

GMS[®] SCALE



Efficiency meets innovation



- / Maximum profitability
- / Maximum quality
- / Maximum flexibility
- / Maximum scalability

GMS[®] SCALE

At MKG GÖBEL, quality, efficiency, reliability and flexibility are our DNA.

So it's no surprise that these same values were a key part of the development of our GMS[®] SCALE mounting system. The experience that we've gained over the course of countless projects has allowed us to completely rethink and fine-tune our mounting systems.

With its combination of exceptional quality and efficiency, GMS[®] SCALE is built different.

Vertical and horizontal carriers on two rows of posts – this is all that's needed for a stable and efficient mounting system. Our specially developed heads and modified module clamps provide enormous flexibility, which allows the GMS[®] SCALE mounting system to be adapted to an extremely diverse range of needs. Added to this is our unique ASSEMBLY 2.0 process (page 5), which enables an unprecedented reduction in set-up times, while also allowing for tighter installation on your site.

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Discover the GMS[®] SCALE – the perfect mounting system for your next project.



THE BENEFITS AT A GLANCE

Maximum efficiency

/ Optimised design

The construction has been optimised for bifacial solar modules, with a sophisticated carrier routing along the module frame. Less shadow, more gain.

/ Long lifetime

Very high durability and long-term corrosion protection. Steel profiles made from high-strength grades.

/ Standardised components

A small number of standardised components bring together simplicity and flexibility – allowing individual configurations to be implemented.

/ Short shipping routes

Fast and climate-friendly delivery thanks to production in Europe.

/ Efficient care of greenery

The system avoids the need for obstructive bracing underneath, this makes it easy to mow the ground.

Maximum flexibility

/ Tailored for your terrain

Quick and easy adaptation to the ground profile directly on site: Our flexible balancing rocker allows the system to be tilted up to 8° to the side, and in special cases up to 15°.

/ Suitable for every type of ground

The GMS® SCALE system boasts suitable mounting system options for all ground conditions and project-specific requirements, even for aggressive grounds.

/ Suitable for all solar modules

The system is compatible with all common solar modules.

/ Continuously adjustable components

Stepless mounting allows for outstanding flexibility when adjusting the system, e.g. for specific ground conditions or site profiles, or for the specific modules used.

Maximum safety

/ Great stability

Sturdy design thanks to closed, torsionally rigid profiles.

/ Secure structural engineering

Always in the green zone ensuring structural safety. Thanks to a project-specific calculation according to the respective norms.

/ Safe adjustment

Safe and precise height adjustment with form-locking pins.

/ Open cable installation

Open, coordinated cable routing on the mounting system provides for maximum protection against heat build-up and water accumulation.

/ Outstanding material quality

Only materials of the highest grades are used: Posts are batch galvanised, support elements are made from steel with a zinc-magnesium coating, and mounting elements are made from stainless steel. Long-term partner companies and a carefully selected range of suppliers allow us to ensure the highest standards of quality for your project.

Maximum scalability

/ ASSEMBLY 2.0

The GMS® SCALE system can be combined with the revolutionary ASSEMBLY 2.0 process, which further increases the profitability of the installation: Maximum mounting speed, maximum soil protection – in short, maximum efficiency, especially for megaparks!

/ Optimum use of space

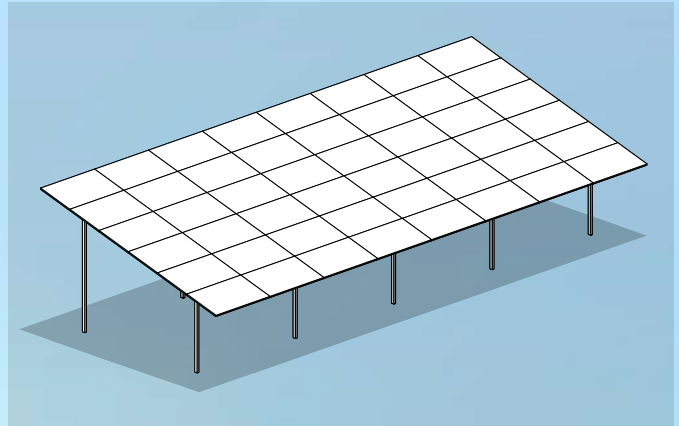
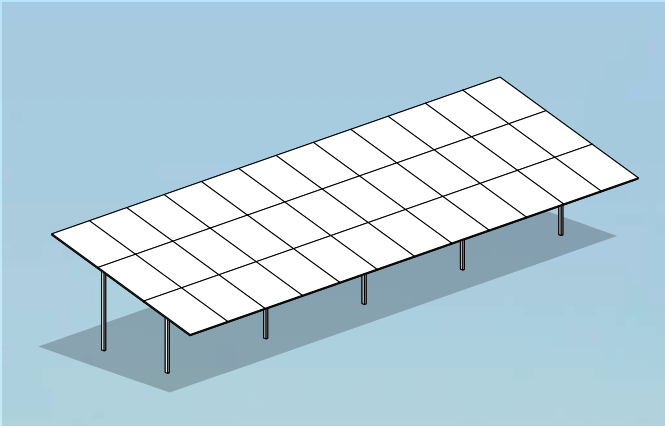
The ASSEMBLY 2.0 process enables smaller gaps between rows – something which is not possible with a standard mounting system. This ensures the optimum use of space and also means that the installation causes the minimum environmental and soil damage.

