



Inverter Type: Enphase IQ8A-72-2-US
PV Panel: (44) REC395AA BLK
Racking: Iron Ridge XR-100
Total Wattage: 17,380W
Roof Type: Composition Shingle
Wind Load: 21 to 27 Deg
Fastener Type: Use 5/16" Dia 4.75" 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:
-Enphase IQ8A-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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Orange City, FL 32763
386-218-6930


Legend


 Ground Access


 Utility Meter


 PV Disconnect

 3' First responder access


 1'-6"

 Chimney

 Satellite

 Vent Pipe

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

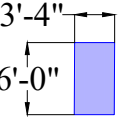
1st Responder Access minimum of 36" unobstructed as per Section R324 of the 2020 IRC

Customer Info:


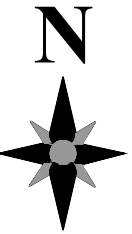
Larry Alcorn
716 Southwest Mandiba Drive
Lake City, FL 32024

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.)

FRONT OF HOUSE

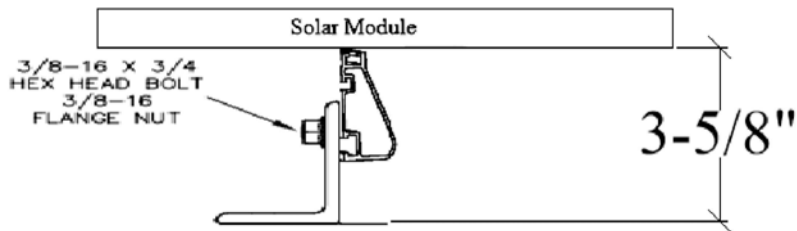


Layout Subject to Change Based on Site Conditions

<div>Godwin Engineering and Design, LLC 8378 Foxtail Loop Pensacola, FL 32526 D. Chad Godwin, PE Chad@godwineng.com</div>	<div>Donnie C Godwin 2022.03.14 13:34:03 '00'05-</div> <div></div>
<div>Date: 2/23/2022</div> <div>Drawn by: GKS</div> <div>Revised by: DC</div> <div>Rev #: 1</div> <div>Rev Date: 3/11/2022</div> <div>Page: S-1</div>	<div> Compass for Aerial</div>



Ironridge XR-100



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.

Install will be done to Manufacturer Spec

Roof Section	Pitch	Roof Rafter and Spacing	Overhang	Notes:
R1-R2	6/12	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) - 130mph 3 sec gust, Exposure Category - B -Designed as per ASCE7-16		Inverter Type: Enphase IQ8A-72-2-US PV Panel: (44) REC395AA BLK Racking: Iron Ridge XR-100 Total Wattage: 17,380W Roof Type: Composition Shingle Wind Load: 21 to 27 Deg Fastener Type: Use 5/16" Dia 4.75" Lags		Customer Info: Larry Alcorn 716 Southwest Mandiba Drive Lake City, FL 32024

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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
Per Circuit
#8 AWG THWN
(1) EGC
Inside @ least 3/4" Conduit (tbd on site)

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

Grounding Conductor
to be bare #8 Awg

Photovoltaics:
(44) REC395AA BLK

Inverters:
(44) Enphase IQ8A-72-2-US Micro Inverters

Circuits:
(4) circuit of (11) Modules
Maximum Inverters Per 20A Circuit (11)

Roof

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

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: 63.8A
NOMINAL OPERATING VOLTAGE: 240VAC

Enphase Combiner Box

(1) - 20A Breaker
Per Circuit
4 Circuits
240V
10/15A Breaker for Envoy
Disconnect

Solar Combiner Box
#X-IQ-AM1-240

100A Service Rated
Fused Disconnect
Neutral to Ground Bond
AC Disconnect
80A Fuse

