# PHOTOVOLTAIC ROOF MOUNT SYSTEM

12 MODULES-ROOF MOUNTED - 4.980 kW DC, 7.600 kW AC

275 SE FAYE LN, LAKE CITY, FL 32025

## PROJECT DATA

| | |
|---|---|
| PROJECT ADDRESS | 275 SE FAYE LN,<br>LAKE CITY, FL 32025 |
| OWNER: | BROOKS REDDING |
| CONTRACTOR: | LUNEX POWER,<br>4721 N GRADY AVE<br>TAMPA FL 33614<br>PHONE: 813-540-8807 |
| DESIGNER: | ESR |

SCOPE: 4.980 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH
12 TRINA SOLAR: TSM-NE09RC.05 415W PV MODULES WITH
04 TESLA: MCI-2 RAPID SHUTDOWN DEVICE WITH
01 TESLA : SOLAR INVERTER 7.6KW

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

## SHEET INDEX


| | |
|---|---|
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| PV-2 | SITE PLAN |
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## PROFESSIONAL ENGINEER SEAL

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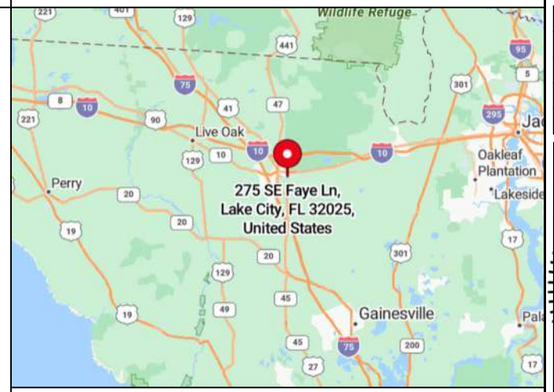
## GENERAL NOTES

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 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.
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: 2025.02.28 16:16:04 -05'00'


LUNEX POWER
THE PURE SOURCE

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: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN, LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

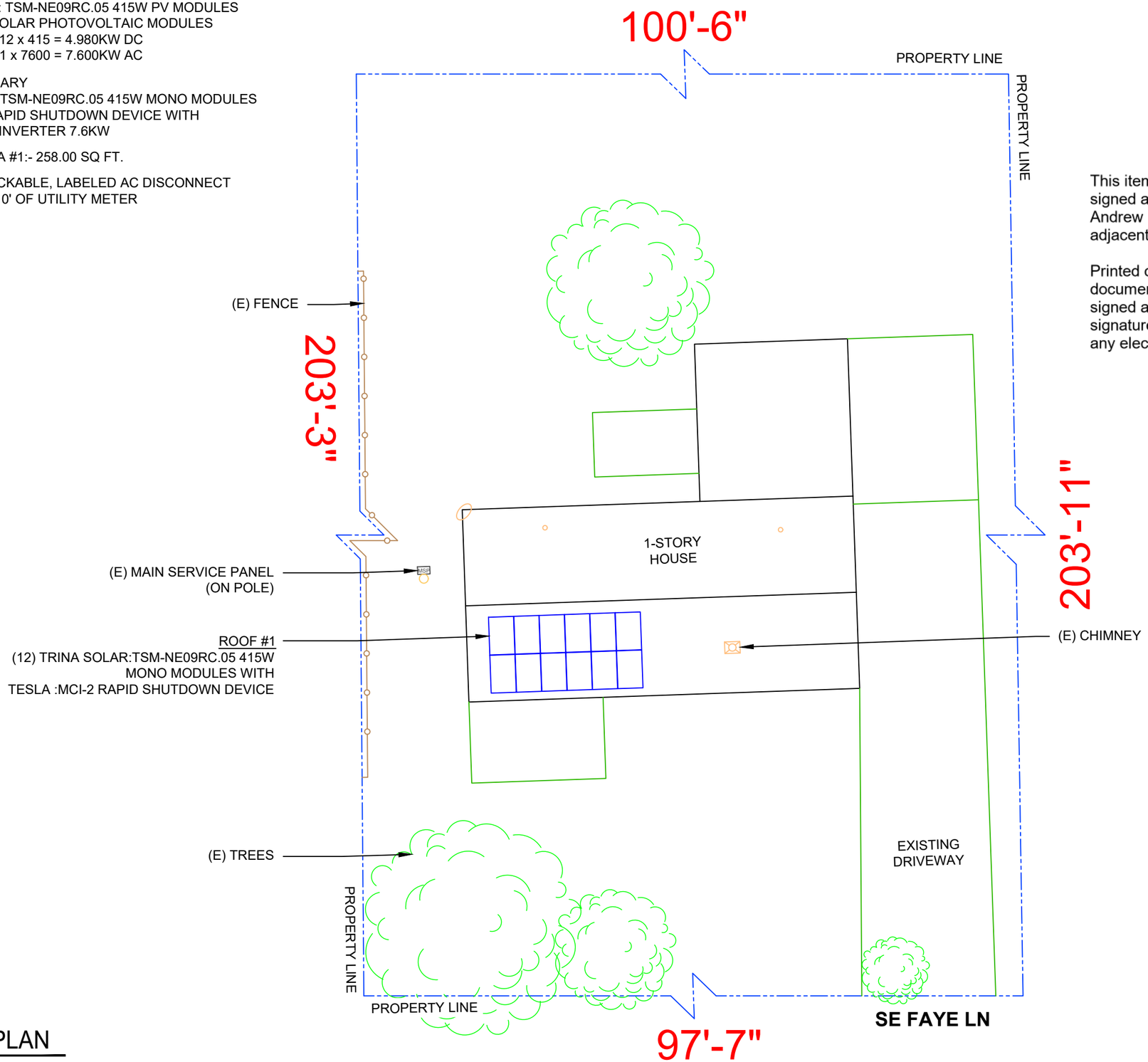
# PROJECT DESCRIPTION:

12 X TRINA SOLAR: TSM-NE09RC.05 415W PV MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 12 x 415 = 4.980KW DC
AC SYSTEM SIZE: 1 x 7600 = 7.600KW AC

EQUIPMENT SUMMARY
12 TRINA SOLAR: TSM-NE09RC.05 415W MONO MODULES
04 TESLA: MCI-2 RAPID SHUTDOWN DEVICE WITH
01 TESLA : SOLAR INVERTER 7.6KW

ROOF ARRAY AREA #1:- 258.00 SQ FT.

