

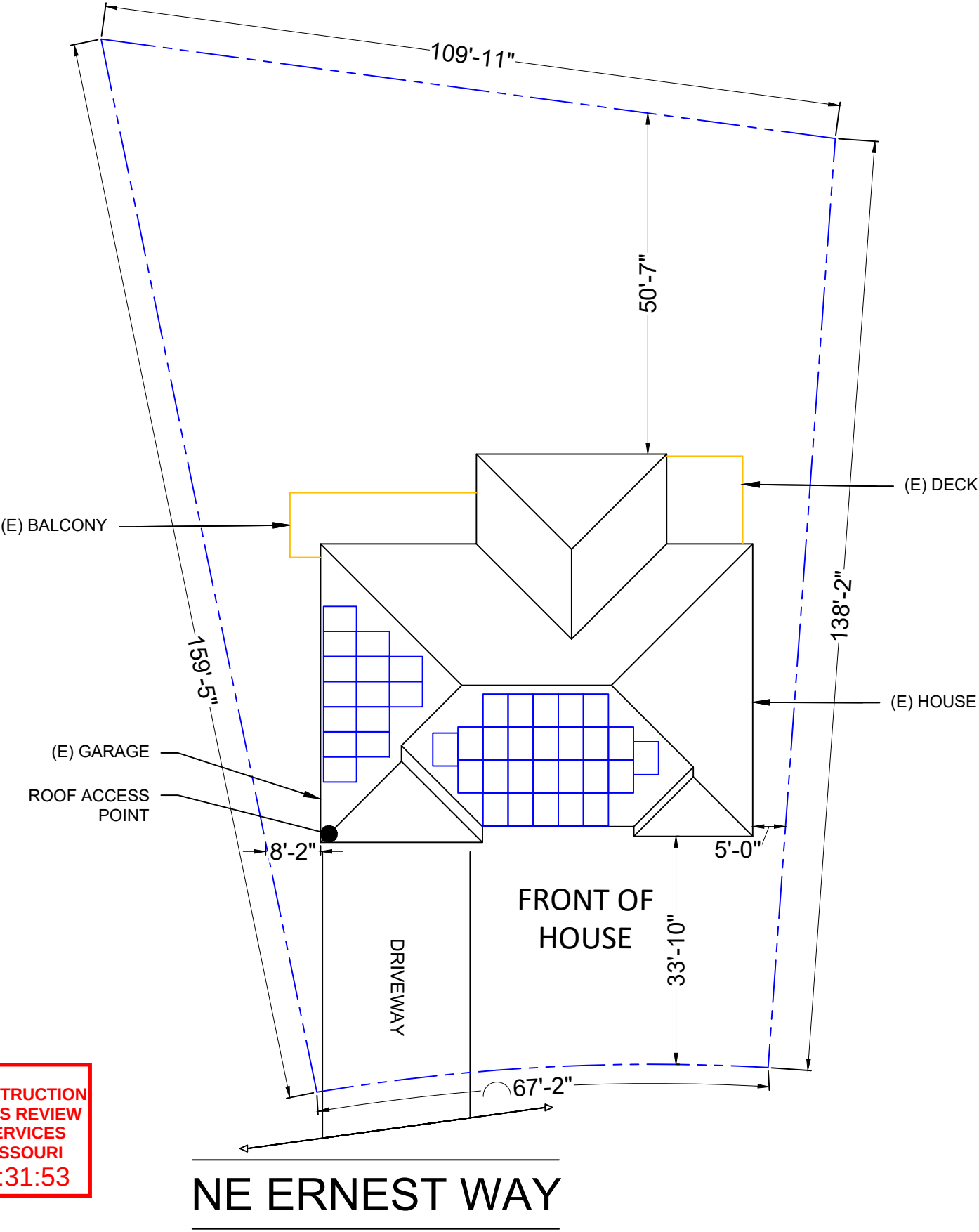
NEW PHOTOVOLTAIC ROOF MOUNTED SYSTEM - 17.000 KW DC/11.600 KW AC
1408 NE ERNEST WAY, LEE'S SUMMIT, MO 64086

NEW PV SYSTEM SPECIFICATIONS
SYSTEM SIZE: DC SIZE: 17.000 KW DC-(STC)
AC SIZE: 11.600 KW AC
MODULE: (40) JINKO JKM425N-54HL4-B [425W]
INVERTER: (40) ENPHASE IQ8PLUS-72-2-US [240V]

DESIGN CRITERIA
ROOF SURFACE TYPE: ASPHALT SHINGLES
ROOF FRAMING: 2"x4" TRUSS @ 24" OC
BUILDING STORY: ONE STORY
GROUND SNOW LOAD: 30 PSF
WIND SPEED: 115 MPH
WIND EXPOSURE: B
RISK CATEGORY: II

APPLICABLE CODES
2018 INTERNATIONAL BUILDING CODE
2018 INTERNATIONAL FIRE CODE
2018 INTERNATIONAL RESIDENTIAL CODE
2017 NATIONAL ELECTRICAL CODE
AS ADOPTED BY CITY OF LEE'S SUMMIT

PROJECT NOTES
1.1.1 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE RELEVANT YEAR OF THE NATIONAL ELECTRIC CODE (NEC), ALL MANUFACTURER'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.2 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND THE PV SYSTEM MUST BE INSPECTED PRIOR TO OPERATION
1.1.3 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC AND OTHER GOVERNING CODES
1.1.4 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.



SHEET INDEX

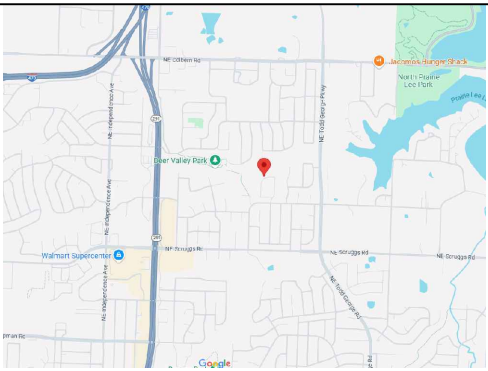
PV-01	COVER PAGE
PV-02	SITE PLAN
PV-03	ATTACHMENT PLAN
PV-3.1	ATTACHMENT DETAILS
PV-04	ELECTRICAL DIAGRAM
PV-05	NOTES
PV-06	WARNING LABELS
PV-07	INSTALLATION RESOURCE
EQUIPMENT DATASHEETS ATTACHED	

LEGEND

	- PROPERTY LINE
	- FENCE LINE

SCOPE OF WORK
1.2.1 CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM. THE CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTION OF EXISTING ONSITE CONDITIONS TO DESIGN, SPECIFY, AND INSTALL THE ROOF-MOUNTED PHOTOVOLTAIC SYSTEM DETAILED IN THIS DOCUMENT

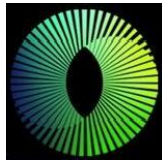
VICINITY MAP



SATELLITE MAP



CONTRACTOR



NATURAL ENERGY SOLUTIONS

501 SW B ST, BENTONVILLE,
AR 72712

PHONE - (479) 273-0123
LIC. NO. - 427310323

PROJECT NAME & ADDRESS

LAUREN MEDLIN

1408 NE ERNEST WAY,
LEE'S SUMMIT, MO 64086

APN #: 52720280600000000
AHJ: CITY OF LEE'S SUMMIT
UTILITY: EVERGY ELECTRIC

SYSTEM DETAILS

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AC SIZE: 11.600 KW AC
(40) JINKO JKM425N-54HL4-B [425W]
(40) ENPHASE IQ8PLUS-72-2-US [240V]

REVISIONS

REV	DESCRIPTION	DATE

SHEET TITLE

COVER PAGE

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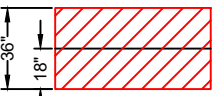
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- NOTES:**
- ROOF ACCESS POINT SHALL NOT BE LOCATED IN AREAS THAT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.
 - STRUCTURES, PATIO COVERS, AND/OR ADDITIONS BUILT WITHOUT PERMITS TO BE RESOLVED BY A SEPARATE PERMIT.

PLAN VIEW TOTAL ROOF AREA: 3145 FT²
TOTAL PV ARRAY AREA: 840.78 FT²
TOTAL % OF ROOF COVERED BY PV: 26.73%

LEGEND

-  FIRE SETBACKS
-  = MECHANICAL VENT
-  = FLUE / PLUMBING VENT
- 1 MICROINVERTER (1 PER MODULE)
- 2 (40) JINKO JKM425N-54HL4-B [425W] MODULES WITH ENPHASE IQ8PLUS-72-2-US [240V] UNDER EACH MODULE
- 3 (N) JUNCTION BOX (NEMA 3R)
- 4 CONDUIT RUN; SURFACE MOUNTED (ACTUAL CONDUIT RUNS TO BE DETERMINED IN FIELD)
- 5 (E) UTILITY METER-MAIN (UNDERGROUND SERVICE) METER #: 25 016 313
- 6 (E) MAIN DISTRIBUTION PANEL (INSIDE HOUSE)
- 7 AC DISCONNECT AND PV PRODUCTION METER
- 8 (N) ENPHASE IQ COMBINER BOX 4
- 9 (N) CONNECT DER METER COLLAR

