

SURETTE RESIDENCE
16.88kW PV SYSTEM

1970 N US HWY 441,
LAKE CITY, FL 32055

Castillo
Engineering

SOLAR DONE RIGHT®

CASTILLO ENGINEERING
SERVICES, LLC

COA# 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally
Signed by:
Ermocrates
E Castillo
Date:
2021.10.28
16:39:00

ERMOCRATES E. CASTILLO
No. 52590
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

PROJECT NAME

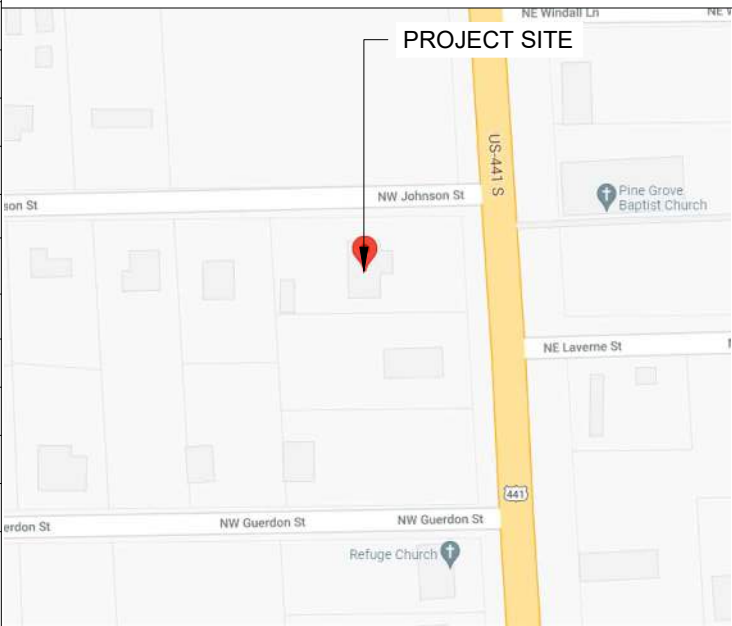
SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
G-01

PROJECT DESCRIPTION:	CODES AND STANDARDS	OWNER	HOUSE PHOTO																										
45x375 LG NEON2: LG375N1C-A6 (375W) MODULES ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES SYSTEM SIZE: 16.88 kW DC STC ARRAY AREA #1: 585.10 SQ FT. ARRAY AREA #2: 253.55 SQ FT. ARRAY AREA #3: 39.01 SQ FT. EQUIPMENT SUMMARY 45 LG NEON2: LG375N1C-A6 (375W) MODULES 45 ENPHASE: IQ7PLUS-72-2-US MICROINVERTERS RACKING: UNIRAC LIGHT RAIL ATTACHMENT: S-5-PROTEA DESIGN CRITERIA: WIND SPEED (ULT): 120 MPH WIND SPEED (ASD): 93 MPH RISK CATEGORY: II EXPOSURE: B	GOVERNING CODES : FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC) FLORIDA PLUMBING CODE, 7TH EDITION 2020 (FPC) FLORIDA BUILDING CODE, 7TH EDITION 2020 (FBC) FLORIDA MECHANICAL CODE, 7TH EDITION 2020 (FMC) NATIONAL ELECTRICAL CODE 2017 (NEC) ASCE 7-16 	SURETTE, ANDRA INSTALLER SUNPRO SOLAR 4492 Eagle Falls Place, Tampa, FL 33619 (866) 450-1012 ENGINEER Castillo Engineering Services LLC 620 N. Wymore Road, Suite 250, Maitland, FL 32751 TEL: (407) 289-2575 Ermocrates E. Castillo License#: FL PE 52590 <table><thead><tr><th colspan="2">SHEET INDEX</th></tr></thead><tbody><tr><th>SHEET #</th><th>SHEET DESCRIPTION</th></tr><tr><td>G-01</td><td>COVER SHEET</td></tr><tr><td>A-00</td><td>NOTES AND DESCRIPTION</td></tr><tr><td>A-01</td><td>ROOF PLAN</td></tr><tr><td>S-01</td><td>MODULE LAYOUT</td></tr><tr><td>S-01.1</td><td>PARTIAL PRESSURE AND MODULES EXPOSURE</td></tr><tr><td>S-02</td><td>ATTACHMENT DETAIL</td></tr><tr><td>S-02.2</td><td>STRUCTURE CALCULATION</td></tr><tr><td>E-01</td><td>ELECTRICAL LINE DIAGRAM</td></tr><tr><td>E-02</td><td>WIRING CALCULATIONS</td></tr><tr><td>E-03</td><td>SYSTEM LABELING</td></tr><tr><td>DS-01-07</td><td>DATA SHEETS</td></tr></tbody></table>	SHEET INDEX		SHEET #	SHEET DESCRIPTION	G-01	COVER SHEET	A-00	NOTES AND DESCRIPTION	A-01	ROOF PLAN	S-01	MODULE LAYOUT	S-01.1	PARTIAL PRESSURE AND MODULES EXPOSURE	S-02	ATTACHMENT DETAIL	S-02.2	STRUCTURE CALCULATION	E-01	ELECTRICAL LINE DIAGRAM	E-02	WIRING CALCULATIONS	E-03	SYSTEM LABELING	DS-01-07	DATA SHEETS	 PROJECT SITES VICINITY MAP  PROJECT SITE
	SHEET INDEX																												
SHEET #	SHEET DESCRIPTION																												
G-01	COVER SHEET																												
A-00	NOTES AND DESCRIPTION																												
A-01	ROOF PLAN																												
S-01	MODULE LAYOUT																												
S-01.1	PARTIAL PRESSURE AND MODULES EXPOSURE																												
S-02	ATTACHMENT DETAIL																												
S-02.2	STRUCTURE CALCULATION																												
E-01	ELECTRICAL LINE DIAGRAM																												
E-02	WIRING CALCULATIONS																												
E-03	SYSTEM LABELING																												
DS-01-07	DATA SHEETS																												
STRUCTURAL CERTIFICATION:	ELECTRICAL CERTIFICATION:																												
I ERMOCRATES CASTILLO PE# 52590 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC: RESIDENTIAL 2020 7th ED., CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.	I ERMOCRATES CASTILLO PE# 52590 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 107, THE NEC 2017, AND THOSE SET FORTH BY THE FLORIDA SOLAR ENERGY CENTER CERTIFICATION																												

Symbols:

Section.....

Sheet where section is located

Elevation

Detail ID Letter
Sheet where section is located

Detail

Detail ID Letter
Sheet where section is located

Detail

Detail ID Letter
Area to be enlarged
Sheet where section is located

Keyed Notes

1

Keyed note designation on applicable sheet

Ground Terminal

Grounding Point/rod....

Solar Panel

or 00

Module with Source Circuit number

Combiner Box

CB

AC Disconnect

ACD

Main Distribution Panel

MDP

Fuse

Overcurrent Breaker ..

Inverter

Transformer

Automatic

ATS

Transfer Switch

Vent, Attic fan (Roof obstruction)

PV Roof Attachment

Trusses

Conduit

Fire Access

Abbreviations:

AC	Alternating Current
ACD	AC Disconnect
APPROX	Approximate
AWG	American Wire Gauge
BAT	Battery
CB	Combiner Box
DC	Direct Current
DISC	Disconnect
(E)	Existing
EL	Elevation
EQ	Equal
GP	Generation Panel
JB	Junction Box
MCB	Main Combiner Box
MFR	Manufacturer
MID	Microgrid Interconnect Device
MIN	Minimum
MISC	Miscellaneous
MDP	Main Distribution Panel
(N)	New
NAVD	North American Vertical datum
OCPD	OverCurrent Protection Device
POCC	Point Of Common Coupling
PV	Photovoltaic
SF	Squarefoot/feet
STC	Standard Test Conditions
SD	Soladeck
TBD	To Be Determined
TYP	Typical
UNO	Unless Noted Otherwise
UM	Utility meter
VIF	Verify In Field
WP	Weather Proof

System Description

This system is a grid-tied, PV system, with PV generation consisting of 45x375 LG NEON2: LG375N1C-A6 (375W) Modules with a combined STC rated dc output power of 16,875W. The modules are connected into 45 Enphase: IQ7PLUS-72-2-US microinverters. The inverter has electronic maximum power point tracking to maximize energy captured by the PV modules. The inverter also has an internal ground fault detection and interruption device that is set to disconnect the array in the event that a ground fault that exceeds one ampere should occur. The inverter has DC and AC disconnect integrated system and labels are provided as required by the *NATIONAL ELECTRICAL CODE*

When the sun is shining, power from the PV array is fed into the inverter, where it is converted from DC to AC. The inverter output is then used to contribute to the power requirements of the occupancy. If PV power meets the requirements of the loads of the occupancy, any remaining PV power is sold back to the utility. When utility power is available, but PV power is not available, building loads are supplied by the utility.

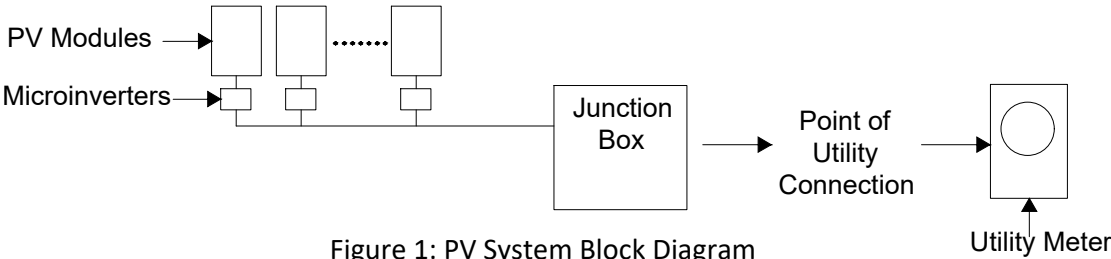


Figure 1: PV System Block Diagram

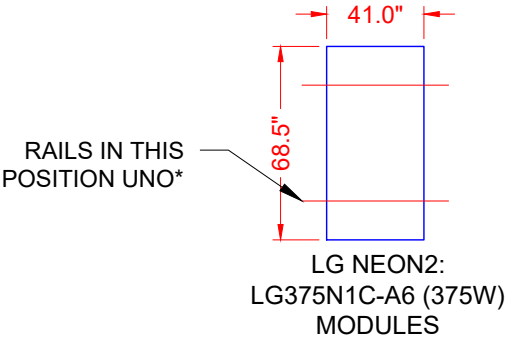
The inverter meets the requirements of IEEE 1547 and UL 1741.

