

ERNEST PASQUOT  
NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM  
DC SYSTEM SIZE (29.48KW)

SYSTEM DETAILS

DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	SYSTEM SIZE :29.48 KW DC STC
AC RATING OF SYSTEM	19.43 KW
AC OUTPUT CURRENT	81.07 A
NO. OF MODULES	(67) URECO FAK440E8D (440W) SOLAR MODULES
NO. OF INVERTERS	(67) ENPHASE IQ8PLUS-72-2-US MICROINVERTERS
POINT OF CONNECTION	LINE SIDE TAP IN THE MSP
ARRAY STRINGING	(5) BRANCHES OF 11 MODULES (1) BRANCH OF 12 MODULES

SITE DETAILS

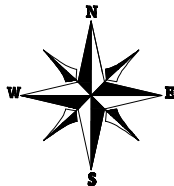
ASHRAE EXTREME LOW	-5°C
ASHRAE 2% HIGH	34°C
GROUND SNOW LOAD	0 PSF
WIND SPEED	140MPH (ASCE 7-16)
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	B
UTILITY	CLAY ELECTRIC

GOVERNING CODES

FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)
FLORIDA BUILDING CODE, 7TH EDITION 2020 (FBC)
FLORIDA FIRE PREVENTION CODE, 7TH EDITION 2020 (FFPC)
FLORIDA EXISTING BUILDING CODE, 7TH EDITION 2020 (FBC EX)
NATIONAL ELECTRIC CODE, NEC 2017 CODE BOOK, NFPA 70

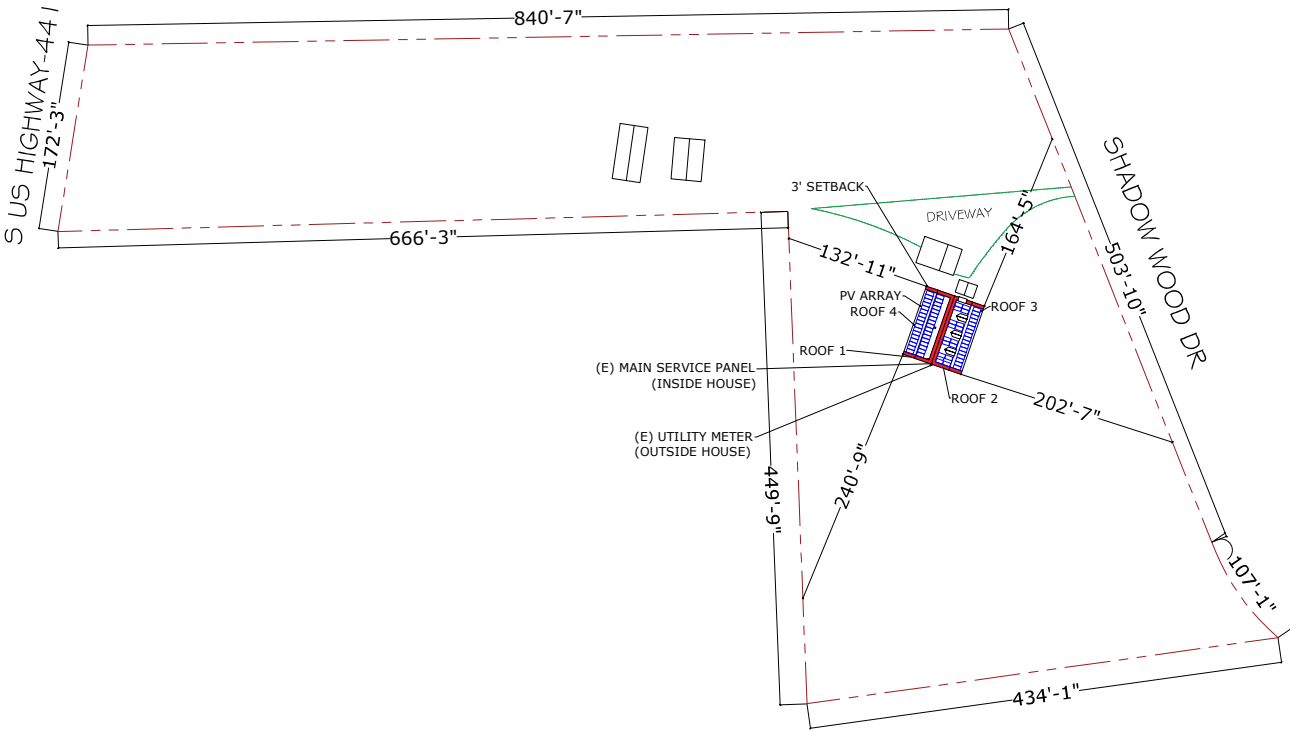
SHEET INDEX

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S - 03	STRUCTURAL ATTACHMENT DETAIL
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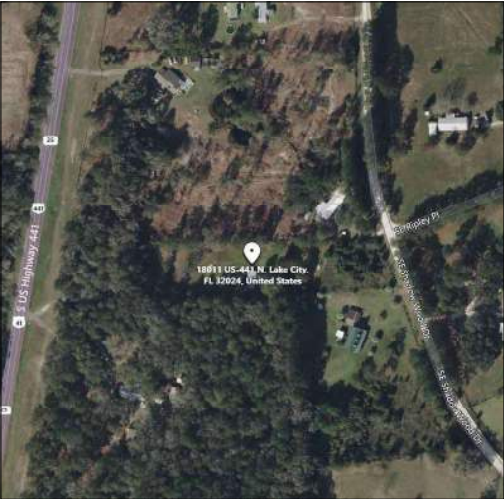


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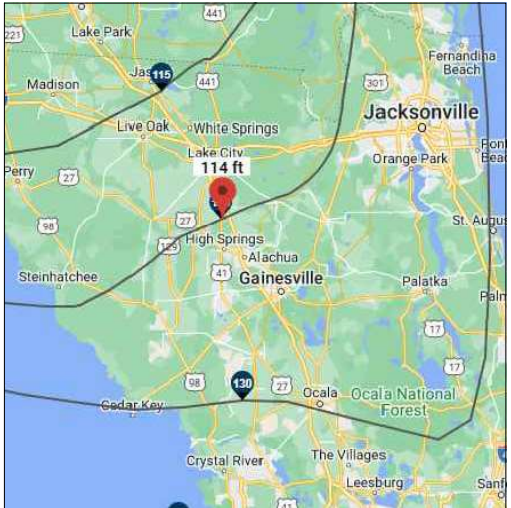
SITE MAP (N.T.S)



VICINITY MAP



WIND FLOW MAP



PHONE: 855-335-2469  
5344 9TH ST, ZEPHYRHILLS FL 33541  
LICENSE# EC13010029

ENGINEER OF RECORD

ERNEST PASQUOT

18011 US-441, LAKE CITY,  
FL 32024

REVISIONS

REV	ENG.	DESCRIPTION	DATE

PERMIT DEVELOPER

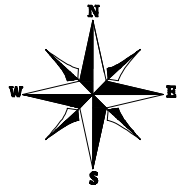
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME

SITE MAP &  
VICINITY MAP

SHEET NUMBER

A-00



## MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 67 MODULES  
MODULE TYPE = URECO FAK440E8D (440W) SOLAR MODULES  
WEIGHT = 50.71 LBS / 23 KG.  
MODULE DIMENSIONS = 82.44" X 40.87" = 23.4 SF

NUMBER OF INVERTER = 67 MICROINVERTERS  
INVERTER TYPE = ENPHASE IQ8PLUS-72-2-US MICROINVERTERS  
DC SYSTEM SIZE: 29.48 KW  
AC SYSTEM SIZE: 19.43 KW

NOTES:  
1. LOCATION OF JUNCTION BOX(ES), AC DISCONNECTS(S), AC COMBINER PANEL(S), AND OTHER ELECTRICAL EQUIPMENT(S) RELEVANT TO PV INSTALLATION SUBJECT TO CHANGE BASED ON SITE CONDITIONS.  
2. SETBACKS AT RIDGES CAN BE REDUCED TO 18 INCHES IN COMPLIANCE WITH FBC R 324.6.2:  
TOTAL PLAN VIEW AREA = 3026.7 SQFT  
TOTAL PV AREA =  $67(82.44 \text{ IN})(40.87 \text{ IN}) / (144 \text{ IN}^2)$   
 $= 1567.6 \text{ SQFT}$   
 $(1567.6 \text{ SQFT} / 3026.7 \text{ SQFT})100 = 51.79 \%$   
TOTAL PV AREA POPULATES 51.79% OF TOTAL PLAN VIEW AREA AND IS NOT WITHIN THE 33% REQUIREMENT.