Manual Lockable Disconnect

Located Adjacent to Utility Meter

200A
Generac ATS

200A
Main Disconnect

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 Output Ckt Per String	
To Overcurrent Protection Device	
AC Max Output Current	15.95
AC Max Output Current * 1.25%	19.9
Overcurrent Protection (A)	20
No. of Current Carrying Cond	<4
Conductor Gauge (AWG)	10
Enphase Total Output Ckt	
AC Max Output Current	63.8
AC Max Output Current * 125%	79.8
Overcurrent Protection (A)	80
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	80
To Line Side Tap	C	1	4	N/A	80

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

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 11.12

Customer Info:

Larry Alcorn
716 Southwest Mandiba Drive
Lake City, FL
32024

ALL AMERICAN SOLAR

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Inverter Type:
Enphase IQ8A-72-2-US
PV Panel:
(44)
REC395AA BLK
Total Wattage:
17,380W

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 compliance with FFPC 1:11.12 7th Edition.	
Smoke Detectors will be added as per FBC 553.883	All Exterior equipment is A minimum of Nema-R3 Rated
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
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	Disconnect is in compliance 230.72
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.	Over Current Protection Device is "Next size up" Based on Inverter Maximum Continuous Output Current Rating 2017 NEC 240.4(B)
E05. These construction documents specify that a label is provided with the method to initiate rapid shut down per 690.12(4).	-All new equipment located adjacent to Meter on exterior wall
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).	Labels will be placed in the correct location Per Code NEC 690.56(B), 690.56(C), & 690.53
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.	Include required label for metallic raceways and conduits to sheet E-1 per NEC article 690.31(G)(3).
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.	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.

System meets the grounding requirements of NEC 690.43

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	64A	690.8(A)(3)
AC Max Output Current * 1.25%	80A	690.8(B)
Overcurrent Protection(A)	80A	
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	63.8A*1.25=80A<85A Pass
Ampacity Check 2 Per 690.8(B)(2)	Pass	85A*0.94A*1=79.9A>63.8A 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

In compliance with 230.71

Combiner box in compliance Per Code NEC 705.12

4* 20A < 125A

*No other loads to be added

Permanent sticker added to disconnect

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at 386-218-6930

Apply to Main Disconnect

Line Side Tap will be done in Generac Transfer Switch adjacent to Utility Meter

-Markings Shall Be reflective, Weather Resistant and suitable for the environment.
-Markings Shall be red with white lettering with minimum ³/₈" 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.

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

Including the label below

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

Customer Info:

Larry Alcorn
716 Southwest Mandiba Drive
Lake City, FL
32024

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)

