

PHOTOVOLTAIC ROOF MOUNT SYSTEM

10 MODULES-ROOF MOUNTED - 3.950 kW DC, 2.900 kW AC

300 BRUCE JOHNSON RD, LILLINGTON, NC 27546

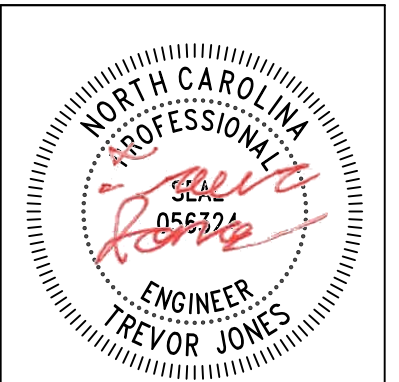


TOP TIER SOLAR SOLUTIONS

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

REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	10/05/2023	
AS-BUILT	10/26/2023	A



STRUCTURAL ONLY
10/26/2023

PROJECT NAME & ADDRESS

REBECCA HUNTER
RESIDENCE
300 BRUCE JOHNSON RD,
LILLINGTON, NC 27546

DRAWN BY

ESR

SHEET NAME

COVER SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-1

PROJECT DATA

PROJECT ADDRESS: 300 BRUCE JOHNSON RD, LILLINGTON, NC 27546

OWNER: REBECCA HUNTER

DESIGNER: ESR

SCOPE: (N) 3.950 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH (N)10 MISSION SOLAR: MSE395SX9R 395W PV MODULES WITH (N) 10 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN

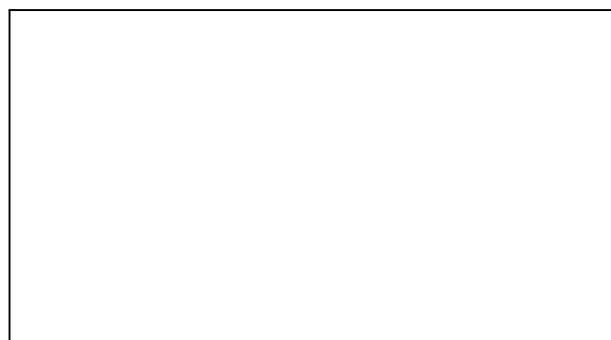
EXISTING: (E) 13.860 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH (E) 36 MISSION SOLAR: MSE385SX5R 385W PV MODULES WITH (E) 36 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN

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

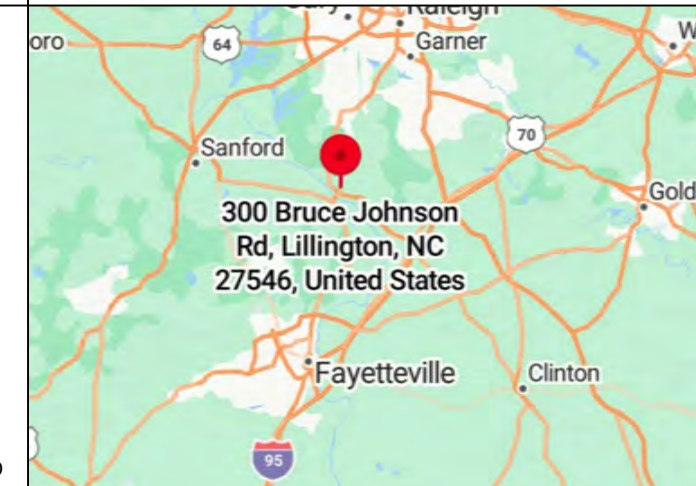
SIGNATURE



GENERAL NOTES

- 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

PROJECT DESCRIPTION:

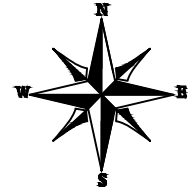
10 X MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
 DC SYSTEM SIZE: (N) 10 x 395 + (E) 36 x 385 = 17.810 kW DC
 AC SYSTEM SIZE: (N) 10 x 290 + (E) 36 x 290 = 13.340 kW AC

EQUIPMENT SUMMARY

(E) 36 MISSION SOLAR: MSE385SX5R 385W MONO MODULES
 (E) 36 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN
 (N)10 MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 (N) 10 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN

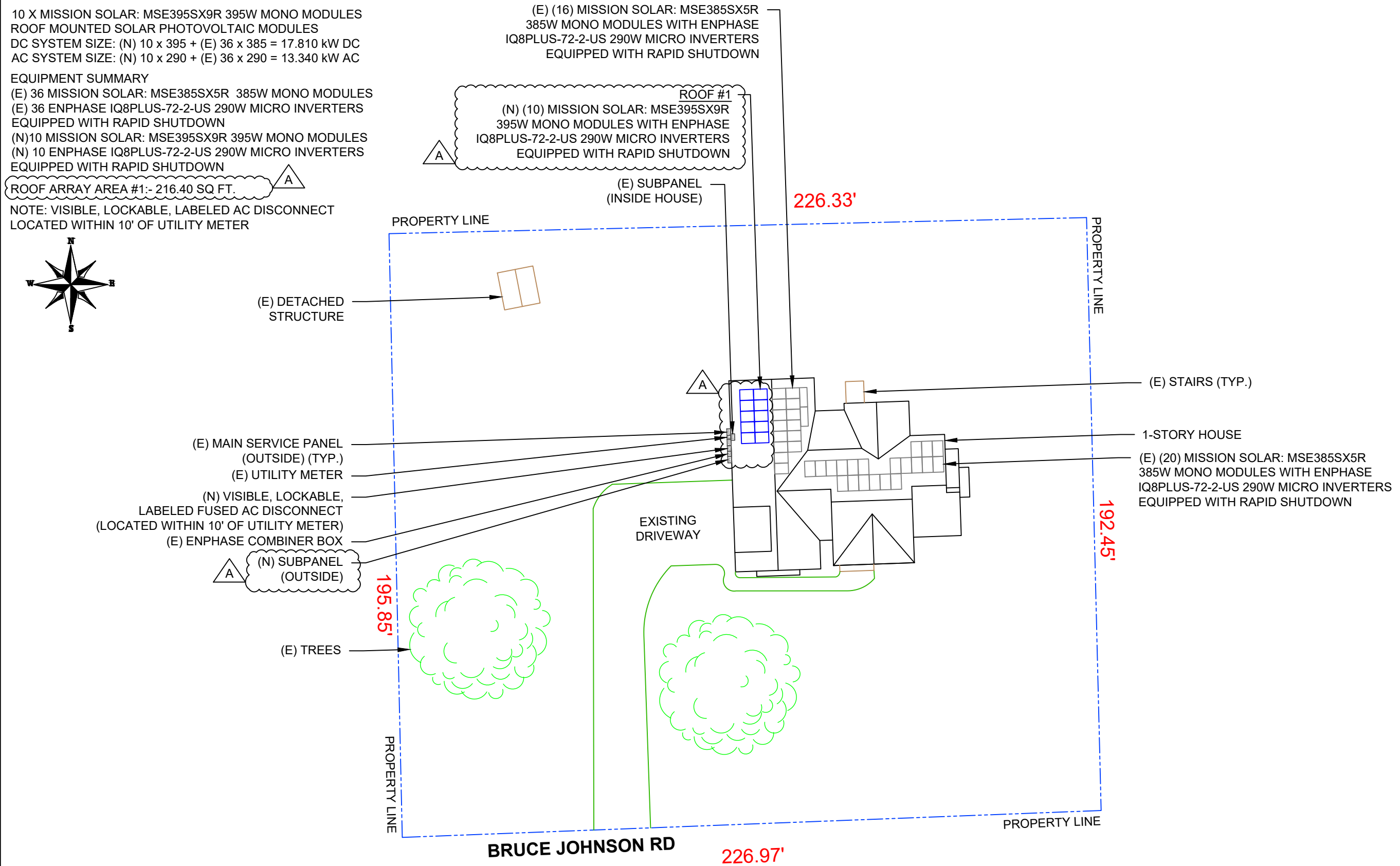
ROOF ARRAY AREA #1:- 216.40 SQ FT.

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



(E) (16) MISSION SOLAR: MSE385SX5R
 385W MONO MODULES WITH ENPHASE
 IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN

(N) (10) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH ENPHASE
 IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN



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DRAWN BY
ESR

SHEET NAME
SITE PLAN

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

SHEET NUMBER
PV-2

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

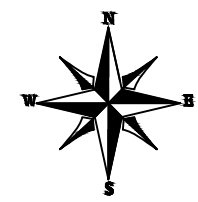
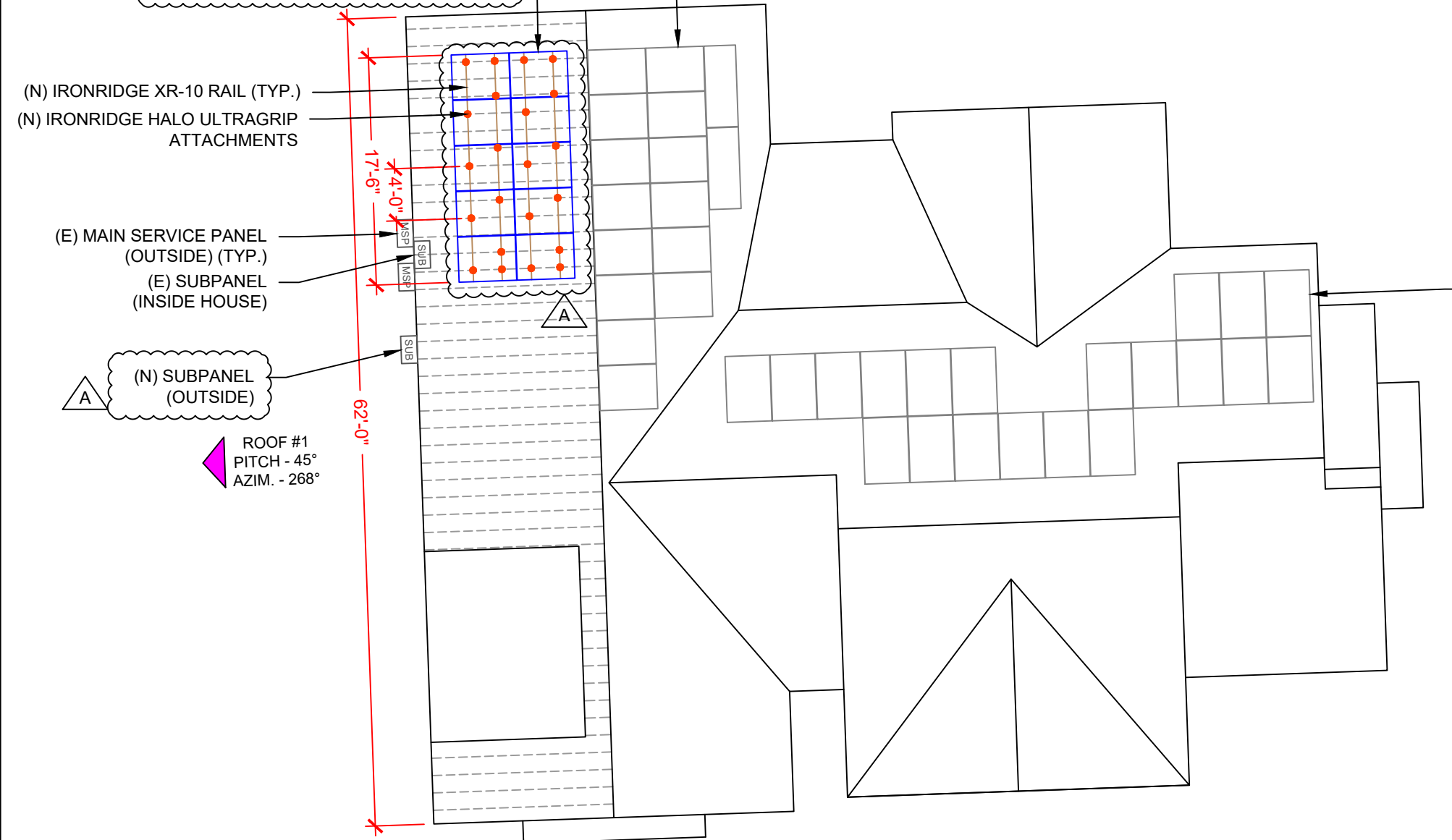
DESIGN SPECIFICATION
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER
 WIND EXPOSURE: REFER STRUCTURAL LETTER
 WIND SPEED: REFER STRUCTURAL LETTER

