

# **RED-DOT-RACK ROOFTOP RACKING INSTALLATION MANUAL**

1.	OVERVIEW.....	3
2.	PRODUCT RANGE.....	4
2.1	Range of Rooftop Components .....	4
3.	Packaged Rooftop Mounting Systems.....	5
4.	PREPARATION FOR INSTALLATION .....	6
4.1	Applications .....	6
4.2	Tools for Installation .....	6
5.	PLANNING THE INSTALLATION .....	7
5.1	Site Locations.....	7
5.2	Building / Installation Height .....	8
5.3	Solar Panel Layout .....	8
5.4	General Installation Notes .....	9
5.5	Fastening Torque of Bolts.....	9
6.	INSTALLATION MANUALS .....	10
6.1	L-Bracket Mounting Instruction.....	10
6.2	Hanger Bolt Instruction.....	11
6.3	Tile Hook Mounting Instruction.....	12
6.4	Adjustable Tile Hook Mounting Instruction.....	13
6.5	Compression Coupling Bracket Mounting Instruction .....	14
6.6	Bracket Spacing Guidelines.....	15
6.7	Rail Fastening Instruction .....	17
6.8	Rail Splice Instruction.....	17
6.9	Solar Panel Module Installation.....	18
6.10	End Clamps.....	18
6.11	Mid Clamps .....	19
6.12	Thin Film clamps .....	20
7.	GROUNDING COMPONENTS.....	22
7.1	Mid Clamp Earthing Washer .....	22
7.2	Earthing Lug .....	22
8.	CONTACT DETAILS.....	24

# 1. OVERVIEW

Thank you for choosing RED-DOT-RACK for supplying your solar mounting systems. RED-DOT-RACK mounting systems have been designed using the highest quality materials and engineering expertise in their design and manufacture.

All of RED-DOT-RACK rooftop mounting systems can be used in a wide range of installation locations such as; rural, industrial, commercial or residential. The mounting systems can be installed in coastal areas with corrosive environmental conditions and regions with cyclonic winds when installing the system in compliance with the guidelines in this manual.

All products come backed with a 12-year warranty as subject to the terms and conditions in the RED-DOT-RACK product warranty document.

## Safety Instructions

- Installation of the mounting systems should be performed by a trained professional only. Poor installation methods can result in damage to the solar plant and the existing building structure and may present a risk to others.
- There is a risk of falling when working at heights such as a building rooftop. Safety regulations must be implemented and followed including the provision of safety equipment for all workers, securing the installation site and installing signage to warn people of the risks in the area.

The installer is solely responsible for:

- Complying with all applicable local and national building codes;
- Ensuring that all products used in the installation are appropriate for the particular installation type and location;
- Ensuring that the existing building and roof structure provides the load bearing capacity for installing the entire solar PV system including mounting systems, modules and electrical equipment under live building load conditions;
- Ensuring only RED-DOT-RACK parts are used in the installation of the mounting hardware. Substitution of third party products may lead to a failure in the RED-DOT-RACK system and void any warranty claims;
- Maintaining the watertight integrity of the roof;
- Ensuring safe installation of all components of the system
- Verifying that other loading factors including water, ice, snow and seismic loads do not affect the installation.

## 2. PRODUCT RANGE

RED-DOT-RACK offers a wide range of rooftop solar mounting systems to allow for the installation of solar on almost any type of roof surface in the world. Rooftop mounting systems cover applications for both flat and raised installation on pitched metal roof and for flat concrete slabs. RED-DOT-RACK provides all the components you need to successfully install your system in any part of the world.

### 2.1 Range of Rooftop Components

 <p>L-Bracket</p>	 <p>Portrait Tile Hook</p>	 <p>Landscape Tile Hook</p>
 <p>Earthing Washer</p>	 <p>Earthing Lug</p>	 <p>T-Bolt Connector</p>
 <p>Adjustable Mid Clamp</p>	 <p>Adjustable End Clamp</p>	 <p>Rail Splice</p>
 <p>KlipLok 700 Bracket</p>	 <p>KlipLok 406 Bracket</p>	 <p>V 600 Bracket</p>
 <p>Rail: 2100mm, 4200mm, 5200mm</p>	 <p>KlipLok EPDM Rubbers</p>	 <p>Hanger Bolt</p>

### 3. Packaged Rooftop Mounting Systems

In addition to the loose order components available, Red-Dot-Rack also offers the pre-packaged Red-Dot-Rack™ available in modular kits to suit all 2, 3 and 4 panel installations and to suit either tin or tile roofs.

Each kit comes with 2 rails and enough mounting components to suit most applications. Additional components are available as individual purchase items to adapt the kit to suit high wind and/or cyclonic regions.

To review which components your kit includes please refer to the Red-Dot-Rack price list with the Packaged Kit Code specified in the table below.

Regardless of the components available in your kit, always ensure that your kit is installed in accordance with the bracket spacing guidelines provided in this manual.

<b>Packaged Kit Code</b>	<b>Red-Dot-Rack Kit Description</b>	<b>Rail Lengths Included</b>
400-0001	4 Mod Tile Roof	2 x 4200mm
400-0002	3 Mod Tile Roof	2 x 3200mm
400-0003	4 Mod Tile Roof with Earthing	2 x 4200mm
400-0004	3 Mod Tile Roof with Earthing	2 x 3200mm
400-0006	4 Mod Tile Roof with Earthing	4 x 2100mm
401-0001	4 Mod Tin Roof	2 x 4200mm
401-0002	3 Mod Tin Roof	2 x 3200mm
401-0001	4 Mod Tin Roof	4 x 2100mm
401-0003	4 Mod Tin Roof with Earthing	2 x 4200mm
401-0004	3 Mod Tin Roof with Earthing	2 x 3200mm
401-0006	4 Mod Tin Roof with Earthing	4 x 2100mm

## 4. PREPARATION FOR INSTALLATION

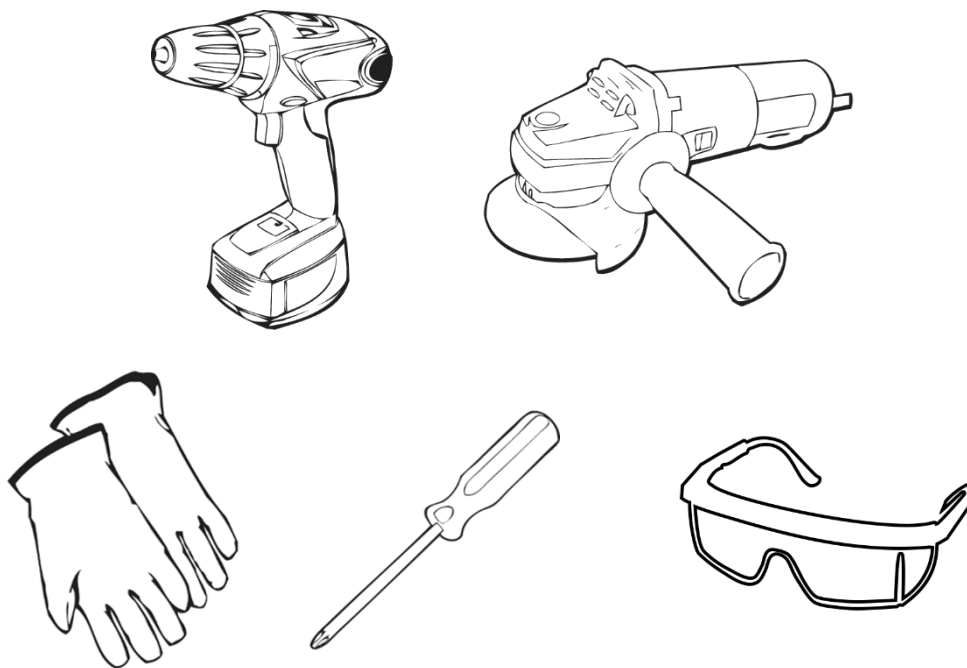
### 4.1 Applications

All RED-DOT-RACK rooftop mounting systems are designed for installation on residential and commercial buildings in urban and rural locations.

