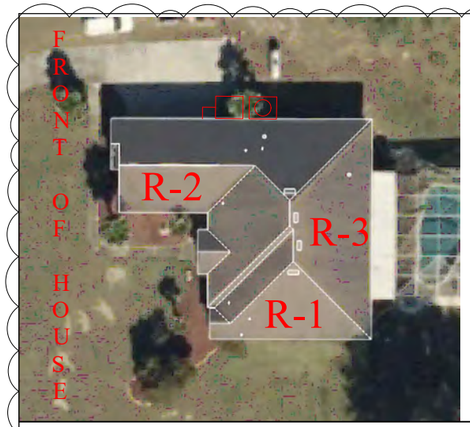


Inverter Type: (46)Enphase IQ8PLUS-72-2-US
PV Panel: (46) TSM-390DE09C.07
Racking: Iron Ridge XR-100
Total Wattage: 17,940W DC
Roof Type: Composition Shingle
Wind Load: 27 to 45 Deg
Fastener Type: Use (2) #14 x 3" SS Screws

## Sheet Index


S-1 Cover Sheet / Site Plan
S-2 Detail
E-1 One - Line
E-2 Electrical Code
S-1A Mounting Plan


General Notes:
-Enphase IQ8PLUS-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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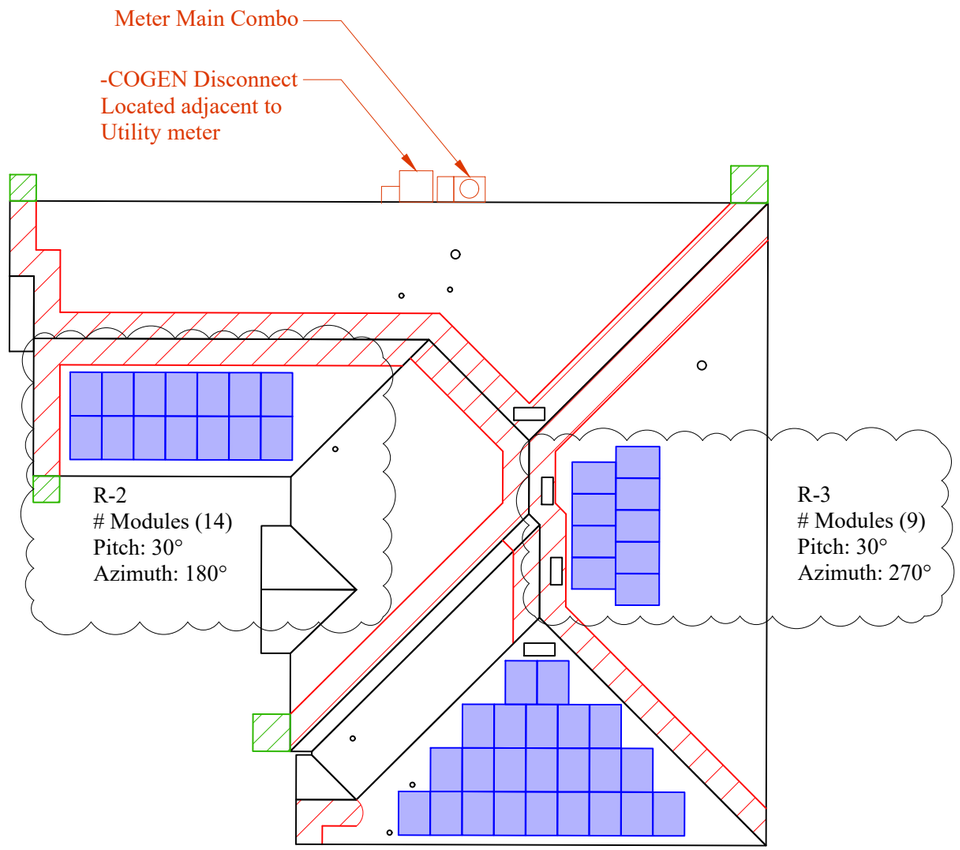
FRONT OF HOUSE




R-1
# Modules (23)
Pitch: 30°
Azimuth: 180°

Layout Subject to Change Based on Site Conditions

**Legend**
3' 1'-6" First responder access
Ground Access
Chimney
Utility Meter
Satellite
PV Disconnect
Vent Pipe

Meets All Editions of Florida Fire Prevention Code 2020 7th Edition
Meets all requirements of 2018 Editions of NFPA-1 and NFPA-101
3' Access Pathway
Represents all Fire Clearance including Alternative methods
1st Responder Access minimum of 36" unobstructed as per Section R324 of the 2020 IRC

System meets the requirements of NFPA 70th Edition, Chapter 1:11.12 (2018 Edition)

Install will be done to Manufacturer Spec

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, 2020 Florida Building Energy Conservation Code 7th edition, County of Columbia Code, 2017 National Electric Code.)

**Customer Info:**

ANDREW BUERGO
241 NW POMPANO CT
LAKE CITY, FL
32055


Godwin Engineering and Design, LLC
8378 Foxtail Loop
Pensacola, FL 32526
D. Chad Godwin, PE
Chad@godwineng.com


D. CHAD GODWIN LICENSE No. 81360 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by Donnie C Godwin
Date: 2023.11.09 11:40:04 -06'00'

| | |
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| **Revised by:** | DMB |
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| **Page:** | 11"x17" S-1 |

