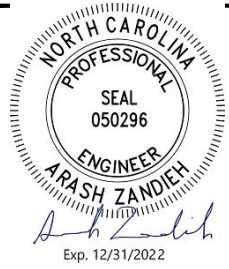


PHOTOVOLTAIC ROOF MOUNT SYSTEM

26 MODULES-ROOF MOUNTED - 10.27 kWDC, 7.54 kWAC

116 S DAKOTA CT, SPRING LAKE, NC 28390, USA



8/31/2022



DEL MAR, CA 92014, USA

SYSTEM SUMMARY:

- (N) 26 - CANADIAN SOLAR CS3N-395MS (395W) MODULES
- (N) 26 - ENPHASE ENERGY IQ8PLUS-72-2-US MICRO-INVERTERS
- (N) JUNCTION BOX
- (E) 200A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER
- (N) 60A NON-FUSED AC DISCONNECT
- (N) ENPHASE IQ COMBINER BOX 4

INTERCONNECTION METHOD - BACKFEED BREAKER

DESIGN CRITERIA:

- ROOF TYPE: - COMP SHINGLE
- NUMBER OF LAYERS: - 01
- ROOF FRAME: - 2"X4" TRUSSES @ 24" O.C.
- STORY: - TWO STORY
- SNOW LOAD : - 10 PSF
- WIND SPEED :- 120 MPH
- WIND EXPOSURE:- C
- RISK CATEGORY:- II

GOVERNING CODES:

- THIS PROJECT SHALL COMPLY WITH THE FOLLOWING CODE
- 2018 NORTH CAROLINA BUILDING CODE (NCBC)
- 2018 NORTH CAROLINA RESIDENTIAL CODE (NCRC)
- 2018 NORTH CAROLINA FIRE CODE (NCFC)
- 2018 NORTH CAROLINA PLUMBING CODE (NCPC)
- 2018 NORTH CAROLINA MECHANICAL CODE (NMC)
- 2018 NORTH CAROLINA FUEL GAS CODE (NCFG)
- 2018 NORTH CAROLINA ENERGY CONSERVATION CODE (NCECC)
- 2017 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-3.1 | ATTACHMENT DETAILS |
| PV-4 | ELECTRICAL LINE DIAGRAM & CALCULATIONS |
| PV-5 | PLACARDS & WARNING LABELS |
| PV-6+ | EQUIPMENT SPEC SHEETS |

GENERAL NOTES

- THE CONTRACTOR/INSTALLER OF THE SOLAR PV SYSTEM OVER EXISTING ROOF SHALL CONFORM TO OSHA REQUIREMENTS DURING THE CONSTRUCTION PHASE. JOB SAFETY AND CONSTRUCTION PROCEDURES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR/INSTALLER.
- REFER TO ELECTRICAL DRAWING PV-4 FOR PANEL DETAILED INFORMATION.
- IN CASE OF CONFLICT BETWEEN STRUCTURAL DRAWINGS AND ELECTRICAL DRAWINGS, THE MOST RIGID REQUIREMENTS SHALL GOVERN.
- THE CONTRACTOR/INSTALLER SHALL VERIFY ALL EXISTING BUILDING INFORMATION SHOWN (DIMENSIONS, ROOF TOP PROJECTIONS, ETC.) AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATIONS OF PV SYSTEM.
- THE CONTRACTOR/INSTALLER SHALL VERIFY AND COORDINATE EXISTING OPENINGS, ROOF TOP UNITS, VENT PIPES, ETC. SHOWN ON DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN DRAWINGS, IT IS THE CONTRACTORS/INSTALLER'S RESPONSIBILITY TO NOTIFY ENGINEER PRIOR TO PERFORMING THE WORK.
- ALL CONSTRUCTION IS TO BE PERFORMED IN STRICT CONFORMANCE WITH ALL APPLICABLE TOWN, COUNTY & STATE REGULATIONS AND/OR ANY OTHER GOVERNING BODIES.
- DO NOT SCALE THESE DRAWINGS, USE DIMENSIONS. CONTRACTOR MUST CONDUCT ROOF SURVEY TO VERIFY DIMENSIONS SHOWN ON PLAN PRIOR TO INSTALLATION. IF THERE IS A DISCREPANCY IT IS CONTRACTOR/INSTALLER'S RESPONSIBILITY TO NOTIFY THE ENGINEER IMMEDIATELY.

ELECTRICAL NOTES

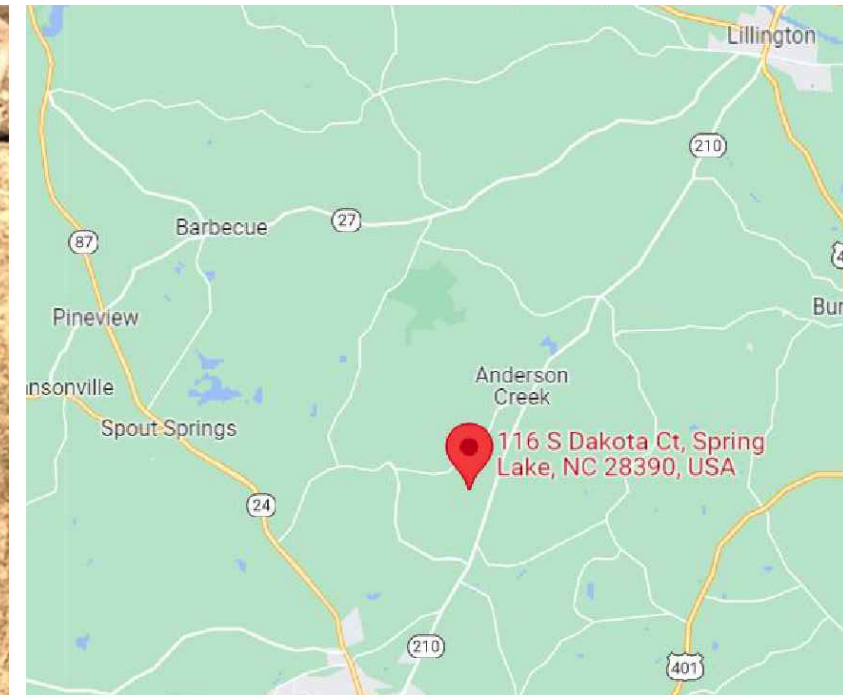
- 1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- 3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST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

1. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE FRAMING SIZES, SPACINGS, AND SPANS NOTED IN THE STAMPED PLANS AND ACCOMPANYING CALCULATIONS AND NOTIFY THE ENGINEER OF RECORD OF ANY DISCREPANCIES PRIOR TO STARTING CONSTRUCTION.
2. THESE PLANS ARE STAMPED FOR STRUCTURAL CODE COMPLIANCE OF THE ROOF FRAMING SUPPORTING THE PROPOSED PV INSTALLATION REFERENCED ONLY. THESE PLANS ARE NOT STAMPED FOR WATER LEAKAGE. PV MODULES, RACKING, AND ATTACHMENT COMPONENTS MUST FOLLOW MANUFACTURER GUIDELINES AND REQUIREMENTS.
3. PLEASE SEE THE ACCOMPANYING STRUCTURAL CALCULATIONS REPORT FOR DETAILS REGARDING CALCULATIONS AS WELL AS LIMITS OF SCOPE OF WORK AND LIABILITY.

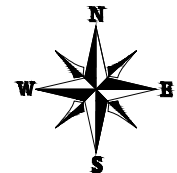
NOTE TO INSTALL: VERIFY THE ROOF FRAMING INFO BEFORE INSTALLATION AND NOTIFY THE EOR IF THERE IS ANY INCONSISTENCY BETWEEN SITE VERIFICATION AND FOLLOWINGS: 2x4 RAFTERS @ 24" OC SPACING WITH MAX UNSUPPORTED SPAN EQUAL OR LESS THAN 7 FT



1 | AERIAL PHOTO
PV-0 | SCALE: NTS



2 | VICINITY MAP
PV-0 | SCALE: NTS



VERSION

| DESCRIPTION | DATE | REV |
|-----------------|------------|-----|
| INITIAL RELEASE | 08/30/2022 | UR |
| | | |
| | | |

PROJECT NAME

JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 01053601011121
UTILITY: SOUTH RIVER EMC
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:
 • ALL ELECTRICAL EQUIPMENT, INVERTERS, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.



8/31/2022



DEL MAR, CA 92014, USA

| VERSION | | |
|-----------------|------------|-----|
| DESCRIPTION | DATE | REV |
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| | | |

