

April 28, 2022

Revised November 11, 2024

Green World Renewable Energy
4408 Ritchie Highway
Baltimore, MD 21225

Scott Wyssling
, PE

Digitally signed by Scott Wyssling, PE
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, OU
=Engineering, CN="Scott Wyssling, PE", E=swyssling@
wysslingconsulting.com
Reason: I am the author of this document
Location:
Date: 2024.11.11 12:25:46-07'00'
Foxit PDF Editor Version: 13.1.4

Re: Engineering Services
Potts Residence
126 Southwest Wilshire Drive, Lake City, FL
10.800 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

A. Site Assessment Information

1. Site visit documentation identifying attic information including size and spacing of framing 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 will be utilized for approval and construction of the proposed system.

B. Description of Structure:

Roof Framing: Assumed prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber.
Roof Material: Composite Asphalt Shingles
Roof Slope: 22 degrees
Attic Access: Inaccessible
Foundation: Permanent

C. Loading Criteria Used

- **Dead Load**
 - Existing Roofing and framing = 7 psf
 - New Solar Panels and Racking = 3 psf
 - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 0 psf
- **Wind Load** based on ASCE 7-16
 - Ultimate Wind Speed = 120 mph (based on Risk Category II)
 - Exposure Category C

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the FBC 2020 (7th Edition) including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.

D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent IronRidge installation manual. 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. The maximum allowable withdrawal force for a #14 screw is 194 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 2", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using two (2) #14 screws with a minimum of 2" embedment will be adequate and will include a sufficient factor of safety.
3. The maximum allowable withdrawal for a #14 screw in 1/2" plywood is 55 lbs per screw (per APA technical note E830d). Connection on the roof is utilizing four (6) #14 screws into the existing decking to resist uplift forces. Contractor to verify installation to be performed in accordance with the manufacturer's recommendations. Based on four (6) #14 screws into 1/2" plywood 330 lbs of uplift resistance is provided per attachment.
4. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 24"/48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the FBC 2020 (7th Edition), current industry standards, and is 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
Florida Business License No. RY34912



Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
Florida License # RY34912

Signed 11/11/2024

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SEALED BY SCOTT WYSSLING, PE USING A DIGITAL
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WILLIAM POTTS
NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM
DC SYSTEM SIZE (10.8 KW)



ADD : 612 FLORIDA AVENUE, PALM HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REV	ENGG.	DESCRIPTION	DATE				

PERMIT DEVELOPER

DATE04/28/2022

DESIGNERODK

REVIEWER

SHEET NAME

SITE MAP &
VICINITY MAP

SHEET NUMBER

A-01

SYSTEM DETAILS

DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	SYSTEM SIZE :10.8 KW DC STC
AC RATING OF SYSTEM	8.7 KW
AC OUTPUT CURRENT	36.3 A
NO. OF MODULES	(30) TRINA SOLAR TSM-DE06X.05(II) 360W MODULES
NO. OF INVERTERS	(30) ENPHASE IQ8PLUS-72-2-US MICROINVERTERS
POINT OF INTERCONNECTION	LINE SIDE TAP IN THE MSP
ARRAY STRINGING	(3) BRANCHES OF 10 MODULES

SITE DETAILS

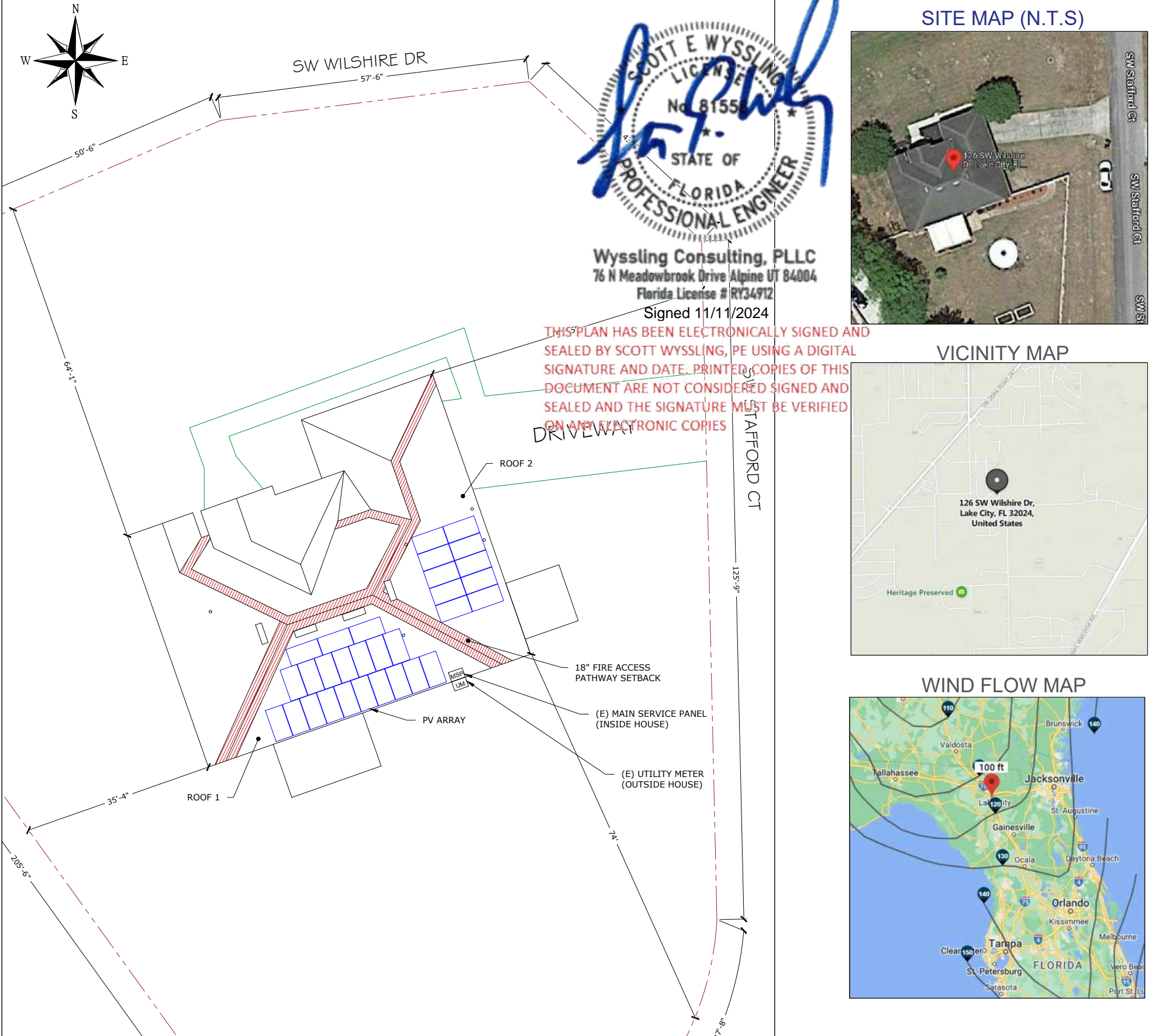
ASHRAE EXTREME LOW	-5°C
ASHRAE 2% HIGH	34°C
GROUND SNOW LOAD	0 PSF
WIND SPEED	120MPH (ASCE 7-16)
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	C

