

SnapNrack™
Solar Mounting Solutions

UL LISTED
PV Mounting System
2703



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.

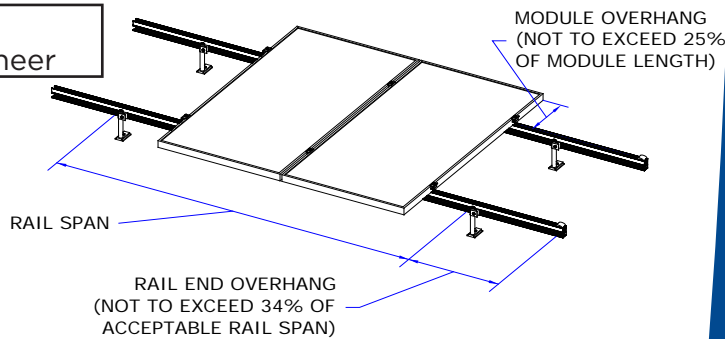
Span Table Example

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														
		Vult	110	115	120	125	130	135	140	145	150	155	160	170	180	190
		q _n	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
Ground Snow Load (psf)	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.

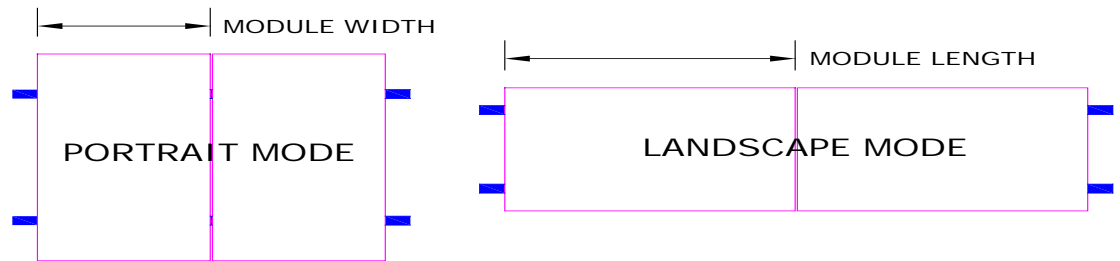
- Appropriate fall protection gear should be used. Extreme caution should be used when near the edge of the roof.

Notes

- The UL Listing covers bonding for a load rating up to 45 psf.
- Series 100 UL has been tested with the following UL Listed modules: See Appendix on page 40.
- These systems have been evaluated for module to system bonding, only to the requirements of UL Subject 2703.
- This system has also been evaluated for a Class A System Fire Classification for a steep-sloped roof with Type 1 modules.

Survey the Site

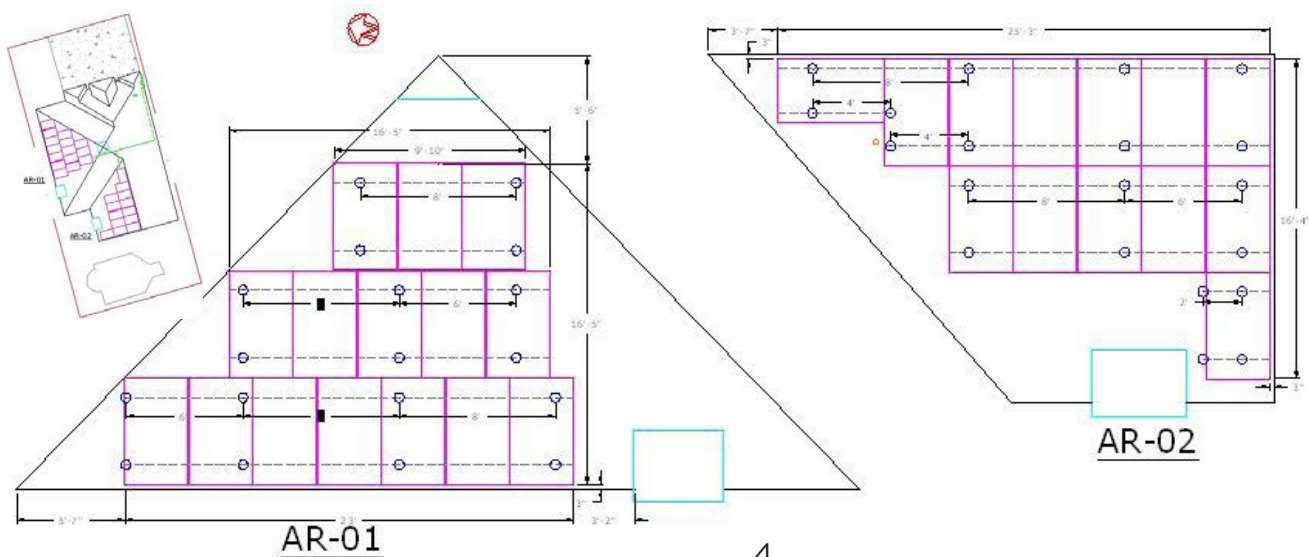
- Measure the roof surfaces and develop an accurate drawing, including any obstacles such as chimneys and roof vents.
- If plans are available, check to make sure that the plans match the final structure.
- Review the shading pattern across the roof surface from the residence itself, from adjacent structures, 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.



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.

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	_____

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.

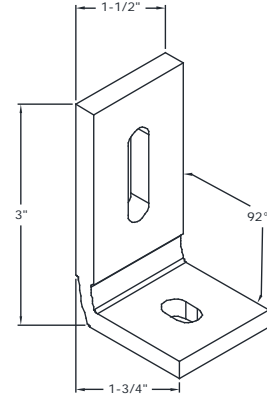
Required Tools:

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:

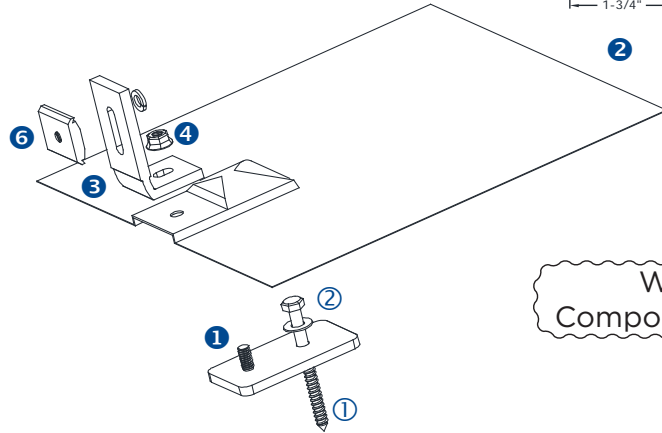
- ① (1) SnapNrack Flashed Base
- ② (1) SnapNrack Composition Flashing
- ③ (1) SnapNrack L Foot, Composition 92°
- ④ (1) 5/16in- 18 SS Flange Hex Nut
- ⑤ (1) 5/16in Flange Bolt
- ⑥ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

Dimensioned L-Foot



Other Materials Required:

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

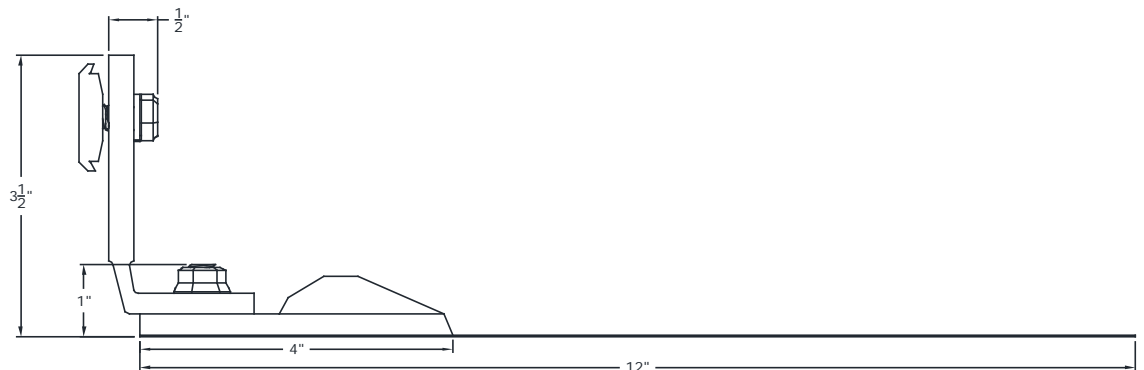


When To Use:
Composite Shingle Roofs

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

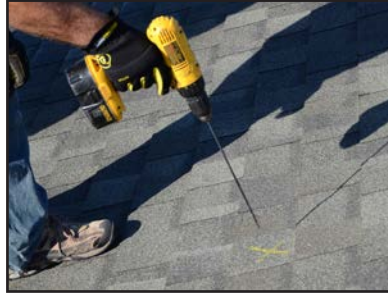


Series 100 UL Flashed L-Foot

1) Locate the rafter



2) Drill the pilot hole



3) Prep the base



4) Attach base



5) Set the flashing



6) Attach 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

- Alternative 90° L Foot included in UL 2703 Listing
- 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

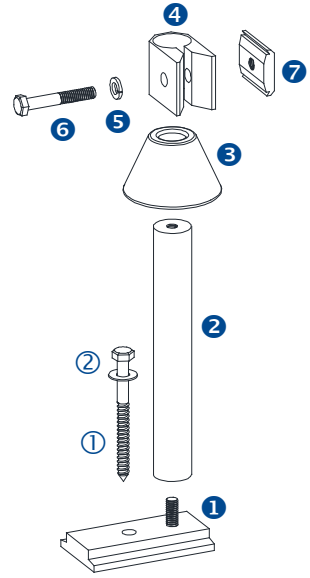
Required Tools:

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:

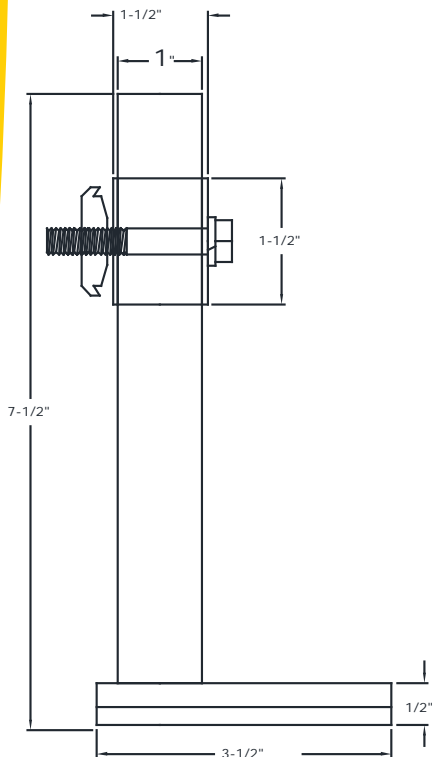
- ① (1) 5/16in Lag Screw
- ② (1) 5/16in Washer
- (1) Roof Cone Flashing

Technical Standoff Shaft Data:

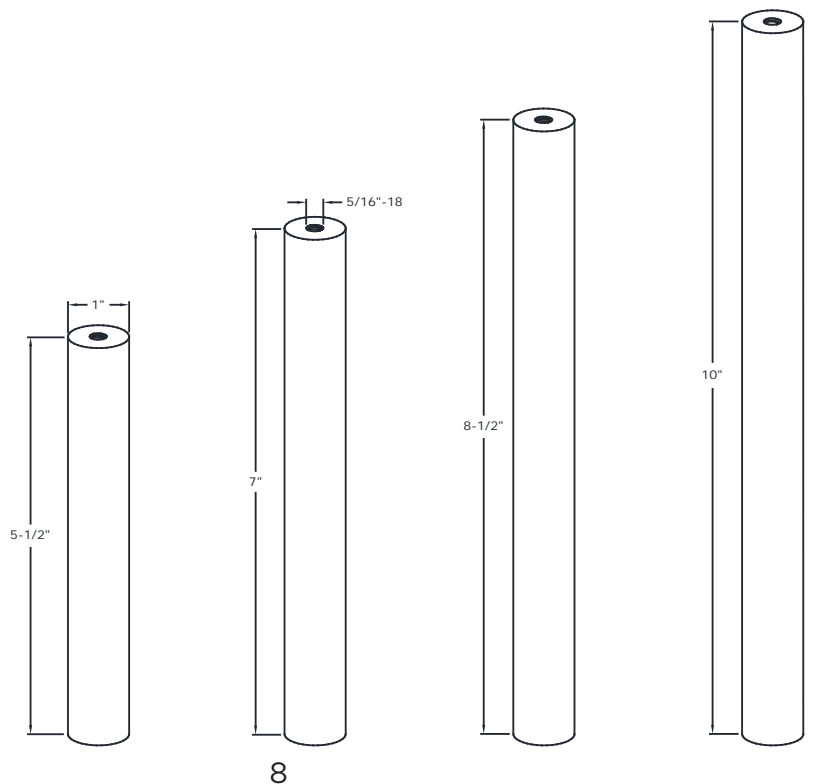
Material	6000 Series Heat Treated Aluminum
Finish	Mill
Weight	5.5" Shaft = 0.4 LBS 7" Shaft = 0.5 LBS 8.5" Shaft = 0.6 LBS
Design Uplift Load	200 LBS Uplift
Design Ultimate Load	1600 LBS Uplift

All Standoff shafts are mill finished

Dimensioned Assembly



Dimensioned Shaft



Series 100 UL Standoff Post

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



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

- 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

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

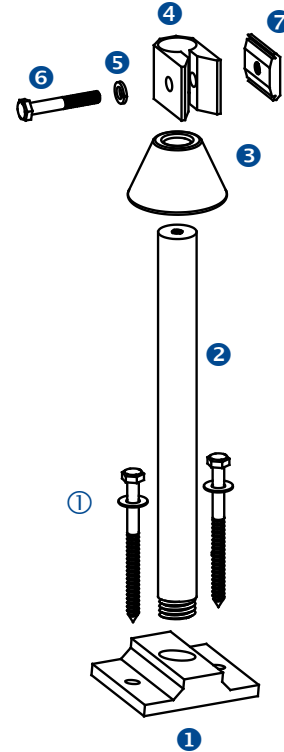
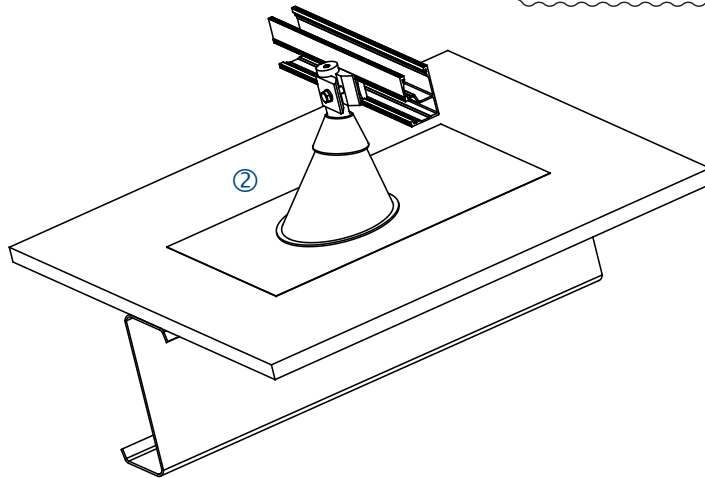
Standard Standoff Base



Other Materials Required:

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

When To Use:
Steel Structural
Member Configurations



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

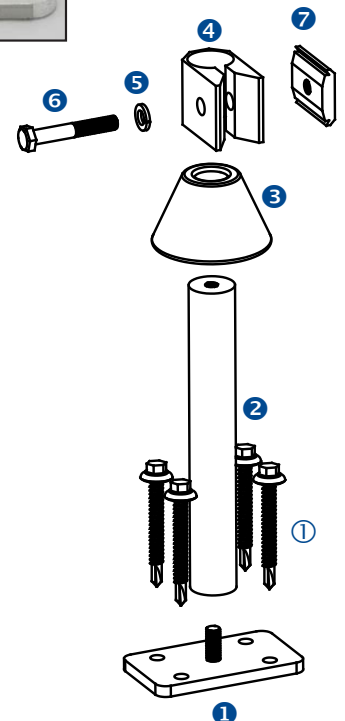
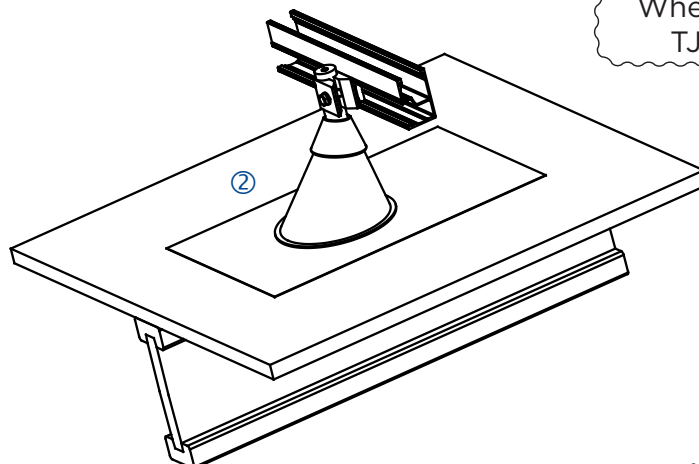
Four Hole Base



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

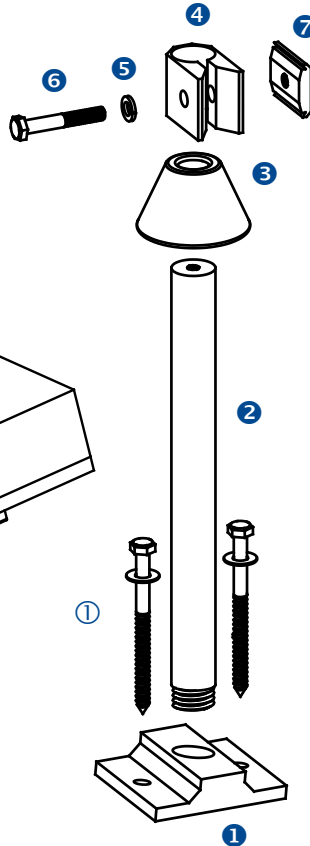
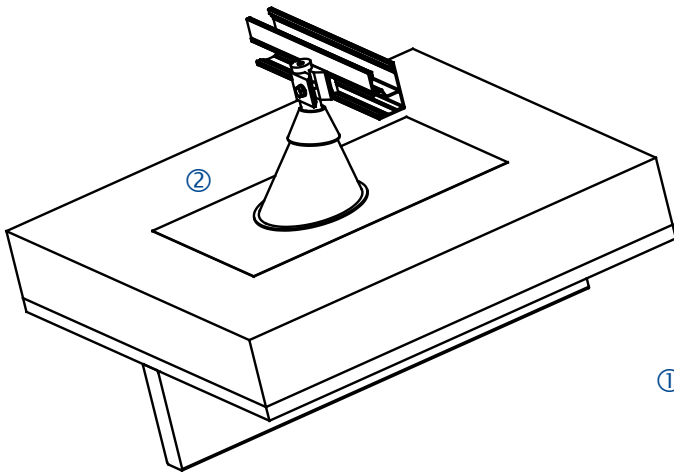
HD Base



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



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
 Flat Pry Bar

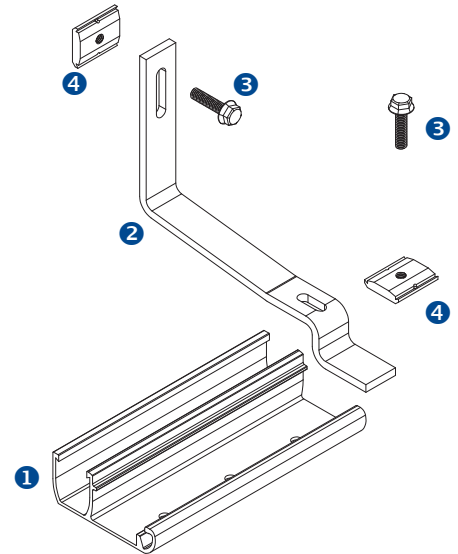
When To Use:
 Flat, Wave and S Style
 Concrete Tile Roofs

Materials Included In Universal Tile Roof Hook:

- ① (1) SnapNrack Universal Tile Roof Hook Base
- ② (1) SnapNrack Universal Tile Roof Hook Arm
- ③ (2) 5/16in Flange Bolt
- ④ (2) SnapNrack Bonding Channel Nut, 5/16in - 18

Other Materials Required:

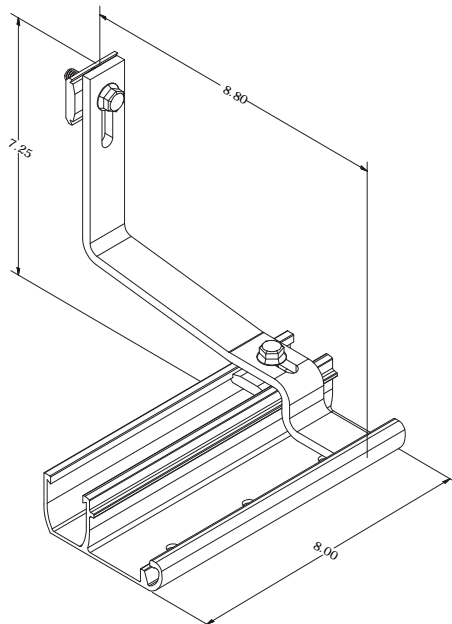
- ① (2) 5/16in Lag Screw
- ② (2) 5/16 Washer
- ③ Roof Felt of Flexible Flashing (when required for deck-level flashing)



Technical Universal Tile Roof Hook Data:

Material	6000 Series Heat Treated Aluminum Base 304 Stainless Steel Arm
Finish	Mill Finish Base Bare Metal Arm
Weight	2 lbs
Design Uplift Load	175 lbs
Design Ultimate Load	650 lbs

Dimensioned Assembly:



Series 100 UL Universal Tile Roof Hook

Step-by-Step Instructions

1) Locate the rafter



2) Drill pilot holes



3) Install Tile Hook base



4) Position Tile Hook arm



5) Work channel nut into groove



6) Attach Tile Hook arm to base



7) Optional deck-level flashing



8) Replace tile and install rail



1) Use pry bar to remove roof tile where the base 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) Align the base over the rafter so the hook can enter at the valley of a tile and not extend beyond the edge of the base. Drill two pilot holes in the center of the rafter. If the rafter is not found then seal the pilot hole immediately with sealant.

