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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: your signing location here  
Date: 2022.11.10 06:30:40-0700  
Foxit PDF Editor Version: 11.1.0

November 10, 2022

Modern Concepts Solar  
201 North Franklin Street  
Suite 2200  
Tampa, FL 33602

Re: Engineering Services  
Rodriguez Residence  
1781 Southwest Ironwood Drive, Lake City, FL  
8.910 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:** 23 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 (7<sup>th</sup> 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.*

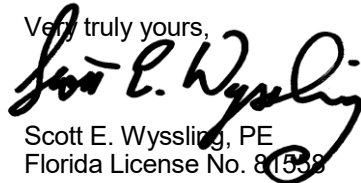
**D. Solar Panel Anchorage**

1. The solar panels shall be mounted in accordance with the most recent K-2 Systems 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 an M5 screw is 426 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 (2) M5 screw with a minimum of 2" embedment will be adequate and will include a sufficient factor of safety.
3. 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 48" on centers.
4. Panel supports connections shall be staggered to distribute load to adjacent framing members.

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 (7<sup>th</sup> 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

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

Signed November 10, 2022

# PHOTOVOLTAIC ROOF MOUNT SYSTEM

22 MODULES-ROOF MOUNTED - 8.910 KW DC, 6.380 KW AC

1781 SW IRONWOOD DR, LAKE CITY, FL 32025



MODERN CONCEPTS SOLAR

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

## PROJECT DATA

PROJECT ADDRESS: 1781 SW IRONWOOD DR, LAKE CITY, FL 32025

OWNER: ANAISY RODRIGUEZ

DESIGNER: ESR

SCOPE: 8.910 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH 22 JINKO SOLAR: JKM405M-72HL-V 405W PV MONO MODULES WITH 22 ENPHASE IQ8PLUS-72-2-US 290W MICROINVERTERS EQUIPPED WITH RAPID SHUTDOWN

AUTHORITIES HAVING JURISDICTION:  
BUILDING: CITY OF LAKE CITY  
ZONING: CITY OF LAKE CITY  
UTILITY: FPL

## SHEET INDEX

PV-1 COVER SHEET  
PV-2 SITE PLAN  
PV-3 ROOF PLAN & MODULES  
PV-4 ELECTRICAL PLAN  
PV-5 STRUCTURAL DETAIL  
PV-6 ELECTRICAL LINE DIAGRAM  
PV-7 WIRING CALCULATIONS  
PV-8 LABELS  
PV-9 PLACARD  
PV-10 MICRO INVERTER CHART  
PV-11+ EQUIPMENT SPECIFICATIONS

## SIGNATURE

## GENERAL NOTES

- ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
- THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2017.
- THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
- ALL CONDUCTORS OF A CIRCUIT, INCLUDING THE EGC, MUST BE INSTALLED IN THE SAME RACEWAY, OR CABLE, OR OTHERWISE RUN WITH THE PV ARRAY CIRCUIT CONDUCTORS WHEN THEY LEAVE THE VICINITY OF THE PV ARRAY.
- WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
- HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH CEC 690.47 AND 250.50 THROUGH 60 AND 250-166 SHALL BE PROVIDED. PER NEC GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT. GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO LARGER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
- PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
- PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING. MECHANICAL, OR BUILDING ROOF VENTS.
- ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE. WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF THE ROOF SURFACE.
- ALL SINAGE TO BE PLACED IN ACCORDANCE WITH THE LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SINAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
- INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE UL 1741 LISTED.
- THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
- SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
- PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
- DISCONNECTING MEANS SHALL BE LOCATED IN A VISIBLE, READILY ACCESSIBLE LOCATION WITHIN THE PV SYSTEM EQUIPMENT OR A MAXIMUM OF 10 FEET AWAY FROM THE SYSTEM [NEC 690.13(A)]
- ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
- WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
- ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
- ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.

## VICINITY



## HOUSE PHOTO



## CODE REFERENCES

PROJECT TO COMPLY WITH THE FOLLOWING:

FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)  
FLORIDA PLUMBING CODE, 7TH EDITION 2020 (FPC)  
FLORIDA BUILDING CODE, 7TH EDITION 2020 EDITION (FBC)  
FLORIDA MECHANICAL CODE, 7TH EDITION 2020 (FMC)  
2017 NATIONAL ELECTRICAL CODE  
FLORIDA FIRE PREVENTION CODE, 7TH EDITION 2020 (FFPC)

## REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	11/10/2022	



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76 N Meadowbrook Drive Alpine UT 84004  
Florida License # RY34912

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## PROJECT NAME & ADDRESS

ANAISY RODRIGUEZ  
RESIDENCE  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

## DRAWN BY

ESR

## SHEET NAME

COVER SHEET

## SHEET SIZE

ANSI B  
11" X 17"

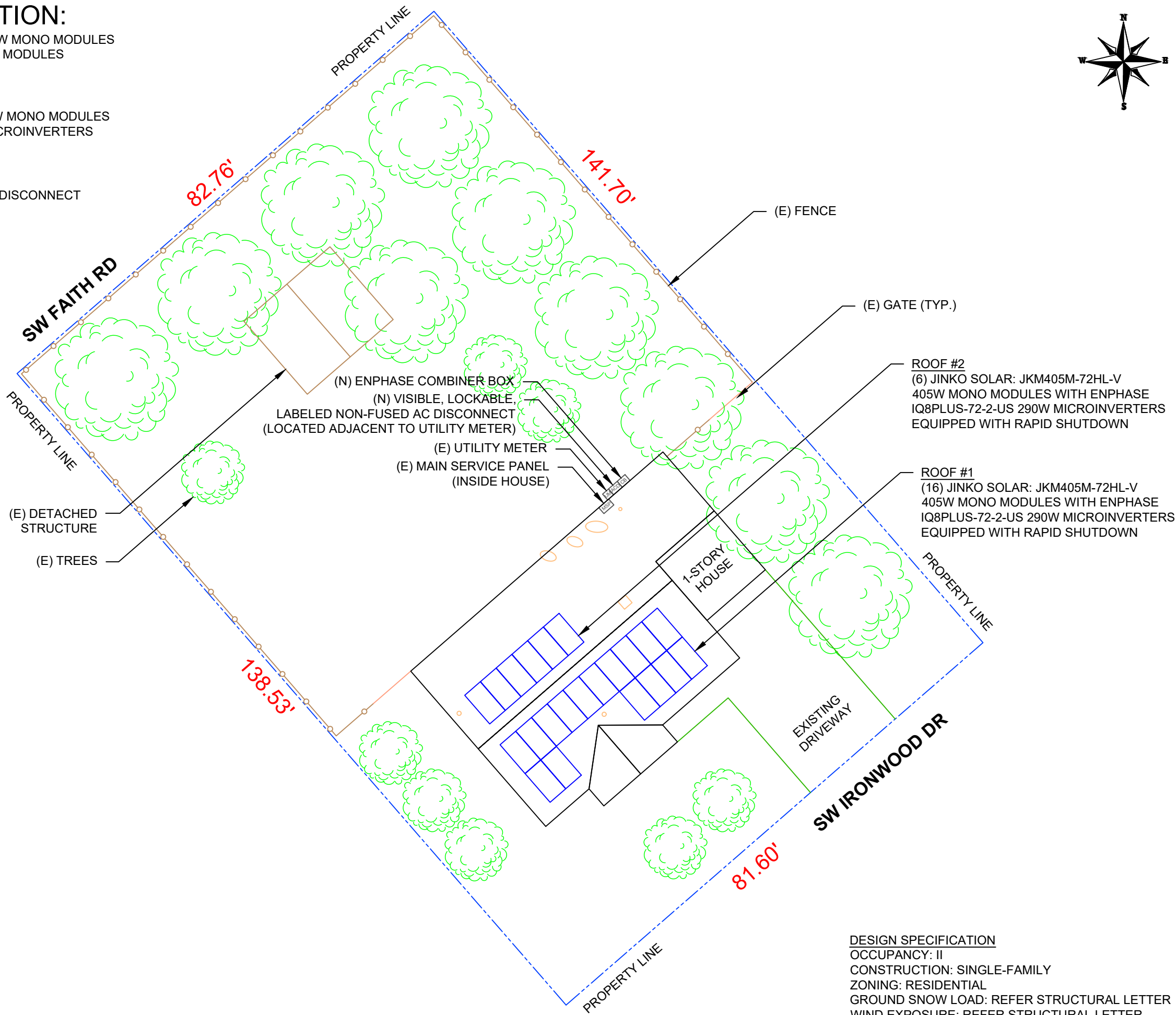
## SHEET NUMBER

PV-1



PROJECT DESCRIPTION:

22 X JINKO SOLAR: JKM405M-72HL-V 405W MONO MODULES  
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
DC SYSTEM SIZE: 22 x 405 = 8.910KW DC  
AC SYSTEM SIZE: 22 x 290 = 6.380KW AC  
EQUIPMENT SUMMARY  
22 JINKO SOLAR: JKM405M-72HL-V 405W MONO MODULES  
22 ENPHASE IQ8PLUS-72-2-US 290W MICROINVERTERS  
EQUIPPED WITH RAPID SHUTDOWN  
ROOF ARRAY AREA #1:- 346.56 SQ FT.  
ROOF ARRAY AREA #2:- 129.96 SQ FT.  
NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT  
LOCATED ADJACENT TO UTILITY METER



