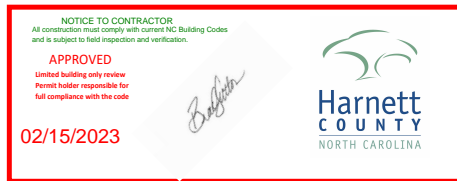


SCOPE OF WORK

NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE

| | |
|-----------------|---------------------------------|
| DC STC (KW): | 22.80 |
| AC RATING (KW): | 16.53 |
| MODULE: | (57) Q.PEAK DUO BLK ML-G10+ 400 |
| MICROINVERTER: | (57) IQ8PLUS-72-2-US |
| COMBINER BOX: | X-1Q-AM1-240-4 |



Rev 1

PROJECT DETAILS

PROPERTY OWNER: SHARON MOSCONI
PROPERTY ADDRESS: 1454 POPE RD. DUNN, NC 28334

BUILDING INFORMATION: TWO STORY HOUSE
OCCUPANCY: RESIDENTIAL GROUP R-3

ELECTRICAL INFORMATION
UTILITY COMPANY: DUKE ENERGY
MAIN SERVICE AMPERAGE: 200A

AHJ: COUNTY OF HARNETT

APPLICABLE CODES:

| | | |
|------------|--------------------------|------------|
| ELECTRICAL | 2017 NC ELECTRICAL CODE | (2017 NEC) |
| FIRE | 2018 NC FIRE CODE | (2018 IFC) |
| BUILDING | 2018 NC BUILDING CODE | (2018 IBC) |
| PLUMBING | 2018 NC PLUMBING CODE | (2018 IPC) |
| DWELLING | 2018 NC RESIDENTIAL CODE | (2018 IRC) |

CONTRACTOR INFORMATION

COMPANY: EMPWR SOLAR

ADDRESS: 1007 JOHNNIE DODDS BLVD
SUITE 111
MT. PLEASANT, SC 29464

PHONE NUMBER: (866) 337-1104
www.empwrsolar.com/

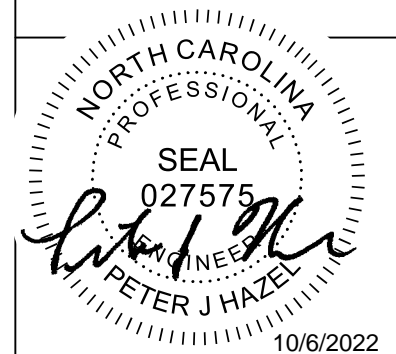


B AERIAL VIEW
NOT TO SCALE

1454-2022



GRID-TIED SOLAR POWER SYSTEM
SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334
 22.8KW DC 16.53KW AC



PROJECT SUMMARY

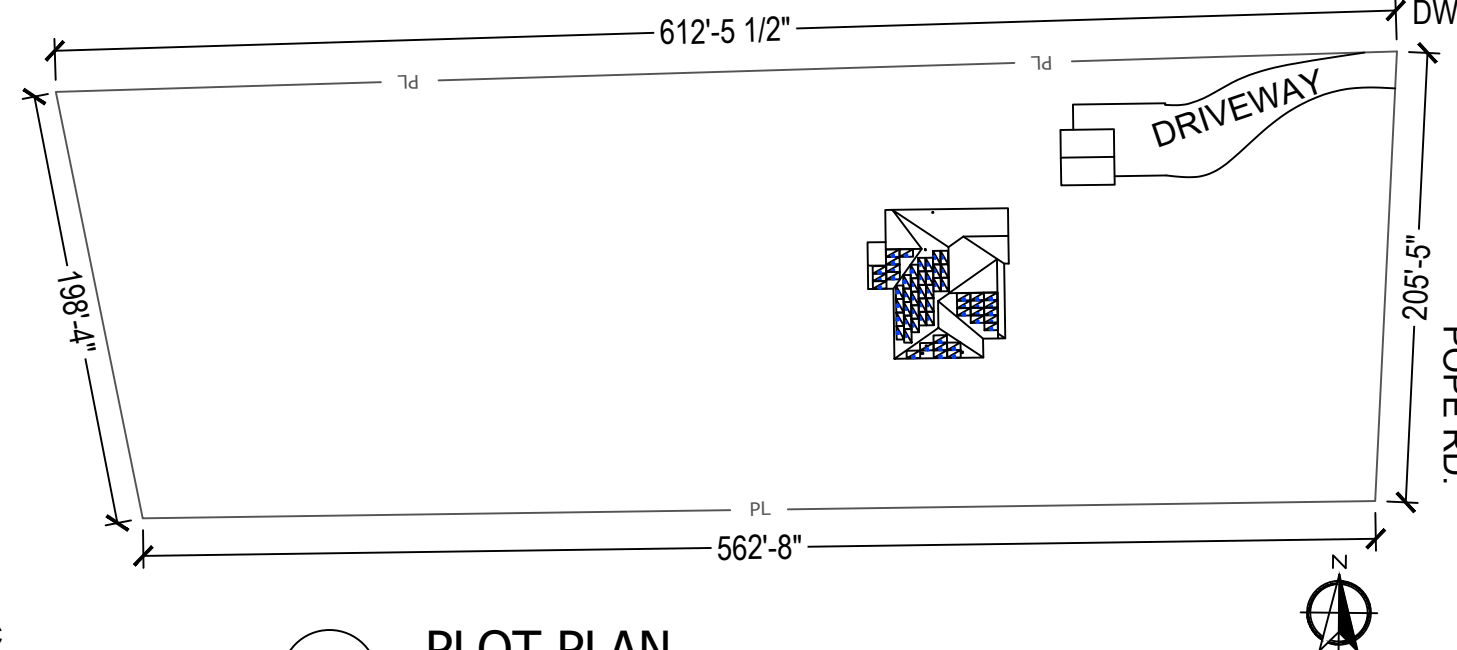
DOC ID
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CREATED BY: JPL
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PV-1

SHEET INDEX

| | |
|------|----------------------------|
| PV-1 | COVER SHEET |
| PV-2 | ROOF PLAN |
| PV-3 | SINGLE LINE DIAGRAM |
| PV-4 | WIRING CALCULATIONS |
| PV-5 | WARNING LABELS/ PLACARD |
| PV-6 | ATTACHMENT PLAN |
| PV-7 | IRONRIDGE REPORT |
| E-1 | MODULE CUT SHEET |
| E-2 | COMBINER CUT SHEET |
| E-3 | INVERTER CUT SHEET |
| E-4 | DISCONNECT CUT SHEET |



A PLOT PLAN
NOT TO SCALE

SITE DETAILS

ASHRAE EXTREME LOW: -11°C
ASHRAE 2% HIGH: 34°C
CLIMATE DATA SOURCE: FSEC
WIND SPEED: 121 MPH
RISK CATEGORY: II
WIND EXPOSURE CATEGORY: B
GROUND SNOW LOAD: 10 PSF

INTERCONNECTION DETAILS

POINT OF INTERCONNECTION: NEW LINE SIDE TAP
CONNECTION PER NEC 705.12 (A)

UTILITY SERVICE: 120/240V

LOCATION: LINE SIDE TAP WITHIN THE MAIN OUTDOOR
DISCONNECT

ROOF PROPERTIES

| | |
|------------------|--------------|
| ROOF MATERIAL | COMP SHINGLE |
| SLOPE | 45° |
| MEAN ROOF HEIGHT | 30FT |
| DECK SHEATHING | 15 / 32" OSB |
| CONSTRUCTION | 2X6@24"O.C. |

ARRAY AREA

| ARRAY | # OF MODULES | ARRAY AREA (SQFT) | ROOF TILT | AZIMUTH |
|-------|--------------|-------------------|-----------|---------|
| A1 | 7 | 149.90 | 45° | 179° |
| A2 | 30 | 633.00 | 34° | 269° |
| A3 | 8 | 168.80 | 27° | 179° |
| A5 | 12 | 253.20 | 45° | 179° |

GENERAL NOTES

- EQUIPMENT LIKELY TO BE WORKED UPON WHILE ENERGIZED SHALL BE INSTALLED IN LOCATIONS THAT SATISFY MINIMUM WORKING CLEARANCES PER NEC 110.26.
- CONTRACTORS SHALL USE ONLY COMPONENTS LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE INTENDED USE.
- CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL EQUIPMENT, CABLES, ADDITIONAL CONDUITS, RACEWAYS, AND OTHER ACCESSORIES NECESSARY FOR A COMPLETE AND OPERATIONAL PV SYSTEM.
- WHERE DC PV SOURCE OR DC PV OUTPUT CIRCUITS ARE RUN INSIDE THE BUILDING, THEY SHALL BE CONTAINED IN METAL RACEWAYS, TYPE MC METAL-CLAD CABLE, OR METAL ENCLOSURES FROM THE POINT OF PENETRATION INTO THE BUILDING TO THE FIRST READILY ACCESSIBLE DISCONNECTING MEANS, PER NEC 690.31 (G).
- RAFTER 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"

SETBACK NOTES

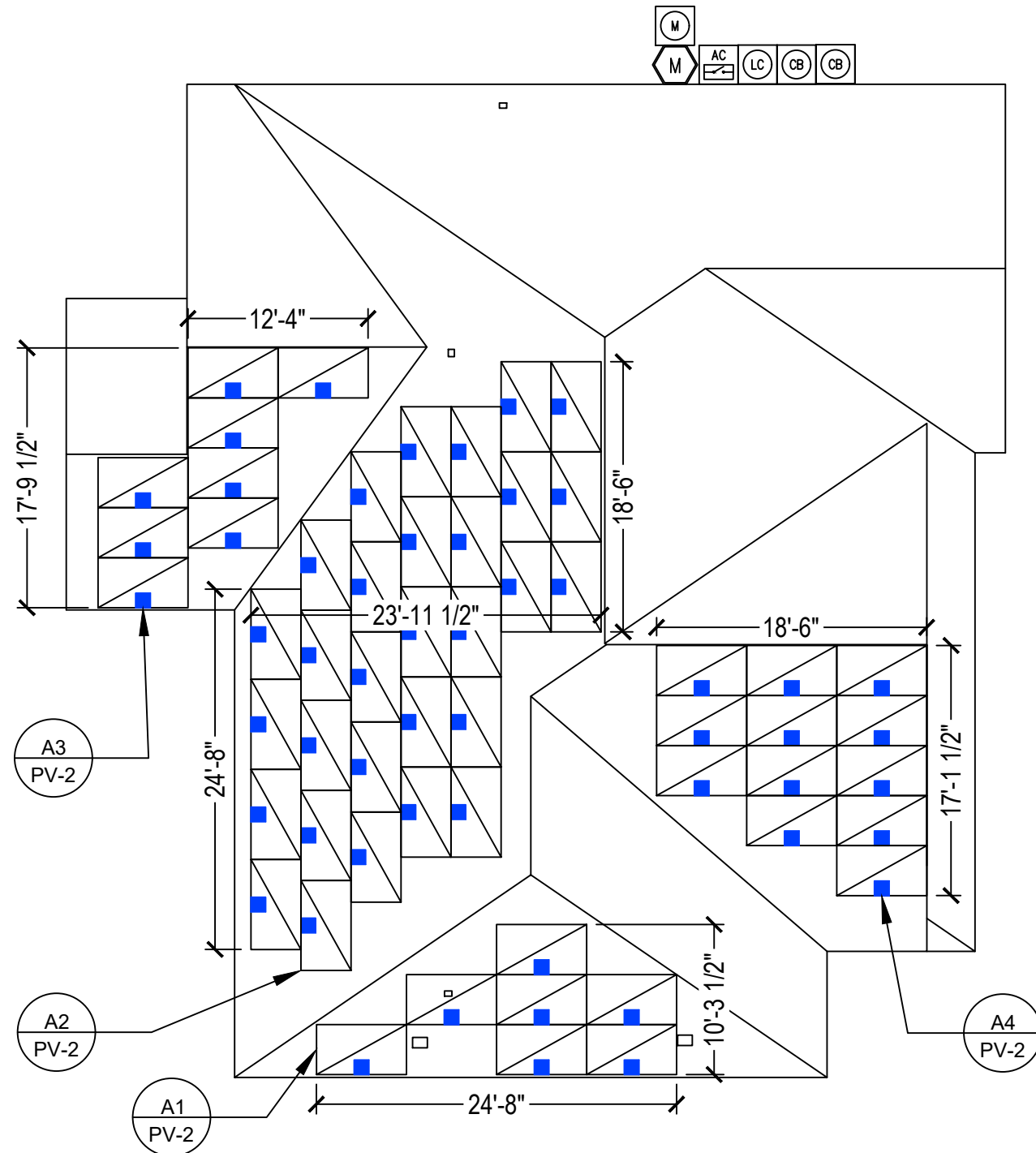
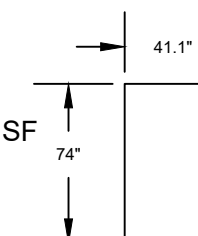
- FOR PV ARRAYS OCCUPYING MORE THAN 1/3 OF THE PLAN VIEW TOTAL ROOF AREA, A MIN. 3'-WIDE SETBACK IS REQUIRED ON BOTH SIDES OF A HORIZONTAL RIDGE. (IFC 1204.2.1.2) (SEE TABLE ON SHEET PV-2)
- ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF OF GROUND LADDERS OVER OPENINGS 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.
- AT LEAST TWO 36"-WIDE PATHWAYS ON SEPARATE ROOF PLANES, FROM LOWEST ROOF EDGE TO RIDGE, SHALL BE PROVIDED ON ALL BUILDINGS. THERE SHALL BE AT LEAST ONE PATHWAY ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANE WITH A PV ARRAY, AT LEAST ONE SUCH PATHWAY SHALL BE PROVIDED ON THE SAME ROOF PLANE, OR ON AN ADJACENT ROOF PLANE, OR STRADDLING THE SAME AND ADJACENT ROOF PLANES. (IFC 1204.2.1.1)
- PV MODULES SHALL NOT BE INSTALLED ON THE PORTION OF A ROOF THAT IS BELOW AN EMERGENCY ESCAPE AND RESCUE OPENING. A 36"-WIDE PATHWAY SHALL BE PROVIDED TO THE EMERGENCY ESCAPE AND RESCUE OPENING. (IFC 1204.2.2)