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 10 MODULES
 MODULE TYPE = MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 MODULE WEIGHT = 48.5 LBS / 22.0KG.
 MODULE DIMENSIONS = 75.08" x 41.50" = 21.64 SF

(E) (16) MISSION SOLAR: MSE385SX5R
 385W MONO MODULES WITH ENPHASE
 IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN

ROOF #1
 (N) (10) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH ENPHASE
 IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN



ROOF DESCRIPTION					
ROOF TYPE			ASPHALT SHINGLE		
ROOF LAYER			1 LAYER		
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	RAFTER SIZE	RAFTER SPACING
#1	10	45°	268°	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 (%)
995.44	3799.21	26

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NORTH CAROLINA PROFESSIONAL ENGINEER

TREVOR JONES

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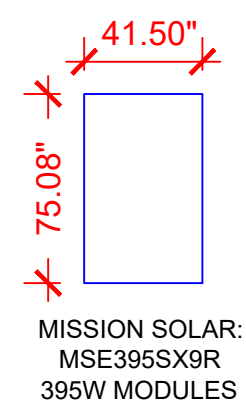
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SHEET NAME
ROOF PLAN & MODULES

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

SHEET NUMBER
PV-3

(E) (20) MISSION SOLAR: MSE385SX5R
 385W MONO MODULES WITH ENPHASE
 IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN



LEGEND

- JB - JUNCTION BOX
- CB - COMBINER BOX
- ACD - AC DISCONNECT
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- SUB - SUBPANEL
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- - RAFTER
- - - CONDUIT

1 ROOF PLAN & MODULES

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

DC SYSTEM SIZE: (N) 10 x 395 + (E) 36 x 385 = 17.810 kW DC
 AC SYSTEM SIZE: (N) 10 x 290 + (E) 36 x 290 = 13.340 kW AC

(E) 36 MISSION SOLAR: MSE385SX5R 385W MONO MODULES
 (E) 36 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
 (N) 10 MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 (N) 10 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN

CIRCUIT LEGENDS	
	(E) CIRCUIT #1
	(E) CIRCUIT #2
	(E) CIRCUIT #3
	(N) CIRCUIT #4
	(N) CIRCUIT #5

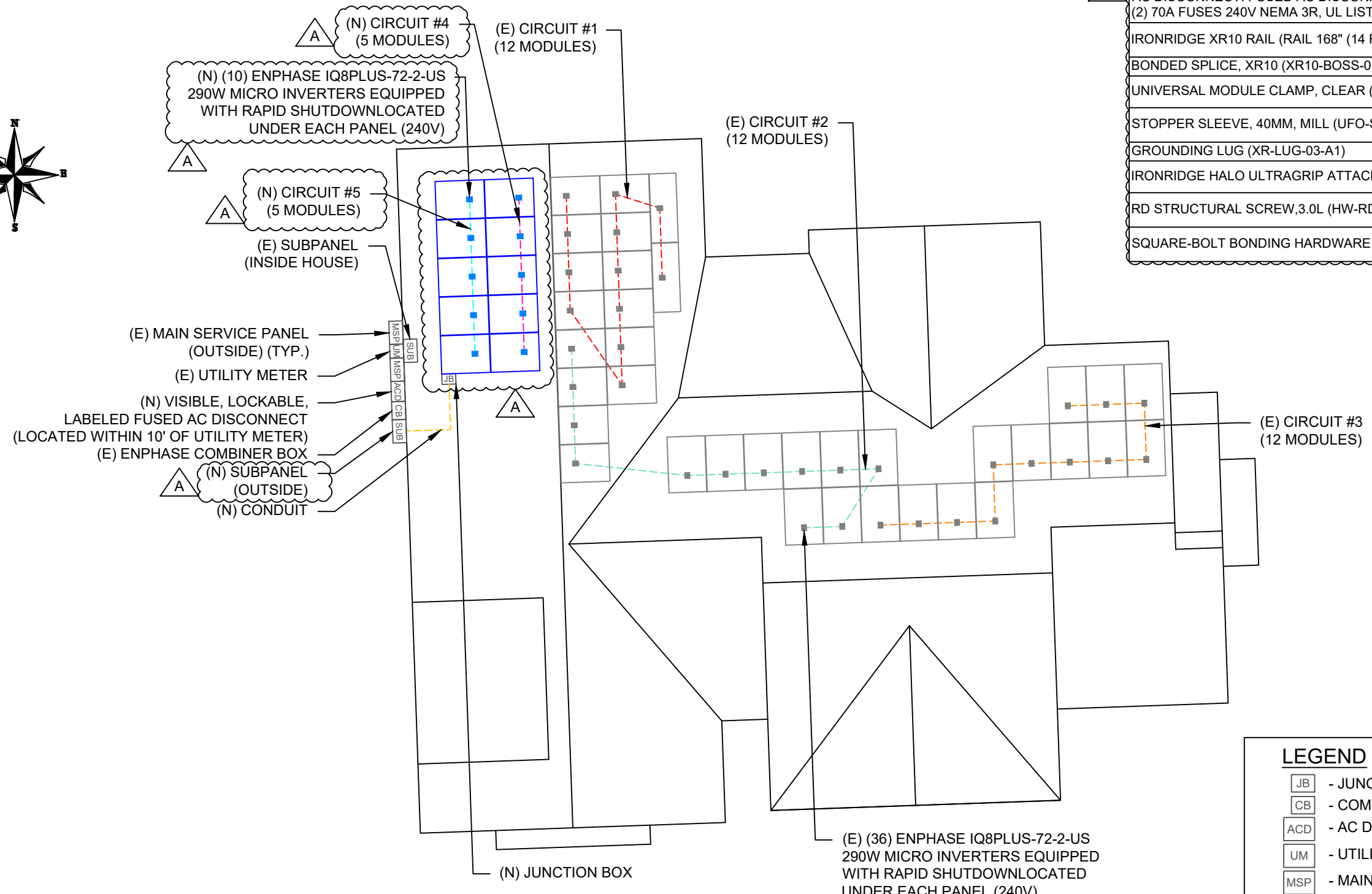
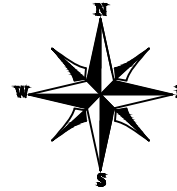
BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
SOLAR PV MODULES: MISSION SOLAR: MSE395SX9R 395W MODULE	10
MICRO INVERTERS: ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN	10
JUNCTION BOXES: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO.290	1
20A BREAKERS	2
AC DISCONNECT: FUSED AC DISCONNECT, 100A FUSED, (2) 70A FUSES 240V NEMA 3R, UL LISTED	1
IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A)	8
BONDED SPLICE, XR10 (XR10-BOSS-01-M1)	4
UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1)	24
STOPPER SLEEVE, 40MM, MILL (UFO-STP-40MM-M1)	8
GROUNDING LUG (XR-LUG-03-A1)	2
IRONRIDGE HALO ULTRAGRIP ATTACHMENTS (QM-HUG-01-M1)	22
RD STRUCTURAL SCREW, 3.0L (HW-RD1430-01-M1)	44
SQUARE-BOLT BONDING HARDWARE (BHW-SQ-02-A1)	22

