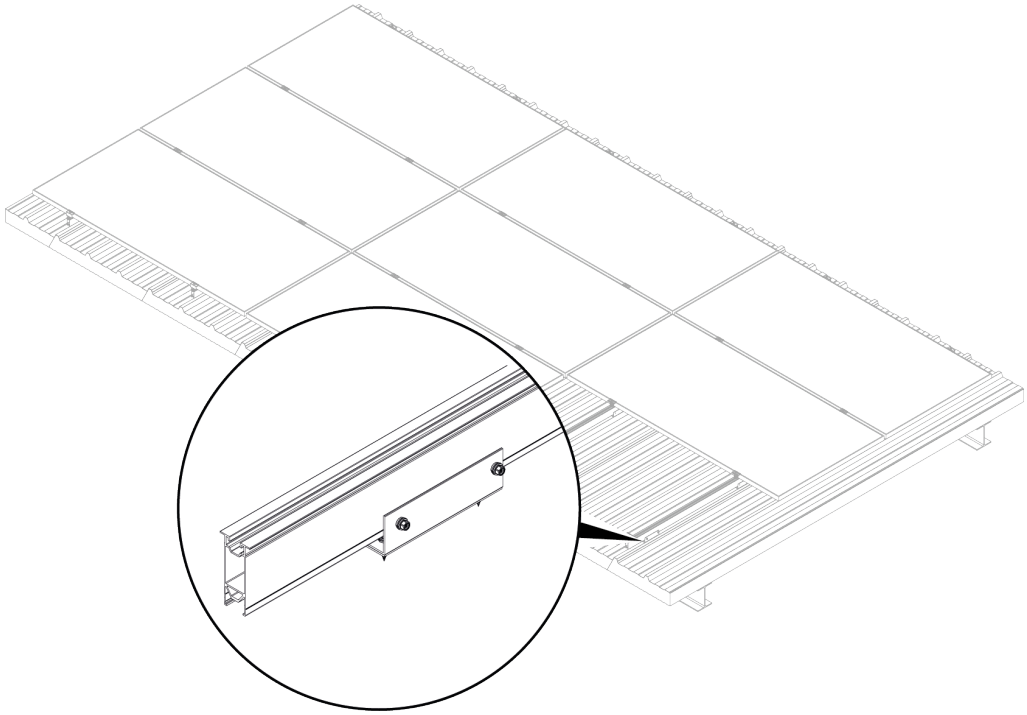
AEROCOMPACT®

ENGLISH



Assembly Instruction

# COMPACT**METAL** TR

**Version : 3.5**
**Language : English**
**Important! Read carefully before installation!**

**Legal Notice**



**Manufacturer**

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**Creation date**

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# TOC

# GENERAL

These assembly instructions describe the assembly procedure and must be strictly adhered to. Read these installation instructions carefully before starting installation. The basic prerequisite for safe working is compliance with all the safety and handling instructions in these installation instructions. In addition, the local accident prevention regulations and general safety regulations for the area of application of the product apply. Illustrations in these instructions are for basic understanding and may differ from the actual design.

## APPLICABLE DOCUMENTS

In addition to this manual, you have received an AEROTOOL project report, planning documents and drawings. Always comply with the instructions and notes contained therein.

## LIMITATION OF LIABILITY

All information and instructions in these assembly instructions have been compiled taking into account the applicable standards and regulations, the state of the art and our many years of knowledge and experience. Liability provisions are stated in our **terms** and can be accessed at **www.aerocompact.com/downloads**.

## EXPLANATION OF SYMBOLS

### SYMBOLS FOR INSTRUCTIONS


Prerequisites for action instruction


Results of action steps


Step by step action instruction


This note provides useful information for smooth installation

### SYMBOLS IN ILLUSTRATIONS - ACTIVITIES


Optional component,
optional mounting variation


Activity by hand


Check AEROTOOL project report or planning documents


Visual inspection


Observe right angle

### SYMBOLS IN ILLUSTRATIONS - TOOLS


Measuring tape, measure


Pencil, mark


Chalk line


Scissors, tin snips, cut to size


Cordless screwdriver, screwdriver


Use a torque wrench,
Observe torque


Use Allen key

# SAFETY

The following list serves as an indication of the most common safety risks that can occur when installing these products. There is no liability for the completeness of the risks presented. A specific check of the necessary safety measures must be carried out by an authorized specialist company before installation.

## APPROPRIATE USE

The TR74 system is designed exclusively for mounting PV modules on metal roofs consisting of sandwich panels and high trapezoidal sheets. Proper installation in accordance with these installation instructions is also part of the intended use. approval from the module manufacturer is required for the use of PV modules with the TR74 system. AEROCOMPACT accepts no liability for loss of performance or damage of any kind to the PV modules. Any other use of the TR65 system is considered improper use.

**NOTE ON THE PROCESSING OF THIN SHEET METAL SCREWS**

ⓘ The attachment of thin sheet metal screws with impulse or impact screwdrivers is not permitted. The high speeds can cause damage to the screw bodies, the flashing and the sealing. Thin sheet metal screws may **only** be used **once,** as their performance is not guaranteed if they are reused.

☐ Apply pressure to the thin sheet metal screw and screw in at low speed (< 500 rpm).
☐ Then reduce the pressure and screw in the thin sheet screw at a higher speed.

## PERSONNEL REQUIREMENTS

Installation may only be carried out by a specialist company and must be carried out strictly in accordance with the installation instructions, the project report and the planning documents. A specialist company is a company that is familiar with the installation and maintenance of photovoltaic systems as part of its normal business operations. National and local building regulations, standards and environmental protection must be complied with. Under no circumstances may the assembly personnel be under the influence of medication, alcohol, drugs or in any other condition that impairs consciousness (e.g. overtiredness). Trainee personnel may only carry out work under the instruction and supervision of specialist personnel who are authorized to train personnel.

## WORKING SAFELY

The contractual partner must ensure that the necessary safety measures and the relevant labor law and occupational safety regulations are observed when installing products from AEROCOMPACT Europe GmbH. Information from AEROCOMPACT Europe GmbH on the need to comply with security measures is provided without guarantee and without any claim to completeness and serves only to support the contractual partner. The contractual partner is obliged to inform himself about all relevant regulations concerning working safety and to comply with them. AEROCOMPACT Europe GmbH expressly assumes no responsibility and consequently no liability. Areas below the roof on which work is being carried out must be protected from falling objects. Where this is not possible, the affected areas must be closed to the public and unauthorized personnel. If the weather is unsuitable, work on the roof must not be continued for longer than necessary or must not be started at all. Never carry out installation work in strong winds. Strong winds exert particular exerts enormous forces on the large-area PV modules. There is a risk of a module being torn off the roof and people being injured. Never work in wet conditions or at temperatures below freezing. Depending on the roof pitch, there is a risk of slipping. Only use suitable, intact and tested ladders. Set up and secure ladders according to specifications. Separate rules apply to mechanical climbing aids (elevators, cherry pickers, etc.). Never use the PV mounting system as a climbing support. Keep sufficient distance from overhead power lines. Equipotential bonding between the individual system components must be carried out in accordance with the respective country-specific regulations. When cutting materials to size, make sure there are no burrs, especially on edges and corners where there is a risk of injury.

## BREAKTHROUGH PROTECTION

Roof windows, skylights, large ventilation flaps, etc. generally cannot withstand the weight or impact of a person. Such objects must be secured in a similar way to the roof edge. Corrugated fiber-cement roofs can be at risk of breakthrough over the entire surface. Define routes and secure them with load distribution measures. Always use load distribution aids on roof coverings or roof structures (e.g. thin sheet metal, corrugated fiber cement) with insufficient load-bearing capacity.

