

SERIES 100 ROOF MOUNT



CODE COMPLIANT
INSTALLATION
MANUAL | 2011

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1. Introduction

1.1 Overview of the SnapNrack System

SnapNrack Series 100 PV Mounting System offers a low profile, visually appealing, photovoltaic (PV) module installation system. This innovative system simplifies the process of installing solar PV modules, shortens installation times, and lowers installation costs.

SnapNrack systems, when installed in accordance with this manual, will be structurally adequate for the specific installation site and will meet the local building code and the International Building Code.

The SnapNrack installation system is a set of engineered components that can be assembled into a wide variety of PV mounting structures. It is designed to be installed by qualified solar installation technicians. With SnapNrack you will be able to solve virtually any PV module mounting challenge.



Figure 1.0 - Placing modules on S100 standard rails installed on L-Feet

1.2 Overview of this Manual

This manual describes the installation procedures for standard roof mounting for common photovoltaic (PV) arrays. It guides you through the correct procedures for mounting the SnapNrack PV module racking system on the major types of roof structures and materials. It also provides layout guidelines, installation tips and directions.

Review this entire manual before installing the SnapNrack system.

Throughout this manual you will see highlighted notes which will provide you with different types of information:

 **NOTICES** indicate important information to help with the installation or to avoid potential damage to the structure or components.

 **CAUTIONS** indicate a potential for property damage, personal injury, or death.

For help with your installation, call SnapNrack technical support. Visit www.snapNrack.com and click Contact in the top menu bar.

For information on Ground Mount installation procedures, refer to SnapNrack Ground Mount Installation Manual. It can be downloaded from www.snapNrack.com

1.3 Your responsibility as installer

Comply with all applicable local or national building codes, including any that may supersede this manual.

- Make sure that the SnapNrack components and other products are appropriate for the particular installation and the installation environment.
- Make sure that the roof, its rafters, connections, and other structural members can support the array in compliance with all applicable code requirements.
- Use only SnapNrack parts and components.
- Make sure that lag screws or roof attachment fasteners are properly and securely attached to the roof rafters or structural members and that roof members are structurally sound.

- Maintain the waterproof integrity of the roof, including the proper use of roofing sealant and selection of appropriate flashings for post type installations (see section 4 for flush-mount installations using standoffs and section 6 for tilted installations using standoffs).

✓ **Note: L-foot type mounting assembly includes flashing material.**

- Ensure safe installation of all electrical aspects of the PV array.

- ✗ **All installers working on any roof surface must always follow necessary and applicable precautions for working in a rooftop environment including maintaining a secure attachment to a regulation fall protection safety harness that conforms to OSHA standards.**
 - ✗ **If it is raining, or if you anticipate any potentially dangerous conditions, do not proceed with the installation.**
 - ✗ **All tools and equipment used on the roof should be secured to avoid falling object hazards.**
 - ✗ **All equipment should be properly maintained and inspected prior to use.**
 - ✗ **Any exposed studs should be protectively capped to help avoid injury.**
-

1.4 Support

For help with your installation, call technical support. Visit www.snapNrack.com and click Contact in the top menu bar.



Figure 1.1 - SnapNrack.com

2. Prepare for the installation

2.1 Identify type of roof

Roofs on residential buildings are constructed primarily of three types of material: asphalt shingles (commonly known as composition shingles), tile or slate (which we will refer to as tile), and wood or shake shingles (which we will refer to as shake).

PV array installations on composition roof surfaces using the SnapNrack flashed L-foot components as described in section 3, offers the quickest and easiest SnapNrack installation solution.

Installations on tile or shake roofs, or thicker composition roofs that exceed a typical 1/8-inch material thickness (often called presidential composition), should not use SnapNrack L-feet and should instead use standoffs as described in section 4.

Installation of PV arrays tilted at an angle to the roof surface is described in section 6.

✓ Sometimes stainless steel hardware has a tendency to seize up when it is exposed to sunlight and gets hot. To reduce the possibility of seizing, apply lubricant to bolts, shade the hardware prior to installation, and avoid spinning on nuts at high speed.

2.2 Identify SnapNrack components

Make sure you have all the necessary SnapNrack system components needed to complete the installation.



