# PHOTOVOLTAIC ROOF MOUNT SYSTEM

## 13 MODULES-ROOF MOUNTED - 5.135 kW DC, 6.000 kW AC

## 184 WEXFORD DR, FUQUAY-VARINA, NC 27526

## PROJECT DATA

| | |
|---|---|
| PROJECT ADDRESS | 184 WEXFORD DR, FUQUAY-VARINA, NC 27526 |
| OWNER: | BARBARA WOODLEY |
| DESIGNER: | ESR |

SCOPE: 5.135 KW DC ROOF MOUNT
SOLAR PV SYSTEM WITH
13 MISSION SOLAR: MSE395SX9R 395W
PV MODULES WITH
13 SOLAREDGE: S440 POWER OPTIMIZERS AND
01 SOLAREDGE: SE6000H-US (240V/6000W)
INVERTER

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

## SHEET INDEX


| | |
|---|---|
| PV-1 | COVER SHEET |
| PV-2 | SITE PLAN |
| PV-3 | ROOF PLAN & MODULES |
| PV-4 | ELECTRICAL PLAN |
| PV-5 | STRUCTURAL DETAIL |
| PV-6 | ELECTRICAL LINE DIAGRAM |
| PV-7 | WIRING CALCULATIONS |
| PV-8 | LABELS |
| PV-9+ | EQUIPMENT SPECIFICATIONS |

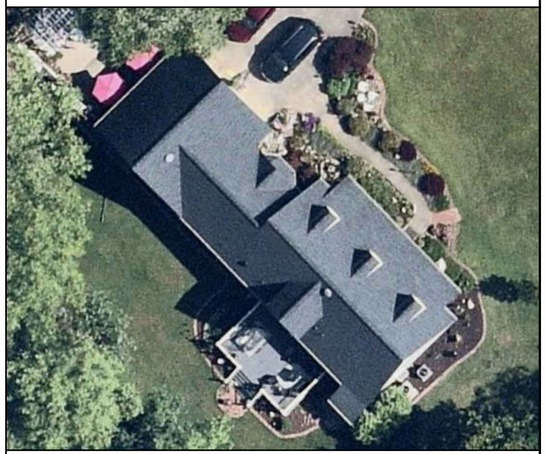

## SIGNATURE

## GENERAL NOTES

1. ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
2. THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2017.
3. THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
4. 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.
5. WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
6. HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
7. 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.
8. PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
9. PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING. MECHANICAL, OR BUILDING ROOF VENTS.
10. 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.
11. 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.
12. INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE UL 1741 LISTED.
13. THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
14. ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
15. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
16. SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
17. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
18. 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)]
19. ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
20. WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
21. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
22. 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


**TOP TIER SOLAR SOLUTIONS**

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


| REVISIONS | | |
|---|---|---|
| DESCRIPTION | DATE | REV |
| INITIAL DESIGN | 10/11/2023 | |
| AS BUILT | 11/03/2023 | A |
| | | |

NORTH CAROLINA PROFESSIONAL SEAL 056724 ENGINEER TREVOR JONES

STRUCTURAL ONLY
11/03/2023

PROJECT NAME & ADDRESS

BARBARA WOODLEY RESIDENCE

184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

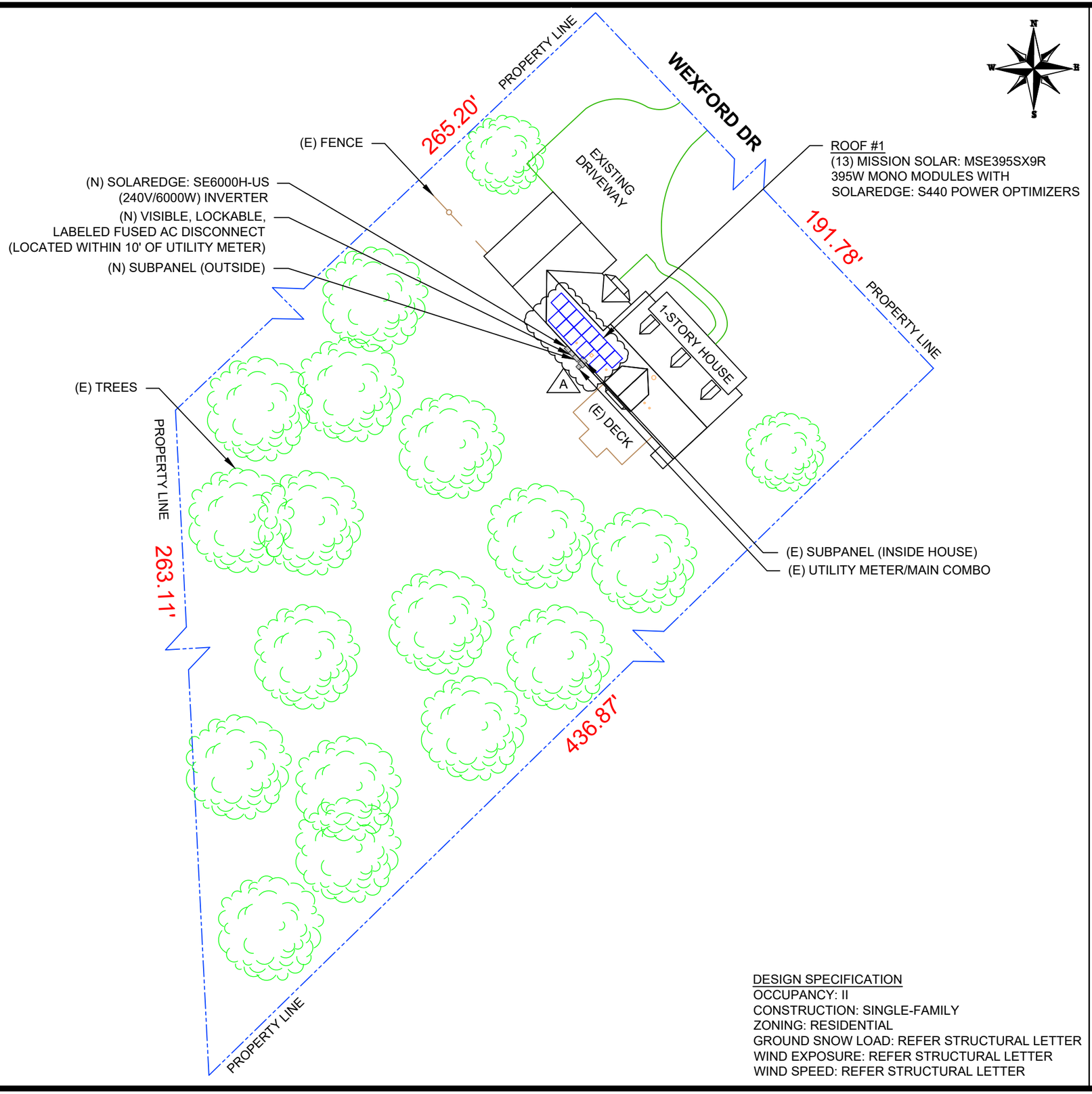
# PROJECT DESCRIPTION:

13 X MISSION SOLAR: MSE395SX9R 395W MONO MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 5.135 kW DC
AC SYSTEM SIZE: 6.000 kW AC

EQUIPMENT SUMMARY
13 MISSION SOLAR: MSE395SX9R 395W MONO MODULES
13 SOLAREDGE: S440 POWER OPTIMIZERS
01 SOLAREDGE: SE6000H-US (240V/6000W) INVERTER

ROOF ARRAY AREA #1:- 281.32 SQ FT.

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




1 SITE PLAN
PV-2 SCALE: 1/32" = 1'-0"

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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DRAWN BY
ESR

