EzQuik™ Model 2012

Code-Compliant

Installation Manual V1022

(AS/NZ1170.2.2021)

MicroSolar System Pty Ltd

MicroSolar System

EzQuik™ **Aluminum Solar PV Module Mounting System**

CONTENTS

SECTION 1 INTRODUCTION

1.1 _EzQuik_

Thank you for choosing **_EzQuik_**.

This manual provides easy and quick step-by-step planning and installation instructions.

This is an update for installation manual v1019. The mounting systems and new installation description meet the new (2021) version of AS/NZS1170.2.

The mounting system is compliant with applicable local or Australian/New Zealand building codes:

AS 1170.2 part 2:   Wind Loads

AS 4100   Steel and Fasteners

AS 2050   Installation of roof tiles

AS 1562.1   Design and installation of sheet roof and wall cladding

AS/NZS 3000:2007   Wiring Rules

AS/NZS 5033:2005   Installation of photovoltaic (PV) arrays

1.2 Why _EzQuik_?

● The fasteners Full compliant with the National Construction Code (NCC 2022)

● **_EzQuik Mounting System_** provides absolutely SAFE products; by using high strength material and providing most reasonable design along with certified engineer reports.

● Two steps EASY installation! Only **Plug** and **Drill** to fix connections with **_EzQuik_** _T-Bolt_.

● Internal build-in earthing System with NO extra jobs needed; Make installation EASIER and FASTER! _Refer to Clause 5.4._

1.3 Before You Begin

Please verity that all components are included and consistent within your order.

To avoid conflicts, never modify or combine the system with components that are not provided by MSS; otherwise warranty provided for this system will be voided.

SECTION 2 INSTALLER'S RESPONSIBILITY

Please read this manual thoroughly before installing *EzQuik Aluminium Solar PV Module Mounting System.* This manual provides engineer supporting documentations for building permit applications within Australia and New Zealand in relation to *Aluminium Solar PV Module Mounting System* and also provide planning and installation assembly instructions for *Aluminium Solar PV Module Mounting System*.

When *Aluminium Solar PV Module Mounting System* is installed in accordance with the guidelines provided, it is required to be installed structurally adequate and meet the structural requirements of the different wind regions in Australia and New Zealand in accordance with the following standards: AS 1170.2 SAA part 2 Loading Code – Wind Loads, AS2050 Installation of roof tiles, AS/NZS1562.1 Installation and Design of sheet roof and wall cladding, AS3000 Wiring Rules and AS5033 Installation of PV arrays.

The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any that may supersede this manual;
- Ensuring that products from MSS are appropriate for the particular installation and the installation environment;
- Ensuring that the roof, rafters, connections, and other structural support members can support the modules under all code level loading conditions (this total building assembly is referred to as the building structure);
- Using only MSS parts and installer-supplied parts as specified by MSS (substitution of parts may void the warranty and invalidate the letters of certification in all MSS publications);
- Ensuring that lag screws have adequate pullout strength and shear capacities as installed;
- Verifying the strength of any alternate mounting used in lieu of the lag screws;
- Maintaining the waterproof integrity of the roof, including selection of appropriate flashing;
- Ensuring safe installation of all electrical aspects of the PV array.

SECTION 3   *EzQuik* MOUNTING SYSTEM COMPONENTS
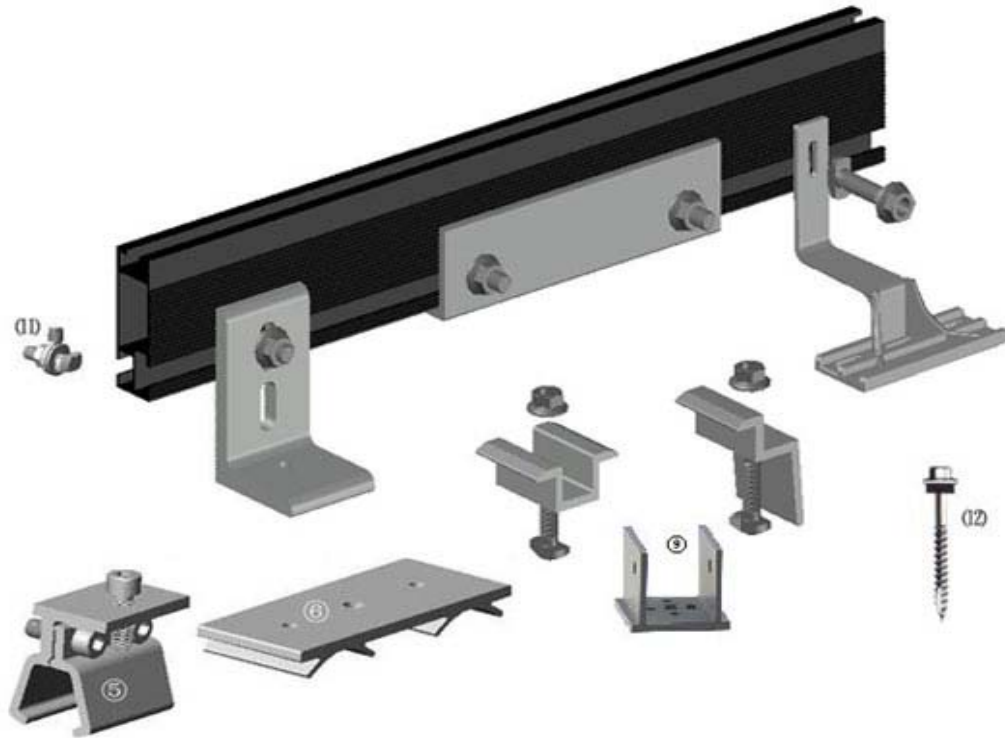
1. **Rails**– Two rows of rails were often used to support one row of PV modules. Rails are 3400mm in length, with surface anodized and manufactured with Aluminium extrusion.

2. **Rail Splicer** – Used to join and align rails into one single continuous rail line; as well as achieve rigidity in strength and act as thermal expansion joint. Splicers are 150mm in length, predrilled, anodized surface and manufactured with Aluminium extrusion.

3. **L-Feet** – Use to secure rails on tin roofing. Refer to TABLE 4.4.3.2 for spacing. L-Feet provide anodized surface and are manufactured with Aluminium extrusion.

4. **Tile Hook** – Used to secure rail on tile roof. Refer to TABLE 4.4.3.1 for spacing. Tile Hooks are manufactured with stainless steel or steel with zinc plated.

5. **Klip-Lok Clamp** – Used to secure rails on both Lysaught® Klip-Lok 700/406 Tin roof without penetration. Refer to TABLE 4.4.3.3 for spacing. Klip-Lok Clamp provides anodized surface and are manufactured with Aluminium extrusion.

6. **Corrugated Bracket TB-1** – Perfectly connects with Corrugated Roof; provide stable foundation to other *EzQuik* footings. Refer to TABLE 4.4.3.2 for spacing. Bracket Platform TB-1 provide anodized surface and are manufactured with Aluminium extrusion.

7. **Mid Clamp** – Installed in between the PV modules with M8 stainless steel T-blots and flange nuts provided and used to attach PV modules to rails. Mid Clamps provide anodized surface and are manufactured with Aluminium extrusion.

8. **End Clamp** – Used to attach PV modules to rails with M8 stainless steel T-bots and flange nuts provided. End Clamp provide anodized surface and are manufactured with Aluminium extrusion.

9.**Square-Feet**– Used to connect *EzQuik* Base Rail to Tin Roof; and used in combination with Stainless Steel Hex-socket Round Head Bolts M8 x 65. It's also to connect *EzQuik* tilt system

10. **MSS T-bolt**– Provide in combination with M8 stainless steel flange nut. Used as fasteners to connect footings and parts to each other.

11. **MSS Earthing Lug**– Provide attaching point for earthing cables, and is installed either on top or on the side of the rails.Only one Earthing Lug would be required for each module array.

12. **Hex Seal Timber Screw** – Used to secure brackets to roof structures. Screws were manufactured according to Australian Standard.

