

TILT MOUNT PROLINE

INSTALLATION MANUAL V1.0

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1.0 Introduction

1.1 Short Description of the system

Schletter Australia offers a wide array of solutions for tilt mount photovoltaic (PV) applications suitable for nearly any environmental condition. The solar mounting systems are designed for strength and ease of installation using high quality products to meet or exceed applicable local and international standards.

The system consists of fastening frames securing Proline rails which support PV modules. The pre-assembled components, slide in rail joiners without the use of screws and click in module clamps, accounts for ease of install and industry leading installation times.

The components are made from Aluminium and High-Grade Steel allowing durability in adverse site conditions. The system comes with a 25-year warranty that is compliant with Australian Standards: AS/NZS 1170.2:2021 for wind actions, AS/NZS 1170.1:2002 (R2016) for imposed loadings, and AS/NZS 1170.0:2002 for general principles.

1.2 Scope of the Installation Manual

The manual aims to provide information on safety warnings, mounting system setup and components for installation of PV modules in flat metal roofs.

Section 1 and 2 focuses on introduction and an overall overview of the mounting system. Section 3 and 4 focuses on installation instructions on the appropriate methods for assembling the mounting system.

Please refer to the installation manual and bill of materials carefully before commencing any installation or maintenance work. All necessary information regarding installation and maintenance should be provided. For further questions, please contact Schletter Australia.

The content of this manual should be followed to comply with product warranty.

1.3 Appropriate Use/Warnings

The mounting system acts as a support structure for the installation of photovoltaic modules. Any other and/or additional use or incorrect assembly (for example: use of third-party components) or non-observance of tolerance specifications are considered as improper use and exclude any liability of the manufacturer. Any use under conditions other than those assumed in the planning is also considered as improper use and leads to the loss of any liability claims against the manufacturer.

This applies if the system is used under other load, climatic and/or corrosion conditions than originally assumed. Schletter Australia is in no case responsible for damages to the product itself or consequential damages caused by the product which are the result of an inappropriate handling of the product.

Schletter Australia is not responsible for outages or faults resulting from modifications made by the customer or other individuals. There is no entitlement to the availability of previous versions or to the re-fitting of delivered components to the current series status.



1.4 Safety Instructions

Read and understand these safety instructions carefully before starting the assembly and keep them safely at hand. Comply with all regional and national valid standards, building regulations and accident prevention regulations.



Break hazard! PV modules may be damaged if stepped on.



Planning, installation and commissioning of the solar power system must only be performed by qualified technical personnel. Improper execution can result in damage to the system and endanger individuals.



Electrical current hazard! Installation and maintenance of the PV modules must only be performed by qualified technical personnel. Observe the safety instructions issued by the PV module manufacturer!



Falling hazard! Working on the roof as well as ascending and descending poses a risk of falling. It is vital to observe accident prevention regulations and use appropriate fall protection equipment. PV mounting systems are not suitable as climbing aids or fall protection.



Injury hazard! Falling objects pose a risk of injury to people. Prior to installation, set up barriers in the hazard area to warn people nearby.



It is the obligation of the operator to ensure that all parts of the mounting instructions are kept within easy reach on the PV-plant for the fitters at any time.