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

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ALL AMERICAN SOLAR

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Date: 2/23/2022
Drawn by: GKS
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Rev #: 1
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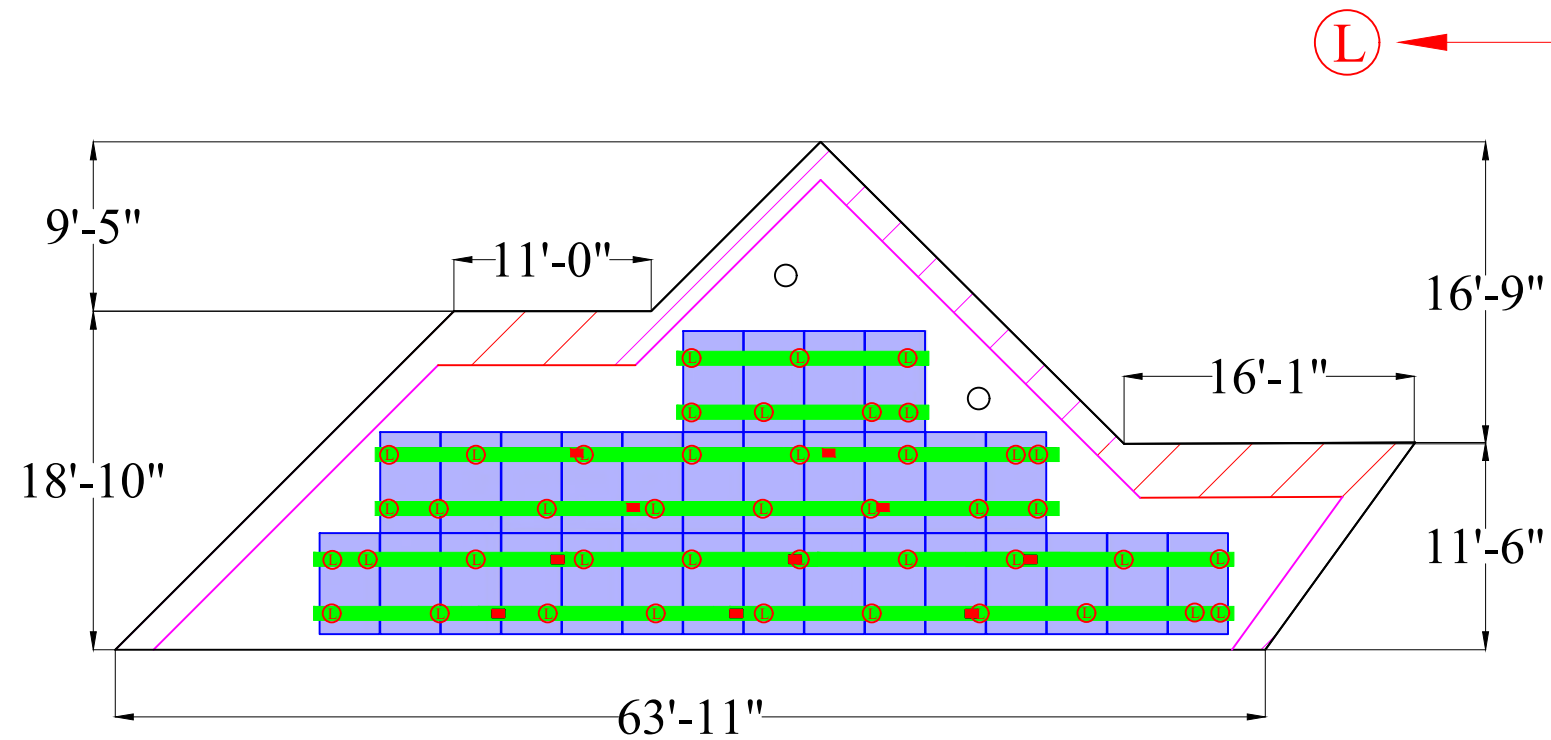
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PV Panel:
(44)
REC395AA BLK
Total Wattage:
17,380W