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SITE PLAN

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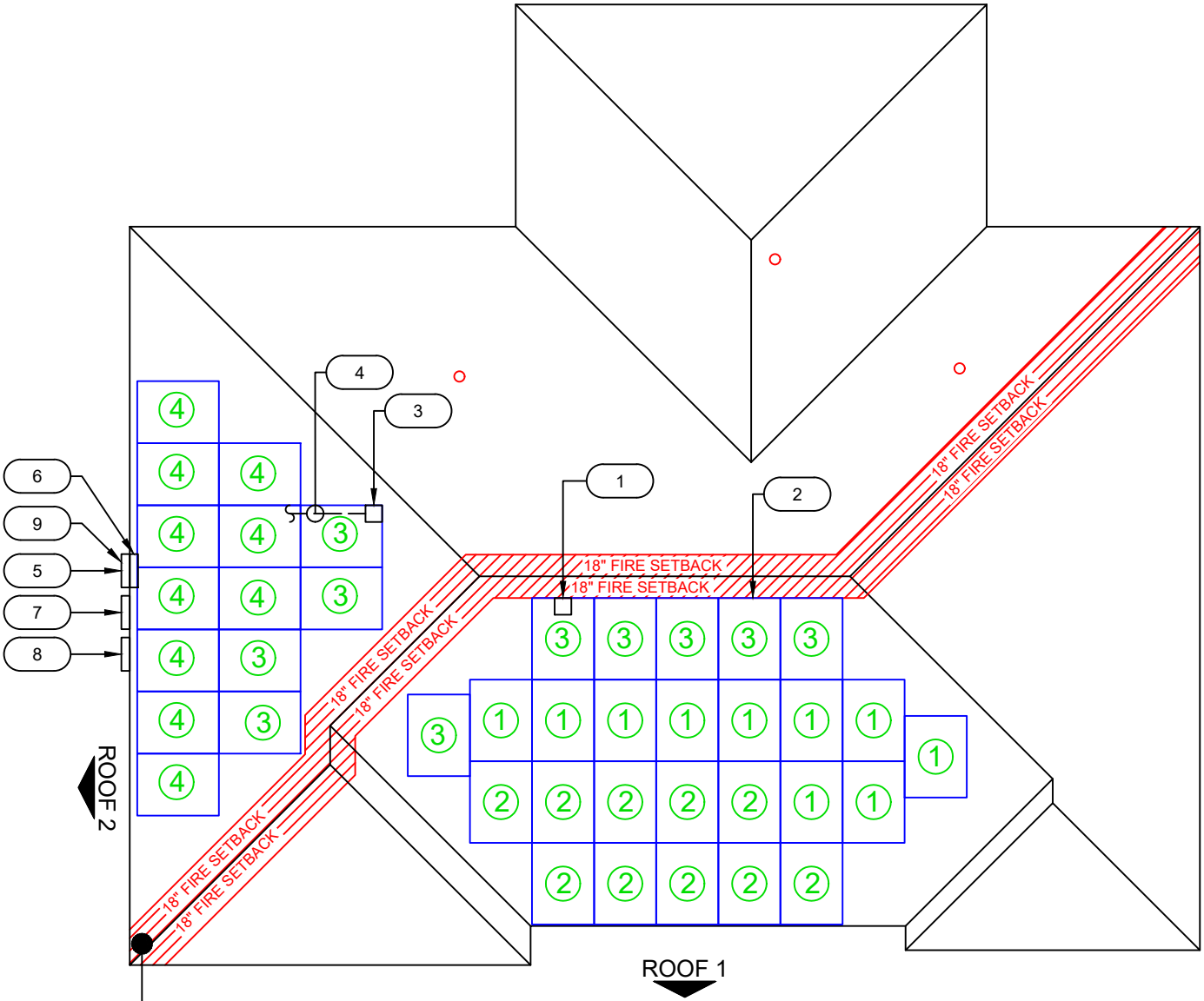
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DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI

PV-02

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BACK OF HOUSE



ROOF 1

ROOF 2

ROOF ACCESS
POINT

FRONT OF HOUSE

NE ERNEST WAY



1

SITE PLAN

SCALE:1"-10'-0"

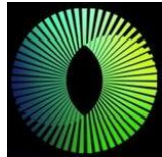
DISTRIBUTED LOAD CALCULATIONS	
MODULE	JINKO JKM425N-54HL4-B [425W]
MODULE WEIGHT	46.3 LBS
MODULE DIMENSIONS (L" x W")	67.79" x 44.65"
TOTAL QTY. OF MODULES	40
TOTAL WEIGHT OF MODULES	1852.00 LBS
TYPE OF RACKING	PEGASUS SKIP RAIL
TYPE OF ATTACHMENT	PEGASUS INSTAFLASH
DISTRIBUTED WEIGHT OF RACKING	0.5 PSF
TOTAL WEIGHT OF ARRAY	2272.39 LBS
AREA OF MODULE	21.02 SQFT.
TOTAL ARRAY AREA	840.78 SQFT.
DISTRIBUTED LOAD	2.70 PSF

- NOTE:**
- CONTRACTOR/INSTALLER TO VERIFY COMPATIBILITY OF ANY BRANDS OR PRODUCTS SUBSTITUTED OR USED AS ALTERNATES WITHIN ANY BRAND-SPECIFIC SYSTEMS. CONTRACTOR SHALL SUPPLY AND PRESENT CERTIFICATES OF COMPATIBILITY TO THE BUILDING OFFICIAL UPON INSPECTION AS NEEDED.
 - REFER TO PV MODULE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR RAIL SPACING SPECIFICATIONS

LEGEND	
	- ATTACHMENT POINTS
	- RAIL
	- STRUCTURAL MEMBER

ROOF 1 	SLOPE	- 30°
	AZIMUTH	- 154°
	MODULE QTY	- 26
	TRUSS	- 2"X4" @ 24" O.C.
ROOF 2 	SURFACE TYPE	- ASPHALT SHINGLES
	SLOPE	- 30°
	AZIMUTH	- 244°
	MODULE QTY	- 14
	TRUSS	- 2"X4" @ 24" O.C.
	SURFACE TYPE	- ASPHALT SHINGLES

