



1011 N Causeway Blvd, Suite 19 ♦ Mandeville, Louisiana 70471 ♦ Phone: 985.624.5001 ♦ Fax: 985.624.5303

Tuesday, October 24, 2023

Property Owner: Kiddian Gonzalez

Property Address: 1651 Raynor McLamb Road, Linden, NC 28356

RE: Photovoltaic System Roof Installations

I have reviewed the existing structure referenced above to determine the adequacy of the existing structure to support the proposed installation of an array of solar panels on the roof.

Based on my review, the existing structure meets or exceeds applicable codes listed below to support the proposed solar panel installation. This assessment is based on recent on-site inspection by solar inspectors and photographs of the existing structure. The photovoltaic system is designed to withstand uplift and downward forces. The structural considerations used in our review and assessment include the following:

Evaluation Criteria:

Applied Codes: ASCE 7-10 NCBC 2018 NCRC 2018 NEC 2020

Risk Category: II

Design Wind Speed (3-second gust): 118 mph

Wind Exposure Category: C

Ground Snow Load: 10 PSF

Seismic Short Period Acceleration (SDS): 0.208

Existing Structure:

Roof Material: Shingle

Roof Structure: 2x6 Rafters

Roof Slope: 5/12

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MANDEVILLE, LA 70471
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NORTH CAROLINA FIRM NO. C4113

PRINCIPAL Infrastructure®

Architecture ♦ Engineering ♦ Construction

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Effect of the Solar Array on Structure Loading:

Gravity Load:

The existing structure was evaluated using gravity load combinations including dead, snow, and live loads per IRC Section R324.4. Connections of the mounts to the underlying structure are to be installed in a staggered pattern, except at the array ends, to distribute the loading evenly to the roof structure. The stresses within the rafters or truss top chord due to the introduction of discrete mount loads are within acceptable limits, as shown on the attached calculations.

Wind Load:

The solar panel array will be flush mounted (no more than 6" above the surrounding roof surface, and parallel to the roof surface). The component wind loads were evaluated and did not significantly increase the wind load on the structure. The array structure is designed by the manufacturer to withstand uplift and downward forces resulting from wind and snow loads. The attached calculations verify the capacity of the connection of the solar array to the roof to resist uplift due to wind loads, the governing load case.

Snow Load:

The reduced friction of the glass surface of the solar panels allows for the lower slope factor (Cs) per Section 7.4 of ASCE 7.10 resulting in a reduced design snow load for the structure. This analysis conservatively considered the snow load to be unchanged.

Seismic Load:

The solar panel installation represents an increase in the weight of the roof and corresponding lateral seismic loads of less than 10%. By code, therefore, re-analysis of the existing structure is not required.

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Conclusion:

To the best of my professional knowledge and belief, the subject construction and photovoltaic system installation will be in compliance with all state and local building codes and guidelines in effect at the time of our review.

Limitations:

Engineer's assessment of the existing structure is based on recent field reports and current photographs of the elements of the structure that were readily accessible at the time of inspection. The design of the solar panel racking (mounts, rails, connectors, etc.), connections between the racking and panels, and electrical construction related to the installation are the responsibility of others. The photovoltaic system installation must be by competent personnel in accordance with manufacturer recommendations and specifications and should meet or exceed industry standards for quality. The contractor is responsible for ensuring that the solar array is installed according to the approved plans and must notify the engineer of any undocumented damage or deterioration of the structure, or of discrepancies between the conditions depicted in the approved plans and those discovered on site so that the project may be reevaluated and altered as required. Engineer does not assume any responsibility for improper installation of the proposed photovoltaic system.

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**Uplift and Wind Downforce Calculation Summary (ASCE 7-10)
Mount, Rack, & Panel Proportioning**

| | | | | |
|------------------|-------------------------|-----------------------------|------------|-----------|
| Property Owner: | Kiddian Gonzalez | Individual Panel Dimensions | | |
| Project Address: | 1651 Raynor McLamb Road | Length (in) | Width (in) | Area (sf) |
| City, State: | Linden, NC 28356 | 74 | 41.1 | 21.12 |

| Wind Load Calculation Summary (ASCE 7-10 C&C Provisions) | | | | |
|---|-------------|-------------|-----------------------------|--------|
| Building Characteristics, Design Input, and Adjustment Factors | | | | |
| Roof Dimensions: | Length (b): | 55 ft. | Least Dimension: | 31 ft. |
| | Width (w): | 31 ft. | | |
| Roof Height (h): | | 15 ft. | Must be less than 60 | ✓ |
| Pitch: | 5 on 12 = | 22.6° | Must be less than 45° | ✓ |
| Roof Configuration | | Gable | | |
| Roof Structure: | | 2x6 Rafters | | |
| Roof material: | | Plywood | | |
| Ultimate Wind Speed (mph): | | 118 | From ASCE 7-10, Fig. 26.5 | |
| Exposure Category: | | C | Para 26.7.3 | |
| Directionality Factor, K_d | | 0.85 | Table 26.6-1 | |
| Risk Category: | | 2 | Table 1.5-2 | |
| Exposure Coefficient, K_z | | 0.9 | Table 30.3-1 | |
| Topographic Adj., K_{zt} | | 1 | Fig. 26.8-1 | |
| Effective Wind Area (sf): | | 22 | (Area per individual panel) | |
| Velocity Pressure (psf), q_n : | | 27.27 | psf, Eq. 30.3-1 | |
| Internal Pressure Coeff, GC_{pi} | | 0.18 | Table 26.11-1 | |

| Roof Zone Strip (a), in ft, Fig. 30.5-1, Note 5 | |
|---|-------------------|
| 1 - Least Roof Horizontal Dimension (L or W) x 0.10 | 3.1 |
| 2 - Roof Height x 0.4 | 6 |
| 3 - Least Roof Horizontal Dimension (L or W) x 0.04 | 1.24 |
| 4 - Lesser of (1) and (2) | 3.1 |
| 5 - Greater of (3) and (4) | 3.1 |
| 6 - Greater of (5) and 3 feet | a= 3.1 ft. |

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| Net Design Wind Pressures | | | | | |
|--|-----------------|--------------|-----------------|-------------|---------------------------------------|
| (ASCE 7, Eq. 30.4.1; Load Factor for ASD = 0.6, per ASCE 7, 2.4.1) | | | | | |
| | Uplift (-psf) | | Down (psf) | | Description of Zone |
| | GC _p | Pressure | GC _p | Pressure | |
| Zone 1 | -0.88 | -17.3 | 0.39 | 16.0 | Interior Roof Area, >(a) ft from edge |
| Zone 2 | -1.52 | -27.8 | 0.38 | 16.0 | Strip of (a) ft wide at roof edge |
| Zone 3 | -2.39 | -42.0 | 0.35 | 16.0 | Corner intersection of Zone 2 strips |

| Snow Load | | |
|---|----------|--------------------|
| Ground Snow Load, p _g | 10.0 | From ASCE 7 or AHJ |
| Reducible (Y/N)? | | |
| Terrain Category: | C | Para 6.5.6.3 |
| Exposure | Fully | |
| Exposure Factor C _e | 0.9 | Table 7-2 |
| Thermal Factor, C _t | 1.0 | Table 7-3 |
| Importance Factor, I _s | 1.0 | Table 1.5.2 |
| Roof Configuration | Gable | |
| Roof Slope | 22.6° | |
| Distance from Eave to Ridge | 15.5 | |
| p _m , Minimum required Snow Load | N/A | Para. 7.3.4 |
| p _f , Calculated Snow Load | 6.30 | Eq. 7.3-1 |
| p _f , Design Snow Load | 6.30 psf | |

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| Mount Selection and Spacing | | |
|--|------------------------------|---|
| Manufacturer: | Unirac | Portrait Panel Orientation |
| Mount: | Flashkit Pro | Allowable Arrangement by Uplift Pressure |
| Substrate: | Wood Rafters/Truss Top Chord | ≤ 39 psf : 2 rails, mounts @ 4'-0" o.c. |
| Connector: | 3/8" - #16 Lag Bolt/Screws | 40 to 78 psf : 2 rails, mounts @ 2'-0" o.c. |
| | | 79 to 117 psf : 3 rails, mounts @ 2'-0" o.c. |
| Allowable Uplift: | 480lb, max. | 118 to 156 psf : 4 rails, mounts @ 2'-0" o.c. |
| Portrait Mount Layout | | ≥ 157 psf : Mount capacity exceeded |
| Zone 1 | 2 rails, mounts @ 4'-0" o.c. | |
| Zone 2 | 2 rails, mounts @ 4'-0" o.c. | |
| Zone 3 | 2 rails, mounts @ 2'-0" o.c. | |
| <i>(Allowable loads are based on individual mount failure before rail failure)</i> | | |

| Landscape Mount Layout | | Landscape Panel Orientation |
|------------------------|------------------------------|--|
| Zone 1 | 2 rails, mounts @ 6'-0" o.c. | Allowable Arrangement by Uplift Pressure |
| Zone 2 | 2 rails, mounts @ 6'-0" o.c. | ≤ 47 psf : 2 rails, mounts @ 6'-0" o.c. |
| Zone 3 | 2 rails, mounts @ 6'-0" o.c. | 48 to 70 psf : 3 rails, mounts @ 6'-0" o.c. or 2 rails, mounts @ 4'-0" o.c. |
| | | 71 to 105 psf : 3 rails, mounts @ 4'-0" o.c. |
| | | 106 to 140 psf : 2 rails, mounts @ 2'-0" o.c. |
| | | 141 to 210 psf : 3 rails, mounts @ 2'-0" o.c. |
| | | 211 to 280 psf : 4 rails, mounts @ 2'-0" o.c. |
| | | ≥ 281 psf : Mount capacity exceeded |

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PHOTOVOLTAIC ROOF MOUNT SYSTEM

21 MODULES-ROOF MOUNTED - 8.400 kWDC, 5.040 kWAC

1651 RAYNOR MCLAMB RD, LINDEN, NC 28356 USA



SYSTEM SUMMARY:

- (N) 21 - Q.CELL Q.PEAK DUO BLK ML-G10+ (400W) MODULES
- (N) 21 - ENPHASE ENERGY IQ8-60-2-US [240V] MICRO-INVERTERS
- (N) JUNCTION BOX
- (E) 200A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER
- (N) 30A NON-FUSED AC DISCONNECT
- (N) ENPHASE IQ COMBINER 4
- X2-IQ-AM1-240-4 (IEEE 1547:2018)

INTERCONNECTION METHOD : BACKFEED BREAKER

DESIGN CRITERIA:

- ROOF TYPE: - COMP SINGLE
- NUMBER OF LAYERS: - 02
- ROOF FRAME: - 2"X6" RAFTERS @24" O.C.
- STORY: - ONE STORY
- SNOW LOAD :- 10 PSF
- WIND SPEED :- 118 MPH
- WIND EXPOSURE:- C
- RISK CATEGORY:- II
- COORDINATE:- 35.285098, -78.840995

