ÉNERGIE SOLAIRE
SOLAR ENERGY
DC inc.

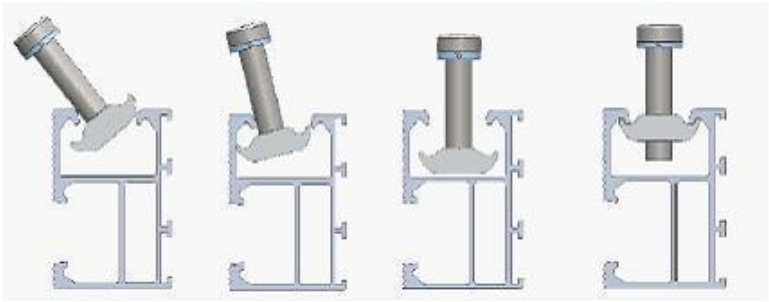
Solar Energy DC Inc Pitched Roof Solar Mounting System Installation Manual

Contents

Chapter	Subject	Page
1	General information	2
2	Safety and Installer Responsibilities	3
3	Technical Specifications	4
4	Tools for Installation	5
5	Components Description	7
6	System overview	9
7	Designing the module field	10
8	AS/NZS 1170 Compliance Assessment	11
9	Installation	20
10	Warranty	25

1. General Information

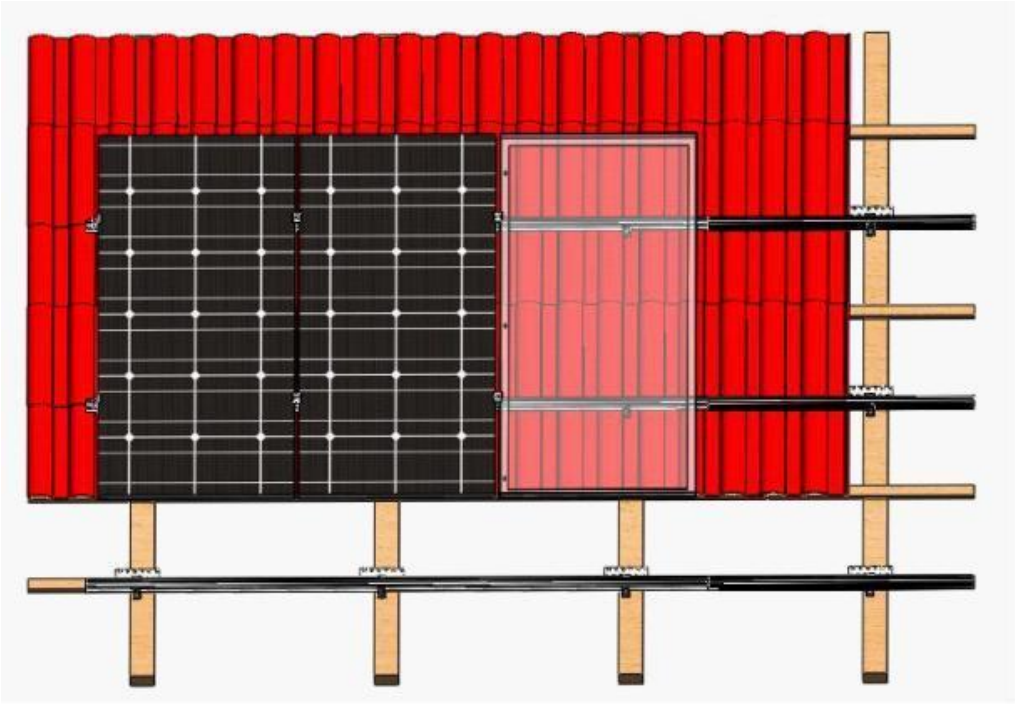
Thank you for choosing Solar Energy DC solar mounting system. Made from custom-built aluminum extrusions and components, Solar Energy DC's innovative design and improved frame strength greatly simplify solar panel installation. The easy 4 steps installation makes the Tilt-in modules able to be put into NSP Rail in any position quickly. So, the Tilt-in modules are pre-assembled with the clamp to save your installing time.



Tilt In Align Lock

Four Steps, Easy Installation!

Solar Energy DC's versatile design makes it suitable for a wide variety of building types and zones including residential, commercial and remote environments.



2. Safety and Installer Responsibilities

2.1. Safety and Installer Responsibilities

It is critically important that safety practices are observed when installing

2.1.1 Do not throw or roughly handle any Solar Energy DC components.

2.1.2 Do not bring Solar Energy DC system into contact with sharp or heavy objects.

2.1.3 Do not modify Solar Energy DC components in any way. The exchange of bolts, drilling of holes, bending or any other physical changes not described in standard installation procedure will void the warranty.

2.1.4 It is the installer's responsibility to verify the integrity of the structure to which Solar Energy DC components are fixed. Roofs or structures with rotten timber members, undersized timber members, excessively spaced timber members or rusted sheet metal, or any other unsuitable substructure cannot be used with Solar Energy DC components, and installation on such structures will void the warranty, and could result in death or serious injury.

2.1.5 It is the installer's responsibility not to overload the existing structures due to the weight and additional wind load (liplift) of installation.

2.2. Safety and Installer Responsibilities

2.2.1 REMEMBER average wind speeds are higher for structure mounted closer to the roof perimeter zone (edge). Refer to 'Fixing within Roof Installation Zone' for more information).

