

# SnapNrack™

Solar Mounting Solutions

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## RL Universal

Railless Residential Roof Mount System  
Installation Manual

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[snapnrack.com](http://snapnrack.com)

SnapNrack's primary goal is to provide our customers with the lowest possible installed cost for mounting residential solar modules, without compromising the values the industry has come to expect: ease of use, quality, aesthetics, and safety. Designing with this goal in mind, we are proud to present the SnapNrack RL Universal Solar Mounting System.

SnapNrack has created a rail less system combining great features and benefits we are known for, with our Ultra Rail system and the most up to date technical innovation in the industry, thus reducing parts while driving down labor, material, and total installation costs. Designed to work with standard module frames, achieving UL 2703 Listing for Grounding/Bonding and Fire Classification, providing integrated wire management, aesthetics and our industry leading "Snap-In" features, SnapNrack is providing the simplest and most cost effective solar mounting solution on the market with RL Universal.

## Benefits of Installing the SnapNrack RL Universal System

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### Install With Very Few Parts

This elimination of parts leads to a lower estimated system cost for both the installer and home owner.

### Install RL Universal With One Tool

All RL Universal hardware is attached using a standard ½" socket

### Built in Wire Management and Aesthetics

Extensive wire management solutions have been designed specifically for the system that adapts to multiple possible mounting positions.

The system is designed to be aesthetically pleasing and sturdy with a skirt that provides considerable strength at the leading edge and an elegant look for those seeking high end looking systems.

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## Certification Details

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SnapNrack RL Universal system has been evaluated by Underwriters Laboratories (UL) and Listed to UL Standard 2703 for Grounding/Bonding, and Fire Classification.

### **Grounding/Bonding**

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Only specific components have been evaluated for bonding, and are identified as being in the ground path. The RL Universal components that have been evaluated for bonding are the Mount Assembly, Ridge Mount Assembly, Link Assembly, Skirt, Flash Track, Ground Lugs and Smart Clips.

The following system components are not required to be bonded to the system based on the exceptions in clause 9.1 of UL 2703 1st Ed.: Skirt Spacer, Umbrella Bolt, Flashing and Positioning Springs. Wire management clips are utilized to route conductors away from these components and must be assembled according to the instructions.

This mounting system may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. See Appendix A for the list of modules tested with the RL Universal system for integrated grounding.

Ground Lugs have been evaluated to both UL 467 and UL 2703 Listing requirements. The following ground lugs have been approved for use: SnapNrack model 242-02101, 242-92202, and IlSCO models GBL-4DBT and SGB-4.

The following components have been evaluated for bonding as the fault current ground path: Mount Assembly, Ridge Mount Assembly, Link Assembly, Flash Track and Ground Lugs. In order to maintain the Listing for bonding, wire management clips must be assembled to route conductors away from parts that have not been evaluated for bonding.

A Listed (QIMS) and Unlisted Component (KDER3) grounding lug, SnapNrack part no. 242-92202, is attached to the module frame flange, Flash Track or Ridge Mount Track for the normal attachment of a Grounding Electrode Conductor, which provides bonding within the system and eventual connection to a Grounding Electrode, as required by the U.S. NEC. Details of part no. 242-92202 can be found in Volume 1, Section 4, and Volume 2, Section 2. When this method is used, the grounding symbol is stamped onto the body of the ground lug to identify the grounding terminal.

An alternate method of grounding, A UL Listed (QIMS) and Unlisted Component (KDER3) grounding lug, SnapNrack part no. 242-02101 is attached to the Flash Track. Details of part no. 242-02101 can be found in Volume 1, Section 4, and Volume 2, Section 1. When this method is used, the grounding symbol is stamped onto the body of the ground lug to identify the grounding terminal.

An alternate method of grounding, a UL Listed (KDER and QIMS) grounding lug, IlSCO (E34440 and E354420) model SGB-4 is attached to the module frame flange, Flash Track or Ridge Mount Track. When this method is used, the grounding terminal is identified by the green colored screws of the lug.

An alternate method of grounding, a UL Listed (KDER and QIMS) grounding lug, IlSCO (E34440 and E354420) model GBL-4BDT is attached to the module frame flange through the specified hardware and torque values. When this method is used, the grounding terminal is identified by the green colored set screw of the lug.

An alternate method of grounding, Enphase R/C (QIKH2)(QIMS2) model M250, M215 & C250 is bonded to the Listed PV module frame by the Enphase R/C (QIMS2) Model EFM-XXMM anodization piercing mounting/clamping kit. The total roof-mounted PV system is bonded (modules and microinverters)

together and the assembly is bonded to ground through the Enphase R/C (QIMS2) Engage Cables; Model ETXX-240, ETXX-208 or ETXX-277, when properly grounded at the service entrance.

R/C (QIMS2), Dynoraxx (E357716) photovoltaic bonding device cat. no. Dynobond is an optional component that may be used with this system. The Dynobond device has been evaluated to provide module to module bonding. The Dynobond device attaches to the frame flange of adjacent modules Listed (QIMS), SnapNrack MLPE Frame Attachment Kit model 242-02151 has been investigated to bond approved MLPE device back plates to frames of modules.

Tested MLPE devices include the following:

- NRTL Listed, SolarEdge Optimizer Model P300-5NC4ARS, P320-5NC4ARS, P370-5NC4AFS, or P400-5NC4AFS
  - Enphase R/C (QIKH2)(QIMS2) M250, M215 & C250
  - Enphase - NRTL Listed Microinverter models IQ6-60-2-US, IQIQ7-60-2-US, IQ7-60-B-US
  - Celestica International - Rapid Shutdown Device models DG-006-F001201x and DG-006-F001401x
- The following MLPE devices have been evaluated for attachment to the Flash Track using the SnapNrack MLPE Rail Attachment Kit, and the Flash Track has been evaluated for use with Listed (QIMS) and Unlisted Component (KDER3) grounding lug, SnapNrack part no. 242-92202.

- SMA - Rapid Shutdown Device model RSB-2S-US-10

Additional MLPE devices were evaluated for attachment to the module with the SnapNrack MLPE Frame Attachment Kit model 242-02151 or through the device mounting means. These devices have not been evaluated for bonding, as the enclosures are entirely polymeric:

- Ginlong - Rapid Shutdown Device model Solis-MLRSD-R1-1G and Solis-MLRSD-R2-1G
- Tigo - Monitoring Device models TSR-4-F, TSR-4-M, TSR-4-O, TSR-4-S, TS4-R-M-DUO, TS4-R-O-DUO, TS4-R-S-DUO

When installing the MLPEs per the specifications in the MLPE Installation section of this manual, the system is bonded to the optimizer backing plate.

## **Fire**

RL Universal has been investigated for a Class A System Fire Classification for a Steep-Sloped Roof with Type 1 and Type 2 modules. Because the system was tested at 5 inches above the test roof fixture RL Universal can be installed without any height restrictions due to System Fire Classification. See Appendix A for potential module-specific height restrictions due to module temperature. The Skirt is considered an optional component with respect to Fire Classification, as RL Universal maintains the same Fire Classification Rating both with and without the skirt.

SnapNrack recommends a periodic re-inspection of the completed installation for loose components, loose fasteners, and any corrosion, such that if found, the affected components are to be immediately replaced.

## **Wind-Driven Rain Test**

Only the following components have been evaluated for the Wind-Driven Rain Test per UL Subject 2582:

Comp Flashing, Composition Umbrella Flashing, Flash Track, Umbrella Bolt. Testing was conducted without roofing sealant and without the Umbrella Bolt Gasket

## RL Universal Structural Components



**Umbrella Lag**

SnapNrack Umbrella Lag



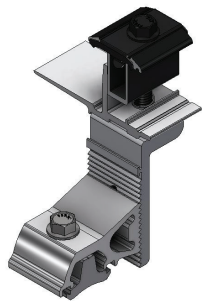
**Composition Flash Track**

SnapNrack Composition Flash Track



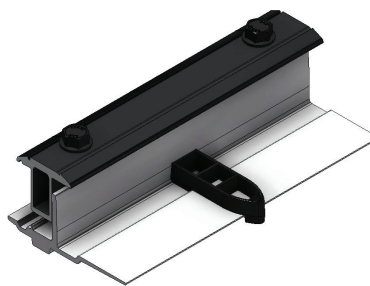
**Composition Flashing**

SnapNrack Composition Flashing



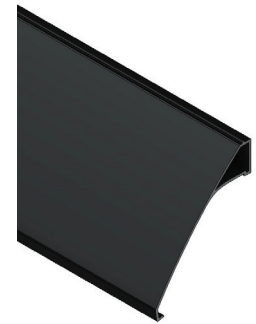
**Mount**

SnapNrack RL Universal Mount assembly including rock in channel nut, Riser, Leveler, Mount clamp, and spring



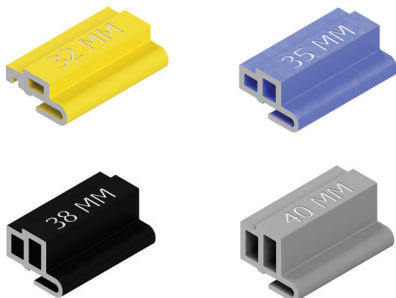
**Link**

SnapNrack RL Universal Link assembly including Link bottom, Link top, Link column spacer, and springs



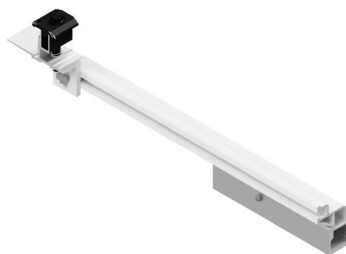
**Skirt**

SnapNrack RL Universal Skirt in single portrait or double landscape lengths



**Skirt Spacers**

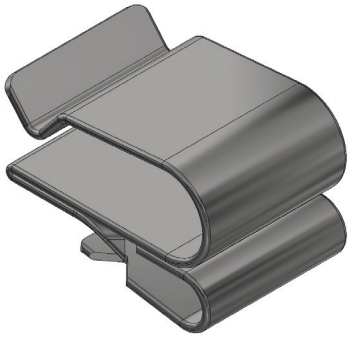
SnapNrack RL Universal Skirt Spacer for 40mm, 38mm, 35mm and 32mm modules (install 30mm modules with skirt and no spacer).



**Ridge Mount**

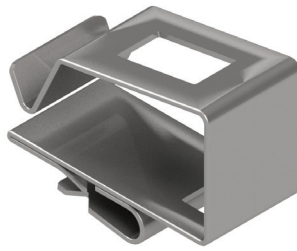
SnapNrack RL Universal Ridge Mount assembly including Ridge Mount Track, Ridge Mount Extension, Leveler, Mount Clamp, and spring

## Wire Managements Components



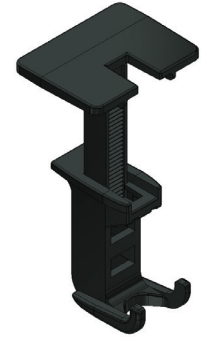
**Smart Clip**

Module frame cable clip, holds two PV wires or Enphase IQ-Cables



**Smart Clip XL**

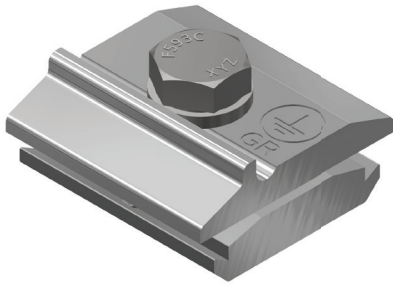
Module frame cable clip, holds six PV wires or four Enphase IQ-Cable



**Wire Saver**

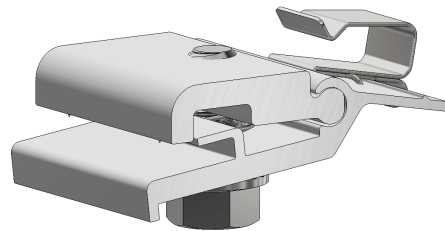
Designed to secure conductors that become loose and hang below the array, holds one conductor

## Grounding/MLPE Components



**Ground Lug R**

Ground Lug R including bonding channel nut, Ground Lug R PRC, bolt, and split lock washer.



