

BLAISE, JEANS

NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM

DC SYSTEM SIZE (11.070 KW)

GENERAL NOTES

SCOPE OF WORK

1. THE PROJECT IS NEW PHOTOVOLTAIC SYSTEM CONSISTING OF SOLAR ARRAY(S) AND ASSOCIATED POWER CONDITIONING EQUIPMENT.
2. ALL CONSTRUCTION SHALL COMPLY WITH THE ADOPTED EDITION OF THE INTERNATIONAL BUILDING CODE AND ELECTRIC CODE AS SPECIFIED IN THE PROJECT SPECIFIC NOTES.
3. IT SHALL ALSO COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE AND LOCAL ELECTRICAL UTILITY CODES, RULES AND REGULATIONS.
4. THE SYSTEM WILL BE INTERCONNECTED TO THE ELECTRICAL UTILITY GRID IN ACCORDANCE WITH THE REQUIREMENTS OF THE ADOPTED ELECTRIC AND THE ELECTRICAL UTILITY COMPANY.
5. THE CONTRACTOR SHALL PROVIDE LABOR FOR CONSTRUCTION OF THE ARRAY AND INSTALLATION OF ALL ELECTRICAL EQUIPMENT. THE CONTRACTOR WILL PROVIDE COMPETENT SUPERVISION FOR THE WORK TO BE ACCOMPLISHED. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BY OWNER AS REQUESTED.
6. THERE WILL BE NO SUBMISSION FOR ANY EQUIPMENT WITH THE VENDOR PART NUMBER ON THE DRAWING WITHOUT WRITTEN APPROVAL OF THE PROFESSIONAL ENGINEER. COMMON ITEMS SUCH AS CONDUITS, WIRE, FITTINGS, ETC. ARE NOT SPECIFIED BY VENDOR BUT THE SIZES CANNOT BE REDUCED.
7. THE CONSTRUCTION CONTRACTOR AND HIS SUBCONTRACTORS AGREE THAT IN ACCORDANCE WITH THE GENERALLY ACCEPTED CONSTRUCTION PRACTICES CONSTRUCTION CONTRACTOR AND HIS SUBCONTRACTORS WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE SAFETY OF ALL PERSON AND PROPERTY, AND THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS.
8. CONSTRUCTION CONTRACTOR AND HIS SUBCONTRACTORS FURTHER AGREE TO DEFEND, INDEMNIFY AND HOLD HARMLESS THE DESIGN PROFESSIONAL FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PERSONNEL.
9. CONSTRUCTION CONTRACTOR AND HIS SUBCONTRACTORS WILL BE REQUIRE TO REPAIR ANY DAMAGE DONE TO BUILDINGS, GROUNDS OR UTILITIES AT NO ADDITIONAL COST TO THE CUSTOMER. DEFECTIVE MATERIAL OR WORKMANSHIP WILL NOT BE ALLOWED ON THIS PROJECT.RESONABLE HOUSEKEEPING AND CLEAN UP SHALL BE CONDUCTED BOTH DURING THE EXECUTION OF AND AT THE CONCLUSION OF THE PROJECT.

GENERAL

1. THE ACTUAL SYSTEM EQUIPMENT SPECIFICATIONS FOR THE PHOTOVOLTAIC SYSTEM ARE INCLUDED IN THE PV SYSTEM SPECIFICATION ON THE TITLE PAGE AND THROUGHOUT THE DRAWING AS NECESSARY FOR CLARITY.IN ADDITION THE ACTUAL VENDOR SPECIFICATION DATA SHEETS WILL BE INCLUDED AS PART OF THE PERMIT SUBMITTAL.
2. ONLY NEW MATERIAL WILL BE INSTALLED AS PART OF THE PROJECT. ALL NEW INSTALLED EQUIPMENT WILL BE APPROPRIATELY LISTED AND NEMA RATED. ALL NEW EQUIPMENT SHALL HAVE PERMANENT PLASTIC ENGRAVED IDENTIFICATION TAGS INSTALLED.
3. ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF NEW RACEWAYS AND EQUIPMENT SHALL BE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. ALL WORK SHALL BE PERFORMED BY TRADESMAN EXPERIENCED IN WORK REQUIRED. ALL FINISHES SHALL MATCH THE EXISTING ADJACENT FINISHES. OPENING IN FIRE RATED WALLS WILL BE PATCHED IN A MANNER MAINTAINING THE ORIGINAL FIRE AND SMOKE RATING.
4. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND CANNOT SHOW EVERY CONNECTION, JUNCTION BOX, WIRE,CONDUIT, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEM.
5. CONTRACTOR SHALL COORDINATE ALL POWER OUTAGES WITH THE OWNER'S REPRESENTATIVE IN ADVANCE.
6. 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.
7. ELECTRICAL TESTING SHALL BE IN COMPLIANCE WITH NFPA 70E

CONDUIT AND WIRE

1. ALL EXISTING CONDUIT RUNS ARE NOT SHOWN. CONTRACTOR SHALL VERIFY EXISTING CONDUIT LOCATIONS IN FIELD.
2. ALL CONDUCTORS SHALL BE INSTALLED IN A RACEWAY AS SPECIFIED IN THE DRAWINGS. THE EXCEPTION IS PV SOURCE CIRCUIT CONDUCTORS MADE OF PV WIRE CABLE. THESE CONDUCTORS MAY BE EXPOSED WITHIN THE PV ARRAY.
3. INDOOR EMT FITTINGS MAY BE COMPRESSION TYPE OR STEEL SET SCREW TYPE. OUTDOOR EMT FITTINGS MUST BE COMPRESSION RAINTIGHT TYPE.
4. A PULL ROPE SHALL BE INSTALLED IN ALL EMPTY CONDUITS.
5. CONDUCTORS MATERIAL, EITHER COPPER OR ALUMINUM IN SPECIFIED IN THE DRAWINGS. CONDUCTOR INSULATION TYPE SHALL BE THWN - 2 UNLESS OTHERWISE NOTED.

EQUIPMENT

1. ALL ELECTRICAL COMPONENTS INSTALLED OUTDOORS, EXPOSED TO WEATHER OR IN DAMP LOCATIONS SHALL BE RATED FOR NEMA 3R OR GREATER. INSTALLATION OF THESE COMPONENTS MUST COMPLY WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. ALL RACEWAYS, CABINETS, BOXES, FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN AN APPROVED MANNER.
3. AT THE COMPLETION OF THE PROJECT NEATLY TYPED ACCURATE PANEL BOARD DIRECTORIES INDICATING ALL BRANCH CIRCUITS AND SPARES WILL BE PROVIDED. ALL SPARES SHALL BE LEFT IN THE OFF POSITION.
4. ALL SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE WITH COVER INTERLOCK AND HANDLE LOCK OFF PROVISIONS. SWITCHES SHALL BE MANUFACTURED BY A COMPANY CONSISTENT WITH OTHER INSTALLED EQUIPMENT WHENEVER POSSIBLE. PART NUMBERS, RATING AND FUSING SHALL BE AS SHOWN ON THE DRAWINGS.
5. CONTRACTOR SHALL ENSURE ALL CEC AND MAINTENANCE CLEARANCE REQUIREMENTS ARE MET FOR NEW EQUIPMENT AND MAINTAINED FOR EXISTING EQUIPMENT.
6. CONTRACTOR SHALL FIELD VERIFY EQUIPMENT CLEARANCE AND PLACEMENTS WHILE COORDINATING LOCATORS WITH OTHER TRADES, CONSTRUCTION MANAGERS, AND SITE SUPERVISORS PRIOR TO PURCHASING AND INSTALLING EQUIPMENT.
7. EVERY STRUCTURE AND PORTION THEREOF, INCLUDING NONSTRUCTURAL COMPONENTS THAT ARE PERMANENTLY ATTACHED TO STRUCTURES AND THEIR SUPPORTS AND ATTACHMENTS, SHALL BE DESIGNED AND CONSTRUCTED TO RESIST THE EFFECTS OF EARTHQUAKE MOTIONS IN ACCORDANCE WITH ASCE 7, EXCLUDING CHAPTER 14 AND APPENDIX 11A. THE SEISMIC DESIGN CATEGORY FOR A STRUCTURE IS PERMITTED TO BE DETERMINED IN ACCORDANCE WITH SECTION 1613 OR ASCE 7.
8. ALL CONTROLS AND SWITCHES INTENDED TO BE USED BY THE OCCUPANT OF THE ROOM OR AREA TO CONTROL LIGHTING AND RECEPTACLE OUTLETS, APPLIANCE AND COOLING, HEATING AN D VENTILATING EQUIPMENT, SHALL BE LOCATED NO MORE THAN 48 INCHES MEASURED FROM THE TOP OF THE JUNCTION OR DEVICE BOX NOR LESS THAN 15 INCHES MEASURED TO THE BOTTOM OF THE JUNCTION OR DEVICE BOX ABOVE THE FINISHED FLOOR.
9. ALL RECEPTACLE OUTLETS ON BRANCH CIRCUITS OF 30 - AMPERES OR LESS AND COMMUNICATION SYSTEM RECEPTACLES SHALL BE LOCATED NO MORE THAN 48 INCHES MEASURED FROM THE TOP OF THE RECEPTACLE OUTLET BOX OR RECEPTACLE HOUSING NOR LESS THAN 15 INCHES MEASURED TO THE BOTTOM OF THE RECEPTACLE OUTLET BOX OR RECEPTACLE HOUSING ABOVE FINISHED FLOOR.