SITE PLAN LEGEND

- SERVICE ENTRANCE AND 200A MAIN PANEL
- INVERTER
- PV LOAD CENTER
- METER
- JUNCTION BOX
- PULLBOX
- DC DISCONNECT
- AC DISCONNECT
- FACILITY SUBPANEL
- BATTERY
- ENERGY STORAGE SYSTEM
- AUTO TRANSFER SWITCH
- COMBINER BOX
- RAFTERS

MODULE DIMENSIONS & WEIGHT

WEIGHT: 48.5 LBS/22 KG
 DIMENSIONS: 74 IN X 41.1 IN=21.1 SF
 UNIT WEIGHT OF ARRAY: 2.6 PSF



ARRAY PLAN

3/32" = 1'-0"

1454-2022

EMPWR
SOLAR

GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC



ROOF PLAN

DOC ID
 DATE: 10/4/2022
 CREATED BY: JPL
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PV-2

| GENERAL ELECTRICAL NOTES | |
|--------------------------|--|
| 1 | UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE. |
| 2 | MODULES CONFORM TO AND ARE LISTED UNDER UL 1703. |
| 3 | CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICL 310.10 (D) |
| 4 | CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C). |

SERVICE INFORMATION
 UTILITY COMPANY: DUKE ENERGY
 MAIN SERVICE VOLTAGE: 240V
 MSP MANUFACTURER: EATON
 MAIN SERVICE PANEL: 200A
 MAIN CIRCUIT RATING: 200A

| NOTES | |
|-------|---|
| 1 | MATING CONNECTORS SHALL COMPLY WITH NEC 690.33. |
| 2 | PHOTOVOLTAIC MOUNTED SYSTEM MEETS REQUIREMENTS FOR PHOTOVOLTAIC RAPID SHUTDOWN SYSTEM (PVRSS), AS PER NEC 690.12(B). |
| 3 | DC PV CONDUCTORS ARE NOT SOLIDLY-GROUNDED. NO DC PV CONDUCTOR SHALL BE WHITE- OR- GRAY COLORED |
| 4 | ALL METAL ENCLOSURES, RACEWAYS, CABLES AND EXPOSED NONCURRENT-CARRYING METAL PARTS OF EQUIPMENT SHALL BE GROUNDED TO EARTH AS REQUIRED BY NEC 250.4(A) AND PART III OF ARTICLE 250 AND EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45. THE GROUNDING ELECTRODE SYSTEM SHALL ADHERE TO NEC 690.47(A) AND NEC 250.169. THE DC GROUNDING ELECTRODE SHALL BE SIZED ACCORDING TO NEC 250.166 AND INSTALLED IN COMPLIANCE WITH NEC 250.64. |
| 5 | MAX DC VOLTAGE OF ARRAY FIXED BY THE INVERTER AT 400V REGARDLESS OF TEMPERATURE. THE MAX DC VOLTAGE OF THE MODULE AT -17°C IS 45.3V (-17°C - 25°C) X -0.11V/C + 40.66V = 45.3V). |
| 6 | POINT-OF-INTERCONNECTION IS ON LINE SIDE OF SERVICE DISCONNECT, IN COMPLIANCE WITH NEC 705.12(A) |
| 7 | PV SYSTEM DISCONNECT SHALL BE A VISIBLE KNIFE-BLADE TYPE DISCONNECT THAT IS ACCESSIBLE AND LOCKABLE BY THE UTILITY IN ACCORDANCE WITH NEC 690.13(E). THE DISCONNECT SHALL BE LOCATED WITHIN 10 FT OF UTILITY METER AND INSTALLED IN COMPLIANCE WITH NEC 705.20 AND GROUPED AS REQUIRED BY NEC 230.72. |

| GROUNDING NOTES | |
|-----------------|---|
| 1 | ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690 |
| 2 | PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULE LUGS OR RACKING INTEGRATED GROUNDED CLAMPS AS ALLOWED BY LOCAL JURISDICTION. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS. |
| 3 | INSTALLER SHALL CONFIRM THAT MOUNTING SYSTEM HAS BEEN EVALUATED FOR COMPLIANCE WITH UL 2703 "GROUNDING AND BONDING" WHEN USED WITH PROPOSED PV MODULE. |
| 4 | ALL GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE |
| 5 | IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE. |
| 6 | AC SYSTEM GROUNDING ELECTRODE CONDUCTOR (GEC) SHALL BE A MINIMUM SIZE #8AWG WHEN INSULATED, #6AWG IF BARE WIRE. |
| 7 | EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE, AND #6AWG SHALL BE USED WHEN EXPOSED TO DAMAGE |
| 8 | GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN, OR MARKED GREEN IF #4AWG OR LARGER |

1454-2022

EMPWR
 SOLAR

GRID-TIED SOLAR POWER SYSTEM
SHARON MOSCONI
1454 POPE RD.
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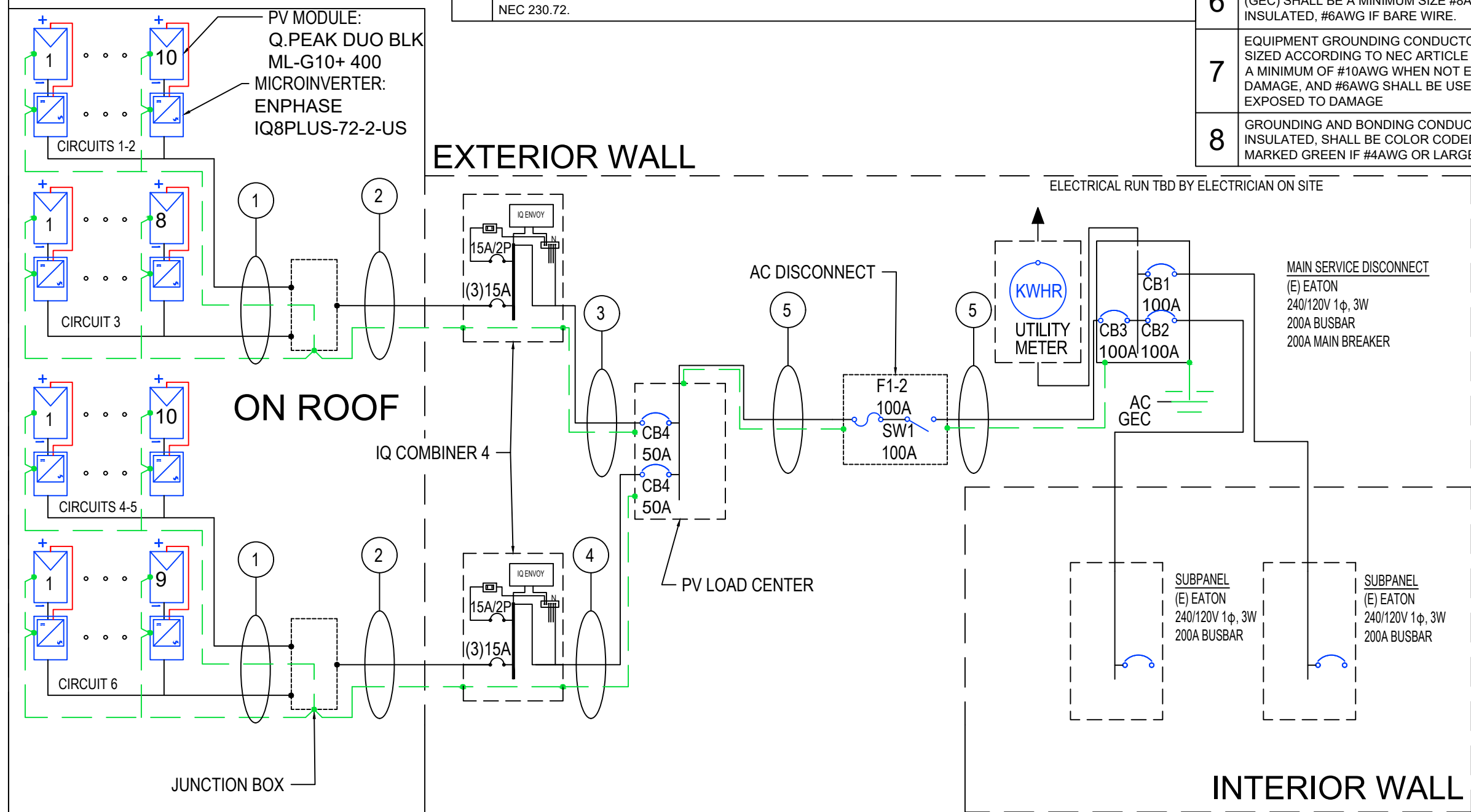
22.8KW DC 16.53KW AC

SINGLE LINE DIAGRAM 1-2

DOC ID
 DATE: 10/5/2022
 CREATED BY: JPL
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| | |
| | |

