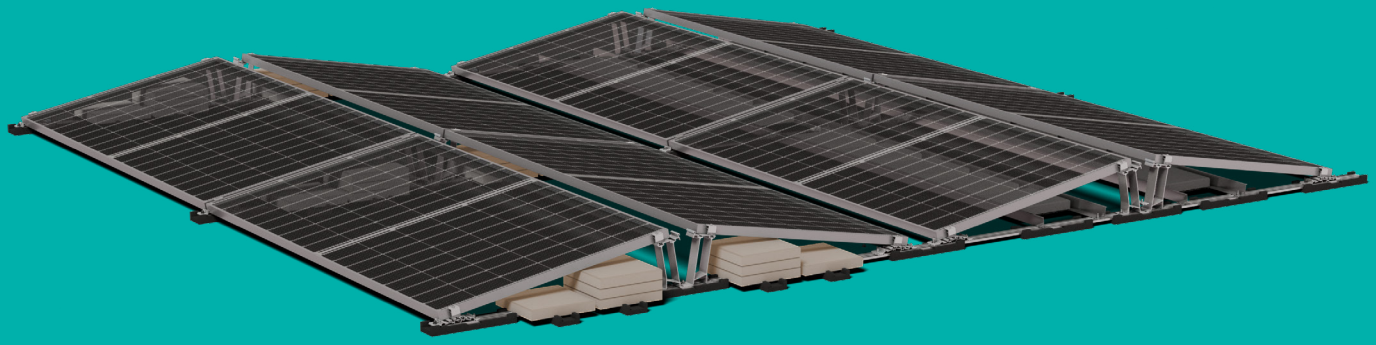
mounting systems

LightX Speed
Installation Manual



Contents

1. Introduction

1.1 Disclaimer

Project reports created with the Mounting Systems design software does not include a review of the entered data. The individual responsible for data entry must verify the information provided. If the project report is prepared by an employee of Mounting Systems GmbH, it will be based solely on the documents or information supplied by the customer. A separate review of these documents—such as an on-site visit—will not occur.

The customer is responsible for determining the coefficient of friction required for calculating the ballast in flat roof installations. If no information is available, the ballast will be calculated using a default coefficient of friction of 0.5. The customer must verify this value before installing the systems.

Mounting Systems GmbH accepts no liability or guarantee for errors arising from incorrect entries or omissions in the calculation basis.

1.2 System Description

The LightX Speed ProLine is a robust framework designed for assembling photovoltaic (PV) modules on flat roofs exceeding 10 m^2 allowing to mount PV modules with a width of 1134 mm. This system facilitates connecting multiple rows of modules facing south, with inclination of 10°.
This solution has been specially developed for applications on flat roofs with a low permissible load. All elements have been designed as easy to assemble. The elements used are made from aluminum and stainless steel. The selected materials used for the system guarantees a high resistance to corrosion, while at the same time offering the possibility of full disposal.

1.3 Manual Overview

Content
These instructions cover assembling the LightX Speed ProLine flat roof system, including planning, components, and safety information. The initial drawings demonstrate corner clamping for framed modules.

Applicable Documents
In addition to this manual, each MSY system includes the "Installation Manual - General Information" providing general details on standards, safety, transport, maintenance, disassembly, and disposal relevant to the assembly site. Both this Installation Manual and the "Installation Manual - General Information" are essential components of the LightX Speed ProLine mounting system and must be followed for every installation.

It is crucial to carefully read these Instructions as well as all applicable documents prior to carrying out any installation, maintenance or disassembly work. You are provided with the information required for the safe and complete installation, maintenance and disassembly. Should you have any questions, please contact Mounting Systems GmbH.

User Group
Mounting Systems GmbH's installation instructions are intended for the following persons (user group):

- Skilled personnel
- Instructed personnel

Skilled personnel
Skilled personnel are individuals who, on the basis of their professional training, are able to execute installation, maintenance, and disassembly work appropriately.

Instructed personnel
Instructed personnel are individuals who have been instructed and taught appropriately regarding the assigned tasks and the possible risks in the event of improper conduct. An instructed individual must have received instructions regarding the required safety policies, precautions, relevant regulations, accident prevention regulations, as well as operating conditions and must have demonstrated his/her competence. The implemented work must be approved by skilled personnel.

Guidance notes
The following pictograms allow for the easier orientation in this manual:

Pictograms:

This symbol indicates important information and useful tips.

This symbol indicates tips and tricks for easier procedures.

