

PHOTOVOLTAIC ROOF MOUNT SYSTEM

11 MODULES-ROOF MOUNTED - 4.400 kW DC, 3.190 kW AC
191 SE CRAIG AVE, LAKE CITY, FL 32025



LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

PROJECT DATA

PROJECT ADDRESS: 191 SE CRAIG AVE, LAKE CITY, FL 32025

OWNER: RUTHANN CONWAY

CONTRACTOR: LUNEX POWER, 4721 N GRADY AVE TAMPA FL 33614 PHONE: 813-540-8807

DESIGNER: ESR

SCOPE: 4.400 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH 11 HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W PV MODULES WITH 11 ENPHASE: IQ7PLUS-72-2-US (240V) MICROINVERTERS (COMPLIANT WITH RAPID SHUTDOWN)

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

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PROFESSIONAL ENGINEER SEAL

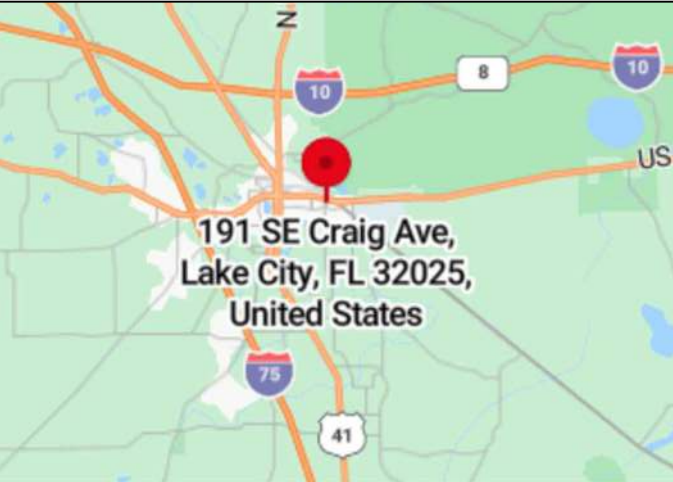
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GENERAL NOTES

- 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 MAP



HOUSE PHOTO



CODE REFERENCES

PROJECT TO COMPLY WITH THE FOLLOWING:

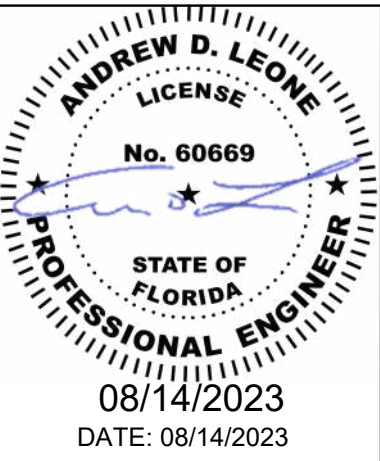
FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)
FLORIDA PLUMBING CODE, 7TH EDITION 2020 (FPC)
FLORIDA BUILDING CODE, 7TH EDITION 2020 EDITION (FBC)
FLORIDA MECHANICAL CODE, 7TH EDITION 2020 (FMC)
2017 NATIONAL ELECTRICAL CODE
FLORIDA FIRE PREVENTION CODE, 7TH EDITION (FFPC)

Andrew D.
Leone

Digitally signed by Andrew D. Leone
Date: 2023.08.15 09:51:42 -04'00'

REVISIONS

DESCRIPTION	DATE	REV



PROJECT NAME & ADDRESS

RUTHANN CONWAY
RESIDENCE
191 SE CRAIG AVE,
LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

COVER SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-1

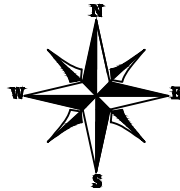
PROJECT DESCRIPTION:

11 X HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W PV MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 11 x 400 = 4.400KW DC
AC SYSTEM SIZE: 11 x 290 = 3.190KW AC

EQUIPMENT SUMMARY
11 HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W MONO MODULES
11 ENPHASE: IQ7PLUS-72-2-US (240V) MICROINVERTERS (COMPLIANT WITH RAPID SHUTDOWN)

ROOF ARRAY AREA #1:- 105.60 SQ FT.
ROOF ARRAY AREA #2:- 126.72 SQ FT.

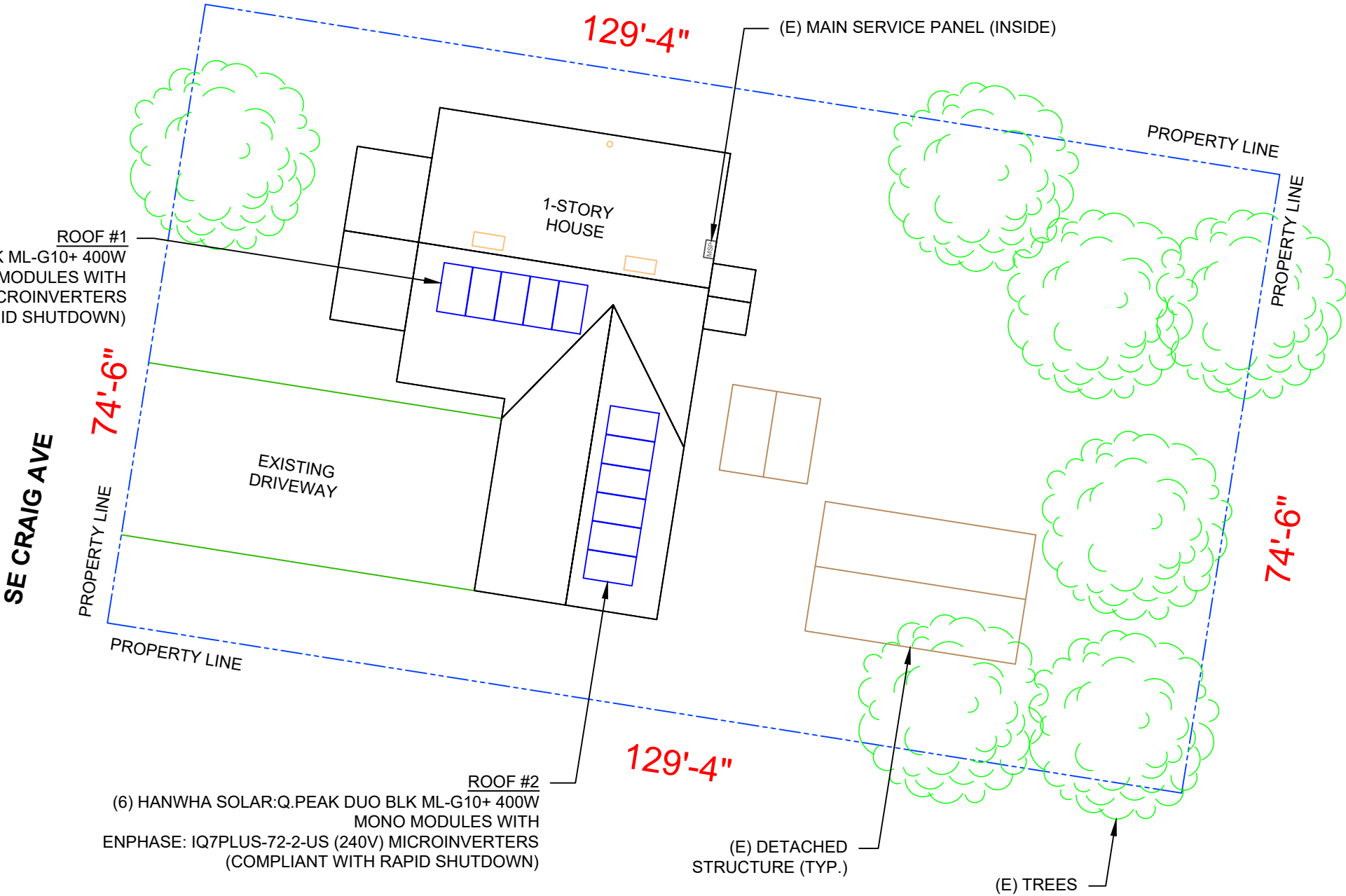
NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT
LOCATED WITHIN 10' OF UTILITY METER