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




1 SITE PLAN
PV-2 SCALE: 1/16" = 1'-0"

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

/ /
DATE: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE

275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

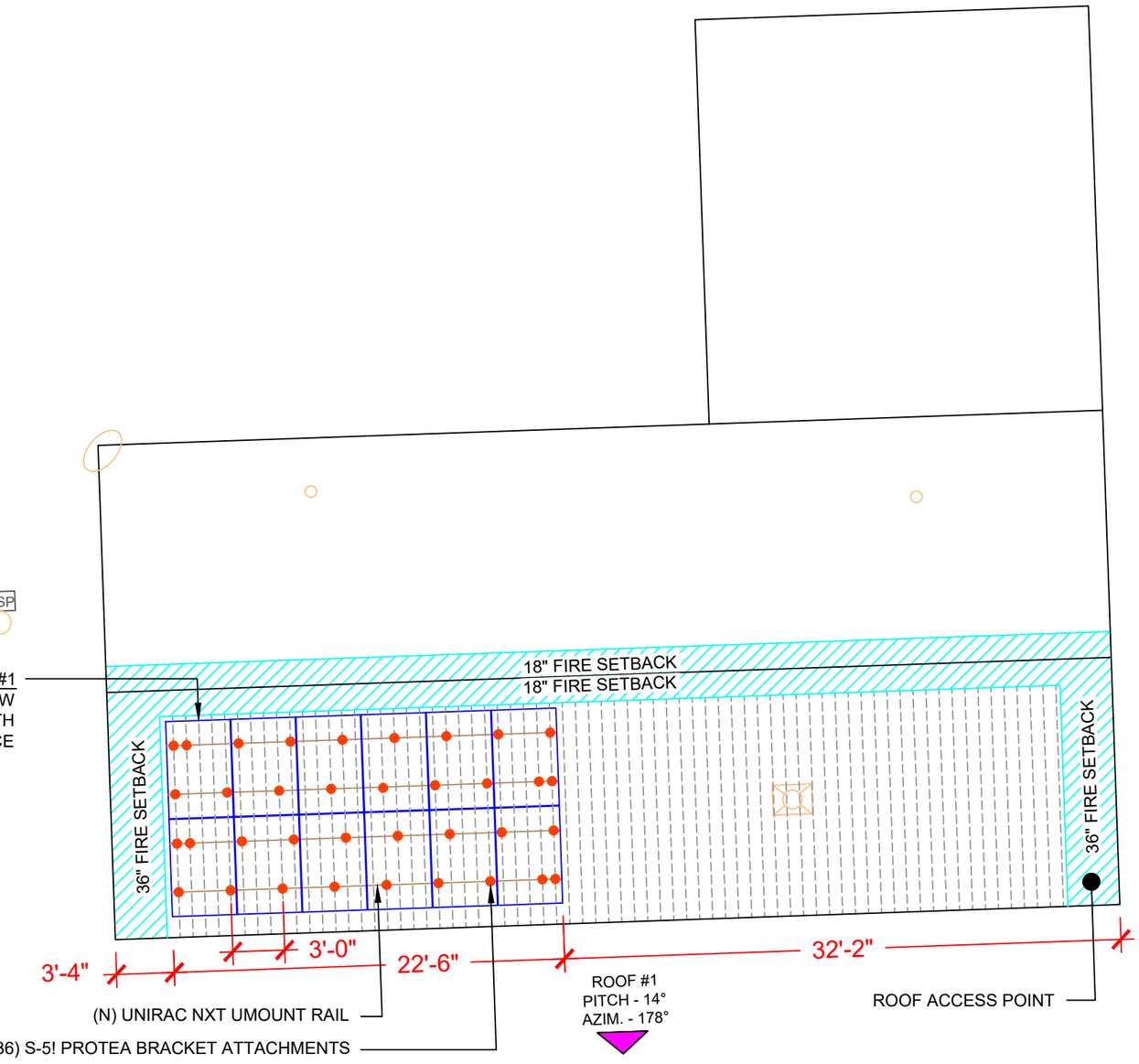
SHEET NUMBER
PV-2

## MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 12 MODULES
MODULE TYPE = TRINA SOLAR: TSM-NE09RC.05 415W MONO MODULES
MODULE WEIGHT = 47.0 LBS / 21.3 KG.
MODULE DIMENSIONS = 69.37" x 44.65" = 21.50 SF

| ARRAY AREA & ROOF AREA CALC'S | | | | |
|---|---|---|---|---|
| ROOF | # OF MODULES | ARRAY AREA (Sq. Ft.) | ROOF AREA (Sq. Ft.) | ROOF AREA COVERED BY ARRAY (%) |
| #1 | 12 | 258.00 | 827.58 | 31 |
| TOTAL | 12 | 258.00 | 2185.42 | 12 |

| ROOF DESCRIPTION | | | |
|---|---|---|---|
| ROOF TYPE | | METAL | |
| ROOF | ROOF PITCH | AZIMUTH | SEAM SPACING |
| #1 | 14° | 178° | 9" |

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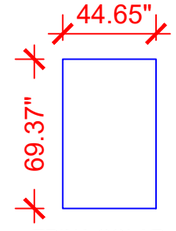


TRINA SOLAR:
TSM-NE09RC.05 415W
MODULES

### LEGEND

- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- SUB — SUB PANEL
- MSP — MAIN SERVICE PANEL

## 1 ROOF PLAN & MODULES

PV-3

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


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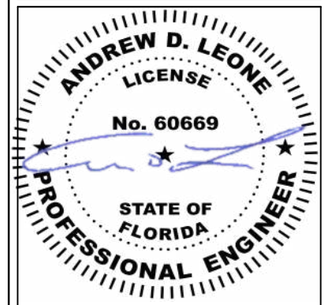



