PV-ezRack Solar Terrace II-F

Installation Guide V1.0

NO.: PZ52-IM01-10

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

1. Introduction

Clenergy PV-ezRack® SolarTerrace II-F™ (STII-F) is a pre-assembled ground mounted system suitable for large scale commercial and utility scale PV installations. STII-F has been developed to be compatible with common PV Modules, including framed and frameless PV Modules. The innovative and patented STII-F TR-Rails are not only suitable for flat land, but also suitable for eastern and western facing slopes and high snow load areas.

Please review this manual thoroughly before installing STII-F. This manual provides the following contents: (1) Installation planning; (2) Installation instructions;

When installed in accordance with this guide, the mounting structure will be structurally adequate and adhere to related standards. During installation, and especially when working on the ground, please comply with the appropriate occupational health and safety regulations. Please also pay attention to other relevant regulations in your local region. Please check that you are using the latest version of the installation manual by contacting Clenergy via email on sales @clenergy.co.jp, or contacting your local distributor.

The installer is solely responsible for:

- Complying with all building codes according to any applicable place or country that may supersede this manual.
- Ensuring that PV-ezRack and other products are appropriate for the particular installation and the installation environment.
- Using only PV-ezRack parts and installer-supplied parts as specified by Clenergy (substitution of parts may void the warranty).
- Recycling: according to local related statutes.
- Disassembly: reverse installation process.
- Ensuring that there are no less than two professionals working on panel installation at the one time;
- Ensuring that all related electrical equipment is installed by a professional electrician.

Clenergy China
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Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

2. Tools and Components

2.1 Tools

			
Allen Key 6mm (M8 Hexagonal socket screw)	Electric Drill (for M6.3 Self-tapping screw & M8 Hexagon Socket Screw)	5m Tape	Marker Pen
			
Torque Wrench	String	Wrench	Hydraulic Pile Driver
			
Total Station (or an instrument with similar functions)	Spanner (M8/M12/M10)		

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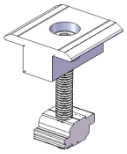
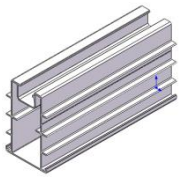
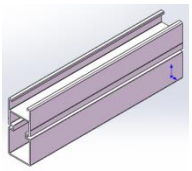
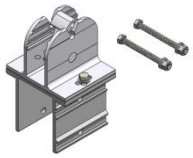
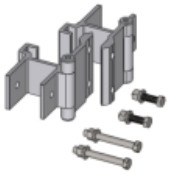
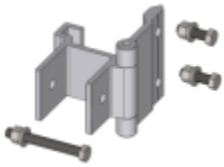
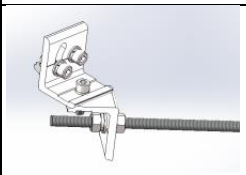
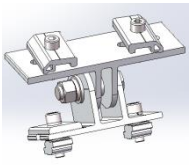
2.2 Components

Component List			
			
ER-EC-ST40 End Clamp	**ER-IC-ST40** Inter Clamp	**R-TR/100** TR –Rail100	**SP-TR100** Splice for TR-100 Rail
			
ER-RC-T Rail Clamp for T Rail	**S-STIIF/D15** STII-F，Double Support (Pre-assembled)	STII-F, Support (Pre-assembled)	**PH-STII-F** STII-F， Post Head for C-post
			
CP-D15/A/Q STII-A，C-Post	**ER-PB-CP/D/A** STII-A，Post Brace for C-Post On Double Support	**ER-PB-CP/A** STII-A，Post Brace for C-Post	**CO-STIIF/TR TR-10** Tie Rod Connector and Tie Rod (optional)
			
BR-R110/EW/A East/West Adjustable Bracket II (optional)			

Note: Double Support (Pre-assembled) and Post Brace for C-Post on Double Support are only suitable for STII-F with Double Support.

