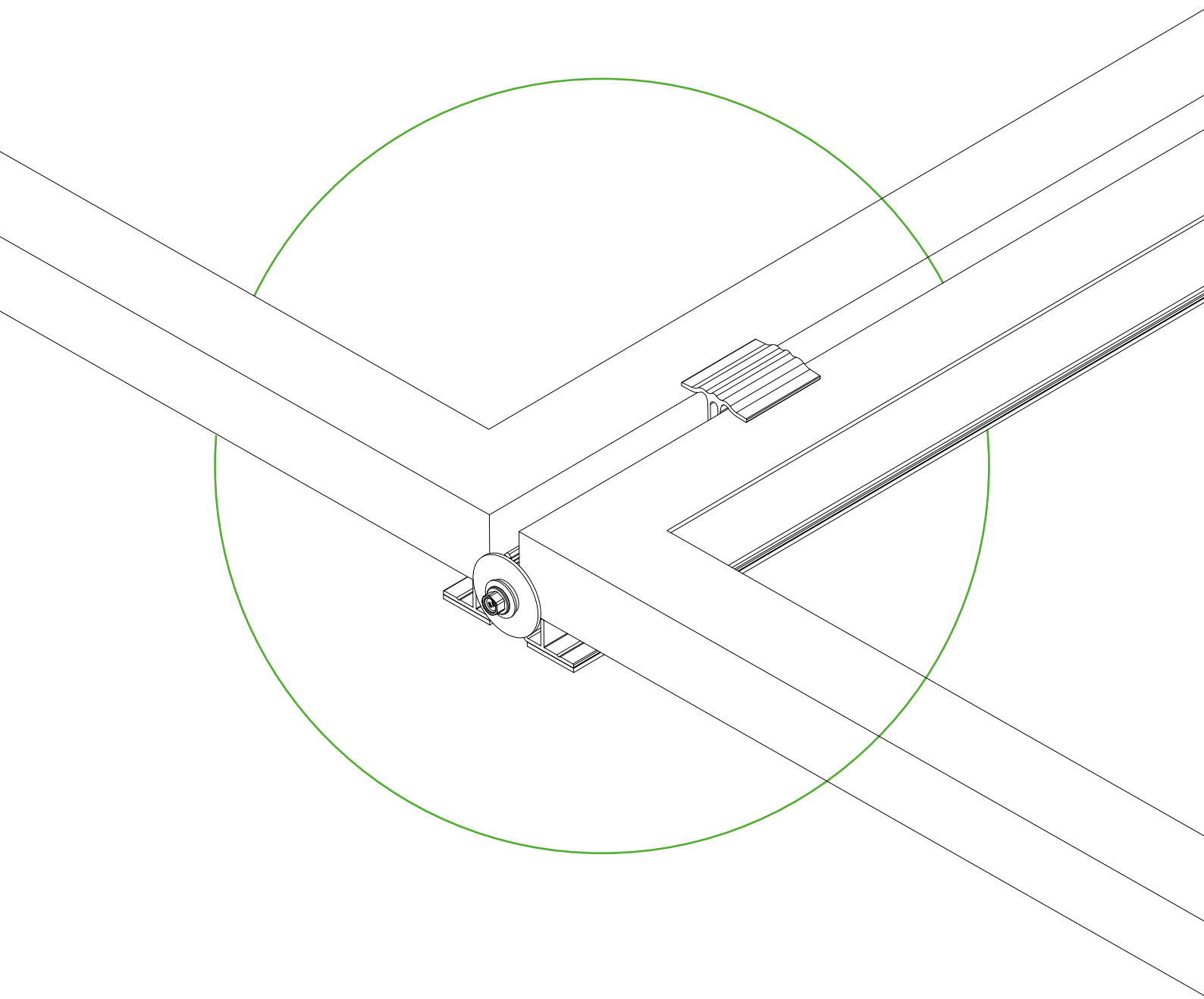
PMT GHOST

ASSEMBLY INSTRUCTIONS



TO A FINISHED SYSTEM
IN JUST **THREE STEPS**

Contents

PMT GHOST

INTERACTIVE ASSEMBLY INSTRUCTIONS

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General Safety Instructions

Please note that our general safety instructions must be observed.

Installation by specialists only

PMT photovoltaic substructures may only be assembled and commissioned by qualified personnel. These persons must be able to ensure the proper and professional assembly of our products on the basis of their professional aptitude, which they have acquired, for example, through training or professional experience.

Before assembly starts:

1. Check the structural requirements of the roof and the building:
Before installing the PMT photovoltaic substructure, it is imperative that the customer checks whether the roof and building structure permits the safe installation and operation of the photovoltaic system. This must be checked on site by a qualified person, e.g. a structural engineer, before installation. The information in the project report is based only on planning assumptions, which do not necessarily have to correspond to the conditions on site. Static requirements must therefore be clarified on site and in advance of assembly. Before proceeding, ensure you have confirmation from a qualified person and do not begin assembly without such a document.

2. Compliance with building and accident prevention regulations:
National and local building regulations, standards and environmental protection regulations must be strictly observed.

Occupational safety and accident prevention regulations as well as the regulations of professional associations must be observed.

In particular, the following must be taken into account:

- It is necessary to wear safety clothing [esp. safety helmet, work shoes and gloves].
- For roof work, the regulations for work on the roof must be observed [e.g. use of fall protection, scaffolding with safety gear from an eaves height of 3 m etc.].
- The presence of two people is mandatory for the entire assembly process in order to be able to provide rapid assistance in the event of an accident.

3. Check installation instructions for updates:
PMT assembly systems are subject to continuous further development. Assembly procedures can change as a result. Therefore, be sure to check the assembly instructions for updates before assembly. They can be found at **https://pmt.solutions/downloads/.** On request, we will also be happy to send you the current version of the assembly instructions.

During the entire assembly time, it must be ensured that a copy of the assembly instructions is available to each installer.

4. The module manufacturer's assembly instructions must also be observed.

5. Equipotential bonding between the individual system parts must be carried out in accordance with the relevant country-specific regulations.

PMT assumes no liability for damages resulting from non-compliance with general safety instructions.

General System Notes

a. Basics of planning with PMT PLAN

What is PMT PLAN for?

PMT PLAN is used to plan the substructures distributed by PMT on roofs on the basis of data entered by the user and the planning assumptions based on this, which are stored in PMT PLAN.

Who can plan with PMT PLAN?

Requirement of expertise for planning with PMT PLAN
The proper and correct use of PMT PLAN requires expertise and experience not only in the field of substructures for solar power systems, but also in the construction industry with regard to the roofs on which the entire system is to be used by the end customer.

How does PMT PLAN make plans?

1. Data input by the user as the basis for planning
The starting point and basis for planning with PMT PLAN is always and exclusively the project data entered by the user. PMT does not check the accuracy of these data. Rather, the user is solely responsible for correct data collection and entry in PMT PLAN.

Attention: If the data is not collected and/or entered correctly by the user, this will have an impact on planning. Changes may lead, among other things, to deviating quantities of material and deviating static requirements. This may lead to personal injury as well as financial losses for which PMT assumes no liability.

2. Planning assumptions in PMT PLAN
PMT PLAN processes data entered by the user and uses certain planning assumptions in the process. These planning assumptions in turn result from technical regulations that underlie the calculations of PMT PLAN.

Which planning assumptions underlie the concrete planning can be taken from the project report?

PMT PLAN takes into account the Eurocodes, i.e. the European-wide uniform rules for measurement in the construction industry, including national annexes, as well as national building regulations.

PMT endeavours to ensure the up-to-dateness of the Eurocodes taken into account by means of updates. However, we would like to point out that after the publication of new rules, a certain period of time is always required to implement them in the software, which is why there is no entitlement to appropriate updates and the user is always responsible for observing the latest state of the rules on which the program is based.

The rules are applied on the basis of the specified location. It is the responsibility of the user to check planning assumptions for their correctness.

Attention: If planning assumptions are not checked by the user for correctness, this has an impact on the planning. Changes may lead, among other things, to deviating quantities of material and deviating static requirements. This may lead to personal injury as well as financial losses for which PMT assumes no liability.

3. What is the purpose of the project report?
What does “What's important is what's on the roof” mean?
PMT PLAN creates a project report based on the user's input. However, this planning report cannot and should not replace the expert planning based on actual conditions on site.

The project report is therefore not the end of your project planning, but the beginning.

The only appropriate professional approach is the following, which is the sole responsibility of the user:

First step: Before ordering the photovoltaic substructures and even more so before assembling them on the roof, the user must check the correctness and plausibility of the data, planning assumptions and results in the project report.

Second step: ("What's important is what's on the roof!") It is imperative that the user verifies the project report also on the basis of the actual conditions on the roof. In our experience, project-specific features must be taken into account for each roof, which usually only arise on the roof on site.

If the user does not have the necessary expertise to review the project report, they must consult an expert for this purpose.

If changes arise from these mandatory audit steps compared to the project report, a new planning must be carried out with the changed data in PMT PLAN.

Attention: If the data is not and/or not correctly verified by the user based on the actual circumstances, this has an impact on the planning. Changes may lead, among other things, to deviating quantities of material and deviating static requirements. This may lead to personal injury as well as financial losses for which PMT assumes no liability.

4. In addition, which other technical requirements must always be observed by the customer and checked independently?

a. Technical requirements for the roof and its components

PPMT PLAN assumes that the roof and its components are suitable for the installation of a photovoltaic system and that the customer has had this verified by an expert prior to planning.

PMT PLAN does not guarantee the compatibility of the PMT photovoltaic substructure with the roof in terms of roof covering, roof substructure and roof construction. Rather, this is to be checked by the user themselves.

Before installation, users must ensure that the functional layers of the roof structure (e.g. waterproofing layer, thermal insulation layer) are suitable and designed for the installation of photovoltaic systems. In particular, it must be ensured by the user that the suitability for use of the thermal insulation layer continues to exist despite the additional loads which arise as a result of the assembly of the solar power system (substructure and solar modules).

Tip: To do this, obtain the approval of the manufacturer of the individual components and verify the manufacturer's specifications with the conditions on site on the roof.

The user must check the suitability, load-bearing capacity and serviceability of the entire roof structure for the assembly of the solar power system as a whole.

A structural engineer must be consulted to check the loadbearing capacity. PMT-PLAN does not replace this check under any circumstances.

Attention: If the user does not check the compatibility of the photovoltaic substructure with the roof and/ or does not check it properly, this will have an impact on the planning. Changes may lead, among other things, to deviating quantities of material and deviating static requirements. This may lead to personal injury as well as financial losses for which PMT assumes no liability.

b. Static requirements

PMT PLAN does not take into account the static requirements of the building on the roof of which the solar power system is to be built.

Building and roof statics must therefore be professionally checked by the user before assembly on his own responsibility.

A structural engineer must be consulted for this purpose. PMT-PLAN does not replace this check under any circumstances.

Attention: If the building statics are not checked or not checked correctly by the user, this has an impact on the planning. Changes can lead, among other things, to deviating quantities of material and deviating static requirements. This may lead to personal injury as well as financial losses for which PMT assumes no liability.

c. Photovoltaic modules

PMT-PLAN enables planning with a variety of photovoltaic modules. However, due to the large number of photovoltaic modules available on the market, not all modules are stored in the database. Missing modules are added to the database on a separate request based on the module manufacturer's data sheet.

PMT does not guarantee that the module data is up to date. In particular, dimensions and weight parameters must be verified by the customer before planning.

PMT-PLAN only takes into account the dimensions and weight of the modules. Other parameters are not taken into account.

Therefore, please check the compatibility of the module with the substructure before assembly on the basis of the assembly guidelines of the module manufacturer.

PMT-PLAN requires that the module may also be used in the mounting form clamping on the short module sides. Therefore, please check whether the clamping points of the module comply with the manufacturer's specifications before assembly. If the connection points do not correspond to the specifications of the module manufacturer, it is recommended that the module manufacturer be contacted in order to obtain approval of the planning.

This approval can either be generally available as part of the module certification or possibly also be granted by the module manufacturer on a project-specific basis.

Attention: If the compatibility of the substructure with the solar modules is not clarified by the user, this can lead to financial losses for which PMT assumes no liability.

Assembly Instructions and Maintenance

Assembly instructions

Assembly should not begin until the construction manager's written instructions have been received.
The components of PMT's installation system are used exclusively for fastening PV modules. Depending on the type of roof on the building and the characteristics of the roof, the components intended for this purpose should be used. The exact item details can be found in the project documents, consisting of the project report and the CAD plan.

When using the assembly system, it is essential to observe the assembly instructions, safety instructions and system instructions.

In the event of improper use of the components, noncompliance with the notes and the use of components not belonging to the system, all warranty, guarantee and liability claims against PMT are void. The user is liable for damage and consequential damage to other components, PV modules or the building, as well as for personal injury.

Before starting the assembly, the compatibility between the roof skin and the assembly system must be tested and ensured and the roof checked for damage of any kind. These must be recorded in the **Roof Inspection Protocol**. Repair work may be necessary.

