



Scott E. Wyssling, PE, PP, CME

Wyssling Consulting
76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

September 14, 2021

Jacob Humpherys, COO
Meraki Solutions
30700 Wekiva River Road
Sorrento, FL 32776

Scott E Wyssling, PE

Digitally signed by Scott E Wyssling, PE
DN: c=US, s=Utah, l=Alpine, o=Wyssling Consulting, cn="Scott E Wyssling, PE",
e=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2021.09.14 16:50:14 -0400
Foxit PhantomPDF Version: 10.1.3



Re: Engineering Services
Langford Residence
266 SW Hoot Owl Place, Fort White, FL
11.550 kW System

Dear Mr. Humphreys:

Pursuant to your request, we have reviewed the following information regarding solar panel installation on the roof of the above referenced home:

1. Site Visit/Verification Form prepared by a Meraki Solutions representative identifying specific site information including size and spacing of rafters for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information was prepared by Meraki Solutions and will be utilized for approval and construction of the proposed system.
3. Photographs of the interior and exterior of the roof system identifying existing structural members and their conditions.

Based on the above information we have evaluated the structural capacity of the existing roof system to support the additional loads imposed by the solar panels and have the following comments related to our review and evaluation:

Description of Residence:

The existing residence is typical wood framing construction with the roof system consisting of truss system with all chords constructed of 2 x 4 dimensional lumber at 24" on center. The attic space is unfinished and photos indicate that there was free access to visually inspect the size and condition of the roof rafters. All wood material utilized for the roof system is assumed to be Spruce Pine Fir #2 or better with standard construction components. The existing roofing material consists of metal roofing. Photos of the dwelling also indicate that there is a permanent foundation.

A. Loading Criteria Used

- 160 MPH wind loading based on ASCE 7-16 Exposure Category "C" at a slope of 14 degrees
- 7 PSF = Dead Load roofing/framing Live Load = 20 PSF/ 0 PSF (where panels are installed)
- 3 PSF = Dead Load solar panels/mounting hardware

Total Dead Load = 10 PSF

The above values are within acceptable limits of recognized industry standards for similar structures in accordance with the (FBC 2020, 7th Edition). Analysis performed of the existing roof structure utilizing the above loading criteria indicates that the existing rafters will support the additional panel loading without damage, if installed correctly.

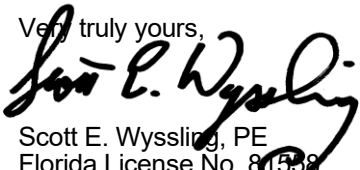
B. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent "*S-5 Installation Manual*", which can be found on the S-5 website (<http://s-5.com/>). If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. System will be attached to the metal roofing material utilizing the patented S-5 connection. Installation of the connections shall be in accordance with the manufacturer's recommendations.
3. Considering the roof slopes, the size, spacing, condition of roof, the panel supports shall be placed no greater than 48" o/c.

Based on the above evaluation, it is the opinion of this office that with appropriate panel anchors being utilized the roof system will adequately support the additional loading imposed by the solar panels. This evaluation is in conformance with the FBC 2020, 7th Edition, current industry and standards, and based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

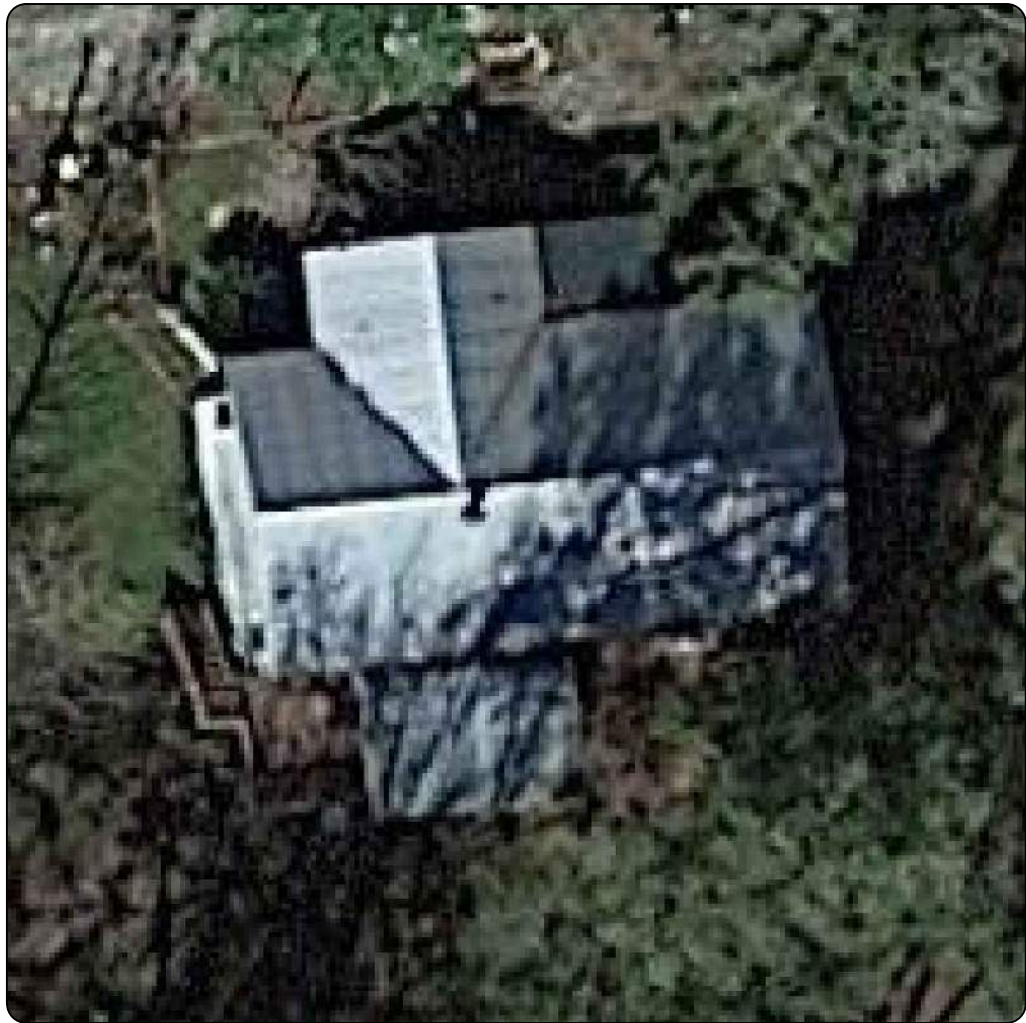


Scott E. Wyssling, PE
Florida License No. 81558



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AERIAL VIEW:



STREET VIEW:



CONTRACTOR INFORMATION:
Meraki Installers
484-663-3792
21 N New Warrington Rd
Pensacola, FL 32507
License # CVC57044

SITE INFORMATION

Daniel Langford
266 Sw Hoot Owl Pl
Ft White, FL 32038
AC SYSTEM SIZE: 10 kW AC
DC SYSTEM SIZE: 11.55 kW DC
Lat, 29.8571158
Long, -82.6524854
(35) Trina Solar TSM-DD06M.05(II) 330 PV
MODULES
(1) SolarEdge SE10000H-US (240V)
INVERTER(S)
Clay Electric Cooperative

GENERAL NOTES

1. INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM SHALL BE IN ACCORDANCE WITH NEC ARTICLE 690, AND ALL OTHER APPLICABLE NEC CODES WHERE NOTED OR EXISTING.
2. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL COMPLY WITH NEC ARTICLE 110.
3. ALL WIRES, INCLUDING THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE IN ACCORDANCE WITH NEC ARTICLE 250
4. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE; THIS SYSTEM IS UTILITY INTERACTIVE PER UL 1741 AND DOES NOT INCLUDE STORAGE BATTERIES OR OTHER ALTERNATIVE STORAGE SOURCES.
5. ALL DC WIRES SHALL BE SIZED ACCORDING TO [NEC 690.8]
6. DC CONDUCTORS SHALL BE WITHIN PROTECTED RACEWAYS IN ACCORDANCE WITH [NEC 690.31]
7. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL JURISDICTIONAL BUILDING CODE.

