

# TRITEC

ENERGY FOR  
A BETTER WORLD

## TRI-STAND ASSEMBLY INSTRUCTIONS

Tiled roof

- simple
- quick
- efficient

### Rooftop mounting system:

- Statics tested
- Color choice natural or black
- Wind and snow loads secured

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## Tiled roof

### BASICS



### 1 Notes

When installing the TRI-STAND mounting system, only products from the TRI-STAND range may be used.

The use of foreign components can influence the stability of the system and cause considerable damage. Installation may only be carried out by trained and competent personnel.

No liability is accepted for damage caused by the use of third-party components or incorrect installation.

#### Required screw torques:

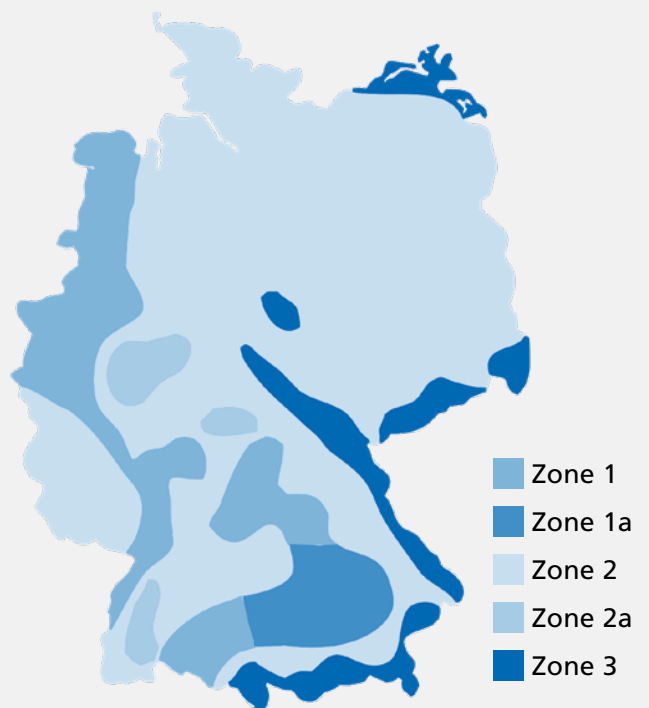
- SafeClick: 20 Nm
- M10 screw connections flat round head, Hammer head and hexagonal: 30 Nm
- M8 screw fittings: 20 Nm

### 2 Load effect

In addition to the dead weight of the photovoltaic system, the system components and the substructure are primarily stressed by wind and snow loads. Each system must therefore be calculated and planned specifically for its requirements and external influences, taking into account DIN 1055\* (Actions on supporting structures).

The stress due to wind loads depends primarily on the wind zone (according to DIN 1055-4\*), the height of the building, the roof shape and pitch, and the position of the roof center. Weight loads due to snow accumulation depend on the snow zone (according to DIN 1055-5\*), the height of the building, the roof shape and pitch, and the position of the roof center.

For each location, the wind and snow load zone can be determined according to which the system is designed.



\* German standard: DIN 1055, 1055-4, 1055-5  
Swiss standard: SIA 261  
Austrian standard: ÖNORM EN 1991-1-3, B 1991-1-3

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### 3 Statics

On the construction side, the statics of the roof, the substructure or the facade must be taken into account above all. Basically, the statics of every roof must be checked by authorized specialists. The main question to be answered here is whether the additional loads on the roof caused by the solar the solar system can be absorbed by the roof.

Since the load bearing capacity of a roof and the load effect of a photovoltaic system are determined by many factors, a structural analysis calculation must be made individually for each roof. The current condition of the roof must be such that the roof does not need to be renovated for a period of at least 20 years.

### 4 Design software

The TRI-DESIGN design software calculates and designs the TRI-STAND assembly system according to the guidelines of DIN 1055\*. The two relevant are DIN 1055-4\* for wind loads and DIN 1055-5\* for snow loads and DIN 1055-5\* for snow and ice loads acting on the photovoltaic system and its substructure.

In addition to the number of roof hooks to be used, the design software also calculates the rail spacing and the maximum span width of the various profiles. TRI-DESIGN makes it possible to design the system optimally for the respective roof and the modules used and thus to select the best possible variant of the mounting system. To comply with the warranty conditions, all TRI-STAND systems must be designed using TRI-DESIGN.

