



SERIES 100 UL ROOF MOUNT SYSTEM

SnapNrack Residential PV Mounting Systems
Code Compliant Installation Manual

Series 100 UL Introduction

SnapNrack Series 100 UL 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 and International Building Code. Systems will also be bonded to ground, under SnapNrack's UL 2703 Certification.

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.

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How to Configure Your System

First calculate the spans and penetration count. There is a SnapNrack span calculation table on the back of this Manual. Determine site conditions: general building height, array pitch, the wind speed, and snow load or topographical condition. Find appropriate railspan from table.

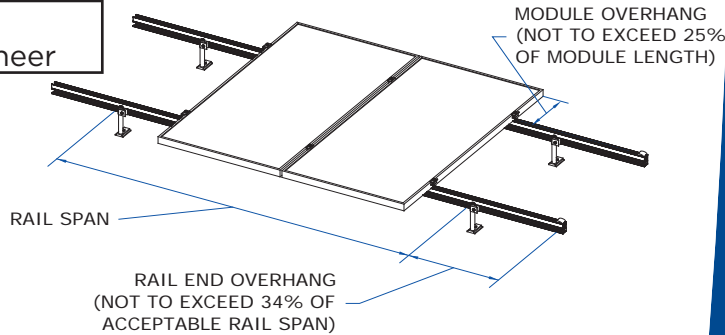
Span Table Example

| | |
|---------------------------------|-----------------------|
| Building Height | 0 - 30 ft |
| Array Pitch | 16° |
| 2012 IBC Wind Speed | 120 mph |
| Snow Load | 8 lbs/ft ² |
| Topo. Cond. | None |
| Rail Span | 104" |
| Rail Span on 24" spacing roof | 96" (8 ft) |
| Do edge/corner reductions apply | Yes, shaded cell |
| Edge Zone Span | 72" (6 ft) |
| Corner Zone Span | 24" (2 ft) |

0-30 ft. Roof Height

| Table 1A: Rail Spans (in) for Roof Slopes and Tilt Angles 0° to 19° 6063 Alloy | | | | | | | | | | | | | | | | |
|--|----------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Wind Load | | | | | | | | | | | | | | | | |
| Ground Snow Load (psf) | Vult | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 170 | 180 | 190 | |
| | q _h | 15.5 | 16.9 | 18.4 | 20.0 | 21.6 | 23.3 | 25.1 | 26.9 | 28.8 | 30.7 | 32.8 | 37.0 | 41.5 | 46.2 | |
| | P _g | P _s | -10.7 | -11.7 | -12.7 | -13.8 | -14.9 | -16.1 | -17.3 | -18.6 | -19.9 | -21.2 | -22.6 | -25.5 | -28.6 | -31.9 |
| | 0 | 0 | 116 | 110 | 104 | 99 | 95 | 91 | 87 | 83 | 80 | 77 | 75 | 70 | 65 | 62 |
| | 10 | 8 | 114 | 110 | 104 | 99 | 95 | 91 | 87 | 83 | 80 | 77 | 75 | 70 | 65 | 62 |
| | 20 | 15 | 89 | 89 | 89 | 89 | 89 | 89 | 87 | 83 | 80 | 77 | 75 | 70 | 65 | 62 |
| | 30 | 23 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 70 | 65 | 62 |
| | 40 | 31 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 65 | 62 |
| | 50 | 39 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| | 60 | 46 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| 70 | 54 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | |
| 80 | 62 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | |

*CS-Consult
Structural Engineer



Series 100 UL Roof Mounted System

Safety Guidance

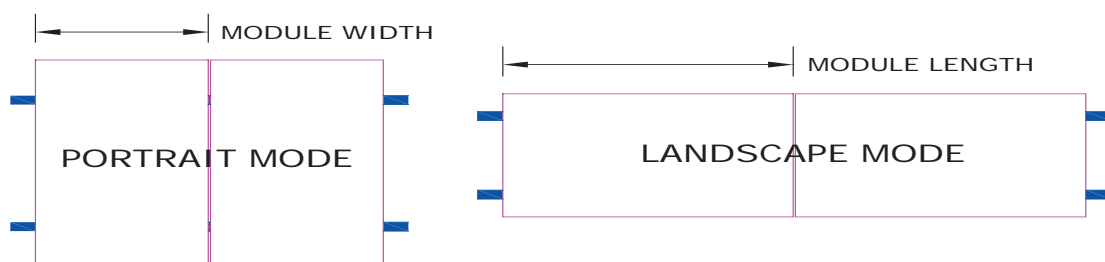
- Always wear the proper OSHA approved safety equipment when working on a roof.
- Safety equipment should be checked annually for wear and quality.
- Always wear proper eye protection.
- When walking on the roof avoid walking on installed rails. If this is unavoidable check L-feet for fatigue before final installation.
- Appropriate fall protection gear should be used. Extreme caution should be used when near the edge of the roof.

Notes

- The UL Listing covers bonding for a load rating up to 45 psf.
- Please note that Series 100 has not been fire rated.
- REC Group Modules are listed with a minimum 4" clearance requirement under the modules.
- Series 100 has been tested with the following modules: REC Solar AS (E308147): REC214, REC215, REC220, REC225, REC230, REC235, REC240, REC245, REC250, REC255, REC260, REC265, REC270, all followed by PE, PE(BLK), PE-US, PE-US(BLK), PE Q2 or PEQ3
- These systems have been evaluated for module to system bonding, only to the requirements of UL Subject 2703.

Survey the Site

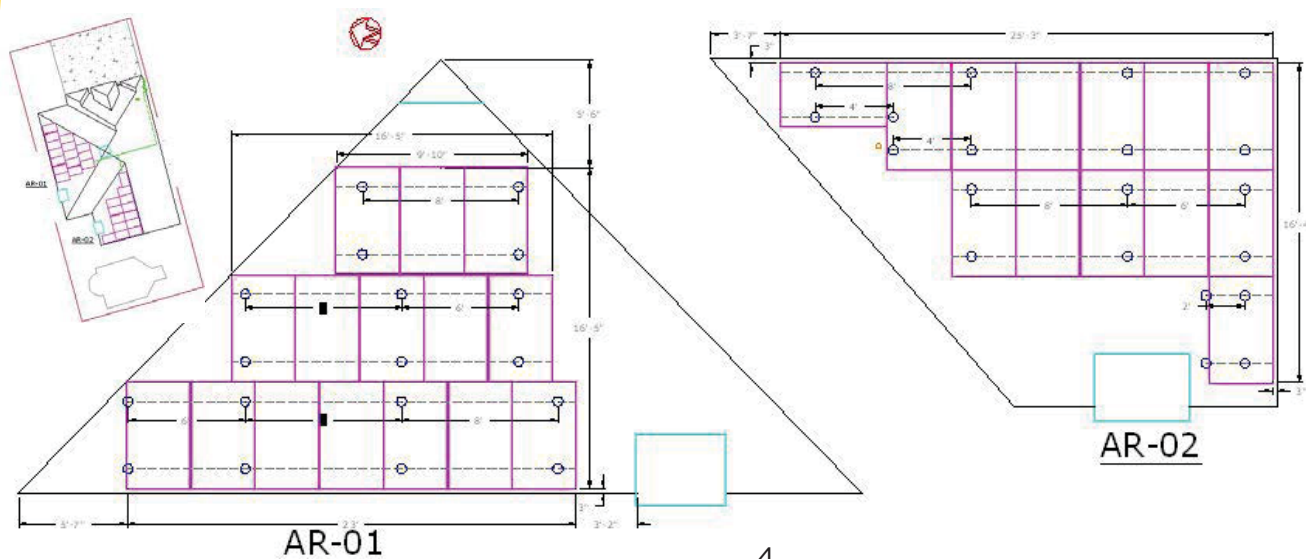
- Measure the roof surfaces and develop an accurate drawing, including any obstacles such as chimneys and roof vents.
- If plans are available, check to make sure that the plans match the final structure.
- Review the shading pattern across the roof surface from the residence itself, from adjacent structures, 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 spacing 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.
- If you find structural problems such as termite damage or cracked rafters that may compromise the structure's integrity, consult a structural engineer.



Develop a Layout

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

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.



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 are installed between modules in a row and require 0.5 inch of space between the modules.

Adjustable end clamps require 1.5 inches of extra rail to extend past the end of the module frame. If using the Universal End Clamp, the rail is first cut flush to the module using the rail cutting tool.

When installing multiple rows of modules, a minimum spacing gap of 1/8" should be used between rows.

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.

Transfer the array layout to the roof using a roof marking crayon to mark the inside and outside corners of the array. Locate the estimated rafter positions and mark them in the array area with a roof marking crayon.

Transfer rail and estimated attachment locations to the roof, noting that attachments will be located at intersections of rails and rafters. Layout rails such that module frame ends do not overhang mounting rails by more than 25% of total module length.

Project Information Sections

| | | |
|-----------------|-------|---------------------|
| Building Height | _____ | |
| Roof Pitch | _____ | |
| Wind Speed | _____ | |
| Snow Load | _____ | |
| Topo. Cond. | _____ | Max Rail Span _____ |

| | |
|-------------------------|-------|
| Roof Structure Type | _____ |
| Roof Structure Size | _____ |
| Roof Structure Span | _____ |
| | _____ |
| Roof Type & Condition | _____ |
| Stories from the Ground | _____ |
| Roof Orientation | _____ |

Series 100 UL Surveying and Layout

Tips and Tricks

- Layout the entire array on the roof by drawing all of the corners of the modules on the roof with a roof marking crayon.
- Use a chalk line to help identify the rest of the roof penetrations
- When leveling rails, hand tighten the hardware to easily level and position the rails. Once rails are level, fully tighten hardware to specified torque.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Required Tools:

Hammer Or Stud Finder
Roof Marking Crayon
Drill with 1/8 inch Pilot Drill Bit
Roof Sealant
Torque Driver with Bit Adapter
1/2 inch Socket Wrench

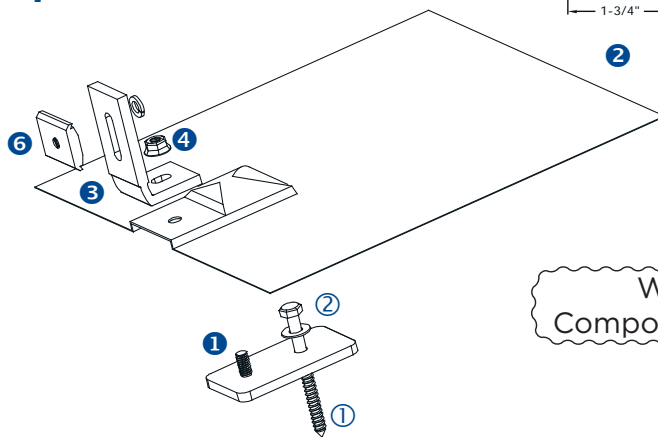
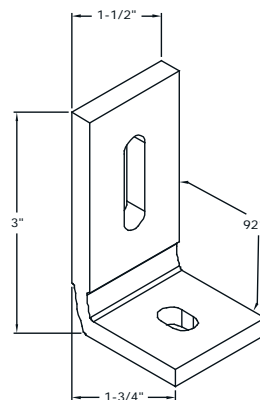
Materials Included in Series 100 L-Foot Kit:

- ① (1) SnapNrack Flashed Base
- ② (1) SnapNrack Composition Flashing
- ③ (1) SnapNrack L Foot, Composition 92°
- ④ (1) 5/16in- 18 SS Flange Hex Nut
- ⑤ (1) 5/16in Flange Bolt
- ⑥ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

Other Materials Required:

- ① (1) 5/16 in Lag Screw
- ② (1) 5/16 in Washer

Dimensioned L-Foot

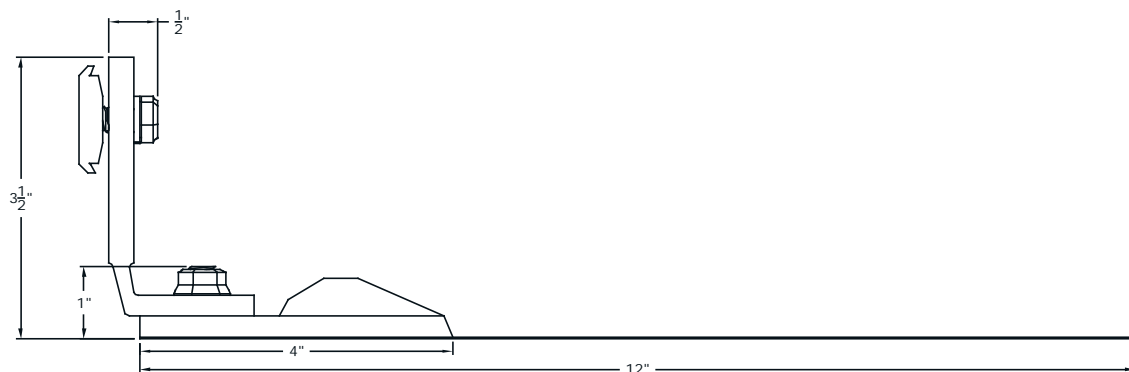


When To Use:
Composite Shingle Roofs

Technical L-Foot Data:

| | |
|----------------------|---|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Class 2 Anodized Finish Clear and Black Finish Available |
| Weight | 0.16 LBS |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | 1000 LBS Uplift |

Dimensioned Assembly



1) Locate the rafter



2) Drill the pilot hole



3) Prep the base



4) Attach base



5) Set the flashing



6) Attach L-Foot



Series 100 UL Flashed L-Foot

Step-by-Step Instructions

1) Locate the rafter underneath the decking of the roof by looking underneath the eaves or in the attic.