NOTE: INSTALLER TO DETERMINE OPTIMAL CONDUIT RUN ON SITE. ATTIC RUN IS OPTIONAL UNLESS REQUIRED BELOW.
ATTIC RUN: REQUIRED

GOVERNING CODES:

- 2018 NORTH CAROLINA BUILDING CODE (NCBC)
- 2018 NORTH CAROLINA RESIDENTIAL CODE (NCRS)
- 2018 NORTH CAROLINA FIRE CODE (NCFC)
- 2018 NORTH CAROLINA PLUMBING CODE (NCPC)
- 2018 NORTH CAROLINA MECHANICAL CODE (NMC)
- 2018 NORTH CAROLINA FUEL GAS CODE (NCFGC)
- 2018 NORTH CAROLINA ENERGY CONSERVATION CODE (NCECC)
- 2020 NORTH CAROLINA ELECTRICAL CODE (NCEC)

SHEET INDEX

- PV-0 COVER SHEET
- PV-1 SITE PLAN WITH ROOF PLAN
- PV-2 ROOF PLAN WITH MODULES
- PV-3 ATTACHMENT DETAILS
- PV-4 ELECTRICAL LINE DIAGRAM WITH CALCULATION
- PV-5 WARNING LABELS & PLACARD
- PV-6+ EQUIPMENT SPEC SHEETS

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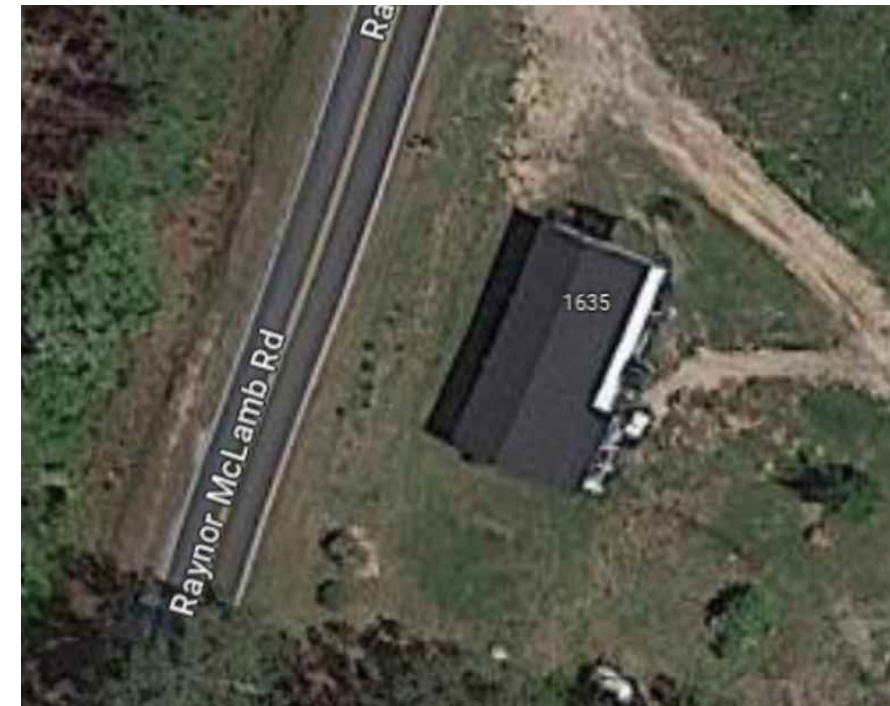


CONSTRUCTION NOTE:

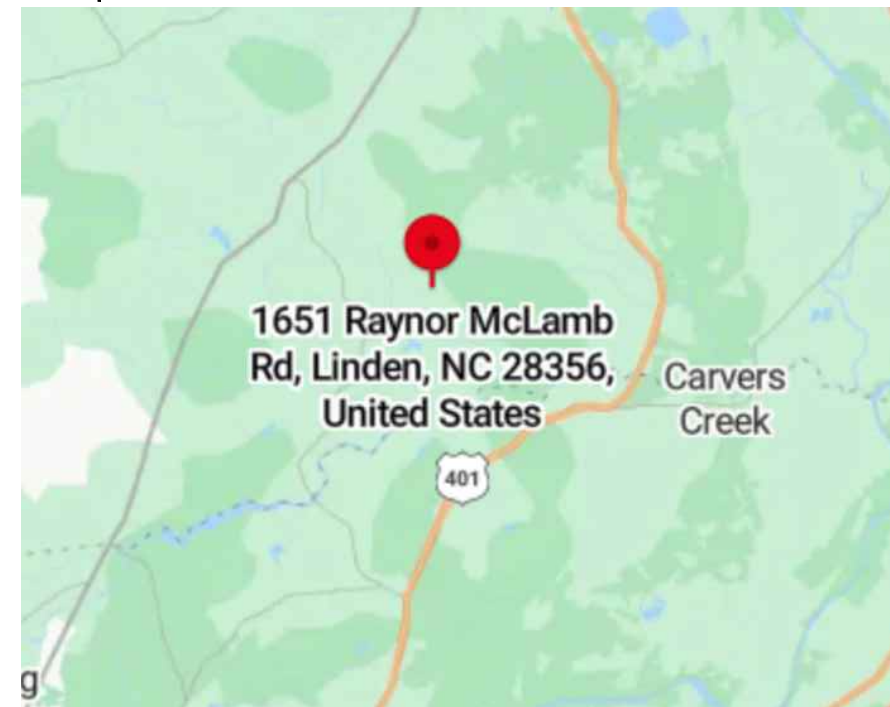
A LADDER SHALL BE IN PLACE FOR INSPECTION
THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY GRID INTERACTIVE SYSTEM
A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 690-47 AND 250-50 THROUGH 60 250-166 SHALL BE PROVIDED PER NEC, GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO GREATER THAN #8 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE OR A COMPLETE GROUND. EACH MODULE WILL BE GROUNDED USING THE SUPPLIED GROUNDING POINTS IDENTIFIED BY THE MANUFACTURER.
EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.136(A) REGARDLESS OF VOLTAGE. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED
ALL SIGNAGE WILL BE INSTALLED AS REQUIRED BY AND 2017 NEC.
HEIGHT OF INTEGRATED AC/DC DISCONNECT SHALL NOT EXCEED 6' 7" PER NEC 240.24
THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE PER NEC 250-64B. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER NEC 250.64C. ALL EXTERIOR CONDUIT SHALL BE PAINTED TO MATCH ADJACENT SURFACES. THE PV CONNECTION IN THE PANEL BOARD SHALL BE POSITIONED AT THE OPPOSITE (LOAD) END FROM THE INPUT FEEDER LOCATION OR MAIN CIRCUIT LOCATION. NEC 690.64(B)(7)
SITE CONDITIONS SHALL PREVAIL IF NO SCALE IS GIVEN. DRAWINGS ARE NOT NECESSARILY TO SCALE. ALL DIMENSIONS SHALL BE VERIFIED BY SUBCONTRACTOR UPON COMMENCEMENT OF CONSTRUCTION.

ELECTRICAL NOTES

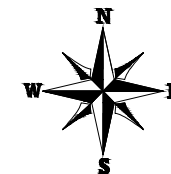
- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 & 75 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER E.G.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE



1 AERIAL PHOTO
PV-0 SCALE: NTS



2 VICINITY MAP
PV-0 SCALE: NTS



LIGHTING ELECTRIC

230 Blacksnake Rd,
Stanley, NC 28164-1622
LICENSE : NC-29517

| VERSION | | |
|-----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL RELEASE | 10/19/2023 | UR |
| | | |
| | | |

PROJECT NAME
**KIDDIAN GONZALEZ
1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY**

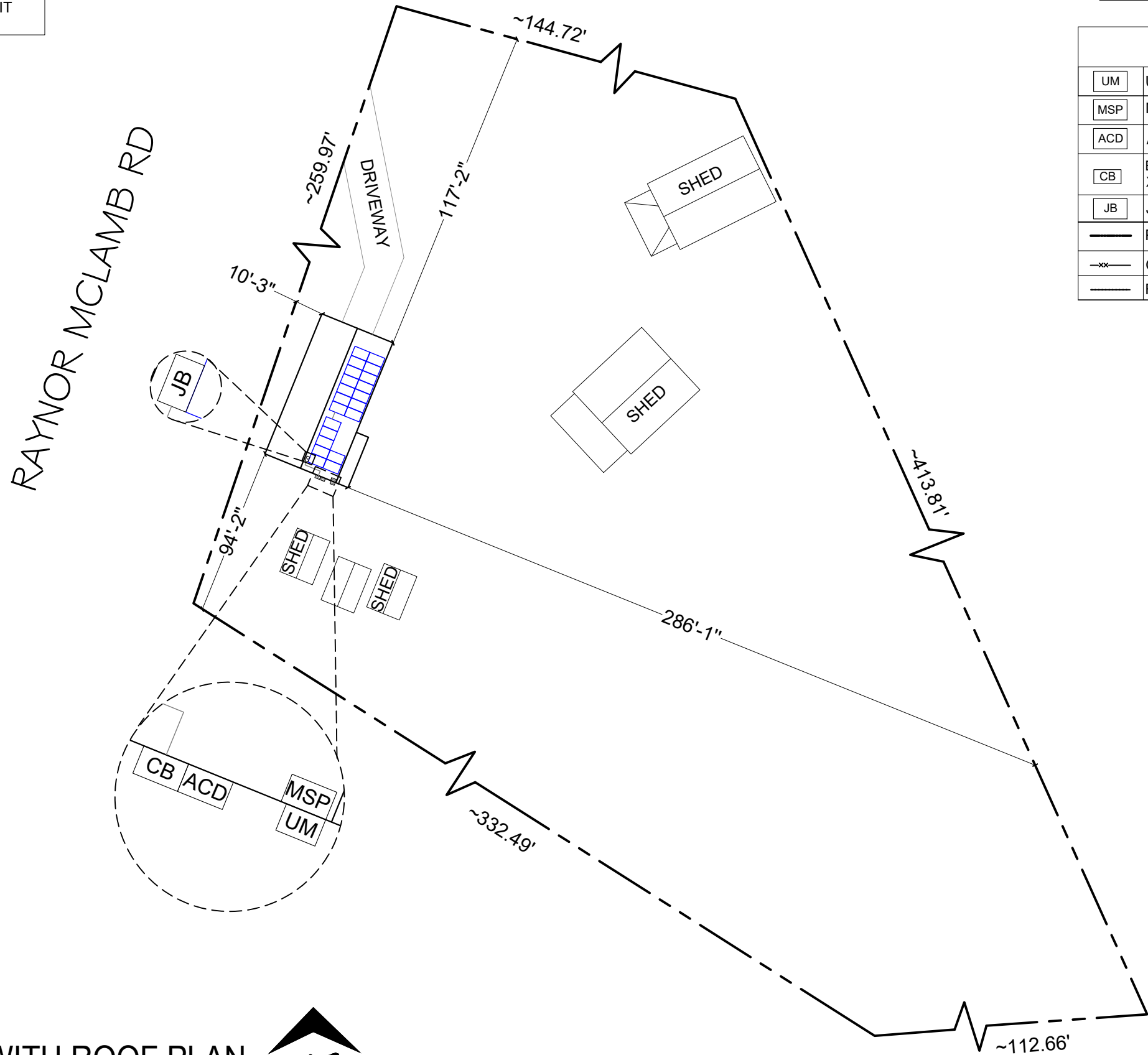
| |
|---|
| SHEET NAME COVER SHEET |
| SHEET SIZE ANSI B 11" X 17" |
| SHEET NUMBER PV-0 |

● **ROOF ACCESS POINT** SHALL BE LOCATED IN AREAS THAT DO NOT 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.