3) Apply roofing sealant to the bottom of the base and directly onto each lag screw. Attach the base with two 5/16" lag screws with washers at a minimum 2 1/2" lag shank embedment into the rafter. Tighten the lag screw to seat using a hand wrench.

4) Insert the top end of the arm into the groove at the top of the base. The arm will move freely in the base until the channel nut is tightened. Position the arm over the valley of the tile below, then lower the arm down.

5) As you lower the arm you can work the channel nut into the lower groove of the base without removing the channel nut.

6) Ensure the hook is aligned with the valley of the tile. Tighten the bolt in the channel nut and be sure the arm fully seats to the base. The arm will work in any position on the base independent of the lag screw location.

7) If deck-level flashing is required, integrate roof felt or a flexible flashing with the existing underlayment and over the Tile Hook.

8) Replace the roof tiles and install SnapNrack Standard Rail directly to the available channel nut on the Tile Hook arm.

Notes

- SnapNrack engineered systems should only be installed with SnapNrack components and hardware. Any alternate application may void the warranty, the UL 2703 Listing, and the structural calculations may no longer be valid.

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
 Flat Pry Bar

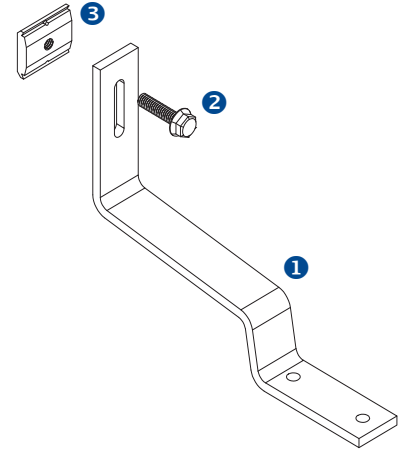
When To Use:
 Flat Concrete
 Tile Roofs

Materials Included In Flat Tile Roof Hook:

- ① (1) SnapNrack Flat Tile Hook
- ② (1) 5/16in Flange Bolt
- ③ (1) SnapNrack Bonding Channel Nut, 5/16in - 18

Other Materials Required:

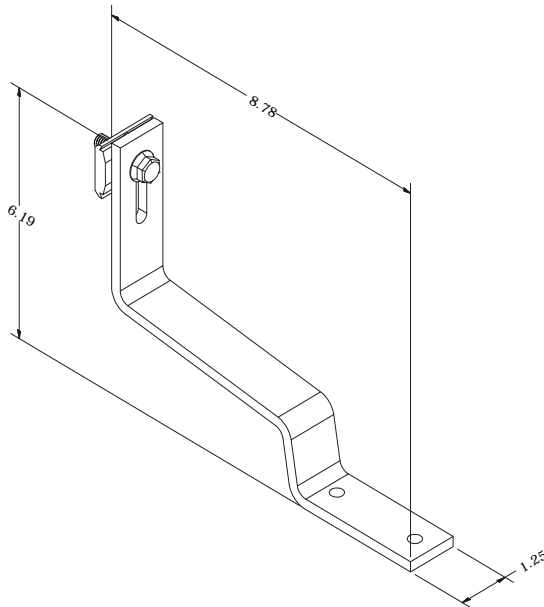
- ① (2) 5/16in Lag Screw
- ② (2) 5/16 Washer
- ③ Roof Felt or Flexible Flashing (when required for deck-level flashing)



Technical Flat Tile Roof Hook Data:

Material	304 Stainless Steel
Finish	Bare Metal
Weight	1.2 lbs
Design Uplift Load	175 lbs
Design Ultimate Load	650 lbs

Dimensioned Flat Tile Roof Hook:



1) Locate the rafter



2) Drill pilot holes



3) Install Tile Hook



4) Optional deck-level flashing



5) Replace tile and install rail



Series 100 UL Flat Tile Roof Hook

Step-by-Step Instructions

1) Use pry bar to remove roof tile where the Tile Hook 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) Align the Tile Hook over the rafter and drill two pilot holes in the center of the rafter. If the rafter is not found then seal the pilot hole immediately with sealant.

3) Apply roofing sealant to the bottom of the Tile Hook and directly onto each lag screw. Attach the base with two 5/16" lag screws with washers with a minimum 2 1/2" lag shank embedment into the rafter. Tighten the lag screw to seat using a hand wrench.

4) If deck-level flashing is required, integrate roof felt or a flexible flashing with the existing underlayment and over the Tile Hook.

5) Replace the roof tiles and install SnapNrack Standard Rail directly to the available channel nut on the Tile Hook arm.

Notes

- SnapNrack engineered systems should only be installed with SnapNrack components and hardware. Any alternate application may void the warranty, the UL 2703 Listing, and the structural calculations may no longer be valid.

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 system to be an accurate and fast installation. 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

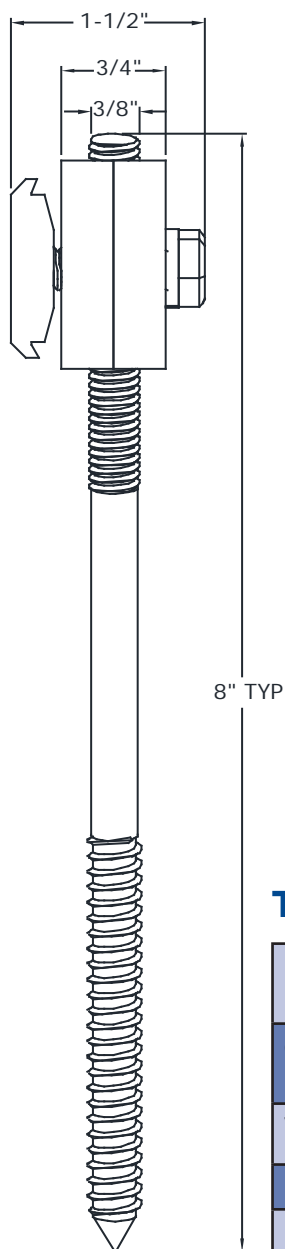
Materials Included In Series 100 Hanger Bolt Kit:

- 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:

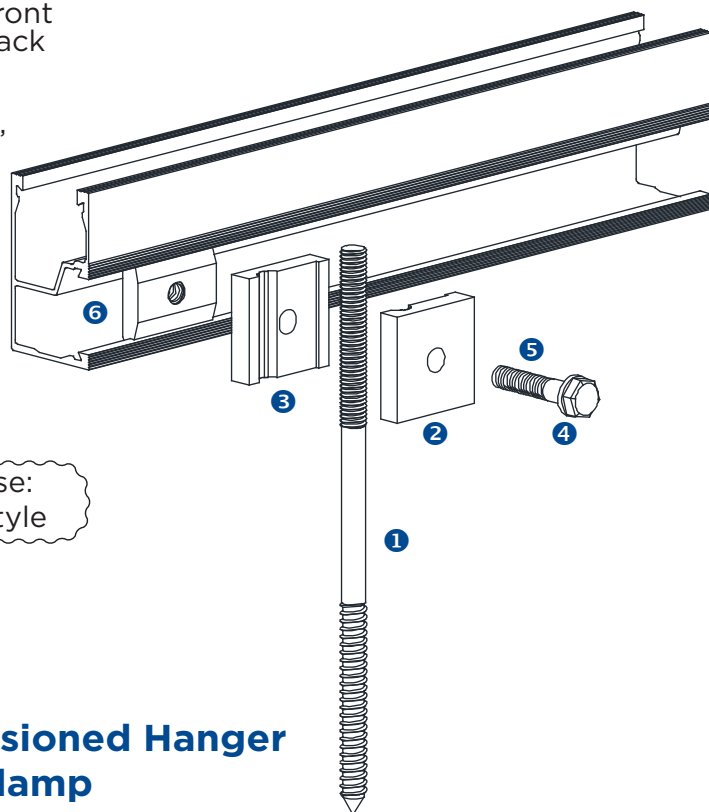
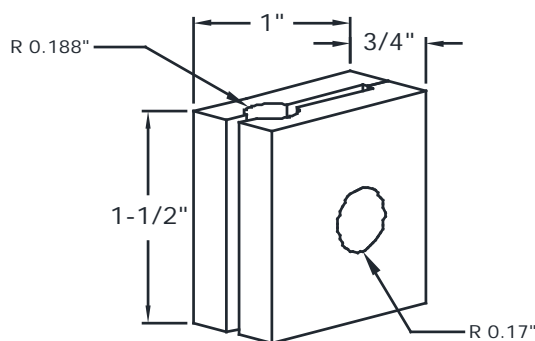
- ① (1) 3/8" Stainless Steel Hanger Bolt

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) Install hanger bolt



5) Set in rail



6) Attach to 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

- 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

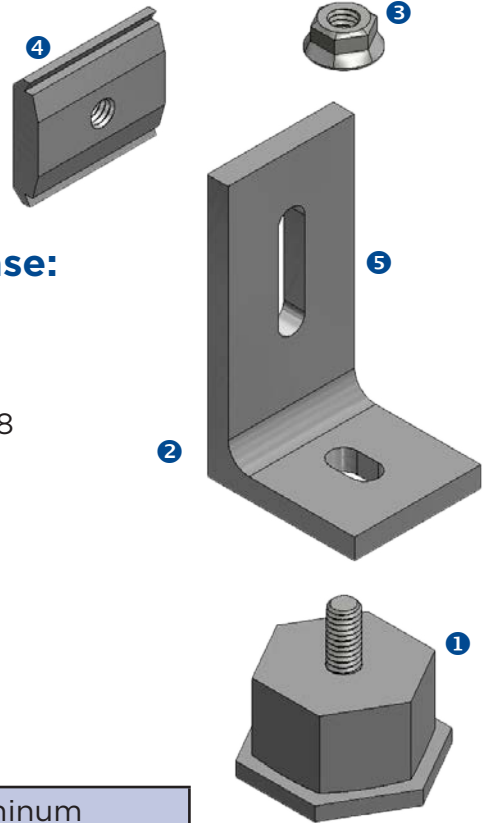
Series 100 UL Metal Roof Base

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)



