

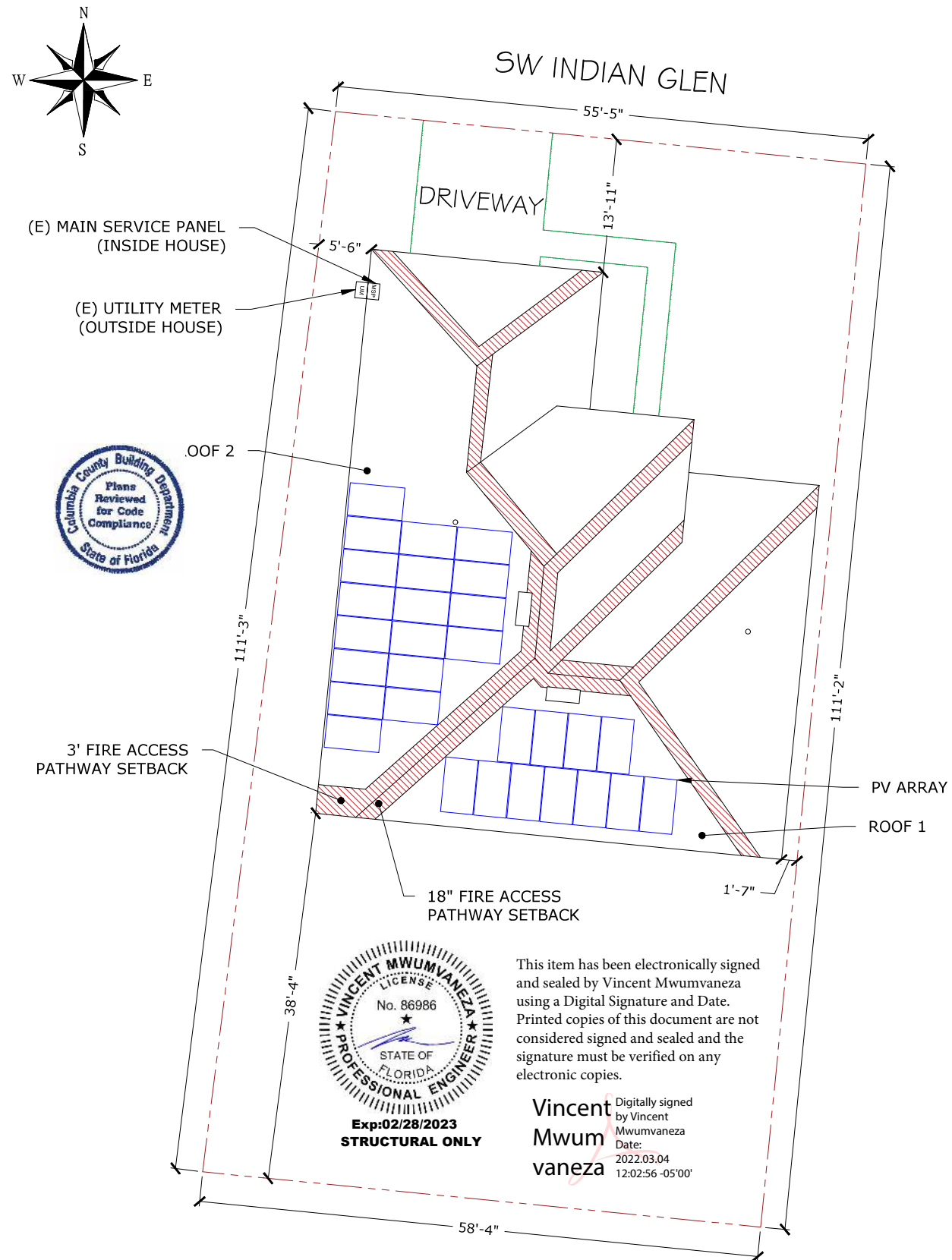
CHRISTELLE PUTNEY
-INTERACTIVE PHOTOVOLTAIC SYSTEM
DC SYSTEM SIZE (9.86 KW)

SYSTEM DETAILS	
DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	SYSTEM SIZE :9.86 KW DC STC
AC RATING OF SYSTEM	6.96 KW
AC OUTPUT CURRENT	29 A
NO. OF MODULES	(29) HANWHA Q.PEAK DUO BLK-G6+ (340W) MODULES
NO. OF INVERTERS	(29) ENPHASE IQ7 -60-2-US MICROINVERTERS
POINT OF INTERCONNECTION	LINE SIDE TAP IN THE MSP
ARRAY STRINGING	(1) BRANCH OF 15 MODULES (1) BRANCH OF 14 MODULES

SITE DETAILS	
ASHRAE EXTREME LOW	-5°C
ASHRAE 2% HIGH	34°C
GROUND SNOW LOAD	0 PSF
WIND SPEED	120MPH (ASCE 7-16)
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	B

GOVERNING CODES
FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)
FLORIDA BUILDING CODE, 7TH EDITION 2020 (FBC)
FLORIDA FIRE PREVENTION CODE, 7TH EDITION 2020 (FFPC)
NATIONAL ELECTRIC CODE, NEC 2017 CODE BOOK, NFPA 70

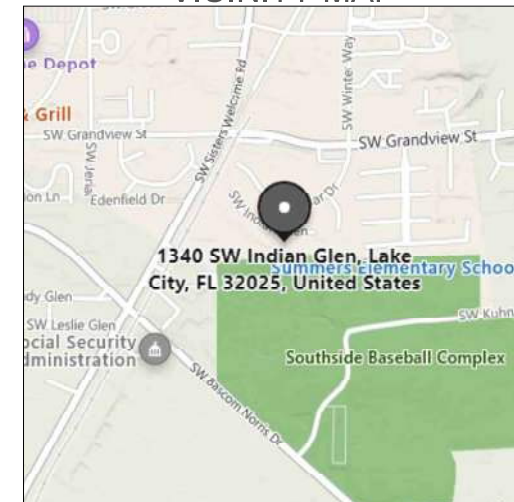
SHEET INDEX	
SHEET NO.	SHEET NAME
A - 01	SITE MAP & VICINITY MAP
A - 02	ROOF PLAN & MODULES
S - 01	ARRAY LAYOUT
S - 02	STRUCTURAL ATTACHMENT DETAIL
E - 01	ELECTRICAL LINE DIAGRAM
E - 02	WIRING CALCULATIONS
E - 03	SYSTEM LABELING
DS - 01	MODULE DATASHEET
DS - 02	INVERTER DATASHEET
DS - 03	COMBINER BOX DATASHEET
DS - 04	ATTACHMENT DATASHEET
DS - 05	RACKING DATASHEET