The RED-DOT-RACK product range is designed for mounting solar modules onto flat or pitched steel rooftops, tile rooftops and concrete slab rooftops.

### 4.2 Tools for Installation

You will need the following tools for installing the Red-Dot-Rack rooftop solar mounting systems.



1. Cordless drill
2. Grinder with stone disk (for tile roof installation only)
3. Protective gloves and clothing
4. Protective eyewear
5. Screw drivers, including Phillips head driver and Torx head

## 5. PLANNING THE INSTALLATION

Red-Dot-Rack rooftop mounting systems have been developed in accordance with Australian standards AS1170.2 to suit a wide range of roof types and environmental conditions around the world. Guidelines for installing fixtures for different systems are provided in this installation manual. Should your system requirements fall outside of the guidelines provided, please contact a Red-Dot-Rack expert before proceeding with the installation.

### 5.1 Site Locations

Locations in Australia are subject to different wind structural loadings in accordance with the requirements identified in AS 1170. Red-Dot-Rack rooftop mounting systems have been designed to be installed in most areas in Australia where installations are located in Regions A and B. This includes all major city and suburban regions of Sydney, Melbourne, Brisbane, Adelaide, Canberra, Hobart and Perth. See figure 1 for wind areas.

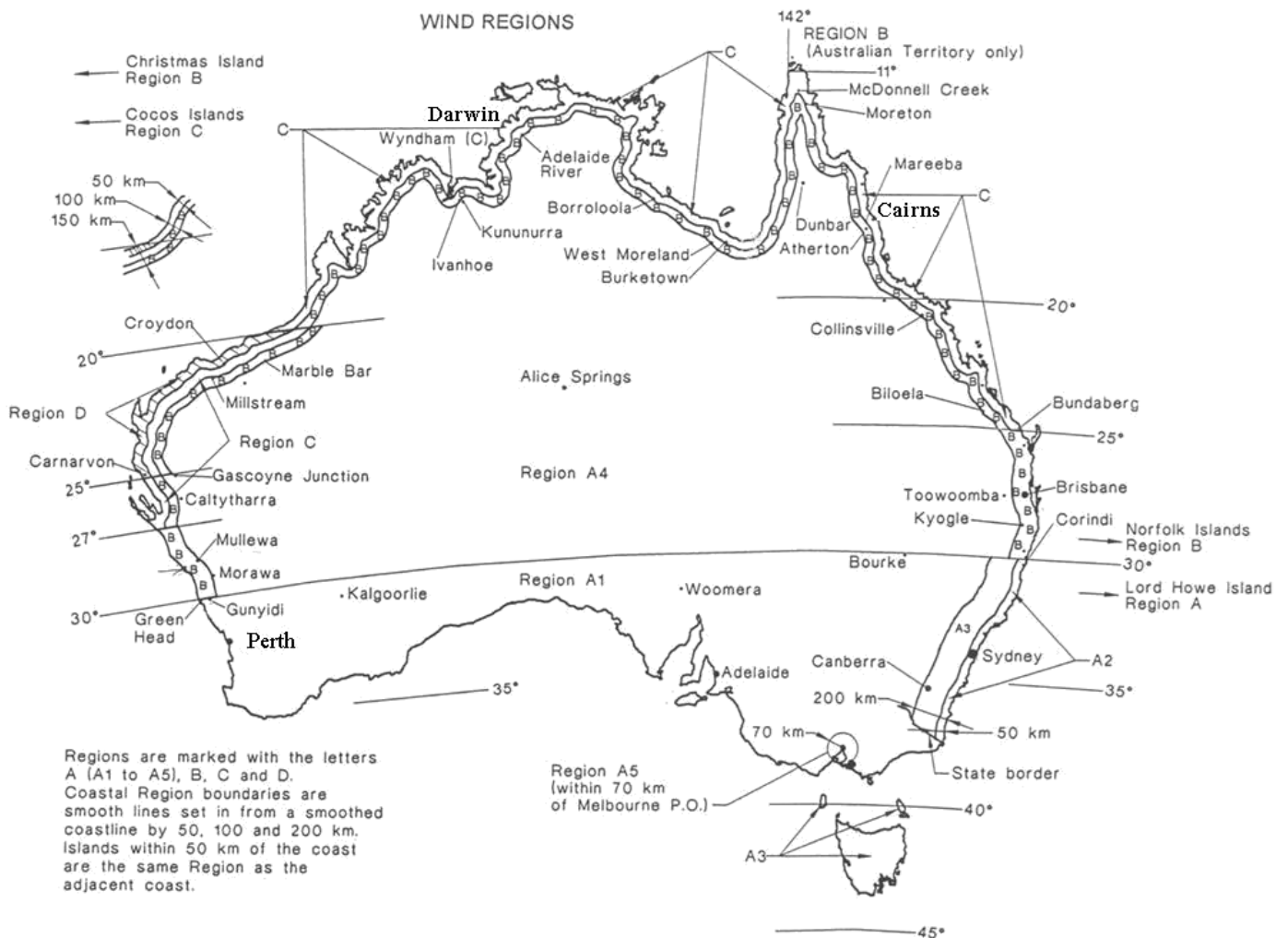


Figure 1 - Wind Regions - Australia AS 1170

## Installing in Wind Regions C and D

Installing Red-Dot-Rack™ in Cyclonic regions identified as wind Region C and Region D will require the purchase additional mounting brackets to ensure the installation meets the structural guidelines. To determine the quantity of additional mounting brackets required refer to **Section 5.6 Bracket Spacing Guidelines** which states the maximum allowed bracket spaces.

Additional mounting brackets will also require additional T-Bolts (one per mounting bracket) for assembling to rails and may require additional screws for fastening to the roof surface. Be sure to review the installation steps for your selected mounting bracket to determine which additional components are required for your installation.

## 5.2 Building / Installation Height

The Red-Dot-Rack™ has been designed specifically for single storey, 2 storey and commercial buildings up to a maximum height of 20 m above the ground.

If you are intending to use the Red-Dot-Rack™ for installations higher than 20 m above ground level you may need to purchase additional Red-Dot-Rack™ mounting components. Please contact a Red-Dot-Rack™ technician directly for more information on these types of installations.

## 5.3 Solar Panel Layout

The Red-Dot-Rack™ is a modular system to which a range of solar panel modules can be mounted. The Red-Dot-Rack™ clamps the solar panel modules to parallel rails that are aligned with and tied structurally to the existing roof structure.

Solar panels installed with the Red-Dot-Rack™ must follow the exclusion zone rules of 200mm or a distance of  $2xS$  from the edge of the roof, whichever is greater, where  $S$  is taken as the distance between the underside of the solar panel and the roof surface. (e.g. if the solar panel is mounted 150mm off the roof then an exclusion distance of 300mm shall apply). See Figure 2 for the sectional view of the Exclusion Zone.

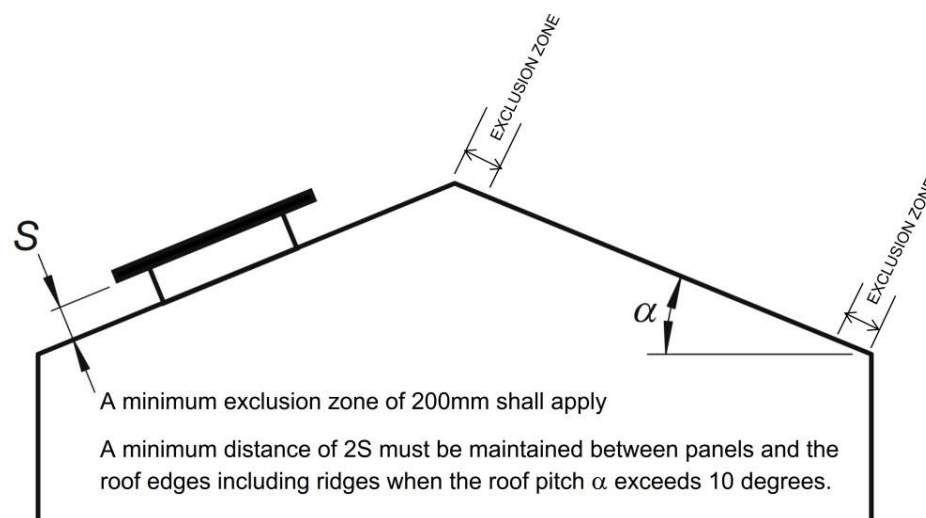


Figure 2 – Sectional view of Exclusion Zones



The exclusion zone to the ridge and edges of the roof indicated below by distances A and B.

