Harnett COUNTY NORTH CAROLINA

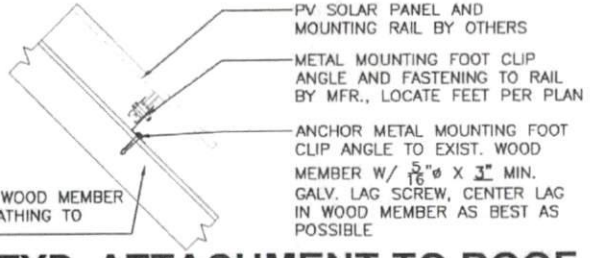
Approved

button 08/21/2019

NORTH CAROLINA PROFESSIONAL SEAL 033906 2019-08-08 ENGINEER RANDALL W. TRITT

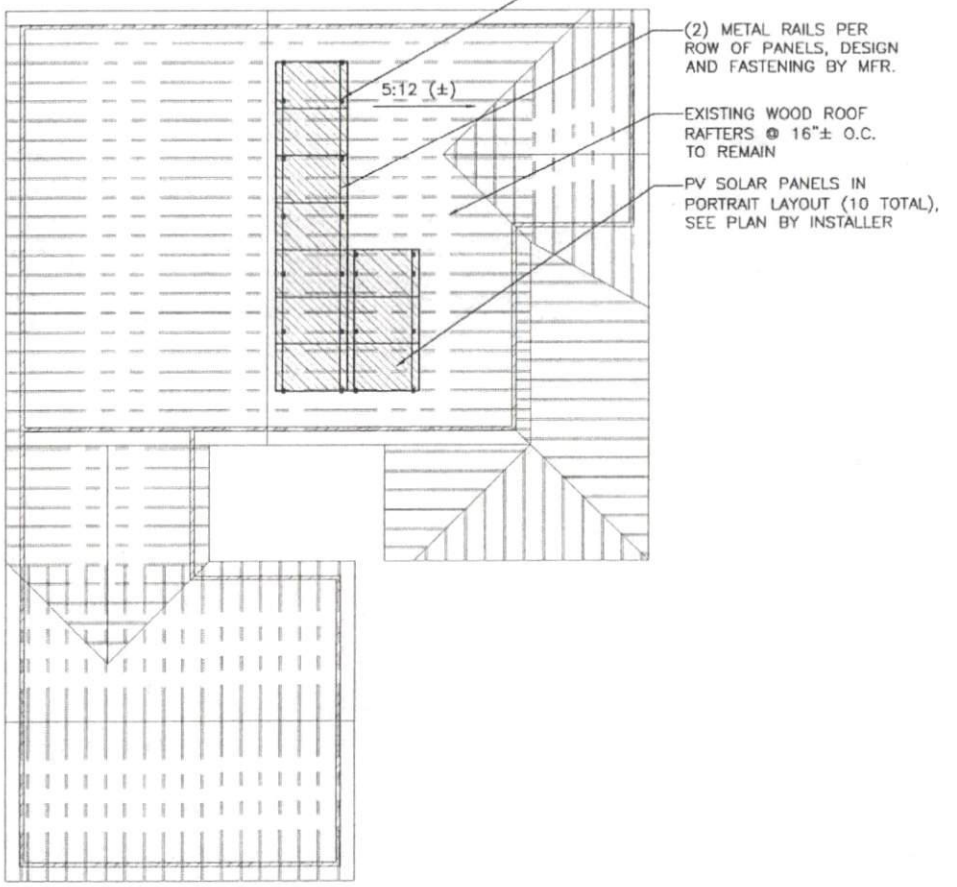
GENERAL NOTES

1. Existing rafters have been analyzed based upon indicated sizes, spacings, and spans. Rafters have been confirmed by the installer to be 2x10 Southern Yellow Pine No. 2 Grade (SYP #2).
2. Analysis performed using the design procedures included in the 2018 IBC and based upon a nominal design wind speed of 118 mph and ground snow load of 15 psf. Exposure B.
3. Installer has verified the member sizes, grade stamps, truss spans, and spacing in field. Anomalies such as wider spacings, additional loads (such as HVAC equipment), and/or deflected, bowed, or damaged framing members shall be brought to the engineer's attention immediately.
4. Metal rails, clips, and other support hardware shall be provided by others. See provider's cut sheets for material information and fastening details.
5. Photovoltaic (PV) solar panels as analyzed based upon the criteria: approximate size of 3'-3" x 5'-6" and weigh approximately 47 pounds each. Exact manufacturer and model chosen and installed by installer.
