PROJECT DESCRIPTION:

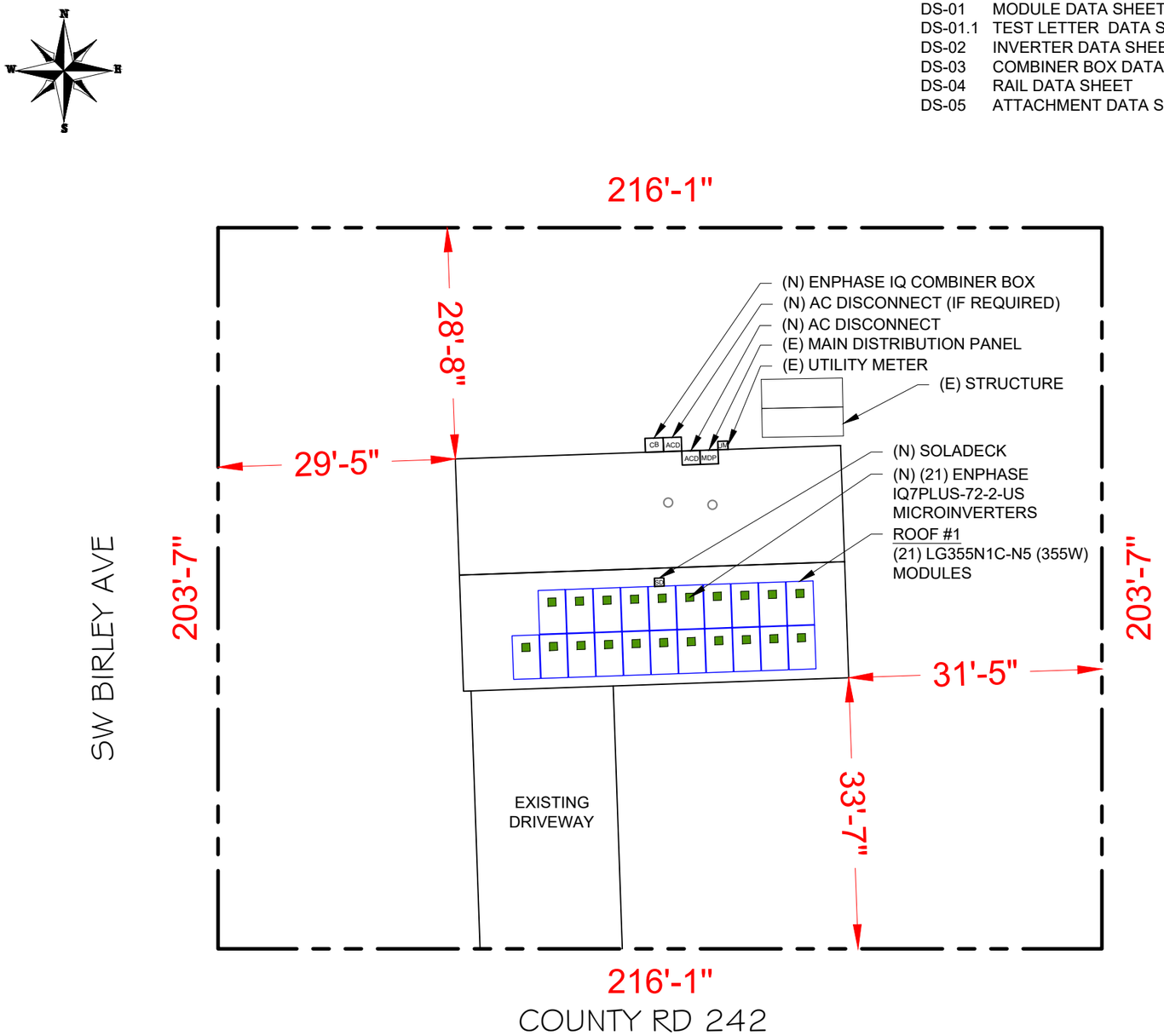
21X355 LG355N1C-N5 (355W) MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

SYSTEM SIZE: 7.46 kW DC STC
ARRAY AREA #1: 390.18 SQ FT.

EQUIPMENT SUMMARY
21 LG355N1C-N5 (355W) MODULES
21 ENPHASE IQ7PLUS-72-2-US MICROINVERTERS

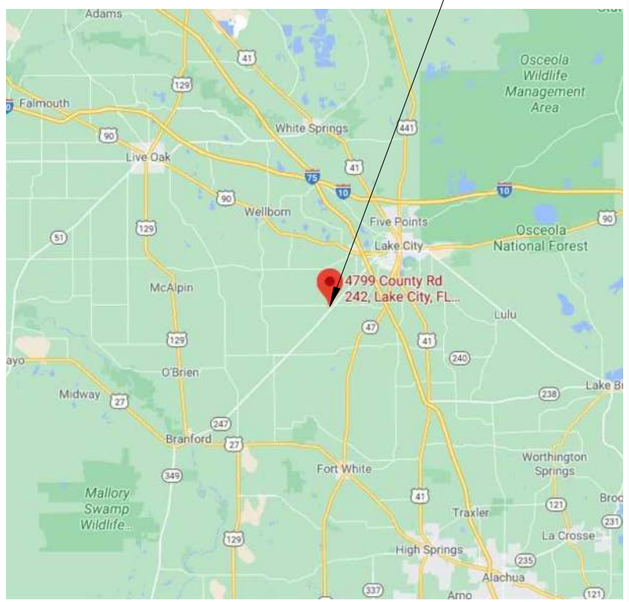
GOVERNING CODES :
FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)
FLORIDA PLUMBING CODE, 7TH EDITION 2020 (FPC)
FLORIDA BUILDING CODE, 7TH EDITION 2020 EDITION (FBC)
FLORIDA MECHANICAL CODE, 7TH EDITION 2020 (FMC)
NEC 2017 CODE BOOK
ASCE 7-16

SHEET INDEX



1 PLOT PLAN WITH ROOF PLAN
A-00 SCALE: 1/16" = 1'-0"

2 HOUSE PHOTO
A-00 SCALE: NTS



3 VICINITY MAP
A-00 SCALE: NTS

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

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER
SUNPRO

Signature with Seal
E. E. CASTILLO LICENSE No. 52590 STATE OF FLORIDA PROFESSIONAL ENGINEER
Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:09

PROJECT NAME
KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
PLOT PLAN & VICINITY MAP

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
A-00

Symbols:

Section..... X / X-XX — Sheet where section is located

Elevation ..... X / X-XX — Detail ID Letter; Sheet where section is located

Detail ..... X / X-XX — Detail ID Letter; Sheet where section is located

Detail ..... (Enlarged Plan) X / X-XX — 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

DC Disconnect ..... DCD

Main Distribution Panel ..... MDP

Fuse .....

