

Pile Ground Mounting System



XIAMEN GRACE SOLAR TECHNOLOGY CO., LTD.

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Pile Ground Mounting System Installation Guide



GS Pile Ground Mounting System is applicable for the large commercial and utility scale PV system on a non-sandy ground. It is suitable for the framed or frameless module installation.

In GS Pile Ground Mounting System, Open Post can be pile into the ground 1~2meters by Pile Machine quickly, and then you can mount the pre-assembly Al-Beam structure, the B-Rail and the clamp easily.

The installations please follow the procedures and precautions in these instructions carefully. And it must be complied with the local construction acts and the safety laws.

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1. Introduction

1.1 Intended use

- Are intended to be used by individuals with sufficient technical skills for the task. Knowledge and use of hand tools, measuring devices and values is also required.
- Include various precautions in the forms of Notes, Cautions, and Warnings. These are to assist in the assembly process and/or to draw attention to the fact that certain assembly steps may be dangerous could cause serious personal injury and/or damage to components. Following the step-by-step procedures and these precautions should minimize the risk of any personal injury or damage to components making the installation not only safe but an efficient process.

1.2 Service life warranty

Grace Solar provides a warranty of 10 years for the service life of all materials used.

1.3 Safety

The following basic safety instructions and warning symbols form an essential part of this manual and are of fundamental importance when handling this product.

- Do not remove or disable any safety devices
- Comply with the relevant safety regulations.
- The presence of a second party who can provide help in the event of an accident is obligatory during the entire installation process.
- Keep a copy of this installation manual in the immediate vicinity of the system.

0

1.4 Responsibilities of the owner/operator

The system operator has the following safety-related responsibilities:

- To ensure that installation of the system is only carried out by individuals with specialist technical knowledge and basic knowledge of mechanical engineering.
- To ensure that those commissioned to perform the work can evaluate their assigned tasks and recognize possible risks.
- To ensure that those commissioned to perform the work are familiar with the system components.
- To ensure that the installation manual is available during installation. The installation manual is an integral part of the product.
- Ensure that the installation manual, and in particular the safety instructions, are read and understood by the relevant personnel before installation.
- Ensure that the permissible operation conditions are observed. Mounting systems is not liable for damage occurring when these conditions are not adhered to.
- Ensure the durability of all connections and the attachment of the system.
- Ensure that suitable lifting gear is used for installation.
- Ensure that only Mounting System components are used when parts need to be replaced. Otherwise any warranty claim is null and void

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2. Planning

2.1 Installation Location

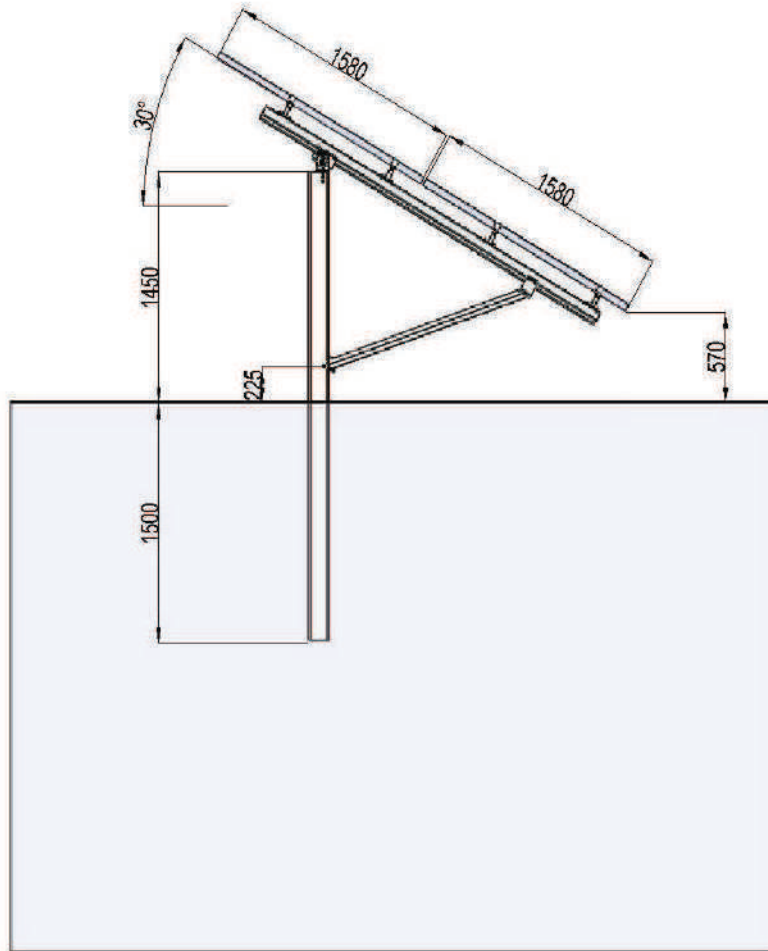
The Pile-Ground Mounting System is application for the particular location, such as non-sandy soil with dense enough. Therefore you have to produce an accordant static and a geotechnical expertise to define the pile length for the Open Post.

It is recommended to consult with the local engineer to do it before the beginning of the project.

2.2 Layout Drawing

A general layout drawing will be made for every system before delivery. This drawings show the accordant admeasurements and the position of every components and also the type of the connectors.

For example, when the module size is 1580x808x46mm, the array configure is 2x12, which is placed portrait, the tilt angle 30deg and the pile length 1500mm. Therefore, the planning drawing shown as follows.