/ /
DATE: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

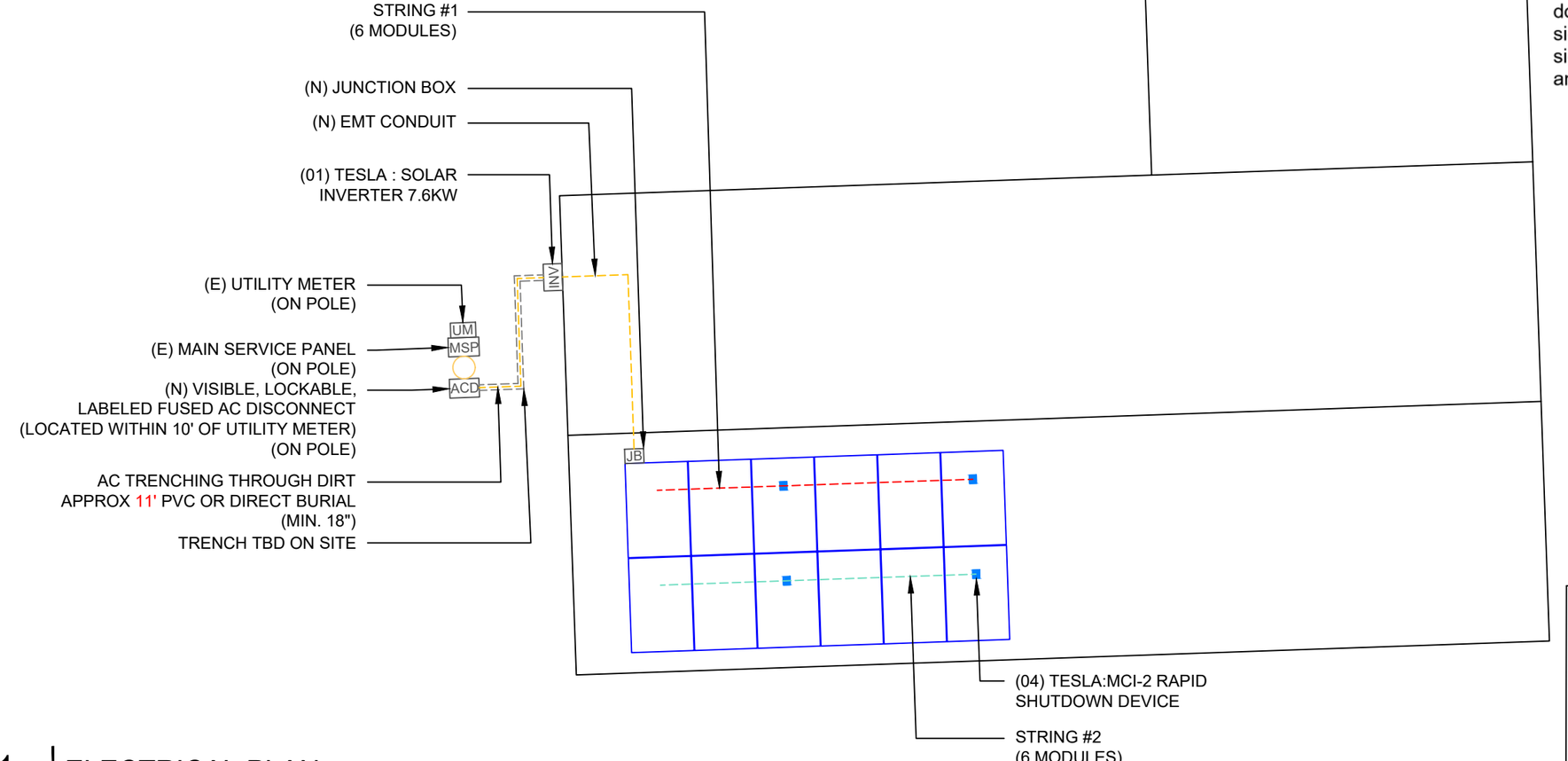
DRAWN BY
ESR

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

| CIRCUIT LEGENDS |
|---|
| STRING #1 |
| STRING #2 |




1 ELECTRICAL PLAN

PV-4 SCALE: 1/8" = 1'-0"

| BILL OF MATERIALS | | |
|---|---|---|
| EQUIPMENT | QTY | DESCRIPTION |
| SOLAR PV MODULES | 12 | TRINA SOLAR: TSM-NE09RC.05 415W MODULE |
| INVERTER | 1 | TESLA : SOLAR INVERTER 7.6KW |
| RAPID SHUTDOWN DEVICE | 4 | TESLA:MCI-2 RAPID SHUTDOWN DEVICE |
| JUNCTION BOX | 1 | JUNCTION BOXES |
| RAILS | 7 | UNIRAC NXT UMOUNT RAIL |
| SPLICES | 4 | SPLICE KIT |
| MID MODULE CLAMPS | 20 | MID MODULE CLAMPS |
| END CLAMPS | 8 | END CLAMPS / STOPPER SLEEVE |
| ATTACHMENTS | 36 | S-5! PROTEA BRACKET ATTACHMENTS |

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LEGEND

- JB - JUNCTION BOX
- INV - INVERTER
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- SUB - SUB PANEL
- CONDUIT

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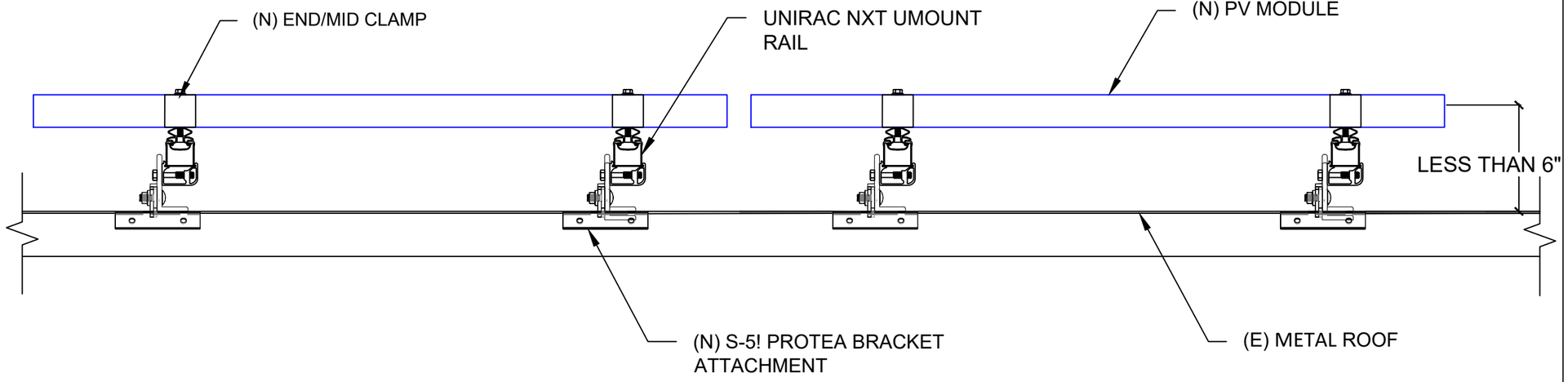
ESR

SHEET NAME
ELECTRICAL PLAN

SHEET SIZE
ANSI B
11" X 17"

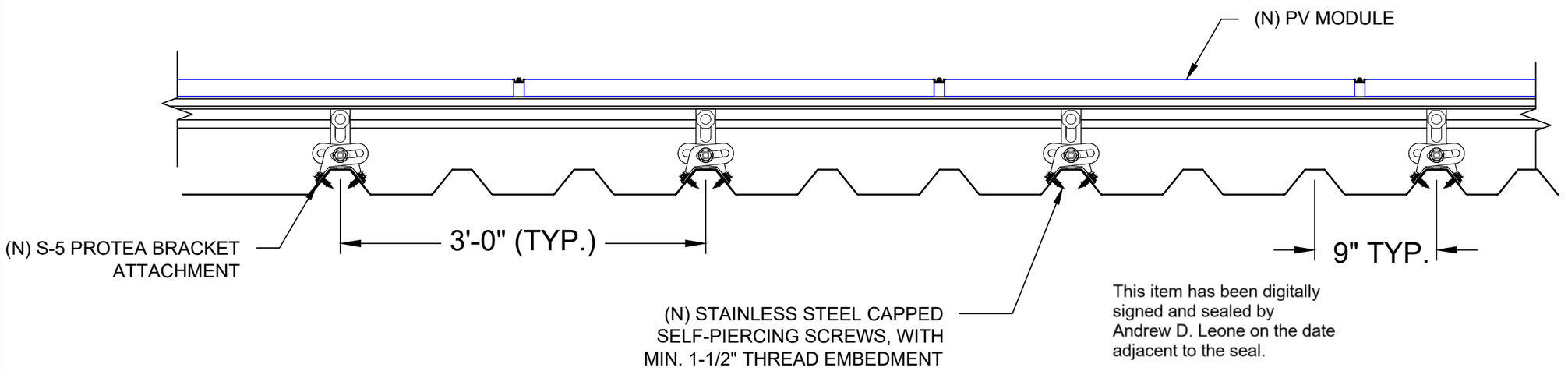
SHEET NUMBER
PV-4

**DESCRIPTION**: CANTILEVER
CANTILEVER CONSIDER 1/3RD OF ROOF ATTACHMENT SPACING.
ATTACHMENT SPACING= 36" O/C
CANTILEVER = 12"




1 PV-5 STRUCTURAL ATTACMENT (SIDE VIEW)

SCALE: N.T.S.




2 PV-5 ATTACHMENT DETAIL (FRONT VIEW)

SCALE: N.T.S.

