ROCK-IT SYSTEM™ 2.0

RAIL FREE SOLAR ROOF MOUNT

UTILIZES ECOFASTEN SOLAR'S PATENTED TECHNOLOGY

EcoFasten Solar®

Document date 12.30.2016

Contents

Pg. 1 ..... Assets of Design
Features
System Components

Pg. 2 ..... Rock-It 2.0 Mount Assembly
Rock-It 2.0 Coupling Assembly

Pg. 3 ..... Rock-It 2.0 Hybrid Coupling Assembly
Rock-It Clip SS Assembly

Pg. 4 ..... Array Layout
GreenFasten Flashing Install

Pg. 5 ..... Rock-It System 2.0 Install

Pg. 6 ..... Ground Lug Install
Rock-It Clip SS Install

Pg. 7 ..... Grounding Information
Bonding Assembly and Bonding Path

Pg. 8 ..... Thermal Expansion and Bonding
Bracket Spacing
Staggered Layout
Cantilever

Back Cover ..... Evaluated, Compatible Modules
System Specifications

ROCK-IT SYSTEM 2.0

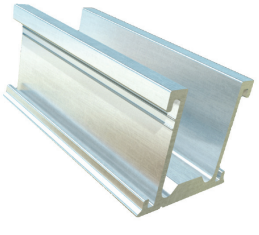
Designed with the installer in mind.

EcoFasten Solar specializes in solar roof attachments that are fast and easy to install, straightforward, secure and cost-effective. EcoFasten offers a wide variety of standard products as well as custom solutions, for a one-stop source for all of your rooftop anchoring needs. Products are rigorously tested and approved above and beyond industry standards in-house and by third party agencies. EcoFasten's patented conical sealing system has been in service in the snow guard and solar industries for two decades.

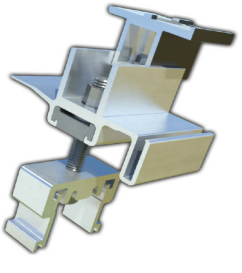
Features

- Fastest, easiest to level system on the market
- Conforms to UL 2703 First Edition
- Class A Fire Rating with Type 1 modules
- Integrated electrical bonding
- SIMPLE- only 4 components
- North-South adjustability
- Only one tool required (1/2" deep well socket)
- Vertical adjustment of 3"-4"

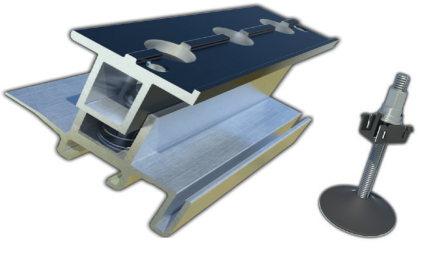
System Components - Required



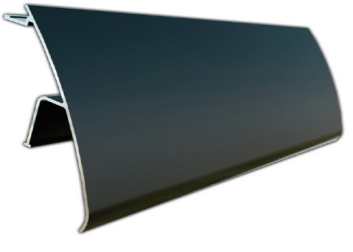
ROCK-IT SLIDE
4" FOR COMP SHINGLE
8" FOR TILE



ROCK-IT 2.0 MOUNT

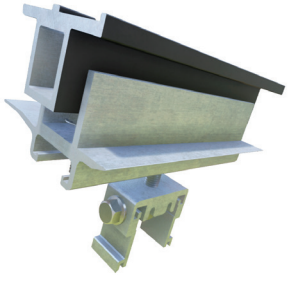


ROCK-IT 2.0 COUPLING & LOAD BEARING FOOT

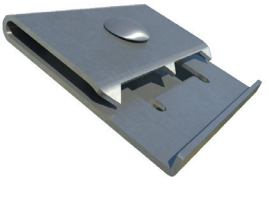


ROCK-IT 2.0 ARRAY SKIRT

System Components - Optional



ROCK-IT 2.0 HYBRID COUPLING
(Refer to pg. 5)



ROCK-IT CLIP SS
(Refer to pg. 6)

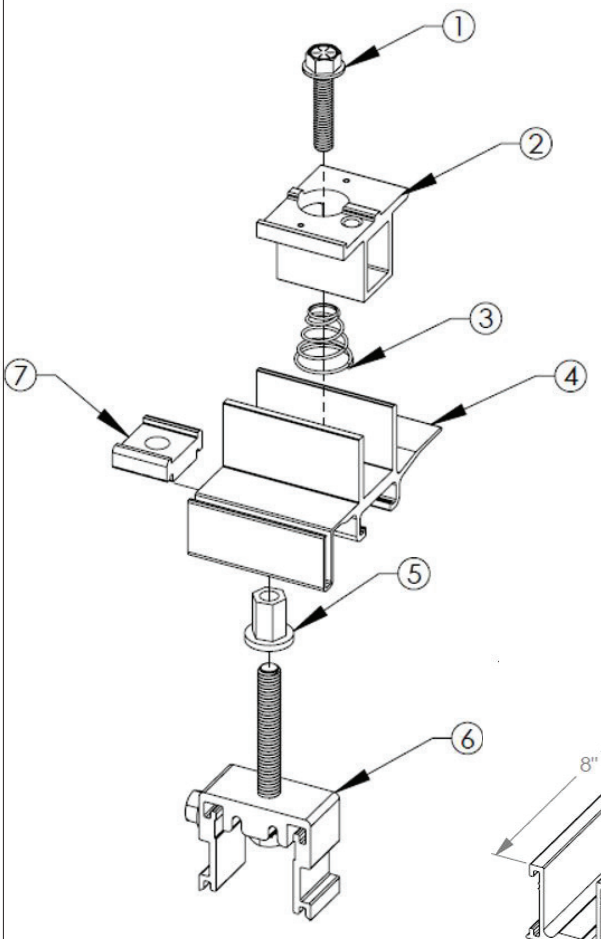
EcoFasten Solar®

EcoFasten Solar products are protected by the following U.S. Patents:

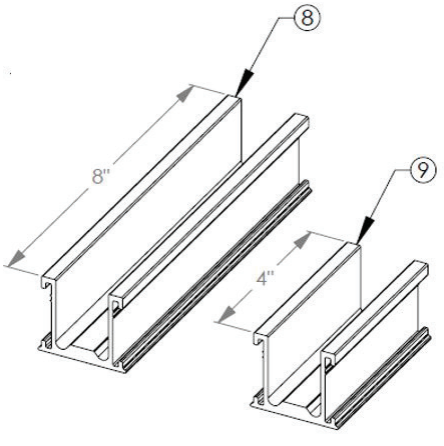
8,151,522 8,153,700 8,181,398 8,166,713 8,146,299
8,209,914 8,245,454 8,272,174 8,225,557 9,010,038
9,134,040 9,175,478 9,212,833

ROCK-IT 2.0 MOUNT ASSEMBLY

NOTE: ITEMS 1-7 SHIP ASSEMBLED ITEM 6 PRE-TORQUED



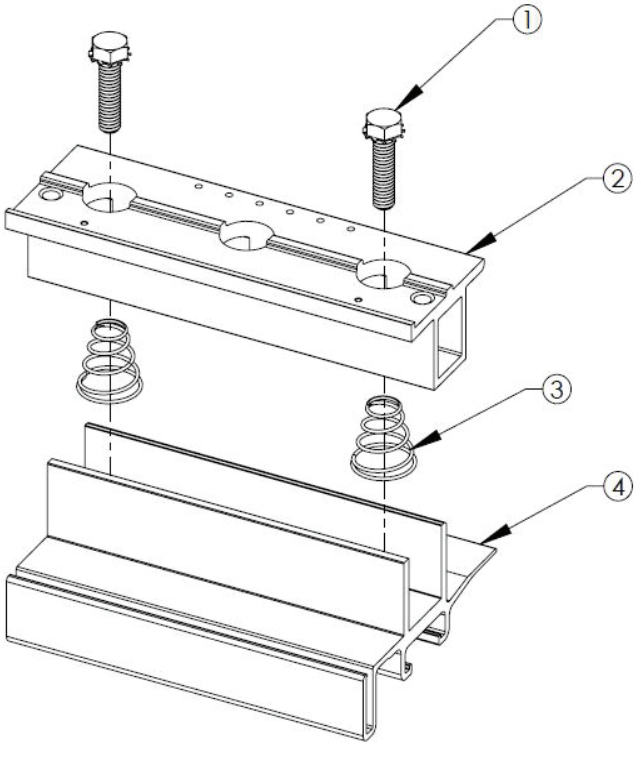
1 5/16"-18 Hex Flange Bolt (or Hex w/ star washer) 300 Series SS
2 Rock-It Mid-Clamp 6000 Series AL
3 Conical Spring 300 Series SS
4 Rock-It Shelf 2.0 6000 Series AL
5 Flange Level Nut 300 Series SS
6 Rock-It Pedestal 6000 Series AL
7 Rock-It-Tie Plate 6000 Series AL
8 Rock-It-Slide-Tile 2.0 6000 Series AL (sold separately)
9 Rock-It-Slide-Comp 2.0 6000 Series AL (sold separately)



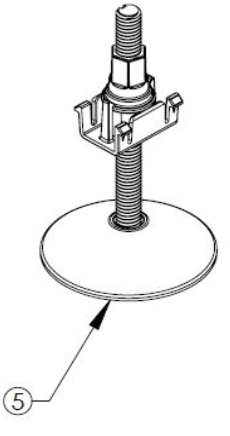
ITEMS 8-9 ARE ACCEPTABLE BRACKETS FOR USE WITH THE ROCK-IT 2.0 (SOLD SEPARATELY)

ROCK-IT 2.0 COUPLING ASSEMBLY

NOTE: ITEMS 1-4 SHIP ASSEMBLED

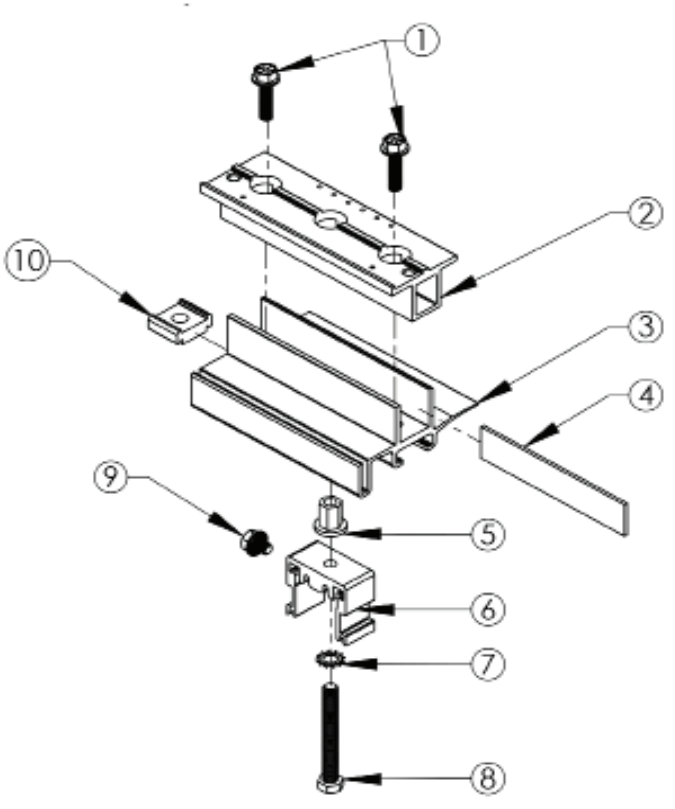


1 5/16"-18 x 1.25" or 1.5" Hex Flange Bolt 300 Series SS
2 Rock-It-Coupling-MidClamp 6000 Series AL
3 Conical Spring 300 Series SS
4 Rock-It-Coupling-Shelf-2.0 6000 Series AL
5 Load Bearing Foot