GROUNDING

1. THE GROUNDING SYSTEM SHALL MEET THE REQUIREMENTS OF THE NEC AND THE LOCAL ADOPTED CODE. ALL ELECTRICAL EQUIPMENT AND RACEWAYS SHALL BE PROPERLY GROUNDED.
2. AN INSULATED EQUIPMENT GROUNDING CONDUCTOR, IN ACCORDANCE WITH NEC CODE , SHALL BE PROVIDED IN ALL CONDUITS WITH CURRENT CARRYING CONDUCTORS. ALL LUGS AND CONNECTORS SHALL BE RATED FOR THE CONDUCTOR MATERIAL AND THE CONDITIONS OF USE.
3. THE GROUNDING RESISTIVITY WILL BE TESTED AFTER INSTALLATION TO CONFIRM 5 OHM OR LESS RESISTANCE FROM RACKING TO GROUND. IF GROUND RESISTANCE IS GREATER THAN 5 OHMS ADDITIONAL GROUNDING WILL BE INSTALLED UNTIL RESISTANCE IS LESS THAN 5 OHMS.

WIRING DEVICES

1. RECEPTACLES SHALL BE AS DESIGNED ON THE DRAWINGS AND SHOULD BE A BRAND CONSISTENT WITH OTHERS IN THE VICINITY WHENEVER POSSIBLE.
2. ALL WIRING DEVICES SHALL BE PROVIDED WITH APPROPRIATE COVER-PLATES. ANY EMPTY BOXES SHALL HAVE BLANK COVER PLATES. COVER-PLATES SHALL BE LEXAN, PLASTIC OR STAINLESS STEEL IN FINISHED AREA. GALVANIZED COVER-PLATES MAY BE USED IN EQUIPMENT ROOMS.

LABELING AND PHASING

1. FOR LABELING USE NUMBERED UV RATED LABELS TO INDICATE STRING NUMBER.
2. AS A SUBSTITUTE FOR LABELS YELLOW TAPE MAY BE USED FOR PHASING
3. EACH METHOD DESCRIBED ABOVE WILL NEED TO BE PERFORMED ON BOTH POSITIVE AND NEGATIVE AT POINTS WHERE CONDUCTORS ARE TERMINATED

SYSTEM DETAILS

DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	SYSTEM SIZE :11.070KW DC STC
AC RATING OF SYSTEM	7.83 KW
MAX. AC OUT. CURRENT	40.83 A
NO. OF MODULES	(27) JKM410M-72HL-V G2 (410W) JINKO SOLAR
NO. OF INVERTERS	(27) ENPHASE IQ7PLUS-72-2-US MICROINVERTERS
POINT OF CONNECTION	BACKFEED BREAKER
ARRAY STRINGING	(3) BRANCHES OF 09 MODULES

SITE DETAILS

ASHRAE EXTREME LOW	0°C
ASHRAE 2% HIGH	33°C
GROUND SNOW LOAD	0 PSF
WIND SPEED	160 MPH (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

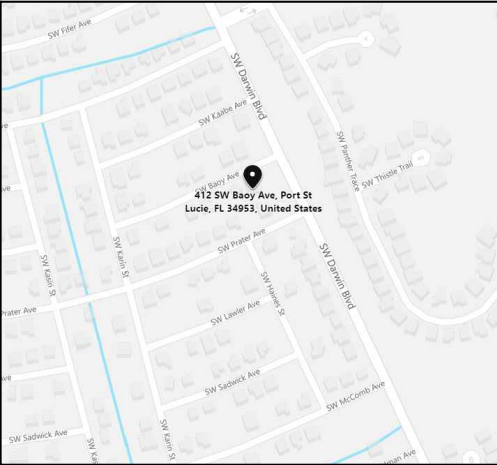
SHEET INDEX

SHEET NO.	SHEET NAME
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PV-3	ROOF PLAN
PV-4	ARRAY LAYOUT
PV-5	RACKING LAYOUT
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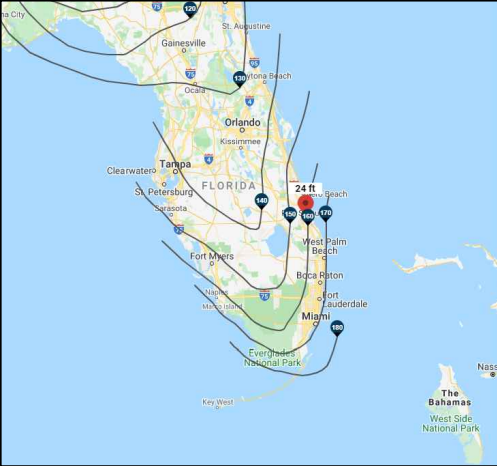
SITE MAP (N.T.S)



VICINITY MAP



WIND FLOW MAP



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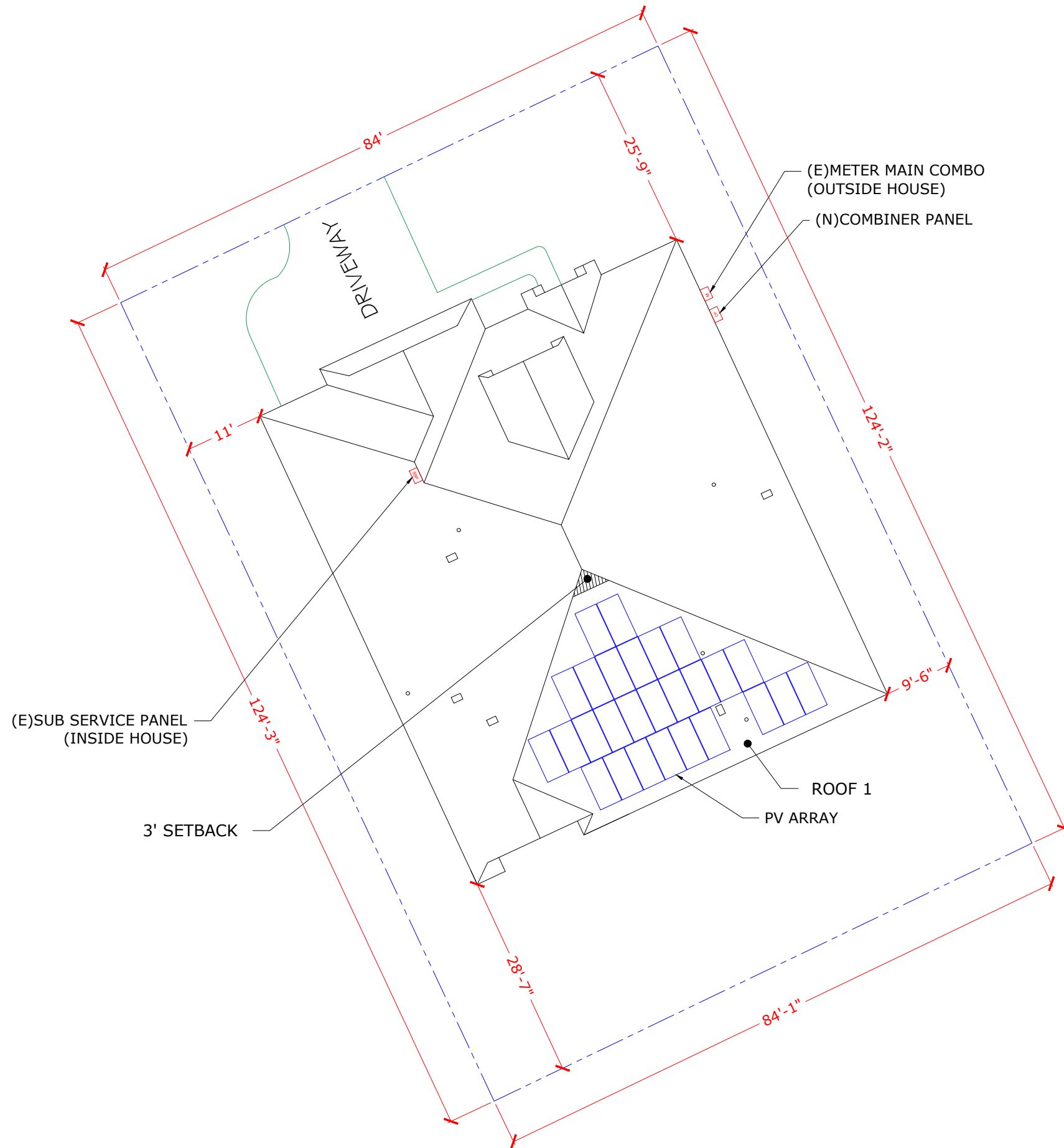
REVISIONS	DATE				
	DESCRIPTION				
	ENGG				
	REV				