6. Work not indicated on a part of the drawings, but reasonably implied to be similar to that shown at corresponding pieces, shall be repeated.
7. These structural drawings are intended solely to address the adequacy of the existing roof framing components to support the additional loads imposed by the installation of the indicated PV solar panels in accordance with the load requirements of the 2018 North Carolina Residential Code. All other components of the existing house, both structural and otherwise, are outside the scope of these drawings.
8. Install water-tight flashing and/or caulking around all roof penetrations as required by IRC.
9. Fasteners for preservative treated and fire retardant-treated wood shall be hot-dipped zinc coated galvanized steel, stainless steel, silicon bronze, or copper per IBC 2304.9.5.



2/S1 **TYP. ATTACHMENT TO ROOF**

SCALE: 1" = 1'-0"



SIDE OF BUILDING

1/S1 **PANEL INSTALLATION PLAN**

SCALE: 1/8" = 1'-0"

B&A Engineering, PC
License # C-4437
15571 City View Drive
Suite 200
Midlothian, VA 23113
804-794-0571
FAX 804-794-2635

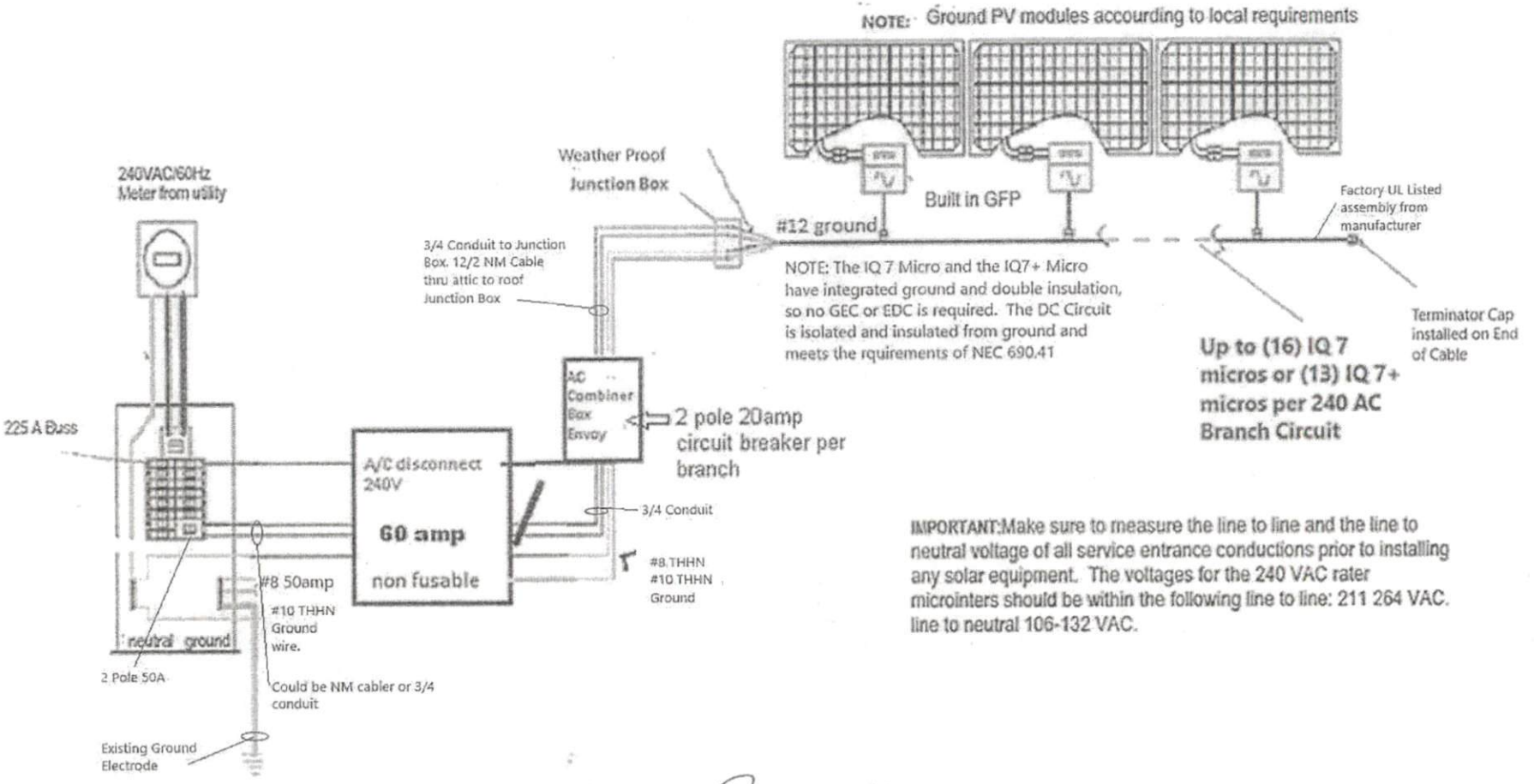
AAPCO / SOLAR TYME
JOB #821243 BLAIR RESIDENCE
161 CURR WELL DR,
BENSON, NC 27504

