



lumil SOLAR

H2100 - SS189

TECHNICAL MANUAL

Version:05.23



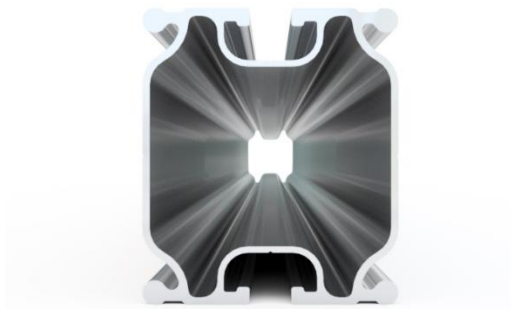
Assembly Instructions

❖ CONTENTS

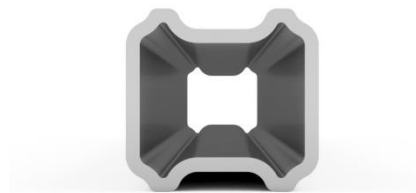
A.	MATERIAL LIST	3
1.	Aluminum Profiles.....	3
2.	Steel Profiles	3
3.	Fasteners & other accessories.	4
➤	Accessories needed to mount the profiles	4
➤	Accessories needed to mount PV panels to the structure.....	5
4.	Tooling set.....	6
5.	Nut's torques.....	7
6.	Tolerance.....	7
B.	ASSEMBLY INSTRUCTIONS FOR SS189	8
1.	SS189 Portrait	8
➤	Ramming piles in the ground	8
➤	Mounting inclined beam on piles	10
➤	Mounting purlins on inclined beam.....	11
➤	Connecting purlins together by using core.....	13
➤	Mounting panels on the purlins.....	15
➤	Placing end cups for purlins	17
➤	Mounting Wire Ropes - Windshields (optional)	18
C.	MAINTENANCE.....	23

A. MATERIAL LIST

1. Aluminum Profiles



PURLIN



CORE FOR PURLIN

2. Steel Profiles



BACK PILE



FRONT PILE



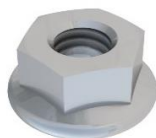
INCLINED BEAM

3. Fasteners & other accessories.

➤ Accessories needed to mount the profiles



HEXAGON BOLT DIN6921
M10x25 A2 INOX
(EX-7623102501)



HEXAGON NUT DIN6923 M10
WITH SERRATION INOX
(EX-8968010201)



DIN 7504-K SELF DRILLING SCREW 5,5x19
A2 INOX
(EX-7626701901)



HAMMER HEAD BOLT WITH EPDM
M8x22 INOX A2
(EX-8969122081)



HEXAGON NUT DIN6923 M8
WITH SERRATION INOX
(EX-8968808201)



WIRE ROPE CLIP DIN 741 F4 A4 INOX
(EX-8960005301)



LIFTING EYE BOLTS DIN580 M8 A2 INOX
(EX-8960005801)



TURNBUCKLE EYE HOOK M8
A4 INOX TYPE C
(EX-8960005111)



WIRE ROPE 1x19 TOUGH 4mm A4 INOX
(EX-8960005401)



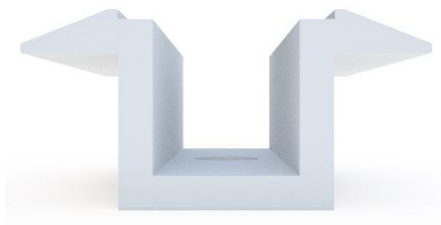
END CAP FOR PURLIN-RAL1003 YELLOW
*Size of end cup depends on the purlin profile



POLYAMIDE SS189
(EX-8960018903)

<i>Purlin Profile</i>	<i>End cap</i>
<i>H2055</i>	<i>EX-8960600040</i>
<i>H2060</i>	<i>EX-8960600040</i>
<i>H2070</i>	<i>EX-8960700040</i>
<i>H2080</i>	<i>EX-8960800040</i>
<i>H2090</i>	<i>EX-8960900040</i>

➤ Accessories needed to mount PV panels to the structure



MID CLAMP PANEL
(EX-8960180200)



END CLAMP LENGTH : X mm*

*Height of end clamp depends on the thickness of the PV panel



SERRATED LOCK WASHER DIN6798-A M8 A2 INOX
(EX-7627300801)



T-SLOT NUT M8 ALUMINUM
(EX-8968008103)



ALLEN BOLT M8x'LENGTH*'

*Length of allen bolt depends on the thickness of the PV panel



CAP OF PANEL GRIP WITH 55mm LENGTH
(EX-8960660000)

Panel thickness (mm)	End clamp	Allen bolt
50	EX-8960330100	EX-7629085001
46	EX-8960430100	EX-7629084501
42	EX-8960340100	EX-7629084001
40	EX-8960440100	EX-7629084001
38	EX-8960720100	EX-7629084001
35	EX-8960450100	EX-7629083501
34	EX-8960460100	EX-7629083001
32	EX-8960621100	EX-7629083001
30	EX-8960630100	EX-7629083001

4. Tooling set



Spirit Level (2m)



Stell Tape Measure (50 -100m)



Spanners Sockets (Metric)

Torque Wrench



Screw Rivet Tool



Suitable Angular Measuring Device

String Line



Tap screw adaptor



Power Driver & Bits
Impact Driver



Health & Safety

It is the installer's responsibility that their personnel ensure that safe working practices as required by the site specific contract are adopted and achieved at all times.

No operation should cause danger to employer, employee, contractor, sub-contractor or any member of the public.

5. Nut's torques

The table below represents the specific torques that should be used for fastening the screws and nut's, according to size (i.e. M8 or M10) and aluminum's finishing (i.e. mill finished or anodized).

SCREW TIGHTENING TORQUES (MILL FINISHED PROFILES)		
M10	M8	M8 Allen
T=40-45 Nm	T=25 Nm	T = 9 - 10Nm (for thin film panels) T =12-15 Nm (for poly panels)
SCREW TIGHTENING TORQUES (ANODISED PROFILES)		
M10	M8	M8 Allen
T=50 Nm	T=25-30 Nm	T = 9 –11 Nm (for thin film panels) T =14–17 Nm (for poly panels)

6. Tolerance

Ramming process	
Description	Tolerance
Distance between pillars (East-West between 2 back or 2 front pillars)	± 3cm
Distance between pillars (North-South between 1 back and 1 front pillar)	± 2 cm
East-West alignment (vertical and horizontal direction)	± 1,5cm
North-South alignment (vertical and horizontal direction)	± 1,5cm
Verticality	± 1º

PV panels and structure assembly	
Description	Tolerance
East-West alignment (vertical and horizontal direction)	± 2cm
North-South alignment (vertical and horizontal direction)	± 1.5 cm
Inclination	± 1º
Verticality	± 1º

