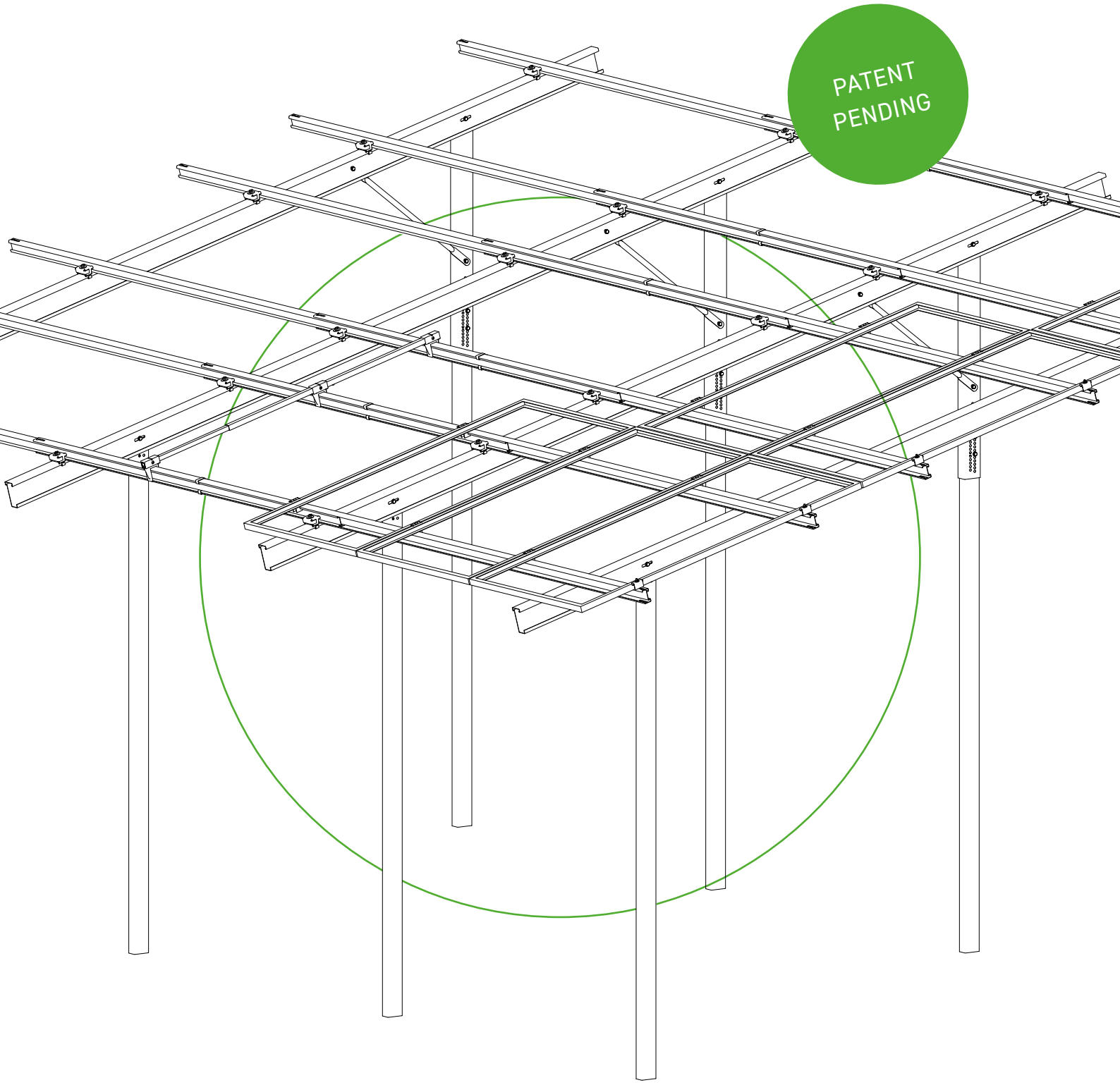
PMT TITAN

ASSEMBLY INSTRUCTIONS



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

Contents

PMT TITAN

INTERACTIVE ASSEMBLY INSTRUCTIONS

Click to select page

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. Geotechnical Report
Before installing the TITAN ground-mounted system, a qualified geotechnical report must be prepared by the customer. The report must include details on soil type, bearing capacity, groundwater level, and an assessment of corrosion risk.

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 assembly instructions for updates:
PMT assembly systems are subject to continuous 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 a planning tool for designing PMT substructures. It is based on the project data entered by the user and uses the technical planning assumptions stored in the software to create a project-specific system solution.

Who can use PMT PLAN to make plans?

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?
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 their installation, the user must check the correctness and plausibility of the data, planning assumptions and results in the project report.

Second step: It is essential that the user also checks the project report against the actual conditions on site. The terrain may have project-specific features that only become apparent during the site inspection or during pile driving work—e.g., deviating soil conditions, rock, or settlement zones in the subsoil.

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

Attention: If the data is not verified or is 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 site and building ground
PMT PLAN assumes that the site designated for the installation of the PMT TITAN ground-mounted system is fundamentally suitable for a photovoltaic installation, and that the customer has had the ground conditions professionally assessed for suitability prior to the design phase.

PMT PLAN does not guarantee the suitability or load-bearing capacity of the soil for the selected type of foundation. It is the user's responsibility to verify these conditions in advance and to provide proof through a qualified geotechnical report.

In particular, it must be ensured that the soil conditions allow for the planned embedment depth and load-bearing capacity, that there are no critical layers (e.g. peat, organic layers, rock, or highly variable soils), and that there are no land-use conflicts or soil contaminations present.

b. 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 intended type of clamping complies 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 user does not clarify the compatibility of the substructure with the solar modules, this can lead to financial losses for which PMT accepts 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 ground, as well as for personal injury.

Before starting the installation, a qualified geotechnical report must be obtained, providing specific information on soil type, bearing capacity, groundwater conditions, and corrosion risk. The installation area must be cleared of vegetation, stones, roots, contamination, and debris prior to assembly. Any unevenness of the terrain must be assessed and leveled if necessary.

The necessary distances to railings, paths, or protective strips specified in the project documentation must be observed.

A thermal separation (distance between module fields) must be maintained in accordance with the PMT PLAN project documentation.

Attention: If there are deviations from the PMT PLAN project documents, such as changed module dimensions, module field layouts, or ground parameters, installation 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

Photovoltaic substructures are not maintenance-free.

Maintenance, in particular checking that the structure is firmly anchored in the ground (e.g., driven posts), visually inspecting it for signs of corrosion, and checking all mechanical connections, must be carried out at least once a year and documented in a maintenance log.

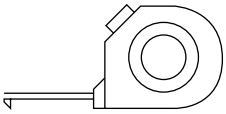
Furthermore, all components of the PMT ground-mounted system must be regularly inspected for tight fit, structural integrity, and potential settlement, and these inspections must be properly documented. All bolted connections must be checked during maintenance and, if necessary, retightened to the torque values specified in the installation manual. We recommend performing annual maintenance in accordance with our maintenance protocol.

In the event of exceptionally severe weather conditions, we recommend immediate maintenance.

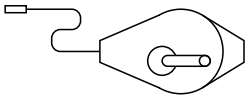
Attention: Failure to maintain the facility may lead to personal injury as well as financial losses for which PMT assumes no liability.

Required Tools

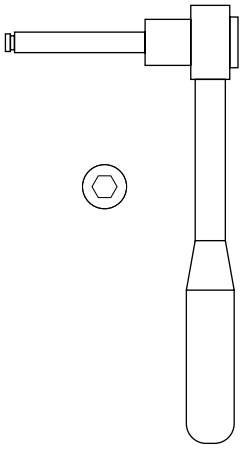
1 Tape measure



2 Chalk line



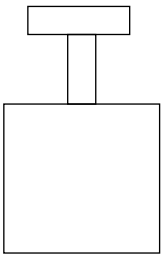
3 Torque-wrench with attachment
Hexagon socket
SW 13, 17, 18 und 19 mm



4 Assembly Aid
(optional tool)

5 Digital spirit level

6 Module spacing gauge
(optional tool)

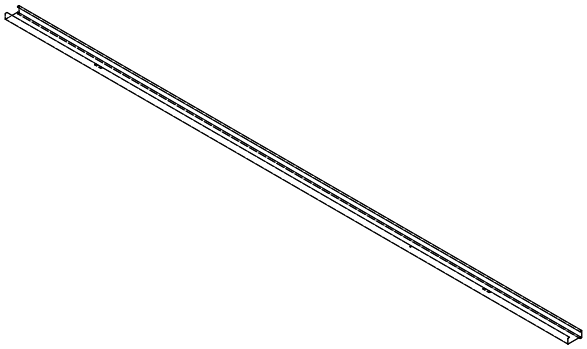


Attention! Some components are available in different lengths and versions.
The exact article versions can be found in the project documents.

Component Types

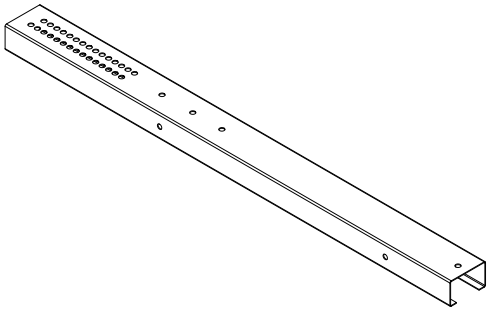
A TITAN C-profile driven post

S350 GD ZM310



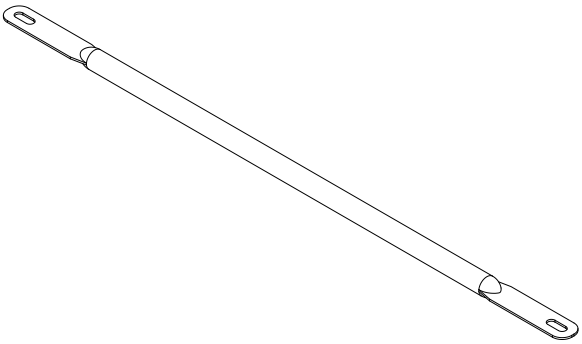
B TITAN C-profile extension

S350 GD ZM310



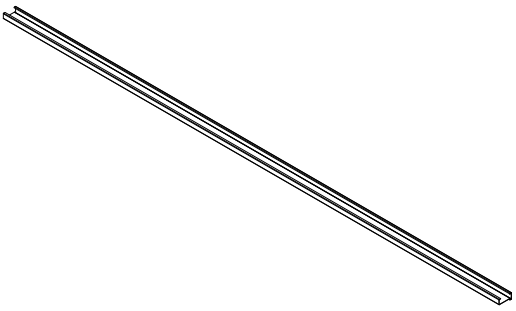
C TITAN Diagonal

DX51 + Z275 bandverzinkt



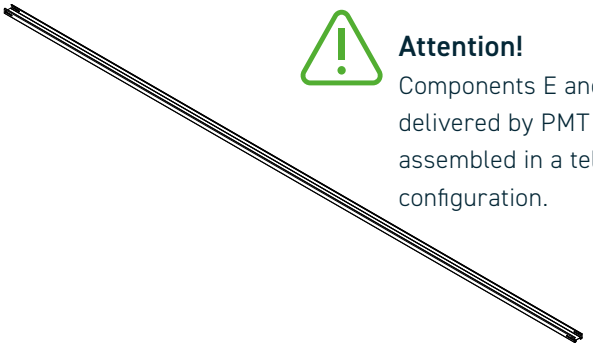
D TITAN Rafter

S350 GD ZM310



E TITAN Outer Purlin

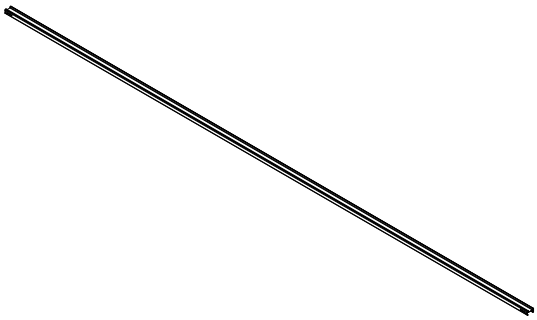
S350 GD ZM310



Attention!
Components E and F are delivered by PMT pre-assembled in a telescoped configuration.