SOLAR PANEL INSTALLATION PLAN

DRAWN BY DEW
DESIGNED BY DEW
CHECKED BY NKG
DATE 2019-08-08
SCALE AS NOTED
REVISIONS:

SHEET NO. S1of1

JOB NO. 57140353.00



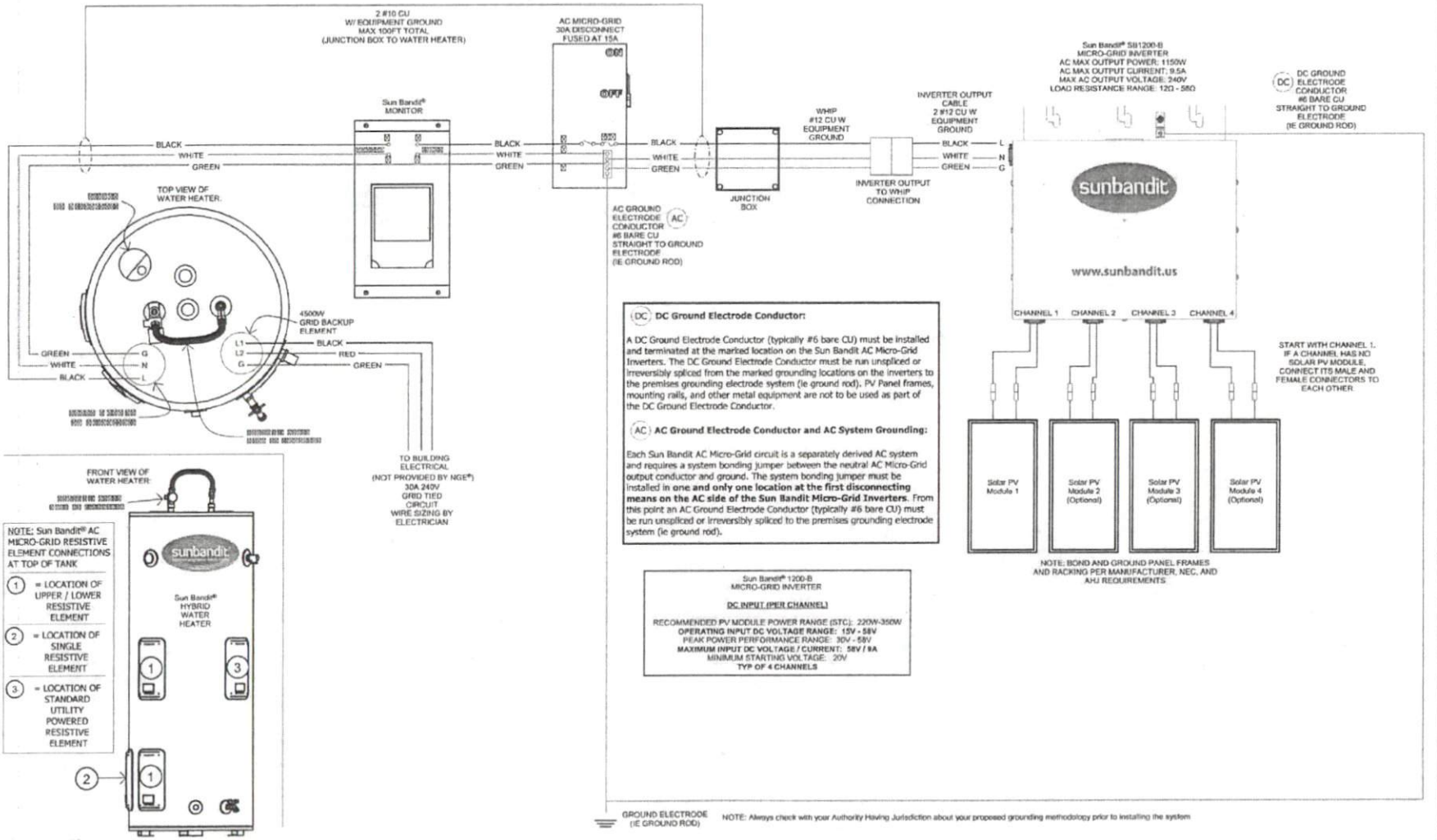
IMPORTANT: Make sure to measure the line to line and the line to neutral voltage of all service entrance conductions prior to installing any solar equipment. The voltages for the 240 VAC rater microinters should be within the following line to line: 211 264 VAC. line to neutral 106-132 VAC.