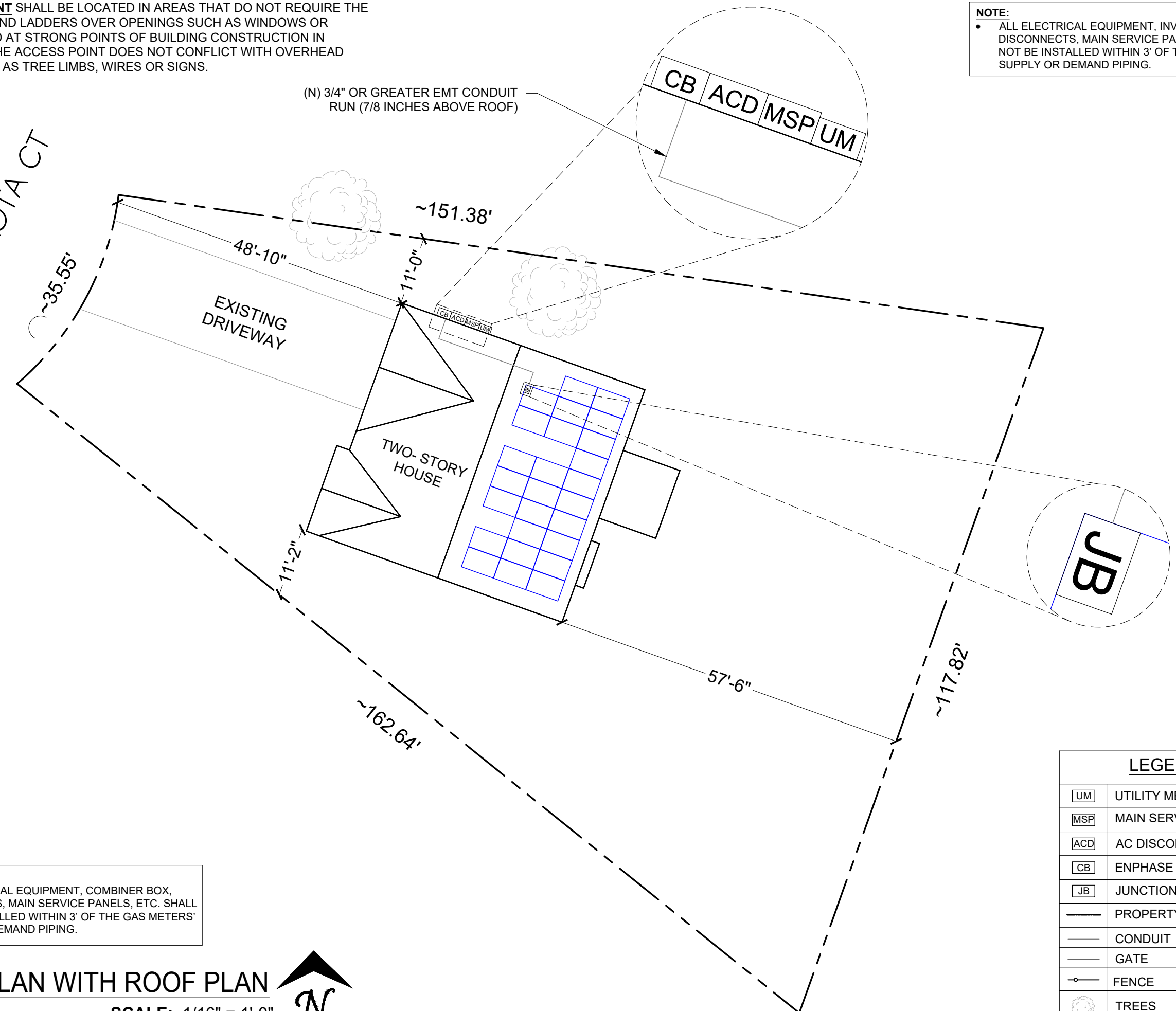
PROJECT NAME
JAIME HELEN TOLLERS
 116 S DAKOTA CT,
 SPRING LAKE, NC 28390, USA
 APN# 01053601011121
 UTILITY: SOUTH RIVER EMC
 AHJ: HARNETT COUNTY

SHEET NAME
SITE PLAN WITH ROOF PLAN

SHEET SIZE
**ANSI B
 11" X 17"**

SHEET NUMBER
PV-1

S DAKOTA CT



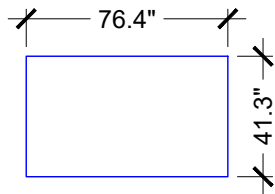
NOTE:
 • ALL ELECTRICAL EQUIPMENT, COMBINER BOX, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.

| LEGEND | |
|--------|-----------------------|
| UM | UTILITY METER |
| MSP | MAIN SERVICE PANEL |
| ACD | AC DISCONNECT |
| CB | ENPHASE IQ COMBINER 4 |
| JB | JUNCTION BOX |
| — | PROPERTY |
| — | CONDUIT |
| — | GATE |
| — | FENCE |
| ☁ | TREES |

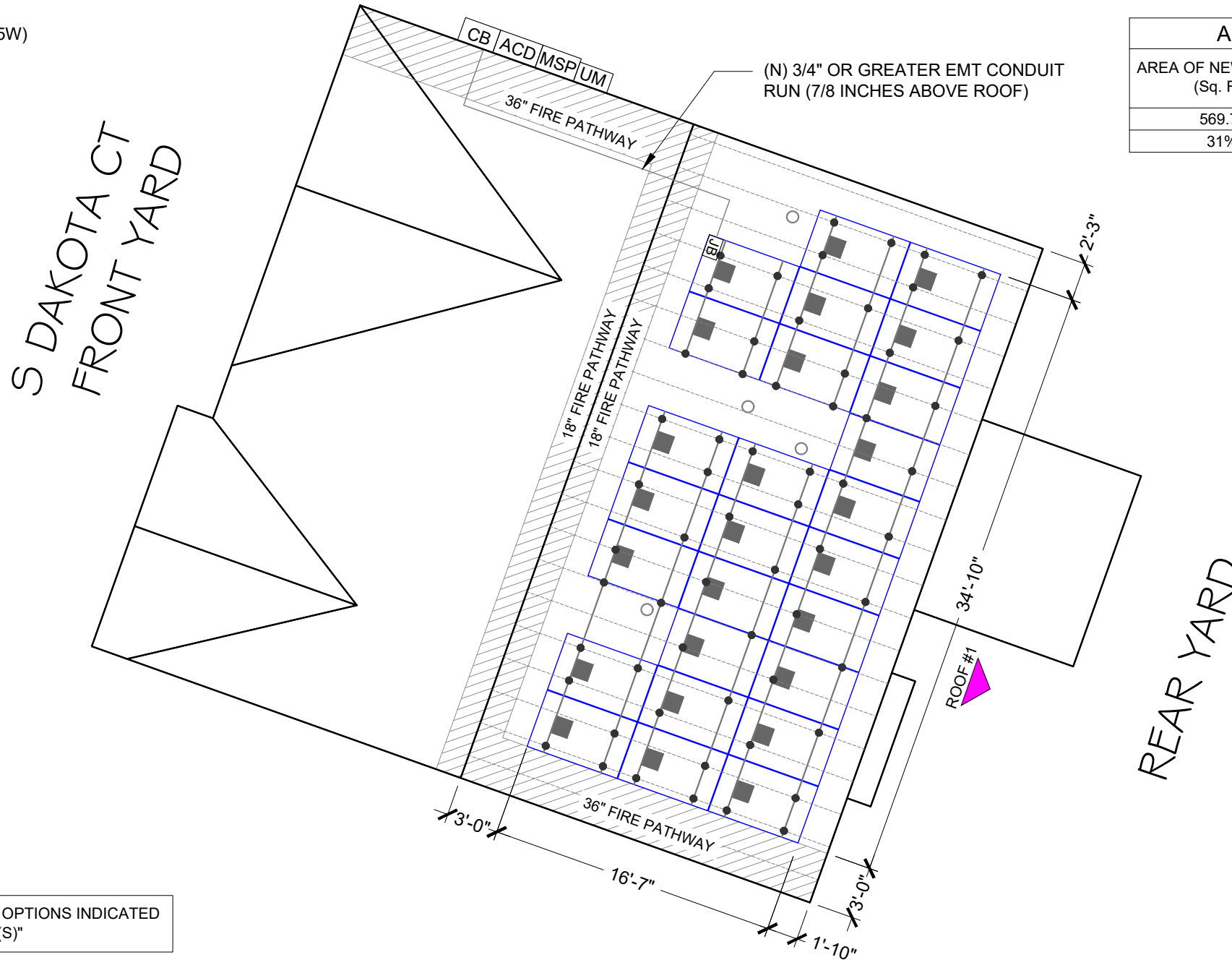
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 26 MODULES
 MODULE TYPE = CANADIAN SOLAR CS3N-395MS (395W) MODULES
 MODULE WEIGHT = 51.6 LBS / 23.5 KG.
 MODULE DIMENSIONS = 76.4" X 41.3" = 21.91 SF
 UNIT WEIGHT OF ARRAY = 2.35 PSF
 DISTRIBUTED DEAD LOAD = 2.53 PSF
 AVERAGE ROOF POINT DEAD LOAD = 24.04 LBS
 TOTAL SYSTEM WEIGHT: 1442.18 LBS

PHOTOVOLTAIC MODULES
 CANADIAN SOLAR CS3N-395MS (395W)



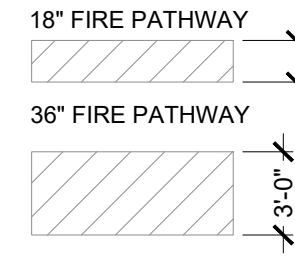
S DAKOTA CT
 FRONT YARD



| ROOF DESCRIPTION | | | | | |
|------------------|--------------|-----------|-------------------|--------------|-----------------|
| ROOF TYPE | | | COMP SHINGLE ROOF | | |
| ROOF | # OF MODULES | ROOF TILT | AZIMUTH | TRUSSES SIZE | TRUSSES SPACING |
| #1 | 26 | 30° | 110° | 2"x4" | 24" O.C. |

| BILL OF MATERIALS | | |
|-------------------|-----|--|
| EQUIPMENT | QTY | DESCRIPTION |
| RAIL | 13 | UNIRAC SM LIGHT RAIL 168" MILL |
| SPLICE | 06 | BND SPLICE BAR PRO SERIES MILL |
| MID CLAMP | 40 | UNIVERSAL AF MID CLAMPS |
| END CLAMP | 24 | UNIVERSAL AF END CLAMPS |
| ATTACHMENT | 61 | UNIRAC FLASHLOC OR FLASHKIT PRO ATTACHMENT |
| GROUNDING LUG | 06 | GROUND LUG |

| 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 % |
| 569.71 | 1828.308 | 31% |
| 31% | ROOF AREA (ARRAY >33% OF ROOF AREA) | |



8/31/2022



DEL MAR, CA 92014, USA

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|-----------------|------------|-----|
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PROJECT NAME
JAIME HELEN TOLLERS
 116 S DAKOTA CT,
 SPRING LAKE, NC 28390, USA
 APN# 01053601011121
 UTILITY: SOUTH RIVER EMC
 AHJ: HARNETT COUNTY

| LEGEND | |
|---------|---------------------------------------|
| UM | UTILITY METER |
| MSP | MAIN SERVICE PANEL |
| ACD | AC DISCONNECT |
| CB | IQ COMBINER BOX 4 |
| JB | JUNCTION BOX |
| — | UNIRAC SM LIGHT RAIL |
| ----- | CONDUIT |
| - - - - | TRUSSES |
| ■ | MICRO INVERTERS |
| ● | UNIRAC FLASHLOC ATTACHMENT @ 48" O.C. |
| ○ □ | VENT, ATTIC FAN (ROOF OBSTRUCTION) |

SHEET NAME
ROOF PLAN WITH MODULES

SHEET SIZE
ANSI B
 11" X 17"

