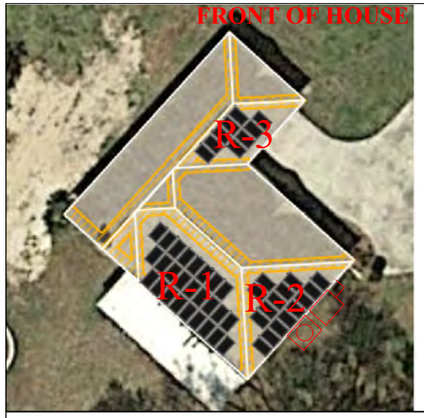

Inverter Type:	Enphase IQ7PLUS-72-2-US
PV Panel:	(50) Silfab-SIL 330 NL
Racking:	Iron Ridge
Total Wattage:	16,500W
Roof Type:	Composition Shingle
Wind Load:	20 to 27 Deg
Fastener Type:	Use 5/16" Dia 4.75" Lags

Sheet Index

General Notes:
-Enphase IQ7PLUS-72-2-US Micro Inverters are located on roof behind each module.
-First responder access maintained and from adjacent roof.
-Wire run from array to connection is 40 feet.

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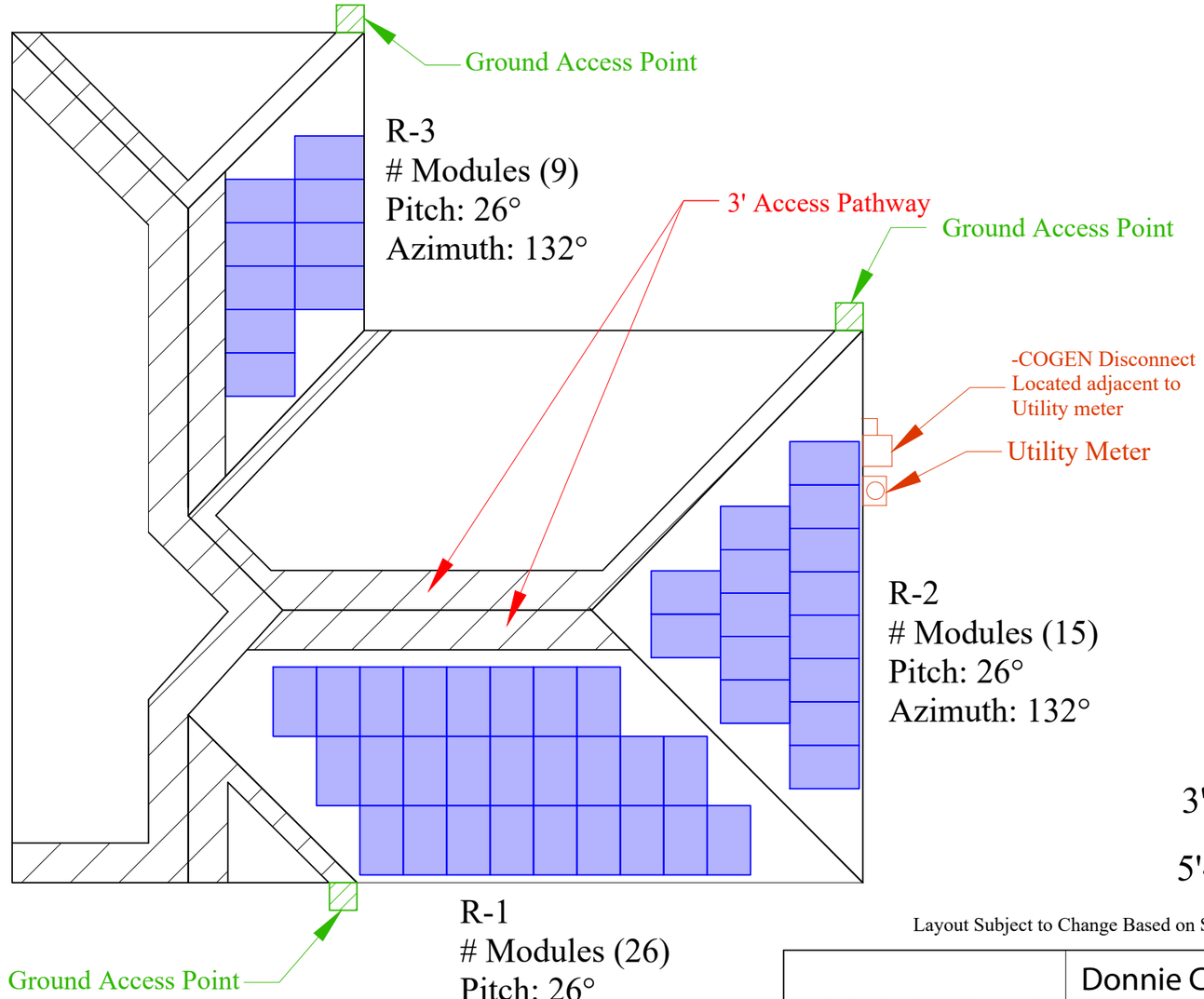
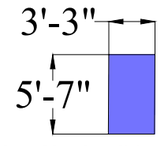
386-218-6930

Columbia County Building Department
Plans Reviewed for Code Compliance
State of Florida

FRONT OF HOUSE





Layout Subject to Change Based on Site Conditions

System meets the requirements of NFPA 70th Edition, Chapter 11.12

Install will be done to Manufacturer Spec

Legend

First responder access
Utility Meter
PV Disconnect
Chimney
Satellite
Vent Pipe

Meets All Editions of Florida Fire Prevention Code 2017 7th Edition

Represents all Fire Clearance including Alternative methods

1st Responder Access minimum of 36" unobstructed as per Section R324 of the 2018 IRC

Meets the requirements of the following- (2020 FL Residential Code & FBC, 7th Edition (2018 International Residential Code) - 2nd Printing modified by the FL Building Standards , 2018 International Energy Conservation Code, County of Columbia Code, 2017 National Electric Code.)