PHOTOVOLTAIC (PV) SYSTEM SPECIFICATIONS

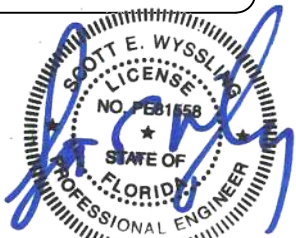
EQUIPMENT:
AC SYSTEM SIZE: 10 kW AC
DC SYSTEM SIZE: 11.55 kW DC
(35) Trina Solar TSM-DD06M.05(II) 330 PV MODULES
(1) SolarEdge SE10000H-US (240V) INVERTER(S)
RACKING: IronRidge

APPLICABLE GOVERNING CODES

2017 NEC
2020 FBC - RESIDENTIAL 7TH EDITION ADOPTS THE IRC 2018 WITH AMENDMENTS
2020 FBC 7TH EDITION
2020 FBC - BUILDING 7TH EDITION ADOPTS THE IBC 2018 WITH AMENDMENTS

SITE SPECIFICATIONS

OCCUPANCY: R-3
ZONING: RESIDENTIAL



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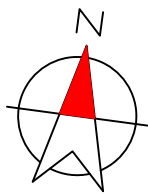
SHEET INDEX:

- PV01 COVER PAGE
- PV02 SITE PLAN
- PV03 ROOF ATTACHMENTS
- PV04 MOUNTING DETAIL
- PV05 LINE DIAGRAM
- PV06 LABELS
- PV07 PLACARD
- PV08 SITE PHOTOS

DRAWN BY: SoloCAD

DATE:
September 13, 2021

COVER PAGE - PV01



TRENCHING THROUGH DIRT
APPROX: 30'
18" MIN DEPTH PVC SCH40

FRONT OF HOME

MP1
PITCH: 14°
AZIMUTH: 353°

MP2
PITCH: 14°
AZIMUTH: 353°

MP3
PITCH: 14°
AZIMUTH: 173°

266 Sw Hoot Owl Pl

FRONT OF HOME

626'-1"

556'-11"



MERAKI
ZERO DOWN SOLAR

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SITE INFORMATION

Daniel Langford

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Ft White, FL 32038

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DC SYSTEM SIZE: 11.55 kW DC

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Long, -82.6524854

(35) Trina Solar TSM-DD06M.05(II) 330 PV
MODULES

(1) SolarEdge SE10000H-US (240V)
INVERTER(S)

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EQUIPMENT LEGEND:



UTILITY METER



VISIBLE, LOCKABLE, LABELED
AC DISCONNECT



INVERTER



SUB PANEL



FIRE ACCESS PATHWAY (3' TYP)



BATTERY(IES)



MAIN SERVICE PANEL



METER SOCKET
(FOR UTILITY PV METER)



COMBINER BOX



LOAD CENTER



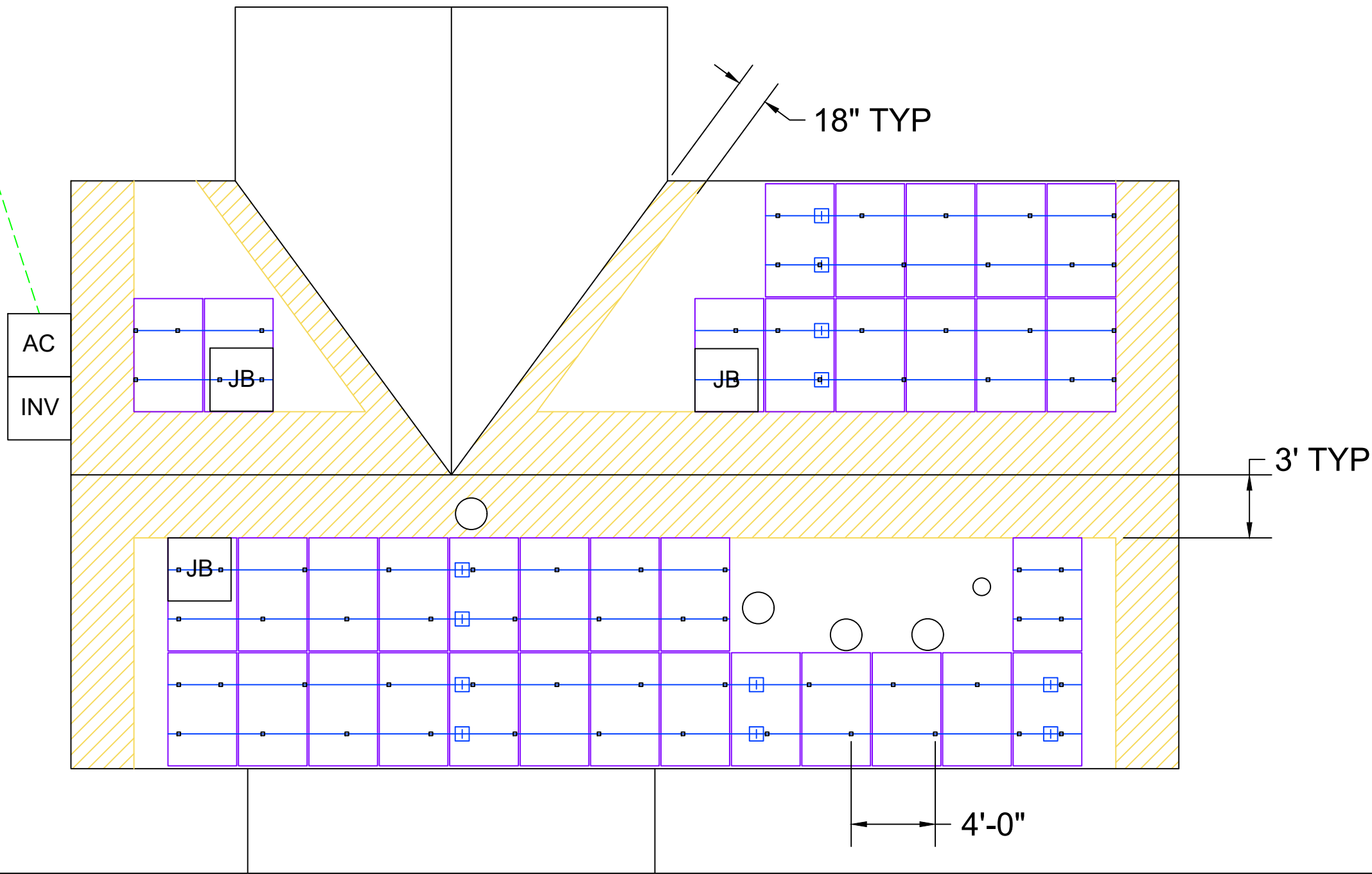
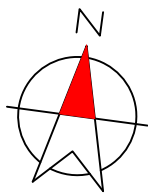
PROPERTY LINE