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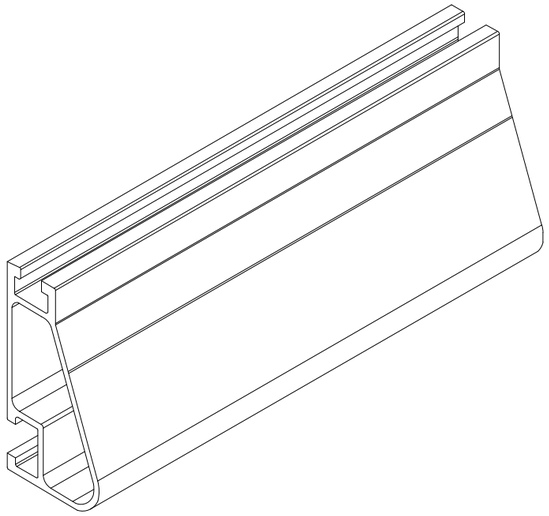
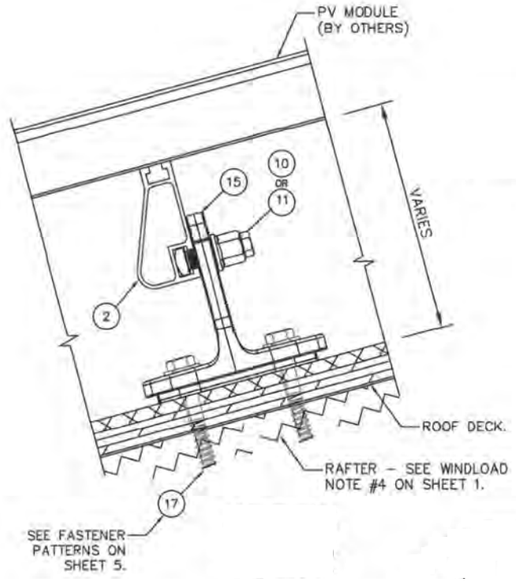
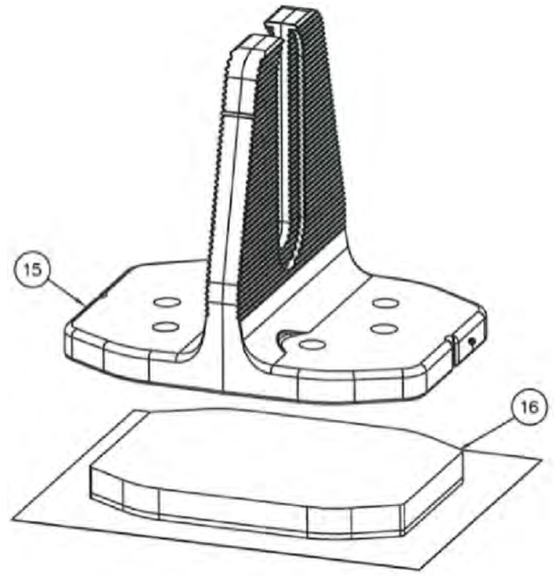
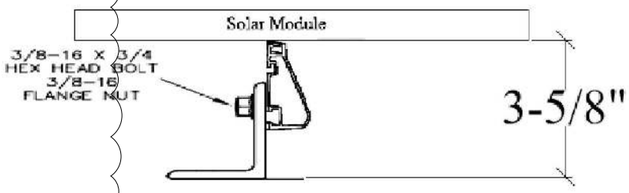


Ironridge XR-100




| BILL OF MATERIALS- QuickMount Halo Ultra Grip (HUG) | | |
|---|---|---|
| # | DESCRIPTION | MATERIALS/NOTES |
| 15 | HALO ULTRAGRIP BASE, MILL OR BLACK | 300 SERIES ALUMINUM |
| 16 | ULTRAGRIP FLASHING SYSTEM | PRESSURE SENSITIVE ADHESIVE |
| 17 | SCREW, #14 X 3" WITH EPDM BACKED WASHER | 300 SERIES SS & EPDM |

Install will be done to Manufacturer Spec

R1-R3

| | |
|---|---|
| Roof Type: | Composition Shingle |
| Roof Pitch & Overhang: | 7/12; 12" Overhang |
| Mount Type: | Halo UltraGrip |
| Fastener: No Substitutions | (2) #14 x 3" SS Self-drilling Screws into Roof Rafters |
| Structure: | 2"x4" Wood Trusses @ 24" O.C. |
| Sealing/Flashing: | All penetrations are sealed and flashed with Ultragrip Flashing System |
| Extra Notes: | (HW-RD1430-01-M1 screw) |

| Rafter Spans | Zone 1 | Zone 2e | Zone 2r | Zone 3 |
|---|---|---|---|---|
| Exposed | 24" | 24" | 24" | 24" |
| Non-Exposed | 48" | 48" | 24" | 24" |

**-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: (46)Enphase IQ8PLUS-72-2-US
PV Panel: (46) TSM-390DE09C.07
Racking: Iron Ridge XR-100
Total Wattage: 17,940W DC
Roof Type: Composition Shingle
Wind Load: 27 to 45 Deg
Fastener Type: Use (2) #14 x 3" SS Screws

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Pensacola, FL 32526
D. Chad Godwin, PE
Chad@godwineng.com

D. CHAD GODWIN LICENSE No. 81388 STATE OF FLORIDA PROFESSIONAL ENGINEER

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978 SW 2nd Ave
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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.

Enphase IQ Trunk Cable
Q-12-240
#12AWG THHN-THWN-2
UL 9703

Grounding Conductor to be protected #8 Awg or to be unprotected #6 Awg 250.64(B) 250.66 & 250.120(C)

Photovoltaics:
(46) TSM-390DE09C.07

Inverters:
(46) Enphase IQ8PLUS-72-2-US Micro Inverters

Circuits:
(2) circuits of (13) Modules
(2) circuits of (10) Modules
Maximum Inverters Per 20A Circuit (13)

**Meter/Main Combo**
200A Main
200A Bus

Existing loads in meter main combo to be relocated and no other loads to be added to it's busbar per 705.12(B)(2)(1)(b)

**Roof**

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

GEC

#2/0 L1, L2, N
#6 Ground
In @ least 2"
Conduit

Load Side Tap

Load side connection will be done in Main Service Panel adjacent to Utility Meter

There will be a Main breaker for feeder protection Per 705.12(B)(2)(1)(b)

12-2 Romex can be used for interior building and attic runs only. Do not use romex in conduit or outdoor environments.

#10 AWG THWN for Home runs
(1) Line 1
(1) Line 2
4 Circuits
(1) EGC
Inside @ least (2) 3/4" Conduit (tbd on site)

WARNING
ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

PHOTOVOLTAIC SYSTEM
! AC DISCONNECT !

RATED AC OUTPUT CURRENT: 55.66A
NOMINAL OPERATING VOLTAGE: 240VAC

#2/0 AWG
(2) L1
(2) L2
(2) Neutral
#6 AWG
(2) Ground
In @ least 2.5"
Conduit

C

Generator
Grid
Load

Existing

Interior Distribution Panel
200A Main

Refer to NEC 312.8 for Conditions on taps in switch and over current devices Enclosures.
If the conditions are not met a tap box will need to be installed and revision completed.