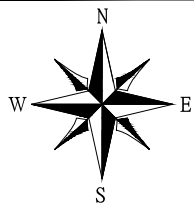
GOVERNING CODES

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

SHEET INDEX

SHEET NO.	SHEET NAME
A - 01	SITE MAP & VICINITY MAP
A - 02	ROOF PLAN & MODULES
S - 01	ARRAY LAYOUT
S - 02	STRUCTURAL ATTACHMENT DETAIL
S - 03	STRUCTURAL ATTACHMENT DETAIL
E - 01	ELECTRICAL LINE DIAGRAM
E - 02	WIRING CALCULATIONS
E - 03	SYSTEM LABELING
DS - 01	MODULE DATASHEET
DS - 02	INVERTER DATASHEET
DS - 03	COMBINER BOX DATASHEET
DS - 04	ATTACHMENT DATASHEET
DS - 05	RACKING DATASHEET





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Florida License # RY34912

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MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 30 MODULES
MODULE TYPE = TRINA SOLAR TSM-DE06X.05(II) 360W MODULES
MODULE WEIGHT = 43.43 LBS / 19.7 KG.
MODULE DIMENSIONS = 72.91" X 39.21" = 19.85 SF

NUMBER OF INVERTER = 30 MICROINVERTERS
INVERTER TYPE = ENPHASE IQ8PLUS-72-2-US MICROINVERTERS

DC SYSTEM SIZE: 10.8 KW
AC SYSTEM SIZE: 8.7 KW

GENERAL INSTALLATION PLAN NOTES:

(1) PANEL DESIGNATIONS SHOWN ON THESE DRAWINGS ARE GIVEN FOR CLARIFICATION OF THE CIRCUITING ONLY AND MAY NOT CORRESPOND TO THE DESIGNATIONS FOUND IN THE FIELD

2) ROOF ATTACHMENTS TO TRUSSES 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.

3) EXISTING RESIDENTIAL BUILDING ROOF WITH MEAN ROOF HEIGHT 15 FT AND 2"X4" WOOD ROOF TRUSSES SPACED 24" 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.

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 = 3073 SQFT
TOTAL PV AREA = $30(72.91 \text{ IN})(39.21 \text{ IN}) / (144 \text{ IN}^2)$
= 595.58 SQFT

$(595.58 \text{ SQFT} / 3073 \text{ SQFT}) 100 = 19.38 \%$
TOTAL PV AREA POPULATES 19.38 % OF TOTAL PLAN VIEW AREA AND IS WITHIN THE 33% REQUIREMENT.

LEGENDS

- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- JB - JUNCTION BOX
- ACD - AC DISCONNECT
- CP - COMBINER PANEL
- FIRE SETBACK
- ROOF ACCESS POINT
- MICROINVERTER
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- CONDUIT

NOTE : INSTALLERS MAY MOVE PANELS IF NEEDED TO BE WITHIN THE MEANS OF THE SETBACKS.



Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVISIONS	DATE				
	DESCRIPTION				
REV	ENG.				