ROOF #1
(5) HANWHA SOLAR:Q.PEAK DUO BLK ML-G10+ 400W
MONO MODULES WITH
ENPHASE: IQ7PLUS-72-2-US (240V) MICROINVERTERS
(COMPLIANT WITH RAPID SHUTDOWN)

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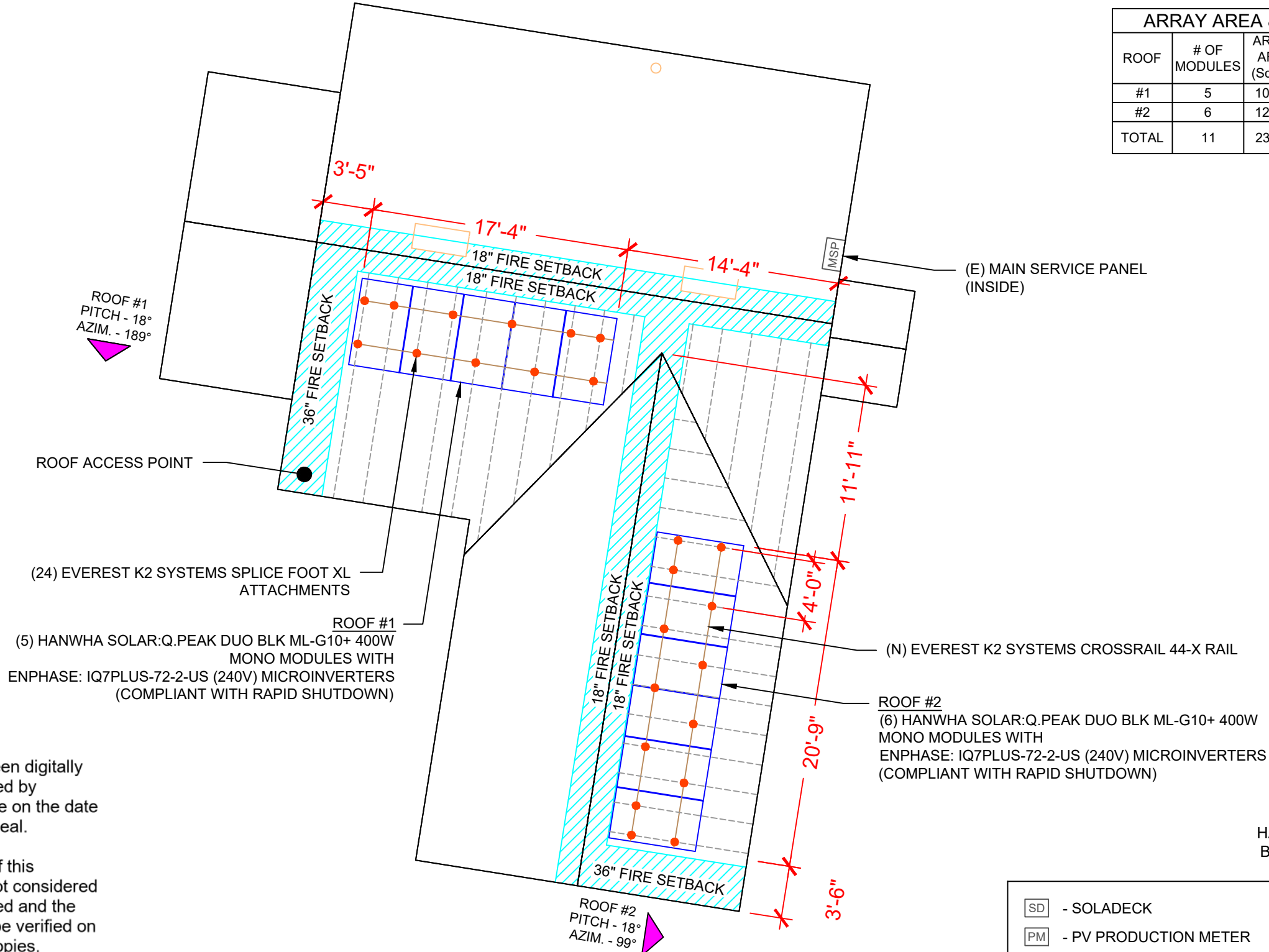
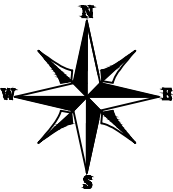
SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 11 MODULES
MODULE TYPE = HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W MONO MODULES
MODULE WEIGHT = 48.5 LBS / 22.0KG.
MODULE DIMENSIONS = 74.0" x 41.1" = 21.12 SF



ROOF DESCRIPTION				
ROOF TYPE			COMP. SHINGLE	
ROOF	ROOF PITCH	AZIMUTH	RAFTER SIZE	RAFTER SPACING
#1	18°	189°	2"X6"	24"
#2	18°	99°	2"X6"	24"

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	5	105.60	469.91	22
#2	6	126.72	312.11	41
TOTAL	11	232.32	1889.50	12



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SHEET NAME
ROOF PLAN & MODULES

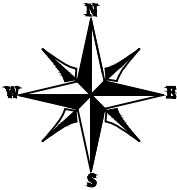
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

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CIRCUIT LEGENDS	
---	CIRCUIT #1