PERMIT DEVELOPER

DATE	02/05/2021
DESIGNER	OVC
REVIEWER	

COVER PAGE

PV-1



LEGENDS

- UM - UTILITY METER
- M - METER MAIN COMBO
- MSP - MAIN SERVICE PANEL
- SSP - SUB SERVICE PANEL
- ACD - AC DISCONNECT
- PM - PRODUCTION METER
- CP - COMBINER PANEL
- Fire Setback
- Roof Obstruction



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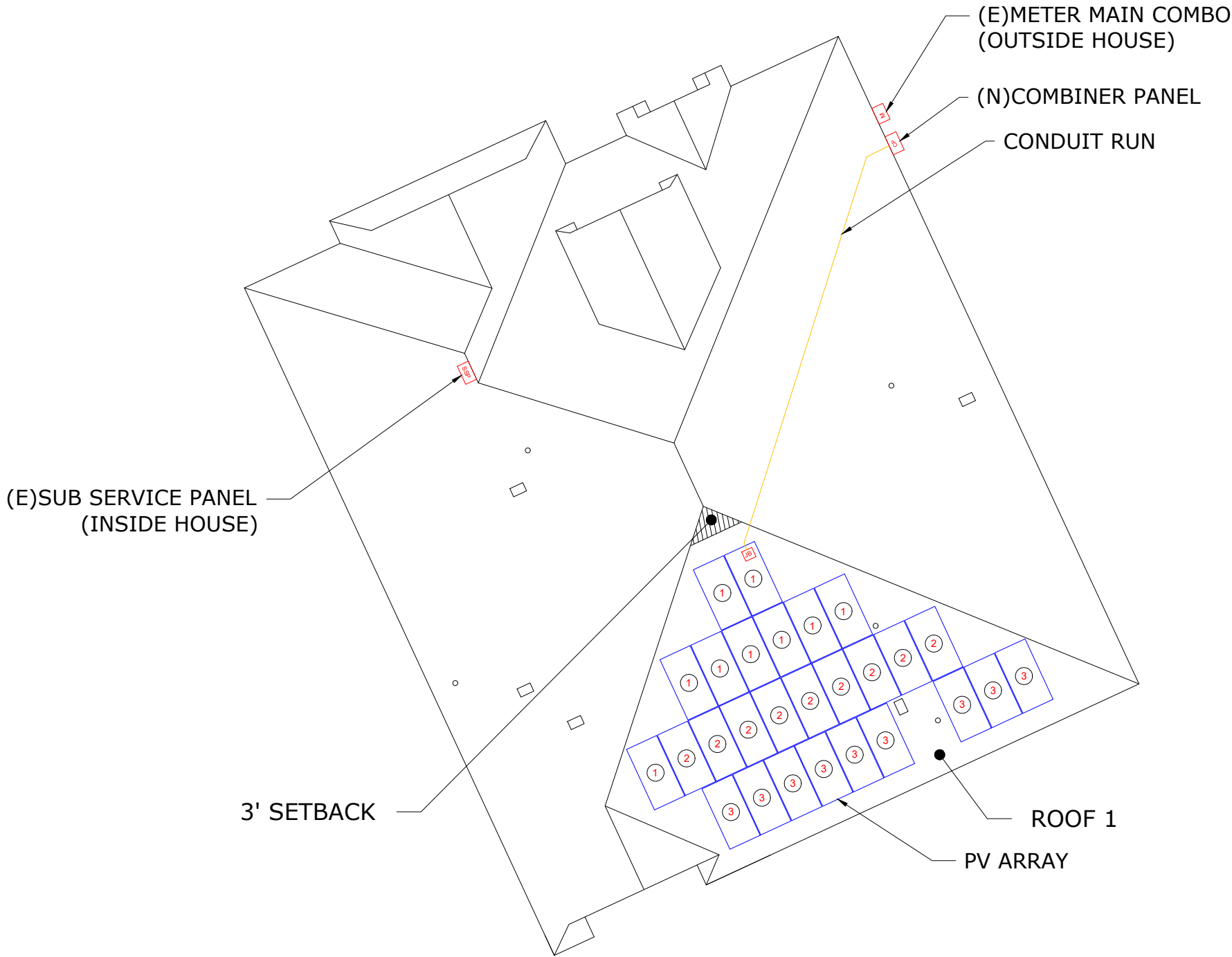
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PERMIT DEVELOPER

DATE	02/05/2021
DESIGNER	OVC
REVIEWER	

SITE PLAN

PV-2



EQUIPMENT SPECIFICATIONS		
EQUIPMENT	DESCRIPTION	QUANTITY
MODULE	JKM410M-72HL-V G2 (410W) JINKO SOLAR	27
INVERTER	ENPHASE IQ7PLUS-72-2-US MICROINVERTERS	27
JUNCTION BOX	600 V,NEMA 3R UL LISTED	1
COMBINER PANEL	125A ENPHASE IQ COMBINER 3	1
ATTACHMENT	IRONRIDGE (KNOCKOUT TILE)	57
RACKING SYSTEM	IRONRIDGE XR100 RAILS	-

ROOF SPECIFICATIONS	
ROOF MATERIAL	FLAT TILE
ROOF CONDITION	GOOD
RAFTERS	2"x4"@24" O.C.

ROOF INFORMATION			
ROOF	QUANTITY	PITCH	AZIMUTH
ROOF 1	27	5/12	154°

SYSTEM INFORMATION	
DC SYSTEM SIZE	11.070 KW
AC SYSTEM SIZE	7.830 KW

LEGENDS

- UM - UTILITY METER
- M - METER MAIN COMBO
- MSP - MAIN SERVICE PANEL
- SSP - SUB SERVICE PANEL
- JB - JUNCTION BOX
- ACD - AC DISCONNECT
- PM - PRODUCTION METER
- CP - COMBINER PANEL
- 1 - STRING TAG
- CONDUIT RUN
- FIRE SETBACK
- ROOF OBSTRUCTION



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ROOF PLAN
PV-3



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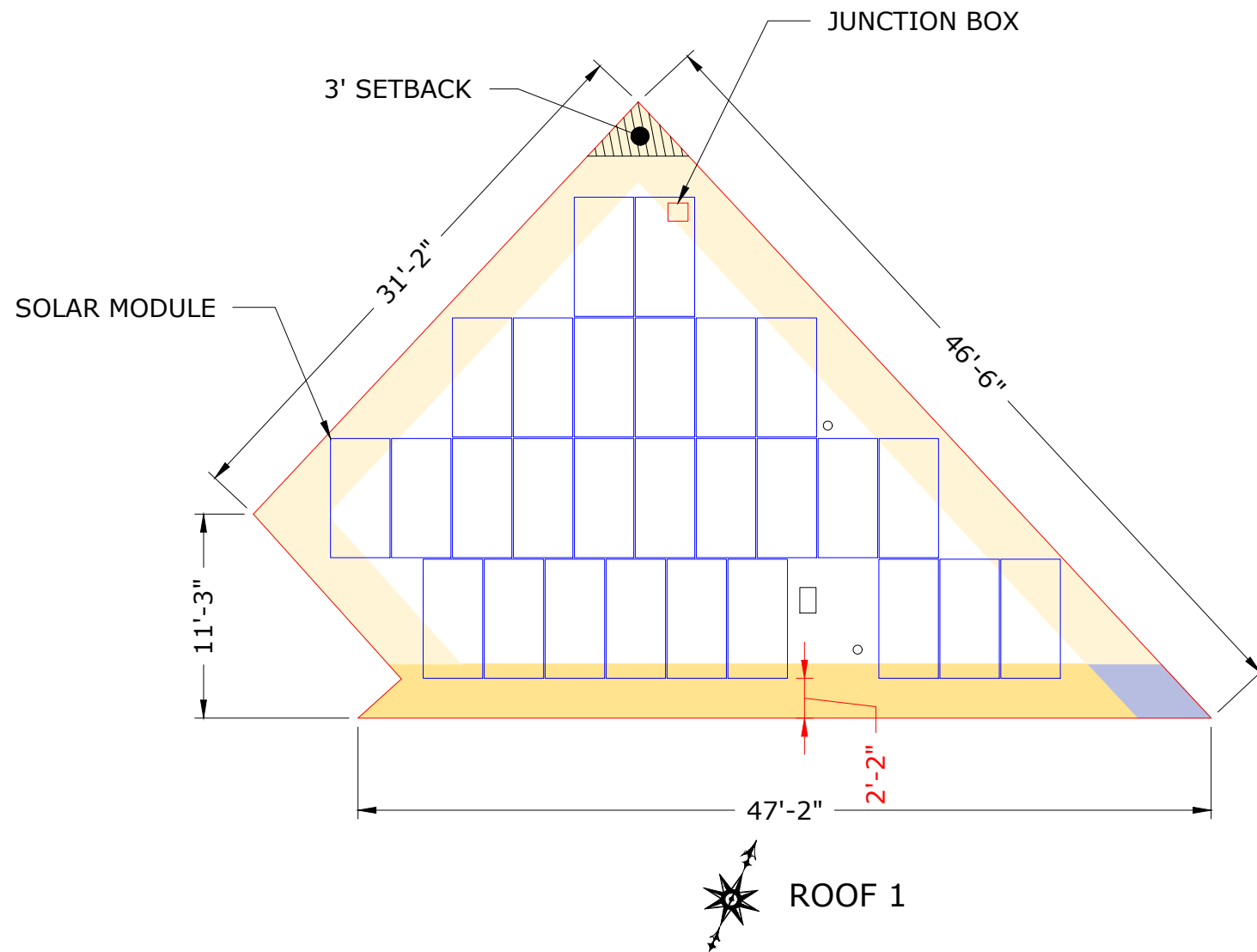
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REVIEWER	