Note:

● **Waterproof roofing sealant** – Sealant should be used on roofs for waterproof purposes. Consult with local roofing company for further details.

SECTION 4   PLANNING YOUR *EzQuik* INSTALLATION ON ROOF

4.1 Installation Zone

Confirming the installation zone is the first step.

Center the installation zone over the roof structural members as much as possible.

Panels should provide a gap between 50mm and 300mm between the underside of the panel and the roof surface.

Use the following table (TABLE 4.1) to find out the minimum distance between panel and roof edge (**A**) in Fig.4.1 according to the roof height and width.

TABLE 4.1   MINIMUM DISTANCE BETWEEN PANEL AND ROOF EDGE (**A**)

ROOF HEIGHT (m)	SHORT EDGE DISTANCE OF ROOF (m)						
	3	6	10	12.5	15	20	≥25
5	0.3	0.3	0.4	0.5	0.6	0.8	1.0
10	0.3	0.3	0.4	0.5	0.7	0.9	1.0
15	0.3	0.4	0.5	0.6	0.8	1.0	1.0

Source from: AS/NZ 1170.2

The width (**W**) of the installation zone equals the length of whole module.

The length (**L**) of the installation zone will equal to the following; the total width of the modules, plus 26mm for each space between modules (for mid-clamp) and plus 80mm (Minimum 40mm for each panel away from edge of rail). See FIG. 4.1.1

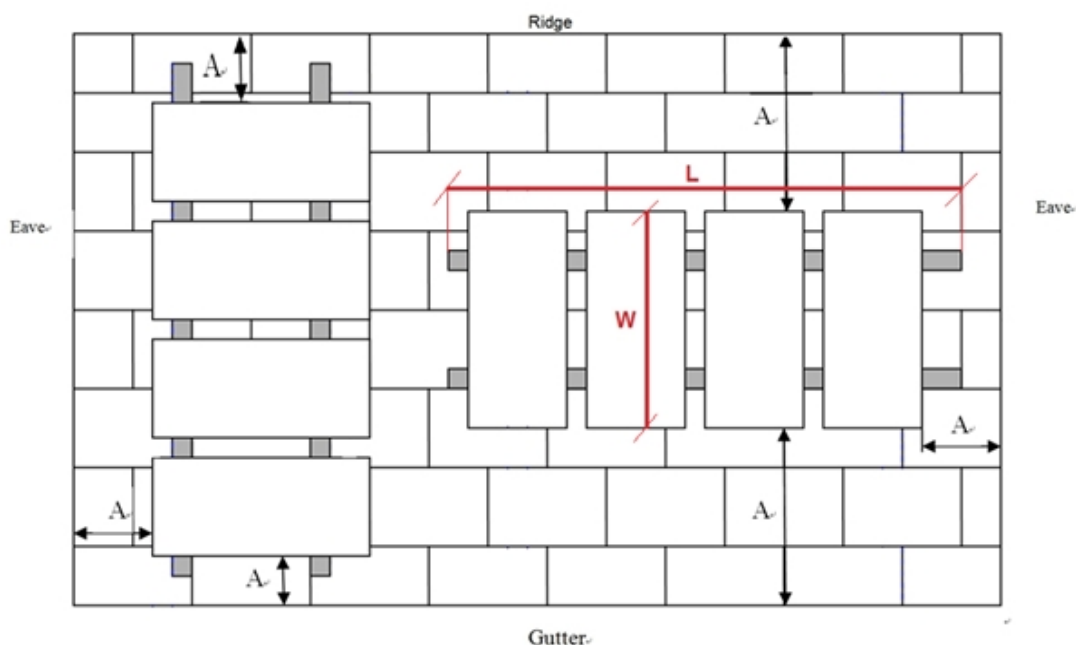Please leave enough room to safely move around during installation.

FIGURE 4.1 INSTALLATION ZONE

4.2 Design Considerations – Wind

After deciding the installation zone, define the wind region where the property is located.

The Australian Standards AS 1170.2 is to be considered, regarding the following:

- The regional design wind speeds;
- The terrain category of a building site;
- Local requirements and covenants determined by State and/or local statutory authorities.

The installation specifications given in this manual are based on a wind speed for ultimate strength of 69m/s (ultimate serviceability wind speed in Region D) at a height under 15m from ground level (see *Report on Adequacy of Bracketry to Support Solar Panels on Rooves For MicroSolar System*) and is designed to support for installations using *EzQuik* Aluminium Solar PV Module Mounting System manufactured by MSS. This is suitable for sites in Australian Regions A, B and New Zealand. For installation specifications for designated cyclonic areas i.e. Region C and D it is also advisable to refer this manual or to consult your local building engineer.

4.2.1 Wind Force

The pressure that wind created must be considered when specifying roof structures and roofing materials. In most situations, when wind comes across roofs, negative pressure (lifting force) will exert on a roof and the negative pressure will be much greater than the weight of a PV panel (FIG. 4.2.1). Therefore determining the wind force affecting the site at certain height is essential to identify the appropriate level of security installation.

Figure 4.2.1   LIFTING FORCE ON ROOF

Source from: AS/NZ 1170.2
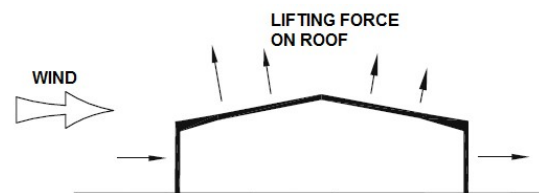
4.2.2 Basic Wind Speed