SHEET NUMBER
PV-2

NOTE: "APPROVED ROOF ATTACHMENT OPTIONS INDICATED ON PV-3.1 ATTACHMENT DETAILS PAGE(S)"

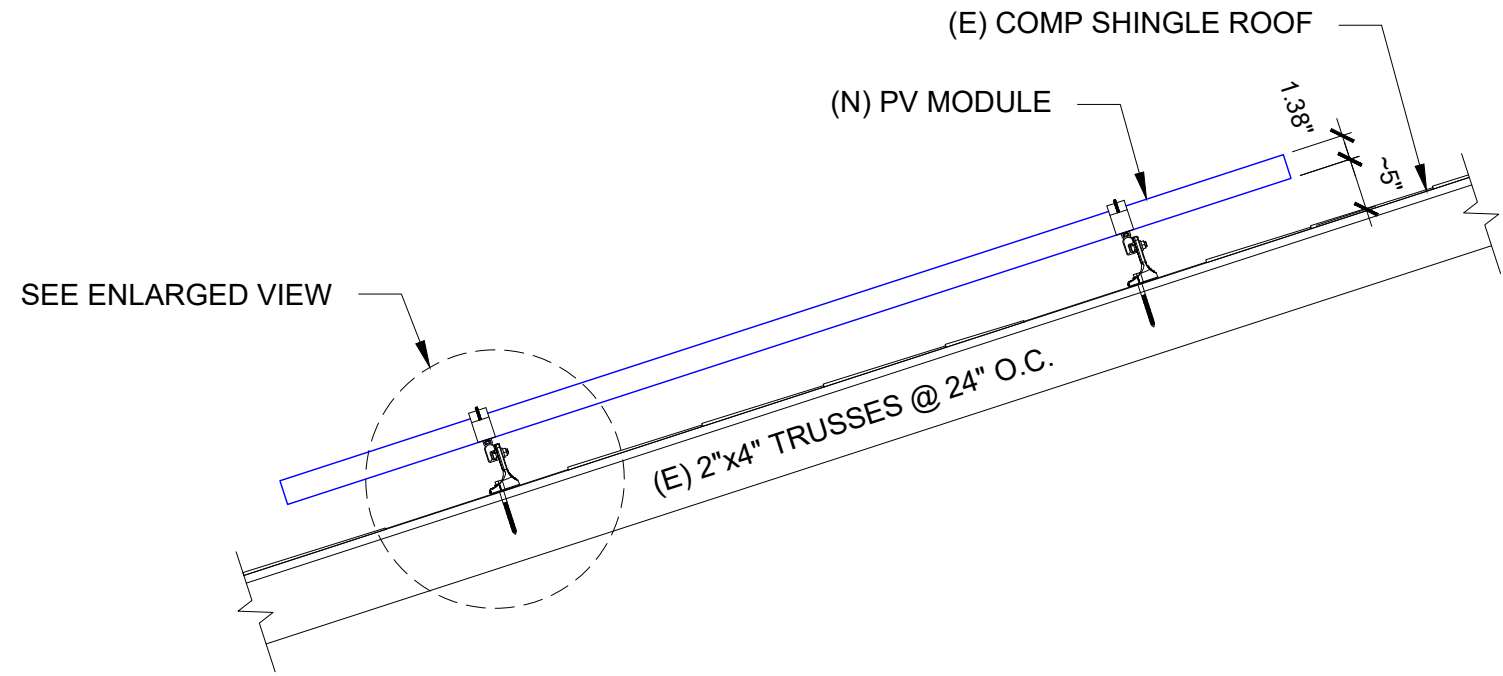
NOTE: ACTUAL ROOF CONDITIONS AND TRUSSES (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

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

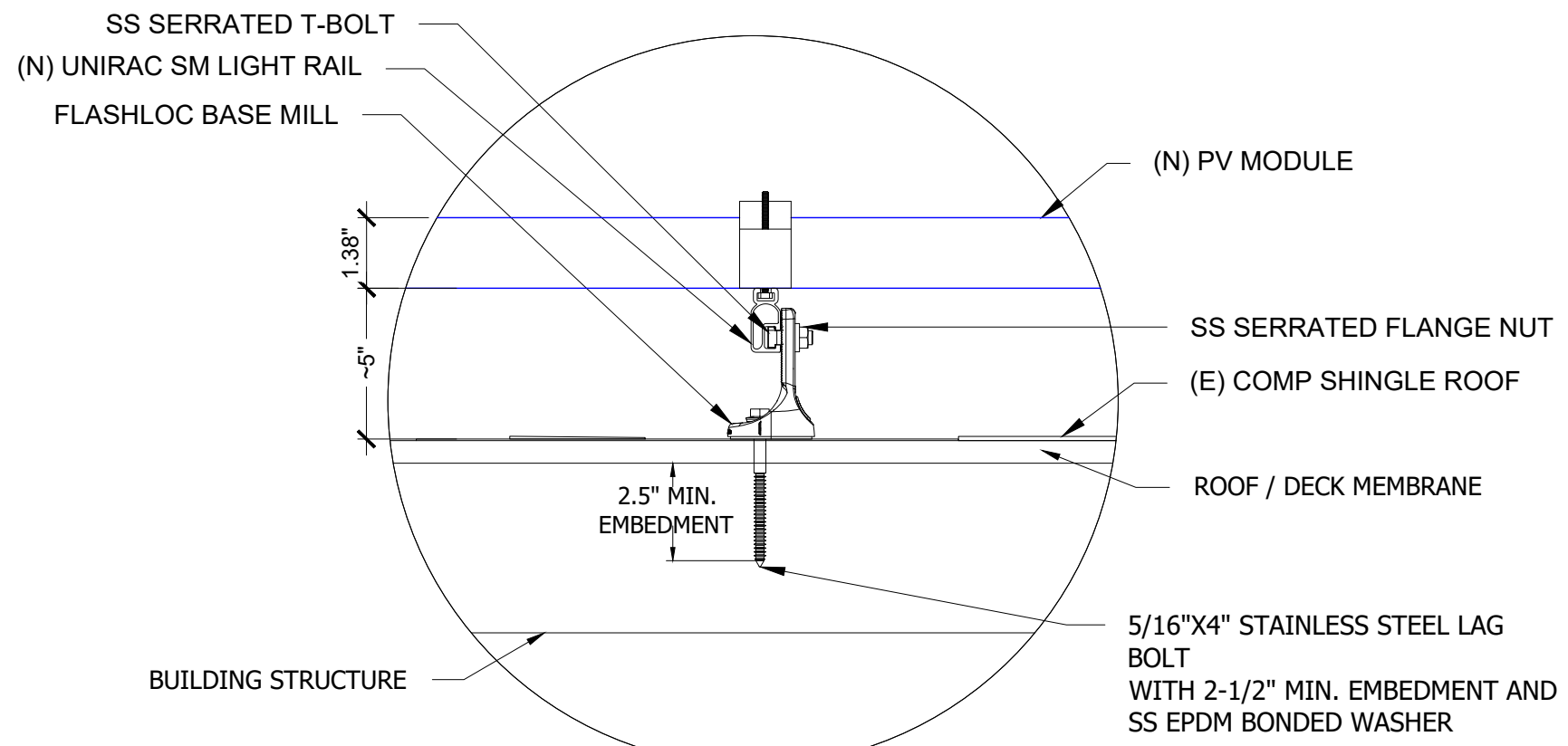


• PLUMBING VENTS, SKYLIGHTS AND MECHANICAL VENTS SHALL NOT BE COVERED, MOVED, RE-ROUTED OR RE-LOCATED.

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



1 ATTACHMENT DETAIL
SCALE: NTS



2 ATTACHMENT DETAIL (ENLARGED VIEW)
SCALE: NTS



8/31/2022



DEL MAR, CA 92014, USA

| VERSION | | |
|-----------------|------------|-----|
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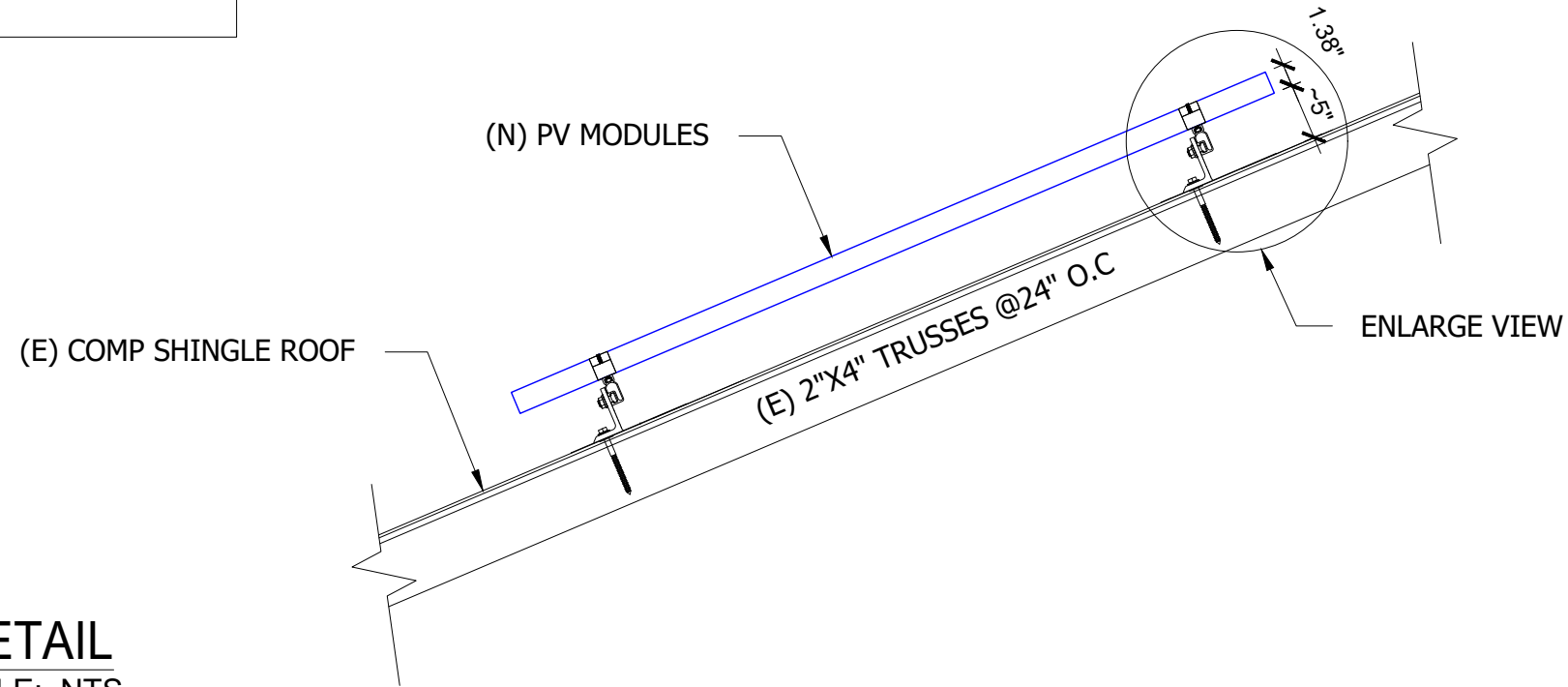
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JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 01053601011121
UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME
ATTACHMENT DETAIL

