

ZiLO

Designed &
Engineered
in Australia

Zilo Solar Mounting Solutions Installation Manual

Code-Compliant Planning and Installation Guide Version1



Best In Class **Solar Mounting Solutions**

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ZILO Solar Mounting Solar Systems are emerging leaders in commercial solar mounting solutions. Our products are designed and engineered in Australia by specialists with advanced knowledge of installation requirements.

ZILO Commercial Mounting Systems are Australian owned and operated, with stock available across the country. Made from custom-designed aluminium extrusions and components, Zilo's innovative design, streamlines the installation process. The unique versatile design makes it suitable for a wide variety of commercial applications, building types and zones.

The structural engineering companies we use have the mechanical load tests of our rail and base the site specific engineering reports computations from the data of our mechanical test reports. So when a customer gets our **engineering certification** they are facilitated with **roof fixing components, Certification based on the computation for our mounting kits and Wind and Terrain category zones.**

Our mechanical load tests include:

- Rail strength
- Rail Joiner strength
- Fixing strength (mids / ends)
- Pull Tests
- Bend Tests
- Input data for structural engineering computation reports

Tools used to fix the fittings during the mechanical tests are impact drills **(the tool that site staff use).**

Zilo Solar Mounting Systems provides components such as Eco Rail, Premium Rail, Solar Mount Kit which includes rail joiner, mid clamp, end clamp, earthing plate, grounding lug, L-feet, klip lok clamp, 10 degree fixed tilt and 10-15 degree adjustable tilt legs, cable clips and ties.

Zilo's Commercial products are backed by a 20-year warranty and are compliant with the AS/NZS 1170.2:2021 on wind actions, AS/NZS1170.1:2002(R2016)(CHANGE) on permanent, imposed and other actions, AS/NZS1170.0:2002 on general principles.

***Zilo Rails are designed according to the site specifications for each project.**

***Over 39kW system size require Site specific Certificate**





Americold Logistics



ETEX Australia Pty Ltd



Chartar Hall



Frasers -Techtronic Industries-HY



ESR Horsley Logistics Park



DFO South Wharf

■ All safety practices are implemented when installing Zilo Commercial Solar Mounting Systems.

It is important that all safety practices are observed when installing **Zilo mounting systems**, including:

- Do not throw or roughly handle any Zilo components.
- Do not modify Zilo components in any way. The exchange of bolts, drilling of holes, bending or any other physical changes not described in the standard installation procedure will void the warranty.
- Do not bring Zilo into contact with sharp or heavy objects.
- It is the installer's responsibility to verify the integrity of the structure to which Zilo is fixed.
- Roofs or structures with rotten/rusted purlins, undersized purlins, excessively spaced purlins, or any other unsuitable substructure cannot be used with Zilo. Installation on such structures will void the warranty, and could result in serious injury or death.

■ Wind & Climate Design

A Zilo components installed in accordance with this installation manual is compliant with **AS/NZS 1170.2:2021**. This manual cannot cover all types of buildings and circumstances. For buildings outside the limits stated on the drawings, contact a structural engineer for a custom design.

AS/NZS 1170.2:2021 provides guidance on determining the wind pressures applicable to your Zilo install site, taking into account roof shape and geographic location. Sufficient guidance is given in this document, but you may wish to procure a copy of these standards if your company installs Australia/New Zealand wide.

- Keep in mind average wind speeds are higher for structures mounted closer to the roof perimeter zone (edge)
- 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.
- If alternative fasteners are used to fix the framing to the roof (assuming supplied fasteners are unsuitable for any reason). All screw fasteners must conform to corrosion resistance **Class 4 Australian Standard AS3566** and be of equal or greater strength to those supplied with your Zilo



Handling solar mounting kits properly is crucial to ensure their integrity and safety during transportation and installation.

Below are some general material handling procedures for solar mounting kits:

Storage: Store the solar mounting kits in a dry, clean, and secure area. Avoid exposure to moisture and rain.

If the kits are stored outdoors, protect them with waterproof covers.

Lifting and Carrying: Use appropriate lifting equipment such as forklifts, cranes, or pallet jacks to move heavy and bulky mounting components. Avoid manual lifting whenever possible to prevent injuries.

Packaging Inspection: Before handling, inspect the packaging for any signs of damage or tampering. If you notice any issues, document them, and contact the supplier or manufacturer immediately.

Handling Fragile Components: Some mounting kits may include delicate parts such as solar panels or fragile brackets. Handle these components with extra care to avoid breakage.