2.2.2 Make sure your installation complies with local and national building codes. Take into account relevant design parameters (wind speed, exposure and topographic factor) when determining the loading for the installation.

2.2.3 If alternative fasteners are used to fix the mounting to the roof (assuming supplied fasteners are unsuitable for any reason), all screw fasteners must conform to corrosion resistance Class 4 Standard and be of equal or greater strength to those supplied with your Solar Energy DC mounting system order.

3. Technical Specifications

3.1. Applications

3.1.1 Commercial and residential buildings

3.1.2 Marine applications and remote areas

3.2. Features

3.2.1 6005-T5 Aluminum extrusion

3.2.2 Innovative design of the Tilt-in modules, which can be pre-assembled with the clamp, making the installation easy and quick.

3.2.3 Suitable for different conditions and the most solar panels at present market.

3.2.4 Significantly higher strength-to-weight ratio than other mounting products, providing improved efficiency due to greater lifespans, inherent corrosion resistance resulting in low on-going maintenance and an extended product life.

3.2.5 Anodized finish

3.3. Materials

Materials	Tensile Strength	
	Ultimate	Yield
Extruded 6005-T5 Aluminum	260MPa	240MPa
Stainless Steel 304	670MPa	300MPa

3.4. Materials

Roof Slope	0°—60°
Building Height	up to 20m
Mounting Structure	Timber
Roof Types	Roman tile, Flat tile, Asphalt shingle/Slate tile, tin and irregular sheet metal,etc.
System Angles	Flushed with the roof

4. Tools for Installation

The following tools are required for installation:

No.	Tool Name	Usages/Notes	Pics
1	6 mm Allen key or hexagonal driver bit.	If using a 6mm driver bit, make sure the cordless power tool used for the driving has a hand-tight clutch setting a fine (soft) impact drive to prevent damage to the fragile glass panels and threads on the structure.	
2	Cordless drill	Drill or impact driver for driving roof material fixings,	
3	Angle grinder	For tile roof installation, and angle grinder fitted with a continuous edge diamond tipped tile cutting blade; gloves, hearing protection, a face protection mask, and a suitably rated breathing protection mask for all people in proximity of Grinding.	
4	open-end wrench	For fastening the bolts.	

No.	Tool Name	Usages/Notes	Pics
5	Power socket	For power connection	
6	Gloves	Protect hands from the hazard of the sharp corners.	
7	Spirit level	To maintain each row of rails in same level.	
8	Rule	For measuring lengths and positioning.	
9	Cord and color pen	Mark the installation position.	 
10	Timber/Wood board	If necessary to shim the roof hooks.	

5. Components Description

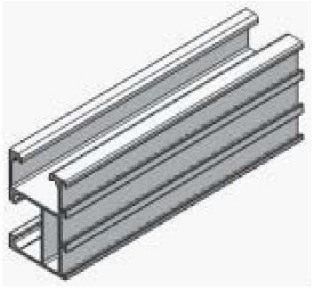
Rails :

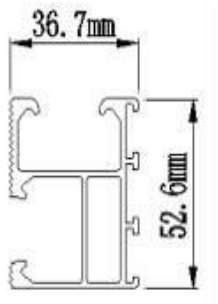
1.Material : 6005-T5 Aluminum.

2.Length : Customized.

3.Applicable : Framed modules in any sizes.

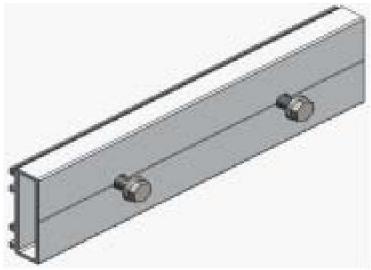
Module width (mm):	Standard rails (mm):
808~826	2560/3400
990~1020	4200





Rail splice kit :

1.To extend NSP Rail to any length as required by the quantity or width of the solar modules.



End Clamp Kit For Firmed Modules:

1.Hold the edge of each end panel
2.Fastened with a 6mm Allen key
3.Standard pre-assembly for the usual panels with thickness 30, 35, 40, 46, 50, 57mm

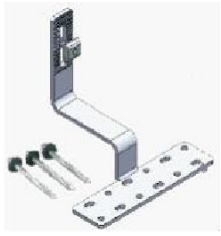
Inter Clamp Kit For Firmed

1. Fit between two panels
2. Fastened with a 6mm Allen key
3.Standard pre-assembly for the usual panels with thickness 30, 35, 40, 46, 50, 57mm

Roof Hooks :

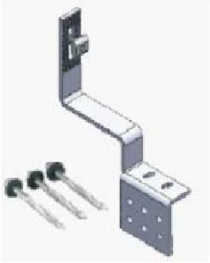
Stainless Steel Tile Roof Hook #1 :

1. Fix to the rafter below Roman tile roof
2. With Tilt-in module kit and lock washers.
3. Include 3pcs St6.3*14G*80 wood screws



Stainless Steel Tile Roof Hook #3 :

1. Fix to the rafter below Roman tile roof
2. With Tilt-in module kit and lock washers.
3. Include 3pcs St6.3*14G*80 wood screws

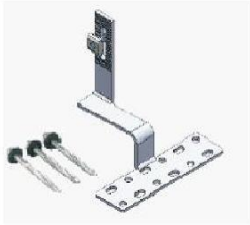


Stainless Steel Tile Roof Hook #4 :

