

# S-5!® suggestions for spacing of S-5! mini clamps for PV arrays.

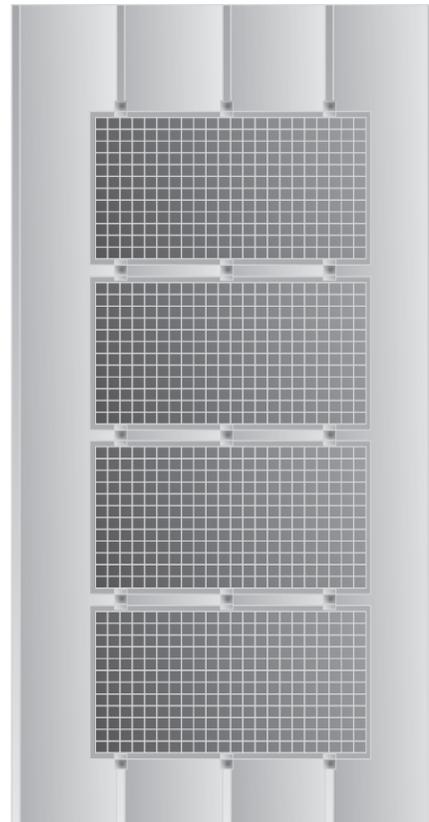
The following suggestions assume that determination has been made that the roof to which the S-5!® mini clamps will be attached is structurally adequate. Any loads imposed on the S-5! mini clamps will be transferred to the panels. Panel seams must have sufficient flexural strength to carry these loads. Panels must also be adequately attached to the building structure, and the structure must be sufficient to carry these loads. The makers of S-5! mini clamps make no representations with respect to these variables. It is the responsibility of the user to verify this information, or seek assistance from a qualified design professional if necessary.

The key to frequency and spacing of attachment points for PV frames utilizing the S-5-PV Kit is to distribute loads to the metal standing seam panels in a manner that is consistent with the intended distribution of loads from the roof panels into the building structure. With very few exceptions, the attachment of a single S-5! mini clamp to the seam will be stronger than a single point of attachment of the seam to the building structure. Hence the “weak link” is not the S-5! mini clamp but the attachment clips that hold the metal panels to the building structure, or the beam strength of the roof panel seam itself.

The most conservative approach to the spacing/frequency of PV frame attachment to the roof is to determine the spacing/frequency of the roof’s attachment to the building structure, then duplicate it at minimum. Determining panel attachment spacing in one axis is very simple. Standing seam panels’ attachment will be made using concealed hold-down clips within the seam area of the panel. So, in that axis, the clip spacing is the same as the seam spacing. The location of the clips along the seam (in the other axis) can be determined by a) consultation with the roof system manufacturer or installer, b) checking from the underside or, c) close examination from the topside along the seam. There will usually be a slight, but detectable, deformation of the seam at the clip location visible from the roof’s topside. Many standing seam roof systems are installed on “pre-engineered” steel buildings. The attachment spacing in that industry is typically 5'-0" and is readily apparent by inspecting the spacing of the structural purlins to which the panel clips are attached from the roof underside (interior of the building).

If, for instance, the panel clips are spaced 5'-0" on center along the seam, then use the 5'-0" dimension as a maximum spacing for the S-5! mini clamps. (S-5! mini clamps may also be spaced at closer centers, but not wider.) When modules are direct attached without racking in the landscape orientation, this spacing dimension is dictated by the smallest dimension of the PV frame. Using the roof panel clip spacing as a maximum spacing template for S-5! mini clamps is a sound practice, whether the PV modules are attached direct to S-5! mini clamp or to a racking system and then to the S-5! mini clamp (and panel seams). To evenly distribute loads, it is also necessary that each seam be involved in the finished assembly. Thus, every time a seam is traversed, it should be attached. Such an attachment scheme should evenly distribute wind loads into the building structure through the panels and their attachment, as was intended in the original roof construction assembly.

Please note these are only suggestions. Wind dynamics are complex, and S-5! advises review of the planned PV frame attachment design by a qualified professional who understands wind effects and metal roof design and construction. In certain solar installations a design professional may determine that seams can be skipped as points of attachment, but this determination must be made on a job-specific basis.