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment is used to protect people from health and safety hazards at work. Personnel must wear personal protective equipment during installation. Personal protective equipment is explained below:

**Wear safety goggles when drilling and sawing**

**Wear cut-resistant work gloves during assembly**

**Wear safety shoes**

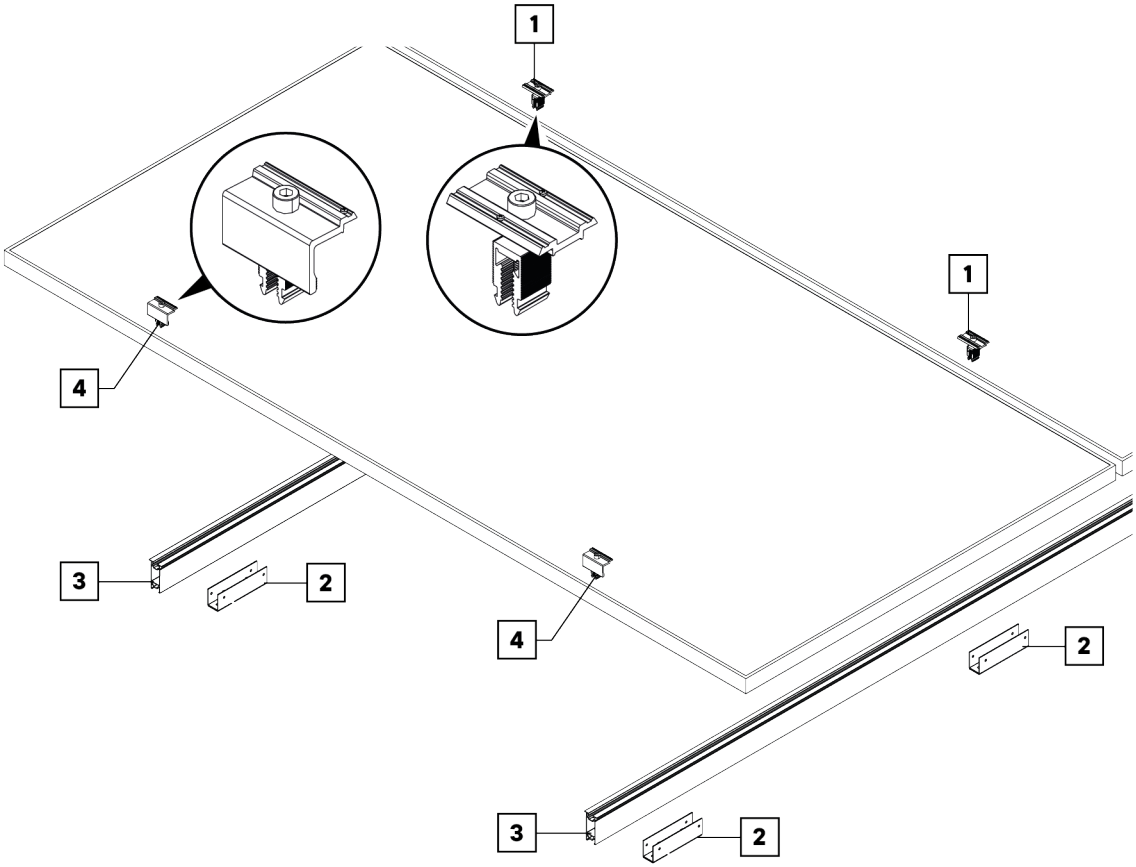
**Use fall protection**

**Helmets must be worn by all persons working on the construction site**

**Wear hearing protection**

# SYSTEM OVERVIEW

## BASIC COMPONENTS TR




**1** **CLM10**
Middle clamp Click 30 - 46 mm

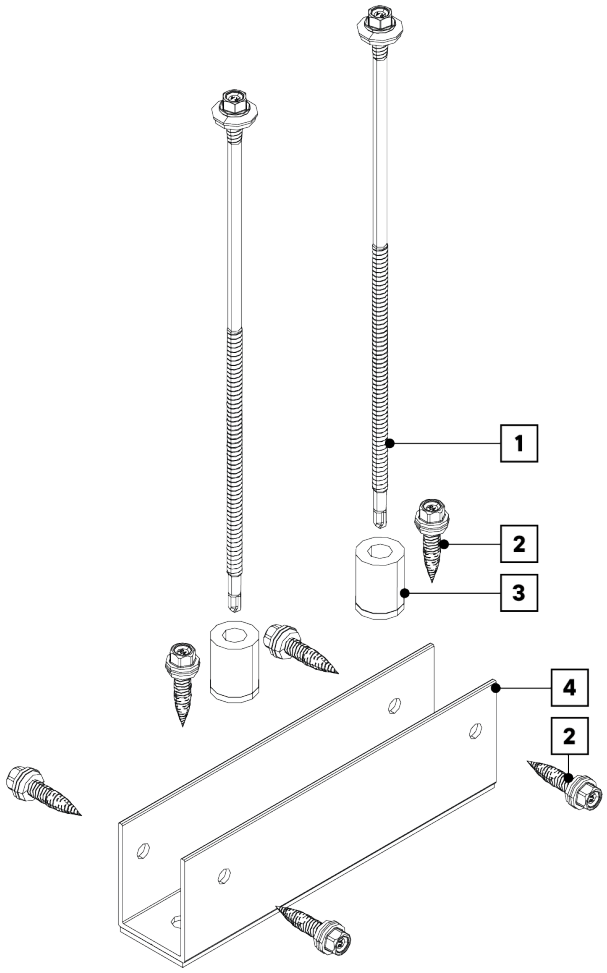
**2** **TR15**
TR15 bracket 150 mm or 5.9 in

**3** **TR59-5800**
Mounting rail 5800 mm

**3** **TR74-5800**
Mounting rail 5800 mm

**4** **CLE10**
End clamp Click 30-46

# TR15 WITH MOUNTING MATERIAL



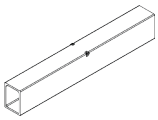

**1** **SDS-4/ XXX E16 | SDS-12/ XXX E16**
Drill screw 12 mm 5.5x(142|185|210|235)

**2** **MSS 6x25***
Metal sheet screw 6x25

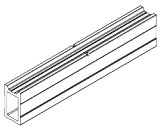
**3** **SP20**
Bolt spacer 20mm

**4** **TR15**
TR15 bracket 150 mm or 5.9 in

## SYSTEM ACCESSORIES

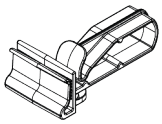


**TRPCN59**
Rail connector for mounting rail TR59

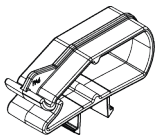


**TRPCN74**
Rail connector for mounting rail TR74

## MODULE ACCESSORIES



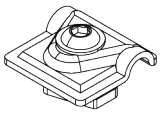
**CLP-U**
Cable clip universal



**CLP-R**
Cable clip rail

**CLP-M**
Cable tie clip for module frames with a thickness of 1 - 3 mm

## POTENTIAL EQUALIZATION



**WCL8-10**
Wire clamp 8 - 10 mm

# ASSEMBLY

## ASSEMBLY PREPARATION

### Required tools for assembly

ⓘ Before starting the assembly, make sure that the assembly personnel are familiar with the proper use of the listed tools.

**Bit hexagon socket 6 mm**

**Bit TORX T40**

**Torque wrench 10 - 30 Nm with hexagon socket bit 6mm**

**Cordless screwdriver**

**Measuring tape**

**Socket bit 8 mm**

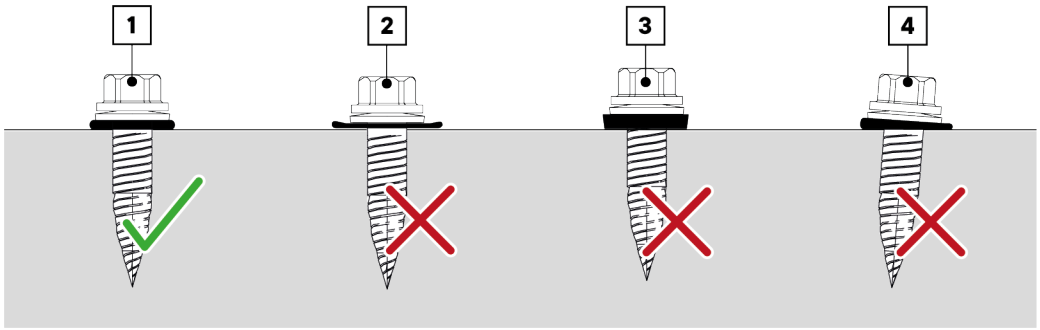
#### NOTE ON THE PROCESSING OF THIN SHEET METAL SCREWS

ⓘ The attachment of thin sheet metal screws with impulse or impact screwdrivers is not permitted. The high speeds can cause damage to the screw bodies, the flashing and the sealing. Thin sheet metal screws may **only** be used **once,** as their performance is not guaranteed if they are reused.