AS 1170.2/Amdt 3 and AS 4055 provide information on wind speeds generally affecting different regions of Australia and New Zealand (FIG. 4.2.2 and TABLE 4.2.2).Wind regions are pre-defined for all of Australia and New Zealand by AS 1170.2 SAA Loading Code – Wind Loads. The wind region has nothing to do with surrounding topography or buildings.
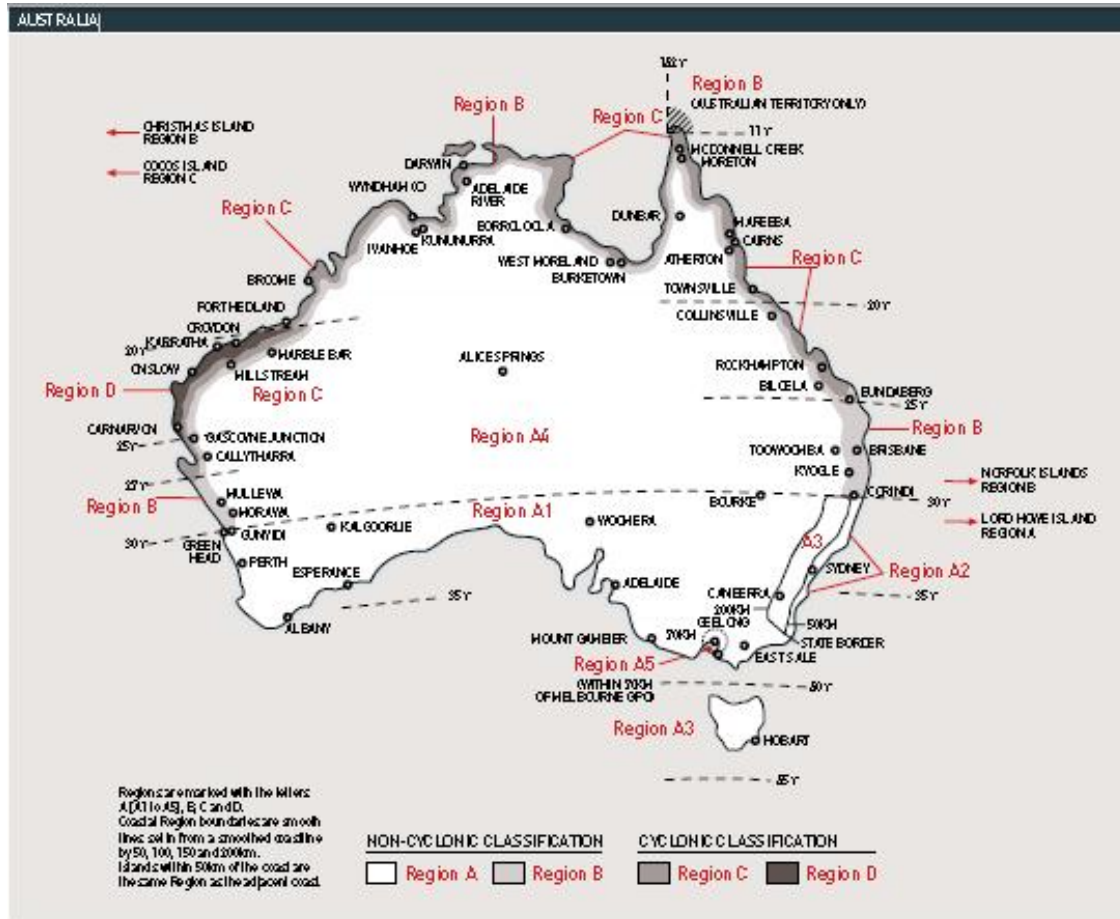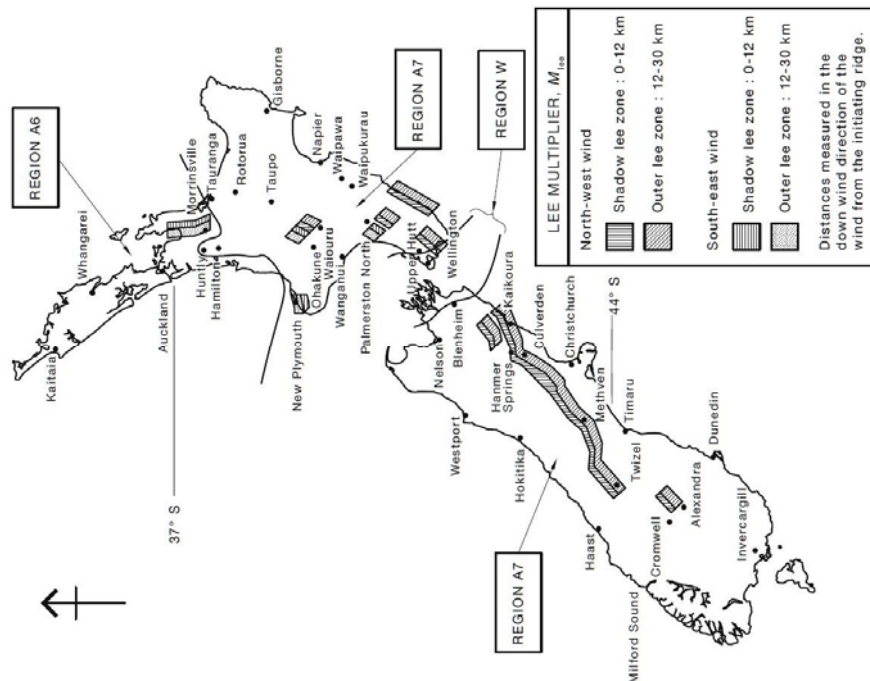
FIGURE 4.2.2(A)   WIND REGIONS – AUSTRALIA

FIGURE 4.2.2(B)   WIND REGIONS – NEW ZEALAND

Source from: AS/NZ 1170.2

TABLE   4.2.2   THE SERVICEABILITY REGIONAL WIND SPEEDS

Regions	Vp (m/s)
A	41
B	49
C	57
D	69

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MicroSolar System Pty Ltd.

* Note.

- All the Region A (1 – 7) are defined as Region A
- All the areas in New Zealand are defined as Region A
- This manual provides sufficient information for *EzQuik* PV module mounting system being installed on any roof less than 15 meters of height. Please call MSS for assistance if required.

4.3 Rail Spacing

Under normal circumstances, each module requires two rails for support. The ideal spacing between the rails is 50% ~ 70% of one module length, but no greater than 80% of its length. This rule applies to all types of roofs. For accurate installation, please refer to the roof structure. (Under special cases, please contact MicroSolar Energy Pty Ltd for further information).

4.4 Footing Types and Spacing for Different Roof Types

Different types of roofs require different footing structures and spacing.

4.4.1 Roof Types

- Tile roof
- Tin roof

   -Non-penetration needed

       KLIP-LOK 406/ 700 & GRS700

   -Penetration needed

       All other tin-roofs (e.g. Flat Roofs, Corrugated Roofs)

4.4.2 Footing Types

◆ There are four types of *EzQuik* footings for installation on tile roof –*Tile Hook (MSTSS), Side Tile Hook (MSTSS-S), Vertical Tile Hook (MSTSS-V)* and *Horizontal Tile Hook (MSTSS-H)*; depending on the roof structure situations, different footing types are used.

Tile Hook (MSTSS)   Side Tile Hook (MSTSS-S)   Vertical Tile Hook (MSTSS-V)   Horizontal Tile Hook (MSTSS-H)

◆ *EzQuik KLIP-LOK Clamp (KLC)* is used for non-penetration needed tin roofs, special for KLIP-LOK and GRS tin roof, also they can be used with MSS Tilt system. There are three models, K*LC406 use for* **Lysaght Klip-Lok 406** *metal sheet, KLC700 use for* **Lysaght Klip-Lok 700 Hi-Strength** *metal sheet and GRS70 use for* **Lysaght Klip-Lok 700 Classic** *metal sheet,* available now. Please check the roof sheet type before installing.
Warning: using the wrong model Clamps will bear the risk of metal sheet damage.

KLC 406/700 & GRS700

◆ *EzQuik Corrugated Bracket Platform (TB-1)*, *EzQuik L-Feet (MSLFT)* and *EzQuik Tilt System (MSTKT)* are used as footing for installation on penetration needed tin roofs.

Corrugated Bracket Platform (TB-1)   *L-Feet (MSLFT)*   *EzQuik Tilt System (MSTKT)*

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4.4.3 Foot Spacing (for area of panel less than 2.3 M^2)

The load of roof PV mounting system mainly comes from PV module, and the load depends on the area of the panel. The larger the area, the greater the load.

Please refer to the tables below (Table 4.4.3) for footing spacing to determine the numbers of support brackets are needed for different types of roof installations.

TABLE 4.4.3.1 MAXIMUM FOOTING SPACING- TILE ROOF

ROOF TYPE: TILE ROOF		FOOTING TYPE: TILE HOOK		
Roof Height	Region A (mm)	Region B (mm)	Region C (mm)	Region D (mm)
5 Meters	2135	1050	720	500
10 Meters	1340	980	700	500
15 Meters	1300	920	680	500

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MSS

TABLE 4.4.3.2   MAXIMUM FOOTING SPACING- PENETRATION TIN ROOFS

ROOF TYPE: PENETRATION TIN ROOFS		FOOTING TYPE: TB-1, MSLFT AND MSTKT		
Roof Height	Region A (mm)	Region B (mm)	Region C (mm)	Region D (mm)
5 Meters	1280	1280	720	720
10 Meters	1200	1200	700	700
15 Meters	1100	1100	650	650

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MSS

TABLE 4.4.3.3   MAXIMUM FOOTING SPACING- NONPENETRATION TIN ROOFS

ROOF TYPE: NON-PENETRATION TIN ROOFS		FOOTING TYPE: KLIP-LOK CLAMP		
	KLC406		KLC700 / GRS700	
Roof Height	Region A (mm)	Region B (mm)	Region A (mm)	Region B (mm)
5 Meters	1015	930	950	700
10 Meters	1015	815	950	700
15 Meters	812	700	700	500

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MSS

4.4.4 Foot Spacing (for area of panel larger than 2.3 M^2 but less than 2.7 M^2)

The load of roof PV mounting system mainly comes from PV module, and the load depends on the area of the panel. The larger the area, the greater load.

Please refer to the tables below (Table 4.4.4) for footing spacing to determine the numbers of support brackets are needed for different types of roof installations.

