In this guide we demonstrate the installation of PV Mounting Rail and PV Panels on different roof types, using a Solar Adjustable Tile Bracket Kit, Aluminum Tin Interface Kit, Hanger Bolt Hook and S-5 PV Kit - Solar Mounting Bracket.

Section 1: Demonstration of Earthing using Grounding Lug
Section 2: Mounting PV Rail & Panels to a tile roof using Solar Adjustable Tile Bracket Kit
Section 3: Mounting PV Rail to a standard corrugated roof using Aluminum Tin Interface Kit
Section 4: Mounting PV Panels to a standard corrugated roof using an Aluminium Tin Interface Kit OR Hanger Bolt Hook
Section 5: Mounting PV Rail to a standard corrugated roof using Hanger Bolt Hook
Section 6: Mounting PV Panels to a longrun roof using S-5 PV Kit - Solar Mounting Bracket
Section 7: Demonstration of Connecting Rail Using Standard Rail Splice Kit & Bonding Jumper
#S-5PVKIT
S-5 PV Kit - Solar Mounting Bracket.

#GSIKH04
Hanger Bolt Hook

#BRKTADJTILE
Solar Adjustable Tile Bracket Kit

#GSIK05
Aluminum Tin Interface Kit

#GSIC40
Inter Clamp Kit

#GSEC40
End Clamp Kit

#GSGGC
Grounding Clip

#GSGGL
Grounding Lug

#GSGBJ
Bonding Jumper

#GSDR2560
Rail with a standard length of 2560mm. Designed to mount three modules (width 808~826mm)

#GSDR3405
Rail with a standard length of 3405mm. Designed to mount four modules (width 808~826mm)

#GSDR4200
Rail with standard length of 4200mm. Designed to mount four modules (width 990~996mm)

M6 Allen Key
M5 Allen Key
3/16” Allen Key
Flat Bar or similar tool
Fox Wooden Wedges
Lanolin Spray
Neutral Cure Silicon
Torque Wrench
Cordless Drill
Cordless Step Drill
Deep Draw Socket Size 13
3/8” Tech Head Driver
Circular Saw with aluminium cutting blade
Angle Grinder with masonry cutting disc
Tape Measure
String Line
Electrical Tape
Marker Pen
Wire Strippers
Spirit Level
SECTION 1: DEMONSTRATION OF EARTHING USING GROUNDING LUG

It is important to note that each length of rail in ANY PV installation has a quality Earth connection. This can be done using a Grounding Lug. Earth connections should be completed by an appropriately qualified Electrician and set out in conjunction with the mechanical drawings supplied by the PV Install Designer.

Insert Grounding Lug into rail by sliding it in. Tighten with M6 Allen key.

Use 4mm earth bonding wire and strip section of wire using wire strippers. Twist cable tightly.

Clamp earth bonding wire between the screw in the Grounding Lug.

Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines.

Using a cardboard template of the panels may help you in positioning the array.

When you have decided on the position of your array, mark the position of where the brackets will go using tape or a marker pen.

The Solar Adjustable Tile Bracket sits underneath the tiles and fixes to the roof rafters. Once the position of panels is decided you must establish where the roof rafters lie underneath the tiles, generally they are 900mm apart.

Once you establish where the roof rafters are you need to remove the tile where the bracket will sit. Do this carefully by using wooden fox wedges and a flat bar or similar tool to gradually lever up a tile and surrounding tiles.

SECTION 2: MOUNTING PV RAIL TO A TILE ROOF USING SOLAR ADJUSTABLE TILE BRACKET KIT

In this section we demonstrate mounting PV Panels to a tile roof using the Adjustable Tile Bracket Kit. Before beginning - always check the owner of the house has spare roof tiles available in case of unavoidable damage.

Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines.

Using a cardboard template of the panels may help you in positioning the array.

When you have decided on the position of your array, mark the position of where the brackets will go using tape or a marker pen.

The Solar Adjustable Tile Bracket sits underneath the tiles and fixes to the roof rafters. Once the position of panels is decided you must establish where the roof rafters lie underneath the tiles, generally they are 900mm apart.

Once you establish where the roof rafters are you need to remove the tile where the bracket will sit. Do this carefully by using wooden fox wedges and a flat bar or similar tool to gradually lever up a tile and surrounding tiles.

Insert Grounding Lug into rail by sliding it in. Tighten with M6 Allen key.

Use 4mm earth bonding wire and strip section of wire using wire strippers. Twist cable tightly.

Clamp earth bonding wire between the screw in the Grounding Lug.

Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines.

Using a cardboard template of the panels may help you in positioning the array.

When you have decided on the position of your array, mark the position of where the brackets will go using tape or a marker pen.

The Solar Adjustable Tile Bracket sits underneath the tiles and fixes to the roof rafters. Once the position of panels is decided you must establish where the roof rafters lie underneath the tiles, generally they are 900mm apart.