PERMIT DEVELOPER

DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME

ROOF PLAN
& MODULES

SHEET NUMBER

A-02

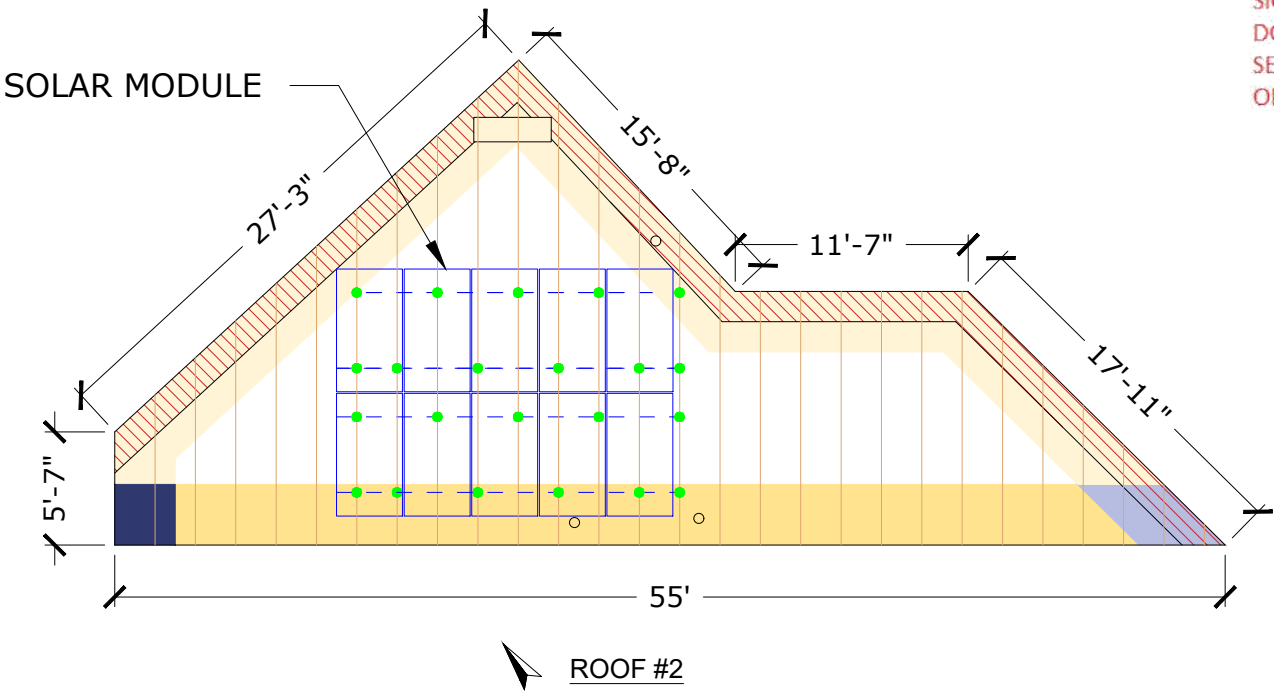
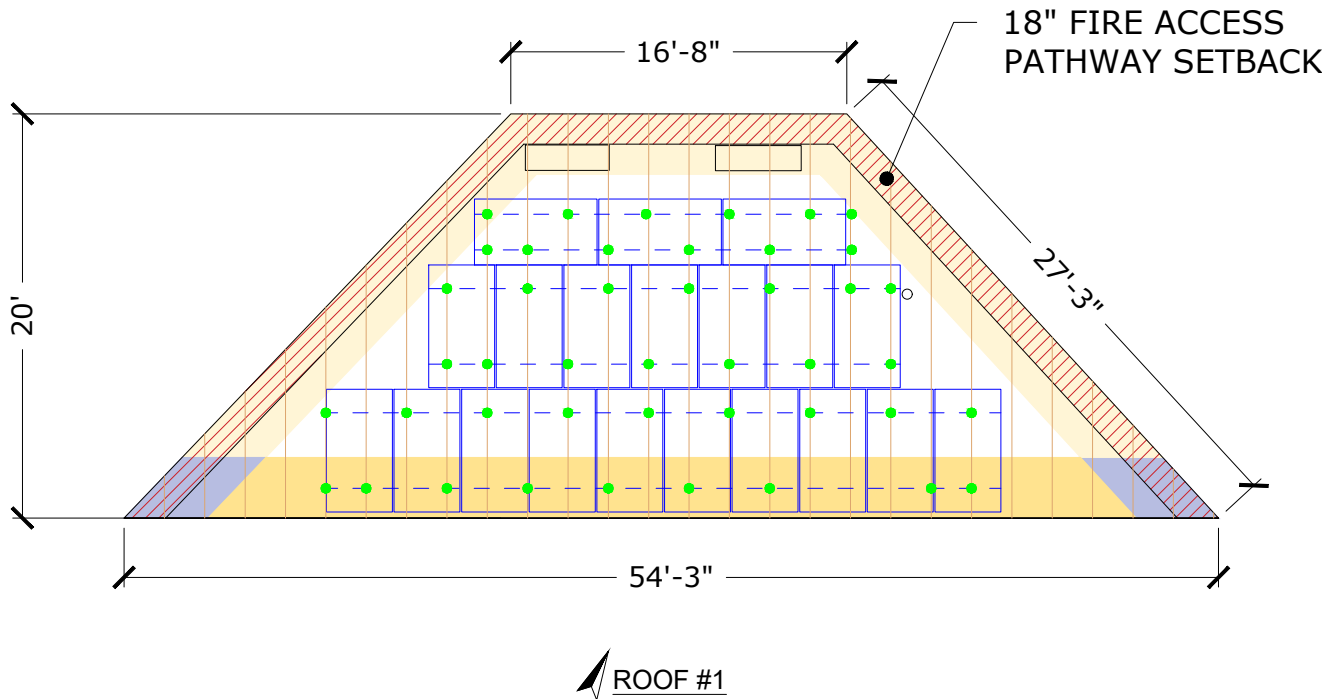
ROOF DESCRIPTION:

(ROOF #1)

MODULES - 20
ROOF TILT - 22°
ROOF AZIMUTH - 160°
TRUSSES SIZE - 2"x4" @ 24" O.C.

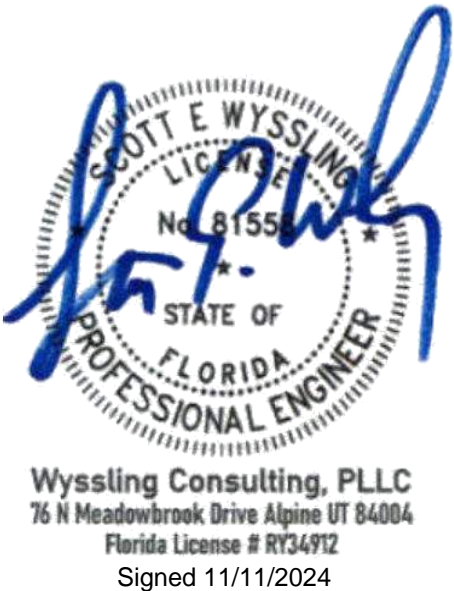
(ROOF #2)

MODULES - 10
ROOF TILT - 22°
ROOF AZIMUTH - 70°
TRUSSES SIZE - 2"x4" @ 24" O.C.



TRUSS 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"

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: 120 MPH
EXPOSURE CATEGORY: C
RISK CATEGORY: II
MEAN ROOF HEIGHT: 15 FEET
ROOF SLOPE: 20-27°



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LEGENDS

- FIRE SETBACK
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- PV ROOF ATTACHMENT
- RAIL
- 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)

Unicity
Solar Energy
ADD : 612 FLORIDA AVENUE, PALM
HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVISIONS	DATE	DESCRIPTION	REV	ENG.	DATE