1.4 Warning notices

The warning notices used in this Installation Manual indicate safety-relevant information. They include:

- warning symbol (pictogram)
- signal word indicating the hazard level
- information on the type and source of hazard
- information on possible consequences if hazards are disregarded
- measures to be taken in order to prevent
- hazards and avoid injuries or damage

The signal words of the warning notices indicate the following hazard levels:

DANGER!
Indicates a great and extraordinary danger, which may result in death or serious injury if ignored.

WARNING!
Indicates a potentially dangerous situation, which may result in serious or medium injury or damage to the property.

CAUTION!
Indicates a potentially dangerous situation, which may result in minor injuries or damage to the property if ignored.

ATTENTION!
Indicates potential danger, which can result in damage to property

1.5 Safety

The complete general safety regulations for the frame systems supplied by Mounting Systems GmbH are included in the further applicable document “Installation Manual - General Information”. Read this document with care and always observe the notices contained - use the frame only in compliance with its intended purpose. Observe the duties of the principal and follow the general as well as the specific safety instructions.

For any jobs you accomplish, the specific safety notes which precede the instruction steps in this productspecific Installation Manual must also be observed.

DANGER!
Danger to life due to falling parts!

Parts falling from the roof may cause severe injury or death!

Seal off the danger zone on the ground prior to starting assembly work in order to prevent persons from being injured by falling parts!

Make sure to secure the parts so that they cannot fall from the roof!

Wear the protective equipment stipulated by law!

Do not stand in the danger zone!

Do not work in high wind!

After having completed assembly, check the frame system and the modules whether they are tightly secured!

DANGER!
Danger to life due to falling parts!

Falling from the roof may cause severe injury or death!

Wear the protective equipment stipulated by the law!

Secure yourself against falling!

Do not work on the roof during high wind!

2. Important assembly notes

2.1 Application conditions

Ballast stones are utilized on the ground rails to stabilize the installed flat roof system. Your personalized ballast plan specifies the arrangement of these stones and is included in the delivery package. The customer is responsible for verifying that the roof can support the extra weight of the system and the ballast stones.

2.2 Assembly preparation

Mounting Systems GmbH recommends gathering information on the on-site conditions before placing an order but in particular, you should familiarise yourself with:

- The roof structure (e.g. surface material)
- The permissible extra load capacity of the roof
- Ensuring the supporting structure is securely fixed to the roof surface.

2.3 Assembling aid and required tools

The following tools are required for the assembly of the frame system :

- Allen wrench, 5 mm
- Impact wrench with a tightening torque of min. 18 Nm or an M13 ring spanner wrench
- Elongation for impact wrench
- Attachment for impact wrench, 13 mm nut
- Chalk line
- Spirit level
- Folding rule / measuring tape
- Lifting gear (e.g. roofer lift, harness)
- Plunger elevator
- Spacing template (included in the scope of delivery)
- Gloves

DANGER!
Danger to life due to damage to the roof

Excessive load may severely damage the roof!

Before starting assembly, make sure that the building and in particular the roof cladding meet the static requirements which will increase due to the PV system and during assembly work.

2.4 Expansion joints

Due to thermal expansion, the frame must be designed with joints which must be taken into account for the ballast plan. The following data can be used for module design:

In North-South direction: every 16 meters
In East-West direction: every 16 meters

2.5 On the assembly description

The following chapters outline the sequential steps required for planning and assembling the system.

Please carefully follow these assembly steps and ensure strict compliance with the safety instructions.

DANGER!
Danger to life due to falling parts!

Parts falling from the roof may cause severe injury or death!

Before starting assembly, make sure that the material used meets the on-site static requirements.