VISIBLE, LOCKABLE,
LABELED AC DISCONNECT
LOCATED WITHIN 10'
OF UTILITY METER

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DATE:
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SITE PLAN - PV02



CONTRACTOR INFORMATION:
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ROOF ATTACHMENTS - PV03

EQUIPMENT INFORMATION:

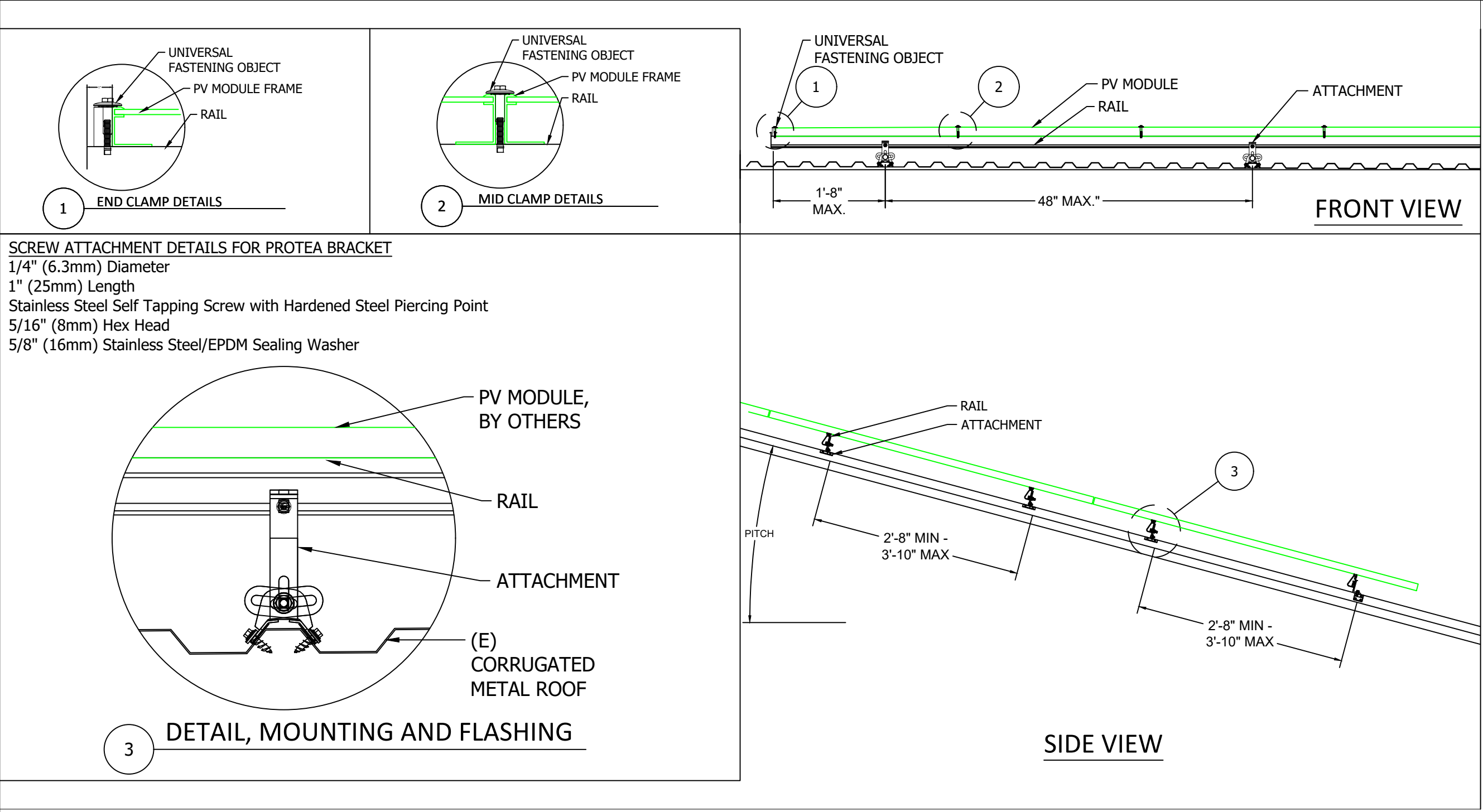
RAIL MANUFACTURER	IronRidge
RAIL PART NUMBER	XR-100
ATTACHMENTS	S-51 - PROTEA BRACKET
ATTACHMENT QTY	73
SPLICE QTY	12
MIDCLAMP QTY	58
ENDCLAMP QTY	24

ROOF INFO:

ROOF TYPE	trap_metal
ROOF FRAMING	manufactured_truss
RAFTER/TOP CHORD SIZE	2x4
RAFTER/TOP CHORD SPACING	24"
ATTACHMENT SPACING	48

PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:

PV MODULE COUNT:	35
ARRAY AREA:	MODULE COUNT * 18.06ft ² = 632.1
ROOF AREA:	1644 ft ²
PERCENT OF ROOF COVERED:	38%
ARRAY WEIGHT:	MODULE COUNT * 50lbs = 1750
DISTRIBUTED LOAD:	ARRAY LBS/ATTACHMENTS = 23.97
POINT LOAD: (lbs/ft ²)	(ARRAY) WEIGHT/AREA = 2.77 lbs/ft ²



SCREW ATTACHMENT DETAILS FOR PROTEA BRACKET
1/4" (6.3mm) Diameter
1" (25mm) Length
Stainless Steel Self Tapping Screw with Hardened Steel Piercing Point
5/16" (8mm) Hex Head
5/8" (16mm) Stainless Steel/EPDM Sealing Washer

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DATE:
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MOUNTING DETAIL - PV04

EQUIPMENT INFORMATION:		ROOF INFO:		PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:	
RAIL MANUFACTURER	IronRidge	ROOF TYPE	trap_metal	PV MODULE COUNT:	35
RAIL PART NUMBER	XR-100	ROOF FRAMING	manufactured_truss	ARRAY AREA:	MODULE COUNT * 18.06ft ² = 632.1
ATTACHMENTS	S-5! - PROTEA BRACKET	RAFTER/TOP CHORD SIZE	2x4	ROOF AREA:	1644 ft ²
ATTACHMENT QTY	73	RAFTER/TOP CHORD SPACING	24"	PERCENT OF ROOF COVERED:	38%
SPLICE QTY	12	ATTACHMENT SPACING	48	ARRAY WEIGHT:	MODULE COUNT * 50lbs = 1750
MIDCLAMP QTY	58			DISTRIBUTED LOAD:	ARRAY LBS/ATTACHMENTS = 23.97
ENDCLAMP QTY	24			POINT LOAD: (lbs/ft ²)	(ARRAY) WEIGHT/AREA = 2.77 lbs/ft ²