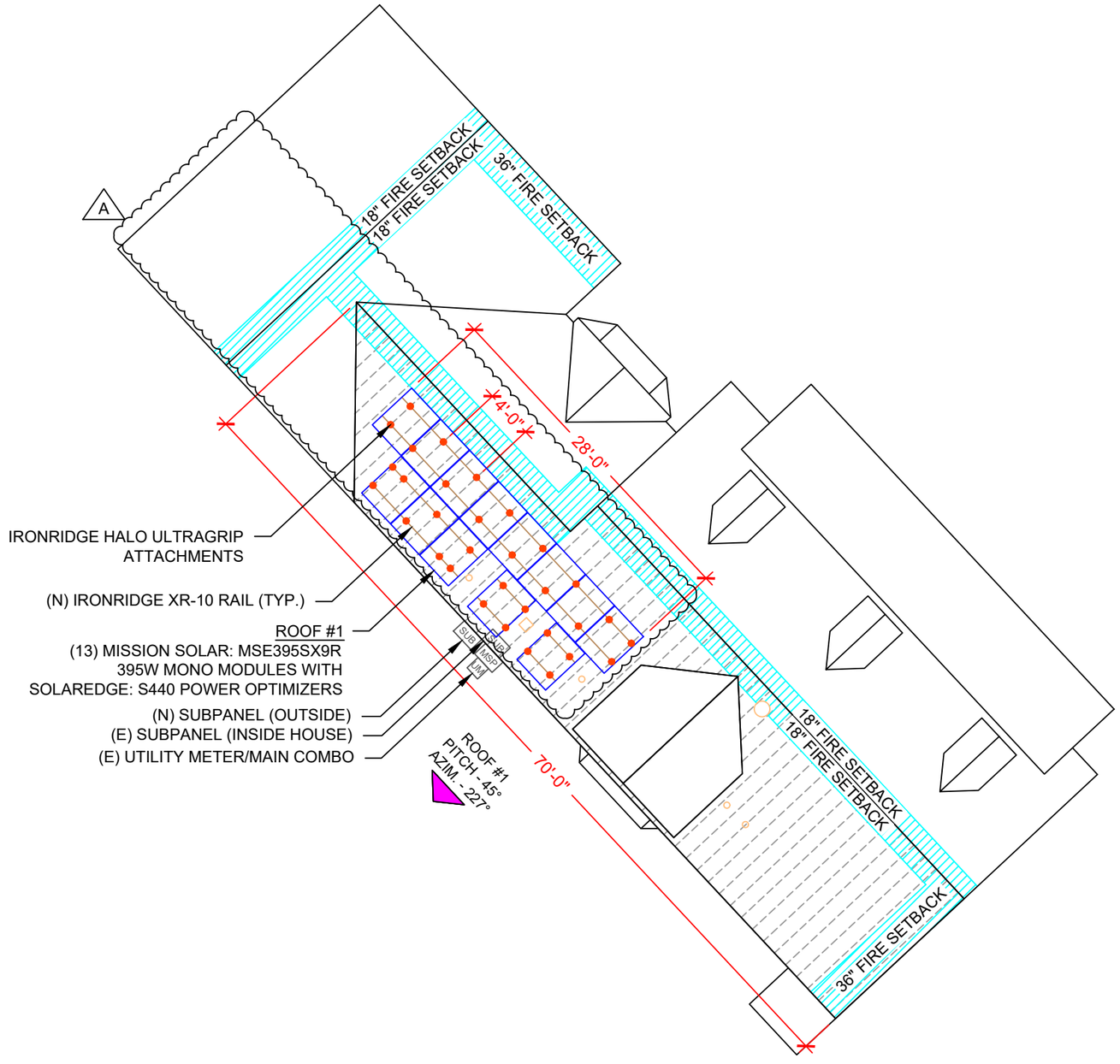
SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

## MODULE TYPE, DIMENSIONS & WEIGHT

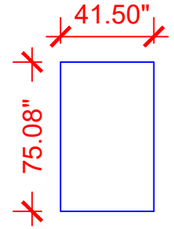
NUMBER OF MODULES = 13 MODULES
MODULE TYPE = MISSION SOLAR: MSE395SX9R 395W MONO MODULES
MODULE WEIGHT = 48.5 LBS / 22.0 kg.
MODULE DIMENSIONS = 75.08" x 41.50" = 21.64 SF


1 ROOF PLAN & MODULES
PV-3 SCALE: 3/32" = 1'-0"

| ROOF DESCRIPTION | | | | | |
|---|---|---|---|---|---|
| ROOF TYPE | | | | ASPHALT SHINGLE | |
| ROOF LAYER | | | | 1 LAYER | |
| ROOF | # OF MODULES | ROOF PITCH | AZIMUTH | RAFTER SIZE | RAFTER SPACING |
| #1 | 13 | 45° | 227° | 2"X6" | 16" |

| ARRAY AREA & ROOF AREA CALC'S | | |
|---|---|---|
| TOTAL PV ARRAY AREA (SQ. FT.) | TOTAL ROOF AREA (Sq. Ft.) | ROOF AREA COVERED BY ARRAY (%) |
| 281.32 | 2695.71 | 10 |




MISSION SOLAR:
MSE395SX9R
395W MODULES

### 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
- RAFTER
- CONDUIT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FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
ROOF PLAN & MODULES

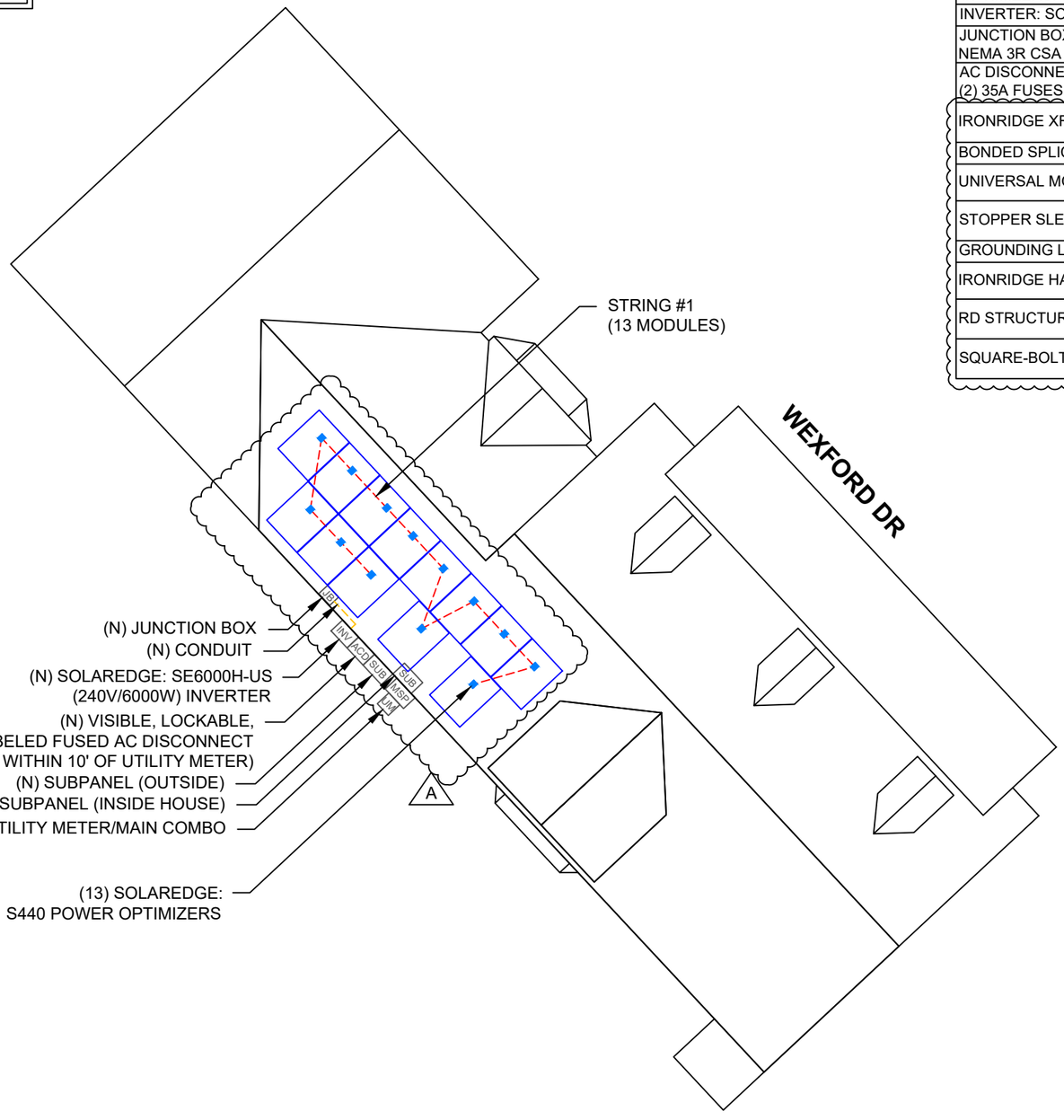
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

DC SYSTEM SIZE: 5.135 kW DC
AC SYSTEM SIZE: 6.000 kW AC
(13) MISSION SOLAR: MSE395SX9R 395W MONO MODULES
WITH (13) SOLAREDGE: S440 POWER OPTIMIZERS
LOCATED UNDER EACH PANEL AND
01 SOLAREDGE: SE6000H-US (240V/6000W) INVERTER

**STRING LEGENDS**

---------- STRING #1


## BILL OF MATERIALS

| EQUIPMENT DESCRIPTION | QTY |
|---|---|
| SOLAR PV MODULES: MISSION SOLAR: MSE395SX9R 395W MODULE | 13 |
| OPTIMIZERS: SOLAREDGE: S440 POWER OPTIMIZERS | 13 |
| INVERTER: SOLAREDGE: SE6000H-US (240V/6000W) INVERTER | 01 |
| JUNCTION BOX: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO.290 | 1 |
| AC DISCONNECT: FUSED AC DISCONNECT, 60A FUSED, (2) 35A 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) | 4 |
| UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1) | 34 |
| STOPPER SLEEVE, 40MM, MILL (UFO-STP-40MM-M1) | 16 |
| GROUNDING LUG (XR-LUG-03-A1) | 4 |
| IRONRIDGE HALO ULTRAGRIP ATTACHMENTS (QM-HUG-01-M1) | 34 |
| RD STRUCTURAL SCREW,3.0L (HW-RD1430-01-M1) | 68 |
| SQUARE-BOLT BONDING HARDWARE (BHW-SQ-02-A1 ) | 34 |

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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
- - RAFTER
- - CONDUIT