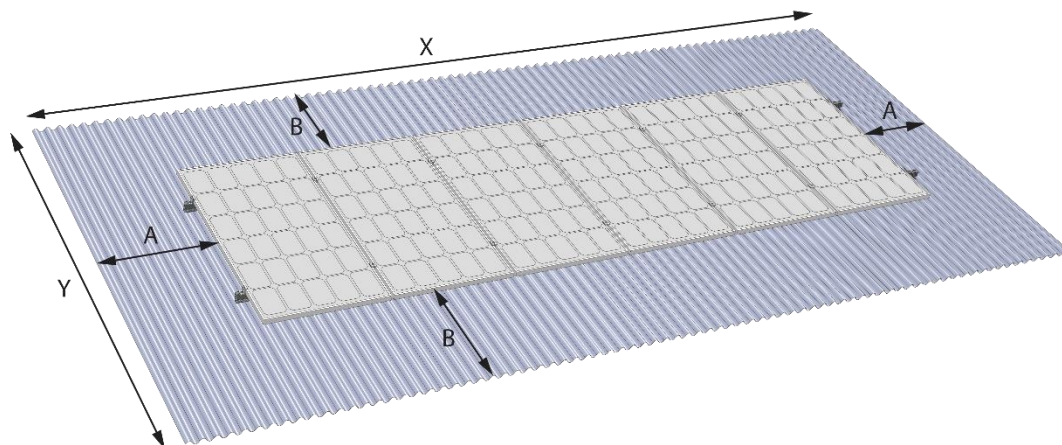


Figure 3 – Installation Exclusion Zones

## 5.4 General Installation Notes

1. The distance S between the underside of the module and the roof shall be between 50mm and 300mm.
2. All solar panels must be supported by a minimum of 2 rails.
3. All brackets must be installed in accordance with the appropriate guidelines stated in this installation manual in **Section 5.6**.
4. All brackets shall be spaced evenly along the rail.
5. The cantilever span of the solar panel shall not exceed 25% of its own length (i.e. 412mm for a 1650mm solar panel).
6. The cantilever span of the rail shall not exceed 33% of the applicable bracket spacing.

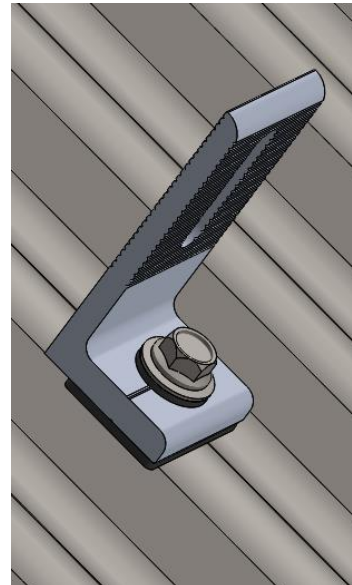
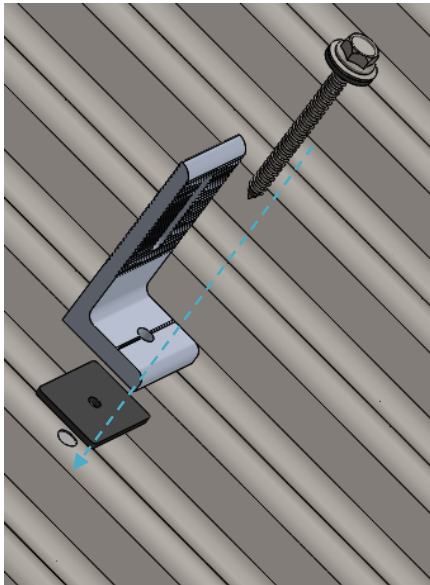
## 5.5 Fastening Torque of Bolts

All M8 sized diameter bolts in the RED-DOT-RACK product range are to be fastened to a torque of 8Nm. This is applicable to the bolts used in compression coupling brackets (e.g. KlipLok, VLok and Standing Seam variations) all module clamps (e.g. Mid-Clamps and End Clamps) and all accessories (e.g. Grounding Lug).

Over-tightening bolts in assembly may lead to damage to the mounting products and/or solar modules.

## 6. INSTALLATION MANUALS

### 6.1 L-Bracket Mounting Instruction



#### Mount the Bracket

1. Position and mark the installation points of the L-Brackets in accordance with the Spacing Guidelines and ensure the L-Brackets are located over the center of the rafters.
2. Drill pilot holes in the metal roof sheet and steel rafter for the roofing screw.
3. Place the rubber pad supplied with each bracket under the bracket and over the pilot hole to ensure a watertight connection.
4. Secure the bracket in place over the rubber pad with the roofing screw supplied

#### L-Bracket Spacing Guidelines

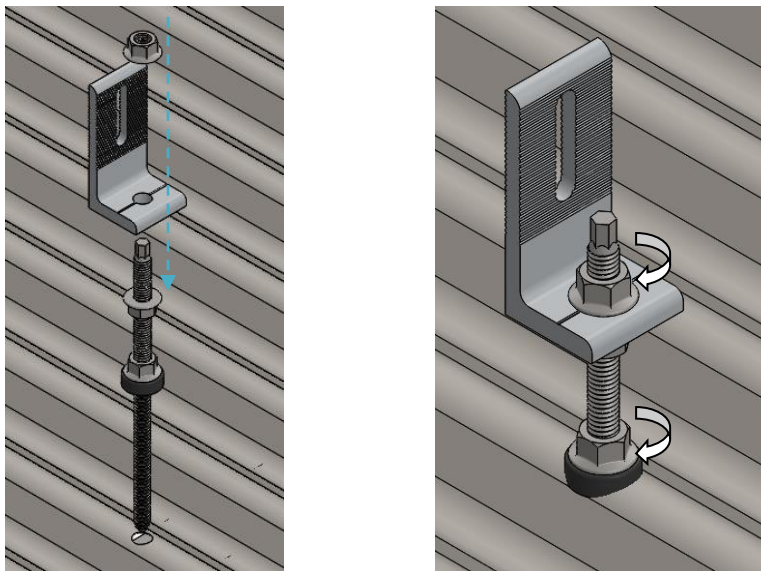
- Installing L-Brackets on rooftops up to 10m and pitch less than 15 degrees refer to the spacing guidelines table 1.0 for 60 cell solar panels and table 1.1 for 72 cell solar panels (Section 5.6).
- Installing L-Brackets on rooftops up to 10m and pitch 15 degrees or greater refer to the spacing guidelines table 2.0 for 60 cell solar panels and table 2.1 for 72 cell solar panels (Section 5.6).

#### Additional Assembly Information

- Clamps must sit flat on the metal roof sheet when fastening with the roofing screw
- Do not over tighten screws or bolts during installation
- A minimum roof sheet thickness of 0.5 mm for Steel and 0.8 mm for Aluminum must be available.
- The roof structure must be able to provide adequate load bearing capabilities for the entire system.
- Once installed, roofing screws must not be removed and re-installed in the same position.

## 6.2 Hanger Bolt Instruction

The Hanger Bolt is used as an alternative to the L-Bracket where the rafters are spaced further apart than can be achieved with the L-Bracket or for installations in regions of more extreme wind and/or snow loading requirements.