ROCK-IT 2.0 HYBRID COUPLING ASSEMBLY

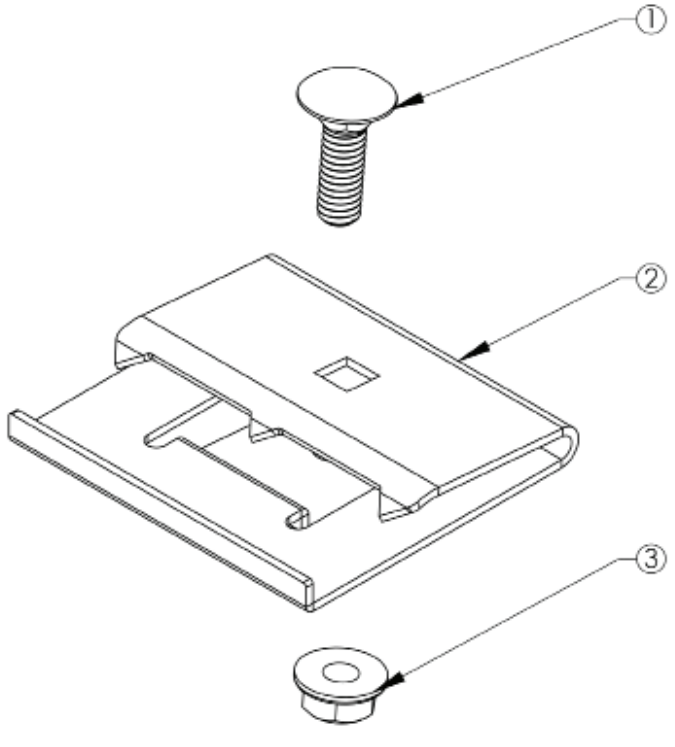
NOTE: ITEMS 1-10 SHIP ASSEMBLED



1 5/16"-18 x 1.25" or 1.5" Hex Flange Bolt 300 Series SS
2 Rock-It-Coupling-MidClamp 6000 Series AL
3 Rock-It-Coupling-Shelf-2.0 6000 Series AL
4 Crushable Spacer - Cardboard or Similar
5 Flange Level Nut 300 Series SS
6 Rock-It Pedestal 6000 Series AL
7 3/8" ID Star Washer 300 Series SS
8 3/8"-16 x 3" Hex Tap Bolt 300 Series SS
9 5/16"-18 x 3/8" Hex Serrated Flange Bolt 300 Series SS
10 Rock-It Tie-Plate-T 6000 Series AL

ROCK-IT CLIP SS ASSEMBLY

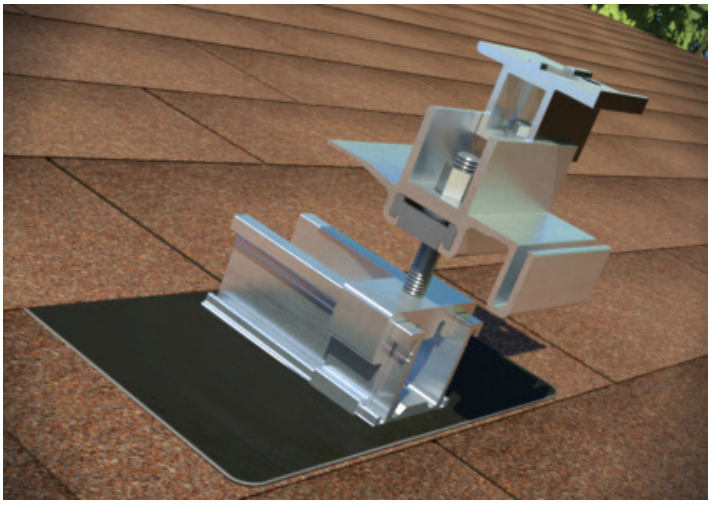
NOTE: ITEMS 1-3 SHIP ASSEMBLED



1 Stainless Steel Carriage Bolt - .313-18X.75
2 Rock-It Clip SS
3 Stainless Steel Flange nut .313-18

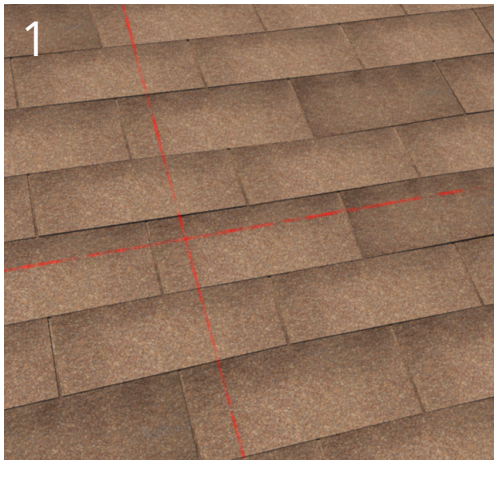
Array Layout

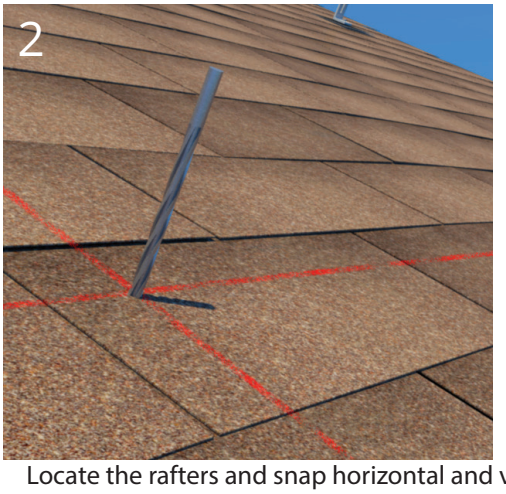
- Find the required structural attachment points. Mark these using a vertical (N-S) chalk line on the center of the rafters.
- Spacing may vary depending upon project specific structural requirements; i.e. high snow and wind load areas may require lesser bracket spacing in the E-W axis vs. the maximum spacing. Max spacing is 48" for portrait orientation and 72" for landscape orientation. Consult project layout diagram for project specific bracket spacing on the roof.
- Install Rock-It Mounts to predetermined mount spacing.
- The array skirt sections are the width of a typical 60 cell module – use the array skirt as a guide to lay out module placement.

