
Inverter Type: (26)SolarEdge SE6000H-US
PV Panel: (26) Q.PEAK DUO BLK-G6+/TS 340
Racking: Iron Ridge XR-10
Total Wattage: 8,840W DC
Roof Type: Composition Shingle
Wind Load: 27 to 45 Deg
Fastener Type: Use 5/16" Dia 4" Lags

**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:
-SolarEdge SE6000H-US Inverter located near utility meter
-SolarEdge S440 Optimizers are located on roof behind each module.
-First responder access maintained and from adjacent roof.
-Wire run from array to connection is 60 feet.


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605 W Lumsden Rd,
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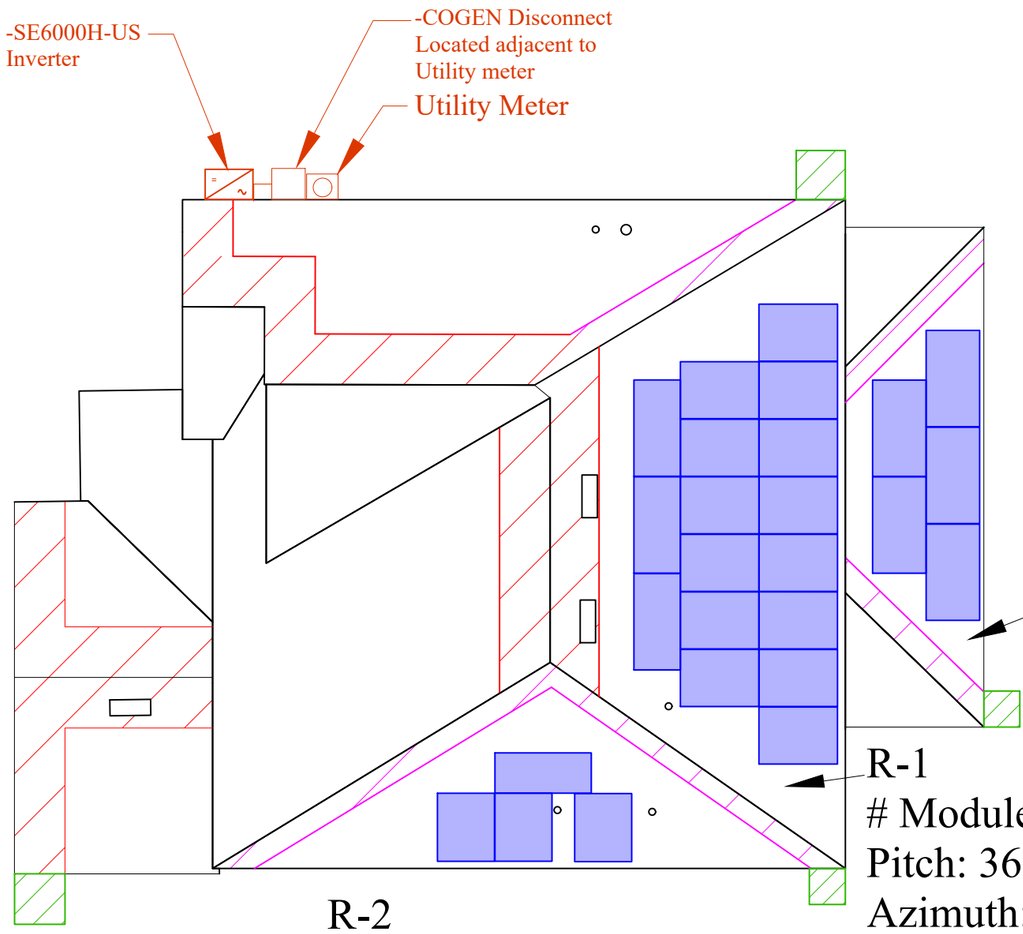
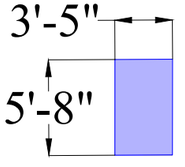
FRONT OF HOUSE




R-3
# Modules (5)
Pitch: 25°
Azimuth: 132°

R-1
# Modules (17)
Pitch: 36°
Azimuth: 132°

R-2
# Modules (4)
Pitch: 36°
Azimuth: 222°




Layout Subject to Change Based on Site Conditions

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

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

Install will be done to Manufacturer Spec

**Legend**

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

Meets All Editions of Florida Fire Prevention Code 2020 7th Edition
Meets all requirements of NFPA-1 7th Edition 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

Meets the requirements of the following- (2020 FL Residential Code & FBC, 7th Edition (2020 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:**

ARSENIO PERRY
415 SW MULBERRY DR
LAKE CITY, FL
32024


Godwin Engineering and Design, LLC
8378 Foxtail Loop
Pensacola, FL 32526
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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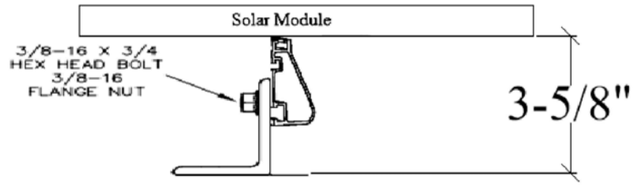
| **Date:** | 4/6/2022 |
| **Drawn by:** | VK |
| **Revised by:** | DC |
| **Rev #:** | 01 |
| **Rev Date:** | 5/27/2022 |
| **Page:** | S-1 |

N
Compass for Aerial

Ironridge XR-10


General Notes: R1-R2
- Flashlocs are secured to roof rafters.
@ 72" O.C. in Zone 1, @ 72" O.C in Zone 2e,
@ 48" O.C. in Zone 2r & @ 48" O.C in Zone 3
using 5/16" x 4" stainless steel Lag bolts.
- Subject roof has One layer.
- All penetrations are sealed and flashed.