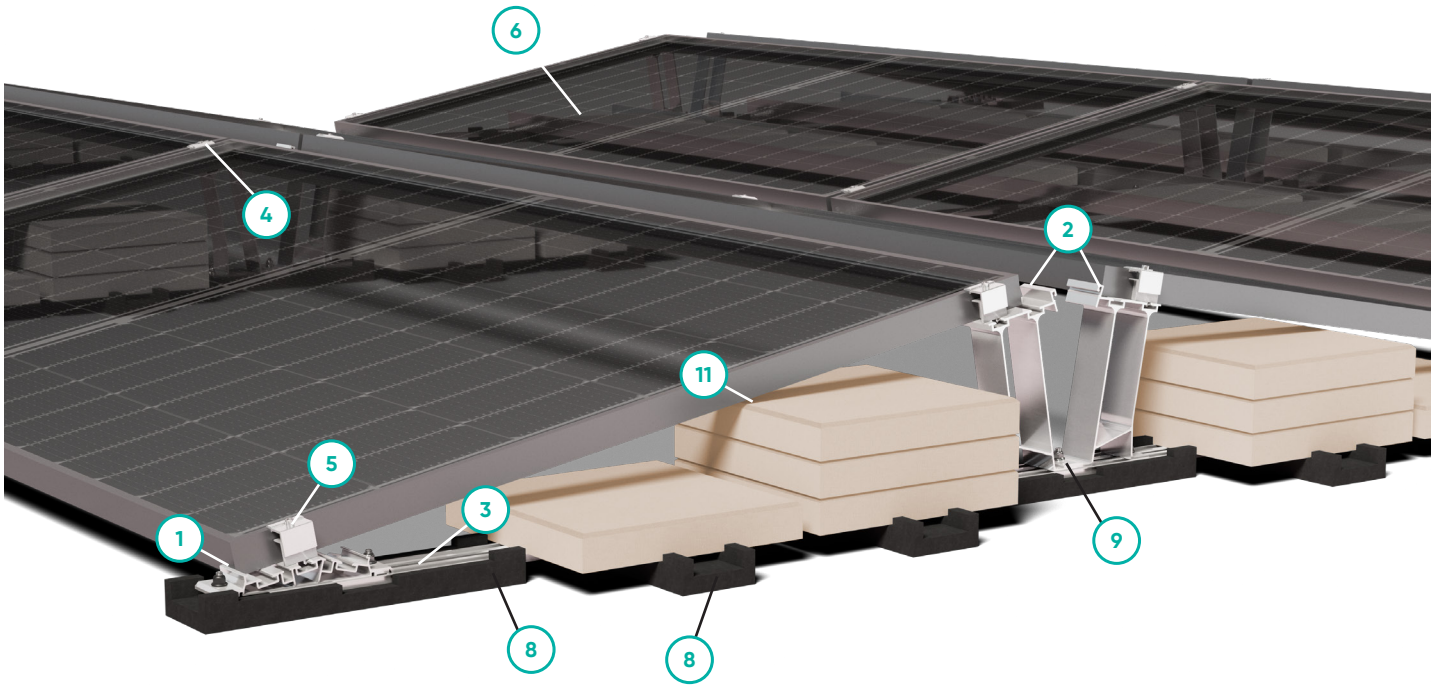
3. Technical description

3.1 System overview

The following illustration shows all crucial system parts.

The design of each system part may vary.
It depends on:

- type of roof
- type of module
- number of modules
- local conditions.



1 Front Support

2 Back Support

3 Ground Rails

4 Module Mid Clamp

5 Module End Clamp

6 Universal Ballast Tray

7 Ballast Stone

8 Universal Building Protection Mat,
(standard or coated with aluminium)

9 New lock mechanism for back support

3.2 Components

The following illustration shows all parts of the LightX Speed frame which can be included in the scope of delivery.

1 Pre-assembled rail

2 Back Support

3 Module Mid Clamp

4 Module End Clamp

5 Universal Ballast Tray

6 T-Head Bolt & Locking Nut for Ballast Tray

7 Universal Building Protection Mat (standard or coated with aluminium)

8 Cross Connector 1/22

9 Clamp for Lightning protection and potential equalisation

3.3 Technical data

Application	Flat roof
Roofing	For all roof coverings (except green roof)
Roof inclination	Up to 5°
Building height	Max. 25 m
Module width	1134 mm / +- 1 mm
Module length	Up to 2400 mm
Module inclination	10°
Supporting profiles	Aluminium (EN AW 6063 T66)
Lightning protection and potential equalisation	Dehn clamps In process to be certified
Small parts	Stainless steel (V2A)
Color	Aluminium: Natural
Unique selling points	pre-assembled rails; three screws for mounting the rails; no connecting rails; universal protection mats with ballast tray replacement function;
Warranty	10 years

4. Planning of the module area

Before you can start assembly, the following tasks must be accomplished:

- Clean the roof surface.
- The first row must always be mounted towards the front roof edge (south).
- Align the installation area because roof areas are not always at right angles.
- Apply, for example, a chalk line at the first row to align the front side.