PV-3



| MODULES | | | | | | | | | | |
|-----------|-----|-----------------------------------|------|------|-------|-------|-------|-------|---------------------|-------------|
| REF. | QTY | MAKE AND MODEL | PMAX | PTC | ISC | IMP | VOC | VMP | TEMP. COEFF. OF VOC | FUSE RATING |
| PV MODULE | 57 | HANHWA Q.PEAK DUO BLK ML-G10+ 400 | 400W | 318W | 11.14 | 10.77 | 45.30 | 37.13 | -0.27%/C° | 20A |

| MICROINVERTERS | | | | | | | | | | |
|----------------|------|-------------------------|------------|----------------------|-------------|--------------------|-------------------|-------------------|-------------------------|--|
| REF. | QTY. | MAKE AND MODEL | AC VOLTAGE | GROUND | RATED POWER | MAX OUTPUT CURRENT | MAX INPUT CURRENT | MAX INPUT VOLTAGE | CEC WEIGHTED EFFICIENCY | |
| MINV | 57 | ENPHASE IQ8PLUS-72-2-US | 240V | NOT SOLIDLY GROUNDED | 290W | 1.21A | 15A | 60V | 97% | |

| COMBINER BOX | | | | | | |
|--------------|------|------------------------|------------|--------------------|-------------------|---------------|
| REF. | QTY. | MODEL | AC VOLTAGE | MAX OUTPUT CURRENT | MAX INPUT CURRENT | BUSBAR RATING |
| CB | 1 | ENPHASE X-IQ-AM1-240-4 | 240V | 65A | 64A | 125A |

| DISCONNECTS | | | |
|-------------|------|--------------------------|---------------|
| REF. | QTY. | MAKE AND MODEL | RATED CURRENT |
| ACD | 1 | EATON DG223NRB OR EQUIV. | 100A |

| OCPDS | | | |
|-------|------|---------------|-------------|
| REF. | QTY. | RATED CURRENT | MAX VOLTAGE |
| CB1 | 1 | 100A | 240VAC |
| CB2 | 1 | 100A | 240VAC |
| CB3 | 1 | 100A | 240VAC |
| CB4 | 2 | 50A | 240VAC |
| F1-2 | 1 | 100A | 240VAC |

| PV LOAD CENTER | | | | |
|----------------|------|-----------------|------------|---------------|
| REF. | QTY. | MAKE AND MODEL | AC VOLTAGE | BUSBAR RATING |
| LC | 1 | EATON OR EQUIV. | 240V | 100A, 2 POLE |

1454-2022



GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC

EQUIPMENT SCHEDULE

AC WIRE AND CONDUIT SCHEDULE

| ID | CIRCUIT DESCRIPTION | ORIGIN | DESINATION | CONDUIT TYPE | CONDUIT SIZE | CONDUIT FILL % | CONDUCTOR QTY PER CONDUIT | CONDUCTOR SIZE | CONDUCTOR MATERIAL | CONDUCTOR INSULATION | NEUTRAL & EQUIP. GROUND SIZE |
|----|---|--------|------------|--------------|--------------|----------------|---------------------------|----------------|--------------------|----------------------|------------------------------|
| 1 | MICROINVERTERS TO JUNCTION BOX | MINV | JBOX | FREE AIR | N/A | N/A | 2 | #12 | Cu | PV WIRE | #12 |
| 2 | JUNCTION BOX TO COMBINER BOX (X2) | JBOX | CB | LFMC | 1" | 28.32% | 6 | #10 | Cu | THWN-2 | #12 |
| 3 | COMBINER BOX TO PV LOAD CENTER | CB | LC | EMT | 3/4" | 26.94% | 2 | #6 | Cu | THWN-2 | #10 |
| 4 | COMBINER BOX TO PV LOAD CENTER | CB | LC | EMT | 3/4" | 26.94% | 2 | #6 | Cu | THWN-2 | #10 |
| 5 | PV LOAD CENTER TO AC DISCO TO MAIN SERIVCE DISCONNECT | LC | MSD | EMT | 1" | 35.28% | 2 | #2 | Cu | THWN-2 | #8 |

AC AMPACITY CALCULATIONS

| AMBIENT TEMP. | AMBIENT TEMP. CORRECTION FACTOR | # CONDUIT ADJUSTMENT FACTOR | MAX. CIRCUIT CURRENT (AMPS) | MIN. CONDUCTOR AMPACITY | DERATED AMPACITY | CONDUCTOR AMAPCITY | OCPD RATING | VOLTAGE DROP PERCENTAGE |
|---------------|---------------------------------|-----------------------------|-----------------------------|-------------------------|------------------|--------------------|-------------|-------------------------|
| 34 | 0.94 | 1.00 | 12.08 | 15.10 | 23.5 | 25 | 20 | 0.00 |
| 34 | 0.94 | 0.80 | 12.08 | 15.10 | 26.32 | 35 | 20 | 0.30 |
| 34 | 0.94 | 1.00 | 33.83 | 42.29 | 61.1 | 65 | 50 | 0.14 |
| 34 | 0.94 | 1.00 | 35.04 | 43.80 | 61.1 | 65 | 50 | 0.14 |
| 34 | 0.94 | 1.00 | 68.88 | 86.09 | 108.1 | 115 | 90 | 0.12 |

WIRE AND CONDUIT CALCULATIONS

WIRING CALCS 2-2

DOC ID
DATE: 10/4/2022
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PV-4

DC- DISCONNECT
 2 5 7

DC RACEWAYS
 6

JBOX - TRANSITION BOX
 (SOLADECK 0783-3R-4ER6)
 2

ACD - DISCONNECT
 (EATON DG223NRB)
 2 3 4 9

INV - MICROINVERTER
 (ENPHASE IQ8PLUS-72-2-US)
 2 3

MSP - MAIN SERVICE PANEL
 (EATON)
 1 4 8 9
 10

8

⚠ WARNING
 DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

VINYL LABEL, ORANGE W/ WHITE, BLACK LETTERS
 PLACEMENT: MAIN SERVICE PANEL; NEC705.12(D)(3)

9

⚠ PHOTOVOLTAIC SYSTEM AC DISCONNECT ⚠

OPERATING VOLTAGE: 240 VOLTS
 RATED CURRENT: 68.9 AMPS

VINYL LABEL, BLACK W/ WHITE LETTERS; NEC 690.54
 PLACEMENT: AC DISCONNECT, MAIN SERVICE PANEL

10

⚠ WARNING

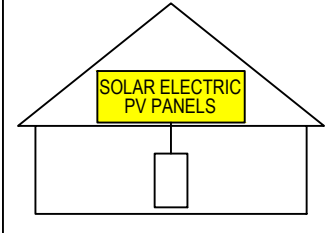
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

VINYL LABEL, ORANGE W/ WHITE, BLACK LETTERS
 PLACEMENT: NEAR PV BREAKER; NEC705.12(D)(2)(3)(b)

1

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



VINYL LABEL, YELLOW W/ WHITE, BLACK LETTERS
 PLACEMENT: MAIN SERVICE PANEL; NEC 690.56(C)(1)(a)

2

⚠ WARNING
 ELECTRIC SHOCK HAZARD

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

VINYL LABEL, ORANGE W/ WHITE, BLACK LETTERS
 PLACEMENT: AC DISC, DC COMBINER BOX, DC DISCONNECT; NEC 690.13(B)

3

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

VINYL LABEL, RED W/ WHITE LETTERS
 PLACEMENT: AC DISCONNECT, INVERTER; NEC 690.56(C)(3)

4

PHOTOVOLTAIC AC DISCONNECT

VINYL LABEL, WHITE W/ BLACK LETTERS
 PLACEMENT: AC DISCONNECT, MAIN SERVICE PANEL; NEC 690.13(B)

⚠ CAUTION: ⚠
 MULTIPLE SOURCES OF POWER

VINYL LABEL, YELLOW W/ BLACK LETTERS,
 PLACEMENT: MAIN SERVICE PANEL; NEC 705.10
 WILL BE CUSTOMIZED WITH DIRECTORY OF DISCONNECTING MEANS PROPERLY

1454-2022



GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
 1454 POPE RD.
 DUNN, NC 28334

22.8KW DC 16.53KW AC

WARNING LABELS

DOC ID
 DATE: 10/4/2022
 CREATED BY: JPL
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PV-5

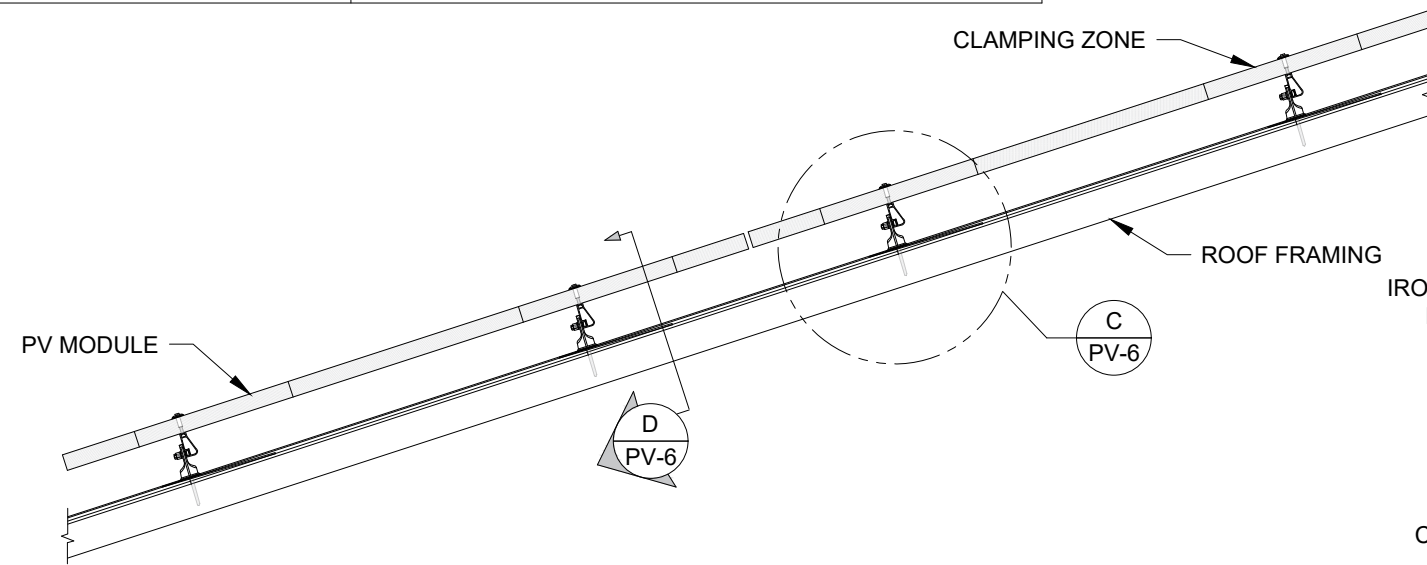
MOUNTING SYSTEM PROPERTIES

| | |
|------------------------|--|
| MAX. MOUNT SPACING | 72IN (ZONES 1,2, AND 3) |
| MAX. ALLOW. CANTILEVER | 18IN (ZONES 1,2, AND 3) |
| GROUNDING AND BONDING | INTEGRAL GROUNDING CERTIFIED TO UL 2703 REQUIREMENTS |

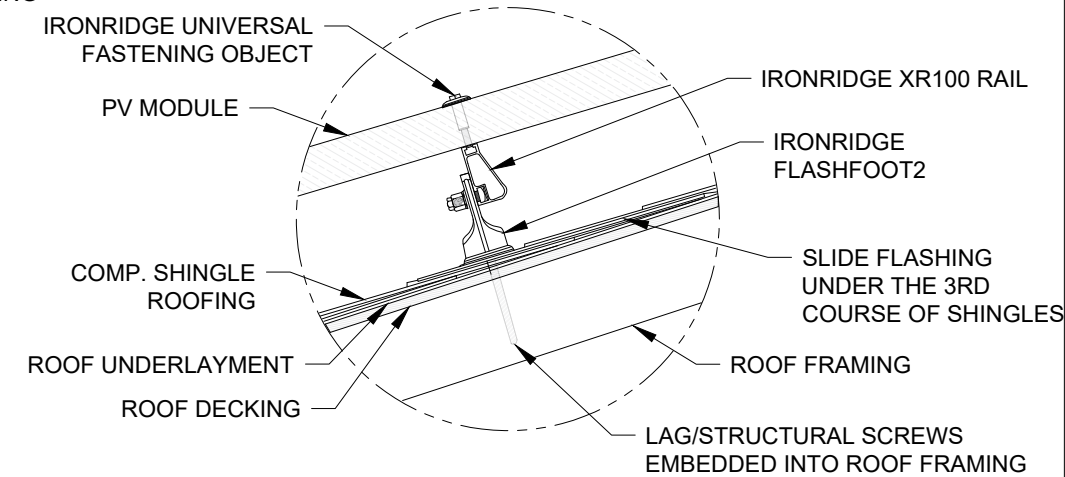
MOUNTING SYSTEM NOTES

- FLASHING SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS.
- IF THERE IS ANY CONFLICT BETWEEN WHAT IS DEPICTED HERE AND INSTRUCTIONS PROVIDED BY A MANUFACTURER, THE MANUFACTURER'S INSTRUCTIONS SHALL SUPERCEDE.