Overcurrent Breaker ..

Inverter .....

Transformer .....

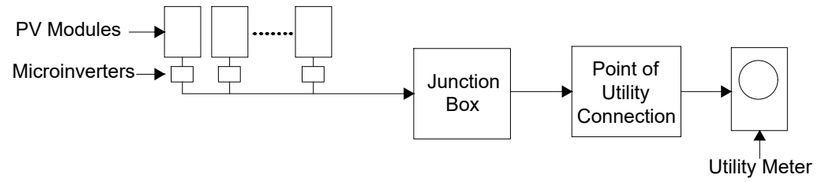
Automatic ..... Transfer Switch ATS

Abbreviations:

AC	Alternating Current
APPROX	Approximate
AWG	American Wire Gauge
CB	Combiner Box
DC	Direct Current
DCD	Direct Current Disconnect
DISC	Disconnect
(E)	Existing
EL	Elevation
EQ	Equal
JB	Junction Box
MCB	Main Combiner Box
MFR	Manufacturer
MIN	Minimum
MISC	Miscellaneous
(N)	New
OCPD	OverCurrent Protection Device
POCC	Point Of Common Coupling
PV	Photovoltaic
SF	Squarefoot/feet
STC	Standard Test Conditions
TBD	To Be Determined
TYP	Typical
VIF	Verify In Field
WP	Weather Proof

System Description

This system is a grid-tied, PV system, with PV generation consisting of 21 LG355N1C-N5 (355W) MODULES with a combined STC rated dc output power of 7,455W. The modules are connected into 21 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 Electric 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.

The inverter meets the requirements of IEEE 1547 and UL 1741. This means that if it detects a loss of utility power, it will automatically disconnect from the utility. When utility voltage is restored, the inverter automatically reconnects to the utility grid after verifying utility voltage and frequency stability.

On a day with average Florida sunshine, this system outputs 29.19 kWh per day on site.

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COA # 28345
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ERMOCRATES E. CASTILLO - FL PE 52590

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DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

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PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
SYMBOLS & SYSTEM DESCRIPTION

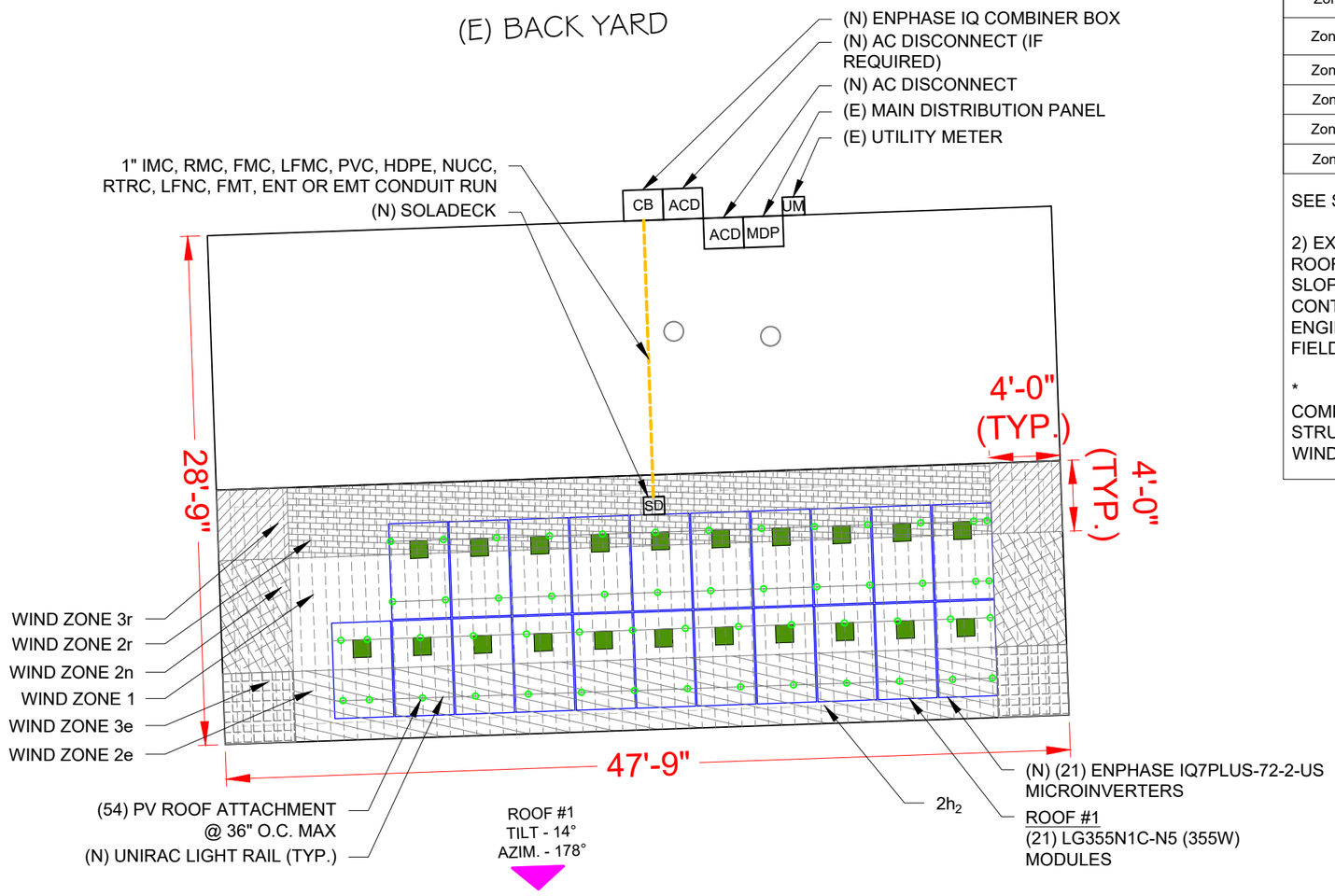
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
A-01

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 21 MODULES
MODULE TYPE = LG355N1C-N5 (355W) MODULES
WEIGHT = 39.68 LBS / 18.0 KG.
MODULE DIMENSIONS = 66.9" x 40" = 18.58 SF
UNIT WEIGHT OF ARRAY = 2.14 PSF

ROOF	ROOF TYPE	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)	TILT	AZIMUTH	SEAM SPACING
#1	METAL	390.18	687.66	56.74	14°	178°	9" O.C.