### Mount the Bracket

1. Position and mark the installation points of the Hanger Bolts in accordance with the Spacing Guidelines and ensure the Hanger Bolts are located over the center of the rafters.
2. Drill pilot holes in the metal roof sheet and steel rafter for the Hanger Bolt.
3. Drill the Hanger Bolt through the metal roof sheet and into the wood/steel purlin below until the rubber gasket attached to the bolt makes a tight fit onto the roof.
4. Fasten the M10 nut down over the rubber gasket to ensure a watertight seal is made.
5. Position the L-Bracket at the appropriate height on the upper Hanger Bolt thread and fasten in place with the two M10 nuts provided.
6. Secure the bracket in place over the rubber pad with the roofing screw supplied

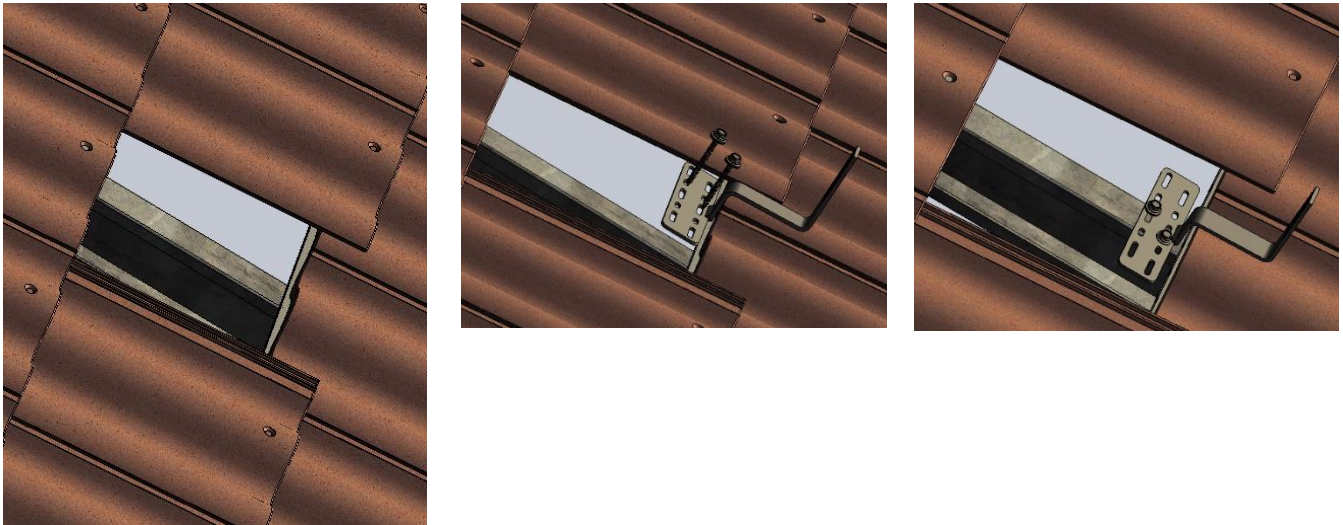
### Hanger Bolt Spacing Guidelines

- Installing Hanger Bolts on rooftop up to 10m and pitch less than 15 degrees refer to the spacing guidelines table 1.0 for 60 cell solar panels and table 1.1 for 72 cell solar panels (Section 5.6).
- Installing Hanger Bolts on rooftops up to 10m and pitch 15 degrees or greater refer to the spacing guidelines table 2.0 for 60 cell solar panels and table 2.1 for 72 cell solar panels (Section 5.6).

### Additional Assembly Information

- Select the appropriate Hanger Bolts for your project; wood or steel rafters.
- Do not over tighten the nut over the rubber gasket or damage may occur and the water tight seal lost.
- The roof structure must be able to provide adequate load bearing capabilities for the entire system.
- Once installed, Hanger Bolts must not be removed and re-installed in the same position.

## 6.3 Tile Hook Mounting Instruction



### Mount the Bracket

1. Position and mark the installation points of the Tile Hooks in accordance with the Spacing Guidelines and ensure the Tile Hooks are located over the center of the rafters.
2. Remove the tile from the roof.
3. Locate the position of the tile hook such that the tile hook lies in the valley of the lower tile. Ensure that the tile hook is located against the up-slope edge of the lower tile.
4. Mount the Tile Hook to the exposed rafter using a minimum of 2 of the supplied roofing screws.
5. Replace the tile over the Tile Hook flat against the lower tiles. If necessary, cut recesses into the inner face of the tile to accommodate the tile hook and ensure best watertight fit.

### Tile Bracket Spacing Guidelines

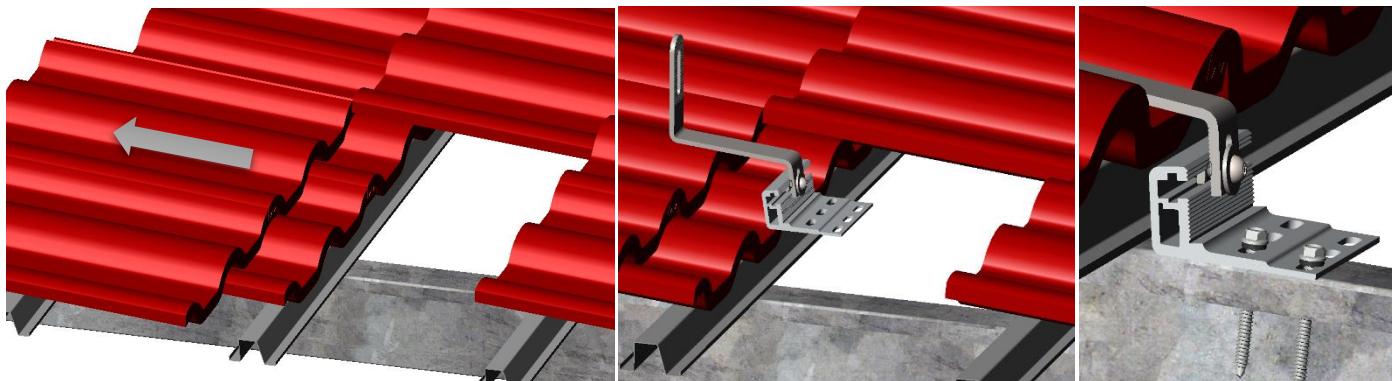
- Installing Tile Brackets on rooftops up to 10m and pitch up to 45 degrees refer to the spacing guidelines table 2.0 for 60 cell solar panels and table 2.1 for 72 cell solar panels (Section 5.6).

### Additional Assembly Information

- Tile Hooks must sit flush on the metal or wood rafter when fastening with the roofing screw.
  - In order to replace the tile flat over the lower tile, a small recess may need to be made into the tiles lower surface, do so with care.
  - Do not over tighten screws or bolts during installation
  - The roof structure must be able to provide adequate load bearing capabilities for the entire system.
- Once installed, roofing screws must not be removed and re-installed in the same positions.

## 6.4 Adjustable Tile Hook Mounting Instruction

The rails are attached to the roof structure using the adjustable tile hooks. Modifications to tiles are required where the adjustable tile hooks will be placed.



### Mount the Bracket

1. Position and mark the installation points of the Tile Hooks in accordance with the Spacing Guidelines and ensure the Tile Hooks are located over the center of the rafters.
2. Remove the tile from the roof.
3. Locate the position of the tile hook such that the tile hook lies in the valley of the lower tile. Ensure that the tile hook is located against the up-slope edge of the lower tile.
4. Mount the Tile Hook to the exposed rafter using a minimum of 2 of the supplied roofing screws.
5. Adjust and fasten the tile bracket arm piece so that it lies flush against the tile for best fit.
6. Replace the tile over the Tile Hook flat against the lower tiles. If necessary, cut recesses into the inner face of the tile to accommodate the tile hook and ensure best watertight fit.

### Adjustable Tile Bracket Spacing Guidelines

- Installing Adjustable Tile Brackets on rooftops up to 10m and pitch up to 45 degrees refer to the spacing guidelines table 2.0 for 60 cell solar panels and table 2.1 for 72 cell solar panels (Section 5.6).