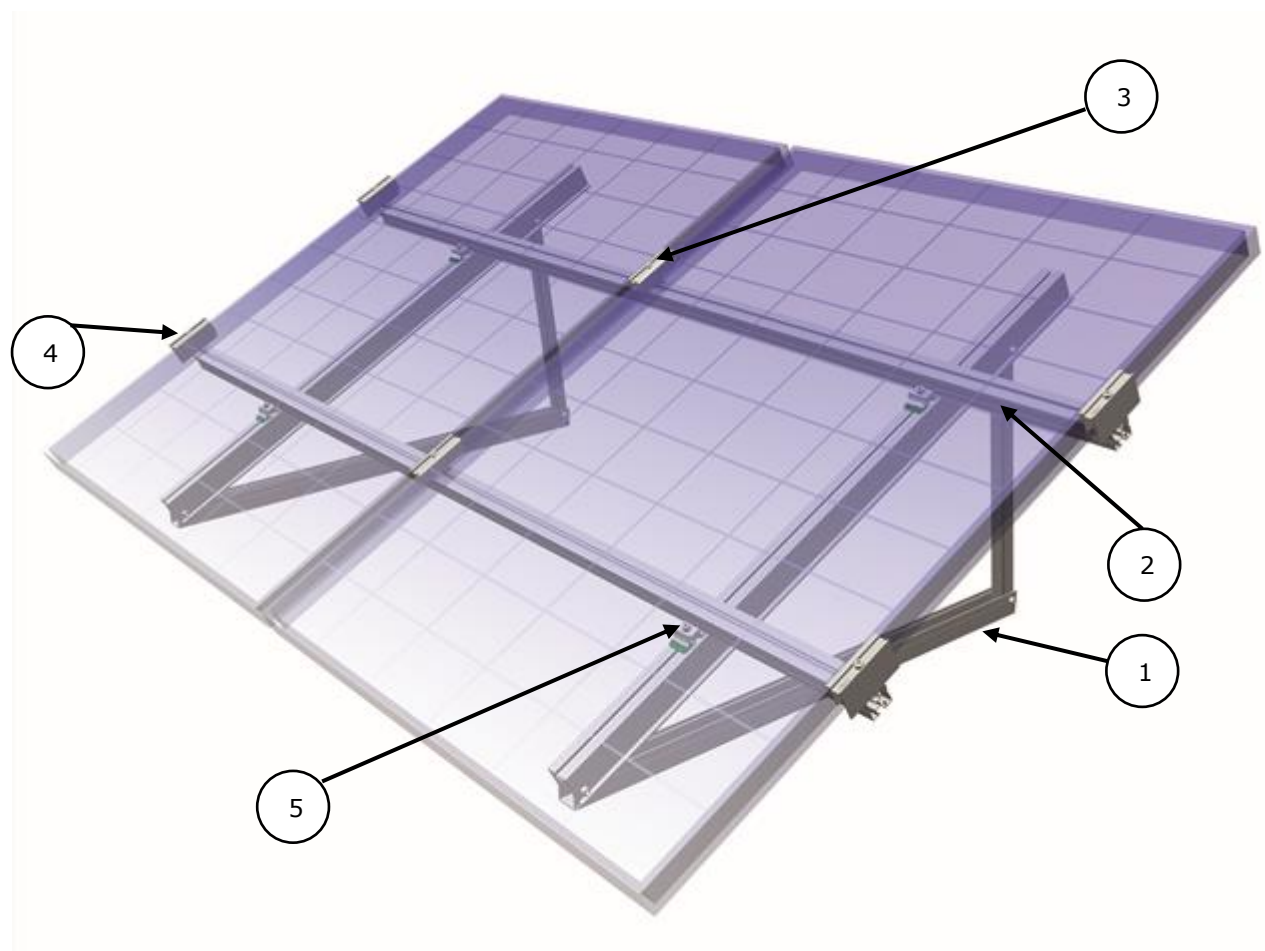
As personnel, only persons who can be expected to carry out their work reliably can be admitted. Persons whose responsiveness is affected, e.g., by narcotics, alcohol, or medication, are NOT permitted.



2.0 System Overview

2.1 System Setup

An overview of the roof-top tilt mounted system is depicted in Figure 2.1, subject to changes based on project specific requirements.



Key Components

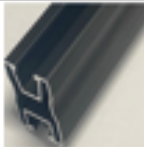

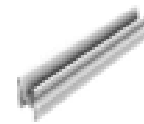
1	A-Frame	2	PRO Line Rails	3	Middle Clamps
4	End Clamps	5	Rail Cross Connector		

Accessories

- Rail Cross Connector
- Rail Caps
- Cable Clips
- Earth Lugs
- Rubber Pads



2.2 Components Details

ITEM CODE	ITEM DESCRIPTION	PU	IMAGE	
120020-04400	Rail Pro35 4400mm	200		RAILS
120020-94400	Rail Pro35 4400mm - Black	200		
120021-04400	Rail Pro50 4400mm	150		
129200-000	Rail Joiner Proline	40		JOINERS
150101-150	Tripod - up to 1.8 meter length modules	1		TRIPODS
151001-220	Tripod - up to 2.4 meter length modules	1		

131020-001	Mid Clamp 30-47mm Proline	100	
131020-000	End Clamp 30-47mm Proline	50	
131020-901	Mid Clamp 30-47mm Proline Black	100	
131020-900	End Clamp 30-47mm Proline Black	50	
900000-080	Universal Screw	250	
900000-360	Screw , Direct to Sheet	500	
129065-009	Module Cable Clip	100	
129065-001	Rail Cable Clip	100	
129200-010	Plastic End Cap Proline	100	