In the case of very uneven roofs or roof seals, compensation measures must be taken if necessary to ensure uniform load introduction. In order to ensure a flat support of the rails on the raised bead of the trapezoidal sheet, the roof surface must be cleaned before construction begins and impurities, such as moss, leaves, dirt, stones, etc. removed.

The necessary distances to the roof edges specified in the project documents must be observed. The maximum module field size depends on the type of roof.

The surface load must not exceed the residual load-bearing capacity of the building. It must be ensured that the runoff of rainwater is not hindered. Roof drainage must be included in the assembly planning.

It must be checked whether lightning protection provisions have to be changed and reworked as a result of the assembly of the PV system. A thermal separation (distance between rail joints) must be maintained according to the PMT PLAN project documents.

Attention: If the actual module dimensions exceed the module widths specified in the table, assembly must not be started.

The specified tightening torques in these assembly instructions must be strictly observed.

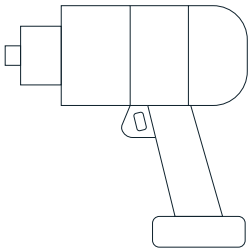
After events such as storms, heavy rain, earth movements, etc., the system must be checked by a specialist for damage. If damage is detected during the inspection, these must be remedied immediately. Defective components must be replaced by new components.

Maintenance

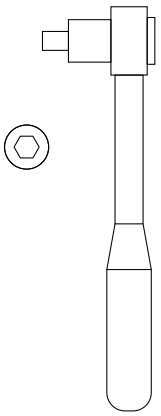
Provided that all safety regulations, system requirements, and installation instructions have been followed and the installation has been carried out correctly in accordance with this mounting manual, PMT GHOST is characterized by a largely maintenance-free operation.

Required Tools

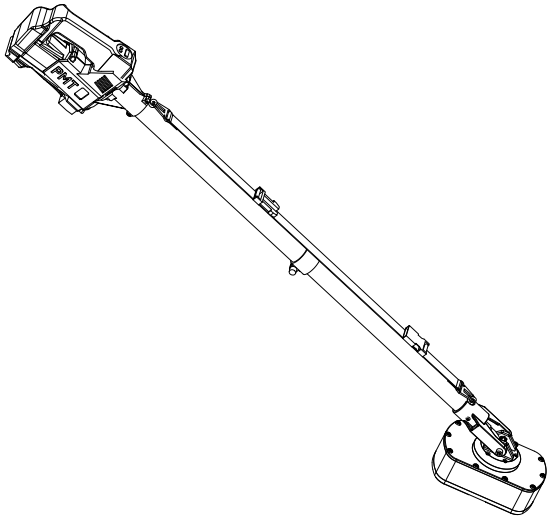
1 cordless driller with attachment SW 8 mm



2 Torque-wrench with attachment Hexagon socket SW 8 mm



3 PMT GHOSTBUSTER



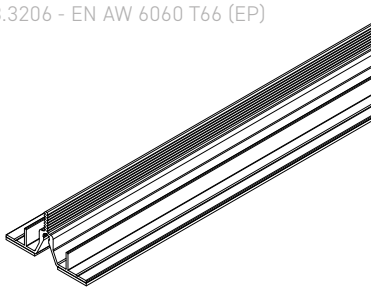
4 Assembly aid (optional tool)

Attention! Some components are available in different lengths and versions.
The exact article versions can be found in the project documents.

Component Types

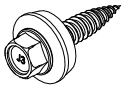
A Rail

3.3206 - EN AW 6060 T66 (EP)



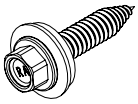
B Self-tapping screw

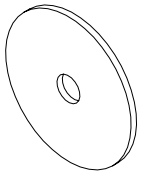
A2



C Self-tapping screw with washer

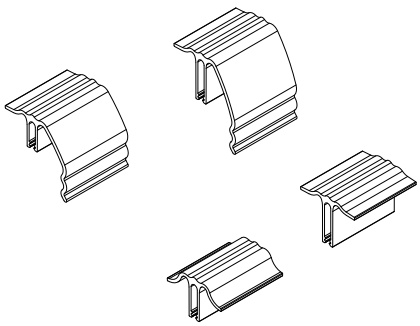
A2





D Middle and end clamps

3.3206 - EN AW 6060 T66 (EP)

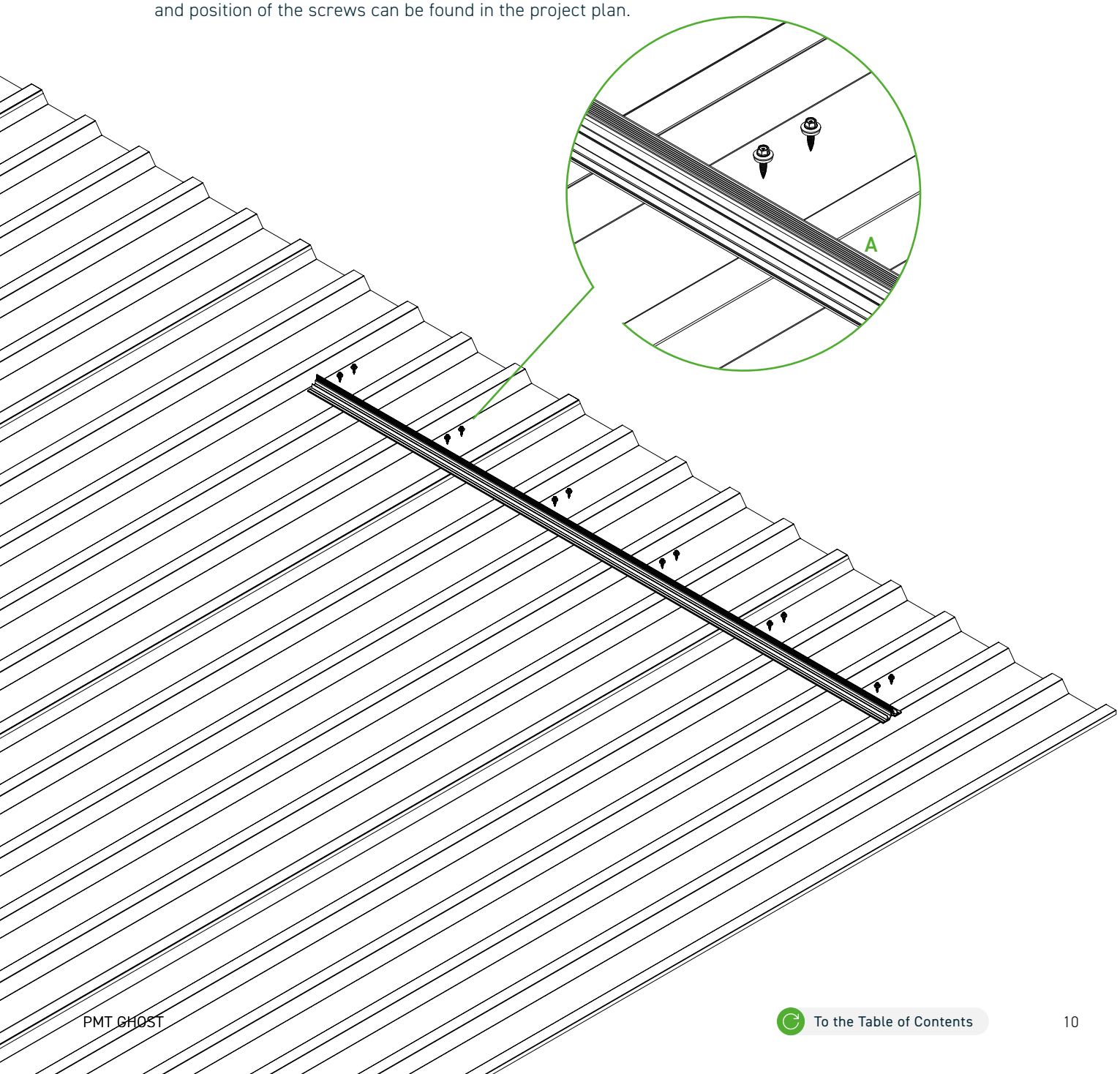


1

Position the first rail **A** and screw it to the raised bead of the trapezoidal sheet metal on the ridge.

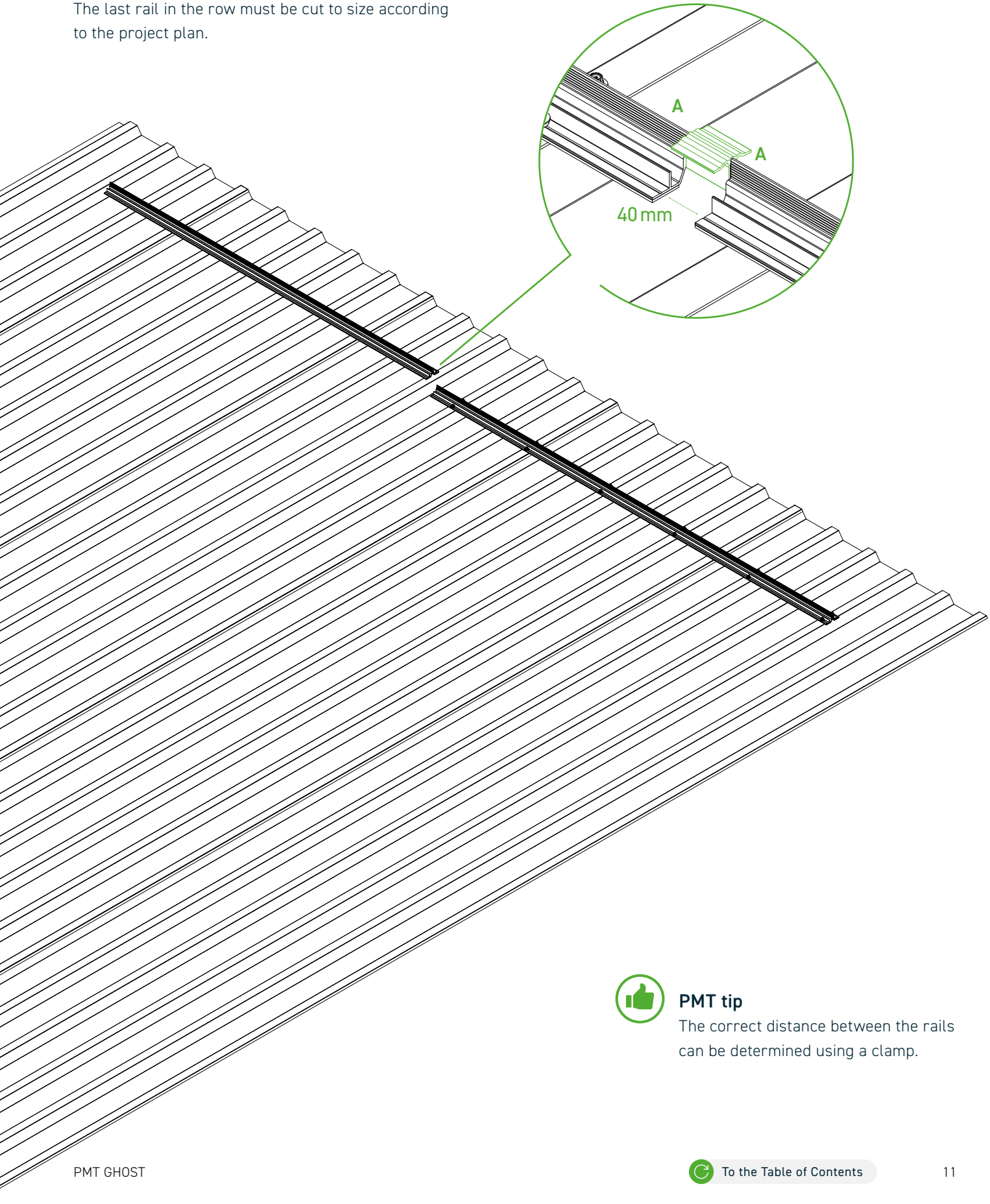
Note
The position of the rails in relation to the bargeboard can be found in the project plan.

Attention!
The number of rails, the screw type and the number and position of the screws can be found in the project plan.



1.1

Attach the next rail **A** and continue the row.
The last rail in the row must be cut to size according to the project plan.