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LUNEX POWER
THE PURE SOURCE

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REVISIONS

| DESCRIPTION | DATE | REV |
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ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

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PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
STRUCTURAL DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

DC SYSTEM SIZE: 12 x 415 = 4.980 kW DC
AC SYSTEM SIZE: 1 X 7600 = 7.600 KW AC

(12) TRINA SOLAR: TSM-NE09RC.05 415W MONO MODULES WITH
(04) TESLA: MCI-2 RAPID SUTDOWN DEVICES
(01) TESLA : SOLAR INVERTER 7.6KW

(2) BRANCH CIRCUIT OF 06 MODULES ARE CONNECTED IN SERIES

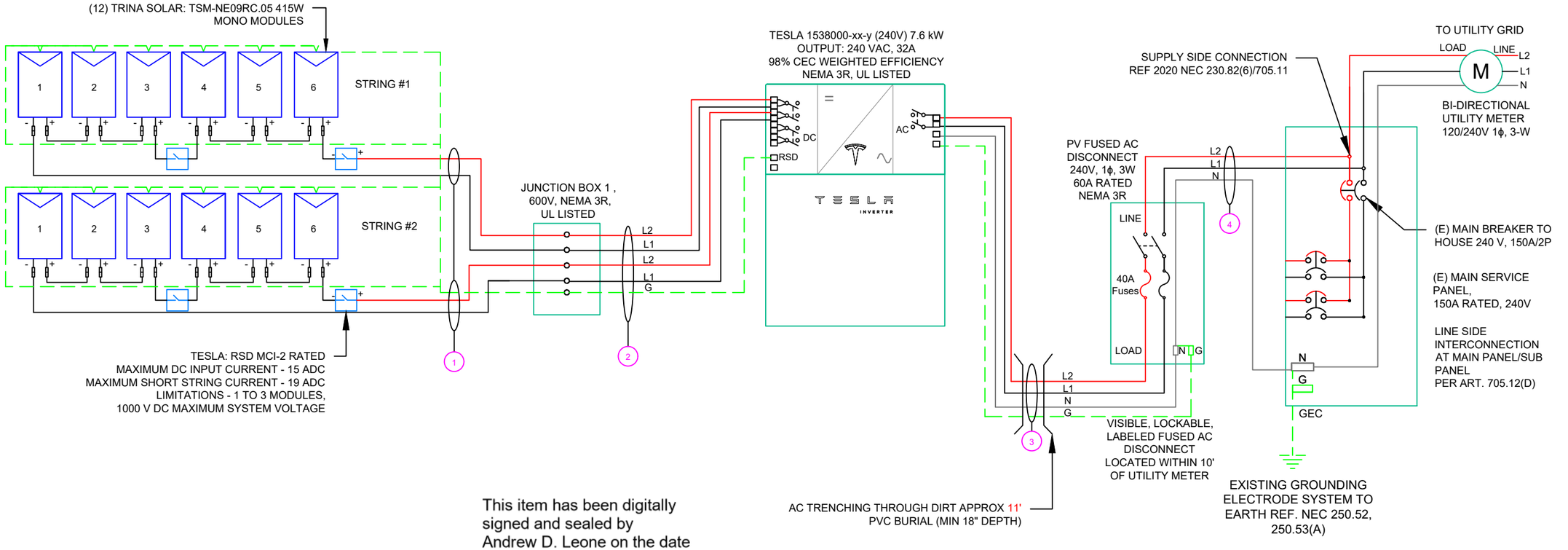
**INSTALLER / ELECTRICIAN NOTE:**
EC IS TO MEASURE VOLTAGE BEFORE STARTING WORK.
IF RESULT IS ANY OTHER VOLTAGE MEASURED THAN 120/240V IS OBSERVED, DO NOT PROCEED. CONTACT ENGINEER.

**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.

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| | QTY | CONDUCTOR INFORMATION | | CONDUIT TYPE | CONDUIT SIZE |
|---|---|---|---|---|---|
| 1 | (4) | CU#10AWG - | PV WIRE (L1 & L2 NO NEUTRAL) | 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#6AWG - | THWN-2 (L1,L2) | PVC BURIAL (MIN 18") | 3/4" |
| | (1) | CU#6AWG - | THWN-2 N | | |
| | (1) | CU#6AWG - | THWN-2 GND | | |
| 4 | (2) | CU#6AWG - | THWN-2 (L1,L2) | EMT, LFMC OR LFNC | 3/4" |
| | (1) | CU#6AWG - | THWN-2 N | | |

1 ELECTRICAL LINE DIAGRAM
PV-6 SCALE: NTS


LUNEX POWER
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TAMPA FL 33614
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/ /
DATE: 02/28/2025

PROJECT NAME & ADDRESS
BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER / MODEL # | TESLA :: SOLAR INVERTER 7.6KW |
| NOMINAL AC POWER | 7.600KW |
| NOMINAL GRID VOLTAGE | 120/240 VAC |
| NOMINAL OUTPUT CURRENT | 32A |
| PV MAXIMUM INPUT VOLTAGE | 600 VDC |

| 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 | -0.244%°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 | -0.234%°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 | 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)(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 | 600 | 15.00 | 19.00 | 20 | N/A | BARE COPPER #6 AWG | CU #10 AWG | 35 | PASS | 37 | 2 | 40 | 0.91 | 1 | 36.4 | PASS | 19 | 1.24 | 0.118 | N/A | #N/A |
| STRING 2 | JUNCTION BOX | 600 | 15.00 | 19.00 | 20 | N/A | BARE COPPER #6 AWG | CU #10 AWG | 35 | PASS | 37 | 2 | 40 | 0.91 | 1 | 36.4 | PASS | 19 | 1.24 | 0.118 | N/A | #N/A |
| JUNCTION BOX | INVERTER | 600 | 15.00 | 19.00 | 20 | N/A | CU #10 AWG | CU #10 AWG | 35 | PASS | 37 | 4 | 40 | 0.91 | 0.8 | 29.12 | PASS | 27 | 1.24 | 0.167 | 3/4" EMT | 19.79362 |

| | |
|---|---|
| String 1 Voltage Drop | 0.285 |
| String 2 Voltage Drop | 0.285 |

**AC FEEDER 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)(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 #6 AWG | CU #6 AWG | CU #6 AWG | 65 | PASS | 37 | 2 | 75 | 0.91 | 1 | 68.25 | PASS | 11 | 0.491 | 0.144 | 3/4" PVC | 39.9213 |
| AC DISCONNECT | POI | 240 | 32 | 40 | 40 | CU #6 AWG | N/A | CU #6 AWG | 65 | PASS | 37 | 2 | 75 | 0.91 | 1 | 68.25 | PASS | 5 | 0.491 | 0.065 | 3/4" EMT | 28.5366 |
| | | | | | | | | | | | | | | | | | | CUMULATIVE VOLTAGE INV | | 0.209 | | |

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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

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: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

CAUTION: AUTHORIZED SOLAR PERSONNEL ONLY!