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
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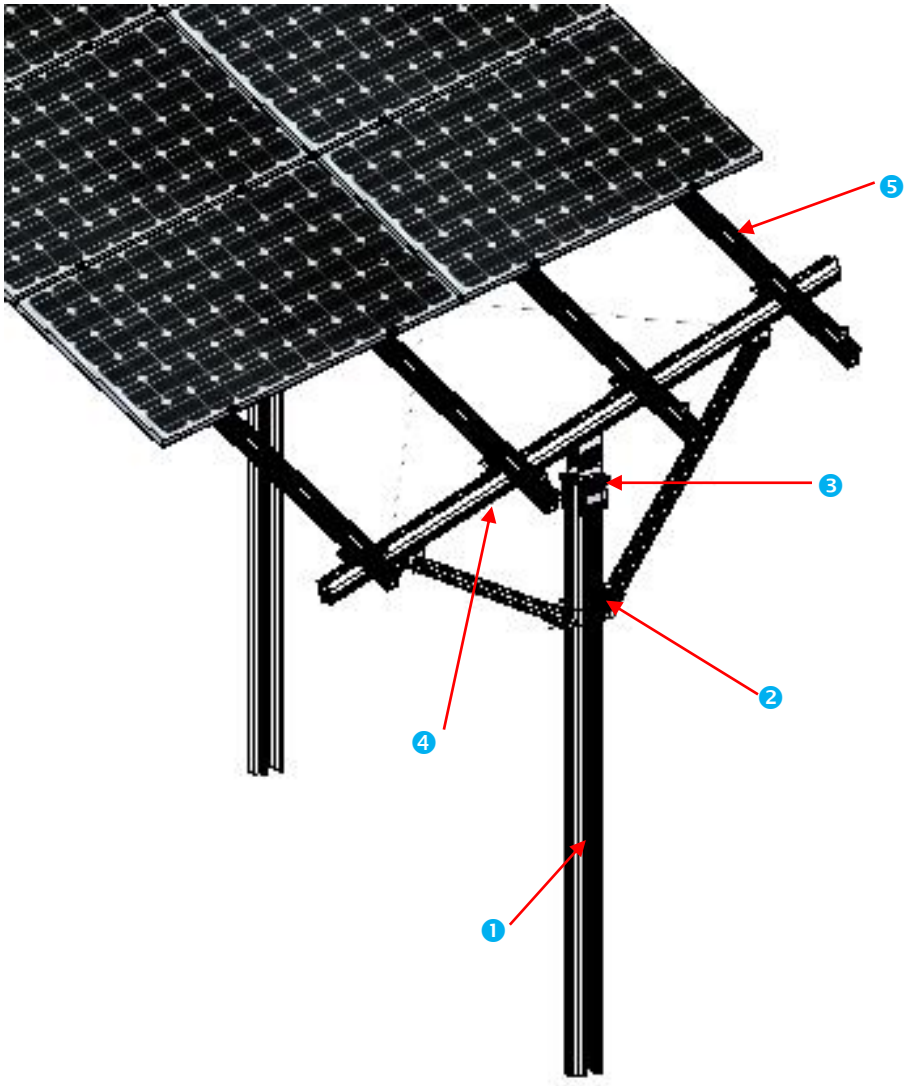
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

3. System Overview

3.1 System Overview:



❶STⅡ-F，C-Post

❷STⅡ-A，Post Brace for C-Post

❸STⅡ-F，Post Head for C-post

❹STⅡ-F，Support (Pre-assembled)

❺TR–Rail 100

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3.2 Precautionary Measures for Stainless-Steel Fastener Installation

Improper operation may lead to the deadlock of bolts and nuts. Follow the steps below to reduce this risk.

1．Reduce the friction coefficient

（1）Ensure that the thread surface is clean (no dirt or contaminant).

（2）Apply lubricant (grease or 40# engine oil) to fasteners prior to tightening to avoid galling or seizing in the threads.

2．General installation instructions

（1）Apply force to fasteners in the direction of thread.

（2）Apply force uniformly to maintain required torque.

（3）Professional tools and tool belts are recommended.

（4）Avoid using electric tools for final tightening.

（5）Avoid working at high temperatures.

3．Safe Torques

Please refer to safe torques defined in this guide as shown in the figure below. If power tools are required, Clenergy recommends the use of low speed only. High speed and impact drivers increase the risk of bolt galling (deadlock). If deadlock occurs and you need to cut fasteners, please make sure that there is no load on the fastener before you cut it. Avoid damaging the anodized or galvanized surfaces.

