

AB1-Series Photovoltaic Modules

Mounting Application Note

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Overview

The purpose of this application note is to help guide system designers by providing the mechanical requirements for mounting Abound Solar's AB1-Series of Photovoltaic Modules and suggesting possibilities for mounting techniques. Abound Solar provides this information only as a minimal starting point, and compliance with the information contained herein is not a guarantee of an approved photovoltaic system.

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1.0 Safety

All instructions should be read and understood before attempting to install, wire, operate, and/or maintain the AB1 photovoltaic modules. Be aware that metal rails can have sharp edges. Please make sure that your designs allow for the safe installation of equipment.



DANGER: Risk of Electrical Shock
PV modules generate DC electrical energy when exposed to sunlight or other light sources. **Contact with electrically active parts of the module such as terminals can result in burns, sparks, and lethal shock**

whether the module is connected or disconnected.



Caution: Risk of Broken Glass. Since the AB1 Module consists primarily of glass, the possibility of broken glass exists. Broken glass can be sharp and cause injury if not handled with protective equipment such as gloves and eyewear.

Specifications are subject to change; please contact Abound Solar to ensure that you are utilizing the most current information available.

2.0 The AB1 Module

Overview: Abound Solar modules are comprised of two sheets of glass that are bonded together. There is a gap between these two pieces of glass. The construction is such that there are reinforcing beads within this area, giving the module exceptional strength. The interior of this assembly contains the semiconductor film, which will produce electricity when exposed to sunlight. Cables with industry standard MC4 style connectors provide for the electrical connections. A junction box is on the rear of this module assembly to provide strain relief to these cables. These are frameless modules. Each module weighs about 12 kg, which is about 26 pounds. This equates to a roof loading of 3.125 #/SF (15.25 kg/m²).

Within Abound AB1 Photovoltaic Modules, the active cells are oriented along the long axis. This allows the maximum number of modules to be stacked in series before hitting the voltage limitation of the inverter, maximizing the obtainable electrical energy from each string. Because of this cell orientation, 'portrait mode' mounting orientation is desirable to minimize the possibility of complete shading of any one cell.

Engineering CAD models of the AB1 modules are available; please contact Abound Solar for more details.

Backbox: The backbox is located on the rear of the non-semiconductor back side of the module, and its purpose is to provide strain relief for the two interconnection cables. It is approximately 16mm thick. The backbox is sealed and should never be opened; preferably, the modules should be oriented so the leads from the backbox are pointing toward the ground to minimize the possibility of water ingress into the backbox.

Cables: The cables are designed for optimum efficiency, and they are long enough to connect side-by-side modules when placed with reasonable spacing. The effective length of the cables is approximately 600 mm. The positive (+) cable is on the left when viewed from the rear of the module, which should always be placed on the eastern side of the module when mounted in the Northern Hemisphere. The (+) connector has a male plastic housing with a female metal ferrule inside.

Frames: The modules do not have a frame. Abound Solar AB1-Series solar modules are intended to be installed in most applications without a frame. However, it is understood that under special circumstances, such as an extremely high wind load, a frame may be desirable. Please discuss the application with Abound Solar prior to installing a frame.

Grounding: Since the modules do not have a frame, nor do they have any exposed metal components, there is no need to ground any part of the module. In fact, the module must be insulated from contact with metallic surfaces.

Clips: Modules must be mounted with a minimum of 4 rubberized clips installed on the long (1200mm) module edges, with the centerline of the clips placed 275 mm +/- 25 mm from the short edge of the module as shown in the Figure 2.0. Typical rubberization is typically made from Ethylene Propylene Diene Monomer (EPDM) – or similar material - contacting the module. Be sure to follow the clip manufacturer's recommendations; a minimum gap of 1 mm is required between the edge of the

rubberized clip and the edge of the module to allow for thermal expansion.

The amount of overlap that the clip should have on the module is a maximum distance of 12 mm, minimum of 10 mm. It is acceptable to have additional overlap on the bottom-side of the modules as this will not interfere with the electrical properties of the active cells.

Thickness: The typical module thickness is 8.1 mm. Due to manufacturing process tolerances, this value may vary by -0.4 mm and up to +0.8 mm. Any clips which are used must be able to accommodate this range of module thickness.

The compressive force exhibited by the clips on the module should be no greater than 19 psi.