LABEL-1:
LABEL LOCATION:
AC DISCONNECT

⚠ WARNING

**ELECTRICAL SHOCK HAZARD**

**TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION**

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

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

LABEL- 3:
LABEL LOCATION:
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

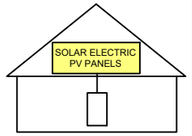
⚠ WARNING

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 | 32.00 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)

| | |
|---|---|
| **MAXIMU VOLTAGE:** | **600 V** |
| **MAXIMUM CIRCUIT CURRENT:** | **15.0 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

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LUNEX POWER
THE PURE SOURCE

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: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

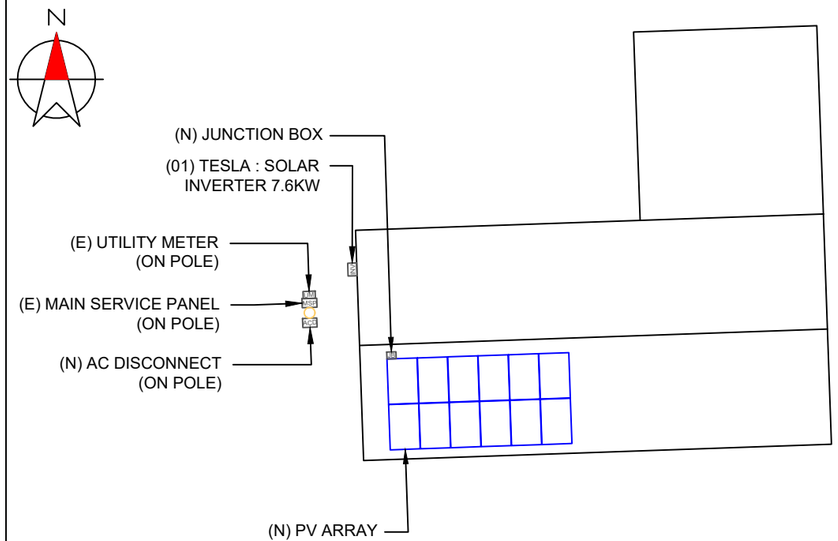
SHEET NAME
LABELS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

# CAUTION

## MULTIPLE SOURCES OF POWER




275 SE FAYE LN, LAKE CITY, FL 32025

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])

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]

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LUNEX POWER
THE PURE SOURCE

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TAMPA FL 33614
LIC #: CVC57085
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| | | |
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ANDREW D. LEONE LICENSE No. 60669 STATE OF FLORIDA PROFESSIONAL ENGINEER

/ /

DATE: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE

275 SE FAYE LN, LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

PLACARD

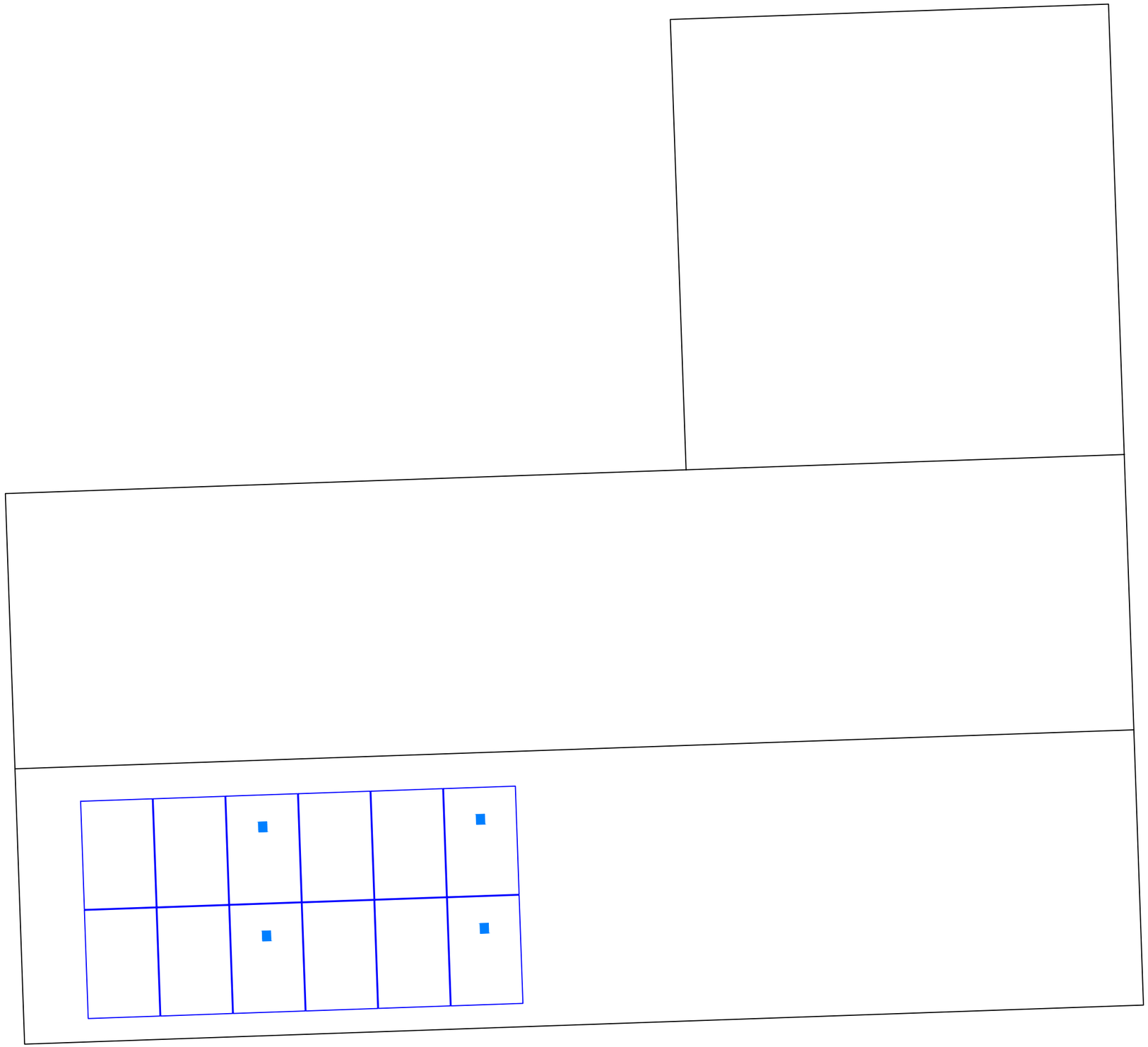
SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9

# RAPID SHUTDOWN CHART




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


REVISIONS

| DESCRIPTION | DATE | REV |
|---|---|---|
| | | |
| | | |
| | | |

DATE: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE

275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY

ESR

SHEET NAME

RAPID SHUTDOWN CHART

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

Mono Multi Solutions

# Vertex S+

## BACKSHEET MONOCRYSTALLINE MODULE

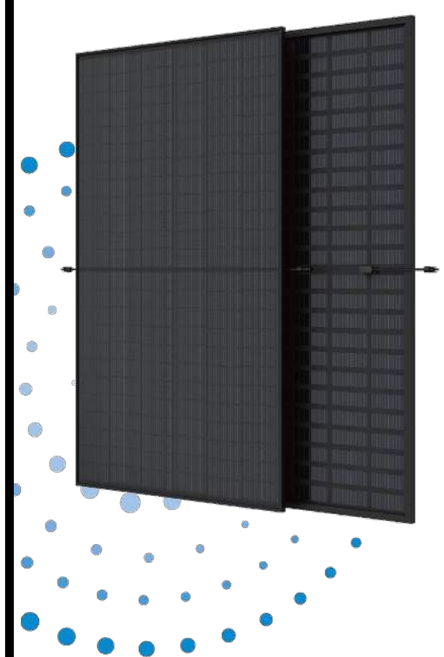
PRODUCT: TSM-NE09RC.05

PRODUCT RANGE: 400-430W

**430W**
MAXIMUM POWER OUTPUT

**0~+5W**
POSITIVE POWER TOLERANCE

**21.5%**
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

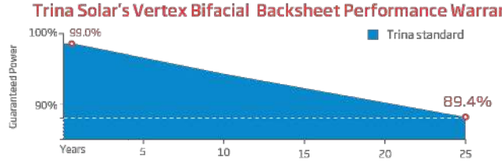
### Ultra-low Degradation, longer warranty, higher output

