



SnapNrack™

Solar Mounting Solutions

TopSpeed® Mounting System

Installation Manual

snapnrack.com

An Intro to SnapNrack TopSpeed® with SpeedSeal™ and SpeedSeal+™ Technologies

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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 TopSpeed mounting system.

Note on Modules and other 3rd Party products used with SnapNrack: Review module and any 3rd party manufacturer's documentation for compatability and compliance with warranty terms and conditions

SnapNrack has created a ground breaking system combining great features and benefits we are known for, with our TopSpeed 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 TopSpeed including integrated fasteners and SpeedSeal / SpeedSeal+ Technology.

Advantages of Installing the SnapNrack TopSpeed System

Modules are installed with a minimum number of parts

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

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.

SnapNrack TopSpeed includes SpeedSeal Technology

SpeedSeal™ Technology features integrated flashing which accepts RTV sealant. This eliminates loosening layers of composition and removing nails with a pry bar, leading to less damage to the roof, minimized potential roof leaks, and much faster installs.

SnapNrack TopSpeed also includes SpeedSeal+ Technology

SpeedSeal+ Technology features an integrated chemical flashing with pre-installed sealant. This offers the same benefits as SpeedSeal while improving the installation efficiency by eliminating the need for RTV sealants.

TopSpeed Mounts attach Directly to the Decking

TopSpeed attaches to the roof sheathing and does not require rafter attachment. Simply attaching to the roof sheathing removes the requirement for finding rafters and drilling pilot holes, creating potential rafter misses that can cause leaks.

Project Plans

Certification Details	4
Component Details	5
Pre-Installation Requirements	7

Installation Steps

TopSpeed Skirt Layout	8
TopSpeed Mount to Module Installation	9
TopSpeed Mount Skirt Installation	10
Wire Management	13
MLPE Attachment	16
Module Installation	19

Grounding Specifications 22

Maintaining the Grounding Bonding When Removing a Module	23
Appendix A: List of approved Modules and MLPEs	25

Certification Details

SnapNrack TopSpeed® mounting system has been evaluated by Underwriters Laboratories (UL) and Listed to UL Standard 2703 for Grounding/Bonding, and Fire Classification (UL File E359313).

Grounding/Bonding

Only specific components have been evaluated for bonding, and are identified as being in the ground path. The TopSpeed components that have been evaluated for bonding are the Mount Assembly (Mount Clamp Top, Module Clamp Tower, Angle Bracket), Clamp Assembly, Universal Skirt, Ground Lugs, and Smart Clips.

Universal Skirt Spacers, Mount Channel Nut, and Mount Base are not required to be bonded to the system based on the exceptions in clause 9.1 of UL 2703 1st Ed. 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 or UL 61703 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 for use with the TopSpeed 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 242-92202, and IlSCO models GBL-4DBT and SGB-4.

The following components have been evaluated for bonding as the fault current ground path: TopSpeed Mount Assembly, (Mount Clamp Top, Module Clamp Tower, Angle Bracket), Clamp Assembly, Wire Management Clips, 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 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 (KDER and QIMS) grounding lug, IlSCO (UL Files E34440 and E354420) model SGB-4 is attached to the module frame flange. 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 (UL Files 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 (UL File 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.

Fire

SnapNrack TopSpeed® has been investigated for a Class A System Fire Classification for Steep-Sloped and low sloped roofs with Type 1, Type 2, and Type 29 modules. Because the system was tested at 5 inches above the test roof fixture, TopSpeed 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 SnapNrack TopSpeed maintains the same Fire Classification Rating both with and without the skirt.

NOTE: Modules with an asterisk* have a fire rating that is different from Type 1, Type 2 or Type 29. SNR systems have only been evaluated for use with Type 1, Type 2, or Type 29 modules. Modules with a different fire type rating should be considered to not have been evaluated for use with SNR systems with respect to a system fire rating.

Inspection Practices

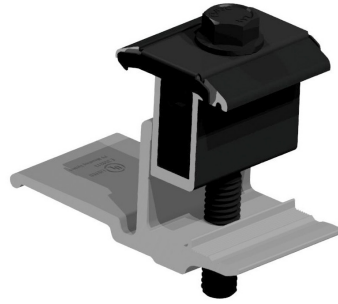
SnapNrack recommends a periodic re-inspection of the completed installation for loose components, loose fasteners, and any corrosion, such that if found, the affected components are to be immediately replaced.

TopSpeed® Structural Components



TopSpeed Mount

SnapNrack TopSpeed Mount assembly including SpeedSeal™ or SpeedSeal+™ Base, Clamp Top, and (4) SnapNrack #14 SS Wood Screws with 1/2" Hex Head.



TopSpeed Clamp

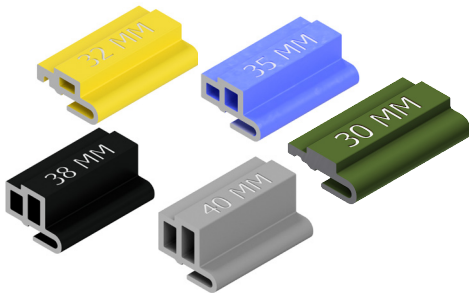
SnapNrack TopSpeed™ Clamp assembly including Link bottom, Link top, and springs.



Universal Skirt

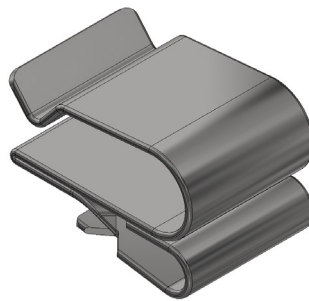
SnapNrack Universal Skirt in double portrait or single landscape lengths.

Wire Managements Components



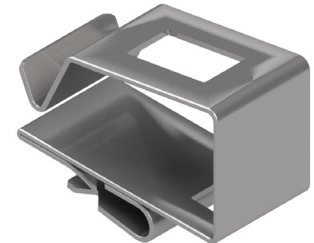
Skirt Spacers

SnapNrack Universal Skirt Spacer for 40mm, 38mm, 35mm, 32mm, and 30mm modules.



Smart Clip

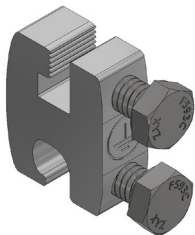
Module frame cable clip, holds two PV wires or Enphase IQ-Cables.



Smart Clip XL

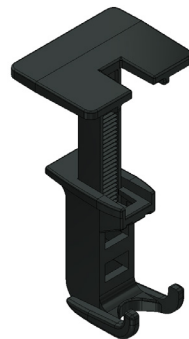
Module frame cable clip, holds six PV wires or four Enphase IQ-Cable.

Grounding/MLPE Components



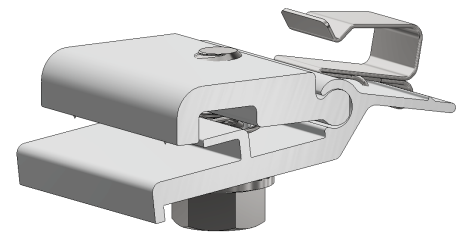
Ground Lug

SnapNrack Ground Lug assembly used for attaching the Equipment Grounding Conductor on to one module or any TopSpeed™ Mount per array.



Wire Saver

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



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
All TopSpeed® ½" bolts; System Leveling Bolt, TopSpeed Mount Clamping Bolt, Clamp Bolt	16 ft-lb [21.7 N.m]
Ground Lug model 242-92202 to Module Frame or anywhere on the TopSpeed Mount (excluding the Base), and Ground Lug model 242-92202 to Grounding Electrode Conductor (6-10 Sol.)	8 ft-lb [10.8 N.m]
MLPE Frame Attachment Kit, MLPE Rail Attachment Kit	10 ft-lb [13.6 N.m]
SolarEdge Frame Mounted Microinverter Bracket to Module Frame	11 ft-lb [14.9 N.m]
Enphase Frame Mounted Microinverter Bracket to Module Frame	13 ft-lb [17.6 N.m]
Ground Lug model SGB-4 to module	75 in-lb [8.5 N.m]
Ground Lug model SGB-4 to Grounding Electrode Conductor (4-14 Sol. or Str.)	35 in-lb [4.0 N.m]
Ground Lug model GBL-4DBT to module	35 in-lb [4.0 N.m]
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (10-14 Sol. or Str.)	20 in-lb [2.3 N.m]
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (8 Sol. or Str.)	25 in-lb [2.8 N.m]
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (4-6 Sol. or Str.)	35 in-lb [4.0 N.m]

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 [19 mm] spacing between rows and columns of modules when creating the layout.
- 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 TopSpeed® Structural Engineering Report to determine the number of attachments per module side.
- Insert SnapNrack installation details into design plan set specific to the project requirements.



Best Practice:

If environmental load conditions require three TopSpeed attachments per module side, draw roof attachment locations on plan set layout based on TopSpeed Structural Engineering. This is only required when modules share attachments. Refer to SnapNrack TopSpeed Structural Engineering for details.

- Identify homerun and Junction Box locations based on rooftop wiring requirements.
- Mark distance from array edge to identifiable roof feature in x and y axes.



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.

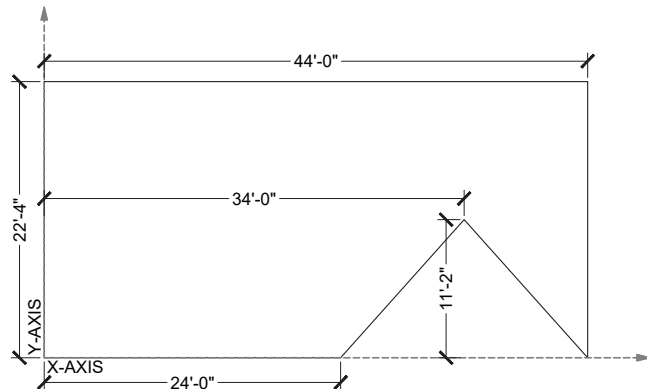


Image note: X-Axis described in this manual is cross-slope on the roof, Y-Axis is in line with the roof slope.