2) Drill a pilot hole through the roofing material into the rafter to ensure that the lag bolt will be located into a solid portion of the rafter. If the rafter is not found then seal the pilot hole immediately with roofing sealant.

3) Apply roofing sealant to the bottom of the base and directly onto the lag bolt to ensure a water tight seal.

4) Attach the L-foot base with a 5/16" lag bolt and a minimum embedment of 2 1/2" lag shank into the rafter. Tighten Lag bolt to seat with a hand wrench.

5) Slide the flashing underneath the row of shingles, directly above the installed standard base, and then line up the hole in the flashing with the threads on the base. It may be necessary to pry up shingles with a breaker bar.

6) Attach the L-foot to the threaded portion of the base that is protruding from the flashing. Then tighten the flange bolt over the threads to 10 - 16 ft-lbs. The L-foot can be attached in any orientation.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Series 100 UL Standoff Post

Required Tools:

Hammer or Stud Finder
Roof Marking Crayon
Drill with 1/8 inch Pilot Drill Bit
Roof Sealant
Torque Driver with Bit Adapter
Channel Locks
1/2 inch Socket Wrench

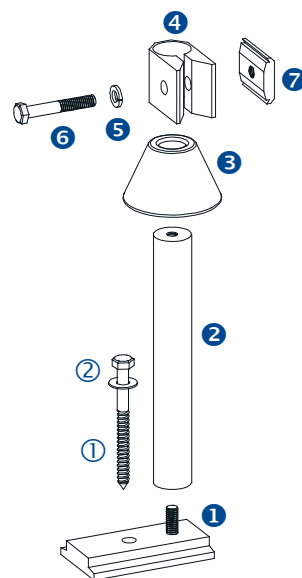
When To Use:
Concrete or Clay Tile Roofs

Materials Included In Series 100 Standoff Kit:

- ① (1) SnapNrack Standoff Base
- ② (1) SnapNrack Standoff Shaft
- ③ (1) SnapNrack Rubber Rain Collar
- ④ (1) SnapNrack Standoff Clamp
- ⑤ (1) 5/16in SS Split Lock Washer
- ⑥ (1) 5/16in - 18 X 2in SS HCS Bolt
- ⑦ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

Other Materials Required:

- ① (1) 5/16in Lag Screw
- ② (1) 5/16in Washer
- (1) Roof Cone Flashing

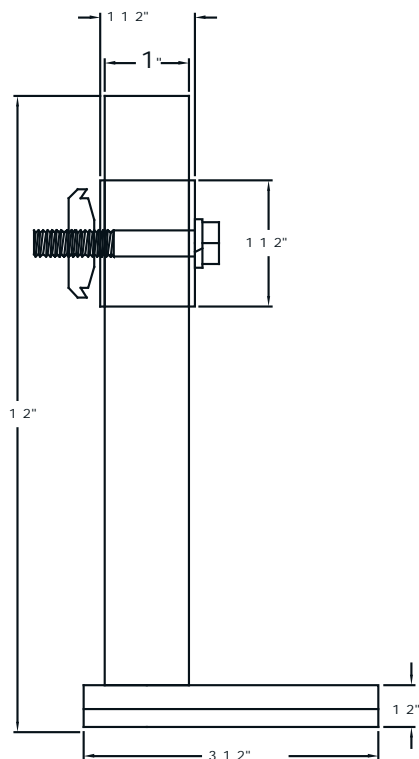


Technical Standoff Shaft Data:

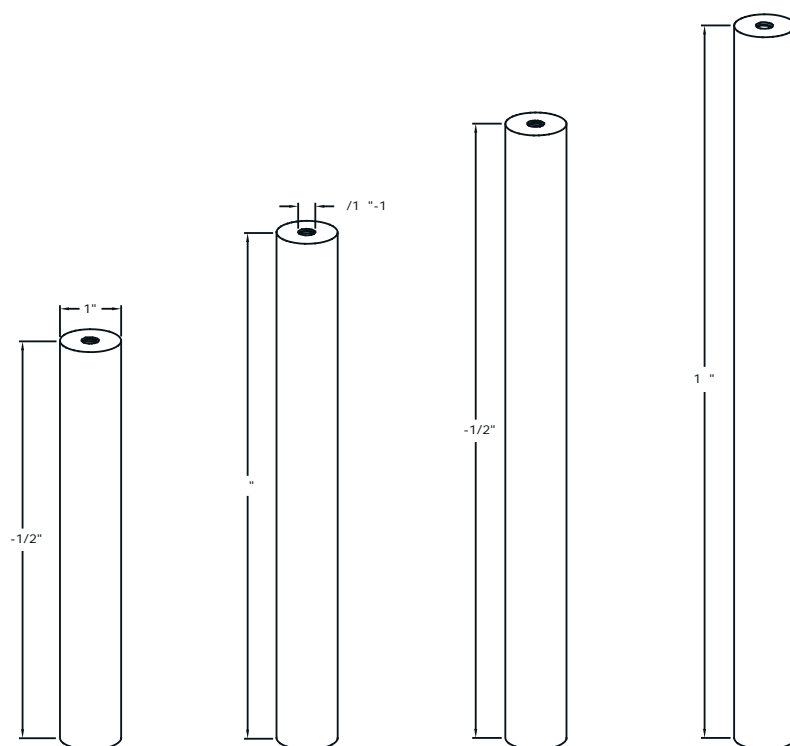
| | |
|----------------------|--|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Mill |
| Weight | 5.5" Shaft = 0.4 LBS 7" Shaft = 0.5 LBS 8.5" Shaft = 0.6 LBS |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | 1600 LBS Uplift |

All Standoff shafts
are mill finished

Dimensioned Assembly



Dimensioned Shaft



1) Remove tile and locate the rafter



2) Drill pilot hole



3) Prep the base and attach base



4) Set flashing



5) Attach post



6) Replace tile and attach standoff clamp



Series 100 UL Standoff Post

Step-by-Step Instructions

1) Remove roof tile where the penetration will be installed. Locate the rafter underneath the decking of the roof by locating under the eave, in the attic, or by tapping the roof surface with a hammer.

2) Drill a pilot hole through the roofing material into the rafter to ensure that the lag bolt will be located into a solid portion of the rafter. If the rafter is not found then seal the pilot hole immediately with roofing sealant.

3) Apply roofing sealant to the bottom of the base and directly onto the lag bolt to ensure a water tight seal. Attach the Standoff base with a 5/16" lag bolt and a minimum embedment of 2 1/2" lag shank into the rafter. Tighten lag bolt to seat using a hand wrench.

4) Set the flashing by sliding the flashing underneath the row of tiles directly above the installed base, with the hole in the flashing directly above the threaded portion of the base.

5) Attach the standoff shaft by sliding it through the hole in the flashing and tightening it onto the threads protruding from the base snug with channel locks.

6) Cut the tile to fit around the flashing, replace the tile, then attach the standoff clamp by first sliding the rubber rain collar over the standoff shaft then the standoff clamp with bolt, washer and channel nut.

Notes

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Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

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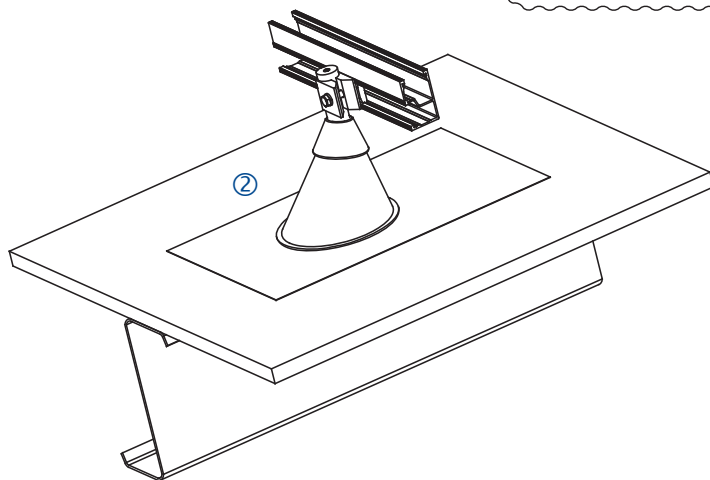
Materials Included In Series 100 Standoff Kit (Steel Structural Member):

- ① (1) SnapNrack Standoff Base
- ② (1) SnapNrack Standoff Shaft
- ③ (1) SnapNrack Rubber Rain Collar
- ④ (1) SnapNrack Standoff Clamp
- ⑤ (1) 5/16in SS Split Lock Washer
- ⑥ (1) 5/16in - 18 X 2in SS HCS Bolt
- ⑦ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

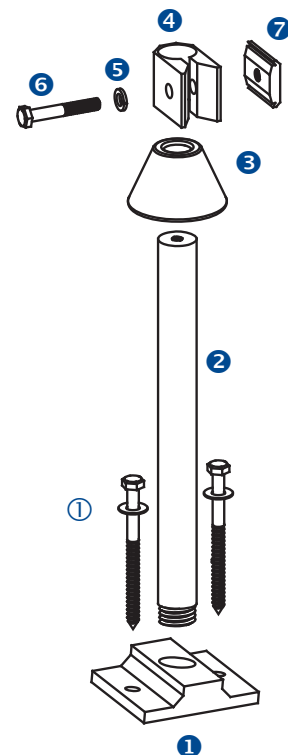
Other Materials Required:

- ① (1) 1/4in Tek Screw
- ② (1) Roof Cone Flashing

When To Use:
Steel Structural
Member Configurations



Standard Standoff Base



Materials Included In Series 100 Four Hole Standoff Kit:

- ① (1) SnapNrack Four Hole Standoff Base
- ② (1) SnapNrack Standoff Shaft
- ③ (1) SnapNrack Rubber Rain Collar
- ④ (1) SnapNrack Standoff Clamp
- ⑤ (1) 5/16in SS Split Lock Washer
- ⑥ (1) 5/16in - 18 X 2in SS HCS Bolt
- ⑦ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

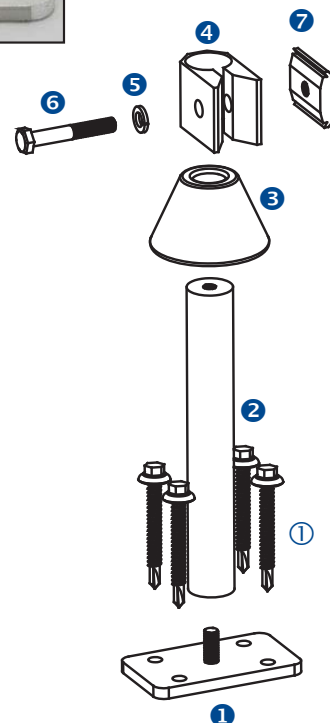
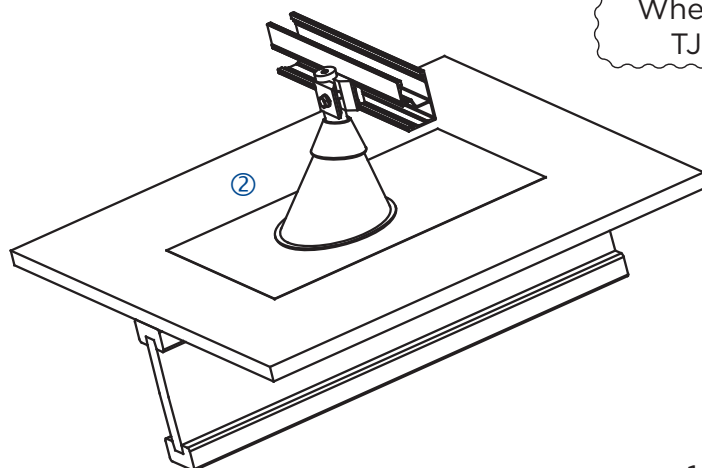
Four Hole Base



Other Materials Required:

- ① (4) Wood Screws 1/4"
- ② (1) Roof Cone Flashing

When To Use:
TJI Joists



Materials Included In Series 100 Heavy Duty Standoff Kit:

- ① (1) SnapNrack HD Standoff Base
- ② (1) SnapNrack HD Standoff Shaft
- ③ (1) SnapNrack Rubber Rain Collar
- ④ (1) SnapNrack Standoff Clamp
- ⑤ (1) 5/16in SS Split Lock Washer
- ⑥ (1) 5/16in - 18 X 2in SS HCS Bolt
- ⑦ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

