powered by Q.ANTUM DUO Z

Q.PEAK DUO BLK ML-G9+

365-385

ENDURING HIGH PERFORMANCE

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2020

25 YR Warranty
Product & Performance

Q CELLS
Yield Security

BREAKING THE 20% EFFICIENCY BARRIER
Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.6%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behavior.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminum alloy frame, certified for high snow (6000 Pa) and wind loads (4000 Pa).

A RELIABLE INVESTMENT
Inclusive 25-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative 12-busbar design with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (–1500 V, 168 h)
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

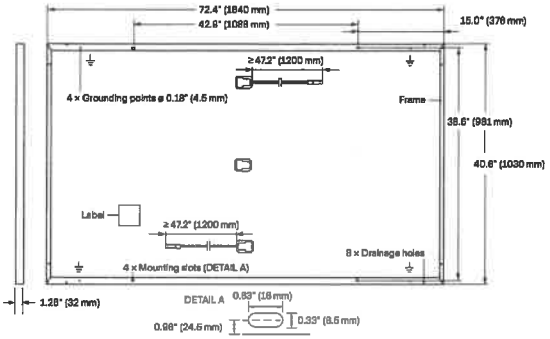
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	72.4 in × 40.6 in × 1.26 in (including frame) (1840 mm × 1030 mm × 32 mm)
Weight	43.0 lbs (19.5 kg)
Front Cover	0.11 in (2.8 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥47.2 in (1200 mm), (−) ≥47.2 in (1200 mm)
Connector	Stäubli MC4; IP68

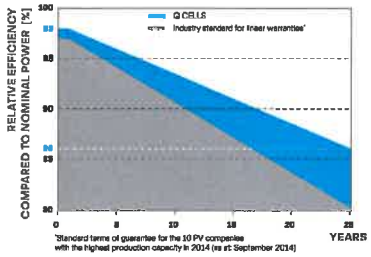


ELECTRICAL CHARACTERISTICS

POWER CLASS				365	370	375	380	385
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)								
Minimum	Power at MPP[1]	P_{MPP}	[W]	365	370	375	380	385
	Short Circuit Current[1]	I_{SC}	[A]	10.40	10.44	10.47	10.50	10.53
	Open Circuit Voltage[1]	V_{OC}	[V]	44.93	44.97	45.01	45.04	45.08
	Current at MPP	I_{MPP}	[A]	9.87	9.92	9.98	10.04	10.10
	Voltage at MPP	V_{MPP}	[V]	36.99	37.28	37.57	37.85	38.13
	Efficiency[1]	η	[%]	≥19.3	≥19.5	≥19.8	≥20.1	≥20.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]								
Minimum	Power at MPP	P_{MPP}	[W]	273.3	277.1	280.8	284.6	288.3
	Short Circuit Current	I_{SC}	[A]	8.38	8.41	8.43	8.46	8.48
	Open Circuit Voltage	V_{OC}	[V]	42.37	42.41	42.44	42.48	42.51
	Current at MPP	I_{MPP}	[A]	7.76	7.81	7.86	7.91	7.96
	Voltage at MPP	V_{MPP}	[V]	35.23	35.48	35.72	35.96	36.20

[1]Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2°C, AM 1.5 according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5

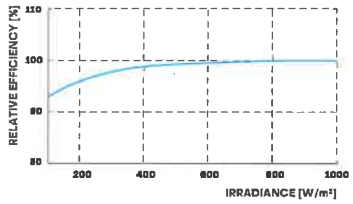
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.35	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1000 (IEC) / 1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull[3]	[lbs / ft²]	84 (4000 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	−40°F up to +185°F (−40°C up to +85°C)
Max. Test Load, Push / Pull[3]	[lbs / ft²]	125 (6000 Pa) / 84 (4000 Pa)		

[3] See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
IEC 61215:2016,
IEC 61730:2016,
U.S. Patent No. 9,893,215
(solar cells)

C Certified US
UL 61730

CE

TÜVRheinland CERTIFIED
www.tuv.com
ID 1111220277

PACKAGING AND TRANSPORT INFORMATION

Horizontal packaging	74.4 in 1890 mm	42.5 in 1080 mm	47.6 in 1208 mm	1458 lbs 661 kg	28 pallets	24 pallets	32 modules

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748 59 96 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.us

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready Enphase IQ 7 Micro™ and Enphase IQ 7+ Micro™ dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.

UL CERTIFIED
SAFETY UL-CA
E341165

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US / IQ7-60-B-US	IQ7PLUS-72-2-US / IQ7PLUS-72-B-US
Commonly used module pairings[1]	235 W - 350 W +	235 W - 440 W +
Module compatibility	60-cell PV modules only	60-cell and 72-cell PV modules
Maximum input DC voltage	48 V	60 V
Peak power tracking voltage	27 V - 37 V	27 V - 45 V
Operating range	16 V - 48 V	16 V - 60 V
Min/Max start voltage	22 V / 48 V	22 V / 60 V
Max DC short circuit current (module Isc)	15 A	15 A
Overvoltage class DC port	II	II
DC port backfeed current	0 A	0 A
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range[2]	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[3]	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	

EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak CEC efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %

MECHANICAL DATA	
Ambient temperature range	-40°C to +65°C
Relative humidity range	4% to 100% (condensing)
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)	Friends PV2 (MC4 intermateable). Adaptors for modules with MC4 or UTX connectors: - PV2 to MC4: order ECA-S20-S22 - PV2 to UTX: order ECA-S20-S25
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection - No fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environmental category / UV exposure rating	NEMA Type 6 / outdoor

FEATURES	
Communication	Power Line Communication (PLC)
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.

1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

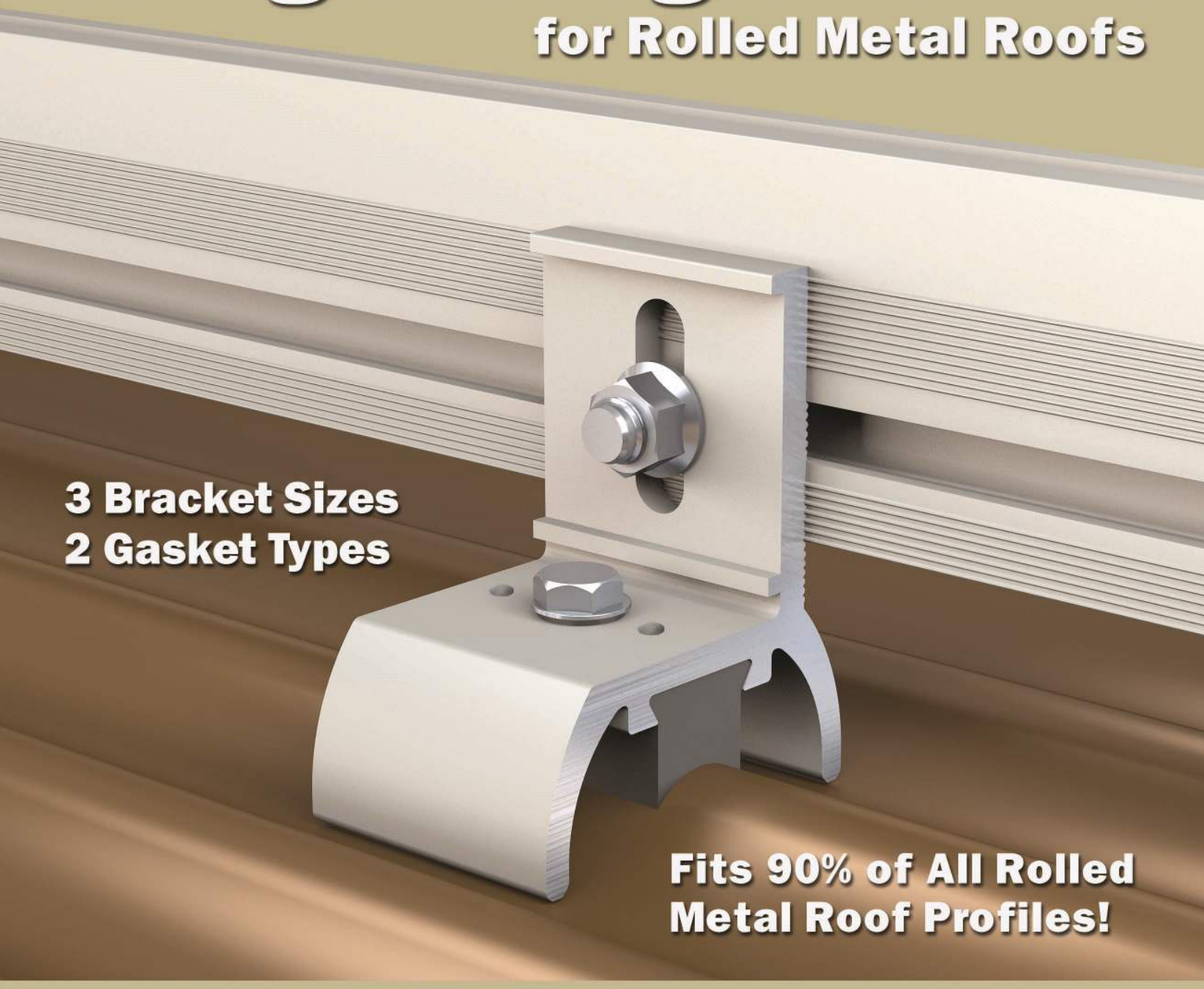
ENPHASE

2018-05-24

SUNMODO®

Ridge Bridge Mount

for Rolled Metal Roofs



3 Bracket Sizes
2 Gasket Types

Fits 90% of All Rolled Metal Roof Profiles!

The Next Generation

in Metal Roof Mounts!

SUNMODO
1905 E 5th St., Ste. A
Vancouver, WA 98661
Phone: 360-844-0048 www.sunmodo.com

Ridge Bridge Mount

Patent #: US 8424821

for Rolled Metal Roofs

K10211-XXX (shown with corrugated roof gasket)

K10212-XXX (shown with barn roof gasket)

Designed for maximum flexibility; 3 bracket sizes fit almost any rolled metal roof profile.

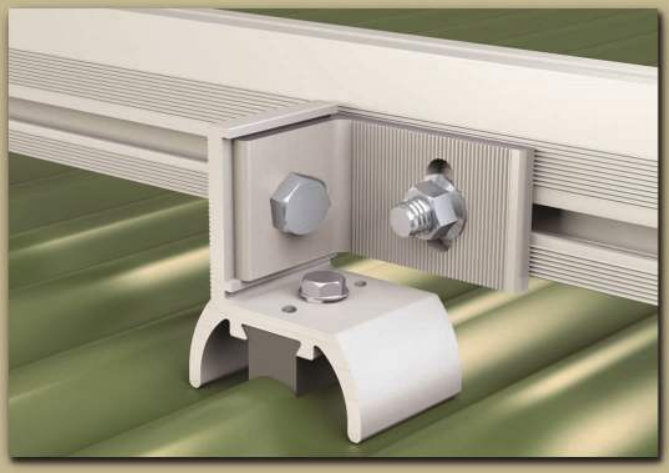
Single screw penetration mount on wood or metal purlins for fast and easy installation.

Choice of 2 EPDM gaskets for a superior water tight seal.

The vertical slot feature provides adjustment to the solar array when roofing is uneven.

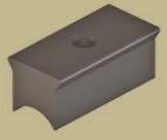
Durable aluminum anodizing finish for increased weather corrosion resistance.

Combine with L-Adaptor (K10066-016) to change the orientation of rail at right angles to corrugations



All kits come complete with the following parts:

1 - Corrugated Roof Mount
(Choice of 3 Sizes)



1 - Roof Mount Gasket
(Choice of 2 Types)

1 - Lag Bolt 5/16 X 5"
& 1 Sealing Washer

1 - T-Bolt & 1 - Flange Nut

SUNMODO
1905 E 5th St., Ste. A
Vancouver, WA 98661
Phone: 360-844-0048 www.sunmodo.com

Daniel W. Dunzik **Architect LEED-AP**
370 Burnt Hill Rd. Skillman, NJ. 08558 **908-872-3664**

February 4, 2021

Building Department

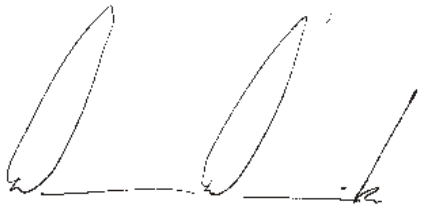
Attn: Plan Reviewer

Re:Proposed Photovoltaic Solar Panel Installation

Dear Sir:
I have reviewed the following documents related to the "EcoFasten Solar" ROCK-IT SYSTEM 4.0 and certify that the attachment system when installed in strict compliance with the manufacturers Installation Manual appropriate for this application and is in compliance with the latest building codes including Florida Administrative Code, 2020 Florida Building Code - Residential Seventh Edition, ASCE-7-16, 2020 Florida Building Code – Energy Conservation, Seventh Edition, 2017 National Electric Code, All Local Governing County and Municipal Ordinances adopted by reference or enacted by law. I make this certification for the following listed documents:

1. ROCK-IT SYSTEM 4.0 Installation Manual
2. PZSE, Inc Structural Engineers Certification.
3. EcoFasten Solar Certificate No. US 82150026
4. ROCK-IT SYSTEM 4.0 Cut Sheet for Coupling, Hybrid Coupling, and Mount.