## GENERAL INSTALLATION PLAN NOTES:

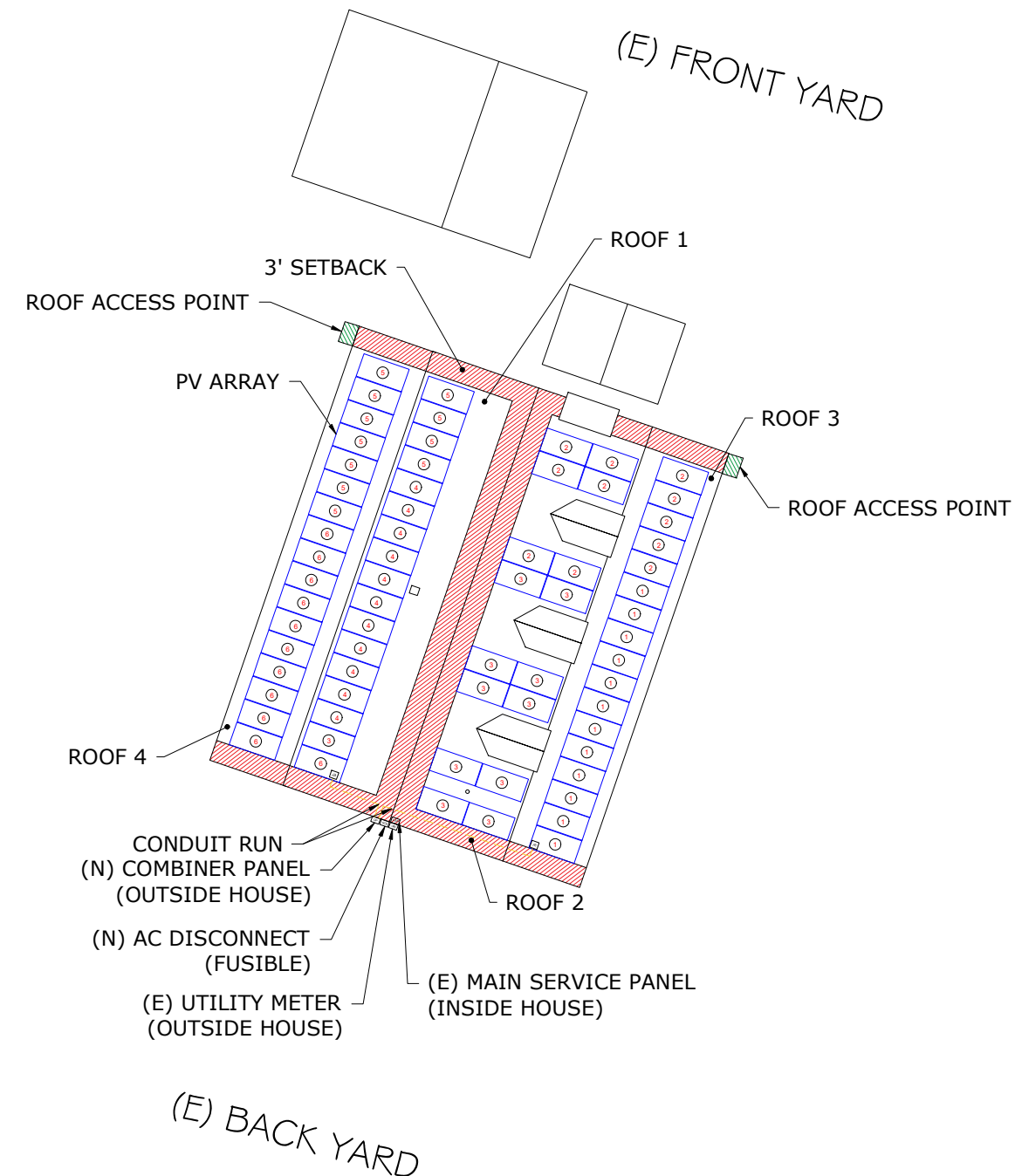
1) ROOF ATTACHMENTS TO METAL SEAMS SHALL BE INSTALLED AS SHOWN IN SHEET S-01 AND AS FOLLOWS FOR EACH WIND ZONE:.

WIND ZONE 1: MAX SPAN 4'-0" O.C.  
WIND ZONE 2: MAX SPAN 4'-0" O.C.  
WIND ZONE 3: MAX SPAN 2'-0" O.C.

2) EXISTING RESIDENTIAL BUILDING METAL 26 GAUGE ROOF WITH MEAN ROOF HEIGHT 25 FT AND METAL SEAMS SPACED 24" O.C. & 12" O.C.

CONTRACTOR TO FIELD VERIFY AND SHALL REPORT TO THE ENGINEER IF ANY DISCREPANCIES EXIST BETWEEN PLANS AND IN FIELD CONDITIONS.

I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC: RESIDENTIAL CHAPTER 3.BUILDING STRUCTURE WILL SAFELY ACCOMMODATE LATERAL AND UPLIFT WIND LOADS, AND EQUIPMENT DEAD LOADS. \*



- ① - MODULE STRING
- ② - MODULE STRING
- ③ - MODULE STRING
- ④ - MODULE STRING
- ⑤ - MODULE STRING
- ⑥ - MODULE STRING



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## LEGENDS

- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- M - METER MAIN COMBO
- ATS - AUTOMATIC TRANSFER SWITCH
- G - GENERATOR
- SWH - SMART WATER HEATER
- JB - JUNCTION BOX
- BI - BACKUP INTERFERENCE
- BAT - BATTERY
- CP - COMBINER PANEL
- ACD - AC DISCONNECT
- PM - PRODUCTION METER
- INV - INVERTER
- [Red Hatched Box] - FIRE SETBACK
- ① - STRING TAG
- □ - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - - - - CONDUIT



PHONE: 855-335-2469  
5344 9TH ST, ZEPHYRHILLS FL 33541  
LICENSE# EC13010029

ENGINEER OF RECORD

ERNEST PASQUOT

18011 US-441, LAKE CITY,  
FL 32024

REV	ENG.	DESCRIPTION	DATE			

## PERMIT DEVELOPER

DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

## SHEET NAME

ROOF PLAN  
& MODULES

## SHEET NUMBER

A-01

ROOF DESCRIPTION:

(ROOF #1)

MODULES - 17  
ROOF TILT - 43°  
ROOF AZIMUTH - 202°  
SEAM SIZE - @ 12" O.C.

(ROOF #2)

MODULES -16  
ROOF TILT - 43°  
ROOF AZIMUTH - 112°  
SEAM SIZE - @ 12" O.C.

(ROOF #3)

MODULES -17  
ROOF TILT - 18°  
ROOF AZIMUTH - 112°  
SEAM SIZE - @ 12" O.C.

(ROOF #4)

MODULES -17  
ROOF TILT - 18°  
ROOF AZIMUTH - 202°  
SEAM SIZE - @ 12" O.C.



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WIND LOAD INFORMATION:  
THIS SYSTEM HAS BEEN DESIGN TO MEET THE REQUIREMENTS OF THE 7TH EDITION OF THE FLORIDA BUILDING CODE AND USED THE FOLLOWING DESIGN PARAMETERS:  
ULTIMATE WIND SPEED: 140 MPH  
EXPOSURE CATEGORY: B  
RISK CATEGORY: II  
MEAN ROOF HEIGHT: 25  
ROOF SLOPE: 07°-20°, 27°-45°

SEAMS LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS MAY DIFFER AND CONTRACTOR MAY NEED TO ADJUST MOUNT LOCATIONS. IN NO CASE SHALL THE MOUNT SPACING EXCEED "MAX. MOUNT SPACING"