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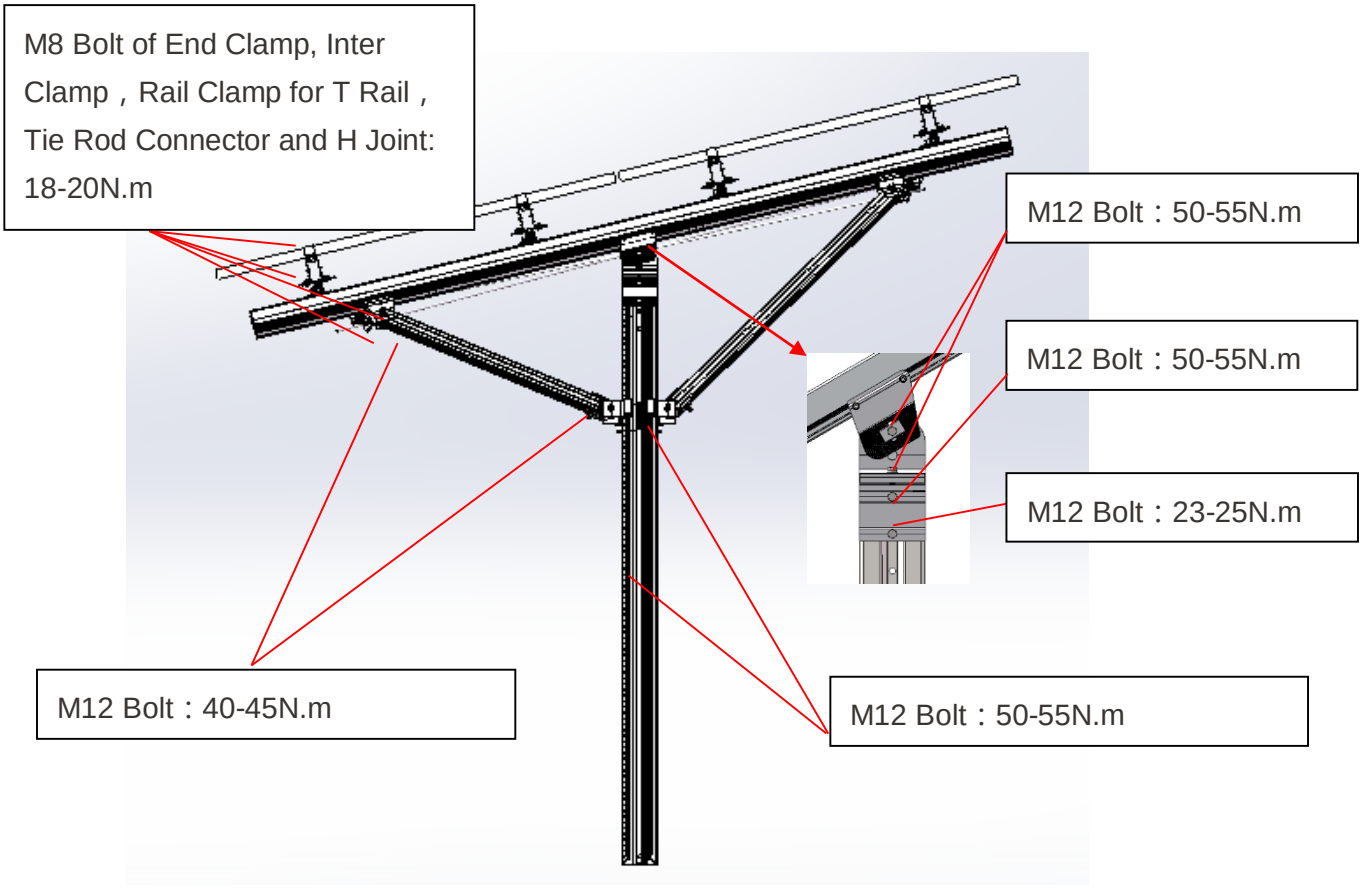

Note: Do not fasten bolts tightly until each component is adjusted properly. Repeated fastening or unlocking will result in bolt galling / deadlock.

3.3 Installation Dimensions

All drawings and dimensions in this installation guide are for generic reference. The PV-ezRack STII-F is to be optimized to suit specific conditions for each project and documented in engineering drawings. As a result, major components of the PV-ezRack STII-F may be provided in sectional sizes and lengths that vary from those shown in this guide. The installation operations detailed in this instruction guide remain the same regardless of the component size. In case any on-site modifications or alteration of the system are needed, in a way that would be different from engineering drawings, please provide marked up drawings/sketches for Clenergy's review prior to modification for comment and approval.

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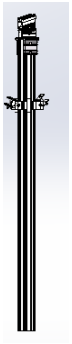
3.4 Installation in brief

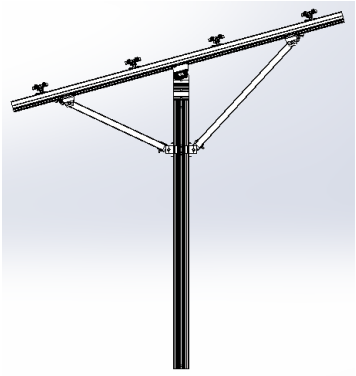
Step 1: C-Post piling

Step 2: Top and side Post Brace installation

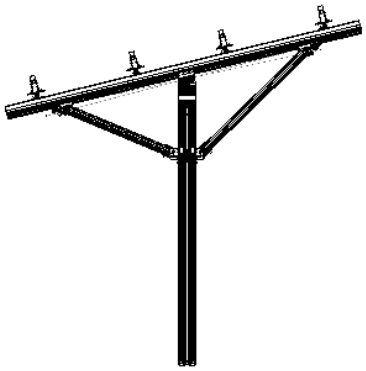


Step 3: Pre-assembled Support installation

Step 4: East/West Adjustable Bracket II installation



Step 5:TR –Rail and Tie Rod Connector



Step 6: PV Modules installation

Note: The overall installation steps of STII-F single and double support bracket systems are the same. Please refer to this installation manual for the installation of the respective components.

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
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sales@clenergy.com.cn

4. Installation Instructions

4.1 C-Post Installation

4.1.1 Before starting, prepare the required installation tools and components first. Make sure that the hydraulic pile driver equipment is suitable for your particular installation.

4.1.2 According to the installation plan, use the total station to mark the ramming position of each C-Post. When ramming, ensure that the C-Posts in the same row are in line and facing the same direction. Also pay attention to the opening of the C-Posts and ensure they are aligned towards the same direction.

The piling depth should be determined by the engineering drawings.