1454-2022

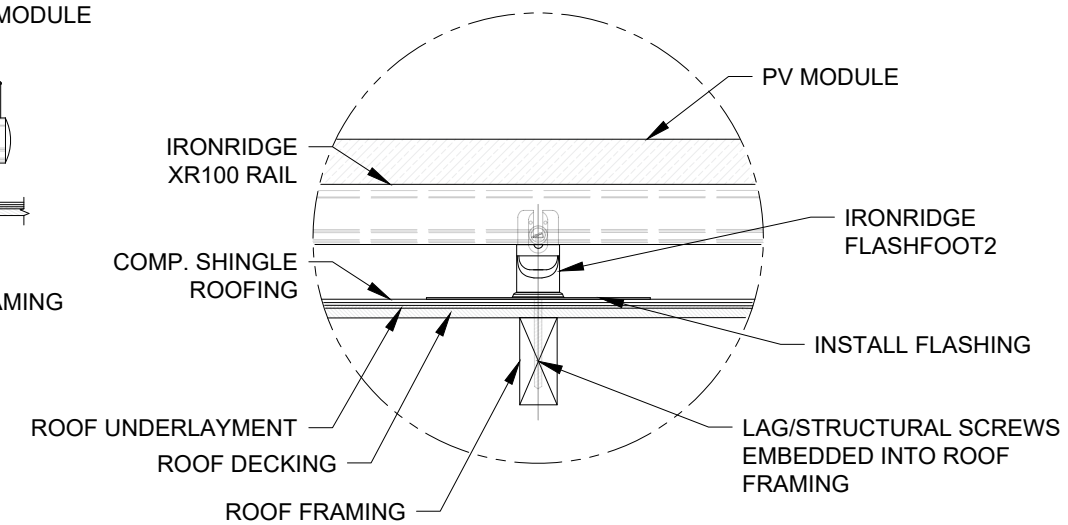
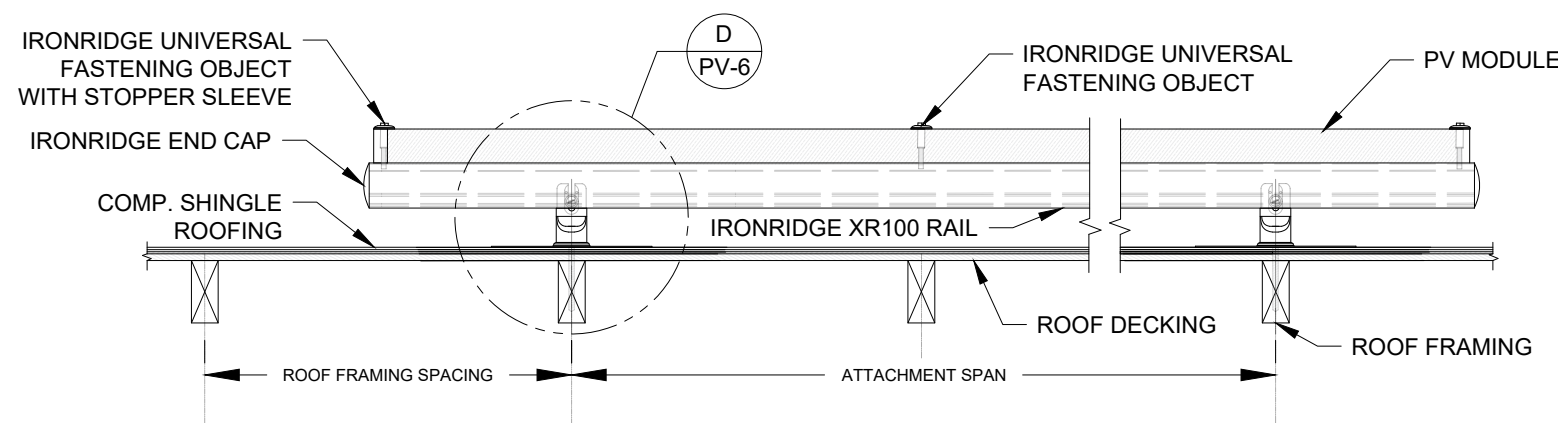


LAGSCREW DIAMETER: 5/16"
MINIMUM EMBEDMENT: 2-1/2"



A RACKING ELEVATION (TRANSVERSE VIEW)
PV-6 SCALE: NTS

C ATTACHMENT DETAIL (TRANSVERSE VIEW)
PV-6 SCALE: NTS



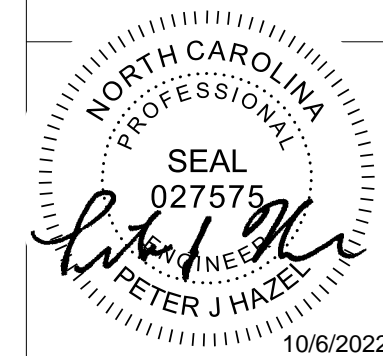
B RACKING ELEVATION (LONGITUDINAL VIEW)
PV-6 SCALE: NTS

D ATTACHMENT DETAIL (LONGITUDINAL VIEW)
PV-6 SCALE: NTS

GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

16.53KW AC
22.8KW DC



ATTACHMENT DETAILS

DOC ID
DATE: 10/4/2022
CREATED BY: JPL
REVIEWED BY:

REVISIONS

PV-6

| Project Details | | | |
|-------------------|--|----------------------|------------|
| Name | 1454 Pope Road | Date | 10/05/2022 |
| Location | 1454 Pope Road, Dunn, NC 28334 | Total modules | 57 |
| Module | Hanwha Q.Cells: Q.PEAK DUO BLK ML-G10+ 400 (32mm) | Total watts | 22,800 |
| Dimensions | Dimensions: 73.98" x 41.14" x 1.26" (1879.0mm x 1045.0mm x 32.0mm) | Attachments | 156 |
| ASCE | 7-16 | Rails per row | 2 |

| System Weight | |
|----------------------------|-------------|
| Total system weight | 3,620.4 lbs |
| Weight/attachment | 23.2 lbs |
| Racking weight | 855.9 lbs |
| Distributed weight | 3.0 psf |

| Load Assumptions | |
|-------------------------------------|----------|
| Wind exposure | B |
| Wind speed | 121 mph |
| Ground snow load | 10 psf |
| Attachment spacing landscape | 6.0' |
| Site Elevation | 208.0 ft |
| S_{DS} | 0.14 |

| Roof Information | | | |
|-----------------------------|--------------|----------------------------|--------------|
| Roof Material Family | Comp Shingle | Roof material | Comp Shingle |
| Building height | 30 ft | Roof attachment | Flashfoot2 |
| Roof slope | 45 ° | Attachment hardware | Square |
| Risk category | II | | |
| Roof shape | Gable | | |

| Span Details XR100 - Landscape | | | |
|--------------------------------|-----------------|----------|----------------|
| Zone | Module Position | Max span | Max cantilever |
| Zone 1/2e/2r | Normal | 10' 2" | 3' |
| Zone 2n/3r | Normal | 10' 2" | 3' |
| Zone 3e | Normal | 10' 2" | 3' |

| Reaction Forces XR100 - Landscape | | | | |
|-----------------------------------|-----------------|------------|--------------|---------------|
| Zone | Module Position | Down (lbs) | Uplift (lbs) | Lateral (lbs) |
| Zone 1/2e/2r | Normal | 122 | 173 | 43 |
| Zone 2n/3r | Normal | 122 | 195 | 43 |
| Zone 3e | Normal | 122 | 246 | 43 |

Bill of Materials

| Part | Spares | Total Qty |
|---|--------|-----------|
| Rails & Splices | | |
| XR-100-204A XR100, Rail 204" (17 Feet) Clear | 0 | 16 |
| XR-100-168A XR100, Rail 168" (14 Feet) Clear | 0 | 48 |
| XR100-BOSS-01-M1 Bonded Splice, XR100 | 0 | 22 |
| Clamps & Grounding | | |
| UFO-CL-01-A1 Universal Module Clamp, Clear | 0 | 156 |
| UFO-STP-32MM-M1 Stopper Sleeve, 32MM, Mill | 0 | 84 |
| XR-LUG-03-A1 Grounding Lug, Low Profile | 0 | 21 |
| Attachments | | |
| FF2-01-M2 FlashFoot2, Mill | 0 | 156 |
| BHW-SQ-02-A1 Square-Bolt Bonding Hardware | 0 | 156 |

1454-2022



GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC



IRONRIDGE
REPORTS

DOC ID

DATE: 10/4/2022

CREATED BY: JPL

REVIEWED BY:

REVISIONS

PV-7

| Project Details | | | |
|-------------------|--|----------------------|------------|
| Name | 1454 Pope Road | Date | 10/05/2022 |
| Location | 1454 Pope Road, Dunn, NC 28334 | Total modules | 57 |
| Module | Hanwha Q.Cells: Q.PEAK DUO BLK ML-G10+ 400 (32mm) | Total watts | 22,800 |
| Dimensions | Dimensions: 73.98" x 41.14" x 1.26" (1879.0mm x 1045.0mm x 32.0mm) | Attachments | 156 |
| ASCE | 7-16 | Rails per row | 2 |

| System Weight | |
|----------------------------|-------------|
| Total system weight | 3,620.4 lbs |
| Weight/attachment | 23.2 lbs |
| Racking weight | 855.9 lbs |
| Distributed weight | 3.0 psf |

| Load Assumptions | |
|-------------------------------------|----------|
| Wind exposure | B |
| Wind speed | 121 mph |
| Ground snow load | 10 psf |
| Attachment spacing landscape | 6.0' |
| Site Elevation | 208.0 ft |
| S_{DS} | 0.14 |

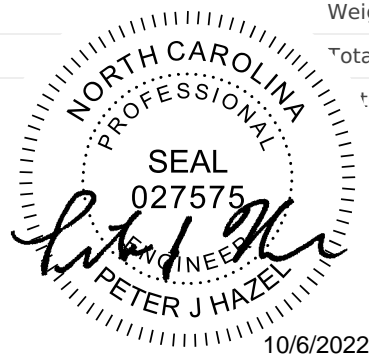
| Roof Information | | | |
|-----------------------------|--------------|----------------------------|--------------|
| Roof Material Family | Comp Shingle | Roof material | Comp Shingle |
| Building height | 30 ft | Roof attachment | Flashfoot2 |
| Roof slope | 45 ° | Attachment hardware | Square |
| Risk category | II | | |
| Roof shape | Gable | | |

