



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

September 2021

Property Owner: David Miller

Property Address: 178 Southwest Hastings Way, Lake City, FL 32024

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 is adequate to support the proposed solar panel installation. This assessment is based on recent on-site inspection by SunPro 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 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): 165 MPH

Wind Exposure Category: C

Ground Snow Load: 0 PSF

Seismic Design Category: D

Existing Structure:

Roof Material: Shingle

Roofing Structure: 2x6 rafters @ 24" O.C.

Roof Slope: 2/12

Connection of Array to Structure:

Manufacturer: UNIRAC

Mount: Flashloc Comp Kit

Mounting Connection: Flashloc Comp Kit 5/16" lag screw w/min 2.5" embedment into framing

Zone 1: 3 rails 3'-0" o.c. mounts

Zone 2: 4 rails 3'-0" o.c. mounts

Zone 3: 4 rails 3'-0" o.c. mounts



PRINCIPAL ENGINEERING, INC.
1011 N. CAUSEWAY BLVD. STE 19
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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 Loads:

Per IBC Section 1607.12.5.1, 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 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 (C_s) 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 engineering 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:	David Miller	Max. Individual Panel Dimensions		
Project Address:	178 Southwest Hastings Way	Length (in)	Width (in)	Area (sf)
City, State:	Lake City, FL 32024	77	39	20.85

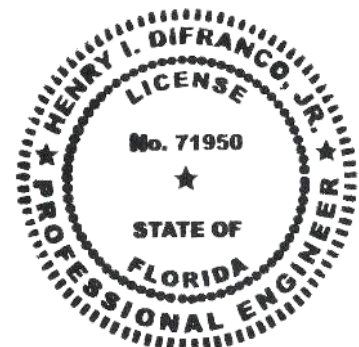
Building Characteristics, Design Input, and Adjustment Factors				
Roof Dimensions:	Length:	75	Greater Dimension	75
	Width:	66	Least Dimension:	66
Roof Height (h):		15	Fig 30.4-1, valid under 60°	✓
Pitch: 2 on 12 =		9.5°	Must be less than 45°	✓
Roof Configuration		Gable		
Roof Structure		2x Rafters		
Roof Material		Plywood		
Risk Category:		II		
Basic Wind Speed:		165	From 26.5-1	
Exposure Category:		C	Fig. 26.7	
Topographic Factor (K_{zt})		1.0	Fig. 26.8-1	
Wind Pressure @ $h=30$, p_{net30}		See Table Below	Fig. 30.4-1	
Ht. & Exposure Adjustment (λ)		0.82	Fig. 30.4-1	
Adjusted Wind Pressures, p_{net}		See Table Below	Eq. 30.4-1	
Effective Wind Area (sf):		10.43	(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		6.6		
2 - Roof Height x 0.4		6		
3 - Least Roof Horizontal Dimension (L or W) x 0.04		2.64		
4 - Least of (1) and (2)		6		
5 - Greater of (3) and (4)		6		
6 - Greater of (5) and 3 feet	a=	6		



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Net Design Pressures, p_{net} (Fig 30.4-1), Components & Cladding					
	Uplift (-psf)			Factored Pressure (0.6W, ASCE 7-16)	θ
		P_{30net}	$IK_{zt}P_{30net}$		
gable /hip /flat					
Gable	Zone 1 & 2e	85.4	70.1	42.0	$7^\circ < \theta \leq 20^\circ$
	Zone 2n,2r,3e	124.7	102.2	61.3	
	Zone 3r	148.2	121.5	72.9	
Hip					



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Snow Load		
Ground Snow Load, p_g	0.0	From ASCE 7 or AHJ
Terrain Category:	C	Para 6.5.6.3
Exposure	Fully	
Exposure Factor C_e	0.9	Table 7-2
Thermal Factor, C_t	1.0	Table 7-3
Importance Factor, I_s	1.0	Table 1.5.2
Roof Configuration	Gable	
Roof Slope	09.5°	
Distance from Eave to Ridge	33.0	
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 (FS=3.0)		
Manufacturer:	S5!	Allowable Mount Spacing by Uplift Pressure
Model:	Protea Bracket	< 38 psf : 2 rails, mounts @ 3 ft. o.c. 38 to 57 psf : 3 rails, mounts @ 3 ft. o.c. 57 to 0 psf : 4 rails, mounts @ 3 ft. o.c. > 0 psf : > 76 psf : Mount capacity exceeded
Substrate	Corrugated Panel	
Connector:	4- 6mm self-piercing screws	
Allowable Uplift:	366 lb., max.	

Rail & Mount Layout by Zone		
Zone 1:	3 rails, mounts @ 3 ft. o.c.	Zone 2r: 4 rails, mounts @ 3 ft. o.c.
Zone 1':	N/A	Zone 3: N/A
Zone 2:	N/A	Zone 3e: 4 rails, mounts @ 3 ft. o.c.
Zone 2e:	3 rails, mounts @ 3 ft. o.c.	Zone 3r: 4 rails, mounts @ 3 ft. o.c.
Zone 2n:	4 rails, mounts @ 3 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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NEW PHOTOVOLTAIC SYSTEM 13.88 KW DC
178 SW HASTINGS WAY, LAKE CITY, FL 32024



22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS
DAVID MILLER
178 SW HASTINGS WAY, LAKE CITY, FL 32024
COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE
DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:



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SHEET TITLE
COVER PAGE

DRAWN DATE	9/23/2021
DRAWN BY	VS

SHEET NUMBER
G-001

GENERAL NOTES

- 1.1.1 PROJECT NOTES:
1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION
1.1.4 GROUND FAULT DETECTION AND INTERRUPTION (GFDI) DEVICE IS INTEGRATED WITH THE MICRO-INVERTER IN ACCORDANCE WITH NEC 690.41(B)
1.1.5 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY
1.1.6 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
1.1.7 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4. SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].
1.1.8 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH 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.
- 1.2.1 SCOPE OF WORK:
1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT
- 1.3.1 WORK INCLUDES:
1.3.2 PV RACKING SYSTEM INSTALLATION - UNIRAC SOLAR
1.3.3 PV MODULE AND INVERTER INSTALLATION - LG ELECTRONICS LG375N1C-A6 / ENPHASE IQ7PLUS-72-2-US INVERTER
1.3.4 PV EQUIPMENT ROOF MOUNT
1.3.5 PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX
1.3.6 PV LOAD CENTERS (IF INCLUDED)
1.3.7 PV METERING/MONITORING (IF INCLUDED)
1.3.8 PV DISCONNECTS
1.3.9 PV GROUNDING ELECTRODE & BONDING TO (E) GEC
1.3.10 PV FINAL COMMISSIONING
1.3.11 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV
1.3.12 SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

PROJECT INFORMATION

OWNER
NAME: DAVID MILLER

PROJECT MANAGER
NAME: SHAHIN HAYNES
PHONE: 8665071461

CONTRACTOR NAME
MARC JONES CONSTRUCTION,
LLC DBA SUNPRO SOLAR
PHONE: 5052180838

SCOPE OF WORK
SYSTEM SIZE: STC:37 X 375W= 13.88 kW DC
PTC: 37 x 347.3W = 12.85 kW DC
(37) LG ELECTRONICS LG375N1C-A6
(37) ENPHASE IQ7PLUS-72-2-US

ATTACHMENT TYPE: ROOF MOUNT
MSP UPGRADE: NO
UTILITY METER UPGRADE: NO

AUTHORITIES HAVING JURISDICTION

BUILDING: COLUMBIA COUNTY
ZONING: COLUMBIA COUNTY
UTILITY: CLAY ELECTRIC CO-OP

DESIGN SPECIFICATION

OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: REFER STRUCTURAL LETTER
WIND EXPOSURE: REFER STRUCTURAL LETTER
WIND SPEED: 165 MPH

APPLICABLE CODES & STANDARDS

BUILDING: IBC 2018, IRC 2018, FBC 2020 (7TH EDITION)
ELECTRICAL: NEC 2017
FIRE: IFC 2020

VICINITY MAP



SATELLITE VIEW



SHEET INDEX

G-001	COVER PAGE
G-002	NOTES
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R-003	RESOURCE DOCUMENT
R-004	RESOURCE DOCUMENT
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R-006	RESOURCE DOCUMENT
R-007	RESOURCE DOCUMENT
R-008	RESOURCE DOCUMENT
R-009	RESOURCE DOCUMENT
R-010	RESOURCE DOCUMENT

SW HASTINGS WAY

(37) LG ELECTRONICS LG375N1C-A6
(37) ENPHASE IQ7PLUS-72-2-US

ADDRESS : 178 SW HASTINGS WAY
CITY ZIP : LAKE CITY, FL 32024

DC SIZE 37 X 375W = 13.875 kW DC-STC
AC SIZE 37X 290W = 10.730 kW AC

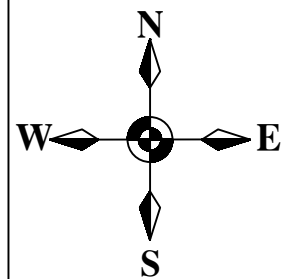
(N) ENPHASE COMBINER PANEL
WITH ENVOY-IQ METER

(N) VISIBLE LOCKABLE LABELED AND
FUSIBLE AC DISCONNECT (UTILITY
DISCONNECT)

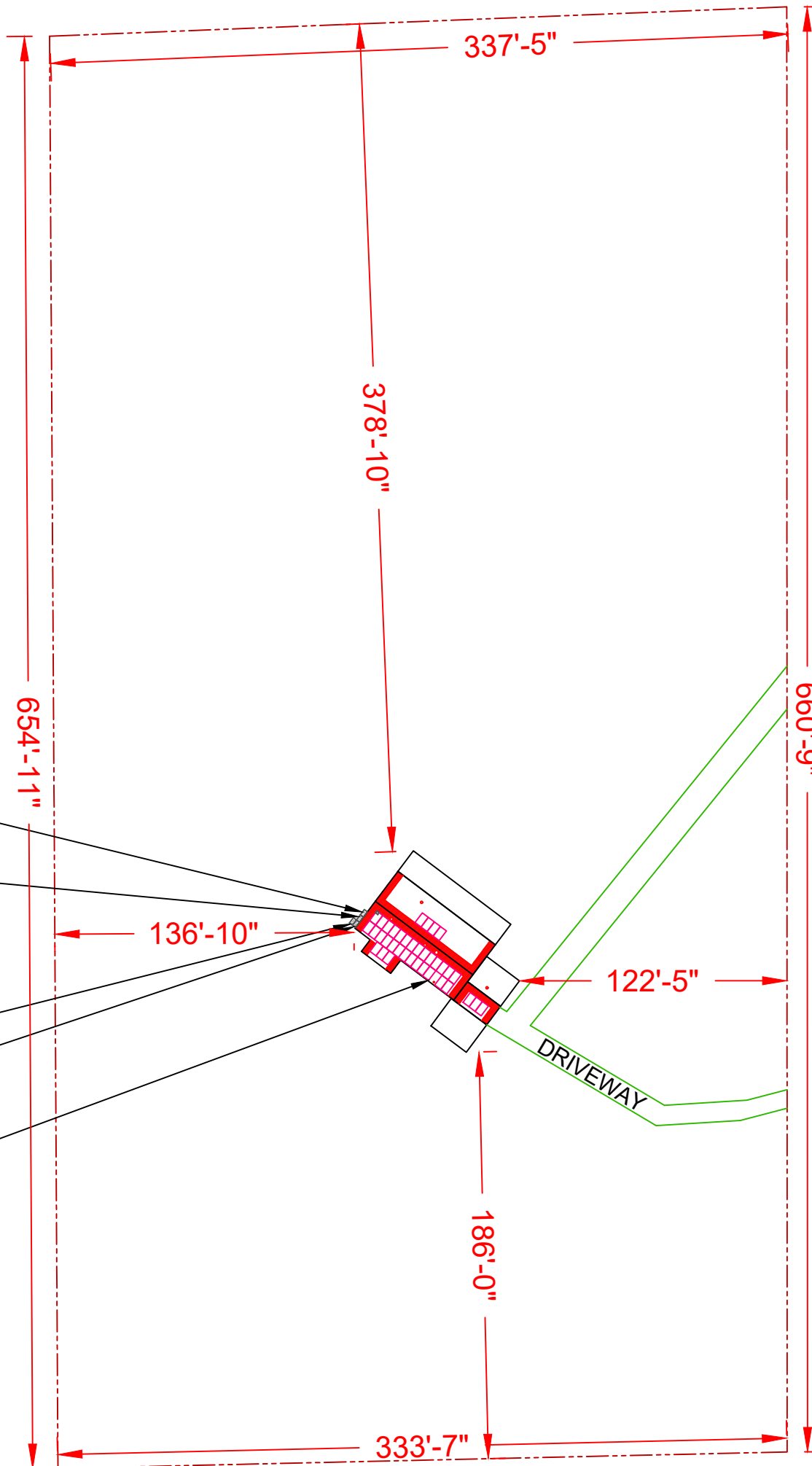
(E) UTILITY METER

(E) MAIN SERVICE PANEL

37 LG ELECTRONICS LG375N1C-A6 MODULES WITH
ENPHASE IQ7PLUS-72-2-US MICROINVERTERS UNDER
EACH MODULE (240V)



1 | SITE PLAN
SCALE: 1/64" = 1'-0"