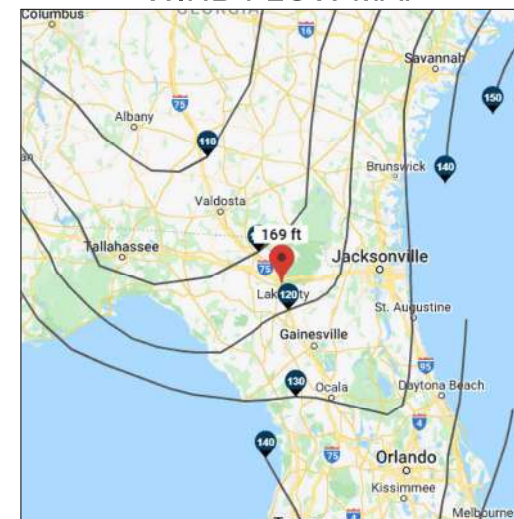
SITE MAP (N.T.S)



VICINITY MAP



WIND FLOW MAP



Signature with Seal

CHRISTELLE PUTNEY

1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

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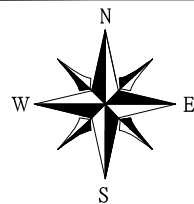
PERMIT DEVELOPER	
DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME

SITE MAP & VICINITY MAP

SHEET NUMBER

A-01



MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 29 MODULES
MODULE TYPE = HANWHA Q.PEAK DUO BLK-G6+ (340W) MODULES
MODULE WEIGHT = 43.87 LBS / 19.9 KG.
MODULE DIMENSIONS = 68.5" X 40.6" = 19.31 SF

NUMBER OF INVERTER = 29 MICROINVERTERS
INVERTER TYPE = ENPHASE IQ7 -60-2-US MICROINVERTERS

DC SYSTEM SIZE: 9.86 KW
AC SYSTEM SIZE: 6.96 KW

GENERAL INSTALLATION PLAN NOTES:

(1) PANEL DESIGNATIONS SHOWN ON THESE DRAWINGS ARE GIVEN FOR CLARIFICATION OF THE CIRCUITING ONLY AND MAY NOT CORRESPOND TO THE DESIGNATIONS FOUND IN THE FIELD

2) ROOF ATTACHMENTS TO TRUSSES SHALL BE INSTALLED AS SHOWN IN SHEET S-01 AND AS FOLLOWS FOR EACH WIND ZONE:

WIND ZONE 1: MAX SPAN 4'-0" O.C.
WIND ZONE 2: MAX SPAN 4'-0" O.C.
WIND ZONE 3: MAX SPAN 2'-0" O.C.

3) EXISTING RESIDENTIAL BUILDING ROOF WITH MEAN ROOF HEIGHT 15 FT AND 2"X4" WOOD ROOF TRUSSES SPACED 24" O.C.

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.

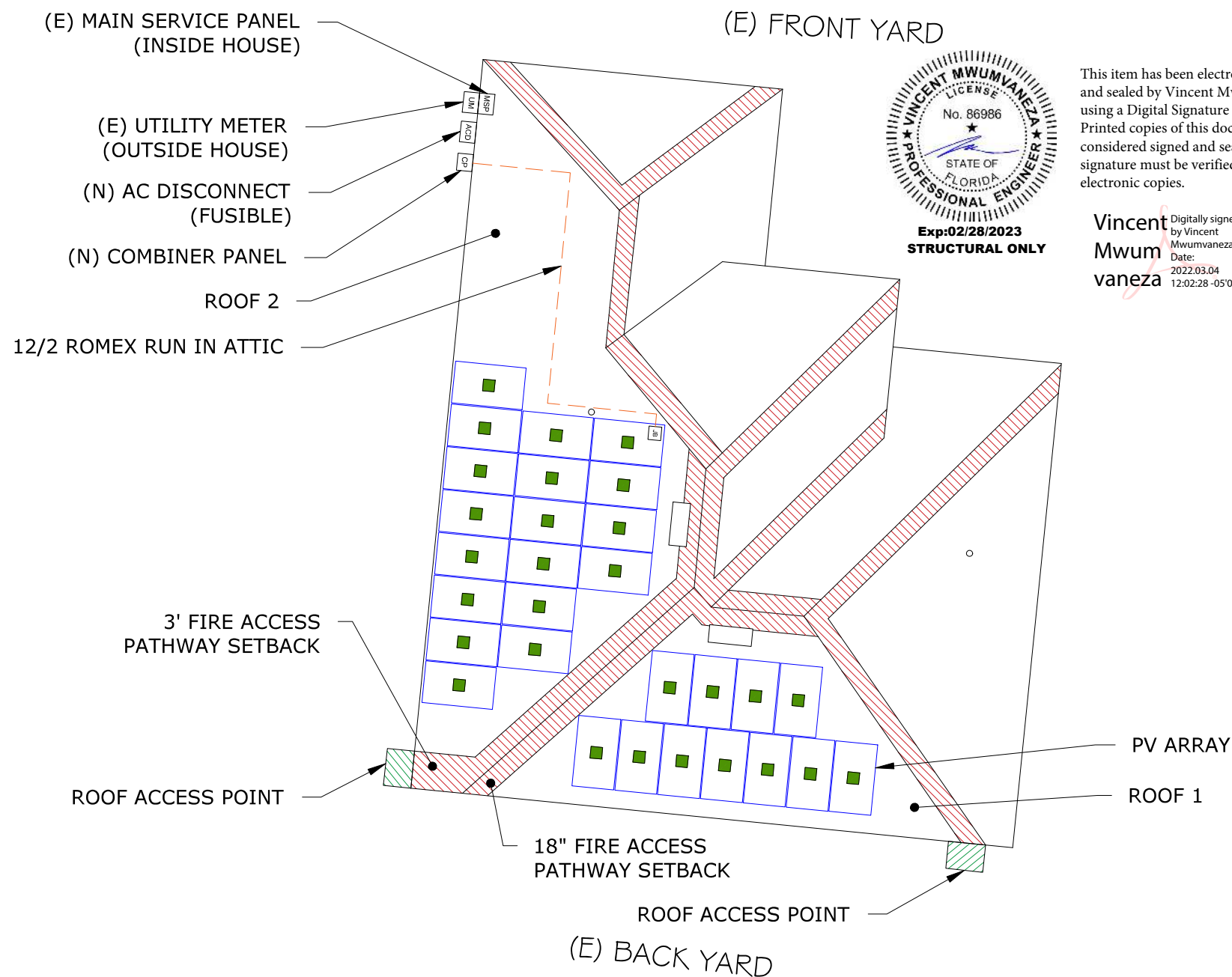
NOTES:

1. LOCATION OF JUNCTION BOX(ES), AC DISCONNECTS(S), AC COMBINER PANEL(S), AND OTHER ELECTRICAL EQUIPMENT(S) RELEVANT TO PV INSTALLATION SUBJECT TO CHANGE BASED ON SITE CONDITIONS.
2. SETBACKS AT RIDGES CAN BE REDUCED TO 18 INCHES IN COMPLIANCE WITH FBC R 324.6.2:
TOTAL PLAN VIEW AREA = 2460 SQFT
TOTAL PV AREA = 29(68.5 IN)(40.6 IN)/(144 IN^2)
= 560.08 SQFT
(560.08 SQFT/ 2460 SQFT)100 = 22.77 %
TOTAL PV AREA POPULATES 22.77 % OF TOTAL PLAN VIEW AREA AND IS WITHIN THE 33% REQUIREMENT.