We require using building protection mats in order to avoid damage to the waterproofing of the roof. Depending on the surface structure of the roof, we recommend the following building protection mats:

Roof	Building protection mat
Bitumen-coated	Standard
Foil roof	Coated on one side with aluminium
Gravel-covered	Optional

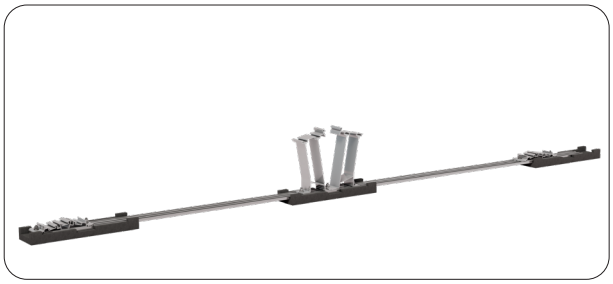
Two building protection mats for each elevation must be placed under each ground rail (one each under every front foot and every back support). If additional ballast support components such as ballast tray or ballast plates are used, additional building protection mats are required.

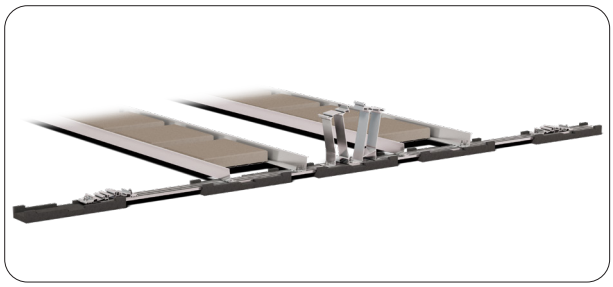
The following calculation applies:

- **Ballast profile:** one additional building protection mat for every two ballast profiles

- Building protection mats are cut out such that safety tabs can be fold out in order to prevent lateral slipping (for example caused by thermal expansion)

Make sure that the building protection mat protrudes from both ends of the ground rail by approx. 50 mm and the safety tabs are be unfolded. This is to ensure optimal protection for the roof surface.

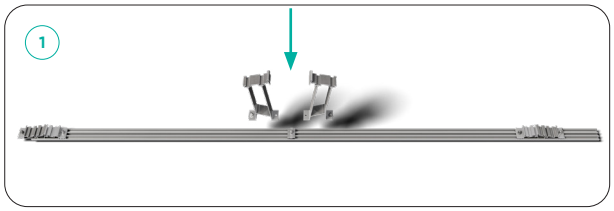


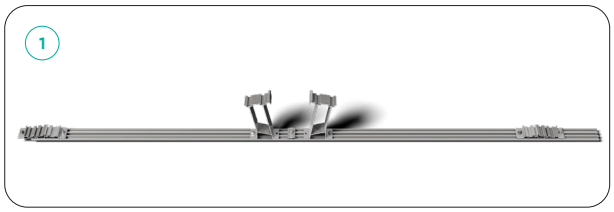


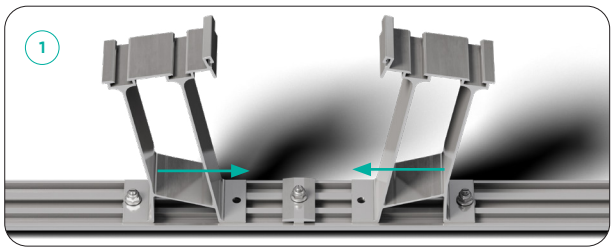
5. Mounting Steps

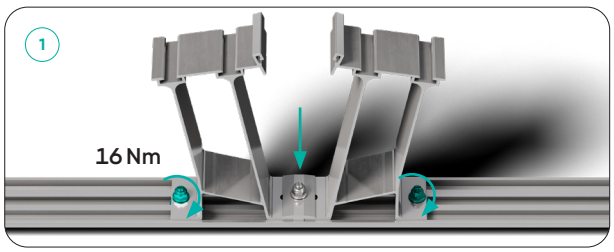
5.1 Assembling back supports

1 Place the back supports on the pre-assembled ground rail. Slide the supports under the pre-assembled mounting aid and then fasten with M8 T-head bolt nut applying 16 Nm force.