### 5 The system components at a glance

- 01 Roof Hook
- 02 UP-Universale Profile
- 03 TS-Insertion Profile
- 04 SafeClick SC
- 05 TS-C Insertion Profile Connector
- 06 UP-C Universale Profile Connector
- 07 TS-E Endbraked

01



02



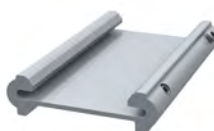
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04



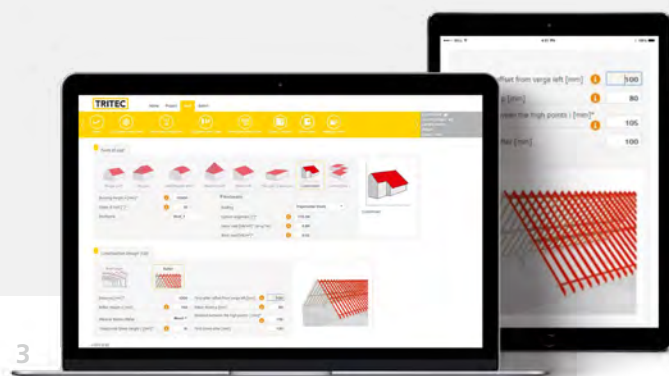
05



06



07





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### Tools

Installation requires the following tools:



- 01 Cordless screwdriver with Torx 40
- 02 Open-end wrench 15 mm
- 03 Allen wrench 3 mm hexagon socket
- 04 Allen wrench 5 mm hexagon socket
- 05 TRI-STAND bending tool

## 6 Structure of the mounting system

The assembly is carried out in four steps:

- 6.1 Mounting the roof hooks
- 6.2 Mounting of the vertically running universal profiles UP-L, UP-L+ or UP-LS 40
- 6.3 Fastening the horizontal TS insertion profiles
- 6.4 Inserting the modules

### Mounting

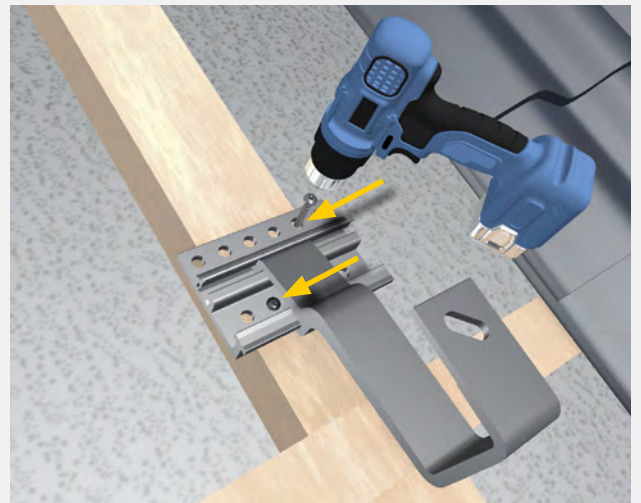
#### 6.1 the roof hooks

After checking the substructure of the roof for its point load-bearing capacity, the roof hooks are installed at the points provided in the layout plan. The hooks are installed in a line in the vertical direction. It should be noted that each roof hook is fixed with at least two wood screws - one on the upper row, one on the lower row.

The roof hook pushed to the desired position is then secured horizontally. With the help of the bending tool, the plate is bent down and fixed on the left and right at the front bracket end.

#### 6.2 Mounting the vertically running universal profiles UP-L, UP-L+ or UP-LS

The selection of the appropriate universal profile is determined in advance in the TRI-DESIGN planning software according to the requirements.