# S-5!® The Right Way!

These instructions for use by those experienced in the craft. Always follow appropriate safety precautions and use appropriate tools.

## Installation Instructions

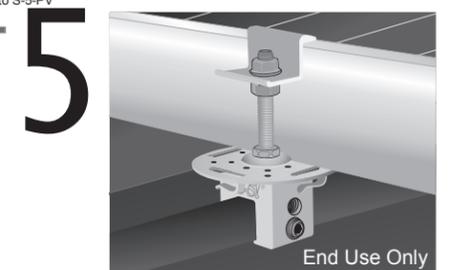
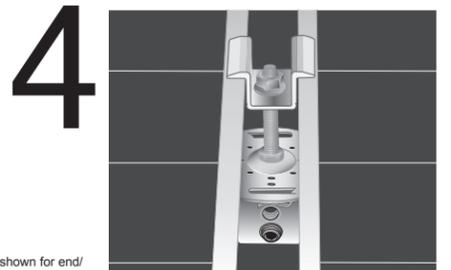
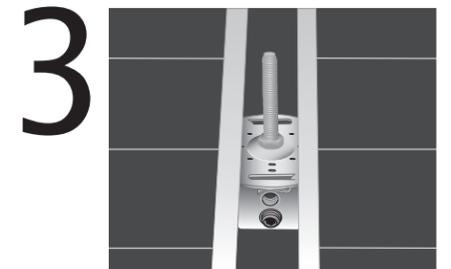
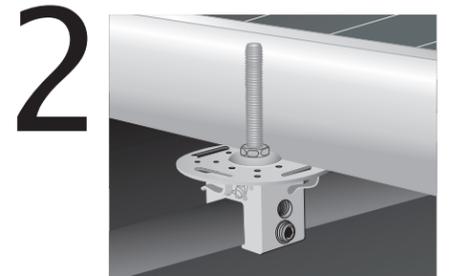
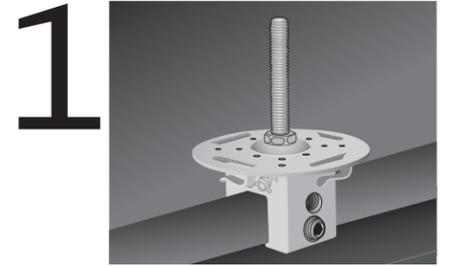
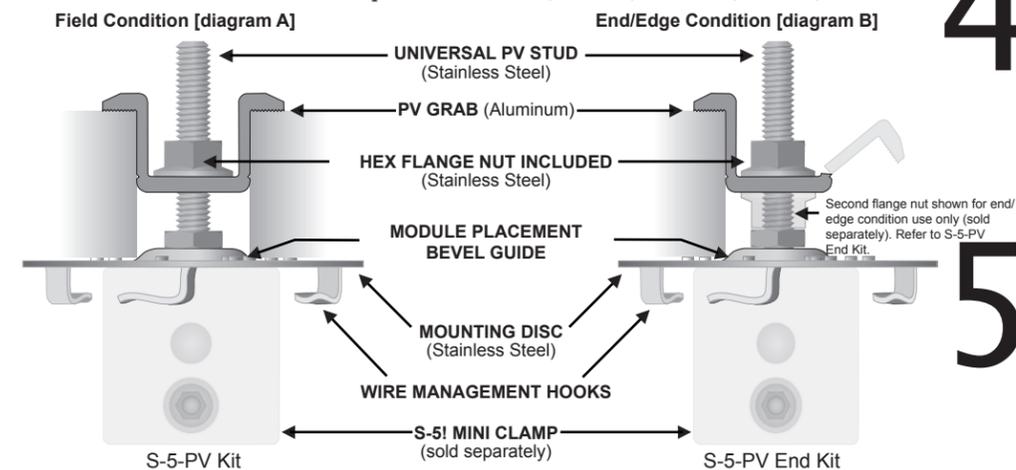
**S-5!® Warning!** Please use these products responsibly! Visit our website or contact your S-5! distributor for detailed installation instructions and available load test results. The user and/or the installer of these parts is responsible for all necessary engineering and design for the intended use of these parts in an assembly or application. Note that a continuous ground must be followed in accordance with National Electric Code (NEC), ANSI/NFPA 70. Installation in Canada must be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1. For use with PV Modules having a maximum fuse rating of 15A or less. Prior to installation contact the local code Authority Having Jurisdiction (AHJ) to determine the proper grounding requirements.