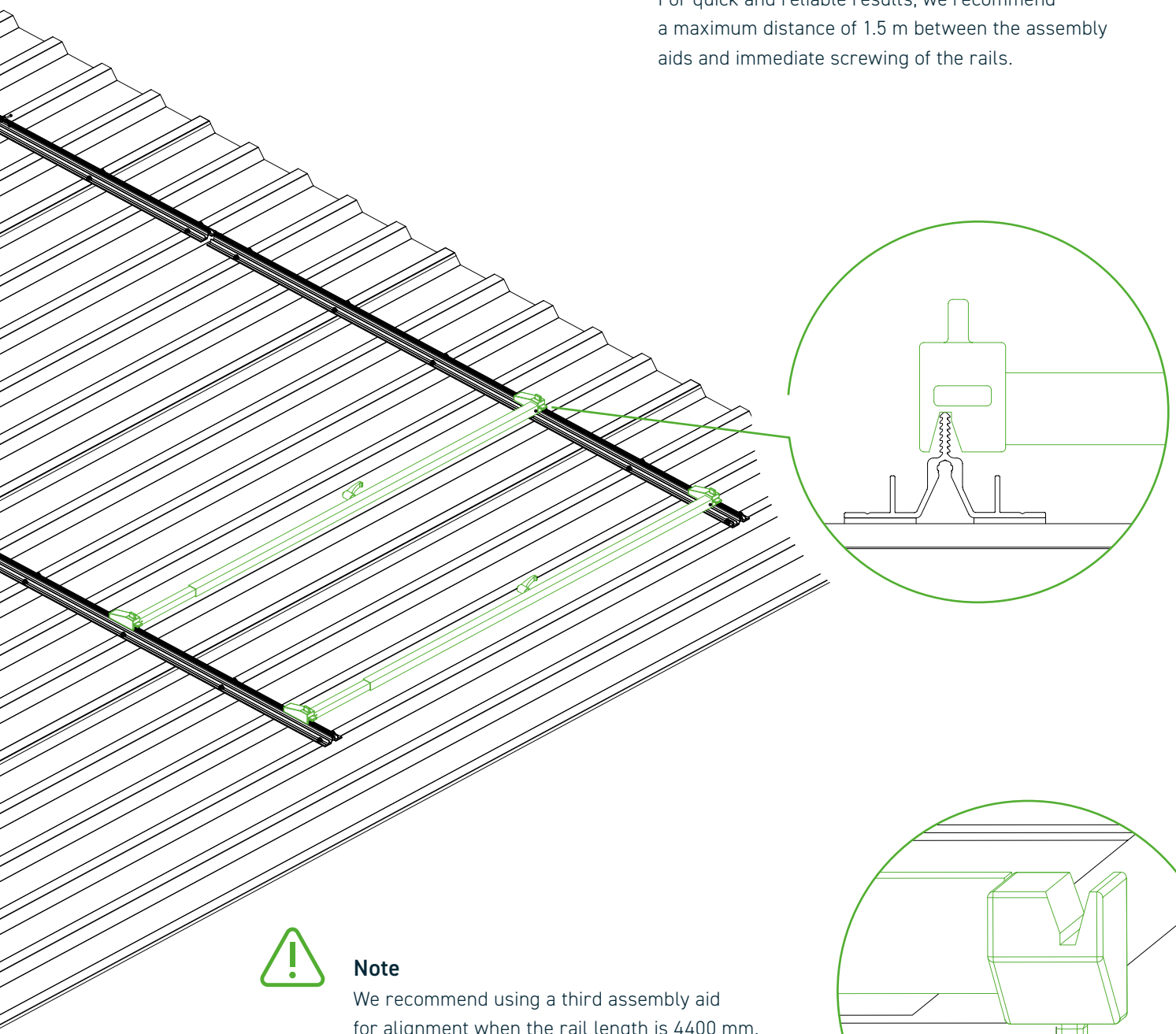


PMT tip
The correct distance between the rails can be determined using a clamp.

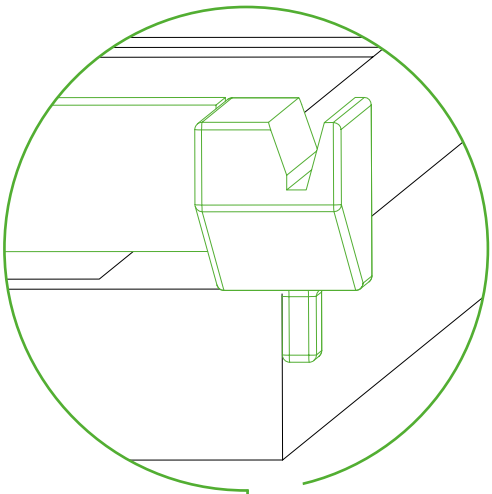
1.2

Use the assembly aid to define the position of the second rail **A** in the direction of the eaves and screw it on. Repeat the process until the planned system field size in the direction of the ridge is reached.

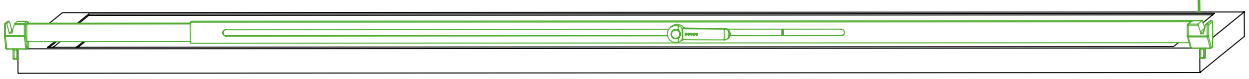
PMT tip
For quick and reliable results, we recommend a maximum distance of 1.5 m between the assembly aids and immediate screwing of the rails.



Note
We recommend using a third assembly aid for alignment when the rail length is 4400 mm.

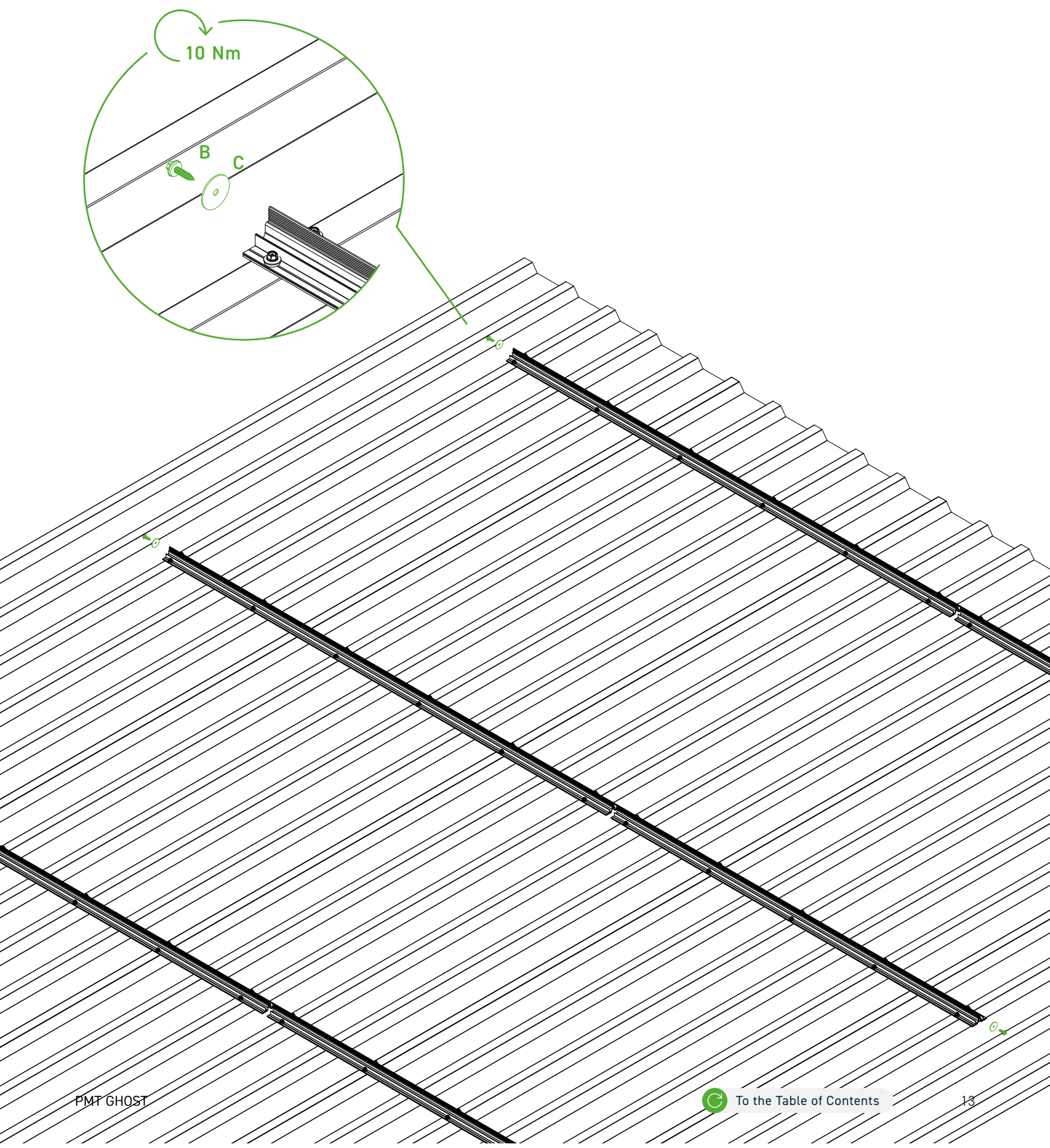


Assembly aid setting = Module length
Align the spigot flush with the end of the module to determine the distance.



2

Attach screws **B** and washers **C** and mount on both sides of the system.

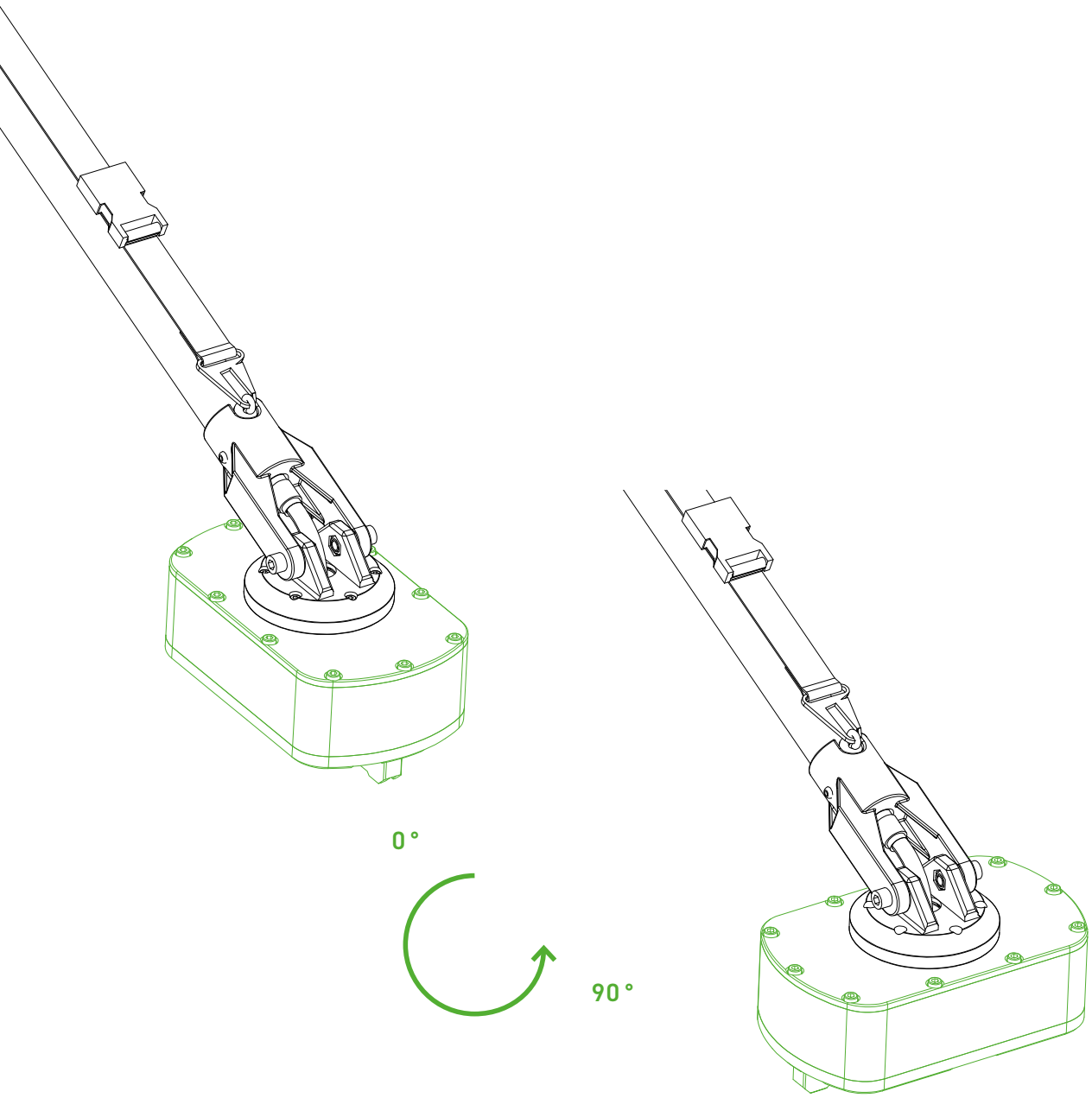


3

Preparation of the Buster assembly tool.

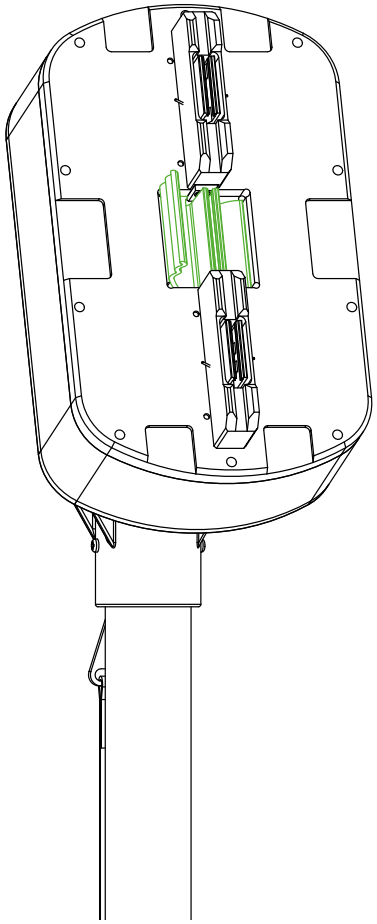
The assembly unit can be mounted at 0° or 90°, depending on the side of the module to be assembled (vertical or horizontal assembly).