DESIGN SPECIFICATION  
OCCUPANCY: II  
CONSTRUCTION: SINGLE-FAMILY  
ZONING: RESIDENTIAL  
GROUND SNOW LOAD: REFER STRUCTURAL LETTER  
WIND EXPOSURE: REFER STRUCTURAL LETTER  
WIND SPEED: REFER STRUCTURAL LETTER



**MODERN CONCEPTS SOLAR**  
201 N. FRANKLIN ST. SUITE 2200  
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PROJECT NAME & ADDRESS

**ANAI SY RODRIGUEZ  
RESIDENCE**  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY

**ESR**

SHEET NAME

**SITE PLAN**

SHEET SIZE

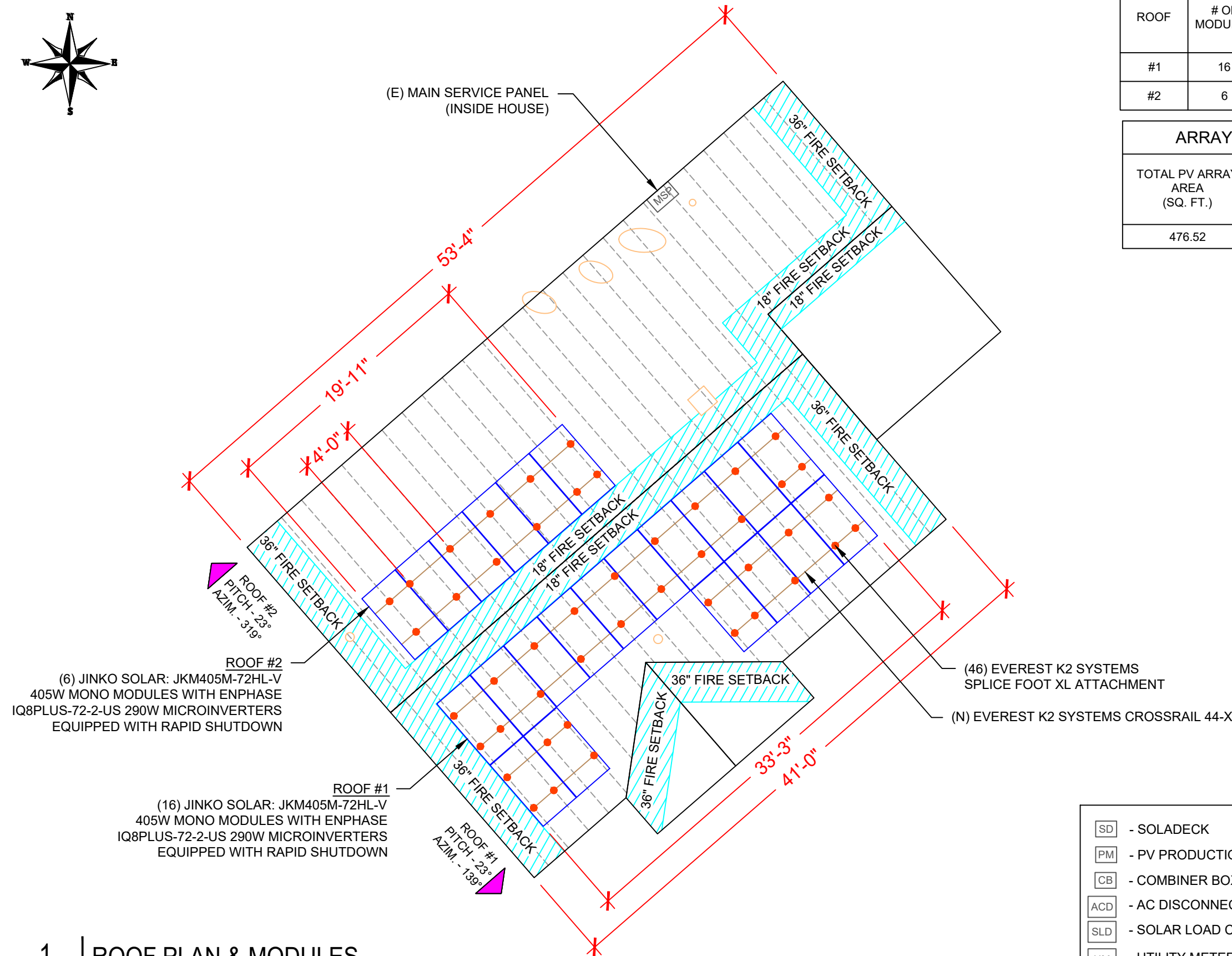
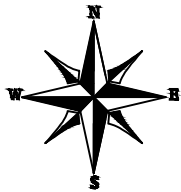
**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-2**

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 22 MODULES  
MODULE TYPE = JINKO SOLAR: JKM405M-72HL-V 405W MONO MODULES  
MODULE WEIGHT = 49.6 LBS / 22.5KG.  
MODULE DIMENSIONS = 79.06" x 39.45" = 21.66 SF

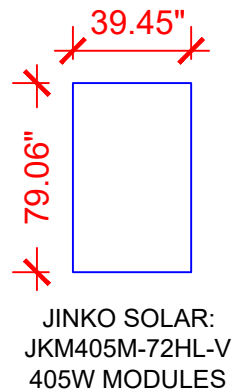


ROOF #2  
PITCH - 23°  
AZIM. - 319°  
(6) JINKO SOLAR: JKM405M-72HL-V  
405W MONO MODULES WITH ENPHASE  
IQ8PLUS-72-2-US 290W MICROINVERTERS  
EQUIPPED WITH RAPID SHUTDOWN


ROOF #1  
PITCH - 23°  
AZIM. - 139°  
(16) JINKO SOLAR: JKM405M-72HL-V  
405W MONO MODULES WITH ENPHASE  
IQ8PLUS-72-2-US 290W MICROINVERTERS  
EQUIPPED WITH RAPID SHUTDOWN

ROOF DESCRIPTION					
ROOF TYPE				ASPHALT SHINGLE	
ROOF LAYER				1 LAYER	
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	16	23°	139°	2"X4"	24"
#2	6	23°	319°	2"X4"	24"

ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
476.52	1709.70	28



LEGEND			
[SD]	- SOLADECK	[INV]	- INVERTER
[PM]	- PV PRODUCTION METER	[JB]	- JUNCTION BOX
[CB]	- COMBINER BOX	[O]	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
[ACD]	- AC DISCONNECT	[•]	- ROOF ATTACHMENT
[SLD]	- SOLAR LOAD CENTER	[—]	- TRUSS
[UM]	- UTILITY METER	[---]	- CONDUIT
[MSP]	- MAIN SERVICE PANEL		