Conduit & Conductor Schedule									
TAG	WIRE GAUGE	DESCRIPTION	QTY	CONDUIT SIZE	CONDUCTOR RATING	# OF CONDUCTORS DERATE	TEMP. DERATE	CONDUCTOR RATING W/DERATES	CONDUIT FILL
1	10 AWG	PV-WIRE , USE-2, COPPER (L 1, L 2)	(2)	N/A - FREE AIR	40A	N/A - FREE AIR	0.96	38.4A	N/A - FREE AIR
	6 AWG	BARE, COPPER (GROUND)	(1)						
2	10 AWG	THWN-2, or THHN, or 10/2 NM-B COPPER - (L 1, L 2)	(2)	3/4" EMT	40A	1	0.96	38.4A	11.9%
	10 AWG	THWN-2, or THHN, or 10/2 NM-B COPPER - (GROUND)	(1)						
3	10 AWG	THHN/THWN-2, COPPER - (L1, L2)	(6)	3/4" EMT	40A	0.8	0.96	30.72A	27.8%
	10 AWG	THHN/THWN-2 - (GROUND)	(1)						
4	6 AWG	THWN-2 COPPER - (L1, L2, NEUTRAL)	(3)	3/4" EMT	65A	1	0.96	62.4A	32.6%
	10 AWG	THWN-2 COPPER - (GROUND)	(1)						
5	4 AWG	THWN-2 COPPER - (L1,L2,NEUTRAL)	(3)	1.5" PVC	85A	1	0.96	81.6A	17.41%
	6 AWG	THWN-2 COPPER - (GROUND)	(1)						

EQUIPMENT SCHEDULE:			
TYPE:	QTY:	DESCRIPTION:	RATING:
MODULES:	(35)	Trina Solar TSM-DD06M.05(II) 330	330 W
INVERTERS:	(1)	SolarEdge SE10000H-US (240V)	10000 W
AC DISCONNECT(S):	(1)	PV AC DISCONNECT, 240V, 2-POLE	60A
DC OPTIMIZERS:	(35)	SolarEdge P340	15 Adc

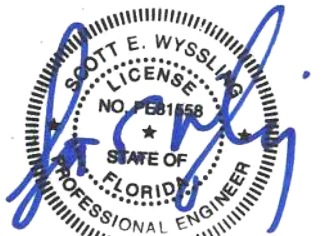


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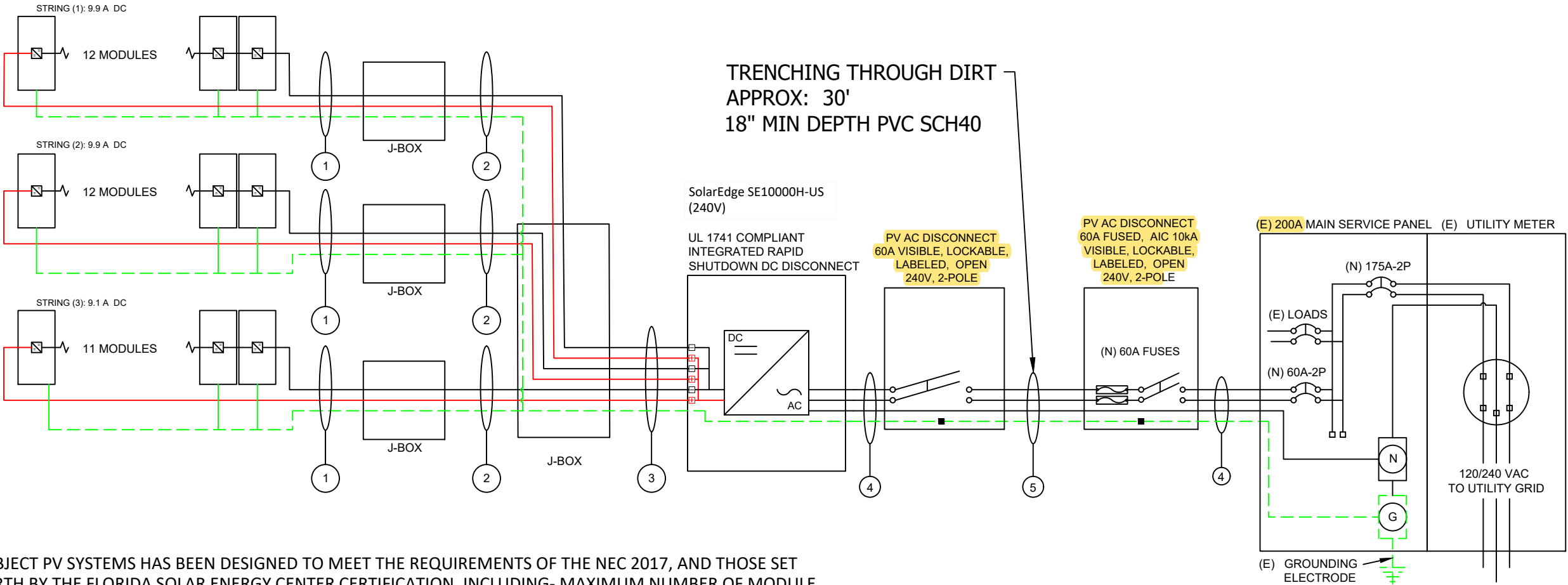


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LINE DIAGRAM - PV05



SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS 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.

GROUNDING & GENERAL NOTES:

1. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
2. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
3. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
4. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOXES DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
5. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.

INTERCONNECTION NOTES:

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].
3. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]
4. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
5. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH

VISIBLE, LOCKABLE,
LABELED AC DISCONNECT
LOCATED WITHIN 10'
OF UTILITY METER

WARNING

ELECTRIC SHOCK HAZARD

**TERMINALS ON THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION**

LABEL 1
FOR PV DISCONNECTING MEANS WHERE THE LINE AND
LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN
POSITION.
[NEC 690.13(B)]

WARNING

**THIS EQUIPMENT IS FED BY MULTIPLE
SOURCES. TOTAL RATING OF ALL
OVERCURRENT DEVICES, EXCLUDING
MAIN SUPPLY OVERCURRENT
DEVICE, SHALL NOT EXCEED
AMPACITY OF BUSBAR.**

LABEL 2
PLACED ADJACENT TO THE BACK-FED BREAKER
FROM THE INVERTER IF TIE IN CONSISTS OF
LOAD SIDE CONNECTION TO BUSBAR.
[NEC 705.12(B)(2)(3)(b)]

WARNING

INVERTER OUTPUT CONNECTION

**DO NOT RELOCATE
THIS OVERCURRENT
DEVICE**

LABEL 3
PLACED ADJACENT TO THE BACK-FED BREAKER
FROM THE INVERTER IF TIE IN CONSISTS OF
LOAD SIDE CONNECTION TO BUSBAR.
[NEC 705.12(B)(2)(3)(c)]