TOP TIER
SOLAR SOLUTIONS

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LEGEND	
	- JUNCTION BOX
	- COMBINER BOX
	- AC DISCONNECT
	- UTILITY METER
	- MAIN SERVICE PANEL
	- SUBPANEL
	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
	- ROOF ATTACHMENT
	- RAFTER
	- CONDUIT

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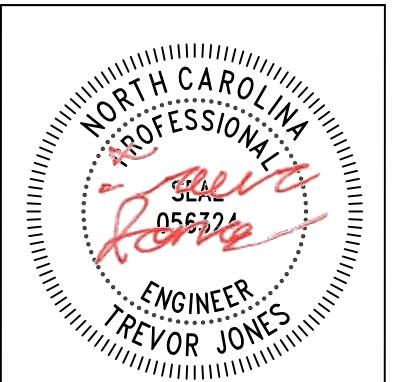
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SHEET NAME	ELECTRICAL PLAN
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-4

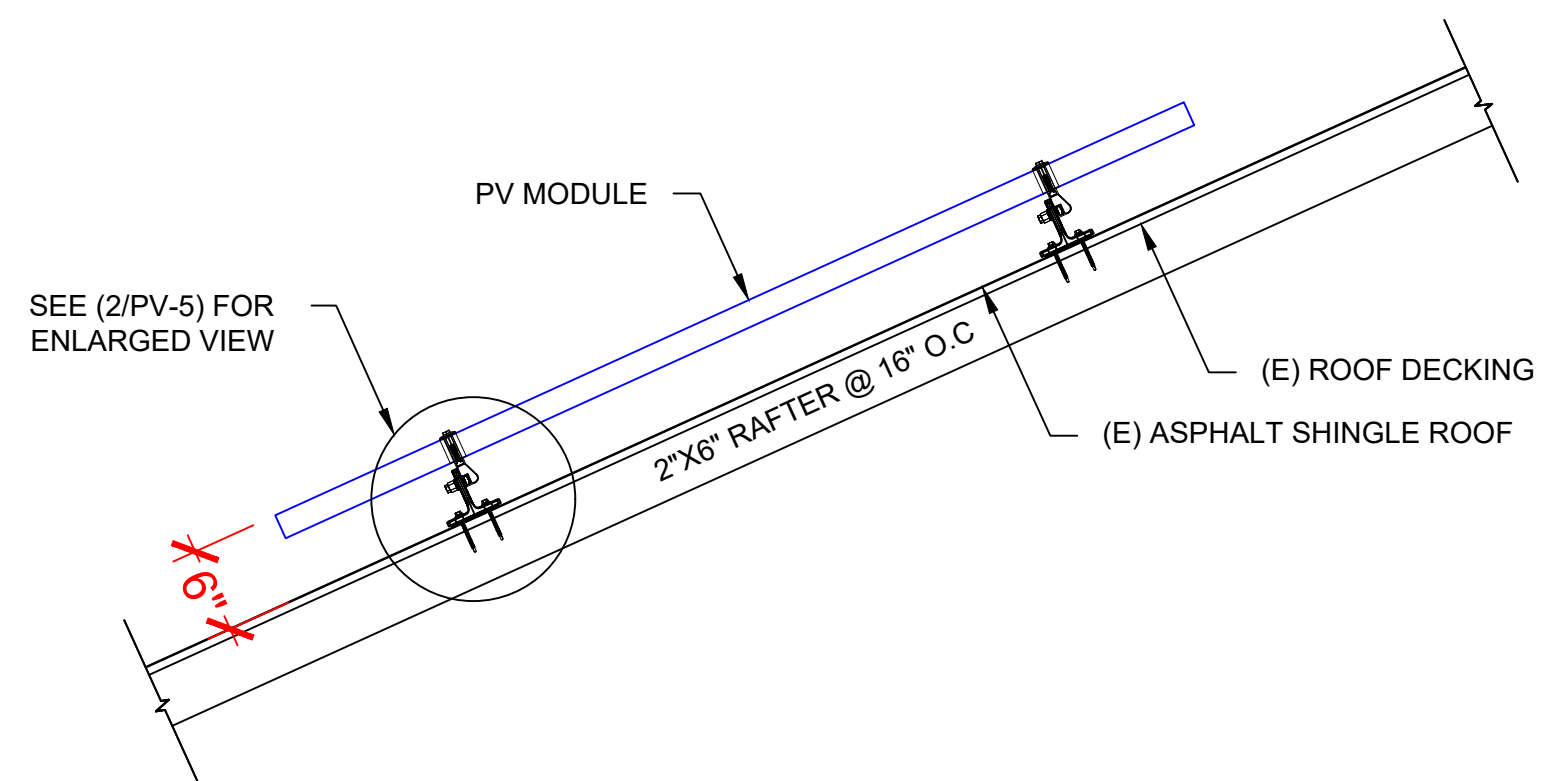


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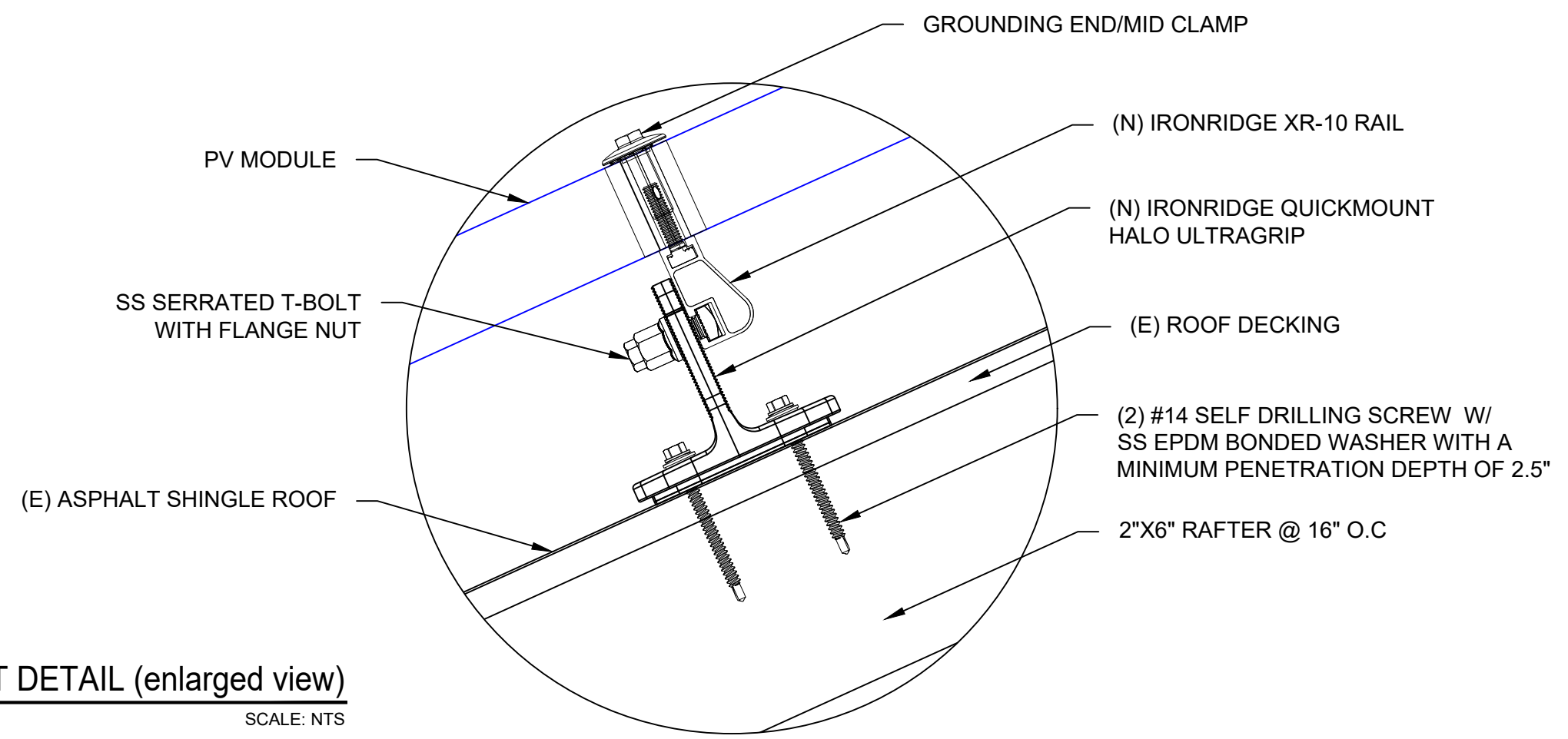
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1 | STRUCTURAL ATTACHMENT (Side view)
 PV-5 | SCALE: N.T.S