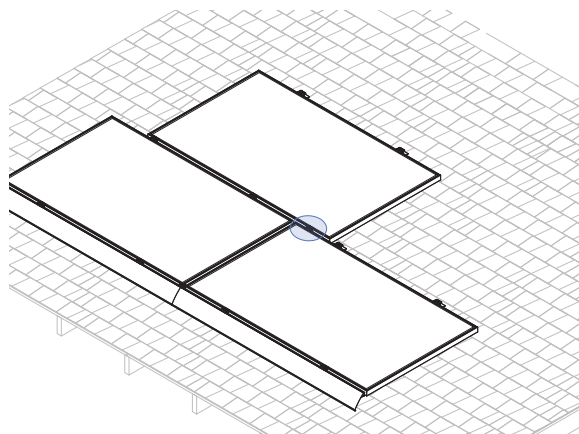
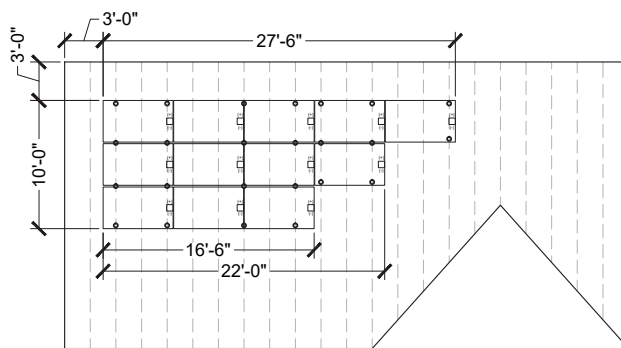


Image note: This four module array is installed in a high load configuration with three attachments per side where two modules share attachments. See highlighted area. As shown, three attachments are never required at the skirt or the top of the array.



Safety Guidance Continued

- Safety equipment should be checked periodically for wear and quality issues.
- Always wear proper eye protection when required.

Required Tools

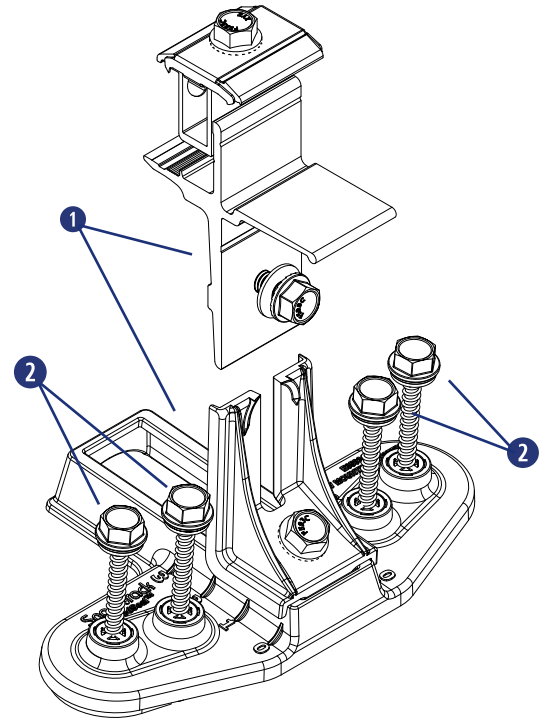
- Socket Wrench/Impact Driver
- Torque Wrench
- 1/2" or 13 mm Socket

Materials Included - TopSpeed System with SpeedSeal™ / SpeedSeal+™ Technologies

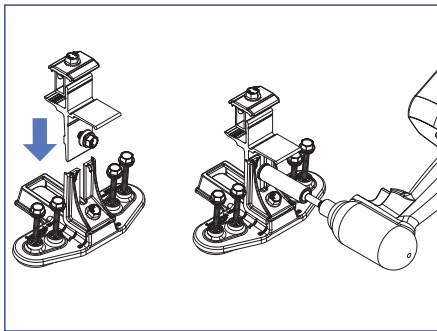
- 1 (1) SnapNrack TopSpeed Mount
- 2 (4) SnapNrack #14 Wood Screw with 1/2" Hex Head & sealing washer

Best Practice:

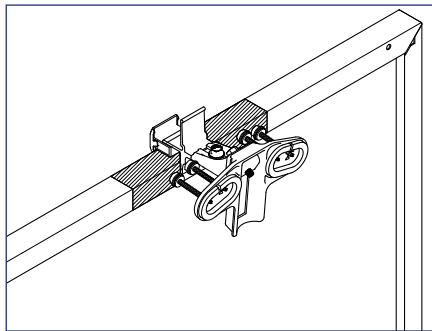
Attach all TopSpeed mounts as the modules are being prepped with MLPEs on the ground. Attach Mounts before attaching MLPEs to simplify wire management.



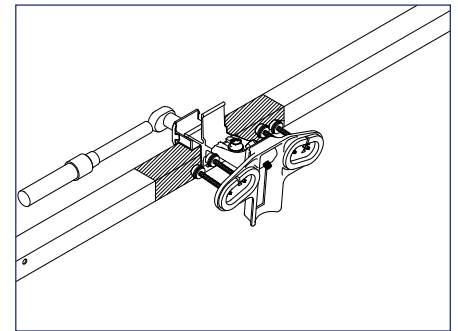
INSTALLATION INSTRUCTIONS



1) Assemble all TopSpeed Mounts required for the installation. Slide the clamp tower assembly into the angle bracket riser of the Base and tighten the leveling bolt to 16 ft-lbs [21.7 N.m].



2) Position TopSpeed Mount clamp on the module frame within the module manufacturers required clamping zone.



3) Tighten 1/2" clamping bolt to 16 ft-lb [21.7 N.m]. A minimum of 2 Mounts are required per module on one side.

Install Note:

For high load conditions, add a third attachment in the middle of the module frame. Refer to SnapNrack TopSpeed® Structural Engineering for details.

Required Tools

- Roof Marking Crayon or Chalk
- Tape Measure

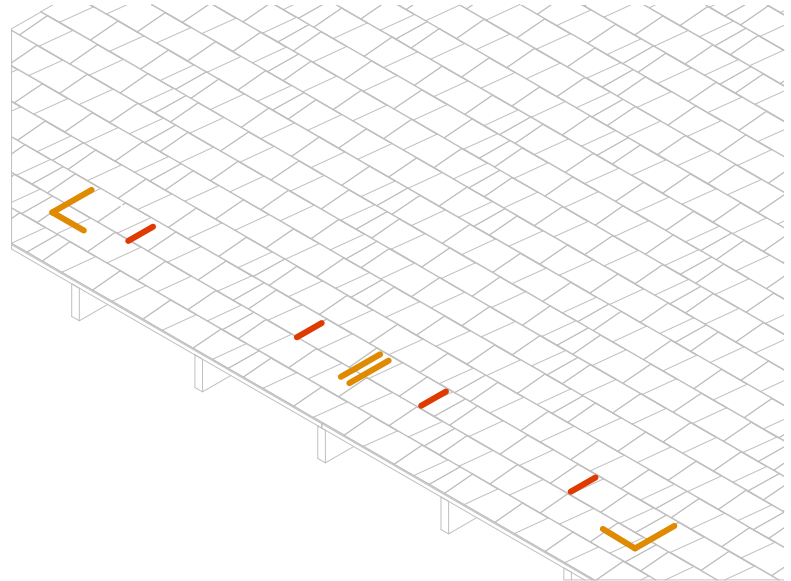
LAYOUT INSTRUCTIONS

- 1) Use a tape measure to verify that all modules will fit properly on the roof surface.
- 2) On the roof, draw the layout for the skirt installation including module gaps (recommended 0.75 inch [19 mm] gap), bottom corners, and locations of the two TopSpeed® attachments per module that clamp to the skirt. Three attachments per module is never required at the skirt.



Install Note:

If environmental load conditions require three TopSpeed attachments per module side, this is only required when modules share attachments (i.e. Mounts are shared between module rows).



TopSpeed® Mount: Skirt Installation

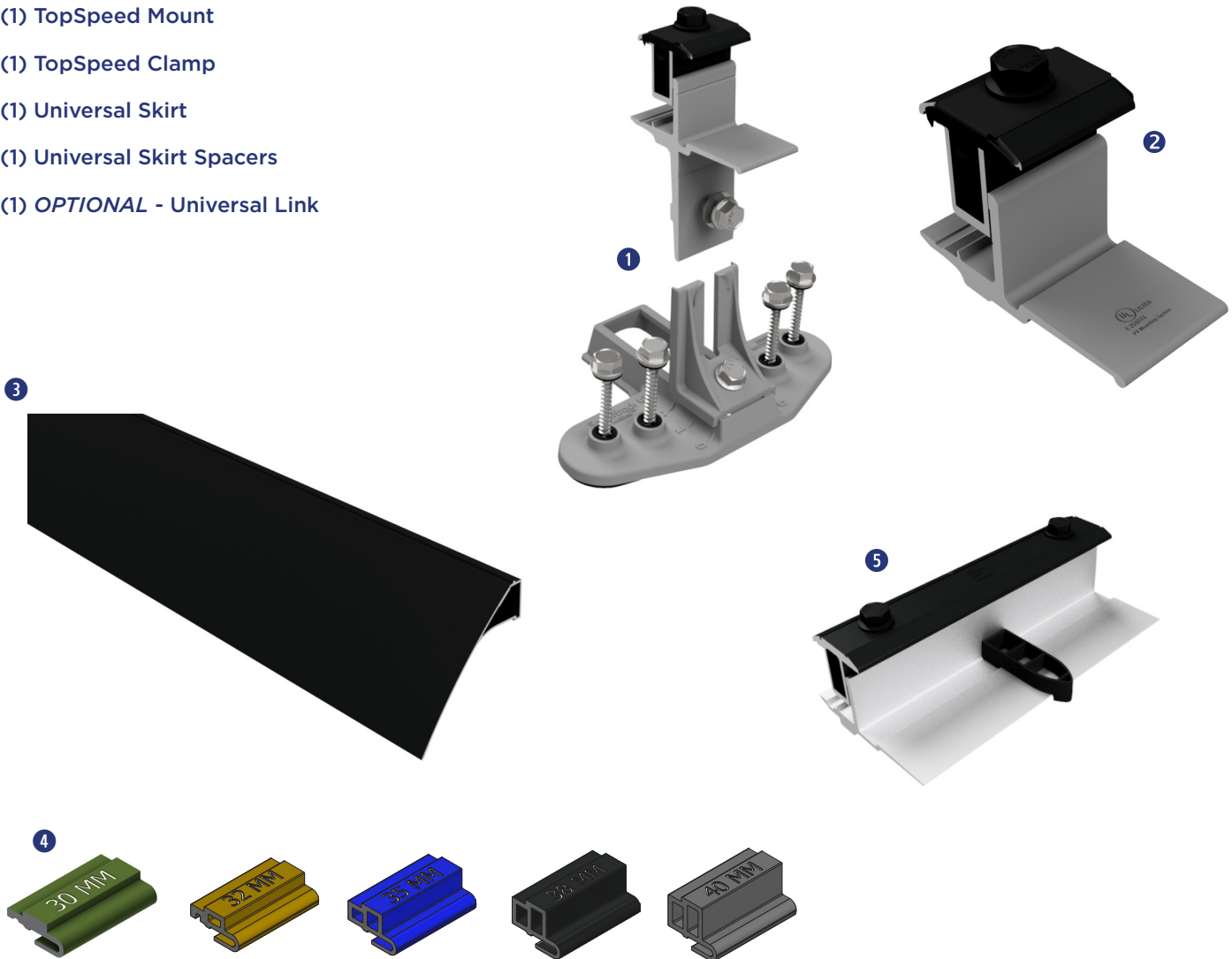
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Required Tools