**MLPE Frame Attachment Kit**

Attaches MLPEs (Module Level Performance Enhancers) and other related equipment to the module frame.

## Hardware Torque Specifications

The recommended torque to be applied to components for proper assembly and bonding are as follows:

Hardware Description	Torque Specification
RL Universal ½” bolts; System Leveling Bolt, Drop In/Rock In Channel Nut, Mount Top-Down Clamp, Link Top-Down Clamp	12 ft-lb
Ground Lug model 242-92202 to Flash Track, Ridge Mount Track or Module Frame, and Ground Lug model 242-92202 to Grounding Electrode Conductor (6-12 SOL)	8 ft-lb
Ground Lug model 242-02101 to Flash Track (6-12 SOL)	16 ft-lb
MLPE Frame Attachment Kit, MLPE Rail Attachment Kit	10 ft-lb
SolarEdge Frame Mounted Microinverter Bracket to Module Frame	11 ft-lb
Enphase Frame Mounted Microinverter Bracket to Module Frame	13 ft-lb
Ground Lug model SGB-4 to module or Flash Track	75 in-lb
Ground Lug model SGB-4 to module	75 in-lb
Ground Lug model SGB-4 to Grounding Electrode Conductor (4-14 SOL or STR)	35 in-lb
Ground Lug model GBL-4DBT to module	35 in-lb
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (10-14 SOL or STR)	20 in-lb
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (8 SOL or STR)	25 in-lb
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (4-6 SOL or STR)	35 in-lb



## Site Survey

- Measure the roof surfaces and develop an accurate drawing, including any obstacles such as chimneys and roof vents.
- If plans for the roof structure are available, verify that the plans match the final structure.
- Identify any roof access or setback areas as required by the local AHJ.
- Identify any construction issues 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.

## Design Guidance

- PV Designers should account for the 0.75 inch spacing between rows and 1.0 inch spacing between columns of modules when creating the layout.
- Ridge Mounts are required if modules will be installed with the top edge of the modules less than 12 inches from the ridge peak.
- Draw the rafter location on the layout to identify where roof attachments can be installed.
- Determine site conditions for calculating the engineering values, confirm site conditions and code versions comply with local AHJ requirements.
- Reference site conditions and system specifications in RL Universal Structural Engineering Report to determine maximum attachment spacing and cantilever values
- Draw roof attachment locations on layout based on maximum attachment spacing and cantilever values

### Design Recommendation:

Four roof attachments per module are recommended for at least one module per row to provide rigidity in the array.

- Staggering rows of attachments on alternating rafters is acceptable, and may provide more evenly distributed loads on the roof structure.
- Identify homerun and Junction Box locations based on roof top wiring requirements.
- Mark distance from array edge to identifiable roof feature in x and y axes.
- Mark distance from array edge to identifiable roof feature in x and y axes.
- Insert SnapNrack installation details into design plan set specific to the project requirements.

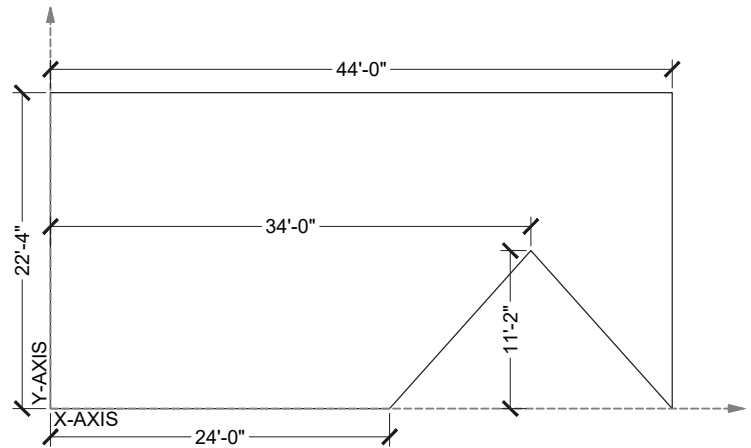
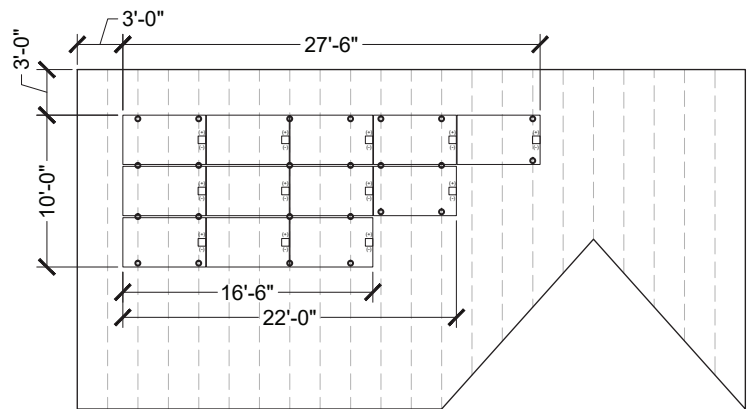


Image note: X-Axis described in this manual is cross-slope on the roof, Y-Axis is in line with the roof slope.



### Safety Guidance

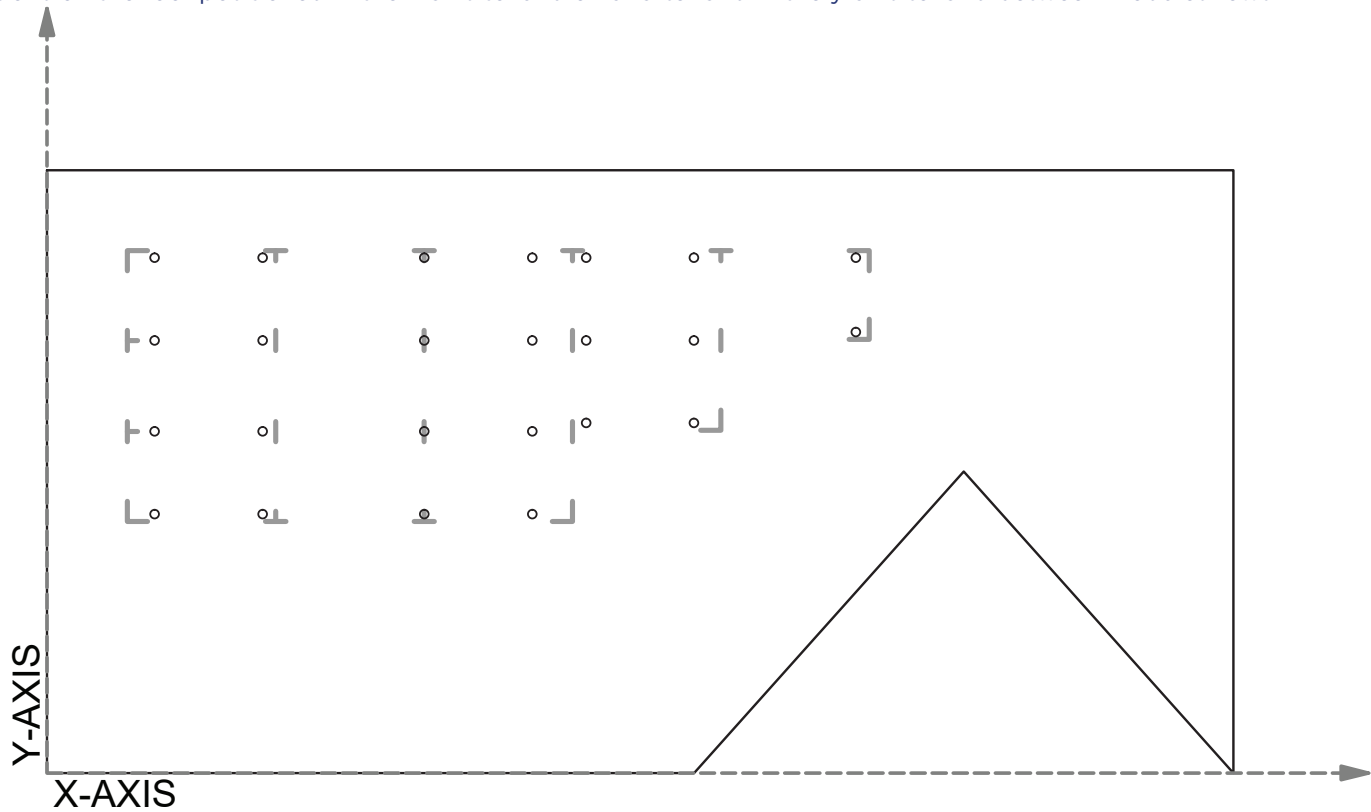
- Always wear appropriate OSHA approved safety equipment when at active construction site.
- Appropriate fall protection or prevention gear should be used. Always use extreme caution when near the edge of a roof.
- Use appropriate ladder safety equipment when accessing the roof from ground level.
- Safety equipment should be checked periodically for wear and quality issues.
- Always wear proper eye protection when required.


## Required Tools

- Roof Marking Crayon or Chalk
- Tape Measure
- Prybar

## LAYOUT INSTRUCTIONS

1) Transfer the layout to the roof using marking crayon or chalk and identify the outside corners of the array. Draw attachment locations on the roof positioned in the x-axis to land on a rafter and in the y-axis to land between modules rows.