TABLE 4.4.41MAXIMUM FOOTING SPACING- TILE ROOF

ROOF TYPE: TILE ROOF		FOOTING TYPE: TILE HOOK		
Roof Height	Region A (mm)	Region B (mm)	Region C (mm)	Region D (mm)
5 Meters	1708	840	576	400
10 Meters	1072	784	560	400
15 Meters	1040	736	544	400

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MSS

TABLE 4.4.42   MAXIMUM FOOTING SPACING- PENETRATION TIN ROOFS

ROOF TYPE: PENETRATION TIN ROOFS		FOOTING TYPE: TB-1, MSLFT AND MSTKT		
Roof Height	Region A (mm)	Region B (mm)	Region C (mm)	Region D (mm)
5 Meters	1024	1024	576	576
10 Meters	960	960	560	560
15 Meters	880	880	520	520

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MSS

TABLE 4.4.4.3   MAXIMUM FOOTING SPACING- NONPENETRATION TIN ROOFS

ROOF TYPE: NON-PENETRATION TIN ROOFS		FOOTING TYPE: KLIP-LOK CLAMP		
	KLC406		KLC700 / GRS700	
Roof Height	Region A (mm)	Region B (mm)	Region A (mm)	Region B (mm)
5 Meters	812	744	760	560
10 Meters	812	650	760	560
15 Meters	650	490	560	400

Source from: Report on Adequacy of Bracketry to Support Solar Panels on Rooves for MSS

*Note:

- The tables show above is based on attaching a pair of *EzQuik* rails to panels with an area of panel less than 2.5 **M²**. If the size of panel is no longer in this range, please consult with MSE.

- These tables are suitable for the roofs with any angles and directions.

- All the footing spacing is calculated with the greatest wind pressure either in Upwind Zone, Central Zone or Downwind Zone.

- All the footing spacing shall be used for Terrain Category 3 or below.

- Rail overhang must be equal or less than 400mm

SECTION 5   INSTALLING *PV MODULE*

Follow the recommended step by step instructions for installing *PV Module*.

5.1 Step One: Joining Rails with Splices

If length required, two or three rails can be joined together as one continuous rail with **EzQuik** *Splicer(s).*

Keep rail slots clear from debris and roof grit. External matter will cause bolts to bind as the slide into the slots.

Place the *Splicer* into the right position, 1-1.5mm gap should be left between the rails to allow thermal expansion; and bolt it to the rail slots with the *T-Bolts M8x25* with flange nuts provided (FIG. 5.1)

Please note: The T-Bolt should not be tightened over 20 Nm.

Attach the rails together by using *Splices* before mounting the rails to the footings. Try to avoid using more than five splices within one continuous rail line.

Structure –wise, the Splicer joiner is not as strong as the rail itself. Please note that each rail should always be supported by more than one footing on either side of the splicer.

Please contact MSE when experiencing special cases or concerning about thermal expansion issues.

FIGURE 5.1   Join two rails together using

5.2 Step Two: Attach Rails to Roof Structure

In accordance to the roof types, use one of the methods bellow for attaching.

5.2.1 Tile Roof

There are four types of stainless steel Tile Hook which are suitable for most common types of tile roof in Australia and New Zealand. They are used to support rails and panels without moving or braking roof tiles. Please refer to the Tables 4.4.3.1 or Tables 4.4.4.1in Clause 4.4.3 and Clause 4.4.4 for footing spacing.

5.2.1.1 *EzQuik* Tile Hook (MSTSS)

Tile Hook is used for normal tile roof witch rails are installed perpendicular to rafters. As shown in FIG. 5.2.1.1

a) The Tile Hook should be fixed to rafter with two *Hex timber screws 14g – 10x65.*

b) After finishing fixing all Tile Hook to roof strucutre, align and attach the rails to the Tile Hooks using the *T-Bolts M8x25* with flange nuts provided.

c) Trim the rails to the length needed.

*Note. .

● Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.

● **The T-Bolt should not be tightened over 20 Nm**

FIGURE 5.2.1.1 *EzQuik* Tile Hook (MSTSS)

5.2.1.2 *EzQuik* Vertical Tile Hook (MSTSS-V)

Vertical Tile Hook is used for tile roof witch rails are installed parallel to rafters. As shown in FIG. 5.2.1.2

   a)   The Tile Hook should be fixed to rafter with two *Hex timber screws 14g – 10x65.*

   b)   After finishing fixing all Tile Hook to roof strucutre, attach the rails to the Tile Hooks using *MSS T-Bolts M8x25* with flange nuts provided.

   c)   Trim the rails to the length needed.

   *Note. .

   ●   Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.

   ●   **The T-Bolt should not be tightened over 20 Nm**

FIGURE 5.2.1.2   *EzQuik* Vertical Tile Hook *(MSTSS-V)*

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5.2.1.3 *EzQuik* Side Tile Hook (MSTSS-S)

If the rafter does not have enough space for two lag screws on top, please use *Side Tile Hook*. This type of footing is used to support rails perpendicular to the rafters by connecting to the side profile of rafters. As shown in FIG. 5.2.1.3

a) The Side Tile Hook should be fixed to rafter with either two Hex timber screws 14g – 10x50 or two of stainless steel *Hex Socket Round Head Bolts M6x60* with flange nuts; please use the right screws or bolts according to the rafter.
b) After finishing fixing all Side Tile Hook to roof strucutre, attach the rails to the Tile Hooks using the MSS *T-BoltsM8x25*with flange nuts provided.
c) Trim the rails to the length needed.

* Note.
- Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.
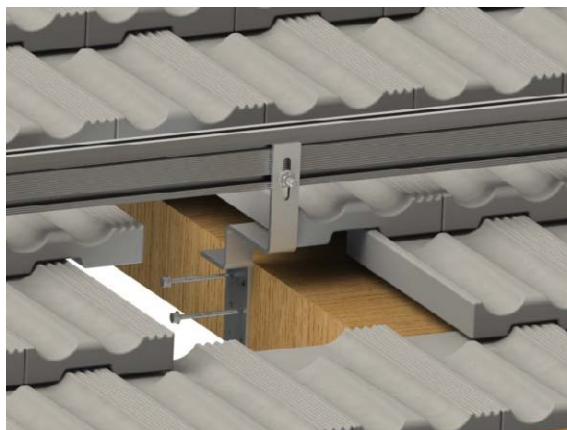- **The T-Bolt should not be tightened over 20 Nm**

FIGURE 5.2.1.3 *EzQuik* Side Tile Hook *(MSTSS-S)*

5.2.1.4 *EzQuik* Horizontal Tile Hook (MSTSS-H)

Horizontal Tile Hook (MSTSS-H) is a latest derivative product of *MSTSS Tile Hook*. Rails can be installed in any directions on roof by using the Horizontal Tile Hook with *EzQuik* L-feet Brackets, as shown in FIG. 5.2.1.4

a)   The *Horizontal Tile Hook* should be fixed to rafter with two of *Hex timber screws 14g-10x65*.

b)   Attach *L-feet Bracket* to each *Horizontal Tile Hook* by using stainless steel *Hex Socket Round Head Bolts M8x25* with flange nuts provided*.*

c)   After finishing fixing all *Horizontal Tile Hook* and *brackets*, attach the rails to the *L-feet Brackets* using the MSS*T-Bolts M8x25* with flange nuts provided.

d)   Trim the rails to the length needed.

* Note.

 ●   Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.

 ●   *MSS Horizontal Tile Hook* CAN be used in combination with other *EzQuik* footing parts.

