A FRAMES

INSTALLATION MANUAL V2.0

LAST REVISED ON 23.08.2024

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1.0 Introduction

1.1 Brief 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, account for ease of installation and industry leading installation times.

The components are made from Aluminium (T66) 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 the installation of PV modules in flat metal roofs.

Section 1 and 2 focuses on an 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 the 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 improper use and exclude any liability of the manufacturer. Any use under conditions other than those assumed in the planning is also considered 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 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!

Ensure all personnel are trained in proper grounding techniques and the use of earthing lugs.

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.

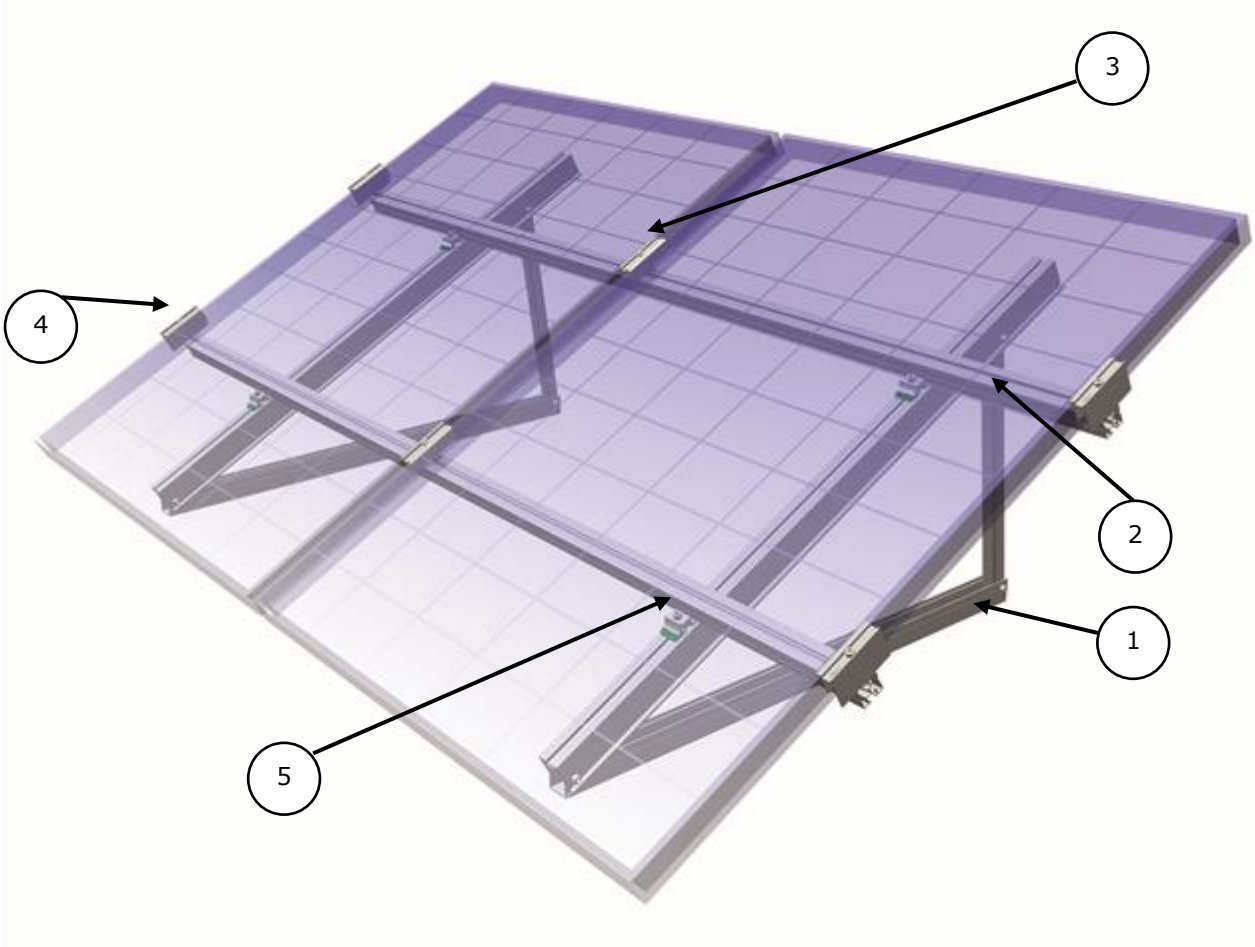
Injury hazard! Falling objects pose a risk of injury to people. Prior to installation, set up barriers in the hazard area to warn people nearby.

