21 N New Warrington Rd
Pensacola, FL 325207
Office: (850) 220-6533
CVC57201, EC13012400

Date: 09/08/2023
Customer Name: MicheleCuadras
Project Address: 279 SW Sweetbreeze Dr Lake City FL 32024

To Whom It May Concern:

Outlined below are the list of changes made to the plans in response to the plan review department comments.

Remarks: Customer layout request.

- Please see PV03 and PV04 with the updated panel layout.
- Please see PV05 with the updated Roof attachments.

Ayracon V Almaraz
2023.09.11
16:53:37-05'00'

21 N New Warrington Rd
Pensacola, FL 32506
Office: (850) 220-6533
CVC57201, EC13012400

COLUMBIA COUNTY
Building Department

Re: Engineering Services
Project No. P-21288
MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY, FL 32024
24.42 kW DC

To Whom It May Concern:

A proposed solar system is planned for the residential home referenced above. This is an evaluation of the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar array of panels.

A. GOVERNING CODES:

BUILDING CODE =	FBC 7TH EDITION (2020)
ASCE BUILDING CODE VERSION =	ASCE 7-16

B. SITE ASSESSMENT INFORMATION:

SITE VISIT =	DOCUMENTATION IDENTIFYING ROOF MATERIAL AND INFORMATION INCLUDING SIZE AND SPACING OF ROOF FRAMING FOR THE EXISTING STRUCTURE.
SOLAR DESIGN DRAWINGS =	DESIGN DRAWINGS OF THE PROPOSED SYSTEM INCLUDING A SITE PLAN, ROOF PLAN AND CONNECTION DETAILS FOR THE SOLAR PANELS.
RISK CATEGORY CLASSIFICATION =	II
RISK CATEGORY =	WIND
EXPOSURE CATEGORY =	C
BASIC WIND SPEED, V (mph) =	120
NUMBER OF STORIES =	1

C. STRUCTURE DESCRIPTION: **CONTRACTOR SHALL INFORM THIS OFFICE IF ANY ITEM DIFFERS.**

ROOF MATERIAL =	ASPHALT SHINGLE
ROOF FRAMING =	MANUFACTURED TRUSS
ASSUMED TRUSS FRAMING SPECIES =	MIXED SOUTHERN PINE
RAFTER/TOP CHORD SIZE (in) =	2X4
RAFTER/TOP CHORD SPACING (in) =	24
ROOF SLOPE, θ (°) =	26
SOLAR PANEL TILT, ω (°) =	0
MEAN ROOF HEIGHT, h (ft) =	16.10
ROOF TYPE =	GABLE ROOF
EXISTING FOUNDATION =	PERMANENT

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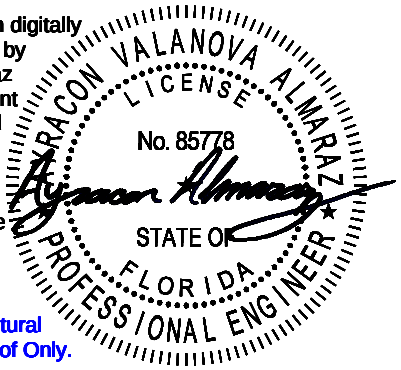

MERAKI Installers, LLC
COA #36090

D. LOADING CRITERIA USED:

EXISTING ROOFING AND FRAMING WITH 20 PSF LIVE LOAD (NO PANELS):

ROOF TCDL (lb/ft^2) =	4.32	= 15292 lbs
ROOF BCDL (lb/ft^2) =	4.58	= 16223 lbs
ROOF TCLL (lb/ft^2) =	20	= 70800 lbs
ROOF BCLL (lb/ft^2) =	0	= 0 lbs

NEW SOLAR PANELS AND RACKING:

DISTRIBUTED LOAD (lb/ft^2) =	3.00	= 3889 lbs

EXISTING SOLAR PANELS AND RACKING:

DISTRIBUTED LOAD (lb/ft^2) =	0	= 0 lbs

EXISTING STRUCTURES:

EXISTING GRAVITY LOAD (NO PANELS) (lb) =	94064
NEW GRAVITY LOAD (lb) =	98390
GRAVITY LOAD INCREASE =	4.60%
NEW LOADING <5% INCREASE =	OK

E. SOLAR PANEL DESCRIPTION:

1. INSTALLED PARALLEL TO ROOF STRUCTURE WITH A 2° (DEGREE) TOLERANCE.
2. GAP SPACING TO BE A MINIMUM OF 0.25 INCHES.
3. LONGEST DIMENSION OF PANEL IS NOT TO EXCEED 6.7 FT.
4. ARRAY LOCATED A MINIMUM OF 2 x h2 INCHES FROM ROOF EDGE AND GABLE/HIP RIDGE.

   2 x h2 (in) = 8.00
5. HEIGHT ABOVE ROOF SURFACE NOT TO EXCEED 10 INCHES.
6. RAILS AND PANELS: **INSTALL PER MANUFACTURER INSTRUCTIONS.**

   RAIL MANUFACTURER = IRONRIDGE
7. ANCHORAGE: **INSTALL PER MANUFACTURER INSTRUCTIONS.**

ATTACHMENT TYPE* =	FLASHVUE	**SEE NOTE**
ATTACHMENT LOCATION =	GABLE ROOF	
PV MODULE COUNT =	66	
ATTACHMENT QUANTITY =	215	
ATTACHMENT SPACING (in) =	48	**-STAGGER PANEL SUPPORT CONNECTIONS TO DISTRIBUTE LOAD.**
SCREW ø (in) =	0.31	
SCREW MIN. PENETRATION DEPTH (in) =	3	
SCREW QUANTITY PER ATTACHMENT =	1	
F_{SCREW} (CHECK) =	OK	

***ATTACHMENT TO BE INSTALLED ON RAFTERS NO LESS THAN 2x4 IN SIZE WITH A SCREW PENETRATION DEPTH OF NO LESS THAN 3". CONTRACTOR TO INFORM THIS OFFICE IF ATTACHMENT DEPTH DIFFERS AND/OR RAFTER SIZE IS SMALLER THAN 2X4 IN SIZE.**

-THE ANALYSIS ABOVE DOES NOT INCLUDE CAPACITY FOR THE COMPLETE MOUNTING SYSTEM. FOR CAPACITY OF THE COMPLETE MOUNTING SYSTEM, PLEASE SEE MANUFACTURER'S RECOMMENDATIONS

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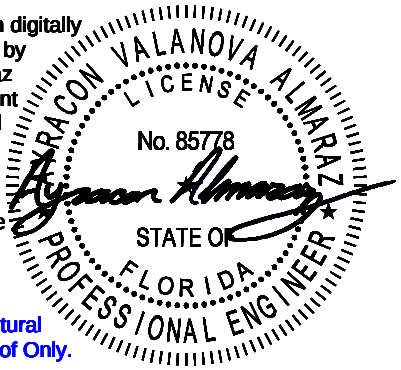

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COA #36090

IF DURING SOLAR PANEL INSTALLATION, THE ROOF FRAMING MEMBERS OR ROOF COVERING APPEAR UNSTABLE OR DEFLECT NON-UNIFORMLY, OUR OFFICE SHALL BE NOTIFIED BEFORE PROCEEDING WITH THE INSTALLATION.

Based on the above evaluation and on information supplied at the time of this report, this office certifies with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system.

Should you have any questions regarding the above or if you require further information, please do not hesitate to contact me.

Regards,

Ayracon Almaraz, PE
Florida License No 85778

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AYRACON VALANOVA ALMARAZ
LICENSE
No. 85778
STATE OF FLORIDA
PROFESSIONAL ENGINEER

MERAKI Installers, LLC
COA #36090

21 N New Warrington Rd
Pensacola, FL 325207
Office: (850) 220-6533
CVC57201, EC13012400

COLUMBIA COUNTY
Building Department

Re: Engineering Services
Project No. P-21288
MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY, FL 32024
24.42 kW DC

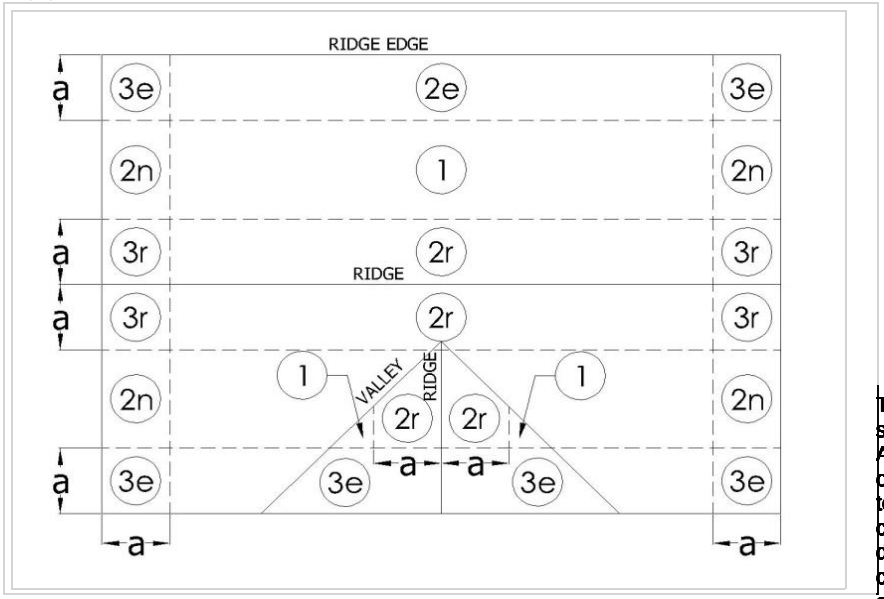
FLASHVUE ON 26° GABLE ROOF

MAX ALLOWABLE ATTACHMENT SPACING (in)
TABLE

ZONE	EDGE[1][4]	EXPOSED[2][4]	NON-EXPOSED[3][4]
1	48	48	48
1'	N/A	N/A	N/A
2	N/A	N/A	N/A
2'	N/A	N/A	N/A
2e	48	48	48
2n	48	48	48
2r	48	48	48
3	N/A	N/A	N/A
3'	N/A	N/A	N/A
3e	48	48	48
3r	48	48	48

DNI = DO NOT INSTALL PANEL IN ROOF ZONE FOR CONDITION SHOWN
***INCREASE ATTACHMENT QUANTITY AS REQUIRED**
(1)EDGE ATTACHMENT SPACING FOR WHEN EDGE OF PANEL IS INSTALLED WITHIN 8" OF ROOF EDGE OR GABLE/HIP RIDGE.
(2)EXPOSED ATTACHMENT SPACING FOR PANELS INSTALLED IN EXPOSED CONDITIONS.
(3)NON-EXPOSED ATTACHMENT SPACING TO BE USED FOR PANELS INSTALLED IN NON-EXPOSED CONDITIONS.
(4)REFERENCE FIGURES ON NEXT PAGE TO DETERMINE EDGE, EXPOSED, AND NON-EXPOSED PANEL CONDITIONS.

