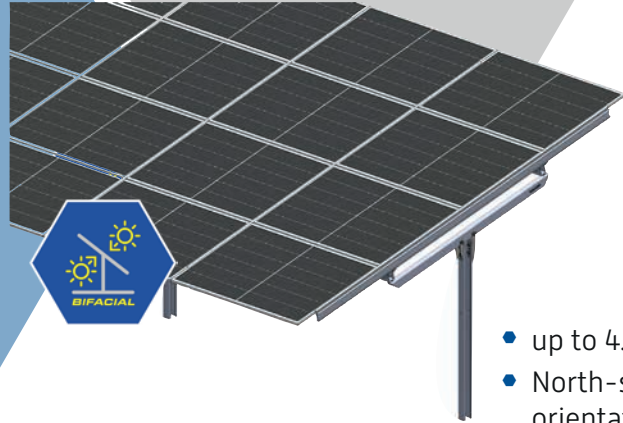
- high flexibility on adaption to the compound
- highly flexible and precise angle adjustment

Vario KS

1-Post-System

- ideally suited for bifacial applications
- easy to maintain, as no bracing is required in the system
- cable duct integrated in the system

4 modules landscape



- up to 4.50 meters span width
- North-south & east-west orientation possible

3 modules landscape



- up to 4.50 meters span width
- North-south & east-west orientation possible

Module support variants

- **Vario Slide-in** (see page 16)
- **Vario Clamping system** (see page 17)



1 or 2 modules portrait



- up to 4.50 meters span width
- North-south & east-west orientation possible



North-south or east-west orientation

An east-west orientation is possible for all variants.



Vario SMART

2-Post-System

- ideally suited for bifacial applications
- easy to maintain, as no bracing is required in the system
- Cable duct integrated in the system

Module support variants

- **Vario Slide-in** [see page 16]
- **Vario Clamping system** [see page 17]

2 to 4 modules portrait



- 5 to approx. 7 meters span width
- North-south & east-west orientation possible

4 to 6 modules landscape



- up to 4.50 meters span width
- North-south & east-west orientation possible

North-south or east-west orientation

An east-west orientation is possible for all variants.



AGRI - Photovoltaics

Agri-PV has developed very dynamically in recent years and is increasingly being used in agriculture. Thanks to our clever solutions for agricultural dual use, we can offer numerous advantages and guarantee optimum utilisation.

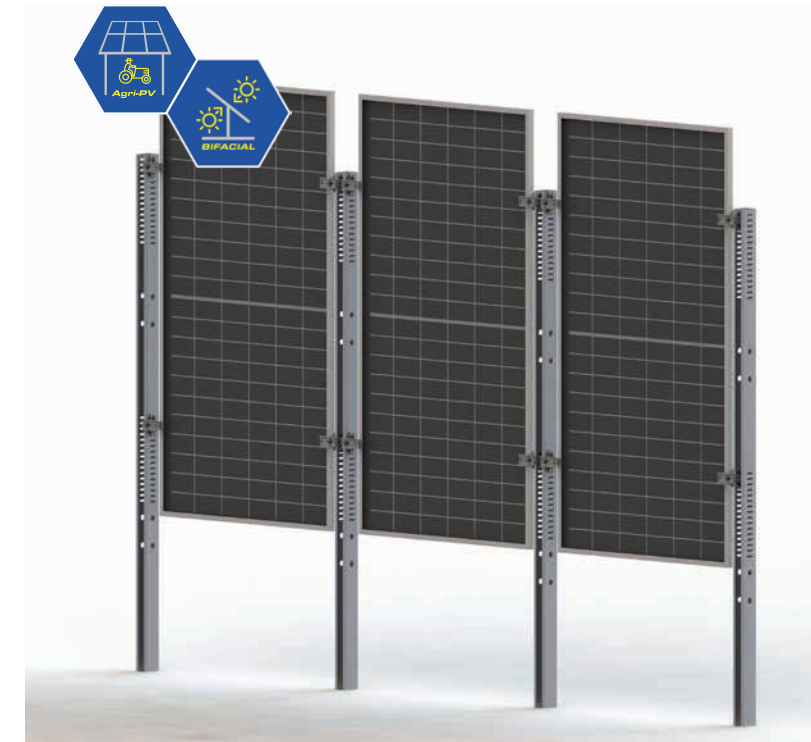
Vario *SMART* agricultural solution



- 5 to approx. 7 meters span width
- North-south & east-west orientation possible

V1-SOL

- 1 module portrait - with the latest module technology, module size approx. 1300x2400 mm, approx. 650 watts
- suitable for flat terrain and surfaces with a gradient of up to 15°
- designed for wind loads up to wind zone 2 (0.58kN/m²)
- very low land consumption
- simple wiring of the modules including passing the cables through the post
- areas between the module rows can continue to be used for agricultural purposes
- low shading by the profiles
- anti-cyclical yield peaks (compared to conventional south-facing PV systems) in the morning and evening hours, therefore better grid compatibility