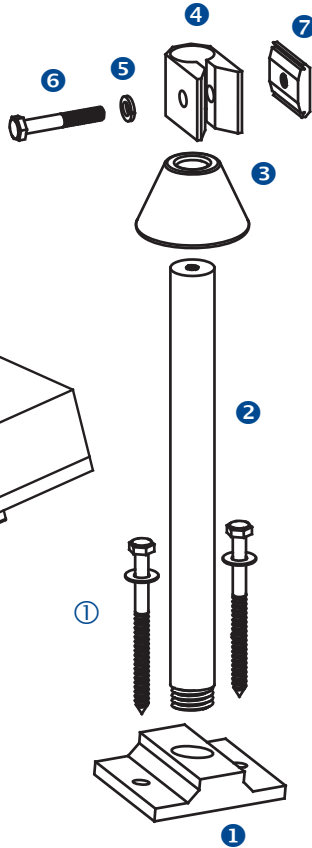
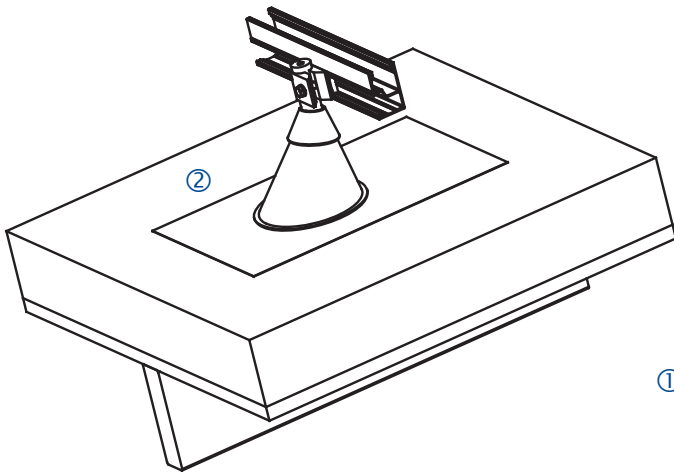
HD Base



Other Materials Required:

- ① (2) 5/16in Lag Screw
- ② (1) Roof Cone Flashing

When To Use:
Foam Roofs



Series 100 UL Standoff Options

Step-by-Step Instructions For Zee Purlin Installation

1) Follow the instruction exactly as the SnapNrack Standoff penetration. Substituting the tek Screw for the 5/16" lag bolt.

Step-by-Step Instructions For Four Hole Installation

1) Follow the instruction exactly as the SnapNrack regular Standoff penetration. Substituting the base for the four hole base and 1/4" wood screws for the 5/16" lag bolt.

Step-by-Step Instructions For Heavy Duty Installation

1) Remove the foam roofing above the rafter to be installed on.

2) Attach the SnapNrack heavy duty standoff base directly to the exposed rafter using (2) 5/16" lag bolts.

3) Screw in the SnapNrack HD Standoff to the base snug with channel locks.

4) Replace the foam roofing that was removed.

5) Flash the standoff by sliding the cone flashing over the exposed standoff and heat weld the rubber membrane around the flashing for a water tight seat.

6) Attach remaining hardware as in the standard SnapNrack standoff.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com



Series 100 UL Hanger Bolt

Required Tools:

Hammer or Stud Finder
Roof Marking Crayon
Drill with 1/8 inch Pilot Drill Bit
Roof Sealant
Threaded Bit Adapter
1/2 inch Socket Wrench
Torque Wrench

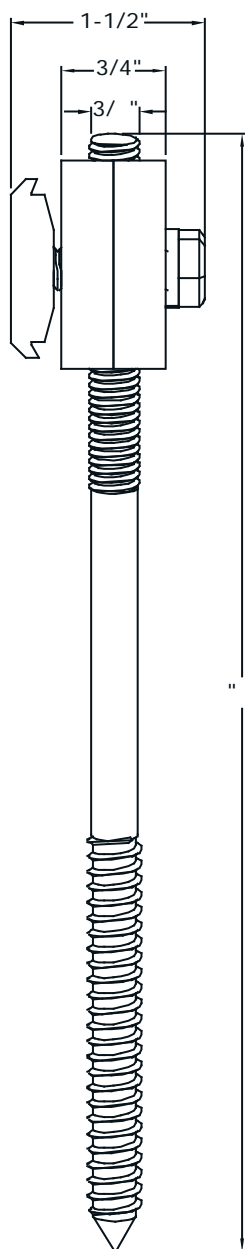
Materials Included In Series 100 Hanger Bolt Kit:

- ① (1) SnapNrack Hanger Bolt Clamp Front
- ② (1) SnapNrack Hanger Bolt Clamp Back
- ③ (1) 5/16in SS Split Lock Washer
- ④ (1) 5/16in - 18 X 1in SS HCS Bolt
- ⑤ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

Other Materials Required:

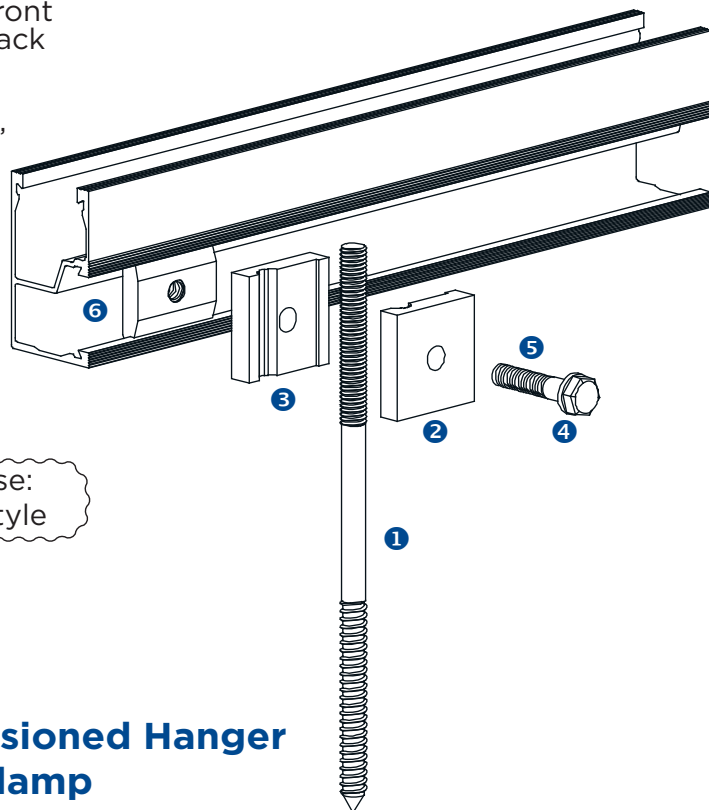
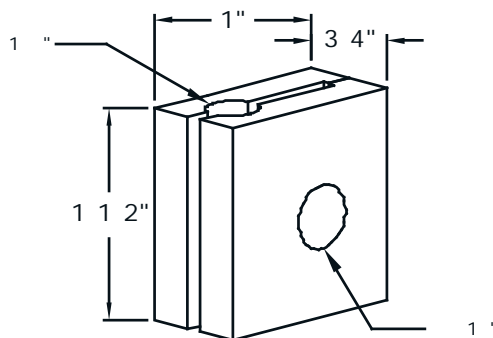
- ① (1) 3/8" Stainless Steel Hanger Bolt

Dimensioned Assembly



When To Use:
Any Roof Style

Dimensioned Hanger Bolt Clamp



Technical Hanger Bolt Clamp Data:

| | |
|----------------------|---|
| Material | 6000 Series Heat Treated Aluminum |
| Color | Class 2 Anodized Finish Clear Finish Available |
| Weight | 0.7 LBS |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | 1600 LBS Uplift |

1) Locate the rafter



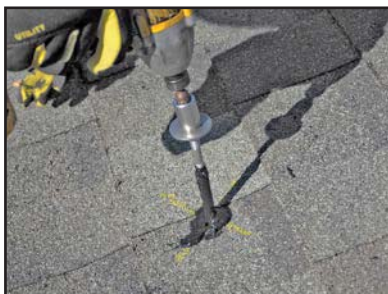
2) Drill the pilot hole



3) Prep the bolt and hole



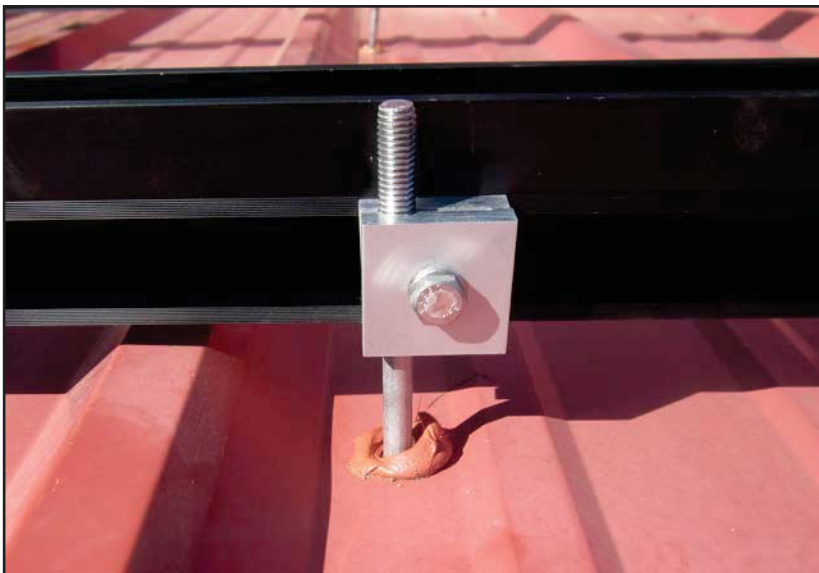
4) Attach hanger bolt



5) Set in rail



6) Attach hanger bolt



Series 100 UL Hanger Bolt

Step-by-Step Instructions

1) Locate the rafter underneath the decking of the roof.

2) Drill a pilot hole through the roofing material into the rafter to ensure that the lag bolt will be located into a solid portion of the rafter. If the rafter is not found then seal the pilot hole immediately with roofing sealant.

3) Apply roofing sealant directly onto the pilot hole and the hanger bolt lag to ensure a water tight seal.

4) Attach the hanger bolt using the threaded bit adapter with a minimum embedment of 2 1/2" lag shank into the rafter. Tighten Lag bolt to seat.

5) Attach the channel nut of the hanger bolt assembly into rail.

6) Then attach the hanger bolt clamp by setting it around the threaded portion of the hanger bolt to the desired height and tighten silver hardware to 10-16 ft-lbs and black hardware to 8-10 ft-lbs.

Notes

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Warning

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- Do not over tighten hardware.
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Design Tools

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Series 100 UL

Metal Roof Base

Required Tools:

Hammer Or Stud Finder
 Roof Marking Crayon
 Drill with 3/16" Pilot Drill Bit
 Torque Driver with Bit Adapter
 1/2 inch Socket Wrench

Materials Included In Metal Roof Base:

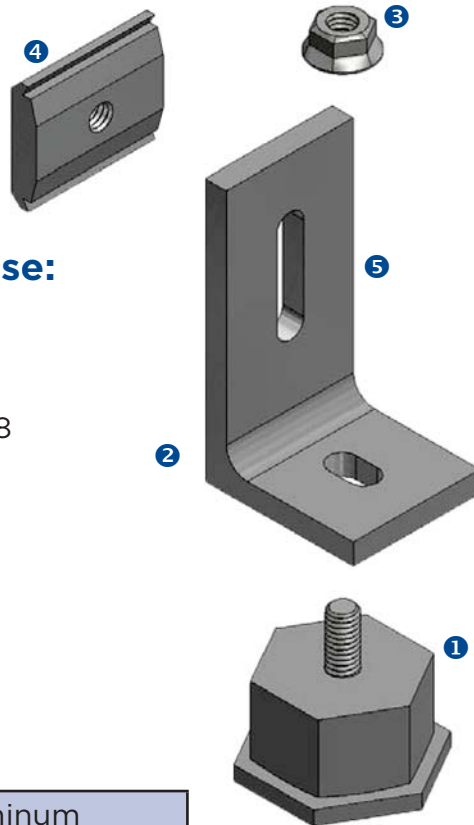
- ① (1) SnapNrack Metal Roof Base
- ② (1) SnapNrack L Foot 90 degree
- ③ (1) 5/16in - 18 SS Flange Nut
- ④ (1) SnapNrack Bonding Channel Nut, 5/16in - 18
- ⑤ (1) 5/16in - Flange Bolt (not pictured)