General Notes: R3
- Flashlocs are secured to roof rafters.
@ 72" O.C. in Zone 1, @ 48" O.C in Zone 2e,
@ 48" O.C. in Zone 2r & @ 48" O.C in Zone 3
using 5/16" x 4" stainless steel Lag bolts.
- Subject roof has One layer.
- All penetrations are sealed and flashed.

Install will be done to Manufacturer Spec

| Roof Section | Pitch | Roof Rafter and Spacing | Overhang | Notes: |
|---|---|---|---|---|
| R1-R2 | 9/12 | 2"x4" @ 24 O.C. | 12" | Truss |
| R3 | 6/12 | 2"x4" @ 24 O.C. | 12" | Truss |

**-Roof Height 25'**
**-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: (26)SolarEdge SE6000H-US
PV Panel: (26) Q.PEAK DUO BLK-G6+/TS 340
Racking: Iron Ridge XR-10
Total Wattage: 8,840W DC
Roof Type: Composition Shingle
Wind Load: 27 to 45 Deg
Fastener Type: Use 5/16" Dia 4" Lags

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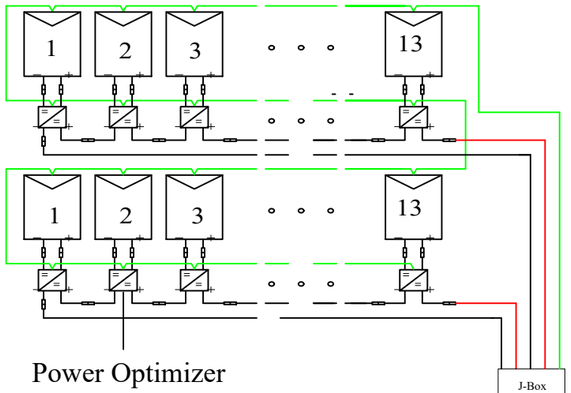



Equipment list

PV:
(26) Q.PEAK DUO BLK-G6+/TS 340

(26) SolarEdge Power Optimizer S440
(2) strings of (13)

Inverter:
(1) SolarEdge SE6000H-US
SolarEdge AC/DC Safety Switch

AC Disconnect:
60A Fused Disconnect

All wiring to meet the 2017 NEC and 2018 Energy Code

PHOTOVOLTAIC SYSTEM DC DISCONNECT
MAX CIRCUIT CURRENT:16.5A
MAX POWER POINT VOLTAGE: 380 VDC
MAX SYSTEM VOLTAGE: 480 DC
MAX RATED OUTPUT CURRENT: 15A

Apply to DC disconnect/inverter

WARNING
ELECTRIC SHOCK HAZARD

THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

Apply to each J box, combiner box, disconnect,and device where energized, ungrounded circuits maybe exposed during service.

! WARNING !

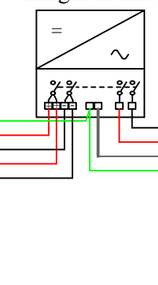
POWER SOURCE OUTPUT CONNECTION: DO NOT RELOCATE THIS OVERCURRENT DEVICE

PHOTOVOLTAIC SYSTEM
! AC DISCONNECT !

RATED AC OUTPUT CURRENT: 25A
NOMINAL OPERATING VOLTAGE: 240VAC

(4) #10 AWG Wire
(1) #8 EGC
In 3/4" Metal Conduit

SolarEdge Inverter
SE6000H-US
w/ Integrated Disconnect



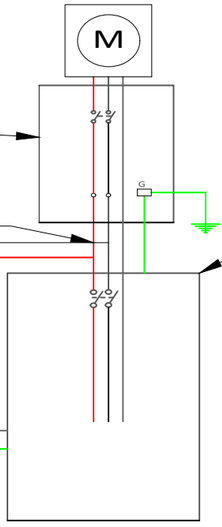

B

Utility PV AC Disco
Manual Lockable Disconnect

60A Fused Disconnect
40A Fuses

Located Adjacent to Utility Meter

C




**Main Service**
200A
200A Bus

Load side tap

**Distribution Panel**
200A Bus

| Inverter Output Ckt | |
|---|---|
| To Overcurrent Protection Device | |
| AC Max Output Current | 25.0 |
| AC Max Output Current * 125% | 31.3 |
| Overcurrent Protection (A) | 40 |
| No. of Current Carrying Cond | <4 |
| Conductor Gauge (AWG) | 8 |

| | | Conduit(in) | L1,L2,N (Awg) | Ground (Awg) | OCPD |
|---|---|---|---|---|---|
| After Inverter | B | 0.75 | 8 | 8 | 40 |
| To Line Side Tap | C | 0.75 | 6 | N/A | 40 |