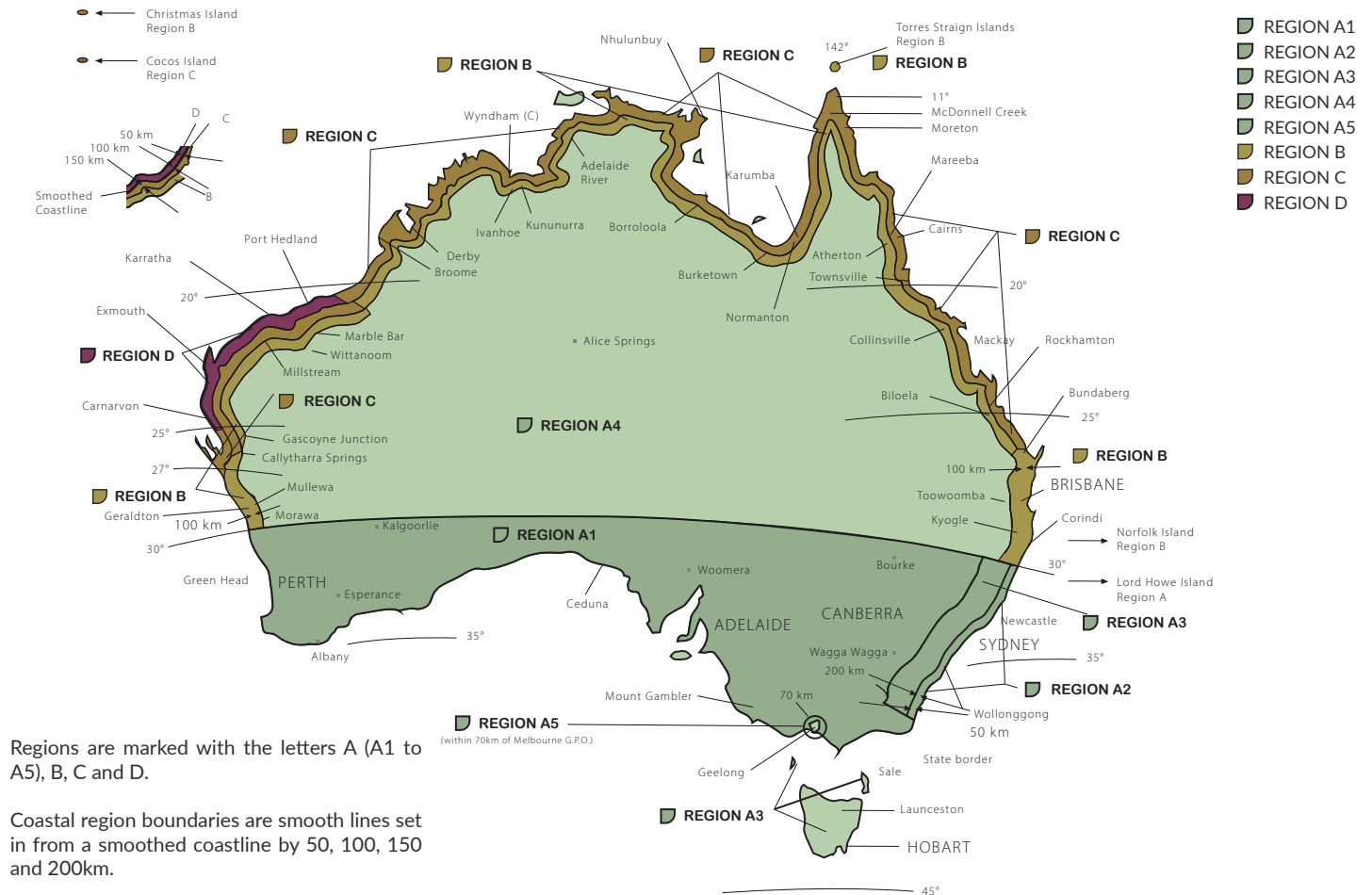
Documentation: Maintain proper documentation, including packing lists, invoices, and shipping documents, to track the movement of the mounting kits and assist with any potential claims or issues.

Site Preparation: Before installation, make sure the installation site is clear, level, and free from debris that could interfere with the mounting process.

Always refer to the ZILO's guidelines and specific instructions for handling the particular solar mounting kits you are working with, as different kits may have unique requirements. Adhering to proper material handling practices will help maintain the quality of the components and ensure a successful and safe solar installation.



Determine the wind region of your installation site



Regions are marked with the letters A (A1 to A5), B, C and D.

Coastal region boundaries are smooth lines set in from a smoothed coastline by 50, 100, 150 and 200km.

Islands within 50km of the coast are designated in the same region as the adjacent coast.

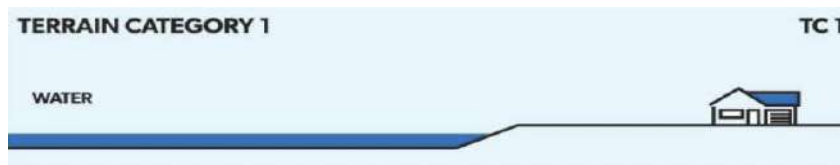
Region Definition

Wind regions are predefined for the whole of Australia by the Australian Standard 1170.2. The Wind Region is an independent factor of surrounding topography or buildings.

- Most of Australia is designated Region A which indicates a Regional Wind Velocity of 43 m/s with wind average recurrence of 200 years.
- Some areas are designated Region B (52 m/s). Local authorities will advise if this applies in your area.
- Region C areas (64 m/s) are generally referred to as Cyclonic and are generally limited to northern coastal areas. Most Region C zones end 100km inland.
- Region D (79 m/s) is Australia's most extreme Cyclonic Region, located between the town of Carnarvon and Pardoo Station in Western Australia.

Determine the Terrain Category

Terrain Category 1 (TC1): This category refers to very exposed open terrain with minimal obstructions. It includes flat, treeless plains with poor grass cover, as well as rivers, canals, lakes, and enclosed bays that are smaller than 10km in the direction of the prevailing wind.



Terrain Category 1.5 (TC1.5): TC1.5 applies to open water surfaces experiencing shoaling waves. It encompasses near-shore ocean waters, larger unenclosed bays in seas and oceans, lakes, and enclosed bays that extend more than 10km in the direction of the prevailing wind. The terrain height multipliers for this category are determined through linear interpolation between the values of TC1 and TC2.

Terrain Category 2 (TC2): This category covers open terrain, including grasslands, with scattered obstructions ranging from 1.5m to 5m in height. The obstructions should not exceed two per hectare. Examples include farmland and cleared subdivisions with isolated trees and uncut grass.



Terrain Category 2.5 (TC2.5): TC2.5 represents terrain with a few trees or isolated obstructions, intermediate between TC2 and TC3. It typically characterizes developing outer urban areas with scattered houses or larger acreage developments with fewer than ten buildings per hectare. The terrain-height multipliers for this category are determined through linear interpolation between the values of TC2 and TC3.

Terrain Category 3 (TC3): TC3 applies to terrain with numerous closely spaced obstructions ranging from 3m to 10m in height. The minimum obstruction density should be equivalent to at least ten house-sized obstructions per hectare. Examples include suburban housing areas or light industrial estates.



Terrain Category 4 (TC4): TC4 refers to terrain with numerous larger and closely spaced buildings, typically ranging from 10m to 30m tall. This category includes large city centers and well-developed industrial complexes.

Tools

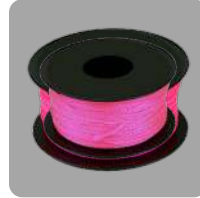
Tools required for penetrative, non penetrative and for tile



Nut Driver Bit



13mm Spanner



String Line



Tape



Circular Saw



6MM Hex bit



PPE Kit



Impact drill with
Torque Settings

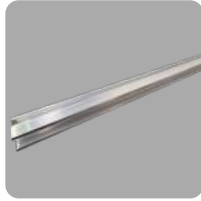


Torque
Wrench

Components



Eco Rail



Premium Rail



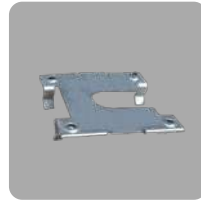
Rail Joiner



Mid Clamps



End Clamps



Earthing Plates



Grounding Lug



Cable Clips



Tile Hook



Klip Lok Clamp



Adjustable Tilt Leg



10 Degree Tilt Leg



Allen Nut/Bolt



Tin Screw



L Feet

How to use Impact drill with Torque Settings



The impact drill will come with various speed settings. For instance, Milwaukee drills offer specific speed settings.