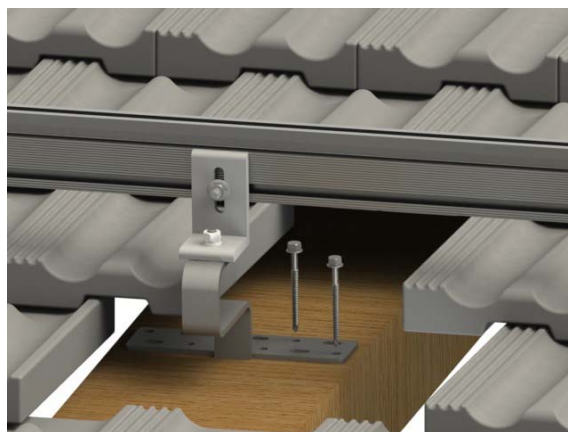 ●   **The T-Bolt should not be tightened over 20 Nm**

FIGURE 5.2.1.4 *EzQuik* Horizontal Tile Hook *(MSTSS-S)*

5.2.2 Flat Roof

EzQuik L-feet Bracket and *EzQuik Tilt System (MSTKT)* are used to connect rails and roofs. Depend on what is the angle needed between Modules and roofs, please choose the right type of footing. Please refer to the TABLE 4.4.3.2 in Clause 4.4.3 for footing spacing.

5.2.2.1 *EzQuik L-feet (MSLFT)*

L-Feet is used when the flat tin roof provides suitable angles for PV panels. Rails can be installed in any directions on roof by using L-feet. As shown in FIG. 5.2.2.1

a) The *EzQuik L-feet* with rubber matt should be located on tin roof with structures underneath. Use one Hex Seal timber screw 14g-10x65/75 to fix each L-feet to the structures.

b) After finishing fixing all *L-feet,* attach the rails to the feet using *T-Bolts M8x25* with flange nuts provided.

c) Trim the rails to the length needed.

* Note.

- Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.
- Please make sure the embedment depth of screw is more than 40mm.
- *EzQuik Base Rails* are required if the roof structure does not meet the installation requirement. Please refer to Clause 6.2 for further details.
- **The T-Bolt should not be tightened over 20 Nm**

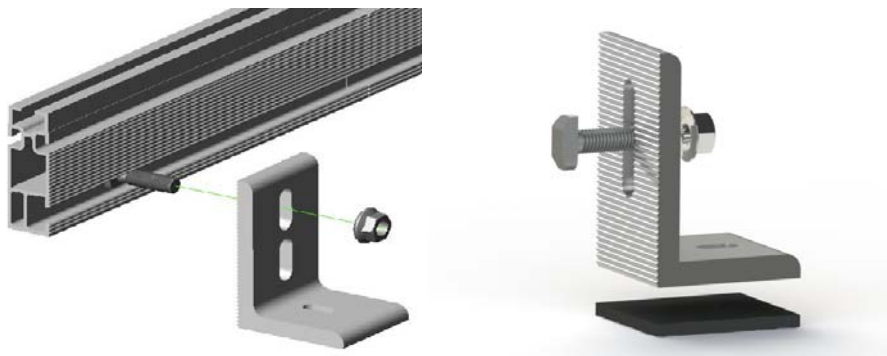FIGURE 5.2.2.1 *EzQuik L-feet (MSLFT)*

5.2.2.2 *EzQuik Tilt* System *(MSTKT)*

Tilt System is a special footing part. It used when there is an angle needed between PV Modules and roof surfaces. With such footing, rails are perpendicular with Rib of metal sheet.

As shown in FIG. 5.2.2.2

a) Each leg of *Tilt System* with rubber matt should be located on the tin roof with structures underneath. Use **two** Hex Seal timber screw 14g-10x65/75 to fix each leg to the structures.

b) Adjust angles to requirements and tighten the *T-Bolts M8x25*.

c) After finishing fixing all tilt legs, attach the rails to the legs using the *T-Bolts M8x25* with flange nuts provided.

d) Trim the rails to the length needed.

* Note.

- Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.

- Please make sure the embedment depth of screw is more than 40m

- Please refer to Clause 6.1 to check the footing spans and modules' angles.

- *EzQuik Base Rails* are required if the roof structure does not meet the installation requirement. Please refer to Clause 6.2 for further details.

- *Tilt System* CAN be used in combination with other *EzQuik footing parts.* Please refer to Clause 6.1 for further details about Tilt System.

- **The T-Bolt should not be tightened over 20 Nm**

FIGURE 5.2.2.2 *EzQuik Tilt System (MSTKT)*

5.2.2.3 *EzQuik Triangle Tilt* System *(EzTruss)*

EzTruss is an ideal tilt System with a reasonable structure. The best advantage of it is that Triangle Tilt System can install in any directions on the roof, even if the rail is parallel to the rib of metal sheet. Not only that, it is a prefabricated triangular system with faster and easier installation process, which greatly reduces installation time and money; at the same time providing great cost performance. As shown in FIG. 5.2.2.3

FIGURE 5.2.2.3 *EzQuik Triangle Tilt System (MSTKT-T)*

a)   Each *Triangular Tilt System* with rubber matt should be located on the tin roof with structures underneath. Use **two** Hex Seal timber screw 14g-10x65/75 to fix each leg to the structures.

b)   Tighten the *T-Bolts M8x25* to adjust angle of requirements.

c)   After finish fixing all systems, attach the L-Feet along with the rails to the top profile of the Triangle Tilts by using *Hex Socket Round Head Bolts M8x25* with flange nuts provided.

d)   Trim the rails to the length needed.

   * Note.

   ●   Please check certification for the spacing of triangle tilt system.

   ●   Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.

   ●   Please make sure the embedment depth of screw is more than 40mm.

   ●   *EzQuik Base Rails* are required if the roof structure does not meet the installation requirement. Please refer to Clause 6.2 for further details.

   ●   *Tilt System* CAN be used in combination with other *EzQuik footing parts.* Please refer to Clause 6.1 for further details about Tilt System.

   ●   **The T-Bolt should not be tightened over 20 Nm**

The triangle tilt work with MSCL

The triangle tilt work with TB-1

5.2.3 Corrugated Roof

MSS specially provide *EzQuik Corrugated Bracket (TB-1)* for Corrugated Roof to stably support *EzQuik L-feet* with water proof ability. Rails can install in any directions on roof. As shown in FIG. 5.2.3

a) *TB-1* should be located on Corrugated Roof with structure underneath. Use **two** Hex Seal timber screws 14g-10x65/75 to fix each TB-1 to the structures.

b) Attach *L-feet Bracket* to each *TB-1* by using the *Hex Socket Round Head Bolts M8x25* with flange nuts provided*.*

c) After finishing fixing all *L-feet* on TB-1, attach the rails to the brackets using the *T-Bolts M8x25* with flange nuts provided.

d) Trim the rails to the length needed.

   * Note.

     ● Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 4.4m.

     ● Please make sure the embedment depth of screw is more than 40mm.

     ● *MSS TB-1* CAN be used in combination with other *EzQuik footing parts.*

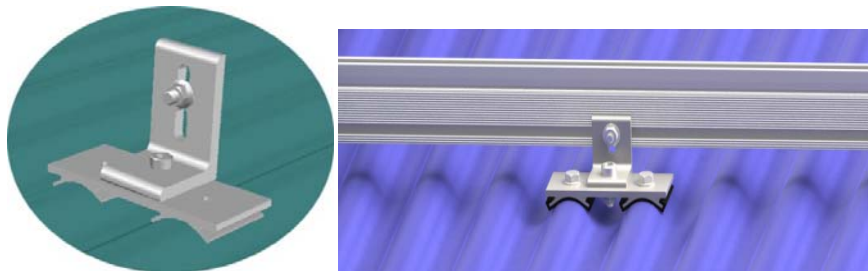   ● **The T-Bolt should not be tightened over 20 Nm**

FIGURE 5.2.3 *EzQuik* Corrugated Bracket (TB-1) and L-feet (MSLFT)

5.2.4 KLIP-LOK Roof

EzQuik KLIP-LOK Clamps (KLC) has been specially proved by *BSC Constructing Engineer Pty Ltd* and tested by *A. Noble & Son Ltd,* please refer to Appendix.

Use our *EzQuik KLIP-LOK Clamps (KLC)* and *Clamp L-feet85 (MSLFT85)* to attach rails to the *KLIP-LOK roof* perpendicular to the rafters without penetration. As shown in FIG. 5.2.4.2 Please refer to the TABLE 4.4.3.3 in Clause 4.4.3 for footing spacing.