Customer Info:

Gerald Ellis
1454 NW Frontier Dr
Lake City, FL
32055

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8378 Foxtail Loop
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D. Chad Godwin, PE
Chad@godwineng.com

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D. CHAD GODWIN LICENSE No 81360 STATE OF FLORIDA PROFESSIONAL ENGINEER
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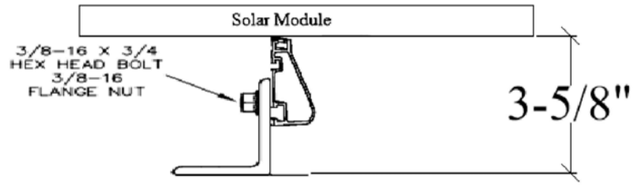
Rev Date:	.
Page:	S-1

N

Compass for Aerial

Ironridge XR-100



Install will be done to Manufacturer Spec

General Notes:

- L Feet are secured to roof rafters.
 @ 72" O.C. in Zone 1, @ 72" O.C in Zone 2e,
 @ 72" O.C. in Zone 2r & @ 72" O.C. in Zone 3
 using 5/16" x 4.75" stainless steel Lag bolts.
- Subject roof has One layer.
- All penetrations are sealed and flashed.

Roof Section	Pitch	Roof Rafter and Spacing	Overhang	Notes:
R1-R3	4/12	2"x4" @ 24 O.C.	12"	Truss

-Roof Height 15'
-Per 2020 FBC, the Roof Mounted PV System will be subject to the following design criteria: Design Wind Speed(Vult) - 120mph 3 sec gust, Exposure Category - C
-Designed as per ASCE7-16

Inverter Type:	Enphase IQ7PLUS-72-2-US
PV Panel:	(50) Silfab-SIL 330 NL
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Date:	7/22/2021
Drawn by:	GKS
Revised by:	.
Rev #:	00
Rev Date:	.
Page:	S-2

Total Enphase Battery Output Ckt	
AC Max Output Current	48
AC Max Output Current * 1.25%	60
Overcurrent Protection (A)	60
No. of Current Carrying Cond	<4
Conductor Gauge (AWG)	6

Combined Total Output Ckt	
AC Max Output Current	108.5
AC Max Output Current * 1.25%	135.62
Overcurrent Protection (A)	140
No. of Current Carrying Cond	<4
Conductor Gauge (AWG)	1

Enphase Output Ckt Per String	
To Overcurrent Protection Device	
AC Max Output Current	15.73
AC Max Output Current * 1.25%	19.7
Overcurrent Protection (A)	20
No. of Current Carrying Cond	<4
Conductor Gauge (AWG)	10

Enphase Total Output Ckt	
AC Max Output Current	60.5
AC Max Output Current * 1.25%	75.6
Overcurrent Protection (A)	80
No. of Current Carrying Cond	<4
Conductor Gauge (AWG)	3

Warning
THREE POWER SOURCES
SOURCES: UTILITY GRID,BATTERY AND PV SOLAR ELECTRIC SYSTEM

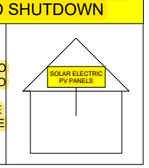
! WARNING !
POWER SOURCE OUTPUT CONNECTION: DO NOT RELOCATE THIS OVERCURRENT DEVICE

3/8 IN MIN. TEXT

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

3/16 IN MIN. TEXT

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY.



Engage Cable

NEMA 3R Junction Box
Black - L1
Red - L2
Green - Ground

Photovoltaics:
(50) Silfab-SIL 330 NL

Inverters:
(50) Enphase IQ7PLUS-72-2-US Micro Inverters

Circuits:
(2) circuits of (13) Modules
(2) circuits of (12) Modules
Maximum Inverters Per 20A Circuit (13)

Roof

#12 UF Cable for Home runs under 100'
#10 UF Cable for Home runs over 100'
(1) Line 1
(1) Line 2
Per Circuit
(1) EGC

PHOTOVOLTAIC SYSTEM
! AC DISCONNECT !
RATED AC OUTPUT CURRENT: 108.5A
NOMINAL OPERATING VOLTAGE: 240VAC

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT A
NOMINAL OPERATING AC VOLTAGE V

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

Meter

#2/0 AWG THWN
(1) Line 1
(1) Line 2
(1) Neutral
#8 (1) EGC
in @ least 1.5"
Conduit Typically