WARNING

DUAL POWER SUPPLY

**SOURCES: UTILITY GRID AND PV
SOLAR ELECTRIC SYSTEM**

LABEL 4
EQUIPMENT CONTAINING OVERCURRENT
DEVICES IN CIRCUITS SUPPLYING POWER
TO A BUSBAR OR CONDUCTOR SUPPLIED
FROM MULTIPLE SOURCES SHALL BE
MARKED TO INDICATE THE PRESENCE OF
ALL SOURCES [NEC 705.12(B)(3)]

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:

42

NOMINAL OPERATING AC VOLTAGE:

240

LABEL 5
AT POINT OF INTERCONNECTION, MARKED
AT AC DISCONNECTING MEANS.
[NEC 690.54, NEC 690.13 (B)]

- LABELING NOTES:
1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
 2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
 3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
 4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21(B)(3)]
 5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

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

LABEL 6
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS
AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS;
SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY
ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.
[NEC 690.31(G)(3&4)]

LABEL 7
FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS
LEAVING THE ARRAY:
SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE
DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED
AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID
SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.
[NEC 690.56(C)(1)(A)]

**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

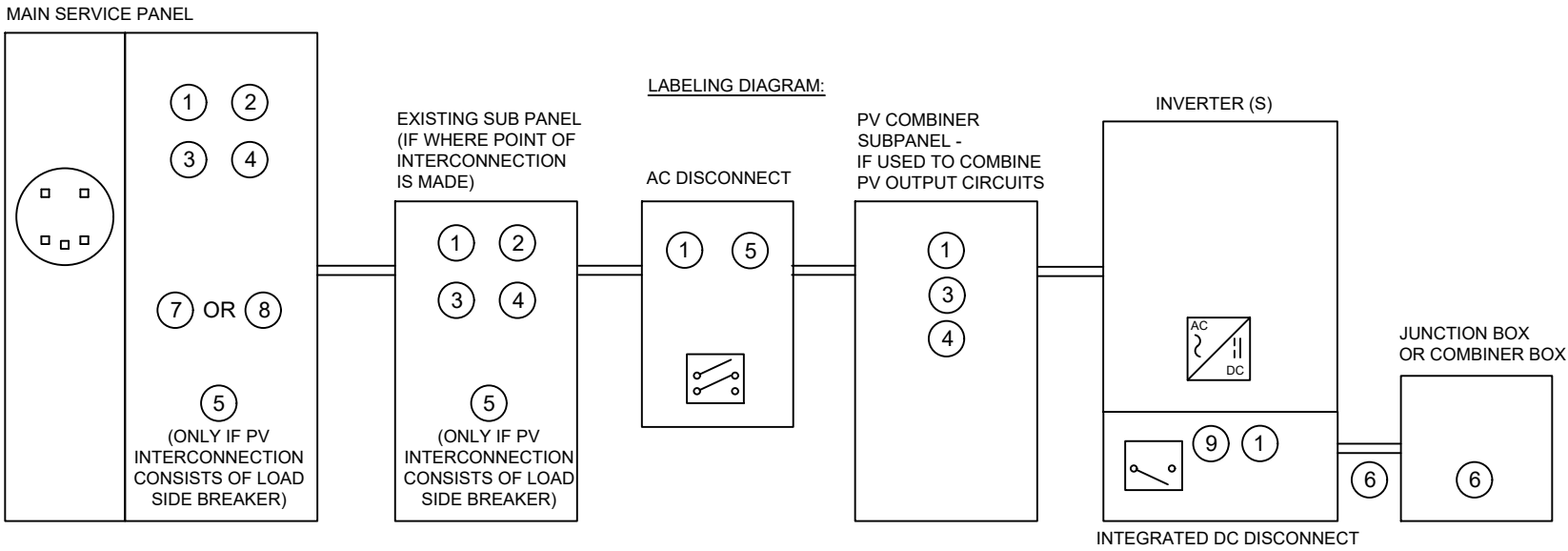
TURN RAPID SHUTDOWN
SWITCH TO THE "OFF"
POSITION TO SHUT DOWN
CONDUCTORS OUTSIDE
THE ARRAY. CONDUCTORS
WITHIN THE ARRAY REMAIN
ENERGIZED IN SUNLIGHT

LABEL 8
FOR PV SYSTEMS THAT ONLY SHUT DOWN
CONDUCTORS LEAVING THE ARRAY:
SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT
AWAY FROM SERVICE DISCONNECTING MEANS TO
WHICH THE PV SYSTEMS ARE CONNECTED AND
SHALL INDICATE THE LOCATION OF ALL IDENTIFIED
RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME
LOCATION.
[NEC 690.56(C)(1)(b)]

IMPORTANT

**RAPID SHUTDOWN
SWITCH FOR
SOLAR PV SYSTEM**

LABEL 9
SIGN LOCATED AT RAPID SHUT DOWN
DISCONNECT SWITCH [NEC 690.56(C)(3)].



*ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ON THE ELECTRICAL DIAGRAM PAGE.



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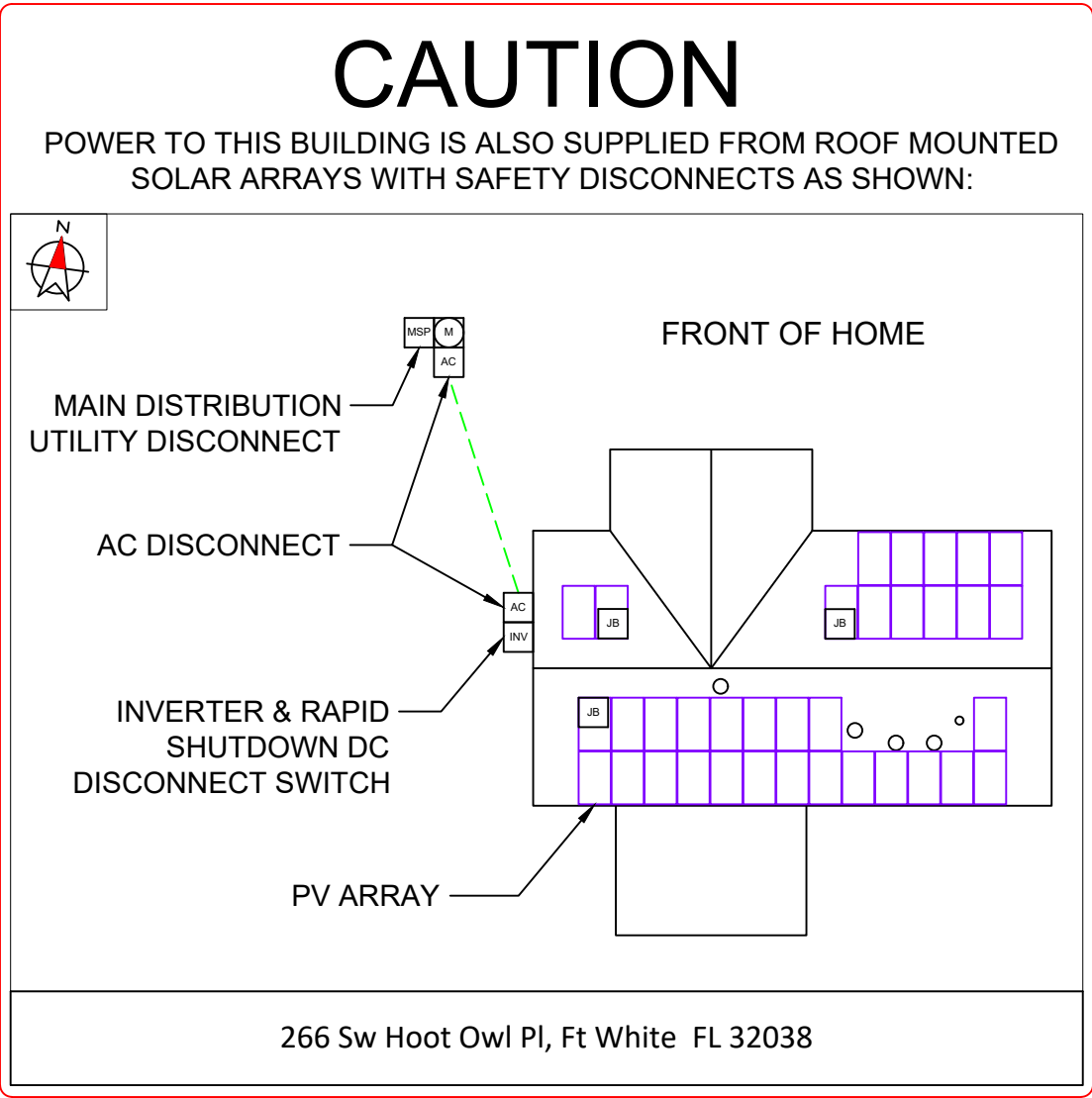
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LABELS - PV06