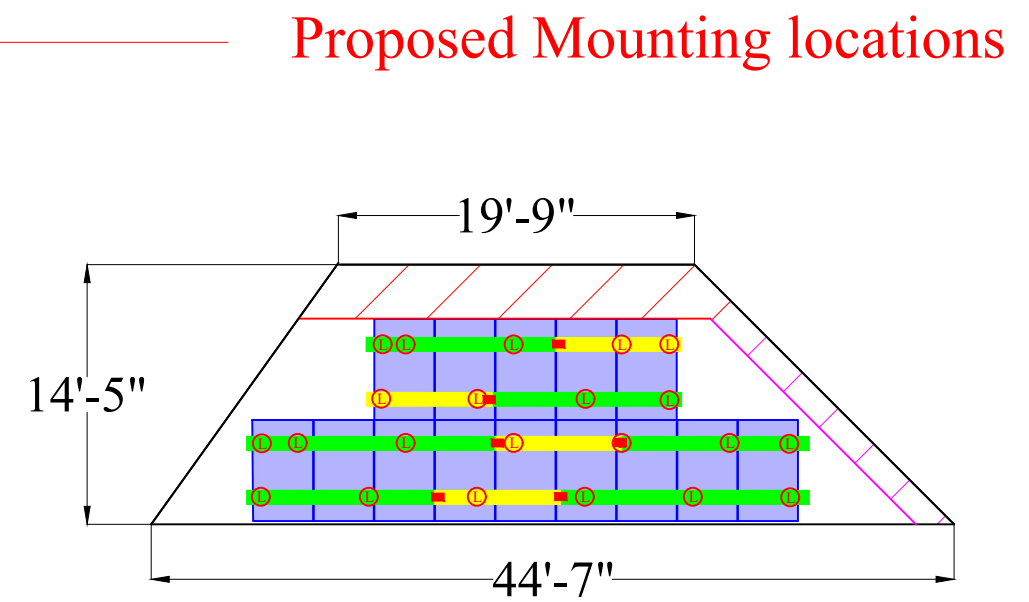
NEC 690.35

Install will be done to Manufacturer Spec

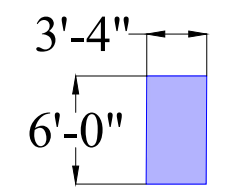
- Iron Ridge XR-100 Rail
- 14' 24
 - 7'
 - 4'
- 16 ■ Splice Bar
- 65 Iron Ridge FF2
- 98 Iron Ridge UFO's
- 20 Iron Ridge Sleeves/End Caps
- 2 Roof Top Combiner
- 5 Iron Ridge Ground Lugs
- 44 REC395AA BLK
- 44 Enphase IQ8A-72-2-US
- 1 100A Fused Disconnect
- 2 80A Fuses
- 4 20A 2P Breaker
- 1 Enphase Combiner Box



R-1
Modules (30)
Pitch: 25°
Azimuth: 154°





R-2
Modules (14)
Pitch: 25°
Azimuth: 154°



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

- Zone 1: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (1/3) = 72" * (1/3) = 24"
- Zone 2e: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (1/3) = 72" * (1/3) = 24"
- Zone 2r: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (1/3) = 72" * (1/3) = 24"
- Zone 3: Max cantilever is 24" as per manufacturer spec.
Max Cantilever = Max Span * (1/3) = 72" * (1/3) = 24"

Inverter Type: Enphase IQ8A-72-2-US	Customer Info: Larry Alcorn 716 Southwest Mandiba Drive Lake City, FL 32024
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SOLAR'S MOST TRUSTED





REC ALPHA[®] PURE
BLACK SERIES
PRODUCT SPECIFICATIONS

400WP
20.3 W/FT²

PRODUCT
LABOR
PERFORMANCE

REC
25 YEAR
PROTRUST
WARRANTY

ELIGIBLE




LEAD-FREE
ROHS COMPLIANT

EXPERIENCE



PERFORMANCE







SOLAR'S MOST TRUSTED

REC ALPHA PURE BLACK SERIES > PRODUCT SPECIFICATIONS

PRODUCT SPECIFICATIONS

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730 (Pending)
ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007, IEC 62941



WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	≤25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply

MAXIMUM RATINGS

Operational temperature:	-40 ... +185°F (-40 ... +85°C)
Maximum system voltage:	1000 V
Maximum test load (front):	+ 7000 Pa (146 lbs/sq ft)*
Maximum test load (rear):	- 4000 Pa (83.5 lbs/sq ft)*
Max series fuse rating:	25 A
Max reverse current:	25 A

* See installation manual for mounting instructions.
Design load = Test load / 1.5 (safety factor)

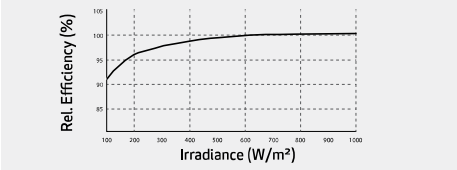
TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P _{MAX} :	-0.26 %/°C
Temperature coefficient of V _{OC} :	-0.24 %/°C
Temperature coefficient of I _{SC} :	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology 6 strings of 22 cells in series	Connectors:	Stäubli MC4 PV-KBT4/KST4, 12 AWG (4mm²) in accordance with IEC 62852 IP68 only when connected
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12 AWG (4mm²) PV wire, 43+47 in (11+1.2 m) accordance with EN 50618
Backsheet:	Highly resistant polymer (black)	Dimensions:	71.7 x 40 x 1.2 in (1821 x 1016 x 30 mm)
Frame:	Anodized aluminum (black)	Weight:	45 lbs (20.5 kg)
Junction box:	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790	Origin:	Made in Singapore