1 ELECTRICAL PLAN
PV-4 SCALE: 3/32" = 1'-0"


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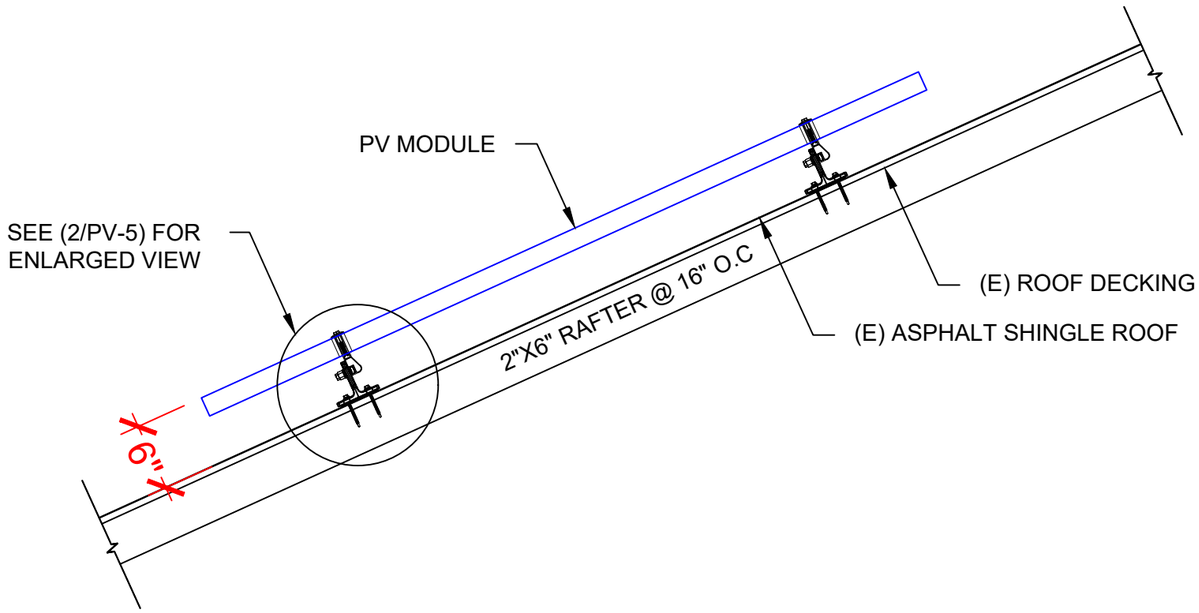
DRAWN BY
ESR

SHEET NAME
ELECTRICAL PLAN

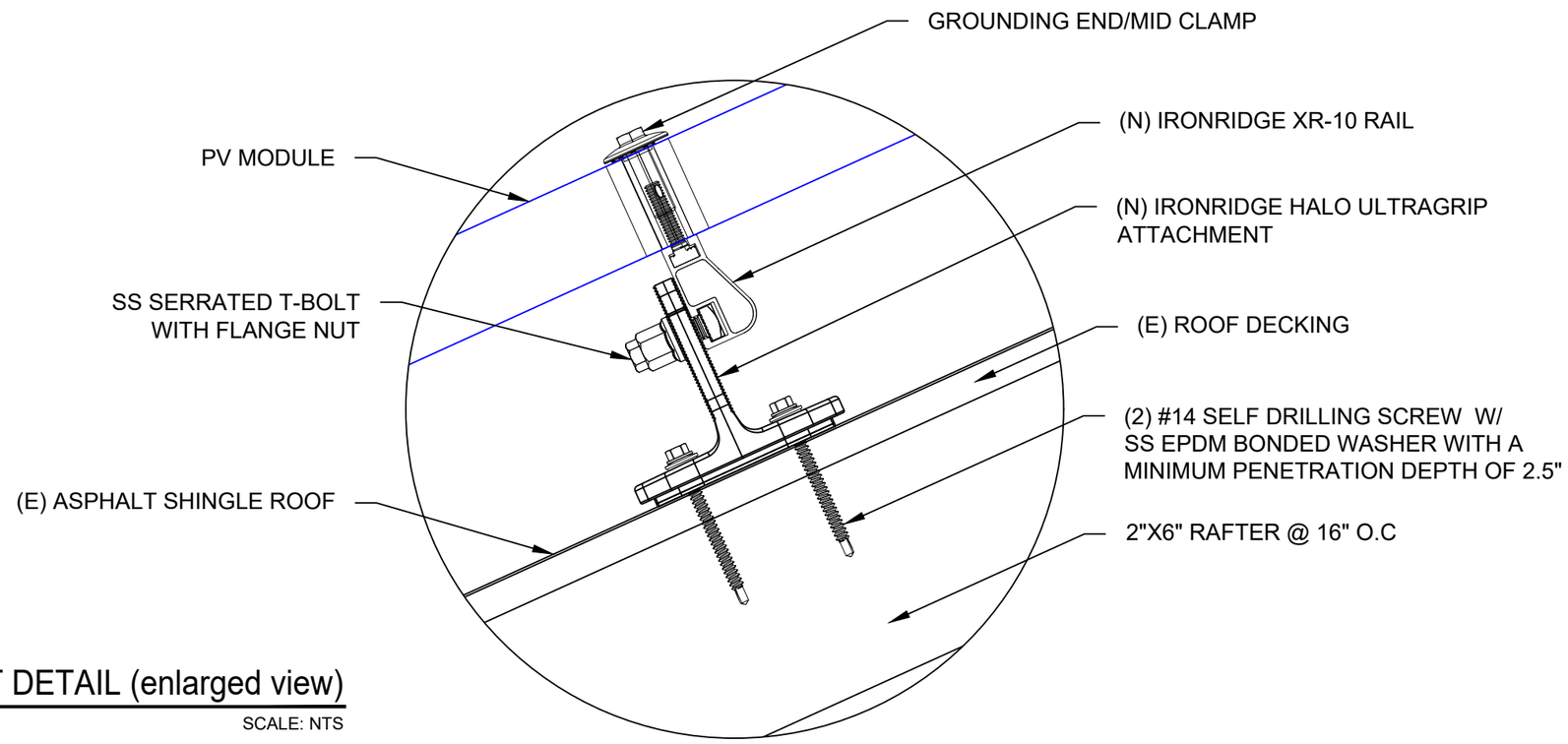
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4




1 | STRUCTURAL ATTACHMENT (Side view)

PV-5 | SCALE: N.T.S




2 | ATTACHMENT DETAIL (enlarged view)

PV-5 | SCALE: NTS

TOP TIER SOLAR SOLUTIONS

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NORTH CAROLINA PROFESSIONAL SEAL 056724 ENGINEER TREVOR JONES

STRUCTURAL ONLY
11/03/2023

PROJECT NAME & ADDRESS

BARBARA WOODLEY RESIDENCE

184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

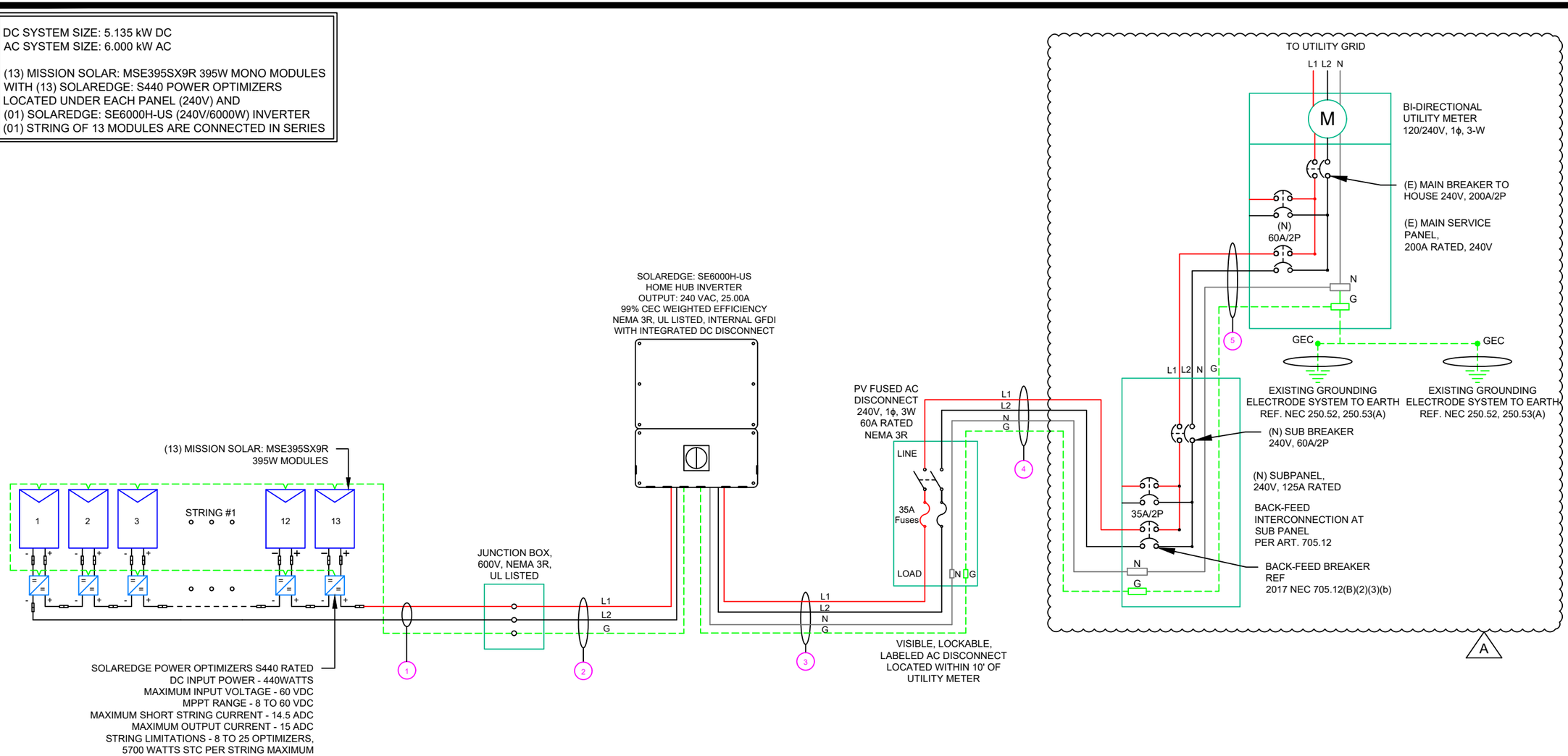
SHEET NAME
STRUCTURAL DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