Note: Our THREE kinds of clamps are especially designed for Lysaght® KLIP-LOK 406 (KLC406) , Lysaght® KLIP-LOK 700 (KLC-700) and GRS700 (GRS700) tin roof. Please choose the right clamp according to the roof type. As shown in FIG.5.2.4 below.

Lysaght® KLIP-LOK 700 metal sheet	*KLIP-LOK Clamps (MSCL)*	Lysaght® KLIP-LOK 406 metal sheet

FIGURE 5.2.4 *EzQuik KLIP-LOK Clamps* and KLIP-LOK metal sheet

Warning: using the wrong model Clamps will bear the risk of metal sheet damage.

a) Position the *KLIP-LOK Clamp* appropriately on rib and ensures the clip (which is located under the metal sheet) is right underneath the *KLIP-LOK Clamp*. Tighten the bolts on the clamp until the clamp is closed completely.

b) Then attach *Clamp L-feet* to each KLIP-LOK Clamp by using the *Hex Socket Round Head Bolts M8x30* provided.

c) After fixing all *Clamp L-Feet* to position, attach the rails to *Clamp L-Feet* with *M8-25 T-bolts* with flange nuts provided.

d) Trim the rails to the length needed.

* Note.

● Please keep the straightness of continuous rail(s). The deviation of straightness should not be more than 35mm in every 3.4m.

● *KLIP-LOK Clamp* CAN be used in combination with other *EzQuik footing parts.*

● PLEASE NOTE, rails CANNOT attach parallel to roof ribs, as shown in FIG. 5.2.4.1. If it is the case, *EzQuik* Base Rails or *EzTruss* should be applied.

● *EzQuik Base Rails* are required If the roof structure does not meet the installation requirement. Please refer to Clause 6.2 for further details.

FIGURE 5.2.4.1 *EzQuik KLIP-LOK Clamps* should never installed parallel to roof ribs
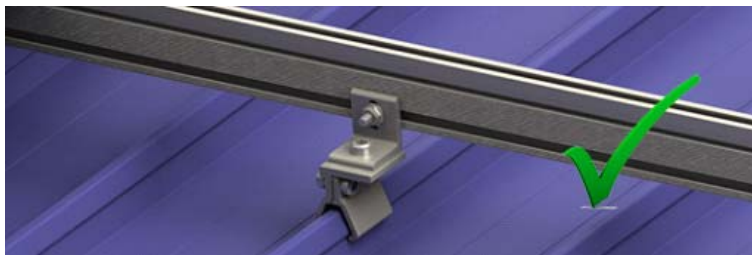
FIGURE 5.2.4.2 *EzQuik KLIP-LOK Clamps* and *Clamp L-feet installed correctly.*

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5.3 Step three: Installing Modules

5.3.1 Installing the First Module

Use the Plug and Drill method; lay the first module with end clamps at the aligned end of each rail using the T-bolts and nuts provided. Please allow minimum 15mm space between the rail end and the end clamps, shown in Center and align the module as needed, and securely tighten the flange nuts, (20Nm), as shown in FIG. 5.3.1
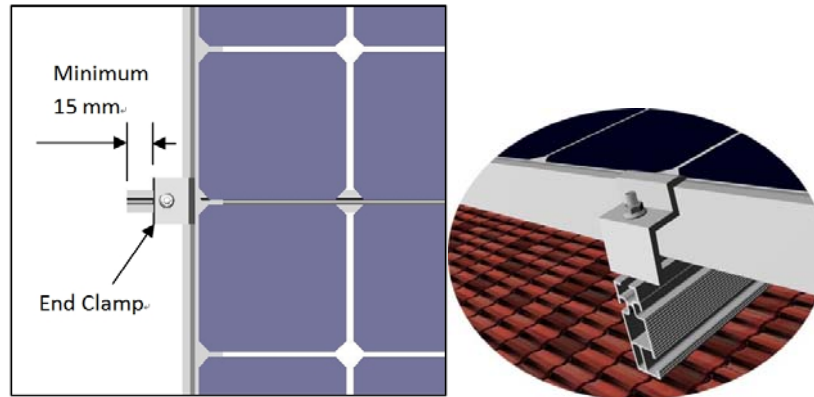

FIGURE 5.3.1   Installing the first module with End Clamp

5.3.2 Installing Other Modules

Use the Plug and Drill method; align the second module next to the first module side by side with mid clamps installed in between. Secure the mid clamps with the T-bolts and flange nuts provided, and then tighten the flange nuts (20Nm), as shown in FIG. 5.3.2
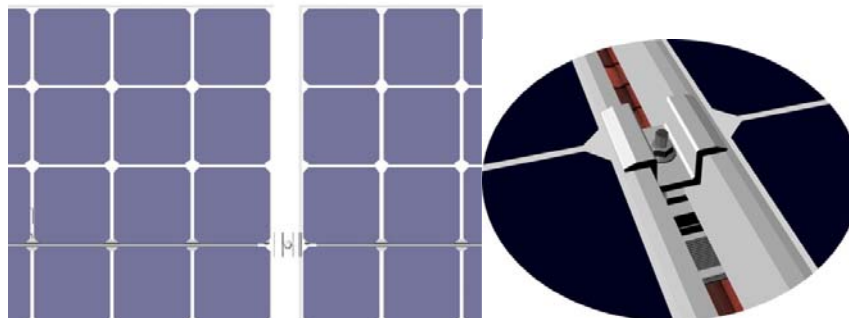

Fig. 5.3.2 Installing the second module with Mid Clamp

Repeat the procedure until all modules are installed. Attach the outside edge of the last module to the rail with end clamps.

Trim off any excess rail. Allow minimum 15mm between the end clamp and the end of the rail.

5.4 Step Four: Earthing the System

EzQuik *Aluminium Solar PV Module Mounting System* has internal build-in earthing system. No extra earthing job is needed during installation; just connect earthing cables through one *EzQuik* *Earthing Lug* which is bolted on each module array after finish Modules installation. As shown in FIG. 5.4
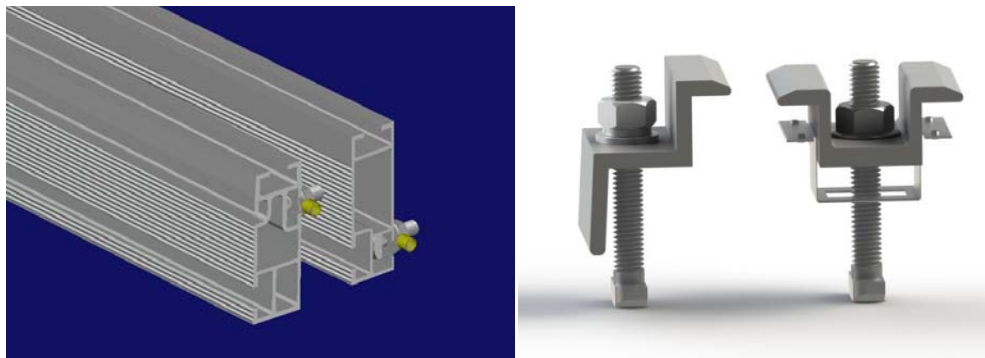
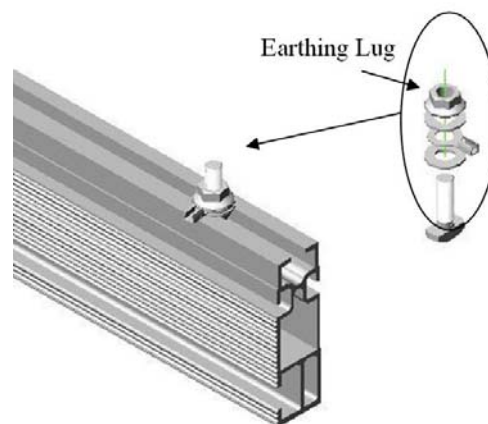# How to earth PV module

Step1

Make sure all mid-clamp with earthing clips (Figure 1), install all mid-clamp as usual.
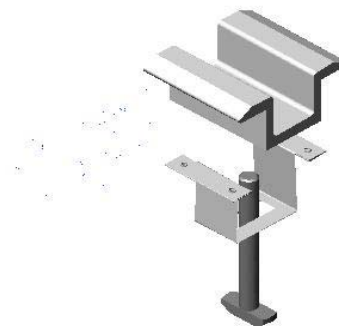
Step2

Insert the T head earthing lug in the aluminium rail (Figure 2). Tighten the nut (20Nm)

Each continuous array only requires one earthing lug.