NOTE:
3/4" OR GREATER EMT CONDUIT
RUN (7/8" ABOVE ROOF)

NOTE:
A. ALL ELECTRICAL EQUIPMENT, INVERTERS/COMBINER, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.

| LEGEND | |
|--------|---|
| UM | UTILITY METER |
| MSP | MAIN SERVICE PANEL |
| ACD | AC DISCONNECT |
| CB | ENPHASE IQ COMBINER 4 X2-IQ-AM1-240-4 (IEEE 1547:2018) |
| JB | JUNCTION BOX |
| — | PROPERTY LINE |
| —x— | GATE |
| ---- | FENCE |



LIGHTING ELECTRIC

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SHEET NAME

SITE PLAN WITH
ROOF PLAN

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-1

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1 SITE PLAN WITH ROOF PLAN

SCALE: 3/128" = 1'-0"



MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 21 MODULES
 MODULE TYPE = Q.CELL Q.PEAK DUO BLK ML-G10+ (400W) MODULES
 MODULE WEIGHT = 48.5 LBS / 22.0 KG.
 MODULE DIMENSIONS = 74.0X 41.1 = 21.12 SF
 UNIT WEIGHT OF ARRAY = 2.30 PSF

- PLUMBING VENTS, SKYLIGHTS AND MECHANICAL VENTS SHALL NOT BE COVERED, MOVED, RE-ROUTED OR RE-LOCATED.

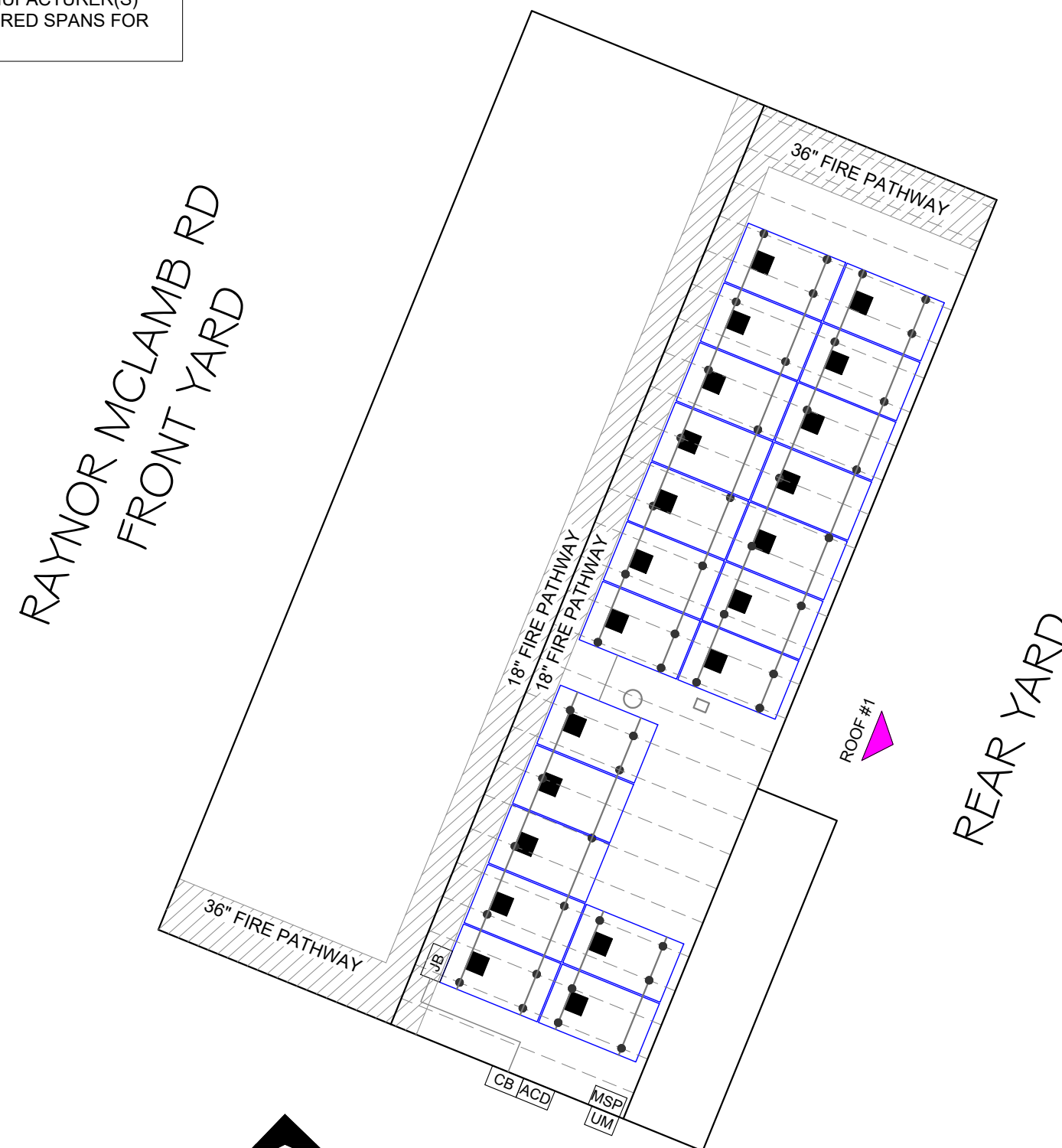
NOTE: ACTUAL ROOF CONDITIONS AND RAFTERS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

| ARRAY AREA & ROOF AREA CALC'S | | |
|-------------------------------|-----------------------------------|------------------------------------|
| AREA OF NEW ARRAY (Sq. Ft.) | AREA OF ROOF(PLAN VIEW) (Sq. Ft.) | TOTAL ROOF AREA COVERED BY ARRAY % |
| 443.54 | 1567 | 28.30% |

| ARRAY AREA & ROOF AREA CALC'S | | | | |
|-------------------------------|--------------|----------------------|---------------------|--------------------------------|
| ROOF | # OF MODULES | ARRAY AREA (Sq. Ft.) | ROOF AREA (Sq. Ft.) | ROOF AREA COVERED BY ARRAY (%) |
| #1 | 21 | 443.54 | 829 | 53.50 |

| ROOF DESCRIPTION | | | | |
|------------------|-----------|---------|------------------|-----------------|
| ROOF TYPE | | | COMP SINGLE ROOF | |
| ROOF | ROOF TILT | AZIMUTH | RAFTERS SIZE | RAFTERS SPACING |
| #1 | 22° | 112° | 2"X6" | 24" O.C. |

NOTE:
 3/4" OR GREATER EMT CONDUIT RUN (7/8" ABOVE ROOF)



LIGHTING ELECTRIC

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 APN# 0545-78-5655.000
 UTILITY: N/A
 AHJ: HARNETT COUNTY

| BILL OF MATERIALS | | |
|-------------------|-----|--------------------------------|
| EQUIPMENT | QTY | DESCRIPTION |
| RAIL | 11 | UNIRAC SM RAIL RAIL 168" MILL |
| SPLICE | 06 | BND SPLICE BAR PRO SERIES MILL |
| MID CLAMP | 34 | UNIVERSAL AF SERIES MID CLAMP |
| END CLAMP | 16 | UNIVERSAL AF SERIES END CLAMP |
| ATTACHMENT | 47 | UNIRAC FLASH KIT PRO |
| GROUNDING LUG | 04 | GROUND LUG |

| LEGEND | |
|--------|--|
| UM | UTILITY METER |
| MSP | MAIN SERVICE PANEL |
| ACD | AC DISCONNECT |
| CB | ENPHASE IQ COMBINER 4 X2-IQ-AM1-240-4 (IEEE 1547:2018) |
| JB | JUNCTION BOX |
| ■ | ENPHASE ENERGY IQ8-60-2-US [240V] MICRO-INVERTER |
| — | UNIRAC SM RAIL RAIL |
| ● | ROOF ATTACHMENT UNIRAC FLASH KIT PRO @ 48" O.C. |
| ○ □ | VENT, ATTIC FAN (ROOF OBSTRUCTION) |
| ⊠ | CHIMNEY |
| - - - | RAFTERS |
| ▨ | FIRE SETBACK |

SHEET NAME
 ROOF PLAN WITH MODULES

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-2

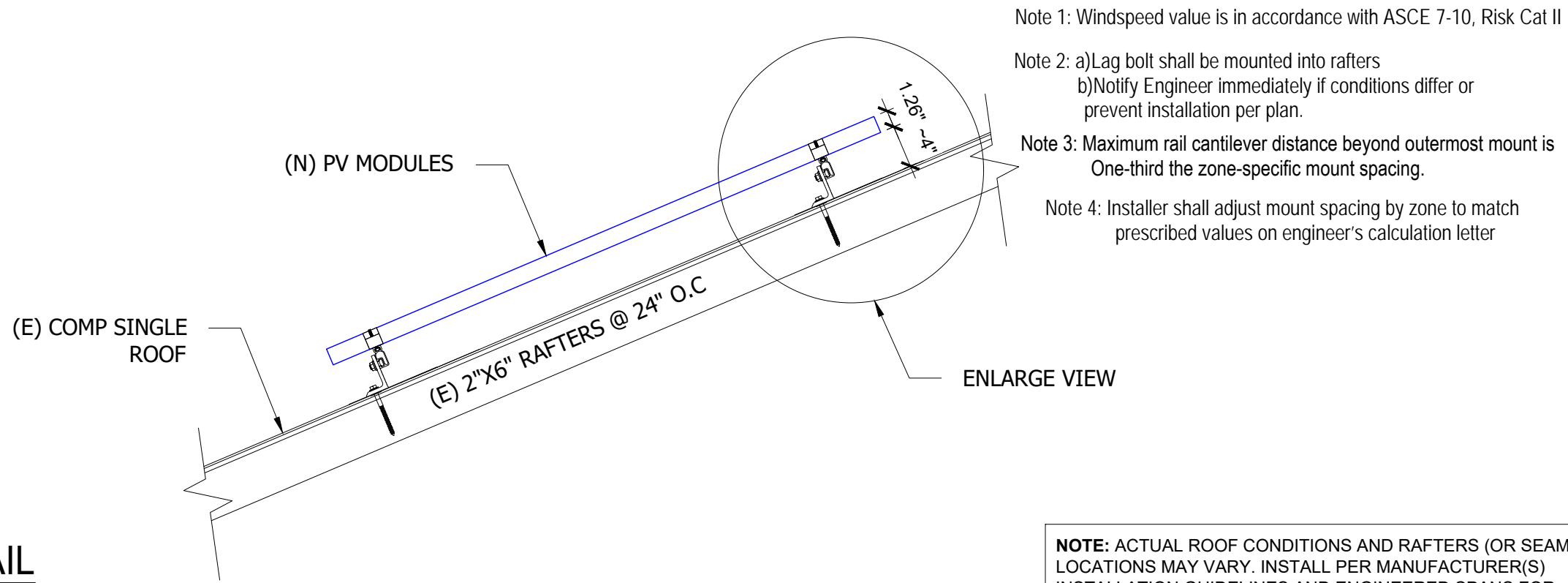
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1 ROOF PLAN WITH MODULES
 SCALE: 1/8" = 1'-0"