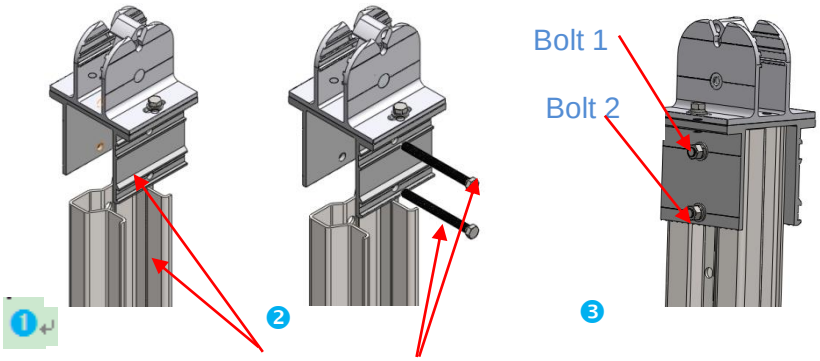
4.2 Post Head Installation

Fix the Post Head on the post and fasten it with M12 Hexagonal bolts and nuts as shown on the right figure.

Recommended torques:

Bolt 1: 50-55 N•m

Bolt 2 :23-25 N•m



The ribbed surface of the Post Head cap should be facing the same direction as the opening direction of the post and the bolt head

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
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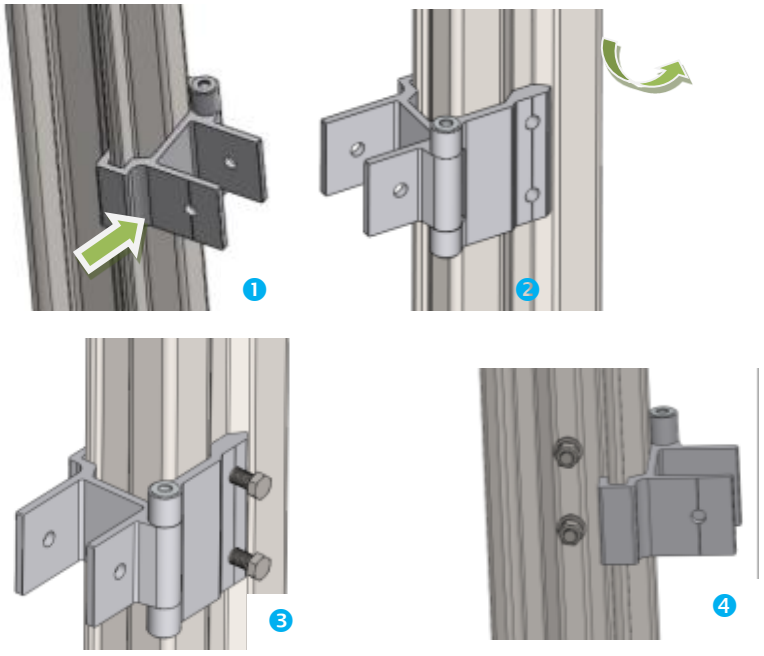
Facsimile +86 592 599 5028
sales@clenergy.com.cn

4.3 Post Brace Installation

4.3.1 Click the Post Brace on the opening side of the C-Post as shown on the right figure and then fasten the Post Brace onto the Post with M12 bolts and nuts.

If there are several mounting holes on the C-Post, the installation position of the Post Brace should be determined according to the engineering drawing.

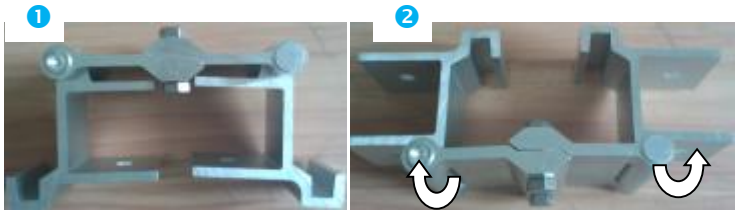
Recommended torques for Bolt M12 is 50-55 N•m



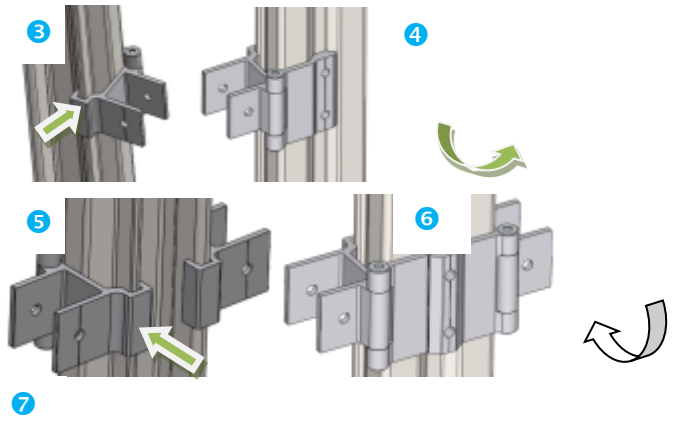
4.3.2 Post Brace for C-Post On Double Support Installation.

Click one Post Brace on the opening side of the C-Post and then click the other Post Brace in the same way, and then fasten the Post Brace on to the C-Post with M12 hexagonal bolts and nuts as shown on the right figures.

If there are several mounting holes on the C-Post, the installation position of the Post Braces should be determined according to the engineering drawing.



Rotate the Post Brace as per the figure on the top right, then remove the bolt and nut.