**Install S-5! mini clamp. See mini clamp installation instructions.**

- 1) Place mounting disc on the S-5! mini clamp. Secure Universal PV stud through the mounting disc into the S-5! mini clamp. Using a 13 mm deepwell socket, tighten universal PV stud to 140-160 inch pounds.
- 2-3) Install PV frames on top of the mounting disc utilizing the module placement bevel guide to ensure proper placement.
- 4) Install the universal PV anchor grab to the universal PV stud, with the flanged nut to secure the two PV frames (See diagram A). Tighten flange nut to 100-120 inch pounds.
- 5) For end/edge condition use two flange nuts (one sold separately). Install the first flange nut flange side up, and then install the PV anchor grab on top of the first flange nut. Ensure the arm of the PV grab fully engages module frame. Then install the second flange nut on the stud. Tighten top flange nut to 100 to 120 inch pounds and verify proper torque is achieved. Using locking pliers break off extra PV anchor grab arm by bending toward module frame and then back (see diagram B).

**Note:** An electric tool can be utilized for ease of installation provided proper torque is achieved.

Use the S-5-PV Kit for frame depths from 1.3" (33 mm) to 2.5" (64 mm).

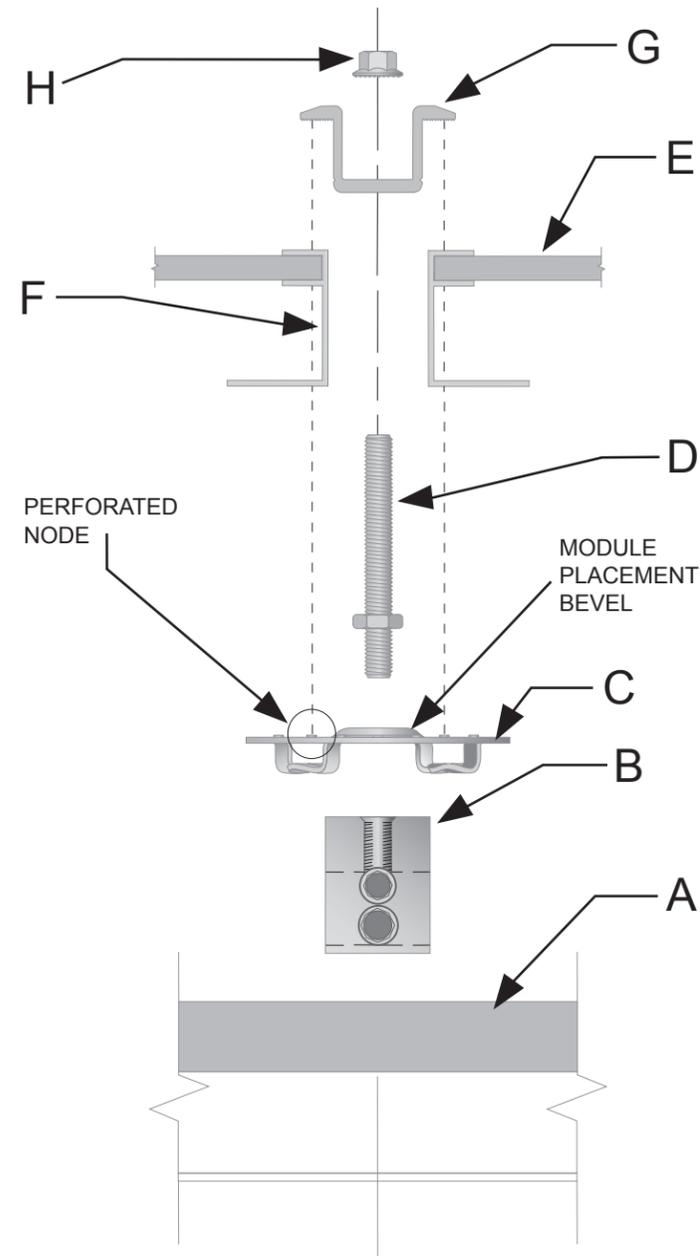


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The right way to attach almost anything to metal roofs!