1 ATTACHMENT DETAIL
SCALE: NTS



Note 1: Windspeed value is in accordance with ASCE 7-10, Risk Cat II
 Note 2: a) Lag bolt shall be mounted into rafters
 b) Notify Engineer immediately if conditions differ or prevent installation per plan.
 Note 3: Maximum rail cantilever distance beyond outermost mount is One-third the zone-specific mount spacing.
 Note 4: Installer shall adjust mount spacing by zone to match prescribed values on engineer's calculation letter

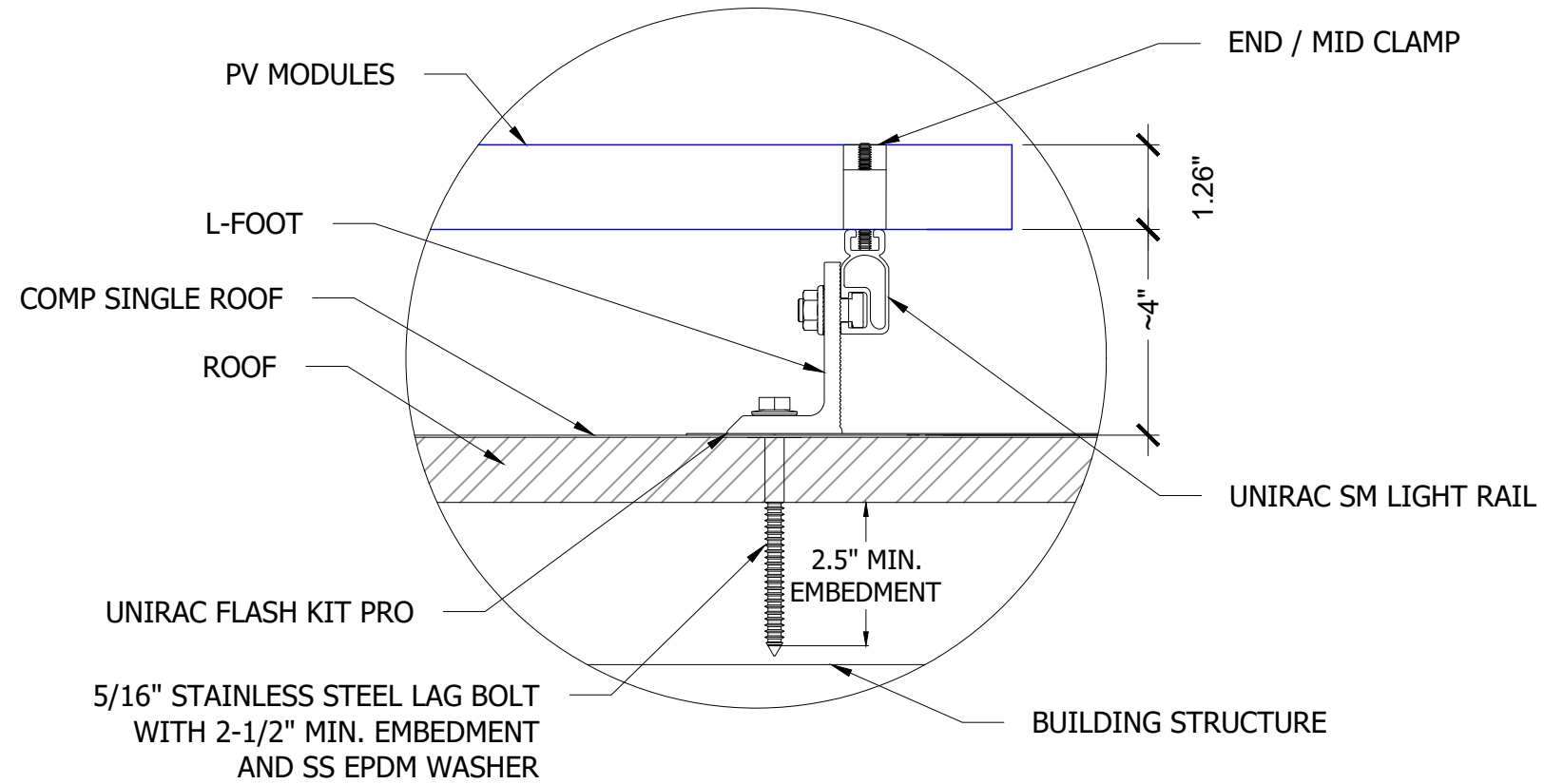
NOTE: ACTUAL ROOF CONDITIONS AND RAFTERS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

LIGHTING ELECTRIC

230 Blacksnake Rd,
Stanley, NC 28164-1622
LICENSE : NC-29517

| VERSION | | |
|-----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL RELEASE | 10/19/2023 | UR |
| | | |
| | | |

2 ATTACHMENT DETAIL (ENLARGED VIEW)
SCALE: NTS



This item has been digitally signed and sealed by Henry I. DiFranco, Jr., P.E. on October 24, 2023. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

PRINCIPAL ENGINEERING, INC.
1011 N. CAUSEWAY BLVD. STE 19
MANDEVILLE, LA 70471
985.624.5001
INFO@PI-AEC.COM
NORTH CAROLINA FIRM NO. C4113

PROJECT NAME

KIDDIAN GONZALEZ
1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME
ATTACHMENT
DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

| SOLAR MODULE SPECIFICATIONS | | | | | | |
|---|----------------------------|-------|-------|-------|--------------------------------|--------------|
| MANUFACTURER / MODEL # | VMP | IMP | VOC | ISC | TEMPERATURE COEFFICIENT OF Voc | # OF MODULES |
| Q.CELL Q.PEAK DUO BLK ML-G10+ (400W), 0.4 kVA | 37.13 | 10.77 | 45.30 | 11.14 | -0.27%/°C | 21 |
| MODULE DIMENSION | 74.0" L x 41.1" W x 1.26"D | | | | | |

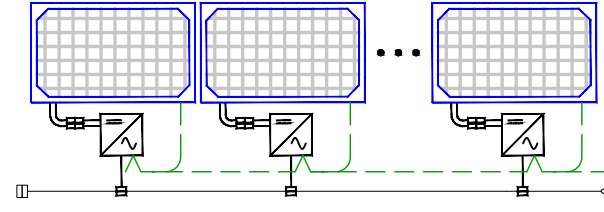
SYSTEM SIZE:- 21 x 400W = 8.400 kWDC
21 x 240W = 5.040 kWAC

NOTE:
3/4" OR GREATER EMT CONDUIT RUN (7/8" ABOVE ROOF)

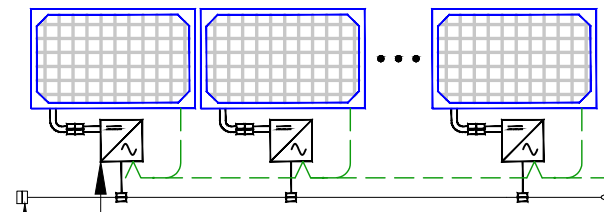
| AMBIENT TEMPERATURE SPECIFICATIONS | | | |
|------------------------------------|-----------------------------|--------------------------------------|---------------------------------------|
| RECORD LOW TEMP | AMBIENT TEMP (HIGH TEMP 2%) | CONDUCTOR TEMPERATURE RATE (ON ROOF) | CONDUCTOR TEMPERATURE RATE (OFF ROOF) |
| -10° | 36° | 90° | 75° |

| INVERTER SPECIFICATIONS | | | |
|--|----------|------------------------|------------------------|
| MANUFACTURER / MODEL # | QUANTITY | NOMINAL OUTPUT VOLTAGE | NOMINAL OUTPUT CURRENT |
| ENPHASE ENERGY IQ8-60-2-US [240V], 0.3 kVA | 21 | 240 VAC | 1.00A |

11 MICRO-INVERTERS IN BRANCH CIRCUIT #1



10 MICRO-INVERTERS IN BRANCH CIRCUIT #2

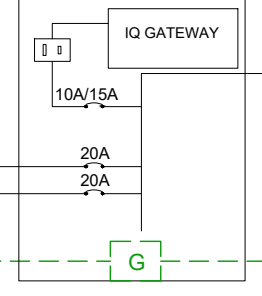


ENPHASE ENERGY IQ8-60-2-US [240V], MICRO-INVERTERS

TERMINATOR CAP ON LAST CABLE CONNECTOR Q CABLE (TYP)

(N) ENPHASE IQ COMBINER BOX 4 X2-IQ-AM1-240-4 (IEEE 1547:2018)

(N) JUNCTION BOX



(N) AC DISCONNECT 30A NON-FUSED, 240 VAC

(N) 30A PV BREAKER

BI-DIRECTIONAL UTILITY METER 1-PHASE, 3-W, 120V/240V, 60Hz

(E) 200A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER (BOTTOM FED)

EXISTING GROUNDING SYSTEM

| WIRE TAG | CONDUIT | WIRE QTY | WIRE GAUGE | WIRE TYPE | TEMP. RATING | WIRE AMPACITY (A) | TEMP. DERATE | CONDUIT FILL DERATE | DERATED AMPACITY (A) | INVERTER QTY. | DESIGN CURRENT (A) | GROUND SIZE | GROUND WIRE TYPE | | | | |
|----------|----------|----------|------------|-----------|--------------|-------------------------------|--------------|---------------------|----------------------|---------------|--------------------|-------------|------------------|----|-------|--------|--------|
| A | OPEN AIR | 2 | 12 AWG | Q-CABLES | 90°C | 30 | 0.91 | N/A | 27.30 | 11 | 13.75 | 06 AWG | BARE CU GND | | | | |
| B | 3/4" EMT | 4 | 10 AWG | 12 AWG | THWN-2 | NM-B CABLES WHERE RUN INDOORS | 90°C | 40 | 30 | 0.91 | 0.8 | 29.12 | 21.84 | 11 | 13.75 | 10 AWG | THWN-2 |
| C | 3/4" EMT | 3 | 10 AWG | THWN | 75°C | 35 | 0.88 | 1.0 | 30.80 | 21 | 26.25 | 10 AWG | THWN | | | | |

LIGHTING ELECTRIC

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1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME
ELECTRICAL LINE
DIAGRAM WITH
CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