Side View

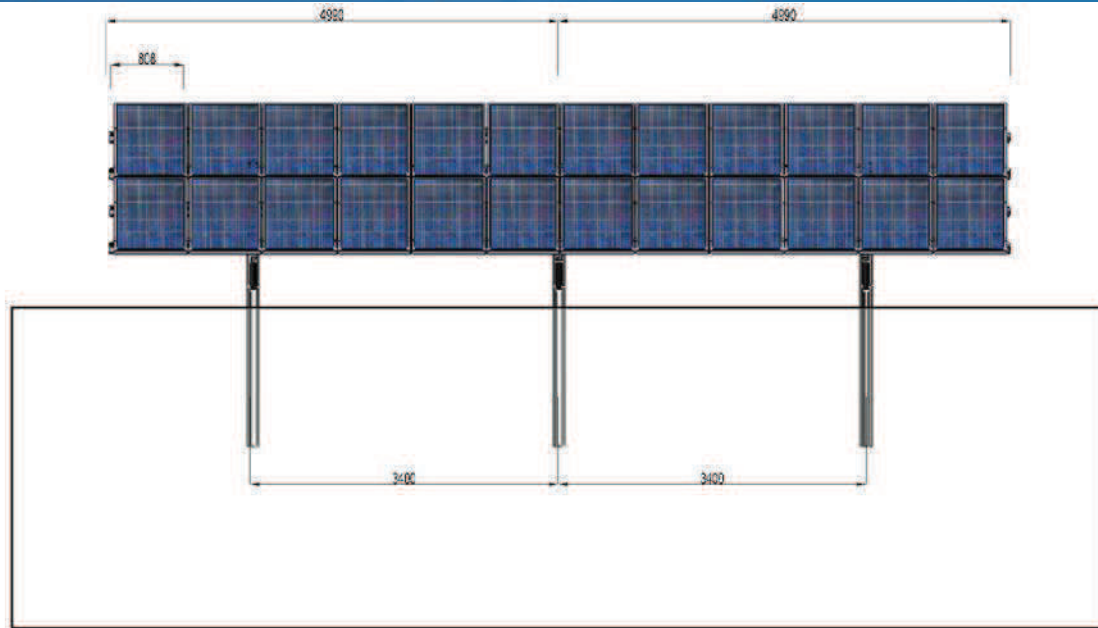
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2.3 Grounding Planning

The grounding work has to be carried out by business specializing in grounding. Based on our design of the units you have to compile grounding plans so that the works flow smoothly. These plans have to be completed at least a week before the beginning of the grounding work. These plans have to show the position of the piles and have to dimension it accordingly. Furthermore, you have to mark the first and the last pile of every line with a dowel. If a line is longer than 50m there will be markings (dowels) necessary within the lines.

2.3.1 Tolerance by grounding:

The grounding company should keep the following tolerances to provide a good basis for the further mounting.

Height	Slop (North-South)	Slop (East-West)
± 10mm	± 2 deg	± 2 deg

Tolerance grounding

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2.3.2 Grounding with difficult surface:

- Notice that grounding profiles have to be marked clearly and they have to be hold in a grounding plan.
- Irregularities by grounding that may affect the pile adhesive have to be noted (e.g. inclination, decrease with a following sudden rise of the penetration velocity, swift penetration velocity of the pile while grounding.
- Every action that departs from the guidelines for pile-grounding has to be cleared up with the engineer
- If a pre-drilling is necessary because of possible grounding bars (boulder in the ground or high laid bedrock level), it has to be proceeded as follows:
 - Pre-drilling down to the designed grounding depth
 - The drilling product has to be exhausted,
 - Fill the blast hole 0.80 m with compressed concrete (quality min. C16/20) and compact it in two steps (each with 0.40m), fill the remaining height with drilling product and compact it
 - ground the pile within 3 hours.
 - Test loading on 10 finished grounding piles that are picked arbitrary.
 - The test loading is applied by hanging dynamometer or by accordant appropriate measuring system. The pile has to be loaded with 15 KN (1500 Kg) and the pile must not move more than 10 mm out of the ground. Please send the results to engineer in a test chart. Furthermore it is important that the construction management on-site is readily identifiable in the test chart. The construction manager has to guarantee for the correctness of the measurement with his signature. Among the grounding work please do also document the values of the tested piles in a printout.

2.3.3 Treatment after grounding

After the grounding the upper parts of the piles have to be coated with zinc dust primer (ca. 3 cm).

Attention!

Only a special color (Zinc Dust Primer) will give the needed protection and is accredited according to the standards. Simple zinc color-sprays will not give long-term protection!

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2.3 Installation Tools

Allen Key 6mm



Coach Wrench
(for M10~M12 Hex Bolts)



torque Wrench



Power Tool



Power Tool Bit For Hex Bolt M10
and M12



Drill Bit for Power Tool (5mm)



Tape Measure



Rope



Wood Hammer



Laser Theodolite



Pile Machine



Note: the Laser Theodolite and the Pile Machine is chose according to the actual requirement.

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2.5 System overview



The system overview shows all system parts..

