

# PHOTOVOLTAIC ROOF MOUNT SYSTEM

15 MODULES-ROOF MOUNTED - 6.000 KW DC, 4.350 KW AC

833 NORTHWEST WILSON STREET, LAKE CITY, FL 32055

This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

PROJECT DATA

PROJECT ADDRESS 833 NORTHWEST WILSON STREET,  
LAKE CITY, FL 32055  
OWNER: JEROME LOVE  
DESIGNER: ESR

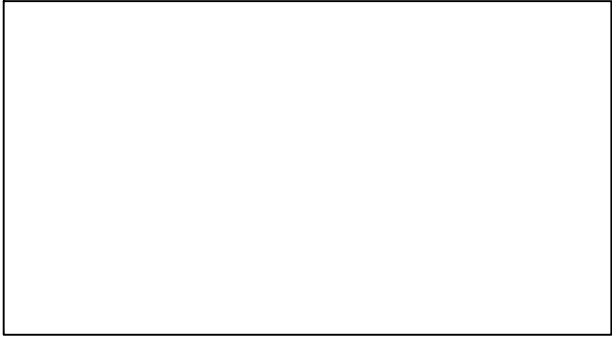
SCOPE: 6.000 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH  
15 HYUNDAI SOLAR HIS-S400YH(BK) 400W PV MODULES WITH  
15 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS

AUTHORITIES HAVING JURISDICTION:  
BUILDING: COLUMBIA COUNTY  
ZONING: COLUMBIA COUNTY  
UTILITY: FPL

SHEET INDEX

G001 COVER SHEET  
E001 SITE PLAN  
S001 ROOF PLAN AND MODULES  
E002 ELECTRICAL PLAN  
S002 STRUCTURAL DETAIL  
E003 ELECTRICAL LINE DIAGRAM  
E004 WIRING CALCULATIONS  
E005 LABELS  
E006 PLACARD  
PD001+ EQUIPMENT SPECIFICATIONS

SIGNATURE



GENERAL NOTES

- 1. ALL COMPONENTS ARE UL LISTED AND NEC CERTIFIED, WHERE WARRANTED.
- 2. THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2017.
- 3. THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
- 4. 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.
- 5. WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
- 6. HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
- 7. A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 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.
- 8. PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
- 9. PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- 10. 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.
- 11. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH THE LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
- 12. INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE UL 1741 LISTED.
- 13. THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
- 14. ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- 15. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
- 16. SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
- 17. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
- 18. 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)]
- 19. ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
- 20. WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
- 21. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
- 22. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
- 23. IN ACCORDANCE WITH 2021 IFC 1205.5, 2018 IFC 1204.4, AND 2015 IFC 605.11.2 A CLEAR, BRUSH-FREE AREA OF 10 FEET(3048 MM) SHALL BE REQUIRED FOR GROUND-MOUNTED PHOTOVOLTAIC ARRAYS.
- 24. PANEL LAYOUT ORIENTATION IS SUBJECT TO CHANGE ON DESIGNED MOUNTING PLANES.

VICINITY MAP



HOUSE PHOTO



CODE REFERENCES

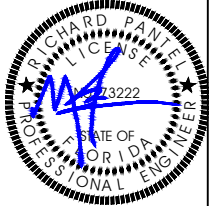
PROJECT TO COMPLY WITH THE FOLLOWING:

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	07/12/2023	

Richard Pantel



Digitally signed by Richard Pantel  
DN: c=US, st=Virginia, l=Round Hill, o=TectonCorp, P, C, cn=Richard Pantel, email=rpantel@princeton-engineering.com  
Date: 2023.07.14 16:34:20 -0400

Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

COVER SHEET

SHEET SIZE

ANSI B  
11" X 17"

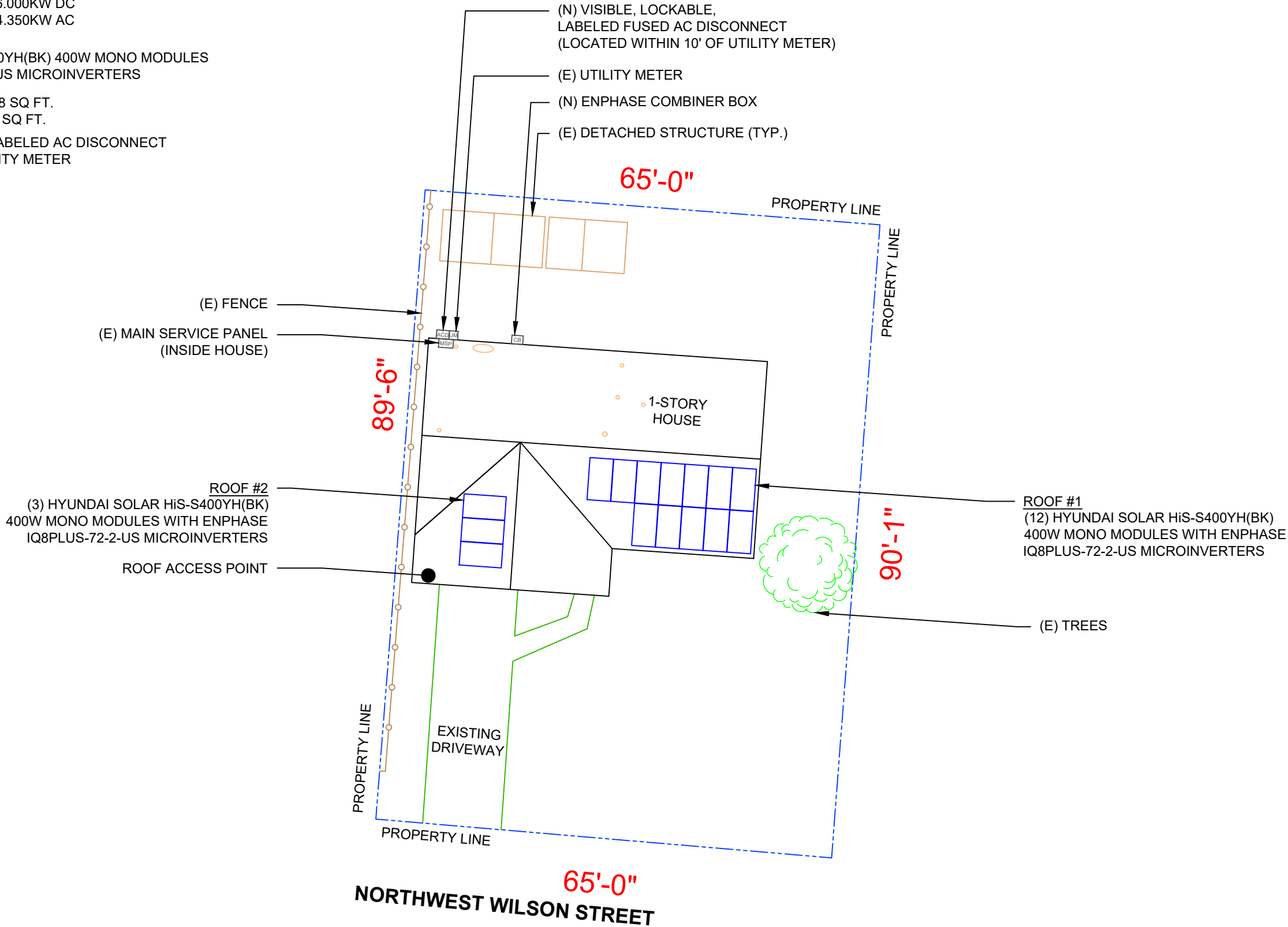
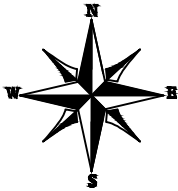
SHEET NUMBER

G001

PROJECT DESCRIPTION:

15 X HYUNDAI SOLAR HiS-S400YH(BK) 400W MONO MODULES  
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
DC SYSTEM SIZE: 15 x 400 = 6.000KW DC  
AC SYSTEM SIZE: 15 x 290 = 4.350KW AC  
EQUIPMENT SUMMARY  
15 HYUNDAI SOLAR HiS-S400YH(BK) 400W MONO MODULES  
15 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS

ROOF ARRAY AREA #1:- 257.88 SQ FT.  
ROOF ARRAY AREA #2:- 64.47 SQ FT.  
NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT  
LOCATED WITHIN 10' OF UTILITY METER



This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

SITE PLAN

SHEET SIZE

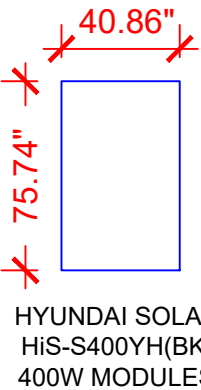
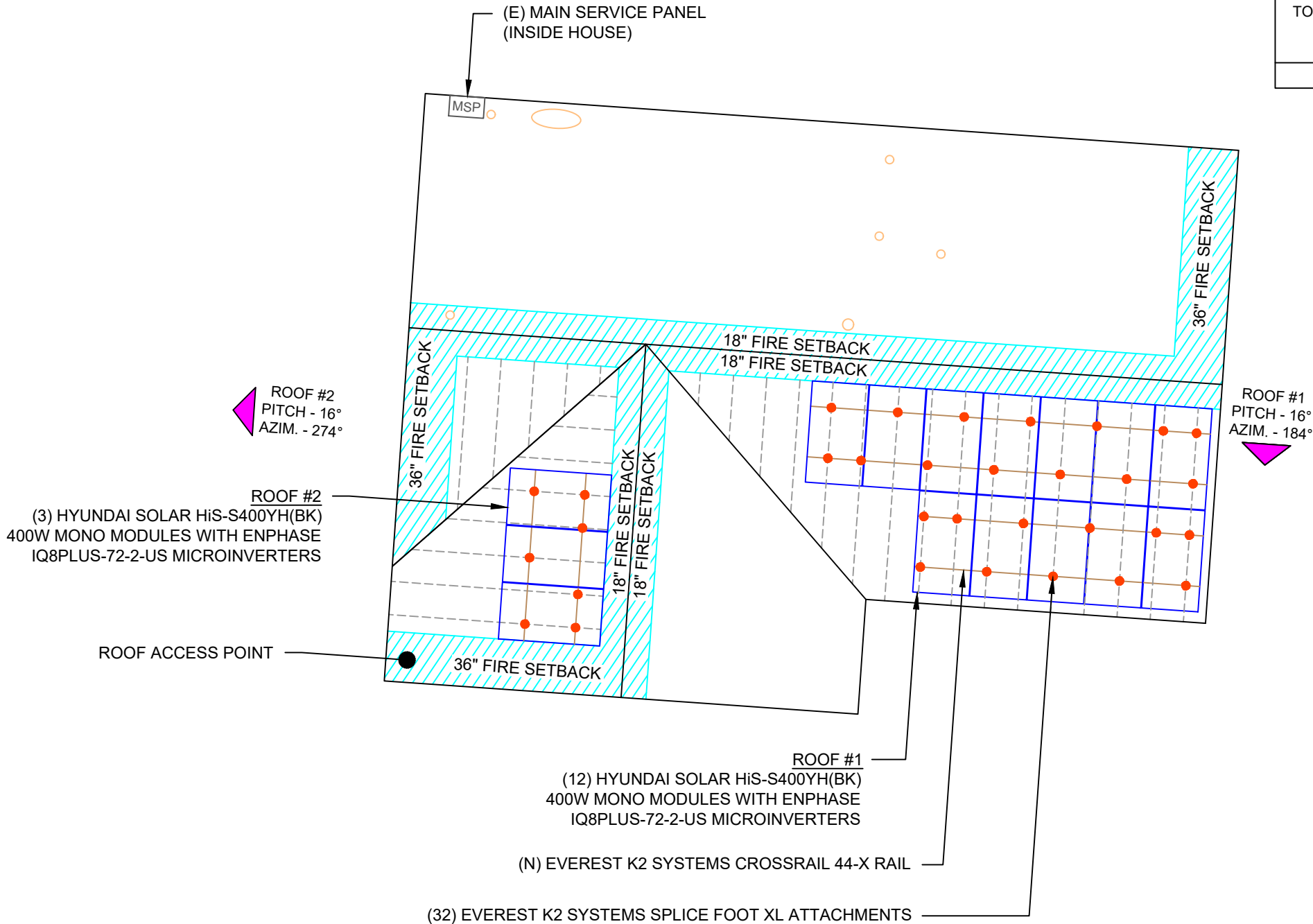
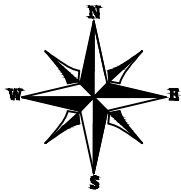
ANSI B  
11" X 17"

SHEET NUMBER

E001

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 15 MODULES  
MODULE TYPE = HYUNDAI SOLAR HiS-S400YH(BK) 400W MONO MODULES  
MODULE WEIGHT = 46.51 LBS / 21.1KG.  
MODULE DIMENSIONS = 75.74" x 40.86" = 21.49 SF



HYUNDAI SOLAR  
HiS-S400YH(BK)  
400W MODULES

This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

ROOF DESCRIPTION				ASPHALT SHINGLE	
ROOF TYPE					
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	12	16°	184°	2"X4"	24"
#2	3	16°	274°	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 (%)
322.35	1587.42	20

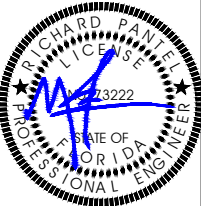


SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

ROOF PLAN AND  
MODULES

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

S001

LEGEND



- MAIN SERVICE PANEL



- VENT, ATTIC FAN  
(ROOF OBSTRUCTION)