When To Use:
 Metal Roof
 Profiles

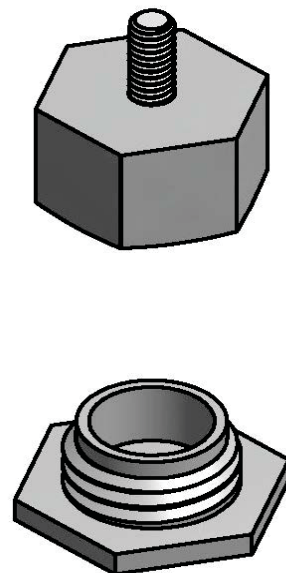
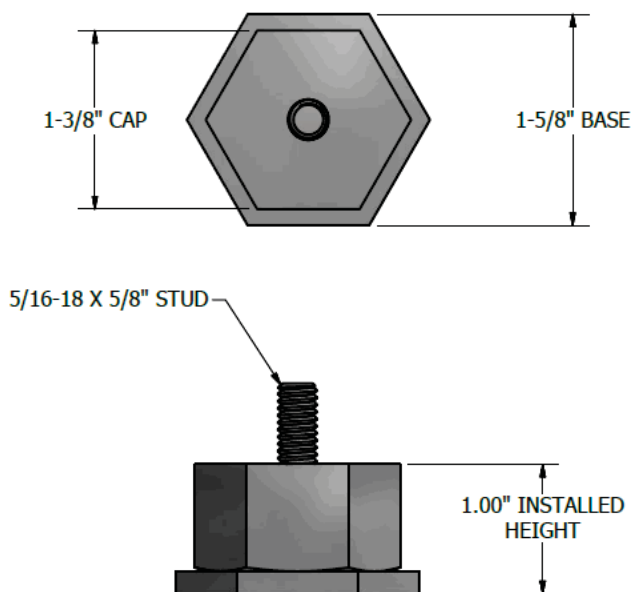
Technical Metal Roof Base Data:

| | |
|----------------------|-------------------------|
| Material | 6000 Series Aluminum |
| Color | Clear Anodized Aluminum |
| Weight | 0.4 LBS |
| Design Uplift Load | 1,008 LBS Uplift |
| Design Ultimate Load | 4,033 LBS Uplift |

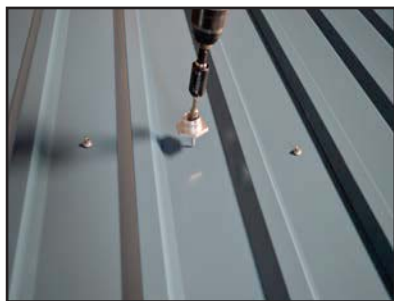
Use With:
 Anodized
 Aluminum L-Foot
 and Flange Bolt



Dimensioned Assembly



1) Locate the rafter & drill pilot hole



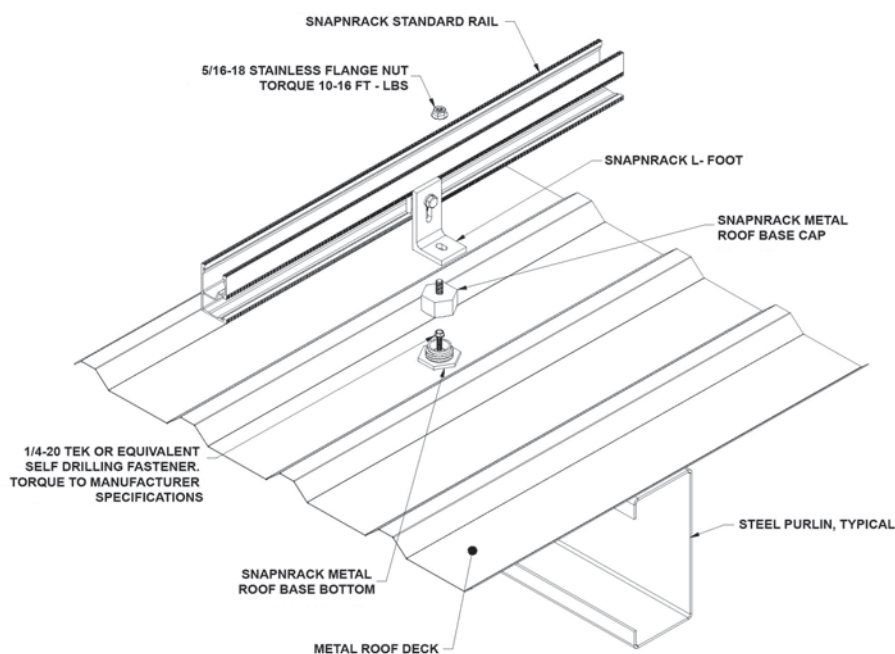
2) Attach base with screw



3) Thread on cap



4) Attach L Foot



Series 100 UL Metal Roof Base

Step-by-Step Instructions

1) Drill 3/16" pilot hole in rafter. Ensure area is free from metal shavings and debris.

2.) Attach metal roof base to rafter with 5/16" lag bolt (or Tek screw). Torque to appropriate fastener specification.

3) Thread metal roof base cap onto metal roof base bottom. Take care to ensure the base does not twist when cap is tightened. Ensure cap is fully seated to base.

4) Attach L Foot to stud in metal roof base cap.

Notes

- Metal roofs with excessive debris, corrosion, or non factory coating should be evaluated for adequate dealing surface.
- Additional roof sealant not required but can be applied after tightening the Metal Roof Base to roof, if desired.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Series 100 UL Corrugated Block

Required Tools:

Hammer or Stud Finder
Drill with 1/8 inch Pilot Drill Bit
Roof Sealant
Torque Driver with Bit Adapter
1/2 inch Socket Wrench

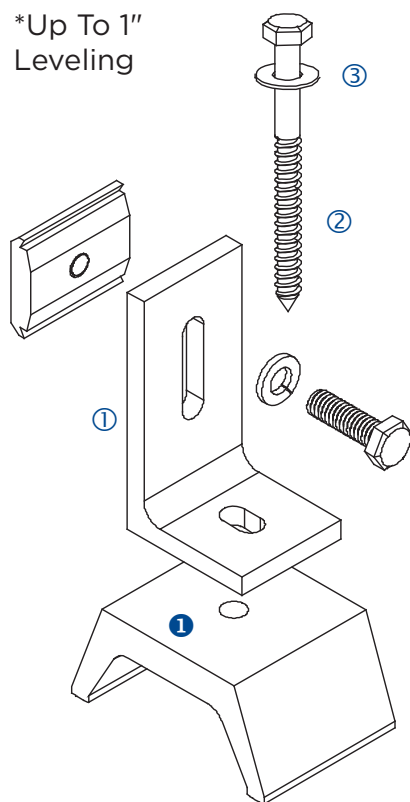
Materials included in Series 100 Straddle Block:

- ❶ (1) SnapNrack Corrugated Straddle Block

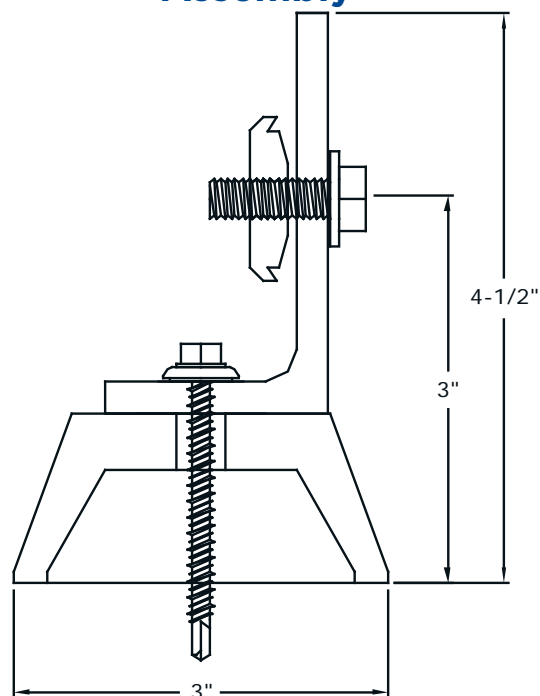
Other Materials Required:

- ❶ (1) SnapNrack L-Foot Assembly
- ❷ (1) 5/16in Lag Screw
- ❸ (1) 5/16in Washer

*Up To 1"
Leveling

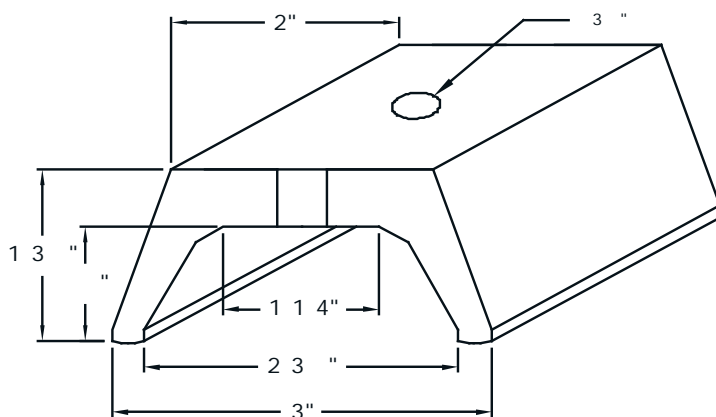


Dimensioned Assembly



Tek Screw For Steel Roofing Members,
Lag Screw For Wooden Rafters

Dimensioned Corrugated Block



Technical Corrugated Block Data:

| | |
|----------------------|-----------------------------------|
| Material | 6000 Series Heat Treated Aluminum |
| Color | Mill Finish |
| Weight | 0.3 LBS |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | 1000 LBS Uplift |

Only use
Mill Finish L-foot
with
Split lock washer

1) Locate the rafter



2) Drill the pilot hole



3) Apply roofing sealant



4) Attach corrugated block with L-Foot



5) Tighten hardware



Series 100 UL Corrugated Block

Step-by-Step Instructions

1) Locate the rafter underneath the decking of the roof by locating the screws. The rafter lies directly underneath the screws.

2) Drill a pilot hole through the roofing material into the rafter to ensure that the lag bolt will be located into a solid portion of the rafter. If the rafter is not found then seal the pilot hole immediately with roofing sealant.

3) Apply roofing sealant if needed directly onto the pilot hole and lag to ensure a water tight seal.

4) Attach the Corrugated Block with L-foot using a 5/16" lag bolt (TYP) or appropriate lag with a minimum embedment of 2 1/2" lag shank into the rafter. Tighten lag bolt to seat.

5) Tighten L-foot assembly silver hardware to 10 - 16 ft-lbs and tighten black hardware to 8-10 ft-lbs.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Series 100 UL 5° - 15° Tilt Mount

Required Tools:

Hammer or Stud Finder
Roof Marking Crayon
Drill with 1/8 inch Pilot
Roof Sealant
Torque Driver with Bit Adapter
1/2 inch Socket Wrench

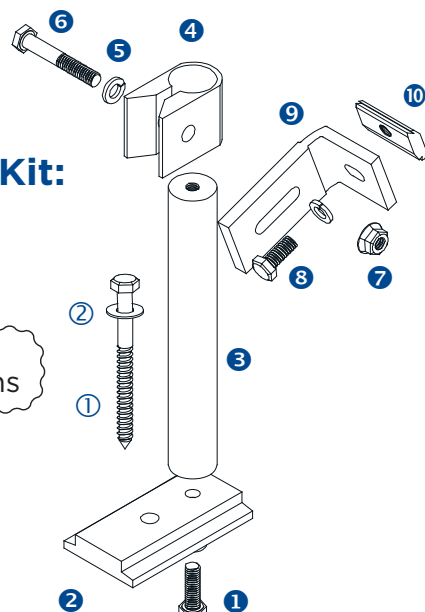
Materials Included In Series 100 5°-15° Tilt Kit:

- ① (2) 5/16in- 18 X 3/4in SS HCS Bolt
- ② (2) SnapNrack Standoff Base
- ③ (2) SnapNrack Standoff Shaft
- ④ (2) SnapNrack Standoff Clamp
- ⑤ (4) 5/16in SS Split Lock Washer
- ⑥ (2) 5/16in - 18 X 2in SS HCS Bolt
- ⑦ (2) 5/16in - 18 Flat Hex Nut
- ⑧ (2) 5/16in - 18 1in SS HCS Bolt
- ⑨ (2) SnapNrack L Foot
- ⑩ (2) SnapNrack Bonding Channel Nut

When To Use:
Flat Roof Applications

Other Materials Required:

- ① (2) 5/16in Lag Screw
- ② (2) 5/16 Washer
- (2) Roof Cone Flashings

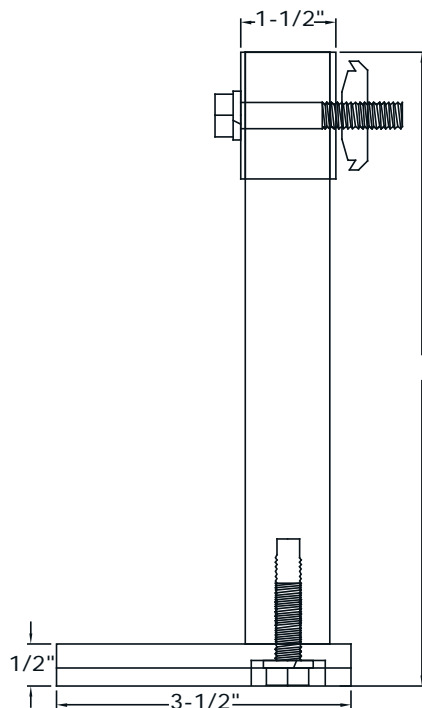


Technical Standoff Data:

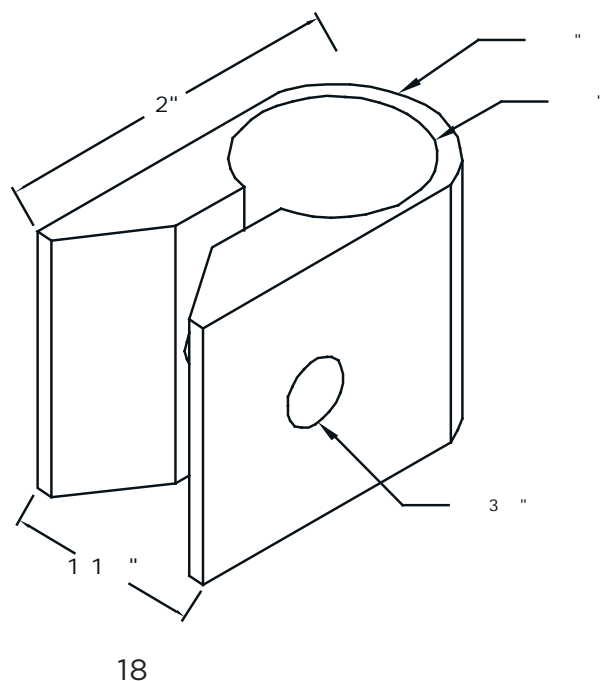
| | |
|----------------------|--|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Mill |
| Weight | 5.5" Shaft = 0.4 LBS 7" Shaft = 0.5 LBS 8.5" Shaft = 0.6 LBS |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | 1000 LBS Uplift |

All parts
are mill finish

Dimensioned Assembly



Dimensioned Standoff Clamp



1) Locate the rafter



2) Drill the pilot hole



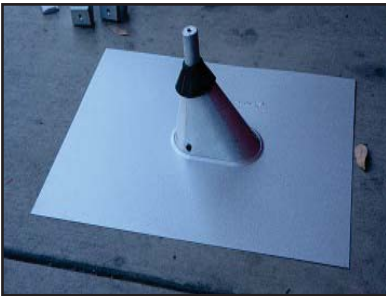
3) Prep the base



4) Attach base



5) Set standoff and flashing



6) Attach standoff clamp



Series 100 UL 5°-15° Tilt Mount

Step-by-Step instructions

1) Locate the rafter underneath the decking of the roof by tapping the roof surface with a hammer.

2) Drill a pilot hole through the roofing material into the rafter to ensure that the lag bolt will be located into a solid portion of the rafter. If the rafter is not found then seal the pilot hole immediately with roofing sealant.

3) Apply roofing sealant to the bottom of the base and directly onto the pilot hole to ensure a water tight seal.

4) Attach the L-foot base with a 5/16" lag bolt and a minimum embedment of 2 1/2" lag shank into the rafter. Tighten Lag bolt to seat.

5) Next attach the standoff to the base and set the cone flashing by sliding it over the standoff and directly applying it to the roof surface. Use all necessary sealants and attachment methods for flashing.

6) Attach the standoff clamp by sliding it over the standoff shaft. Adjust it to the desired height and tighten silver hardware to 10-16 ft-lbs and black hardware to 8-10 ft-lbs.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Series 100 UL 10° - 45° Tilt Mount

Required Tools:

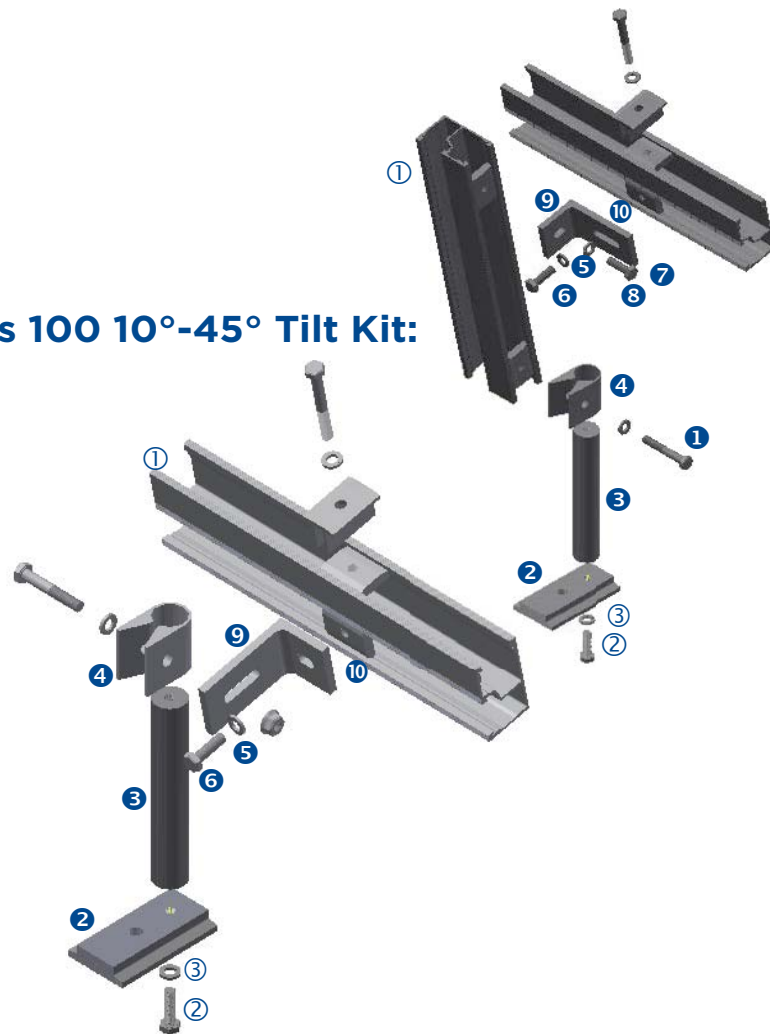
Hammer
Roof Marking Crayon
Drill with 1/8 inch Pilot
Roof Sealant
Torque Driver with Bit Adapter
1/2 inch Socket Wrench
SnapNrack Tool

Materials Included In Series 100 10°-45° Tilt Kit:

- ① (4) 5/16in- 18 X 1in SS HCS Bolt
- ② (2) SnapNrack Standoff Base
- ③ (2) SnapNrack Standoff Shaft
- ④ (2) SnapNrack Standoff Clamp
- ⑤ (5) 5/16in SS Split Lock Washer
- ⑥ (5) 5/16inX3/4in SS HCS Bolt
- ⑦ (1) 5/16in - 18 SS Flat Hex Nut
- ⑧ (2) 5/16in X 3/4in SS Flat Washer
- ⑨ (2) SnapNrack L Foot
- ⑩ (4) SnapNrack Bonding Channel Nut

Other Materials Required:

- ① (2) Spare Standard Rail
- ② (2) 5/16in Lag Screw
- ③ (2) 5/16 Washer
- (2) Roof Cone Flashing

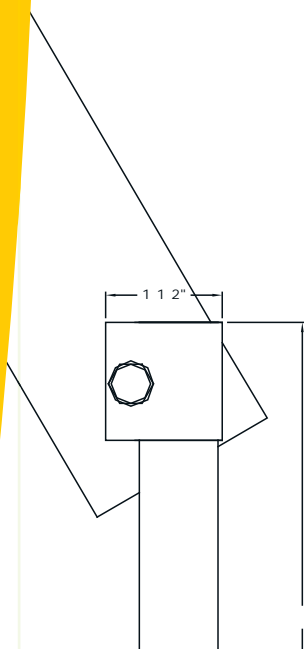


Technical Standoff Data:

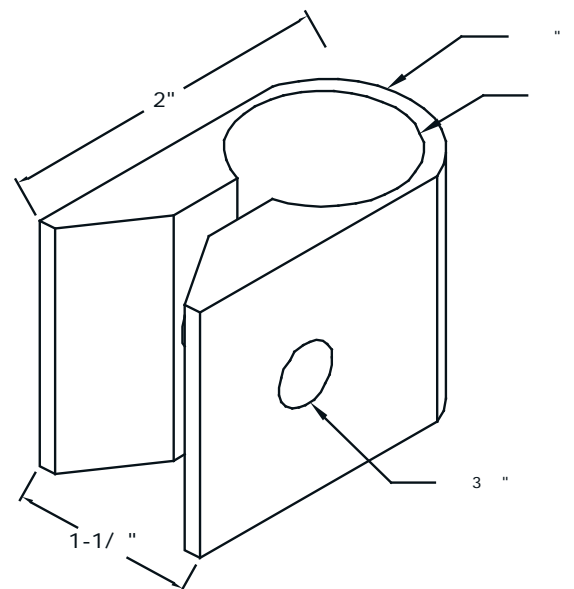
| | |
|----------------------|-----------------------------------|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Mill |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | 1000 LBS Uplift |

All parts are mill finish.
L-foot can be anodized or mill finish

Dimensioned Assembly



Dimensioned Standoff Clamp



1) Attach 3in standoff with standoff clamp



2) Drill the pilot hole



3) Prep the base



4) Attach base



5) Set post and flashing



6) Attach standoff clamp



7) Attach rail and tighten



8) Set SnapNrack tool



Series 100 UL 10°-45° Tilt Mount

Step-by-Step Instructions

1) Locate the rafter underneath the decking of the roof by tapping the roof surface with a hammer.

2) Drill a pilot hole through the roofing material into the rafter to ensure that the lag bolt will be located into a solid portion of the rafter. If the rafter is not found then seal the pilot hole immediately with roofing sealant.

3) Apply roofing sealant to the bottom of the base and directly onto the pilot hole to ensure a water tight seal.

4) Attach the standoff base with a 5/16" lag bolt and a minimum embedment of 2 1/2" lag shank into the rafter. Tighten Lag bolt to seat.

5) Next attach the standoff to the base and set the cone flashing by sliding it over the standoff and directly applying it to the roof surface. Use all necessary sealants and attachment methods for flashing.

6) Attach the standoff clamp by sliding it over the standoff shaft. Adjust it to the desired height and tighten Silver hardware to 10-16 ft-lbs and black hardware to 8-10 ft-lbs.

7) Attach the scrap rail and modules then tighten Silver hardware to 10-16 ft-lbs and black hardware to 8-10 ft-lbs. Remove tilt tool.

8) Use the SnapNrack tilt tool to support the top rail in place (see page 36 for instructions.)

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

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Series 100 UL Seam Clamp

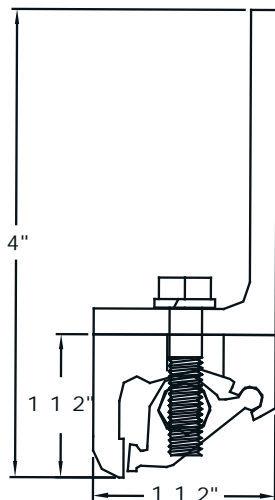
Required Tools

Torque Driver with Bit Adapter
1/2 inch Socket Wrench

Materials Included In Series 100 Seam Clamp Kit:

- ① (1) 5/16in - 18 X 1in SS HCS Bolt
- ② (1) 5/16in SS Split Lock Washer
- ③ (1) SnapNrack Seam Clamp Insert
- ④ (1) SnapNrack Seam Clamp Cam
- ⑤ (1) SnapNrack Seam Clamp Base

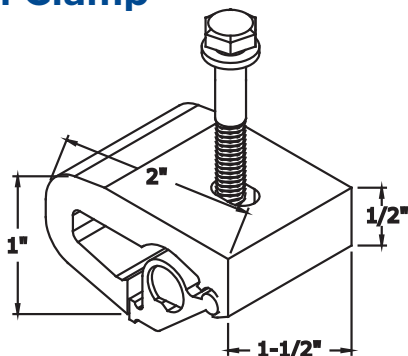
Dimensioned Assembly with L-Foot:



Materials Included In Series 100 Wide Seam Clamp Kit:

- ① (1) 5/16in - 18 X 1in SS HCS Bolt
- ② (1) 5/16in SS Split Lock Washer
- ③ (1) SnapNrack Seam Clamp Insert
- ④ (1) SnapNrack Seam Clamp Cam
- ⑤ (1) SnapNrack Seam Clamp Wide Base

