



YHI (NEW ZEALAND) LTD

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PV MOUNTING SYSTEMS INSTALLATION GUIDE





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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.

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MOUNTING SYSTEMS COMPONENTS:

TOOL LIST:



#BRKTADJTILE
Solar Adjustable Tile Bracket Kit



#GSIK05
Aluminum Tin Interface Kit



#GSIKH04
Hanger Bolt Hook



#S-5PVKIT
S-5 PV Kit - Solar Mounting Bracket.



#GSIC40
Inter Clamp Kit



#GSEC40
End Clamp Kit



#GSGGC
Grounding Clip



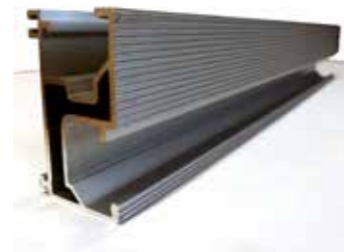
#GSGGL
Grounding Lug



#GSGBJ
Bonding Jumper



#GSDRSP
Standard rail splice kit



#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.



Tighten with M6 Allen key.



Run the earth wire down to the next level of rail and install another Grounding Lug following the same procedure



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.



Once a tile is removed you can confirm the rafter position



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



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



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



Replace the tile you have ground the slot out of and any other tiles you have removed next to it.



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



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



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



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



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.



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.



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



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



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



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



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.



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



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.



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.



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



Take **End Clamp Kit**, spray liberally with lanolin for long term corrosion resistance.



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



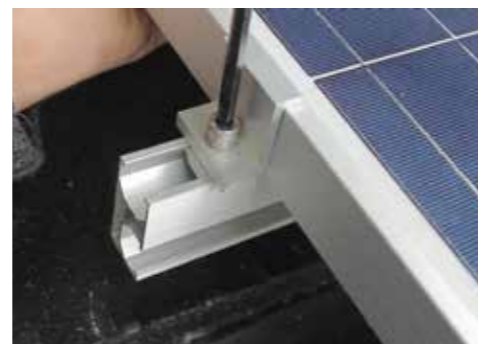
Carefully position next panel - take care to ensure the **Grounding Clip** is flat and level. Once flat push the two panels together and hand tighten using a M6 allen key



Loosely position **End Clamp Kit** where you have marked on the rail.



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



Use a M6 allen key to hand tighten

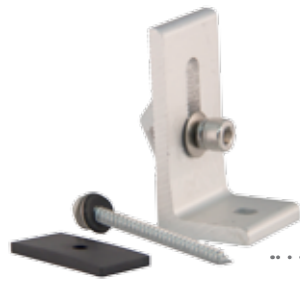


As you install each panel in the array check alignment and make minor adjustments as required. Once you have installed all panels in the array use **End Clamp Kits** to secure the last panel,



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.





SECTION 3: 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.



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,



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



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.



Install the next rail following the same process, once completed check the rail ends are even



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

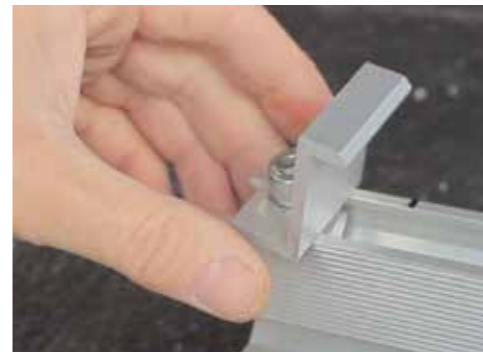


Aluminum Tin Interface Kit

Hanger Bolt Hook

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.*



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

Use a M6 allen key to hand tighten



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.

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.



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

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

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



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



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 5.5-7.0 mm 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.



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



Once you have attached all L Feet to the rail, proceed with mounting the assembly on to the **Hanger Bolt Hook**



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 on 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.



Spray lanolin liberally on all stainless and alluminium 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.



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 set the correct height, tighten all nuts using a wrench until they are locked securely. Once you have mounted all **Hanger Bolt Hooks** required You are ready to continue with mounting your PV Panels to the rail.



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 6: MOUNTING PV PANELS TO A LONGRUN ROOF
USING S-5 PV KIT - SOLAR MOUNTING BRACKET

In this section we demonstrate mounting PV Panels to a LONG RUN Iron ROOF using the S-5 PV Kit Solar MOUNTING BRACKET. The S-5 PV kit is a universal clamp and can be used as an End Clamp or Inter Clamp and does not require rail.



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



3: 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



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



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.



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



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



Adjust the top riser nut to secure panel and hand tighten with a 3/16" allen key



Continue with the next panels in the array





When the S-5 PV Kit Bracket is used as an Inter Clamp Kit the bottom Riser Nut is not required

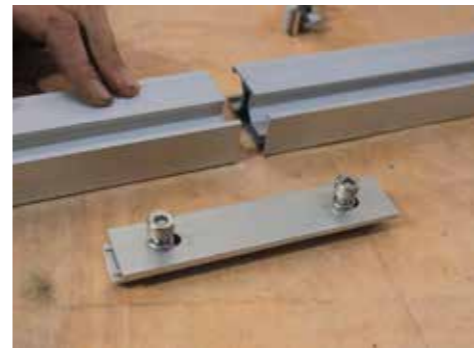


Check you have tightened all nuts with a torque wrench set at 17.5 Nm



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 a M6 Allen Key and use a torque wrench set at 15Nm to tighten



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



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