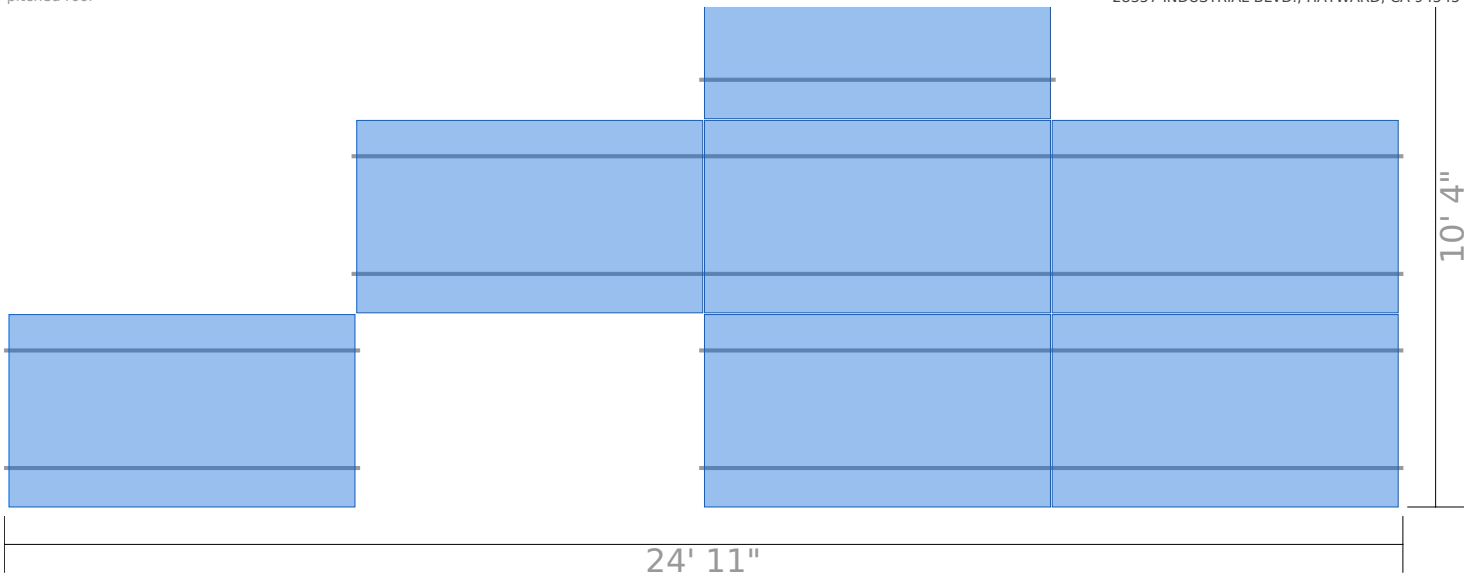
| Span Details XR100 - Landscape | | | |
|--------------------------------|-----------------|----------|----------------|
| Zone | Module Position | Max span | Max cantilever |
| Zone 1/2e/2r | Normal | 10' 2" | 3' |
| Zone 2n/3r | Normal | 10' 2" | 3' |
| Zone 3e | Normal | 10' 2" | 3' |

| Reaction Forces XR100 - Landscape | | | | |
|-----------------------------------|-----------------|------------|--------------|---------------|
| Zone | Module Position | Down (lbs) | Uplift (lbs) | Lateral (lbs) |
| Zone 1/2e/2r | Normal | 122 | 173 | 43 |
| Zone 2n/3r | Normal | 122 | 195 | 43 |
| Zone 3e | Normal | 122 | 246 | 43 |

| Roof Section 1 | | |
|------------------------------|---------------------------------|-----------------------------|
| Details | | Weights |
| Panels: 7 | Provided rail: 140' [10 x 168"] | Total weight: 464.7 lbs |
| Rail orientation: East-West | Attachments: 22 | Weight/attachment: 21.1 lbs |
| Panel orientation: Landscape | Splices: 2 | Total Area: 150.8 sq ft |
| Entry type: Graphical | Clamps: 22 | tributed weight: 3.1 psf |

Diagram





Segments

| Identifier | Columns | Row length | Rail length | Cantilever | Rail | Attachments | Splices | Clamps |
|-----------------------------------|---------|------------|-------------|------------|-----------------------|-------------|----------|----------|
| A | 1 | 6' 4" | 6' 4" | 2" | 28' [2 x 168"] | 4 | 0 | 4 |
| Row segment totals (x 2) → | | | | | 56' [4 x 168"] | 8 | 0 | 8 |
| B | 3 | 18' 9" | 18' 9" | 4" | 56' [4 x 168"] | 8 | 2 | 8 |
| C | 2 | 12' 6" | 12' 6" | 3" | 28' [2 x 168"] | 6 | 0 | 6 |

Contour Plan - Trim Cut List

| Identifier | Scrap from | Length | Scraps Created | Discard |
|------------|------------|--------|----------------|---------|
|------------|------------|--------|----------------|---------|

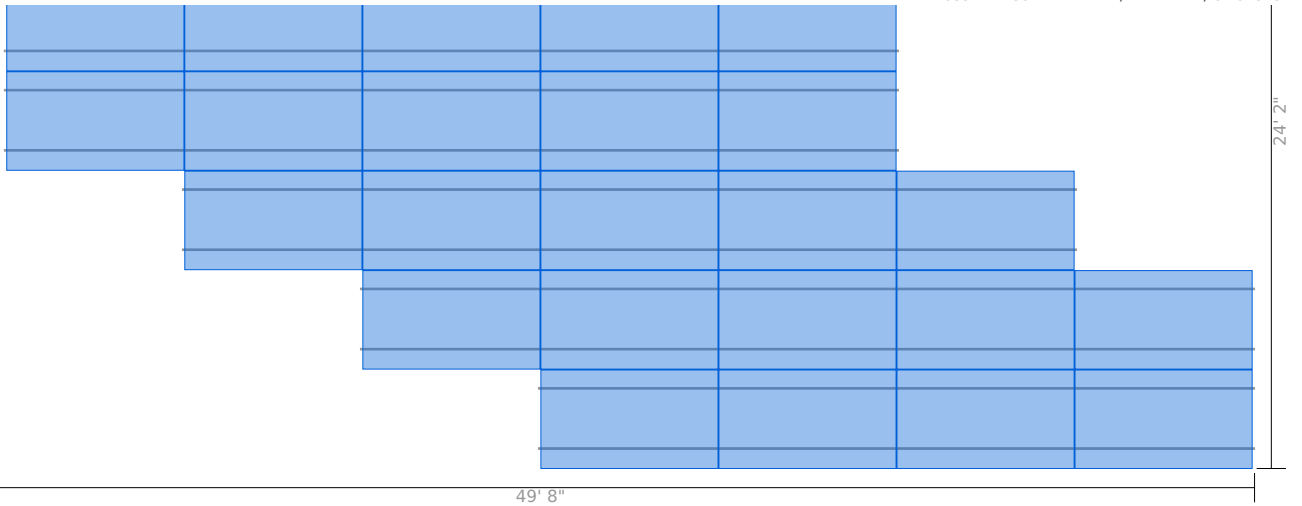
Roof Section 2

Details

| | | |
|------------------------------|--|-----------------------------|
| Panels: 30 | Provided rail: 440' [12 x 168", 16 x 204"] | Total weight: 1,856.7 lbs |
| Rail orientation: East-West | Attachments: 74 | Weight/attachment: 25.1 lbs |
| Panel orientation: Landscape | Splices: 14 | Total Area: 644.0 sq ft |
| Entry type: Graphical | Clamps: 74 | Distributed weight: 2.9 psf |

Diagram





Segments

| Identifier | Columns | Row length | Rail length | Cantilever | Rail | Attachments | Splices | Clamps |
|-----------------------------------|---------|------------|-------------|------------|-------------------------|-------------|----------|-----------|
| A | 3 | 18' 9" | 18' 9" | 4" | 56' [4 x 168"] | 8 | 2 | 8 |
| Row segment totals (x 2) → | | | | | 112' [8 x 168"] | 16 | 4 | 16 |
| B | 5 | 31' 1" | 31' 1" | 7" | 68' [4 x 204"] | 12 | 2 | 12 |
| Row segment totals (x 4) → | | | | | 272' [16 x 204"] | 48 | 8 | 48 |
| C | 4 | 24' 11" | 24' 11" | 6" | 56' [4 x 168"] | 10 | 2 | 10 |

Contour Plan - Trim Cut List

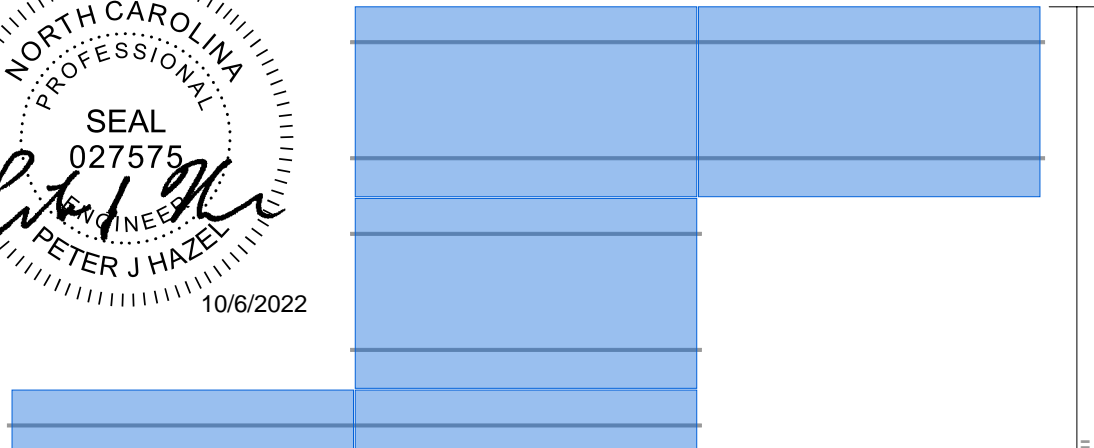
| Identifier | Scrap from | Length | Scraps Created | Discard |
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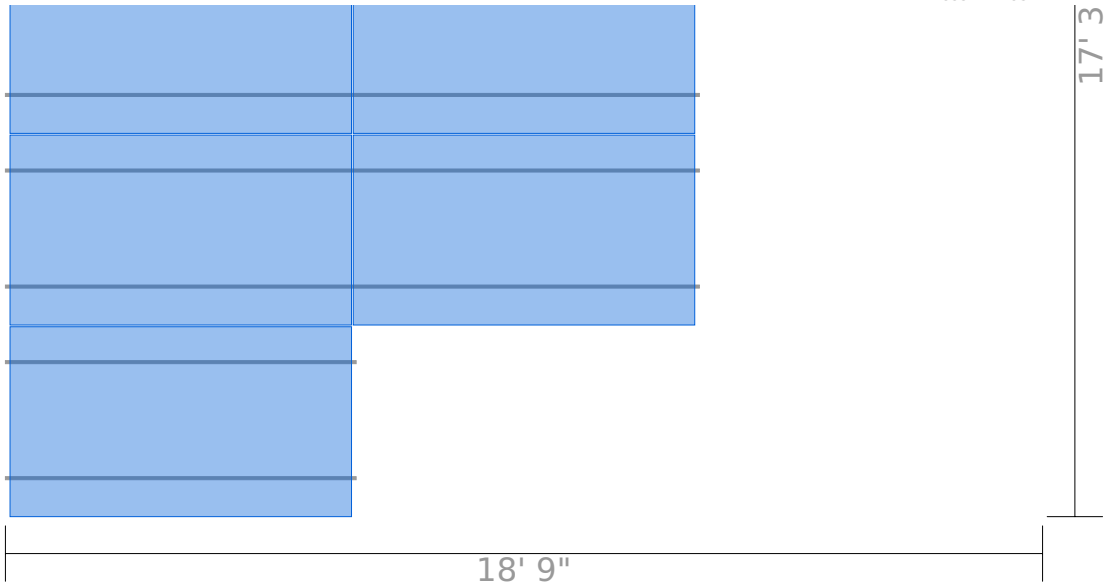
Roof Section 3

Details

| Details | Weights | |
|------------------------------|---------------------------------|-----------------------------|
| Panels: 8 | Provided rail: 140' [10 x 168"] | Total weight: 517.1 lbs |
| Rail orientation: East-West | Attachments: 26 | Weight/attachment: 19.9 lbs |
| Panel orientation: Landscape | Splices: 0 | Total Area: 173.2 sq ft |
| Entry type: Graphical | Clamps: 26 | Distributed weight: 3.0 psf |

Diagram





Segments

| Identifier | Columns | Row length | Rail length | Cantilever | Rail | Attachments | Splices | Clamps |
|-----------------------------------|---------|------------|-------------|------------|-----------------------|-------------|----------|-----------|
| A | 2 | 12' 6" | 12' 6" | 3" | 28' [2 x 168"] | 6 | 0 | 6 |
| Row segment totals (x 3) → | | | | | 84' [6 x 168"] | 18 | 0 | 18 |
| B | 1 | 6' 4" | 6' 4" | 2" | 28' [2 x 168"] | 4 | 0 | 4 |
| Row segment totals (x 2) → | | | | | 56' [4 x 168"] | 8 | 0 | 8 |