Load side connection Per 705.12(B)(2)(3)(b)
Use Matching or equivalent approved breaker if derating

| Load Side Connection | |
|---|---|
| Busbar Rating | 200 |
| Main Breaker Size | 200 |
| Bus Rating *1.2-Main Break Size | 40 |
| Max Allowable Load Side | 40 |
| Load Side Breaker Size | 40 |

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AC/DC Solar LLC

605 W Lumsden Rd,
Brandon, FL 33511
855-577-7999

Including the label below

In Case of Emergency Call
ACDC Solar LLC
at 855-577-7999

Meets 11.12.2.1.5

Note:
-All wiring to meet the 2017 NEC and Florida electric codes.
60A 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:**

ARSENIO PERRY
415 SW MULBERRY DR
LAKE CITY, FL
32024

| | |
|---|---|
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| **Drawn by:** | VK |
| **Revised by:** | . |
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| **Page:** | E-1 |

Inverter Type:
SolarEdge SE6000H-US
PV Panel:
(26)
Q.PEAK DUO BLK-G6+/TS 340
Total Wattage:
**8,840W DC**

System meets the grounding requirements of NEC 690.43

The Placard shall be permanently riveted..., and shall be made of red, weatherproof, hard plastic, with engraved white block lettering.

-A placard will be added with instructions and locations to be in compliance with 690.12, 690.56(B) and NEC 705.10

Rapid Shutdown Built in Per Code NEC 690.12

In compliance with NEC 250.58, NEC 690.8, NEC 250.24, NEC250.24(D)

PV AC disconnect is lockable in the open position per code NEC 705.22(7)

Conductors have a min ampacity of 60 amperes Per Code NEC 230.79(D)

Everything will be built to Code without all Specifics labeled on plan

System is in complaince with FFPC 1:11.12 7th Edition.

Smoke Detectors will be added as per FBC 553.883

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

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

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.I2 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.

| Inverter Output Ckt To Overcurrent Protection Device | | |
|---|---|---|
| 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 | 25A | 690.8(A)(3) |
| AC Max Output Current * 1.25% | 31A | 690.8(B) |
| Overcurrent Protection(A) | 40A | |
| Amp Temp Correction Factor | 0.94 | 310.15(B)(2)(a) |
| Raceway Fill adjustment Factor | 100% | 310.15(B)(3)(a) |
| Wire Size(Awg) | 8 | 310.15(B)(16) |
| Cond. Allowable Ampacity(A) | 50A | |
| Cond Adjusted Ampacity(A) | 47A | 50A*1*0.94=47A |
| Ampacity Check 1 Per 690.8(B)(1) | Pass | 25A*1.25=40A<50A Pass |
| Ampacity Check 2 Per 690.8(B)(2) | Pass | 50A*0.94A*1=47A>25A Pass |

All Exterior equipment is A minimum of Nema-R3 Rated

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

Disconnect is in compliance 230.72

Supply side disconnect adjacent to Msp

Over Current Protection Device is "Next size up" Based on Inverter Maximum Continuous Output Current Rating **2017** NEC 240.4(B)

-All new equipment located adjacent to Meter on exterior wall

Labels will be placed in the correct location Per Code NEC 690.56(B), 690.56(C), & 690.53

Smoke Alarms per F.S. 553.883

Include required label for metallic raceways and conduits to sheet E-1 per NEC article 690.31(G)(3).

Add required label to sheet E-1 per NEC article 705.10.

Include required label to sheet E-1 per NEC article 705.12(B)

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.

| PV Source Ckt | | |
|---|---|---|
| Distance above roof | ½ in. -3 ½ in. | 310.15(B) |
| Amb. Temp. Adder for Rooftops (°F) | 40 | |
| Design temperature (°F) | 136.8 | |
| Adjusted Temp. Range for Roof | 132-140 | 310.15(B)(2)(a) |
| Temp. Rating of Conductor | 90°C | |
| No. of Current Carrying Cond. | 4-6 | 310.15(B)(3)(a) |
| Max Source Circuit Current | 15 | 690.8(A)(5) |
| Max Source Circuit Current * 1.25% | 18.8 | 690.8(B)(1) |
| Amb. Temp Correction Factor | 0.71 | 310.15(B)(2)(a) |
| Raceway Fill Adjustment Factor | 80% | 310.15(B)(3)(a) |
| Cond. Gauge (AWG) | 10 | 310.15(B)(16) |
| Cond. Allowable Ampacity (Amps) | 40 | |
| Cond. Adjusted Ampacity (Amps) | 23 | 40*.71*.8=22.7 |

In compliance with 230.71

DC to DC Converter Current Per String - 15A

Permanent sticker added to disconnect

In Case of Emergency Call
ACDC Solar LLC
at 855-577-7999

← Apply to Main Disconnect

-All Electrical Service Equipment shall be located at or above BFE+1' or 8.00' NAVD

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

-Markings Shall Be reflective, Weather Resistant and suitable for the environment.
-Markings Shall be red with white lettering with minimum ⅜" Capital Letters

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.

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.