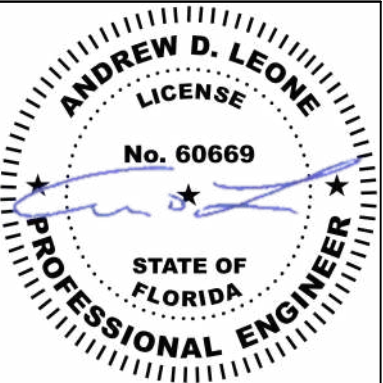


BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	11	HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W MODULE
MICROINVERTERS	11	ENPHASE: IQ7PLUS-72-2-US (240V) MICROINVERTERS (COMPLIANT WITH RAPID SHUTDOWN)
SOLADECK	2	SOLADECKS
RAILS	6	EVEREST K2 SYSTEMS CROSSRAIL 44-X, 166" ALUMINIUM
SPLICES	4	SPLICE KIT
MID MODULE CLAMPS	18	MID MODULE CLAMPS
END CLAMPS	8	END CLAMPS / STOPPER SLEEVE
ATTACHMENTS	24	EVEREST K2 SYSTEMS SPLICE FOOT XL ATTACHMENTS



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SHEET NAME

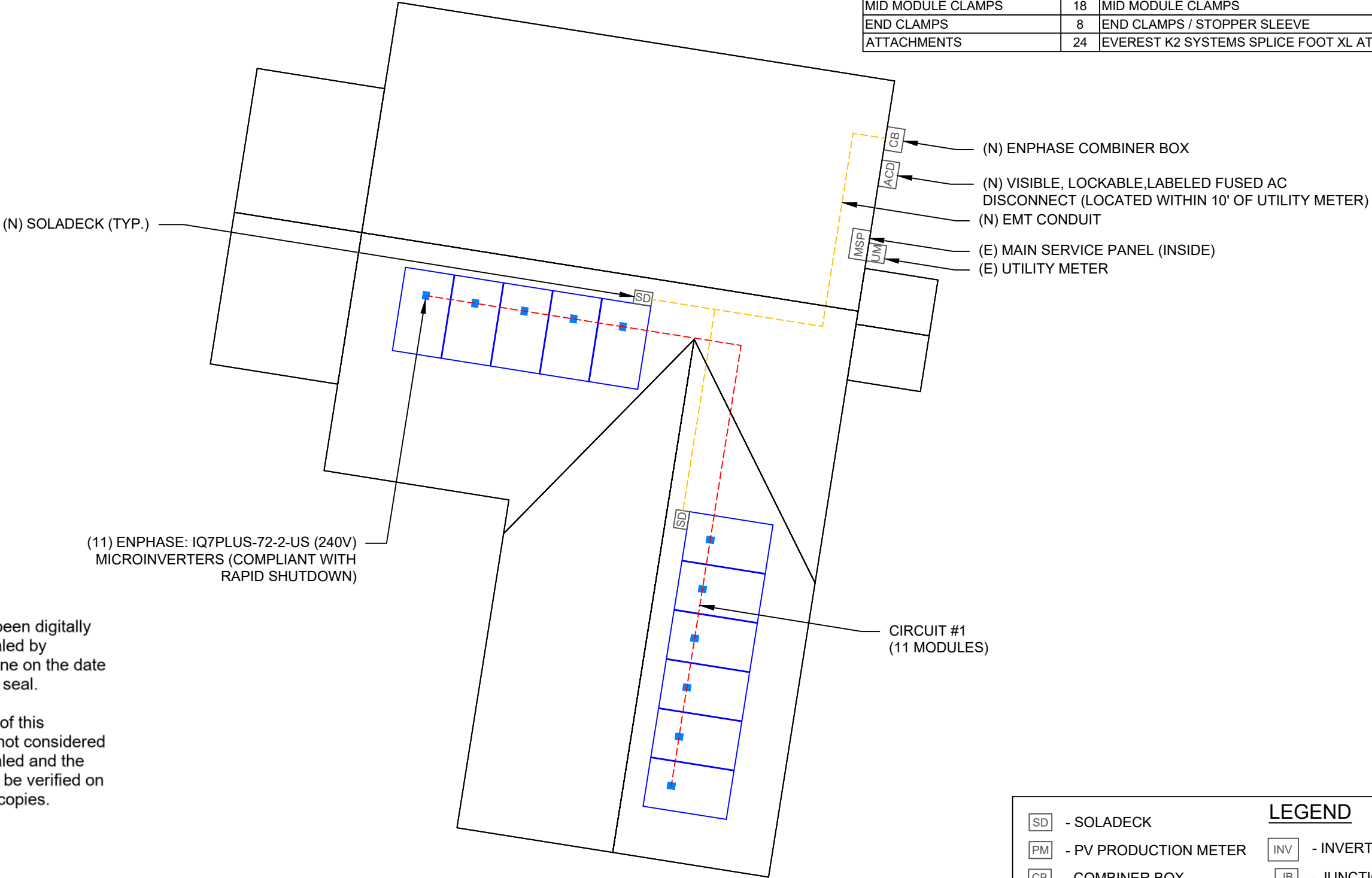
ELECTRICAL PLAN

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-4

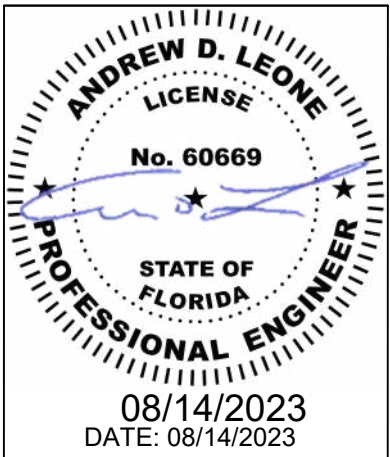


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SD	- SOLADECK		
PM	- PV PRODUCTION METER	INV	- INVERTER
CB	- COMBINER BOX	JB	- JUNCTION BOX
ACD	- AC DISCONNECT	○	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
SLD	- SOLAR LOAD CENTER	●	- ROOF ATTACHMENT
UM	- UTILITY METER	—	- RAFTER
MSP	- MAIN SERVICE PANEL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