1 ELECTRICAL LINE DIAGRAM WITH CALCULATION
SCALE: NTS

Q.PEAK DUO BLK ML-G10+ SERIES



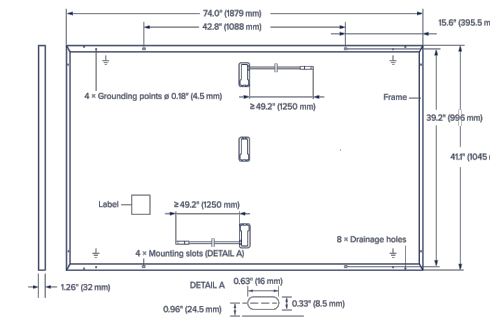
385-410 Wp | 132 Cells
20.9% Maximum Module Efficiency

MODEL Q.PEAK DUO BLK ML-G10+

Q.PEAK DUO BLK ML-G10+ SERIES

Mechanical Specification

| | |
|--------------|---|
| Format | 74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 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 anodised aluminium |
| Cell | 6 × 22 monocrystalline Q.ANTUM solar half cells |
| Junction box | 2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 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 | 410 | |
|---|------------------------------------|----------------------|-------|-------|-------|-------|-------|-------|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W/-0 W) | | | | | | | | |
| Minimum | Power at MPP ¹ | P _{MPP} [W] | 385 | 390 | 395 | 400 | 405 | 410 |
| | Short Circuit Current ¹ | I _{SC} [A] | 11.04 | 11.07 | 11.10 | 11.14 | 11.17 | 11.20 |
| | Open Circuit Voltage ¹ | V _{OC} [V] | 45.19 | 45.23 | 45.27 | 45.30 | 45.34 | 45.37 |
| | Current at MPP | I _{MPP} [A] | 10.59 | 10.65 | 10.71 | 10.77 | 10.83 | 10.89 |
| | Voltage at MPP | V _{MPP} [V] | 36.36 | 36.62 | 36.88 | 37.13 | 37.39 | 37.64 |
| | Efficiency ¹ | η [%] | ≥19.6 | ≥19.9 | ≥20.1 | ≥20.4 | ≥20.6 | ≥20.9 |

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT²

| | | | | | | | | |
|---------|-----------------------|----------------------|-------|-------|-------|-------|-------|-------|
| Minimum | Power at MPP | P _{MPP} [W] | 288.8 | 292.6 | 296.3 | 300.1 | 303.8 | 307.6 |
| | Short Circuit Current | I _{SC} [A] | 8.90 | 8.92 | 8.95 | 8.97 | 9.00 | 9.03 |
| | Open Circuit Voltage | V _{OC} [V] | 42.62 | 42.65 | 42.69 | 42.72 | 42.76 | 42.79 |
| | Current at MPP | I _{MPP} [A] | 8.35 | 8.41 | 8.46 | 8.51 | 8.57 | 8.62 |
| | Voltage at MPP | V _{MPP} [V] | 34.59 | 34.81 | 35.03 | 35.25 | 35.46 | 35.68 |

¹Measurement 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

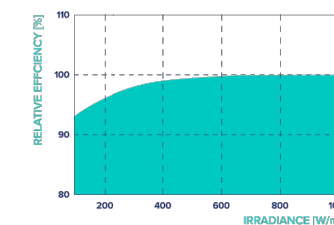
Qcells PERFORMANCE WARRANTY



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 Qcells sales organisation 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 _{sys} [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 ³ | [lbs/ft ²] | 113 (5400 Pa)/84 (4000 Pa) | | |

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),



6 busbar cell technology

12 busbar cell technology



Breaking the 20% efficiency barrier

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



A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty¹.



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology² and Hot-Spot Protect.



Extreme weather rating

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



Innovative all-weather technology

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



The most thorough testing programme in the industry

Qcells 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.

¹ See data sheet on rear for further information.

² APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96 h)

³ See Installation Manual

The ideal solution for:



Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product. Harwha Q CELLS America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL hcq-inquiry@qcells.com | WEB www.qcells.com



LIGHTING ELECTRIC

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LICENSE : NC-29517

VERSION

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APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-6

Specifications subject to technical changes © Qcells Q.PEAK DUO BLK ML-G10+ series_385-410_2023-01_Rev03_NA





IQ8 Series Microinverters

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



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



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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IQ8SE-DS-0001-01-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 Series Microinverters

| INPUT DATA (DC) | | IQ8-60-2-US | IQ8PLUS-72-2-US | IQ8M-72-2-US | IQ8A-72-2-US | IQ8H-240-72-2-US | IQ8H-208-72-2-US ⁽¹⁾ |
|--|----|---|-----------------|---|--------------|------------------|---------------------------------|
| Commonly used module pairings ² | W | 235 – 350 | 235 – 440 | 260 – 460 | 295 – 500 | 320 – 540+ | 295 – 500+ |
| Module compatibility | | 60-cell/120 half-cell | | 60-cell/120 half-cell and 72-cell/144 half-cell | | | |
| MPPT voltage range | V | 27 – 37 | 29 – 45 | 33 – 45 | 36 – 45 | 38 – 45 | 38 – 45 |
| Operating range | V | 25 – 48 | | 25 – 58 | | | |
| Min/max start voltage | V | 30 / 48 | | 30 / 58 | | | |
| Max input DC voltage | V | 50 | | 60 | | | |
| Max DC current ³ [module Isc] | A | | | 15 | | | |
| 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 | IQ8M-72-2-US | IQ8A-72-2-US | IQ8H-240-72-2-US | IQ8H-208-72-2-US |
| Peak output power | VA | 245 | 300 | 330 | 366 | 384 | 366 |
| Max continuous output power | VA | 240 | 290 | 325 | 349 | 380 | 360 |
| Nominal (L-L) voltage/range ⁴ | V | 240 / 211 – 264 | | 208 / 183 – 250 | | | |
| Max continuous output current | A | 1.0 | 1.21 | 1.35 | 1.45 | 1.58 | 1.73 |
| Nominal frequency | Hz | 60 | | | | | |
| Extended frequency range | Hz | 50 – 68 | | | | | |
| Max units per 20 A (L-L) branch circuit ⁵ | | 16 | 13 | 11 | 11 | 10 | 9 |
| Total harmonic distortion | | <5% | | | | | |
| 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 | 97.6 | 97.6 | 97.6 | 97.4 |
| CEC weighted efficiency | % | 97 | 97 | 97 | 97.5 | 97 | 97 |
| Night-time power consumption | mW | 60 | | | | | |
| MECHANICAL DATA | | | | | | | |
| Ambient temperature range | | -40°C to +60°C (-40°F to +140°F) | | | | | |
| Relative humidity range | | 4% to 100% (condensing) | | | | | |
| DC Connector type | | MC4 | | | | | |
| Dimensions (HxWxD) | | 212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2") | | | | | |
| Weight | | 1.08 kg (2.38 lbs) | | | | | |
| Cooling | | Natural convection – no fans | | | | | |
| Approved for wet locations | | Yes | | | | | |
| Acoustic noise at 1 m | | <60 dBA | | | | | |
| Pollution degree | | PD3 | | | | | |
| Enclosure | | Class II double-insulated, corrosion resistant polymeric enclosure | | | | | |
| Environ. category / UV exposure rating | | NEMA Type 6 / outdoor | | | | | |
| COMPLIANCE | | | | | | | |
| Certifications | | CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 | | | | | |
| | | This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions. | | | | | |

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

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

LIGHTING ELECTRIC

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SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-7

IQ Combiner 4/4C



The **IQ Combiner 4/4C** with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It 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 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
- Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC 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
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

IQ Combiner 4/4C

| MODEL NUMBER | |
|---|--|
| IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018) | IQ Combiner 4 with 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 and IQ System Controller 2 and to deflect heat. |
| IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018) | IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes 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) | |
| Supported microinverters | IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8) |
| 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 - 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 |
| 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) |
| X-IQ-NA-HD-125A | Hold-down kit for Eaton circuit breaker with screws |
| Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP) | A pair of 200A split core current transformers |
| ELECTRICAL SPECIFICATIONS | |
| Rating | Continuous duty |
| System voltage | 120/240VAC, 60 Hz |
| Eaton BR series busbar rating | 125A |
| Max. continuous current rating | 65A |
| Max. continuous current rating (input from PV/storage) | 64A |
| Max. fuse/circuit rating (output) | 90A |
| 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 |
| IQ Gateway breaker | 10A or 15A rating GE/Siemens/Eaton included |
| Production metering CT | 200A solid core pre-installed and wired to IQ Gateway |
| MECHANICAL DATA | |
| Dimensions (WxHxD) | 37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets. |
| Weight | 7.5 kg (16.5 lbs) |
| Ambient temperature range | -40°C to +46°C (-40°F to 115°F) |
| Cooling | Natural convection, plus heat shield |
| Enclosure environmental rating | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction |
| Wire sizes | • 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A 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 | Up to 3,000 meters (9,842 feet) |
| INTERNET CONNECTION OPTIONS | |
| Integrated Wi-Fi | IEEE 802.11b/g/n |
| Cellular | CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations. |
| Ethernet | Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included) |
| COMPLIANCE | |
| Compliance, IQ Combiner | CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3 rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 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 |

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IQ-C-4-4C-DS-0103-EN-US-12-29-2022

LIGHTING ELECTRIC

230 Blacksnake Rd.
Stanley, NC 28164-1622
LICENSE : NC-29517

VERSION

| DESCRIPTION | DATE | REV |
|-----------------|------------|-----|
| INITIAL RELEASE | 10/19/2023 | UR |
| | | |
| | | |

PROJECT NAME

KIDDIAN GONZALEZ
1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-8



To learn more about Enphase offerings, visit enphase.com
IQ-C-4-4C-DS-0103-EN-US-12-29-2022



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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LIGHTING ELECTRIC

230 Blacksnake Rd.
 Stanley, NC 28164-1622
 LICENSE : NC-29517

VERSION

| DESCRIPTION | DATE | REV |
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| INITIAL RELEASE | 10/19/2023 | UR |
| | | |
| | | |

PROJECT NAME

KIDDIAN GONZALEZ
 1651 RAYNOR MCLAMB RD,
 LINDEN, NC 28356 USA
 APN# 0545-78-5655.000
 UTILITY: N/A
 AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

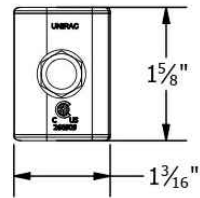
ANSI B
 11" X 17"

SHEET NUMBER

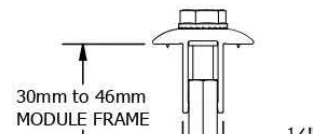
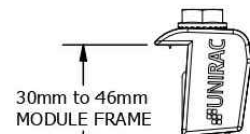
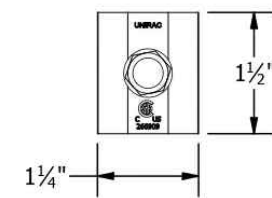
PV-9

| PART # TABLE | |
|--------------|-------------------------------|
| P/N | DESCRIPTION |
| 302045M | UNIVERSAL AF MID CLAMP - MILL |
| 302045D | UNIVERSAL AF MID CLAMP - DRK |
| 302050M | UNIVERSAL AF END CLAMP - MILL |
| 302050D | UNIVERSAL AF END CLAMP - DRK |