1. Fix to the rafter below Asphalt shingle/Slate tile roofs.
2. With Tilt-in module kit and lock washers.
3. Include 2pcs St6.3*14G*80 wood screws

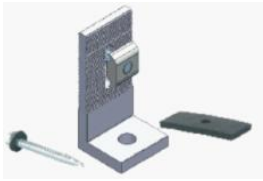
Stainless Steel Tile Roof Hook #5 :

1. Fix to the rafter below Roman tile roof
2. With Tilt-in module kit and lock washers.
3. Include 3pcs St6.3*14G*80 wood screws



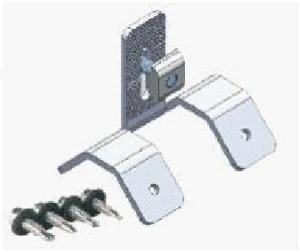
Tin Roof Hook L-Foot &T-Foot :

1. Fix to the purlin on tin roof
2. With Tilt-in module kit and lock washers.
3. Include 1pc St6.3*14G*80 wood screw & 1pc rubber pad

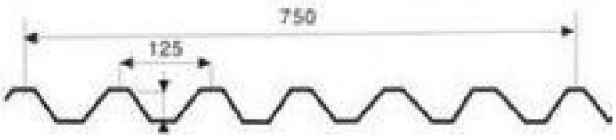


Stainless steel Trapezoid Sheet Metal Roof Hook Trapezoid-Foot :

1. Fix directly to Trapezoid sheet metal roof
2. With Tilt-in module kit &lock washers.
3. Include 4pcs St5.5*12G*25 self-taping screws.



NOTE: Trapezoid color steel tile hook is especially for tiles in fixed shape as left pic shows. Other shape cannot use it. Its Advantage is to be free from restrictions of supporting structures. The roofs use this hook are generally factory buildings, and their supporting structures are mainly in concrete ones. The spans between supporting beams are quite large which limit the hooks for rails and thus effect the stability of whole PV system. And this hook just solve this problem with fixing the hook tightly into the roofs by 4 screws.

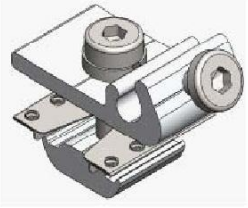


Grounding Clip :

1. Installed under 2 panels, to puncture the anodized cover on the surfaces of the rails, and realize the grounding function of the mounting system.

Grounding lug :

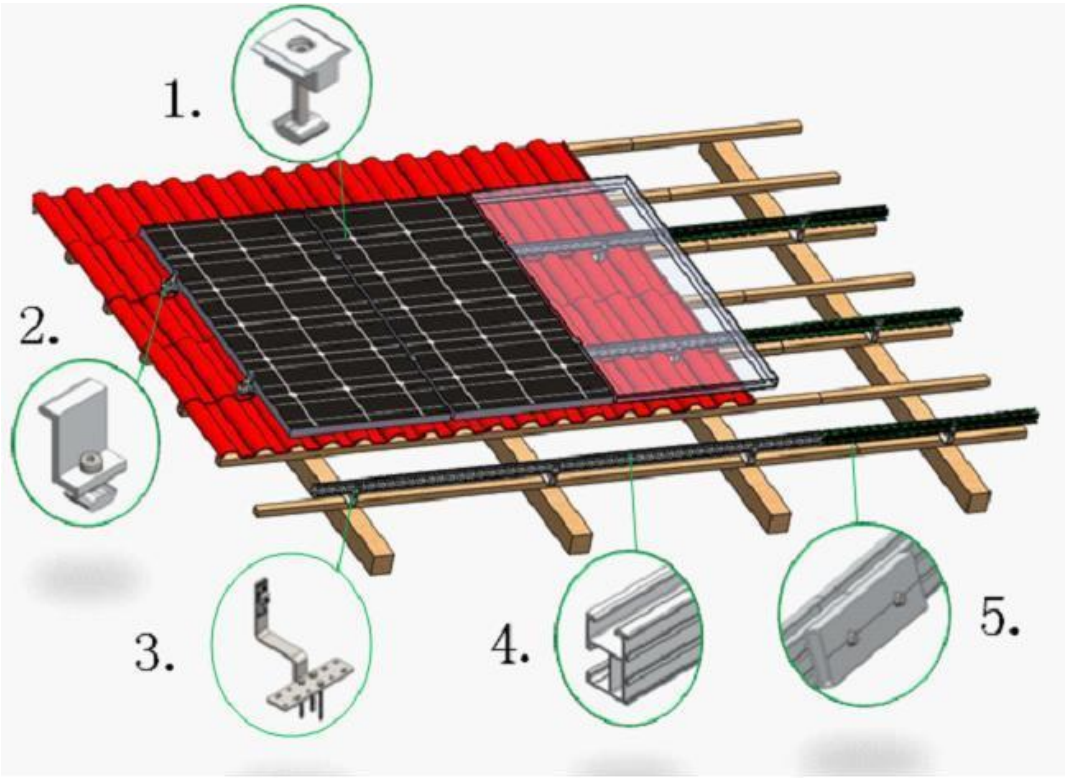
1. To connect grounding conductive wires.