Item	Code	Description	Spec
1	GS-BR-4990	B-Rail 4990	4990 mm
2	GS-BR-SP	B-Rail Splice	200 mm
3	GS-BR-C60	B-Rail Clamp	60 mm
4	GS-IC-F46	Inter Clamp Kit	46 mm
5	GS-EC-F46	End Clamp Kit	46 mm
6	GS-PG-BA30	Assembly of Support Beam	30deg
7	GS-PG-TC	Aluminum Top Cap	80mm
8	GS-PG-OP2950	Open Post 2950	2950 mm

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2.5 Components

2.5.1 Aluminum Parts

		
B-Rail	B-Rail Splice	B-Rail Clamp
		
Inter Clamp Kit	End Clamp Kit	Aluminum Top Cap
		
Assembly of Support Beam		

2.5.2 Galvanized Steel Parts


Open Post

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3. Installation Steps

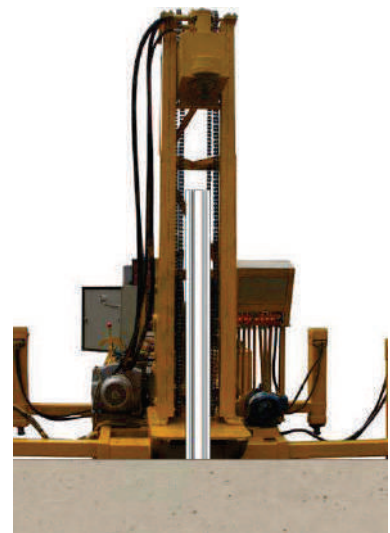
CAUTION:

Install care while working around the structure during assembly;

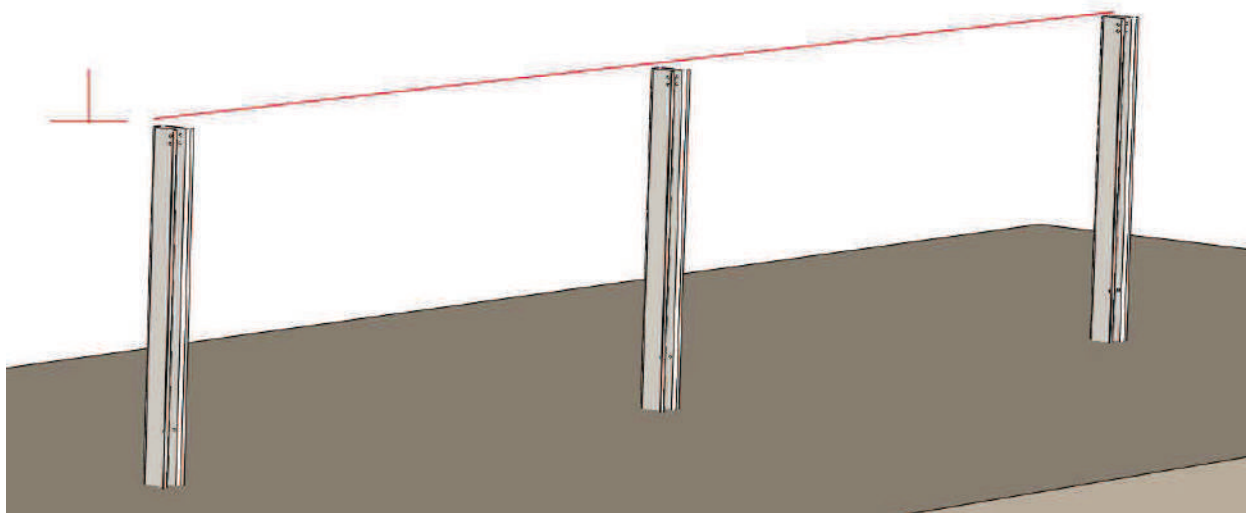
There could be components that create hazards or obstruct free moment causing serious bodily injury; many at head/eye level. Move slowly and with care around the work area.

Step 1: Pile the Open Post

- According to the layout drawing, mark out the pile point on the installation site.
- Piling the Open Post into the ground comply with the *Chapter 2.3*.
- Make sure the Open Post is in a line and on the same height by the Laser Theodolite