Contour Plan - Trim Cut List

| Identifier | Scrap from | Len | Created | Discard |
|------------|------------|-----|---------|---------|
|------------|------------|-----|---------|---------|

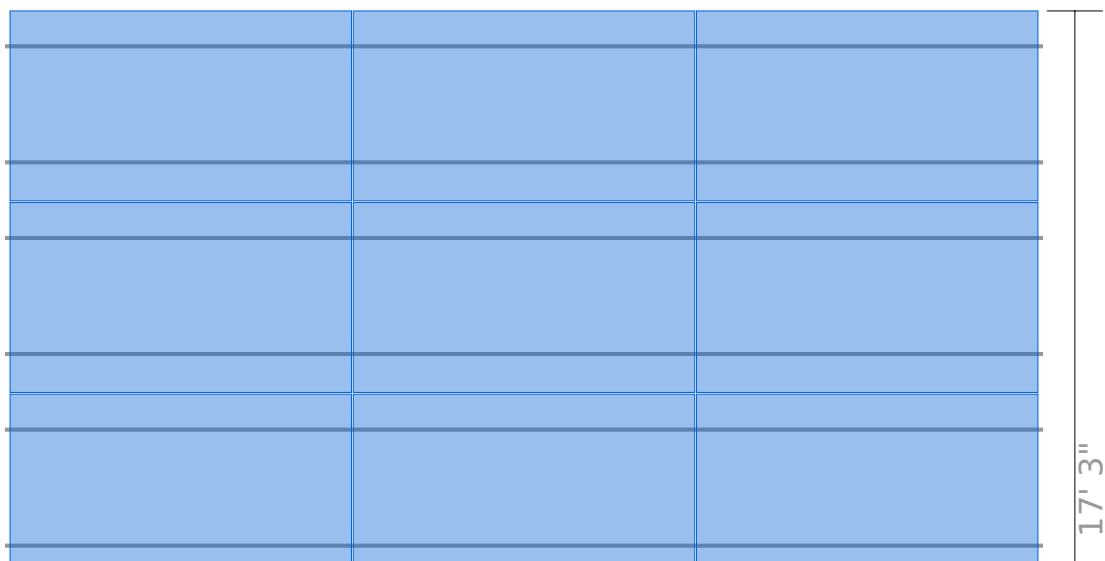
Roof Section 4

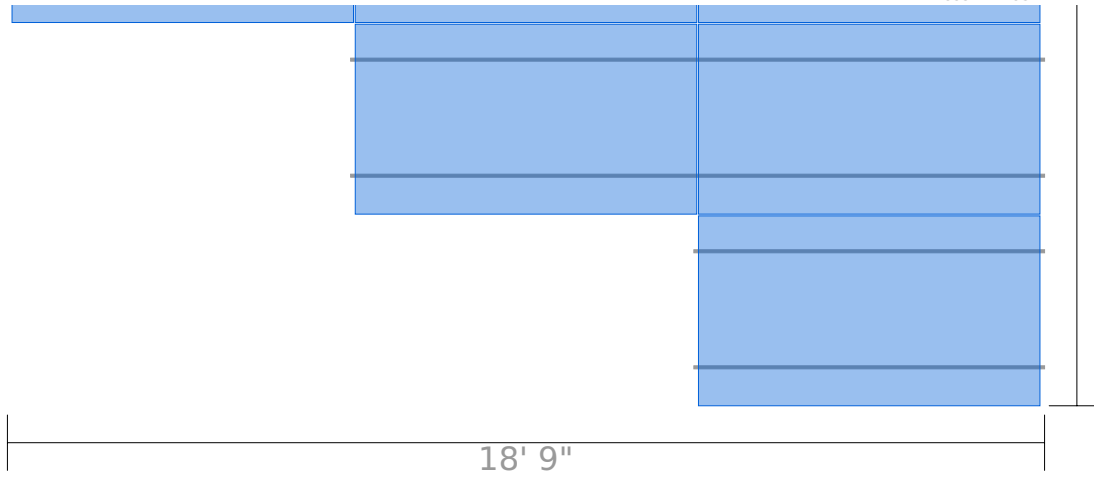
Details

| | | |
|------------------------------|-------------------------|-----------------------------|
| Panels: 12 | Provided rail: 224' [16 | Weight: 782.0 lbs |
| Rail orientation: East-West | Attachments: 34 | Weight/attachment: 23.0 lbs |
| Panel orientation: Landscape | Splices: 6 | Total Area: 258.4 sq ft |
| Entry type: Graphical | Clamps: 34 | Distributed weight: 3.0 psf |



Diagram





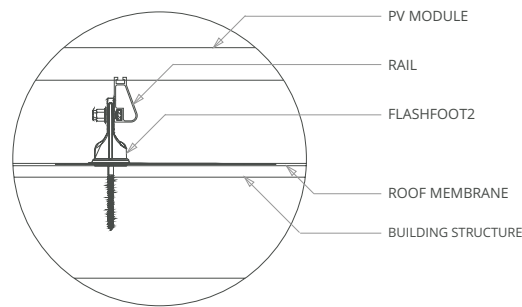
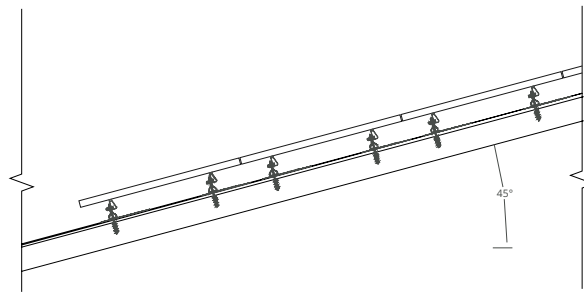
Segments

| Identifier | Columns | Row length | Rail length | Cantilever | Rail | Attachments | Splices | Clamps |
|-----------------------------------|---------|------------|-------------|------------|-------------------------|-------------|----------|-----------|
| A | 3 | 18' 9" | 18' 9" | 4" | 56' [4 x 168"] | 8 | 2 | 8 |
| Row segment totals (x 3) → | | | | | 168' [12 x 168"] | 24 | 6 | 24 |
| B | 2 | 12' 6" | 12' 6" | 3" | 28' [2 x 168"] | 6 | 0 | 6 |
| C | 1 | 6' 4" | 6' 4" | 2" | 28' [2 x 168"] | 4 | 0 | 4 |

Contour Plan - Trim Cut List

| Identifier | Scrap from | Length | Scraps Created | Discard |
|------------|------------|--------|----------------|---------|
| | | | | |

Side View (landscape)



powered by
Q.ANTUM DUO Z

Q.PEAK DUO BLK ML-G10+

385-405

ENDURING HIGH PERFORMANCE



BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti-LID Technology, Anti-PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

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



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96h)

² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

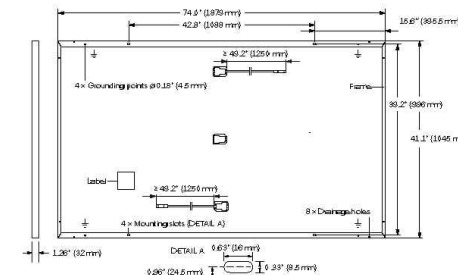


Engineered in Germany



MECHANICAL SPECIFICATION

| | |
|--------------|---|
| Format | 74.0 in x 41.1 in x 1.26 in (including frame) (1879 mm x 1045 mm x 32 mm) |
| Weight | 48.5 lbs (22.0 kg) |
| Front Cover | 0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology |
| Back Cover | Composite film |
| Frame | Black anodized aluminum |
| Cell | 6 x 22 monocrystalline Q.ANTUM solar half cells |
| Junction Box | 2.09-3.98 in x 1.26-2.36 in x 0.59-0.71 in (53-101 mm x 32-60 mm x 15-18 mm), IP67, with bypass diodes |
| Cable | 4 mm ² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm) |
| Connector | Stäubli MC4; IP68 |

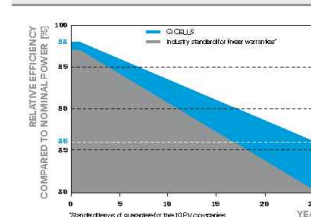


ELECTRICAL CHARACTERISTICS

| POWER CLASS | 385 | 390 | 395 | 400 | 405 | |
|---|----------------------|--------|--------|--------|--------|--------|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W) | | | | | | |
| Power at MPP ² | P _{MPP} [W] | 385 | 390 | 395 | 400 | 405 |
| Short Circuit Current ³ | I _{SC} [A] | 11.04 | 11.07 | 11.10 | 11.14 | 11.17 |
| Open Circuit Voltage ⁴ | V _{OC} [V] | 45.19 | 45.23 | 45.27 | 45.30 | 45.34 |
| Current at MPP | I _{MPP} [A] | 10.59 | 10.65 | 10.71 | 10.77 | 10.83 |
| Voltage at MPP | V _{MPP} [V] | 36.36 | 36.62 | 36.88 | 37.13 | 37.39 |
| Efficiency ⁵ | η [%] | ≥ 19.6 | ≥ 19.9 | ≥ 20.1 | ≥ 20.4 | ≥ 20.6 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ² | | | | | | |
| Power at MPP | P _{MPP} [W] | 288.8 | 292.6 | 296.3 | 300.1 | 303.8 |
| Short Circuit Current | I _{SC} [A] | 8.90 | 8.92 | 8.95 | 8.97 | 9.00 |
| Open Circuit Voltage | V _{OC} [V] | 42.62 | 42.65 | 42.69 | 42.72 | 42.76 |
| Current at MPP | I _{MPP} [A] | 8.35 | 8.41 | 8.46 | 8.51 | 8.57 |
| Voltage at MPP | V _{MPP} [V] | 34.59 | 34.81 | 35.03 | 35.25 | 35.46 |

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 2800 W/m², NMOT, spectrum AM 1.5

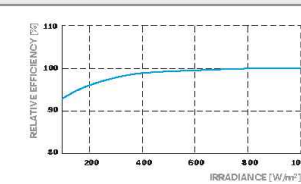
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

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

PERFORMANCE AT LOW IRRADIANCE



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

TEMPERATURE COEFFICIENTS

| | | | | | |
|---|---------|-------|--|-----------|-----------------------|
| Temperature Coefficient of I _{SC} | α [%/K] | +0.04 | Temperature Coefficient of V _{OC} | β [%/K] | -0.27 |
| Temperature Coefficient of P _{MPP} | γ [%/K] | -0.34 | Nominal Module Operating Temperature | NMOT [°F] | 109 ± 5.4 (43 ± 3 °C) |

PROPERTIES FOR SYSTEM DESIGN

| | | | | |
|--|------------------------|----------------------------|---|---|
| Maximum System Voltage V _{GIS} | [V] | 1000 (IEC)/1000 (UL) | PV module classification | Class II |
| Maximum Series Fuse Rating | [A DC] | 20 | Fire Rating based on ANSI/UL 61730 | TYPE 2 |
| Max. Design Load, Push / Pull ² | [lbs/ft ²] | 75 (3600 Pa)/55 (2660 Pa) | Permitted Module Temperature on Continuous Duty | -40 °F up to +185 °F (-40 °C up to +85 °C) |
| Max. Test Load, Push / Pull ² | [lbs/ft ²] | 113 (5400 Pa)/84 (4000 Pa) | | |

² See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells), QCPV Certification ongoing.