ARRAY LAYOUT

PV-4



NOTE:
PROPOSED PHOTOVOLTAIC LAYOUT IN COMPLIANCE WITH NFPA 1,2018 EDITION

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: 160 MPH
EXPOSURE CATEGORY: B
RISK CATEGORY: II
MEAN ROOF HEIGHT: 30FT
ROOF SLOPE: 20°-27°

EQUIPMENT SPECIFICATIONS		
EQUIPMENT	DESCRIPTION	QUANTITY
MODULE	JKM410M-72HL-V G2 (410W) JINKO SOLAR	27
INVERTER	ENPHASE IQ7PLUS-72-2-US MICROINVERTERS	27
JUNCTION BOX	600 V,NEMA 3R UL LISTED	1
COMBINER PANEL	125A ENPHASE IQ COMBINER 3	1
ATTACHMENT	IRONRIDGE (KNOCKOUT TILE)	57
RACKING SYSTEM	IRONRIDGE XR100 RAILS	-

ROOF SPECIFICATIONS	
ROOF MATERIAL	FLAT TILE
ROOF CONDITION	GOOD
RAFTERS	2"x4"@24" O.C.

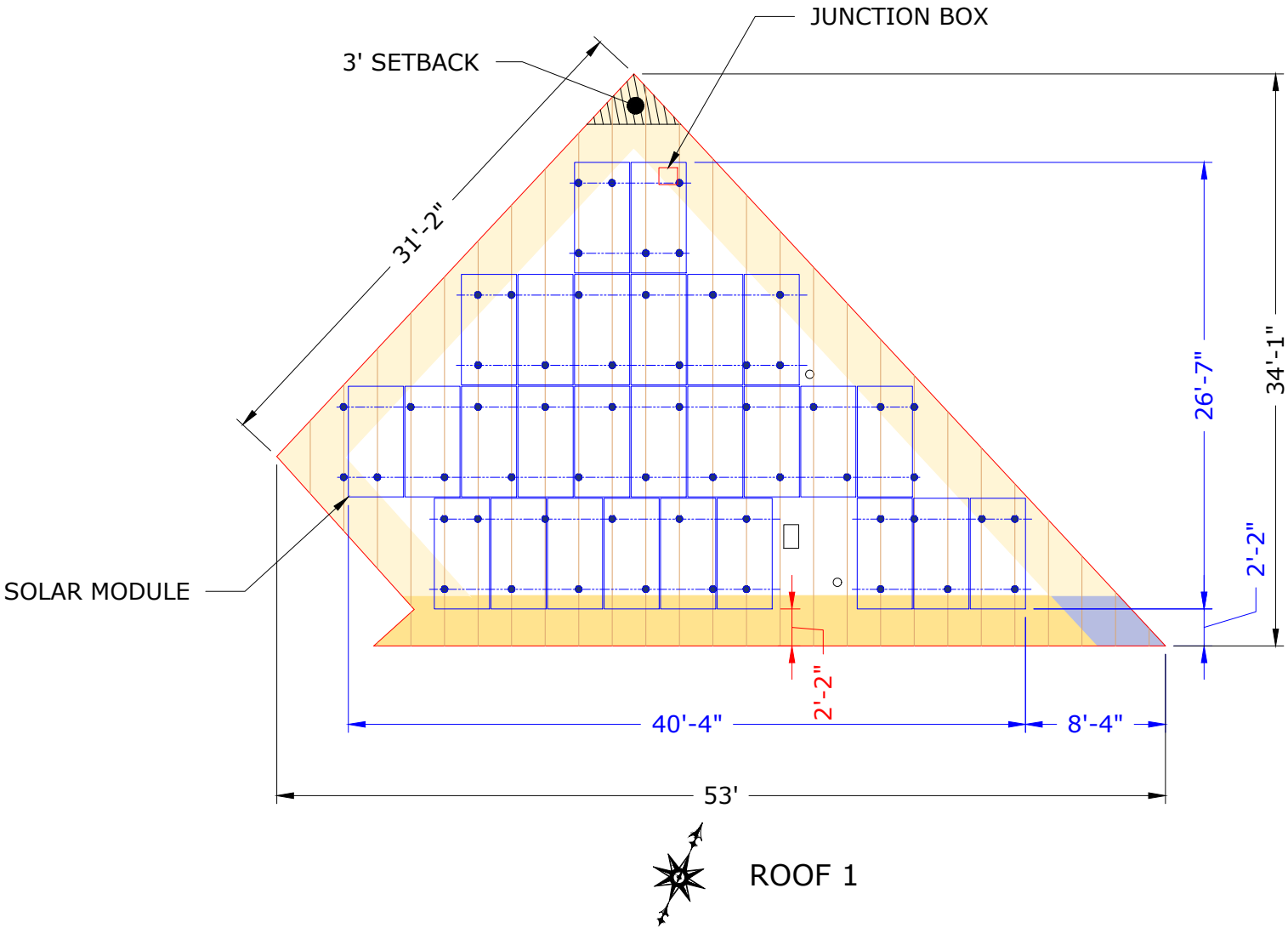
ROOF INFORMATION			
ROOF	QUANTITY	PITCH	AZIMUTH
ROOF 1	27	5/12	154°

SYSTEM INFORMATION	
DC SYSTEM SIZE	11.070 KW
AC SYSTEM SIZE	7.830 KW

LEGENDS

- □ - ROOF OBSTRUCTION
- - JUNCTION BOX
- ▨ - FIRE SETBACK

NOTES:
TRUSS/RAFTERS 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"



NOTE:
PROPOSED PHOTOVOLTAIC LAYOUT IN COMPLIANCE WITH NFPA 1,2018 EDITION

LEGENDS

- 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)

LEGENDS

- JUNCTION BOX
- PV ROOF ATTACHMENT
- RAFTERS/TRUSSES
- RAIL
- ROOF OBSTRUCTION
- FIRE SETBACK



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RACKING LAYOUT

PV-5

EQUIPMENT SPECIFICATIONS

EQUIPMENT	DESCRIPTION	QUANTITY
MODULE	JKM410M-72HL-V G2 (410W) JINKO SOLAR	27
INVERTER	ENPHASE IQ7PLUS-72-2-US MICROINVERTERS	27
JUNCTION BOX	600 V,NEMA 3R UL LISTED	1
COMBINER PANEL	125A ENPHASE IQ COMBINER 3	1
ATTACHMENT	IRONRIDGE (KNOCKOUT TILE)	57
RACKING SYSTEM	IRONRIDGE XR100 RAILS	-

ROOF SPECIFICATIONS

ROOF MATERIAL	FLAT TILE
ROOF CONDITION	GOOD
RAFTERS	2"x4"@24" O.C.