CONTRACTOR



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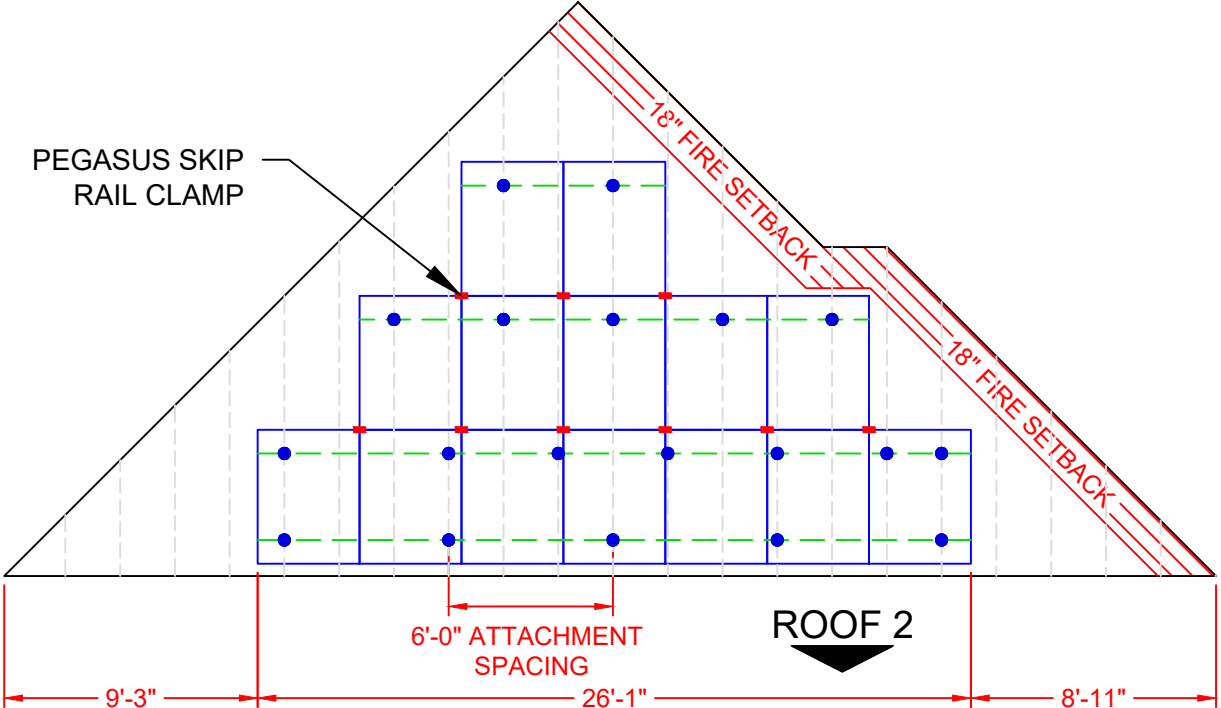
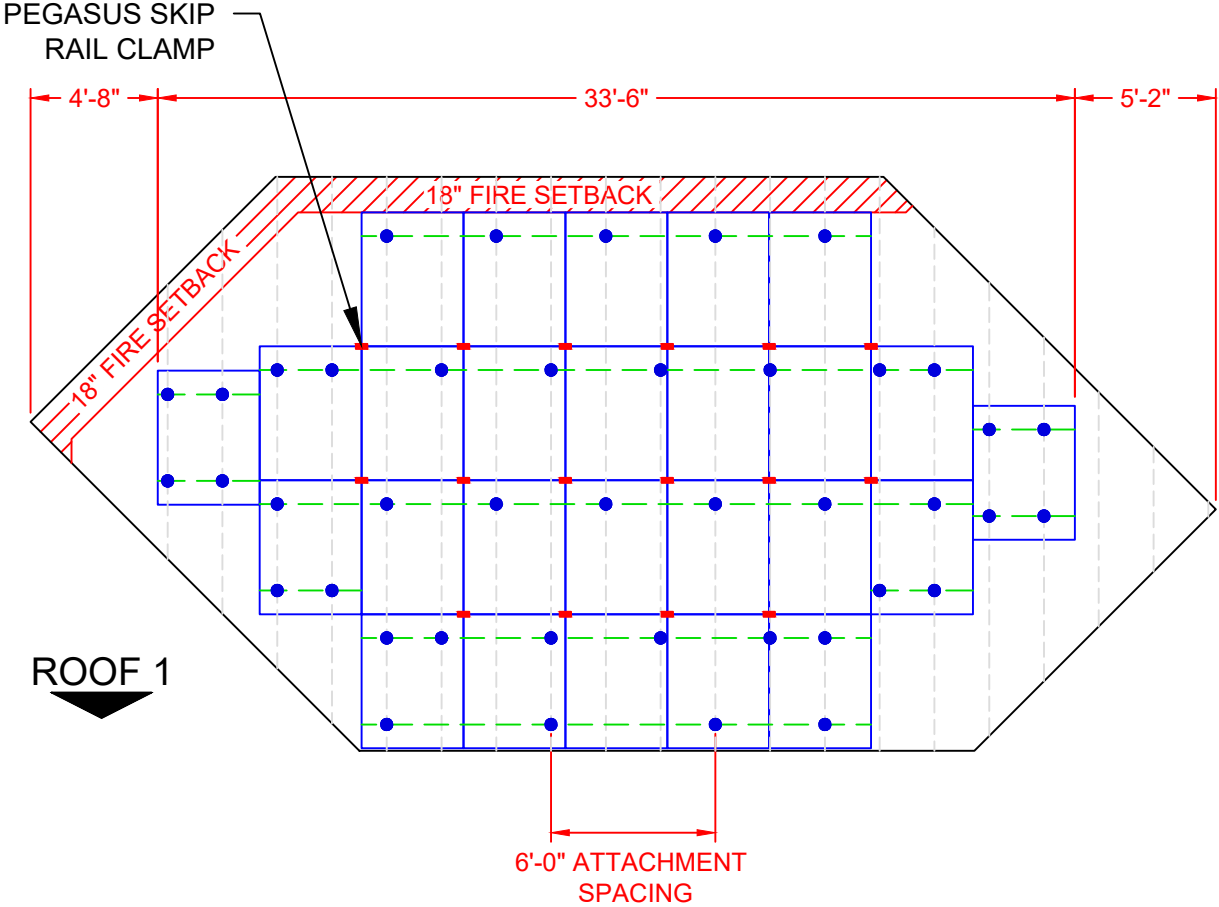
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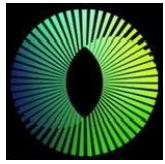
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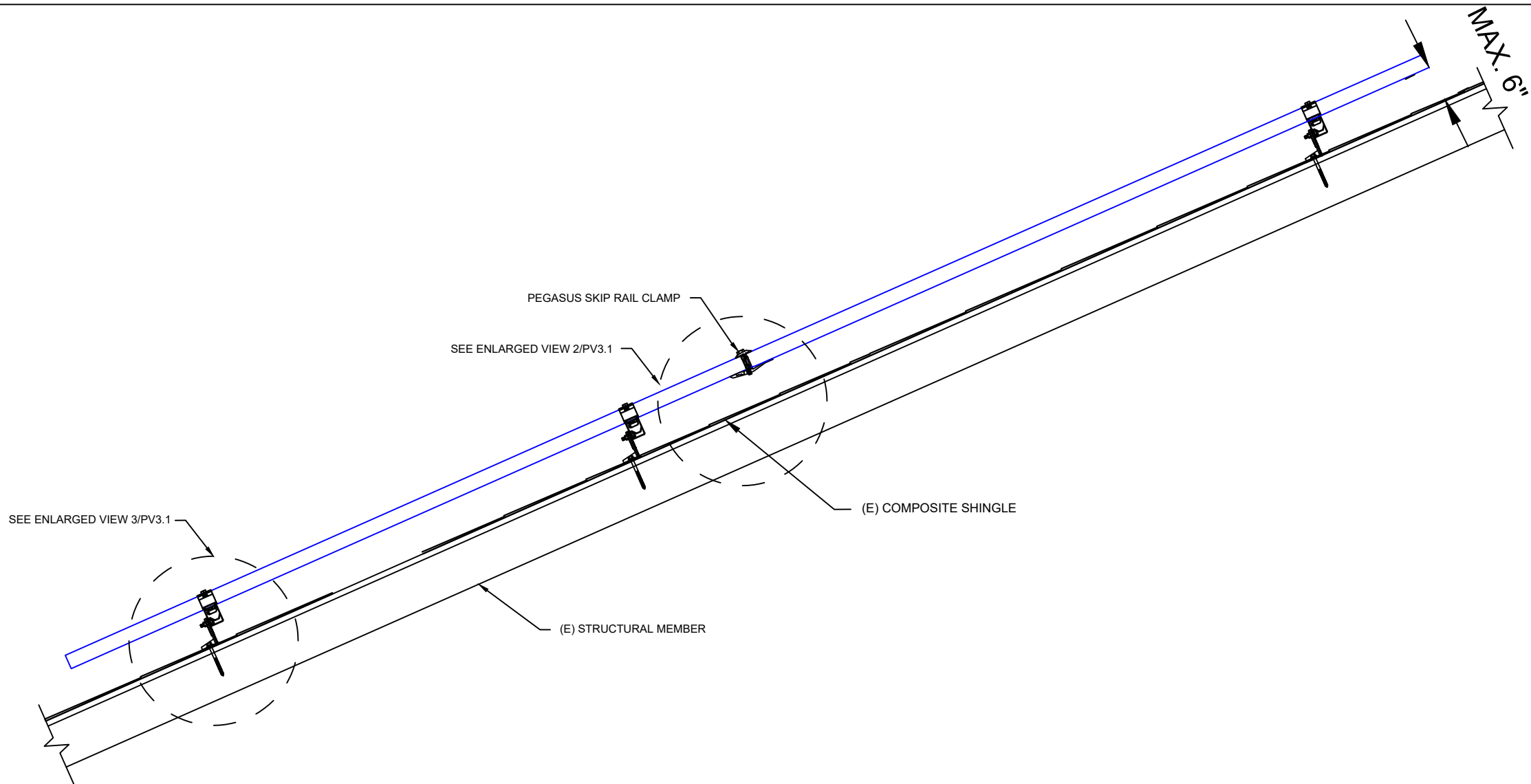
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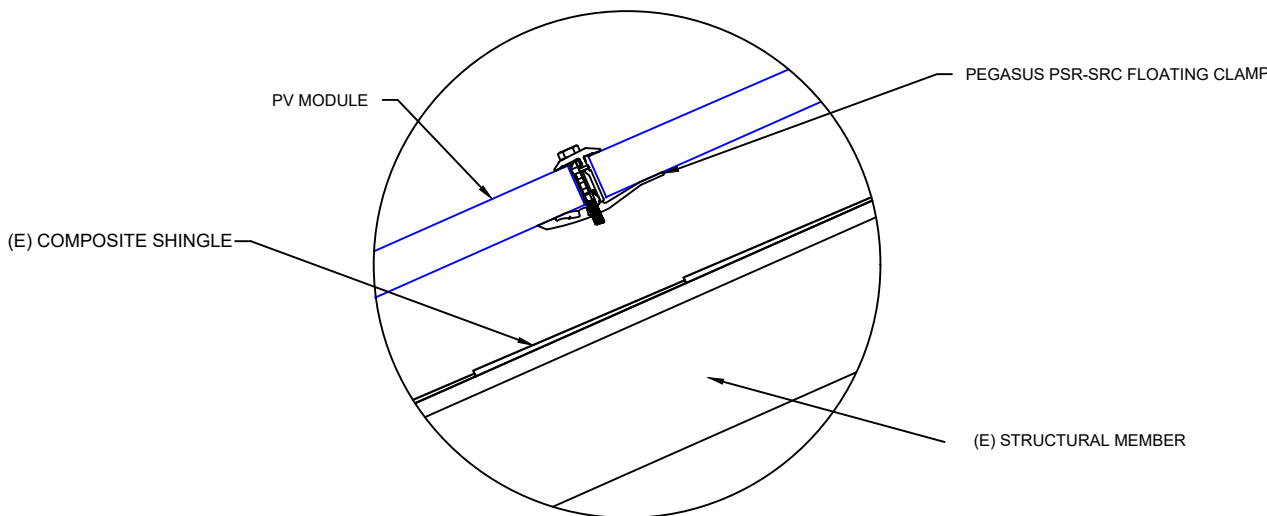


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ATTACHMENT DETAIL

PV-03.1

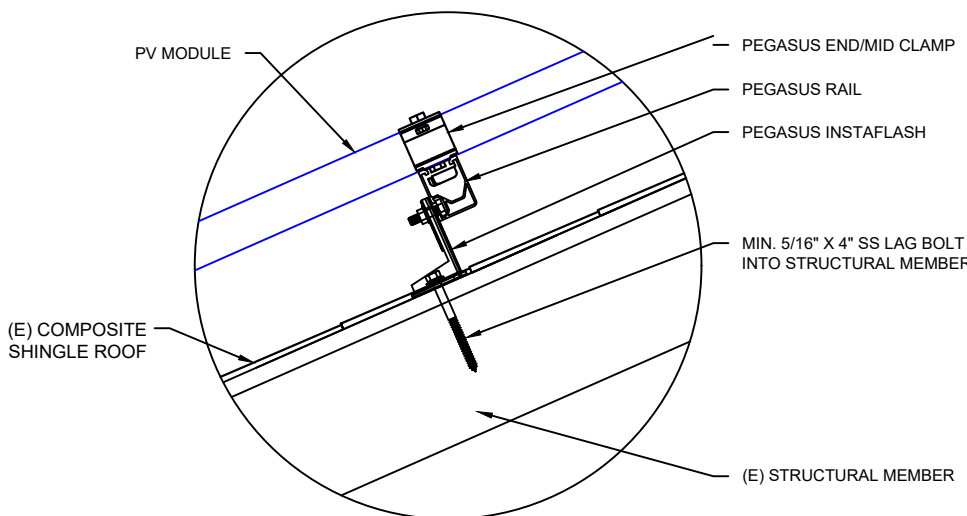
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2

ENLARGED VIEW

PV-03.1



3

ENLARGED VIEW

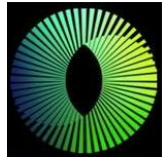
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MICROINVERTER SPECIFICATIONS		SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ8PLUS-72-2-US [240V]	MANUFACTURER / MODEL #	JINKO JKM425N-54HL4-B [425W]
INPUT POWER RANGE	235W-440W	VMP	32.37V
MIN/MAX START VOLTAGE	22V/58V	IMP	13.13A
NOMINAL AC VOLTAGE	240V	VOC	38.95V
MAX CONT. OUTPUT CURRENT	1.21A	ISC	13.58A
MAX CONT. OUTPUT POWER	290W	TEMP. COEFF. VOC	-0.25%/°C
MAX MODULES PER STRING	13 (13 MICROINVERTERS)		

NEW PV SYSTEM SPECIFICATIONS	
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AMBIENT TEMPERATURE SPECIFICATIONS	
RECORD LOW TEMP	-15°C
AMBIENT TEMP (HIGH TEMP 2% AVG.)	34°C
MINIMUM CONDUIT HEIGHT BELOW ROOF SURFACE	18"

