



1011 N Causeway Blvd, Suite 19 ♦ Mandeville, Louisiana 70471 ♦ Phone: 985.624.5001 ♦ Fax: 985.624.5303

Friday, February 17, 2023

Property Owner: Joclene Rivera

Property Address: 1025 NW Eadie St, Lake City, FL 32055

**RE: Photovoltaic System Roof Installations**

I have reviewed the existing structure referenced above to determine the adequacy of the existing structure support the proposed installation of an array of solar panels on the roof.

Based on my review, the existing structure meets or exceeds applicable codes listed below to support the proposed solar panel installation. This assessment is based on recent on-site inspection by solar inspectors and photographs of the existing structure. The photovoltaic system is designed to withstand uplift and downward forces; our assessment is regarding the structure's support of the array. Stresses induced by the introduction of individual mount loads on the rafters or truss top chord are within acceptable limits as shown on the attached calculations. The structural considerations used in our review and assessment include the following:

**Evaluation Criteria:**

Applied Codes: ASCE 7-16 FBC 2020 NEC 2017

Risk Category: II

Design Wind Speed (3-second gust): 118 mph

Wind Exposure Category: B

Ground Snow Load: 0 PSF

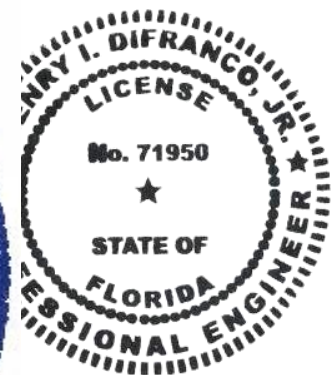
Seismic Design Category: D

**Existing Structure:**

Roof Material: Metal

Roof Structure: 2x4 Truss Top Chord

Roof Slope: 3/12



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FLORIDA FIRM NO. 30649

**PRINCIPAL Infrastructure®**

Architecture ♦ Engineering ♦ Construction

www.pi-aec.com ♦ info@pi-aec.com

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**Effect of the Solar Array on Structure Loading:**

**Gravity Load:**

Per IBC Section 1607, the areas of the roof where solar panels are located are considered inaccessible, and therefore not subject to roof live loading. Live load in these areas is replaced by the dead load of the solar array, 3 psf. The total gravity load on the structure is therefore reduced and the structure may remain unaltered. Connections of the mounts to the underlying structure are to be installed in a staggered pattern, except at the array ends, to distribute the loading evenly to the roof structure. The stresses within the rafters or truss top chord due to the introduction of discrete mount loads are within acceptable limits, as shown on the attached calculations.

**Wind Load:**

The solar panel array will be flush mounted (no more than 6" above the surrounding roof surface, and parallel to the roof surface. Any additional wind loading on the structure due to the presence of the array is negligible. The array structure is designed by the manufacturer to withstand uplift and downward forces resulting from wind and snow loads. The attached calculations verify the capacity of the connection of the solar array to the roof to resist uplift due to wind loads, the governing load case.

**Snow Load:**

The reduced friction of the glass surface of the solar panels allows for the lower slope factor (Cs) per Section 7.4 of ASCE 7.16 resulting in a reduced design snow load for the structure. This analysis conservatively considered the snow load to be unchanged.

**Seismic Load:**

Analysis shows that additional seismic loads due to the array installation will be small. Even conservatively neglecting the wall materials, the solar panel installation represents an increase in the total weight of the roof and corresponding seismic load of less than 10%. This magnitude of additional forces meets the requirements of the exception in Section 11B.4 of ASCE 7-16. The existing lateral force resisting system of the structure is therefore allowed to remain unaltered.



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Conclusion:

To the best of my professional knowledge and belief, the subject construction and photovoltaic system installation will be in compliance with all state and local building codes and guidelines in effect at the time of our review.

Limitations:

Engineer's assessment of the existing structure is based on recent field reports and current photographs of the elements of the structure that were readily accessible at the time of inspection. The design of the solar panel racking (mounts, rails, connectors, etc.), connections between the racking and panels, and electrical construction related to the installation are the responsibility of others. The photovoltaic system installation must be by competent personnel in accordance with manufacturer recommendations and specifications and should meet or exceed industry standards for quality. The contractor is responsible for ensuring that the solar array is installed according to the approved plans and must notify the engineer of any undocumented damage or deterioration of the structure, or of discrepancies between the conditions depicted in the approved plans and those discovered on site so that the project may be reevaluated and altered as required. Engineer does not assume any responsibility for improper installation of the proposed photovoltaic system.



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**Uplift and Wind Downforce Calculation Summary (ASCE 7-16)**  
**Mount, Rack, & Panel Proportioning**  
**Point Load Check and Rafter Stress Analysis**

|                  |                     |                                  |            |           |
|------------------|---------------------|----------------------------------|------------|-----------|
| Property Owner:  | Joclene Rivera      | Max. Individual Panel Dimensions |            |           |
| Project Address: | 1025 NW Eadie St    | Length (in)                      | Width (in) | Area (sf) |
| City, State:     | Lake City, FL 32055 | 57.6                             | 41.1       | 16.44     |

| Building Characteristics, Design Input, and Adjustment Factors |                      |                             |                             |    |
|----------------------------------------------------------------|----------------------|-----------------------------|-----------------------------|----|
| Roof Dimensions:                                               | Length:              | 63                          | Greater Dimension           | 63 |
|                                                                | Width:               | 52                          | Least Dimension:            | 52 |
| Roof Height (h):                                               |                      | 15                          | Fig 30.4-1, valid under 60' | ✓  |
| Pitch:                                                         | <div>3 on 12 =</div> | 14.0°                       | Must be less than 45°       | ✓  |
| Roof Configuration                                             | Gable                |                             |                             |    |
| Roof Structure                                                 | 2x4 Truss Top Chord  |                             |                             |    |
| Roof Material                                                  | Plywood              |                             |                             |    |
| Risk Category:                                                 | II                   |                             |                             |    |
| Basic Wind Speed:                                              | 118                  | From 26.5-1                 |                             |    |
| Exposure Category:                                             | B                    | Fig. 26.7                   |                             |    |
| Topographic Factor ( $K_{zt}$ )                                | 0.82                 | Fig. 26.8-1                 |                             |    |
| Wind Pressure @ h=30, $p_{net30}$                              | See Table Below      |                             | Fig. 30.4-1                 |    |
| Ht. & Exposure Adjustment ( $\lambda$ )                        | 0.82                 | Fig. 30.4-1                 |                             |    |
| Adjusted Wind Pressures, $p_{net}$                             | See Table Below      |                             | Eq. 30.4-1                  |    |
| Effective Wind Area (sf):                                      | 8.22                 | (Area per individual mount) |                             |    |
| Roof Zone Strip (a), in ft, Fig. 30.4-1, Note 5                |                      |                             |                             |    |
| 1 - Least Roof Horizontal Dimension (L or W) x 0.10            |                      |                             | 5.2                         |    |
| 2 - Roof Height x 0.4                                          |                      |                             | 6                           |    |
| 3 - Least Roof Horizontal Dimension (L or W) x 0.04            |                      |                             | 2.08                        |    |
| 4 - Least of (1) and (2)                                       |                      |                             | 5.2                         |    |
| 5 - Greater of (3) and (4)                                     |                      |                             | 5.2                         |    |
| 6 - Greater of (5) and 3 feet                                  |                      |                             | 5.2                         |    |
|                                                                |                      |                             | a=                          |    |



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| Net Design Pressures, $p_{net}$ (Fig 30.4-1), Components & Cladding |               |             |                    |                                        |                                  |
|---------------------------------------------------------------------|---------------|-------------|--------------------|----------------------------------------|----------------------------------|
|                                                                     | Uplift (-psf) |             |                    | Factored Pressure<br>(0.6W, ASCE 7-16) | $\theta$                         |
|                                                                     |               | $P_{30net}$ | $IK_{zt}P_{30net}$ |                                        |                                  |
| gable /hip<br>/flat                                                 |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
| Gable                                                               | Zone 1 & 2e   | 44.7        | 30.0               | 18.0                                   | $7^\circ < \theta \leq 20^\circ$ |
|                                                                     | Zone 2n,2r,3e | 65.2        | 43.8               | 26.3                                   |                                  |
|                                                                     | Zone 3r       | 77.5        | 52.1               | 31.3                                   |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
| Hip                                                                 |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
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|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |
|                                                                     |               |             |                    |                                        |                                  |



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| Snow Load                          |          |                    |
|------------------------------------|----------|--------------------|
| Ground Snow Load, $p_g$            | 0.0      | From ASCE 7 or AHJ |
| Terrain Category:                  | B        | Para 6.5.6.3       |
| Exposure                           | Partial  |                    |
| Exposure Factor $C_e$              | 1.0      | Table 7-2          |
| Thermal Factor, $C_t$              | 1.2      | Table 7-3          |
| Importance Factor, $I_s$           | 1.0      | Table 1.5.2        |
| Roof Configuration                 | Gable    |                    |
| Roof Slope                         | 14.0°    |                    |
| Distance from Eave to Ridge        | 26.0     |                    |
| $p_m$ , Minimum required Snow Load | 0.00 psf | Para. 7.3.4        |
| $p_f$ , Calculated Snow Load       | 0.00     | Eq. 7.3-1          |
| $p_f$ , Design Snow Load           | 0.00 psf |                    |

| Rail & Mount Selection |                               |                                                                                                                                                                                                                                                                                                   |
|------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manufacturer:          | S5!                           | Allowable Mount Spacing by Uplift Pressure                                                                                                                                                                                                                                                        |
| Model:                 | Solar Foot                    | $< 39$ psf : 2 rails, mounts @ 4 ft. o.c.<br>$39$ to $58$ psf : 2 rails, mounts @ 2 ft. o.c.<br>$58$ to $78$ psf : 3 rails, mounts @ 4 ft. o.c.<br>$78$ to $116$ psf : 3 rails, mounts @ 2 ft. o.c.<br>$116$ to $155$ psf : 4 rails, mounts @ 2 ft. o.c.<br>$> 155$ psf : Mount capacity exceeded |
| Substrate              | Corrugated Panel              |                                                                                                                                                                                                                                                                                                   |
| Connector:             | (4) 1/4-14 SD Screws 3/8" HWH |                                                                                                                                                                                                                                                                                                   |
| Allowable Uplift:      | 372 lb., max.                 |                                                                                                                                                                                                                                                                                                   |
|                        |                               |                                                                                                                                                                                                                                                                                                   |

| Rail & Mount Layout by Zone                                                                                                |                                       |  |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--|
| Zone 1: 2 rails, mounts @ 4 ft. o.c.                                                                                       | Zone 2r: 2 rails, mounts @ 4 ft. o.c. |  |
| Zone 1': N/A                                                                                                               | Zone 3: N/A                           |  |
| Zone 2: N/A                                                                                                                | Zone 3e: 2 rails, mounts @ 4 ft. o.c. |  |
| Zone 2e: 2 rails, mounts @ 4 ft. o.c.                                                                                      | Zone 3r: 2 rails, mounts @ 4 ft. o.c. |  |
| Zone 2n: 2 rails, mounts @ 4 ft. o.c.                                                                                      |                                       |  |
| (From rail analysis, allowable spacing and number of rails are controlled by individual mount pullout before rail bending) |                                       |  |



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# PHOTOVOLTAIC ROOF MOUNT SYSTEM

21 MODULES-ROOF MOUNTED - 8.295 KW DC STC, 7.751 KW DC PTC, 6.090 KW AC

1025 NW EADIE ST, LAKE CITY, FL 32055



22171 MCH RD  
MANDEVILLE, LA 70471  
PHONE: 9152011490

## PROJECT DATA

PROJECT ADDRESS: 1025 NW EADIE ST, LAKE CITY, FL 32055

OWNER: JOCLENE RIVERA

CONTRACTOR: ADT SOLAR LLC  
PHONE: (985) 238-0864

DESIGNER: ESR

SCOPE: 8.295 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH 21 CANADIAN SOLAR CS3N-395MS 395W PV MODULES WITH 21 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS

AUTHORITIES HAVING JURISDICTION:  
BUILDING: LAKE CITY, CITY OF (FL)  
ZONING: LAKE CITY, CITY OF (FL)  
UTILITY: FLORIDA POWER & LIGHT CO. - FPL (FL)

## SHEET INDEX

|        |                          |
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| PV-1   | COVER SHEET              |
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| PV-3   | ROOF PLAN & MODULES      |
| PV-4   | ELECTRICAL PLAN          |
| PV-5   | STRUCTURAL DETAIL        |
| PV-6   | ELECTRICAL LINE DIAGRAM  |
| PV-7   | WIRING CALCULATIONS      |
| PV-8   | LABELS                   |
| PV-9   | PLACARD                  |
| PV-10  | JHA FORM                 |
| PV-11  | MICRO INVERTER CHART     |
| PV-12+ | EQUIPMENT SPECIFICATIONS |

## GENERAL NOTES

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

## VICINITY MAP



## HOUSE PHOTO



## CODE REFERENCES

PROJECT TO COMPLY WITH THE FOLLOWING:

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

| REVISIONS      |            |     |
|----------------|------------|-----|
| DESCRIPTION    | DATE       | REV |
| INITIAL DESIGN | 02/17/2023 |     |
|                |            |     |



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### PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
COVER SHEET

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-1

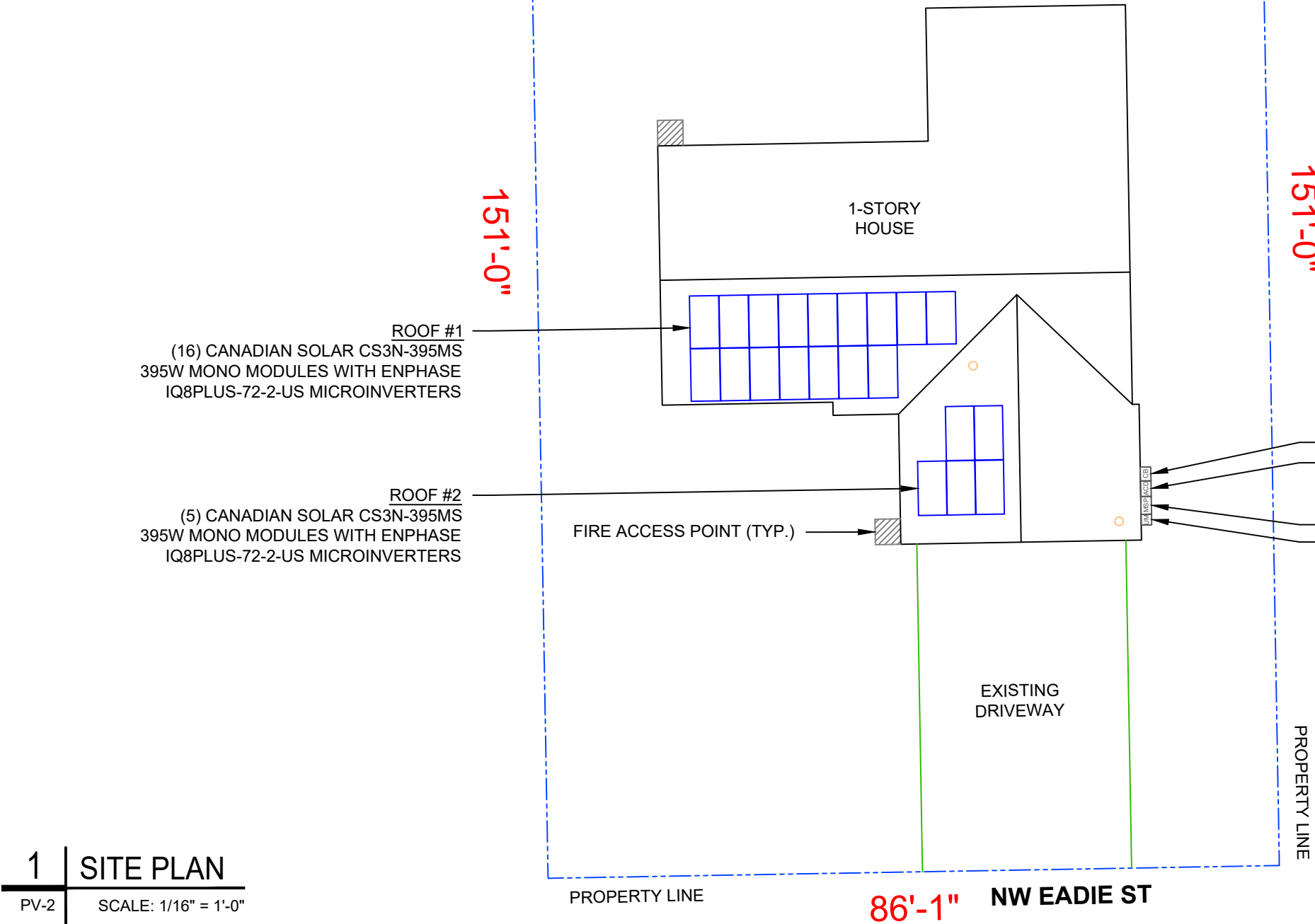
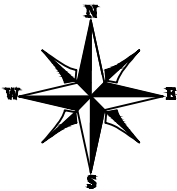
PROJECT DESCRIPTION:

21 X CANADIAN SOLAR CS3N-395MS 395W PV MODULES  
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
DC SYSTEM SIZE: 21 x 395 = 8.295KW DC  
AC SYSTEM SIZE: 21 x 290 = 6.090KW AC

EQUIPMENT SUMMARY  
21 CANADIAN SOLAR CS3N-395MS 395W MONO MODULES  
21 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS

ROOF ARRAY AREA #1:- 350.56 SQ FT.  
ROOF ARRAY AREA #2:- 109.55 SQ FT.