Enphase Combiner Box
#X2-IQ-AM1-240

20A
20A
10A/15A
20A
20A
Envoy-IQ Monitor

Manual Lockable Disconnect
100A Fused Disconnect
70A Fuses

AC Disconnect
Located Adjacent to Utility Meter

B

GENERATOR
Existing

ATS
200 Main
Existing

| Enphase Output Ckt Per String | |
|---|---|
| To Overcurrent Protection Device | |
| AC Max Output Current | 15.73 |
| AC Max Output Current * 125% | 19.7 |
| Overcurrent Protection (A) | 20 |
| No. of Current Carrying Cond | <4 |
| Conductor Gauge (AWG) | 10 |
| **Enphase Total Output Ckt** | |
| AC Max Output Current | 55.66 |
| AC Max Output Current * 125% | 69.6 |
| Overcurrent Protection (A) | 70 |
| No. of Current Carrying Cond | <4 |
| Conductor Gauge (AWG) | 4 |

| | | Conduit (in) | L1,L2,N (Awg) | Ground (Awg) | OCPD |
|---|---|---|---|---|---|
| After Combiner | B | 1 | 4 | 8 | 70 |
| To Load Side Tap | C | 1 | 4 | 6 | 70 |

Including the label below

In Case of Emergency Call
Enlight Energy
at 352-222-0795

Meets 11.12.2.1.5

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 1:11:12

**Customer Info:**

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Inverter Type:
Enphase IQ8PLUS-72-2-US
PV Panel:
(46)
TSM-390DE09C.07
Total Wattage:
**17,940W DC**

## Disconnect

NEC 225
- Disconnect means shall be provided for disconnecting all ungrounded conductors that supply or pass through the building or structure Per Code 2017 NEC Section 225.31 & Section 225.32

NEC 230
- If multiple service disconnects are present, grouping of disconnects will be done per NEC 230.72

NEC 690
- Rapid Shutdown Built in Per Code NEC 690.12
- E04. Construction documents specify PV system circuits installed on or in buildings include a rapid shutdown function that controls specific conductors in accordance with NEC article 690.12.
- E05. These construction documents specify that a label is provided with the method to initiate rapid shut down per 690.12(4).
- E06. Construction drawings specify buildings or structures with both utility service and a PV system, complying with NEC article 690.12 shall have a permanent plaque or directory including the following wording: “PHOTO VOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN” as per NEC article 690.56 (C).
- E07. Construction documents specify PV power circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings, or floors.
- E08. Construction documents specify all warning sign(s) or label(s) shall comply with NEC article 110.21 (B). Label warnings shall adequately warn of the hazard. Labels shall be permanently affixed to the equipment, and Labels required shall be suitable for the environment.

NEC 705
- PV AC disconnect is lockable in the open position per code NEC 705.22(7)
- Photovoltaic AC disconnect shall be capable of being locked in the open position per NEC article 705.22(6).
- Photovoltaic AC Overcurrent protection shall be located within 10 feet of the point where conductors are connected to the service per NEC 705.31.

## Grounding

- In compliance with NEC 250.58, NEC 690.8, NEC 250.24, NEC250.24(D)
- System meets the grounding requirements of NEC 690.43

Grounding Electrode:
- All grounding Electrodes will be at meter or MDP
- Ground Rods to be at least 8' long and 5/8" in diameter per NEC 250.52(A)(5)
- Add supplemental electrode as required
- System meets requirements of NEC250.50

## Fire

- All Exterior equipment is a minimum of Nema-R3 Rated
- Smoke Alarms per F.S. 553.883
- All Electrical Service Equipment shall be located at or above BFE+1' or 8.00' NAVD

## Misc

- Install will be done to Manufacturer Spec
- Service Conductors are Parallel
- No interconnections to be performed on inside panels unless stated by the contractor.
- The Contractor shall Be responsible for verifying all existing conditions, and for conforming with these drawings in the event of any unforeseen circumstances.
- Plans Satisfy NEC 250.94 & NEC250.53(A)(2)

Note:
- Subject PV Systems has been designed to meet the requirments of the NEC 2017, and those set forth by the Florida Solar Energy Center Certification, Including Maximum Number of Module Strings, Maximum number of modules per string, Maximum Output, Module Manufacturer and model number, inverter manufacturer and model number, as applicable.

## Labeling

- Markings shall be placed on all DC Conduits, DC Combiners, Raceways, Enclosures, Junction Boxes, and Cable Assemblies at every 10', turns, and above and below penetrations in compliance with NFPA
- All Interactive System(S) Points of interconnection with other sources shall be marked at an accesible location at the disconnecting means as a power source and with the rated ac output current and the nominal operating AC voltage. Per NEC 690.54
- Labels will be placed in the correct location Per Code NEC 690.56(B), 690.56(C), & 690.53
- Include required label for metallic raceways and conduits per NEC article 690.31(G)(3).
- Add required label per NEC article 705.10.
- Markings Shall Be reflective, Weather Resistant and suitable for the environment.
- Markings Shall be red with white lettering with minimum 3/8" Capital Letters
- NEC 705.10 A permanent plaque or directory, denoting the location of all electric power source disconnecting means on or in the premises, shall be installed at each service equipment location and at the location(s) of the system disconnect(s) for all electric power production sources capable of being interconnected. One sign required for each PV system.

Combiner box in compliance
Per Code NEC 705.12
4* 20A < 125A
*No other loads to be added

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.
SOLAR ELECTRIC PV PANELS

PHOTOVOLTAIC AC DISCONNECT
RATED AC OUTPUT CURRENT: 55.66A
NOMINAL OPERATING AC VOLTAGE 240VAC

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUT DOWN THE ENTIRE PV SYSTEM.
SOLAR ELECTRIC PV PANELS
NEC690.56(C)(1) AND NFPA 111.12.2.1.1.1.1,11.12.2.1.4

