

PHOTOVOLTAIC ROOF MOUNT SYSTEM

20 MODULES-ROOF MOUNTED - 8.100 kW DC, 7.600 kW AC

308 W E ST, ERWIN, NC 28339



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

| REVISIONS | | |
|----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL DESIGN | 03/10/2025 | |
| | | |
| | | |

STRUCTURAL ONLY
03/10/2025

PROJECT NAME & ADDRESS

**JAMES BRADLEY
RESIDENCE**

308 W E ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
COVER SHEET

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

SHEET NUMBER
PV-1

PROJECT DATA

PROJECT ADDRESS: 308 W E ST,
ERWIN, NC 28339

OWNER: JAMES BRADLEY

DESIGNER: ESR

SCOPE: 8.100 kW DC ROOF MOUNT
SOLAR PV SYSTEM WITH
20 JA SOLAR: JAM54S31-405/MR 405W
PV MODULES WITH
20 SOLAREEDGE: S440 POWER OPTIMIZERS AND
01 SOLAREEDGE: SE7600H-US (240V/7600W)
INVERTER

AUTHORITIES HAVING JURISDICTION:
BUILDING: HARNETT COUNTY
ZONING: HARNETT COUNTY
UTILITY: DUKE ENERGY PROGRESS

SHEET INDEX

| | |
|-------|--------------------------|
| PV-1 | COVER SHEET |
| PV-2 | SITE PLAN |
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SIGNATURE



GENERAL NOTES

- ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
- THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2017.
- THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
- ALL CONDUCTORS OF A CIRCUIT, INCLUDING THE EGC, MUST BE INSTALLED IN THE SAME RACEWAY, OR CABLE, OR OTHERWISE RUN WITH THE PV ARRAY CIRCUIT CONDUCTORS WHEN THEY LEAVE THE VICINITY OF THE PV ARRAY.
- WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
- HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH CEC 690.47 AND 250.50 THROUGH 60 AND 250-166 SHALL BE PROVIDED. PER NEC GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE 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 LARGER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
- PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
- PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE. WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF THE ROOF SURFACE.
- ALL SINAGE TO BE PLACED IN ACCORDANCE WITH THE LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SINAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
- INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE UL 1741 LISTED.
- THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
- SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
- PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
- DISCONNECTING MEANS SHALL BE LOCATED IN A VISIBLE, READILY ACCESSIBLE LOCATION WITHIN THE PV SYSTEM EQUIPMENT OR A MAXIMUM OF 10 FEET AWAY FROM THE SYSTEM [NEC 690.13(A)]
- ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
- WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
- ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
- ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.

VICINITY MAP



HOUSE PHOTO



CODE REFERENCES

2018 NORTH CAROLINA BUILDING CODE
2018 NORTH CAROLINA RESIDENTIAL CODE
2018 NORTH CAROLINA FIRE CODE
2017 NATIONAL ELECTRICAL CODE

NOTICE TO CONTRACTOR:
All construction must comply with current NC Building Codes and is subject to field inspection and verification.

APPROVED
Limited building only center
Permit holder responsible for full compliance with the code

04/03/2025

PROJECT DESCRIPTION:

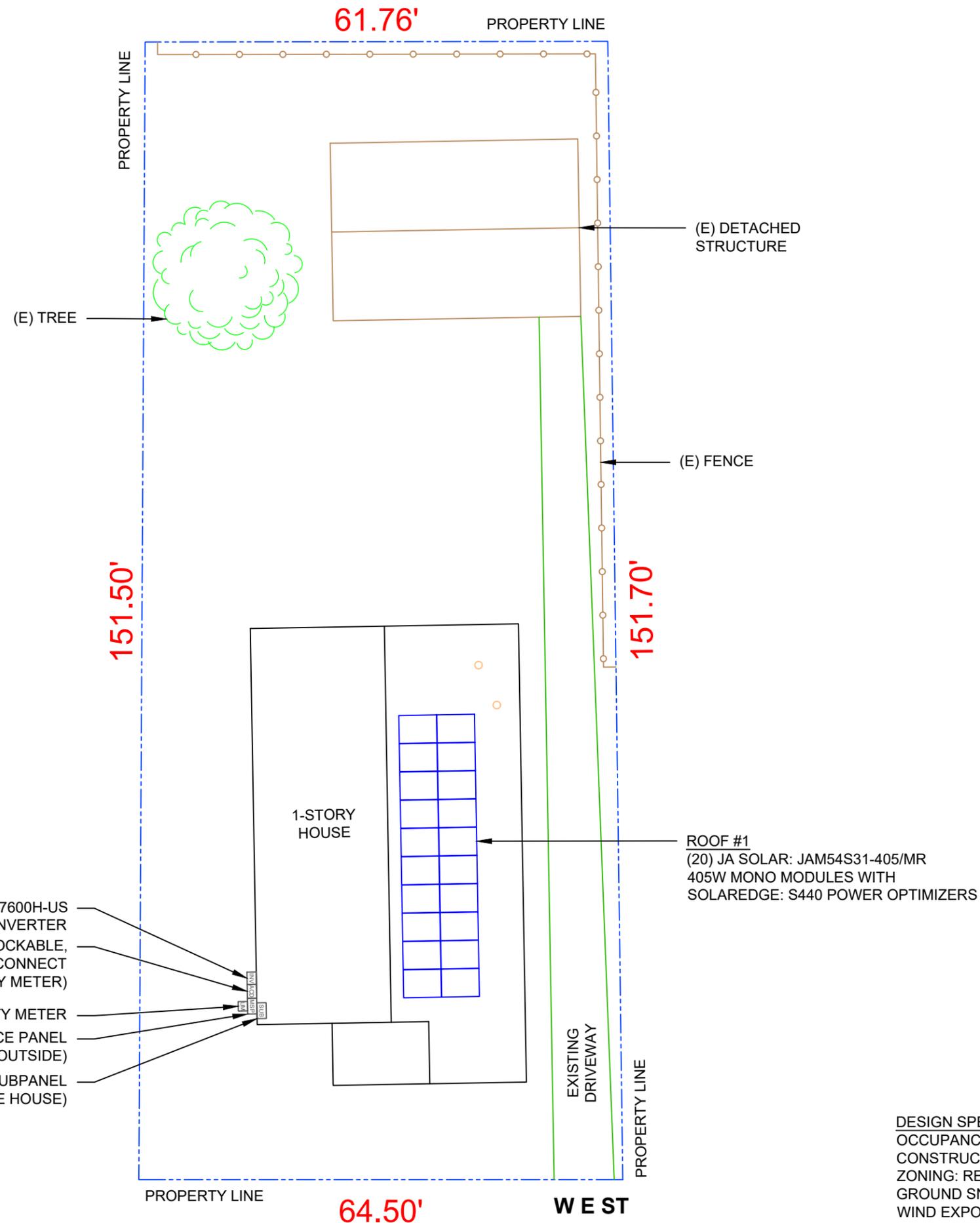
20 X JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
 DC SYSTEM SIZE: 8.100 kW DC
 AC SYSTEM SIZE: 7.600 kW AC

EQUIPMENT SUMMARY

20 JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
 20 SOLAREEDGE: S440 POWER OPTIMIZERS
 01 SOLAREEDGE: SE7600H-US (240V/7600W) INVERTER

ROOF ARRAY AREA #1:- 420.20 SQ FT.

NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT
 LOCATED WITHIN 10' OF UTILITY METER



(N) SOLAREEDGE: SE7600H-US
 (240V/7600W) INVERTER
 (N) VISIBLE, LOCKABLE,
 LABELED FUSED AC DISCONNECT
 (LOCATED WITHIN 10' OF UTILITY METER)

(E) UTILITY METER
 (E) MAIN SERVICE PANEL
 (OUTSIDE)
 (E) SUBPANEL
 (INSIDE HOUSE)

ROOF #1
 (20) JA SOLAR: JAM54S31-405/MR
 405W MONO MODULES WITH
 SOLAREEDGE: S440 POWER OPTIMIZERS

DESIGN SPECIFICATION
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER
 WIND EXPOSURE: REFER STRUCTURAL LETTER
 WIND SPEED: REFER STRUCTURAL LETTER



TOP TIER SOLAR SOLUTIONS

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PROJECT NAME & ADDRESS

JAMES BRADLEY
 RESIDENCE

308 W E ST,
 ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME

SITE PLAN

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

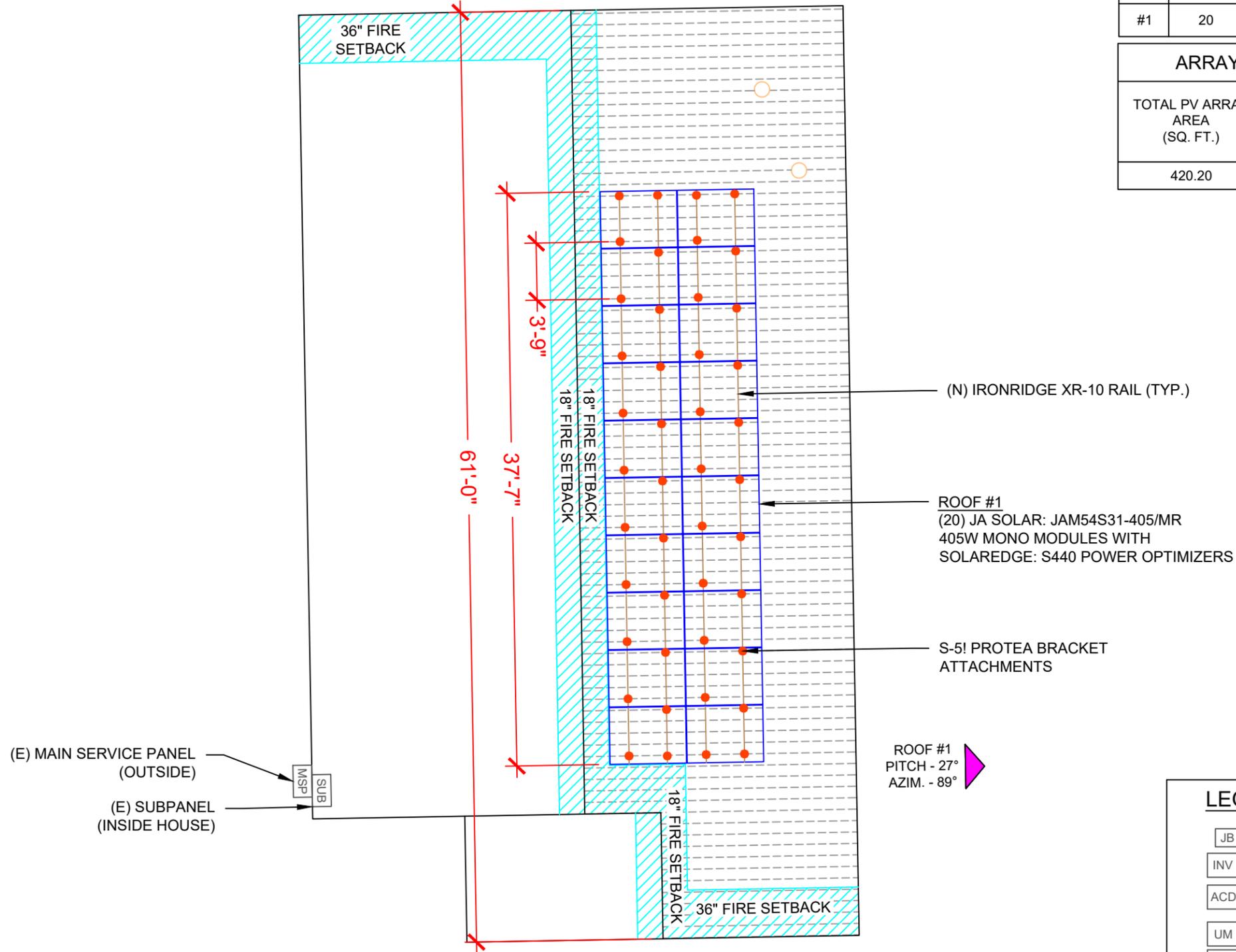
PV-2

1 | SITE PLAN

PV-2 | SCALE: 1/16" = 1'-0"