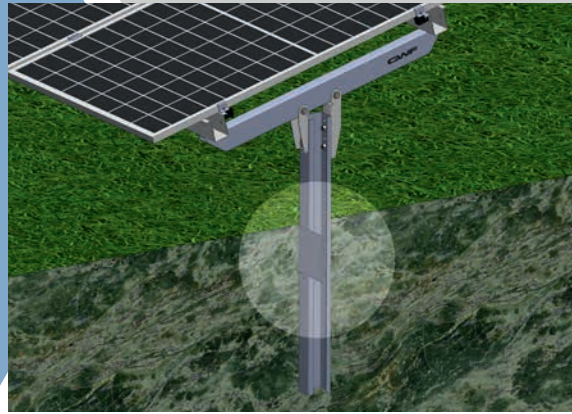
Vario Solutions

Customised solutions for special requirements.

We offer project-specific solutions and static aids for the realisation of projects on moorland and soft ground.

Restrictions on the ability to build, such as minimum ramming depths or a general ban on ramming posts into the ground, may be taken into account with **Vario Solutions**.

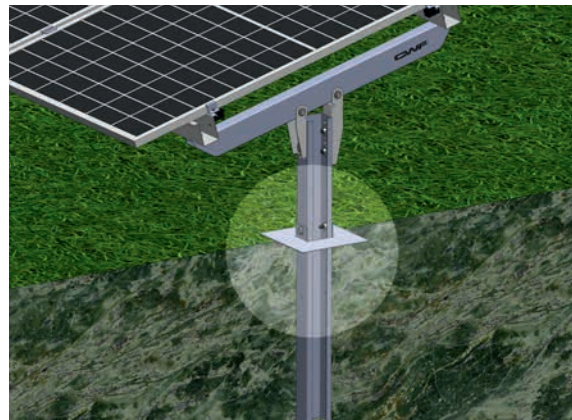
Post reinforcement for horizontal loads



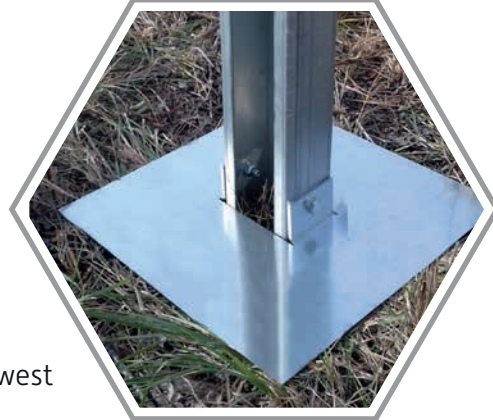
- North-south & east-west orientation possible



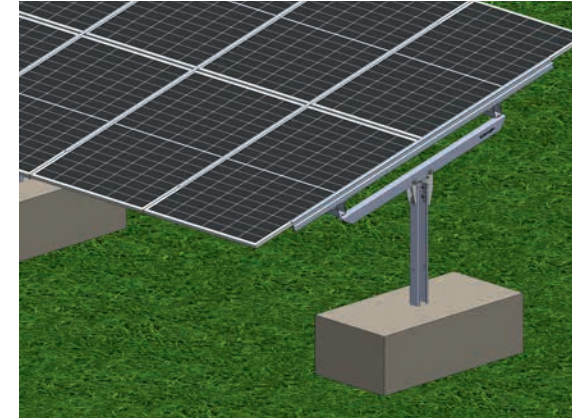
Vertical force retainer



- North-south & east-west orientation possible



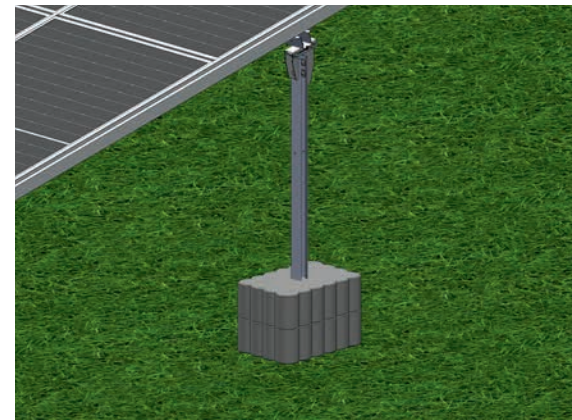
Concrete foundation / folding box formwork



- e.g. project-related concrete foundations
- North-south & east-west orientation possible



Foundation with flora stones



- if the required pull-out values are not reached
- North-south & east-west orientation possible