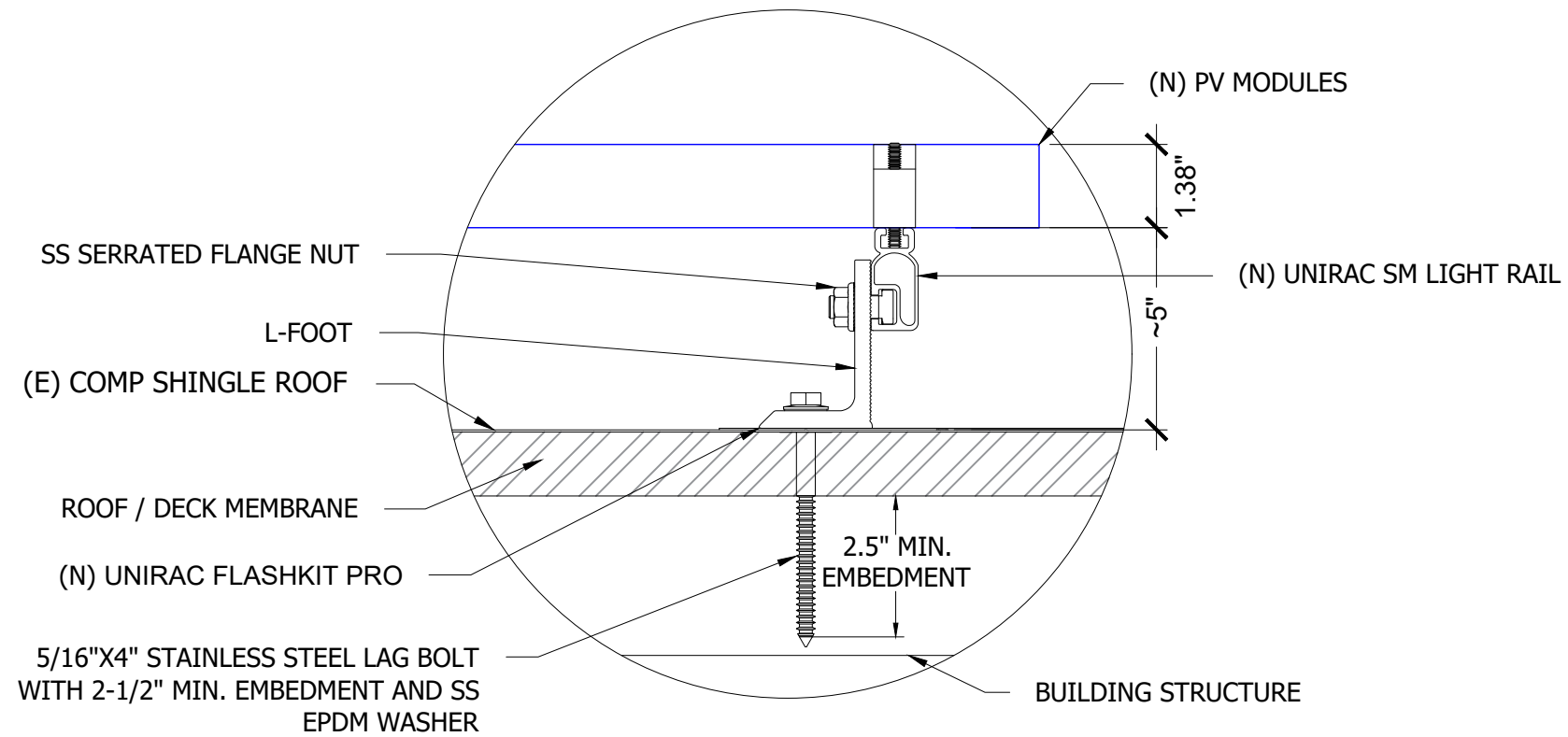
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

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



1 ATTACHMENT DETAIL
SCALE: NTS



2 ATTACHMENT DETAIL (ENLARGED VIEW)
SCALE: NTS



8/31/2022



DEL MAR, CA 92014, USA

| VERSION | | |
|-----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL RELEASE | 08/30/2022 | UR |
| | | |
| | | |

PROJECT NAME

JAIM HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 01053601011121
UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME
ATTACHMENT
DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3.1

SOLAR MODULE SPECIFICATIONS

| MANUFACTURER / MODEL # | VMP | IMP | VOC | ISC | TEMPERATURE COEFFICIENT OF Voc | # OF MODULES |
|----------------------------------|-----------------------------|-------|------|-------|--------------------------------|--------------|
| CANADIAN SOLAR CS3N-395MS (395W) | 37.0 | 10.68 | 44.3 | 11.44 | -0.27%/°C | 26 |
| MODULE DIMENSION | 76.4" L x 41.3" W x 1.38" D | | | | | |

AMBIENT TEMPERATURE SPECIFICATIONS

| RECORD LOW TEMP | AMBIENT TEMP (HIGH TEMP 2%) | CONDUIT HEIGHT | CONDUCTOR TEMPERATURE RATE (ON ROOF) | CONDUCTOR TEMPERATURE RATE (OFF ROOF) |
|-----------------|-----------------------------|----------------|--------------------------------------|---------------------------------------|
| -13° | 34° | 7/8" | 90° | 75° |

INVERTER SPECIFICATIONS

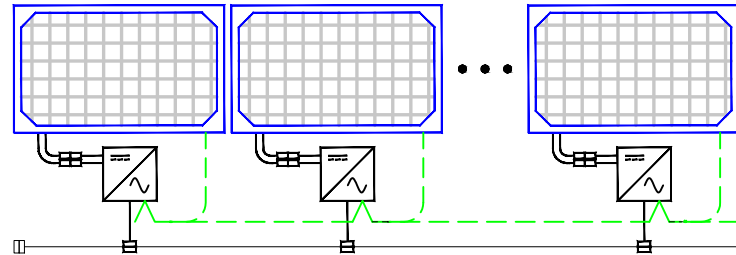
| MANUFACTURER / MODEL # | QUANTITY | NOMINAL OUTPUT VOLTAGE | NOMINAL OUTPUT CURRENT |
|--------------------------------|----------|------------------------|------------------------|
| ENPHASE ENERGY IQ8PLUS-72-2-US | 26 | 240 VAC | 1.21A |

INTERCONNECTION
120% RULE - NEC 705.12(B)(2)(3)(b)

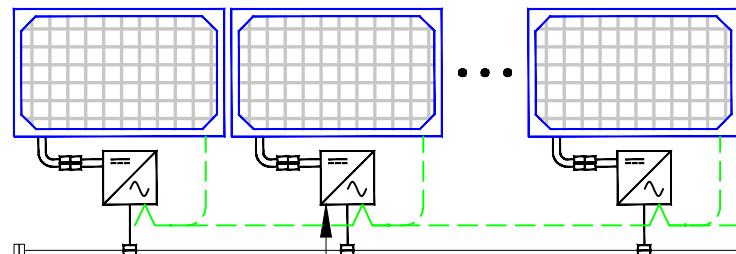
UTILITY FEED + SOLAR BACKFEED
200A + 40A = 240A
BUSS RATING x 120%
200A x 120% = 240A

SYSTEM SIZE:- 26 x 395W = 10.27 kWDC
SYSTEM SIZE:- 26 x 290W = 7.54 kWAC

13 MICRO-INVERTERS IN BRANCH CIRCUIT #1

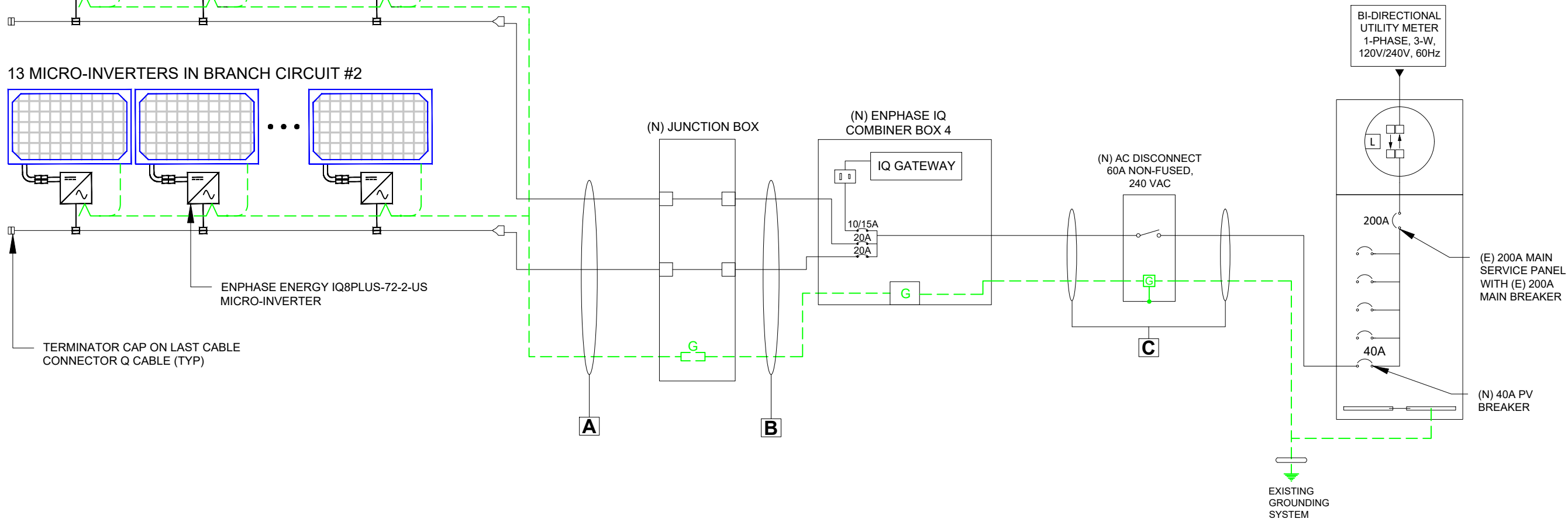


13 MICRO-INVERTERS IN BRANCH CIRCUIT #2



ENPHASE ENERGY IQ8PLUS-72-2-US MICRO-INVERTER

TERMINATOR CAP ON LAST CABLE CONNECTOR Q CABLE (TYP)