/ Flexible mounting processes

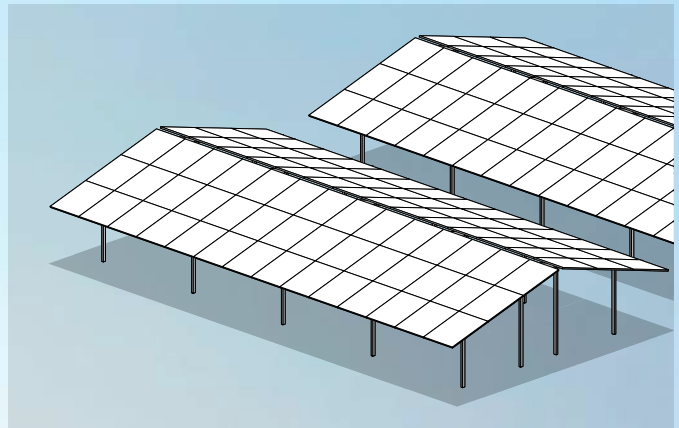
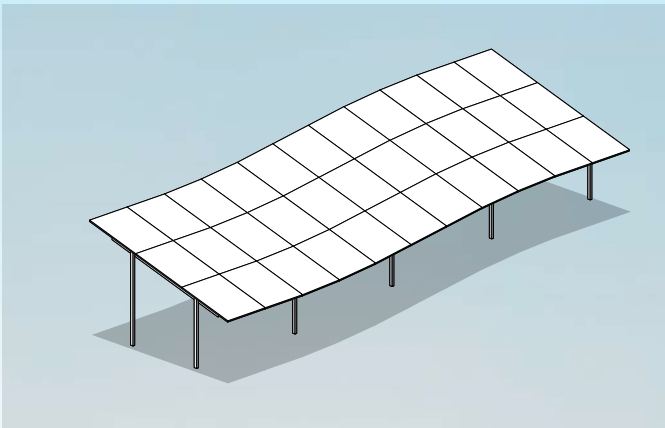
DC mounting is maximally independent of the mechanical mounting process.

APPLICATIONS

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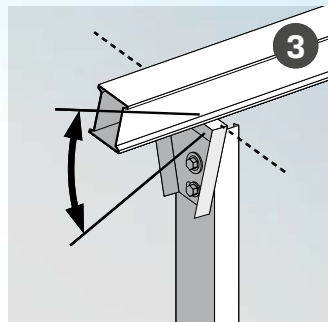
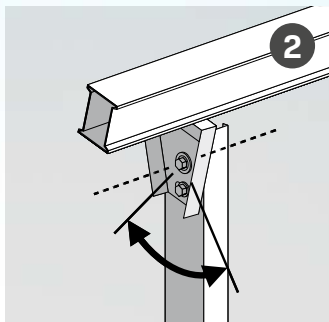
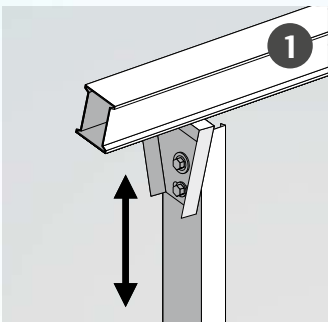


South-oriented systems with 2 rows of posts, 2-4 vertical or 4-6 horizontal rows of modules

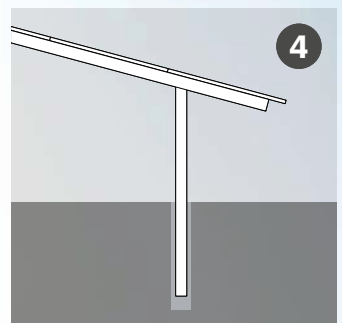
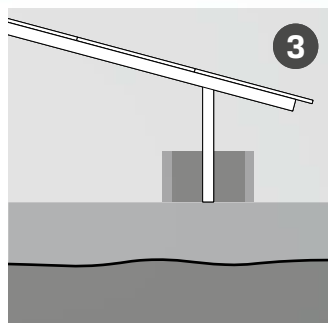
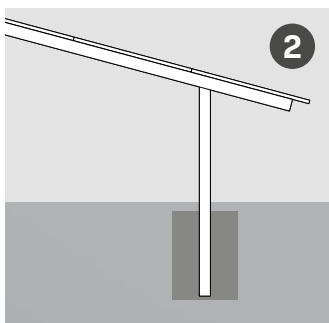
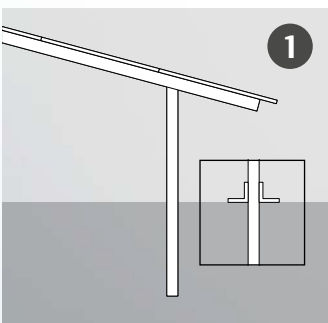


Adaptation to the ground profile

East-west systems vertical / horizontal



① Height adjustment; ② Stepless tilt angle; ③ East-west rocker



Suitable for every ground type thanks to various foundation options:

- ① Rammed post foundation (also with load distribution plates),
- ② concrete incast foundation,
- ③ ballast foundation (e.g. for limited anchoring depth),
- ④ drill-holes (in rocky ground)

THE SOLUTION FOR MEGAPARKS

GMS® SCALE is different thanks to its outstanding efficiency – at every scale. The design advantages are already apparent in smaller solar parks, but have been developed with a view to optimising scalability. Added to this is the revolutionary ASSEMBLY 2.0 process for rapid, space-saving and soil-friendly mounting. This makes GMS® SCALE the perfect choice for current megaparks.

