PHOTOVOLTAIC ROOF MOUNT SYSTEM

24 MODULES-ROOF MOUNTED - 9.960 kW DC, 7.600 kW AC

251 IRENE LN, LAKE CITY, FL 32055

PROJECT DATA

PROJECT ADDRESS	251 IRENE LN, LAKE CITY, FL 32055
OWNER:	CHARLES DOWNING
CONTRACTOR:	LUNEX POWER, 4721 N GRADY AVE TAMPA FL 33614 PHONE: 813-540-8807
DESIGNER:	ESR
SCOPE:	9.960 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH 24 TRINA SOLAR: TSM-NE09RC.05 415W PV MODULES WITH 24 SOLAREDGE: S440 POWER OPTIMIZERS 01 SOLAREDGE: SE7600H-USMNUBL15 (DOMESTIC) INVERTER

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

SHEET INDEX

PROFESSIONAL ENGINEER SEAL

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GENERAL NOTES

1. ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
2. THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2020.
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 2020 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 SINAGE 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.

VICINITY MAP

HOUSE PHOTO

CODE REFERENCES

PROJECT TO COMPLY WITH THE FOLLOWING:

FLORIDA RESIDENTIAL CODE, 8TH EDITION 2023 (FRC)
FLORIDA PLUMBING CODE, 8TH EDITION 2023 (FPC)
FLORIDA BUILDING CODE, 8TH EDITION 2023 EDITION (FBC)
FLORIDA MECHANICAL CODE, 8TH EDITION 2023 (FMC)
2020 NATIONAL ELECTRICAL CODE
FLORIDA FIRE PREVENTION CODE, 8TH EDITION 2023 (FFPC)

Andrew D. Leone — Digitally signed by Andrew D. Leone, Date: 2025.03.05 15:46:38 -05'00'

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

REVISIONS		
DESCRIPTION	DATE	REV

ANDREW D. LEONE — LICENSE No. 60669 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY: ESR

SHEET NAME: COVER SHEET

SHEET SIZE: ANSI B 11" X 17"

SHEET NUMBER: PV-1

PROJECT DESCRIPTION:

24 X TRINA SOLAR: TSM-NE09RC.05 415W PV MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 24 x 415 = 9.960KW DC
AC SYSTEM SIZE: 01 x 7.600 = 7.600KW AC

EQUIPMENT SUMMARY
24 TRINA SOLAR: TSM-NE09RC.05 415W MONO MODULES
24 SOLAREDGE: S440 POWER OPTIMIZERS
01 SOLAREDGE: SE7600H-USMNUBL15 (DOMESTIC) INVERTER

ROOF ARRAY AREA #1:- 344.00 SQ FT.
ROOF ARRAY AREA #2:- 172.00 SQ FT.

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

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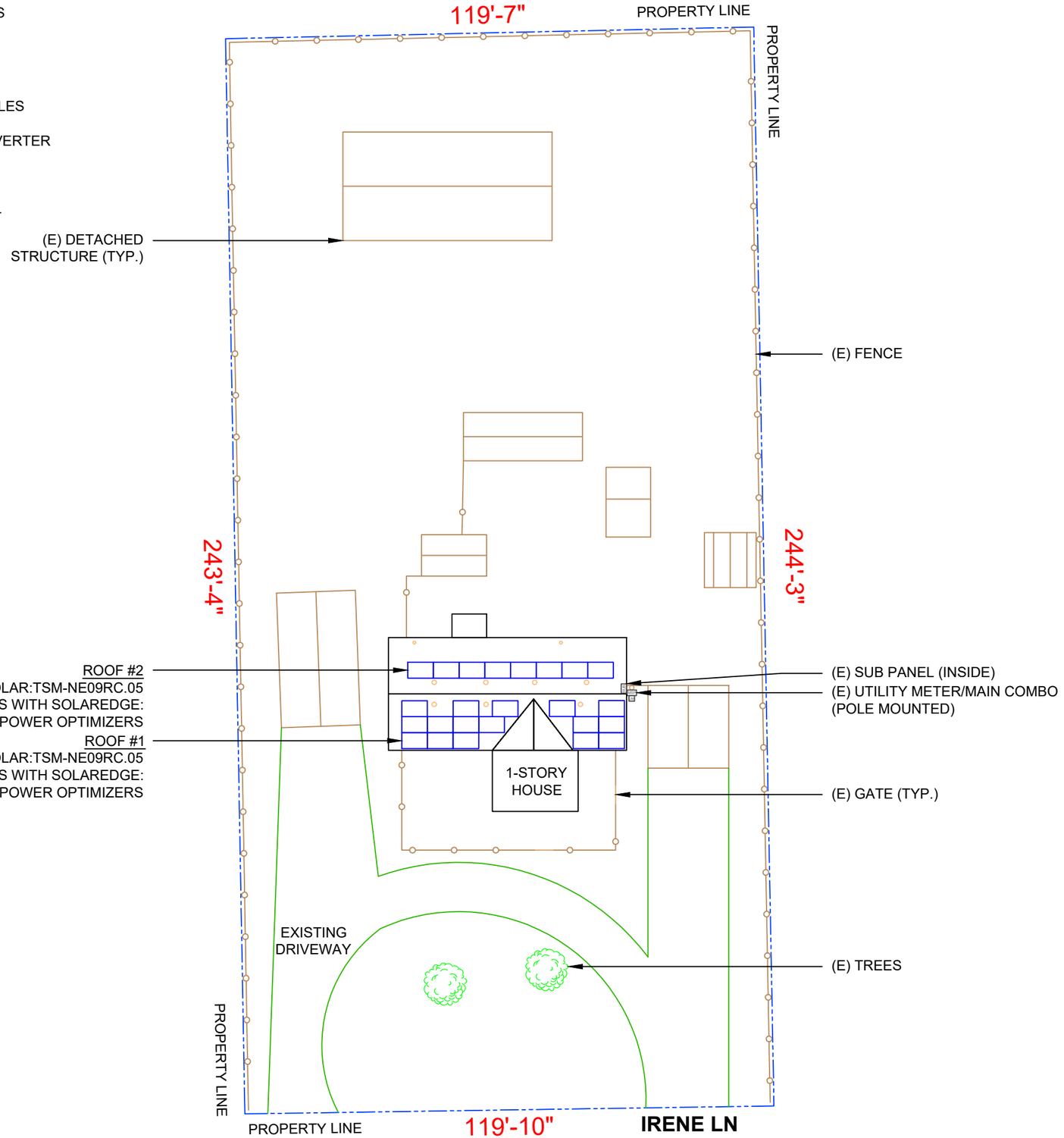

1 SITE PLAN
PV-2 SCALE: 1/26" = 1'-0"

LUNEX POWER
THE PURE SOURCE
LUNEX POWER INC.
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ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