Dimensioned Wide Seam Clamp

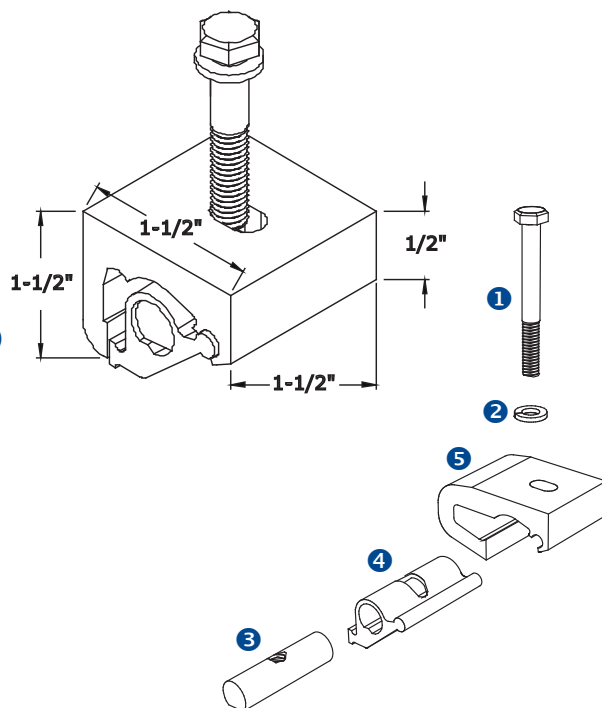


Technical Seam Clamp Data:

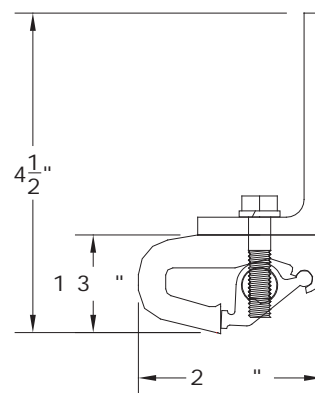
| | |
|----------------------|-----------------------------------|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Mill |
| Design Uplift Load | 200 LBS Uplift |
| Design Ultimate Load | Varies by Seam C-Test Results |

When To Use:
Standing Metal Seam
That The Seam Clamp
Fits Over, Not Limited To
The Table To The Right

Dimensioned Standard Seam Clamp



Dimensioned Assembly with L-Foot



Use with:
Anodized L foot
and Flange Bolt

Example Standing Seam

| MANUFACTURER | PANEL NAME | CLAMP |
|--------------------|---------------------|---------------|
| AEP | Design Span HP | Standard Base |
| AEP | Span-Lok | Wide Base |
| American Buildings | Standing Seam II | Standard Base |
| Behlen | ZL-24 Triple Lock | Wide Base |
| Berridge | Zee-Lock | Wide Base |
| Borga | Tioga | Standard Base |
| Butler | MR-24 | Standard Base |
| Custom Bilt Metals | SL-1750 | Standard Base |
| Custom Bilt Metals | CB-2000 Single Lock | Wide Base |
| Custom Bilt Metals | CB-2000 Double Lock | Standard Base |
| Everlast | Everseam | Standard Base |
| Fabral | Thin Seam | Standard Base |
| Fabral | Stand 'N Seam | Standard Base |
| Mastercraft Metals | Seam-Loc 1000 | Wide Base |
| Mastercraft Metals | Seam-Loc 1500 | Wide Base |
| Mastercraft Metals | Seam-Loc 2000 | Wide Base |
| MBCI | Double-Lok | Standard Base |
| MBCI | SuperLok | Standard Base |
| MBCI | LokSeam | Wide Base |
| MBCI | Ultra-Dek | Standard Base |
| MBCI | BattenLok | Wide Base |
| McElroy | MasterLok FS | Standard Base |
| McElroy | Maxima | Wide Base |
| Merchant & Evans | Zip-Lok Single Lock | Standard Base |
| Merchant & Evans | Zip-Lok Double Lock | Standard Base |
| Metal Sales | MagnaLoc | Wide Base |
| Metal Sales | Vertical Seam | Standard Base |
| Nucor | CFR Vise Lock | Wide Base |
| Nucor | VR-16 II Vise Lock | Wide Base |
| VP Buildings | SSR | Standard Base |
| Whirlwind | Super Seam II | Standard Base |

1) Assemble seam clamp



2) Attach seam clamp



3) Tighten hardware



Series 100 UL Seam Clamp

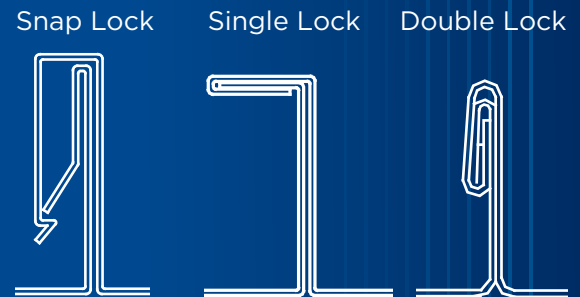
Step-by-Step Instructions

1) Assemble the seam clamp components to be ready to attach to standing metal seam.

2) Attach the seam clamp to the standing metal seam by loosening the seam clamp bolt then opening the seam clamp cam and placing the clamp over the top of the standing metal seam.

3) Tighten remaining hardware in the L-Foot assembly. Tighten both silver and black hardware to 10-16 ft-lbs.

SnapNrack Seam Clamps have been designed to work with a variety of standing seam metal roofs, the most common seam types are:



If a specific roof seam is not found on list, contact SnapNrack prior to installation.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

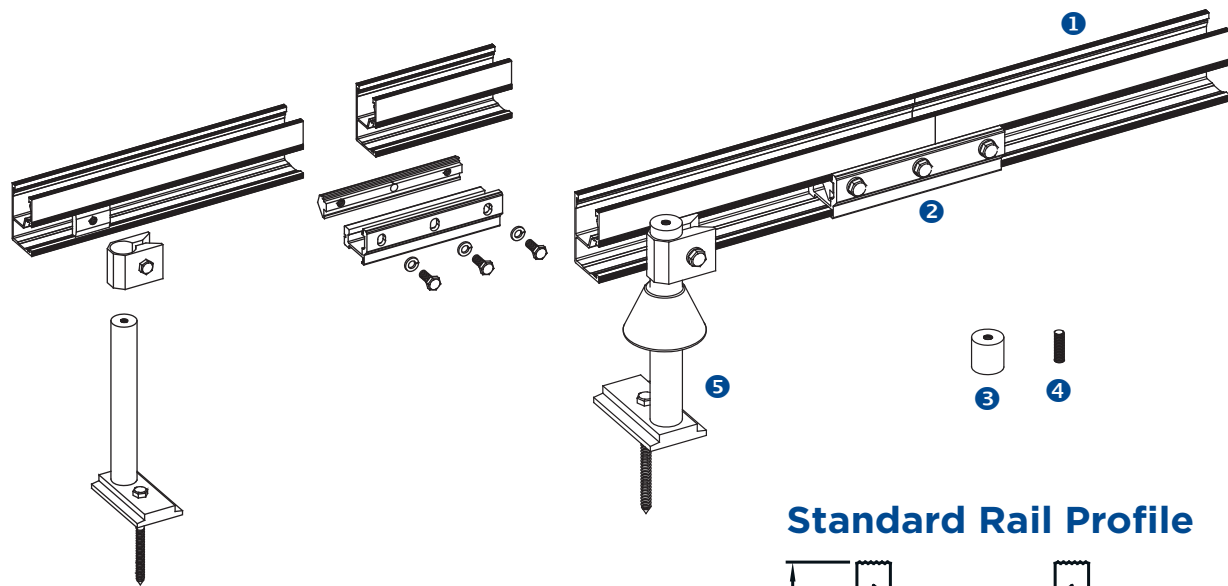
Required Tools:

Level
String Line or Spare Rail
Pitch Meter
1/2in Socket Wrench
5/32in Allen Key
Torque Wrench

Materials Needed to Install and Level Rails:

- ① SnapNrack Standard Rail
- ② SnapNrack Bonding Splices
- ③ 1" SnapNrack Standoff Spacers
- ④ 5/16" - 18 X 1" Fully Threaded Set Screw
- ⑤ Pre installed SnapNrack Roof Attachments (L-Foot Or Standoff)

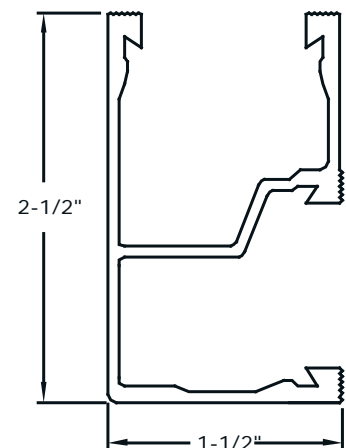
Use with:
Mill Finish
Standoff Parts



Technical Rail Data:

| | |
|----------|--|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Class 2 Anodized Finish Clear and Black Finish Available Mill Finish Available |
| Weight | 0.75 LBS/FT |
| Max Span | See Span Charts in Structural Engineering Letters |

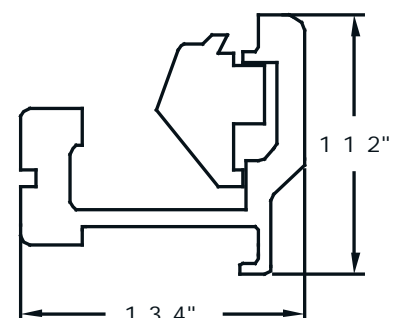
Standard Rail Profile



Technical Rail Splice Data:

| | |
|----------|---|
| Material | 6000 Series Heat Treated Aluminum |
| Finish | Class 2 Anodized Finish Clear and Black Finish Available |
| Weight | 0.64 LBS |
| Recomm. | 1/8" Gap Between Rails |

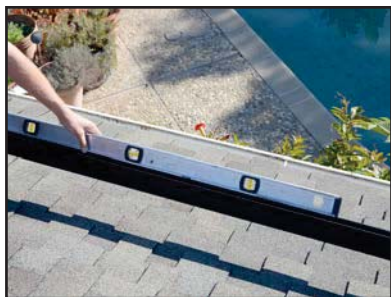
Rail Splice Profile



1) Set rails into all attachments



2) Level bottom rail



3) Run string line and set pitch



4) Level top



5) Level remaining rails to pitch



6) Tighten hardware



Rail splice

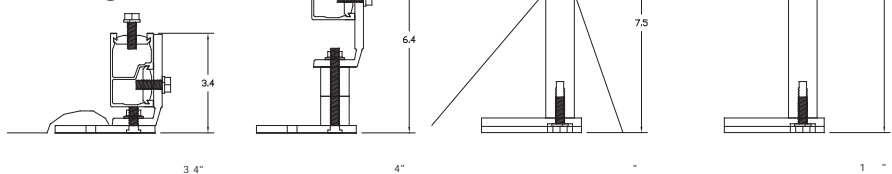


The rail splice is inserted into the channel where two rails but together. Three bolts are used to tighten the splice.

Use a single level space on no more than 30% of attachment points.

Use a double level space on no more than 10% of attachment points.

*Up To 3" Leveling



Series 100 UL installing and Leveling Rails

Step-by-Step instructions

1) Set all of the rails into the attachments by snapping the channel nuts into the side channel of the standard rail. Connect multiple lengths of rail end to end with the SnapNrack splice.

2) Find the highest attachment point of the roof, and set that attachment point to the lowest adjustability. Level the bottom rail of the array to the roof by tightening attachment points. Torque silver hardware to 10-16 ft-lbs and black hardware to 7-9 ft-lbs.

3) Using a string line or spare rails run from the bottom rail to the top rail and raise the top rail, then set the desired pitch of the array by adjusting the top rail. Add leveling spacers if needed.

4) Level the top rail by moving the string line down the length of the rail, matching pitch over the entire length of the array.

5) Level the remaining rails to the string line, working out from the middle rail. Add leveling spacers if needed.