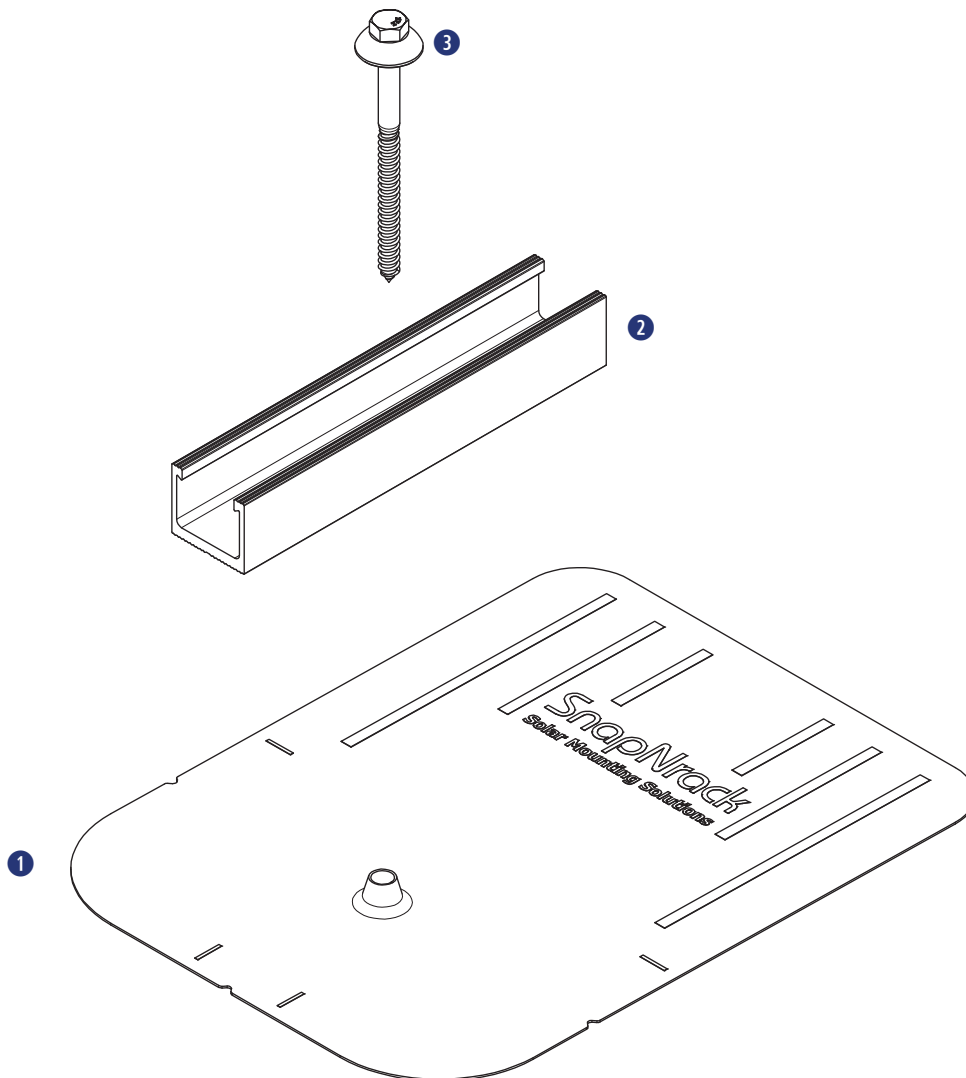
 **Layout Note:** Ensure the final roof attachment locations do not exceed the maximum attachment spacing and cantilever specified in the design plan

## Required Tools

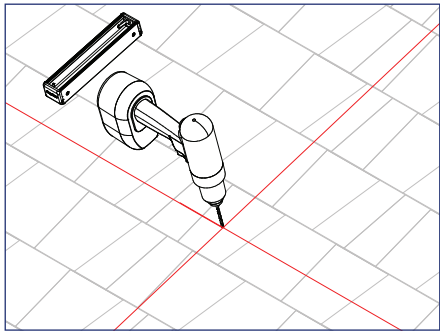
- Hammer or Stud Finder
- Roof Marking Crayon or Chalk
- Drill with 3/16" Drill Bit
- Roof Sealant
- Socket Wrench
- Torque Wrench
- 1/2" Socket

## Materials Included

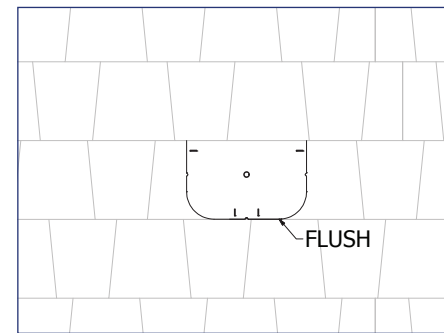
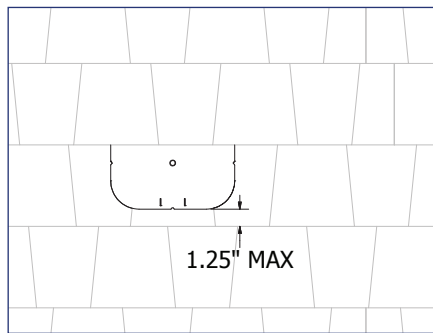
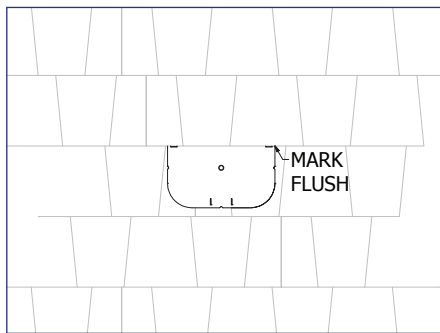
- 1 (1) SnapNrack Composition Flashing
- 2 (1) SnapNrack Flash Track
- 3 (1) SnapNrack 5/16" SS Umbrella Lag Screw



## INSTALLATION INSTRUCTIONS



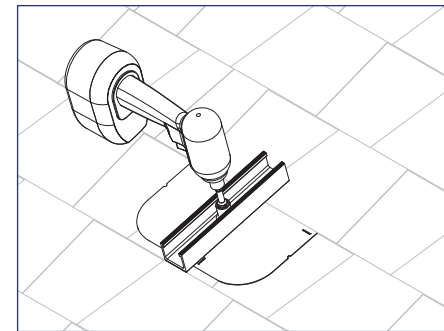
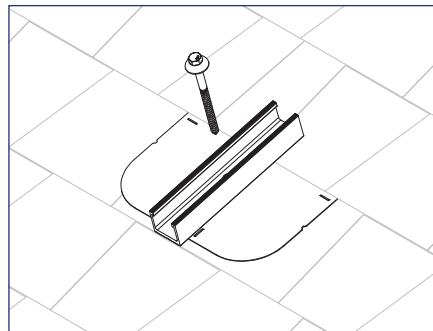
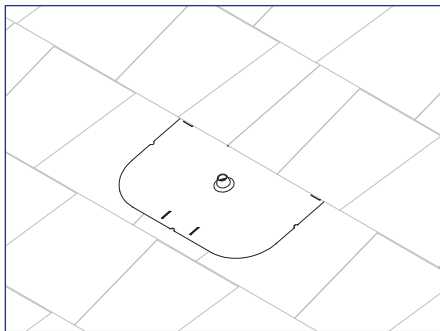
1) Using a Flash Track as a template, drill a pilot hole into the rafter with 3/16" drill bit.



### Install Note:

Composition Flashings should be installed in the nominal position; Marks on flashing edge flush with overlapping composition leading edge. It is acceptable to install the flashing with leading edge of flashing 1-1/4" above the leading edge of first course of composition, or flush with the leading edge of the first course of composition.

2) Apply roofing manufacturer's approved sealant to lag screw, apply sealant in a circle around pilot hole and fill pilot hole with sealant.



3) Install flashing underneath shingle course directly above pilot hole, align hole in flashing with pilot hole.

4) Place Flash Track over hole in flashing, drive Umbrella Lag through hole in Flash Track, flashing, and into pilot hole for minimum 2.5" embedment in rafter

### Install Note:

Ensure flashing extends minimum (2) courses above base.

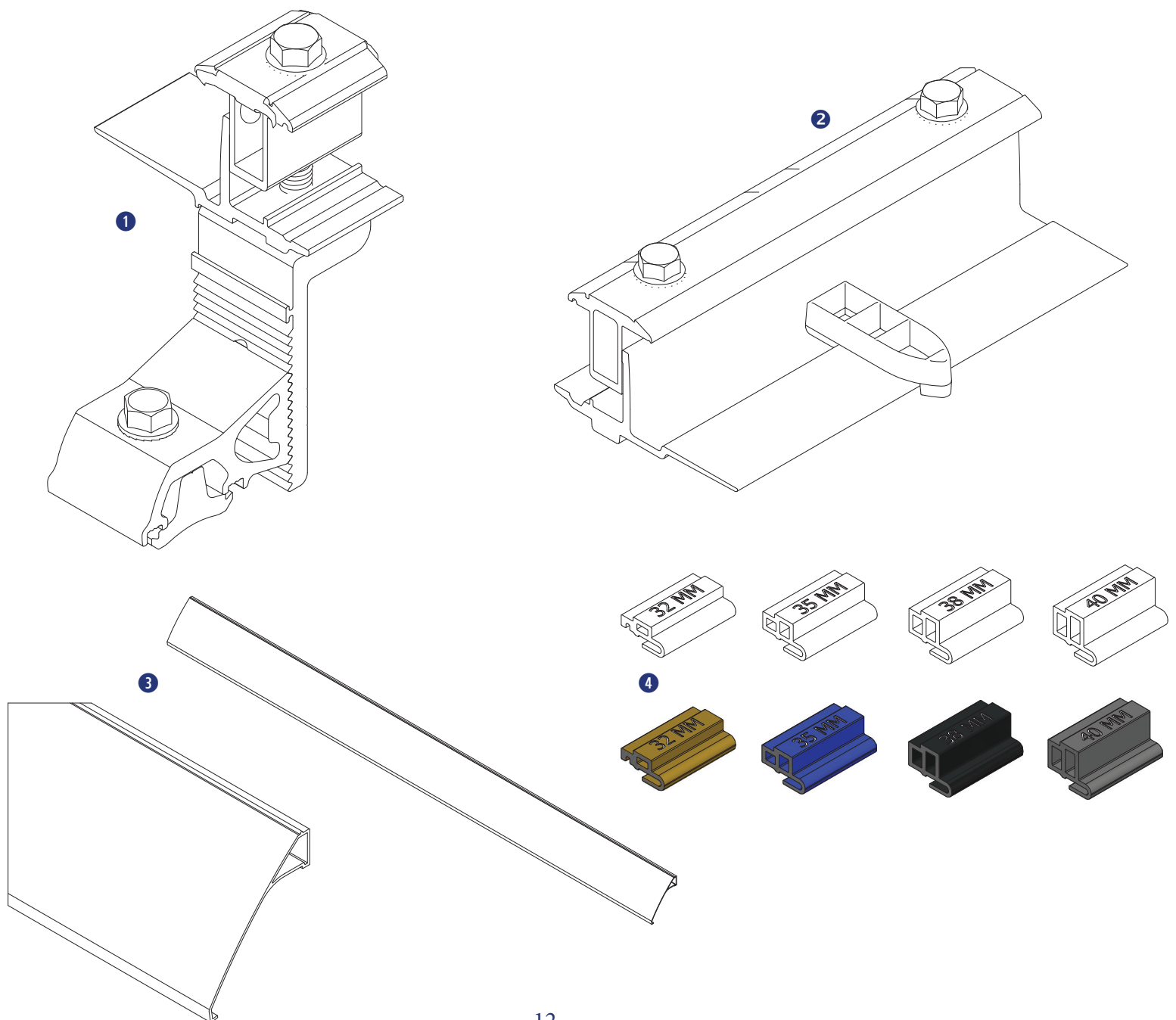
Best Practice: Apply a U-shape of sealant on top portion of flashing underside.

## Required Tools

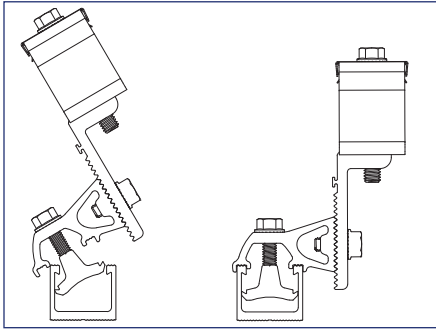
- Socket Wrench
- Torque Wrench
- 1/2" Socket
- String Line

## Materials Included - RL Universal Mount

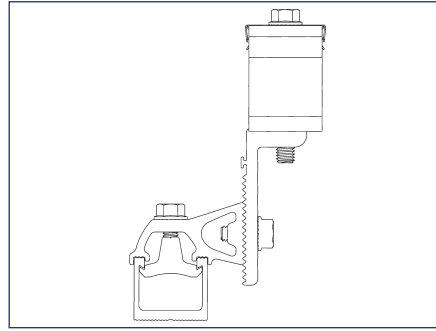
- ① (1) RL Universal Mount
- ② (1) RL Universal Link
- ③ (1) RL Universal Skirt
- ④ (1) RL Universal Skirt Spacers



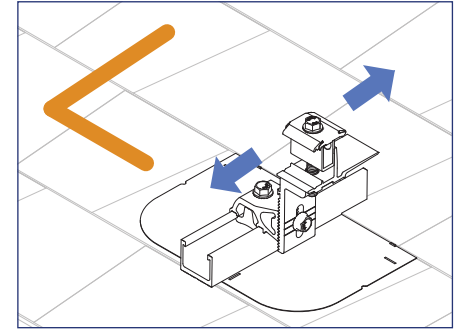
## INSTALLATION INSTRUCTIONS



1) Install the front row of Mounts by rocking the channel nut on bottom of RL Universal Mount into Flash Track.