PHOTOVOLTAIC POWER SOURCE

WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.13

DO NOT DISCONNECT UNDER LOAD

WARNING
POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

Install will be done to Manufacturer Spec

Apply to Main Disconnect

In Case of Emergency Call
Enlight Energy
at 352-222-0795

Permanent sticker added to disconnect

**Customer Info:**

ANDREW BUERGO
241 NW POMPANO CT
LAKE CITY, FL
32055

## Electrical Calculations

| Inverter Output Ckt To Overcurrent Protection Device with Copper | | |
|---|---|---|
| Design Temperature(F) | 94°F | |
| Max Amb Temp Range(F) | 87-95 | 310.15(B)(2)(a) |
| Temp Rating of Conductors (C) | 75°C | |
| Current Carrying | <4 | 310.15(B)(3)(a) |
| AC Max Output Current | 56A | 690.8(A)(3) |
| AC Max Output Current * 1.25% | 70A | 690.8(B) |
| Overcurrent Protection(A) | 70A | |
| Amp Temp Correction Factor | 0.94 | 310.15(B)(2)(a) |
| Raceway Fill adjustment Factor | 100% | 310.15(B)(3)(a) |
| Wire Size(Awg) | 4 | 310.15(B)(16) |
| Cond. Allowable Ampacity(A) | 85A | |
| Cond Adjusted Ampacity(A) | 80A | 85A*1*0.94=79.9A |
| Ampacity Check 1 Per 690.8(B)(1) | Pass | 55.66A*1.25=70A<85A Pass |
| Ampacity Check 2 Per 690.8(B)(2) | Pass | 85A*0.94A*1=79.9A>55.66A Pass |


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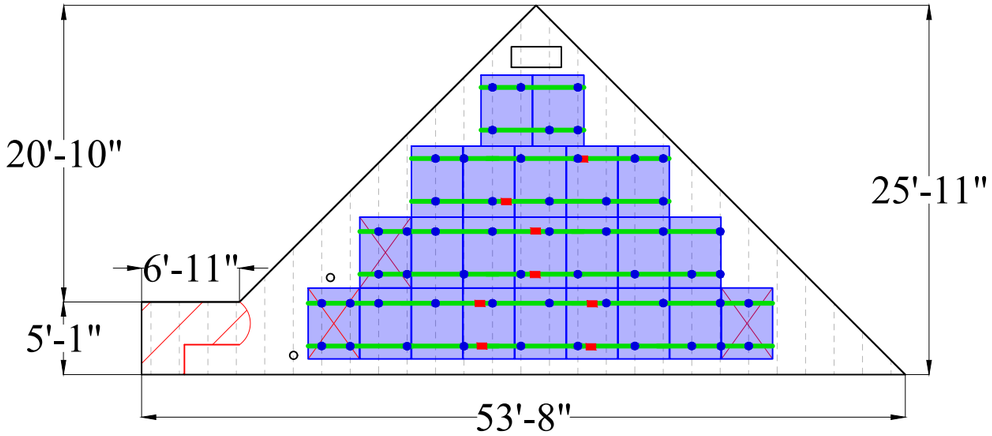
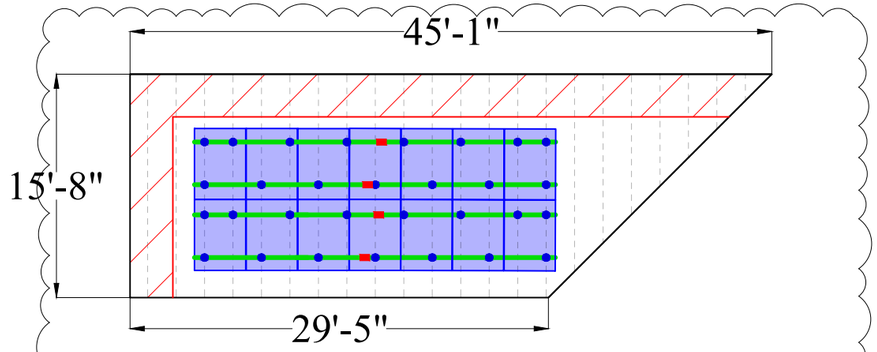
Inverter Type:
Enphase IQ8PLUS-72-2-US
PV Panel:
(46)
TSM-390DE09C.07
Total Wattage:
**17,940W DC**

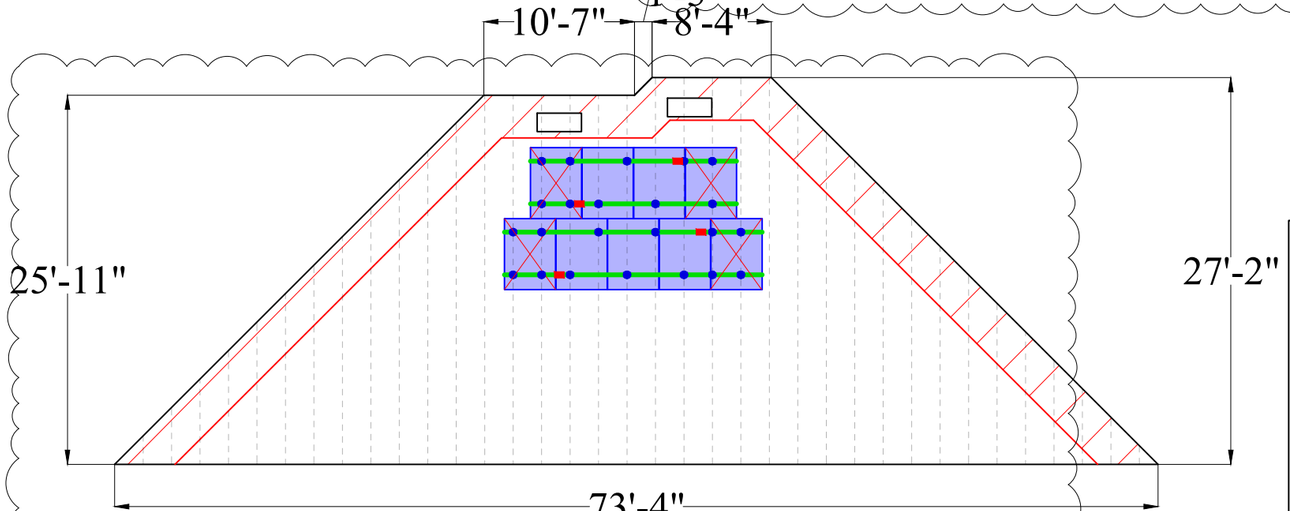
Proposed Mounting locations




R-1
# Modules (23)
Pitch: 30°
Azimuth: 180°




R-2
# Modules (14)
Pitch: 30°
Azimuth: 180°




R-3
# Modules (9)
Pitch: 30°
Azimuth: 270°

Iron Ridge XR-100 Rail

14' — 28

| | |
|---|---|
| 16 | Splice Bar |
| 106 | IronRidge HUG |
| 108 | Iron Ridge UFO's |
| 32 | Iron Ridge Sleeves/End Caps |
| 3 | Roof Top Combiner |
| 8 | Iron Ridge Ground Lugs |
| 46 | TSM-390DE09C.07 |
| 46 | Enphase IQ8PLUS-72-2-US |
| 1 | 100A Fused Disconnect |
| 2 | 70A Fuses |
| 4 | 20A 2P Breakers |
| 1 | Enphase Combiner Box |