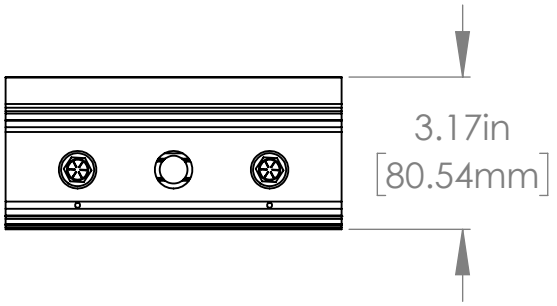
If you have any questions relating to this matter, please contact me at your earliest convenience. Thank you.

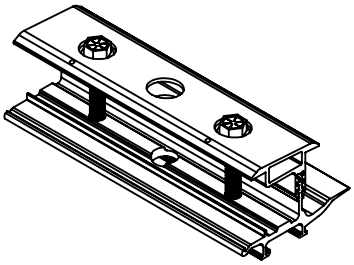


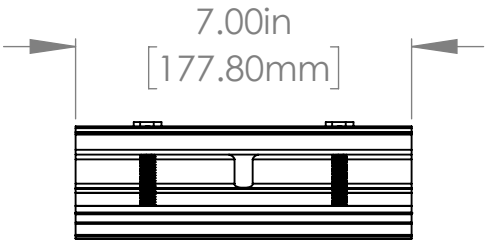
Daniel W. Dunzik, RA. LEED-AP
Fl. Lic. No. AR98795

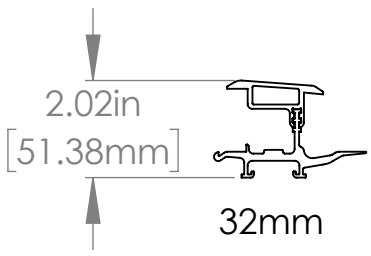
Cut Sheet - Rock-It-4.0-Coupling

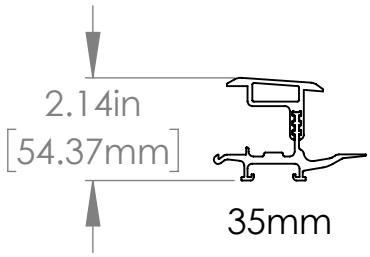
1. Installation to be completed in accordance with manufacturer's written specifications and installation instructions.
2. See spec sheet or contact manufacturer for detailed material, finishes, and configuration options.
3. Contact manufacturer for detailed layout.
4. Do not scale drawings.
5. Subject to change without notice.

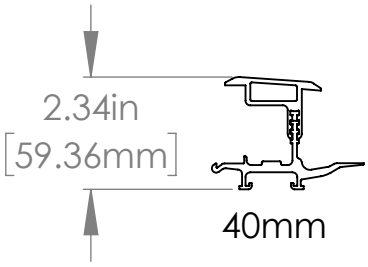












ALPINE SNOWGUARDS
Toll Free Phone 1.888.766.4273
Toll Free Fax 1.888.766.9994

EcoFasten Solar
Toll Free Phone 1.877.859.3947
Toll Free Fax 1.888.766.9994

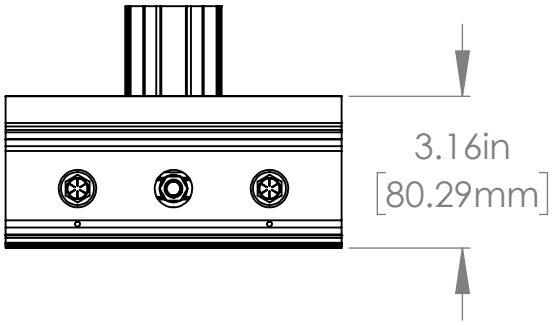
4741 W Polk Stree Ste. 4
Phoenix, AZ 85043

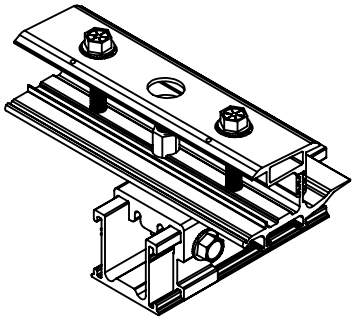
Material: See Spec Sheet

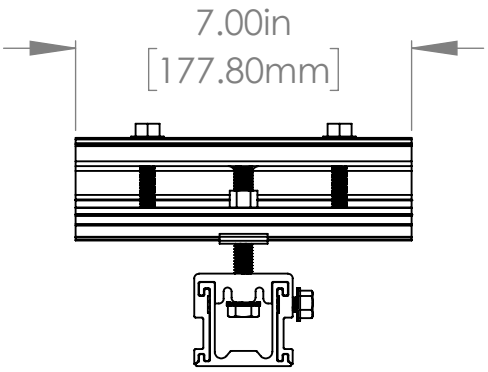
Scale: 1:4	6/28/2017	ASG: -	EFS: x

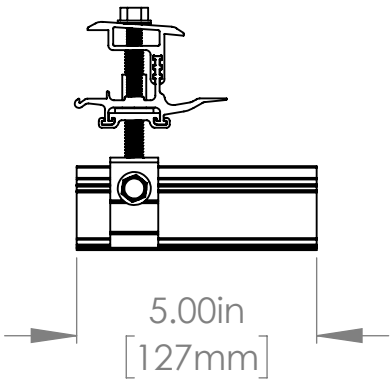
Cut Sheet - Rock-It-4.0-Hybrid Coupling

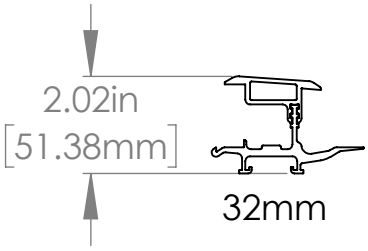
1. Installation to be completed in accordance with manufacturer's written specifications and installation instructions.
2. See spec sheet or contact manufacturer for detailed material, finishes, and configuration options.
3. Contact manufacturer for detailed layout.
4. Do not scale drawings.
5. Subject to change without notice.

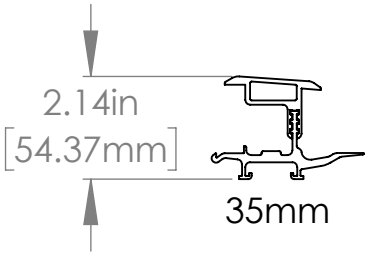


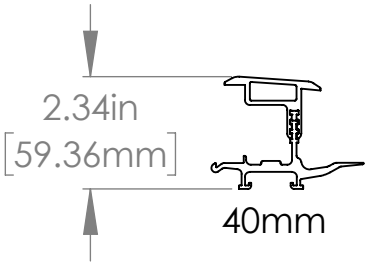












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Toll Free Fax 1.888.766.9994

4741 W Polk Street Ste. 4
Phoenix, AZ 85043

Material: See Spec Sheet

Scale: 1:1	6/28/2017	ASG: -	EFS: x

ROCK-IT SYSTEM™ 4.0

RAIL-FREE RACKING

UTILIZES ECOFASTEN SOLAR'S PATENTED TECHNOLOGY

EcoFasten Solar®

Document Date: 9.8.2017

Contents

ROCK-IT SYSTEM 4.0

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

- New and improved design
- Fastest, easiest to level system on the market
- 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 4.0 MOUNT

ROCK-IT 4.0 COUPLING & LOAD BEARING FOOT

ROCK-IT 4.0 ARRAY SKIRT

System Components* - Optional

ROCK-IT 4.0 HYBRID MOUNT
(REFER TO PG. 5)

ROCK-IT CLIP SS
(REFER TO PG. 6)

ROCK-IT CLIP 2.0
(REFER TO PG. 6)

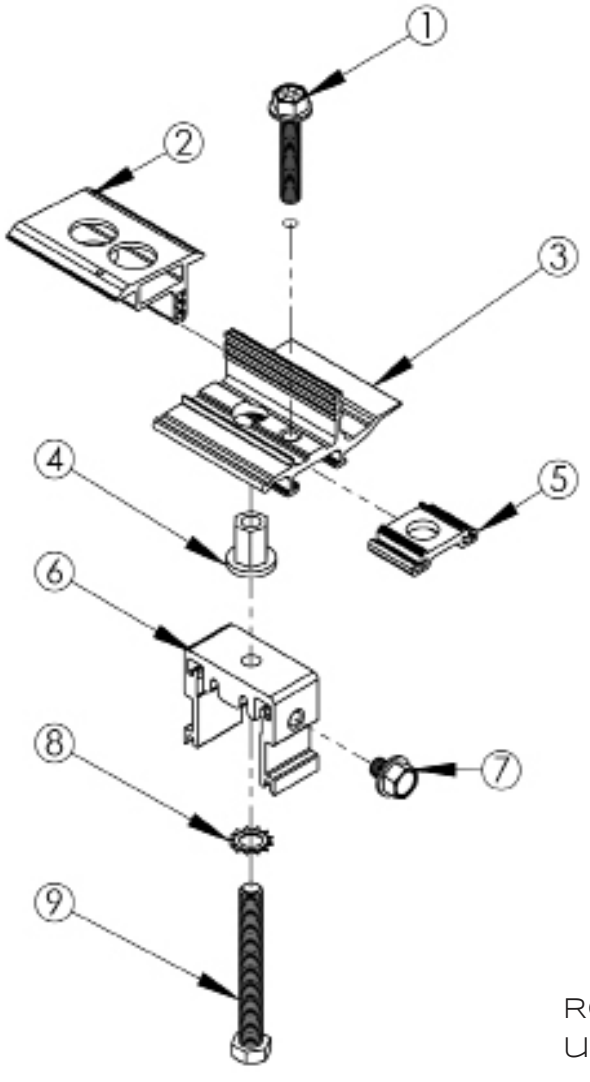
ROCK-IT 4.0 ARRAY SKIRT END CAPS
(END CAPS COME PRE-INSTALLED ON EAST END OF SKIRT SECTIONS)

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

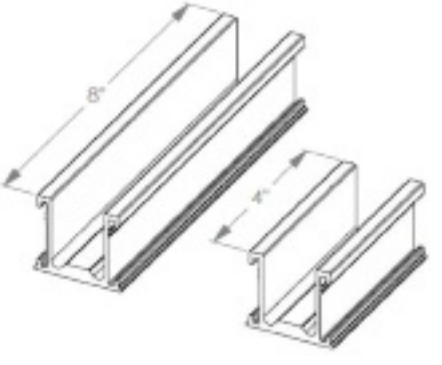
*Components for use with 32mm modules are available as special order. Components for use with 32mm modules are labeled as such on system packaging. Please refer to evaluated, compatible modules grid on page 15 to identify system compatible 32mm modules.