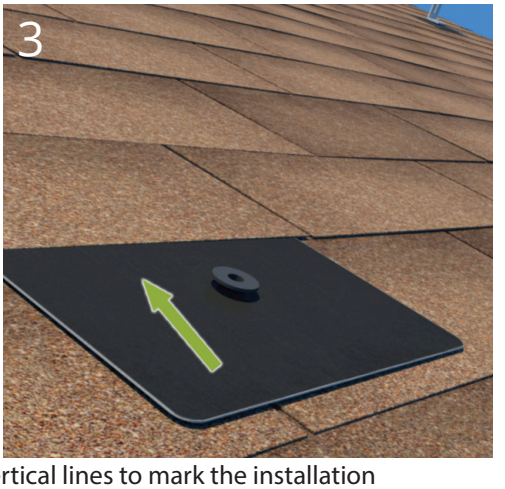


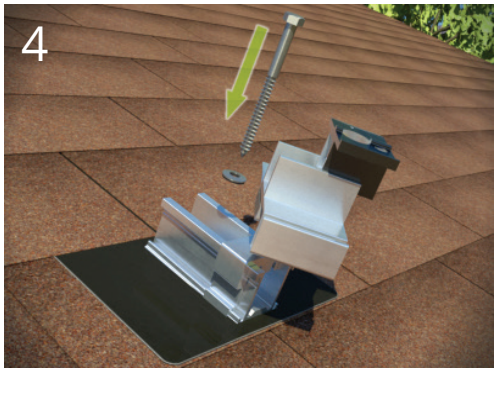
Note: The distance between the rows of mounts is calculated by the module dimension N-S plus 1 3/8" (35mm). Lag screw should be installed as close to center of exposed shingle as possible. The minimum distance between the lag screw and the edge of the shingle is 1/2".

GreenFasten Flashing Install









1 Locate the rafters and snap horizontal and vertical lines to mark the installation position for each GreenFasten flashing.

2 Drill a pilot hole (1/4" diameter) for the lag bolt. Backfill with sealant. EcoFasten Solar recommends an EPDM mastic.

3 Insert the flashing so the top part is under the next row of shingles and pushed far enough up slope to prevent water infiltration through vertical joint in shingles. The leading edge of flashing must butt against upper row of nails to prevent turning when torqued.

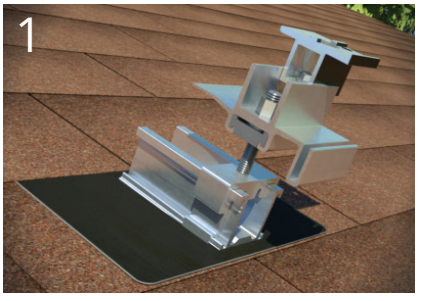
4 Line up pilot hole with GreenFasten flashing hole.

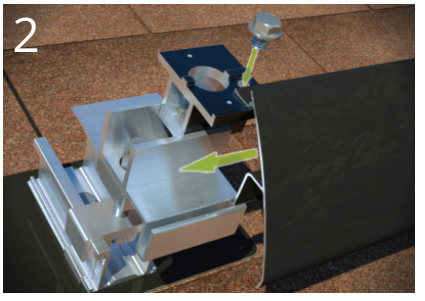
Insert the lag bolt through the EPDM bonded washer, the Rock-It slide, the gasketed hole in the flashing and into the rafter.

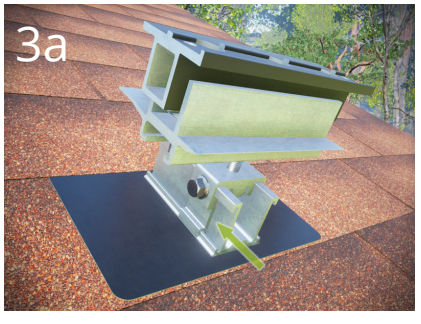
Torque: The range is between 100-140 torque inch-pounds depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners be careful not to over torque the fastener. You may need to stop and use a ratchet to finish the install.

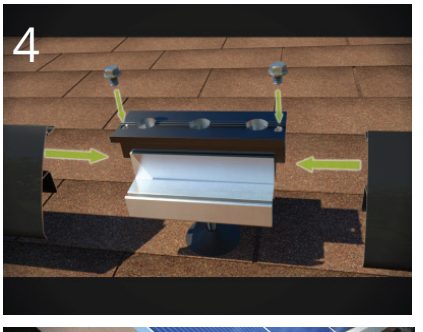
*The Engineer of Record shall check capacity of rafter to support lag screw loading.