GENERAL INSTALLATION PLAN NOTES:

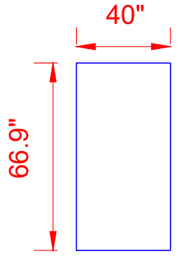
1) ROOF ATTACHMENTS TO SEAM SHALL BE INSTALLED AS SHOWN IN SHEET S-02 AND AS FOLLOWS FOR EACH WIND ZONE:

WIND ZONES	Non-Exposed Modules		Edge/Exposed Modules	
	Span	Cantilever	Span	Cantilever
Zone 1	36"	12"	36"	12"
Zone 1'	X	X	X	X
Zone 2e	36"	12"	36"	12"
Zone 2n	36"	12"	36"	12"
Zone 2r	36"	12"	36"	12"
Zone 3e	36"	12"	36"	12"
Zone 3r	36"	12"	27"	9"

SEE SHEET S-02.1 FOR SUPPORTING CALCULATIONS.

2) EXISTING RESIDENTIAL BUILDING IS A METAL ROOF WITH MEAN ROOF HEIGHT 15 FT AND SEAM SPACING 9" 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 CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE LATERAL AND UPLIFT WIND LOADS AND EQUIPMENT DEAD LOADS. *



LG355N1C-N5
(355W) MODULES

LEGEND

- UM - UTILITY METER
- SD - SOLADECK
- MICROINVERTER
- ACD - AC DISCONNECT
- MDP - MAIN DISTRIBUTION PANEL
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- PV ROOF ATTACHMENT
- SEAM
- CONDUIT
- CB - COMBINER BOX

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PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-01

1 ROOF PLAN & MODULES
S-01 SCALE: 1/8" = 1'-0"

	1	1'	2e	2n	2r	3e	3r
	24.20	0.00	24.20	30.10	30.10	30.10	35.50

Module Size 18.58 Sqft.

Non-Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P1	9.12	0.00	9.46	0.00	0.00	0.00	0.00	24.20
P2	12.56	0.00	0.00	0.00	6.02	0.00	0.00	26.11

ALLOWABLE MODULE PRESSURE : 88 PSF

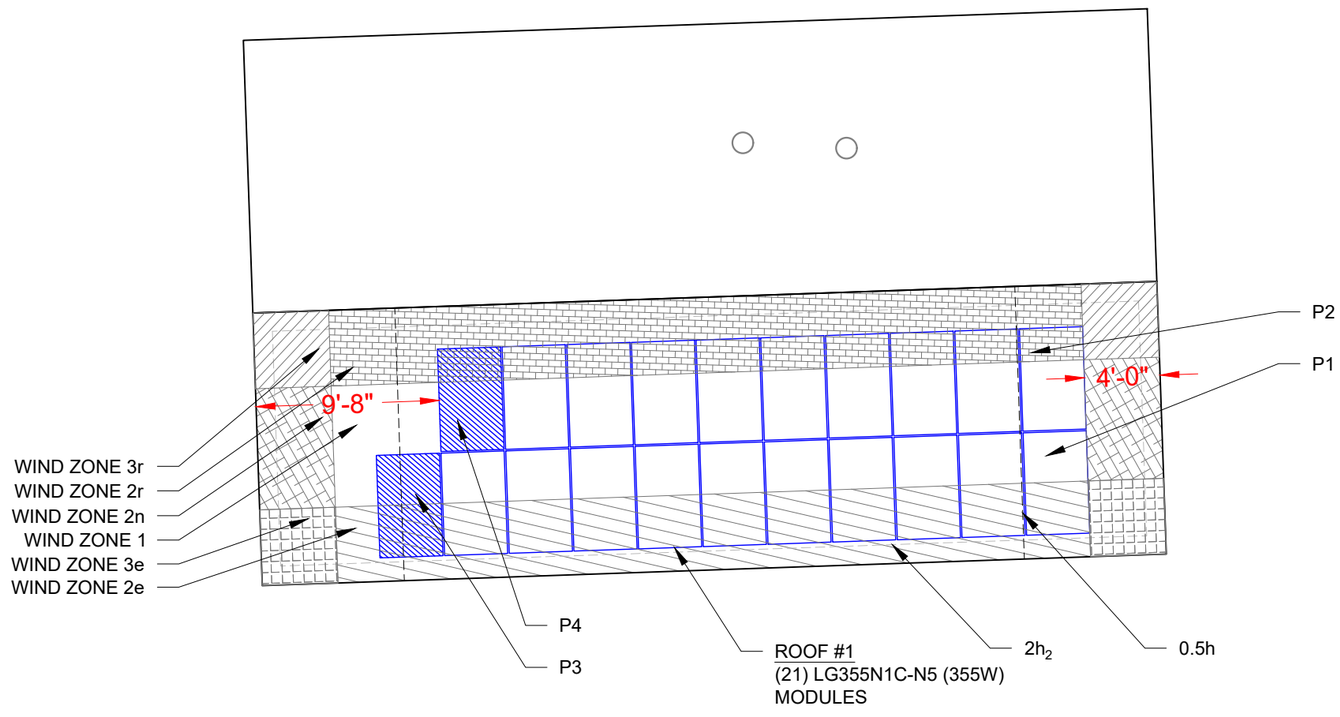
	1	1'	2e	2n	2r	3e	3r
	36.30	0.00	36.30	45.10	45.10	45.10	53.20

Module Size 18.58 Sqft.

Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P3	9.12	0.00	9.46	0.00	0.00	0.00	0.00	36.30
P4	12.56	0.00	0.00	0.00	6.02	0.00	0.00	39.15

ALLOWABLE MODULE PRESSURE : 88 PSF

(E) BACK YARD



(E) FRONT YARD

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.

$2h_2$ DISTANCE : 12"
0.5h DISTANCE : 7'-6"

LEGEND

- EXPOSED MODULE
- NON-EXPOSED MODULE
- MIN PANEL EDGE DISTANCE LINE

1 PARTIAL PRESSURE AND MODULE EXPOSURE
S-01.1
SCALE: 1/8" = 1'-0"

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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

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DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

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Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:10

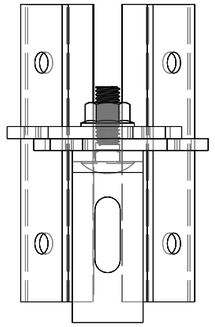
PROJECT NAME

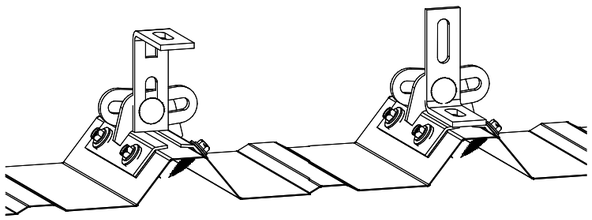
KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
PARTIAL PRESSURE AND MODULE EXPOSURE

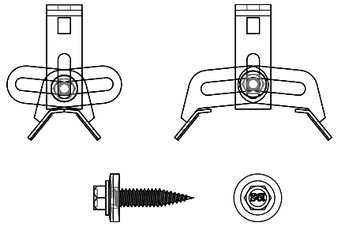
SHEET SIZE
ANSI B
11" X 17"

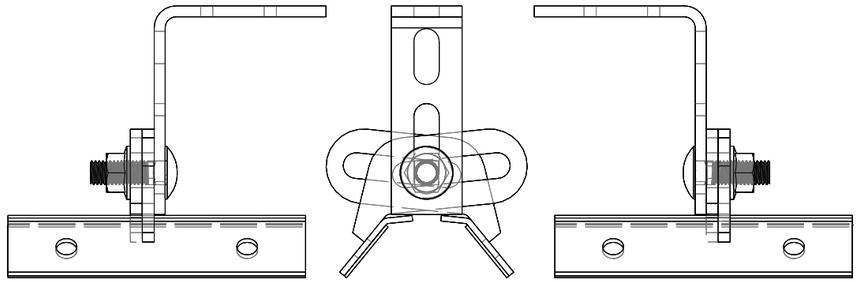
SHEET NUMBER
S-01.1





ProteaBracket



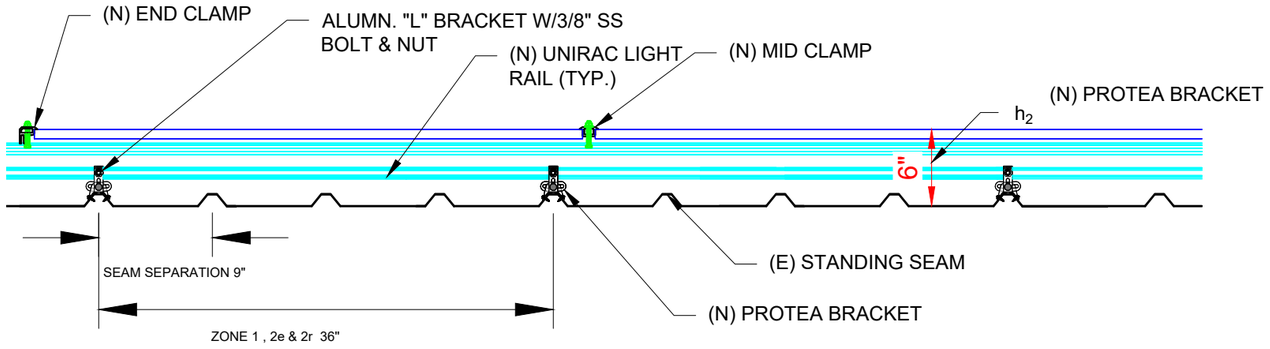


LEFT VIEW FRONT VIEW RIGHT VIEW

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

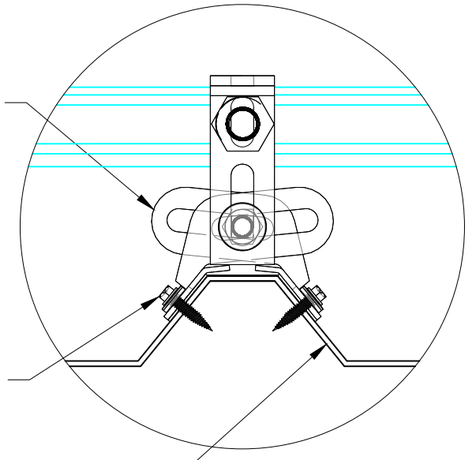
1 ATTACHMENT DETAILS

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



2 ATTACHEMENT DETAIL

S-02 SCALE: 1" = 1'-0"



3 ENLARGE SECTION

S-02 SCALE: NTS

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

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

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Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:10

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
STRUCTURAL ATTACHMENT DETAILS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-02