ASCE 7-16 - FIGURE 30.3-2C
GABLE ROOF
a (ft) = 4.2



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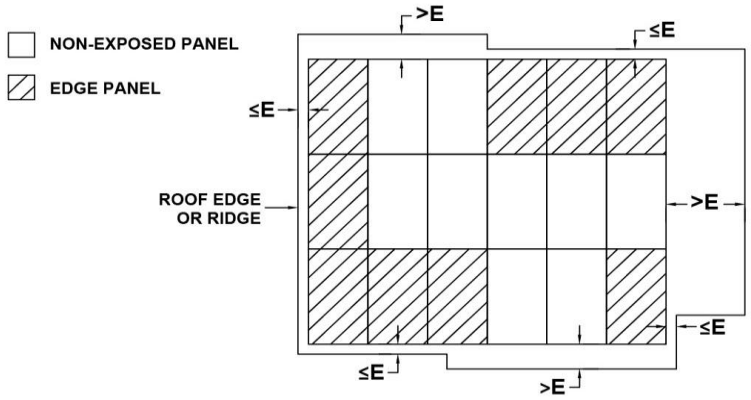
COA #36090

MAX ALLOWABLE ATTACHMENT SPACING FOR EDGE PANELS SHALL BE REQUIRED IF A SOLAR PANEL IS WITHIN DISTANCE E OR LESS FROM ROOF EDGE OR GABLE/HIP RIDGE

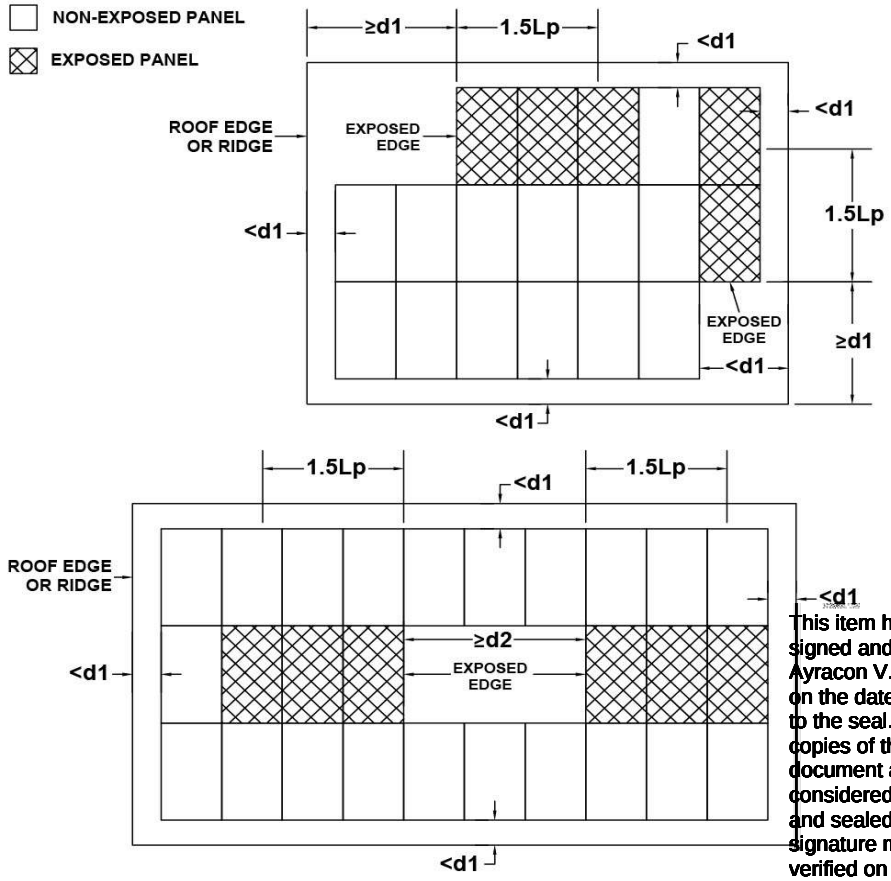
E= 8"



MAX ALLOWABLE ATTACHMENT SPACING FOR EXPOSED PANELS SHALL BE REQUIRED IF A SOLAR PANEL MEETS ANY OF THE FOLLOWING CRITERIA:

1. IF DISTANCE d1 IS GREATER THAN 8'-1" FROM THE EDGE OF PANEL TO ROOF EDGE OR GABLE/HIP RIDGE.
2. IF d2 IS GREATER THAN 4'-0 TO THE ADJACENT PANEL/ARRAY.
3. IF PANEL IS WITHIN A DISTANCE OF 8'-8" (1.5Lp) FROM THE END OF A ROW AT AN EXPOSED EDGE.

d1= 8'-1" d2= 4'-0" 1.5Lp= 8'-8"



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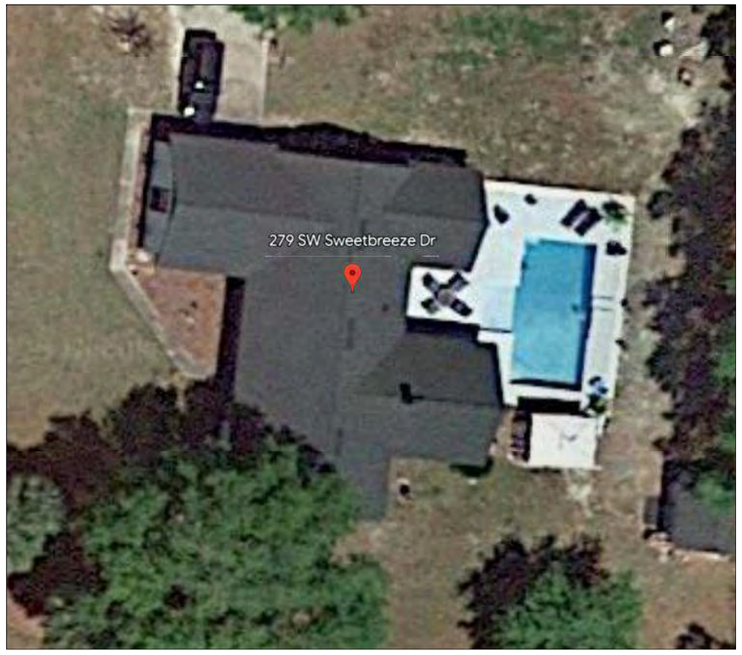
PROFESSIONAL ENGINEER

MERAKI Installers, LLC
COA #36090

PROJECT INFORMATION	PROJECT NUMBER: P-21288
MICHELE CUADRAS 279 SW SWEETBREEZE DR LAKE CITY FL 32024 UTILITY: FLORIDA POWER & LIGHT (FPL)	



AERIAL VIEW:

STREET VIEW:

PHOTOVOLTAIC SYSTEM INFORMATION				STRUCTURAL INFORMATION
DC SYSTEM SIZE: 24.420 KW	AC SYSTEM SIZE: 19.140 KW			ROOF MATERIAL: ASPHALT SHINGLE
MODULES:	APTOS DNA-120-370W	QTY:	66	ATTACHMENT: FLASHVUE
INVERTER(S):	ENPHASE IQ8PLUS-72-2-US	QTY:	66	RAIL: IRONRIDGE XR-10

SHEET INDEX	
PV01	COVER SHEET
PV02	NOTES AND LEGEND
PV03	SITE PLAN
PV04	ROOF PLAN
PV05	DETAILS
PV06	ELECTRICAL DIAGRAM
PV07	ELECTRICAL CALCS
PV08	LABELS
PV09	PLACARD

DESCRIPTION OF DESIGN:
INSTALLATION OF GRID-TIED,
UTILITY INTERACTIVE
PHOTOVOLTAIC SYSTEM

SITE SPECIFICATIONS:
OCCUPANCY: R-3
ZONING: RESIDENTIAL

APPLICABLE GOVERNING CODES:
FBC 2020 7TH EDITION
NEC 2017
FFPC 2020

Columbia County Building Department
Plans Reviewed for Code Compliance
State of Florida

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET:	PV01 - COVER SHEET
DESIGNED BY:	J. CUENO
DATE: 9/8/2023	REV: REVA
CONTRACTOR:	MERAKI INSTALLERS, LLC LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
PENSACOLA, FL 32506
850-220-6533

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PROFESSIONAL ENGINEER

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MERAKI Installers, LLC
COA #36090

MERAKI

GENERAL NOTES:

1. INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM SHALL BE IN ACCORDANCE WITH NEC ARTICLE 690, AND ALL OTHER APPLICABLE NEC CODES WHERE NOTED OR EXISTING.
2. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL COMPLY WITH NEC ARTICLE 110.
3. ALL WIRES, INCLUDING THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE IN ACCORDANCE WITH NEC ARTICLE 250
4. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE; THIS SYSTEM IS UTILITY INTERACTIVE PER UL 1741 AND DOES NOT INCLUDE STORAGE BATTERIES OR OTHER ALTERNATIVE STORAGE SOURCES.
5. ALL DC WIRES SHALL BE SIZED ACCORDING TO [NEC 690.8]
6. DC CONDUCTORS SHALL BE WITHIN PROTECTED RACEWAYS IN ACCORDANCE WITH [NEC 690.31]
7. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL JURISDICTIONAL BUILDING CODE.
8. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
9. INVERTER CONFORMS TO AND IS LISTED UNDER UL 1741.
10. RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
11. ALL EQUIPMENT LOCATED OUTDOORS TO BE NEMA 3R OR NEMA 4R.

GROUNDING & ELECTRICAL NOTES:

1. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
2. DC GEC AND AC EGC TO REMAIN SPLICED TO EXISTING ELECTRODE
3. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
4. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOXES DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.

INTERCONNECTION NOTES:

1. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9] & [NEC 230.95]
2. SUPPLY SIDE INTERCONNECTION ACCORDING TO [NEC705.12]

DISCONNECT NOTES

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED. THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED “LINE SIDE” (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.