| Wire Tag | Conduit | Wire Qty | Wire Gauge | Wire Type | Temp. Rating | Wire Ampacity (A) | Temp. Derate | Conduit Fill Derate | Derated Ampacity (A) | Inverter Qty | NOC (A) | Design Current (A) | Ground Size | Ground Wire Type |
|----------|----------|----------|------------|--|--------------|-------------------|--------------|---------------------|----------------------|--------------|---------|--------------------|-------------|------------------|
| A | OPEN AIR | 2 | 12 AWG | Q Cable | 90°C | 30 | 0.96 | 1.0 | 28.80 | 13 | 1.21 | 15.73 | 06 AWG | BARE CU |
| B | 3/4" EMT | 4/2 | 12 AWG | THWN-2 OR NM-B CABLES WHERE RUN INDOOR | 90°C | 30 OR 40 | 0.96 | 0.80 | 23.04/30.72 | 13 | 1.21 | 15.73 | 10 AWG | THWN-2 |
| C | 3/4" EMT | 3 | 8 AWG | THWN | 75°C | 50 | 0.94 | 1.0 | 47.00 | 26 | 1.21 | 31.46 | 10 AWG | THWN |



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UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME

ELECTRICAL LINE DIAGRAM

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-4

1

ELECTRICAL LINE DIAGRAM WITH CALCULATION

SCALE: NTS

⚠ WARNING
ELECTRIC SHOCK HAZARD
 TERMINALS ON THE LINE AND LOAD
 SIDES MAY BE ENERGIZED IN THE
 OPEN POSITION

LABEL LOCATION:
 AC & DC DISCONNECT AND SUB PANEL
 (PER CODE: NEC 690.13(B))

⚠ WARNING DUAL POWER SOURCE
 SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
 MAIN SERVICE PANEL & NET METER
 (PER CODE: NEC 705.12(D)(3), NEC
 705.12(B)(3-4) & NEC 690.59)

MAXIMUM DC VOLTAGE
 OF PV SYSTEM

2020 NEC CODE 690.53

⚠ CAUTION
 PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

LABEL LOCATION:
 MSP
 (PER CODE: NEC 690.13 (F), NEC
 705.12(B)(3-4) & NEC 690.59)

PHOTOVOLTAIC SYSTEM AC DISCONNECT
 RATED AC OPERATING CURRENT 31.46 AMPS
 AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
 AC DISCONNECT & INVERTER
 (PER CODE: NEC690.54)

⚠ WARNING
 POWER SOURCE OUTPUT
 CONNECTION
 DO NOT RELOCATE THIS
 OVERCURRENT DEVICE

LABEL LOCATION:
 SERVICE PANEL IF SUM OF BREAKERS EXCEEDS
 PANEL RATING
 (PER CODE: NEC 705.12 (B)(2)(3)(b))

**WARNING:PHOTOVOLTAIC
 POWER SOURCE**

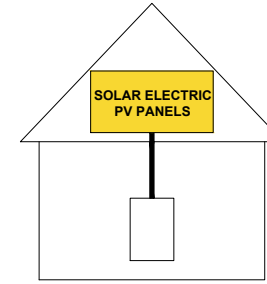
LABEL LOCATION:
 CONDUIT, COMBINER BOX
 (PER CODE: NEC 690.31(G)(3))

**MAIN PHOTOVOLTAIC
 SYSTEM DISCONNECT**

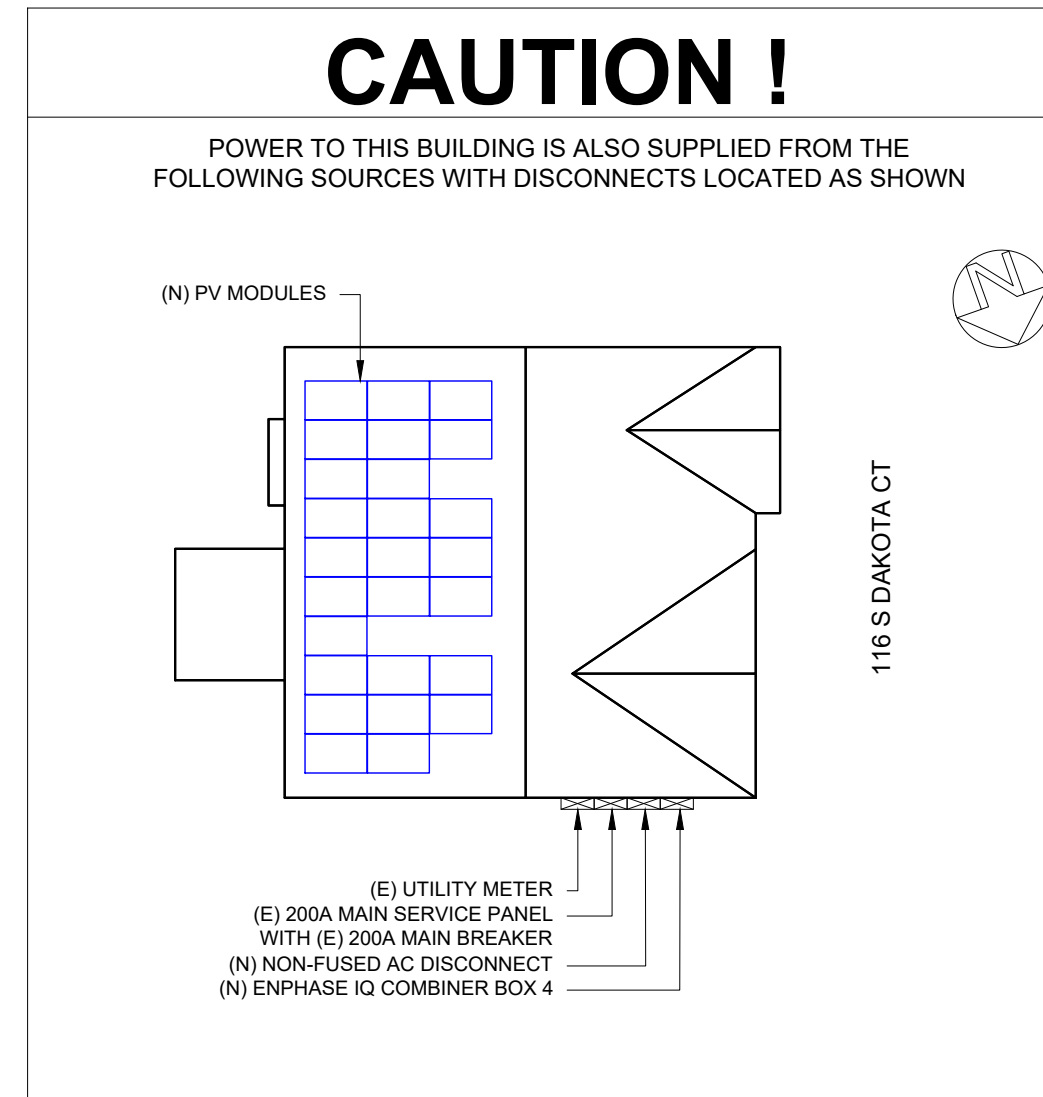
LABEL LOCATION:
 MAIN SERVICE DISCONNECT / UTILITY METER
 (PER CODE: NEC 690.13(B))

**SOLAR PV SYSTEM EQUIPPED
 WITH RAPID SHUTDOWN**

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



LABEL LOCATION:
 AC DISCONNECT, DC DISCONNECT, POINT OF
 INTERCONNECTION
 (PER CODE: 605.11.3.1(1) & 690.56(C)(1)(a))



DEL MAR, CA 92014, USA

| VERSION | | |
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PROJECT NAME
JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 0105360101121
UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME
**WARNING LABELS &
 PLACARD**

SHEET SIZE
**ANSI B
 11" X 17"**

SHEET NUMBER
PV-5



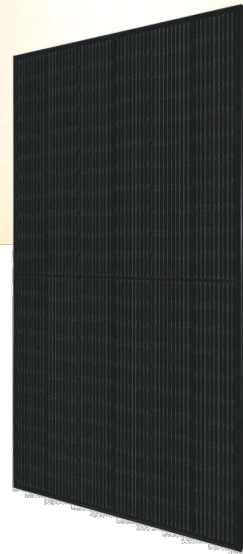
HiKuBlack Mono PERC

BLACK FRAME ON BLACK BACKSHEET

F23 Frame

380 W ~ 410 W

CS3N-380 | 385 | 390 | 395 | 400 | 405 | 410MS



MORE POWER

- 410 W** Module power up to 410 W
Module efficiency up to 20.2 %
- \$** Lower LCOE & BOS cost
- Bar Chart** Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation
- Calculator** Better shading tolerance

MORE RELIABLE

- Shield** Minimizes micro-crack impacts
- ***** Heavy snow load up to 8100 Pa, enhanced wind load up to 6000 Pa*

25 Years Industry Leading Product Warranty on Materials and Workmanship*

25 Years Linear Power Performance Warranty*

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.55%

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on residential rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001: 2015 / Quality management system
ISO 14001: 2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE
FSEC (US Florida) / UL 61730 / IEC 61701 / IEC 62716



* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

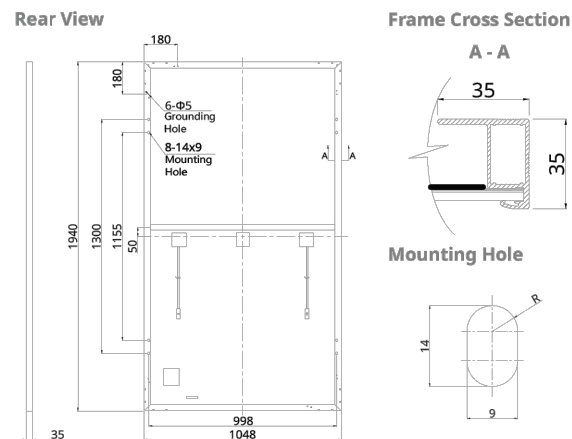
CSI SOLAR (USA) CO., LTD. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 20 years, it has successfully delivered over 63 GW of premium-quality solar modules across the world.