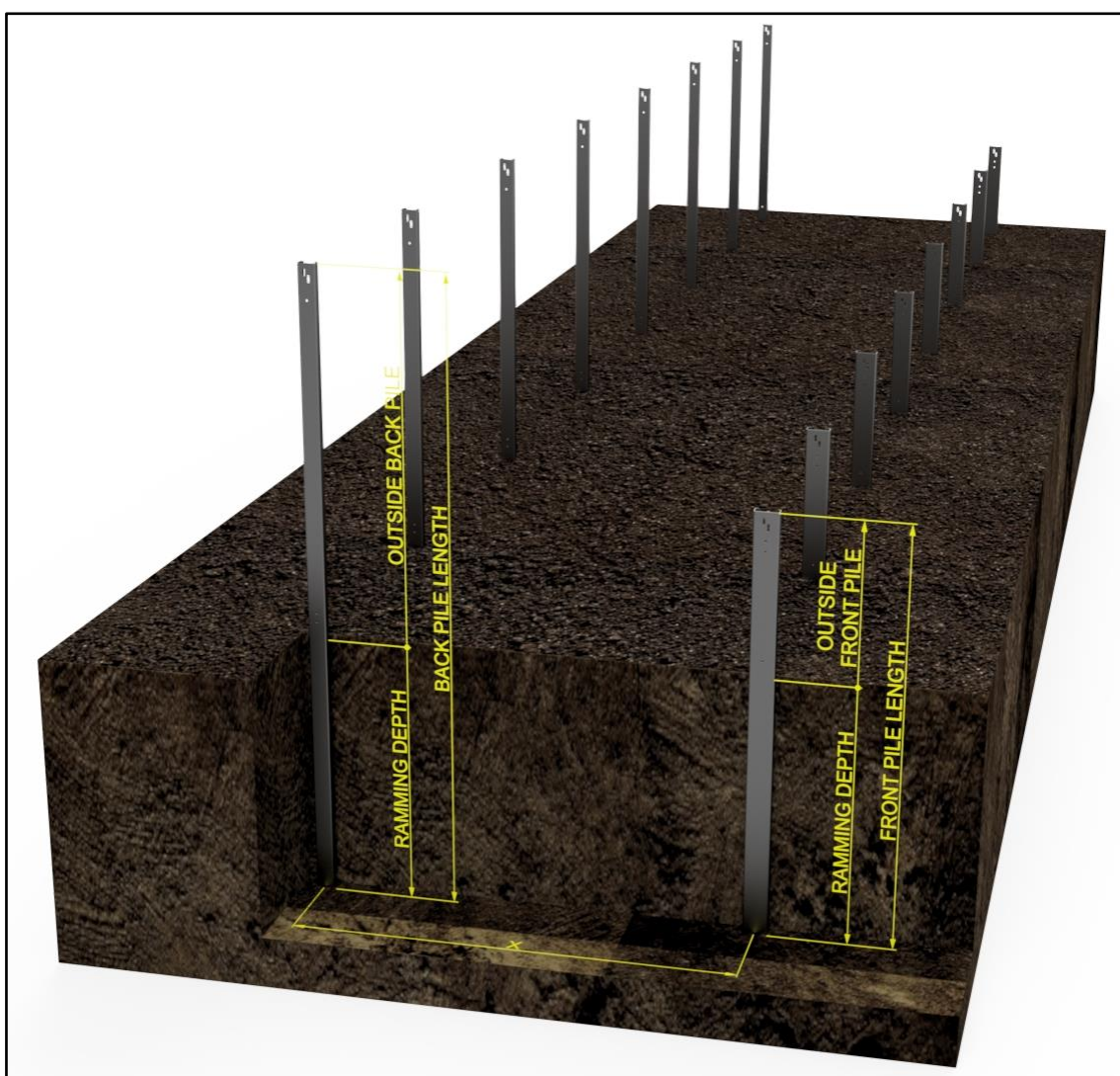
*Notice: 'Distance between pillars' tolerances cannot not be additive to 'East-West alignment' and 'North-South alignment' tolerances.

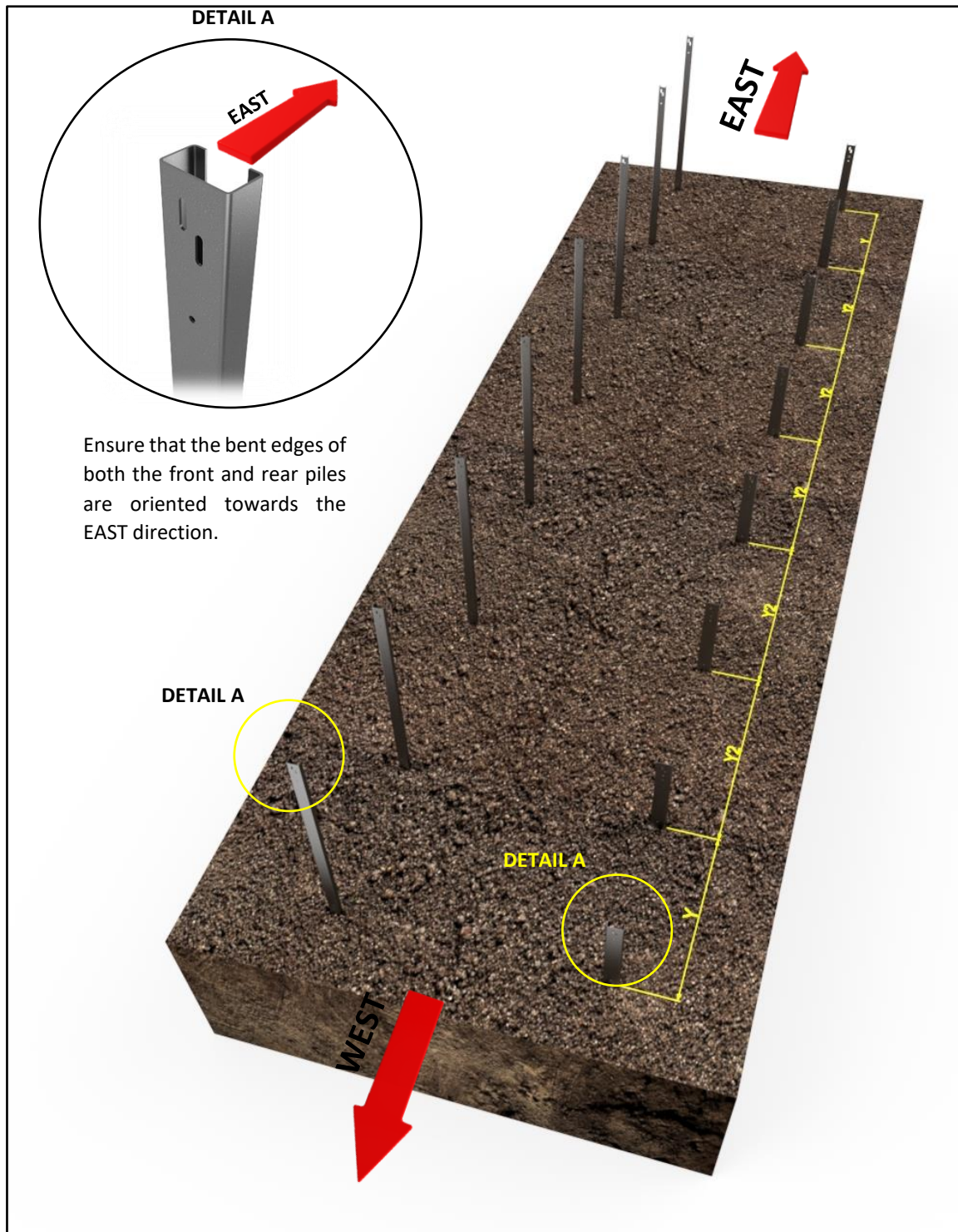
B. ASSEMBLY INSTRUCTIONS FOR SS189

1. SS189 Portrait

➤ Ramming piles in the ground

Drive the rear pile into the soil to the specified Ramming Depth dimension using the ramming process. Repeat the procedure for the front pile, ensuring the depth matches the Ramming Depth dimension. The spacing between the rear and front piles must be in accordance with dimension X.



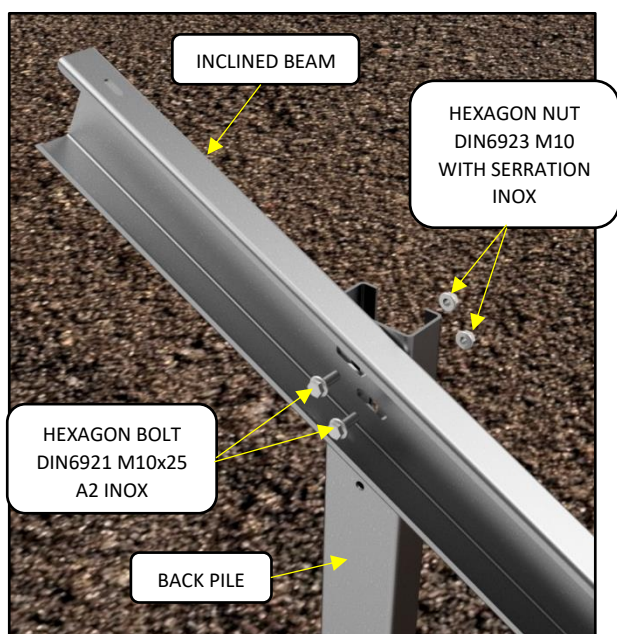
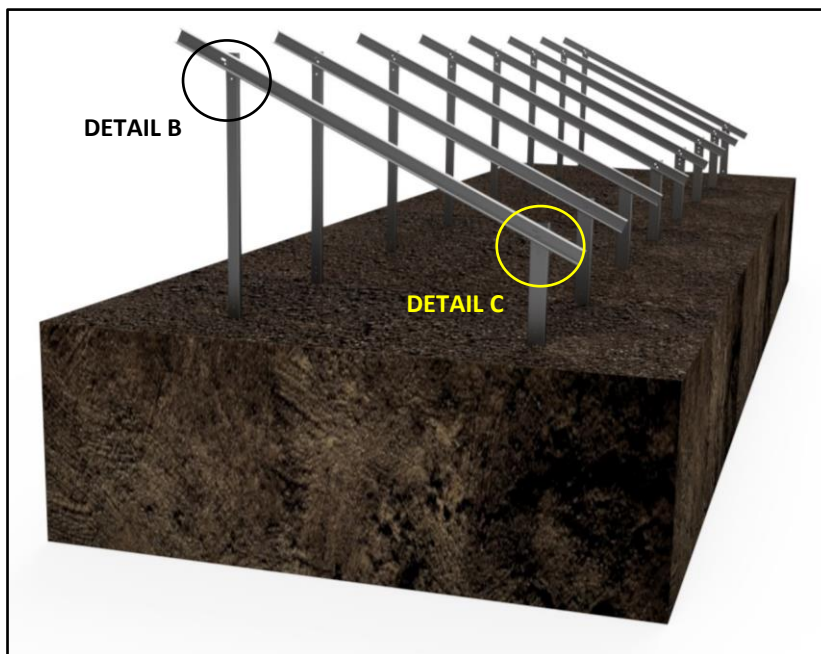