ROCK-IT 4.0 MOUNT ASSEMBLY

NOTE: ITEMS 1-7 SHIP ASSEMBLED

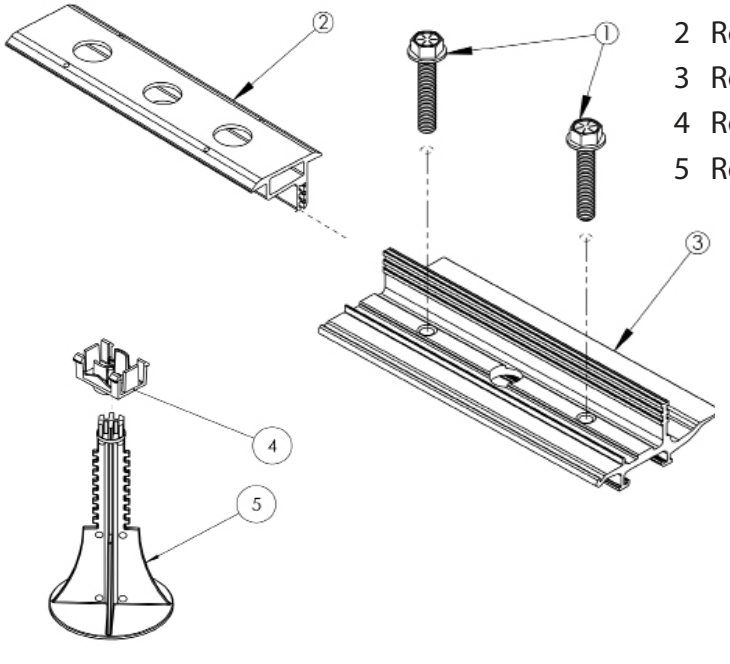
1 5/16"-18 x 1.75" Hex Serrated Flange Bolt 300 Series SS
2 Rock-It 4.0 Mid-Clamp 6000 Series AL
3 Rock-It 4.0 Shelf 6000 Series AL
4 Flange Level Nut 300 Series SS
5 Rock-It 4.0 Tie Plate 6000 Series AL
6 Rock-It Pedestal 6000 Series AL
7 5/16"-18 x 3/8" Hex Serrated Flange Bolt 300 Series SS
8 3/8" ID Star Washer 300 Series SS
9 3/8"-16 x 3" Hex Tap Bolt 300 Series SS



ROCK-IT SLIDES ARE ACCEPTABLE BRACKETS FOR USE WITH ROCK-IT 4.0 (SOLD SEPARATELY)

ROCK-IT 4.0 COUPLING ASSEMBLY

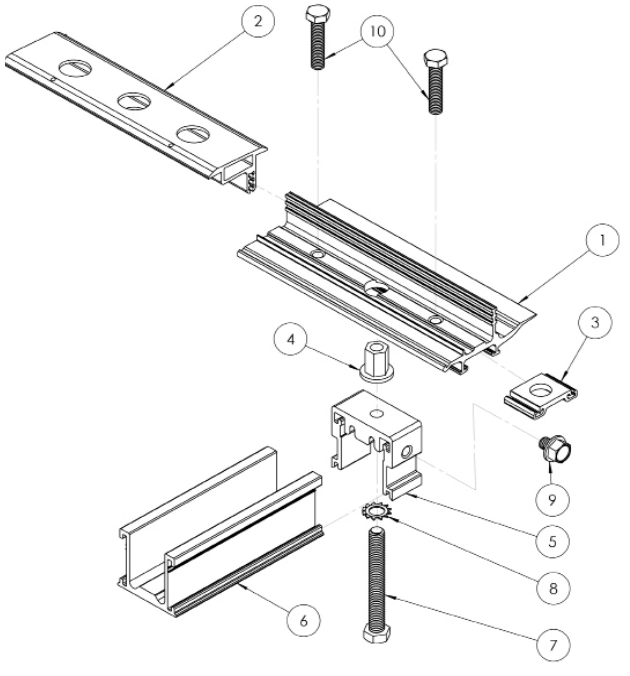
NOTE: ITEMS 1-3 SHIP ASSEMBLED



1 5/16"-18 x 1.75" Hex Serrated Flange Bolt 300 Series SS
2 Rock-It 4.0 Coupling Mid-Clamp 6000 Series AL
3 Rock-It 4.0 Coupling Shelf 6000 Series AL
4 Rock-It Load Bearing Foot Clip
5 Rock-It Load Bearing Foot Base

ROCK-IT 4.0 HYBRID MOUNT ASSEMBLY

NOTE: ITEMS 1-10 SHIP ASSEMBLED

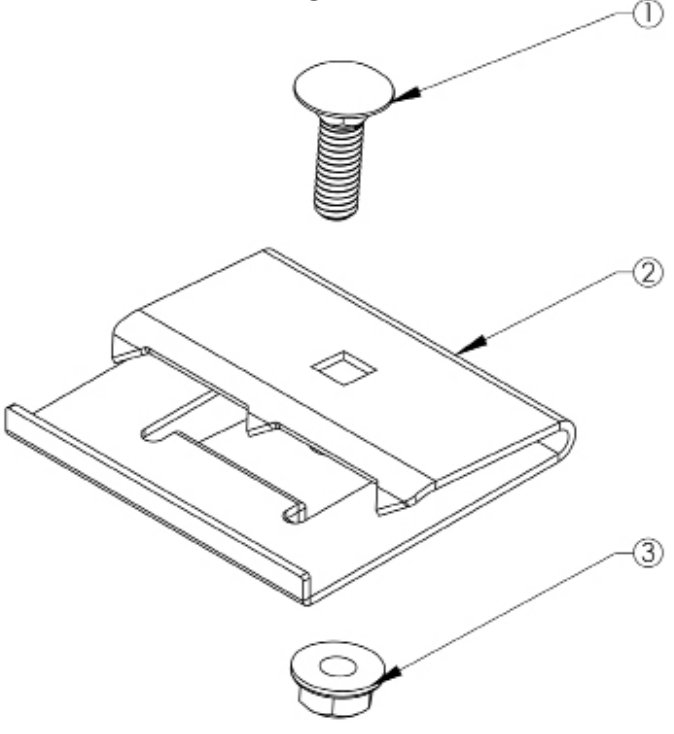


1 Rock-It 4.0 Shelf 6000 Series AL
2 Rock-It 4.0 Coupling Mid-Clamp 6000 Series AL
3 Rock-It 4.0 Coupling Tie Plate6000 Series AL
4 Flange Level Nut 300 Series SS
5 Rock-It Pedestal 6000 Series AL
6 Rock-It Slide 6000 Series AL
7 3/8"-16 x 3" Hex Tap Bolt 300 Series SS
8 3/8" ID Star Washer 300 Series S
9 5/16"-18 x 3/8" Hex Serrated Flange Bolt 300 Series SS
10 5/16"-18 x 1.5" Hex Serrated Flange Bolt 300 Series SS

ROCK-IT CLIP SS ASSEMBLY

NOTE: ITEMS 1-3 SHIP ASSEMBLED

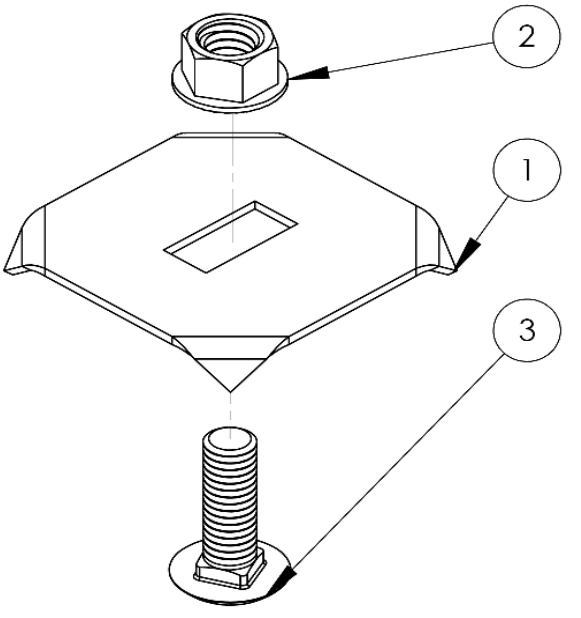
1 Stainless Steel Carriage Bolt - .313-18X.75
2 Rock-It Clip SS
3 Stainless Steel Flange nut .313-18



ROCK-IT CLIP 2.0 ASSEMBLY

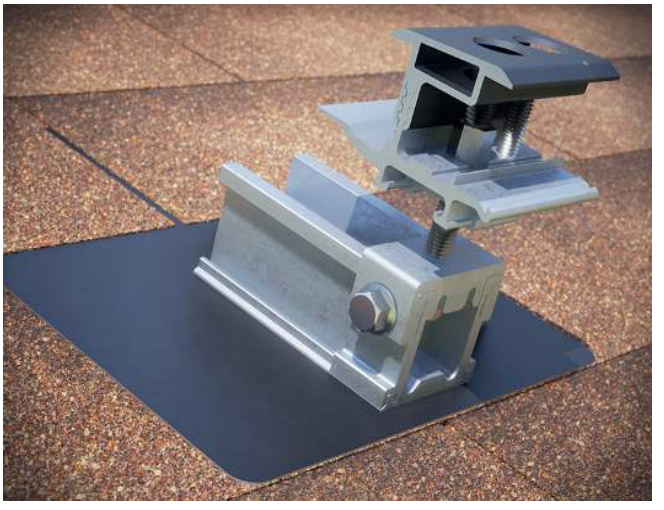
NOTE: ITEMS 1-3 SHIP ASSEMBLED

1 Rock-It Clip 2.0
2 Stainless Steel Flange nut .313-18
3 Bolt .3125-18x1x1-S



Array Layout

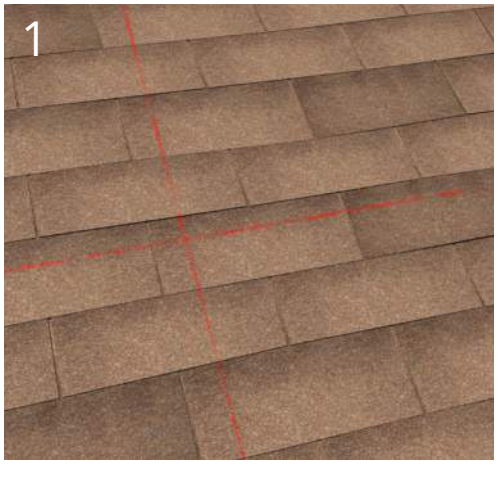
- Find the required structural attachment points. Mark these using a vertical (N-S) chalk line on the center of the rafters.
- Spacing may vary depending upon project specific structural requirements; i.e. high snow and wind load areas may require lesser bracket spacing in the E-W axis vs. the maximum 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.

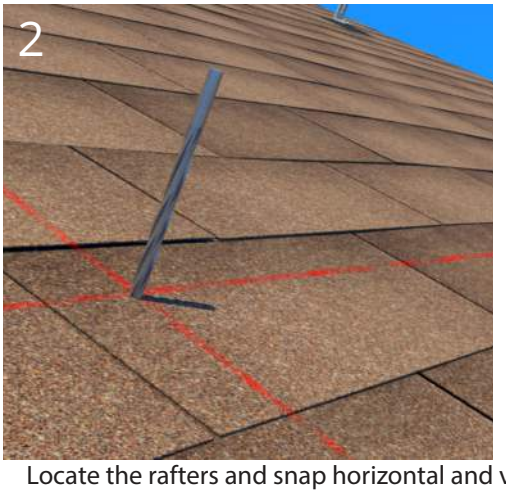


- The Rock-It Array Skirt sections are the width of a typical 60 cell module – use the Rock-It Array Skirt as a guide to lay out module placement.

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.

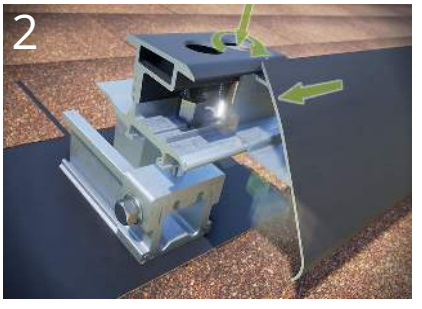
4 Line up pilot hole with GreenFasten flashing hole.

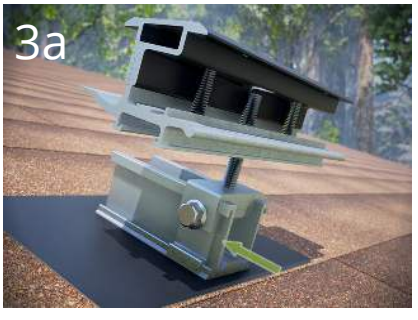
Insert the lag bolt through the EPDM bonded washer, the Rock-It slide, the gasketed hole in the flashing and into the rafter.