Utility PV AC Disco
100A Non-Fused Disconnect
Manual Disconnect

Enphase Combiner Box

(1) - 20A Breaker
Per Circuit
4 Circuits
10/15A Breaker for Envoy

Solar Combiner Box
#X-IQ-AM1-240
Disconnect

3 AWG THWN
(1) Line 1
(1) Line 2
(1) Neutral
#8 (1) EGC
in @ least 1.25"
Conduit Typically

(1) Encharge 10 w/ NEMA 3R Rating

(1) Encharge 10 w/ NEMA 3R Rating

(1) Encharge 10 w/ NEMA 3R Rating

40A
20A

#3 AWG THWN
(1) Line 1
(1) Line 2
(1) Neutral
#8 (1) EGC
in @ least 1.25" Conduit Typically

80A
200A
60A
200A
GEC

Enpower
200A ATS
Disconnect

#6 L1,L2
#8 Ground
In Min 3/4"
Conduit

(1)#6 AWG EGC & GEC

#2/0 AWG THWN
(1) Line 1
(1) Line 2
(1) Neutral
#6 (1) EGC
in @ least 1.5"
Conduit Typically

200A MSP

If Encharge to empower >5Ft
or if not line of sight, an AC disconnect
is required on Encharge side of Feeder.
CT's installed Line side of the empower.

NEC LABEL NOTES:
1. THE WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH NEC 110.21(B)
2. LABELS SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE THEY ARE INSTALLED.
3. LABELS TO BE A MIN LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
4. LABELS SHALL ALSO COMPLY WITH THE SPECIFIC REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

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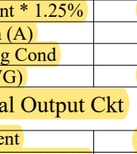

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Orange City, FL 32763
386-218-6930

System meets the grounding requirements of NEC 690.43
Including the label below

In Case of Emergency Call
All American Solar
at 386-218-6930

Note:
-All wiring to meet the 2017 NEC and Florida electric codes.
100A Disconnect
-Type of conduit to be determined on site by contractor.

Install will be done to Manufacturer Spec

GEC NOTES
- Ungrounded system per 690.41(A)(4)
- GEC must be installed per 250.64
- GEC must be continuous un-spliced or irreversibly spliced from inverter to existing service ground system or continuous from the arrays to the existing service ground system.
- GEC must be min #8 AWG and installed in conduit
- If GEC is not in conduit, it must be #6 min

Disconnects will be Visible, lockable, adjacent to and within 10' of utility meter
All Labels & Markings for photovoltaic system will be reflective and meet all requirements for NFPA 11.12

Customer Info:

Gerald Ellis
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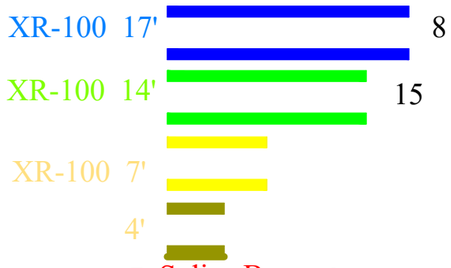
Lake City, FL
32055

Date:	7/22/2021
Drawn by:	GKS
Revised by:	.
Rev #:	00
Rev Date:	.
Page:	E-1

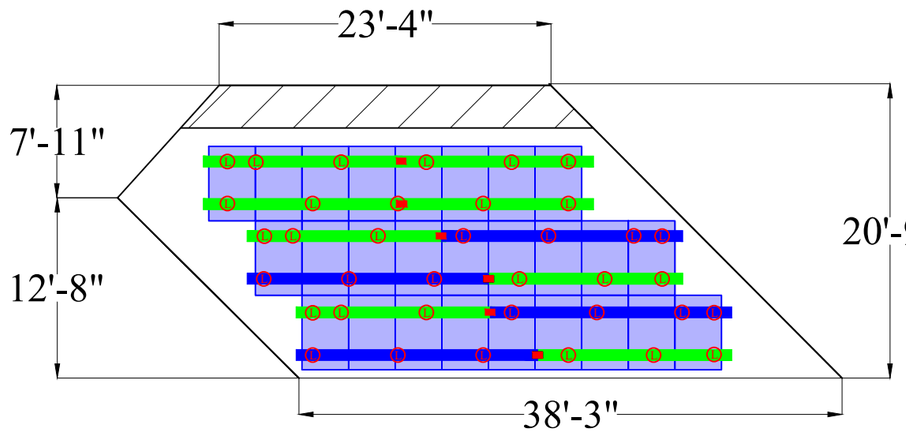
Inverter Type:
Enphase IQ7PLUS-72-2-US
PV Panel:
(50)
Silfab-SIL 330 NL
Total Wattage:
16,500W

Iron Ridge Rail

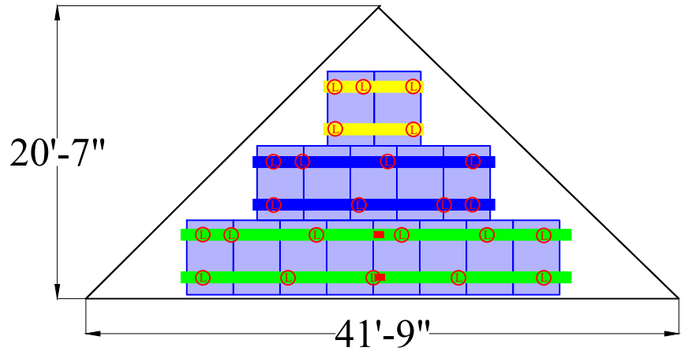


Splice Bar	8
Iron Ridge FF2	76
Iron Ridge UFO's	116
Iron Ridge Sleeves/End Caps	32
Combiner	3
Iron Ridge Ground Lugs	8
Silfab-SIL 330 NL	50
Enphase IQ7PLUS-72-2-US	50
100A Non-Fused Disconnect	1
200A Breakers	2
80A Breaker	1
60A Breaker	1
40A Breaker	1
20A Breakers	5
Enphase Combiner Box	1
200A Enpower ATS	1
Encharge 10	3