GODBOLD RD

LEGEND

-  - FIRE SETBACK
-  - PROPERTY LINE
-  - JUNCTION BOX
-  - SKYLIGHT (ROOF OBSTRUCTION)
-  - CHIMNEY (ROOF OBSTRUCTION)
-  - VENT, ATTIC FAN (ROOF OBSTRUCTION)

CONTRACTOR

SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

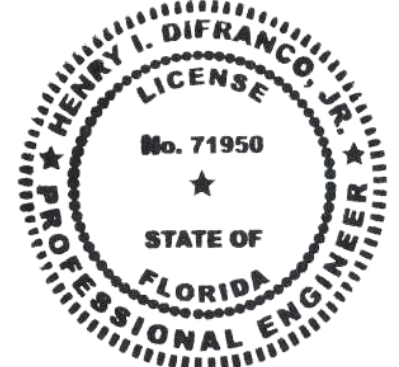
**178 SW HASTINGS
WAY, LAKE CITY,
FL 32024**

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:



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SHEET TITLE

SITE PLAN

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

A-101

ROOF 1	TILT - 14° AZIMUTH - 217° MODULE - 30 SYSTEM SIZE (KW)- 11.25
ROOF 2	TILT - 11° AZIMUTH - 217° MODULE - 3 SYSTEM SIZE (KW)- 1.13
ROOF 3	TILT - 14° AZIMUTH - 37° MODULE - 4 SYSTEM SIZE (KW)- 1.50

	- FIRE SETBACK		- SKYLIGHT (ROOF OBSTRUCTION)
	- PROPERTY LINE		- CHIMNEY (ROOF OBSTRUCTION)
	- JUNCTION BOX		- VENT, ATTIC FAN (ROOF OBSTRUCTION)

- 1 - MODULE STRING
- 2 - MODULE STRING
- 3 - MODULE STRING

SUNPRO

PROJECT NAME & ADDRESS

**178 SW HASTINGS
WAY, LAKE CITY,
FL 32024**

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

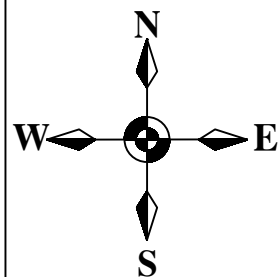
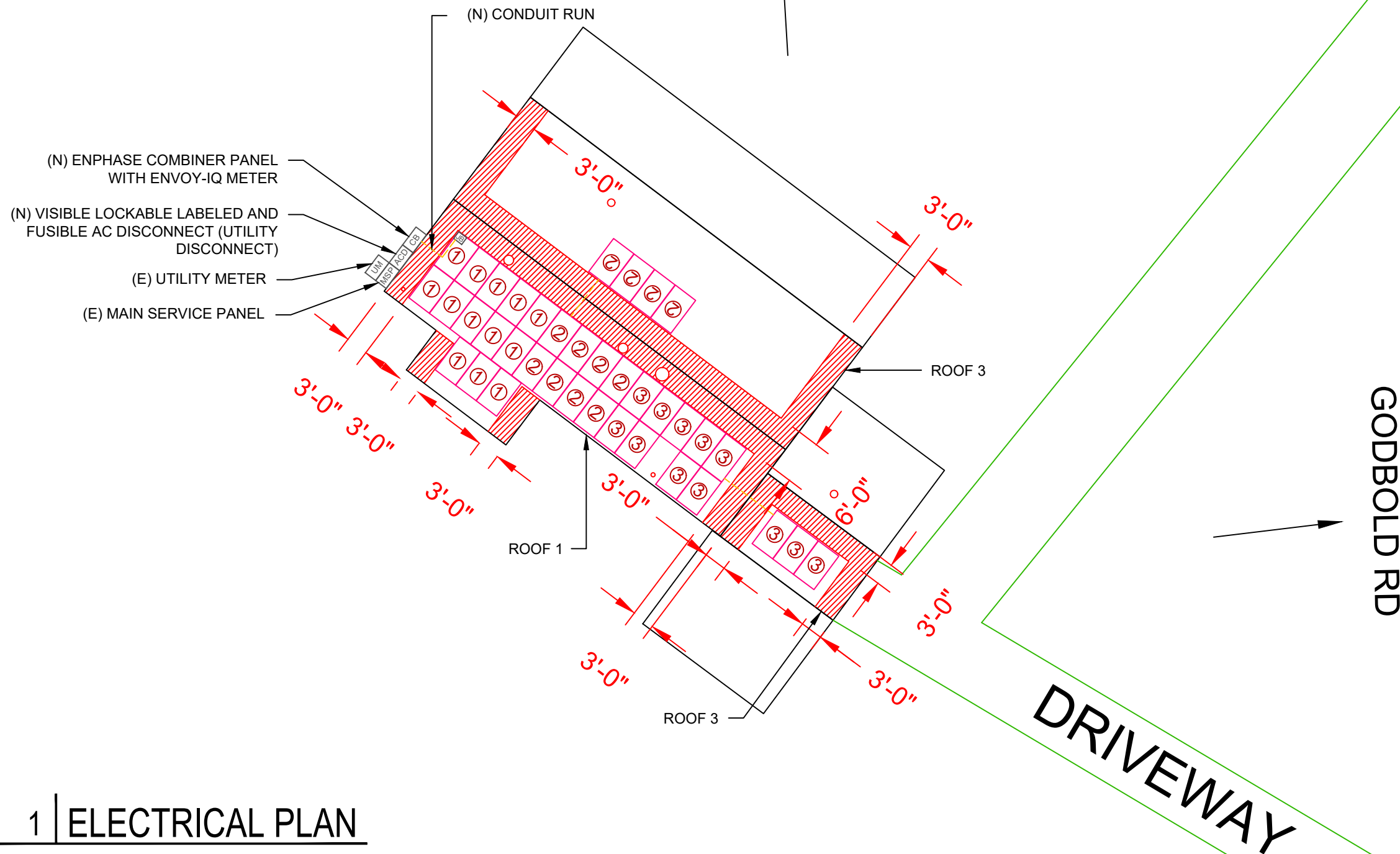
A circular professional engineer license seal for the State of Florida. The outer ring contains the text "NESTOR J. HOUGHTON" at the top and "PROFESSIONAL ENGINEER" at the bottom, separated by two stars. Inside this ring, the word "LICENSE" is at the top and "STATE OF FLORIDA" is at the bottom, also separated by two stars. In the center of the seal, the license number "No. 64501" is displayed. The seal is surrounded by a decorative border of short, radiating lines.

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ELECTRICAL PLAN

DRAWN BY	VS
----------	----

A-102



1 | ELECTRICAL PLAN

SCALE: 1/16" = 1'-0"

TOTAL MOUNT COUNT - 100

Note 1: Windspeed value is design 3-sec gust in accordance with ASCE 7-16

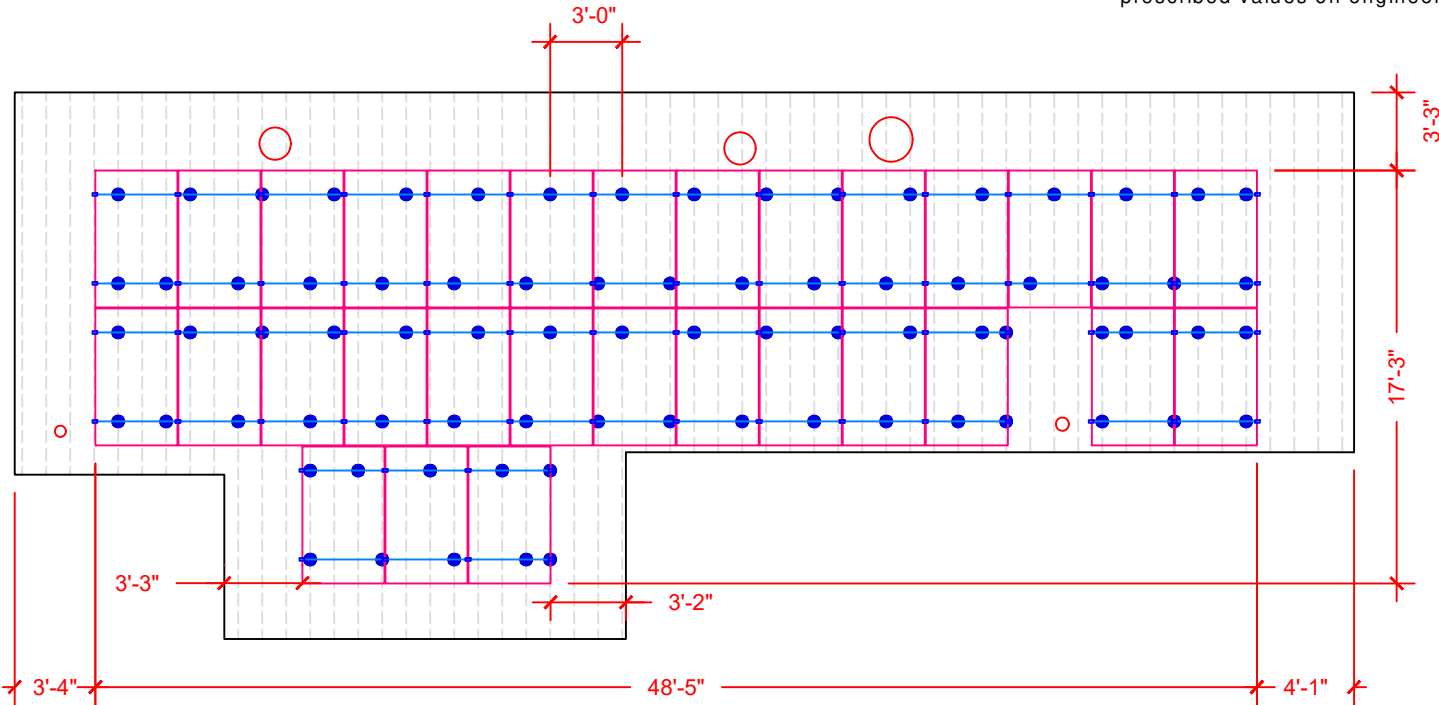
- Note 2: a) Metal roof brackets require screws into purlins and deck
b) Do not install SolarFoot brackets into OSB deck without separate written instructions from the Engineer
c) Installers must verify metal panels are 26 gauge or thicker before use of proteabacket

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.

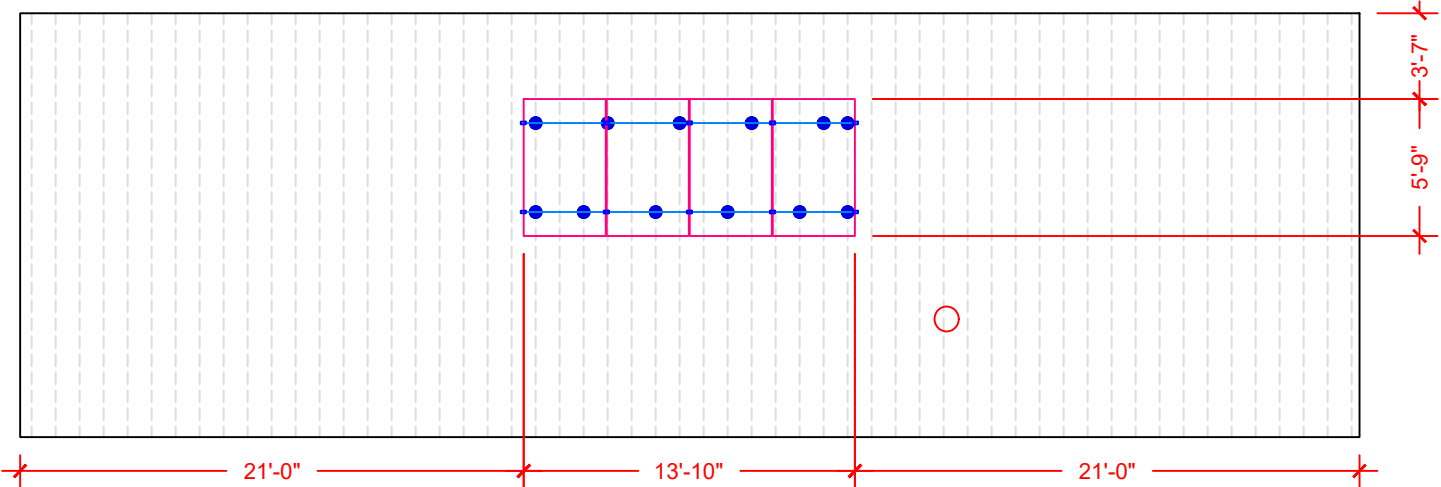
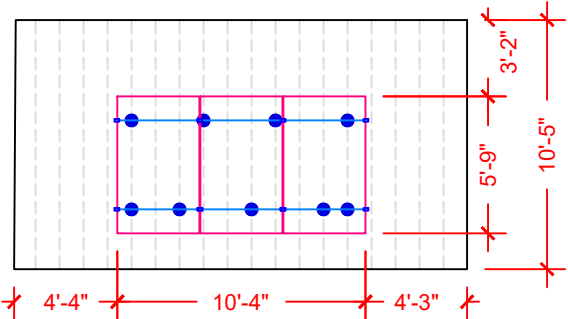
Note 4: Installer shall adjust mount spacing by zone to match prescribed values on engineer's calculation letter

- CLAMP
- PROTEA BARACKET
- RAIL
- TRAPEZOIDAL METAL SEAM @ 12" O.C.