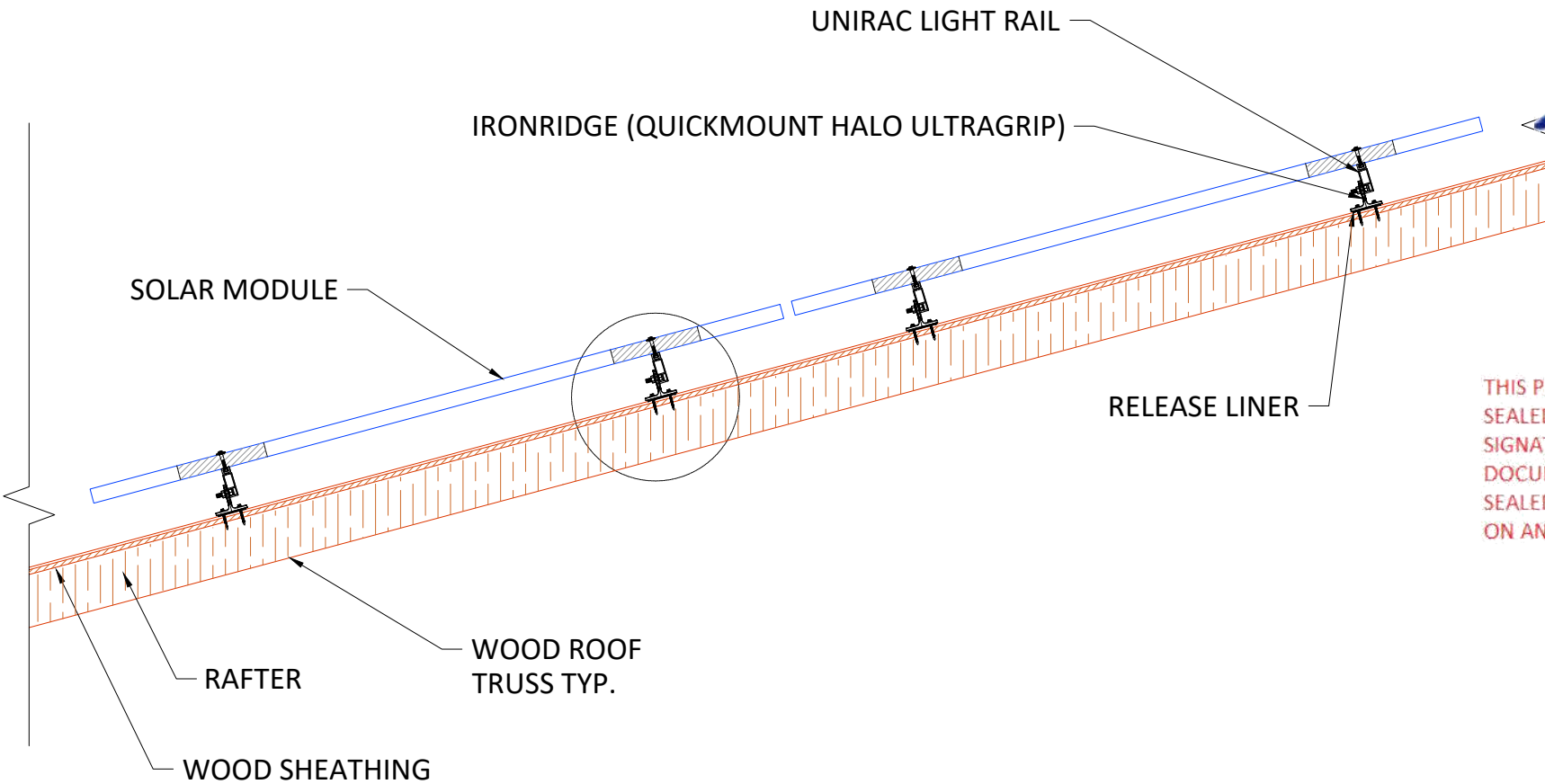
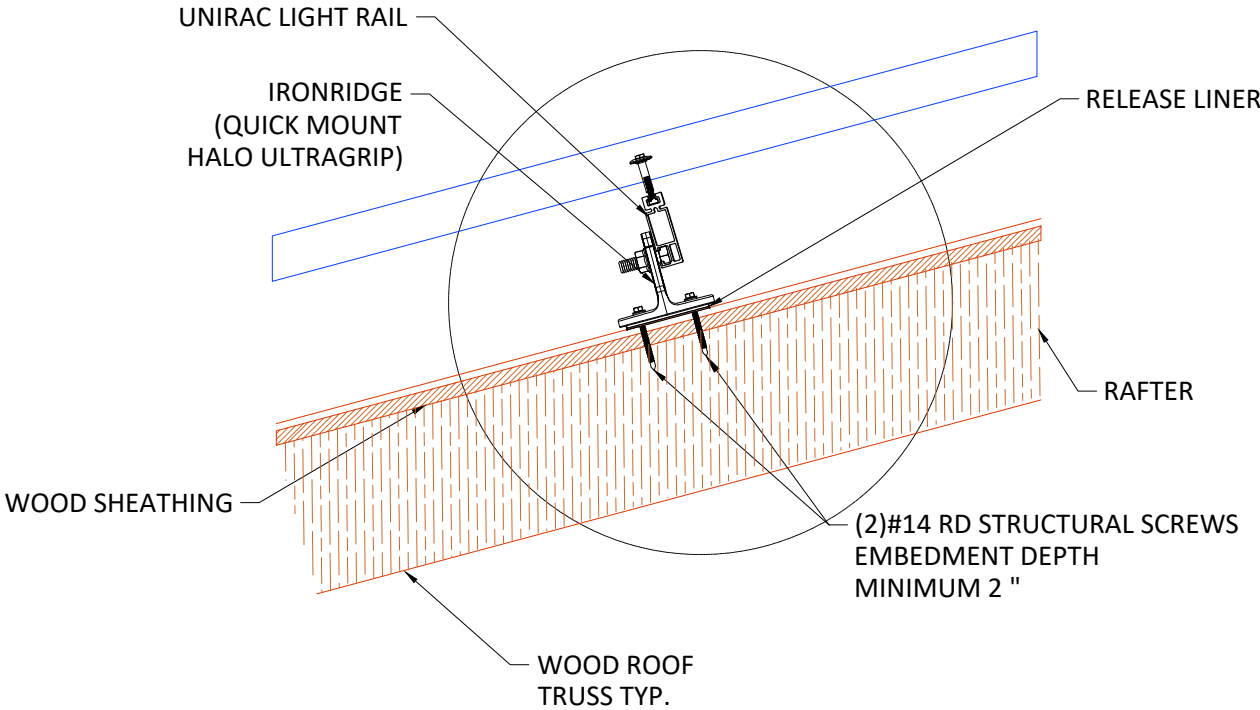
PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME	
ARRAY LAYOUT	
SHEET NUMBER	
S-01	

PHOTOVOLTAIC MODULE GENERAL NOTES:

- FOR PITCHED ROOF
- 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 MANUFACTURER'S MANUAL FOR ALL ARCHITECTURAL, MECHANICAL, ELECTRICAL AND SOLAR SPECS.
 - 6. ALL ALUMINIUM COMPONENTS SHALL BE ANODIZED ALUMINIUM 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 MANUFACTURER'S INSTRUCTIONS.
 - 9. I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC:BUILDING CHAPTER 16 AND FRC:RESIDENTIAL CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE CALCULATED WIND LATERAL AND UPLIFT FORCES AND EQUIPMENT DEAD LOADS.