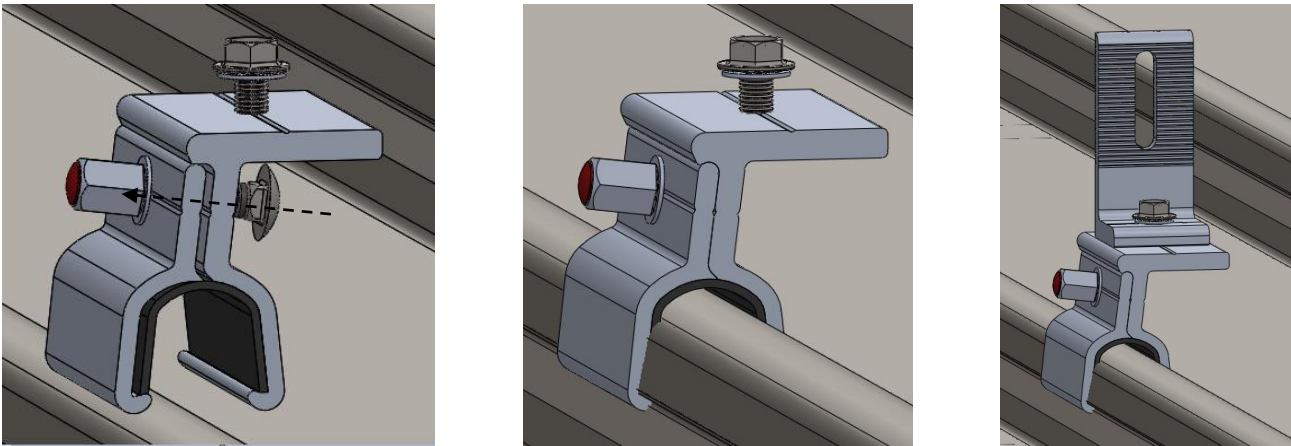
### Additional Assembly Information

- Tile Hooks must sit flush on the metal or wood rafter when fastening with the roofing screw.
- In order to replace the tile flat over the lower tile, a small recess may need to be made into the tiles lower surface, do so with care.
- Do not over tighten screws or bolts during installation
- The roof structure must be able to provide adequate load bearing capabilities for the entire system.
- Once installed, roofing screws must not be removed and re-installed in the same positions.

## 6.5 Compression Coupling Bracket Mounting Instruction

Compression coupling brackets include; all KlipLok variations, Standing Seam and VLock brackets. All of these brackets secure the mounting system to the metal roof sheet via a compression force rather than anchoring with a penetrating roofing screw.

It is very important to select the correct bracket type for the rooftop being used. The wrong bracket may lead to system failure such as tear off from the building rooftop, causing damage to both the PV system and the existing building.



### Mount the Bracket

1. Insert the EPDM rubber piece (#102-0005) for galvanic separation of the bracket from the roof (optional if purchased).
2. Position and mark the installation points of the compression brackets over the center of the rafters. Ensure the distance from one rafter to the next does not exceed the distances stated in the Bracket Spacing Guidelines.
3. Fasten the compression bracket with the side screw to 8Nm torque so that both mating pieces come together around the metal sheet without leaving any visible gap.
4. Remove the screw from the top landing of the compression bracket.
5. Align an L-Bracket on the top landing of the compression bracket and fasten in place with the provided screw to 8Nm torque.

### Compression Coupling Bracket Spacing Guidelines

- Installing all compression coupling brackets on rooftops up to 10m and pitch up to 45 degrees refer to the spacing guidelines table 2.0 for 60 cell solar panels and table 2.1 for 72 cell solar panels (Section 5.6).

### Additional Assembly Information

- Where the rafter spacing exceeds the maximum distance allowed in the bracket spacing guidelines, additional compression brackets may be installed on the metal sheet between rafters.
- Avoid installing compression coupling brackets over rooftop joints.

## 6.6 Bracket Spacing Guidelines

The following determines the maximum bracket spacing applicable for your installation. Ensure you refer to the correct roof type, roof pitch angle, wind region and roof zone while planning your installation. Please refer to the figure 4 to understand the roof zones and roof height. Regions given in the tables are discussed at section 4.1 and illustrated by figure 1.

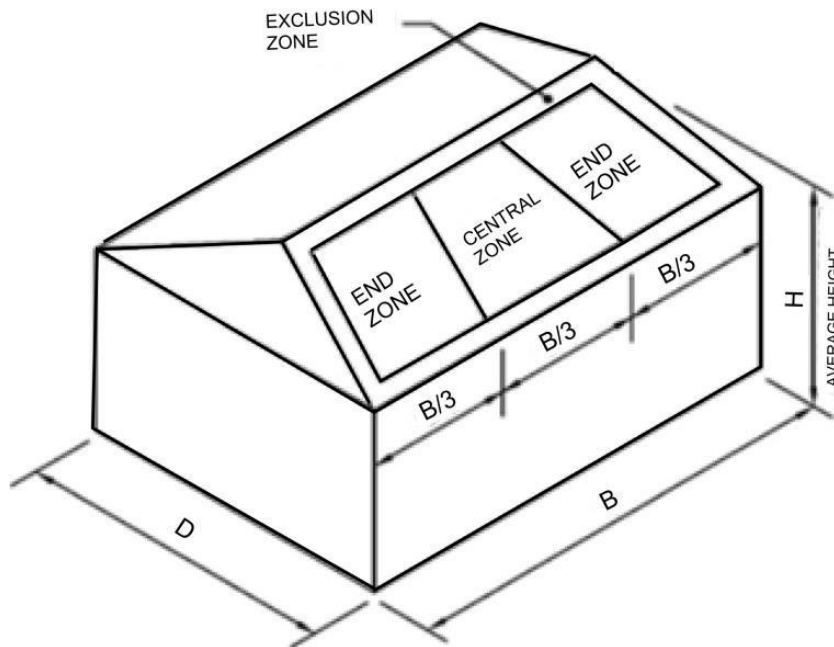


Figure 3 – Plan view to understand the height and zones of the roof

Red-Dot-Rack kits include sufficient materials for all wind Region A and Region B installations. Use the bracket spacing guidelines to determine the quantity of additional brackets required for any wind Region C and Region D installations.

Spacings of brackets for metal roofs when the roof pitch is less than 15 degrees are tabulated in tables 1.0 and 1.1.

Table 1.0 METAL ROOF								
Maximum spacing (mm) of the fixing of the railing to Pitched METAL roof								
Roof Pitch: 0 to 15deg. <i>For pitch exceeding 15 degrees use Table 2.0</i>								
	Region A		Region B		Region C		Region D	
Roof Height	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone
5m	2280	2050	1860	1680	1400	1140	880	720
10m	2060	1860	1680	1580	1260	1030	790	650
15m	1950	1760	1600	1430	1090	890	690	570
20m	1900	2000	1550	1350	970	800	620	510
<b>1640 long solar Panels</b>								

Table 1.1 METAL ROOF								
Maximum spacing (mm) of the fixing of the railing to Pitched METAL roof								
Roof Pitch: 0 to 15deg. <i>For pitch exceeding 15 degrees use Table 2.1</i>								
	Region A		Region B		Region C		Region D	
Roof Height	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone
5m	2080	1870	1690	1530	1160	950	730	600
10m	1880	1690	1530	1310	1040	850	660	540
15m	1780	1610	1460	1190	910	740	570	470
20m	1730	1670	1370	1120	810	660	510	420
<b>1970 long solar Panels</b>								

Please refer to the table 1.0 if the solar panel has 60 cells and table 1.1 if the solar panel has 72 cells.

Spacings of brackets for tiled roofs and metal roofs when the roof pitch is higher than 15 degrees are tabulated in tables 2.0 and 2.1. Please refer to the table 2.0 if the solar panel has 60 cells and table 2.1 if the solar panel has 72 cells.

