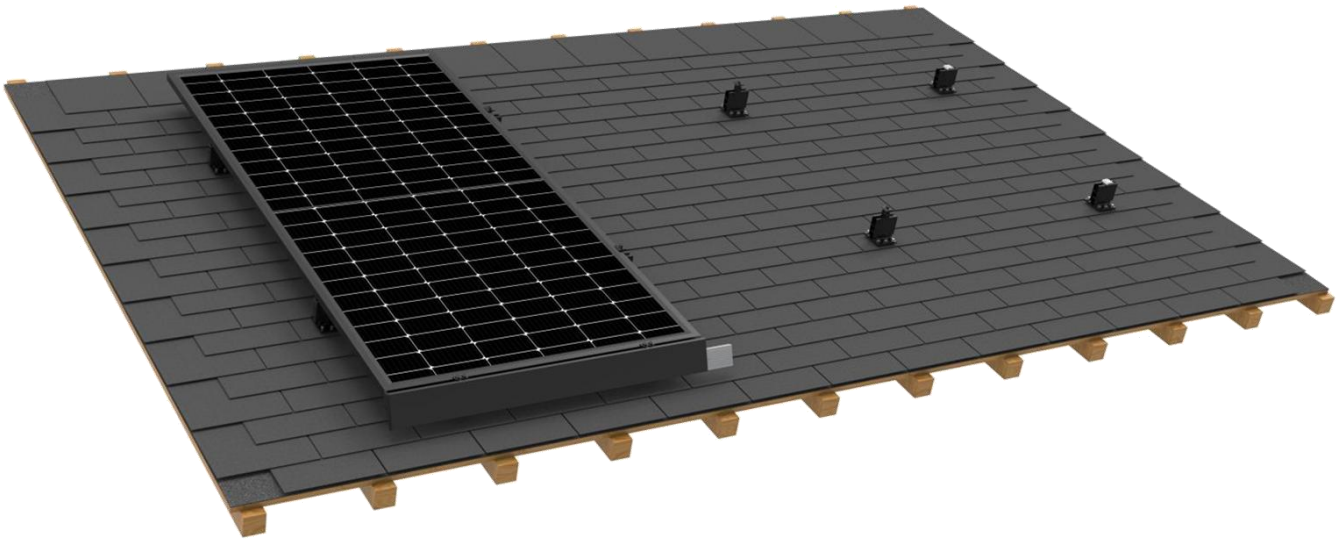
TOP·RACK™



TRT Rail-less Base racking system TRT01

Assembly Instructions

Version 3.6

04/08/2026

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Thank you 27

1. General safety information

- Prior to installation, ensure that the product complies with on-site static loading requirements. For roof-mounted systems, the roof load-bearing capacity must always be checked to meet the requirements.

- During installation, the construction site must be blocked from the public to prevent fall injuries. At least one copy of the installation instructions must be available at the installation site. Installation work may only be carried out by adequately trained and qualified installers.

- Qualified personnel are those who have skills, knowledge and training in the installation of PV mounting systems necessary to follow this manual to safely use the required tools and to carry out the required procedures. They must be physically and mentally fit and at no time are they allowed to perform installation work while under the influence of drugs, alcohol or even drugs.

- The installation team must distribute safety helmets, gloves, safety ropes and other equipment to each installation worker to ensure that each installation location is equipped with more than two installers for timely rescue in the event of an accident.

- These installation instructions describe the procedure for installing the product. Read these assembly instructions carefully before starting the assembly. Follow the instructions carefully to ensure the correct installation of the product.

- Failure to follow our general safety and assembly instructions, Top Rack Technology, Inc. (TRT) from any liability for resulting in defects or damage. Warranty is void in such cases.

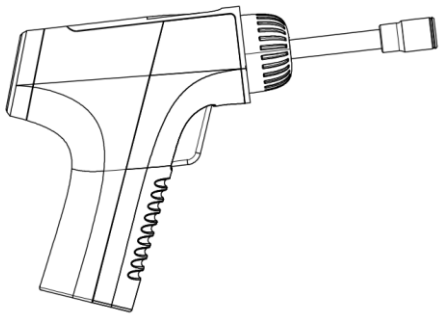
2. Test and certification

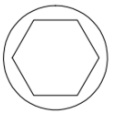
The bracket design complies with the following test and certification:

- UL 2703 CERTIFIED
- PE CERTIFIED
- FIRE TEST
- GROUNDING TEST

3.Tools overview

- **Power tool with Torque**

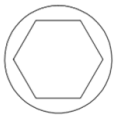




With 1/2’’ or 13mm socket

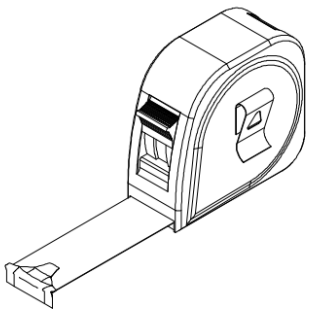
- **Wrench**



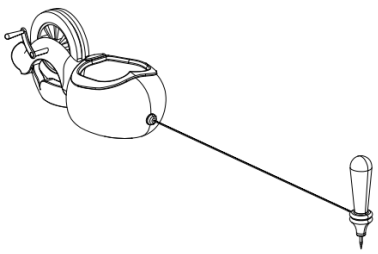


1/2’’ or 13mm wrench

- **Tape measure**



- **Chalk line tool**

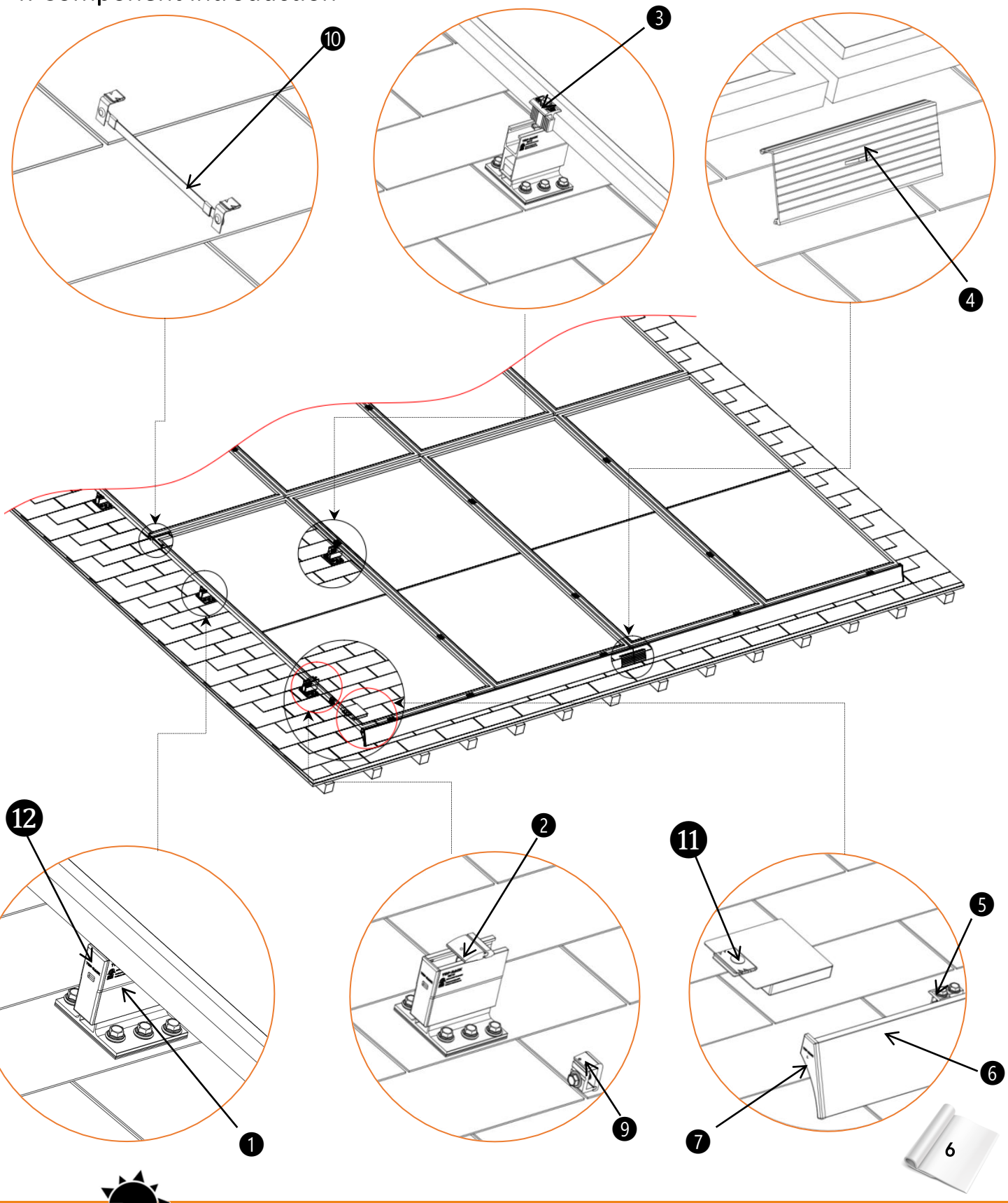


- **Chalk**



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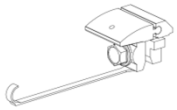
4. Component introduction