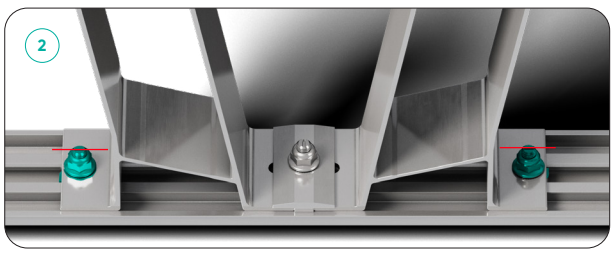


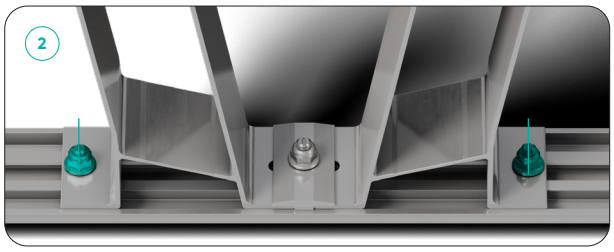




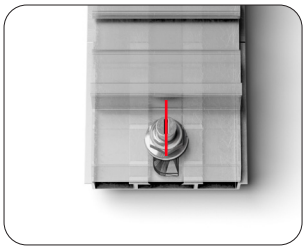


2 The screws have to be tightened which is indicated by the vertical slot

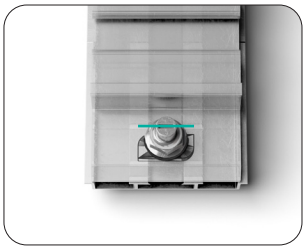




ATTENTION!
Pay attention to the screws not yet tightened which is indicated by the vertical slot



Screw not tightend



Screw tightend

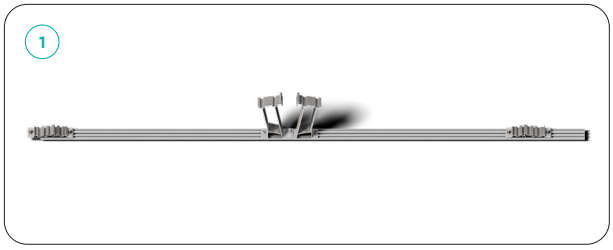
5.2 Mounting the next unit:

Assembly steps:

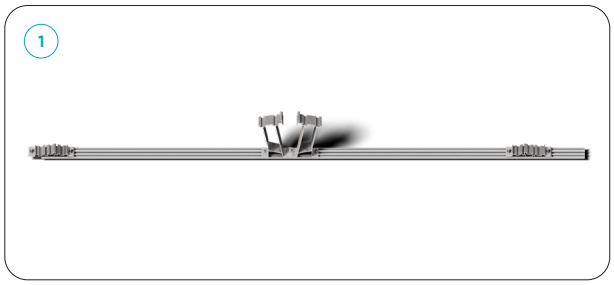
1 At this stage, the installer should have completed the preassembly of units that consists of pre assembled rails and back supports.

2 Following this, the preassembled units need to be joined together by securing the front supports of each unit, which face each other. Pay attention to front support so that it does not get out of place or rotate when being tightened.

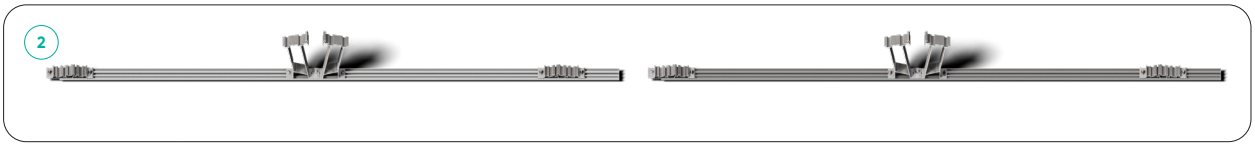
Repeat these steps until the mounting frame row is complete.