FALL PROTECTION:
ANCHORAGES USED FOR ATTACHMENT OF PERSONAL FALL ARREST EQUIPMENT MUST BE INDEPENDENT OF ANY ANCHORAGE BEING USED TO SUPPORT OR SUSPEND PLATFORMS, AND CAPABLE OF SUPPORTING AT LEAST 5,000 POUNDS PER EMPLOYEE ATTACHED, OR MUST BE DESIGNED AND USED AS FOLLOWS:

- AS PART OF A COMPLETE PERSONAL FALL ARREST SYSTEM WHICH MAINTAINS A SAFETY FACTOR OF AT LEAST TWO.
- UNDER THE SUPERVISION OF A QUALIFIED PERSON

ADDITIONAL INFORMATION

- 29 CFR 1926 SUBPART M, FALL PROTECTION. OSHA STANDARD.
- 1926.502, FALL PROTECTION SYSTEMS CRITERIA AND PRACTICES
- ... 1926.502(D)(15)



ALLOWABLE/DESIGN PRESSURE	PSF
DOWN PRESSURE	126
UPLIFT PRESSURE, 2 RAILS	89

Castillo Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC
COA# 28345
620 N. WYMORE ROAD, SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING SERVICES, LLC

REVISIONS
DESCRIPTIONDATEREV

PROJECT INSTALLER

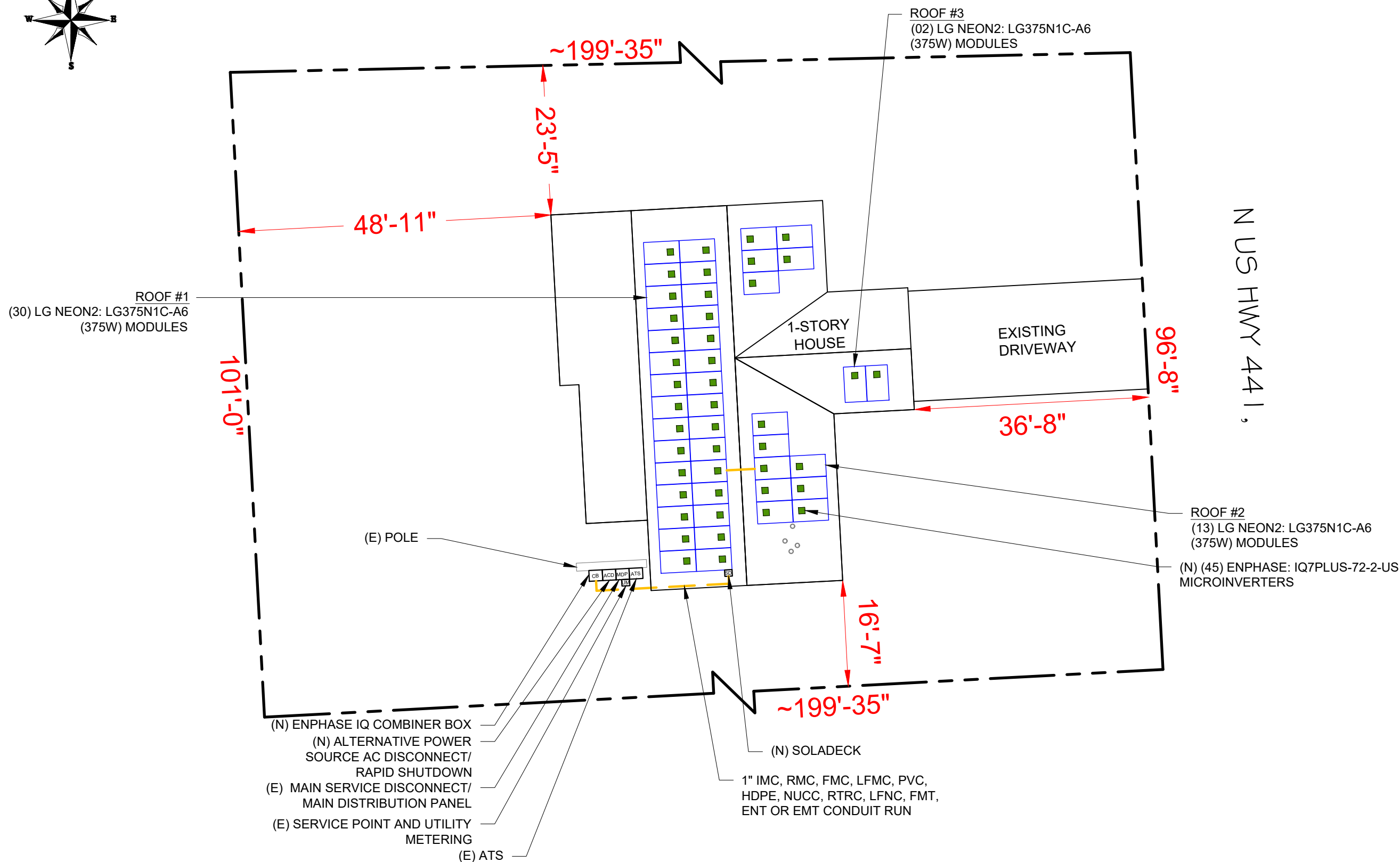
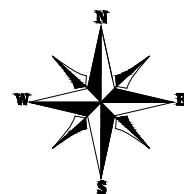
Digitally signed by:
Ermocrates E Castillo
Date: 2021.10.28 16:39:03

PROJECT NAME
SURETTE RESIDENCE
1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
NOTES AND DESCRIPTION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
A-00



REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally signed by:
Ermocrates E. Castillo
Date: 2021.10.28 16:39:03

PROJECT NAME

SURETTE RESIDENCE
1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME

ROOF PLAN

SHEET SIZE

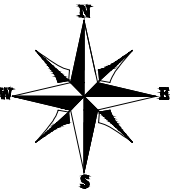
**ANSI B
11" X 17"**

SHEET NUMBER

A-01

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 45 MODULES
MODULE TYPE = LG NEON2: LG375N1C-A6 (375W) MODULES
MODULE WEIGHT = 41.01 LBS / 18.6 KG.
MODULE DIMENSIONS = 68.5"x 41.0" = 19.50 SF
UNIT WEIGHT OF ARRAY = 2.10 PSF



ARRAY AREA & ROOF AREA CALC'S								
ROOF	ROOF TYPE	ARRAY AREA (sq.Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)	TILT	AZIMUTH	TRUSS SIZE	SEAM SPACING
#1	METAL	585.10	892.50	65.56	14.0°	267°	2"X4"	12" o.c.
#2	METAL	253.55	749.37	33.83	14.0°	87°	2"X4"	12" o.c.
#3	METAL	39.01	191.74	20.34	14.0°	177°	2"X4"	12" o.c.

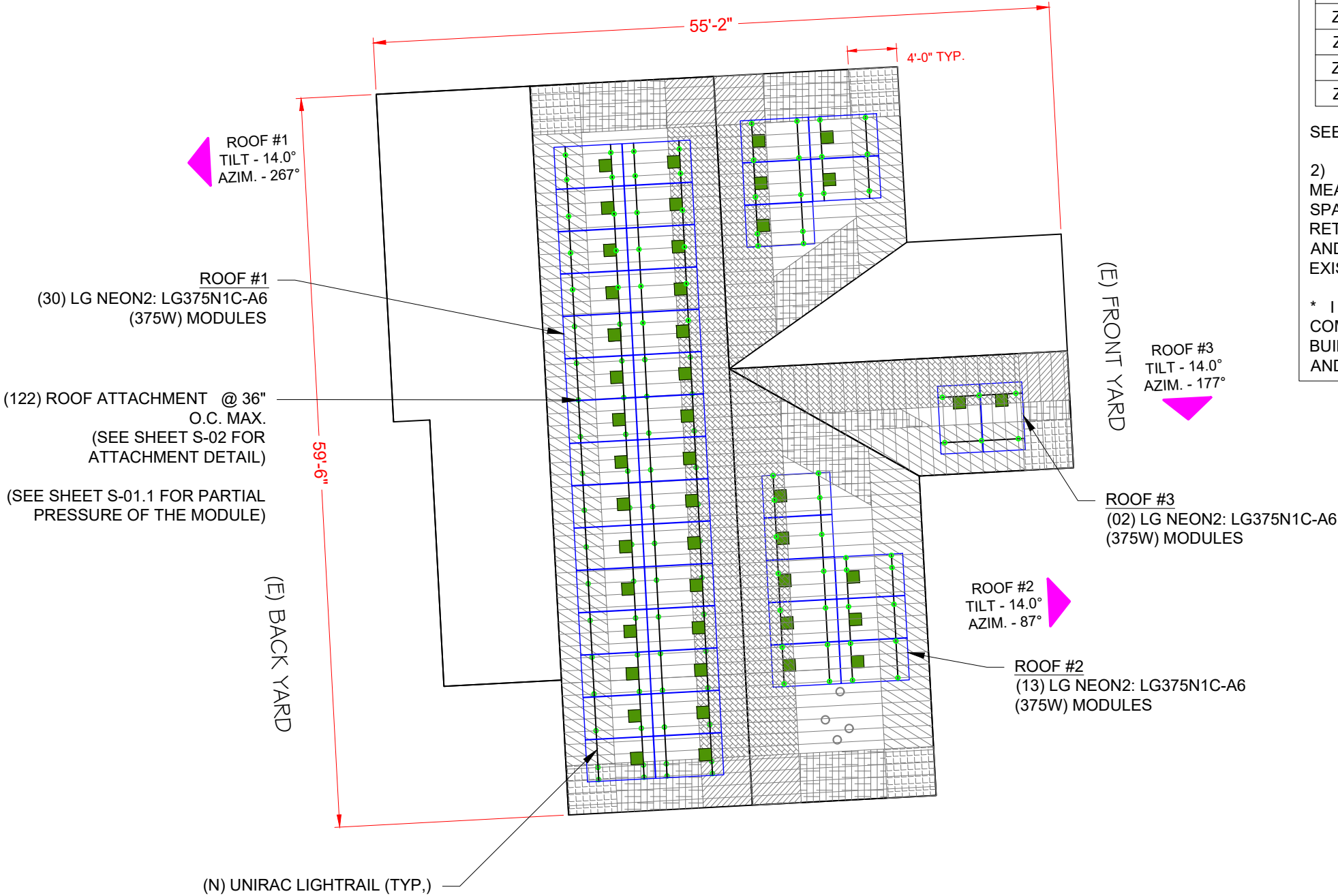
GENERAL INSTALLATION PLAN NOTES:
1) ROOF ATTACHMENTS TO SYP TRUSSES SHALL BE INSTALLED AS SHOWN IN SHEET S-02 AND AS FOLLOWS FOR EACH WIND ZONE:

WIND ZONES	NON - EXPOSED MODULES		EDGE / EXPOSED MODULES	
	SPAN	CANTILEVER	SPAN	CANTILEVER
ZONE 1	3' - 0"	1' - 0"	3' - 0"	1' - 0"
ZONE 1'	X	X	X	X
ZONE 2e	3' - 0"	1' - 0"	3' - 0"	1' - 0"
ZONE 2n	3' - 0"	1' - 0"	3' - 0"	1' - 0"
ZONE 2r	3' - 0"	1' - 0"	3' - 0"	1' - 0"
ZONE 3e	3' - 0"	1' - 0"	3' - 0"	1' - 0"
ZONE 3r	3' - 0"	1' - 0"	3' - 0"	1' - 0"

SEE SHEET S-02.1 FOR SUPPORTING CALCULATIONS

2) EXISTING RESIDENTIAL BUILDING IS AN METAL ROOF WITH MEAN ROOF HEIGHT OF 15 FT AND SYP 2"X4" ROOF TRUSSES SPACED 12" O.C. EXISTING ROOF SLOPE FOR SOLAR SYSTEM RETROFIT IS 14.0 DEGREES. CONTRACTOR TO FIELD VERIFY AND SHALL REPORT TO THE ENGINEER IF ANY DISCREPANCIES EXIST BETWEEN PLANS AND IN FIELD CONDITIONS.

* I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC: RESIDENTIAL 2020 7TH ED., CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES AND EQUIPMENT DEAD LOADS. *



LEGEND

- WIND ZONE 1 (TYP)
- WIND ZONE 2e (TYP)
- WIND ZONE 2n (TYP)
- WIND ZONE 2r (TYP)
- WIND ZONE 3r (TYP)
- WIND ZONE 3e (TYP)



CASTILLO ENGINEERING SERVICES, LLC
COA# 28345
620 N. WYMORE ROAD, SUITE 250, MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY CASTILLO ENGINEERING SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



Digitally signed by: Ermocrates E Castillo
Date: 2021.10.28 16:39:04

PROJECT NAME

SURETTE RESIDENCE
1970 N US HWY 441, LAKE CITY, FL 32055

SHEET NAME

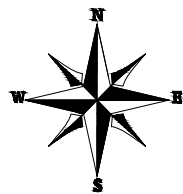
MODULE LAYOUT

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

S-01



(E) BACK YARD

ROOF #1
(30) LG NEON2: LG375N1C-A6
(375W) MODULES

0.5h

ROOF #2
(13) LG NEON2: LG375N1C-A6
(375W) MODULES

4'-0" TYP.

6'-6"

7'-6"

ROOF #3
(02) LG NEON2: LG375N1C-A6
(375W) MODULES

2h₂ DISTANCE : 0' - 10"
0.5h DISTANCE : 7' - 6"

NOTE : PARTIAL PRESSURES OF THE WIND ZONES ON ALL MODULES HAVE BEEN VERIFIED AND ARE WITHIN THE ALLOWABLE PER THE MANUFACTURER SPECIFICATION, INSTALLER SHOULD FOLLOW THE LAYOUT TO AVOID HIGHER ZONAL PARTIAL PRESSURES. ANY CHANGES IN LAYOUT SHOULD BE REPORTED BACK TO THE ENGINEER OF RECORD.

FOR EXPOSED MODULES

1	1'	2e	2n	2r	3e	3r
24.3	0	24.3	30.5	30.5	30.5	35.9

Module Size 19.51 Sq. ft.

Exposed modules							Partial Pressure
	1	1'	2e	2n	2r	3e	3r
P1	13.16	0	0	0	6.34	0	0
P2	11.35	0	8.16	0	0	0	0
P3	12.36	0	0	0	7.14	0	0

FOR NON-EXPOSED MODULES

1	1'	2e	2n	2r	3e	3r
16.2	0	16.2	20.3	20.3	20.3	23.9

Module Size 19.51 Sq. ft.

Non-Exposed modules							Partial Pressure
	1	1'	2e	2n	2r	3e	3r
P4	11.35	0	8.16	0	0	0	0
P5	6.71	0	4.83	4.63	0	3.32	0
P6	13.16	0	0	0	6.35	0	0
P7	7.79	0	0	5.36	3.75	0	2.59
P8	12.64	0	0	0.52	6.34	0	0
P9	11.35	0	8.16	0	0	0	0
P10	5.42	0	8.16	0	5.92	0	0
P11	5.19	0	7.79	0.24	5.65	0.36	0.26
P12	12.36	0	0	0	7.14	0	0
P13	11.37	0	0	0.98	6.57	0	0.57
P14	12.15	0	7.36	0	0	0	0
P15	11.18	0	6.77	0.96	0	0.58	0

ALLOWABLE MODULE UPLIFT PRESSURE 2 RAILS: 89 PSF

LEGEND

- EXPOSED MODULE
- EDGE MODULE
- NON- EXPOSED MODULE
- MISSING MODULE
- MIN. MODULE EDGE DISTANCE LINE
- MODULE EXPOSURE LINE
- WIND ZONE 1 (TYP)
- WIND ZONE 2e (TYP)
- WIND ZONE 2n (TYP)
- WIND ZONE 2r (TYP)
- WIND ZONE 3r (TYP)
- WIND ZONE 3e (TYP)

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally signed by:
Ermocrates E Castillo
Date: 2021.10.28 16:39:04