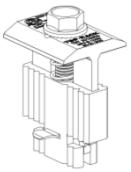
❶ Rail-Less Base | 3010354



❷ Hidden End clamp | 3010138



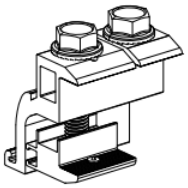
❸ Mid clamp | 3010355



❹ Skirt Connector | 3010405



❺ Skirt clip | 3010363



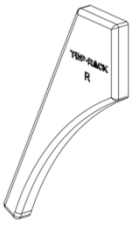
❻ Skirt | A197-2300



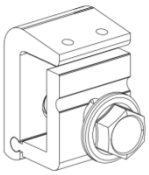
❼ Skirt Cap-L(108) | 1040108



❽ Skirt Cap-R(109) | 1040109



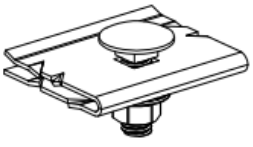
❾ Grounding lug 3 | 3010887



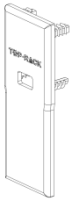
❿ Bonding Jumper | 3010406



⓫ Micro Inverter Racking 2 | 3010367

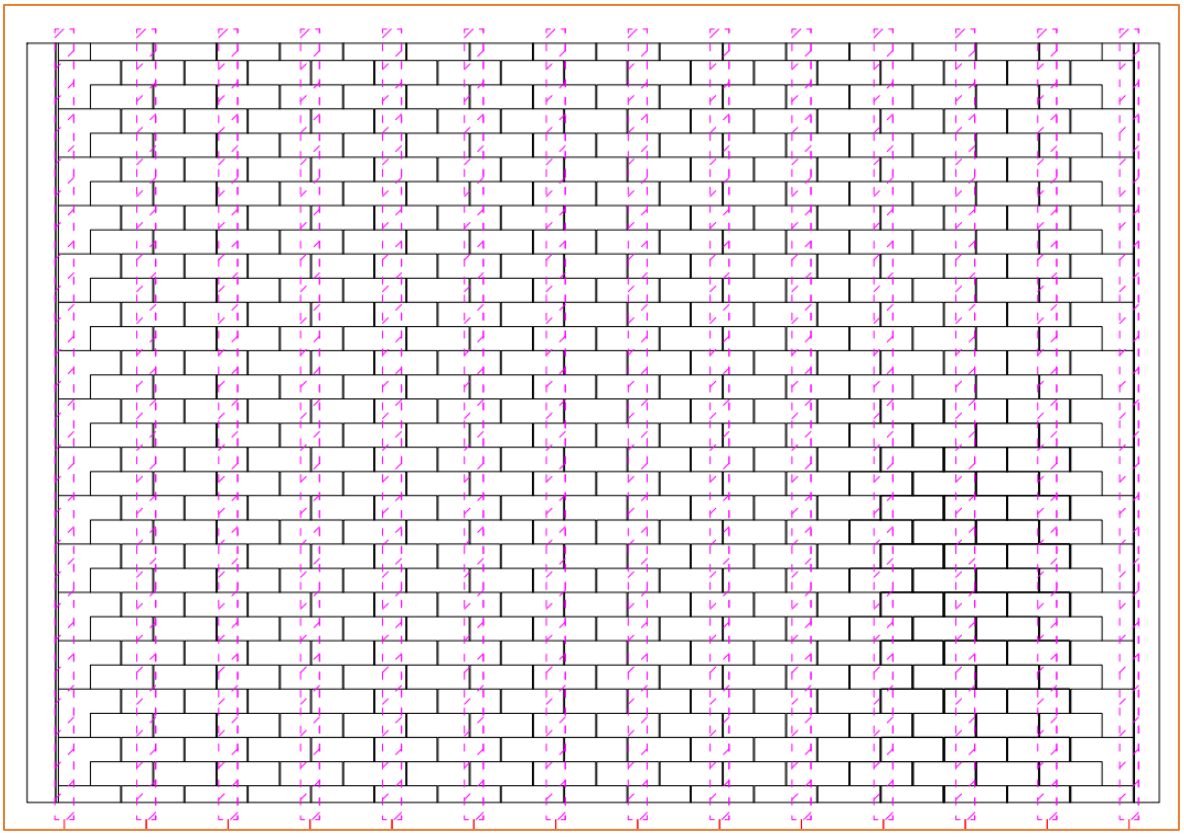


⓬ Base Cap | 1040091



4.Roof inspection and system layout

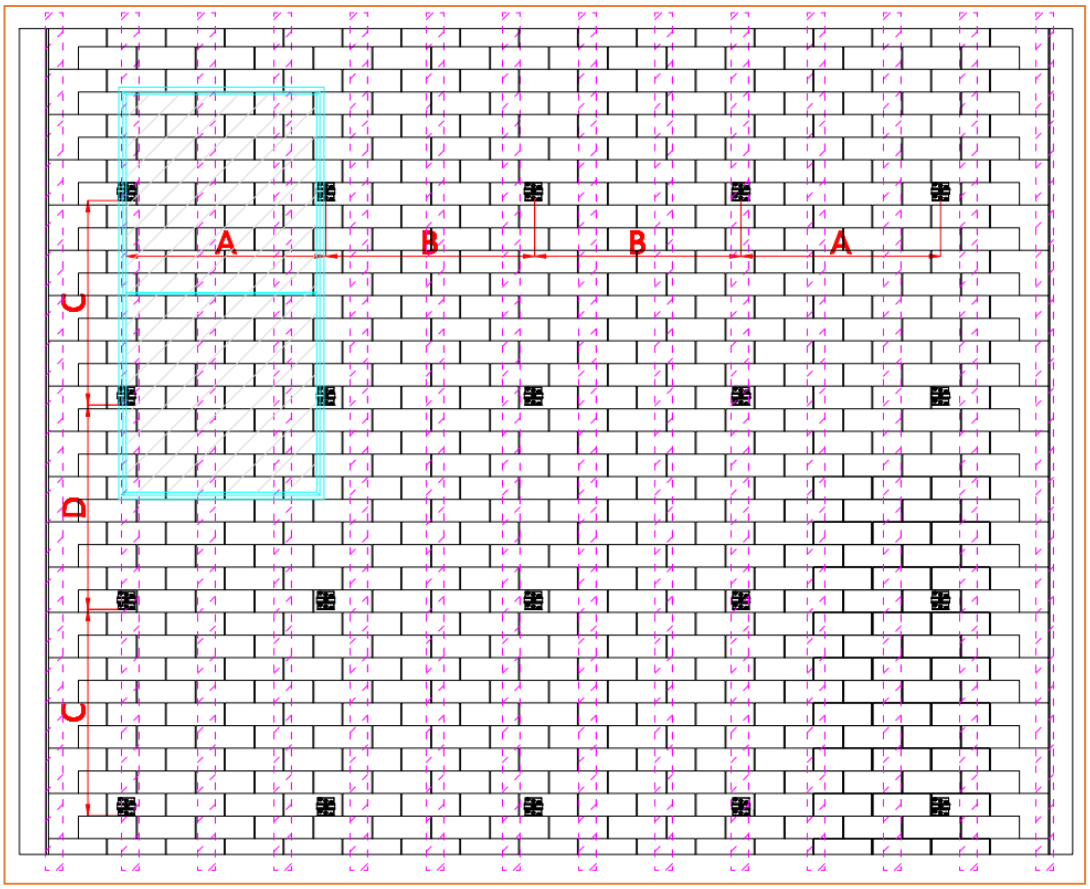
- Measure the dimensions of the roof, make sure after the system is installed, there is at least 6'' from the roof ridge, and 20" from eaves
- Measure the spacing between rafters, make sure the width of the rafter is not smaller than 2"
- The installation must ensure that the gap between the system and the roof can ensure ventilation, drainage, fire protection and moisture resistance. After installation, places that are prone to moss and dirt should be cleaned regularly.
- Survey the actual length, width, angle, rafter span etc. of the roof.

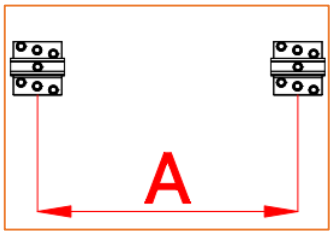


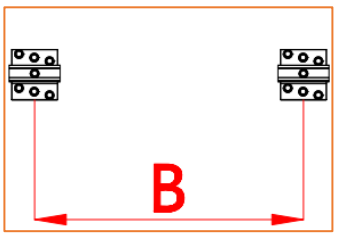
- Draw the rafter locations on the layout plan to identify where the roof accessories can be installed. The span between each installation location should follow up the PE Letter of each States.

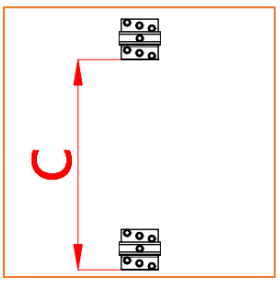
- Transfer the layout plan to the roof in proportion using a marker pen or chalk

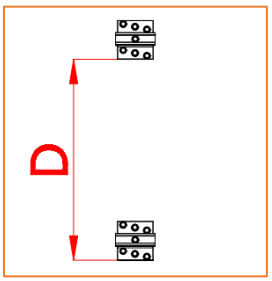
When installing the module vertically.











A= Short frame length-2'' **(-2" is because the first and last column bracket is fully under the solar panel)**

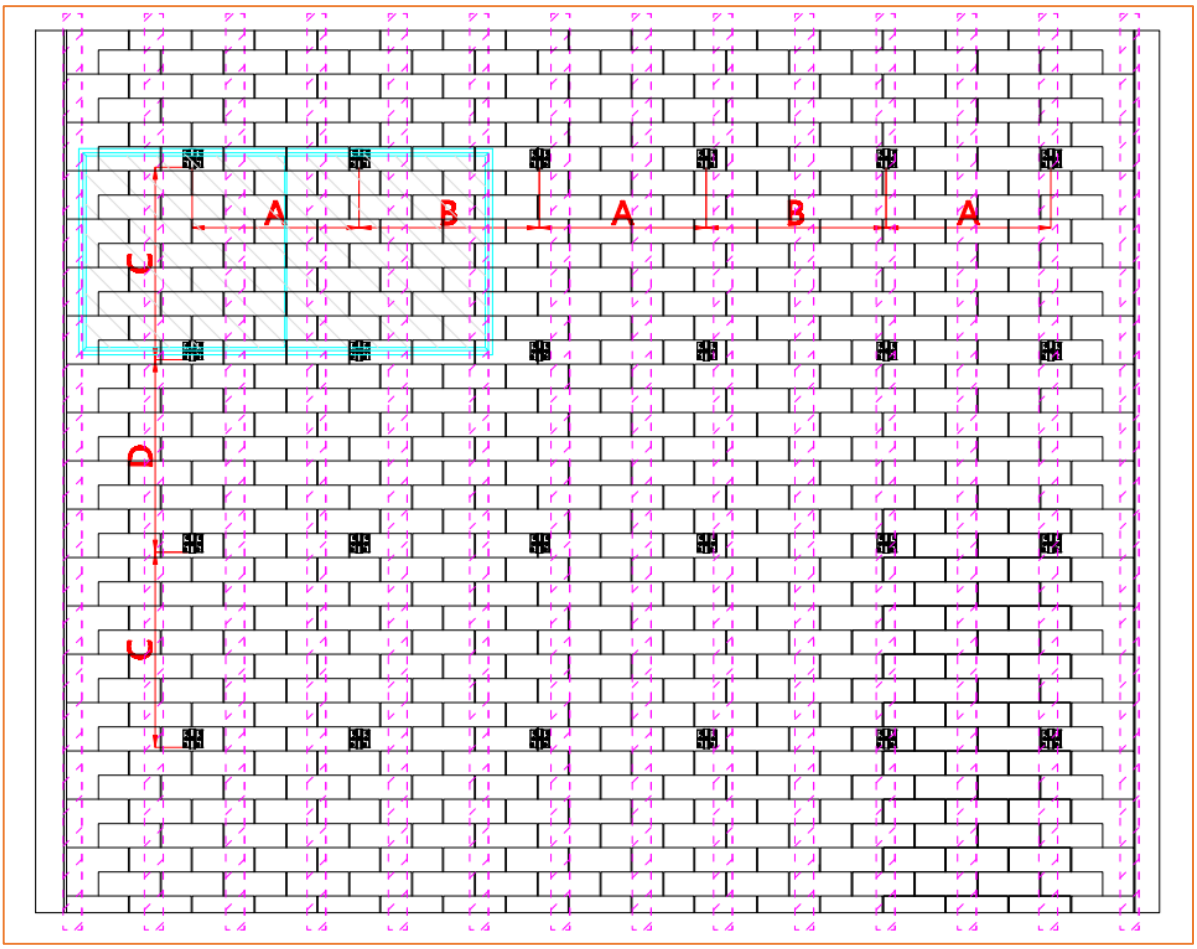
B=Short frame length+0.5'' **the +0.5" is for the middle clamp thickness gap**