CONTRACTOR

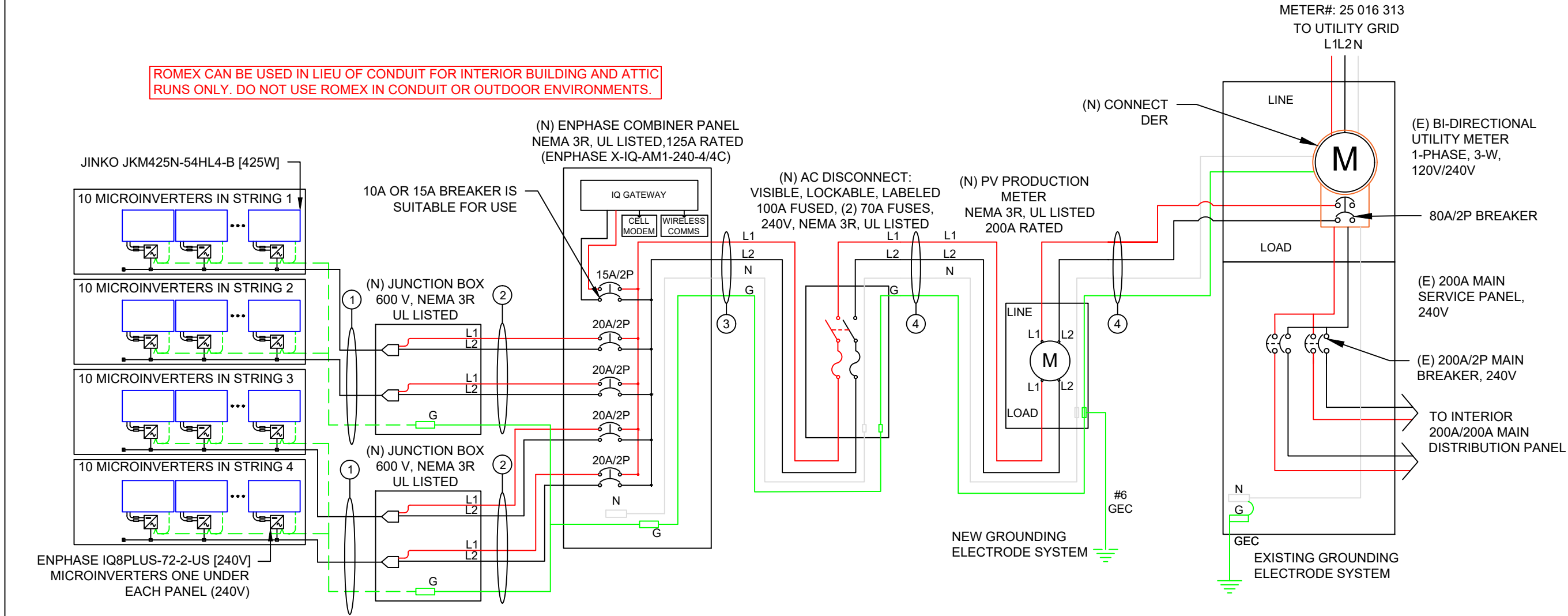


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ROMEX CAN BE USED IN LIEU OF CONDUIT FOR INTERIOR BUILDING AND ATTIC
RUNS ONLY. DO NOT USE ROMEX IN CONDUIT OR OUTDOOR ENVIRONMENTS.



DESCRIPTION					FORMULA					RESULT			
PV OVERCURRENT PROTECTION NEC 690.9(B)					TOTAL INVERTER OUTPUT CURRENT x 1.25 = (40 x 1.21)A x 1.25					60.50A (SELECTED OCPD = 30A)			
WIRE ID	EXPECTED WIRE TEMP (°C)	TEMP DERATE (90 °C)	QTY OF CURRENT CARRYING CONDUCTORS	CONDUIT FILL DERATE	MINIMUM CONDUIT SIZE (TBD ON SITE)	WIRE GAUGE & TYPE	CONDUCTOR AMPACITY @ 90°C (A)	CONDUCTOR AMPACITY @ 75°C (A)	REQUIRED CIRCUIT CONDUCTOR AMPACITY (A)	ADJUSTED CONDUCTOR AMPACITY @ 90 °C (A)	NEUTRAL CONDUCTOR SIZE & TYPE	GROUND WIRE SIZE & TYPE	
1	34	0.96	4/4	1	NM-B ROMEX	#12/4 NM-B ROMEX	30	25	15.13	24.00	NONE	#12 THHN	
2	34	0.96	4/4	1	3/4" EMT	#12 THHN	30	25	15.13	28.80	NONE	#12 THHN	
3	34	0.96	2	1	1" EMT	#4 THHN	95	85	60.50	91.20	#4 THHN	#8 THHN	
4	34	0.96	2	1	1" LFMC	#4 THHN	95	85	60.50	91.20	#4 THHN	#6 THHN	

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ELECTRICAL
DIAGRAM

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GENERAL NOTES

SITE NOTES

- 2.1.1 A LADDER WILL BE IN PLACE FOR INSPECTION IN ACCORDANCE WITH OSHA REGULATIONS.
- 2.1.2 THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
- 2.1.3 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- 2.1.4 PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED IN ACCORDANCE WITH SECTION NEC 110.26.
- 2.1.5 ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.

EQUIPMENT LOCATIONS

- 2.2.1 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS IN ACCORDANCE WITH NEC 110.26.
- 2.2.2 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).
- 2.2.3 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES IN ACCORDANCE WITH NEC 690.34.
- 2.2.4 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
- 2.2.5 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL IN ACCORDANCE WITH NEC APPLICABLE CODES.
- 2.2.6 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

STRUCTURAL NOTES

- 2.3.1 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED IN ACCORDANCE WITH THE CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, IN ACCORDANCE WITH RAIL MANUFACTURER'S INSTALLATION PRACTICES.
- 2.3.2 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.
- 2.3.3 ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.
- 2.3.4 ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER OR PROFESSIONAL ENGINEERING GUIDANCE.
- 2.3.5 WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

WIRING & CONDUIT NOTES

- 2.4.1 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
- 2.4.2 CONDUCTORS SIZED IN ACCORDANCE WITH THE NEC
- 2.4.3 AC CONDUCTORS TO BE COLORED OR MARKED PER NEC
- 2.4.4 LISTED OR LABELED EQUIPMENT SHALL BE INSTALLED AND USED IN ACCORDANCE WITH ANY INSTRUCTIONS INCLUDED IN THE LISTING OR LABELING PER NEC

GROUNDING NOTES

- 2.5.1 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
- 2.5.2 PV EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH NEC 690.43 AND NEC TABLE 250.122.
- 2.5.3 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORDANCE WITH NEC 250.134 AND 250.136(A).
- 2.5.4 EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH NEC 690.45 AND INVERTER MANUFACTURER'S INSTALLATION PRACTICES
- 2.5.5 EACH MODULE WILL BE GROUNDED AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ.
- 2.5.6 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
- 2.5.7 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER PER NEC 250.119
- 2.5.8 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED IN ACCORDANCE WITH NEC 250, NEC 690.47 AND THE AHJ.
- 2.5.9 GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS

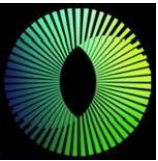
DISCONNECTION AND OVERCURRENT PROTECTION NOTES

- 2.6.1 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).
- 2.6.2 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
- 2.6.3 PV SYSTEM CIRCUITS INSTALLED ON OR IN HABITABLE BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12
- 2.6.4 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
- 2.6.5 INVERTER ON-GRID BRANCHES SHALL BE CONNECTED TO A SINGLE BREAKER OR GROUPED FUSE DISCONNECT(S) IN ACCORDANCE WITH NEC 110.3(B).
- 2.6.6 IF REQUIRED BY THE AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION IN ACCORDANCE WITH NEC 690.11 AND UL1699B.

INTERCONNECTION NOTES

- 2.7.1 LOAD SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH NEC 705.12.
- 2.7.2 THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120 PERCENT OF BUSBAR RATING PER NEC 705.12.
- 2.7.3 THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD IN ACCORDANCE WITH NEC 705.12.
- 2.7.4 AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT PROTECTION DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE MAIN OVERCURRENT PROTECTION DEVICE MAY BE EXCLUDED IN ACCORDANCE WITH NEC 705.12.
- 2.7.5 FEEDER TAP INTERCONNECTION (LOAD SIDE) IN ACCORDANCE WITH NEC 705.12.
- 2.7.6 SUPPLY SIDE TAP INTERCONNECTION IN ACCORDANCE WITH TO NEC 705.12 WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42.
- 2.7.7 BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING PER NEC 705.12.

CONTRACTOR



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⚠️

WARNING

ELECTRICAL SHOCK HAZARD

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

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

⚠️

WARNING

TURN OFF PHOTOVOLTAIC AC
DISCONNECT PRIOR TO
WORKING INSIDE PANEL

LABEL LOCATION: COMBINER PANEL(S), MAIN SERVICE DISCONNECT
PER CODE: NEC 110.27(C), OSHA 1910.145(f)(7)

WARNING: PHOTOVOLTAIC
POWER SOURCE

LABEL LOCATION: DC CONDUIT/RACEWAY/CABLE TRAY
PER CODE: NEC 690.31(G)(3-4)

PHOTOVOLTAIC SYSTEM AC DISCONNECT

RATED AC OUTPUT CURRENT: 48.40 A
NOMINAL OPERATING AC VOLTAGE: 240 V

LABEL LOCATION: POINT OF INTERCONNECTION
PER CODE: NEC 690.54

PV SYSTEM

DISCONNECT

LABEL LOCATION: AC DISCONNECT
PER CODE: NEC 690.13(B)

DO NOT DISCONNECT
UNDER LOAD

LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.15(C) & NEC 690.33(E)(2)

⚠️ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 705.12(B)(3-4), NEC 690.59

⚠️

WARNING

THIS EQUIPMENT FED BY MULTIPLE SOURCES.
TOTAL RATING OF ALL OVERCURRENT DEVICES
EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE
SHALL NOT EXCEED AMPACITY OF BUSBAR.