DC SYSTEM SIZE: 5.135 kW DC
AC SYSTEM SIZE: 6.000 kW AC

(13) MISSION SOLAR: MSE395SX9R 395W MONO MODULES
WITH (13) SOLAREDGE: S440 POWER OPTIMIZERS
LOCATED UNDER EACH PANEL (240V) AND
(01) SOLAREDGE: SE6000H-US (240V/6000W) INVERTER
(01) STRING OF 13 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

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

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| | QTY | | CONDUCTOR INFORMATION | CONDUIT TYPE | CONDUIT SIZE |
|---|---|---|---|---|---|
| 1 | (2) | #10AWG - | PV WIRE/USE-2 | N/A | N/A |
| | (1) | #6AWG - | BARE COPPER IN FREE AIR | | |
| 2 | (2) | #10AWG - | CU,THWN-2 | EMT OR LFMC IN ATTIC | 3/4" |
| | (1) | #10AWG - | CU,THWN-2 GND | | |
| 3 | (2) | #8AWG - | CU,THWN-2 | EMT,LFMC OR PVC | 3/4" |
| | (1) | #8AWG - | CU,THWN-2 N | | |
| | (1) | #10AWG - | CU,THWN-2 GND | | |
| 4 | (2) | #8AWG - | CU,THWN-2 | EMT,LFMC OR PVC | 3/4" |
| | (1) | #8AWG - | CU,THWN-2 N | | |
| | (1) | #10AWG - | CU,THWN-2 GND | | |
| 5 | (2) | #6AWG - | CU,THWN-2 | EMT, LFMC OR PVC | 3/4" |
| | (1) | #6AWG - | CU,THWN-2 N | | |
| | (1) | #10AWG - | CU,THWN-2 GND | | |

1 | ELECTRICAL LINE DIAGRAM
PV-6 | SCALE: NTS


TOP TIER SOLAR SOLUTIONS

**TOP TIER SOLAR SOLUTIONS**

1530 CENTER PARK DR #2911,
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UNITED STATES


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PROJECT NAME & ADDRESS

BARBARA WOODLEY
RESIDENCE

184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

| SOLAR MODULE SPECIFICATIONS | |
|---|---|
| MANUFACTURER / MODEL # | MISSION SOLAR: MSE395SX9R 395W MODULE |
| VMP | 36.99V |
| IMP | 10.68A |
| VOC | 45.18V |
| ISC | 11.24A |
| TEMP. COEFF. VOC | -0.259%/°C |
| MODULE DIMENSION | 75.08"L x 41.50"W x 1.57"D (In Inch) |

| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER / MODEL # | SOLAREDGE: SE6000H-US (240V/6000W) INVERTER |
| NOMINAL AC POWER | 6.000 kW |
| NOMINAL OUTPUT VOLTAGE | 240 VAC |
| NOMINAL OUTPUT CURRENT | 25.00A |

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

| AMBIENT TEMPERATURE SPECS | |
|---|---|
| AMBIENT TEMP (HIGH TEMP 2%) | 38° |
| RECORD LOW TEMPERATURE | -9° |
| MODULE TEMPERATURE COEFFICIENT OF Voc | -0.259%/°C |

**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 |
| JUNCTION BOX | INVERTER | 380 | 15.00 | 18.75 | 20 | CU #10 AWG | CU #10 AWG | 35 | PASS | 38 | 2 | 40 | 0.91 | 1 | 36.4 | PASS | 20 | 1.24 | 0.196 | 3/4" EMT | 11.87617 |

| String 1 Voltage Drop | 0.245 |
|---|---|

**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 | 25 | 31.25 | 35 | CU #8 AWG | CU #10 AWG | CU #8 AWG | 50 | PASS | 38 | 2 | 55 | 0.91 | 1 | 50.05 | PASS | 5 | 0.778 | 0.081 | 3/4" EMT | 24.5591 |
| AC DISCONNECT | SUBPANEL | 240 | 25 | 31.25 | 35 | CU #8 AWG | CU #10 AWG | CU #8 AWG | 50 | PASS | 38 | 2 | 55 | 0.91 | 1 | 50.05 | PASS | 5 | 0.778 | 0.081 | 3/4" EMT | 24.5591 |
| SUBPANEL | MMC | 240 | 60 | 60 | 60 | CU #6 AWG | CU #10 AWG | CU #6 AWG | 65 | PASS | 38 | 2 | 75 | 0.91 | 1 | 68.25 | PASS | 5 | 0.491 | 0.123 | 3/4" EMT | 32.4953 |

| CUMULATIVE VOLTAGE DROP | 0.162 |
|---|---|

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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 BOX, 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 G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
10. 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

TOP TIER SOLAR SOLUTIONS

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


REVISIONS

| DESCRIPTION | DATE | REV |
|---|---|---|
| INITIAL DESIGN | 10/11/2023 | |
| AS BUILT | 11/03/2023 | A |
| | | |

PROJECT NAME & ADDRESS

BARBARA WOODLEY RESIDENCE

184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

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:
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

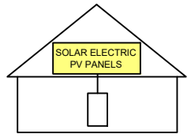
**⚠ WARNING**

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 | 25.00 A |

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

| | |
|---|---|
| **MAXIMUM VOLTAGE** | 480 V |
| **MAXIMUM CIRCUIT CURRENT** | 16.50 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

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DRAWN BY
ESR

SHEET NAME
LABELS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

# MSE PERC 66

MISSION SOLAR ENERGY

**395W**
Class leading power output

Positive Power Tolerance
**-0 to +3%**

## FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.58% annually from years two to 30 with 84.08% capacity guaranteed in year 25.
For more information, visit www.missionsolar.com/warranty

## CERTIFICATIONS

CEC · TÜV SUD · c UL us LISTED

UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

If you have questions or concerns about certification of our products in your area, please contact Mission Solar Energy.

## True American Quality
## True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas where we manufacture our modules. We produce American, high-quality solar modules ensuring the highest-in-class power output and best-in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long term.

Demand the best. Demand Mission Solar Energy.

### Certified Reliability
- Tested to UL 61730 & IEC Standards
- PID resistant
- Resistance to salt mist corrosion

### Advanced Technology
- 9 Busbar
- Passivated Emitter Rear Contact
- Ideal for all applications

### Extreme Weather Resilience
- Up to 5,400 Pa front load & 3,600 Pa back load
- Tested load to UL 61730
- 40 mm frame

### BAA Compliant for Government Projects
- Buy American Act
- American Recovery & Reinvestment Act

Modules Assembled Designed & Engineered IN THE USA

25 YEAR FRAME-TO-FRAME WARRANTY

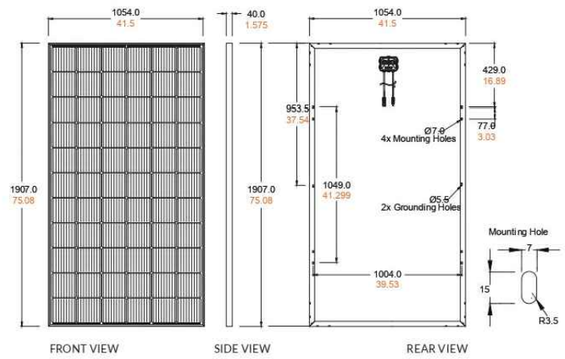


Class Leading
**390-400W**

MSE PERC 66

## BASIC DIMENSIONS

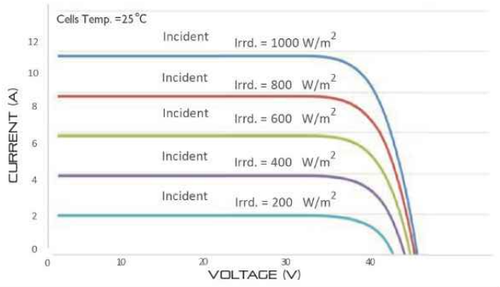
[UNITS: MM/IN]




## CURRENT-VOLTAGE CURVE

**MSE385SX9R: 385WP, 66 CELL SOLAR MODULE**

Current-voltage characteristics with dependence on irradiance and module temperature




## CERTIFICATIONS AND TESTS

| | |
|---|---|
| IEC | 61215, 61730, 61701 |
| UL | 61730 |

TÜV SUD · CEC · c UL us LISTED

## ELECTRICAL SPECIFICATION

| PRODUCT TYPE | MSExxxSX9R (xxx = $P_{max}$) | | | |
|---|---|---|---|---|
| Power Output | $P_{max}$ / $W_p$ | 390 | 395 | 400 |
| Module Efficiency | % | 19.4 | 19.7 | 19.9 |
| Tolerance | % | 0/+3 | 0/+3 | 0/+3 |
| Short Circuit Current | $I_{sc}$ A | 11.19 | 11.24 | 11.31 |
| Open Circuit Voltage | $V_{oc}$ V | 45.04 | 45.18 | 45.33 |
| Rated Current | $I_{mp}$ A | 10.63 | 10.68 | 10.79 |
| Rated Voltage | $V_{mp}$ V | 36.68 | 36.99 | 37.07 |
| Fuse Rating | A | 20 | 20 | 20 |
| System Voltage | V | 1,000 | 1,000 | 1,000 |

## TEMPERATURE COEFFICIENTS

| | |
|---|---|
| Normal Operating Cell Temperature (NOCT) | 43.75°C (±3.7%) |
| Temperature Coefficient of Pmax | -0.367%/°C |
| Temperature Coefficient of Voc | -0.259%/°C |
| Temperature Coefficient of Isc | 0.033%/°C |

## OPERATING CONDITIONS

| | |
|---|---|
| Maximum System Voltage | 1,000Vdc |
| Operating Temperature Range | -40°F to 185°F (-40°C to +85°C) |
| Maximum Series Fuse Rating | 20A |
| Fire Safety Classification | Type 1* |
| Front & Back Load (UL Standard) | Up to 5,400 Pa front and 3,600 Pa back load, Tested to UL 61730 |
| Hail Safety Impact Velocity | 25mm at 23 m/s |

*Mission Solar Energy uses quality sourced materials that result in a Type 1 fire rating. Please note, the 'Fire Class' Rating is designated for the fully-installed PV system, which includes, but is not limited to, the module, the type of mounting used, pitch and roof composition.