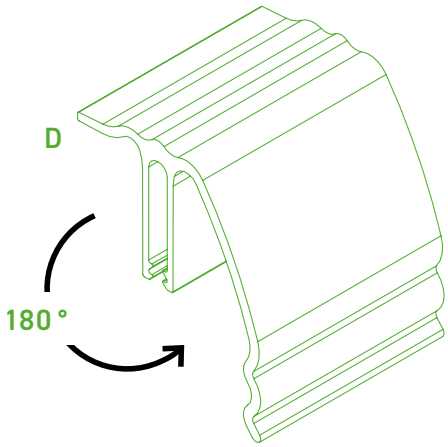
To turn the assembly unit, remove the locking pin, turn the unit and reinsert the locking pin.

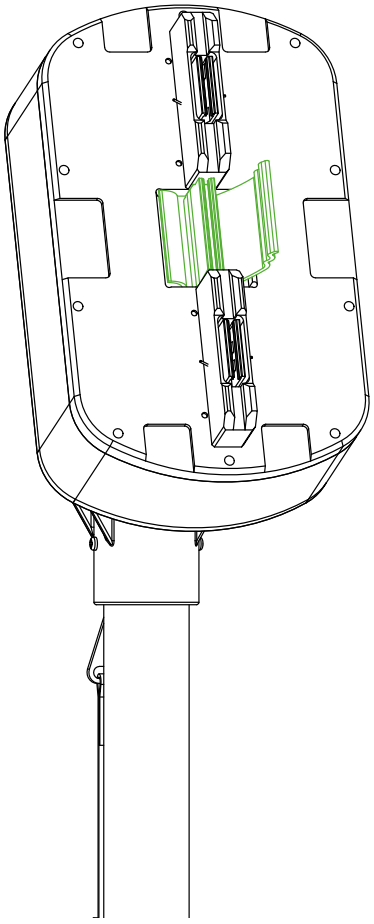


3.1

Insert end clamp **D** into the Buster, depending on the direction in which the modules are mounted.







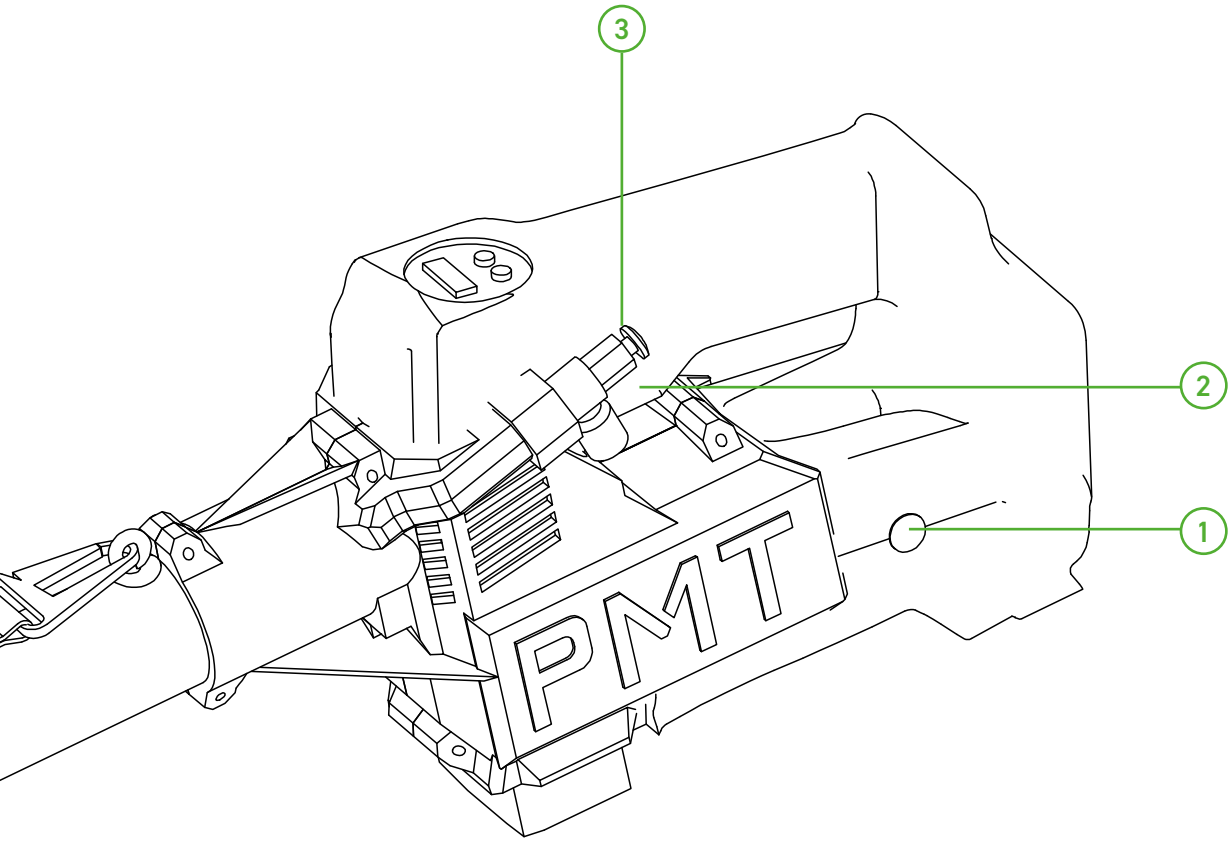
The Buster is switched on and off using the button **1** on the side.

The buster is set to an operating pressure of 2.3 bar.

Press and hold button **2** to mount the clamps until the device switches off automatically.

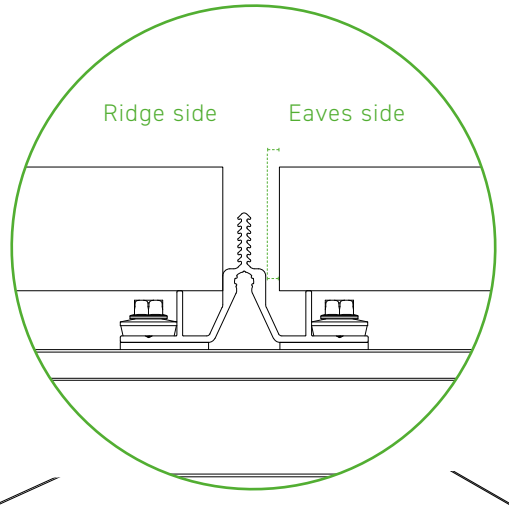
Finally, activate vent valve **3** until no air discharge is audible, the buster has been fully vented, and it has returned to its initial position.

The buster can now be removed from the rail and fitted with a new middle clamp.

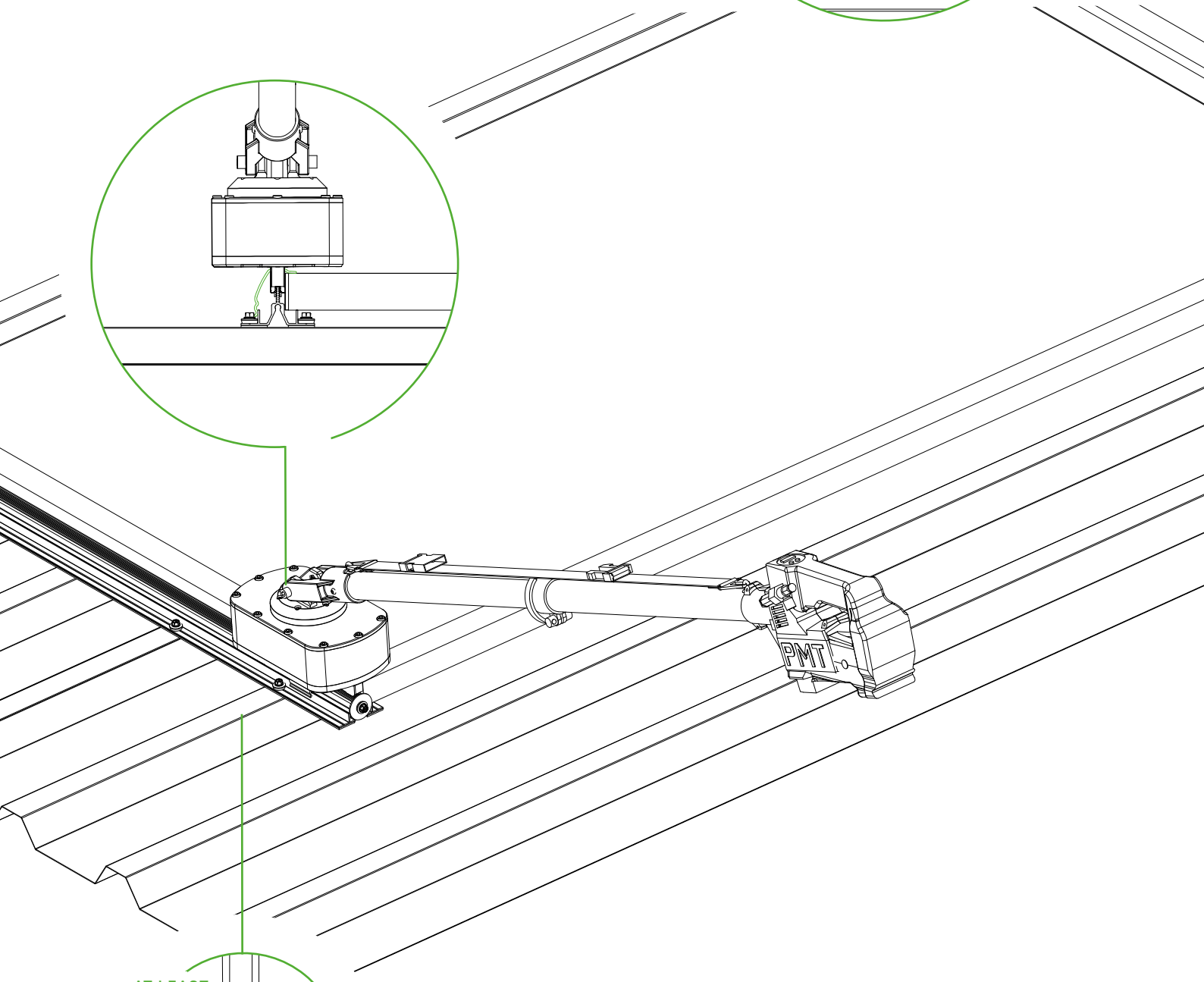


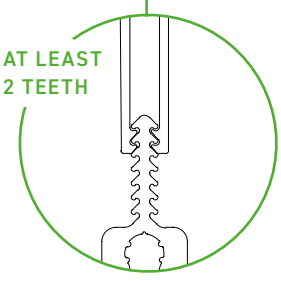
Note
It is essential to maintain the specified working pressure.

Position the first row of modules on the bar of the rails and use the Buster to fix the end clamp **D**.



Note
The module edge must always be in contact with the rail on the eaves side. This means that there must be a gap on the ridge side (thermal separation).