Step 1.b



Step 1 .c

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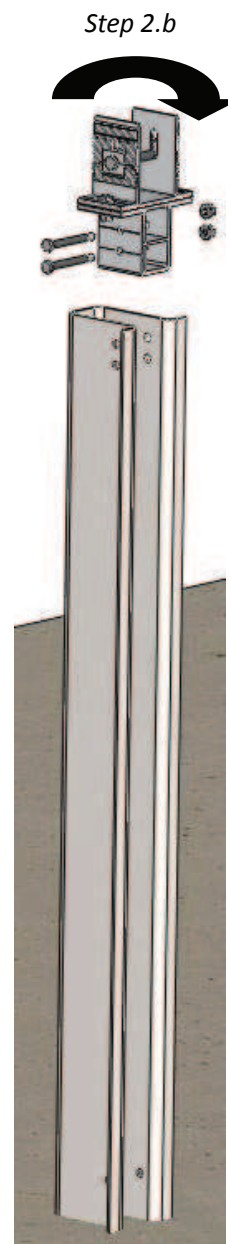
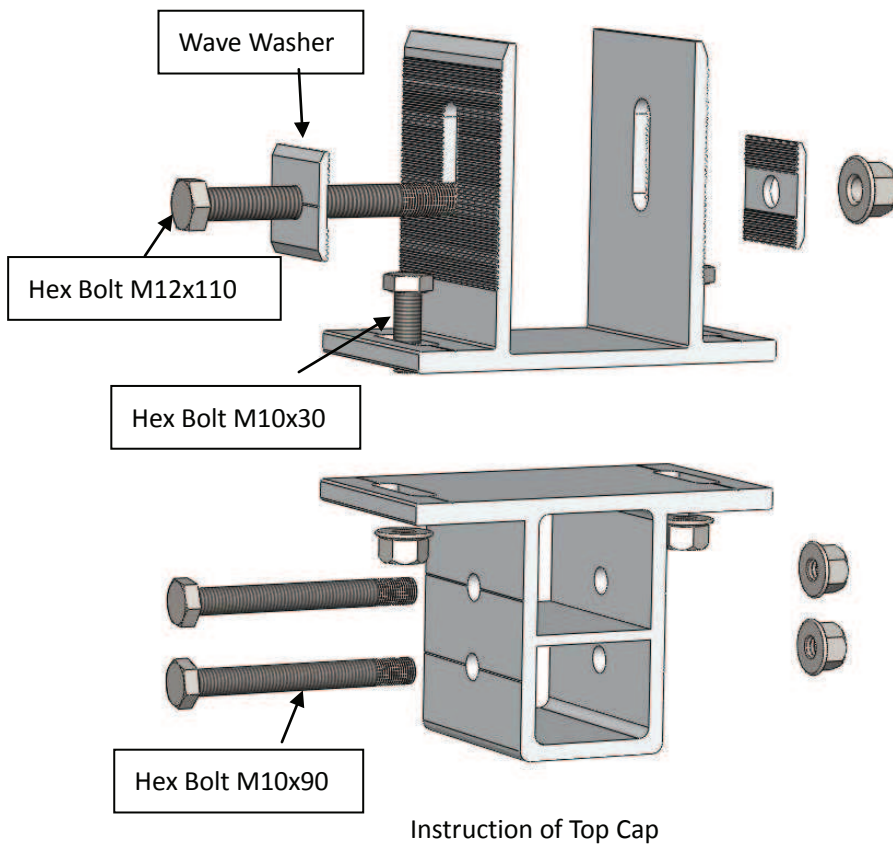
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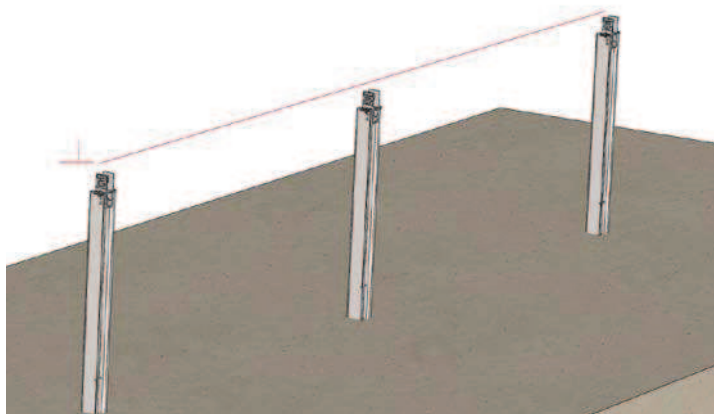


Step 2: Install and adjust the Top Cap

- Insert the Top cap into the inner of the Open Post. Fixed by two Hex Bolt M10x90mm;
- If need change towards of the Top Cap, release the hex bolt M10x30 between the cap. And rotate the top cap to the right position. Then, fixed the hex bolt again;
- If need to adjust the height of the Cap. Release the hex bolt M12x110, and adjust the bolt to the right position; then, fixed the hex bolt again;
- Install the other Top Cap, and adjust the bolt to be on the same height;



Step 2.a



Step 2.d

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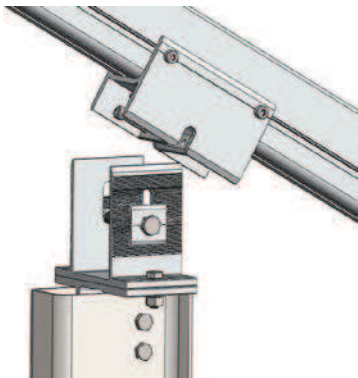
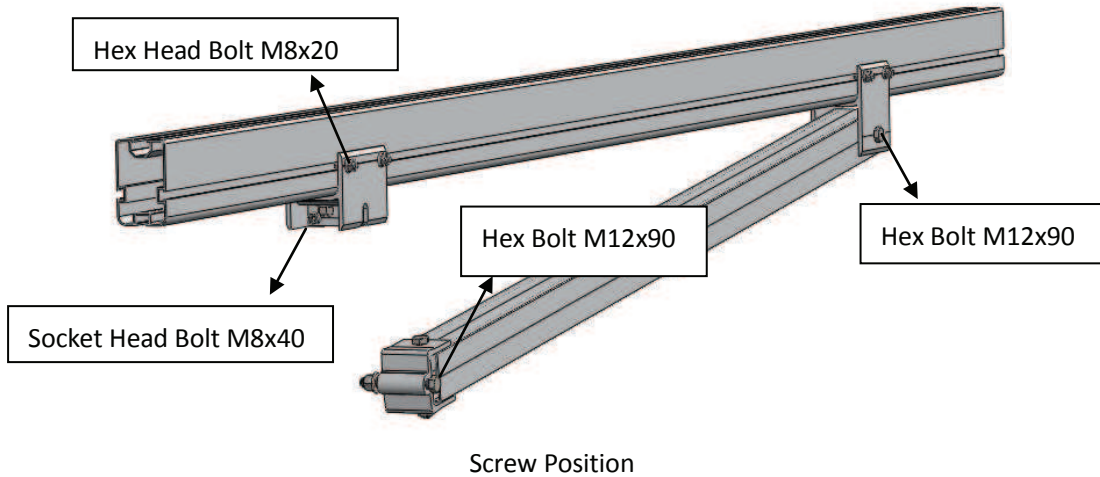
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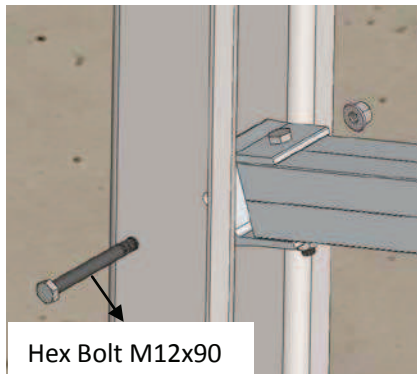


Step 3: Install the Assembly of Beam

- Open the Assembly of Beam and place the top bracket on the Top cap;
- Fix the Axis of Brace with the bottom hole of the Open Post by the Hex bolt M12x90;
- Screw the socket head bolt M8x40 to clamp the Top Cap by the Allen Key.
- Install the other Assembly of Beam, and adjust these Beams is parallel to each other. It is recommended to tie the Beam by the rope temporarily. Please retighten the all fasten for the next step.