DIRECTORY
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS OUTLINED WITHIN:
NEC 690.56(B)&(C), [NEC 705.10])



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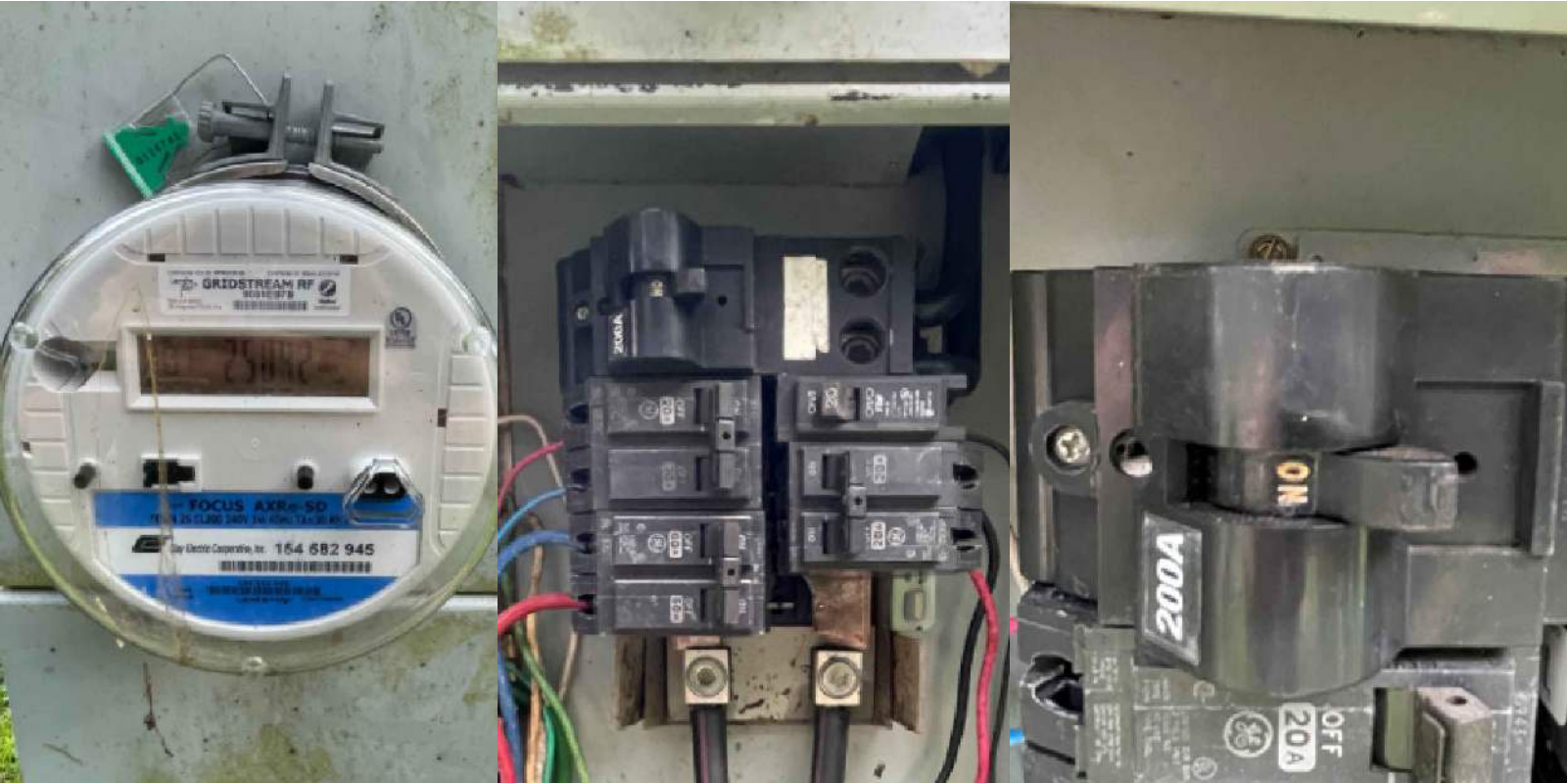
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(35) Trina Solar TSM-DD06M.05(II) 330 PV
MODULES
(1) SolarEdge SE10000H-US (240V)
INVERTER(S)
Clay Electric Cooperative

DRAWN BY: SoloCAD

DATE:
September 13, 2021

PLACARD - PV07

SITE PHOTOS:



CONTRACTOR INFORMATION:

Meraki Installers
484-663-3792
21 N New Warrington Rd
Pensacola, FL 32507
License # CVC57044

SITE INFORMATION

Daniel Langford
266 Sw Hoot Owl Pl
Ft White, FL 32038
AC SYSTEM SIZE: 10 kW AC
DC SYSTEM SIZE: 11.55 kW DC
Lat, 29.8571158
Long, -82.6524854
(35) Trina Solar TSM-DD06M.05(II) 330 PV
MODULES
(1) SolarEdge SE10000H-US (240V)
INVERTER(S)
Clay Electric Cooperative

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DATE:
September 13, 2021

SITE PHOTOS - PV08

THE

Residential Module

MULTI-BUSBAR120 HALF-CELL BOB MODULE

120-Cell
MONOCRYSTALLINE MODULE

330 W
POWER OUTPUT RANGE

19.6%
MAXIMUM EFFICIENCY

-5W+3%
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading comprehensive solutions provider for solar energy, we believe close cooperation with our partners is critical to success. Trina Solar now distributes its PV products to over 60 countries all over the world. Trina is able to provide exceptional service to each customer in each market and supplement our innovative, reliable products with the backing of Trina as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaboration with installers, developers, distributors and other partners.