6. System Overview

All components of the system are listed below.
The version and quantities of the parts can vary, depending of

# type of roof	# type of module
# Site specifications	# No. of module



1.Inter clamp kit

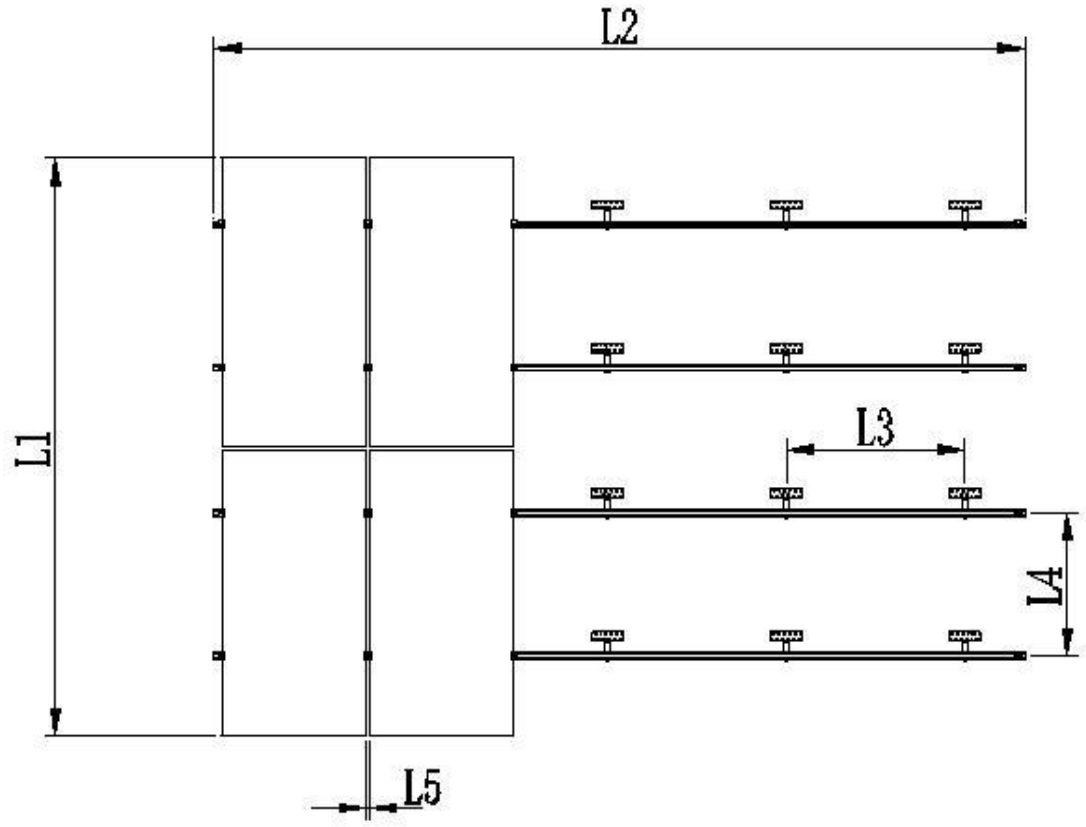
2.End clamp kit

3.Stainless steel hook 4.Rail

5.Rail splice kit

7. Module field planning

Below, the distances between roof connections for a portrait installation are specified. Clamp-on roof hooks need to be installed in specific distances, depending on the distance of rafters and the tolerance of conditions.



1. Height of the module field: module height x number of modules vertically
2. Width of the module field: NO. of modules horizontally x (width of the module+18 mm)+32 mm
3. Distance between roof connections vertically (according to the clamping points pre-defined by the module producer): Quarter-points of the modules, about 1/2 of module height.
4. Distance between roof connections horizontally: Depending on the distance between rafters and on the fixing requirements.
5. Distance between modules: 17 mm

When positioning the modules, please take into consideration that

- the values above are
- dimensions of tiles or other roof covering and the position of the rafters define the precise actual horizontal distance between roof connections
- the clamping points of modules defines the precise actual vertical distance between roof connections.

8.2. Determine the height of your installation site.

This document provides sufficient information for Newsunpower solar mounting system installation height less than 10 meters. If your installation site is more than 10 meters in height, please contact Newsunpower to obtain engineering data to support your installation.

8.3. Determine the maximum rail support spacing.

Please use the following table to determine NSP Rail support spacing for tile roof installations.

8.4. Verify acceptable rail end overhang

Rail end overhang must not exceed 50% of foot spacing and a maximum of 600mm.
Thus, if foot spacing is 1200mm, the rail end overhang can be up to 600mm.