ARRAY 1
TILT- 14 DEG
AZIMUTH - 217 DEG



ARRAY 2
TILT- 11 DEG
AZIMUTH - 217 DEG



ARRAY 3
TILT- 14 DEG
AZIMUTH - 37 DEG

CONTRACTOR

SUNPRO

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SHEET TITLE

ATTACHMENT PLAN

DRAWN DATE

9/23/2021

DRAWN BY

VS

SHEET NUMBER

A-103

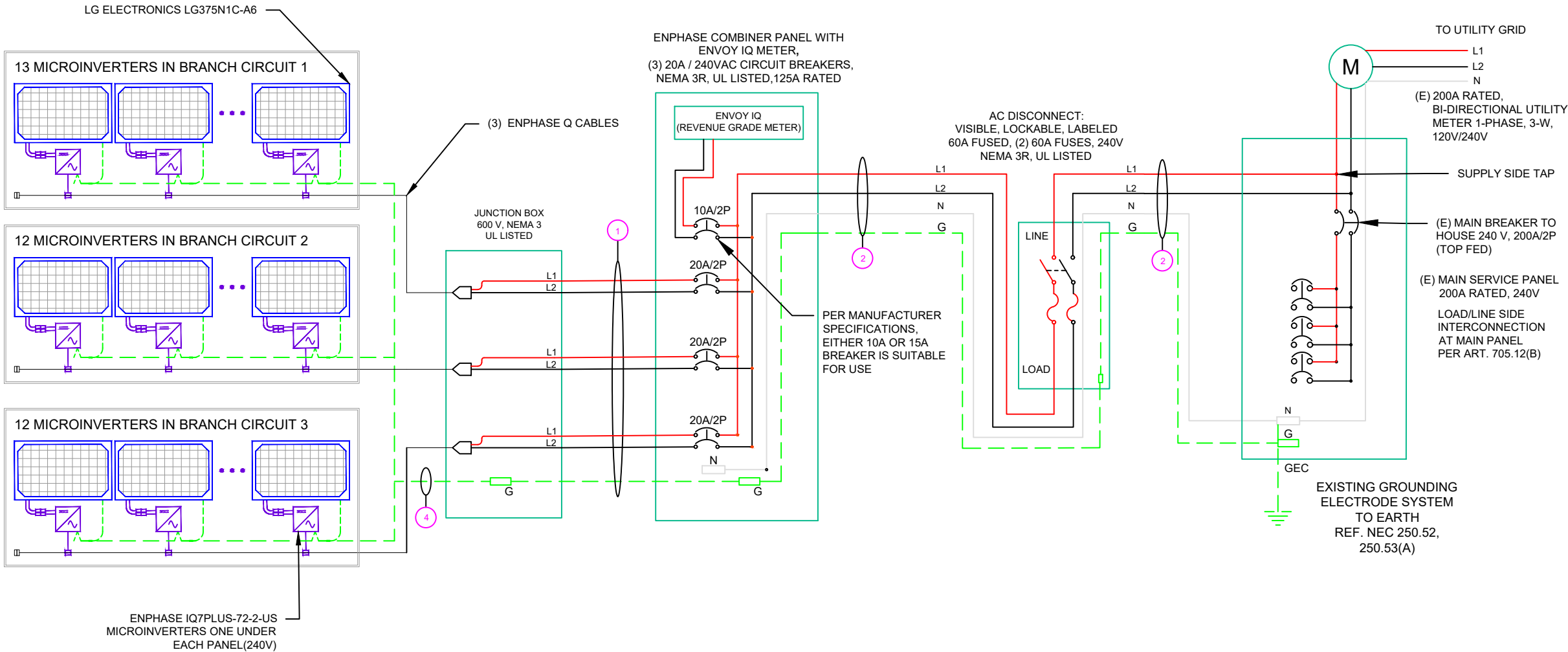
SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	LG ELECTRONICS LG375N1C-A6
VMP	35.3V
IMP	10.63A
VOC	41.8V
ISC	11.35A
TEMP. COEFF. VOC	-0.26%/°C
MODULE DIMENSION	68.50"L x 41"W x 1.57"D (In Inch)

DC SIZE 37 X 375W = 13.875 kW DC-STC
AC SIZE 37X 290W = 10.730 kW AC

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ7PLUS-72-2-US MICROINVERTER
MIN/MAX DC VOLT RATING	22V MIN/ 60V MAX
MAX INPUT POWER	235W-440W
NOMINAL AC VOLTAGE RATING	240V/ 211-264V
MAX AC CURRENT	1.21A
MAX MODULES PER STRING	13 (SINGLE PHASE)
MAX OUTPUT POWER	290 VA

WIRE /CONDUIT SCHEDULE	
TAG	DESCRIPTION
1	#12/2 ROMEX IN ATTIC/ #12 THWN-2 ON EXTERIOR & (1)#6 THWN-2 GROUND / (GN)
2	#6 THWN-2 & (1)#6 THWN-2 GROUND / (GN)
3	#6 THWN-2 & (1)#6 THWN-2 GROUND / (GN)
4	(1)#6 BARE GROUND

(GN) GENERAL CONDUIT NOTE :
CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED (EX. -EMT,SCH 80 PVC OR RMC)*FMC MAYBE USED IN INDOOR APPLICATIONS WHERE PERMITTED BY NEC ART .348



CONTRACTOR
SUNPRO

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MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

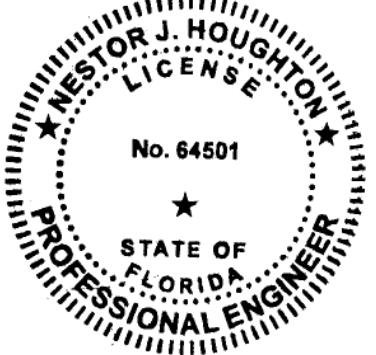
DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE
DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:



This item has been digitally signed and sealed by Nestor J. Houghton, P.E. on September 23, 2021 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

SHEET TITLE

LINE DIAGRAM

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

E-601

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-5°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT HEIGHT	0.5"
CONDUCTOR TEMPERATURE RATE	90°

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

CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE IQ COMBINER PANEL

AMBIENT TEMPERATURE - (34)°C ...NEC 310.15(B)(3)(c)
TEMPERATURE DERATE FACTOR - 0.96 ...NEC 310.15(B)(2)(a)
GROUPING FACTOR - 0.8...NEC 310.15(B)(3)(a)

CONDUCTOR AMPACITY

= (INV O/P CURRENT) x 1.25 / A.T.F / G.F ...NEC 690.8(B)
= [(13 x 1.21) x 1.25] / [0.96 x 0.8]
= 25.60A

SELECTED CONDUCTOR - #12 THWN-2 ...NEC 310.15(B)(16)

(B) AFTER IQ COMBINER PANEL

TEMPERATURE DERATE FACTOR - 0.96
GROUPING FACTOR - 1

CONDUCTOR AMPACITY

= (TOTAL INV O/P CURRENT) x 1.25 / 0.96/ 1 ...NEC 690.8(B)
= [(37 x 1.21) x 1.25] / [0.96 x 1]
= 58.29 A

SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION

= TOTAL INVERTER O/P CURRENT x 1.25
= (37 x 1.21) x 1.25 = 55.96 A

...NEC 690.9(D)

CONTRACTOR



22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

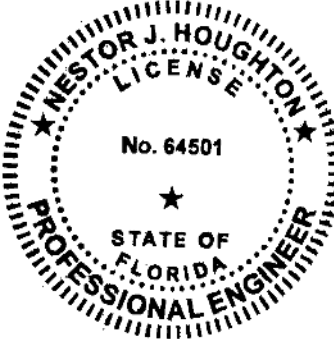
178 SW HASTINGS WAY,LAKE CITY, FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
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985.624.5001
INFO@PI-AEC.COM
FLORIDA FIRM NO. 30649

SHEET TITLE

ELECTRICAL CALCULATIONS

DRAWN DATE

9/23/2021

DRAWN BY

VS

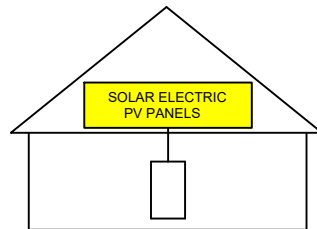
SHEET NUMBER

E-602

WARNING: PHOTOVOLTAIC
POWER SOURCE

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



AC DISCONNECT

⚠ WARNING ⚠ ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH LINE AND
LOAD SIDES
MAY BE ENERGIZED IN THE
OPEN POSITION

⚠ PHOTOVOLTAIC SYSTEM AC DISCONNECT ⚠

OPERATING VOLTAGE: ____ VOLTS
OPERATING CURRENT: ____ AMPS

SOLAR
BREAKER

AC COMBINER BOX

PHOTOVOLTAIC
MICROINVERTERS
LOCATED UNDER
EACH PV MODULE IN
ROOFTOP ARRAY

PHOTOVOLTAIC SYSTEM
EQUIPPED WITH
RAPID SHUTDOWN

RATED AC OUTPUT CURRENT: ____
NOM. OPERATING VOLTAGE: ____

⚠ WARNING ⚠ DUAL POWER SOURCES

SOURCES: UTILITY GRID AND PV
SOLAR ELECTRIC SYSTEM

____ KW SOLAR
DISCONNECT LOCATED

____ FT ←

→ FT ____

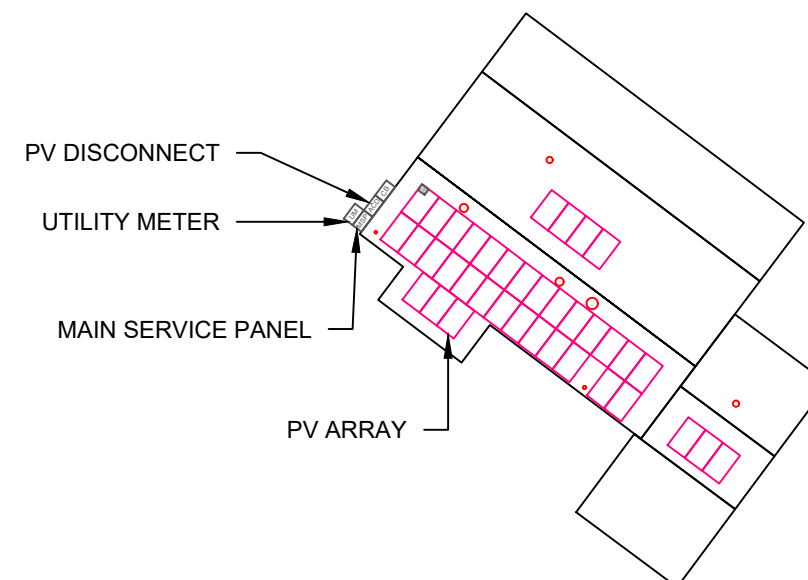
⚠ WARNING ⚠ INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS
OVERCURRENT DEVICE

SOLAR CONNECTION LINE SIDE TAP

CAUTION

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



CONTRACTOR
SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

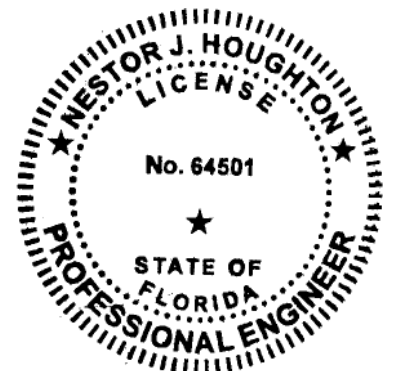
178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY: COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:



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SHEET TITLE

PLACARD

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

E-603

Residential Optional Calculation

25-09-1997

Job Name

by: John Sokolik

Version 2011 L

Marc Jones Construction, LLC Sunpro Solar

STEP 1 Article 220.82 (B) (1),(2)

sq. ft	1400	General Lighting load	4,200 VA
	4	Small Appliance	6,000 VA
	1	Laundry circuit	1,500 VA
		Gen.Lgt, Sm App.& Laun. Load	11,700 VA

23-09-2021 15:24

STEP 2 Article 220.82 (C)



General lighting, Sm. Appl. & Laundry

11,700 VA

A/C Condenser & Fixed Electric Space Heating

5 ton	7,130 VA	AHU 1	9.6kW	10,800 VA	1
A/C #2	VA	AHU 2	Select	VA	Qty
A/C #3	VA	AHU 3	Select	VA	Qty
A/C #4	VA	AHU 4	Select	VA	Qty
A/C #5	VA	AHU 5	Select	VA	Qty