2) Partially tighten Riser bolt to seat the channel nut into the Flash Track.

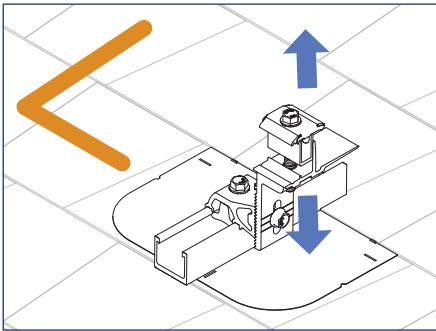


3) Slide the bottom two corner Mounts up or down in the Flash Track until aligned with the bottom edge of array as marked on the roof, then tighten the Riser bolt.

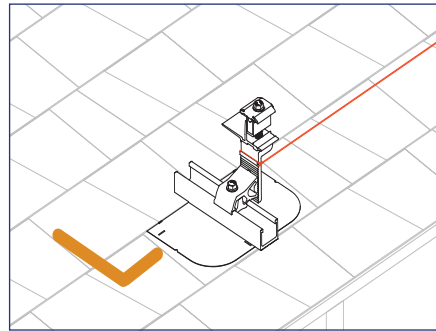


### Install Note:

Mounts can be installed on either the left or right side of the Flash Track to avoid any interference with Links



4) To set the RL Universal Mount level loosen the Leveler bolt and move the Leveler up or down, then tighten the Leveler bolt and torque to 12 ft-lb.

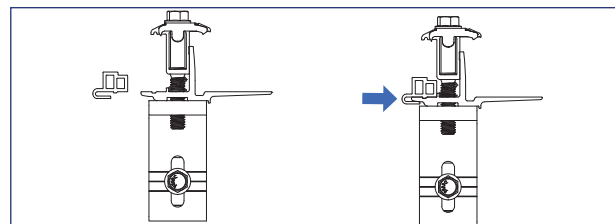
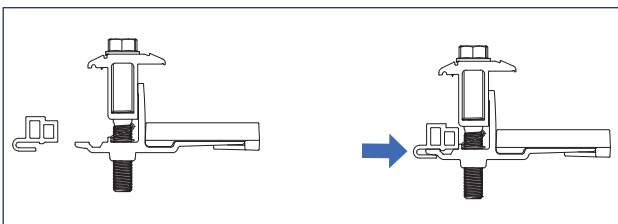


5) Run string line along bottom row to align and level RL Universal Mounts between the corner mounts



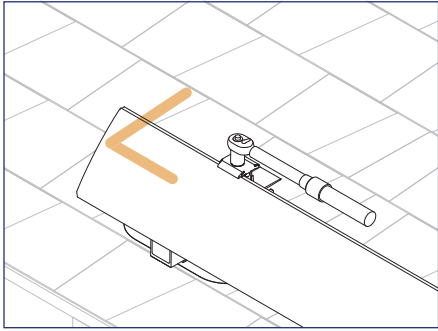
### Install Note:

Use the string line catch and alignment feature on Mounts to hold the string line in place to level and align the Mounts

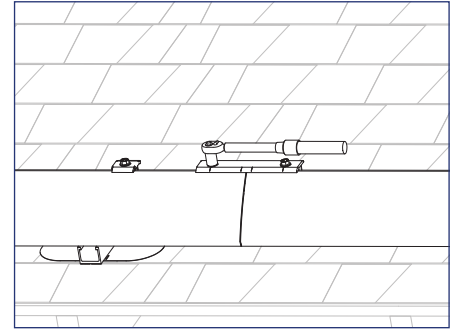
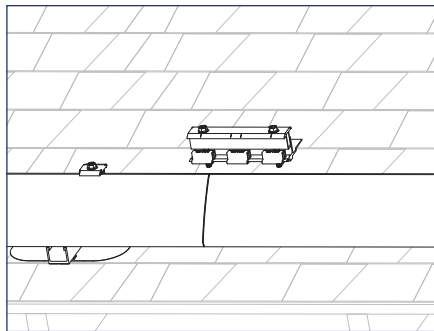


6) RL Universal Spacers will need to be added to Mounts and Links where Skirt will be installed

## INSTALLATION INSTRUCTIONS



7) Install RL Universal Skirt by holding the skirt in Mount, sliding Skirt to align with array layout marks, and clamping skirt into mount



8) Use RL Universal Links to connect multiple lengths of Array Skirt

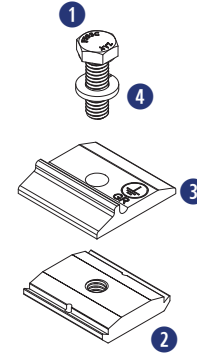
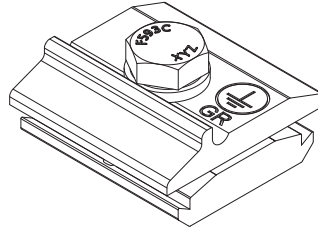
## Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket
- Electrician Tools

## Materials Included

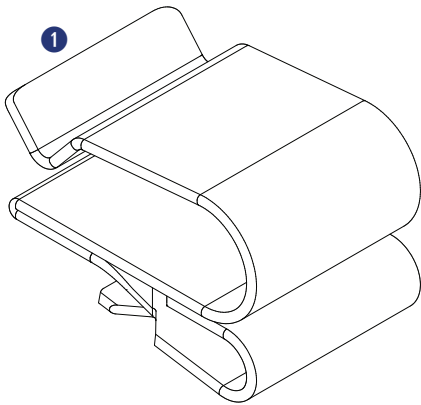
### SnapNrack Ground Lug R (242-92101)

- ① (1) Bolt, Hex Cap, 5/16" - 18" X 1", SS
- ② (1) SnapNrack Bonding Channel Nut
- ③ (1) SnapNrack Ground Lug R PRC
- ④ (1) 5/16" SS Split Lock Washer

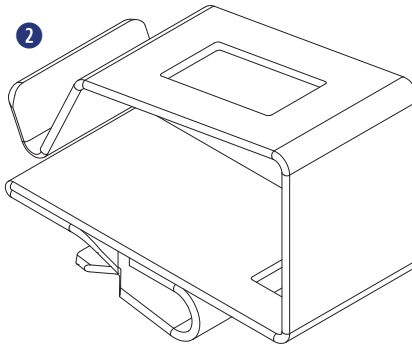


## Smart Clips

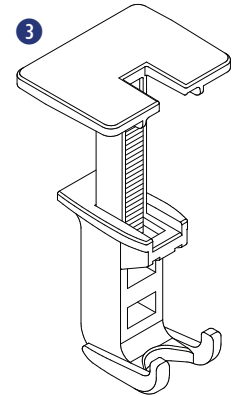
- ① (1) Smart Clip ((2) PV Wire, (1) Enphase IQ Cable)
- ② (1) Smart Clip XL ((6) PV Wire, (4) Enphase IQ)
- ③ (1) Wire Saver ((1) PV Wire)



Smart Clip



Smart Clip XL

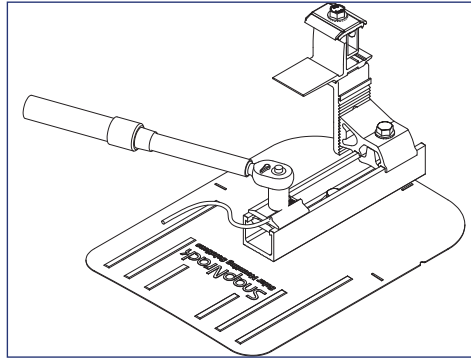
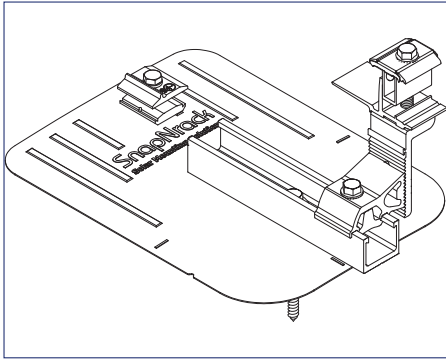


Wire Saver



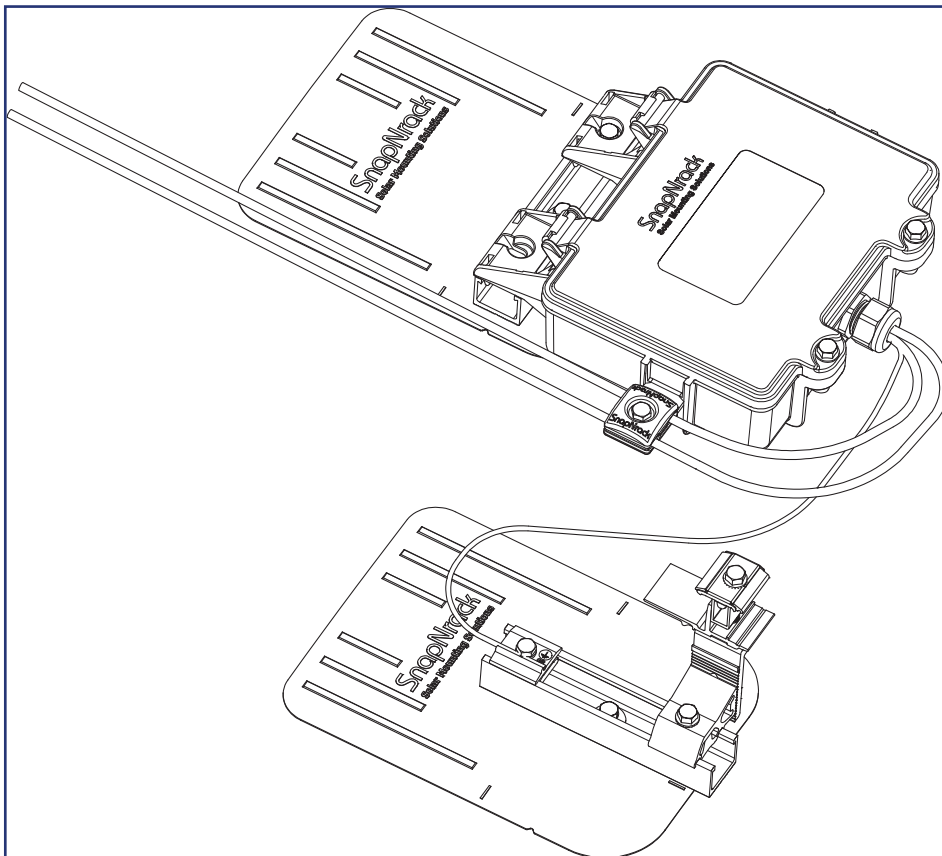
## INSTALLATION INSTRUCTIONS - RL GROUND LUG

The RL Ground Lug to be used in accordance with the National Electric Code, ANSI/NFPA 70.