ROOF INFORMATION

ROOF	QUANTITY	PITCH	AZIMUTH
ROOF 1	27	5/12	154°

SYSTEM INFORMATION

DC SYSTEM SIZE	11.070 KW
AC SYSTEM SIZE	7.830 KW



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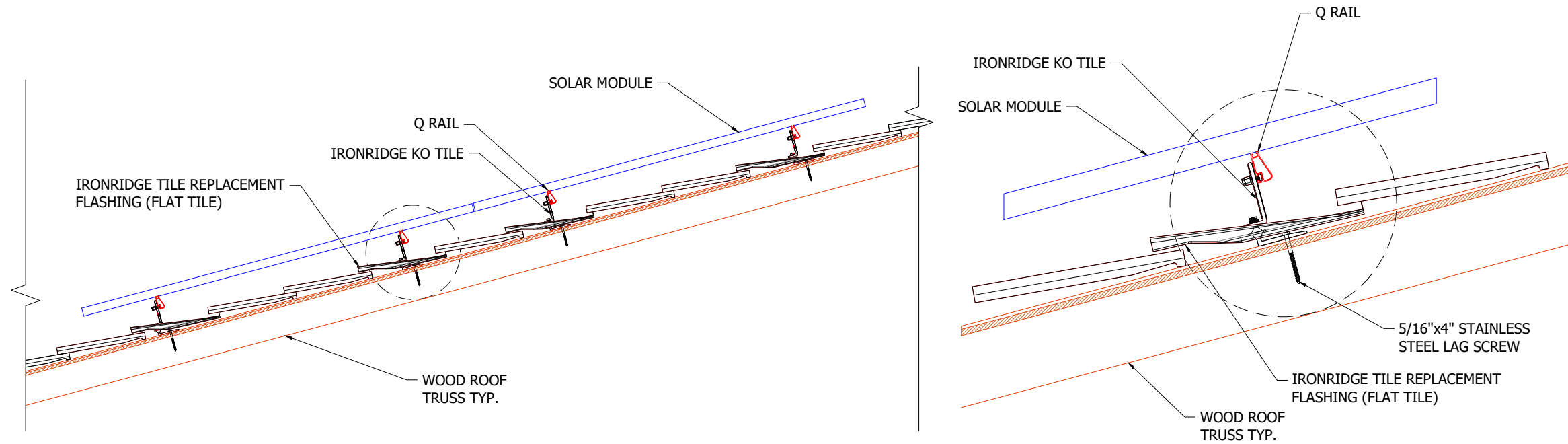
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STRUCTURAL DETAILS

PV-6



Span limits ①					Panels Attachments					
					Reaction Forces	Uplift ①	Down ①	Uplift ①	Lateral ①	
		XR10	XR100	XR1000		(PSF)	(lbs)	(lbs)	(lbs)	
Zone 1/2e ①	Normal	4' (1' 7")	6' (2' 5")	6' (2' 5")	Zone 1/2e	Normal	26	165	315	17
	Exposed	4' (1' 7")	6' (2' 5")	6' (2' 5")		Exposed	38	165	484	17
	Edge	3' 1" (1' 2")	4' 11" (1' 11")	4' 11" (1' 11")		Edge	53	191	674	17
Zone 2n/2r/3e	Normal	4' (1' 7")	5' 11" (2' 5")	5' 11" (2' 5")	Zone 2n/2r/3e	Normal	40	165	511	17
	Exposed	0" (0")	4' 5" (1' 9")	4' 5" (1' 9")		Exposed	61	165	778	17
	Edge	0" (0")	0" (0")	0" (0")		Edge	N/A	N/A	N/A	N/A
Zone 3r	Normal	3' 6" (1' 5")	5' 4" (2' 2")	5' 4" (2' 2")	Zone 3r	Normal	47	165	597	17
	Exposed	0" (0")	3' 10" (1' 6")	3' 10" (1' 6")		Exposed	N/A	N/A	N/A	N/A
	Edge	0" (0")	0" (0")	0" (0")		Edge	N/A	N/A	N/A	N/A
System Weight										
Total system weight					1,277.9 lbs					
Weight/attachment					31.9 lbs					
Racking weight					236.3 lbs					
Distributed weight					2.8 psf					

STRUCTURAL DETAILS

CONDUIT SCHEDULE		
SR. NO.	DESCRIPTION	CONDUIT SIZE
Ⓐ	ENPHASE Q CABLES, (1) #10 AWG THWN-2 (G)	
①	(3) #10 AWG THWN-2 (L1) ,(3) #10 AWG THWN-2 (L2) , (1) #10 AWG THWN-2 (G)	IN 3/4" CONDUIT RUN
②	(3) #8 AWG THWN-2 (L1,L2,N) , (1) #10 AWG THWN-2 (G)	IN 3/4" CONDUIT RUN

MODULE SPECIFICATION	
MANUFACTURER	JINKO SOLAR
MODEL NO.	JKM 410M-72HL-V G2
PEAK POWER (P _{mpp})	410W
PEAK VOLTAGE (V _{mpp})	40.68V
PEAK CURRENT (I _{mpp})	10.08A
OPEN CIRCUIT VOLTAGE (V _{oc})	49.6V
SHORT CIRCUIT CURRENT (I _{sc})	10.76A

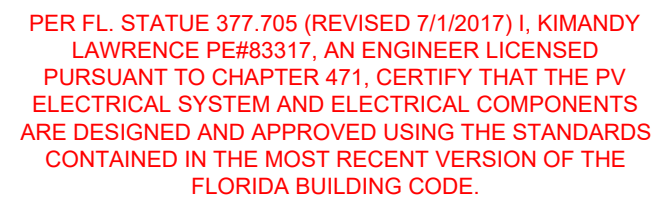
INVERTER SPECIFICATION	
MANUFACTURER	ENPHASE
MODEL NO.	IQ7PLUS-72-2-US
MAX. DC INPUT VOLTAGE	60V
MAX. CONT. OUTPUT POWER	290VA
NOMINAL AC OUTPUT VOLTAGE	240V
MAX. CONT. OUTPUT CURRENT	1.21A

ARRAY DETAILS	
DC SYSTEM SIZE	11.070 KW
AC SYSTEM SIZE	7.83 KW
TOTAL NO. OF MODULES	27
NO. OF MODULE PER STRING	3@9
NO. OF STRING	3



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PV-7



ELECTRICAL CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE IQ COMBINER PANEL :

AMBIENT TEMPERATURE = 33°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)
= [(9x 1.21) x 1.25] / 0.96 / 0.8
= 17.72 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)
= [(27 x 1.21) x 1.25] / 0.96 / 1
=42.53 A
SELECTED CONDUCTOR - #8 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION ...NEC 690.9(B)

=TOTAL INVERTER O/P CURRENT x 1.25
=(27 x 1.21) x 1.25 = 40.83 A
SELECTED OCPD IS 45A

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

GENERAL ELECTRICAL NOTES:

1. 1. THE DC AND AC CONNECTORS OF THE ENPHASE IQ7PLUS-72-2-US ARE LISTED TO MEET REQUIREMENTS AS A DISCONNECT MEANS AS ALLOWED BY NEC 690.15(A).
2. MICROINVERTER BRANCH CIRCUIT CONDUCTORS ARE MANUFACTURED ENPHASE Q CABLES LISTED FOR USE IN 20A OR LESS CIRCUITS OF ENPHASE IQ MICROINVERTERS. THEY ARE ROHS, OIL RESISTANT, AND UV RESISTANT. THEY CONTAIN AWG CONDUCTORS OF TYPE THHN/THWN-2 DRY/WET AND CERTIFIED TO UL3003 AND UL 9703. THE CABLE'S DOUBLE INSULATED RATING REQUIRES NO NEUTRAL OR GROUNDED CONDUCTOR.
3. ALL METAL ENCLOSURES, RACEWAYS, CABLES AND EXPOSED NONCURRENT-CARRYING METAL PARTS OF EQUIPMENT SHALL BE GROUNDED TO EARTH AS REQUIRED BY NEC 250.4(B) AND PART III OF NEC ARTICLE 250 AND EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45. THE GROUNDING ELECTRODE SYSTEM SHALL ADHERE TO 690.47(A) AND 250.169. THE DC GROUNDING ELECTRODE SHALL BE SIZED ACCORDING TO 250.166
4. PV SYSTEM DISCONNECT SHALL BE READILY ACCESSIBLE.
5. POINT-OF-CONNECTION SHALL BE MADE IN COMPLIANCE WITH NEC 705.12
6. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
7. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
8. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6(C)(1) AND ARTICLE 310.10 (D).
9. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).

GROUNDING NOTES:

PV MODULE AND RACKING GROUNDING AS PER APPROVED INSTALLATION PRACTICE AND IN LINE WITH MANUFACTURE'S GUIDELINES.