WARNING:PHOTOVOLTAIC POWER SOURCE

DO NOT OPEN UNDER LOAD

WARNING
THIS SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM

705.12(B)(3)

WARNING
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

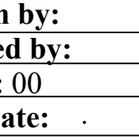
705.12(B)(2)(3)(b)

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.




WARNING
PHOTOVOLTAIC POWER SOURCE

NEC 690.31 (G)(3)

Figure 690.56(C)(1)(a) Label for PV Systems that Shut down the array and the conductors leaving the array

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

WARNING:
INVERTER OUTPUT CONNECTION: DO NOT RELOCATE THIS OVERCURRENT DEVICE

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

WARNING:
DEDICATED SOLAR PANEL DO NOT CONNECT ANY OTHER LOADS

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN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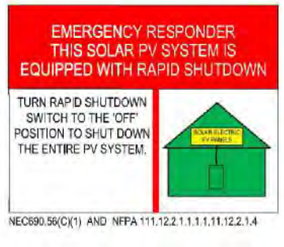
Total Wattage:
**8,840W DC**





NEC 690.35

Install will be done to Manufacturer Spec

Plans Satisfy NEC 250.94 & NEC250.53(A)(2)

Including the label below

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ACDC Solar LLC
at 855-577-7999

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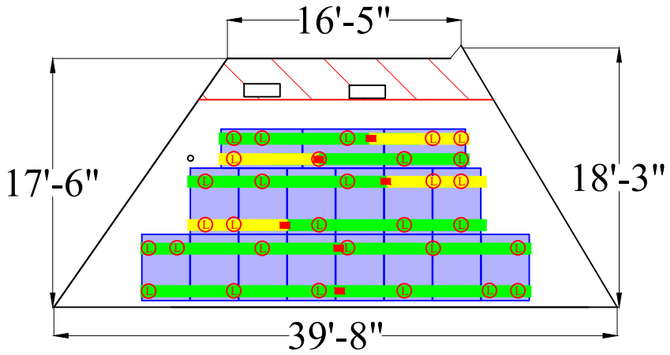
415 SW MULBERRY DR
LAKE CITY, FL
32024

Proposed Mounting locations

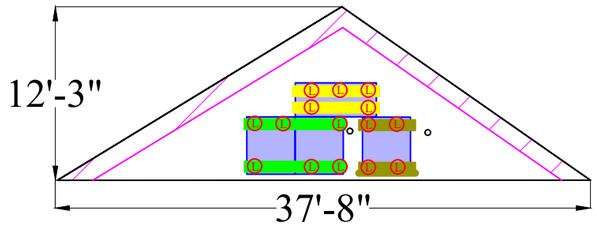
Iron Ridge XR-10 Rail

14' — 19
7'
4'

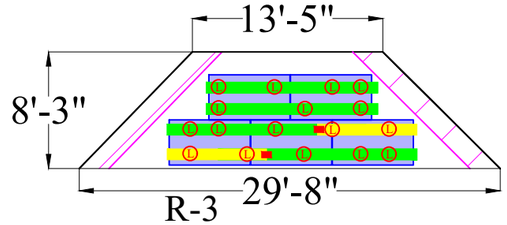
8 Splice Bar
63 Unirac Flashloc
68 Iron Ridge UFO's
32 Iron Ridge Sleeves/End Caps
3 Roof Top Combiner
8 Iron Ridge Ground Lugs
26 Q.PEAK DUO BLK-G6+/TS 340
1 SolarEdge SE6000H-US
1 60A Fused Disconnect
2 40A Fuses
26 SolarEdge S440 Optimizers




R-1
# Modules (21)
Pitch: 36°
Azimuth: 132°




R-2
# Modules (5)
Pitch: 36°
Azimuth: 222°




R-3
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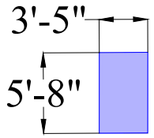


Plans satisfy zones FBC-1510.7.1
Install will be done to Manufacturer Spec

## R1-R2

Zone 1: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (⅓)=72"*(⅓)=24"

Zone 2e: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (⅓)=72"*(⅓)=24"

Zone 2r: Max cantilever is 16" as per manufacturer spec.
Max Cantilever = Max Span * (⅓)=48"*(⅓)=16"

Zone 3: Max cantilever is 16" as per manufacturer spec.
Max Cantilever = Max Span * (⅓)=48"*(⅓)=16"

## R3

Zone 1: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (⅓)=72"*(⅓)=24"

Zone 2e, 2r & 3e: Max cantilever is 16" as per manufacturer spec.
Max Cantilever = Max Span * (⅓)=48"*(⅓)=16"

| | |
|---|---|
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| PV Panel: | (26) Q.PEAK DUO BLK-G6+/TS 340 |
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powered by Q.ANTUM DUO

# Q.PEAK DUO BLK-G6+ / TS

## 330-345

ENDURING HIGH PERFORMANCE

### Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.5%.

### INNOVATIVE ALL-WEATHER TECHNOLOGY

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

### ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID and Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

### ZEP COMPATIBLE™ FRAME DESIGN

High-tech black Zep Compatible™ frame, for improved aesthetics, easy installation and increased safety.