☑ Apply pressure to the thin sheet metal screw and screw in at low speed (< 500 rpm).
☑ Then reduce the pressure and screw in the thin sheet screw at a higher speed.

#### TIGHTEN METAL SCREWS WITH ATTACHED EPDM WASHER

ⓘ Mount metal screws with EPDM washer always with mechanical depth stop. The sealing washer must be compressed by approx. 30 %.

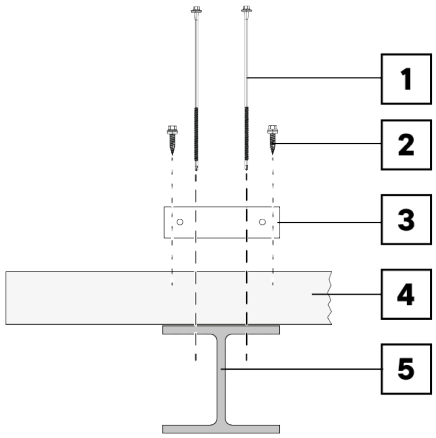


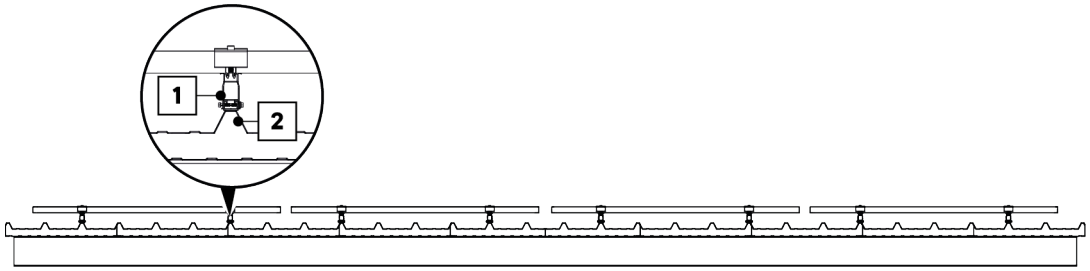

(1) Correct | (2) Tightened too tight | (3) Tightened too weak | (4) Tightened too diagonally

# MEASURE THE AREA

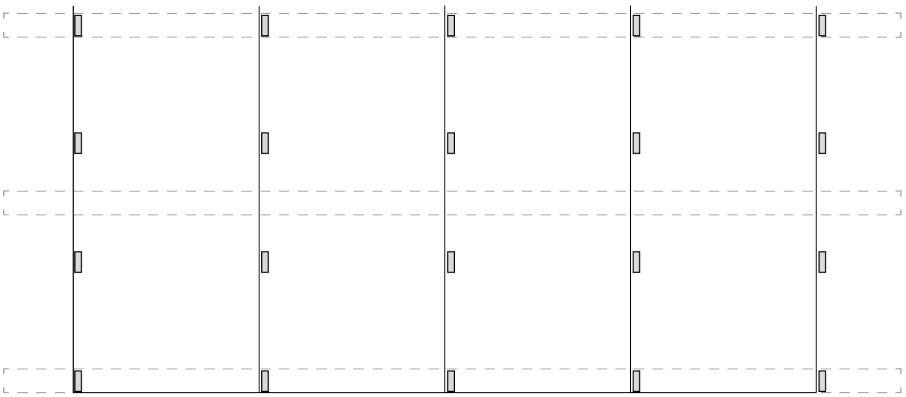
**DESIGNATIONS IN THIS MANUAL**

1. TR self drilling screw (incl. spacer sleeves)
2. Thin sheet metal screws
3. TR15 bracket
4. Sandwich roof
5. Roof substructure



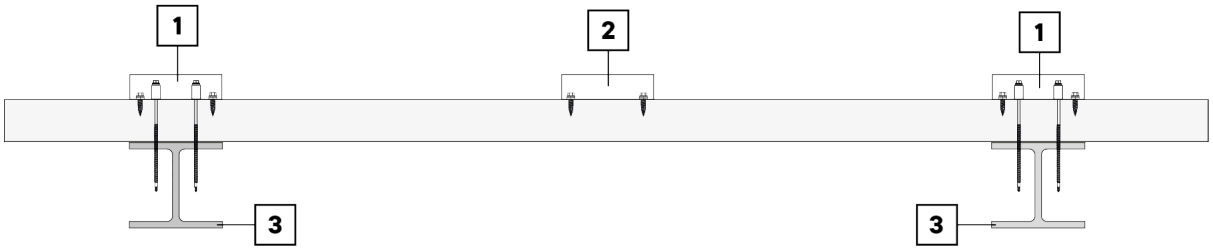

- The TR15 brackets (1) are each mounted along a bead (2).
- The distance between the TR15 brackets varies depending on the width of the modules and the spacing of the beads and must be taken from the planning documents.



- Identify and mark the positions of the TR15 brackets.

# TR15 BRACKET ASSEMBLE

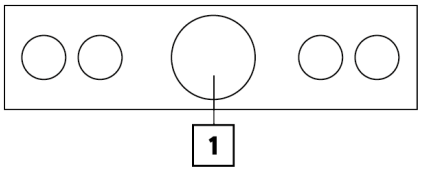
## Assembly



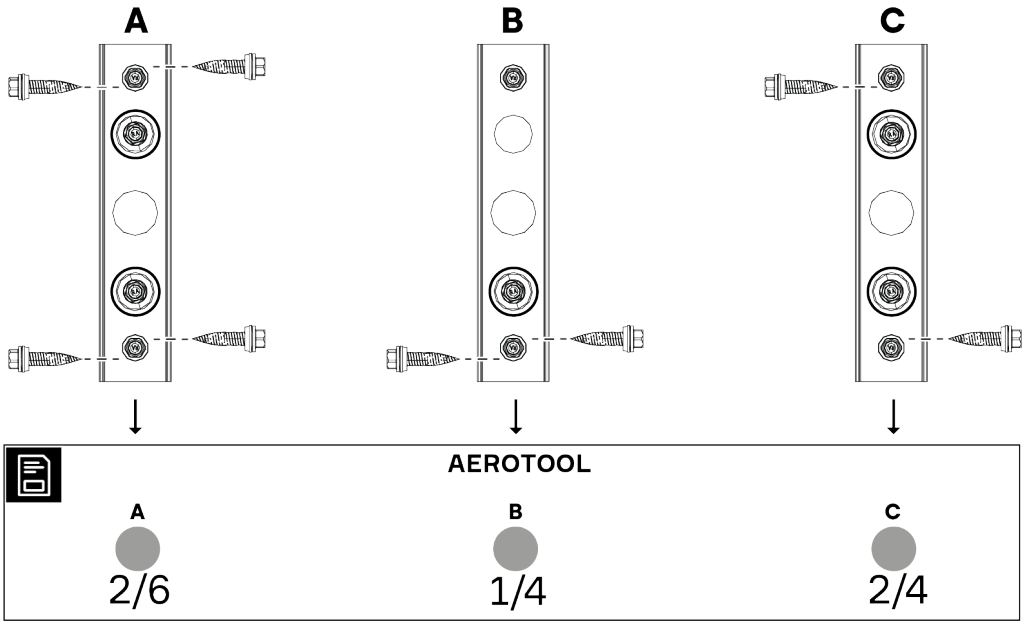

ⓘ The TR15 bracket (1), which are located in the area of the substructure (3), are fastened to the sandwich roof with thin sheet metal screws and to the substructure (3) with **additional drilling screws**. The TR15 bracket (2) in between serve as intermediate bearings and are only attached to the sandwich roof.