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME

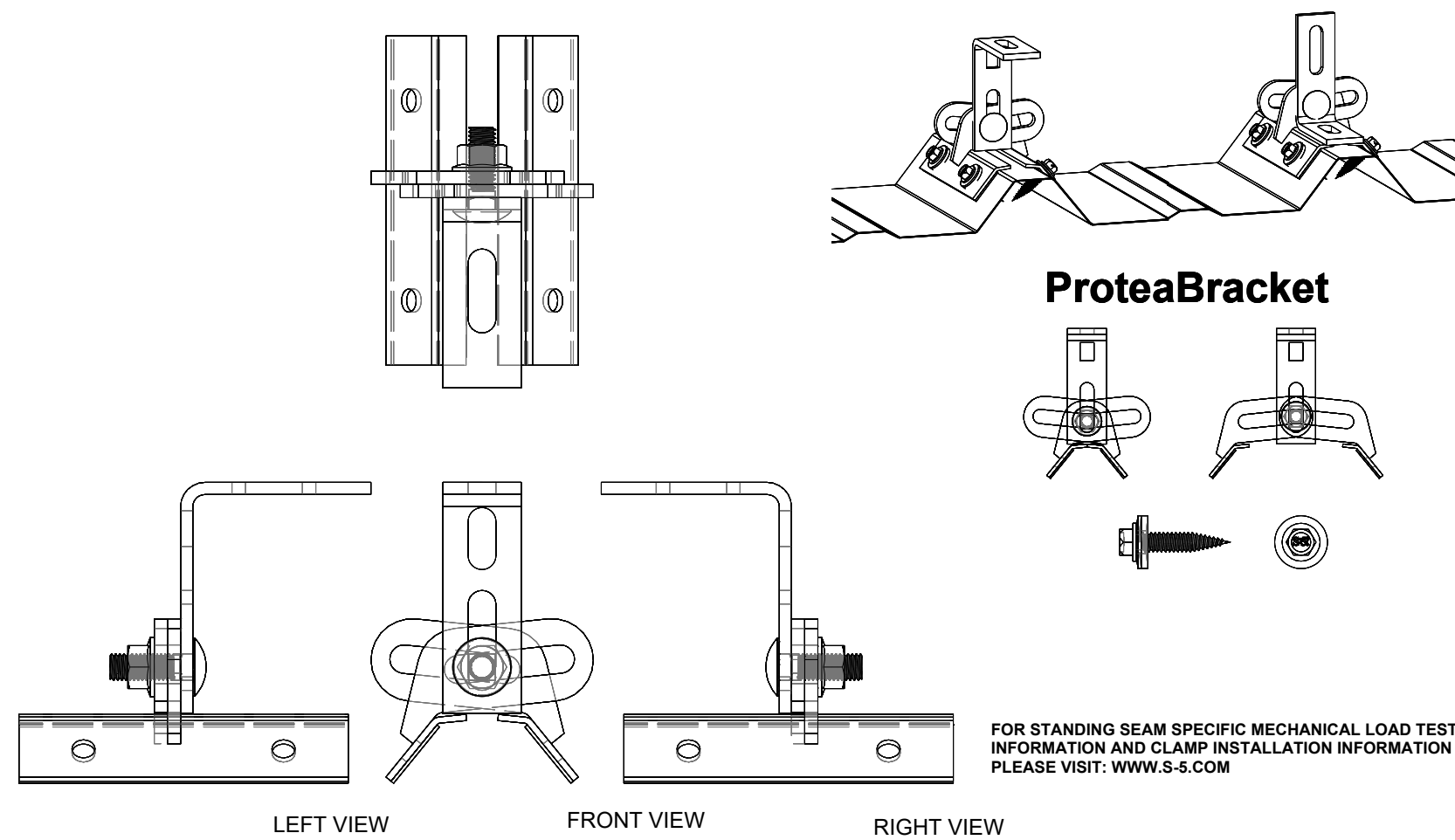
PARTIAL PRESSURE AND
MODULES EXPOSURE

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

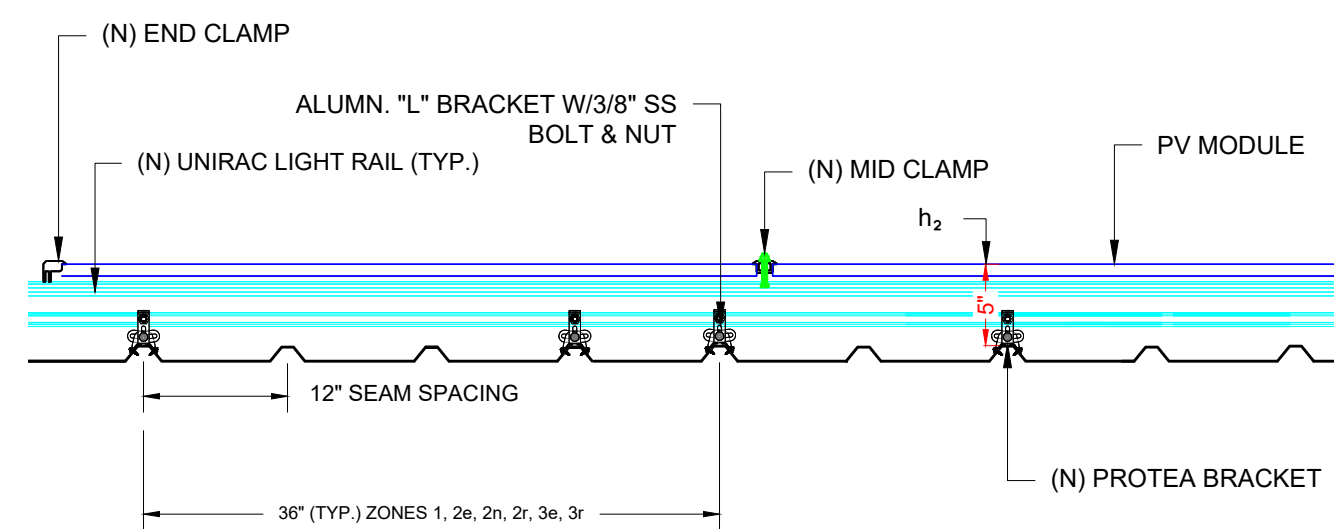
S-01.1



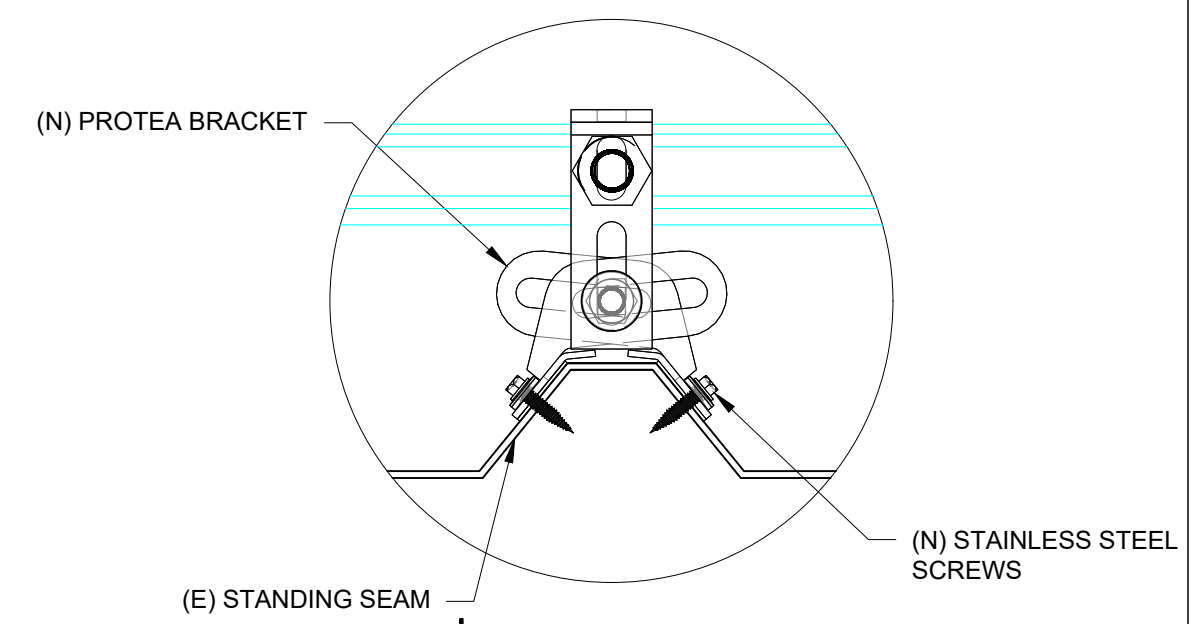
ProteaBracket

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

1 ATTACHMENT DETAIL
S-02 SCALE: 3" = 1'-0"



2 ATTACHMENT DETAIL
S-02 SCALE: 1" = 1'-0"



3 ENLARGED VIEW
S-02 SCALE: 3" = 1'-0"



Castillo Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD, SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



Digitally signed by:
Ermocrates E Castillo
Date: 2021.10.28 16:39:04

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
S-02

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally
signed by:
Ermocrates
E Castillo
Date:
2021.10.28
16:39:05

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME

STRUCTURE
CALCULATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

S-02.2

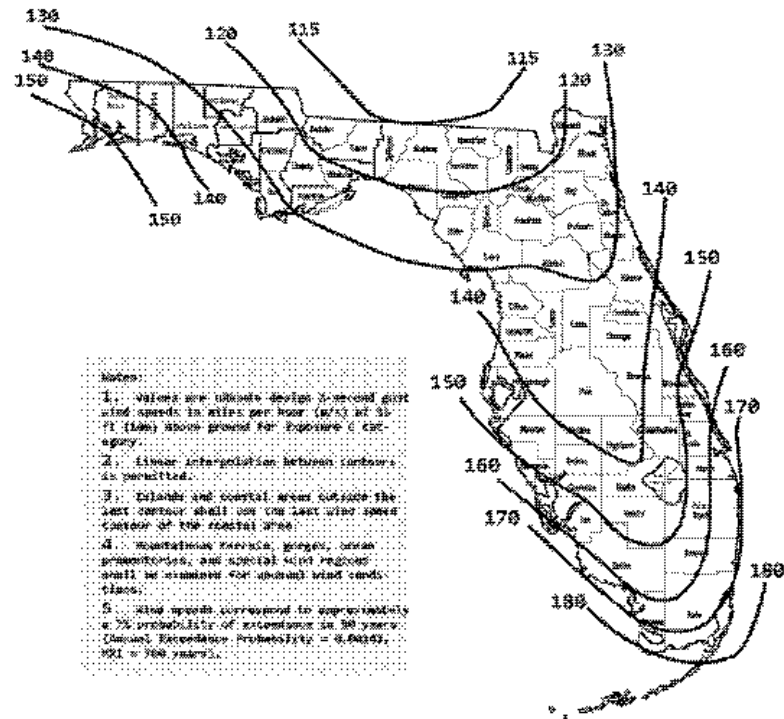


FIGURE 1609.3(1)
ULTIMATE DESIGN WIND SPEEDS, V_{ULT} , FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES

WIND LOAD CALCULATIONS FOR MODULES INSTALLED ON ROOFS WITH A HEIGHT LESS THAN 60'

SITE INFORMATION			
FBC VERSION	2020	RISK CATEGORY	II
MEAN ROOF HEIGHT (ft)	15.0	EXPOSURE CATEGORY	B
ROOF LENGTH (ft)	55.2	ROOF SLOPE	3 /12
ROOF WIDTH (ft)	59.6	ROOF SLOPE (°)	14.0
PARAPET HEIGHT (ft)	0.0	ROOF TYPE	GABLE
MODULE LENGTH (in)	68.5	ULTIMATE WIND SPEED	120 mph
MODULE WIDTH (in)	41.0	NOMINAL WIND SPEED	93 mph
MODULE ORIENTATION	PORTRAIT	EXPOSURE FACTOR (C_e)	1.000
MODULE AREA (sq. ft)	19.50	TEMPERATURE FACTOR (C_t)	1.000
GROUND SNOW LOAD (psf)	0.0	IMPORTANCE FACTOR (I_s)	1.000
DEAD LOAD (psf)	3.0	SLOPE FACTOR (C_s)	0.910
SLOPED ROOF SNOW LOAD (psf)	0.0	K_D	0.850
EFFECTIVE WIND AREA (ft ²)	19.5	K_{ZF}	1.000
GROUND ELEVATION (ft)	174.0	K_e	0.994
HVHZ	NO	K_z	0.575

DESIGN CALCULATIONS			
VELOCITY PRESSURE (q) = $.00256 \cdot K_e \cdot K_{ZF} \cdot K_D \cdot V^2$			
VELOCITY PRESSURE(ASD) 10.7 psf			
WIDTH OF PRESSURE COEFFICIENT	55.2' * 10%	=	5.52'
	15' * 40%	=	6'
ZONE WIDTH A	4 FT		
	ZONE 2 WIDTH	N/A	(FOR (°) < 7°)
ZONE 3 WIDTH	N/A		(FOR (°) < 7°)
EXTERNAL PRESSURE COEFFICIENT	ZONE 1	0.467	-2.023
	ZONE 1'	X	X
	ZONE 2e	0.467	-2.023
	ZONE 2n	0.467	-2.585
	ZONE 2r	0.467	-2.585
	ZONE 3e	0.467	-2.585
	ZONE 3r	0.467	-3.078
INTERNAL PRESSURE COEFFICIENT (+/-)		0.18	