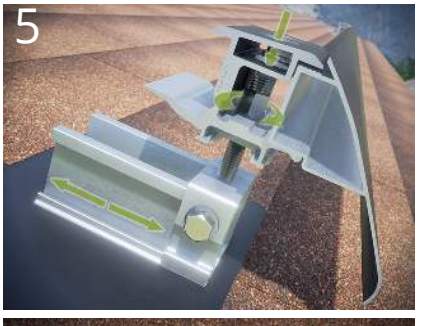
Torque: The range is between 100-140 torque inch-pounds depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners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

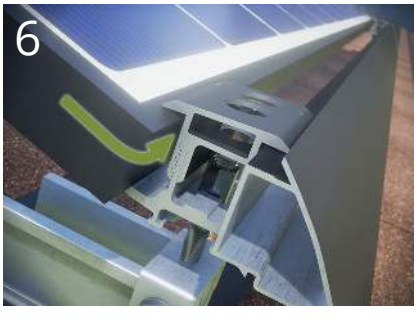
*The Engineer of Record shall check capacity of rafter to support lag screw loading.

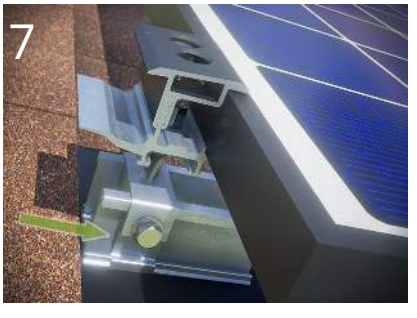
ROCK-IT SYSTEM 4.0 INSTALL

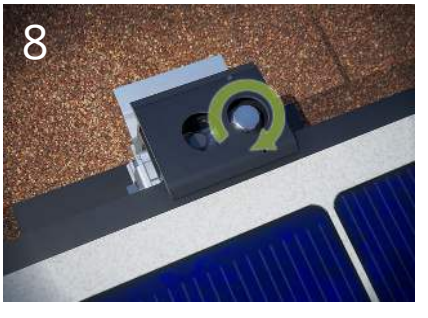












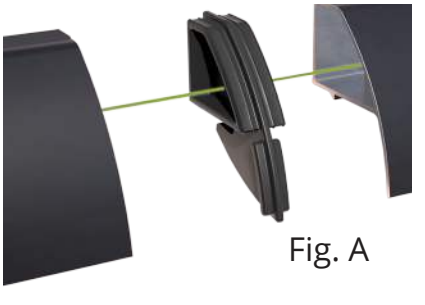


Fig. A

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 Rock-It Array Skirt onto Eave Mounts
- Slide Rock-It Array Skirt into front channel on Rock-It Shelf.
- Array Skirt End Caps are pre-installed on the East end of each skirt section, and are used to couple the skirt sections where needed (see Fig. A).
- Tighten Mid-Clamp bolt, clamping Rock-It Array Skirt to mount. Torque to 200 in-lbs. (130 in-lbs. when installing with 32mm modules).

3-4 Install Rock-It Couplings (when joining 4 panels with a Coupling, the use of a load bearing foot is required)
- Prior to mounting on the roof, snap Load Bearing Foot into the bottom of Rock-It Coupling if required. (Each Load Bearing Foot is set to same height as the Rock-It Mounts - adjust accordingly)
- On eave row only, slide Rock-It Array Skirt onto Rock-It Coupling Shelf. Torque to specified value.
- NOTE: If a coupling lands on a rafter, the Hybrid Mount* should be used in place of the Rock-It Coupling (refer to image 3a). *Hybrid Mount can be made in the field by assembling a coupling to a mount pedestal, or by purchasing separately.

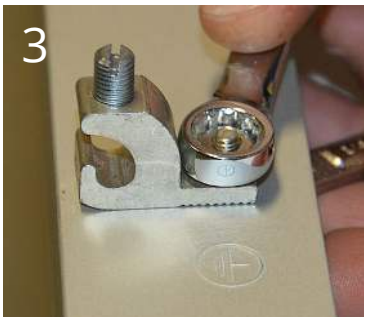
5 Align and Straighten First Row of the Rock-It System with Rock-It Array Skirt
- Use North-South adjustment of the Rock-It Pedestal to straighten Rock-It Array Skirt and align module with Array Skirt.
- Torque screw on side of Rock-It Pedestal to 150 in-lbs to secure it to the Rock-It Slide.
- Adjust Flange Level Nut to level the system (optional – can be leveled during or after installation).

6-9 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 2nd row of Mid-Clamps on Rock-It Mounts and Rock-It Couplings to specified value.
- Install balance of PV modules, ensuring that the Rock-It Pedestals are in the appropriate position, then torque Mid-Clamps to secure modules.

10 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).
- Height between roof surface and underside of modules should be 3" or less, when installed with Type 2 modules.

INSTALLATION NOTE: Modules should be installed so that the junction box is installed upslope, away from the leading edge of the array.

Grounding Lug Install



Necessary Components:

- One of the following ground lugs (or any UL 2703 compliant ground lug):
  - Burndy CL50-1TN Ground Lug (UL 2703 - E351343 / UL 467 - E9999)
  - ILSCO SGB-4 Ground Lug (UL 2703 - E354420 / UL 467 - E34440)
  - ILSCO GBL-4DBT (UL 2703 - E354420 / UL 467 - E34440)
  - ILSCO GBL-4DBTH (UL 2703 - E354420 / UL 467 - E34440)
  - ILSCO GBL-4SS (UL 2703 - E354420 / UL 467 - E34440)

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

Torque Values:

14-10 AWG= 20 in-lbs.

8 AWG= 25 in-lbs.

6-4 AWG= 35 in-lbs.

1 Insert the flange bolt into the module ground hole. Place Star Washer over bolt. Place ground lug over the bolt and Star Washer, and turn to desired orientation.

2 Install Flange Nut.

3 Tighten Flange Nut/Bolt.

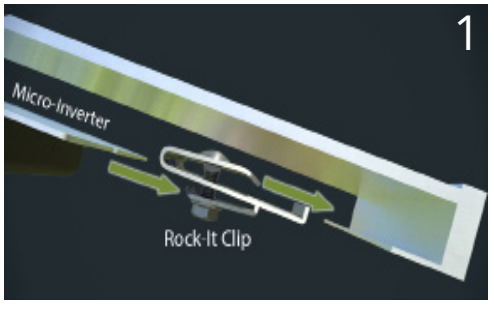
4 Place wire in Ground Lug channel and tighten set screw to complete assembly.

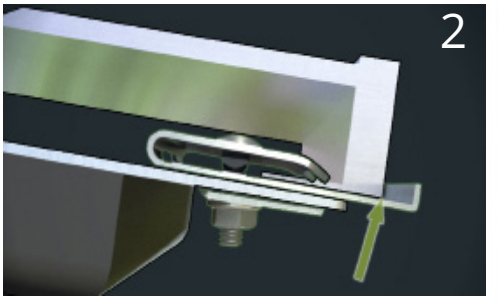
*Wire should be sized in accordance with the National Electrical Code, NFPA 70, Section 690.45, and a minimum of 1/4" clearance required between bare copper wire and aluminum.


Drill hole per grounding lug manufacturers specifications in the upslope part of Rock-It Coupling for attaching grounding lug.

Note: Deburr hole in Ground Lug and Rock-It Coupling prior to installation.

ROCK-IT CLIP SS INSTALL





1 Locate all parts

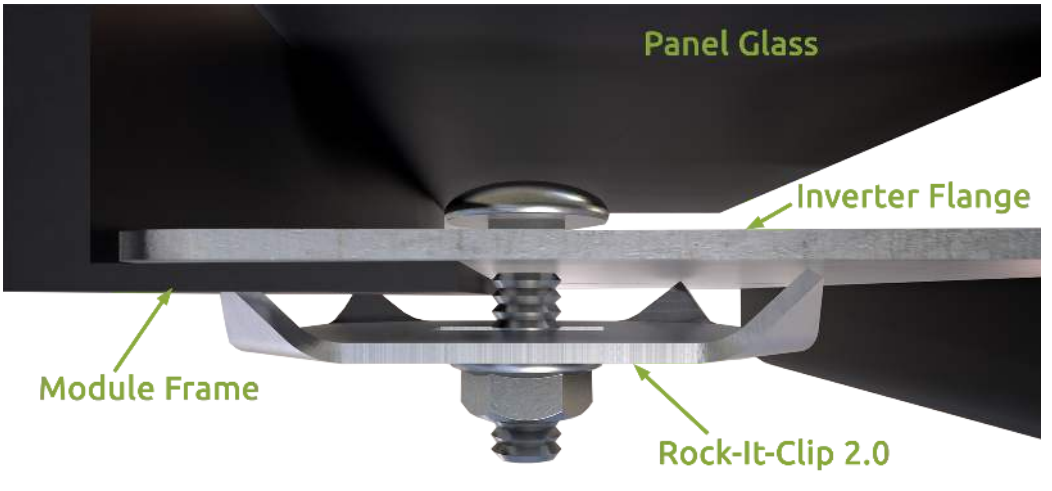
•Locate the Rock-It Clip SS, micro-inverter/power optimizer, and the section of the module frame in which you will be mounting the micro-inverter/power optimizer.

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 150 in-lb minumum 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.

ROCK-IT CLIP 2.0 INSTALL



1 Locate all parts

•Locate the Rock-It Clip 2.0, micro-inverter/power optimizer, and the section of the module frame in which you will be mounting the micro-inverter/power optimizer.

2 Install the Rock-It Clip 2.0 (See below detail)

- Slide the Rock-It Clip 2.0 onto the lip of the micro-inverter/power optimizer.
- Slide the micro-inverter/power optimizer into the opposite lip of the module frame.
- Tighten the bolt to 150 in-lb to clamp the Rock-It Clip 2.0 to the module frame and the micro-inverter/power optimizer to the Rock-It Clip 2.0.
- 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.

Snow Load 0-20 psf

Modules in Landscape								
Wind Speed		Exposure Category	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	159	93	59	103	103	103
		C	114	67	42	103	88	88
		D	96	56	35	91	74	74
90 mph	115 mph	B	146	85	54	103	103	103
		C	104	61	38	98	80	80
		D	88	51	32	83	68	68
100 mph	125 mph	B	123	72	45	103	95	95
		C	88	51	32	83	68	68
		D	74	43	27	70	57	57
110 mph	140 mph	B	98	57	36	93	76	76
		C	70	41	26	66	54	54
		D	59	34	22	56	46	46
120 mph	150 mph	B	85	50	31	81	66	66
		C	61	36	22	58	47	47
		D	51	30	19	49	40	40

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff, however the designer must round down to meet appropriate rafter spacing

2.) Maximum allowed spacing approved by EcoFasten Solar is 72"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module width of 40"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 0-20 psf

Modules in Portrait								
Wind Speed		Exposure Category	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	91	53	33	62	62	62
		C	65	38	24	61	50	50
		D	55	32	20	52	42	42
90 mph	115 mph	B	83	49	30	62	62	62
		C	59	35	22	56	46	46
		D	50	29	18	47	38	38
100 mph	125 mph	B	70	41	26	62	54	54
		C	50	29	18	47	39	39
		D	42	26	15	40	32	32
110 mph	140 mph	B	56	33	20	53	43	43
		C	40	23	14	38	31	31
		D	34	19	12	32	26	26
120 mph	150 mph	B	49	28	18	46	37	37
		C	35	20	12	33	27	27
		D	29	17	10	28	22	22

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff

2.) Maximum allowed spacing approved by EcoFasten Solar is 48"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module length of 70"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 21-30 psf

Modules in Landscape								
Wind Speed		Exposure Category	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	110	93	59	68	68	68
		C	110	67	42	68	68	68
		D	96	56	35	68	68	68
90 mph	115 mph	B	110	85	54	68	68	68
		C	104	61	38	68	68	68
		D	88	51	32	68	68	68
100 mph	125 mph	B	110	72	45	68	68	68
		C	88	51	32	68	68	68
		D	74	43	27	68	57	57
110 mph	140 mph	B	98	57	36	68	68	68
		C	70	41	26	66	54	54
		D	59	34	22	56	46	46
120 mph	150 mph	B	85	50	31	68	66	66
		C	61	36	22	58	47	47
		D	51	30	19	49	40	40

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff, however the designer must round down to meet appropriate rafter spacing

2.) Maximum allowed spacing approved by EcoFasten Solar is 72"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module width of 40"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 21-30 psf

Modules in Portrait								
Wind Speed		Exposure Category	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	66	53	33	41	41	41
		C	65	38	24	41	41	41
		D	55	32	20	41	41	41
90 mph	115 mph	B	66	49	30	41	41	41
		C	59	35	22	41	41	41
		D	50	29	18	41	38	38
100 mph	125 mph	B	66	41	26	41	41	41
		C	50	29	18	41	39	39
		D	42	26	15	40	32	32
110 mph	140 mph	B	56	33	20	41	41	41
		C	40	23	14	38	31	31
		D	34	19	12	32	26	26
120 mph	150 mph	B	49	28	18	41	37	37
		C	35	20	12	33	27	27
		D	29	17	10	28	22	22