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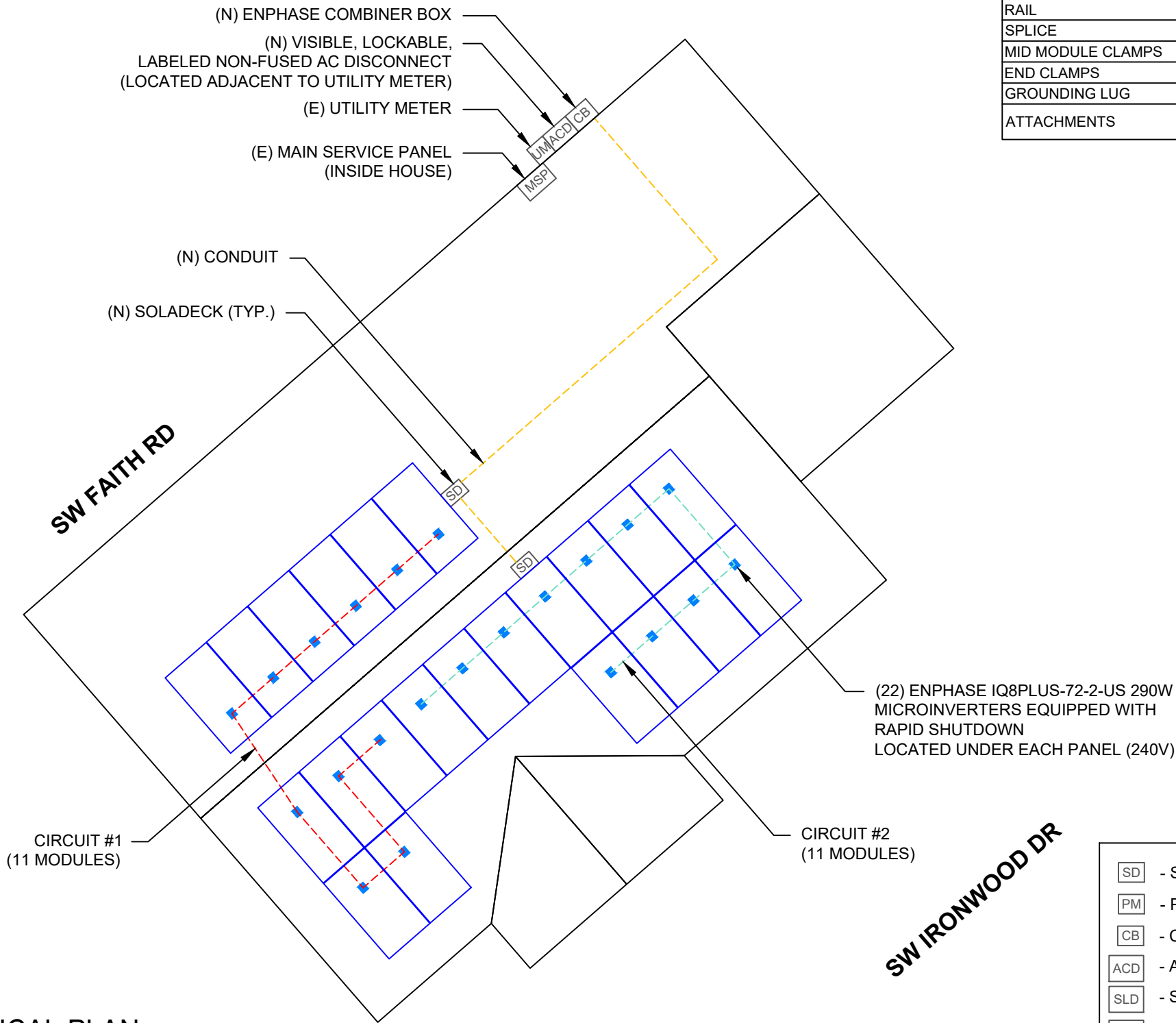
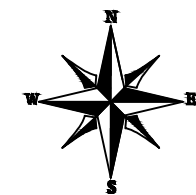
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PROJECT NAME & ADDRESS  
**ANAISSY RODRIGUEZ  
RESIDENCE**  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY <b>ESR</b>
SHEET NAME <b>ROOF PLAN &amp; MODULES</b>
SHEET SIZE <b>ANSI B 11" X 17"</b>
SHEET NUMBER <b>PV-3</b>

DC SYSTEM SIZE: 22 x 405 = 8.910KW DC  
AC SYSTEM SIZE: 22 x 290 = 6.380KW AC  
(22) JINKO SOLAR: JKM405M-72HL-V 405W MONO MODULES  
WITH (22) ENPHASE IQ8PLUS-72-2-US 290W MICROINVERTERS  
EQUIPPED WITH RAPID SHUTDOWN  
LOCATED UNDER EACH PANEL (240V)

CIRCUIT LEGENDS	
<span style="color: red;">---</span>	CIRCUIT #1
<span style="color: green;">---</span>	CIRCUIT #2



BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	22	JINKO SOLAR: JKM405M-72HL-V 405W MODULE
MICRO INVERTERS	22	ENPHASE IQ8PLUS-72-2-US 290W MICROINVERTERS EQUIPPED WITH RAPID SHUTDOWN
SOLADECKS	2	SOLADECKS
COMBINER BOX	1	ENPHASE IQ COMBINER X-IQ-AM1-240-4/4C 120/240VAC, 1φ, 3W 125A RATED BUS BAR, NEMA 3R SOLAR LOADS ONLY UL 1741 COMPLIANT
BREAKERS	2	20A BREAKERS
AC DISCONNECT	1	NON-FUSED AC DISCONNECT 60A , 240V NEMA 3R, UL LISTED
RAIL	12	EVEREST K2 SYSTEMS CROSSRAIL 44-X 166"
SPLICE	6	SPLICE FOOT XL RAIL CONNECTOR
MID MODULE CLAMPS	36	MID MODULE CLAMPS
END CLAMPS	16	END CLAMPS / STOPPER SLEEVE
GROUNDING LUG	4	GROUNDING LUG
ATTACHMENTS	46	EVEREST K2 SYSTEMS SPLICE FOOT XL ATTACHMENTS



MODERN CONCEPTS SOLAR

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

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ANAI SY RODRIGUEZ  
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1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