SnapNrack Standard Rail



Universal End Clamp Ver1&2



Standard Rail Splice



Snap-in Channel Nut

Figure 2.0 - Common System Components



Top-mount End Clamp



Mid Clamp



Rubber end cap



L-foot assembly —base, L-foot,
stamped steel flashing



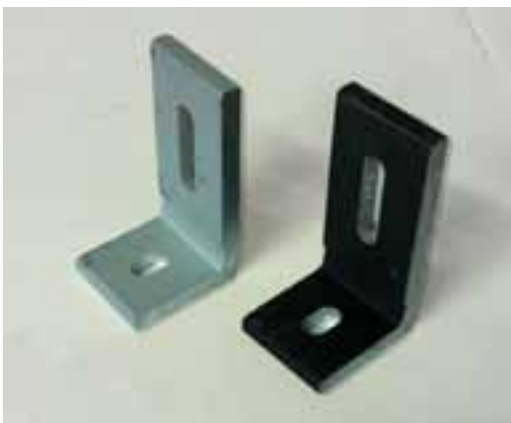
Standoff assembly —
base and standoff shaft



L-Foot Base



Standoff base



L-Foot



Standoff Clamp

Figure 2.1 - Common System Components - Cont.



Corrugate Roof Block



Standard Base Seam Clamp



Heavy Duty (HD) Standoff and Base



Wide Base Seam Clamp



Four-Hole Standoff Base and Standard Standoff



Hanger Bolt Clamp

Fig 2.2 - Alternate SnapNrack Hardware

2.3 Obtain installer supplied tools and materials

Make sure you have all the necessary additional hardware components, tools, and other material that are needed to complete the installation. These include:

- Appropriate roof flashings for standoff installations
- Lag bolts and washers for roof attachments
- Waterproof roofing sealant (such as Rainbuster) in a color to match the color of the roof
- ½-inch box / open end wrench
- 3/8-inch ratchet wrench with ½-inch socket and short extension
- 3/8-inch torque wrench
- Power drill with 3/16-inch x 6-inch and 12-inch drill bits for lag bolt pilot holes
- 5/32-inch Allen key for leveling spacers on standoffs
- Tools for attaching grounding hardware
- Reciprocating saw (such as a Sawzall or miter box) with correct blade for trimming non-ferrous metal rails
- Metal file for finishing trimmed rails
- Chalk line and grease pens (in two or three different colors) for marking mounting locations on the roof material
- Tape measure
- Flat pry bar
- Structural plans for the building when available
- SnapNrack Rail Cutting Guide (Optional)



Figure 2.3 UEC Rail Cutting Guide

2.4 Survey the site

- Measure the roof surfaces and develop an accurate drawing of the roof and any obstacles such as chimneys and roof vents.
- If plans are available, check to make sure that the plans match the final structure.
- Review the shading pattern across the roof surface from the residence itself, from adjacent structures, and from other nearby features such as trees.
- Identify any roof access areas or keep-out areas as required by the local jurisdiction.
- Confirm roof construction, type, and condition.
- Assess roof rafter size, material, and span to confirm that the structure is sound and can support the additional load of the array.
- Identify any construction anomalies that may complicate the process of locating rafters from the roof surface.

- Measure the spacing between the rafters.
- If you find structural problems such as termite damage or cracked rafters that may compromise the structure's integrity, consult a structural engineer.

Determine the design wind speed and site specific conditions for the site and reference the structural engineering tables (see section 13: Appendix) to determine the maximum allowable rail span for this site.

If you are unsure about the local design wind speed, consult with the local building jurisdiction.

2.5 Lay out system on the roof

Using the information collected in the site survey, complete a system layout showing array location and distances from key roof features. Include any information necessary for the permitting process.

The following definitions are used to describe array layout designs:

- Module length—the measurement along the longest side of the module frame
- Module width—the measurement along the shorter side of the module frame
- Module thickness—the measurement of the thickness of the module