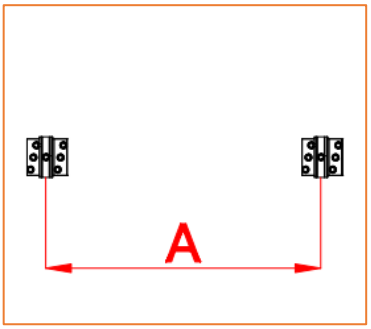
C=1/2 Long frame length+/-2'' **(The +/-2" adjustment is to avoid the step between two shingle layers.)**

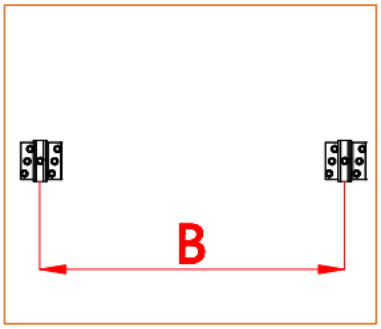
D= (Long frame length-C) +/- 2''+0.5''

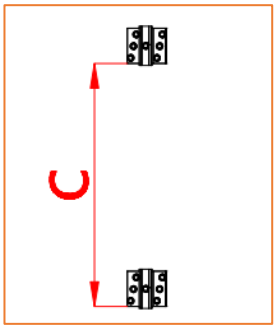
(the +0.5" is the gap between two panels)

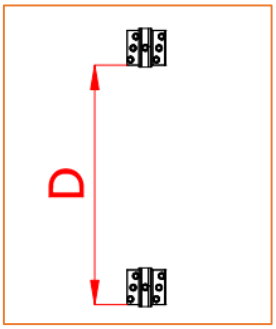
When installing the module horizontally











A= 1/2 of long frame length

B= 1/2 of long frame length +0.5'' (the 0.5" is the gap between two panels)

C= Short frame length-2'' (the top and bottom row -2" is because the bracket is totally under the solar panel frame)

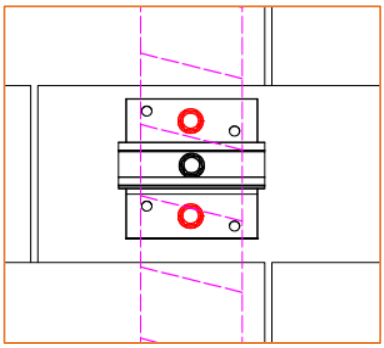
D= Short frame length+0.5'' (the 0.5" is the mid-clamp thickness gap)

6. Installation step

6.1 Determine the base installation position

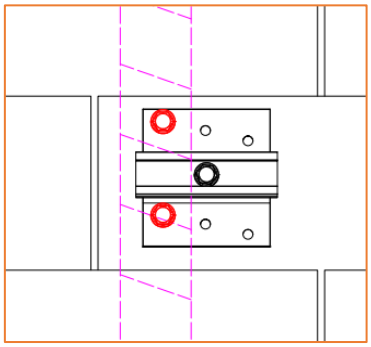
① Tap the roof with a hammer to find the location of the rafters, depending on the layout, some bases will be installed above the beams and some will be on the deck.

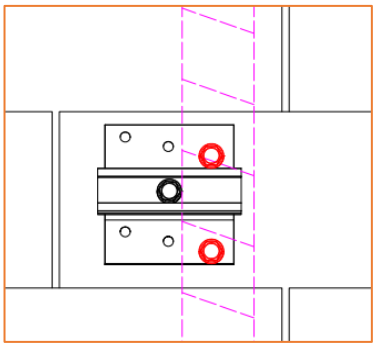
When installing the module vertically



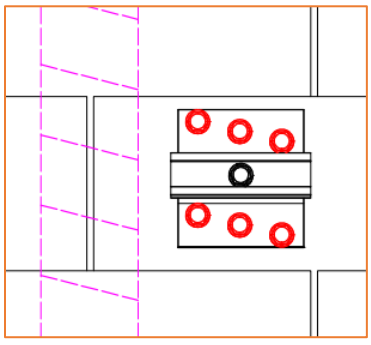
Install on rafter:

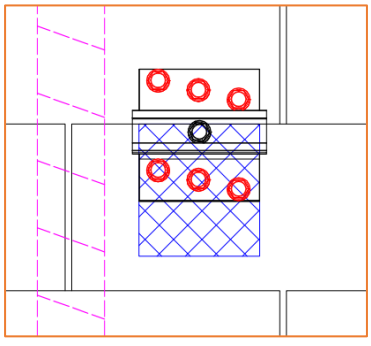
When any set of mounting holes of the base is located above the beam, we can choose this set of mounting holes to fix the base.





Note: If the mounting holes do not fit perfectly on top of the rafter, we can move them slightly, within 1"

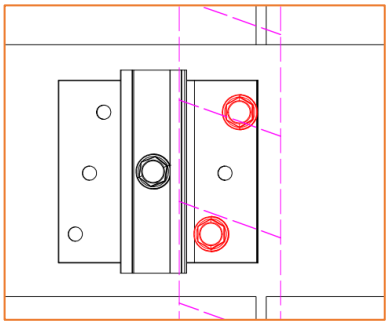


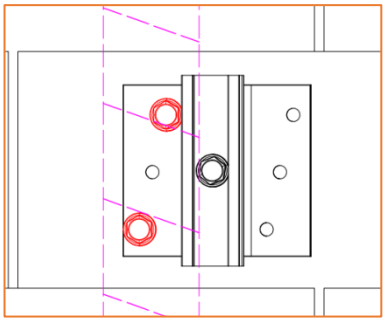


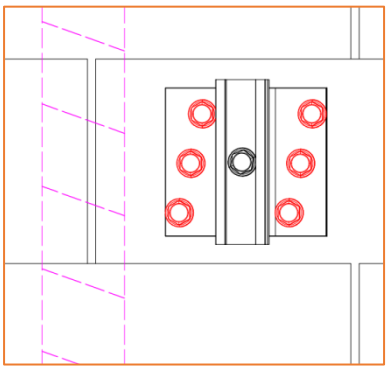
Install on deck:

If the entire base on the deck, then use 6 lag screws to fix the base.

When installing the module horizontally



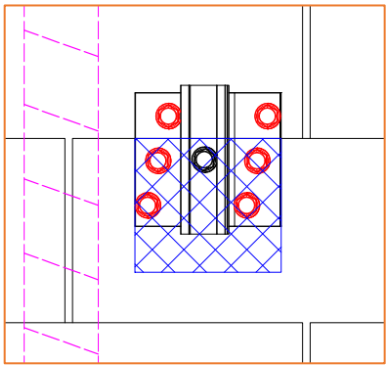




Install on deck:

If the entire base on the deck, then use 6 lag screws to fix the base.

If the base installed on the junction of asphalt shingles, a butyl rubber pad must be placed underneath to level the surface.

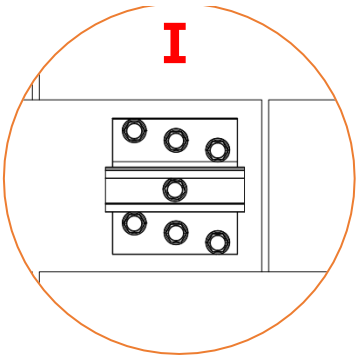


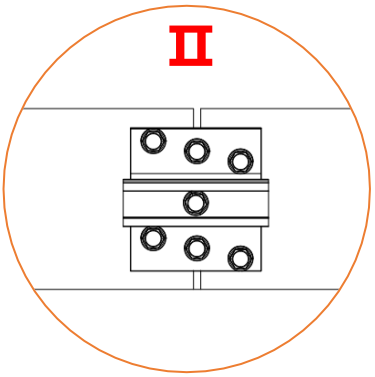
Install on rafter:

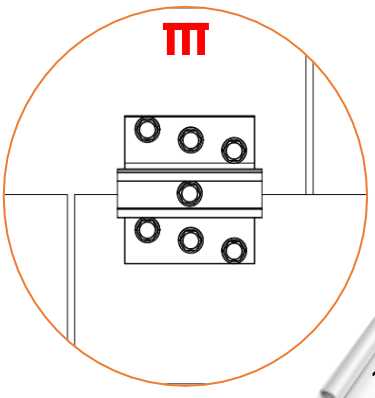
When the mounting holes on any side of the base are above the rafter, we can select the upper and lower mounting holes to fix the base.

Note: If the mounting holes do not fit perfectly on top of the rafter, we can move them slightly, within 1''

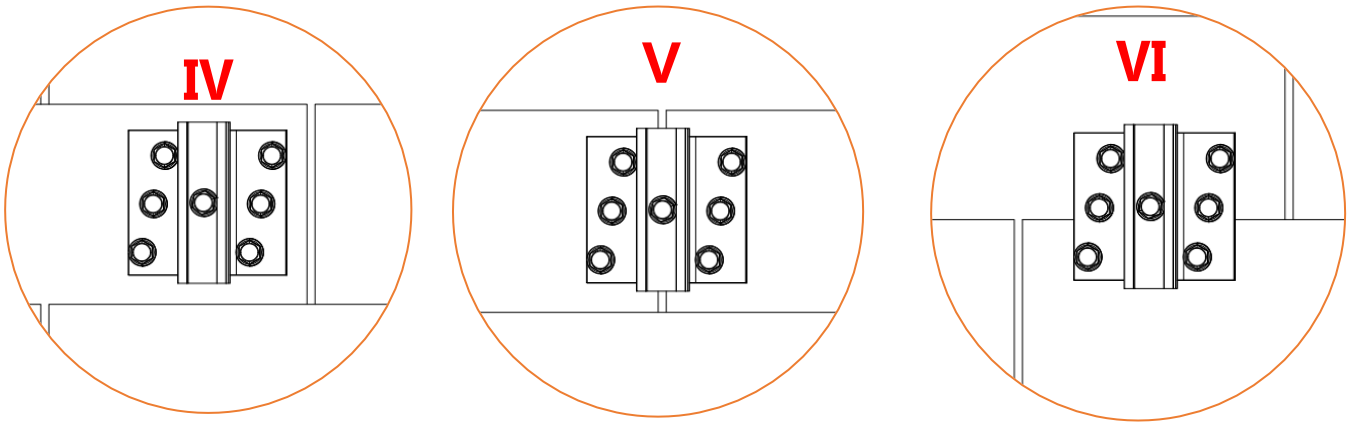
Installing modules vertically







Installing modules horizontally

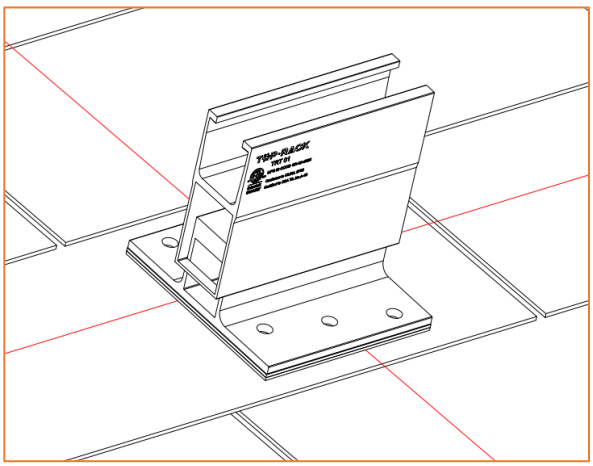


Ⅰ & Ⅳ: when the bases installed on the flat part of shingle, no special impervious water treatment is required.