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



Key Components

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

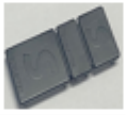
2.2 Components Details

ITEM CODE	ITEM DESCRIPTION	IMAGE	
120020-04400	Rail Pro35 4400mm		RAILS
120020-94400	Rail Pro35 4400mm - Black		
120021-04400	Rail Pro50 4400mm		
129200-000	Rail Joiner Proline		JOINERS
150101-150	Tripod - up to 1.8 meter length modules		A Frames
151001-220	Tripod - up to 2.4 meter length modules		
131020-001	Mid Clamp 30-47mm Proline		MODULE CLAMPS
131020-000	End Clamp 30-47mm Proline		
131020-901	Mid Clamp 30-47mm Proline Black		
131020-900	End Clamp 30-47mm Proline Black		

ACCESSORIES

900000-080	Universal Screw, Purlin 80mm	
900000-065	Universal Screw, Purlin 65mm	
900000-360	Screw, Direct to Sheet	
129065-009	Module Cable Clip	
129065-100	Cable Clip Pro	
129065-101	Cable Clip Pro - Black	

ACCESSORIES

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

3.0 Installation Tools

Tape Measure

Chalk Line

Marker

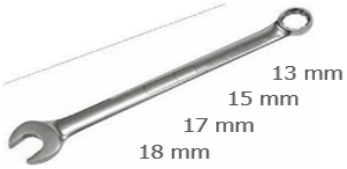
Pliers

Angle Grinder

Carpenter's Square

Rubber Mallet

Torque Wrench



Wrench

Rechargeable Power Drill

Torx® bit (TX 40)

4.0 Mounting Instructions

4.1 Tilt Frames

4.1.1 A Frame Configurations

The A-Frame can be oriented at 15^0 and 30^0. The inner strut can be used as the outer strut to achieve 15^0 from the 30^0 tilt as shown in Fig 4.1.

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

he A-Frames come in the following sizes:

Part Number	Frame	Tilt Angles	Maaximum Panel Dimensions	Image
151001-220	A Frame – 2.2m in length	15° and 30°	2.4m in length	Figure 4.1.1A
150101-150	A Frame – 1.5m in length	15° and 30°	1.8m in length	Figure 4.1.1B