Front (1st) Unit

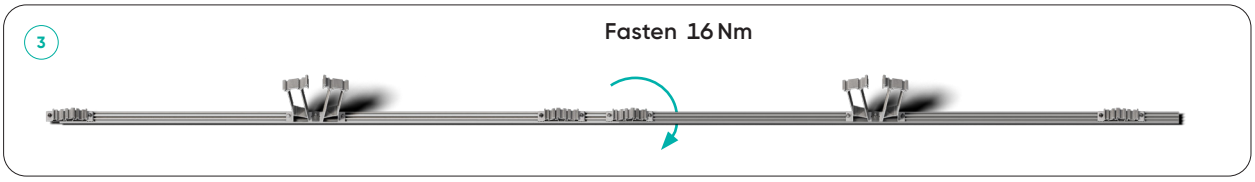


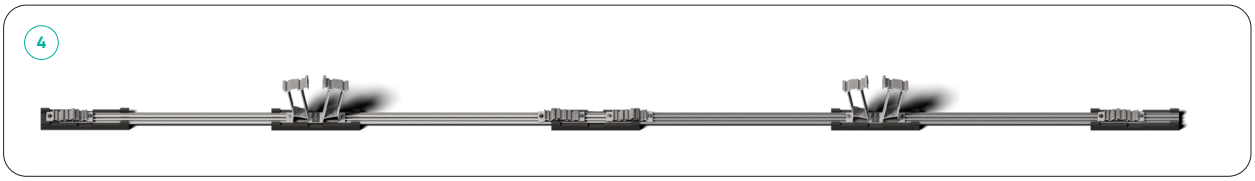
Mid Unit



3 Connecting preassembled units.

4 Place the protection mats underneath the rails.

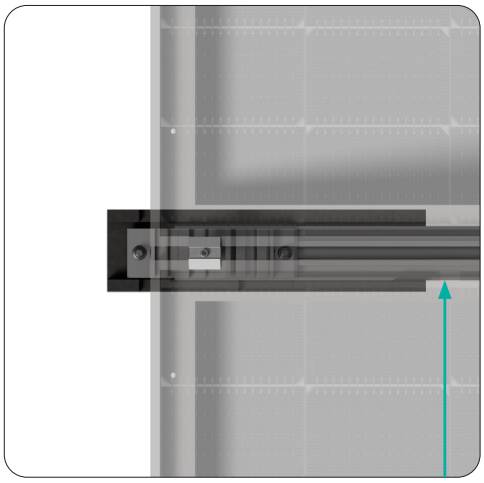




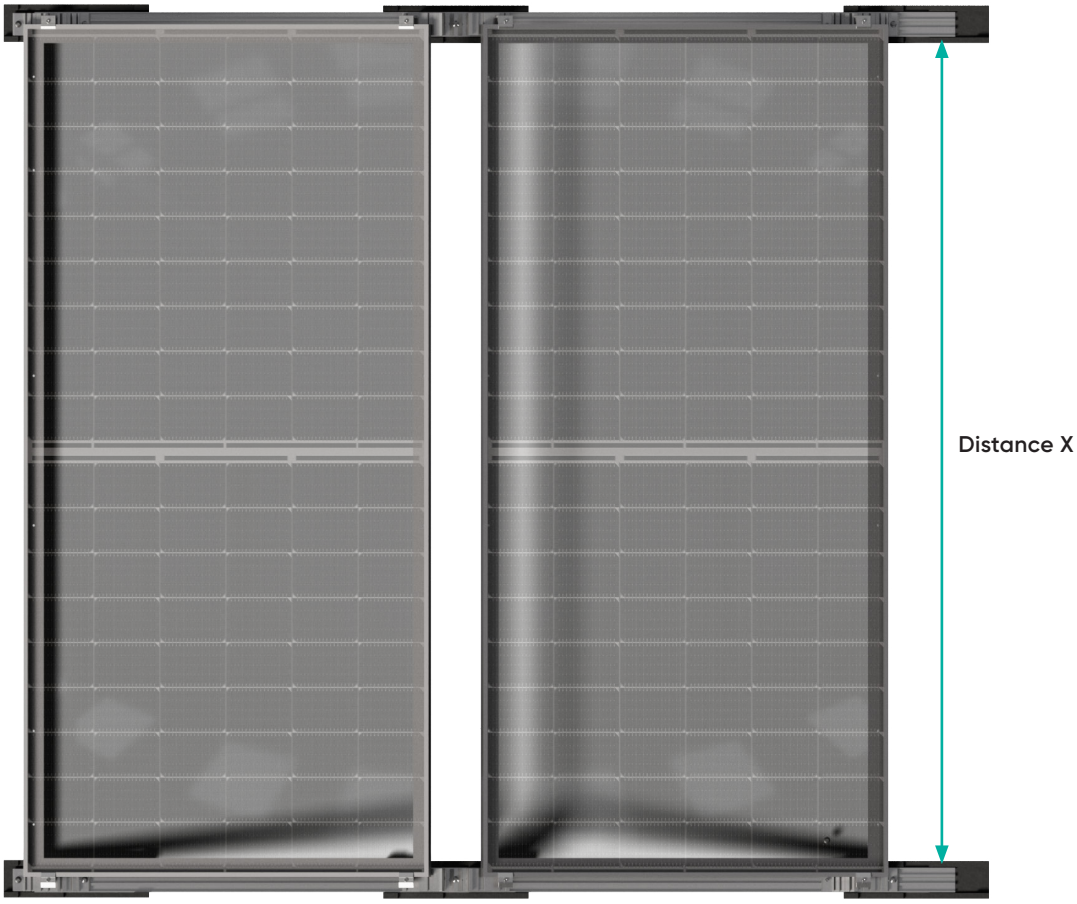
5.3 Placing the next row:

Assembly steps:

- All the preassembled units are aligned alongside the application area on the roof with a certain distance in between.
- The distance between the rows corresponds approximately to the module length.
- It is recommended to precisely realign this distance when assembling the modules.