Once you establish where the roof rafters are you need to remove the tile where the bracket will sit. Do this carefully by using wooden fox wedges and a flat bar or similar tool to gradually lever up a tile and surrounding tiles.

Run the earth wire down to the next level of rail and install another Grounding Lug following the same procedure.
Once the bracket is in position, set a torque wrench to 15Nm and tighten the M8 Stainless Steel nut & bolt assembly.

There is both vertical and horizontal adjustment in the bracket to suit the profile of the roof tile.

When replacing the removed tile where the bracket is positioned a slot should be ground to accommodate the thickness of the bracket and allow the tile to sit flush with the surrounding tiles.

Sit the Solar Adjustable Tile Bracket on the tile in the desired location over the rafter.

Place the tile where it will sit and mark out the size and position of the slot.

Grind a slot in the tile using an angle grinder with appropriate disc for example a diamond tip or masonry grinding disc.

Spray lanolin liberally on all stainless and aluminum interface connections for long term corrosion resistance.

When a tile is removed you can confirm the rafter position.

Once your brackets are installed you are ready to mount your rail to the Solar Adjustable Tile Brackets.

Once the bracket is in position, set a torque wrench to 15Nm and tighten the M8 Stainless Steel nut & bolt assembly.

Use two M6 wood tech screws that come with the Solar Adjustable Tile Bracket Kit to fasten the bracket on to the rafter.

Rest the rail you cut to length earlier on the roof brackets while you position the Tilt-In Set bolts - these bolts are included in the Solar Adjustable Tile Bracket Kit.

Attach the Tilt-In Set bolts loosely to the bracket riser, then manoeuvre the Slide Nut into the slot of the rail - if bolts are difficult you can leverage gently with an allen key.

Set the height for your rail to sit - ideally the top of the rail should be 100mm to the top of the tile.

The first bracket is now ready for rail to be mounted to it. Repeat this process to mount the next brackets in your PV System Design.

When replacing the removed tile where the bracket is positioned a slot should be ground to accommodate the thickness of the bracket and allow the tile to sit flush with the surrounding tiles.
Take End Clamp Kit, spray liberally with lanolin for long term corrosion resistance.

Now you are ready to mount the panel to the rail. Ensure rail ends are even at this stage. Extra Care must be taken with the first panel to ensure it is positioned correctly. This will assist in the even positioning of the final array.

Set up the earth connection on the rails following the steps demonstrated in Section 1: Demonstration of Earthing using Grounding Lug in this Installation Guide, in conjunction with the mechanical drawings supplied by your PV Install Designer.

Tighten by hand using a M6 allen key and once all rails are installed and you are happy with your rail height use a torque wrench set at 15 Nm and tighten.

Mark the top of the rails where the edge of the panel will sit, this is typically 50mm in from the ends.

Set up the earth connection on the rails following the steps demonstrated in Section 1: Demonstration of Earthing using Grounding Lug in this Installation Guide, in conjunction with the mechanical drawings supplied by your PV Install Designer.

At this stage the panel alignment can be adjusted before the second End Clamp Kit is tightened. Ensure panels are following the correct line of the roof.

Grounding Clips are used to ensure the PV Panels are earth bonded to the mounting rail. The sharp edges of the Grounding Clips pierce the anodizing of the panel and rail to create the earth connection.

Before mounting the next panel Position your next Inter Clamp Kit and Grounding Clip ready for the next panel.

Carefully position next panel - take care to ensure the Grounding Clip is flat and level. Once flat push the two panels together and hand tighten using a M6 allen key.

These are installed between the panel and the rail using the Inter Clamp Kit. It is ESSENTIAL care is taken in this step to ensure a quality earth.

As you install each panel in the array check alignment and make minor adjustments as required. Once you have installed all panels in the array use End Clamp Kits to secure the last panel.

Hand tighten using a M6 Allen key and then use a torque wrench set at 15 Nm to tighten - check you have tightened ALL End Clamp Kits and Inter Clamp Kits in your panel array.
MOUNTING PV RAIL TO A STANDARD CORRUGATED ROOF USING ALUMINIUM TIN INTERFACE KIT

In this section we demonstrate mounting PV Panels to a standard corrugated roof with wooden purlins using the Aluminium Tin Interface Kit.

Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines.

Assess the spacings of the Purlins on the roof. The roof fastenings will indicate the line of the Purlins.

Set up a string line between the two furthest points the Aluminium Tin Interface Kits will be mounted as specified in the mechanical drawings given by the PV Install Designer.

The required distance between the Aluminium Tin Interface Kit brackets will vary between installations and this measurement will be provided by the PV Install Designer in the mechanical drawings. Using the measurement you are given mark out where the Interface Kits will be screwed along the string line. These can only be mounted on the peaks of the tin roof profile.