1) Ground Lug R can be attached to any Flash Track near the Junction Box. Insert Ground Lug R into Flash Track

2) Run 10 - 6 AWG, solid, bare copper GEC into Ground Lug R channel, torque clamping bolt to 16 ft-lb

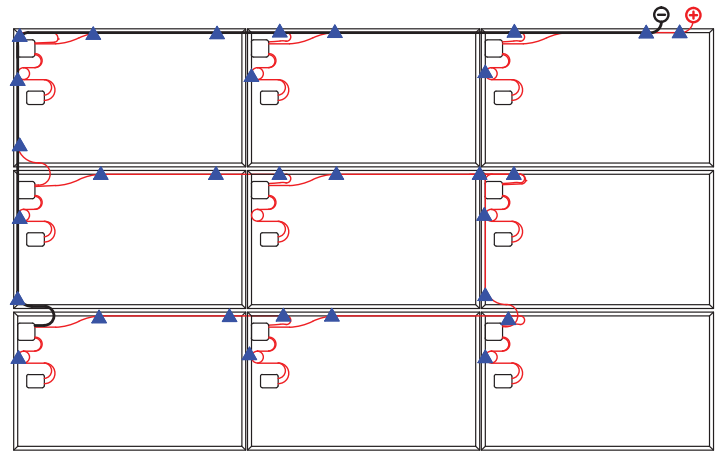
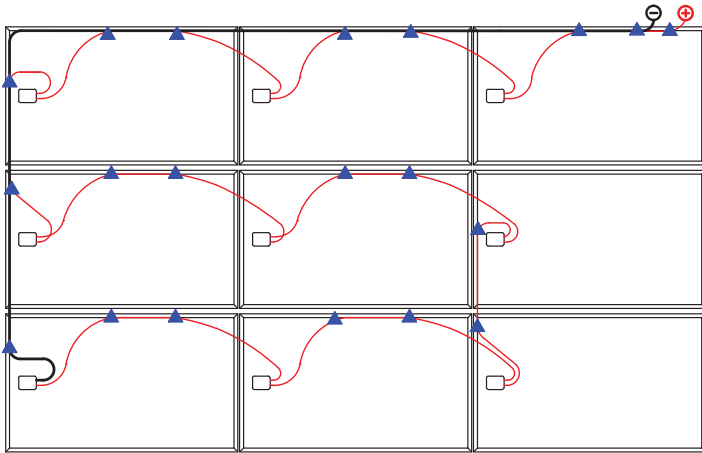


3) Run bare, solid EGC from Ground Lug R to Junction Box, bond bare EGC to stranded EGC in Junction Box. For details on installing the Junction Box reference the **RL Universal Junction Box Installation Manual**.

## INSTALLATION INSTRUCTIONS - SMART CLIPS

Route all conductors away from A Mounts and B Mount Bases and Flashings. SmartClips should be used to keep conductors routed away from non-bonded components.

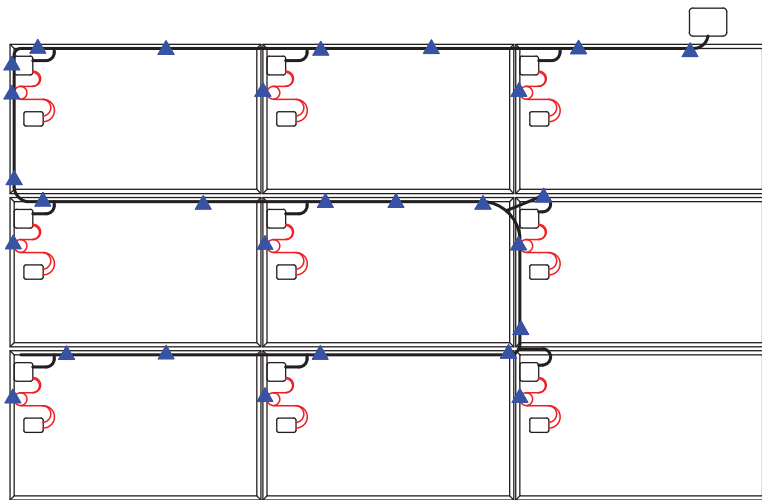
- ▲ SMART CLIP
- HOME-RUN/TRUNK CABLE
- PV CONDUCTORS



1A) For central inverter and DC to DC MLPE systems: Identify where PV string poles are located, use SnapNrack Smart Clips to manage conductors in route from far pole to the Junction Box

### Install Note:

Use Smart Clips to manage PV module leads connected to the MLPE



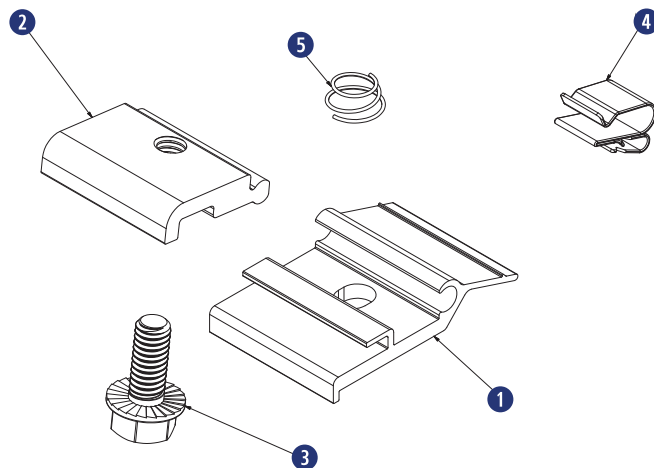
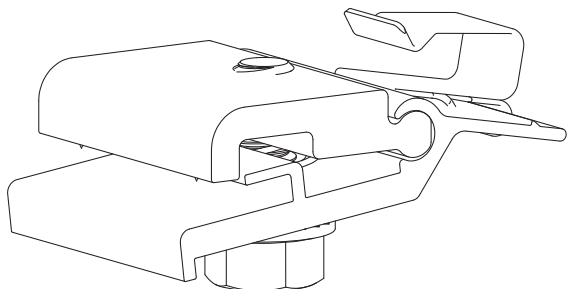
1B) For microinverter systems: Identify route from furthest microinverter to Junction Box, use Smart Clips to manage AC trunk cables and multiple PV wires.

## Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket

## Materials Included - MLPE Rail Attachment Kit

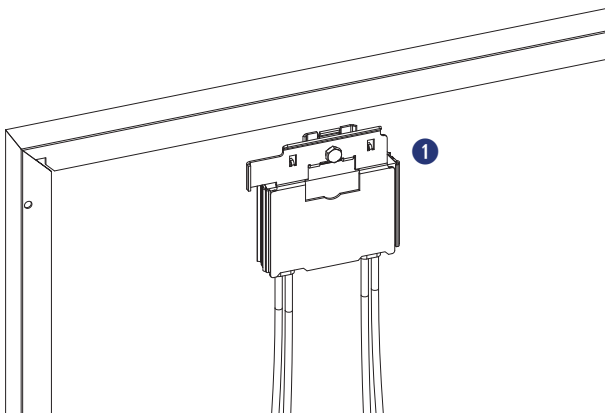
- ① (1) SnapNrack MLPE Frame Attachment Top
- ② (1) SnapNrack MLPE Frame Attachment Bottom
- ③ (1) 5/16"-18 X 3/4" Serrated Flange Bolt SS
- ④ (1) SnapNrack Smart Clip
- ⑤ (1) SnapNrack MLPE Frame Attachment Coil Spring SS



## Materials Included

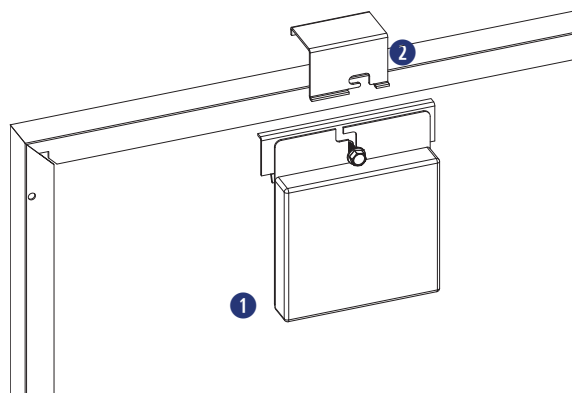
### SolarEdge Frame Mount

- ① (1) SolarEdge Optimizer w/ Frame-Mounted Module Add-On



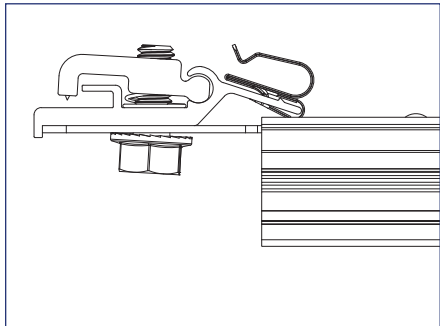
### Enphase Frame Mount

- ① (1) Enphase Microinverter
- ② (1) Enphase Frame Mount

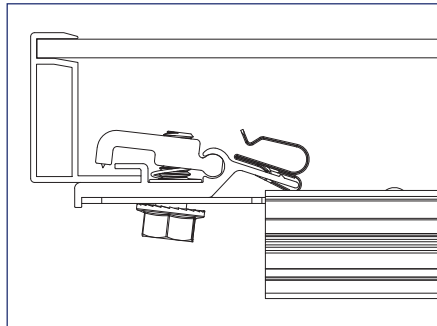


## INSTALLATION INSTRUCTIONS - SNAPRACK MLPE FRAME ATTACHMENT KIT

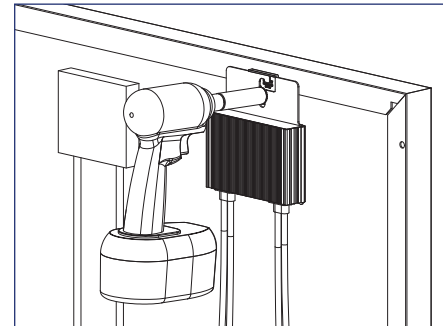
SnapNrack MLPE Frame Attachment kit are used to attach module level performance enhancing devices, and other devices such as an SRD (rapid shutdown device), directly to module frames, and provide integrated grounding/bonding for Devices grounded through metal back plate. (Refer to the list of tested MLPE devices on page 4 of this manual)



1) Slide the backplate channel of the MLPE device under the MLPE Frame Attachment Kit bolt. The MLPE mounting plate should rest against the MLPE mounting plate backstop on the MLPE Frame Attachment Kit



2) Position the MLPE Frame Attachment Kit on the module frame flange in a location that will not interfere with mounting system components. The module frame flange should rest against the module flange backstop on the MLPE Frame Attachment Kit.



3) Tighten the mounting bolt on the MLPE Frame Attachment Kit to 10 lb-ft (120 lb-in).



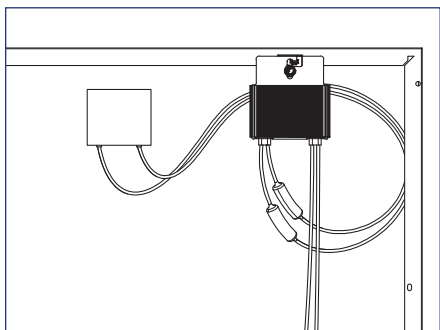
### Install Note:

The MLPE Frame Attachment Kit bonds the following components:  
Module Frame, MLPE backplate and Smart Clip.