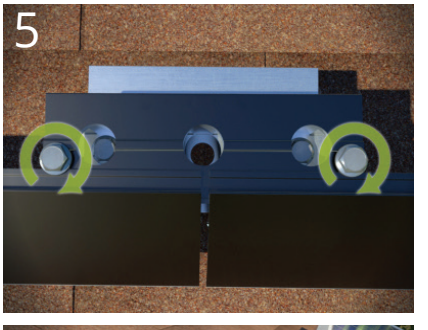
ROCK-IT SYSTEM 2.0 INSTALL

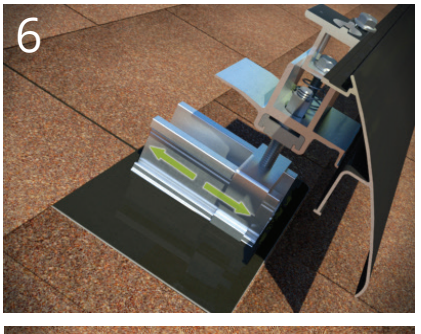


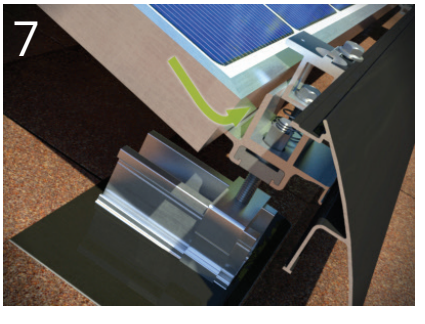


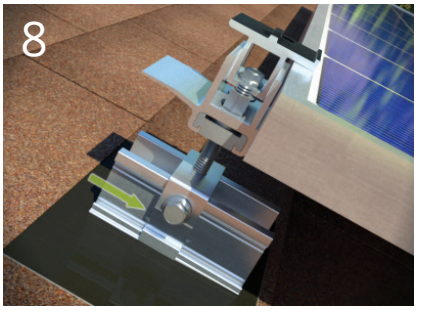


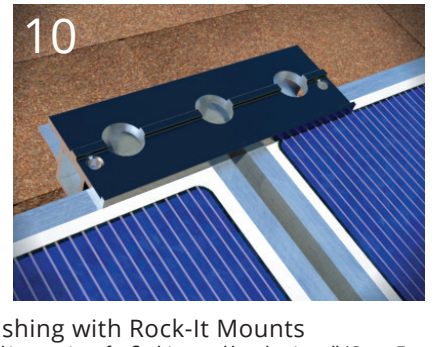


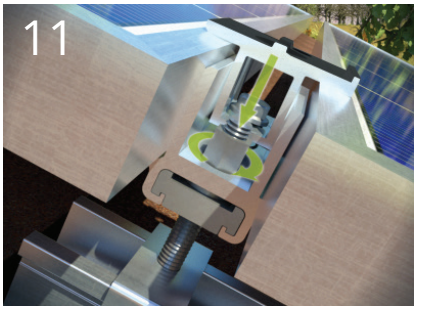












1 Install EcoFasten Solar Flashing with Rock-It Mounts

- Follow EcoFasten Solar Install instructions for flashing and bracket install (GreenFasten shown above)
- Optimum vertical distance between lag bolts is 1 3/8" plus module dimension
- Set mounts on eave most row so that the Rock-It Pedestal is on the South end of Rock-It Slide
- Set mounts on all upper rows so that the Rock-It Pedestal is on the North end of Rock-It Slide

2 Install Array Skirt on Eave Mounts

- Loosen Hex Flange Bolt in Rock-It Mid-Clamp
- Slide Array Skirt into front channel on Rock-It Shelf
- Tighten Hex Flange Bolt to engage the Array Skirt

3-5 Install Rock-It Couplings

- Snap Load Bearing Foot into the bottom of every Rock-It Coupling prior to mounting on the roof
  (Each Load Bearing Foot is set to same height as the Rock-It Mounts - adjust accordingly)
- On eave row only, slide Rock-It Skirt into front channel on Rock-It Coupling
- On eave row only, tighten the west most Array Skirt bolt on Coupling first to 150 in-lbs., followed by tightening the east bolt, drawing the Array Skirt sections together
- Upon final levelling of entire array (see step 11), utilize the Levelling Nut to ensure that the Load Bearing Feet engage the roof surface
- NOTE: If a coupling lands on a rafter, the Hybrid Coupling* should be used in place of the Rock-It Coupling (refer to image 3a)
  *Hybrid Coupling can be made in the field by assembling a coupling to a mount pedestal, or by purchasing separately

6 Align and Straighten First Row of the Rock-It System with Array Skirt

- Use North-South adjustment of the Rock-It Pedestal to straighten array skirt
- Torque screw on side of Rock-It Pedestal to 150 in-lbs to secure it to the Rock-It Slide
- Adjust Flange Level Nut to level the system (optional – can be leveled during or after installation)

7-10 Install 1st Row of PV Modules

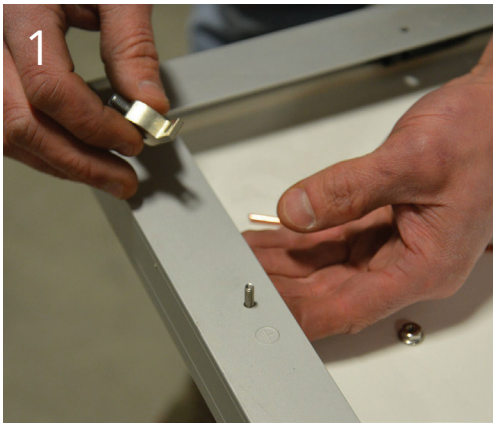
- Slide upslope Rock-It Mounts down to engage top of first module
- Install Rock-It Couplings on the upslope side of 1st row of panels
- Torque 1st and 2nd row of Mid-Clamps on Rock-It Mounts and Rock-It Couplings to 150 in-lbs.
- Install balance of PV modules, ensuring that the Rock-It Pedestals are in the appropriate position, then torque Mid-Clamps to secure modules

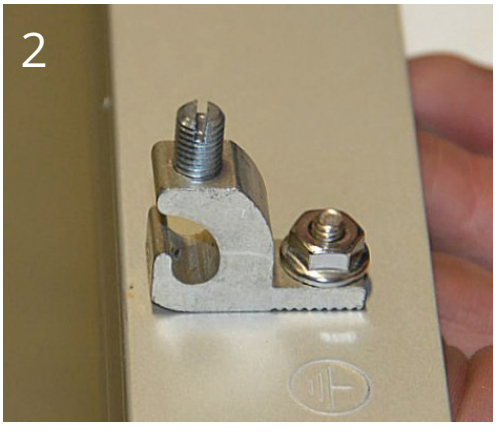
11 Level the Rock-It System

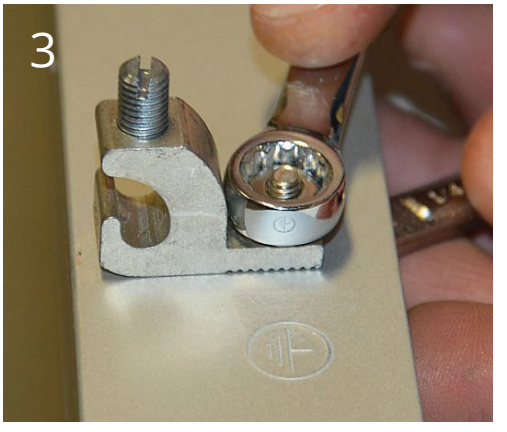
- When assembly is complete, level the entire system by adjusting Flange Level Nuts (Flange Level Nuts have no torque value)