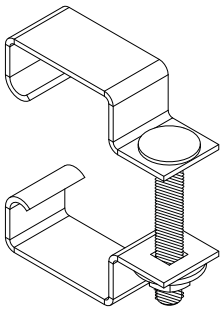
F TITAN Inner Purlin

PE-HD GF 20



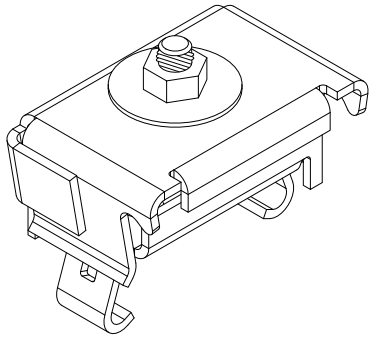
G TITAN Purlin Clamp

S350 GD ZM310



H TITAN Cross Clamp

S350 GD ZM310

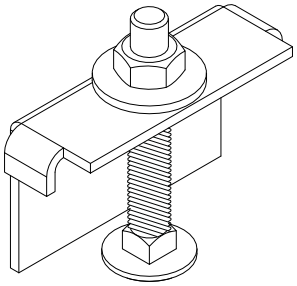


Attention! Some components are available in different lengths and versions.
The exact article versions can be found in the project documents.

Component Types

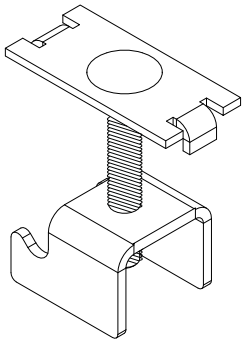
I TITAN Module End Clamp

S350 GD ZM310



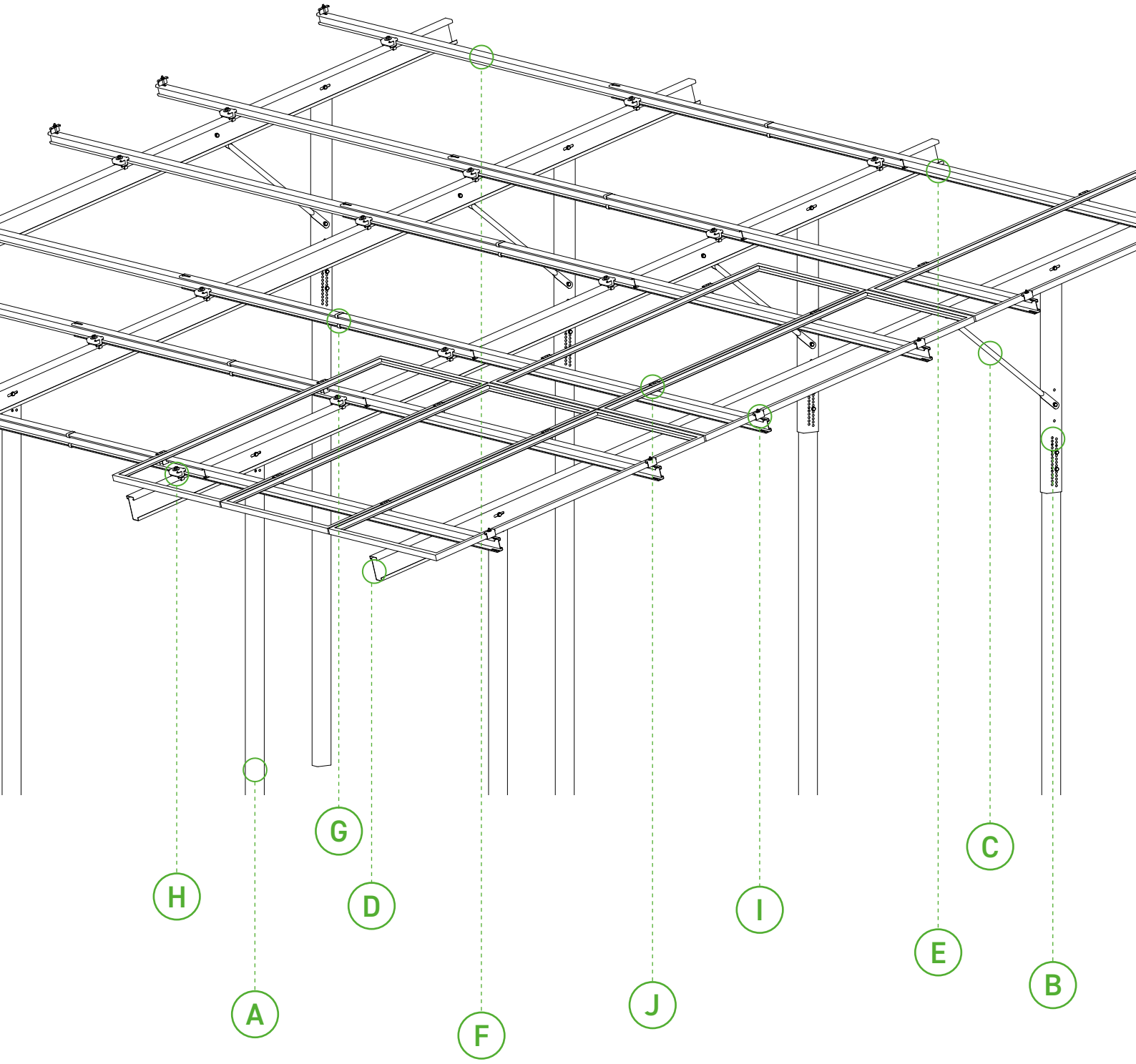
J TITAN Module Mid Clamp

MK Stahl OT, S350 GD ZM310



TORQUE TABLE

Component	Letter	Screw	Wrench size	Tightening torque in Nm
C-profile extension	A & B B & D	M12	Screw: 19 Nut: 18	90–100
C-profile driven posts & Diagonal	B & C	M12	Screw: 19 Nut: 18	90–100
C-profile driven posts & Rafter	B & D	M12	Screw: 19 Nut: 18	90 – 100
Diagonal & Rafter	C & D	M12	Screw: 19 Nut: 18	90 – 100
Purlin Clamp	G	M8	13	12 – 15
Cross Clamp	H	M10	17	15 – 17
Module Mid Clamp	J	M8	13	12 – 15
Module End Clamp	I	M8	13	12 – 15



A C-profile driven posts

B C-profile extension

C Diagonal

D Rafter

E Outer Purlin

F Inner Purlin

G Purlin Clamp

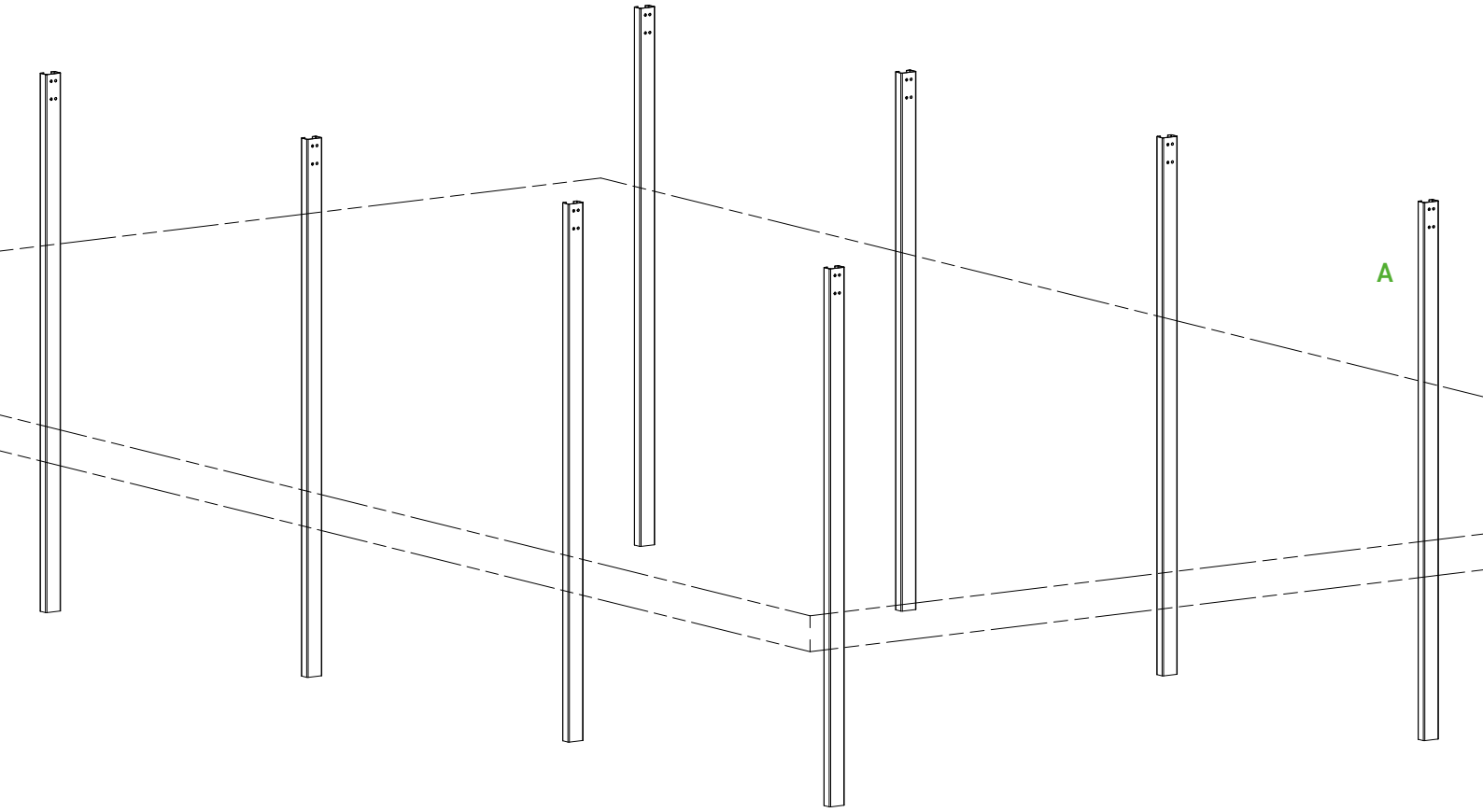
H Cross Clamp

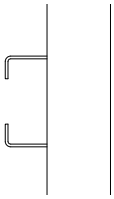
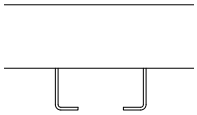
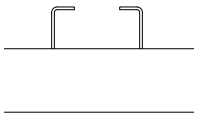
I Module End Clamp

J Module Mid Clamp

1

Drive the C-profile driven post **A** to the depth specified in the project report.

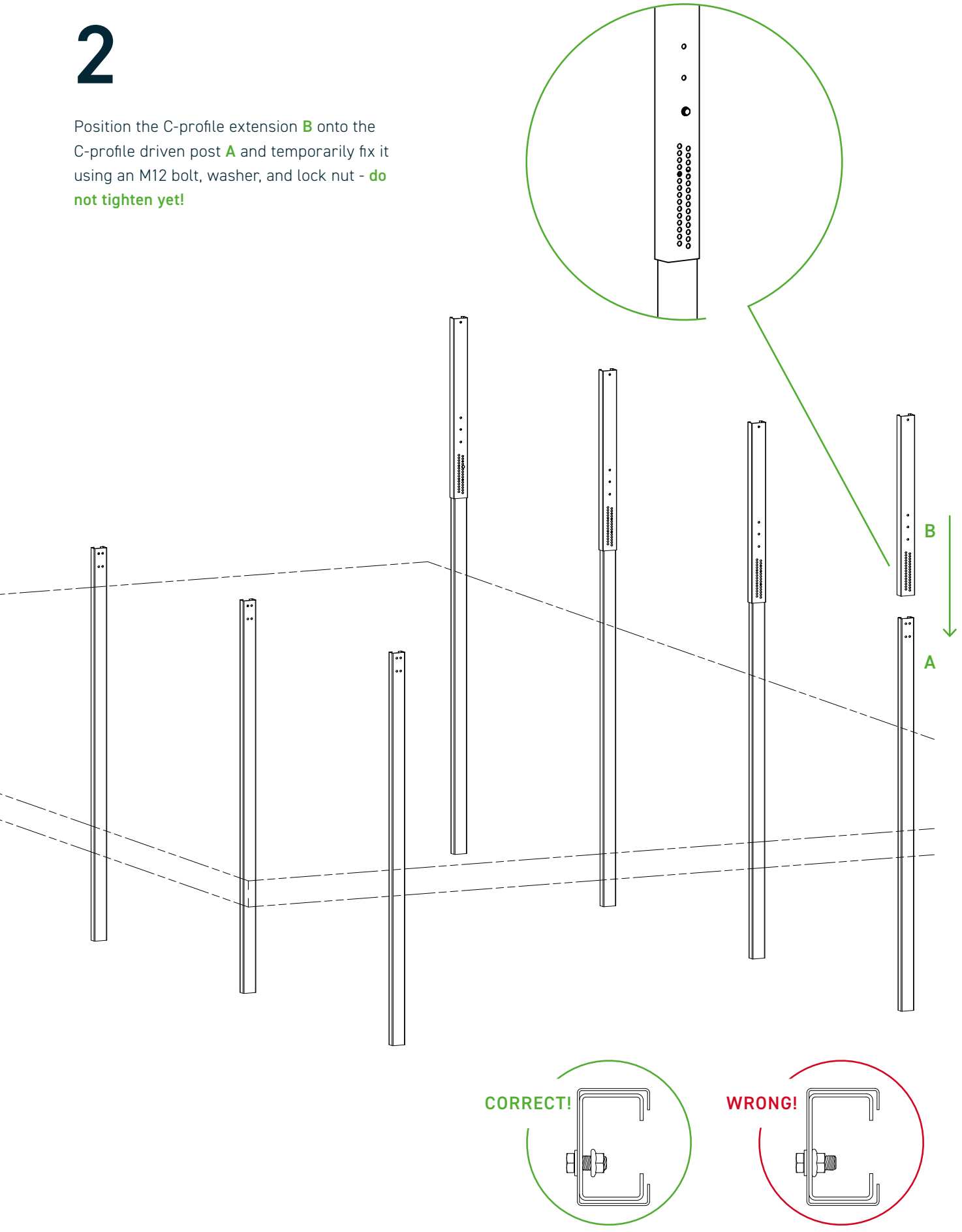


System variant	Orientation driven posts
South-facing system: Open side Direction west	
East-facing system: Open side Direction south	
West-facing system: Open side Direction nord	

Attention!
Always ensure that the orientation of the driven posts matches the specifications in the project report!