* For detailed information, please refer to Installation Manual.

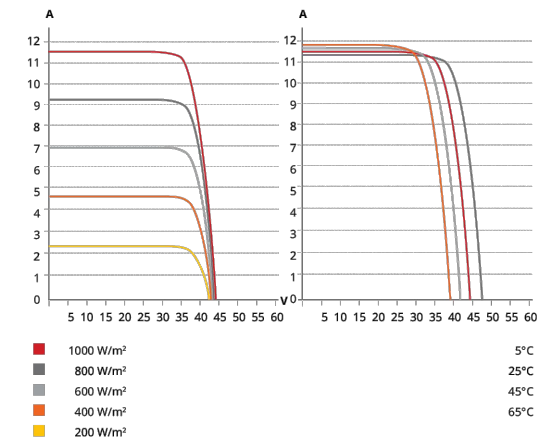
CSI SOLAR (USA) CO., LTD.

1350 Treat Blvd. Suite 500, Walnut Creek, CA 94598, USA | www.csisolar.com/na | service.ca@csisolar.com

ENGINEERING DRAWING (mm)



CS3N-400MS / I-V CURVES



ELECTRICAL DATA | STC*

| CS3N | 380MS | 385MS | 390MS | 395MS | 400MS | 405MS | 410MS |
|------------------------------|-------------------------|---------|---------|---------|---------|---------|---------|
| Nominal Max. Power (Pmax) | 380 W | 385 W | 390 W | 395 W | 400 W | 405 W | 410 W |
| Opt. Operating Voltage (Vmp) | 36.4 V | 36.6 V | 36.6 V | 37.0 V | 37.2 V | 37.4 V | 37.6 V |
| Opt. Operating Current (Imp) | 10.44 A | 10.52 A | 10.60 A | 10.68 A | 10.76 A | 10.83 A | 10.92 A |
| Open Circuit Voltage (Voc) | 43.7 V | 43.9 V | 44.1 V | 44.3 V | 44.5 V | 44.7 V | 44.9 V |
| Short Circuit Current (Isc) | 11.26 A | 11.32 A | 11.38 A | 11.44 A | 11.50 A | 11.56 A | 11.62 A |
| Module Efficiency | 18.7% | 18.9% | 19.2% | 19.4% | 19.7% | 19.9% | 20.2% |
| Operating Temperature | -40°C ~ +85°C | | | | | | |
| Max. System Voltage | 1000V (UL) | | | | | | |
| Module Fire Performance | TYPE 2 (UL 61730 1000V) | | | | | | |
| Max. Series Fuse Rating | 20 A | | | | | | |
| Application Classification | Class A | | | | | | |
| Power Tolerance | 0 ~ + 10 W | | | | | | |

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

| CS3N | 380MS | 385MS | 390MS | 395MS | 400MS | 405MS | 410MS |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Nominal Max. Power (Pmax) | 284 W | 288 W | 291 W | 295 W | 299 W | 303 W | 306 W |
| Opt. Operating Voltage (Vmp) | 34.0 V | 34.2 V | 34.4 V | 34.6 V | 34.7 V | 34.9 V | 35.1 V |
| Opt. Operating Current (Imp) | 8.35 A | 8.42 A | 8.48 A | 8.54 A | 8.60 A | 8.66 A | 8.73 A |
| Open Circuit Voltage (Voc) | 41.2 V | 41.4 V | 41.6 V | 41.8 V | 41.9 V | 42.1 V | 42.3 V |
| Short Circuit Current (Isc) | 9.08 A | 9.13 A | 9.18 A | 9.23 A | 9.28 A | 9.33 A | 9.37 A |

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

MECHANICAL DATA

| Specification | Data |
|------------------------------------|---|
| Cell Type | Mono-crystalline |
| Cell Arrangement | 132 [2 X (11 X 6)] |
| Dimensions | 1940 X 1048 X 35 mm (76.4 X 41.3 X 1.38 in) |
| Weight | 23.4 kg (51.6 lbs) |
| Front Cover | 3.2 mm tempered glass |
| Frame | Anodized aluminium alloy |
| J-Box | IP68, 3 bypass diodes |
| Cable | 12 AWG (UL) |
| Cable Length (Including Connector) | Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-) (supply additional cable jumper: 2 lines/pallet); landscape: 1250 mm (49.2 in)* |
| Connector | T4 or MC4 series |
| Per Pallet | 30 pieces |
| Per Container (40' HQ) | 720 pieces |

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

TEMPERATURE CHARACTERISTICS

| Specification | Data |
|--------------------------------------|--------------|
| Temperature Coefficient (Pmax) | -0.34 % / °C |
| Temperature Coefficient (Voc) | -0.26 % / °C |
| Temperature Coefficient (Isc) | 0.05 % / °C |
| Nominal Module Operating Temperature | 42 ± 3°C |

PARTNER SECTION



* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

CSI SOLAR (USA) CO., LTD.

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DEL MAR, CA 92014, USA

VERSION

| DESCRIPTION | DATE | REV |
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| INITIAL RELEASE | 08/30/2022 | UR |

PROJECT NAME

JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 0105360101121
UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-6



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 | | |
| Overvoltage 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% | | | |
| Overvoltage class AC port | | | | III | | | |
| AC port backfeed current | mA | | | 30 | | | |
| Power factor setting | | | | 1.0 | | | |
| Grid-tied power factor (adjustable) | | | | 0.85 leading – 0.85 lagging | | | |
| Peak efficiency | % | 97.5 | 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



DEL MAR, CA 92014, USA

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 APN# 0105360101121
 UTILITY: SOUTH RIVER EMC
 AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-7

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

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 COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05 | - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan |
| Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B | Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support |
| EPLC-01 | Power line carrier (communication bridge pair), quantity - one pair |
| XA-SOLARSHIELD-ES | Replacement solar shield for IQ Combiner 4/4C |
| XA-PLUG-120-3 | Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01) |
| XA-ENV-PCBA-3 | Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C |
| X-IQ-NA-HD-125A | Hold down kit for Eaton circuit breaker with screws. |
| ELECTRICAL SPECIFICATIONS | |
| Rating | Continuous duty |
| System voltage | 120/240 VAC, 60 Hz |
| Eaton BR series busbar rating | 125 A |
| Max. continuous current rating | 65 A |
| Max. continuous current rating (input from PV/storage) | 64 A |
| Max. fuse/circuit rating (output) | 90 A |
| Branch circuits (solar and/or storage) | Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included) |
| Max. total branch circuit breaker rating (input) | 80A of distributed generation / 95A with IQ Gateway breaker included |
| Production metering CT | 200 A solid core pre-installed and wired to IQ Gateway |
| Consumption monitoring CT (CT-200-SPLIT) | A pair of 200 A split core current transformers |
| MECHANICAL DATA | |
| Dimensions (WxHxD) | 37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets. |
| Weight | 7.5 kg (16.5 lbs) |
| Ambient temperature range | -40° C to +46° C (-40° to 115° F) |
| Cooling | Natural convection, plus heat shield |
| Enclosure environmental rating | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction |
| Wire sizes | • 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing. |
| Altitude | To 2000 meters (6,560 feet) |
| INTERNET CONNECTION OPTIONS | |
| Integrated Wi-Fi | 802.11b/g/n |
| Cellular | CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations. |
| Ethernet | Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) |
| COMPLIANCE | |
| Compliance, IQ Combiner | UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5 |
| Compliance, IQ Gateway | UL 60601-1/CANCSA 22.2 No. 61010-1 |



To learn more about Enphase offerings, visit enphase.com



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DEL MAR, CA 92014, USA

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JAIME HELEN TOLLERS
116 S DAKOTA CT,
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AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

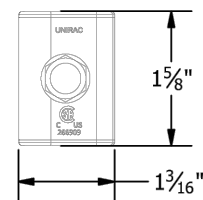
ANSI B
11" X 17"

SHEET NUMBER

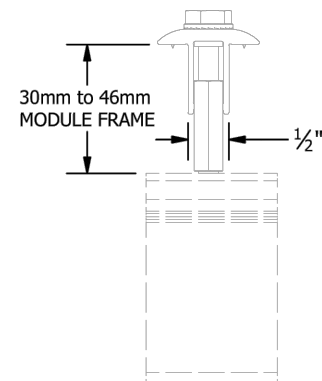
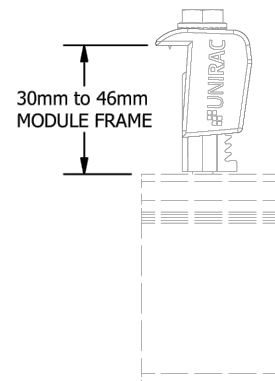
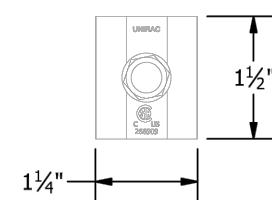
PV-8