- Socket Wrench/Impact Driver
- Torque Wrench
- 1/2" or 13 mm Socket
- Roofing sealant

Materials Included - TopSpeed Mount (SpeedSeal™ or SpeedSeal+™)

- ① (1) TopSpeed Mount
- ② (1) TopSpeed Clamp
- ③ (1) Universal Skirt
- ④ (1) Universal Skirt Spacers
- ⑤ (1) *OPTIONAL* - Universal Link



⚙️ Application Note:

SpeedSeal+ Mount:

Compatible roofing substrates and minimum roof pitches: Asphalt shingle- 9.5°

Low slope roofs including metal, rolled composition, EPDM, TPO, PVC, PolyPropylene, and SMS modified bitumen. Ensure positive drainage with no chance of standing water.

Ensure roof construction and pitch meet minimum building code requirements.

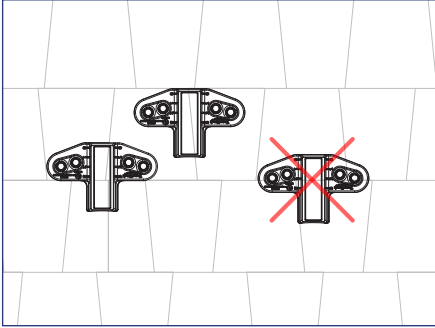
Temperature Range:

Installation: 0°F - 150°F (-18°C - 66°C)

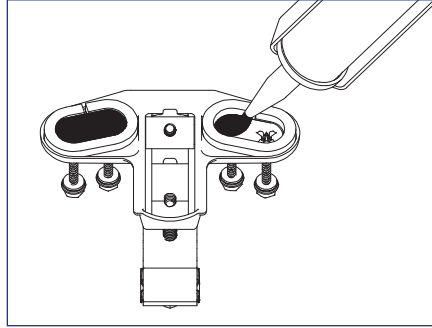
Service: -40°F - 200°F (-40°C - 93°C)

For installation temperatures below 32°F (0°C) it is recommended that the butyl is warmed to more easily conform to the roof texture.

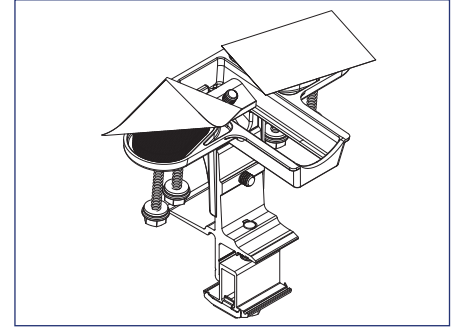
INSTALLATION INSTRUCTIONS



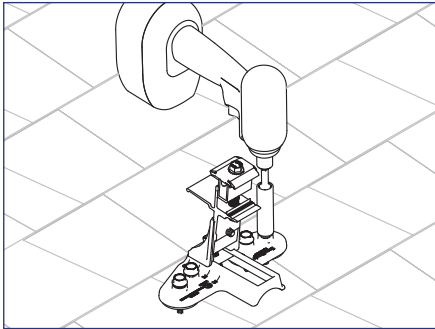
1) Install TopSpeed Mounts at locations drawn during the skirt layout. Mounts must be installed entirely on one course of composition.



2a) For the SpeedSeal™ Base, fill both cavities on bottom of TopSpeed™ Mount created by SpeedSeal™ gasket with roof sealant to ensure a watertight seal.



2b) For the SpeedSeal+™ Base, remove the protective backing from the butyl pads on the bottom of the mount before installation to ensure a watertight seal.



3) Attach TopSpeed Mount to roof using the (4) SnapNrack #14 Wood Screws with 1/2" hex head that are captured in the Mount.



Install Note:

SpeedSeal Mount: Roof sealant should be expelled from both vents of the TopSpeed Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from all four vents, remove TopSpeed Mount, add more sealant to the cavity, then reinstall.



Install Note:

SpeedSeal+ Mount: If possible, avoid installation directly over shingle joints/seams. Otherwise, fill the seam with sealant prior to installation.

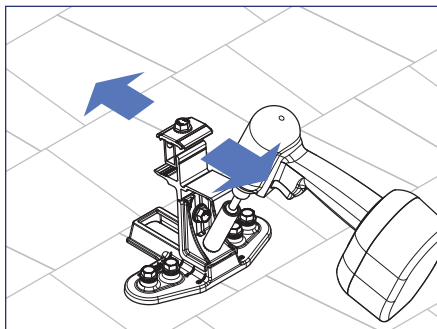
IMPORTANT: Do not install over shingle steps greater than 1/8" [3mm] tall.

Double check attachment positions before installing screws, butyl is difficult to move once tightened.

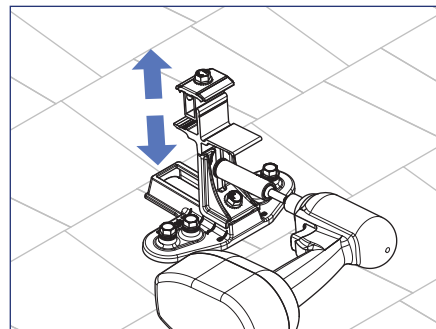


Best Practice:

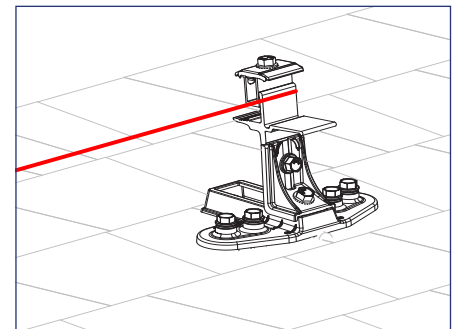
SpeedSeal+ Mount: For best results, install on dry, clean surfaces. Remove any moisture, ice, dirt, or debris from the roof surface before installation.



4) Loosen Course Adjustment bolt and adjust end Mounts up or down until aligned with bottom edge of array as marked on the roof, then tighten the Course Adjustment bolt.



5) To set the TopSpeed Mount level loosen the Leveling bolt and move the clamp up or down, then tighten the Leveling bolt and torque to 16 ft-lb [21.7 N.m].



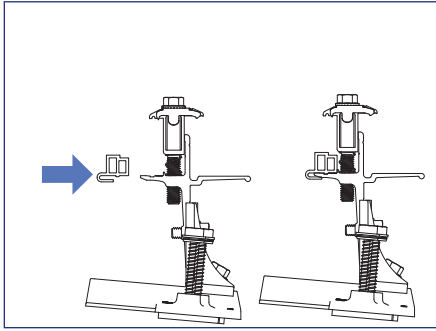
6) Pull string line tight from one corner mount to opposite corner mount to align and level all TopSpeed Mounts between the end mounts.



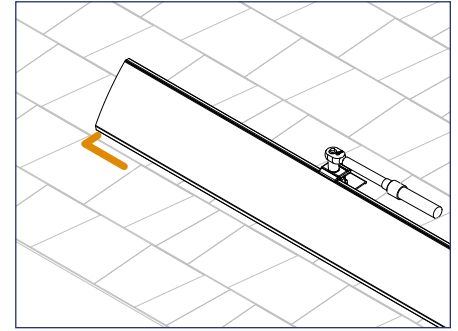
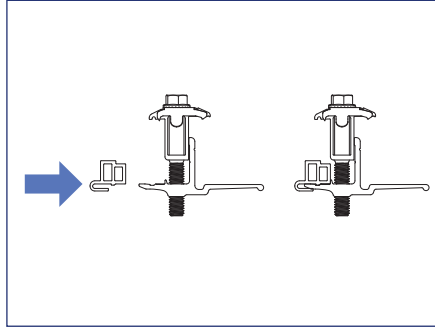
Install Note:

Use the string line alignment feature on Mounts to gauge leveling and up-slope / down-slope adjustment.

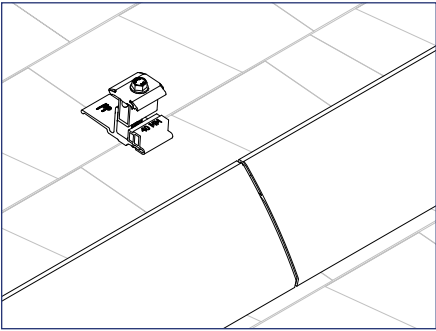
INSTALLATION INSTRUCTIONS



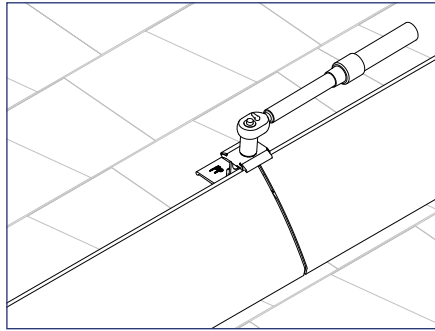
7) Universal Spacers will need to be added to Mounts and Clamps where Skirt will be installed.



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



9) Use TopSpeed Clamps to connect multiple lengths of Array Skirt.



Install Note:

Optionally use Universal Links to connect lengths of Array Skirt.

Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" or 13 mm Socket
- Electrician Tools

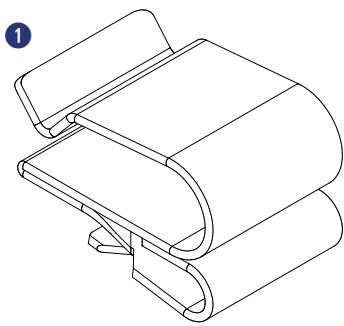
Materials Included

Wire Management

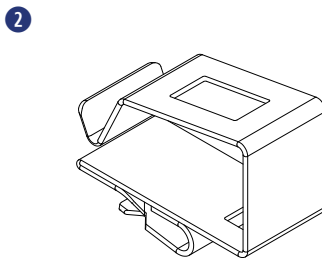
① (1) Smart Clip [(2) PV Wire, (1) Enphase IQ Cable]

② (1) Smart Clip XL [(6) PV Wire, (4) Enphase IQ]

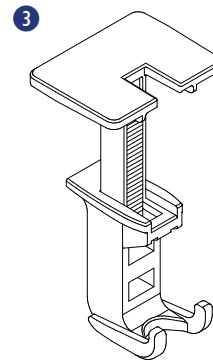
③ (1) Wire Saver [(1) PV Wire]



Smart Clip



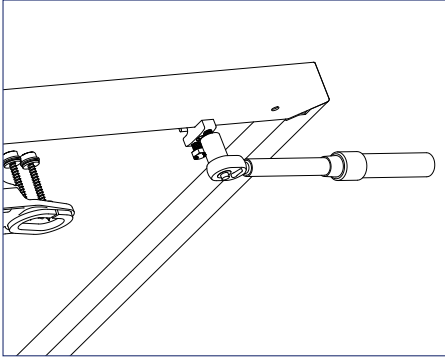
Smart Clip XL



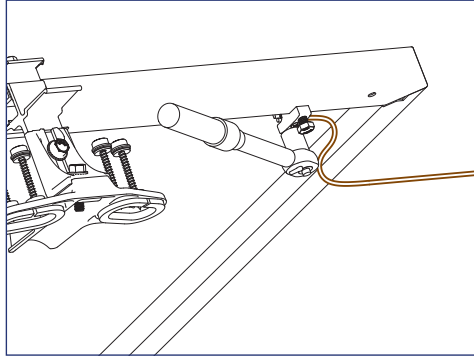
Wire Saver

INSTALLATION INSTRUCTIONS - GROUND LUG

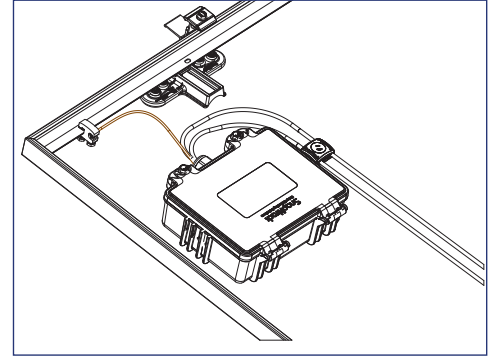
The SnapNrack Ground Lug to be used in accordance with the National Electric Code, ANSI/NFPA 70.



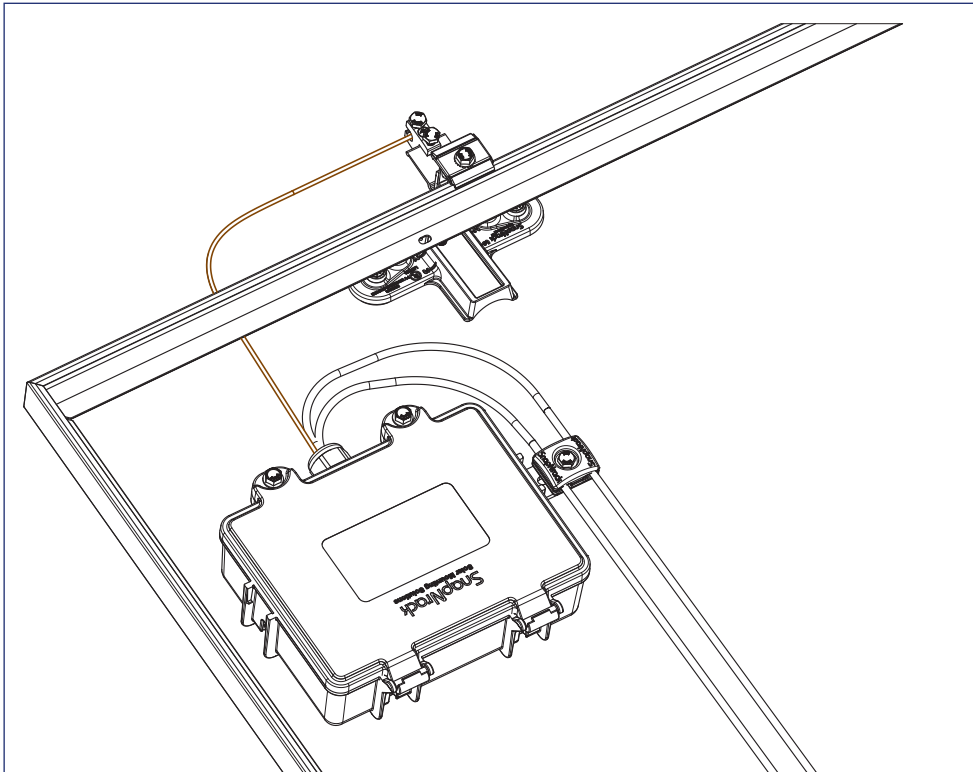
1) Ground Lug (242-92202) can be attached anywhere along the module frame or any TopSpeed® Mount near the Junction Box. Torque module clamping bolt to 8 ft-lb [10.8 N.m].



2) Run 10 - 6 AWG, solid, bare copper GEC into Ground Lug channel, torque wire clamping bolt to 8 ft-lb [10.8 N.m].



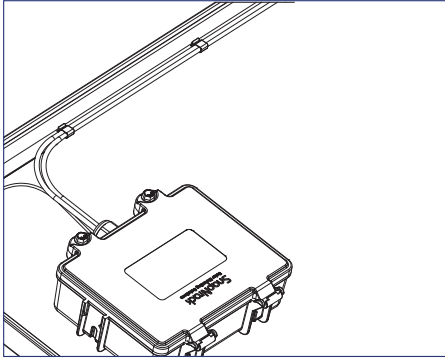
3) Run bare, solid EGC from Ground Lug R to Junction Box, bond bare EGC to stranded EGC in Junction Box. For details on installing the Junction Box reference the **Junction Box Installation Manual**.



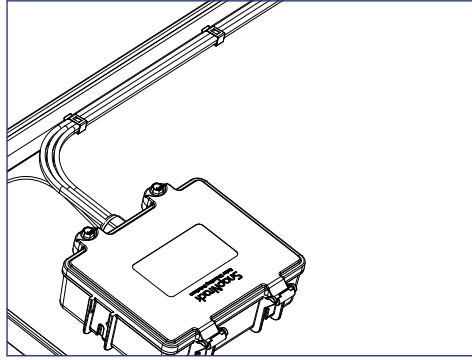
4) Optionally; Install Ground Lug on the Mount Landing Pad at the top of the array. Run bare copper between ground lug and Junction Box.

INSTALLATION INSTRUCTIONS - SMART CLIPS

SmartClip and SmartClip XL should be used to route conductors in a neat and workmanlike manner away from all non-bonded components and support the conductors adequately to eliminate potential damage.



1) Use SnapNrack Smart Clip II to manage up two PV wires inside the module frame while prepping out the modules on the ground or installing modules on the roof.



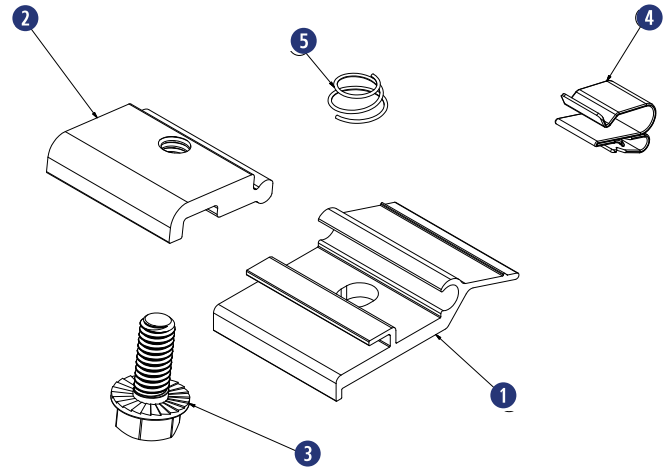
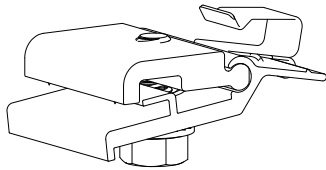
2) Use SnapNrack Smart Clip XL to manage larger bundles of PV wire; up to 6 PV wires per clip

Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" or 13 mm Socket

Materials Included - MLPE Rail Attachment Kit

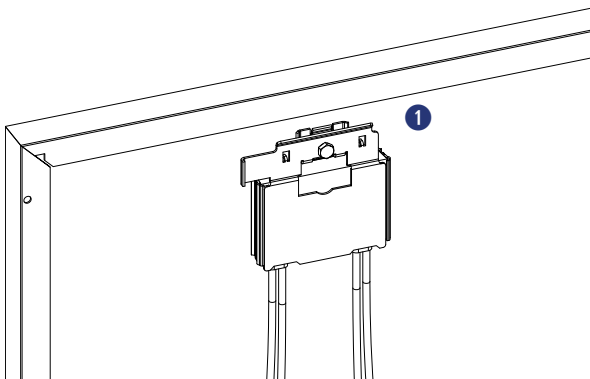
- ① (1) SnapNrack MLPE Frame Attachment Top
- ② (1) SnapNrack MLPE Frame Attachment Bottom
- ③ (1) 5/16"-18 X 3/4" Serrated Flange Bolt SS
- ④ (1) SnapNrack Smart Clip
- ⑤ (1) SnapNrack MLPE Frame Attachment Coil Spring SS