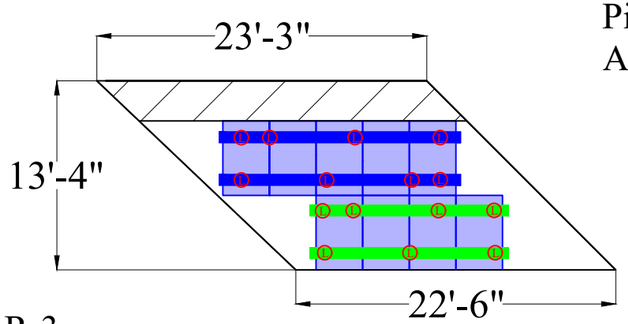
Proposed Mounting locations



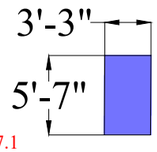
R-1
Modules (26)
Pitch: 26°
Azimuth: 222°



R-2
Modules (15)
Pitch: 26°
Azimuth: 132°



R-3
Modules (9)
Pitch: 26°
Azimuth: 132°



Plans satisfy zones FBC-1510.7.1
Install will be done to Manufacturer Spec

Zone 1, 2e, 2r & 3: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * ($\frac{1}{3}$)=72"*($\frac{1}{3}$)=24"

Inverter Type:	Enphase IQ7PLUS-72-2-US
PV Panel:	(50) Silfab-SIL 330 NL
Racking:	Iron Ridge
Total Wattage:	16,500W
Roof Type:	Composition Shingle
Wind Load:	20 to 27 Deg
Fastener Type:	Use 5/16" Dia 4.75" Lags

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1060 East Industrial Dr, Suite A
Orange City, FL 32763
386-218-6930

Date:	7/22/2021
Drawn by:	GKS
Revised **by:**	.
Rev #:	00
Rev Date:	.
Page:	S-1A

SIL-330 NL

BAA ARRA · 25 YEAR PRODUCT WARRANTY · AUTOMATED MANUFACTURING · JUST-IN-TIME · PVEL DNV·GL TOP PERFORMER · TIER 1 BANKABLE $$$ · HIGH EFFICIENCY

HIGH EFFICIENCY PREMIUM MONO-PERC PV MODULE

CE · ETL Intertek · ETL Intertek · IEC · Fraunhofer ISE

CHUBB
* Chubb provides error and omission insurance to Silfab Solar Inc.

INDUSTRY LEADING WARRANTY
All our products include an industry leading 25-year product workmanship and 30-year performance warranty.

35+ YEARS OF SOLAR INNOVATION
Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies, to ensure our partners have the latest in solar innovation.

NORTH AMERICAN QUALITY
Silfab is the leading automated solar module manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules.

BAA / ARRA COMPLIANT
Silfab panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all utilized Silfab panels in their solar installations.

LIGHT AND DURABLE
Engineered to accommodate high wind load conditions for test loads validated up to 4000Pa uplift. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

QUALITY MATTERS
Total automation ensures strict quality controls during the entire manufacturing process at our ISO certified facilities.

DOMESTIC PRODUCTION
Silfab Solar manufactures PV modules in two automated locations within North America. Our 500+ North American team is ready to help our partners win the hearts and minds of customers, providing customer service and product delivery that is direct, efficient and local.

AESTHETICALLY PLEASING
All black sleek design, ideal for high-profile residential or commercial applications.

PID RESISTANT
PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1.

Electrical Specifications		SIL-330 NL mono PERC	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	330	235
Maximum power voltage (Vpmax)	V	33.3	30.2
Maximum power current (Ipmax)	A	9.92	7.8
Open circuit voltage (Voc)	V	40.5	36.7
Short circuit current (Isc)	A	10.42	8.2
Module efficiency	%	19.4	17.3
Maximum system voltage (VDC)	V	1000	
Max series fuse rating	A	20	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
• Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10W.

Temperature Ratings	SIL-330 NL mono PERC
Temperature Coefficient Isc	0.064 %/°C
Temperature Coefficient Voc	-0.28 %/°C
Temperature Coefficient Pmax	-0.36 %/°C
NOCT (± 2°C)	46 °C
Operating temperature	-40/+85 °C