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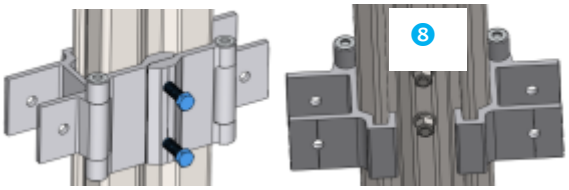
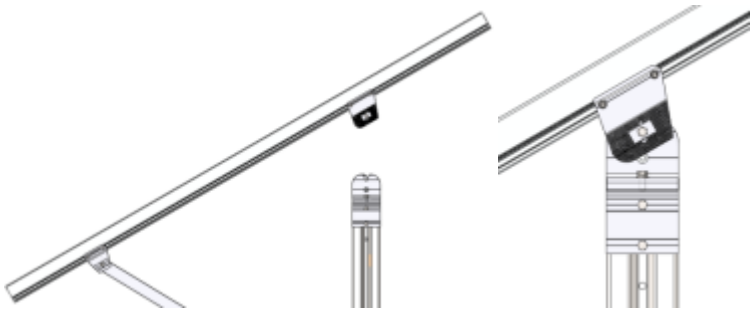
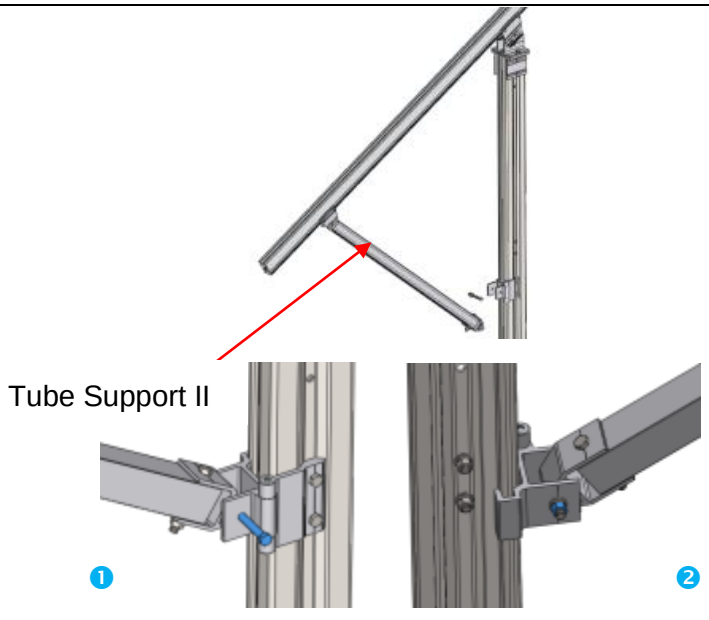
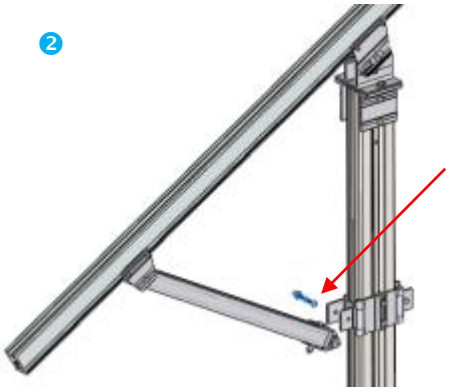
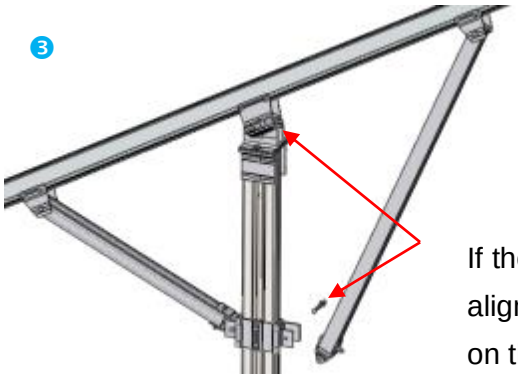
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

Recommended torques for Bolt M12 is 50-55 N•m	
4.4 Support (Pre-assembled) Installation	
Single Support (Pre-assembled) Installation	
Place the Pre-assembled Support onto Post Head. When doing this, ensure the hook on the Post Head is secured with the hexagonal bolts on the Tri-Groove Square Girder 100 of Pre-assembled Support	
Connect the Tube Support II of the Pre-assembled Support and Post Brace with M12 hexagonal bolts and nuts and lightly fasten the nuts by hand.	
Double Support (Pre-assembled) Installation	

1

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

Place the Pre-assembled Support onto Post Head then connect two Tube Support II and Post Braces with M12 hexagonal bolts and nuts and fasten the nuts.	 Before installing the Support, pay attention to the difference in length between the two Tube Support II. Make sure that the shorter Tube Support faces the direction of the sunlight to prevent the tilt angle from being in reverse. ❷  Install the shorter Tube Support II first. ❸  If the bolt holes are not aligned, adjust the bolts on the corrugated H Joint, then fasten it after installing the Tube.

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

	❹  If the second Tube Support II is unable to be installed due to ramming deviation, refer to the following operations to adjust the orientation of the Post Head.

4.5 Mounting Frame Adjustment

After installing the Pre-assembled Support, adjust the mounting frame.

Adjust vertically: Loosen Bolt 1 and adjust along the slotted holes.

Adjust Girder: Loosen Bolt 2 and Bolt 3, turn Post Head slightly, move Tube Support along to the left and right until all girders are parallel.