6) Tighten all racking hardware, torque silver hardware to 10-16 ft-lbs and all black hardware to 8-10 ft-lbs.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

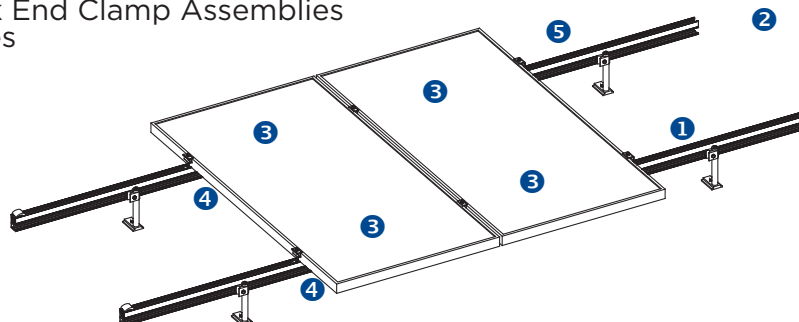
- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Required Tools:

1/2 inch Socket Wrench
Torque Wrench

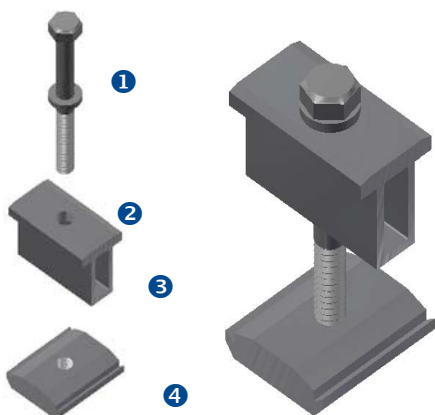
Materials Needed to Install Mid and End Clamps:

- ① Pre Installed SnapNrack Roof Attachments
- ② Pre Installed SnapNrack Rails
- ③ SnapNrack Mid Clamp Assemblies
- ④ SnapNrack End Clamp Assemblies
- ⑤ PV Modules



Mid Clamp Assembly

- ① (1) 5/16in - 18 X 2 1/2in SS HCS Bolt
- ② (1) 5/16in SS Split Lock Washer
- ③ (1) SnapNrack Bonding Mid Clamp
- ④ (1) 5/16in - 18 SnapNrack Bonding Channel Nut



X Clamp Assembly

- ① (1) 5/16in - 18 2x3/4in SS HCS Bolt
- ② (1) 5/16in SS Split Lock Washer
- ③ (1) SnapNrack Self Adjusting Top
- ④ (1) SnapNrack Self Adjusting Bottom



Universal End Clamp Assembly:

- ① (1) 5/16in - 18 X 1 1/2in SS HCS Bolt
- ② (1) 5/16in X 3/4in SS Flat Washer
- ③ (1) SnapNrack Universal Wedge
- ④ (1) SnapNrack Universal Wave



SnapNrack Mid Clamp

1) Snap into channel



2) Set mid clamp



3) Set modules



4) Tighten



SnapNrack X Clamp

1) Snap into channel



2) Set on module



3) Tighten



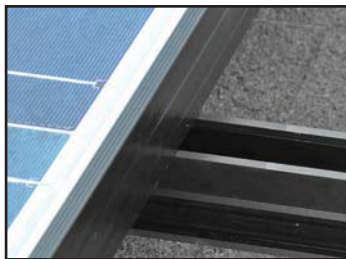
Torque:
Silver 10-16
ft-lbs. Black
8-10 ft-lbs.

SnapNrack Universal End Clamp

1) Set in rail



2) Place module



3) Pull tab forward



4) Set end cap



Series 100 UL Attaching Modules

Step-by-Step Instructions

SnapNrack Mid Clamp

- 1) Snap the preassembled SnapNrack mid clamp's channel nut into the top channel of the rail.
- 2) Slide the mid clamp flush to the module with the top lip of the mid clamp over the top edge of the module.
- 3) Place the next module flush to the other side of the mid clamp.
- 4) Tighten hardware, torque silver hardware to 10-16 ft-lbs and black hardware to 8-10 ft-lbs.

SnapNrack X Clamp

- 1) Snap the preassembled SnapNrack X clamp's channel nut into the top channel of the rail.
- 2) Slide the X clamp flush to the edge of the module with the lip of the top of the end clamp over the top of the module and lip of the bottom of the end clamp under the module.
- 3) Tighten hardware, torque silver hardware to 10-16 ft-lbs and black hardware to 8-10 ft-lbs.
- 4) Install rubber end cap to finish.

SnapNrack Universal End CLamp

- 1) Slide the preassembled universal end clamp into the end of the rail.
- 2) Lift the module and slide the universal end clamp under the module far enough to pass the lip of the bottom edge of the module.
- 3) Use the pull tab to pull the universal end clamp tight to the end of the rail.
- 4) Hold and tighten the universal end clamp to 10 - 16 ft-lbs. Then install rubber end cap to finish.

Notes

- REC Group Modules are listed with a minimum 4" clearance requirement under the modules.
- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- Do not over tighten hardware
- Always wear fall protection and safety gear

Design Tools

- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Required Tools:

Wire Cutters
Pliers

NOTE:
Series 100 Edge Screen
is NOT UL Listed

Materials Included With Series 100 Edge Screen:

- 1 (1) SnapNrack Edge Screen Clip
- 2 (1) SnapNrack Edge Screen

When To Use:

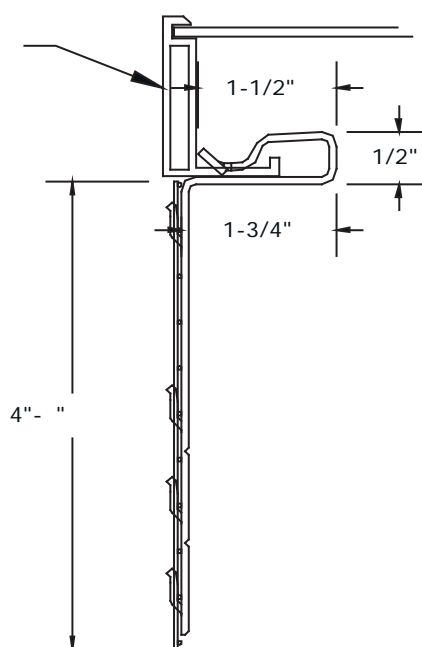
To Prevent Animals From Getting Under The Array and Causing Problems Such As Chewing On Wires

Technical Edge Screen Data:

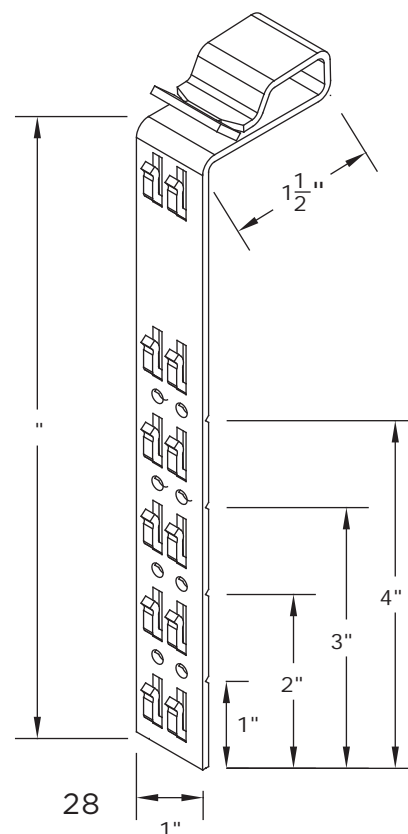
| | |
|-----------------|----------------------------|
| Screen Material | Galvanized Steel 1/2" Mesh |
| Color | Black PVC Coating |
| Weight | 0.18 LBS/ Ft. X 8" Wide |

| | |
|----------|-------------------------|
| Material | Galvanized Spring Steel |
| Color | Black Paint |
| Weight | 0.16 LBS |

Dimensioned Assembly



Dimensioned Edge Screen Clip:



Series 100 UL Edge Screen

1) Determine edge clip height



2) Snap the clip to the correct height



3) Attach clip to the module



4) Attach screen to clip



Step-by-Step Instructions

- 1) Hold the SnapNrack edge screen clip upside down up to the edge of the array to visually see which notch the clip will need to be broken off at.
- 2) Using pliers break the Edge screen clip at the appropriate length.
- 3) Clip the edge screen clip to the lip on the underside of the modules around the area that the edge screen will be installed.
- 4) Attach the screen to the clips on the installed clips and repeat these steps continuing around the entire array.

Notes

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Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

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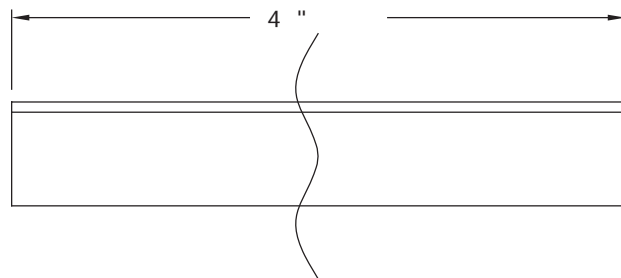
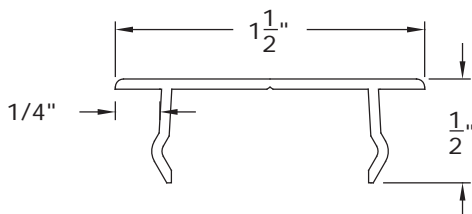
Required Tools

Chop Saw or Reciprocating Saw

Materials Included In Series 100 Rail Cover:

- ① (1) SnapNrack Rail Cover

Dimensioned Rail Cover



Technical Rail Cover Data:

| | |
|----------|---|
| Material | 6000 Series Heat Treated Aluminum |
| Color | Class 2 Anodized Finish Clear Finish Available |
| Weight | 0.155 LBS/FT |

Materials Included In Series 100 Wire Clips:

- ① (1) SnapNrack Wire Clip



Dimensioned Wire Clip



Technical Wire Clip Data:

| | |
|----------|---------------|
| Material | Luran Plastic |
| Color | Black |
| Weight | 0.01 LBS |

SnapNrack Rail Cover

1) Measure length of cover needed



2) Cut cover to length



3) Place all conductors



4) Snap on cover



SnapNrack Wire Clip

1) Place all conductors



2) Snap on clip



When To Use:
For Any Exposed Conductors To
Sunlight That Are Not Approved In
UV Light



Series 100 UL Wire Management

Step-by-Step Instructions

SnapNrack Rail Cover

1) Measure the length of the SnapNrack rail cover that is needed. SnapNrack standard lengths of rail covers are 48 inches.

2) Cut the rail cover to length.

3) Place all electrical conductors in the bottom of the rail to clear the rail cover.

4) Snap rail cover into place, enclosing all conductors inside of rail channel.

SnapNrack Rail Cover is designed to stay in place once installed. If it needs to be relocated or removed use a flat blade screw driver to remove.

SnapNrack Wire Clip

1) Place all electrical conductors in the bottom of the rail channel

2) Install the wire clip by snapping it into place on the rail. All electrical conductors are now securely enclosed in the rail

Notes

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Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
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Design Tools

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Series 100 UL Micro Inverter Attachment

Required Tools

1/2 inch Socket Wrench

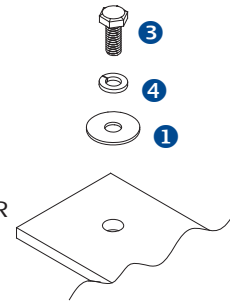
NOTE:
**Series 100 Micro
Inverter Attachment Kit
is NOT UL Listed**

Materials Included In Series 100 Micro Inverter Attachment Kit:

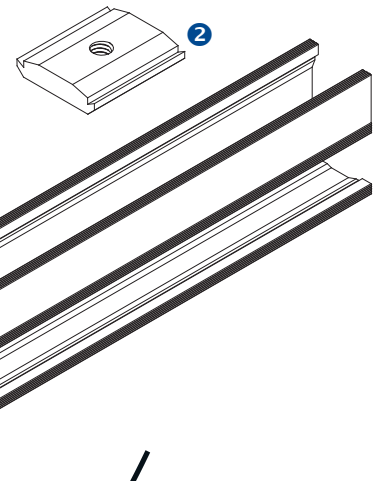
- ① (1) 1.50In X 0.328 in X 0.187 in SS Fender Washer
- ② (1) Snaprack Bonding Channel Nut 5/16In-18
- ③ (1) 5/16In - 18 X 1In Ss Hcs Bolt
- ④ (1) 5/16In Ss Split Lock Washer

When To Use:
If Micro Inverter Has An
Attachment Tab

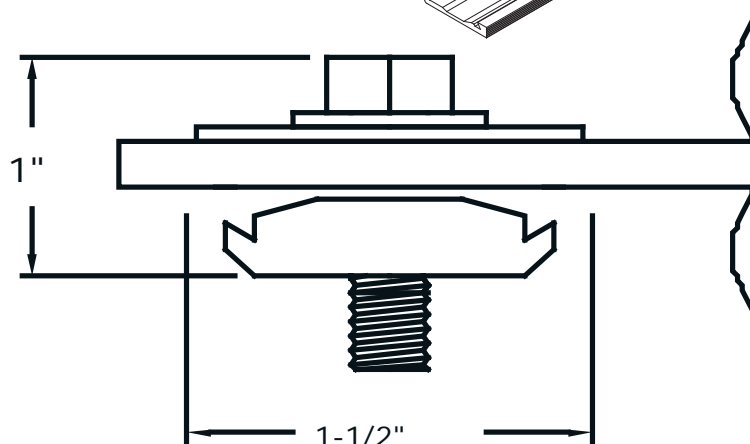
MICRO INVERTER
MOUNTING TAB



Body Micro Inverters May
Have Separate Grounding And
Will Not require a WEEB



Dimensioned Assembly



1) Snap in the channel nut



2) Place the bolt and washers



3) Tighten hardware



Series 100 UL Micro Inverter Attachment

Step-by-Step Instructions

1) Snap the SnapNrack micro inverter attachment kit channel nut into the desired location on the rail where the micro inverter will be installed.

2) Attach the micro inverter to the bolt on the micro inverter attachment kit. Bolt and washers may need to be removed and then replaced.