2 | ATTACHMENT DETAIL (enlarged view)
 PV-5 | SCALE: NTS

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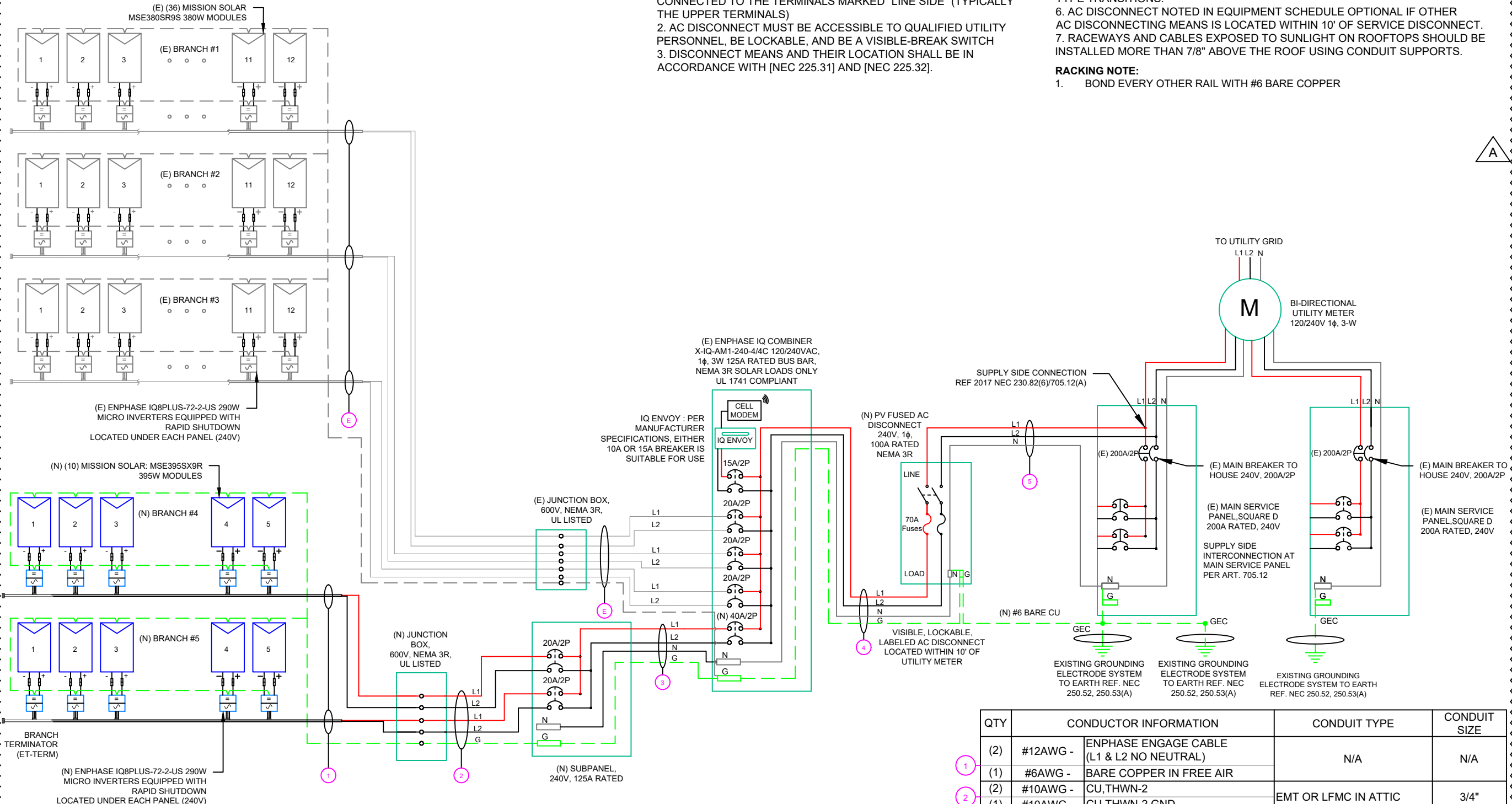
SHEET NAME
 STRUCTURAL DETAIL

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-5

DC SYSTEM SIZE: (N) 10 x 395 + (E) 36 x 385 = 17.810 kW DC
 AC SYSTEM SIZE: (N) 24 x 290 + (E) 36 x 290 = 13.340 kW AC

- (E) 36 MISSION SOLAR: MSE385SR9S 380W MONO MODULES
- (E) 36 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
- (N) 10 MISSION SOLAR: MSE395SX9R 395W MONO MODULES
- (N) 10 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
- (3) BRANCH CIRCUITS OF (E) 12 MODULES AND
- (2) BRANCH CIRCUITS OF (N) 5 MODULES ARE CONNECTED IN PARALLEL



- 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

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SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
**ANSI B
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SHEET NUMBER
PV-6

QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
(2)	#12AWG - ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR		
(2)	#10AWG - CU, THWN-2	EMT OR LFMC IN ATTIC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#8AWG - CU, THWN-2		
(1)	#8AWG - CU, THWN-2 N	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#4AWG - CU, THWN-2		
(1)	#4AWG - CU, THWN-2 N	EMT, LFMC OR PVC	1"
(1)	#6AWG - CU, THWN-2 GND		
(2)	#4AWG - CU, THWN-2		
(1)	#4AWG - CU, THWN-2 N	EMT, LFMC OR PVC	1"

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

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
MIN/MAX DC VOLT RATING	30V MIN/ 58V MAX
MAX INPUT POWER	235W-440W
NOMINAL AC VOLTAGE RATING	240V/ 211-264V
MAX AC CURRENT	1.21A
MAX MODULES PER CIRCUIT	13 (SINGLE PHASE)
MAX OUTPUT POWER	290 VA

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	MISSION SOLAR: MSE395SX9R 395 W 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)

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

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

AC CALCULATIONS																						
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OC PD 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 (%)
(E) CIRCUIT 1	JUNCTION BOX	240	14.52	18.15	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS		0.5	N/A	#N/A	
(E) CIRCUIT 2	JUNCTION BOX	240	14.52	18.15	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS		0.65	N/A	#N/A	
(E) CIRCUIT 3	JUNCTION BOX	240	14.52	18.15	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS		0.65	N/A	#N/A	
(N) CIRCUIT 4	JUNCTION BOX	240	6.05	7.5625	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS		0.13	N/A	#N/A	
(N) CIRCUIT 5	JUNCTION BOX	240	6.05	7.5625	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS		0.13	N/A	#N/A	
JUNCTION BOX	SUB PANEL	240	6.05	7.5625	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	38	4	40	0.91	0.8	29.12	PASS	20	1.24	0.125	3/4" EMT	19.79362
SUB PANEL	COMBINER PANEL 1	240	12.1	15.125	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	5	0.778	0.039	3/4" EMT	24.5591
COMBINER PANEL 1	AC DISCONNECT	240	55.66	69.575	70	CU #4 AWG	CU #6 AWG	CU #4 AWG	85	PASS	38	2	95	0.91	1	86.45	PASS	5	0.308	0.071	1" EMT	34.47917
AC DISCONNECT	POI	240	55.66	69.575	70	CU #4 AWG	N/A	CU #4 AWG	85	PASS	38	2	95	0.91	1	86.45	PASS	5	0.308	0.071	1" EMT	28.61111