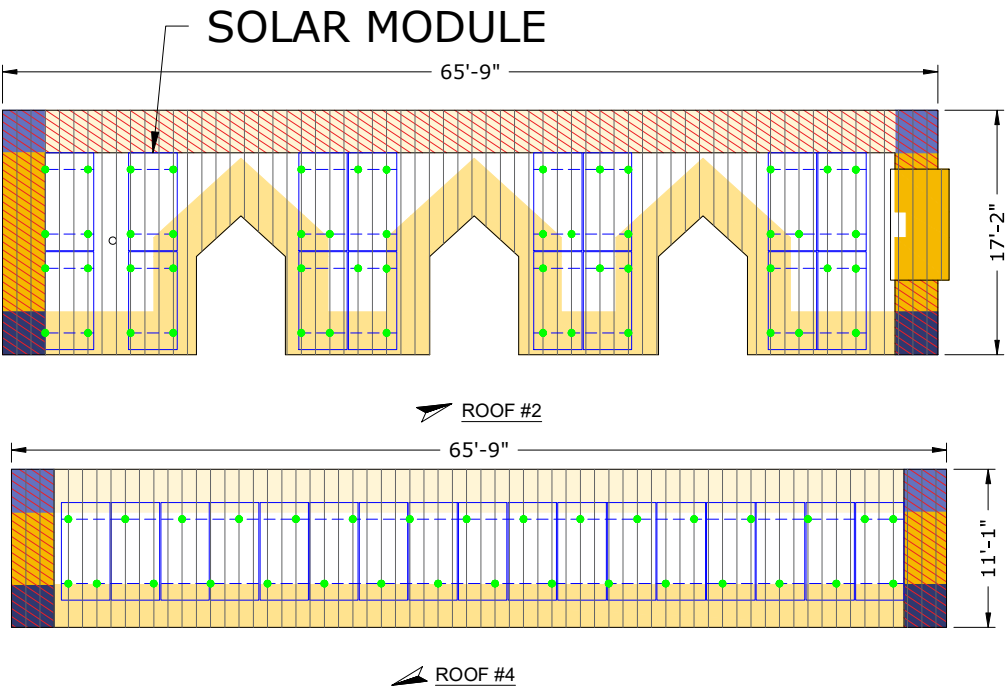
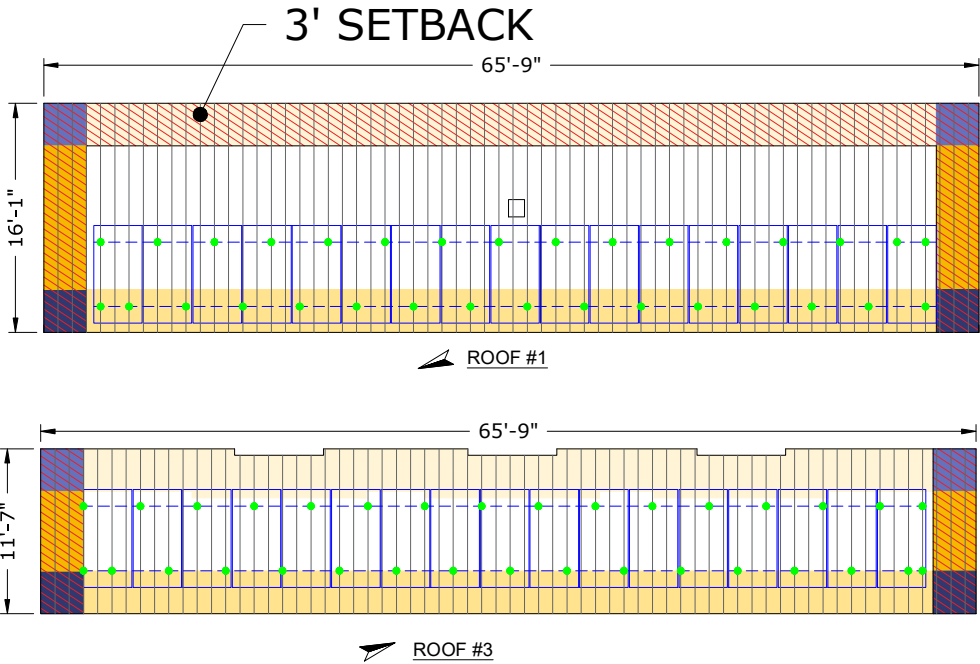


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LEGENDS

- FIRE SETBACK
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- PV ROOF ATTACHMENT
- RAILS
- RAFTERS / TRUSSES
- METAL SEAM
- WIND ZONE 1
  - WIND ZONE 1
  - WIND ZONE 1'
- WIND ZONE 2
  - WIND ZONE (2)
  - WIND ZONE (2r)
  - WIND ZONE (2e)
  - WIND ZONE (2n)
- WIND ZONE 3
  - WIND ZONE (3)
  - WIND ZONE (3r)
  - WIND ZONE (3e)

REV	ENG.	DESCRIPTION	DATE

PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
ARRAY LAYOUT

SHEET NUMBER
S-01



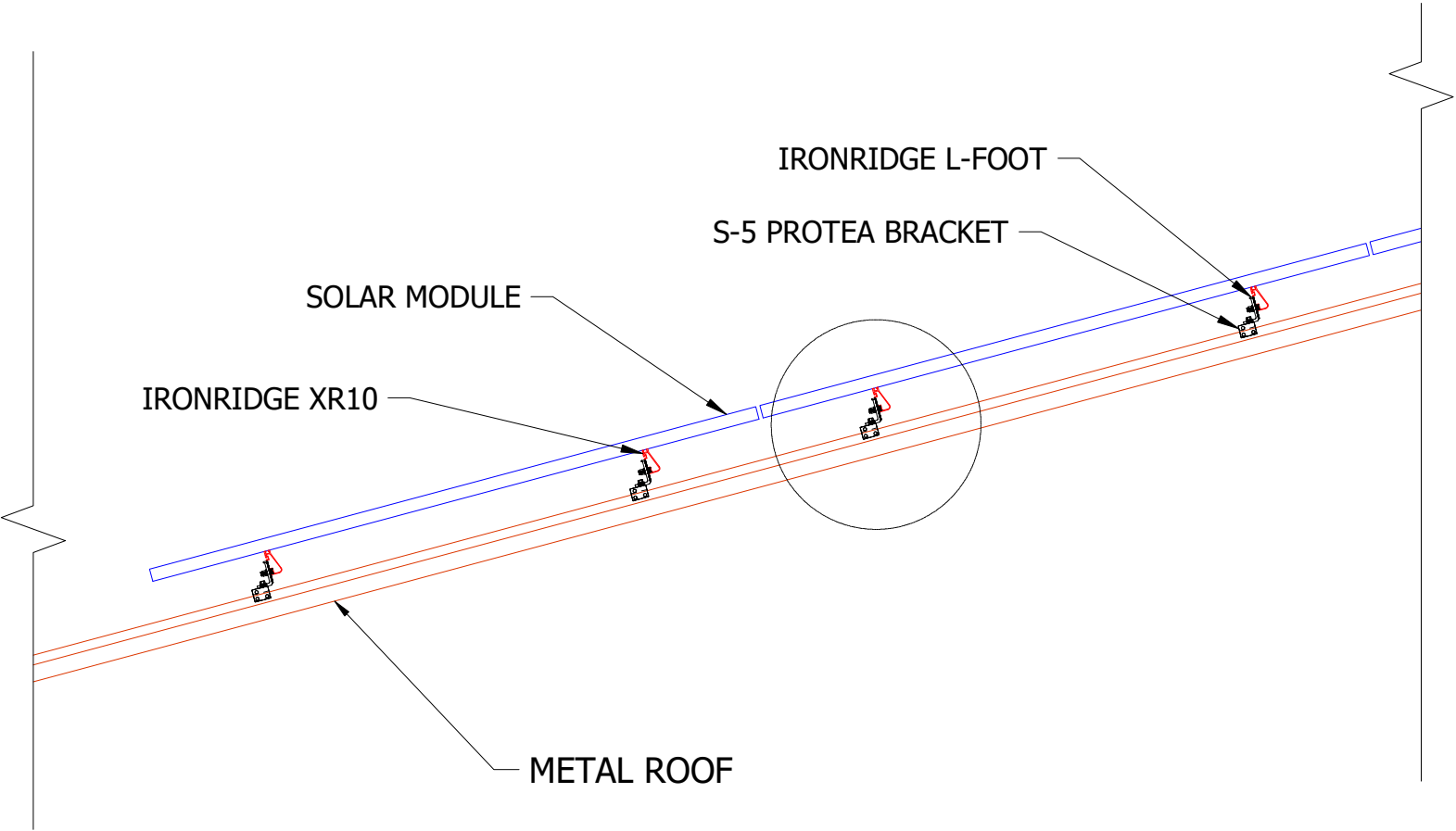
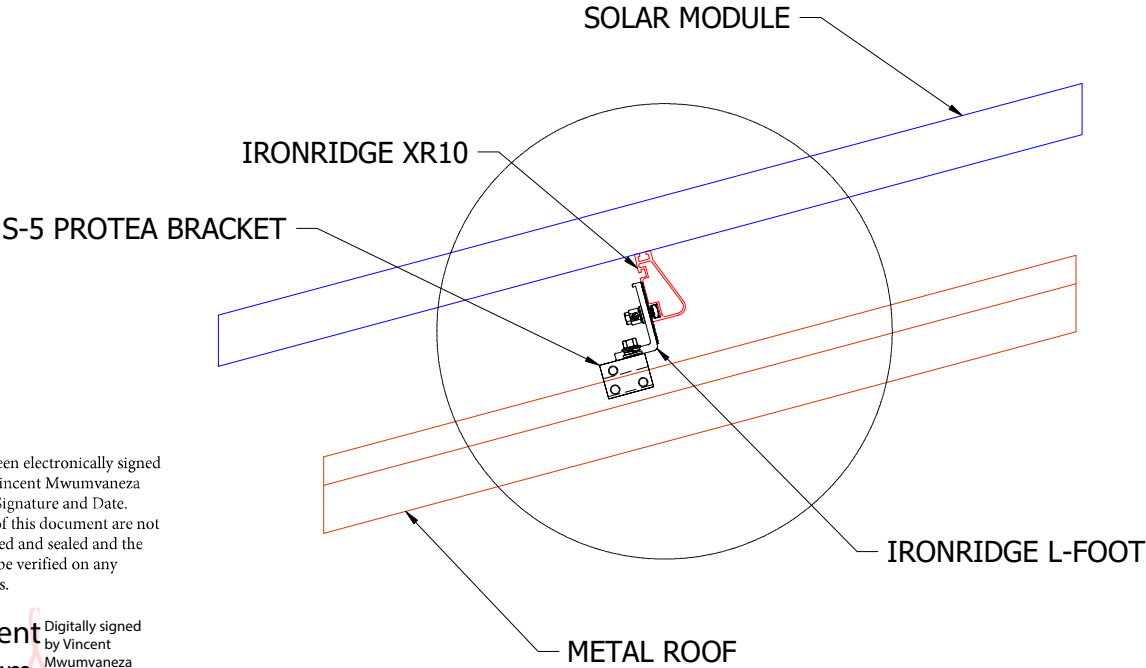
PHOTOVOLTAIC MODULE GENERAL NOTES:

- 1. APPLICABLE CODE: 2020 FLORIDA BUILDING CODE 7th ED. & ASCE 7-16  
MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES
- 2. BOLT DIAMETER AND EMBEDMENT LENGTHS ARE DESIGNED PER NDS(2012)  
REQUIREMENTS. ALL BOLT CAPACITIES ARE BASED ON A  
WOOD ROOF TRUSS AS EMBEDMENT MATERIAL.
- 3. ALL WIND DESIGN CRITERIA AND PARAMETERS ARE FOR HIP AND GABLE  
RESIDENTIAL ROOFS, CONSIDERING FROM A 7° TO A MAXIMUM 27° (2/12 TO A  
MAXIMUM 6/12 PITCH) ROOF IN SCHEDULE. ALL RESIDENTIAL ROOFS SHALL NOT  
EXCEED 30'-0" MEAN ROOF HEIGHT.
- 4. ROOF SEALANTS SHALL CONFORM TO ASTM C920 AND ASTM 6511.
- 5. THIS SHEET REFLECTS STRUCTURAL CONNECTIONS ONLY. REFER TO  
MANUFACTURERS' MANUAL FOR ALL ARCHITECTURAL, MECHANICAL,  
ELECTRICAL, AND SOLAR SPECS.
- 6. ALL ALUMINUM COMPONENTS SHALL BE ANODIZED ALUMINUM 6105-T5 UNLESS  
OTHERWISE NOTED.
- 7. LAG BOLTS SHALL BE ASTM A276 STAINLESS STEEL UNLESS OTHERWISE NOTED.
- 8. ALL RAILING AND MODULES SHALL BE INSTALLED PER  
MANUFACTURERS' INSTRUCTIONS.
- 9. I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE  
WITH FBC:BUILDING CHAPTER 16 AND FBC:RESIDENTIAL CHAPTER 3.  
BUILDING STRUCTURE WILL SAFELY ACCOMMODATE CALCULATED  
WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.



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STRUCTURAL ATTACHMENT DETAILS



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ENGINEER OF RECORD

ERNEST PASQUOT

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	DESCRIPTION					
	REV					
	ENG.					

PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
STRUCTURAL ATTACHMENT DETAILS

SHEET NUMBER
S-02

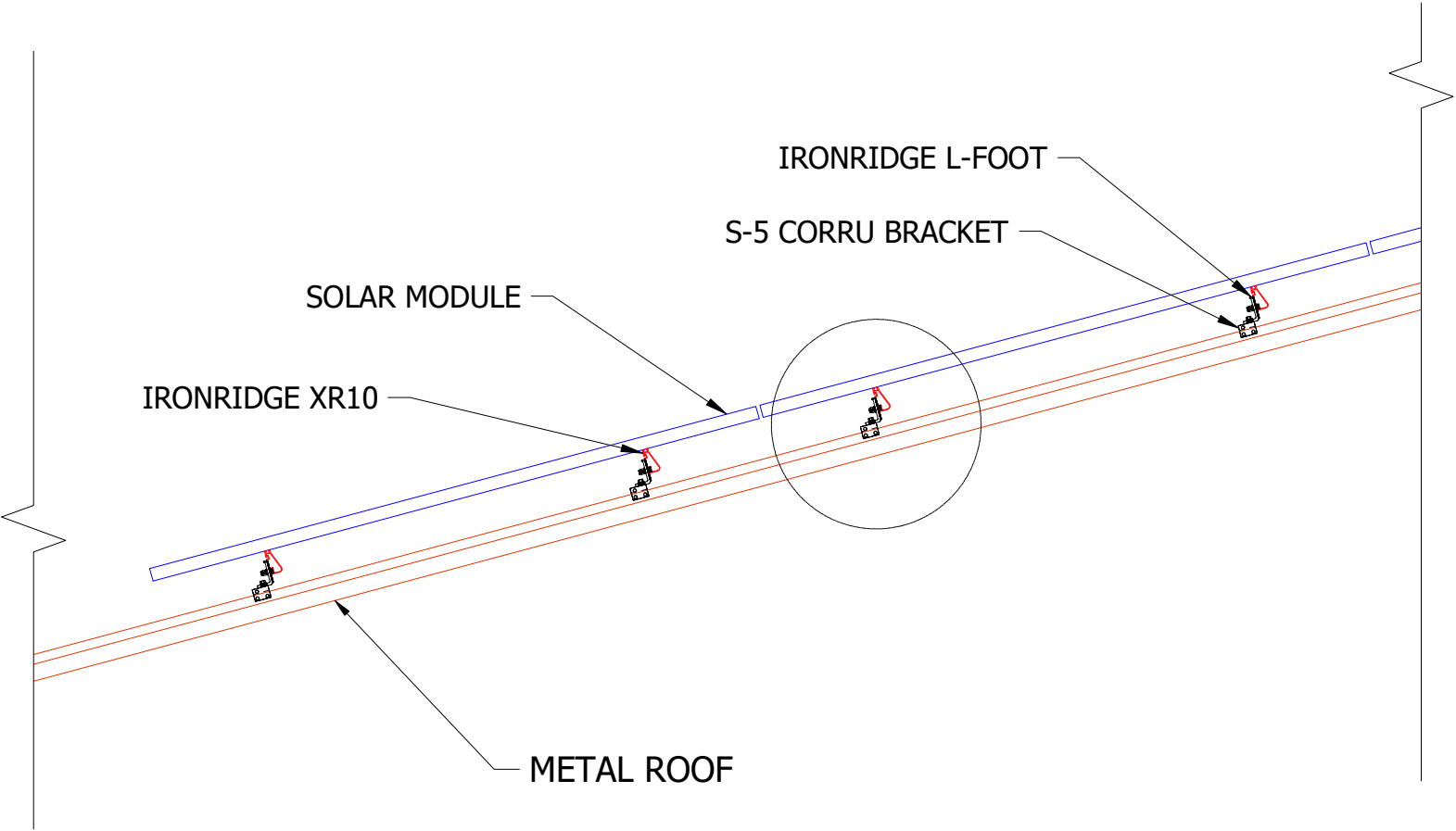
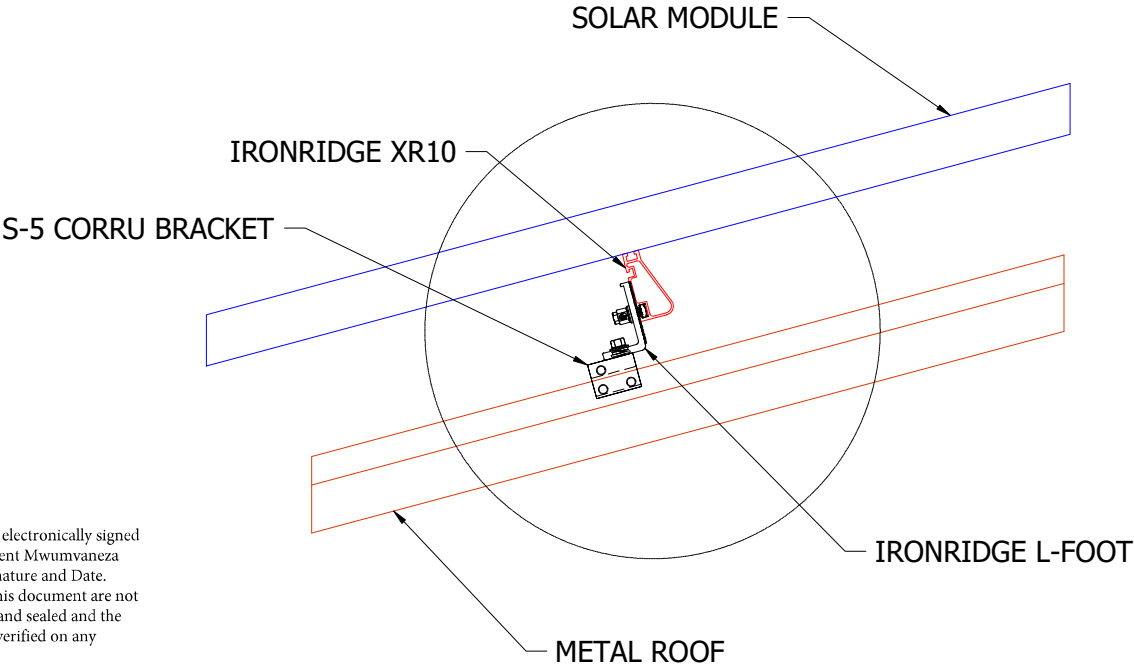
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STRUCTURAL ATTACHMENT DETAILS