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff

2.) Maximum allowed spacing approved by EcoFasten Solar is 48"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module length of 70"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 31-40 psf

Modules in Landscape								
Wind Speed		Exposure	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10	Category	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	83	83	59	51	51	51
		C	83	67	42	51	51	51
		D	83	56	35	51	51	51
90 mph	115 mph	B	83	83	54	51	51	51
		C	83	61	38	51	51	51
		D	83	51	32	51	51	51
100 mph	125 mph	B	83	72	45	51	51	51
		C	83	51	32	51	51	51
		D	74	43	27	51	51	51
110 mph	140 mph	B	83	57	36	51	51	51
		C	70	41	26	51	51	51
		D	59	34	22	51	46	46
120 mph	150 mph	B	83	50	31	51	51	51
		C	61	36	22	51	47	47
		D	51	30	19	49	40	40

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff, however the designer must round down to meet appropriate rafter spacing

2.) Maximum allowed spacing approved by EcoFasten Solar is 72"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module width of 40"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 31-40 psf

Modules in Portrait								
Wind Speed		Exposure	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10	Category	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	50	50	33	31	31	31
		C	50	38	24	31	31	31
		D	50	32	20	31	31	31
90 mph	115 mph	B	50	49	30	31	31	31
		C	50	35	22	31	31	31
		D	50	29	18	31	31	31
100 mph	125 mph	B	50	41	26	31	31	31
		C	50	29	18	31	31	31
		D	42	26	15	31	31	31
110 mph	140 mph	B	50	33	20	31	31	31
		C	40	23	14	31	31	31
		D	34	19	12	31	26	26
120 mph	150 mph	B	49	28	18	31	31	31
		C	35	20	12	31	27	27
		D	29	17	10	28	22	22

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff

2.) Maximum allowed spacing approved by EcoFasten Solar is 48"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module length of 70"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 41-50 psf

Modules in Landscape								
Wind Speed		Exposure	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10	Category	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	66	66	59	51	51	51
		C	66	66	42	51	51	51
		D	66	56	35	51	51	51
90 mph	115 mph	B	66	66	54	51	51	51
		C	66	61	38	51	51	51
		D	66	51	32	51	51	51
100 mph	125 mph	B	66	66	45	51	51	51
		C	66	51	32	51	51	51
		D	66	43	27	51	51	51
110 mph	140 mph	B	66	57	36	51	51	51
		C	66	41	26	51	51	51
		D	59	34	22	51	46	46
120 mph	150 mph	B	66	50	31	51	51	51
		C	61	36	22	51	47	47
		D	51	30	19	49	40	40

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff, however the designer must round down to meet appropriate rafter spacing

2.) Maximum allowed spacing approved by EcoFasten Solar is 72"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module width of 40"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 41-50 psf

Modules in Portrait								
Wind Speed		Exposure	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10	Category	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	40	40	33	25	25	25
		C	40	38	24	25	25	25
		D	40	32	20	25	25	25
90 mph	115 mph	B	40	40	30	25	25	25
		C	40	35	22	25	25	25
		D	40	29	18	25	25	25
100 mph	125 mph	B	40	40	26	25	25	25
		C	40	29	18	25	25	25
		D	40	26	15	25	25	25
110 mph	140 mph	B	40	33	20	25	25	25
		C	40	23	14	25	25	25
		D	34	19	12	25	25	25
120 mph	150 mph	B	40	28	18	25	25	25
		C	35	20	12	25	25	25
		D	29	17	10	25	22	22

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff

2.) Maximum allowed spacing approved by EcoFasten Solar is 48"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module length of 70"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 51-60 psf

Modules in Landscape								
Wind Speed		Exposure Category	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	55	55	55	34	34	34
		C	55	55	42	34	34	34
		D	55	55	35	34	34	34
90 mph	115 mph	B	55	55	54	34	34	34
		C	55	55	38	34	34	34
		D	55	51	32	34	34	34
100 mph	125 mph	B	55	55	45	34	34	34
		C	55	51	32	34	34	34
		D	55	43	27	34	34	34
110 mph	140 mph	B	55	55	36	34	34	34
		C	55	41	26	34	34	34
		D	55	34	22	34	34	34
120 mph	150 mph	B	55	50	31	34	34	34
		C	55	36	22	34	34	34
		D	51	30	19	34	34	34

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff, however the designer must round down to meet appropriate rafter spacing

2.) Maximum allowed spacing approved by EcoFasten Solar is 72"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module width of 40"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

Snow Load 51-60 psf

Modules in Portrait								
Wind Speed		Exposure Category	2:12 < Roof Pitch < 6:12			7:12 < Roof Pitch < 12:12		
ASCE 7-05	ASCE 7-10		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
85 mph	110 mph	B	33	33	33	21	21	21
		C	33	33	24	21	21	21
		D	33	32	20	21	21	21
90 mph	115 mph	B	33	33	30	21	21	21
		C	33	33	22	21	21	21
		D	33	29	18	21	21	21
100 mph	125 mph	B	33	33	26	21	21	21
		C	33	29	18	21	21	21
		D	33	26	15	21	21	21
110 mph	140 mph	B	33	33	20	21	21	21
		C	33	23	14	21	21	21
		D	33	19	12	21	21	21
120 mph	150 mph	B	33	28	18	21	21	21
		C	33	20	12	21	21	21
		D	29	17	10	21	21	21

Notes:

Spacing Governed by Snow Load

1.) Values in above table represent the maximum allowable spacing in inches for pullout forces only on EcoFasten Solar standoff

2.) Maximum allowed spacing approved by EcoFasten Solar is 48"

3.) Maximum allowed standoff capcity = 547# (per testing results)

4.) Includes additional factor of safety of 1.5 for lag pullout capacity

5.) Values based on a maximum module length of 70"

6.) Based on Risk Category II (ASCE 7-10) structures less than 30 feet in height

7.) All adjustment factors are set to 1. No site specific engineering is included in this table

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 to pierce into upon retightening.

Grounding Method

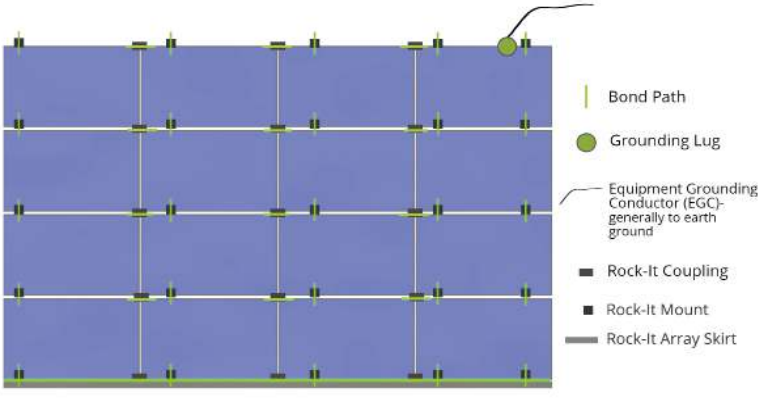
Rock-It 4.0 Mount bonds N-S rows of modules

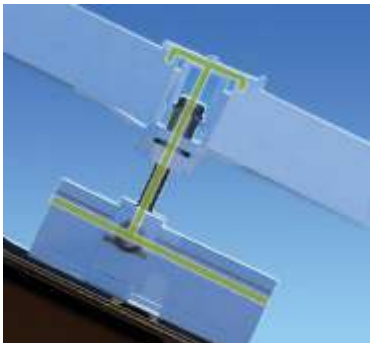
Rock-It 4.0 Coupling bonds E-W rows of modules

Rock-It Array Skirt bonds E-W along the entire array when installed

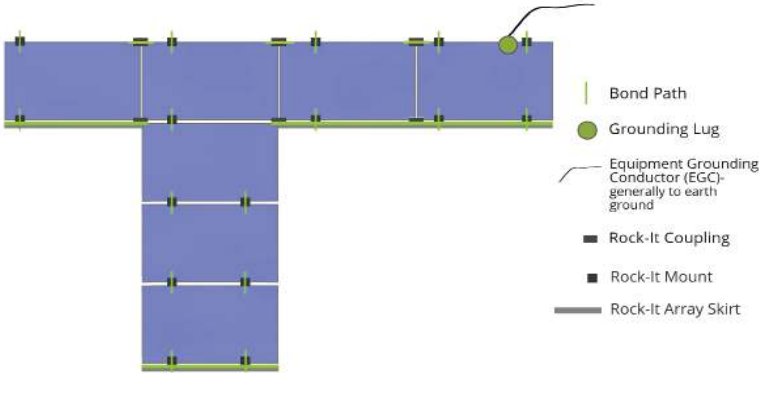
One Burndy CL50-1TN ground lug is required per PV array, limited to 300 modules placed in either portrait or landscape orientation.

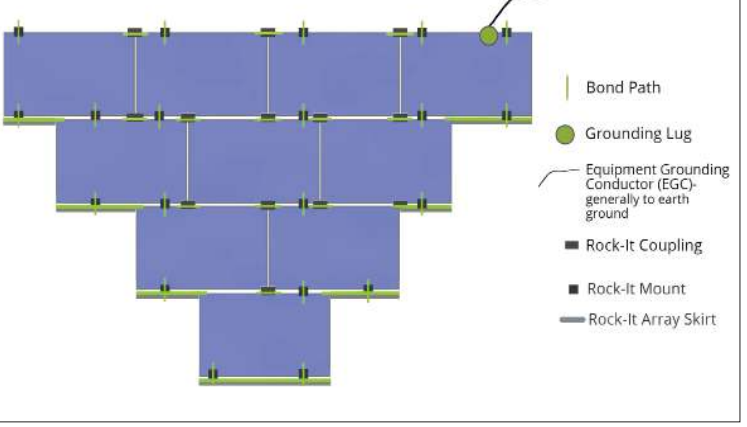
Bonding Assembly and Bonding Path





Integrated Bonding

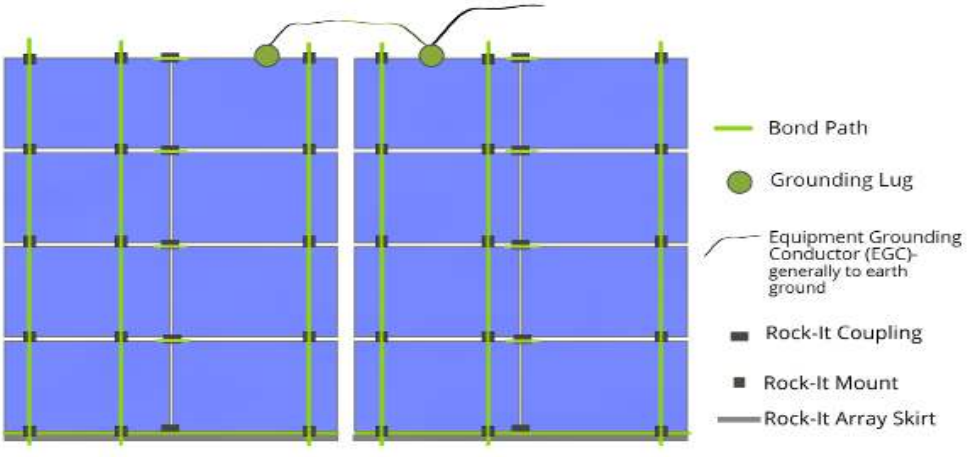




Thermal Expansion and Bonding

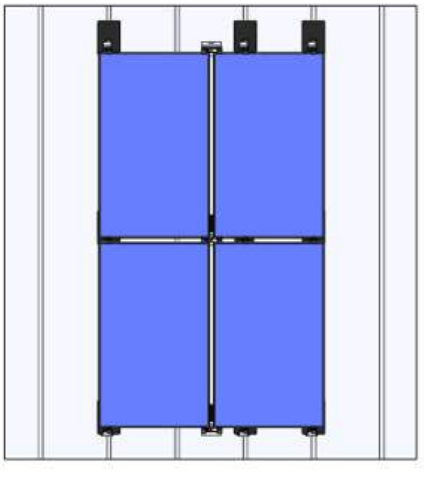
A thermal expansion gap is required per each continuous 40' length of modules.

Omit a coupling and leave a 2" gap in the Rock-It Array Skirt and also between the modules at that point.