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 20 MODULES
 MODULE TYPE = JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
 MODULE WEIGHT = 47.39 LBS / 21.5 kg.
 MODULE DIMENSIONS = 67.79" x 44.65" = 21.01 SF



| ROOF DESCRIPTION | | | | | | |
|------------------|--------------|------------|---------|------------|---------------|--------------|
| ROOF TYPE | | | | METAL ROOF | | |
| ROOF | # OF MODULES | ROOF PITCH | AZIMUTH | TRUSS SIZE | TRUSS SPACING | SEAM SPACING |
| #1 | 20 | 27° | 89° | 2"X4" | 24" | 9" |

| ARRAY AREA & ROOF AREA CALC'S | | |
|-------------------------------|---------------------------|--------------------------------|
| TOTAL PV ARRAY AREA (SQ. FT.) | TOTAL ROOF AREA (Sq. Ft.) | ROOF AREA COVERED BY ARRAY (%) |
| 420.20 | 1768.24 | 24 |

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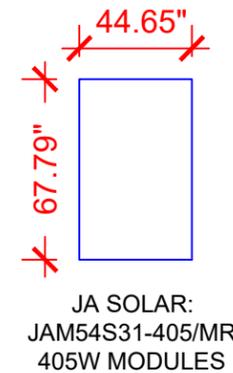
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NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 056324

TREVOR JONES

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 03/10/2025



LEGEND

- [JB] - JUNCTION BOX
- [INV] - INVERTER
- [ACD] - AC DISCONNECT
- [UM] - UTILITY METER
- [MSP] - MAIN SERVICE PANEL
- [SUB] - SUB PANEL
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- — - SEAM
- --- - CONDUIT

PROJECT NAME & ADDRESS

JAMES BRADLEY RESIDENCE

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 ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
ROOF PLAN & MODULES

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

SHEET NUMBER
PV-3

DC SYSTEM SIZE: 8.100 kW DC
 AC SYSTEM SIZE: 7.600 kW AC
 (20) JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
 WITH (20) SOLAREEDGE: S440 POWER OPTIMIZERS
 LOCATED UNDER EACH PANEL AND
 01 SOLAREEDGE: SE7600H-US (240V/7600W) INVERTER

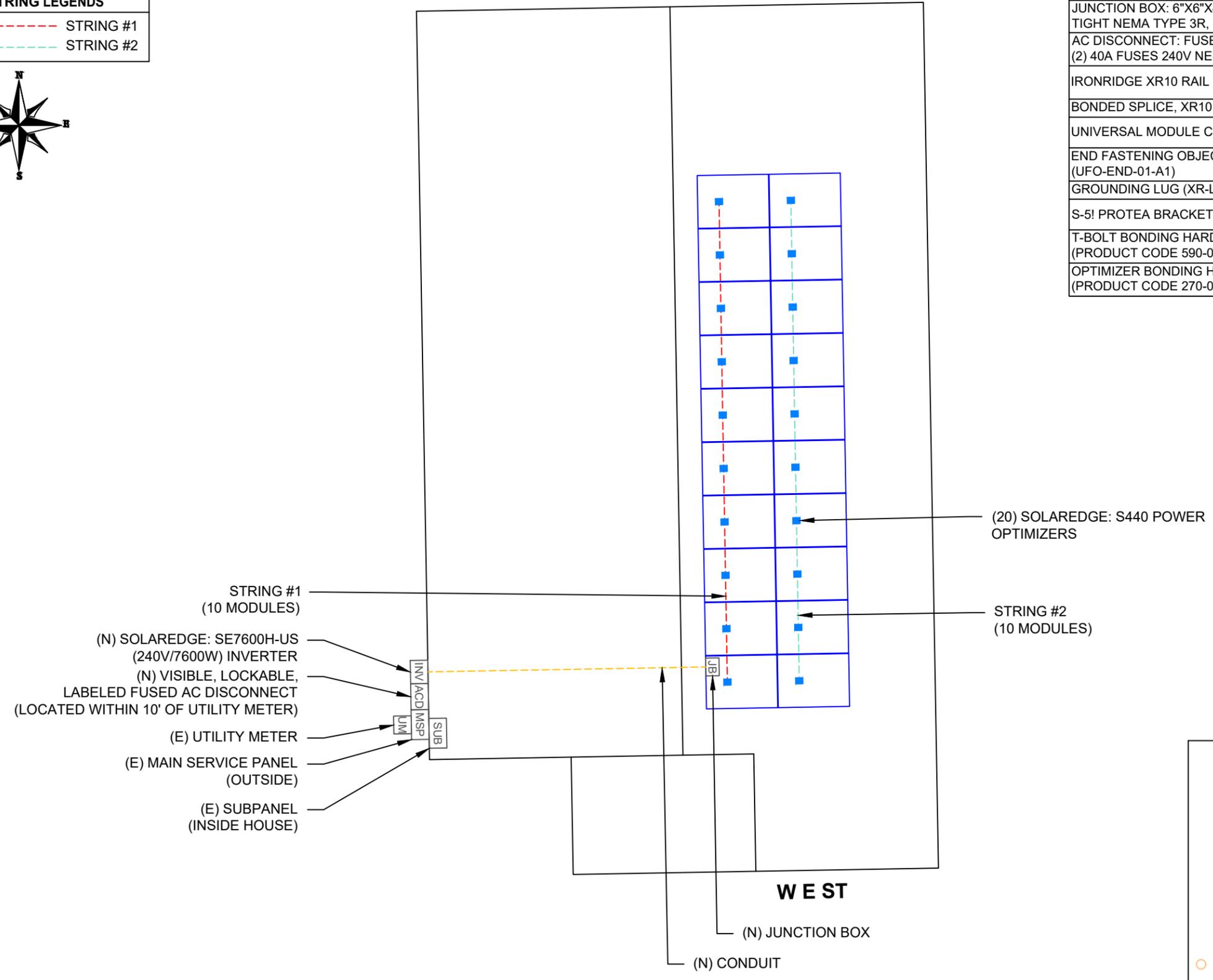


| BILL OF MATERIALS | |
|--|-----|
| EQUIPMENT DESCRIPTION | QTY |
| SOLAR PV MODULES: JA SOLAR: JAM54S31-405/MR 405W MODULE | 20 |
| OPTIMIZERS: SOLAREEDGE: S440 POWER OPTIMIZERS | 20 |
| INVERTER: SOLAREEDGE: SE7600H-US (240V/7600W) INVERTER | 01 |
| JUNCTION BOX: 6"X6"X4" UL LISTED, STEEL WATER TIGHT NEMA TYPE 3R, UL LISTED | 1 |
| AC DISCONNECT: FUSED AC DISCONNECT, 60A FUSED, (2) 40A FUSES 240V NEMA 3R, UL LISTED | 1 |
| IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A) | 12 |
| BONDED SPLICE, XR10 (XR10-BOSS-01-M1) | 8 |
| UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1) | 36 |
| END FASTENING OBJECT (END CLAMP, 30-40MM), MILL (UFO-END-01-A1) | 8 |
| GROUNDING LUG (XR-LUG-03-A1) | 2 |
| S-5! PROTEA BRACKET ATTACHMENTS | 46 |
| T-BOLT BONDING HARDWARE (BHW-TB-02-A1) (PRODUCT CODE 590-0116) | 46 |
| OPTIMIZER BONDING HARDWARE T-BOLT (BHW-MI-01-A1) (PRODUCT CODE 270-0152) | 20 |

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LEGEND

- JB - JUNCTION BOX
- INV - INVERTER
- ACD - AC DISCONNECT
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- SUB - SUB PANEL
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- — — — — - TRUSS
- --- --- - CONDUIT

PROJECT NAME & ADDRESS

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SHEET NAME
ELECTRICAL PLAN

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

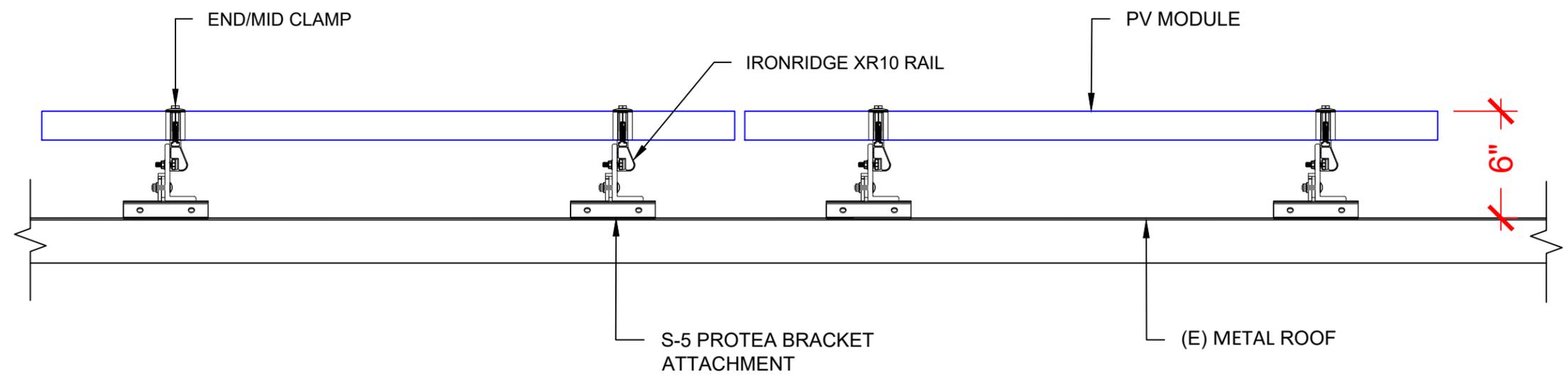
SHEET NUMBER
PV-4



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1 ATTACHMENT DETAIL (side view)

PV-5

SCALE: N.T.S.