Total 1

Heating Load	7,440 VA
CU Load	8,330 VA

Electric Space Heat @ 65% <4, 40% >3, vs. A/C @ 100% 8,330 VA

STEP 3 Article 220.82 (B) (3)

4,500 VA	1	Water Heater	4,500 VA
1,400 VA	1	Refrigerator	1,400 VA
600 VA		Freezer	VA
1,030 VA	1	Dishwasher	1,030 VA
690 VA		Disposal	VA
400 VA		R / Hood	VA
1,630 VA	1	Microwave	1,630 VA
☐ 4,000 VA		Microwave	VA
170 VA		Mini Refrig	VA
☐ 400 VA		Wine Clr	VA
☐ 5,000 VA		Insta Hot	VA
1,500 VA		Ironing Center	VA
☐ select		Jacuzzi Tub	VA
☐ select		Sprinkler Pump	VA
☐ 1 hp		Well Pump	1,840 VA
select		Fountain Pump	VA
select		Elevator	VA
☐		Pool Equip. Panel	VA Apply Demand
☐		GATES	VA No Demand
☐		Other load	VA No Demand

Appliance Demand Load 10,400 VA

Dryer Demand Load 5,000 VA

Range Demand Load 10,000 VA

Service Demand 29,170 VA

Demand Load 122 A

Neutral Demand 76 A

Min.Service Req. 125 A

Min. Feeder size 2

Min. Neutral size 4

Eq. Grding Cond. 6

☐ Copper

Total Appliance Load 10,400 VA

STEP 4 Article 220.82 (B) (3)

Electric Clothes Dryers 5,000 VA

STEP 5 Article 220.82 (B) (3)

Electric Ranges 10,000 W Col C demand 8000

or Number of appliances

☐ Check Box for Gas Range	Cooktop	Col B demand
	Cooktop	Col B demand
	Oven(s)	Col B demand
	Oven(s)	Col B demand
	Number of appliances	0 Dem. Factor
	Cooktop & Oven Demand Load	

jmp1jds@comcast.net

Pool Panel Feeder Calculation

(See Note)

Continuous Motors	0	A	B	N
Non-continuous	0	0	0	0
Spa heater 11 kVA		0	0	
Pool heater 3.5 ton		0	0	
Pool heater 5 ton		0	0	
Pool Light	select	0	0	0
Blower	select	0	0	0
other load		0	0	0
other load		0	0	0
☐ Min.Copper Pool Feeder	AWG	A	A	A
Minimum Panel Rating	A	Phase Amperes	Neut. load	

Continuous Motors

select	240v
select	240v
select	240v
select	240v
select	240v

Non-continuous Motors

select	240v
select	240v
select	240v
select	240v
select	240v

0.0 Motor Neutral Load

Max.Unbalanced Neutral Load

CONTRACTOR

SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY,LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE

LOAD
CALCULATIONS

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

E-604

LG NeON[®]2

LG370N1C-A6 | LG375N1C-A6 | LG380N1C-A6 Preliminary

370W | 375W | 380W

The LG NeON[®] 2 is LG's best selling solar module and one of the most powerful and versatile modules on the market today. The cells are designed to appear all-black at a distance, and the performance warranty guarantees 90.6% of labeled power output at 25 years.



Features



Enhanced Performance Warranty

LG NeON[®] 2 has an enhanced performance warranty. After 25 years, LG NeON[®] 2 is guaranteed at least 90.6% of initial performance.



25-Year Limited Product Warranty

The NeON[®] 2 is covered by a 25-year limited product warranty. In addition, up to \$450 of labor costs will be covered in the rare case that a module needs to be repaired or replaced.



Solid Performance on Hot Days

LG NeON[®] 2 performs well on hot days due to its low temperature coefficient.



Roof Aesthetics

LG NeON[®] 2 has been designed with aesthetics in mind using thinner wires that appear all black at a distance.

When you go solar, ask for the brand you can trust: LG Solar

About LG Electronics USA, Inc.

LG Electronics is a global leader in electronic products in the clean energy markets by offering solar PV panels and energy storage systems. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first Mono[®] series to the market, which is now available in 32 countries. The NeON[®] (previous Mono[®] NeON), NeON[®]2, NeON[®]2 BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG's leadership and innovation in the solar industry.



LG NeON[®]2

LG370N1C-A6 | LG375N1C-A6 | LG380N1C-A6



Preliminary

General Data

Cell Properties (Material/Type)	Monocrystalline/N-type
Cell Maker	LG
Cell Configuration	60 Cells (6 x 10)
Module Dimensions (L x W x H)	1,740mm x 1,042mm x 40mm
Weight	18.6 kg
Glass (Material)	Tempered Glass with AR Coating
Backsheet (Color)	White
Frame (Material)	Anodized Aluminium
Junction Box (Protection Degree)	IP 68 with 3 Bypass Diodes
Cables (Length)	1,100mm x 2EA
Connector (Type/Maker)	MC 4/MC

Certifications and Warranty

Certifications**	IEC 61215-1/-1-1/2: 2016, IEC 61730-1/2: 2016, UL 61730-1: 2017, UL 61730-2: 2017, ISO 9001, ISO 14001, ISO 50001
Salt Mist Corrosion Test	OHSAS 18001, IEC 61701:2012 Severity 6
Ammonia Corrosion Test	IEC 62716: 2013
Module Fire Performance	Type 1 (UL 61730)
Fire Rating	Class C (UL 790, ULC/ORD C 1703)
Solar Module Product Warranty	25 Year Limited
Solar Module Output Warranty	Linear Warranty*

*Improved: 1st year 98.5% from 2-24th year: 0.33%/year down, 90.6% at year 25
**In Progress

Temperature Characteristics

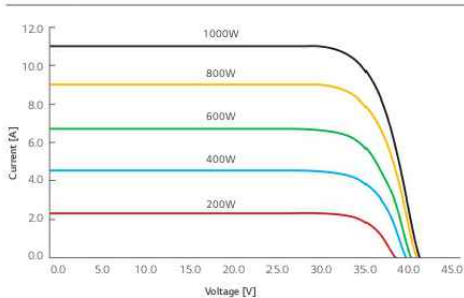
NMOT*	[°C]	42 ± 3
P _{max}	[%/°C]	-0.34
V _{oc}	[%/°C]	-0.26
I _{sc}	[%/°C]	0.03

*NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m², Ambient temperature 20°C, Wind speed 1 m/s, Spectrum AM 1.5

Electrical Properties (NMOT)

Model		LG370N1C-A6	LG375N1C-A6	LG380N1C-A6
Maximum Power (Pmax)	[W]	277	281	285
MPP Voltage (Vmp)	[V]	32.8	33.2	33.5
MPP Current (Imp)	[A]	8.46	8.48	8.49
Open Circuit Voltage (Voc)	[V]	39.3	39.4	39.4
Short Circuit Current (Isc)	[A]	9.09	9.13	9.16

I-V Curves



Electrical Properties (STC*)

Model		LG370N1C-A6	LG375N1C-A6	LG380N1C-A6
Maximum Power (Pmax)	[W]	370	375	380
MPP Voltage (Vmpp)	[V]	34.9	35.3	35.7
MPP Current (Impp)	[A]	10.61	10.63	10.65
Open Circuit Voltage (Voc, ± 5%)	[V]	41.7	41.8	41.9
Short Circuit Current (Isc, ± 5%)	[A]	11.31	11.35	11.39
Module Efficiency	[%]	20.4	20.7	21.0
Bifaciality Coefficient of Power	[%]		10	
Power Tolerance	[%]		0 - +3	

*STC (Standard Test Condition): Irradiance 1000 W/m², cell temperature 25°C, AM 1.5

Operating Conditions

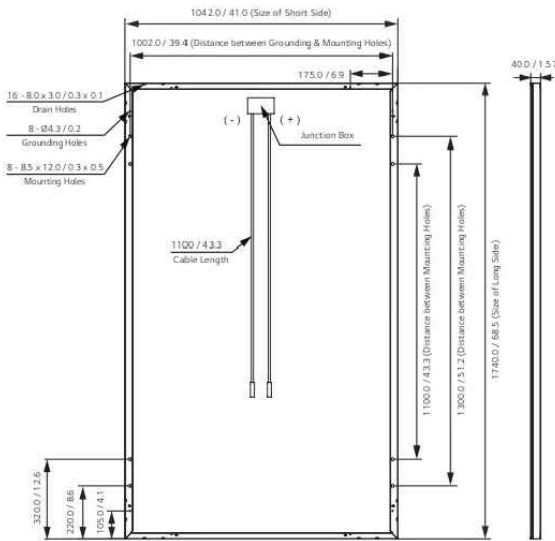
Operating Temperature	[°C]	-40 ~+85
Maximum System Voltage	[V]	1,000
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load* (Front)	[Pa/psf]	5,400
Mechanical Test Load* (Rear)	[Pa/psf]	4,000

*Based on IEC 61215-2: 2016 (Test Load = Design Load x Safety Factor (1.5))
Mechanical Test Loads: 6,000Pa / 5,400Pa based on IEC 61215: 2005

Packaging Configuration

Number of Modules per Pallet	[EA]	25
Number of Modules per 40' Container	[EA]	650
Number of Modules per 53' Container	[EA]	850
Packaging Box Dimensions (L x W x H)	[mm]	1,790 x 1,120 x 1,213
Packaging Box Dimensions (L x W x H)	[in]	70.5 x 44.1 x 47.8
Packaging Box Gross Weight	[kg]	500
Packaging Box Gross Weight	[lb]	1,102

Dimensions (mm/inch)



LG Electronics USA, Inc.
Solar Business Division
2000 Millbrook Drive
Lincolnshire, IL 60069
www.lg-solar.com

Product specifications are subject to change without notice.
LG370-380N1C-A6_AUS.pdf
121520

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CONTRACTOR
SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY: COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

R-001

Enphase IQ 7 and IQ 7+ Microinverters

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

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

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



Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)		IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings¹		235 W - 350 W +		235 W - 440 W +	
Module compatibility		60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage		48 V		60 V	
Peak power tracking voltage		27 V - 37 V		27 V - 45 V	
Operating range		16 V - 48 V		16 V - 60 V	
Min/Max start voltage		22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)		15 A		15 A	
Overvoltage class DC port		II		II	
DC port backfeed current		0 A		0 A	
PV array configuration		1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)		IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power		250 VA		295 VA	
Maximum continuous output power		240 VA		290 VA	
Nominal (L-L) voltage/range²		240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current		1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency		60 Hz		60 Hz	
Extended frequency range		47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles		5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit³		16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port		III		III	
AC port backfeed current		0 A		0 A	
Power factor setting		1.0		1.0	
Power factor (adjustable)		0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY		@240 V	@208 V	@240 V	@208 V
Peak efficiency		97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency		97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA					
Ambient temperature range		-40°C to +65°C			
Relative humidity range		4% to 100% (condensing)			
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)		MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (WxHxD)		212 mm x 175 mm x 30.2 mm (without bracket)			
Weight		1.08 kg (2.38 lbs)			
Cooling		Natural convection - No fans			
Approved for wet locations		Yes			
Pollution degree		PD3			
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating		NEMA Type 6 / outdoor			
FEATURES					
Communication		Power Line Communication (PLC)			
Monitoring		Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means		The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance		CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

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

To learn more about Enphase offerings, visit enphase.com

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PROJECT NAME & ADDRESS

DAVID MILLER

**178 SW HASTINGS
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COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE
DC SIZE: 13.875 KW DC-(STC)
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ENGINEER:

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE	9/23/2021
DRAWN BY	VS

SHEET NUMBER
R-002

Enphase IQ Combiner 3 (X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV 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 Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring
- Supports Ensemble Communications Kit for communication with Enphase Encharge™ storage and Enphase Enpower™ smart switch

Simple

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

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- UL listed



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and REPLACEMENT PARTS (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G/12-year data plan) CELLMODEM-01 (3G/5-year data plan) CELLMODEM-M1 (4G based LTE-M/5-year data plan) Consumption Monitoring* CT CT-200-SPLIT * Consumption monitoring is required for Enphase Storage Systems	Plug and play industrial grade cellular modem with data plan 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.) Split core current transformers enable whole home consumption metering (+/- 2.5%).
Ensemble Communications Kit COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows wireless communication with Encharge and Enpower.
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replace the default solar shield with this Ensemble Combiner Solar Shield to match the look and feel of the Enphase Enpower™ smart switch and the Enphase Encharge™ storage system
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 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. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80 A of distributed generation / 95 A with IQ Envoy breaker included
Envoy breaker	10A or 15A rating GE Q-line/Siemens Type QP /Eaton BR series included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	CELLMODEM-M1 4G based LTE-M cellular modem (not included). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
COMPLIANCE	
Compliance, Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003
Compliance, IQ Envoy	Production metering: ANSI C12.20 accuracy class 0.5 (PV production) UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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CONTRACTOR
SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE

**RESOURCE
DOCUMENT**

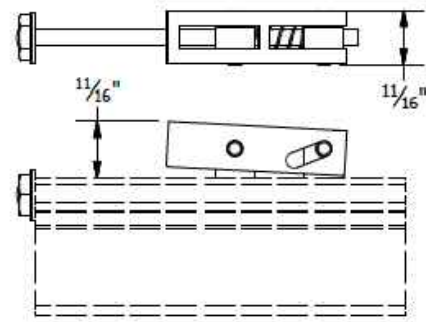
DRAWN DATE 9/23/2021

DRAWN BY VS

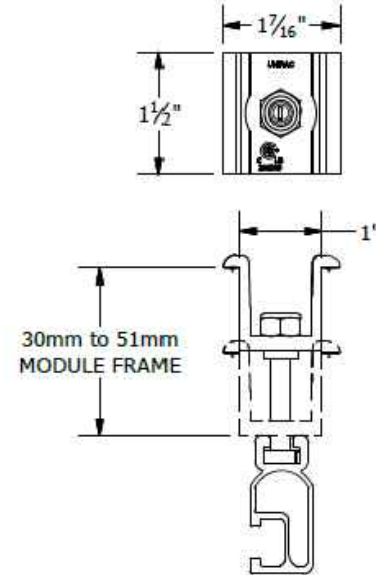
SHEET NUMBER

R-003

PRO SERIES END CLAMP

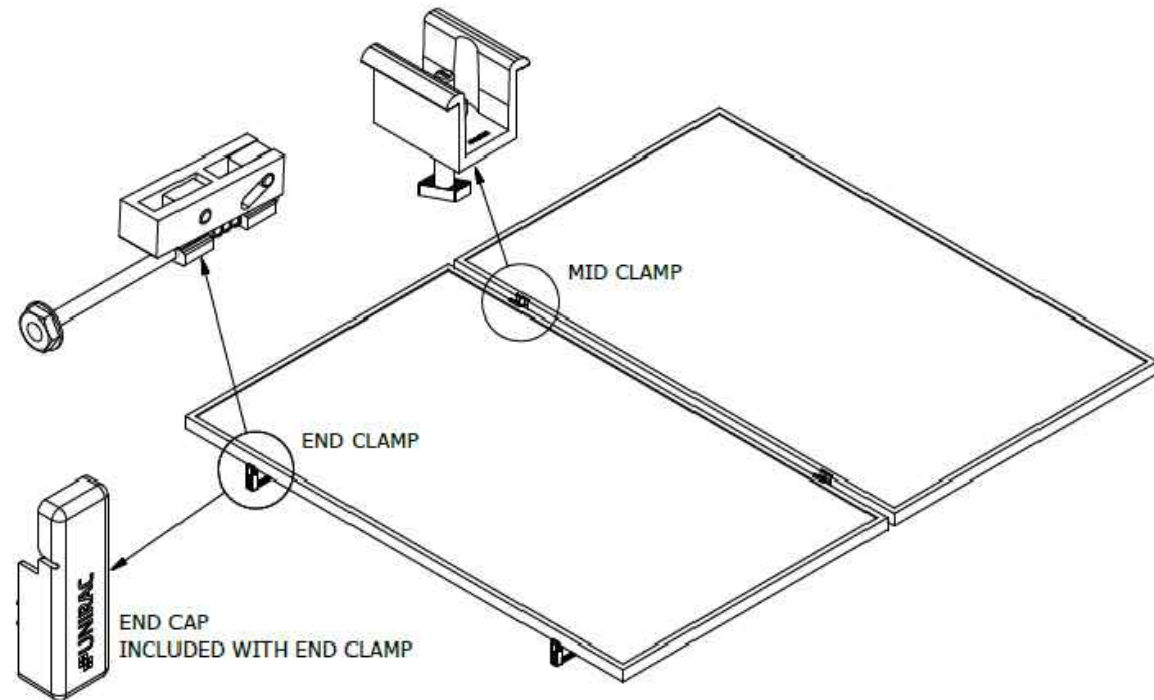


PRO SERIES MID CLAMP



PART # TABLE

P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK



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

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

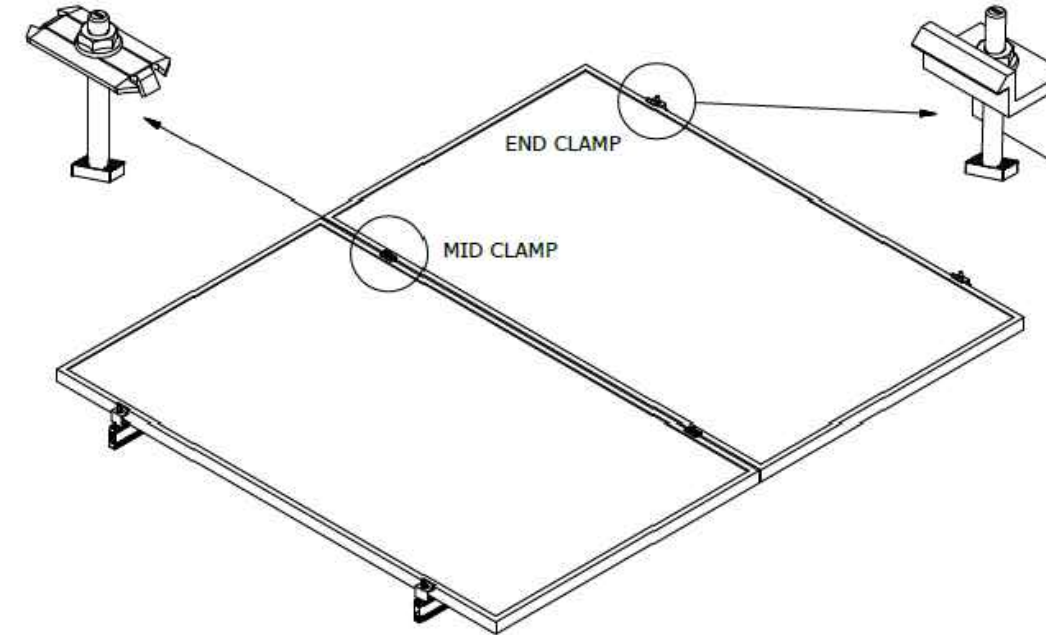
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01

SHEET

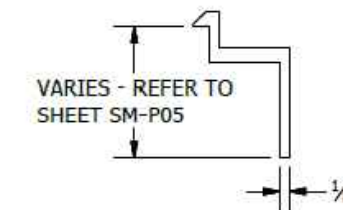
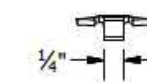
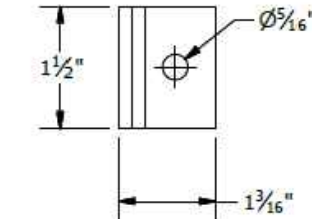
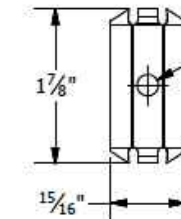
END CLAMP

MID CLAMP



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 REFER TO SHEET SM-P05



BONDING SM MID CLAMP

BONDING SM END CLAMP



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

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING TOP 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-A01A

SHEET

CONTRACTOR

SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE

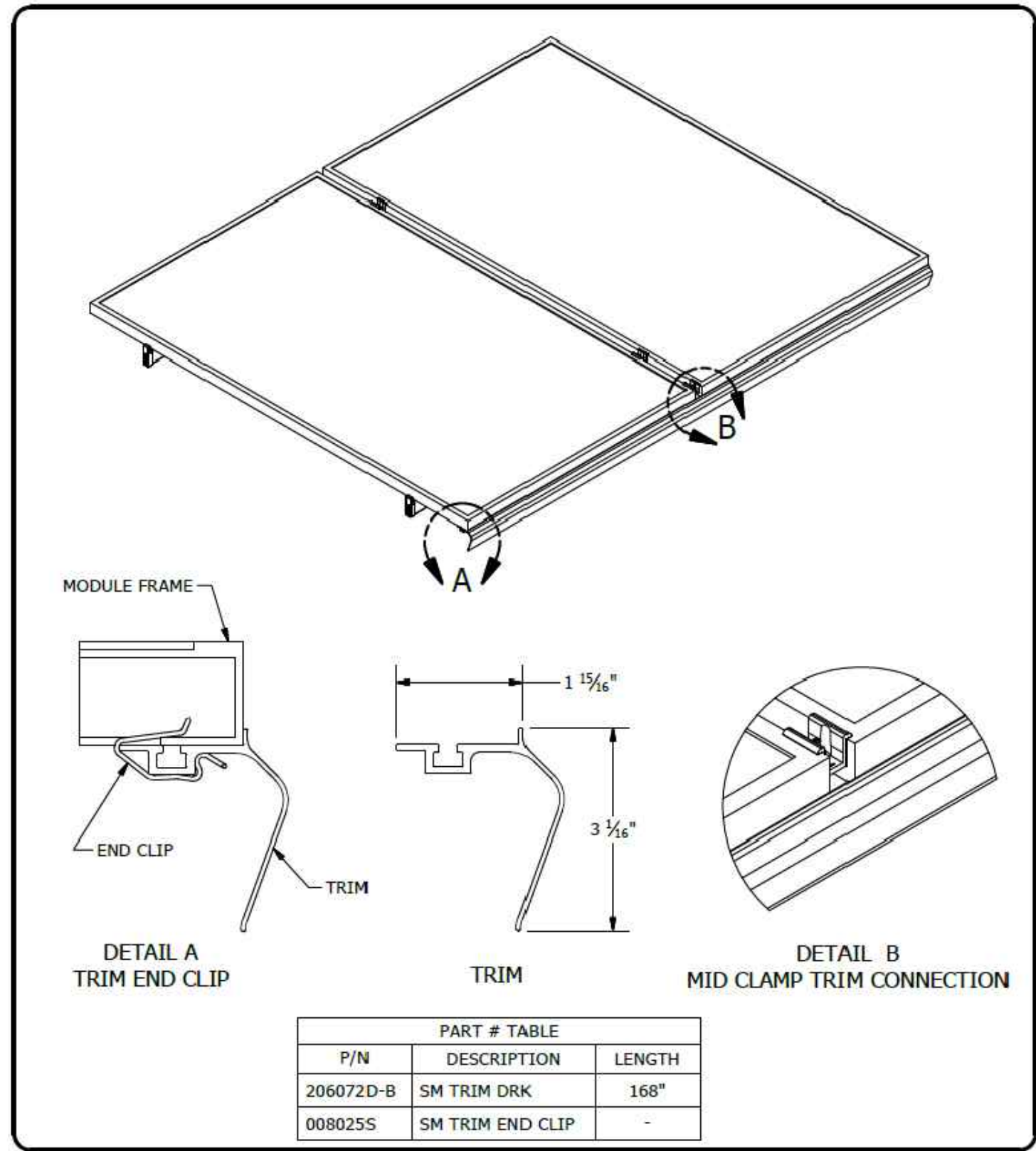
**RESOURCE
DOCUMENT**

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

R-004



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

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

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS

LEGAL NOTICE

SM-A02

SHEET

CONTRACTOR	
SUNPRO	
22171 MCH RD MANDEVILLE, LA 70471 PHONE: 9152011490	
PROJECT NAME & ADDRESS	
DAVID MILLER	
178 SW HASTINGS WAY, LAKE CITY, FL 32024	
COUNTY:-COLUMBIA COUNTY	
SYSTEM SIZE	
DC SIZE: 13.875 KW DC-(STC) AC SIZE: 10.730 KW AC	
ENGINEER:	
SHEET TITLE	
RESOURCE DOCUMENT	
DRAWN DATE	9/23/2021
DRAWN BY	VS
SHEET NUMBER	
R-005	

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE
**RESOURCE
DOCUMENT**

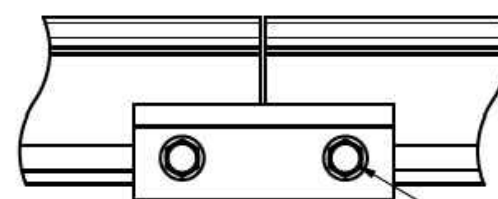
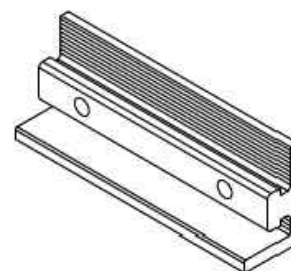
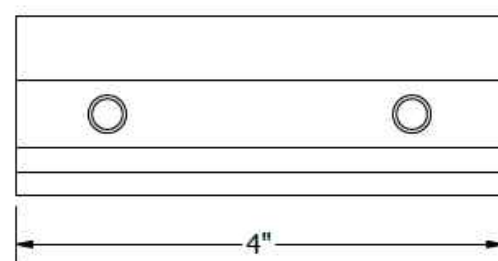
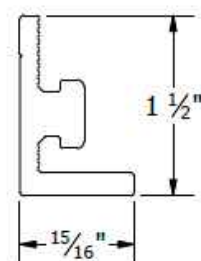
DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