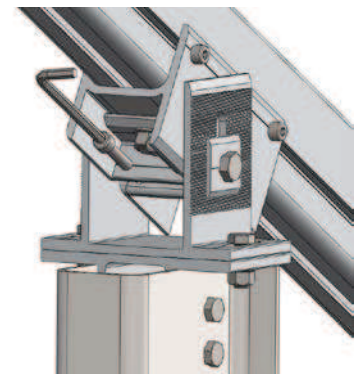


Step 3.a

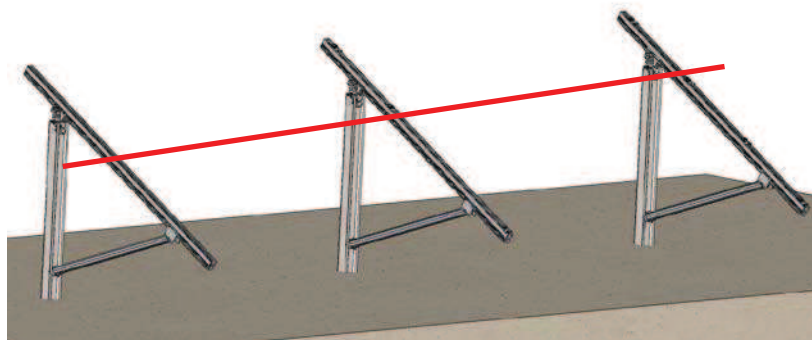


Hex Bolt M12x90

Step 3.b



Step 3.c



Step 3.d

Note: you can release the Hex Head Bolt M8x20 to adjust the space of the top and bottom bracket.

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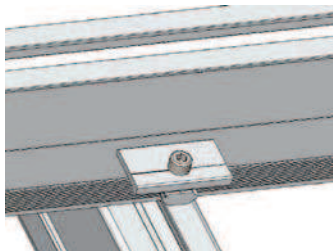
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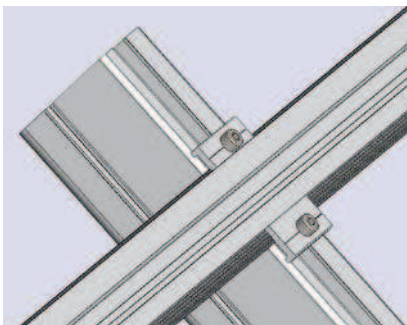


Step 4: Install the B-Rail on the Beam

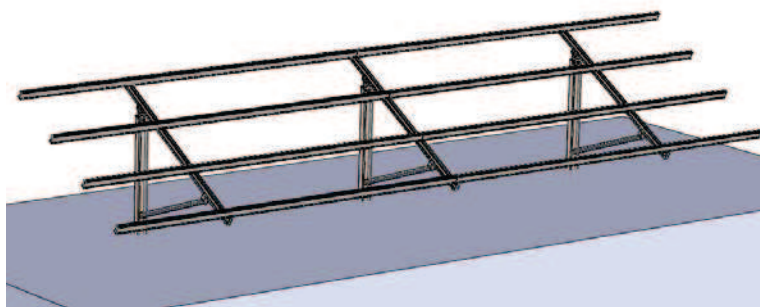
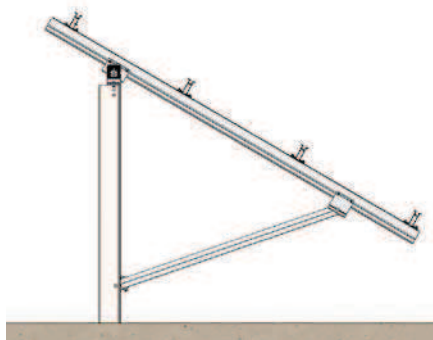
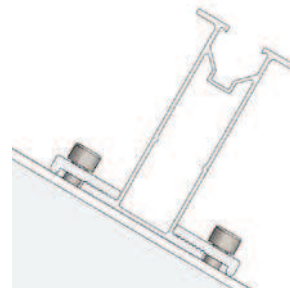
- a. Clamp the B-Rail both side by the B-Rail Clamp. Place the B-Rail comply with the planning.



Tilt in the B-Rail Clamp

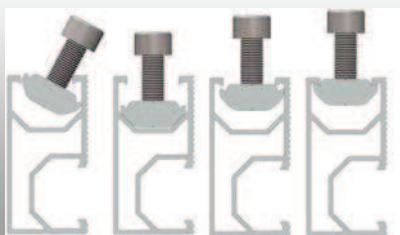


Clamp the B-Rail Both Side



Easy Installation for D-Module:

Four Step to put the D-Module into Rail easily;



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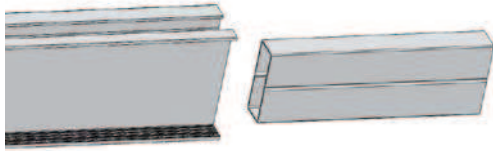
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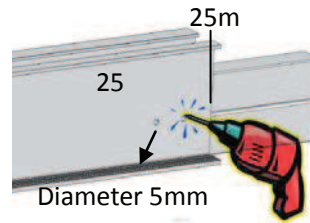
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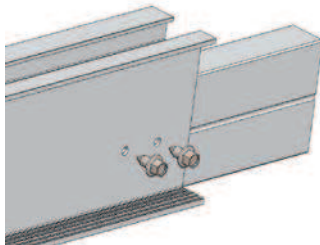
- b. Connection of two B-Rails. At first, insert half of the B-Rail into one of the B-Rail. Drill two 5mm holes, and fixed by two self-drill screw st6.3x25. Secondly, insert the other B-Rail into the other end of splice. Finally, drill two 5mm holes and fixed by the self drill screw too.