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

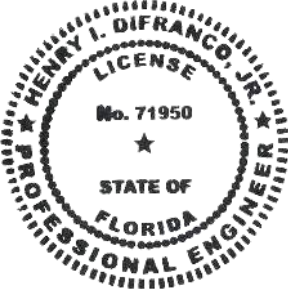


DESIGN SPECIFICATION  
OCCUPANCY: II  
CONSTRUCTION: SINGLE-FAMILY  
ZONING: RESIDENTIAL  
GROUND SNOW LOAD: REFER STRUCTURAL LETTER  
WIND EXPOSURE: REFER STRUCTURAL LETTER  
WIND SPEED: REFER STRUCTURAL LETTER



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PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE  
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
SITE PLAN

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-2

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 21 MODULES  
MODULE TYPE = CANADIAN SOLAR CS3N-395MS 395W MONO MODULES  
MODULE WEIGHT = 51.6 LBS / 23.4KG.  
MODULE DIMENSIONS = 76.4" x 41.3" = 21.91 SF



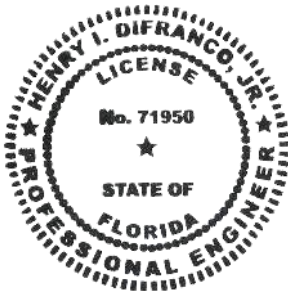
| ROOF DESCRIPTION |            |         |            |               |
|------------------|------------|---------|------------|---------------|
| ROOF TYPE        |            |         | METAL ROOF |               |
| ROOF             | ROOF PITCH | AZIMUTH | TRUSS SIZE | TRUSS SPACING |
| #1               | 14°        | 179°    | 2X4        | 24"           |
| #2               | 14°        | 269°    | 2X4        | 24"           |

| ARRAY AREA & ROOF AREA CALC'S |                            |                           |                                |
|-------------------------------|----------------------------|---------------------------|--------------------------------|
| TOTAL # OF MODULES            | TOTAL ARRAY AREA (Sq. Ft.) | TOTAL ROOF AREA (Sq. Ft.) | ROOF AREA COVERED BY ARRAY (%) |
| 21                            | 460.11                     | 2547.45                   | 18                             |



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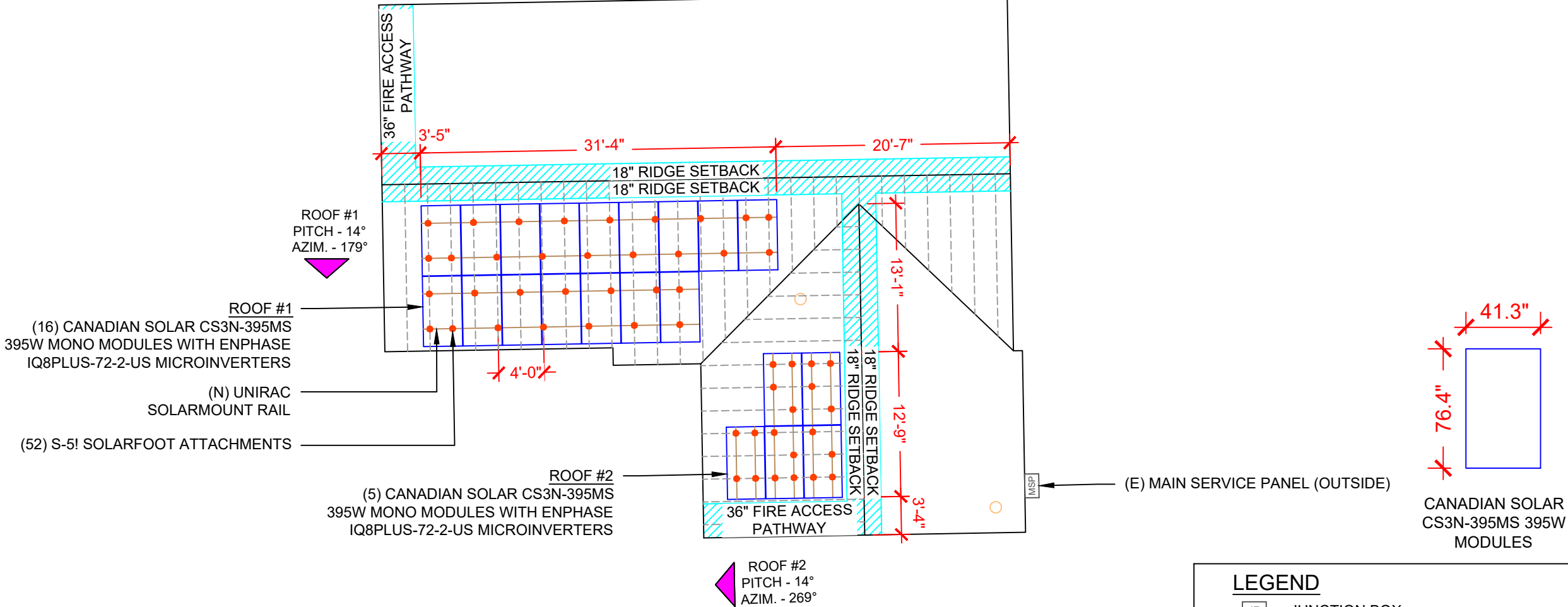
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SHEET NAME  
ROOF PLAN &  
MODULES

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-3



LEGEND

- JB - JUNCTION BOX
- SD - SOLADECK
- INV - INVERTER
- CB - COMBINER BOX
- ACD - AC DISCONNECT
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- - - TRUSS
- - - CONDUIT

1 ROOF PLAN & MODULES

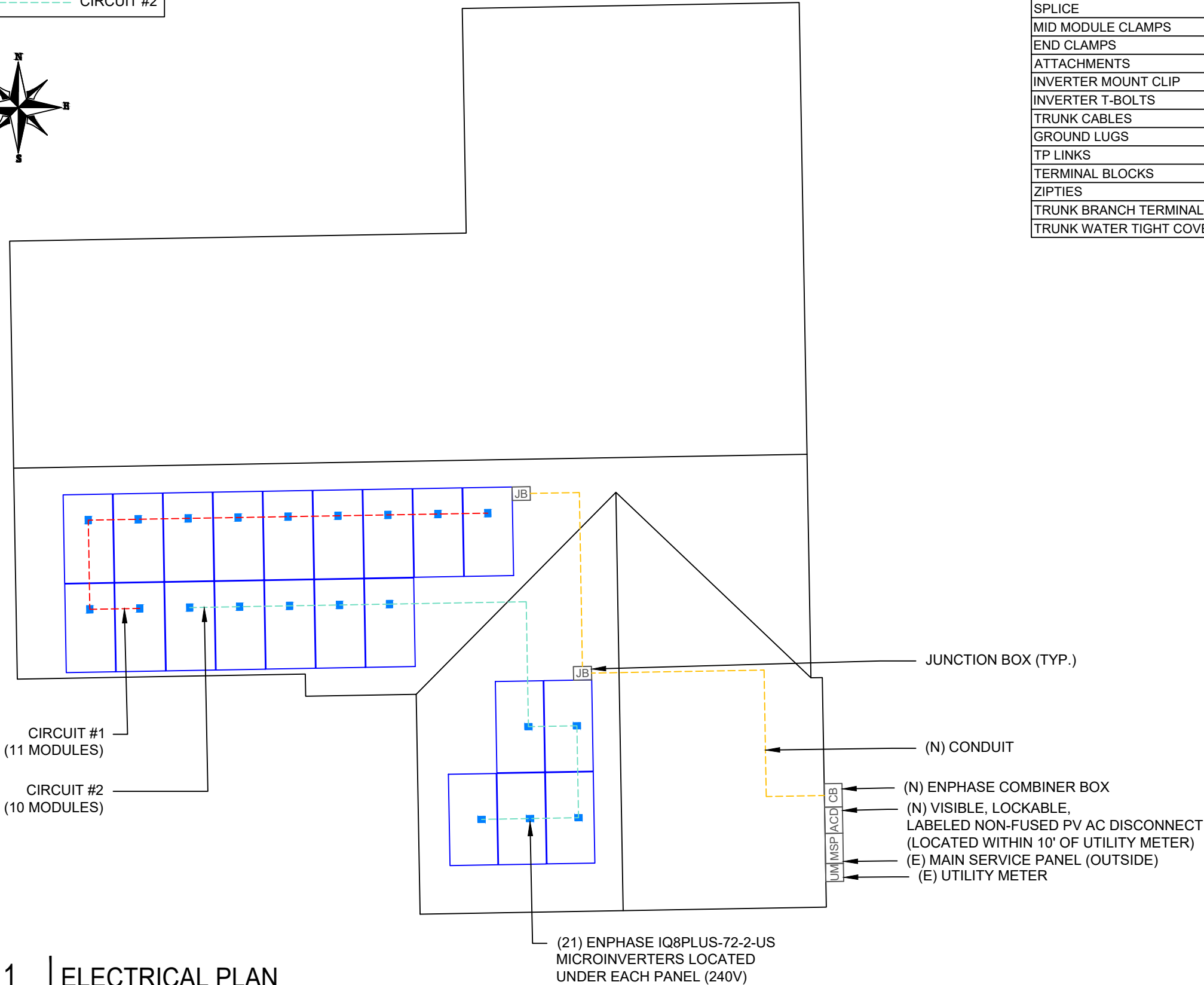
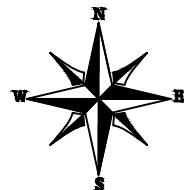
PV-3

SCALE: 3/32" = 1'-0"

DC SYSTEM SIZE: 21 x 395 = 8.295KW DC  
AC SYSTEM SIZE: 21 x 290 = 6.090KW AC  
(21) CANADIAN SOLAR CS3N-395MS 395W MONO MODULES  
WITH (21) ENPHASE IQ8PLUS-72-2-US MICROINVERTERS  
LOCATED UNDER EACH PANEL (240V)

CIRCUIT LEGENDS

CIRCUIT #1

CIRCUIT #2

| BILL OF MATERIALS       |     |                                                               |
|-------------------------|-----|---------------------------------------------------------------|
| EQUIPMENT               | QTY | DESCRIPTION                                                   |
| SOLAR PV MODULES        | 21  | CANADIAN SOLAR CS3N-395MS 395W MODULES                        |
| MICRO INVERTERS         | 21  | ENPHASE IQ8PLUS-72-2-US MICROINVERTERS                        |
| JUNCTION BOXES          | 2   | 6"X6"X4" UL LISTED, STEEL WATER TIGHT NEMA TYPE 3R, UL LISTED |
| RAIL                    | 13  | UNIRAC SM STANDARD RAIL, 168" SILVER                          |
| SPLICE                  | 6   | SPLICE KIT                                                    |
| MID MODULE CLAMPS       | 32  | MID MODULE CLAMPS                                             |
| END CLAMPS              | 20  | END CLAMPS / STOPPER SLEEVE                                   |
| ATTACHMENTS             | 52  | S-5! SOLARFOOT ATTACHMENT                                     |
| INVERTER MOUNT CLIP     | 21  | INVERTER MOUNT CLIP                                           |
| INVERTER T-BOLTS        | 21  | INVERTER T-BOLTS                                              |
| TRUNK CABLES            | 25  | TRUNK CABLES                                                  |
| GROUND LUGS             | 2   | GROUND LUGS                                                   |
| TP LINKS                | 1   | TP LINKS                                                      |
| TERMINAL BLOCKS         | 10  | TERMINAL BLOCKS                                               |
| ZIPTIES                 | 100 | ZIPTIES                                                       |
| TRUNK BRANCH TERMINAL   | 6   | TRUNK BRANCH TERMINAL                                         |
| TRUNK WATER TIGHT COVER | 6   | TRUNK WATER TIGHT COVER                                       |

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INFO@PI-AEC.COM  
FLORIDA FIRM NO. 30649

PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME

ELECTRICAL PLAN

SHEET SIZE

ANSI B  
11" X 17"

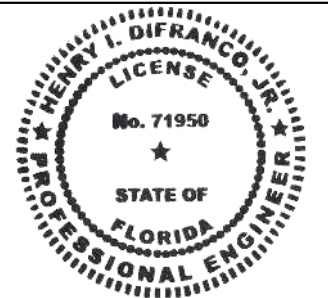
SHEET NUMBER

PV-4



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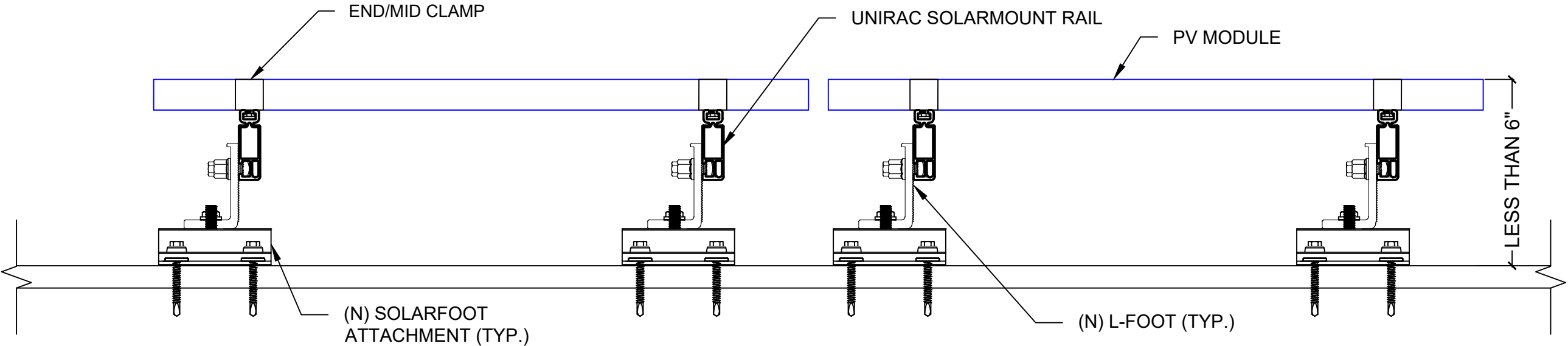
PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE  
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
STRUCTURAL DETAIL

