

powered by

Q.ANTUM DUO Z

PRELIMINARY

Q.PEAK DUO BLK-G10+ 350-370

ENDURING HIGH
PERFORMANCE



Quality
Controlled PV

www.tuv.com
ID 1111232615



BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC / TS 62804-1:2015, method A (~1500 V, 96h)

² See data sheet on rear for further information.



THE IDEAL SOLUTION FOR:



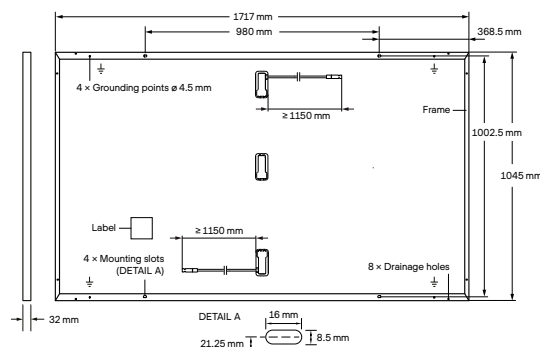
Rooftop arrays on
residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	1717 mm × 1045 mm × 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 1150 mm, (-) ≥ 1150 mm
Connector	Stäubli MC4; IP68

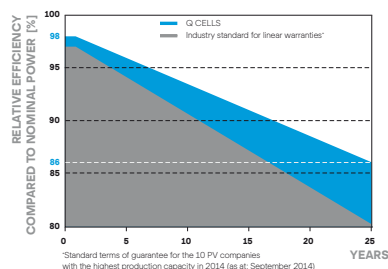


ELECTRICAL CHARACTERISTICS

POWER CLASS				350	355	360	365	370
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / – 0 W)								
Minimum	Power at MPP ¹	P _{MPP}	[W]	350	355	360	365	370
	Short Circuit Current ¹	I _{SC}	[A]	10.97	11.00	11.04	11.07	11.10
	Open Circuit Voltage ¹	V _{OC}	[V]	41.11	41.14	41.18	41.21	41.24
	Current at MPP	I _{MPP}	[A]	10.37	10.43	10.49	10.56	10.62
	Voltage at MPP	V _{MPP}	[V]	33.76	34.03	34.31	34.58	34.84
	Efficiency ¹	η	[%]	≥19.5	≥19.8	≥20.1	≥20.3	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²								
Minimum	Power at MPP	P _{MPP}	[W]	262.6	266.3	270.1	273.8	277.6
	Short Circuit Current	I _{SC}	[A]	8.84	8.87	8.89	8.92	8.95
	Open Circuit Voltage	V _{OC}	[V]	38.77	38.80	38.83	38.86	38.90
	Current at MPP	I _{MPP}	[A]	8.14	8.20	8.26	8.31	8.37
	Voltage at MPP	V _{MPP}	[V]	32.24	32.48	32.71	32.94	33.17

¹Measurement 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 • 2800 W/m², NMOT, spectrum AM 1.5

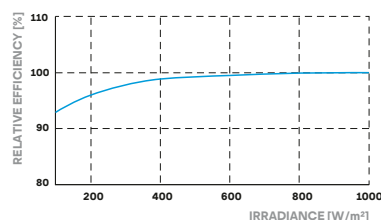
Q CELLS PERFORMANCE WARRANTY



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]	-0.34	Nominal Module Operating Temperature	NMOT	[°C]	43 ± 3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V _{SYS}	[V]	1000	PV module classification	Class II
Maximum Reverse Current	I _R	[A]	20	Fire Rating based on ANSI / UL 61730	C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2660	Permitted Module Temperature on Continuous Duty	-40°C - +85°C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES

Quality Controlled PV - TÜV Rheinland;
IEC 61215:2016; IEC 61730:2016.
This data sheet complies
with DIN EN 50380.
QCPV Certification ongoing.



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.

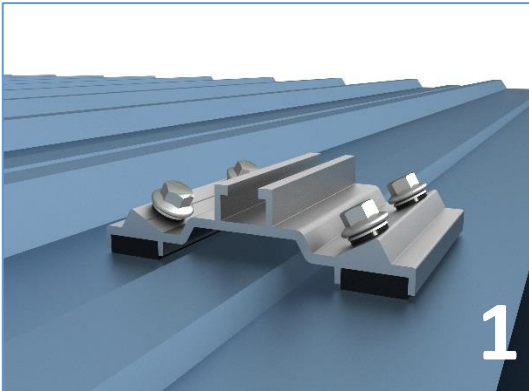
Hanwha Q CELLS GmbH

Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0)3494 66 99-23444 | **FAX** +49 (0)3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

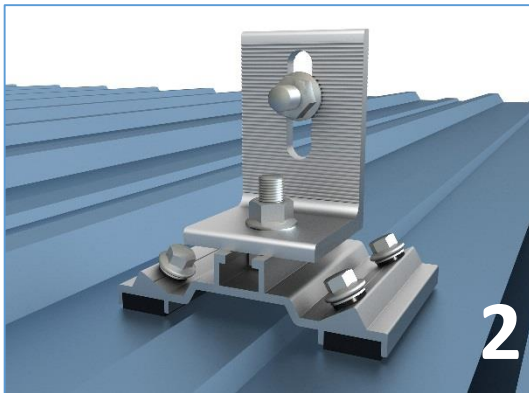


EZ Grip Metal Mount Kit (K50532-001 & K50532-002):

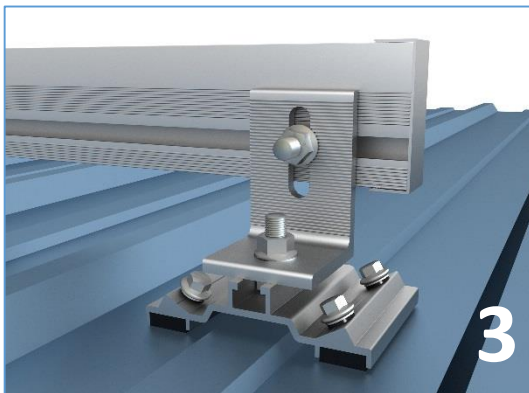
These Installation Instructions are for attaching the EZ Grip Metal Mount Kit into 1/2" plywood, 7/16" OSB or 26ga sheet metal roof decking material. The SunModo EZ Grip Metal Mount Kit comes complete with Mount, 1/4 x 3" or 1/4 x 1-1/2" Hex Washer Head Lag Bolts, L-Foot and 3/8" Hardware.



Locate desired location for the EZ Grip Metal Mount. Install using the four 1/4 x 3" or 1/4 x 1-1/2" Hex Washer Head Lag Bolts supplied.



Secure the L-Foot to the Mount using the 3/8" Hardware supplied. Torque to 15 ft. lbs.



Using the 3/8" hardware supplied attach the Rail to the L-Foot. Torque to 15 ft. lbs.

Installation Notes:

1. Tools Required: Drill, torque wrench, sockets set, tape measure, string line or laser line.
2. The use of an impact driver is strongly discouraged for all stainless nut and bolt hardware.
3. Installer shall use anti-seize compound, such as Permatex anti-seize. Lubricant is recommended for all stainless steel threaded parts.



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!***



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.

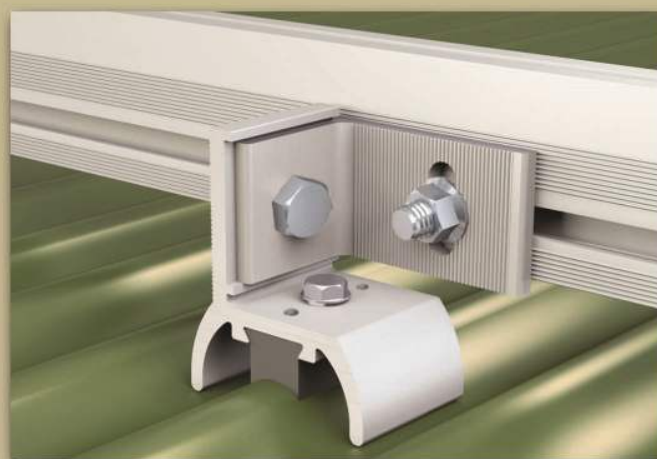
Single screw penetration mount on
wood or metal purlins for fast and
easy installation.

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.

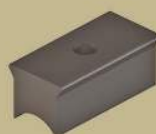
Combine with L-Adaptor (K10066-016)
to change the orientation
of rail at right angles to corrugations



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



1905 E 5th St., Ste. A
Vancouver, WA 98661

Phone: 360-844-0048 www.sunmodo.com



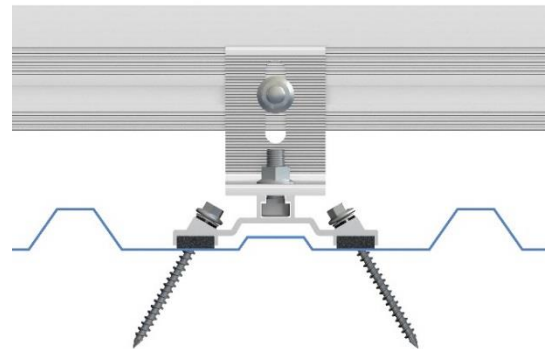
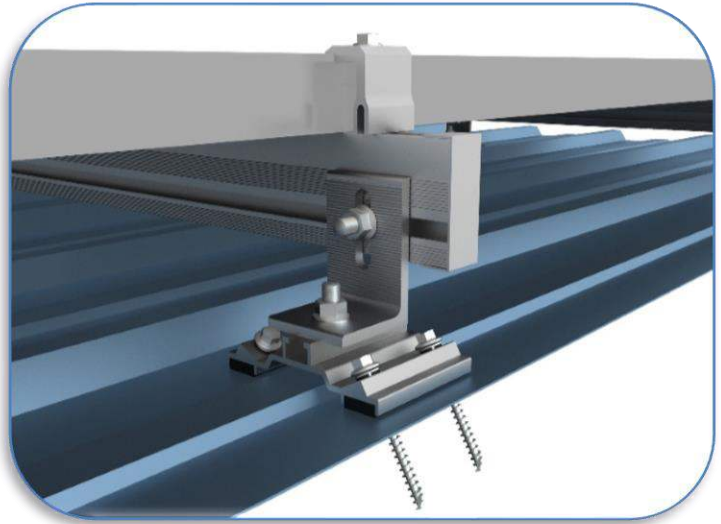
EZ GRIP METAL DECK MOUNT

Make your next metal roof attachment without the daunting task of locating the truss.

SunModo's EZ Grip Metal Deck Mount installs into 26 gauge sheet metal, 1/2 plywood or 7/16 OSB roof decking material.

SunModo's EZ Grip Metal Deck Mount installs in just minutes into sheet metal, plywood or OSB roof decking. The four included 1/4 x 3" Hex Washer Head Self-tapping Screws have the length to penetrate through 1-1/2 inches of insulation while still piercing completely through the roof decking. And since the four screws are guided by the aluminum extruded base to penetrate at a 30-degree angle, the Metal Roof Deck Mount Kit offers superior attachment performance. 1/4-20 Self-drilling screws can be used for attachments into 26 gauge minimum thickness metal roofs.

The EZ Grip Metal Deck Mount is designed to fit on the most popular R-Panel and U-Panel trapezoidal types of metal roofs. The aluminum extruded base easily clears roof profiles 7/16" tall by 1-1/2" wide. The EPDM gaskets on the washers and on the aluminum extruded base combine to provide a water tight seal at the roof penetration site.



Features and Benefits

- Attaches into 1/2 plywood or 7/16 OSB roof decking material using four 1/4 x 3" Hex Washer Head Self-tapping Screws
- Attaches into 26 gauge minimum thickness sheet metal using four 1/4 x 2" Hex Washer Head Self-drilling Screws
- Angled penetrations provide superior attachment performance
- A wide variety of L-feet and attachment options are available
- Passed the High-Velocity Hurricane Zone (HVHZ) –TAS 100(a) Wind-Driven Rain Test



IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

IQ8 Series Microinverters

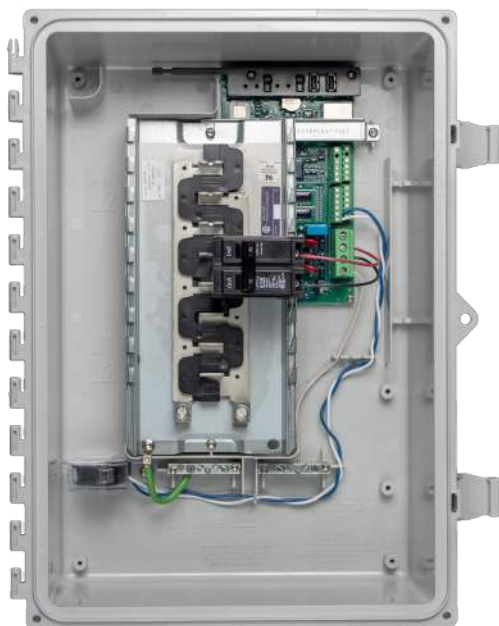
INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US ¹
Commonly used module pairings ²	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48	25 – 58				
Min/max start voltage	V	30 / 48	30 / 58				
Max input DC voltage	V	50	60				
Max DC current ³ [module Isc]	A	15					
Overvoltage class DC port		II					
DC port backfeed current	mA	0					
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US ¹
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range ⁴	V	240 / 211 – 264					208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
AC short circuit fault current over 3 cycles	Arms	2					4.4
Max units per 20 A (L-L) branch circuit ⁵		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					
MECHANICAL DATA							
Ambient temperature range		–40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3”) x 175 mm (6.9”) x 30.2 mm (1.2”)					
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					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
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					
Certifications		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer’s instructions.					

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

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



LISTED

To learn more about Enphase offerings, visit enphase.com



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 Enphase Energy. All rights reserved. All trademarks or brands in this document are registered by their respective owner.
2018-09-13





FLORIDA BUILDING CODE COMPLIANCE

FLORIDA BUILDING CODE 2020 REQUIREMENTS

Questions often arise in the solar industry as to the requirements for installing solar mounting systems in Dade and Broward counties and throughout the rest of the Florida. Outlined below are the four requirements to comply with the 2020 Florida Building Code. The first three requirements are necessary for solar racking systems, while the fourth is specific to solar roof attachments. The fifth item, Florida-specific testing, is optional for installation.

1 - UL CERTIFICATIONS

- ▶ Racking UL 2703 (Supplied by EcoFasten)
- ▶ Modules UL 1703 or UL 61730 (See module manufacturer website)
- ▶ Inverters UL 1741 (See inverter manufacturer website)

2 - MODULE LOAD RATING

- ▶ UL 1703 / UL 61730 load rating to meet site conditions pressure for project (see module manufacturer installation manual or data sheet)
- ▶ Or alternately, Module Mechanical Load Test Report to show that the module meets or exceed the site conditions load rating

3 - RACKING STRUCTURAL CAPACITY

- ▶ Florida PE stamped system capacity and span tables that meet site conditions and roof zones for the project (Supplied by EcoFasten)

4 - ROOF ATTACHMENTS

- ▶ Structural Capacity certification letters that meets or exceeds site conditions (Supplied by EcoFasten)
- ▶ Waterproofing/Flashing per NRCA & FRSA/TRI (Florida) guidelines (Supplied by EcoFasten, when applicable)

5 - OPTIONAL FLORIDA SPECIFIC TESTING OR CERTIFICATIONS

- ▶ Florida Product Approval
- ▶ Miami Dade NOA
- ▶ Water Seal Testing: TAS100(A) (required for HVHZ Florida Product Approval or Miami Dade NOA)

ECOFASTEN ROOF ATTACHMENTS – FLORIDA COMPLIANT

EcoFasten offers two roof attachments that meet the specifications for installation in the State of Florida, which are GF-1® and QB-1 as shown below.