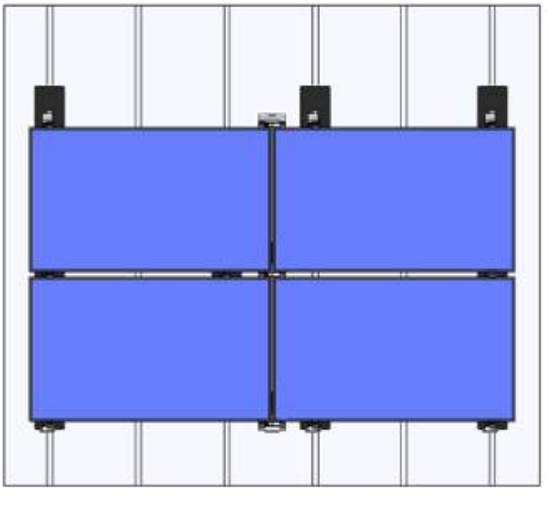
Bracket Spacing

Portrait Orientation



Maximum east/west bracket spacing is 48" OC.

Landscape Orientation

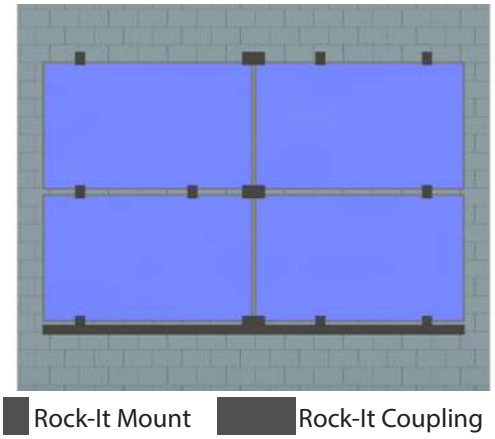


Max east/west bracket spacing is 72" OC.
32mm modules: Max east/west bracket spacing is 48" OC.

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

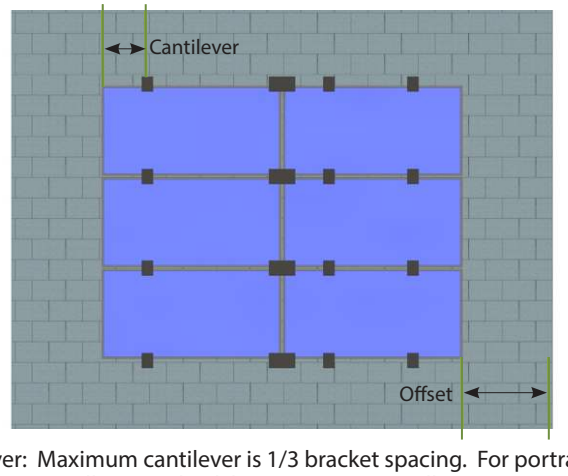
Staggered Mounting Points



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 4.0

SYSTEM SPECIFICATIONS

Max No. of Panels	300 Modules per ground lug	Materials	300 Series Stainless, 6000 Series Aluminum
Max System Voltage	1000VDC	Coating	Black Andodization/Mill Finish
Class A Fire Rating	With UL1703 Type 1 Rated Modules, see note below.	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 Range Rock-It Slide Tile	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 (35mm/40mm) Max Anchor Spacing (32mm)	72" 48"	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 Rock-It Slide Box QTY	12 units 50 units	Module Cantilever	Maximum cantilever is 1/3 bracket spacing
Coupling Box QTY	12 units	Warranty	20 Year Material and Workmanship

Codes: National Electric Code, ANSI/NFPA 70, NEC 250, NEC 690, IRC, IBC

Standards: UL 2703: First Edition, UL 1703

The EcoFasten Solar Rock-It System is a rooftop PV racking system consisting of 6000 Series Aluminum and 300 Series Stainless Steel components. The Rock-It System includes the rack components but does not include the PV panels, inverters or electrical components. The PV modules to be used with Rock-It shall be certified under UL 1703. The system shall be used on steep slope roofs mounted over a Class A fire rated roofing material and attached to the roof structure using 5/16" diameter, minimum 4" long 300 series Stainless Steel lag bolts with minimum thread embedment depth of 2 1/2" into the roof structure.

Periodic re-inspection for loose components

The system is subject to re-inspection as required by the PV module manufacturer or by the Authority Having Jurisdiction. Re-inspection, as required, should include evaluation of any loose components or loose fasteners. All loose components and fasteners should be secured in accordance with these instructions. The system should also be evaluated for any evidence of corrosion. Any corrosion should be removed. Any affected part should be cleaned or replaced in accordance with these instructions.

EcoFasten Solar®

Features

- New and improved design
- Fastest, easiest to level system on the market
- Integrated electrical bonding
- SIMPLE- only 4 components
- North-South adjustability
- Only one tool required (1/2" deep well socket)
- Vertical adjustment of 3"-4"

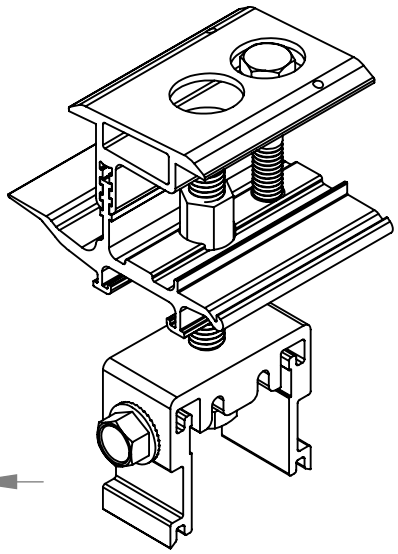
Evaluated, Compatible Modules

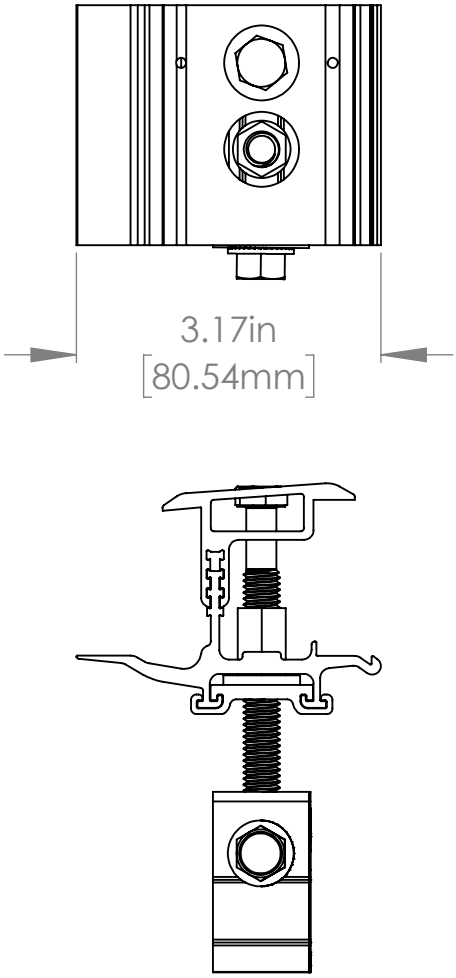
Module Manufacturer	Model Type ("x" used to indicate variable test)	Module Dimensions (mm)	Module Dimensions (in)	Downward Pressure Design Load (psf)	Upward Pressure Design Load (psf)	Down-slope Design Load (psf)	Maximum Clamp Spacing (in)
Trina Solar	TSM-xxx-PX05.08	1640 x 992 x 40	64.95"x39.05"x1.57"	33.3	33.3	20	72
Canadian Solar	CS6P-xxxM	1638 x 922 x 40	64.48"x38.66"x1.57"	33.3	33.3	20	72
Canadian Solar	CS6P-xxxP	1638 x 982 x 40	64.5"x38.7"x1.57"	33.3	33.3	20	72
Jinko Solar	JKMxxxP-60	1650 x 992 x 40	64.96"x39.05"x1.57"	30	30	20	72
Jinko Solar	JKMxxxM-60	1650 x 992 x 40	64.96"x39.05"x1.57"	30	30	20	72
Jinko Solar	JKMxxxPP-60	1650 x 992 x 40	64.96"x39.05"x1.57"	30	30	20	72
Jinko Solar	JKMxxxMM-60	1650 x 992 x 40	64.96"x39.05"x1.57"	30	30	20	72
Yingli Solar	YL2xxP-29b	1650 x 990 x 40	64.96"x38.97"x1.57"	30	30	20	72
LG Elcetronics	LG300N1C-B3	1640 x 1000 x 35	64.57"x39.37"x1.38"	30	30	20	72
LG Elcetronics	LG300N1K-G4	1640 x 1000 x 40	64.57"x39.37"x1.57"	30	30	20	72
Axitec Solar	AC-xxxM/156-60S	1640 x 992 x 40	64.5"x39.06"x1.38"	30	30	20	48
RECOM	RCM-2xx-6MB	1640 x 992 x 35	64.56"x39.05"x1.37"	30	30	20	72
Silfab	SLA2xxP	1650 x 990 x 38	64.96"x38.97"x1.49"	30	30	20	72
Solaria	PowerXT xxxR-BX	1621 x 1056 x 40	63.89"x41.53"x1.57"	30	30	20	48
Hanwha - Q Cells*	Q.PRO G4 2xx	1670 x 1000 x 32	65.75"x39.37"x1.25"	30	30	20	48
Hanwha - Q Cells*	Q.PRO G4 2xx	1670 x 1000 x 32	65.75"x39.37"x1.25"	30	30	20	72
Sunpreme	GxB-3xxT	1670 x 997 x 40	65.75"x39.25"x1.57"	30	30	20	48
REC	REC-xxx-6MB	1675 x 997 x 38	65.94"x39.25"x1.5"	20	20	20	72
REC	REC-xxx-6MB	1675 x 997 x 38	65.94"x39.25"x1.5"	30	30	20	48
SolarWorld	SW xxx Mono Black	1675 x 961 x 33	65.95"x37.8"x1.30"	20	20	20	72
SolarWorld	SW xxx Mono Black	1675 x 961 x 33	65.95"x37.8"x1.30"	30	30	20	48

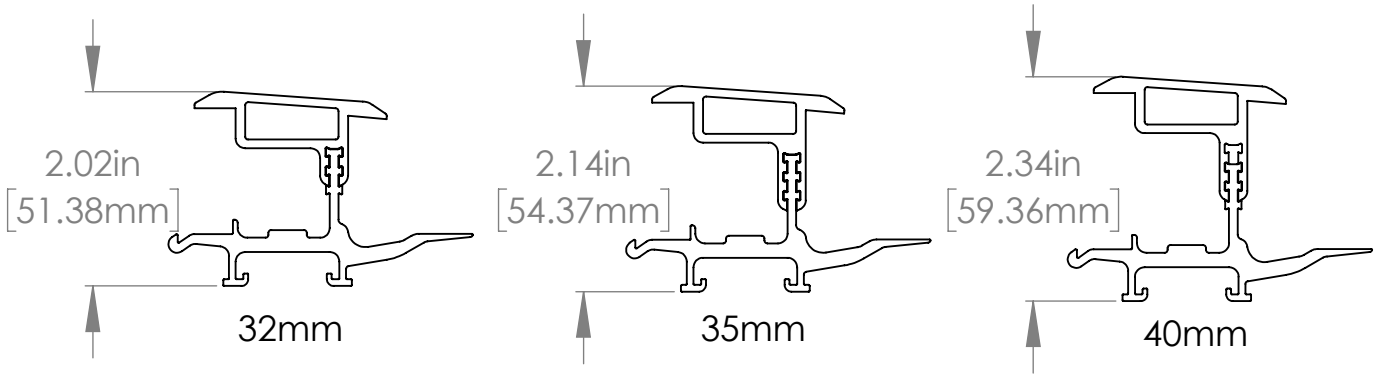
*Hanwha Q- Cells 32mm modules to be used with special order Rock-It System components. Call for details.

Cut Sheet - Rock-It-4.0-Mount

1. Installation to be completed in accordance with manufacturer's written specifications and installation instructions.
2. See spec sheet or contact manufacturer for detailed material, finishes, and configuration options.
3. Contact manufacturer for detailed layout.
4. Do not scale drawings.
5. Subject to change without notice.







