

METIS - Mounting solution

Translation of the assembly instruction into english



- + ballasted system for pitched foil and bitumen roofs
- + without roof penetration up to a roof pitch of 30°
- + easy and fast Click clamping system for the module fastening
- + project-specific wind suction calculation

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Translation of the assembly instruction

English

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1 METIS - Mounting solution

The METIS mounting system is used to mount a photovoltaic system on sloping foil and bitumen roofs. The installation on the roof is carried out without roof penetration. The METIS system is a pure ballasted system, which is ideally secured against slipping with a connection over the ridge. To ensure a low-ballast overall system, the METIS system was not only tested for stability in a WtG-approved boundary-layer wind tunnel, but also optimized in terms of aerodynamics. A 120 mm wide gap between the rows of modules mounted on edge ensures a low-ballast system. The weighting is project-specific. The assembly system is constructed as a cross-connection. The first rail layer is formed by the flat METIS profile, the second rail layer by the compact ZELOS profile. The quick click system for the assembly of the module clamps should be emphasized.



2 Usage of the mounting instruction




The **mounting instruction** is a part of the METIS installation system. The document contains important information on all phases of the product's life, in particular on assembly. The assembly instructions are intended for qualified specialists for the (dis)assembly and maintenance of the METIS assembly system.




Qualified specialists are persons who, on the basis of their technical training, knowledge and experience as well as their knowledge of the relevant standards, are able to assess the specified assembly steps and carry them out professionally as well as recognize possible hazards.




3 General informations




- Keep the assembly instructions for the entire lifetime of the product.
- Observe all country-specific regulations.
- Carry out the installation exclusively according to the project-specific module assignment plan of T.Werk GmbH.
- It is essential that you mechanically secure the METIS mounting system against slipping.
- Coordinate all changes in the assembly of the mounting system as well as all changes to the building that take place after the project-specific module layout plan and the project-specific wind suction calculation have been drawn up with T.Werk GmbH. Otherwise, the warranty and the proof of stability shall expire. The same applies to incorrect information provided when placing the order.

4 General safety informations

 WARNING		
	<p>Warning of loose components due to improper assembly</p> <ul style="list-style-type: none">➤ Make sure that you have read and understood the assembly instructions completely before starting the assembly work.➤ Carry out the installation according to the specifications of T.Werk GmbH - in accordance with these installation instructions.➤ Only carry out the planning if you are qualified specialist.➤ Only carry out the subsequent installation if you are a qualified specialist.➤ Only carry out the subsequent commissioning if you are a qualified specialist.➤ Only carry out maintenance and servicing if you are a trained specialist.➤ Failure to do so may result in personal injury and damage to the system.	

 WARNING		
	<p>Warning against sharp-edged assembly components</p> <ul style="list-style-type: none">➤ Use gloves for assembly work.➤ Failure to do so may result in injury to the hand.	

 WARNING		
	<p>Warning of heavy falling assembly components.</p> <ul style="list-style-type: none">➤ Use safety shoes for assembly work.➤ Failure to do so may result in injury to the foot.	

 WARNING		
	<p>Risk of falling and injury</p> <ul style="list-style-type: none">➤ Observe the national accident prevention regulations.➤ Install fall protection devices in accordance with the applicable standards.➤ Prevent unauthorised persons from entering the assembly area.➤ Block off the assembly area.	

5 Warranty conditions



We guarantee that, with proper handling and installation and under normal conditions of use, operation and maintenance, for a period of twelve years from the date of sale from T.Werk GmbH, our components will be free from defects in material and workmanship.

If, despite proper handling and installation, the quality of a component does not meet the warranty conditions or damage occurs, we will replace the affected component or provide a replacement immediately within the warranty period. We reserve the right to repair defective components.

Any costs incurred for the removal, return transport and reinstallation of the components are excluded from this guarantee.

The obligation to provide a guarantee does not apply in the case of:

- improper installation and handling of the system
- force majeure, exceptional forces of nature and exceptional circumstances beyond our control (e.g. biological and chemical effects, storm damage, volcanic eruptions, earthquakes, hurricanes, lightning strikes, ...)
- improper maintenance
- instability and insufficient stability of the building substrate
- Signs of wear / wearing parts
- Optical surface changes (e.g.: Discolouration of edges and punched holes on galvanized materials or discolouration on the surfaces of aluminium and steel profiles).
- Vandalism or wilful damage
- misuse or negligent application
- alteration of the products

Claims under the guarantee may not be made by third parties without our consent. Claims can only be made by our contractual partner.