ELECTRICAL PLAN

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-4

1

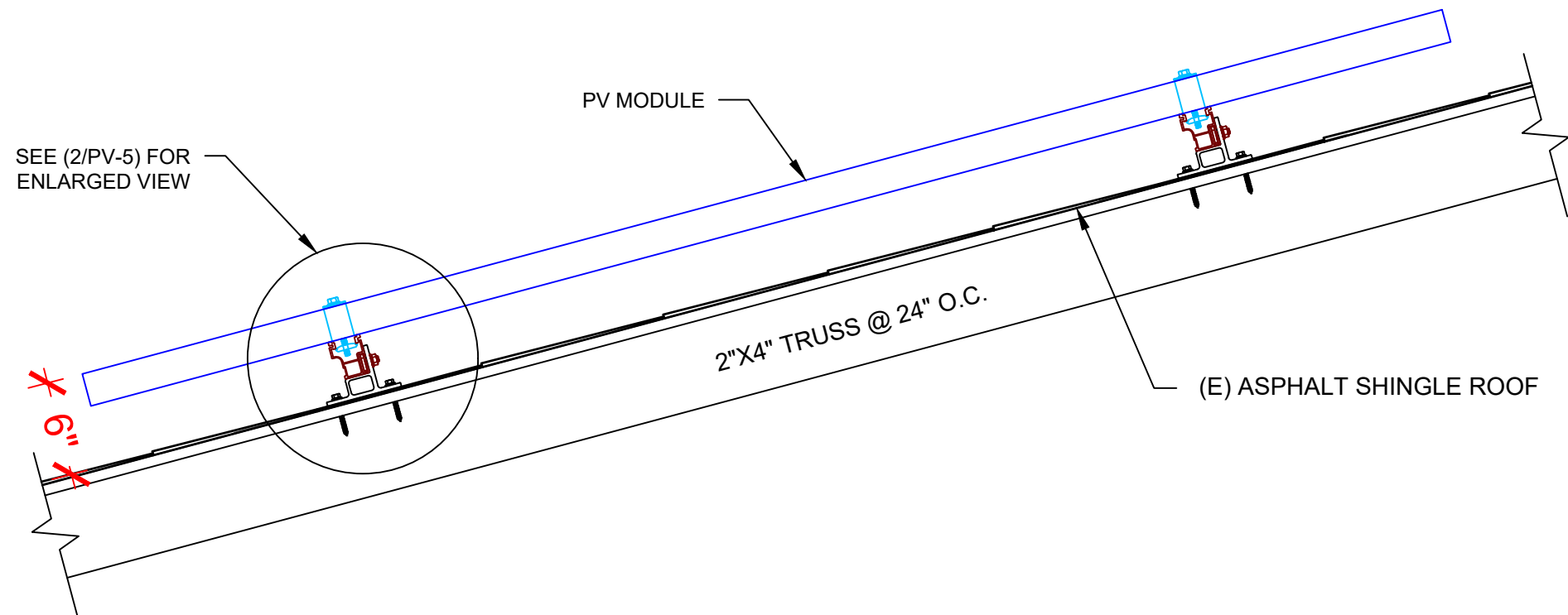
ELECTRICAL PLAN

PV-4

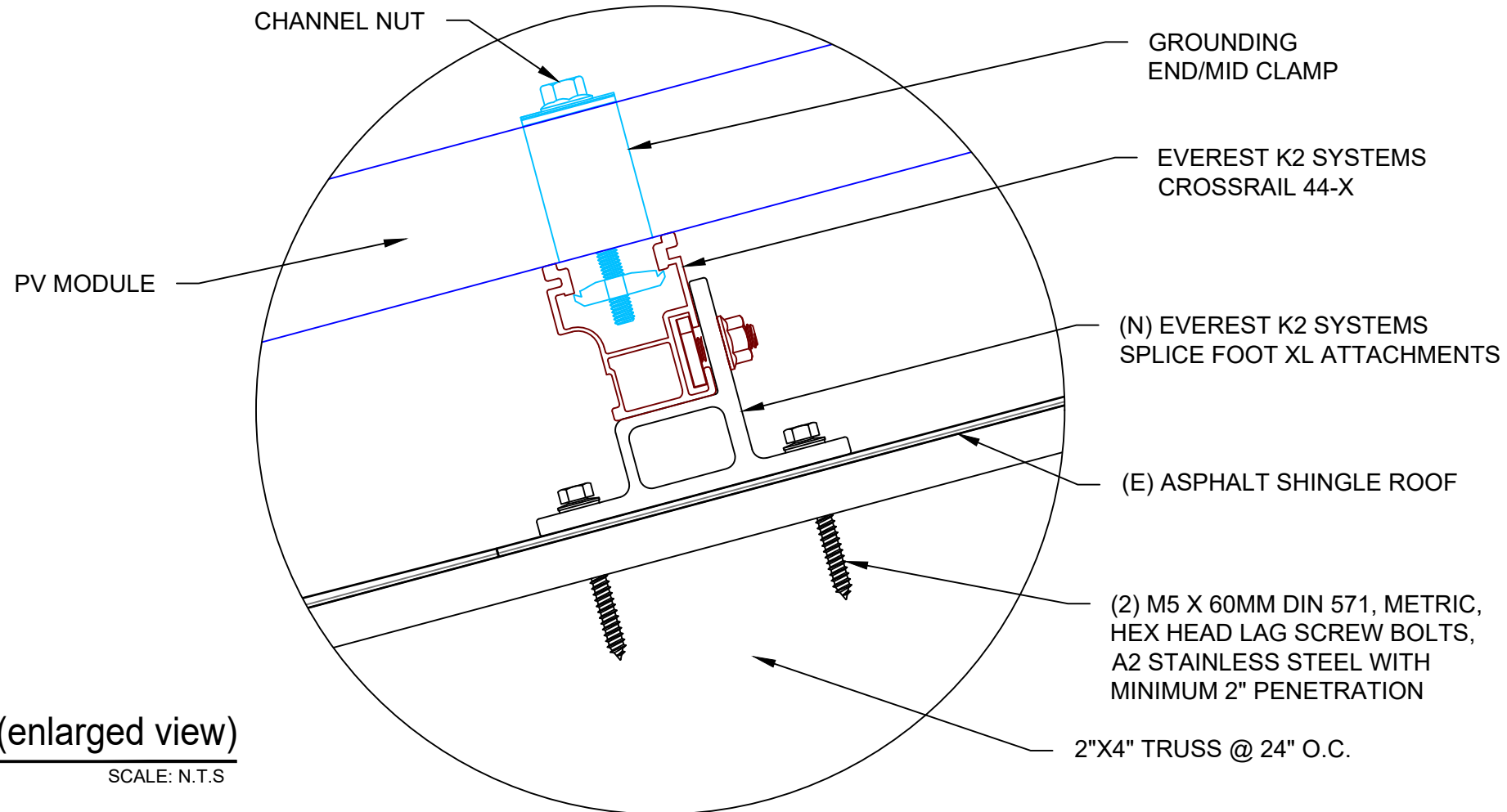
SCALE: 1/8" = 1'-0"

LEGEND	
<span style="border: 1px solid black; padding: 2px;">SD</span> - SOLADECK	<span style="border: 1px solid black; padding: 2px;">INV</span> - INVERTER
<span style="border: 1px solid black; padding: 2px;">PM</span> - PV PRODUCTION METER	<span style="border: 1px solid black; padding: 2px;">JB</span> - JUNCTION BOX
<span style="border: 1px solid black; padding: 2px;">CB</span> - COMBINER BOX	<span style="border: 1px solid black; padding: 2px;">○</span> - VENT, ATTIC FAN (ROOF OBSTRUCTION)
<span style="border: 1px solid black; padding: 2px;">ACD</span> - AC DISCONNECT	<span style="color: red;">●</span> - ROOF ATTACHMENT
<span style="border: 1px solid black; padding: 2px;">SLD</span> - SOLAR LOAD CENTER	<span style="color: gray;">---</span> - TRUSS
<span style="border: 1px solid black; padding: 2px;">UM</span> - UTILITY METER	<span style="color: yellow;">---</span> - CONDUIT
<span style="border: 1px solid black; padding: 2px;">MSP</span> - MAIN SERVICE PANEL	





1 | STRUCTURAL ATTACMENT (SIDE VIEW)  
PV-5 | SCALE: N.T.S



2 | ATTACHMENT DETAIL (enlarged view)  
PV-5 | SCALE: N.T.S



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LAKE CITY, FL 32025

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ESR

SHEET NAME  
STRUCTURAL DETAIL

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-5

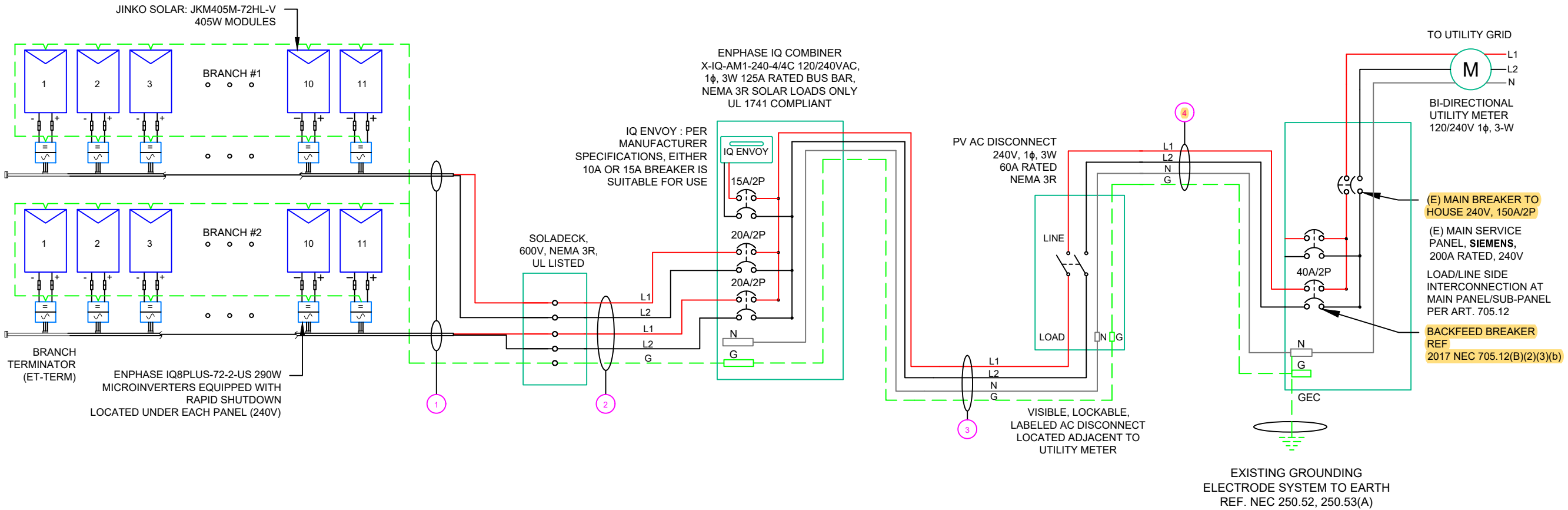
DC SYSTEM SIZE: 22 x 405 = 8.910KW DC  
AC SYSTEM SIZE: 22 x 290 = 6.380KW AC

(22) JINKO SOLAR: JKM405M-72HL-V 405W MONO MODULES  
WITH (22) ENPHASE IQ8PLUS-72-2-US 290W MICROINVERTERS  
EQUIPPED WITH RAPID SHUTDOWN  
LOCATED UNDER EACH PANEL (240V)  
(2) BRANCH CIRCUITS OF 11 MODULES CONNECTED IN PARALLEL

- INTERCONNECTION NOTES:**
1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
  2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
  3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
  4. 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
  3. DISCONNECT MEANS AND THEIR LOCATION SHALL BE IN ACCORDANCE WITH [NEC 225.31] AND [NEC 225.32].

- GROUNDING & GENERAL NOTES:**
1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
  2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
  3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
  4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
  5. SOLADECK QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - SOLADECK DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
  6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.
  7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.

- RACKING NOTE:**
1. BOND EVERY RAIL WITH #6 BARE COPPER



QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
(4)	#12AWG - ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
(1)	#10AWG - CU, THWN-2 GND		
(4)	#10AWG - CU, THWN-2	EMT OR LFMC IN ATTIC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#8AWG - CU, THWN-2		
(1)	#8AWG - CU, THWN-2 N	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#8AWG - CU, THWN-2		
(1)	#8AWG - CU, THWN-2 N	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		

**MC. SOLAR**

**MODERN CONCEPTS SOLAR**

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TAMPA, FL 33602

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SCOTT E. WYSSLING  
LICENSED PROFESSIONAL ENGINEER  
No. 81555  
STATE OF FLORIDA

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76 N Meadowbrook Drive Alpine UT 84004  
Florida License # RY34912

Signed 11/10/2022

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PROJECT NAME & ADDRESS

**ANAIY RODRIGUEZ  
RESIDENCE**

1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY  
**ESR**

SHEET NAME  
**ELECTRICAL LINE DIAGRAM**

SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-6**



INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ8PLUS-72-2-US 290W MICROINVERTERS EQUIPPED WITH RAPID SHUTDOWN
MIN/MAX DC VOLT RATING	22V MIN/ 60V MAX
MAX INPUT POWER	235W-440W
NOMINAL AC VOLTAGE RATING	240V/ 211-264V
MAX AC CURRENT	1.21A
MAX MODULES PER CIRCUIT	13 (SINGLE PHASE)
MAX OUTPUT POWER	290 VA

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	JINKO SOLAR: JKM405M-72HL-V 405W MODULE
VMP	42.0V
IMP	9.65A
VOC	50.1V
ISC	10.48A
TEMP. COEFF. VOC	-0.28%/°C
MODULE DIMENSION	79.06"L x 39.45"W x 1.57"D (In Inch)