/ /
DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

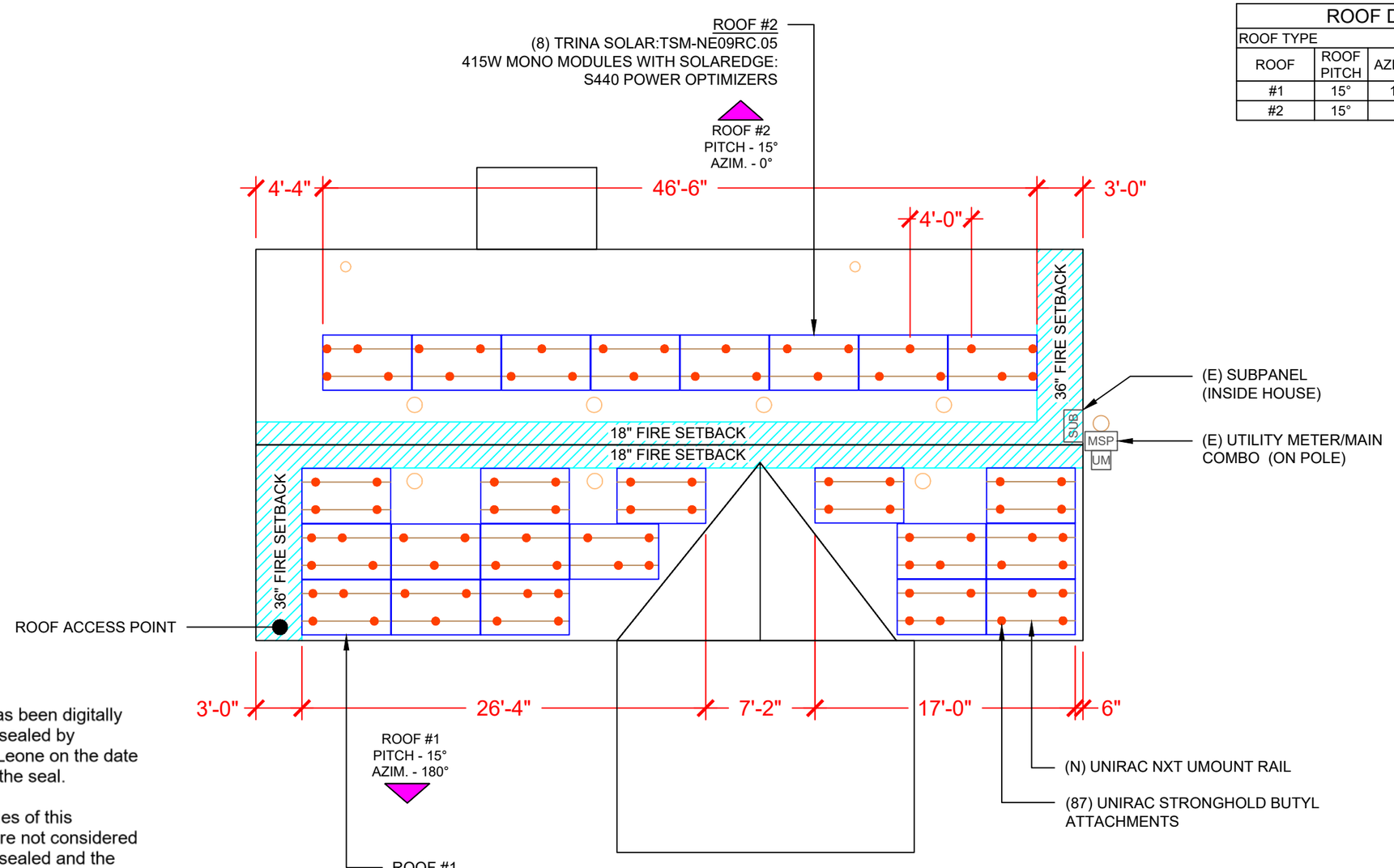
SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 24 MODULES
MODULE TYPE = TRINA SOLAR: TSM-NE09RC.05 415W MONO MODULES
MODULE WEIGHT = 47.0 LBS / 21.3KG.
MODULE DIMENSIONS = 69.37" x 44.65" = 21.50 SF



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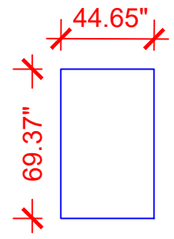

TRINA SOLAR: TSM-NE09RC.05
415W MODULES

ARRAY AREA & ROOF AREA CALC'S

ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	16	344.00	581.89	59
#2	8	172.00	687.54	25
TOTAL	24	516.00	1684.48	31

ROOF DESCRIPTION

ROOF TYPE			ASPHALT SHINGLE	
ROOF	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	15°	180°	2"X2"	24"
#2	15°	0°	2"X2"	24"

LEGEND

- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- MSP - MAIN SERVICE PANEL
- UM - UTILITY METER

1 ROOF PLAN & MODULES

PV-3 SCALE: 1/8" = 1'-0"

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STATE OF FLORIDA
PROFESSIONAL ENGINEER

DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

CIRCUIT LEGENDS

- STRING #1
- STRING #2

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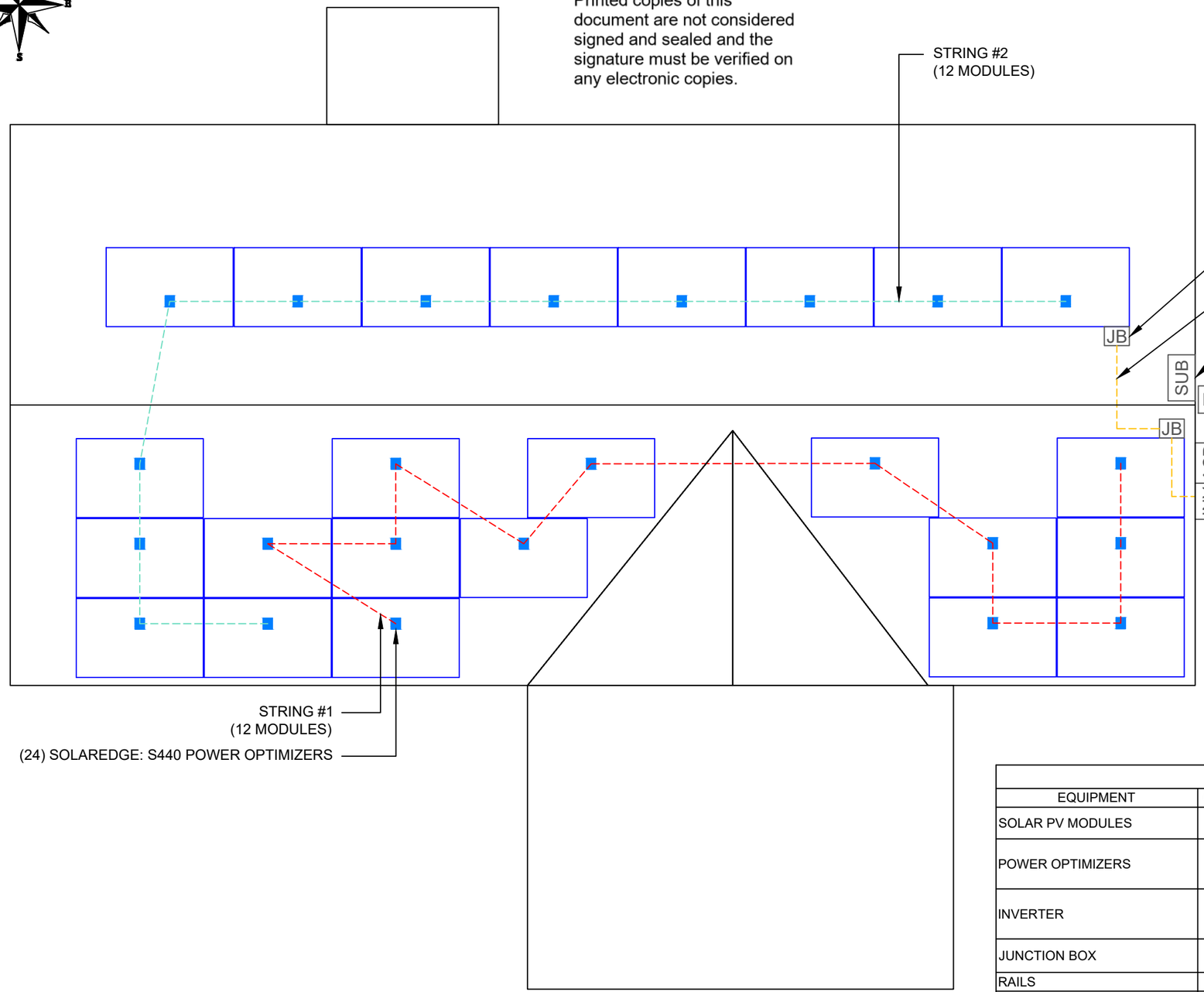

LEGEND

- JB - JUNCTION BOX
- INV - INVERTER
- ACD - AC DISCONNECT
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- CONDUIT

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	24	TRINA SOLAR: TSM-NE09RC.05 415W MODULE
POWER OPTIMIZERS	24	SOLAREDGE: S440 POWER OPTIMIZERS
INVERTER	1	SOLAREDGE: SE7600H-USMNUBL15 (DOMESTIC) INVERTER
JUNCTION BOX	2	JUNCTION BOXES
RAILS	20	UNIRAC NXT UMOUNT RAIL
SPLICES	10	SPLICE KIT
MID MODULE CLAMPS	28	MID MODULE CLAMPS
END CLAMPS	40	END CLAMPS / STOPPER SLEEVE
ATTACHMENTS	87	UNIRAC STRONGHOLD BUTYL ATTACHMENTS

1 ELECTRICAL PLAN

PV-4 SCALE: 3/16" = 1'-0"

LUNEX POWER
THE PURE SOURCE

LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
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ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