- Scalability: GMS® SCALE is designed for solar parks of all possible sizes
- ASSEMBLY 2.0 reduces mounting times
- Optimum use of space: ASSEMBLY 2.0 allows for small gaps between rows
- Soil-friendly mounting
- Independent of weather conditions, thus allowing for increased planning security
- Optimised installation site logistics reduce staff expenses, fuel usage, costs and CO₂ emissions



ASSEMBLY 2.0 in action: The solar modules are installed from the side – they are pushed on as a 'whole table' on rollers.



MAIN VERSIONS

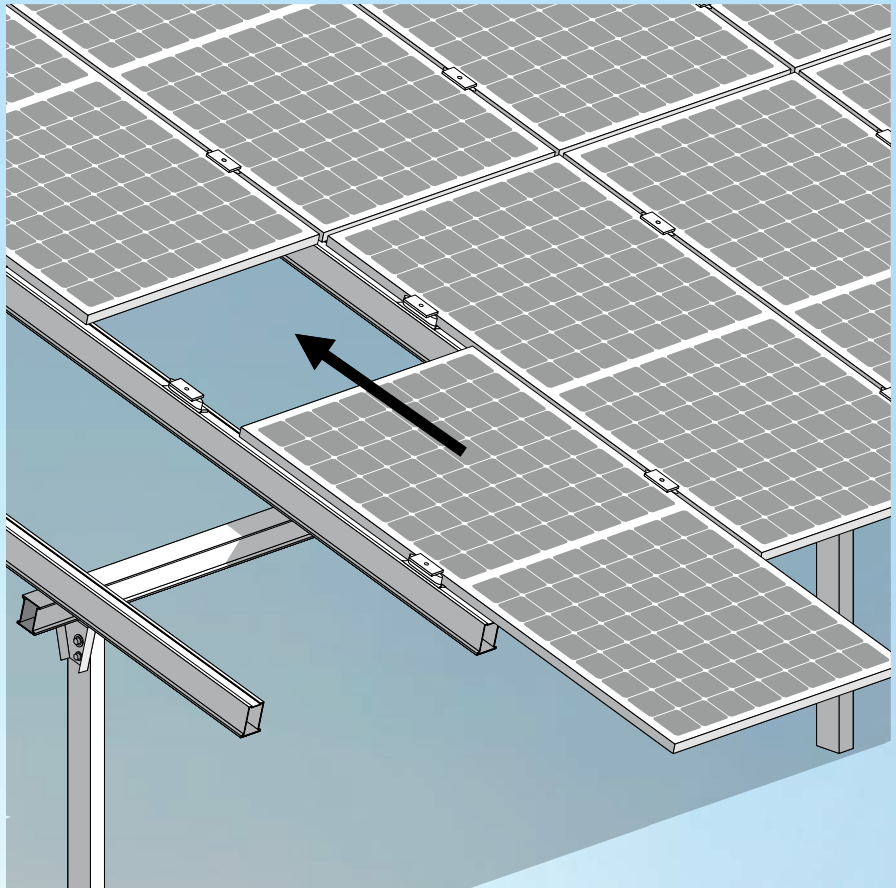
Vertical versions

The module carriers run along the frame of the solar module. They are fitted to the long side of the module using clamps.

This configuration is ideal for bifacial solar modules. As the carriers run laterally, the double-sided effect can be harnessed across the entire surface without limitations.

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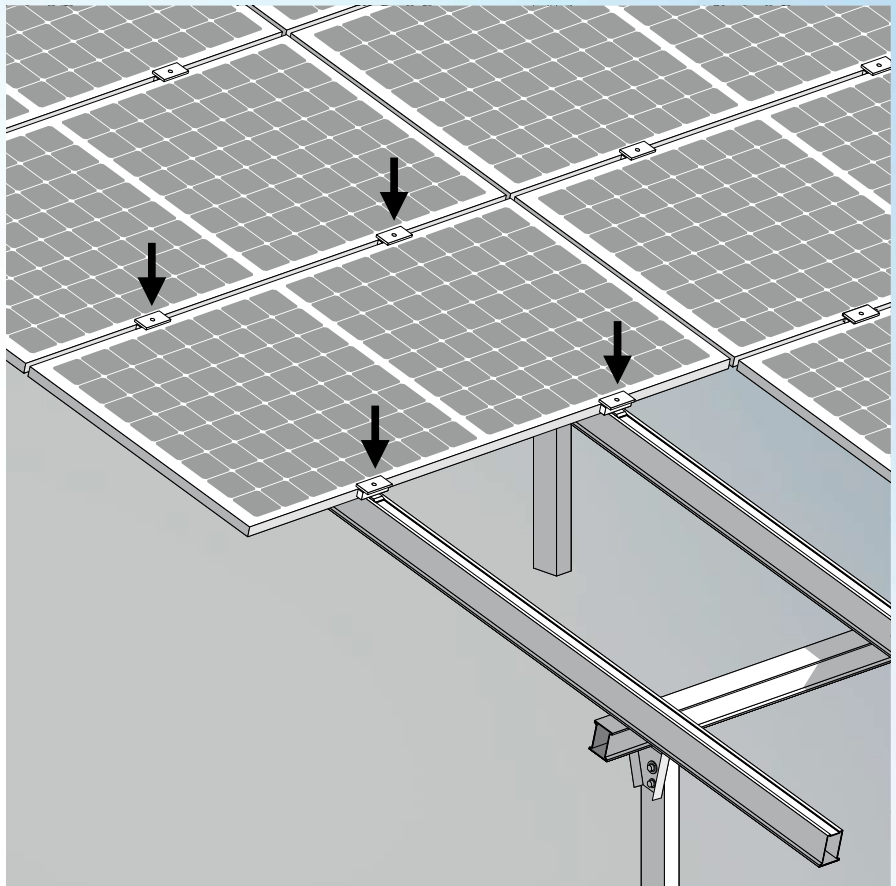
- / **Main version:**
3 vertical modules
(max. 4 vertical modules)
- / **Variable carrier dimensions, adapted for all common solar modules**
- / **Tilt angle 5 to 25°**
- / **ASSEMBLY 2.0**