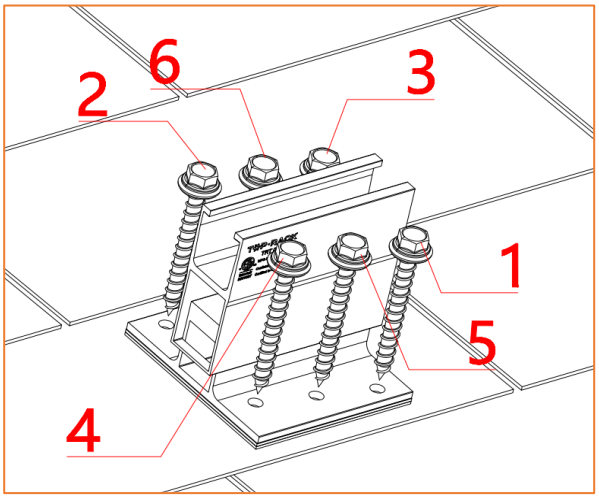
Ⅱ& Ⅴ: The base should be avoided to installed directly on the keyways of the shingle, if it is unavoidable, fill the keyways by a layer of approved sealant.

Ⅲ & Ⅵ: Avoid mounting the base at the joint of the layers of asphalt shingles, if this cannot be avoided, apply an extra layer of butyl glue on the lower tiles, so that the installation area is highly consistent

6.2 Installation of Rail-less base



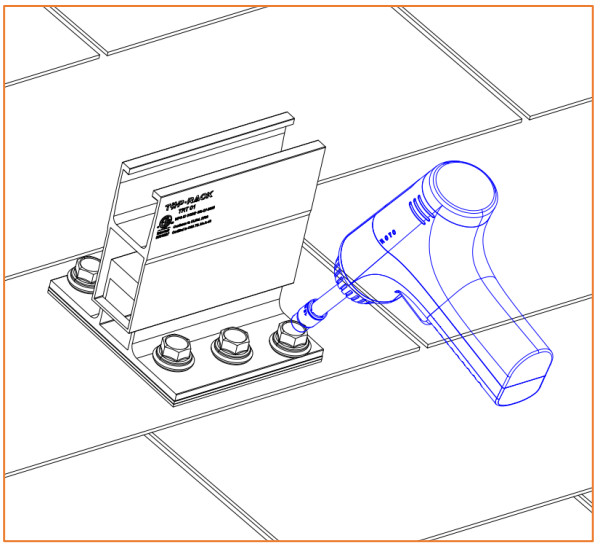
① All surfaces must be clean and dry before applying the butyl. Removing the release liner gradually to prevent contamination of the adhesive prior to application. Stick the attachment on the planned mounting location, press gently to make the butyl adhesive adhere to the roof. Apply pressure to ensure good contact and seal.



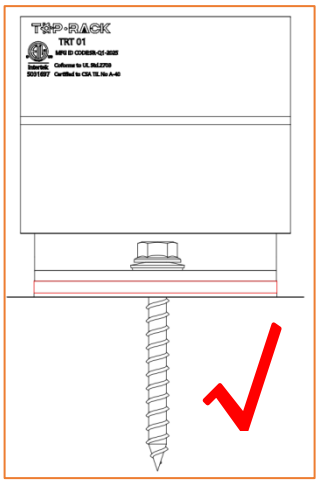
Note: Butyl is not compatible with silicone sealants or lubricants. Avoid using silicone-based products near butyl.

② After confirming the mounting position, Drive the 5/16x3'' lag screws by 1/2'' or 13mm socket.

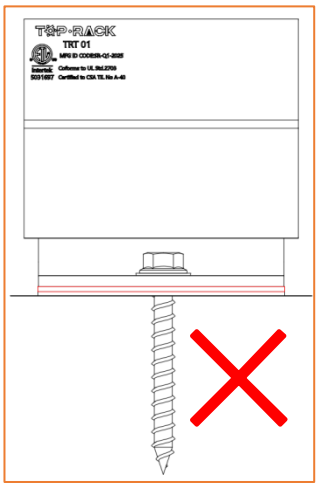
Note: install these 6 lag screws diagonally from 1 to 6 as shown in the image.



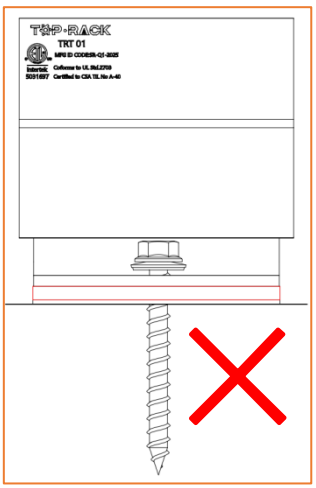
Note: The torque applied when installing the screws should not be too much or too little, and the screws should not be tilted.



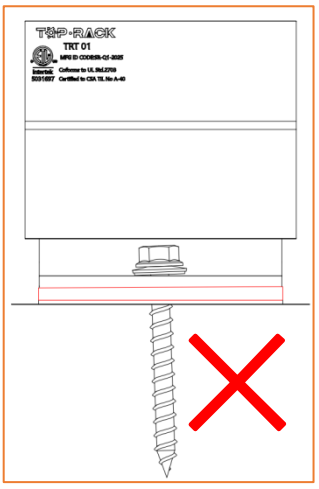
Correct Torque



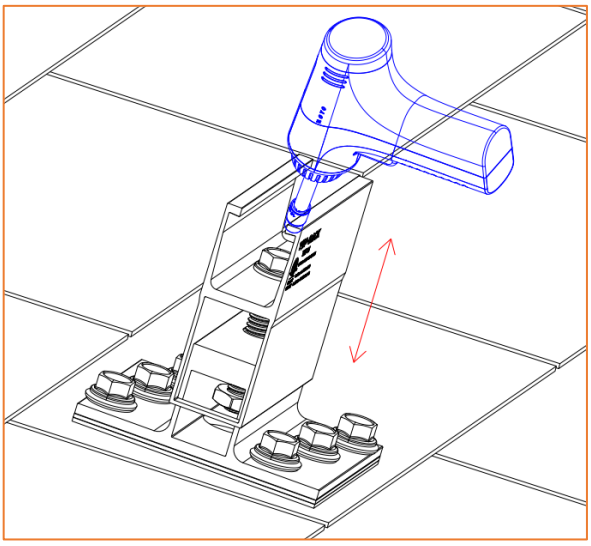
Too much Torque



Not enough Torque



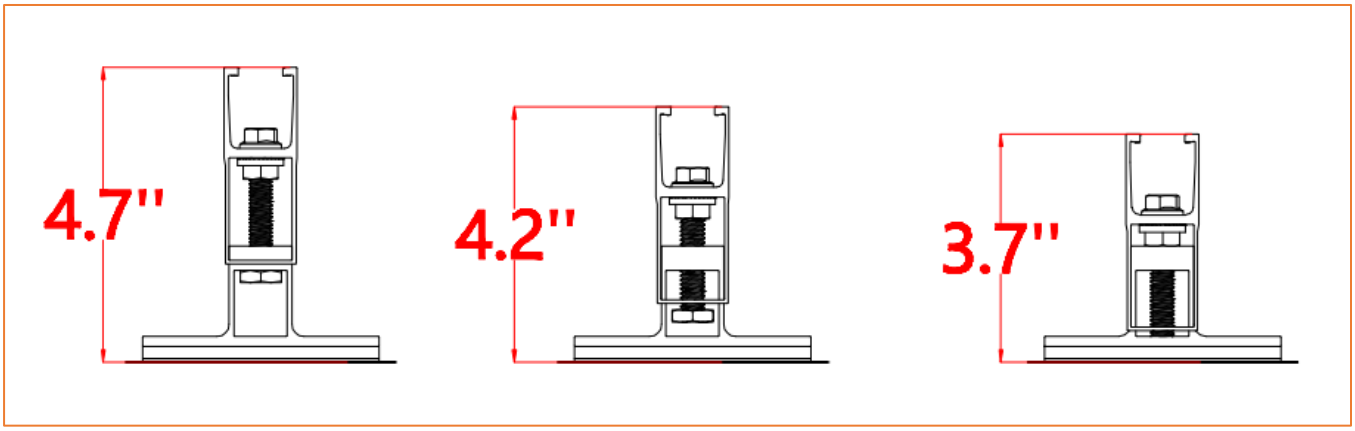
Tilted



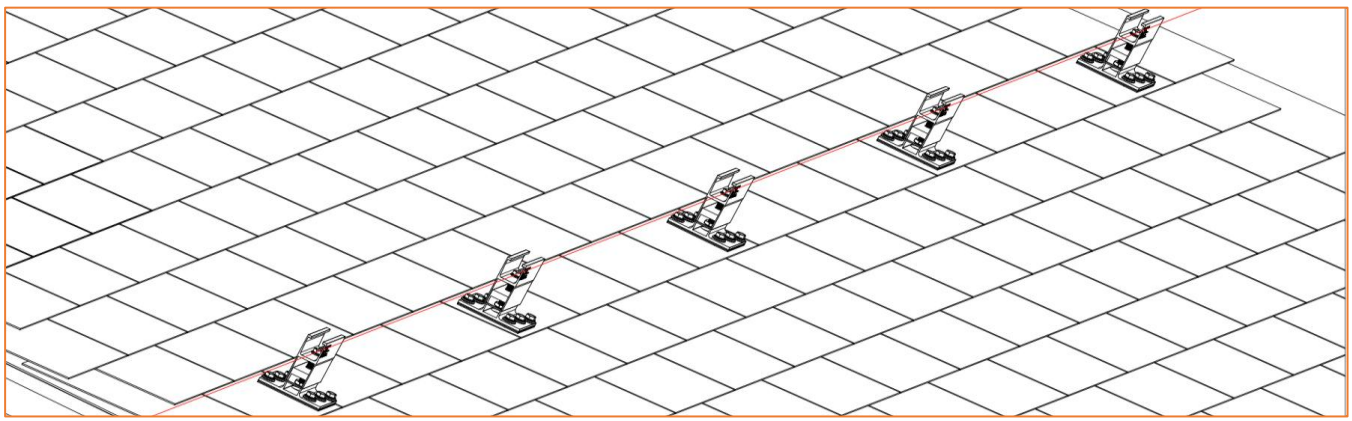
③ Due to the aging of the roof, the roof surface may be uneven. We can adjust the base height to keep the mounting bracket level.

Using 1/2'' or 13mm socket to adjust the central bolt up and down to adjust the overall height of the base. The base height can be adjusted within a 1'' range.

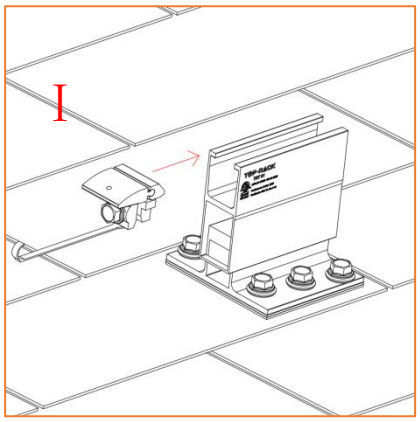
Note: The maximum height of the base is 4.7'' and the minimum height is 3.7''.