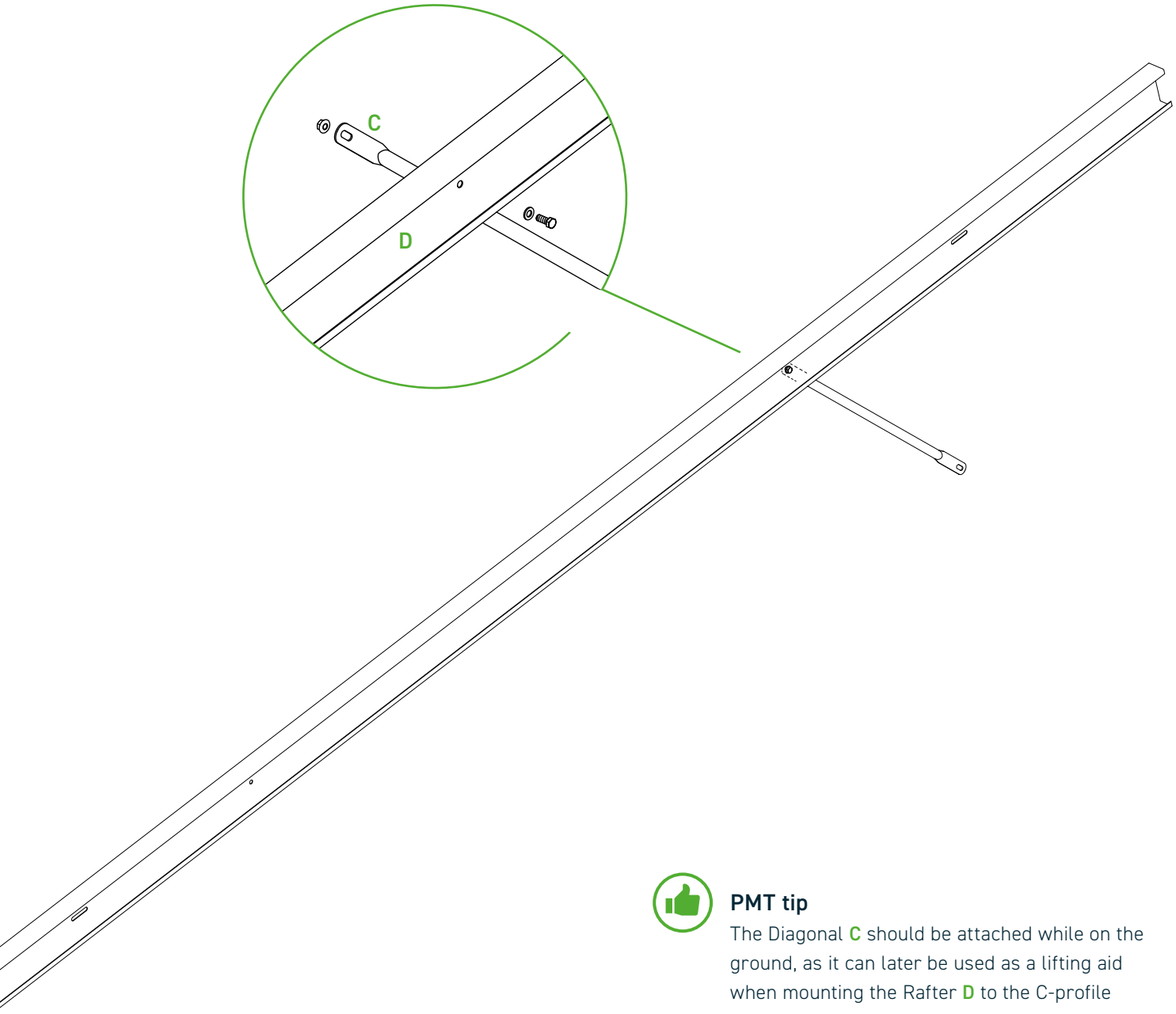
2

Position the C-profile extension **B** onto the C-profile driven post **A** and temporarily fix it using an M12 bolt, washer, and lock nut - **do not tighten yet!**



3

Attach the Diagonal **C** to the Rafter **D** using an M12 bolt, washer, and lock nut.

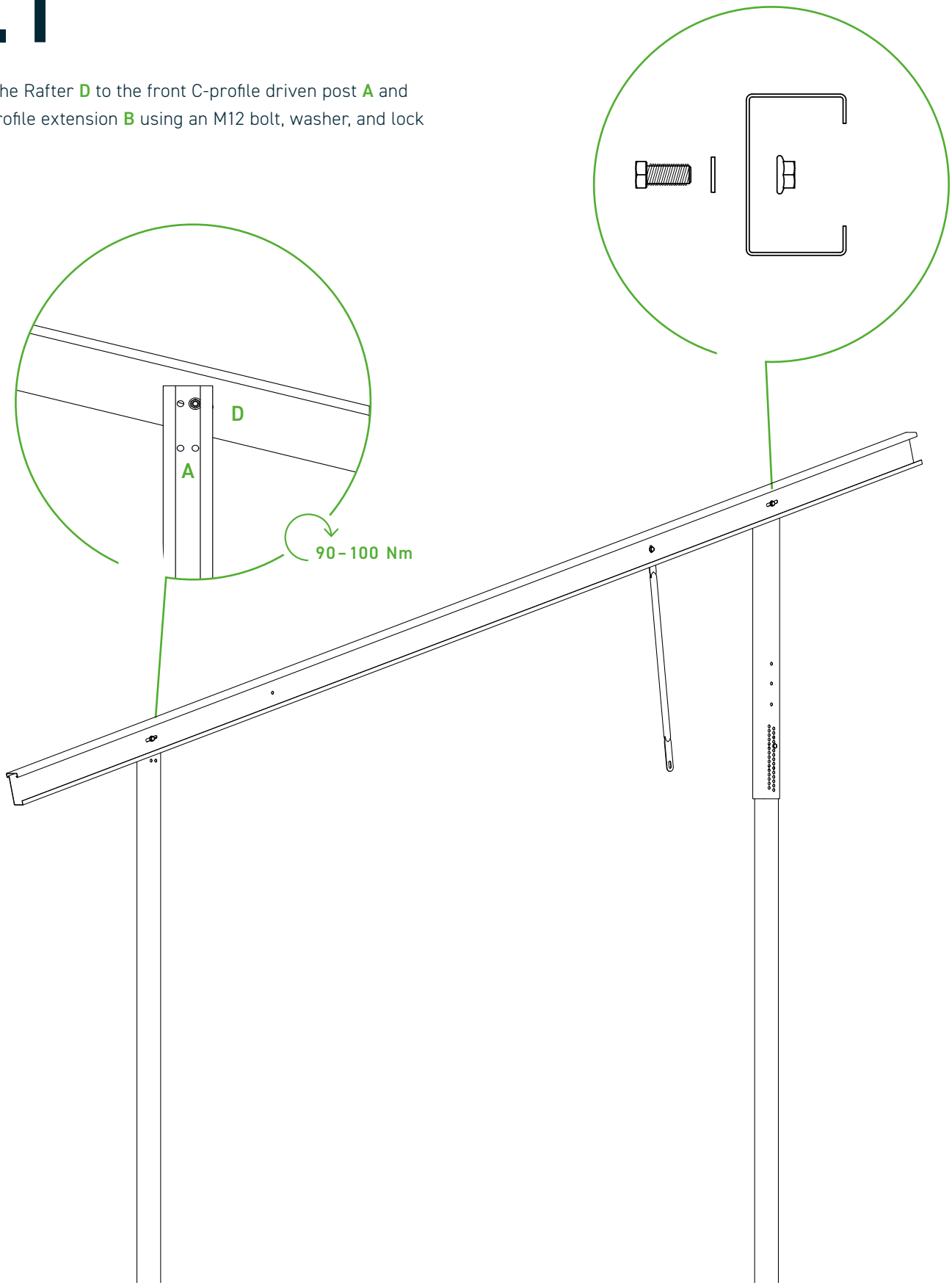


PMT tip

The Diagonal **C** should be attached while on the ground, as it can later be used as a lifting aid when mounting the Rafter **D** to the C-profile extension **B**.

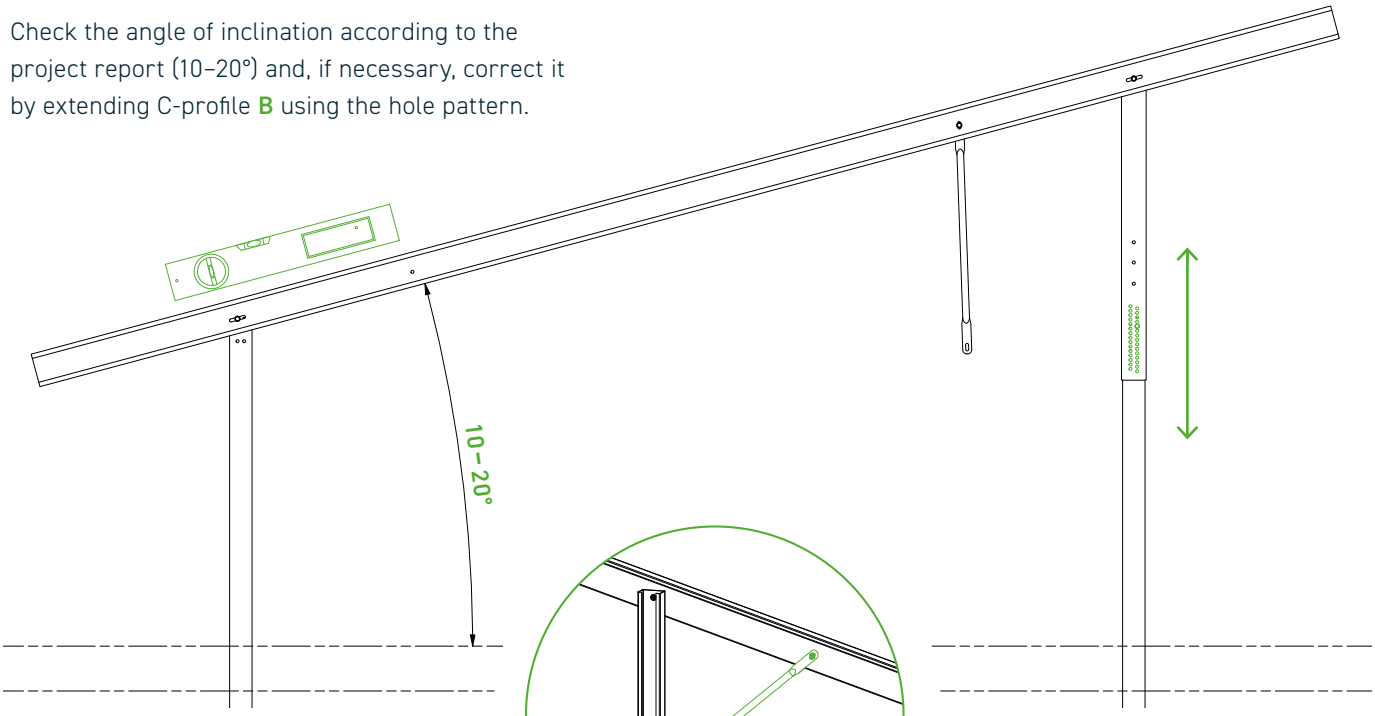
3.1

Attach the Rafter **D** to the front C-profile driven post **A** and the C-profile extension **B** using an M12 bolt, washer, and lock nut.