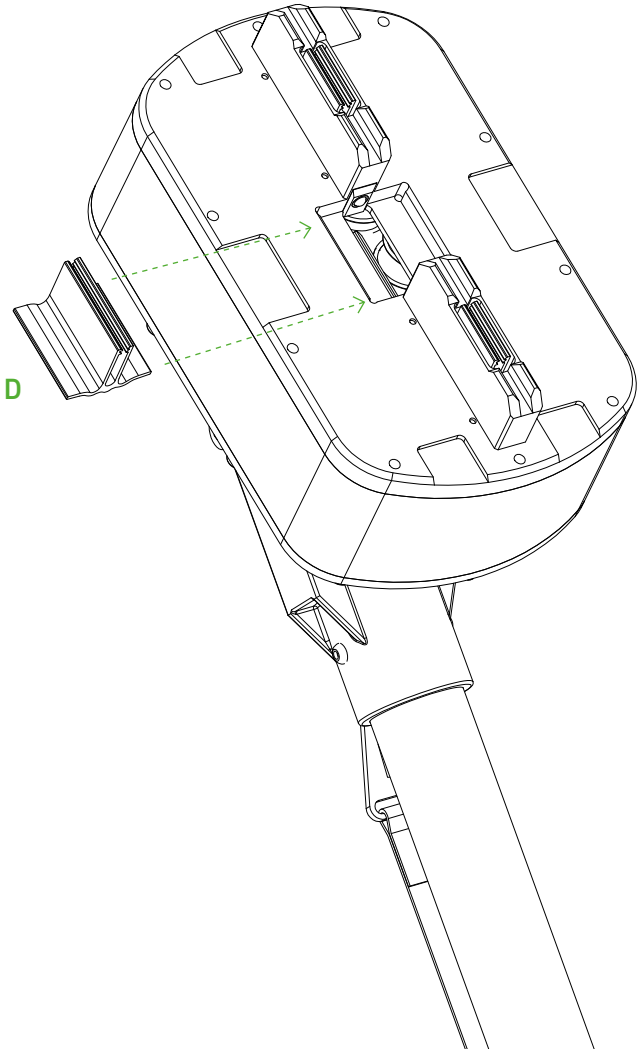


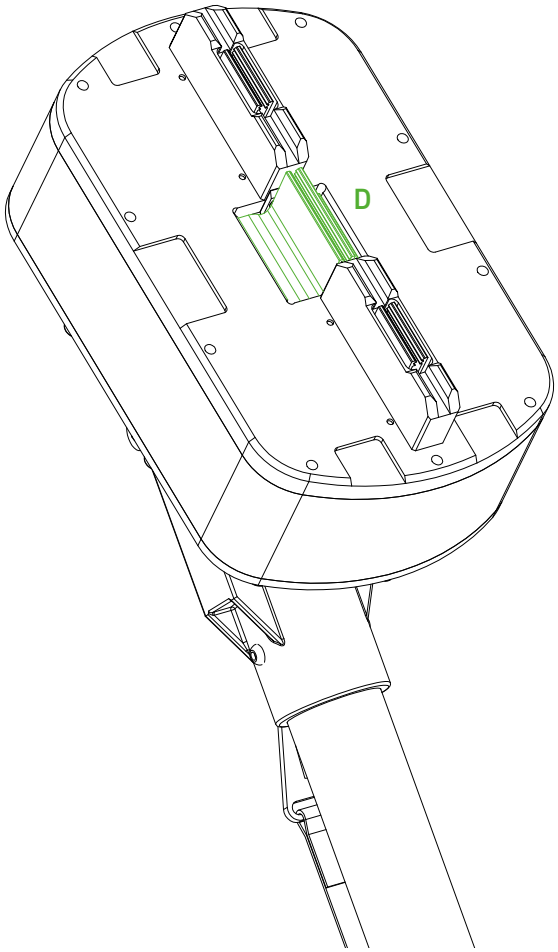


Attention!
Please refer to the project report for the number and positioning of the clamps.

3.2

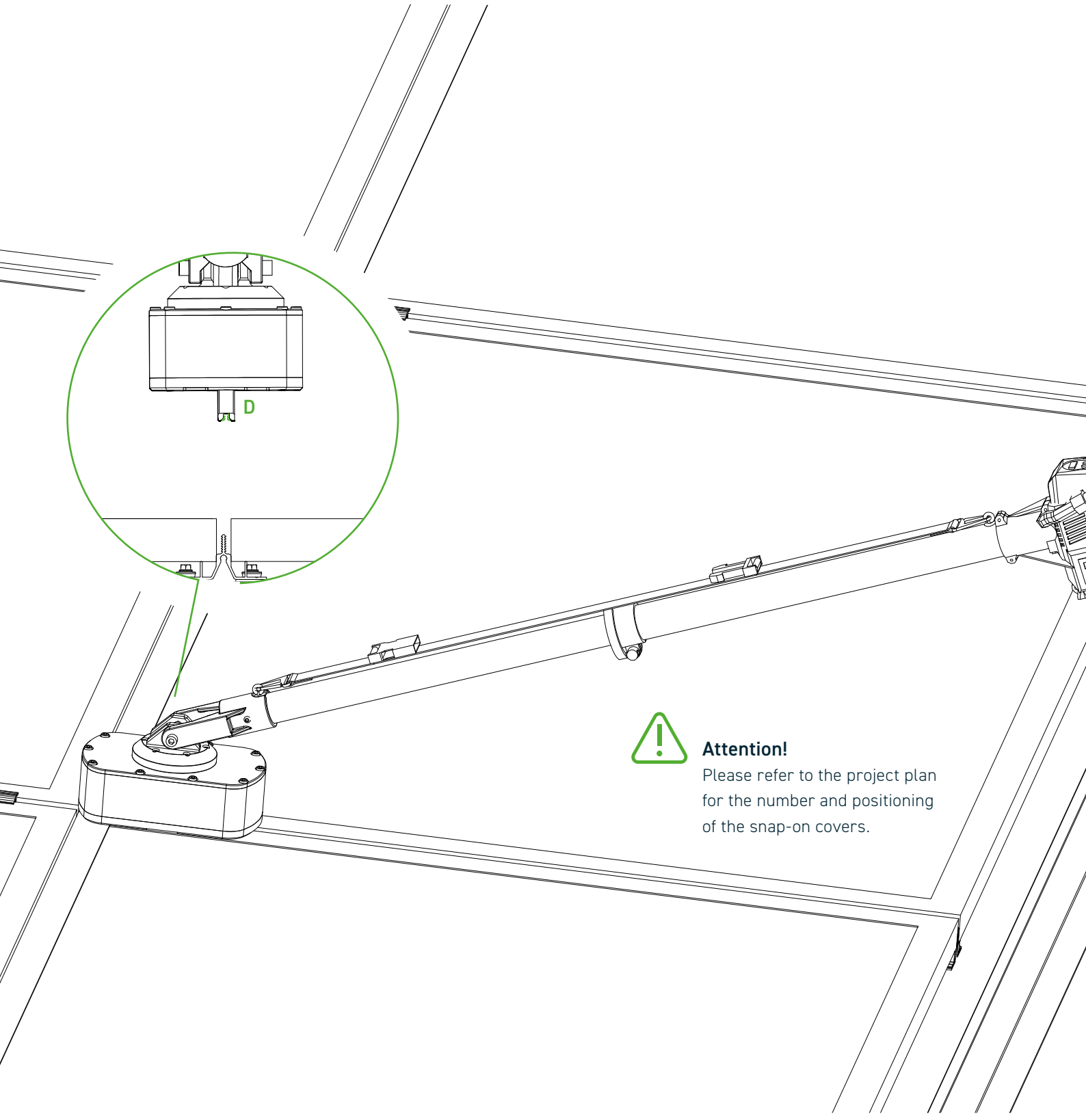
Insert the middle clamp **D** into the Buster.





Position the first row of modules on the bar of the rails and use the Buster to fix the middle clamp **D**.

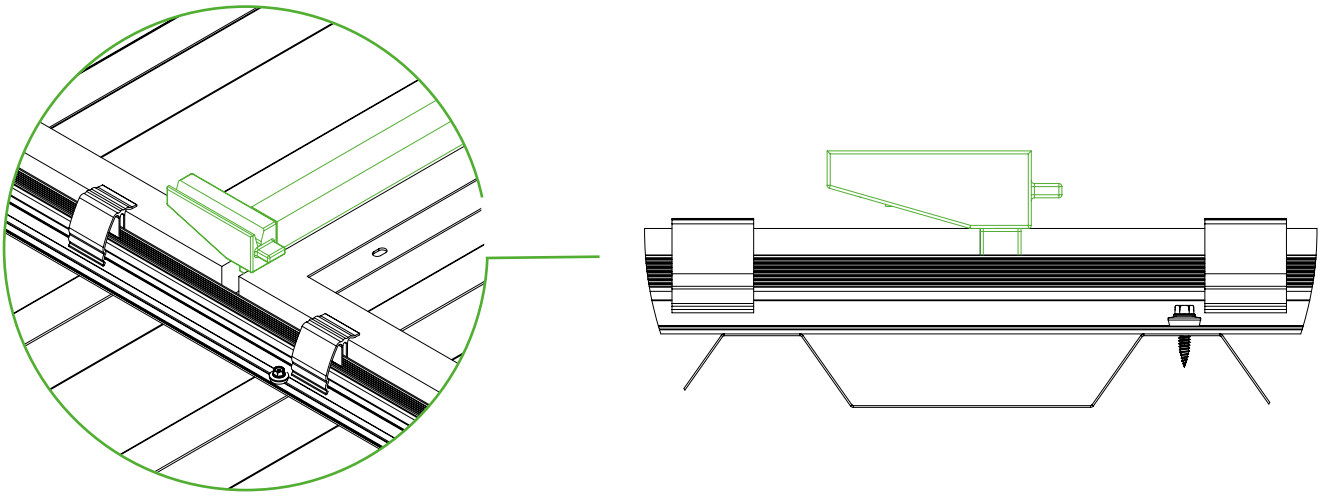
Place the Buster on the recess between the two modules. Then slide it along the system rail to the position indicated in the assembly plan.

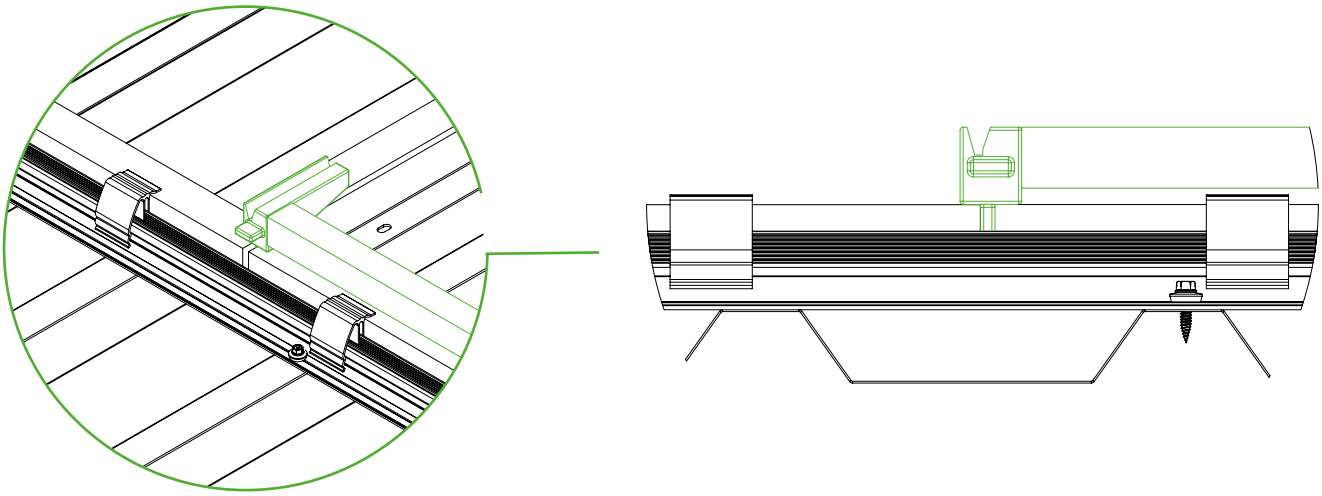


Attention!
Please refer to the project plan for the number and positioning of the snap-on covers.

PMT tip

The correct distance between the modules can be determined using the assembly aid. The spacing must be between 7 – 20 mm.