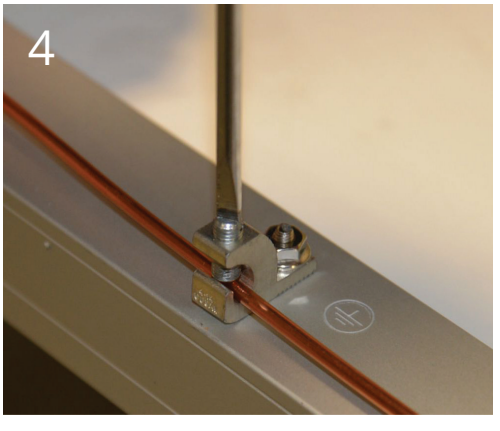
www.ecofastensolar.com info@ecofastensolar.com 877-859-3947

Grounding Lug Install









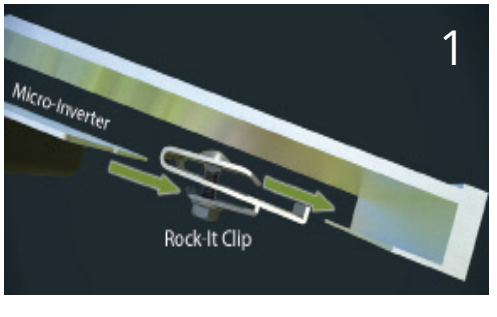
Necessary Components:

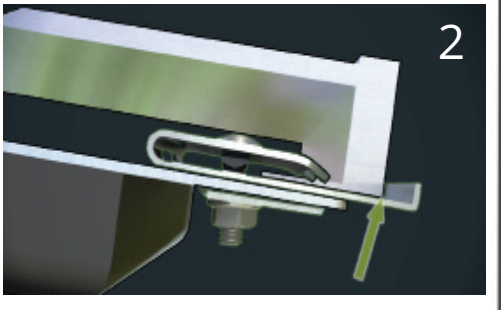
- Burndy CL50-1TN Ground Lug (UL Listing #KDER.E9999)
  Note: Drill and deburr hole in Ground Lug prior to installation
- 14 AWG - 4 AWG Copper Ground Wire*
- 8-32 x 0.5" Serrated Flange Head Bolt (300 Series SS)
- 8-32 Serrated Flange Nut (300 Series SS)
- 11/32" and 1/4" wrenches or ratchets/sockets

1 Insert the flange bolt into the module ground hole. Place Ground Lug over the bolt and turn to desired orientation.
2 Install Flange Nut.
3 Tighten Flange Nut/Bolt.
4 Place wire in Ground Lug channel and tighten set screw to complete assembly.
Torque Values:
14-10 AWG= 20 in-lbs.
8 AWG= 25 in-lbs.
6-4 AWG= 35 in-lbs.

*Minimum of 1/4" clearance required between bare copper wire and aluminum.

Rock-It Clip SS Install





1 Locate all parts
•Locate the Rock-It Clip SS, micro-inverter/power optimizer, and the section of the module frame in which you will be mounting the micro-inverter/power optimizer. See fig. A for acceptable mounting locations.

2 Install the Rock-It Clip SS

- Slide the Rock-It Clip SS onto the lip of the module frame.
- Slide the micro-inverter/power optimizer into the opposite lip of the Rock-It Clip SS.
- Tighten the bolt to 20 ft-lb to clamp the Rock-It Clip SS to the module frame and the micro-inverter/power optimizer to the Rock-It Clip SS.
- Ensure that the lip on the clip is tight against the frame and that the micro-inverter/power optimizer flange is tight against the Clip flange to avoid rotation during tightening.

Grounding Information

The rail-free Rock-It System may be used to mount and ground PV modules that comply with UL 1703, only when that specific module has been evaluated for mounting and grounding, in compliance with the included installation instructions.

Note: Grounding lug must be visible to inspectors from the entire perimeter of the PV array.

Multiple Use Grounding Pins

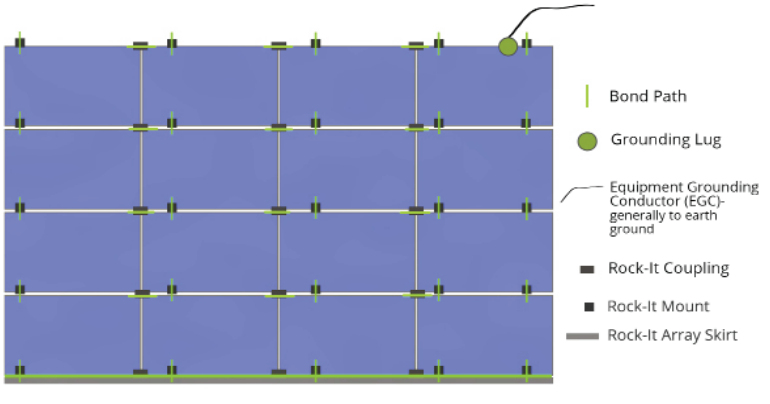
Grounding pins within the mid-clamp are multiple use bonding/grounding devices. Modules will need to be adjusted if the mid-clamps are loosened to ensure there is "new" metal for the grounding pins to pierce into upon retightening.