PROJECT NAME & ADDRESS

**JAMES BRADLEY
 RESIDENCE**

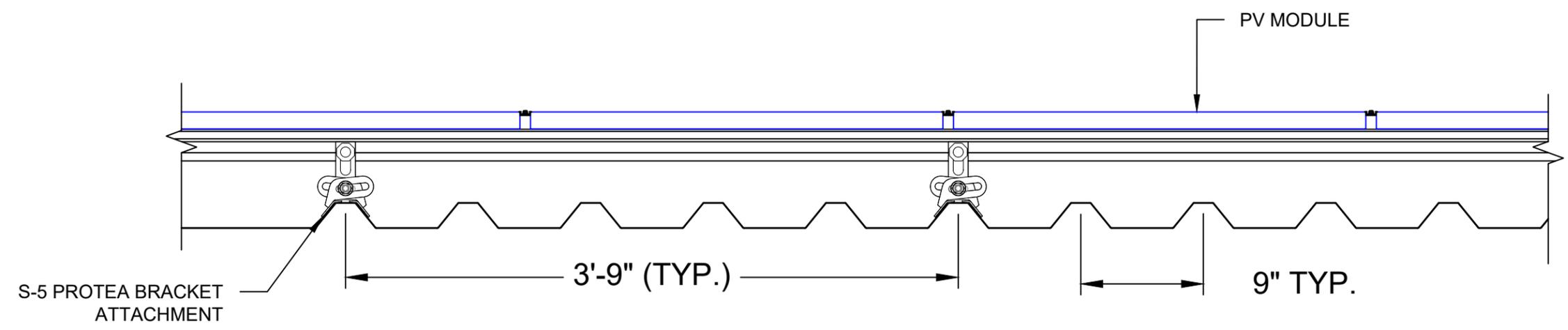
308 W E ST,
 ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
STRUCTURAL DETAIL

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

SHEET NUMBER
PV-5



2 ATTACHMENT DETAIL (front view)

PV-5

SCALE: N.T.S.

DC SYSTEM SIZE: 8.100 kW DC
AC SYSTEM SIZE: 7.600 kW AC

(20) JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
WITH (20) SOLAREEDGE: S440 POWER OPTIMIZERS
LOCATED UNDER EACH PANEL (240V) AND
(01) SOLAREEDGE: SE7600H-US (240V/7600W) INVERTER
(2) STRINGS OF 10 MODULES ARE CONNECTED IN SERIES

INTERCONNECTION NOTES:

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES:

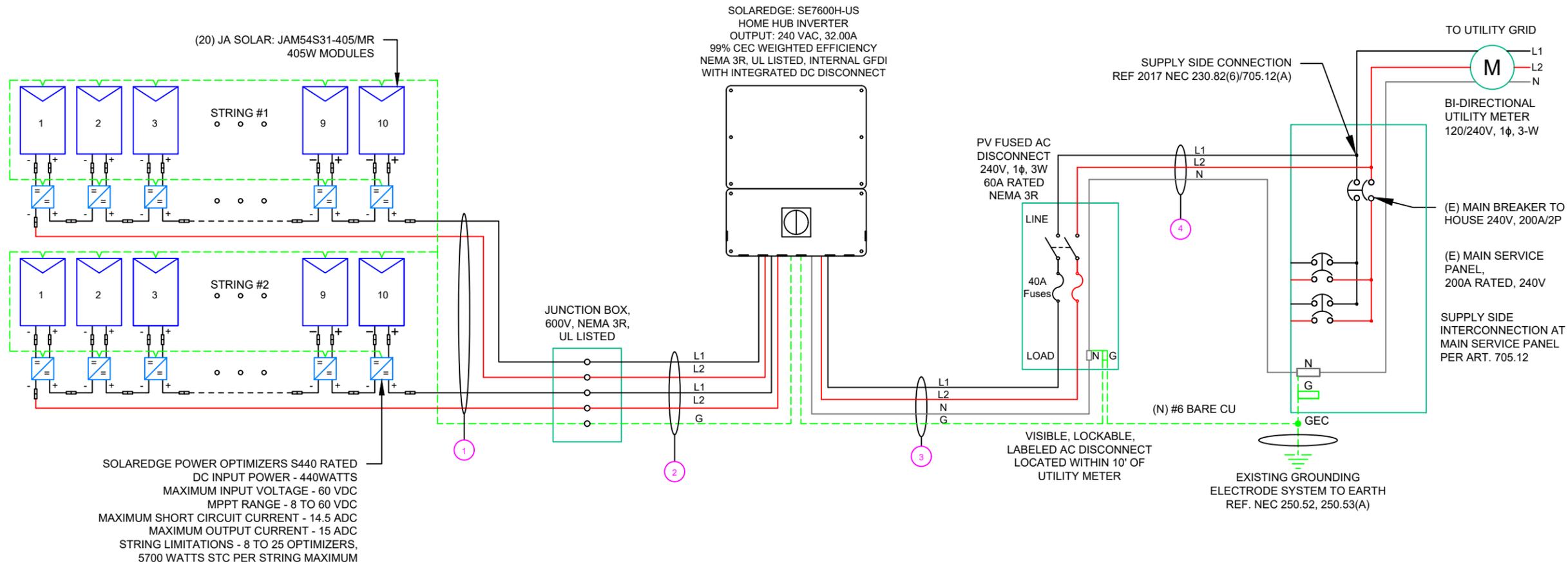
1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
3. DISCONNECT MEANS AND THEIR LOCATION SHALL BE IN ACCORDANCE WITH [NEC 225.31] AND [NEC 225.32].

GROUNDING & GENERAL NOTES:

1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.

RACKING NOTE:

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER



SOLAREEDGE POWER OPTIMIZERS S440 RATED
DC INPUT POWER - 440WATTS
MAXIMUM INPUT VOLTAGE - 60 VDC
MPPT RANGE - 8 TO 60 VDC
MAXIMUM SHORT CIRCUIT CURRENT - 14.5 ADC
MAXIMUM OUTPUT CURRENT - 15 ADC
STRING LIMITATIONS - 8 TO 25 OPTIMIZERS,
5700 WATTS STC PER STRING MAXIMUM

| QTY | CONDUCTOR INFORMATION | | CONDUIT TYPE | CONDUIT SIZE |
|-------|-----------------------|-------------------------|------------------|--------------|
| 1 (4) | #10AWG - | PV WIRE/USE-2 | N/A | N/A |
| (1) | #6AWG - | BARE COPPER IN FREE AIR | | |
| 2 (4) | #10AWG - | CU, THWN-2 | EMT OR LFMC | 3/4" |
| (1) | #10AWG - | CU, THWN-2 GND | | |
| 3 (2) | #6AWG - | CU, THWN-2 | EMT, LFMC OR PVC | 3/4" |
| (1) | #6AWG - | CU, THWN-2 N | | |
| 4 (1) | #6AWG - | CU, THWN-2 GND | EMT, LFMC OR PVC | 3/4" |
| (2) | #6AWG - | CU, THWN-2 | | |
| (1) | #6AWG - | CU, THWN-2 N | | |

NOTE: CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED

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DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

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

SHEET NUMBER
PV-6

| SOLAR MODULE SPECIFICATIONS | |
|-----------------------------|---------------------------------------|
| MANUFACTURER / MODEL # | JA SOLAR: JAM54S31-405/MR 405W MODULE |
| VMP | 31.21V |
| IMP | 12.98A |
| VOC | 37.23V |
| ISC | 13.87A |
| TEMP. COEFF. VOC | -0.275%/°C |
| MODULE DIMENSION | 67.79"L x 44.65"W x 1.18"D (In Inch) |

| INVERTER SPECIFICATIONS | |
|-------------------------|--|
| MANUFACTURER / MODEL # | SOLAREEDGE: SE7600H-US (240V/7600W) INVERTER |
| NOMINAL AC POWER | 7.600 kW |
| NOMINAL OUTPUT VOLTAGE | 240 VAC |
| NOMINAL OUTPUT CURRENT | 32.00A |

| AMBIENT TEMPERATURE SPECS | |
|---------------------------------------|------------|
| AMBIENT TEMP (HIGH TEMP 2%) | 38° |
| RECORD LOW TEMPERATURE | -9° |
| MODULE TEMPERATURE COEFFICIENT OF Voc | -0.275%/°C |

| PERCENT OF VALUES | NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT |
|-------------------|--|
| .80 | 4-6 |
| .70 | 7-9 |
| .50 | 10-20 |

| DC FEEDER CALCULATIONS | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---------------------|-------------|--------------------------|--------------|---------------|--------------------|----------------|-------------------|-------------------|--------------------|--------------------------------|-------------------|---|--|---------------------------|-------------------|----------------------|--------------------------------|-------------------------|--------------|------------------|--|
| CIRCUIT ORIGIN | CIRCUIT DESTINATION | VOLTAGE (V) | FULL LOAD AMPS "FLA" (A) | FLA*1.25 (A) | OCPD SIZE (A) | GROUND SIZE | CONDUCTOR SIZE | 75°C AMPACITY (A) | AMPACITY CHECK #1 | AMBIENT TEMP. (°C) | TOTAL CC CONDUCTORS IN RACEWAY | 90°C AMPACITY (A) | DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a) | DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a) | 90°C AMPACITY DERATED (A) | AMPACITY CHECK #2 | FEEDER LENGTH (FEET) | CONDUCTOR RESISTANCE (OHM/KFT) | VOLTAGE DROP AT FLA (%) | CONDUIT SIZE | CONDUIT FILL (%) | |
| STRING 1 | JUNCTION BOX | 380 | 15.00 | 18.75 | 20 | BARE COPPER #6 AWG | CU #10 AWG | 35 | PASS | 38 | 2 | 40 | 0.91 | 1 | 36.4 | PASS | 5 | 1.24 | 0.049 | N/A | #N/A | |
| STRING 2 | JUNCTION BOX | 380 | 15.00 | 18.75 | 20 | BARE COPPER #6 AWG | CU #10 AWG | 35 | PASS | 38 | 2 | 40 | 0.91 | 1 | 36.4 | PASS | 5 | 1.24 | 0.049 | N/A | #N/A | |
| JUNCTION BOX | INVERTER | 380 | 15.00 | 18.75 | 20 | CU #10 AWG | CU #10 AWG | 35 | PASS | 38 | 4 | 40 | 0.91 | 0.8 | 29.12 | PASS | 15 | 1.24 | 0.147 | 3/4" EMT | 19.79362 | |
| | | | | | | | | | | | | | | | | | | | String 1 Voltage Drop | | 0.196 | |
| | | | | | | | | | | | | | | | | | | | String 2 Voltage Drop | | 0.196 | |