To find the speed settings for your particular drill model, please refer to the Installation Manual provided with the different product.



M18 FUEL™ 1/4" HEX IMPACT DRIVER

Milwaukee Impact Drill with Torque Wrench

Due to the constant variability in impact drills and their settings, it is recommended to individually test each impact drill. Follow these steps:

- Install the Zilo component using the impact drill and take note of the drill's setting.
- Use a torque wrench on the Zilo component to verify the applied torque.
- If the torque is below the required limit of the Zilo component, increase the impact drill's setting and repeat the process until the required torque is reached.
- If the torque exceeds the required limit of the Zilo component, decrease the impact drill's setting and repeat the process until the required torque is achieved.

Speed Selection Settings for Milwaukee

Mode	Accessory/Fastener Material			Aluminium
	1	2	3	
RPM	0-1700	0-3000	0-3900	Designed for driving self-tapping screws in sheet metal
IPM	0-1400	0-3600	0-4400	

Please refer to the Milwaukee product manual for more information:

<https://www.totaltools.com.au/media/product-attachments/Milwaukee-18V-Fuel-14inch-Hex-Impact-Driver-M18FID20-Product-Manual.pdf>

Tin Roof

Overview of the System Overview



- 1 ▶ L-foot
- 2 ▶ Zilo Rail
- 3 ▶ Rail Joiner
- 4 ▶ End Clamp
- 5 ▶ Mid Clamp

Flush Mounting System

Penetrative and Non-Penetrative

“**Penetrative solar installation**” refers to a type of solar panel installation method that involves attaching solar panels to a surface by penetrating it, typically through fasteners or mounting brackets. The panels are secured directly onto the surface, such as a roof or a ground-mounted structure, by drilling holes and using screws or bolts to fix them in place.

This installation method requires making penetrations in the surface, which may involve drilling holes through roofing materials, concrete, or other structural elements. The penetrations provide a secure attachment for the solar panels, ensuring they remain in place even during extreme weather conditions.

Penetrative solar installations are commonly used in residential, commercial, and industrial sites. They are a popular choice because they provide a stable and durable mounting solution for solar panels. However, it's important to ensure proper installation techniques are followed to maintain the integrity of the surface and prevent any potential water leaks or structural issues.



“**Non-penetrative solar installation**” refers to a type of solar panel installation method that does not require penetrating the surface on which the panels are mounted. Instead of drilling holes or using fasteners that penetrate the surface, non-penetrative installations rely on alternative mounting systems that do not compromise the integrity of the underlying structure.

Non-penetrative solar installations are commonly used in situations where the property owner wants to avoid any potential damage to the roof or surface. They are often preferred for leased or temporary installations, as well as for buildings with sensitive roofing materials or structural considerations.



Eco / Premium Rail

Introducing our PV Panel rails, a robust structural component meticulously designed to provide unwavering support and securement for solar panels or modules. Crafted from durable materials such as aluminum or steel, these rails are engineered for installation on rooftops or ground-mounted structures. Their primary objective is to guarantee the steadfastness and safety of the solar panels by furnishing a dependable mounting platform.

Within our product range, we offer two distinct types of rails:

Eco Rail: These rails boast a weight of 68g/m, ensuring a balance of strength and reliability for your solar installation.

Premium Rail: Our premium rails exhibit a weight of 73g/m, providing enhanced durability and dependability for your solar panel setup.

Choose the rail that best suits your project's requirements, knowing that both options are carefully engineered to meet the highest standards of quality and performance."

The solar module rail is a sturdy structural component specifically created to provide support and secure solar panels or modules. It is typically constructed using robust materials such as aluminum. The rail is designed to be installed on rooftops or ground-mounted structures. Its primary purpose is to ensure the stability and safety of the solar panels by offering a reliable mounting platform.



How to Cut Rails

Safety Precautions: Wear proper safety gear. Clear and secure the work area.

Marking: Measure and mark the desired length accurately.

Secure the Rail: Place the solar rail on a stable surface. Use clamps to prevent movement.

Blade Selection: Use a suitable circular saw blade for metal cutting. Ensure it's in good condition and properly mounted.

Adjust the Cutting Depth: Set the cutting depth slightly deeper than the rail's thickness.

Positioning: Align the saw blade with the marked line. Hold the saw firmly with both hands.

Start the Saw: Turn on the saw and let the blade reach full speed.

Make the Cut: Guide the saw slowly along the marked line. Apply gentle pressure, letting the saw do the work. Maintain a steady cutting motion.

Complete the Cut: Gradually release the saw trigger. Wait for the blade to stop before lifting it.

Safety First: Wait for the blade to stop before adjusting or removing it. Exercise caution when handling power tools.

Inspect the Cut: Check the cut for accuracy and smoothness. If necessary, use a file or deburring tool to remove any rough edges or burrs.



Rail Joiner

When multiple sections of rail need to be connected together, a solar rail joiner is used.

1. Bring the second rail up to the first rail and slide the rail joiner to the centre of both the rails.
2. Then secure the M8 bolts using the impact driver. The splice provides electrical connection between the two rails through pressure bolts, eliminating the need for using two earthing lugs.

The recommended torque for fastening is 17 N-m.



PV Module Installation

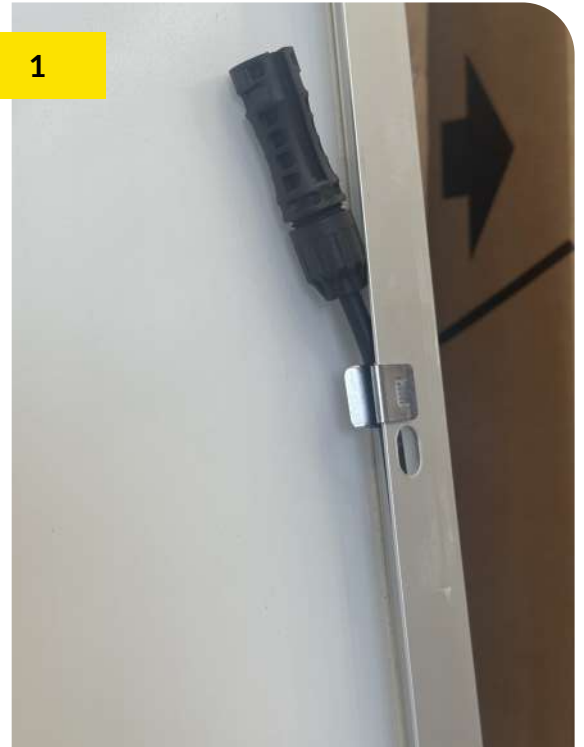
Cable Clips

Step 1: Installing Cable Clips

- Place the cable clip against the side of the frame.
- Press the clip firmly until it securely attaches in place.
- Install all five clips in this order: one above the hole, one higher up, and one below for the negative end.
- For the positive end, position one directly across from the negative J-Box and another higher up.