RAFTER MOUNT



SCOTT E WYSSLING
LICENSE
No. 81551
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Wyssling Consulting, PLLC
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Florida License # RY34912
Signed 11/11/2024

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Unicity
Solar Energy

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CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVISIONS	DATE				
	DESCRIPTION				
	REV	ENGG			

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
STRUCTURAL ATTACHMENT DETAILS

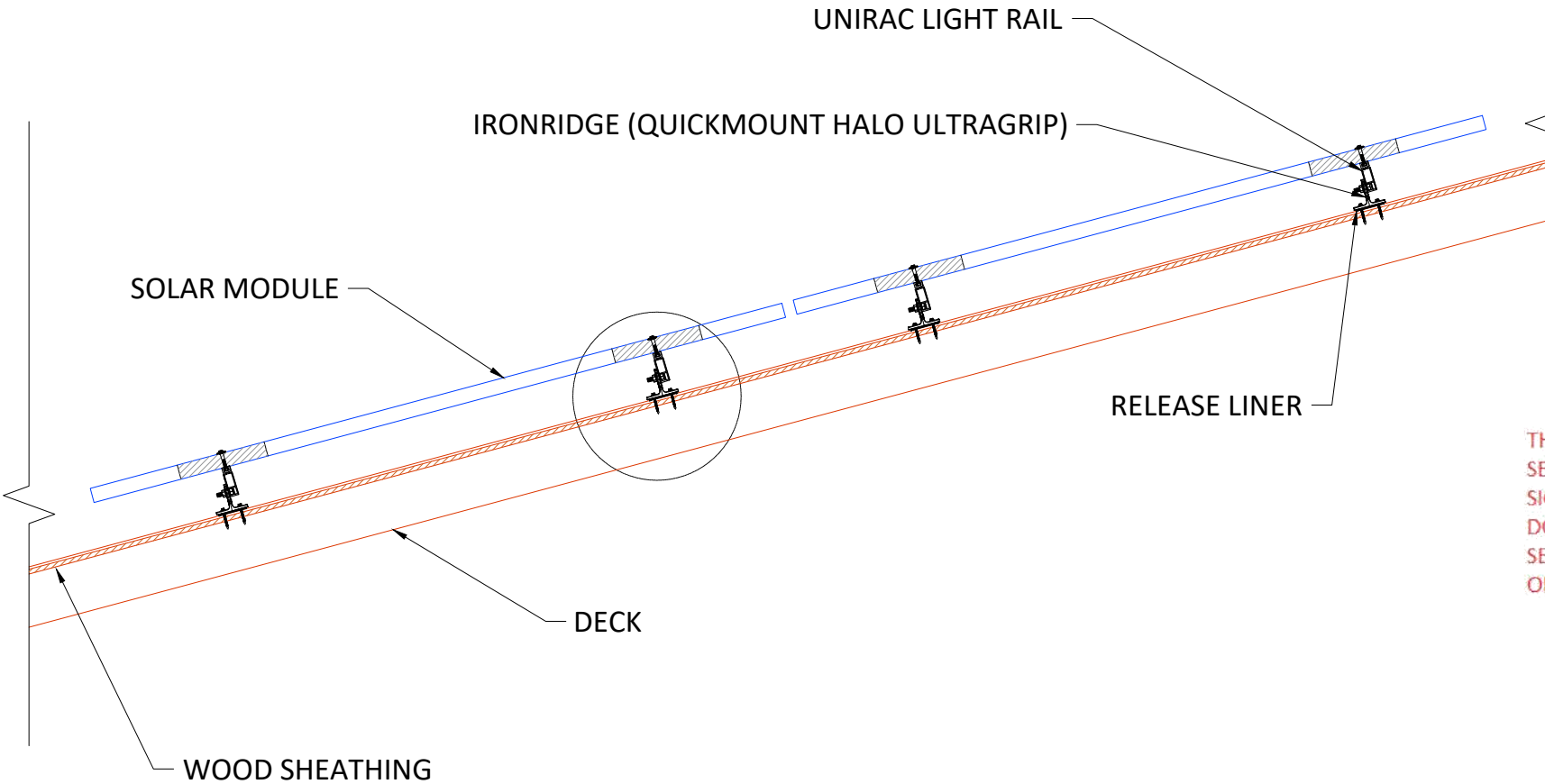
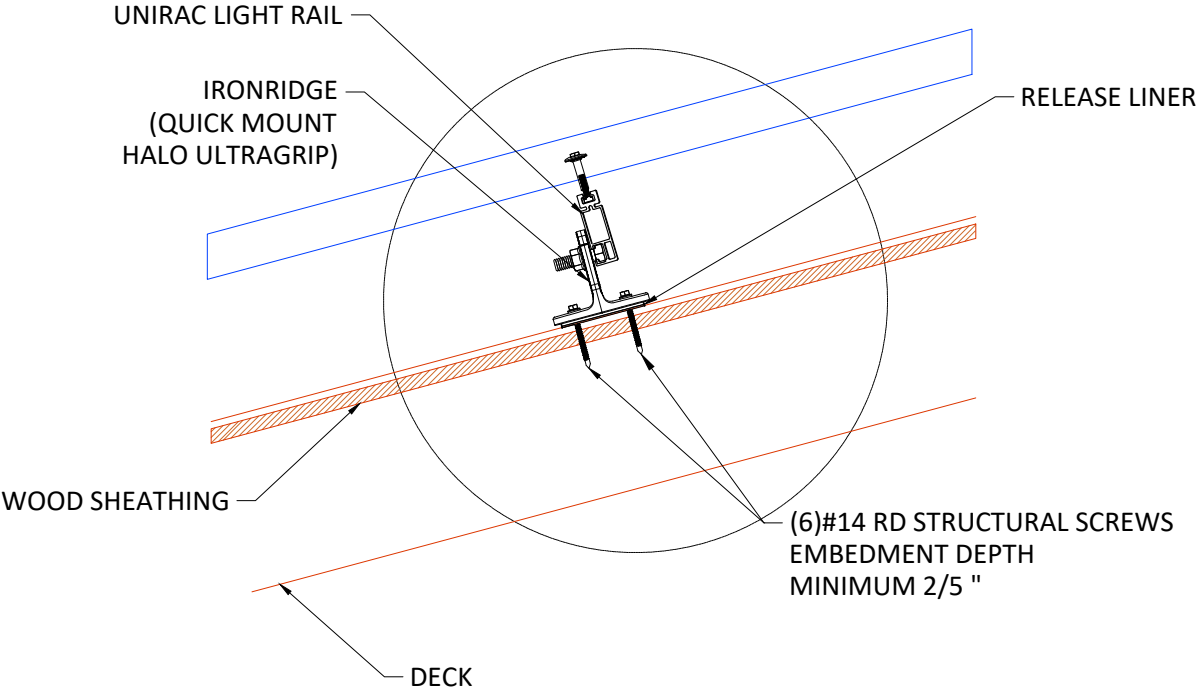
SHEET NUMBER
S-02