SITE AND ROOF PLAN LEGEND

EXISTING ELECTRICAL

- EXISTING PV ARRAY
- M — EXISTING UTILITY METER
- MSP — EXISTING MAIN SERVICE PANEL
- ENPH IQ — EXISTING ENPHASE IQ COMBINER
- EXISTING INVERTER
- AC — EXISTING AC DISCONNECT
- C — EXISTING COMBINER PANEL
- SP — EXISTING SUB PANEL
- PV — EXISTING PV METER

NEW ELECTRICAL

- NEW PV MODULE
- M — NEW UTILITY METER
- MSP — NEW MAIN SERVICE PANEL
- ENPH IQ — NEW ENPHASE IQ COMBINER
- NEW INVERTER
- AC — NEW AC DISCONNECT
- C — NEW COMBINER PANEL
- SP — NEW SUB PANEL
- PV — NEW PV METER
- JB — NEW JUNCTION BOX

SITE CONDITIONS AND STRUCTURAL

- FIRE ACCESS PATHWAY
- OBSTRUCTION
- ROOF ATTACHMENT (FLASHVUE)
- RAIL
- PROPERTY BOUNDARY
- TRENCHING
- B — BALLAST BAY

ELECTRICAL DIAGRAM LEGEND

(N) = NEW

(E) = EXISTING

NOTE: ALL SYMBOLS SHOWN IN LEGEND MAY NOT BE PRESENT IN PLANS

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET: PV02 - NOTES AND LEGEND

DESIGNED BY: J. CUENO

DATE: 9/8/2023 REV: REVA

CONTRACTOR: MERAKI INSTALLERS, LLC
LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
PENSACOLA, FL 32506
850-220-6533

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AYRACON VALANOVA ALMARAZ
LICENSE
No. 85778
STATE OF
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PROFESSIONAL ENGINEER

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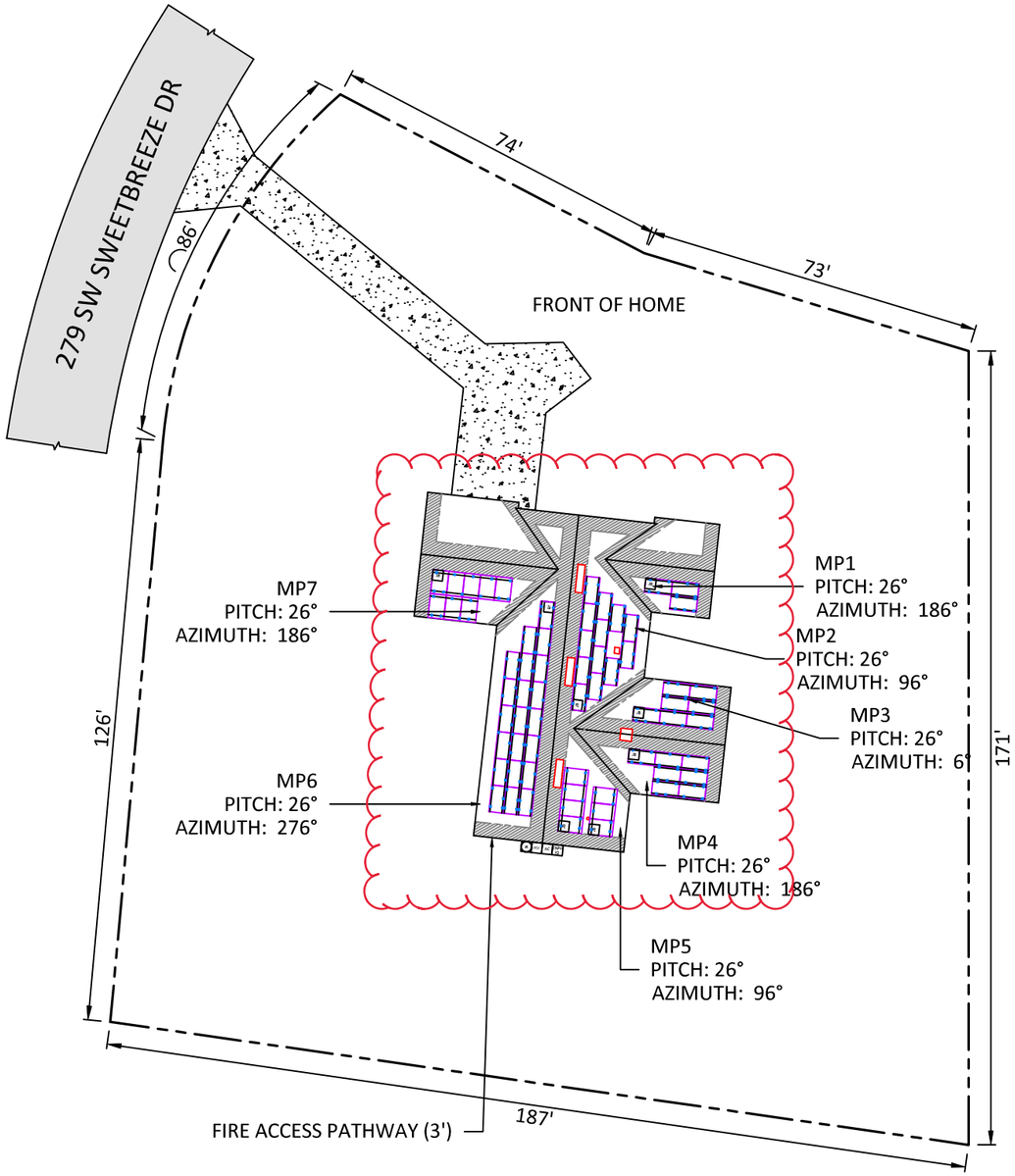
COA #36090

MERAKI



N

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

EQUIPMENT:
PV MODULE(S): (66) APTOS DNA-120-370W PV MODULES x 370W = 24.420kW DC
INVERTER(S): (66) ENPHASE IQ8PLUS-72-2-US (240V) INVERTER(S) x 290W = 19.140 kW AC

NOTES:
1. VISIBLE, LOCKABLE, LABELED AC DISCONNECT.

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET:	PV03 - SITE PLAN
DESIGNED BY:	J. CUENO
DATE: 9/8/2023	REV: REVA
CONTRACTOR:	MERAKI INSTALLERS, LLC LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
PENSACLA, FL 32506
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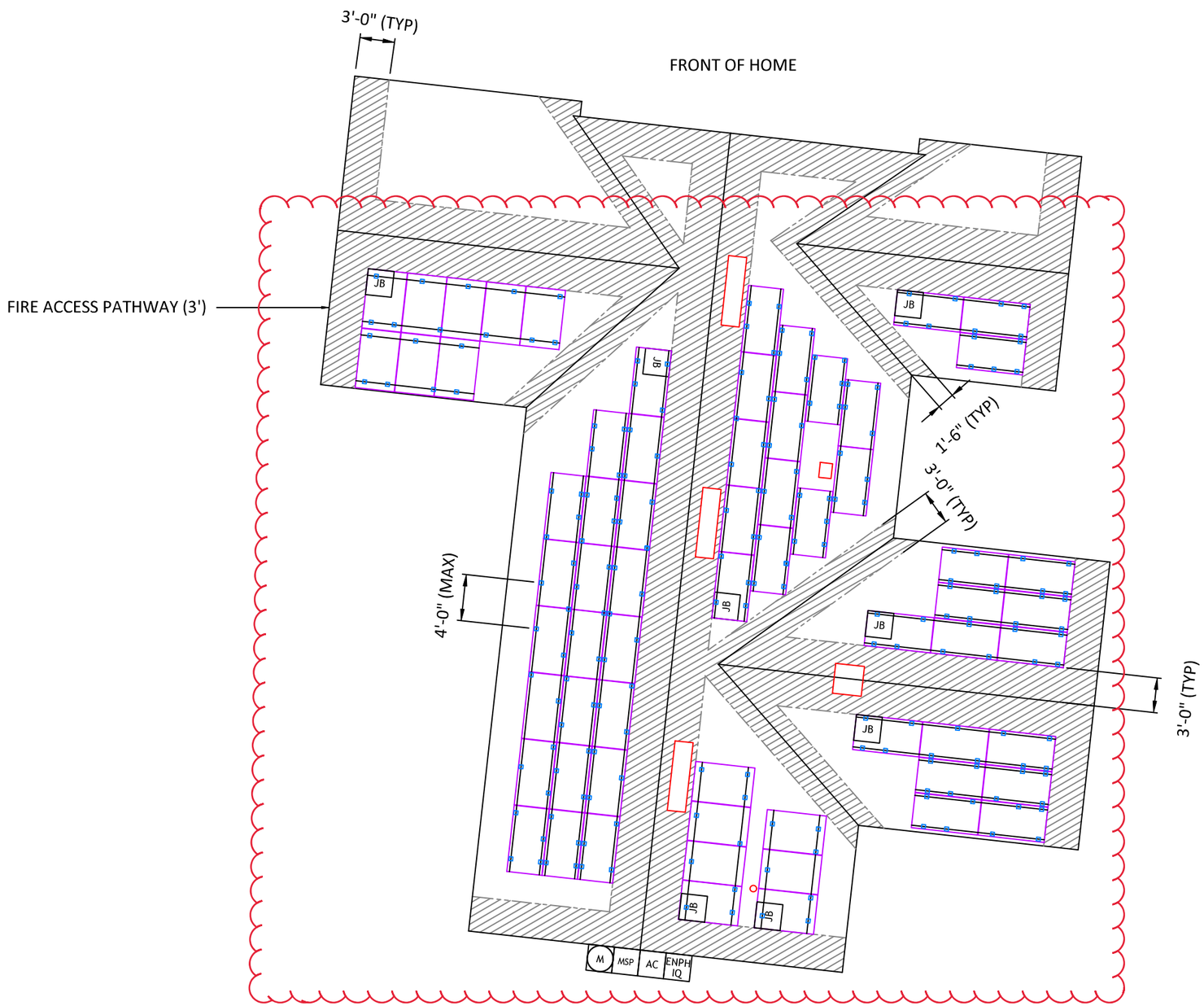
MERAKI Installers, LLC
COA #36090

MERAKI



N

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

Reference Engineer's Max Allowable Attachment Spacing Table to determine attachment spacing requirements for this project. Increase attachment quantity if panels are installed within roof zones noted on table.