Step 2: Securing the Negative Cable

- Start with the negative end of the cable
- Insert it into the designated section.
- Run the excess cable down the frame and flip it into the bottom clip.
- Straighten the remaining excess cable to create a straight line along the frame.
- Clip the cable securely into place.



PV Module Installation

Cable Clips

Step 3: Installing the Positive Lead

- Begin at the junction box with the positive lead.
- Clip it straight across and run the excess lead straight up to reach the top clip.
- Firmly clip the positive lead into the top clip. This will be plugged into the opposite panel.
- The remaining loop, which has the previously installed extra clip, should be attached, creating a small loop at the top.
- Ensure the loop is not sagging. If the loop is too large adjust the clips to prevent sagging.

4



5



Tin Interface Installation

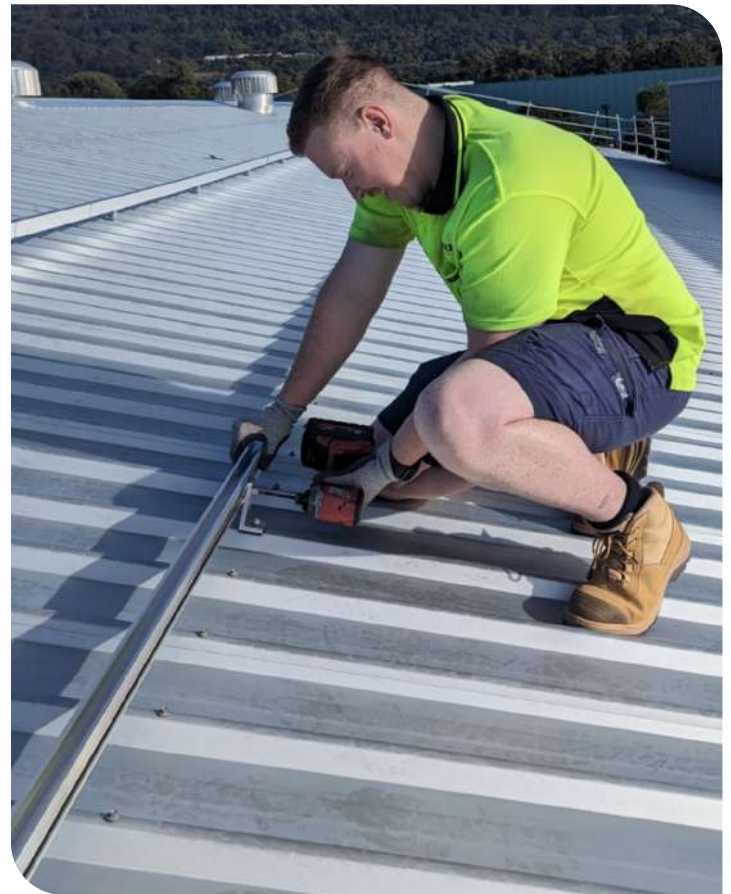
L Feet

As per your PV layout, identify and mark using marker, where you'll be installing the L-feet on the roof. Carefully drill holes through the marked locations on the roof.

Place the L-feet back over the drilled holes and secure them to the roof using 14g-10 TPI Tek screws on the roof at the predetermined locations.

Make sure the L-feet are firmly attached and flush with the roof surface.

It is recommended to apply a torque of **15-17 N-m** when fastening the M8 bolt.



Klip Lok Clamps

Installation of Kliplok Interface

1. As per your PV layout, identify and mark using marker, where you'll be installing the klip lok clamp on the roof.
2. Secure the clamp to the roof rib and tight en the bolts with the impact driver, now the klip lok clamp interlocks to the rib
3. Now, tighten the L-foot bolt on top of klip lok clamp using the impact driver.

The recommended torque to apply is **15-17N-m**.



Tilt Legs- Front/ Rear

1. The mounting position and direction of the front and rear legs will depend on site specific requirements.
2. Make sure the tilt legs (front and rear) are aligned and spaced correctly as per the designed plan.
3. Now, run the Zilo rail to the front and rear leg and secure the bolt to fix the rail using the impact driver.
4. Ensure the rails are straight and securely fastened to the respective tilt legs

Make sure the angle of the of the rear tilt leg should be less than 90 degrees to the roof horizontal surface.

The recommended torque is **17N-m**



Grounding Lugs

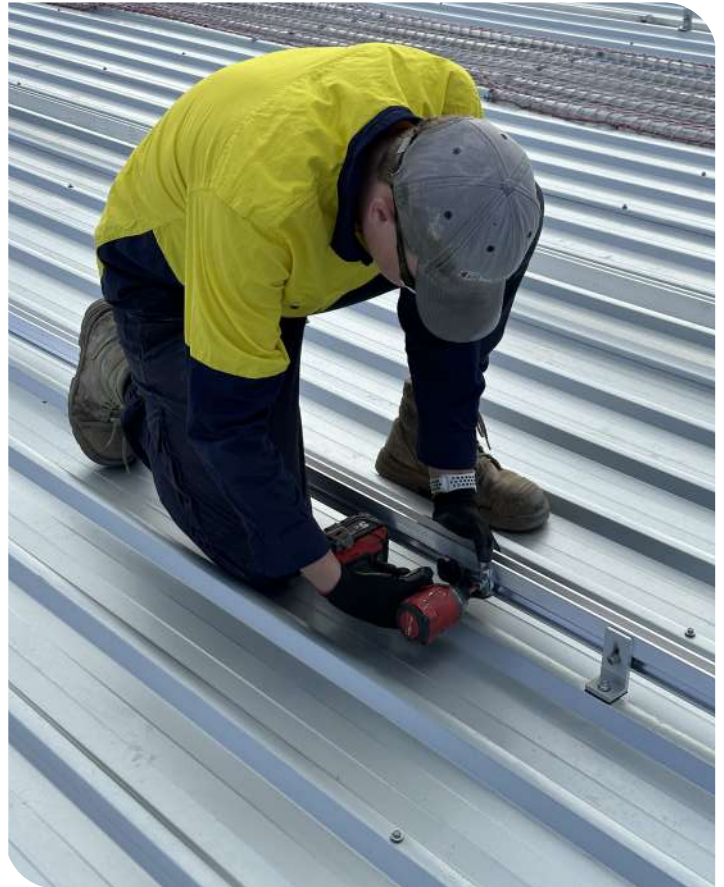
Install one pre-assembled Grounding Lug per Rail. Insert the Grounding Lug into the rail channel. Installation of grounding lugs on Zilo Rail either on side or top of the channel depending on your site requirement and secure the M8 bolt.