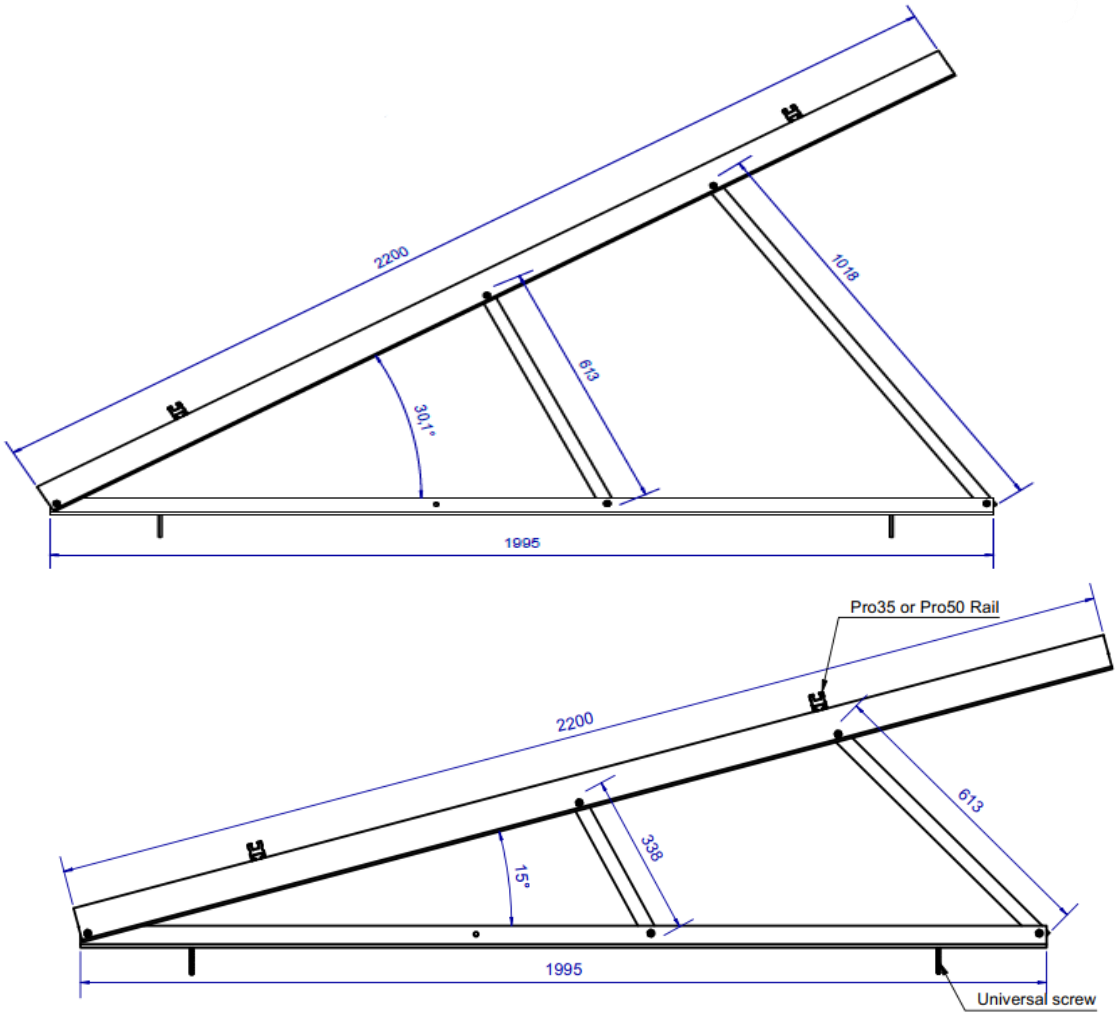


Fig 4.1.1A A-Frames [2.2m] at 15^0 and 30^0 tilt orientation.