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-5



STRUCTURAL ATTACHMENT (SIDE VIEW)

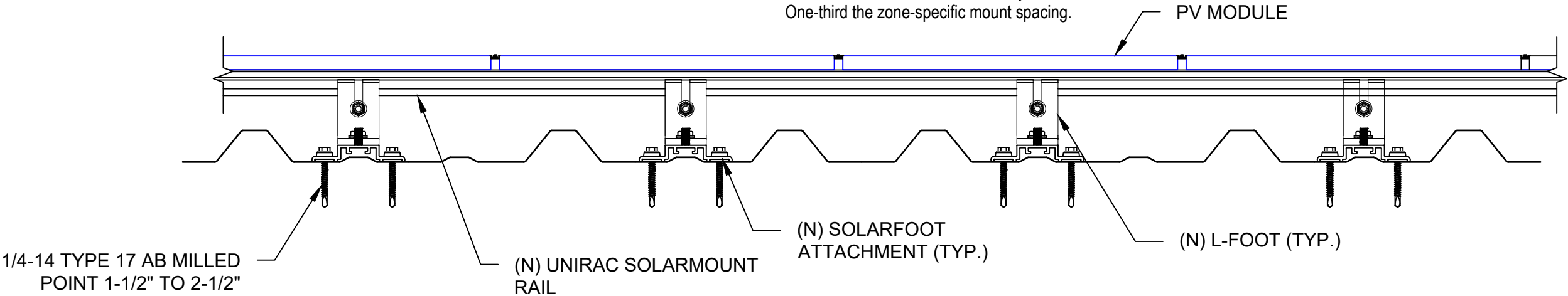
PV-5 SCALE: N.T.S

- Note 1: Windspeed value is design 3-sec gust in accordance with ASCE 7-16
- Note 2: a) Metal roof brackets require additional screws into purlins and deck  
b) Do not install SolarFoot brackets into OSB deck without separate written instructions from Engineer  
c) Installers must verify metal panels are 26 gauge or thicker before use of S-5! SolarFoot (CCD)

Note 3: These drawings were prepared under my supervision. I have researched the code and to the best of my knowledge And belief, these drawings comply with the 2020 Florida Building Code.

Note 4: Installer shall adjust mount spacing by zone to match prescribed values on engineer's calculation letter

Note 5: Maximum rail cantilever distance beyond outermost mount is One-third the zone-specific mount spacing.



ATTACHMENT DETAIL (FRONT VIEW)

PV-5 SCALE: N.T.S

DC SYSTEM SIZE: 21 x 395 = 8.295KW DC  
AC SYSTEM SIZE: 21 x 290 = 6.090KW AC

(21) CANADIAN SOLAR CS3N-395MS 395W MONO MODULES  
WITH (21) ENPHASE IQ8PLUS-72-2-US MICROINVERTERS  
LOCATED UNDER EACH PANEL (240V)  
(1) BRANCH CIRCUIT OF 11 MODULES AND  
(1) BRANCH CIRCUIT OF 10 MODULES CONNECTED IN PARALLEL

**BACKFEED BREAKER CALCULATION (120% RULE):**  
(MAIN BUSS X 1.2 - MAIN BREAKER) >= (INVERTER CURRENT\*1.25)  
(200A X 1.2 - 200A) >= (31.763A)  
(40A) >= (31.763A) HENCE OK

**OCPD CALCULATIONS:**  
NEC 690.9(B)  
(21 IQ8 PLUS) \* 1.21A \* 1.25  
=31.763A

**INTERCONNECTION NOTES:**

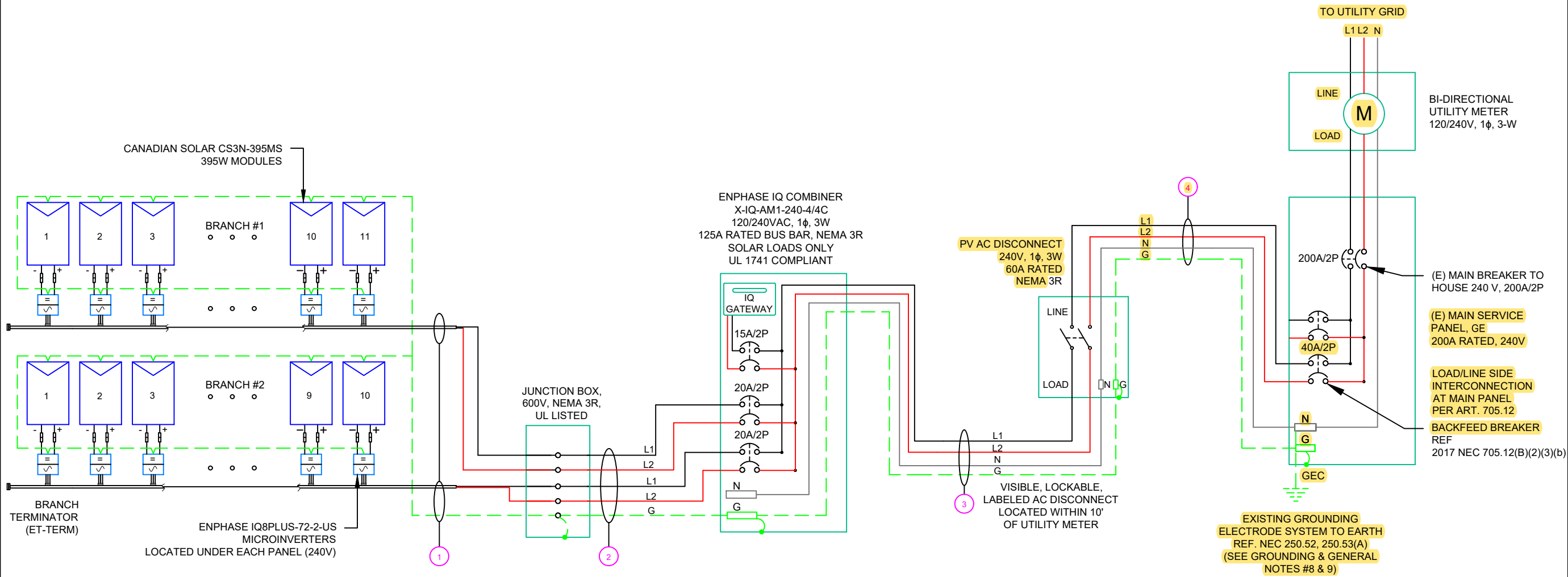
1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE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

**DISCONNECT NOTES:**

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

**GROUNDING & GENERAL NOTES:**

1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. 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.
8. VERIFY UFER/EXISTING ROD OR ADD TWO GROUNDING RODS(5/8" X 8' EMBEDMENT) SPACED 6 FEET MINIMUM APART.(RECOMMENDED MINIMUM SPACING SHALL BE THE LENGTH OF THE GROUND ROD USED.)
9. BOND COLD WATER AND GAS LINES(IF PRESENT) TO GROUNDING ELECTRODE CONDUCTOR



**(GN) GENERAL NOTES :**

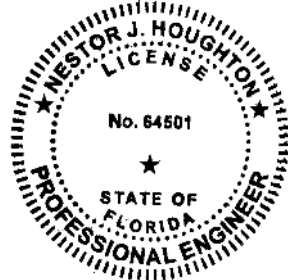
1. CONDUIT TO BE UL LISTED FOR WET LOCATION AND UV PROTECTED (EX. -EMT, SCH 80 PVC OR RMC).
2. FMC MAYBE USED IN INDOOR APPLICATIONS WHERE PERMITTED BY NEC ART. 348

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



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FLORIDA FIRM NO. 30649

PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE  
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
ELECTRICAL LINE DIAGRAM

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-6

| INVERTER SPECIFICATIONS   |                                        |
|---------------------------|----------------------------------------|
| MANUFACTURER / MODEL #    | ENPHASE IQ8PLUS-72-2-US MICROINVERTERS |
| MIN/MAX DC VOLT RATING    | 30V MIN/ 58V MAX                       |
| MAX INPUT POWER           | 235W-440W                              |
| NOMINAL AC VOLTAGE RATING | 240V/ 211-264V                         |
| MAX AC CURRENT            | 1.21A                                  |
| MAX MODULES PER CIRCUIT   | 13 (SINGLE PHASE)                      |
| MAX OUTPUT POWER          | 290 VA                                 |

| SOLAR MODULE SPECIFICATIONS |                                       |
|-----------------------------|---------------------------------------|
| MANUFACTURER / MODEL #      | CANADIAN SOLAR CS3N-395MS 395W MODULE |
| VMP                         | 37V                                   |
| IMP                         | 10.68A                                |
| VOC                         | 44.3V                                 |
| ISC                         | 11.44A                                |
| TEMP. COEFF. VOC            | -0.26%/°C                             |
| MODULE DIMENSION            | 76.4"L x 41.3"W x 1.38"D (In Inch)    |

| AMBIENT TEMPERATURE SPECS             |           |
|---------------------------------------|-----------|
| RECORD LOW TEMP                       | -5°C      |
| AMBIENT TEMP (HIGH TEMP 2%)           | 36°C      |
| MODULE TEMPERATURE COEFFICIENT OF Voc | -0.26%/°C |

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

| AC CALCULATIONS        |                     |             |                          |              |               |              |                    |                |                   |                   |                    |                                |                   |                                                             |                                                                |                           |                   |                      |                                |                         |              |                  |
|------------------------|---------------------|-------------|--------------------------|--------------|---------------|--------------|--------------------|----------------|-------------------|-------------------|--------------------|--------------------------------|-------------------|-------------------------------------------------------------|----------------------------------------------------------------|---------------------------|-------------------|----------------------|--------------------------------|-------------------------|--------------|------------------|
| CIRCUIT ORIGIN         | CIRCUIT DESTINATION | VOLTAGE (V) | FULL LOAD AMPS "FLA" (A) | FLA*1.25 (A) | OCPD SIZE (A) | NEUTRAL SIZE | GROUND SIZE        | CONDUCTOR SIZE | 75°C AMPACITY (A) | AMPACITY CHECK #1 | AMBIENT TEMP. (°C) | TOTAL CC CONDUCTORS IN RACEWAY | 90°C AMPACITY (A) | DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a) | DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a) | 90°C AMPACITY DERATED (A) | AMPACITY CHECK #2 | FEEDER LENGTH (FEET) | CONDUCTOR RESISTANCE (OHM/KFT) | VOLTAGE DROP AT FLA (%) | CONDUIT SIZE | CONDUIT FILL (%) |
| CIRCUIT 1              | JUNCTION BOX        | 240         | 13.31                    | 16.6375      | 20            | N/A          | BARE COPPER #6 AWG | CU #12 AWG     | 25                | PASS              | 36                 | 2                              | 30                | 0.91                                                        | 1                                                              | 27.3                      | PASS              |                      |                                | 0.55                    | N/A          | #N/A             |
| CIRCUIT 2              | JUNCTION BOX        | 240         | 12.1                     | 15.125       | 20            | N/A          | BARE COPPER #5 AWG | CU #12 AWG     | 25                | PASS              | 36                 | 2                              | 30                | 0.91                                                        | 1                                                              | 27.3                      | PASS              |                      |                                | 0.32                    | N/A          | #N/A             |
| JUNCTION BOX           | COMBINER PANEL      | 240         | 13.31                    | 16.6375      | 20            | N/A          | CU #12 AWG         | CU #12 AWG     | 25                | PASS              | 36                 | 4                              | 30                | 0.91                                                        | 0.8                                                            | 21.84                     | PASS              | 20                   | 1.98                           | 0.439                   | 1" PVC       | 7.992768         |
| COMBINER PANEL         | AC DISCONNECT       | 240         | 25.41                    | 31.7625      | 40            | CU #8 AWG    | CU #10 AWG         | CU #8 AWG      | 65                | PASS              | 36                 | 2                              | 75                | 0.91                                                        | 1                                                              | 68.25                     | PASS              | 5                    | 0.491                          | 0.052                   | 1" PVC       | 20.81731         |
| AC DISCONNECT          | PJ                  | 240         | 25.41                    | 31.7625      | 40            | CU #6 AWG    | CU #10 AWG         | CU #6 AWG      | 65                | PASS              | 36                 | 2                              | 75                | 0.91                                                        | 1                                                              | 68.25                     | PASS              | 5                    | 0.491                          | 0.052                   | 1" PVC       | 20.81731         |
| Circuit 1 Voltage Drop |                     |             |                          |              |               |              |                    |                |                   |                   |                    |                                |                   |                                                             |                                                                |                           |                   |                      | 1.093                          |                         |              |                  |
| Circuit 2 Voltage Drop |                     |             |                          |              |               |              |                    |                |                   |                   |                    |                                |                   |                                                             |                                                                |                           |                   |                      | 0.863                          |                         |              |                  |

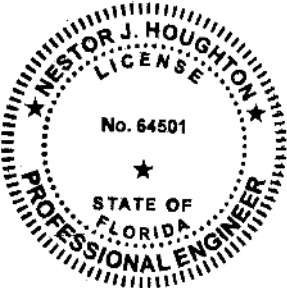
ELECTRICAL NOTES

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
3. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
4. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6. WHERE SIZES OF SOLADECK, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
10. TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.