GF-1®

GF-1® is a versatile solution for use on composition shingle roofs. The 8" x 12" flashing installs with a single fastener and when combined with an EcoFasten compression bracket, a watertight seal is created, maintaining the integrity of the roof.

Available GF-1® SKUs:

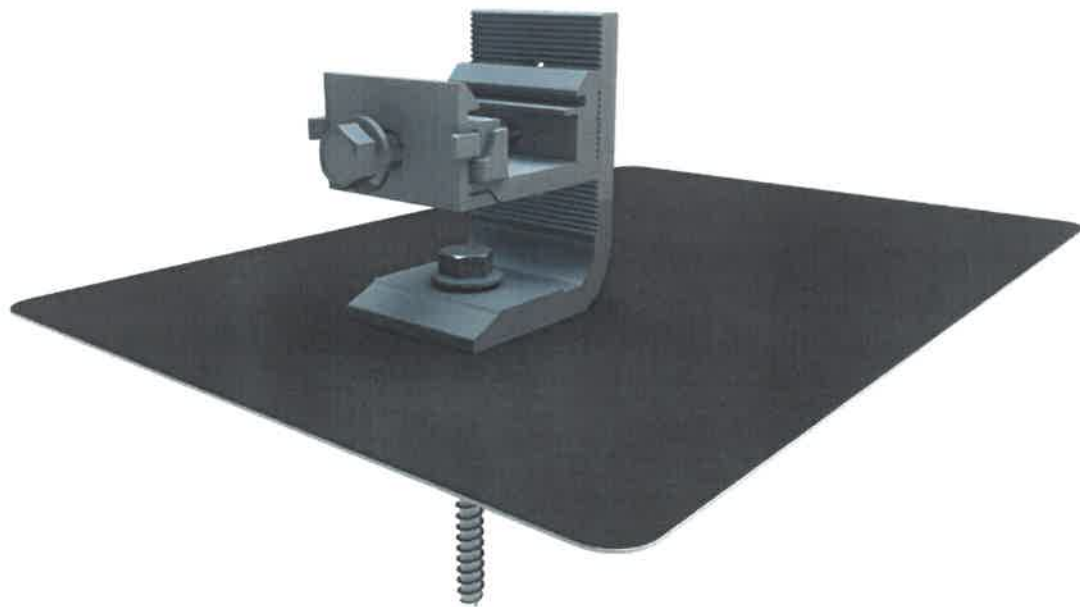
- 3012010 - GF-1 FLASHING GLV BLK 8x12"
- 3012011 - GF-1 FLASHING GLV MLL 8X12"

Available Compression Brackets:

- 2012022 - CF UNIV L-FOOT MLL 3"

GF-1® Structural Capacity Documentation for Permit Packets

- ▶ [ClickFit L-Foot Capacity Report 07.29.2021](#)
- ▶ [GF-1 Installation Manual Florida 08.11.2021 v2.0](#)



QB-1

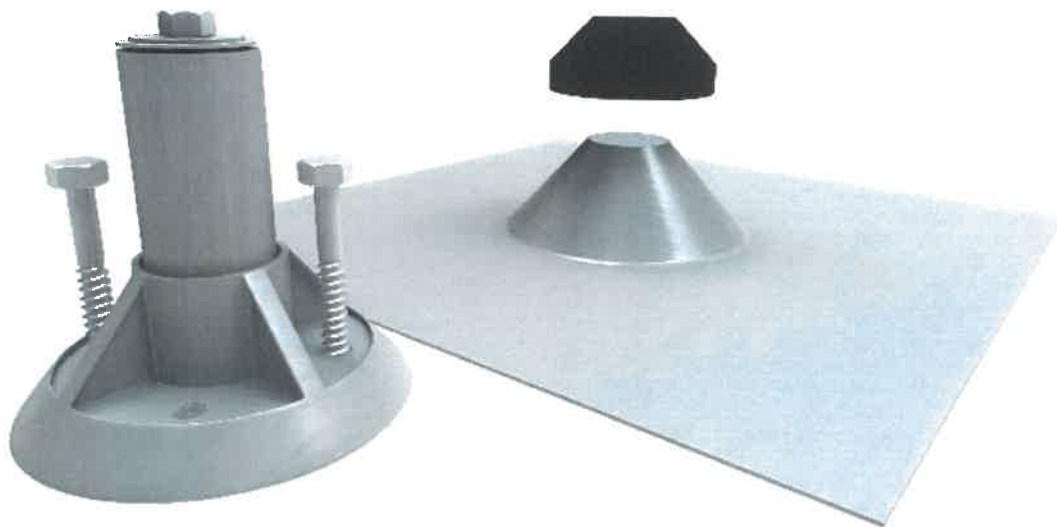
QB-1 uses a super strong base that can be used on composition shingle, tile, shake, slate, metal shingle, and low slope rooftops. This is a rail-based solution is ideal for new residential construction projects. The base can be installed prior to the roofing material, allowing for the roof to be shingled or tiled around the posts.

Available QB-1 SKUs:

- 3017010 - QB-1 BASE AL
- 3017011 - QB-1 POST AL MLL 4.5"
- 3017012 - QB-1 POST AL MLL 6.5"
- 3017013 - QB-1 FLASHING AL MLL 12X12"
- 3017014 - QB-1 FLASHING AL MLL 18X18"
- 3017015 - QB-1 EPDM COLLAR BLK 1.25"

QB-1 Structural Capacity Documentation for Permit Packets

- ▶ [QB-1 State of Florida Certification Letter 07.29.2021](#)
- ▶ [QB-1 Installation Manual 04.09.2021 v1.0](#)



ECOFASTEN RACKING SYSTEM – FLORIDA COMPLIANT

CLICKFIT®

ClickFit® is one of the fastest installing rail-based systems in the industry. With its click-in rail assembly, the rails can be connected to any of EcoFasten's composition shingle, tile, and metal roof mounts in seconds without the need for fasteners or tools. The ClickFit system is made of robust, anti-corrosive materials, such as aluminum and cold formed coated steel, to ensure the strength, corrosion resistance, and longevity.

Available ClickFit Rail SKUs:

- 2012021 - CF STD RAIL MLL AL 14FT
- 2012025 - CF STD RAIL AL MLL 171.5"

ClickFit UL 2703 Certification for Permit Packets

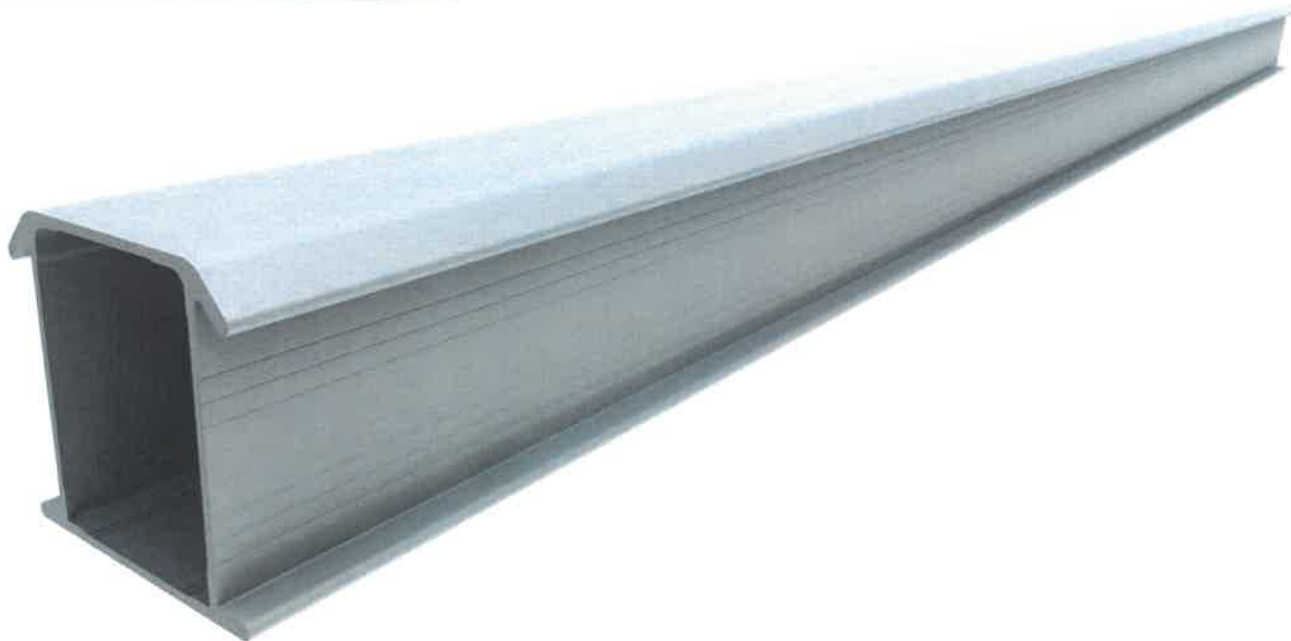
- ▶ [*ClickFit UL 2703 Approved Installation Manual Version 07.06.2021 v2.5*](#)
- ▶ [*ClickFit UL 2703 Approved Addendum 06.07.2021 v1.1*](#)

ClickFit Module Load Rating/Span Tables for Permit Packets

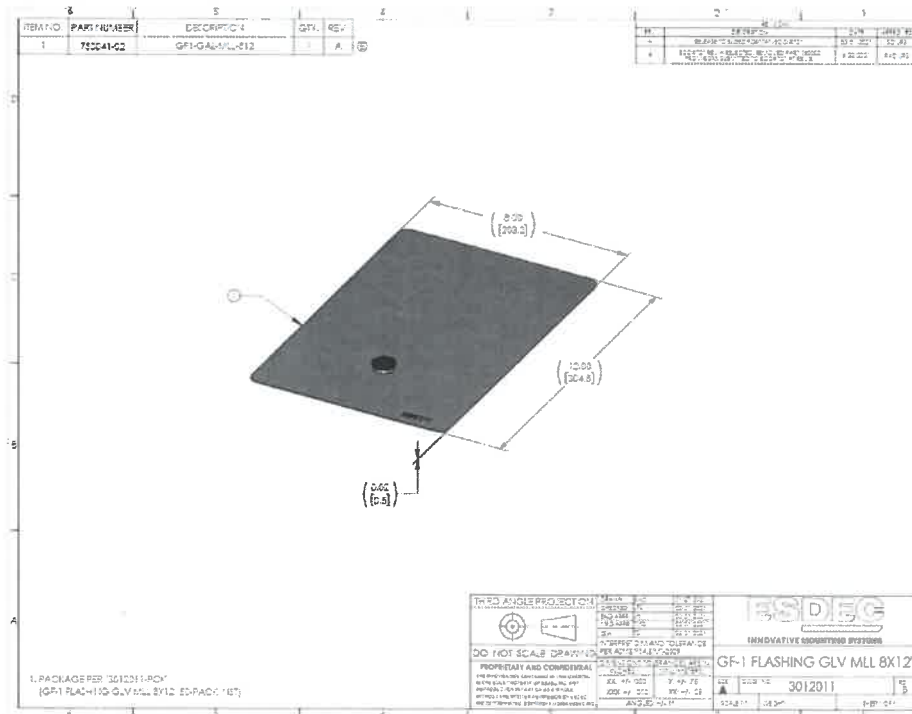
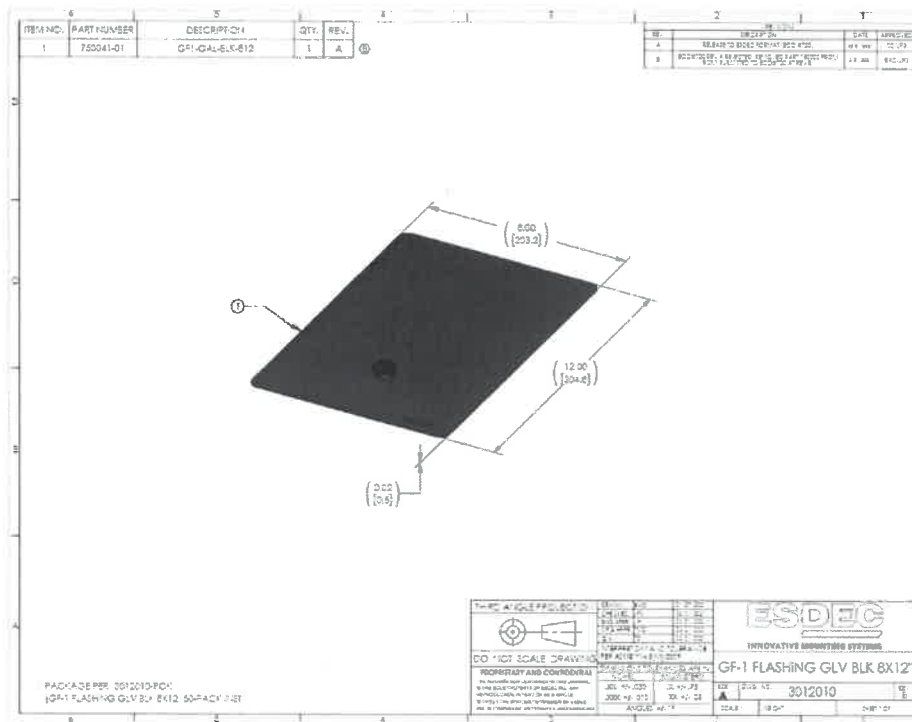
- ▶ [*ClickFit Master Letter Certification 04.15.2021*](#)

ClickFit Waterproofing for Permit Packets

- ▶ [*ClickFit UL 441 Rain Report 03.17.2021*](#)