FIELD WIRING DIAGRAM
240VAC SINGLE PHASE

NAME: Richard Alexander Blair
ADDRESS: 1161 Carr Well Dr. Benson, NC 27504

MODEL: (16) enphase energy 0.3 kw (Model IQ7plus-72-x-US 240v 295w
PANEL: (16) Solaria 360w (Model Solaria Power XT-360 R-PD)

Series 1200-B Three-Line



NOTE: ALL WORK TO BE PERFORMED BY QUALIFIED ELECTRICIANS.ALL WORK TO BE DONE PER AHJ AND UTILITY REQUIREMENTS. ALL INSTALLATION CONDITIONS TO BE FIELD VERIFIED FOR APPROPRIATENESS.

Version 170830

Series 1200-B THREE-LINE

sunbandit®
Solar Hybrid Energy Systems • Patent(s) Pending

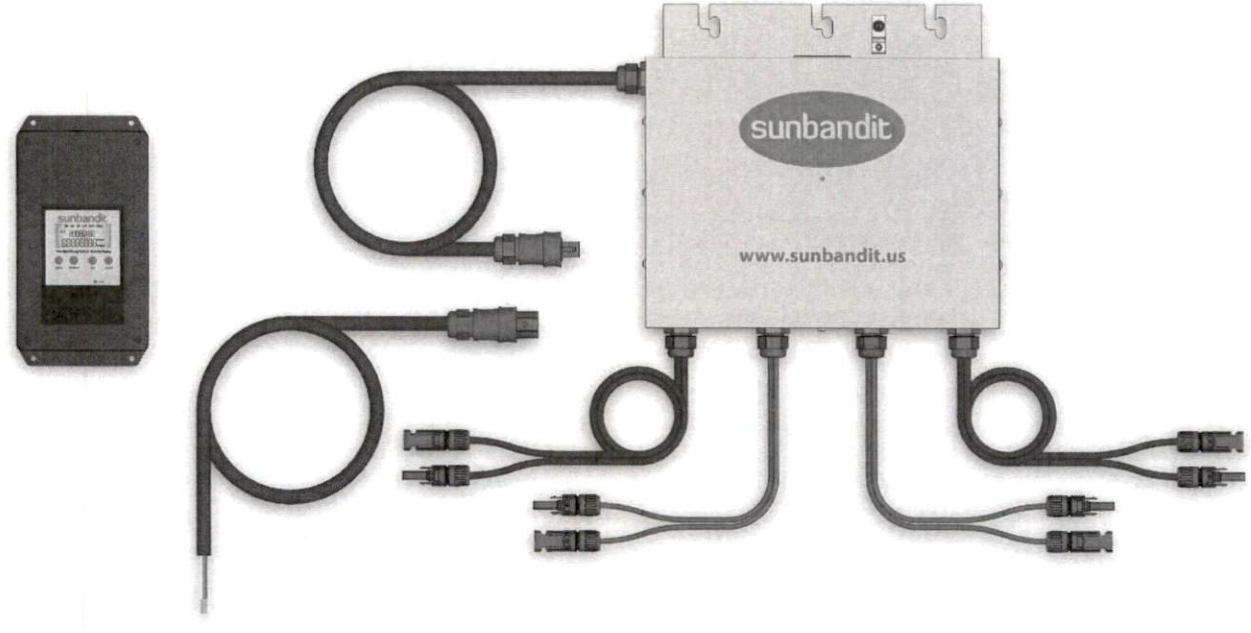
sunbandit®
Energy For Everyone

SB1200-B-PPK
Spec Sheet

Patented technologies simplify installation, optimize performance and eliminate the need for utility connection providing off-grid energy independence even during a power outage.