LABEL LOCATION: POINT OF INTERCONNECTION, COMBINER PANEL
PER CODE: NEC 705.12(B)(2)(3)(c)

⚠️

WARNING

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

LABEL LOCATION: MAIN SERVICE DISCONNECT, POINT
OF INTERCONNECTION
PER CODE: 705.12(B)(2)(3)(b)

MAIN PHOTOVOLTAIC
SYSTEM DISCONNECT

LABEL LOCATION: MAIN SERVICE DISCONNECT, UTILITY METER
PER CODE: NEC 690.13(B)

RAPID SHUTDOWN FOR
SOLAR PV SYSTEM

LABEL LOCATION: RSD INITIATION DEVICE, AC DISCONNECT
PER CODE: NEC 690.56(C)(3)

SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

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

SOLAR ELECTRIC
PV PANELS

LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.56(C)(1)(a)

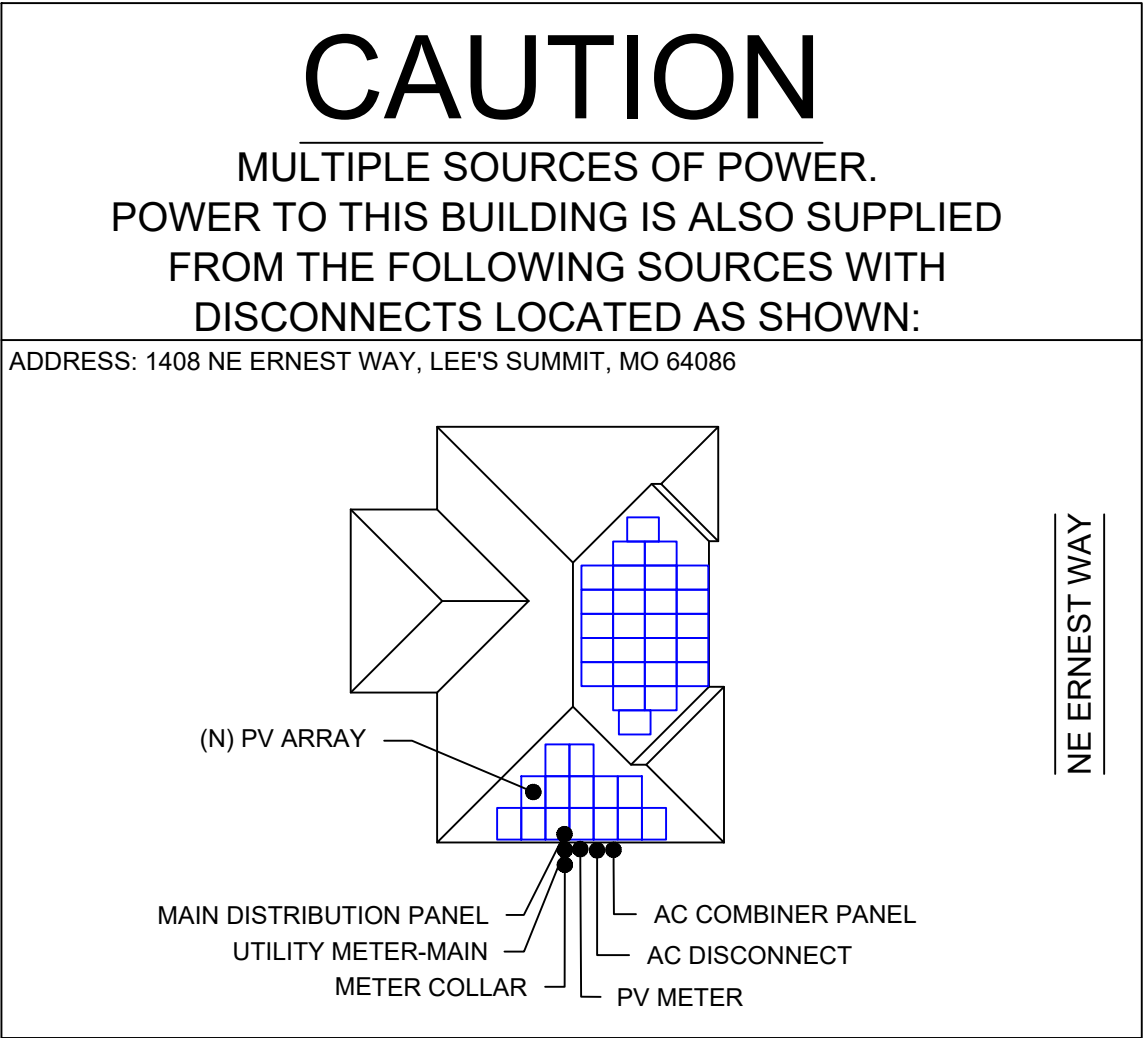
⚠️ CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

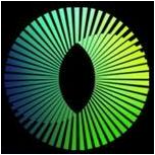
LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.13(F), NEC 705.12(B)(3-4), NEC 690.59

PV METER

LABEL LOCATION: PV METER



CONTRACTOR



NATURAL ENERGY SOLUTIONS

501 SW B ST, BENTONVILLE,
AR 72712

PHONE - (479) 273-0123
LIC. NO. - 427310323

PROJECT NAME & ADDRESS

LAUREN MEDLIN

1408 NE ERNEST WAY,
LEE'S SUMMIT, MO 64086

APN #: 52720280600000000
AHJ: CITY OF LEE'S SUMMIT
UTILITY: EVERGY ELECTRIC

SYSTEM DETAILS

DC SIZE: 17.000 KW DC-(STC)
AC SIZE: 11.600 KW AC
(40) JINKO JKM425N-54HL4-B [425W]
(40) ENPHASE IQ8PLUS-72-2-US [240V]

REVISIONS		
REV	DESCRIPTION	DATE

SHEET TITLE

WARNING LABELS

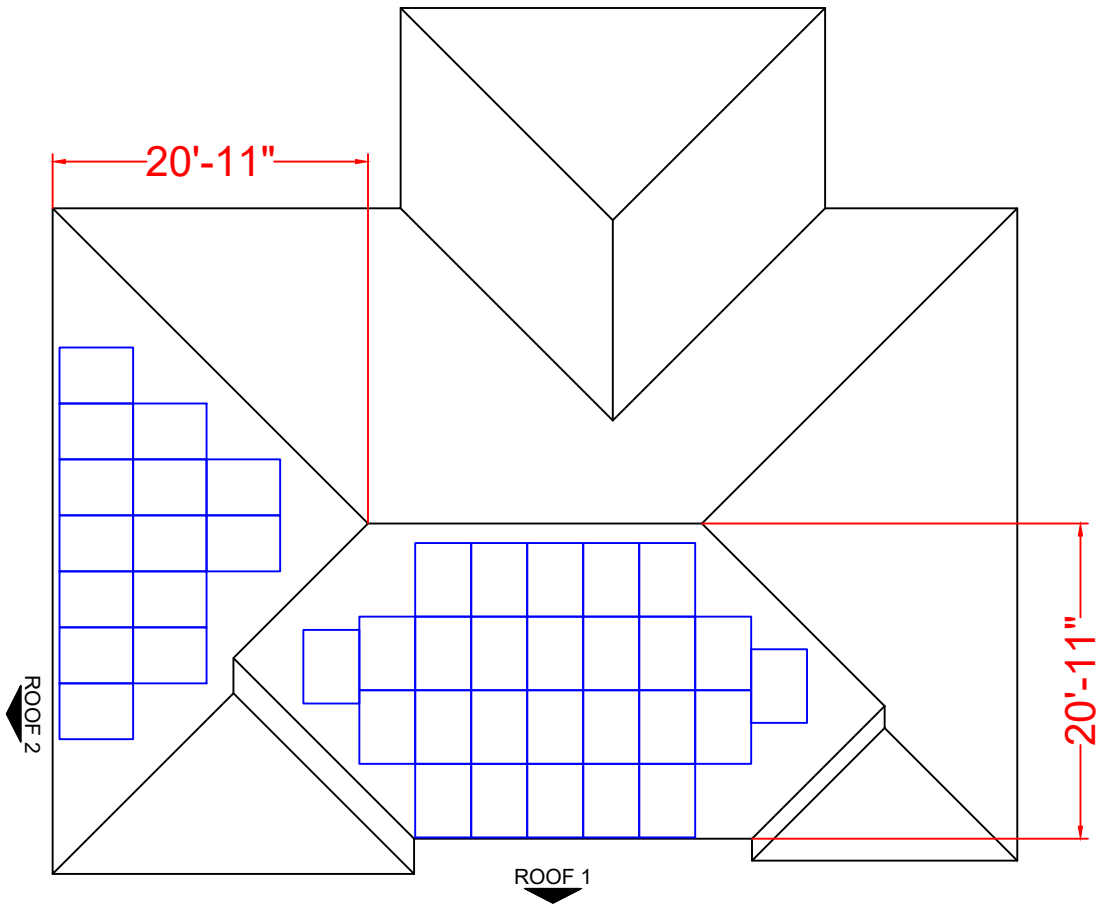
DRAWN DATE	6/5/2025
DRAWN BY	ND

SHEET NUMBER

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
PV-06
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	A	B	C	D	E	F
1						
2						
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10						

REFERENCE ONLY



**DIMENSIONS ARE 2D (FLAT)

CONTRACTOR



NATURAL ENERGY SOLUTIONS

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REVISIONS

REV	DESCRIPTION	DATE

SHEET TITLE
INSTALLATION
RESOURCE

DRAWN DATE	6/5/2025
DRAWN BY	ND

SHEET NUMBER

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DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI

PV-07

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THE MOST DEPENDABLE SOLAR PRODUCT

EAGLE® 54 66R

420-440 WATT • N-TYPE TOPCON

Positive power tolerance of 0~+3%

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Top performance in the strictest 3rd party labs
- Automated manufacturing utilizing artificial intelligence
- Vertically integrated, tight controls on quality
- Premium solar factories in USA, Vietnam, and Malaysia

KEY FEATURES

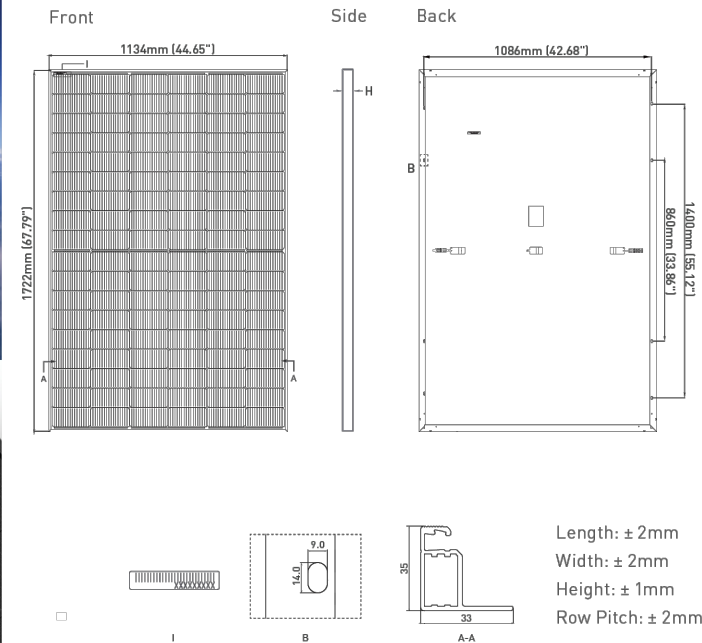
- Superior Aesthetics**
Black backsheet and black frame create ideal look for residential applications.
- N-Type Technology**
N-type cells with Jinko's in-house TOPCon technology offers better performance and improved reliability.
- Thick and Tough**
Fire Type 1 rated module engineered with a thick frame, 3.2mm front side glass, and thick backsheet for added durability.
- Shade Tolerant**
Twin array design allows continued 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.
- Warranty**
25-year product and 30-year linear power warranty.