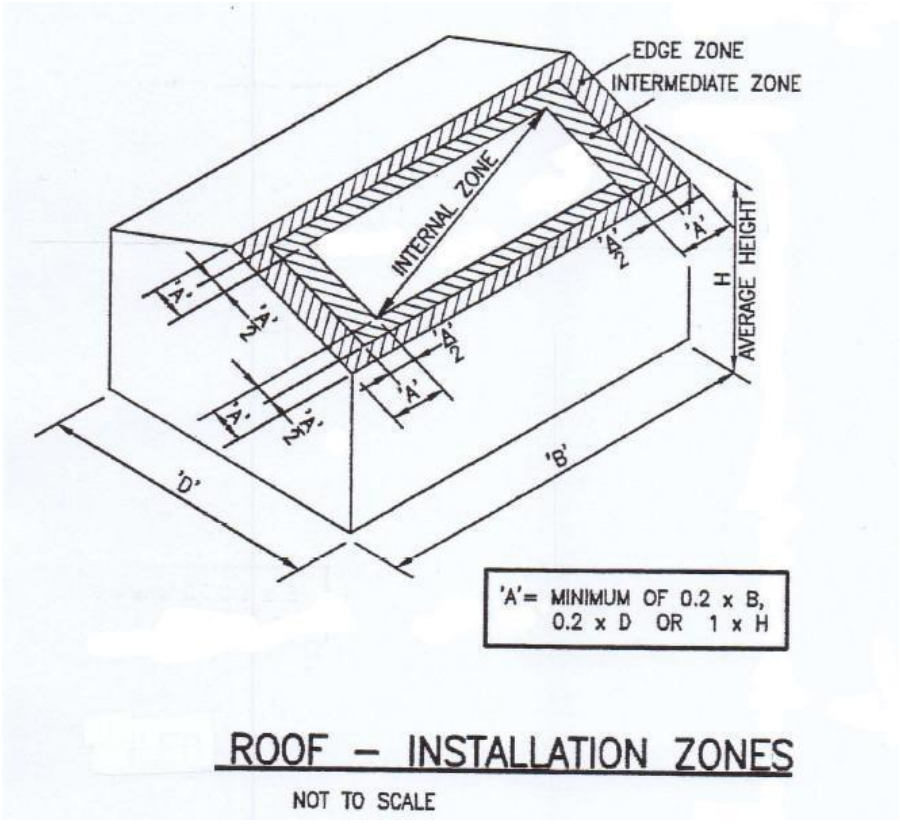
In this case, two feet can support a rail as long as 2400mm
{1200mm between the feet and 600mm of overhang at each end).

8.5. Determine roof slope

Solar Energy DC solar mounting system can be used for roof slope up to 60 degrees. Please verify the Installation site roof slope is between 10 degree and 60 degrees.

8.6. Determine roof installation roof areas

Solar Energy DC solar mounting system can be installed anywhere on a roof but fixing centers are required to be reduced at ridges and edges. The diagram below shows the area of higher wind loadings.

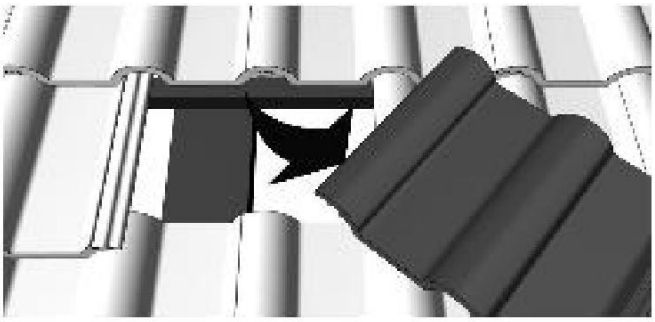


9. Installation

Tile Roof Hook Installation:

1. According to system planning, to determine the hooks installation directions and positions.

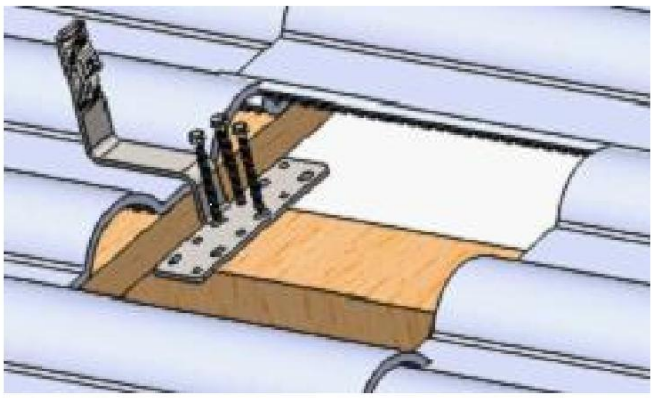
Move away the roof tiles at the marked position or simply lift them up slightly. (See right pic.)



2. Input the roof hook to the marked wooden beam.

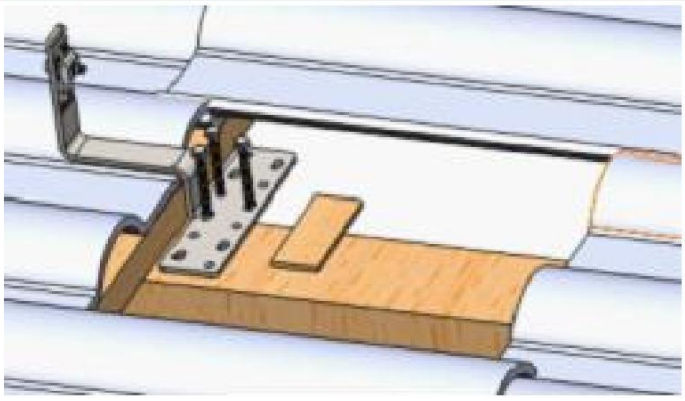
Fix the roof hooks with 3x wood screws (St6.3*14G*80) by Cordless drill.

(See right pic.)

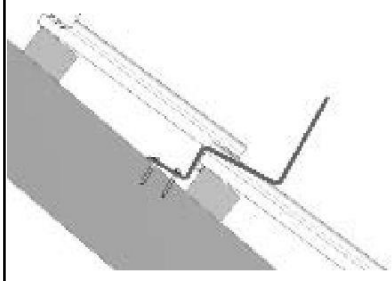


3. Where the beam which for supporting hook handle is too high for the hook to lean on, shim the roof hook with wood board till the corner of the hook handle is in same level with the tile.