NOTES:
1.SETBACK AT RIDGE PER FBC R324.6.2.
ARRAY AREA IS 37% PLAN VIEW TOTAL ROOF AREA.
2. PV MODULES, RAILS, MOUNTINGS AND ANCHORS TO BE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET:	PV04 - ROOF PLAN
DESIGNED BY:	J. CUENO
DATE: 9/8/2023	REV: REVA
CONTRACTOR:	MERAKI INSTALLERS, LLC LICENSE # CVC57201,EC13012400

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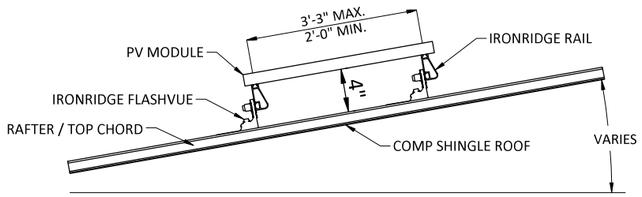
MERAKI Installers, LLC
COA #36090

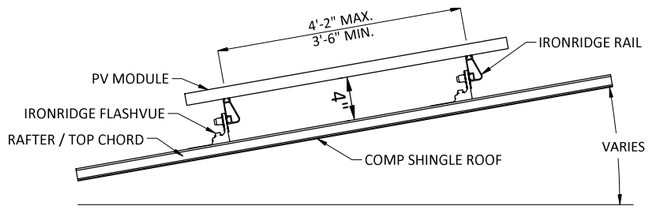
MERAKI

LANDSCAPE ORIENTATION

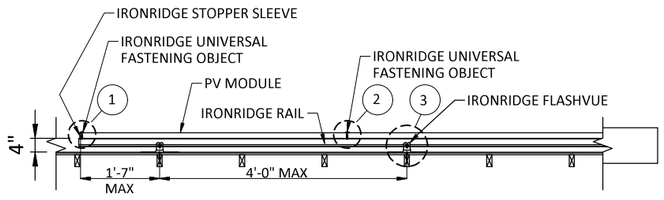


SIDE VIEW

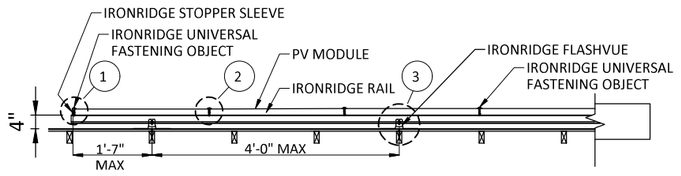
PORTRAIT ORIENTATION



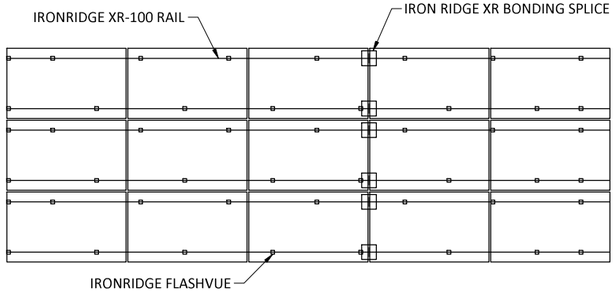
SIDE VIEW



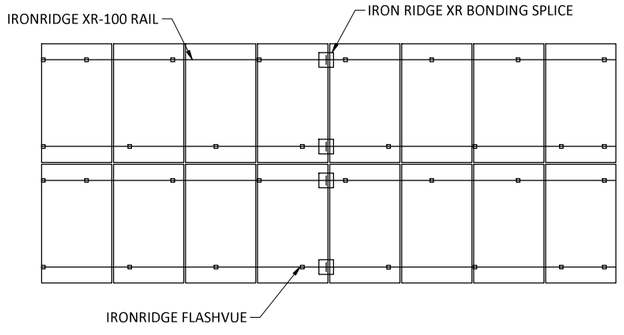
LANDSCAPE FRONT VIEW



PORTRAIT FRONT VIEW

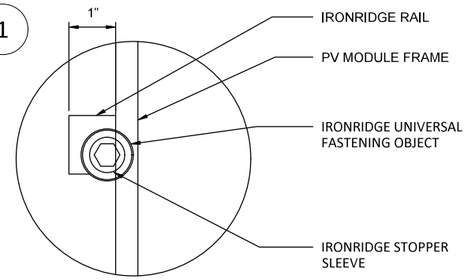


PLAN VIEW LANDSCAPE MODULE



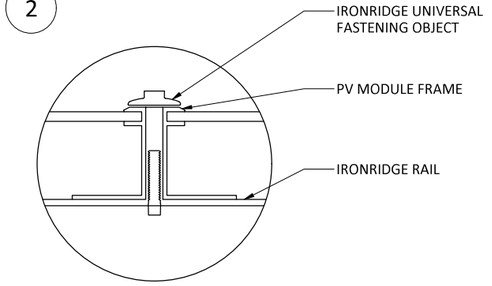
PLAN VIEW PORTRAIT MODULE

1



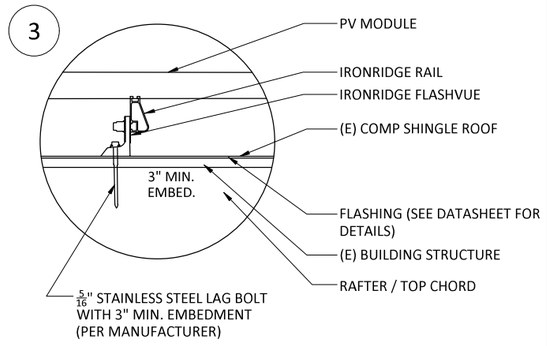
IRONRIDGE UNIVERSAL FASTENING OBJECT WITH STOPPER SLEEVE

2



IRONRIDGE UNIVERSAL FASTENING OBJECT

3



IRONRIDGE FLASHVUE ATTACHMENT

EQUIPMENT INFORMATION:	
RAIL MANUFACTURER	IRONRIDGE
RAIL PART NUMBER	XR-10
ATTACHMENTS	FLASHVUE
ATTACHMENT QTY	215
SPLICE QTY	16
MIDCLAMP QTY	92
ENDCLAMP QTY	80

PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:	
PV MODULE COUNT	66
ARRAY AREA (FT²)	MODULE COUNT * 19.64 = 1296.24
ROOF AREA (FT²)	3540
PERCENT OF ROOF COVERED	37%
ARRAY WEIGHT	MODULE COUNT * 45LBS = 2970
POINT LOAD	ARRAY LBS/ATTACHMENTS = 13.81
DISTRIBUTED LOAD	ARRAY LBS/AREA = 2.29 LBS/FT²

ROOF INFO:	
ROOF MATERIAL	ASPHALT SHINGLE
ROOF FRAMING	MANUFACTURED TRUSS
RAFTER/TOP CHORD SIZE	2X4
RAFTER/TOP CHORD SPACING	24"
ATTACHMENT SPACING	48"

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET:	PV05 - DETAILS
DESIGNED BY:	J. CUENO
DATE: 9/8/2023	REV: REVA
CONTRACTOR:	MERAKI INSTALLERS, LLC LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
PENSACOLA, FL 32506
850-220-6533

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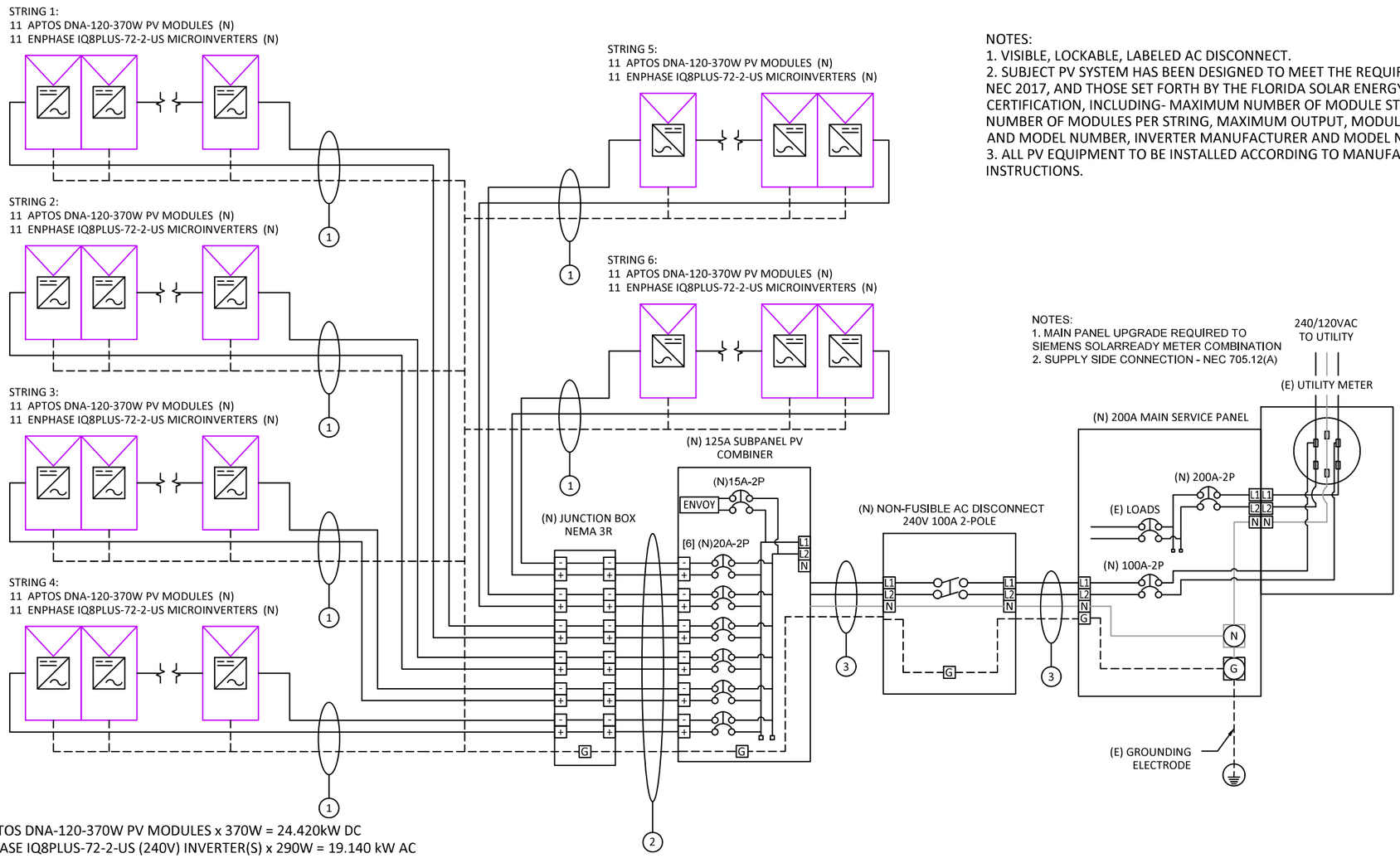
AYRACON VALANOVA ALMARAZ
LICENSE
No. 85778
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Designed for Structural Attachments to Roof Only.