Earthing Lug

Step3

Connect earthing cable with earthing lug.
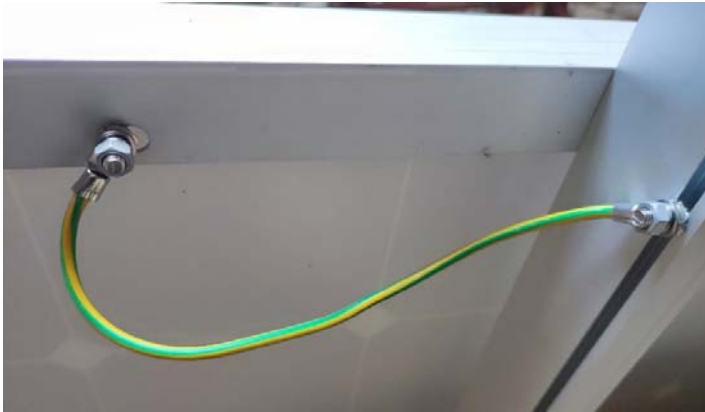
For single panel array

Step 1

Attach one earthing lug to the earthing hole on the solar panel.

Step 2

Attach one earthing lug in the aluminium rail.

Step 3

Connect earthing cable between panel and aluminium rail.

Note: For the purpose of Earthing, only one Earthing Lug would be required to be installed in one module array. The design and manufacture of *EzQuik* products ensure the system meets Earthing requirement.

FIGURE 5.4 *EzQuik* internal build-in system and Earthing Lug

Secure the earthing lug with the T-bolts and flange nuts provided, and then tighten the flange nuts (15Nm)

SECTION 6   SPECIAL PARTS

6.1 *EzQuik* Tilt System (MSTKT)

Tilt System is used to quickly set the tilt angle required. Each kit offers one short leg and one long leg to adjust the exact tilt angle without cutting or drilling on the job site.

MSTKT Types:

- Adjustable
  - 15-35 degrees
  - 35-60 degrees
- Fixed
  - 10 degrees
  - 16 degrees
- Triangle
  - Adjustable Triangle 15-30 degrees

Please refer to tables below for tilt legs angles, spans and lengths.

TABLE 6.1.1: Angles, Spacing, and length for*EzQuik Adjustable Tilt System*, **15-35 degrees**

Legs Span **B** (mm)	Adjustable Leg Length	
	495mm	775mm
800	19°	33°
850	18°	33°
900	17°	32°
950	17°	32°
1000	17°	31°
1100	15°	30°

TABLE 6.1.2: Angles, Spacing, and length for *EzQuik Adjustable Tilt System*, **35-60 degrees**

Legs Span **B** (mm)	Adjustable Leg Length	
	815mm	1375mm
800	37°	78°
850	37°	76°
900	36°	74°
950	36°	72°
1000	35°	70°
1100	33°	66°

TABLE 6.1.3: Angles, Spacing, and length for *EzQuik* Fixed Tilt System, **10 and 16 degrees**

Legs Span, **B** (mm)	Adjustable Leg Length	
	345mm (10 degrees)	465mm (16 degrees)
800	11°	17°
850	11°	17°
900	10°	16°
950	10°	16°
1000	9°	15°
1100	8°	15°

* Note.

● The short leg of *Adjustable Tilt System 15-35 degrees* cannot be adjusted; the long leg can be adjusted between 495-775mm.

● The short leg of *Adjustable Tilt System 35-60 degrees* cannot be adjusted; the long leg can be adjusted between 815-1375mm.

● The angle of *15-30 Adjustable Triangle System* depends on the length of leg only.

● The spans between front and back Tilt Leg (**B)** (FIG.6.1) should be approximately equal to 50-70% of the module length (no less than 50% and no more than 70%). Please refer to the actual roof structure for accurate installation.

● For the spacing needed between each set of legs, please refer to TABLE 4.4.3.2

● *Tilt System* CAN be used in combination with other *EzQuik footing parts.*

● For installation, please refer to Clause 5.2.2.2

● If the roof structure does not meet the footing requirement, *EzQuik Base Rails* are required; refer to Clause 6.2 for further details.

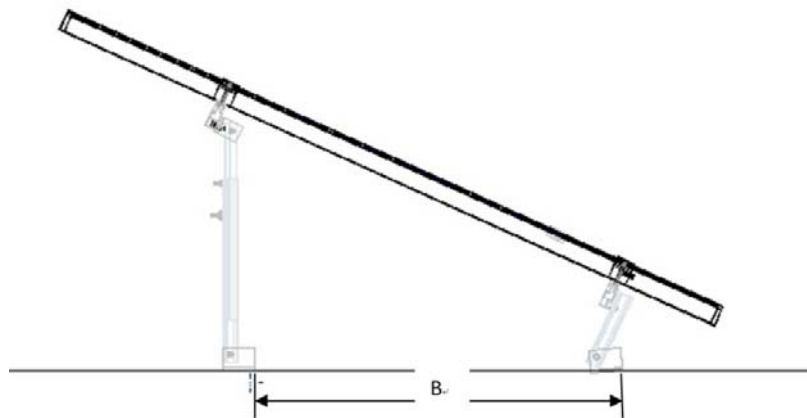FIGURE   6.1   Cross section of *EzQuik Adjustable Tilt System* 35-60 degrees
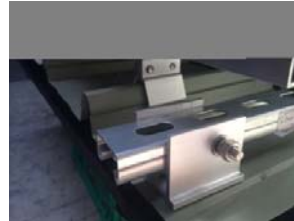
6.2 *EzQuik* Base Rail

Base Rail is used as extra support when the Tin Roof structure does not meet footing requirements. MSS provides two types of *Base Rail*: *Aluminum Base Rail* and *Steel Base Rail.* As shown in FIG. 6.2. Both of them are installed in combination with ***EzQuik*** *Tin-Foot*; and can be used to support either ***EzQuik*** L-Feet or *Tilt System.* Please ensure Base Rail is installed on roof waterproofed.

Aluminium Base Rail   *Steel Base Rail*

FIGURE   6.2 Two types of ***EzQuik*** *Base Rail* (top) and combination with *Tilt System* (bottom)

6.2.1 *EzQuik Base Rail* Installation

According to the roof structure and installation needs, please follow the following steps to complete the installation.

a)   Fix the *Square-Foot* according to the roof structure with *Hex-socket Round Head Bolts* M8 x 65.

b)   Attach one end of the *Base Rail* to *Square-Foot* with *Hex-socket Round Head Bolts* M8 x 65 and. (8.5mm hole is required to drill through the Base Rail.)

c)   Attach the other end of the *Base Rail* to the second *Square-Foot* according to the roof structure with *Hex-socket Round Head Bolts* M8 x 65. (8.5mm hole is required to drill through the Base Rail on site.)

d)   Then *L-Feet* or *Tilt System* can be installed on *Base Rail* to achieve stable structure.

* Note.

- The *Square-Foot* spacing for *Aluminum Base Rail* should be no greater than 1.6m; and the *Square-Foot* spacing for *Steel Base Rail* should be no greater than 1.8m. Please choose the right type in accordance to the needs

- Please contact MSS for further enquiries.