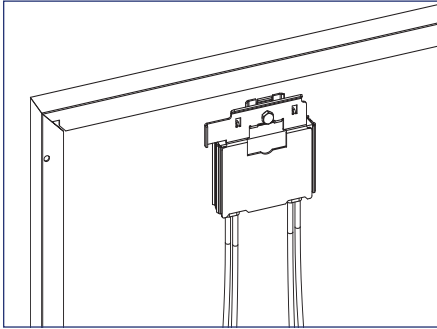
### Install Note:

Avoid blocking module frame drainage holes when installing the MLPE Frame Attachment Kit.

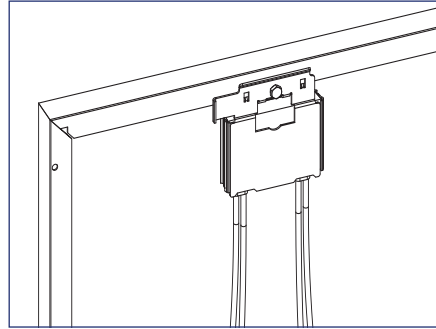


4) Connect the module leads to the input connectors on the MLPE device and manage conductors with the integrated Smart Clip.

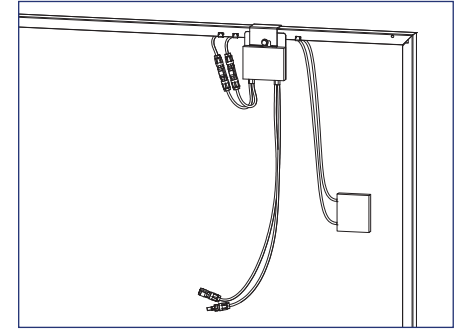
## INSTALLATION INSTRUCTIONS - SOLAREGE FRAME MOUNT



1) Locate the SolarEdge optimizer with Frame-Mounted Module Add-On at a location on the module frame that will not interfere with the RL Universal Mounts.



2) Install the optimizer mounting plate onto the module frame and tighten hardware to 11 ft-lbs.



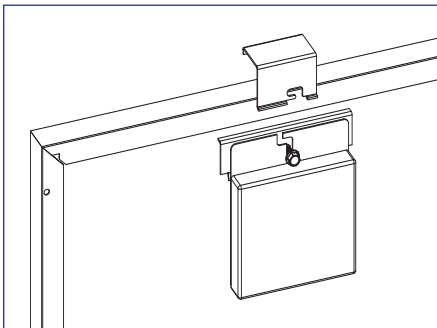
3) Connect the module leads to the input connectors on the optimizer and manage conductors with SnapNrack Smart Clips.



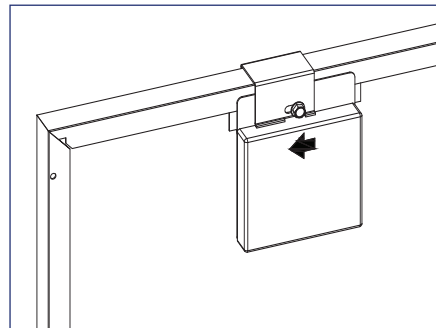
### Install Note:

If module is mounted in portrait, install MLPE on long side, short side for landscape.

## INSTALLATION INSTRUCTIONS - ENPHASE FRAME MOUNT



1) Locate the Enphase Frame Mount bracket clamp at a location on the module frame that will not interfere with the RL Universal Mounts.

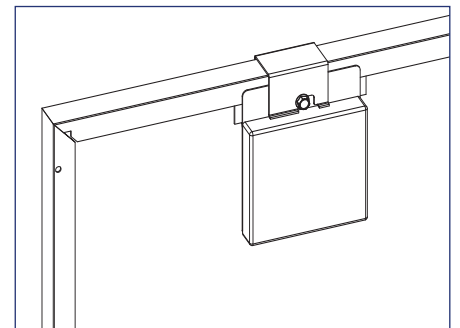


2) Slide the microinverter unit onto the bracket clamp, then move it slightly to the left.



### Install Note:

The microinverter mounting flange should be on the outside of the module frame.



3) Tighten the hardware to 13 ft-lbs

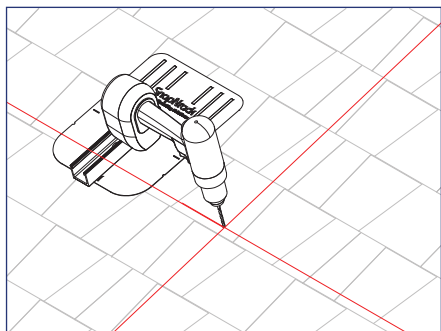
4) Connect module leads to microinverter DC connectors.



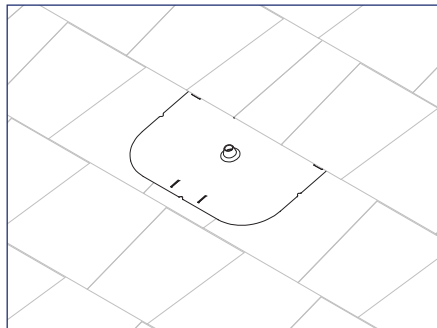
### Install Note:

Refer to the Enphase Frame Mount installation guide for additional instructions.

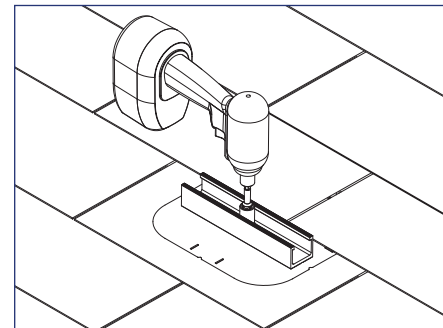
## INSTALLATION INSTRUCTIONS - DECK MOUNTED MLPE & RSD



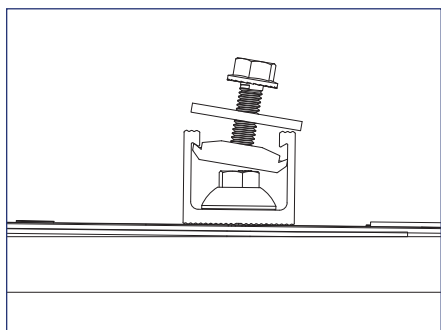
1) Drill pilot hole into decking with 3/16" drill bit, and apply roofing manufacturer's approved sealant to lag screw, in a circle around pilot hole, and fill pilot hole with sealant



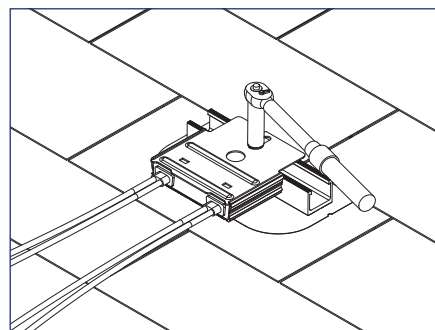
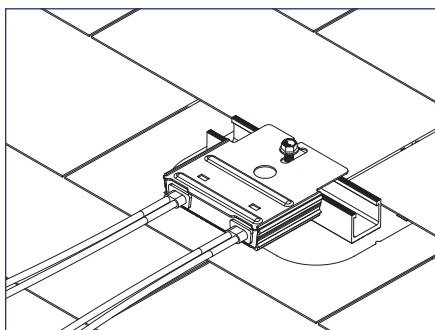
2) Install flashing underneath shingle course directly above pilot hole aligning hole in flashing with pilot hole.



3) Place Flash Track over hole in flashing parallel with composition course, drive Umbrella Lag through hole in Flash Track, flashing, and into pilot hole



4) Insert channel nut of MLPE Attachment Kit into Flashtrack, insert back plate of device over the large fender washer, and tighten bolt to 10-16 ft-lb

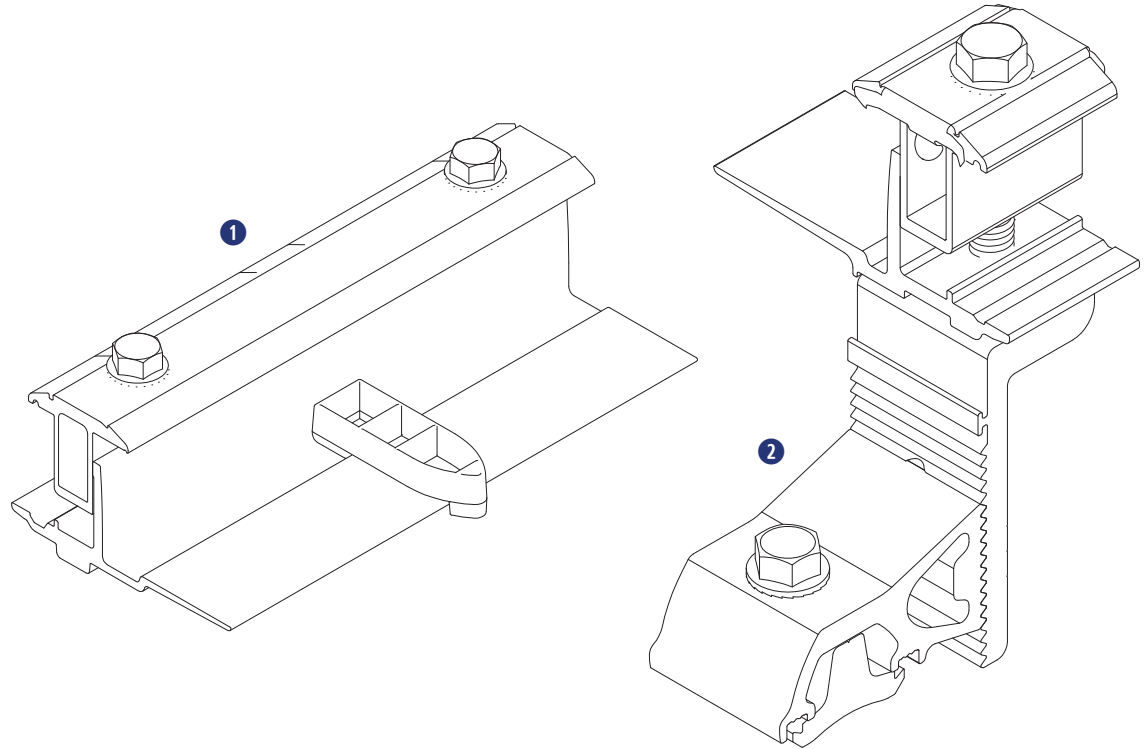


## Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket

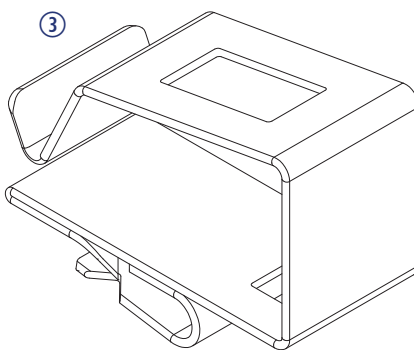
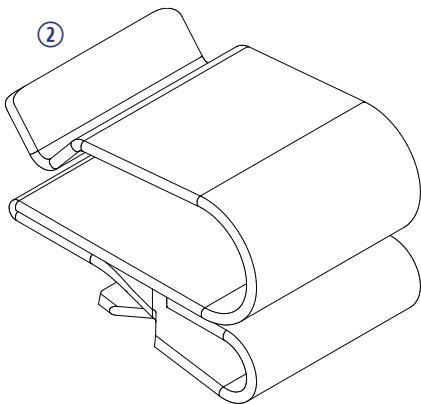
## Materials Included