### HOLE PATTERN TR15 BRACKET

ⓘ The center hole (1) of the TR15 bracket is intended for on-site fastening of the sandwich roof. The TR15 bracket is mounted so that the existing fixing screw is placed in the center hole (1).



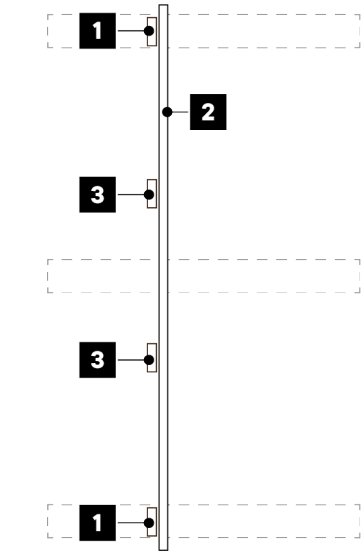

### DETERMINING THE NUMBER OF SCREWS BASED ON THE PLANNING DOCUMENTS

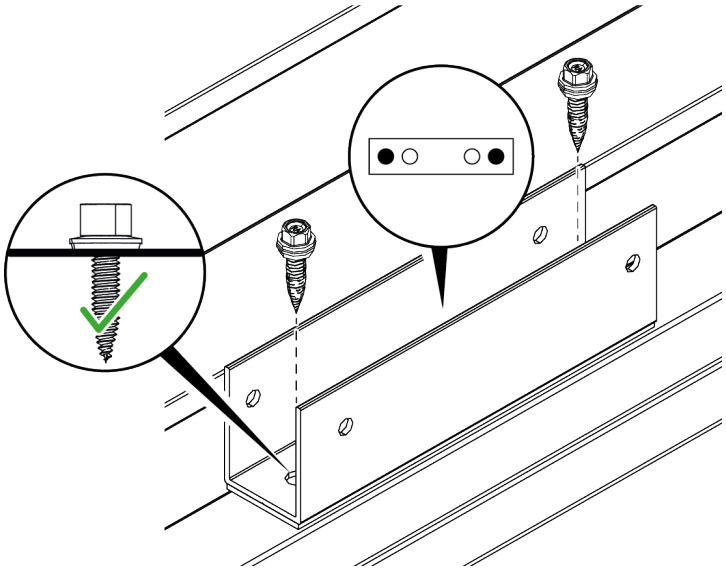



ⓘ The required number of screws for fixing the TR15 bracket is specified in the planning documents. The **first digit** indicates the quantity of drilling screws and the **second digit** indicates the number of thin sheet screws (lateral and vertical).

**Variant A:** 2/6 = 2 self-drilling screws, 6 thin sheet metal screws
**Variant B:** 1/4 = 1 self-drilling screw, 4 thin sheet metal screws
**Variant C:** 2/4 = 2 self-drilling screws, 4 thin sheet metal screws

**FASTENING TR15 BRACKET WITH THIN SHEET SCREWS**

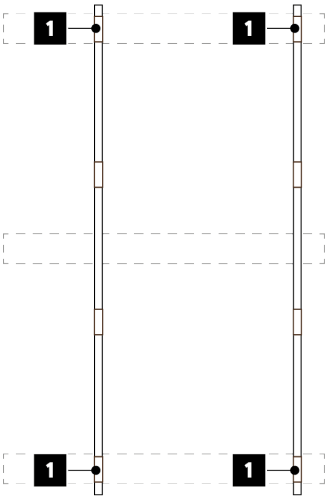


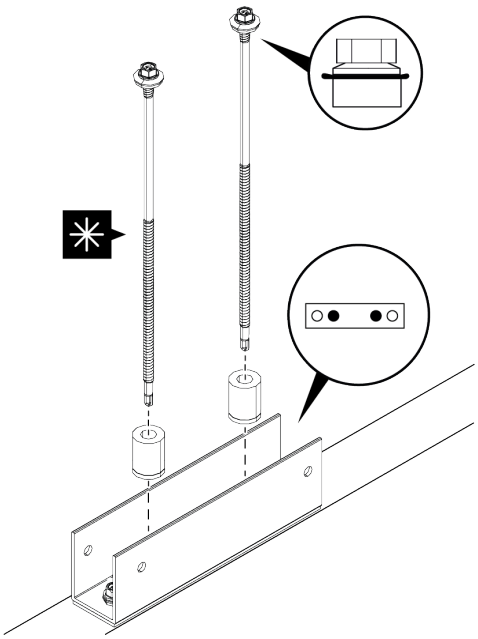



i It should be noted that the TR15 bracket are mounted in parallel. A mounting rail (2) serves as a useful aid here to facilitate mounting and ensure alignment.

- First screw down the front and rear TR15 brackets (1).
- Then mount the TR15 brackets (3) in between.
- The sealing washer of the thin sheet metal screw must be compressed by approx. 30 %.

## TR15 bracket to substructure

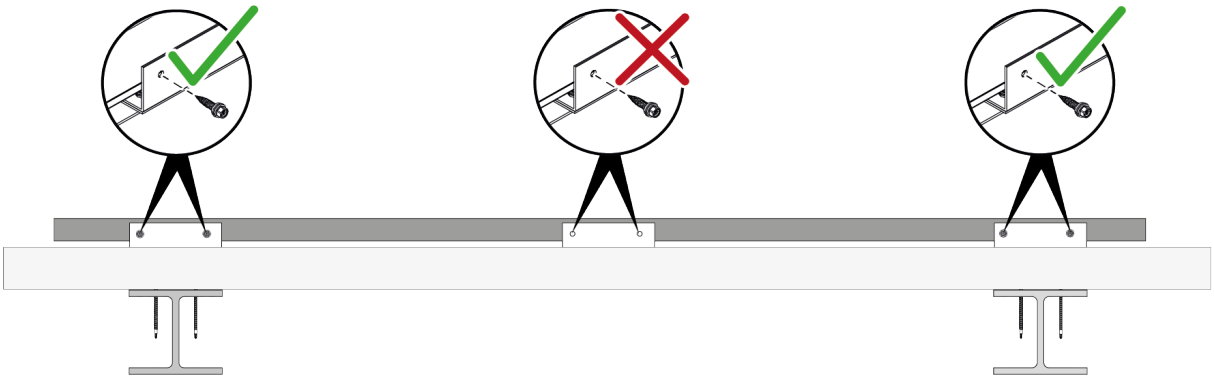


- Mount the TR15 brackets using the supplied self-drilling screws and spacer sleeves.
- Make sure that the seal on the spacer sleeves is facing downwards.
- The sealing washer of the drilling screw must be compressed by approx. 30 %.