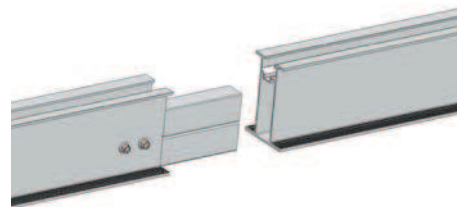
Insert the Splice



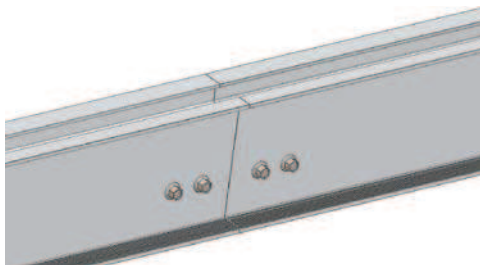
Dill two holes 5mm with space 25mm



Fixed by two self-drill screw st6.3



Insert the other Rail



Fixed the other B-Rail by the Self-drill Screw

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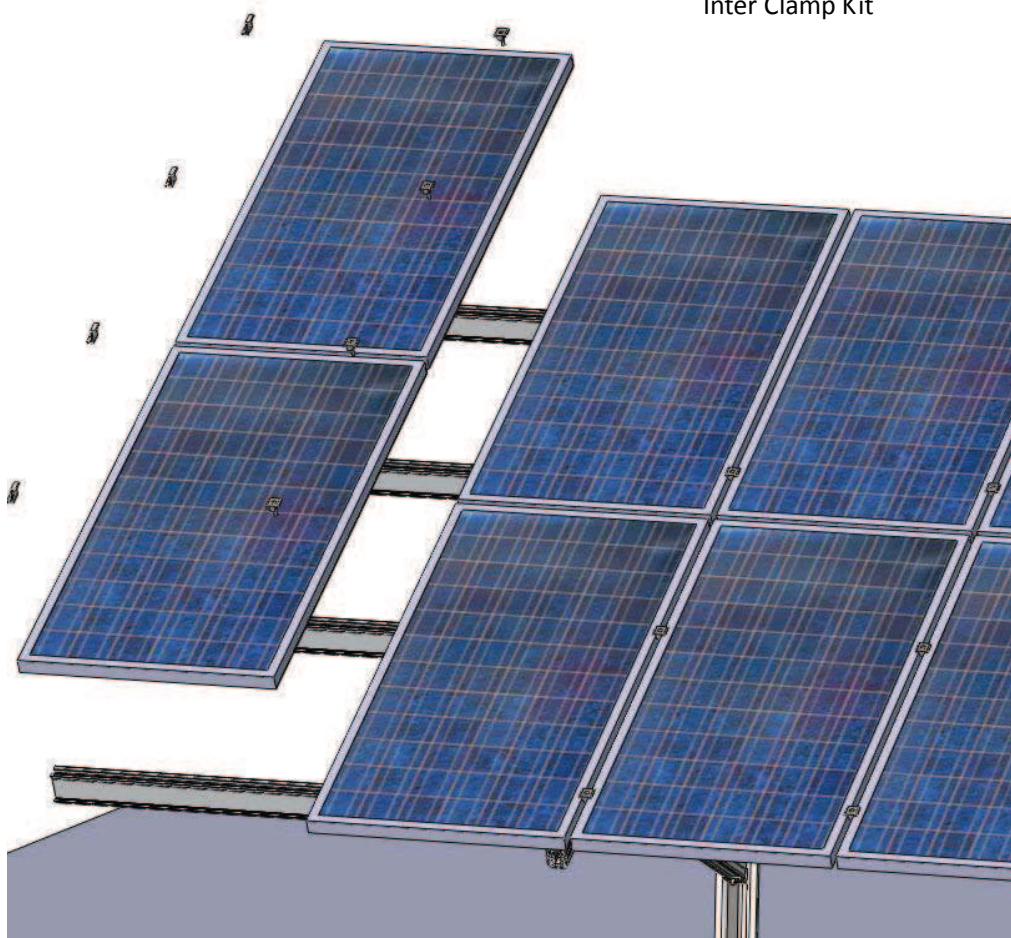
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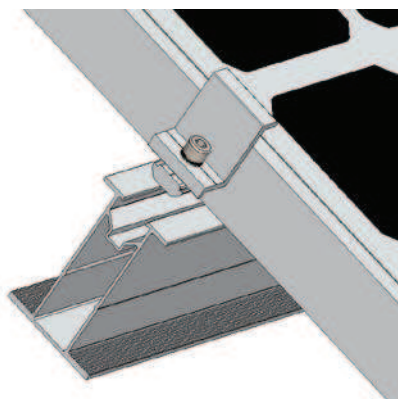
Step 5: Install the Solar Panels

- Install the Solar Panels from one side to the other side.
- On the end, fix the solar panels by the End Clamp Kit
- Between two panels, fix by the Inter Clamp.