Features
- Complete autonomous operation with no grid-tie or batteries needed.
- 4 DC Input Channels with Maximum Power Point Tracking (MPPT) for each module.
- For use with one (1) to four (4) modules per circuit.
- Maximum power output of 1150W per circuit.
- Peak Efficiency of 96%.

Includes
- (1) Sun Bandit® SB1200-B Inverter with Whip
- (1) Sun Bandit® Monitor with Case



ICC-SRCC OG-100 Certified

ICC-SRCC OG-100 Certified PV water heating collector when 4 solar PV modules with a nominal output of 280W per module meeting Sun Bandit® AC Micro-Grid Inverter specifications are used to power a 3000W resistive heating element.

Information is subject to change without notice. Images may not be to scale.

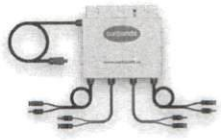
www.sunbandit.us 877-643-4786

MET c us

MADE IN U.S.A.

sunbandit®
Energy For Everyone

SB1200-B AC Micro-Grid Inverter
Technical Specifications



Specifications	SB1200-B
Number of Inverters / DC Input Channels	1 / 4
Number of Modules per Channel	1
Number of Modules per Circuit	1, 2, 3 or 4
DC Input (per Channel)	Data
Recommended PV Module Power Range (STC)	220 W – 350 W
Operating Input DC Voltage Range	15 V – 58 V
Peak Power Performance Range	30 V – 58 V
Maximum Input DC Voltage / Current	58 V / 9 A
Minimum Starting Voltage	20 V
AC Output (per Inverter)	Data
Maximum Output Power / Rated Output	1150 W / 960 W
Maximum Output Current	9.5A
Nominal Operating AC Output Voltage	20 V – 240 V, Single-Phase
Nominal Frequency	50 Hz – 60 Hz
Load Resistance Range	12 ohm - 58 ohm
Efficiency	Data
Peak Efficiency / MPPT Tracking	96% / 99%
Mechanical Data	
Ambient Temperature Range	-40° F to +149° F / -40° C to +65° C
Internal Operating Temperature Range	-40° F to +190° F / -40° C to +88° C
Dimensions w/o mounting bracket (L x H x W)	12.5" x 9.5" x 2.3" / 32 cm x 24 cm x 5.8 cm
Weight	14.25 lbs / 6.5 kg
Cooling / Enclosure	Natural Convection, No Fan / Potted
DC / AC Wire, Connectors	42" CH 1 & 4, 12" CH 2 & 3 DC Wires, MC-4 / 72" AC Wire + 30" Whip (8'-6")
Features and Compliance	Data
Safety and EMC Compliance	UL1741 and IEEE1547 (E113426), CSA 107.1, FCC Part 15 Class A
Compatibility	60-Cell, 72-Cell and Thin Film PV Solar Panels meeting DC Input above
DC Ground Fault Detector Interrupter (GFDI)	Built-In
Standard Warranty	6 Years* / 1 Year
Enclosure Environmental Rating / Safety	Outdoor – NEMA 6 / Transformer Isolated Circuits

** When purchased and installed with a Sun Bandit® Tank and Sun Bandit® Monitor within the United States.*
Information is subject to change without notice.

www.sunbandit.us 877-643-4786

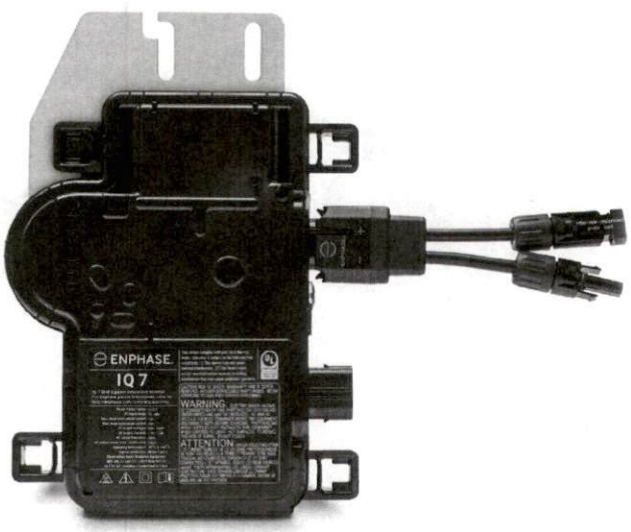
Data Sheet
Enphase Microinverters
Region: AMERICAS