MODULE CLAMPS

ACCESSORIES

129200-910	Plastic End Cap Proline Black	100	
135003-002P	Earthing Clamp Proline	100	
135004-002P	Earthing Shim Proline	100	
149120-004P	Micro/Optimiser Kit Proline	100	
973000-014Z	EPDM Rubber Self-Adhesive 48x4	-	
129063-010	Cross Connector	350	

ACCESSORIES

3.0 Installation Tools



Tape Measure



Chalk Line



Marker



Pliers



Angle Grinder



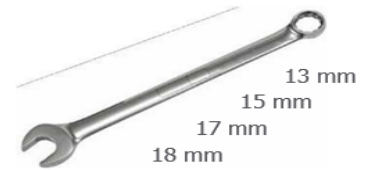
Carpenter's Square



Rubber Mallet



Torque Wrench



Wrench



Rechargeable Power Drill



Torx® bit (TX 40)



4.0 Mounting Instructions

4.1 A-Frames: Flat Roof

4.1.1 Choice of A-Frame Configurations

The mounting beam and bottom beam come pre-assembled which has to be connected with the inner and outer struts to make a complete tripod.

Based on panel tilt requirements, the A-Frame can be oriented at 15° and 30° . The inner strut can be used as outer to achieve 15° from the 30° tilt as shown Fig 4.1.

