



PRODUCT: TSM-DE09C.07 PRODUCT RANGE: 380-405W

405W

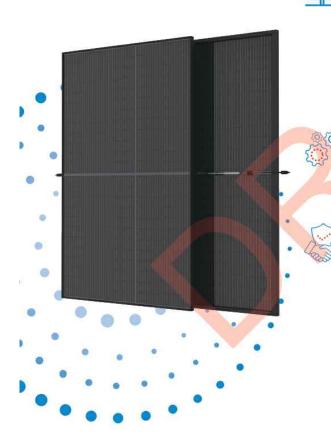
MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.1%

MAXIMUM EFFICIENCY





Smaller panels, bigger power generation

- Small-format panels allow high power generation in limited space
- Up to 405W, 21.1% module efficiency with high density interconnect
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection.
- Reduce installation cost with higher power bin and efficiency.
- · Boost performance in warm weather with lower temperature. coefficient (-0.34%) and operating temperature.

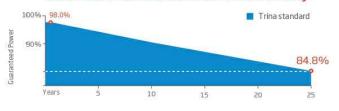
Universal solution for residential and C&I rooftops

- · Designed for compatibility with existing mainstream optimizers, inverters and mounting systems.
- Perfect size and light weight for easy handling and transportation
- Diverse installation application, Flexible for system deployment.

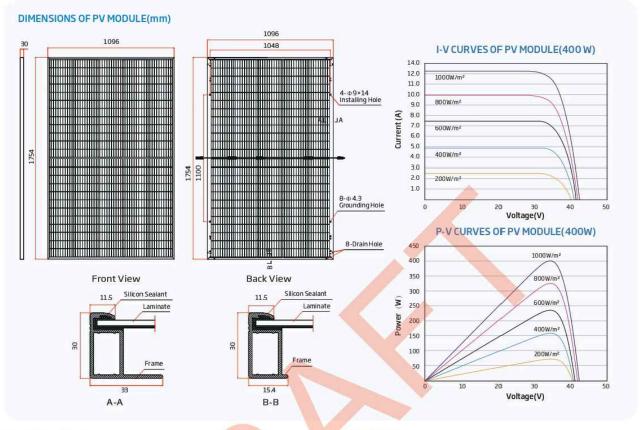
High Reliability

- 25 year product warranty,
- 25 year performance warranty with lowest degradation.
- Ensured PID resistance through cell process and module material
- Mechanical performance up to 6000 Pa positive load and 4000 Pa negative load.

Trina Solar's Backsheet Performance Warranty



Vertex S TRANSPARENT BACKSHEET MODULE



ELECT	RICAL	DATA	(STC)

Peak Power Watts-PMAX (Wp)*	380	385	390	395	400	405
Power Tolerance-PMAX (W)			0 ~	+5	19	
Maximum Power Voltage-VMPP (V)	33.4	33.6	33.8	34.0	34.2	34.4
Maximum Power Current-Impp (A)	11.38	11.46	11.54	11.62	11.70	11.77
Open Circuit Voltage-Voc (V)	40.4	40.6	40.8	41.0	41.2	41.4
Short Circuit Current-Isc (A)	12.00	12.07	12.14	12.21	12.28	12.34
Module Efficiency ₁₁ m (%)	19.8	20.0	20,3	20.5	20.8	21.1

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power -PMAX (Wp)	407	412	417	423	428	433	
Maximum Power Voltage-VMPP (V)	33.4	33.6	33.8	34.0	34.2	34.4	
Maximum Power Current-Impp (A)	12.19	12.26	12.34	12.44	12.51	12.59	
Open Circuit Voltage-Voc (V)	40.4	40.6	40.8	41.0	41.2	41.4	
Short Circuit Current-Isc (A)	12.92	13.00	13.08	13.20	13.25	13.36	
Irradiance ratio (rear/front)			1	.0%			
AND							١

ELECTRICAL DATA (NOCT)