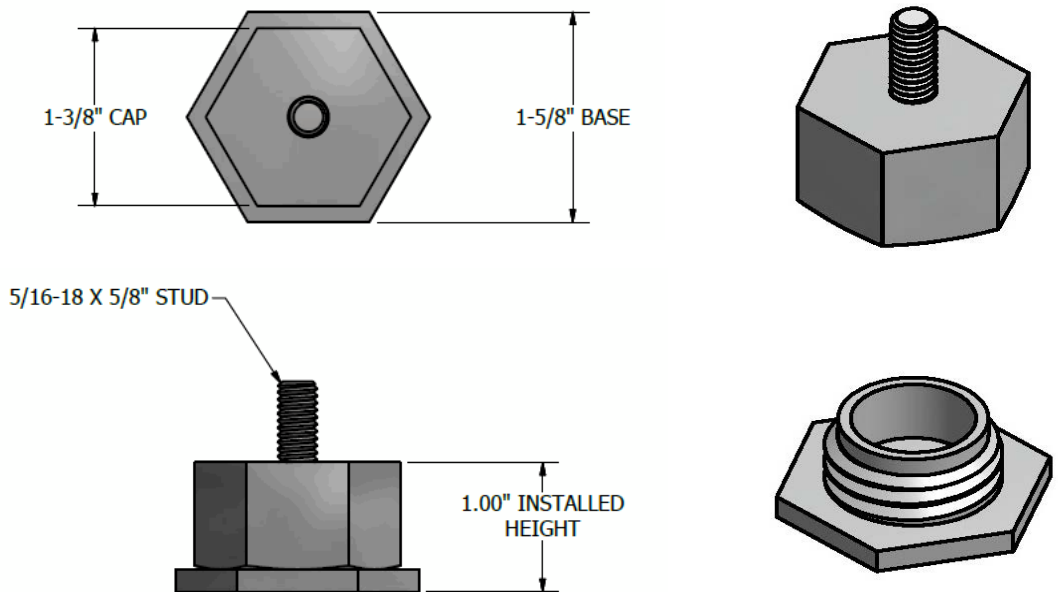
When To Use:
 Metal Roof
 Profiles

Technical Metal Roof Base Data:

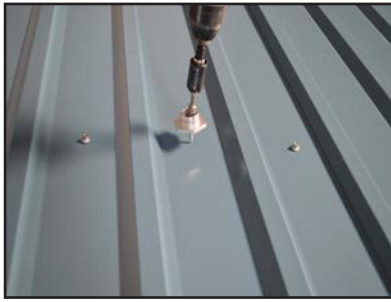
Material	6000 Series Aluminum
Color	Clear Anodized Aluminum
Weight	0.4 LBS
Design Uplift Load	1,008 LBS Uplift
Design Ultimate Load	4,033 LBS Uplift

Use With:
 Anodized
 Aluminum L-Foot
 and Flange Bolt

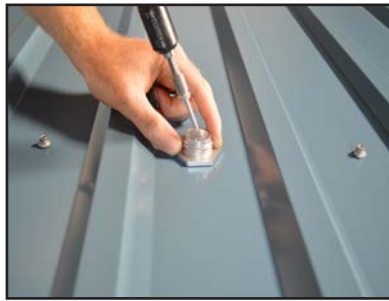
Dimensioned Assembly



1) Locate the rafter & drill pilot hole



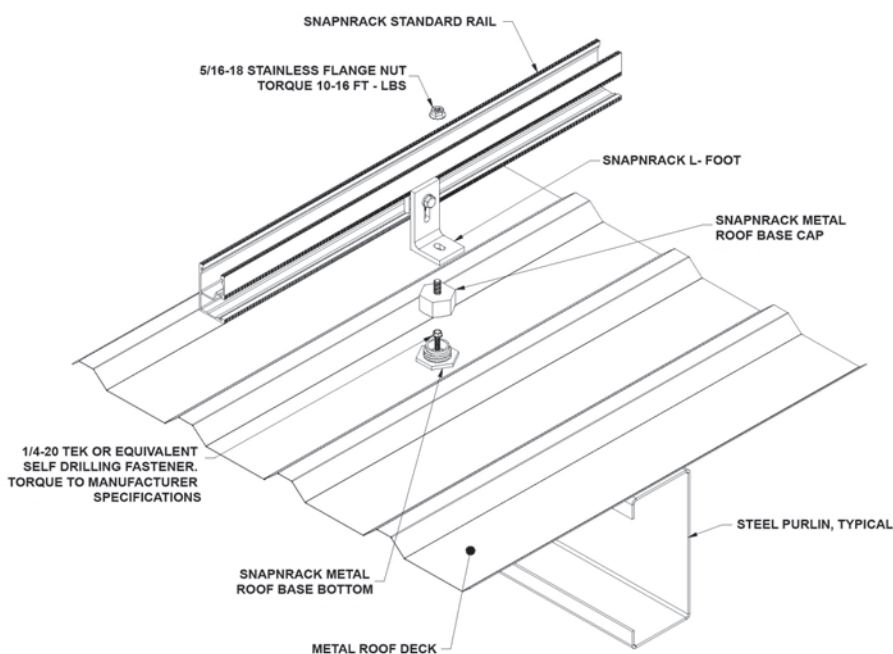
2) Attach base with screw



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

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

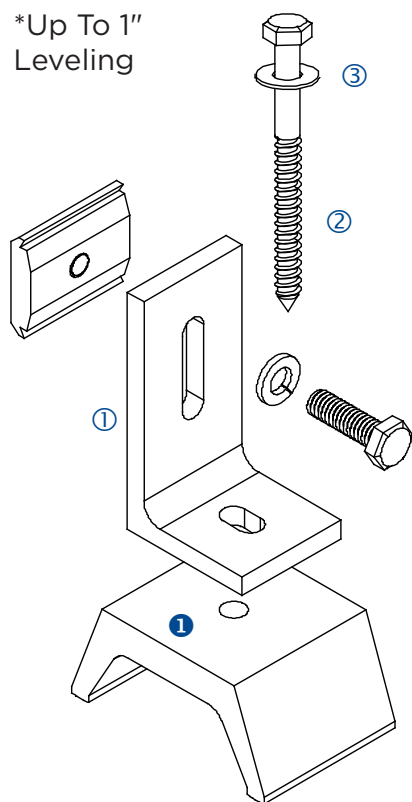
Materials included in Series 100 Straddle Block:

- ① (1) SnapNrack Corrugated Straddle Block

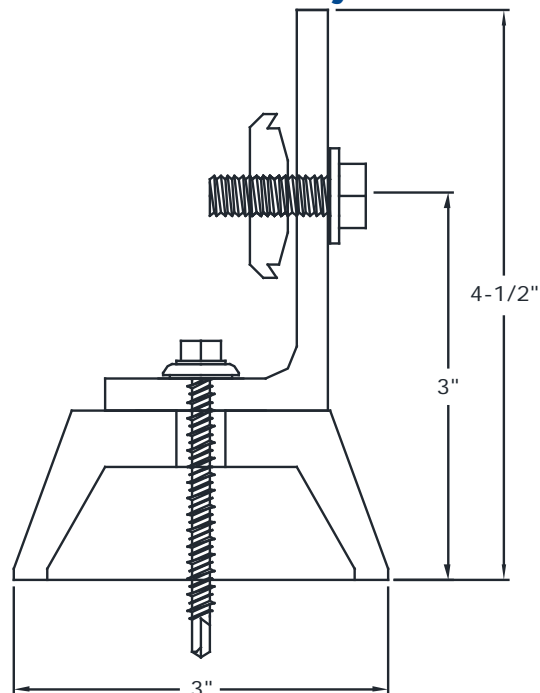
Other Materials Required:

- ① (1) SnapNrack L-Foot Assembly
- ② (1) 5/16in Lag Screw
- ③ (1) 5/16in Washer

*Up To 1"
Leveling

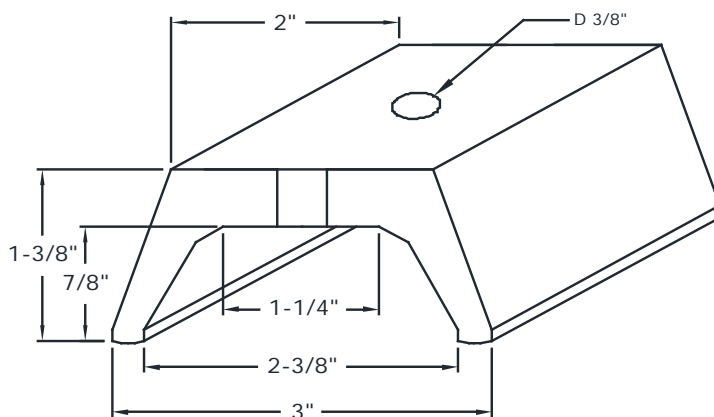


Dimensioned Assembly



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

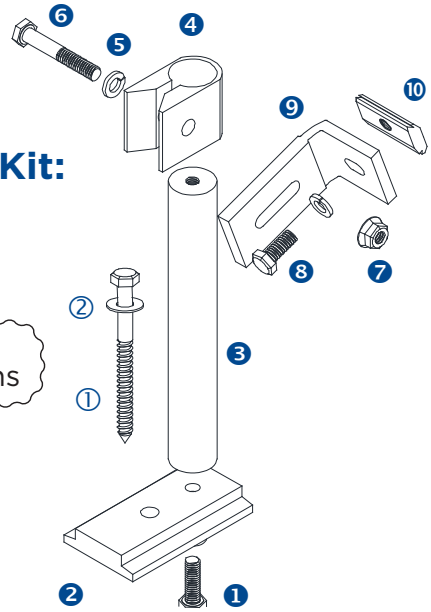
Required Tools:

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:

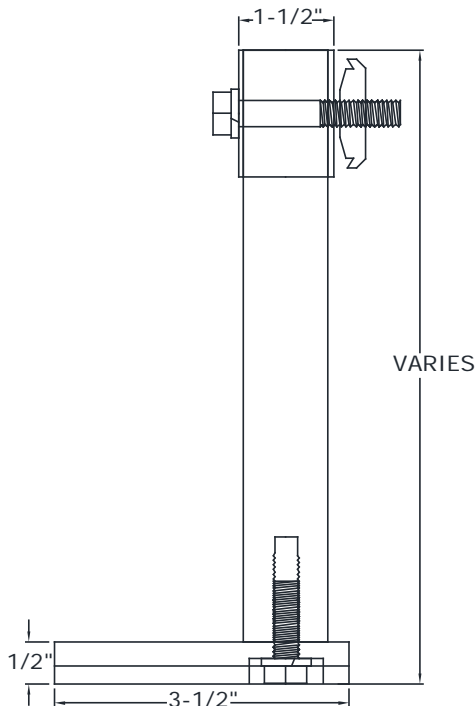
- ① (2) 5/16in Lag Screw
- ② (2) 5/16 Washer
- (2) Roof Cone Flashings

Technical Standoff Data:

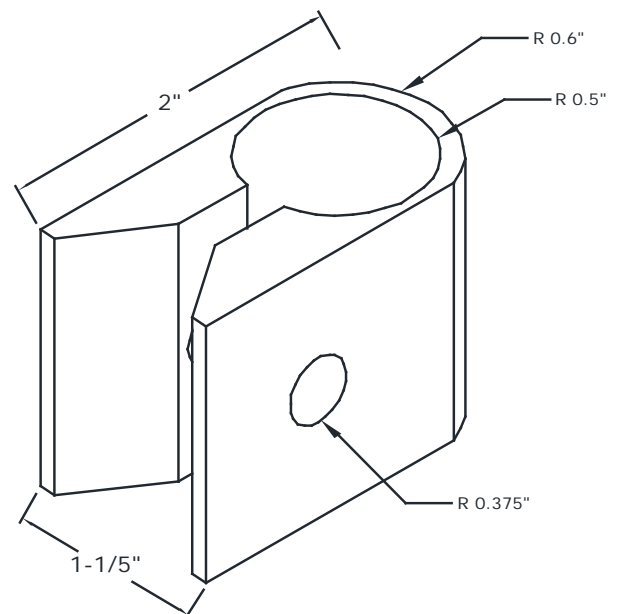
Material	6000 Series Heat Treated Aluminum
Finish	Mill
Weight	5.5" Shaft = 0.4 LBS 7" Shaft = 0.5 LBS 8.5" Shaft = 0.6 LBS
Design Uplift Load	200 LBS Uplift
Design Ultimate Load	1000 LBS Uplift

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:

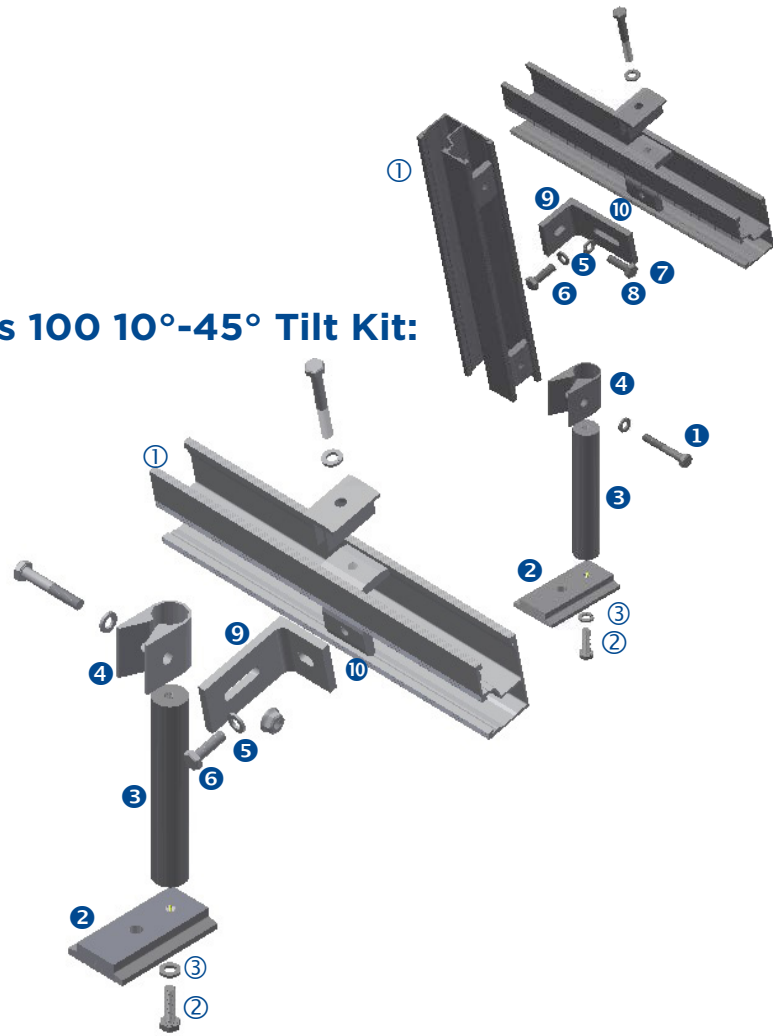
Hammer
 Roof Marking Crayon
 Drill with 1/8 inch Pilot
 Roof Sealant
 Torque Driver with Bit Adapter
 1/2 inch Socket Wrench
 SnapNrack Tool

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

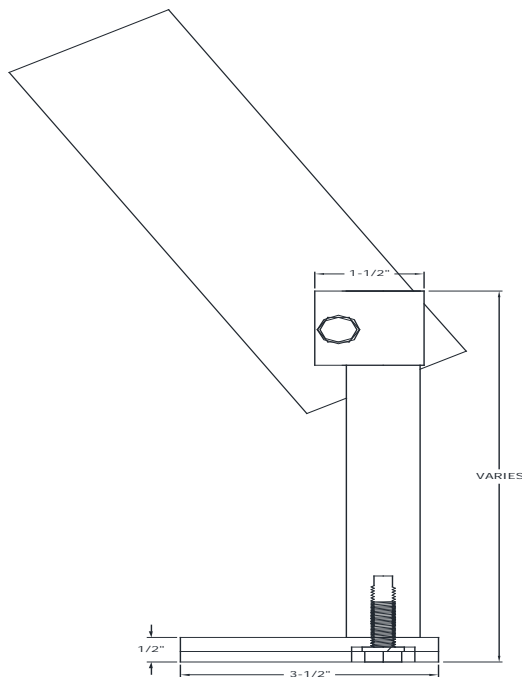


Technical Standoff Data:

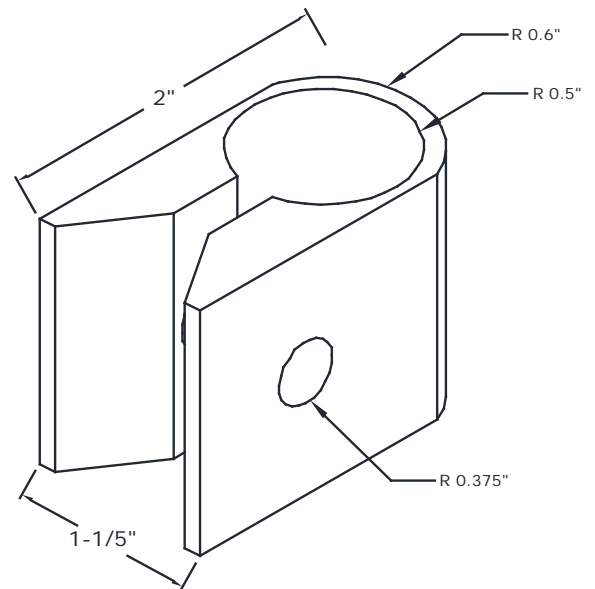
Material	6000 Series Heat Treated Aluminum
Finish	Mill
Design Uplift Load	200 LBS Uplift
Design Ultimate Load	1000 LBS Uplift

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

- 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 Seam Clamp

Required Tools

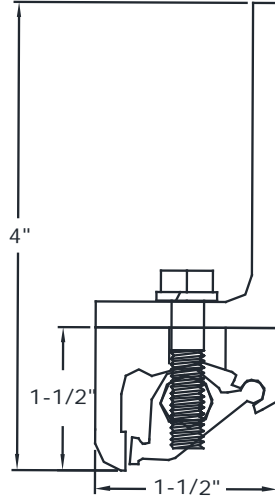
Torque Driver with Bit Adapter
1/2 inch Socket Wrench

Materials Included In Series 100 Seam Clamp Kit:

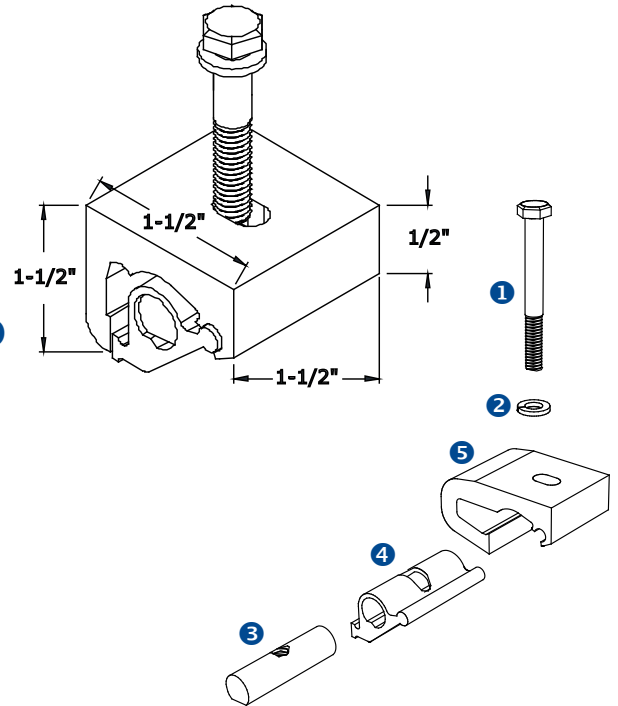
- ① (1) 5/16in - 18 X 1in SS HCS Bolt
- ② (1) 5/16in SS Split Lock Washer
- ③ (1) SnapNrack Seam Clamp Insert
- ④ (1) SnapNrack Seam Clamp Cam
- ⑤ (1) SnapNrack Seam Clamp Base

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

Dimensioned Assembly with L-Foot:



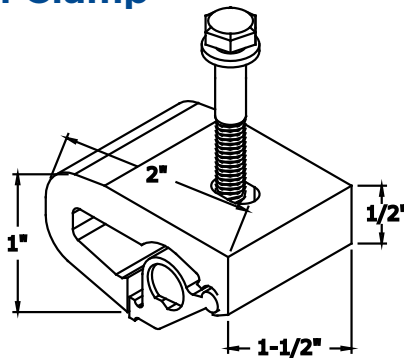
Dimensioned Standard Seam Clamp



Materials Included In Series 100 Wide Seam Clamp Kit:

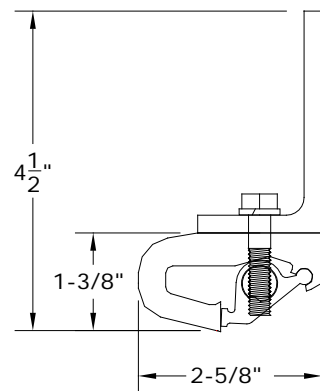
- ① (1) 5/16in - 18 X 1in SS HCS Bolt
- ② (1) 5/16in SS Split Lock Washer
- ③ (1) SnapNrack Seam Clamp Insert
- ④ (1) SnapNrack Seam Clamp Cam
- ⑤ (1) SnapNrack Seam Clamp Wide Base

Dimensioned Wide Seam Clamp



Dimensioned Assembly with L-Foot

Use with:
Anodized L foot
and Flange Bolt



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

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:

Snap Lock Single Lock Double Lock



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

Series 100 UL

Installing and Leveling Rails

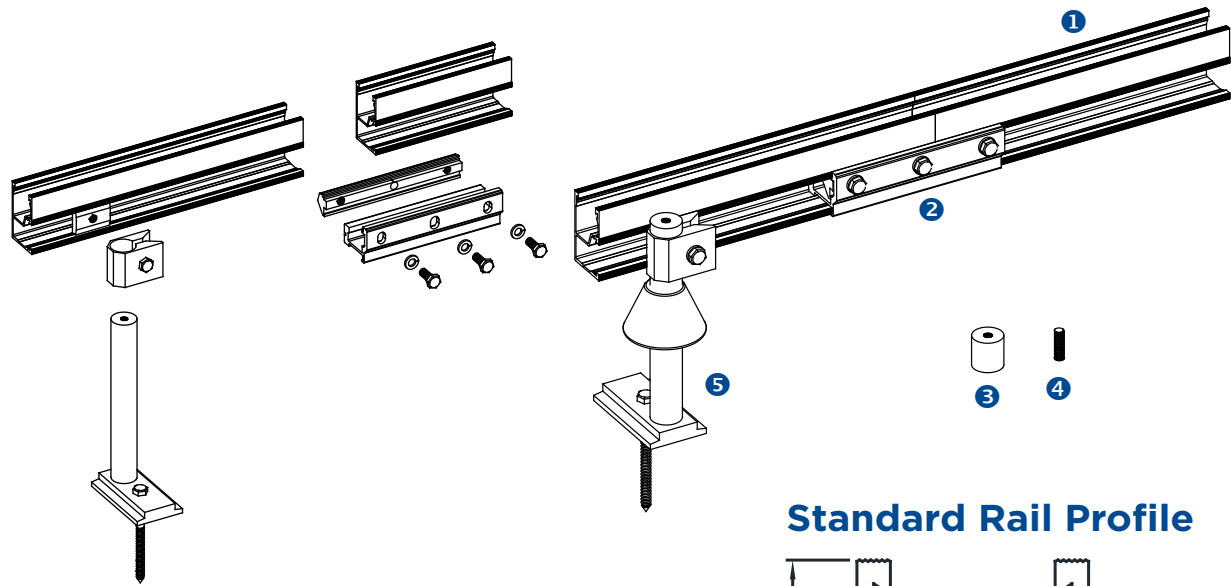
Required Tools:

- 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)

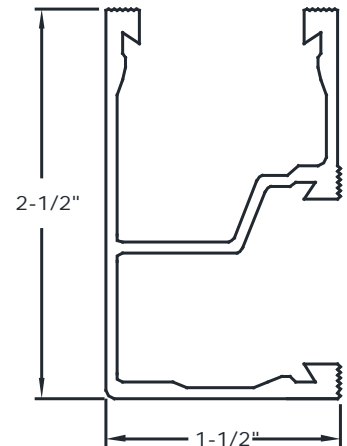
Use with:
Mill Finish
Standoff Parts



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

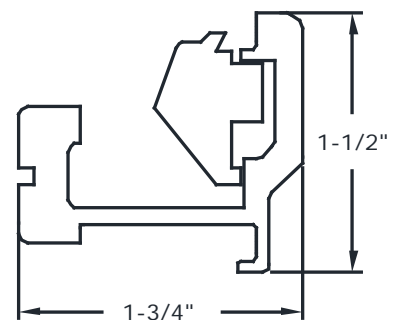
Standard Rail Profile



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

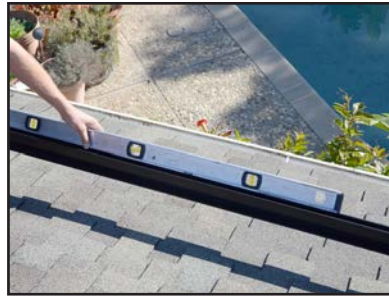


Step 3: Leveling Rails

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

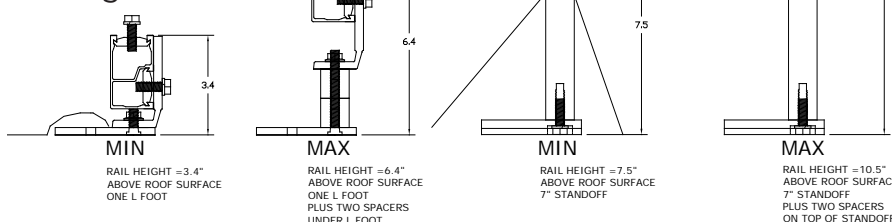


The rail splice is inserted into the channel where two rails but together. Three bolts are used to tighten the splice.

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.
- The minimum standoff height between the modules and roof is as follows:
 - REC Solar, Yingli, and Suniva modules: 4.00 in
 - ReneSola modules: 3.93 in
 - Trina Solar modules: 4.53 in

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

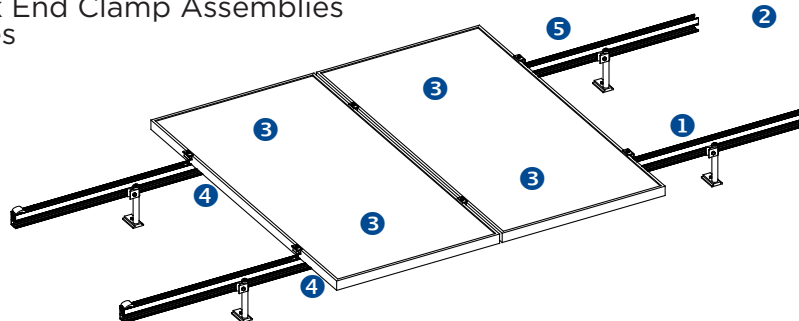
- SnapNrack has a suite of design tools to help configure your PV installation to be an accurate and fast install. Please visit us at: www.SnapNrack.com

Required Tools:

1/2 inch Socket Wrench
Torque Wrench

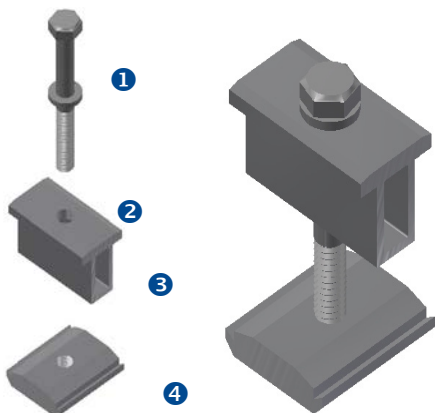
Materials Needed to Install Mid and End Clamps:

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



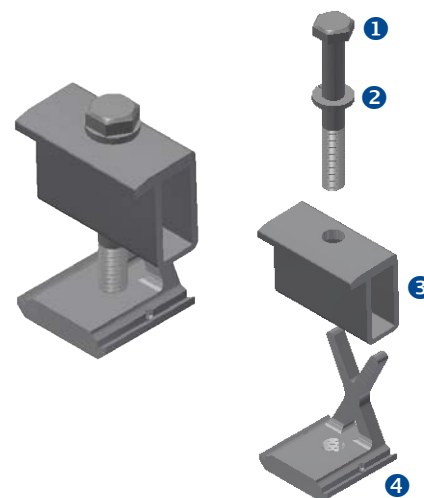
Mid Clamp Assembly

- 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



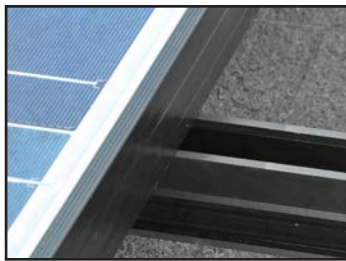
Torque:
Silver 10-16
ft-lbs. Black
8-10 ft-lbs.

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

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Required Tools:

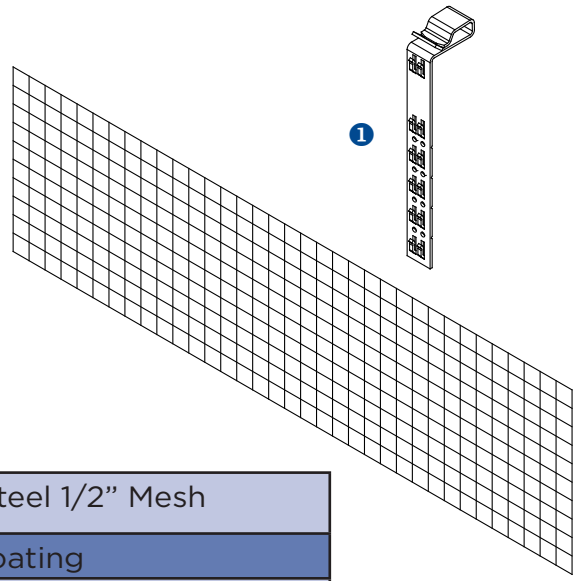
Wire Cutters
Pliers

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

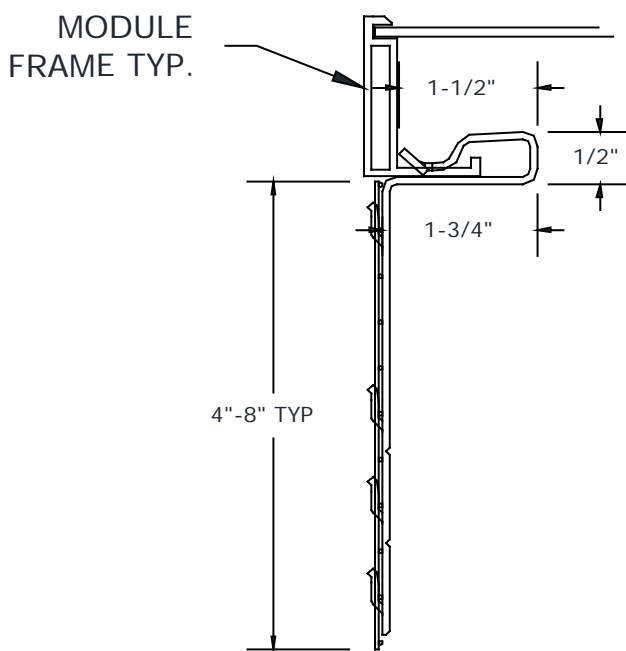


Technical Edge Screen Data:

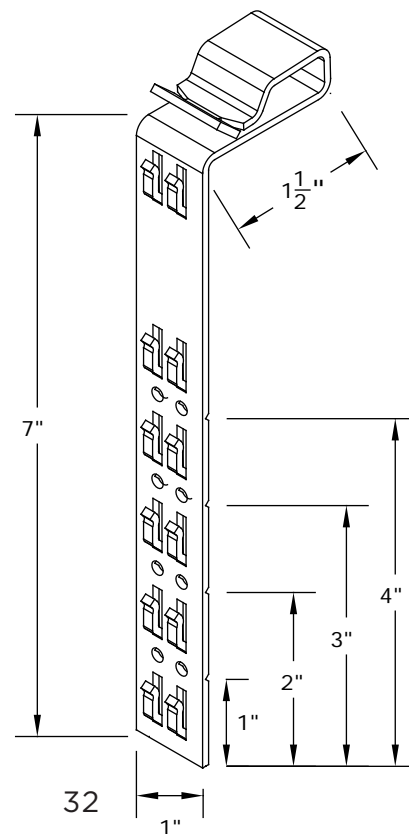
Screen Material	Galvanized Steel 1/2" Mesh
Color	Black PVC Coating
Weight	0.18 LBS/ Ft. X 8" Wide

Material	Galvanized Spring Steel
Color	Black Paint
Weight	0.16 LBS

Dimensioned Assembly



Dimensioned Edge Screen Clip:



Series 100 UL Edge Screen

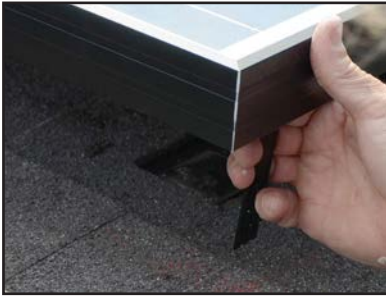
1) Determine edge clip height



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

- 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.