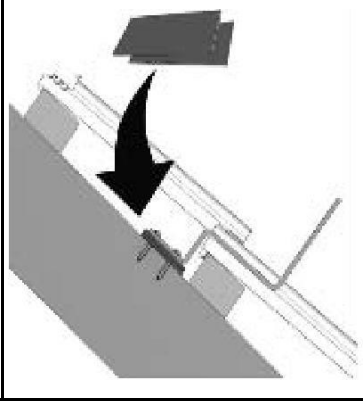
(See right pic.)



Wrong

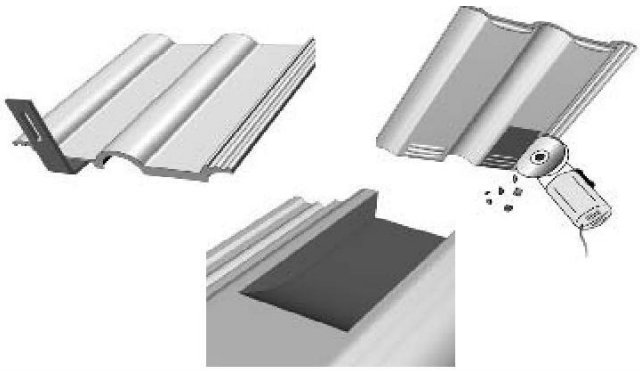


Correct

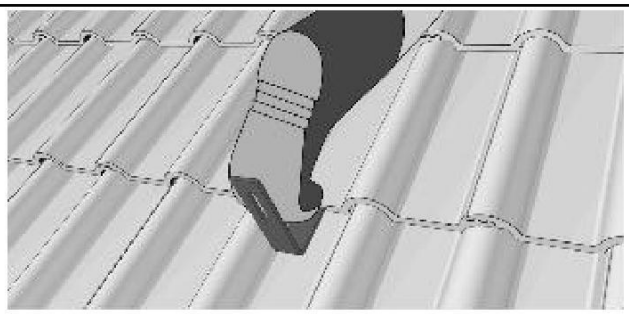


4. Where the roof tiles pose an obstacles to the hook or blocks the hook to get through, use an angle grinder/hammer to cut the extra part and make the hook handle can closely lean on the tile.

(See right pic.)

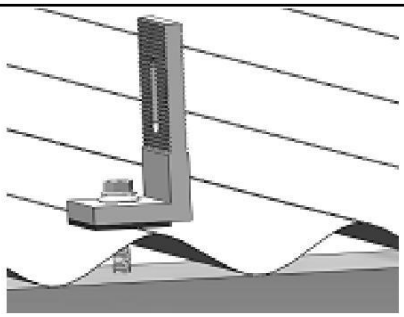


5. Caution! Do not step upon the installed hooks as a ladder since such extreme pressure could damage the tile below.
(See right pic.)



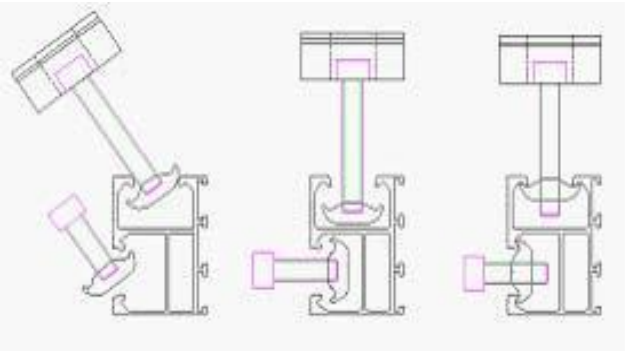
Tin Roof Hook Installation:

6. Mark roof hook installation points and use the Cordless drill to drill the wood screw through the point to fasten the L feet and rubber pad with the purlin.
(See right pic.)

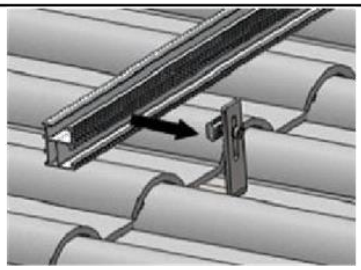
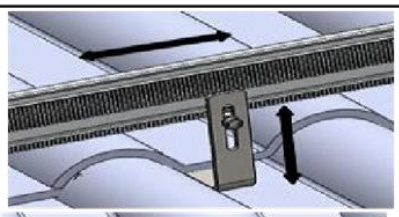
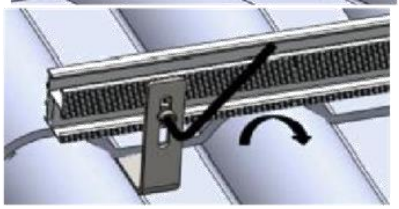
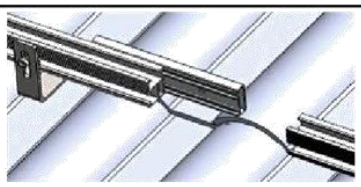
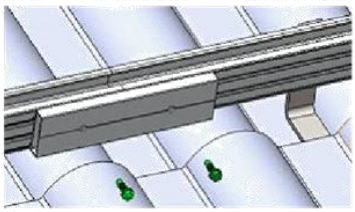
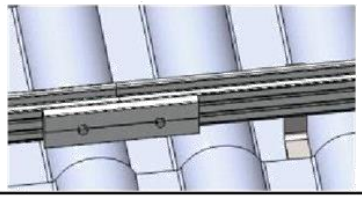
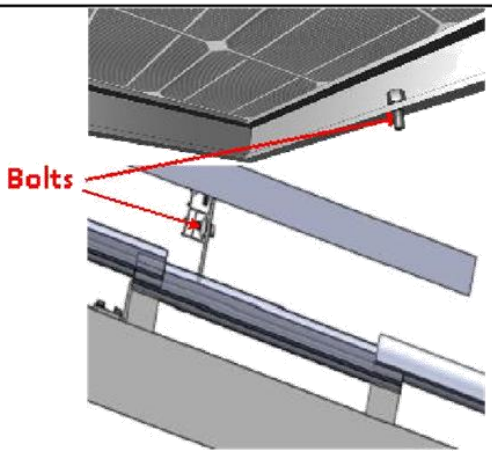