Strip the earthing cable (as per local standards) and insert the conductor into the provided copper tube.

Place the copper tube into the channel of the Grounding Lug and tighten the bolt to ensure a secure connection for the earthing cable.

Note: Make sure the earthing continuity is established between the rails and the DC cable tray.

Below are some pictures of installing the grounding lug on the side channel and top channel of the rail.



Corrosion on Dissimilar metals

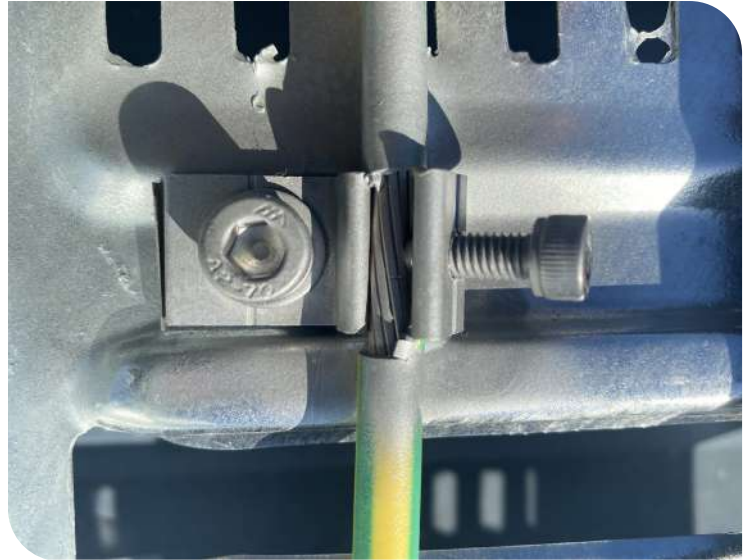
Grounding Lugs

Contact between dissimilar metals occurs frequently but is often not a problem. The aluminium head on a cast iron block, the solder on a copper pipe, galvanising on a steel purlin and the steel fastener in an aluminium sheet are common examples.

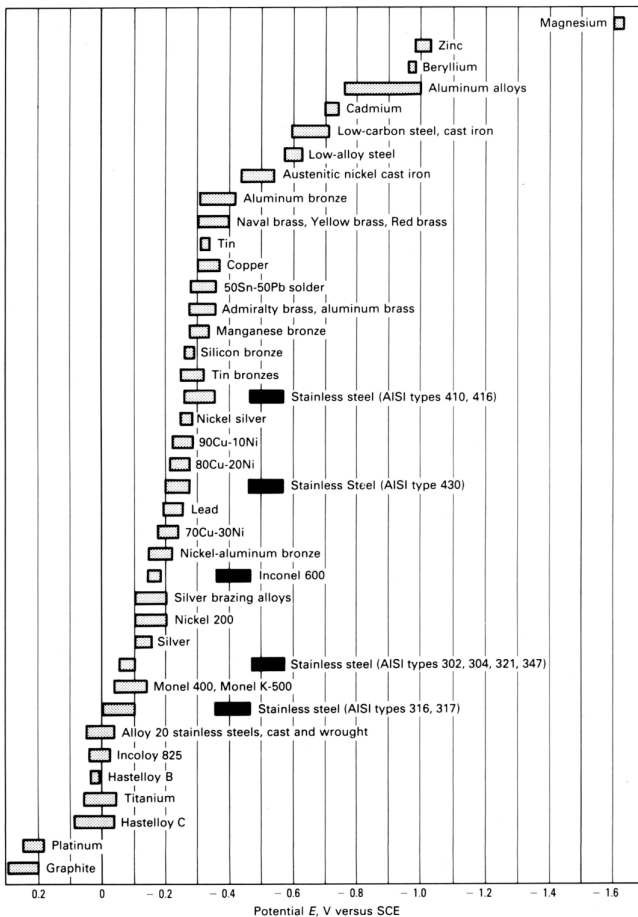
What causes galvanic corrosion?

For galvanic or dissimilar or electrolytic corrosion to occur, three conditions must be met:

- The metal join must be wet with a conductive liquid.
- There must be metal-to-metal contact.
- The metals must have sufficiently different potentials



Galvanic Series



Klip Lok Clamps

Corrosion on Dissimilar metals

If two different metals are placed in electrical contact and bridged by an electrolyte, a current flows through the solution from the anodic to the cathodic or more noble metal. As a result, the cathodic metals tends to be protected but the anodic materials may suffer great corrosion.