REVISIONS		
DESCRIPTION	DATE	REV



PROJECT NAME & ADDRESS

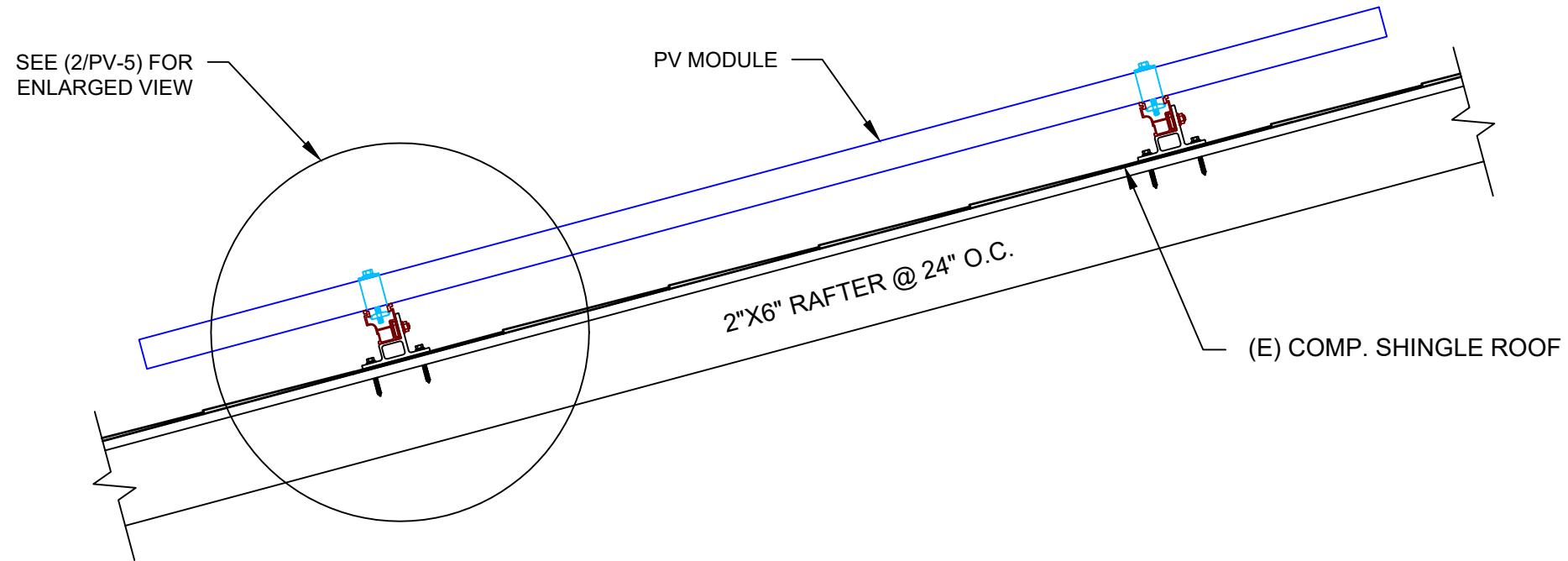
RUTHANN CONWAY
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SHEET NAME
STRUCTURAL DETAIL

SHEET SIZE
ANSI B
11" X 17"

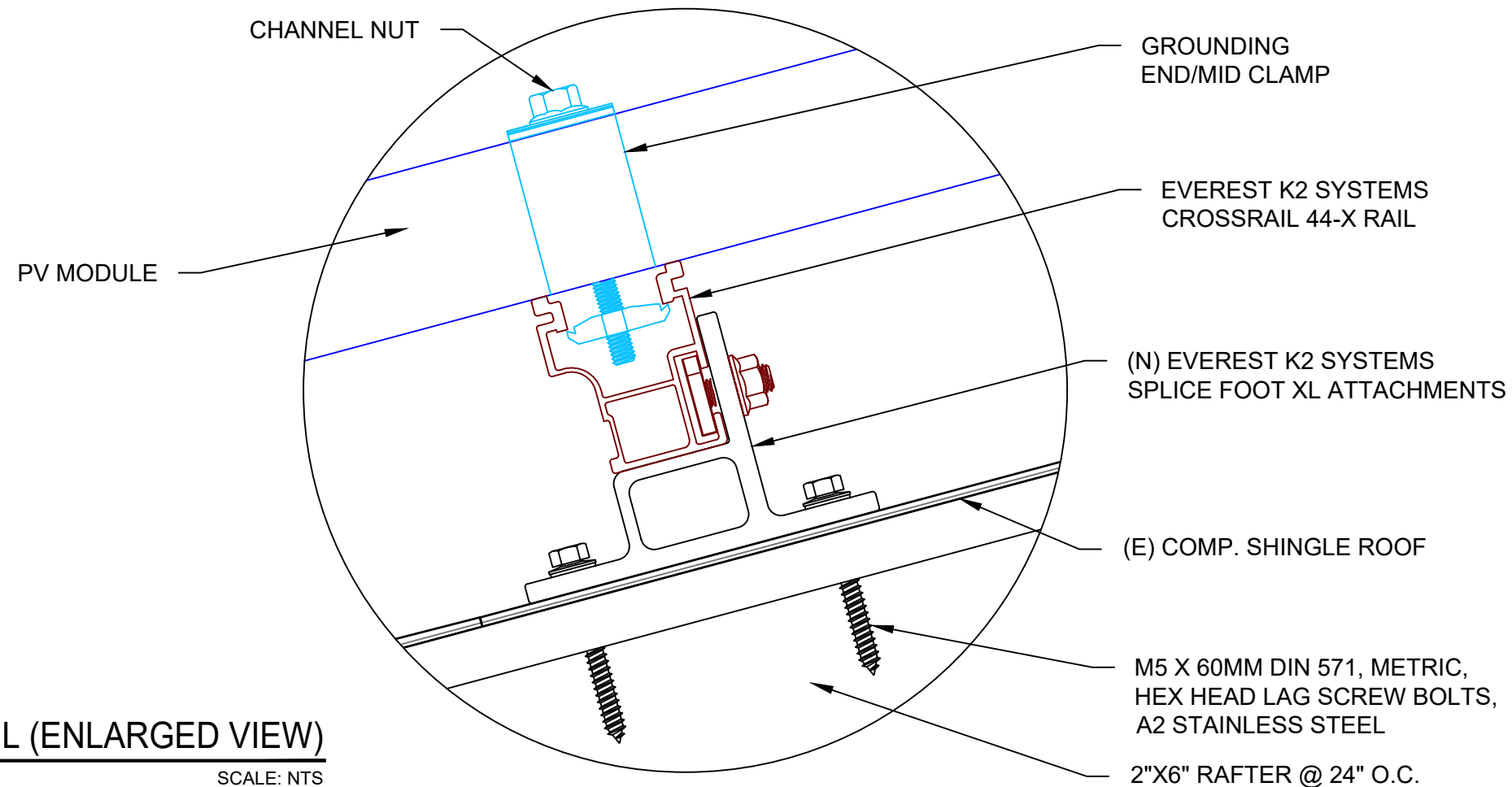
SHEET NUMBER
PV-5



1 ATTACHMENT DETAIL
PV-5 SCALE: NTS

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2 ATTACHMENT DETAIL (ENLARGED VIEW)
PV-5 SCALE: NTS

DC SYSTEM SIZE: 11 x 400 = 4.400KW DC
AC SYSTEM SIZE: 11 x 290 = 3.190KW AC

(11) HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W MONO MODULES WITH (11) ENPHASE: IQ7PLUS-72-2-US (240V) MICROINVERTERS (COMPLIANT WITH RAPID SHUTDOWN)