| 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 |

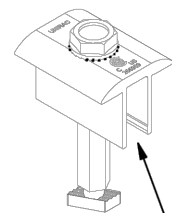
UNIVERSAL AF
END CLAMP



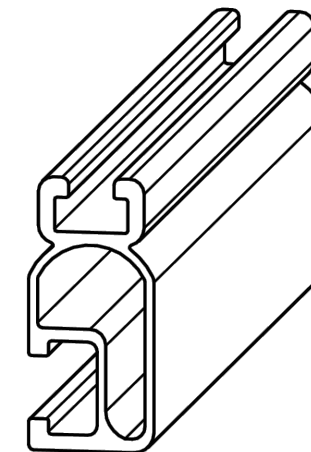
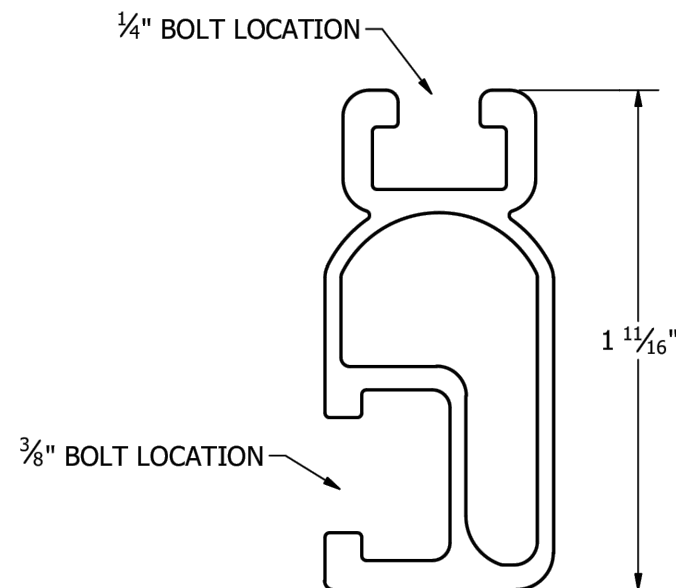
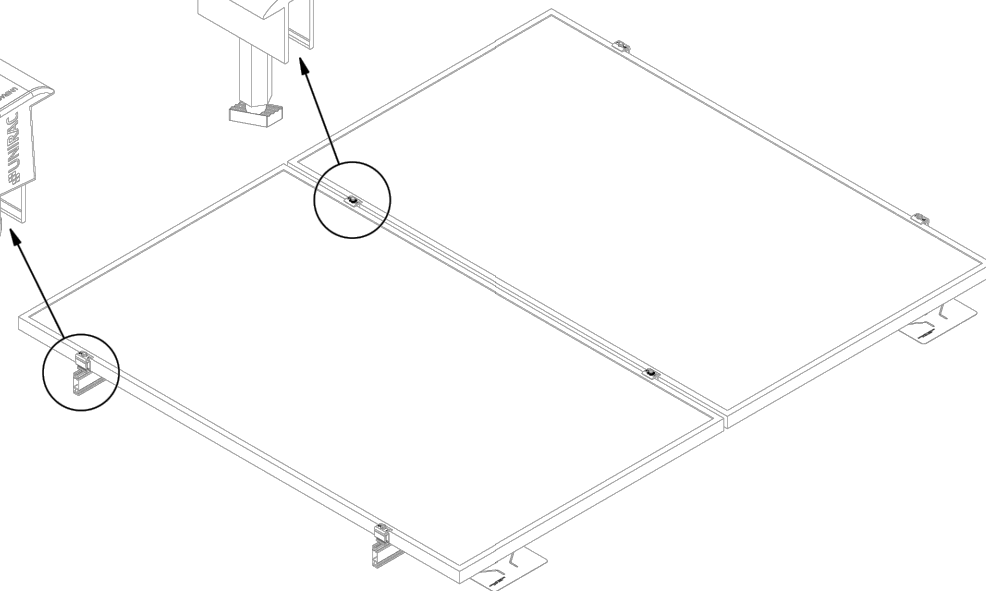
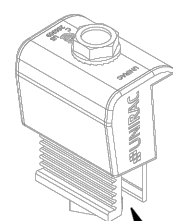
UNIVERSAL AF
MID CLAMP



UNIVERSAL
MID CLAMP



UNIVERSAL
END CLAMP



| PART # TABLE | | |
|--------------|-------------------------|--------|
| P/N | DESCRIPTION | LENGTH |
| 315168M | SM LIGHT RAIL 168" MILL | 168" |
| 315168D | SM LIGHT RAIL 168" DRK | 168" |
| 315240M | SM LIGHT RAIL 240" MILL | 240" |
| 315240D | SM LIGHT RAIL 240" DRK | 240" |



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



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

| | |
|----------------|-------------|
| PRODUCT LINE: | SOLARMOUNT |
| DRAWING TYPE: | PART DETAIL |
| DESCRIPTION: | LIGHT RAIL |
| REVISION DATE: | 9/11/2017 |

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-P02

SHEET



DEL MAR, CA 92014, USA

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SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9

FLASH LOC



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



PROTECT THE ROOF

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



LOC OUT WATER

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



HIGH-SPEED INSTALL

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

FLASH LOC

INSTALLATION GUIDE



PRE-INSTALL

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

At each location, drill a 7/32" pilot hole. Clean roof surface of dirt, debris, snow, and ice. Next, BACKFILL ALL PILOT HOLES WITH SEALANT.

NOTE: Space mounts per racking system install specifications.



STEP 1: SECURE

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

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



STEP 2: SEAL

Insert tip of UNIRAC provided sealant into port. Inject until sealant exits both vents.

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



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

USE ONLY UNIRAC APPROVED SEALANTS: Chemlink Duralink 50 (included in kit) or Chemlink M-1

FASTER INSTALLATION. 25-YEAR WARRANTY.

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

FASTER INSTALLATION. 25-YEAR WARRANTY.

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 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-torquing 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.



DEL MAR, CA 92014, USA

VERSION

| DESCRIPTION | DATE | REV |
|-----------------|------------|-----|
| INITIAL RELEASE | 08/30/2022 | UR |
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PROJECT NAME

JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 01053601011121
UTILITY: SOUTH RIVER EMC
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

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 UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved system level performance for steep sloped roofs. System level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. 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 are listed below:

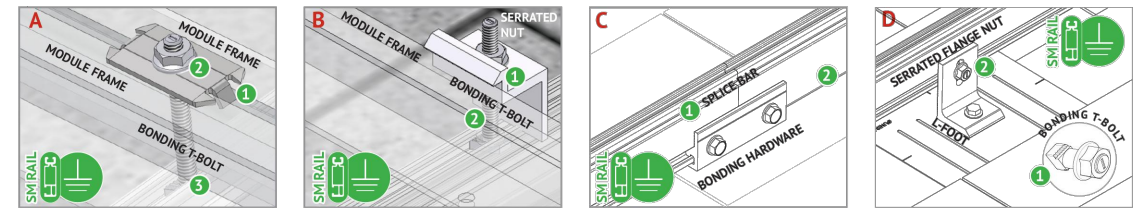
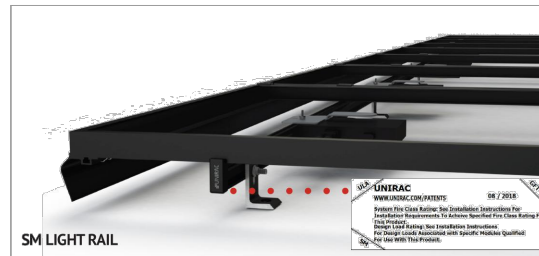
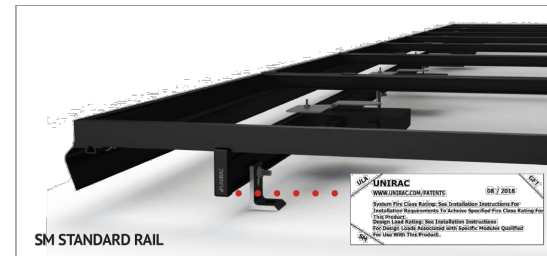
| Rail Type | Module Type | System Level Fire Rating | Rail Direction | Module Orientation | Mitigation Required |
|---------------|----------------------------------|----------------------------|----------------|-----------------------|---------------------|
| Standard Rail | Type 1, Type 2, Type 3 & Type 10 | Class A, Class B & Class C | East-West | Landscape OR Portrait | None Required |
| | | | North-South | Landscape OR Portrait | None Required |
| Light Rail | Type 1 & Type 2 | Class A, Class B & Class C | East-West | Landscape OR Portrait | None Required |
| | | | North-South | Landscape OR Portrait | None Required |

This racking system may be used to ground and/or mount a PV module complying with UL1703 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.



BONDING MIDCLAMP ASSEMBLY

1. Stainless steel Midclamp points, 2 per module, pierce module frame anodization to bond module to module through clamp.
2. Serrated flange nut bonds stainless steel clamp to stainless steel T-bolt.
3. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to grounded SM rail.

ENDCLAMP ASSEMBLY

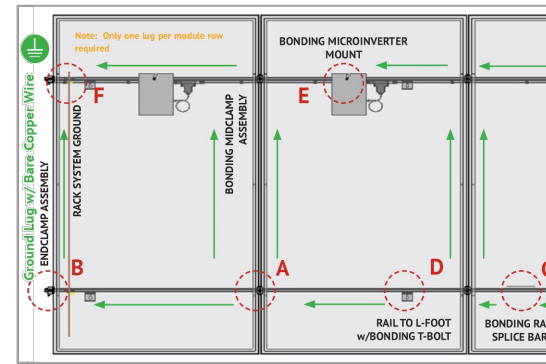
1. Serrated flange nut bonds aluminum Endclamp to stainless steel T-bolt.
 2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and Endclamp to grounded SM rail.
- Note: End clamp does not bond to module frame.

BONDING RAIL SPLICE BAR

1. Bonding Hardware creates bond between splice bar and each rail section.
 2. 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.