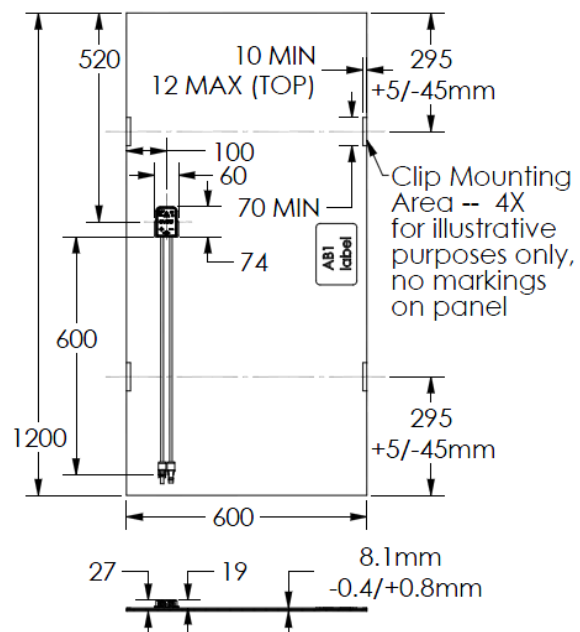


Figure 2.0
Panel Mechanical Reference

Safety Hook: When mounted in portrait mode with side clips, the module must be supported on the lower edge to prevent the module from sliding due to gravity and drag forces. A safety hook should be used to prevent sliding of the module. The location along the bottom edge of the module is not critical, but it should not cover

more than 10 mm of the topside of the module. A representative safety hook is illustrated in Figure 2.1.

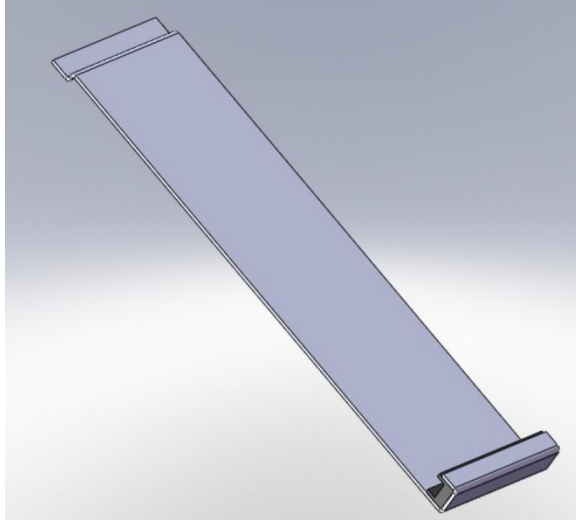


Figure 2.1
Safety Hook

3.0 Clips

The clips themselves should provide a contact area of no smaller than 70mm x 10 mm. On the front of the module, it is imperative to not encroach upon the active cell area, which lies about 12mm in from the edge of the glass. On the rear of the module, there is no constraint on how far the clip may encroach on the module. The farther the clip protrudes on the rear of the module, the higher the load bearing capability will be.

Note that in some installations the overall impedance of the system will be affected by this overlap - creating an electrical backplane - that may affect the operation of some inverters under certain conditions. The amount of overlap, and the distance between the back of the module and the clip and/or rail, will affect the amount of parasitic capacitance that is then built into the system. This capacitance, although low on a per panel basis, may add up to a significant

amount on a large installation. Consult your inverter manufacturer for more information.

3.1 Approved Clips

Approved clips have been tested to ensure compliance with UL and IEC standards, including IEC 61646, 10.16 (applied load test) and IEC 61646 10.15.2 (deflection over distance). New clip and mounting system designs must comply with these standards.

The following clips are approved for use on Abound AB1 Series Photovoltaic Modules:

Manufacturer	Model Number
Schletter http://www.schletter-inc.us/	ECO-8

Contact Abound Solar to initiate the approval process on newly designed clips.

4.0 Racking

The mounting structure must not cause any twist or stress to be placed on the modules.

Rails: The mounting rails must provide support for the modules. To allow the modules to comply with the safety requirements, the clips, which mount to the rails, must be placed in specific locations on the modules. These locations are shown in Figure 2.0.

Avoid placing rails directly beneath the label, which is located on the backside of the module. The label is located 25 mm

from the outside of the long edge and is 600 mm from the short edge.