GF-1 CUT SHEETS

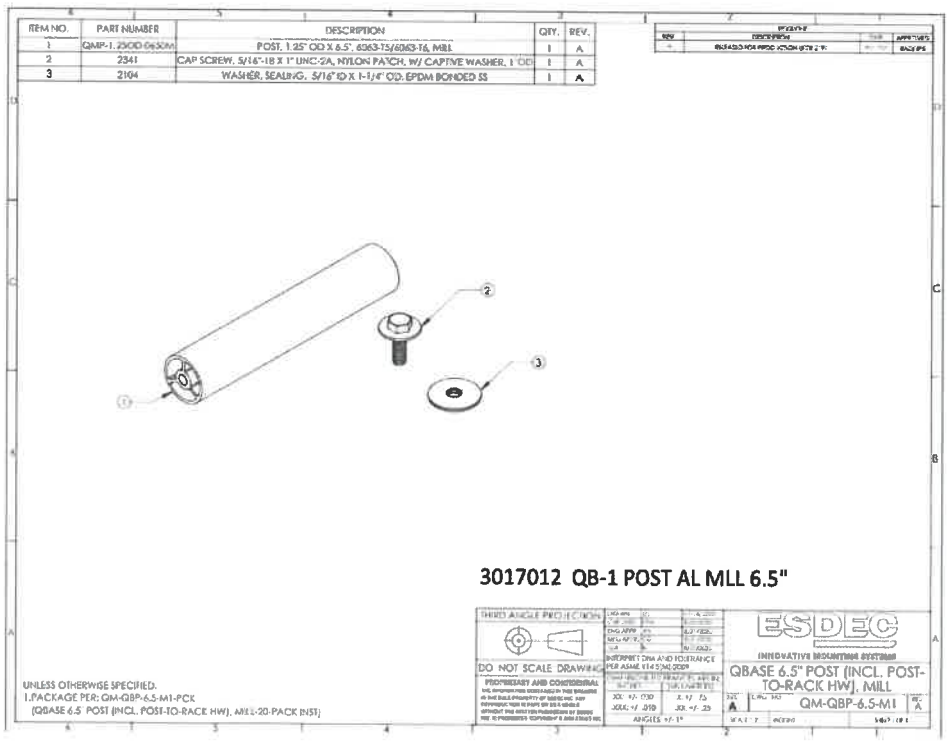
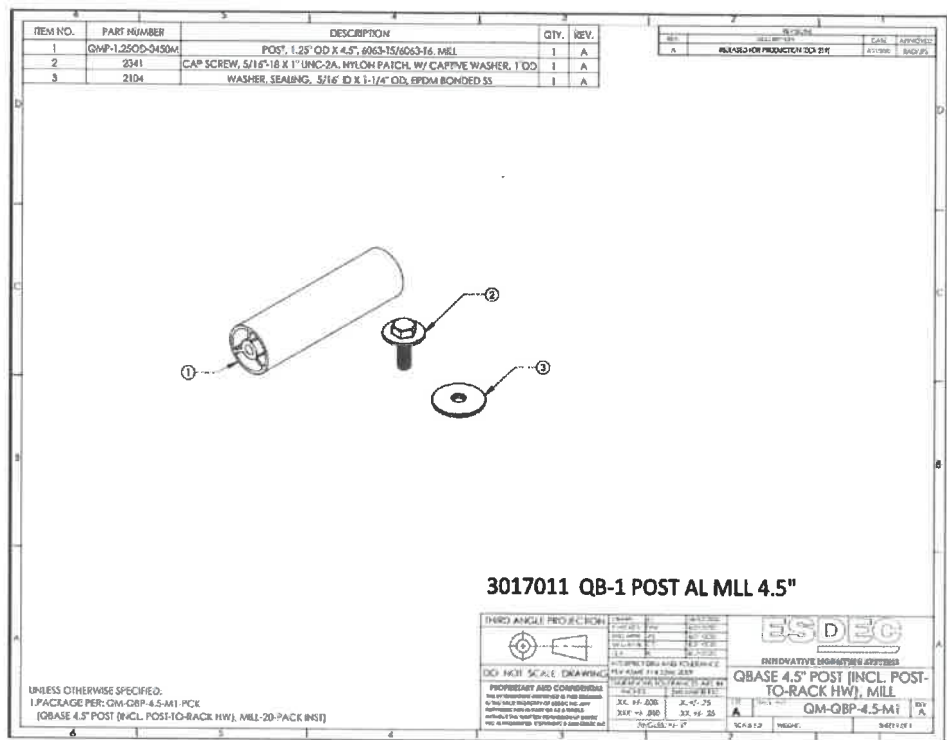


WATERPROOFING PER NRCA GUIDELINES

Designed and Certified for Compliance with the Florida Building Code & ASCE/SEI-7

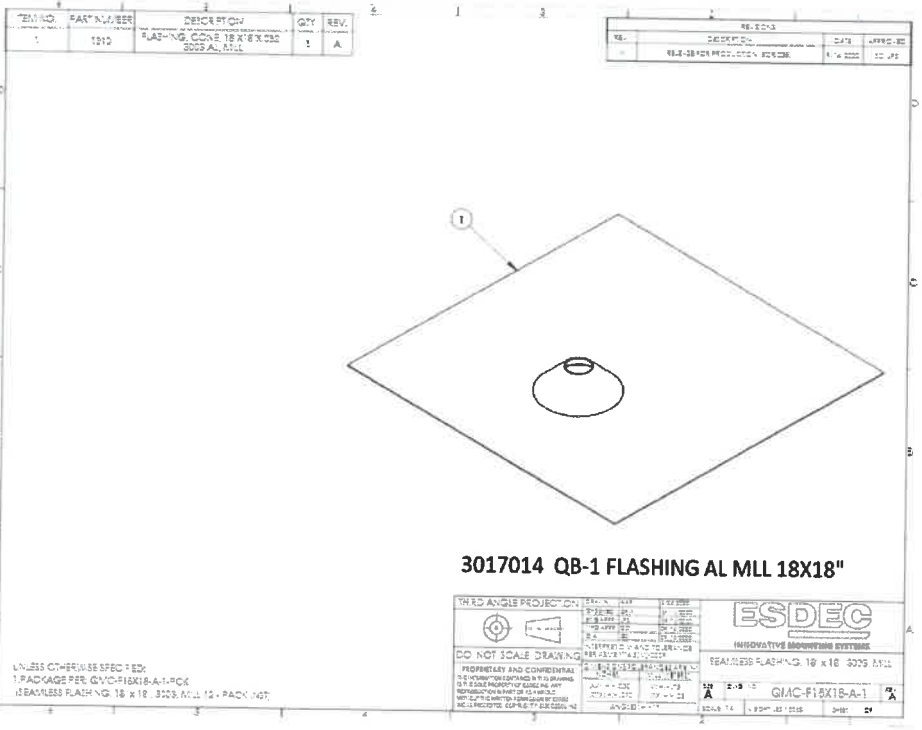
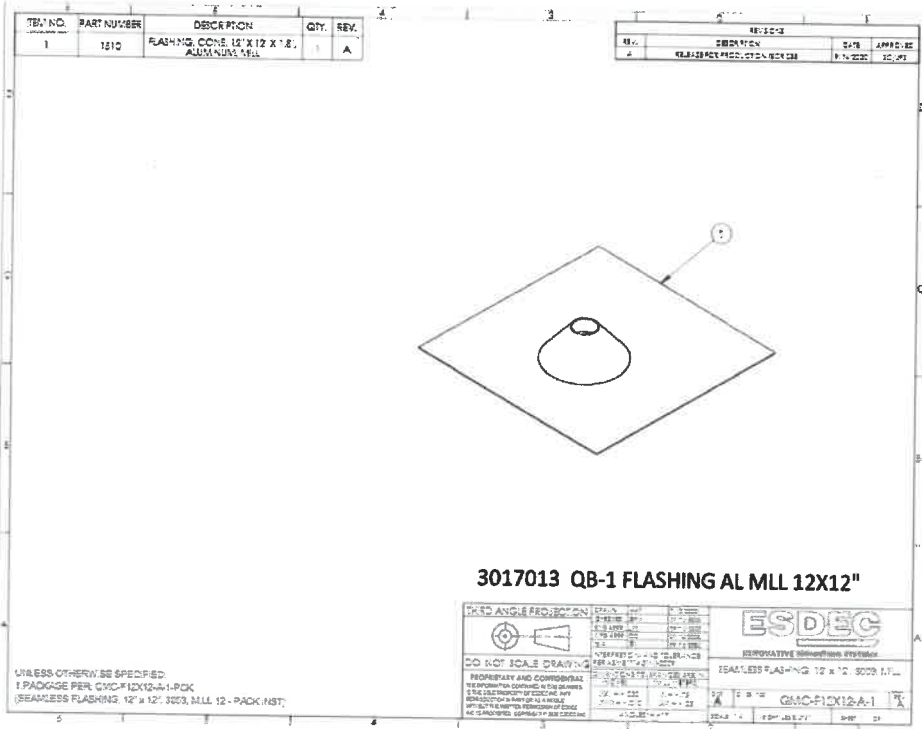
STRUCTURAL CERTIFICATION
Designed and Certified for Compliance with the Florida Building Code & ASCE/SEI-7

QB-1 CUT SHEETS



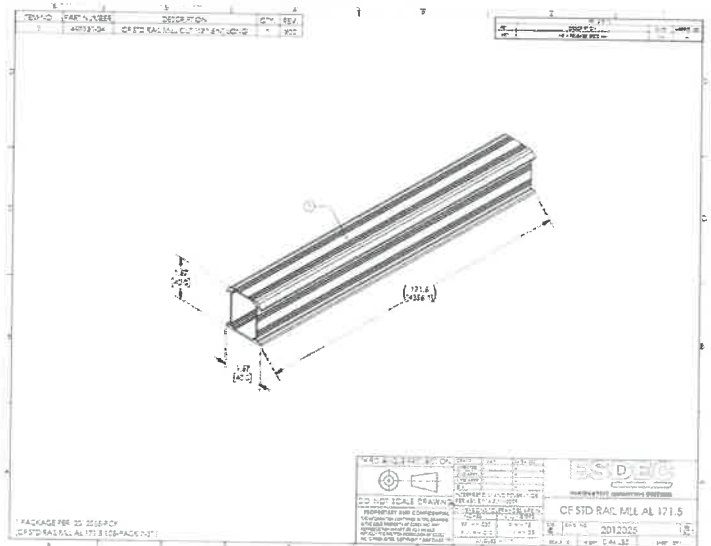
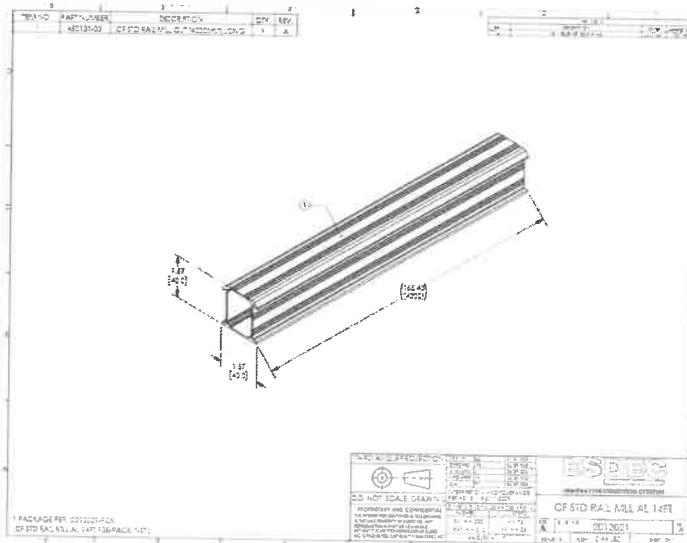
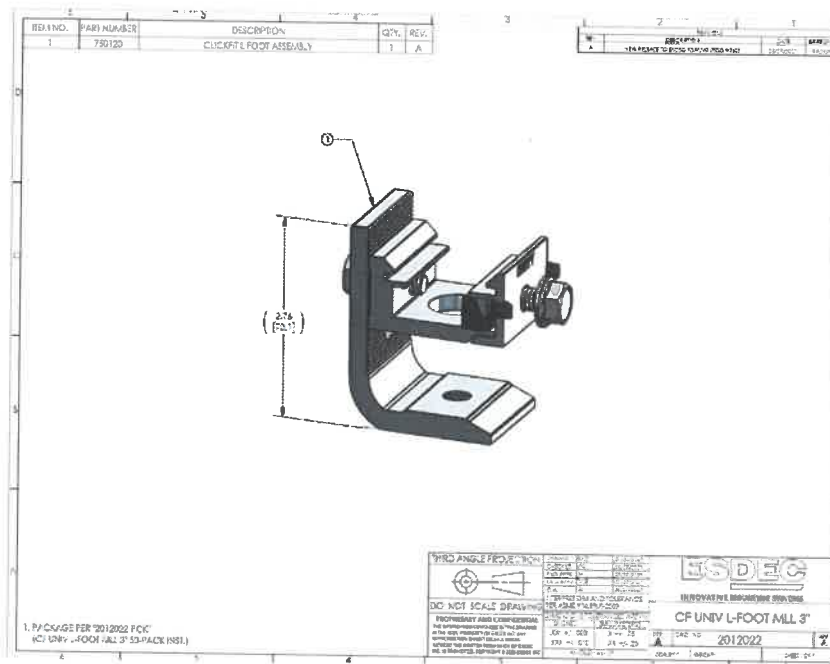
STRUCTURAL CERTIFICATION
Designed and Certified for Compliance with the Florida Building Code & ASCE/SEI-7

QB-1 CUT SHEETS



WATERPROOFING PER NRCA GUIDELINES
Designed and Certified for Compliance with the Florida Building Code & ASCE/SEI-7

CLICKFIT CUT SHEETS



STRUCTURAL CERTIFICATION

Designed and Certified for Compliance with the Florida Building Code & ASCE/SEI-7

UL 2703

Conforms to UL 2703 Mechanical & Bonding requirements. See EcoFasten ClickFit Installation Manual for full ratings.

PERMITTING PACKETS

Listed below is the documentation you will need to provide to your AHJ for permitting approval. Click on the link to download file.

UL 2703 CERTIFICATIONS:

- ▶ [ClickFit UL 2703 Approved Installation Manual Version 07.06.2021 v2.5](#)
- ▶ [ClickFit UL 2703 Approved Addendum 06.07.2021 v1.1](#)

STRUCTURAL CERTIFICATIONS:

- ▶ [ClickFit L-Foot Capacity Report 07.29.2021](#)
- ▶ [ClickFit Master Letter Certification 04.15.2021](#)
- ▶ [GF-1 Installation Manual Florida 08.11.2021 v2.0](#)
- ▶ [QB-1 State of Florida Certification Letter 07.29.2021](#)

WATERPROOFING:

- ▶ [ClickFit UL 441 Rain Report 03.17.2021](#)

INSTALLATION MANUALS:

- ▶ [GF-1 Installation Manual Florida 08.11.2021 v2.0](#)
- ▶ [QB-1 Installation Manual 04.09.2021 v1.0](#)

OPTIONAL CUT SHEETS:

- ▶ [2012021 - CF STD RAIL MLL AL 14FT Cut Sheet](#)
- ▶ [2012022 - CF UNIV L-FOOT MLL 3" Cut Sheet](#)
- ▶ [2012025 - CF STD RAIL AL MLL 171.5" Cut Sheet](#)
- ▶ [3012010 - GF-1 FLASHING GLV BLK 8x12" Cut Sheet](#)
- ▶ [3012011 - GF-1 FLASHING GLV MLL 8X12" Cut Sheet](#)
- ▶ [3017010 - QB-1 BASE AL Cut Sheet](#)
- ▶ [3017011 - QB-1 POST AL MLL 4.5" Cut Sheet](#)
- ▶ [3017012 - QB-1 POST AL MLL 6.5" Cut Sheet](#)
- ▶ [3017013 - QB-1 FLASHING AL MLL 12X12" Cut Sheet](#)
- ▶ [3017014 - QB-1 FLASHING AL MLL 18X18" Cut Sheet](#)
- ▶ [3017015 - QB-1 EPDM COLLAR BLK 1.25" Cut Sheet](#)

CONTACT ECOFASTEN

4141 W Van Buren Street, Suite 2, Phoenix, AZ 85009

877.859.3947 | ecofastensolar.com





April 15, 2021

EcoFasten Solar LLC
4141 W Van Buren St, Ste 2
Phoenix, AZ 85009
TEL: (877) 859-3947

Attn.: EcoFasten Solar LLC - Engineering Department

Re: Report # 2019-11325HG5.01 Engineering Certification for the EcoFasten Solar LLC ClickFit - Rail System for Gable and Hip Roof.