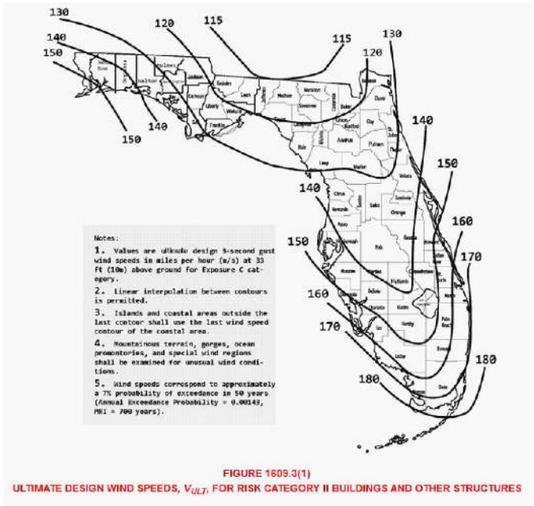

FIGURE 1609.3(1)
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES

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)	47.9	ROOF SLOPE	3 /12	
ROOF WIDTH (ft)	28.9	ROOF SLOPE (°)	14.0	
PARAPET HEIGHT (ft)	0.0	ROOF TYPE	GABLE	
MODULE LENGTH (in)	66.9	ULTIMATE WIND SPEED	120	mph
MODULE WIDTH (in)	40.00	NOMINAL WIND SPEED	93	mph
MODULE ORIENTATION	PORTRAIT	EXPOSURE FACTOR (C_e)	1.000	
MODULE AREA (sq. ft.)	18.58	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)	18.6	K_{zt}	1.000	
GROUND ELEVATION (ft)	97.0	K_e	0.996	
HVHZ	NO	K_z	0.575	

DESIGN CALCULATIONS

VELOCITY PRESSURE (q) = $.00256*K_eK_zK_{zt}K_DV^2$

VELOCITY PRESSURE(ASD) 10.8 psf

WIDTH OF PRESSURE COEFFICIENT	28.9' * 10%	=	2.89'	ZONE WIDTH A	4 FT
	15' * 40%	=	6'	ZONE 2 WIDTH	N/A (FOR (°) < 7°
				ZONE 3 WIDTH	N/A (FOR (°) < 7°

EXTERNAL PRESSURE COEFFICIENT	ZONE 1	-2.068	-2.068
	ZONE 1'	X	X
	ZONE 2e	-2.068	-2.068
	ZONE 2n	-2.615	-2.615
	ZONE 2r	-2.615	-2.615
	ZONE 3e	-2.615	-2.615
	ZONE 3r	-3.116	-3.116

INTERNAL PRESSURE COEFFICIENT (+/-) 0.18

DESIGN PRESSURES

ROOF ZONE	DOWN	UP				
1	16.0	-24.2	psf			
1'	X	X	psf	Module allowable uplift pressure	88	psf
2e	16.0	-24.2	psf	Module allowable uplift pressure	125	psf
2n	16.0	-30.1	psf	Module allowable down pressure	125	psf
2r	16.0	-30.1	psf			
3e	16.0	-30.1	psf			
3r	16.0	-35.5	psf			

ARRAY FACTORS

ARRAY EDGE FACTOR (EXPOSED)	1.5	SOLAR PANEL PRESSURE EQUALIZATION FACTOR	0.692
ARRAY EDGE FACTOR (NON-EXPOSED)	1		

ADJUSTED DESIGN PRESSURES

ROOF ZONE	DOWN	UP (Exposed)'	(N. Exposed)	
1	16.0	-36.3	-24.2	psf
1'	X	X	X	psf
2e	16.0	-36.3	-24.2	psf
2n	16.0	-45.1	-30.1	psf
2r	16.0	-45.1	-30.1	psf
3e	16.0	-45.1	-30.1	psf
3r	16.0	-53.2	-35.5	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 9 in NO. OF RAILExposed: 2 Non. Exp: 2

ROOF ZONE	DOWN	UP (Exposed)'	(N. Exposed)		SPANS (E)	SPANS (N.E)
1	133.8	303.7	202.5	lbs	36 in	36 in
1'	X	X	X	lbs	X in	X in
2e	133.8	303.7	202.5	lbs	36 in	36 in
2n	133.8	377.5	251.7	lbs	36 in	36 in
2r	133.8	377.5	251.7	lbs	36 in	36 in
3e	133.8	377.5	251.7	lbs	36 in	36 in
3r	133.8	333.8	296.7	lbs	27 in	36 in

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620 N. WYMORE ROAD,
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ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Signature with Seal

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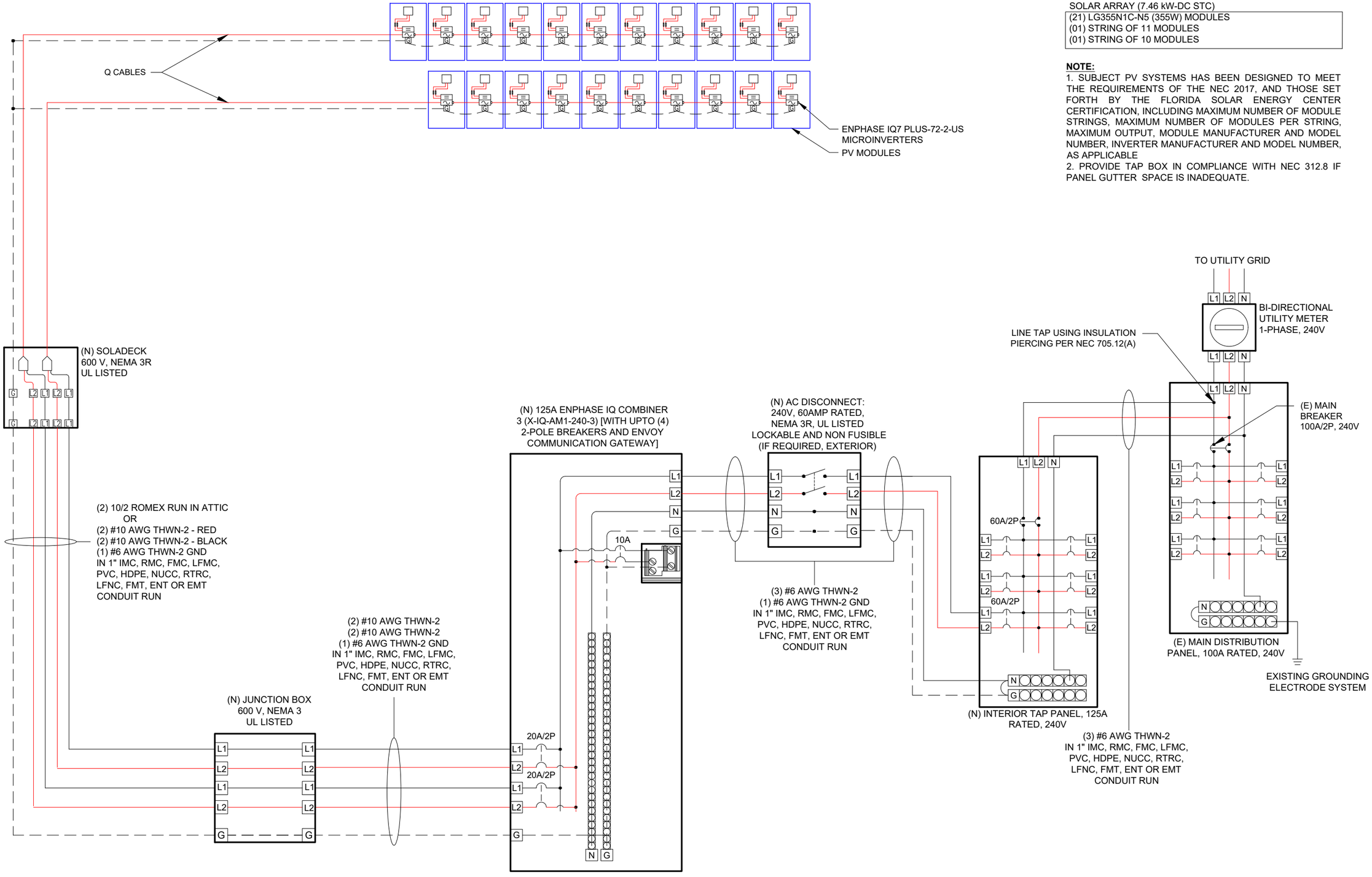
PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
STRUCTURAL ATTACHMENT CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-02.1