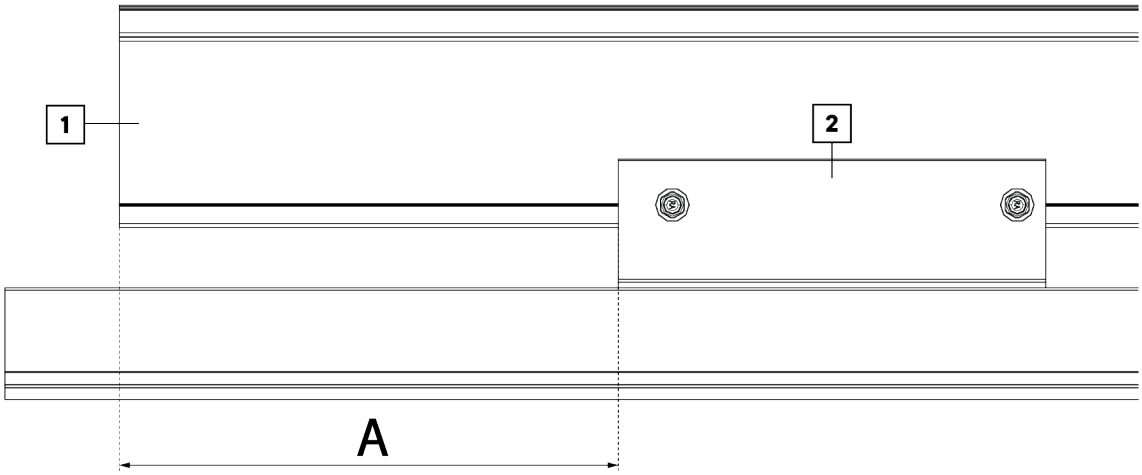
# MOUNT THE TR MOUNTING RAIL

TR mounting rails may only be attached to TR15 brackets that are screwed to the on-site substructure. The TR15 brackets in between serve as intermediate bearings and must **not** be screwed to the TR mounting rail.



*Example representation

## Overhang TR mounting rail



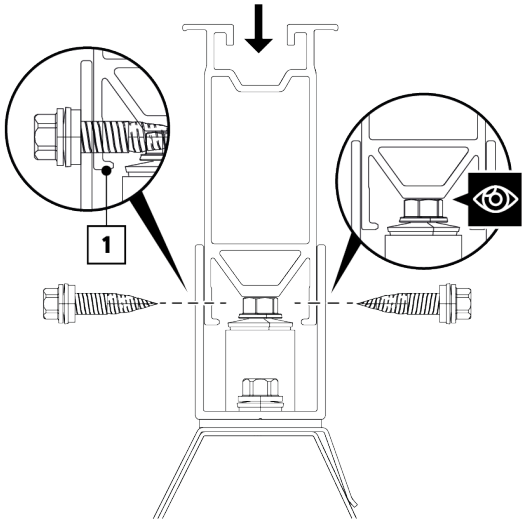

The **maximum** overhang of the TR mounting rail (1) for a TR15 bracket (2) is:

- **A= 600 mm for TR59 mounting rail**
- **A= 800 mm for TR74 mounting rail**

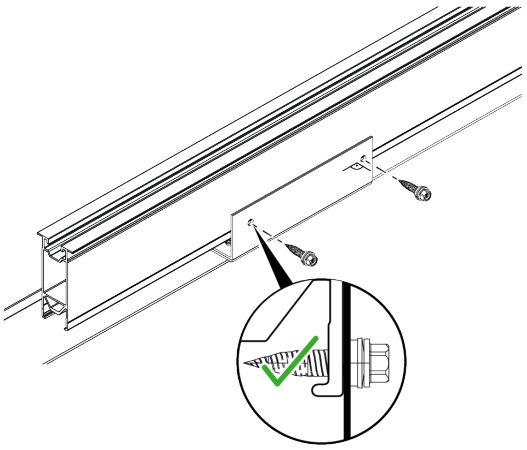
# TR - Insert mounting rail

- Insert the mounting rail into the TR15 bracket so that it lies flush on the drill screws with spacer sleeves.
- Make sure that the lateral holes of the TR15 are located above the bar (1).

Example: TR74 rail




- Fasten the TR mounting rail laterally with thin sheet metal screws*.
- Screw in the screws until the sealing washer visibly touches. The sealing washer must be compressed by approx. 30 %.

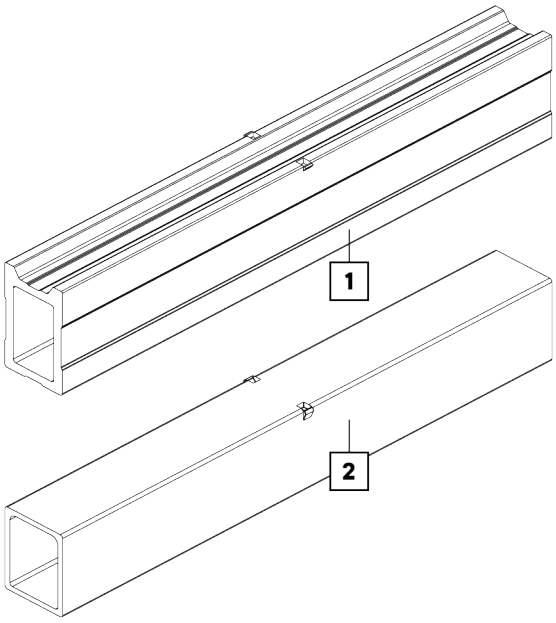


# MOUNT RAIL CONNECTOR

**TRCPN59 AND TRCPN74**

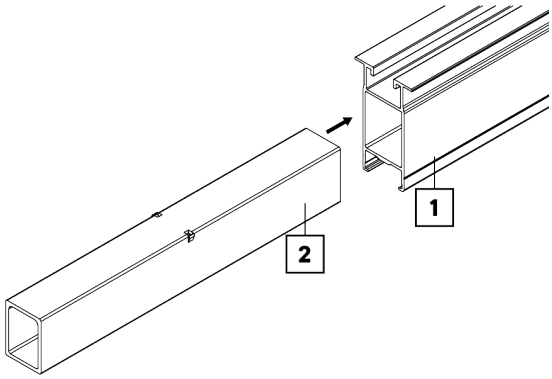
- Rail connector **TRCPN74** (1) for TR74 mounting rails.
- Rail connector **TRCPN59** (2) for TR59 mounting rails.

The following steps apply equally to the TRCPN74 (1) and the TRCPN59 (2).

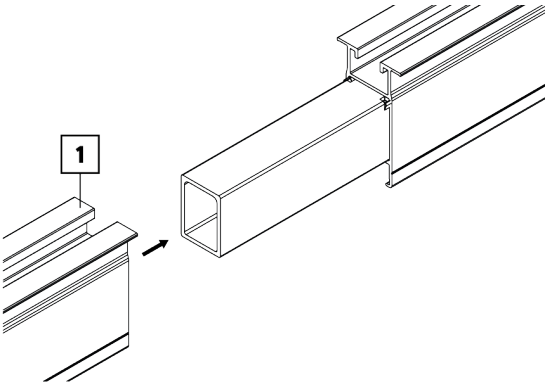



**INSERT RAIL CONNECTOR**

- Insert the rail connector (2) into the mounting rail (1).

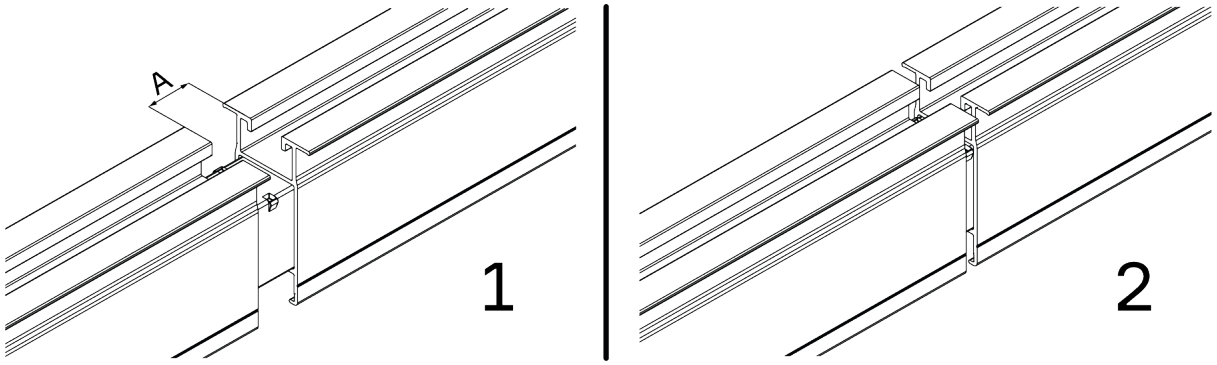



- Insert the second mounting rail (1).