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PROJECT NAME & ADDRESS

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RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

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

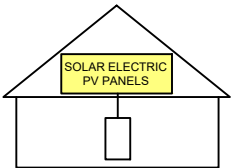
⚠ WARNING

**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)

**P H O T O V O L T A I C**

**A C D I S C O N N E C T**

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 **25.41 A**

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

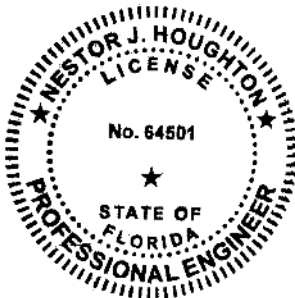
**MAIN PHOTOVOLTAIC  
SYSTEM DISCONNECT**

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



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SHEET NAME

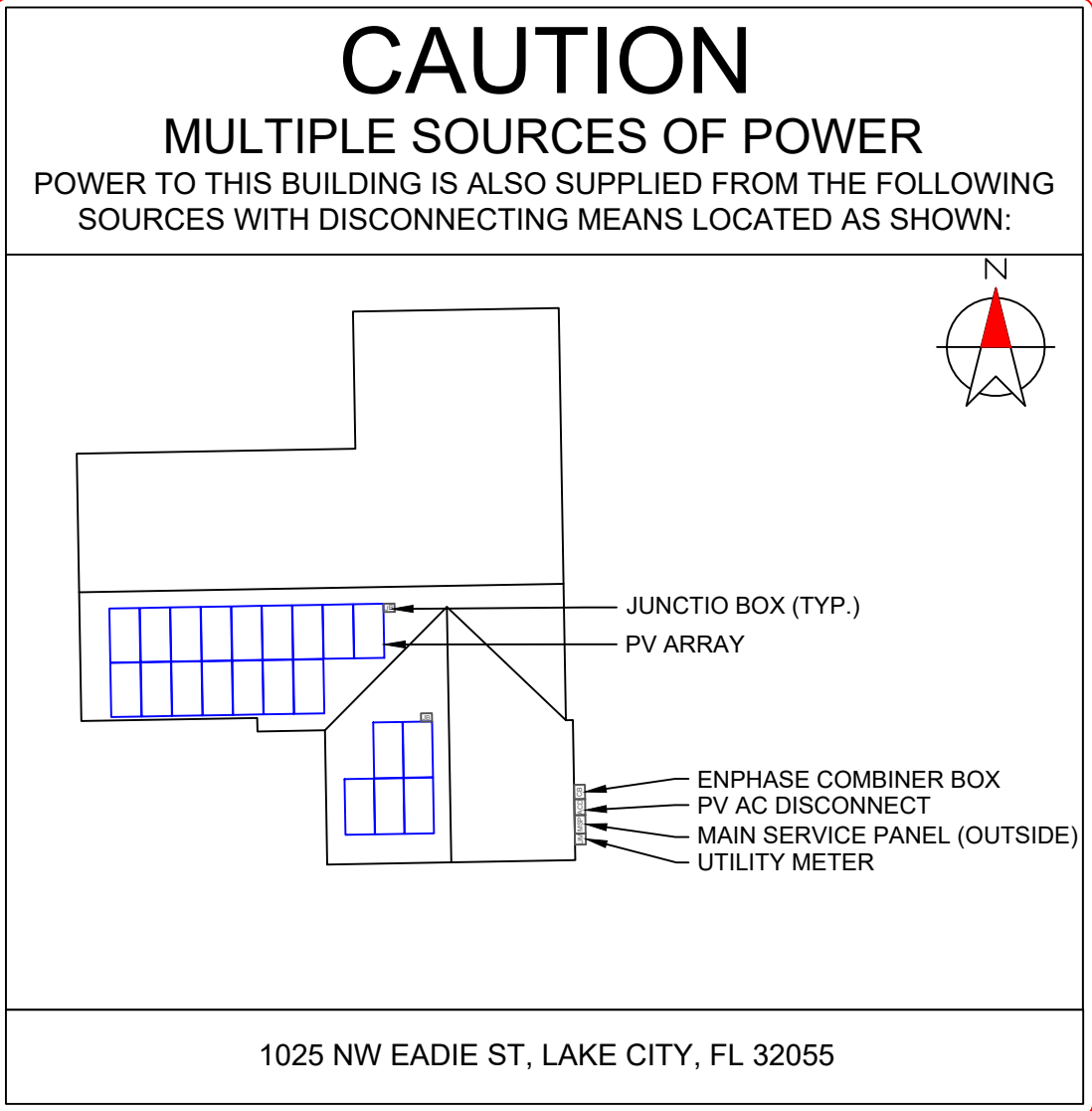
**LABELS**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-8**



DIRECTORY  
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

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

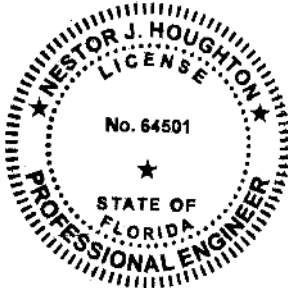
LABELING NOTES:

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]



22171 MCH RD  
MANDEVILLE, LA 70471  
PHONE: 9152011490

| REVISIONS      |            |     |
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| DESCRIPTION    | DATE       | REV |
| INITIAL DESIGN | 02/17/2023 |     |
|                |            |     |



This item has been digitally signed and sealed by Nestor J. Houghton, P.E. on February 17, 2023  
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

PRINCIPAL ENGINEERING, INC.  
1011 N. CAUSEWAY BLVD. STE 19  
MANDEVILLE, LA 70471  
985.624.5001  
INFO@PI-AEC.COM  
FLORIDA FIRM NO. 30649

PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE  
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
PLACARD

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER  
PV-9



- (H) - INSPECT ENTIRE JOBSITE FOR HAZARDS

(SV) - DRAW SUNPRO VEHICLE LOCATION ON PLANS

(HHZ) - DRAW HARD HAT ZONE AROUND HOUSE

(X) - DRAW FALL PROTECTION ANCHOR LOCATIONS
- (L) - DRAW LADDER & ROOF ACCESS POINTS

(EH) - DRAW ELECTRICAL HAZARD AREAS

(W/TH) - DRAW WATER & TRIP HAZARD LOCATIONS

SKY LIGHT: YES | NO IF SO, HOW MANY: \_\_\_\_\_

SERVICE LINE ENTRANCE: OVERHEAD | UNDERGROUND  
\*IF OVERHEAD, DRAW POWERLINE ON PLAN SET AND PROVIDE  
APPROPRIATE WORK BOUNDARY

ROOF SURFACE: SHINGLE | METAL | TILE | TPO

CIRCLE WEATHER CONDITIONS:

SUNNY OVERCAST LIGHT RAIN

HEAVY RAIN FOGGY WINDY

TEMPERATURE: \_\_\_\_\_ IF WINDY, STATE WIND SPEED: \_\_\_\_\_

CHECK IF THE FOLLOWING EQUIPMENT IS READILY AVAILABLE ON  
ALL SUNPRO SOLAR INSTALLATION VEHICLES ON EACH JOB SITE:

\_\_\_\_ EYE WASH BOTTLE/SOLUTION

\_\_\_\_ DRINKING WATER

\_\_\_\_ FIRE EXTINGUISHER

\_\_\_\_ FIRST AID KIT

\_\_\_\_ NECESSARY JOB SPECIFICS

ADDRESS OF NEAREST MEDICAL CARE FACILITY:

LEAD INSTALLER IS TO CONDUCT A DAILY SAFETY  
BRIEFING AND THE INCLUDED CHECKLIST MUST BE  
COMPLETED WITH ALL NECESSARY LABELS PRIOR TO  
BEGINNING ANY ONSITE WORK.

\_\_\_\_\_  
LEAD INSTALLER SIGNATURE DATE

CREW SIGNATURES:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

PROJECT ADDRESS:



22171 MCH RD  
MANDEVILLE, LA 70471  
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PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME

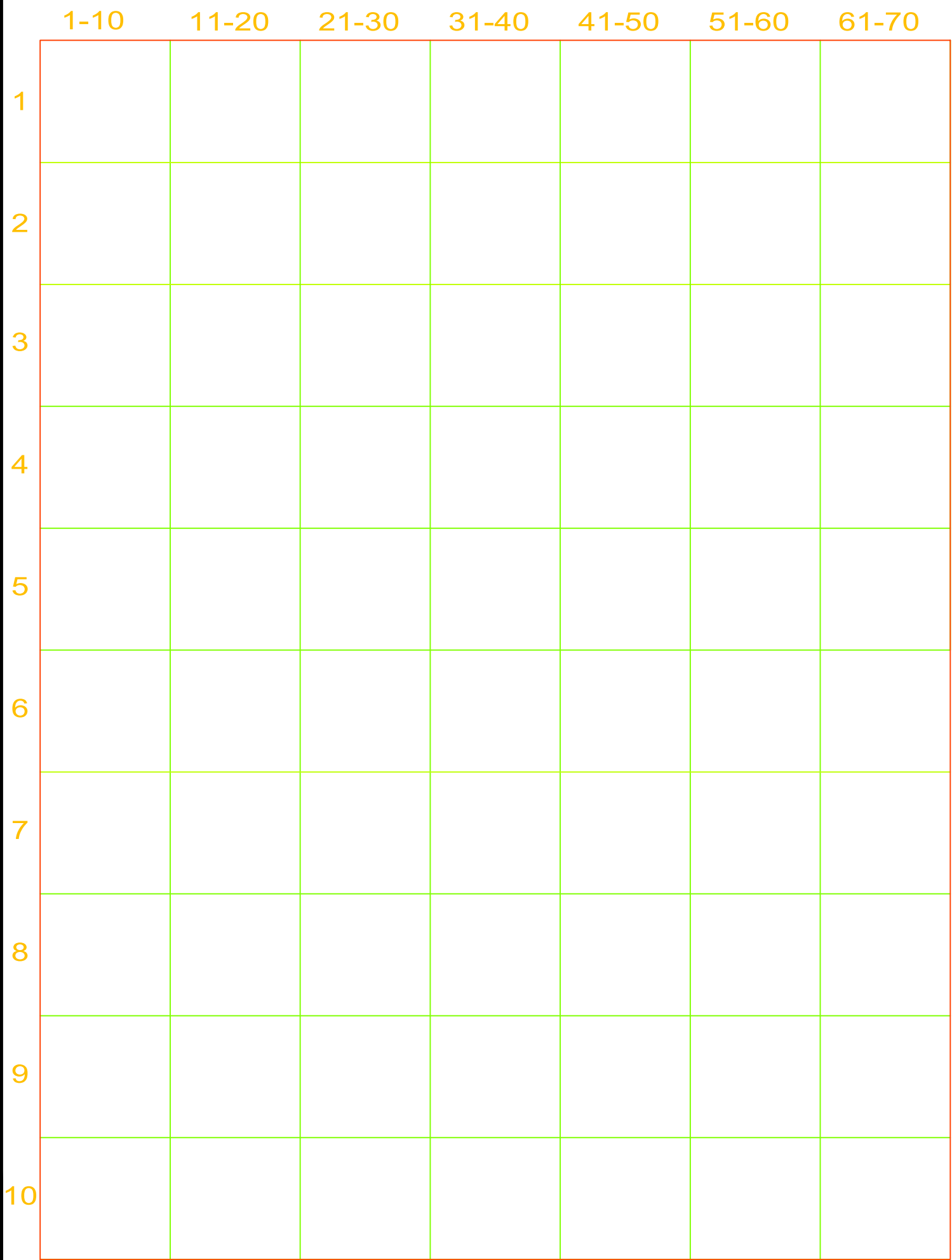
JHA FORM

SHEET SIZE

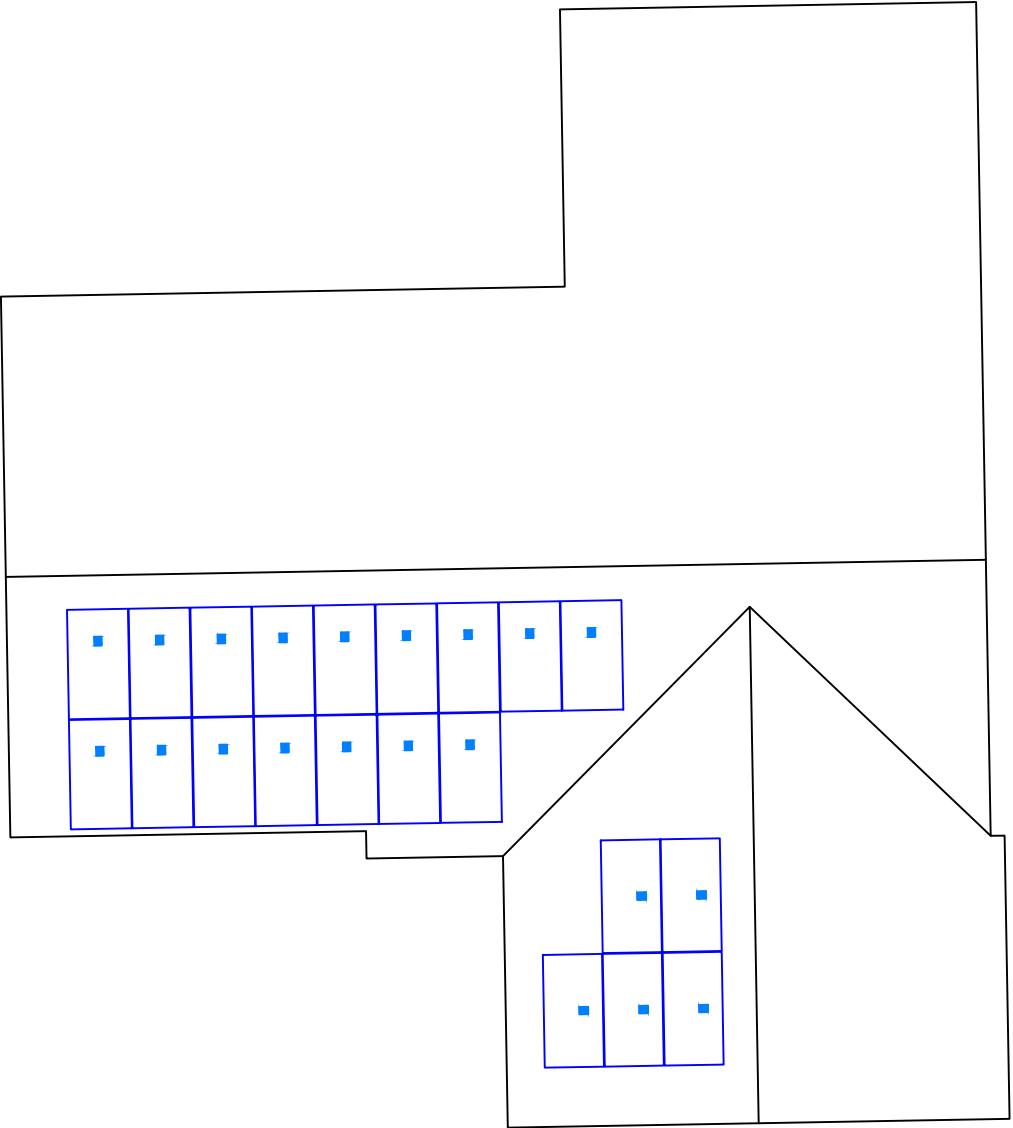
ANSI B  
11" X 17"

SHEET NUMBER

PV-10



# MICRO INVERTER CHART



22171 MCH RD  
MANDEVILLE, LA 70471  
PHONE: 9152011490

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|                |            |     |

DATE: 02/17/2023

PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME

MICRO INVERTER CHART

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-11



HiKuBlack Mono PERC  
BLACK FRAME ON BLACK BACKSHEET  
F23 Frame  
380 W ~ 410 W  
CS3N-380 | 385 | 390 | 395 | 400 | 405 | 410MS

MORE POWER

- 410 W Module power up to 410 W  
Module efficiency up to 20.2 %
- \$ Lower LCOE & BOS cost
- Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation
- + Better shading tolerance

MORE RELIABLE

- Minimizes micro-crack impacts
- Heavy snow load up to 8100 Pa, enhanced wind load up to 6000 Pa\*

25 Years Industry Leading Product Warranty on Materials and Workmanship\*

25 Years Linear Power Performance Warranty\*

1<sup>st</sup> year power degradation no more than 2%  
Subsequent annual power degradation no more than 0.55%

\*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on residential rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES\*

ISO 9001: 2015 / Quality management system  
ISO 14001: 2015 / Standards for environmental management system  
ISO 45001: 2018 / International standards for occupational health & safety

PRODUCT CERTIFICATES\*

IEC 61215 / IEC 61730 / CE  
FSEC (US Florida) / UL 61730 / IEC 61701 / IEC 62716



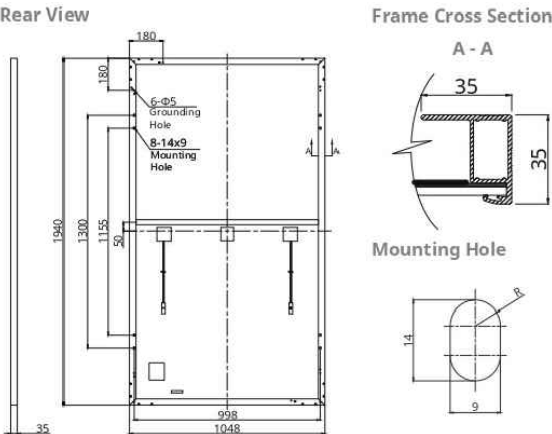
\* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

CSI SOLAR (USA) CO., LTD. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 20 years, it has successfully delivered over 63 GW of premium-quality solar modules across the world.

\* For detailed information, please refer to Installation Manual.