### A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty[2].

### STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (–1500 V, 168 h)
[2] See data sheet on rear for further information

### THE IDEAL SOLUTION FOR:

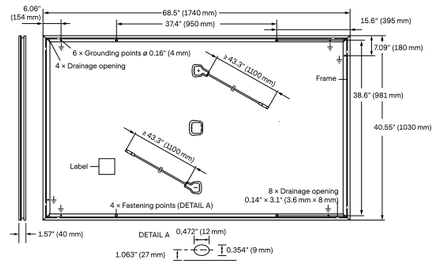
Rooftop arrays on commercial and industrial buildings

Engineered in Germany

Q CELLS

## MECHANICAL SPECIFICATION

| | |
|---|---|
| Format | 68.5 × 40.6 × 1.57 in (including frame) (1740 × 1030 × 40 mm) |
| Weight | 47.4 lbs (21.5 kg) |
| Front Cover | 0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology |
| Back Cover | Composite film |
| Frame | Black anodized aluminum |
| Cell | 6 × 20 monocrystalline Q.ANTUM solar half cells |
| Junction Box | 2.09-3.98 × 1.26-2.36 × 0.59-0.71 in (53-101 × 32-60 × 15-18 mm), Protection class IP67, with bypass diodes |
| Cable | 4 mm² Solar cable; (+) ≥ 43.3 in (1100 mm), (–) ≥ 43.3 in (1100 mm) |
| Connector | Stäubli MC4; IP68 |

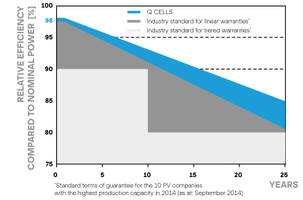



## ELECTRICAL CHARACTERISTICS

| POWER CLASS | | | | 330 | 335 | 340 | 345 |
|---|---|---|---|---|---|---|---|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W) | | | | | | | |
| Minimum | Power at MPP[1] | $P_{MPP}$ | [W] | 330 | 335 | 340 | 345 |
| | Short Circuit Current[1] | $I_{SC}$ | [A] | 10.41 | 10.47 | 10.52 | 10.58 |
| | Open Circuit Voltage[1] | $V_{OC}$ | [V] | 40.15 | 40.41 | 40.66 | 40.92 |
| | Current at MPP | $I_{MPP}$ | [A] | 9.91 | 9.97 | 10.02 | 10.07 |
| | Voltage at MPP | $V_{MPP}$ | [V] | 33.29 | 33.62 | 33.94 | 34.25 |
| | Efficiency[1] | η | [%] | ≥18.4 | ≥18.7 | ≥19.0 | ≥19.3 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2] | | | | | | | |
| Minimum | Power at MPP | $P_{MPP}$ | [W] | 247.0 | 250.7 | 254.5 | 258.2 |
| | Short Circuit Current | $I_{SC}$ | [A] | 8.39 | 8.43 | 8.48 | 8.52 |
| | Open Circuit Voltage | $V_{OC}$ | [V] | 37.86 | 38.10 | 38.34 | 38.59 |
| | Current at MPP | $I_{MPP}$ | [A] | 7.80 | 7.84 | 7.89 | 7.93 |
| | Voltage at MPP | $V_{MPP}$ | [V] | 31.66 | 31.97 | 32.27 | 32.57 |

[1] Measurement tolerances $P_{MPP}$ ±3%; $I_{SC}$; $V_{OC}$ ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

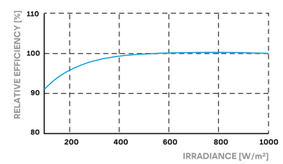
### Q CELLS PERFORMANCE WARRANTY




At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organization of your respective country.

### PERFORMANCE AT LOW IRRADIANCE




Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

| TEMPERATURE COEFFICIENTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Temperature Coefficient of $I_{SC}$ | α | [%/K] | +0.04 | Temperature Coefficient of $V_{OC}$ | β | [%/K] | –0.27 |
| Temperature Coefficient of $P_{MPP}$ | γ | [%/K] | –0.36 | Nominal Module Operating Temperature | NMOT | [°F] | 109±5.4 (43±3 °C) |

## PROPERTIES FOR SYSTEM DESIGN

| | | | | |
|---|---|---|---|---|
| Maximum System Voltage $V_{SYS}$ | [V] | 1000 (IEC) / 1000 (UL) | PV module classification | Class II |
| Maximum Series Fuse Rating | [A DC] | 20 | Fire Rating based on ANSI / UL 61730 | TYPE 2 |
| Max. Design Load, Push / Pull (UL)[3] | [lbs / ft²] | 50 (2400 Pa) / 50 (2400 Pa) | Permitted Module Temperature on Continuous Duty | –40 °F up to +185 °F (–40 °C up to +85 °C) |
| Max. Test Load, Push / Pull (UL)[3] | [lbs / ft²] | 75 (3600 Pa) / 75 (3600 Pa) | | |

[3] See Installation Manual

## QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
IEC 61215:2016,
IEC 61730:2016,
U.S. Patent No. 9,893,215 (solar cells)

**Note:** Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

**Hanwha Q CELLS America Inc.**
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748 59 96 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.us