LEGENDS

UM	- UTILITY METER
MSP	- MAIN SERVICE PANEL
M	- METER MAIN COMBO
JB	- JUNCTION BOX
ACD	- AC DISCONNECT
PM	- PRODUCTION METER
CP	- COMBINER PANEL
	- FIRE SETBACK
	- ROOF ACCESS POINT
	- MICROINVERTER
	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
	- CONDUIT

NOTE : INSTALLERS MAY MOVE PANELS IF NEEDED TO BE WITHIN THE MEANS OF THE SETBACKS.



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Vincent Mwumvaneza
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Date: 2022.03.04 12:02:28 -05'00'



Signature with Seal

CHRISTELLE PUTNEY

1340 SW INDIAN GLEN, LAKE CITY, FL 32025, USA

REVISIONS	DATE				
	DESCRIPTION				
REV	ENGG.				

PERMIT DEVELOPER

DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME

ROOF PLAN & MODULES

SHEET NUMBER

A-02

ROOF DESCRIPTION:

(ROOF #1)

MODULES - 11
ROOF TILT - 22°
ROOF AZIMUTH - 182°
TRUSSES SIZE - 2"X4" @ 24" O.C.

(ROOF #2)

MODULES - 18
ROOF TILT - 22°
ROOF AZIMUTH - 272°
TRUSSES SIZE - 2"X4" @ 24" O.C.

TRUSS LOCATIONS ARE APPROXIMATE.
ACTUAL LOCATIONS MAY DIFFER AND
CONTRACTOR MAY NEED TO ADJUST MOUNT
LOCATIONS. IN NO CASE SHALL THE MOUNT
SPACING EXCEED "MAX. MOUNT SPACING"

WIND LOAD INFORMATION:
THIS SYSTEM HAS BEEN DESIGN TO MEET
THE REQUIREMENTS OF THE 7TH EDITION OF
THE FLORIDA BUILDING CODE AND USED
THE FOLLOWING DESIGN PARAMETERS:
ULTIMATE WIND SPEED: 120 MPH
EXPOSURE CATEGORY: B
RISK CATEGORY: II
MEAN ROOF HEIGHT: 15 FEET
ROOF SLOPE: 20-27°



ADD : 612 FLORIDA AVENUE, PALM
HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

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CHRISTELLE PUTNEY

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FL 32025, USA

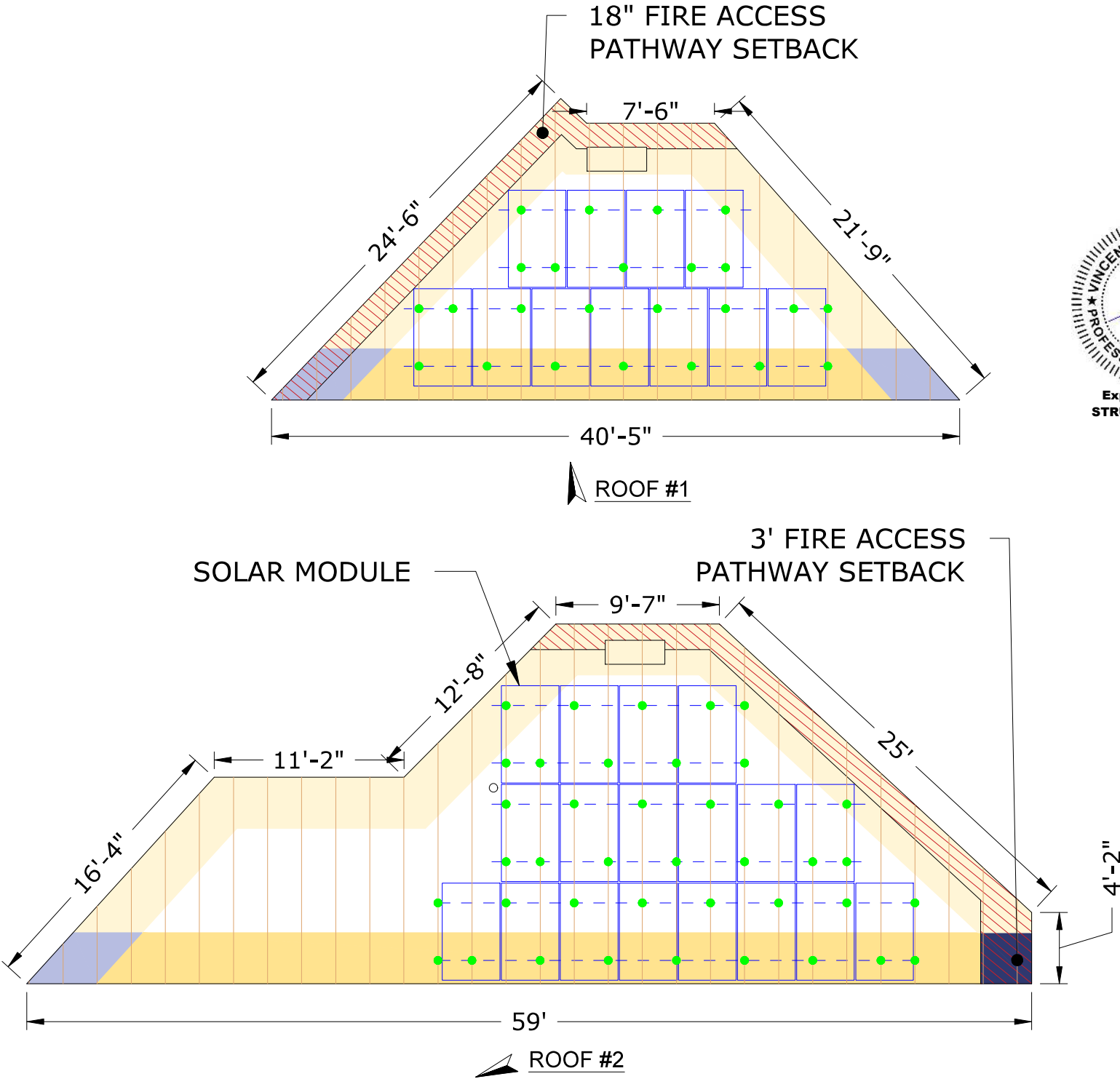


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Date: 2022.03.04 12:02:12 -05'00'