CSI SOLAR (USA) CO., LTD.  
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94598, USA | [www.csisolar.com/na](http://www.csisolar.com/na) | [service.ca@csisolar.com](mailto:service.ca@csisolar.com)

ENGINEERING DRAWING (mm)



ELECTRICAL DATA | STC\*

| CS3N                         | 380MS                   | 385MS   | 390MS   | 395MS   | 400MS   | 405MS   | 410MS   |
|------------------------------|-------------------------|---------|---------|---------|---------|---------|---------|
| Nominal Max. Power (Pmax)    | 380 W                   | 385 W   | 390 W   | 395 W   | 400 W   | 405 W   | 410 W   |
| Opt. Operating Voltage (Vmp) | 36.4 V                  | 36.6 V  | 36.8 V  | 37.0 V  | 37.2 V  | 37.4 V  | 37.6 V  |
| Opt. Operating Current (Imp) | 10.44 A                 | 10.52 A | 10.60 A | 10.68 A | 10.76 A | 10.83 A | 10.92 A |
| Open Circuit Voltage (Voc)   | 43.7 V                  | 43.9 V  | 44.1 V  | 44.3 V  | 44.5 V  | 44.7 V  | 44.9 V  |
| Short Circuit Current (Isc)  | 11.26 A                 | 11.32 A | 11.38 A | 11.44 A | 11.50 A | 11.56 A | 11.62 A |
| Module Efficiency            | 18.7%                   | 18.9%   | 19.2%   | 19.4%   | 19.7%   | 19.9%   | 20.2%   |
| Operating Temperature        | -40°C ~ +85°C           |         |         |         |         |         |         |
| Max. System Voltage          | 1000V (UL)              |         |         |         |         |         |         |
| Module Fire Performance      | TYPE 2 (UL 61730 1000V) |         |         |         |         |         |         |
| Max. Series Fuse Rating      | 20 A                    |         |         |         |         |         |         |
| Application Classification   | Class A                 |         |         |         |         |         |         |
| Power Tolerance              | 0 ~ + 10 W              |         |         |         |         |         |         |

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT\*

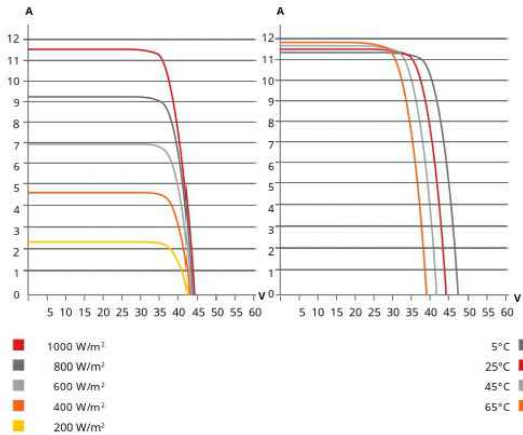
| CS3N                         | 380MS  | 385MS  | 390MS  | 395MS  | 400MS  | 405MS  | 410MS  |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Nominal Max. Power (Pmax)    | 284 W  | 288 W  | 291 W  | 295 W  | 299 W  | 303 W  | 306 W  |
| Opt. Operating Voltage (Vmp) | 34.0 V | 34.2 V | 34.4 V | 34.6 V | 34.7 V | 34.9 V | 35.1 V |
| Opt. Operating Current (Imp) | 8.35 A | 8.42 A | 8.48 A | 8.54 A | 8.60 A | 8.66 A | 8.73 A |
| Open Circuit Voltage (Voc)   | 41.2 V | 41.4 V | 41.6 V | 41.8 V | 41.9 V | 42.1 V | 42.3 V |
| Short Circuit Current (Isc)  | 9.08 A | 9.13 A | 9.18 A | 9.23 A | 9.28 A | 9.33 A | 9.37 A |

\* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

\* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

CSI SOLAR (USA) CO., LTD.

CS3N-400MS / I-V CURVES



MECHANICAL DATA

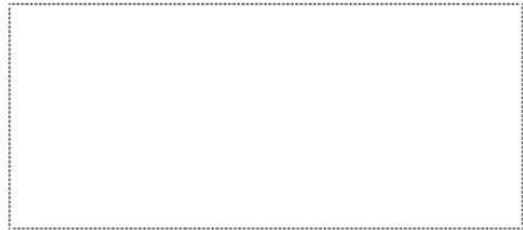
| Specification                      | Data                                                                                                                                  |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Cell Type                          | Mono-crystalline                                                                                                                      |
| Cell Arrangement                   | 132 [2 X (11 X 6)]                                                                                                                    |
| Dimensions                         | 1940 X 1048 X 35 mm<br>(76.4 X 41.3 X 1.38 in)                                                                                        |
| Weight                             | 23.4 kg (51.6 lbs)                                                                                                                    |
| Front Cover                        | 3.2 mm tempered glass                                                                                                                 |
| Frame                              | Anodized aluminium alloy                                                                                                              |
| J-Box                              | IP68, 3 bypass diodes                                                                                                                 |
| Cable                              | 12 AWG (UL)                                                                                                                           |
| Cable Length (Including Connector) | Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-) (supply additional cable jumper: 2 lines/pallet); landscape: 1250 mm (49.2 in)* |
| Connector                          | T4 or MC4 series                                                                                                                      |
| Per Pallet                         | 30 pieces                                                                                                                             |
| Per Container (40' HQ)             | 720 pieces                                                                                                                            |

\* For detailed information, please contact your local Canadian Solar sales and technical representatives.

TEMPERATURE CHARACTERISTICS

| Specification                        | Data         |
|--------------------------------------|--------------|
| Temperature Coefficient (Pmax)       | -0.34 % / °C |
| Temperature Coefficient (Voc)        | -0.26 % / °C |
| Temperature Coefficient (Isc)        | 0.05 % / °C  |
| Nominal Module Operating Temperature | 42 ± 3°C     |

PARTNER SECTION



22171 MCH RD  
MANDEVILLE, LA 70471  
PHONE: 9152011490

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DATE: 02/17/2023

PROJECT NAME & ADDRESS

JOCELENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-12

Jan. 2022 | All rights reserved | PV Module Product Datasheet v2.9C25\_F23\_J2\_NA



DATA SHEET



## IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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

### Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

### High productivity and reliability

- Produce power even when the grid is down\*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

### Microgrid-forming

- Complies with the latest advanced grid support\*\*
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

\* Only when installed with IQ System Controller 2, meets UL 1741.

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

## IQ8 and IQ8+ Microinverters

| INPUT DATA (DC)                                      |                                                                                                                                                                                                                                                                         | IQ8-60-2-US                                                                                                             | IQ8PLUS-72-2-US                                                        |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Commonly used module pairings <sup>1</sup>           | W                                                                                                                                                                                                                                                                       | 235 – 350                                                                                                               | 235 – 440                                                              |
| Module compatibility                                 |                                                                                                                                                                                                                                                                         | 60-cell/120 half-cell                                                                                                   | 60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell |
| MPPT voltage range                                   | V                                                                                                                                                                                                                                                                       | 27 – 37                                                                                                                 | 29 – 45                                                                |
| Operating range                                      | V                                                                                                                                                                                                                                                                       | 25 – 48                                                                                                                 | 25 – 58                                                                |
| Min/max start voltage                                | V                                                                                                                                                                                                                                                                       | 30 / 48                                                                                                                 | 30 / 58                                                                |
| Max input DC voltage                                 | V                                                                                                                                                                                                                                                                       | 50                                                                                                                      | 60                                                                     |
| Max DC current <sup>2</sup> [module Isc]             | A                                                                                                                                                                                                                                                                       |                                                                                                                         | 15                                                                     |
| Overtoltage class DC port                            |                                                                                                                                                                                                                                                                         |                                                                                                                         | II                                                                     |
| DC port backfeed current                             | mA                                                                                                                                                                                                                                                                      |                                                                                                                         | 0                                                                      |
| PV array configuration                               |                                                                                                                                                                                                                                                                         | 1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit |                                                                        |
| OUTPUT DATA (AC)                                     |                                                                                                                                                                                                                                                                         | IQ8-60-2-US                                                                                                             | IQ8PLUS-72-2-US                                                        |
| Peak output power                                    | VA                                                                                                                                                                                                                                                                      | 245                                                                                                                     | 300                                                                    |
| Max continuous output power                          | VA                                                                                                                                                                                                                                                                      | 240                                                                                                                     | 290                                                                    |
| Nominal (L-L) voltage/range <sup>3</sup>             | V                                                                                                                                                                                                                                                                       |                                                                                                                         | 240 / 211 – 264                                                        |
| Max continuous output current                        | A                                                                                                                                                                                                                                                                       | 1.0                                                                                                                     | 1.21                                                                   |
| Nominal frequency                                    | Hz                                                                                                                                                                                                                                                                      |                                                                                                                         | 60                                                                     |
| Extended frequency range                             | Hz                                                                                                                                                                                                                                                                      |                                                                                                                         | 50 – 68                                                                |
| AC short circuit fault current over 3 cycles         | A <sub>rms</sub>                                                                                                                                                                                                                                                        |                                                                                                                         | 2                                                                      |
| Max units per 20 A (L-L) branch circuit <sup>4</sup> |                                                                                                                                                                                                                                                                         | 16                                                                                                                      | 13                                                                     |
| Total harmonic distortion                            |                                                                                                                                                                                                                                                                         |                                                                                                                         | <5%                                                                    |
| Overtoltage class AC port                            |                                                                                                                                                                                                                                                                         |                                                                                                                         | III                                                                    |
| AC port backfeed current                             | mA                                                                                                                                                                                                                                                                      |                                                                                                                         | 30                                                                     |
| Power factor setting                                 |                                                                                                                                                                                                                                                                         |                                                                                                                         | 1.0                                                                    |
| Grid-tied power factor (adjustable)                  |                                                                                                                                                                                                                                                                         |                                                                                                                         | 0.85 leading – 0.85 lagging                                            |
| Peak efficiency                                      | %                                                                                                                                                                                                                                                                       | 97.5                                                                                                                    | 97.6                                                                   |
| CEC weighted efficiency                              | %                                                                                                                                                                                                                                                                       | 97                                                                                                                      | 97                                                                     |
| Night-time power consumption                         | mW                                                                                                                                                                                                                                                                      |                                                                                                                         | 60                                                                     |
| MECHANICAL DATA                                      |                                                                                                                                                                                                                                                                         |                                                                                                                         |                                                                        |
| Ambient temperature range                            |                                                                                                                                                                                                                                                                         | -40°C to +60°C (-40°F to +140°F)                                                                                        |                                                                        |
| Relative humidity range                              |                                                                                                                                                                                                                                                                         | 4% to 100% (condensing)                                                                                                 |                                                                        |
| DC Connector type                                    |                                                                                                                                                                                                                                                                         | MC4                                                                                                                     |                                                                        |
| Dimensions (HxWxD)                                   |                                                                                                                                                                                                                                                                         | 212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")                                                                          |                                                                        |
| Weight                                               |                                                                                                                                                                                                                                                                         | 1.08 kg (2.38 lbs)                                                                                                      |                                                                        |
| Cooling                                              |                                                                                                                                                                                                                                                                         | Natural convection – no fans                                                                                            |                                                                        |
| Approved for wet locations                           |                                                                                                                                                                                                                                                                         | Yes                                                                                                                     |                                                                        |
| Pollution degree                                     |                                                                                                                                                                                                                                                                         | PD3                                                                                                                     |                                                                        |
| Enclosure                                            |                                                                                                                                                                                                                                                                         | Class II double-insulated, corrosion resistant polymeric enclosure                                                      |                                                                        |
| Environ. category / UV exposure rating               |                                                                                                                                                                                                                                                                         | NEMA Type 6 / outdoor                                                                                                   |                                                                        |
| COMPLIANCE                                           |                                                                                                                                                                                                                                                                         |                                                                                                                         |                                                                        |
|                                                      | CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01                                                                                                                                                |                                                                                                                         |                                                                        |
| Certifications                                       | This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions. |                                                                                                                         |                                                                        |

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

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



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PHONE: 9152011490

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DATE: 02/17/2023

### PROJECT NAME & ADDRESS

JOCELENE RIVERA  
RESIDENCE  
1025 NW EADIE ST,  
LAKE CITY, FL 32055

### SHEET NAME EQUIPMENT SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-13

# Enphase IQ Combiner 4/4C

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



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

## Smart

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

## Simple

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

## Reliable

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



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



## Enphase IQ Combiner 4/4C

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

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

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| REVISIONS      |            |     |
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| DESCRIPTION    | DATE       | REV |
| INITIAL DESIGN | 02/17/2023 |     |
|                |            |     |

|                                           |  |  |
|-------------------------------------------|--|--|
| DATE: 02/17/2023                          |  |  |
| PROJECT NAME & ADDRESS                    |  |  |
| JOCELENE RIVERA<br>RESIDENCE              |  |  |
| 1025 NW EADIE ST.,<br>LAKE CITY, FL 32055 |  |  |
| SHEET NAME<br>EQUIPMENT<br>SPECIFICATION  |  |  |
| SHEET SIZE<br>ANSI B<br>11" X 17"         |  |  |
| SHEET NUMBER<br>PV-14                     |  |  |



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#### REVISIONS

| DESCRIPTION    | DATE       | REV |
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DATE: 02/17/2023

#### PROJECT NAME & ADDRESS

JOCELENE RIVERA  
RESIDENCE

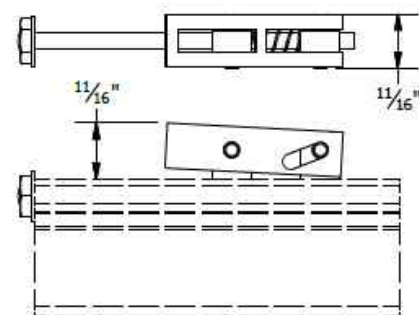
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
EQUIPMENT  
SPECIFICATION

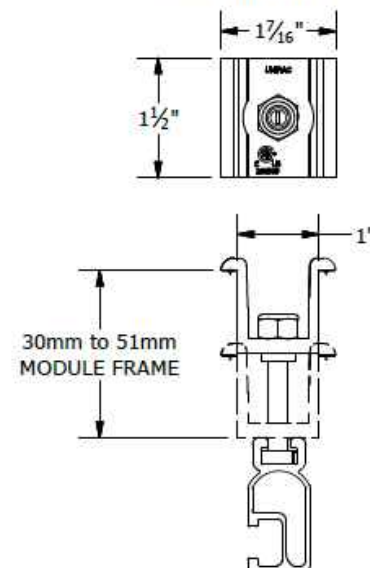
SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-15

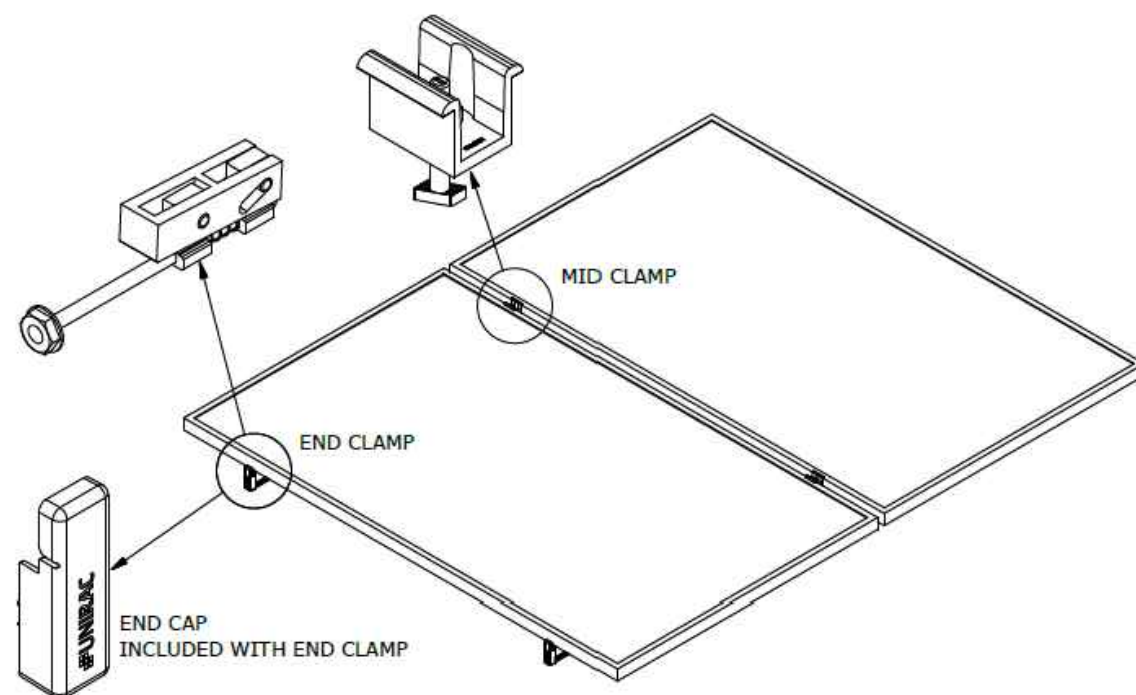
#### PRO SERIES END CLAMP



#### PRO SERIES MID CLAMP



| PART # TABLE |                     |
|--------------|---------------------|
| P/N          | DESCRIPTION         |
| 302035M      | ENDCLAMP PRO        |
| 302030M      | MIDCLAMP PRO - MILL |
| 302030D      | MIDCLAMP PRO - DRK  |