ALPINE SNOWGUARDS
Toll Free Phone 1.888.766.4273
Toll Free Fax 1.888.766.9994

EcoFasten Solar
Toll Free Phone 1.877.859.3947
Toll Free Fax 1.888.766.9994

4741 W Polk Street Ste. 4
Phoenix, AZ 85043

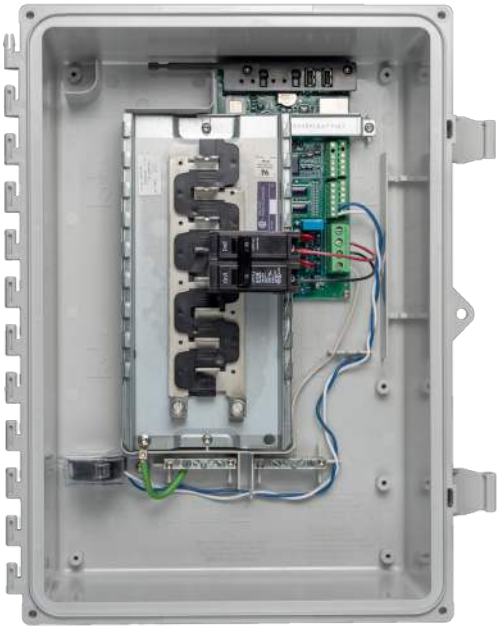
Material: See Spec Sheet

Scale: 1:2	6/28/2017	ASG: -	EFS: x

Enphase IQ Combiner 3

(X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3**™ with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed

UL LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE.

Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and **REPLACEMENT PARTS** (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5” x 14.75” x 6.63”). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit **enphase.com**

2018-09-13

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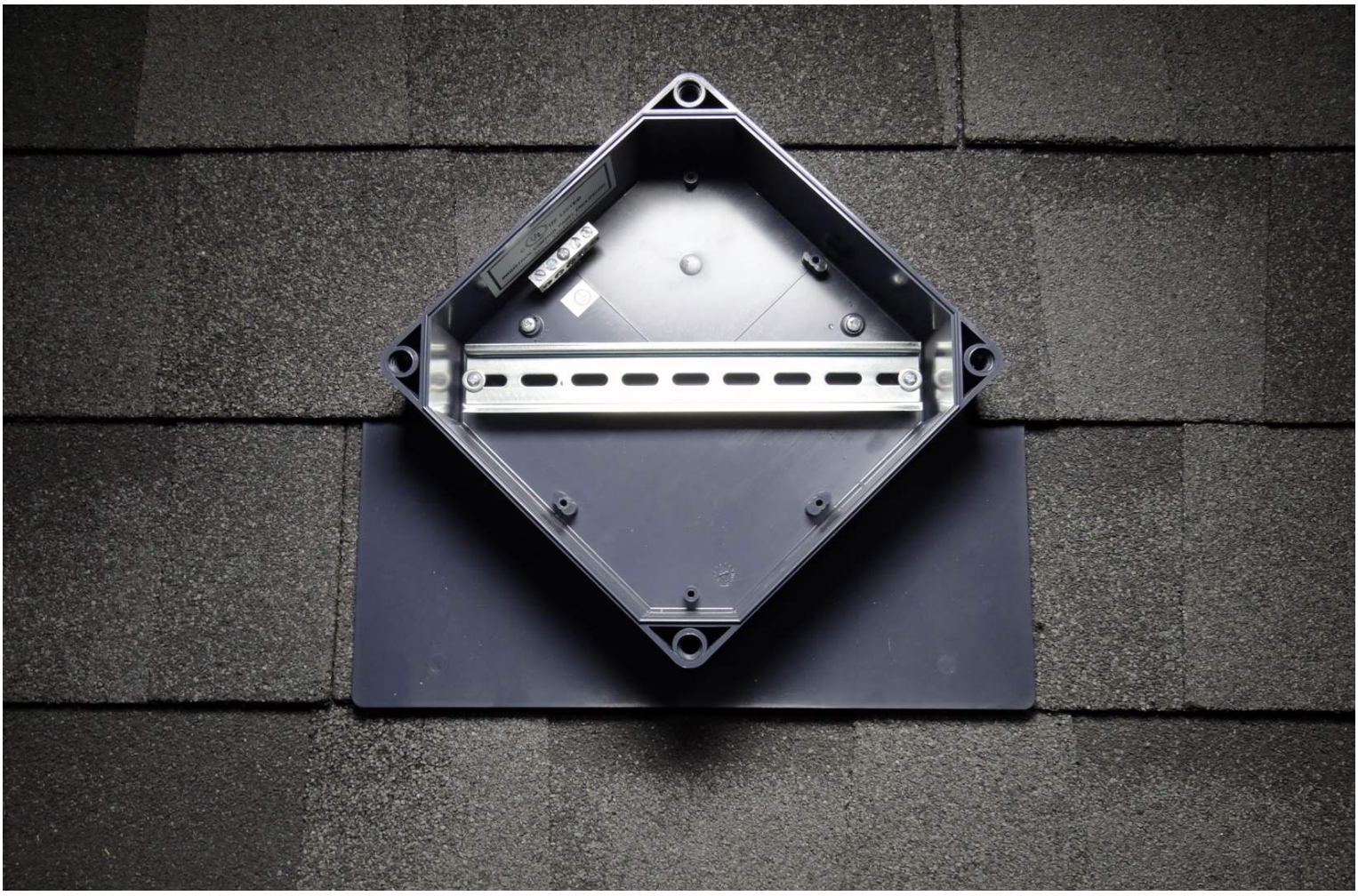

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' 4 5 4 ' 4 &' B4 5 & : 4 &' 4 4 &4" ' '& ' 54 : R' ' 4 5 n't l ' : #
R' ' :4 5' :' & 4 5B: ' '5B 4 # ' 5 & 4 4 4" ' : & '& y
E4 5 & : ' &' :4 '' ' : '# # 4 4 ' n &' 'tBR' ' 4 ' ' & '& 4 & :4 '
' ' 4 Bnt" ' 4 #4 5' :' & ' 54 4#' 5 4 4 : ' 5 & B nt" 4 #4 4 4" ' Bj yNyl y
R' ' 4 ' : ' B4 '&' 4 ' 4 '5 ' 4&' ' 4 yJ ' ' 4 :4 ' &4 "' & '&' 5
" R' ' '4 4" ' ' :: B ' 4 ' '# 4 ' 4 ' 4" ' 45 ' &' y
Y ' '&' 5 # 4 4# 4 ' : ' ' & ' ' '5' : &4 n &' 4 't "4 '5 5' :' & :4 ' :
5 & ' &' ' ' ' &4 & 4&B 5' B 4 4 B n & 5 # R' ' '# #' &' tB & 4"
' ' 4 5 ' ' '5yC ' ' 4 : ' 4 4 ' 5B4 & 4" 4 ' 4 ' 4 5 l '
4 4 ' 4 ' 4 4" ' ' B 54 4:' ' 4 4 ' 5B # ' ' &' :4 5' :' & & 4 '4 ' 5
5 # '
4 4 ' 5yW &' 4 ' :) &' cB M4 ' B ' : '# # 4 4 ' 4 ' ' & ' 4 5 ' :4 '
4 4 ' B ' ' ' B 4 B '5 4 y" N EP M' EWO RY) YCYND1 J) DD) " Y1 Nj PWDFU) " Y) I E" EY1
ND j EY" WRR j ND M) DYEF C") D MCDMNRWRU) " ") MM' 1yR' ' 5 ' 4 4 4 5 & ' &' : '
& l ' 4 5' # 4 ' 5y

R R 0CS1, B 8 a

D1 25b3N43 vN&G30 D4v3b6Y3D54v

bGNWN:: D4v3b6Y3D54v l vN&G30 8 Nb4D4Lv 2bD5b 35 D4v3N::N3D54

453Gmv N7G3HGvG D4v3b6Y3D54v

Y 4 4 & 4 4 & 4 4 "' : '55 # 44 45 4 ' 4 &' : '
R '& DAud : & " :4 #y

OG UHQ YQ HDG H0G80G GK O 0,KD UG,K HQQH ,YKmY8G0H ,YK HKO G0 ,VGYN U, G9 ,8B GK R
80Y8G0 80GVH ,YK B AG HFGK H HQQ ,B G Y GK 0G UG HNG YN UG G0 ,VG8G0 YKKGQR R

vN&G30 8 Nb4D4Lv l YN63D54v

- N 4:'5 ' ' &' '5' '& &4 5 4 5 &4 5 ' & '' 4' 5'5: ' 5 5 4nt y
- Y '5 &' ' :' '& & &B B 5'4 B4 '' '& &4 #4 5 & '& "' ' : '5" 4:'5 ' ' y
- "' 4 4#' 4' ' ' 5 # ' 44 B ' 4 B4 5 ' & # : ' ' yM ' '&4 "' 4 ' 4 4 ' ' ' ' 4:' : ' ' &' ' ' y
- j 4' 4 5 :'5' 4 N&& 4 4 R4:' 4 5 U' 4)5 4 mNRU)t # 5' ' 4 5 '# 4 ' 4 # 5 &y
- C ' ' M 4 M '& ' W ' mMMMt4 ' '5 ' 4 4 4 5 &4 '# 4 4 ' 4 : 4 4 "' 4& &' y
- E 4 4 4 4 4&& 54 &')" REEn j M) mpB" 4 4 W' & &4 F 5' n" WFtyj 4 4 4 &4 ' '& &4 & 5' y
- E 4 B ' 4 'B4 5 ' 5 & 4 4 ' & ' ' & 5' 5yj 4 ' : ' &' 5 ' 5 &4 '5 4 ' :'4 B ' 54 4#' B & ' ' 4 54 4#' y

R R 0CS1, B 8 M

G: GY3bDYN: 2bGYN63D54v

- W ' 4 ' '& &4 & 5 & 4 ' 4 ' 4#' ' 4 "' : ' 4 # ' & # y
- ”' ' " '4 & 4& 4 & & # ' 4 4 ' 5 & '& 5' &' y
- j ' 4" '5 & 4 5 4# &' 5 ' : 4 ' '& &4 & 5 & ' & #y
- I ' 4 ' : ' ' ' & : ' :B ' ' 45 ' ' & 4& 4 ' ' '& & B ' 4 B 5' 4 y
- J ' 5 & '& # &' & & B 5' :: &' ' 4 4 ' 5 ' ' ' '& & 4 :4& ' & 4 4 5' ' ' 5 & 4 #' : 4 & 5 & ' & & y
-) 4 ' : ' '# 4 5 ' 4 4 : ' ' '& &4 & ' ' ' # #' ' & &4 & & y
- ” u ' 4 &' & ' 5 5' # 5 # '4 "' '' & 5 & '& y Y ' ' : # 5 # " 4 5 ' ' 4 ' ' '5y
- ; 5 # "' '5 ' ” WF ' ' ' B4 5 ' ' " : ' 4 ' y