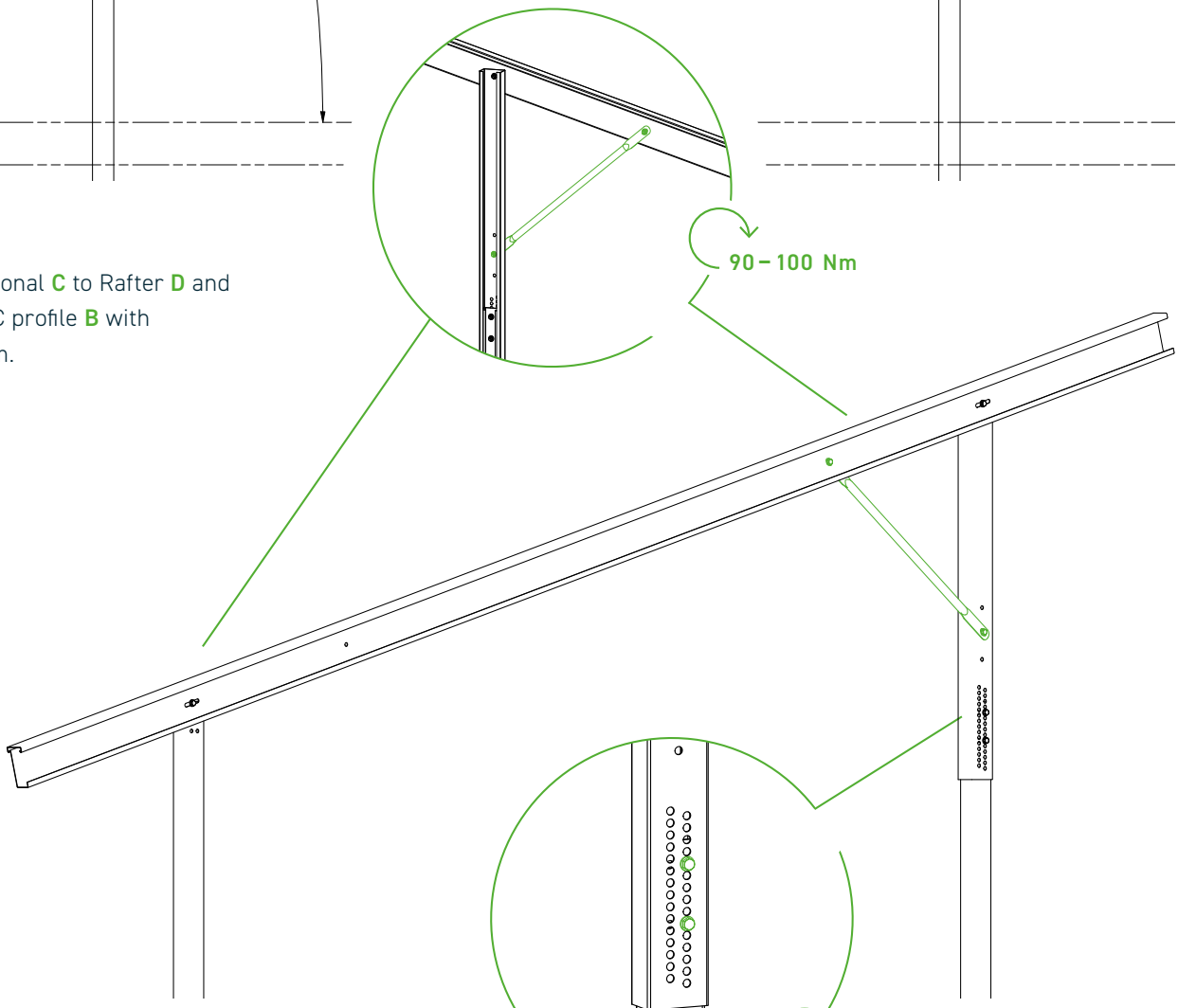


3.2

Check the angle of inclination according to the project report (10–20°) and, if necessary, correct it by extending C-profile **B** using the hole pattern.



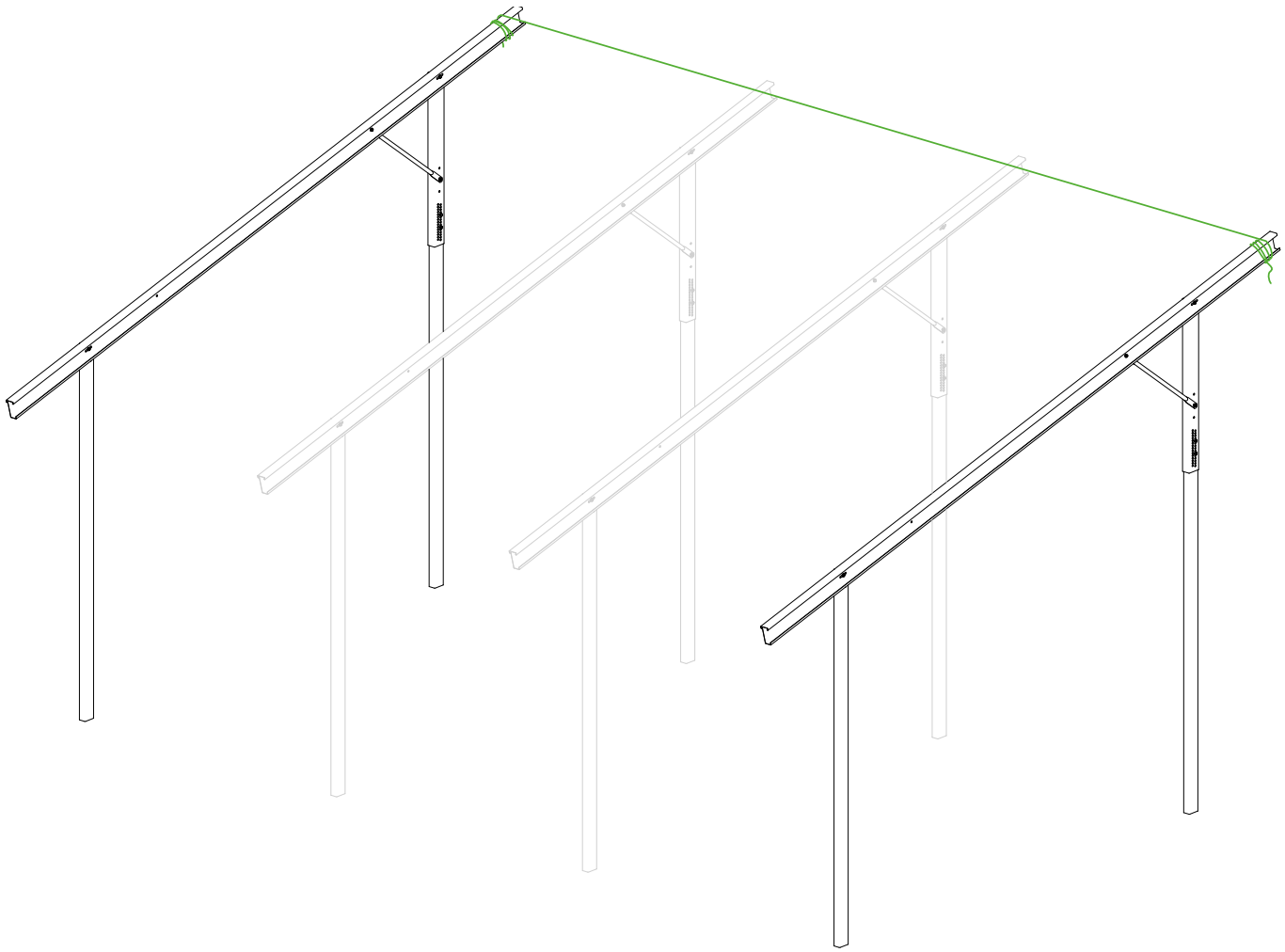
Screw diagonal **C** to Rafter **D** and extension C profile **B** with 90 – 100 Nm.



Tighten the second screw on the C-profile **B** extension to 90 – 100 Nm.

PMT tip

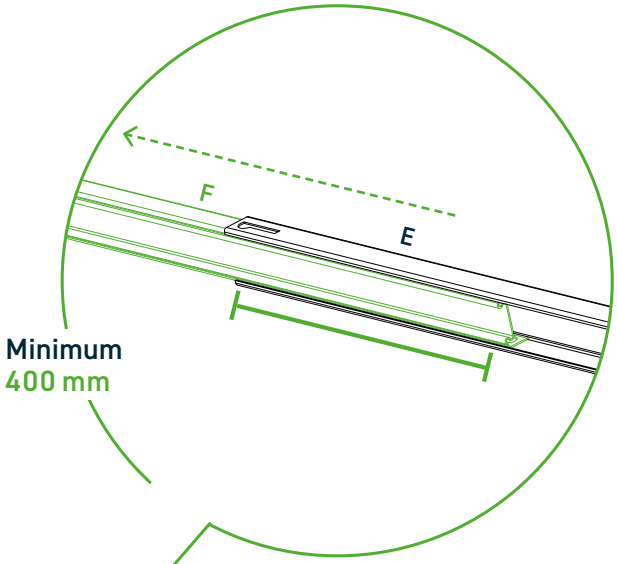
Once the tilt angle of the first and last Rafter **D** has been set, a guide line can be stretched between them to serve as a reference for aligning the remaining angles.

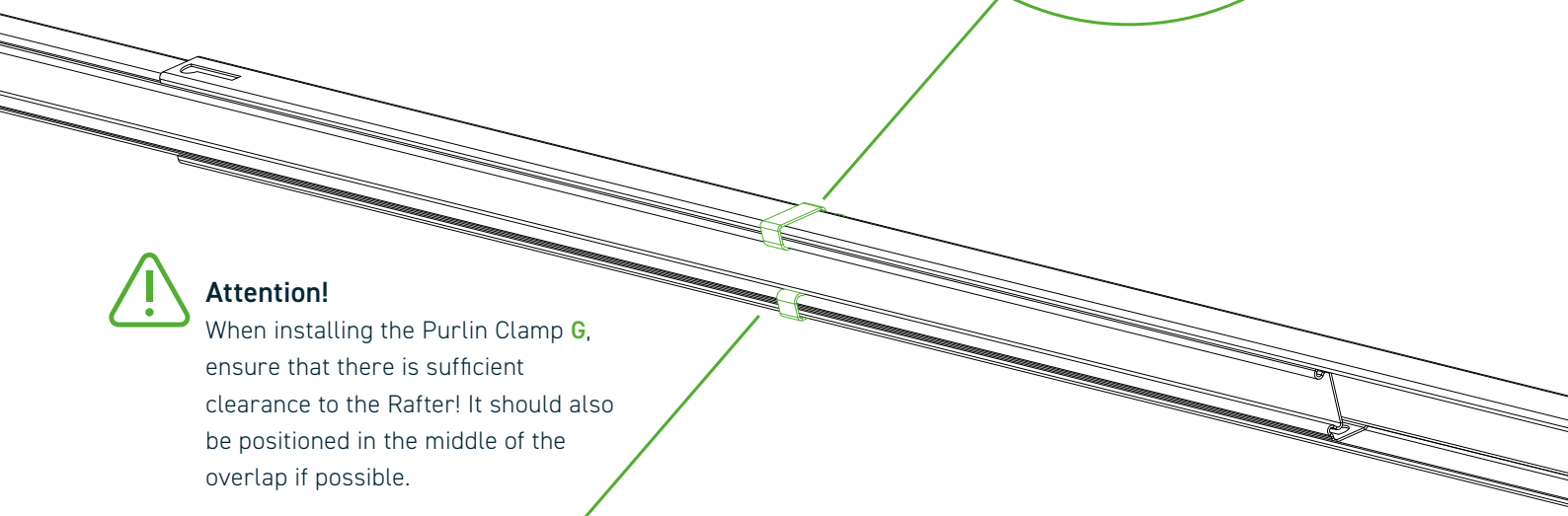


4

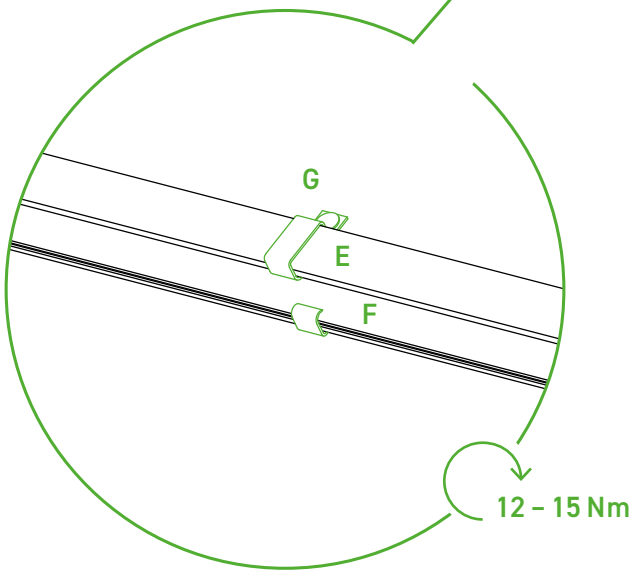
Push the inner and outer Purlins **F** & **E** apart until the overlap of the Purlins corresponds to the length specified in the project report (at least 400 mm).