ELECTRICAL DATA

Product Code*: RECxxxAA Pure Black

STC	Power Output - P _{MAX} (Wp)	385	390	395	400	405
	Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5
	Nominal Power Voltage - V _{MPP} (V)	41.2	41.5	41.8	42.1	42.4
	Nominal Power Current - I _{MPP} (A)	9.35	9.40	9.45	9.51	9.56
	Open Circuit Voltage - V _{OC} (V)	48.5	48.6	48.7	48.8	48.9
	Short Circuit Current - I _{SC} (A)	9.99	10.03	10.07	10.10	10.14
	Power Density (W/sq ft)	19.3	19.6	19.8	20.1	20.3
	Panel Efficiency (%)	20.8	21.1	21.3	21.6	21.9
NMOT	Power Output - P _{MAX} (Wp)	293	297	301	305	309
	Nominal Power Voltage - V _{MPP} (V)	38.8	39.1	39.4	39.7	40.0
	Nominal Power Current - I _{MPP} (A)	7.55	7.59	7.63	7.68	7.72
	Open Circuit Voltage - V _{OC} (V)	45.7	45.8	45.9	46.0	46.1
	Short Circuit Current - I _{SC} (A)	8.07	8.10	8.13	8.16	8.19
	Values at standard test conditions (STC: air mass AM1.5, irradiance 10.75 W/sq ft (1000 W/m²), temperature 77°F (25°C), based on a production spread with a tolerance of P _{MAX} , V _{OC} & I _{SC} ±3% within one watt class. Nominal module operating temperature (NMOT): air mass AM1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s). * Where xxx indicates the nominal power class (P _{MAX}) at STC above.					

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.



www.recgroup.com



Ref: PW-D5-12-01-Rev- A 03.21



IQ8M and IQ8A Microinverters

Our newest IQ8 Microinverters are the industry's first grid-forming 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.



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.



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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IQ8MA-DS-0003-01-EN-US-2021-10-19

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Grid-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

IQ8M and IQ8A Microinverters

INPUT DATA (DC)		IQ8M-72-2-US	IQ8A-72-2-US
Commonly used module pairings ¹	W	260 – 460	295 – 500
Module compatibility		60-cell/120 half-cell and 72-cell/144 half-cell	
MPPT voltage range	V	33 – 45	36 – 45
Operating range	V	25 – 58	
Min/max start voltage	V	30 / 58	
Max input DC voltage	V	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)		IQ8M-72-2-US	IQ8A-72-2-US
Peak output power	VA	330	366
Max continuous output power	VA	325	349
Nominal (L-L) voltage/range ³	V	240 / 211 – 264	
Max continuous output current	A	1.35	1.45
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
Max units per 20 A (L-L) branch circuit ⁴		11	
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	%	97.6	97.6
CEC weighted efficiency	%	97	97.5
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. 1071-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8MA-DS-0003-01-EN-US-2021-10-19

Enphase IQ Combiner 4/4C

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



The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

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

Reliable

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

Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	
(not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1