Comprehensive Products And System Certificates

UL 61730
IEC61215/IEC61730/UL1703/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System



PRODUCTS	BACKSHEET COLOR	POWER RANGE
TSM-DD06M.05(II)	Black	330W
FRAME COLOR: Black		



High power output

- Reduce BOS cost with high power bin and 1000V system voltage
- New cell string layout and split J-box location reduces the energy loss caused by inter-row shading
- Lower resistance of half-cut cells and increased MBB (Multi Busbar) reflectance ensure higher power



High energy generation, low LCOE

- Excellent 3rd party validated IAM and low light performance with cell process and module material optimization
- Low Pmax temp coefficient (-0.36%) increases energy production
- Better anti-shading performance and lower operating temperature



Outstanding visual appearance, easy to install

- Designed for superior rooftop aesthetics
- Thinner wires give an eye catching all black look
- Safe and easy to transport, handle, and install



Certified to perform in highly challenging environments

- High PID resistance through cell process and module material control
- Resistant to salt, acid, sand, and ammonia
- Over 30 in-house tests (UV, TC, HF etc)
- Certified to 5400 Pa positive load and 2400 Pa negative load

PERFORMANCE WARRANTY

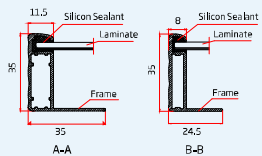
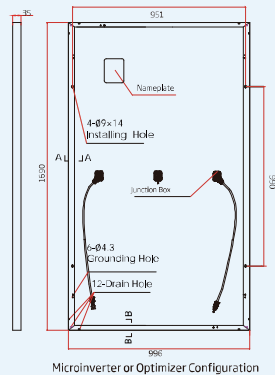
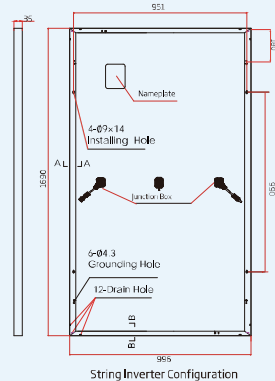
10 Year Product Warranty · 25 Year Power Warranty



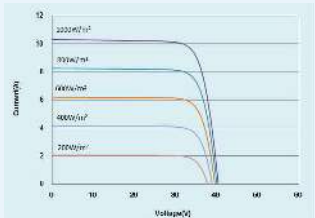
Residential Module

MULTI-BUSBAR 120 HALF-CELL BOB MODULE

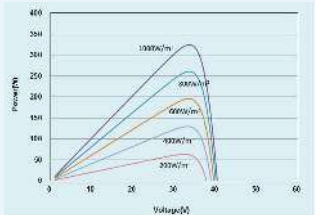
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE (330W)



P-V CURVES OF PV MODULE (330W)



ELECTRICAL DATA (STC)

Peak Power Watts-P _{MAX} (Wp)*	330
Power Output Tolerance-P _{MAX} (W)	-5 + 3%
Maximum Power Voltage-V _{MPP} (V)	33.8
Maximum Power Current-I _{MPP} (A)	9.76
Open Circuit Voltage-V _{OC} (V)	40.6
Short Circuit Current-I _{SC} (A)	10.40
Module Efficiency η _m (%)	19.6

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

ELECTRICAL DATA (NMOT)

Maximum Power-P _{MAX} (Wp)	250
Maximum Power Voltage-V _{MPP} (V)	31.7
Maximum Power Current-I _{MPP} (A)	7.86
Open Circuit Voltage-V _{OC} (V)	38.3
Short Circuit Current-I _{SC} (A)	8.38

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

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	120 cells (6 × 20)
Module Dimensions	1690 × 996 × 35 mm (66.54 × 39.21 × 1.38 inches)
Weight	18.0 kg (39.7 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened
Encapsulant Material	Glass EVA
Backsheet	Black [DD06M.05(II)]
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Portrait: N 140mm/P 285mm (5.51/11.22 inches) Landscape: N 1200 mm /P 1200 mm (47.24/47.24 inches)
Connector	MC4

TEMPERATURE RATINGS

NMOT (Nominal Module Operating Temperature)	41°C (±3°C)
Temperature Coefficient of P _{MAX}	-0.36%/°C
Temperature Coefficient of V _{OC}	-0.26%/°C
Temperature Coefficient of I _{SC}	0.04%/°C

(DO NOT connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

- 12 year Product Workmanship Warranty
- 25 year Power Warranty

(Please refer to product warranty for details)

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC (IEC) 1000V DC (UL)
Max Series Fuse Rating	20A

PACKAGING CONFIGURATION

- Modules per box: 30 pieces
- Modules per 40' container: 780 pieces

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

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)

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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 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 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	600ka Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 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 (H)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 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	-13 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

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505



POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

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Power Optimizer For North America

P320 / P340 / P370 / P400 / P405 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT							
Rated Input DC Power ⁽¹⁾	320	340	370	400	405	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125 ⁽²⁾	87 ⁽²⁾	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 87	Vdc
Maximum Short Circuit Current (Isc)	11			10.1		14	Adc
Maximum DC Input Current	13.75			12.5		17.5	Adc
Maximum Efficiency	99.5						%
Weighted Efficiency	98.8					98.6	%
Overvoltage Category	II						
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)							
Maximum Output Current	15						Adc
Maximum Output Voltage	60				85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)							
Safety Output Voltage per Power Optimizer	1 ± 0.1						Vdc
STANDARD COMPLIANCE							
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62109-1 (class II safety), UL1741						
Material	UL94 V-0 , UV Resistant						
RoHS	Yes						
INSTALLATION SPECIFICATIONS							
Maximum Allowed System Voltage	1000						Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters						
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1			129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	Single or dual MC4 ⁽³⁾						
Input Wire Length	0.16 / 0.52						m / ft
Output Wire Type / Connector	Double Insulated / MC4						
Output Wire Length	0.9 / 2.95		1.2 / 3.9				m / ft
Operating Temperature Range	-40 - +85 / -40 - +185						°C / °F
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100						%

⁽¹⁾ Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed

⁽²⁾ NEC 2017 requires max input voltage be not more than 80V

⁽³⁾ For other connector types please contact SolarEdge

PV System Design Using a SolarEdge Inverter ⁽⁴⁾⁽⁵⁾		Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400	8		10	18	
	P405 / P505	6		13 (12 with SE3K)	14	
Maximum String Length (Power Optimizers)		25		25	50 ⁽⁶⁾	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000 ⁽⁷⁾	12750 ⁽⁸⁾	W
Parallel Strings of Different Lengths or Orientations		Yes				