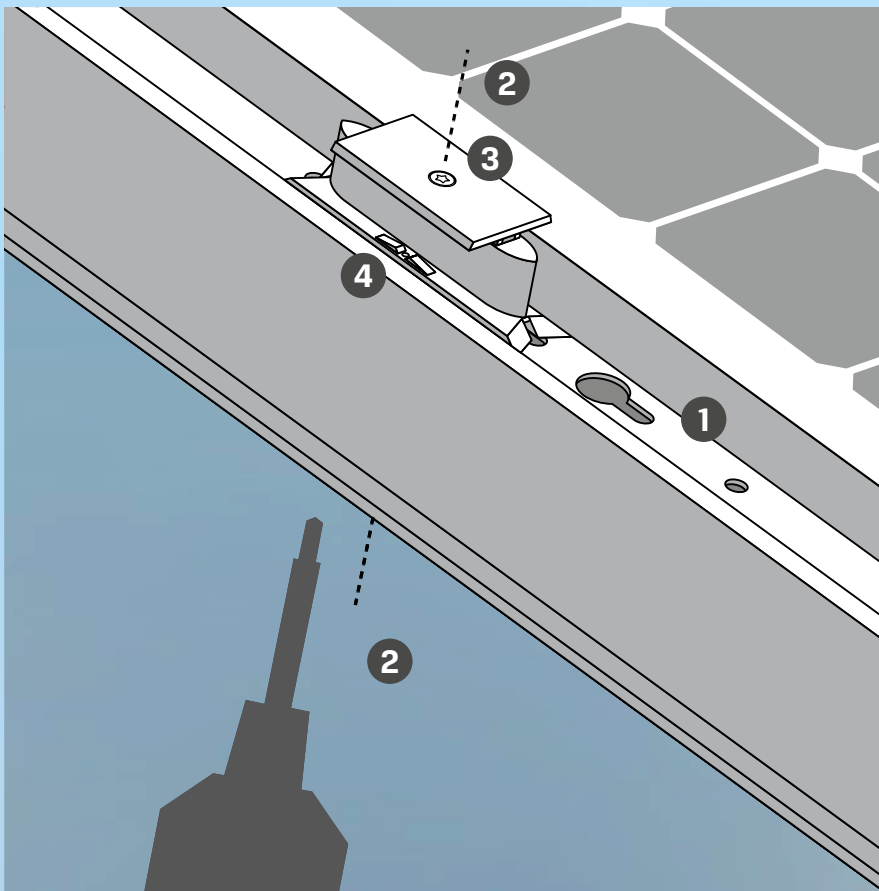
Horizontal versions

The module carriers run below the modules. The solar modules are fitted to the long side of the module using clamps.

- / **Main version:**
6 horizontal modules
- / **Variable carrier dimensions, adapted for all common solar modules**
- / **Tilt angle 5 to 25°**
- / **ASSEMBLY 2.0**



MODULE CLAMPS



The module clamps which were specially developed for the GMS® SCALE system are not only used to fix the solar modules in place: they combine a wide range of functions and can be used in a variety of ways.

1. Quick, safe mounting

The clamp locks securely into prefabricated profile holes.