LEGENDS

- FIRE SETBACK
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- PV ROOF ATTACHMENT
- RAIL
- RAFTERS / TRUSSES
- METAL SEAM
- WIND ZONE 1
 - WIND ZONE 1
 - WIND ZONE 1'- WIND ZONE 2
 - WIND ZONE (2)
 - WIND ZONE (2r)
 - WIND ZONE (2e)
 - WIND ZONE (2n)- WIND ZONE 3
 - WIND ZONE (3)
 - WIND ZONE (3r)
 - WIND ZONE (3e)



PHOTOVOLTAIC MODULE GENERAL NOTES:

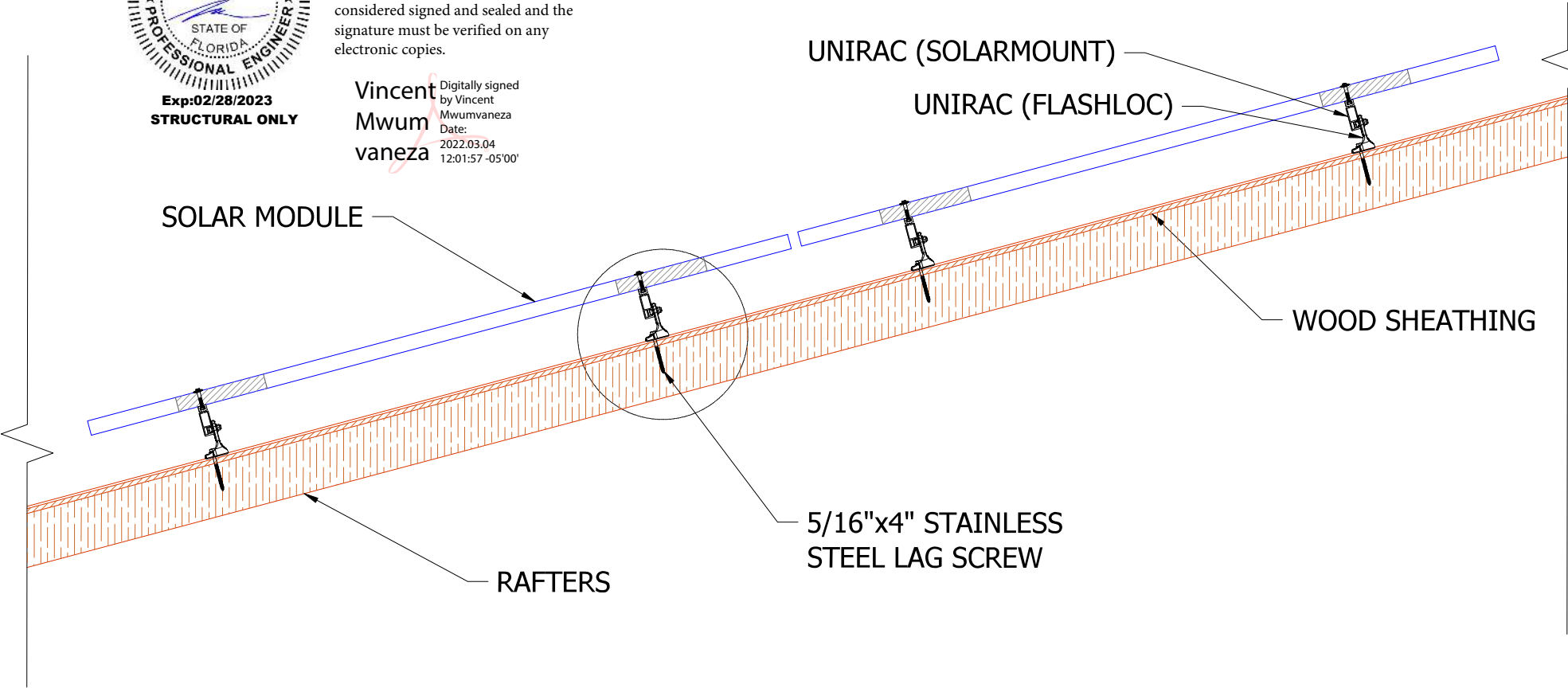
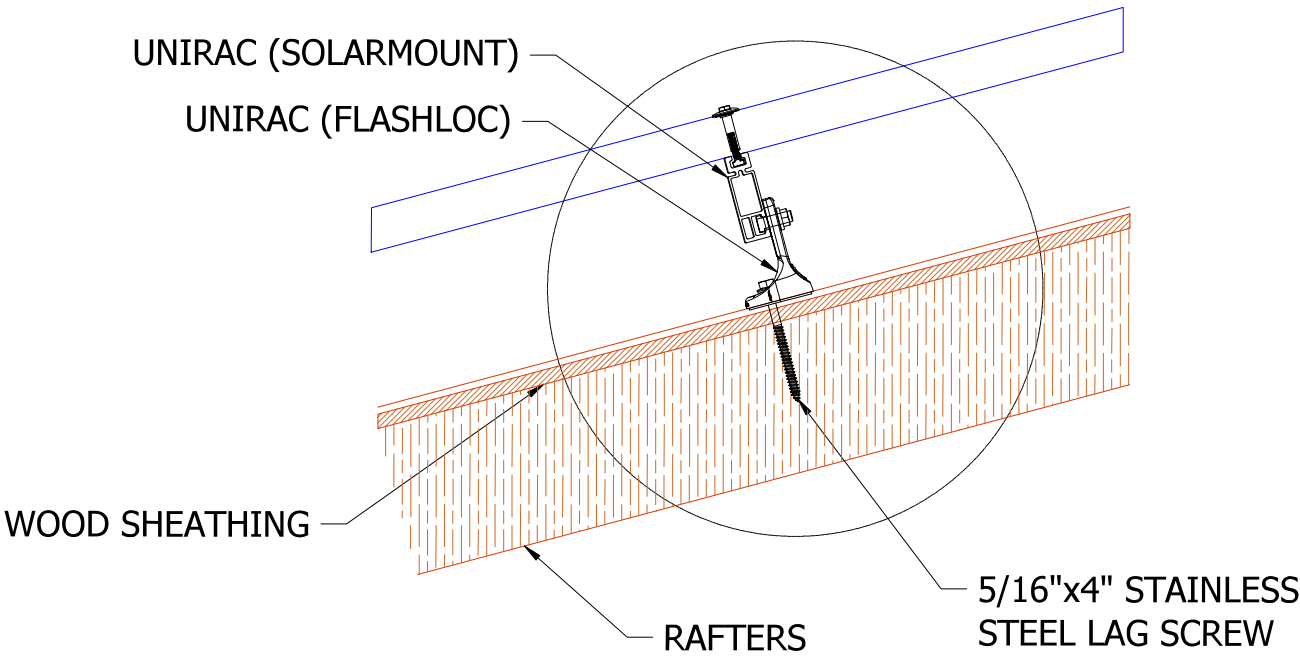
FOR PITCHED ROOF