No claims can be made if the damage is covered or can be covered by insurance.

The prerequisite for the effectiveness of this guarantee is the exclusive use of our components or components recognized by us as well as compliance with our assembly instructions and the legally prescribed or generally recognized standards and the complete payment of our components or the contract on which the components are based. Offsetting or rights of retention are not permitted.

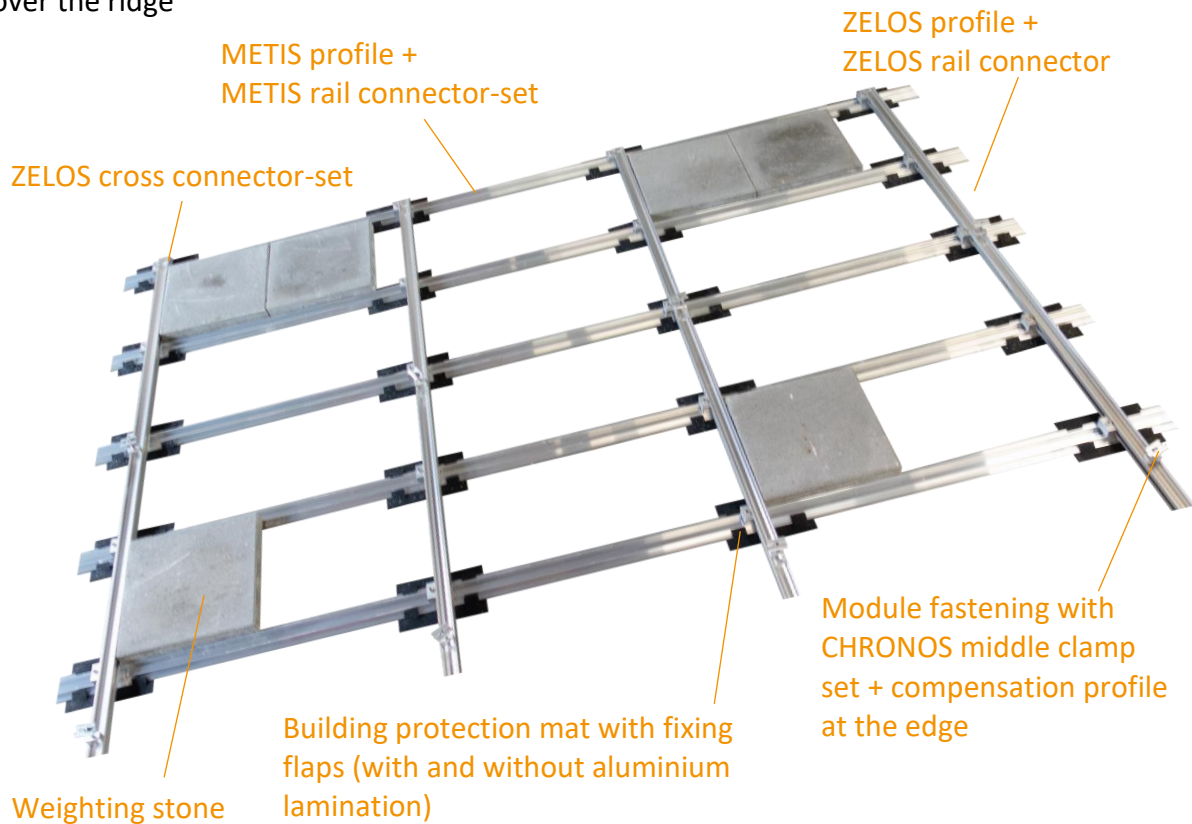
T.Werk GmbH is not liable for additional or consequential damages.

In case of justified warranty claims, please contact T.Werk GmbH or your authorized seller immediately in writing.



Legal warranty or liability claims remain unaffected by this guarantee. Our General Terms and Conditions as well as German law apply.