Materials Included

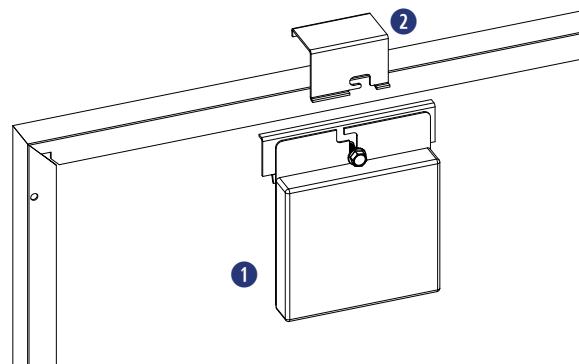
SolarEdge Frame Mount

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



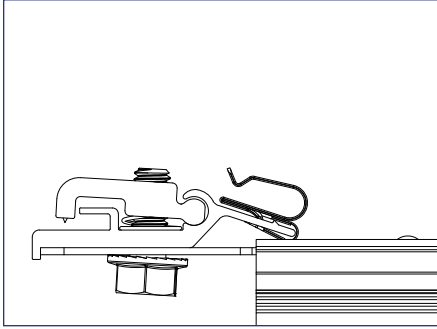
Enphase Frame Mount

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

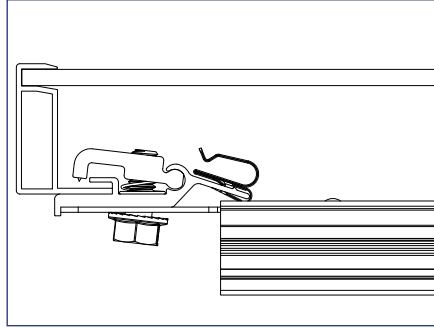


INSTALLATION INSTRUCTIONS - SNAPNRACK MLPE FRAME ATTACHMENT KIT

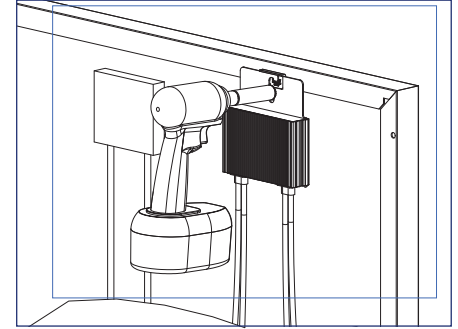
SnapNrack MLPE Frame Attachment kit are used to attach module level performance enhancing devices, and other devices such as an SRD (rapid shutdown device), directly to module frames, and provide integrated grounding/bonding for Devices grounded through metal back plate. (Refer to the list of tested MLPE devices on page 29 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 12 lb-ft (144 lb-in).



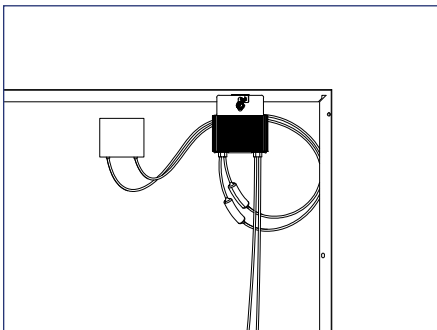
Install Note:

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



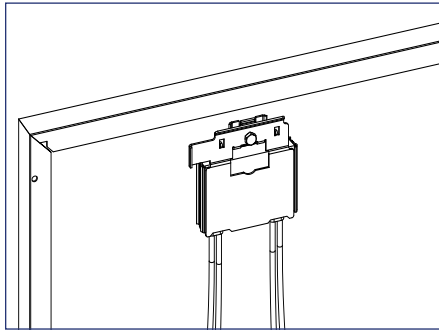
Install Note:

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

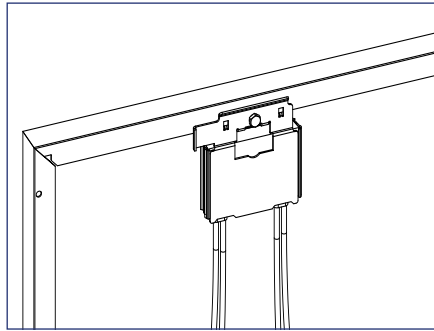


4) Connect the module leads to the input connectors on the MLPE device and manage conductors with the integrated Smart Clip.

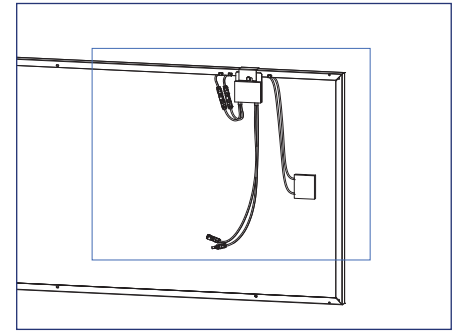
INSTALLATION INSTRUCTIONS - SOLAREGE FRAME MOUNT



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



2) Install the optimizer mounting plate onto the module frame and tighten hardware to 11 ft-lbs [14.9 N.m].



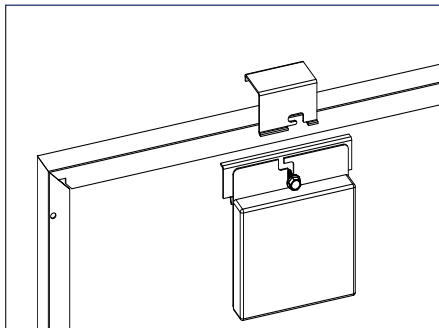
3) Connect the module leads to the input connectors on the optimizer and manage conductors with SnapNrack Smart Clips.



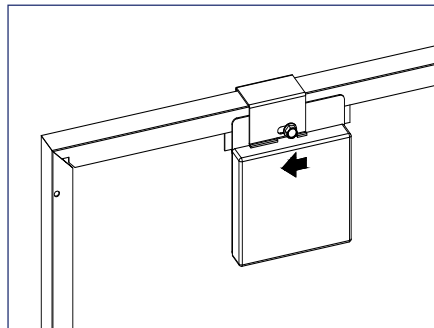
Install Note:

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 TopSpeed Mounts.

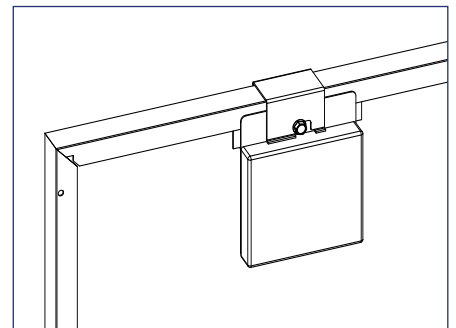


2) Slide the microinverter unit onto the bracket clamp, then move it slightly to the left.



Install Note:

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



3) Tighten the hardware to 13 ft-lbs [17.6 N.m].

4) Connect module leads to microinverter DC connectors.



Install Note:

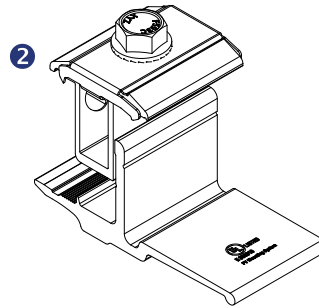
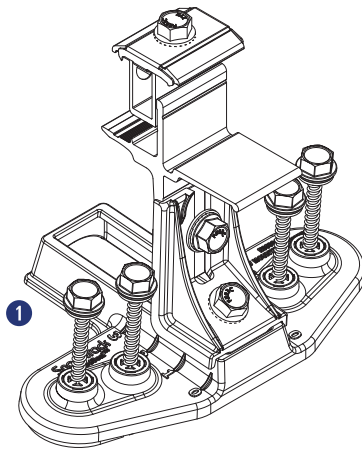
Refer to the Enphase Frame Mount installation guide for additional instructions.

Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" or 13 mm Socket
- Roofing Sealant

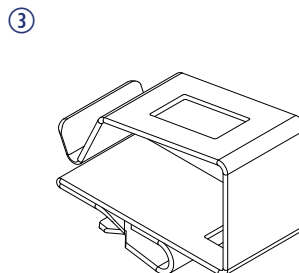
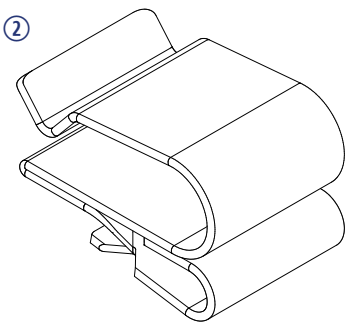
Materials Included

- ① SnapNrack TopSpeed® Mount (SpeedSeal™ or SpeedSeal+™)
- ② SnapNrack TopSpeed® Clamp



Other Materials Required

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



INSTALLATION INSTRUCTIONS - BOTTOM ROW

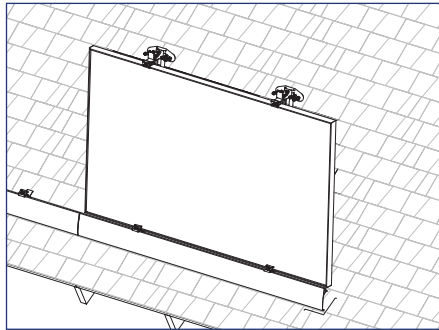
Recommended Best Practice:

Attach all TopSpeed® mounts as the modules are being prepped with MLPEs on the ground. Attach Mounts before attaching MLPEs to simplify wire management.

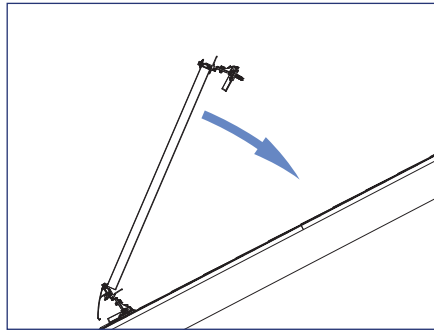
Install Note:

It is recommended that module leads and connectors are prepared for installation using SnapNrack Smart Clips before being brought to the rooftop.

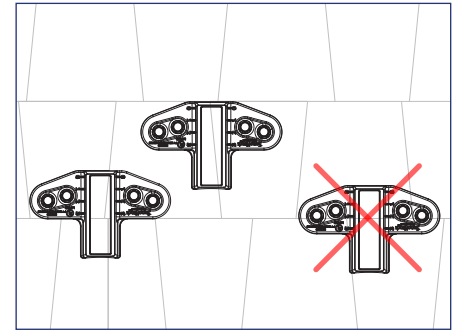
- With no MLPE, secure module leads to module frame to allow access to connectors while modules are installed
- Secure MLPE device to module frame with SnapNrack MLPE Frame Attachment Kit and connect module leads to MLPE, and manage leads by positioning connectors to allow access during installation



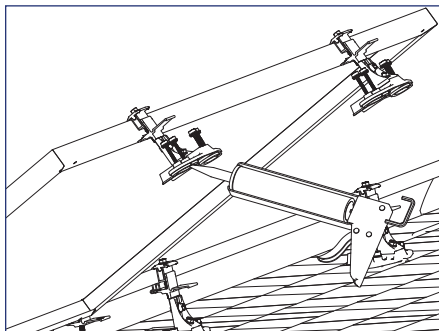
1) Rest downslope edge of module on the Mounts and/or Clamps position module so side edge is flush with marked edge of array layout or Skirt.