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PHONE: 505.242.6411  
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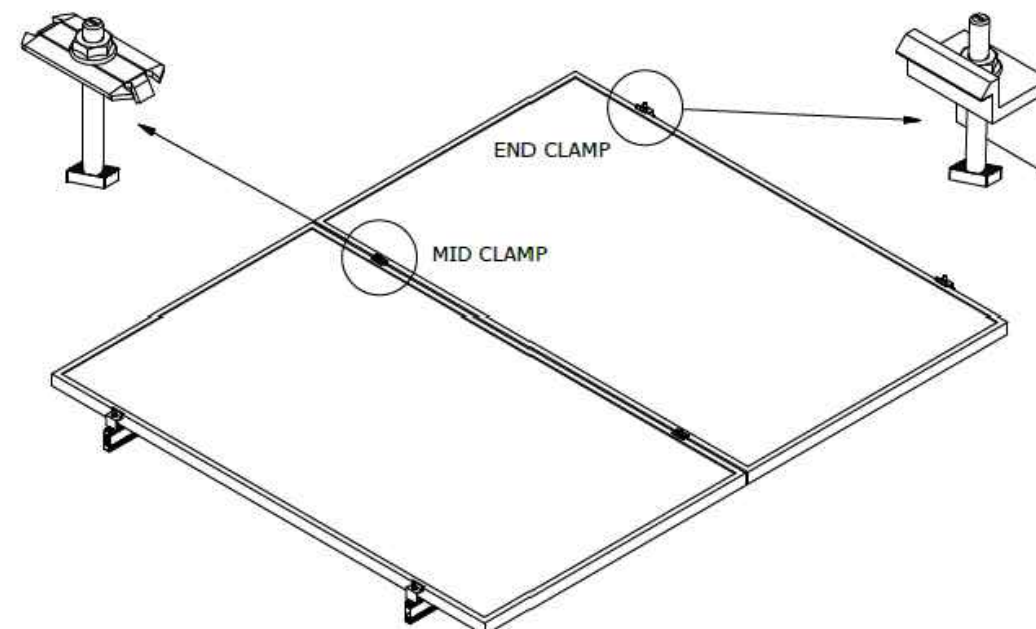
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| PRODUCT LINE:  | SOLARMOUNT                   |
| DRAWING TYPE:  | PART & ASSEMBLY              |
| DESCRIPTION:   | PRO SERIES<br>BONDING CLAMPS |
| REVISION DATE: | 10/26/2017                   |

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

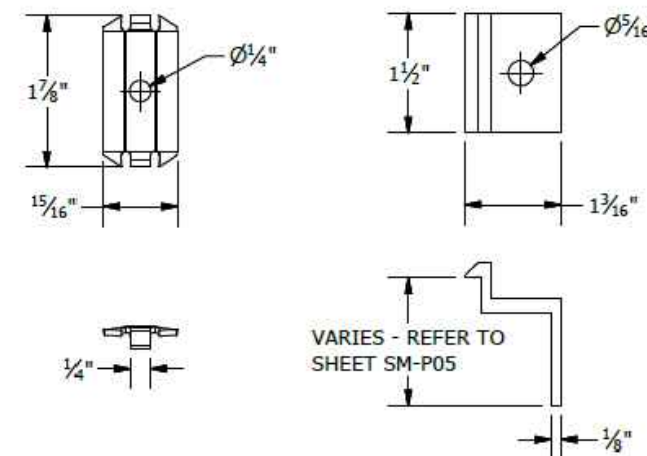
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A01

SHEET



| PART # TABLE |                                                |
|--------------|------------------------------------------------|
| P/N          | DESCRIPTION                                    |
| 302027C      | SM BND MIDCLAMP BC SS                          |
| 302027D      | SM BND MIDCLAMP BC DRK SS                      |
| 302028C      | SM BND MIDCLAMP EF SS                          |
| 302028D      | SM BND MIDCLAMP EF DRK SS                      |
| 302029C      | SM BND MIDCLAMP DK SS                          |
| 302029D      | SM BND MIDCLAMP DK DRK SS                      |
|              | FOR BONDING END CLAMP<br>REFER TO SHEET SM-P05 |



BONDING SM MID CLAMP    BONDING SM END CLAMP



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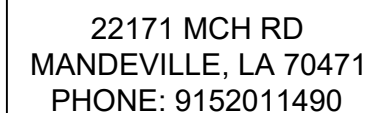
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| PRODUCT LINE:  | SOLARMOUNT            |
| DRAWING TYPE:  | PART & ASSEMBLY       |
| DESCRIPTION:   | BONDING TOP<br>CLAMPS |
| REVISION DATE: | 10/26/2017            |

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SHEET



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|                |            |     |

DATE: 02/17/2023

PROJECT NAME &amp; ADDRESS

JOCLENE RIVERA  
RESIDENCE

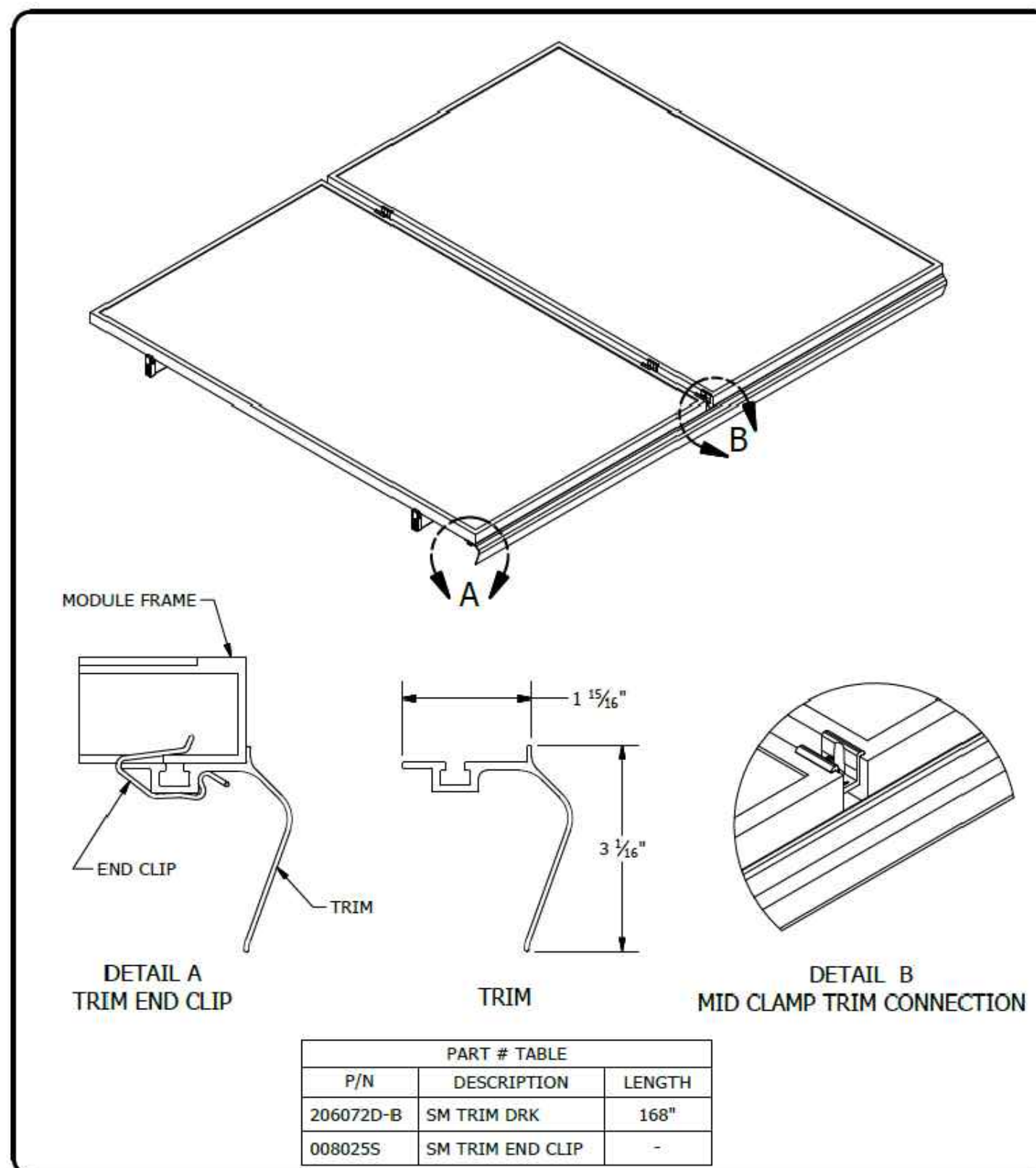
1025 NW EADIE ST,  
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SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER  
PV-16



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|                |                  |
|----------------|------------------|
| PRODUCT LINE:  | SOLARMOUNT       |
| DRAWING TYPE:  | PART & ASSEMBLY  |
| DESCRIPTION:   | SM TRIM END CLIP |
| REVISION DATE: | 9/27/2017        |

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SHEET

SHEET NUMBER  
PV-16

# S-5!®

## The Right Way!

### NEW PRODUCT

## SolarFoot™

Introducing the new SolarFoot™ for exposed fastener metal roofing with the strength, testing, quality, and time-proven integrity you expect from S-5!. The SolarFoot provides an ideal mounting platform to attach the L-Foot (not included) of a rail-mounted PV system to the roof. This solution is The Right Way to secure rail-mounted solar systems to exposed fastener metal such as AG-Panel or R-Panel.

#### SolarFoot Features:

Manufactured in the U.S.A. from certified low material

Extruded in our own ISO 9001:2015 certified facility

All quantities and materials components

25yr limited warranty

Compatible with all standard L-Foot products on the market

Factory applied 40-year butyl/sealant provides excellent weather seal for reliable waterproofing

Sealant reservoir in product prevents compression of sealant

Low to failure tested Material has been by a nationally accredited laboratory on numerous metal roof materials and substrates

Four points of attachment into structure or deck with tested holding strength for single and double rows

Integral M8-1.25x17mm stud and M8-1.25 stainless steel hex flange nut included

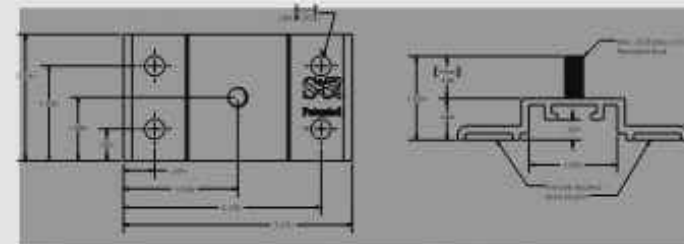
# S-5!®

The Right Way!



## SolarFoot™ Mounting for Exposed Fastener Roofing

The SolarFoot is a simple, cost-effective pedestal for L-Foot (not included) attachment of rail-mounted solar PV. The unique design is compatible with all rail producer L-Foot components. The new SolarFoot assembly ensures a durable weathertight solution for the life of the roof. Special factory applied butyl co-polymeric sealant contained in a reservoir is The Right Way, allowing a water-tested seal. Stainless integrated stud and hex flange lock-nut secure the L-Foot into position. A low center of gravity reduces the moment arm commonly associated with L-Foot attachments. Direct attachment of the SolarFoot to the structural member or deck provides unparalleled holding strength.



\*Fasteners sold separately. Fastener type varies with substrate. Contact S-5! on how to purchase fasteners and obtain our test results. L-Foot also sold separately.

#### Fastener Selection



**Metal to Metal:**  
1/4-14 Self Drilling Screw  
1-1/2" to 2-1/2"



**Metal to Wood:**  
1/4-14 Type 17 AB Milled Point  
1-1/2" to 2-1/2"

To source fasteners for your projects, contact S-5!

When other brands claim to be "just as good as S-5!", tell them to PROVE IT.

#### SolarFoot Advantages:

Exposed fastener mounting platform for solar arrays attached via L-Foot and Rails

Weatherproof attachment to exposed fastener roofing

Butyl sealant reservoir provides long-term waterproof seal

M8-1.25x17mm stud with M8 hex flange nut for attachment of all popular L-Foot/rail combinations

Tool: 13 mm Hex Socket or 1/2" Hex Socket

Tool Required: Electric screw gun with hex drive socket for self-tapping screws.

Low Center of Gravity reduces moment arm commonly associated with L-Foot/Rail solar mounting scenarios

Attaches directly to structure or deck for optimal holding strength

S-5! Recommended substrate-specific (e.g. steel purlin, wood 2x4, OSB, etc.) fasteners provide excellent waterproofing and pull-out strength

Fastener through-hole locations comply with NDS (National Design Specification) for Wood Construction

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

The independent lab test data found at [www.S-5.com](http://www.S-5.com) can be used for load-critical designs and applications.

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, fastener torque, patents, and trademarks, visit the S-5! website at [www.S-5.com](http://www.S-5.com). Copyright 2017, Metal Roof Innovations, Ltd. S-5! products are patent protected.

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| INITIAL DESIGN | 02/17/2023 |     |
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DATE: 02/17/2023

#### PROJECT NAME & ADDRESS

JOCELENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-17

The right way to attach almost anything to metal roofs!