The spacing between two consecutive back or front piles should be in accordance with dimensions Y and Y2.

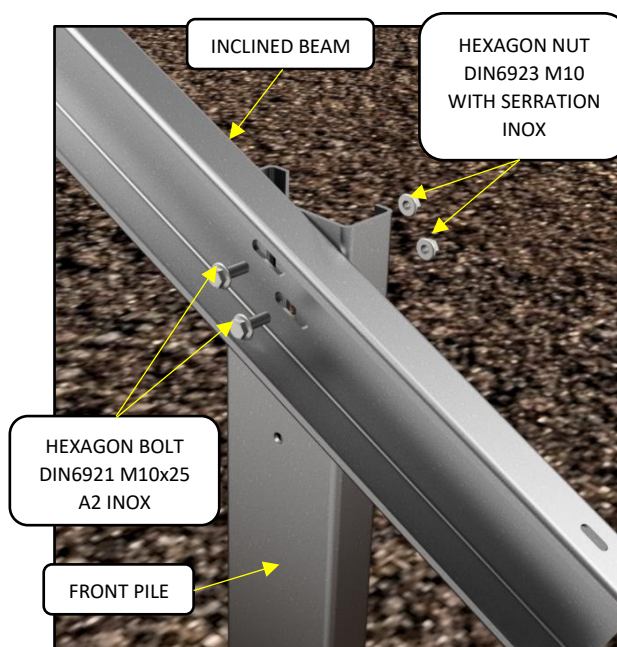
* The dimensions for Ramming Depth, Outside Back Pile, Outside Front Pile, X, Y, and Y2 are depicted in the shop drawings for each project, as they are dependent on the results of the structural analysis.

➤ Mounting inclined beam on piles

Install the Inclined Beam onto the Front and Back Piles using M10x25 Hex Flange Bolts and M10 nuts with serrations. Do not fully tighten the screws, simply place them into the appropriate holes. This will allow for adjustment of the Inclined Beam to the specified angle, as indicated in the drawings.



DETAIL B

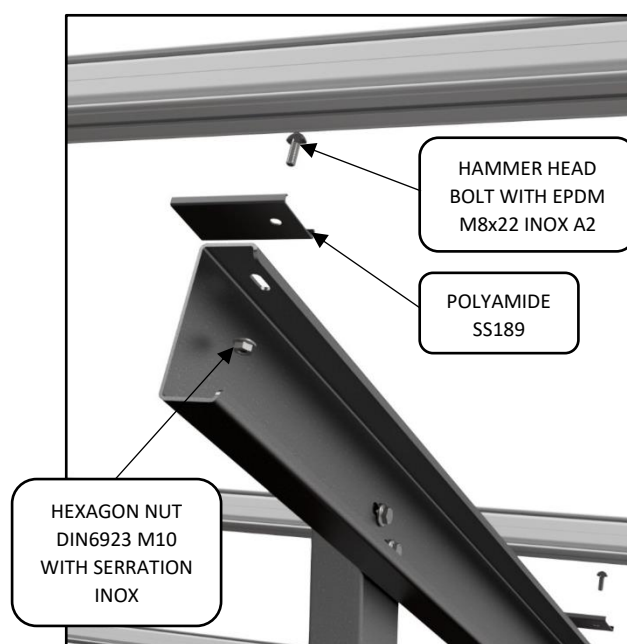
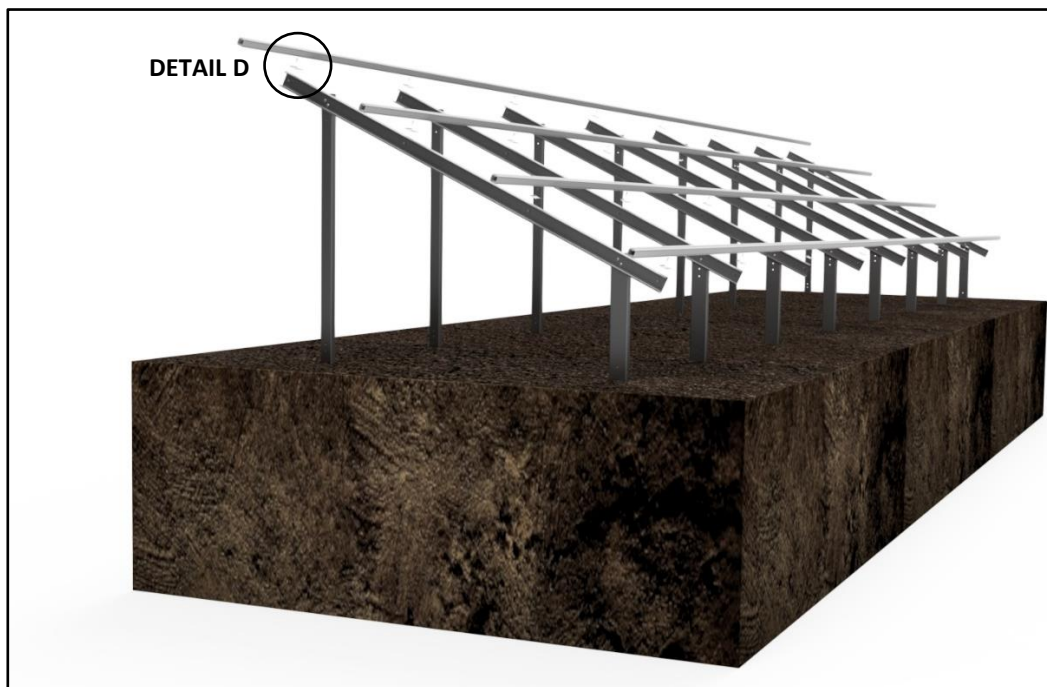