3) Tighten hardware, torque silver hardware to 10-16 ft-lbs.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

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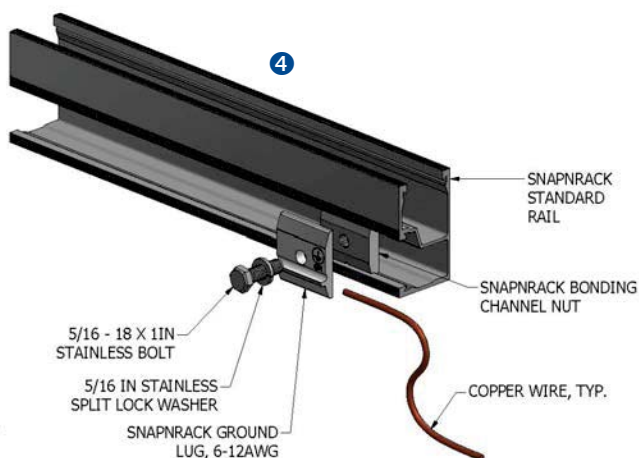
System Ground Methods Include:

- ① SnapNrack Mid Clamp
- ② SnapNrack Universal End Clamp
- ③ SnapNrack X Clamp
- ④ SnapNrack Bonding Lug
- ⑤ IlSCO Bonding Lug

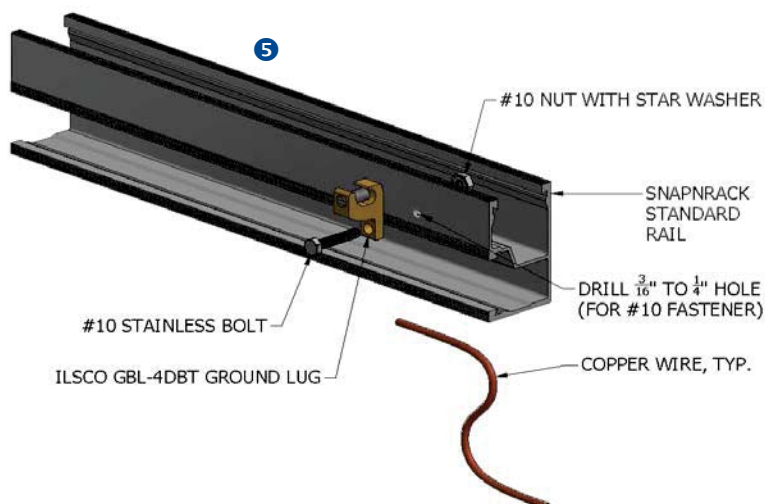
All SnapNrack Module Clamps contain a SnapNrack Bonding Channel Nut in assembly to properly ground the system (except Universal End Clamps).



SnapNrack Bonding Lug Assembly



IlSCO Bonding Lug Assembly



SnapNrack Bonding Lug

1) Snap in Bonding Lug



2) Attach grounding



3) Tighten hardware



IlSCO Bonding Lug

1) Drill & attach IlSCO Lug



2) Attach grounding



3) Tighten hardware



Series 100 UL System Ground

Step-by-Step Instructions

SnapNrack Bonding Lug

1) Snap in the SnapNrack Bonding Lug in to the rail channel.

2) Attach grounding conductor into slot and tighten bolt to 7 ft-lbs.

3) Tighten all hardware to a min of 10 ft-lbs.

IlSCO Bonding Lug

1) Using a 3/8" drill bit, drill a hole in the back side of the for the IlSCO lug to attach to and place the bolt through the hole and attach the lug assembly.

2) Attach grounding conductor into slot and tighten bolt to 7 ft-lbs.

3) Tighten all hardware to a min of 10 ft-lbs.

Notes

- System has been evaluated to a maximum overcurrent device (OCD) protection level of 20 Amps.

- Universal End Clamp (UEC) does not bond module to rail, the UEC is bonded to the module frame. Be sure to separately ground any modules that only secured by UECs, especially during servicing.

- SnapNrack Bonding Lug Assembly: torque bolt to 16 ft-lbs. The bonding lug may be used in side or top slot. It may be rotated 90 degrees relative to slot to facilitate running copper across top of rails

- Grounding with a standard IlSCO GBL-4DBT Lug is a listed alternate and requires drilling of a hole in the rail.

- Hardware connection to rail: 5 ft-lbs.
Torque for lug set screw: #10-#14 Copper- 20in-lb, #8-#14 Copper- 25in-lb, #4-#6 Copper- 35in-lb

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.

- Do not over tighten hardware.

- Always wear fall protection and safety gear.

Design Tools

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Series 100 UL

Rail Cutting Tool and End Cap

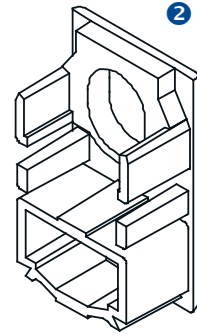
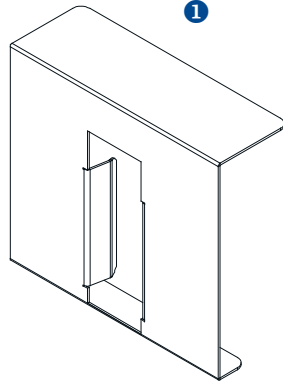
Required Tools:

Reciprocating Saw

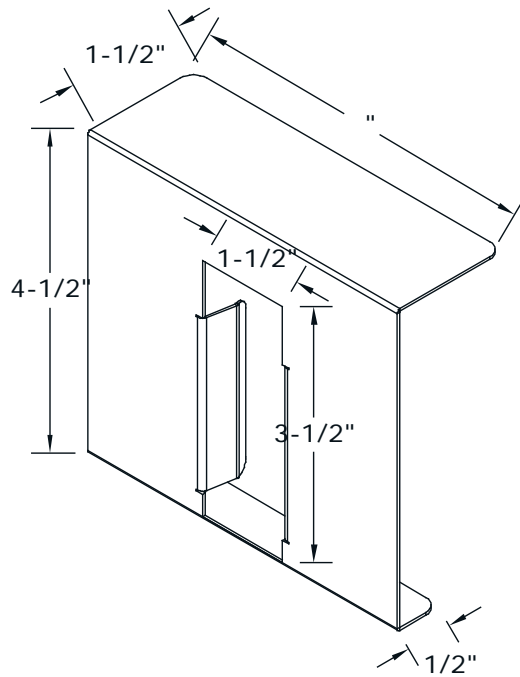
Materials Included In Series 100 Rail Cutting Tool and End Cap:

- ① (1) SnapNrack Rail Cutting Tool
- ② (1) SnapNrack Rubber End Cap

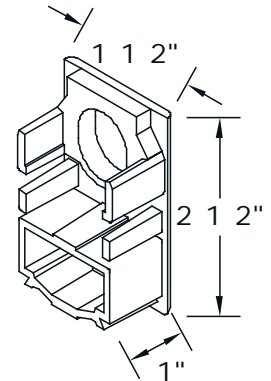
When To Use:
UEC For Flush Rail Cut



Dimensioned Rail Cutting Tool



Dimensioned End Cap



1) Place Cutting Tool



2) Cut off end of rail



3) Remove the Cutting Tool



4) Insert End Cap



Series 100 UL Rail Cutting Tool, and End Cap

Rail Cutting Tool and End Clamp

1) Slide the Cutting tool over the end of the rail and place it so that the upper lip is safely covering the edge of the module.

2) Use the reciprocating saw to cut off the end of the rail.

3) Remove the cutting tool from the rail.

4) Insert SnapNrack rubber end cap to have a flush finish to the array.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

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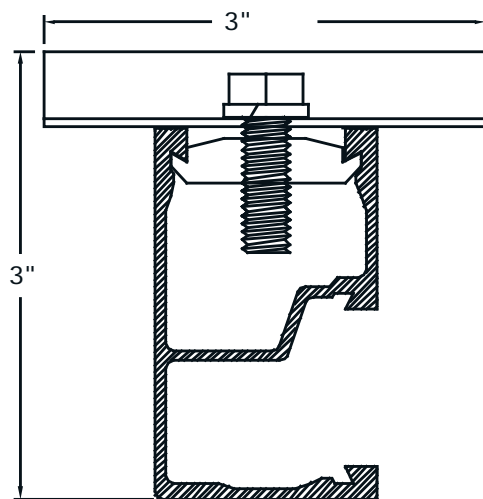
Required Tools:

Drill
Measuring Tape
Reciprocating Saw
1/2 inch Socket Wrench

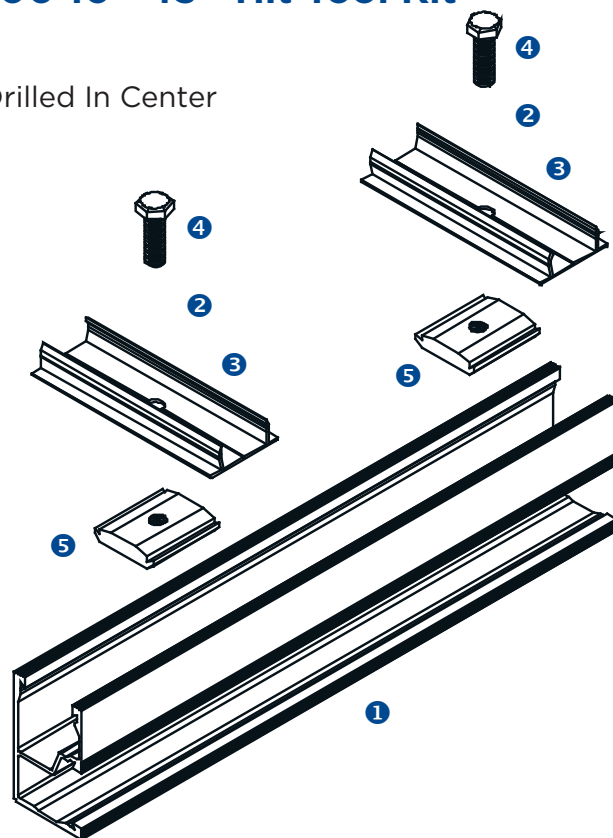
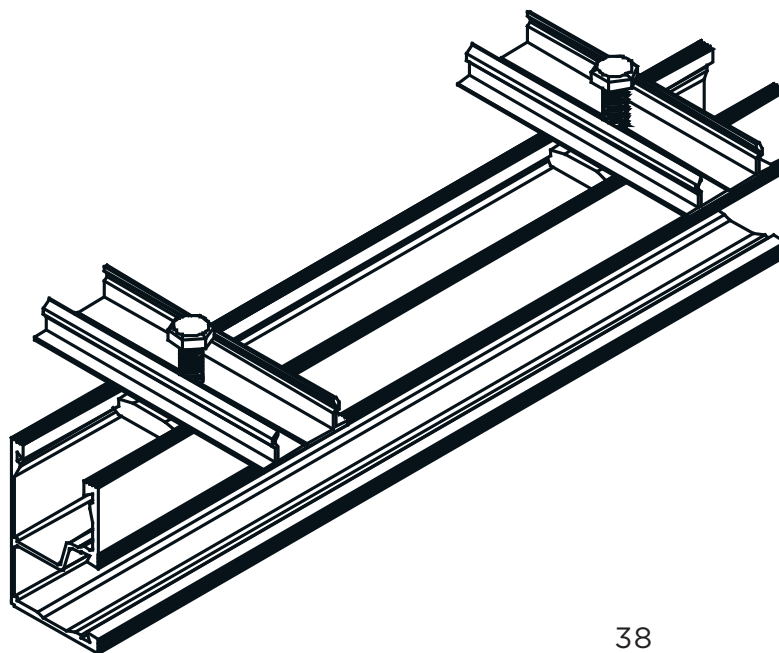
Materials Included in Series 100 10°-45° Tilt Tool Kit

- ① (1) 48in Scrap Piece Of Rail
- ② (2) 5/16in Split Lock Washer
- ③ (2) 4in Rail Covers With 3/8" Holes Drilled In Center
- ④ (2) 5/16in X 3/4in Flange Bolts
- ⑤ (2) SnapNrack Channel Nut 5/16in

Dimensioned Tilt Tool



Assembled Tilt Tool



When To Use:
When Installing The
High Tilt Configuration

Installing the Tilt Tool

1) Construct pieces



2) Assemble hardware



3) Set rail to proper length



4) Tighten hardware



Series 100 UL High Tilt Tool

Step-by-Step Instructions

1) Construct either a standard, shallow, or ground scrap piece of rail to the dimensions of the panels being installed. Drill $\frac{3}{8}$ " holes in each rail cover. Cut two $\frac{5}{16}$ " channel nuts to length. Drill holes into channel nuts. Obtain all of the parts: rail, two rail covers, two channel nuts, two bolts, and two split lock washers.

2) Once $\frac{3}{8}$ " holes are drilled in each rail, cover the channel nuts so they can be bolted to the rail covers and slid in to the rail.

3) The rail covers can then be slid to the correct positions and tightened down.

4) Tighten hardware.

Notes

- SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any alternate application may void the warranty and structural calculations could become invalid.

Warning

- If a pilot hole is drilled and a rafter is not found, immediately seal pilot hole with roofing sealant to avoid water damage.
- Do not over tighten hardware.
- Always wear fall protection and safety gear.

Design Tools

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Notes

[illegible]