PACKAGING INFORMATION

| | | | | | | | |
|----------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|
| Horizontal packaging | 76.4 in 1940 mm | 43.3 in 1100 mm | 48.0 in 1220 mm | 1656 lbs 751 kg | 24 pallets | 24 pallets | 32 modules |
|----------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|

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

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

1454-2022



GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC

MODULE CUTSHEET

DOC ID

DATE: 10/4/2022

CREATED BY: JPL

REVIEWED BY:

REVISIONS

E-1

Specifications subject to technical change © Q CELLS Q.PEAK DUO BLK ML-G10+...385-405_2021-05_Rev01_NA

Data Sheet
Enphase Networking

Enphase IQ Combiner 4/4C

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



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



To learn more about Enphase offerings, visit enphase.com

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



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 | - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites |
| COMMS-CELLMODEM-M1-06 | - 4G based LTE-M1 cellular modem with 5-year Sprint data plan |
| CELLMODEM-M1-06-SP-05 | - 4G based LTE-M1 cellular modem with 5-year AT&T data plan |
| CELLMODEM-M1-06-AT-05 | |
| Circuit Breakers | Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. |
| BRK-10A-2-240V | Circuit breaker, 2 pole, 10A, Eaton BR210 |
| BRK-15A-2-240V | Circuit breaker, 2 pole, 15A, Eaton BR215 |
| BRK-20A-2P-240V | Circuit breaker, 2 pole, 20A, Eaton BR220 |
| BRK-15A-2P-240V-B | Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support |
| BRK-20A-2P-240V-B | 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 | <ul style="list-style-type: none"> • 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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GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC

COMBINER CUTSHEET

DOC ID

DATE: 10/4/2022

CREATED BY: JPL

REVIEWED BY:

REVISIONS

E-2



DATA SHEET



IQ8 and IQ8+ Microinverters

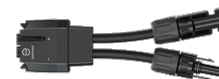
Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit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



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



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



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



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

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IQ8SP-DS-0002-01-EN-US-2021-10-19

Easy to install

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

High productivity and reliability

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

Microgrid-forming

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

IQ8 and IQ8+ Microinverters

| INPUT DATA (DC) | | IQ8-60-2-US | IQ8PLUS-72-2-US |
|--|----|---|---|
| Commonly used module pairings ¹ | W | 235 - 350 | 235 - 440 |
| Module compatibility | | 60-cell/120 half-cell | 60-cell/120 half-cell and 72-cell/144 half-cell |
| MPPT voltage range | V | 27 - 37 | 29 - 45 |
| Operating range | V | 25 - 48 | 25 - 58 |
| Min/max start voltage | V | 30 / 48 | 30 / 58 |
| Max input DC voltage | V | 50 | 60 |
| Max DC current ² [module Isc] | A | | 15 |
| Overtoltage class DC port | | | II |
| DC port backfeed current | mA | | 0 |
| PV array configuration | | 1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit | |
| OUTPUT DATA (AC) | | IQ8-60-2-US | IQ8PLUS-72-2-US |
| Peak output power | VA | 245 | 300 |
| Max continuous output power | VA | 240 | 290 |
| Nominal (L-L) voltage/range ³ | V | 240 / 211 - 264 | |
| Max continuous output current | A | 1.0 | 1.21 |
| Nominal frequency | Hz | 60 | |
| Extended frequency range | Hz | 50 - 68 | |
| Max units per 20 A (L-L) branch circuit ⁴ | | 16 | 13 |
| Total harmonic distortion | | <5% | |
| Overtoltage class AC port | | III | |
| AC port backfeed current | mA | 30 | |
| Power factor setting | | 1.0 | |
| Grid-tied power factor (adjustable) | | 0.85 leading - 0.85 lagging | |
| Peak efficiency | % | 97.5 | 97.6 |
| CEC weighted efficiency | % | 97 | 97 |
| Night-time power consumption | mW | 60 | |
| MECHANICAL DATA | | | |
| Ambient temperature range | | -40°C to +60°C (-40°F to +140°F) | |
| Relative humidity range | | 4% to 100% (condensing) | |
| DC Connector type | | MC4 | |
| Dimensions (HxWxD) | | 212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2") | |
| Weight | | 1.08 kg (2.38 lbs) | |
| Cooling | | Natural convection - no fans | |
| Approved for wet locations | | Yes | |
| Acoustic noise at 1 m | | <60 dBA | |
| Pollution degree | | PD3 | |
| Enclosure | | Class II double-insulated, corrosion resistant polymeric enclosure | |
| Environ. category / UV exposure rating | | NEMA Type 6 / outdoor | |
| COMPLIANCE | | | |
| Certifications | | CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 | |
| | | This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions. | |

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

IQ8SP-DS-0002-01-EN-US-2021-10-19

GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC

INVERTER CUTSHEET

DOC ID

DATE: 10/4/2022

CREATED BY: JPL

REVIEWED BY:

REVISIONS

E-3

1454-2022

EMPWR
SOLAR

GRID-TIED SOLAR POWER SYSTEM

SHARON MOSCONI
1454 POPE RD.
DUNN, NC 28334

22.8KW DC 16.53KW AC

DISCONNECT
CUTSHEET

DOC ID

DATE: 10/4/2022

CREATED BY: JPL

REVIEWED BY:

REVISIONS

E-4



pe.eaton.com



General Duty Cartridge Fuse Safety Switch

DG223NRB

UPC: 782113144252

Dimensions: 6.42 IN * 8.82 IN * 7 IN (L * W * H)

Notes: Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

Warranty: Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

Specifications:

- Amperage Rating: 100A
- Enclosure: NEMA 3R
- Enclosure Material: Painted galvanized steel
- Fuse Class Provision: Class H fuses
- Fuse Configuration: Fusible with neutral
- Number Of Poles: Two-pole
- Number Of Wires: Three-wire
- Product Category: General Duty Safety Switch
- Voltage Rating: 240V
- Type: General Duty/Cartridge Fuse

Supporting documents:

- [Eatons Volume 2-Commercial Distribution Catalog](#)
- [Drawing Dataset Drawing](#)

Certifications:

- UL Listed

Product compliance: No Data

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SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included



SolaDeck Model SD 0783



SolaDeck UL50 Type 3R Enclosures

Available Models:

Model SD 0783 - (3" fixed Din Rail)

Model SD 0786 - (6" slotted Din Rail)



SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

**Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 1- Power Distribution Block 600VDC 175AMP
- 1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

**Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 4- Din Rail Mounted Terminal Blocks
- Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.



Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.



Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.



Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

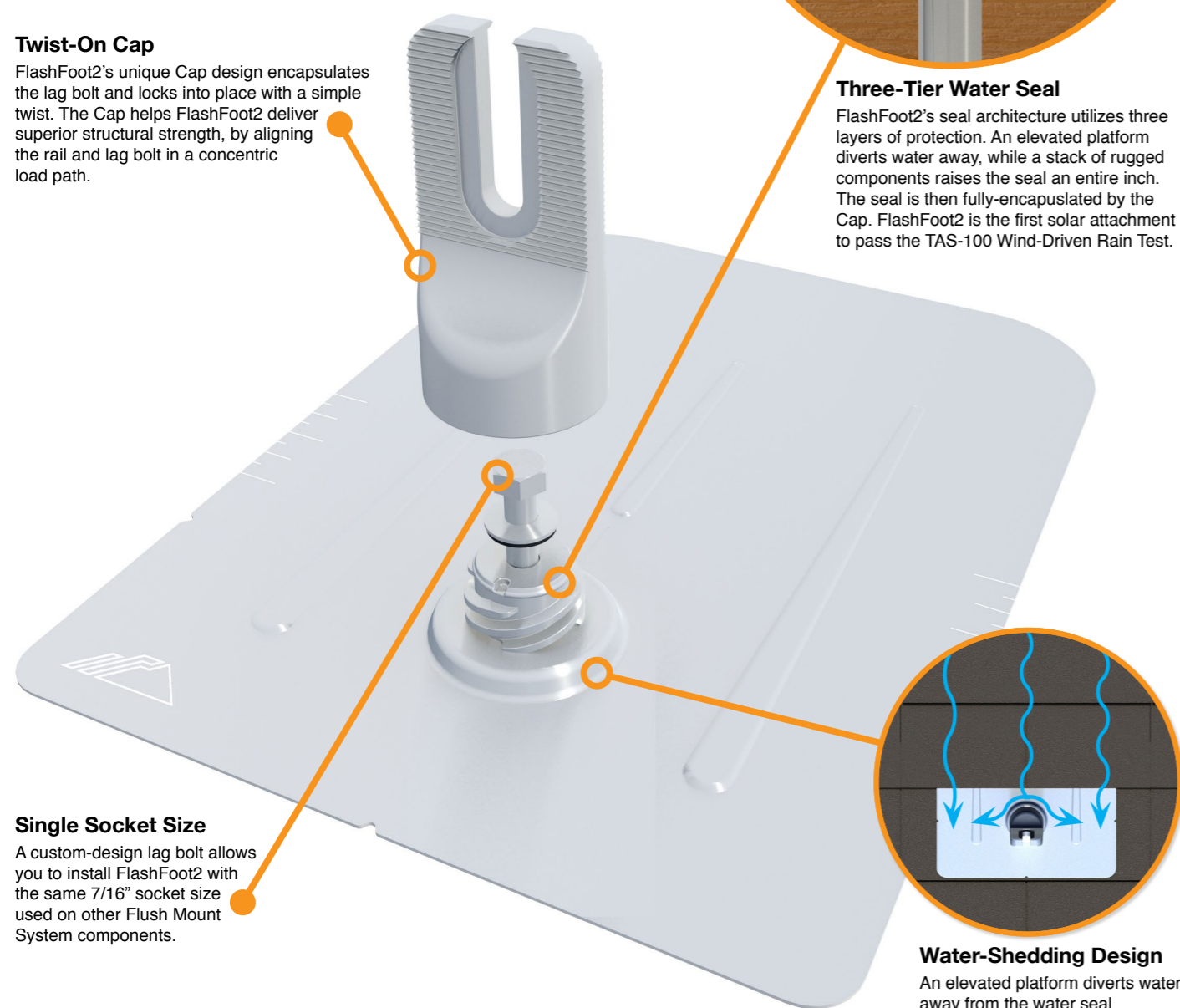
FlashFoot2

The Strongest Attachment in Solar

IronRidge FlashFoot2 raises the bar in solar roof protection. The unique water seal design is both elevated and encapsulated, delivering redundant layers of protection against water intrusion. In addition, the twist-on Cap perfectly aligns the rail attachment with the lag bolt to maximize mechanical strength.

Twist-On Cap

FlashFoot2's unique Cap design encapsulates the lag bolt and locks into place with a simple twist. The Cap helps FlashFoot2 deliver superior structural strength, by aligning the rail and lag bolt in a concentric load path.



Three-Tier Water Seal

FlashFoot2's seal architecture utilizes three layers of protection. An elevated platform diverts water away, while a stack of rugged components raises the seal an entire inch. The seal is then fully-encapsulated by the Cap. FlashFoot2 is the first solar attachment to pass the TAS-100 Wind-Driven Rain Test.

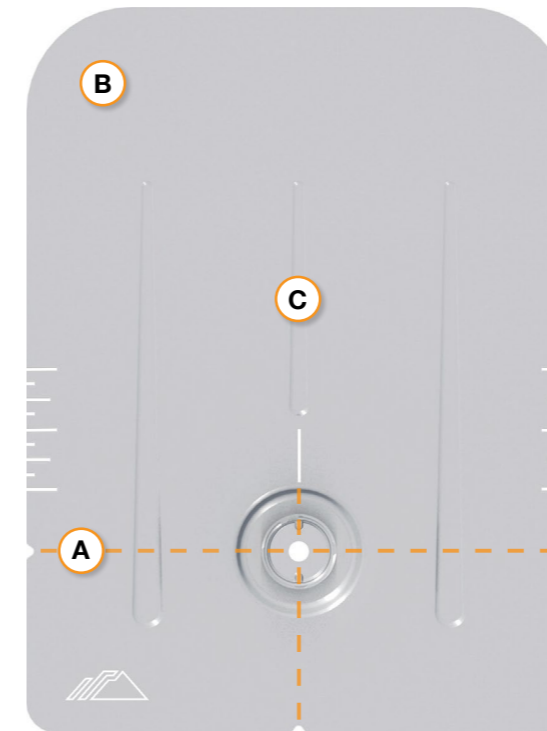
Single Socket Size

A custom-design lag bolt allows you to install FlashFoot2 with the same 7/16" socket size used on other Flush Mount System components.