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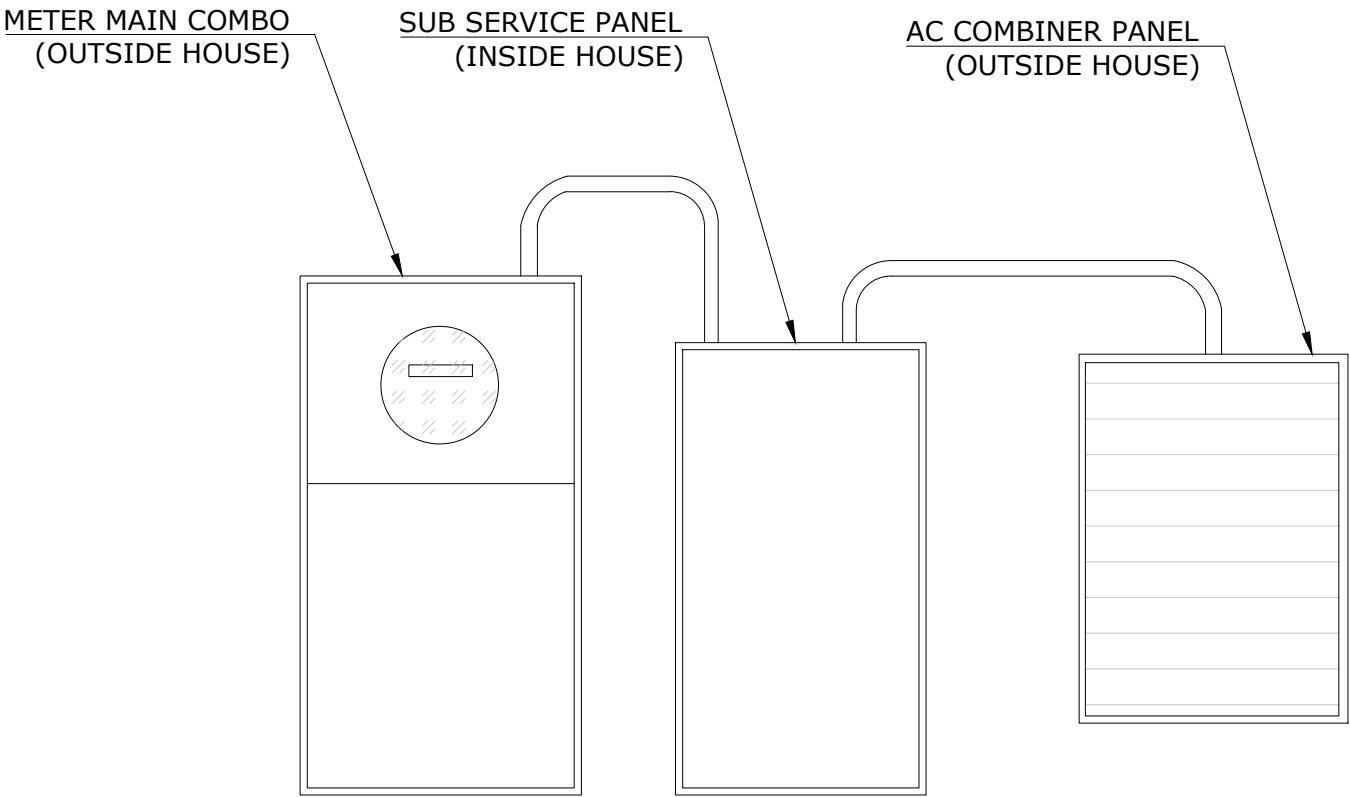
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PERMIT DEVELOPER	
DATE	02/05/2021
DESIGNER	OVC
REVIEWER	

ELECTRICAL CALCULATIONS

PV-8

EQUIPMENT ELEVATION VIEW



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AC COMBINER

WARNING

AC VOLTAGE : 240V
MAX FUSE :
MAX CURRENT: 40.83A

NOTICE

AC COMBINER AND DATA AQUISITION.
DO NOT ADD LOADS.

NOTICE

RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM

SERVICE PANEL LABEL

WARNING

INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

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 PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

FIRST RESPONDERS:
THIS SOLAR PV SYSTEM IS EQUIPPED
WITH RAPID SHUTDOWN.
TURN RAPID SHUTDOWN SWITCH TO THE "OFF"
POSITION TO SHUT DOWN ENTIRE PV SYSTEM.

EMERGENCY CONTACT

561-609-2664

UTILITY METER

WARNING

DUAL POWER SOURCE

REV	ENG	DESCRIPTION	DATE				

PERMIT DEVELOPER	
DATE	02/05/2021
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REVIEWER	

LABELS
PV-9



THE MOST
DEPENDABLE
SOLAR BRAND

EAGLE 72HM G2

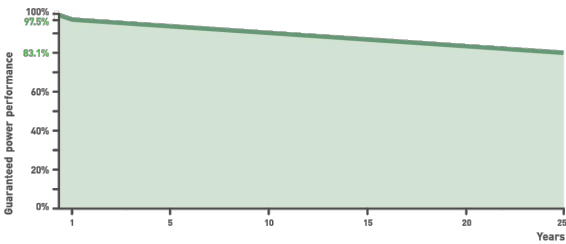
390-410 WATT • HALF CELL MONO PERC MODULE

Positive power tolerance of 0~+3%

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Best-selling module globally for last 4 years
- Top performance in the strictest 3rd party labs
- 99.9% on-time delivery to the installer
- Automated manufacturing utilizing artificial intelligence
- Vertically integrated, tight controls on quality
- Premium solar panel factories in USA and Malaysia

LINEAR PERFORMANCE WARRANTY

25-Year Performance Warranty



Nomenclature: JKM410M-72HL-V

Code	Cell	Code	Cell	Code	Certification
Full	Full	Full	Normal	Full	1000V
H	Half	L	Diamond	V	1500V



- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- IEC61215, IEC61730 certified products
- OHSAS18001 Occupational Health & Safety Standards
- UL1703 certified products

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KEY FEATURES



Diamond Half Cell Technology
World-record breaking efficient mono PERC half cut solar cells deliver high power in a small footprint.



Designed for Long Life
Uses the same DuPont protective film as the Space Station, Mars Lander, and jetliners. 25-year warranty.



Shade Tolerant
Twin array design allows continued performance even with shading by trees or debris.



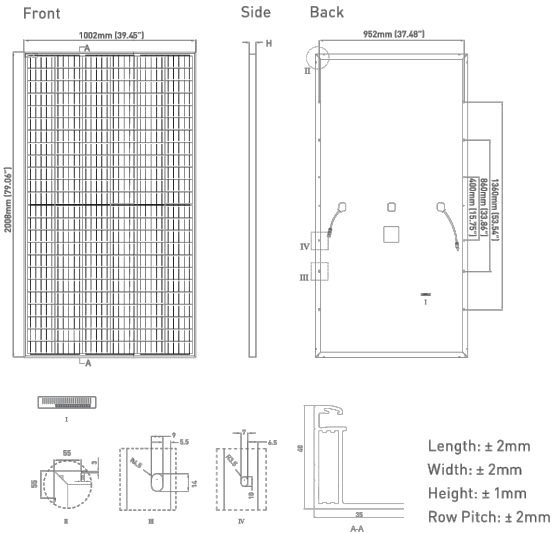
Power Boost in Cloudy Conditions
A special film diffuses light, boosting performance even with shading by trees or debris.



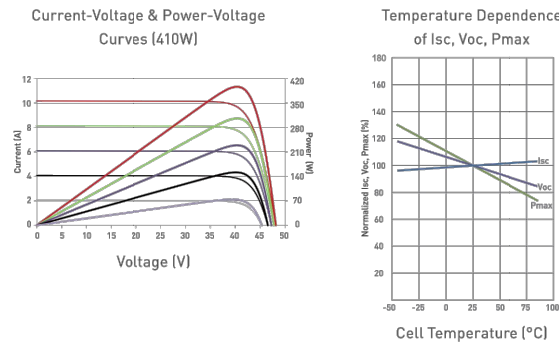
Protected Against All Environments
Certified to withstand humidity, heat, rain, marine environments, wind, hailstorms, and packed snow.