## FLEXIBLE AND RIGID RAIL CONNECTION

Rail connections are distinguished between a rigid and flexible rail connection. Due to thermal expansion, a flexible rail connection is used for mounting rail lengths of **11.6 m** and above. The type of rail connection to be used is specified in the AEROTOOL planning documents as follows:


**(1) FLEXIBLE RAIL CONNECTION:**

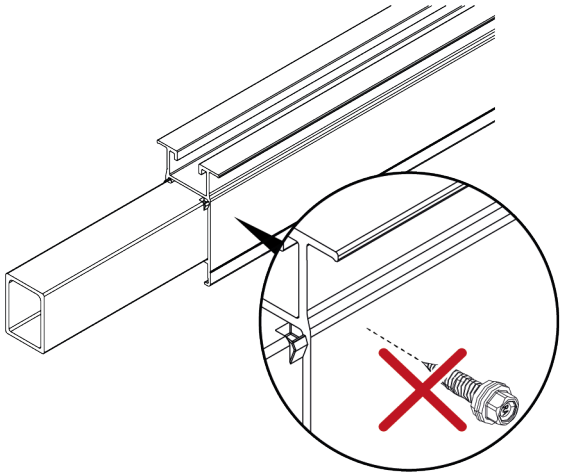
For the flexible rail connection, there must be a distance between the two rail ends of **A= 20 mm.**

**(2) RIGID RAIL CONNECTION:**

With the rigid rail connection, the mounting rails are inserted up to the stop of the rail connector.

## IMPORTANT INFORMATION ABOUT THE RAIL CONNECTOR

The rail connector may only be plugged in. It is **forbidden to** screw the connector to the mounting rail.

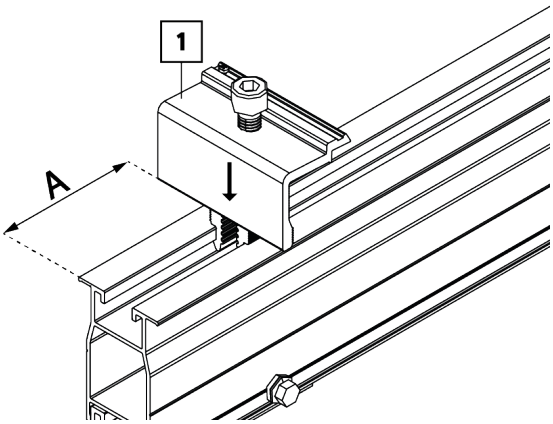


# INSTALLING MODULES

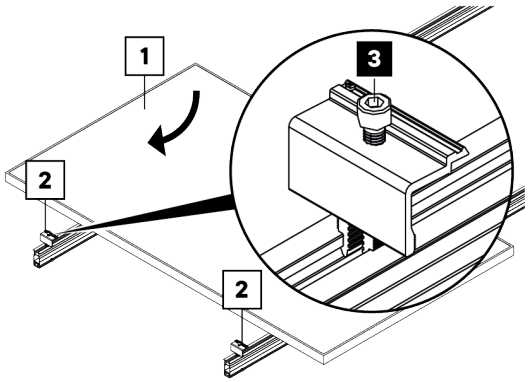
When mounting, wire the modules at the same time. The cables can be attached to the module with the cable tie clip (CLP-M). Do not enter the modules.

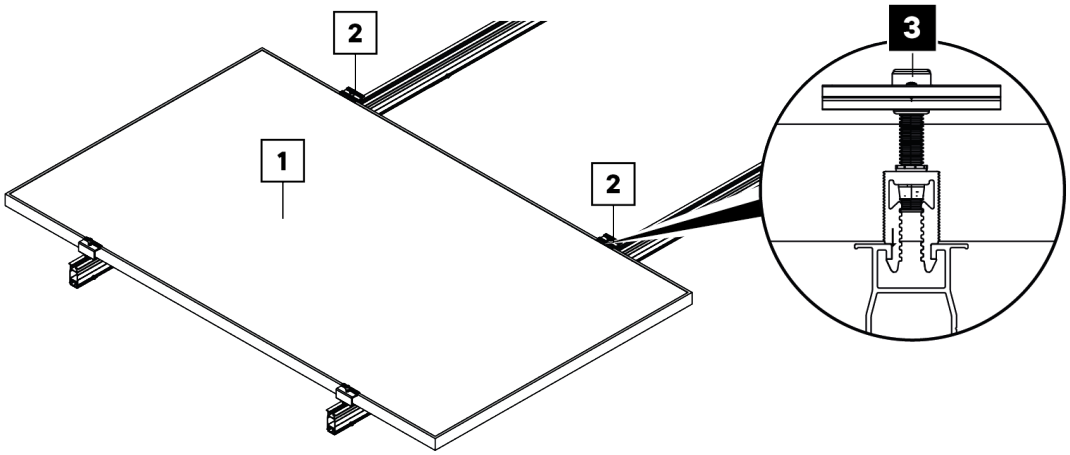
## Mount the first module row

- Attach the end clamps (1) to the TR mounting rails.
- The edge distance of the end clamps (1) of **A = 25 mm** must be observed.



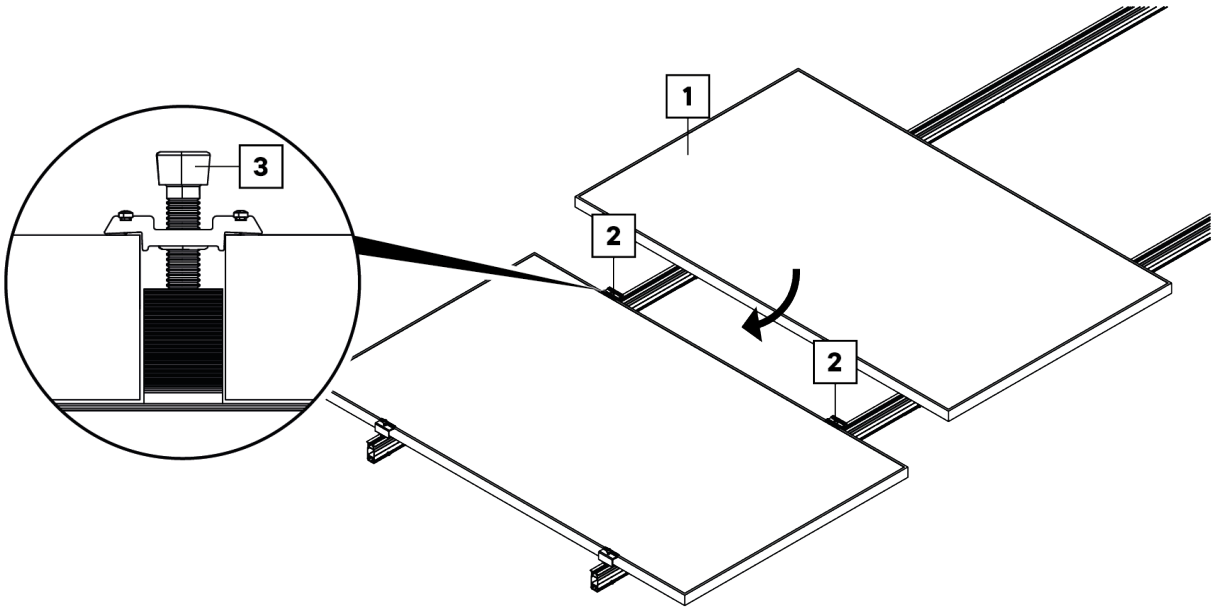

- Place the first module (1) and bring it up to the end clamps (2).
- Tighten the screws (3) on the end clamps (2) to a torque of 15 Nm or 11 ft lb.