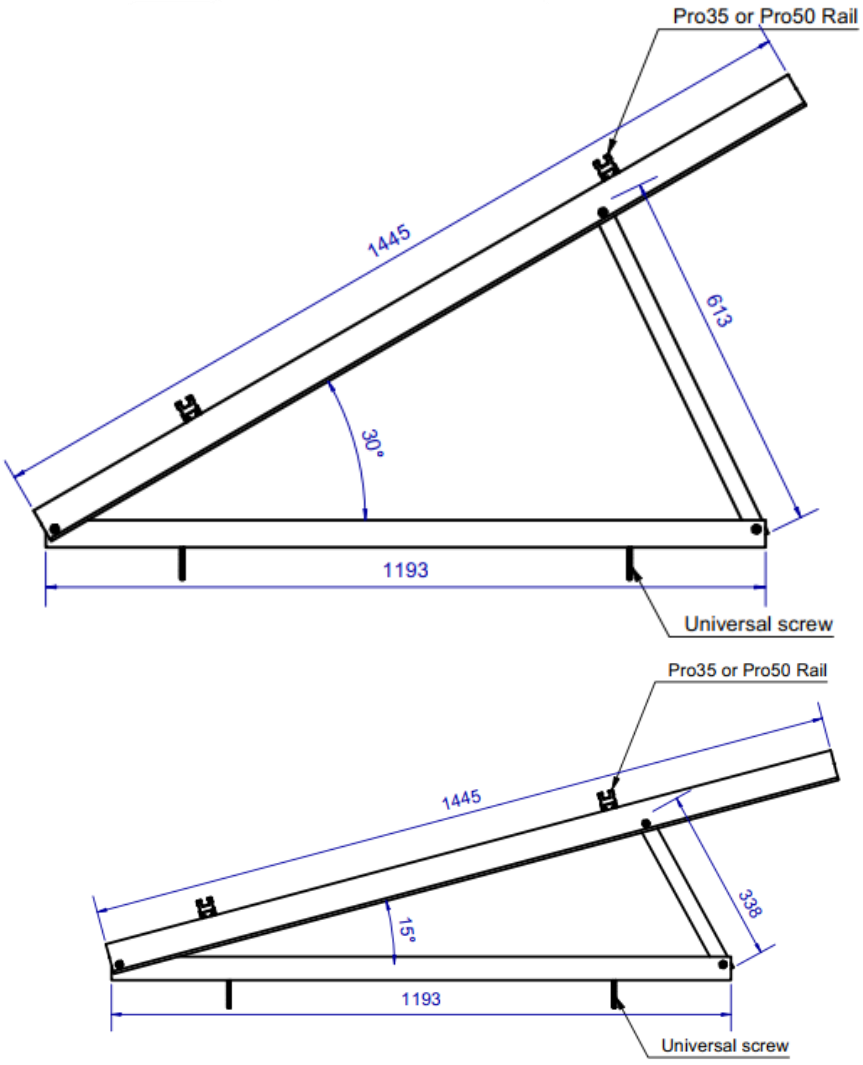


Fig 4.1.1B A-Frames [1.5m] at 15^0 and 30^0 tilt orientation

4.1.2 A-Frame Setup

I. The A-Frame positioning depends on the installation plan. The variables **A**, **B** and **C** as per Fig 4.1.2A need to be determined at the site before securing the A-Frames to the roof purlins.

II. **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.

III. **B** can be determined from standard shading calculations.

IV. **C** can be determined from standard engineering certificates.

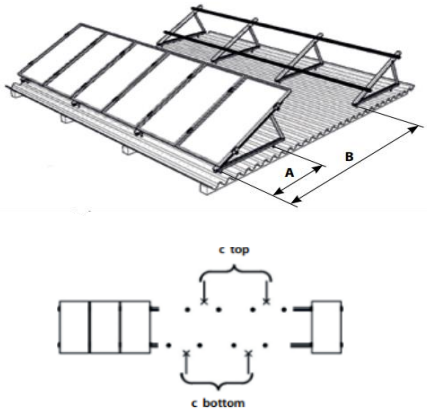


Fig 4.1.2A: Screw fixing and shading distances

4.1.3 Secure A-Frame to Roof

I. Pre-drill the bottom support of the A Frame with 0.55mm tolerance over the screw diameter of 6.2mm as shown in Fig 4.1.3A.

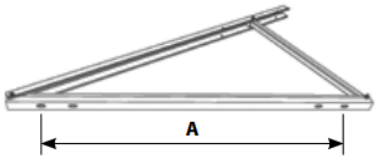


Fig 4.1.3A: Pre-drill hole for screw connection

II. The rubber pads with integrated adhesive should be attached across the base of the A Frame, 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 holes of 4.5mm in diameter is recommended

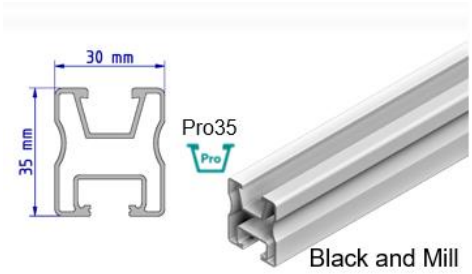
The tightening torque must be limited (15Nm) to prevent this deformation and to ensure thermal expansion is not impeded.

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.

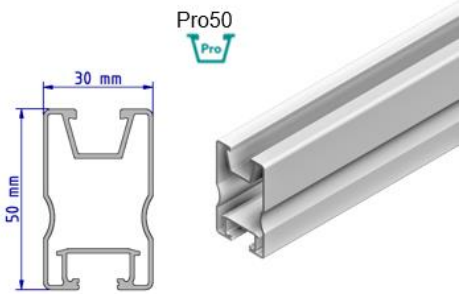
4.2 Rail Installation

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 the 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.