6 Structure of the METIS - Mounting solution

The structure of the METIS mounting system is explained using the following illustration as an example. In addition, the METIS system must be secured against slipping with a connection over the ridge





An overview of all components of the METIS mounting system is shown in the table below:

article	version	article-nr.	weight
 Building protection mat METIS	Material: PUR-bonded rubber granulate with aluminium triplex foil Dimensions: 250 x 160 x 6 mm Pre-cut aluminium laminated	SOV01207	0,32 kg
 METIS profile 6.000 mm	Base profile for roof-parallel mounting systems Material: aluminium EN AW 6063 T66 EN 755-9 Surface: press finished Dimensions: 80 x 16 x 6.000 mm Upper channel: CHRONOS Click channel	SOV01192	5,67 kg

 <p>METIS rail connector-set</p>	<p>1 x threaded plate 120 mm 1x aluminium flat material 120 x 50 x 3 mm 2 x cylinder head screw M8x16 A2</p>	<p>SOV01194</p>	<p>0,16 kg</p>
 <p>ZELOS profile</p>	<p>Length: 3.2 m Material: Aluminium EN AW 6063 T66 EN 755-9 Surface: press finish w x h: 42 x 34 mm Channel top: CHRONOS Click Channel bottom/side: HKS 28/15</p>	<p>SOV01061</p>	<p>3,04 kg</p>
 <p>ZELOS rail connector</p>	<p>Material: Aluminium EN AW 6063 T66 Surface: press finish dimension: 22,6 x 11,4 x 200 mm internal rail connector for CHRONOS Click: 2 pieces for ZELOS: 1 piece</p>	<p>SOV01066</p>	<p>0,055 kg</p>
 <p>ZELOS cross connector-set</p>	<p>ZELOS cross connector with CHRONOS clamp adapter and cylinder head screw M8x35 Material: Aluminium EN AW 6063 T66 / A2 Surface: press finish Dimensions: 29,3 mm x 26,3 mm x 50 mm / 39.4 mm x 10 mm x 25 mm pre-assembled</p>	<p>SOV01096</p>	<p>0,062 kg</p>
 <p>CHRONOS middle clamp-set</p>	<p>Pre-assembled middle clamp for all framed PV modules from 29 - 51 mm frame height. Clamp width 19 mm</p>	<p>SOV00278</p>	<p>0,055 kg</p>

 <p>Compensation profile</p>	<p>Available for all frame heights (FH)</p>	<p>Depending on FH</p>	<p>0,014 kg bis 0,020 kg</p>
 <p>Alu-bracket 40x40x4x50 mm</p>	<p>Material: Alu EN AW 6060 T66 2 drilling holes</p>	<p>SOV01321</p>	<p>0,1 kg</p>
 <p>CHRONOS threaded plate</p>	<p>Material: Aluminium EN AW 6063 T66 Length: 50 mm Internal thread M8</p>	<p>SOV01065</p>	<p>0,024 kg</p>
 <p>Cylinder head screw M8x55</p>	<p>Material: A2 stainless steel DIN 912 with locking teeth under head hexagon socket SW6 PU: 100 piece</p>	<p>SOV00065</p>	<p>0,027 kg</p>
 <p>Alu-profile flat 30x3 mm</p>	<p>Material: Alu EN AW 6060 T66 Dimensions: 30x3x6.000 mm Cutting possible</p>	<p>SOV00622</p>	<p>1,5 kg</p>

 <p>Cylinder head screw M8x20</p>	<p>Material: A2 stainless steel DIN 912 with locking teeth under head hexagon socket SW6 PU: 100 piece</p>	<p>SOV00058</p>	<p>0,0134 kg</p>
 <p>Flange nut M8</p>	<p>Material: A2 stainless steel DIN 6923 with locking teeth VE: 100 piece</p>	<p>SOV00051</p>	<p>0,007 kg</p>

7 Transport

For the transport of the METIS mounting system, the METIS and ZELOS profiles are packed in bundles according to the length of the profiles and lashed. The small material of the METIS mounting system is picked in cartons and these are then packed together on pallets, wrapped and lashed.




Make sure that all packages are well secured and protected from damage during transport. Otherwise, the packages may be damaged or lost.

8 Storage

Recommendation of T.Werk GmbH:

Only store the assembly material in closed rooms, fenced areas or under supervision. Otherwise there is an increased risk of theft of the assembly material.

9 Unpacking

 DANGER		
	<p>Danger of asphyxiation from foils and packaging material.</p> <ul style="list-style-type: none"> ➤ Dispose of the foils and packaging material as soon as possible after unpacking. 	

Cut the lashing straps wrapped around the bundles and pallets with a cutter knife. Then remove the foils. Then cut the straps of the individual boxes. Now remove the assembly material.

Check the assembly material immediately after receipt for completeness and for possible damage during transport. In the case of a defect, contact T.Werk GmbH immediately.