/ /

DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE

251 IRENE LN,
LAKE CITY, FL 32055

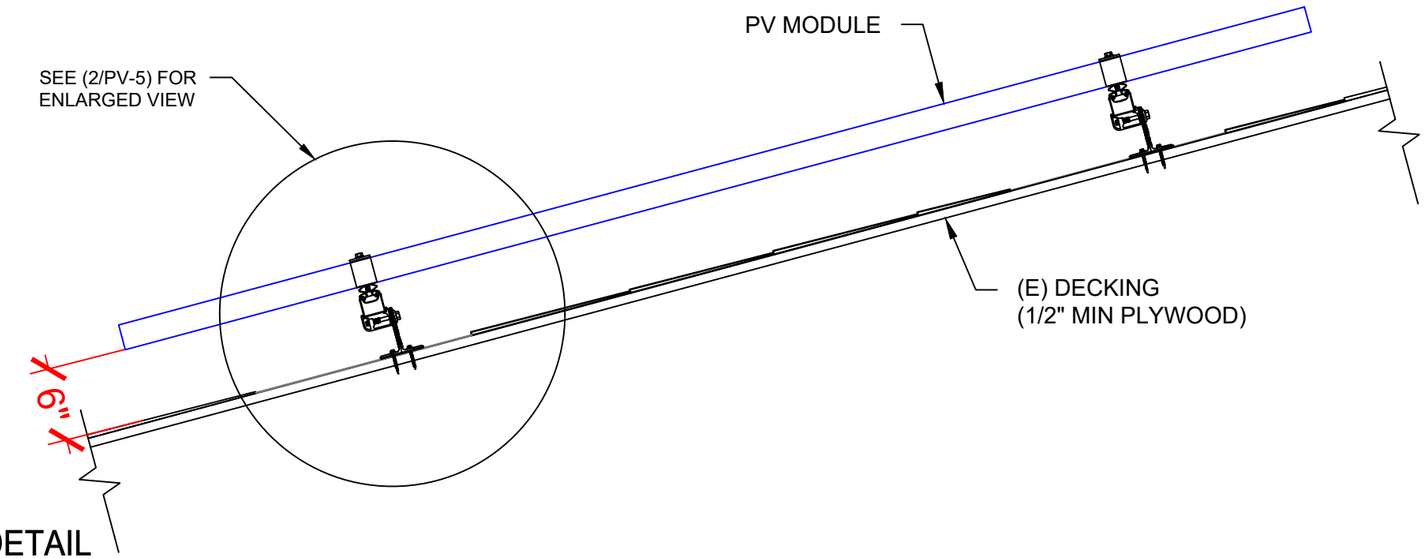
DRAWN BY
ESR

SHEET NAME
ELECTRICAL PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

DESCRIPTION: CANTILEVER
CANTILEVER CONSIDER 1/3RD OF ROOF ATTACHMENT SPACING.
ATTACHMENT SPACING= 48" O/C
CANTILEVER = 16"



1 ATTACHMENT DETAIL
PV-5 SCALE: NTS

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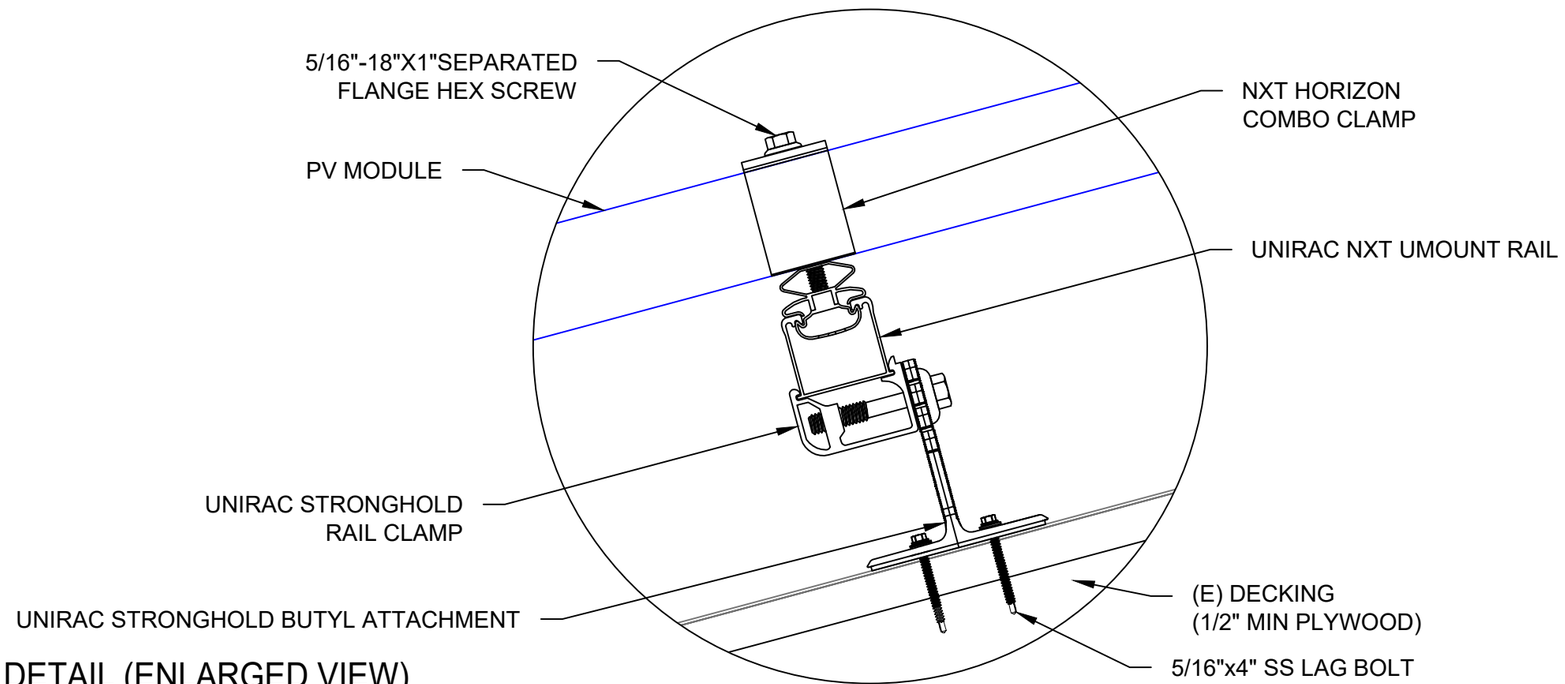

2 ATTACHMENT DETAIL (ENLARGED VIEW)
PV-5 SCALE: NTS

LUNEX POWER
THE PURE SOURCE
LUNEX POWER INC.
4721 N GRADY AVE
TAMPA FL 33614
LIC #: CVC57085
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ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

DATE: 03/05/2025

PROJECT NAME & ADDRESS
CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
STRUCTURAL DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

DC SYSTEM SIZE: 24 x 415 = 9.960KW DC
AC SYSTEM SIZE: 01 x 7.600 = 7.600KW AC

(24) TRINA SOLAR: TSM-NE09RC.05 415W MONO MODULES WITH
(24) SOLAREDGE: S440 POWER OPTIMIZERS
01 SOLAREDGE: SE7600H-USMNUBL15 (DOMESTIC) INVERTER

(2) BRANCH CIRCUITS OF 12 MODULES ARE CONNECTED IN PARALLEL

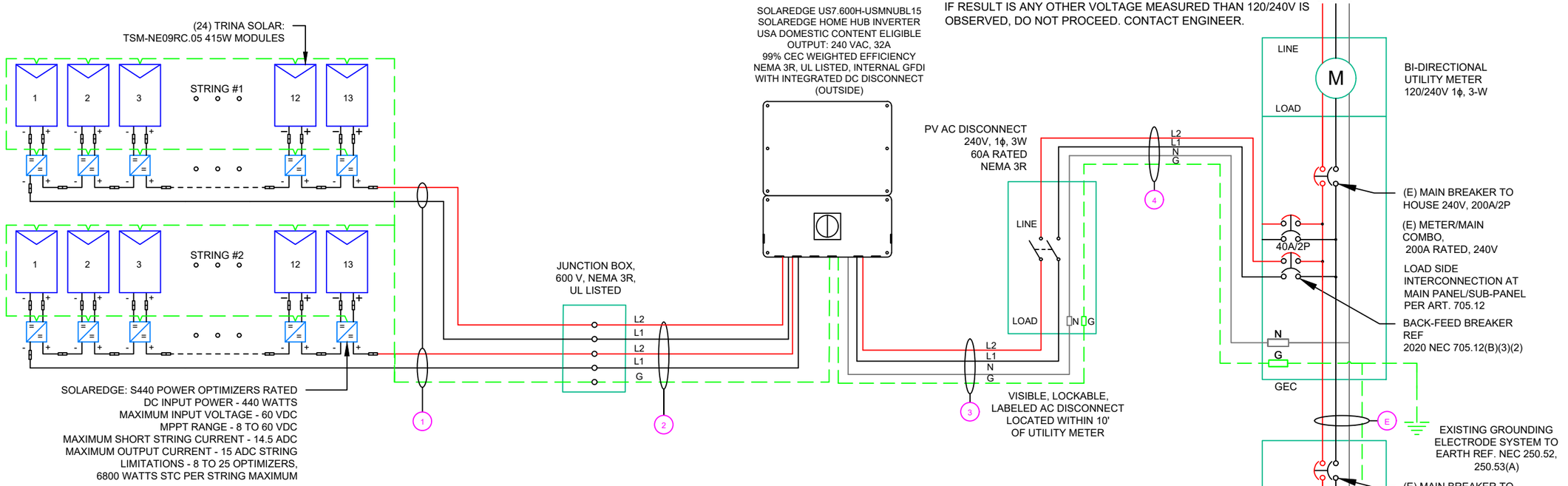
INTERCONNECTION NOTES:
1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE 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 NOTES:
1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER

GROUNDING & GENERAL NOTES:
1. **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)]
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. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOX 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.