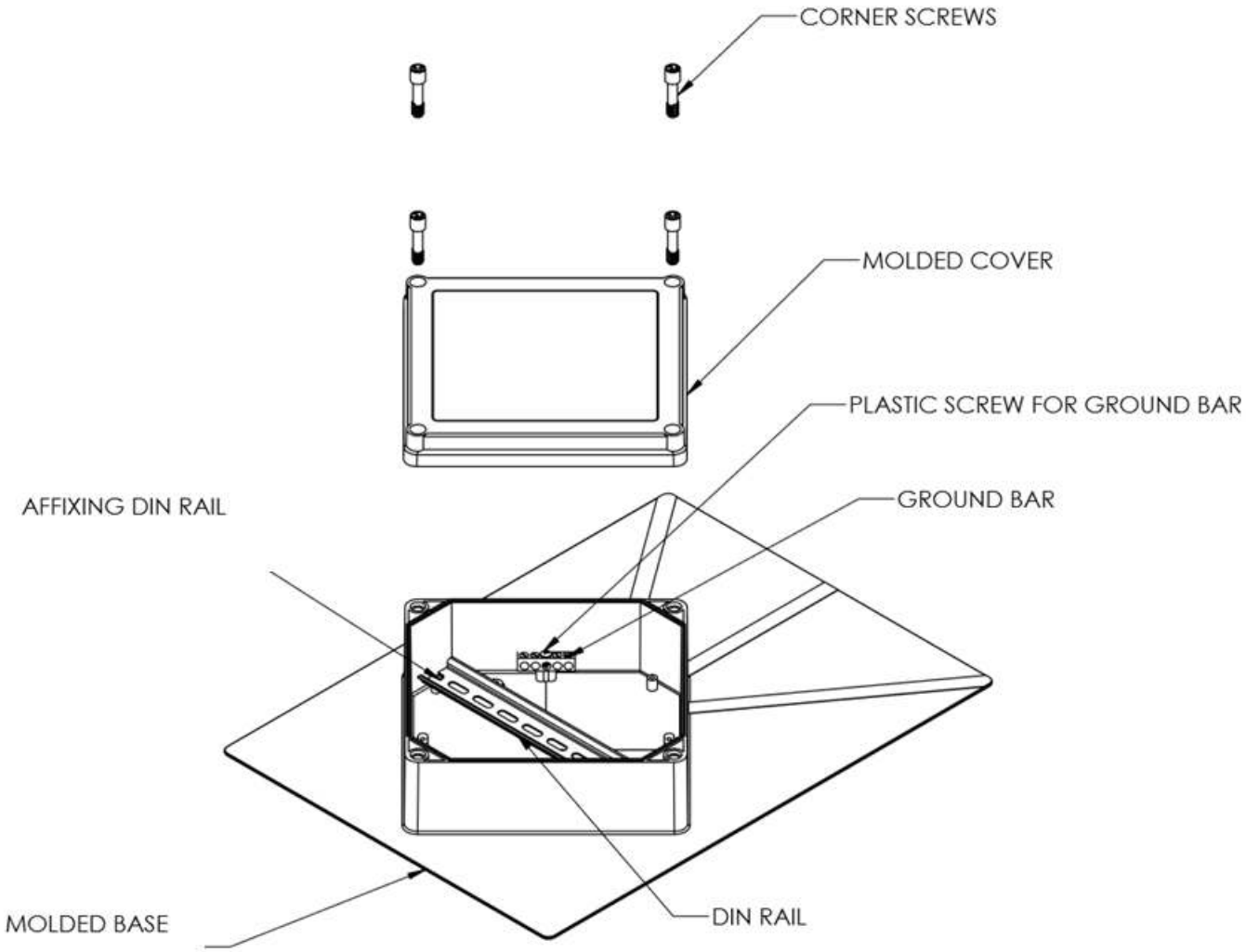
1 GYHN4DYN: 2bGYN63D54v

- J ' 5 # 4 4 & 4&' B' ' 4 ' '& &4 ' B '& 4 &4 " & B ' 4 ' '& &4 4 4 5 4 ' ' '5 : ' & 4 5 5 '& : ' 5 y
- O 4 : ' : ' B: '5B & ' '5 " &' y
- E 4 4 : 5 & "' & ' 54 4#' 5B ' ' 4 5 5' ' ' ' : ' y j 4 ' 5 4 ' : ' B ' 54 4#' B ' 4 B ' '& & B 5' 4 y
- O ' ' 5 & 4 & :4 '& ' ' y

2b5W6Y3D4&5b1N3D5 4

57Gb7DG8

- Y'R '& DAudD' 5' 4D : A & I 4:4 '5 : '' 4 5' #'5 '& ''& &4 & 5 & ' ' # ' : h4 &yE 45' :4 #u ' # CHu' 4 4 5 CHu 4" '5 ' & 4' 4y
- Y' DAud' & ' & ' : ' '5 4 '5OE 4 '5 5' '' & '5' #'5 : # :OE 4 4&&' 'B & 4 ' 4" & y
-): # 5"4 4 5'54 4 '4 : 4" 5"' '' ' 4 4 4 '5 ' :4 5 '" 5 #y



2bG2 I 2:NYG1 G43

bG" 6DbGW355:v

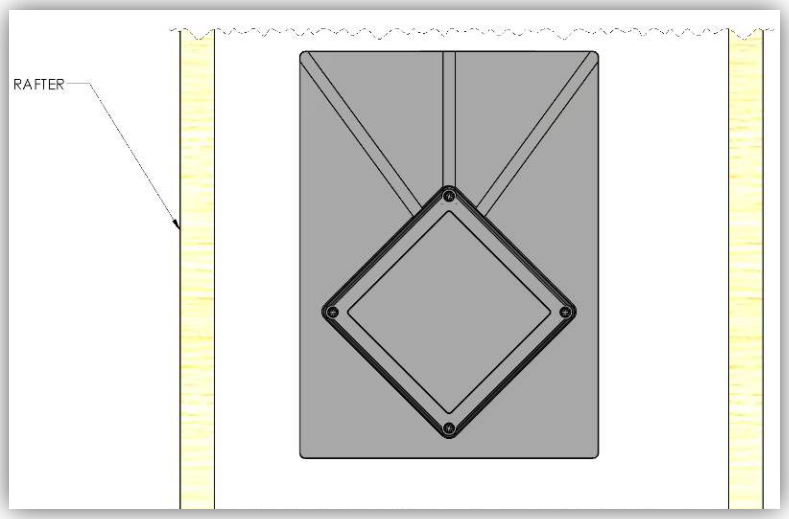
- ✓ Shingle Ripper Bar
- ✓ Lumber Crayon
- ✓ Hole Saw or Spade Bit
- ✓ Roofing Sealant
- ✓ #2 Phillips Screwdriver
- ✓ Uni-Bit
- ✓ Utility Knife

PRODUCT PLACEMENT

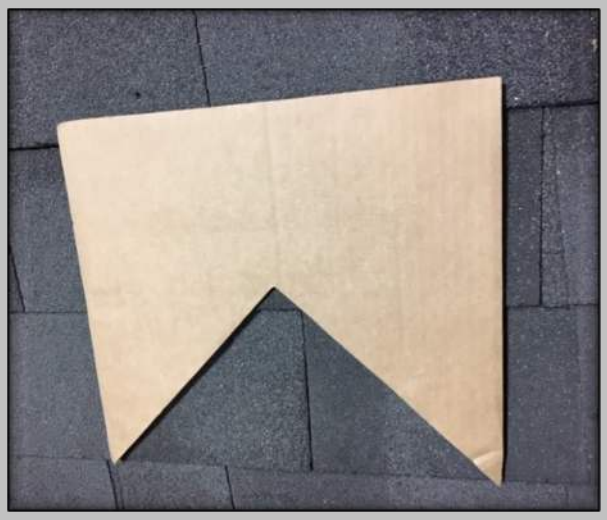
- E5' : ' &4 4 5 4&' ' : ' :4 # ' :4 yY ' 5 & 4 "' '5"' '4 ' 4 4 454&' ' 4 4 y

D' ' ' 4': 4&4# # 45 ' R' c

v3G2 J



DO NOT LOCATE THE PRODUCT DIRECTLY OVER A RAFTER TO ENSURE THE RAFTER DOES NOT INTERFERE WITH THE WIRING ENTRY INTO THE ATTIC



M ' '5#' : ' z JSn
z– J ” : #' 4 y

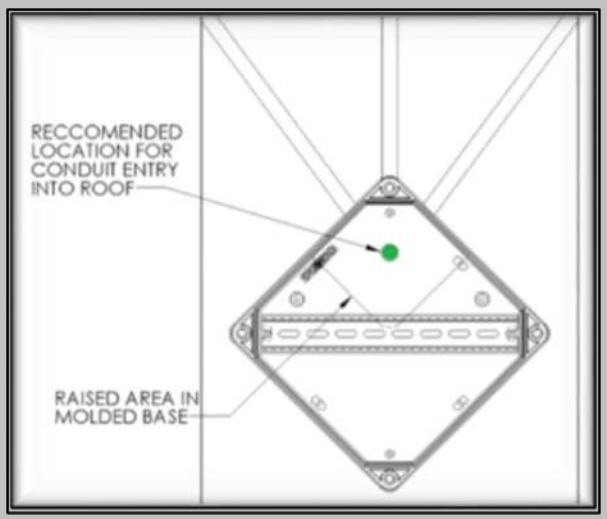
v3G2 c

Y4&' 4 5 & ' #4 "' &4 '
" : ' c 5 & ' 'y F 4 # ' 4 5
#' y

v3G2 B

D' ' 4 : # 4 "' ' 4 ' d Bc 5B
v 5 & ' : ' 4 " & ' :
' : : 4 #y

v3G2 x



WbD: 2D53H5:G

R 5' DAud A & " 4&' ' '
& #' ' 4 ' yY ' 4#' 4" '
' ' 5 ' ' '

v3G2 F

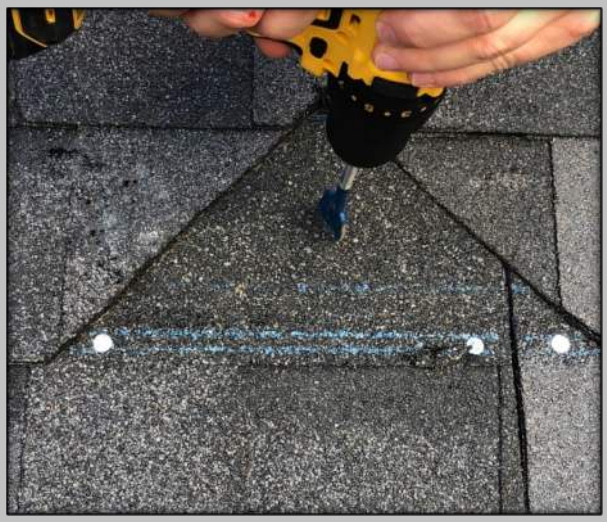
WbD: 2D53H5:G

R 5' DAud A & " &4 ' '
& #' ' 4'yC #dhie5 " 5
# " wD : 4' n &4
'' ' ft

v3G2 h

D' ' " w '' ' :y

v3G2 g



C # ' 'BO # ' :B '
54 '' '&' 4 ' ' 4
4&& 54' ' 4 4' & 5 : #

v3G2 U

D' 4 " w # ' ' 4#4 B5
' 54 '' '&' 4 ' ' 4
4&& 54' ' 4 4' & 5 : #

v3G2 C

D' ' DAudB: ' B ' &' 4 w 4
4 "' 45 : : # ' 4 4 ' 5' 5' : '
: 4 # yW ' 4 a 4&' 5 '
eC 5' u5 CeR 4 ' ' # '
4 ' ' & B) R RUNJ ” y

v3G2 Jr

D' 4 C y C ' ' ' 5 O' & #
R&' ' : 4 # ' :y
Y ' ' ' &: &4 5 &4 ' 5 '
' &: &4 y D' :' **3z– 3c o z Jr** :
' ' # ' # ' y

v3G2 JJ

25 26 : N3G bVfJ

- M 4 ' ' DAud # '
4 4 ' ' & ' & B ' 4
" & B ' ' &' 4 & ' y
- W ' 4 ' & ' 4 ' 5 4 '
4 ' 5 : 4 5 4 ' 4" ' : ' ' 5' 5
' y
- Y ' DAud 5' 5 '
4 5 :: & &4 4&& 54 '
4&&' ' "' ' 5y

v JJpN

E 4 ' & ' ' : ' ' & ' y
Y # ' i & ' &' ' Y ' 4 '
5 &4 ' 5

3z– 3Bo z Jr

v3G2 Jc

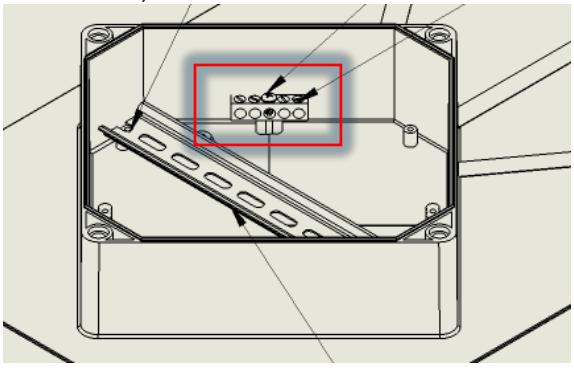
v2GYD&DYN3D54v

1GYHN4DYN:SG:GY3bDYN:

- 2 q ” Y ”z m6:FrUN
- G ” bz m3 x9
- N ”Y q 2z 3 Y ” v bz mJSsn J
- 1z pv q 8z Y q v mJ
- 1z Y m4 9N
- 1z 7 z m4 9N
- N – 5 z 3 z mfB5C 75Y

35b" 6GbN3D4Lv

3z– 3Jm 5l4F '& BJ 'D4 #'qli ldiBi C4"'F '&



8 v	3 3 o–f
xfhN8 L	BF
UN8 L	Br
JrfJxN8 L	cF

3z– 3J

3z– 3cmP #R&' BP # O'& #Bc M 5'5

3 3 o–f
JFfcr

3z– 3BmY 'H4 'BF 'h'5R&' Bi M 5'5BF4 '

3 3 o–f
JJ

soltection™

by vynckier

- b :

i El 0

5 b EEoi ,

lymkkyi i EyoVEE