Use a 4-6mm Drill Bit to pierce the tin where you have marked your spacings, perpendicular to the length and width of the roof.

Screw the Aluminium Tin Interface Bracket into the wooden purlin using a 3/8 tech head driver, do not overtighten.

Attach the slide nut into the rail, once attached loosely hand tighten to prevent it falling out of the assembly.

Spray lanolin liberally on all stainless and aluminium interface connections for long term corrosion resistance.

Screw the Aluminium Tin Interface Bracket into the wooden purlin using a 3/8 tech head driver, do not overtighten.

You can adjust the height of the rail using the adjustment in the bracket - once the rail is in correct position hand tighten the bolts using a M6 allen key.

At this point you can still make further adjustments to the rail height.

Repeat this process with the remaining Aluminium Tin Interface Kits in your install plans. Once all Tin Interface Kits are installed you are ready to mount the rail to the brackets.

You are now ready to continue by mounting your PV Panels to the rail. Set up the earth connection on the rails following the steps demonstrated in Section 1: Demonstration of Earthing using Grounding Lug in this Installation Guide, in conjunction with the mechanical drawings supplied by your PV Install Designer.

You can adjust the height of the rail using the adjustment in the bracket - once the rail is in correct position hand tighten the bolts using a M6 allen key.

At this point you can still make further adjustments to the rail height.

Repeat this process with the remaining Aluminium Tin Interface Kits in your install plans. Once all Tin Interface Kits are installed you are ready to mount the rail to the brackets.

You are now ready to continue by mounting your PV Panels to the rail. Set up the earth connection on the rails following the steps demonstrated in Section 1: Demonstration of Earthing using Grounding Lug in this Installation Guide, in conjunction with the mechanical drawings supplied by your PV Install Designer.

Follow the steps IN SECTION 4: MOUNTING PV PANELS TO A STANDARD CORRUGATED ROOF.
**SECTION 4: MOUNTING PV PANELS TO A STANDARD CORRUGATED ROOF USING ALUMINIUM TIN INTERFACE KIT OR HANGER BOLT HOOK**

In this section we demonstrate mounting PV Panels to a standard corrugated roof with wooden purlins using the Aluminium Tin Interface Kit OR Hanger Bolt Hook. The procedure for mounting PV panels is the same for both components.

1. **Mark the top of the rails where the edge of the panel will sit; this is typically 50mm in from the ends.**

2. **Take End Clamp Kits, spray liberally with lanolin and loosely position where you have marked on the rail.**

3. Mark the top of the rails where the edge of the panel will sit, this is typically 50mm in from the ends.

4. Lift panel onto the rail, sliding the End Clamp on to hold it.

5. Before mounting the next panel position your next Inter Clamp Kit and Grounding Clip ready for the next panel.

6. Carefully position next panel - take care to ensure the Grounding Clip is flat and level. Once flat push the two panels together and hand tighten using a M6 allen key.

7. At this stage the panel alignment can be adjusted before the second End Clamp Kit is tightened. Ensure panels are following the correct line of the roof.

8. Use a M6 allen key to hand tighten.

9. Grounding Clips are used to ensure the PV Panels are earth bonded to the mounting rail. The sharp edges of the Grounding Clips pierce the anodizing of the panel and rail to create the earth connection.

10. These are installed between the panel and the rail using the Inter Clamp Kit. It is ESSENTIAL care is taken in this step to ensure a quality earth.
As you install each panel in the array check alignment and make minor adjustments as required. Once you have installed all panels in the array use End Clamp Kits to secure the last panel.

Hand tighten using a M6 Allen key.

Then use a torque wrench set at 15 Nm to tighten. Check you have tightened ALL End Clamp Kits and Inter Clamp Kits in your panel array.

**SECTION 5: MOUNTING PV RAIL TO A STANDARD CORRUGATED ROOF USING HANGER BOLT HOOK**

In this section we demonstrate mounting PV Rail to a Standard Corrugated roof using the Hanger Bolt Hook, which is most suited to uneven Roofs that require greater height adjustment to level the rails of the PV System.

Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines. Assess the spacings of the Purlins on the roof. The roof fastenings will indicate the line of the Purlins.

Set up a string line between the two furthest points the Hanger Bolt Hooks will be mounted as specified in the mechanical drawings given by the PV Install Designer. The required distance between the Hanger Bolt Hooks will vary between installations and this measurement will be provided by the PV Install Designer in the mechanical drawings. Using the measurement you are given mark out where the Hanger Bolt Hooks will be screwed along the string line. These can only be mounted on the peaks of the tin roof profile.

Use a 4-6mm Drill Bit to pierce the tin where you have marked your spacings, perpendicular to the length and width of the roof.

Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines. Assess the spacings of the Purlins on the roof. The roof fastenings will indicate the line of the Purlins.

Set up a string line between the two furthest points the Hanger Bolt Hooks will be mounted as specified in the mechanical drawings given by the PV Install Designer. The required distance between the Hanger Bolt Hooks will vary between installations and this measurement will be provided by the PV Install Designer in the mechanical drawings. Using the measurement you are given mark out where the Hanger Bolt Hooks will be screwed along the string line. These can only be mounted on the peaks of the tin roof profile.
Once holes are drilled, use a larger diameter drill bit to drill pilot holes in the timber Purlins to accommodate the M10 coach thread of the Hanger Bolt Hook. Use a 7.00 - 7.5mm drill bit for older dryer roof timber and 5.5-7.0mm for newer roof timber.

There is a tapered rubber grommet on the bottom of the Hanger Bolt Hook which must be seated flush to the roof.

Use a step drill to open up the holes in the tin roof to allow the tapered grommet to seat correctly.

Once you have completed drilling all of the holes for the Hanger Bolt Hooks in your install, sweep away the metal filings.

Now you are ready to screw the Hanger Bolt Hook into the wood purlin. First ensure the rubber seal on the Hanger Bolt is positioned in the unthreaded part of the bolt shank - there must be some adjustment available between the bottom of the thread and the bottom of the nut.

Begin by coating the rubber grommet on the Hanger Bolt Hook with Neutral Cure Silicon.

Screw Hanger Bolt Hook into the purlin using a 3/8 tech head driver.

Once you have set the correct height, tighten all nuts using a wrench until they are locked securely.

You are ready to continue with mounting your PV Panels to the rail.

Tighten the lower nut to seat the rubber grommet correctly if required.

Clean excess silicon away with a clean rag, tighten the bolt with a wrench.

On the rail mark out where the L Foot of the Hanger Bolt Hook will be attached. The L Foot must be attached to the rail before you attach the rail to the Hanger Bolt Hook.

Once you have mounted all Hanger Bolt Hooks required you are now ready to continue by mounting your PV Panels to the rail.

Ensure the L Foot is flush with the top of the rail and attach.

On the rail mark out where the L Foot of the Hanger Bolt Hook will be attached. The L Foot must be attached to the rail before you attach the rail to the Hanger Bolt Hook.

Spray lanolin liberally on all stainless and aluminium interface connections for long term corrosion resistance.

Adjust finishing height of the rail so the rail sits evenly on the roof. The Hanger Bolt Hook provides a lot of height adjustment to allow for uneven roof lines.

You are now ready to continue by mounting your PV Panels to the rail. Set up the earth connection on the rails following the steps demonstrated in Section 1: Demonstration of Earthing using Grounding Lug in this Installation Guide, in conjunction with the mechanical drawings supplied by your PV Install Designer.
Begin by deciding the layout of the panel array in conjunction with the mechanical drawings supplied by the PV Install Designer. It is essential panels do not overhang spouting line or any roof lines.

Using a cardboard template of the panels may help you in positioning the S-5 PV Kit Brackets. For larger arrays it may be helpful to set up a string line between the two furthest points the S-5 PV Kit Brackets will be mounted as specified in the mechanical drawings given by the PV Install Designer.

1. Holding the entire bracket assembly in position, tighten the bolt using a 3/16” allen key and tighten using a torque wrench set at 17.5NM.

Position the panel on to the Earth Disc of the S-5 PV Kit Bracket.

Adjust the bottom riser nut on the thread of the S-5 Bracket Riser to the correct height needed for your panel and hand tighten with a 3/16” allen key.

To Clamp the PV panel down - Fit Clamp component of the S5-PV Kit Bracket onto bottom riser nut.

Once you have mounted the first line of S-5 PV Kit Brackets in your array you are ready to begin mounting your PV Panels.

Continue with the next panels in the array.

Remove the top Riser Nut and Clamp, then fix the Earth Disc onto the clamp using a M13 Deep draw socket. Repeat this process with your next S-5 PV Kit.
When the S-5 PV Kit Bracket is used as an Inter Clamp Kit, the bottom Riser Nut is not required. Check you have tightened all nuts with a torque wrench set at 17.5 Nm.

SECTION 5: DEMONSTRATION OF CONNECTING RAIL USING STANDARD RAIL SPLICE KIT & BONDING JUMPER

In this section we demonstrate Connecting Rail Using Standard Rail Splice Kit and Bonding Jumper.

When connecting two pieces of rail, a Standard Rail Splice Kit is required. Place each section of rail in the splice kit leaving a 1mm gap between rail sections.

Tighten using an M6 Allen Key and use a torque wrench set at 15 Nm to tighten.

Wherever a Standard Rail Splice Kit is used, a Bonding Jumper must also be attached to ensure a quality earth connection.