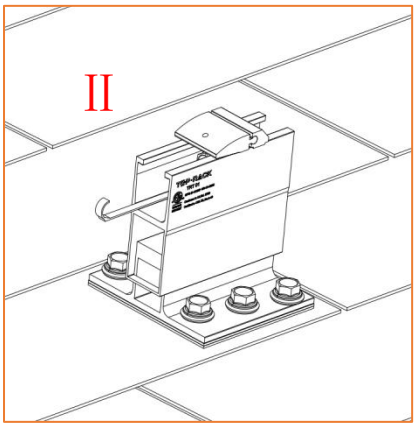


Check to make sure the bases are at the same level.

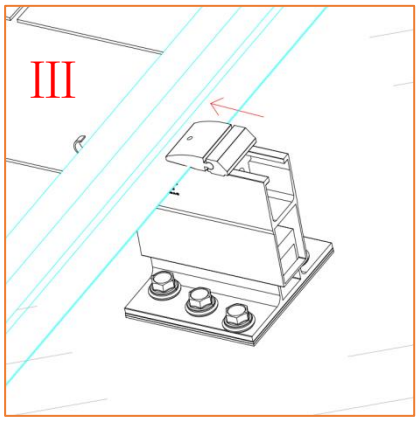


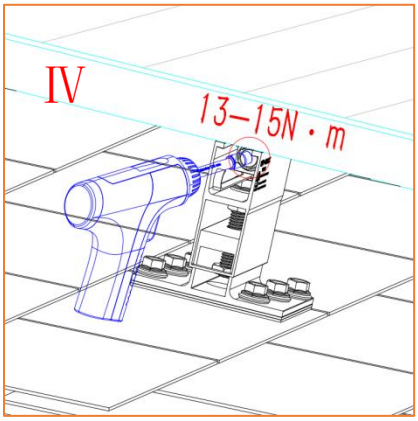
6.3 Installation of solar panel



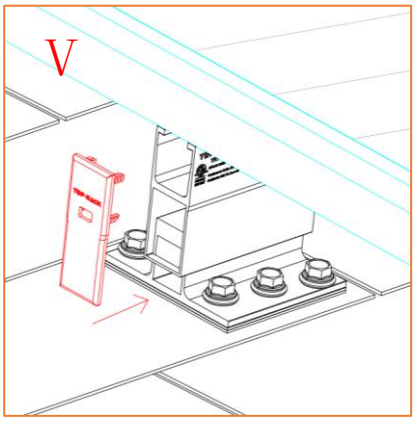


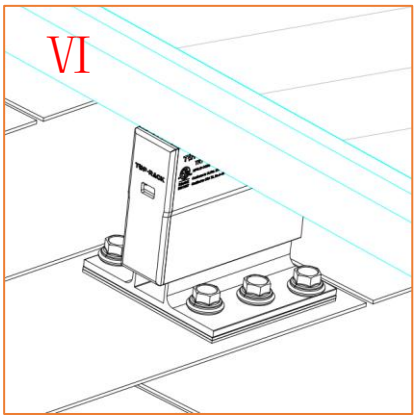
④ Sliding the hidden end clamp into the Channel. Place the solar module on the Channel over the end clamp. Pull the tie of the hidden end clamp to press against the module frame, continuing pulling the tie till the edge of the module frame is flush with the edge of the base.



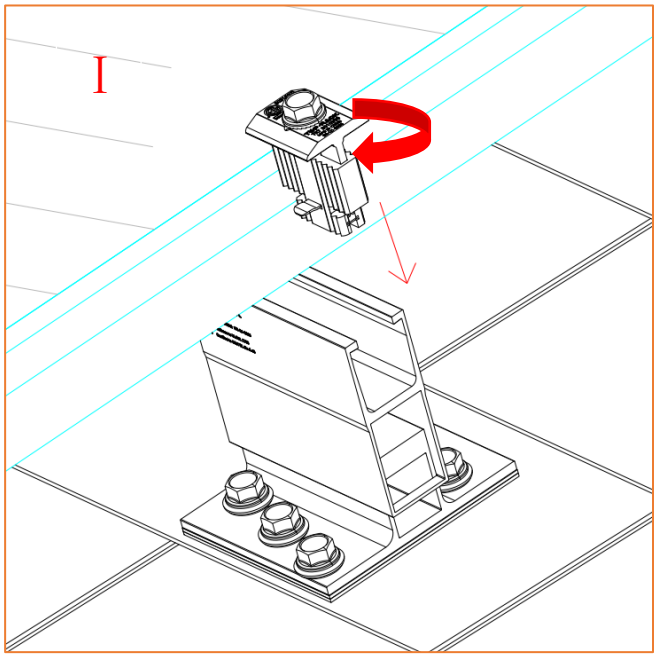


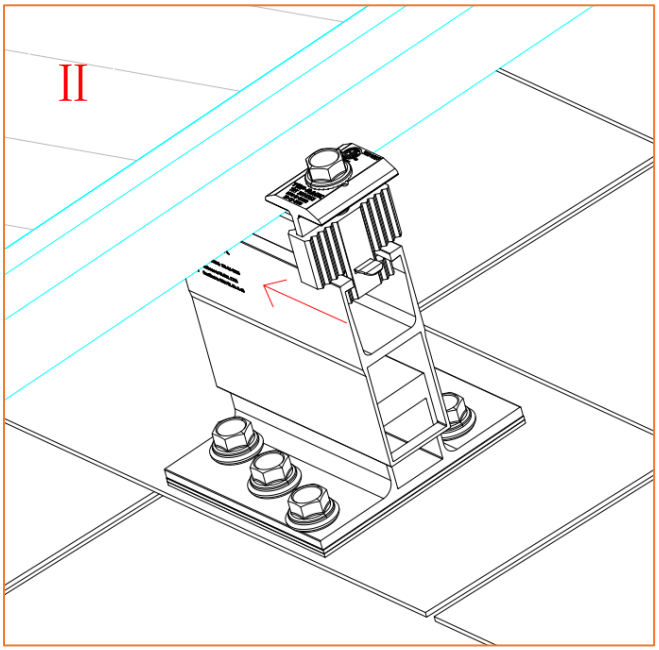
⑤ Tighten the bolt by 1/2'' or 13mm socket to secure the hidden end clamp. The Torque is 13-15N.m

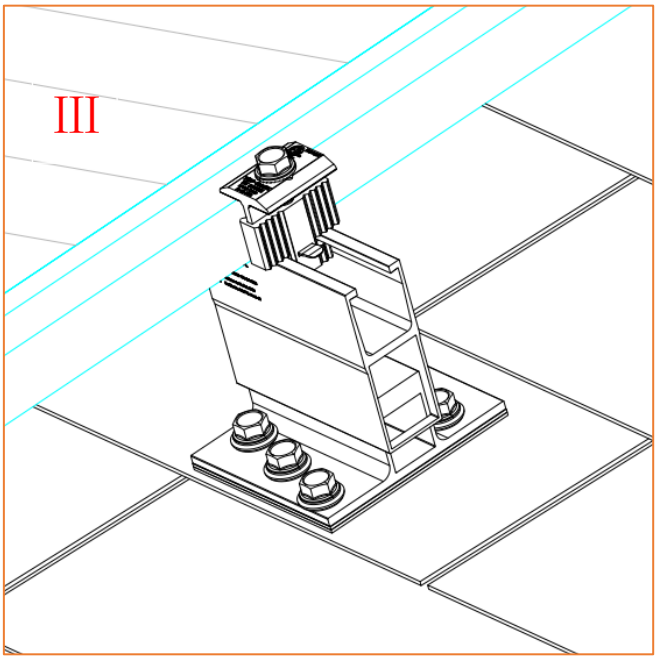




⑥ Insert the exposed tie into the Channel, then cover it with the end cap.



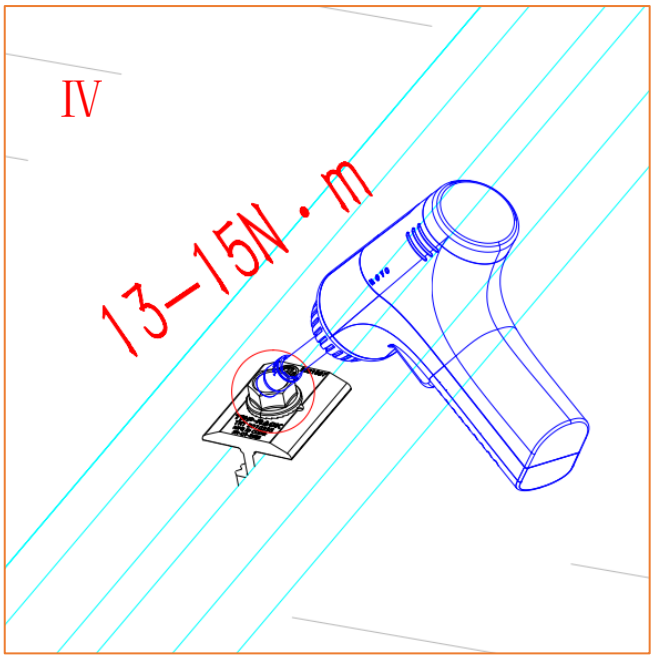




⑦ Insert the mid clamp into the rail as the direction of the panel clamp, Rotate the middle clamp by 90° , Slide the mid clamp until it compresses the frame of the solar modules.

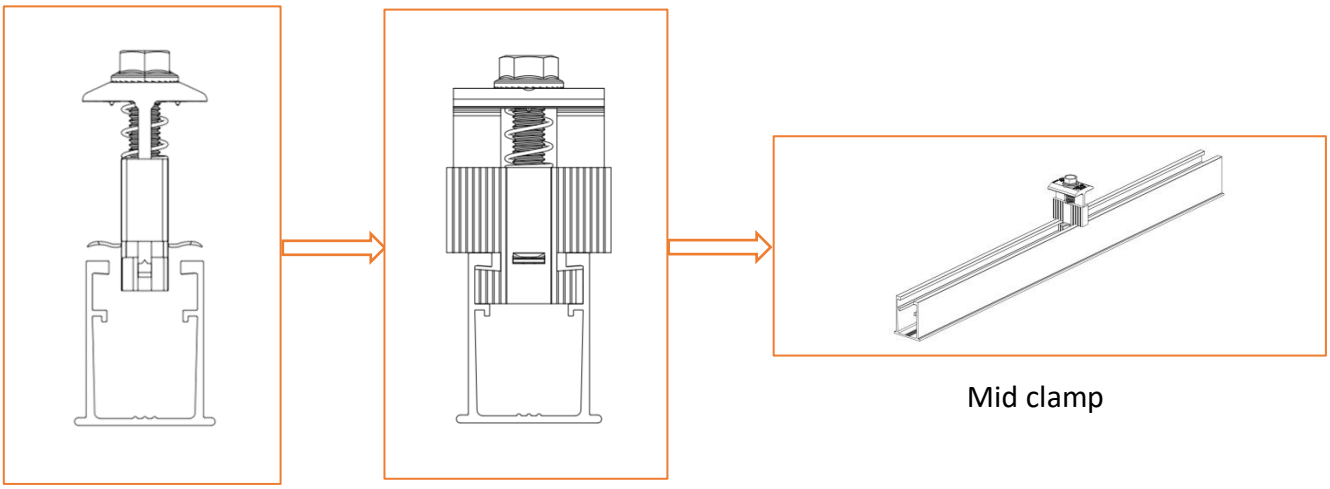
Note: The grounding nail of the mid clamp must press on the frame.