DETAIL C

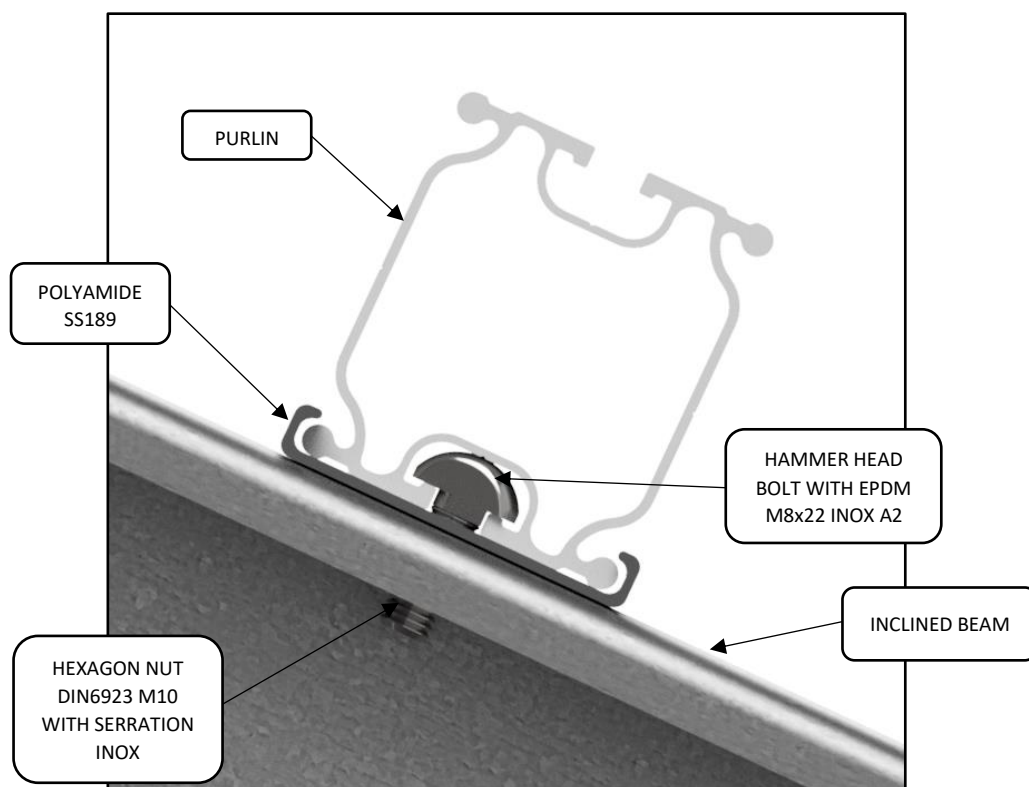
Utilize the adjustability of the Inclined Beam, both for the Front and Back Piles, to move it up and down until the desired angle and overall dimensions of the structure are achieved, as shown in the drawings. Then, tighten the screws to secure the beam in place.

➤ Mounting purlins on inclined beam

Insert the head of the M8x22 Hammer Head Bolt with EPDM into the channel of the purlin and rotate it to the desired position where it will be mounted on the Inclined Beam. After securing the M8x22 Hammer Head Bolt, place the Polyamide Plastic Part by inserting the Hammer Head Bolt into its hole and fastening it to the edges of the Purlin. Note that the hole in the Plastic Part is not centered, but offset to the side. The opposite side, without the hole, should be positioned above the Inclined Beam to prevent direct contact between the Inclined Beam and Purlin and reduce the risk of electrochemical corrosion. Finally, secure the assembly with a M8 Hex Nut with Serration.



DETAIL D



DETAIL
MOUNTING PURLINS ON INCLINED BEAM

Repeat the process to mount 4 purlins (in a 2 portrait alignment) or 5 purlins (in a 4 landscape alignment) onto each triangle.

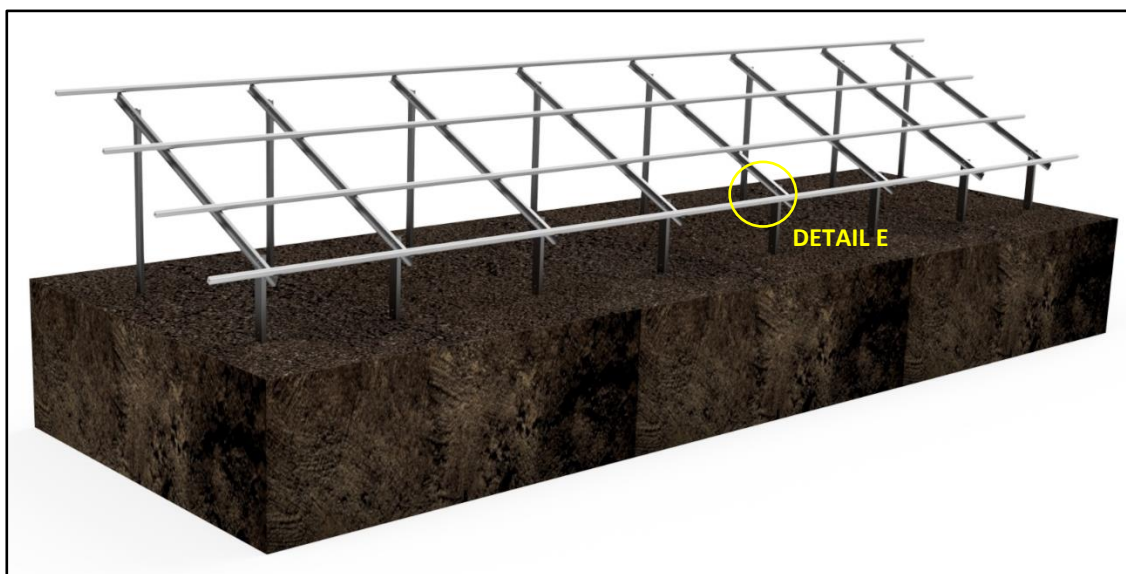
Repeat the process to mount the 4 purlins (in a 2 portrait alignment) or 5 purlins (in a 4 landscape alignment) onto all triangles of a table after connecting the purlins together using cores (as described in the next chapter).

Note:

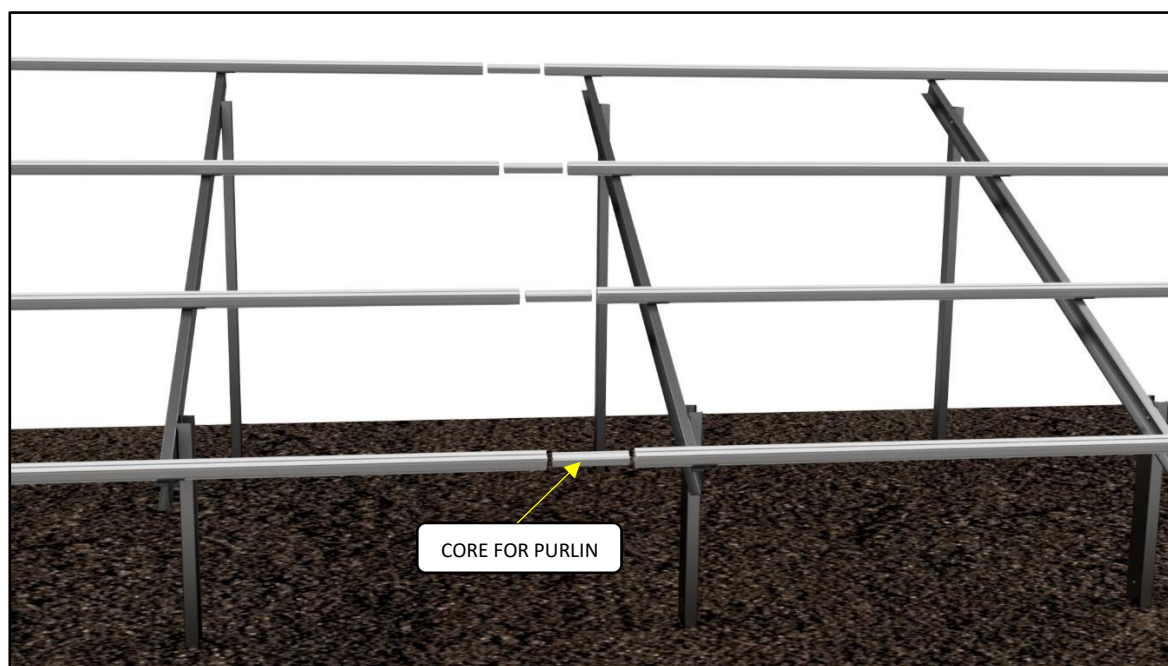
- Inspect the entire installation to make sure that all components are securely attached and that there are no gaps or other issues.
- It is important to follow the manufacturer's specifications and guidelines for the installation of the inclined beam, brackets, poles, and connector, as these will vary based on the specific application and requirements. Failure to properly install these components can result in damage or failure of the structure.

➤ Connecting purlins together by using core

Once the triangle bases have been installed, the horizontal beams can be placed. The connection between the beams should be made using a core accessory at their point of intersection. The core is used to connect two identical profiles and provides for thermal expansion absorption caused by temperature changes. The core (total length of 300mm) is inserted 150mm into the first horizontal beam and 150mm into the adjacent beam.