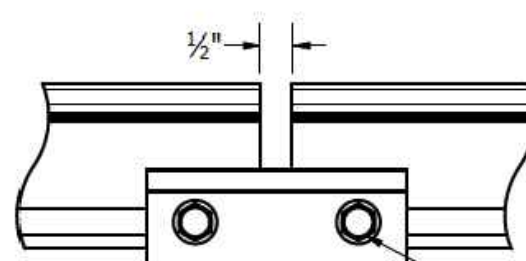
R-006

BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL

5/16"-18 TYPE F THREAD
CUTTING SCREWS INCLUDED



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

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

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

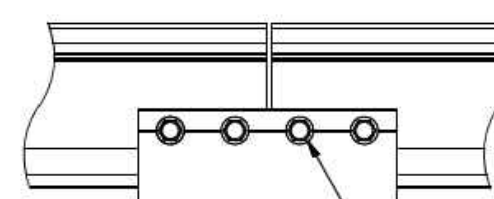
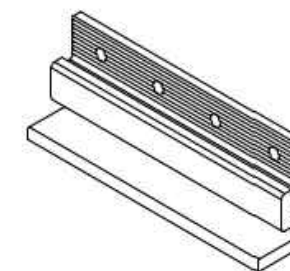
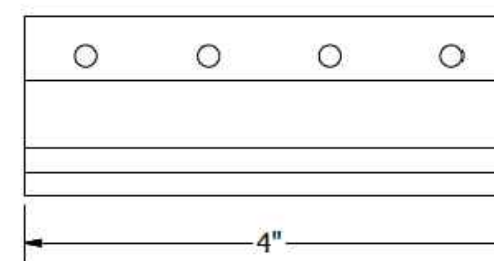
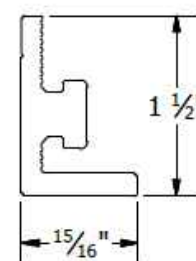
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A05

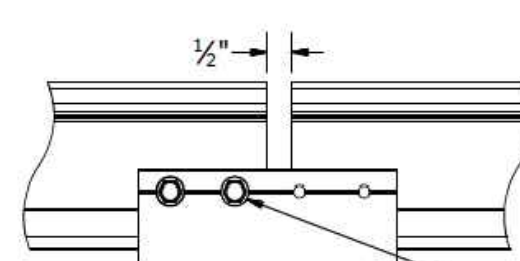
SHEET

BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL

#12 X 3/4" SELF DRILLING SS SCREWS INCLUDED



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

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

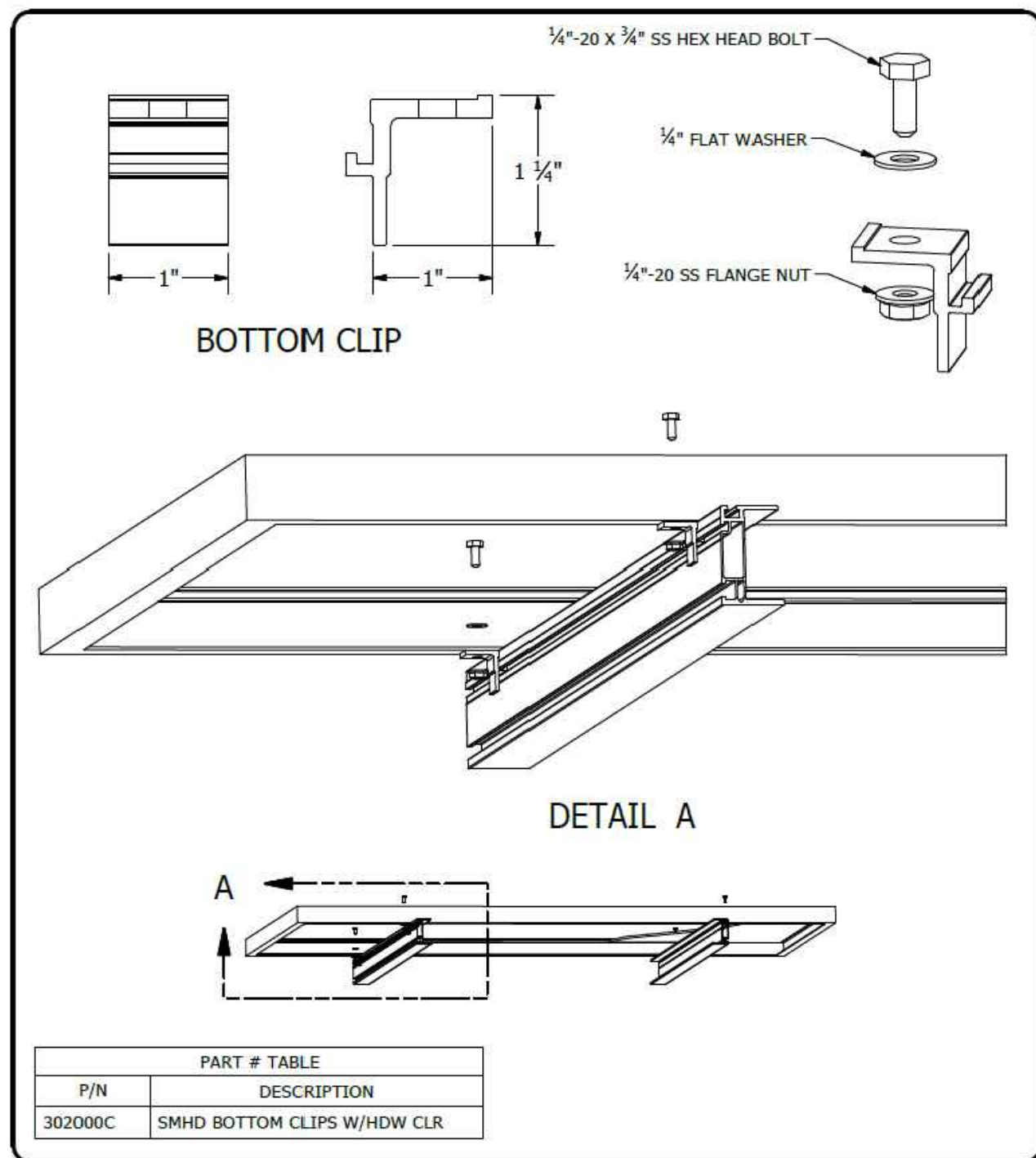
PRODUCT LINE: SOLARMOUNT
DRAWING TYPE: PART & ASSEMBLY
DESCRIPTION: BONDING SPLICE
BAR
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A05

SHEET



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

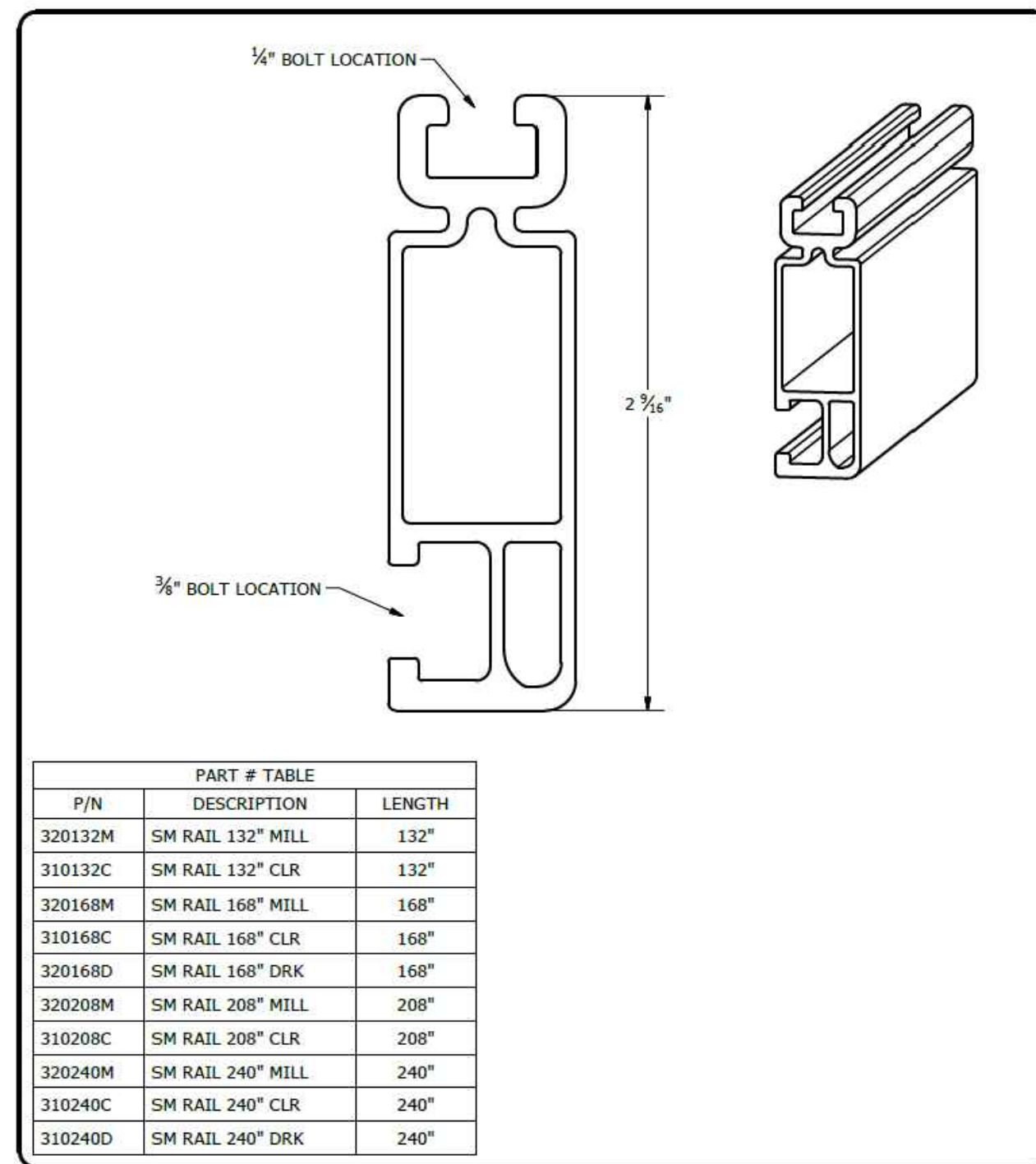
PRODUCT LINE:	SOLARMOUNT HD
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BOTTOM CLIP
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS

LEGAL NOTICE

SM-A10
SHEET



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

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

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS

LEGAL NOTICE

SM-P01
SHEET

CONTRACTOR

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE

RESOURCE
DOCUMENT

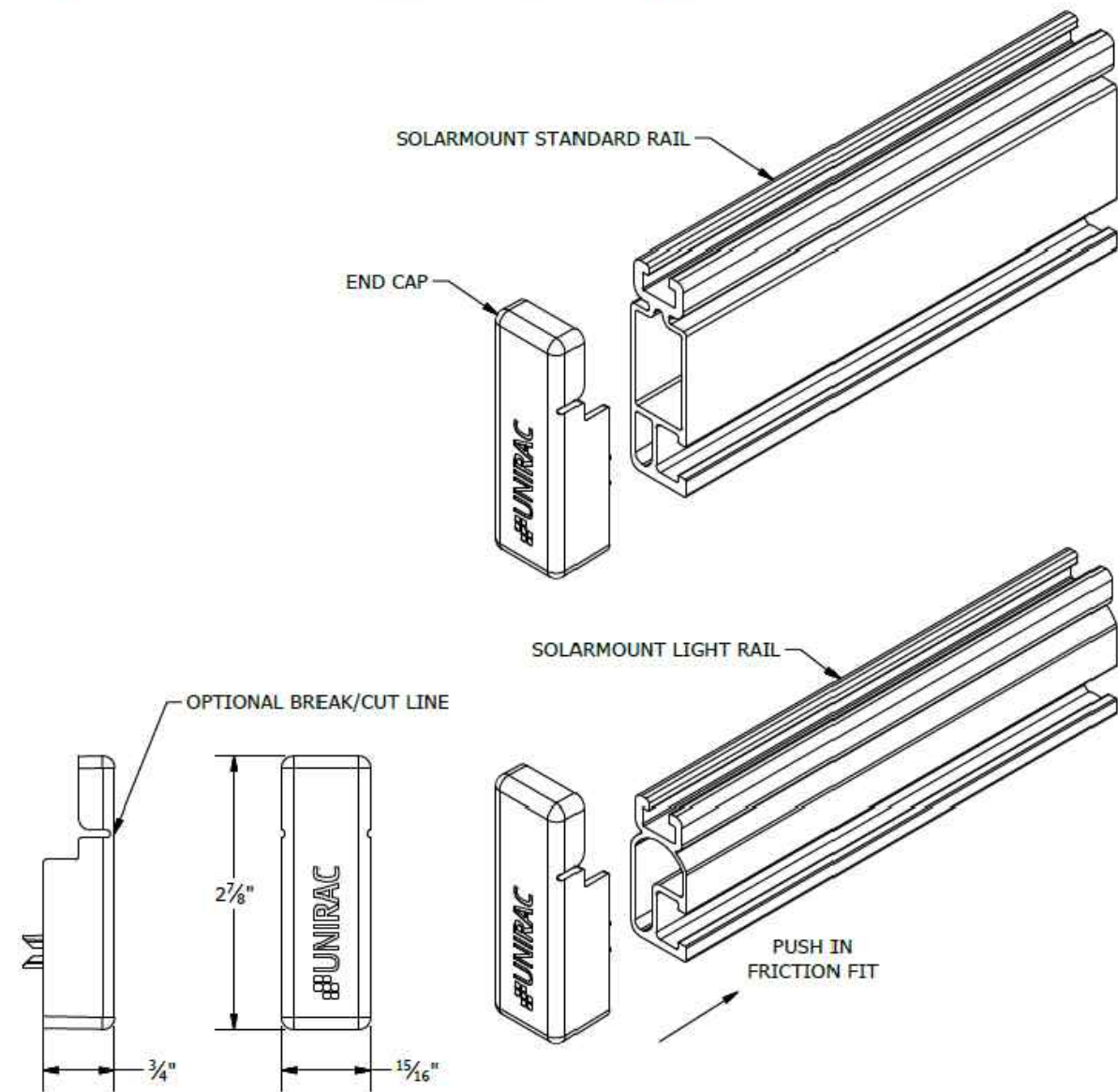
DRAWN DATE	9/23/2021
DRAWN BY	VS

SHEET NUMBER

R-007

NOTES:

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

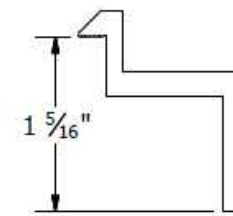


UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

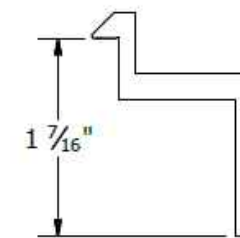
PRODUCT LINE: SOLARMOUNT
DRAWING TYPE: PART DETAIL
DESCRIPTION: END CAPS
REVISION DATE: 9/27/2017

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

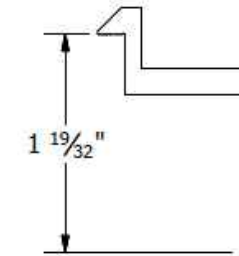
SM-P04
SHEET



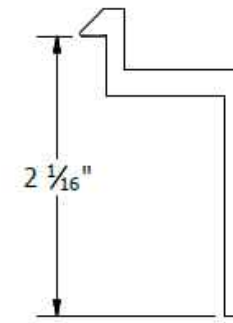
B CLAMP
30mm to 32mm Module Thickness
(1.18" to 1.26")



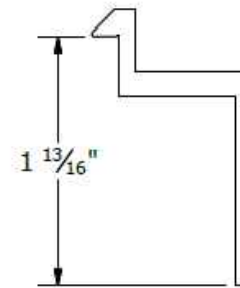
C CLAMP
33mm to 36mm Module Thickness
(1.30" to 1.42")



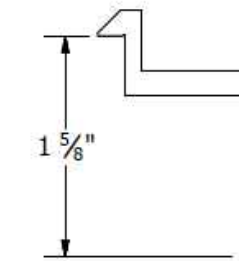
D CLAMP
38mm to 40mm Module Thickness
(1.50" to 1.57")



E CLAMP
50mm to 51mm Module Thickness
(1.97" to 2.00")

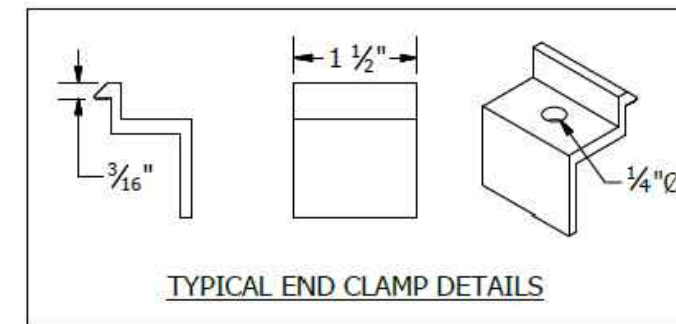


F CLAMP
45mm to 47mm Module Thickness
(1.77" to 1.85")



K CLAMP
39mm to 41mm Module Thickness
(1.54" to 1.61")

PART # TABLE	
P/N	DESCRIPTION
302021C	SM ENDCLAMP B CLR AL
302021D	SM ENDCLAMP B DRK AL
302022C	SM ENDCLAMP C CLR AL
302022D	SM ENDCLAMP C DRK AL
302023C	SM ENDCLAMP D CLR AL
302023D	SM ENDCLAMP D DRK AL
303024C	SM ENDCLAMP E CLR AL
302024D	SM ENDCLAMP E DRK AL
302025C	SM ENDCLAMP F CLR AL
302025D	SM ENDCLAMP F DRK AL
302026C	SM ENDCLAMP K CLR AL
302026D	SM ENDCLAMP K DRK AL



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

CONTRACTOR
SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

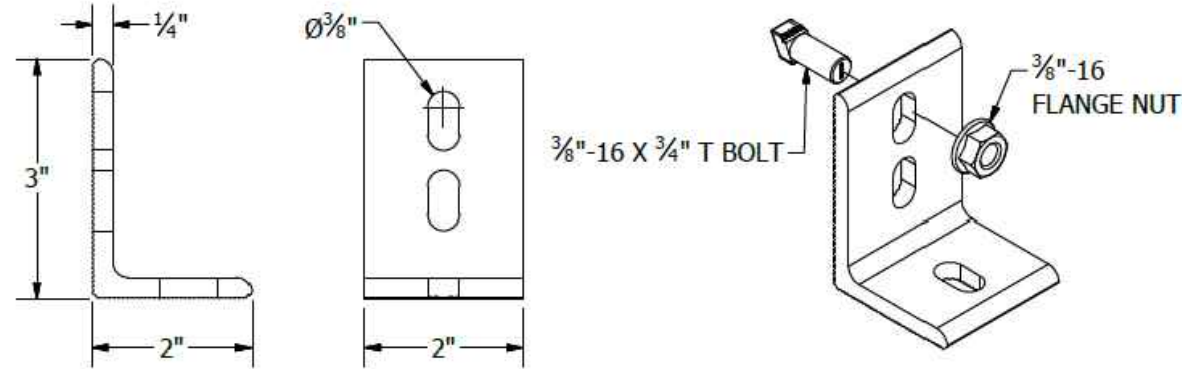
ENGINEER:

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE 9/23/2021
DRAWN BY VS

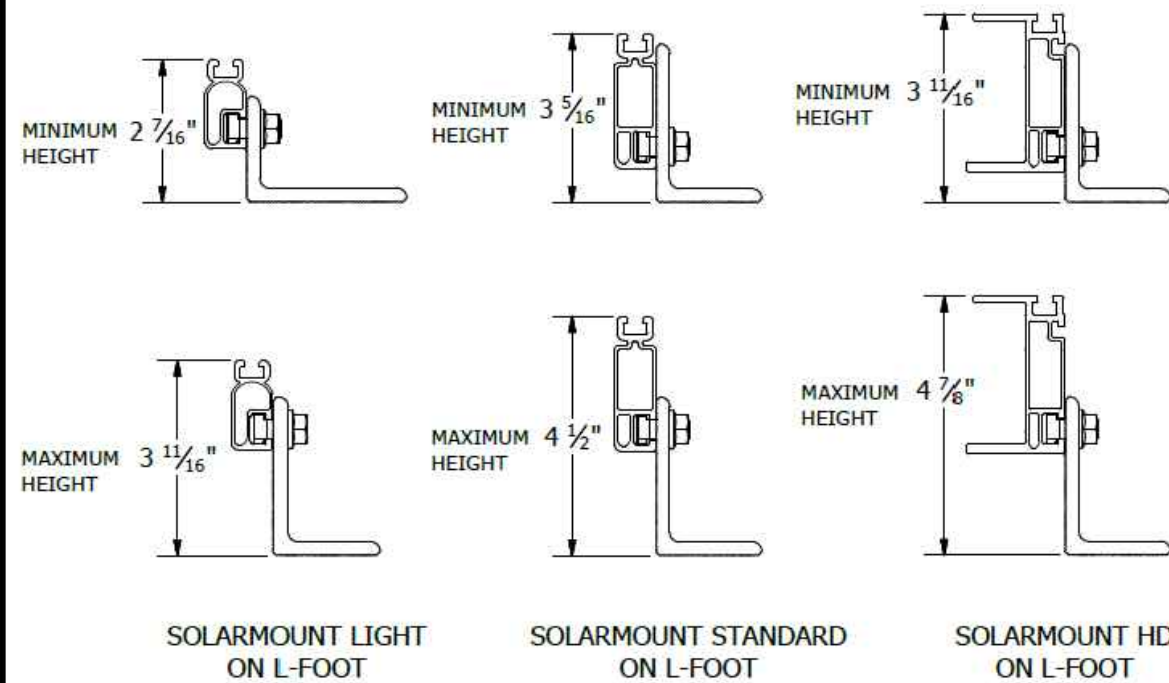
SHEET NUMBER

R-008



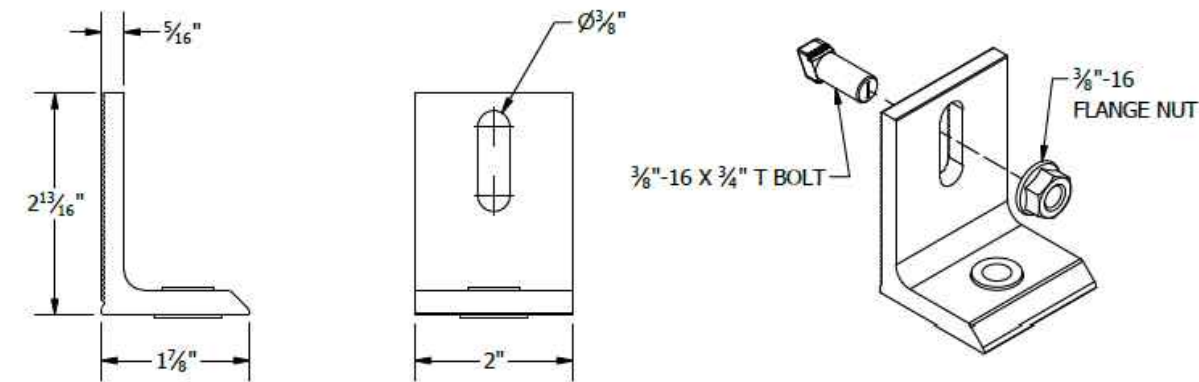
L-FOOT

PART # TABLE	
P/N	DESCRIPTION
304001C	L-FOOT SERR W/T-BOLT CLR
304001D	L-FOOT SERR W/T-BOLT DRK

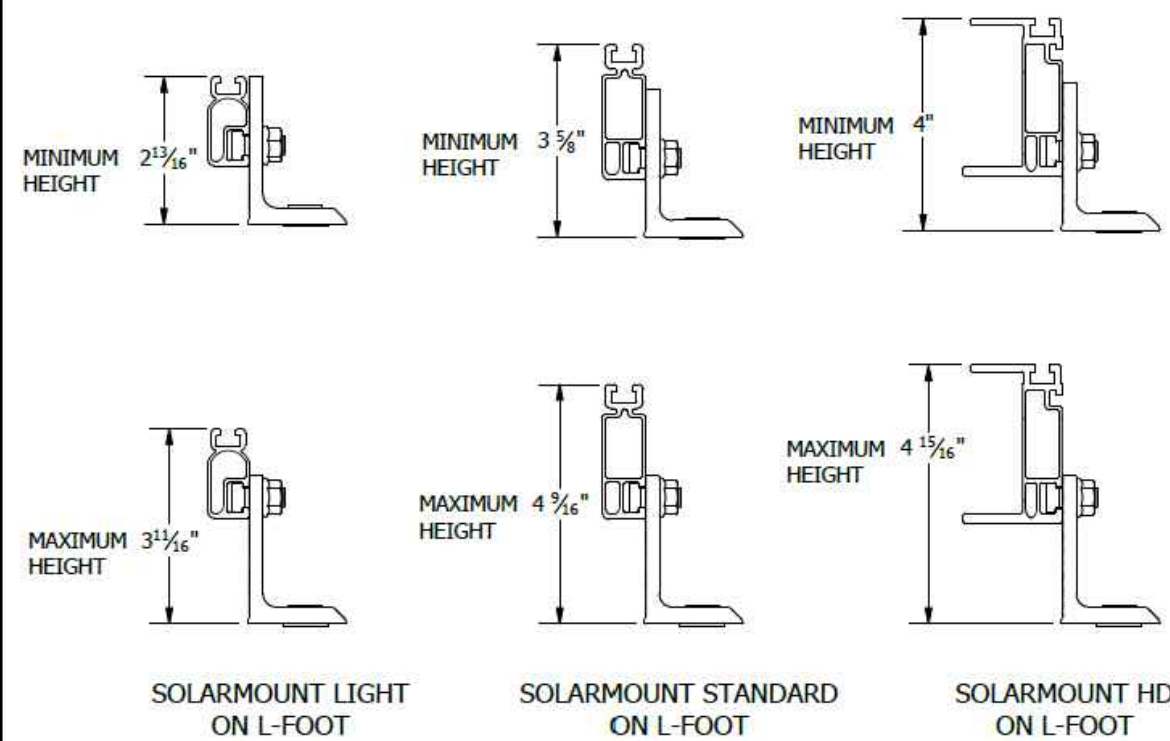


NOTES:
1. L-FOOT CAN BE INSTALLED IN TWO ORIENTATIONS, PLEASE REFER TO INSTRUCTIONS IN THE QUICK START GUIDE.