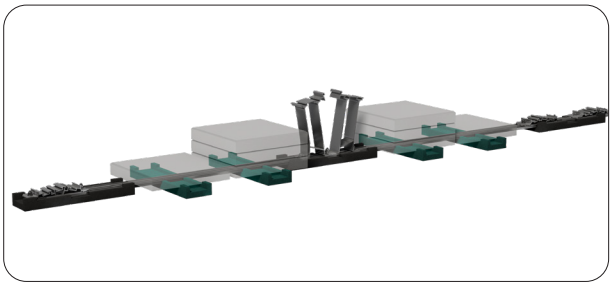


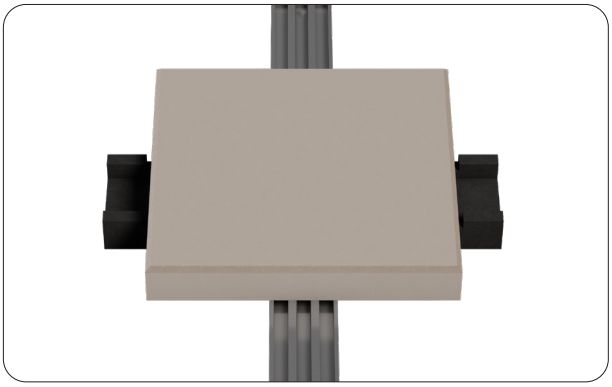
Distance X between rails is calculated by below formula:
Module Length - (2x20 mm)



5.4 Applying ballast

Before finally mounting the modules, ballast must be applied. Depending on the amount of the ballast, there are two variants for applying ballast to the LightX Speed ProLine system. Both variants as well as their assembly are presented in this chapter.





Applying ballast with universal building protection mat.

Assembly steps:

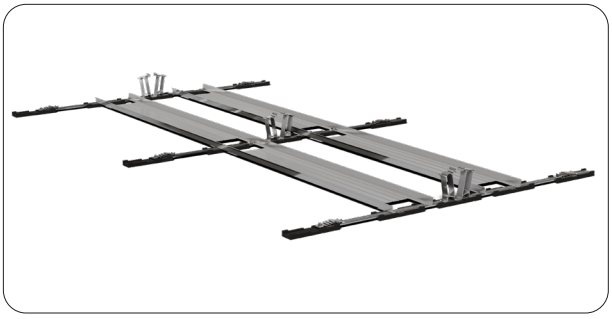
- Simply place the protection mats underneath the rails. This variant also offers the option of using 30 x 30 x 4 cm paving stones in addition to the ballast stones.
- It is mandatory to apply building protection mats under the rails!
- Depending on pitch and module width, only a certain number of ballast stones can be applied (see ballast plan in calculation tool).

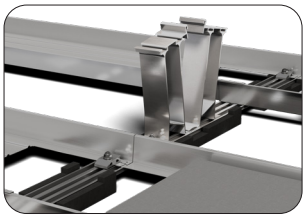
Configuration	Number of paving stones on the ground rail and ballast profiles
10°	max 5 (approx. 40 kg)

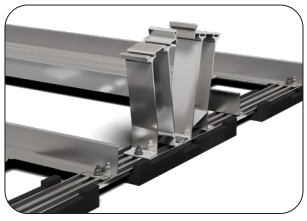
Applying ballast with with universal ballast tray.

Assembly steps:

- Prepare the T-head bolts/nuts for one end of the tray for proper fixing, while utilizing bottom clamps (cross connector) for the other end.
- The ballast tray on the back support aligns perfectly with the back support.
- Depending on the ballast calculation, only a certain number of ballast blocks can be used (Pleae refer to the ballast plan in calculation tool.)







Configuration	Number of paving stones under the module
10°	max 15 (approx. 120 kg)

5.5 Mounting the modules

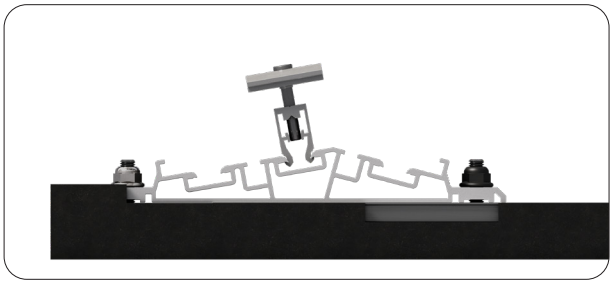
Clickstones are used for mounting the modules. Clickstones are special clips for fitting the module clamp in the rail channel. You only need an Allen key (5 mm) for assembly. You can insert the Clickstone into the rail channel from above. Each module end clamp can hold one module. The module clamp is positioned between two modules.