Water-Shedding Design

An elevated platform diverts water away from the water seal.

Installation Features



A Alignment Markers

Quickly align the flashing with chalk lines to find pilot holes.

B Rounded Corners

Makes it easier to handle and insert under the roof shingles.

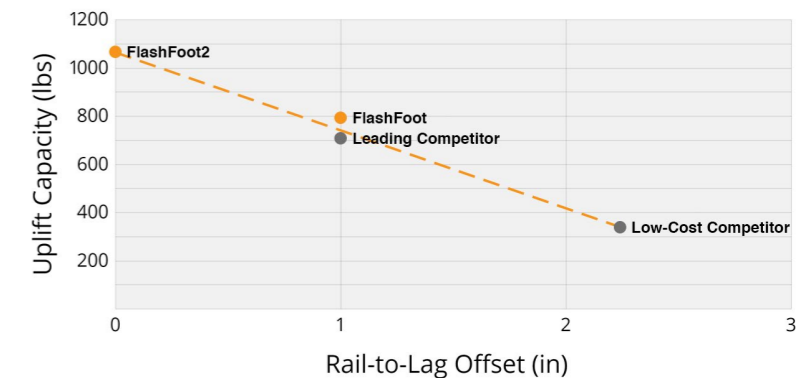
C Reinforcement Ribs

Help to stiffen the flashing and prevent any bending or crinkling during installation.

Benefits of Concentric Loading

Traditional solar attachments have a horizontal offset between the rail and lag bolt, which introduces leverage on the lag bolt and decreases uplift capacity.

FlashFoot2 is the only product to align the rail and lag bolt. This concentric loading design results in a stronger attachment for the system.



Testing & Certification

Structural Certification

Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7.

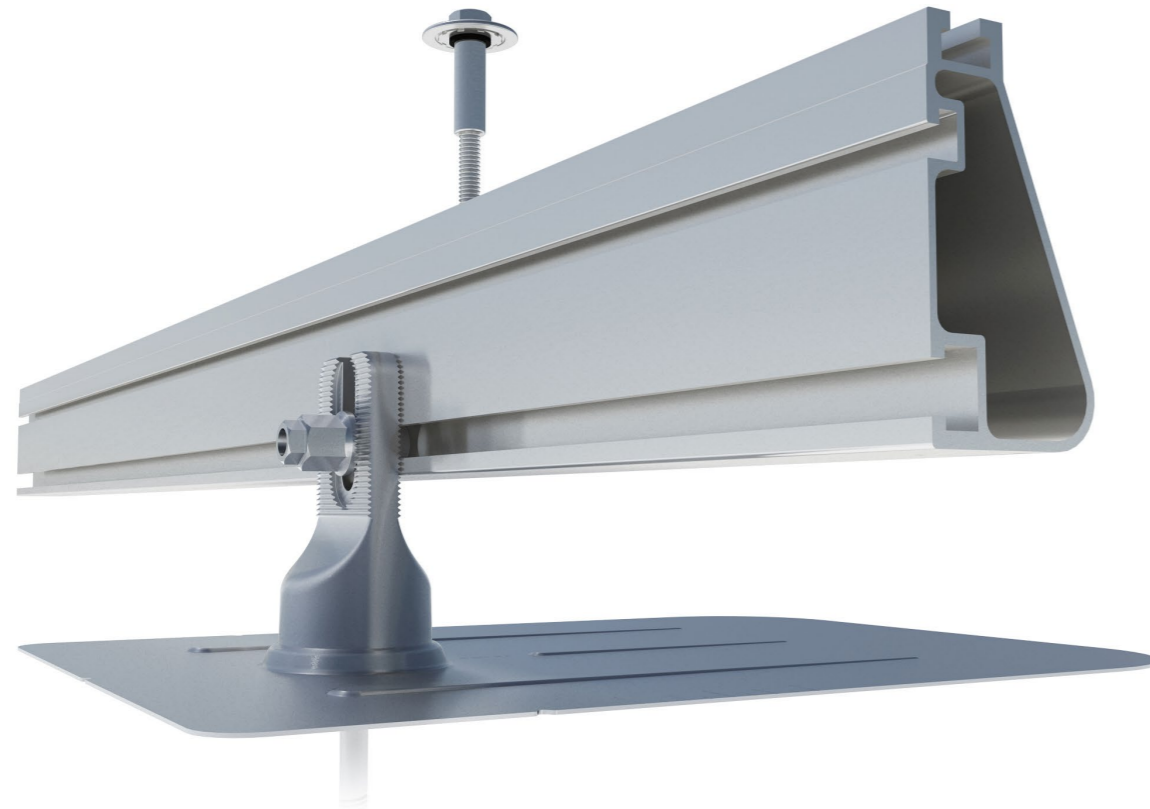
Water Seal Ratings

Water Sealing Tested to UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind Driven Rain Test" by Intertek. Ratings applicable for composition shingle roofs having slopes between 2:12 and 12:12.

UL 2703

Conforms to UL 2703 Mechanical and Bonding Requirements. See Flush Mount Install Manual for full ratings.

Flush Mount System



Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Every component has been tested to the limit and proven in extreme environments.

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.

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

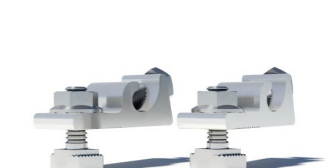
CAMO



Bond modules to rails while staying completely hidden.

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

Grounding Lugs



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

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

Slotted L-Feet



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

Bonding Hardware



Bond and attach XR Rails to roof attachments.

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

Resources



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



NABCEP Certified Training
 Earn free continuing education credits, while learning more about our systems.
[Go to IronRidge.com/training](https://www.ironridge.com/training)

Attn: Corey Geiger, COO, IronRidge Inc.

Date: August 31st, 2021

Re: Structural Certification and Span Tables for IronRidge Flush Mount System

This letter addresses the structural performance and code compliance of IronRidge's Flush Mount System. The contents of the letter shall be read in its entirety before being applied to any project design. The Flush Mount System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum XR Rails and secured to the rails with IronRidge mounting clamps. The XR Rails are side mounted to a selected roof attachment with 3/8" stainless steel bonding hardware and then attached directly to the roof structure or to a stanchion that is fastened to the underlying roof structure. Assembly details of a typical Flush Mount installation and its core components are shown in Exhibit EX-0015.

The IronRidge Flush Mount System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- 2015 International Building Code (IBC-2015)
- 2018 North Carolina State Building Code
- 2015 Aluminum Design Manual (ADM-2015)

The tables included in this letter provide the maximum allowable spans of XR Rails in the Flush Mount System for the respective loads and configurations listed, covering wind exposure categories B, C, & D, roof zones 1, 2 & 3, and roof slopes from 8° to 45°. The span tables are applicable provided that the following conditions are met:

1. *Span* is the distance between two adjacent roof attachment points (measured at the center of the attachment fastener)
2. The underlying roof slope, measured between roof surface and horizontal plane, is 8° to 45°.
3. Each module shall be supported by 2 rails (2 rail system) or 3 rails (3 rail system). Spans are calculated based on 2 rail systems, and conservatively deemed acceptable for 3 rail systems.
4. The *mean roof height*, defined as the average of the roof eave height and the roof ridge height measured from grade, does not exceed 30 feet.
5. Module length and area shall not exceed the maximum values listed on the respective span tables.
6. All Flush Mount components shall be installed in a professional workmanlike manner per IronRidge's *Flush Mount installation manual* and other applicable standards for general roof construction practice.

The parameters and adjustments allowed in the span tables are defined as the following:

1. The Flush Mount System is designed as a Risk Category II structure as defined by ASCE 7-10 Chart 1.5-1.
2. The wind speed selection shall conform to ASCE 7-10 Fig. 26.5-1A (Risk Category II wind) and any state & local county/city amendments to the IBC. No special wind topographic features are included in the span tables and the topographic coefficient (K_{zt}) is taken as 1.0.
3. The snow load used in the span tables is the *ground snow* and shall conform to ASCE 7-10 Fig. 7-1 and applicable state & local county/city amendments to the IBC. If the local jurisdiction specified snow load is in the format of a flat roof snow load, it shall first be converted to a ground snow following the local building code/amendment before the application of the attached span tables. No special snow conditions are considered including unbalanced, drifting, sliding, retention, or ponding snow. The span tables do not include buildings which are intentionally kept below freezing, kept just above freezing, or unheated.
4. The span tables reflect the ASCE 7 prescribed earthquake loads with the maximum magnitudes being:
 - 1) For ground snow no greater than 42psf: $S_s \leq 2.0g$ for Site Class A, B, C, or D.
 - 2) For ground snow greater than 65psf: $S_s \leq 1.0g$ for Site Class A, B, C, or D.
 - 3) For ground snow between 42 and 65psf: $S_s \leq 1.5g$ for Site Class A, B, C, or D.
5. Roof zone size and definition conforms to ASCE 7-10 Fig. 30.4-2A to 30.4-2C.
6. Allowable span length in the charts may be multiplied by a factor of 1.08 if the rails are continuous over a minimum of three spans.
7. The maximum rail cantilever length, measured from the rail end to the nearest attachment point, shall be the lesser of the following two conditions: 40% of the allowable span provided for the respective load & configuration condition from the span tables, or 36".
8. An array to roof clearance of 2" minimum must be provided.
9. No splices are allowed in the rail cantilever. For each XR splice type install per the following requirements:
 - a) XR Bonded Splice cannot be installed in the center 1/3 of interior spans, or the outer 2/3 of end spans.
 - b) BOSS Splice can be installed at any location within a span.
10. Shaded cells of the span tables indicate conditions in which UFO Mid Clamp connection capacity is exceeded. If such conditions are encountered contact support@ironridge.com.
11. When a roof attachment listed in IronRidge's Flush Mount *installation manual* is considered, the span values provided in this letter can be adjusted using IronRidge's online Design Assistant by checking the capacity of the selected roof attachment against the reaction forces provided in Design Assistant.

12. Systems using CAMO module clamps shall be installed with the following guidance:

- 1) For single module installations (“orphan modules”) using modules with a length greater than 67.5”, CAMO clamps shall not be installed in regions that experience ground snow loads of 70psf and greater: such scenarios are shown by asterisks in the applicable span table.
- 2) CAMO will function within a module’s design load ratings. Be sure the specific module being used with CAMO meets the dimensional requirements shown in the figure below and that the module selected is suitable for the environmental conditions of a particular project.

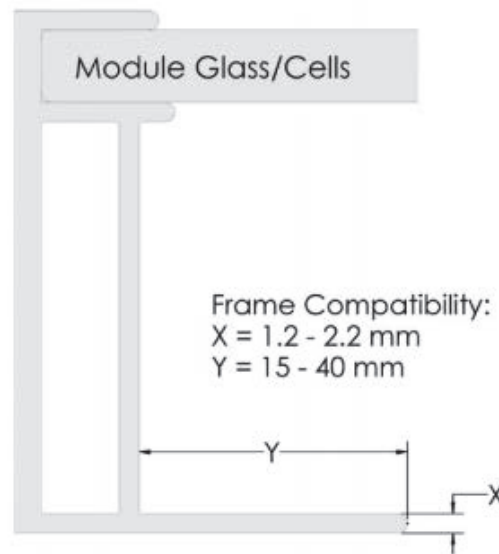


Figure 1: CAMO Module Frame Dimensional Requirements

The span tables provided in this letter are certified based on the structural performance of IronRidge XR Rails only with no consideration of the structural adequacy of the chosen roof attachments, PV modules, or the underlying roof supporting members. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the aforementioned system components in regards to the applied or resultant loads of any chosen array configuration.

Sincerely,

A handwritten signature in blue ink that reads "Gang Xuan".

2021.08.31

18:04:27

-07'00'

Gang Xuan, PE
Senior Structural Engineer