| AC FEEDER CALCULATIONS | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---------------------|-------------|--------------------------|--------------|---------------|--------------|-------------|----------------|-------------------|-------------------|--------------------|--------------------------------|-------------------|---|--|---------------------------|-------------------|----------------------|--------------------------------|-------------------------|--------------|------------------|
| CIRCUIT ORIGIN | CIRCUIT DESTINATION | VOLTAGE (V) | FULL LOAD AMPS "FLA" (A) | FLA*1.25 (A) | OCPD SIZE (A) | NEUTRAL SIZE | GROUND SIZE | CONDUCTOR SIZE | 75°C AMPACITY (A) | AMPACITY CHECK #1 | AMBIENT TEMP. (°C) | TOTAL CC CONDUCTORS IN RACEWAY | 90°C AMPACITY (A) | DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a) | DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a) | 90°C AMPACITY DERATED (A) | AMPACITY CHECK #2 | FEEDER LENGTH (FEET) | CONDUCTOR RESISTANCE (OHM/KFT) | VOLTAGE DROP AT FLA (%) | CONDUIT SIZE | CONDUIT FILL (%) |
| INVERTER | AC DISCONNECT | 240 | 32 | 40 | 40 | CU #6 AWG | CU #6 AWG | CU #6 AWG | 65 | PASS | 38 | 2 | 75 | 0.91 | 1 | 68.25 | PASS | 5 | 0.491 | 0.065 | 3/4" EMT | 38.0488 |
| AC DISCONNECT | POI | 240 | 32 | 40 | 40 | CU #6 AWG | N/A | CU #6 AWG | 65 | PASS | 38 | 2 | 75 | 0.91 | 1 | 68.25 | PASS | 5 | 0.491 | 0.065 | 3/4" EMT | 28.5366 |
| | | | | | | | | | | | | | | | | | | | CUMULATIVE VOLTAGE DROP | | 0.131 | |

ELECTRICAL NOTES

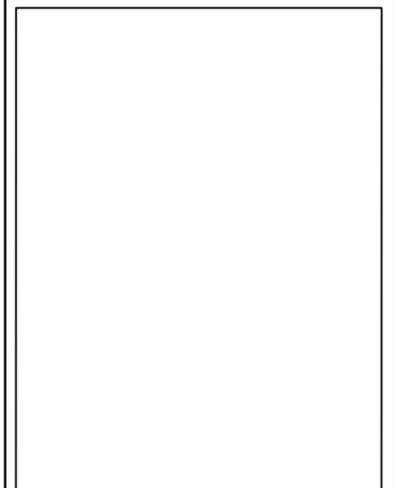
- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE RATED UPTO 600V FOR RESIDENTIAL AND 1000V FOR COMMERCIAL AND 90 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE 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 BOX, 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 G.E.C. VIA WEEB LUG OR ILSKO GBL-4DBT LAY-IN LUG.
- TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

| REVISIONS | | |
|----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL DESIGN | 03/10/2025 | |
| | | |
| | | |



PROJECT NAME & ADDRESS

JAMES BRADLEY
RESIDENCE

308 W E ST,
ERWIN, NC 28339

| | |
|----------|-----|
| DRAWN BY | ESR |
|----------|-----|

| | |
|------------|---------------------|
| SHEET NAME | WIRING CALCULATIONS |
|------------|---------------------|

| | |
|------------|---------------------|
| SHEET SIZE | ANSI B 11" X 17" |
|------------|---------------------|

| | |
|--------------|------|
| SHEET NUMBER | PV-7 |
|--------------|------|

PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT & ENCLOSURES

LABEL- 1:
LABEL LOCATION:
DC/EMT CONDUIT RACEWAY
SOLADECK / JUNCTION BOX
CODE REF: NEC 690.31 (D)(2)

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

LABEL- 2:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.13(B)

⚠ WARNING

DUAL POWER SUPPLY

SOURCE: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

LABEL- 3:
LABEL LOCATION:
MAIN SERVICE PANEL
CODE REF: NEC 705.12(C) & NEC 690.59

SOLAR PV BREAKER:

**BREAKER IS BACKFED
DO NOT RELOCATE**

LABEL-4:
LABEL LOCATION:
MAIN SERVICE PANEL
CODE REF: NEC 705.12(C) & NEC 690.59

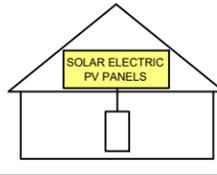
⚠ WARNING

POWER SOURCE OUTPUT
CONNECTION. DO NOT
RELOCATE THIS
OVERCURRENT DEVICE

LABEL- 5:
LABEL LOCATION:
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
SUBPANEL (ONLY IF SOLAR IS BACK-FED)
CODE REF: NEC 705.12(B)(3)(2)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LABEL- 6:
LABEL LOCATION:
AC DISCONNECT
CODE REF: [NEC 690.56(C)(1)(A)]

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL- 7:
LABEL LOCATION:
AC DISCONNECT
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
CODE REF: NEC 690.56(C)(2)

DC DISCONNECT

LABEL- 8:
LABEL LOCATION:
INVERTER
CODE REF: NEC 690.13(B)

AC DISCONNECT PHOTOVOLTAIC SYSTEM POWER SOURCE

NOMINAL OPERATING AC VOLATGE **240 V**
RATED AC OUTPUT CURRENT **32.00 A**

LABEL- 9:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.54

MAXIMUM VOLTAGE **480 V**
MAXIMUM CIRCUIT CURRENT **40.00 A**
MAXIMUM RATED OUTPUT
CURRENT OF THE CHARGE
CONTROLLER OR DC-TO-DC
CONVERTER (IF INSTALLED)

LABEL- 10:
LABEL LOCATION:
ON THE RIGHT SIDE OF THE INVERTER (PRE-EXISTING ON THE INVERTER)
CODE REF: NEC 690.53

TOP TIER

SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

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| INITIAL DESIGN | 03/10/2025 | |
| | | |
| | | |

PROJECT NAME & ADDRESS

JAMES BRADLEY
RESIDENCE

308 W E ST,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME

LABELS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-8

Harvest the Sunshine

DEEP BLUE 3.0 Light

Mono

405W MBB
Half-cell Black Module
JAM54S31 380-405/MR Series

Introduction

Assembled with 11BB PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.



Higher output power



Lower LCOE



Less shading and lower resistive loss

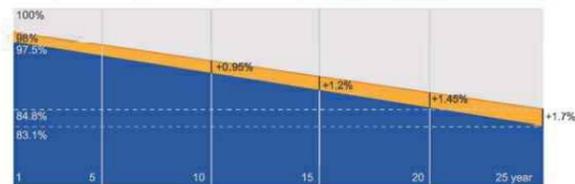


Better mechanical loading tolerance

Superior Warranty

- 25-year product warranty
- 25-year linear power output warranty

0.55% Annual Degradation
Over 25 years



■ New linear power warranty ■ Standard module linear power warranty

Comprehensive Certificates

- IEC 61215, IEC 61730, UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval



JA SOLAR

www.jasolar.com

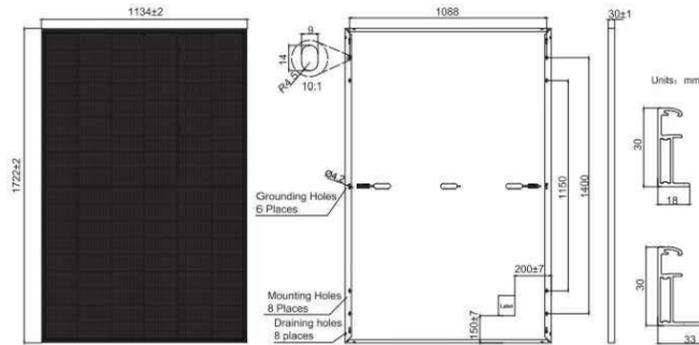
Specifications subject to technical changes and tests. JA Solar reserves the right of final interpretation.



JA SOLAR

JAM54S31 380-405/MR Series

MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

| | |
|------------------------------------|---|
| Cell | Mono |
| Weight | 21.5kg±3% |
| Dimensions | 1722±2mm×1134±2mm×30±1mm |
| Cable Cross Section Size | 4mm ² (IEC) , 12 AWG(UL) |
| No. of cells | 108(6x18) |
| Junction Box | IP68, 3 diodes |
| Connector | MC4-EVO2(1500V) |
| Cable Length (Including Connector) | Portrait: 300mm(+)/400mm(-); Landscape: 1200mm(+)/1200mm(-) |
| Packaging Configuration | 36pcs/Pallet, 864pcs/40ft Container |

ELECTRICAL PARAMETERS AT STC

| TYPE | JAM54S31 -380/MR | JAM54S31 -385/MR | JAM54S31 -390/MR | JAM54S31 -395/MR | JAM54S31 -400/MR | JAM54S31 -405/MR |
|--|---|------------------|------------------|------------------|------------------|------------------|
| Rated Maximum Power(Pmax) [W] | 380 | 385 | 390 | 395 | 400 | 405 |
| Open Circuit Voltage(Voc) [V] | 36.58 | 36.71 | 36.85 | 36.98 | 37.07 | 37.23 |
| Maximum Power Voltage(Vmp) [V] | 30.28 | 30.46 | 30.64 | 30.84 | 31.01 | 31.21 |
| Short Circuit Current(Isc) [A] | 13.44 | 13.52 | 13.61 | 13.70 | 13.79 | 13.87 |
| Maximum Power Current(Imp) [A] | 12.55 | 12.64 | 12.73 | 12.81 | 12.90 | 12.98 |
| Module Efficiency [%] | 19.5 | 19.7 | 20.0 | 20.2 | 20.5 | 20.7 |
| Power Tolerance | ±2% | | | | | |
| Temperature Coefficient of Isc(α _{Isc}) | +0.045%/°C | | | | | |
| Temperature Coefficient of Voc(β _{Voc}) | -0.275%/°C | | | | | |
| Temperature Coefficient of Pmax(γ _{Pmp}) | -0.350%/°C | | | | | |
| STC | Irradiance 1000W/m ² , cell temperature 25°C, AM1.5G | | | | | |