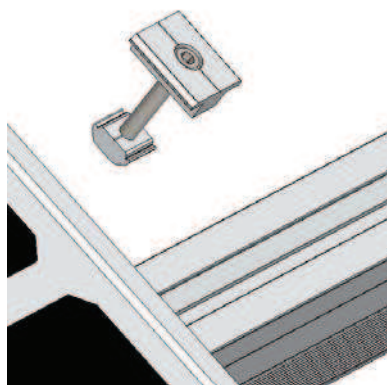
End Clamp Kit



Inter Clamp Kit



End Clamp Kit



Inter Clamp Kit

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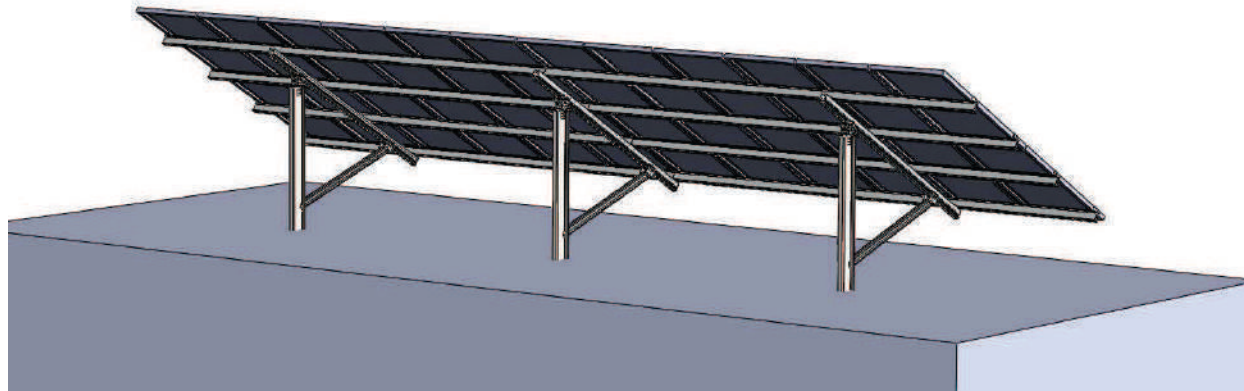
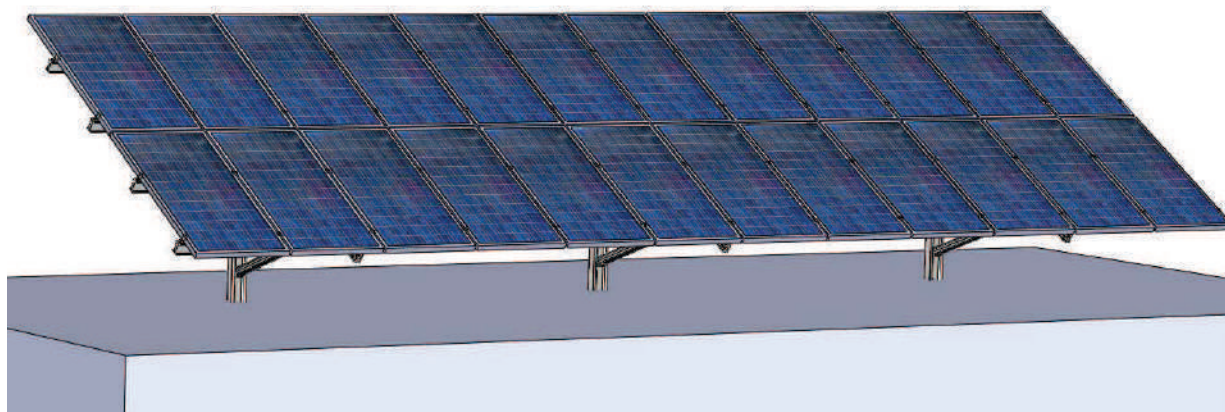
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Step 6: Finish

Check the structure and retighten the all bolts.



NOTE:

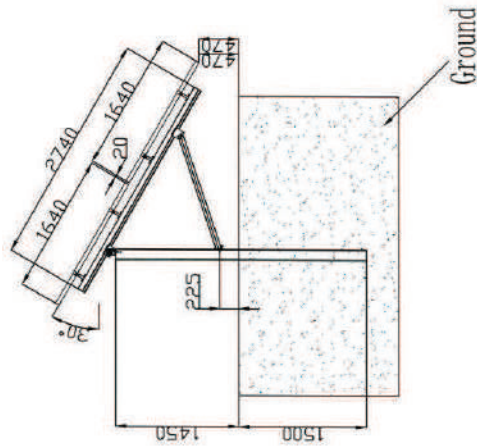
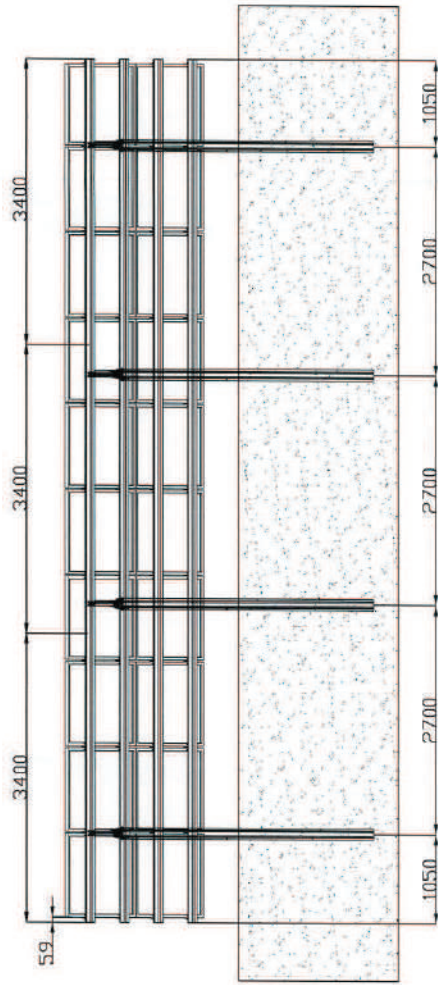
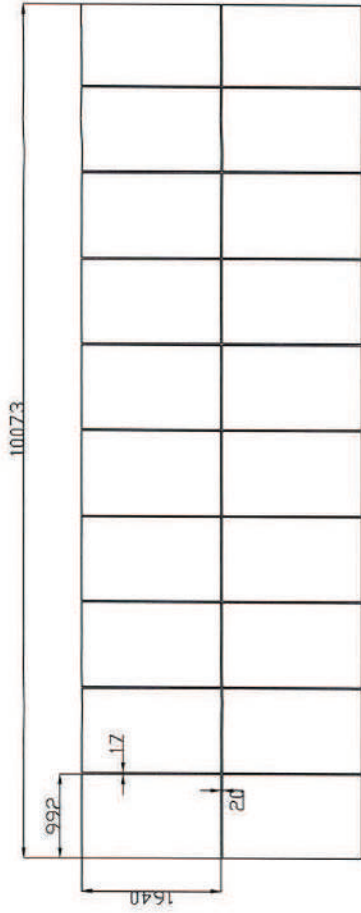
The tighten torque for the A2-70 bolt is listed as below:

M8 Bolt: 11 N*m

M10 Bolt: 22 N*m


M12 Bolt: 43 N*m

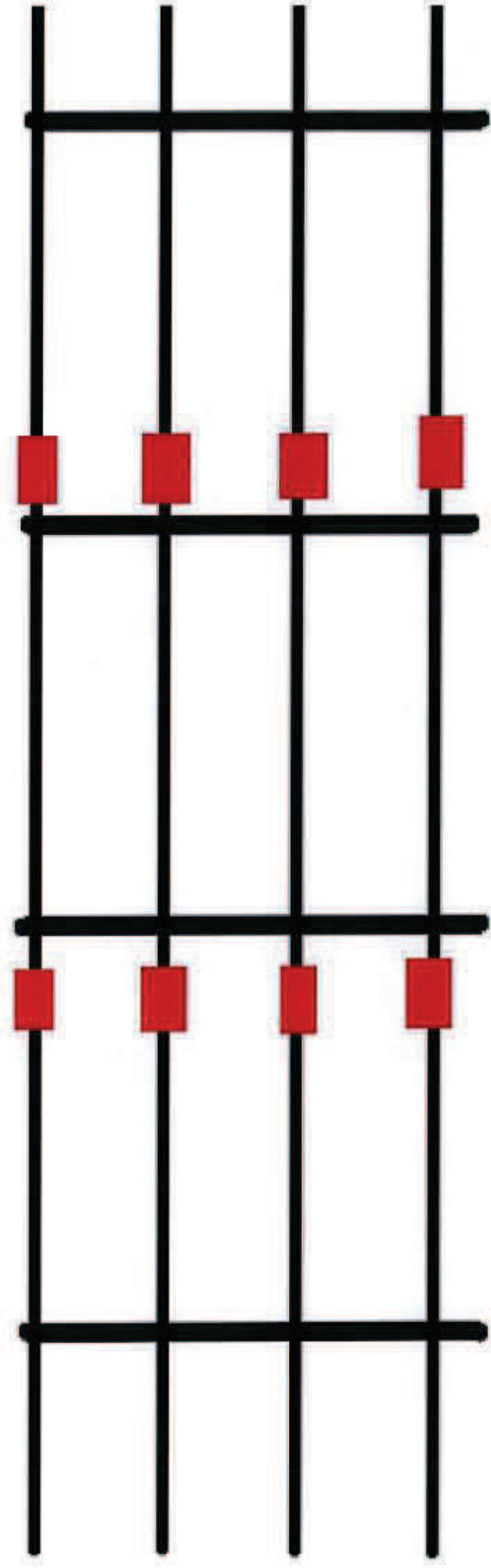
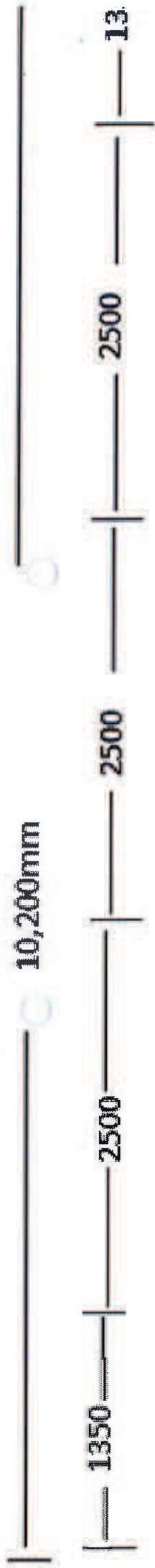
M24 Bolt: 210 N*m



Technical information:

1. Module Size 1640x992x40mm, array config is 2x10 (20pcs).
2. Basic Wind Speed is less than 60m/s (3s gust) ;
3. Please consult with the local engineer to make sure the ground condition for the pile length;

 Grasol 格瑞士太阳能	
Part Name 产品名称 Ground Mount 2x10	
Part No. 产品编号:	
Qty 数量:	
Unit 单位:	
Description 描述:	
Material 材料:	
Scale 比例:	
Date 日期:	
Drawn By 制图:	
Checked By 审核:	
Approved By 批准:	
Drawing No. 图号:	
Rev. 版本:	
Scale 比例:	
Unit 单位:	
Qty 数量:	
Part No. 产品编号:	
Unit 单位:	
Qty 数量:	



Splices

Poles & Support beam

■ 3400mm Rails