2. Can be screwed into place from above and below

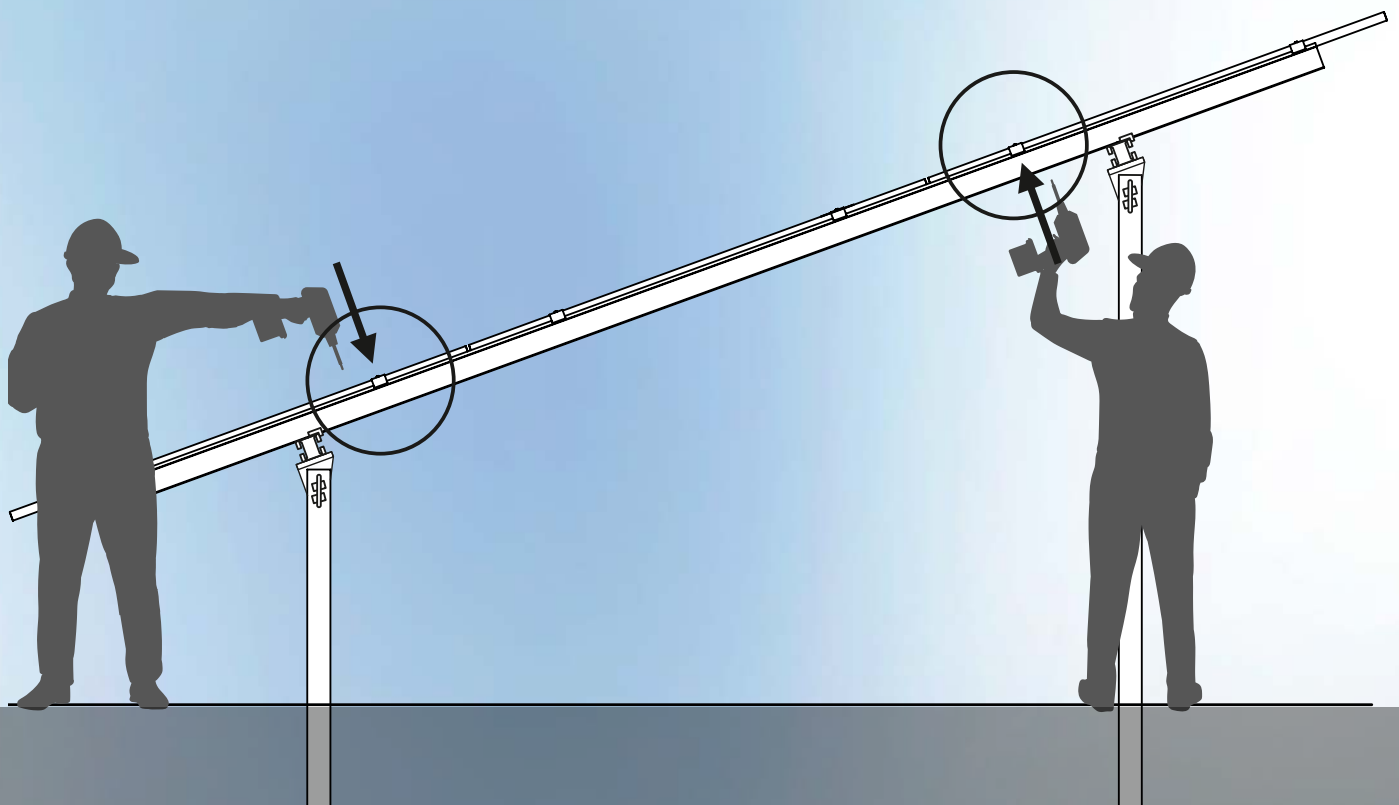
Makes the mounting process easier.

3. Theft protection

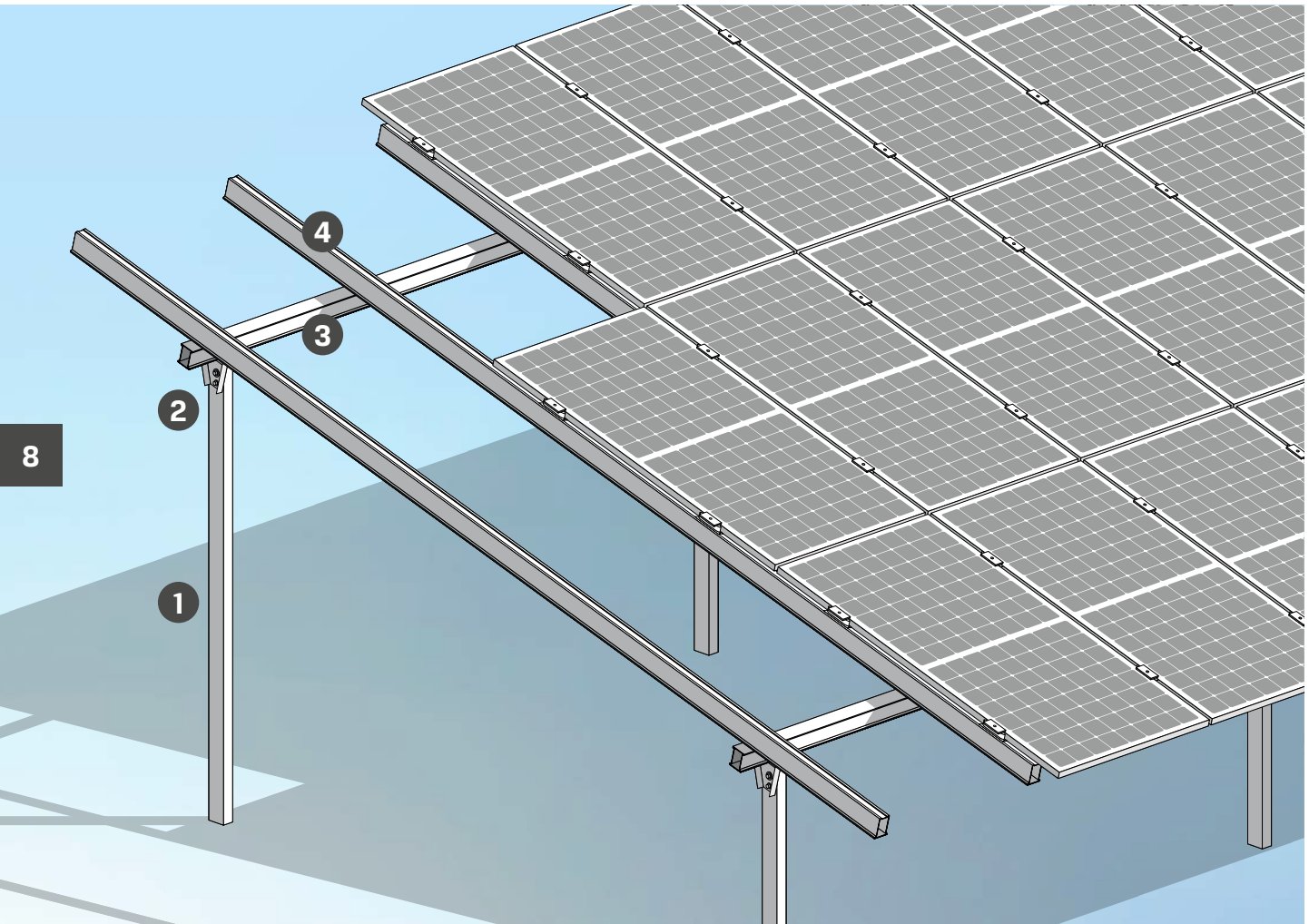
Special bit for secure fixing of the module clamps and protection against theft.