UNIVERSAL AF
END CLAMP

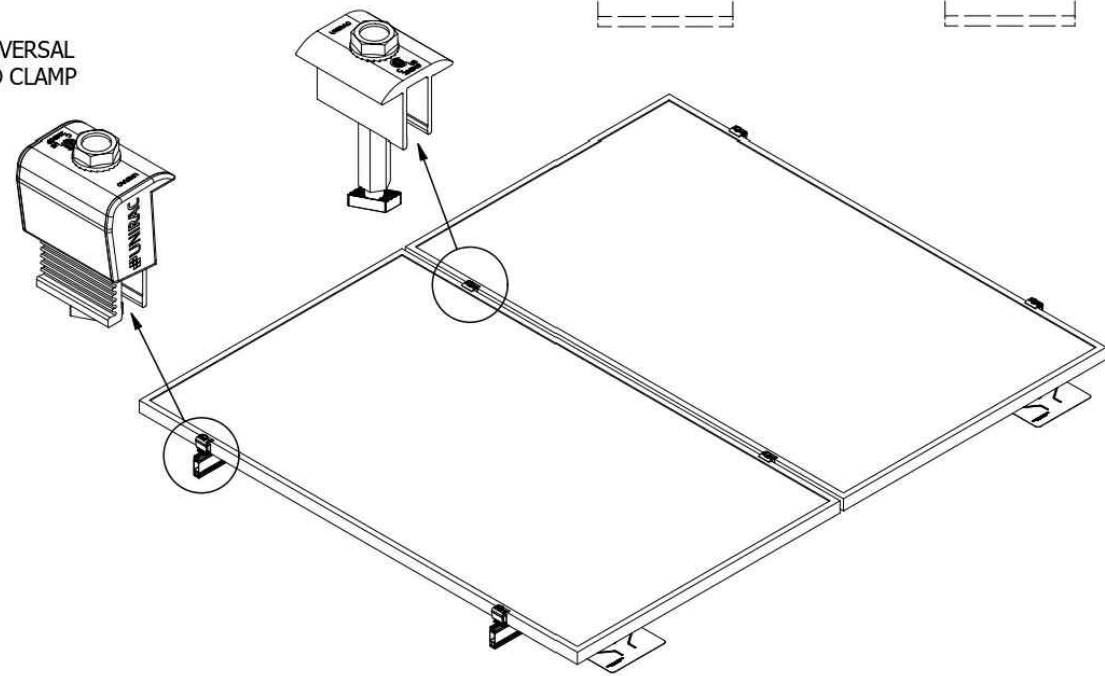


UNIVERSAL AF
MID CLAMP



UNIVERSAL
END CLAMP

UNIVERSAL
MID CLAMP



UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

| | |
|----------------|---------------------|
| PRODUCT LINE: | SOLARMOUNT |
| DRAWING TYPE: | PART & ASSEMBLY |
| DESCRIPTION: | UNIVERSAL AF CLAMPS |
| REVISION DATE: | 9/28/2020 |

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01B

SHEET

UNIRAC
1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

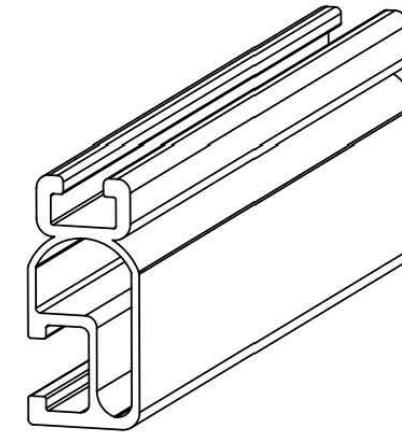
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|----------------|--------------|
| PRODUCT LINE: | SOLARMOUNT |
| DRAWING TYPE: | PART DETAIL |
| DESCRIPTION: | LIGHT RAIL |
| REVISION DATE: | October 2016 |

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

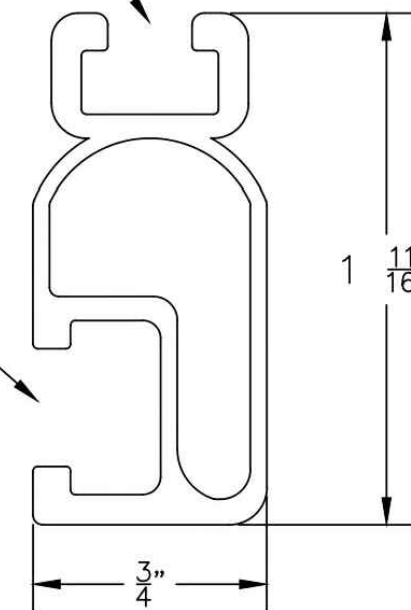
SM-P02

SHEET



1/4" BOLT LOCATION

3/8" BOLT LOCATION



Standard Rail Lengths:

168"
240"

LIGHTING ELECTRIC

230 Blacksnake Rd.
Stanley, NC 28164-1622
LICENSE : NC-29517

VERSION

| DESCRIPTION | DATE | REV |
|-----------------|------------|-----|
| INITIAL RELEASE | 10/19/2023 | UR |
| | | |
| | | |

PROJECT NAME

KIDDIAN GONZALEZ
1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

FLASHKIT PRO



FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Featuring Unirac's patented SHED & SEAL technology, a weather proof system which provides the ultimate protection against roof leaks. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With FLASHKIT pro, you have everything you need for a quick, professional installation.



TRUSTED WATER SEAL FLASHINGS
FEATURING SHED & SEAL TECHNOLOGY



YOUR COMPLETE SOLUTION
Flashings, lags, continuous slot L-Feet and hardware



CONVENIENT 10 PACKS
Packaged for speed and ease of handling

FLASHKIT PRO

INSTALLATION GUIDE



FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.



INSTALL FLASHKIT PRO FLASHING



INSTALL L-FOOT



ATTACH L-FOOT TO RAIL

PRE-INSTALL

- Locate roof rafters and snap chalk lines to mark the installation point for each roof attachment.
- Drill a 7/32" pilot hole at each roof attachment. Fill each pilot hole with sealant.

STEP 1 INSTALL FLASHKIT PRO FLASHING

- Add a U-shaped bead of roof sealant to the underside of the flashing with the open side of the U pointing down the roof slope. Slide the aluminum flashing underneath the row of shingles directly up slope from the pilot hole as shown. Align the indicator marks on the lower end of the flashing with the chalk lines on the roof to center the raised hole in the flashing over the pilot hole in the roof. When installed correctly, the flashing will extend under the two courses of shingles above the pilot hole.

STEP 2 INSTALL L-FOOT

- Fasten L-foot and Flashing into place by passing the included lag bolt and pre-installed stainless steel-backed EPDM washer through the L-foot EPDM grommet, and the raised hole in the flashing, into the pilot hole in the roof rafter.

- Drive the lag bolt down until the L-foot is held firmly in place. It is normal for the EPDM on the underside of the stainless steel backed EPDM washer to compress and expand beyond the outside edge of the steel washer when the proper torque is applied.

TIP:

- Use caution to avoid over-torqueing the lag bolt if using an impact driver.
- Repeat Steps 1 and 2 at each roof attachment point.

STEP 3 ATTACH L-FOOT TO RAIL

- Insert the included 3/8"-16 T-bolts into the lower slot on the Rail (sold separately), spacing the bolts to match the spacing between the roof attachments.
- Position the Rail against the L-Foot and insert the threaded end of the T-Bolt through the continuous slot in the L-Foot. Apply anti-seize to bolt threads to prevent galling of the T-bolt and included 3/8" serrated flange nut. Place the 3/8" flange nut on the T-bolt and finger tighten. Repeat STEP 3 until all L-Feet are secured to the Rail with a T-bolt. Adjust the level and height of the Rail and torque each bolt to 30ft-lbs.

LIGHTING ELECTRIC

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LICENSE : NC-29517

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PROJECT NAME

KIDDIAN GONZALEZ
1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

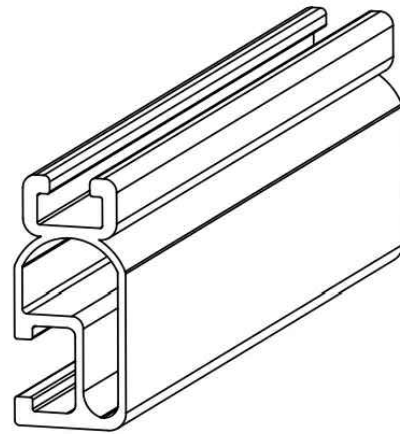
PV-11

THE COMPLETE ROOF ATTACHMENT SOLUTION

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

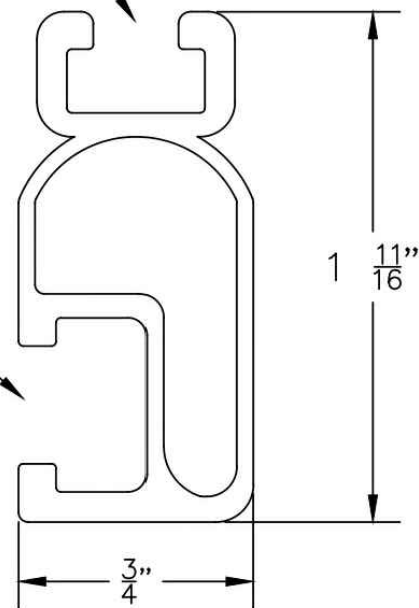
FASTER INSTALLATION. 25-YEAR WARRANTY.