SOLAR ARRAY (7.46 kW-DC STC)

(21) LG355N1C-N5 (355W) MODULES
(01) STRING OF 11 MODULES
(01) STRING OF 10 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 NEC 312.8 IF PANEL GUTTER SPACE IS INADEQUATE.

1 ELECTRICAL LINE DIAGRAM

E-01 SCALE: NTS

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COA # 28345
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MAITLAND, FL 32751
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ERMOCRATES E. CASTILLO - FL PE 52590

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Date: 2021.04.07 14:24:10

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-01

AC CONDUCTOR AMPACITY CALCULATIONS: FROM ROOF TOP SOLADECK TO LOAD CENTER

Module Manufacturer	LG
Module Model	LG355N1C-N5
Inverter Manufacturer	Enphase
Inverter Model	Enphase IQ 7 Plus
Modules/Branch Circuit 1	11
Modules/Branch Circuit 2	10
Total Array Power (kW)	7.46
System ac Voltage	240V 1-Phase

Design Temperature	
Min. Ambient Temp. °F	32
Max. Ambient Temp. °F	117
Calculated Max. Voc	45
Calculated Min Vmp	27
Conduit Fill	
Number of conduits	1

Ampacity Calcultions										
Circuit	Max Amps	1.25 x Max Amps	AWG	90 °C Ampacity	Ambient Temp °F	Temp Derate	Conduit Fill	Fill Derate	Derated Ampacity	Maximum Circuit Breaker
Circuit 1	13.3	16.6	#12	30	95	0.96	4	0.8	23.04	20 A
Circuit 2	12.1	15.1	#12	30	95	0.96	4	0.8	23.04	20 A
AC Combiner Panel Output	25.4	31.7	#6	75	95	0.96	3	1	72	40 A

Maximum Circuit Voltage Drop	2%

Voltage Drop Calculations					
Circuit	AWG	Circular Mills	I	V	Max Length
Circuit 1	#12	6530	13.3	240	91 Feet
Circuit 2	#12	6530	12.1	240	101 Feet
Combiner Panel Output	#6	26240	25.4	240	192 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 Voc 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.

AC CONDUCTOR AMPACITY CALCULATIONS: FROM AC COMBINER BOX TO MSP

Module Properties			
Voc	41.5	Isc	10.8
Vmpp	34.7	Imp	10.25
TC Voc	-0.26%/ °C	TC Vmp	-0.34%/ °C
Pmp	355.0	NOCT	45 °C

Inverter Properties	
Output Voltage	240 L-L 1-ph
Max Input dc Voltage	60 Vdc
Operating Range	16 - 60 Vdc
MPPT Voltage Range	27 - 45 Vdc
Start Voltage	22 Vdc
Max Input Power	440 Wdc
Continuous AC Power	290 VA

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).

ENPHASE IQ7PLUS-72-2-US MICROINVERTER		
Input Data (DC)		
	Recommended Input Power (STC)	235-400W +
	Maximum Input DC Voltage	60V
	Peak Power Tracking Voltage	27V-45V
	Operating Range	16V-60V
	Min. / Max. Start Voltage	22V / 60V
	Max DC Short Circuit Current	15A
Output Data (AC)		
	Maximum Output Power	290W
	Nominal Output Current	1.21A
	Nominal Voltage / Range	240V/211-264V
	Nominal Frequency / Range	60 Hz
	Extended Frequency / Range	47-68 Hz
	Power Factor at rated power	1.0
	Maximum unit per 20A Branch Circuit	13 (240 VAC)

Castillo Engineering
DESIGNED TO PERMIT
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

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Signature with Seal

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

Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:11

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

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))

PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL LOCATION:
AC DISCONNECT
(PER CODE: NEC 690.56(C)(3))

ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
- 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]

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OPERATING CURRENT 25.4 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.54)

WARNING
INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

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

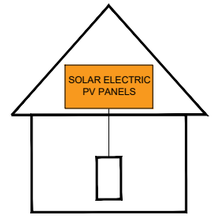
DATA PER PANEL

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: NEC 690.52)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



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

WARNING
⚠ IN CASE OF EMERGENCY CONTACT: ⚠
SUNPRO SOLAR
PH. NO. - (866) 450-1012

LABEL LOCATION:
MAIN DISCONNECT
(PER CODE: NFPA - 11.12.2.1.5)

AC COMBINER BOX

LABEL LOCATION:
COMBINER BOX
(PER CODE: NEC 690.52)

AC DISCONNECT

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.54)

SOLAR CONNECTION LINE SIDE TAP

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

SOLAR BREAKER

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

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

LABEL LOCATION:
INVERTER
(PER CODE: NEC 690.52)

7.46 KW SOLAR DISCONNECT LOCATED

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.54)

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DESIGNED TO PERMIT
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

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Signature with Seal

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

Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:11

PROJECT NAME

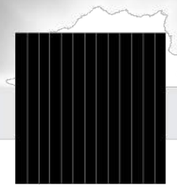
KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
SYSTEM LABELING

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-03

LG NeON®2



60

360W | 355W | 350W

The LG NeON® 2 is one of the most powerful and versatile modules on the market today. Featuring LG's Cello Technology in monocrystalline n-type solar cells, the LG NeON® 2 increases power output. Now includes a 25 years product and 90.1% performance warranty for higher performance and reliability.
The new LG NeON® 2 has been designed with aesthetics in mind using new cell design.