10 Assembly



Needed tools

- 1.) Measuring tools for marking the module field (laser, angle, chalk/string, tape measure, chalk/marker pen).
- 2.) Cordless screwdriver/torque wrench
- 3.) Screwdriver bits for hexagon socket SW6
- 4.) Open-end spanner SW9



Requirements

- 1.) First check the roof for damage (cracks, holes, brittleness, ...). If necessary, document the existing damage to the roof. Submit the documentation to your client before the start of construction and before components are placed on the roof.
- 2.) Before placing the delivered assembly material on the roof, make sure to check the **remaining load-bearing capacity** of the roof. Distribute the material on the roof. Make sure that the maximum local load of the roof is not exceeded. Lay out building protection mats on the roof at the parking area to protect the roof cladding. Otherwise, the roof and the roof cladding may be damaged.
- 3.) Ensure that the roof is free of dirt, moss, water accumulation, snow, ice and objects. Do not start the installation until all these conditions have been met.
- 4.) Measure the module field according to the module assignment plan. Separate the module fields after approx. 15-20 modules. This allows for thermal expansion of the modules and creates a maintenance aisle. Mark the outer edges of the module field with a chalk for this purpose. Check all dimensions on site before you start the assembly.
- 5.) Make sure that the modules are at least 0.2 m away from the edge of the roof at every point. Otherwise the warranty and the proof of stability will be invalidated.
- 6.) Observe the module manufacturer's specifications in the installation instructions for clamping and module installation.



Assembly

1 Mount the first profile layer METIS Profile

1.1

Measure the position of the first profile layer of METIS profiles according to the module layout plan of T.Werk GmbH and mark it on the roof.

If necessary, saw the METIS profiles to their required length.



1.2

Clamp the building protection mats to the METIS profiles using the pre-cut fixing flaps.

Make sure that the aluminium-laminated side of foil roofs rests on the roof later.

For all other roofs, the building protection mats are without aluminium lamination.



1.3

Lay the first profile layer METIS Profile at the marked positions.

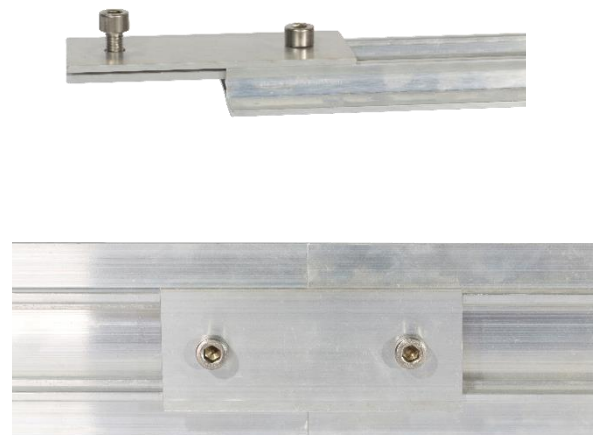


1.4

Connect the METIS profiles at the joints using the METIS rail connector set.

Insert the pre-assembled CHRO-NOS threaded plate 120 mm into the CHRONOS channel of the first METIS profile. Then slide the second METIS profile into the CHRONOS threaded plate so that the two METIS profiles are adjacent to each other.

Then tighten the two cylinder head screws M8x14. Make sure that the flat aluminium material lies flat on the METIS profiles.



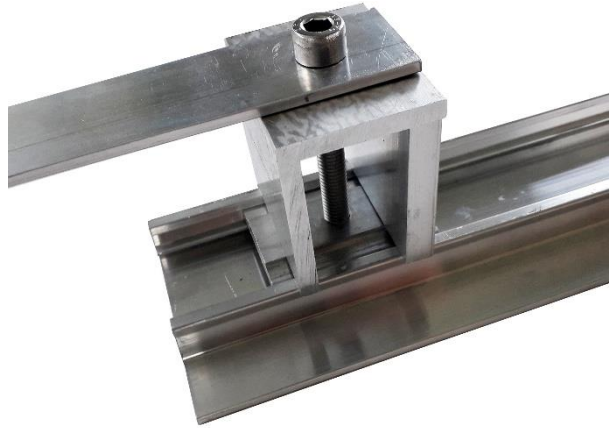
1.5

Secure the METIS profiles mechanically against slipping.

To do this, fasten an aluminium angle 40x40x4x50 mm, supported by a 36 mm compensation profile with a CHRONOS threaded plate 50 mm + cylinder head screw M8x55 at the end of each METIS profile facing the ridge. Then fix the ALU flat material 30x3 mm on top of this on the angle over the ridge.