 1411 BROADWAY BLVD. NE ALBUQUERQUE, NM 87102 USA PHONE: 505.242.6411 WWW.UNIRAC.COM	PRODUCT LINE:	SOLARMOUNT	DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL	SM-A04
	DRAWING TYPE:	PART & ASSEMBLY		
	DESCRIPTION:	L-FOOT	PRODUCT PROTECTED BY ONE OR MORE US PATENTS	
	REVISION DATE:	9/27/2017		
		LEGAL NOTICE	SHEET	



L-FOOT



 1411 BROADWAY BLVD. NE ALBUQUERQUE, NM 87102 USA PHONE: 505.242.6411 WWW.UNIRAC.COM	PRODUCT LINE:	SOLARMOUNT	DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL	SM-A11
	DRAWING TYPE:	PART & ASSEMBLY		
	DESCRIPTION:	L-FOOT	PRODUCT PROTECTED BY ONE OR MORE US PATENTS	
	REVISION DATE:	11/19/2018		
		LEGAL NOTICE	SHEET	

CONTRACTOR
SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

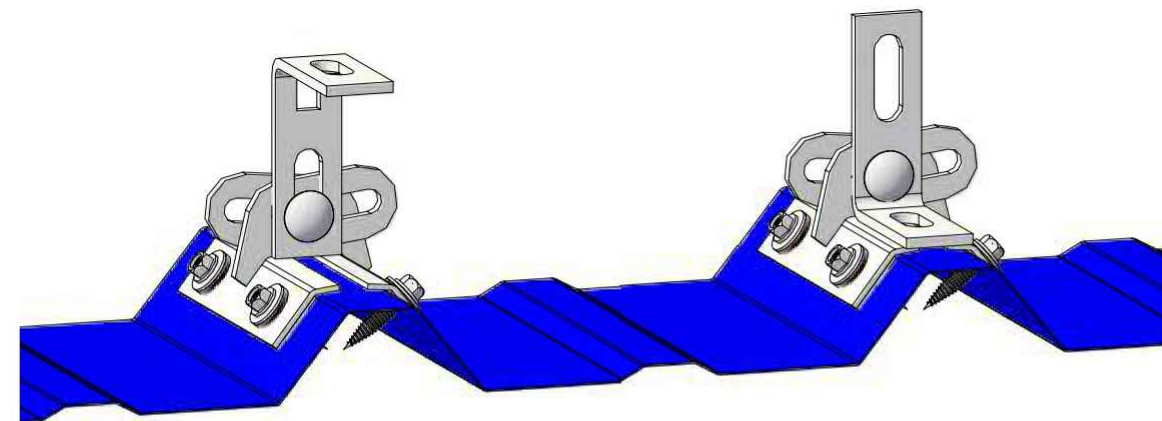
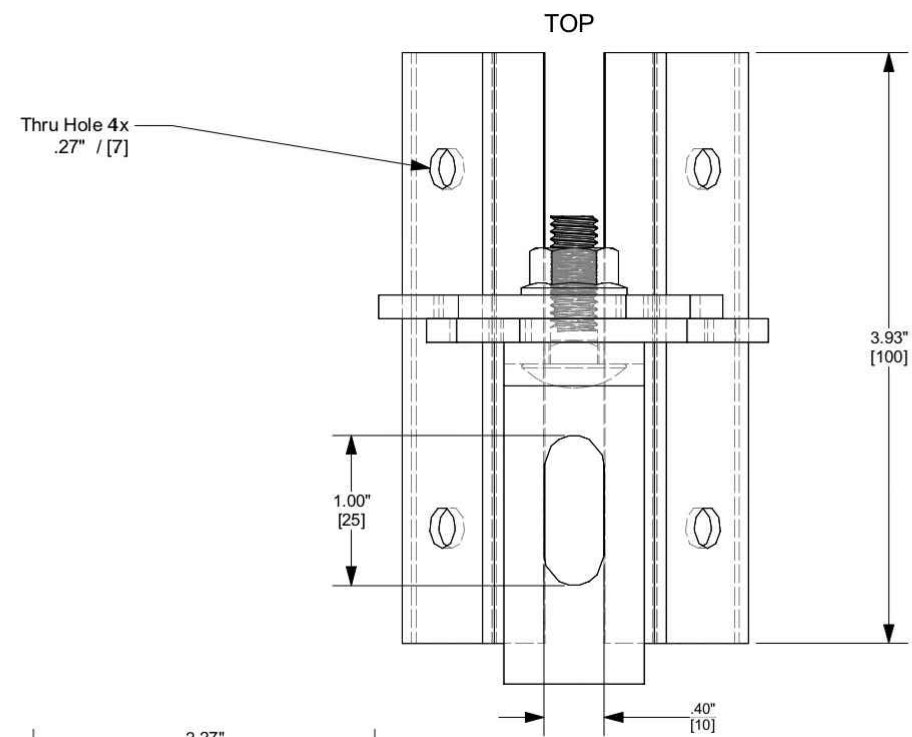
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**RESOURCE
DOCUMENT**

DRAWN DATE 9/23/2021

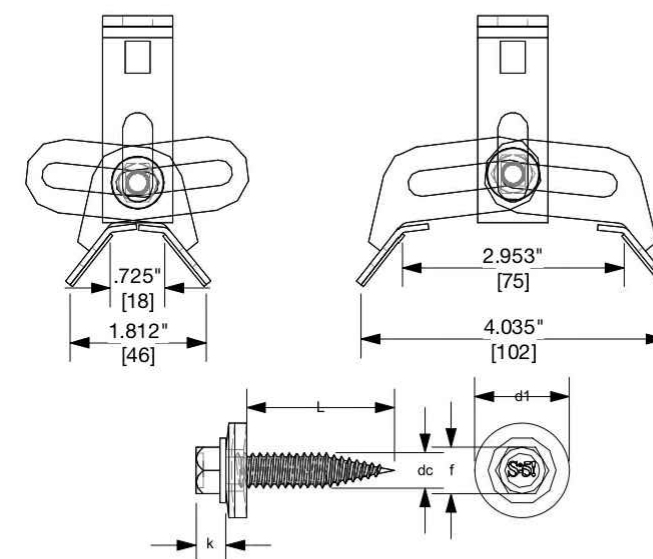
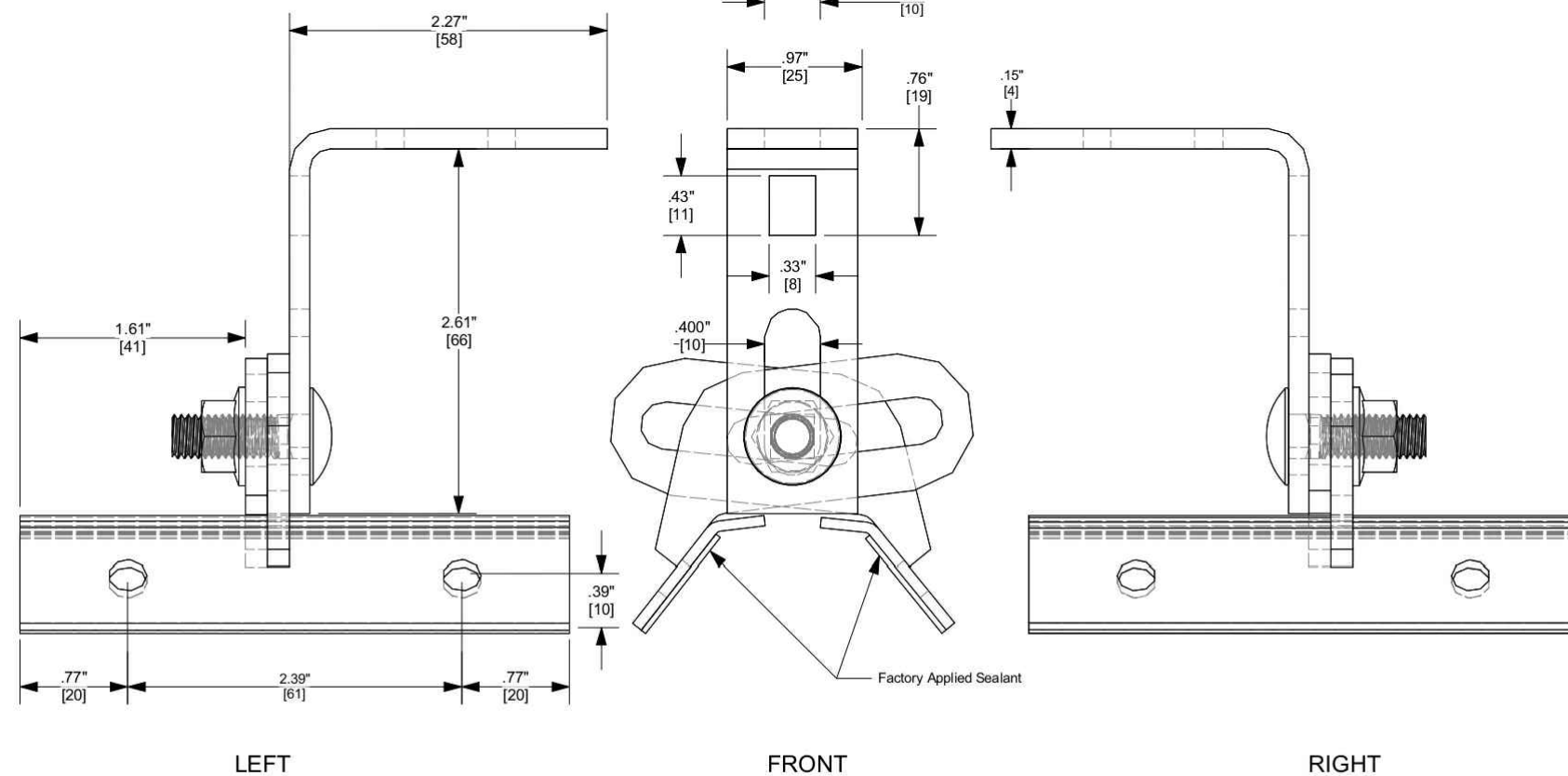
DRAWN BY VS

SHEET NUMBER

R-009



ProteaBracket



	k	dc	L	d1	f
MM	3.9	6.10-6.25	25.4	14.7	7.8
INCH	.15	.24-.246	1	.58	.31

6mm X 25mm (8mm Hex W/16mm Washer)

FOR STANDING SEAM SPECIFIC MECHANICAL LOAD TEST INFORMATION AND CLAMP INSTALLATION INFORMATION PLEASE VISIT: WWW.S-5.COM

MATERIAL: A2 Stainless	 The Right Way!		METAL ROOF INNOVATIONS, LTD. 8655 TABLE BUTTE RD COLORADO SPRINGS, CO 80908 719-495-0518 719-495-0045 (FAX)	
EST ASSEMBLY WEIGHT : .526 lbs				
SUPPLIED HARDWARE: (4) 6mm X 25mm (8mm Hex W/Washer) B1-Metal Sheet Screw				
	TITLE S-5! ProteaBracket			
SCALE: 1:1	DRAWING NO. ProteaBracket_CCD_2015	DRAWN BY DMMH	DATE 10/5/2015	
OTHER:	S-5!® PRODUCTS ARE PROTECTED BY MULTIPLE U.S. PATENTS INCLUDING 5,228,248, 5,983,588 AND 6,164,033 (OTHERS ISSUED AND PENDING). EUROPEAN PATENTS ARE ALSO APPLIED FOR AND PENDING UNDER THE PATENT COOPERATION TREATY WITH DIVISIONAL FILING RIGHTS RETAINED. METAL ROOF INNOVATIONS, LTD. (LICENSOR OF S-5!® TECHNOLOGY) AGGRESSIVELY PROSECUTES PATENT INFRINGEMENT.			

CONTRACTOR

SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

DAVID MILLER

178 SW HASTINGS
WAY, LAKE CITY,
FL 32024

COUNTY:-COLUMBIA COUNTY

SYSTEM SIZE

DC SIZE: 13.875 KW DC-(STC)
AC SIZE: 10.730 KW AC

ENGINEER:

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE 9/23/2021

DRAWN BY VS

SHEET NUMBER

R-010