## MECHANICAL DATA

| | |
|---|---|
| Solar Cells | P-type mono-crystalline silicon |
| Cell Orientation | 66 cells (6x11) |
| Module Dimension | 1,907mm x 1,054mm x 40mm |
| Weight | 48.5 lbs. (22 kg) |
| Front Glass | 3.2mm tempered, low-iron, anti-reflective |
| Frame | 40mm Anodized |
| Encapsulant | Ethylene vinyl acetate (EVA) |
| Junction Box | Protection class IP67 with 3 bypass-diodes |
| Cable | 1.2m, Wire 4mm2 (12AWG) |
| Connector | Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-8 |

## SHIPPING INFORMATION

| Container Feet | Ship To | Pallet | Panels | 390W Bin |
|---|---|---|---|---|
| 53' | Most States | 30 | 780 | 304.20 kW |
| Double Stack | CA | 26 | 676 | 263.64 kW |

**PALLET [26 PANELS]**

| Weight | Height | Width | Length |
|---|---|---|---|
| 1,300 lbs. (572 kg) | 47.56 in (120.80 cm) | 46 in (116.84 cm) | 77 in (195.58 cm) |

Mission Solar Energy
8303 S. New Braunfels Ave., San Antonio, Texas 78235
www.missionsolar.com | info@missionsolar.com

Mission Solar Energy reserves the right to make specification changes without notice.

C-SA2-MKTG-0027 REV 4 03/18/2022 www.missionsolar.com | info@missionsolar.com

TOP TIER SOLAR SOLUTIONS

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PROJECT NAME & ADDRESS

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184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

# Power Optimizer

## For Residential Installations

S440 / S500 / S500B / S650B


POWER OPTIMIZER

## Enabling 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 cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules

* Functionality subject to inverter model and firmware version

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# Power Optimizer

## For Residential Installations

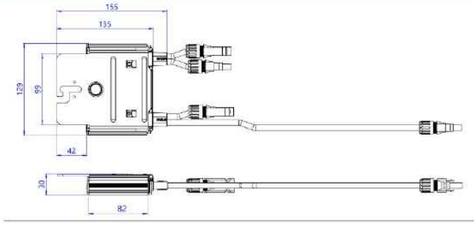
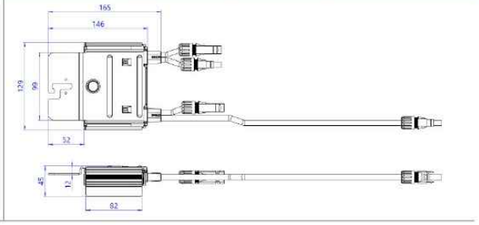
S440 / S500 / S500B / S650B


| | S440 | S500 | S500B | S650B | UNIT |
|---|---|---|---|---|---|
| **INPUT** | | | | | |
| Rated Input DC Power(1) | 440 | 500 | | 650 | W |
| Absolute Maximum Input Voltage (Voc) | 60 | | 125 | 85 | Vdc |
| MPPT Operating Range | 8 – 60 | | 12.5 – 105 | 12.5 - 85 | Vdc |
| Maximum Short Circuit Current (Isc) of Connected PV Module | 14.5 | 15 | | | Adc |
| Maximum Efficiency | 99.5 | | | | % |
| Weighted Efficiency | 98.6 | | | | % |
| Overvoltage Category | II | | | | |
| **OUTPUT DURING OPERTION** | | | | | |
| Maximum Output Current | 15 | | | | Adc |
| Maximum Output Voltage | 60 | | 80 | | Vdc |
| **OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)** | | | | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | | | | Vdc |
| **STANDARD COMPLIANCE(2)** | | | | | |
| EMC | FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011 | | | | |
| Safety | IEC62109-1 (class II safety), UL1741 | | | | |
| Material | UL94 V-0, UV Resistant | | | | |
| RoHS | Yes | | | | |
| Fire Safety | VDE-AR-E 2100-712:2018-12 | | | | |
| **INSTALLATION SPECIFICATIONS** | | | | | |
| Maximum Allowed System Voltage | 1000 | | | | Vdc |
| Dimensions (W x L x H) | 129 x 155 x 30 | | 129 x 165 x 45 | | mm |
| Weight | 720 | | 790 | | gr |
| Input Connector | MC4(3) | | | | |
| Input Wire Length | 0.1 | | | | m |
| Output Connector | MC4 | | | | |
| Output Wire Length | (+) 2.3, (-) 0.10 | | | | m |
| Operating Temperature Range(4) | -40 to +85 | | | | °C |
| Protection Rating | IP68 | | | | |
| 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 details about CE compliance, see Declaration of Conformity – CE.
(3) For other connector types please contact SolarEdge.
(4) Power de-rating is applied for ambient temperatures above +85°C for S440 and S500, and for ambient temperatures above +75°C for S500B. Refer to the Power Optimizers Temperature De-Rating Technical Note for details.

| PV System Design Using a SolarEdge Inverter(5) | | SolarEdge Home Wave Inverter Single Phase | SolarEdge Home Short String Inverter Three Phase | Three Phase for 230/400V Grid | Three Phase for 277/480V Grid | |
|---|---|---|---|---|---|---|
| Minimum String Length (Power Optimizers) | S440, S500 | 8 | 9 | 16 | 18 | |
| | S500B, S650B | 6 | 8 | 14 | | |
| Maximum String Length (Power Optimizers) | | 25 | 20 | 50 | | |
| Maximum Continuous Power per String | | 5700 | 5625 | 11250 | 12750 | W |
| Maximum Allowed Connected Power per String (In multiple string designs, the maximum is permitted only when the difference in connected power between strings is 2,000W or less) | | See(6) | See(6) | 13500 | 15000 | W |
| Parallel Strings of Different Lengths or Orientations | | Yes | | | | |

(5) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.
(6) If the inverter's rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to Application Note: Single String Design Guidelines.

| S440, S500 (Flat Bracket) | S500B, S650B (Bent Bracket) |
|---|---|
|  |  |



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CE RoHS

TOP TIER SOLAR SOLUTIONS

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PROJECT NAME & ADDRESS

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184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

# SolarEdge Home Hub Inverter

## For North America

SE3800H-US / SE5700H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US(1)


HOME BACKUP

## Optimized battery storage with HD-Wave technology

- Record-breaking 99% weighted efficiency with 200% DC oversizing
- Small, lightweight, and easy to install
- Modular design, future ready with optional upgrades to:
  - DC-coupled storage for full or partial home backup
  - Built-in consumption monitoring
  - Direct connection to the SolarEdge Home EV Charger
- Multi-inverter, scalable storage solution, with enhanced battery power up to 10kW
- Integrated arc fault protection and rapid shutdown for NEC 2014 – 2023, per article 690.11 and 690.12
- Embedded revenue grade production data, ANSI C12.20 Class 0.5

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# SolarEdge Home Hub Inverter

## For North America

SE3800H-US / SE5700H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US(1)


| Applicable to inverters with part number | SEXXXXH-USMNBBXXX / SEXXXXH-USSNBBXXX | | | | | | |
|---|---|---|---|---|---|---|---|
| | SE3800H-US | SE5700H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | Units |
| **OUTPUT – AC ON GRID** | | | | | | | |
| Rated AC Power | 3800 @ 240V<br>3300 @ 208V | 5760 @ 240V<br>5000 @ 208V | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | W |
| Maximum AC Power Output | 3800 @ 240V<br>3300 @ 208V | 5760 @ 240V<br>5000 @ 208V | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208 | 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(2) | | | | | | Hz |
| Maximum Continuous Output Current @ 240V | 16 | 24 | 25 | 32 | 42 | 47.5 | A |
| Maximum Continuous Output Current @ 208V | 16 | 24 | 24 | - | - | 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 BACKUP(3)** | | | | | | | |
| Rated AC Power in Backup Operation(4) | 7600 | 5760 | 6000 | 7600<br>11400* | 10000<br>11400* | 11400 | W |
| AC L-L Output Voltage Range in Backup | 211 – 264 | | | | | | Vac |
| AC L-N Output Voltage Range in Backup | 105 – 132 | | | | | | Vac |
| AC Frequency Range in Backup (min - nom - max) | 55 – 60 – 65 | | | | | | Hz |
| Maximum Continuous Output Current in Backup Operation | 32 | 24 | 25 | 32<br>47.5 | 42<br>47.5 | 47.5 | A |
| GFDI | 1 | | | | | | A |
| THD | < 5 | | | | | | % |
| **OUTPUT – SOLAREDGE 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 | 7600 | 11520 | 12000 | 15200 | 20000 | 22800 | W |
| Maximum DC Power @ 208V | 6600 | 10000 | 10000 | - | - | 20000 | W |
| Maximum Input Current(5) @ 240V | 20 | 16 | 16.5 | 20<br>30 | 30 | 30 | Adc |
| Maximum Input Current(5) @ 208V | 9 | 13.5 | 13.5 | - | - | 27 | Adc |
| Max. Input Short Circuit Current | 45 | | | | | | |
| Maximum Inverter Efficiency | 99.2 | | | | | | % |
| CEC Weighted Efficiency | 99 | | | | | 99 @ 240V<br>98.5 @ 208V | % |
| 2-pole Disconnection | Yes | | | | | | |

* Supported with PN SExxxxH-USMNxxxxxx.