Compatibility between different metals and alloys

Cladding Material	Accessory/Fastener Material							
	Stainless Steel (300 Series)	Zinc-Coated Steel and Zinc	Zinc/aluminum coated steel	Aluminium	Copper & Brass	Lead	Monel	Carbon Black***
Zinc-coated steel & zinc	No	Yes	Yes*	Yes*	No	Yes**	No	No
Zinc/aluminium - coated steel	No	Yes*	Yes	Yes	No	No	No	No
COLORBOND®	No	Yes*	Yes	Yes	No	No	No	No
COLORBOND® METALLIC	No	Yes*	Yes	Yes	No	No	No	No
COLORBOND® ULTRA	No	Yes*	Yes	Yes	No	No	No	No
COLORBOND® STAINLESS	Yes	No	No	No	No	No	No	No

Reference to the table above: https://dashboard.bluescope.co.za/_media/resource/615163c19ff22-bed6fb24fbc00bc7fd5d266773589a45406ccc16.pdf

Aluminium of Zilo Universal Clip Lock interface indicating it is not an issue as a dissimilar metal with Klip Lok roof sheeting

Aluminium 6005-T5	Chemical Composition (%)							
	Mg	Si	Cu	Fe	Mn	Zn	Cr	Ti
Test Requirements	0.40~0.6	0.60~0.90	≤0.10	≤0.35	≤0.10	≤0.10	≤0.10	≤0.10
Test Results	0.544	0.731	0.012	0.192	0.011	0.012	0.011	0.013
Conclusion	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Note: a Refer to the GB/T 6892-2015 standards

Links to Disimilar Metals

<https://membership.corrosion.com.au/wp-content/uploads/2017/08/CM-April-2013-Galvanic-Corrosion-Dissimilar-Metals-Technical-Intro.pdf>

Corrosion on Rails

AS/NZS 2312.2 incorporates the most up-to-date global standards for assessing corrosion and designing Hot-Dip Galvanizing (HDG). Consequently, the expected durability of HDG, often referred to as "life to first maintenance," is now calibrated with long-term performance data from both Australian and internationally recognized standards. This alignment has led to an increase in the quoted lifespan for HDG coatings on structural steel, as demonstrated in Table 1. This updated standard serves as a valuable resource for steel designers seeking guidance on effective methods for protecting structural steel from corrosion.

AS/NZS 4680				AS/NZS 2312.2 Corrosivity category & Life to first maintenance (years)					
Steel thickness	Coating mass and thickness		Designation	2002	C2	C3	C4	C5	CX*
mm	g/m ²	µm		versus 2014 edition					
>1.5 to ≤3.0	390	55	HDG390	2002 2014	25+ 78->100	15-25 26-78	5-15 13-26	2-5 6-13	- 2-6
>3.0 to ≤6.0	500	70	HDG500	2002 2014	25+ >100	25+ 33-100	10-25 16-33	5-10 8-16	- 2-8
>6.0	600	85	HDG600	2002 2014	25+ >100	25+ 40->100	15-25 20-40	5-15 10-20	- 3-10
>>6.0	900 [†]	125	HDG900 [†]	2002 2014	25+ >100	25+ 60->100	25+ 30-60	10-25 15-30	10-25 15-30

NOTES:
[†] CX* is a new corrosivity category, not previously referenced in local or International Standards.
[†] Hot dip galvanized coatings thicker than 85µm are not specified in AS/NZS 4680, however in conjunction with the galvanizer, a specification can be written for thicker coatings.

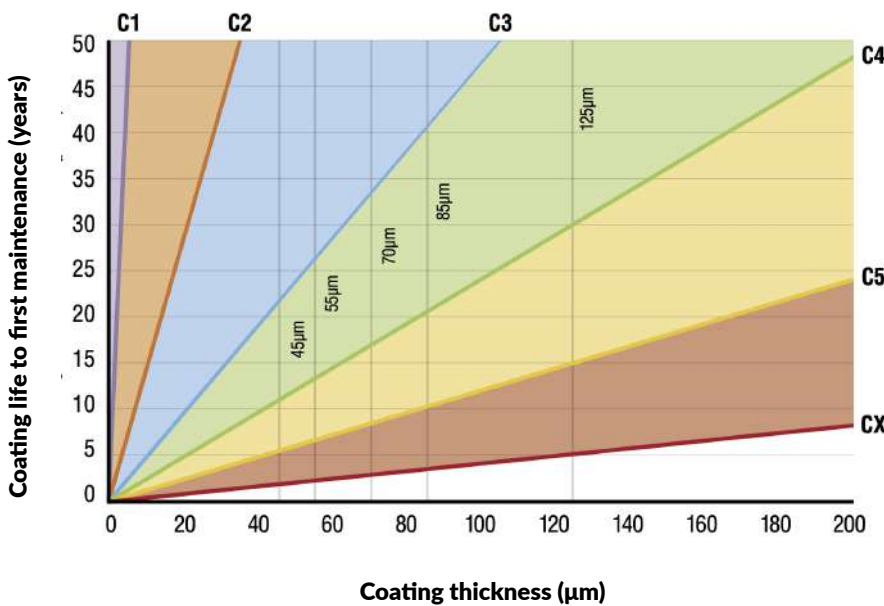


Figure 2: Calculated corrosivity rates for hot dip galvanizing from AS/NZS 2312.2 can be represented in a graphical format for quick estimates. For example, a coating thickness of 85µm can be estimated to last a minimum of 20 years to a maximum of 40 years in a C4 environment

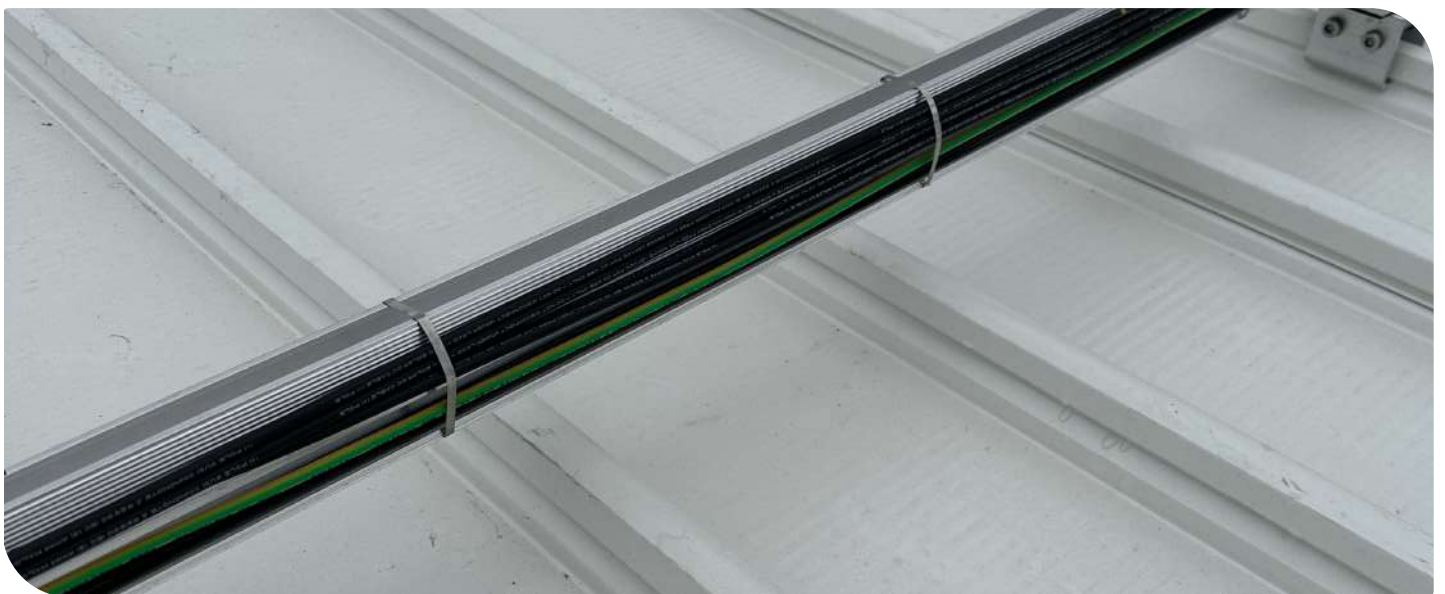
Reference to the table above:
<https://auprogal.com.au/wp-content/uploads/2021/05/Changes-to-ASNZS-2312.2.pdf>