(1) BRANCH CIRCUIT OF 11 MODULES ARE CONNECTED IN PARALLEL

INTERCONNECTION NOTES:

- INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
- GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
- ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
- PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES:

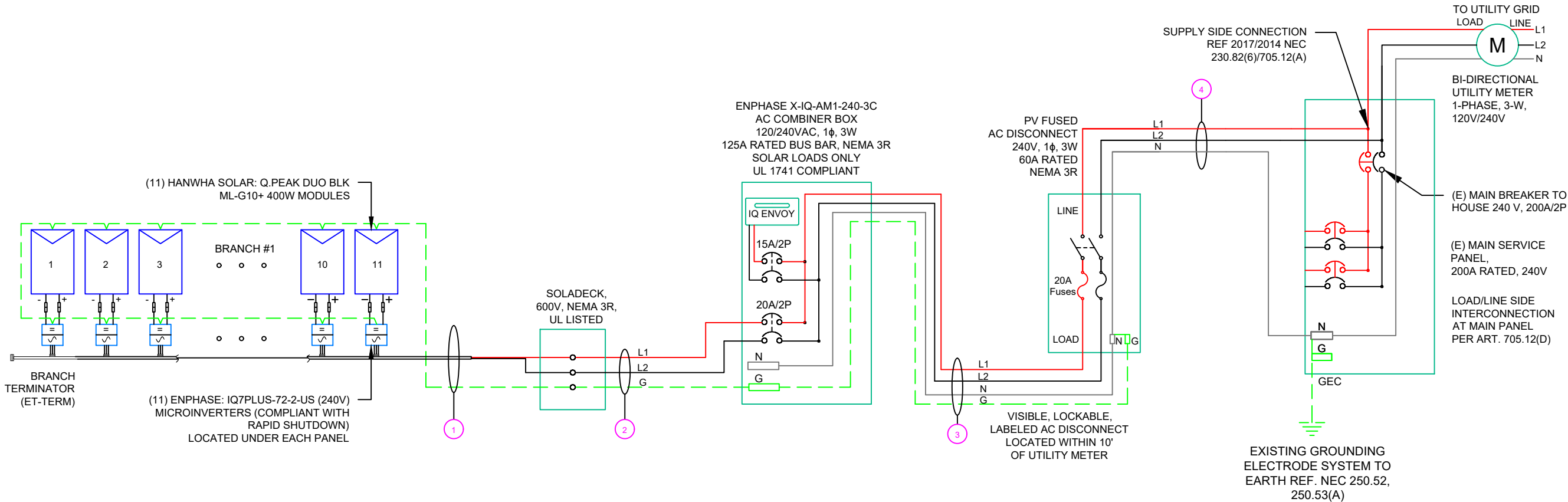
- DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
- AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
- DISCONNECT MEANS AND THEIR LOCATION SHALL BE IN ACCORDANCE WITH [NEC 225.31] AND [NEC 225.32].

RACKING NOTE:

- BOND EVERY OTHER RAIL WITH #6 BARE COPPER

GROUNDING & GENERAL NOTES:

- GROUNDING ELECTRODES AND GROUNDING ELECTRODE CONDUCTORS.** ADDITIONAL GROUNDING ELECTRODES SHALL BE PERMITTED TO BE INSTALLED IN ACCORDANCE WITH 250.52 AND 250.54. GROUNDING ELECTRODES SHALL BE PERMITTED TO BE CONNECTED DIRECTLY TO THE PV MODULE FRAME(S) OR SUPPORT STRUCTURE PER [NEC 690.47(B)]
- PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
- DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
- ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
- SOLADECK QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - SOLADECK DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
- AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.
- RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.



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

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DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE: IQ7PLUS-72-2-US (240V) MICROINVERTERS (COMPLIANT 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 #	HANWHA SOLAR: Q.PEAK DUO BLK ML-G10+ 400W MODULE
VMP	37.13V
IMP	10.77A
VOC	45.30V
ISC	11.14A
TEMP. COEFF. VOC	-0.27%/K
MODULE DIMENSION	74.0"L x 41.1"W x 1.26"D (In Inch)

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-7°
AMBIENT TEMP (HIGH TEMP 2%)	35°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.27%/K

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	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	35	2	30	0.96	1	28.8	PASS			0.56	N/A	#N/A
SOLADECK	COMBINER BOX	240	13.31	16.6375	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	35	2	40	0.96	1	38.4	PASS	40	1.24	0.550	3/4" EMT	11.87617
COMBINER BOX	AC DISCONNECT	240	13.31	16.6375	20	CU #6 AWG	CU #5 AWG	CU #6 AWG	65	PASS	35	2	75	0.96	1	72	PASS	5	0.491	0.027	3/4" EMT	38.04878
AC DISCONNECT	POI	240	13.31	16.6375	20	CU #6 AWG	N/A	CU #6 AWG	65	PASS	35	2	75	0.96	1	72	PASS	5	0.491	0.027	3/4" EMT	28.53659

Circuit 1 Voltage Drop	1.165
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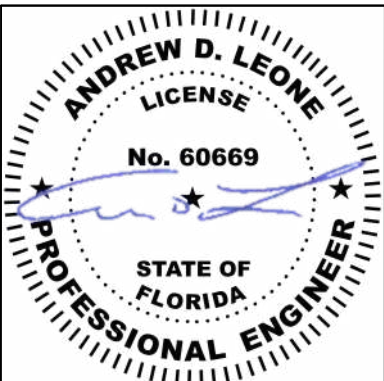
ELECTRICAL NOTES

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.



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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:
PRODUCTION METER
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(D) & NEC 690.59

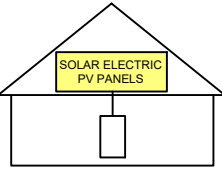
 **WARNING**

**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: IFC 605.11.3.1(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 **13.31 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)

**PRODUCTION
METER**

LABEL- 12:
LABEL LOCATION:
PRODUCTION METER (ONLY IF PRODUCTION METER IS USED)

**CAUTION: PHOTOVOLTAIC SYSTEM
FOR SERVICE : LUNEX POWER
813-540-8807**

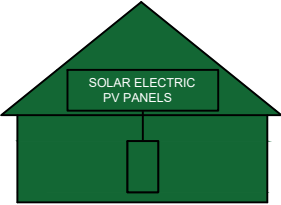
LABEL-13:

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

LABEL-14:
LABEL LOCATION:
EMT/CONDUIT RACEWAY
SOLADECK/JUNCTION BOX
CODE REF : NEC 690.31 (D) (14)

**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- 15:
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)

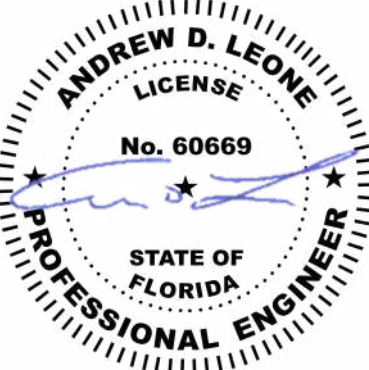
This item has been digitally
signed and sealed by
Andrew D. Leone on the date
adjacent to the seal.