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ENGINEER OF RECORD

ERNEST PASQUOT

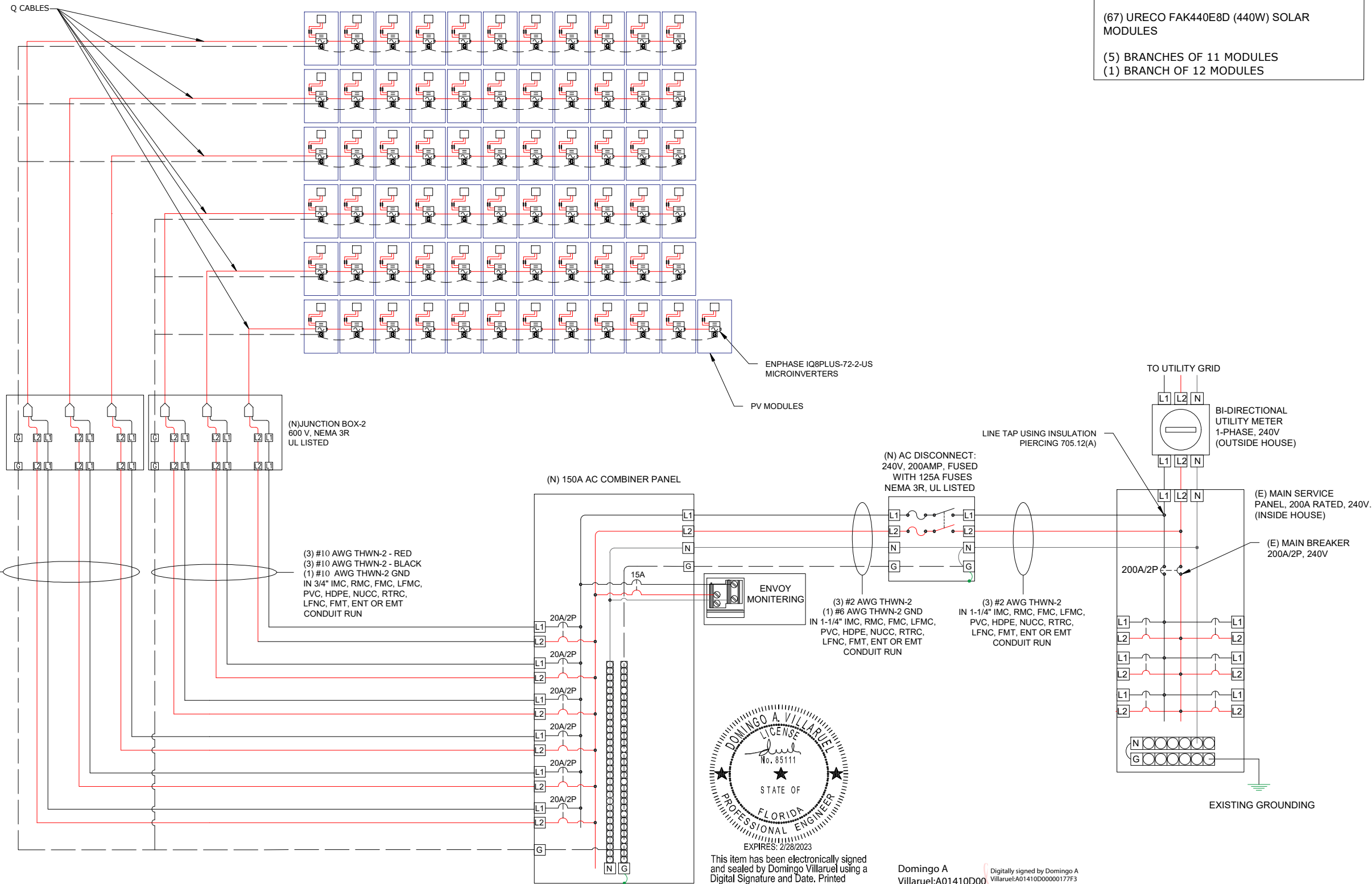
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FL 32024

REVISIONS	DATE				
	DESCRIPTION				
	REV	ENG.			

PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
STRUCTURAL ATTACHMENT DETAILS

SHEET NUMBER
S-03



**NOTE:**  
1. SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE NEC 2017, NFPA 70 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.  
2. PROVIDE TAP BOX IN COMPLIANCE WITH 312.8 IF PANEL GUTTER SPACE IS INADEQUATE.

SOLAR ARRAY (29.48KW-DC STC)  
  
(67) URECO FAK440E8D (440W) SOLAR MODULES  
  
(5) BRANCHES OF 11 MODULES  
(1) BRANCH OF 12 MODULES



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ERNEST PASQUOT

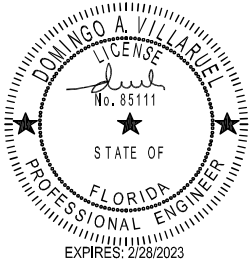
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FL 32024

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	DESCRIPTION				
	REV	ENG.			

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DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET NUMBER
E-01



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Domingo A  
Villaruel:A01410D00  
000177F3BC588C00  
01626D

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Villaruel:A01410D00000177F3  
BC588C0001626D  
Date: 2022.06.22 07:35:02  
-07'00'

ELECTRICAL CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE IQ COMBINER PANEL

AMBIENT TEMPERATURE = 34°C  
CONDUIT INSTALLED AT MINIMUM DISTANCE OF 7/8 INCHES ABOVE ROOF .....NEC 310.15(B)(3)(c)  
TEMPERATURE DERATE FACTOR - 0.96 ...NEC 310.15(B)(2)(a)  
GROUPING FACTOR - 0.8...NEC 310.15(B)(3)(a)

CONDUCTOR AMPACITY  
= (INV O/P CURRENT ) x 1.25 / A.T.F / G.F ...NEC 690.8(B)  
= [(12 x 1.21) x 1.25] / 0.96 / 0.8  
= 23.63 A  
SELECTED CONDUCTOR - #10 THWN-2 ...NEC 310.15(B)(16)

(B) AFTER IQ COMBINER PANEL

TEMPERATURE DERATE FACTOR - 0.96  
GROUPING FACTOR - 1

CONDUCTOR AMPACITY  
=(TOTAL INV O/P CURRENT) x 1.25 / 0.96 / 1 ...NEC 690.8(B)  
=[(67x 1.21) x 1.25] /0.96 / 1  
=105.56 A  
SELECTED CONDUCTOR - #2 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION ..NEC 690.9(B)

=TOTAL INVERTER O/P CURRENT x 1.25  
=(67 x 1.21) x 1.25 = 101.34 A  
SELECTED OCPD = 125A

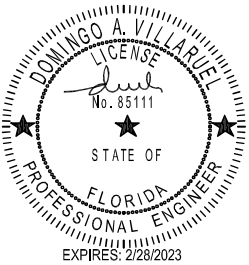
SELECTED EQUIPMENT GROUND CONDUCTOR (EGC) = #6 THWN-2 ... NEC 250.122(A)

ELECTRICAL NOTES

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.THE TERMINALS ARE RATED FOR 75 DEGREE C.
3. CONDUCTOR TERMINATION AND SPLICING AS PER NEC 110.14
4. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
5. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
6. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
7. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
8. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
9. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
10. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
11. THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
12. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
13. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
14. RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
15. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
16. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).

INVERTER SPECIFICATIONS	
MANUFACTURER	ENPHASE
MODEL NO.	IQ8PLUS-72-2-US
MAX DC INPUT VOLTAGE	60 V
MAX OUTPUT POWER	290 VA
NOMINAL AC OUTPUT VOLTAGE	240 V
NOMINAL AC OUTPUT CURRENT	1.21 A

MODULE SPECIFICATION	
MODEL NO.	URECO FAK440E8D
PEAK POWER	440W
RATED VOLTAGE (Vmpp)	41.16 V
RATED CURRENT (Impp)	10.69 A
OPEN CIRCUIT VOLTAGE (Voc)	49.47 V
SHORT CIRCUIT CURRENT (Isc)	11.16 A



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Domingo A  
Villaruel:A01410D0000  
0177F3BC588C000162  
6D

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Villaruel:A01410D00000177F3B  
C588C0001626D  
Date: 2022.06.22 07:35:13  
-07'00'



PHONE: 855-335-2469  
5344 9TH ST, ZEPHYRHILLS FL 33541  
LICENSE# EC13010029

ENGINEER OF RECORD

ERNEST PASQUOT

18011 US-441, LAKE CITY,  
FL 32024

REVISIONS	DATE				
	DESCRIPTION				
	REV	ENG.			

PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
WIRING CALCULATIONS

SHEET NUMBER
E-02



⚠

WARNING

ELECTRIC SHOCK HAZARD

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

LABEL LOCATION:  
AC DISCONNECT, POINT OF INTERCONNECTION,  
COMBINER PANEL  
(PER CODE: NEC 690.13(B))

WARNING PHOTOVOLTAIC  
POWER SOURCE

LABEL LOCATION:  
CONDUIT RUNWAY  
(PER CODE: NEC690.31(G)(3)(4))

⚠

WARNING DUAL POWER SOURCE

SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:  
MAIN SERVICE DISCONNECT  
(NEC 705.12(B)(3-4) & NEC 690.59)

ADHESIVE FASTENED SIGNS:  
·ANSI Z535.4-2011 PRODUCT SAFETY SIGNS AND LABELS, PROVIDES  
GUIDELINES FOR SUITABLE FONT SIZES, WORDS, COLORS, SYMBOLS, AND  
LOCATION REQUIREMENTS FOR LABELS. NEC 110.21(B)(1)  
·THE LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE  
ENVIRONMENT INVOLVED. NEC 110.21(B)(3)  
·ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY  
ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT. IFC 605.11.1.3

PHOTOVOLTAIC SYSTEM AC DISCONNECT

RATED AC OPERATING CURRENT 81.07 AMPS  
AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:  
AC DISCONNECT, INVERTER  
(PER CODE: NEC 690.54)

WARNING

INVERTER OUTPUT CONNECTION DO NOT  
RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:  
POINT OF INTERCONNECTION, MAIN SERVICE DISCONNECT  
(PER CODE: NEC 705.12 (B)(2)(c))  
[Not required if panelboard is rated not less than sum of ampere ratings  
of all overcurrent devices supplying it]

DATA PER PANEL

NOMINAL OPERATING AC VOLTAGE -	240	V
NOMINAL OPERATING AC FREQUENCY-	60	Hz
MAXIMUM AC POWER-	290	VA
MAXIMUM AC CURRENT-	1.21	A
MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION PER CIRCUIT-	20	A

LABEL LOCATION:  
COMBINER PANEL, AC DISCONNECT  
(PER CODE: NEC 690.52)

PHOTOVOLTAIC SYSTEM  
EQUIPPED WITH RAPID  
SHUTDOWN

LABEL LOCATION:  
AC DISCONNECT, DC DISCONNECT, POINT OF  
INTERCONNECTION  
(PER CODE: NEC 690.56(C)(3))

⚠

WARNING

INVERTER OUTPUT CONNECTION  
DO NOT RELOCATE THIS  
OVERCURRENT DEVICE

EMERGENCY CONTACT

855-335-2469

⚠

WARNING

DEDICATED SOLAR PANELS DO  
NOT CONNECT ANY OTHER LOADS

SOLAR PV SYSTEM EQUIPPED  
WITH RAPID SHUTDOWN

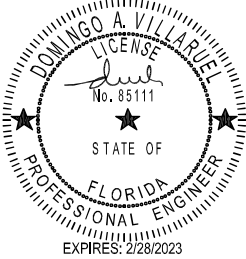
TURN RAPID SHUTDOWN  
SWITCH TO THE  
"OFF" POSITION TO  
SHUTDOWN PV SYSTEM  
AND REDUCE  
SHOCK HAZARD  
IN ARRAY

SOLAR ELECTRIC  
PV PANELS

IFC 605.11.3.1(1) & 690.56(C)(1)(a) Label for PV Systems that  
Shut down the array and the conductors leaving the array

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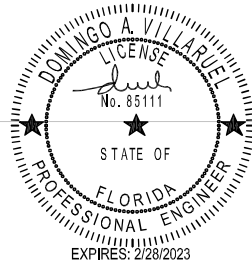
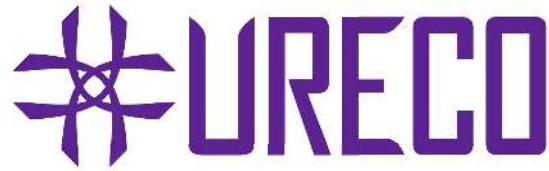
18011 US-441, LAKE CITY,  
FL 32024

REVISIONS	DATE				
	DESCRIPTION				
REV	ENG.				

PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
SYSTEM LABELING
SHEET NUMBER
E-03





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FAK\_E8D / 144 cells  
440-460W  
Mono-Crystalline PV Module

URE Peach module uses URE state-of-the-art cell cutting technology, and advanced module manufacturing experiences.



## Key Features



Positive power tolerance  
+0 ~ +4.99 watt



100% EL inline inspection  
Better module reliability



Withstand heavy loading  
front load 5400 Pa & rear load 2400 Pa



Design for 1500 VDC  
Reduce the system BOS effectively



Excellent low light performance  
3.5% relative eff. Reduction at low-irradiance (200W/m<sup>2</sup>)



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For more information, please visit us at [www.urecorp.com](http://www.urecorp.com)

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## Electrical Data

Model - STC		FAK440E8D	FAK445E8D	FAK450E8D	FAK455E8D	FAK460E8D
Maximum Rating Power (Pmax)	[W]	440	445	450	455	460
Module Efficiency	[%]	20.24	20.47	20.70	20.93	21.16
Open Circuit Voltage (Voc)	[V]	49.47	49.67	49.87	50.06	50.25
Maximum Power Voltage	[V]	41.16	41.36	41.56	41.75	41.94
Short Circuit Current (Isc)	[A]	11.16	11.23	11.30	11.37	11.44
Maximum Power Current	[A]	10.69	10.76	10.83	10.90	10.97

\*Standard Test Condition (STC): Cell Temperature 25 °C, Irradiance 1000 W/m<sup>2</sup>, AM 1.5

\*Values without tolerance are typical numbers. Measurement tolerance: ±3%

## Mechanical Data

Item	Specification
Dimensions	2094mm (L) <sup>1</sup> x 1038 mm (W) <sup>1</sup> x 40 mm (D) <sup>2</sup> / 82.44" (L) <sup>1</sup> x 40.87" (W) <sup>1</sup> x 1.57" (D) <sup>2</sup>
Weight	23.0 kg / 50.71 lbs
Solar Cell	166mm x 83mm, 144 pcs
Front Glass	3.2mm thickness
Junction Box	IP 68, 3 diodes
Frame	Anodized aluminum alloy
Cables/Connectors	4.0mm <sup>2</sup> / MC4 compatible
Package Configuration	27pcs per pallet, 594 pcs per 40' HQ container

<sup>1</sup> : With assembly tolerance of ± 2 mm [ ± 0.08" ]

<sup>2</sup> : With assembly tolerance of ± 0.8 mm [ ± 0.03" ]

## Operating Conditions

Item	Specification
Mechanical Load	5400 Pa
Maximum System Voltage	1500 VDC
Series Fuse Rating	20 A
Operating Temperature	-40 to 85 °C

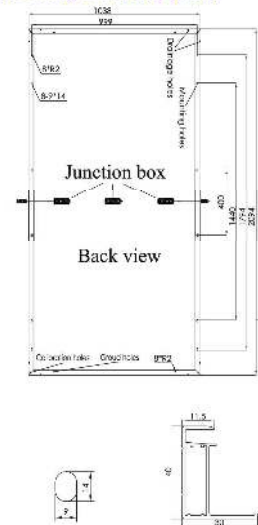
## Temperature Characteristics

Item	Specification
Nominal Module Operating Temperature	43°C ± 2°C
Temperature Coefficient of Isc	0.039 % / °C
Temperature Coefficient of Voc	-0.295 % / °C
Temperature Coefficient of Pmax	-0.390 % / °C

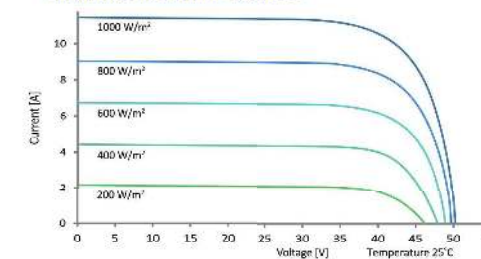
\*Nominal module operating temperature (NMOT): Air mass AM 1.5, irradiance 800W/m<sup>2</sup>, temperature 20°C, wind speed 1 m/s.