Mechanical Properties and Components	SIL-330 NL mono PERC	
	Metric	Imperial
Module weight	18.6 kg ±0.2 kg	41 ±0.4 lbs
Dimensions (H x L x D)	1700 mm x 1000 mm x 38 mm	66.9 in x 39.4 in x 1.5 in
Maximum surface load (wind/snow)*	4000 Pa rear load / 5400 Pa front load N/m²	83.5/112.8 lb/ft^2
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	60 - Si mono PERC - 5 busbar 158.75 x 158.75 mm	60 - Si mono PERC - 5 busbar 6.25 x 6.25 Inch
Glass	3.2 mm high transmittance, tempered, DSM anti-reflective coating	0.126 in high transmittance, tempered, DSM anti-reflective coating
Cables and connectors (refer to installation manual)	1200 mm, ø 5.7 mm, MC4 from Staubli	47.2 in, ø 0.22 in (12AWG), MC4 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV backsheet	
Frame	Anodized Aluminum (Black)	
Bypass diodes	3 diodes-30SQ045T (45V max DC blocking voltage, 30A max forward rectified current)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP67 rated	
Warranties	SIL-330 NL mono PERC	
Module product workmanship warranty	25 years**	
Linear power performance guarantee	30 years ≥ 97.1% end 1st year | ≥ 91.6% end 12th year | ≥ 85.1% end 25th year ≥ 82.6% end 30th year	
Certifications	SIL-330 NL mono PERC	
Product	ULC ORD C1703, UL1703, CEC listed***, UL 61215-1/-1-1/-2, UL 61730-1/-2, IEC 61215-1/-1-1/-2***. IEC 61730-1/-2***, CSA C22.2#61730-1/-2***, IEC 62716 Ammonia Corrosion; IEC61701:2011 Salt Mist Corrosion Certifed, UL Fire Rating: Type 2	
Factory	ISO9001:2015	

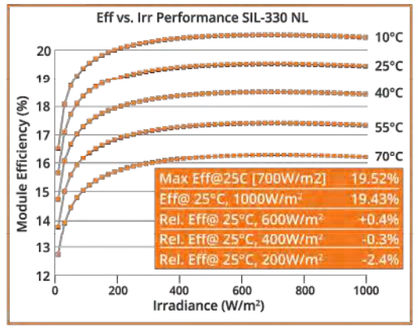
- Modules Per Pallet: 26
- Pallets Per Truck: 36
- Modules Per Truck: 936

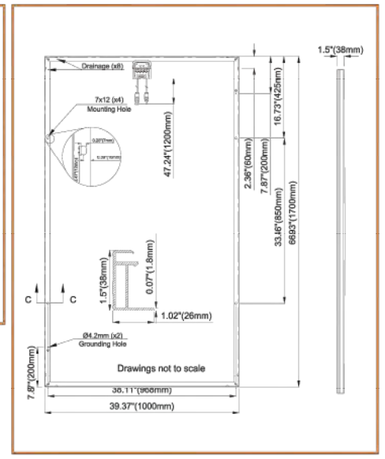
*⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.

**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

***Certification and CEC listing in progress. August 2020 expected completion date for CEC listing, IEC 61730/61215 and CSA C22.2#61730-1/-2

Third-party generated pan files from Fraunhofer-Institute for Solar Energy Systems ISE are available for download at: www.silfabsolar.com/downloads





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info@silfabsolar.com | www.silfabsolar.com

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Bellingham WA 98225 USA
Tel +1 360-569-4733

2020 TOP PERFORMER PVEL DNV·GL PV MODULE RELIABILITY SCORECARD

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)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	**@240 V**	**@208 V**	**@240 V**	**@208 V**
Peak CEC efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)	Friends PV2 (MC4 intermateable). Adaptors for modules with MC4 or UTX connectors: - PV2 to MC4: order ECA-S20-S22 - PV2 to UTX: order ECA-S20-S25			
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

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

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

ENPHASE.

2018-05-24

Enphase Encharge 10

The **Enphase Encharge 10™** all-in-one AC-coupled storage system is **reliable, smart, simple,** and **safe**. It is comprised of three base Encharge 3™ storage units, has a total usable energy capacity of 10.08 kWh and twelve embedded grid-forming microinverters with 3.84 kW power rating. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.

Reliable

- Proven high reliability IQ Series Microinverters
- Ten-year limited warranty
- Three independent Encharge storage base units
- Twelve embedded IQ 8X-BAT Microinverters
- Passive cooling (no moving parts/fans)

Smart

- Grid-forming capability for backup operation
- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

Safe

- Cells safety tested
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

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

ENPHASE.

Enphase Encharge 10

MODEL NUMBER	
ENCHARGE-10-1P-NA	Encharge 10 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - Three Encharge 3.36 kWh base units (B3-A01-US001-1-3) - One Encharge 10 cover kit with cover, wall mounting bracket, watertight conduit hubs, and interconnect kit for wiring between batteries (B10-C-1050-O)
ACCESSORIES	
ENCHARGE-HNDL-R1	One set of Encharge base unit installation handles
OUTPUT (AC)	**@ 240 VAC[1]**
Rated (continuous) output power[2]	3.84 kVA
Peak output power	5.7 kVA (10 seconds)
Nominal voltage / range	240 / 211 – 264 VAC
Nominal frequency / range	60 / 57 – 61 Hz
Rated output current	16 A
Peak output current	24.6A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20 A branch circuit	1 unit (single phase)
Interconnection	Single-phase
Maximum AC short circuit fault current over 3 cycles	69.6 Arms
Round trip efficiency[2]	89%
BATTERY	
Total capacity	10.5 kWh
Usable capacity	10.08 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	73.5 V
Ambient operating temperature range	-15° C to 55° C (5° F to 131° F) non-condensing
Optimum operating temperature range	0° C to 30° C (32° F to 86° F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (WxHxD)	1070 mm x 664 mm x 319 mm (42.13 in x 26.14 in x 12.56 in)
Weight	Three individual 44.2 kg (97.4 lbs) base units plus 21.1 kg (48.7 lbs) cover and mounting bracket; total 154.7 kg (341 lbs)
Enclosure	Outdoor – NEMA type 3R
IQ 8X-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2500 meters (8200 feet)
Mounting	Wall mount
FEATURES AND COMPLIANCE	
Compatibility	Compatible with grid-tied PV systems. Compatible with Enphase IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enlighten Manager and MyEnlighten monitoring options; API integration
Compliance	UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 107.1-16
LIMITED WARRANTY	
Limited Warranty[3]	>70% capacity, up to 10 years or 4000 cycles

1. Supported in backup/off grid operations
2. AC to Battery to AC at 50% power rating.
3. Whichever occurs first. Restrictions apply.