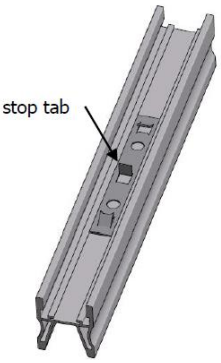


Fig 4.2.2A: Rail Joiner

⚠ For Schletter Rail Pro35/Pro50, the maximum array length is 20m. However, we would recommend 20m for fixing to substructure and 11m for fixing in roofing sheets due to thermal expansion on roof sheet.

⚠ The rail joiners are for single use application only.

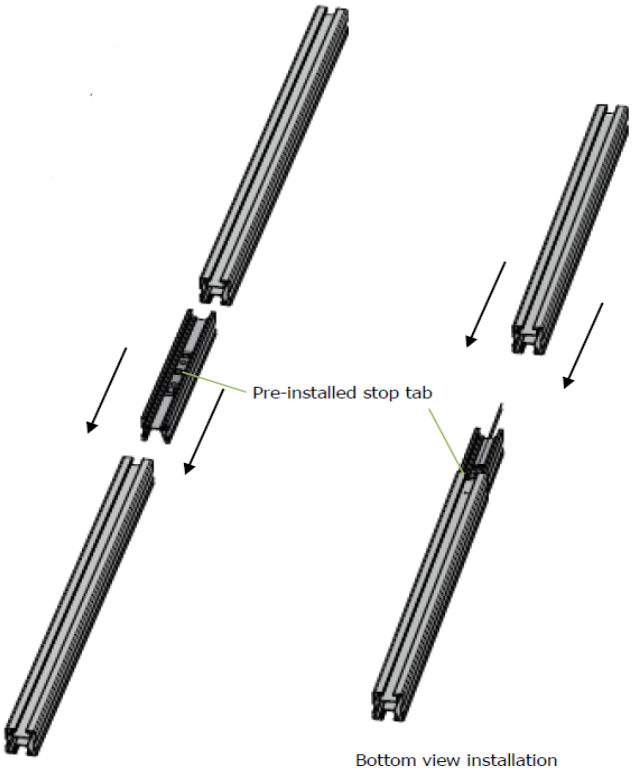


Fig 4.2.2B: Joiner connecting Proline rails

Fig 4.2.2C: Rails secured together via Proline joiner

4.2.3 Add Rail to Fastener

I. Position the rail cross-connectors on top of the tripods to allow the rails to run perpendicular to the A-frame module beam. Align rails to clamping zones of the panel.

II. Position and fit the bottom (rectangular channel) of Proline rails on top of rail cross connectors, across each A Frame frame, as shown in Fig 4.2.3.