STRUCTURAL ATTACHMENT DETAILS

PHOTOVOLTAIC MODULE GENERAL NOTES:

- FOR PITCHED ROOF
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
MANUFACTURER'S MANUAL FOR ALL ARCHITECTURAL, MECHANICAL,
ELECTRICAL AND SOLAR SPECS.
 6. ALL ALUMINIUM COMPONENTS SHALL BE ANODIZED ALUMINIUM 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
MANUFACTURER'S INSTRUCTIONS.
 9. I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE
WITH FBC:BUILDING CHAPTER 16 AND FRC:RESIDENTIAL CHAPTER 3.
BUILDING STRUCTURE WILL SAFELY ACCOMMODATE CALCULATED
WIND LATERAL AND UPLIFT FORCES AND EQUIPMENT DEAD LOADS.

DECK MOUNT




Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
Florida License # RY34912
Signed 11/11/2024

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STRUCTURAL ATTACHMENT DETAILS


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Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVISIONS	DATE				
	DESCRIPTION				
	REV	ENG			

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
STRUCTURAL ATTACHMENT DETAILS

SHEET NUMBER
S-03

MODULE SPECIFICATION	
MODEL NO.	TRINA SOLAR TSM-DE06X.05(II) 360W
PEAK POWER	360W
RATED VOLTAGE (Vmpp)	37V
RATED CURRENT (Impp)	9.74A
OPEN CIRCUIT VOLTAGE (Voc)	44.8V
SHORT CIRCUIT CURRENT (Isc)	10.30A

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

- NOTE:
- ALL ELECTRICAL EQUIPMENTS SHALL COMPLY WITH NEC CODE AND MAY CHANGE AS PER THE SITE CONDITION, NEC OR AHJ REQUIREMENTS.
 - LEGEND: (E) = EXISTING, (N) = NEW; APPLICABLE TO CONDUCTORS, CONDUITS, ELECECTRICAL ENCLOSURES, ETC.



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SOLAR ARRAY (10.8 KW-DC STC)

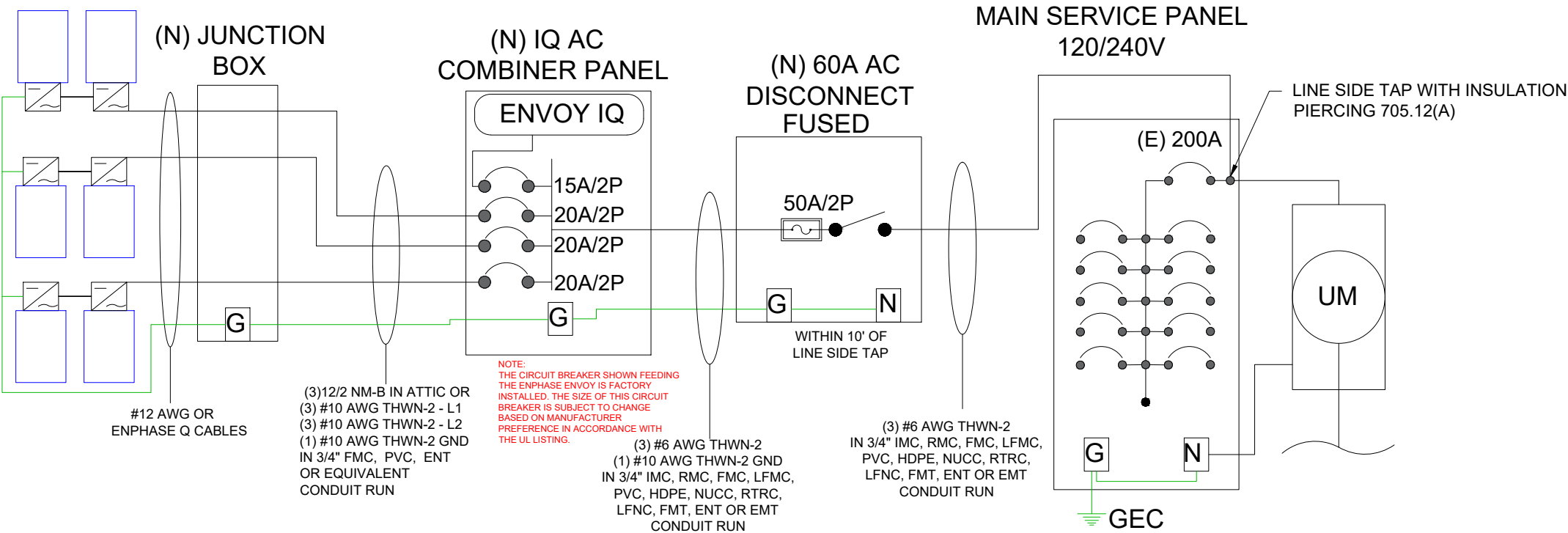
(30) TRINA SOLAR TSM-DE06X.05(II) 360W MODULES
(3) BRANCHES OF 10 MODULES

I, SCOTT WYSSLING, PE#81558, AN ENGINEER PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE, FBC 107.

1 STRING OF
10 MODULES WITH
MICROINVERTERS

1 STRING OF
10 MODULES WITH
MICROINVERTERS

1 STRING OF
10 MODULES WITH
MICROINVERTERS



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PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
SINGLE LINE DIAGRAM

SHEET NUMBER
E-01

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 ROOFNEC 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)
= [(10 x 1.21) x 1.25] / 0.96 / 0.8
= 19.69 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)
=[(30x 1.21) x 1.25] / 0.96 / 1
=47.27 A
SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)


2. PV OVER CURRENT PROTECTION ..NEC 690.9(B)
=TOTAL INVERTER O/P CURRENT x 1.25
=(30 x 1.21) x 1.25 = 45.38 A
SELECTED OCPD = 50A

SELECTED EQUIPMENT GROUND CONDUCTOR (EGC) = #10 THWN-2 ... NEC 250.122(A)