Make sure that the 50 mm wide side of the ALU angle is across the METIS profile.

Tighten the screws firmly.



1.6

The first layer of METIS profiles is mounted.



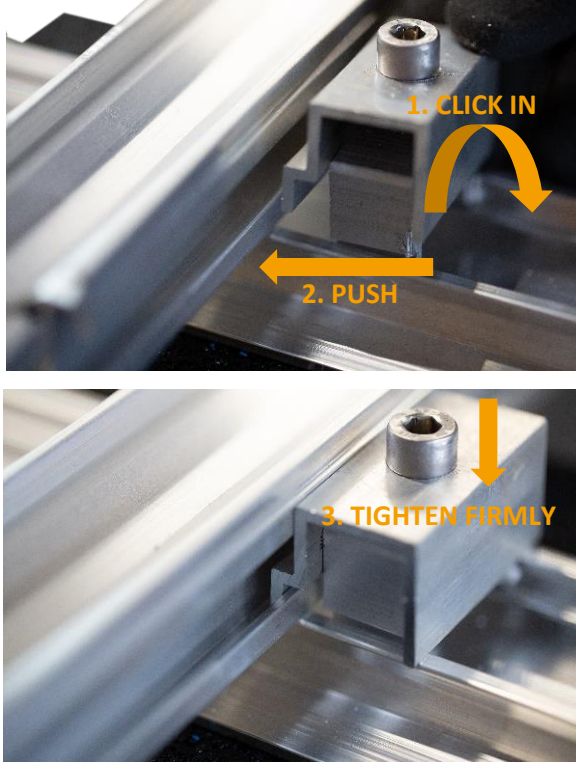
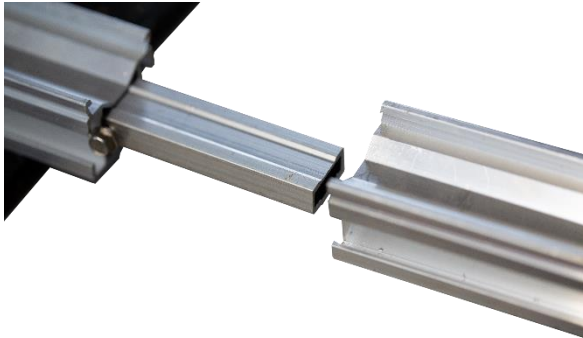
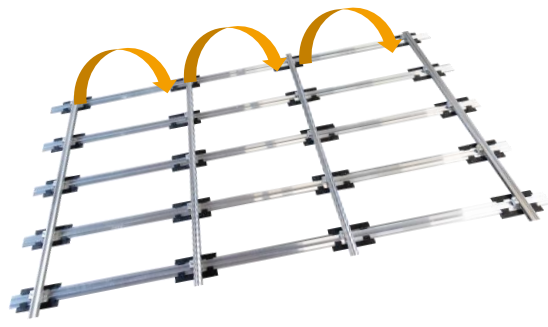

2 Mount the second profile layer ZELOS Profiles

2.1

Measure the position of the second profile layer of ZELOS profiles according to the module layout plan of T.Werk GmbH and mark it on the roof.

If necessary, cut the ZELOS profiles to the required length.



<p>2.2</p>	<p>Place a ZELOS profile of the second profile layer on the first layer of METIS profiles at the marked position.</p> <p>Fix this at the crossing points with the METIS profiles using the ZELOS cross connector set.</p> <p>To do this, click the CHRONOS clamp adapter of the ZELOS cross connector set into the CHRONOS channel of the METIS profile (1). Slide the ZELOS cross connector set towards the ZELOS profile so that the cross connector engages in the side channel of the ZELOS profile (2). Then tighten the cylinder head screw M8x35 of the ZELOS cross connector set firmly (10 Nm) (3).</p>	
<p>2.3</p>	<p>At the connection points of the ZELOS profiles, push the inner ZELOS rail connector into the first ZELOS profile of each row in the inner channel.</p> <p>Then push the second ZELOS profile onto the ZELOS rail connector.</p>	
<p>2.4</p>	<p>Then attach the next ZELOS profile according to 2.2. Carry out points 2.2 to 2.3 until the ZELOS profiles of a row are completely assembled.</p>	
<p>2.5</p>	<p>The second profile layer ZELOS Profile is completely mounted.</p>	

3 Weight the METIS system

3.1

Carry out the weighting of the mounting system according to the project-specific weighting plan of T.Werk GmbH.