Keep all of the Tri-Groove Square Girder 100 at the same level and parallel to each other.

Check the torque value of each bolt:

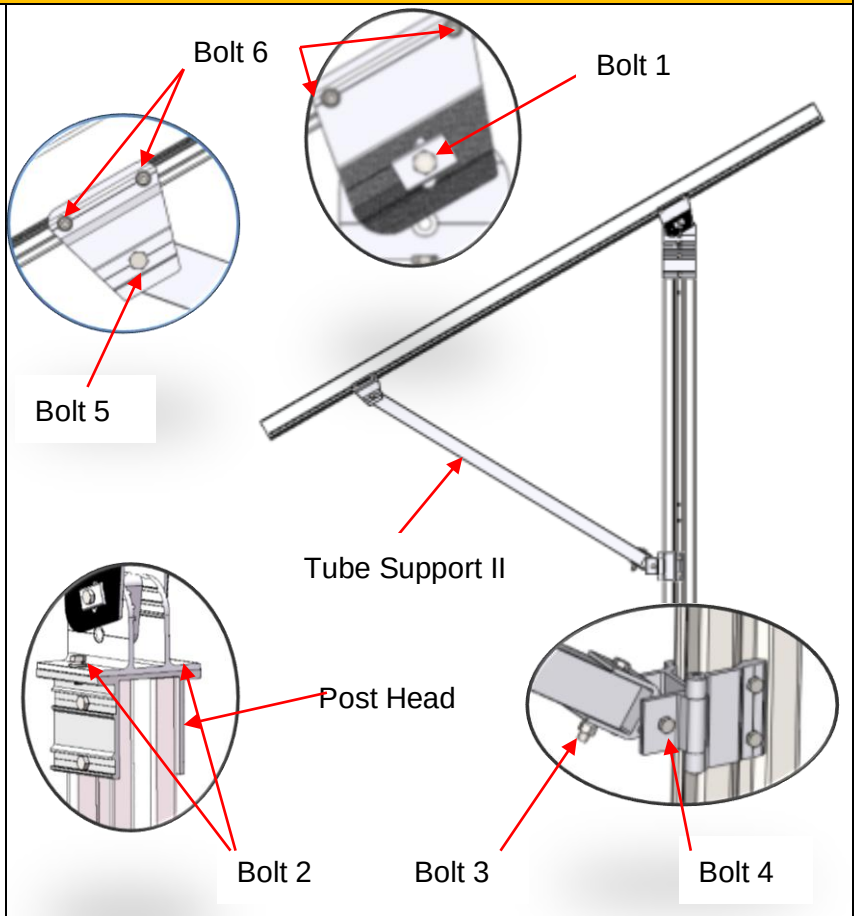
Bolt 1 with 50-55 N•m

Bolt 2 with 50-55 N•m

Bolt 3 with 40-45 N•m

Bolt 4 with 50-55 N•m

Bolt 5 with 40-45 N•m



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Telephone +86 592 311 0088
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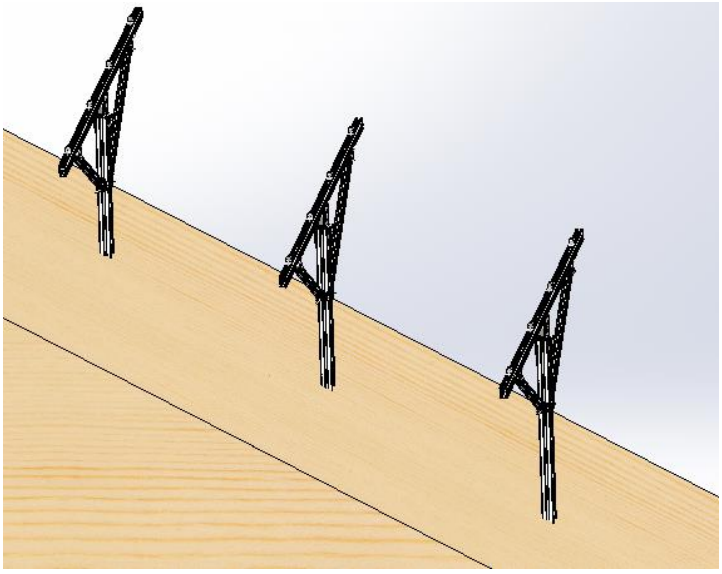
Bolt 6 with 18-20 N•m	