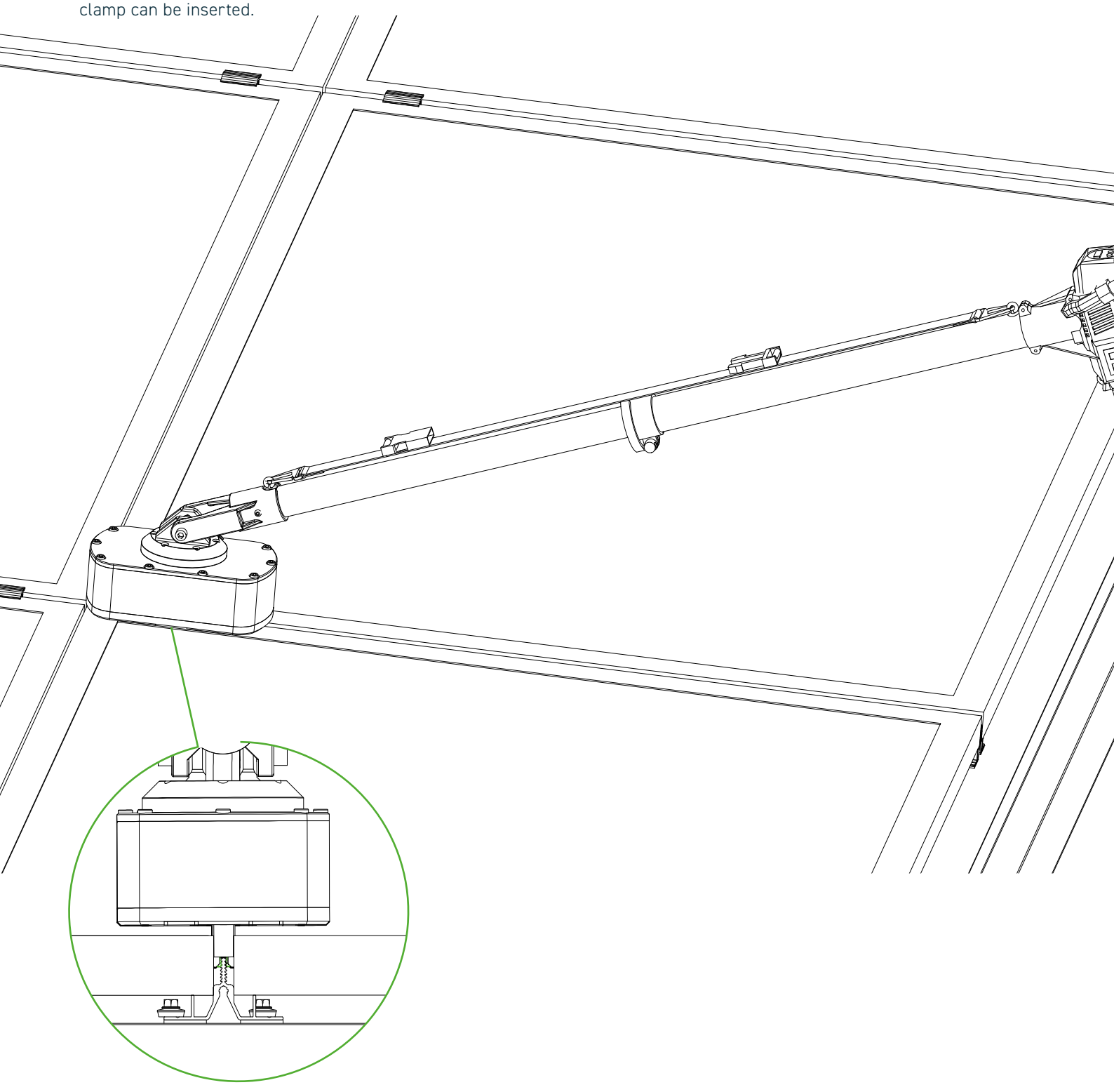




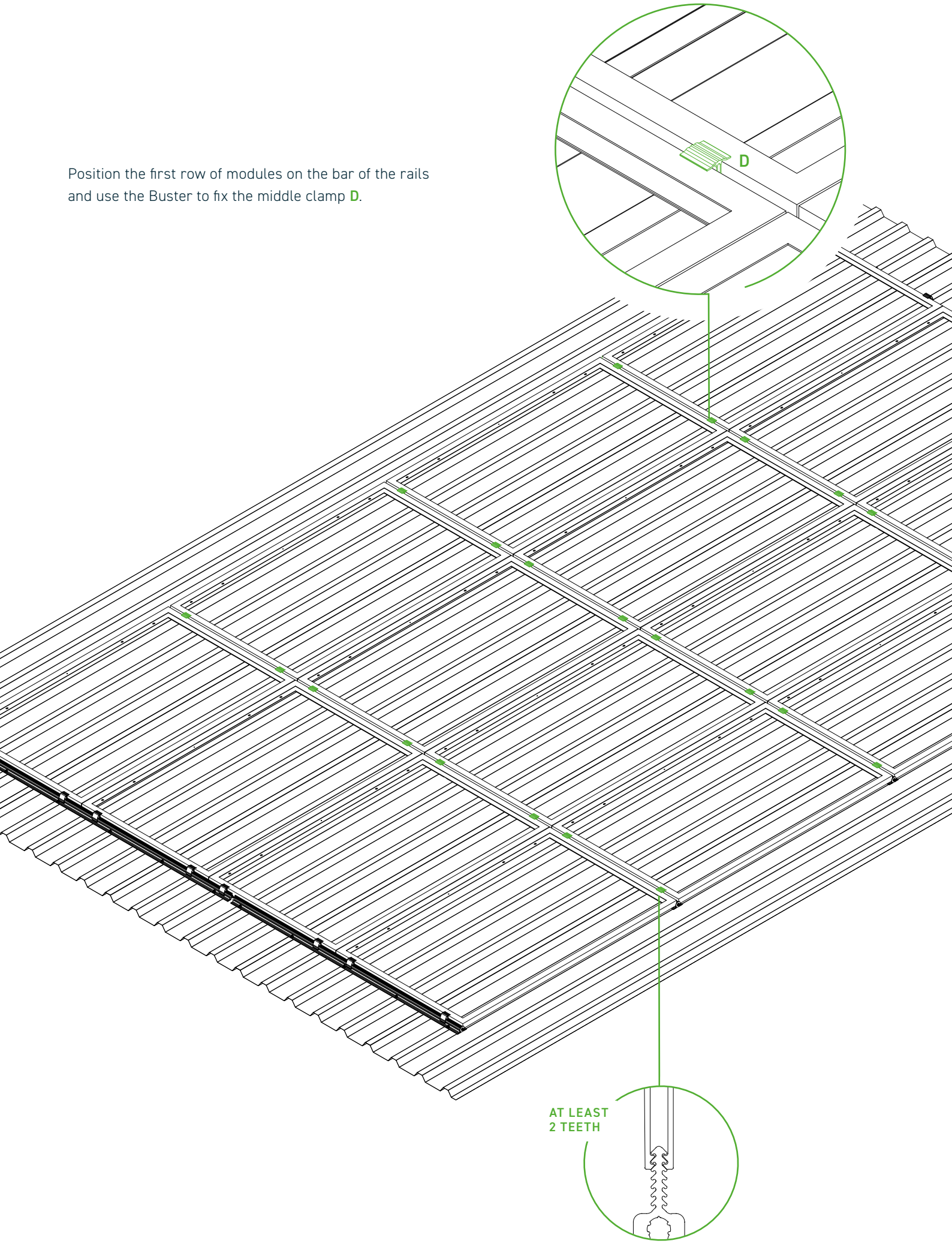
To set the middle clamp, press and hold the control unit's button until the device automatically switches off.

Finally, activate the vent valve until no more air escapes.

The Buster can now be removed from the rail and a new middle clamp can be inserted.

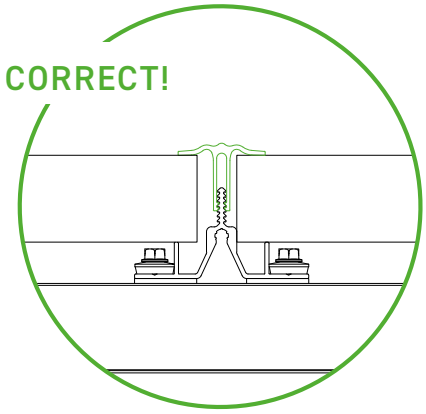


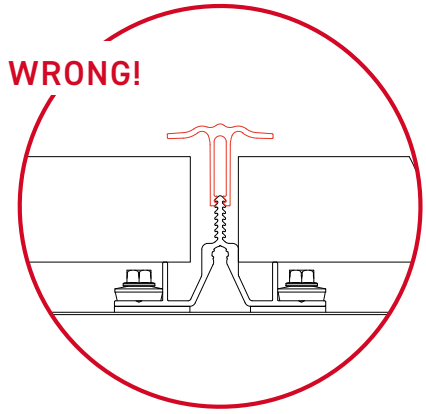
Position the first row of modules on the bar of the rails and use the Buster to fix the middle clamp **D**.

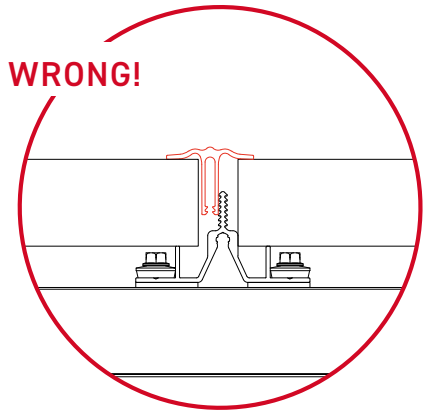


Correct installation of the clamps.

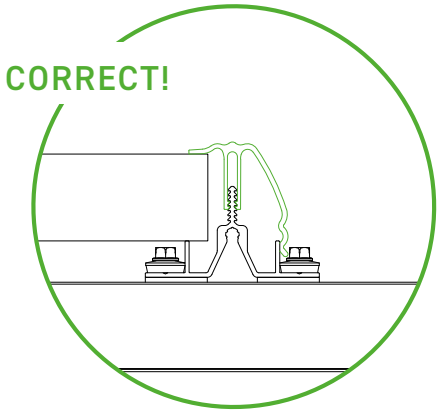
Inner clip



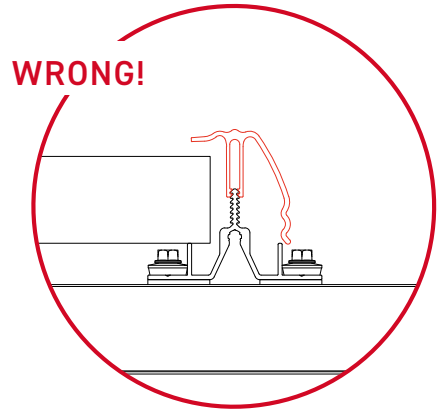


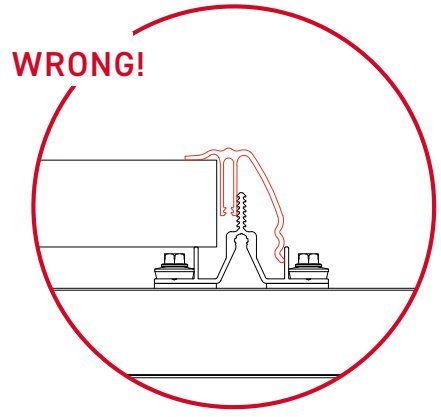


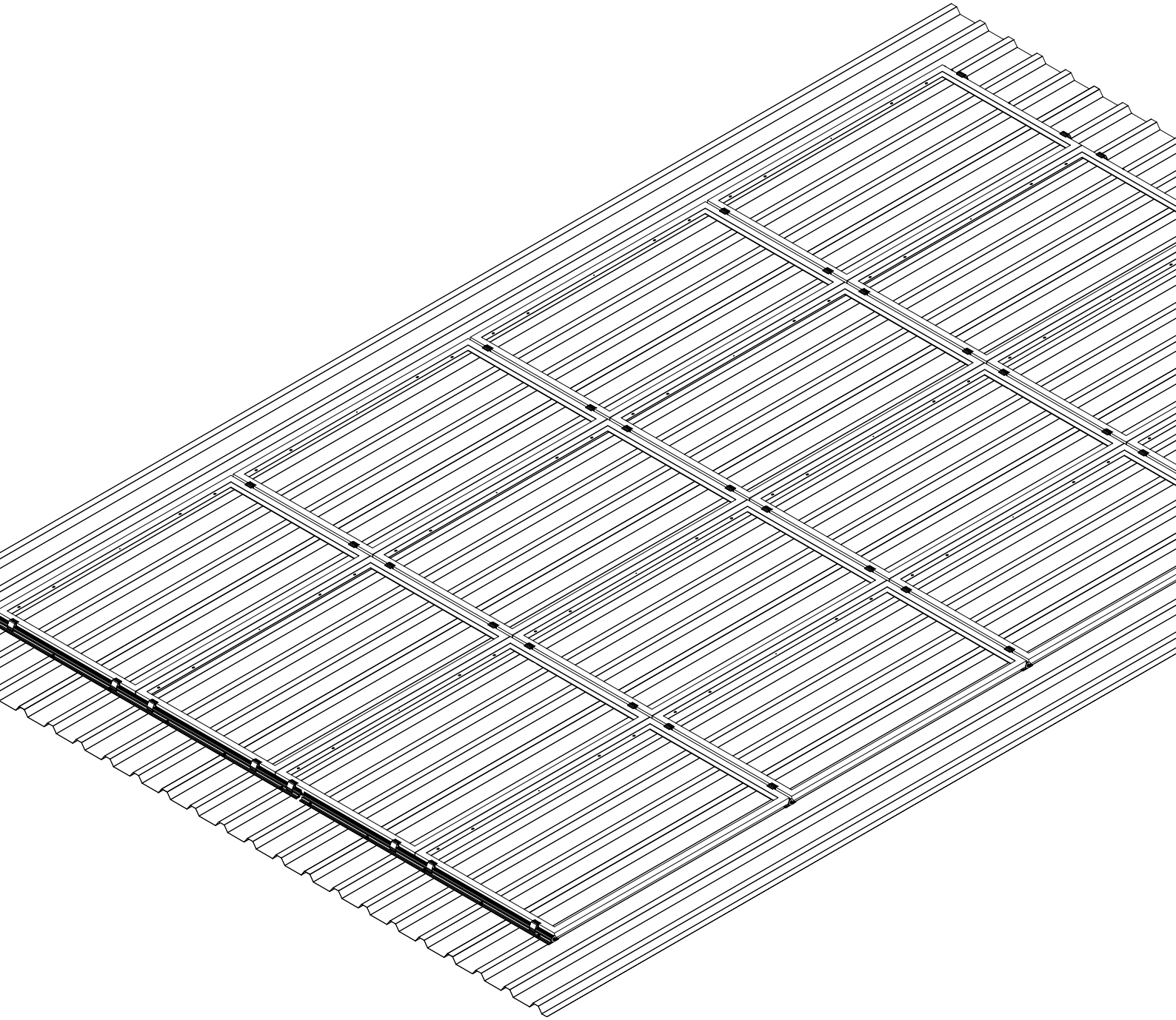
End clamp



The end clamps must be placed at an angle to the rail screw due to the risk of tilting.



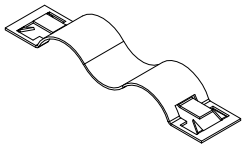




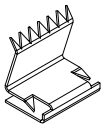
DONE WITH THE BASIC SYSTEM!