III. Secure by tightening the bolt on the cross-connector clamp using recommended torques (15Nm).

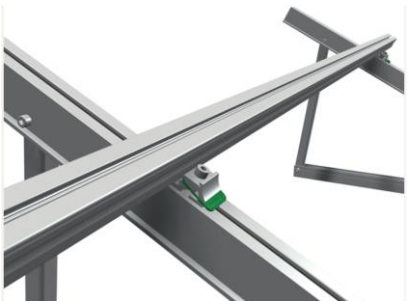


Fig 4.2.3: Multi Adaptor fixing rail to fastener

4.3.1 Position Modules

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

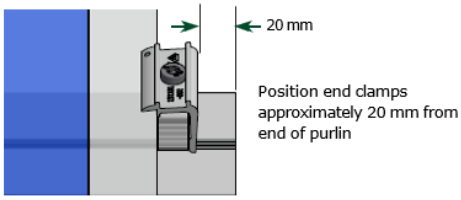


Fig 4.3.1A: Positioning end clamp

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

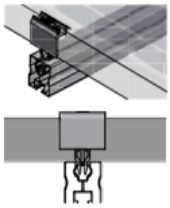


Fig 4.3.1B Postioning first module

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

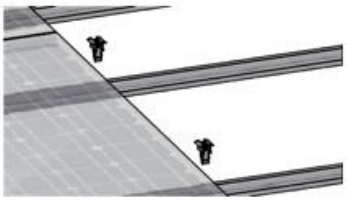


Fig 4.3.1C Positioning middle clamps

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

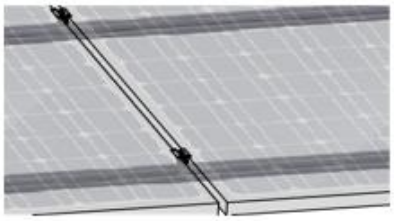


Fig 4.3.1D Positioning second module

V. Repeat until end of row, as shown in Fig 4.3.1E. This image illustrates A-Frames only.

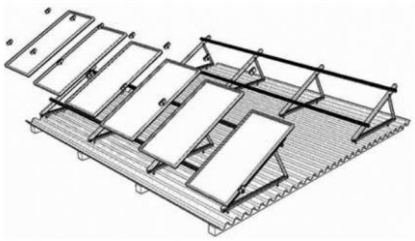


Fig 4.3.1E Complete array of panels with A-Frames

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.

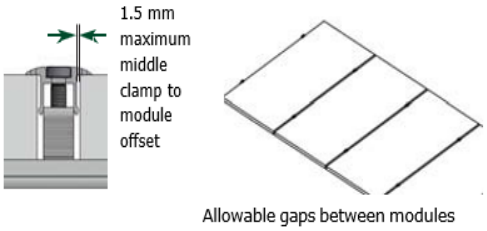


Fig 4.3.2A: Securing middle clamp and PV modules

III. Please observe a minimum of 5mm gap between module rows for better heat dissipation [Fig 4.3.2B].

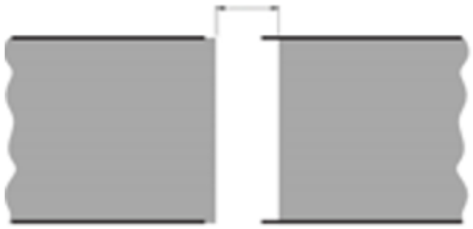
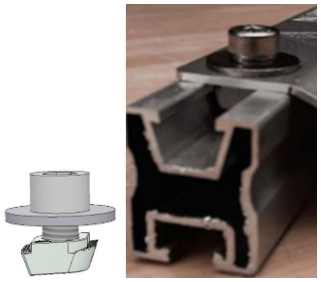


Fig 4.3.2B: Gap between PV Module rows

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 [14Nm].

4.4.2 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 inside the top groove using the hammerhead nuts.
II. Place the earthing wires inside the lug chamber.
III. Use a calibrated torque wrench to apply the recommended 14 Nm torque for a secure connection.
IV. Inspect the connection to ensure the earthing wire is properly seated and there are no loose strands.
V. The advisable positioning of the earthing lug on the rails is as follows:
    a. Lug distance to the edge of rail: 8-10 mm.
    b. Connection (single/multi-wired): 4-50 mm^2.

⚠ The earthing of the PV system can be achieved with one earthing lug per array as the entire system is bonded via integrated earthing pins on the mid and end clamps.

However, additional lugs can be provided upon request, as the final responsibility to ensure earthing at the site is upon the installers in order to maintain compliance with AS/NZS 3000.

4.4.3 Cable Clip Pro

Schletter provides cable management options with the Proline rails via the rail cable clips. They come in silver and black options.

- Insert cable clip into the top of the Proline rail channel. Once pressed this should click in and be firmly attached to the side of the rail as shown in Figure 4.4.3B.
- Insert cable clip by pushing firmly into the channel, until it snaps in, as shown in Fig 4.4.3B.
- The cables are then run through the retainer and the clip holds the cables firmly in place.
- Can hold 4mm or 6mm cables.

Figure 4.4.3A: Cable Clip Pro in silver and black

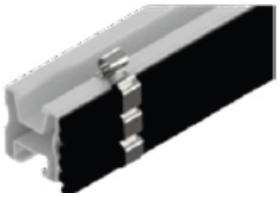


Figure 4.4.3B: Cable Clip Pro with cables running parallel to rail

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 4.5:

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.

5.0 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 have 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 4.5.
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 the 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 4.5.

V. Check for loose wiring.

VI. Apply anti-corrosion compound to connection points, especially in coastal high corrosivity areas.

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 the relevant manufacturer's guidelines.

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