# Single Phase Inverter with HD-Wave Technology

## for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

12-25 YEAR WARRANTY

INVERTERS


## Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

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# Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

| | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|---|---|---|---|---|---|---|---|---|
| **OUTPUT** | | | | | | | | |
| Rated AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | VA |
| Maximum AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | VA |
| AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Vac |
| AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229) | - | ✓ | - | ✓ | - | - | ✓ | Vac |
| AC Frequency (Nominal) | 59.3 - 60 - 60.5[1] | | | | | | | Hz |
| Maximum Continuous Output Current @240V | 12.5 | 16 | 21 | 25 | 32 | 42 | 47.5 | A |
| Maximum Continuous Output Current @208V | - | 16 | - | 24 | - | - | 48.5 | A |
| GFDI Threshold | 1 | | | | | | | A |
| Utility Monitoring, Islanding Protection, Country Configurable Thresholds | Yes | | | | | | | |
| **INPUT** | | | | | | | | |
| Maximum DC Power @240V | 4650 | 5900 | 7750 | 9300 | 11800 | 15500 | 17650 | W |
| Maximum DC Power @208V | - | 5100 | - | 7750 | - | - | 15500 | W |
| Transformer-less, Ungrounded | Yes | | | | | | | |
| Maximum Input Voltage | 480 | | | | | | | Vdc |
| Nominal DC Input Voltage | 380 | | | | 400 | | | Vdc |
| Maximum Input Current @240V[2] | 8.5 | 10.5 | 13.5 | 16.5 | 20 | 27 | 30.5 | Adc |
| Maximum Input Current @208V[2] | - | 9 | - | 13.5 | - | - | 27 | Adc |
| Max. Input Short Circuit Current | 45 | | | | | | | Adc |
| Reverse-Polarity Protection | Yes | | | | | | | |
| Ground-Fault Isolation Detection | 600kΩ Sensitivity | | | | | | | |
| Maximum Inverter Efficiency | 99 | 99.2 | | | | | | % |
| CEC Weighted Efficiency | 99 | | | | | | 99 @ 240V<br>98.5 @ 208V | % |
| Nighttime Power Consumption | < 2.5 | | | | | | | W |
| **ADDITIONAL FEATURES** | | | | | | | | |
| Supported Communication Interfaces | RS485, Ethernet, ZigBee (optional), Cellular (optional) | | | | | | | |
| Revenue Grade Data, ANSI C12.20 | Optional[3] | | | | | | | |
| Rapid Shutdown - NEC 2014 and 2017 690.12 | Automatic Rapid Shutdown upon AC Grid Disconnect | | | | | | | |
| **STANDARD COMPLIANCE** | | | | | | | | |
| Safety | UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07 | | | | | | | |
| Grid Connection Standards | IEEE1547, Rule 21, Rule 14 (HI) | | | | | | | |
| Emissions | FCC Part 15 Class B | | | | | | | |
| **INSTALLATION SPECIFICATIONS** | | | | | | | | |
| AC Output Conduit Size / AWG Range | 3/4" minimum / 14-6 AWG | | | | | 3/4" minimum /14-4 AWG | | |
| DC Input Conduit Size / # of Strings / AWG Range | 3/4" minimum / 1-2 strings / 14-6 AWG | | | | | 3/4" minimum / 1-3 strings / 14-6 AWG | | |
| Dimensions with Safety Switch (HxWxD) | 17.7 x 14.6 x 6.8 / 450 x 370 x 174 | | | | | 21.3 x 14.6 x 7.3 / 540 x 370 x 185 | | in / mm |
| Weight with Safety Switch | 22 / 10 | | 25.1 / 11.4 | 26.2 / 11.9 | | 38.8 / 17.6 | | lb / kg |
| Noise | < 25 | | | | <50 | | | dBA |
| Cooling | Natural Convection | | | | | | | |
| Operating Temperature Range | -40 to +140 / -25 to +60[4] (-40°F / -40°C option)[5] | | | | | | | °F / °C |
| Protection Rating | NEMA 4X (Inverter with Safety Switch) | | | | | | | |

[1] For other regional settings please contact SolarEdge support
[2] A higher current source may be used; the inverter will limit its input current to the values stated
[3] Revenue grade inverter P/N: SExxxxH-US000NNC2
[4] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[5] -40 version P/N: SExxxxH-US000NNU4



RoHS

# Power Optimizer
## For Residential Installations

S440, S500


POWER OPTIMIZER

## Enabling PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules

* Functionality subject to inverter model and firmware version

solaredge.com

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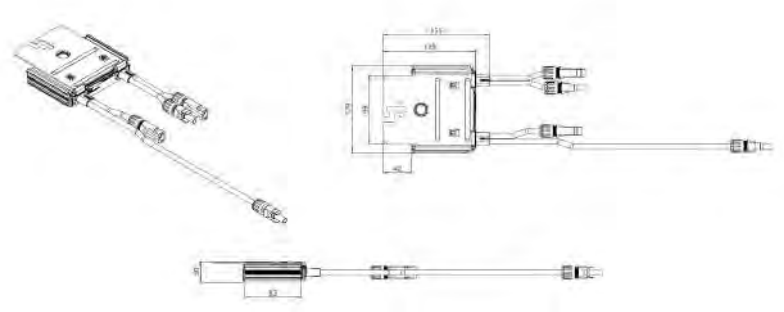
# Power Optimizer
## For Residential Installations
S440, S500