- ROOF ATTACHMENT



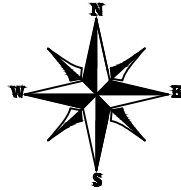
- TRUSS

1 ROOF PLAN AND MODULES

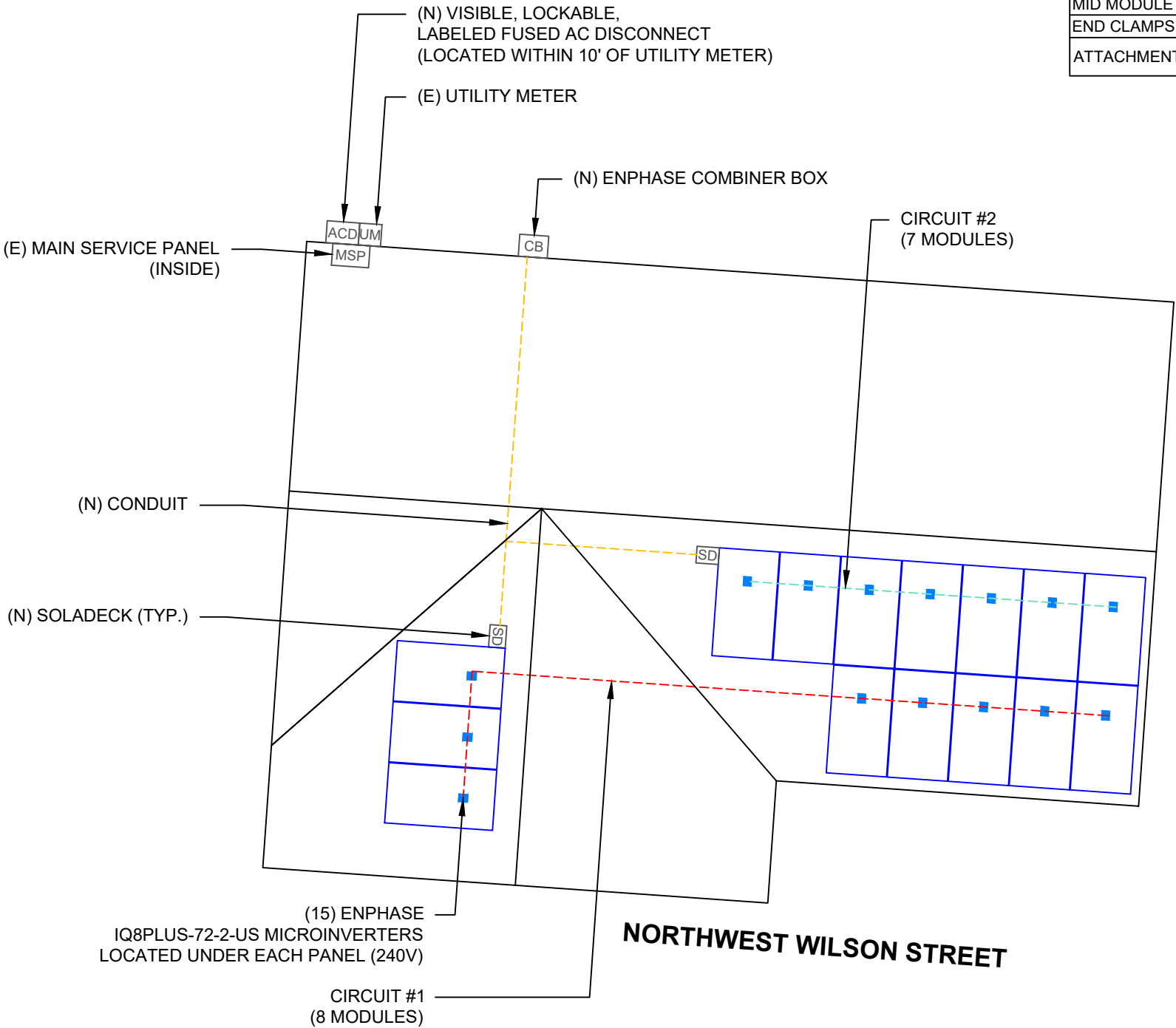
S001

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

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



NOTE : CONDUIT INSTALLED AT  
MINIMUM DISTANCE OF 7/8 INCHES  
ABOVE ROOF



This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

### BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	15	HYUNDAI SOLAR HiS-S400YH(BK) 400W MODULE
MICRO INVERTERS	15	ENPHASE IQ8PLUS-72-2-US MICROINVERTERS
SOLADECK	1	SOLADECK
RAIL	8	EVEREST K2 SYSTEMS CROSSRAIL 44-X RAIL
SPLICES	4	SPLICES
MID MODULE CLAMPS	24	MID MODULE CLAMPS
END CLAMPS	12	END CLAMPS / STOPPER SLEEVE
ATTACHMENTS	32	EVEREST K2 SYSTEMS SPLICE FOOT XL ATTACHMENTS

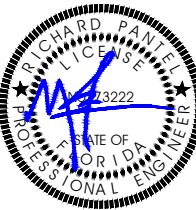


### SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

### PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

### DRAWN BY

ESR

### SHEET NAME

ELECTRICAL PLAN

### SHEET SIZE

ANSI B  
11" X 17"