How to run DC Cables?

Plan the cable routing before installation to ensure an organized and efficient layout. Consider factors such as cable length, voltage drop, proximity to other cables or components, and compliance with local electrical standards.

Protect the DC cables from potential damage, such as physical abrasion, sharp edges, or exposure to excessive heat and there shall be only one cable to be run behind the keystone, refer image on the right.

If there are more than one cables to be run, it shall be run on side of the channel and the cables are to be fixed using a stainless steel cable ties to prevent sag, refer attached image at the bottom.

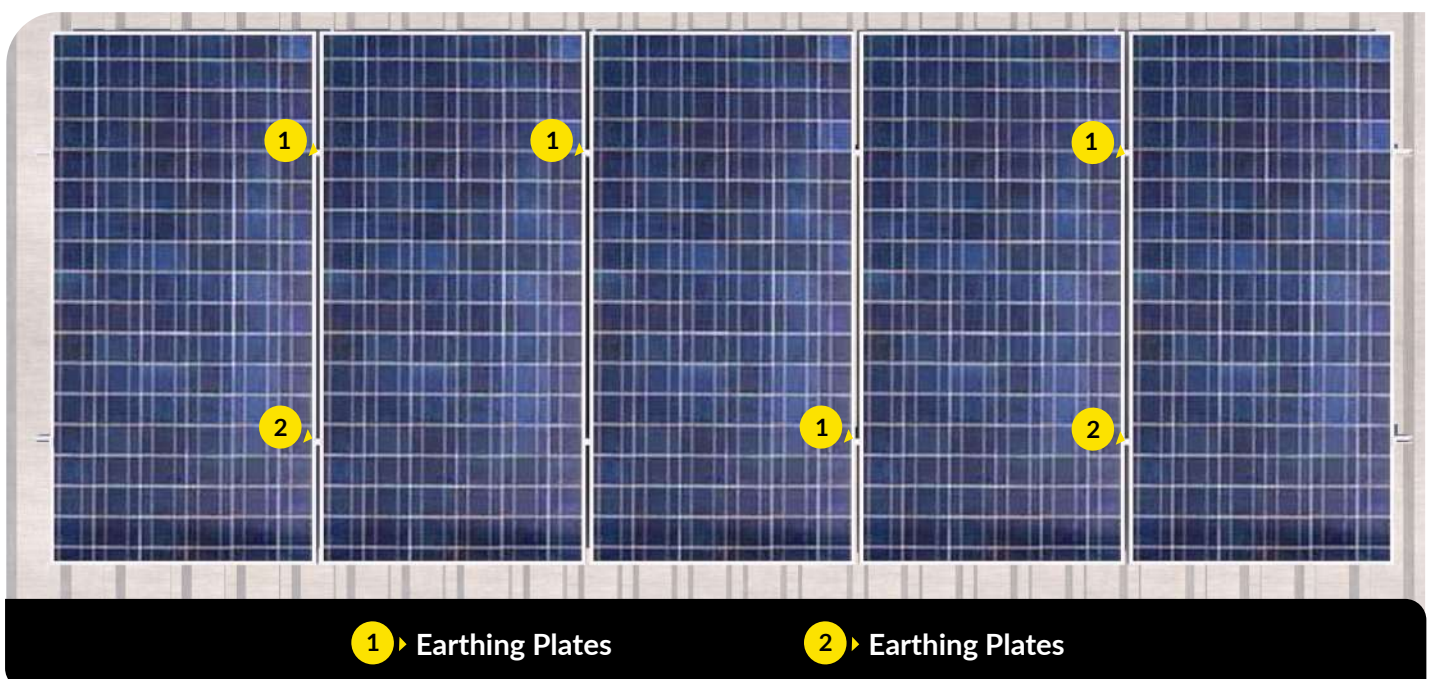


■ Earthing Plates

When installing Earthing plates, insert it into the rail channel and gently elevate the framed PV Module to confirm that the Earthing plate is completely enclosed, as depicted in the illustration on the right.

Additionally, ensure that the frame of the PV Module makes close contact with the earthing plates, as illustrated on the right.

Repeat the above steps to install all PV Modules. Conduct a visual inspection to verify that the earthing plates and PV modules are correctly positioned, and then proceed to securely tighten all the Clamps.



Mid Clamps

Steps for installing Mid clamps to install PV modules:

Zilo Mid clamps are available to fix both the panels.

These are used to support both the panels, and it will be fixed to zilo rail.

Insert the Mid clamp into the top channel of the Zilo rail and push the clamp firmly against the already fixed module.

Now, then push the next module against the other side of the mid clamp.

The recommended torque to fix the bolt is 15-17N-m.