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-5°
AMBIENT TEMP (HIGH TEMP 2%)	37°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.28%/°C


PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
.80	4-6
.70	7-9
.50	10-20

AC CALCULATIONS																						
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
CIRCUIT 1	SOLADECK	240	13.31	16.6375	20	N/A	CU #10 AWG	CU #12 AWG	25	PASS	37	2	30	0.91	1	27.3	PASS			0.55	N/A	#N/A
CIRCUIT 2	SOLADECK	240	13.31	16.6375	20	N/A	CU #10 AWG	CU #12 AWG	25	PASS	37	2	30	0.91	1	27.3	PASS			0.55	N/A	#N/A
SOLADECK	COMBINER PANEL 1	240	13.31	16.6375	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	37	4	40	0.91	0.8	29.12	PASS	45	1.24	0.619	3/4" EMT	19.79362
COMBINER PANEL 1	AC DISCONNECT	240	26.62	33.275	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	37	2	55	0.91	1	50.05	PASS	5	0.778	0.086	3/4" EMT	24.5591
AC DISCONNECT	POI	240	26.62	33.275	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	37	2	55	0.91	1	50.05	PASS	5	0.778	0.086	3/4" EMT	24.5591

Circuit 1 Voltage Drop	1.342
Circuit 2 Voltage Drop	1.342

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.
3. 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.
4. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6. WHERE SIZES OF SOLADECK, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
10. TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.



**MODERN CONCEPTS SOLAR**

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

REVISIONS		
DESCRIPTION	DATE	REV
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**Wyssling Consulting, PLLC**  
76 N Meadowbrook Drive Alpine UT 84004  
Florida License # RY34912

Signed 11/10/2022

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PROJECT NAME & ADDRESS

ANAISY RODRIGUEZ  
RESIDENCE  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

WIRING CALCULATIONS

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-7

**CAUTION:**  
**AUTHORIZED SOLAR**  
**PERSONNEL ONLY!**

LABEL- 1:  
LABEL LOCATION:  
AC DISCONNECT

**WARNING**  
**ELECTRICAL SHOCK HAZARD**  
TERMINALS ON THE LINE AND LOAD SIDES MAY  
BE ENERGIZED IN THE OPEN POSITION

LABEL- 2:  
LABEL LOCATION:  
AC DISCONNECT  
COMBINER  
MAIN SERVICE PANEL  
SUBPANEL  
MAIN SERVICE DISCONNECT  
CODE REF: NEC 690.13(B)

**WARNING DUAL POWER SOURCE**  
**SECOND SOURCE IS PHOTOVOLTAIC SYSTEM**

LABEL- 3:  
LABEL LOCATION:  
UTILITY METER  
MAIN SERVICE PANEL  
SUBPANEL  
CODE REF: NEC 705.12(C) & NEC 690.59

**WARNING**  
**TURN OFF PHOTOVOLTAIC AC**  
**DISCONNECT PRIOR TO**  
**WORKING INSIDE PANEL**

LABEL- 4:  
LABEL LOCATION:  
MAIN SERVICE PANEL  
SUBPANEL  
MAIN SERVICE DISCONNECT  
COMBINER  
CODE REF: NEC 110.27(C) & OSHA 1910.145 (f) (7)

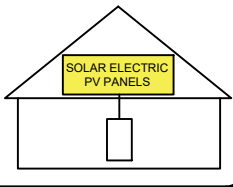
**CAUTION**  
**PHOTOVOLTAIC SYSTEM CIRCUIT IS**  
**BACKFEED**

LABEL- 5:  
LABEL LOCATION:  
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)  
SUBPANEL (ONLY IF SOLAR IS BACK-FED)  
CODE REF: NEC 705.12(B)(3-4) & NEC 690.59

**WARNING**  
POWER SOURCE OUTPUT  
CONNECTION. DO NOT  
RELOCATE THIS  
OVERCURRENT DEVICE

LABEL- 6:  
LABEL LOCATION:  
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)  
SUBPANEL (ONLY IF SOLAR IS BACK-FED)  
CODE REF: NEC 705.12(B)(3)(2)

**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 THE ARRAY



LABEL- 7:  
LABEL LOCATION:  
AC DISCONNECT  
CODE REF: FFPC 11.12.1.1.1.1 & NEC 690.56(C)

**RAPID SHUTDOWN SWITCH**  
**FOR SOLAR PV SYSTEM**

LABEL- 8:  
LABEL LOCATION:  
AC DISCONNECT  
CODE REF: NEC 690.56(C)(2)

**PHOTOVOLTAIC**  
**AC DISCONNECT**

LABEL- 9:  
LABEL LOCATION:  
AC DISCONNECT  
CODE REF: NEC 690.13(B)

**PHOTOVOLTAIC**  
**AC DISCONNECT**  
NOMINAL OPERATING AC VOLATGE **240 V**  
RATED AC OUTPUT CURRENT **26.62 A**

LABEL- 10:  
LABEL LOCATION:  
MAIN SERVICE PANEL  
SUBPANEL  
AC DISCONNECT  
CODE REF: NEC 690.54

**MAIN PHOTOVOLTAIC**  
**SYSTEM DISCONNECT**

LABEL- 11:  
LABEL LOCATION:  
MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)  
CODE REF: NEC 690.13(B)



**MODERN CONCEPTS SOLAR**

201 N. FRANKLIN ST. SUITE 2200  
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76 N Meadowbrook Drive Alpine UT 84004  
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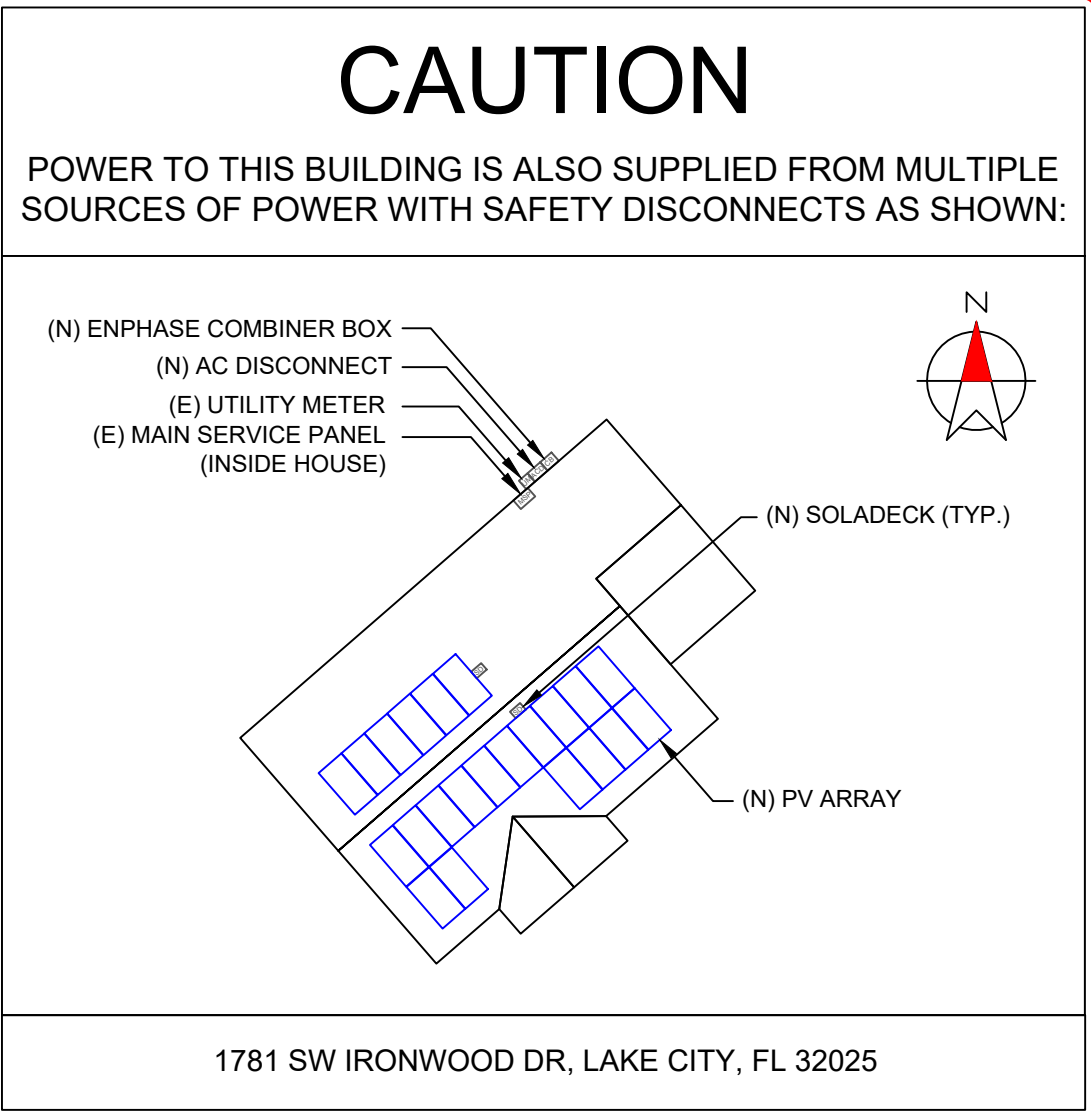
PROJECT NAME & ADDRESS  
ANAISY RODRIGUEZ  
RESIDENCE  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY  
ESR