Note: The mid clamp can fit panel thickness from 30~40mm.

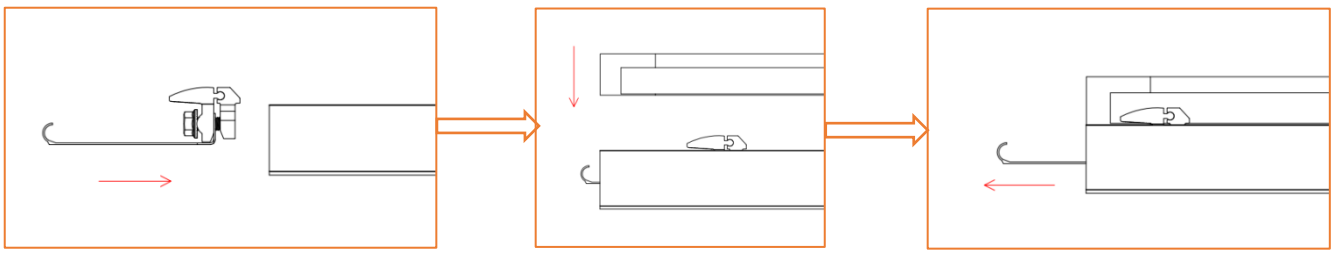


⑧ Place another solar module on the base, press it by another side of the mid clamp, adjust the module then using 1/2'' or 13mm socket to secure the bolt of mid clamp. The torque of the bolt is 13-15N.m

*Details about how to install the panel clamps

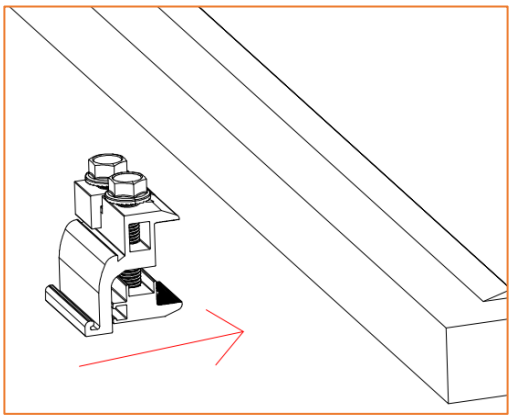


Mid clamp

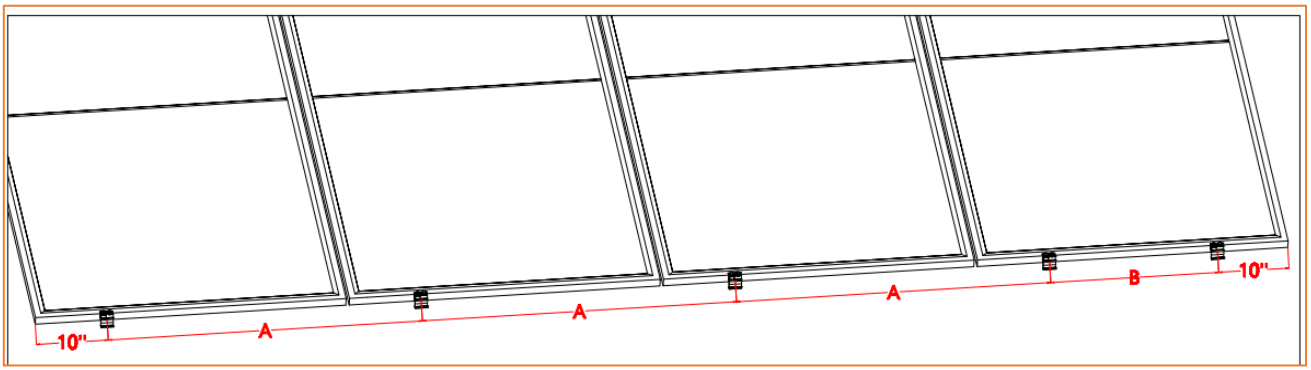


End clamp

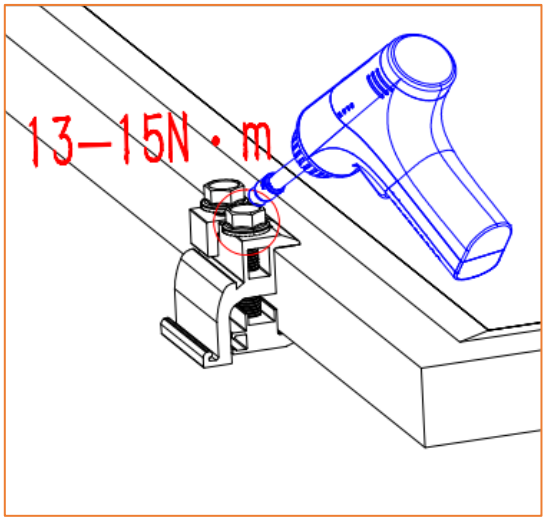
6.4 Installation of skirt



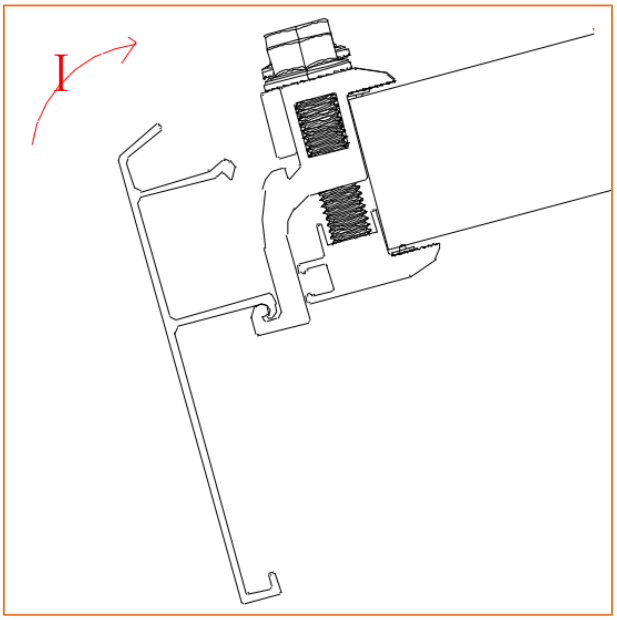
⑨ Assembly the skirt fastener clip on the frame of first row of solar panel, the skirt fastener can be used on the frame thickness from 30~40mm.

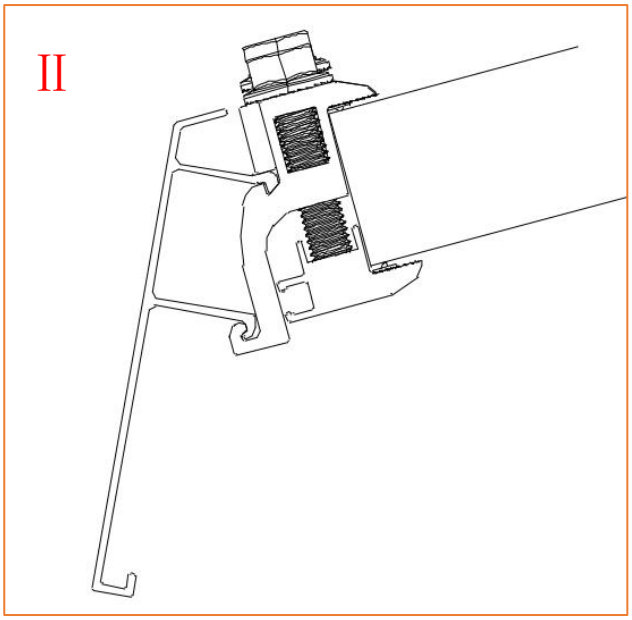


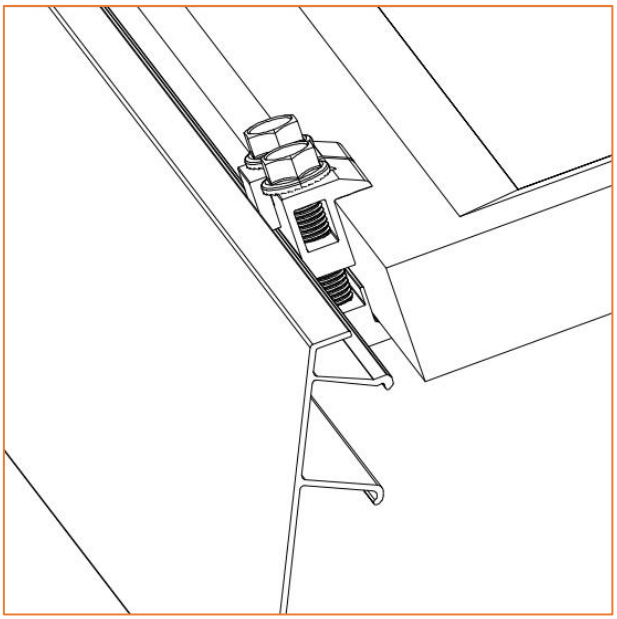
⑩ Adjust the position of the skirt clips , The distance from both ends of the panel to the nearest skirt clip is 10''. The space of other skirt clips is at most the width of the panel, which can be decreased if needed, such as Case B.



⑪ Secure the right bolt by 1/2'' or 13mm socket to prevent the clip from loosening and moving. The torque is 13-15N.m



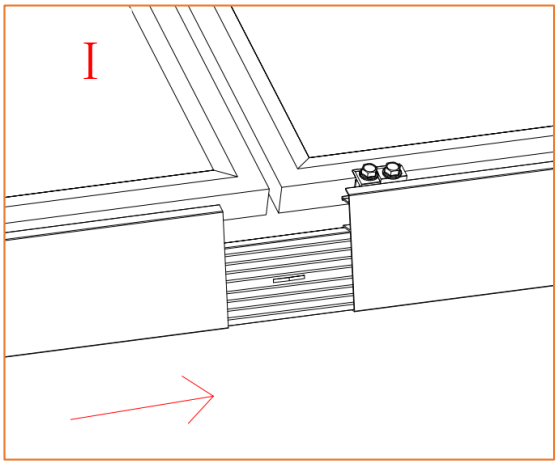


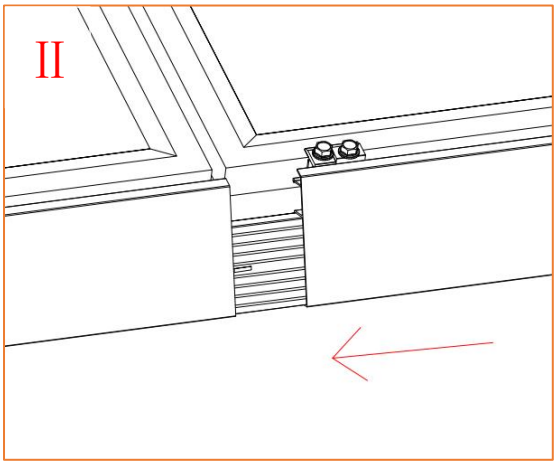


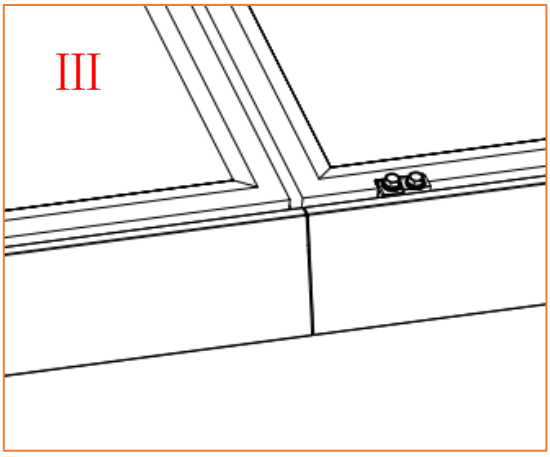
⑫ Tilt the skirt so that the central buckle fits perfectly with the bayonet at the lower end of the fastener.