SNAPNRACK SERIES 100 ON FLASHED L FEET

FLASHED L FEET ARE OPTIMIZED FOR QUICK AND ROBUST INSTALLATION ON STANDARD COMPOSITION SHINGLE ROOF SURFACES

FOR OTHER ROOF TYPES STANDOFFS ARE RECOMMENDED

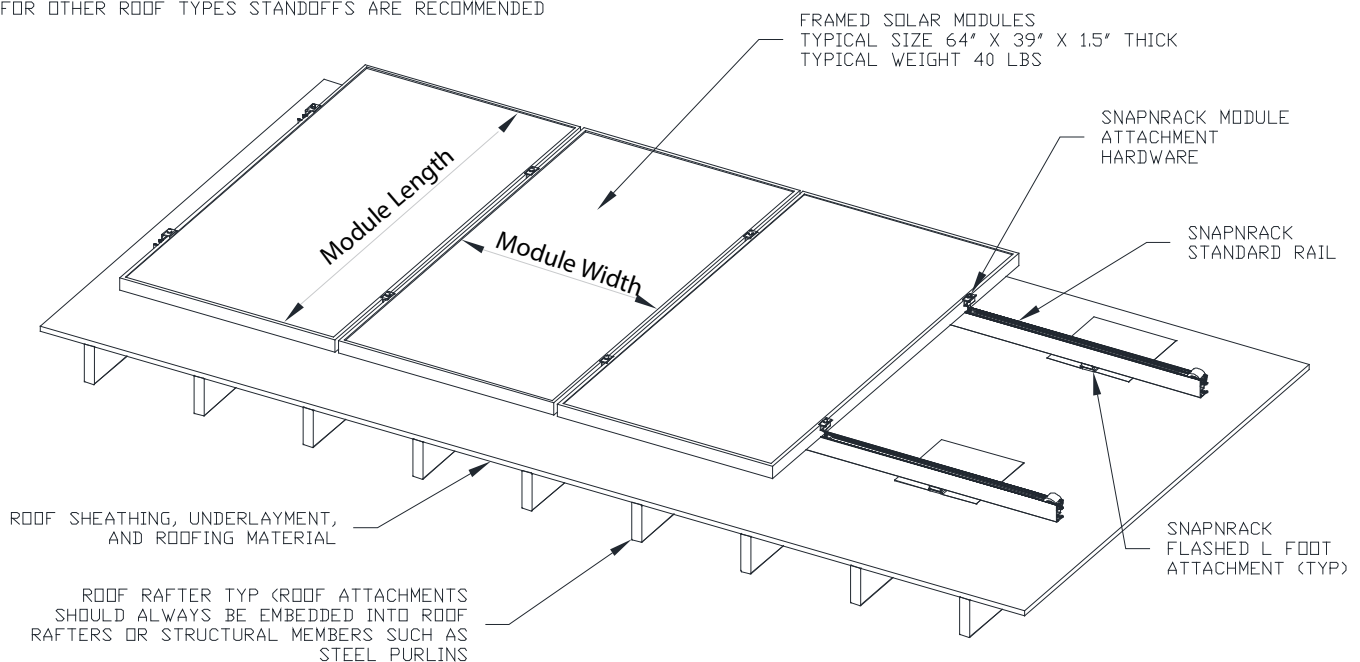


Fig 2.4 - Layout of PV modules showing rail span

Typically, PV modules are installed in portrait mode, with the long side of the module running up the roof slope and the rails running horizontally across the roof perpendicular to the roof rafters, which commonly run down slope.

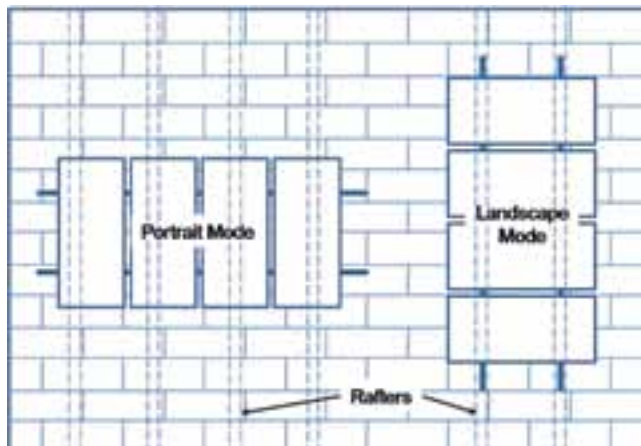


Fig 2.5 - Portrait and Landscape Illustration

Arrays can also be installed in landscape mode, with the modules oriented so that their long edge runs horizontally across the roof and the rails run up the roof slope.

Landscape mode is typically used in cases where the roof has been constructed with structural elements running horizontally across the roof, but can also be used on standard residential buildings for a variety of reasons including to facilitate a convenient layout.

When laying out the array, be sure to leave space for the module clamps on the rails.

Module mid clamps (see Fig 2.1) are installed between modules in a row and require .5 inch of space between the modules.

Standard top-mount end clamps (see Fig 2.1)

require 1½ inches of extra rail to extend past the end of the module frame. If using the UEC this does not apply.

The space between rows of modules is not critical, but it is common for rows of modules to be installed so that the modules are flush with each other.

Submit array plans to local permitting jurisdiction and proceed with the roof layout only when all permits for the project have been granted by the authority having jurisdiction.



CAUTION: If possible leave at least 3 to 4 feet around the outside edges of the array to enable safe access during the installation and during maintenance and cleaning.

Transfer the array layout to the roof using grease pens to mark the inside and outside corners of the array.

Locate estimated rafter positions and mark them in the array area with a different color grease pen.



Common techniques for locating rafters include looking under the eaves, measuring from the ends of the roof, using attic access, and using electronic stud and rafter finders.