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

ENPHASE.

Enphase Enpower

The **Enphase Enpower**™ smart switch connects the home to grid power, the Encharge storage system, and solar PV. It provides microgrid interconnection device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.

Reliable

- Durable NEMA type 3R enclosure
- Ten-year limited warranty

Smart

- Controls safe connectivity to the grid
- Automatically detects grid outages
- Provides seamless transition to backup

Simple

- Connects to the load or service equipment[1] side of the main load panel
- Centered mounting brackets support single stud mounting
- Supports conduit entry from the bottom, bottom left side, and bottom right side
- Supports whole home and partial home backup and subpanel backup
- Up to 200A main breaker support
- Includes neutral-forming transformer for split phase 120/240V backup operation

1. Enpower is not suitable for use as service equipment in Canada.

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

ENPHASE.

Enphase Enpower

MODEL NUMBER	
EP200G101-M240US00	Enphase Enpower smart switch with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and storage installations.
ACCESSORIES and REPLACEMENT PARTS	
XA-E3-PCBA-ENS	Replacement Enpower controller printed circuit board
Circuit breakers (as needed)[2,3]	Not included, must order separately:
BRK-100A-2P-240V	• Main breaker, 2 pole, 100A, 25kAIC, CSR2100N or CSR2100
BRK-125A-2P-240V	• Main breaker, 2 pole, 125A, 25kAIC, CSR2125N
BRK-150A-2P-240V	• Main breaker, 2 pole, 150A, 25kAIC, CSR2150N
BRK-175A-2P-240V	• Main breaker, 2 pole, 175A, 25kAIC, CSR2175N
BRK-200A-2P-240V	• Main breaker, 2 pole, 200A, 25kAIC, CSR2200N
BRK-20A-2P-240V-B	• Circuit breaker, 2 pole, 20A, 10kAIC, BR220B
BRK-30A-2P-240V	• Circuit breaker, 2 pole, 30A, 10kAIC, BR230B
BRK-40A-2P-240V	• Circuit breaker, 2 pole, 40A, 10kAIC, BR240B
BRK-60A-2P-240V	• Circuit breaker, 2 pole, 60A, 10kAIC, BR260
BRK-80A-2P-240V	• Circuit breaker, 2 pole, 80A, 10kAIC, BR280
EP200G-HNDL-R1	Enpower installation handle kit (order separately)
ELECTRICAL SPECIFICATIONS	
Assembly rating	Continuous operation at 100% of its rating
Nominal voltage / range (L-L)	240 VAC / 100 - 310 VAC
Voltage measurement accuracy	±1% V nominal (±1.2V L-N and ±2.4V L-L)
Nominal frequency / range	60 Hz / 56 - 63 Hz
Frequency measurement accuracy	±0.1 Hz
Maximum continuous current rating	160A
Maximum output overcurrent protection device	200A
Maximum input overcurrent protection device	200A
Maximum overcurrent protection device rating for storage branch circuit[4]	80A
Maximum overcurrent protection device rating for PV combiner branch circuit[4]	80A
Neutral Forming Transformer (NFT)	• Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral • Continuous rated power: 3600VA • Maximum continuous unbalance current: 30A @ 120V • Peak rated power: 8800VA for 30 seconds • Peak unbalanced current: 80A @ 120V for 30 seconds
MECHANICAL DATA	
Dimensions (WxHxD)	50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in)
Weight	38.5 kg (85 lbs)
Ambient temperature range	-40° C to +50° C (-40° F to 122° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NEMA type 3R, polycarbonate construction
Altitude	To 2500 meters (8200 feet)
WIRE SIZES	
Connections	• Main lugs, backup load lugs, and CSR breakers: Cu/AL: 2 AWG - 300 KCMIL, 6 AWG • BR breakers (wire provided): 14 AWG – 2 AWG • AC combiner lugs, Encharge lugs, and generator (reserved for future use) lugs • Neutral (large lugs): Cu/AL: 6 AWG - 300 KCMIL
Neutral and ground bars	Large holes (5/16-24 UNF): 14 AWG – 1/0 AWG Small holes (10-32 UNF): 14 AWG – 6 AWG
COMPLIANCE	
Compliance	UL 1741, UL 1741 SA, UL1998, UL869A[5], UL67[5], UL508[5], UL50E[5] CSA 22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, AC156.

2. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.
3. The kAIC of Enpower is the same as the kAIC of the main breaker being installed as listed.
4. Not included. Installer must provide properly rated breaker per circuit breaker list above.
5. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

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

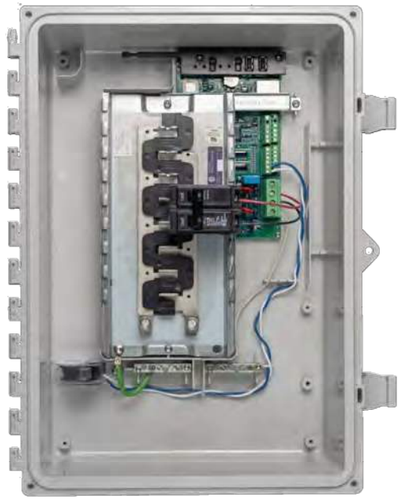
ENPHASE.