| | S440 | S500 | UNIT |
|---|---|---|---|
| Rated Input DC Power(1) | 440 | 500 | W |
| Absolute Maximum Input Voltage (Voc) | 60 | | Vdc |
| MPPT Operating Range | 8 - 60 | | Vdc |
| Maximum Short Circuit Current (Isc) of Connected PV Module | 14.5 | 15 | Adc |
| Maximum Efficiency | 99.5 | | % |
| Weighted Efficiency | 98.6 | | % |
| Overvoltage Category | II | | |
| **OUTPUT DURING OPERATION** | | | |
| Maximum Output Current | 15 | | Adc |
| Maximum Output Voltage | 60 | | Vdc |
| **OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)** | | | |
| Safety Output Voltage per Power Optimizer | 1 | | Vdc |
| **STANDARD COMPLIANCE** | | | |
| EMC | FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011 | | |
| Safety | IEC62109-1 (class II safety), UL1741 | | |
| Material | UL94 V-0, UV Resistant | | |
| RoHS | Yes | | |
| Fire Safety | VDE-AR-E 2100-712:2013-05 | | |
| **INSTALLATION SPECIFICATIONS** | | | |
| Maximum Allowed System Voltage | 1000 | | Vdc |
| Dimensions (W x L x H) | 129 x 155 x 30 | | mm |
| Weight (including cables) | 655 / 1.5 | | gr / lb |
| Input Connector | MC4(2) | | |
| Input Wire Length | 0.1 | | m |
| Output Connector | MC4 | | |
| Output Wire Length | (+) 2.3, (-) 0.10 | | m |
| Operating Temperature Range(3) | -40 to +85 | | °C |
| Protection Rating | IP68 / NEMA6P | | |
| Relative Humidity | 0 - 100 | | % |

(1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

| PV System Design Using a SolarEdge Inverter | | Single Phase HD-Wave | Three Phase | Three Phase for 277/480V Grid | |
|---|---|---|---|---|---|
| Minimum String Length (Power Optimizers) | S440, S500 | 8 | 16 | 18 | |
| Maximum String Length (Power Optimizers) | | 25 | 50 | | |
| Maximum Nominal Power per String(4) | | 5700 | 11250(5) | 12750(6) | W |
| Parallel Strings of Different Lengths or Orientations | | Yes | | | |

(4) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(5) For the 230/400V grid: it is allowed to install up to 13,500W per string when the maximum power difference between each string is 2,000W
(6) For the 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W
(7) It is not allowed to mix S-series and P-series Power Optimizers in new installations





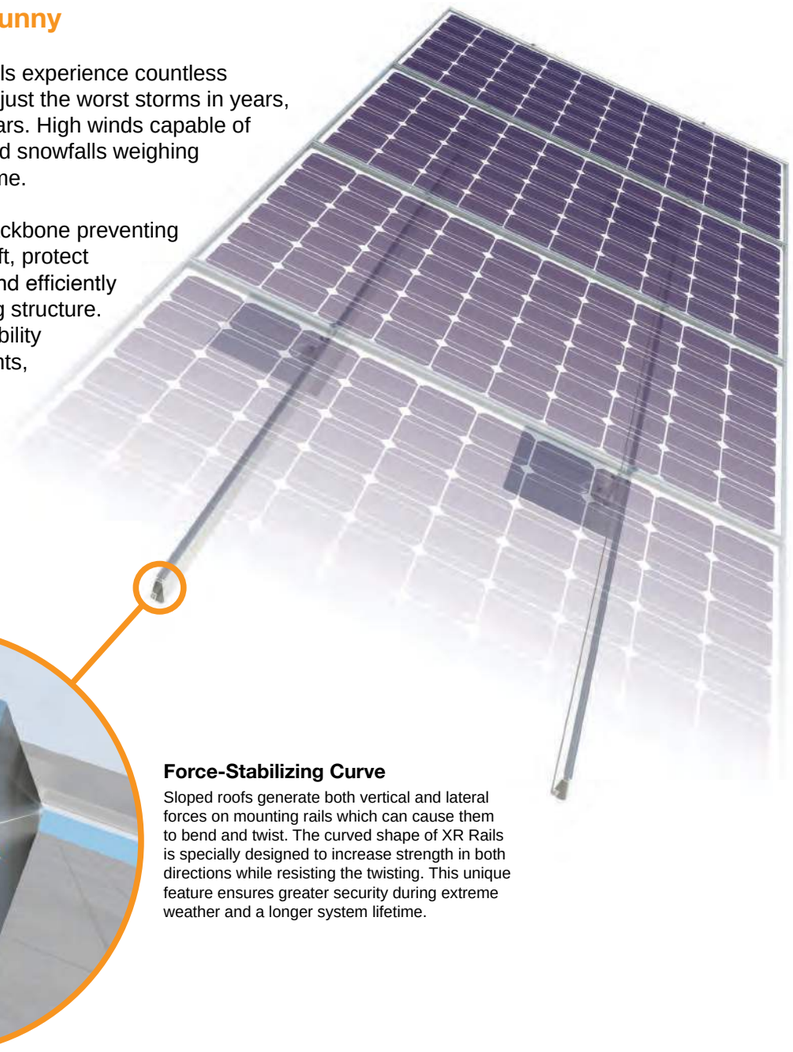
CE RoHS

# 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


April 8, 2022

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

Re: Perry – Residential PV Roof Mount Installation
415 SW Mulberry Dr.
Lake City, FL 32024