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL PARAMETERS AT NOCT

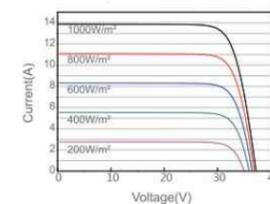
| TYPE | JAM54S31 -380/MR | JAM54S31 -385/MR | JAM54S31 -390/MR | JAM54S31 -395/MR | JAM54S31 -400/MR | JAM54S31 -405/MR |
|--------------------------------|--|------------------|------------------|------------------|------------------|------------------|
| Rated Max Power(Pmax) [W] | 286 | 290 | 294 | 298 | 302 | 306 |
| Open Circuit Voltage(Voc) [V] | 34.36 | 34.49 | 34.62 | 34.75 | 34.88 | 35.12 |
| Max Power Voltage(Vmp) [V] | 28.51 | 28.68 | 28.87 | 29.08 | 29.26 | 29.47 |
| Short Circuit Current(Isc) [A] | 10.75 | 10.82 | 10.89 | 10.96 | 11.03 | 11.10 |
| Max Power Current(Imp) [A] | 10.03 | 10.11 | 10.18 | 10.25 | 10.32 | 10.38 |
| NOCT | Irradiance 800W/m ² , ambient temperature 20°C, wind speed 1m/s, AM1.5G | | | | | |

OPERATING CONDITIONS

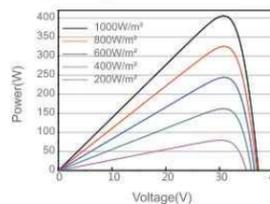
| | |
|-----------------------------|--------------------------------|
| Maximum System Voltage | 1000V/1500V DC |
| Operating Temperature | -40°C ~+85°C |
| Maximum Series Fuse Rating | 25A |
| Maximum Static Load, Front* | 5400Pa(112lb/ft ²) |
| Maximum Static Load, Back* | 2400Pa(50lb/ft ²) |
| NOCT | 45±2°C |
| Safety Class | Class II |
| Fire Performance | UL Type 1 |

CHARACTERISTICS

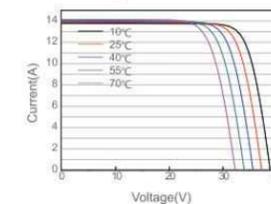
Current-Voltage Curve JAM54S31-405/MR



Power-Voltage Curve JAM54S31-405/MR



Current-Voltage Curve JAM54S31-405/MR



Premium Cells, Premium Modules

Version No. : Global_EN_20231130A

TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
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REVISIONS

| DESCRIPTION | DATE | REV |
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| INITIAL DESIGN | 03/10/2025 | |

PROJECT NAME & ADDRESS

JAMES BRADLEY
RESIDENCE

308 W E ST,
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DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Applicant: Shanghai JA Solar Technology Co., Ltd. **Manufacturer:** JA SOLAR VIET NAM COMPANY LIMITED.
Address: No. 118, Lane 3111, West Huancheng Road, Fengxian District, 201401 Shanghai **Address:** Lot G, Quang Chau industrial park, Quang Chau Ward, Viet Yen Town, Bac Giang Province, 236110
Country: P. R. China **Country:** Vietnam
Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Intertek Testing Services Shanghai Limited
Control Number: 5020189 **Authorized by:**  for L. Matthew Snyder, Certification Manager



This document supersedes all previous Authorizations to Mark for the noted Report Number.

This Authorization to Mark is for the exclusive use of Intertek's Client and is provided pursuant to the Certification agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Authorization to Mark. Only the Client is authorized to permit copying or distribution of this Authorization to Mark, and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the agreement and in this Authorization to Mark. Any further use of the Intertek name for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. Initial Factory Assessments and Follow up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance with the agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect.

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

| | |
|---------------------|--|
| Standard(s): | Terrestrial Photovoltaic (PV) Modules - Design Qualification And Type Approval - Part 1: Test Requirements [UL 61215-1:2017 Ed.1] |
| | Terrestrial Photovoltaic (PV) Modules - Design Qualification And Type Approval - Part 1-1: Special Requirements For Testing Of Crystalline Silicon Photovoltaic (PV) Modules [UL 61215-1-1:2017 Ed.1] |
| | Terrestrial Photovoltaic (PV) Modules - Design Qualification And Type Approval - Part 2: Test Procedures [UL 61215-2:2017 Ed.1] |
| | Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements For Construction [UL 61730-1:2017 Ed.1] |
| | Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements For Testing [UL 61730-2:2017 Ed.1] |
| | Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [CSA C22.2#61730-1:2019 Ed.2] |
| | Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [CSA C22.2#61730-2:2019 Ed.2] |

AUTHORIZATION TO MARK

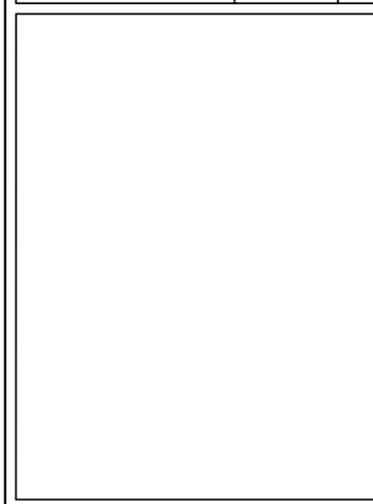
| | |
|--------------------|--|
| Product: | Crystalline Silicon Photovoltaic modules |
| Brand Name: | JA SOLAR 晶澳 |
| Models: | JAM72S03-385/PR, JAP72S03-340/SC, JAM72S10- followed by 395, 400, 405, 410 or 415 followed by /MB, JAM60S10- followed by 330, 335, 340 or 345 followed by /MB, JAM72S10- followed by 395, 400, 405, 410 or 415 followed by /MR, JAM66S10- followed by 365, 365, 370, 375 or 380 followed by /MR, JAM60S10- followed by 330, 335, 340 or 345 followed by /MR, JAM72S09- followed by 370, 375, 380, 385, 390, 395 or 400 followed by /PR, JAM60S09- followed by 310, 315, 320 or 325 followed by /PR, JAM72S09- followed by 375, 380 or 385 followed by /BP, JAM60S09- followed by 315 or 320 followed by /BP, JAM72S10- followed by 385, 390, 395 or 400 followed by /BP, JAM60S10- followed by 320, 325 or 330 followed by /BP, JAM72S10- followed by 380, 385, 390, 395, 400 or 405 followed by /PR, JAM60S10- followed by 320, 325, 330 or 335 followed by /PR, JAM72S12- followed by 365, 370, 375, 380 or 385 followed by /PR, JAM60S12- followed by 305, 310, 315 or 320 followed by /PR, 1JAM78S10- followed by 435, 440, 445, 450 or 455 followed by /MR, 1JAM6(K)-72-335/4BB/1500V, JAM60S17- followed by 320, 325, or 330 followed by /MR, JAM72S20- followed by 430, 435, 440, 445, 450, 455, 460, 465 or 470 followed by /MR, JAM60S20- followed by 355, 360, 365, 370, 375, 380, 385 or 390 followed by /MR, JAM72S30- followed by 530, 535, 540, 545, 550 or 555 followed by /MR, JAM66S30- followed by 490, 495 or 500 followed by /MR, JAM68S11- followed by 355, 360 or 365 followed by /PR, JAM68S11- followed by 345, 350, 355, 360 or 365 followed by /PR(B), JAM76S11- followed by 395, 400, 405, 410 or 415 followed by /PR(B), JAM76S11- followed by 395, 400, 405, 410 or 415 followed by /PR(B)/1000V, JAM78S30-followed by 575, 580, 585, 590, 595, 600, 605 or 610 followed by /GR, JAM72S30-followed by 535, 540, 545, 550, 555 or 560 followed by /GR, JAM66S30-followed by 490, 495, 500 or 505 followed by /GR, JAM60S30-followed by 445, 450, 455 or 460 followed by /GR, JAM54S30-followed by 400, 405, 410, 415 or 420 followed by /GR, JAM78S31-followed by 570, 575, 580, 585 or 590 followed by /GR, JAM72S31-followed by 530, 535 or 540 followed by /GR, JAM66S31-followed by 485, 490 or 495 followed by /GR, JAM60S31-followed by 440, 445 or 450 followed by /GR, JAM54S31-followed by 395, 400, 405, 410 or 415 followed by /GR, JAM60S31-followed by 430, 435, 440, 445 or 450 followed by /GR/1000V, JAM54S31-followed by 390, 395, 400, 405, 410 or 415 followed by /GR/1000V, JAM54S30-followed by 400, 405, 410, 415, 420 or 425 followed by /MR, JAM72S31-followed by 510, 515, 520, 525, 530, 535, 540 or 545 followed by /MR, JAM54S31-followed by 385, 390, 395, 400 or 405 followed by /MR, JAM54S30-followed by 400, 405, 410, 415, 420 or 425 followed by /MR/1000V, JAM72S31-followed by 510, 515, 520, 525, 530,535, 540 or 545 followed by /MR/1000V, JAM54S31-followed by 385, 390, 395, 400 or 405 followed by /MR/1000V, JAM72S17-followed by 390, 395, 400 or 405 followed by /MR, JAM72S17-followed by 390, 395, 400 or 405 followed by /MR/1000V, JAM78S30- followed by 580, 585, 590, 595, 600 or 605 followed by /MR,JAM72S30-followed by 555, 560, 565, 570, 575, 580 followed by /LR, JAM54S30-followed by 415, 420, 425, 430, 435 followed by /LR, JAM54S31-followed by 415, 420 followed by /LR, JAM54S30-followed by 385, 390, 395, 400, 405, 410 followed by /MB, JAM54S31-followed by 385, 390, 395, 400, 405 followed by /MB, JAM54S30-followed by 410, 415, 420, 425 followed by /LB, JAM54S31-followed by 410, 415 followed by /LB, JAM72S30-followed by 535, 540, 545, 550 followed by /MB, JAM72S31-followed by 525, 530, 535, 540 followed by /MB. |

TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
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PROJECT NAME & ADDRESS