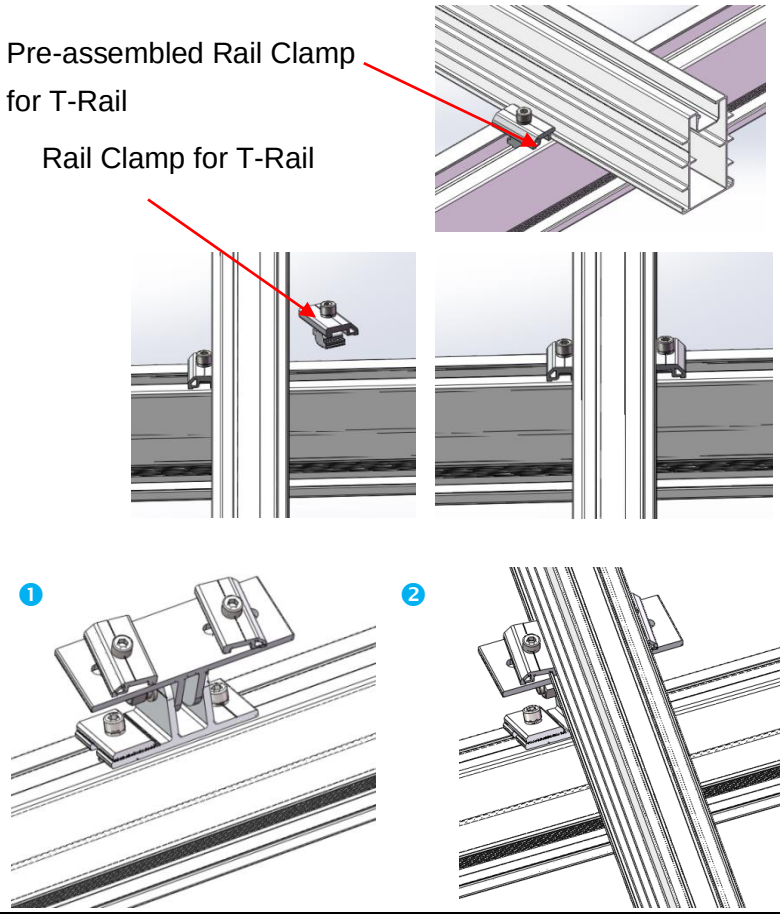
4.6 TR-Rail Installation

4.6.1 Direct installation:

Slide the TR rail into the pre-assembled Rail Clamp for T-Rail at the same height on the Tri-Groove Square Girder, and then fasten the bolt with the 6mm Allen key. The other side of the TR- Rail is fixed with another Rail Clamp for T-Rail. Press the TR-Rail against the Tri-Groove Square Girder.

Recommended Torque for M8 is 18-20Nm

Note: If the actual project is not equipped with the pre-assembled Rail Clamp for T-Rail, apply a Rail Clamp for T-



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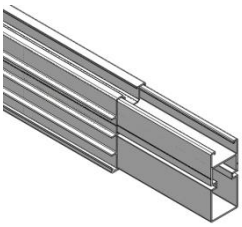
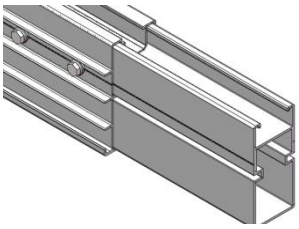
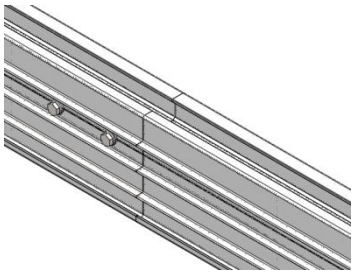
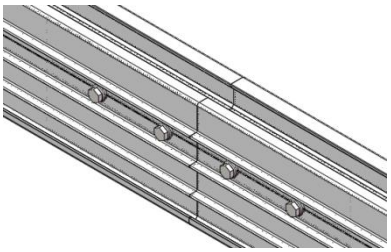
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

<table>
<tr>
<td>Rail on both sides of the TR Rail 100.
4.6.2 East/West Adjustable Bracket II Installation:
Fix the pre-assembled East/West Adjustable Bracket on to the Tri-Groove Square Girder and fasten with the 6mm Allen key; align the TR Rail and then place it on the East/West Adjustable Bracket II, lift the Rail Clamp for T-Rail and then fasten the TR Rail with the 6mm Allen key.</td>
<td> 
Recommended Torque for M8 bolt is 18-20Nm</td>
</tr>
<tr>
<td>Before installing the TR-Rail on to the Tri-Groove Square Girder or the East/West Adjustable Bracket II, please confirm the length of the required TR-Rail. If it is not long enough, connect it with the Splice for TR-Rail. Connection of the Splice on to the Tri-Groove Square Girder is not recommended.

Apply four sets of self-tapping screws ST6.3*22 into each side of the TR Rail 100, a total of eight sets, and fasten until the plastic washers on the screws are slightly flattened.</td>
<td>❶
 
Insert half of Splice for TR-Rail
❷
 
Symmetrically apply two self-tapping screws ST6.3*22 in each side
❸
 
Insert the other TR-Rail onto the Splice.
❹
 
Symmetrically apply two self-tapping screws ST6.3*22 in each side</td>
</tr>
</table>