Enphase IQ 7 and IQ 7+ Microinverters

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

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

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



Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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

UL CERTIFIED
SAFETY US-CA
E341165

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

ENPHASE

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US / IQ7-60-B-US		IQ7PLUS-72-2-US / IQ7PLUS-72-B-US	
Commonly used module pairings[1]	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	**IQ 7 Microinverter**		**IQ 7+ Microinverter**	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range[2]	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[3]	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	**@240 V**	**@208 V**	**@240 V**	**@208 V**
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)	Friends PV2 (MC4 intermateable). Adaptors for modules with MC4 or UTX connectors: - PV2 to MC4: order ECA-S20-S22 - PV2 to UTX: order ECA-S20-S25			
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

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

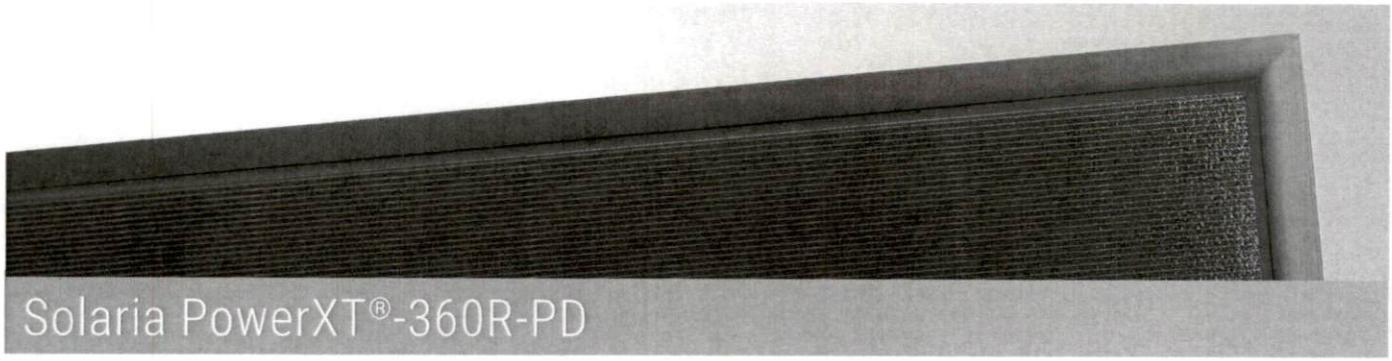
To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

2018-11-19

SOLARIA

Solaria PowerXT® | Residential



Solaria PowerXT®-360R-PD

Achieving up to 20% efficiency, Solaria PowerXT solar modules are one of the highest power modules in the residential solar market. Compared to conventional modules, Solaria PowerXT modules have fewer gaps between the solar cells; this leads to higher power and superior aesthetics. Solaria PowerXT residential modules are manufactured with black backsheet and frames, giving them a striking appearance.

Developed in California, Solaria's patented cell cutting and module assembly takes processed solar wafers and turns them into PowerXT solar modules. The process starts by creating a highly reliable PowerXT cell where busbars and ribbon interconnections are eliminated. Solaria then packages the cells into the PowerXT solar module, reducing inactive space between the cells. All of the above leads to an exceptionally efficient solar module produced in a cost effective manner.

Higher Efficiency, Higher Power

Solaria PowerXT modules achieve up to 20% efficiency; conventional modules achieve 15% – 17% efficiency. Solaria PowerXT modules are one of the highest power modules available.

Lower System Costs

Solaria PowerXT modules produce more power per square meter area. This reduces installation costs due to fewer balance of system components.

Improved Shading Tolerance

Sub-strings are interconnected in parallel, within each of the four module quadrants, which dramatically lowers the shading losses and boosts energy yield.

Improved Aesthetics

Compared to conventional modules, Solaria PowerXT modules have a more uniform appearance and superior aesthetics.

Durability and Reliability

Solder-less cell interconnections are highly reliable and designed to far exceed the industry leading 25 year warranty.