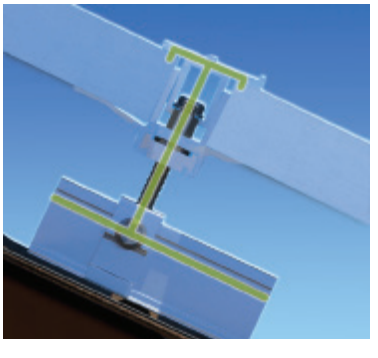
Grounding Method

Rock-It 2.0 Mount: Bonds N-S rows of modules
Rock-It 2.0 Coupling: Bonds E-W rows of modules
Array Skirt 2.0: Bonds E-W along entire array when installed

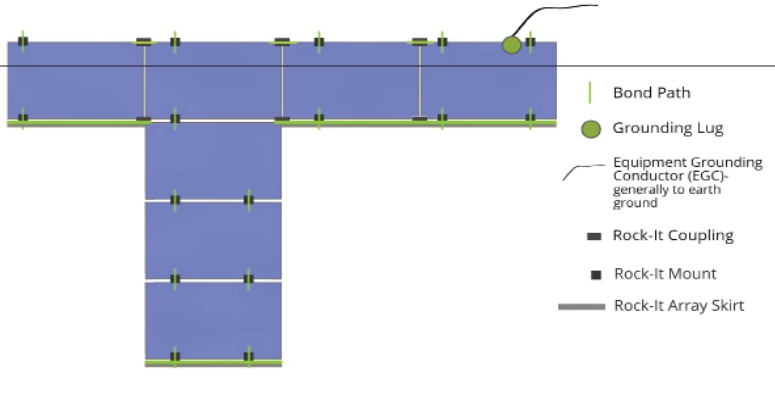
One Burndy CL50-1TN ground lug is required per PV array, limited to 300 modules, placed in either portrait or landscape orientation.

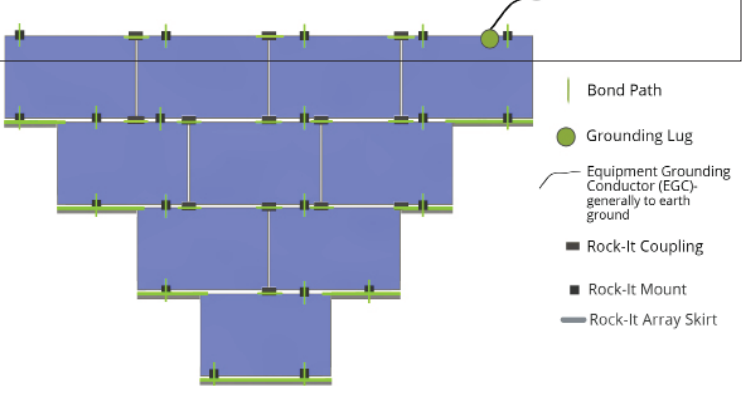
Bonding Assembly and Bonding Path





Integrated Bonding

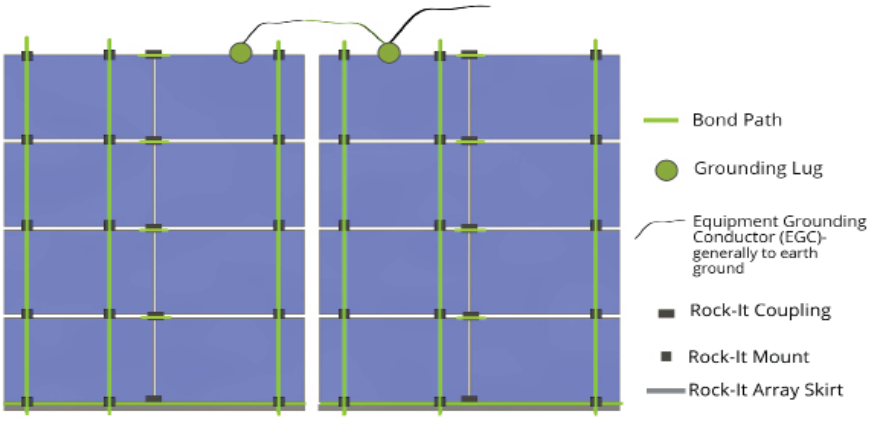




Thermal Expansion and Bonding

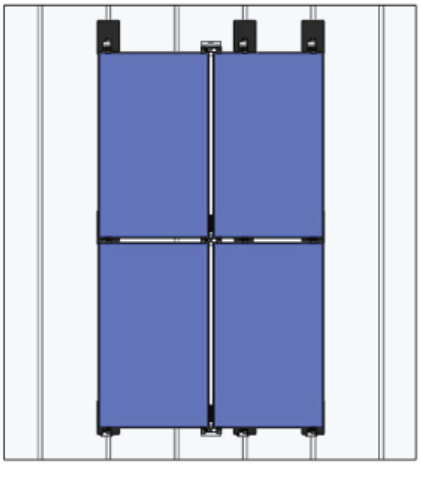
A thermal expansion gap is required per each continuous 40' length of modules.

Omit a coupling and leave a 2" gap in the array skirt and also between the modules at that point.



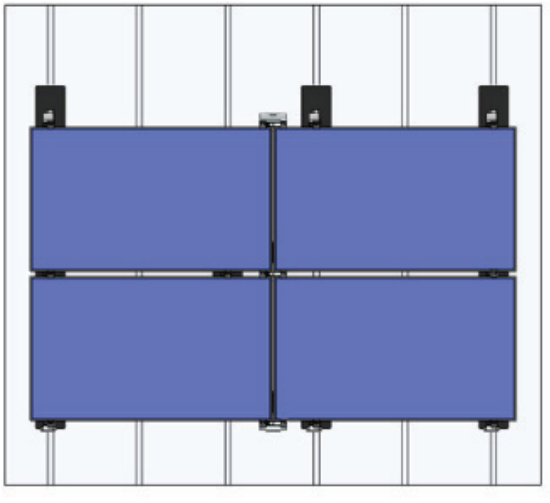
Bracket Spacing

Portrait Orientation



Maximum east/west bracket spacing in portrait orientation is 48" OC.