Set roof hooks



Secure the roof hook with the bending tool

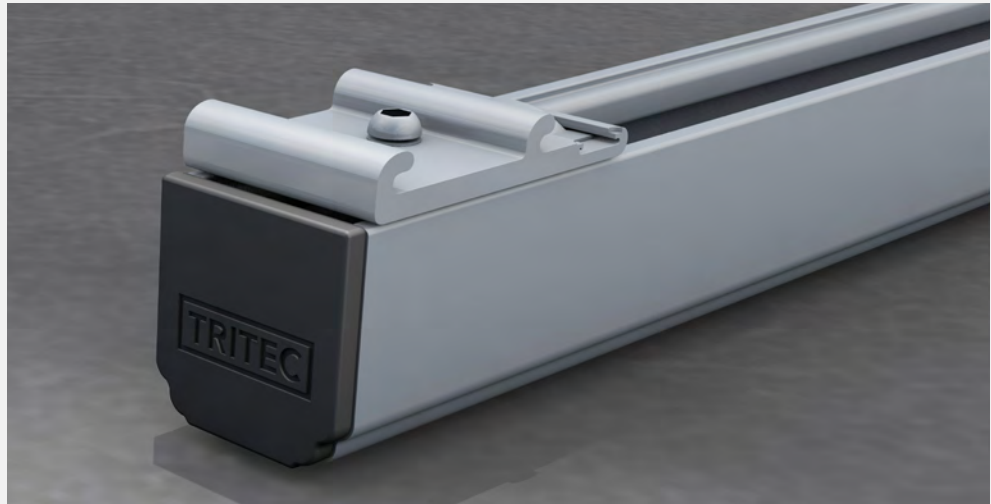
# TRI-STAND ASSEMBLY INSTRUCTIONS



## Tiled roof

### Pre-assembly of the universal profiles

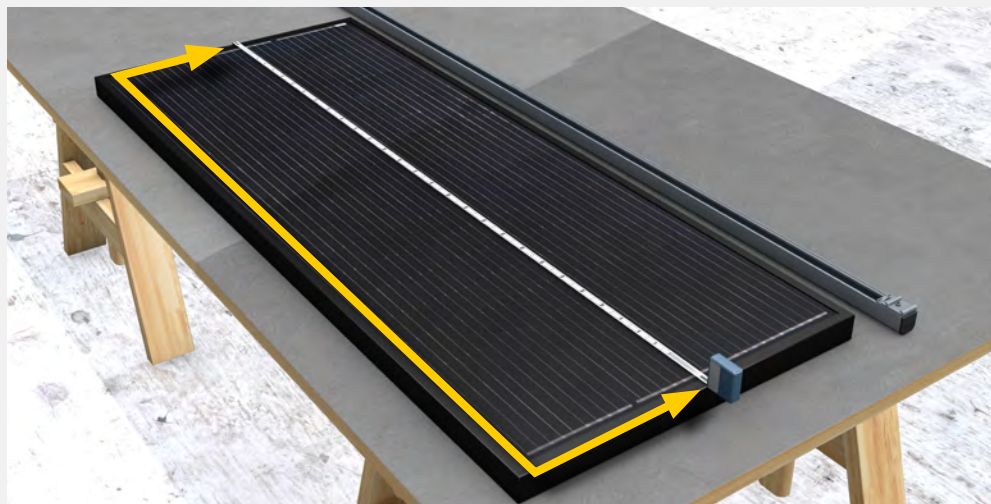
First, the first SafeClick is mounted on the lower end of the universal profile and the end cap is inserted to terminate the universal profile.



First SafeClick at lower edge of profile

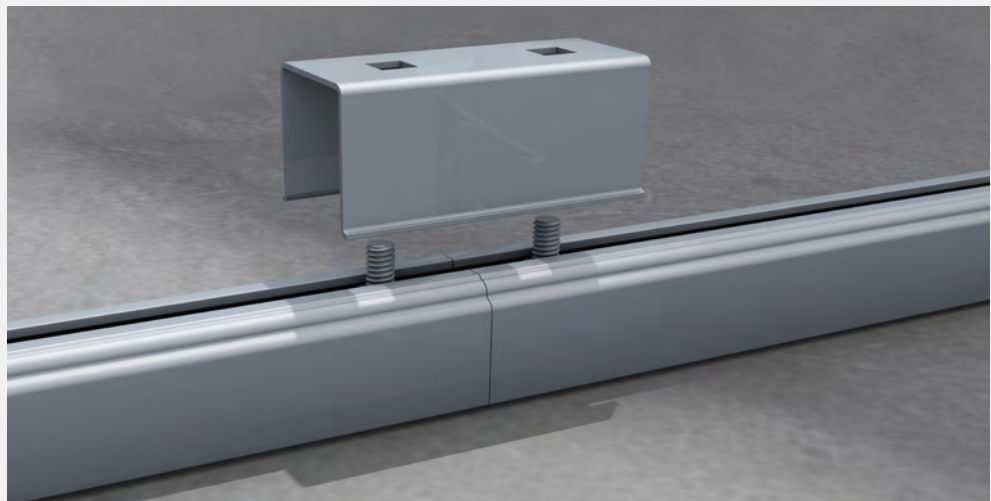
The other SafeClicks are then attached to the universal profile. The spacing of the SafeClicks is calculated from the dimensions of the modules used.