- 1. APPLICABLE CODE: 2020 FLORIDA BUILDING CODE 7th ED. & ASCE 7-16
MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES
- 2. BOLT DIAMETER AND EMBEDMENT LENGTHS ARE DESIGNED PER NDS(2012)
REQUIREMENTS. ALL BOLT CAPACITIES ARE BASED ON A
WOOD ROOF TRUSS AS EMBEDMENT MATERIAL.
- 3. ALL WIND DESIGN CRITERIA AND PARAMETERS ARE FOR HIP AND GABLE
RESIDENTIAL ROOFS, CONSIDERING FROM A 7° TO A MAXIMUM 27° (2/12 TO A
MAXIMUM 6/12 PITCH) ROOF IN SCHEDULE. ALL RESIDENTIAL ROOFS SHALL NOT
EXCEED 30'-0" MEAN ROOF HEIGHT.
- 4. ROOF SEALANTS SHALL CONFORM TO ASTM C920 AND ASTM 6511.
- 5. THIS SHEET REFLECTS STRUCTURAL CONNECTIONS ONLY. REFER TO
MANUFACTURER'S MANUAL FOR ALL ARCHITECTURAL, MECHANICAL,
ELECTRICAL AND SOLAR SPECS.
- 6. ALL ALUMINIUM COMPONENTS SHALL BE ANODIZED ALUMINIUM 6105-T5 UNLESS
OTHERWISE NOTED.
- 7. LAG BOLTS SHALL BE ASTM A276 STAINLESS STEEL UNLESS OTHERWISE NOTED.
- 8. ALL RAILING AND MODULES SHALL BE INSTALLED PER
MANUFACTURER'S INSTRUCTIONS.
- 9. I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE
WITH FBC:BUILDING CHAPTER 16 AND FBC:RESIDENTIAL CHAPTER 3.
BUILDING STRUCTURE WILL SAFELY ACCOMMODATE CALCULATED
WIND LATERAL AND UPLIFT FORCES AND EQUIPMENT DEAD LOADS.



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STRUCTURAL ATTACHMENT DETAILS

Ucity
Solar Energy

ADD : 612 FLORIDA AVENUE, PALM
HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

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CHRISTELLE PUTNEY

1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

REVISONS	DATE				
	DESCRIPTION				
	REV ENGG.				

PERMIT DEVELOPER	
DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
STRUCTURAL ATTACHMENT DETAILS

SHEET NUMBER
S-03

MODULE SPECIFICATION	
MODEL NO.	HANWHA Q PEAK DUO BLK-G6+
PEAK POWER	340W
RATED VOLTAGE (Vmpp)	33.94V
RATED CURRENT (Impp)	10.02A
OPEN CIRCUIT VOLTAGE (Voc)	40.66V
SHORT CIRCUIT CURRENT (Isc)	10.52A

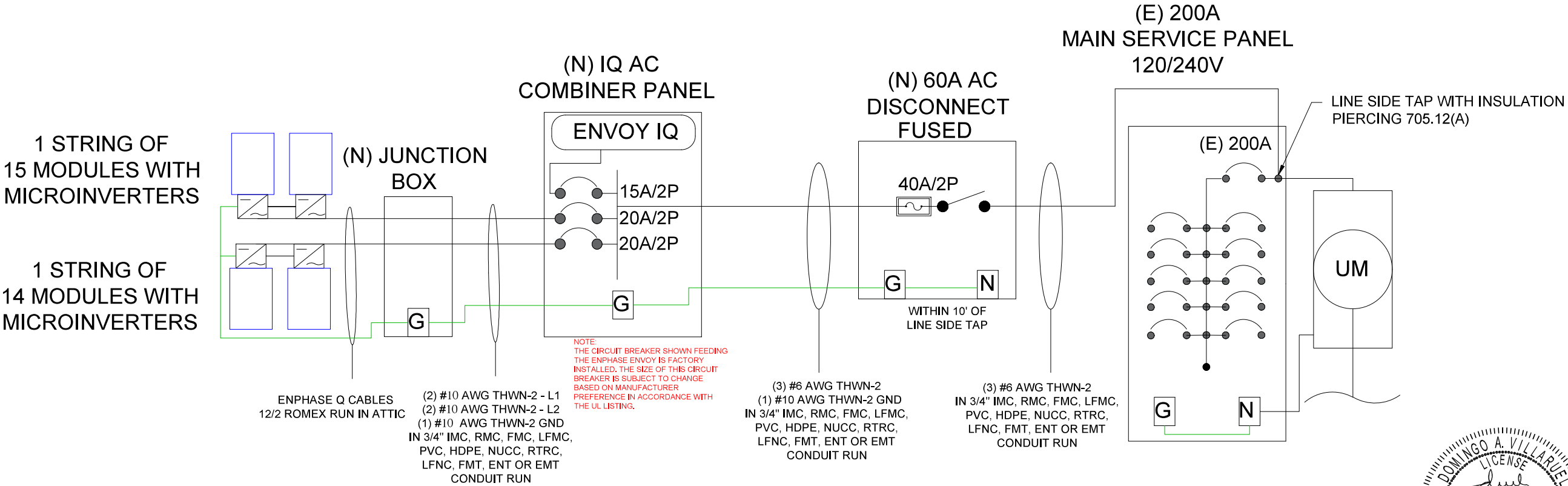
INVERTER SPECIFICATIONS	
MANUFACTURER	ENPHASE
MODEL NO.	IQ7-60-2-US
MAX DC INPUT VOLTAGE	48 V
MAX OUTPUT POWER	240 VA
NOMINAL AC OUTPUT VOLTAGE	240 V
NOMINAL AC OUTPUT CURRENT	1 A

- NOTE:
- ALL ELECTRICAL EQUIPMENTS SHALL COMPLY WITH NEC CODE AND MAY CHANGE AS PER THE SITE CONDITION, NEC OR AHJ REQUIREMENTS.
 - LEGEND: (E) = EXISTING, (N) = NEW; APPLICABLE TO CONDUCTORS, CONDUITS, ELECECTRICAL ENCLOSURES, ETC.

- NOTE:
- SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE NEC 2017, NFPA 70 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.
 - PROVIDE TAP BOX IN COMPLIANCE WITH 312.8 IF PANEL GUTTER SPACE IS INADEQUATE.