- ISO9001:2015 Quality Standards
- ISO14001:2015 Environmental Standards
- IEC61215, IEC61730 certified products
- ISO45001:2018 Occupational Health & Safety Standards
- UL61730 certified products

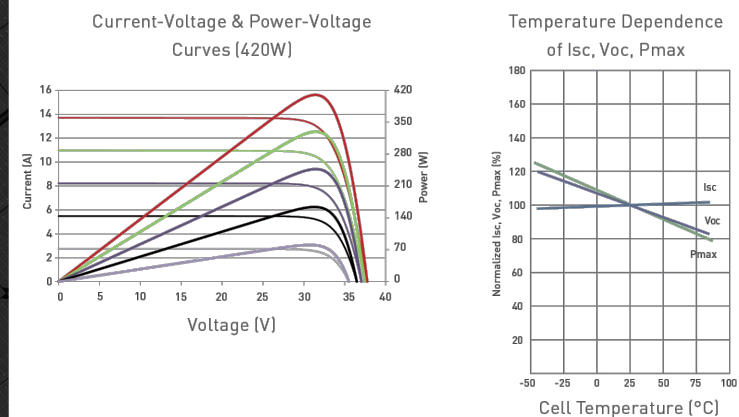


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ENGINEERING DRAWINGS



ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



ELECTRICAL CHARACTERISTICS

Module Type	JKM420N-54HL4-B		JKM425N-54HL4-B		JKM430N-54HL4-B		JKM435N-54HL4-B		JKM440N-54HL4-B	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	420Wp	316Wp	425Wp	320Wp	430Wp	323Wp	435Wp	327Wp	440Wp	331Wp
Maximum Power Voltage (Vmp)	32.16V	29.95V	32.37V	30.19V	32.58V	30.30V	32.78V	30.50V	32.99V	30.73V
Maximum Power Current (Imp)	13.06A	10.55A	13.13A	10.60A	13.20A	10.66A	13.27A	10.72A	13.34A	10.77A
Open-circuit Voltage (Voc)	38.74V	36.80V	38.95V	37.00V	39.16V	37.20V	39.36V	37.39V	39.57V	37.59V
Short-circuit Current (Isc)	13.51A	10.91A	13.58A	10.96A	13.65A	11.02A	13.72A	11.08A	13.80A	11.14A
Module Efficiency STC (%)	21.51%		21.76%		22.02%		22.28%		22.53%	

*STC: ☀ Irradiance 1000W/m²
NOCT: ☀ Irradiance 800W/m²

🌡 Cell Temperature 25°C
🌡 Ambient Temperature 20°C

☁ AM = 1.5
☁ 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. JKM400-420N-54HL4-B-F4-US

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MECHANICAL CHARACTERISTICS

No. of Half Cells	108 (2 x 54)
Dimensions	1722 × 1134 × 35mm (67.79 × 44.65 × 1.38 inch)
Weight	21.0kg (46.3lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68 Rated
Output Cables	12 AWG, 1400mm (55.12in) or Customized Length
Connector	Staubli MC4
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)*

*see Supplemental Installation Manual for higher wind pressure rating solutions

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.29%/°C
Temperature Coefficients of Voc	-0.25%/°C
Temperature Coefficients of Isc	0.045%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1000VDC
Maximum Series Fuse Rating	25A

PACKAGING CONFIGURATION

(Two pallets = One stack)
31pcs/pallets, 62pcs/stack, 806pcs/40 HQ Container

WARRANTY

25-year product and 30-year linear power warranty
1st year degradation not to exceed 1%, each subsequent year not to exceed 0.4%, minimum power at year 30 is 87.4% or greater.

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Jinko Solar
DEVELOPMENT SERVICES
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IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters^{1,2,3} are the industry's first microgrid-forming⁴, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently.



Key specifications	IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	245 VA	300 VA
Nominal grid voltage (L-L)	240 V, split-phase (L-L), 180°	
Nominal frequency	60 Hz	60 Hz
CEC weighted efficiency	97%	97%
Maximum input DC voltage	50 V	60 V
MPPT voltage range	27–37 V	27–45 V
Maximum module I_{sc}	20 A	20 A
Ambient temperature range	–40°C to 60°C (–40°F to 140°F)	

Simple

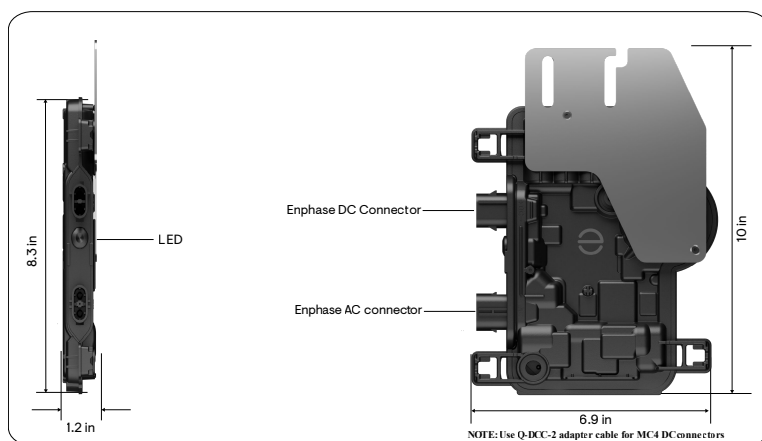
- Lightweight and compact with plug-and-play connectors
- Power line communication (PLC) between components
- Faster installation with simple two-wire cabling

Reliable

- Produce power even when the grid is down⁴
- More than one million cumulative hours of testing
- Industry-leading limited warranty of up to 25 years
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Compliant with the latest advanced grid support⁵
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3rd Ed.)



¹ IQ8 Series Microinverters can be added to existing IQ7 systems on the same IQ Gateway only in the following grid-tied configurations: Solar Only or Solar + Battery (IQ Battery 3T/10T and IQ Battery 5P) without backup.

² IQ7 Series Microinverters cannot be added to a site with existing IQ8 Series Microinverters on the same gateway. Mixed system of IQ7 and IQ8 will not support IQ8-specific PCS features and grid-forming capabilities.

³ IQ Microinverters ship with default settings that meet North America's IEEE 1547 interconnection standard requirements. Region-specific adjustments may be requested by an Authority Having Jurisdiction (AHJ) or utility representative, according to the IEEE 1547 interconnection standard. Use an IQ Gateway to make these changes during installation.

⁴ Meets UL 1741 only when installed with IQ System Controller 2 or 3.

⁵ IQ8 and IQ8+ support split-phase, 240 V installations only.

Input data (DC)	Units	IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ⁶	W	235–350	235–440
Module compatibility	—	To meet compatibility, PV modules must be within maximum input DC voltage and maximum module I_{sc} . Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator .	
MPPT voltage range	V	27–37	27–45
Operating range	V	16–48	16–58
Minimum/Maximum start voltage	V	22/48	22/58
Maximum input DC voltage	V	50	60
Maximum continuous input DC current	A	10	12
Maximum input DC short-circuit current	A	25	
Maximum module I_{sc}	A	20	
Overvoltage class DC port	—	II	
DC port backfeed current	mA	0	
PV array configuration	—	Ungrounded array; no additional DC side protection required; AC side protection requires a maximum 20 A per branch circuit.	
Output data (AC)	Units	IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Maximum continuous output power	VA	240	290
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	
Minimum and Maximum grid voltage ⁷	V	211–264	
Maximum continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short-circuit fault current over three cycles	Arms	2	
Maximum units per 20 A (L-L) branch circuit ⁸	—	16	13
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	%	97.7	
CEC weighted efficiency	%	97	
Nighttime power consumption	mW	23	25
Mechanical data		IQ8-60-2-US	IQ8PLUS-72-2-US
Ambient temperature range		–40°C to 60°C (–40°F to 140°F)	

⁶ No enforced DC/AC ratio.

⁷ Nominal voltage range can be extended beyond nominal if required by the utility.

⁸ Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

Mechanical data	IQ8-60-2-US	IQ8PLUS-72-2-US
Relative humidity range	4% to 100% (condensing)	
DC connector type	MC4	
Dimensions (H × W × D)	212 mm (8.3 in) × 175 mm (6.9 in) × 30.2 mm (1.2 in)	
Weight	1.08 kg (2.38 lb)	
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	
Compliance	IQ8-60-2-US	IQ8PLUS-72-2-US
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3 rd Ed.), 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 shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems, for AC and DC conductors, when installed according to the manufacturer’s instructions.	

Enphase IQ Combiner 4/4C

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



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



To learn more about Enphase offerings, visit enphase.com



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

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Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.



Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste

Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS				
Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable			
Flame test rating	FT4			
Compliance	RoHS, OIL RES I, CE, UV Resistant, combined UL for Canada and United States			
Conductor type	THHN/THWN-2 dry/wet			
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Q CABLE TYPES / ORDERING OPTIONS				
Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200
ENPHASE Q CABLE ACCESSORIES				
Name	Model Number	Description		
Raw Q Cable	Q-12-RAW-300	300 meters of 12 AWG cable with no connectors		
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector		
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector		
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling		
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount		
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling		
Terminator	Q-TERM-10	Terminator cap for unused cable ends		
Enphase EN4 to MC4 adaptor ¹	ECA-EN4-S22	Connect PV module using MC4 connectors to IQ micros with EN4 (TE PV4-S SOLARLOK). 150mm/5.9" to MC4.		
Enphase EN4 non-terminated adaptor ¹	ECA-EN4-FW	For field wiring of UL certified DC connectors. EN4 (TE PV4-S SOLARLOK) to non-terminated cable. 150mm/5.9"		
Enphase EN4 to MC4 adaptor (long) ¹	ECA-EN4-S22-L	Longer adapter cable for EN4 (TE PV4-S SOLARLOK) to MC4. Use with split cell modules or PV modules with short DC cable. 600mm/23.6"		
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)		
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)		

1. Qualified per UL subject 9703.

	TERMINATOR Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)		SEALING CAPS Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)
	DISCONNECT TOOL Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)		CABLE CLIP Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

To learn more about Enphase offerings, visit enphase.com

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2020-06-26

CERTIFICATE OF COMPLIANCE

Certificate Number 20230825-E341165
Report Reference E341165-20210317
Date 2023-09-27

SB

Issued to: Enphase Energy Inc.
1420 N. McDowell Blvd. Petaluma, CA 94954-6515

This is to certify that representative samples of Photovoltaic Grid Support Utility Interactive Inverter with Rapid Shutdown Functionality

Models: IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

Models IQ8HC-72, IQ8AC-72, IQ8MC-72 may be f/b -2, -5, -E or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

Model IQ8X-80 may be f/b -2, -5, -E, or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: See Page 2

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.