About Solaria

Established in 2000, The Solaria Corporation has created one of the industry's most respected IP portfolios, with over 100 patents encompassing materials, processes, applications, products, manufacturing automation and equipment. Headquartered in Fremont, California, Solaria has developed a technology platform that unlocks the potential of solar energy allowing it to be ubiquitous and universally accessed.

TOP PERFORMER 2018 DNV·GL PV MODULE RELIABILITY SCORECARD

TÜVRheinland® Precisely Right.

The Solaria Corporation 6200 Paseo Padre Parkway, Fremont, CA 94555 P: (510) 270-2500 www.solaria.com

Rev 1H 08-22-2018

SOLARIA

Solaria PowerXT®-360R-PD

Performance at STC (1000W/m², 25° C, AM 1.5)

Solaria PowerXT-		345R-PD	350R-PD	355R-PD	360R-PD
Max Power (Pmax)	[W]	345	350	355	360
Efficiency	[%]	19.1	19.4	19.6	19.9
Open Circuit Voltage (Voc)	[V]	46.9	47.1	47.4	47.7
Short Circuit Current (Isc)	[A]	9.46	9.49	9.53	9.56
Max Power Voltage (Vmp)	[V]	38.5	38.8	39.1	39.5
Max Power Current (Imp)	[A]	8.93	9.02	9.09	9.13
Power Tolerance	[%]	-0/+3	-0/+3	-0/+3	-0/+3

Performance at NOCT (800W/m², 20°C Amb, Wind 1 m/s, AM 1.5)

Max Power (Pmax)	[W]	255	259	261	265
Open Circuit Voltage (Voc)	[V]	44.1	44.3	44.6	44.8
Short Circuit Current (Isc)	[A]	7.66	7.69	7.68	7.71
Max Power Voltage (Vmp)	[V]	35.4	35.7	36.0	36.3
Max Power Current (Imp)	[A]	7.15	7.22	7.27	7.30

Temperature Characteristics

NOCT	[°C]	45 +/-2
Temp. Coeff. of Pmax	[% / °C]	-0.39
Temp. Coeff. of Voc	[% / °C]	-0.29
Temp. Coeff. of Isc	[% / °C]	0.04

Design Parameters

Operating temperature	[°C]	-40 to +85
Max System Voltage	[V]	1000
Max Fuse Rating	[A]	15
Bypass Diodes	[#]	4

Mechanical Characteristics

Cell Type	Monocrystalline Silicon
Dimensions (L x W x H)	1621mm x 1116mm x 40mm
Weight	21 kg / 46 lbs
Glass Type / Thickness	AR Coated, Tempered / 3.2mm
Frame Type	Anodized Aluminum
Cable Type / Length	12 AWG PV Wire (UL) / 1000mm
Connector Type	Amphenol H4 (MC4 compatible)
Junction Box	IP67 / 4 diodes
Front Load (UL 1703)	5400 Pa / 113 psf*
Rear Load (UL 1703)	2400 Pa / 50 psf*

* Refer to Solaria Installation Manual for details

Certifications / Warranty

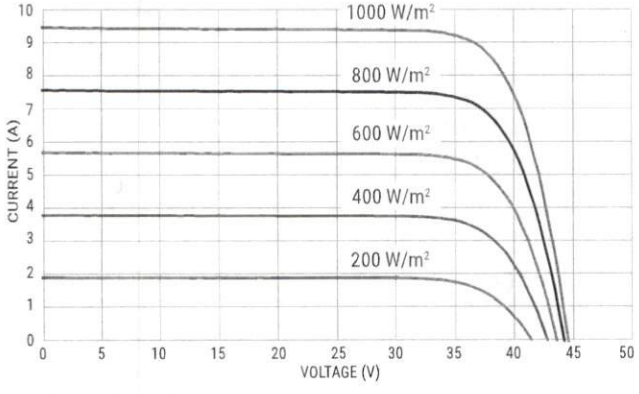
Certifications	UL 1703/IEC 61215/IEC 61730/CEC CAN/CSA-C22.2
Fire Type (UL 1703)	1
Power & Product Warranty	25 years*

* Warranty details at www.solaria.com

Packaging

Stacking Method	Horizontal / Palletized
Pcs / Pallet	25
Pallet Dims	1668 x 1150 x 1230 mm
Pallet Weight	590 kg / 1300 lbs
Pallets / 40-ft Container	28
Pcs / 40-ft Container	700

IV Curves vs. Irradiance (350W Module)



Authorized Dealer