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 Iron ridge railing and flashings/attachments. The attachments can be attached up to 72" apart in roof zones 1, & 2e, and 48" apart in roof zones 2r, & 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" x 4" 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 2022.05.3 15:08:05 1 '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(Gable,Hip,Flat h<60ft, 0°<θ<45°)

### *Wind Load Parameters - Inputs*

| | | | |
|---|---|---|---|
| Risk Category | | II | Table 1.5-1 |
| Basic Wind Speed (Ult) | | 120 mph | Figure 26.5-1B |
| Roof Angle | | 28° to 45° | |
| Roof Type | | Hip | |
| Exposure Cat. | B,C, or D | C | Section 26.7 |
| Mean Roof Height | h | 25.00 ft | |
| Roof attachment | | 5/16" x 4" Lag Screw | |
| Rafter/Truss Spacing | | 24 in O.C. | |
| No. of Rails | | 2 | |
| No. of Modules - Portrait | | 26 | |
| No. of Modules - Landscape | | 0 | |
| Module Model Number | | Q.Peak DUO BLK-G6+ / TS | |
| bldg. least horizontal dim (typ.) | | 180 Dimensions, LxWxH (in) | |
| Elevation | | <1000 ft | |
| Est. # of attachment points | | 44 | |

### Wind Load Paramaters

| | | | | |
|---|---|---|---|---|
| Wind Speed (asd) | | 93 | mph | FRC R301.2.1.3 |
| Effective Wind Area | | 19.31 | $ft^2$ | 26.20 |
| Wind Directionality | $K_d$ | 0.85 | | Table 26.6-1 |
| 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 | $K_z$ | 0.94 | | Table 26.10-1 |
| Array Edge Factor | $\gamma_E$ | 1.50 | | 29.4.4 *Modules are considered Exposed |
| Solar Panel Equalization Factor | $\gamma_a$ | 0.69 | | Fig. 29.4-8 |
| Velocity Pressure | $q_h$ | 17.67 | psf | $q_h=0.00256\ K_z K_{zt} K_d K_e V^2$ |
| Added Safety Factor | | 1.2 | | |
| Allowable Pullout per mount | | 709.6 | lbs | |
| 0.4h or 0.6h | | 10.00 | ft | Flat - 0.6h, Gable, Hip - 0.4h |
| 10% of least horizontal dim | | 1.50 | 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 | 12.50 | ft | *modules are considered exposed that are within 1.5Lp from roof edge |

### *PV Dead Load*

| | | | |
|---|---|---|---|
| # of Modules | | 26 | |
| Module | $W_{mod}$ | 47 | lbs |
| Array | $W_{mods}$ | 1232 | lbs |
| Micro/optimizer | $W_{mic}$ | 104 | lbs |
| PV Rail | $W_{PV\ rail}$ | 19 | lbs |
| Total Weight | $W_{total}$ | 1355 | lbs |
| Total Area | $A_T$ | 502.14 | $ft^2$ |
| Dead Load | $D_{PV}$ | 2.70 | psf |
| Weight/attachment | | 30.8 | lbs |

### *Module and Racking Specs*

| | | |
|---|---|---|
| Dimensions, LxWxH (in) | 68.5 x 40.6 x 1.57 | |
| Width | 3.38 | ft |
| Length | 5.71 | ft |
| Module Area | 19.31 | $ft^2$ |

Module load ratings

| | Ultimate | Allowable |
|---|---|---|
| Load Rating - Snow(psf) | 113.4 | 75.6 |
| Load Rating - Wind(psf) | -113.4 | -75.6 |

### *PV Attachment - Results*

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 | | | | |
| $p = q_h(GC_p)(\gamma_E)(\gamma_a)$ | -22.7 | -24.6 | -35.5 | -35.5 | | | psf | 29.4-7 |
| $p = q_h(GC_p)(\gamma_E)(\gamma_a)$ | 12.7 | 12.7 | 12.7 | 12.7 | | | psf | 29.4-7 |
| Max Allowable Span | 6 | 6 | 4 | 4 | | | ft | *notes |
| Max Cantilever (in) | 24 | 24 | 16 | 16 | | | Max span * 33% (in) | |

### Notes

*Eq.1* Point Load = Roof Zone psf * TA

*Eq.2* TA = (Module Length /2) * Max Span

*Eq.3* *Max span Equation, SF = Allowable pullout / Point Load

*Eq.4* Max Span = Allowable Pullout / (SF * Roof Zone psf * L/2)

*a)* The Max span between attachment points must not exceed the rail spans provided by racking manufacture.

*b)* Allowable Module load ratings are determined by SF = 1.5

Donnie C Godwin 2022.05.31 15:08:19 '00'05-

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