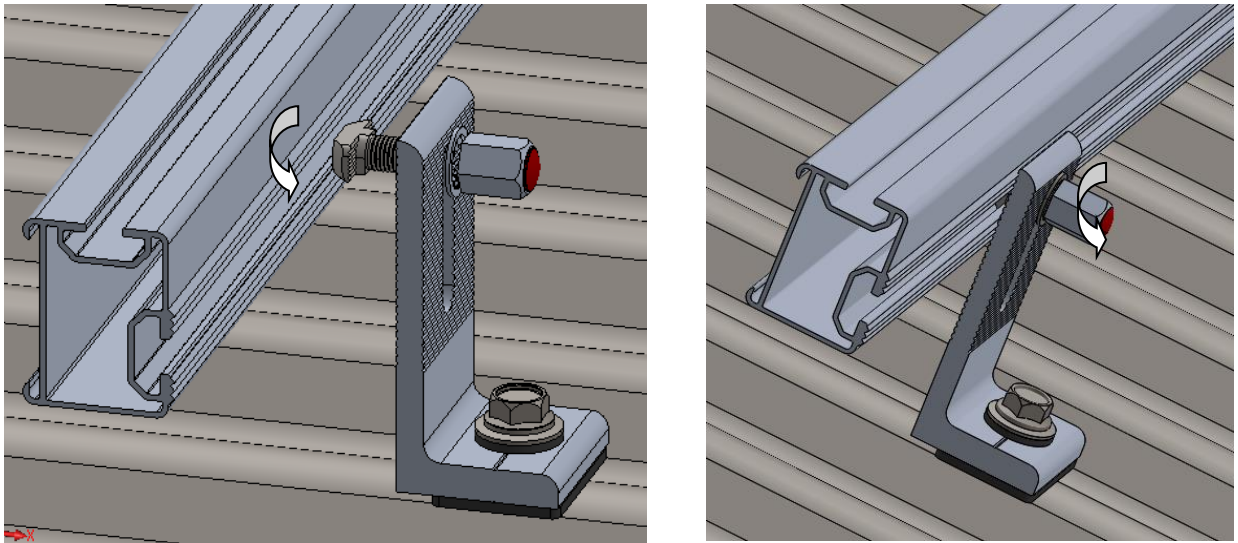
Table 2.0 TILED ROOF & For Metal Roofs with Pitch $\geq$ 15degrees								
Maximum spacing (mm) of the fixing of the railing to Rafters								
Roof Slope: 15 to 45deg.								
	Region A		Region B		Region C		Region D	
Roof Height	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone
5m	2480	2050	2020	1680	1640	1140	1030	720
10m	2240	1860	1820	1580	1470	1030	930	650
15m	2120	1760	1730	1430	1280	890	810	570
20m	2060	2000	1680	1350	1140	800	720	510
<b>1640 long solar Panels</b>								

Table 2.1 TILED ROOF & For Metal Roofs with Pitch $\geq$ 15degrees								
Maximum spacing (mm) of the fixing of the railing to Rafters								
Roof Slope: 15 to 45deg.								
	Region A		Region B		Region C		Region D	
Roof Height	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone	Central Zone	Edge Zone
5m	2260	1870	1840	1530	1360	950	860	600
10m	2040	1690	1660	1310	1230	850	770	540
15m	1940	1610	1580	1190	1060	740	670	470
20m	1880	1670	1530	1120	950	660	600	420
<b>1970 long solar Panels</b>								



## 6.7 Rail Fastening Instruction

All Red-Dot-Rack rail lengths (2100mm, 3200mm, 4200mm and 5200mm) and custom lengths are compatible with the range of rooftop brackets available.

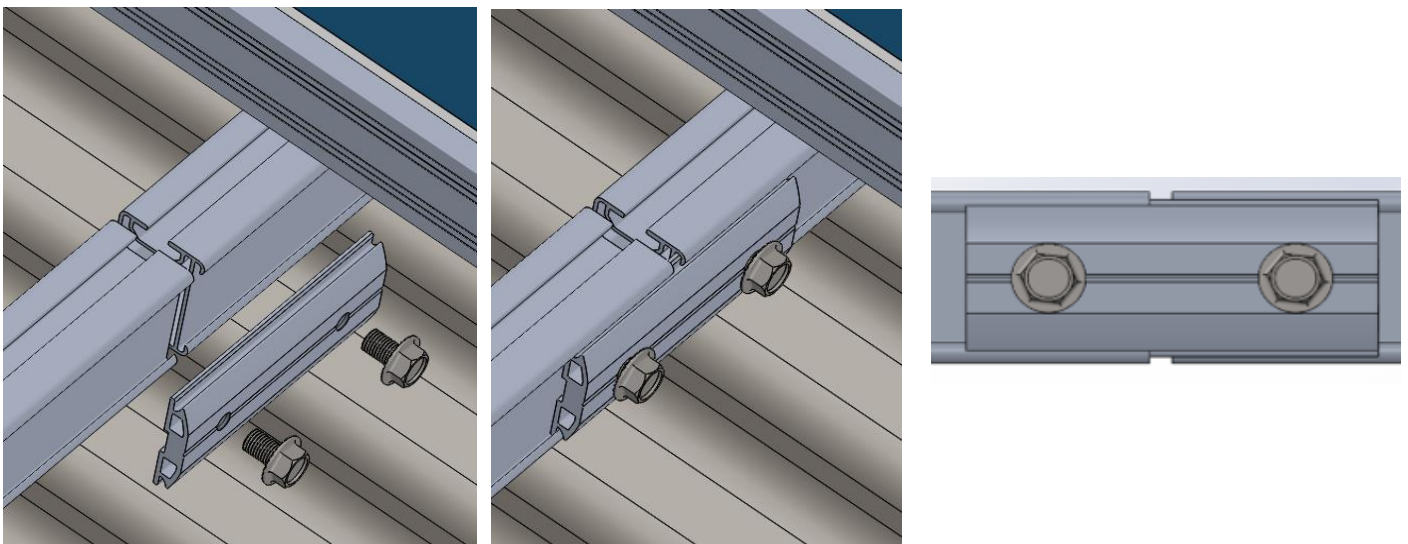


### Assembly steps;

1. Align the rail to be installed along the set of fastened rooftop brackets.
2. Ensure the corrugated side of the rail aligns with the corrugated side of the L-Bracket
3. Insert the T-Bolt head into the rail channel and twist to lock in place.
4. Position the rail at the desired height at each bracket and fasten the rail connector nuts with a torque of 8Nm to ensure a tight connection.

## 6.8 Rail Splice Instruction

Where 4 module kits using 2,100mm rails are installed the rails must be joined together by applying a rail joiner to each break. The joiner can also be applied to create long arrays greater than 4 modules. The rail joiner consists of one aluminium splice and 2 screws as a set.



## Assembly steps

1. Once the rooftop brackets have been installed, align the two rails end to end allowing the break to meet flush. The rail connectors should not yet be fully fastened.
2. Insert the aluminium rail joiner splice piece so that it sits evenly across the two pieces of rail, with approximately 50mm length installed into each rail.
3. Insert and fasten the two screws supplied to a torque of 8Nm
4. Once the rail joiner has been installed the rail nut connectors can be fully fastened to 8Nm each to ensure a tight connection over the entire length of extended rail.

## 6.9 Solar Panel Module Installation

### WARNING

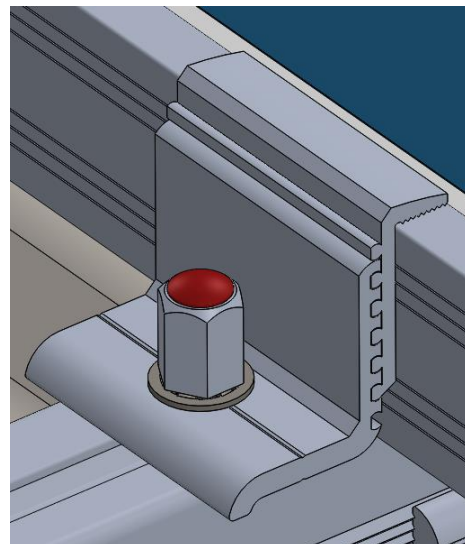
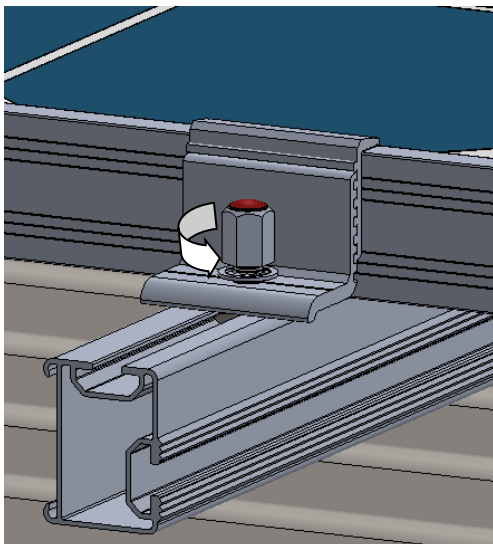
ENSURE YOU FOLLOW ALL RECOMMENDATIONS AND INSTRUCTIONS OF THE SOLAR PANEL MANUFACTURER IN HANDLING AND INSTALLING THE SOLAR PANELS.