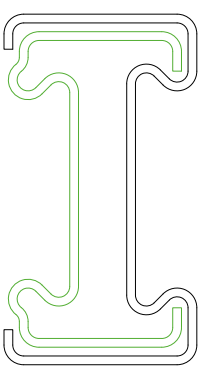
The gripping arms of the Purlin Clamp must grip the inner Purlin **F** and should be screwed together with 12 – 15 Nm approximately in the middle of the overlap.

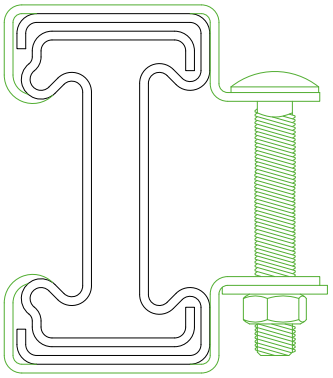




Attention!
When installing the Purlin Clamp **G**, ensure that there is sufficient clearance to the Rafter! It should also be positioned in the middle of the overlap if possible.

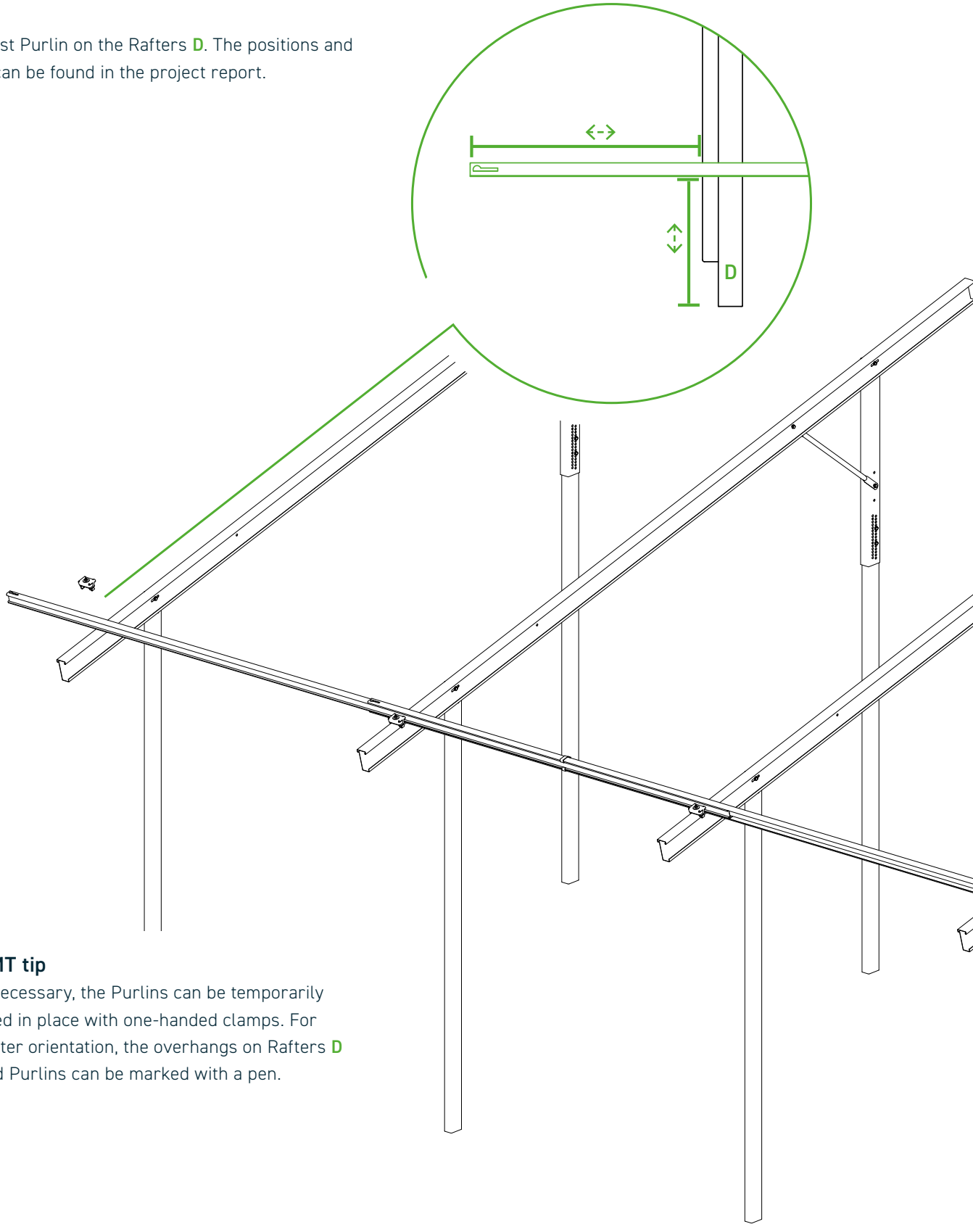






5

Place the first Purlin on the Rafters **D**. The positions and overhangs can be found in the project report.

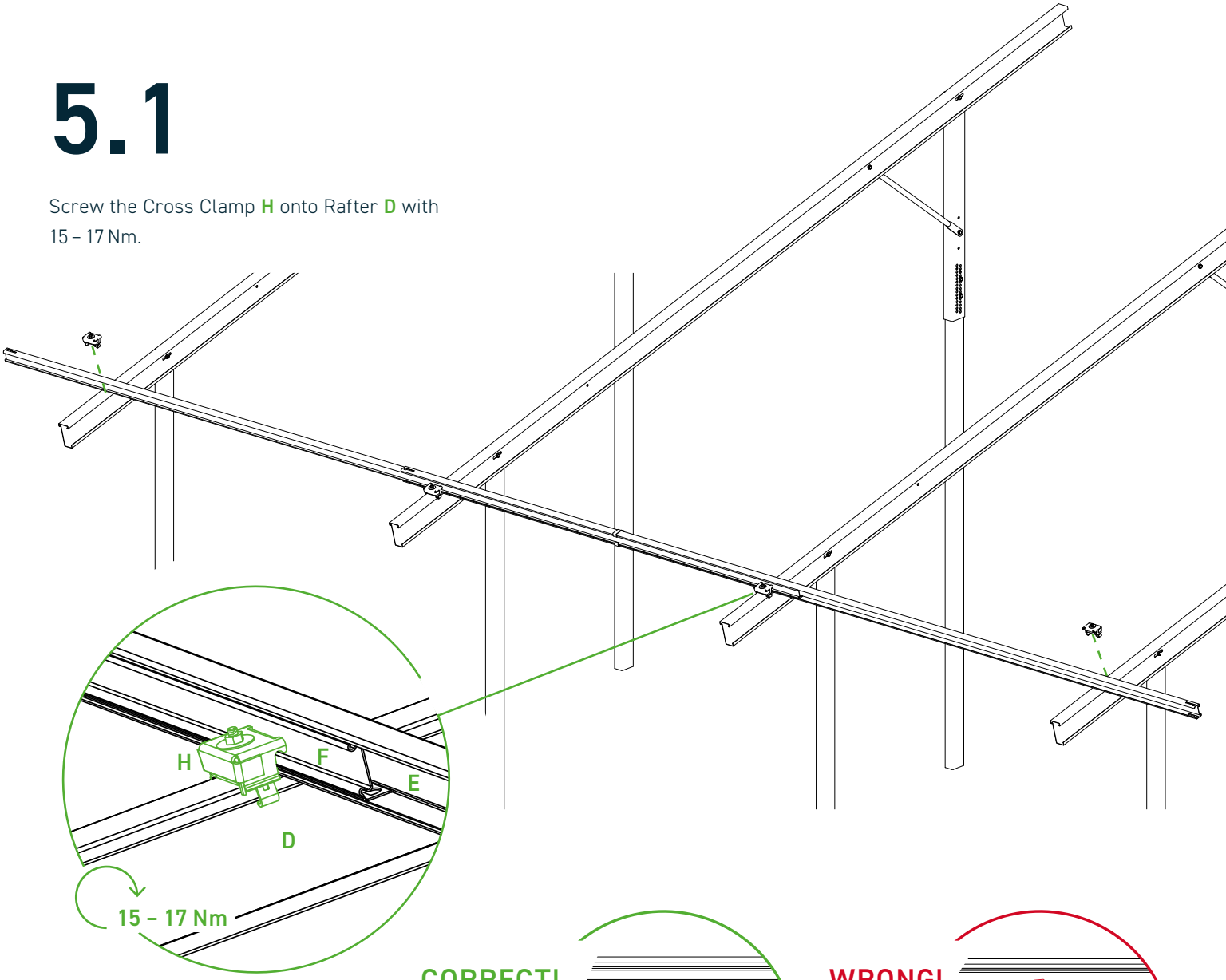


PMT tip

If necessary, the Purlins can be temporarily fixed in place with one-handed clamps. For better orientation, the overhangs on Rafters **D** and Purlins can be marked with a pen.

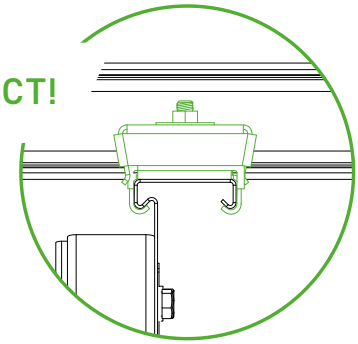
5.1

Screw the Cross Clamp **H** onto Rafter **D** with 15 – 17 Nm.

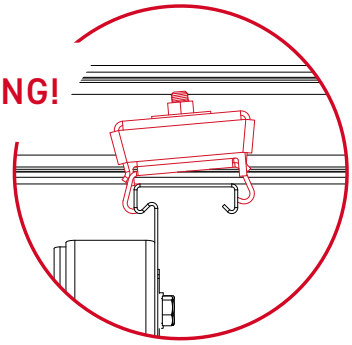


Attention!
The Cross Clamp **H** must always be mounted on the side of the inner Purlin **F.** On the part of the Purlin where only the outer Purlin **E** is still present, the clamp must be attached on the opposite side.

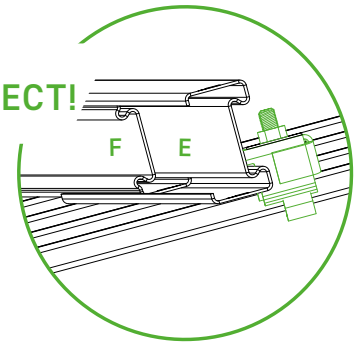
CORRECT!



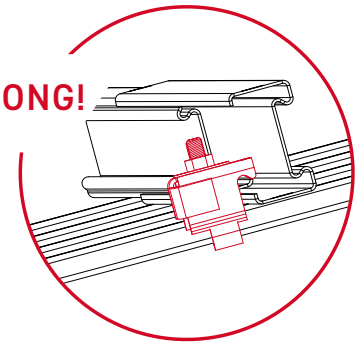
WRONG!



CORRECT!