Exposed Spacing

Non-Exposed Spacing

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

| Rafter Spans | Zone 1 | Zone 2e | Zone 2r | Zone 3 |
|---|---|---|---|---|
| Exposed | 24" | 24" | 24" | 24" |
| Non-Exposed | 48" | 48" | 24" | 24" |
| Max Cantilever | 19.2" | 19.2" | 9.6" | 9.6" |

Max Cantilever = Max Span * ($\frac{2}{5}$)

Inverter Type: (46)Enphase IQ8PLUS-72-2-US
PV Panel: (46) TSM-390DE09C.07
Racking: Iron Ridge XR-100
Total Wattage: 17,940W DC
Roof Type: Composition Shingle
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Mono Multi Solutions

# Vertex S

**BACKSHEET MONOCRYSTALLINE MODULE**

PRODUCT: TSM-DE09C.07

PRODUCT RANGE: 380-405W

| 405W | 0~+5W | 21.1% |
|---|---|---|
| MAXIMUM POWER OUTPUT | POSITIVE POWER TOLERANCE | MAXIMUM EFFICIENCY |

## High value

- More productivity from same roof size.
- Outstanding visual appearance.
- Leading 210mm cell technology.

## Small in size, big on power

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

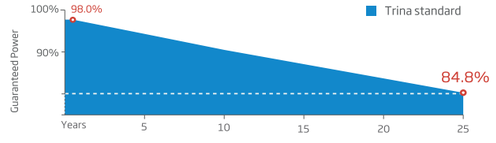
## Universal solution for residential and C&I rooftops

- Designed for compatibility with existing mainstream optimizers, inverters and mounting systems.
- Perfect size and low weight makes handling and transportation easier and more cost-effective.
- Diverse installation solutions for flexibility in system deployment

## High Reliability

- 25 year product warranty.
- 25 year performance warranty with lowest degradation.
- Minimized micro-cracks with innovative non-destructive cutting technology.
- Ensured PID resistance through cell process and module material control.
- Mechanical performance up to +6000 Pa and-4000 Pa negative load

## Trina Solar's Backsheet Performance Warranty



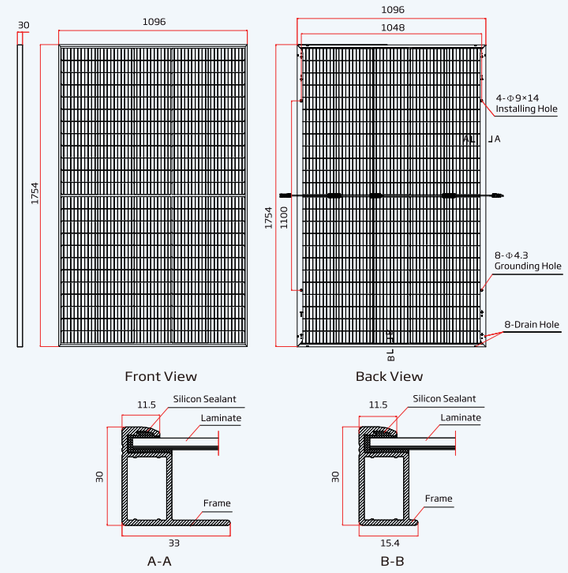

## Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System

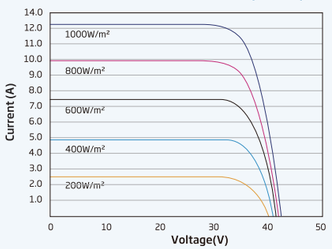
Trinasolar

# Vertex S BACKSHEET MONOCRYSTALLINE MODULE

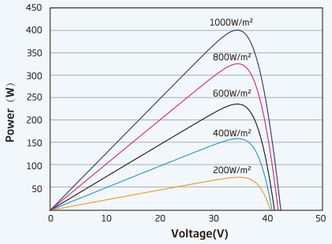
## DIMENSIONS OF PV MODULE(mm)




## I-V CURVES OF PV MODULE(400 W)




## P-V CURVES OF PV MODULE(400W)




## ELECTRICAL DATA (STC)

| Peak Power Watts-PMAX (Wp)* | 380 | 385 | 390 | 395 | 400 | 405 |
|---|---|---|---|---|---|---|
| Power Tolerance-PMAX (W) | 0 ~ +5 | | | | | |
| 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 η m (%) | 19.8 | 20.0 | 20.3 | 20.5 | 20.8 | 21.1 |

STC: Irradiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

### 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) | 10% | | | | | |

Power Bifaciality:70±5%.

## ELECTRICAL DATA (NOCT)

| Maximum Power-PMAX (Wp) | 286 | 290 | 294 | 298 | 302 | 305 |
|---|---|---|---|---|---|---|
| Maximum Power Voltage-VMPP (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 |

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

## MECHANICAL DATA

| Solar Cells | Monocrystalline |
|---|---|
| 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, AR Coated Heat Strengthened Glass |
| Encapsulant material | EVA/POE |
| Backsheet | Transparent backsheet |
| Frame | 30mm(1.18 inches) Anodized Aluminium Alloy |
| J-Box | IP 68 rated |
| Cables | Photovoltaic Technology Cable 4.0mm² (0.006 inches²),<br>Portrait: 350/280 mm(13.78/11.02 inches)<br>Landscape: N 1100 mm /P 1100 mm (43.31/43.31 inches) |
| Connector | MC4 EVO2 / TS4* |

*Please refer to regional datasheet for specified connector.

## TEMPERATURE RATINGS

| NOCT (Nominal Operating Cell Temperature) | 43°C (±2°C) |
|---|---|
| Temperature Coefficient of PMAX | - 0.34%/°C |
| Temperature Coefficient of VOC | - 0.25%/°C |
| Temperature Coefficient of ISC | 0.04%/°C |

## MAXIMUMRATINGS

| Operational Temperature | -40~+85°C |
|---|---|
| Maximum System Voltage | 1500V DC (IEC) |
| | 1500V DC (UL) |
| Max Series Fuse Rating | 25A |

## WARRANTY

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

(Please refer to product warranty for details)

## PACKAGING CONFIGUREATION

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

Trinasolar

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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Version number: TSM_NA_2022_A

www.trinasolar.com

ENPHASE

DATA SHEET

# IQ8 and IQ8+ 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.

Enphase 25 year limited warranty

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.