Printed copies of this
document are not considered
signed and sealed and the
signature must be verified on
any electronic copies.



LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

REVISIONS		
DESCRIPTION	DATE	REV



08/14/2023
DATE: 08/14/2023

PROJECT NAME & ADDRESS

RUTHANN CONWAY
RESIDENCE
191 SE CRAIG AVE,
LAKE CITY, FL 32025

DRAWN BY ESR
SHEET NAME LABELS
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-8

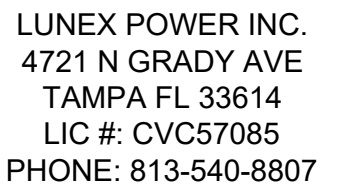
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING
SOURCES WITH DISCONNECTING MEANS LOCATED AS SHOWN:



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

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 [IFC 605.11.1.1]

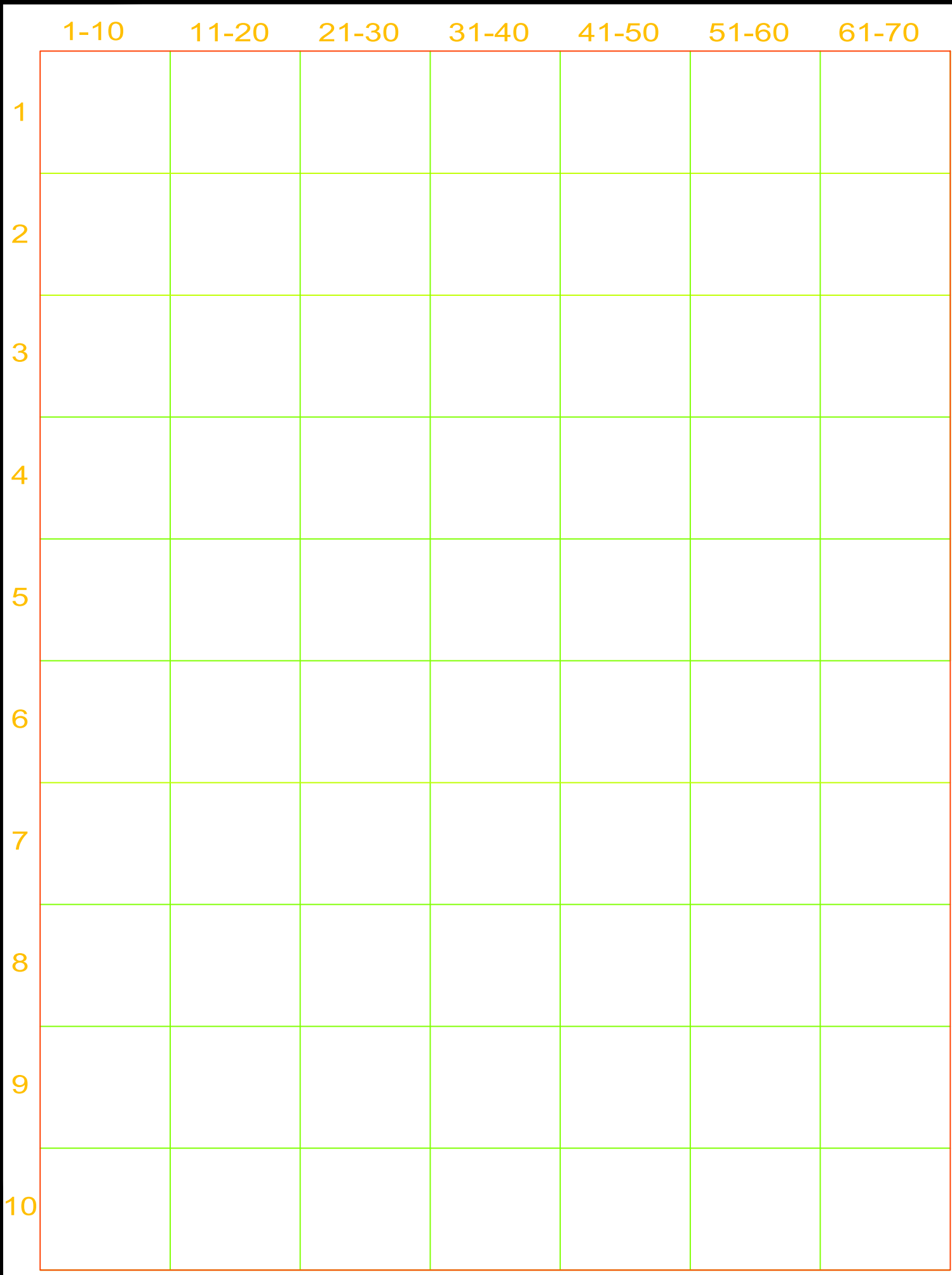
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