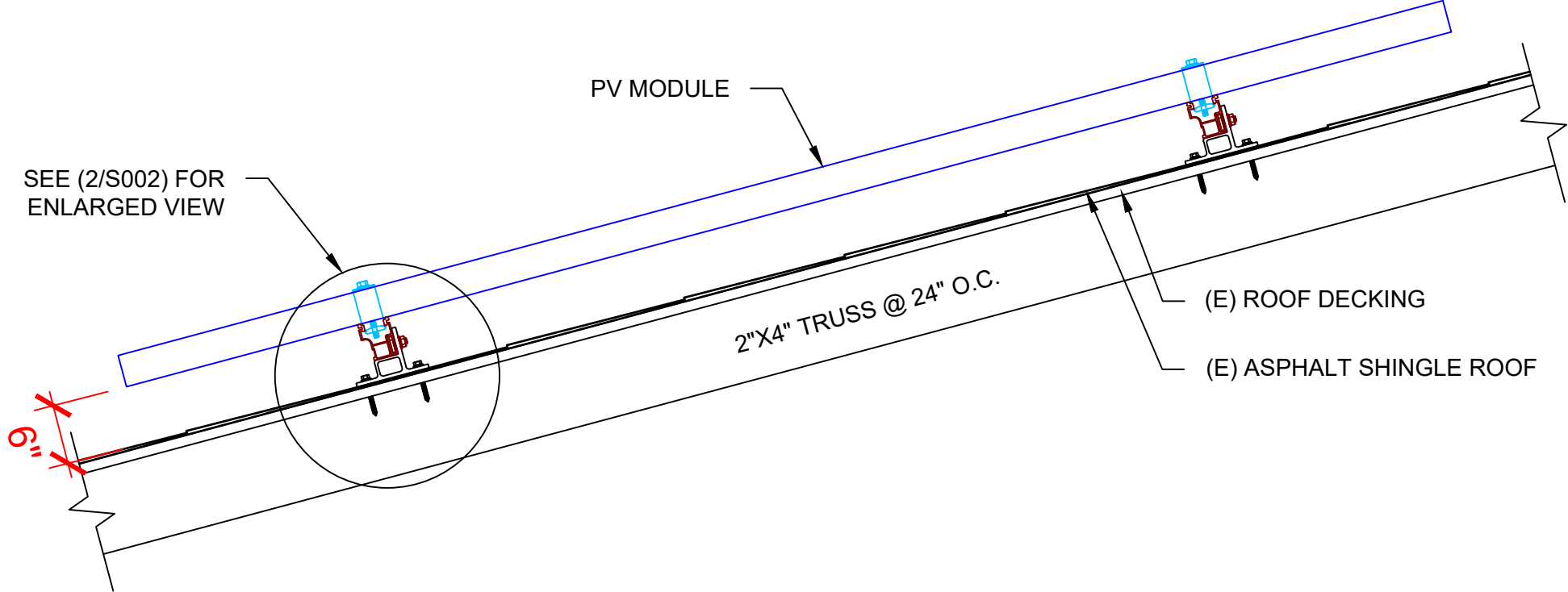
### SHEET NUMBER

E002

### LEGEND

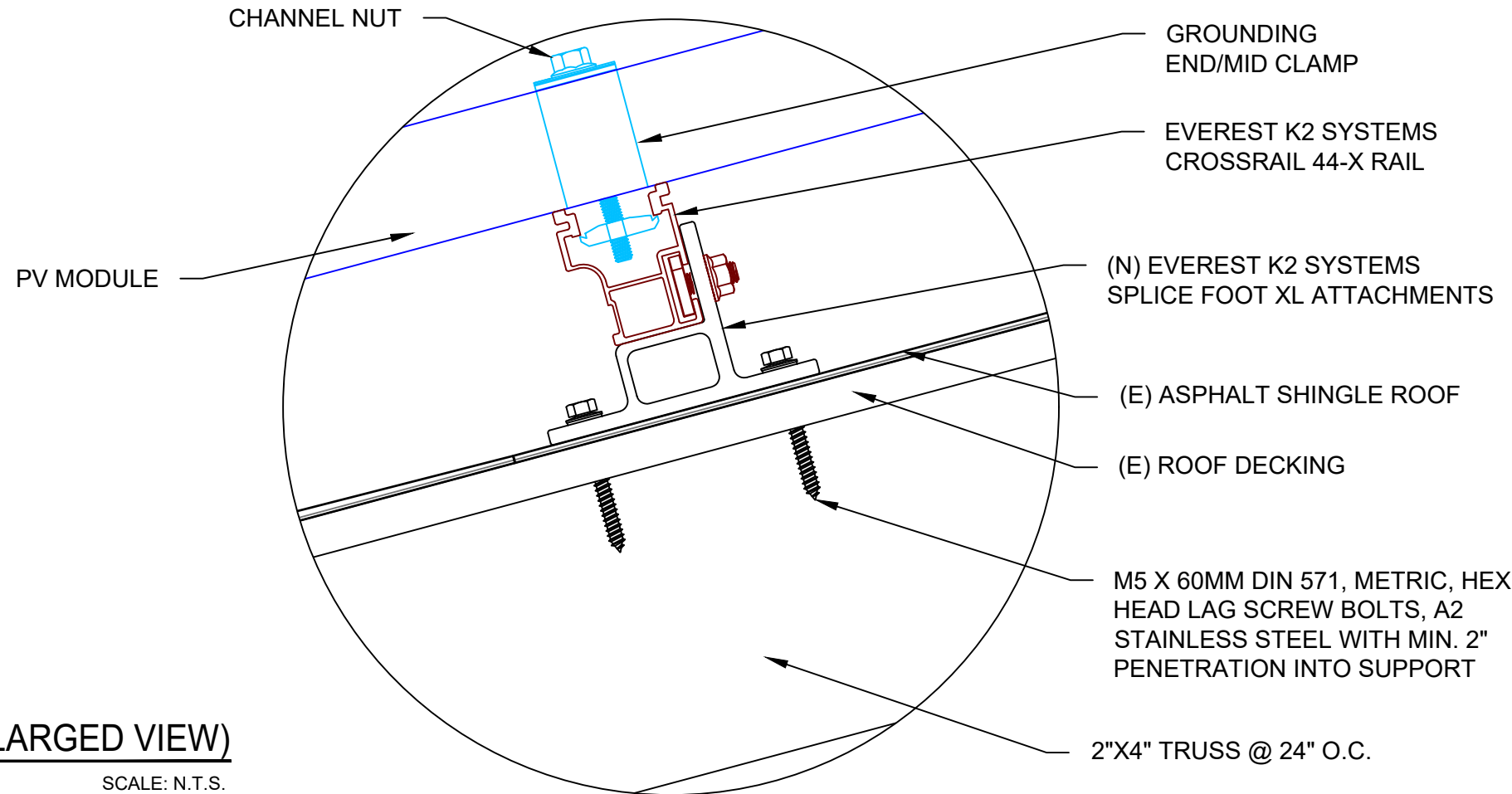
<span style="border: 1px solid black; padding: 2px;">CB</span>	- COMBINER BOX	<span style="border: 1px solid black; padding: 2px;">SD</span>	- SOLADECK
<span style="border: 1px solid black; padding: 2px;">ACD</span>	- AC DISCONNECT	<span style="border: 1px solid black; padding: 2px;">○</span>	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
<span style="border: 1px solid black; padding: 2px;">UM</span>	- UTILITY METER	<span style="color: red;">●</span>	- ROOF ATTACHMENT
<span style="border: 1px solid black; padding: 2px;">MSP</span>	- MAIN SERVICE PANEL	<span style="color: gray;">---</span>	- TRUSS
		<span style="color: green;">---</span>	- CONDUIT





# 1 | ATTACHMENT DETAIL (SIDE VIEW)

S002 SCALE: N.T.S.



# 2 | ATTACHMENT DETAIL (ENLARGED VIEW)

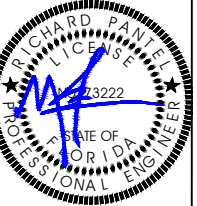
S002 SCALE: N.T.S.



## SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

## PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

## DRAWN BY

ESR

## SHEET NAME

STRUCTURAL DETAIL

## SHEET SIZE

ANSI B  
11" X 17"

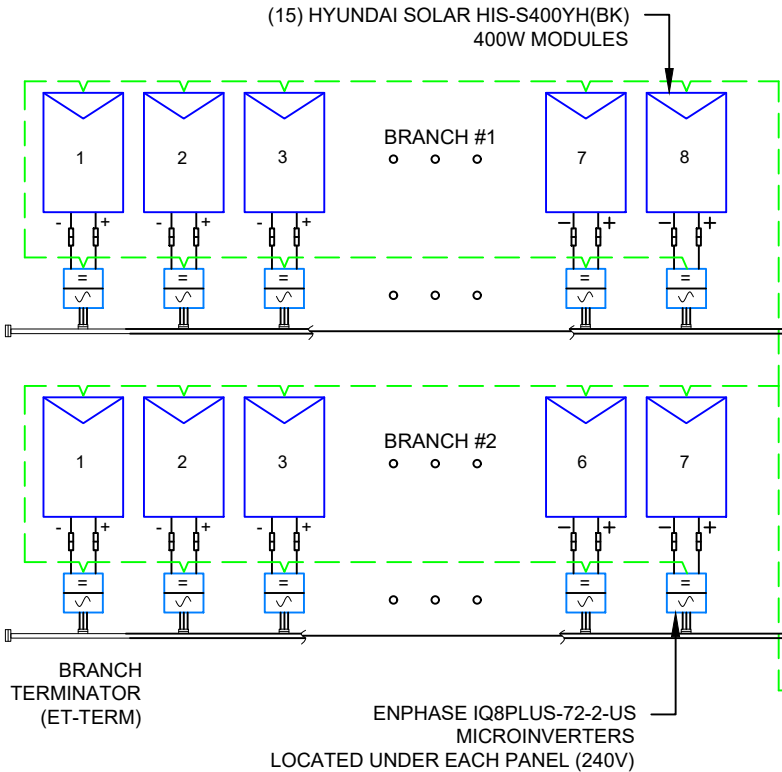
## SHEET NUMBER

S002

DC SYSTEM SIZE: 15 x 400 = 6.000KW DC  
AC SYSTEM SIZE: 15 x 290 = 4.350KW AC

(15) HYUNDAI SOLAR HiS-S400YH(BK) 400W MONO MODULES  
WITH (15) ENPHASE IQ8PLUS-72-2-US MICROINVERTERS  
LOCATED UNDER EACH PANEL (240V)

(1) BRANCH CIRCUIT OF 08 MODULES AND  
(1) BRANCH CIRCUIT OF 07 MODULES ARE 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].

**RACKING NOTE:**

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER

This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

**GROUNDING & GENERAL NOTES:**

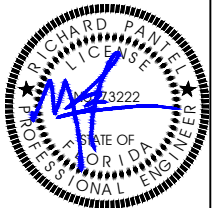
1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE 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.