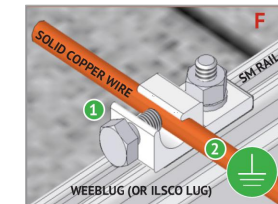
RAIL TO L-FOOT w/BONDING T-BOLT

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



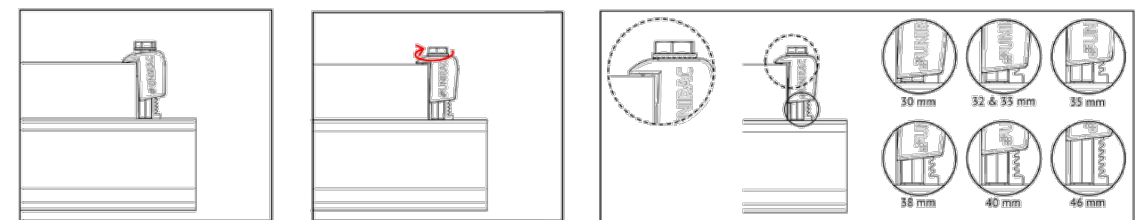
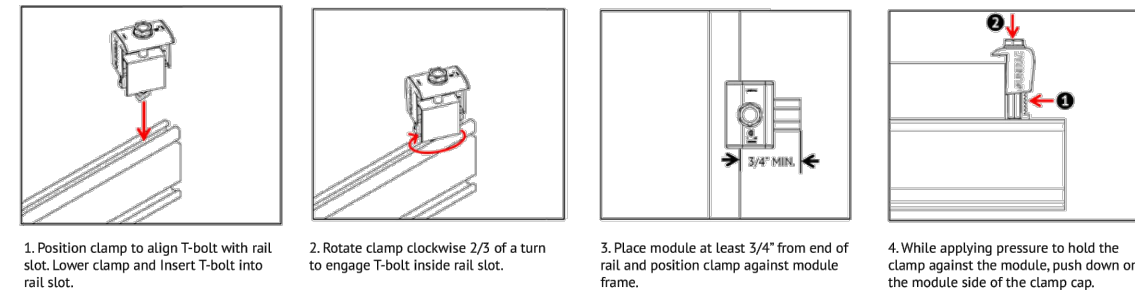
BONDING MICROINVERTER MOUNT

1. Hex nut with captive lock washer bonds metal microinverter flange to stainless steel T-bolt.
2. 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 1 for details.

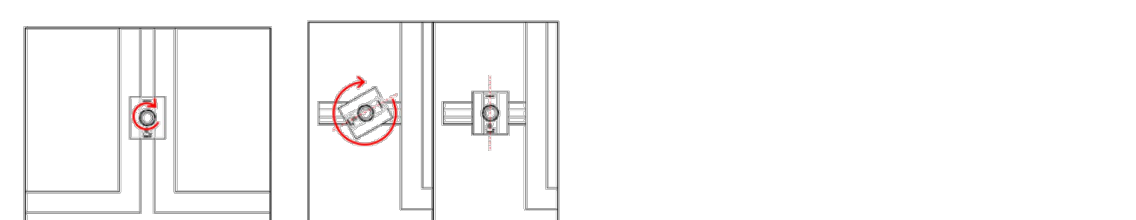
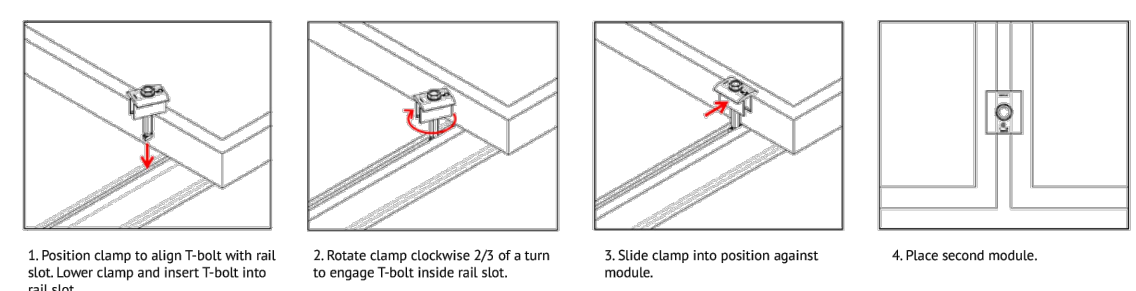


RACK SYSTEM GROUND

1. Weeb washer dimples pierce anodized rail to create bond between rail and lug.
 2. Solid copper wire connected to lug is routed to provide final system ground connection.
- NOTE: Ilcoo lug can also be used when secured to the side of the rail. See page 2 for details.



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.



NOTE: If excessive force is applied in step 2, the cap may over-rotate causing it to be mis-aligned with the module frame. If this occurs, keep rotating the cap clockwise until it returns to the original position.



DEL MAR, CA 92014, USA

| VERSION | | |
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| DESCRIPTION | DATE | REV |
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PROJECT NAME

JAIME HELEN TOLLERS
 116 S DAKOTA CT,
 SPRING LAKE, NC 28390, USA
 APN# 01053601011121
 UTILITY: SOUTH RIVER EMC
 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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 Prepared By: Michael Hoffnagle
 Authorized By: Michael Hoffnagle

Edition 18: June 8, 2022; Project 80128750 - Irvine
 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



DEL MAR, CA 92014, USA

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| DESCRIPTION | DATE | REV |
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PROJECT NAME
JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 01053601011121
UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME
SPEC SHEETS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-13



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 |
|----------------|--|
| Aionrise | AION60G1, AION72G1 |
| Aleo | P-Series & S-Series |
| Aptos Solar | DNA-120-MF10 DNA-120-(MF/BF)23 DNA-144-(MF/BF)23 DNA-120-(MF/BF)26 DNA-144-(MF/BF)26 |
| Astronergy | CHSM6612 M, M/HV CHSM6612P Series CHSM6612P/HV Series CHSM72M-HC CHSM72M(DG)/F-BH |
| Auxin | AXN6M610T AXN6P610T AXN6M612T AXN6P612T |
| Axitec | AC-xxx(M/P)/60S, AC-xxx(M/P)/72S AC-xxxP/156-60S AC-xxxMH/120(S/V/SB/VB) AC-xxxMH/144(S/V/SB/VB) |
| Boviet | BVM6610, BVM6612 |
| BYD | P6K & MHK-36 Series |
| Canadian Solar | CS1(H/K/U/Y)-MS CS3K-(MB/MB-AG/MS/P/P HE/PB-AG) CS3L-(MS/P) CS3N-MS CS3U-(MB/MB-AG/MS/P/P HE/PB/PB-AG) CS3W-(MS/P/P-PB-AG) |

| Manufacture | Module Model / Series |
|------------------------|--|
| Canadian Solar (cont.) | CS5A-M CS6K-(M/MS/MS AllBlack/P/P HE) CS6P-(M/P) CS6U-(M/P/P HE) CS6X-P, CSX-P ELPS CS6(A/P)-MM |
| Centrosolar America | C-Series & E-Series |
| CertainTeed | CT2xxMxx-01, CT2xxPxx-01, CTxxMxx-01 CTxxPxx-01, CTxxMxx-02, CTxxMxx-03 CTxxMxx-04, CTxxHC11-04 |
| Eco Solargy | Orion 1000 & Apollo 1000 |
| ET Solar | ET AC Module, ET Module |
| First Solar | FS-6XXX(A) FS-6XXX(A)-P, FS-6XXX(A)-P-I |
| Flextronics | FXS-xxxBB |
| FreeVolt | PVGraf |
| GCL | GCL-P6 & GCL-M6 Series |
| Hanwha SolarOne | HSL 60 |
| Hansol | TD-AN3, TD-AN4 UB-AN1, UD-AN1 |
| Heliene | 36M, 36P 60M, 60P, 72M & 72P Series 144HC M6 |
| HT Solar | HT72-156(M/P) HT72-156P-C, HT72-156P(V)-C HT72-156M(PDV)-BF, HT72-156M(PD)-BF HT60-156M-C HT60-156M(V)-C |

| Manufacture | Module Model / Series |
|----------------|---|
| Hyundai | KG, MG, RW, TG, RI, RG, TI, KI, HI Series HiA-SxxxHG, HiD-SxxxRG(BK), HiS-S400PI |
| ITEK | iT-SE Series |
| Japan Solar | JPS-60 & JPS-72 Series |
| JA Solar | JAM72D30MB, JAM78D10MB JAP6 60-xxx JAM6(K)-60/xxx, JAP6(k)-72-xxx/4BB JAP72S##-xxx/** JAP6(k)-60-xxx/4BB, JAP60S##-xxx/** JAM6(k)-72-xxx/**, JAM72S##-xxx/** JAM6(k)-60-xxx/**, JAM60S##-xxx/** i. ##: 01, 02, 03, 09, 10 ii. **: SC, PR, BP, HiT, IB, MW, MR ** = Backsheet, ## Cell technology |
| Jinko | JKM & JKMS Series JKMxxxM-72HL-V JKMxxxM-72HL4-(T)V JKMxxxM-7RL3-V |
| Kyocera | KD-F & KU Series |
| LA Solar | LSxxxHC(166) |
| LG Electronics | LGxxx(E1C/E1K/N1C/N1K/N2T/N2W/S1C/ S2W/Q1C/Q1K)-A5 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/ QAC/QAK)-A6 LGxxxN2W-B3 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4 |

- 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**



DEL MAR, CA 92014, USA

VERSION

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| INITIAL RELEASE | 08/30/2022 | UR |
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PROJECT NAME

JAIME HELEN TOLLERS
116 S DAKOTA CT,
SPRING LAKE, NC 28390, USA
APN# 0105360101121
UTILITY: SOUTH RIVER EMC
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-14



Certificate of Compliance

Certificate: 70131735 **Master Contract:** 266909
Project: 80128750 **Date Issued:** 2022-06-08
Issued To: Unirac
1411 Broadway NE
Albuquerque, New Mexico, 87102
United States
Attention: Rob D'Anastasio

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Issued by: Michael Hoffnagle
Michael Hoffnagle

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



Certificate: 70131735
Project: 80128750

Master Contract: 266909
Date Issued: 2022-06-08

| | | | |
|---------|-----|---|---|
| Models: | SM | - | SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations. |
| | ULA | - | Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules. |

Solarmount

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless-steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs. Fire ratings of Class A with Type 1, 2, 3 (with metallic frame), 4 (with trim), 5 (with trim), 10(with metallic frame), 19, 22, 25, 29, or 30 for steep slope. Tested at 5" interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.

UL 2703 Mechanical Load ratings:

| | |
|--|-------|
| Downward Design Load (lb/ft ²) | 113.5 |
| Upward Design Load (lb/ft ²) | 50.7 |
| Down-Slope Load (lb/ft ²) | 16.13 |

Test Loads:

| | |
|---------------------------------------|--------|
| Downward Load (lb/ft ²) | 170.20 |
| Upward Load (lb/ft ²) | 76.07 |
| Down-Slope Load (lb/ft ²) | 24.2 |



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SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-15