SHEET NAME  
LABELS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-8



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])  
PER FFPC 11.12.2.1.4

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]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED FFPC 11.12.2.1.1.2

MC. SOLAR

MODERN CONCEPTS SOLAR

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

REVISIONS		
DESCRIPTION	DATE	REV
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SCOTT E. WYSSLING

FLORIDA

PROFESSIONAL ENGINEER

No. 81555

Wysling Consulting, PLLC  
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Florida License # RY34912

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1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

PLACARD

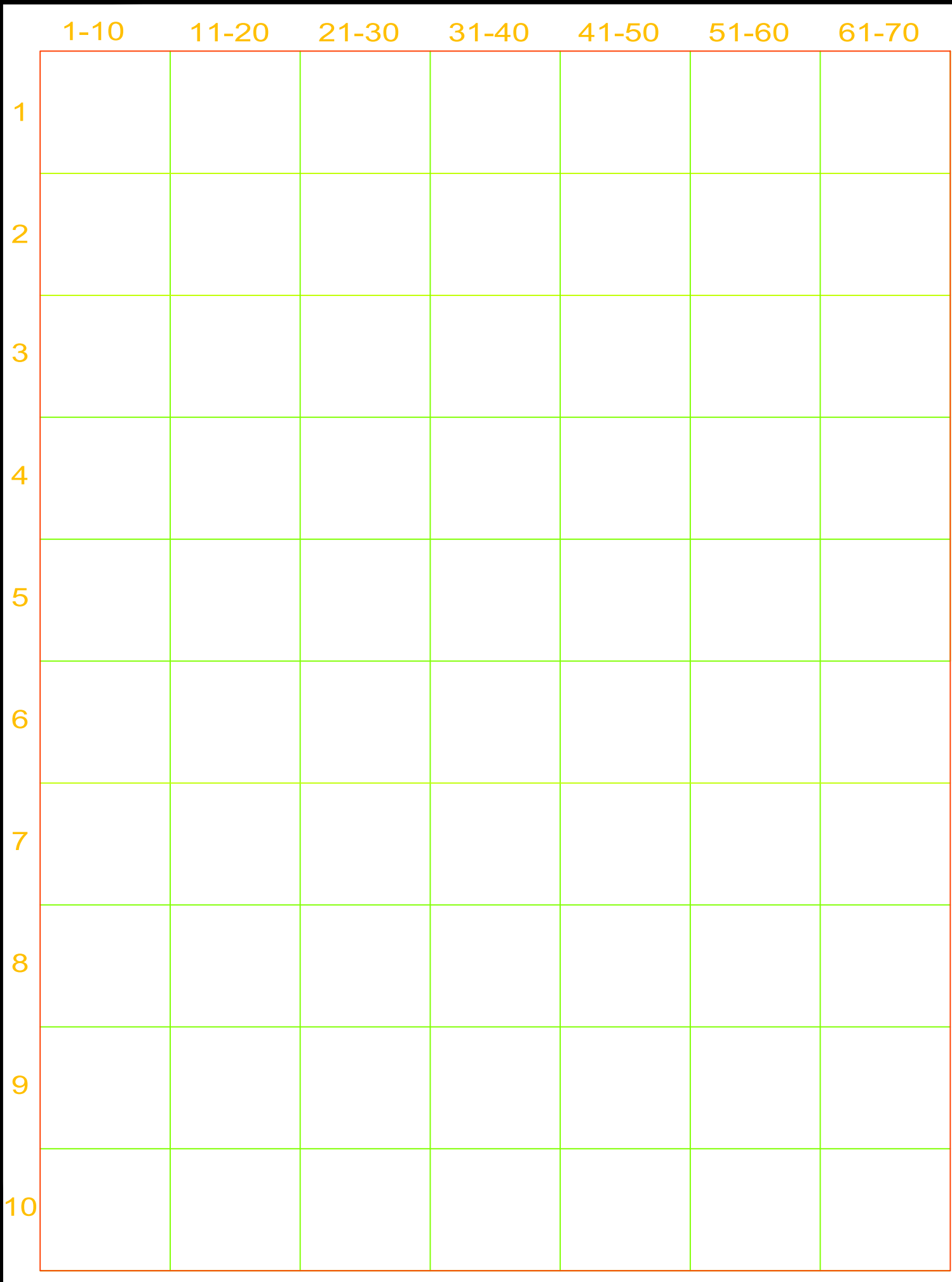
SHEET SIZE

ANSI B  
11" X 17"

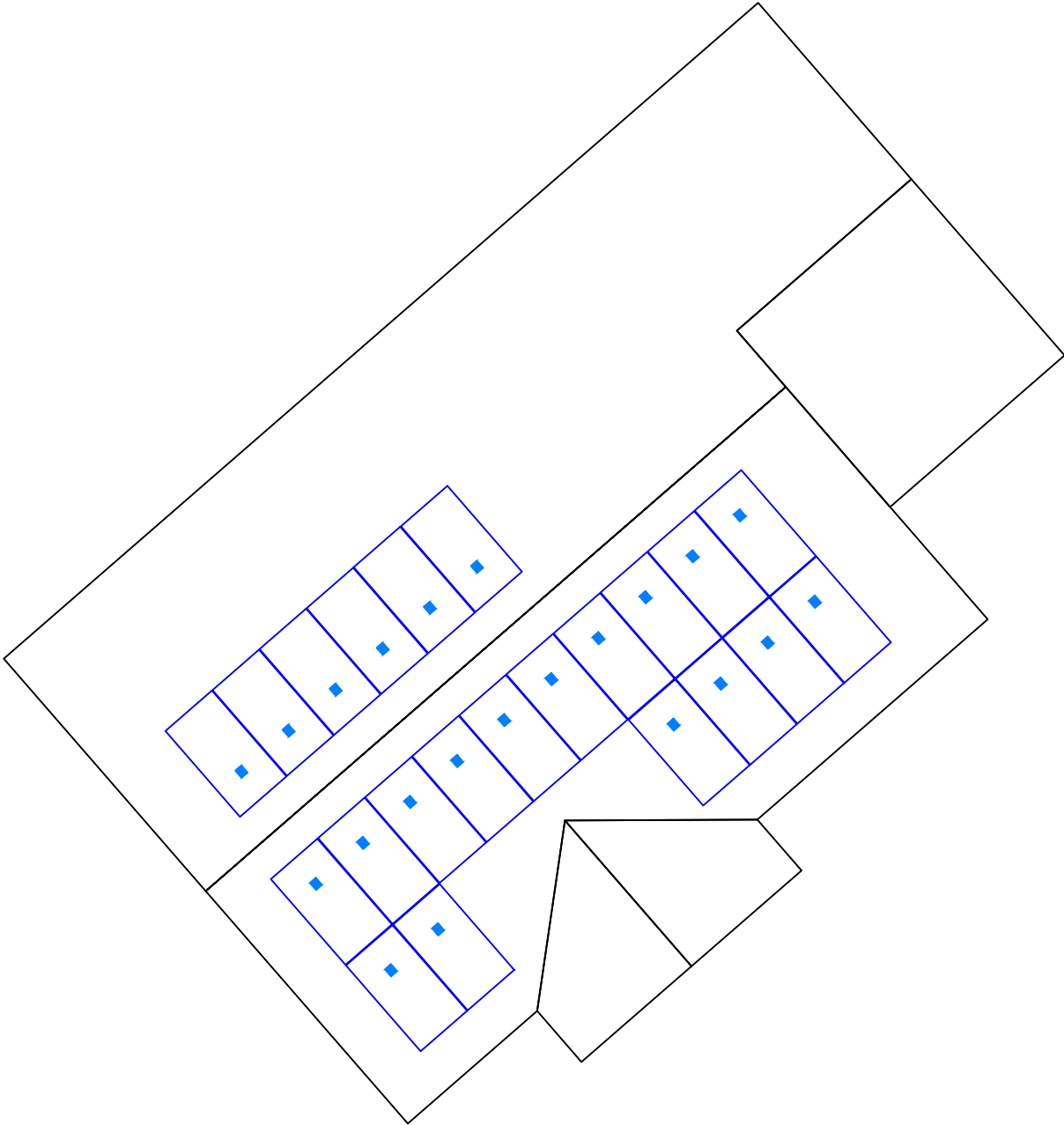
SHEET NUMBER


PV-9





# MICRO INVERTER CHART





**MODERN CONCEPTS SOLAR**  
201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

REVISIONS		
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PROJECT NAME & ADDRESS