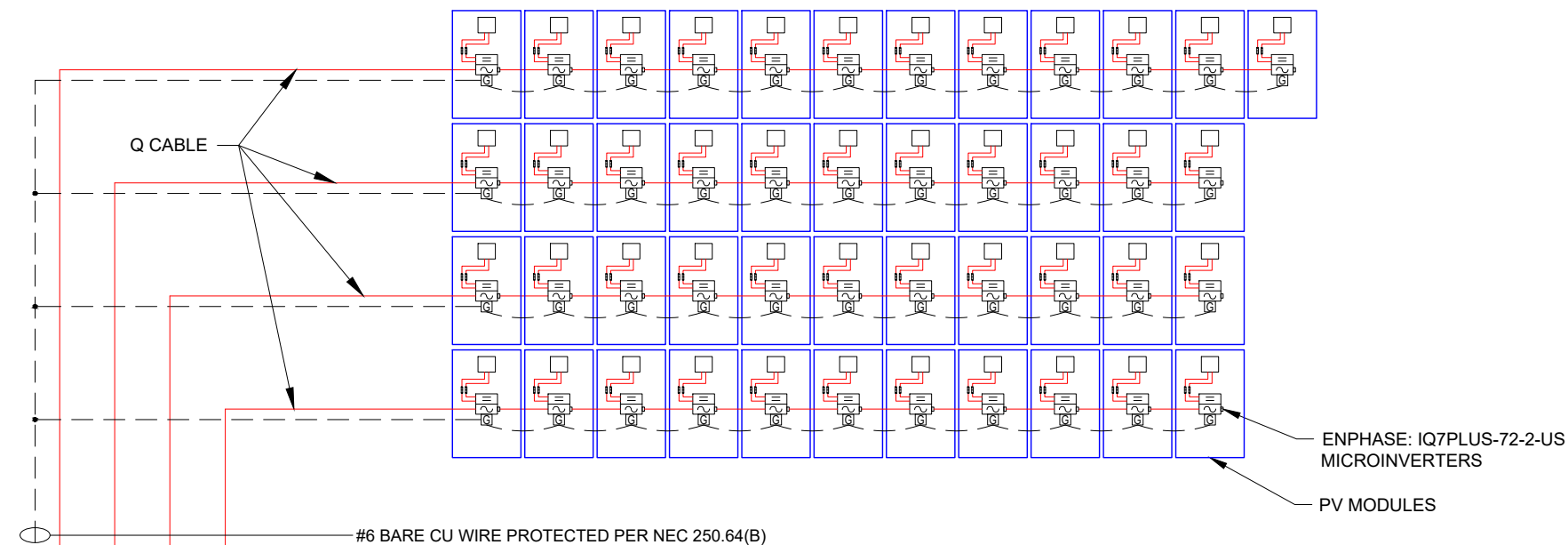
DESIGN PRESSURES				
ROOF ZONE	DOWN	UP		
1	16.0	-23.7	psf	
1'	X	X	psf	
2e	16.0	-23.7	psf	Module allowable uplift pressure 89 psf
2n	16.0	-29.7	psf	Module allowable down pressure 126 psf
2r	16.0	-29.7	psf	
3e	16.0	-29.7	psf	
3r	16.0	-35.0	psf	

ARRAY FACTORS			
ARRAY EDGE FACTOR (EXPOSED)	1.5	SOLAR PANEL PRESSURE	
ARRAY EDGE FACTOR (NON-EXPOSED)	1	EQUALIZATION FACTOR	0.68396

ADJUSTED DESIGN PRESSURES				
ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)	
1	16.0	-24.3	-16.2	psf
1'	X	X	X	psf
2e	16.0	-24.3	-16.2	psf
2n	16.0	-30.5	-20.3	psf
2r	16.0	-30.5	-20.3	psf
3e	16.0	-30.5	-20.3	psf
3r	16.0	-35.9	-23.9	psf

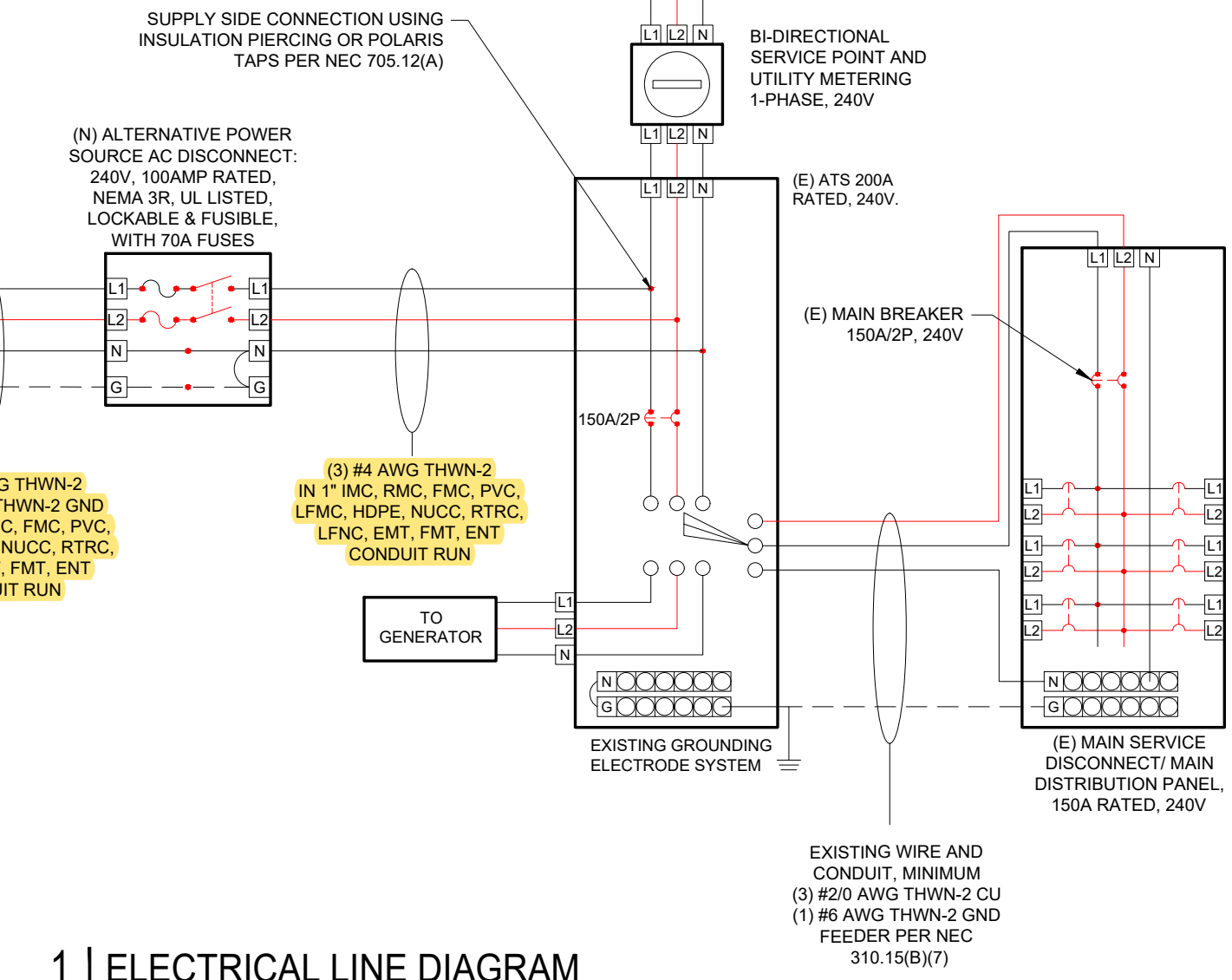
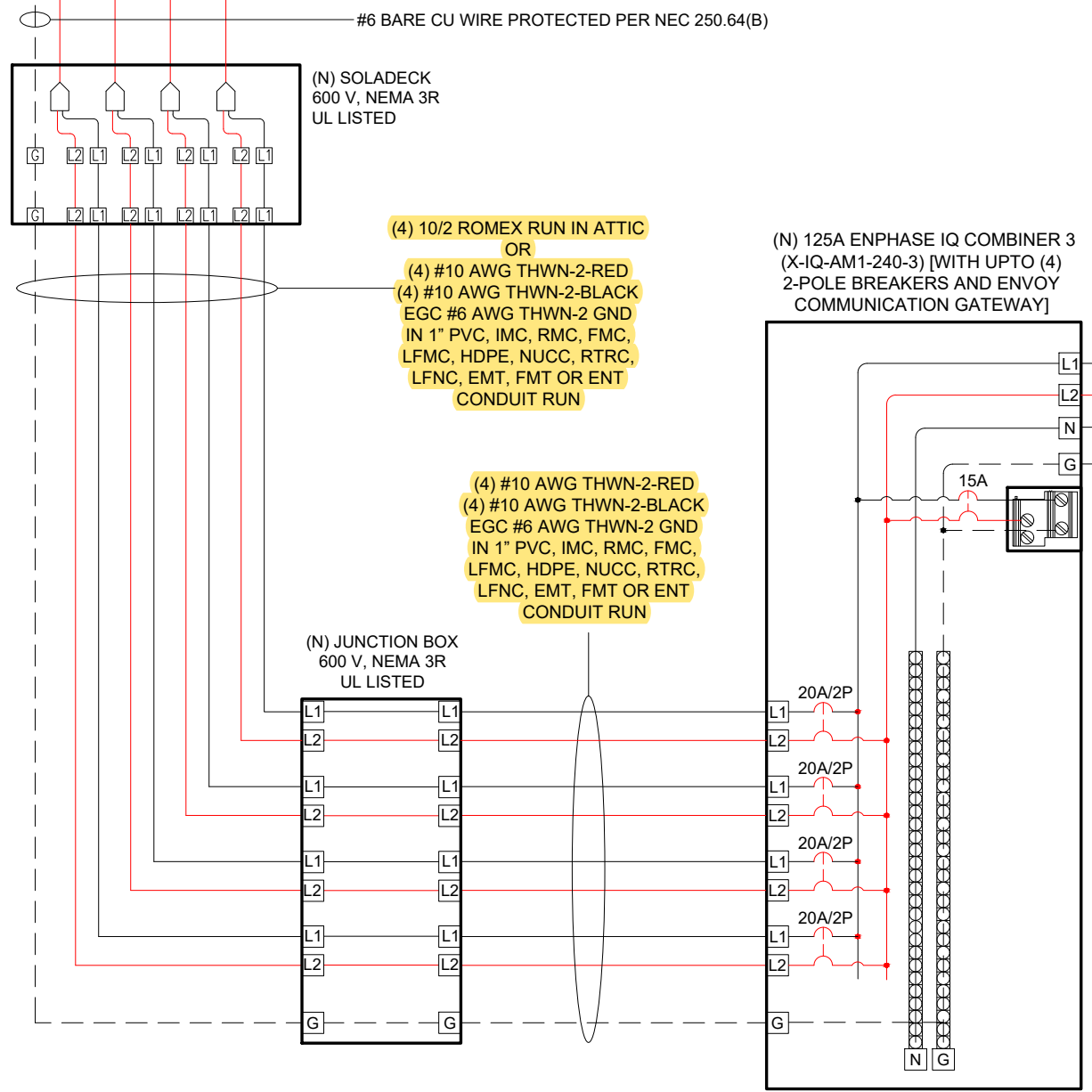
ATTACHMENTS USED		
ATTACHMENT MODEL	S-5 protea	
ATTACHMENT STRENGTH	422	lbs