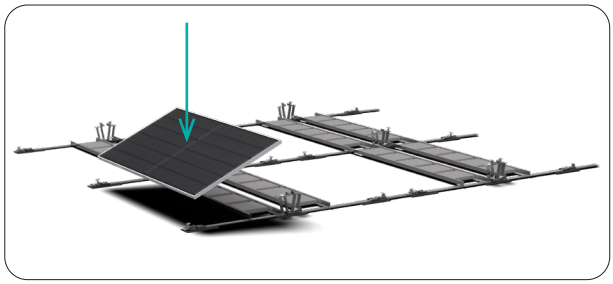
Assembly steps:

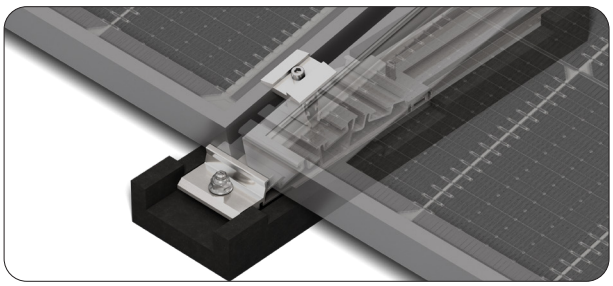
- Insert the Clickstone into the rail channel at a slightly slanted position.
- Press down the Clickstone and engage it in the rail until you hear a clicking sound.
- Tighten the hexagon socket screw with a torque of 8 Nm.

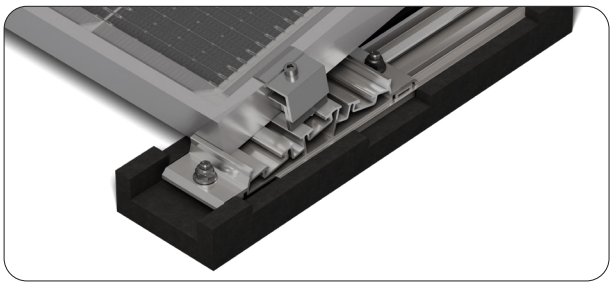
The lugs at the inside of the Clickstone are designed such that any mechanical release is ruled out once the screw has been tightened. So if you want to remove the Clickstone from the rail by pressing it together and lifting it up, you must first unscrew the screw to above the lug.

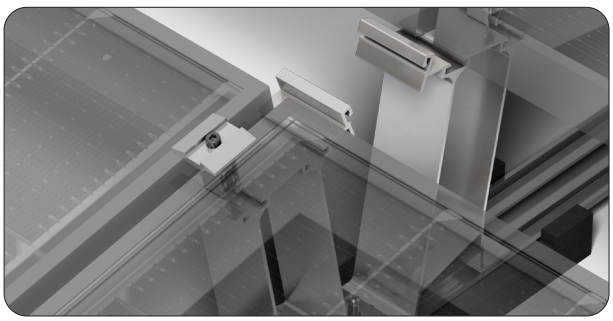
NOTE!
The shape of the Clickstone corresponds exactly to the profile of the rail channel.
It has been consciously constructed not to run easily in order to prevent unintentional slipping in vertical rail tracks.
To move the Clickstone, press lightly on the bolt, from above, and move the stone with a little pressure along the rail channel.











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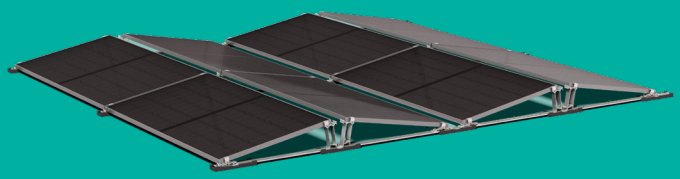

Rangsdorf 1
Headquarters & Production

Mounting Systems GmbH
Mittenwalder Straße 9a
D-15834 Rangsdorf, Germany

Tel: +49 33708 529 - 100
Fax: +49 33708 529 - 199

Rangsdorf 2
Warehouse & Production

Mounting Systems GmbH
Maulbeerstraße 13
D-15834 Rangsdorf, Germany

Tel: +49 33708 529 - 100
Fax: +49 33708 529 - 199

Cologne
Sales Office

Mounting Systems GmbH
Rolshover Straße 524
D-51105 Cologne, Germany

Tel: +49 221 29277 - 600
Fax: +49 221 29277 - 629

info@mounting-systems.com
www.mounting-systems.com