ANAISY RODRIGUEZ  
RESIDENCE

1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

MICRO INVERTER CHART

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-10

# Eagle 72 HM G2

## 390-410 Watt

MONO PERC HALF CELL MODULE

Positive power tolerance of 0~+3%

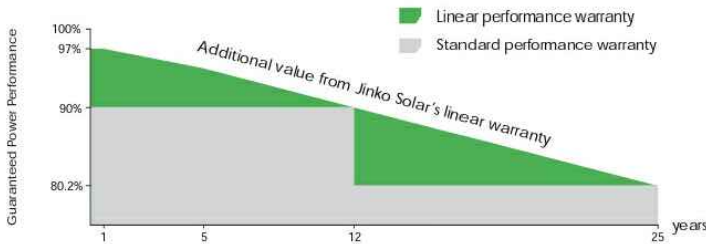


### KEY FEATURES

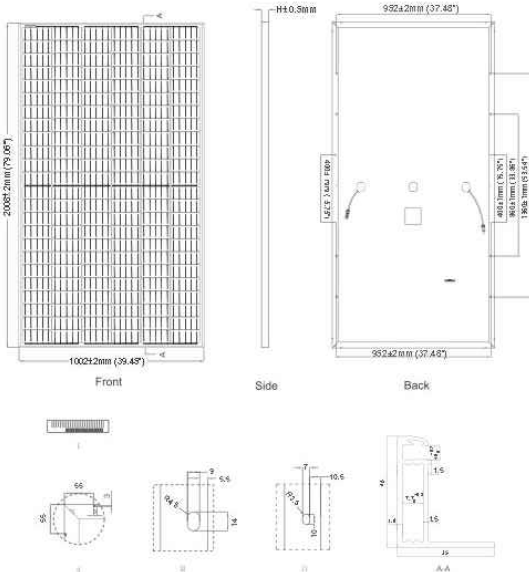
- Diamond Cell Technology**  
Uniquely designed high performance 5 busbar mono PERC half cell
- 1500V**  
UL and IEC 1500V certified; lowers BOS costs and yields better LCOE
- Higher Module Power**  
Decrease in current loss yields higher module efficiency
- Shade Tolerance**  
More shade tolerance due to twin arrays
- PID FREE**  
Reinforced cell prevents potential induced degradation
- Strength and Durability**  
Certified for high snow (5400 Pa) and wind (2400 Pa) loads

### LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty • 25 Year Linear Power Warranty



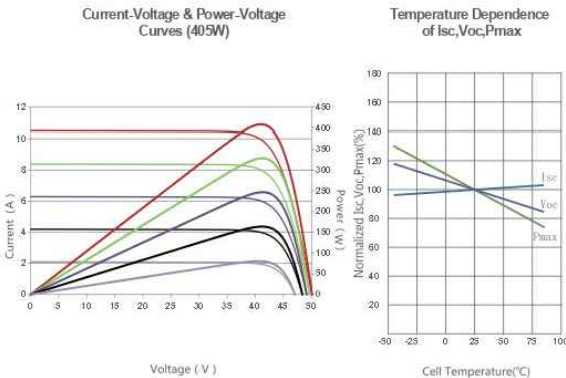
### Engineering Drawings



### Packaging Configuration

(Two pallets = One stack)  
26pcs/pallet, 52pcs/stack, 572pcs/40'HQ Container

### Electrical Performance & Temperature Dependence



### Mechanical Characteristics

Cell Type	Mono PERC Diamond Cell (158.75 x 158.75 mm)
No. of Half-cells	144 (6x24)
Dimensions	2008x1002x40mm (79.06x39.45x1.57 inch)
Weight	22.5 kg (49.6 lbs)
Front Glass	3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	12AWG, (+) 1400mm(55.12 in), (-) 1400mm(55.12 in) or Customized Length
Fire Type	Type 1

### SPECIFICATIONS

Module Type	JKM390M-72HL-V		JKM395M-72HL-V		JKM400M-72HL-V		JKM405M-72HL-V		JKM410M-72HL-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	390Wp	294Wp	395Wp	298Wp	400Wp	302Wp	405Wp	306Wp	410Wp	310Wp
Maximum Power Voltage (Vmp)	41.1V	39.1V	41.4V	39.3V	41.7V	39.6V	42.0V	39.8V	42.3V	40.0V
Maximum Power Current (Imp)	9.49A	7.54A	9.55A	7.60A	9.60A	7.66A	9.65A	7.72A	9.69A	7.76A
Open-circuit Voltage (Voc)	49.3V	48.0V	49.5V	48.2V	49.8V	48.5V	50.1V	48.7V	50.4V	48.9V
Short-circuit Current (Isc)	10.12A	8.02A	10.23A	8.09A	10.36A	8.16A	10.48A	8.22A	10.60A	8.26A
Module Efficiency STC (%)	19.38%		19.63%		19.88%		20.13%		20.38%	
Operating Temperature (°C)	-40°C~+85°C									
Maximum System Voltage	1500VDC(UL)/1500VDC(IEC)									
Maximum Series Fuse Rating	20A									
Power Tolerance	0~+3%									
Temperature Coefficients of Pmax	-0.36%/°C									
Temperature Coefficients of Voc	-0.28%/°C									
Temperature Coefficients of Isc	0.048%/°C									
Nominal Operating Cell Temperature (NOCT)	45±2°C									

STC: ☀ Irradiance 1000W/m<sup>2</sup> 📦 Cell Temperature 25°C ☁ AM=1.5

NOCT: ☀ Irradiance 800W/m<sup>2</sup> 📦 Ambient Temperature 20°C ☁ AM=1.5 🌀 Wind Speed 1m/s

\* Power measurement tolerance: ± 3%

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.  
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JKM390-410M-72HL-V-A1-US

### MODERN CONCEPTS SOLAR

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

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1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

### DRAWN BY

ESR

### SHEET NAME

EQUIPMENT  
SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-11





DATA SHEET



## IQ8 and IQ8+ 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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IQ8SP-DS-0002-01-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.

\*\* IQ8 and IQ8Plus supports split phase, 240V installations only.

## IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings <sup>1</sup>	W	235 – 350	235 – 440
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
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>2</sup> [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
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range <sup>3</sup>	V	240 / 211 – 264	
Max continuous output current	A	10	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit <sup>4</sup>		16	13
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
CEC weighted efficiency	%	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. 1071-01	
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) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>

(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17



### MODERN CONCEPTS SOLAR

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#### DRAWN BY

ESR

#### SHEET NAME

EQUIPMENT  
SPECIFICATION

#### SHEET SIZE

ANSI B  
11" X 17"

#### SHEET NUMBER

PV-12



## Enphase IQ Combiner 4/4C

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



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

### Smart

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

### Simple

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

### Reliable

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

## Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
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](https://enphase.com)

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### MODERN CONCEPTS SOLAR

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	11/10/2022	

### PROJECT NAME & ADDRESS

ANAI SY RODRIGUEZ  
RESIDENCE  
1781 SW IRONWOOD DR.,  
LAKE CITY, FL 32025

### DRAWN BY

ESR

### SHEET NAME EQUIPMENT SPECIFICATION

### SHEET SIZE

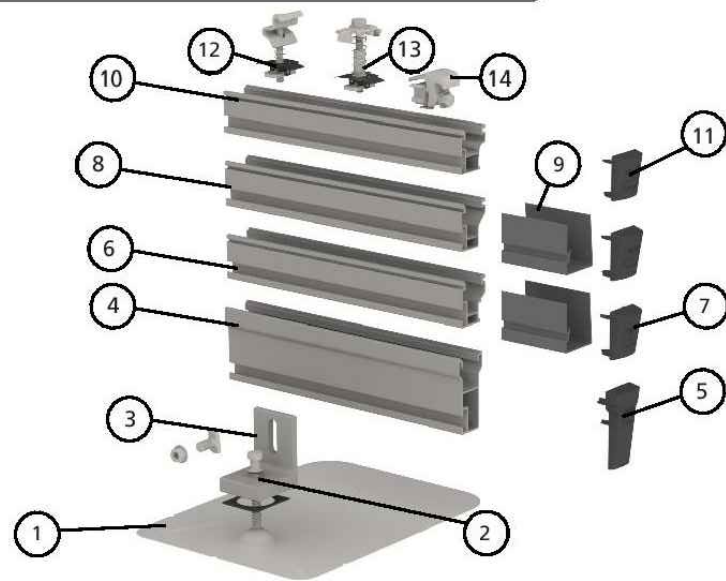
ANSI B  
11" X 17"

### SHEET NUMBER

PV-13



# CrossRail System



Item No.	Description	Part No.
1	EverFlash XP Comp Kit, Mill or Dark	4000060, 4000061, 4000057
2	Lag Bolt D145/16 x 4" SS	4000359
3	L-Foot XP Set, Mill or Dark	4000036, 4000038
4	CrossRail 80 168" Rail, Mill	4000508
5	CrossRail 80 End Cap, Black	4001221
6	CrossRail 48-XL 166", Mill or Dark	4000695, 4000705
7	CrossRail 48-X/48-XL End Cap or Flat End Cap	4000433, 4000431
8	CrossRail 48-X 166" or 180", Mill or Dark	4000662, 4000675, 4000663
9	CrossRail 48-X/48-XL 3" Sleeve	4000583
10	CrossRail 44-X 166", Mill or Dark	4000019, 4000020
11	CrossRail 44-X End Cap	4000067
12	CR Mid Clamp Silver or Dark	4000601-H, 4000602-H
13	CR End Clamp Silver or Dark	4000429, 4000430
14	Yeti Clamp (Hidden End Clamp)	40000050-H