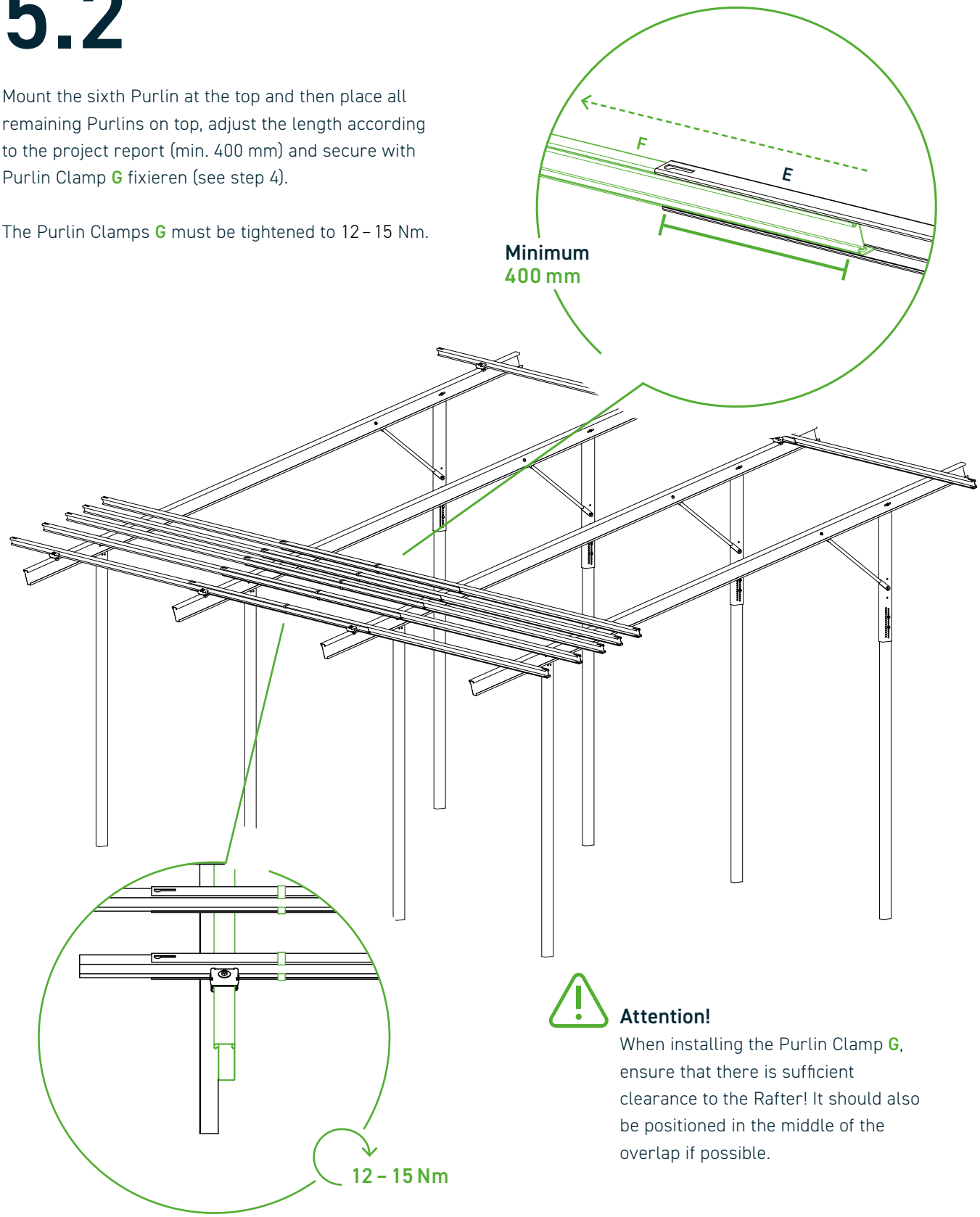
WRONG!



5.2

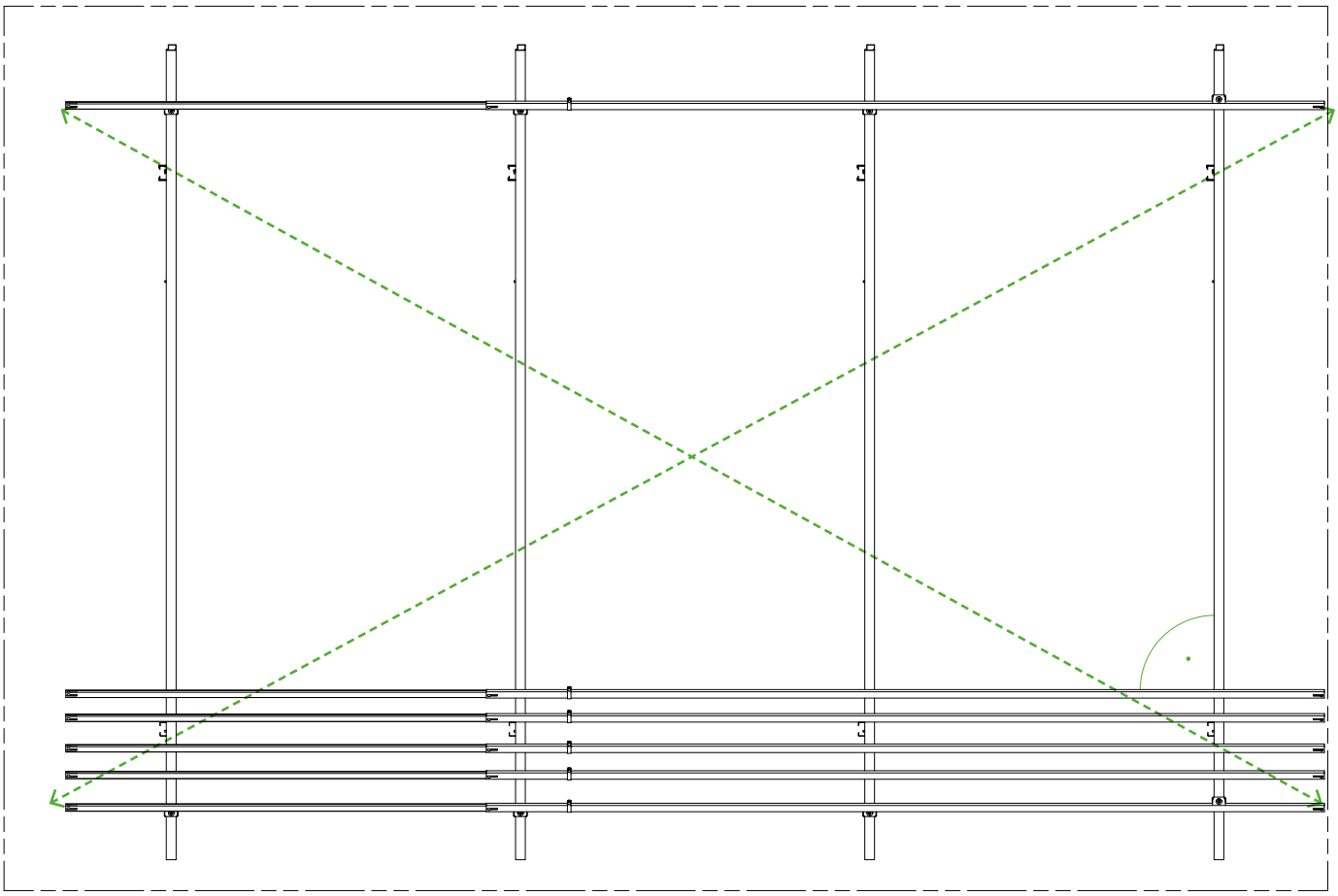
Mount the sixth Purlin at the top and then place all remaining Purlins on top, adjust the length according to the project report (min. 400 mm) and secure with Purlin Clamp **G** fixieren (see step 4).

The Purlin Clamps **G** must be tightened to 12 – 15 Nm.



Attention!
When installing the Purlin Clamp **G**, ensure that there is sufficient clearance to the Rafter! It should also be positioned in the middle of the overlap if possible.

Attach the top Purlin at the location defined in the project report using Cross Clamp **H** and check that it is at a right angle.

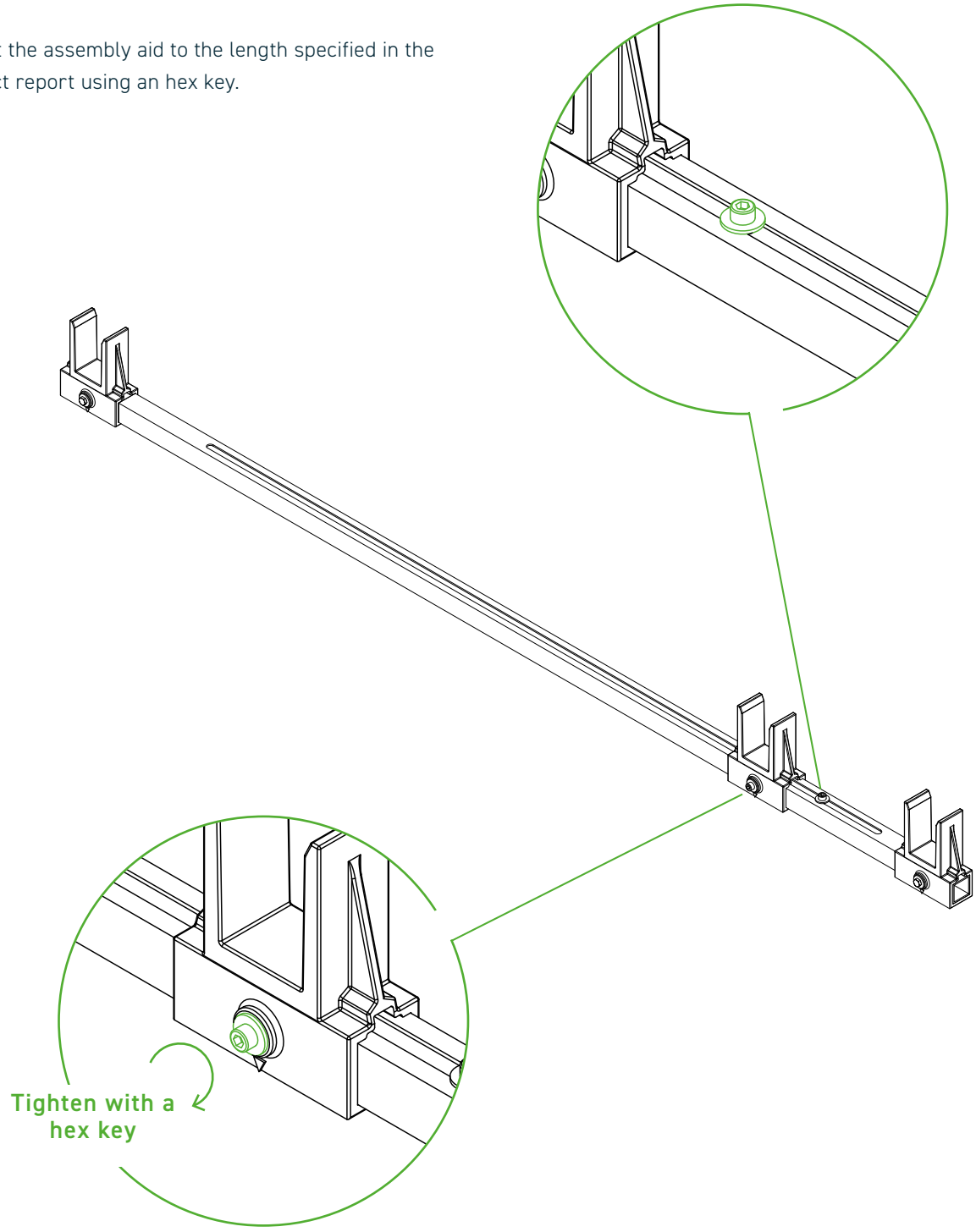


PMT tip

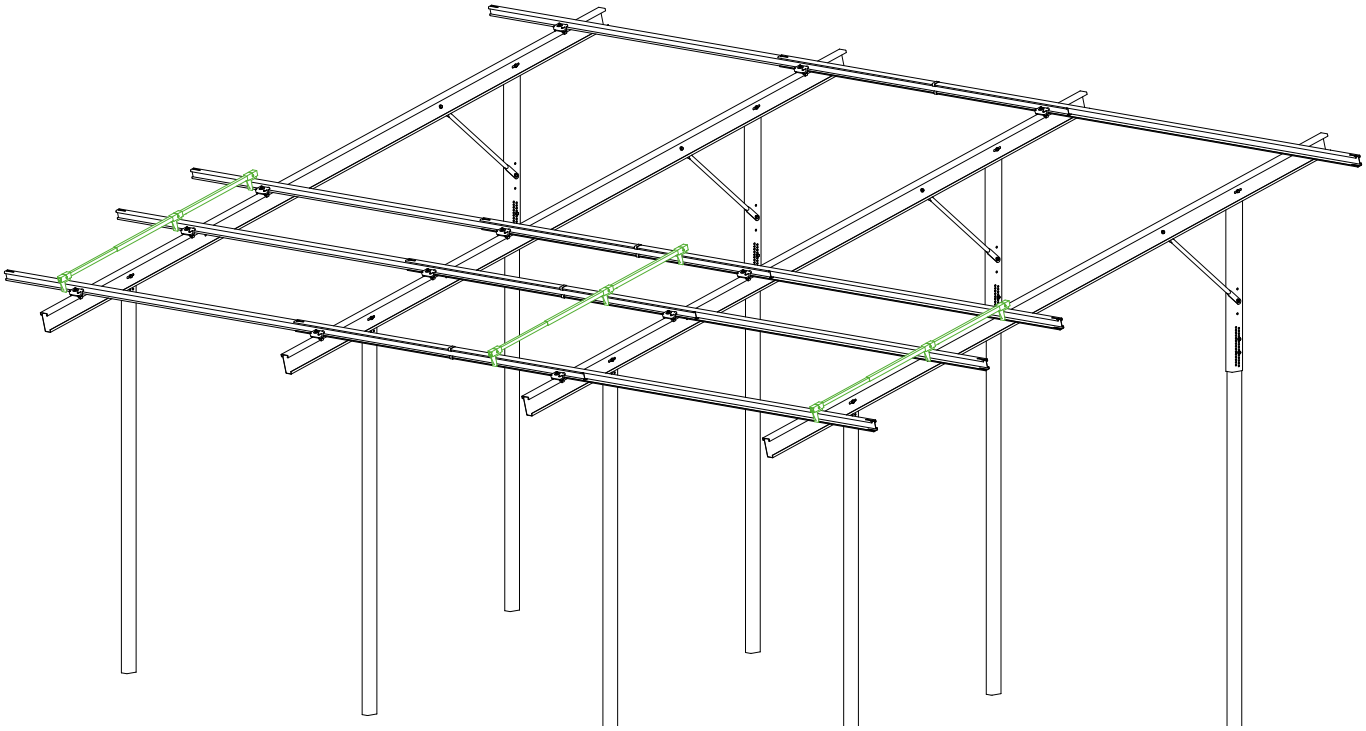
To ensure a right angle between the Purlins and Rafters **D**, we recommend measuring the diagonals between the bottom and top Purlins. If the diagonals are the same length, the right angle has been correctly established.