The following applies:  
length or width of the module  
minus 58 mm - depending on  
whether the modules are inserted  
horizontally or vertically.



Calibrate SafeClick: SafeClick-to-SafeClick distance = module dimension minus 58 mm

If the length of a single universal profile is not sufficient for the designed installation, several profiles can be connected by means of UP-C connectors.





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### Mounting the universal profiles on the roof

The first and the last of the pre-assembled profiles are installed on the roof hooks. To fix the profiles, the M10 hammerhead screw is used, which is inserted into the profile from below, turned vertically. When it is screwed to the roof hook, it tilts in the profile and the nut can be tightened securely.



Mounting UP-L profiles

On a measuring line stretched between these two profiles at the lower end all other profiles can be conveniently aligned and mounted between them.



Align UP-L profiles to measuring line

# TRI-STAND ASSEMBLY INSTRUCTIONS

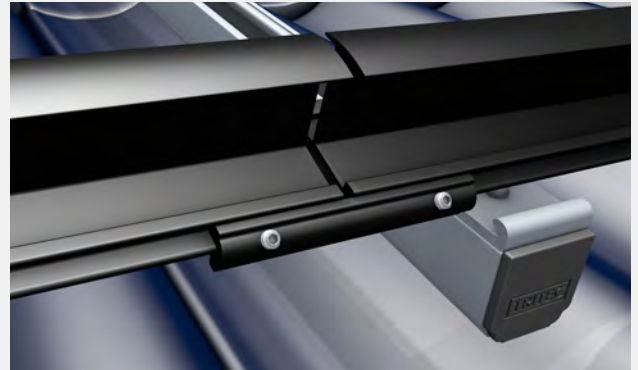


## Tiled roof

### Fastening the horizontal

#### 6.3 TS insertion profiles

Several TS profiles can be connected to the required length using the TS-C profile connector. To do this, the connector is pushed onto the end of one profile and fastened with the grub screw. The other profile is then inserted into the connector at a distance of 3 mm from the previous one. Only one of the two grub screws is tightened at a time, so that the TS profiles can expand or contract relatively stress-free with temperature changes. The module loads are nevertheless transmitted.



TS-C profile connector

The TS-C profiles are then inserted into the SafeClicks on the universal profiles. When the TS profile snaps into the SafeClick, both rails are firmly connected to each other.

Now, each profile must be bent to the left and right of a SafeClick located in the middle of the rail using the TS bending tool.



Mounting UP-L profiles

This measure limits a later migration of the rails due to heat and cold.

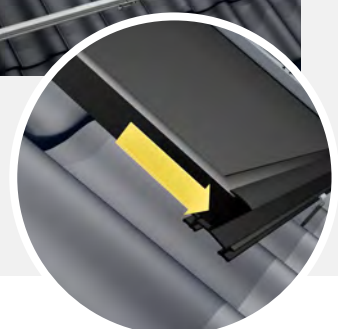
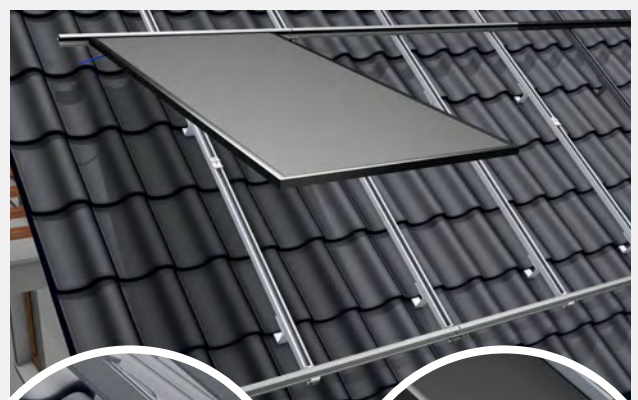
### Inserting the modules

#### 6.4 and laying the cables

To insert the modules, they are first pushed into the upper TS profile and then lowered until they rest in the lower profile.