MAX VOLTAGE DROP CALCULATION						
CABLE SIZE	CABLE DESCRIPTION	ONE WAY DISTANCE IN FEET (D)	BRANCH CURRENT (I)	RESISTANCE OF CONDUCTOR(R)	VOLTAGE (V)	% VOLTAGE DROP=(0.2*D*I*R)/V
#10 THWN-2	JUNCTION BOX TO COMBINER PANEL	20	36.3	1.24	240	0.75

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL AND LABELED FOR ITS APPLICATION.
- COPPER CONDUCTORS SHALL BE RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT. THE TERMINALS ARE RATED FOR 75 DEGREE C ROMEX/NM-B (NONMETALLIC-SHEATHED) CABLE MAY BE USED FOR BOTH EXPOSED AND CONCEALED WORK IN NORMALLY DRY LOCATIONS AT TEMPERATURES NOT TO EXCEED 90°C (WITH AMPACITY LIMITED TO THAT FOR 60°C CONDUCTORS) AS SPECIFIED IN THE NATIONAL ELECTRICAL CODE. VOLTAGE RATING FOR NM-B CABLE IS 600 VOLTS.
- CONDUCTOR TERMINATION AND SPLICING AS PER NEC 110.14 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. SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.265. WORKING CLEARANCES AROUND ALL NEW AND EXISTING SYSTEMS SHALL COMPLY WITH NEC 110.265.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILS CO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE.
- UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
- MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
- RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C)


Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
Florida License # RY34912
Signed 11/11/2024
THIS PLAN HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY SCOTT WYSSLING, PE USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

I, SCOTT WYSSLING, PE#81558, AN ENGINEER PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE, FBC 107.


ADD : 612 FLORIDA AVENUE, PALM HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

WILLIAM POTTS


126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REV	ENG	DESCRIPTION	DATE				

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
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 36.3 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
727-945-6060

I, SCOTT WYSSLING, PE#81558, AN
ENGINEER PURSUANT TO CHAPTER 471,
CERTIFY THAT THE PV ELECTRICAL
SYSTEM AND ELECTRICAL COMPONENTS
ARE DESIGNED AND APPROVED USING
THE STANDARDS CONTAINED IN THE
MOST RECENT VERSION OF THE FLORIDA
BUILDING CODE, FBC 107.



Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
Florida License # RY34912

Signed 11/11/2024

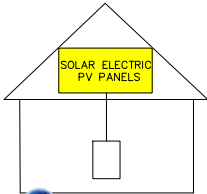
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ON ANY ELECTRONIC COPIES

**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



IFC 605.11.3.1(1) & 690.56(C)(1) Label for PV Systems that
Show how the array and the conductors leaving the array



ADD : 612 FLORIDA AVENUE, PALM
HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVIEWS	DATE				
	DESCRIPTION				
REV/ENG.					

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
SYSTEM LABELING

SHEET NUMBER
E-03

Mono Multi Solutions

THE

Residential Module

MULTI-BUSBAR MONO PERC MODULE

132-Cell
MONOCRYSTALLINE MODULE

355-380W
POWER OUTPUT RANGE

20.6%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

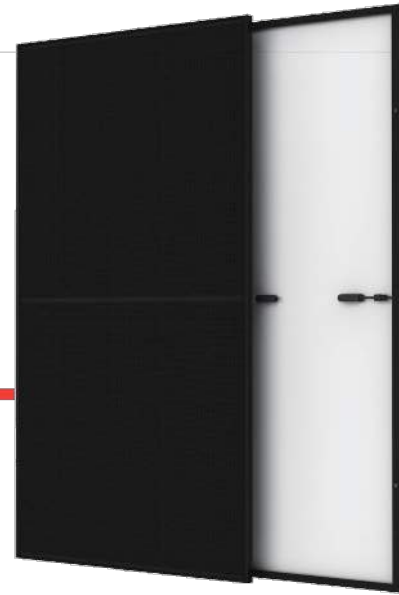
IEC61215/IEC61730/IEC61701/IEC62716/UL61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System



Trina solar

PRODUCTS
TSM-DE06X.05(II)

POWER RANGE
355-380W



High power and High Efficiency

- Up to 380W front power and 20.6% module efficiency with half-cut and MBB (Multi Busbar) technology bringing more BOS savings
- Reduce BOS cost with higher power bin and 1500V system voltage



Outstanding visual appearance

- Designed with aesthetics in mind
- High standard Production, Excellent cell color control by dedicated cell blackening treatment and machine selection
- Thinner wires that appear all black at a distance



High reliability

- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load

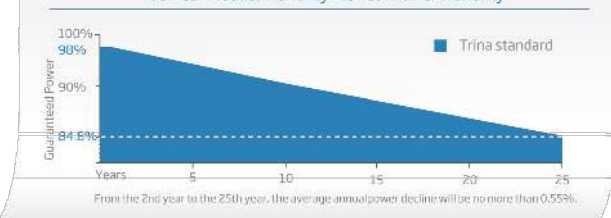


Certified to withstand the most challenging environmental conditions

- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp co-efficient (-0.34%) and NOCT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

PERFORMANCE WARRANTY

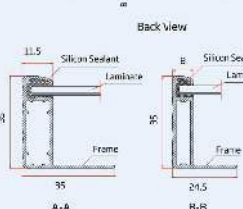
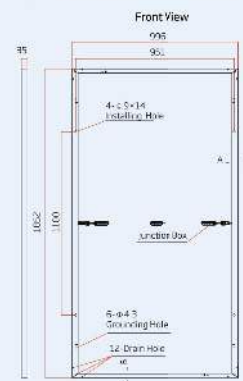
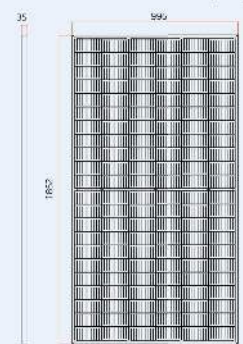
25 Year Product Warranty · 25 Year Power Warranty



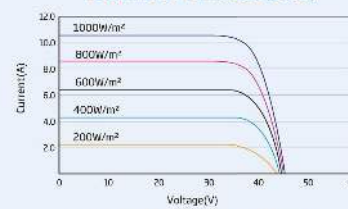
Residential Module

MULTI-BUSBAR MONO PERC MODULE

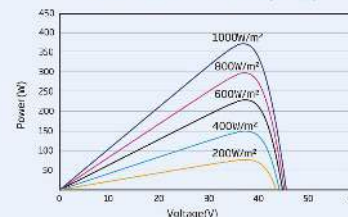
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(370W)



P-V CURVES OF PV MODULE(370W)



ELECTRICAL DATA (STC)

Peak Power Watts- P_{max} (Wp)*	355	360	365	370	375	380
Power Output Tolerance- P_{max} (W)			0 ~ +5			
Maximum Power Voltage- V_{mp} (V)	36.8	37.0	37.2	37.4	37.6	37.8
Maximum Power Current- I_{mp} (A)	9.66	9.74	9.82	9.90	9.98	10.07
Open Circuit Voltage- V_{oc} (V)	44.6	44.8	45.0	45.2	45.3	45.5
Short Circuit Current- I_{sc} (A)	10.24	10.30	10.35	10.40	10.45	10.51
Module Efficiency η (%)	19.2	19.5	19.8	20.1	20.3	20.6

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.
*Measurement tolerance: $\pm 5\%$.