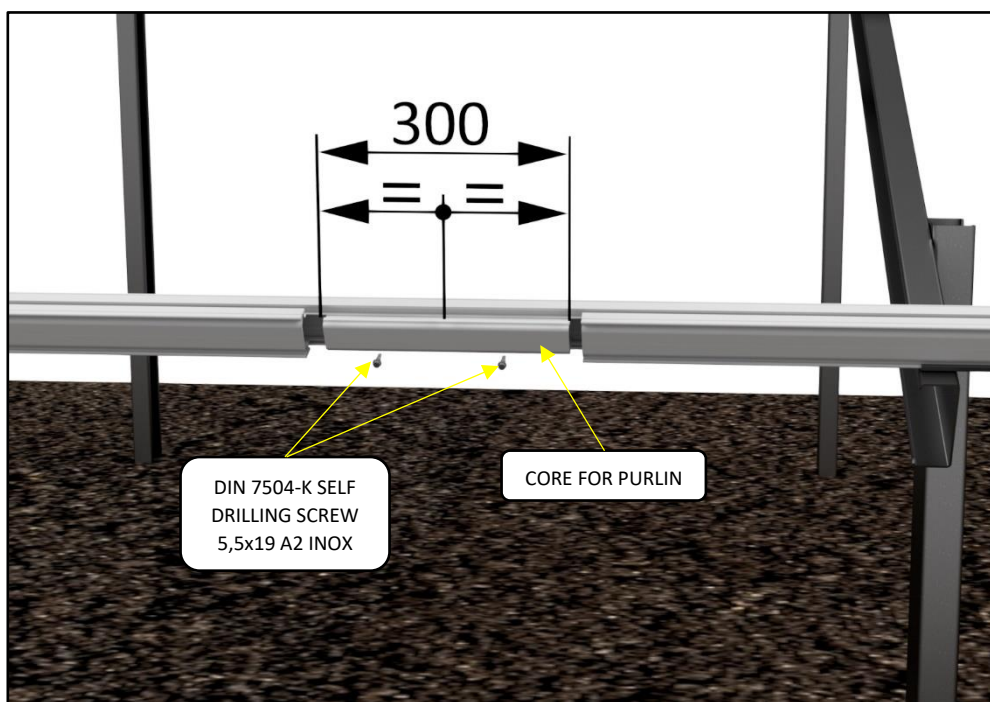


Insert the core into the two consecutive purlins.



DETAIL E

Secure each core to the two consecutive purlins by using two 5.5x19mm shelf drilling screws, one on each side of the purlin.

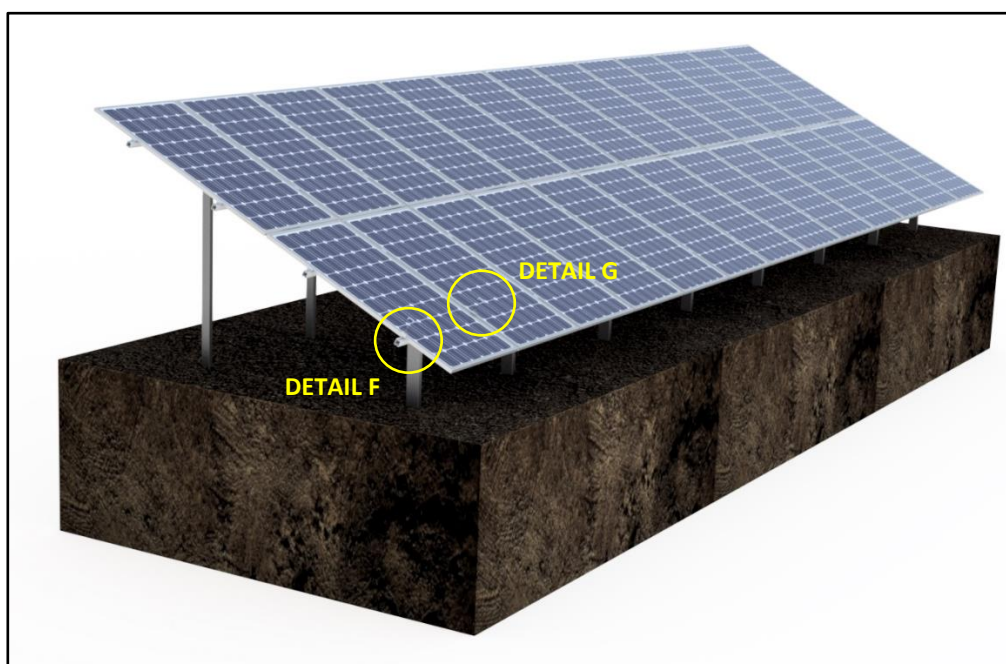
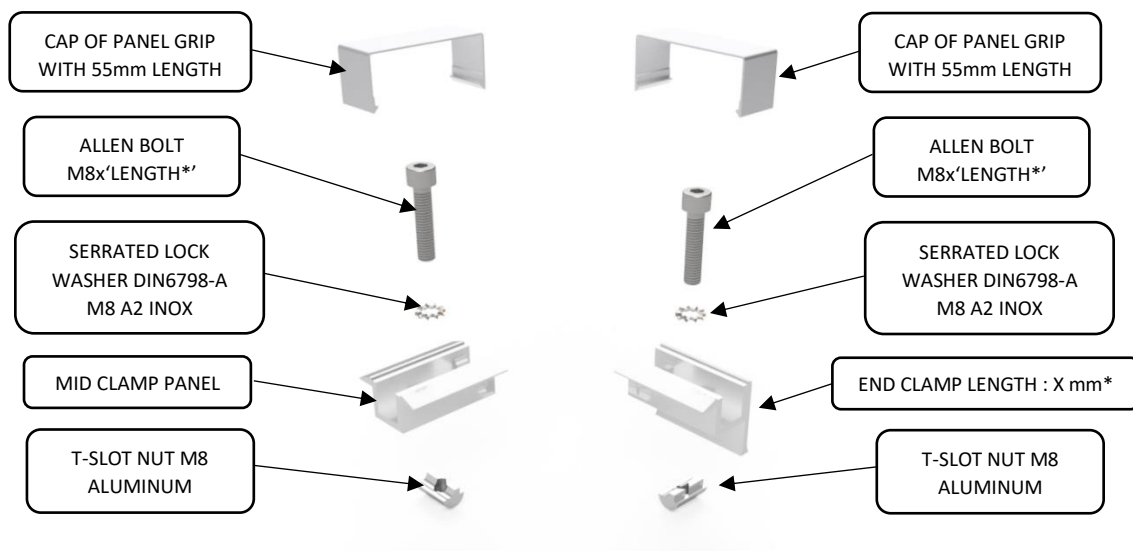


Additionally, the core should be placed no further than $\frac{1}{4}$ of the span of the triangle away from the inclined beam.

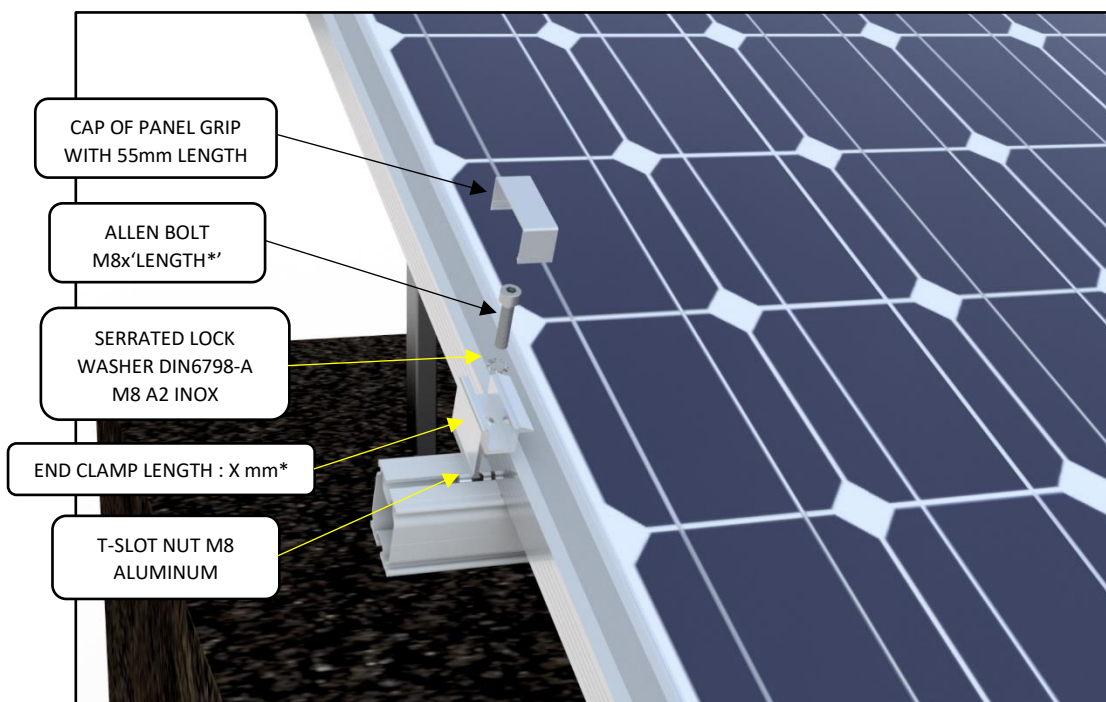


➤ Mounting panels on the purlins

Materials:

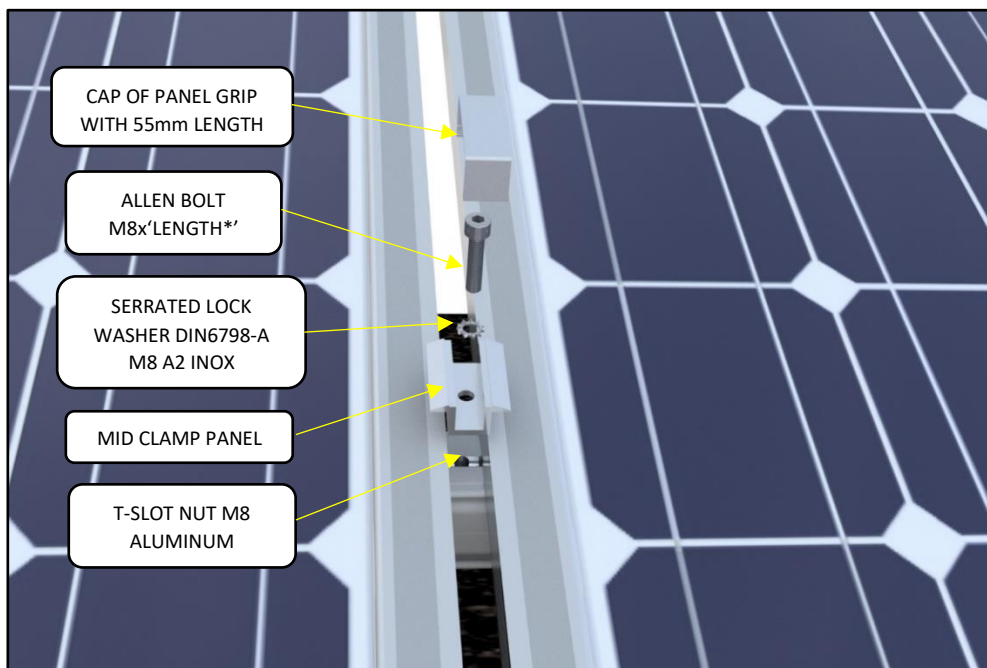


Mount the edge panels onto the purlins using an End Clamp, an M8 Allen Bolt of specified length, a M8 Grover, and a T-Slot Aluminum Nut.



DETAIL F

To mount two intermediate panels on the purlins, use a Mid Clamp, an M8 Allen Bolt of specified length, a M8 Grover, and a T-Slot Aluminum Nut.

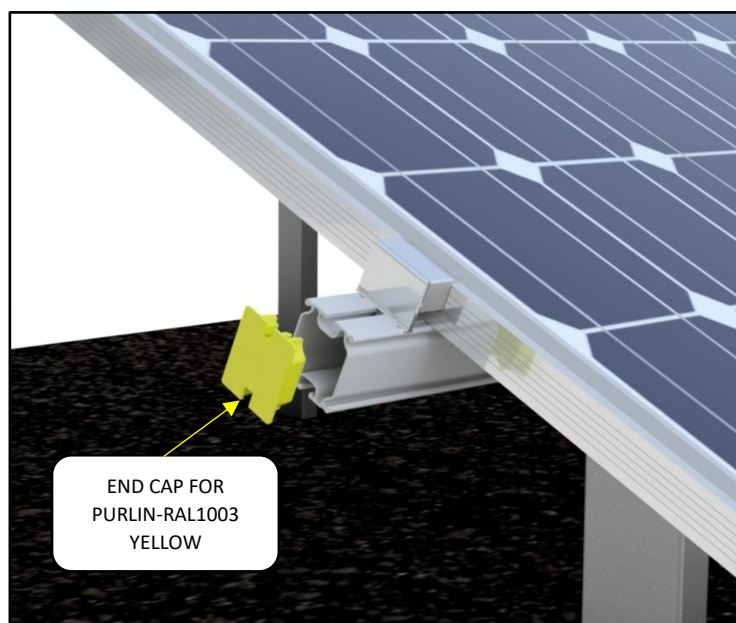
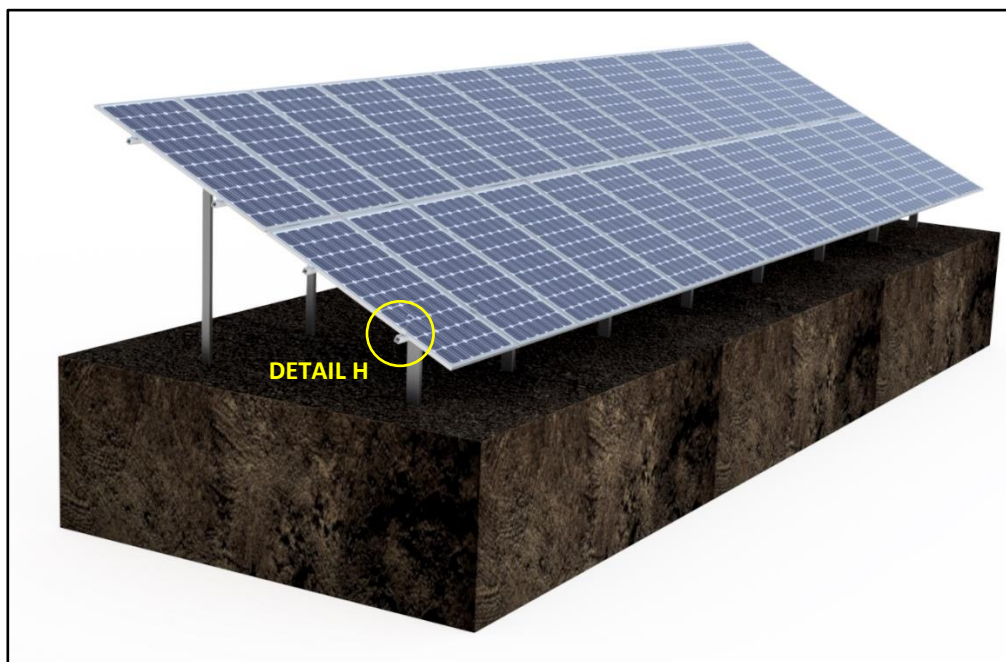


DETAIL G

Note: It is important to follow the manufacturer's specifications and guidelines for the installation of the PV modules, clamps, and other components, as these will vary based on the specific application and requirements. Failure to properly install these components can result in damage or failure of the system.

➤ **Placing end caps for purlins**

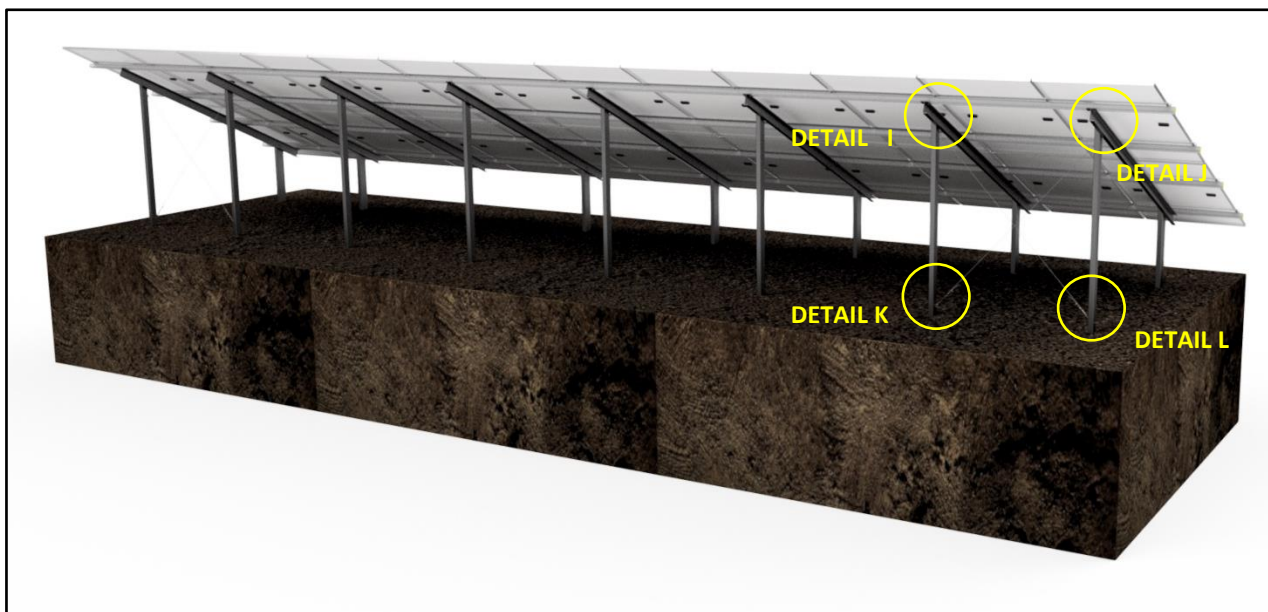
Install the yellow plastic caps at the end of the rails, with four caps for one side of the table and four caps for the other side.