UL CERTIFIED SAFETY

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

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**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 and IQ8+ Microinverters

| INPUT DATA (DC) | | IQ8-60-2-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 | V | 30 / 48 | 30 / 58 |
| Max input DC voltage | V | 50 | 60 |
| Max DC current[2] [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** |
| Peak output power | VA | 245 | 300 |
| Max continuous output power | VA | 240 | 290 |
| Nominal (L-L) voltage/range[3] | V | 240 / 211 – 264 | |
| Max continuous output current | A | 1.0 | 1.21 |
| Nominal frequency | Hz | 60 | |
| Extended frequency range | Hz | 50 – 68 | |
| Max units per 20 A (L-L) branch circuit[4] | | 16 | 13 |
| 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 |
| CEC weighted efficiency | % | 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 | |
| Acoustic noise at 1 m | | <60 dBA | |
| Pollution degree | | PD3 | |
| Enclosure | | Class II double-insulated, corrosion resistant polymeric enclosure | |
| Environ. category / UV exposure rating | | 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<br><br>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.

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

Data Sheet
Enphase Networking

# IQ Combiner 4/4C

The **IQ Combiner 4/4C** with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It 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.

**X-IQ-AM1-240-4C**
**X2-IQ-AM1-240-4C** (IEEE 1547:2018)

**X-IQ-AM1-240-4**
**X2-IQ-AM1-240-4** (IEEE 1547:2018)

## Smart

- Includes IQ Gateway for communication and control
- Includes 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
- Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

## Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC 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
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

UL LISTED

To learn more about Enphase offerings, visit **enphase.com**
IQ-C-4-4C-DS-0103-EN-US-12-29-2022

ENPHASE

## IQ Combiner 4/4C

| | |
|---|---|
| **MODEL NUMBER** | |
| IQ Combiner 4<br>X-IQ-AM1-240-4<br>X2-IQ-AM1-240-4 (IEEE 1547:2018) | IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat. |
| IQ Combiner 4C<br>X-IQ-AM1-240-4C<br>X2-IQ-AM1-240-4C (IEEE 1547:2018) | IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes 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) | |
| Supported microinverters | IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8) |
| Communications Kit<br>COMMS-CELLMODEM-M1-06<br>CELLMODEM-M1-06-SP-05<br>CELLMODEM-M1-06-AT-05 | <br>- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan<br>- 4G based LTE-M1 cellular modem with 5-year Sprint data plan<br>- 4G based LTE-M1 cellular modem with 5-year AT&T data plan |
| Circuit Breakers<br>BRK-10A-2-240V<br>BRK-15A-2-240V<br>BRK-20A-2P-240V<br>BRK-15A-2P-240V-B<br>BRK-20A-2P-240V-B | Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers.<br>Circuit breaker, 2 pole, 10A, Eaton BR210<br>Circuit breaker, 2 pole, 15A, Eaton BR215<br>Circuit breaker, 2 pole, 20A, Eaton BR220<br>Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support<br>Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support |
| 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) |
| X-IQ-NA-HD-125A | Hold-down kit for Eaton circuit breaker with screws |
| Consumption monitoring CT<br>(CT-200-SPLIT/CT-200-CLAMP) | A pair of 200A split core current transformers |
| **ELECTRICAL SPECIFICATIONS** | |
| Rating | Continuous duty |
| System voltage | 120/240VAC, 60 Hz |
| Eaton BR series busbar rating | 125A |
| Max. continuous current rating | 65A |
| Max. continuous current rating (input from PV/storage) | 64A |
| Max. fuse/circuit rating (output) | 90A |
| 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 |
| IQ Gateway breaker | 10A or 15A rating GE/Siemens/Eaton included |
| Production metering CT | 200A solid core pre-installed and wired to IQ Gateway |
| **MECHANICAL DATA** | |
| Dimensions (WxHxD) | 37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets. |
| Weight | 7.5 kg (16.5 lbs) |
| Ambient temperature range | -40°C to +46°C (-40°F to 115°F) |
| Cooling | Natural convection, plus heat shield |
| Enclosure environmental rating | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction |
| Wire sizes | • 20A to 50A breaker inputs: 14 to 4 AWG copper conductors<br>• 60A breaker branch input: 4 to 1/0 AWG copper conductors<br>• Main lug combined output: 10 to 2/0 AWG copper conductors<br>• Neutral and ground: 14 to 1/0 copper conductors<br>• Always follow local code requirements for conductor sizing. |
| Altitude | Up to 3,000 meters (9,842 feet) |
| **INTERNET CONNECTION OPTIONS** | |
| Integrated Wi-Fi | IEEE 802.11b/g/n |
| Cellular | CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations. |
| Ethernet | Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included) |
| **COMPLIANCE** | |
| Compliance, IQ Combiner | CA Rule 21 (UL 1741-SA)<br>IEEE 1547:2018 - UL 1741-SB, 3rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C)<br>CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003<br>Production metering: ANSI C12.20 accuracy class 0.5 (PV production)<br>Consumption metering: accuracy class 2.5 |
| Compliance, IQ Gateway | UL 60601-1/CANCSA 22.2 No. 61010-1 |