888-825-3432 | [www.S-5.com](http://www.S-5.com)

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| INITIAL DESIGN | 02/17/2023 |     |
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PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME

EQUIPMENT  
SPECIFICATION

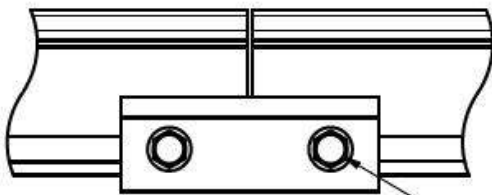
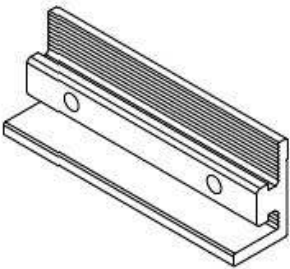
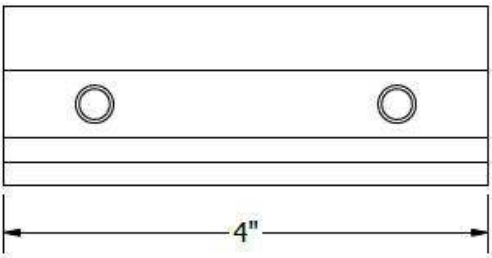
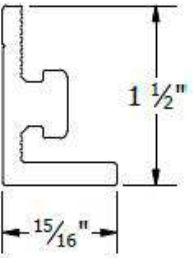
SHEET SIZE

ANSI B  
11" X 17"

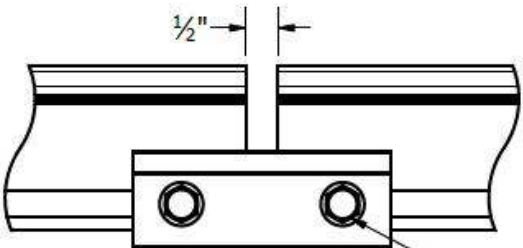
SHEET NUMBER

PV-18

BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL



TYPICAL EXPANSION JOINT DETAIL

NOTE THAT ONLY 2 SCREWS ARE  
USED AT AN EXPANSION JOINT.  
THE SPLICE BAR DOES NOT BOND  
ACROSS AN EXPANSION JOINT.  
SEE INSTALLATION GUIDE FOR  
INSTRUCTION.

| PART # TABLE |                                |
|--------------|--------------------------------|
| P/N          | DESCRIPTION                    |
| 303019M      | BND SPLICE BAR PRO SERIES MILL |
| 303019D      | BND SPLICE BAR PRO SERIES DRK  |



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|                |                                  |
|----------------|----------------------------------|
| PRODUCT LINE:  | SOLARMOUNT                       |
| DRAWING TYPE:  | PART & ASSEMBLY                  |
| DESCRIPTION:   | BONDING SPLICE<br>BAR PRO SERIES |
| REVISION DATE: | 8/23/2018                        |

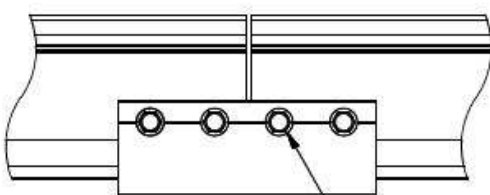
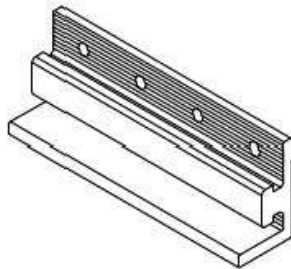
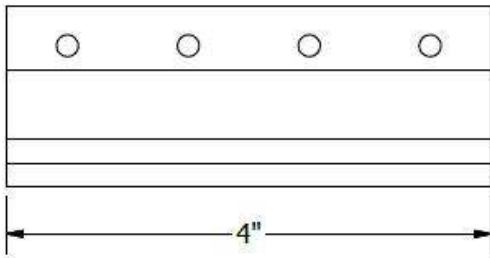
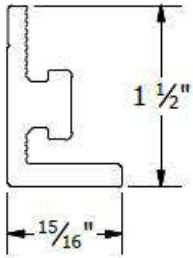
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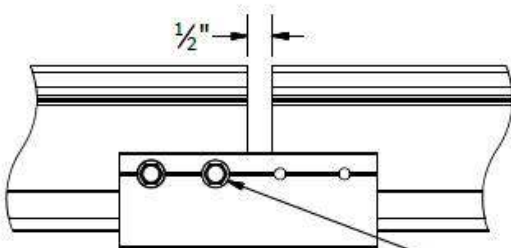
SM-A05

SHEET

BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL



TYPICAL EXPANSION JOINT DETAIL

NOTE THAT ONLY 2 SCREWS ARE  
USED AT AN EXPANSION JOINT.  
THE SPLICE BAR DOES NOT BOND  
ACROSS AN EXPANSION JOINT.  
SEE INSTALLATION GUIDE FOR  
INSTRUCTION.

| PART # TABLE |                             |
|--------------|-----------------------------|
| P/N          | DESCRIPTION                 |
| 303018C      | BND SPLICE BAR SERRATED CLR |
| 303018D      | BND SPLICE BAR SERRATED DRK |



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|                |                       |
|----------------|-----------------------|
| PRODUCT LINE:  | SOLARMOUNT            |
| DRAWING TYPE:  | PART & ASSEMBLY       |
| DESCRIPTION:   | BONDING SPLICE<br>BAR |
| REVISION DATE: | 9/27/2017             |

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| INITIAL DESIGN | 02/17/2023 |     |

DATE: 02/17/2023

PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE  
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME

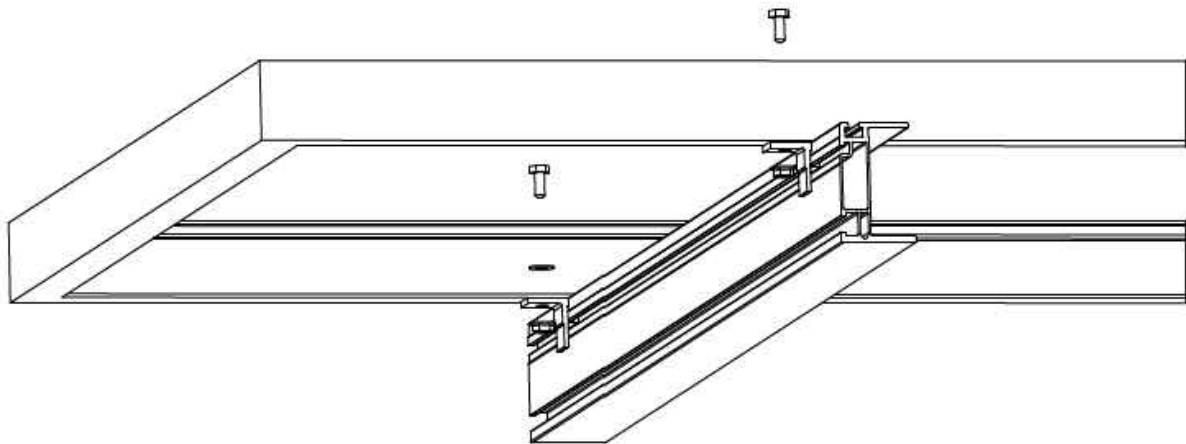
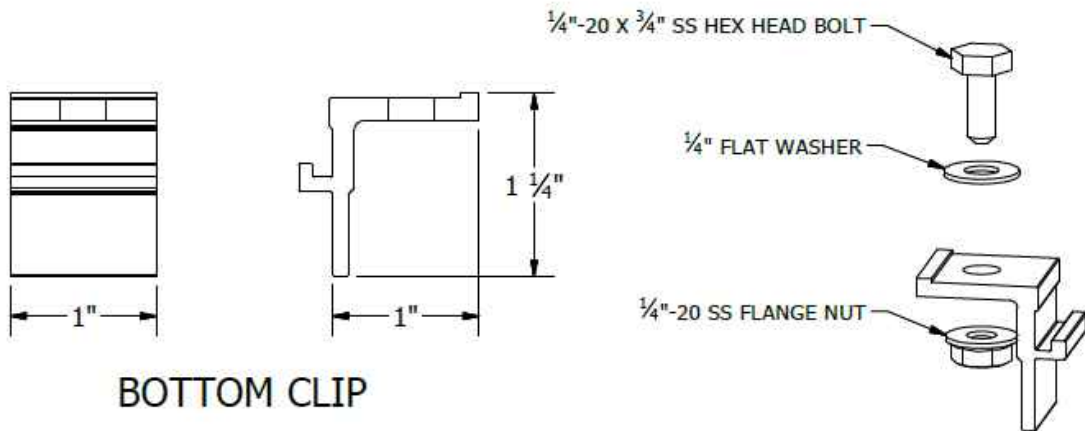
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-19



| PART # TABLE |                             |
|--------------|-----------------------------|
| P/N          | DESCRIPTION                 |
| 302000C      | SMHD BOTTOM CLIPS W/HDW CLR |



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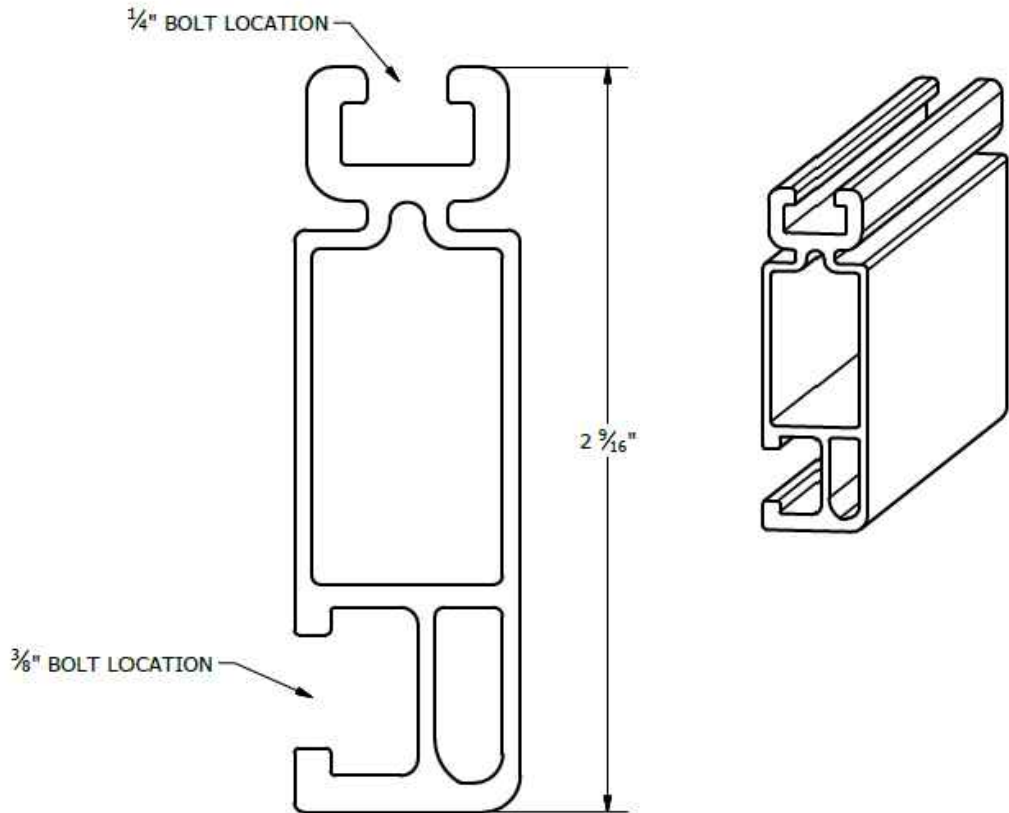
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| PRODUCT LINE:  | SOLARMOUNT HD   |
| DRAWING TYPE:  | PART & ASSEMBLY |
| DESCRIPTION:   | BOTTOM CLIP     |
| REVISION DATE: | 9/27/2017       |

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SHEET



| PART # TABLE |                   |        |
|--------------|-------------------|--------|
| P/N          | DESCRIPTION       | LENGTH |
| 320132M      | SM RAIL 132" MILL | 132"   |
| 310132C      | SM RAIL 132" CLR  | 132"   |
| 320168M      | SM RAIL 168" MILL | 168"   |
| 310168C      | SM RAIL 168" CLR  | 168"   |
| 320168D      | SM RAIL 168" DRK  | 168"   |
| 320208M      | SM RAIL 208" MILL | 208"   |
| 310208C      | SM RAIL 208" CLR  | 208"   |
| 320240M      | SM RAIL 240" MILL | 240"   |
| 310240C      | SM RAIL 240" CLR  | 240"   |
| 310240D      | SM RAIL 240" DRK  | 240"   |



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|----------------|---------------|
| PRODUCT LINE:  | SOLARMOUNT    |
| DRAWING TYPE:  | PART DETAIL   |
| DESCRIPTION:   | STANDARD RAIL |
| REVISION DATE: | 9/11/2017     |

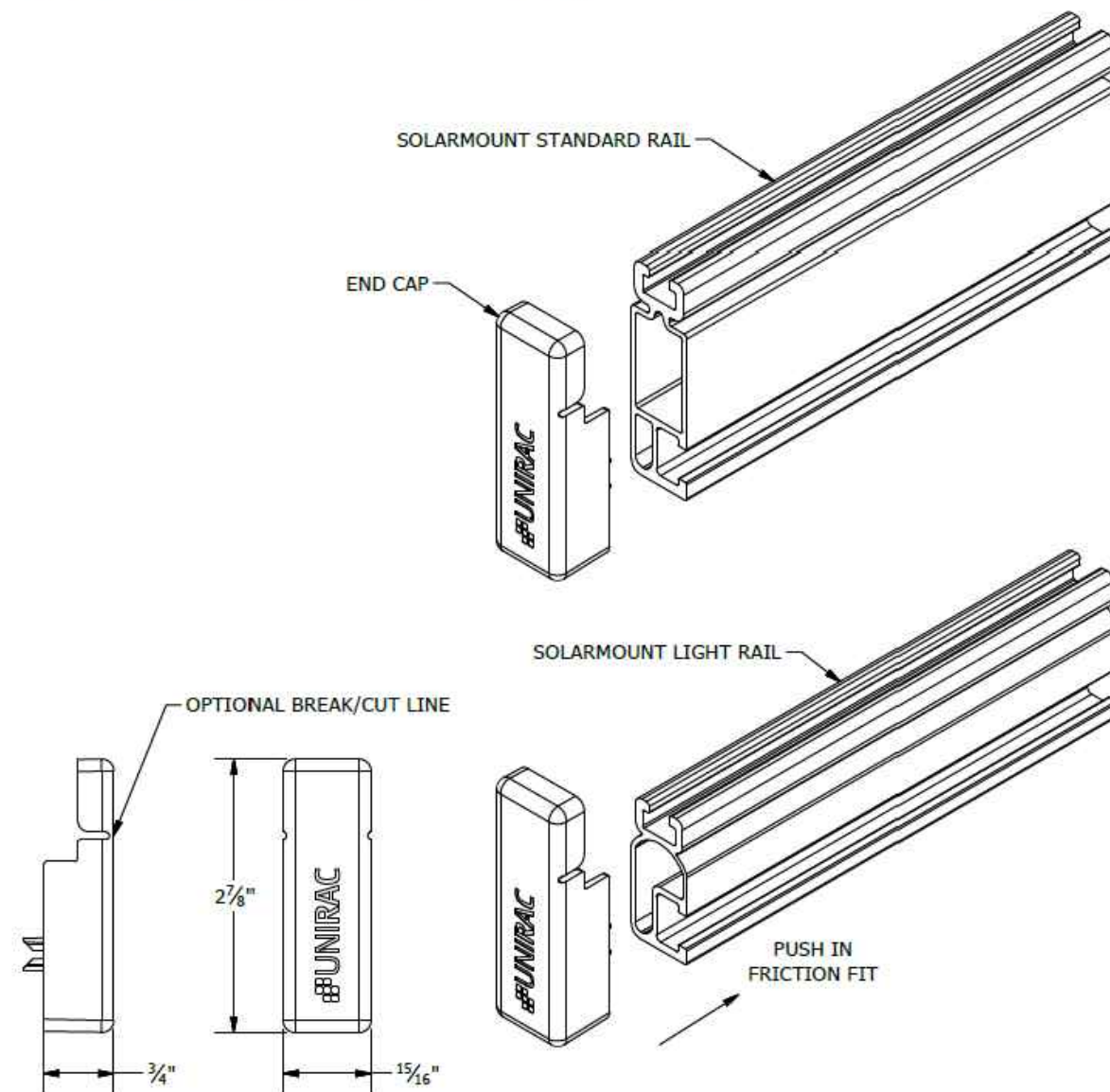
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SM-P01

SHEET

- NOTES:
1. END CAP INCLUDED WITH EVERY END CLAMP.
  2. END CAP FITS SOLARMOUNT LIGHT AND STANDARD RAIL PROFILES.