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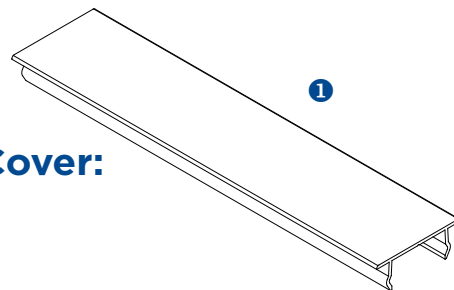


Required Tools

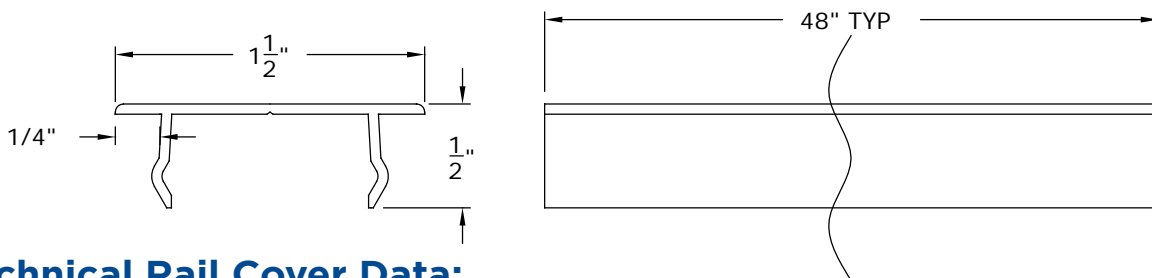
Chop Saw or Reciprocating Saw

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

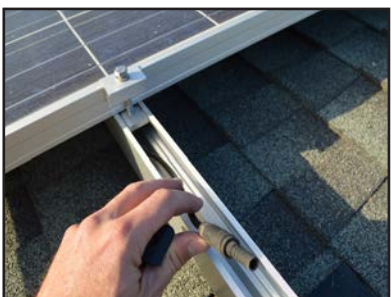


4) Snap on cover



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

- 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 Micro Inverter Attachment

Required Tools

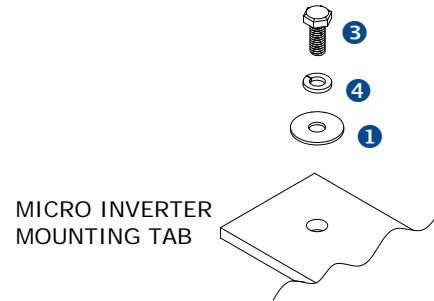
1/2 inch Socket Wrench

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

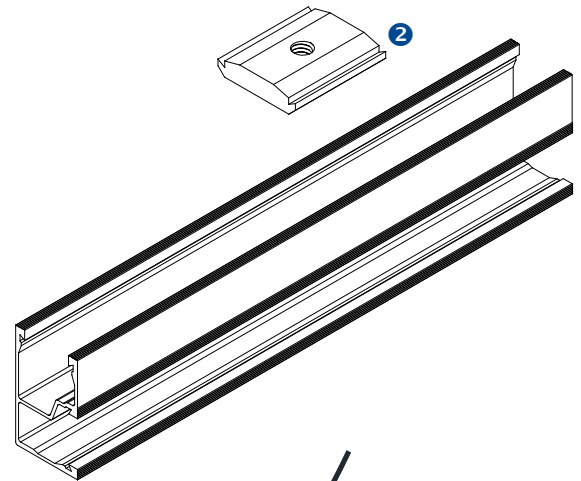
Materials Included In Series 100 Micro Inverter Attachment Kit:

- 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

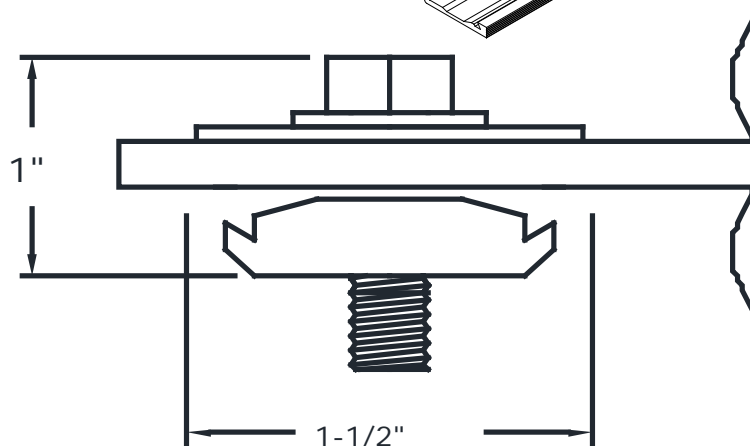
When To Use:
If Micro Inverter Has An
Attachment Tab



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



Dimensioned Assembly



Series 100 UL Micro Inverter Attachment

1) Snap in the channel nut



2) Place the bolt and washers



3) Tighten hardware



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

- 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

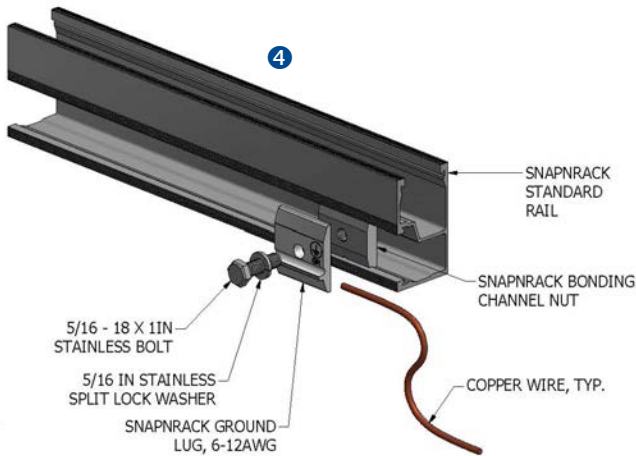
System Ground Methods Include:

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

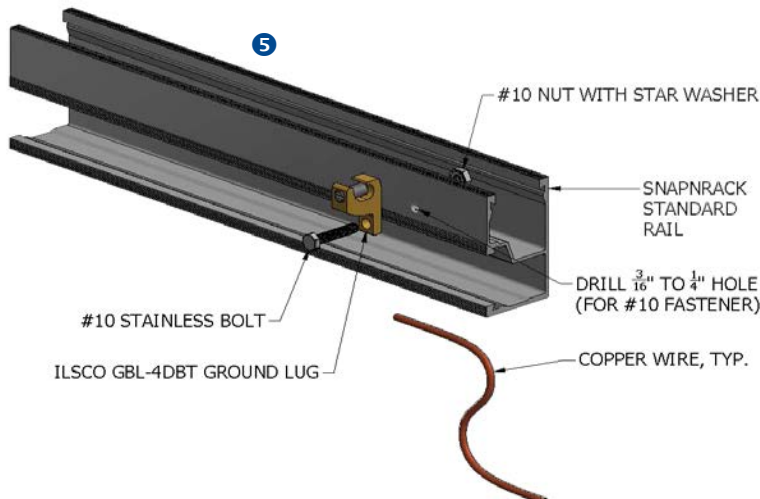
All SnapNrack Module Clamps contain a SnapNrack Bonding Channel Nut in assembly to properly ground the system (except Universal End Clamps).



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

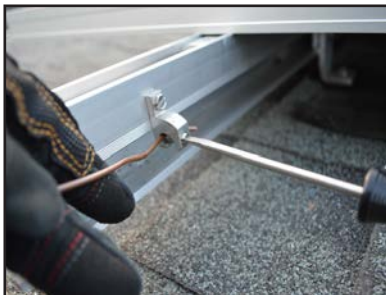
1) Drill & attach IlSCO Lug



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 on **one rail per module row**.

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 rail for the IlSCO lug to attach to and place the bolt through the hole and attach the lug assembly on **one rail per module row**.

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, UL 2703 Listing, and structural calculations could become invalid.

Series 100 UL Rail Cutting Tool and End Cap

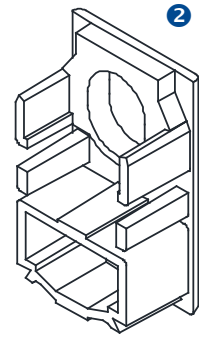
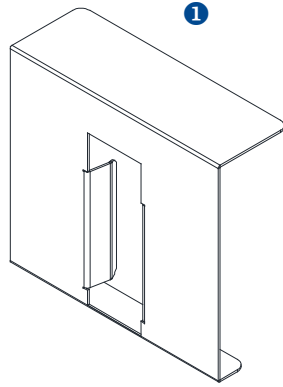
Required Tools:

Reciprocating Saw

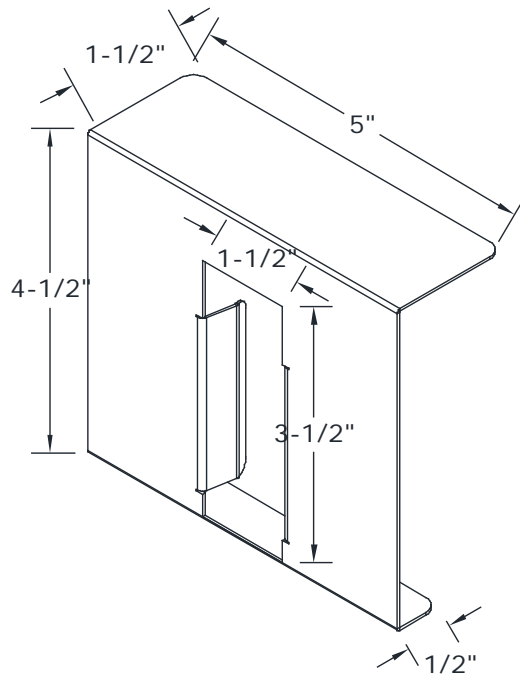
Materials Included In Series 100 Rail Cutting Tool and End Cap:

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

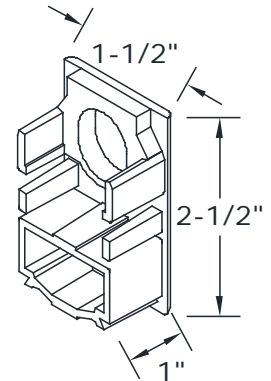
When To Use:
UEC For Flush Rail Cut



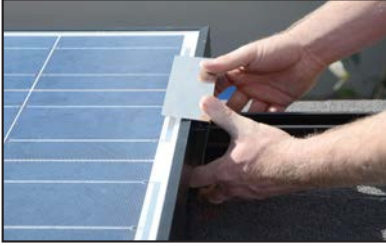
Dimensioned Rail Cutting Tool



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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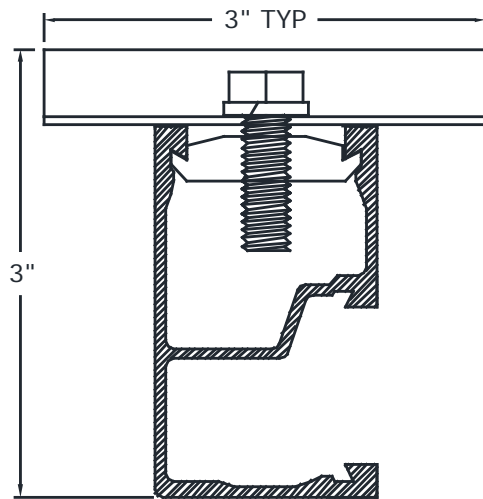
Required Tools:

Drill
Measuring Tape
Reciprocating Saw
1/2 inch Socket Wrench

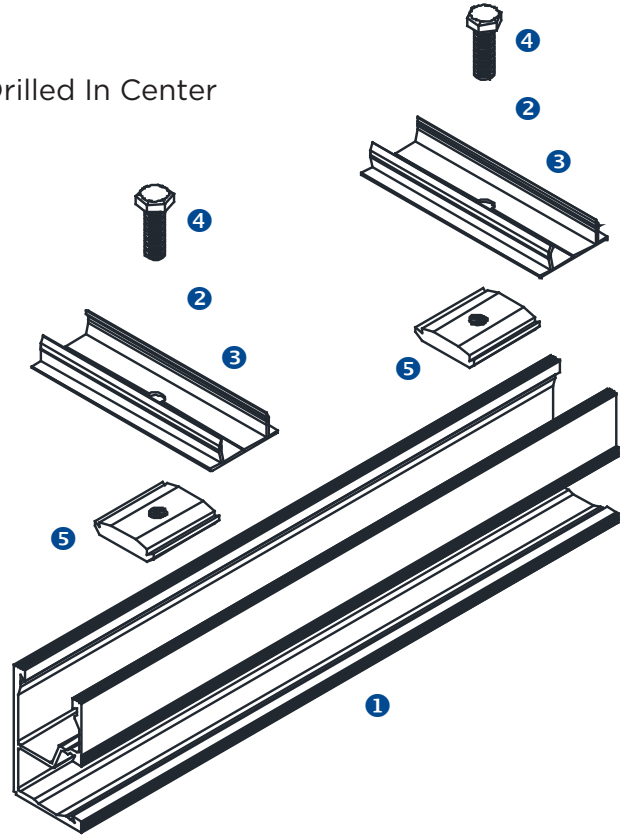
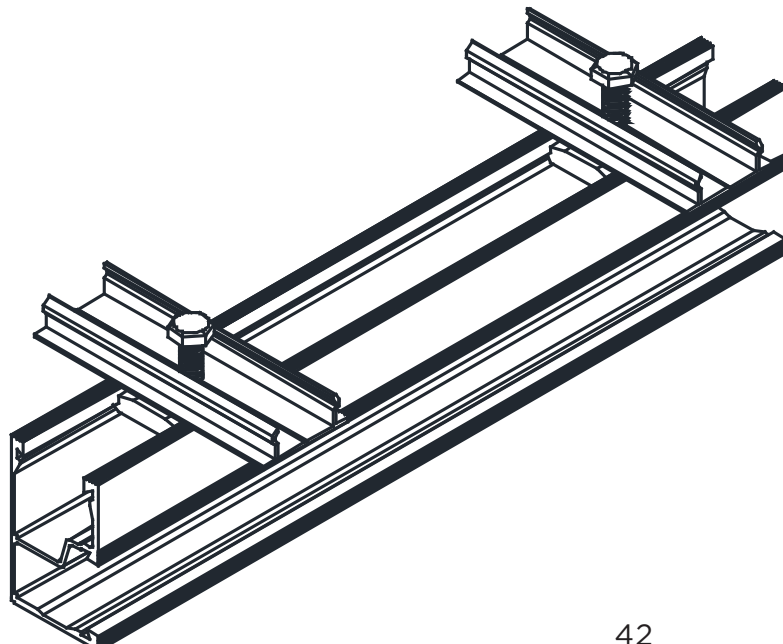
Materials Included in Series 100 10°-45° Tilt Tool Kit

- 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

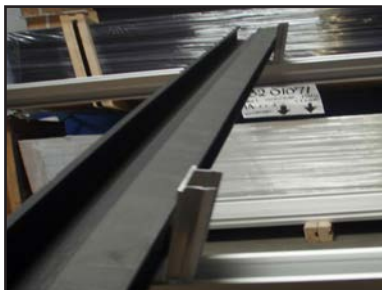
1) Construct pieces



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 $3/8''$ holes in each rail cover. Cut two $5/16''$ 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 $3/8''$ 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

- 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

Appendix

Series 100 UL has been tested with the following UL Listed modules:

REC Solar AS: 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.

Hyundai Heavy Industries Co Ltd:

HiS-MxxxMG Series - HiS-M210MG, HiS-M213MG, HiS-M215MG, HiS-M218MG, HiS-M220MG, HiS-M223MG, HiS-M225MG, HiS-M228MG, HiS-M230MG, HiS-M233MG, HiS-M235MG, HiS-M238MG, HiS-M240MG, HiS-M243MG, HiS-M245MG, HiS-M248MG, HiS-M250MG, HiS-M253MG, HiS-M255MG, HiS-M258MG, HiS-M260MG, HiS-M263MG, HiS-M265MG, HiS-M268MG, HiS-M270MG;

HiS-SxxxMG Series - HiS-S220MG, HiS-S223MG, HiS-S225MG, HiS-S228MG, HiS-S230MG, HiS-S233MG, HiS-S235MG, HiS-S238MG, HiS-S240MG, HiS-S243MG, HiS-S245MG, HiS-S248MG, HiS-S250MG, HiS-S253MG, HiS-S255MG, HiS-S258MG, HiS-S260MG, HiS-S263MG, HiS-S265MG, HiS-S268MG, HiS-S270MG, HiS-S273MG, HiS-S275MG; all may be followed by the suffix BK or blank.

Renesola Jiangsu Ltd: JCxxxM-24/BB Series - JC200M-24/Bb, JC205M-24/Bb, JC210M-24/Bb, JC215M-24/Bb, JC220M-24/Bb, JC225M-24/Bb, JC230M-24/Bb, JC235M-24/Bb, JC240M-24/Bb, JC245M-24/Bb, JC250M-24/Bb, JC255M-24/Bb, JC260M-24/Bb, JC265M-24/Bb, JC270M-24/Bb.

Suniva Inc - MVX-235-60-5-701, MVX-240-60-5-701, MVX-245-60-5-701, MVX-250-60-5-701, MVX-255-60-5-701, MVX-260-60-5-701, MVX-265-60-5-701; MVX-235-60-5-7B1, MVX-240-60-5-7B1, MVX-245-60-5-7B1, MVX-250-60-5-7B1, MVX-255-60-5-7B1, MVX-260-60-5-7B1, MVX-265-60-5-7B1; OPT-250-60-4-800, OPT-255-60-4-800, OPT-260-60-4-800, OPT-265-60-4-800, OPT-270-60-4-800, OPT-275-60-4-800; OPT-250-60-4-8B0, OPT-255-60-4-8B0, OPT-260-60-4-8B0, OPT-265-60-4-8B0, OPT-270-60-4-8B0, OPT-275-60-4-8B0.

Yingli Energy (China) Co Ltd - YLXXXP-29b Series - YL215P-29b, YL220P-29b, YL225P-29b, YL230P-29b, YL235P-29b, YL240P-29b, YL245P-29b, YL250P-29b, YL255P-29b, YL260P-29b; YLXXXA-29b Series - YL220A-29b, YL225A-29b, YL230A-29b, YL235A-29b, YL240A-29b, YL245A-29b, YL250A-29b, YL255A-29b.

Trina Solar Ltd - TSM-215PA05, TSM-220PA05, TSM-225PA05, TSM-230PA05, TSM-235PA05, TSM-240PA05, TSM-245PA05, TSM-250PA05, TSM-255PA05, TSM-260PA05;

TSM-215PA05.05, TSM-220PA05.05, TSM-225PA05.05, TSM-230PA05.05, TSM-235PA05.05, TSM-240PA05.05, TSM-245PA05.05, TSM-250PA05.05, TSM-255PA05.05, TSM-260PA05.05;

TSM-215PA05.08, TSM-220PA05.08, TSM-225PA05.08, TSM-230PA05.08, TSM-235PA05.08, TSM-240PA05.08, TSM-245PA05.08, TSM-250PA05.08, TSM-255PA05.08, TSM-260PA05.08;

TSM-215PD05, TSM-220PD05, TSM-225PD05, TSM-230PD05, TSM-235PD05, TSM-240PD05, TSM-245PD05, TSM-250PD05, TSM-255PD05, TSM-260PD05;

TSM-215PD05.08, TSM-220PD05.08, TSM-225PD05.08, TSM-230PD05.08, TSM-235PD05.08, TSM-240PD05.08, TSM-245PD05.08, TSM-250PD05.08, TSM-255PD05.08, TSM-260PD05.08.

NRTL Listed PV Modules:

Hanwha SolarOne: Models HSL60P6-PB-2-230Q, HSL60P6-PB-2-235Q, HSL60P6-PB-2-240Q, HSL60P6-PB-2-245Q, HSL60P6-PB-2-250Q, HSL60P6-PB-2-255Q, HSL60P6-PB-2-260Q, HSL60P6-PB-2-265Q, HSL60P6-PB-2-270Q;

HSL60P6-PB-4-230Q, HSL60P6-PB-4-235Q, HSL60P6-PB-4-240Q, HSL60P6-PB-4-245Q, HSL60P6-PB-4-250Q, HSL60P6-PB-4-255Q, HSL60P6-PB-4-260Q, HSL60P6-PB-4-265Q, HSL60P6-PB-4-270Q;

may be followed by additional suffixes.

Suniva Inc - OPTXXX-60-4-YYY;

where XXX may be numbers 240 to 270 in increments of 5;

where YYY may be 100;

OPTXXX-60-4-YYY;

where XXX may be numbers 235 to 265 in increments of 5;

where YYY may be 1B0.