**sunergy**

**SUNERGY SOLAR LLC**

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

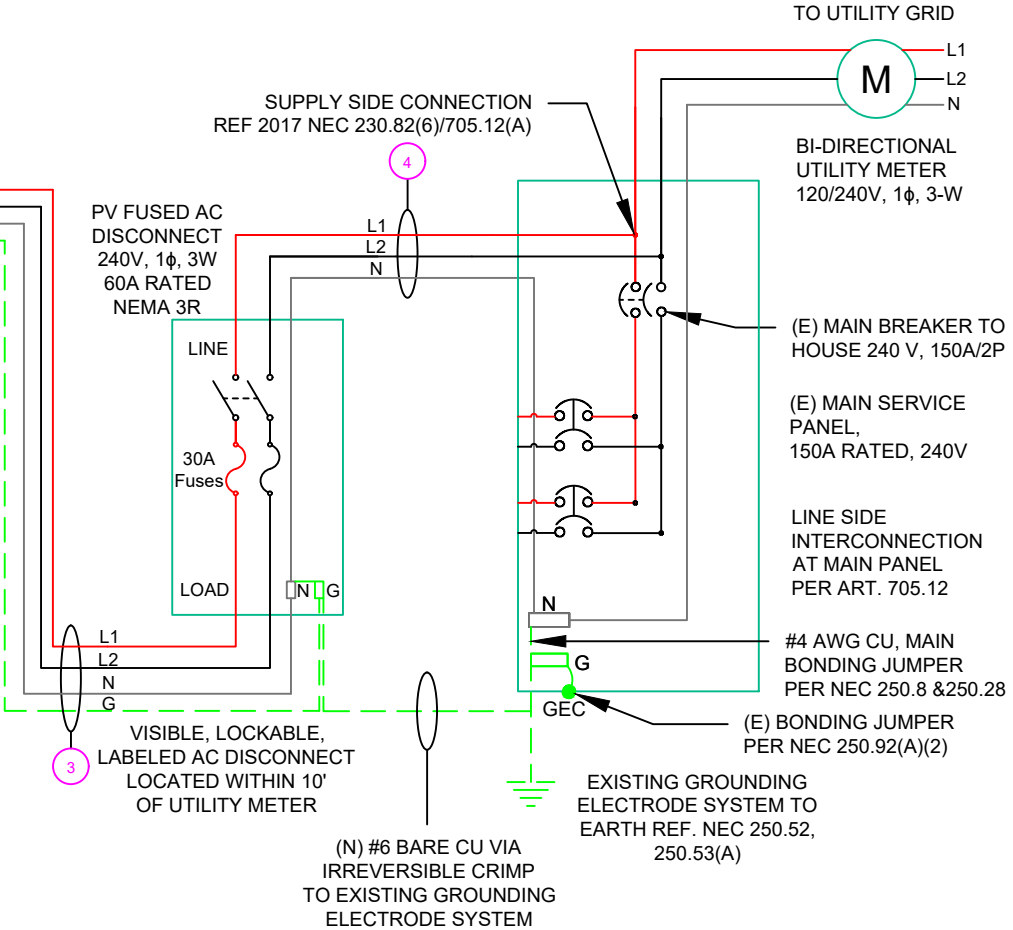
DRAWN BY  
**ESR**

SHEET NAME  
**ELECTRICAL LINE DIAGRAM**

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

SHEET NUMBER  
**E003**

OCPD CONDUCTOR SIZE	
BREAKER/FUSE SIZE	WIRE GAUGE SIZE (75°C,COPPER)
20A	10 AWG
25A	10 AWG
30A	10 AWG
35A	8 AWG
40A	8 AWG
45A	8 AWG
50A	8 AWG
60A	6 AWG
70A	4 AWG
80A	4 AWG
90A	3 AWG
100A	3 AWG
110A	2 AWG
125A	1 AWG
150A	1/0 AWG
175A	2/0 AWG
200A	3/0 AWG



QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
(4)	CU#12AWG -	ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
(1)	CU #6AWG -	BARE COPPER IN FREE AIR		
(4)	CU#10AWG -	THWN-2 L1 & L2	ENT OR LFMC IN ATTIC	3/4"
(1)	CU #10AWG -	CU,THWN-2 GND ATTIC		
(2)	CU #10AWG -	THWN-2 OR THHN L1 & L2	EMT, LFMC OR PVC	3/4"
(1)	CU #10AWG -	CU,THWN-2 OR THHN N		
(1)	CU #10AWG -	CU,THWN-2 OR THHN GND	EMT, LFMC OR PVC	3/4"
(2)	CU #6AWG -	THWN-2 OR THHN L1 & L2		
(1)	CU #6AWG -	CU,THWN-2 OR THHN N		

NOTE : "CONDUIT SIZE IS MINIMUM REQUIRED PER NEC300.17. CONTRACTOR MAY UPSIZE AS NEEDED".

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ8PLUS-72-2-US MICROINVERTERS
MIN/MAX DC VOLT RATING	30V MIN/ 58V 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 #	HYUNDAI SOLAR HIS-S400YH(BK) 400W MODULE
VMP	37.7V
IMP	10.61A
VOC	45.3V
ISC	11.25A
TEMP. COEFF. VOC	-0.26%/°C
MODULE DIMENSION	75.74"L x 40.86"W x 1.37"D (In Inch)


AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-5°
AMBIENT TEMP (HIGH TEMP 2%)	37°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.26%/°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 CIRCUIT 2	SCLADECK	240	9.58	12.10	20	N/A	BARE COPPER #6 AWG	CL #12 AWG	25	PASS	37	2	30	0.91	1	27.3	PASS			0.30	N/A	#N/A
	SCLADECK	240	3.47	10.59	20	N/A	BARE COPPER #6 AWG	CL #12 AWG	25	PASS	37	2	30	0.91	1	27.3	PASS			0.23	N/A	#N/A
SCLADECK COMBINER BOX	COMBINER BOX	240	9.58	12.10	20	N/A	CU #10 AWG	CL #10 AWG	35	PASS	37	4	40	0.91	0.8	29.12	PASS	20	1.24	0.200	3/4" EMT	19.79362
	AC DISCONNECT	240	18.15	22.69	30	CU #10 AWG	CU #10 AWG	CL #10 AWG	35	PASS	37	2	40	0.91	1	36.4	PASS	5	1.24	0.004	3/4" EMT	15.8349
AC DISCONNECT	POI	240	18.15	22.69	30	CU #6 AWG	N/A	CU #6 AWG	65	PASS	37	2	75	0.91	1	68.25	PASS	5	0.491	0.037	3/4" EMT	28.53659
Circuit 1 Voltage Drop																				0.631		
Circuit 2 Voltage Drop																				0.561		

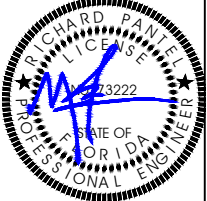
ELECTRICAL NOTES

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.
11. CONDUIT INSTALLED AT MINIMUM DISTANCE OF 7/8 INCHES ABOVE ROOF .....NEC 310.15(B)(3)(C)



**SUNERGY SOLAR LLC**  
7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

WIRING CALCULATIONS

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

E004

**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

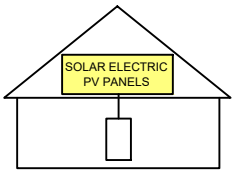
**WARNING**  
**POWER SOURCE OUTPUT**  
**CONNECTION. DO NOT**  
**RELOCATE THIS**  
**OVERCURRENT DEVICE**

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)

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

LABEL- 7:  
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- 8:  
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- 9:  
LABEL LOCATION:  
AC DISCONNECT  
CODE REF: NEC 690.56(C)(2)

**PHOTOVOLTAIC**  
**AC DISCONNECT**

LABEL- 10:  
LABEL LOCATION:  
AC DISCONNECT  
CODE REF: NEC 690.13(B)

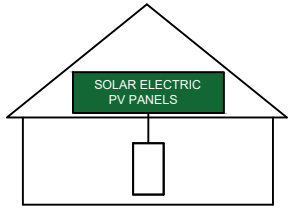
**PHOTOVOLTAIC**  
**AC DISCONNECT**  
**NOMINAL OPERATING AC VOLATGE** **240 V**  
**RATED AC OUTPUT CURRENT** **18.15 A**

LABEL- 11:  
LABEL LOCATION:  
MAIN SERVICE PANEL  
SUBPANEL  
AC DISCONNECT  
CODE REF: NEC 690.54

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

LABEL- 12:  
LABEL LOCATION:  
MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)  
CODE REF: NEC 690.13(B)

**EMERGENCY RESPONDER:**  
**THIS SOLAR PV SYSTEM EQUIPPED**  
**WITH RAPID SHUTDOWN**  
TURN RAPID SHUTDOWN  
SWITCH TO THE 'OFF'  
POSITION TO SHUTDOWN  
ENTIRE PV SYSTEM