⁽⁴⁾ For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf

⁽⁵⁾ It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string

⁽⁶⁾ A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

⁽⁷⁾ For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W

⁽⁸⁾ For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W

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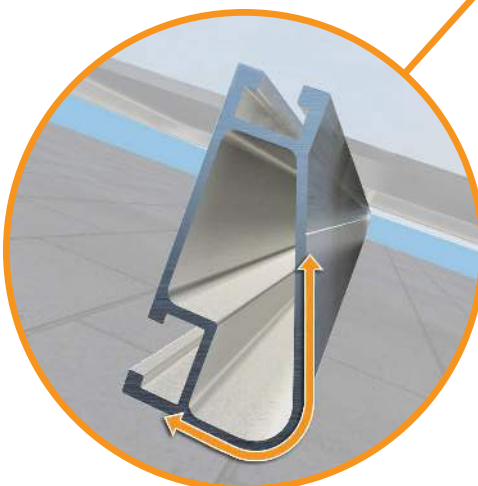
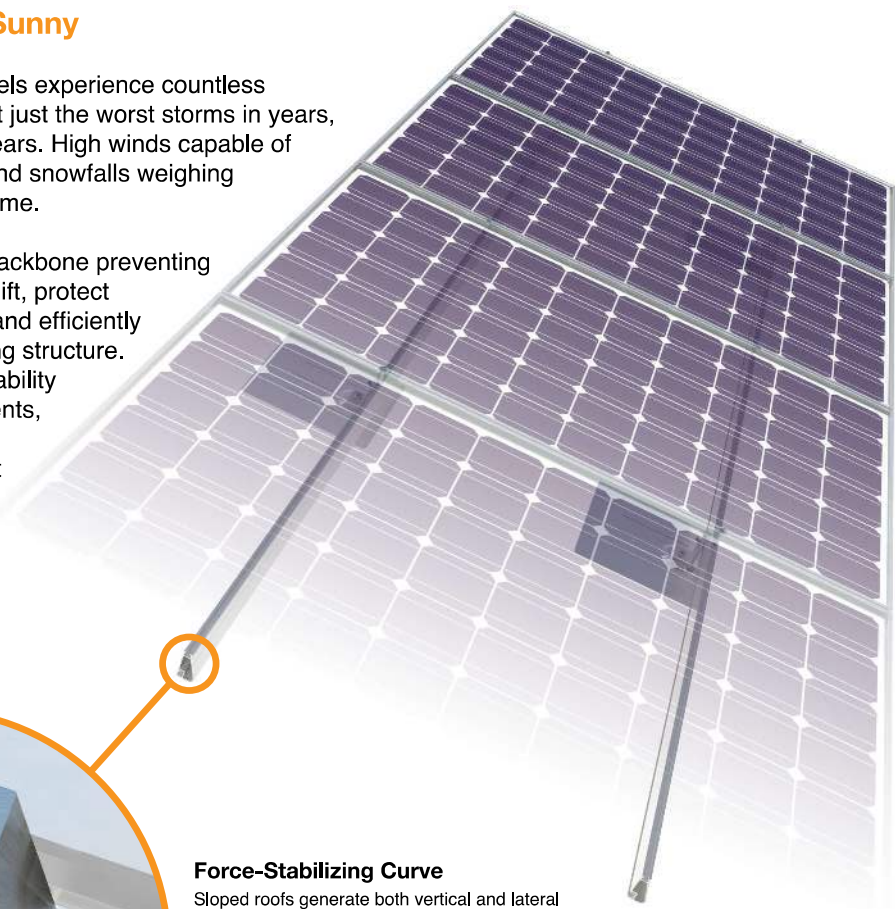
CE RoHS

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.



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.

The right way to attach almost anything to metal roofs!

S-5!® The Right Way!

ProteaBracket™

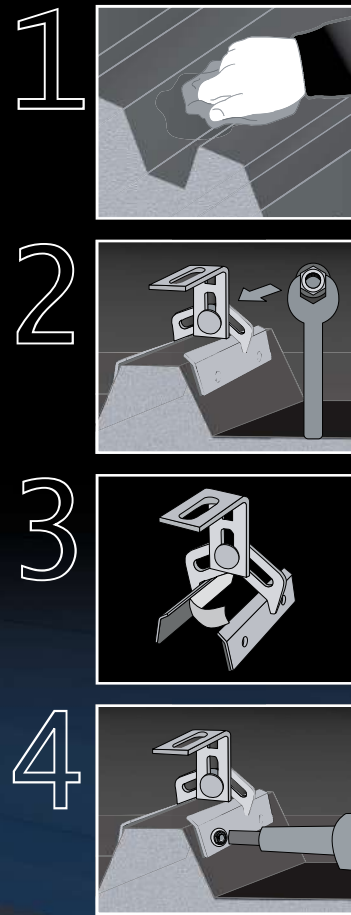
ProteaBracket™ is the most versatile standing seam metal roof attachment solution on the market, fitting most trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate varying widths and heights. There are no messy sealants to apply and no chance for leaks; the ProteaBracket comes with factory-applied, adhesive rubber sealant to ensure quick installation and a weather-proof fit.

Installation is simple! The ProteaBracket is mounted directly onto the crown of the panel, straddling the profile. No surface preparation is necessary; simply wipe away excess oil and debris, align, and apply. Secure ProteaBracket through its pre-punched holes, using the hardened drill point S-5!® screws.

ProteaBracket is the perfect match for our S-5-PV Kit and spares you the hassle of cold-bridging! For a solar attachment solution that is both economical and easy to use, choose ProteaBracket.*

*When ProteaBracket is used in conjunction with the S-5-PV Kit, an additional nut is required during installation.

S-5!® ProteaBracket™ is a versatile bracket that adjusts easily to most trapezoidal roof profiles.



ProteaBracket™

888-825-3432 | www.S-5.com

S-5!®
The Right Way!

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal exposed-fastened metal roof profiles! No messy sealants to apply. The factory-applied adhesive rubber sealant weather-proofs and makes installation easy!

Each **ProteaBracket™** comes with a factory-applied, adhesive rubber sealant on the base. A structural A2 stainless steel bimetal attachment bracket, ProteaBracket is compatible with most common metal roofing materials. All four pre-punched holes must be used to achieve tested strength. Mounting hardware is furnished with the ProteaBracket. For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications. S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:

Side Rail Option



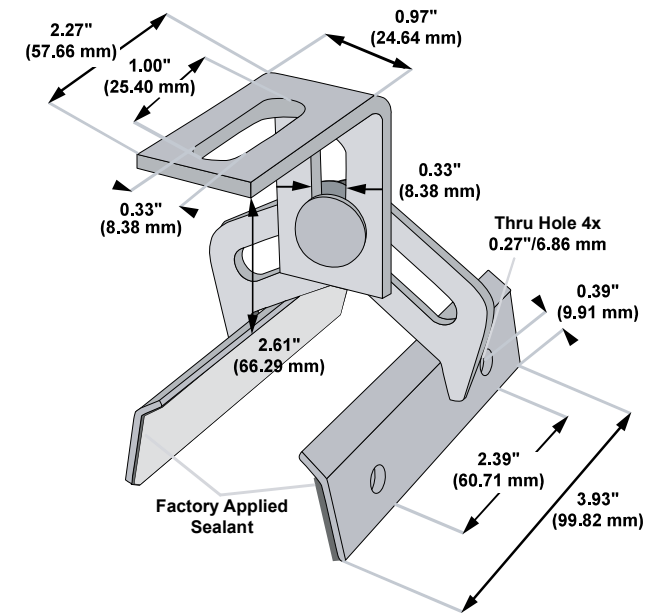
Top Rail Option



S-5-PV Kit Option



ProteaBracket™



Please note: All measurements are rounded to the second decimal place.

Example Applications



S-5-PV Kit demonstrated with a ProteaBracket on a trapezoidal profile.

Example Profile



S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

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