(1) These specifications apply to inverters with part numbers SExxxxH-USMNxxxxx or SExxxxH-USSNxxxxxx and connection unit model number DCD-1PH-US-PxH-F-x.

(2) For other regional settings please contact SolarEdge support.

(3) Not designed for standalone applications and requires AC for commissioning. Backup functionality is only supported for 240V grid.

(4) Rated AC power in Backup Operation is valid for installations with multiple inverters. For a single backup inverter operation, rated AC power in Backup is 90% of the value stated.

(5) A higher current source may be used; the inverter will limit its input current to the values stated.

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DRAWN BY

ESR

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-11

# SolarEdge Home Hub Inverter

## For North America

SE3800H-US / SE5700H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US[1]

| Applicable to inverters with part number | SEXXXXH-USMNBBXXX / SEXXXXH-USSNBBXXX | | | | | | |
|---|---|---|---|---|---|---|---|
| | SE3800H-US | SE5700H-US | SE6000H-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[6] | 7600 @ 240V<br>3800 @ 208V | 5760 @ 240V<br>5000 @ 208V | 6000 | 11400 | | 11400 @ 240V<br>10000 @ 208V | W |
| Peak Power[6] | 7600 @ 240V<br>3800 @ 208V | 5760 @ 240V<br>5000 @ 208V | 6000 | 11400 | | 11400 @ 240V<br>10000 @ 208V | W |
| Max Input Current | 20 | 26.5 | | | | | Adc |
| 2-pole Disconnection | Up to inverter rated backup power | | | | | | |
| **SMART ENERGY CAPABILITIES** | | | | | | | |
| Consumption Metering | Built-in[7] | | | | | | |
| Backup & Battery Storage | With Backup Interface (purchased separately) for service up to 200A; up to 3 inverters | | | | | | |
| EV Charging | Direct connection to SolarEdge Home EV Charger | | | | | | |
| **ADDITIONAL FEATURES** | | | | | | | |
| Supported Communication Interfaces | RS485, Ethernet, Cellular[8, 9], Wi-Fi[9], SolarEdge Home Network | | | | | | |
| Revenue Grade Metering, ANSI C12.20 | Built-in[7] | | | | | | |
| 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, according to NEC 2014 – 2023 per article 690.11 and 690.12 | | | | | | |
| **STANDARD COMPLIANCE** | | | | | | | |
| Safety | UL1741, UL1741 SA, UL1741 SB, UL1741 PCS, UL1699B, UL1998, UL9540, CSA 22.2 | | | | | | |
| Grid Connection Standards | IEEE1547-2018, Rule 21, Rule 14H, CSA C22.3 No. 9 | | | | | | |
| Emissions | FCC part 15 class B | | | | | | |
| **INSTALLATION SPECIFICATIONS** | | | | | | | |
| 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) | 17.7 x 14.6 x 6.8 / 450 x 370 x 174 | | 17.7 x 14.6 x 6.8 / 450 x 370 x 174** | 21.06 x 14.6 x 7.3 / 535 x 370 x 185** | 21.06 x 14.6 x 8.2 / 535 x 370 x 208*** | | in / mm |
| | | | 21.06 x 14.6 x 8.2 / 535 x 370 x 208*** | | | | |
| Weight with Connection Unit | 30.8 / 14 | | 30.8 / 14** | 41.7 / 18.9** | 44.9 / 20.3*** | | lb / kg |
| | | | 44.9 / 20.3*** | | | | |
| Noise | < 50 | | | | | | dBA |
| Cooling | Natural Convection | | | | | | |
| Operating Temperature Range | -40 to +140 / -40 to +60[10] | | | | | | °F / °C |
| Protection Rating | NEMA 4X | | | | | | |

** Supported with PN SEXXXXH-USSNBBXX4 or SEXXXXH-USMNBBXX4.
*** Supported with PN SEXXXXH-USSNBBXX5 or SEXXXXH-USMNBBXX5.
(6) Discharge power is limited up to the inverter rated AC power for on-grid and backup applications, as well as up to the installed batteries' rating.
(7) For consumption metering current transformers should be ordered separately: SECT-SPL-225A-T-20 or SEACT0750-400NA-20 units per box. Revenue grade metering is only for production metering.
(8) Information concerning the Data Plan's terms & conditions is available in the following link: SolarEdge Communication Plan Terms and Conditions.
(9) The part number SEXXXXH-USXNBBXXX only supports the Wi-Fi communication interface, and the part number SEXXXXH-USXNBBLXX only supports the cellular communication interface.
(10) Full power up to at least 50°C / 122°F; for power de-rating information refer to the Temperature Derating Technical Note for North America.


TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
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| DESCRIPTION | DATE | REV |
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| AS BUILT | 11/03/2023 | A |
| | | |

PROJECT NAME & ADDRESS

BARBARA WOODLEY RESIDENCE

184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY

ESR

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-12

Tech Brief

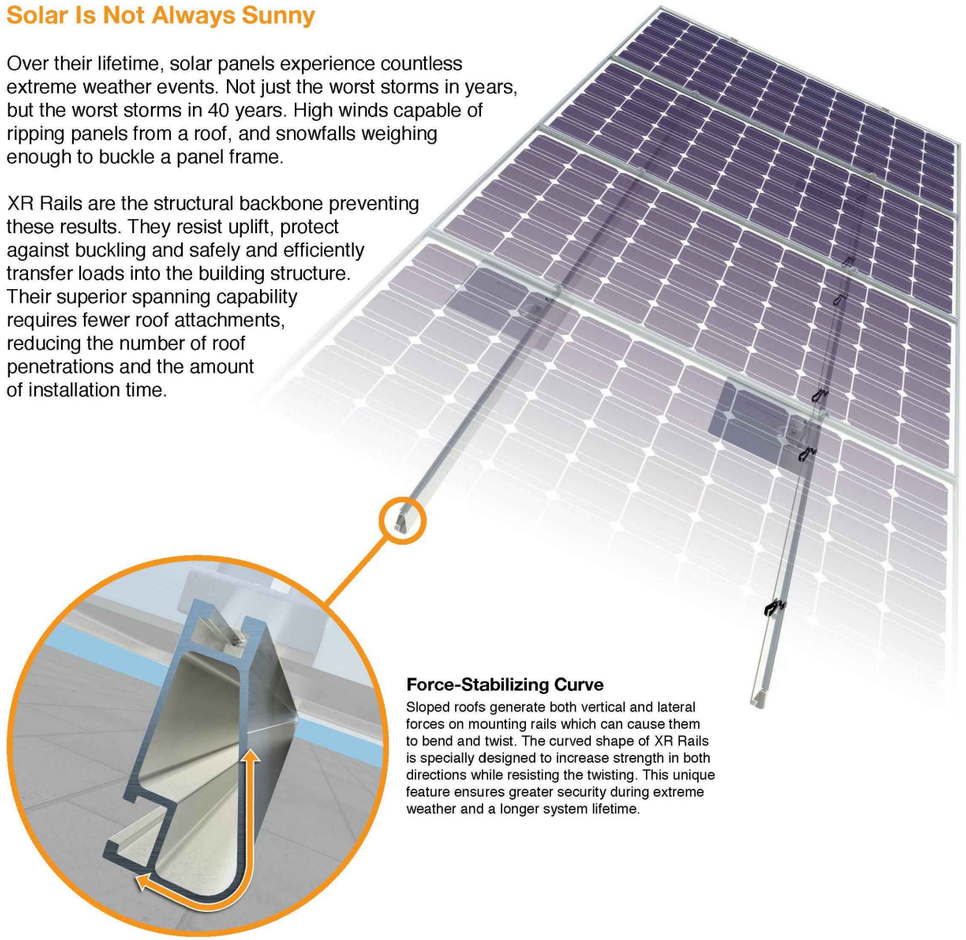
IRONRIDGE

# 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 marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

## 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 6 foot spans, while remaining light and economical.

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

### XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' 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 12 feet or more for commercial applications.