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



1/4" BOLT LOCATION

3/8" BOLT LOCATION



Standard Rail Lengths:

168"
240"

UNIRAC
1411 BROADWAY BLVD NE
ALBUQUERQUE, NM 87102 USA
WWW.UNIRAC.COM

| | |
|-----------------------|--------------|
| PRODUCT LINE: | SOLARMOUNT |
| DRAWING TYPE: | PART DETAIL |
| DESCRIPTION: | LIGHT RAIL |
| REVISION DATE: | October 2016 |

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

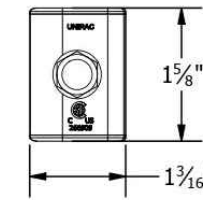
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS

LEGAL NOTICE

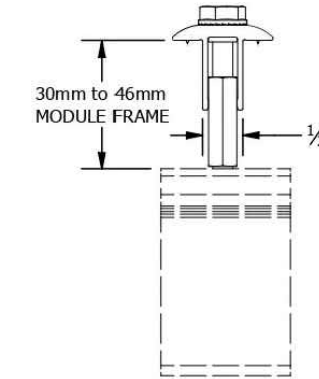
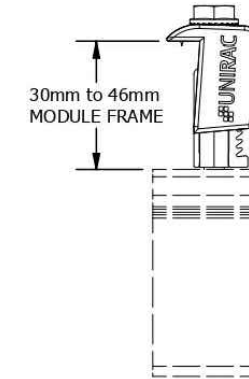
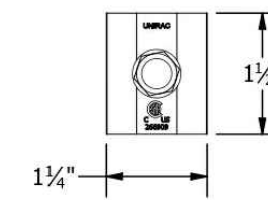
SM-P02
SHEET

| PART # TABLE | |
|--------------|-------------------------------|
| P/N | DESCRIPTION |
| 302045M | UNIVERSAL AF MID CLAMP - MILL |
| 302045D | UNIVERSAL AF MID CLAMP - DRK |
| 302050M | UNIVERSAL AF END CLAMP - MILL |
| 302050D | UNIVERSAL AF END CLAMP - DRK |

UNIVERSAL AF
END CLAMP

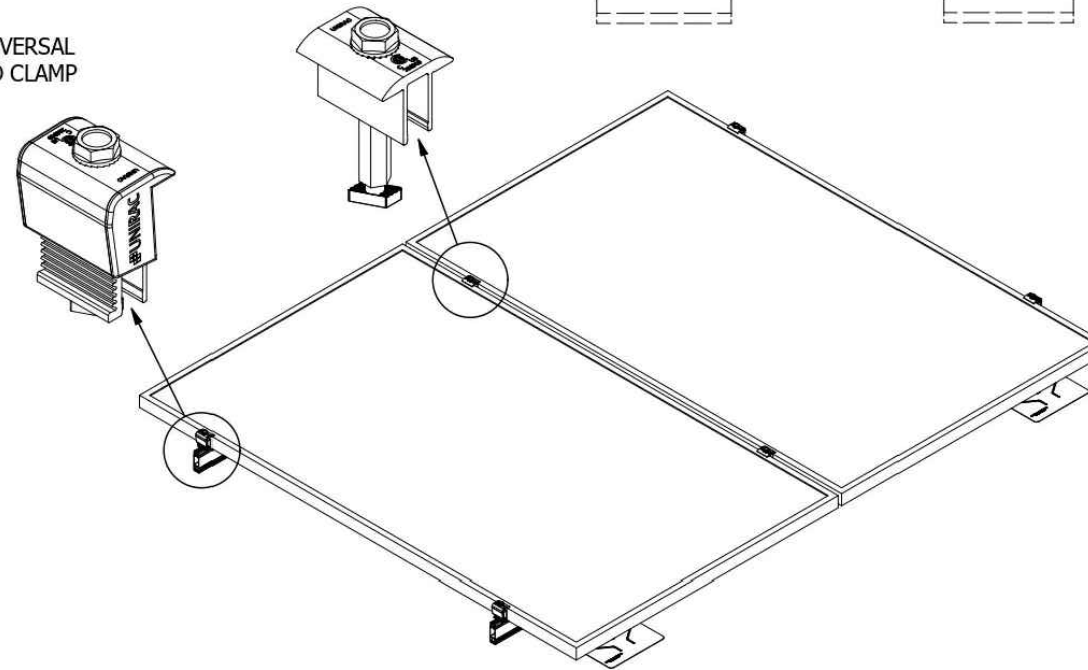


UNIVERSAL AF
MID CLAMP



UNIVERSAL
END CLAMP

UNIVERSAL
MID CLAMP



UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

| | |
|-----------------------|------------------------|
| PRODUCT LINE: | SOLARMOUNT |
| DRAWING TYPE: | PART & ASSEMBLY |
| DESCRIPTION: | UNIVERSAL AF CLAMPS |
| REVISION DATE: | 9/28/2020 |

DRAWING NOT TO SCALE
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ONE OR MORE US PATENTS

LEGAL NOTICE

SM-A01B
SHEET

LIGHTING ELECTRIC

230 Blacksnake Rd.
Stanley, NC 28164-1622
LICENSE : NC-29517

VERSION

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PROJECT NAME

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1651 RAYNOR MCLAMB RD,
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APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-11.1

SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL2703. SOLARMOUNT has achieved system level performance for steep sloped roofs. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes > 2 inches per foot, or 9.5 degrees). The system is to be mounted over fire resistant roof covering rated for the application. There is no required minimum or maximum height limitation above the roof deck to maintain the system fire rating for SOLARMOUNT. Module Types, System Level Fire Ratings, and Mitigation Requirements are listed below:

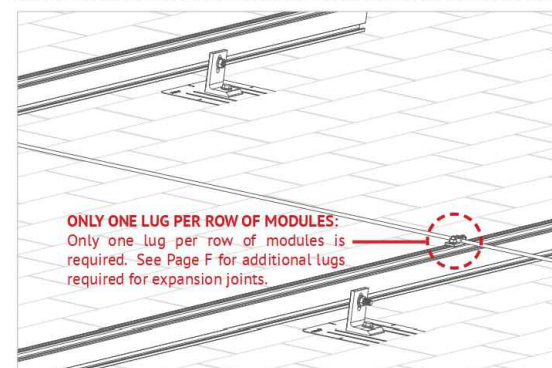
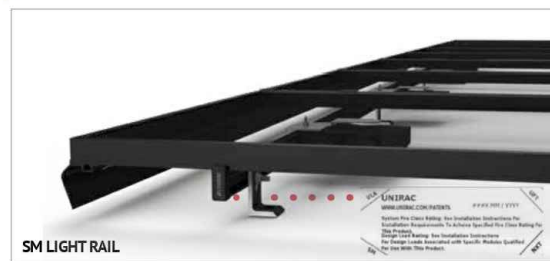
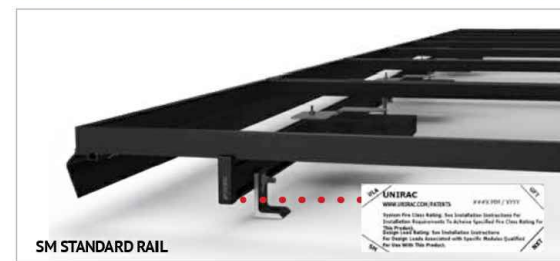
| Rail Type | Module Fire Types | System Level Fire Rating | Rail Direction | Module Orientation | Mitigation Required |
|-----------------------------|---|----------------------------|----------------|-----------------------|--|
| Standard & HD Rails | 1, 2, 3 with Metal Frame, 10 with Metal Frame, 19, 22, 25, 29, & 30 | Class A, Class B & Class C | East-West | Landscape OR Portrait | None Required |
| | | | North-South | Landscape OR Portrait | None Required |
| Light Rail | 1 & 2 | Class A, Class B & Class C | East-West | Landscape OR Portrait | None Required |
| | | | North-South | Landscape OR Portrait | None Required |
| Standard, Light, & HD Rails | 4 & 5 | Class A, Class B & Class C | East-West | Landscape OR Portrait | Trim installation per Solar Mount Installation Guide |
| | | | North-South | Landscape OR Portrait | |

This racking system may be used to ground and/or mount a PV module complying with UL1703 or UL61730 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

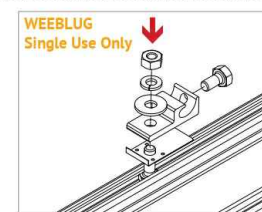
UL2703 CERTIFICATION MARKING LABEL

Unirac SOLARMOUNT is listed to UL 2703. Certification marking is embossed on all mid clamps as shown. Labels with additional information will be provided. After the racking system is fully assembled, a single label should be applied to the SOLARMOUNT rail at the edge of the array. Before applying the label, the corners of the label that do not pertain to the system being installed must be removed so that only the installed system type is showing.

Note: The sticker label should be placed such that it is visible, but not outward facing.

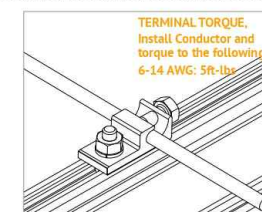


ONLY ONE LUG PER ROW OF MODULES: Only one lug per row of modules is required. See Page F for additional lugs required for expansion joints.



WEEBLUG CONDUCTOR - UNIRAC P/N 0080025:

Apply Anti Seize and insert a bolt in the aluminum rail and through the clearance hole in the stainless steel flat washer. Place the stainless steel flat washer on the bolt, oriented so the dimples will contact the aluminum rail. Place the lug portion on the bolt and stainless steel flat washer. Install stainless steel flat washer, lock washer and nut. Tighten the nut until the dimples are completely embedded into the rail and lug. **TORQUE VALUE 1.0 ft lbs.** (See Note on PG. A) See product data sheet for more details, Model No. WEEB-LUG-6.7

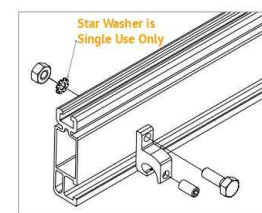


TERMINAL TORQUE: Install Conductor and torque to the following:
6-14 AWG: 5ft-lbs

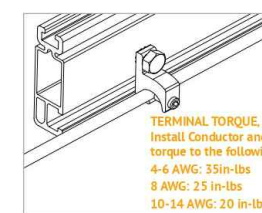
GROUNDING LUG MOUNTING DETAILS: Details are provided for both the WEEB and IlSCO products. The WEEB Lug has a grounding symbol located on the lug assembly. The IlSCO lug has a green colored set screw for grounding indication purposes. Installation must be in accordance with NFPA NEC 70, however the electrical designer of record should refer to the latest revision of NEC for actual grounding conductor cable size. **Required if not using approved integrated grounding microinverters**

| GROUNDING LUG - BOLT SIZE & DRILL SIZE | | |
|--|-----------|---------------------------------|
| GROUND LUG | BOLT SIZE | DRILL SIZE |
| WEEBLug | 1/4" | N/A - Place in Top SM Rail Slot |
| ILSCO Lug | #10-32 | 7/32" |

- Torque value depends on conductor size.
- See product data sheet for torque value.



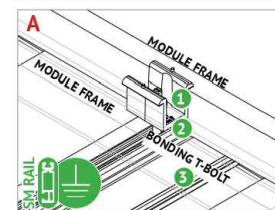
Star Washer is Single Use Only



TERMINAL TORQUE: Install Conductor and torque to the following:
4-6 AWG: 35in-lbs
8 AWG: 25 in-lbs
10-14 AWG: 20 in-lbs

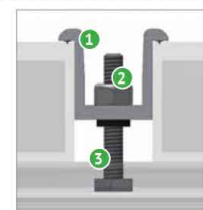
ILSCO LAY-IN LUG CONDUCTOR - UNIRAC P/N 008009P: Alternate Grounding Lug - Drill, deburr hole and bolt thru both rail walls per table. **TORQUE VALUE 5 ft lbs.** (See Note on PG. A) See ILSCO product data sheet for more details, Model No. GBL-4DBT.