PZSE, Inc. - Structural Engineers have reviewed EcoFasten Solar LLC ClickFit System. All information, data, and analysis contained within the EcoFasten Solar LLC ClickFit System Rail span tables are based on and comply with the following codes:

1. Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16
2. 2018 International Building Code, by the International Code Council, Inc.
3. 2018 International Residential Code, by the International Code Council, Inc.
4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012, by ICC-ES
5. Aluminum Design Manual 2015, by The Aluminum Association, Inc.

Following are typical specifications to meet the above code requirements:

Design Criteria: Ground Snow Load = 0 - 60 (psf)
Basic Wind Speed = 90 - 180 (mph)
Roof Mean Height = 0 - 30 (ft)
Enclosed and Partially Enclosed Gable and Hip Roof Pitch = 0° - 60° (degrees)
Exposure Category = B, C & D

Attachment Devices: The evaluation of the ClickFit System considers the ClickFit L-Foot.

Rail: The evaluation of the ClickFit System Rail p/n 2012021 (450124, REV X03), made with an aluminum alloy, 6000 series, with a minimum yield strength of 35 ksi.

Cantilever: Maximum cantilever length is $L/3$, where "L" is the span noted in the Span Tables, provided at least 1 module length between maximum cantilevers.



- Clearance:** 2" to 10" clear from the top of the roof to the top of the PV panel.
- Tolerance(s):** 1.0" tolerance for any specified dimension in this report is allowed for installation.
- PV Module Size:** 60-Cell PV Panel max dimension is 68.5".
72-Cell PV Panel max dimension is 80.4".
- Installation Orientation:** Landscape (L) - PV Panel long dimension is parallel to the ridge/eave line of the roof, and the PV panel is mounted on the short side.
Portrait (P) - PV Panel short dimension is parallel to the ridge/eave line of the roof, and the PV panel is mounted on the long side.

Components and Cladding Roof Zones:

Roof Zones – Enclosed and Partially Enclosed Gable Roofs, $\theta \leq 7^\circ$:

The zones shall be determined using figure 30.3-2A of ASCE 7-16. See Figure 1.

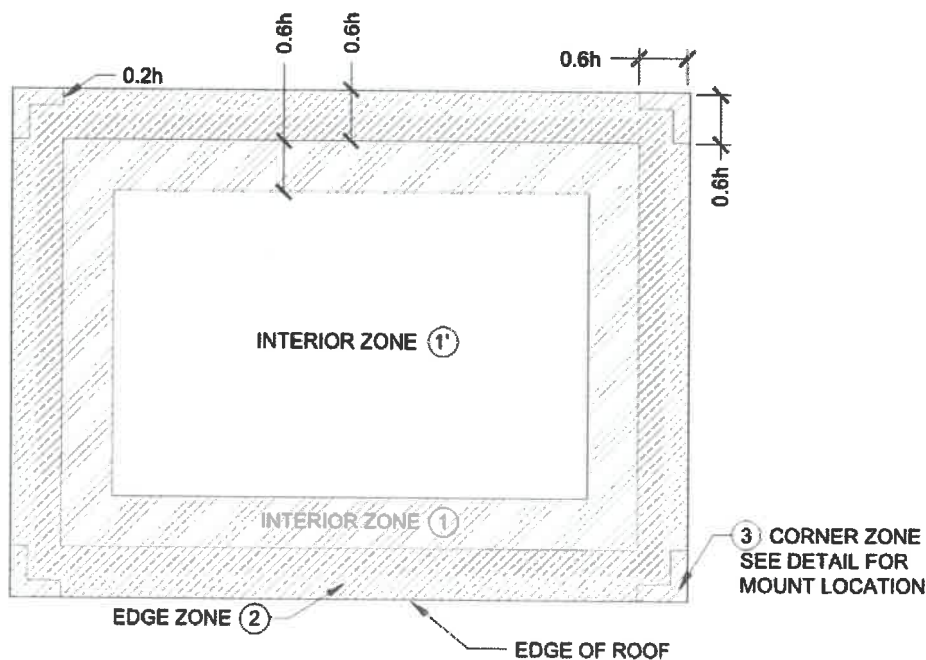


Figure 1: Roof Edge and Corner Zones, Gable Roofs, $\theta \leq 7^\circ$

Roof Zones – Enclosed and Partially Enclosed Gable and Hip Roofs, $7^\circ < \theta \leq 60^\circ$:

The Edge Zone, “a,” shall be determined using figure 30.3-2B to figure 30.3-2D of ASCE 7-16, for Gable roofs.

The Edge Zone, “a,” shall be determined using figure 30.3-2E to figure 30.3-2I of ASCE 7-16, for Hip roofs.

Interior Zone 1 span shall be the minimum of 1 and 1' (See ClickFit System Rail Span Chart). Corner Zone 3 spans shall be the shortest of 3e and 3r (See ClickFit System Rail Span Chart). See Figure 2.

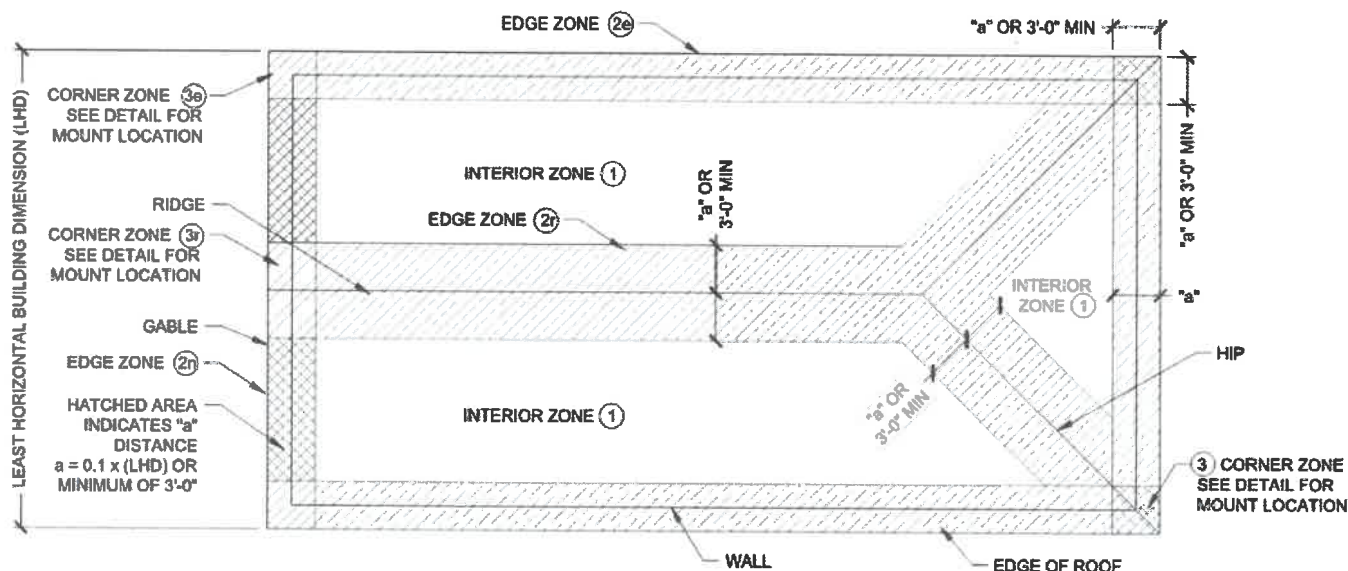


Figure 2: Roof Zones, Gable and Hip Roofs, $7^\circ < \theta \leq 45^\circ$

Panel with Support Mounts in Multiple Roof Zones:

Edge and Corner Zone spacings (Zone 2 & 3, respectively) apply only to mounts located in those Zones, not to all the mounts supporting the module.

Notes:

- 1) Tables are determined for Rail and L-foot only and does not include roof capacity check.
- 2) Risk Category II per ASCE 7-16.
- 3) Topographic factor, k_{zt} is 1.0.
- 4) Average parapet height is 0.0 ft.
- 5) Wind speeds are LRFD values.
- 6) Attachment spacing(s) apply to a seismic design category E or less.

Panel Array Edge:

Panels exposed at array edge shall use figure 29.4-7 of ASCE 7-16 to determine “ d_1 ” and “ d_2 ” to apply “Array Edge” spans that apply to an array layout. See figure 3.

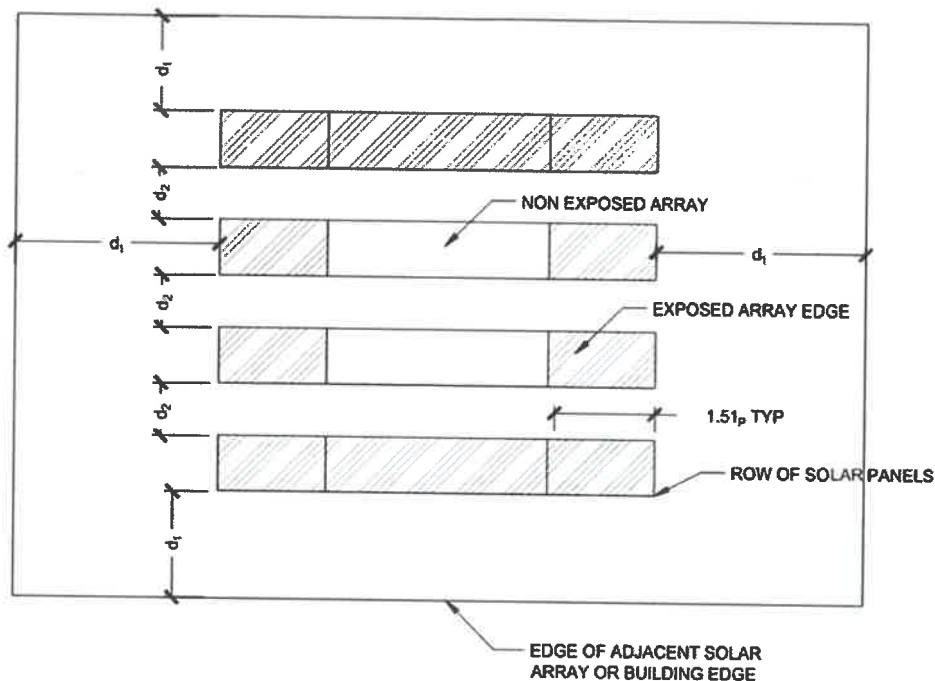


Figure 3: Array Edge

Design Responsibility:

These tables are intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. In all cases, these tables should be used under the direction of a design professional with sufficient structural engineering knowledge and experience to be able to:

- Evaluate whether these tables apply to the project, and
- Understand and determine the appropriate values for all input parameters of these tables.

This letter certifies that the EcoFasten Solar LLC ClickFit Railed System, when installed according to the limitations of this letter and the attached span tables, complies with the above codes and loading criteria. This certification excludes evaluation of the building structure to support the loads imposed on the building by the array; including, but not limited to strength and deflection of structural framing members, fastening and/or strength of roofing materials, and/or the effects of snow accumulation on the roof. Structures will require additional knowledge of the building and are outside the scope of the certification of this racking system.

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville



Table of Contents

Item	Page #
Part 1: EcoFasten Flush-Mount ClickFit System with L-foot - Enclosed Hip and Gable	
Span Tables for Flush-Mount ClickFit System on 0-30 Foot Roof, 60-Cell Modules - Portrait	6
Span Tables for Flush-Mount ClickFit System on 0-30 Foot Roof with 72-Cell Modules - Portrait	14
Span Tables for Flush-Mount ClickFit System on 0-30 Foot Roof with 60-Cell & 72-Cell Modules - Landscape	22
Appendix A: Ecofasten ClickFit Cut Sheets	30

[illegible]