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

## Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

| Load | | Rail Span | | | | | |
|---|---|---|---|---|---|---|---|
| Snow (PSF) | Wind (MPH) | 4' | 5' 4" | 6' | 8' | 10' | 12' |
| None | 100 | XR10 | | XR100 | | XR1000 | |
| | 120 | | | | | | |
| | 140 | | | | | | |
| | 160 | | | | | | |
| 10-20 | 100 | | | | | | |
| | 120 | | | | | | |
| | 140 | | | | | | |
| | 160 | | | | | | |
| 30 | 100 | | | | | | |
| | 160 | | | | | | |
| 40 | 100 | | | | | | |
| | 160 | | | | | | |
| 50-70 | 160 | | | | | | |
| 80-90 | 160 | | | | | | |

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PROJECT NAME & ADDRESS

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184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

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ESR

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-13

Tech Brief

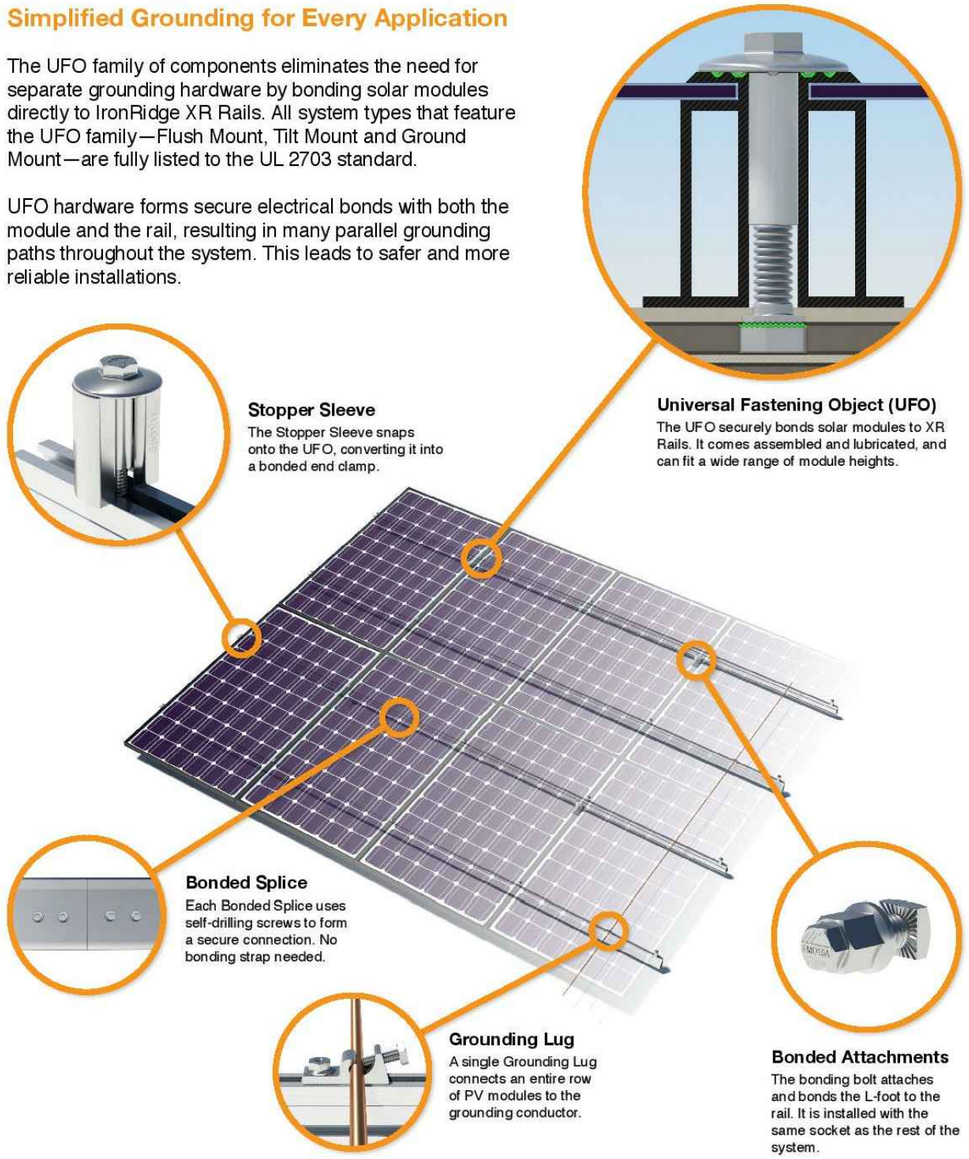
IRONRIDGE

# 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.



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

**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.

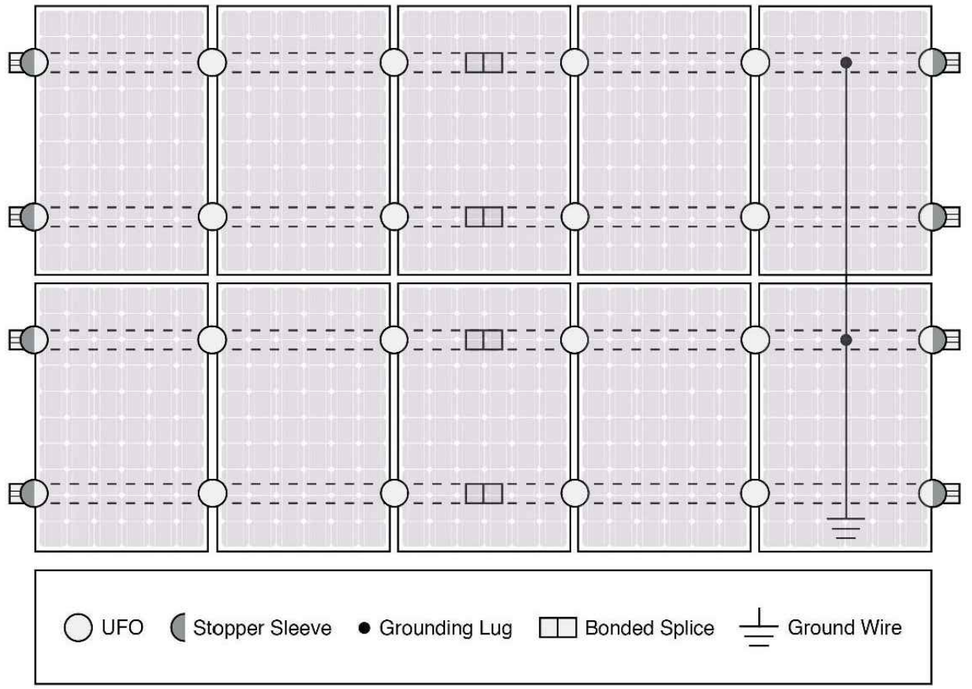
**Bonded Splice**
Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.

**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.

Tech Brief

## System Diagram




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

**Cross-System Compatibility**

| Feature | Flush Mount | Tilt Mount | Ground Mount |
|---|---|---|---|
| XR Rails | ✔ | ✔ | XR1000 Only |
| UFO/Stopper | ✔ | ✔ | ✔ |
| Bonded Splice | ✔ | ✔ | N/A |
| Grounding Lugs | 1 per Row | 1 per Row | 1 per Array |
| Microinverters & Power Optimizers | Enphase - M250-72, M250-60, M215-60, C250-72<br>Darfon - MIG240, MIG300, G320, G640<br>SolarEdge - P300, P320, P400, P405, P600, P700, P730 | | |
| Fire Rating | Class A | Class A | N/A |
| Modules | Tested or Evaluated with over 400 Framed Modules<br>Refer to installation manuals for a detailed list. | | |

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ESR

SHEET NAME
EQUIPMENT SPECIFICATION

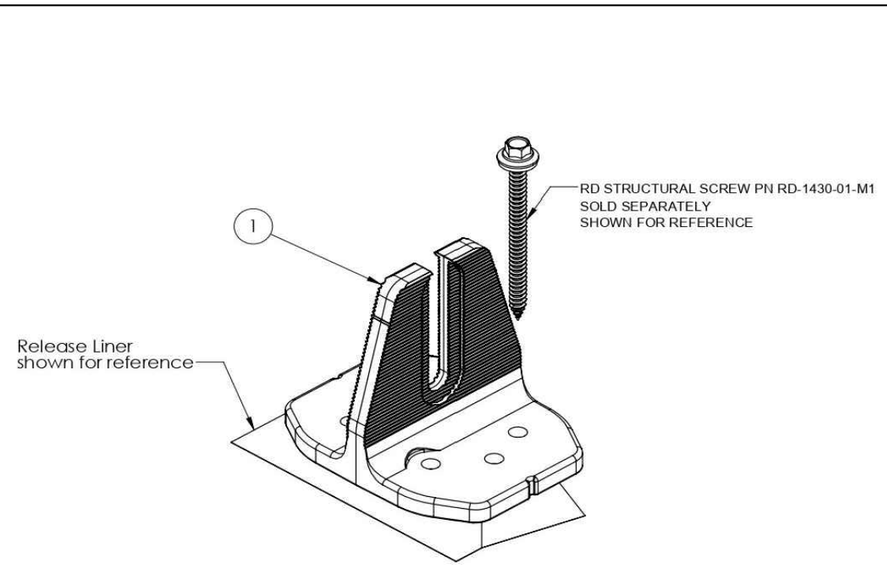
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14

Cut Sheet

IRONRIDGE

# QuickMount® Halo UltraGrip




| ITEM NO | DESCRIPTION | QTY IN KIT |
|---|---|---|
| 1 | QM Halo UltraGrip(Mill or Black) | 1 |

| PART NUMBER | DESCRIPTION |
|---|---|
| QM-HUG-01-M1 | Halo UltraGrip - Mill |
| QM-HUG-01-B1 | Halo UltraGrip - Black |