\*Reduction in efficiency from 1000W/m<sup>2</sup> to 200W/m<sup>2</sup> at 25°C: 3.5 ± 2%.

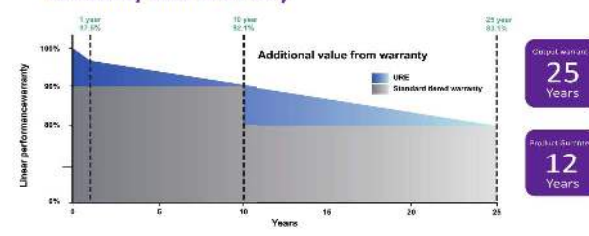
## Engineering Drawing (mm)



## Dependence on Irradiance



## Reliability with Warranty



For more information, please visit us at [www.urecorp.com](http://www.urecorp.com)

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URECO\_EU\_Peach\_FAK\_L8D\_L1\_3.2\_40mm\_WS\_EN\_200806



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5344 9TH ST, ZEPHYRHILLS FL 33541  
LICENSE# EC13010029

ENGINEER OF RECORD

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FL 32024

REV	ENG.	DESCRIPTION	DATE				

PERMIT DEVELOPER

DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME

MODULE  
DATASHEET

SHEET NUMBER

DS-01

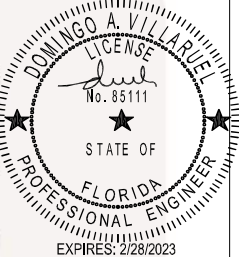




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DATA SHEET



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## IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



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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IQ8SE-DS-0001-01-EN-US-2022-03-17

### Easy to install

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

### High productivity and reliability

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

### Microgrid-forming

- Complies with the latest advanced grid support\*\*
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

\* Only when installed with IQ System Controller 2, meets UL 1741. IQ8H-208V operates only in grid-tied mode.  
\*\* IQ8 Series Microinverters supports split phase, 240V. IQ8H-208 supports split phase, 208V only.

## IQ8 Series Microinverters

INPUT DATA [DC]		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US <sup>1</sup>
Commonly used module pairings <sup>2</sup>	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell					
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48			25 – 58		
Min/max start voltage	V	30 / 48			30 / 58		
Max input DC voltage	V	50			60		
Max DC current <sup>3</sup> [module Isc]	A			15			
Overtoltage class DC port				II			
DC port backfeed current	mA			0			
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA [AC]		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US <sup>1</sup>
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range <sup>4</sup>	V			240 / 211 – 264			208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz			60			
Extended frequency range	Hz			50 – 68			
AC short circuit fault current over 3 cycles	Arms			2			4.4
Max units per 20 A (L-L) branch circuit <sup>5</sup>		16	13	11	11	10	9
Total harmonic distortion				<5%			
Overtoltage class AC port				III			
AC port backfeed current	mA			30			
Power factor setting				1.0			
Grid-tied power factor (adjustable)				0.85 leading – 0.85 lagging			
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW			60			
MECHANICAL DATA							
Ambient temperature range				-40°C to +60°C (-40°F to +140°F)			
Relative humidity range				4% to 100% (condensing)			
DC Connector type				MC4			
Dimensions (HxWxD)				212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")			
Weight				1.08 kg (2.38 lbs)			
Cooling				Natural convection – no fans			
Approved for wet locations				Yes			
Pollution degree				PD3			
Enclosure				Class II double-insulated, corrosion resistant polymeric enclosure			
Environ. category / UV exposure rating				NEMA Type 6 / outdoor			
COMPLIANCE							
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01					
Certifications		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) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2022-03-17



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FL 32024

REVISIONS	DATE				
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PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME	
INVERTER DATASHEET	
SHEET NUMBER	
DS-02	



Powering Business Worldwide

pe.eaton.com



BR style 1-inch loadcenter

BR816L125RP

UPC:786676001472

Dimensions:

- Height: 13 IN
- Length: 3.56 IN
- Width: 11 IN

Warranties:

- 10 year

Specifications:

- Special Features: Current design
- Type: Main lug
- Amperage Rating: 125A
- Box Size: 7r
- Bus Material: Aluminum
- Cover: Cover included
- Enclosure: NEMA 3R
- Enclosure Material: Metallic
- Interrupt Rating: 10 kAIC
- Main Circuit Breaker: BR
- Number Of Circuits: 16
- Number Of Spaces: 8
- Number Of Wires: Three-wire
- Phase: Single-phase
- Voltage Rating: 120/240V
- Wire Size: #14-1 AWG Cu/Al

Supporting documents:

- Eatons Volume 1-Residential and Light Commercial
- Cutler-Hammer Type CH and BR Loadcenters - Instructions
- Type BR Arc Fault Circuit Breakers and Loadcenters
- Eaton Specification Sheet - BR816L125RP

Certifications:

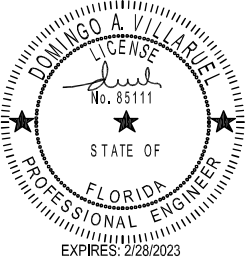
- UL 67
- UL 50

Product compliance: No Data

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DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME	
COMBINER DATASHEET	
SHEET NUMBER	
DS-03	



FLORIDA PRODUCT APPROVAL  
STREAMLINES SOLAR DESIGN & PERMITTING

## The First in Florida

In 2020, IronRidge became the first High Velocity Hurricane Zone (HVHZ) approved solar system in accordance with 7-10 building code. We are happy to share that the Flush Mount System is now HVHZ-approved in accordance with 7-16 as well. We are committed to safe solar, even in extreme environments.

The rigorous evaluation process for Florida Product Approval includes testing for resistance to high wind forces (TAS 202) and wind-driven rain [TAS 100(A)], and ongoing auditing of quality assurance programs.

Our Florida Product Approval (FL#29843) covers all Flush Mount components and applies to all regions of the state of Florida both inside and outside the high-velocity hurricane zones (HVHZ), up to 100 PSF of wind pressure. The approval also lists allowable rail spans for configurations using either XR10, XR100, or XR1000 mounting rails as well as multiple IronRidge roof attachments.



## Approved Components &amp; Configurations

**2-Rail**  
Standard Rack Configuration

**3-Rail**  
Extra Support for Module Frames

**UFO + Stopper**  
Universal Mid- and End-Clamp

**CAMO**  
Hidden End Cam for Superior Aesthetics

## Pressure Tables

The following tables were prepared by IronRidge to provide a quick reference for the maximum wind uplift pressures on gable and hip roofs at different tilt angles (see full [Florida Approval Pressure Tables](#) document on the IronRidge website for official stamped version).

Roof Tilt Angle	Maximum Wind Uplift Pressure for Gable Roofs (psf)								
	Exposure B			Exposure C			Exposure D		
	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
8-20°	35	47	55	48	63	74	57	75	89
21-27°	27	39	44	37	53	59	44	63	71
28-45°	27	32	40	36	43	54	43	52	64

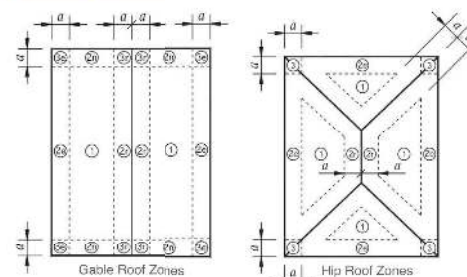
Roof Tilt Angle	Maximum Wind Uplift Pressure for Hip Roofs (psf)								
	Exposure B			Exposure C			Exposure D		
	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
8-20°	33	39	42	44	53	57	52	63	68
21-27°	22	32	32	30	43	43	35	52	52
28-45°	24	26	34	32	35	46	39	41	55

## Footnotes:

- The pressure forces tabulated are per ASD (Allowable Stress Design) method and Florida Building Code 2020.
- The pressure values are calculated based on the single module area of 22 sf as the maximum allowed and 25 ft building height defined as the average of the roof ridge and eave height.
- The tabulated values are based on the selected ultimate design wind speed  $V_{ult}$  of 175 mph. For other chosen ultimate wind speed ( $V_{ult-other}$ ), the pressure shall be adjusted per the following equation: Pressure for  $V_{ult-other}$  = Pressure from the table x  $(V_{ult-other}/175)^2$ .
- The pressures are calculated for non-exposed modules in the array as defined by ASCE 7-16 Section 29.4.4. For exposed modules, the pressure shall be multiplied by an edge factor of 1.5.
- The table is applicable to an array which maintains a minimum edge distance (to ridge, eave, side rake, or hip) of  $2xh_2$  ( $h_2$  is the clearance from the roof surface to underside of the module), and contains modules with the maximum dimension not exceed 80.4".