Maximum Power-PMAX (Wp)	286	290	294	298	302	305
Maximum Power Voltage-V _{MPP} (V)	31.4	31.6	31.8	31.9	32.1	32.4
Maximum Power Current-Impp (A)	9.12	9.18	9.24	9.32	9.38	9.42
Open Circuit Voltage-Voc (V)	38.0	38.2	38.4	38.6	38.8	38.9
Short Circuit Current-Isc (A)	9.67	9.73	9.78	9.84	9.90	9.94

MECHANICAL DATA

Solar Cells	Mono		
No. of cells	120 cells		
Module Dimensions	1754×1096×30 mm (69.06×43.15×1.18 inches)		
Weight	21.0 kg (46.3 lb)		
Glass	3.2 mm (0.13 inches), High Transmission, ARCoated Heat Strengthened Glass		
Encapsulant material	EVA/POE		
Backsheet	Tran sparent		
Frame	30mm(1.18 inches) Anodized Aluminium Alloy		
j-Box	IP 68 rated		
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: 280/280 mm(11.02/11.02 inches) Length can be customized		
Connector	MC4 EV02 / TS4*		

43°C (±2°C)
-0.34%/°C
-0.25%/°C
0.04%/°C

MAXIMUMRATINGS

2°C)	Operational Temperature	-40~+85°C
6/°C	Maximum System Voltage	1500 V DC (IEC)
o/°C		1500 V DC (UL)
°C	Max Series Fuse Rating	20A

WARRANTY					
25 year Product Workmanship War					
25 year Power Warranty					
2% first year degradation					
0.55% Annual Power degradation					

PACKAGING CONFIGUREATION

Modules per box: 36 pieces Modules per 40' container: 828 pieces

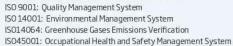
Comprehensive Products and System Certificates











IEC61215/IEC61730/IEC61701/IEC62716/UL61730











IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, softwaredefined 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.



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



of up to 25 years.

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

IO8 Series Microinverters redefine reliability

enabling an industry-leading limited warranty

standards with more than one million

cumulative hours of power-on testing,

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IQ8SP-DS-0002-01-EN-US-2021-10-19

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 highpowered 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 and IQ8+ Microinverters

INPUT DATA (DC)		108-60-2-US	IQ8PLUS-72-2-US			
Commonly used module pairings ¹	w	235 - 350	235 - 440			
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell and 72-cell/144 half-cell			
MPPT voltage range	V	27 - 37	29 – 45			
Operating range	V	25 – 48	25 – 58			
Min/max start voltage	٧	30 / 48	30 / 58			
Max input DC voltage	٧	50	60			
Max DC current ² [module lsc]	Α	15	5			
Overvoltage class DC port		1				
DC port backfeed current	mA	100	X.			
PV array configuration		1x1 Ungrounded array; No additional DC side protection requ	ired; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)		108-60-2-US	IQ8PLUS-72-2-US			
Peak output power	VA	245	300			
Max continuous output power	VA	240	290			
Nominal (L-L) voltage/range ³	٧	240 / 2	11 - 264			
Max continuous output current	Α	1.0	1.21			
Nominal frequency	Hz	6	0			
Extended frequency range	Hz	50 -	-68			
Max units per 20 A (L-L) branch circu	it ⁴	16	13			
Total harmonic distortion		<5%				
Overvoltage class AC port		III				
AC port backfeed current	mA	30	0			
Power factor setting		1.0				
Grid-tied power factor (adjustable)		0.85 leading -	0.85 lagging			
Peak efficiency	%	97.5	97.6			
CEC weighted efficiency	%	97	97			
Night-time power consumption	mW	6	0			
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		мс	64			
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 convec	ction – no fans			
Approved for wet locations		Yes				
Acoustic noise at 1 m		<60 dBA				
Pollution degree		PD3				
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure				
Environ. category / UV exposure ratir	ng	NEMA Type	6 / outdoor			
COMPLIANCE						
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, 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) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/ module-compatibility (2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