MERAKI Installers, LLC
COA #36090

MERAKI

CONDUCTOR & CONDUIT SCHEDULE									
TAG	QTY	WIRE GAUGE	DESCRIPTION	CONDUIT SIZE	CONDUCTOR RATING (A)	CONDUCTOR TEMP. RATE	AMBIENT TEMP	TEMP. DERATE	# OF CONDUCTORS DERATE	CONDUCTOR RATING W/DERATES
(1)	2 1	12-2 6 AWG	PV-WIRE, USE-2, COPPER (POSITIVE +, NEGATIVE -) BARE, COPPER (GROUND)	N/A	30	90°C	34°C	0.96	1	28.8A
(2)	12 1	10 AWG 10 AWG	UF-B COPPER (POSITIVE +, NEGATIVE -) UF-B COPPER (GROUND)	3/4"	30	60°C	34°C	0.96	.5	14.4A
(3)	3 1	2 AWG 6 AWG	THHN, THWN-2 COPPER (L1 ,L2, NEUTRAL) THHN, THWN-2 COPPER (GROUND)	1.25"	115	75°C	34°C	0.94	1	108.1A



NOTES:
1. VISIBLE, LOCKABLE, LABELED AC DISCONNECT.
2. SUBJECT PV SYSTEM 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.
3. ALL PV EQUIPMENT TO BE INSTALLED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

EQUIPMENT:
PV MODULE(S): (66) APTOS DNA-120-370W PV MODULES x 370W = 24.420kW DC
INVERTER(S): (66) ENPHASE IQ8PLUS-72-2-US (240V) INVERTER(S) x 290W = 19.140 kW AC

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET: PV06 - ELECTRICAL DIAGRAM

DESIGNED BY: J. CUENO

DATE: 9/8/2023 REV: REVA

CONTRACTOR: MERAKI INSTALLERS, LLC
LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
PENSACLA, FL 32506
850-220-6533

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Designed for Structural Attachments to Roof Only.

MERAKI Installers, LLC
COA #36090

MERAKI

EQUIPMENT SCHEDULE			
TYPE	QTY	DESCRIPTION	RATING
MODULES:	66	APTOS DNA-120-370W	370W
INVERTER(S):	66	ENPHASE IQ8PLUS-72-2-US	290W
AC DISCONNECT(S):	1	PV AC DISCONNECT, 240V, 2-POLE	100A

STRING CALCULATIONS						
ENPHASE IQ8PLUS-72-2-US	STRING #1	STRING #2	STRING #3	STRING #4	STRING #5	STRING #6
MAX AC CURRENT:	13.3A	13.3A	13.3A	13.3A	13.3A	13.3A
MLPE IN SERIES	11	11	11	11	11	11
NOMINAL STRING VOLTAGE:	240V	240V	240V	240V	240V	240V
MAX AC OUTPUT POWER	3190W	3190W	3190W	3190W	3190W	3190W
ARRAY DC POWER:	24420W					
TOTAL MAX AC CURRENT:	79.9A					

SYSTEM OCPD CALCULATIONS	
INVERTER MODEL(S):	ENPHASE IQ8PLUS-72-2-US
# OF INVERTERS:	66
MAX OUTPUT CURRENT:	79.9A
(# OF INVERTERS) X (MAX OUTPUT CURRENT) X 125% <= OCPD RATING	
(66 X 1.21A X 1.25) = 99.8A <= 100A, OK	

BUSBAR CALCULATIONS - SIEMENS SOLAR READY PANEL	
MAIN BUSBAR RATING:	200A
MAIN BREAKER RATING:	200A
PV OCPD RATING:	100A
PARALLEL ENERGY SOURCE MAX (100A) >= PV OCPD RATING	
100A >= 100A, OK	

APTOS DNA-120-370W SPECS	
NOMINAL POWER (PMAX)	370W
OPEN CIRCUIT VOLTAGE (VOC)	40.8V
SHORT CIRCUIT CURRENT (ISC)	11.51A
MAX POWER VOLTAGE (VMP)	34.06V
MAX POWER CURRENT (IMP)	10.57A
MAXIMUM SERIES FUSE	20A

ENPHASE IQ8PLUS-72-2-US SPECS	
MAX INPUT VOLTAGE	60V
MAX DC SHORT CIRCUIT CURRENT	15A
MAXIMUM OUTPUT POWER	290W
MAXIMUM OUTPUT CURRENT	1.21A
NOMINAL OUTPUT VOLTAGE	240V
MAX UNITS PER 20A CIRCUIT	13
1-PHASE, 60 HZ, UL1741 LISTED	

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET: PV07 - ELECTRICAL CALCS

DESIGNED BY: J. CUENO

DATE: 9/8/2023 REV: REVA

CONTRACTOR: MERAKI INSTALLERS, LLC
LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
PENSACOLA, FL 32506
850-220-6533

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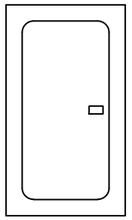
PROFESSIONAL ENGINEER

MERAKI Installers, LLC
COA #36090

MERAKI

MAIN SERVICE PANEL



⚠ WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.13(B)

⚠ WARNING
POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

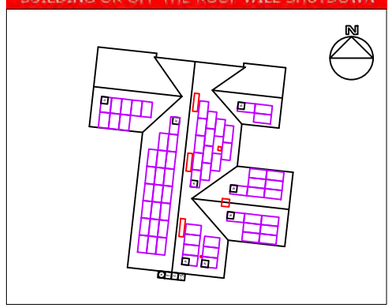
NEC 705.12(B)(2)(3)(c)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.10(C)

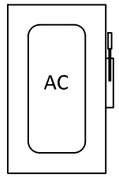
EMERGENCY RESPONDER:
THIS SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN.

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION. ONLY CONDUCTORS INSIDE BUILDING OR OFF THE ROOF WILL SHUTDOWN



NFPA 11.12.2.1.5

FUSIBLE & NON-FUSIBLE
AC DISCONNECT(S)



MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:	79.86 A
NOMINAL OPERATING AC VOLTAGE	240 V

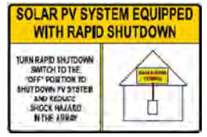
NEC 690.54

⚠ WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.13(B)

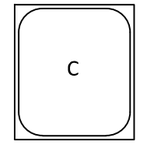
WARNING
IN CASE OF EMERGENCY, CONTACT:
MERAKI SOLAR
PH:(850) 378-1257

NFPA 11.12.2.1.5



NEC 690.56(C)(1)(A)

COMBINER PANEL



RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56(C)(2)

⚠ WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.13(B)

⚠ WARNING
POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

NEC 705.12(B)(2)(3)(c)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.10(C)

CONDUITS & JUNCTION BOX(ES)

WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31(D)(2)

LABELING NOTES:

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

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET:	PV08 - LABELS
DESIGNED BY:	J. CUENO
DATE: 9/8/2023	REV: REVA
CONTRACTOR:	MERAKI INSTALLERS, LLC LICENSE # CVC57201,EC13012400

MERAKI SOLUTIONS LLC.
21 N. NEW WARRINGTON RD.
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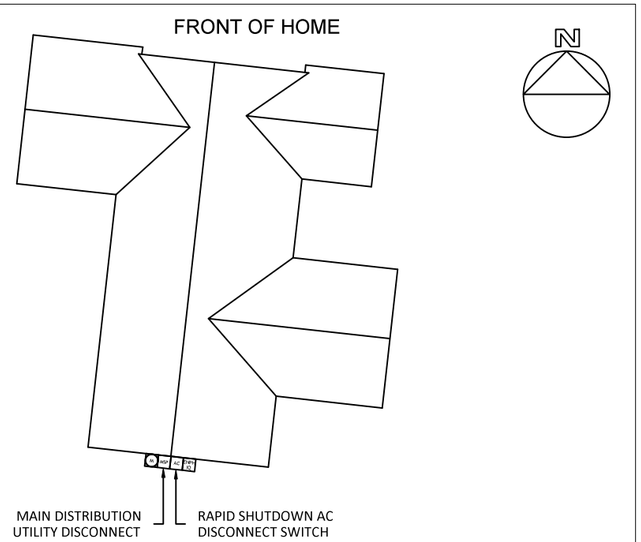
Designed for Structural Attachments to Roof Only.

MERAKI Installers, LLC
COA #36090

MERAKI

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM ROOF MOUNTED SOLAR ARRAYS WITH SAFETY DISCONNECTS AS SHOWN.



MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DIRECTORY

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

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

SYSTEM INFORMATION

MICHELE CUADRAS
279 SW SWEETBREEZE DR
LAKE CITY FL 32024

DC SYSTEM SIZE: 24.420 KW
AC SYSTEM SIZE: 19.140 KW
MODULE: (66) APTOS DNA-120-370W
INVERTER: (66) ENPHASE IQ8PLUS-72-2-US
ATTACHMENT: FLASHVUE
RAIL: XR-10

SHEET:	PV09 - PLACARD
DESIGNED BY:	J. CUENO
DATE: 9/8/2023	REV: REVA
CONTRACTOR:	MERAKI INSTALLERS, LLC LICENSE # CVC57201,EC13012400

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MERAKI Installers, LLC
COA #36090

MERAKI

DNA™ 120

Solar for Innovators

Residential I Commercial

Designed & Engineered in Silicon Valley

370W I 365W I 360W

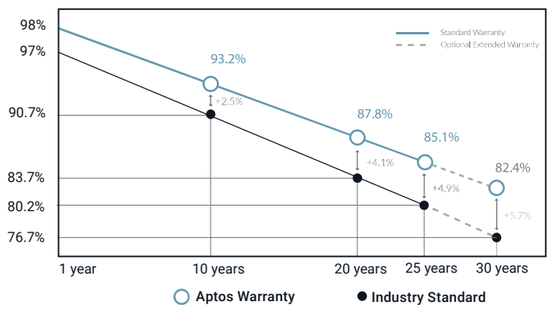
Our DNA™ Split Cell Series impressively combines advanced solar technologies to maximize performance. Our patented Dual Nano Absorber (DNA™) Technology allows the panel to operate at high-efficencies in extreme temperatures. Contact our sales team today to learn more about our line of high-efficienty solar panels.