Module fastening systems

Vario Slide-in "Aluminium module carrier"

Transverse mounting	✓
Upright mounting	✓
Module frame	30, 33, 35, 38, 40
no contact corrosion	✓
Spacer	✓
Spring steel clamp	✓
Module clamp	
Stopper possible	✓
Material	Aluminium ENAW6063
quick assembly	✓
Variants	V7, V7, Plus, V8, V9
Module installation from the ground	✓
Wind and snow loads	suitable for almost all loads in DE
Module cable management system	Cable clip V1, V2, cable clamp

Vario Slide-in "Steel module carrier"

Transverse mounting	✓	✓
Upright mounting	✓	✓
Module frame	30, 33, 35	all
no contact corrosion	✓	✓
Spacer	✓	
Spring steel clamp		
Module clamp	✓ Start and end clamps only	✓
Stopper possible		
Material	Steel S550 GDZM310	Aluminium ENAW6063
quick assembly	✓	
Variants	1.5 mm , 2 mm	V2, V2, Plus, V3a
Module installation from the ground	✓	
Wind and snow loads	also suitable for very high loads	suitable for almost all loads in DE
Module cable management system	Cable clip V3, cable clamp	Cable clip V1, V2, cable clamp

Vario Clamping system



Spring steel clamp



Spacer



Stopper



Module clamp



Cable clamp

Vario Accessories

Our Vario accessories are perfectly matched to all components of the substructures and round off the Vario-system.

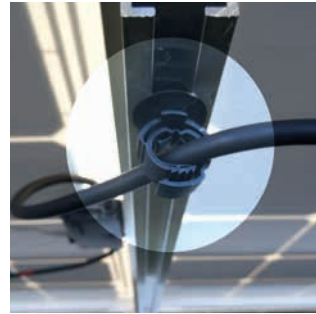
From the cable clip to the protective grid for the inverter, the perfect package can be customised.

Cable clip V1

For fastening the module cables to the aluminium support system

- suitable for 1 to 3 DC cables
- easy to install, self-closing
- UV-resistant
- flexible, as subsequent changes are also possible

Art. No: 4001021



Cable clip V2

For fastening the module cables to the support system

- suitable for 1 to 8 DC cables
- Strain relief of the cable guaranteed
- easy to assemble
- UV-resistant

Art. No: 4001023

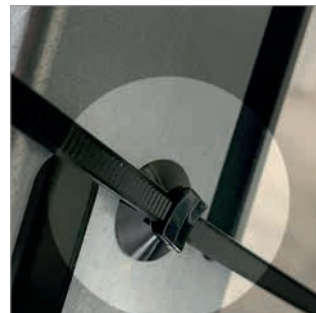


Cable clip V3

For fastening the module cables to the support system

- suitable for 1 to 8 DC cables
- Strain relief of the cable guaranteed
- for hole diameter 5 mm

Art. No: 4001027



Cable clamp

For fastening the module cables to the support system

- suitable for 1 DC cable
- made of stainless steel (A2)
- Strain relief of the cable guaranteed

Art. No: 4001024



Selfdrilling safety screw

To protect the modules against theft

- simple assembly
- no unscrewing possible with standard tools
- Stainless steel A2

Art. No: 3025545



Printed label for row numbering

For clear labelling of the rows

- UV-resistant
- printed

Art. No: 3701052



Aluminium laser engraved for row numbering

For clear labelling of the rows

- UV-resistant
- Laser engraving

Art. No: 3701051



Vario Accessories

Cable protection

To protect the cables during mowing work and against browsing by wild animals

- suitable for all CWF profiles
- simple and secure mounting on the post
- Aluminium
- Length as required

Art. No.:

C110: 550110***

C70: 55070***



Inverter substructure

For Vario KS and Varios Smart

- protection from rain and UV radiation by mounting under the modules
- can be combined with all CWF Vario systems
- quick assembly
- only one additional post and two crossbars required per inverter
- optionally available with anti-theft screws
- Customised solutions on request



Vario protective grid

Protects inverters and cables from bite damage. In addition, the grid protects the sheep, which are often used for green maintenance, from the current of the cables.