T.Werk GmbH recommends concrete blocks with a size of 400 x 400 x 40 mm³ and a weight of 14.5 kg for the weighting.



3.2

Position the weighting stones according to the number and position in the weighting plan.

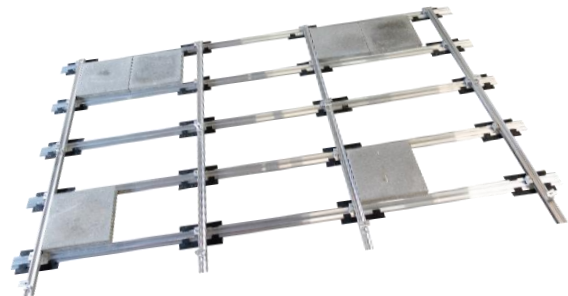
Make sure that the stones are positioned laterally between two METIS profiles and rest on a ZELOS profile at the bottom.

Otherwise the weighting stones may slip (!)



3.3

The mounting system is secured against slipping and lifting by the use of weights.







4 Fastening of the modules

4.1

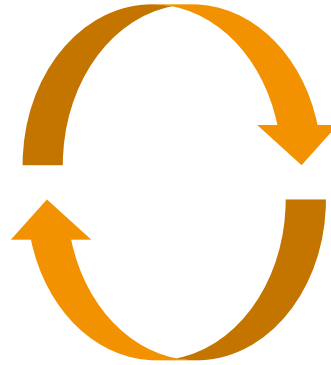
Click the CHRONOS middle clamp sets into the ZELOS profiles at the clamping points.



<p>4.2</p>	<p>Place a module and slide it onto the CHRONOS middle clamp sets already clicked in at the beginning of the row. Make sure that there is a distance of 3.5 cm from the end of the profile.</p>	
<p>4.3</p>	<p>On the free-standing side at the beginning of the row, place one compensating profile each on the CHRONOS middle clamp set (1). Then screw in the cylinder head screw of the CHRONOS centre clamp set with a hexagon socket SW6 with a torque of approx. 10 Nm (observe the specifications of the module manufacturer) (2).</p>	
<p>4.4</p>	<p>Place the next module in the row against the one already mounted.</p>	
<p>4.5</p>	<p>Then screw in the cylinder head screw of the CHRONOS middle clamp set with a hexagon socket SW6 with a torque of approx. 10 Nm (observe the specifications of the module manufacturer).</p>	

4.6

Repeat assembly steps 4.4 and 4.5 until the end of the row.



4.7

At the end of the row, an additional balancing profile must then be positioned under the centre clamp on the free-standing side of each CHRONOS centre clamp set.

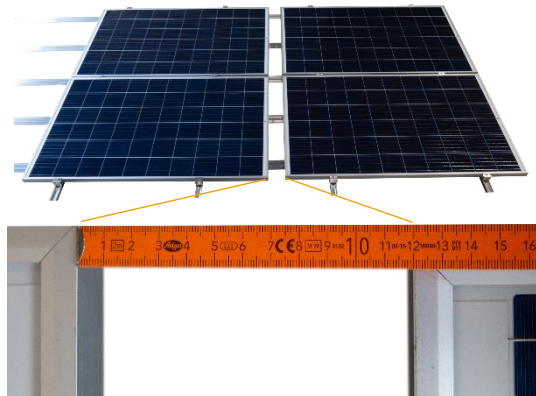


4.8

Repeat assembly steps 4.2 to 4.7 for each row.



Make sure that there is a **distance of 12 cm** between the individual module rows.



4.9

The METIS mounting system is fully mounted on the roof.



11 Maintenance and servicing

Inspect the METIS mounting system once a year. In addition, inspect the METIS mounting system after extraordinary events (severe storms, earthquakes, ...). Annual maintenance is an important precondition for the warranty.

1. Visually check that all modules are in the correct position.
2. Spot-check the strength of all screws.
3. Check the correct position of the balancing profile at the end of the row.
4. Check the correct position of the METIS profiles including the building protection mats.
5. Check the correct position of the weighting stones.
6. check the correct position and randomly check the strength of the screws of the mechanical anti-slip device.

Contact T.Werk GmbH if any components are damaged. Replace them with new, functional components.

12 Disassembly

Disassemble the METIS assembly system in reverse order of assembly. To do this, carry out the assembly steps from the chapter **Assembly** starting from the latter to the former aspect.

13 Disposal

Dispose of the individual components of the METIS assembly system separately in compliance with local and official regulations.

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