MAX DESIGN LOADS ALLOWABLE						
LIMIT MAX SPAN TO		36	in			
RAFTER/SEAM SPACING		12	in	NO. OF RAILS	Exposed: 2	Non. Exp: 2
ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)	SPANS (E)		SPANS (N.E)
1	137.0	207.8	138.6	lbs	36 in	36 in
1'	X	X	X	lbs	X in	X in
2e	137.0	207.8	138.6	lbs	36 in	36 in
2n	137.0	260.8	173.9	lbs	36 in	36 in
2r	137.0	260.8	173.9	lbs	36 in	36 in
3e	137.0	260.8	173.9	lbs	36 in	36 in
3r	137.0	307.3	204.9	lbs	36 in	36 in



SOLAR ARRAY (16.875 kW-DC STC)
(45) LG NEON2: LG375N1C-A6 (375W) MODULES
(01) BRANCH OF 12 MODULES &
(03) BRANCH OF 11 MODULES

- NOTE:**
1. SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE NEC 2017, AND THOSE SET FORTH BY THE FLORIDA SOLAR ENERGY CENTER CERTIFICATION, INCLUDING MAXIMUM NUMBER OF MODULE STRINGS, MAXIMUM NUMBER OF MODULES PER STRING, MAXIMUM OUTPUT, MODULE MANUFACTURER AND MODEL NUMBER, INVERTER MANUFACTURER AND MODEL NUMBER, AS APPLICABLE.
 2. PROVIDE TAP BOX IN COMPLIANCE WITH 312.8 IF PANEL GUTTER SPACE IS INADEQUATE.
 3. IF THE FUSED AC DISCONNECT WIRE RUN EXCEEDS 10 FT FROM THE POINT OF INTERCONNECTION, CABLE LIMITERS OR CURRENT-LIMITED CIRCUIT BREAKERS MUST BE INSTALLED FOR EACH UNGROUNDED CONDUCTOR PER NEC 705.31.
 4. REFER SHEET NUMBER DS-08 FOR LOAD CALCULATION.



1 | ELECTRICAL LINE DIAGRAM
E-01 | SCALE: NTS

Castillo Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD, SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY CASTILLO ENGINEERING SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally signed by: Ermocrates E Castillo
Date: 2021.10.28 16:39:05

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME

ELECTRICAL LINE DIAGRAM

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

E-01

ELECTRICAL CALCULATION

Module Manufacturer	LG
Module Model	LG375N1C-A6
Inverter Manufacturer	ENPHASE
Inverter Model	ENPHASE IQ 7 PLUS
Modules/Branch Circuit 1	12
Modules/Branch Circuit 2	11
Modules/Branch Circuit 3	11
Modules/Branch Circuit 4	11
Total Array Power (kW)	16.88
System AC Voltage	240V 1-PHASE

DESIGN TEMPERATURE	
Min. Ambient Temp. °F	32
Max. Ambient Temp. °F	117
Calculated Max. VDC	45
Calculated Min VMP	28
CONDUIT FILL	
Number of Conduits	1

AMPACITY CALCULATIONS										
Circuit	Max Amps	1.25 x Max Amps	AWG	90 °C AMPACITY	AMBIENT EMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM CIRCUIT BREAKER
Circuit 1	14.5	18.1	#10	40	130	0.76	8	0.7	21.28	20 A
Circuit 2	13.3	16.6	#10	40	130	0.76	8	0.7	21.28	20 A
Circuit 3	13.3	16.6	#10	40	130	0.76	8	0.7	21.28	20 A
Circuit 4	13.3	16.6	#10	40	130	0.76	8	0.7	21.28	20 A
AC COMBINER PANEL OUTPUT	54.4	68.0	#4	95	95	0.96	3	1	91.2	70 A

Maximum Circuit Voltage Drop	2%
------------------------------	----

VOLTAGE DROP CALCULATIONS					
Circuit	AWG	CIRCULAR MILLS	I	V	MAX LENGTH
Circuit 1	#10	10380	14.5	240	133 FEET
Circuit 2	#10	10380	13.3	240	145 FEET
Circuit 3	#10	10380	13.3	240	145 FEET
Circuit 4	#10	10380	13.3	240	145 FEET
COMBINER PANEL OUTPUT	#4	41740	54.4	240	143 FEET

NOTES	
TEMP DERATE BASED ON NEC TABLE 310.15(B)(2)(A)	
CONDUIT FILL DERATE BASED ON NEC TABLE 310.15(B)(3)(A)	
MAXIMUM VDC CALCULATED USING MODULE MANUFACTURE TEMPERATURE COEFFICIENTS PER NEC 690.7(A)	
UNLESS OTHERWISE SPECIFIED, ALL WIRING MUST BE THHN OR THWN-2 COPPER	
ALL WIRE SIZES LISTED ARE THE MINIMUM ALLOWABLE	
	IN ANY CELL INDICATES THAT THE SYSTEM IS SAFE AND COMPLIES WITH NEC REQUIREMENTS
	IN ANY CELL INDICATES A POTENTIALLY UNSAFE CONDITION
	INFORMATION INPUT BY SYSTEM DESIGNER
	INFORMATON OBTAINED FROM MANUFACTURER DATASHEETS

I ERMOCRATES CASTILLO PE# 52590 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 107, THE NEC 2017, AND THOSE SET FORTH BY THE FLORIDA SOLAR ENERGY CENTER CERTIFICATION

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. THE TERMINALS ARE RATED FOR 75 DEGREE C.
3. THE WIRES ARE SIZED ACCORDING TO NEC 110.14.
4. 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.
5. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
6. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
7. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
8. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
9. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
10. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
11. THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
12. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
13. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
14. RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
15. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
16. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
17. THIS SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN OF PV CONDUCTORS IN COMPLIANCE WITH NEC 690.12.
18. LABELING IN COMPLIANCE WITH NEC 690.12 AND 690.56(C) IS SHOWN ON SHEET E-03.
19. ALL CONDUITS TO BE INSTALLED A MIN OF 7/8" ABOVE THE ROOF SURFACE.

Castillo

Engineering

SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC

COA# 28345

620 N. WYMORE ROAD, SUITE 250,

MAITLAND, FL 32751

TEL: (407) 289-2575

ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY CASTILLO ENGINEERING SERVICES, LLC

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally signed by: Ermocrates E Castillo

Date: 2021.10.28 16:39:06

ERMOCRATES E. CASTILLO

PE 52590

STATE OF FLORIDA

PROFESSIONAL ENGINEER

No. 52590

Signature with Seal

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441, LAKE CITY, FL 32055

SHEET NAME

WIRING CALCULATIONS

SHEET SIZE

ANSI B 11" X 17"

SHEET NUMBER

E-02

⚠

WARNING

ELECTRIC SHOCK HAZARD

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

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.13(B))

⚠

WARNING

DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(B)(2)(3)(b))

RAPID SHUTDOWN
SWITCH FOR
SOLAR PV SYSTEM

LABEL LOCATION:
AC DISCONNECT
(PER CODE: NEC690.56(C)(3))

- ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE VISIBLE, REFLECTIVE AND SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED [NFPA 11.12.2.1]
 - WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
 - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

16.88 kW SOLAR
DISCONNECT LOCATED

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.54)

AC COMBINER BOX

LABEL LOCATION:
COMBINER BOX
(PER CODE: NEC690.52)

PHOTOVOLTAIC
SYSTEM
MICROINVERTERS
LOCATED UNDER EACH
PV MODULE IN
ROOF TOP ARRAY

LABEL LOCATION:
INVERTER
(PER CODE: NEC690.52)

SOLAR CONNECTION
LINE SIDE TAP

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(A))

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OPERATING CURRENT 54.4 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.54)

⚠

WARNING

INVERTER OUTPUT CONNECTION DO NOT
RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(B)(2)(3)(b))

DATA PER PANEL		
NOMINAL OPERATING AC VOLTAGE -	240	V
NOMINAL OPERATING AC FREQUENCY-	60	Hz
MAXIMUM AC POWER-	290	VA
MAXIMUM AC CURRENT-	1.21	A
MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION PER CIRCUIT-	20	A