7 of 31

9 of 31

Maximum Rail Spans (Inches)		ClickFit Rail 450124 (REVX09) Flush-Mount on 0 to 30 Foot Roof - L-Foot - 60-Cali	
Ground Snow Load	Exposure Category	Panel Angle	Wind Speed
			ft/mph
			100 mph
			120 mph
			140 mph
			160 mph
			180 mph
			200 mph
			220 mph
			240 mph
			260 mph
			280 mph
			300 mph
			320 mph
			340 mph
			360 mph
			380 mph
			400 mph
			420 mph
			440 mph
			460 mph
			480 mph
			500 mph
			520 mph
			540 mph
			560 mph
			580 mph
			600 mph
			620 mph
			640 mph
			660 mph
			680 mph
			700 mph
			720 mph
			740 mph
			760 mph
			780 mph
			800 mph
			820 mph
			840 mph
			860 mph
			880 mph
			900 mph
			920 mph
			940 mph
			960 mph
			980 mph
			1000 mph
			1020 mph
			1040 mph
			1060 mph
			1080 mph
			1100 mph
			1120 mph
			1140 mph
			1160 mph
			1180 mph
			1200 mph
			1220 mph
			1240 mph
			1260 mph
			1280 mph
			1300 mph
			1320 mph
			1340 mph
			1360 mph
			1380 mph
			1400 mph
			1420 mph
			1440 mph
			1460 mph
			1480 mph
			1500 mph
			1520 mph
			1540 mph
			1560 mph
			1580 mph
			1600 mph
			1620 mph
			1640 mph
			1660 mph
			1680 mph
			1700 mph
			1720 mph
			1740 mph
			1760 mph
			1780 mph
			1800 mph
			1820 mph
			1840 mph
			1860 mph
			1880 mph
			1900 mph
			1920 mph
			1940 mph
			1960 mph
			1980 mph
			2000 mph
			2020 mph
			2040 mph
			2060 mph
			2080 mph
			2100 mph
			2120 mph
			2140 mph
			2160 mph
			2180 mph
			2200 mph
			2220 mph
			2240 mph
			2260 mph
			2280 mph
			2300 mph
			2320 mph
			2340 mph
			2360 mph
			2380 mph
			2400 mph
			2420 mph
			2440 mph
			2460 mph
			2480 mph
			2500 mph
			2520 mph
			2540 mph
			2560 mph
			2580 mph
			2600 mph
			2620 mph
			2640 mph
			2660 mph
			2680 mph
			2700 mph
			2720 mph
			2740 mph
			2760 mph
			2780 mph
			2800 mph
			2820 mph
			2840 mph
			2860 mph
			2880 mph
			2900 mph
			2920 mph
			2940 mph
			2960 mph
			2980 mph
			3000 mph
			3020 mph
			3040 mph
			3060 mph
			3080 mph
			3100 mph
			3120 mph
			3140 mph
			3160 mph
			3180 mph
			3200 mph
			3220 mph
			3240 mph
			3260 mph
			3280 mph
			3300 mph
			3320 mph
			3340 mph
			3360 mph
			3380 mph
			3400 mph
			3420 mph
			3440 mph
			3460 mph
			3480 mph
			3500 mph
			3520 mph
			3540 mph
			3560 mph
			3580 mph
			3600 mph
			3620 mph
			3640 mph
			3660 mph
			3680 mph
			3700 mph
			3720 mph
			3740 mph
			3760 mph
			3780 mph
			3800 mph
			3820 mph
			3840 mph
			3860 mph
			3880 mph
			3900 mph
			3920 mph
			3940 mph
			3960 mph
			3980 mph
			4000 mph
			4020 mph
			4040 mph
			4060 mph
			4080 mph
			4100 mph
			4120 mph
			4140 mph
			4160 mph
			4180 mph
			4200 mph
			4220 mph
			4240 mph
			4260 mph
			4280 mph
			4300 mph
			4320 mph
			4340 mph
			4360 mph
			4380 mph
			4400 mph
			4420 mph
			4440 mph
			4460 mph
			4480 mph
			4500 mph
			4520 mph
			4540 mph
			4560 mph
			4580 mph
			4600 mph
			4620 mph
			4640 mph
			4660 mph
			4680 mph
			4700 mph
			4720 mph
			4740 mph
			4760 mph
			4780 mph
			4800 mph
			4820 mph
			4840 mph
			4860 mph
			4880 mph
			4900 mph
			4920 mph
			4940 mph
			4960 mph
			4980 mph
			5000 mph
			5020 mph
			5040 mph
			5060 mph
			5080 mph
			5100 mph
			5120 mph
			5140 mph
			5160 mph
			5180 mph
			5200 mph
			5220 mph
			5240 mph
			5260 mph
			5280 mph
			5300 mph
			5320 mph
			5340 mph
			5360 mph
			5380 mph
			5400 mph
			5420 mph
			5440 mph
			5460 mph
			5480 mph
			5500 mph
			5520 mph
			5540 mph
			5560 mph
			5580 mph
			5600 mph
			5620 mph
			5640 mph
			5660 mph
			5680 mph
			5700 mph
			5720 mph
			5740 mph
			5760 mph
			5780 mph
			5800 mph
			5820 mph
			5840 mph
			5860 mph
			5880 mph
			5900 mph
			5920 mph
			5940 mph
			5960 mph
			5980 mph
			6000 mph
			6020 mph
			6040 mph
			6060 mph
			6080 mph
			6100 mph
			6120 mph
			6140 mph
			6160 mph
			6180 mph
			6200 mph
			6220 mph
			6240 mph
			6260 mph
			6280 mph
			6300 mph
			6320 mph
			6340 mph
			6360 mph
			6380 mph
			6400 mph
			6420 mph
			6440 mph
			6460 mph
			6480 mph
			6500 mph
			6520 mph
			6540 mph
			6560 mph
			6580 mph
			6600 mph
			6620 mph
			6640 mph
			6660 mph
			6680 mph
			6700 mph
			6720 mph
			6740 mph
			6760 mph
			6780 mph
			6800 mph
			6820 mph
			6840 mph
			6860 mph
			6880 mph
			6900 mph
			6920 mph
			6940 mph
			6960 mph
			6980 mph
			7000 mph
			7020 mph
			7040 mph
			7060 mph
			7080 mph
			7100 mph
			7120 mph
			7140 mph
			7160 mph
			7180 mph
			7200 mph
			7220 mph
			7240 mph
			7260 mph
			7280 mph
			7300 mph
			7320 mph
			7340 mph
			7360 mph
			7380 mph
			7400 mph
			7420 mph
			7440 mph
			7460 mph
			7480 mph
			7500 mph
			7520 mph
			7540 mph
			7560 mph
			7580 mph
			7600 mph
			7620 mph
			7640 mph
			7660 mph
			7680 mph
			7700 mph
			7720 mph
			7740 mph
			7760 mph
			7780 mph
			7800 mph
			7820 mph
			7840 mph
			7860 mph
			7880 mph
			7900 mph
			7920 mph
			7940 mph
			7960 mph
			7980 mph
			8000 mph
			8020 mph
			8040 mph
			8060 mph
			8080 mph
			8100 mph
			8120 mph
			8140 mph
			8160 mph
			8180 mph
			8200 mph
			8220 mph
			8240 mph
			8260 mph
			8280 mph
			8300 mph
			8320 mph
			8340 mph
			8360 mph
			8380 mph
			8400 mph
			8420 mph
			8440 mph
			8460 mph
			8480 mph
			8500 mph
			8520 mph
			8540 mph
			8560 mph
			8580 mph
			8600 mph
			8620 mph
			8640 mph
			8660 mph
			8680 mph
			8700 mph
			8720 mph
			8740 mph
			8760 mph
			8780 mph
			8800 mph
			8820 mph
</			

12 of 31

Maximum Rail Spans (Inches)			ClickFit Rail 450124 (REVX03) Flush-Mount on 0 to 30 Foot Roof – L-Foot – 60-Ceil																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Ground Snow Load	Exposure Category	Panel Angle	Wind Speed (mph)										130 mph										140 mph										150 mph										160 mph										170 mph										180 mph																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
			Roof Zone		1'		2'		3'		4'		5'		1'		2'		3'		4'		5'		1'		2'		3'		4'		5'		1'		2'		3'		4'		5'		1'		2'		3'		4'		5'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
45 psf	B	0 to 7	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62

[illegible]

Maximum Rail Spans (Inches)				ClickFit Rail 450124 (REVX03) Flush-Mount on 0 to 30 Foot Roof – L-Foot – 72-Cell (P)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Ground Snow Load	Exposure Category	Panel Angle	Wind Speed (mph)	130 mph												140 mph												150 mph												160 mph												170 mph												180 mph																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
				1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
0 psf	B	0 to 7	Array Interior	82	74	67	67	67	59	39	82	71	63	63	63	55	82	67	60	60	60	51	81	64	56	56	47	77	61	53	53	44	44	74	54	50	50	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42

Maximum Rail Spans (Inches)			ClickFit Rail 450124 (REVX03) Flush-Mount on 0 to 30 Foot Roof – L-Foot – 72-Cell (P)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Ground Snow Load	Exposure Category	Panel Angle	90 mph												95 mph												100 mph												105 mph												110 mph												115 mph												120 mph																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
15 psf	B	0 to 7	Array Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

17 of 31

Maximum Rail Spans (Inches)				ClickFit Rail #450124 (REVX03) Flush-Mount on 0 to 30 Foot Roof - L-Foot - 72-Cell (P)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Ground Snow Load	Uplift Capacity	Panel Angle	Wind Direction	90 mph										85 mph										100 mph										105 mph										110 mph										115 mph										120 mph																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
				1'	1'	2'	2'	3'	3'	4'	4'	5'	5'	6'	6'	7'	7'	8'	8'	9'	9'	10'	10'	11'	11'	12'	12'	13'	13'	14'	14'	15'	15'	16'	16'	17'	17'	18'	18'	19'	19'	20'	20'	21'	21'	22'	22'	23'	23'	24'	24'	25'	25'	26'	26'	27'	27'	28'	28'	29'	29'	30'	30'	31'	31'	32'	32'	33'	33'	34'	34'	35'	35'	36'	36'	37'	37'	38'	38'	39'	39'	40'	40'	41'	41'	42'	42'	43'	43'	44'	44'	45'	45'	46'	46'	47'	47'	48'	48'	49'	49'	50'	50'	51'	51'	52'	52'	53'	53'	54'	54'	55'	55'	56'	56'	57'	57'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'	71'	71'	72'	72'	73'	73'	74'	74'	75'	75'	76'	76'	77'	77'	78'	78'	79'	79'	80'	80'	81'	81'	82'	82'	83'	83'	84'	84'	85'	85'	86'	86'	87'	87'	88'	88'	89'	89'	90'	90'	91'	91'	92'	92'	93'	93'	94'	94'	95'	95'	96'	96'	97'	97'	98'	98'	99'	99'	100'	100'	101'	101'	102'	102'	103'	103'	104'	104'	105'	105'	106'	106'	107'	107'	108'	108'	109'	109'	110'	110'	111'	111'	112'	112'	113'	113'	114'	114'	115'	115'	116'	116'	117'	117'	118'	118'	119'	119'	120'	120'	121'	121'	122'	122'	123'	123'	124'	124'	125'	125'	126'	126'	127'	127'	128'	128'	129'	129'	130'	130'	131'	131'	132'	132'	133'	133'	134'	134'	135'	135'	136'	136'	137'	137'	138'	138'	139'	139'	140'	140'	141'	141'	142'	142'	143'	143'	144'	144'	145'	145'	146'	146'	147'	147'	148'	148'	149'	149'	150'	150'	151'	151'	152'	152'	153'	153'	154'	154'	155'	155'	156'	156'	157'	157'	158'	158'	159'	159'	160'	160'	161'	161'	162'	162'	163'	163'	164'	164'	165'	165'	166'	166'	167'	167'	168'	168'	169'	169'	170'	170'	171'	171'	172'	172'	173'	173'	174'	174'	175'	175'	176'	176'	177'	177'	178'	178'	179'	179'	180'	180'	181'	181'	182'	182'	183'	183'	184'	184'	185'	185'	186'	186'	187'	187'	188'	188'	189'	189'	190'	190'	191'	191'	192'	192'	193'	193'	194'	194'	195'	195'	196'	196'	197'	197'	198'	198'	199'	199'	200'	200'	201'	201'	202'	202'	203'	203'	204'	204'	205'	205'	206'	206'	207'	207'	208'	208'	209'	209'	210'	210'	211'	211'	212'	212'	213'	213'	214'	214'	215'	215'	216'	216'	217'	217'	218'	218'	219'	219'	220'	220'	221'	221'	222'	222'	223'	223'	224'	224'	225'	225'	226'	226'	227'	227'	228'	228'	229'	229'	230'	230'	231'	231'	232'	232'	233'	233'	234'	234'	235'	235'	236'	236'	237'	237'	238'	238'	239'	239'	240'	240'	241'	241'	242'	242'	243'	243'	244'	244'	245'	245'	246'	246'	247'	247'	248'	248'	249'	249'	250'	250'	251'	251'	252'	252'	253'	253'	254'	254'	255'	255'	256'	256'	257'	257'	258'	258'	259'	259'	260'	260'	261'	261'	262'	262'	263'	263'	264'	264'	265'	265'	266'	266'	267'	267'	268'	268'	269'	269'	270'	270'	271'	271'	272'	272'	273'	273'	274'	274'	275'	275'	276'	276'	277'	277'	278'	278'	279'	279'	280'	280'	281'	281'	282'	282'	283'	283'	284'	284'	285'	285'	286'	286'	287'	287'	288'	288'	289'	289'	290'	290'	291'	291'	292'	292'	293'	293'	294'	294'	295'	295'	296'	296'	297'	297'	298'	298'	299'	299'	300'	300'	301'	301'	302'	302'	303'	303'	304'	304'	305'	305'	306'	306'	307'	307'	308'	308'	309'	309'	310'	310'	311'	311'	312'	312'	313'	313'	314'	314'	315'	315'	316'	316'	317'	317'	318'	318'	319'	319'	320'	320'	321'	321'	322'	322'	323'	323'	324'	324'	325'	325'	326'	326'	327'	327'	328'	328'	329'	329'	330'	330'	331'	331'	332'	332'	333'	333'	334'	334'	335'	335'	336'	336'	337'	337'	338'	338'	339'	339'	340'	340'	341'	341'	342'	342'	343'	343'	344'	344'	345'	345'	346'	346'	347'	347'	348'	348'	349'	349'	350'	350'	351'	351'	352'	352'	353'	353'	354'	354'	355'	355'	356'	356'	357'	357'	358'	358'	359'	359'	360'	360'	361'	361'	362'	362'	363'	363'	364'	364'	365'	365'	366'	366'	367'	367'	368'	368'	369'	369'	370'	370'	371'	371'	372'	372'	373'	373'	374'	374'	375'	375'	376'	376'	377'	377'	378'	378'	379'	379'	380'	380'	381'	381'	382'	382'	383'	383'	384'	384'	385'	385'	386'	386'	387'	387'	388'	388'	389'	389'	390'	390'	391'	391'	392'	392'	393'	393'	394'	394'	395'	395'	396'	396'	397'	397'	398'	398'	399'	399'	400'	400'	401'	401'	402'	402'	403'	403'	404'	404'	405'	405'	406'	406'	407'	407'	408'	408'	409'	409'	410'	410'	411'	411'	412'	412'	413'	413'	414'	414'	415'	415'	416'	416'	417'	417'	418'	418'	419'	419'	420'	420'	421'	421'	422'	422'	423'	423'	424'	424'	425'	425'	426'	426'	427'	427'	428'	428'	429'	429'	430'	430'	431'	431'	432'	432'	433'	433'	434'	434'	435'	435'	436'	436'	437'	437'	438'	438'	439'	439'	440'	440'	441'	441'	442'	442'	443'	443'	444'	444'	445'	445'	446'	446'	447'	447'	448'	448'	449'	449'	450'	450'	451'	451'	452'	452'	453'	453'	454'	454'	455'	455'	456'	456'	457'	457'	458'	458'	459'	459'	460'	460'	461'	461'	462'	462'	463'	463'	464'	464'	465'	465'	466'	466'	467'	467'	468'	468'	469'	469'	470'	470'	471'	471'	472'	472'	473'	473'	474'	474'	475'	475'	476'	476'	477'	477'	478'	478'	479'	479'	480'	480'	481'	481'	482'	482'	483'	483'	484'	484'	485'	485'	486'	486'	487'	487'	488'	488'	489'	489'	490'	490'	491'	491'	492'	492'	493'	493'	494'	494'	495'	495'	496'	496'	497'	497'	498'	498'	499'	499'	500'	500'	501'	501'	502'	502'	503'	503'	504'	504'	505'	505'	506'	506'	507'	507'	508'	508'	509'	509'	510'	510'	511'	511'	512'	512'	513'	513'	514'	514'	515'	515'	516'	516'	517'	517'	518'	518'	519'	519'	520'	520'	521'	521'	522'	522'	523'	523'	524'	524'	525'	525'	526'	526'	527'	527'	528'	528'	529'	529'	530'	530'	531'	531'	532'	532'	533'	533'	534'	534'	535'	535'	536'	536'	537'	537'	538'	538'	539'	539'	540'	540'	541'	541'	542'	542'	543'	543'	544'	544'	545'	545'	546'	546'	547'	547'	548'	548'	549'	549'	550'	550'	551'	551'	552'	552'	553'	553'	554'	554'	555'	555'	556'	556'	557'	557'	558'	558'	559'	559'	560'	560'	561'	561'	562'	562'	563'	563'	564'	564'	565'	565'	566'	566'	567'	567'	568'	568'	569'	569'	570'	570'	571'	571'	572'	572'	573'	573'	574'	574'	575'	575'	576'	576'	577'	577'	578'	578'	579'	579'	580'	580'	581'	581'	582'	582'	583'	583'	584'	584'	585'	585'	586'	586'	587'	587'	588'	588'	589'	589'	590'	590'	591'	591'	592'	592'	593'	593'	594'	594'	595'	595'	596'	596'	597'	597'	598'	598'	599'	599'	600'	600'	601'	601'	602'	602'	603'	603'	604'	604'	605'	605'	606'	606'	607'	607'	608'	608'	609'	609'	610'	610'	611'	611'	612'	612'	613'	613'	614'	614'	615'	615'	616'	616'	617'	617'	618'	618'	619'	619'	620'	620'	621'	621'	622'	622'	623'	623'	624'	624'	625'	625'	626'	626'	627'	627'	628'	628'	629'	629'	630'	630'	631'	631'	632'	632'	633'	633'	634'	634'	635'	635'	636'	636'	637'	637'	638'	638'	639'	639'	640'	640'	641'	641'	642'	642'	643'	643'	644'	644'	645'	645'	646'	646'	647'	647'	648'	648'	649'	649'	650'	650'	651'	651'	652'	652'	653'	653'	654'	654'	655'	655'	656'	656'	657'	657'	658'	658'	659'	659'	660'	660'	661'	661'	662'	662'	663'	663'	664'	664'	665'	665'	666'	666'	667'	667'	668'	668'	669'	669'	670'	670'	671'	671'	672'	672'	673'	673'	674'	674'	675'	675'	676'	676'	677'	677'	678'	678'	679'	679'	680'	680'	681'	681'	682'	682'	683'	683'	684'	684'	685'	685'	686'	686'	687'	687'	688'	688'	689'	689'	690'	690'	691'	691'	692'	692'	693'	693'	694'	694'	695'	695'	696'	696'	697'	697'	698'	698'	699'	699'	700'	700'	701'	701'	702'	702'	703'	703'	704'	704'	705'	705'	706'	706'	707'	707'	708'	708'	709'	709'	710'	710'	711'	711'	712'	712'	713'	713'	714'	714'	715'	715'	716'	716'	717'	717'	718'	718'	719'	719'	720'	720'	721'	721'	722'	722'	723'	723'	724'	724'	725'	725'	726'	726'	727'	727'	728'	728'	729'	729'	730'	730'	731'	731'	732'	732'	733'	733'	734'	734'	735'	735'	736'	736'	737'	737'	738'	738'	739'	739'	740'	740'	741'	741'	742'	742'	743'	743'	744'	744'	745'	745'	746'	746'	747'	747'	748'	748'	749'	749'	750'	750'	751'	751'	752'	752'	753'	753'	754'	754'	755'	755'	756'	756'	757'	757'	758'	758'	759'	759'	760'	760'	761'	761'	762'	762'	763'	763'	764'	764'	765'	765'	766'	766'	767'	767'	768'	768'	769'	769'	770'	770'	771'	771'	772'	772'	773'