- ① SnapNrack RL Universal Link
- ② RL Universal Mount

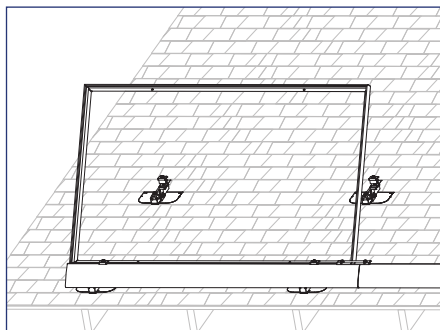


## Other Materials Required

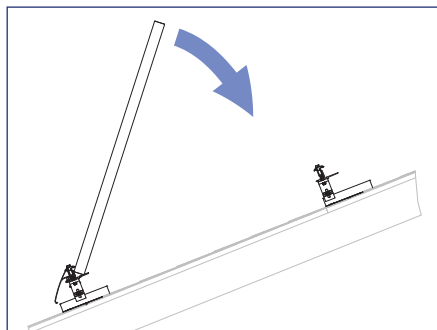
- ② SnapNrack Smart Clip (2-5 per module)
- ③ SnapNrack Smart Clip XL (10-20 per array)  
*See Wire Management section for details*



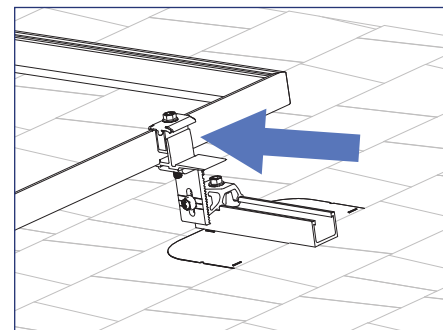
## INSTALLATION INSTRUCTIONS - BOTTOM ROW



1) Rest downslope edge of module on the Mounts and/or Links position module so side edge is flush with marked edge of array layout



2) Lower upslope edge of module while simultaneously applying slight pressure to seat module into Mounts and/or Links

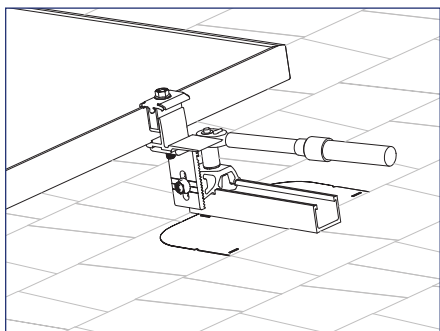


3) When module is level with roof slide Mount down the Flash Track and engage Mount clamp on upslope edge of module

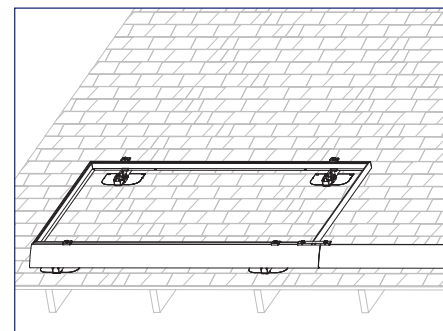
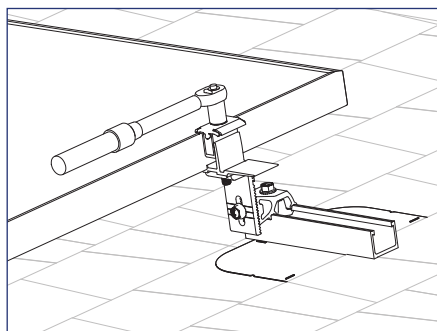
### Install Note:

Secure module leads to module frame to allow access to connectors while subsequent modules are installed

Secure MLPE device to module frame with attachment mount and connect dual module leads to MLPE

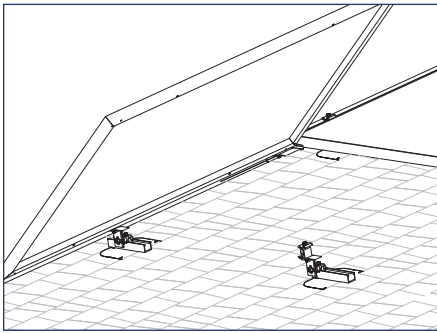


4) With the Mount fully engaged on the module frame first tighten channel nut bolt, then tighten Mount clamp bolt

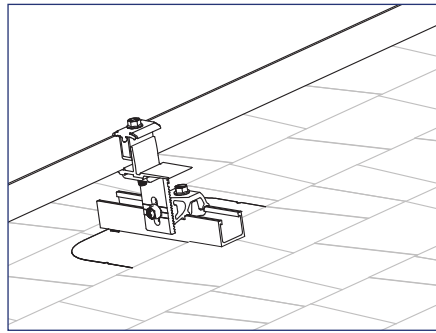




## INSTALLATION INSTRUCTIONS - BOTTOM ROW



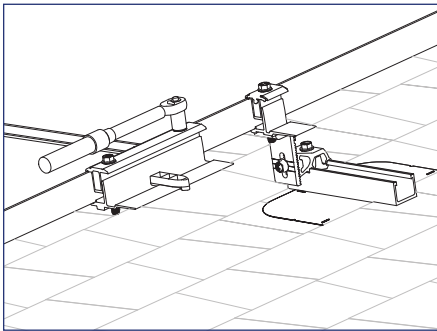
5) Install next module in row by placing downslope edge of module onto Links and Mounts then lower upslope edge of module until level with roof



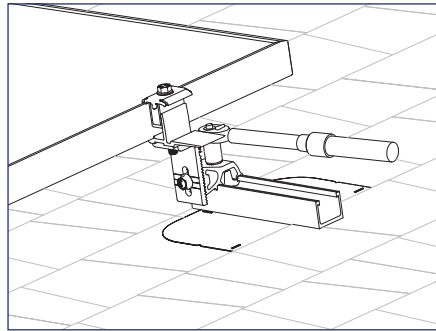
6) Slide Mount down the Flash Track and position the Mount to support the Module

### Install Note:

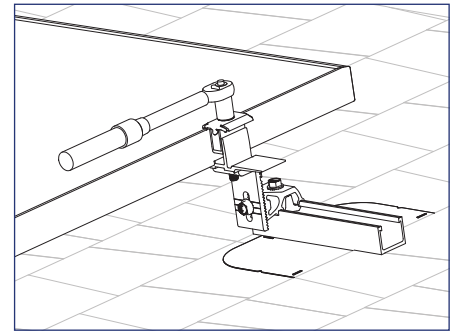
Push modules together so they are tight against the Link module spacer



7) Attach Link to upslope side of modules tighten clamp bolts to engage both modules.

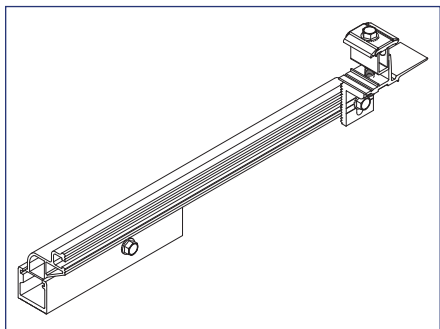


8) Engage Mounts on the module frame and tighten channel nut bolt, then tighten Mount clamp bolt.

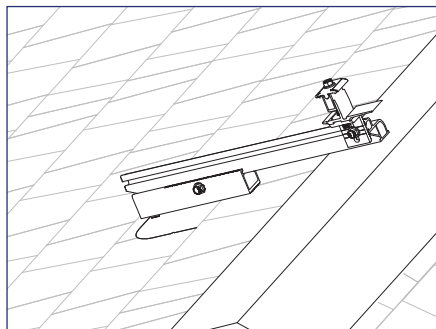


9) Repeat steps 5-7 for additional rows of modules in array

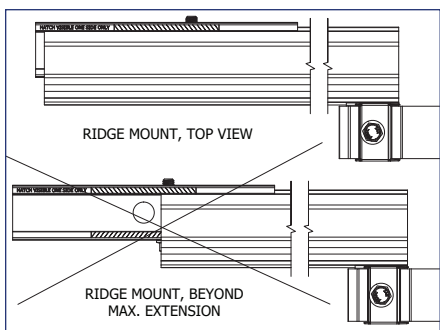
## INSTALLATION INSTRUCTIONS - RIDGE MOUNT



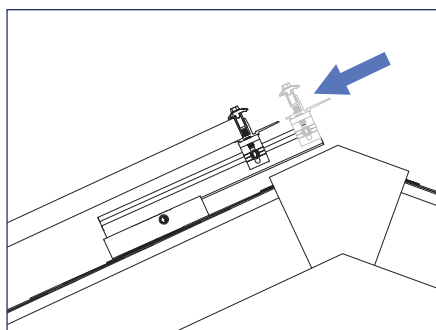
1) Attach Ridge Mount Track with minimum 2-1/2" of embedment in to structural member and minimum 5" from Ridge to end of Composition Flashing



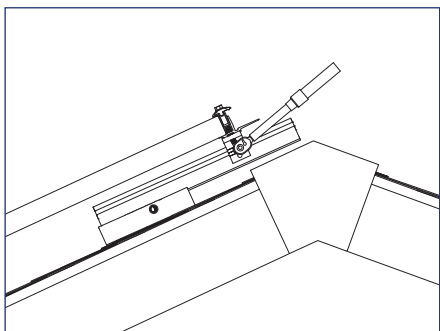
2) Slid Ridge Mount Extension into Ridge Mount Track and hand tighten Extension bolt



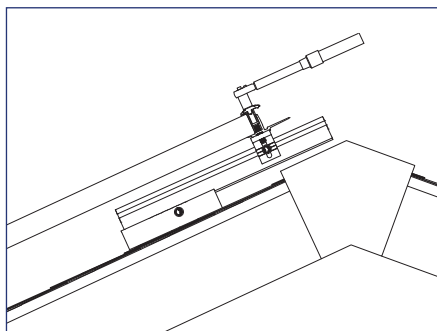
3) Align up-slope end of Ridge Mount Extension with allay layout as drawn on roof, positioning Extension so that hatched pattern is visible on one side only



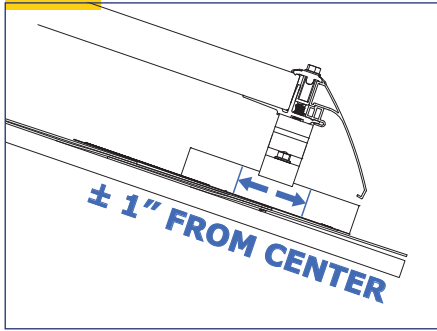
4) As the module is lowered into place slide Leveler and clamp assembly down Extension to engage module frame.



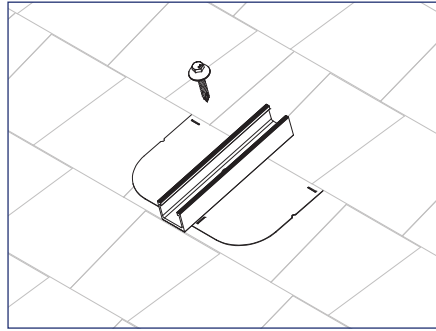
5) With Module Clamp seated on module frame, first tighten the Leveler bolt then tighten the clamping bolt.



