

TB0103-1

To: Sharp Certified Installers and Customers

From: Arthur Rudin, Director of Engineering

Subject: Alternate Methods for Grounding Sharp Modules

Sharp modules utilize an aluminum frame with an anodized coating for corrosion resistance. The coating acts as an electrical insulator and will prevent the flow of current. In order to ground the module frame, this coating must be penetrated. Sharp provides stainless steel hardware to facilitate connection of a ground wire. You can use this hardware to facilitate grounding.

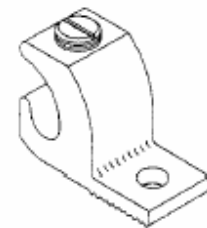
In an effort to save installation time, reduce cost and maintain compliance with the National Electrical Code (NEC), we are offering other methods to ground the modules that you may prefer more than the supplied hardware.

The NEC is approximately 700 pages and 85% applies to photovoltaic systems. We stress that the NEC be referenced as the ultimate source for safe and code compliant installations. In the event of discrepancy between NEC and Sharp recommendations, comply with the NEC requirements.

Caution: Follow the procedures contained in this document to maintain the module warranty. Alterations to the module frame other than those described in this document will void the warranty. Do not drill or enlarge holes in the bottom flange of the module frame. It is recommended that you read and follow the procedures in the PV module installation guide.

1. Use existing ground hole and stainless steel hardware.

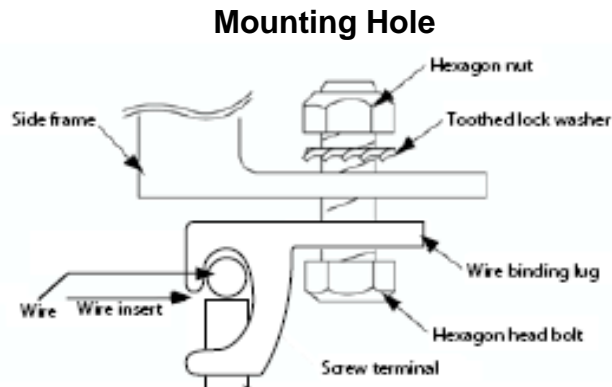
The existing ground hole can be used with the stainless steel bolt, lock washer and nut supplied with the module. All screws, bolts, etc must have a thread count of 32 turns per inch to significantly penetrate coating. These holes can be used to secure a lay in ground lug with a stainless steel bolt that has 32 turns per inch.



Lay in Ground Lug

Use of existing module mounting hole with alternate hardware

An existing mounting hole can be used to install an alternate stainless steel bolt, lock washer and nut.



2. Secure a ground braid or wire to one of the module end cap screws. Unscrew one of the lower end cap screws 2-3 turns to allow for the insertion of a fork terminal that contains the ground wire. Tighten the screw after inserting the terminal.
3. Integrated grounding clips with mounting hardware
Photovoltaic modules can be grounded through means of mechanical fasteners and subsequent grounding of the array support structure in accordance with the National Electric Code (NEC) sections 250.136 and 250.134. This method of grounding all non-current carrying conductive parts (equipment grounding) reduces the number of grounding conductors yet meets UL and NEC requirements for grid tied PV systems. The methods and standards are described below.

Use Stainless steel hardware to fasten the modules to a Steel or Aluminum rail, or other support member. Use a bonding device listed for this application. Figure 1 illustrates mounting using the module mounting holes. Figure 2 illustrates mounting two modules with clamps to a rail. Bonding is used here as defined in the NEC as "The permanent joining of metallic parts to form an electrically conductive path that ensures electrical continuity and the capacity to conduct safely any current likely to be imposed." Follow the manufacturers directions for the number and location of the clips used with each module. The module frame cannot be used as a path for the grounding circuit. If a module is removed from its support frame, all other modules in the array must remain grounded.

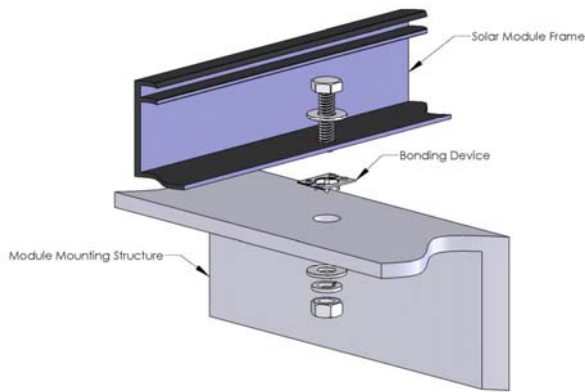


Figure 1

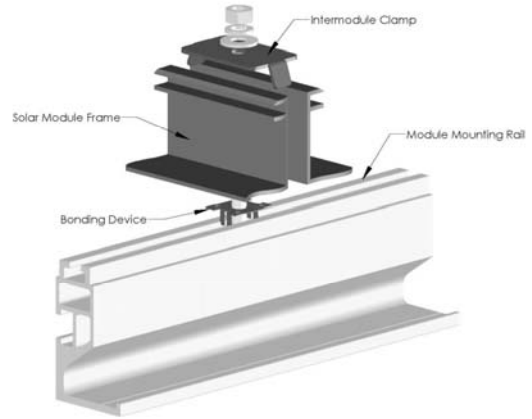


Figure 2

Use parts listed for grounding of the array support structure.

- Secure ground lug to hole drilled in module end cap
Drill a hole in one of the specified locations on the end cap of the module to accommodate a stainless steel self-tapping screw. The screw must have a thread count of 32 turns per inch. Another option is to use a stainless steel bolt, lock washer and nut to secure a ground lug. The locations for this option are 6 to 12 inches from each edge of the end cap and 0.75 inches up from the bottom of the frame.