To learn more about Enphase offerings, visit enphase.com



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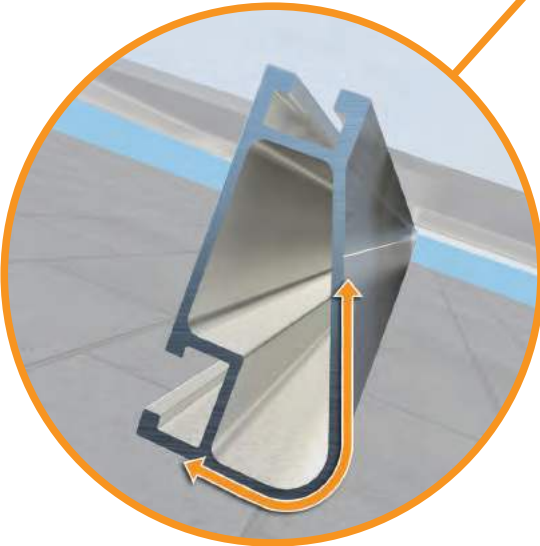
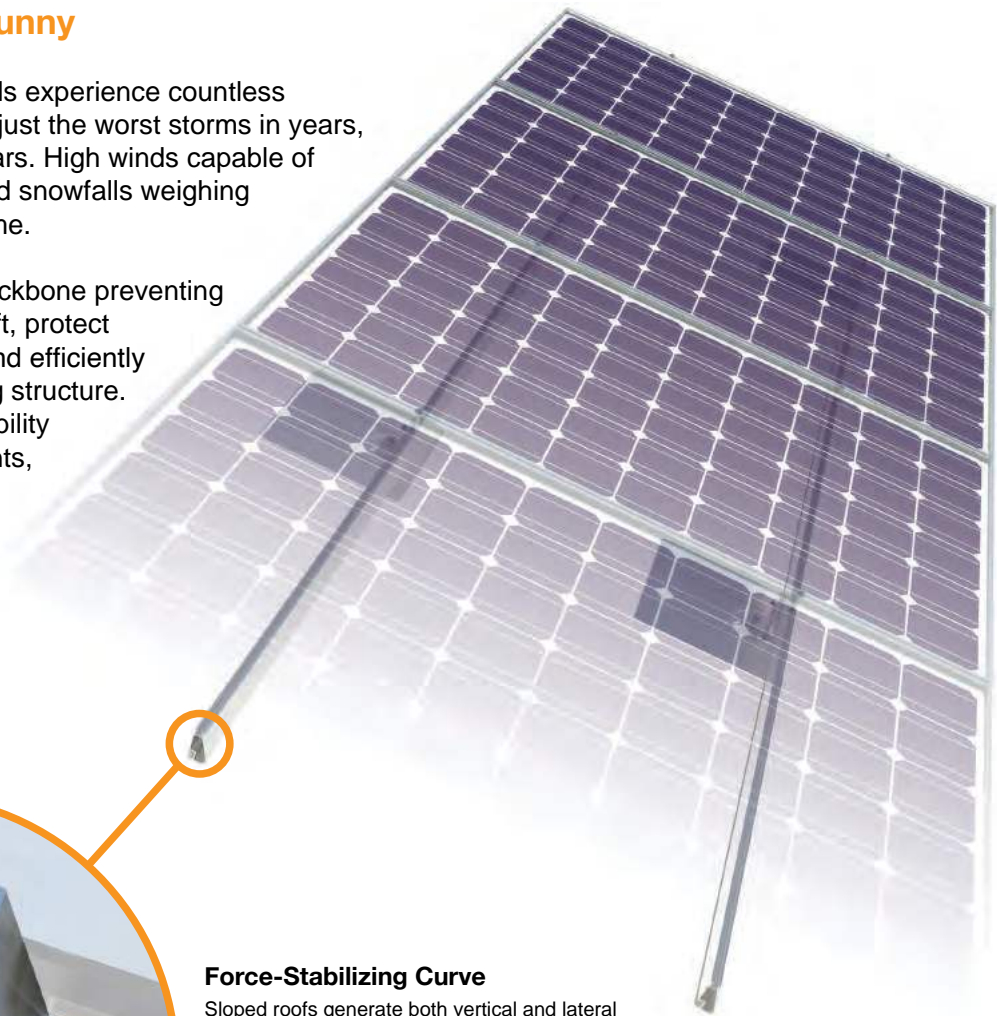


XR Rail Family

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.



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

February 26, 2022

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

Re: Alcorn – Residential PV Roof Mount Installation
716 Southwest Mandiba Drive.
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 – B

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 all roof zones 1, 2e, 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 4.75" lag screw with minimum 2-5/16" thread length.

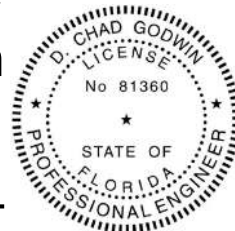
Please see attached documents and contact me should you have any questions.