INSTALLER / ELECTRICIAN NOTE:
EC IS TO MEASURE VOLTAGE BEFORE STARTING WORK.
IF RESULT IS ANY OTHER VOLTAGE MEASURED THAN 120/240V IS OBSERVED, DO NOT PROCEED. CONTACT ENGINEER.



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	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(4)	CU#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	CU#6AWG -	BARE COPPER IN FREE AIR		
2	(4)	CU#10AWG -	THWN-2 (L1,L2)	EMT OR LFMC IN ATTIC	3/4"
	(1)	CU#10AWG -	THWN-2 GND		
3	(2)	CU#8AWG -	THWN-2 (L1,L2)	EMT OR LFMC IN ATTIC	3/4"
	(1)	CU#8AWG -	THWN-2 N		
	(1)	CU#10AWG -	THWN-2 GND		
4	(3)	CU#8AWG -	THWN-2 (L1,L2,N)	EMT, LFMC OR LFNC	3/4"
	(1)	CU#10AWG -	THWN-2 GND		

1 ELECTRICAL LINE DIAGRAM
PV-6 SCALE: NTS

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

ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

/ /
DATE: 03/05/2025

PROJECT NAME & ADDRESS
CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	SOLAREDGE: SE7600H-USMNUBL15(DOMESTIC) INVERTER
NOMINAL AC POWER	7.600 KW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	32A

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	TRINA SOLAR: TSM-NE09RC.05 415W MODULE
VMP	42.5V
IMP	9.77A
VOC	50.5V
ISC	10.40A
TEMP. COEFF. VOC	-0.24%/°C
MODULE DIMENSION	69.37"L x 44.65"W x 1.18"D (In Inch)

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-5°
AMBIENT TEMP (HIGH TEMP 2%)	37°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.24%/°C

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

DC FEEDER CALCULATIONS

CIRCUIT ORIGIN	CIRCIUT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	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)(1)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(C)(1)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
STRING 1	JUNCTION BOX	400	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	37	2	40	0.91	1	36.4	PASS	65	1.24	0.505	N/A	#N/A
STRING 2	JUNCTION BOX	400	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	37	2	40	0.91	1	36.4	PASS	62	1.24	0.377	N/A	#N/A
JUNCTION BOX	INVERTER	400	15.00	18.75	20	CU #10 AWG	CU #10 AWG	35	PASS	37	4	40	0.91	0.8	29.12	PASS	16	1.24	0.149	3/4" EMT	19.79362

String 1 Voltage Drop 0.753
String 2 Voltage Drop 0.725

AC FEEDER CALCULATIONS

CIRCUIT ORIGIN	CIRCIUT 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)(1)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(C)(1)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
INVERTER	AC DISCONNECT	240	32	40	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	37	2	55	0.91	1	50.05	PASS	5	0.778	0.104	3/4" EMT	24.5591
AC DISCONNECT	POI	240	32	40	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	37	2	55	0.91	1	50.05	PASS	5	0.778	0.104	3/4" EMT	24.5591

CUMULATIVE VOLTAGE 0.207

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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 RATED UPTO 600V FOR RESIDENTIAL AND 1000V FOR COMMERCIAL 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 JUNCTION BOX, 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.

LUNEX POWER
THE PURE SOURCE

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DESCRIPTION	DATE	REV

ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

/ /
DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

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)

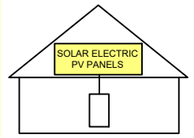
⚠ WARNING

POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

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)(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- 6:
LABEL LOCATION:
AC DISCONNECT
CODE REF: IFC 605.11.3.1(1) & NEC 690.56(C)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

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

PHOTOVOLTAIC

AC DISCONNECT

LABEL- 8:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

NOMINAL OPERATING AC VOLATGE	**240 V**
RATED AC OUTPUT CURRENT	**32 A**

LABEL- 9:
LABEL LOCATION:
MAIN SERVICE PANEL
SUBPANEL
AC DISCONNECT
CODE REF: NEC 690.54

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL- 10:
LABEL LOCATION:
MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)
CODE REF: NEC 690.13(B)

PRODUCTION METER

LABEL- 11:
LABEL LOCATION:
PRODUCTION METER (ONLY IF PRODUCTION METER IS USED)

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.

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

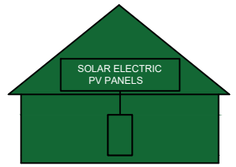
LABEL-12:

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL-13:
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- 14:
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)

MAXIMUM VOLTAGE:	**480 V**
MAXIMUM CIRCUIT CURRENT:	**40 A**
MAXIMUM RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED):	

LABEL- 15:
LABEL LOCATION:
INVERTER
CODE REF: NEC 690.53

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

ANDREW D. LEONE
LICENSE
No. 60669
STATE OF FLORIDA
PROFESSIONAL ENGINEER

/ /
DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

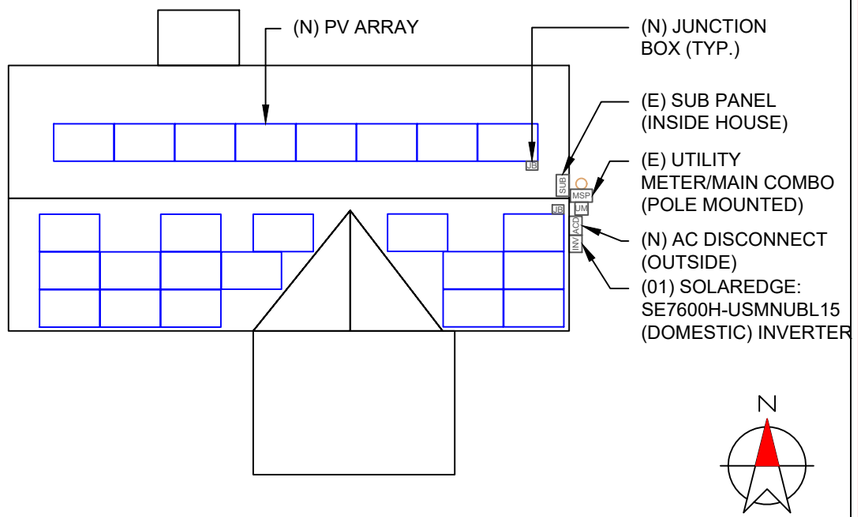
SHEET NAME
LABELS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

CAUTION:

MULTIPLE SOURCES OF POWER



251 IRENE LN, 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])

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.

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 2020 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]