Data Sheet **Enphase Networking**

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4 X-IQ-AM1-240-4C



The Enphase IQ Combiner 4/4C with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters 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 Gateway for communication and control
- · Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- · Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- · Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

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

Reliable

- · Durable NRTL-certified NEMA type 3R enclosure
- · Five-year limited warranty
- · Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

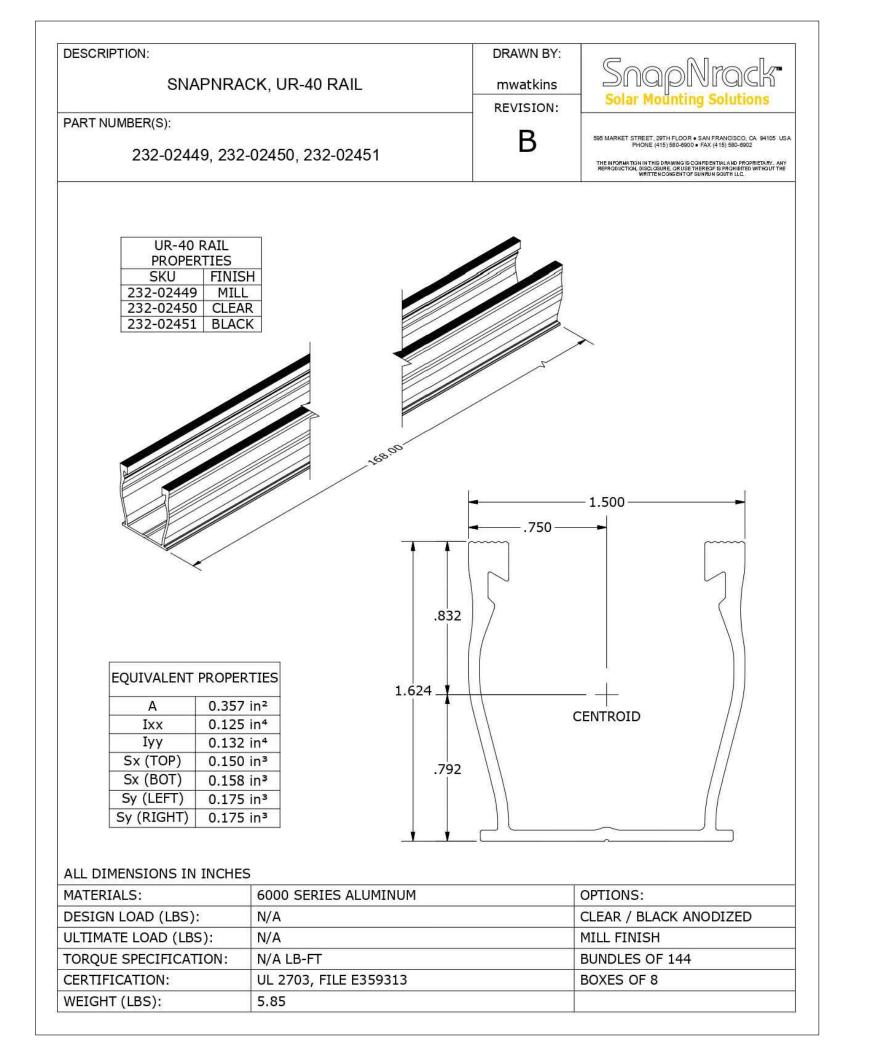


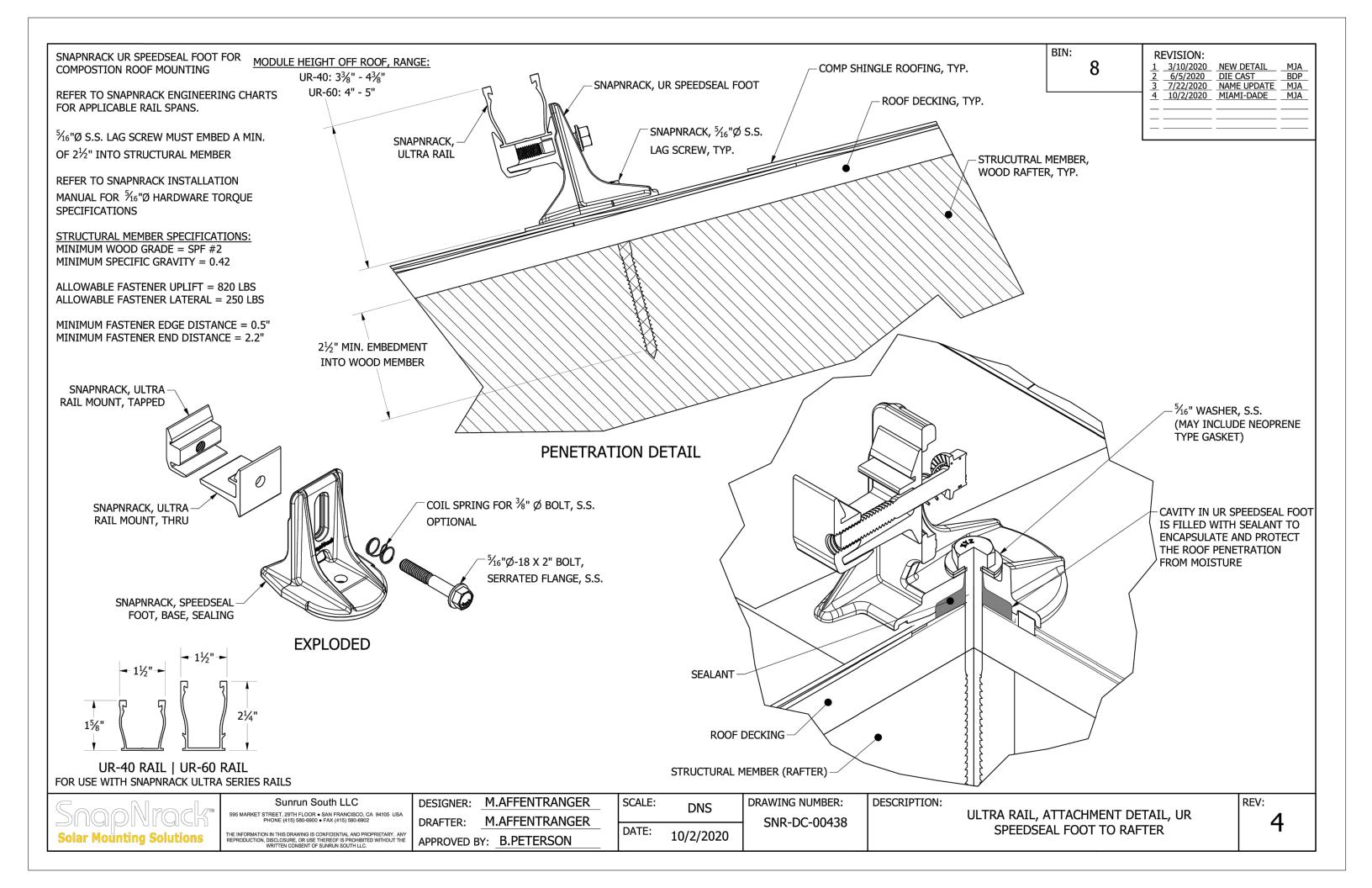
To learn more about Enphase offerings, visit enphase.com

Enphase IO Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANS C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem 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.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	 Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites 4G based LTE-M1 cellular modem with 5-year Sprint data plan 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	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 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 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. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" 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
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ 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) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1







DESCRIPTION:

SNAPNRACK, ULTRA RAIL SPEEDSEAL™ FOOT

PART NUMBER(S):