Feature

Enhanced Performance Warranty

LG NeON® 2 has an enhanced performance warranty. After 25 years, LG NeON® 2 is guaranteed to perform at minimum 90.1% of initial performance.

Enhanced Product warranty

LG has extended the warranty of the NeON® 2 to 25 years, which is among the top of industry standards.

About LG Electronics

LG Electronics is a global big player, committed to expanding its operations with the solar market. 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 MonoX® series to the market, which is now available in 32 countries. The NeON® (previous. MonoX® NeON), NeON®2, NeON®2 BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG Solar's lead, innovation and commitment to the industry.

LG NeON®2

LG360N1C-N5 | **LG355N1C-N5** | LG350N1C-N5

General Data

Cell Properties(Material / Type)	Monocrystalline / N-type
Cell Maker	LG
Cell Configuration	60 Cells (6 x 10)
Number of Busbars	12EA
Module Dimensions (L x W x H)	1,700mm x 1,016mm x 40 mm
Weight	18.0 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)	1,000 mm x 2EA
Connector(Type / Maker)	MC 4 / MC

Certifications and Warranty

Certifications	IEC 61215-1/-1-1/2:2016, IEC 61730-1/2:2016
	ISO 9001, ISO 14001, ISO 50001
	OHSAS 18001
Salt Mist Corrosion Test	IEC 61701:2012 Severity 6
Ammonia Corrosion Test	IEC 62716 : 2013
Hail Test	25mm (1") diameter at 23 m/s (52 mph)
Fire Rating	Class C (UL 790)
Solar Module Product Warranty	25 Years
Solar Module Output Warranty	Linear Warranty*

* 1) First year : 98% 2) After 1st year : 0.33% annual degradation, 3) 90.1% for 25 years

Temperature Characteristics

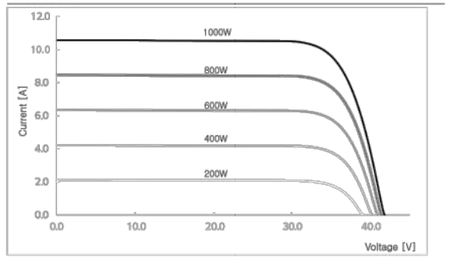
NMOT*	[°C]	42 ± 3
Pmax	[%/°C]	-0.34
Voc	[%/°C]	-0.26
Isc	[%/°C]	0.03

* 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		LG360N1C-N5	LG355N1C-N5	LG350N1C-N5
Maximum Power (Pmax)	[W]	270	266	263
MPP Voltage (Vmpp)	[V]	33.0	32.6	32.2
MPP Current (Impp)	[A]	8.20	8.17	8.15
Open Circuit Voltage (Voc)	[V]	39.2	39.1	39.0
Short Circuit Current (Isc)	[A]	8.71	8.68	8.64

I-V Curves



Electrical Properties (STC*)

Model		LG360N1C-N5	LG355N1C-N5	LG350N1C-N5
Maximum Power (Pmax)	[W]	360	355	350
MPP Voltage (Vmpp)	[V]	35.1	34.7	34.3
MPP Current (Impp)	[A]	10.28	10.25	10.22
Open Circuit Voltage(Voc, ± 5%)	[V]	41.6	41.5	41.4
Short Circuit Current(Isc, ± 5%)	[A]	10.84	10.80	10.76
Module Efficiency	[%]	20.8	20.6	20.3
Power Tolerance	[%]	0 ~ +3		

* STC (Standard Test Condition): Irradiance 1000 W/m², Cell temperature 25 °C, AM 1.5,
Measurement Tolerance of Pmax : ± 3%

Operating Conditions

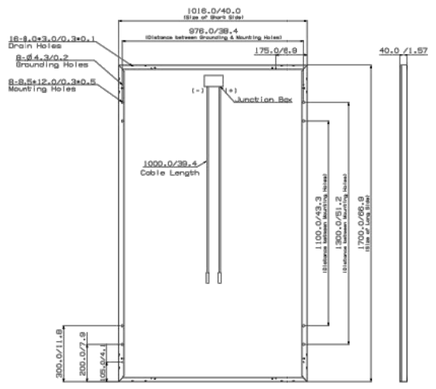
Operating Temperature	[°C]	-40 ~ +90
Maximum System Voltage	[V]	1000(IEC)
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load* (Front)	[Pa / psf]	5,400 / 113
Mechanical Test Load* (Rear)	[Pa / psf]	4,000 / 84

* 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 612152005

Packaging Configuration

Number of Modules per Pallet	[EA]	25
Number of Modules per 40ft HQ Container	[EA]	650
Packaging Box Dimensions (L x W x H)	[mm]	1,750 x 1,120 x 1,221
Packaging Box Gross Weight	[kg]	464

Dimensions (mm / inch)



LG Electronics Inc.
Energy Business Division
LG Twin Towers, 128 Yeoui-daero, Yeongdeungpo-gu, Seoul
07336, Korea
www.lg-solar.com

Product specifications are subject to change without notice.
DS-N5-60-C-G-F-EN-200507

Castillo Engineering
DESIGNED TO PERMIT®
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

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Signature with Seal
ERMOCRATES E. CASTILLO LICENSE No. 52590 STATE OF FLORIDA PROFESSIONAL ENGINEER
Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:11

PROJECT NAME
KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
MODULE 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,