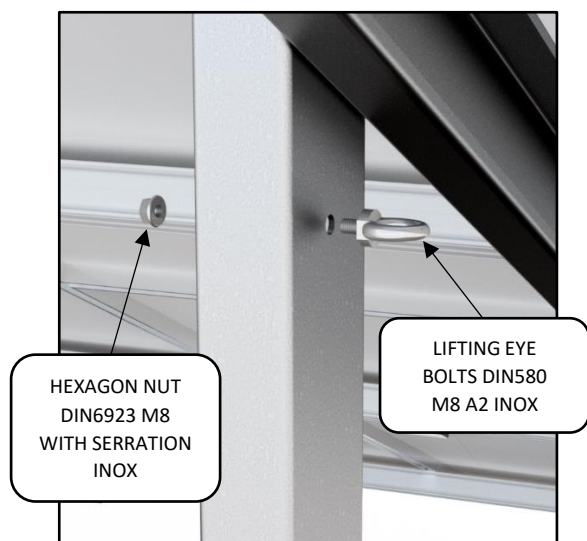


DETAIL H

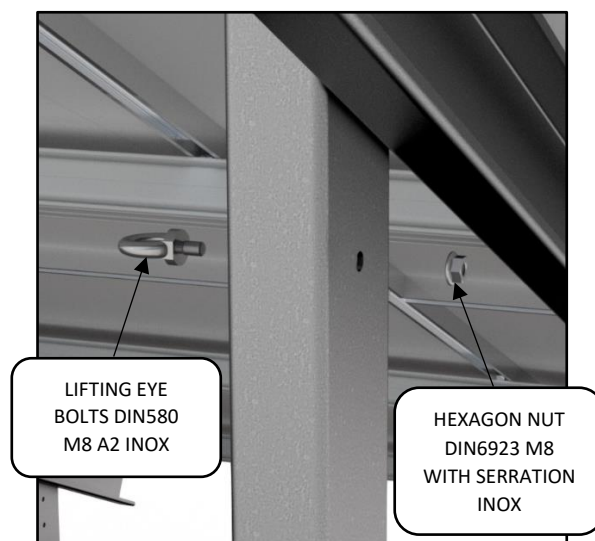
➤ Mounting Wire Ropes - Windshields (optional)

To secure the wire ropes on two adjacent piles, install four connection rings at the four corners (one ring per corner) where wire rope shields are required, as indicated on the shop drawings. Utilize an M10 Nut with Serration to attach the connection rings.