Solar panels are fastened to the Red-Dot-Rack rooftop system one panel at a time. Ensure to use a suitable means to prevent the panels slipping from the frame during installation. Falling panels may cause damage to equipment and harm to others in the construction area.

Once installed, the Mid-Clamps and End clamps will hold the solar panel panels in place even in extreme weather conditions. Until the clamps are securely installed, the solar panel module needs to be appropriately secured.

## 6.10 End Clamps

Adjustable solar panel end clamps are designed to suit solar panels with thickness ranging between 31mm and 50mm. Do not attempt to install solar panels with a thickness outside of this range. If you should have any solar panels outside of the 31-50mm range please contact Red-Dot-Rack for the custom range of products.



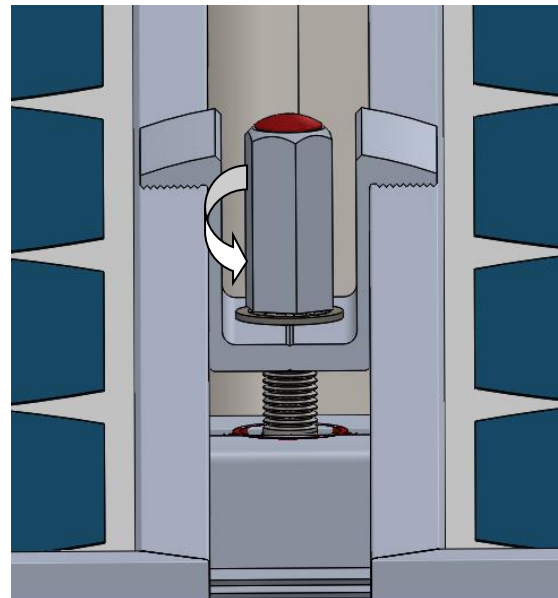
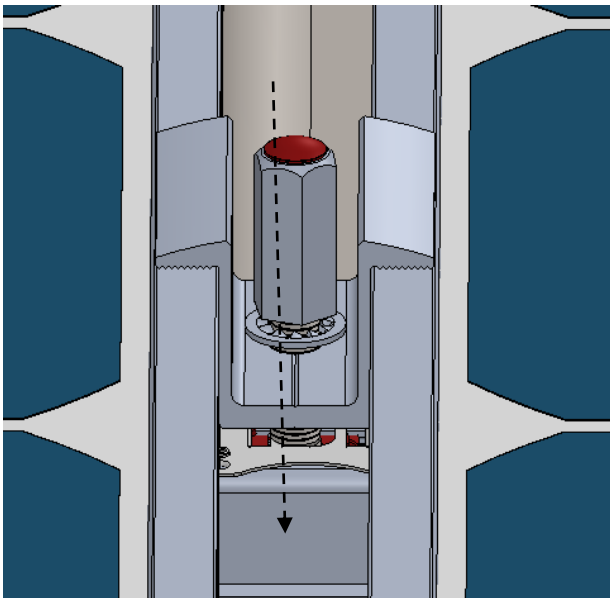
## Assembly steps

1. Determine the thickness of your solar panel by checking the manufacturer specification sheets.
2. Set the end clamp height to the solar panel thickness by removing the top piece and inserting at the correct location.
3. Insert the T-Bolt head into the channel on the top of the rail and twist to lock in place.
4. Fasten the end clamp firmly against the solar panel with a torque of 8Nm. Do not over fasten the end clamp or else damage to the solar panel frame may occur.

## 6.11 Mid Clamps

Adjustable solar panel mid-clamps are designed to suit solar panels with thickness ranging between 31mm and 50mm with the use of a custom design spring.

Do not attempt to install solar panels with a thickness outside of this range. If you should have any solar panels outside of the 31-50mm range please contact Red-Dot-Rack for the custom range of products.



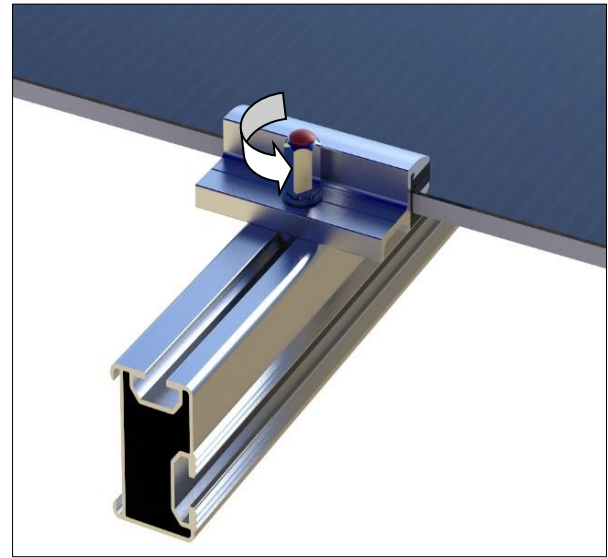
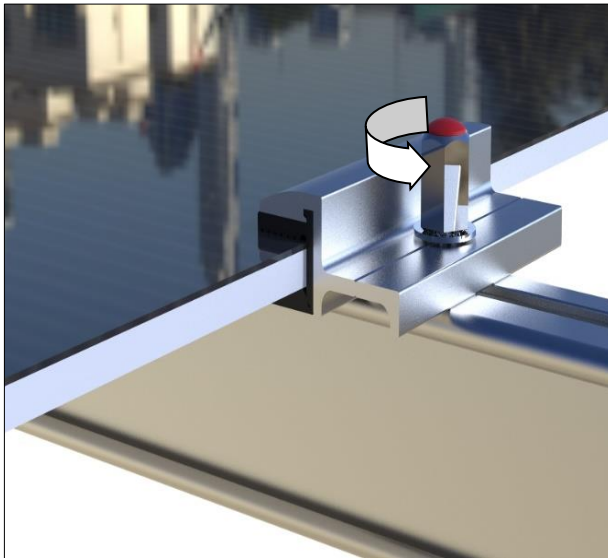
## Assembly steps

1. Insert the T-Bolt head into the channel on the top of the rail and twist to lock in place.
2. By pressing the top of the mid-clamp down by hand, position the mid clamp firmly against the top edge of the solar panel frame.
3. Turn the nut to achieve a loose fit.
4. Slide the adjoining solar panel along the rail and under the mid clamp.
5. Ensure that the mid clamp is tight against the solar panel modules.
6. Fasten the mid-clamp firmly against the solar panel with a torque of 8Nm. Do not over fasten the end clamp or else damage to the solar panel frame may occur.