ENGINEERING DRAWINGS



ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



ELECTRICAL CHARACTERISTICS

Module Type	JKM390M-72HL-V		JKM395M-72HL-V		JKM400M-72HL-V		JKM405M-72HL-V		JKM410M-72HL-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	390Wp	287Wp	395Wp	291Wp	400Wp	294Wp	405Wp	298Wp	410Wp	302Wp
Maximum Power Voltage (Vmp)	39.64V	37.0V	39.90V	37.4V	40.16V	37.6V	40.42V	37.8V	40.68V	38.0V
Maximum Power Current (Imp)	9.84A	7.75A	9.90A	7.77A	9.96A	7.82A	10.02A	7.88A	10.08A	7.94A
Open-circuit Voltage (Voc)	48.6V	45.8V	48.8V	46.0V	49.1V	46.2V	49.4V	46.5V	49.6V	46.7V
Short-circuit Current (Isc)	10.46A	8.45A	10.54A	8.51A	10.61A	8.57A	10.69A	8.63A	10.76A	8.69A
Module Efficiency STC (%)	19.38%		19.63%		19.88%		20.13%		20.38%	

***STC:** ☀ Irradiance 1000W/m² 🌡 Cell Temperature 25°C ☁ AM = 1.5 🌬 Wind Speed 1m/s
NOCT: ☀ Irradiance 800W/m² 🌡 Ambient Temperature 20°C ☁ AM = 1.5 🌬 Wind Speed 1m/s

*Power measurement tolerance: ±3%

The company reserves the final right for explanation on any of the information presented hereby. JKM390-410M-72HL-V-A4-US

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MECHANICAL CHARACTERISTICS

Cells	Mono PERC Diamond Cell (158.75x158.75mm)
No. of Half Cells	144 (6x24)
Dimensions	2008x1002x40mm (79.06x39.45x1.57in)
Weight	22.5kg (49.6lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP67 Rated
Output Cables	12 AWG, 1400mm (55.12in) or Customized Length
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.35%/°C
Temperature Coefficients of Voc	-0.29%/°C
Temperature Coefficients of Isc	0.048%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1500VDC (UL and IEC)
Maximum Series Fuse Rating	20A

PACKAGING CONFIGURATION

[Two pallets = One stack]
27pcs/pallet, 54pcs/stack, 594pcs/40'HQ Container



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	REV				

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REVIEWER	

MODULE DATASHEET

PV-10

Enphase IQ 7 and IQ 7+ Microinverters

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

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

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



Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings¹	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	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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PERMIT DEVELOPER

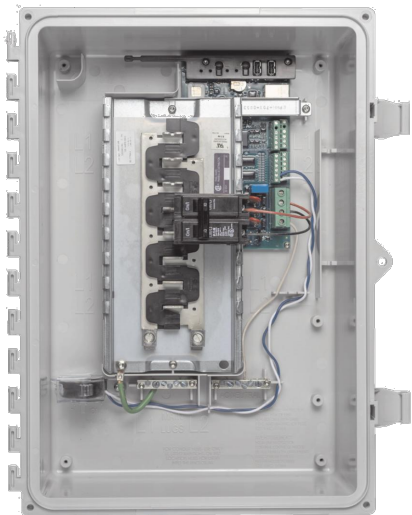
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DESIGNER	OVC
REVIEWER	

INVERTER DATASHEET

PV-11

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

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

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

Reliable

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



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and REPLACEMENT PARTS (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G/12-year data plan) CELLMODEM-01 (3G/5-year data plan) CELLMODEM-M1 (4G based LTE-M/5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
* Consumption monitoring is required for Enphase Storage Systems	
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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2019-11-04



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PERMIT DEVELOPER

DATE	02/05/2021
DESIGNER	OVC
REVIEWER	

COMBINER PANEL DATASHEET

PV-12



Flush Mount System



Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Our components have been tested to the limit and proven in extreme environments, including Florida's high-velocity hurricane zones.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 25-year warranty.



Strength Tested

All components evaluated for superior structural performance.



Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



UL 2703 Listed System

Entire system and components meet newest effective UL 2703 standard.



PE Certified

Pre-stamped engineering letters available in most states.



Design Assistant

Online software makes it simple to create, share, and price projects.



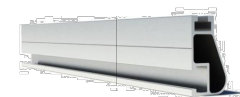
25-Year Warranty

Products guaranteed to be free of impairing defects.

Datasheet

XR Rails ☺

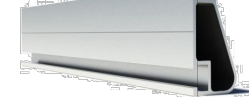
XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish

XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

Bonded Splices

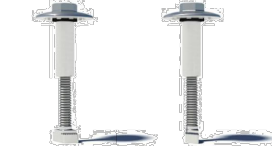


All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding ☺

UFOs



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

CAMO



Bond modules to rails while staying completely hidden.

- Universal end-cam clamp
- Tool-less installation
- Fully assembled

Bonding Hardware



Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

Attachments ☺

FlashFoot2



Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

Conduit Mount



Flash and mount conduit, strut, or junction boxes.

- Twist-on Cap eases install
- Wind-driven rain tested
- Secures 3/4" or 1" conduit

Knockout Tile



Replace tiles and ensure superior waterproofing.

- Flat, S, & W tile profiles
- Form-fit compression seal
- Single-lag universal base

All Tile Hook



Mount on tile roofs with a simple, adjustable hook.

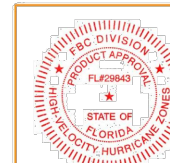
- Works on flat, S, & W tiles
- Single-socket installation
- Optional deck flashing

Resources



Design Assistant

Go from rough layout to fully engineered system. For free.
[Go to IronRidge.com/design](https://ironridge.com/design)



Endorsed by FL Building Commission

Flush Mount is the first mounting system to receive Florida Product approval for 2017 Florida Building Code compliance.

[Learn More at bit.ly/floridacert](https://bit.ly/floridacert)

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RACKING DATASHEET

PV-13



Knockout Tile

Tech Brief

A Breakthrough Tile Solution

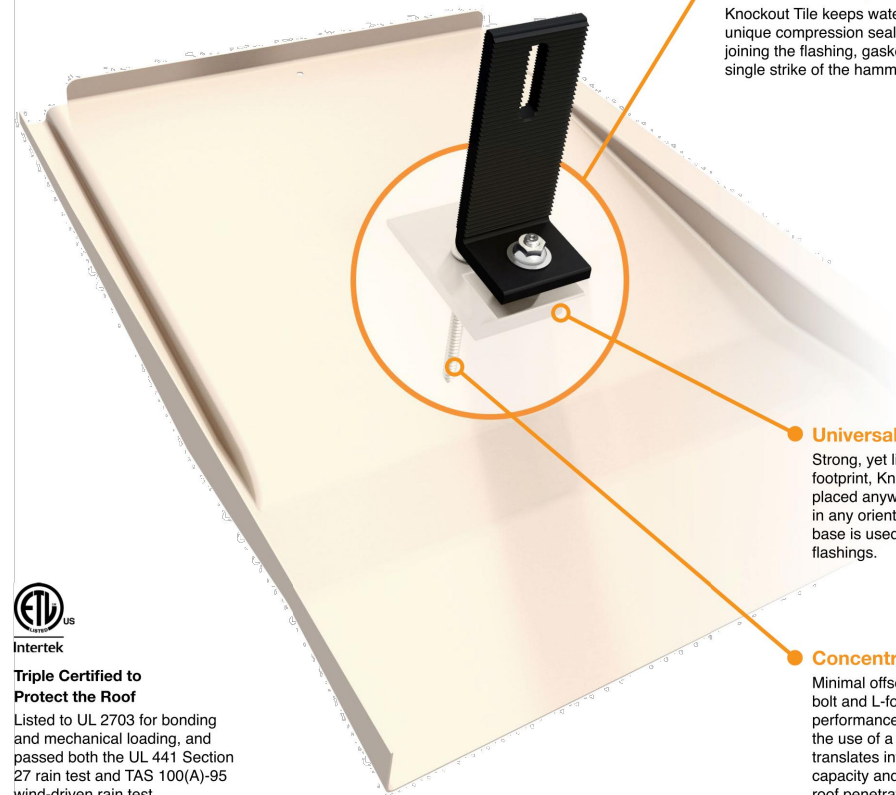
Solar installs on tile roofs can be messy and complicated. These jobs often require tile grinding to ensure fit, a struggle to align mounting components, and extensive searches to find the replacements for broken tiles.

Knockout Tile is the solution. The replacement mount rapidly and reliably integrates into the existing roof system. With the strike of a hammer, you create a solid stack of high-performance, form-fitting components which fully encases the waterproof seal. The result? Unprecedented speed and flexibility during installation.



Form-Fit Waterproofing

Knockout Tile keeps water down and out with its unique compression seal technology formed by joining the flashing, gasket, and L-foot through a single strike of the hammer.



Universal Base

Strong, yet light with a compact footprint, Knockout Tile base can be placed anywhere along the rafter in any orientation. The universal base is used with Flat, S, and W flashings.

Concentric Loading

Minimal offset between the lag bolt and L-foot improves structural performance, and makes possible the use of a single lag. That translates into a 40% higher loading capacity and half the number of roof penetrations.



Intertek

Triple Certified to Protect the Roof

Listed to UL 2703 for bonding and mechanical loading, and passed both the UL 441 Section 27 rain test and TAS 100(A)-95 wind-driven rain test.