For systems which will have more than one row of modules, it is often desirable to have symmetric mounting rails to simplify construction in the field. A suggested approach is to utilize rails that are mounted 610 mm apart, as shown in Figure 4.0. This will also allow enough clearance between modules – about 20 mm - for rain runoff, snow melt, and a reasonable safety clip.

Layout: The panels can easily be placed side by side, making for an efficient layout as illustrated in Figure 4.1.

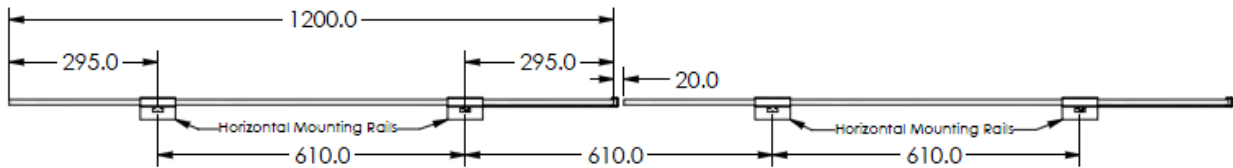


Figure 4.0
Use of Symmetric Rails

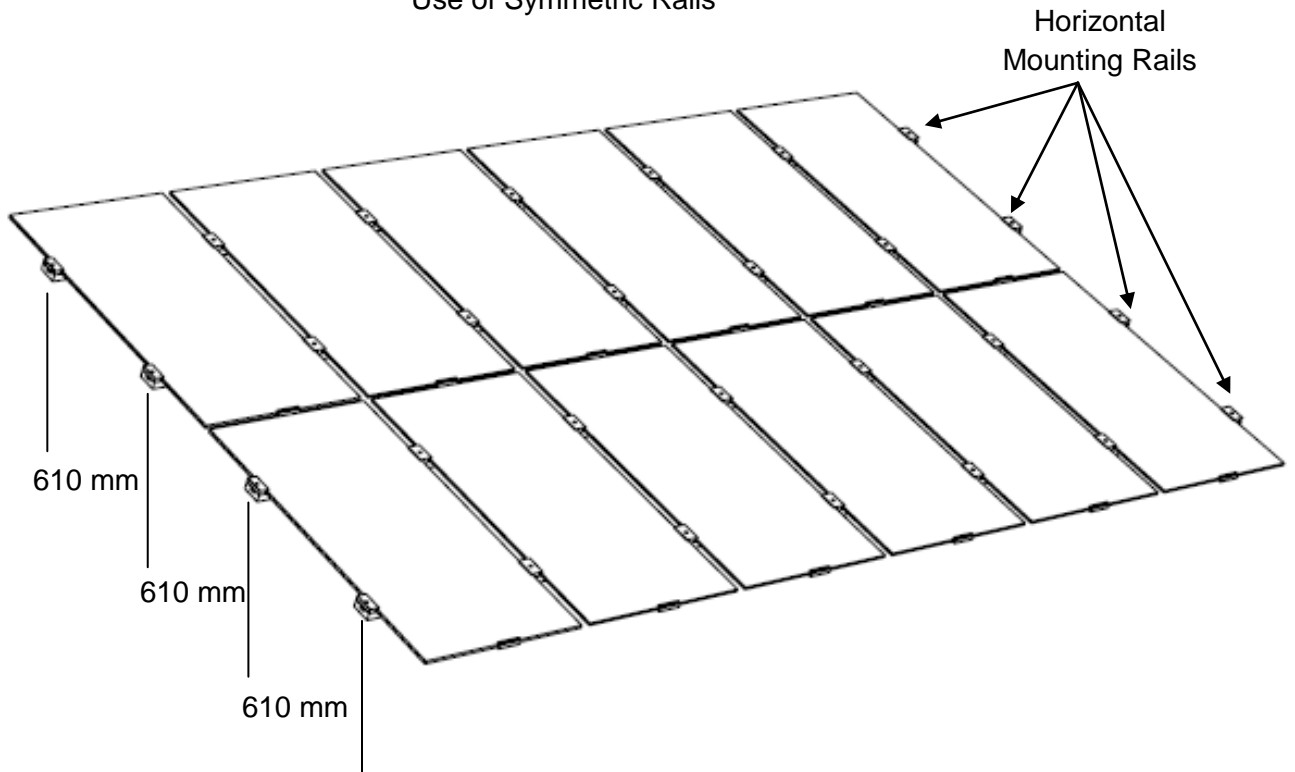


Figure 4.1
Portrait Mode, Side by Side Layout