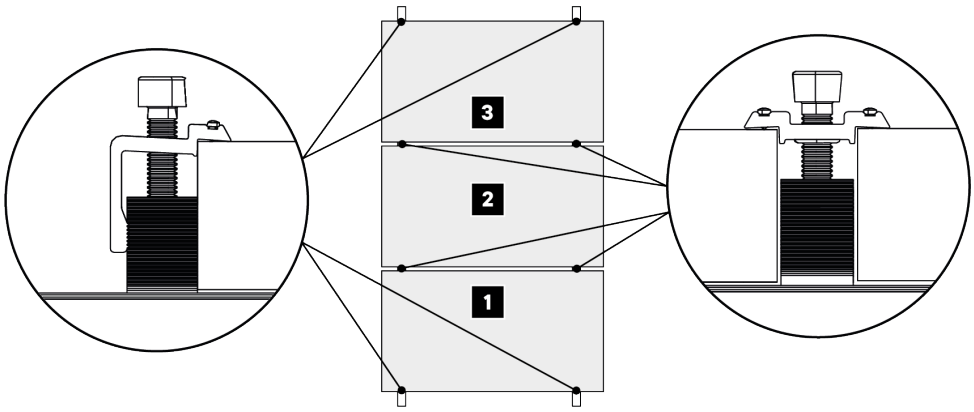

- Attach the center clamps (2) to the first module (1),

## Mounting the second module row




- Place the second module (1) and bring it up to the middle clamps (2).
- Then tighten the screws (3) of the middle clamps with a torque of 15 Nm or 11 ft lb.

## Mount further rows of modules




- Continue placing the modules row by row.
- Tighten the screws of all clamps to a torque of 15 Nm or 11 ft lb.

**REPOSITION / REPLACE CLAMPS**

- Dismantle the mounted clamp: Unscrew the screw on the clamp completely.
- Depending on the installation situation, press the clamp together at the side and pull it out or pull it out of the rail at the side.

# CABLE MANAGEMENT

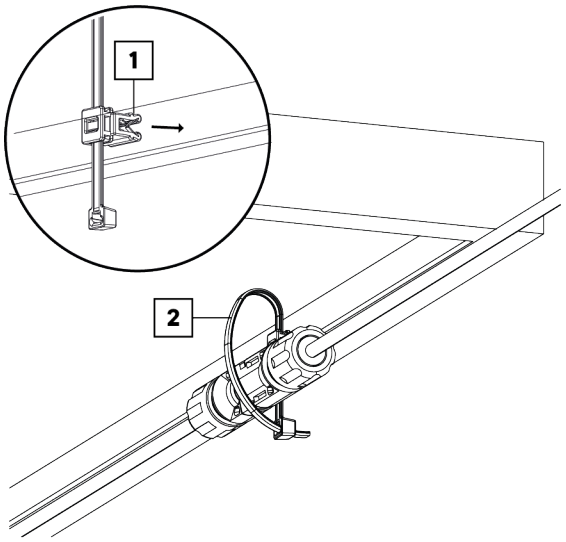
## CABLE CLIP CLP-M FOR MODULES

ⓘ The **CLP-M cable clip** is suitable for module frames with a sheet thickness of **1 - 3 mm.**

**CLP-M**
Cable tie clip for module frames with a thickness of 1 - 3 mm

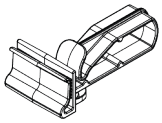
### ASSEMBLY

- Insert the CLP-M (1) into the module frame.
- The CLP-U is suitable for:
  - Solar plug (e.g. MC4)
  - Solar cable
- Then tighten the cable tie (2).




## CABLE CLIP CLP-U FOR MODULES

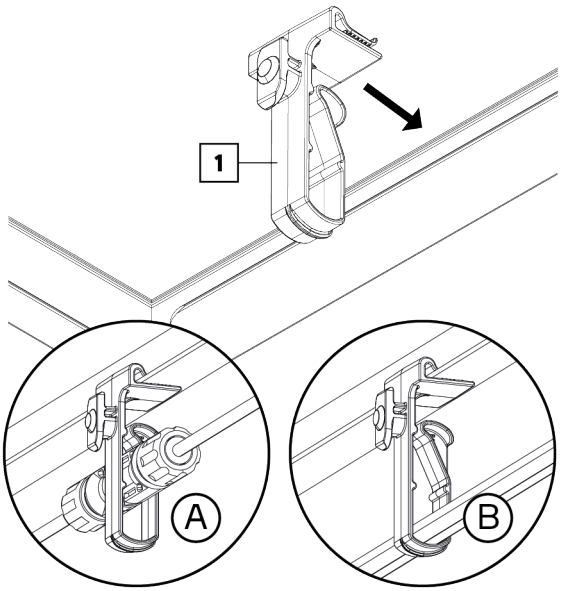
ⓘ The **CLP-U cable clip** is suitable for module frames with a sheet thickness of **1.5 - 3 mm.**



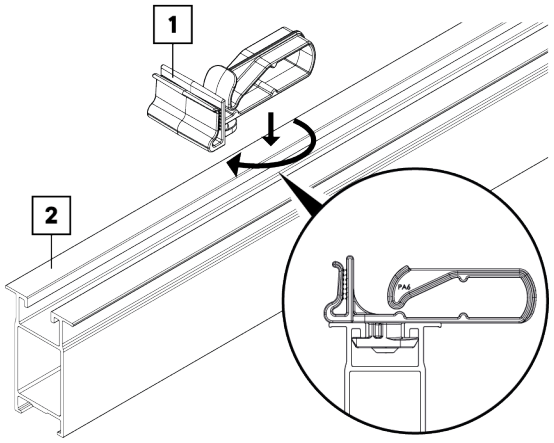
**CLP-U**
Cable clip universal

### ASSEMBLY

- Insert the CLP-U (1) into the module frame.
- The CLP-U is suitable for:
  - **A** - Solar connectors (e.g. MC4)
  - **B** - Solar wire

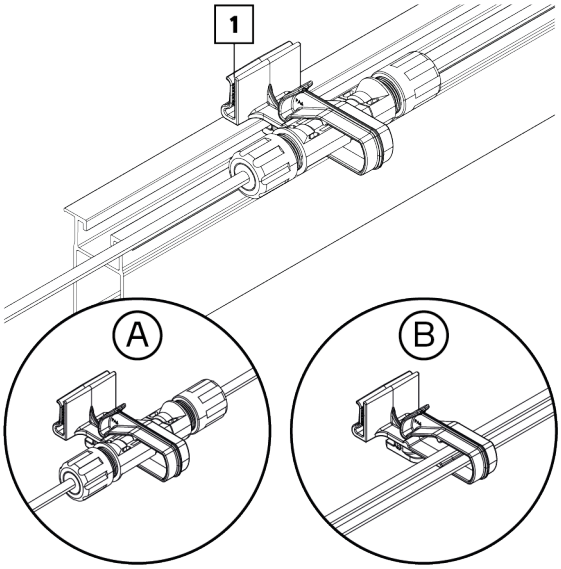


**MOUNT THE CLP-U CABLE CLIP TO THE TR MOUNTING RAIL**



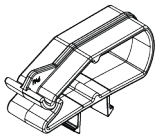

- Insert the cable clip (1) into the TR mounting rail (2) from above.
- Rotate the cable clip by 90°.