- Patented DNA™ technology boosts power performance & module efficiency
- Advanced split cell technology with 9 ultra-thin busbars allows for less resistance and more photon capture
- Ideal solution for applications affected by shading
- All-black design for pristine aesthetics
  No excessive silver bussing or ribbons
- Robust product design is reslient in extreme weather. Up to 5400 Pa snow load and 210 mph wind speeds

intertek CE

30 Year Warranty | 3X IEC Standards | RETC Top Performer

Linear Performance Warranty

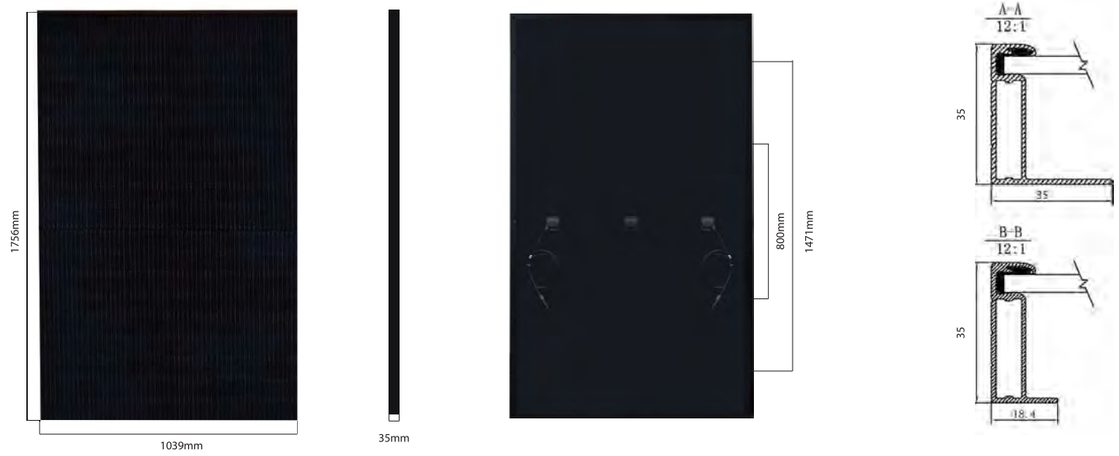


aptos™ solar technology

3140 De La Cruz Blvd., Ste 200
Santa Clara, CA 95054
wwww.aptossolar.com
info@aptossolar.com

DNA™ 120

Solar for Innovators



Electrical Specifiactions	DNA-120-MF26-360W	DNA-120-MF26-365W	DNA-120-MF26-370W
STCrated Output P_{mpp} (W)	360W	365W	370W
Module Efficiency	19.73%	20.01%	20.29%
Open Circuit Voltage V_{VOC} (V)	40.6	40.7	40.8
Short Circiut Current I_{sc} (A)	11.24	11.36	11.51
Rated Voltage V_{mmp} (V)	33.8	33.96	34.06
Rated Voltage I_{mmp} (A)	10.66	10.75	10.87

Standard Test Conditions for front-face of panel: 1000 W/m², 25°C, measurement uncertainty ≤3%

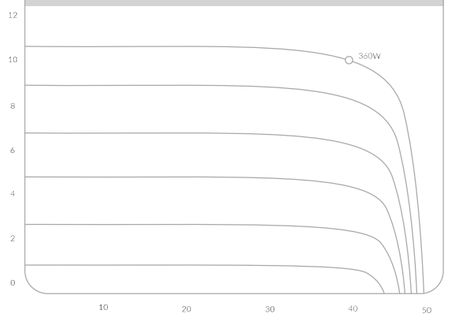
Temperature Coefficients	
Temperature Coefficients P_{mmp}	-0.36%
Temperature Coefficients I_{sc}	+0.05%/°C
Temperature Coefficients V_{OC}	-0.29%/°C
Normal Operating Cell Temperature (NOCT)	44°C

Test Operating Conditions	
Maximum Series Fuse	20A
Maximum System Voltage	1,500 VDC (UL&IEC)
Maximum Load Capacity (Per UL 1703)	5400 PA Snow Load / 210mph Wind Rating
Fire Performance Class	Class C/Type 1

Packaging Configuration	
Number of Modules per Pallet	30
Number of Pallets per 40ft. Container	26
Pallet Dimensions	1740 X 1140 X 1165
Pallet Weight (kg)	640
Container Weight (kg)	16640

Mechanical Properties	
Cell Type	Monocrystalline
Glass	3.2mm, anti-reflection coating, high transmission, low iron, tempered glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68
Dimensions	1756 X 1039 X 35mm
Output Cable	4mm2 (EU)12AWG,39.37in.(1200mm)
Weight	45.19lbs.(20.5kg)
Cable Length	1200mm
Encapsulant	POE

I-V Curve



Certifications

intertek CE

UL61730-1, UL61730-2

aptos solar technology

Data Sheet
Enphase Networking

Enphase IQ Combiner 4/4C

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

X-IQ-AM1-240-4C

X-IQ-AM1-240-4

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

Smart

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

Simple

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

Reliable

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

UL LISTED

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

ENPHASE

Enphase IQ Combiner 4/4C

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

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

ENPHASE

ENPHASE

DATA SHEET

IQ8 Series Microinverters

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

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

Enphase 25 year limited warranty

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

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

UL CERTIFIED SAFETY

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

Easy to install

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

High productivity and reliability

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

Microgrid-forming

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

IQ8SE-DS-0001-01-EN-US-2021-10-19

IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US[1]
Commonly used module pairings[2]	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48	25 – 58				
Min/max start voltage	V	30 / 48	30 / 58				
Max input DC voltage	V	50	60				
Max DC current[3] [module Isc]	A	15					
Overvoltage class DC port		II					
DC port backfeed current	mA	0					
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)		**IQ8-60-2-US**	**IQ8PLUS-72-2-US**	**IQ8M-72-2-US**	**IQ8A-72-2-US**	**IQ8H-240-72-2-US**	**IQ8H-208-72-2-US**
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range[4]	V	240 / 211 – 264					208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
Max units per 20 A (L-L) branch circuit[5]		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					
MECHANICAL DATA							
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")					
Weight		1.08 kg (2.38 lbs)					
Cooling		Natural convection – no fans					
Approved for wet locations		Yes					
Acoustic noise at 1 m		<60 dBA					
Pollution degree		PD3					
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
COMPLIANCE							
Certifications		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, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.					

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2021-10-19

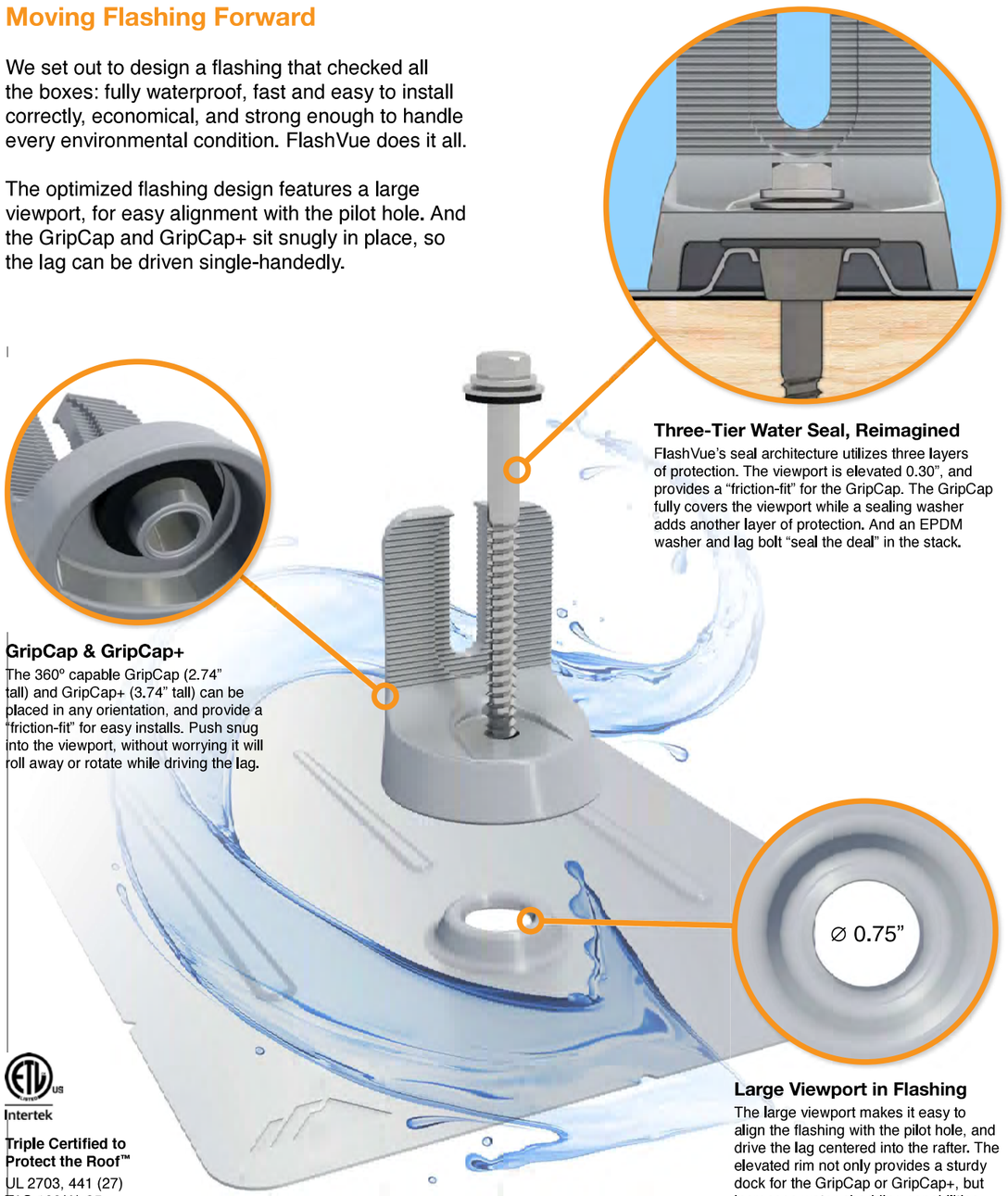
IRONRIDGE

FlashVue™

Moving Flashing Forward

We set out to design a flashing that checked all the boxes: fully waterproof, fast and easy to install correctly, economical, and strong enough to handle every environmental condition. FlashVue does it all.