- 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

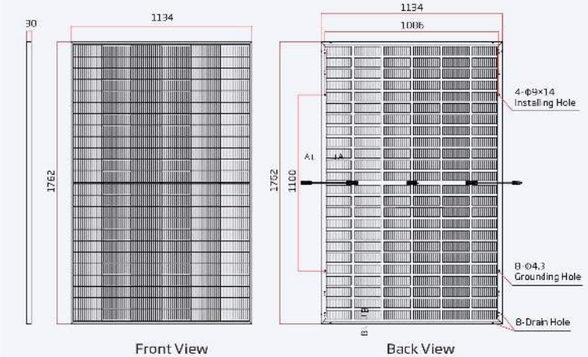
- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Perfect size and low weight for handling and installation
- Most valuable solution on low load capacity rooftops (weight similar to backsheet version)
- Mechanical performance up to 6000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

### Trina Solar's Vertex Bifacial Backsheet Performance Warranty

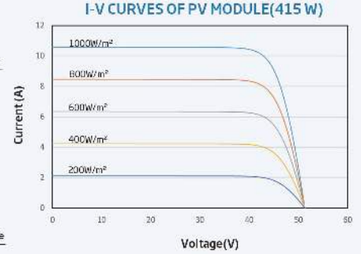



Vertex S+ BACKSHEET MONOCRYSTALLINE MODULE

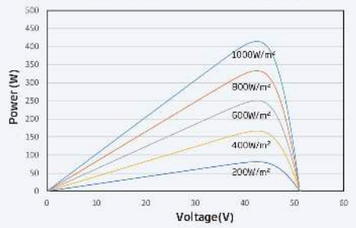
### DIMENSIONS OF PV MODULE(mm)




### 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 ηm (%) | 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 tolerance: ±3%. Bifaciality: 80±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 (0.12inches), High Transmission, Tempered Glass |
| Encapsulant material | POE/EVA |
| BackSheet | Black Grid Transparent Backsheet |
| Frame | 30mm (1.18 inches) Anodized Aluminium Alloy, Black |
| J-Box | IP 68 rated |
| Cables | Photovoltaic Technology Cable 4.0mm² (0.006 inches²) LandscapeN 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

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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Version number: TSM_NA_EN_2023_A

www.trinasolar.com

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

REVISIONS

| DESCRIPTION | DATE | REV |
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DATE: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

## Tesla Solar Inverter
### with Site Controller

—

Tesla Solar Inverter completes the Tesla home solar system, converting DC power from solar to AC power for home consumption. Tesla's renowned expertise in power electronics has been combined with robust safety features and a simple installation process to produce an outstanding solar inverter that is compatible with both Solar Roof and traditional solar panels. Once installed, homeowners use the Tesla mobile app to manage their solar system and monitor energy consumption, resulting in a truly unique ecosystem experience.

KEY FEATURES

- Built on Powerwall technology for exceptional efficiency and reliability
- Wi-Fi, Ethernet, and cellular connectivity with easy over-the-air updates
- Designed to integrate with Tesla Powerwall and Tesla App
- 0.5% revenue-grade metering for Solar Renewable Energy Credit (SREC) programs included

March 17, 2024

## Tesla Solar Inverter Technical Specifications

**Electrical Specifications: Output (AC)**

| | | | | |
|---|---|---|---|---|
| **Model Number** | 1538000-xx-y | | | |
| **Output (AC)**[1] | 3.8 kW | 5 kW | 5.7 kW | 7.6 kW |
| **Nominal Power** | 3,800 W | 5,000 W | 5,700 W | 7,600 W |
| **Maximum Apparent Power** | 3,840 VA | 5,040 VA | 6,000 VA | 7,680 VA |
| **Maximum Continuous Current** | 16 A | 21 A | 24 A | 32 A |
| **Breaker (Overcurrent Protection)** | 20 A | 30 A | 30 A | 40 A |
| **Nominal Power Factor** | 1 - 0.9 (leading / lagging | | | |
| **THD (at Nominal Power)** | <5% | | | |

**Electrical Specifications: Input (DC)**

| | |
|---|---|
| **MPPT** | 4 |
| **Input Connectors per MPPT** | 1-2-1-2 |
| **Maximum Input Voltage** | 600 VDC |
| **DC Input Voltage Range** | 60 - 550 VDC |
| **DC MPPT Voltage Range** | 60 - 480 VDC[1] |
| **Maximum Current per MPPT ($I_{mp}$)** | 13 A[2] |
| **Maximum Short Circuit Current per MPPT ($I_{sc}$)** | 17 A[2] |

[1]Maximum current.
[2]Where the DC input current exceeds an MPPT rating, jumpers can be used to allow a single MPPT to intake additional DC current up to 26 A $I_{mp}$ / 34 A $I_{sc}$.

**Performance Specifications**

| | |
|---|---|
| **Peak Efficiency** | 98.6% at 240 V |
| **CEC Efficiency** | 98.0% at 240 V |
| **Allowable DC/AC Ratio** | 1.7 |
| **Customer Interface** | Tesla Mobile App |
| **Internet Connectivity** | Wi-Fi (2.4 GHz, 802.11 b/g/n), Ethernet, Cellular (LTE/4G)[3] |
| **Revenue Grade Meter** | Revenue Accurate (+/- 0.5%) |
| **AC Remote Metering Support** | Wi-Fi (2.4 GHz, 802.11 b/g/n) |
| **Protections** | Integrated arc fault circuit interrupter (AFCI), Rapid Shutdown |
| **Supported Grid Types** | 60 Hz, 240 V Split Phase |
| **Warranty** | 12.5 years |

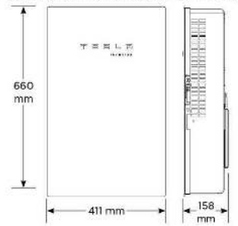
[3]Cellular connectivity subject to network operator service coverage and signal strength.



## Tesla Solar Inverter Technical Specifications

**Mechanical Specifications**

| | |
|---|---|
| **Dimensions** | 660 mm x 411 mm x 158 mm (26 in x 16 in x 6 in) |
| **Weight** | 52 lb[4] |
| **Mounting Options** | Wall mount (bracket) |




[4]Door and bracket can be removed for a mounting weight of 37 lb.