Advantages/benefits

- Front and side panels can be easily folded for servicing & maintenance
- Anti-theft
- Grid is fitted with eyelets all round
- Eyelets reduce the risk of injury to sheep
- Wire rod according to DIN EN ISO & Zinc-aluminium coating




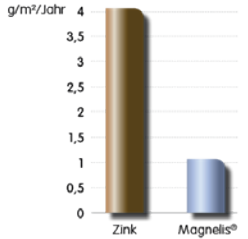




Features

- L:150 cm, D/W: 70 cm, H: 100 cm
- Mesh size: 5 x 10 cm
- Wire rod according to DIN EN ISO
- Zinc-aluminium coating

Art. No: 38315070100



System properties

Engineering	<ul style="list-style-type: none"> • TÜV certification: <ul style="list-style-type: none"> ◊ according to 2 PFG 1794/10.10 (quality) ◊ according to UL 2703 (lightning protection) • Expert wind opinion by Wacker Ingenieure 	 <p>Bauart geprüft Regelmäßige Produktions- überwachung</p> <p>www.tuv.com ID 1111212479</p>						
Statics	<ul style="list-style-type: none"> • project-related • country-specific • according to Euro Code (EC 0/1/3/7/8/9) • Injurious effect class [CC2 according to DIN EN 1990 B.3] • Security class [RC2 according to DIN EN 1990 B.2] • designed for 50 years service life according to Eurocode specification 							
CE-compliant	EU-Declaration of Conformity 0036 / 13 CWF_01-050-2016 DIN EN 1090-1+A1:2011 Carrier system for open field photovoltaic installations							
Guarantee of surface coating	 for Magnelis® by ArcelorMittal up to 25 years							
Zinc removal	only 25% removal compared to batch galvanising according to DIN ISO 1461	 <p>g/m²/Jahr</p> <p>Zink Magnelis®</p>						
Material 	<table border="0"> <tr> <td data-bbox="335 1184 711 1316"> Posts, crossbeams & longitudinal carriers </td> <td data-bbox="724 1184 1464 1316"> <ul style="list-style-type: none"> • Steel S350 GD / S550 GD • ZM310/ZM430  </td> </tr> <tr> <td data-bbox="335 1323 711 1428"> Module carrier </td> <td data-bbox="724 1323 1464 1428"> <ul style="list-style-type: none"> • Aluminium EN AW 6063 T66 • Steel S550 GD + ZM310 </td> </tr> <tr> <td data-bbox="335 1434 711 1495"> Screw connections </td> <td data-bbox="724 1434 1464 1495"> <ul style="list-style-type: none"> • Steel with zinc-nickel coating </td> </tr> </table>	Posts, crossbeams & longitudinal carriers	<ul style="list-style-type: none"> • Steel S350 GD / S550 GD • ZM310/ZM430 	Module carrier	<ul style="list-style-type: none"> • Aluminium EN AW 6063 T66 • Steel S550 GD + ZM310 	Screw connections	<ul style="list-style-type: none"> • Steel with zinc-nickel coating 	
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Our services



References



5.80 MWp



Sjöbo



750 kWp



Wallmersbach



1.55 MWp



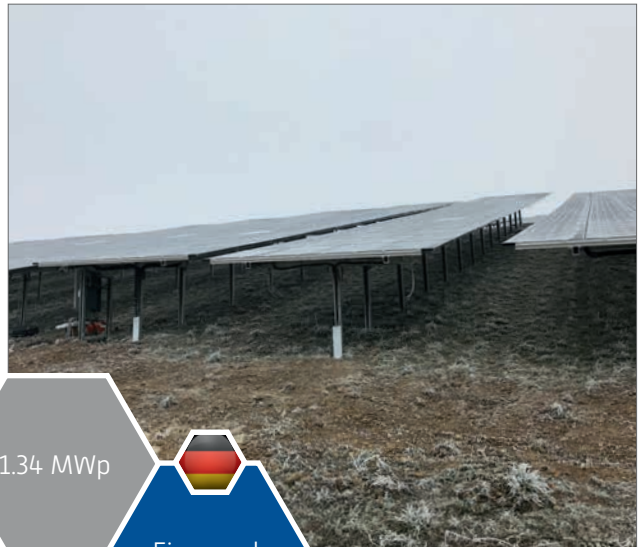
Le Lauzet



1.70 MWp



Nagelsberg



1.34 MWp



Firewood



100.00 MWp



Saran



26.6 MWp



Frestedt



13.5 MWp



Reisbach

Contact person

Management



Carsten Franz

CEO Engineering
carsten.franz@cwf-gmbh.de



Jürgen Wolpert

CEO Purchasing/Sales
juergen.wolpert@cwf-gmbh.de



Sandra Wolpert

CEO Human Resources
sandra.wolpert@cwf-gmbh.de

Sales



Thiemo Hille

National/International Sales
thiemo.hille@cwf-gmbh.de
+49 7940 93116-16



Sabrina Donner

National/International Sales
sabrina.donner@cwf-gmbh.de
+49 7940 93116-25



Tim Stadelmayr

National/International Sales
tim.stadelmayr@cwf-gmbh.de
+49 7940 93116-17

CWF GmbH

Am Käppele 4
74676 Niedernhall
Germany

+49 7940 93116-0
info@cwf-gmbh.de
www.cwf-gmbh.de

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Engineered in Germany