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

REVISIONS

DESCRIPTION	DATE	REV

ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE

251 IRENE LN, LAKE CITY, FL 32055

DRAWN BY: ESR

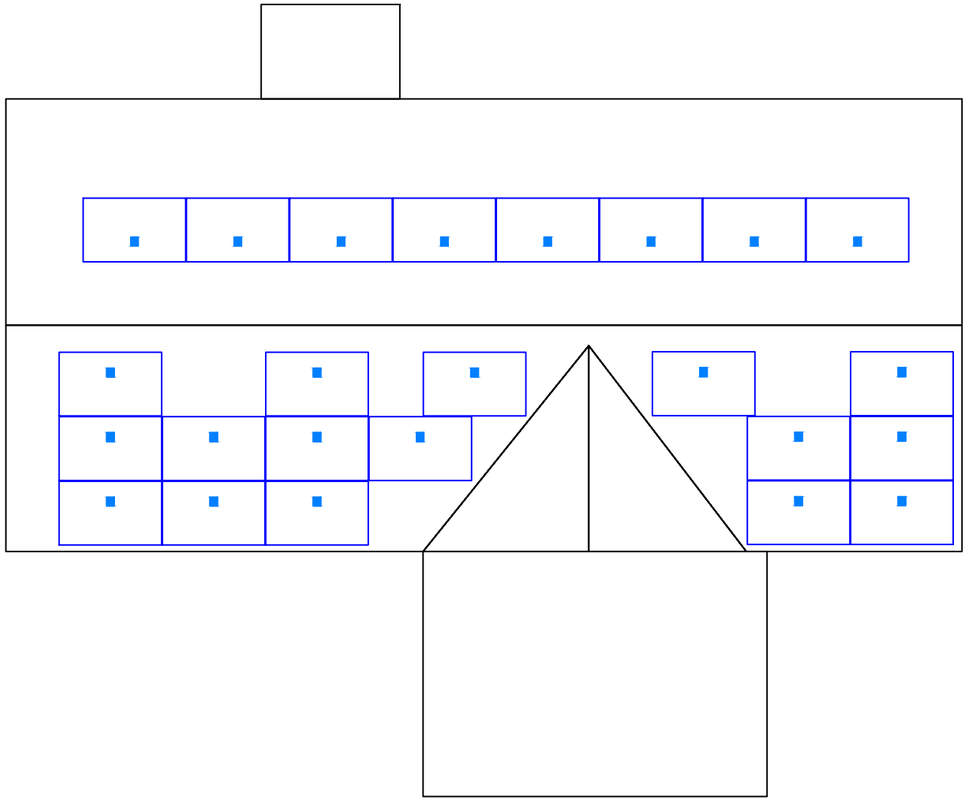
SHEET NAME: PLACARD

SHEET SIZE: ANSI B 11" X 17"

SHEET NUMBER: PV-9

OPTIMIZER CHART

	1-10	11-20	21-30	31-40	41-50	51-60	61-70
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							



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

REVISIONS		
DESCRIPTION	DATE	REV

DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE

251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
OPTIMIZER CHART

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

Mono Multi Solutions

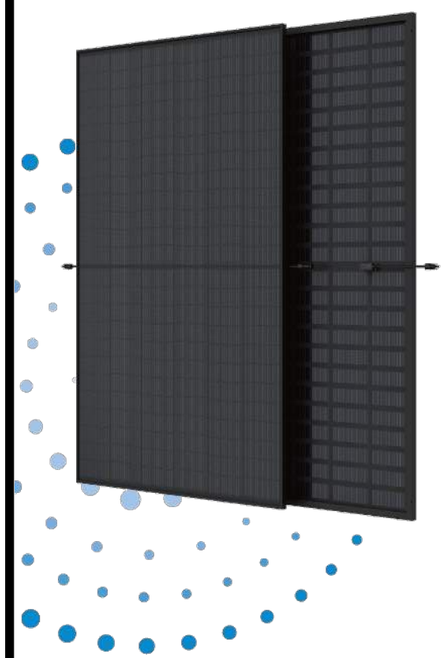
Vertex S+

BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-NE09RC.05

PRODUCT RANGE: 400-430W

430W	0~+5W	21.5%
MAXIMUM POWER OUTPUT	POSITIVE POWER TOLERANCE	MAXIMUM EFFICIENCY



Small in size, bigger on power

- Up to 430W, 21.5% module efficiency with high density interconnect technology
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature

High Reliability

- Innovative non-destructive cutting for improved mechanical resistance and strength
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment

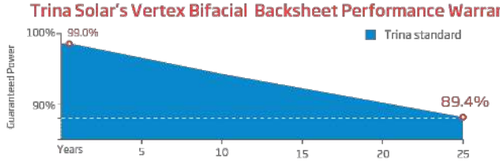
Ultra-low Degradation, longer warranty, higher output

- First-year degradation 1% and annual degradation at 0.4%
- Up to 25 years product warranty and 25 years power warranty

Universal solution for residential and C&I rooftops

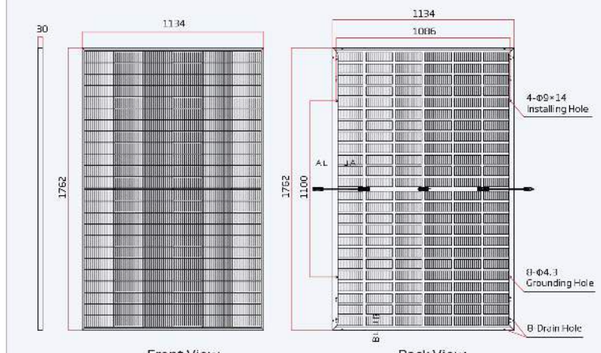
- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Perfect size and low weight for handling and installation
- Most valuable solution on low load capacity rooftops (weight similar to backsheet version)
- Mechanical performance up to 6000 Pa positive load and 4000 Pa negative load

Trina Solar's Vertex Bifacial Backsheet Performance Warranty

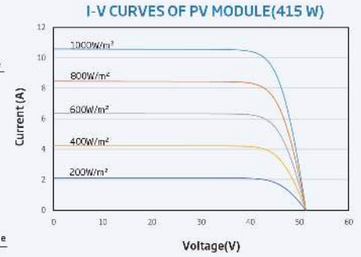


Vertex S+ BACKSHEET MONOCRYSTALLINE MODULE

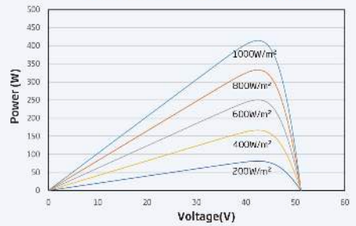
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(415 W)



P-V CURVES OF PV MODULE(415W)



ELECTRICAL DATA (STC)

Peak Power Watts-Pmax (Wp)*	400	405	410	415	420	425	430
Power Tolerance-PMAX (W)				0 ~ +5			
Maximum Power Voltage-Vmpp (V)	41.3	41.7	42.1	42.5	42.8	43.2	43.6
Maximum Power Current-Impp (A)	9.68	9.71	9.73	9.77	9.00	9.04	9.07
Open Circuit Voltage-Voc (V)	49.2	49.6	50.1	50.5	50.9	51.4	51.8
Short Circuit Current-Isc (A)	10.30	10.33	10.37	10.40	10.43	10.47	10.50
Module Efficiency η m (%)	20.0	20.3	20.5	20.8	21.0	21.3	21.5

STC: Irradiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power - Pmax (Wp)	426	431	437	442	447	453	458
Maximum Power Voltage-Vmpp (V)	41.3	41.7	42.1	42.5	42.8	43.2	43.6
Maximum Power Current-Impp (A)	10.31	10.34	10.36	10.41	10.44	10.48	10.51
Open Circuit Voltage-Voc (V)	49.2	49.6	50.1	50.5	50.9	51.4	51.8
Short Circuit Current-Isc (A)	10.97	11.00	11.04	11.08	11.11	11.15	11.18
Irradiance ratio (rear/front)				10%			

Power Bifaciality: 85±10%.

ELECTRICAL DATA (NOCT)

Maximum Power - Pmax (Wp)	312	308	312	316	319	324	328
Maximum Power Voltage-Vmpp (V)	38.6	39.0	39.3	39.7	40.0	40.4	40.7
Maximum Power Current-Impp (A)	7.88	7.91	7.93	7.96	7.98	8.01	8.04
Open Circuit Voltage-Voc (V)	46.6	47.0	47.5	47.8	48.2	48.7	49.1
Short Circuit Current-Isc (A)	8.30	8.32	8.36	8.38	8.41	8.44	8.46

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

MECHANICAL DATA

Solar Cells	Topcon Bifacial
No. of cells	144cells
Module Dimensions	1762×1134×30 mm (69.37×44.65×1.18 inches)
Weight	21.3kg (47.0 lb)
Front Glass	3.2 mm (0.12 inches), High Transmission, Tempered Glass
Encapsulant material	POE/EVA
BackSheet	Black Grid Transparent Backsheet
Frame	30mm (1.18 inches) Anodized Aluminium Alloy, Black
J-Box	IP68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Landscape: N 1100 mm/ P1100 mm(43.31/43.31 inches)
Connector	MC4 EVO2
Fire Type	Type 1 or Type2

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of Pmax	- 0.30%/°C
Temperature Coefficient of Voc	- 0.24%/°C
Temperature Coefficient of Isc	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	25 A

WARRANTY

- 25 year Product Workmanship Warranty
- 25 year Power Warranty
- 1% first year degradation
- 0.4% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 36 pieces
- Modules per 40' container: 792 pieces
- Pallet dimensions (L x W x H): 1800 x 1135 x 1259 mm
- Pallet weight: 829 kg (1827 lb)

Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System

Trinasolar

Trinasolar

Version number: TSM_NA_EN_2023_A

www.trinasolar.com

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: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE

251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

SolarEdge Home Hub Inverter

USA Domestic Content Eligible*

Single Phase, for North America

SE3800H-US / SE5700H-US / SE7600H-US / SE10000H-US / SE11400H-US

HOME BACKUP

12-25 YEAR WARRANTY

Made in the USA

SolarEdge's USA-manufactured residential single phase inverter offering for storage and backup applications

- Eligible for domestic content: SolarEdge USA-manufactured inverters*, when paired with certain SolarEdge power optimizers, are intended to be eligible for the enhanced federal income tax credit for domestic content
- The ultimate home energy manager in charge of PV production, battery storage, backup operation during a power outage**, EV Charging, and smart energy devices
- Record breaking 99% weighted efficiency with up to 200% DC oversizing
- Able to start high LRA HVAC systems during backup operation
- Integrates seamlessly with the complete SolarEdge Home Smart Energy Ecosystem, through SolarEdge Home Network
- Module-level monitoring and visibility of battery status, PV production, and self-consumption data
- Fast and easy installation – small and lightweight, with reduced commissioning time
- A scalable solution that supports future homeowner needs through easy connection to a growing ecosystem of products
- Advanced safety features with integrated arc fault protection and rapid shutdown for 690.11 and 690.12
- Advanced reliability with automotive-grade components
- Embedded revenue grade production data, ANSI C12.20 Class 0.5
- NEMA 4X-rated, for indoor and outdoor installations
- Embedded Power Control System (PCS) – install larger systems while avoiding main panel upgrade

** Requires additional hardware and firmware version upgrade.

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solaredge

/ SolarEdge Home Hub Inverter

USA Domestic Content Eligible

Single Phase, for North America

SE3800H-US / SE5700H-US / SE7600H-US / SE10000H-US / SE11400H-US

Applicable to inverters with part number	SExxxxH-USMNxBLx5 / USExxxxH-USMNBL75					
Model Number[1]	SE3800H-US	SE5700H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT – AC ON GRID						
Maximum AC Power Output	3800 @ 240V 3300 @ 208V	5760 @ 240V 5000 @ 208V	7600 @ 240V	10,000 @ 240V	11,400 @ 240V 10,000 @ 208V	W
AC Output Voltage (Nominal)	208 / 240					Vac
AC Output Voltage (Range)	183 – 264					Vac
AC Frequency Range (min - nom - max)	59.3 – 60 – 60.5[2]					Hz
Maximum Continuous Output Current	16 @ 240V 16 @ 208V	24 @ 240V 24 @ 208V	32 @ 240V	42 @ 240V	47.5 @ 240V 48 @ 208V	A
GFDI Threshold	1					A
Total Harmonic Distortion (THD)	< 3					%
Power Factor	1, adjustable -0.85 to 0.85					
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes					
Charge Battery from AC (if allowed)	Yes					
Typical Nighttime Power Consumption	< 2.5					W
OUTPUT – AC STANDALONE (BACKUP)[3]						
Rated AC Power in Standalone Operation[4]	11,400					W
Maximum Continuous Output Current in Standalone Operation[4]	48					A
Locked Rotor Amperage (LRA)[5]	Up to 106					A
AC L-L Output Voltage Range in Standalone Operation	211 – 264					Vac
AC L-N Output Voltage Range in Standalone Operation	105 – 132					Vac
AC Frequency Range in Standalone Operation (min - nom - max)	55 – 60 – 65					Hz
GFDI	1					A
THD	< 5					%
INPUT – DC (PV AND BATTERY)						
Transformer-less, Ungrounded	Yes					
Maximum Input Voltage	480					Vdc
Nominal DC Input Voltage	380					Vdc
Reverse-Polarity Protection	Yes					
Ground-Fault Isolation Detection	600kΩ Sensitivity					
Maximum Input Short Circuit Current	45					Adc
Maximum Inverter Efficiency	99.2					%
CEC Weighted Efficiency	98.5		99		99 @ 240V 98.5 @ 208V	%
2-Pole Disconnection	Yes					
DC CONNECTION – PV						
Maximum Input Power	7600 @ 240V 6600 @ 208V	11,520 @ 240V 10,000 @ 208V	15,200 @ 240V	20,000 @ 240V	22,800 @ 240V 20,000 @ 208V	W
Maximum Input Current	20 @ 240V 17 @ 208V	30 @ 240V 26 @ 208V	40 @ 240V	53 @ 240V	60 @ 240V 53 @ 208V	Adc
Number of Ports	3					
Maximum Current per Port	40					Adc

/ SolarEdge Home Hub Inverter

USA Domestic Content Eligible

Single Phase, for North America

SE3800H-US / SE5700H-US / SE7600H-US / SE10000H-US / SE11400H-US

Applicable to inverters with part number	SExxxxH-USMNxBLx5 / USExxxxH-USMNBL75					
Model Number[1]	SE3800H-US	SE5700H-US	SE7600H-US	SE10000H-US	SE11400H-US	
DC CONNECTION – BATTERY						
Supported Battery Types	SolarEdge Home Battery 400V					
Number of Batteries per Inverter	Up to 3					
Maximum Continuous Power (Charge and Discharge)[6]	11,400					W
Number of Ports	2					
Maximum Current per Port	40					Adc
2-pole Disconnection	Up to the inverter's rated standalone power					
SMART ENERGY CAPABILITIES						
Consumption Metering	Built-in[7]					
Standalone & Battery Storage	With Backup Interface (purchased separately) for service up to 200A; up to 3 inverters					
EV Charging	Direct connection to the SolarEdge Home EV Charger[8]					
ADDITIONAL FEATURES						
Supported Communication Interfaces	RS485, Ethernet, Cellular[9], Wi-Fi[9] (optional), SolarEdge Home Network[10] (optional)					
Revenue Grade Metering, ANSI C12.20	Built-in[7]					
Integrated AC, DC, and Communication Connection Unit	Yes					
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi Access Point for local connection					
DC Voltage Rapid Shutdown (PV and Battery)	Yes, NEC 690.12					
STANDARD COMPLIANCE						
Safety	UL 1741, UL 1741SA, UL 1741SB, UL 1699B, CSA 22.2#107.1, C22.2#330, C22.3#9, ANSI/CAN/UL 9540					
Grid Connection Standards	IEEE1547-2018 and IEEE-1547.1 Rule 21, Rule 14H					
Emissions	FCC Part 15 Class B					
Power Control System (PCS)	UL 1741 PCS[11]					
INSTALLATION SPECIFICATIONS						
AC Terminals	L1, L2, N terminal blocks, PE busbar for inverter connection L1, L2 terminal blocks, PE busbar for EV Charger AC connection					
DC Terminals	3 x terminal block pairs for PV input, 2 x terminal block pair for battery input					
AC Output and EV AC Output Conduit Size / AWG Range	1" maximum / 14 – 4 AWG					
DC Input (PV and Battery) Conduit Size / AWG Range	1" maximum / 14 – 6 AWG					
Dimensions with Connection Unit (H x W x D)	21.06 x 14.6 x 8.2 / 535 x 370 x 208					in / mm
Weight with Connection Unit	44.9 / 20.3					lb / kg
Noise	< 50					dBA
Cooling	Natural Convection					
Operating Temperature Range	-40 to +140 / -40 to +60[12]					°F / °C
Protection Rating	NEMA 4X					

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: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE

251 IRENE LN, LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

Residential Power Optimizer

For North America

S440 / S500B / S650B

POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

solaredge.com

solaredge

Residential Power Optimizer

For North America

S440 / S500B / S650B

	S440	S500B	S650B	
INPUT				
Rated Input DC Power(1)	440	500	650	W
Absolute Maximum Input Voltage (Voc)	60	125	85	Vdc
MPPT Operating Range	8 – 60	12.5 – 105	12.5 – 85	Vdc
Maximum Input Current (Maximum Isc of Connected PV Module)	14.5	15		Adc
Maximum Input Short Circuit Current(2)	18.75			Adc
Maximum Efficiency	99.5			%
Weighted Efficiency	98.6			%
Overvoltage Category	II			
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)				
Maximum Output Current	15			Adc
Maximum Output Voltage	60	80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR INVERTER OFF)				
Safety Output Voltage per Power Optimizer	1 ± 0.1			Vdc
STANDARD COMPLIANCE				
Photovoltaic Rapid Shutdown System	NEC 2014 – 2023			
EMC	FCC Part 15 Class B, IEC 61000-6-2, IEC 61000-6-3			
Safety	IEC 62109-1 (class II safety), UL 1741			
Material	UL 94 V-0, UV Resistant			
RoHS	Yes			
Fire Safety	VDE-AR-E 2100-712:2013-05			
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage	1000			Vdc
Dimensions (W x L x H)	129 x 155 x 30 / 5.07 x 6.10 x 1.18	129 x 165 x 45 / 5.07 x 6.49 x 1.77		mm / in
Weight	720 / 1.6	790 / 1.74		gr / lb
Input Connector	MC4			
Input Wire Length	0.1 / 0.32			m / ft
Output Connector	MC4			
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32			m / ft
Operating Temperature Range(3)	-40 to +85			°C
Protection Rating	IP68 / NEMA6P			
Relative Humidity	0 – 100			%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
(2) The Maximum Input Short Circuit Current is adjusted for worst case conditions of ambient temperature, irradiance, bifacial gain, and so on, in accordance with NEC and CSA.
(3) Power derating is applied for ambient temperatures above +85°C / +185°F for S440, and for ambient temperatures above +75°C / 167°F for S500B. Refer to the Power Optimizers Temperature Derating technical note for more details.