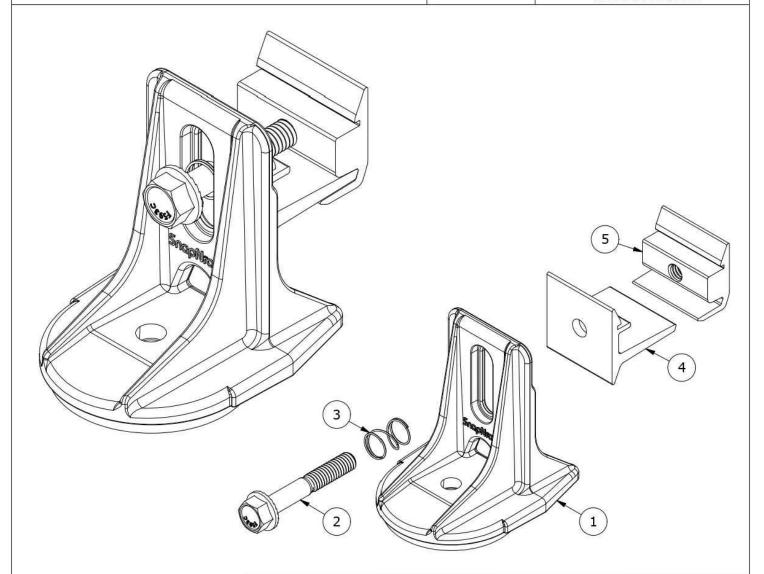
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DRAWN BY:

mwatkins **REVISION:**

595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 580-6900 • FAX (415) 580-6902





			PARTS LIS	Т	
	ITEM	QTY	DESC	RIPTION	
	1	1	SNAPNRACK, SPEEDSEAL FOOT, BASE, SEALING, SILVER / BLAC		
	2 1 BOLT, FLANGE, SERRATED, 5/16IN-18 X 2IN, SS			SIN-18 X 2IN, SS	
	3	1	SNAPNRACK, RL UNIVERSAL, MOUNT SPRING, SS		
	4	1	SNAPNRACK, ULTRA RAIL MOUN	T THRU PRC, CLEAR / BLACK	
5 1 SNAPNRACK, ULTR			SNAPNRACK, ULTRA RAIL MOUN	IT TAPPED PRC, CLEAR / BLACK	
LS:	DIE CAST A	380	80 ALUMINUM, 6000 SERIES ALUMINUM, STAINLESS STEEL		
OAD (LBS):	802 UP. 13	UP. 1333 DOWN. 357 SIDE OPTIONS:			

	J I SNAFNKACK, OLIKA KAII	E MOONT TAFFED FRC, CLEAR / DEACK			
MATERIALS:	DIE CAST A380 ALUMINUM, 6000 SERIES ALUMINUM, STAINLESS STEEL				
DESIGN LOAD (LBS):	802 UP, 1333 DOWN, 357 SIDE OPTIONS:				
ULTIMATE LOAD (LBS):	2118 UP, 4006 DOWN, 1331 SIDE CLEAR / BLACK				
TORQUE SPECIFICATION:	12 LB-FT				
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM SUBJECT UL 2582				
WEIGHT (LBS):	0.45				

DESCRIPTION:

SNAPNRACK, ULTRA RAIL SPEEDSEAL™ FOOT

PART NUMBER(S):

242-02163, 242-02167

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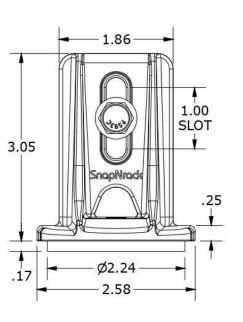
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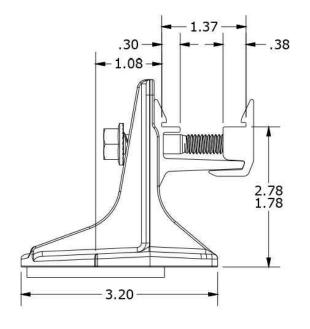
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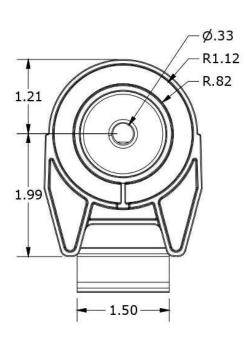
SnapNrack*
Solar Mounting Solutions