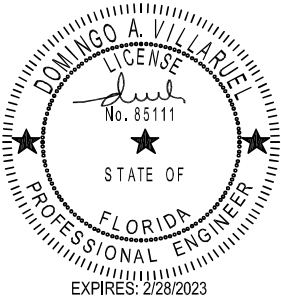
SOLAR ARRAY (9.86 KW-DC STC)

(29) HANWHA Q.PEAK DUO BLK-G6+ (340W) MODULES
(1) BRANCH OF 15 MODULES
(1) BRANCH OF 14 MODULES



Domingo A Villaruel:A01410
D00000177F3BC
588C0001626D

Digitally signed by Domingo A Villaruel:A01410D00000 177F3BC588C0001626D Date: 2022.03.04 06:34:28 -08'00'



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CONTACT : 727.945.6060
LICENSE #EC13010036
#CBC1263094

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CHRISTELLE PUTNEY

1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

REV	ENG.	DESCRIPTION	DATE				

PERMIT DEVELOPER	
DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
SINGLE LINE DIAGRAM

SHEET NUMBER
E-01

ELECTRICAL CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE IQ COMBINER PANEL
AMBIENT TEMPERATURE = 34°C
CONDUIT INSTALLED AT MINIMUM DISTANCE OF 7/8 INCHES ABOVE ROOFNEC 310.15(B)(3)(c)
TEMPERATURE DERATE FACTOR - 0.96 ...NEC 310.15(B)(2)(a)
GROUPING FACTOR - 0.8...NEC 310.15(B)(3)(a)

CONDUCTOR AMPACITY
= (INV O/P CURRENT) x 1.25 / A.T.F / G.F ...NEC 690.8(B)
= [(15 x 1) x 1.25] / 0.96 / 0.8
= 24.41 A
SELECTED CONDUCTOR - #10 THWN-2 ...NEC 310.15(B)(16)

(B) AFTER IQ COMBINER PANEL
TEMPERATURE DERATE FACTOR - 0.96
GROUPING FACTOR - 1

CONDUCTOR AMPACITY
=(TOTAL INV O/P CURRENT) x 1.25 / 0.96 / 1 ...NEC 690.8(B)
=[(29x 1) x 1.25] /0.96 / 1
=37.76 A
SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION ..NEC 690.9(B)
=TOTAL INVERTER O/P CURRENT x 1.25
=(29 x 1) x 1.25 = 36.25 A
SELECTED OCPD = 40A

SELECTED EQUIPMENT GROUND CONDUCTOR (EGC) = #10 THWN-2 ... NEC 250.122(A)

MAX VOLTAGE DROP CALCULATION						
CABLE SIZE	CABLE DESCRIPTION	ONE WAY DISTANCE IN FEET (D)	BRANCH CURRENT (I)	RESISTANCE OF CONDUCTOR(R)	VOLTAGE (V)	% VOLTAGE DROP=(0.2*D*I*R)/V
#10 THWN-2	JUNCTION BOX TO COMBINER PANEL	20	29	1.24	240	0.599

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.THE TERMINALS ARE RATED FOR 75 DEGREE C.
- CONDUCTOR TERMINATION AND SPLICING AS PER 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.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
- UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
- MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
- RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).



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CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

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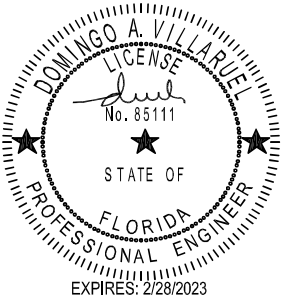
CHRISTELLE PUTNEY

1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

REV	ENG.	DESCRIPTION	DATE				

PERMIT DEVELOPER	
DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME	
WIRING CALCULATIONS	
SHEET NUMBER	
E-02	



Domingo A Villaruel:A01410D00
000177F3BC588C000
1626D

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WARNING

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS

TERMINALS ON BOTH LINE AND

LOAD SIDES MAY BE ENERGIZED

IN THE OPEN POSITION

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

WARNING PHOTOVOLTAIC

POWER SOURCE

LABEL LOCATION:
CONDUIT RUNWAY
(PER CODE: NEC690.31(G)(3)(4))

⚠

WARNING DUAL POWER SOURCE

SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
MAIN SERVICE DISCONNECT
(NEC 705.12(B)(3-4) & NEC 690.59)

ADHESIVE FASTENED SIGNS:

- ANSI Z535.4-2011 PRODUCT SAFETY SIGNS AND LABELS, PROVIDES GUIDELINES FOR SUITABLE FONT SIZES, WORDS, COLORS, SYMBOLS, AND LOCATION REQUIREMENTS FOR LABELS. NEC 110.21(B)(1)
- THE LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED. NEC 110.21(B)(3)
- 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 29 AMPS

AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT, INVERTER
(PER CODE: NEC 690.54)

WARNING

INVERTER OUTPUT CONNECTION DO NOT

RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF INTERCONNECTION, MAIN SERVICE DISCONNECT
(PER CODE: NEC 705.12 (B)(2)(c))
[Not required if panelboard is rated not less than sum of ampere ratings of all overcurrent devices supplying it]

DATA PER PANEL

NOMINAL OPERATING AC VOLTAGE -	240	V
NOMINAL OPERATING AC FREQUENCY-	60	Hz
MAXIMUM AC POWER-	240	VA
MAXIMUM AC CURRENT-	1	A
MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION PER CIRCUIT-	20	A

LABEL LOCATION:
COMBINER PANEL, AC DISCONNECT
(PER CODE: NEC 690.52)

PHOTOVOLTAIC SYSTEM

EQUIPPED WITH RAPID

SHUTDOWN

LABEL LOCATION:
AC DISCONNECT, DC DISCONNECT, POINT OF
INTERCONNECTION
(PER CODE: NEC 690.56(C)(3))

⚠

WARNING

INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS

OVERCURRENT DEVICE

EMERGENCY CONTACT

727-945-6060

⚠

WARNING

DEDICATED SOLAR PANELS DO

NOT CONNECT ANY OTHER LOADS

SOLAR PV SYSTEM EQUIPPED

WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN

SWITCH TO THE

"OFF" POSITION TO

SHUTDOWN PV SYSTEM

AND REDUCE

SHOCK HAZARD

IN ARRAY

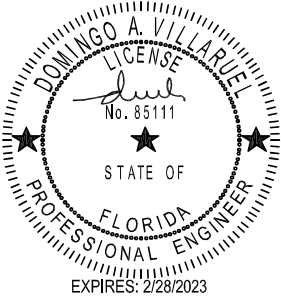
SOLAR ELECTRIC

PV PANELS

IFC 605.11.3.1(1) & 690.56(C)(1)(a) Label for PV Systems that Shut down the array and the conductors leaving the array

Domingo A
Villaruel:A01410
D00000177F3BC
588C0001626D

Digitally signed by
Domingo A
Villaruel:A01410D000001
77F3BC588C0001626D
Date: 2022.03.04 06:34:51
-08'00'



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ADD : 612 FLORIDA AVENUE, PALM

HARBOR, FL 34683, USA

CONTACT : 727 945 6060

LICENSE #EC13010036

#CBC1263094

Signature with Seal

CHRISTELLE PUTNEY

1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

REV	ENG.	DESCRIPTION	DATE

PERMIT DEVELOPER

DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME

SYSTEM LABELING

SHEET NUMBER

E-03



Q.peak DUO BLK-G6+
330-345
ENDURING HIGH PERFORMANCE



Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.5%.



INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID and Anti PID Technology-, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING
High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT
Inclusive 25-year product warranty and 25-year linear performance warranty².



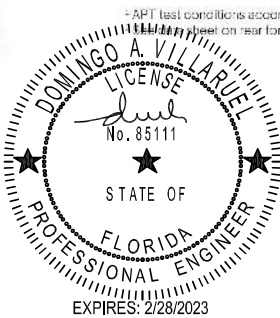
STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

¹ STPT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 1581h)
² See sheet on rear for further information

THE IDEAL SOLUTION FOR:



Engineered in Germany



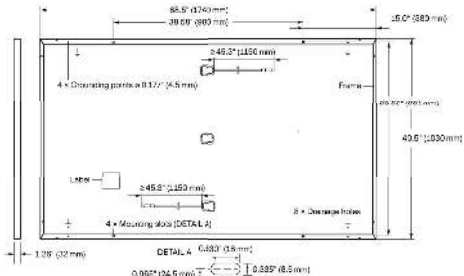
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MECHANICAL SPECIFICATION

Format	68.5 x 40.6 x 1.26 in (including frame) (1740 x 1030 x 32 mm)
Weight	43.9 lbs (19.9 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 x 20 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.95 x 1.28-2.36 x 0.59-0.71 in (53-101 x 32-60 x 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm ² Solar cable, (+) ≥ 45.3 in (1150 mm), (-) ≥ 45.3 in (1150 mm)
Connector	Süßblü MC4, Hanwha Q CELLS HQC4, Amphenol UTX, Renhe Os-6, Tongling TL-Ceb01S, JMTHY JM801; IP68 or Friends PV2c; IP67

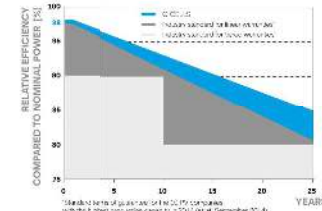


ELECTRICAL CHARACTERISTICS

POWER CLASS	330	335	340	345
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)				
Power at MPP ¹	P _{MPP} [W]	330	335	340
Short Circuit Current ¹	I _{SC} [A]	10.41	10.47	10.52
Open Circuit Voltage ¹	V _{OC} [V]	40.15	40.41	40.66
Current at MPP	I _{MPP} [A]	9.91	9.97	10.02
Voltage at MPP	V _{MPP} [V]	33.29	33.62	33.94
Efficiency ¹	η [%]	≥ 18.4	≥ 18.7	≥ 19.0
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²				
Power at MPP	P _{MPP} [W]	247.0	250.7	254.5
Short Circuit Current	I _{SC} [A]	8.39	8.43	8.48
Open Circuit Voltage	V _{OC} [V]	37.86	38.10	38.34
Current at MPP	I _{MPP} [A]	7.80	7.84	7.89
Voltage at MPP	V _{MPP} [V]	31.66	31.97	32.27

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}, V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 + 7800 W/m², NMOT, spectrum AM 1.5

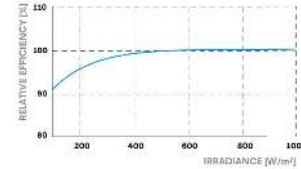
Q CELLS PERFORMANCE WARRANTY



At least 96% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organization of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.36	Normal Module Operating Temperature	NMOT	[°F]	109 ± 5.4 (43 ± 3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC) / 1000 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 1703	C (IEC) / TYPE 2 (UL)
Max. Design Load, Push / Pull ¹	[lbs / ft ²]	75 (3600 Pa) / 55 (2667 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ¹	[lbs / ft ²]	113 (5400 Pa) / 84 (4000 Pa)		

¹ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL1703, VDE Quality Tested, CE-compliant, IEC 61215:2016, IEC 61730:2016, Application Class II, U.S. Patent Nos. 9,593,215 (solar cells)



PACKAGING INFORMATION

Number of Modules per Pallet	32
Number of Pallets per 53' Trailer	28
Number of Pallets per 40' HC-Container	24
Pallet Dimensions (L x W x H)	71.5 x 45.3 x 48.0 in (1815 x 1150 x 1220 mm)
Pallet Weight	1505 lbs (683 kg)

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 742 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us



ADD : 612 FLORIDA AVENUE, PALM HARBOR, FL 34683, USA
CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

Signature with Seal

CHRISTELLE PUTNEY

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FL 32025, USA

REV	ENG.	DESCRIPTION	DATE				

PERMIT DEVELOPER

DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME

MODULE DATASHEET

SHEET NUMBER

DS-01

Data Sheet
Enphase Microinverters
Region: AMERICAS

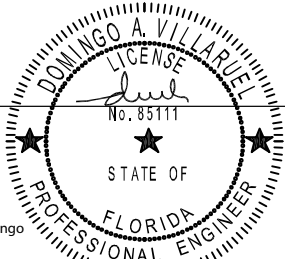
Enphase IQ 7 and IQ 7+ Microinverters



To learn more about Enphase offerings, visit enphase.com

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

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

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

Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US	IQ7PLUS-72-2-US
Commonly used module pairings¹	235 W - 350 W +	235 W - 440 W +
Module compatibility	60-cell PV modules only	60-cell and 72-cell PV modules
Maximum input DC voltage	48 V	60 V
Peak power tracking voltage	27 V - 37 V	27 V - 45 V
Operating range	16 V - 48 V	16 V - 60 V
Min/Max start voltage	22 V / 48 V	22 V / 60 V
Max DC short circuit current (module Isc)	15 A	15 A
Overvoltage class DC port	II	II
DC port backfeed current	0 A	0 A
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %

MECHANICAL DATA	
Ambient temperature range	-40°C to +65°C
Relative humidity range	4% to 100% (condensing)
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection - No fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environmental category / UV exposure rating	NEMA Type 6 / outdoor

FEATURES	
Communication	Power Line Communication (PLC)
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.