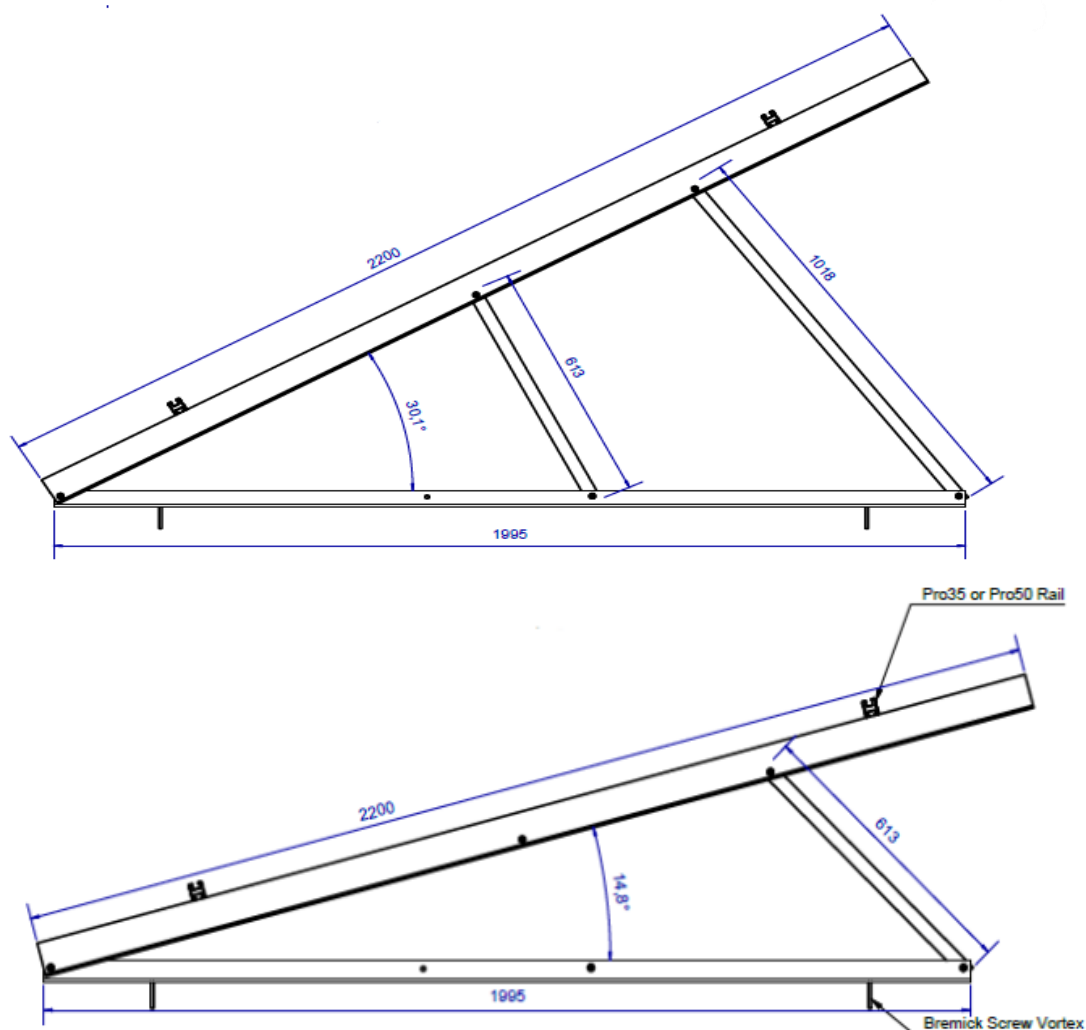


Fig 4.1.1 A-Frames at 15° and 30° tilt orientation.

The A-Frames come in the following sizes:

Part Number	Frame	Tilt Angles
151001-220	Tripod – 2.2m in length	15° and 30°
150101-150	Tripod – 1.5m in length	15° and 30°



4.1.2 A-Frame Setup

- I. The A-Frames positioning depends on the installation plan. The variables **A** and **B** as per Fig 4.1.2A needs to be determined at site prior to securing the A-Frames to the roof purlins.
- II. The measurement **A**, can be either determined by the roofing sheet ribs/crests spacing when rails run perpendicular to purlins or via the purlin spacing when rails are run parallel to purlins, as shown in Fig 4.1.2A.

The measurement B can be determined from standard shading calculations.

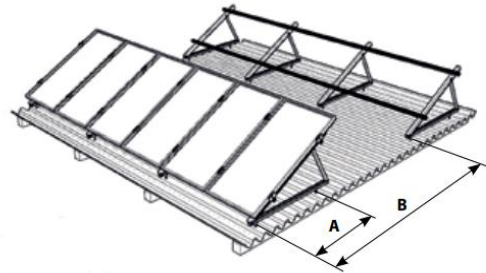


Fig 4.1.2A: Screw fixing and shading distances

4.1.3 Fix A-Frame to roof

- I. Pre-drill the bottom support of the tripod with 0.55mm tolerance over the screw diameter of 6.2mm as shown in Fig 4.1.3A.
- II. The rubber pads with integrated adhesive should be attached across the base of the tripod especially across the pre-drilled holes. This provides for a watertight connection point between screws and the roof purlins.
- III. Secure the A-Frame to the roof purlin via the supplied self-drilling universal screws, 6.2mm x 65mm. Ensure that the screw drilling line of axis is perpendicular to the roofing sheet.

The universal screw works with both timber and steel substructures if the screw embedment requirements are met:

Substructure	Embedment (mm)
F7 Pine Softwood	36mm
1.5 BMT Steel	Complete Penetration - For steel purlins > 1.9mm, pre-drilled hole of 4.5mm in diameter is recommended

The tightening torque must be limited (15Nm) to prevent this deformation and to ensure thermal expansion is not impeded.

In case of applications of trapezoidal tin roofs with wooden purlins, we recommend using the 6.2mm x 80mm screws to reach minimum embedment of 36mm.

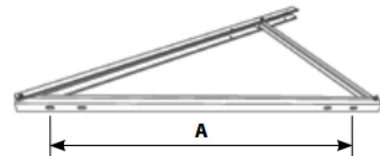


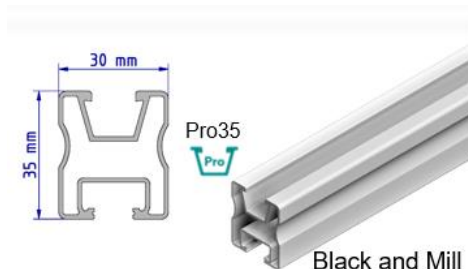
Fig 4.1.3A: Pre-drill hole for screw connection

4.2 Rail Installation

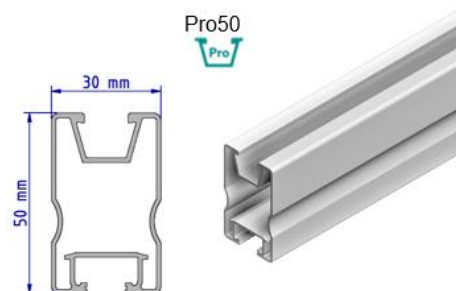
4.2.1 Choice of rail

The Proline rails come in standard sizes of 4400mm.