PV System Design Using a SolarEdge Inverter(4)		SolarEdge Home Wave/Hub Single Phase	Three Phase for 208V Grid	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440	8	10	18	
	S500B, S650B	6	8	14	
Maximum String Length (Power Optimizers)		25		50(5)	
Maximum Usable Power Delivered per String		5700	6000	12,750	W
Maximum Allowed Connected Power per String(7)(8)	Inverters with Rated AC Power ≤ 5700W	Per the inverter's maximum input DC power(6)	One string: 7200 Two strings or more: 7800	15,000	W
	Inverters with Rated AC Power of 6000W	5700			
	Inverters with Rated AC Power ≥ 7600W	6800, only when connected to at least two strings			
Parallel Strings of Different Lengths or Orientations		Yes			

(4) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.
(5) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30 V requirement.
(6) Refer to the Single String Design Guidelines application note for more details.
(7) For the 208 V grid, the maximum is permitted only when the difference in connected power between strings is 1,000 W or less.
(8) For the 240 V or 277/480 V grids, the maximum is permitted only when the difference in connected power between strings 2,000 W or less.

Intertek RoHS

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: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

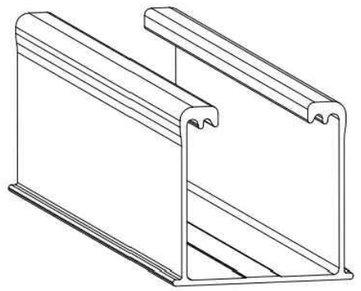
DRAWN BY
ESR

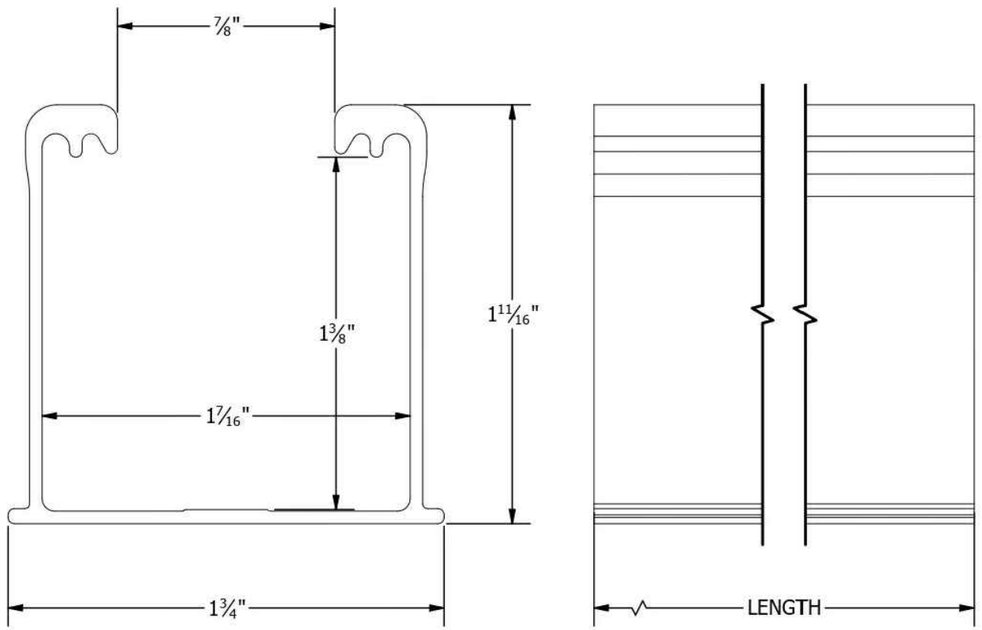
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-13

PART # TABLE		
P/N	DESCRIPTION	LENGTH
084RLM1	NXT HORIZON RAIL 84" MILL	84"
084RLD1	NXT HORIZON RAIL 84" DARK	84"
168RLM1	NXT HORIZON RAIL 168" MILL	168"
168RLD1	NXT HORIZON RAIL 168" DARK	168"
208RLM1	NXT HORIZON RAIL 208" MILL	208"
208RLD1	NXT HORIZON RAIL 208" DARK	208"
246RLM1	NXT HORIZON RAIL 246" MILL	246"
246RLD1	NXT HORIZON RAIL 246" DARK	246"





UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	NXT HORIZON
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	RAIL
REVISION DATE:	9/13/2021

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

NH-P01
SHEET

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: 03/05/2025

PROJECT NAME & ADDRESS
CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

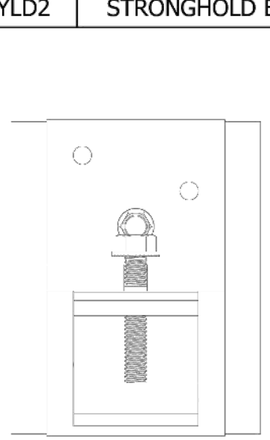
DRAWN BY
ESR

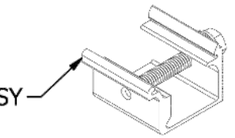
SHEET NAME
EQUIPMENT SPECIFICATION

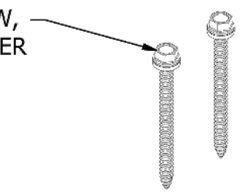
SHEET SIZE
ANSI B
11" X 17"

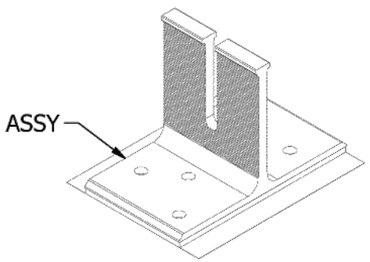
SHEET NUMBER
PV-14

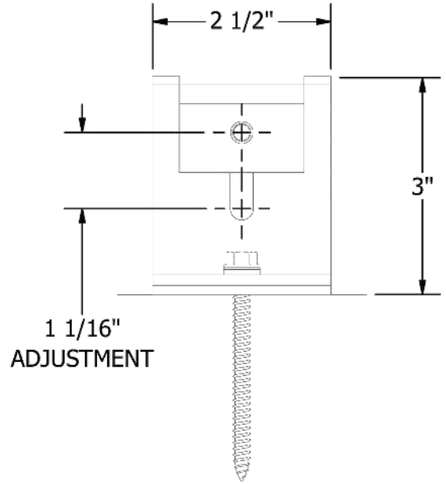
PART # TABLE	
P/N	DESCRIPTION
SHBUTYLM2	STRONGHOLD BUTYL ATT KIT #14S MILL
SHBUTYLD2	STRONGHOLD BUTYL ATT KIT #14S DARK

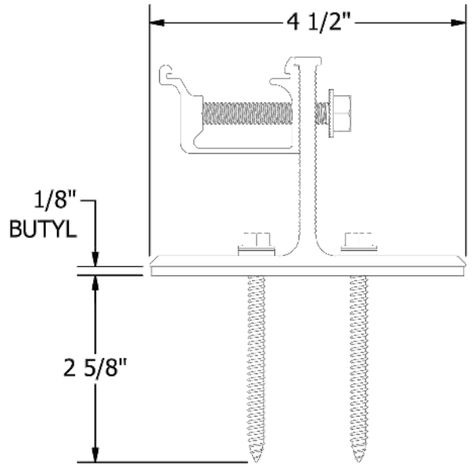












UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	NXT UMOUNT
DRAWING TYPE:	PARTS
DESCRIPTION:	SH BUTYL ATTACHMENT
REVISION DATE:	7/14/2023

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

NU-A10-1
SHEET

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

REVISIONS		
DESCRIPTION	DATE	REV

DATE: 03/05/2025

PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE

251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

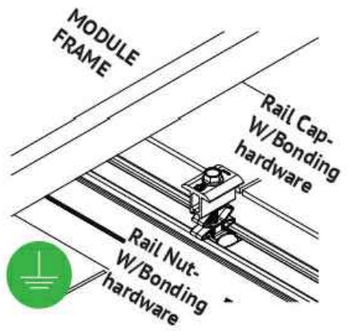
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

NXT UMOUNT® BONDING CONNECTIONS & GROUNDING PATHS

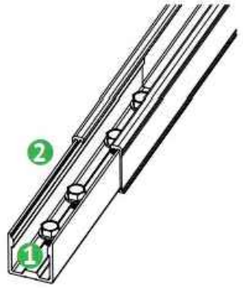
INSTALLATION GUIDE | 21 PAGE



BONDING COMBO MID-END CLAMP ASSEMBLY

1. Aluminum combo mid-end clamp cap with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
2. Stainless steel bolt bonds aluminum clamp to stainless steel Hex bolt
3. Aluminum combo mid-end clamp rail nut with stainless steel bonding pins that pierce rail anodization to bond module to module through clamp

NOTE: See Page 19 for installation details.