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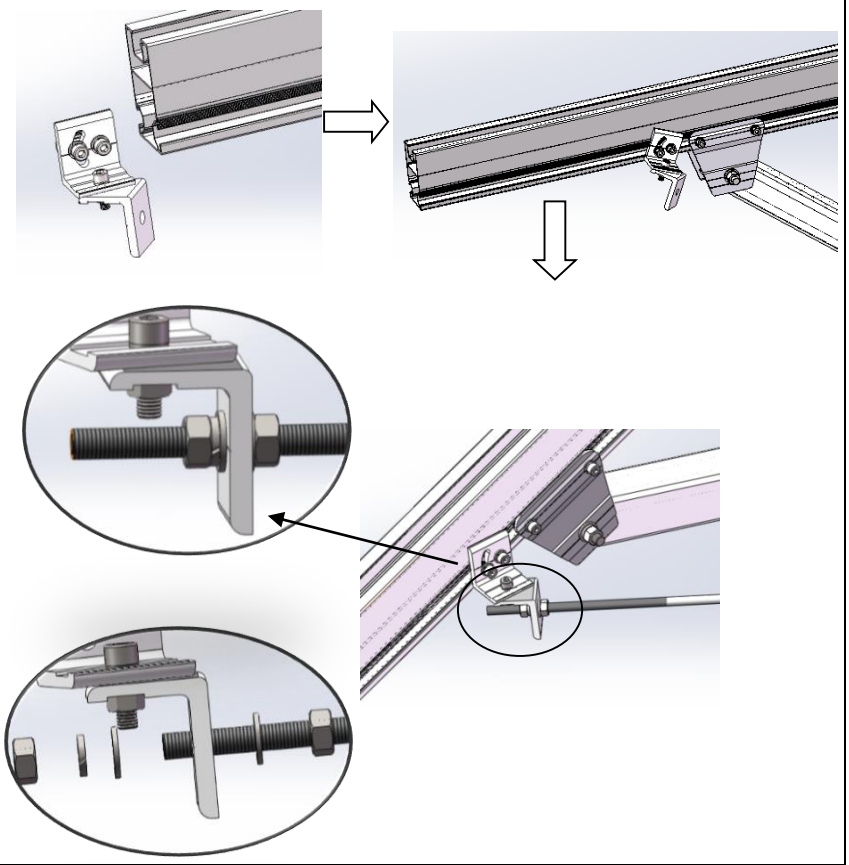
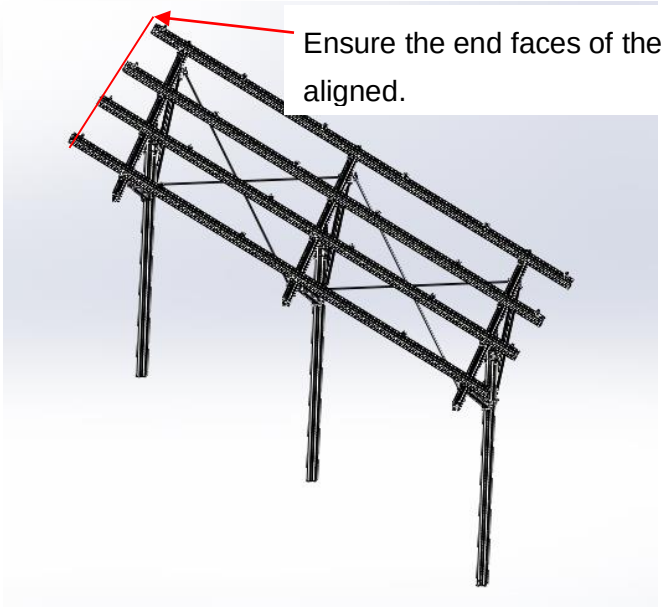
4.7 Tie Rod Connector and Tie Rod Installation (Skip this step in systems without this accessory)

Slide the Tie Rod Connector into the channel of the Tri-Groove Square Girder and into the planned position; Attach one end of the Tie Rod on to the lower part of Tie Rod Connector with the M10 Nut, Plain Washer and Spring Washer. Attach the other end of the Tie Rod in the same way. Adjust the angle of the Tie Rod Connector accordingly and fasten the bolts until the Tie Rods have achieved tension.

Recommended Torque for M8 is 18-20Nm



Now the whole mounting frame installation has been completed.



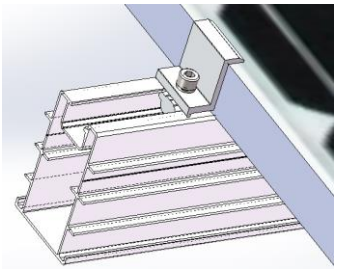
Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
Facsimile +86 592 599 5028
sales@clenergy.com.cn

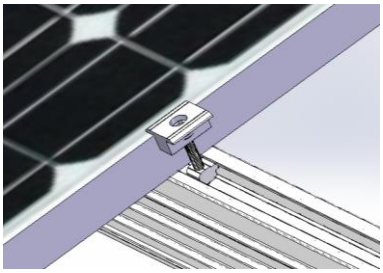
4.8 PV Modules Installation

Place the PV Modules onto the TR Rails, attach the PV Modules with the Clenergy unique Inter and End Clamps and then fasten them with the Allen key.

Tips: Use an Inter Clamp as a spacer to maintain a gap between two PV Modules. Remove the Inter Clamp after the PV Modules have been installed properly.

Recommended Torque of M8 bolt on the Inter and End Clamp is 18-20Nm





Now the whole mounting structure installation is completed.

Clenergy China
999-1009 Min'an Rd, Huoju Hi-tech Ind. Dev. Zone
Xiang'an District 361101, Xiamen, Fujian, China
Telephone +86 592 311 0088
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sales@clenergy.com.cn