Rail Installation:

7. Four steps to quick mount the tilt-in module into NSP rail channel. To facilitate tilt-in module into NSP rail channel, please ensure the hexagon socket head bolt won't get through the bottom of the tilt-in module. Fixing tilt-in module in the rail and screw the bolt in 2-3 rounds slightly. For this time, bolt can still slide in rail freely, slide the bolt to the position where inner clamp kit, end clamp kit and hook will be installed, then fasten tightly with hexagonal driver bit. (Recommend torque force:8 N·m)
(See right pic.)



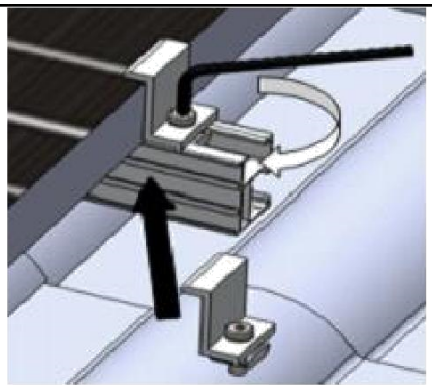
1110 Berlier Laval, H7L3R9 Bur - Off: 450-629-5009 / 1-855-6295009
www.solarenergydc.com

8. Always install from the shortest when the rails are not in the same lengths. Using M8X25mm hexagonal socket head bolt, locking washers, and tilt-in Module to install all rails on the hooks (Do not fasten in order to facilitate the adjustment of rails later on).(See right pic.)	
9. To adjust rails position. Take advantage of the loose connection between long hook hole, tilt-in module and hexagonal socket head bolt to adjust the rails in horizontal and vertical directions. When the position of rails are well adjusted, fasten the hexagonal socket head bolts with hexagonal driver bit. (See right pic.)	 
10.To install rail splice kit. When rails are not long enough, rail splice kit can be used to connect multiple rails together. When connecting, slide half of splice to one rear side of the pre-assembled rail, then put next rail into the other side of the splice kit. When come together, fix 2 hexagonal socket head bolts into the rail splice with cordless drill. (See right pic.)	  
Solar Module Installation:	
11. Before the installation of solar modules, an anti-lip protection should be installed on the bottom row of modules for the security. Therefore, bolts are required to be fastened on holes near the bottom frame of the module. Such protection can prevent the modules from dropping. Refer the right picture to for the details. (See right pic.)	

1110 Berlier Laval, H7L3R9 Bur - Off:
450-629-5009 / 1-855-6295009
www.solarenergydc.com

12. To install end clamp kit.

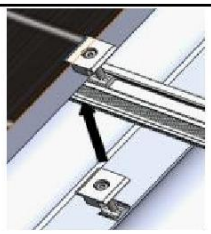
Slide the end clamp kit, firmly stick to the side of module, then use the hexagonal driver bit to fasten the bolt.
(Recommend torque force:8 N·m)
(See right pic.)

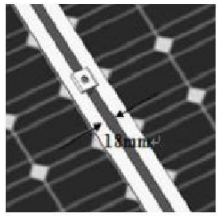


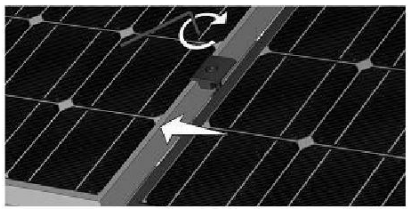
13. To install inter clamp kit.

Slide the inter clamp kit between 2 modules into the right position, then use the hexagonal driver bit to fasten the bolt.

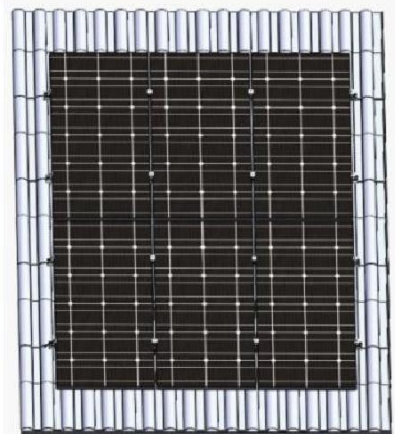
(Recommend torque force:8 N·m)
(See right pic.)