Bruce Mahrenholz, Director North American Certification Program

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CERTIFICATE OF COMPLIANCE

Certificate Number 20230825-E341165
Report Reference E341165-20210317
Date 2023-09-27

SB

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.
Standards for Safety:

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements, Standards for Safety:

UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, Edition 3, Issue Date 05/19/2023. Including the requirements in UL 1741 Supplement SA and SB.

IEEE 1547, Interconnection and Interoperability of Distributed Energy Resources (DERs) with Associated Electric Power Systems (EPSs) Interfaces, Issue Date 02/15/2018

IEEE 1547.1, IEEE Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources (DERs) with Electric Power Systems (EPSs) Associated Interfaces, Issue Date 03/05/2020.

CSA C22.2 No. 107.1-16, General Use Power Supplies, Edition 4, Issue Date 06/2016

☒ R21: The evaluation to the Standards above provides evidence of compliance to the intent of the existing California Rule 21 Interconnection (references to the past publication of IEEE 1547 standards) and UL1741 Table SA1.1 option to use the IEEE 1547.1-2020 and UL1741 SB test methods in conjunction with using IEEE 1547-2018 as the SRD under which SA11.2 Normal Ramp Rate is not address. Additional testing was conducted to confirmed compliance to Normal Ramp Rate SA11.2

☐ 14H (SA): The evaluation to the Standards above provides evidence of compliance to HECO Rule 14H, SRD V1.0, Interconnection Application.

☒ 14H (SB): The evaluation to the Standards above provides evidence of compliance to HECO Rule 14H, SRD V2.0, Interconnection Application.



Bruce Mahrenholz, Director North American Certification Program

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SOLAR METER SOCKET ADAPTER

The ConnectDER™ Solar Meter Socket Adapter (MSA) is designed to rapidly connect grid-ready solar PV assets to the home. The adapter is UL-listed, NEC compliant, and a low-cost alternative to traditional installation methods.



SIMPLE PLUG & PLAY INTERCONNECTION FOR RESIDENTIAL SOLAR PV



- Eliminates main panel upgrades (MPU), reduces costs; provides a safe, reliable, and standardized point of interconnection
- Tool-free junction box removal provides easy access to meter socket for inspection and allows for safe removal by emergency personnel
- Junction box is reversible for conduit entry from either side of the MSA
- Ability to interconnect Solar PV without entering the premises or accessing the main panel
- Compatible with most residential meter sockets, including lever and horn bypass
- Integrated overcurrent protection device for Solar PV (80A, 22k AIC maximum)

Available Now!

www.connectder.com

INSIDE A CONNECTDER SOLAR MSA



CIRCUIT BREAKER



TERMINAL BLOCK

Suitable for use as Service Equipment

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SOLAR METER SOCKET ADAPTER



MECHANICAL SPECIFICATIONS		UTILITY INTERACTIVE SOURCE RATINGS	
ENCLOSURE RATING	NEMA 3R	MAXIMUM POWER	15.36 KW AC
ENCLOSURE TYPE	Injection molded polycarbonate, UL 94 V0 flame rating	MAXIMUM VOLTAGE	240V
COOLING	Natural convection	MAXIMUM CONTINUOUS PV CURRENT	64A
DIMENSIONS (H X W X D)	6.7 x 6.7 x 4.6in adapter only 8.6 x 7.0 x 4.6in with junction box	CONTINUOUS COMBINED CURRENT, PV/GRID	200A
WEIGHT	4.1lb (1.9kg)	INVERTER WIRING TERMINATION	Terminal block
MOUNTING SYSTEM	Blade interface with 4-jaw or 5-jaw meter socket	GRID TERMINATION METHOD	Blade interface with meter socket for L1/L2, pigtail for neutral
ELECTRIC METER COMPATIBILITY	Type 2S and 12S		
METER SOCKET COMPATIBILITY	Ringless and ring-type, lever and horn bypass meter sockets		
DER INTERFACE POINT	Factory configured, load side of utility meter/supply side of main service disconnect		
CONDUIT CONNECTION	Single 1" NPT fitting		
TERMINAL CONNECTIONS	L1, L2, N, G; Up to 3 AWG wire		
SAFETY INFORMATION		OVERCURRENT PROTECTION	
APPLICABLE SAFETY STANDARDS	UL 414 – Meter Sockets	TYPE	Siemens Type QP, Eaton Type BR (10k AIC) Siemens Type QH, Eaton Type BRH (22k AIC) Thermal magnetic 120/240V, externally resettable
UL FILE NUMBER (STANDARDS)	E361188	OVERCURRENT RATINGS AVAILABLE	40A, 60A and 80A Standard
AMBIENT AIR OPERATING TEMPERATURE RANGE	-22°F to 158°F (-30°C to 70°C)	CURRENT INTERRUPTING RATING	10k AIC or 22k AIC
AMBIENT AIR STORAGE TEMPERATURE RANGE	-40°F to 176°F (-40°C to 80°C)		



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RAIL SYSTEM

Instant Bonding
The N-S Bonding Jumper bonds row to row with no tools.

One Clamp Anywhere
The Multi-Clamp works as mid- or end-clamp, and fits standard 30-40mm frames.

Lifetime Wire Management
Open rail channel holds and protects wires. Clamps won't pinch wires after tightening.

Bonding Structural Splice
Connect rails instantly, without tools, interference or limitations.

Next-Level Solar Mounting

A complete system for hassle-free rooftop installation, from watertight mounts to lifetime wire management.



Simplicity

1/2" socket for everything.
One clamp for mid or end.
No tool splicing and bonding.
Easy wire management.



Code Compliant

UL 2703 listed
LTR-AE-001-2012 listed
Class A fire rating for any slope
ASCE 7-16 PE Certified



Premium Aesthetics

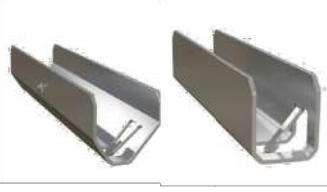
The narrowest panel gap available. Optional Hidden End Clamps and End Caps provide a flush look on the edge of the array.



Watertight for Life

Secured on industry-leading Pegasus Mounts, for composite shingle and tile roofs. Backed by a 25-year warranty.

RAIL SYSTEM

			
Pegasus Rail Available in 14' and 7' lengths for easy layout and shipping. Open-channel design holds MC4 connectors, PV wire and trunk cables. Black and Mill finish	Pegasus Max Rail Maximum-strength design. Meets specifications for high snow-load and hurricane zones. Black and Mill finish	Splice and Max Splice Installs by hand. Works over mounts. Structurally connects and bonds rails automatically; UL2703 listed as reusable.	Dovetail T-bolt Dovetail shape for extra strength. Uses 1/2" socket.
			
Multi-Clamp Fits 30-40mm PV frames, as mid- or end-clamp. Twist-locks into position; doesn't pinch wires in rail. Bonds modules to rail; UL2703 listed as reusable	Hidden End Clamp Offers premium edge appearance. Preinstalled pull-tab grips rail edge, allowing easy, one-hand installation. Tucks away for reuse.	Ground Lug Holds 6 or 8 AWG wire. Mounts on top or side of rail. Assembled on MLPE Mount. UL2703 listed as reusable.	N-S Bonding Jumper Installs by hand, eliminates row-to-row copper wire. UL2703 listed as reusable only with Pegasus Rail.
			
MLPE Mount Secures and bonds most micro-inverters and optimizers to rail. Connectors and wires easily route underneath after installation. UL2703 listed as reusable.	Cable Grip Secures four PV wires or two trunk cables. Stainless-steel backing provides durable grip. Eliminates sagging wires.	Wire Clip Hand operable. Holds wires in channel. Won't slip.	End Cap and Max End Cap Fits flush to PV module and hides raw or angled cuts. Hidden drain quickly clears water from rail.

Certifications:

- UL 2703, Edition 1
- LTR-AE-001-2012
- ASCE 7-16 PE certified
- Class A fire rating for any slope roof



FREE PEGASUS SOLAR Design Tool

Quickly calculate the most efficient layout, spans and materials needed to suit your job. Visit the Pegasus Customer Portal. pegassussolar.com/portal

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LOAD		SPAN			
SNOW (PSF)	WIND (MPH)	32"	4'	6'	8'
0	120	PEGASUS RAIL			
	160				
	190				
15	140	PEGASUS RAIL			
	160				
	190				
30	160	PEGASUS RAIL			
	190				
45	190	PEGASUS RAIL			
70	190	PEGASUS RAIL			
110	190	PEGASUS MAX RAIL			

For reference only. Spans above are calculated using ASCE 7-16 for a Gable Roof, Exposure Category B, 7-20deg roof angle, 30ft mean roof height with non-exposed modules. For PE certified span tables, visit www.pegassussolar.com/spans.



INSTAFLASH™



INSTAFLASH™

Never Deal With Caulking Again!

Factory-installed, non-hardening sealant

Before InstaFlash Installed:
Sealant is contained above roof surface by a protective cage.

After InstaFlash Installed:
Sealant is compressed to fill all holes and voids.

Protective Cage
Prevents sealant from getting on hands or roof.
Collapses upon lag installation.

Effortless Lifetime Roof Protection

The non-hardening sealant completely fills any missed pilot holes, shingle rips, voids, or other potential water ingress points under the entire footprint of the 4.6" wide base.



25-Year Warranty

Manufactured with advanced materials and coatings to outlast the roof itself



Code Compliant

Fully IBC/CBC Code Compliant
Exceeds ASCE 7-16 Standards
FL Cert of Approval FL41396
UL2703 Certified



Self-Healing

The proprietary non-hardening sealant will flex and reseal over years of thermal expansion and contraction



Larger Spans

The extra-large L-foot and proprietary lag screw result in larger spans between mounts

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1
Drill pilot hole in the center of the rafter using a 7/32" bit.



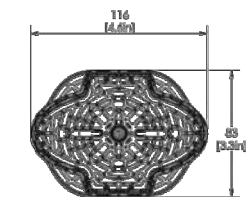
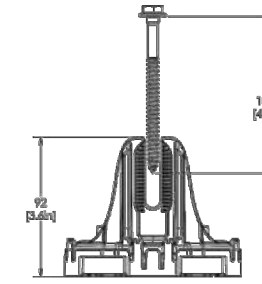
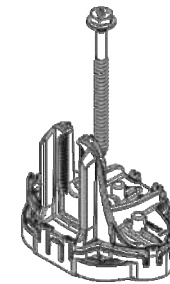
2
Place the InstaFlash over the pilot hole.
Note: the direction of the InstaFlash Down arrows should point down the roof.