# PV Mounting Assembly

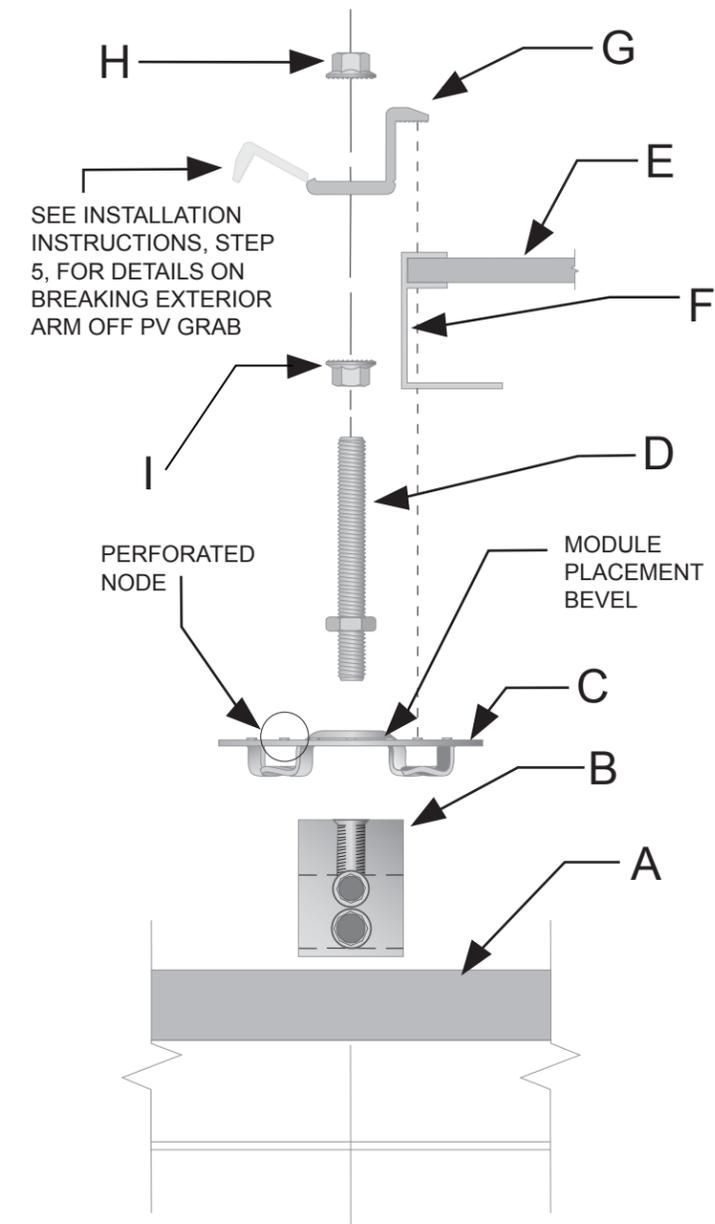
Field Condition



- A. STANDING SEAM METAL ROOF
- B. S-5! MINI CLAMP (Sold separately)
- C. STAINLESS STEEL MOUNTING DISC
- D. STAINLESS STEEL M8--1.25x68 mm UNIVERSAL PV STUD (Tensioned between 140 and 160 inch pounds)
- E. GLASS
- F. MODULE FRAME CROSS SECTION (Frame thickness from 1.3" [33 mm] to 2.5" [64 mm])
- G. PV GRAB
- H. STAINLESS STEEL M8-1.25 HEX FLANGE NUT (Tensioned between 100 and 120 inch pounds)

# PV Mounting Assembly

Edge Condition



- A. STANDING SEAM METAL ROOF
- B. S-5! MINI CLAMP (Sold separately)
- C. STAINLESS STEEL MOUNTING DISC
- D. STAINLESS STEEL M8--1.25x68mm UNIVERSAL PV STUD (Tensioned between 140 and 160 inch pounds)
- E. GLASS
- F. MODULE FRAME CROSS SECTION (Frame thickness from 1.3" [33 mm] to 2.5" [64 mm])
- G. PV GRAB
- H. STAINLESS STEEL M8-1.25 HEX FLANGE NUT (Tensioned between 100 and 120 inch pounds)
- I. STAINLESS STEEL M8-1.25 HEX FLANGE NUT

888-825-3432

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