The optimized flashing design features a large viewport, for easy alignment with the pilot hole. And the GripCap and GripCap+ sit snugly in place, so the lag can be driven single-handedly.



Three-Tier Water Seal, Reimagined

FlashVue’s seal architecture utilizes three layers of protection. The viewport is elevated 0.30”, and provides a “friction-fit” for the GripCap. The GripCap fully covers the viewport while a sealing washer adds another layer of protection. And an EPDM washer and lag bolt “seal the deal” in the stack.

GripCap & GripCap+

The 360° capable GripCap (2.74” tall) and GripCap+ (3.74” tall) can be placed in any orientation, and provide a “friction-fit” for easy installs. Push snug into the viewport, without worrying it will roll away or rotate while driving the lag.

Large Viewport in Flashing

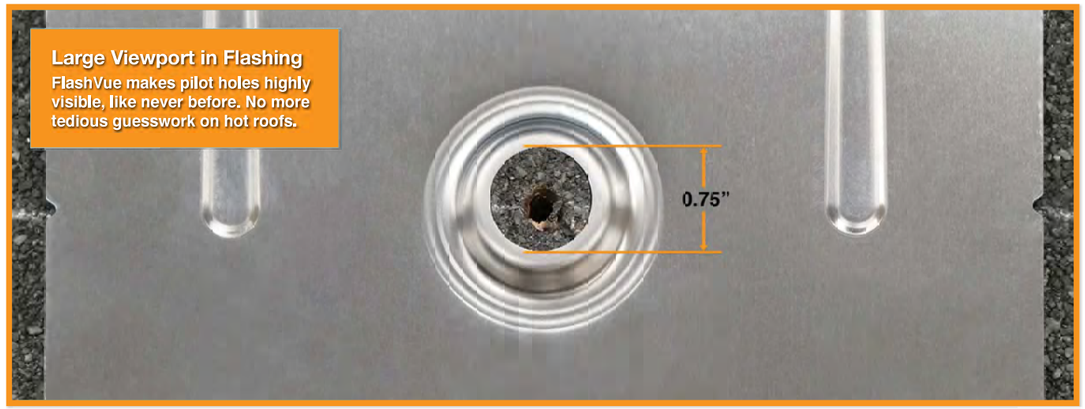
The large viewport makes it easy to align the flashing with the pilot hole, and drive the lag centered into the rafter. The elevated rim not only provides a sturdy dock for the GripCap or GripCap+, but increases water-shedding capabilities.

Intertek

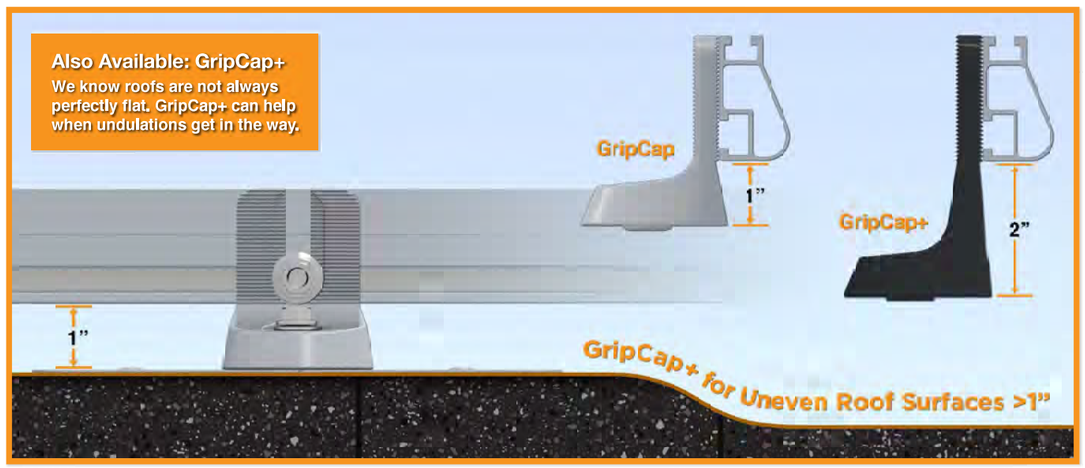
Triple Certified to Protect the Roof™
UL 2703, 441 (27)
TAS 100(A)-95

Tech Brief

See Your Pilot Holes



Solve Roof Undulations



Trusted Strength & Certification

Attachment Loading
FlashVue has been tested and rated to support 1161 (lbs) of uplift and 353 (lbs) of lateral load.

Structural Certification
Designed and certified for compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings
Passed both the UL 441 Section 27 “Rain Test” and TAS 100-95 “Wind Driven Rain Test” by Intertek.

UL 2703 Listed System
Conforms to UL 2703 mechanical and bonding requirements. See Flush Mount Manual for more info.

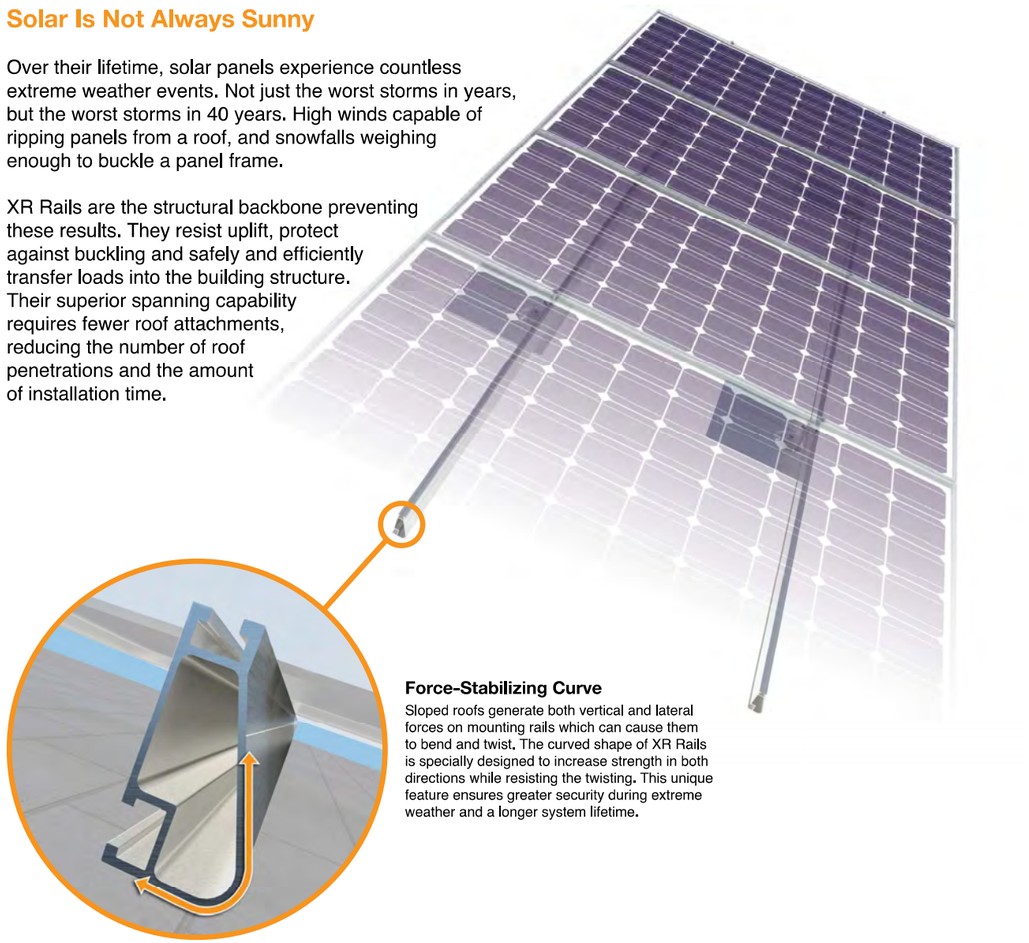
Tech Brief

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	90	XR10		XR100		XR1000	
	120						
	140						
	160						
20	90						
	120						
	140						
	160						
30	90						
	160						
40	90						
	160						
80	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

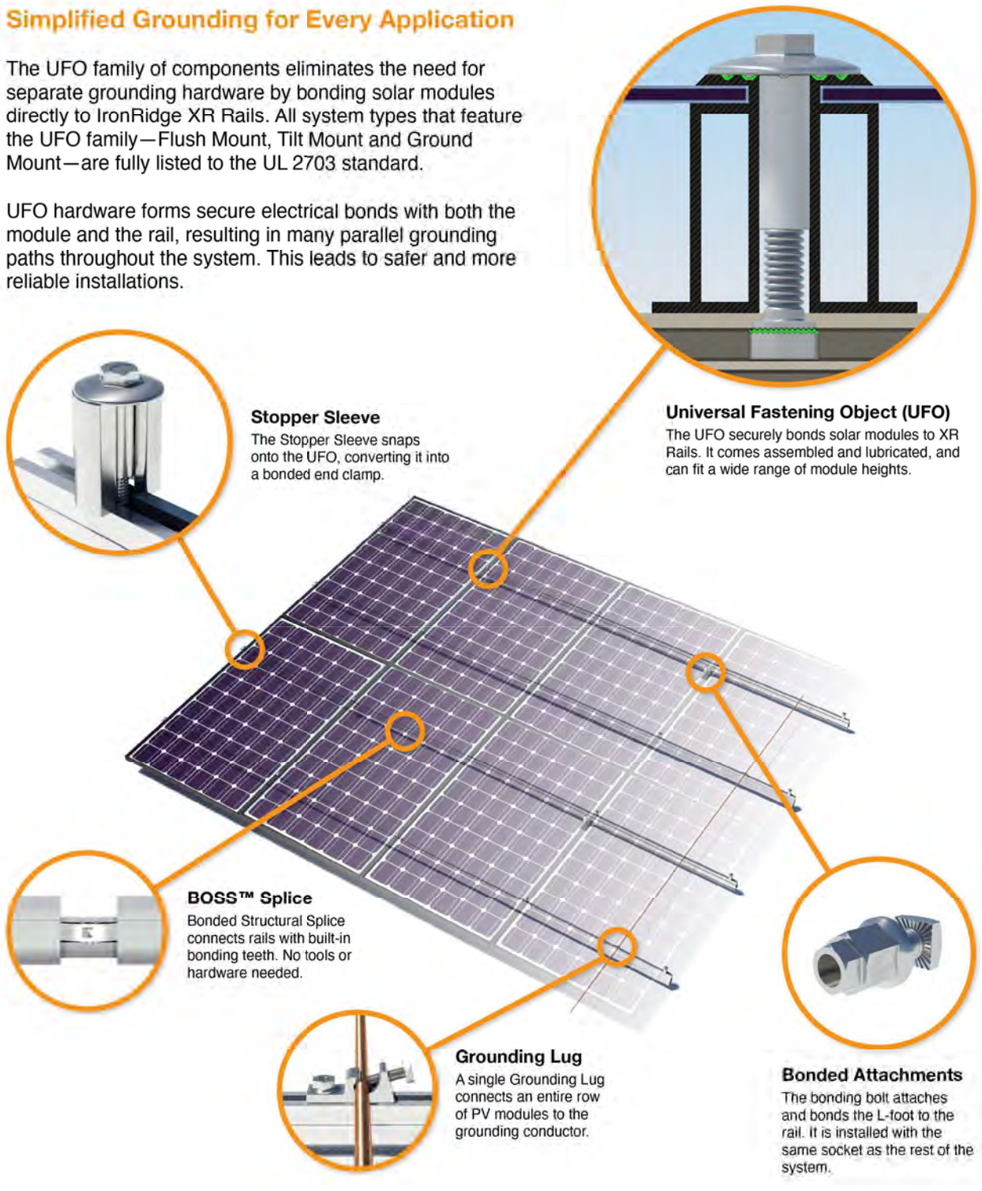
Tech Brief

UFO Family of Components

Simplified Grounding for Every Application

The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



Stopper Sleeve
The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.