Landscape Orientation

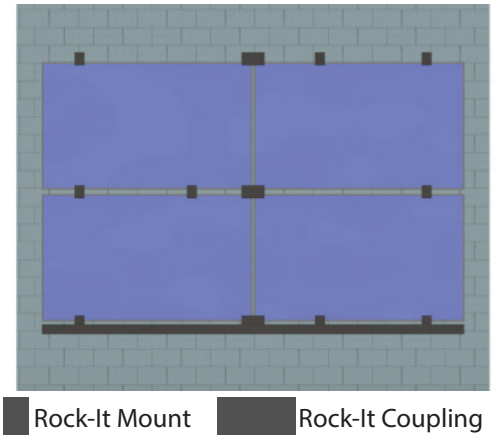


Maximum east/west bracket spacing in landscape orientation is 72" OC.

Spacing may vary depending upon project specific structural requirements; i.e. high snow and wind load areas may require lesser spacing E-W than the maximum.

Staggered Layout

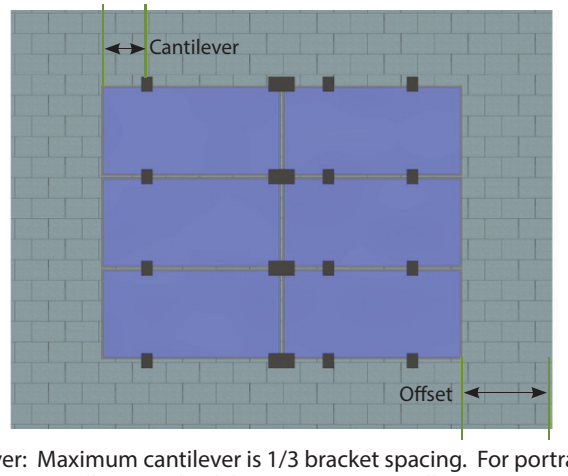
Staggered Mounting Points



Rock-It Mount Rock-It Coupling

The array layout instructions in this installation manual offer a general overview of layout. Periodically, due to a variety of factors (roof obstacles, shading, etc.) other layouts are required.

Cantilever and Offset



Cantilever: Maximum cantilever is 1/3 bracket spacing. For portrait orientation installations, check layout prior to installing.

Offset: Offset from all roof edges depends on wind speed, snow loads, local fire and building codes per location

ROCK-IT SYSTEM 2.0

EVALUATED, COMPATIBLE MODULES

Module Manufacturer	Model Type (X used to indicate variable test)	Module Dimensions (mm)	Module Dimensions (in)	Surface Area (sqft)
Trina Solar	TSM-XXX-PX05.08	1640 x 992 x 40	64.57 x 39.06 x 1.57	17.64
Canadian Solar	CS6P-XXXM	1638 x 982 x40	64.50 x 38.70 x 1.57	17.33
Canadian Solar	CS6P-XXXP	1638 x 982 x 40	64.50 x 38.70 x 1.57	17.33
Jinko Solar	JKMXXXP-60	1650 x 992 x 40	65.00 x 39.05 x 1.57	17.64
Jinko Solar	JKMXXXM-60	1650 x 992 x 40	65.00 x 39.05 x 1.57	17.64
Jinko Solar	JKMXXXPP-60	1650 x 992 x 45	65.00 x 39.05 x 1.77	17.64
Jinko Solar	JKMXXXMM-60	1650 x 992 x 45	65.00 x 39.05 x 1.77	17.64
Yingli Solar	YL2XXP-29b	1650 x 990 x 40	65.00 x 38.98 x 1.57	17.49
LG Electronics	LG300N1C-B3	1640 x 1000 x 35	64.57 x 39.37 x 1.38	17.62
LG Electronics	LG300N1K-G4	1640 x 1000 x 40	64.57 x 39.37 x 1.57	17.62
Aoltec Solar	AC-XXXM/156-60S	1640 x 992 x 40	64.57 x 39.06 x 1.57	17.58

- Fastest, easiest to level system on the market
- Conforms to UL 2703 First Edition
- Class A Fire rating with Type 1 modules
- Integrated electrical bonding
- SIMPLE- only 4 components
- North-South adjustability
- Only one tool required (1/2" deep well socket)

Max No. of Panels	300 Modules per ground lug	Materials	300 Series Stainless Steel 6000 Series Aluminum
Max System Voltage	1000VDC	Coating	Black Andodization/Mill Finish
Class A Fire Rating	With UL1703 Type 1 Rated Modules	Lug Specifications	Burndy CL50-1TN Ground Lug (UL Listing #KDER E9999)
Leveling Range	3-4"	Ground Wire Per above Lug spec.	14 AWG- 4 AWG Copper Ground Wire
Rock-It Slide-Comp 2.0 Range Rock-It Slide-Tile 2.0 Range	3" 7"	Max Module Size	64.96"(1650mm) x 39.05"(992mm) x 2"(50mm)
Min/Max Roof Slope	1/2:12/12:12	Max Downforce/Uplift Rating	45 PSF
Max Anchor Spacing	72"	Rock-It Mount Load Rating	547lbs with Single 5/16" Lag 3.0 Safety Factor
Skirt Box QTY	6 units	Slide Fastening Hole	5/16" diameter
Mount Box QTY	12 units	Module Cantilever	Maximum cantilever is 1/3 bracket spacing
Rock-It Slide Box QTY	50 units		
Coupling Box QTY	12 units	Warranty	20 Year Material and Workmanship

System marking (placed on side or underside of Rock-It Mount and Coupling)

EcoFasten Solar®
ROCK-IT SYSTEM
MFG ID CODE: XXX-QQ-YYYY
CONFORMS TO UL 2703
LOAD RATING: SEE INSTALLATION MANUAL FOR LOAD RATINGS ASSOCIATED WITH SPECIFIC MODULES
SYSTEM CLASS FIRE RATING: SEE INSTALLATION INSTRUCTIONS FOR INSTALLATION REQUIREMENTS TO ACHIEVE A SPECIFIED SYSTEM FIRE CLASS RATING WITH THIS PRODUCT

Codes: National Electric Code, ANSI/NFPA 70, NEC 250, NEC 690, IRC, IBC
Standards: UL 2703 First Edition, UL 1703

EcoFasten Solar®

www.ecofastensolar.com info@ecofastensolar.com 877-859-3947