19 of 31

20 of 31

Maximum Rail Spans (Inches)		ClickFit Rail 4501224 (REV003) Flush-Mount on 0 to 30 Foot Roof – L-Foot – 72-Cel (P)		Wind Speed		120 mph		140 mph		150 mph		160 mph		170 mph		180 mph	
Ground Snow Load	Exposure Category	Panel Angle	Roof Zone	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
B	45 psf	0 to 7	Array Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58
			Array Edge	58	58	57	57	48	48	58	58	52	52	44	44	58	58
			Array Interior	62	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Edge	62	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Edge	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Interior	72	72	72	72	72	72	72	72	72	72	72	72	72	72
			Array Edge	72	72	72	72	72	72	72	72	72	72	72	72	72	72
			Array Interior	82	82	82	82	82	82	82	82	82	82	82	82	82	82
			Array Edge	82	82	82	82	82	82	82	82	82	82	82	82	82	82
			Array Interior	92	92	92	92	92	92	92	92	92	92	92	92	92	92
			Array Edge	92	92	92	92	92	92	92	92	92	92	92	92	92	92
C	45 psf	0 to 7	Array Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Edge	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Edge	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Edge	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Interior	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Edge	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Edge	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94
			Array Edge	94	94	94	94	94	94	94	94	94	94	94	94	94	94
D	45 psf	0 to 7	Array Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Edge	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Edge	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Edge	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Interior	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Edge	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Edge	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94
			Array Edge	94	94	94	94	94	94	94	94	94	94	94	94	94	94
E	50 psf	0 to 7	Array Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Edge	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Edge	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Edge	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Interior	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Edge	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Edge	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94
			Array Edge	94	94	94	94	94	94	94	94	94	94	94	94	94	94
F	60 psf	0 to 7	Array Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Edge	61	61	61	61	61	61	61	61	61	61	61	61	61	61
			Array Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Edge	62	62	62	62	62	62	62	62	62	62	62	62	62	62
			Array Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Edge	64	64	64	64	64	64	64	64	64	64	64	64	64	64
			Array Interior	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Edge	74	74	74	74	74	74	74	74	74	74	74	74	74	74
			Array Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Edge	84	84	84	84	84	84	84	84	84	84	84	84	84	84
			Array Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94
			Array Edge	94	94	94	94	94	94	94	94	94	94	94	94	94	94

Maximum Rail Spans (Inches)				ClickR Rail 450124 (REV03) Flush-Mount on 0 to 30 Foot Roof - L-Form - Landscape																																																							
Ground Slope	Cassette Capacity	Panel Angle	Wind Speed Roof Zone →	90 mph								95 mph								100 mph								105 mph								110 mph								115 mph								120 mph							
				1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'	1'	2'	2 1/2'	3'	3 1/2'											
B	0 to 7	Arroyo Interior	Arroyo Edge	103	103	100	100	93	93	103	103	101	101	101	89	89	103	103	97	97	97	86	86	103	103	93	93	83	83	103	101	90	90	80	80	103	98	87	87	78	78	100	95	85	85	75	75												
			Arroyo Edge	103	103	90	90	90	90	90	103	103	97	97	87	87	77	77	103	93	83	83	74	74	103	90	81	81	72	72	103	87	78	78	70	70	103	84	76	76	67	67	103	84	75	75	65	65											
		Arroyo Interior	Arroyo Edge	95	95	95	82	82	82	82	77	91	91	91	79	79	74	74	88	88	88	76	76	71	85	85	73	73	69	69	82	82	82	71	71	77	79	79	69	69	65	65	77	77	67	67	67	67											
			Arroyo Edge	104	104	104	101	101	101	101	98	104	104	104	97	97	97	94	94	104	104	104	94	94	91	104	104	90	90	83	83	104	104	104	87	87	87	85	85	102	102	85	85	85	85	96	96	82	82	87	87								
		20 to 27	Arroyo Interior	97	97	97	87	87	87	87	87	103	103	97	97	87	87	78	78	90	90	90	78	78	97	97	84	84	73	73	97	97	84	84	73	73	97	97	84	84	73	73	97	97	84	84	73	73											
	Arroyo Edge		105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101									
	45 to 60	Arroyo Interior	109	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107								
		Arroyo Edge	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107								
		Arroyo Interior	103	103	92	92	92	92	92	83	103	99	88	89	79	79	73	73	103	95	86	86	76	76	103	92	83	83	73	73	103	89	80	80	71	71	103	86	77	77	68	68	103	84	75	75	67	67											
		Arroyo Edge	103	89	80	80	80	80	73	73	103	86	77	77	77	77	68	68	103	82	74	74	64	64	103	78	69	69	62	62	103	84	75	75	67	67	103	81	72	72	63	63	103	81	72	72	63	63											
Arroyo Edge		97	97	97	87	87	87	87	87	103	103	97	97	87	87	78	78	90	90	90	78	78	97	97	84	84	73	73	97	97	84	84	73	73	97	97	84	84	73	73	97	97	84	84	73	73													
D pnf	20 to 27	Arroyo Interior	104	104	104	89	89	89	87	104	104	104	86	86	84	84	104	104	100	100	100	83	83	98	96	80	80	80	78	98	98	98	83	83	77	77	77	75	75	79	78	87	87	78	78	73	73												
		Arroyo Edge	93	93	93	77	77	77	77	75	89	89	74	74	74	74	72	86	86	86	72	72	79	83	83	69	69	69	68	86	86	86	67	67	67	65	65	78	78	76	76	65	65	83	83	63	63												
	45 to 60	Arroyo Interior	100	100	100	90	90	90	90	90	100	100	90	90	90	90	90	100	100	90	90	90	80	80	100	100	90	90	80	80	100	100	90	90	80	80	100	100	90	90	80	80	100	100	90	90	80	80											
		Arroyo Edge	86	86	86	86	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83												
	C	20 to 27	Arroyo Interior	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107								
Arroyo Edge			107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107						
45 to 60		Arroyo Interior	103	103	97	97	97	97	97	103	103	97	97	97	97	97	97	103	103	97	97	97	97	97	103	103	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97							
		Arroyo Edge	103	89	80	80	80	80	73	73	103	86	77	77	77	77	68	68	103	82	74	74	64	64	103	78	69	69	62	62	103	84	75	75	67	67	103	81	72	72	63	63	103	81	72	72	63	63											
D		20 to 27	Arroyo Interior	103	103	97	97	97	97	97	103	103	97	97	97	97	97	103	103	97	97	97	97	97	103	103	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97					
	Arroyo Edge		103	89	80	80	80	80	73	73	103	86	77	77	77	77	68	68	103	82	74	74	64	64	103	78	69	69	62	62	103	84	75	75	67	67	103	81	72	72	63	63	103	81	72	72	63	63											
	45 to 60	Arroyo Interior	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107					
		Arroyo Edge	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107				
	S pnf	20 to 27	Arroyo Interior	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107					
Arroyo Edge			107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107			
45 to 60		Arroyo Interior	103	103	97	97	97	97	97	103	103	97	97	97	97	97	97	103	103	97	97	97	97	97	103	103	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97				
		Arroyo Edge	103	89	80	80	80	80	73	73	103	86	77	77	77	77	68	68	103	82	74	74	64	64	103	78	69	69	62	62	103	84	75	75	67	67	103	81	72	72	63	63	103	81	72	72	63	63											
B		20 to 27	Arroyo Interior	103	103	97	97	97	97	97	103	103	97	97	97	97	97	103	103	97	97	97	97	97	103	103	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97		
	Arroyo Edge		103	89	80	80	80	80	73	73	103	86	77	77	77	77	68	68	103	82	74	74	64	64	103	78	69	69	62	62	103	84	75	75	67	67	103	81	72	72	63	63	103	81	72	72	63	63											
	45 to 60	Arroyo Interior	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107			
		Arroyo Edge	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107								

[illegible]

Maximum Rail Spans (Inches)				Click-Rail 450124 (REV03) Flush-Mount on 0 to 30 Foot Roof – L-Foot – Landscape																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Ground Snow Load	Exposure Category	Panel Angle	Wind Direction	150 mph												140 mph												130 mph												120 mph												110 mph																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
				1'	1.25'	2'	2.5'	3'	3.5'	4'	4.5'	5'	5.5'	6'	6.5'	1'	1.25'	2'	2.5'	3'	3.5'	4'	4.5'	5'	5.5'	6'	6.5'	1'	1.25'	2'	2.5'	3'	3.5'	4'	4.5'	5'	5.5'	6'	6.5'	1'	1.25'	2'	2.5'	3'	3.5'	4'	4.5'	5'	5.5'	6'	6.5'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
B		0 to 7	Array Interior	86	86	80	80	71	71	66	65	76	76	68	68	80	80	72	72	64	64	86	77	69	69	69	62	86	74	66	66	66	59	59	86	72	64	64	64	55	55	85	72	64	64	55	55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
			Array Edge	86	77	69	68	69	62	62	65	76	66	66	66	66	70	70	63	63	35	34	83	67	60	60	60	51	83	66	56	56	56	48	48	83	66	56	56	48	48																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
			Array Interior	84	84	73	73	73	68	68	60	60	80	80	80	80	84	84	70	70	68	68	80	80	80	67	67	80	69	67	67	67	65	65	80	69	67	67	65	65																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			Array Edge	73	73	73	63	63	59	59	60	60	65	65	66	66	66	66	56	56	51	51	63	63	63	52	52	60	60	60	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49

[illegible]

[illegible]

[illegible]

[illegible]

Company :
 Designer :
 Job Number:

Feb 19, 2021
 06:43 AM
 Checked By: _____

Section Properties: Section1_450124 (REV X03).DXF

Section Information:

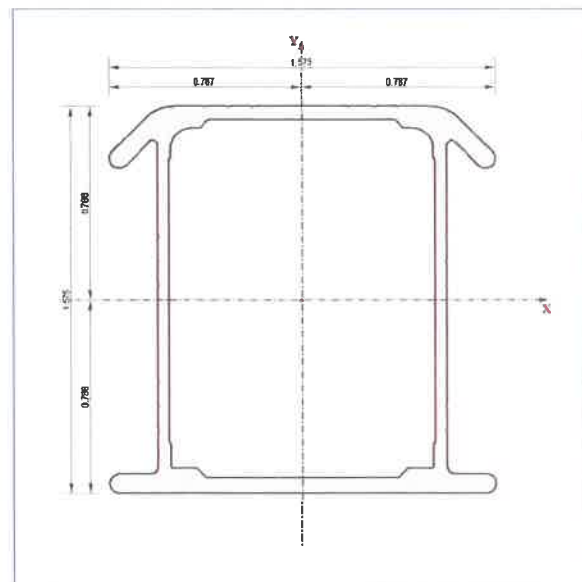
Material Type	=	General
Shape Type	=	Arbitrary
Number of Shapes	=	1

Basic Properties:

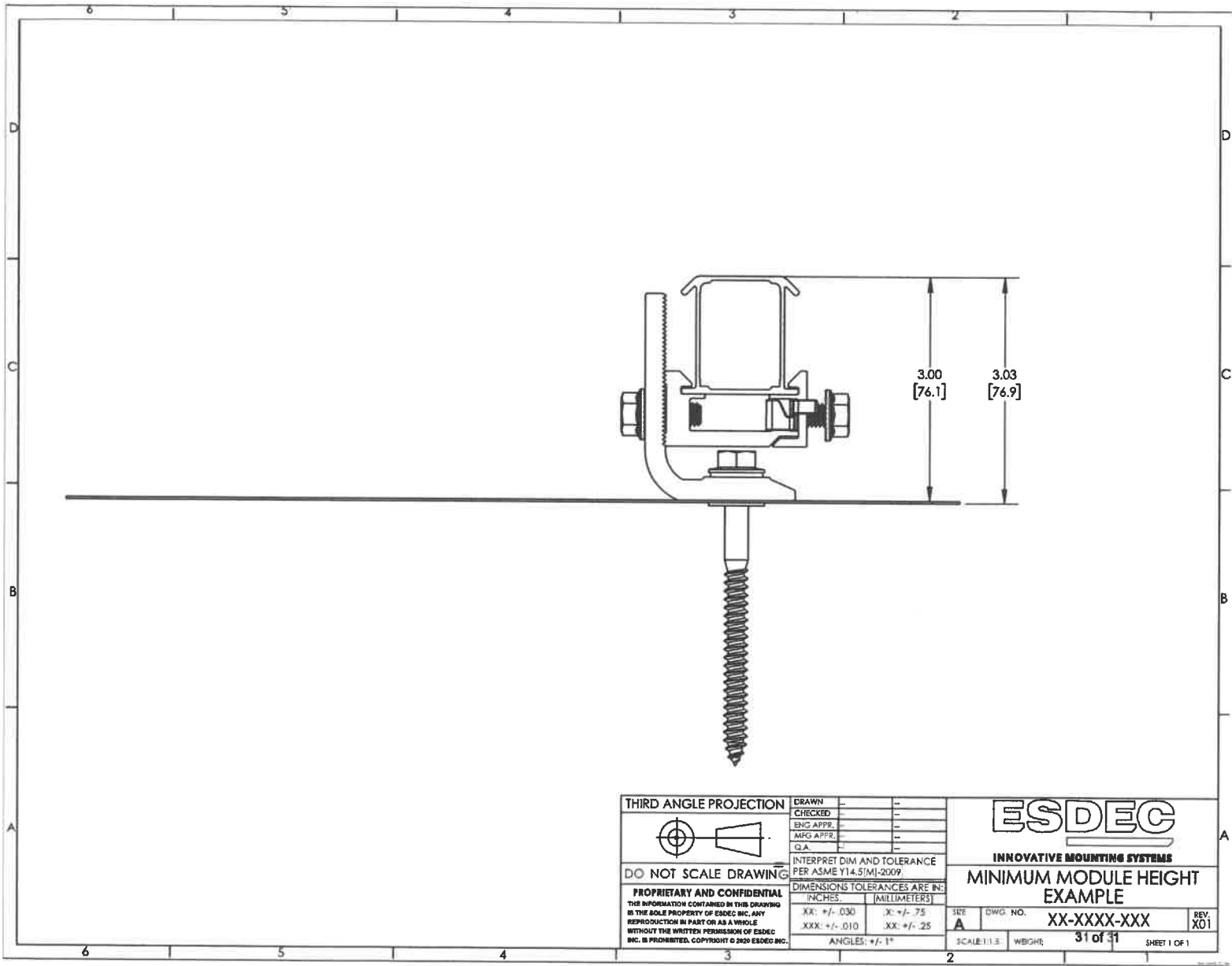
Total Width	=	1.575	in
Total Height	=	1.575	in
Centroid, X _o	=	0.000	in
Centroid, Y _o	=	0.786	in
X-Bar (Right)	=	0.787	in
X-Bar (Left)	=	0.787	in
Y-Bar (Top)	=	0.788	in
Y-Bar (Bot)	=	0.786	in
Max Thick	=	1.575	in

Equivalent Properties:

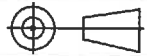
Area, A _x	=	0.373	in ²
Inertia, I _{xx}	=	0.151	in ⁴
Inertia, I _{yy}	=	0.100	in ⁴
Inertia, I _{xy}	=	-0.000	in ⁴
S _x (Top)	=	0.191	in ³
S _x (Bot)	=	0.191	in ³
S _y (Left)	=	0.126	in ³
S _y (Right)	=	0.126	in ³
r _x	=	0.635	in
r _y	=	0.516	in
Plastic Z _x	=	0.222	in ³
Plastic Z _y	=	0.180	in ³
Torsional J	=	<No Calc.>	
As-xx Def	=	1.000	
As-yy Def	=	1.000	
As-xx Stress	=	1.000	
As-yy Stress	=	1.000	



Section Diagram



THIRD ANGLE PROJECTION



DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING
IS THE SOLE PROPERTY OF ESDEC INC. ANY
REPRODUCTION IN PART OR AS A WHOLE
WITHOUT THE WRITTEN PERMISSION OF ESDEC
INC. IS PROHIBITED. COPYRIGHT © 2020 ESDEC INC.

DRAWN	_____
CHECKED	_____
ENG APPR.	_____
MFG APPR.	_____
Q.A.	_____
INTERPRET DIM AND TOLERANCE PER ASME Y14.5[M]-2009.	
DIMENSIONS TOLERANCES ARE IN:	
INCHES	MILLIMETERS
XX: +/- .030	X: +/- .75
XXX: +/- .010	XX: +/- .25
ANGLES: +/- .1°	

ESDEC

INNOVATIVE MOUNTING SYSTEMS

MINIMUM MODULE HEIGHT
EXAMPLE

SIZE	DWG. NO.	REV
A	XX-XXXX-XXX	X01
SCALE: 1:1.5		WEIGHT
31 of 31		SHEET 1 OF 1



April 22, 2021

EcoFasten Solar LLC
4141 W Van Buren St, Ste 2
Phoenix, AZ 85009
TEL: (877) 859-3947

Attn.: Eco Fasten Solar - Engineering Department

Re: Report # 2019-11325HG.05.01 – EcoFasten - ClickFit System for Gable and Hip Roofs
Subject: Engineering Certification for the State of Florida

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - ClickFit System, as presented in PZSE Report # 2019-11325HG.05.01, "Engineering Certification for the EcoFasten - ClickFit System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications:

- Building Codes:
1. 2020 Florida Building Code, by Florida Building Commission
 2. ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
 3. 2018 International Building Code, by International Code Council, Inc.
 4. 2018 International Residential Code, by International Code Council, Inc.
 5. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
 6. Aluminum Design Manual 2015, by The Aluminum Association, Inc.
 7. ANSI/AWC NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

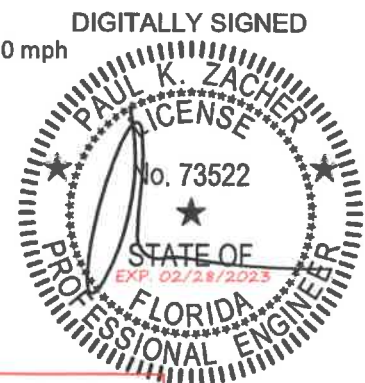
Design Criteria:

Risk Category II
Seismic Design Category = A - E
Exposure Category = B, C & D
Basic Wind Speed (ultimate) per ASCE 7-16 = 90 mph to 180 mph
Ground Snow Load = 0 to 60 (psf)

This letter certifies that the loading criteria and design basis for the EcoFasten - ClickFit System Span Tables are in compliance with the above codes.

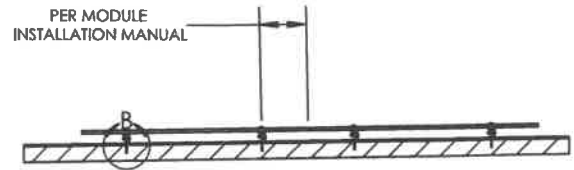
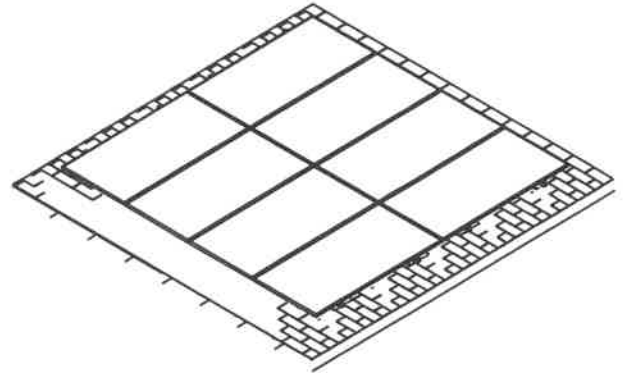
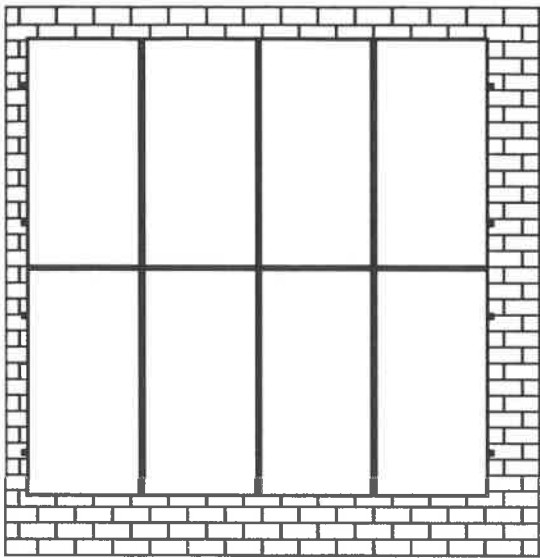
If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA

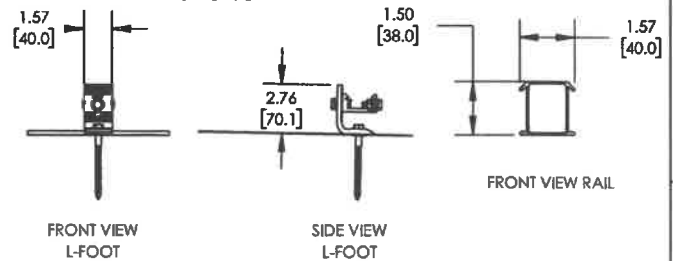


THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY PAUL K. ZACHER, PE ON 04/22/2021 USING A SHA-1 AUTHENTICATION CODE.

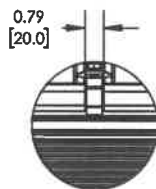
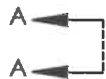
PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SHA-1 AUTHENTICATION CODE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.



SECTION A-A



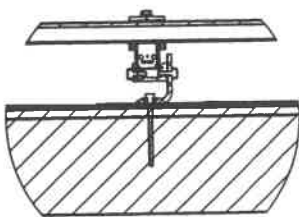
FRONT VIEW RAIL



DETAIL C
SCALE 1 : 6



DETAIL D
SCALE 1 : 6



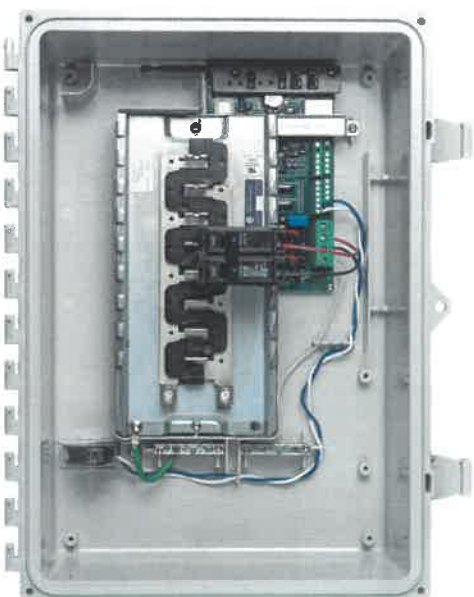
DETAIL B
SCALE 1 : 8

THIRD ANGLE PROJECTION		DRAWN	T. RAY	04/23/2021
		CHECKED		
		ENG APPR		
		MFG APPR		
		Q.A.		
DO NOT SCALE DRAWING		INTERPRET DIM AND TOLERANCE PER ASME Y14.5(M)-2009		
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ESDEC INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ESDEC INC. IS PROHIBITED. COPYRIGHT © 2019 ESDEC INC.		DIMENSIONS TOLERANCES ARE IN:		
		INCHES		
		MILLIMETERS		
		.XX: +/- .030 .XXX: +/- .010 ANGLES: +/- 1°		
		ESDEC INNOVATIVE MOUNTING SYSTEMS CLICKFIT COMP SHINGLE		
		SIZE	DWG. NO.	REV
		A	XX-XXXX-XXX	XD1
		SCALE: 1:50	WGHT:	SHEET 1 OF 2

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



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 Enphase Energy. All rights reserved. All trademarks or brands in this document are registered by their respective owner.
2018-09-13



Soltection RJ-1

**Rooftop Solar Junction Box
Flashing Unit**

For Composition/Asphalt Shingle Roofs



Manufactured by:
Soltection: a division of
Vynckier Enclosure Systems, Inc.
271 McCarty Street
Houston, TX 77029
[1-866-227-0577](tel:1-866-227-0577)

TABLE OF CONTENTS

INSTALLATION INSTRUCTIONS

Contents

IMPORTANT SAFETY INSTRUCTIONS	4
SAFETY WARNINGS & CAUTIONS	4
ELECTRICAL PRECAUTIONS	5
MECHANICAL PRECAUTIONS	5
PRODUCT INFORMATION	6
OVERVIEW	6
PREP & PLACEMENT	7
REQUIRED TOOLS	7
PRODUCT PLACEMENT	7
SPECIFICATIONS	11
MECHANICAL/ ELECTRICAL	11
TORQUE RATINGS	11

WARRANTIES: Seller warrants to Buyer that products and any services furnished hereunder will be free from defects in material, workmanship and title and will be of the kind and quality specified in Seller's written quotation. The foregoing shall apply only to failures to meet said warranties (excluding any defects in title) which appear within two years from the date of shipment hereunder.

The conditions of any tests shall be mutually agreed upon and Seller shall be notified of, and may be represented at, all tests that may be made. The warranties and remedies set forth herein are conditioned upon (a) proper storage, installation, use and maintenance, and conformance with any applicable recommendations of Seller and (b) Buyer promptly notifying Seller of any defects and, if required, promptly making the product available for correction.

If any product of service fails to meet the foregoing warranties (except title), Seller shall thereupon correct any such failure either at its option, (i) by repairing any defective or damaged part or parts of the products, or (ii) by making available, F.O.B. Seller's plant or other point of shipment, any necessary repaired or replacement parts. Where a failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price.

The preceding paragraph sets forth the exclusive remedies for claims (except as to title) based on defect in or failure of products or services; whether the claim is in contract, indemnity, warranty, tort (including Seller's negligence), strict liability or otherwise and however instituted. Upon the expiration of the warranty period, all such liability shall terminate and Buyer shall have a reasonable time, within thirty days after the warranty period, to give written notice of any defects which appeared during the

warranty period. Except as set forth in Article 2, "Patents," the foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. Seller does not warrant any products or services of others which Buyer has designated.

IMPORTANT SAFETY INSTRUCTIONS

READ ALL INSTRUCTIONS & SAFETY WARNINGS PRIOR TO INSTALLATION

NOTE: SAVE THESE INSTRUCTIONS

This manual contains important instructions that shall be followed during installation and maintenance of the Soltection RJ-1 rooftop junction box with flashing.



LETHAL VOLTAGES ARE PRESENT DURING THE INSTALLATION, OPERATION AND SERVICE OF THIS EQUIPMENT. PROPER PRECAUTIONS MUST BE TAKEN AT ALL TIMES TO ENSURE THE SAFETY OF THE SERVICE PERSONNEL .