Universal Fastening Object (UFO)
The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.

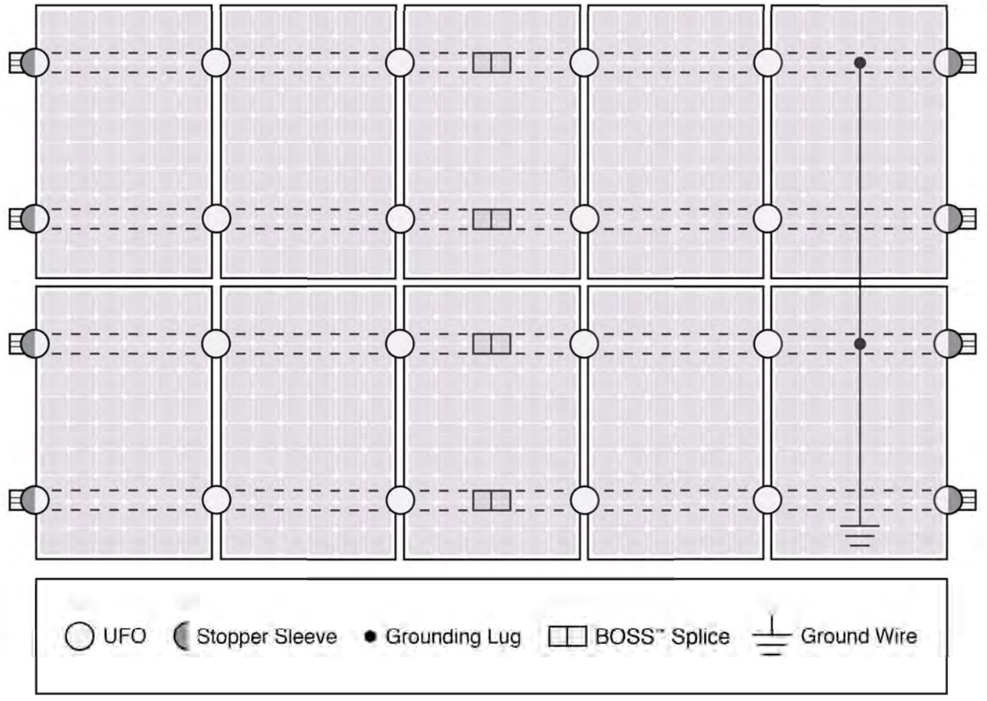
BOSS™ Splice
Bonded Structural Splice connects rails with built-in bonding teeth. No tools or hardware needed.

Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.

Bonded Attachments
The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

Tech Brief

System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed ecuipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

Go to IronRidge.com/UFO

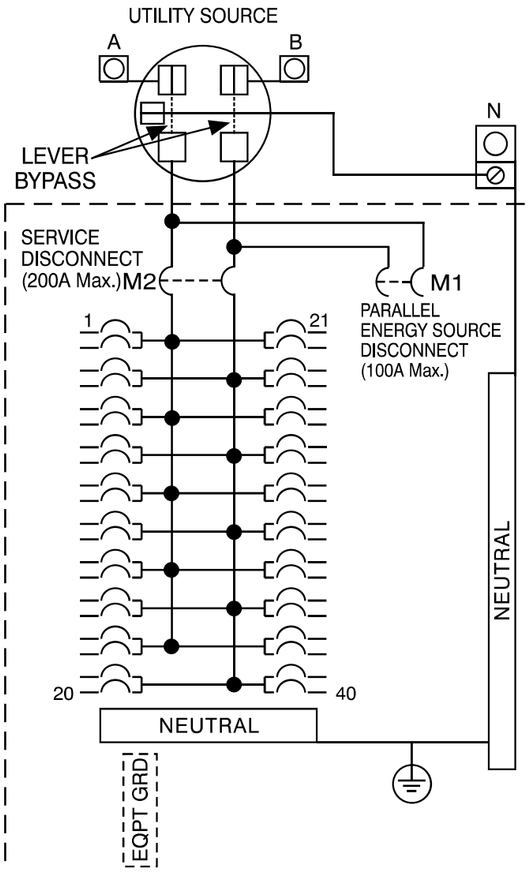
Cross-System Compatibility			
Feature	**Flush Mount**	**Tilt Mount**	**Ground Mount**
XR Rails	✔	✔	XR100 & XR1000
UFO/Stopper	✔	✔	✔
BOSS™ Splice	✔	✔	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Compatible with most MLPE manufacturers. Refer to system installation manual.		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		

SIEMENS

Rainproof Combination Metering

Catalog Number
MC2040S1200JLC

Enclosure
Type 3R



Panelboard Rating: 200 Amps Max. - see service disconnect rating
120/240 Volts~ 1 Phase, 3 Wire
208Y/120 Volts~ 1 Phase, 3 Wire (Derived from 3 phase - 4 wire system)
Meter Socket Rating: 200 Amps Continuous
Parallel Energy Source Disconnect M1: 100 Amp Max.

This panelboard is suitable for use with interconnected parallel electric power production sources and is intended for connection to utility-interactive equipment in accordance with Article 705 of the National Electrical Code®, ANSI/NFPA 70®.

M1 disconnects Parallel Energy Source but does not disconnect all power feeding this device. **Parallel Energy Source must be connected to M1 circuit breaker. M1 cannot be used as a branch breaker position or for a backup (generator) power source.**

System installation must be by a Qualified Person and must meet all local utility and National Electrical Code requirements.

FOR OVERHEAD OR UNDERGROUND SERVICE

Suitable only for use as service equipment.
Use 60/75° C Copper or Aluminum Conductors.

Unused neutral branch terminals may be used to terminate equipment grounding wires in the combinations indicated for equipment ground bar terminals.

125 Amp or above circuit breaker must be installed in the lowest position in the branch panel. All other positions are limited to 100 Amps maximum circuit breakers.

Maximum breaker size on left side:
60°C Wire: CU 85A, AL 65A ; 75°C Wire: CU 100A, AL 75A

General Information: Remove twistouts from trim only where breakers will be installed. All openings must be filled with breakers or filler plates.

Circuit breaker overload trip position is indicated by handle position midway between ON and OFF. To reset, move handle to OFF position then turn ON.

Accessories:
Filler Plate Cat. No. ECQF3

Neutral Lug Kit	Wire Range	Torque
ECLK1-2	2/0-#2	45 Lb-Ins.
ECLK2	2/0-#4	135 Lb-Ins.
ECLK3	300 kcmil - #1	340 Lb-Ins.

Mechanical Breaker Interlock: ECSBPK09
Equipment Grounding Bar: Type ECGB10

If hub is required, use the catalog numbers listed below :

Trade size (in)	Catalog number
RX Type Hub (top endwall)	
1 ¼"	EC38597
1 ½"	EC38598
2"	EC38599
2 ½"	EC38600
HC Type Hub (bottom endwall)	
2"	ECHC200
2 ½"	ECHC250
3"	ECHC300

Terminal	Wire Size	Torque
A, B	250kcmil - #4	275 lb-in
N	250kcmil - #4	250 lb-in
Branch Breaker Terminals	See Markings on Breaker	
Neutral Bar	#10 - #14 CU #10 - #12 AL #8 #6 - #4	20 lb-in 20 lb-in 25 lb-in 35 lb-in
Ground Conductors Only	(2) or (3) #14 AWG	20 lb-in
	(2) #12-#10 AWG	20 lb-in

Short Circuit Current Rating (Watthour Meter not included in short circuit rating)
This panelboard has a maximum short circuit current rating of 22,000 Amps RMS symmetrical, 120/240 V~. The correct Service Disconnect, branch circuit breakers and Parallel Energy Source Disconnect combinations to be used for various short circuit current levels are listed in the tabulation below. Any circuit breaker installed, replaced, or added in this panelboard must be manufactured by Siemens (Siemens or Murray brand) and must be of the correct type as indicated in the tabulation below.

SERVICE DISCONNECT M2*	BRANCH BREAKER	Then the maximum short circuit current rating in RMS symmetrical Amperes, 120/240 Vac is:	DISCONNECT M1
When the installed panelboard service disconnect is a Type	And the branch breakers installed are Type		If installed, the Parallel Energy Source Disconnect must be a Siemens Type:
EQ9683, EQ9685 (Siemens)	QP, QPH, HQP, QT, QAF, QAFH, QPF, QPHF, QE, QEH, QNRH (Siemens)	10,000	QP (Siemens) MP-T (Murray)
	MP-T, MP-HT, MP-MT, MH-T, MP-AT, MP-HAT, MP-GT, MP-HGT, MP-ET, MP-HET, MD-HTR (Murray)	22,000	QPH (Siemens) MP-HT (Murray)

* Replacement main breakers: Siemens MBK150 or MBK200 (Siemens)

Warning: This equipment has been designed for use only with circuit breakers listed above. Use of other circuit breakers in this equipment could result in personal injury or property damage and will void the warranty.

Important: Do not allow petroleum based (hydrocarbon) sprays, chemicals, solvents or any paint to contact interior components. Petroleum based chemicals can cause degradation of electrical insulating materials.

Assembled in Mexico