**Attention:**
Make sure that the cable clip is fully engaged in the rail channel.



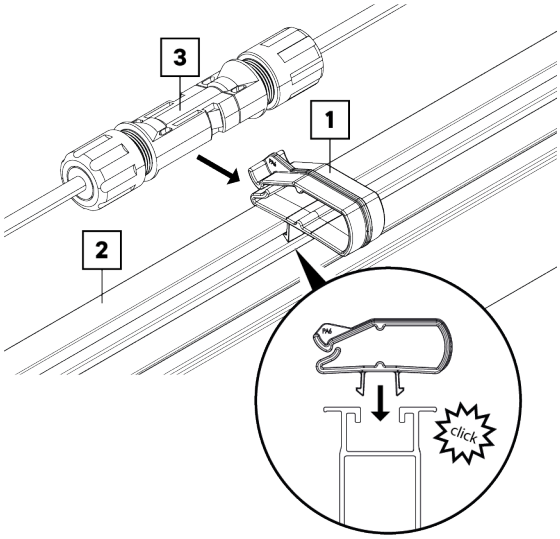

- The CLP-U (1) is suitable for:
  **A** - Solar connectors (e.g. MC4)
  **B** - Solar wire

**MOUNT THE CLP-R CABLE CLIP TO THE TR MOUNTING RAIL**



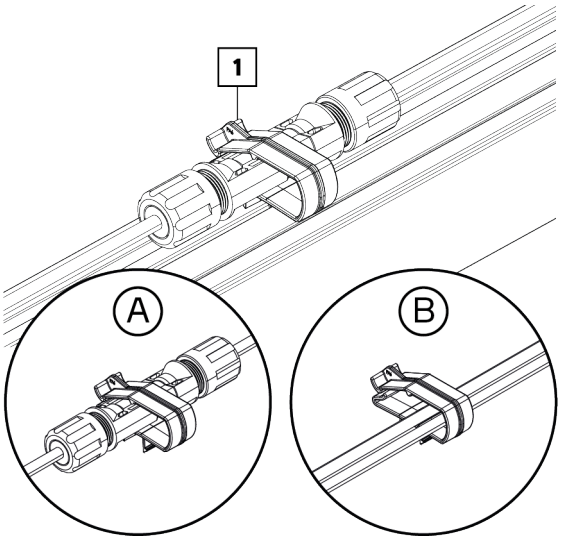
**CLP-R**
Cable clip rail

- Click the cable clip (1) into the TR mounting rail (2) from above.
- Insert the solar plug (3) from the side.




**Attention:**
Make sure that the cable clip is fully engaged in the rail channel.

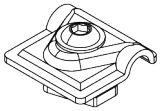
- The CLP-R (1) is suitable for:
  **A** - Solar connectors (e.g. MC4)
  **B** - Solar wire



# POTENTIAL EQUALIZATION

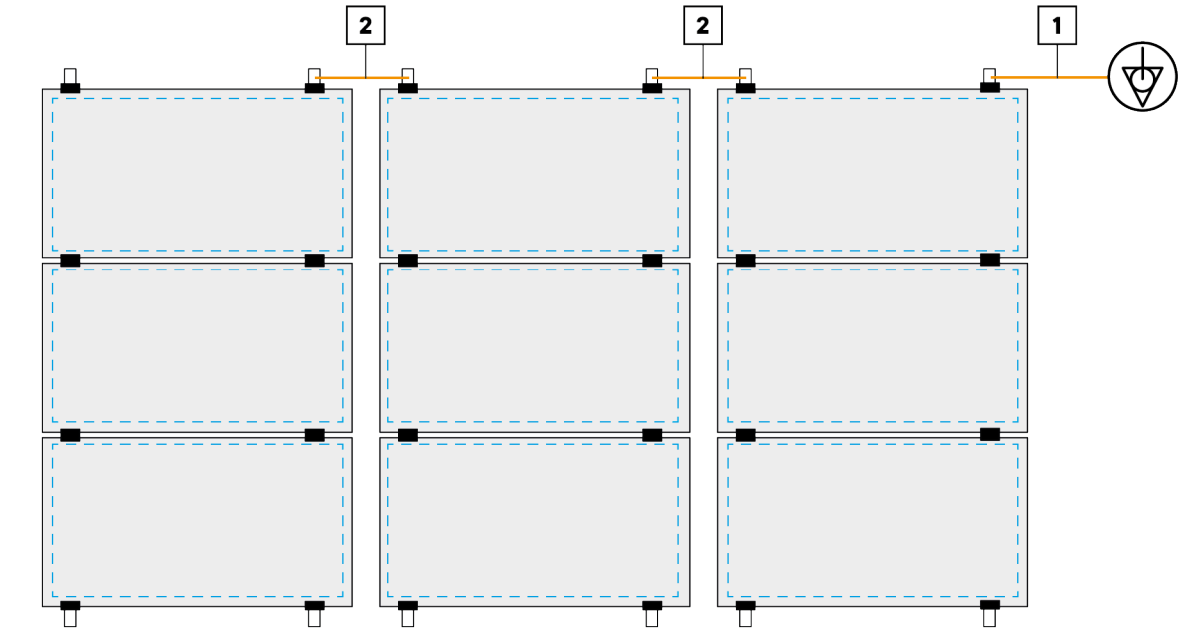
For potential equalization, **AEROCOMPACT Europe GmbH** provides the wire clamp as an accessory. These are each mounted on the mounting rail, depending on the mounting situation, the module rows are connected to each other by the module clamps.

### REQUIRED COMPONENTS



**WCL8-10**
Wire clamp 8 - 10 mm

### WIRING DIAGRAM FOR EQUIPOTENTIAL BONDING




- Attach the on-site potential equalization (1) to a point on the system.
- Create a connection (2) for the module columns.

### MINIMUM CROSS-SECTIONS FOR EQUIPOTENTIAL BONDING

**Caution!**
The specialist planner, contractor or installer is responsible for specifying the minimum cross-sections for equipotential bonding in accordance with the applicable legal requirements and standards. AEROCOMPACT Europe GmbH assumes no liability for this.

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# MAINTENANCE, DISASSEMBLY AND DISPOSAL

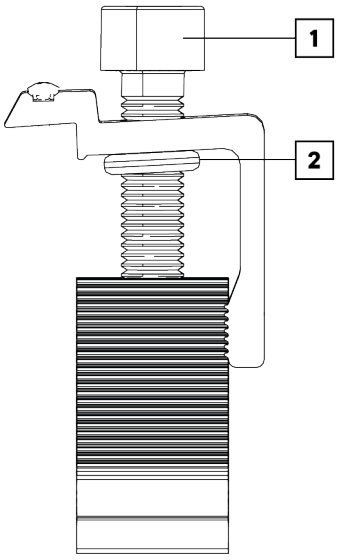
## MAINTENANCE

To prevent personal injury and damage to property, the system must be checked regularly by qualified personnel and annual maintenance is required.

- Check all system components for damage. In the event of damage, replace the affected component immediately.
- Check all screw connections. Tighten loose screw connections, observing the tightening torque specified in the installation instructions.
- Checking all components for damage caused by the weather, animals, dirt, deposits, build-up, vegetation, roof penetrations, seals, stability and corrosion. In the event of damage, clean, repair or replace the affected component.

## DISASSEMBLY

**DISMANTLE CLAMPS (EXAMPLE)**




ⓘ To disassemble the system, carry out the assembly steps in reverse order.

- Unscrew the screw (1) on the clamp completely.
- When reusing the clamps, make sure that the O-ring (2) is not lost.

ⓘ If the components are reused, it must be noted that these are wearing parts. Therefore, the AEROCOMPACT Europe GmbH cannot assume any responsibility for checking the degree of wear. For this reason, any liability or warranty of AEROCOMPACT Europe GmbH in case of reuse is excluded and reuse is at the installer's own responsibility.

ⓘ After completion of the assembly, it is mandatory to seal the sandwich panels in a careful and professional manner. A thorough inspection must then be carried out to ensure that the sandwich panels are suitable for further use.

## DISPOSAL

Unless a take-back or disposal agreement has been made, disassembled components should be recycled:

- Give metals and plastic elements for recycling.
- Dispose of remaining components sorted according to material composition.

ⓘ Incorrect disposal may result in hazards to the environment. In case of doubt, obtain information on environmentally sound disposal from the local municipal authority or from specialized disposal companies.

# APPENDIX

## DECLARATION OF PERFORMANCE

| | |
|---|---|
| Manufacturer: | **AEROCOMPACT Europe GmbH** |
| Designation: | **Long rail racking system CompactMETAL TR for sandwich sheet metal roofs** |
| Identification code: | **TR59, TR74** |
| Applied standard: | **EN 1090** |
| Certification body: | **2397** |

For the declaration of performance

## REVISION HISTORY

| Version | Chapter | Modification |
|---|---|---|
| v3.5 | "Cable management" on page 21 | New chapter added |
| | | |
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