Based on required spans and site conditions, the rails come in the following dimensions:



Pro35



Pro50

4.2.2 Add Rail Splice

- I. To increase the array length, rails can be spliced together using rail joiners [Fig 4.2.2A].
- II. Insert half of internal splice into first rail, push until it reaches midpoint where the stop tab is located under the splice [Fig 4.2.2B].
- III. Add second rail to opposite end until it fully reaches the middle stop plate. This should lock both rails together forming a longer array [Fig 4.2.2C].

No screws are required, saving installation time.

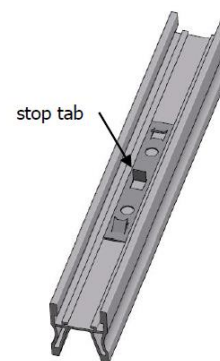




Fig 4.2.2A: Rail Joiner

 It is recommended to limit array lengths to a maximum of 20m, due to thermal expansion limitations, for fixing to substructure.

 The rail joiners are for single use application only.

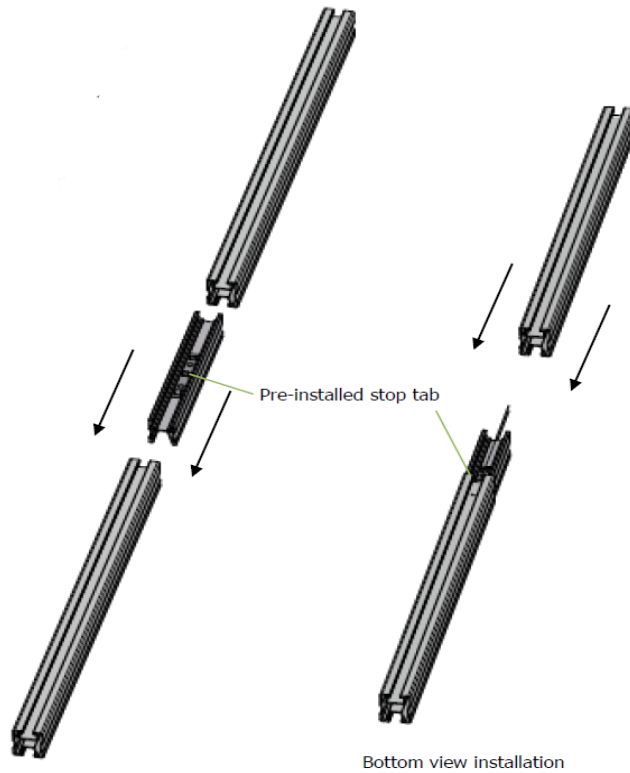


Fig 4.2.2B: Joiner connecting Proline rails



Fig 4.2.2C: Rails secured together via Proline joiner



4.2.3 Add Rail to Fastener

- I. Position the rail cross connector clamps on top of the tripods to allow the rail to run perpendicular and in line with the panel clamping zones of the panel.
- II. Position and fit the bottom (rectangular channel) of Proline rails on top of rail cross connectors, across each tripod frame, as shown in Fig 4.2.3A.
- III. Secure by tightening the bolt on the cross connector clamp using recommended torques (15Nm).

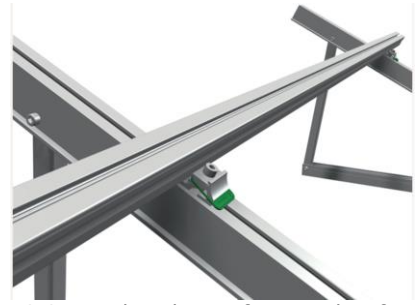


Fig 4.2.3A: Multi Adaptor fixing rail to fastener

4.3 Module Mounting

4.3.1 Position Modules

- I. Position end clamps on rail approximately 20mm from end of rail, do not tighten [Fig 4.3.1A].

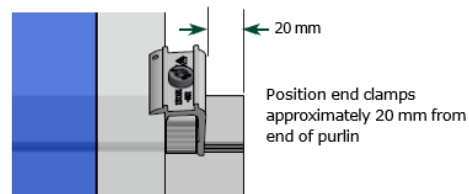


Fig 4.3.1A: Positioning end clamp

- II. Position first module and secure using pre-positioned end clamps, do not tighten [Fig 4.3.1B].