**Environmental Specifications**

| | |
|---|---|
| **Operating Temperature** | -30°C to 45°C (-22°F to 113°F)[5] |
| **Operating Humidity (RH)** | Up to 100%, condensing |
| **Storage Temperature** | -30°C to 70°C (-22°F to 158°F) |
| **Maximum Elevation** | 3000 m (9843 ft) |
| **Environment** | Indoor and outdoor rated |
| **Enclosure Rating** | Type 3R |
| **Ingress Rating** | IP55 (Wiring compartment) |
| **Pollution Rating** | PD2 for power electronics and terminal wiring compartment, PD3 for all other components |
| **Operating Noise @ 1 m** | < 40 db(A) nominal, < 50 db(A) maximum |

[5]Performance may be de-rated to 6.2 kW at 240 V when operating at temperatures greater than 45°C.

**Compliance Information**

| | |
|---|---|
| **Grid Certifications** | UL 1741, UL 1741 SA, UL 1741 SB, UL 1741 PCS, IEEE 1547-2018, IEEE 1547.1 |
| **Safety Certifications** | UL 1741 PVRSS, UL 1699B, UL 1998 (US), UL 3741 |
| **Emissions** | EN 61000-6-3 (Residential), FCC 47CFR15.109 (a) |



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TAMPA FL 33614
LIC #: CVC57085
PHONE: 813-540-8807

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DATE: 02/28/2025

PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE

275 SE FAYE LN,
LAKE CITY, FL 32025

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

# Solar Shutdown Device Technical Specifications

—

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is integral to the rapid shutdown (RSD) function required for rooftop PV systems in accordance with Article 690 of the NEC. When paired with Powerwall 3, solar array shutdown is initiated by an External System Shutdown Switch or the On/Off Enable switch located on Powerwall 3. Systems not subject to rapid shutdown requirements must still install one or more MCIs for functional purposes; see the Powerwall 3 installation manual for details.

## Electrical Specifications

| Model | MCI-1 | MCI-2 | MCI-2 High Current |
|---|---|---|---|
| Nominal Input DC Current Rating ($I_{MP}$) | 13 A | 13 A | 15 A |
| Maximum Input Short Circuit Current ($I_{SC}$) | 19 A | 17 A | 19 A |
| Maximum System Voltage | 600 V DC | 1000 V DC [14] | 1000 V DC [14] |
| Maximum Disconnect Voltage [15] | 600 V DC | 165 V DC | 165 V DC |

[14] Maximum System Voltage is limited by Powerwall to 600 V DC.

[15] Maximum Disconnect Voltage is the maximum voltage allowed across each MCI in the open position (Rapid Shutdown Initiated). An individual MCI-2 has a voltage rating of 165V but in combination (connected in the same string) their voltage ratings are additive.

## RSD Module Performance

| | |
|---|---|
| Maximum Number of Devices per String | 5 |
| Control | Power Line Excitation |
| Passive State | Normally Open |
| Maximum Power Consumption | 7 W |
| Warranty | 25 years |

## Environmental Specifications

| | | |
|---|---|---|
| Operating Temperature | -40°C to 50°C (-40°F to 122°F) | -45°C to 70°C (-49°F to 158°F) |
| Storage Temperature | –30°C to 70°C (–22°F to 158°F) | –30°C to 70°C (–22°F to 158°F) |
| Enclosure Rating | NEMA 4X / IP65 | |

## Mechanical Specifications

| | | |
|---|---|---|
| Electrical Connections | MC4 Connector | |
| Housing | Plastic | |
| Dimensions | 125 x 150 x 22 mm (5 x 6 x 1 in) | 173 x 45 x 22 mm (6.8 x 1.8 x 1 in) |
| Weight | 350 g (0.77 lb) | 120 g (0.26 lb) |
| Mounting Options | ZEP Home Run Clip<br>M4 Screw (#10)<br>M8 Bolt (5/16")<br>Nail / Wood screw | Wire Clip |

## Compliance Information

| | |
|---|---|
| Certifications | UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array) |
| RSD Initiation Method | External System Shutdown Switch or Powerwall 3 Enable Switch |

## UL 3741 PV Hazard Control (and PVRSA) Compatibility

See UL 3741 Application Addendum



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BROOKS REDDING RESIDENCE

275 SE FAYE LN,
LAKE CITY, FL 32025

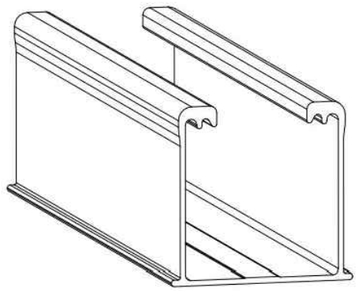
DRAWN BY
ESR

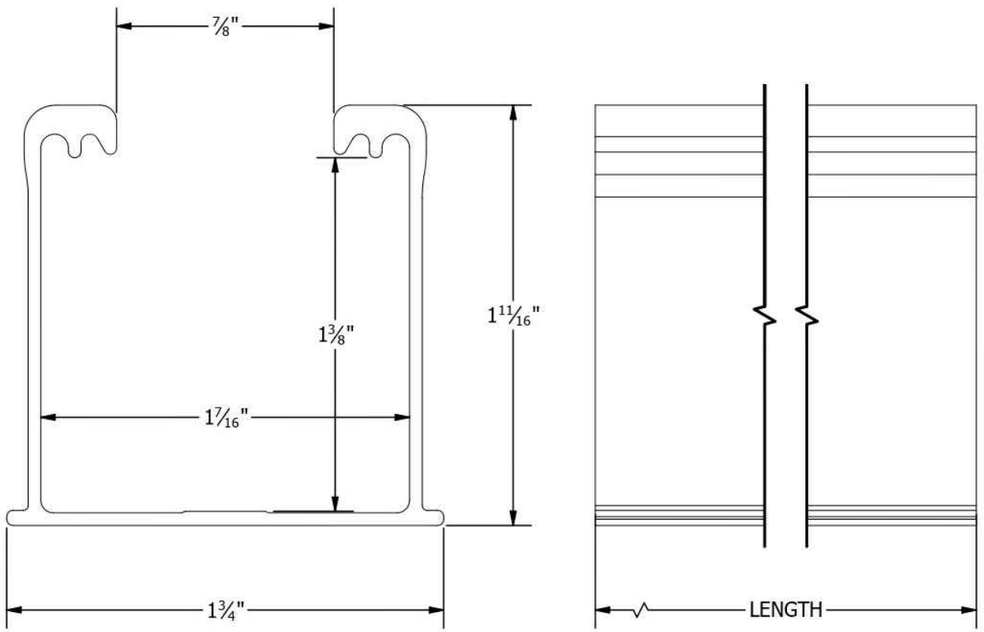
SHEET NAME
EQUIPMENT SPECIFICATION

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

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LAKE CITY, FL 32025

DRAWN BY
ESR

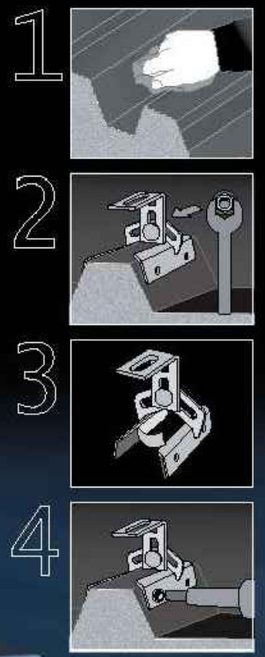
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14

# S-5!®
## The Right Way!

ProteaBracket™



## ProteaBracket™

ProteaBracket™ is the most versatile standing seam metal roof attachment solution on the market, fitting most trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate varying widths and heights. There are no messy sealants to apply and no chance for leaks; the ProteaBracket comes with factory-applied, adhesive rubber sealant to ensure quick installation and a weather-proof fit.