3
Insert the lag screw through the center hole into the pilot hole.



4
Drive the lag until the InstaFlash is fully seated to the roof.



SPECIFICATIONS	INSTAFLASH KITS				
	PIF-RB0	PIF-RBDT	PIF-RBSH	PIF-RM0	PIF-RMDT
Finish	Black			Mill	
Kit Contents	Black InstaFlash, 5/16" x 4.0" SS Lag	Black InstaFlash, 5/16" x 4.0" SS Lag, Dovetail T-bolt w/ Nut	Black InstaFlash, 5/16" x 4.0" SS Lag, M10 Hex Bolt w/ Nut	Mill InstaFlash, 5/16" x 4.0" SS Lag	Mill InstaFlash, 5/16" x 4.0" SS Lag, Dovetail T-bolt w/ Nut
Attachment Type	Rafter Attached				
Roof Type	Sloped Roof: Composition Shingle, Rolled Asphalt Flat roof: Modified Bitumen Roof, Built-Up Roof				
Sealant Application	Factory Installed				
Installation Temperature	0°F to 170° F				
Cure Time	Instantly Waterproof; Non-hardening				
Service Temperature	-40°F to 195° F				
Certifications	IBC, ASCE/SEI 7-16, FL Cert of Approval FL41396, TAS 100(A), UL2703				
Install Application	Most Railed Systems, Pegasus Tilt Leg Kit				
Kit Quantity	24				
Boxes per Pallet	36				

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SCAN FOR
INSTALLATION
VIDEO



SCAN FOR
FREE TRIAL

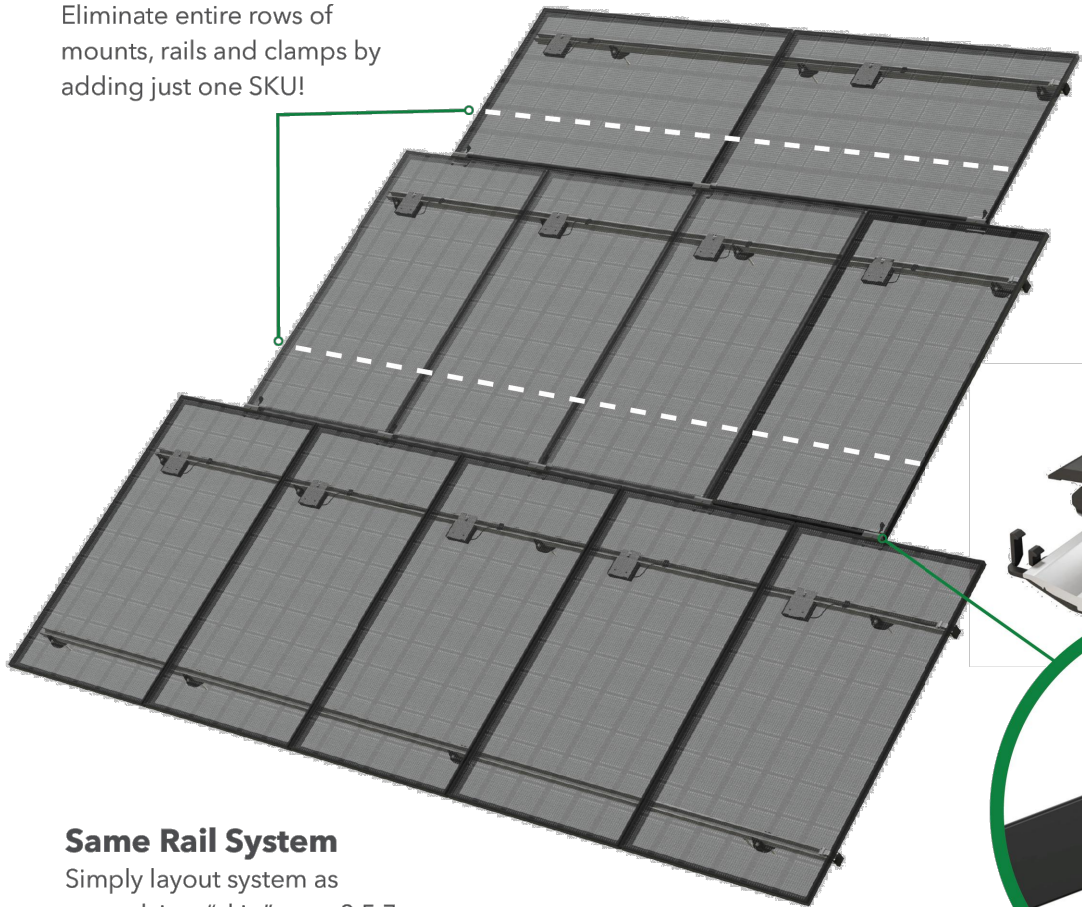
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SK•PRAIL

Skip Rows!

Eliminate entire rows of mounts, rails and clamps by adding just one SKU!



SkipRail Clamp

Structurally connects and bonds modules row-to-row
Eliminate leveling rails:
aligns module rows to be in-plane



Same Rail System

Simply layout system as normal, just "skip" rows 3,5,7,etc. of attachments, rails, and clamps

A Revolution in Solar Installations

Lower your costs and provide your crews a faster system by eliminating entire rows of mounts, rails and clamps with just one SKU.



Dramatically Lower Costs

25% fewer rails and clamps
15% fewer roof penetrations
3500 lbs less per MW to ship, warehouse, pack, and load



Recruit the Best Crews

Less work = happier crews
300 lbs less per week to haul
Faster install
Auto-levels modules



Easy to Implement

Minimal to no training
Same layout as standard rail
Same open-channel wire management



Universal to Any Roof

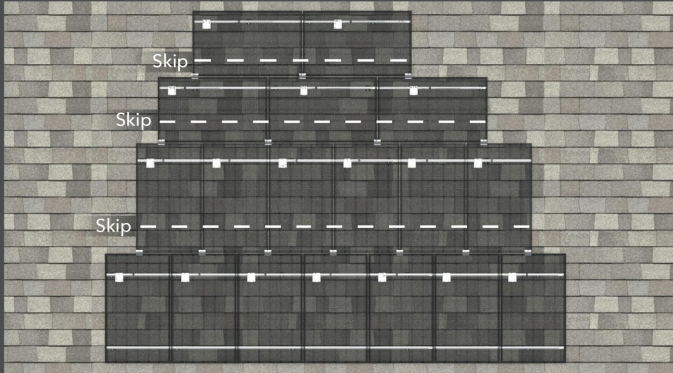
Comp, Tile, Metal, other.
Low slope, steep slopes
Easily work around roof obstructions
Mixed portrait / landscape



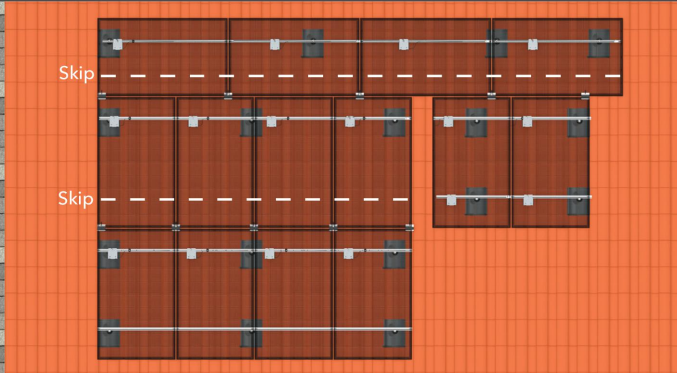
SK•PRAIL

SkipRail SAVINGS | 18% fewer attachments • 32% fewer feet of rails
22% fewer pounds to ship & warehouse

SkipRail SAVINGS | 21% fewer attachments • 30% fewer feet of rails
21% fewer pounds to ship & warehouse

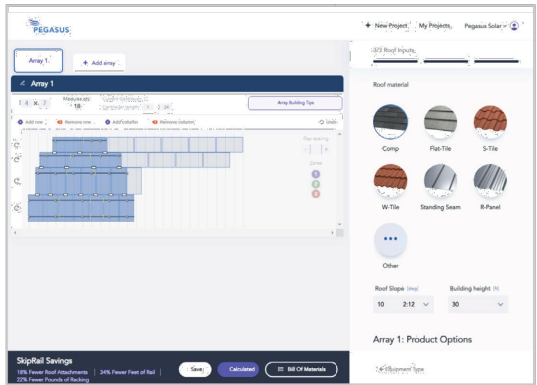


Example of Comp Roof Array

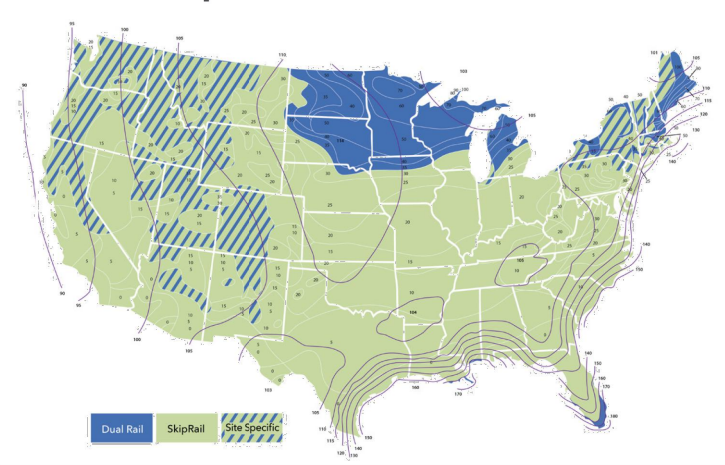


Example of Tile Roof Array

Free Design Tool:
pegasussolar.com/portal



Where SkipRail Works



Specifications			SkipRail Kits	
SKU	PSR-SRC	PSR-SRCK		
Type	Floating Clamp	Extra support with Kickstand		
Finish	Black			
PV module frames	30, 32, 35, 40mm			
Certifications	ASCE 7-16, IBC, CBC, UL2703			
Applicable Roof Types	Any			
Compatible Rail Systems	Pegasus Rail System			
Kit Contents	Pegasus SkipRail Clamp	Pegasus SkipRail Clamp with Kickstand		
Kit Quantity	20	30		

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SCAN FOR VIDEO



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