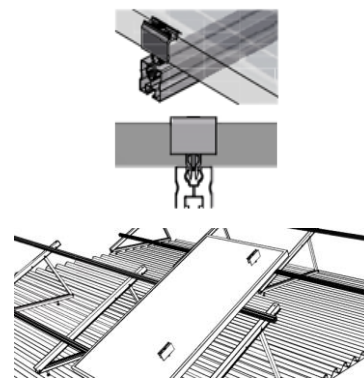


Fig 4.3.1B Positioning first module

- III. Attach middle clamps to rail on the exposed side of the first module [Fig 4.3.1C].

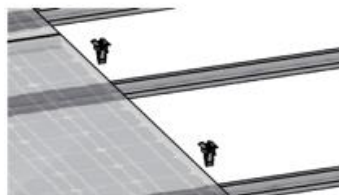


Fig 4.3.1C Positioning middle clamps

- IV. Place second module next to first module and secure using middle clamp, do not tighten [Fig 4.3.1D].

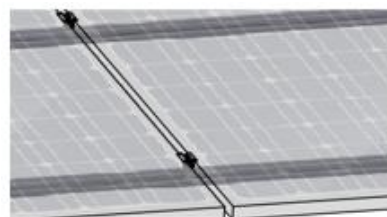


Fig 4.3.1D Positioning second module

- V. Repeat until end of row, as shown in Fig 4.3.1E.

Note:

- Panels can be mounted in both landscape orientations

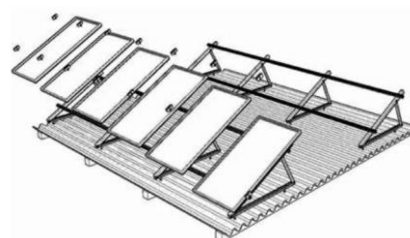


Fig 4.3.1E Complete array of panels

4.3.2 Secure Modules

- I. Verify that the module clamp is fully engaged on the rail and 1.5 mm maximum middle clamp to module offset is aligned with the module frame [Fig 4.3.2A].
- II. Secure all clamps [middle and end] to recommended torque settings [15Nm].

When mounting modules, please observe the clamping points specified by the module manufacturers.

- III. Please observe 20mm gap between module rows for better heat dissipation [Fig 4.3.2B].

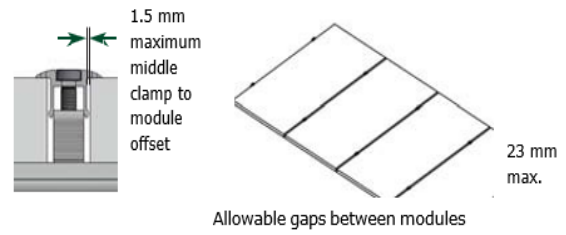


Fig 4.3.2A: Securing middle clamp and PV modules

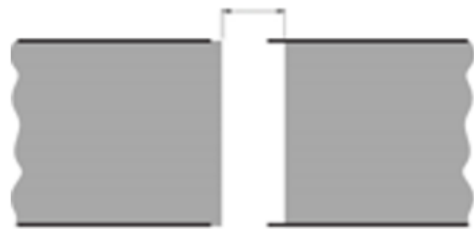


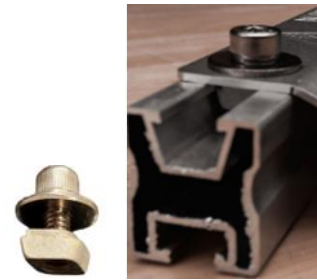
Fig 4.3.2B: Gap between PV Module rows

4.4 Accessories

4.4.1 Micro/Optimiser Kit Proline

The optimiser kits enable mounting of optimisers and micro-inverters on top of the Proline Rails.

- I. Loosely connect the bolts and washer to the mounting holes of the micro-inverter.
- II. Slide in or simply insert the hammerhead nut from above.
- III. Secure the bolt using recommended torque settings [15Nm].



4.4.2 Earthing Shims

The earthing shims ensure conductive connectivity especially between anodised elements of the mounting system. This is only utilised for a fully black anodised system and excludes mill finished systems (self-earthed via mid and end clamp earthing pins).

- I. Slightly lift the PV panels and insert the earthing shim and mid clamp in position.
- II. The correct alignment involves one pair of earthing shim pins under each of the two adjacent panels.
- III. Once the middle clamps are secured with the bolts properly torqued, the teeth of the earthing shims would penetrate the anodisation layers of the panel and rail to provide electrical continuity.