4. Integrated earthing pin (optional)

Discharges electrical charges from the modules via the module carriers.



MAIN COMPONENTS

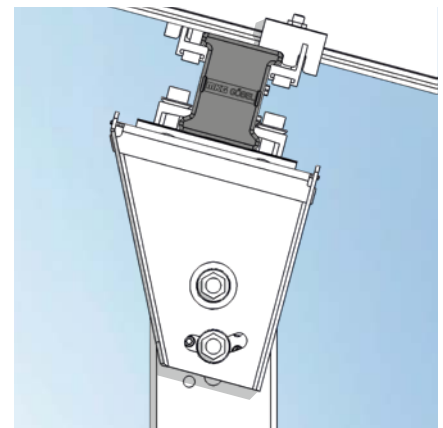
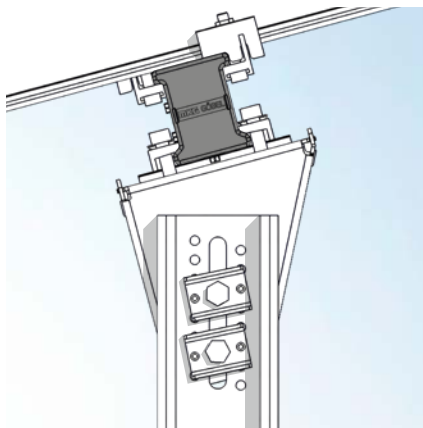


1. Posts

Corrosion-resistant, hot-dip galvanised C-profiles offer maximum flexibility for ground conditions of all kinds.

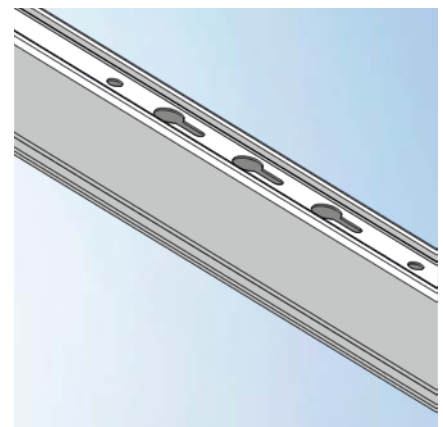
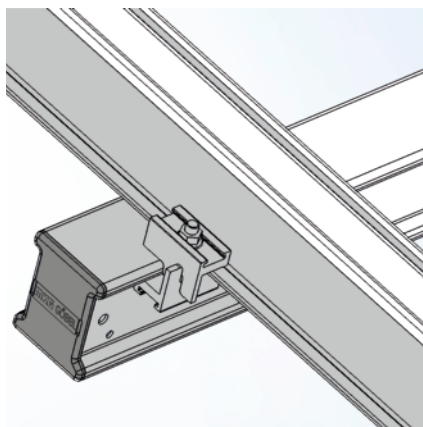
2. Heads

In combination with the counterplate, the special head provides variable and secure height adjustment of up to 50 mm.



3. Long beams

Closed long beams made from steel provide stability.



4. Module carriers

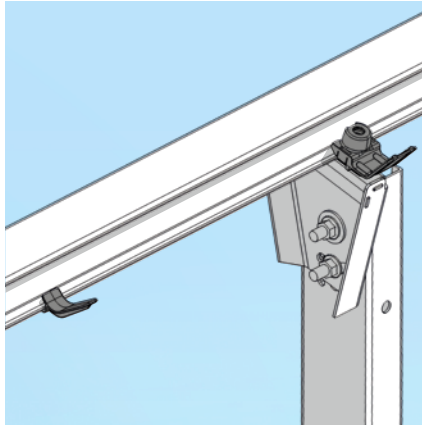
Optimised module carriers made from steel with zinc-magnesium coating.

ACCESSORIES

Cable management

Lightweight cable tray made from reinforced polymer for cable routing along the long beam

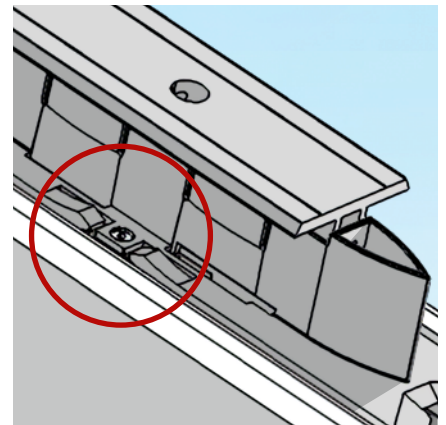
Cable clamps to secure the module cables to the module carrier



Potential equalisation / lightning protection

Bridging strap for potential equalisation between the tables

Optional earthing pin from below



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Inverter mounting

Bracket for string inverter or string combiner boxes (SCB)