LABEL LOCATION:
COMBINER BOX
(PER CODE: NEC690.52)

AC DISCONNECT

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.54)

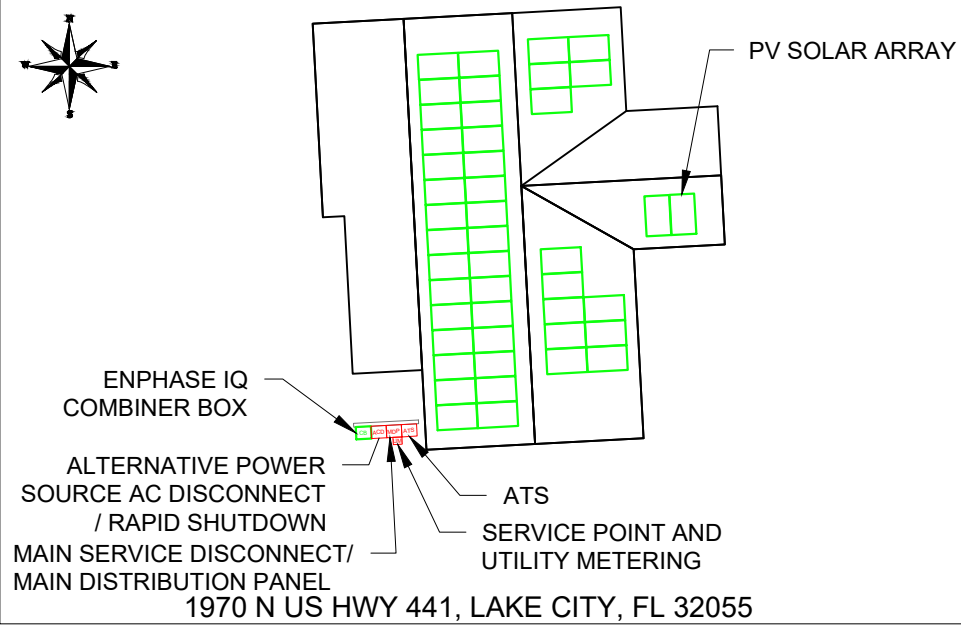
SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN
SWITCH TO THE
"OFF" POSITION TO
SHUT DOWN PV SYSTEM
AND REDUCE
SHOCK HAZARD
IN THE ARRAY

SOLAR ELECTRIC
PV PANELS

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.56(C)(1)(a), IFC 605.11.3.1(1))

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



LABEL LOCATION:
MAIN SERVICE DISCONNECT / MAIN DISTRIBUTION PANEL, PV DISCONNECT
(TEXT HEIGHT SHOULD BE A MINIMUM OF 3/8")
(PER CODE: NEC 690.56(B) AND NEC 705.10)

Castillo
Engineering

SOLAR DONE RIGHT®

C

CASTILLO ENGINEERING
SERVICES, LLC

COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally
signed by:
Ermocrates
E Castillo
Date:
2021.10.28
16:39:06

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
SYSTEM LABELING

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-03

LG NeON[®]2

LG375N1C-A6

375W

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

LG375N1C-A6

General Data

Cell Properties (Material/Type)	Monocrystalline/N-type
Cell Maker	LG
Cell Configuration	60 Cells (5 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, OHSAS 18001
Salt Mist Corrosion Test	IEC 61701:2012 Severity 6
Ammonia Corrosion Test	IEC 62716: 2013
Module Fire Performance	Type 1 (UL 61730)
Fire Rating	Class C (UL 790, UL/C/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

Temperature Characteristics

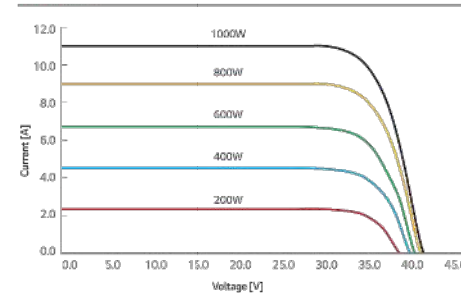
NMOT*	[°C]	42 ± 3
P _{max}	[%/°C]	-0.34
V _{oc}	[%/°C]	-0.26
I _{sc}	[%/°C]	0.03

*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		LG375N1C-A6
Maximum Power (Pmax)	[W]	281
MPP Voltage (Vmpp)	[V]	33.2
MPP Current (Impp)	[A]	8.48
Open Circuit Voltage (Voc)	[V]	39.4
Short Circuit Current (Isc)	[A]	9.13

I-V Curves



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.
LG375N1C-A6_AUS.pdf
012221

© 2021 LG Electronics USA, Inc. All rights reserved.

Electrical Properties (STC*)

Model	LG375N1C-A6	
Maximum Power (Pmax)	[W]	375
MPP Voltage (Vmpp)	[V]	35.3
MPP Current (Impp)	[A]	10.63
Open Circuit Voltage (Voc; ± 5%)	[V]	41.8
Short Circuit Current (Isc; ± 5%)	[A]	11.35
Module Efficiency	[%]	20.7
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

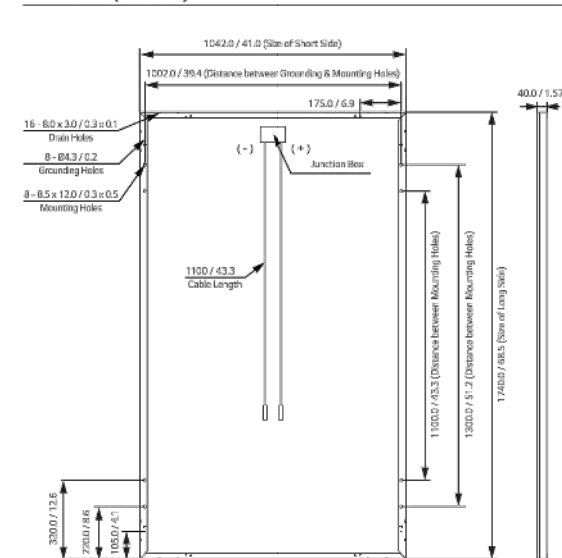
Operating Temperature	[°C]	-40 ~ +85
Maximum System Voltage	[V]	1,000
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load* (Front)	[Pa/psf]	5,400
Mechanical Test Load* (Rear)	[Pa/psf]	4,000

*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)



CASTILLO ENGINEERING
SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



Digitally signed by:
ERMOCRATES E. CASTILLO
Date: 2021.10.28 16:39:07

PROJECT NAME

SURETTE RESIDENCE
1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-01



LG Electronics U.S.A., Inc.
111 Sylvan Avenue
Englewood Cliffs, NJ 07632
201.816.2000

Friday, February 5, 2021

RE: Mechanical Load Testing to Determine Structural Performance under Uniform Static Pressure

To: Castillo Engineering,

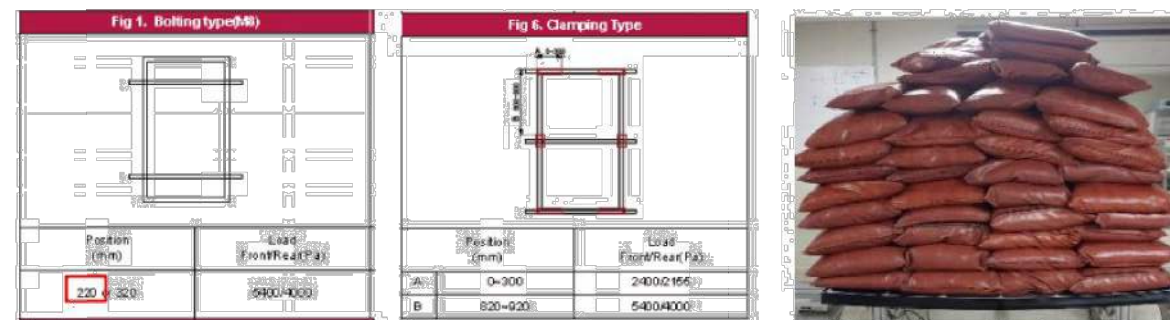
Upon your request we have conducted in house tests to determine the structural performance of the LG Module frames listed below. Our test results meet the requirements you presented in our conference call on January 29th. We will present the test criteria, results, and product limitations that may result from these test conditions in this letter.

The specifications and conditions presented in this letter apply retroactively to the following LG module(s);

	2 Rails	3 Rails
Front	9,000Pa	9,000Pa
Rear	6,350Pa	9,000Pa
Model	LGxxxN1C(K)-N5(L5), LGxxxN1C(K)-A6(B6) LGxxxQ1C(K)-V5, LGxxxQ1C(K)-A6	

*The result is based on test load.

Our R&D department has tested these modules to determine the structural performance of under uniform static loading to represent the effects of a wind load on the module. This test was designed only to determine structural performance; the revised specifications apply only to the mechanical performance of the module. *A safety factor of 1.5 should be applied to these test loads for obtaining design loads. It is not recommend designing any system to the full test load.*



The scope of this test does not include electrical functionality or performance testing. Subjecting the module to these pressures may result in power degradation or total power loss. The electrical function and power generation warranties and specifications of these products are not altered by this document.

If you have any additional questions or concerns about this letter or the test protocol, contact your LG Solar Sales Representative.



CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD, SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



Digitally signed by:
Ermocrates E Castillo
Date: 2021.10.28 16:39:07

PROJECT NAME

SURETTE RESIDENCE
1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-02

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 seamlessly with the Enphase IQ Envoy™, Enphase Q Aggregator™, 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 pairings ¹	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/range ²	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	1.15 A	1.21 A	1.39 A
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 circuit ³	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)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak CEC efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA	IQ 7 Microinverter			
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (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

© 2018 Enphase Energy. All rights reserved. All trademarks or brands used are the property of Enphase Energy, Inc.
2018-02-08



CASTILLO ENGINEERING
SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally
Signed by:
Ermocrates
E Castillo
Date:
2021.10.28
16:39:08

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME

DATA SHEET

SHEET SIZE

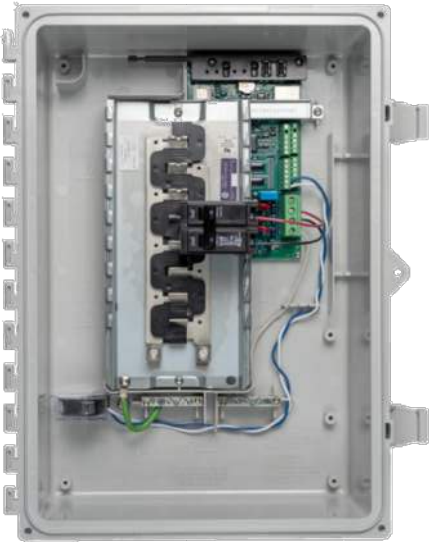
ANSI B
11" X 17"

SHEET NUMBER

DS-03

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)	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.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
* Consumption monitoring is required for Enphase Storage Systems	
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 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

© 2021 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ Combiner 3, and other trademarks or service names are the trademarks of Enphase Energy, Inc. Data subject to change. 2021-05-20



CASTILLO ENGINEERING
SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally
Signed by:
Ermocrates
E Castillo
Date:
2021.10.28
16:39:08

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-04

SOLARMOUNT



SOLARMOUNT defined the standard in solar racking. Features are designed to get installers off the roof faster. Our grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Systems can be configured with standard or light rail to meet your design requirements at the lowest cost possible. The superior aesthetics package provides a streamlined clean edge for enhanced curb appeal, with no special brackets required for installation.



Now Featuring:
THE NEW FACE OF SOLAR RACKING
Superior Aesthetics Package



LOSE ALL OF THE COPPER & LUGS
System grounding through Enphase microinverters and trunk cables



SMALL IS THE NEXT NEW BIG THING
Light Rail is Fully Compatible with all SM Components



ENHANCED DESIGN & LAYOUT TOOLS
Featuring Google Map Capabilities within U-Builder

FAST INSTALLATION. SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT



OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

VERSATILITY

ONE PRODUCT - MANY APPLICATIONS

Quickly set modules flush to the roof or at a desired tilt angle. Change module orientation to portrait or landscape while securing a large variety of framed modules on flat, low slope or steep pitched roofs. Available in mill, clear and dark anodized finishes to outperform your projects financial and aesthetic aspirations.

AUTOMATED DESIGN TOOL DESIGN PLATFORM AT YOUR SERVICE

Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers; there's no need to print results and send to a distributor, just click and share.



UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT

UNMATCHED EXPERIENCE

CERTIFIED QUALITY

ENGINEERING EXCELLENCE

BANKABLE WARRANTY

DESIGN TOOLS

PERMIT DOCUMENTATION

TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2015, 14001:2015 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

BANKABLE WARRANTY

Don't leave your project to chance. Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a twenty five (25) year limited product warranty and a five (5) year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

PUB2017/10/28 - PRINTED

INTEGRATED BONDING MIDCLAMP

INTEGRATED BONDING SPLICE BAR

INTEGRATED BONDING L-FOOT w/ T-BOLT

INTEGRATED BONDING MICROINVERTER MOUNT w/ WIRE MANAGEMENT



CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



Digitally signed by:
Ermocrates E. Castillo
Date: 2021.10.28 16:39:09

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-05

The right way to attach solar PV to trapezoidal roof profiles!

S-5!®

The Right Way!™

NEW

NOW AVAILABLE
IN ALUMINUM

ProteaBracket™

ProteaBracket™

A versatile bracket for
mounting solar PV to
trapezoidal roof profiles

ProteaBracket™ is now made in aluminum. Still the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteaBracket just got better!

The bracket features an adjustable attachment base and module attachment options to accommodate different roof profile dimensions and mounting options.

Our pre-applied EPDM gasket with peel and stick adhesive makes installation a snap, ensuring accurate and secure placement the first time.

With no messy sealants, faster installation, and a weather-proof fit, ProteaBracket offers you the most versatile solar attachment solution available.

ProteaBracket* can be used for
rail mounting or "direct-attach"
with S-5! PVKIT™

Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*

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

*See www.S-5.com for details.



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

S-5!®

The Right Way!™

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal rib, exposed-fastened metal roof profiles!

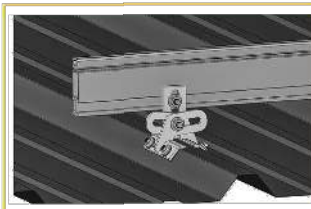
ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

Note: All four pre-punched holes must be used to achieve tested strength. Fasteners are provided.

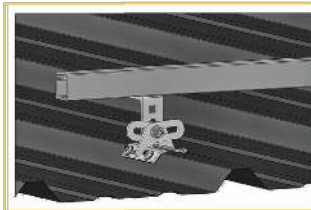
For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:



Side
Mount Rail



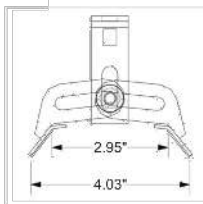
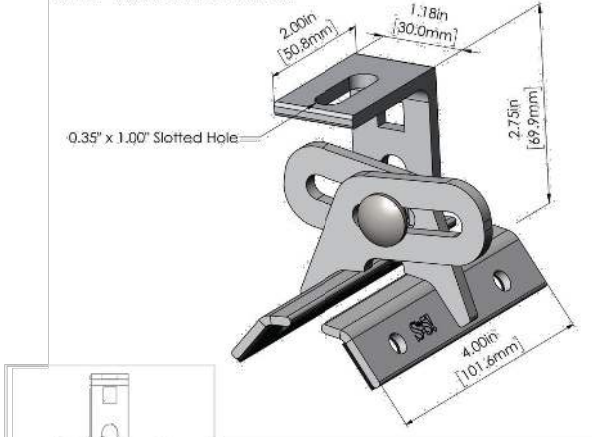
Bottom
Mount Rail



w/ S-5!
PVKIT™
(rail-less)

ProteaBracket™

ProteaBracket™ is still available in stainless steel.



ProteaBracket fits profiles
up to 3 inches

INSTALLATION:

No surface preparation needed. (1) Wipe away excess oil and debris. (2) Peel off adhesive release paper. (3) Align and mount bracket directly onto crown of panel. (4) Secure ProteaBracket through pre-punched holes, using piercing-point S-5! screws.



ProteaBracket™ and the S-5! PVKIT™ 2.0
mounted on a trapezoidal roof profile

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

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com. Copyright 2019, Metal Roof Innovations, Ltd. S-5! products are patent protected. S-5! aggressively protects its patents, trademarks, and copyrights. Version 07089.

Distributed by

Castillo
Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING
SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

COPYRIGHTED BY
CASTILLO ENGINEERING
SERVICES, LLC

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Digitally
signed by:
Ermocrates
E Castillo
Date:
2021.10.28
16:39:09

PROJECT NAME

SURETTE RESIDENCE

1970 N US HWY 441,
LAKE CITY, FL 32055

SHEET NAME

DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-06

Residential Standard Calculation			9/25/1997	Job Name
by: John Eckloff Version 2011 L				
STEP 1 Article 220.42 & 220.52			Marc Jones Construction, LLC Sunpro Solar	
sq. ft.	1512	General Lighting load	4,536 VA	0
	4	Small Appliance	6,000 VA	0
	1	Laundry circuit	1,500 VA	0
	Gen.Lgt, Sm App.& Laun. Load		12,036 VA	
			3,000 VA @ 100% =	3,000 VA
			9,036 VA @ 35% =	3,163 VA
			VA @ 25% =	VA
			General Lighting Demand Load	6,163 VA
STEP 2 Article 220.50 & 220.51 ☒			Total	1
A/C Condenser & Fixed Electric Space Heating			Heating Load	10,800 VA
5 ton	7,130 VA	AHU 1 9.6kW	CU Load	8,330 VA
A/C #2	VA	AHU 2 Select		
A/C #3	VA	AHU 3 Select		
A/C #4	VA	AHU 4 Select		
A/C #5	VA	AHU 5 Select		
			Greater of Heat @ 100% vs.A/C @ 100%	10,800 VA
STEP 3 Article 220.53			Appliance Demand Load	8,560 VA
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	
☐ select		Well Pump	VA	
☐ select		Fountain Pump	VA	
☐ select		Elevator	VA	
☐		Pool Equip. Panel	VA 100% Demand	
☐		GATES	VA No Demand	
☐		Other load	VA No Demand	
			Total Appliance Load	8,560 VA
			4 or more demand @ 75% plus 100% demand loads	6,420 VA
STEP 4 Article 220.54				
		Electric Clothes Dryers	5,000 VA	
STEP 5 Article 220.55				
		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	0%	
	Cooktop & Oven Demand Load	W		

jmp1ds@comcast.net

Pool Panel Feeder Calculation		(See Note)	A	B	N	Continuous Motors	Non-continuous Motors
Continuous Motors	0		0	0	0	☐	☐ 240v
Non-continuous	0		0	0	0	☐	☐ 240v
Spa heater 11 kVA			0	0		☐	☐ 240v
Pool heater 3.5 ton			0	0		☐	☐ 240v
Pool heater 5 ton			0	0		☐	☐ 240v
Pool Light	select ▼	0	0	0	0	☐	☐ 240v
Blower	select ▼	0 ☐ 240v	0	0	0	☐	☐ 240v
other load		0 ☐ 240v	0	0	0	☐	☐ 240v
other load		0 ☐ 240v	0	0	0	☐	☐ 240v
☐ Min.Copper Pool Feeder		AWG	A	A	A		
Minimum Panel Rating			Phase Amperes		Neut. load		

Continuous Motors

select ☐

select ☐

select ☐

select ☐

select ☐

240v

240v

240v

240v

240v

Non-continuous Motors

select ▼

select ▼

select ▼

select ▼

select ▼

☐ 240v

☐ 240v

☐ 240v

☐ 240v

☐ 240v

0.0 Motor Neutral Load

Max.Unbalanced Neutral Load