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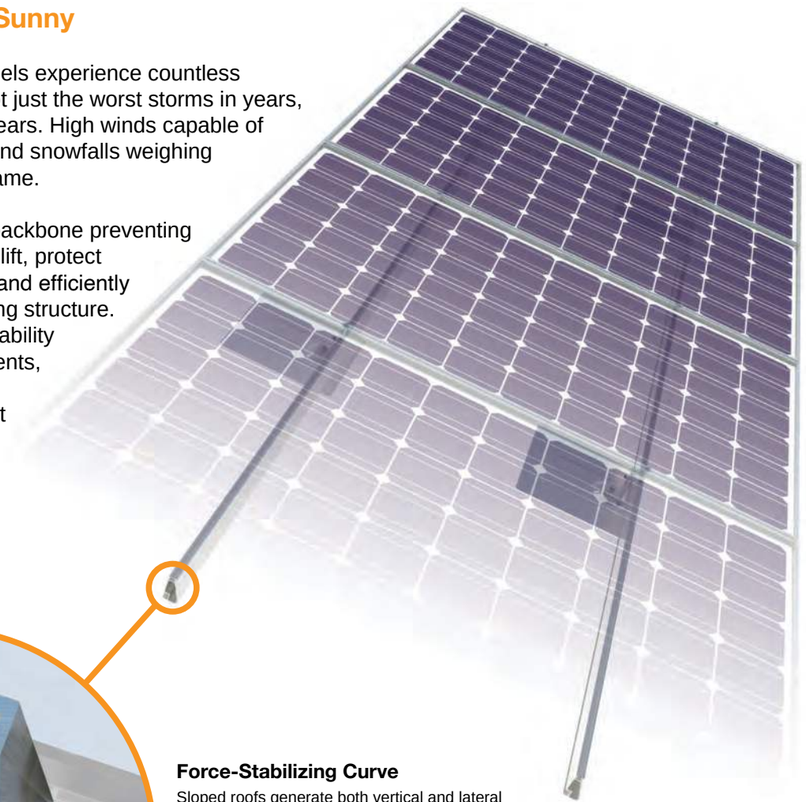
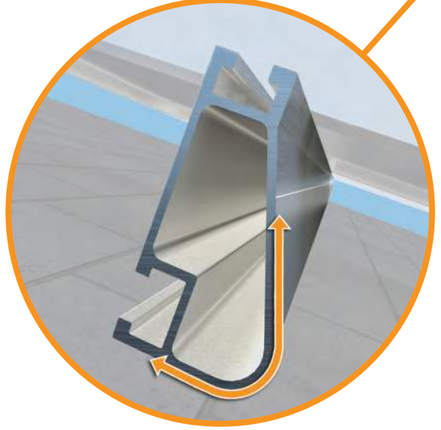
# XR Rail Family

## 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.

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GODWIN ENGINEERING AND DESIGN, LLC

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

November 9, 2023

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

Subject: Buergo - Residential PV Roof Mount Installation
241 NW Pompano Ct
Lake City, FL 32055

To whom it may concern,

This letter is regarding the proposed installation of a rooftop-mounted Solar PV system on the existing residential structure at the subject address. I have reviewed the attachment plan and have determined that the rooftop-mounted PV system is in compliance with the applicable sections of the following Codes as amended and adopted by the jurisdiction when installed in accordance with the manufacturer's installation instructions:

2020 Florida Building Code 7th Edition, FBC
ASCE 7 Min. Design Loads for Buildings & Other Structures
Design Criteria: Design Wind Speed(Vult) - 120 mph 3sec gust, Exposure Category – C, Risk Category II

The rooftop-mounted photovoltaic panel system has been designed in accordance with FRC R324.4. When roof penetrations are necessary, they shall be flashed and sealed in accordance with the manufacture's installation instructions, R905.17.3. The PV system consist of the modules, railing, and connection hardware. Refer to the specific roof type calculation pages for PV dead loads. The portions of the existing structure covered with solar panels will be adequate for supporting the roof loads per R324.4.1.1.

The securement method of the the PV system is to be mounted parallel to the structure with the site specific railing and attachments according to the designed plans. The site specific wind load calculations for the module and their supports are attached with this document. Fasteners shall be installed to the designated roof member with the proper torque from the manufactures installation instructions.

The design wind pressures for rooftop solar panels located on enclosed or partially enclosed buildings of all heights, with panels parallel to the roof surface with a tolerance of 2° and with a max height above the roof surface, $h_2$, not exceeding 10 in. A min gap of 0.25 in shall be provided between all panels with the spacing of gaps between panels not exceeding 6.7 ft. in addition the array shall be located at least $2h_2$ from the roof edge, a gable ridge, or a hip ridge.

It is the contractors responsibility to review all drawings for accuracy and notify the EOR of any discrepancies prior to beginning construction. To the best of my knowledge, the plans and specifications comply with the minimum requirements of the latest Florida Building code.

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

Sincerely,
D. Chad Godwin, PE 81360
Exp. 02/28/2025

Digitally signed by Donnie C Godwin
Date: 2023.11.09 11:41:06 -06'00'

# GODWIN ENGINEERING AND DESIGN, LLC

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


| ***Roof Structure Details*** | | ***Buergo - Residential Calculations Sheet - R1-R3*** |
|---|---|---|
| Roof Angle | 28° to 45° | The securement method of the PV system is to be mounted parallel to the Asphalt Shingle roof with the IR-100 railing and Halo Ultragrip - HUG flashings/attachments. The mounts should be staggered, where possible, to allow distribution of the design loads evenly to the structure. The mounts shall be installed with (2) #14 Self-Dr, QM RD Structural , to Rafter |
| Roof Type | Hip | |
| Roof Covering | Asphalt Shingle | |
| Mean Roof Height | 15 ft | |
| Rafter Spacing | 24 in O.C. | |
| Rafter/Truss Size | 2 x 4 | |

***Wind Load Paramaters***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Wind Speed (asd) | | 93 | mph | FRC R301.2.1.3 | Basic Wind Speed (Ult) | 120 | mph |
| Effective Wind Area | | 20.69 | $ft^2$ | 26.20 | Exposure Cat. | C | B,C, or D |
| Wind Directionality | $K_d$ | 0.85 | | Table 26.6-1 | Elevation | <1000 | ft |
| Topographic factor | $K_{zt}$ | 1.00 | | 26.8 or 26.8.2 | bldg. least hori. dim (typ.) | 360 | in |
| Ground Elevation Factor | $K_e$ | 1.00 | | Table 26.9-1 | Roof Height | 15.00 | ft |
| Velocity Exposure Coefficient | $K_z$ | 0.85 | | Table 26.10-1 | | | |
| Array Edge Factor | $\gamma_E$ | 1.50 | *Exposed* | 29.4.4 | | | |
| Array Edge Factor | $\gamma_E$ | 1.00 | *Non. Exp* | 29.4.4 | | | |
| Solar Panel Equalization Factor | $\gamma_a$ | 0.67 | | Fig. 29.4-8 | | | |
| Velocity Pressure | $q_h$ | 15.98 | psf | $q_h=0.00256\,K_zK_{zt}K_dK_eV^2$ | | | |
| Added Safety Factor | | 1.2 | | | | | |
| Allowable Pullout per mount | | 1004.0 | lbs | | | | |
| 0.4h or 0.6h | | 6.00 | ft | Flat - 0.6h, Gab/Hip - 0.4h | | | |
| 10% of least horizontal dim | | 3.00 | ft | 10% of least hor. Dim. Or 0.4h, whichever is smaller, but not less than either 4% of Least hor. Or 3ft. (flat roof - 0.6h) | | | |
| Roof Zone Set Back | a | 3.00 | ft | | | | |
| | $h_2$ | 5 | in | Not > 10in(panel height above roof) | | | |
| | $2h_2$ | 10 | in | *min distance array shall be from the roof edge, Gable Ridge, or hip ridge | | | |
| | | 0.25 | in | min gap between all panels but not > 6.7ft | | | |
| | d1 | 1.00 | ft | Horizontal distance orthogonal to panel edge | | | |
| | d2 | 0.25 | ft | Horizontal distance from edge of one panel to the nearest edge in the next row | | | |
| | 0.5h | 7.50 | ft | | | | |