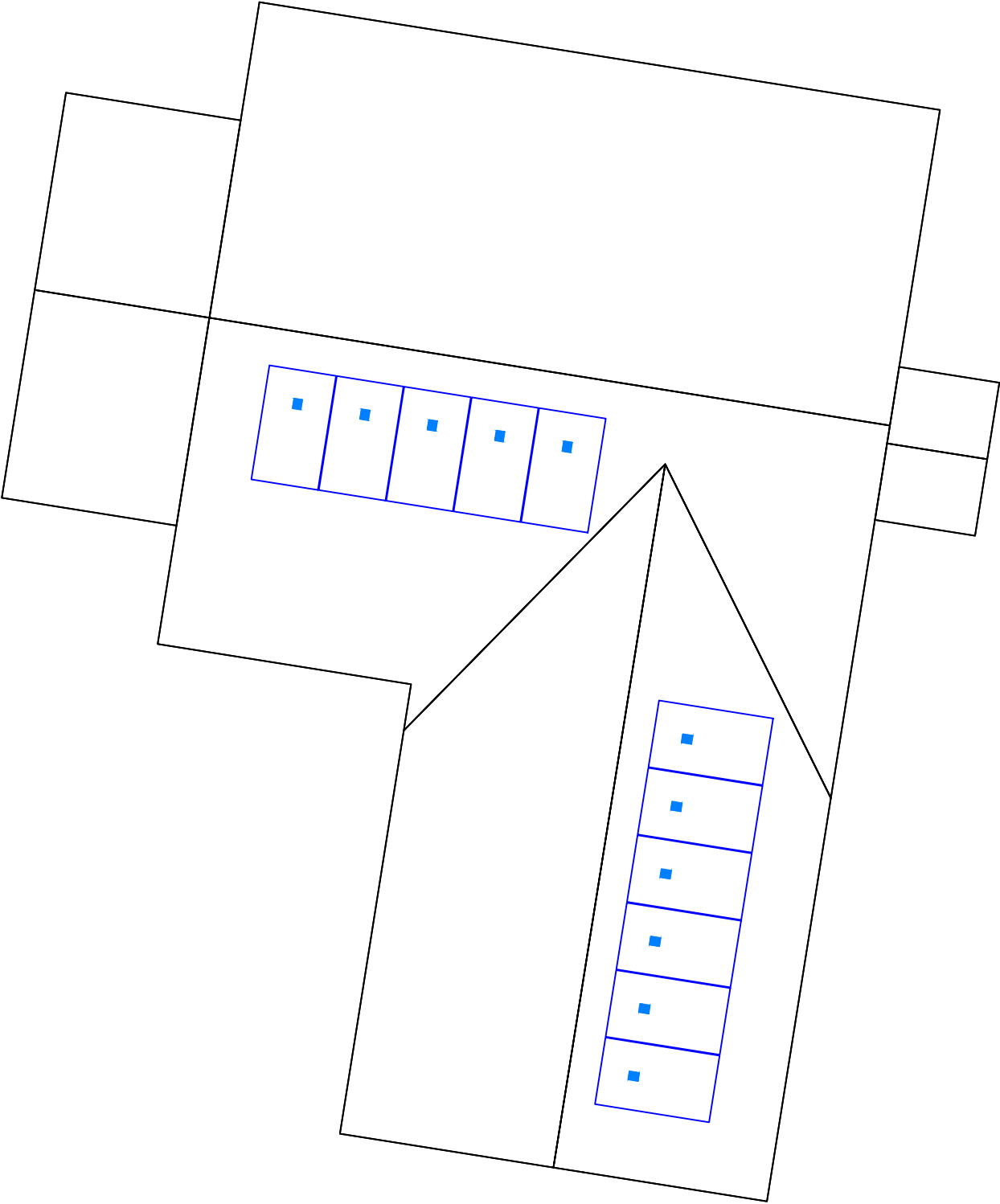
Professional Engineer Seal for Andrew D. Leone, State of Florida, License No. 60669, dated 08/14/2023.

RUTHANN CONWAY
RESIDENCE
191 SE CRAIG AVE,
LAKE CITY, FL 32025

PV-9



MICRO INVERTER CHART





LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

REVISIONS		
DESCRIPTION	DATE	REV

DATE: 08/14/2023

RUTHANN CONWAY
RESIDENCE

191 SE CRAIG AVE,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
MICRO INVERTER CHART

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

powered by
Q.ANTUM DUO Z

Q. PEAK DUO BLK ML-G10+

385-405

ENDURING HIGH PERFORMANCE



BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96h)

² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:



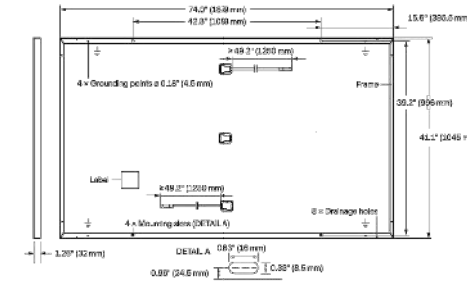
Rooftop arrays or residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68



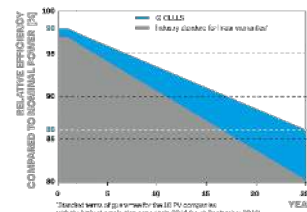
ELECTRICAL CHARACTERISTICS

POWER CLASS		385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)						
Power at MPP ²	P _{MPP} [W]	385	390	395	400	405
Short Circuit Current ⁴	I _{SC} [A]	11.04	11.07	11.10	11.14	11.17
Open Circuit Voltage ⁴	V _{OC} [V]	45.19	45.23	45.27	45.30	45.34
Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.77	10.83
Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.13	37.39
Efficiency ⁴	η [%]	≥ 19.6	≥ 19.9	≥ 20.1	≥ 20.4	≥ 20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²						
Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	300.1	303.8
Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	8.97	9.00
Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.72	42.76
Current at MPP	I _{MPP} [A]	8.35	8.41	8.46	8.51	8.57
Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25	35.46

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}, V_{OC} ± 5% at STC; 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • ² 800 W/m², NMOT, spectrum AM 1.5

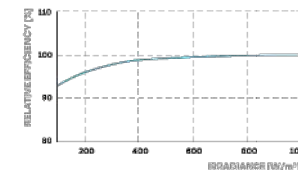
Q CELLS PERFORMANCE WARRANTY

PERFORMANCE AT LOW IRRADIANCE



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α [%/K]	+0.04	Temperature Coefficient of V _{OC}	β [%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ [%/K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull ³	[lbs/ft ²]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ³	[lbs/ft ²]	113 (5400 Pa) / 84 (4000 Pa)		

³ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells), GCPV Certification ongoing.



Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1856 lbs 761 kg	24 pallets	24 pallets	32 modules
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Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

LUNEX POWER
THE PURE SOURCE

LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

REVISIONS

DESCRIPTION	DATE	REV

DATE: 08/14/2023

PROJECT NAME & ADDRESS

RUTHANN CONWAY
RESIDENCE
191 SE CRAIG AVE,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

Specifications subject to technical changes © Q CELLS Q. PEAK DUO BLK ML-G10+ 385-405 2021.05 Rev01_0A

Enphase
IQ 7 and IQ 7+
Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell/120 half-cell and 72-cell/144 half-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell/144 half-cell modules.