Sincerely,

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

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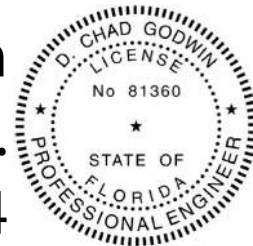
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ASCE 7-16 CHAPTER 29 WIND LOADS - Rooftop Solar Panels Minimum Design Loads - Part 1: Enclosed(Gable,Hip,Flat h<60ft, 0°<θ<45°)									
Wind Load Parameters - Inputs					Wind Load Parameters				
Risk Category	II	Table 1.5-1	Wind Speed (asf)	93	mph	FRC R301.2.1.3			
Basic Wind Speed (Ult)	120	Figure 26.5-1B	Effective Wind Area	19.92	ft²	26.20			
Roof Angle	21° to 27°		Wind Directionality	K _d	0.85	Table 26.6-1			
Roof Type	Hip		Topographic factor	K _z	1.00	26.8 or 26.8.2			
Exposure Cat.	B,C, or D	Section 26.7	Ground Elevation Factor	K _e	1.00	Table 26.9-1			
Mean Roof Height	h	15.00	Velocity Exposure Coefficient	K _z	0.70	Table 26.10-1			
Roof attachment	5/16" x 4.75" Lag Screw		Array Edge Factor	γ _e	1.50	29.4.4	*Modules are considered Exposed		
Rafter/Truss Spacing	24	in O.C.	Solar Panel Equalization Factor	γ _s	0.68	Fig. 29.4-8			
No. of Rails	2		Velocity Pressure	q _h	13.16	psf	q _h =0.00256 K _z K _z K _e V²		
No. of Modules - Portrait	44		Added Safety Factor		1.2				
No. of Modules - Landscape	0		Allowable Pullout per mount		859.2	lbs			
Module Model Number	REC AA Pure BLK		0.4h or 0.6h		6.00	ft	Flat - 0.6h, Gable, Hip - 0.4h		
bdlg. least horizontal dim (typ.)	180	in	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)		
Elevation	<1000	ft	Roof Zone Set Back	a	3.00	ft			
Est. # of attachment points	65		h ₂	5	in	Not > 10in(panel height above roof)			
PV Dead Load			2h ₂	10	in	*min distance array shall be from the roof edge, Gable Ridge, or hip ridge			
Module and Racking Specs				0.25	in	min gap between all panels but not > 6.7ft			
# of Modules	44		Dimensions, LxWxH (in)	71.7 x 40 x 1.2					
Module	W _{mod}	45	Width	3.33	ft	d1	1.00	ft	Horizontal distance orthogonal to panel edge
Array	W _{mods}	1980	Length	5.98	ft	d2	0.25	ft	Horizontal distance from edge of one panel to the nearest edge in the next row
Micro/optimizer	W _{mic}	176	Module Area	19.92	ft²	0.5h	7.50	ft	*modules are considered exposed that are within 1.5lp from roof edge
PV Rail	W _{PV rail}	31	Module load ratings			Notes			
Total Weight	W _{total}	2187	Ultimate Allowable			Eq.1 Point Load = Roof Zone psf * TA			
Total Area	A _T	876.33	Load Rating - Snow(psf)	147	98	Eq.2 TA = (Module Length / 2) * Max Span			
Dead Load	D _{PV}	2.50	Load Rating - Wind(psf)	-113.4	-75.6	Eq.3 *Max span Equation, SF = Allowable pullout / Point Load			
Weight/attachment		33.6				Eq.4 Max Span = Allowable Pullout / (SF * Roof Zone psf * L/2)			
PV Attachment - Results									
Roof Zones - Hip 21° to 27°									
	1	2e	2r	3					
GC _u - Uplift	-1.3	-1.8	-1.8	-1.8					
GC _d - Down	0.7	0.7	0.7	0.7					
p = q _h (GC _u)(γ _s)(γ _a)	-15.0	-21.7	-21.7	-21.7			psf	29.4-7	
p = q _h (GC _d)(γ _s)(γ _a)	9.4	9.4	9.4	9.4			psf	29.4-7	
Max Allowable Span	6	6	6	6			ft	*notes	
Max Cantilever (in)	24	24	24	24			Max span * 33% (in)		

Donnie C
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