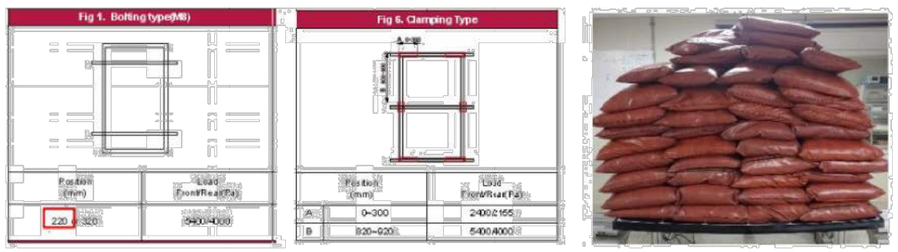
Upon your request we have conducted in house tests to determine the structural performance of the LG Module frames listed below. Our test results meet the requirements you presented in our conference call on January 29th. We will present the test criteria, results, and product limitations that may result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

REVISIONS

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PROJECT INSTALLER

SUNPRO

Signature with Seal

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

Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:12

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
TEST LETTER
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-01.1

Data Sheet
Enphase Microinverters
Region: US

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.

UL CERTIFIED SAFETY US-CA E341165

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE.

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**

ENPHASE.

2018-02-08

Castillo Engineering
DESIGNED TO PERMIT
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

REVISIONS

DESCRIPTION	DATE	REV

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SUNPRO

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Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:12

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
INVERTER DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

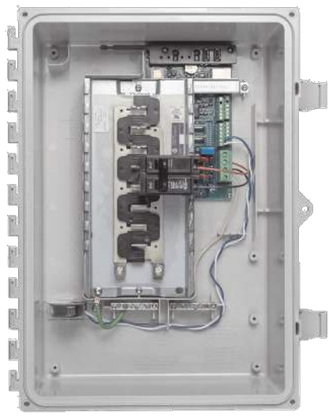
SHEET NUMBER
DS-02

Data Sheet
Enphase Networking

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

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 warranty
- UL listed

LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

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%).
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 2
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)	80A of distributed generation / 90A with IQ Envoy breaker 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	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
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

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit **enphase.com**

2018-09-13

ENPHASE

Castillo Engineering
DESIGNED TO PERMIT
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

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

SUNPRO

Signature with Seal

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

Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:13

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
COMBINER BOX DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-03

SOLARMOUNT

UNIRAC

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.

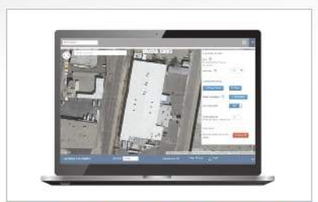
Now Featuring:

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

UNIRAC

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

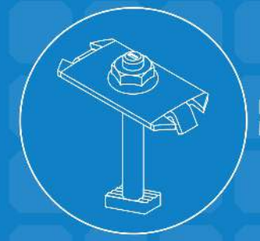
ONE PRODUCT - MANY APPLICATIONS

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 financ al and aesthetic aspirations.

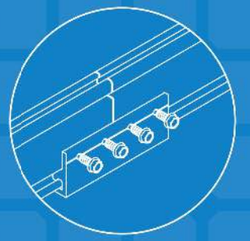
AUTOMATED DESIGN TOOL

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.

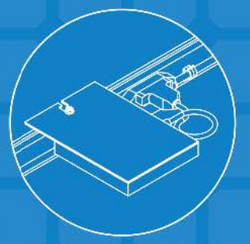


INTEGRATED BONDING MIDCLAMP



INTEGRATED BONDING SPLICE BAR

INTEGRATED BONDING L-FOOT w/ T-BOLT



INTEGRATED BONDING MICROINVERTER MOUNT w/ WIRE MANAGEMENT

LISTED **UL2703** BONDING & GROUNDING MECHANICAL LOADING SYSTEM FIRE CLASSIFICATION

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

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

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Signature with Seal

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Digitally signed by: Ermocrates E Castillo
Date: 2021.04.07 14:24:13

PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
RAIL DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-04

S-5!®

The Right Way!

ProteaBracket™

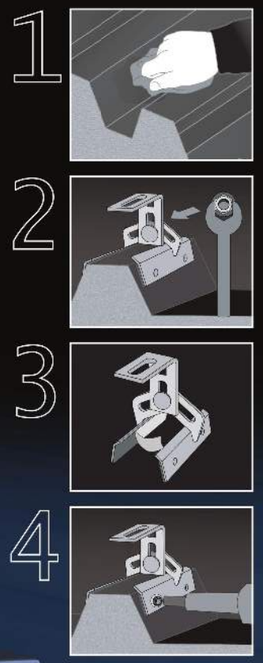
ProteaBracket™ is the most versatile standing seam metal roof attachment solution on the market, fitting most trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate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

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

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

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

The right way to attach almost anything to metal roofs!



ProteaBracket™

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

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

S-5!®

The Right Way!

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

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

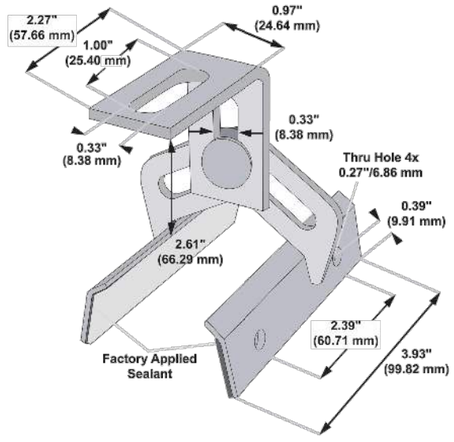
Multiple Attachment Options:

Side Rail Option

Top Rail Option

S-5-PV Kit Option

ProteaBracket™

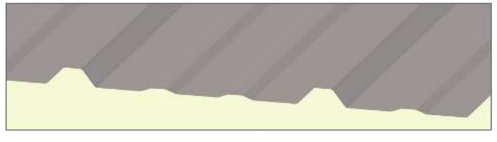


Please note: All measurements are rounded to the second decimal place.

Example Applications

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

Example Profile



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

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

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PROJECT NAME

KARI RESIDENCE
4799 COUNTY RD 242,
LAKE CITY, FL 32024

SHEET NAME
ATTACHMENT DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-05