Optional component types

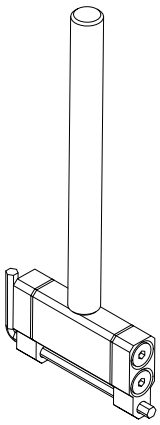
1 TerraGrif GHOST Rail



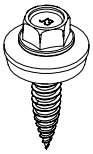
2 TerraGrif GHOST Module



3 Dismantling tool



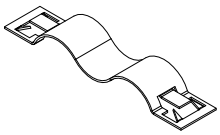
4 Repair screw



1

OPTIONAL INSTALLATION STEP **TERRAGRIF GHOST RAIL**

Bauteil
TerraGrif GHOST Rail



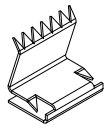
With the help of the TerraGrif GHOST Rail, two rails are joined end-to-end.

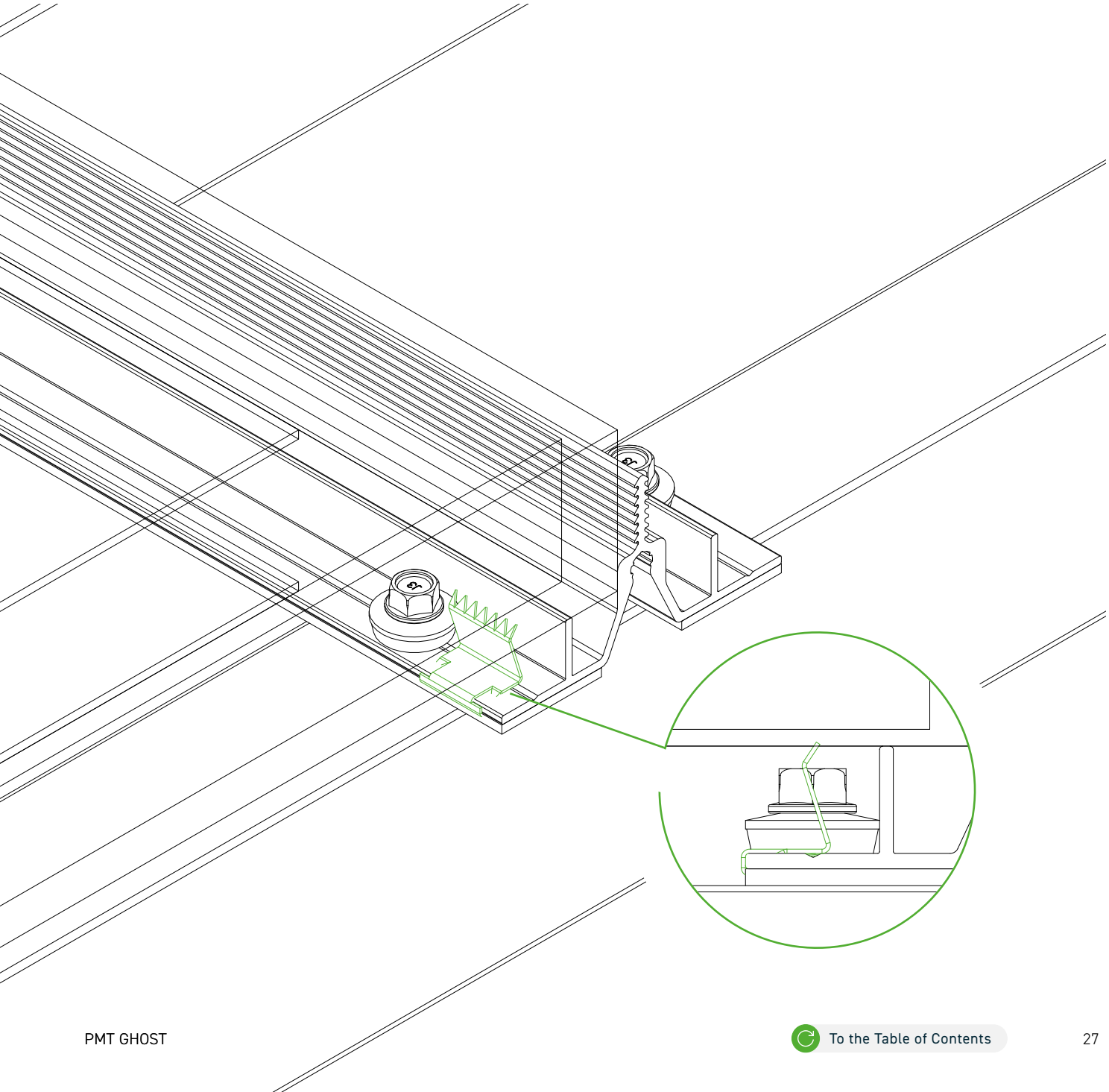
2

OPTIONAL INSTALLATION STEP **TERRAGRIF GHOST MODULE**

Bauteil
TerraGrif GHOST Module

With the help of the TerraGrif GHOST Module, a connection between the rail and the module is established.

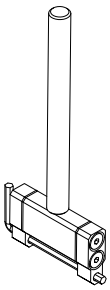




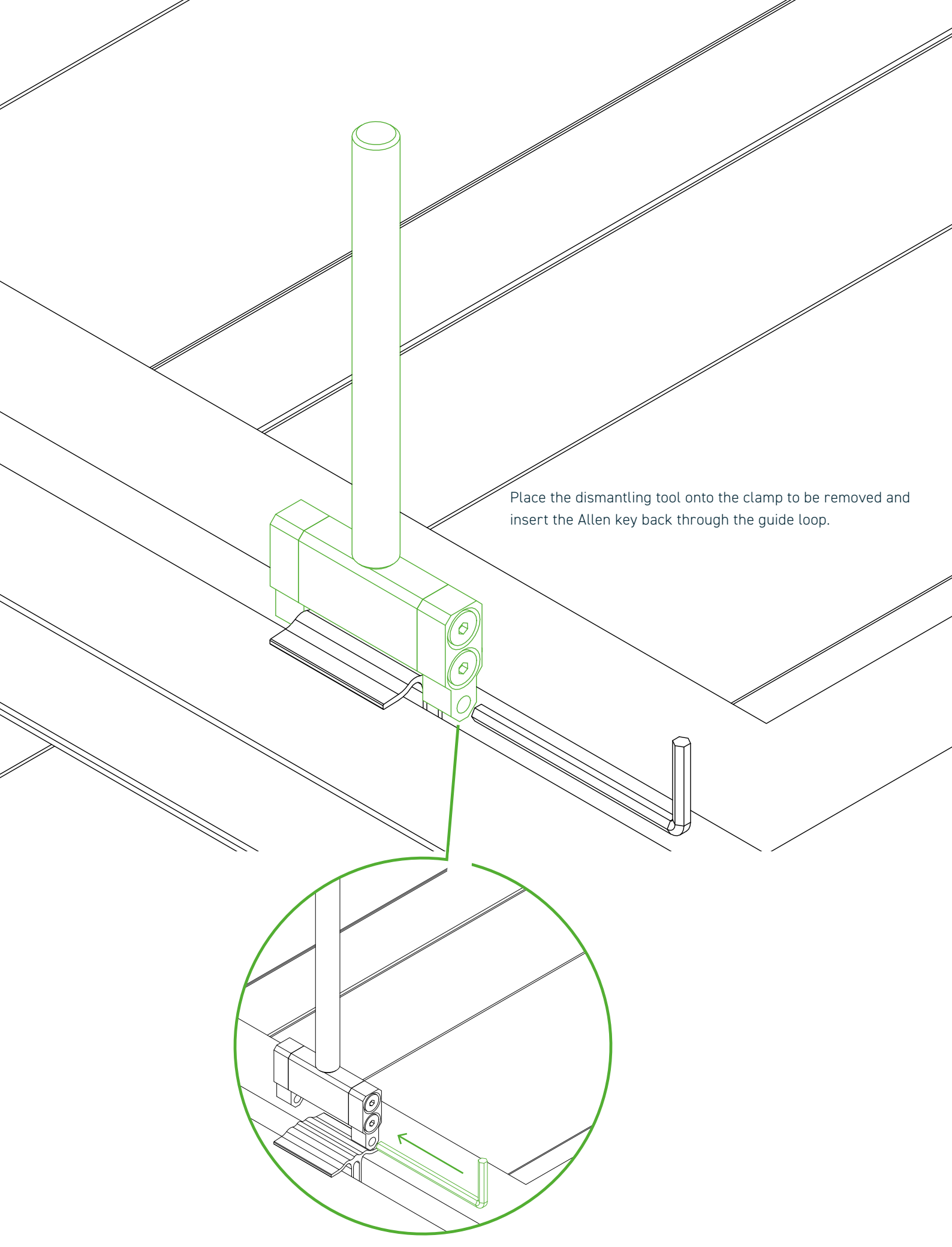
3

OPTIONAL INSTALLATION STEP **DISMANTLING TOOL**

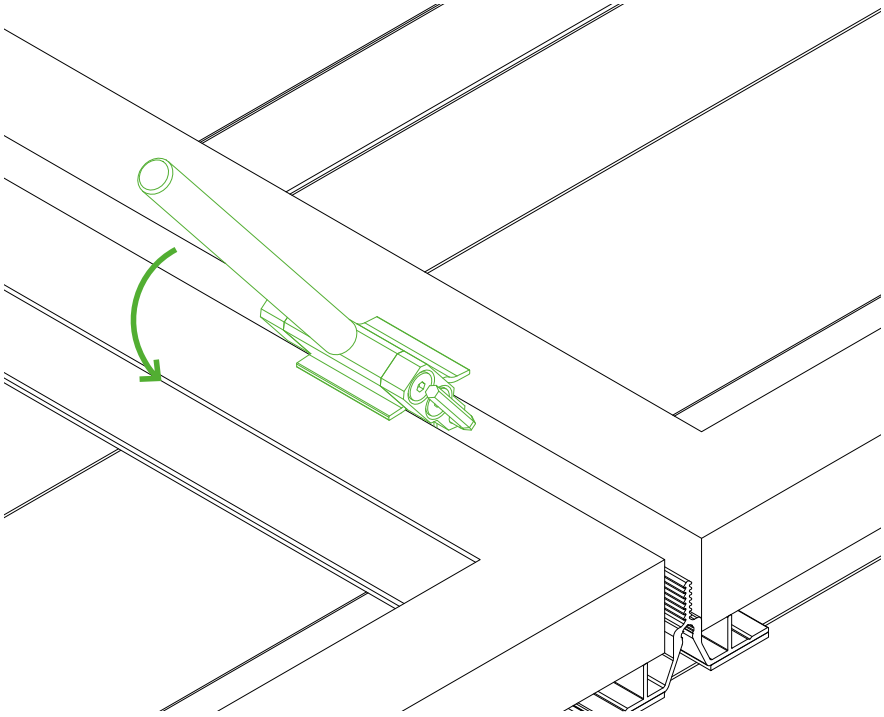
Bauteil
Dismantling tool

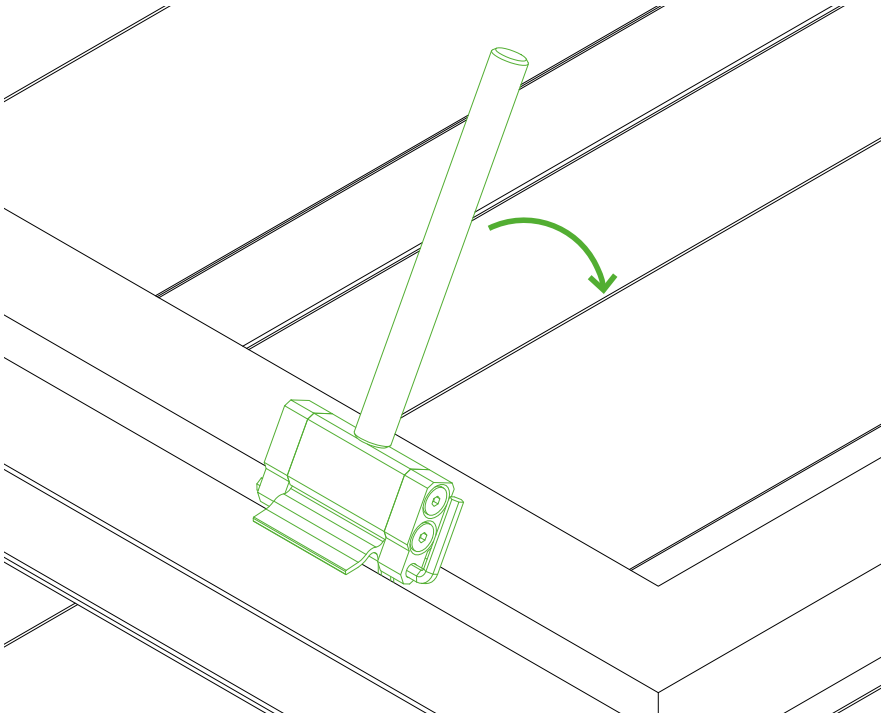


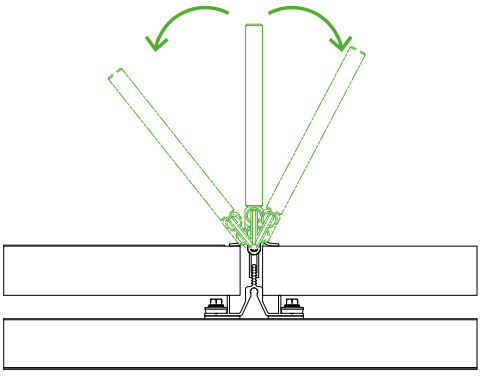
Pull the included Allen key out of the guide holes of the dismantling tool.