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

To learn more about Enphase offerings, visit enphase.com

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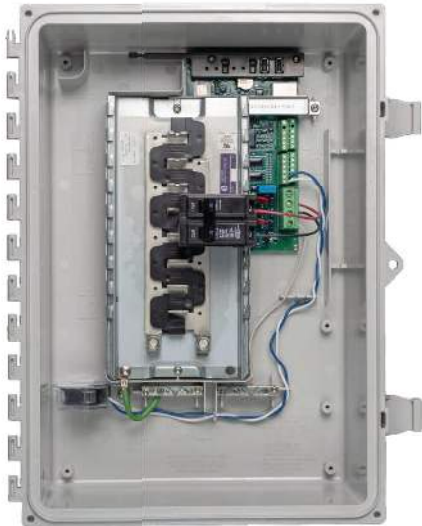
1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

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DATE	03/04/2022
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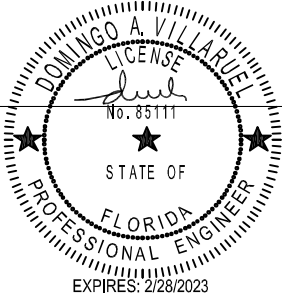
Enphase IQ Combiner 3 (X-IQ-AM1-240-3)



To learn more about Enphase offerings, visit enphase.com

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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 limited warranty
- UL listed



Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and REPLACEMENT PARTS (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G/12-year data plan) CELLMODEM-01 (3G/5-year data plan) CELLMODEM-M1 (4G based LTE-M/5-year data plan) Consumption Monitoring* CT CT-200-SPLIT	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Split core current transformers enable whole home consumption metering (+/- 2.5%).
* Consumption monitoring is required for Enphase Storage Systems	
Wireless USB adapter COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows redundant wireless communication with Encharge and Enpower.
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-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

To learn more about Enphase offerings, visit enphase.com

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CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

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FL 32025, USA

REVISIONS	DATE				
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	REV	ENG.			

PERMIT DEVELOPER

DATE 03/04/2022

DESIGNER ODK

REVIEWER

SHEET NAME

COMBINER BOX
DATASHEET

SHEET NUMBER

DS-03

FLASH LOC



FLASHLOC is the ultimate attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the lag bolt and inject sealant into the base. **FLASHLOC's** patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with lag bolts, sealant, and hardware for maximum convenience. Don't just divert water, **LOC it out!**

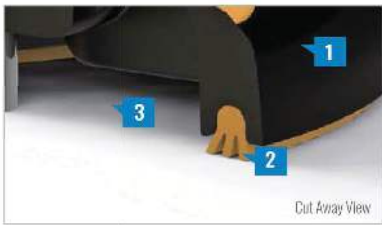


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PROTECT THE ROOF
Install a high-strength waterproof attachment without lifting, prying or damaging shingles.



LOC OUT WATER
With an outer shield **1** contour-conforming gasket **2** and pressurized sealant chamber **3** the Triple-Loc Seal delivers a 100% waterproof connection.



HIGH-SPEED INSTALL
Simply drive lag bolt and inject sealant into the port **4** to create a permanent pressure seal.

FLASH LOC

INSTALLATION GUIDE



PRE-INSTALL
Snap chalk lines for attachment rows. On shingle roofs, snap lines 1-3/4" below upslope edge of shingle course. Locate rafters and mark attachment locations.

At each location, drill a 7/32" pilot hole. Clean roof surface of dirt, debris, snow, and ice, then fill pilot hole with sealant.

NOTE: Space mounts per racking system install specifications. When down pressure is ≥ 34 psf, span may not exceed 2 ft.



STEP 1: SECURE
Place **FLASHLOC** over pilot hole with lag on down-slope side. Align indicator marks on sides of mount with chalk line. Pass included lag bolt and sealing washer through **FLASHLOC** into pilot hole. Drive lag bolt until mount is held firmly in place.

NOTE: The EPDM in the sealing washer will expand beyond the edge of the metal washer when proper torque is applied.



STEP 2: SEAL
Insert tip of UNIRAC provided sealant into port. Inject until sealant exits both vents.

Continue array installation, attaching rails to mounts with provided T-bolts.

NOTE: When **FLASHLOC** is installed over gap between shingle or tabs or vertical joints, fill gap/joint with sealant between mount and upslope edge of shingle course.

Use only provided sealant.

FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FASTER INSTALLATION. 25-YEAR WARRANTY.

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CONTACT : 727 945 6060
LICENSE #EC13010036
#CBC1263094

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DESIGNER	ODK
REVIEWER	

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SHEET NUMBER
DS-04



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SOLARMOUNT



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



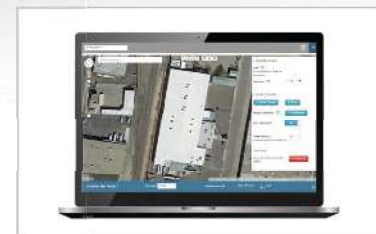
Now Featuring:
THE NEW FACE OF SOLAR RACKING
Superior Aesthetics Package



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



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



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

FAST INSTALLATION. SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT



OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

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

VERSATILITY

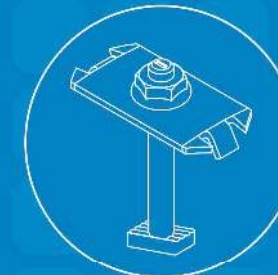
ONE PRODUCT - MANY APPLICATIONS

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

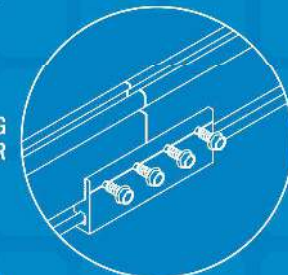
AUTOMATED DESIGN TOOL

DESIGN PLATFORM AT YOUR SERVICE

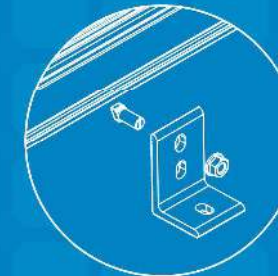
Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability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



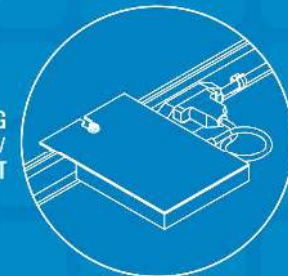
INTEGRATED BONDING
MIDCLAMP



INTEGRATED BONDING
SPLICE BAR



INTEGRATED BONDING
L-FOOT w/ T-BOLT



INTEGRATED BONDING
MICROINVERTER MOUNT w/
WIRE MANAGEMENT



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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1340 SW INDIAN GLEN, LAKE CITY,
FL 32025, USA

REV	ENG.	DESCRIPTION	DATE						

PERMIT DEVELOPER	
DATE	03/04/2022
DESIGNER	ODK
REVIEWER	

SHEET NAME
RACKING DATASHEET

SHEET NUMBER
DS-05