Tilt the skirt again and buckle its upper end into the upper end of the fastener.

Note: Keep the middle buckle from sliding out when installing the upper buckle

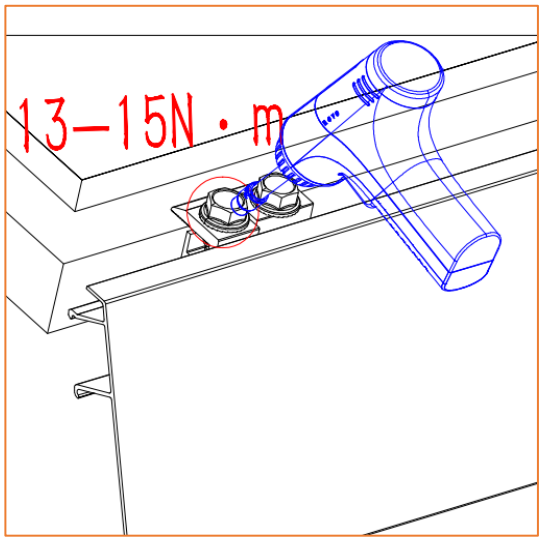




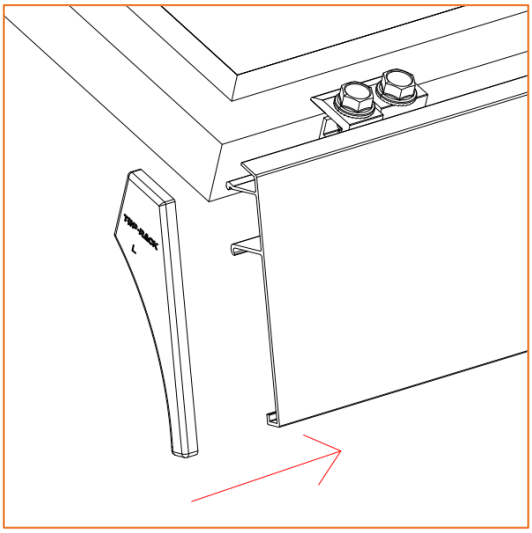


⑬ Adjust the skirt front of each panel, connect the two adjacent skirts with connectors.

Note: Insert the connector to the skirt channel until it reaches the anchor point.

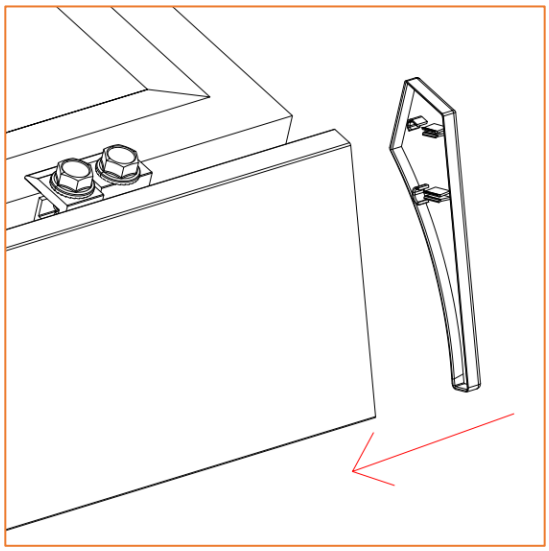


⑭ Secure the left bolt by 1/2'' or 13mm socket to ensure the skirt cannot be move anymore. The torque is 13-15N.m

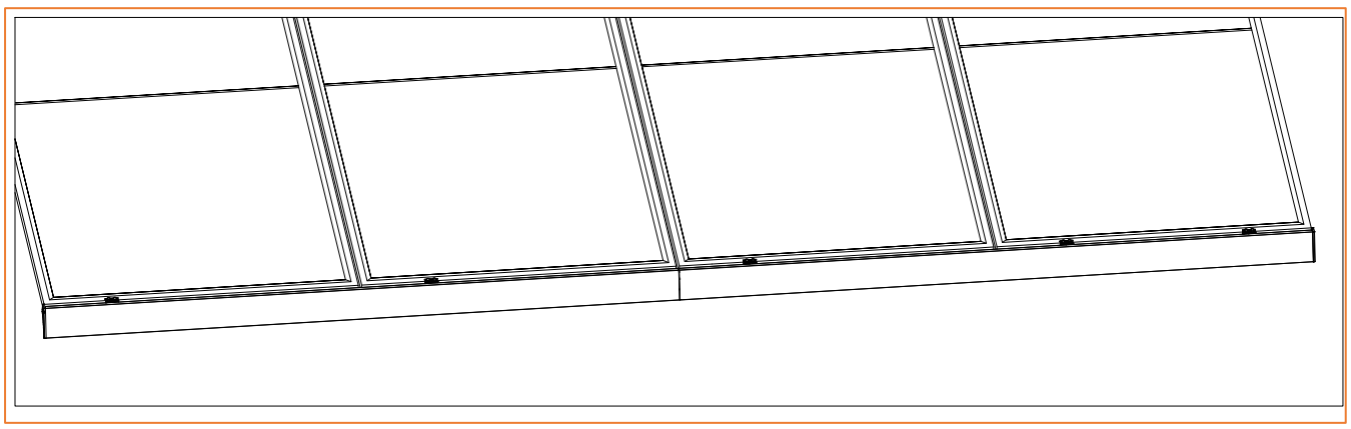


⑮ Cover two ends of the skirt with the end cap.

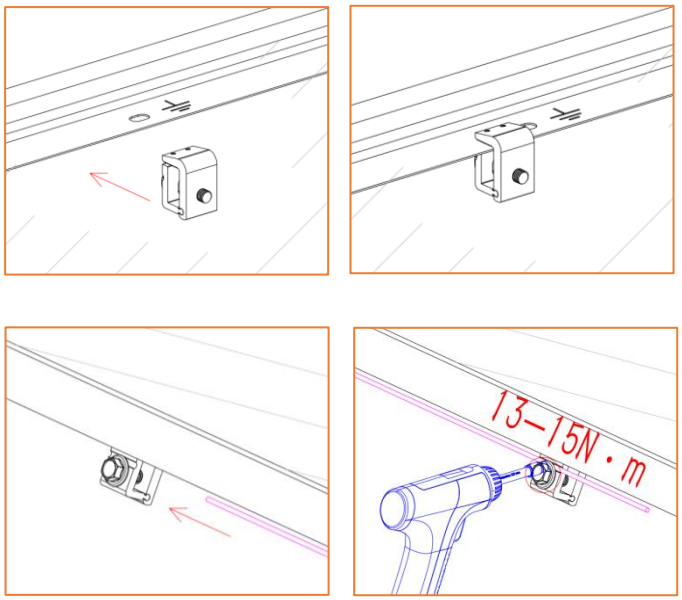
Note: The end cover needs to be distinguished from the left and the right.



Note: When cover the end cap, be careful not to scratch your hands



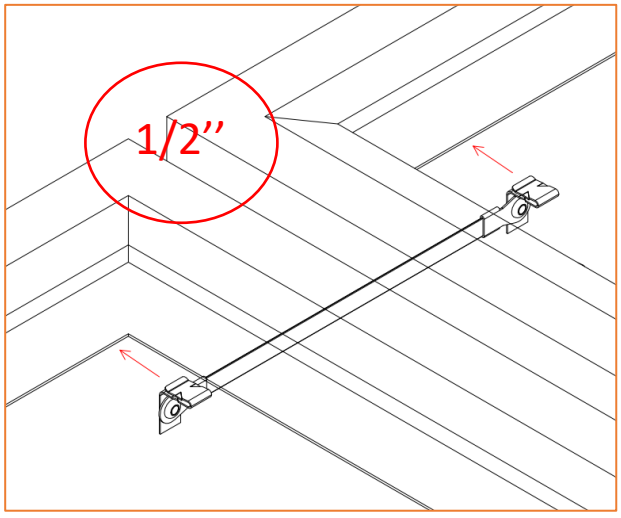
6.5 Installation of grounding lug and bonding jumper



⑯ Assembly the grounding lug on the solar panel frame by 1/2''or 13mm socket, with torque 8.8N.m.

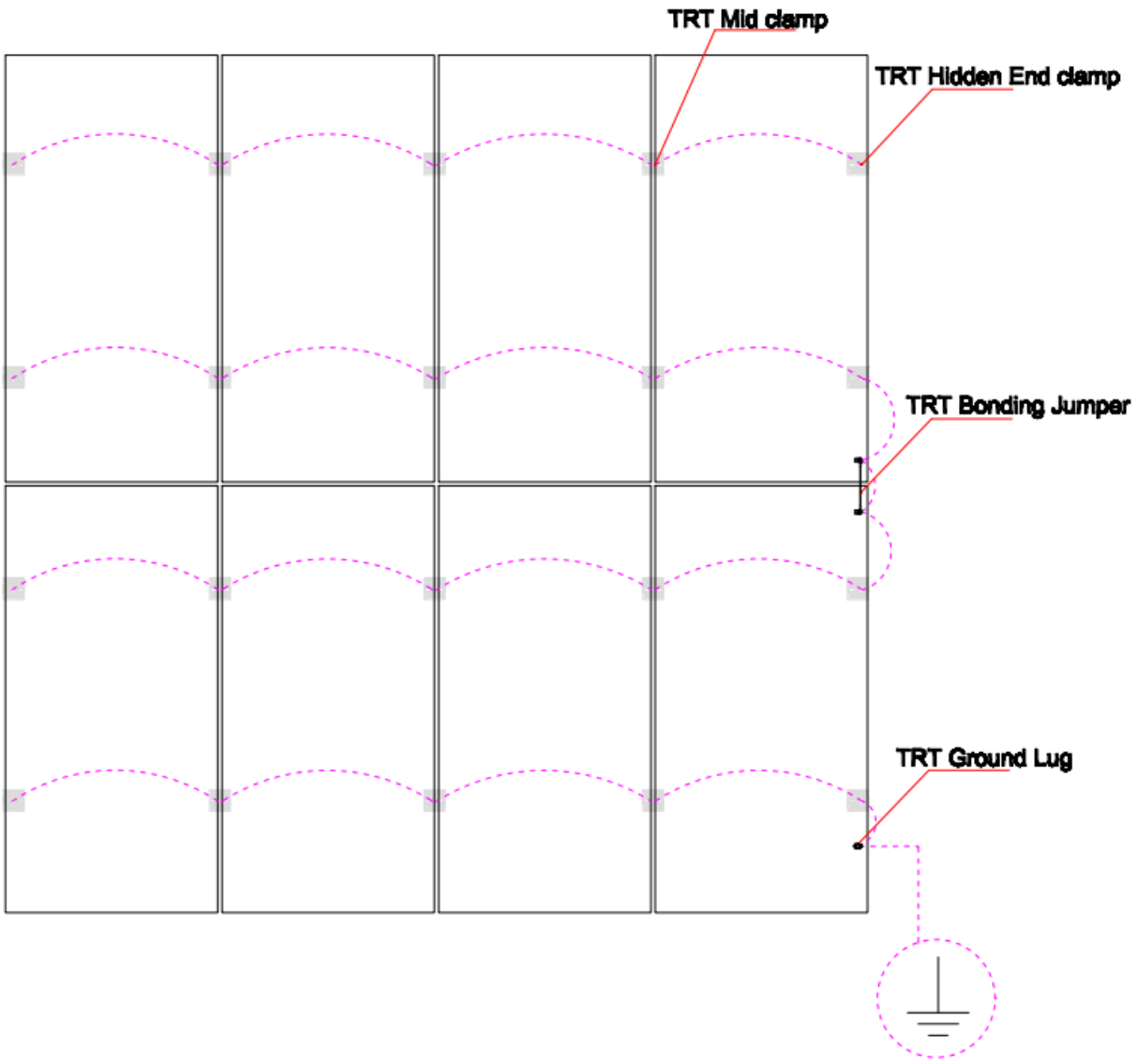
When the panel is struck by lightning, the current can be smoothly conducted to the grounding lug and conducted out through the copper wire because the grounding nails on the mid clamp, end clamp and on the grounding lug have pierced the oxide film on the aluminum frame.