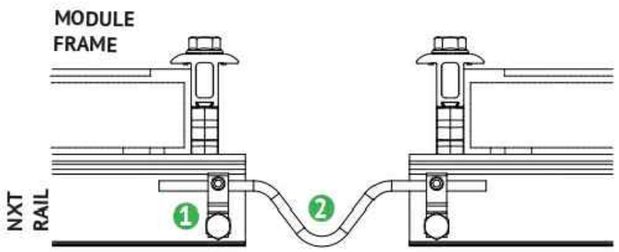


BONDING RAIL SPLICE

1. Bonding Hardware creates bond between Splice bar and each rail section.
2. Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

NOTE:

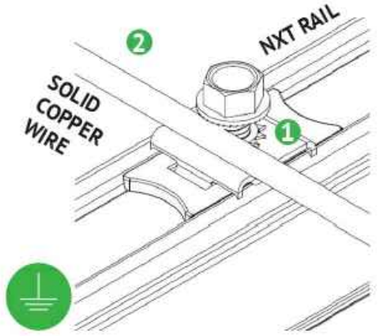
- **See Page 15 for installation details**
- **Splice certified for single-use only**



BONDING BETWEEN THERMAL BREAKS

1. Lug is connected at the end of each thermal break to the rail.
2. Solid copper wire is connected across the gap to bond the two ends.

NOTE: See Page 5 for installation details.



RACK SYSTEM GROUNDING

1. Tabs on the stainless-steel washer pierce anodization on the rail to bond rail to ground wire.
2. Solid copper wire connected to lug is routed to provide final system ground connection.

NOTE: See Page 16 for installation details and alternate racking system grounding methods.

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4721 N GRADY AVE
TAMPA FL 33614
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PHONE: 813-540-8807

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DESCRIPTION	DATE	REV

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PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

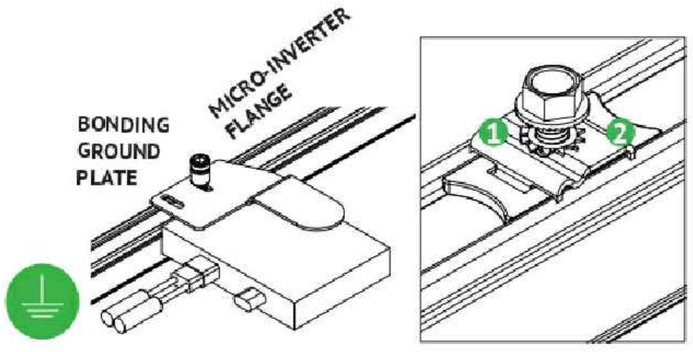
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-16

NXT UMOUNT™ BONDING CONNECTIONS & GROUNDING PATHS

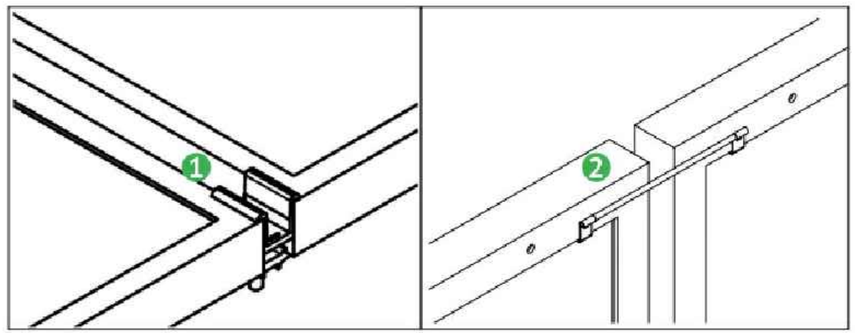
INSTALLATION GUIDE | PAGE 22



BONDING MICROINVERTER MOUNT

1. Stainless steel Tooth lock washer beneath the MLPE flange remove anodization on the MLPE and bonds.
2. Tabs on the stainless steel washer remove anodization on the rail and bonds.

NOTE: See Page 17 for installation details



ALTERNATE ROW-TO-ROW BONDING PATHS

1. Row-to-row module bonding is accomplished with bonding clamp with 2 integral bonding pins.
2. Alternate method by connecting clips on either module to complete the bonding path.

NOTE:

- See Page 16 for installation details
- Row-to-row module bonding certified for single-use only

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PROJECT NAME & ADDRESS

CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

EZ SOLAR
making solar simple.

JB-1.2, JB-1.XL
Specification Sheet
PV Junction Box for Composition/Asphalt Shingle Roofs

A. System Specifications and Ratings

- Maximum Voltage: 1,000 Volts
- Maximum Current: **JB-1.2:** 80 Amps; **JB-1.XL:** 120 Amps
- Allowable Wire: 14 AWG – 6 AWG
- Spacing: Please maintain a spacing of at least ½" between uninsulated live parts and fittings for conduit, armored cable, and uninsulated live parts of opposite polarity.
- Enclosure Rating: Type 3R
- Roof Slope Range: 2.5 – 12:12
- Max Side Wall Fitting Size: 1"
- Max Floor Pass-Through Fitting Size: 1"
- Ambient Operating Conditions: (-35°C) - (+75°C)
- Compliance:
  - **JB-1.2:** UL1741, CSA C22.2 No. 290; **JB-1.XL:** UL1741, CSA C22.2 No. 290
  - Approved wire connectors: must conform to UL1741, CSA C22.2 No. 290
- System Marking: **Intertek Symbol and File #5019942**
- Periodic Re-inspections: If re-inspections yield loose components, loose fasteners, or any corrosion between components, components that are found to be affected are to be replaced immediately.

Intertek
5019942

Table 1: Typical Wire Size, Torque Loads and Ratings

	1 Conductor	2 Conductor	Torque				
			Type	NM	Inch Lbs	Voltage	Current
ABB ZS6 terminal block	10-24 awg	16-24 awg	Sol/Str	0.5-0.7	6.2-8.85	600V	30 amp
ABB ZS10 terminal block	6-24 awg	12-20 awg	Sol/Str	1.0-1.6	8.85-14.16	600V	40 amp
ABB ZS16 terminal block	4-24 awg	10-20 awg	Sol/Str	1.6-2.4	14.6-21.24	600V	60 amp
ABB M6/8 terminal block	8-22 awg		Sol/Str	.08-1	8.85	600V	50 amp
Ideal 452 Red WING-NUT Wire Connector	8-18 awg		Sol/Str	Self-Torque	Self-Torque	600V	
Ideal 451 Yellow WING-NUT Wire Connector	10-18 awg		Sol/Str	Self-Torque	Self-Torque	600V	
Ideal, In-Sure Push-In Connector Port #89	10-14 awg		Sol/Str	Self-Torque	Self-Torque	600V	
WAGO, 2204-1201	10-20 awg	16-24 awg	Sol/Str	Self-Torque	Self-Torque	600V	30 amp
WAGO, 221-612	10-20 awg	10-24 awg	Sol/Str	Self-Torque	Self-Torque	600V	30 amp
Dottie DRC75	6-12 awg		Sol/Str	Snap-In	Snap-In		
ESP NG-53	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		
ESP NG-717	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		
Brumall 4-5,3	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		

Table 2: Minimum wire-bending space for conductors through a wall opposite terminals in mm (inches)

Wire size, AWG or kcmil (mm2)	Wires per terminal (pole)							
	1		2		3		4 or More	
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
14-10 (2.1-5.3)	Not Specified		-		-		-	
8 (8.4)	38.1	(1-1/2)	-		-		-	
6 (13.3)	50.8	(2)	-		-		-	

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CHARLES DOWNING RESIDENCE
251 IRENE LN,
LAKE CITY, FL 32055

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ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-18