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PRODUCT LINE: SOLARMOUNT  
DRAWING TYPE: PART DETAIL  
DESCRIPTION: END CAPS  
REVISION DATE: 9/27/2017

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ONE OR MORE US PATENTS  
LEGAL NOTICE

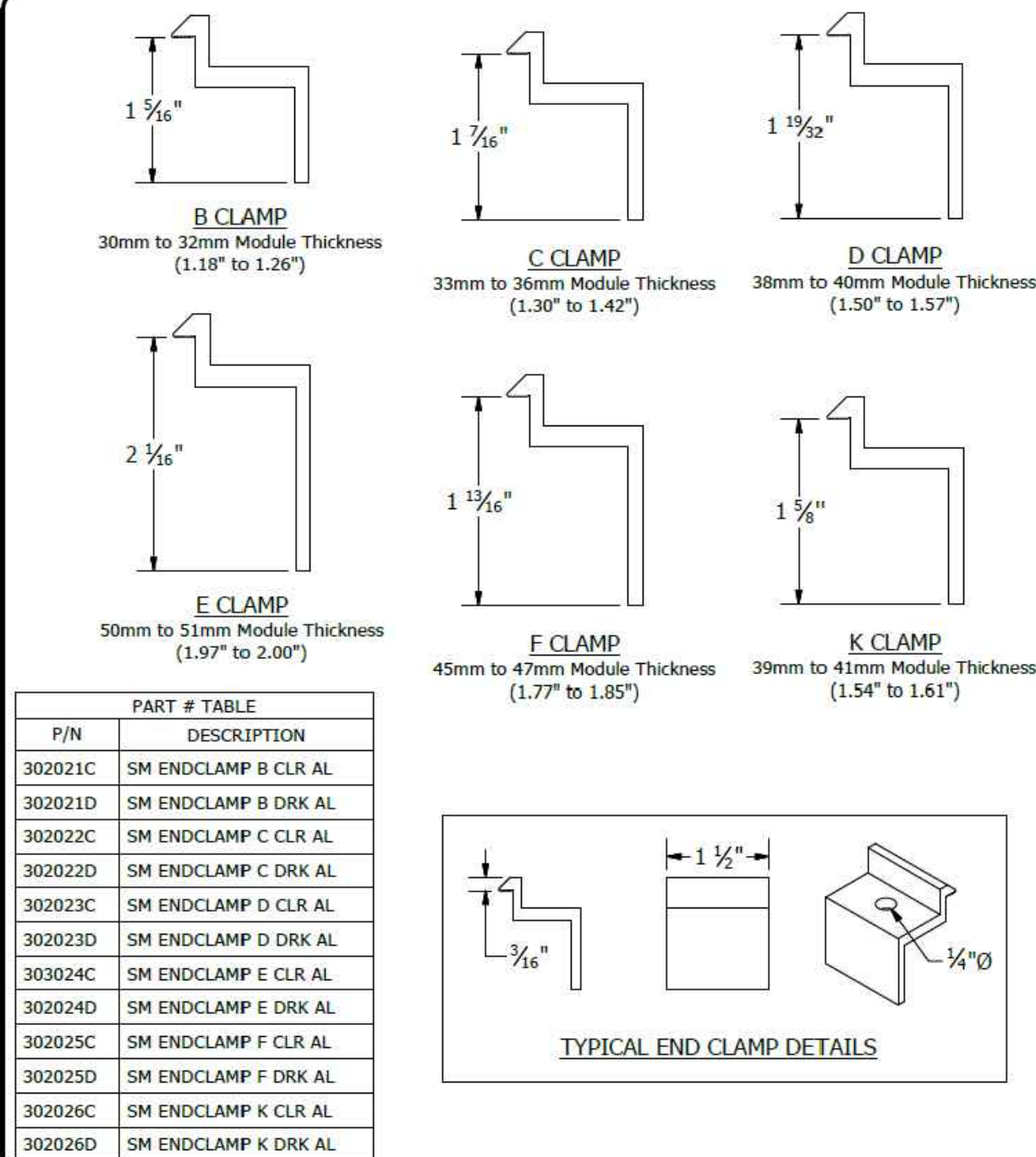
**SM-P04**  
SHEET

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

PRODUCT LINE: SOLARMOUNT  
DRAWING TYPE: PART DETAIL  
DESCRIPTION: END CLAMPS -  
TOP MOUNTING  
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL  
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

**SM-P05**  
SHEET



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

PRODUCT LINE: SOLARMOUNT  
DRAWING TYPE: PART DETAIL  
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TOP MOUNTING  
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL  
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ONE OR MORE US PATENTS  
LEGAL NOTICE

**SM-P05**  
SHEET



22171 MCH RD  
MANDEVILLE, LA 70471  
PHONE: 9152011490

| REVISIONS      |            |     |
|----------------|------------|-----|
| DESCRIPTION    | DATE       | REV |
| INITIAL DESIGN | 02/17/2023 |     |

DATE: 02/17/2023

PROJECT NAME & ADDRESS

JOCELENE RIVERA  
RESIDENCE

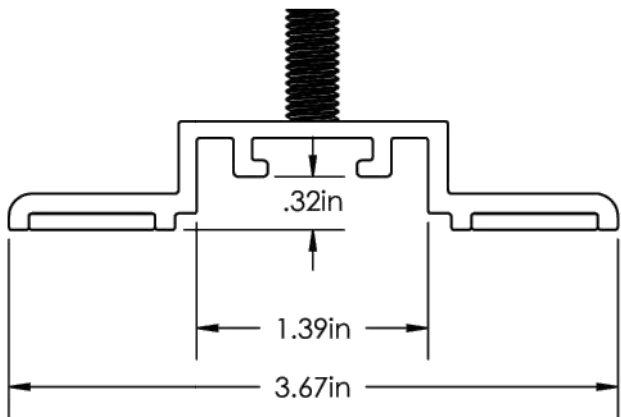
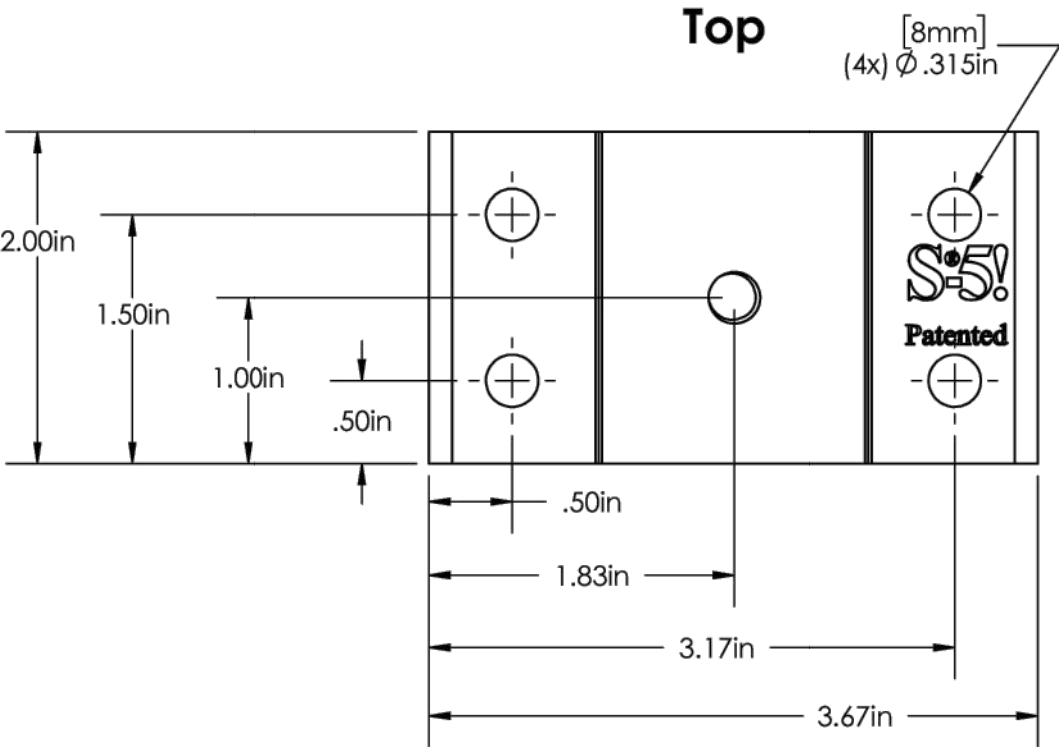
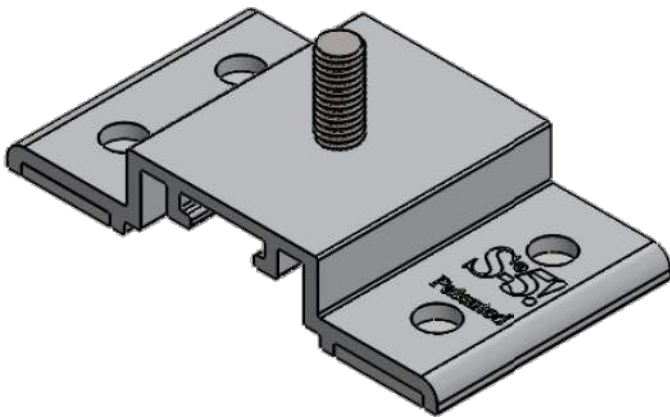
1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-20

SolarFoot



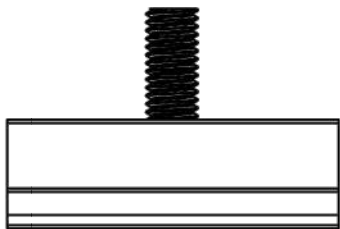
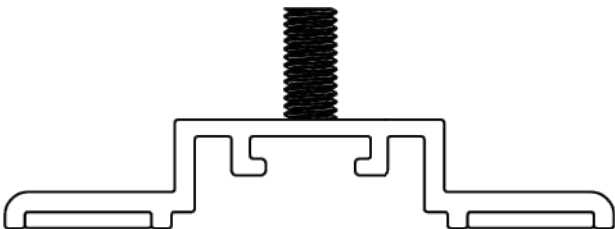
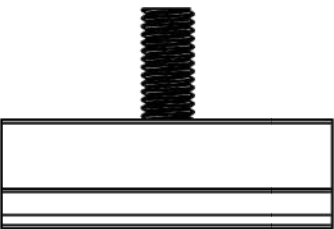
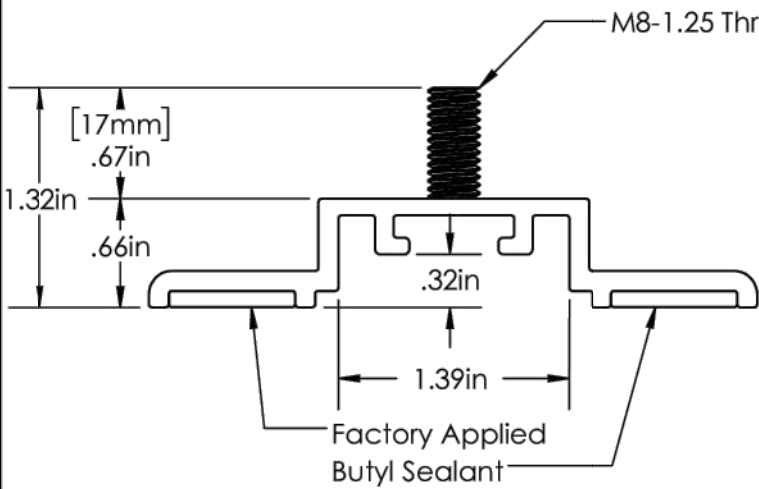
Scale 2:3

Back

Left

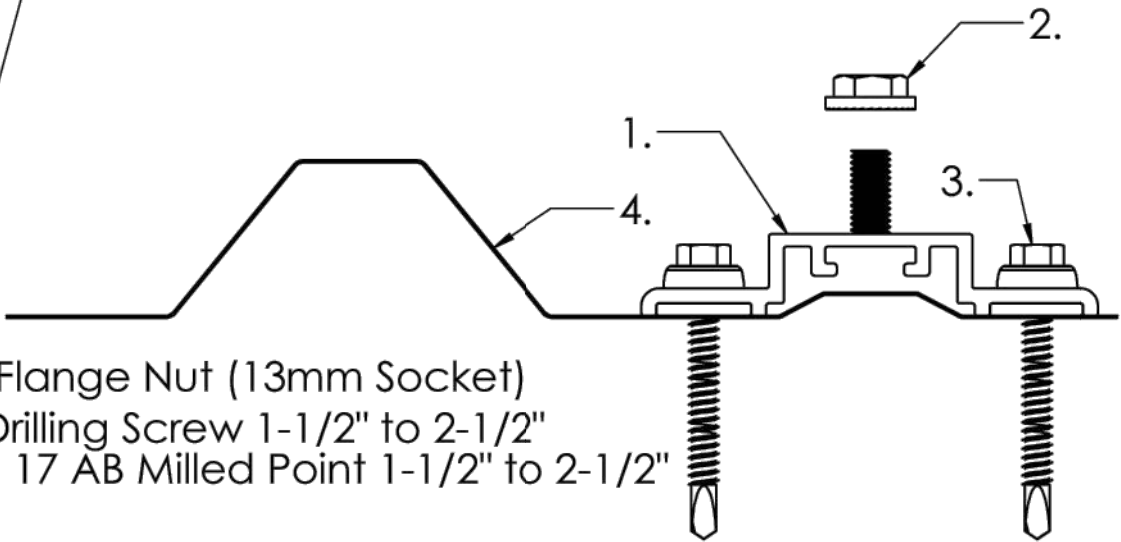
Front

Right



General Notes:

1. SolarFoot
2. M8-1.25 Stainless Steel Hex Flange Nut (13mm Socket)
3. Metal to Metal: 1/4-14 Self Drilling Screw 1-1/2" to 2-1/2"  
Metal to Wood: 1/4-14 Type 17 AB Milled Point 1-1/2" to 2-1/2"
4. Example roof



FOR STANDING SEAM SPECIFIC MECHANICAL LOAD TEST  
INFORMATION AND CLAMP INSTALLATION INFORMATION  
PLEASE VISIT: [WWW.S-5.COM](http://WWW.S-5.COM)

|                                                                             |                                                                                                                                                                                                                             |                         |                    |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|
| MATERIAL:<br>6005A T61 Al                                                   |  <div>METAL ROOF INNOVATIONS, LTD.<br/>8655 TABLE BUTTE RD<br/>COLORADO SPRINGS, CO 80908<br/>719-495-0518<br/>719-495-0045(FAX)</div> |                         |                    |
| EST ASSEMBLY WEIGHT:<br>0.248 lbs                                           |                                                                                                                                                                                                                             |                         |                    |
| SUPPLIED HARDWARE:<br>M8-1.25 Hex Flange Nut                                | TITLE<br>SolarFoot [CCD]                                                                                                                                                                                                    |                         |                    |
| SCALE:<br>2:3                                                               | DRAWING NO.<br>LP66-A-0-A                                                                                                                                                                                                   | DRAWN BY<br>Paul Leitch | DATE<br>09/20/2017 |
| EST. WEIGHT:<br>Bracket: 0.129 lbs<br>Fastener: 0.026 lbs<br>Nut: 0.015 lbs | S-5!® PRODUCTS ARE PROTECTED BY MULTIPLE U.S. AND FOREIGN PATENTS.<br>VISIT OUR WEBSITE AT <a href="http://WWW.S-5.COM">WWW.S-5.COM</a> FOR COMPLETE INFORMATION ON PATENTS AND TRADEMARKS.                                 |                         |                    |



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PHONE: 9152011490

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| DESCRIPTION    | DATE       | REV |
| INITIAL DESIGN | 02/17/2023 |     |

DATE: 02/17/2023

PROJECT NAME & ADDRESS

JOCLENE RIVERA  
RESIDENCE

1025 NW EADIE ST,  
LAKE CITY, FL 32055

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-21