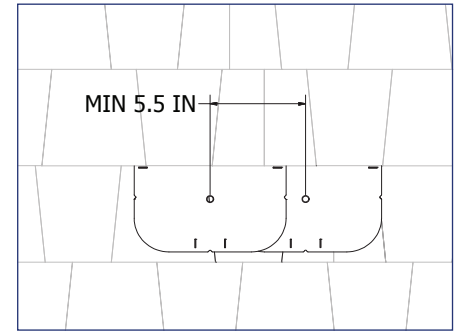
## INSTALLATION INSTRUCTIONS



1) Before attaching Cantilever Deck Mount to roof decking Align Flash Track with module so Mounts will be approximately centered on the Flash Track when clamped or sleeved to the module. A one inch (1") variance up or down the Flash Track from center is acceptable.

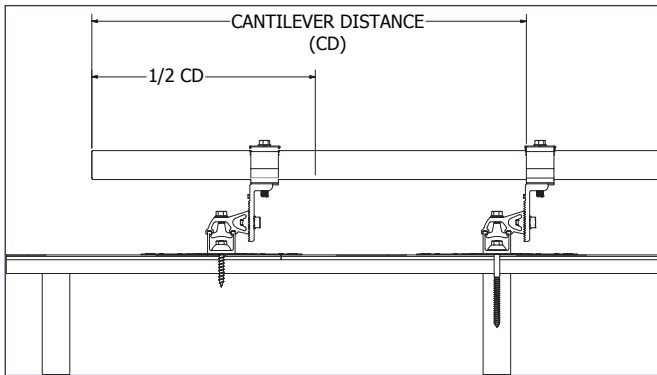


2) Attach flashing and Flash Track to roof decking using a 5/16" x 2" lag screw. If loading conditions require two columns of Cantilever Deck Mounts, it is acceptable to overlap the flashings with a minimum 5-1/2" between holes.

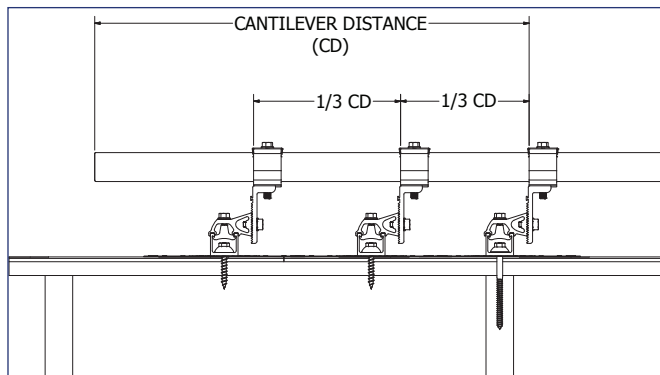


### Install Note:

If roofing is residential composition, use 5/16" x 2-1/2" lag screws.



3) For a single column of Cantilever Deck Mounts attach Mount between center of cantilever and end of module making sure distance from mount to end of module is less than maximum allowable cantilever.



4) With two columns of Cantilever Deck Mounts attach Mounts at approximately 1/3 intervals making sure distance from outside Mount to end of module is less than maximum allowable cantilever.

## GROUND PATH DETAILS

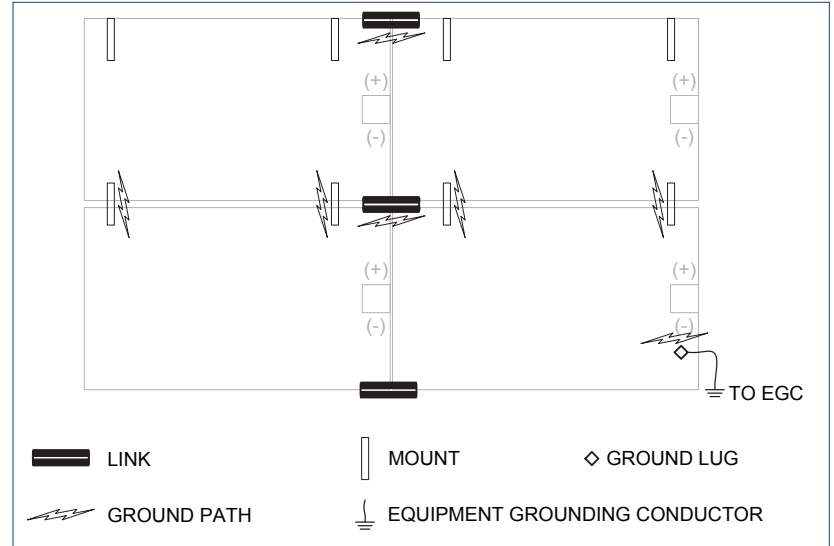
All RL Universal components in the fault current ground path have been Certified to be used multiple times for grounding/bonding. The UL 2703 Listing does not specify a maximum number of uses for the Mount, Link, or Ground Lug. Review the requirements of the National Electrical Code (NEC) Article 250 to select the appropriate Equipment Grounding Conductor size based on the short-circuit current of the PV system

When using Ground Lug R the following components are part of the fault current ground path:

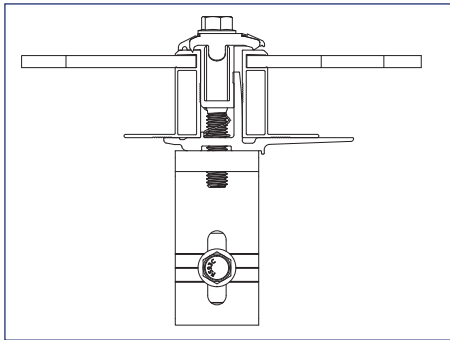
- SnapNrack, Flash Track
- SnapNrack, Mount Assembly
- SnapNrack, Ridge Mount Assembly
- SnapNrack, Link
- SnapNrack, Skirt

## Grounding Specifications

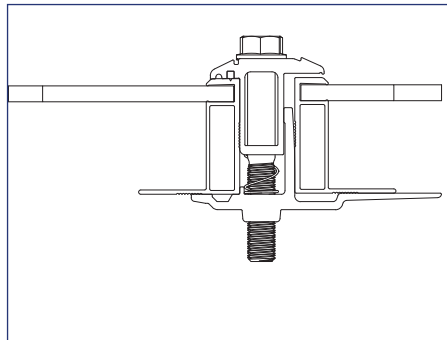
### GROUND PATH DETAILS



## GROUNDING METHOD DETAILS



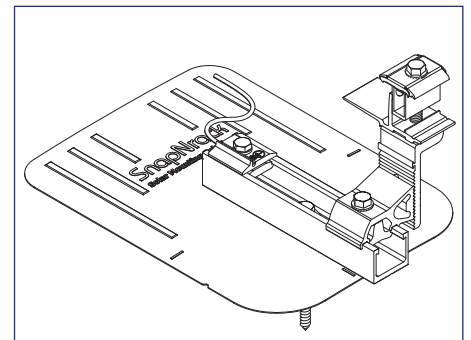
1) Row to row module bonding provided by bonding clip in Mount assembly



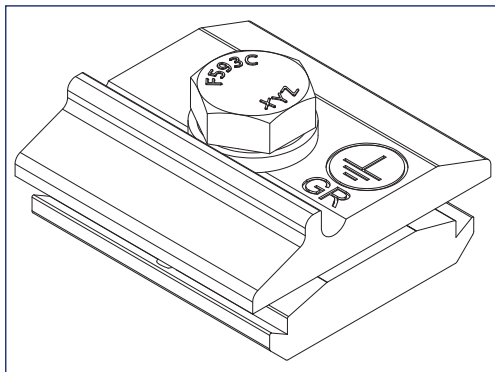
2) Column to column bonding provided by bonding clamp in Link assembly.

Module heights evaluated for bonding with Link Bonding Clamps:

- 40 mm (Canadian, LG, Longi)
- 38 mm (REC)
- 35 mm, (Longi, Canadian)
- 32 mm, (Hanwha)



3) Each continuous array is connected to Equipment Grounding Conductor through Ground Lug R installed on one Flash Track per array



## GROUNDING MARKING DETAILS

The Ground Lug R is marked with the ground symbol.

## APPROVED MODULE INFORMATION

The following modules have completed the UL 2703 Listing process for bonding and fire classification and have been approved for use with the RL Universal mounting system by the module manufacturer. Module manufacturer approval letters can be found at [www.snapnrack.com](http://www.snapnrack.com).

RL Universal has been evaluated for Bonding of the following UL/NRTL Listed PV modules to UL 2703 requirements:

Canadian Solar - CS6K-XXX-M where XXX is 240 to 305; CS6K-XXX-M-SD where XXX is 240 to 305; CS6K-XXX-P where XXX is 220 to 285; CS6K-XXX-P-SD where 220 to 285; CS6K-XXX-MS where XXX is 240 to 305; CS3K-XXX-P where XXX is 250 to 310; CS3K-XXX-MS where XXX is 280 to 330; CS1K-XXX-MS where XXX is 285 to 345.

Hanwha Q-Cells - Q.PEAK DUO-G5-XXX, Q.PEAK DUO BLK-5-XXX and Q.PLUS DUO-G5-XXX where XXX is 290 to 360; Q.PEAK DUO-G7-XXX, Q.PEAK DUO-G7.2-XXX where XXX is 310 to 350; Q.PEAK DUO-BLK-G7-XXX where XXX is 290 to 350; Q.PEAK DUO-G6-XXX, Q.PEAK DUO-G6+-XXX where XXX is 320 to 360; Q.PEAK DUO-BLK-G6-XXX, Q.PEAK DUO-BLK-G6+-XXX where XXX is 310 to 350; Q.PEAK DUO-G8-XXX, Q.PEAK DUO-BLK-G8-XXX, Q.PEAK DUO-G8+-XXX, Q.PEAK DUO-BLK-G8+-XXX where XXX is 290 to 360

LG - Models LGXXXS1C-G4 where XXX is 250 to 300; LGXXXN1K-G4 where XXX is 280 to 300; LGxxxN1C-G4 where XXX is 280 to 340; LGXXXN2C-G4, LGXXXN2W-G4, where XXX is 360 to 395; LGXXXN2K-G4, where XXX is 360 to 385; LGXXX-S2C-G4, LGXXXS2W-G4, where XXX is 300 to 360; LGXXXS1C-A5 where XXX is 280 to 320; LGXXXN1C-A5 where XXX is 320 to 345; LGXXXN1K-A5 where XXX is 310 to 335; LGXXXQ1C-A5 where XXX is 340 to 385; LGXXXQ1K-A5 where XXX is 315 to 375; LGXXXN1C-V5 where XXX is 320 to 350; LGXXXN1K-V5 where XXX is 320 to 340; LGXXXQ1C-V5 where XXX is 340 to 375; LGXXXQ1K where XXX is 350 to 365.

Longi Green Energy Technology Co., Ltd. - LR6-60-XXXM, LR6-60BK-XXXM, LR6-60HV-XXXM, where XXX is 270 to 300; LR6-60PB-XXXM, LR6-60PE-XXXM, LR6-60PH-XXXM, where XXX is 280 to 320.

REC Group - RECXXTP2 and RECXXTP2-BLK Series where XXX is 260 to 300; RECXXTP2M, where XXX is 300 to 315.

Silfab - Models SLAXXX-M where XXX is 280 to 320; SLAXXX-P where XXX is 250 to 275; SSAXXX-M where XXX is 280 to 300; SSAXXX-P where XXX is 250 to 275.