**JAMES BRADLEY
RESIDENCE**

308 W E ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-10

Residential Power Optimizer For North America

S440 / S500B / S650B



POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified wire management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

solaredge.com



Residential Power Optimizer

For North America

S440 / S500B / S650B

| | S440 | S500B | S650B | |
|--|---|-------------------------------------|-----------|---------|
| INPUT | | | | |
| Rated Input DC Power ⁽¹⁾ | 440 ⁽²⁾ | 500 ⁽³⁾ | 650 | W |
| Absolute Maximum Input Voltage (Voc) | 60 | 125 | 85 | Vdc |
| MPPT Operating Range | 8 – 60 | 12.5 – 105 | 12.5 – 85 | Vdc |
| Maximum Input Current (Maximum Isc of Connected PV Module) ⁽²⁾ | 14.5 | 15 | | Adc |
| Maximum Input Short Circuit Current ⁽⁴⁾ | 18.75 | | | Adc |
| Maximum Efficiency | 99.5 | | | % |
| Weighted Efficiency | 98.6 | | | % |
| Overvoltage Category | II | | | |
| OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER) | | | | |
| Maximum Output Current | 15 | | | Adc |
| Maximum Output Voltage | 60 | 80 | | Vdc |
| OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR INVERTER OFF) | | | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | | | Vdc |
| STANDARD COMPLIANCE | | | | |
| Photovoltaic Rapid Shutdown System | CSA C22.2#330, NEC 2014 – 2023 | | | |
| EMC | FCC Part 15 Class B; IEC 61000-6-2; IEC 61000-6-3 | | | |
| Safety | CSA C22.2#107.1; IEC 62109-1 (Class II Safety); UL 1741 | | | |
| Material | UL 94 V-0, UV Resistant | | | |
| RoHS | Yes | | | |
| Fire Safety | VDE-AR-E 2100-712:2013-05 | | | |
| INSTALLATION SPECIFICATIONS | | | | |
| Maximum Allowed System Voltage | 1000 | | | Vdc |
| Dimensions (W x L x H) | 129 x 155 x 30 / 5.07 x 6.10 x 1.18 | 129 x 165 x 45 / 5.07 x 6.49 x 1.77 | | mm / in |
| Weight | 720 / 1.6 | 790 / 1.74 | | gr / lb |
| Input Connector | MC4 | | | |
| Input Wire Length | 0.1 / 0.32 | | | |
| Output Connector | MC4 | | | |
| Output Wire Length | (+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32 | | | |
| Operating Temperature Range ⁽⁵⁾ | -40 to +85 | | | |
| Protection Rating | IP68 / NEMA6P | | | |
| Relative Humidity | 0 – 100 | | | |

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
 (2) For S440 with part number S440-1GM4MRMP, the Rated Input DC Power is 650W, and the Maximum Input Current is 15A.
 (3) For installations after Aug 1st, 2024, the Rated Input DC Power for S500B is 650W.
 (4) The Maximum Input Short Circuit Current is adjusted for worst case conditions of ambient temperature, irradiance, bifacial gain, and so on, in accordance with NEC and CSA.
 (5) Power derating is applied for ambient temperatures above +85°C / +185°F for S440, and for ambient temperatures above +75°C / 167°F for S500B and S650B. Refer to the [Power Optimizers Temperature Derating](#) technical note for more details.

| PV System Design Using a SolarEdge Inverter ⁽⁶⁾ | SolarEdge Home Wave/Hub Single Phase | Three Phase for 208V Grid | Three Phase for 277/480V Grid | |
|---|--|--|---|---|
| Minimum String Length (Power Optimizers) | S440: 8 S500B, S650B: 6 | 10 | 18 | |
| Maximum String Length (Power Optimizers) | 25 | | 50 ⁽⁷⁾ | |
| Maximum Usable Power Delivered per String | 5700 | 6000 | 12,750 | W |
| Maximum Allowed Connected Power per String ⁽⁹⁾⁽¹⁰⁾ | Inverters with Rated AC Power ≤ 5700W | Per the inverter's maximum input DC power ⁽⁸⁾ | One string: 7200 Two strings or more: 7800 | W |
| | Inverters with Rated AC Power of 6000W | 5700 | | |
| | Inverters with Rated AC Power ≥ 7600W | 6800, only when connected to at least two strings | | |
| Parallel Strings of Different Lengths or Orientations | Yes | | | |

(6) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.
 (7) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.
 (8) Refer to the [Single String Design Guidelines](#) application note for details.
 (9) For the 208V grid, the maximum is permitted only when the difference in connected power between strings is 1,000W or less.
 (10) For the 240V or 277/480V grids, the maximum is permitted only when the difference in connected power between strings is 2,000W or less.

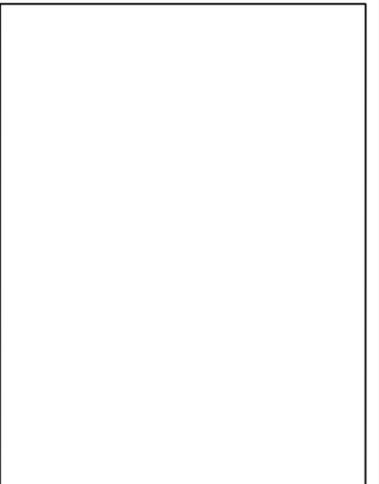
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TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
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PROJECT NAME & ADDRESS

JAMES BRADLEY
RESIDENCE

308 W E ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

SolarEdge Home Hub Inverter

Single Phase, for North America

For Inverters Assembled in the USA

SE3800H-US / SE5700H-US / **SE7600H-US** / SE10000H-US / SE11400H-US



HOME BACKUP

Single phase inverter for storage and backup applications

- / The ultimate home energy manager in charge of PV production, battery storage, backup operation during a power outage*, EV Charging, and smart energy devices
- / Record-breaking 99% weighted efficiency with up to 300% DC oversizing
- / Supports LRA – can provide the required energy for HVAC systems starting during backup operation
- / Integrates seamlessly with the complete SolarEdge Home Smart Energy Ecosystem, through SolarEdge Home Network
- / Module-level monitoring and visibility of battery status, PV production, and self-consumption data
- / Fast and easy installation – small and lightweight, with reduced commissioning time
- / A scalable solution that supports future homeowner needs through easy connection to a growing ecosystem of products
- / Advanced safety features with integrated arc fault protection and rapid shutdown for 690.11 and 690.12
- / Advanced reliability with automotive-grade components
- / Embedded revenue grade production data, ANSI C12.20 Class 0.5
- / IP65-rated, for indoor and outdoor installations

*Requires additional hardware and firmware version upgrade.

solaredge.com



/ SolarEdge Home Hub Inverter

Single Phase, for North America

SE3800H-US / SE5700H-US / **SE7600H-US** / SE10000H-US / SE11400H-US

| Model Number ⁽¹⁾⁽²⁾ | SE3800H-US | SE5700H-US | SE7600H-US | SE10000H-US | SE11400H-US | Units |
|---|---------------------------------|----------------------------|-------------------|-------------|--------------------------------|-------|
| OUTPUT – AC ON GRID | | | | | | |
| Rated AC Power | 3800 @ 240V 3300 @ 208V | 5760 @ 240V 5000 @ 208V | 7600 | 10000 | 11,400 @ 240V 10,000 @ 208V | W |
| Maximum AC Power Output | 3800 @ 240V 3300 @ 208V | 5760 @ 240V 5000 @ 208V | 7600 | 10000 | 11,400 @ 240V 10,000 @ 208V | W |
| AC Output Voltage (Nominal) | 208 / 240 | | | | | Vac |
| AC Output Voltage (Range) | 183 – 264 | | | | | Vac |
| AC Frequency Range (min - nom - max) | 59.3 – 60 – 60.5 ⁽³⁾ | | | | | Hz |
| Maximum Continuous Output Current | 16 | 24 | 32 | 42 | 48 | A |
| GFDI Threshold | 1 | | | | | A |
| Total Harmonic Distortion (THD) | < 3 | | | | | % |
| Power Factor | 1, adjustable -0.85 to 0.85 | | | | | |
| Utility Monitoring, Islanding Protection, Country Configurable Thresholds | Yes | | | | | |
| Charge Battery from AC (if allowed) | Yes | | | | | |
| Typical Nighttime Power Consumption | < 2.5 | | | | | W |
| OUTPUT – AC STAND-ALONE (BACKUP)⁽⁴⁾⁽⁵⁾ | | | | | | |
| Rated AC Power in Stand-alone Operation | 11,400 ⁽⁶⁾ | | | | | W |
| Maximum Stand-alone Capacity | 11,400 | | | | | W |
| AC L-L Output Voltage Range in Stand-alone Operation | 211 – 264 | | | | | Vac |
| AC L-N Output Voltage Range in Stand-alone Operation | 105 – 132 | | | | | Vac |
| AC Frequency Range in Stand-alone (min - nom - max) | 55 – 60 – 65 | | | | | Hz |
| Maximum Continuous Output Current in Stand-alone Operation | 48 | | | | | A |
| GFDI | 1 | | | | | A |
| THD | < 5 | | | | | % |
| OUTPUT – SOLAREGE HOME EV CHARGER AC | | | | | | |
| Rated AC Power | 9600 | | | | | W |
| AC Output Voltage Range | 211 – 264 | | | | | Vac |
| On-Grid AC Frequency Range (min - nom - max) | 59.3 – 60 – 60.5 | | | | | Hz |
| Maximum Continuous Output Current @240V (grid, PV and battery) | 40 | | | | | Aac |
| INPUT – DC (PV AND BATTERY) | | | | | | |
| Transformer-less, Ungrounded | Yes | | | | | |
| Max Input Voltage | 480 | | | | | Vdc |
| Nom DC Input Voltage | 380 | | | | | Vdc |
| Reverse-Polarity Protection | Yes | | | | | |
| Ground-Fault Isolation Detection | 600kΩ Sensitivity | | | | | |
| INPUT – DC (PV) | | | | | | |
| Maximum DC Power @ 240V | 11,400 | 11,520 | 15,200 | 20,000 | 22,800 | W |
| Maximum DC Power @ 208V | 6600 | 10,000 | - | - | 20,000 | W |
| Maximum Input Current ⁽⁷⁾ @ 240V | 20 | 30.5 | 40 | 53 | 60 | Adc |
| Maximum Input Current ⁽⁷⁾ @ 208V | 17.5 | 27 | - | - | 53 | Adc |
| Maximum Input Short Circuit Current | 45 | | | | | Adc |
| Maximum Inverter Efficiency | 99.2 | | | | | % |
| CEC Weighted Efficiency | 98.5 | | 99 | | 99 @ 240V 98.5 @ 208V | % |
| 2-pole Disconnection | Yes | | | | | |

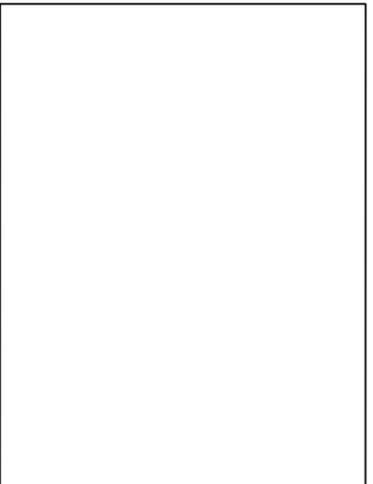
(1) These specifications apply to inverters with part numbers SExxxxH-USMNUxxx5 and SExxxxH-USMNFxxx5 and connection unit model number DCD-1PH-US-PxH-F-x.
 (2) Inverters with part number SExxxxH-USMNFxxx5 are intended for upgrade installations only, as part of the "Re-Energize" program. Use on non-upgrade installations will revoke the product warranty.
 (3) For other regional settings please refer to the [SolarEdge Inverters Power Control Options Application Note](#).
 (4) Not designed for non-grid connected applications and requires AC for commissioning. Stand-alone (backup) functionality is only supported for the 240V grid.
 (5) For LRA (Locked Rotor Amperage) values please refer to the [LRA for NAM Application Note](#).
 (6) For models SE7600H-US and below, the rated AC stand-alone power is configurable between 7600W or 11,400W from CPU version 4.20.xx.
 (7) A higher current source may be used. The inverter will limit its input current to the values stated.