**THE LABEL SHALL BE REFLECTIVE, WITH ALL LETTERS CAPITALIZED AND HAVING**  
**A MINIMUM HEIGHT OF 3/8 IN. (9.5 MM), IN WHITE ON A RED BACKGROUND.**

LABEL- 13  
LABEL LOCATION:  
AC DISCONNECT  
CODE REF: NFPA 1 (11.12.2.1.1.1.1)  
1. THE RAPID SHUTDOWN LABEL SHALL BE LOCATED ON OR NO MORE  
THAN 3 FT (1 M) FROM THE SERVICE DISCONNECTING MEANS  
2. (HEIGHT OF LABEL IS 3/8 IN. (9.5 MM), IN WHITE ON A RED BACKGROUND)

**NOTES:**  
**1.THE MATERIAL USED FOR THE PHOTOVOLTAIC SYSTEM LABELS SHALL BE**  
**REFLECTIVE, WEATHER RESISTANT, AND CONSTRUCTED OF DURABLE ADHESIVE**  
**MATERIAL OR ANOTHER APPROVED MATERIAL SUITABLE FOR THE ENVIRONMENT**  
**IN COMPLIANCE WITH NFPA 1-11.12.**  
**2. FONT, TEXT HEIGHT , CAPITALIZATION , FONT COLOR(S), BACKGROUND**  
**COLOR(S), DIAGRAM COLOR(S)AND CONTEXT OF PHOTOVOLTAIC SYSTEMS LABELS**  
**SHALL COMPLY WITH NFPA 1-11.12 AND NEC 2017 690.56 AS APPLICABLE FOR**  
**THE PHOTOVOLTAIC SYSTEM TO BE INSTALLED.**

This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

**SUNERGY SOLAR LLC**  
**EMERGENCY CONTACT**  
**(727) 375-9375**

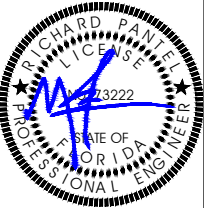
LABEL- 14  
LABEL LOCATION:  
MAIN SERVICE DISCONNECT  
CODE REF: NFPA 1 (11.12.2.1.5)



**SUNERGY SOLAR LLC**

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

**JEROME LOVE**  
**RESIDENCE**  
**833 NORTHWEST**  
**WILSON STREET,**  
**LAKE CITY, FL 32055**

DRAWN BY

**ESR**

SHEET NAME

**LABELS**

SHEET SIZE

**ANSI B**  
**11" X 17"**

SHEET NUMBER

**E005**





SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

PLACARD

SHEET SIZE

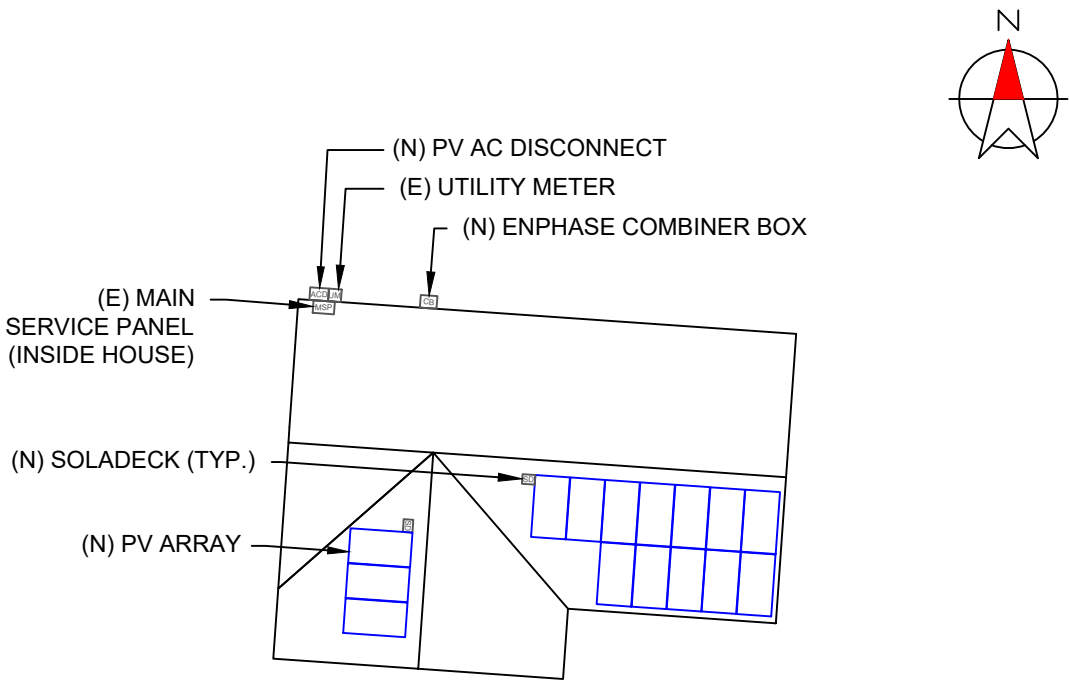
ANSI B  
11" X 17"

SHEET NUMBER

E006

# CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM MULTIPLE  
SOURCES OF POWER WITH SAFETY DISCONNECTS AS SHOWN:



833 NORTHWEST WILSON STREET, LAKE CITY, FL 32055

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:

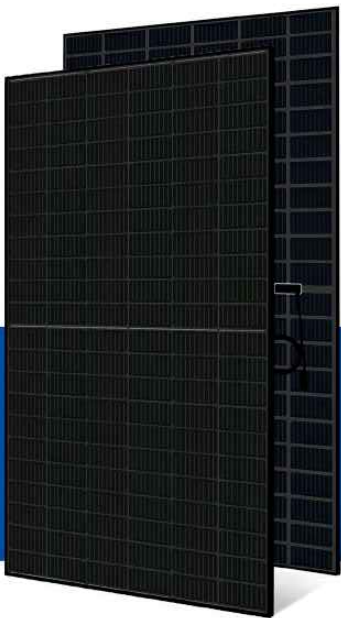
1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
3. MATERIAL BASED 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

HYUNDAI SOLAR MODULE

YH  
SERIES

Dual Black Max

HiS-S385YH(BK) HiS-S390YH(BK) HiS-S395YH(BK)  
HiS-S400YH(BK) HiS-S405YH(BK) HiS-S410YH(BK)



Bifacial Cells  
132



More Power  
Generation  
In Low Light



UL 1,500V  
IEC 1,500V  
Saves BOS Costs



All black Module  
For Sleek Design  
(Black Meshed  
T-Back sheet)



Maximized Power  
Generation

Increased total power output through capturing light from both the front and back of Bifacial solar modules. Back side power gain up to 25% of the front output depending on PV system design.



Mechanical Strength

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow(5,400Pa) and strong wind(4,000Pa).



Half-Cut &  
Multi-Wire Technology

Improved current flow with half-cut technology and 9 thin wiring technology allows high module efficiency of up to 20.5%. It also reduces power generation loss due to micro-cracks.



UL / VDE Test Labs

Hyundai's R&D center is an accredited test laboratory of both UL and VDE.



Anti-LID / PID

Both LID(Light Induced Degradation) and PID(Potential Induced Degradation) are significantly reduced to ensure higher actual yield during lifetime.



Reliable Warranty

Global brand with powerful financial strength provide reliable 25-year warranty.

Hyundai's Warranty Provisions

- 25 YEARS • 25-Year Product Warranty  
• Materials and workmanship
- 25 YEARS • 25-Year Performance Warranty  
• Initial year : 98.0%  
• Linear warranty after second year:  
with 0.54%p annual degradation,  
85.0% is guaranteed up to 25 years

About Hyundai Energy Solutions

Established in 1972, Hyundai Heavy Industries Group is one of the most trusted names in the heavy industries sector and is a Fortune 500 company. As a global leader and innovator, Hyundai Heavy Industries is committed to building a future growth engine by developing and investing heavily in the field of renewable energy.