6

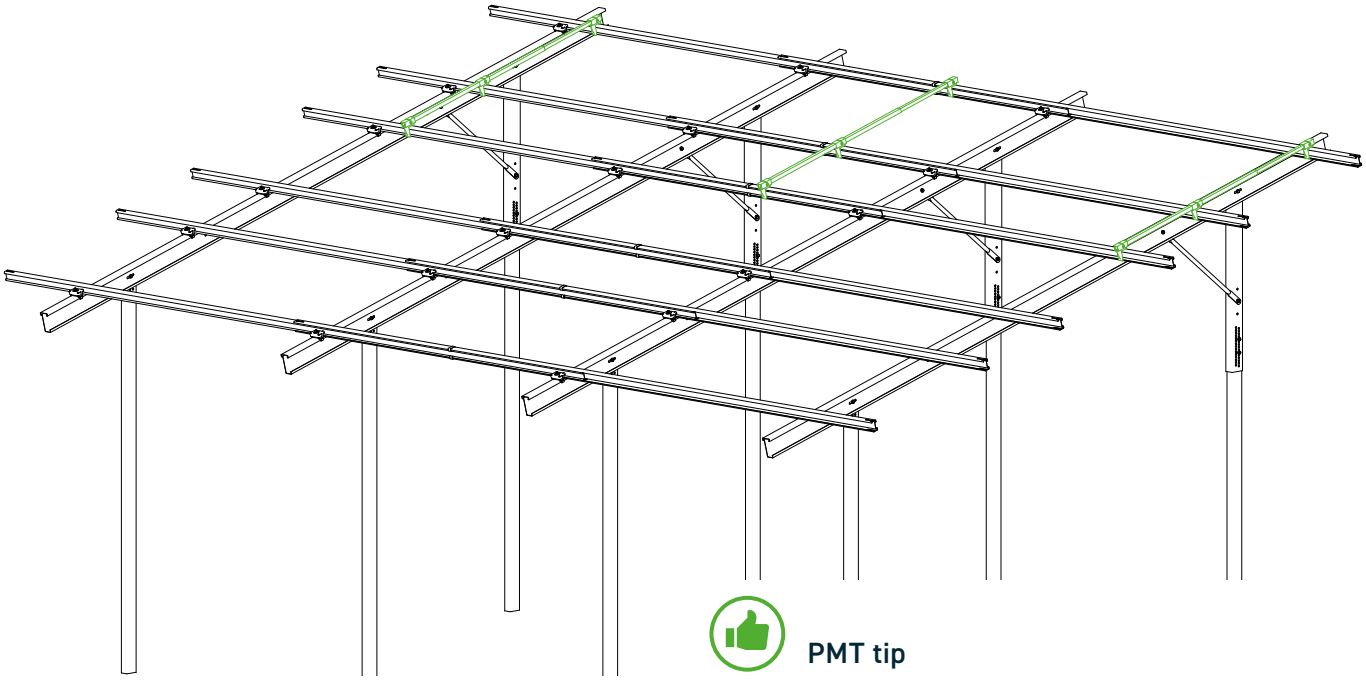
Adjust the assembly aid to the length specified in the project report using an hex key.



Align Purlins 2 and 3 using the mounting aids and fasten them to the Rafters using Cross Clamps **H** with 15 – 17 Nm.



Align Purlins 4 and 5 using the mounting aids and fasten the Cross Clamps **H** to the Rafters with 15 – 17 Nm.

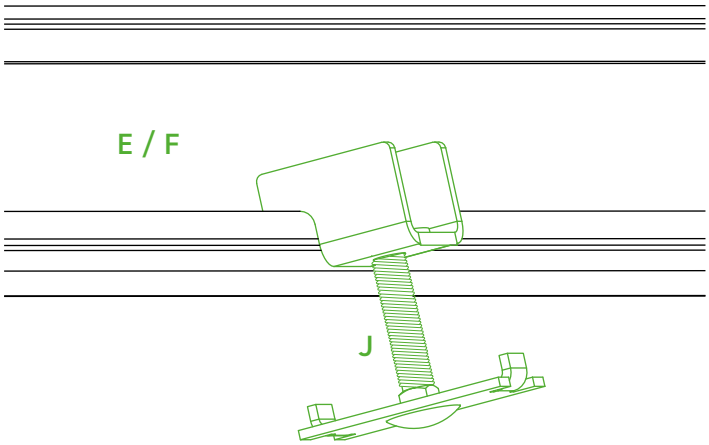


PMT tip

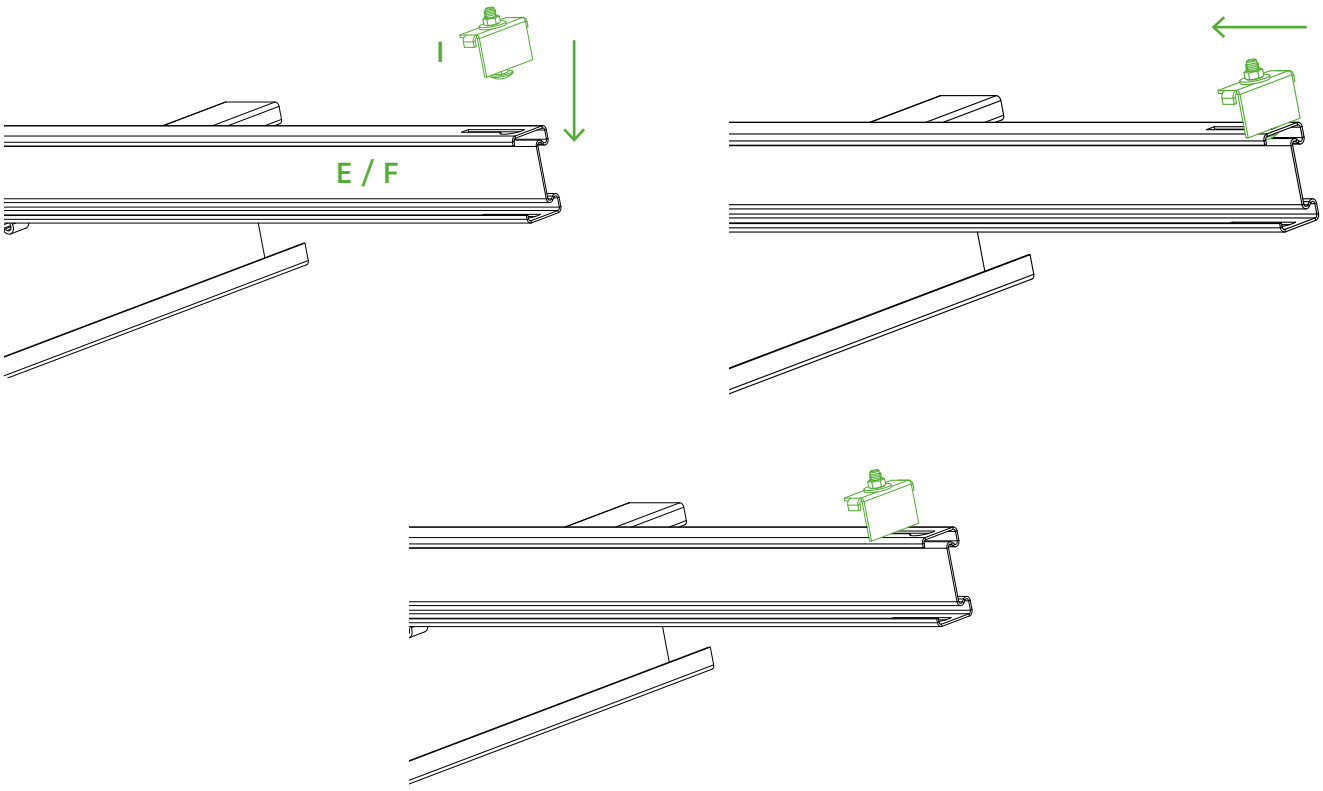
The mounting aid can be used not only to align the Purlins, but also to push them into the defined position.

7

To simplify the installation process, the clamps can be distributed before the modules are placed on top. To do this, the Mid Clamps J can be hooked into the Purlin in their approximate position with the clamping side facing down.

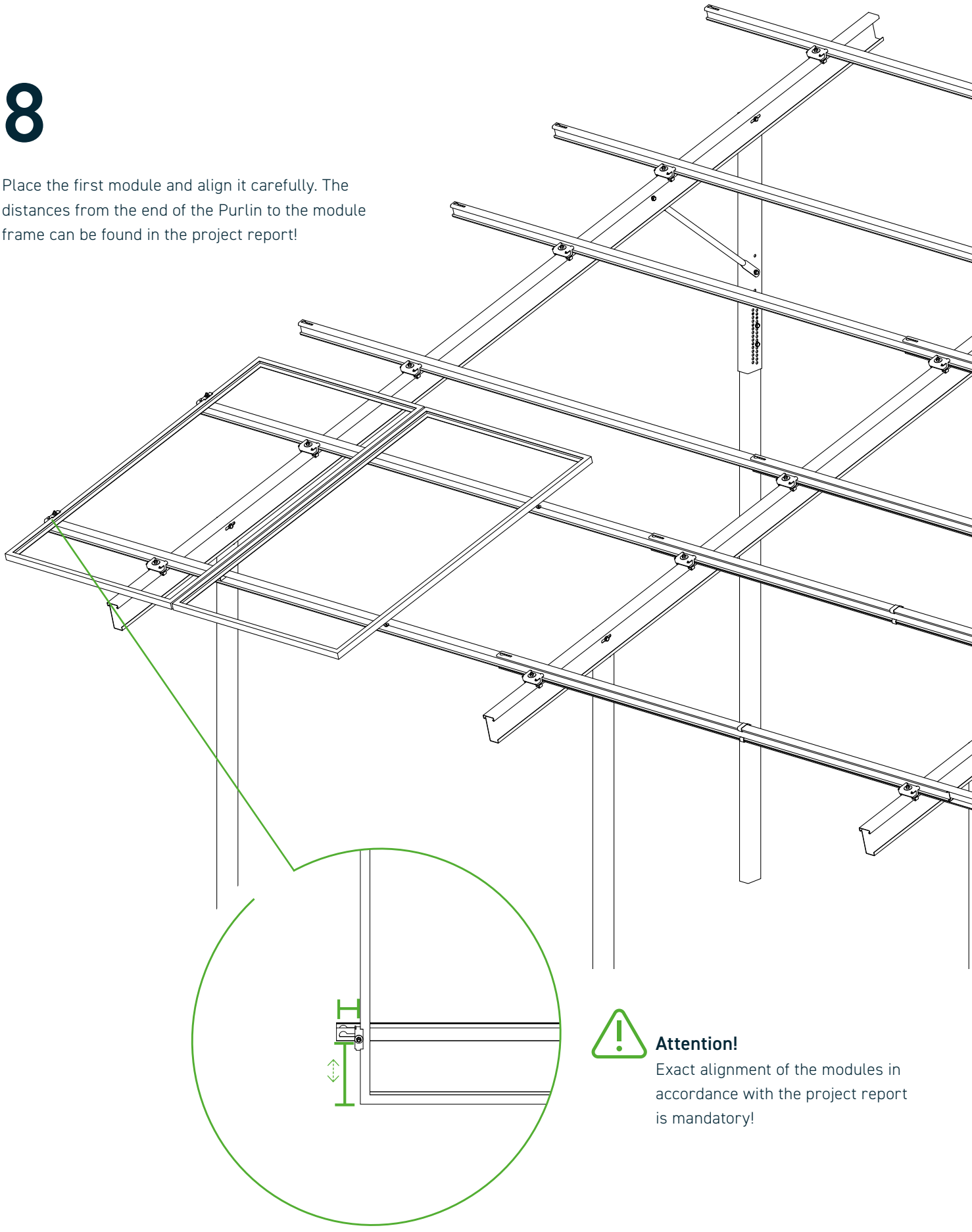


Hang the End Clamps I on each end of the purlin.



8

Place the first module and align it carefully. The distances from the end of the Purlin to the module frame can be found in the project report!