SAFETY WARNINGS & CAUTIONS

- Only qualified personnel or licensed electricians should install this product and the instructions herein are provided for those individual(s) only.
- To reduce the risk of electric shock, injury, or death, all electrical wiring and connections must be performed by qualified personnel.
- Lethal voltages are present during the installation, operation, and servicing of this equipment. Proper precautions must be taken at all times to ensure the safety of the service personnel.
- Follow state and federal Occupational Safety and Health Administration (OSHA) guidelines and regulations when installing this product.
- Utilize proper Personal Protective Equipment (PPE) as required per national and local regulations as well as for installation best practices.
- Install this apparatus in accordance with ANSI/NFPA 70, National Electrical Code (NEC). Follow all national or local electrical codes.
- Install, operate, and use this product in a manner consistent with the instructions provided. Failure to follow the procedures indicated may result in roof leaks, property damage, or consequential damage.



ELECTRICAL PRECAUTIONS

- Ensure all electrical conductors are at zero voltage potential before installing or servicing this unit.
- Never break contact on a circuit without using the appropriate disconnect device.
- Follow established lockout and tagout procedures for all electrical conductors prior to servicing.
- Beware of power lines in the vicinity of the roof, where inadvertent contact may result in electrocution, personal injury, or death.
- When disconnecting source or supply circuits, provide sufficient time as stated in the power electronics manufacturer's instruction manual in order to ensure discharge of all conductors in the circuit.
- Always verify the integrity and proper installation of the electrical components prior to energizing electrical circuits.
- Non-metallic enclosures do not provide grounding means between conduit connections. The use of grounding hubs and jumper wires are required.
- Grounding must be sized per NEC requirements, and is the responsibility of the installer.

MECHANICAL PRECAUTIONS

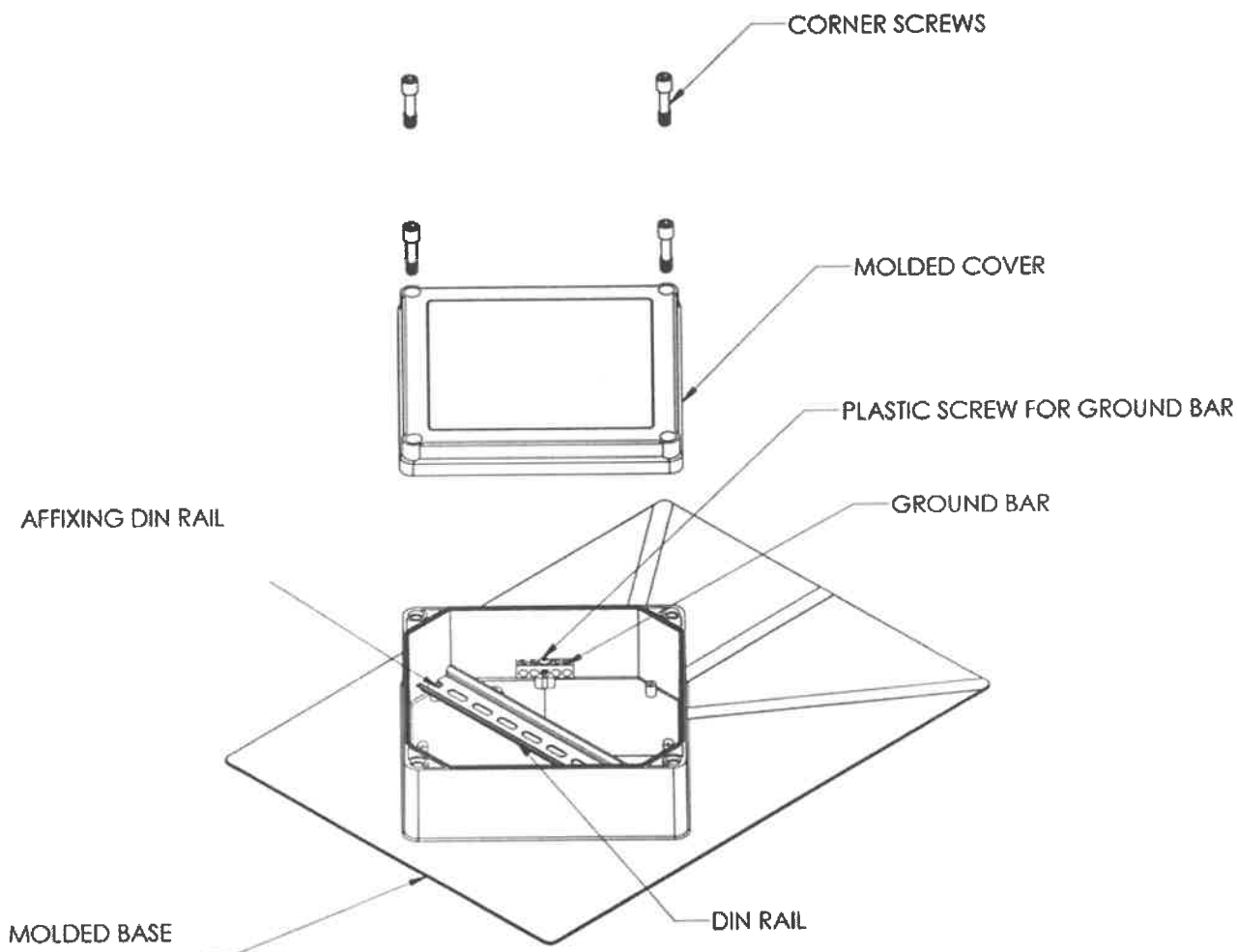
- When drilling into an attic space, ensure that electrical wires, mechanical obstructions, or potential electrical hazards are removed from the vicinity and direction of the drill.
- Do not install if the roof is wet, frosted, or covered by ice or snow.
- If any part of this product becomes damaged, remove and destroy the entirety of the unit. Failure to do so may result in fire, property damage, personal injury, electrocution, or death.
- Do not use the product to anchor fall protection equipment.



PRODUCT INFORMATION

OVERVIEW

- The Soltection RJ-1 Residential Rooftop Junction Box is a flashed roof penetration designed to protect electrical conductors entering the rooftop/attic. It is made of a high-strength UV-resistant and UV-stabilized polymeric material.
- The RJ-1 enclosure comes fully equipped with a slotted DIN rail mounted inside the enclosure designed for mounting of DIN rail accessories, such as terminal blocks.
- A four position ground bar is also provided as a means to form a bond between the solar array mounted on the roof and the building.



PREP & PLACEMENT

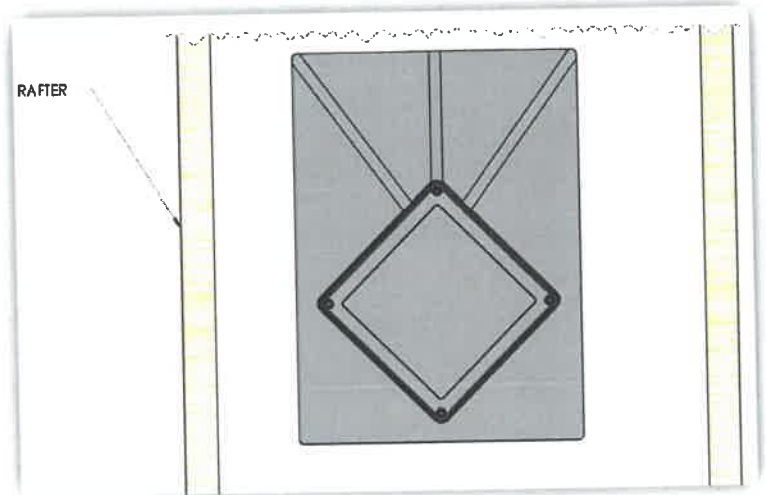
REQUIRED TOOLS

- ✓ Shingle Ripper Bar
- ✓ Lumber Crayon
- ✓ Hole Saw or Spade Bit
- ✓ Roofing Sealant

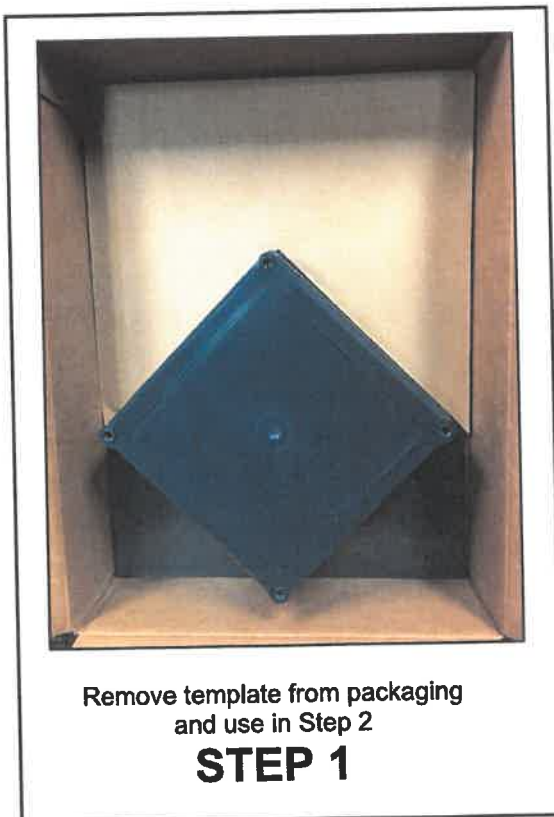
- ✓ #2 Phillips Screwdriver
- ✓ Uni-Bit
- ✓ Utility Knife

PRODUCT PLACEMENT

- Identify the location and placement of the flashing on the roof as shown. The product may be mounted beneath the array or adjacent to the array.

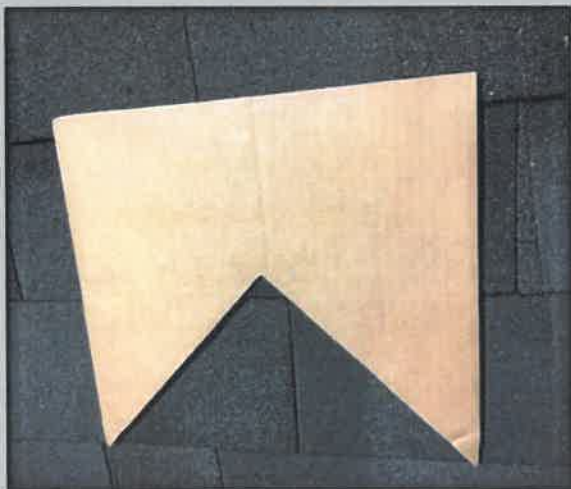


**DO NOT LOCATE THE
PRODUCT DIRECTLY
OVER A RAFTER TO
ENSURE THE RAFTER
DOES NOT INTERFERE
WITH THE WIRING
ENTRY INTO THE ATTIC**



Remove template from packaging
and use in Step 2

STEP 1



Position the top edge of the template 1/2" above the 1st course of shingle as shown.

STEP 2



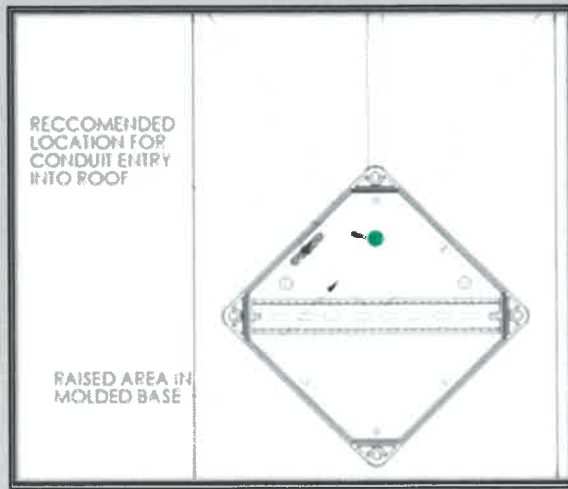
Trace and continue using a lumber crayon to the bottom of the 2nd course. Cut along lines and remove shingles.

STEP 3



Remove any roofing nails beneath the 1st, 2nd, or 3rd course of tile that obstructs the position of the roof flashing.

STEP 4



DRILL PILOT HOLE

Slide RJ-1 Junction box into place where you cut shingle template. The image above shows where you will drill in the next step

STEP 5



DRILL PILOT HOLE

Slide RJ-1 Junction box into location where you cut shingle template. Using 1/4" drill bit drill through box & Roof simultaneously (for location see step 5)

STEP 6



Remove box & see pilot hole in roof.

STEP 7



Using the pilot hole, Drill through the roof, the diameter necessary to ensure that it will accomodate the appropriate conduit fitting

STEP 8



Reinstall box & using the pilot hole again, drill the diameter necessary to ensure that it will accomodate the appropriate conduit fitting

STEP 9



Remove RJ-1, flip it over, wipe it clean & apply a bead of roofing sealant to the underside of the flashing unit. Ensure that it's placed in the "Upside-down U" Shape to support engress water protection, AS SHOWN.

STEP 10



Reinstall Unit. Use the two supplied Decking Screws to mount the flashing to the roof. Torque to the specification indicated in the specifications. Refer to Table T2 (page 10) for the proper tightening torques.

STEP 11

POPULATE RJ-1

- Populate the RJ-1 unit using the appropriate wire connectors, terminal blocks, or other necessary components.
- Ensure that the components installed are rated for and are suitable for the intended purpose.
- The RJ-1 unit is provided with multiple standoffs which can accommodate accessories to be mounted.

Step 11. A



Install the cover onto the top of the enclosure. Tighten 4 cover screws to the Torque value indicated in

Table T3 (see page 10)

STEP 12

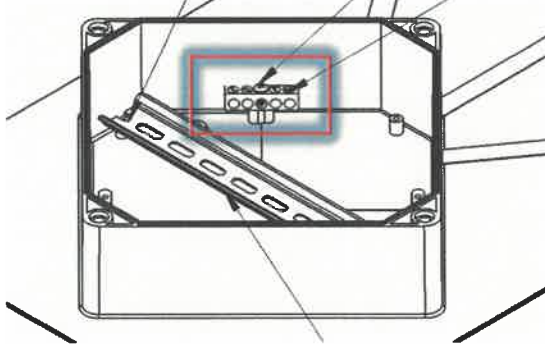
SPECIFICATIONS

MECHANICAL/ ELECTRICAL

- **Product Certifications:** UL508A
- **Enclosure Rating:** Type 4X
- **Attic Conduit Pass Through Connector Size Range:** 1/2" – 1"
- **Max. Side Wall Conduit Size:** 1"
- **Maximum Current:** N/A
- **Maximum Voltage:** N/A
- **Ambient Operating Temperature:** -35C to 75C

TORQUE RATINGS

Table T1: Ground Bar Connection, Wire Range: #4 to #14, 4 Usable Connections



Wire Size	Tightening Torque (lb-in)
4-6 AWG	35
8 AWG	30
10-14 AWG	25

Table T1

Table T2: Mounting Screw, Mounting to Decking, 2 Provided

Tightening Torque (lb-in)
15-20

Table T3: Torque Values, Cover/Lid Screws , 4 Provided, Captive

Tightening Torque (lb-in)
11



Soltection is a division of Vynckier Enclosure Systems, Inc.
271 McCarty Street
Houston, TX 77029
[1-866-227-0577](tel:1-866-227-0577)