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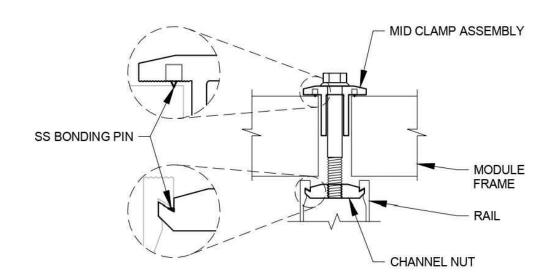




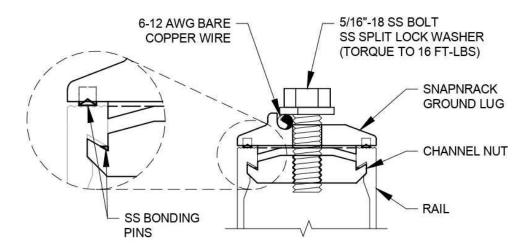


ALL DIMENSIONS IN INCHES





1. ADJUSTABLE END CLAMPS USE SAME BONDING PIN DESIGN TO BOND MODULES TO RAIL



- 1. ALL HARDWARE IS INCLUDED FROM MANUFACTURER
- 2. A MINIMUM OF ONE GROUND LUG IS TO BE INSTALLED ON EVERY CONTINUOUS ROW OF MODULES
- 3. GROUND LUG MAY BE INSTALLED IN EITHER RAIL CHANNEL
- 4. GROUND LUG MAY BE INSTALLED SO GROUND WIRE IS PARALLEL OR PERPENDICULAR TO RAIL
- 5. ENSURE SPLIT LOCK WASHER IS INSTALLED ON TOP OF COPPER WIRE

INSPECTOR:

ASSEMBLER:

DESCRIPTION:		DRAWN BY: MIKE WATKINS	
SNAPNRACK MOUNTING SYSTEM GROUNDING DETAILS PART NUMBER: SCALE:		APPROVED BY: CODY NORMAN REVISION: G 1/11/2016 NEW ITEM	Solar Mounting Solutions Sunrun South LLC 595 MARKET STREET, 297H FLOOR • SAN FRANCISCO, CA 94105 PHONE (415) 580-6800 • FAX (415) 580-6802



SnapNrack UL 2703 Fire Classification

March 2019

As of January 1st, 2015 many jurisdictions are now enforcing codes based upon updates to the International Building Code (IBC) and UL Standards 1703 (modules) and 2703 (mounting systems). The language included in the 2012 IBC requires that the combination of roof mounted solar modules and racking components is to be considered a system (IBC Section 1509.7.2). Additionally, it requires that this system shall meet or exceed the fire classification of the roof assembly.

The objective is to ensure that the PV system does not adversely affect the fire rating of the roof. Roof surface fire ratings are classified either A, B, or C; Class A being the most resistant to the spread of flame.

Since the physical characteristics of the PV module (material, thickness of glass, etc) also potentially affect how a fire will act, modules are now tested and assigned a "type" based upon these characteristics and



spread of flame test results. There are 15 total module types, Types 1, 2 and 3 represent differences in the module composition and Types 4 - 15 are the same module compositions as Types 1 - 3 with differing fire test performance.

SnapNrack Series 100, Ultra Rail and RL systems have been Certified for a Class A fire rating with Type 1 and Type 2 modules, in accordance with the standards set forth in UL1703/2703 and IBC 2012. In order to maintain this classification, the SnapNrack mounting systems must be installed per the UL-approved Installation Manuals. Because the test was conducted with the modules at 5 inches from the roof surface (worst case scenario), there is no restriction to the standoff height.

Attachment 1 is the SnapNrack QIMS File which is accessed through the UL Online Certification Directory, or available here: SnapNrack QIMS File.