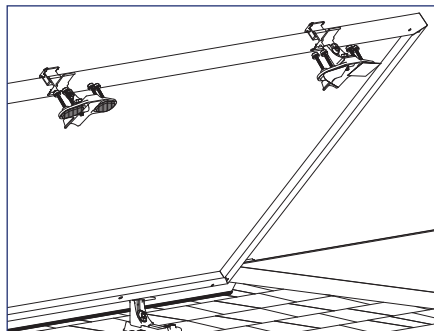
2) Lower upslope edge of module while simultaneously applying slight pressure to seat module into Mounts and/or Clamps.



3) When module is level with roof verify the Speedseal™ or Speedseal+™ portion of the TopSpeed Mounts are positioned entirely on one course of composition. If required loosen the 1/2" nut and adjust the base as needed then tighten the bolt.



4a) SpeedSeal Base: Lift the upslope edge of the module and fill the SpeedSeal reservoir with roofing sealant.

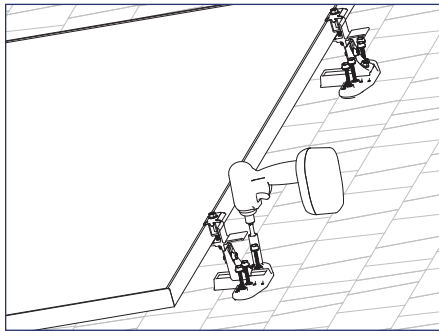


4b) SpeedSeal+ Base: Lift the upslope edge of the module and ensure the backing is removed from each butyl pad. Seal any vertical shingle gaps within 4" from the edge of the base with roofing sealant.

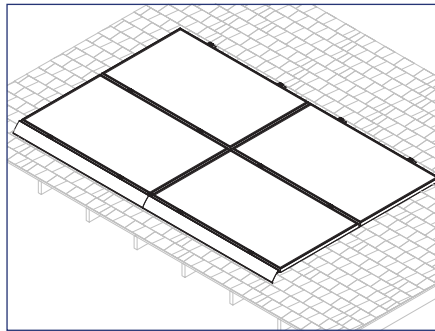
Install Note:

Roof sealant should be expelled from both vents of the TopSpeed Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from all four vents, remove TopSpeed Mount, add more sealant to the cavity, then reinstall.

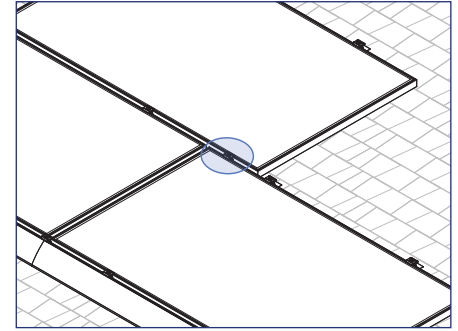
INSTALLATION INSTRUCTIONS - BOTTOM ROW



5) Lower the module to the roof and drive the (4) pre installed Snapnrack #14 Wood Screws with 1/2" hex head into the roof sheathing.



6) Repeat steps 1 through 5 for additional modules in the array.



7) For staggered arrays and arrays with mixed orientation, use the TopSpeed® Clamp as needed to support the modules.



Install Note:

For the SpeedSeal™ Base, roof sealant should be expelled from both vents of the TopSpeed Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from both vents, remove TopSpeed Mount, add more sealant to the cavity, then reinstall.

For the SpeedSeal+™ Base, tighten the screws until the butyl fully conforms to the roof surface.

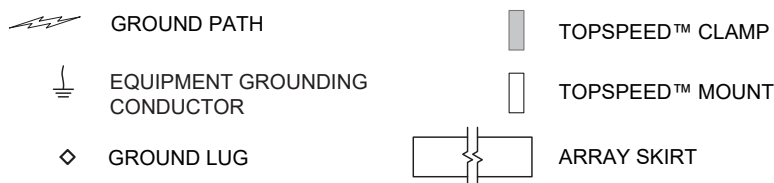
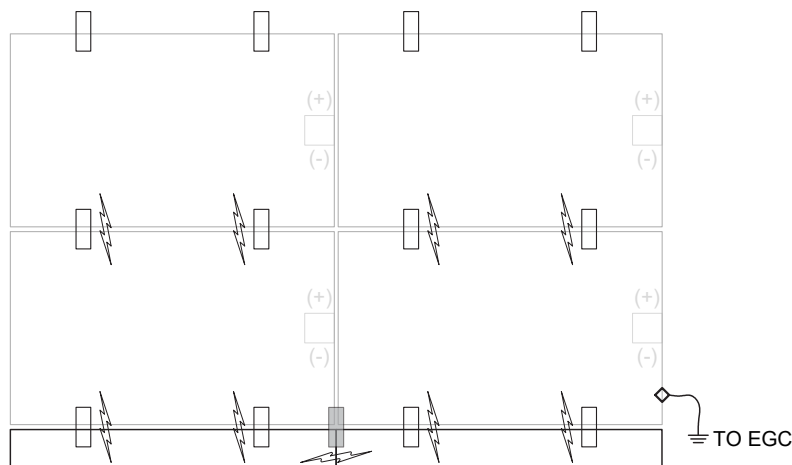
When installing a TopSpeed Clamp for support of an over cantilevered module, the clamp shall be installed 2-6" from the edge of the upslope (cantilevered) module.

GROUND PATH DETAILS

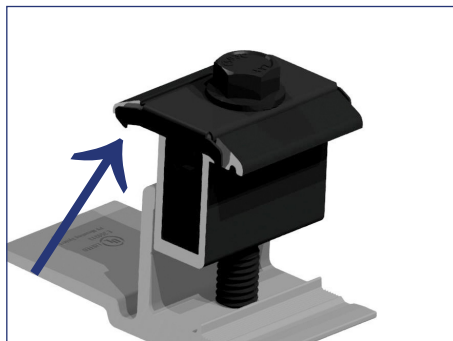
All TopSpeed® components in the fault current ground path have been Certified to be used multiple times for grounding/bonding. The UL 2703 Listing does not specify a maximum number of uses for the Mount, Link, or Ground Lug. Review the requirements of the National Electrical Code (NEC) Article 250 to 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:

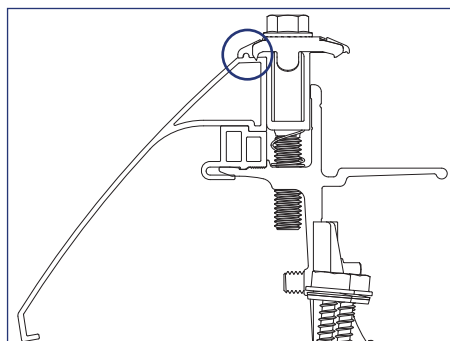
- SnapNrack, TopSpeed Mount
- SnapNrack, TopSpeed Clamp



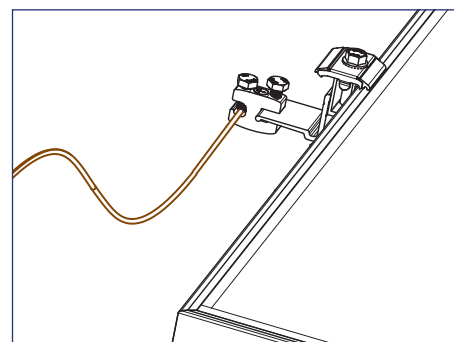
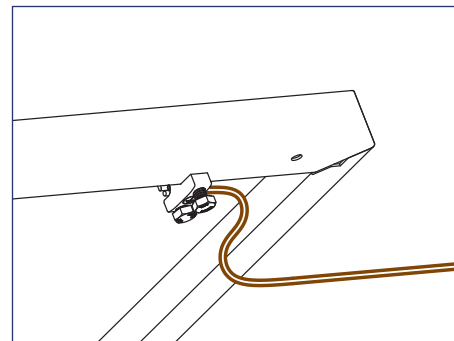
GROUNDING METHOD DETAILS



1) Row to row module bonding provided by bonding clips in Mount assembly and Clamp assembly.



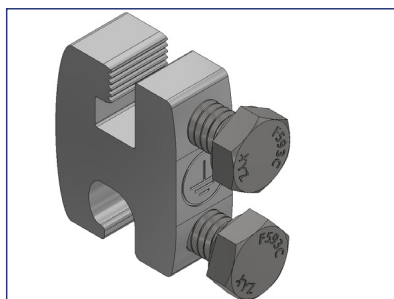
2) Column to column bonding provided by Universal Skirt and bonding clips in the Clamp assembly and/or the RL Universal Link assembly.
Module heights evaluated for bonding with Link Bonding Clamps: 40mm, 38mm, 35mm, 32mm, 30mm



3) Each continuous array is connected to Equipment Grounding Conductor through Ground Lug (242-92202) installed on one module per array.

GROUND MARKING DETAILS

The Ground Lug is marked with the ground symbol.



Optionally; Install Ground Lug on the Mount Landing Pad at the top of the array.

Maintaining the Grounding Bonding When Removing a Module

INSTRUCTION FOR MAINTAINING THE GROUNDING BONDING WHEN REMOVING A MODULE FOR SERVICING

CAUTION: Module removal may disrupt the bonding path and could introduce the risk of electric shock. Additional steps may be required to maintain the bonding path. Modules should only be removed by qualified persons in compliance with the instructions in this manual.

Module removal is not presented as a frequently expected occurrence and will not be required as part of routine maintenance.

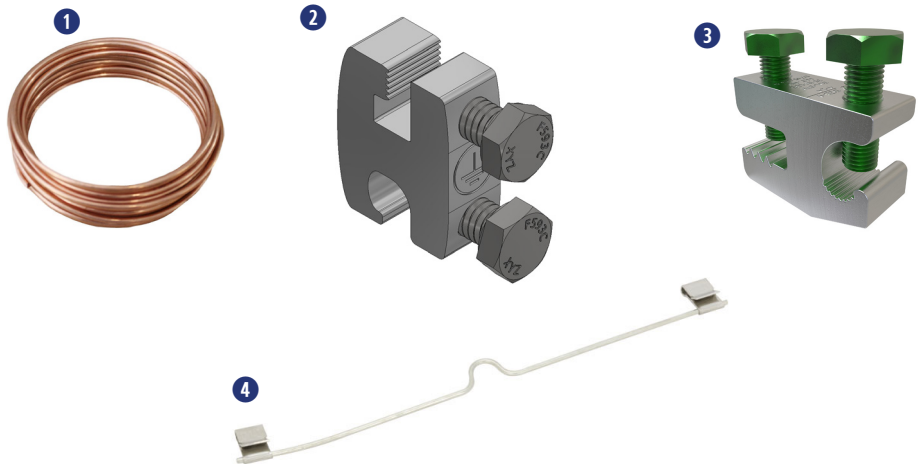
Scenarios that could result in a disruption of the bonding path are described, for example irregularly-shaped arrays, arrays consisting of individual rows, and any other scenario where module removal could disrupt the bonding path. In most cases, the removal of a module for servicing will not disturb or break grounding continuity. If a module is to be removed that will break continuity, these are the steps that must be taken to maintain a continuously bonded SnapNrack TopSpeed® System.

Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" or 13 mm Socket
- 7/16" Socket

Required Materials

- 1 #10 Or Larger Bare Copper Conductor
- 2 SnapNrack Ground Lug part no. 242-92202
- 3 IlSCO Part No. SGB-4
- 4 DynoRaxx Dynobond™

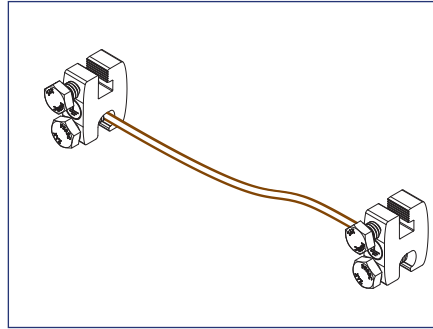


Maintaining the Grounding Bonding When Removing a Module

JUMPER ASSEMBLY INSTRUCTION & INSTALLATION

CAUTION: Do Not Remove the Module until the Jumper is installed

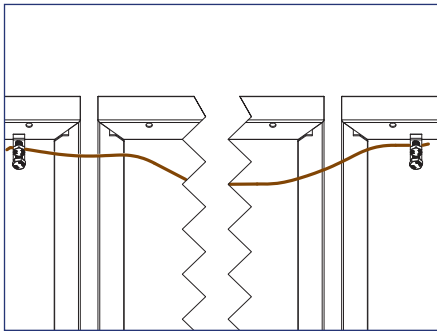
1) Identify the existing ground path at the location of module removal and choose an appropriate length of #10 bare copper to bridge the soon to be broken ground path.



Example of assembled bonding jumper using (2) SnapNrack Ground Lugs

2) Attach one ground lug to each end of #10 bare copper wire. See recommended options below:

1. (2) SnapNrack Ground Lug part no. 242-922022
2. (2) IlSCO part no. SGB-4
3. (1) DroRaxx DynoBond™



3) Before the module is removed, attach the assembled bonding jumper. Depending on where the module will be removed and choice of ground lug, jumper attachment locations will vary.

- SnapNrack Ground Lug part no. 242-92202 or IlSCO SGB-4 lugs can be attached to module frames or anywhere on the TopSpeed™ Mount.
- DynoRaxx DynoBond™ is approved and appropriate when a short bonding jumper is needed from module to module.

4) Service the array. With the bonding jumper installed, it is now safe to remove the module for service or maintenance.

5) After Servicing the array reinstall the module and original ground path. Only then Remove the bonding jumper.

Caution: Do not remove the bonding jumper until original ground path is established.

List of Approved Modules

APPROVED MODULE INFORMATION

SnapNrack TopSpeed Original has been tested with the following UL Listed module series: The SnapNrack TopSpeed Original system employs top-down clamps and links which have been evaluated for frame-to-system bonding, at specific mounting torques and with the specific module series listed below. All wattage values are covered.

Module manufacturer approval letters can be found at www.snapnrack.com.

Manufacturer	Model		
Aptos Solar	DNA-120-MF23-XXX	DNA-120-MF26-XXXW	DNA-108-BF10-xxxW
	DNA-120-BF23-XXX	DNA-144-MF26-XXXW	DNA-120-BF10-xxxW
	DNA-144-MF23-XXX	DNA-120-BF26-XXXW	DNA-108-MF10-xxxW
	DNA-144-BF23-XXX	DNA-144-BF26-XXXW	
Boviet Solar	BVM7612M-XXX-H-HC-BF-DG		
Canadian Solar	CS6K-XXX-M	CS3U-XXX-MS	CS1Y-XXX-MS
	CS6K-XXX-M-SD	CS3U-XXX-P	CS3W-MB-AG
	CS6K-XXX-P	CS1K-XXX-MS	CS3Y-MB-AG
	CS6K-XXX-P-SD	CS1H-XXX-MS	CS6W-XXXMB-AG
	CS6K-XXX-MS	CS1H-XXX-MS-AB	CS6R-XXXMS-HL
	CS3K-XXX-P	CS3W-XXX-P	CS3W-XXX-MS
	CS3K-XXX-MS	CS3N-XXX-MS	CS6.1-54TM-XXX-H
CertainTeed	CTXXXHC11-06	CTM10400HC12-8	
Chint Solar	CHSM6612M-XXX	CHSM6612M/HV-XXX	CHSM72M-HC-XXX* (Astro 5)
	CHSM6612M(BL)-XXX	CHSM72M-HC-XXX* (Astro 4)	
Dehui Solar	DH-M760B-XXXW	DH-M772W-XXXW	DH-M772F-XXXW
	DH-M760W-XXXW	DH-M760F-XXXW	
Freedom Forever	FF-MP-BBB-xxx		
Hanwha Q Cells	Q.PEAK DUO-G5-XXX	Q.PEAK DUO XL-G9.2-XXX	Q.TRON-G1+ XXX
	Q.PEAK DUO-BLK-G5-XXX	Q.PEAK DUO XL-G9.3-XXX	Q.TRON BLK-G1+ XXX
	Q.PLUS DUO-G5-XXX	Q.PEAK DUO XL-G9.3/BFG-XXX	Q.PEAK DUO XL-G10.c-XXX
	Q.PEAK DUO-G7-XXX	Q.PEAK DUO-ML-G9-XXX	Q.PEAK DUO XL-G10.d-XXX
	Q.PEAK DUO-BLK-G7-XXX	Q.PEAK DUO-BLK-ML-G9-XXX	Q.PEAK DUO BLK G10+/AC XXX
	Q.PEAK DUO-G7.2-XXX	Q.PEAK DUO-BLK-G9-XXX	Q.PEAK DUO BLK G10+/HL XXX
	Q.PEAK DUO-G6+-XXX	Q.PEAK DUO G10-XXX	Q.PEAK DUO ML-G10-XXX
	Q.PEAK DUO-BLK-G6+-XXX	Q.PEAK DUO BLK G10-XXX	Q.PEAK DUO BLK ML-G10+-XXX
	Q.PEAK DUO-G6-XXX	Q.PEAK DUO G10+-XXX	Q.PEAK DUO BLK ML-G10.B+
	Q.PEAK DUO-BLK-G6-XXX	Q.PEAK DUO BLK G10+-XXX	Q.PEAK DUO XL-G11.3 XXX
	Q.PEAK DUO BLK-G6+/AC-XXX	Q.PEAK DUO XL-G10.3-XXX	Q.PEAK DUO XL-G11.3 BFG XXX
	Q.PEAK DUO-BLK-G8-XXX	Q.PEAK DUO BLK ML-G10-XXX	Q.PEAK DUO ML-G12S.3/BFG
	Q.PEAK DUO-G8+-XXX	Q.PEAK DUO ML-G10.a+-XXX	Q.TRON M-G2+ XXX
	Q.PEAK DUO L-G8.3/BFG-XXX	Q.PEAK DUO BLK ML-G10.a+-XXX	Q.TRON BLK M-G2+ XXX
	Q.PEAK DUO L-G8.3/BGT-XXX	Q.PEAK DUO ML-G10.a-XXX	Q.TRON XL-G2.3/BFG XXX
	Q.PEAK DUO-BLK-G8+-XXX	Q.PEAK DUO BLK ML-G10.a-XXX	Q.TRON BLK M-G2+/AC
	Q.PEAK DUO-G8-XXX	Q.PEAK DUO XL-G10.2-XXX	Q.PEAK DUO BLK ML-G10.C+
	Q.PEAK DUO-BLK-ML-G9+-XXX	Q.PEAK DUO XL-G10.3/BFG-XXX	Q.TRON BLK M-G2.H+
	Q.PEAK DUO-ML-G9+-XXX	Q.PEAK DUO ML-G10+-XXX	Q.TRON BLK M-G2.H1+_AC
	Q.PEAK DUO-BLK-ML-G9+-XXX	Q.PEAK DUO BLK ML-G10+/t-XXX	