14. Complete the installation of the whole pitched roof solar mounting system.
(See right pic.)



1110 Berlier Laval, H7L3R9 Bur - Off: 450-629-5009 / 1-855-6295009
www.solarenergydc.com

Grounding System Installation:

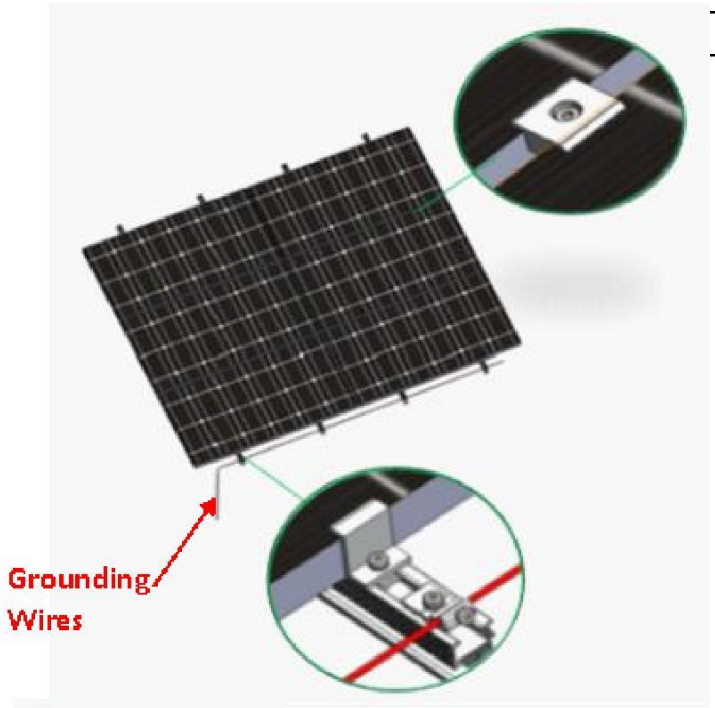
15. To install the grouding system. To order to protect the mounting system from lighting strike, grounding device need to be installed on.

First, install grounding clip on inner clamp kit and end clamp kit respectively;

Next, fix grounding lug kit on end of every row of rails;

Last, connect the conductive wires on the grounding lug, with clamp kit to finish the connection of the mounting system with the ground.

(See right pic.)



Grounding Lug Kit

End Clamp Kit

Grounding Lug

Inter Clamp Kit

Grounding Clip

ÉNERGIE SOLAIRE
SOLAR ENERGY DC inc.

10. Warranty

25 years Long Lifespan, 10 years Quality Warranty, 5 years After-service!

Solar Energy DC., Ltd warrants here a 5 years security of no shedding and no cracks on the surfaces for its Anodized Solar Panel Mounting System and a 25 years Long Lifespan with 10 years Quality Warranty and 5 years After-service for its other all Solar Panel Mounting System on the terms set out in this warranty. The warranty period is valid from the date on which the mounting system is purchased from Solar Energy DC company. And this warranty is applicable to all its installers/installing companies, general regional agents/distributors, and wholesalers.

In the event that the system does not conform to this warranty during the Warranty Period Solar Energy DC will, at its option, either repair or replace the mounting system or pay the cost of having the mounting system repaired or replaced. To the extent permitted by law, Solar Energy DC 's total liability under this warranty will in no circumstances exceed the repair or replacement of the mounting system or payment of the cost of having the mounting repaired or replaced. In the event of replacement of the mounting system, any remaining part of the Warranty Period will be transferred to the replacement mounting system.

This warranty will not apply to any defect or damage to the mounting arising directly or indirectly from:

1. Shipment or storage of the mounting system;
2. Improper installation, maintenance, repair or use of the mounting;
3. Normal wear and tear;
4. Misuse, neglect, abuse, accidental damage or modification to the mounting system;
5. Failure to observe the instructions set out in the Installation Manual; or
6. Power failure, power surges, lightning, fire, explosion, flood, extreme weather conditions, environmental disasters or other causes outside Solar Energy DC 's control, as determined by Solar Energy DC in its sole discretion.

This warranty does not cover, and under no circumstances will Solar Energy DC be liable for, any costs associated with the removal, shipping, handling or re-installation of the mounting system or the costs of sending personnel to any site to repair or replace the mounting system.

This warranty is only applicable for Solar Energy DC's solar panel mounting system. Where other products such as solar modules and flashing are used with Solar Energy DC r's mounting system when installing, covering warranty should be required from the related suppliers.

This warranty is only provided to the original purchaser of the Solar Energy DC panel mounting system (Purchaser) or, where the Purchaser is an installer or builder who on-supplies the mounting system to another

party, to that other party (End-User). This warranty is not transferable.

Where an End-User wants make a claim under this warranty, the End-User must in the first instance contact the installer or builder from whom the mounting system was purchased.

This warranty will not apply to any claims received by Solar Energy DC after the expiration of the Warranty Period. Solar Energy DC makes no warranties, express or implied, other than the warranties made herein and specifically disclaim all other warranties, representations and conditions to the extent permitted by law. To the extent permitted by law, in no circumstances will Solar Energy DC be liable for direct, indirect, special or consequential damages arising from a defective mounting system or for any damage or injury to persons or property. Solar Energy DC 's aggregate liability, if any, in damages or otherwise, will not exceed the invoice value of the mounting system at the time of purchase from Solar Energy DC

Any provision contained in this warranty which is prohibited or unenforceable in any jurisdiction will be deemed to be ineffective to the extent of such prohibition or unenforceability and will not invalidate the remaining provisions nor affect the validity or enforceability of that provision in any other jurisdiction.