NOTE: ISOLATE COPPER FROM ALUMINUM CONTACT TO PREVENT CORROSION



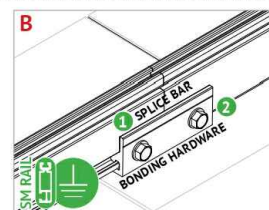
BONDING MIDCLAMP ASSEMBLY

- Aluminum mid clamp with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
- Stainless steel nut bonds aluminum clamp to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to SM rail



BONDING MIDCLAMP ASSEMBLY

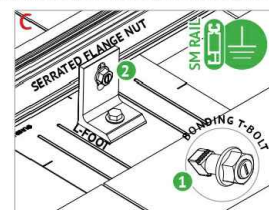
- Stainless steel nut bonds aluminum clamp to stainless steel T-bolt



BONDING RAIL SPLICE BAR

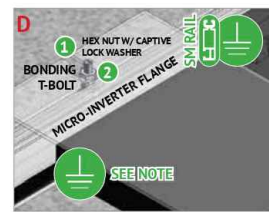
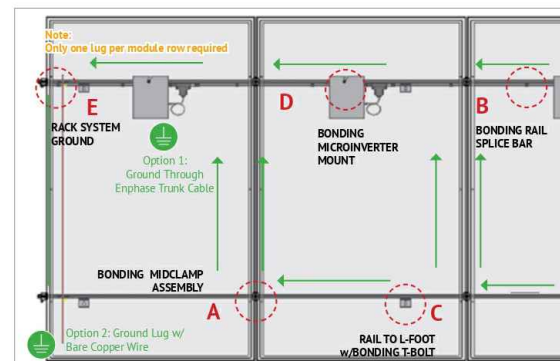
- Bonding Hardware creates bond between splice bar and each rail section
- Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

Note: Splice bar and bolted connection are non-structural. The splice bar function is rail alignment and bonding.



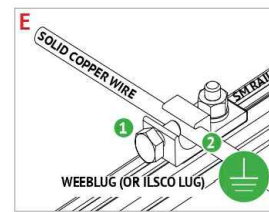
RAIL TO L-FOOT w/BONDING T-BOLT

- Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-Bolt
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail.



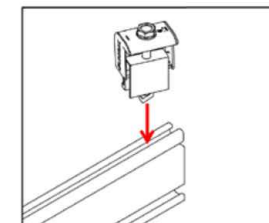
BONDING MICROINVERTER MOUNT

- Hex nut with captive lock washer bonds metal microinverter flange to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail. System ground including racking and modules may be achieved through the trunk cable of approved microinverter systems. See page J for details

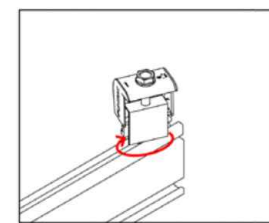


RACK SYSTEM GROUND

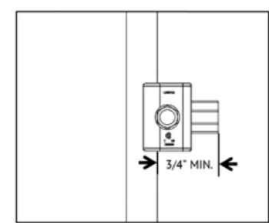
- WEEB washer dimples pierce anodized rail to create bond between rail and lug
- Solid copper wire connected to lug is routed to provide final system ground connection. NOTE: IlSCO lug can also be used when secured to the side of the rail. See page K for details



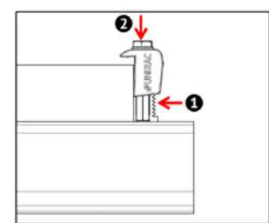
1. Position clamp to align T-bolt with rail slot. Lower clamp and insert T-bolt into rail slot.



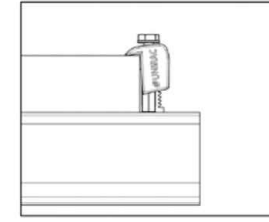
2. Rotate clamp clockwise 2/3 of a turn to engage T-bolt inside rail slot.



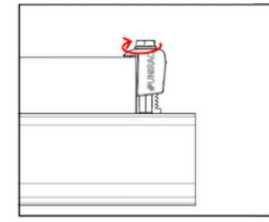
3. Place module at least 3/4" from end of rail and position clamp against module frame.



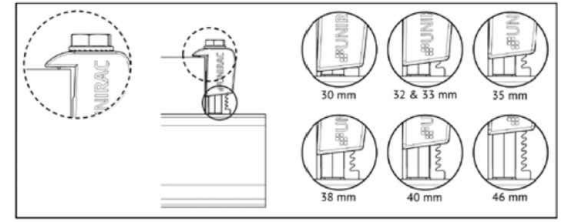
4. While applying pressure to hold the clamp against the module, push down on the module side of the clamp cap.



5. When the cap contacts the module frame, release and it will re-engage to the clamp base.



6. Tighten bolt and torque to 15 ft-lbs.



7. Confirm clamp is engaged in correct module height position and that the top of the cap is sitting level with the module frame.

NOTE: When installing 46mm modules, loosen bolt by 1 turn before positioning clamp against module frame. Do not force clamp onto module frame as this may damage the bonding pin.

LIGHTING ELECTRIC

230 Blacksnake Rd,
Stanley, NC 28164-1622
LICENSE : NC-29517

| VERSION | | |
|-----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL RELEASE | 10/19/2023 | UR |

PROJECT NAME

KIDDIAN GONZALEZ
1651 RAYNOR MCLAMB RD,
LINDEN, NC 28356 USA
APN# 0545-78-5655.000
UTILITY: N/A
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-12



Descriptive Report and Test Results

MASTER CONTRACT: 266909
REPORT: 70131735
PROJECT: 80128750

Edition 1: September 20, 2017; Project 70131735– Albuquerque
Issued by Michael Hoffnagle

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Authorized By: Michael Hoffnagle

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Prepared By: Michael Hoffnagle
Authorized By: Michael Hoffnagle

Report pages reissued

Contents: Certificate of Compliance - Pages 1 to 6
Supplement to Certificate of Compliance - Pages 1 to 3
Description and Tests - Pages 1 to 27
Att1 Installation Manual SM– Pages 1 to 36
Att2 Schematics SM/ULA– Pages 1 to 72
Att3 Installation Manual ULA– Pages 1 to 22
Att4 RM5_Installation Guide - 1 to 19
Att5 RMDT_Installation Guide - 1 to 20
Att6 RM series schematics – 1 to 32
Att7 Installation Manual, GFT Shared Rail – Pages 1 to 40
Att8 Installation Manual, GFT 4-Rail – Pages 1 to 39
Att9 GFT Schematics – Pages 1 to 42
Att10 NXT Horizon Installation Manual – Pages 1 to 22
Att11 Schematics NXT Horizon – Pages 1 to 13

PRODUCTS

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems
CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -
Certified to US Standards

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Telephone: 949.733.4300 1.800.463.6727 Fax: 949.733.4320 www.csagroup.org



Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the SOLARMOUNT system.

| Manufacture | Module Model / Series | Manufacture | Module Model / Series | Manufacture | Module Model / Series |
|------------------------|---|---------------------|---|-----------------|--|
| LG Electronics (cont.) | LGxxxN2T-J5 LGxxxN1K/N1W/N2T/N2W-L5 LGxxxM1C/N1C/Q1C/Q1K-N5 LGxxxN1C/N1K/N2W/Q1C/Q1K-V5 LGxxxN3K-V6 | Phono Solar | PSxxxM1-20/U PSxxxM1H-20/U PSxxxM1-20UH PSxxxM1H-20UH | Q.Cells (cont.) | Q.PEAK DUO XL-(G10/G10.2/G10.3/G10.4/ G10.d) Q.PEAK DUO XL-G10.3/BFG Q.PEAK DUO XL-G10.d/BFG Q.PEAK DUO XL-(G11.2/G11.3) Q.PEAK DUO XL-G11.3/BFG |
| LONGI | LR4-60(HPB/HPH) LR4-72(HPH) LR6-60 LR6-60(BK/HPB/HPH/HV/PB/PE/PH) LR6-72 LR6-72(BK/HV/PB/PE/PH) RealBlack LR4-60HPB RealBlack LR6-60HPB | Phono Solar (cont.) | PSxxxM1-20/UH PSxxxM1H-20/UH PSxxxM-24/T PSxxxMH-24/T PSxxxM-24/TH PSxxxMH-24/TH | REC | RECOxxxAA (BLK/Pure) RECOxxxNP (N-PEAK) RECOxxxP2 (Black) RECOxxxPE, RECOxxxPE72 RECOxxxTP, RECOxxxTP72 RECOxxxTP2(M/BLK2) RECOxxxTP25(M)72 RECOxxxTP3M (Black) RECOxxxTP4 (Black) |
| Meyer Burger | Meyer Burger Black, Meyer Burger White | Prism Solar | P72 Series | Renesola | All 60-cell modules |
| Mission Solar Energy | MSE Mono, MSE Perc | | Plus, Pro, Peak, G3, G4, Peak G5(SC), G6(+)(SQ)(AC), G7, G8(+), Plus, Pro, Peak L-G2, L-G4, L-G5 Peak L-G5, L-G6, L-G7, L-G8(BFF) Q.PEAK DUO (BLK)-G6+ Q.PEAK DUO BLK-G6+/TS Q.PEAK DUO (BLK)-G7 Q.PEAK DUO L-(G7/G7.1/G7.2/G7.3/G7.7) Q.PEAK DUO (BLK) G8(+) Q.PEAK DUO L-(G8/G8.1/G8.2/G8.3) Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-(G9/G9.2/G9.3) Q.PEAK DUO XL-G9.3/BFG Q.PEAK DUO-G10- Q.PEAK DUO BLK G10(+) Q.PEAK DUO BLK G10+/AL Q.PEAK DUO (BLK) ML-G10(a)(+) | Risen | RSM Series |
| Mitsubishi | MIE & MLE Series | Q.Cells | | S-Energy | SN72 & SN60 Series |
| Neo Solar Power Co. | D6M Series | | | SEG Solar | SEG-xxx-BMD-HV |
| Panasonic | VBHNxxxSA06/SA06B/SA11/SA11B VBHNxxxSA15/SA15B/SA16/SA16B, VBHNxxxKA, VBHNxxxKA03/04, VBHNxxxSA17/SA17G/SA17E/SA18/SA18E, VBHNxxxZA01/ZA02/ZA03/VBHNxxxZA04 EVPVxxx EVPVxxx(H/K/PK) | | | Seraphim | SEG-(6PA/6PB/6MA/6MA-HV/6MB/E01/E11) SRP-xxx-6MB-HV, SRP-320-375-BMB-HV, SRP-xxx-BMC-HV, SRP-390-450-BMA-HV, SRP-xxx-BMZ-HV, SRP-390-405-BMD-HV |
| Peimar | S6xxxM (FB/BF) SMxxxM | | | Sharp | NU-SA & NU-SC Series |
| | | | | Silfab | SLA-M, SLA-R, SLG-M, SLG-P & BC Series SILxxx(BL/NL/NT/HL/ML/BK/NX/NU/HQ) |

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- Listed models can be used to achieve a Class A fire system rating for steep slope applications. See Appendix A, page A

LIGHTING ELECTRIC

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LICENSE : NC-29517

VERSION

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1651 RAYNOR MCLAMB RD,
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AHJ: HARNETT COUNTY

SHEET NAME

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ANSI B
11" X 17"

SHEET NUMBER

PV-14