Data Sheet
Enphase Networking

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**

2018-09-13

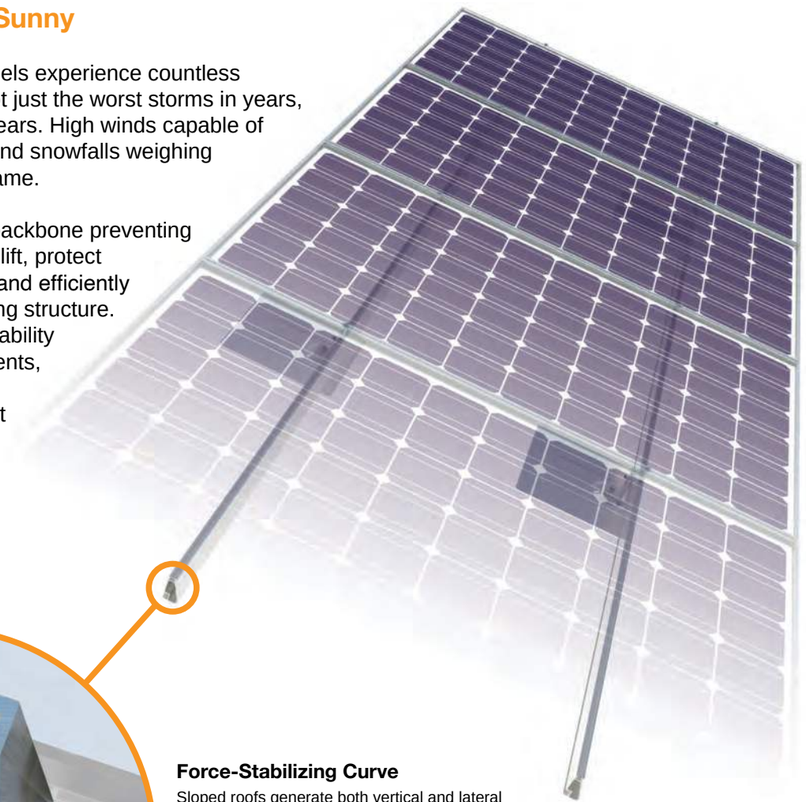
ENPHASE.

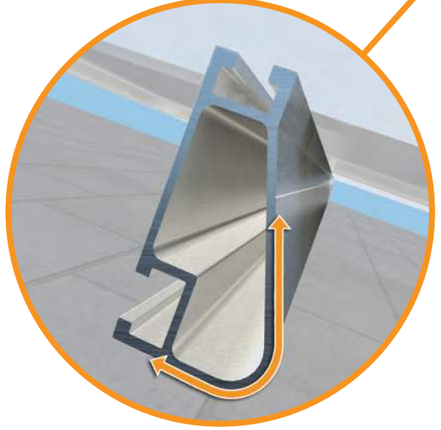
XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.





Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

- 6’ spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10’ spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It’s built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12’ spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4’	5’ 4”	6’	8’	10’	12’
None	90	XR10		XR100		XR1000	
	120						
	140						
	160						
20	90						
	120						
	140						
	160						
30	90						
	160						
40	90						
	160						
80	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

GODWIN ENGINEERING AND DESIGN, LLC

8378 Foxtail Loop, Pensacola, FL 32526 | (850)712-4219 | chad@godwineng.com

July 30, 2021

To: Columbia County Building Department
135 NE Hernando Ave
Lake City, FL 32055

Re: Ellis – Residential PV Roof Mount Installation
1454 NW Frontier Dr.
Lake City, FL 32055

Plan Reviewer,

This letter is regarding the installation of a new roof mounted Solar PV System on the existing residential structure at the address above. I have reviewed the attachment plan and have determined that the roof mounted PV system is in compliance with the applicable sections of the following Codes as amended and adopted by the jurisdiction:

2020 Florida Building Code 7th Edition, FBC
ASCE 7 Min. Design Loads for Buildings & Other Structures

Per 2020 FBC, the Roof Mounted PV system will be subject to the following design criteria:
Design Wind Speed(V_{ult}) - 120mph 3sec gust, Exposure Category – C

The PV System consist of the modules, railing, and connection hardware. The system will add a dead load of approximately 3 psf to the roof.

The existing roof covering is Asphalt Shingle with min. ½" plywood decking and 2" x 4" roof trusses 24" O.C. The roofing, decking, and roof trusses are in good condition. The existing structure will be adequate for supporting the additional PV dead load and wind loads.

The securement method of the PV system is to be flush mounted to the asphalt shingle roof with the Ironridge railing and flashings/attachments. The attachments can be attached up to 72" apart in roof zones 1, 2e, 2r, and 3. The mounts should be staggered, where possible, to allow distribution of the design loads evenly to the structure. The mounts shall be installed with a min. 5/16" lag screw with minimum 2-5/16" thread length.

Please see attached documents and contact me should you have any questions.