Grouping of ASCE 7-16 Roof Zones (Gable)						
Roof Slope	8-27°			28-45°		
Group	1	2	3	1	2	3
ASCE 7-16 Roof Zones	1 2e	2n 2r 3e	3r	1 2e 2r	2n 3r	3e

Grouping of ASCE 7-16 Roof Zones (Hip)									
Roof Slope	8-20°			21-27°			28-45°		
Group	1	2	3	1	2	3	1	2	3
ASCE 7-16 Roof Zones	1	2r	2e 3r	1	2e 2r	3	1	2e	2r 3



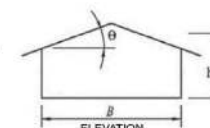
## Notation (Per ASCE 7-16)

$a$  = 10% of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m). If an overhang exists, the edge distance shall be measured from the outside edge of the overhang. The horizontal dimensions used to compute the edge distance shall not include any overhang distances.

$b$  = Horizontal dimension of building measured normal to wind direction, in ft (m).

$h$  = Mean roof height, in ft (m).

$\phi$  = Angle of plane of roof from horizontal, in degrees.



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LICENSE# EC13010029

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FL 32024

REVISIONS	DATE				
	DESCRIPTION				
	REV. ENG.				

## PERMIT DEVELOPER

DATE 05/20/2022

DESIGNER OSK

REVIEWER

## SHEET NAME

RACKING  
DATASHEET

## SHEET NUMBER

DS-03



# S-5!®

## The Right Way

The right way to attach almost anything to metal roofs!

### ProteaBracket™

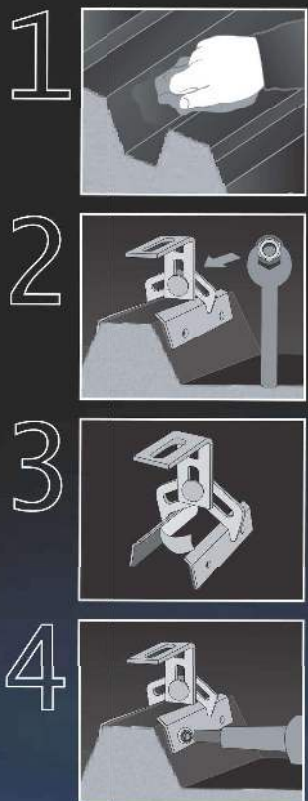
ProteaBracket™ is the most versatile attachment solution on the market, fitting most metal trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate varying widths and 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.

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 all 6 pre-punched holes.

ProteaBracket is the perfect match for the S-5-PV Kit, for a solar attachment solution that is both economical and easy to use.

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

S-5! PV kits have an M8 bolt and are suitable for use with all S-5! clamps.



ProteaBracket™



## 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.

#### S-5!® holding strength is unmatched in the industry.

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. For design assistance, contact Safintra South Africa (and see our website [www.safintra.co.za](http://www.safintra.co.za)), or visit [www.S-5.com](http://www.S-5.com) for the independent lab test data that can be used for load-critical designs and applications. Also, please visit S-5! website for more information including metallurgical compatibilities and specifications.

#### Multiple Attachment Options:

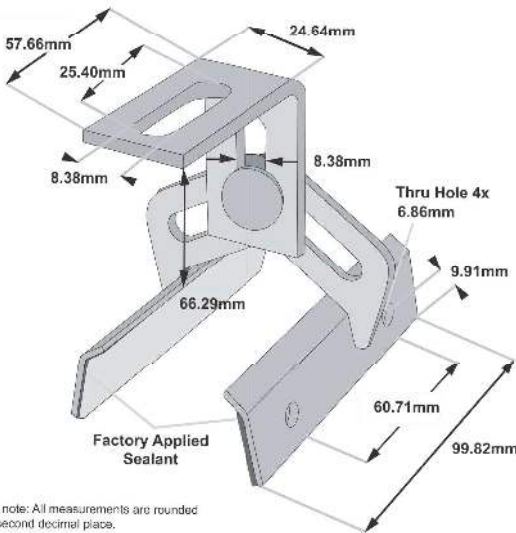
ProteaBracket™ with Top Rail option for PV attachment



ProteaBracket™ with S-5-PV Kit option (if not using a rail)



### ProteaBracket™



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

#### FLUTELINE



#### VERSATILE



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

S-5! Brackets and clamps are not tested for performance as part of a Fall Arrest or Personal Safety system. These applications need to be tested as a dynamic system and warranties or test results must be issued by the system provider. Safintra, Safal Group and its subsidiaries provide no warranties or any assurances in this application, and will accept no claims of any nature whatsoever arising out of any such applications.

Products are protected by multiple international patents. For published data regarding holding strength, bolt torque, patents and trademarks visit the S-5! website at [www.S-5.com](http://www.S-5.com).

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#### Sole Agents for Africa:



PHONE: 855-335-2469  
5344 9TH ST, ZEPHYRHILLS FL 33541  
LICENSE# EC13010029

ENGINEER OF RECORD

ERNEST PASQUOT

18011 US-441, LAKE CITY,  
FL 32024

REVISIONS	DATE				
	DESCRIPTION				
REV	ENG.				

PERMIT DEVELOPER	
DATE	05/20/2022
DESIGNER	OSK
REVIEWER	

SHEET NAME
ATTACHMENT DATASHEET

SHEET NUMBER
DS-04



The right way to attach almost anything to metal roofs!

# S-5!<sup>®</sup>

## The Right Way!

### CorruBracket<sup>™</sup>

CorruBracket<sup>™</sup> can be used to mount almost anything to corrugated metal roofing and is compatible with 7/8" and 3/4" corrugated roofing. No messy sealants to apply! No chance for leaks! The CorruBracket comes with factory-applied butyl sealant already in the base, and the S-5!<sup>®</sup> patented reservoir conceals the sealant, preventing UV degradation.

Installation is simple! CorruBracket is mounted directly into the supporting structure of the roof, i.e. roof decking, wood or steel purlins, or trusses. No surface preparation is necessary; simply wipe away excess oils and debris, peel the release paper, align, and apply. Secure through the pre-punched holes using the appropriate screws for the supporting structure.

CorruBracket is so strong, it will even support heavy-duty applications like snow retention. For corrugated profiles, the CorruBracket is the perfect match for our ColorGard<sup>®</sup> snow retention system. CorruBracket is economical and facilitates quick and easy installation.



S-5!<sup>®</sup> CorruBracket<sup>™</sup> is the right way to attach almost anything to 7/8" and 3/4" corrugated roofing, including PV via DirectAttached<sup>™</sup> or rail methods.

- 
- 
- 

CorruBracket<sup>™</sup>

888-825-3432 | [www.S-5.com](http://www.S-5.com)

## S-5!<sup>®</sup>

### The Right Way!

CorruBracket<sup>™</sup> is extremely versatile. It can be used for almost any attachment need on 7/8" and 3/4" corrugated metal roofing. No messy sealants to apply. The factory-applied butyl sealant waterproofs and makes installation a snap!

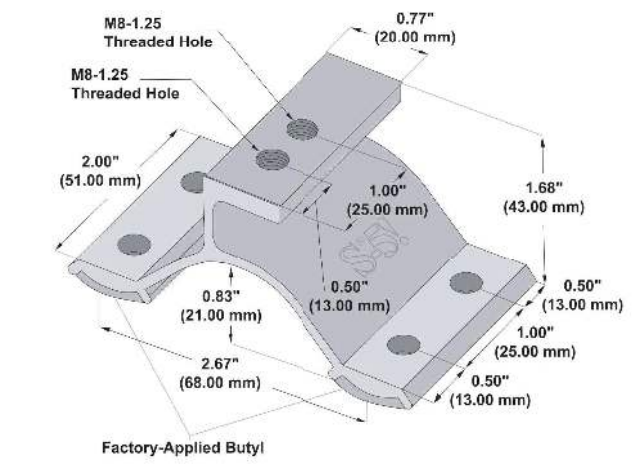
Each CorruBracket<sup>™</sup> comes with factory-applied butyl sealant in the base. CorruBracket is compatible with most common metal roofing materials. For design assistance, ask your distributor, or use our web-based calculator at [www.S-5.com](http://www.S-5.com) for job-specific system engineering and design of your next snow retention project. Also, please visit our website for more information including CAD details, metallurgical compatibilities and specifications.

The CorruBracket has been tested for load-to-failure results on wood decking, and metal and wood purlins. The independent lab test data found at [www.S-5.com](http://www.S-5.com) can be used for load-critical designs and applications. S-5!<sup>®</sup> holding strength is unmatched in the industry.

### Example Profile



### CorruBracket<sup>™</sup>



Please note: All measurements are rounded to the second decimal place. Contact your distributor for information about hardware requirements.

### Example Applications

S-5-PV Kit (DirectAttached<sup>™</sup> or Rail)



ColorGard<sup>®</sup>



**S-5!<sup>®</sup> Warning! Please use this product responsibly!**  
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**DS-05**