As a core energy business entity of HHI, Hyundai Energy Solutions has strong pride in providing high-quality PV products to more than 3,000 customers worldwide.

Certification



UL61730 certified by UL, Type 1(for Fire Class A)

www.hyundai-es.co.kr



Electrical Characteristics

		Mono-Crystalline Type(HiS-S- YH(BK))					
		385	390	395	400	405	410
Nominal Output (Pmpp)	W	385	390	395	400	405	410
Open Circuit Voltage (Voc)	V	44.5	44.8	45.0	45.3	45.6	45.9
Short Circuit Current (Isc)	A	11.04	11.11	11.18	11.25	11.33	11.40
Voltage at Pmax (Vmpp)	V	37.1	37.3	37.5	37.7	37.9	38.1
Current at Pmax (Impp)	A	10.40	10.47	10.54	10.61	10.69	10.76
Module Efficiency	%	19.3	19.5	19.8	20.0	20.3	20.5
Cell Type	-	Mono crystalline, 9busbar					
Maximum System Voltage	V	1,500					
Temperature Coefficient of Pmax	%/K	-0.347					
Temperature Coefficient of Voc	%/K	-0.268					
Temperature Coefficient of Isc	%/K	+0.032					

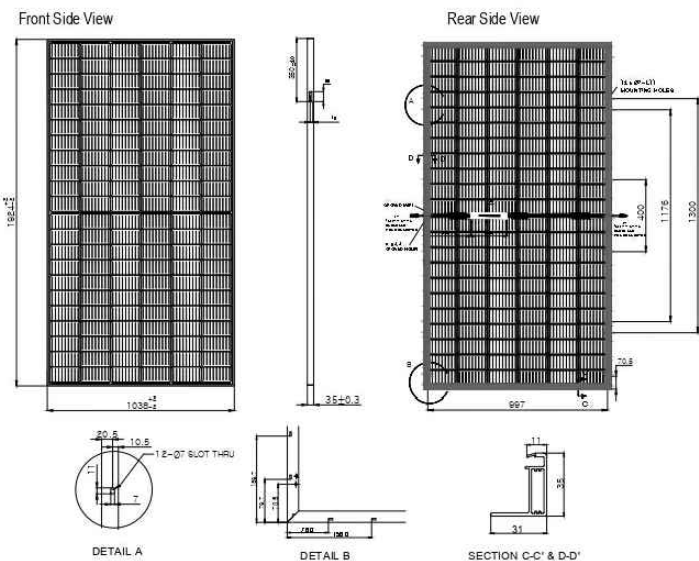
\*All data at STC (Measurement tolerances Pmpp ±3%; Isc ; Voc ±3%). Above data may be changed without prior notice.

Additional Power Gain from rear side		385	390	395	400	405	410
5%	W	399	404	410	415	425	431
15%	W	437	443	449	454	466	472
25%	W	475	482	488	494	506	513

Mechanical Characteristics

Dimensions	1,038 mm (W) x 1,924 mm (L) x 35 mm(H)
Weight	Approx. 21.1 kg
Solar Cells	132 half cut bifacial cells (2 parallel x 66 half cells in series)
Output Cables	Cable : 1,200mm / 4mm <sup>2</sup> Connector : MC4 genuine connector
Junction Box	IP68, weatherproof, IEC certified (UL listed)
Bypass Diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : 3.2mm, High Transmission, AR Coated Tempered Glass Encapsulant : EVA   Back Sheet : Black Meshed Transparent Backsheet
Frame	Anodized aluminum alloy type 6063

Module Diagram (unit : mm)

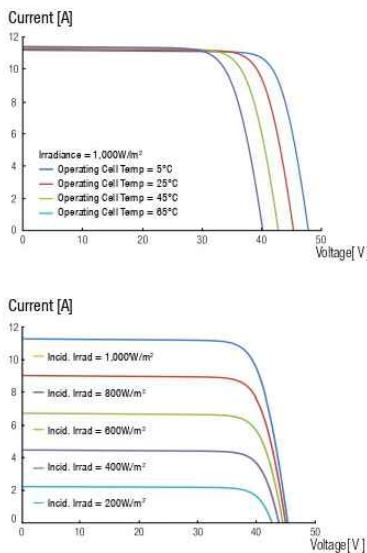


Installation Safety Guide

- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

Nominal Operating Cell Temperature	45.5°C ± 2
Operating Temperature	-40°C ~ +85°C
Maximum System Voltage	DC 1,500V
Maximum Reverse Current	20A
Maximum Test Load	Front 5,400 Pa (11.3psf) Rear 4,000 Pa (8.4psf)

I-V Curves

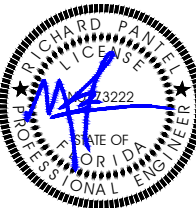


SUNERGY SOLAR LLC

7625 LITTLE RD, SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

MODULE  
DATASHEET

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PD001





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.

### 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)		IQ8-80-2-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)		IQ8-80-2-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	1.0	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			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01  This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

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

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

This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

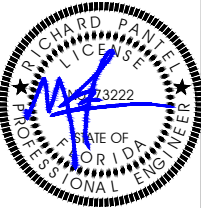


### SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

### PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

### DRAWN BY

ESR

### SHEET NAME

MICROINVERTER  
DATASHEET

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PD002



# 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



To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



## Enphase IQ Combiner 4/4C

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

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

© 2021 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ Combiner 4/4C, and other names are trademarks of Enphase Energy, Inc. Data subject to change. 10-21-2021



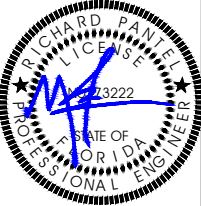
This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



### SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

### PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME  
COMBINER BOX  
DATASHEET

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PD003



We support PV systems  
Formerly Everest Solar Systems



# Splice Foot XL

Patent Pending

## TECHNICAL SHEET

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	

### Technical Data

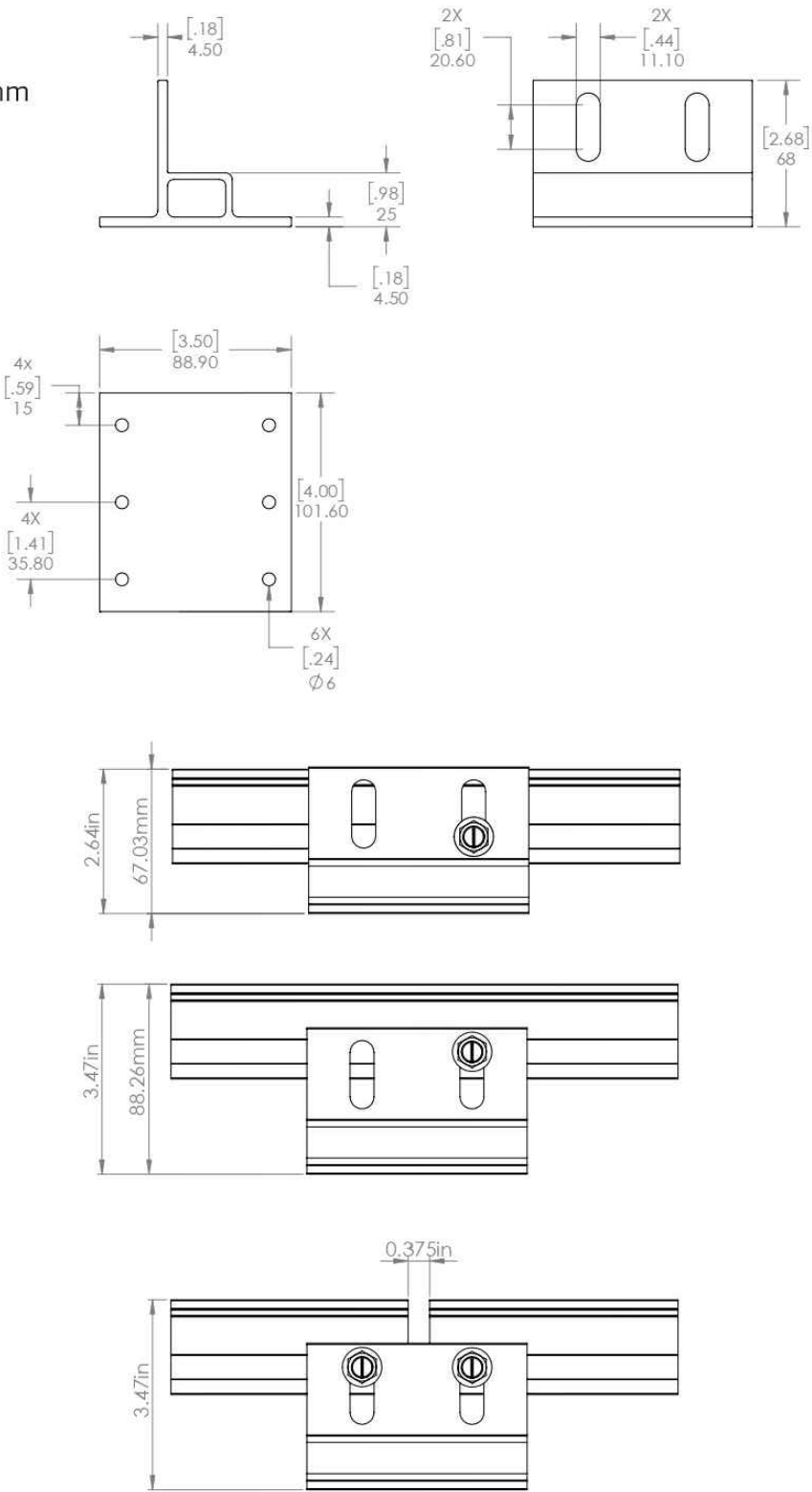
	Splice Foot XL
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

k2-systems.com

We support PV systems  
Formerly Everest Solar Systems



Units: [in] mm



k2-systems.com

This item has been digitally signed and sealed by Richard Pantel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

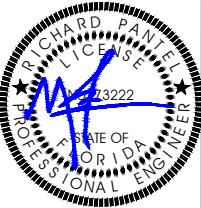


SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

### PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

ATTACHMENT  
DATASHEET

SHEET SIZE

ANSI B  
11" X 17"

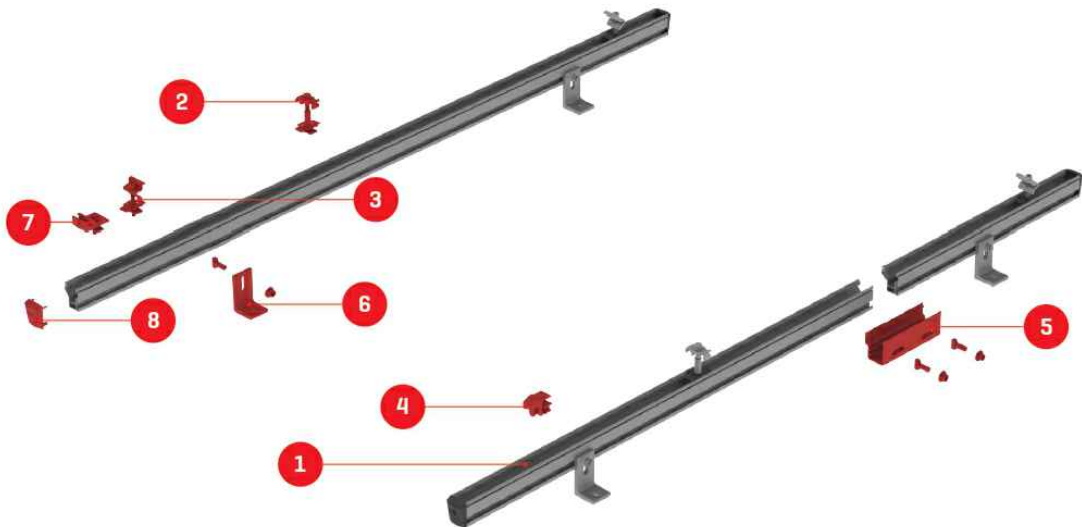
SHEET NUMBER

PD004

We support PV systems  
Formerly Everest Solar Systems



We support PV systems  
Formerly Everest Solar Systems



# CrossRail System

## TECHNICAL SHEET

Item Number	Description	Part Number
1	CrossRail 44-X (shown) all CR profiles applicable	4000019 (166" mill), 4000020 (166" dark) , 4000021 (180" mill), 4000022 (180" dark)
2	CrossRail Mid Clamp	4000601-H (mill), 4000602-H (dark)
3	CrossRail (Standard) End Clamp	4000429 (mill), 4000430 (dark)
4	Yeti Hidden End Clamp for CR	4000050-H
5	CrossRail 44-X Rail Connector (shown) CR 48-X, 48-XL Rail Connector available	4000051 (mill), 4000052 (dark)
6	L-Foot Slotted Set	4000630 (mill), 4000631 (dark)
7	Everest Ground Lug	4000006-H
8	CrossRail 44-X End Cap (shown) CrossRail 48-X, 48-XL and 80 available	4000067

We support PV systems  
Formerly Everest Solar Systems

## CROSSRAIL 44-X



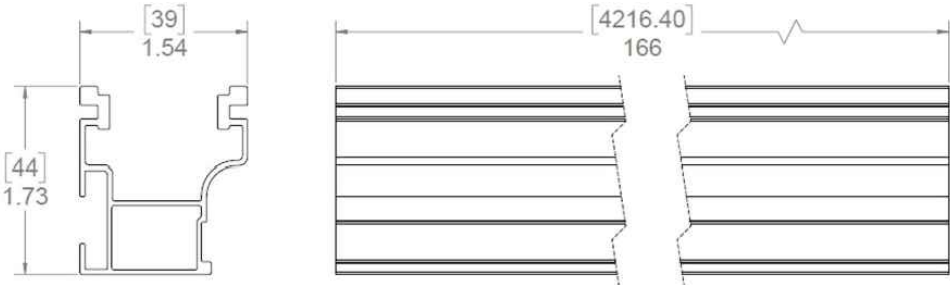
### Mechanical Properties

	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

### Sectional 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]

Units: [mm] in



Notes:

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

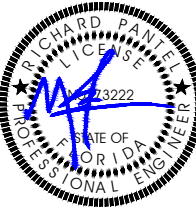


SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

### PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

RACKING  
DATASHEET

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PD005



# 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.

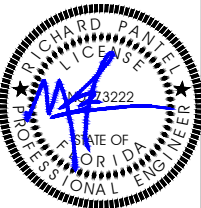
RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Claire, WI 54703  
For product information call 1(866) 367-7782



SUNERGY SOLAR LLC

7625 LITTLE RD. SUITE 200A,  
NEW PORT RICHEY, FL 34654

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/12/2023	



Reviewed and approved  
Richard Pantel, P.E.  
FL Lic. No. 73222  
7/13/2023

PROJECT NAME & ADDRESS

JEROME LOVE  
RESIDENCE  
833 NORTHWEST  
WILSON STREET,  
LAKE CITY, FL 32055

DRAWN BY

ESR

SHEET NAME

SOLADECK  
DATASHEET

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PD006