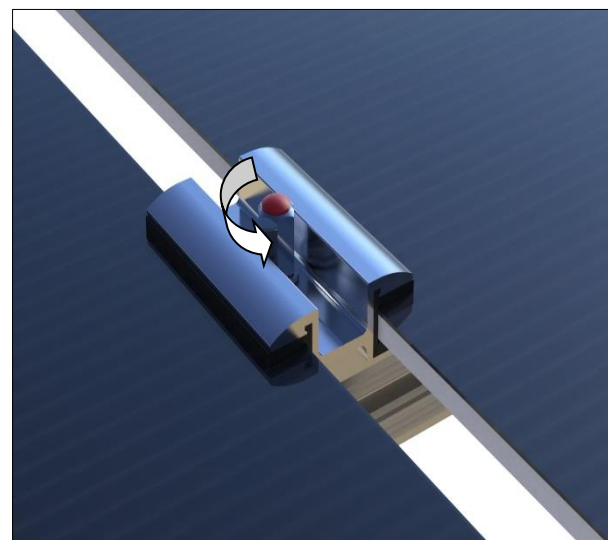
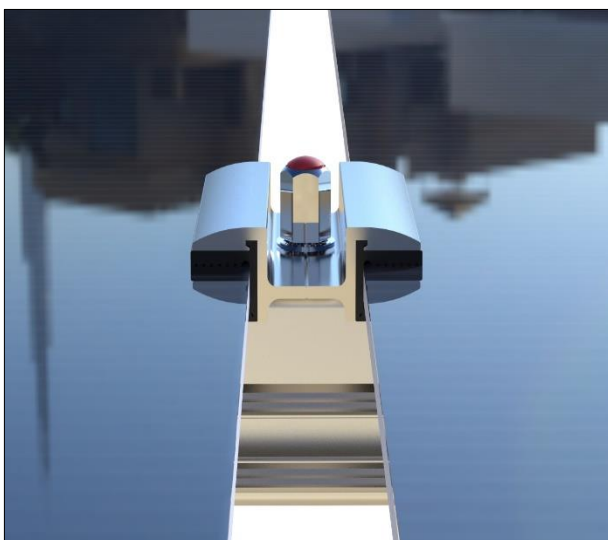
## 6.12 Thin Film clamps

Thin Film solar panel end clamps and mid clamps are designed to suit solar panels with thickness ranging between 6mm and 7.5mm. Do not attempt to install solar panels with a thickness outside of this range. If you should have any solar panels outside of the 6 - 7.5mm range please contact Red-Dot-Rack for the custom range of products.

### End Clamps



### Mid Clamp



## Assembly steps

Determine the thickness of your solar panel by checking the manufacturer specification sheets prior to the assembly process. Since the clamps are not adjustable as in the previous section, thin film module installation should be done sequentially from one end to another. Please follow recommendation and instructions of the solar panel manufacturer in order to find the size of the gaps between rails and gaps between solar panels and make sure the structure has been designed according to the instructions.

1. The first module should be installed at one of the four corners of the structure.
2. Fasten two end clamps to the first rail of the selected corner and insert the module into EPDM pads of the end clamps so that the module will not slide.
3. Insert the other end of the module into the EPDM pads of two mid clamps and those mid clamps should be attached to the second rail. However, the mid clamps should not be fully tightened until the second module insert into the EPDM pads of the other end of the mid clamps.
4. Insert the second module into the EPDM pads of the other side of the mid clamp and fasten the mid clamps so that module will not slide.
5. Repeat steps 3 and 4 until the last module (end clamps mounted) of the row is attached to the last mid clamp.
6. Fasten the end clamps attached to the last model with the last rail.
7. Repeat steps 3, 4, 5, and 6 for all the other rows.
8. Do not exceed the maximum torque of 8Nm while fastening the end clamps or mid clamps to prevent the damages to the solar panel.

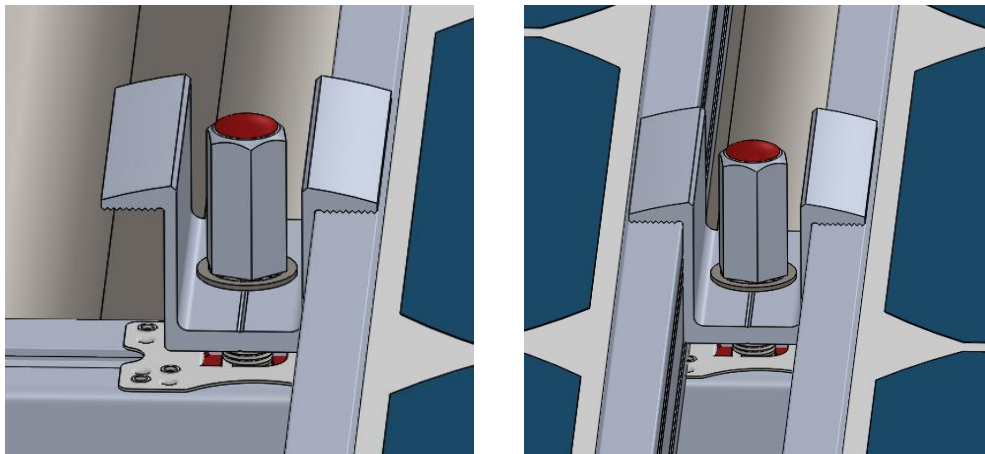
## 7. GROUNDING COMPONENTS

### 7.1 Mid Clamp Earthing Washer

The mid-clamp earthing washer is a stainless-steel plate which provides a grounding bond between the solar panel frame and the mounting structure rails by making a small engraving through the anodized coating on the aluminium during installation.

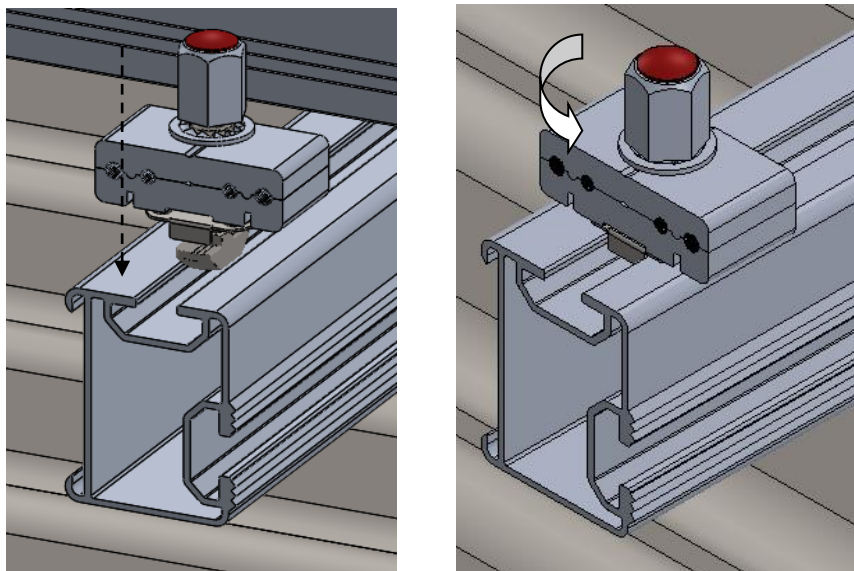
The mid-clamp earthing washer is installed as an alternate pre-assembled product of the standard mid-clamp. Simply insert the rail connector into the top channel of the rail as per the standard mid clamp and position the stainless-steel plate evenly under the solar panel frame on each side.

While fastening the solar panel ensure that the mid-clamp earthing washer does not rotate out from under the solar panel frames.



### 7.2 Earthing Lug

The earthing lug provides a grounding bond between the mounting structure rails and the common electrical ground via a grounding wire. In a system where the mid-clamp with earthing washer has been installed, the earthing lug will complete the grounding circuit.



## Assembly Steps

1. Insert the T-Bolt head into the channel on the top of the rail and twist to lock in place.
2. Align the steel washer and aluminium pieces so that it sits across the channel
3. Insert the stripped end of the system grounding wire into the Earthing Lug port holes and fasten the assembly with a 8Nm torque.

**Note:** *Red-Dot-Rack does not enforce the application of earthing components with the mounting structure. Grounding laws vary in different countries and with different installation types, and therefore may not be necessary to every installation. Please check with your local laws to ensure your installation complies to the required standards.*

## 8. CONTACT DETAILS

For technical questions, please contact us via the following details:

Email: [engineer@reddotrack.com](mailto:engineer@reddotrack.com)

Website: [www.reddotrack.com](http://www.reddotrack.com)