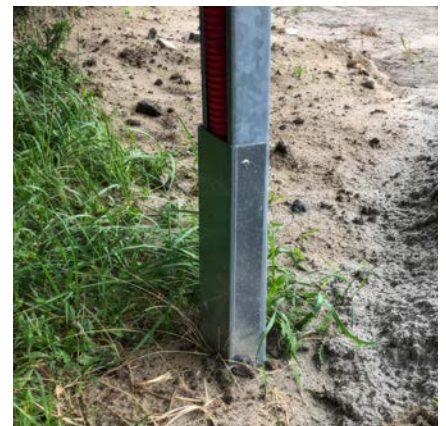
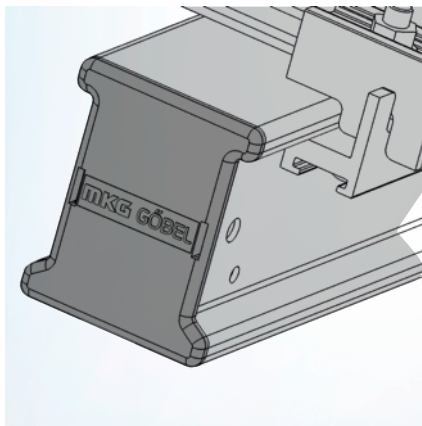
Bite-protection cage made from double bar mesh



Safety

End caps for long beam

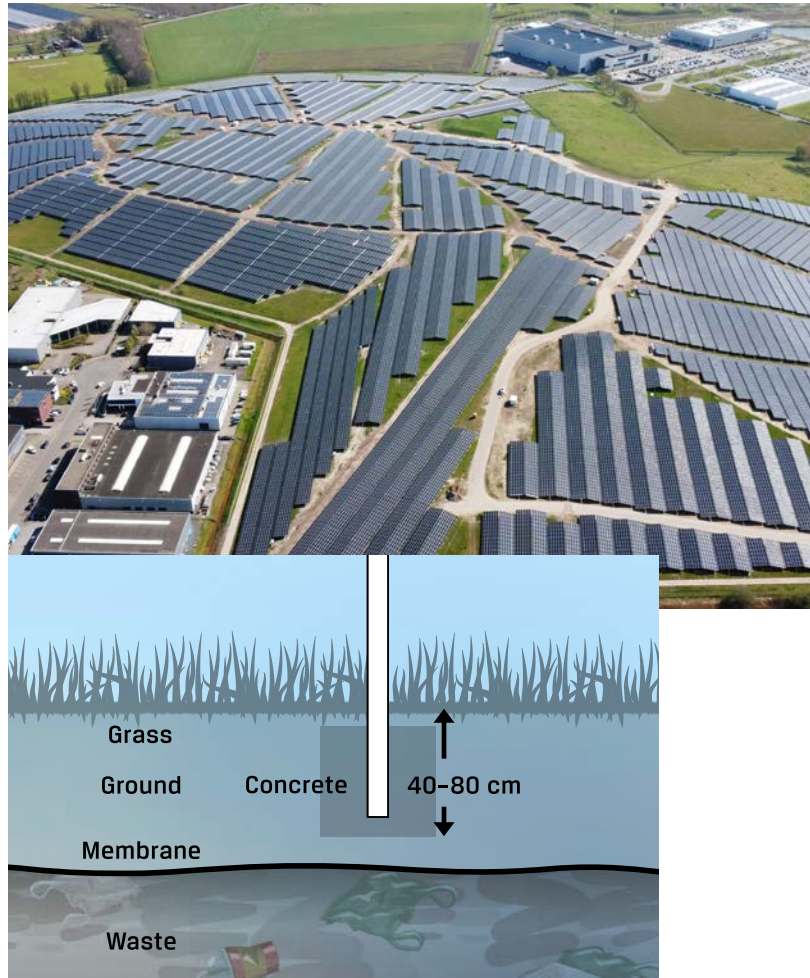
Mowing protection



LANDFILL SITES

Landfill sites can also be used as solar parks to generate additional income. Some problematic issues here are the shallow depth of the cover layer, as well as the sensitive underlying membrane which must not be damaged under any circumstances. GMS® SCALE by MKG GÖBEL is the ideal mounting system for such cases, with the company having already constructed a large number of solar systems on landfill sites.

- Embedding depth of 40 – 80 cm, depending on the landfill site requirements and the depth of the restoration layer
- Slope-parallel installation possible, even on sites with varying slope angles
- Side tilting of up to 15° (slope-parallel or south-orientated)
- Above-ground cable routing possible
- The ASSEMBLY 2.0 process protects the ground surface
- Erosion protection: Erosion-resistant foundations, even water distribution
- Optionally, the system can be designed with split posts to retroactively compensate for ground settlements



PEATLANDS

In some cases, solar parks can be constructed in areas such as peatlands or wet meadows where special construction methods are required due to the ground conditions. Here, too, GMS® SCALE offers a wide range of benefits:

- In cases where the bog/peat layer provides no foothold, it can be pierced through, with the foundation being laid in the firm underlying ground
- Design with split posts possible for huge pile-driving depths
- Posts with special coating as corrosion protection
- Above-ground cable routing possible
- Peatlands with solar installations continue to provide a habitat for a diverse range of plants and animals
- The ASSEMBLY 2.0 process protects the ground surface
- Erosion protection: Erosion-resistant foundations, even water distribution



INSTALLATION ON SLOPES

Thanks to their intense exposure to direct sunlight, slopes provide good conditions for photovoltaic systems, although sloped sites do present particular challenges. Trust the experience and know-how of MKG GÖBEL:

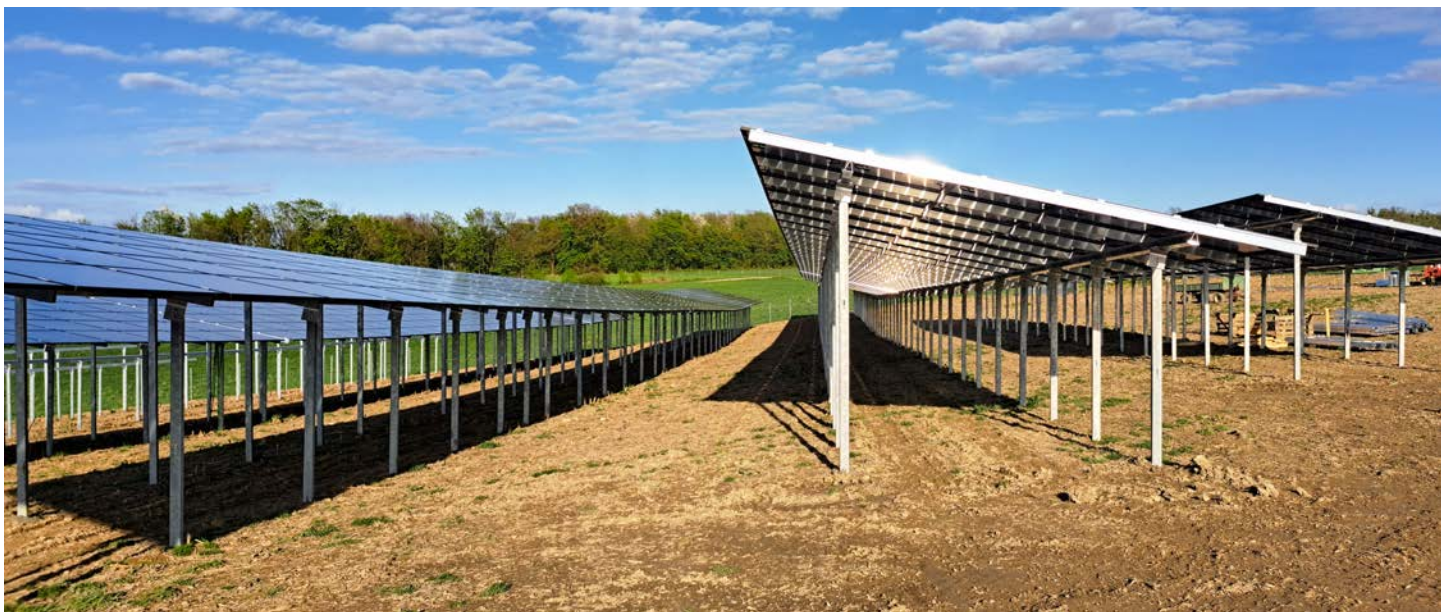
- Soil investigation reports and 3D modelling, even for difficult terrain
- Planning: We design your system for maximum use of sunlight
- The flexibility of GMS® SCALE means that it can adapt to your terrain
- Mounting with specialist machines, e.g. slope pile driving
- ASSEMBLY 2.0 possible on slopes
- Worldwide project experience



AGRI PV

Combined usage: With raised PV modules, the land underneath can also be used, e.g. for agricultural purposes (crop production, livestock farming). In addition, the system can be used in flood zones.

- Complies with DIN SPEC 91434 and 91492
- ASSEMBLY 2.0
- Standard height of lower edge: 2.20 m
- Height differences can be compensated by using split posts



TECHNICAL DATA

Foundations	<ul style="list-style-type: none">• Rammed posts• Concrete incast foundation• Ballast foundation	<ul style="list-style-type: none">• Drill-holes (for rocky grounds)• Load distribution plates
Design	Modular system with only 4 main components	
Materials	<ul style="list-style-type: none">• Posts: Hot-dip galvanised steel (batch galvanised – EN ISO 1461)• Head, long beam, module carriers: Steel S420/S550; surface ZM430• Small parts: Steel S355/S420; surface ZM430 or aluminium EN AW 6063 T66• Mounting elements: Stainless steel 1.4301	
Structural analysis	Project-specific in accordance with Eurocode DIN EN 1991, DIN EN 1993, DIN EN 1999, wind tunnel test, CC2, load return period 50 years	
Module installation	Vertically 2–4 modules, horizontally 3–6 modules on top of each other	
Module tilt angle	Flexible tilt angle Standard: 5° to 25° (other angles upon request)	
Adaptation to site	North/south slope: up to ± 35° (other angles upon request) East/west slope: up to ± 8° (using balancing rocker)	
Accessories	<ul style="list-style-type: none">• Lightweight mesh cable tray• Cable clips• Bridging straps• Middle clamps with earthing pins	<ul style="list-style-type: none">• Brackets for string inverters or string combiner boxes (SCB)• Bite-protection cage• End caps for long beam

Subject to technical modifications

SERVICES

Service package 1

GMS® SCALE

- Pull out tests with ground survey
- Project planning, incl. auditable structural report of the system
- Delivery of mounting system to the site

Service package 2

+ mechanical mounting

- All services from package 1, plus
- Unloading/distribution of material
 - Ramming posts / laying foundations
 - Mounting of substructure
 - Mounting of modules (without electrics)
 - MKG GÖBEL site manager

Service package 3

+ DC installation

- All services from packages 1+2, plus
- Stringing of module cables, connecting of plug pairs etc.
 - DC cabling as far as inverter
 - Mounting of inverter
 - DC measurements/tests

MKG GÖBEL

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