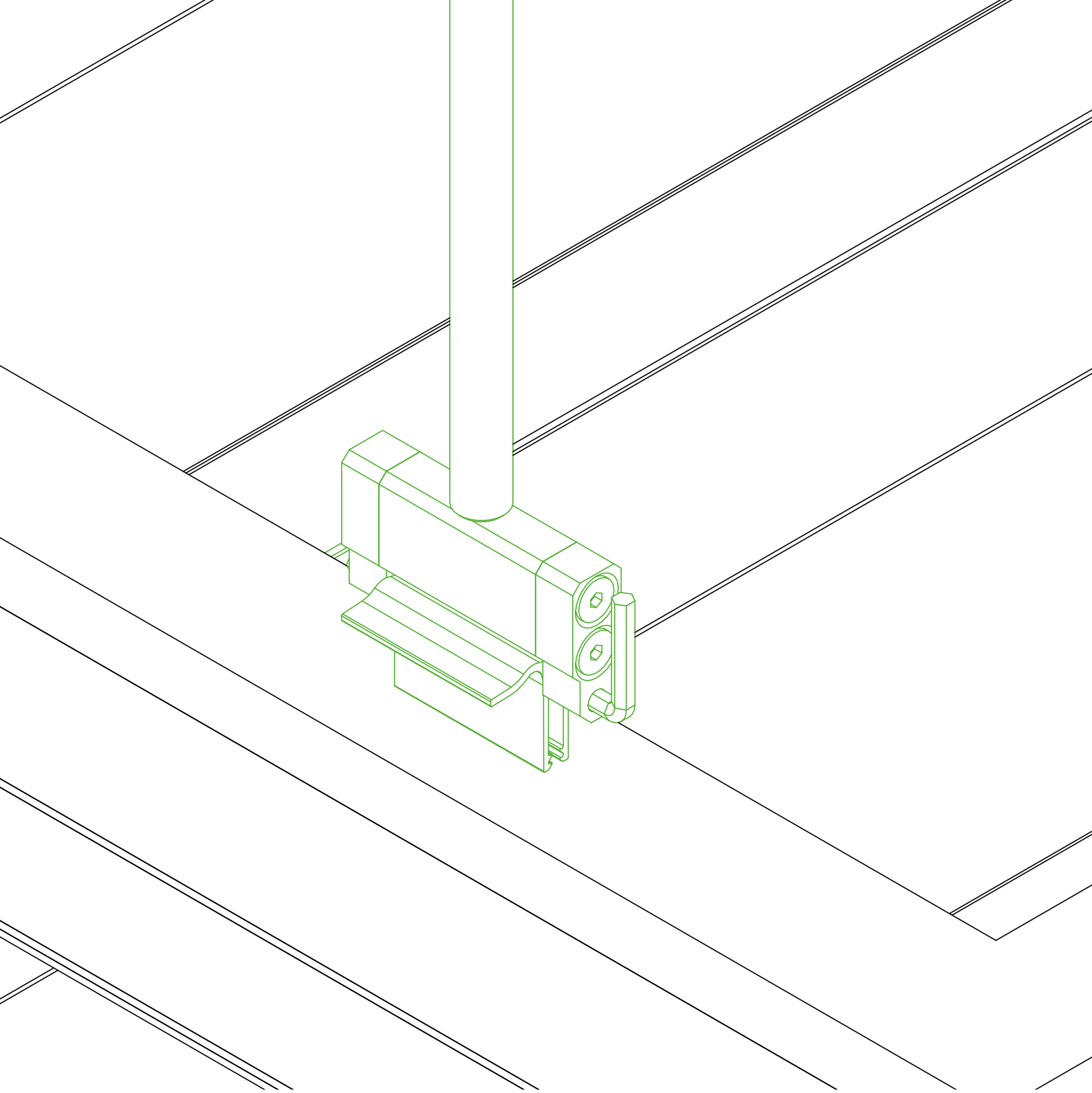
Place the dismantling tool onto the clamp to be removed and insert the Allen key back through the guide loop.

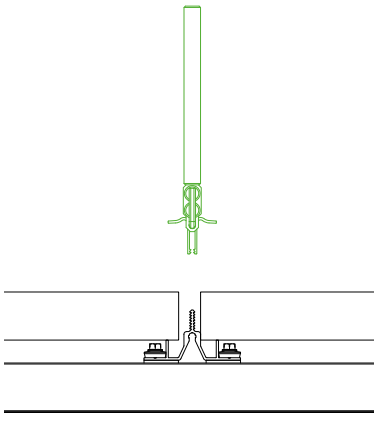






Move the dismantling tool back and forth in the direction of the wing to pry open the clamp.



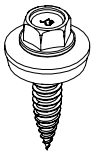


Pull the clamp upwards.

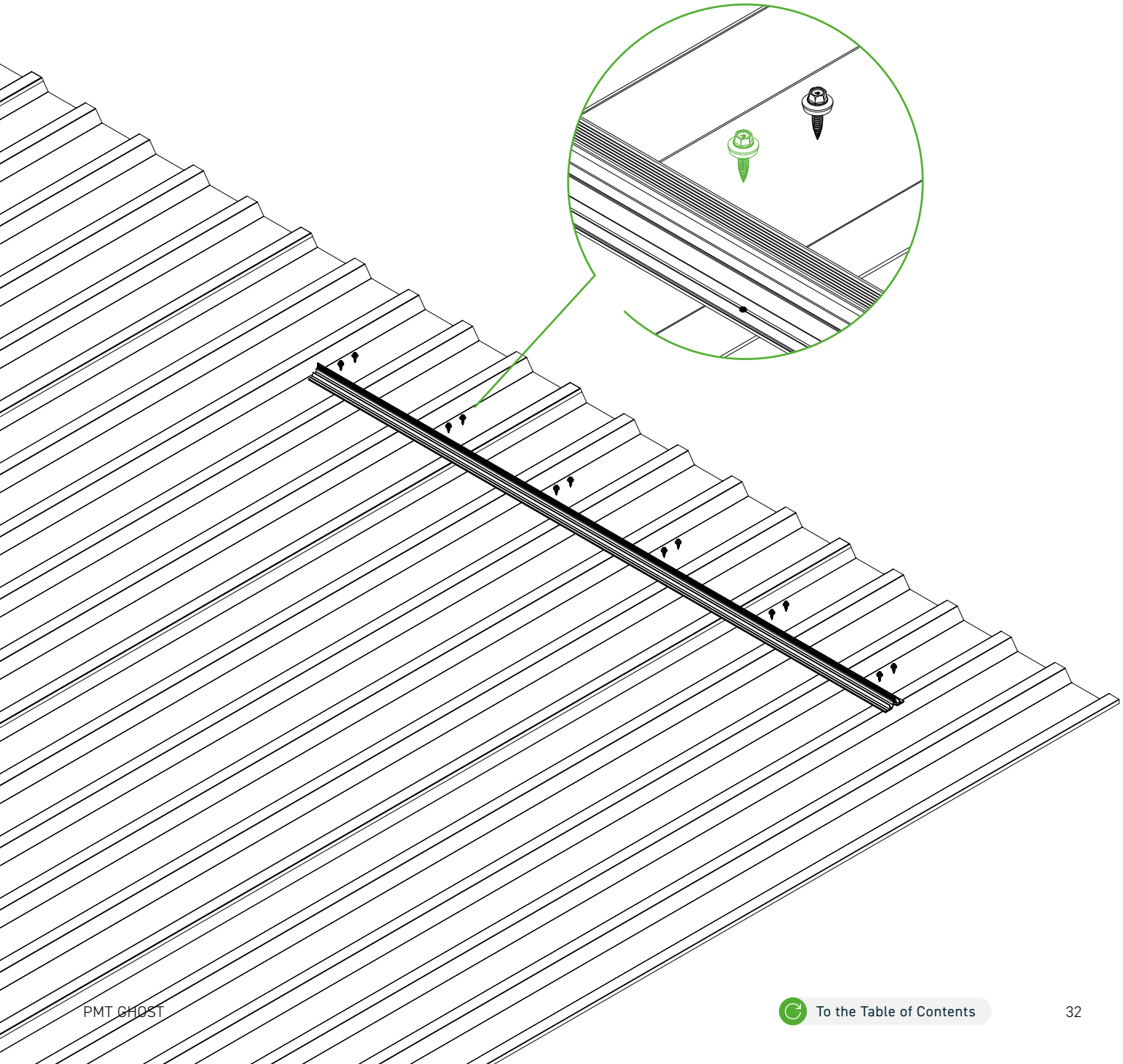
4

OPTIONAL INSTALLATION STEP **REPAIR SCREW**

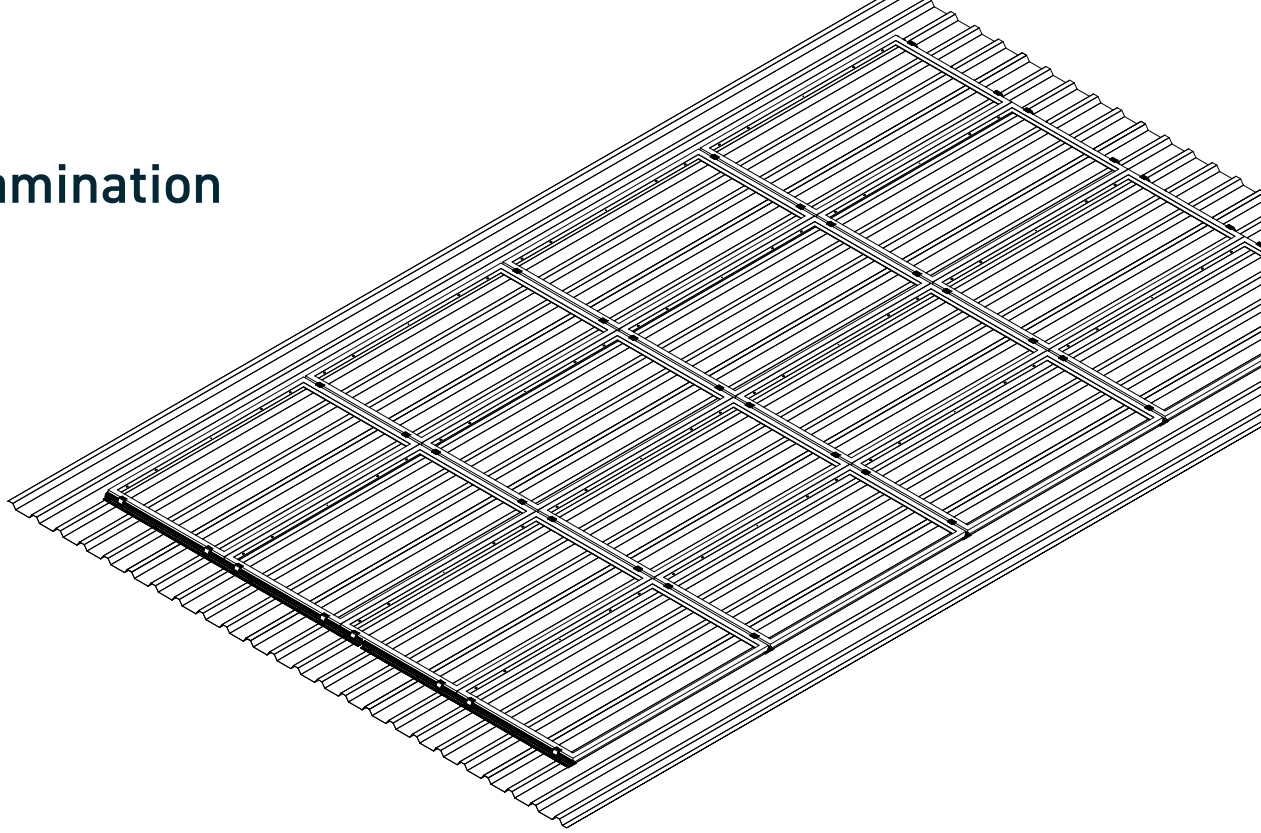
Bauteil
Repair screw



If a self-tapping screw breaks, a slightly stronger repair screw is required for the repair.



Final Examination



Final Examination

- Check whether the entire system and all components have been installed according to the current project report.
- It must be checked whether all screws are inserted at the intended points.
- Check that all clamps are in the intended positions and are locked correctly.

Maintenance

- Regular inspection of the clamp connection.

Warranty and Product Liability

Please note that a product warranty is only granted in accordance with our warranty conditions if all safety and system instructions have been complied with and the system has been installed properly. The warranty conditions can be found at pmt.solutions/downloads/.

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+49 9225 9550 0

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Assembly instructions-PMT-GHOST-06/2025