End Clamps

Steps for installing End clamps to install PV modules:

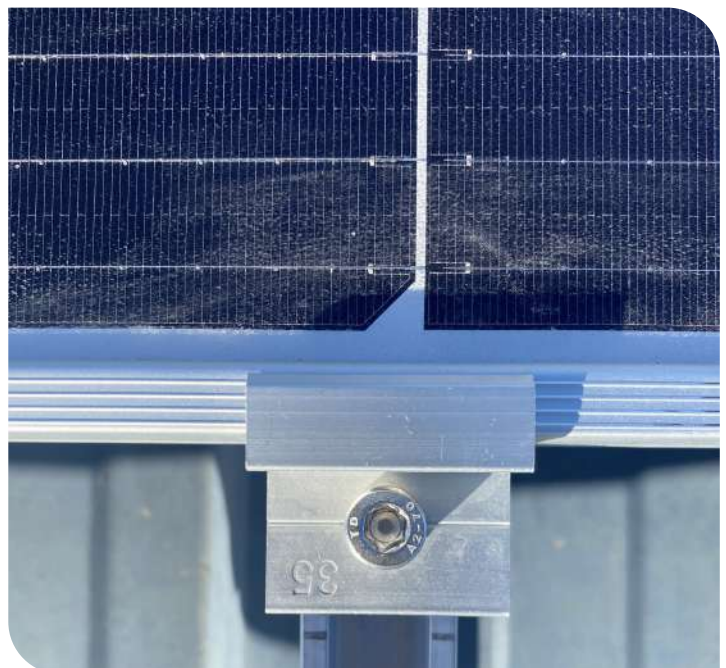
Zilo End clamps are used to secure the solar panels to the mounting rails at the edges of the each panel.

Proper installation ensures the panels are securely attached and do not move.

Place an end clamp over the mounting rail at the marked position. Insert the bolt through the hole in the rail.

Secure the end clamp by attaching a nut to the bolt on the underside of the mounting rail.

The recommended torque to fix the bolt is **15-17N-m**



PRODUCT LIMITED WARRANTY TERMS AND CONDITIONS

Zilo Solar Mounting Systems, shall provide the Limited Warranty (as defined herein) to the purchaser of any Eco Rail, Premium Rail, Solar Mount Kit which includes Panel tile kits, Panel tin kits, Panel tilt accessories, 10Degree fixed tilt systems and Kilp lok +Lfoot.

Subject to the terms and conditions of the Limited Warranty as set forth herein (the "Warranty Terms and Conditions"), a Product shall be considered a "Deficient Product" if Buyer provides written notification of the occurrence of the following within the associated warranty period enumerated below, and proves to Zilo's satisfaction that the deviation exists:

- (i) the Product exhibits a structurally-relevant deviation from Zilo's manufacturing specifications within a period of twenty (20) years from date of Product manufacture ("Structural Warranty");
- (ii) the Product has an anodized finish resulting in visible peeling, cracking or chalking under normal atmospheric conditions within a period of five (5) years from date of Product manufacture ("Finish Warranty"; collectively, the Structural Warranty, and the Finish Warranty are the "Limited Warranty").

The Limited Warranty covers only the Product, and not PV modules, electrical components or wiring used in connection with the Product, or any other materials not provided by Zilo. The Limited Warranty applies exclusively to the Buyer, and third parties will have no rights or benefits under the Limited Warranty. The Limited Warranty is non-assignable, except upon the written consent of Zilo or if the Products remain at their original installation location. Claims for a breach of the Limited Warranty can only be made:

- (i) during the relevant Limited Warranty periods as set forth above,
- (ii) with a proof of purchase as was issued by Zilo to Buyer which includes the Product purchase date and
- (iii) written notification of such Limited Warranty claim being given in writing within thirty (30) days of the alleged occurrence giving rise to the Limited Warranty claim to Zilo at the following address: Zilo Solar Mounting Systems 4 Bridge Rd, Keysborough 3173, Melbourne, VIC 3173

Zilo shall have no obligation under the Limited Warranty:

- (i) with regard to the Finish Warranty, for problems or defects caused by physical damage or contact with any foreign substance;
- (ii) for Product installed in corrosive conditions, as determined solely by Zilo;
- (iii) with regard to the Finish Warranty, if the practices listed in AAMA 609 & 610- 02 – "Cleaning and Maintenance for Architecturally Finished Aluminum" (www.aamanet.org) are not followed by Buyer;
- (iv) for damage to the Product that occurs during its post-sale shipment, storage, or installation, or from force majeure acts including fire, flood, earthquake, storm, hurricane or other natural disaster, war, terrorist activities, acts of foreign enemies and criminal acts;
- (v) for normal wear and tear;
- (vi) for events caused by faulty wiring work, faulty installation work or faulty handling during such work, or for events due to glass breakage caused by external influences or flying objects;
- (vii) for problems or defects due to other influences, such as dirt on the front glass, soiling or damage caused by smoke, salt or other dirt; or

- (viii) if, in Zilo's sole opinion: a) installation of the Product was not performed in accordance with the Zilo Product instructions;
- b) the Product was modified, repaired, or reworked in a manner not authorized in writing by Zilo or c) the Product was installed in an application for which it was not designed.

Zilo shall, at its sole option and discretion, either repair or replace with a comparable product, or refund Buyer's purchase price of, a Deficient Product ("Remedy"). Buyer and Zilo acknowledge and agree that the Remedy is Zilo's sole and exclusive obligation and Buyer's sole and exclusive remedy under this Limited Warranty and with respect to the Product. Where a Deficient Product is no longer being manufactured by Zilo, Zilo reserves the right to supply another type. Absence of Zilo's receipt of written notification within the applicable warranty period in compliance with the terms and conditions set forth herein shall constitute a waiver of all claims under the Limited Warranty.

Zilo's performance of a Remedy shall not cause the beginning of a new warranty period, nor otherwise extend the applicable warranty period. Zilo's cumulative aggregate liability under this Limited Warranty shall not exceed the original purchase price of the Product. Buyer shall bear all costs of shipment and transportation related to the repair or replacement of Deficient Product.

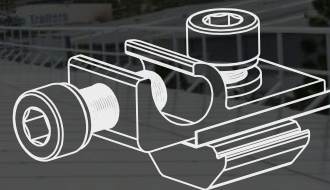
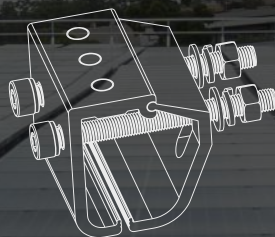
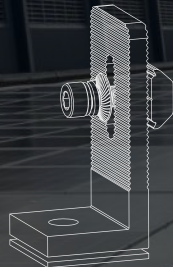
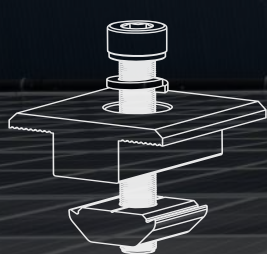
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Installation Manual