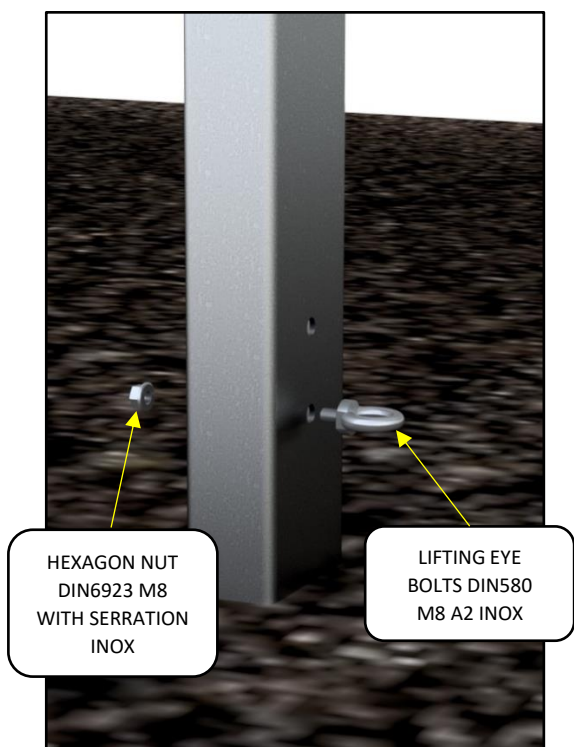




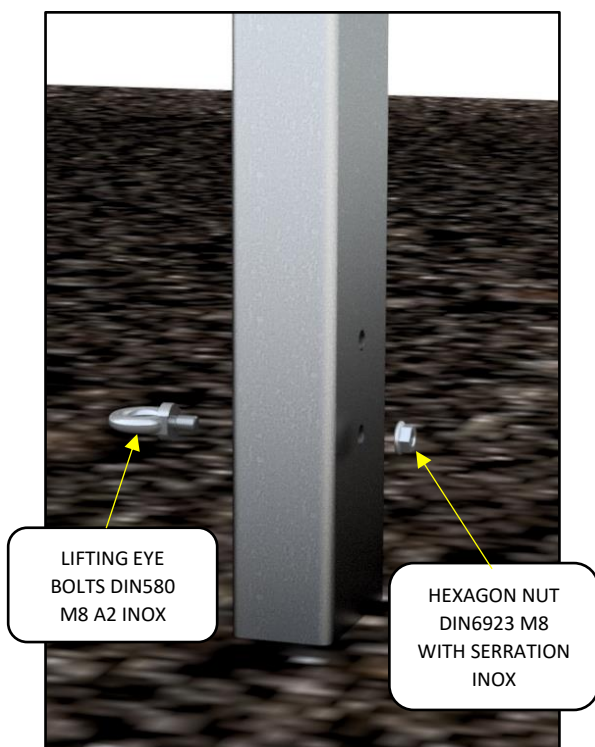
DETAIL I



DETAIL J



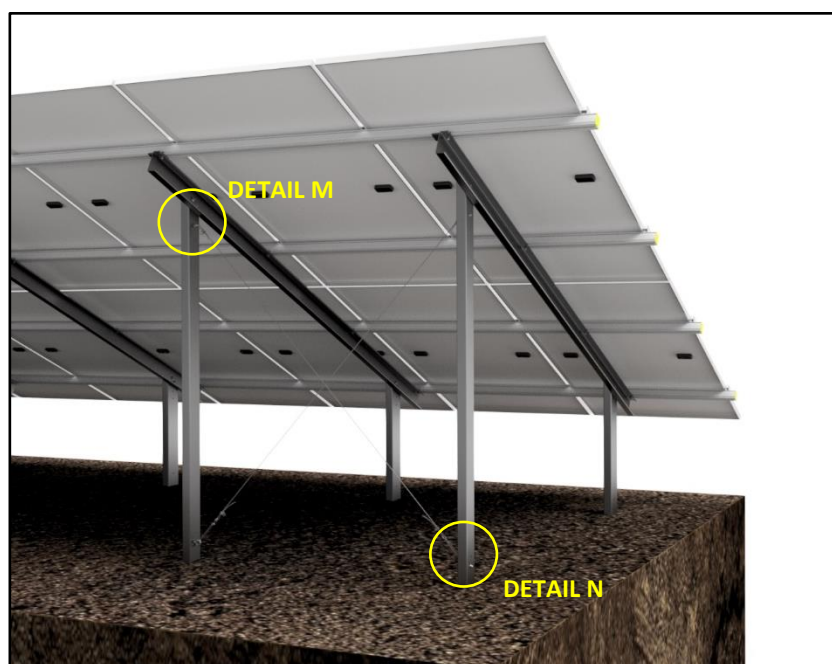
DETAIL K



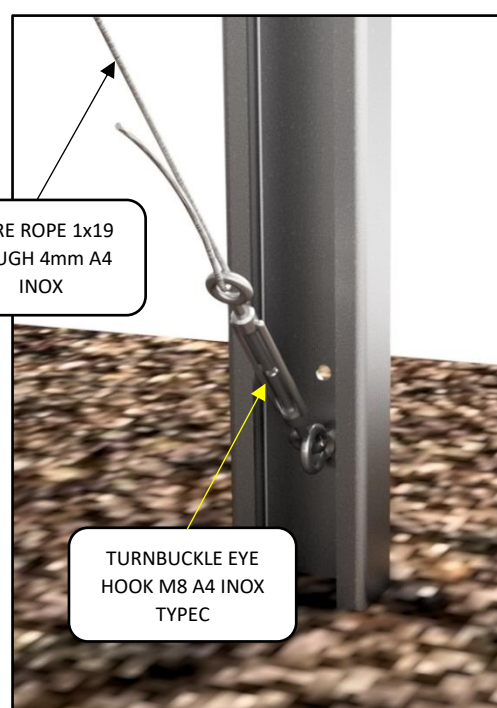
DETAIL L

To secure the wire ropes to two consecutive piles, install 4 connection rings at the 4 corners where wire rope shields are required, as indicated in the project's shop drawings. Use M10 nuts with serration to attach the connection rings.

Insert one end of the wire rope, which has been cut to the appropriate length and tested in the field, into the connection ring, as shown in detail M. Repeat the process for the other end of the wire rope, inserting it into the ring on the tensioner, as shown in detail N. Ensure to add an additional 300mm to the wire rope length, with 100 to 150mm for one end and 100 to 150mm for the other end, to allow for the wire rope to pass through the connection ring and provide enough slack for the wire rope clamp to tighten the overlapping wire rope sections, as illustrated in the following step.

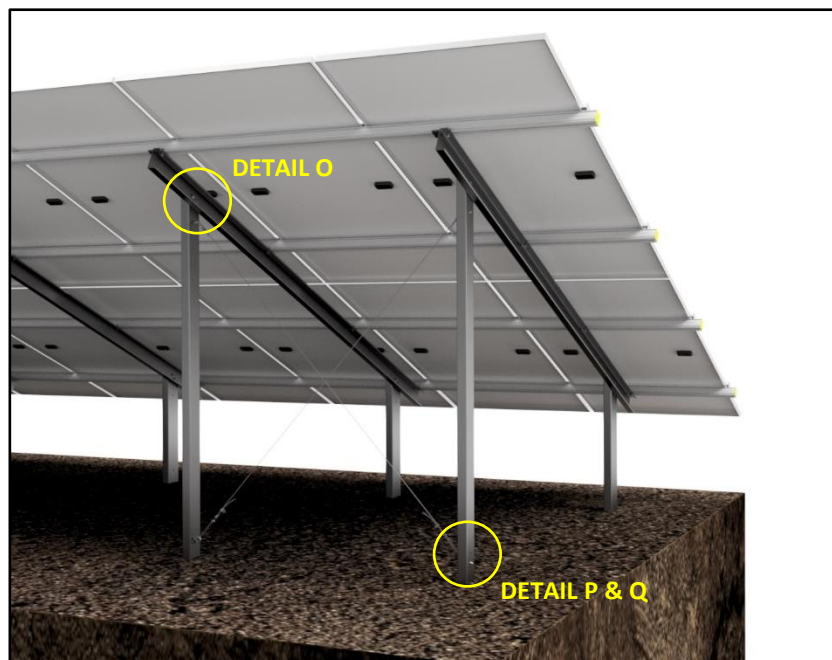


DETAIL M



DETAIL N

To secure one edge of the Wire Rope, use a Wire Rope Clamp and cross the Wire Rope as shown in DETAIL O. At the opposite corner of the pitch, position a Tensioner with its hasp facing the Connection Ring, as illustrated in DETAIL P and Q. Before tightening the Tensioner, ensure that the back-bolted side is almost fully unbolted. This will allow you to tighten the bolted side of the Tensioner and tension the Wire Rope accordingly.

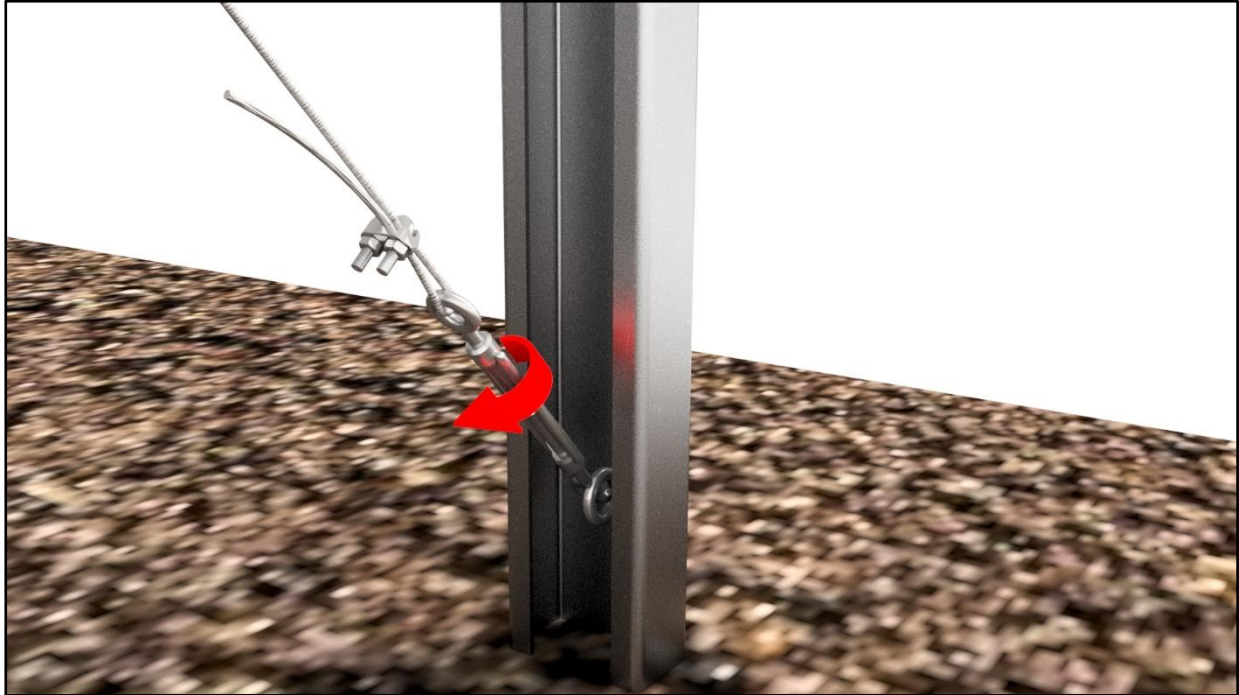


DETAIL O



DETAIL P

Secure the wire rope by tightening the bolted side of the Tensioner.



DETAIL Q

Repeat the process to attach the second diagonal Wire Rope on the same pitch.

Repeat the steps for every 'X' pair of Wire Ropes at all designated triangle pitches, as outlined in the Structural Study and the Shop Drawing.

C. MAINTENANCE

The PV mounting structures of ALUMIL S.A are designed in accordance with the European Standards (Eurocode 1, 3, 9) and do not require any special attention. ALUMIL also offers certified aluminum PV mounting structures made from durable aluminum alloy (Al 6005T6).

However, regular maintenance is recommended to maintain the high quality and longevity of the structures.

During site inspections, it is advisable to pay close attention to areas such as joints and holes. Specifically, the following checks are recommended:

- *Inspect bolted joints annually and replace them if bolt corrosion is detected.*
- *Periodically check the torque of bolted joints (every 1-2 years).*
- *Verify the torque on panel clamps every 6-9 months or after severe weather conditions to ensure the installation and torque settings remain accurate. Torque specifications can be found in the installation manual.*
- *Inspect aluminum and plastic components for any deformations and replace any deformed parts as needed (every 2 years).*
- *For locations close to sea level (<150m), it is important to clean the structures with water (no pressure) to prevent salt corrosion (annually).*
- *If snow accumulates, the panels must be cleared within 2 days of being fully covered to avoid freezing. Remove the snow without allowing it to freeze.*



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