Sincerely,

D. Chad Godwin, PE 81360
Exp. 02/28/2023

Donnie C Godwin 2021.08.02 12:51:22 '00'05-

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY DONNIE CHAD GODWIN USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

ASCE 7-16 CHAPTER 29 WIND LOADS - Rooftop Solar Panels Minimum Design Loads - Part 1: Enclosed(Hip, h<60ft, 21°<θ<27°)

Risk Category		II		Table 1.5-1			
Basic Wind Speed (Ult)		120		Figure 26.5-1B			
Wind Speed (asd)		93		FRC R301.2.1.3			
Roof Angle		21 to 27	°				
Effective Wind Area		18.15	ft^2	26.20			
Wind Load Parameters							
Wind Directionality	K_d	0.85		Table 26.6-1			
Exposure Cat.	B,C, or D	C		Section 26.7			
Topographic factor	K_{zt}	1.00		26.8 or 26.8.2			
Ground Elevation Factor	K_e	1.00		Table 26.9-1			
Velocity Exposure Coefficient	K_z	0.85		Table 30.3-1			
Array Edge Factor	γ_E	1.50		29.4.4	*Modules are considered Exposed		
Solar Panel Equalization Factor	γ_a	0.70		Fig. 29.4-8			
Velocity Pressure	q_p	15.98	psf	$q_h=0.00256\ K_z K_{zt} K_d K_e V^2$			
Mean Roof Height	h	20	ft	h_2	5	in	Not > 10in(height above roof)
	0.4h	8.00	ft	$2h_2$	10	in	*min distance array shall be from the roof edge, Gable Ridge, or hip ridge
least horizontal dim		360	in		0.25	in	min gap between all panels but not > 6.7ft
10% of least horizontal dim		3.00	ft	d1	1.00	ft	Horizontal distance orthogonal to panel edge
Roof Zone Set Back	a	3.00	ft	d2	0.25	ft	Horizontal distance from edge of one panel to the nearest edge in the next row
	h/B	0.67		0.5h	10.00	ft	
				1.5Lp	8.38	ft	

Load Types	Load, PSf
Dead Load, D	3
Weight of Ice, D_i	0
Earthquake, E	0
Fluid, F	n/a
Flood Load, F_a	n/a
Lateral Earth psi, H	n/a
Live Load, L	n/a
Roof Live, L_r	n/a
Rain, R	n/a
Snow, S	0
Self-Straining, T	n/a
Wind, W	see calc
Wind-on-Ice, Wi	n/a

Figure 30.3-2G(Hip roof, h<60ft, 21°<θ<27°)

Zone	1	2r	2e	3			
GC_p	-1.30	-1.80	-1.80	-1.80		uplift	
GC_p	0.70	0.70	0.70	0.70		downward	
$p = q_h(GC_p)(\gamma_E)(\gamma_a)$	-21.70	-30.05	-30.05	-30.05	psf	uplift	29.4-7
$p = q_h(GC_p)(\gamma_E)(\gamma_a)$	11.69	11.69	11.69	11.69	psf	downward	29.4-7

Design Calculations for the Use of Attachment to Roof Truss/Rafter

Module Length	$C(L_p)$	5.58				ft	
Module Width	B	3.25				ft	
Module Area	A	18				ft^2	
Total Design Load (Uplift)	P_{design}	-21.70	-30.05	-30.05	-30.05	psf	
Total Design Load (Downforce)	P_{design}	11.69	11.69	11.69	11.69	psf	
Design Load per Module	T_{up}	-393.84	-545.31	-545.31	-545.31	lbs	$T_{up} = A * P_{design}$
Design Load per Module	T_{down}	212.07	212.07	212.07	212.07	lbs	$T_{dn} = A * P_{design}$
Distributed Load (Uplift)	$P_{dist.\ Up}$	-60.59	-83.89	-83.89	-83.89	plf	$T_{up} / B*2$
Distributed Load (Down)	$P_{dist.\ Down}$	32.63	32.63	32.63	32.63	plf	$T_{dn} / B*2$
Railspan Between Anchor Points	L	6	6	6	6	ft	
Point Load per Mount (Uplift)	R	-363.54	-503.37	-503.37	-503.37	lbs	
Point Load per Mount (Down)	R	97.88	97.88	97.88	97.88	lbs	

Table 1.1 - Pullout Value for Single Lag Screw

Specific Gravity	G	0.55	0.55	0.55	0.55		Table 11.2A, NDS 2005, page 68 (SYP)
Diameter of Lag Screw	D	5/16	5/16	5/16	5/16	In	
Pullout Value of	W	306.8697	306.8697	306.8697	306.8697	lbs/in	$W=1800\ G^{3/2}\ D^{3/4}$
# of Lag screws		1	1	1	1		
Thread Length	T_d	2.3125	2.3125	2.3125	2.3125	In	Table L2, NDS 2005
Design Pullout Value per Mount	W_t	709.6363	709.6363	709.6363	709.6363		$W_t = W * \#\ of\ Lags * T_d$
SAFTEY FACTOR	SF	**1.95**	**1.41**	**1.41**	**1.41**		**Calculation**: $SF=W_t/R$ (Uplift)
		1	2r	2e	3		

Maximum Cantilever from Last attachment

Max Cantilever	M	24	24	24	24	in	Max rail span * 33%

Donnie C Godwin 2021.08.02 12:51:45 '00'05-

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