List of Approved Modules

snapnrack.com

Manufacturer	Model		
HT-SAAE	HT60-166M-XXX	HT60-182M-XXX	
Heliene	60M-XXX	72M-XXX	108HC M10 SL-XXX
	60P-XXX	72P-XXX	
Hyundai	HiA-SXXXMS	HiS-SXXXYI	HiN-TXXXNJ
	HiS-SXXXXY	HiS-SXXXYH(BK)	HiS-TXXXNJ
	HiN-SXXXXG(BK)	HiN-TXXXNF(BK)	HiS-TXXXNJ(BK)
Hyperion / Runergy	HY-DH108P8-XXX(Y)	HY-DH144P8-XXX	HY-DH144N8-XXX
	HY-DH108N8-XXX		
JA Solar	JAM60S09-XXX/PR	JAM72S10-XXX/MR	JAM54S30-XXX/MR
	JAM60S10-XXX/MR	JAM72D10-XXX/MB	JAM54S31-XXX/MR
	JAM60S10-XXX/PR	JAM72S10-XXX/PR	JAM72D30-XXX/MB
	JAM60S12-XXX/PR	JAM72S12-XXX/PR	
	JAM72S09-XXX/PR	JAM60S17-XXX/MR	
Jinko Solar	JKMXXXM-60	JKMXXXM-72	JKMXXXM-6TL3-B
	JKMXXXM-60L	JKMXXXM-72L-V	JKMXXXM-6TopSpeed3-B
	JKMXXXM-60HL	JKMXXXP-72	JKMXXXM-7TopSpeed3-V
	JKMXXXM-60HBL	JKMXXXP-72-V	JKMXXXM-7TopSpeed3-TV
	JKMXXXP-60	JKMXXXPP-72	JKMXXXM-72HL4-V
	JKMXXXP-60-J4	JKMXXXPP-72-V	JKMXXXM-72HL4-TV
	JKMXXXP-60-V	JKMSXXXP-72	JKMXXXN-72HL4-BDV
	JKMXXXP-60B-J4	JKMXXXM-72HL-V	JKMXXXN-72HL4-BDX*
	JKMXXXPP-60	JKMXXXM-72HL-TV	
	JKMXXXPP-60-V	JKMXXXM-72HBL	
KB Solar	MODULE-KBS-375-MONO	MODULE-KBS-375-MONO-BF	MODULE-KBS-450-MONO
	MODULE-KBS-450-MONO-BF		
LG	LGXXXN1C-A5	LGXXXS2W-G4	LGXXXQ1C-A6
	LGXXXN1K-A5	LGXXXN1C-V5	LGXXXQ1K-A6
	LGXXXQ1C-A5	LGXXXN1W-V5	LGXXXM1K-A6
	LGXXXQ1K-A5	LGXXXN2T-V5	LGXXXM1C-A6
	LGXXXS1C-A5	LGXXXN2T-J5	LGXXXA1C-A6
	LGXXXN2C-B3	LGXXXN1T-V5	LGXXXQAC-A6
	LGXXXN2W-B3	LGXXXA1C-V5	LGXXXQAK-A6
	LGXXXN1C-G4	LGXXXM1C-L5	LGXXXN1K-B6
	LGXXXN1K-G4	LGXXXM1K-L5	LGXXXN2W-E6
	LGXXXS1C-G4	LGXXXN1C-N5	LGXXXN2T-E6
	LGXXXN2C-G4	LGXXXN1K-L5	LGXXXN1K-E6
	LGXXXN2K-G4	LGXXXN1K-A6	LGXXXN3K-V6
	LGXXXN2W-G4	LGXXXN1C-A6	
	LGXXXS2C-G4	LGXXXN1W-A6	
Longi	LR6-60-XXXM	LR6-60HPB-XXXM	LR6-60HIH-XXXM
	LR6-60BK-XXXM	LR6-60HPH-XXXM	LR6-60HIB-XXXM
	LR6-60HV-XXXM	LR4-60HPB-XXXM	LR4-72HPH-XXXM
	LR6-60PB-XXXM	LR4-60HIB-XXXM	LR5-72HPB-XXXM
	LR6-60PE-XXXM	LR4-60HPH-XXXM	LR5-54HABB-XXXM
	LR6-60PH-XXXM	LR4-60HIH-XXXM	

List of Approved Modules

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Manufacturer	Model		
Meyer Burger	Meyer Burger Black*	Meyer Burger White*	
mSolar	TXI6-XXX120BB	TXI10-XXX108BB	
Mission Solar	MSEXXXSO5T	MSEXXXSO4J	MSE60AXXX
	MSEXXXSO5K	MSEXXXSO6J	MSEXXXSX5K
	MSEXXXSQ5T	MSEXXXSQ6S	MSEXXXSX5T
	MSEXXXSQ5K	MSEXXXSQ4S	MSEXXXSX6S
	MSEXXXMM4J	MSEXXXSR8K	MSEXXXSX6W
	MSEXXXMM6J	MSEXXXSR8T	MSEXXXSX5R
	MSEXXXSO6W	MSEXXXSR9S	MSE410HT0B
Next Energy Alliance	USNEA-XXXM3-60	USNEA-XXXM3-72	
	USNEA-XXXM3B-60	USNEA-XXXM3B-72	
Panasonic	VBHNXXXKA03	VBHN325SA17E	EVPVXXXH
	VBHNXXXKA04	VBHXXXRA18N	EVPVXXXPK
	VBHNXXXSA17	VBHXXXRA03K	EVPVXXXHK2
	VBHNXXXSA18	EVPVXXX(K)	
Philadelphia Solar	PS-M144(HCBF)-XXXW	PS-M108(HCBF)-XXXW	PS-M108(HC)-XXXW
Phono Solar	PSXXXM-20/U	PSxxxM8GFH-24/TH	PSxxxM6-24/TH
	PSXXXMH-20/U	PSxxxM8GF-18/VH	
	PSxxxM8GF-24/TH	PSxxxM8GFH-18/VH	
REC (All may be followed by "BLK" or "BLACK")	RECXXTP2	RECXXTP2M 72 BLK2	RECXXTP4
	RECXXTP2-BLK	RECXXTP2SM 72	RECXXXAA Pure
	RECXXNP	RECXXTP2SM 72 BLK	RECXXXAA Pure-R
	RECXXTP2M	RECXXTP2SM 72 BLK2	RECXXNP2
	RECXXTP2M 72	RECXXXAA	RECXXNP3
	RECXXTP2M 72 BLK	RECXXTP3M	
SEG Solar	SEG-400-BMB-HV	SEG-xxx-BMD-HV	
	SEG-400-BMB-TB	SEG-xxx-BMD-TB	
Silfab	SLAXXX-M	SLGXXX-M	SILXXXNX
	SLAXXX-P	SLGXXX-P	SILXXXNU
	SSAXXX-M	SSGXXX-M	SILXXXHC
	SSAXXX-P	SSGXXX-P	SILXXXHN
	SILXXXBL	SILXXXNT	SILXXXBG
	SILXXXML	SILXXXHL	SIL-xxxHC+
	SILXXXNL	SILXXXBK	SIL-xxxHM
Solar4America	S4AXXX60H5BB	S4AXXX72H5BB	S4AXXX-108MH10
	S4AXXX60H5BW	S4AXXX72H5BW	S4AXXX-144MH10
	S4AXXX60M5BB	S4AXXX72M5BB	
	S4AXXX60M5BW	S4AXXX72M5BW	
Solaria	Solaria PowerXT-XXXR-PX	Solaria PowerXT-XXXR-AC	Solaria PowerXT-XXXR-PM-AC
	Solaria PowerXT-XXXR-BX	Solaria PowerXT-XXXR-PM	
Sunpower	SPR-AXXX-G-AC	SPR-AXXX-BLK	SPR-MXXX-BLK-H-AC
	SPR-AXXX	SPR-MXXX-H-AC	SPR-MXXX-BLK
	SPR-AXXX-BLK-G-AC	SPR-MXXX	SPR-MAX3-XXX-BLK-R

List of Approved Modules

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Manufacturer	Model		
SunSpark	SST-XXXM3-60	SST-XXXM3-72	
	SST-XXXM3B-60	SST-XXXM3B-72	
Talesun	TP660M-XXX	TP672M-XXX	
	TP660P-XXX	TP672P-XXX	
Thornova	TS-BB54(XXX)	TS-BG54(XXX)	TS-BG72(XXX)
	TS-BB60(XXX)	TS-BG60(XXX)	
Trina	TSM-XXXDD05(II)	TSM-XXXPD05.08	TSM-XXXDEG15VC.20(II)
	TSM-XXXDD05A.05(II)	TSM-XXXPD05.082	TSM-XXXDEG18MC.20(II)
	TSM-XXXDD05A.08(II)	TSM-XXXPD05.08D	TSM-XXXDEG19C.20
	TSM-XXXDD05A.082(II)	TSM-XXXPD05.08S	TSM-XXXDEG21C.20
	TSM-XXXPA05	TSMXXXDD05H.05(II)	TSM-XXXDE09C.05
	TSM-XXXPA05.05	TSM-XXXDD06M.05(II)	TSM-XXXDE09C.07
	TSM-XXXPA05.08	TSM-XXXDE15H(II)	TSM-XXXNE09RC.05
	TSM-XXXPD05	TSM-XXXDE15M(II)	TSM-XXXNE09RH.05
	TSM-XXXPD05.002	TSMXXXDE06X.05(II)	TSM-XXXNE19RC
	TSM-XXXPD05.05	TSMXXXDE09.05	
	TSM-XXXPD05.05S	TSM-XXXDE15V(II)	
Ureco	FBMxxxMFG-BB	FAMxxxE7G-BB	
Vikram Solar	SOMERA VSMHBB.60.XXX.05	PREXOS VSMDHT.60.XXX.05	
	SOMERA VSMH.72.XXX.05	PREXOS VSMDHT.72.XXX.05	
VSUN	VSUNXXX-144BMH-DG	VSUNXXX-108BMH	
	VSUNXXX-120BMH	VSUNXXX-132BMH	
ZNShine	ZXM6-60-XXX/M	ZXM6-NH144-XXXM	ZXM7-SHLDD144-XXXM
	ZXM6-NH120-XXXM	ZXM7-SH108-XXXM	

List of Approved MLPE Devices

SnapNrack TopSpeed Universal has been tested with the following Module Level Power Electronic (MLPE) devices:

SnapNrack TopSpeed Original mounting systems has been tested with the following UL/NRTL Listed Module Level Power Electronic (MLPE) Devices. The back plates of the MLPEs have been evaluated for bonding to TopSpeed Original through the SnapNrack MLPE Frame Attachment Kit, model 242-02151.

MLPE Manufacturer	Model	
AP Smart	RSD-S-PLC	
Celestica International	DG-006-F001201x	DG-006-F001401x
Delta Electronics	GPIO0010105	
Enphase	C250	IQ8PLUS-72
	M215	IQ8A-72
	M250	IQ8H-208-72
	IQ6-60-2-US	IQ8H-240-72
	IQ6PLUS-72-2-US	IQ8HC-72-M-US
	IQ7-60-2-US	IQ8HC-72-M-DOM-US
	IQ7-60-B-US	IQ8MC-72-M-US
	IQ7PLUS-72-2-US	IQ8X-80-M-US
	IQ7PLUS-72-B-US	IQ8X-80-M-DOM-US
	IQ8-60	
Generec	S2502	
Ginlong Technologies	Solis-RSD-1G	
	Solis-MLRSD-R1-1G	Solis-MLRSD-R2-1G
SolarEdge	P300-5NC4ARS	P320-5NC4ARS
	P370-5NC4AFS	P400-5NC4AFS
	P320	P340
	P370	P400
	P401	P405
	P485	P505
	P730	P800p
	P850	P860
	P950	P1100
	P1101	S440
	S500	
SMA	RSB-2S-US-10	
Tigo	TS4-R-F	TS4-R-M
	TS4-R-O	TS4-R-S
	TS4-R-M-DUO	TS4-R-O-DUO
	TS4-R-S-DUO	TS4-A-F
	TS4-A-2F	TS4-A-O
	TS4-A-S	