After laying and connecting the cables, the modules are pushed together one after the other. Due to gravity, they are now positioned and do not have to be fixed with screws.

Insert module



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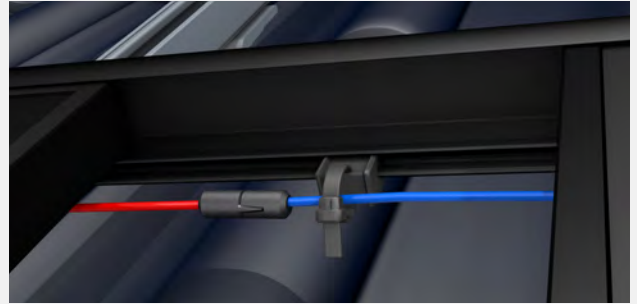


## Tiled roof

In principle, all cables are laid parallel to the mounted rails. The cables are fastened to the TS profiles with the TRI-STAND Edge Clips TS-EC. These are clipped directly to the TS profile. The cable ties are then used to fix the cables.

The edge of the TS profiles is terminated by the TS-E end brackets. They are inserted at both ends of the profile and fixed with the grub screws. The edge termination of the rails prevents the modules from slipping out of the profiles even in adverse weather conditions

Now the system is completely mounted on the roof and can be put into operation.



Cable fixation with edge clip



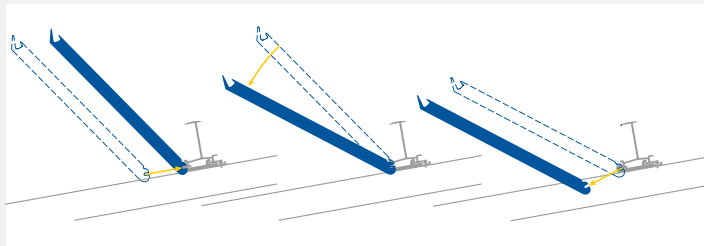
Ready assembled system

## USE OF THE TRI-STAND BENDING TOOL

The TS insertion profiles must each be edge-bent per profile left and right of a SafeClick located in the centre of the TS rail. This method will limit the movement of profiles as a result of temperature.



### Fix TS insertion profile in place

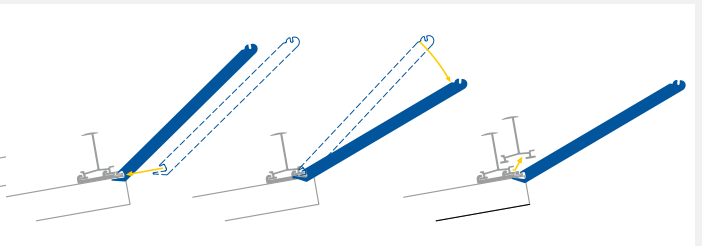


Push bending tool next to the center SafeClick of the rail into the lower leg of the TS insertion profile.

Turn the bending tool by 8 – 10 cm toward the bottom.

Pull out the bending tool again and repeat the same steps on the other side of the SafeClick.

### Detaching the TS insertion profile from SafeClick



Push bending tool from the top over the flat spring of the SafeClick.

Turn the bending tool toward the bottom all the way to the stop.

Push TS insertion profile toward the top and remove.



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Find here the detailed assembly video.

Just scan the QR Code or visit the following link:

<https://www.youtube.com/watch?v=3lI3DbgNs28>



Find here the training video for the TRI-DESIGN planning software.

Just scan the QR Code or visit the following link:

<https://www.tritec-energy.com/en/trainings/>

### The optimal mounting solution for every roof

TRITEC mounting systems combine over 30 years of photovoltaic experience. The own products TRI-STAND and TRI-ROOF+ offer the ideal mounting solution for a wide range of roof types and alignments.

We attach great importance to the high-quality processing of the components as well as to the durability of the substructure.

Further information and the download of the assembly instructions you will find on our homepage [www.tritec-energy.com](http://www.tritec-energy.com).

Or just talk to us directly. Our experts are at your disposal to answer all your questions.

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