6.2.2 The Typical Case of Applying *Base Rail*

For some special circumstances, especially installing on large factory warehouse with rafter spacing greater than 1.5m, two or more *Base Rail*s should be joined together as one continuous *Base Rail.* However, *Base Rail*s cannot be joined with splicer due to strength requirements. Therefore, MSS provides an efficient solution as shown in Fig. 6.2.2.
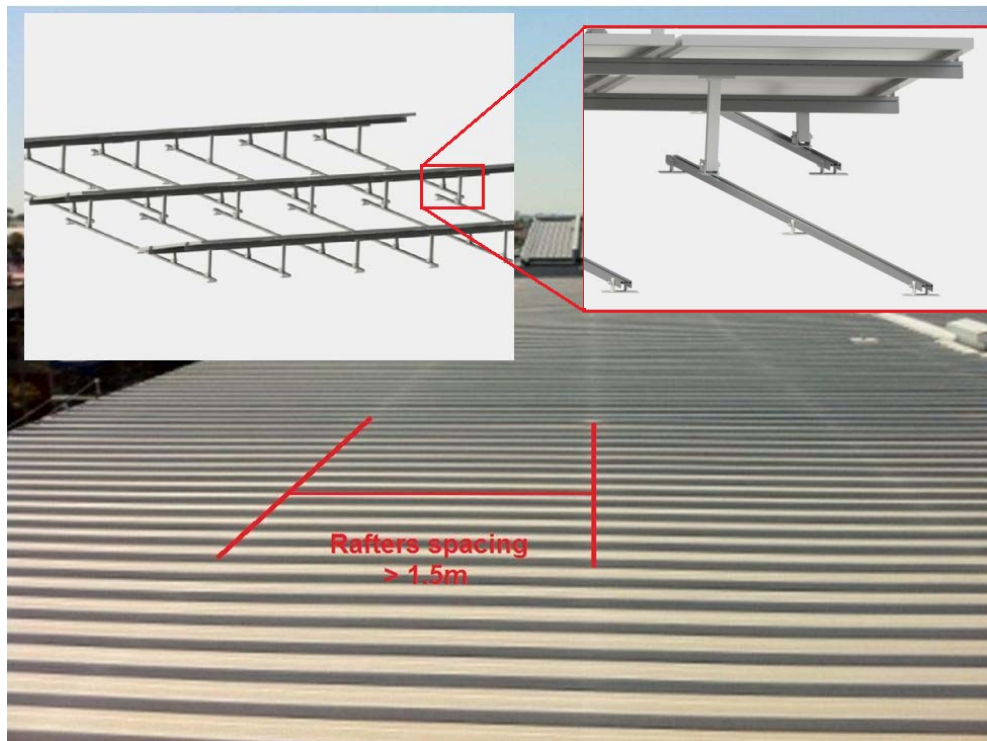

FIGURE   6.2.2 Continuous *Base Rail*s used for special circumstances

At each joint, a pair of *Base Rail*s should be fixed on one rafter and installed one step away from each other, to achieve same effect as one continuous *Base Rail*.

For further information, please visit www.microsolarsystem.com.au.

SECTION 7   ACCESSORIES

Cable Tie – MSS provide four types of Cable Ties used for tie up cables, as shown in Fig. 7.1

    MCT200 – Stainless Steel Cable Tie 4.6x200mm

    MCT250 – Stainless Steel Cable Tie 4.6x250mm

    MCT300 – Stainless Steel Cable Tie 4.6x300mm

    MCT350 – Stainless Steel Cable Tie 4.6x350mm

FIG. 7.1 Cable Tie

Labels – MSS provide labels for Sydney and Melbourne areas according to local standards, as shown in Fig. 7.2

FIG. 7.2 Labels

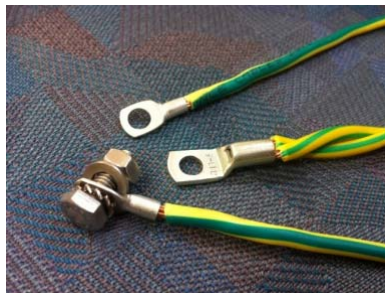*Earthing chip* – Used in combination with Earthing Lug depending on the size of wire, as shown in Fig. 7.3

FIG. 7.3 Earthing Chip

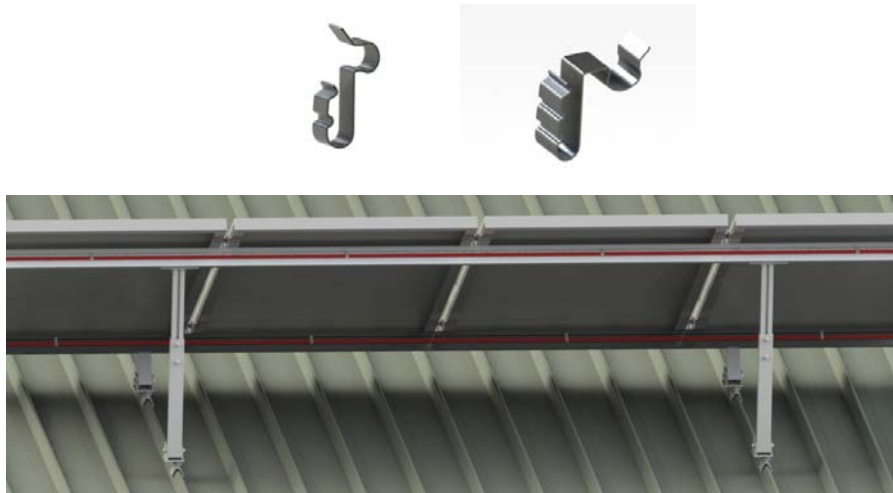**Cable Clip-Rail** – Clip used on rails to clip cables, as shown in Fig. 7.4

FIG. 7.4 Cable Clip for rails.

Cable Clip-Panel – Clip used on panels to clip cables, as shown in Fig. 7.5

FIG. 7.5 Cable Clip for panels.

Out Lock – Used to lock DC isolator switch using Allen Key, as shown in Fig. 7.6

FIG. 7.6 Out Lock used to lock DC isolator switch.

Rail Edge Cover – MSS provide the rail edge cover for safety purposes. As well as make rails visually pleased.

As shown in Fig. 7.7

FIG. 7.7 Rail Edge Cover.

SECTION 8　　SUPPORT

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SECTION 9   MAINTENANCE AND WARRANTY

9.1 Maintenance

After strict calculation of system related fasteners as well as efficient corrosion resistant application, the product, *EzQuik* Mounting system, does not need regular maintenance. However, we advice customers proceed a safety check to tighten the system fasteners once every 8 years:

- Examine and tighten all fasteners, including Rails and Brackets connections
- Examine and fasten all mid and end – clamps.
- Examine all surfaces for aluminium parts for corrosions. If corrosions occur, replacement is needed.
- Please consult with MSS for special situations.

9.2 Warranty

10 years Limited Product Warranty

To the original purchaser of our products, MicroSolar System Pty Ltd warrants that all products shall be free of defects in material and workmanship for a period of 10 years at its first installation site, from the date of installation or 60 days after purchase.

The warranty does not apply to any foreign residue deposited on the finish. All installations in corrosive atmospheric conditions are excluded. This warranty does not cover damage to the product that occurs during its shipment, storage, or installation.

This warranty shall be voided if installation of the product is not performed in accordance with MSS's written installation instructions and design specifications therein, or if the product has been modified, repaired, or reworked in a manner not previously authorized by MSS in writing, or if the product is installed in an environment for which it was not designed.

MSS shall not be liable for consequential, contingent or incidental damages arising out of the use of the product by purchaser under any circumstances.

Within the specified warranty period, the product shall be reasonably proven to be defective for MSS to repair or replace the defective product, or any part thereof, in MSS's sole discretion. Such repair or replacement shall completely satisfy and discharge all of MSS's liability with respect to this limited warranty. Under no circumstances shall MSS be liable for special, indirect or consequential damages arising out of or related to use by purchaser of the product.

Manufacturers of related items, such as PV modules and flashings, may provide written warranties of their own. MSS's limited warranty covers only its product.

APPENDICES