Fig 4.4.2A: Earthing Shim Alignment around mid-clamp

4.4.3 Earthing Lug

The earthing lug can be used as a potential equalization within the mounting racks.

- I. The lug can be positioned by top entry or sliding in top of the rail [V-channel] using the hammerhead nuts.
- II. Place the earthing wires inside the lug chamber.
- III. Secure the bolt using recommended torque settings [15Nm].
- IV. Clamp distance to the edge: 8-10 mm.
- V. Connection (single/multi-wired): 4-50 mm².



4.4.4 Rail Cable Clip

The Proklip-Multi 10 allows quick rail cable clip installation without the use of any nuts and bolts.

- Position the clip (A) of the rail cable clip underneath the bottom (rectangular) channel (B) of the Proline rails.
- Insert cable clip by pushing firmly into the channel, until it snaps in, as shown in Fig 4.4.4A.
- The cables are then run through the retainer and the clip can be closed by pressing it in.

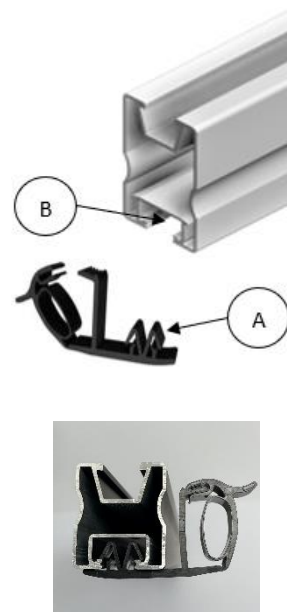


Fig 4.4.4A: Rail cable clip attached to Proline rail



4.5 Torque Specifications and Tolerances

The various bolt sizes of the mounting system and their recommended torques in the mounting system is listed in Table 6.5:

Bolt Size	Recommended Torques
Torx Bolt for RapidPro Module Clamps	15 N-M
M6 and 1/4" Bolt	6 N-M
M8 and 5/16" Bolt	15 N-M
M10 and 3/8" Bolt	40 N-M
M12 and 1/2" Bolt	70 N-M
Note: Recommended speed for installation of self-drilling 1/4" diameter is 1200-1800 RPMS	

Table 4.5: Size of bolt and recommended torques

For project specific system design, please refer to project specific drawings for recommended torque for each size of bolt used in the system and allowable tolerances. In the event of deviation from approved drawings, contact Schletter Australia immediately.

4.6 Maintenance

In general, once correctly assembled, the roof-top systems should operate reliably with minimal maintenance. However, Schletter Australia recommends yearly inspection of system should be conducted to maintain optimal performance. This ensures the system's long-term durability and reliability.

The following best practises and inspection guidelines are advised for roof-top mounting systems:

- I. Prior to installation, it is advisable to store products free from contamination by contact with items that may contain rust, dirt and chemicals. If contamination occurs, affected products has to be cleaned using appropriate methods such as using galvanised zinc spray on affected areas.
- II. Clean any visible contamination from soil, and other particles.
Further guidelines on this can be found in:

Standards	Material	Country
Standards Association of Australia	Aluminium	Australia
Galvanizers Association of Australia (GAA)	Steel	Australia
Galvanizers Association of New Zealand (GANZ)	Steel	New Zealand

- III. Visually inspect for signs of damage, wear, corrosion, or movement.
Replace any affected components immediately.



Aluminium components may undergo surface oxidation, forming a thin and hard film of Aluminium oxide which looks like powdery white or dull grey finish. This is standard ageing process for Aluminium and is beneficial for long-term durability of the product. The oxide layer acts as a barrier against atmospheric corrosion.

- IV. Check torque values of fastening bolts in the structure as per recommended torques in section 6.5.
The following inspection process can be followed:
 - a) At least 2% of bolted connections must be checked using a calibrated torque wrench. The torque wrench must have a display or be a click type torque wrench.
 - b) Torque wrench should be set at 50% of intended tightening torque.
Check is successful if bolt cannot be loosened.
 - c) If more than 10% of checked bolted connections are loose, a re-check has to be done.
The re-check should be increased to 10% of all bolted connections.
 - d) If more than 10% of connections are still loose, all bolted connections much be checked.
 - e) Tighten all non-conforming bolts to specified torques as per section 6.5.
- V. Check for loose wiring.

The maintenance guidelines above apply only to the components of the mounting structure that are manufactured from Schletter. For external components, maintenance should be carried out respective to relevant manufacturer's guidelines.



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