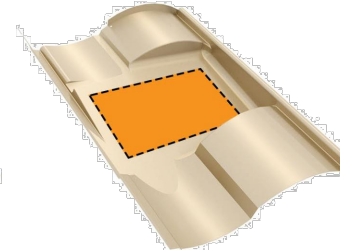
No Struggling to Align Components

Tech Brief

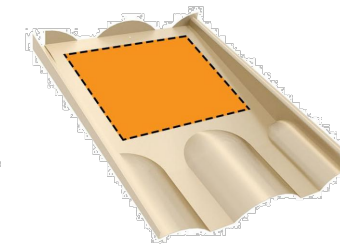
Punch through the flashing anywhere in these zones.



Flat Tile

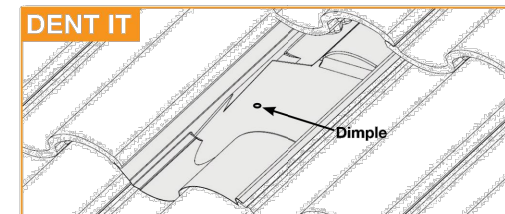


S-Tile



W-Tile

DENT IT



Deliver a Knockout in Record Time

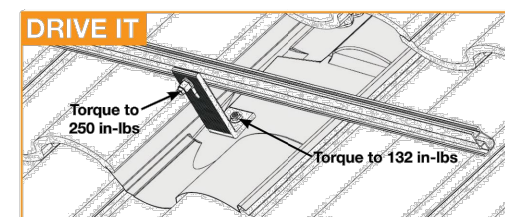
Remove the tile and mark the rafter. Use the base as guide to drill 1/4" pilot hole and fill with roofing manufacturer's approved sealant.

STRIKE IT



Insert the lag bolt with bonded washer through the base into the pilot hole. The base can be installed parallel or perpendicular to the rafter.

DRIVE IT



Place the L-Foot over the top of the dent and strike with the hammer to punch the threaded post through the flashing.

Once the L-Foot is positioned, torque the hardware to 132 in-lbs and attach the rail to either side of the L-Foot and torque hardware to 250 in-lbs.

25-Year Warranty

When using Knockout Tile with XR Rail, the entire assembly is covered by IronRidge's 25-year warranty. To learn more about IronRidge's product warranty, visit the IronRidge website at www.ironridge.com.

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PERMIT DEVELOPER

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DESIGNER	OVC
REVIEWER	

ATTACHMENT DATASHEET

PV-14

PG500

UTILITY PAPER MASKING TAPE

DESCRIPTION

An economical beige, smooth crepe paper masking tape with a pressure-sensitive synthetic rubber adhesive.

PRODUCT APPLICATION

Can be used for a variety of non-critical tape applications such as hanging paper, poly and poster board.



100 Paramount Drive, Suite 300 | Sarasota, FL 34232 | USA
Customer Service: 800.IPG.8273 | 800.474.8273
Tape Technical Service: 877.447.4832
www.itape.com | info@itape.com

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EFFECTIVE: 12/11

INTERTAPE POLYMER GROUP® TECHNICAL DATA SHEET

NOMINAL VALUES

The following data are nominal values based on PSTC, ASTM and other standard tests. The data should not be considered as specifications.

Backing	Smooth Crepe Paper
Adhesive	Synthetic Rubber/Resin
Adhesion to Steel (oz/in of width) PSTC-101	48 (13 N/25mm)
Tensile Strength (lbs/in of width) PSTC-131	21 (92 N/25mm)
Elongation (% at break) PSTC-131	7.5
Total Thickness (mils) PSTC-133	5.0 (0.127mm)
Quick Stick (oz/in of width) PSTC-5	
To Kraft	5 (1.4 N/25mm)
To Steel	16 (4.4 N/25mm)
Color	Beige



BLAISE, JEANS

412 SW BAOY AVENUE PORT
SAINT LUCIE, FL 34953, USA

SIGNATURE WITH SEAL

REVIEWS		DATE				
		DESCRIPTION				
REV	ENGG					

PERMIT DEVELOPER

DATE	02/05/2021
DESIGNER	OVC
REVIEWER	

SEALANT DATASHEET

PV-15



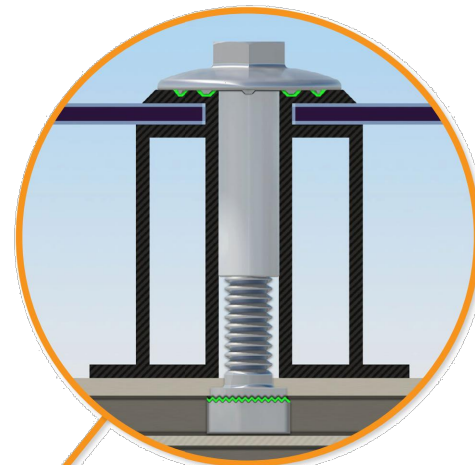
UFO Family of Components

Tech Brief

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.

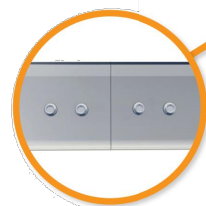
UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



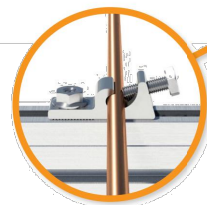
Universal Fastening Object (UFO)
The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.



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



Bonded Splice
Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.

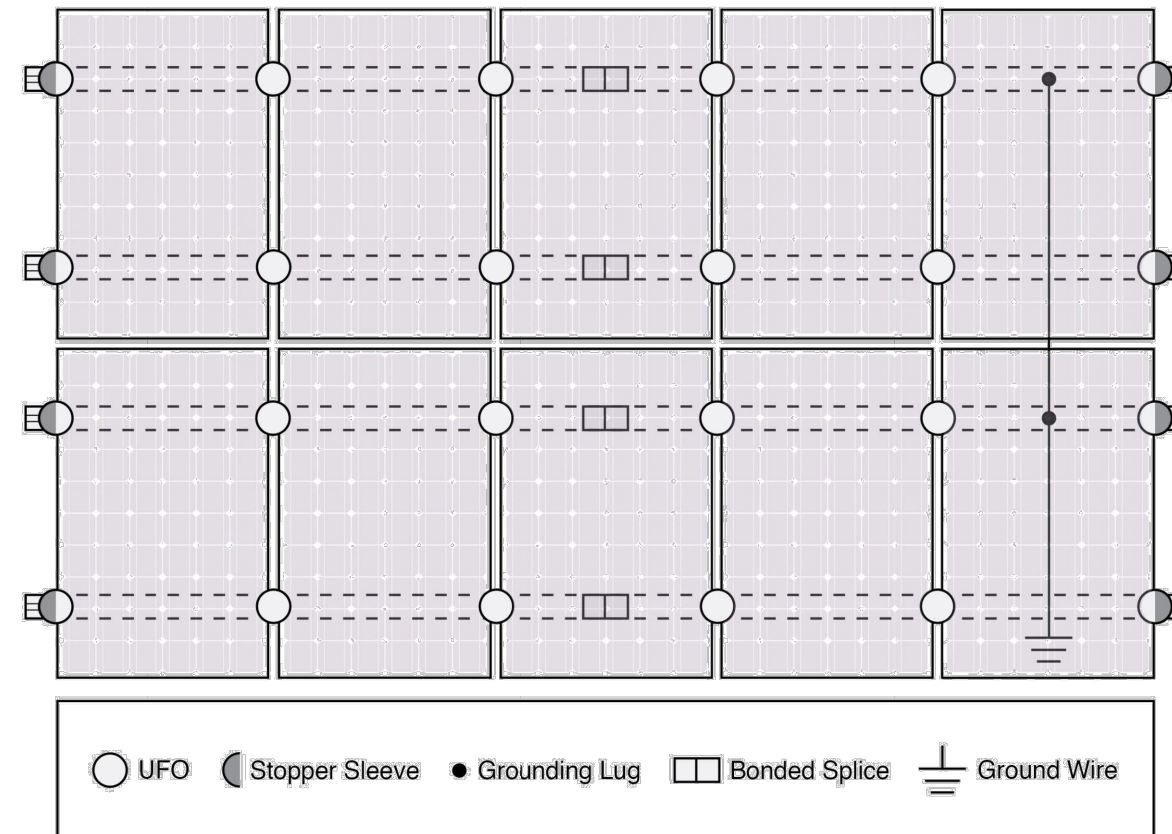


Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



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.

System Diagram



⚡ Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment 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](https://www.ironridge.com/UFO)

Cross-System Compatibility

Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✓	✓	XR1000 Only
UFO/Stopper	✓	✓	✓
Bonded Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
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.		



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REVIEWER	

GROUNDING & BONDING
DATASHEET

PV-16