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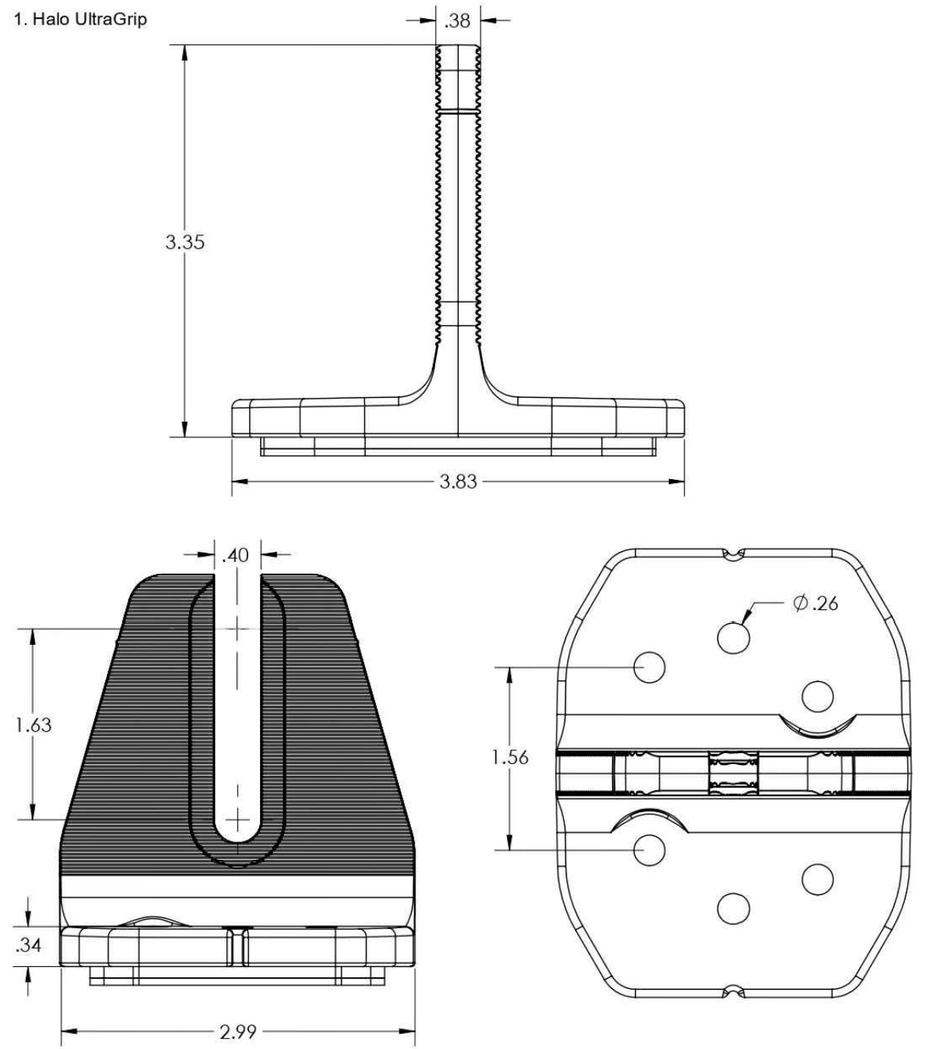
Cut Sheet

1. Halo UltraGrip




| Property | Value |
|---|---|
| Material | 3000 Series Aluminium |
| Finish | Mill or Black |

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QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0

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| | | |

PROJECT NAME & ADDRESS

BARBARA WOODLEY
RESIDENCE

184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

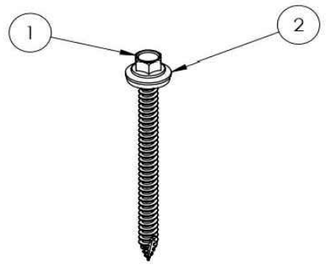
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

Cut Sheet

IRONRIDGE

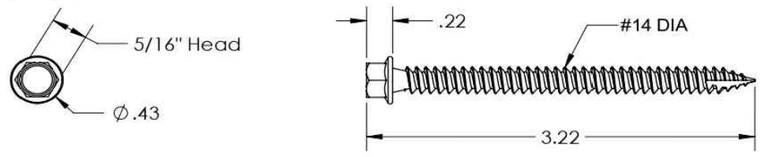
# QuickMount® RD Structural Screw




| ITEM NO | DESCRIPTION | QTY IN KIT |
|---|---|---|
| 1 | Self Drilling Screw, #14, Wood Tip | 1 |
| 2 | Washer, EPDM Backed | 1 |

| PART NUMBER | DESCRIPTION |
|---|---|
| RD-1430-01-M1 | RD Structural Screw |

1. Self Drilling Screw, #14, Wood Tip




| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

2. Washer, EPDM Backed


| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

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184 WEXFORD DR,
FUQUAY-VARINA, NC 27526

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ESR

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-16

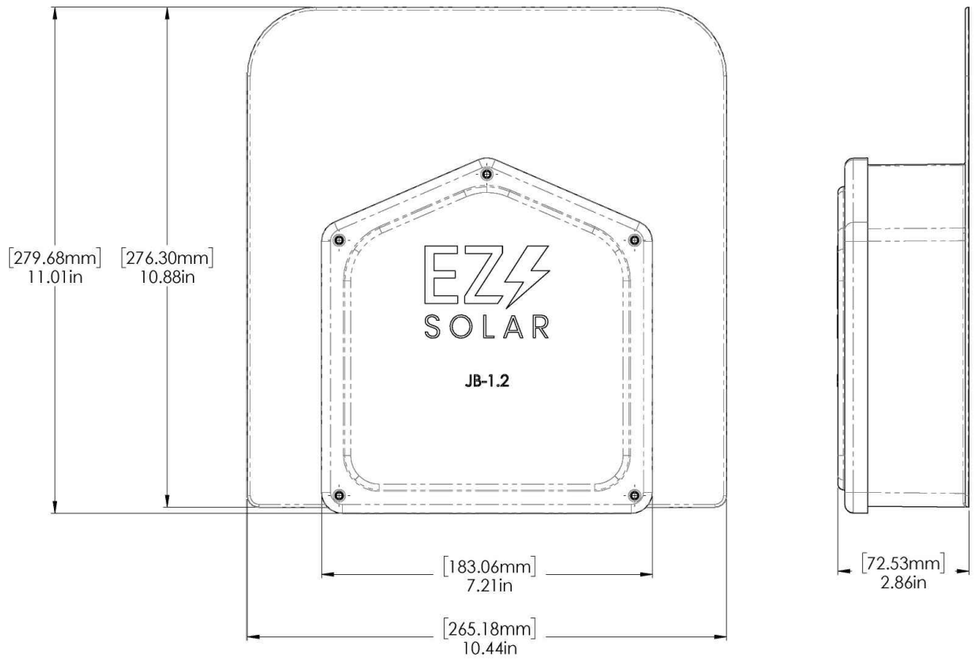
EZ SOLAR
making solar simple.

PHONE: 385-202-4150
WWW.EZSOLARPRODUCTS.COM

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | JB-1.2 BODY | POLYCARBONATE WITH UV INHIBITORS | 1 |
| 2 | JB-1.2 LID | POLYCARBONATE WITH UV INHIBITORS | 1 |
| 3 | #10 X 1-1/4" PHILLIPS PAN HEAD SCREW | | 6 |
| 4 | #8 X 3/4" PHILLIPS PAN HEAD SCREW | | 6 |

| SIZE | DWG. NO. | REV |
|---|---|---|
| B | JB-1.2 | |
| SCALE: 1:2 | WEIGHT: 1.45 LBS | SHEET 1 OF 3 |

| | |
|---|---|
| TORQUE SPECIFICATION: | 15-20 LBS |
| CERTIFICATION: | UL 1741, NEMA 3R CSA C22.2 NO. 290 |
| WEIGHT: | 1.45 LBS |

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Intertek 5015705

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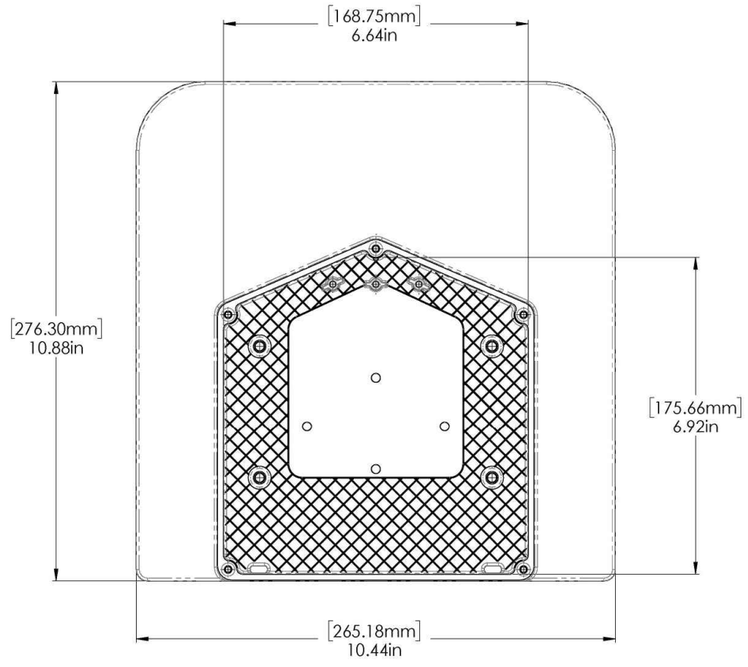
WWW.EZSOLARPRODUCTS.COM

| SIZE | DWG. NO. | REV |
|---|---|---|
| B | JB-1.2 | |
| SCALE: 1:2 | WEIGHT: 1.45 LBS | SHEET 2 OF 3 |

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