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## CrossRail 44-X

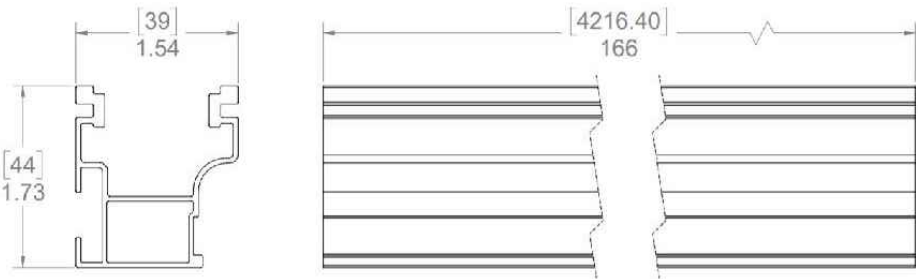


### Mechanical Properties

	CrossRail 44-X
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi (260 MPa)
Yield Strength	34.8 ksi (240 MPa)
Weight	0.47 lbs/ft (0.699 kg/m)
Finish	Mill or Dark Anodized

### Section Properties

	CrossRail 44-X
Sx	0.1490 in³ (0.3785 cm³)
Sy	0.1450 in³ (0.3683 cm³)
A (X-Section)	0.4050 in² (1.0287 cm²)



Dimensions in [mm] Inches

#### Notes:

- ▶ Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-16
- ▶ UL2703 Listed System for Fire and Bonding

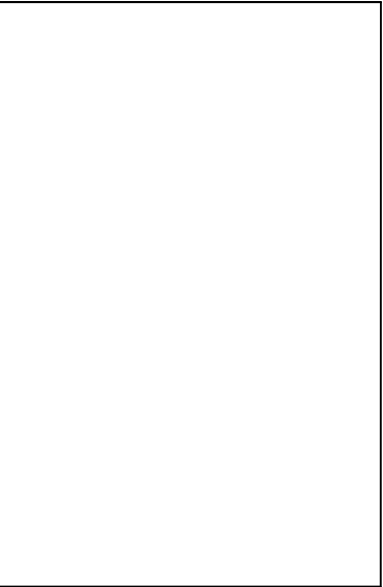
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#### MODERN CONCEPTS SOLAR

201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	11/10/2022	



#### PROJECT NAME & ADDRESS

ANAI SY RODRIGUEZ  
RESIDENCE  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY ESR
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SHEET NAME EQUIPMENT SPECIFICATION
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SHEET SIZE ANSI B 11" X 17"
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SHEET NUMBER PV-14
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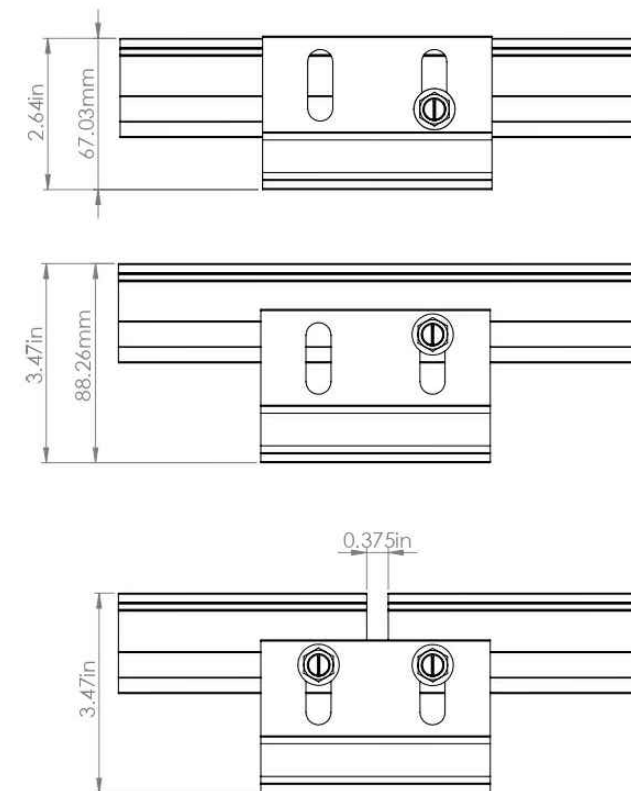
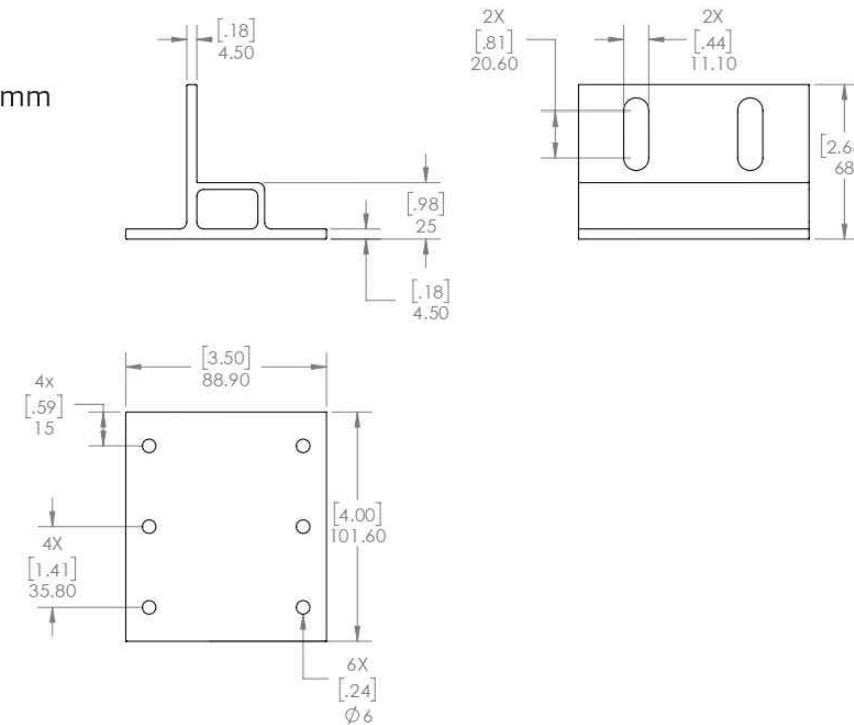
**Patent Pending**

Item Number	Description	Part Number
1	Splice Foot XL	4000162   Splice Foot XL Kit, Mill
2	K2 EverSeal	
3	M5 x 60 lag screws	
4	T-Bolt & Hex Nut Set	

	Splice Foot XL
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

**We support PV systems**  
Formerly Everest Solar Systems 

Units: [in] mm



k2-systems.com



201 N. FRANKLIN ST. SUITE 2200  
TAMPA, FL 33602

REVISIONS		
DESCRIPTION	DATE	REV
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## PROJECT NAME & ADDRESS

ANAISSY RODRIGUEZ  
RESIDENCE  
1781 SW IRONWOOD DR,  
LAKE CITY, FL 32025

DRAWN BY  
ESR

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER

PV-15



# SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

## Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included



SolaDeck Model SD 0783



## SolaDeck UL50 Type 3R Enclosures

Available Models:

- Model SD 0783 - (3" fixed Din Rail)
- Model SD 0786 - (6" slotted Din Rail)



## SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

**Model SD 0783-41** 3" Fixed Din Rail fastened using Norlock System

### \*\*Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 1- Power Distribution Block 600VDC 175AMP
- 1- Bus Bar with UL lug

**Model SD 0786-41** 6" Slotted Din Rail fastened using steel studs

### \*\*Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 4- Din Rail Mounted Terminal Blocks
- Bus Bars with UL lug

\*\*Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.



Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.



Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.



Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

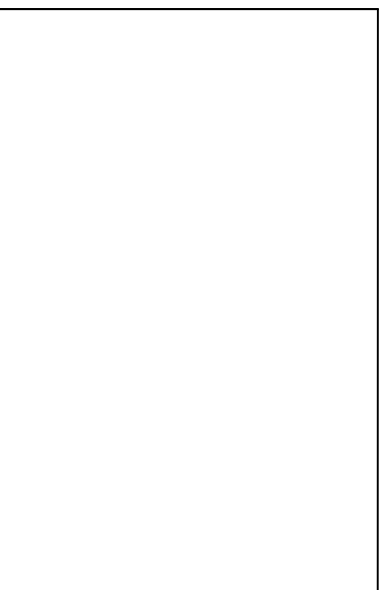
RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Claire, WI 54703  
For product information call 1(866) 367-7782



**MODERN CONCEPTS SOLAR**

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DRAWN BY  
**ESR**

SHEET NAME  
**EQUIPMENT  
SPECIFICATION**

SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-16**