Note：The grounding cable should be prepared by the installer.

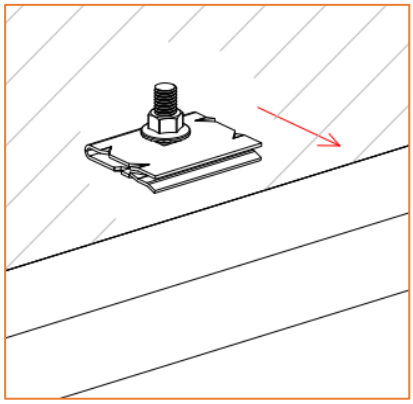


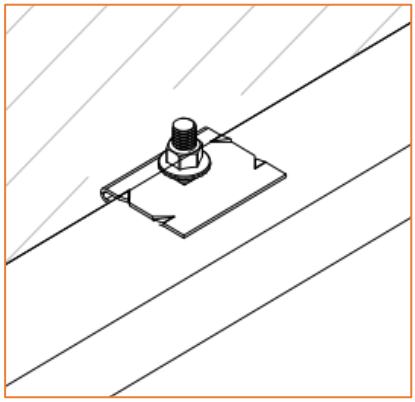
⑰ Using bonding jumper to connect the upper and lower row of panel, the teeth of the clip-on bonding jumper pierced the oxide film on the aluminum frame.

Note: The space between the upper raw and lower row of solar panel is 1/2''

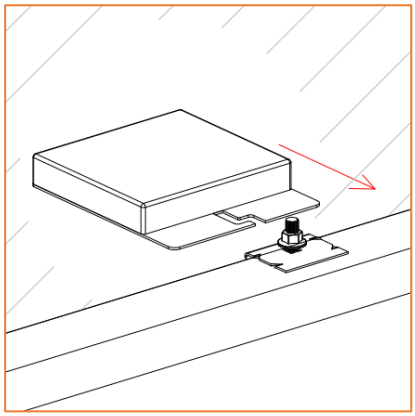

TRT Mid clamp
TRT Hidden End clamp
TRT Bonding Jumper
TRT Ground Lug

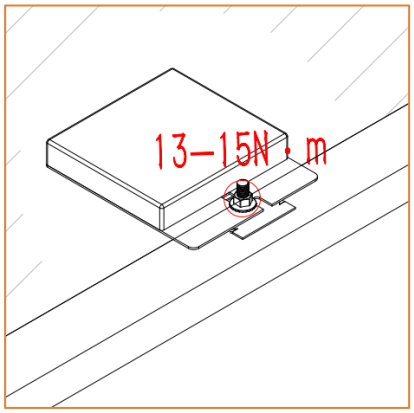
6.6 Installation of micro inverter



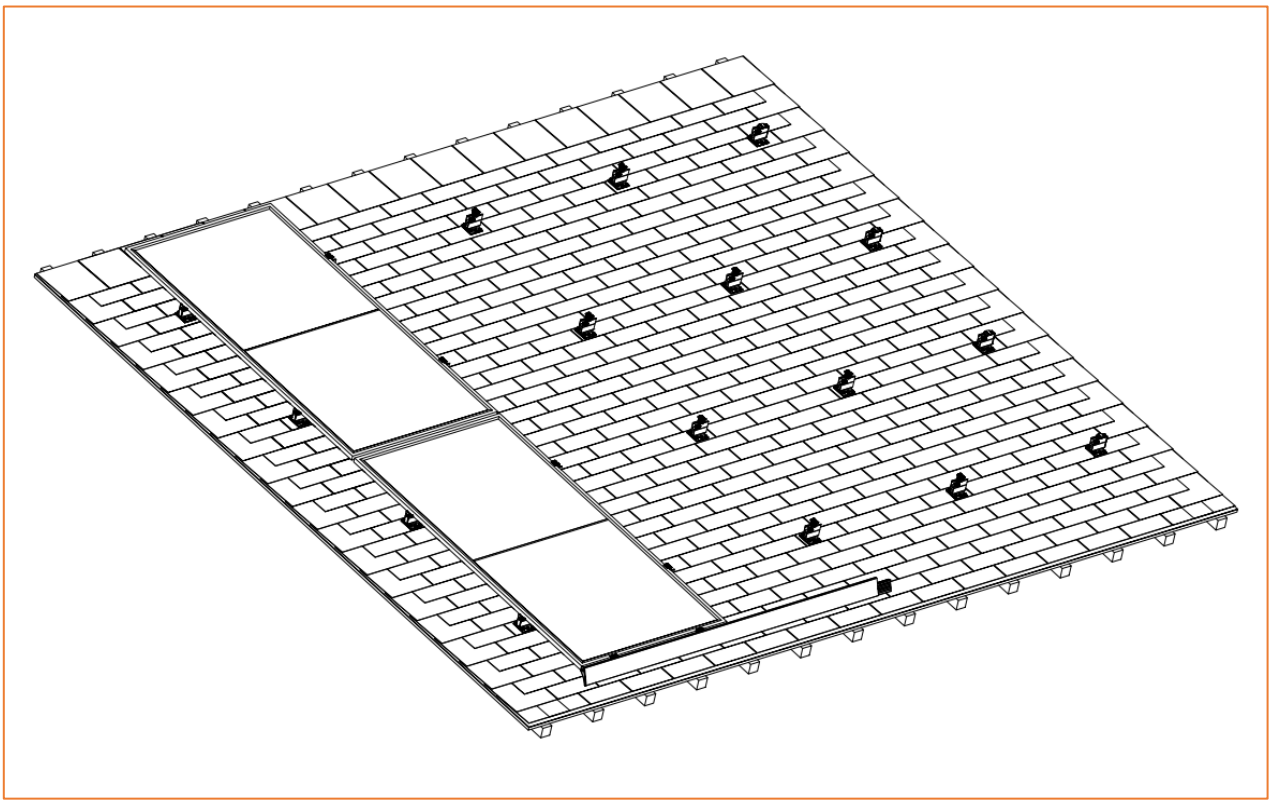


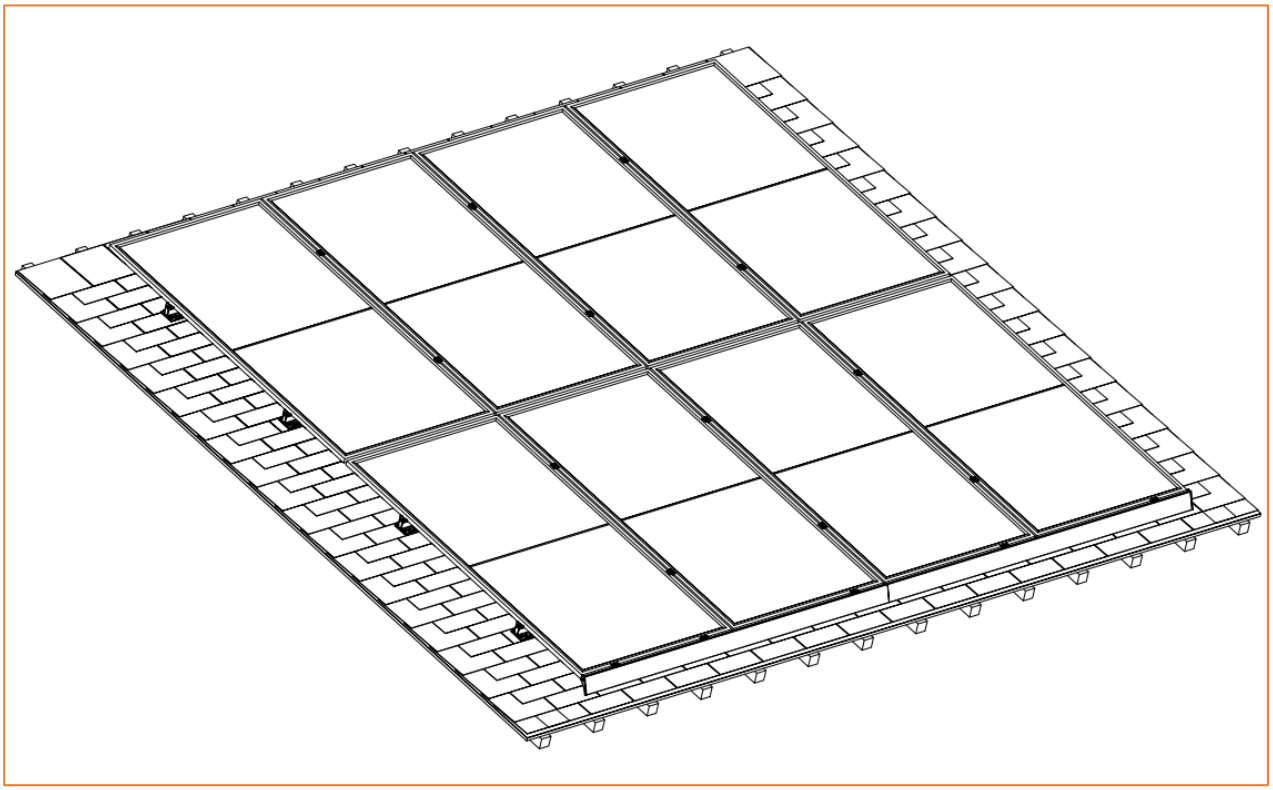
⑱ Clip the micro inverter racking on the solar panel frame. The steel teeth on the Micro inverter racking helps grounding.





⑲ slide the micro inverter til it through and under the flange nut. Tighten the bolt by 1/2’’or 13mm socket with a torque of 13~15N.m.





Thank you!

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