Installation is simple! The ProteaBracket is mounted directly onto the crown of the panel, straddling the profile. No surface preparation is necessary; simply wipe away excess oil and debris, align, and apply. Secure ProteaBracket through its pre-punched holes, using the hardened drill point S-5!® screws.

ProteaBracket is the perfect match for our S-5-PV Kit and spares you the hassle of cold-bridging! For a solar attachment solution that is both economical and easy to use, choose ProteaBracket.*

*When ProteaBracket is used in conjunction with the S-5-PV Kit, an additional nut is required during installation.

**S-5!® ProteaBracket™ is a versatile bracket that adjusts easily to most trapezoidal roof profiles.**

The right way to attach almost anything to metal roofs!

888-825-3432 | www.S-5.com |

S-5!®
The Right Way!

**ProteaBracket™ is the perfect solar attachment solution for most trapezoidal exposed-fastened metal roof profiles! No messy sealants to apply. The factory-applied adhesive rubber sealant weather-proofs and makes installation easy!**

Each **ProteaBracket™** comes with a factory-applied, adhesive rubber sealant on the base. A structural A2 stainless steel bimetal attachment bracket, ProteaBracket is compatible with most common metal roofing materials. All four pre-punched holes must be used to achieve tested strength. Mounting hardware is furnished with the ProteaBracket. For design assistance, ask your distributor, or visit **www.S-5.com** for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications. S-5!® holding strength is unmatched in the industry.

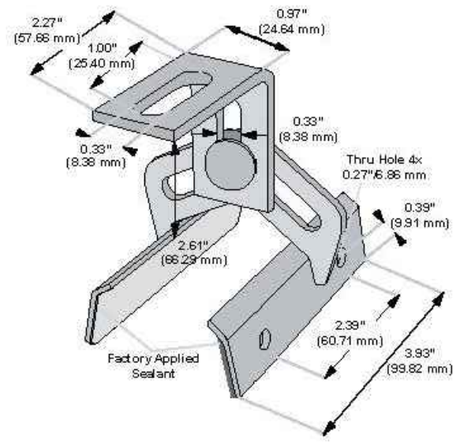
### Multiple Attachment Options:

Side Rail Option

Top Rail Option

S-5-PV Kit Option

## ProteaBracket™




Please note: All measurements are rounded to the second decimal place.

### Example Applications

S-5-PV Kit demonstrated with a ProteaBracket on a trapezoidal profile.

### Example Profile

**S-5!® Warning! Please use this product responsibly!**

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

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S-5! aggressively protects its patents, trademarks, and copyrights. Version 052715.

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PROJECT NAME & ADDRESS

BROOKS REDDING RESIDENCE
275 SE FAYE LN,
LAKE CITY, FL 32025

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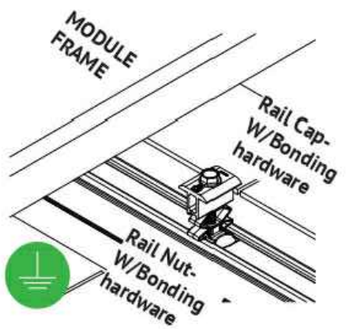
SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

# NXT UMOUNT™ BONDING CONNECTIONS & GROUNDING PATHS

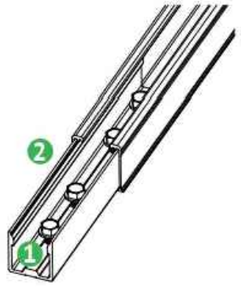
INSTALLATION GUIDE | PAGE 21



## 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.**

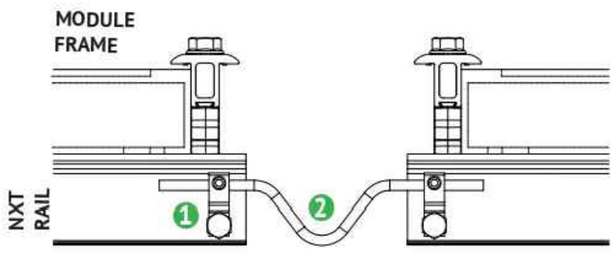



## BONDING RAIL SPLICE

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:**

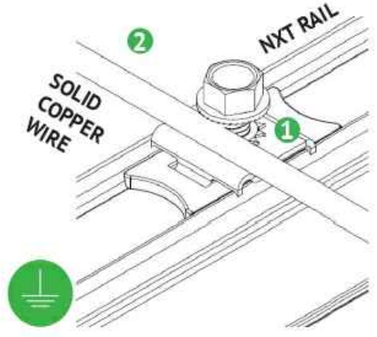
- **See Page 15 for installation details**
- **Splice certified for single-use only**




## 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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SHEET NAME
EQUIPMENT SPECIFICATION

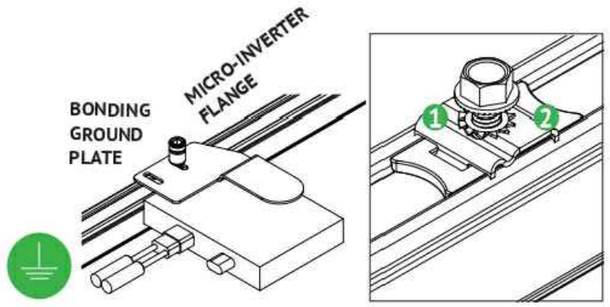
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-16

# NXT UMOUNT® BONDING CONNECTIONS & GROUNDING PATHS

INSTALLATION GUIDE

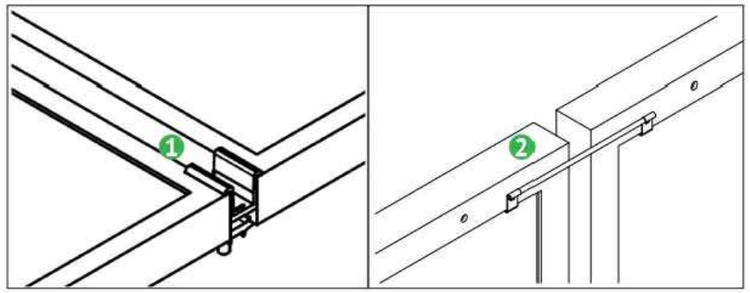





## BONDING MICROINVERTER MOUNT

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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ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

EZ SOLAR
making solar simple.

# JB-3
Specification Sheet
PV Junction Box for Rail or Panel Mount Applications

## A. System Specifications and Ratings

- Maximum Voltage: 1,000 Volts
- Maximum Current: 80 Amps
- Allowable Wire: 14 AWG – 6 AWG
- Maximum Number of Input Circuits: 4
- 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-3: UL1741, CSA C22.2 No. 290
  - Approved wire connectors: must conform to UL1741
- System Marking: **Intertek Symbol and File #5025824**
- 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.

**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 Part #30 | 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) | - | | - | | - | |

Intertek
5025824



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ESR

SHEET NAME
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PV-18