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

| REVISIONS | | |
|----------------|------------|-----|
| DESCRIPTION | DATE | REV |
| INITIAL DESIGN | 03/10/2025 | |
| | | |



PROJECT NAME & ADDRESS

**JAMES BRADLEY
RESIDENCE**

**308 W E ST,
ERWIN, NC 28339**

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-12

/ SolarEdge Home Hub Inverter

Single Phase, for North America

SE3800H-US / SE5700H-US / **SE7600H-US** / SE10000H-US / SE11400H-US

| Model Number ⁽¹⁾⁽²⁾ | SE3800H-US | SE5700H-US | SE7600H-US | SE10000H-US | SE11400H-US | Units |
|---|--|------------------------------|-------------------|--------------------------------|-------------|---------|
| OUTPUT – DC (BATTERY) | | | | | | |
| Supported Battery Types | SolarEdge Home Battery, LG RESU Prime | | | | | |
| Number of Batteries per Inverter | Up to 3 SolarEdge Home Battery, up to 2 LG RESU Prime | | | | | |
| Continuous Power ⁽⁸⁾ | 11,400 @ 240V 3800 @ 208V | 11,400 @ 240V 5000 @ 208V | 11400 @240V | 11,400 @ 240V 10,000 @ 208V | | W |
| Peak Power ⁽⁸⁾ | 11,400 @ 240V 3800 @ 208V | 11,400 @ 240V 5000 @ 208V | 11400 @240V | 11,400 @ 240V 10,000 @ 208V | | W |
| Maximum Input Current | 30 | | | | | Adc |
| 2-pole Disconnection | Up to the inverter's rated stand-alone power | | | | | |
| SMART ENERGY CAPABILITIES | | | | | | |
| Consumption Metering | Built-in ⁽⁹⁾ | | | | | |
| Stand-alone & Battery Storage | With Backup Interface (purchased separately) for service up to 200A; up to 3 inverters | | | | | |
| EV Charging | Direct connection to the SolarEdge Home EV Charger | | | | | |
| ADDITIONAL FEATURES | | | | | | |
| Supported Communication Interfaces | RS485, Ethernet, Cellular ⁽¹⁰⁾ , Wi-Fi (optional), SolarEdge Home Network (optional) | | | | | |
| Revenue Grade Metering, ANSI C12.20 | Built-in ⁽⁹⁾ | | | | | |
| Integrated AC, DC and Communication Connection Unit | Yes | | | | | |
| Inverter Commissioning | With the SetApp mobile application using built-in Wi-Fi Access Point for local connection | | | | | |
| DC Voltage Rapid Shutdown (PV and Battery) | Yes, NEC 690.12 | | | | | |
| STANDARD COMPLIANCE | | | | | | |
| Safety | UL 1741, UL 1741SA, UL 1741SB, UL 1699B, CSA 22.2#107.1, C22.2#330, C22.3#9, ANSI/CAN/UL 9540 | | | | | |
| Grid Connection Standards | IEEE1547 and IEEE-1547.1, Rule 21, Rule 14H | | | | | |
| Emissions | FCC Part 15 Class B | | | | | |
| INSTALLATION SPECIFICATIONS | | | | | | |
| AC Terminals | L1, L2, N terminal blocks, PE busbar for inverter connection L1, L2 terminal blocks, PE busbar for EV Charger AC connection | | | | | |
| DC Terminals | 4 x terminal block pairs for PV input; 1 x terminal block pair for battery input | | | | | |
| AC Output and EV AC Output Conduit Size / AWG Range | 1" maximum / 14-4 AWG | | | | | |
| DC Input (PV and Battery) Conduit Size / AWG Range | 1" maximum / 14-6 AWG | | | | | |
| Dimensions with Connection Unit (H x W x D) | 21.06 x 14.6 x 8.2 / 535 x 370 x 208 | | | | | in / mm |
| Weight with Connection Unit | 44.9 / 20.3 | | | | | lb / kg |
| Noise | < 50 | | | | | dBA |
| Cooling | Natural Convection | | | | | |
| Operating Temperature Range | -40 to +140 / -40 to +60 ⁽¹¹⁾ | | | | | °F / °C |
| Protection Rating | NEMA 4X | | | | | |

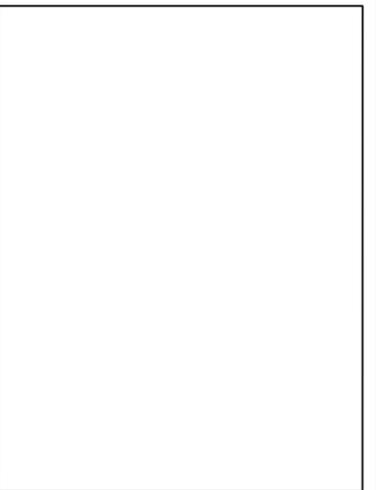
(8) Discharge power is limited up to the inverter's rated AC power for on-grid and stand-alone applications, as well as up to the installed batteries' rating.
 (9) For consumption metering current transformers should be ordered separately: SECT-SPL-225A-T-20 or SEACT1250-400NA-20. Revenue grade metering is only for production metering.
 (10) Information concerning the data plan terms & conditions is available in [SolarEdge Communication Plan Terms and Conditions](#).
 (11) Full power up to at least 50°C / 122°F; for power derating information refer to the [Temperature Derating Technical Note for North America](#).



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PROJECT NAME & ADDRESS

**JAMES BRADLEY
RESIDENCE**

**308 W E ST,
ERWIN, NC 28339**

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-13



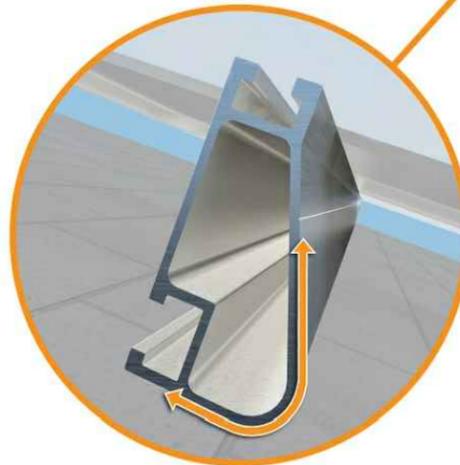
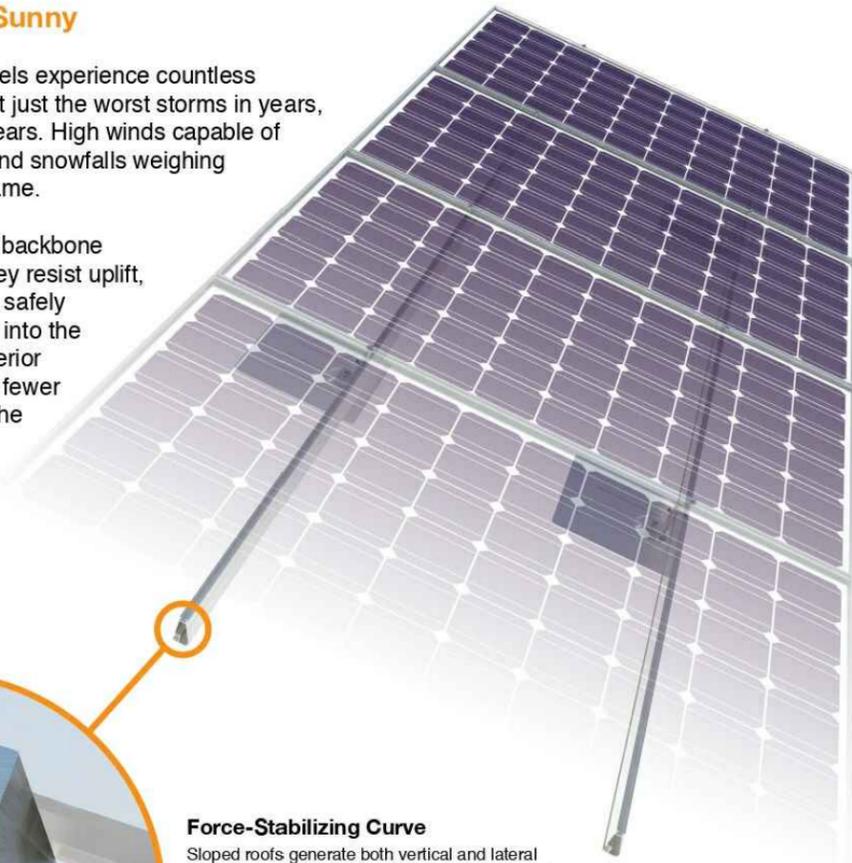


XR Rail® Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails® are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails® is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails® are compatible with FlashFoot® and other pitched roof attachments.

IronRidge® offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails® are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.



XR Rail® Family

The XR Rail® Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail® to match.



XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available



XR100

XR100 is a residential and commercial mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

| Load | | Rail Span | | | | | |
|------------|------------|-----------|-------|-------|----|--------|-----|
| Snow (PSF) | Wind (MPH) | 4' | 5' 4" | 6' | 8' | 10' | 12' |
| None | 90 | | | | | | |
| | 120 | | | | | | |
| | 140 | XR10 | | XR100 | | XR1000 | |
| | 160 | | | | | | |
| 20 | 90 | | | | | | |
| | 120 | | | | | | |
| | 140 | | | | | | |
| | 160 | | | | | | |
| 30 | 90 | | | | | | |
| | 160 | | | | | | |
| 40 | 90 | | | | | | |
| | 160 | | | | | | |
| 80 | 160 | | | | | | |
| | 160 | | | | | | |
| 120 | 160 | | | | | | |
| | 160 | | | | | | |

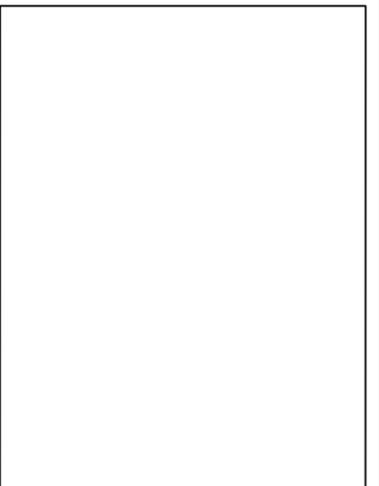
*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.



TOP TIER SOLAR SOLUTIONS

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PROJECT NAME & ADDRESS

JAMES BRADLEY
RESIDENCE

308 W E ST,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-14



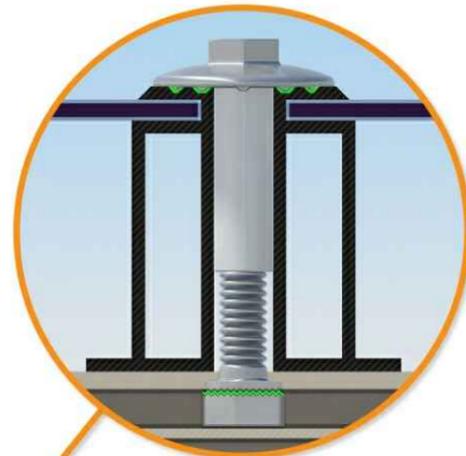
UFO® Family of Components

Simplified Grounding for Every Application

The UFO® family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge® XR Rails®. All system types that feature the UFO® family—Flush Mount®, Tilt Mount® and Ground Mount®—are fully listed to the UL 2703 standard.

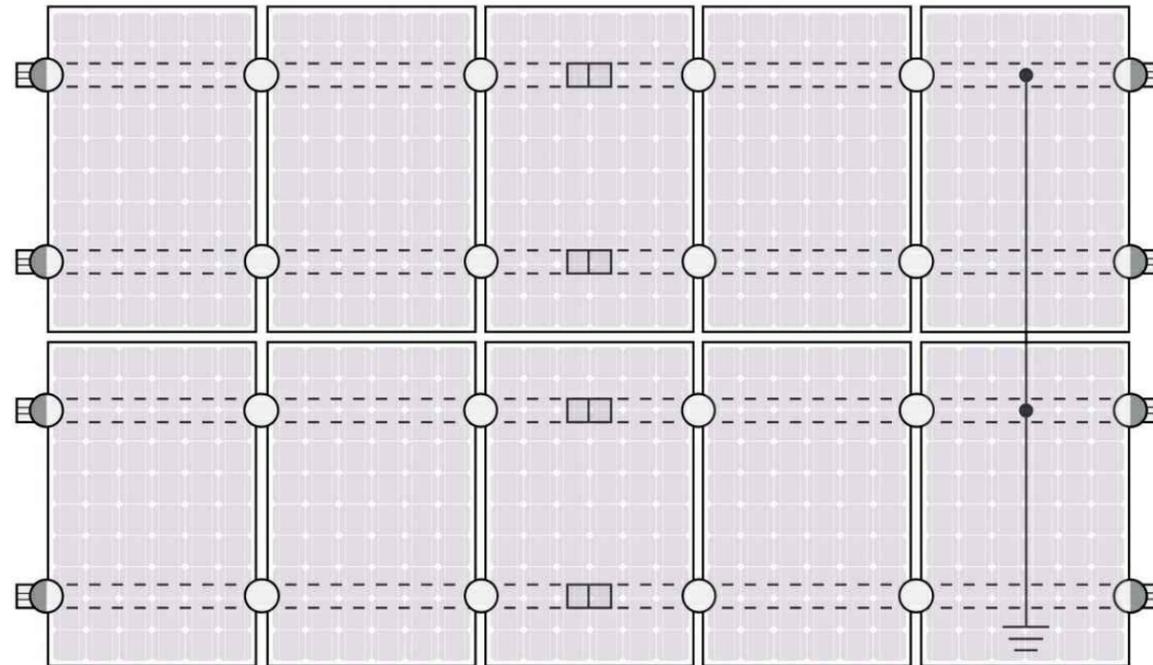
UFO® hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.

Only for installation and use with IronRidge products in accord with written instructions. See IronRidge.com/UFO



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

System Diagram



○ UFO ◐ Stopper Sleeve ● Grounding Lug □ BOSS™ Splice ⊥ Ground Wire

⚡ Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge® Flush Mount®, Tilt Mount®, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

👉 [Go to IronRidge.com/UFO](http://IronRidge.com/UFO)

Cross-System Compatibility

| Feature | Flush Mount | Tilt Mount | Ground Mount |
|-----------------------------------|--|------------|----------------|
| XR Rails® | ✓ | ✓ | XR100 & XR1000 |
| UFO®/Stopper | ✓ | ✓ | ✓ |
| BOSS® Splice | ✓ | ✓ | N/A |
| Grounding Lugs | 1 per Row | 1 per Row | 1 per Array |
| Microinverters & Power Optimizers | Compatible with most MLPE manufacturers. Refer to system installation manual. | | |
| Fire Rating | Class A | Class A | N/A |
| Modules | Tested or Evaluated with over 400 Framed Modules. Refer to installation manuals for a detailed list. | | |



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



BOSS® Splice
Bonded Structural Splice connects rails with built-in bonding teeth. No tools or hardware needed.



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



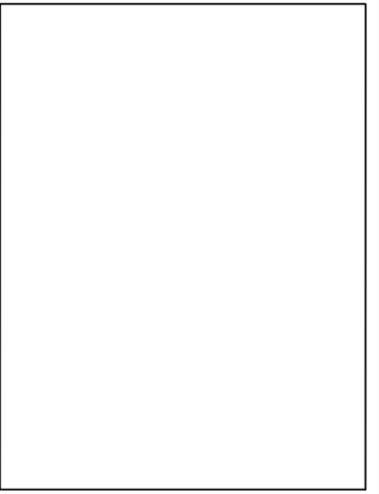
Bonded Attachments
The bonding bolt attaches and bonds the L-foot® to the rail. It is installed with the same socket as the rest of the system.



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308 W E ST,
ERWIN, NC 28339

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ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

S-5!® The Right Way!

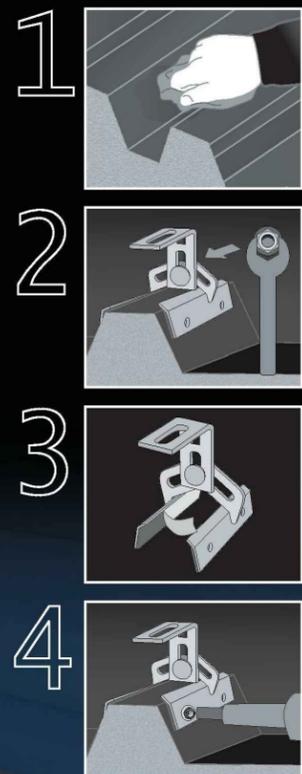
ProteaBracket™

ProteaBracket™ is the most versatile standing seam metal roof attachment solution on the market, fitting most trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate varying widths and heights. There are no messy sealants to apply and no chance for leaks; the ProteaBracket comes with factory-applied, adhesive rubber sealant to ensure quick installation and a weather-proof fit.

Installation is simple! The ProteaBracket is mounted directly onto the crown of the panel, straddling the profile. No surface preparation is necessary; simply wipe away excess oil and debris, align, and apply. Secure ProteaBracket through its pre-punched holes, using the hardened drill point S-5!® screws.

ProteaBracket is the perfect match for our S-5-PV Kit and spares you the hassle of cold-bridging! For a solar attachment solution that is both economical and easy to use, choose ProteaBracket.*

*When ProteaBracket is used in conjunction with the S-5-PV Kit, an additional nut is required during installation.



ProteaBracket™

S-5!® ProteaBracket™ is a versatile bracket that adjusts easily to most trapezoidal roof profiles.

888-825-3432 | www.S-5.com

S-5!® The Right Way!

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal exposed-fastened metal roof profiles! No messy sealants to apply. The factory-applied adhesive rubber sealant weather-proofs and makes installation easy!

Each ProteaBracket™ comes with a factory-applied, adhesive rubber sealant on the base. A structural A2 stainless steel bimetal attachment bracket, ProteaBracket is compatible with most common metal roofing materials. All four pre-punched holes must be used to achieve tested strength. Mounting hardware is furnished with the ProteaBracket. For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications. S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:

Side Rail Option



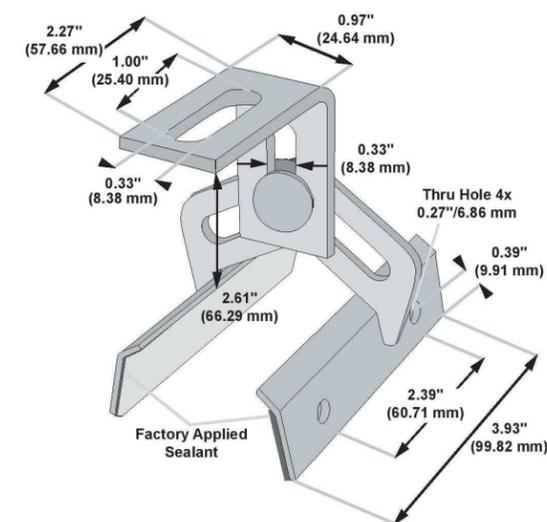
Top Rail Option



S-5-PV Kit Option

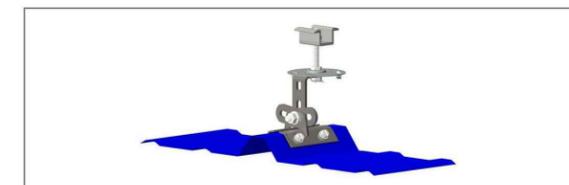


ProteaBracket™



Please note: All measurements are rounded to the second decimal place.

Example Applications



S-5-PV Kit demonstrated with a ProteaBracket on a trapezoidal profile.

Example Profile



S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

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TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
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SHEET NAME
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SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-16