**Exposed Module Definition**

Exposed factor = 1.5 for uplift loads on panels that are exposed and within a distance 1.5($L_p$) from the end of a row at an exposed edge of the array. Modules are condidered Exposed if $d_1$ to the roof edge > 0.5h and one of the following applies:

1. $d_1$ to adjacent array > 4ft.
2. $d_2$ to the next adjacent mod > 4ft.

***PV Attachment - Results***

R1-R3 Roof Zones - Hip 28° to 45°

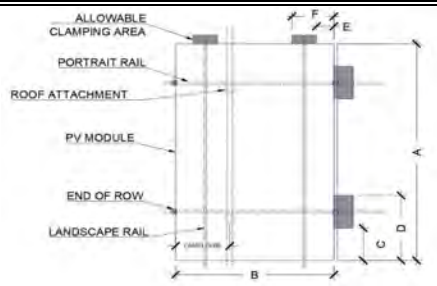
| | 1 | 2e | 2r | 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $GC_p$ - Uplift | -1.4 | -1.5 | -2.1 | -2.1 | | | | | |
| $GC_p$ - Down | 0.7 | 0.7 | 0.7 | 0.7 | | | | | |
| $p = q_h(GC_p)(g_E)(\gamma_a)$Up | -19.8 | -21.4 | -31.1 | -31.1 | | | psf | 29.4-7 | Exposed |
| $p = q_h(GC_p)(g_E)(\gamma_a)$UP | -16.0 | -16.0 | -19.8 | -19.8 | | | psf | 29.4-7 | Non-Exp. |
| $p = q_h(GC_p)(g_E)(\gamma_a)$Down | 16.0 | 16.0 | 16.0 | 16.0 | | | psf | 29.4-7 | Exposed |
| $p = q_h(GC_p)(g_E)(\gamma_a)$Down | 16.0 | 16.0 | 16.0 | 16.0 | | | psf | 29.4-7 | Non-Exp. |
| Point load (Portrait Rails) | -342 | -370 | -537 | -537 | | | lb | $p * A_{eff}$ | Exposed |
| Point load (Portrait Rails) | -276.2 | -276.2 | -342.2 | -342.2 | | | lb | $p * A_{eff}$ | Non-Exp. |
| Point Load (landscape Rails) | -213.8 | -231.3 | -335.8 | -335.8 | | | lb | $p * A_{eff}$ | Exposed |
| Point Load (landscape Rails) | -172.6 | -172.6 | -213.8 | -213.8 | | | lb | $p * A_{eff}$ | Non-Exp. |
| Max Span (Portrait) | 72 | 72 | 72 | 72 | | | in | | Exposed |
| Max Span (Portrait) | 72 | 72 | 72 | 72 | | | in | *** | Non-Exp. |
| Max Span (landscape) | 72 | 72 | ~~72~~ | ~~72~~ | | | in | | Exposed |
| Max Span (landscape) | 72 | 72 | 72 | 72 | | | in | | Non-Exp. |
| Cantilever (Portrait) | 29 | 29 | 29 | 29 | | | in | | Exposed |
| Cantilever (Portrait) | 29 | 29 | 29 | 29 | | | in | Span * 40% | Non-Exp. |
| Cantilever (landscape) | 29 | 29 | 29 | 29 | | | in | | Exposed |
| Cantilever (landscape) | 29 | 29 | 29 | 29 | | | in | | Non-Exp. |

*** Spans with ~~Mark through~~ denote allowable Module pressure rating is exceeded.

***PV Dead Load***

| | | | |
|---|---|---|---|
| QTY of Modules (46 in Portrait, ) | | 46 | |
| Module Area | | 20.69 | $ft^2$ |
| Rail, Clamps, Mounts | | 1 | lb/ft |
| Total Rail Length | | 336 | ft |
| Module | $W_{mod}$ | 46 | lbs |
| Array | $W_{mods}$ | 2130 | lbs |
| Micro/optimizer | $W_{mic}$ | 184 | lbs |
| PV Rail | $W_{PV\ rail}$ | 336 | lbs |
| Total Weight | $W_{total}$ | 2650 | lbs |
| Total Area | $A_T$ | 951.85 | $ft^2$ |
| Dead Load | $D_{PV}$ | 2.78 | psf |
| Weight/attachment | | 25.0 | lbs |

***TSM-DE09C.07 380-405 Module Specifications***




| ***Fastener Allowable Pullout*** | A (ft) | B (ft) | C (in) | D (in) | E (in) | F (in) |
|---|---|---|---|---|---|---|
| **(2) #14 Self-Dr, QM RD Structural** | 5.75 | 3.60 | 9.84 | 13.78 | 0.00 | 7.87 |

| | | |
|---|---|---|
| Diameter | #14 | |
| S.G. | 0.42 | |
| Thread Embedment per | 3 | in |
| # of Fastener | 2 | |
| ***Pullout Value (Source - FL Product Approval)*** | 1004.0 | $lb_f$ |

**Module load ratings (psf)**

| | Ultimate | Allowable( Ult /1.5) | |
|---|---|---|---|
| Load Rating - Snow | 126.0 | 84.0 | Portrait |
| Load Rating - Wind | -84.0 | -56.0 | |
| Load Rating - Snow | 50.4 | 33.6 | Landscape |
| Load Rating - Wind | -37.8 | -25.2 | |

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