ELECTRICAL DATA (NOCT)

Maximum Power- P_{max} (Wp)	268	272	276	279	283	287
Maximum Power Voltage- V_{mp} (V)	34.4	34.7	34.9	35.1	35.3	35.6
Maximum Power Current- I_{mp} (A)	7.80	7.85	7.90	7.96	8.01	8.06
Open Circuit Voltage- V_{oc} (V)	42.0	42.2	42.4	42.6	42.6	42.8
Short Circuit Current- I_{sc} (A)	8.25	8.30	8.34	8.38	8.42	8.47

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

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	132 cells
Module Dimensions	1852 × 996 × 35 mm (72.91 × 39.21 × 1.38 inches)
Weight	19.7 kg (43.4 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	Black-White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²), Portrait: N 280mm/P 280mm (11.02/11.02 inches) Landscape: N 1400 mm/P 1400 mm (55.12/55.12 inches)
Connector	MC4 EVO2
Fire Type	Type 2

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C ($\pm 2^\circ\text{C}$)
Temperature Coefficient of P_{max}	-0.34%/°C
Temperature Coefficient of V_{oc}	-0.25%/°C
Temperature Coefficient of I_{sc}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	20A

WARRANTY

- 25 year Product Workmanship Warranty
- 25 year Linear Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 31 pieces
- Modules per 40' container: 744 pieces

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

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Version number: TSM_DE06X.05(II)_NA_2020_PA3

www.trinasolar.com



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Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVISIONS	DATE	DESCRIPTION
	REV	ENG

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME	
MODULE DATASHEET	
SHEET NUMBER	
DS-01	



DATA SHEET



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 ¹
Commonly used module pairings ²	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell	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 ³ [module Isc]	A	15					
Overvoltage class DC port		II					
DC port backfeed current	mA	0					
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA [AC]		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US ¹
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 ⁴	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 ⁵		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	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							
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 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 54-218 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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	REV	ENG.			

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME	
INVERTER DATASHEET	
SHEET NUMBER	
DS-02	

Enphase
IQ Combiner 4/4C
X-IQ-AM1-240-4
X-IQ-AM1-240-4C



To learn more about Enphase offerings, visit enphase.com



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
Envoy breaker	10A or 15A rating GE/Siemens/Eaton 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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ADD : 612 FLORIDA AVENUE, PALM HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

WILLIAM POTTS

126 SW WILSHIRE DR, LAKE CITY,
FL 32024, USA

REVISIONS	DATE				
	DESCRIPTION				
	REV	ENG.			

PERMIT DEVELOPER	
DATE	04/28/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
COMBINER BOX DATASHEET

SHEET NUMBER
DS-03



The Respect Your Roof Deserves

When integrating with a home, solar attachments must be dependable for the lifetime of the rooftop. Due to recent innovations, many asphalt shingles have bonded courses. A mount that protects without the need to pry shingles can really speed things up.

Halo UltraGrip™(HUG®) is here to respect the roof. Its Halo is a cast-aluminum barrier that encases the UltraGrip, our industrial-grade, foam-and-mastic seal. This allows HUG to accelerate the installation process and provide the utmost in waterproofing protection. Give your roof a HUG.®



UltraGrip™ Seal Technology
HUG UltraGrip™ utilizes a state-of-the-art seal design that uses a unique, foam-and-mastic combination. The foam-backed adhesive provides an entirely new flashing system that conforms and adheres to every nook and cranny of composition shingles, filling gaps and shingle step-downs (up to 1/8" in height).

Multi-Tiered Waterproofing
HUG® utilizes a multi-tiered stack of components to provide revolutionary waterproofing protection. The Halo cast-aluminum, raised-perimeter foundation surrounds the UltraGrip™ base—a foam-backed mastic seal combination that prevents water intrusion by adhering and sealing with the shingle surface.

Halo UltraGrip™ is part of the QuickMount® product line.



Rafter & Deck Mounting Options
Mount HUG® to the roof rafters, the roof deck, or both with our custom-engineered RD (rafter-or-deck) Structural Screw. The RD Structural Screw anchors HUG to the roof with an EPDM sealing washer, completing the stack of waterproofing barriers. See backside for more installation information.

Triple Rated & Certified to Respect the Roof™
UL 2703, 441 (27)
TAS 100(A)-95

Tech Brief

Tech Brief

Adaptive, Rafter-Friendly Installation

Hit the rafter? Good to go!
When you find a rafter, you can move on. Only 2 RD Structural Screws are needed.

Miss the rafter? Try it again.
Place another screw to the left or right. If rafter is found, install 3rd and final screw.

Still no luck? Install the rest.
If more than 3 screws miss the rafter, secure six screws to deck mount it.

Trusted Strength & Less Hassle



Structural capacities of HUG® were reviewed in many load directions, with racking rail running cross-slope or up-slope in relation to roof pitch.

For further details, see the HUG® certification letters for attaching to rafters and decking.

IronRidge designed the HUG®, in combination with the RD Structural Screw to streamline installs, which means the following:

- No prying shingles
- No roof nail interference
- No pilot holes necessary
- No sealant (in most cases)
- No butyl shims needed

Attachment Loading

The rafter-mounted HUG® has been tested and rated to support 1004 (lbs) of uplift and 368 (lbs) of lateral load.

Structural Design

Parts are designed and certified for compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings

HUG passed both the UL 441 Section 27 "Rain Test" and TAS 100(A)-95 "Wind Driven Rain Test" by Intertek.

UL 2703 System

Systems conform to UL 2703 mechanical and bonding requirements. See Flush Mount Manual for more info.

Unicity Solar Energy
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