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings¹	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell/120 half-cell PV modules only		60-cell/120 half-cell and 72-cell/144 half-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
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			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 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 C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

REVISIONS		
DESCRIPTION	DATE	REV

DATE: 08/14/2023	
------------------	--

PROJECT NAME & ADDRESS	
RUTHANN CONWAY RESIDENCE	191 SE CRAIG AVE, LAKE CITY, FL 32025

DRAWN BY ESR

SHEET NAME EQUIPMENT SPECIFICATION
--

SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-12

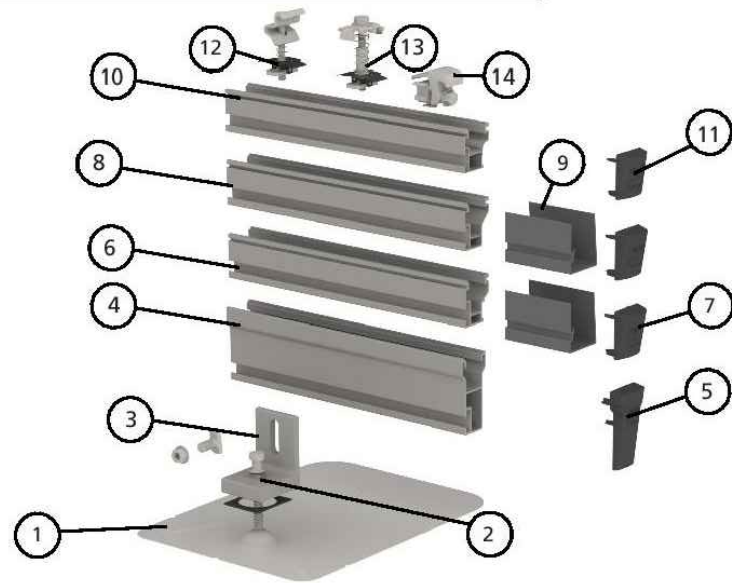


To learn more about Enphase offerings, visit enphase.com





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

www.everest-solarsystems.com

CrossRail 44-X

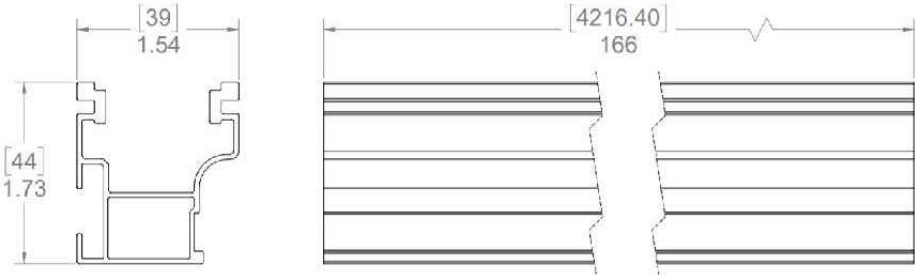


Mechanical Properties

	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 in ³ (0.3785 cm ³)
Sy	0.1450 in ³ (0.3683 cm ³)
A (X-Section)	0.4050 in ² (1.0287 cm ²)



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

www.everest-solarsystems.com



LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

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RESIDENCE
191 SE CRAIG AVE,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14



Splice Foot XL

TECHNICAL SHEET

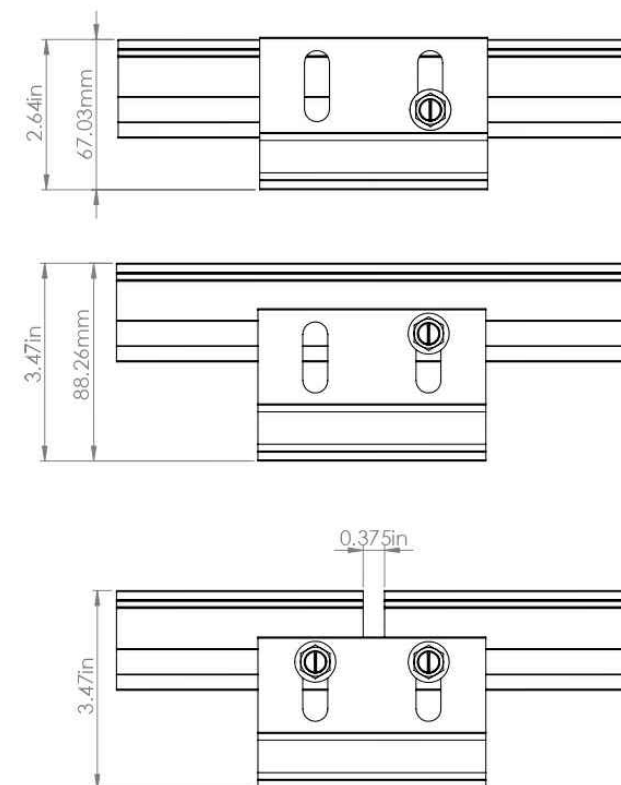
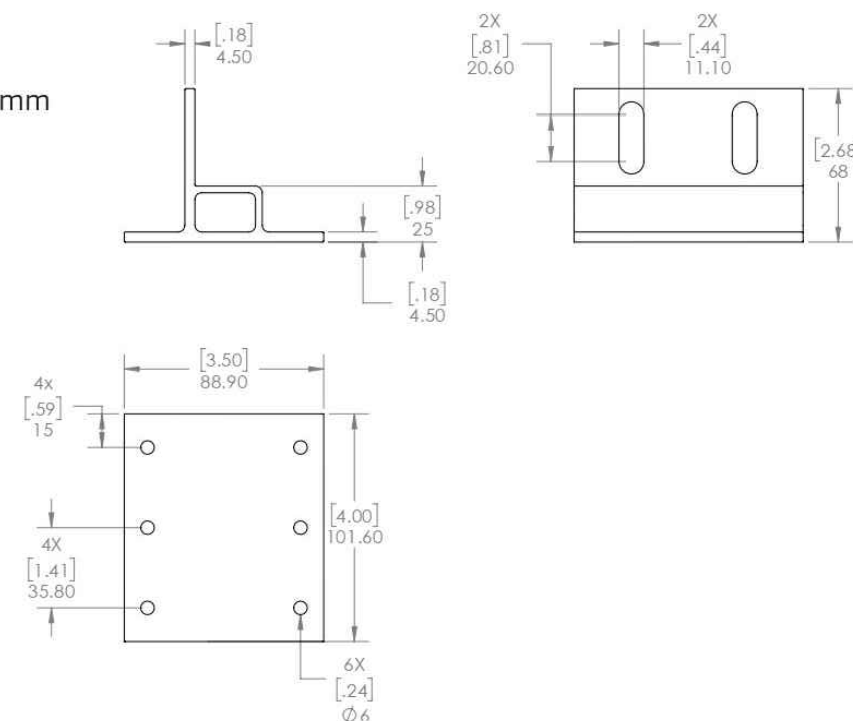
Item Number	Description	Part Number
1	Splice Foot XL	4000162 Splice Foot XL Kit, Mill
2	K2 EverSeal	
3	M5 x 60 lag screws	
4	T-Bolt & Hex Nut Set	

	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



LUNEX POWER INC
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

REVISIONS		
DESCRIPTION	DATE	RE

DATE: 08/14/2023

PROJECT NAME & ADDRESS

RUTHANN CONWAY
RESIDENCE
191 SE CRAIG AVE,
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



LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

REVISIONS		
DESCRIPTION	DATE	REV

DATE: 08/14/2023

PROJECT NAME & ADDRESS

RUTHANN CONWAY
RESIDENCE
191 SE CRAIG AVE,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-16