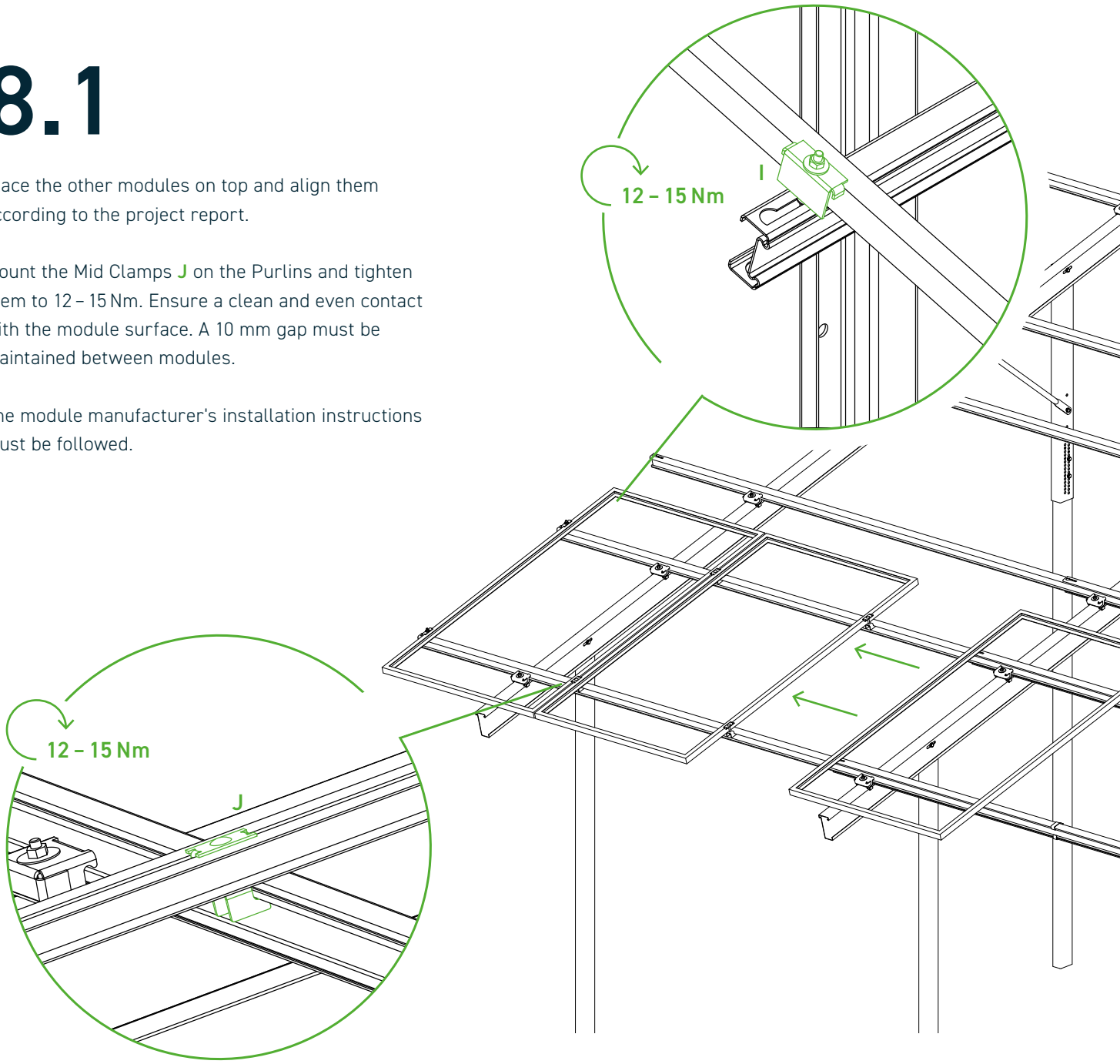
Attention!
Exact alignment of the modules in accordance with the project report is mandatory!

8.1

Place the other modules on top and align them according to the project report.

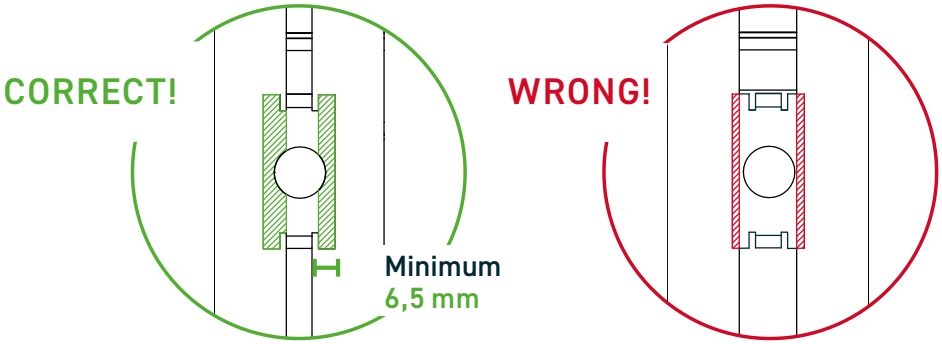
Mount the Mid Clamps J on the Purlins and tighten them to 12 – 15 Nm. Ensure a clean and even contact with the module surface. A 10 mm gap must be maintained between modules.

The module manufacturer's installation instructions must be followed.



PMT tip

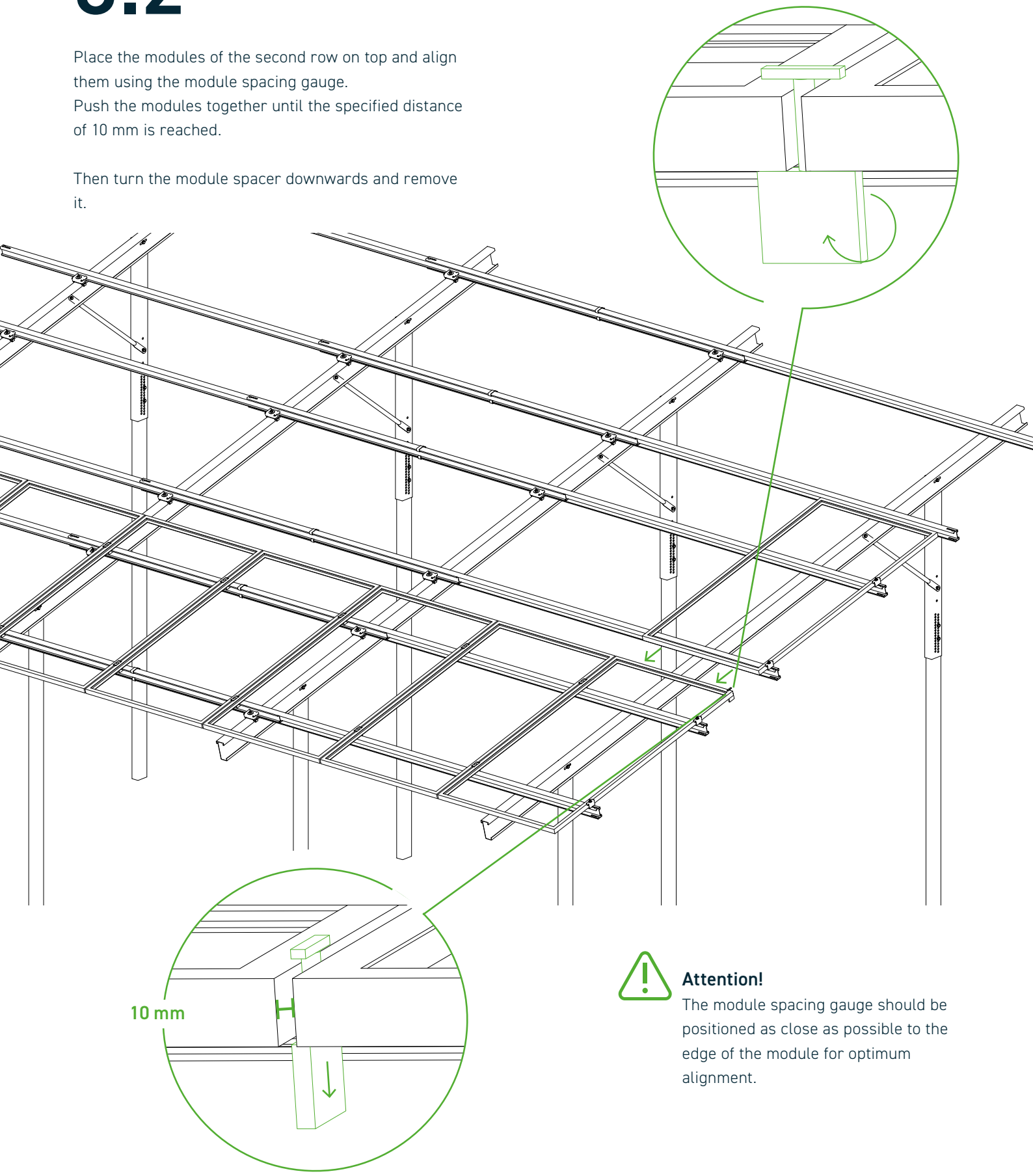
When setting the Mid Clamp, press the screw from bottom to top until the next module has been pushed in completely.



8.2

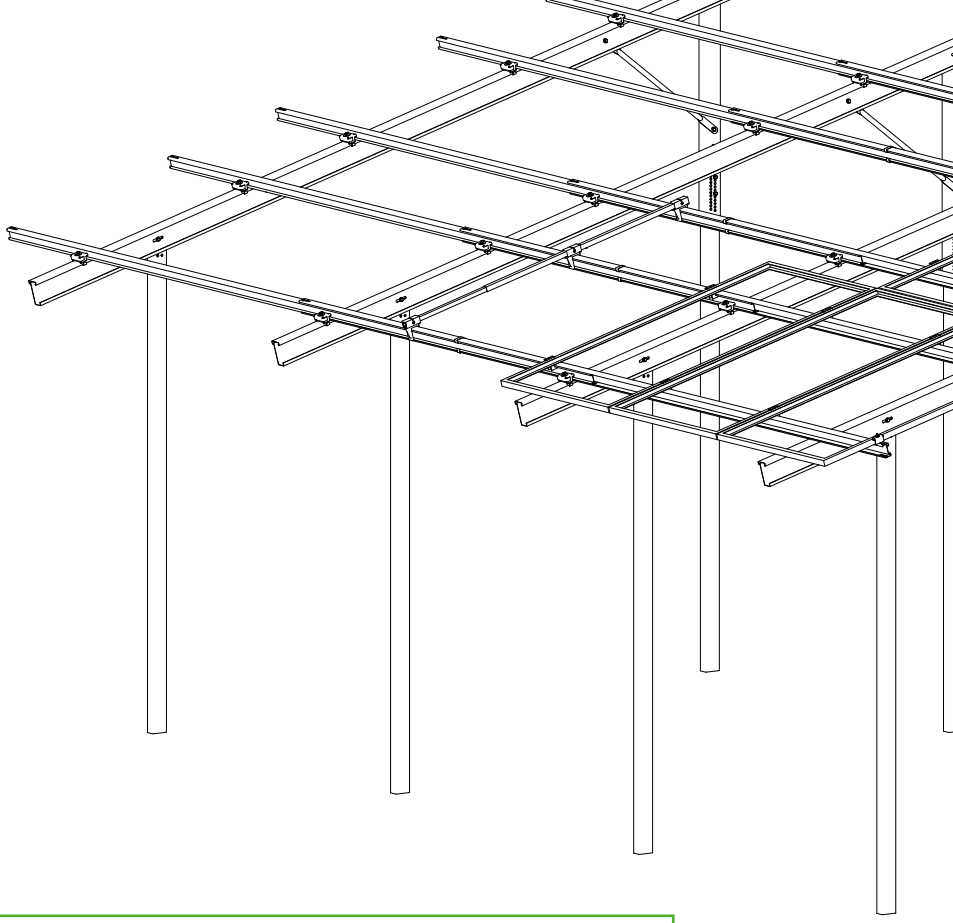
Place the modules of the second row on top and align them using the module spacing gauge.
Push the modules together until the specified distance of 10 mm is reached.

Then turn the module spacer downwards and remove it.



Attention!
The module spacing gauge should be positioned as close as possible to the edge of the module for optimum alignment.

Final Examination



Final Examination

- Check whether the entire system and all components have been installed in accordance with the current project report.
- It must be checked whether all screws are inserted at the intended points and tightened with the specified tightening torque.
- Information on the tightening torque can be found in the assembly instructions or on the packaging. Attention! These are safety-relevant and can lead to considerable damage if not observed.
- Check that all anchors have been correctly positioned and secured in accordance with the project specifications. You will find the relevant information in the current project report.
- Ensure that all system components are securely mounted and that there is no looseness, instability, or play.

Maintenance

- The upper and lower limits of the tightening torque of the screw connections must be checked regularly as part of the maintenance (maintenance interval at least once a year; observe the maintenance protocol).

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 facility has been installed properly. The warranty conditions can be found at pmt.solutions/downloads/.

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We are happy to advise you.

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To the Table of Contents