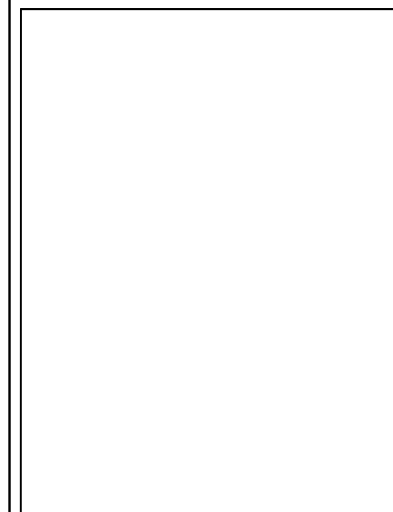
(E) Circuit 1 Voltage	0.807
(E) Circuit 2 Voltage	0.957
(E) Circuit 3 Voltage	0.957
(N) Circuit 4 Voltage	0.437
(N) Circuit 5 Voltage	0.437



TOP TIER SOLAR SOLUTIONS

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

REVISIONS		
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AS-BUILT	10/26/2023	A



PROJECT NAME & ADDRESS

REBECCA HUNTER
RESIDENCE

300 BRUCE JOHNSON RD,
LILLINGTON, NC 27546

DRAWN BY

ESR

SHEET NAME

WIRING CALCULATIONS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-7

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 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 ILSCO 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.

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

LABEL- 1:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.13(B)

PHOTOVOLTAIC

AC DISCONNECT

LABEL- 6:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.13(B)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL- 2:
 LABEL LOCATION:
 UTILITY METER
 MAIN SERVICE PANEL
 SUBPANEL
 CODE REF: NEC 705.12(C) & NEC 690.59

PHOTOVOLTAIC
AC DISCONNECT

NOMINAL OPERATING AC VOLATGE **240 V**

RATED AC OUTPUT CURRENT **55.66 A**

LABEL- 7:
 LABEL LOCATION:
 MAIN SERVICE PANEL
 SUBPANEL
 AC DISCONNECT
 CODE REF: NEC 690.54

⚠ WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

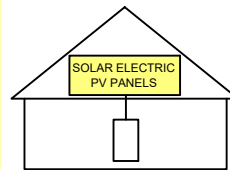
LABEL- 3:
 LABEL LOCATION:
 MAIN SERVICE PANEL
 SUBPANEL
 MAIN SERVICE DISCONNECT
 COMBINER
 CODE REF: NEC 110.27(C) & OSHA 1910.145 (f) (7)

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL- 8:
 LABEL LOCATION:
 MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)
 CODE REF: NEC 690.13(B)

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- 4:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: [NEC 690.56(C)(1)(A)]

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

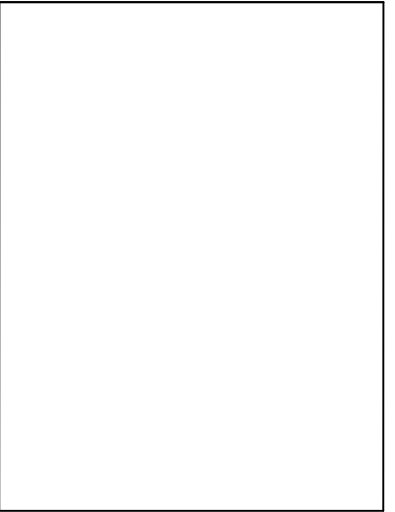
LABEL- 5:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.56(C)(2)



TOP TIER SOLAR SOLUTIONS

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DRAWN BY
ESR

SHEET NAME
LABELS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

MSE PERC 66



395W

Class leading power output **-0 to +3%**

Positive Power Tolerance



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

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

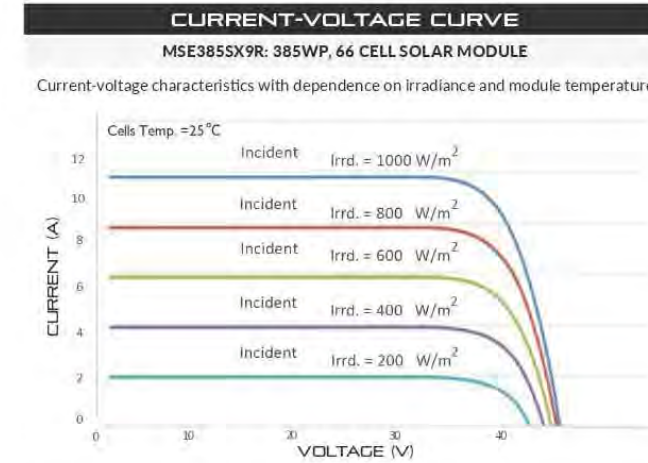
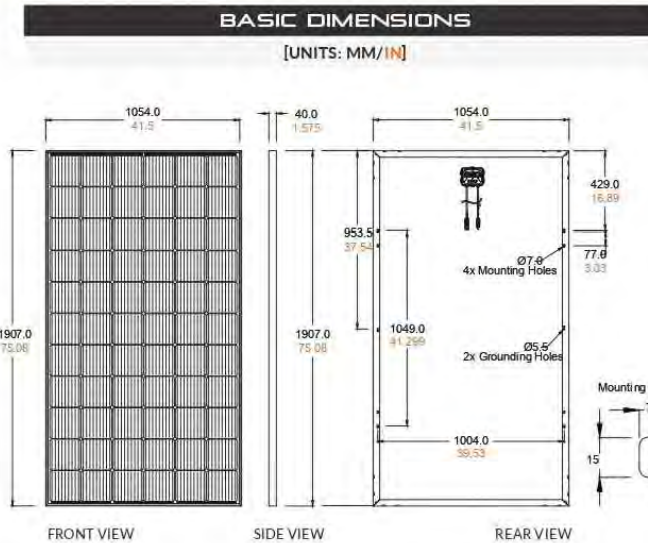


UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

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



Class Leading
390-400W



CERTIFICATIONS AND TESTS

IEC	61215, 61730, 61701
UL	61730



CEC



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

MSE PERC 66

ELECTRICAL SPECIFICATION

PRODUCT TYPE	MSE385SX9R (V _{max} = P _{max})	390W	395W	400W
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 P _{max}	-0.367%/°C
Temperature Coefficient of V _{oc}	-0.259%/°C
Temperature Coefficient of I _{sc}	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 4mm ² (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)

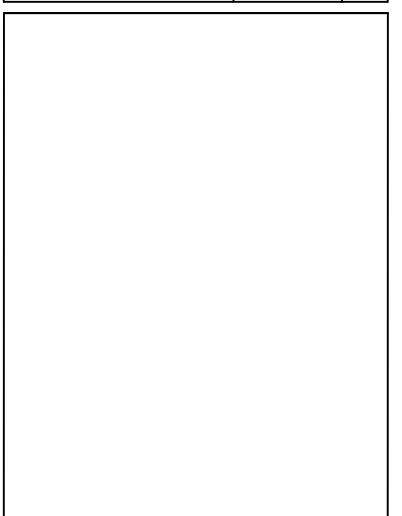
TOP TIER SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

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ESR

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EQUIPMENT SPECIFICATION

SHEET SIZE
**ANSI B
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SHEET NUMBER
PV-9



IQ8 and IQ8+ Microinverters

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



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



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



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



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

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IQ8SP-DS-0002-01-EN-US-2022-03-17

Easy to install

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

High productivity and reliability

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

Microgrid-forming

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

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current ² [module Isc]	A		15
Overvoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V		240 / 211 – 264
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz		60
Extended frequency range	Hz		50 – 68
AC short circuit fault current over 3 cycles	Arms		2
Max units per 20 A (L-L) branch circuit ⁴		16	13
Total harmonic distortion			<5%
Overvoltage class AC port			III
AC port backfeed current	mA		30
Power factor setting			1.0
Grid-tied power factor (adjustable)			0.85 leading – 0.85 lagging
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW		60
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01	

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

IQ8SP-DS-0002-01-EN-US-2022-03-17

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REBECCA HUNTER
RESIDENCE

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DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER

PV-10

Enphase IQ Combiner 4/4C

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



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



To learn more about Enphase offerings, visit enphase.com

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	- 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors - 60 A breaker branch input: 4 to 1/0 AWG copper conductors - Main lug combined output: 10 to 2/0 AWG copper conductors - Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

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PV-11



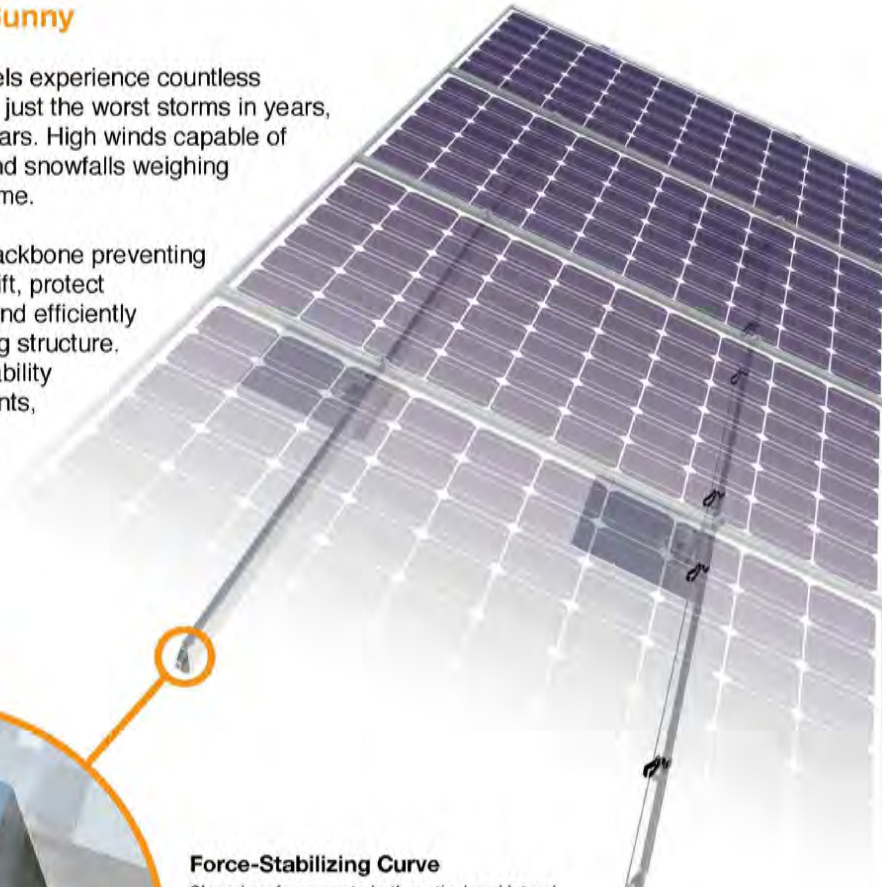
Tech Brief

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.

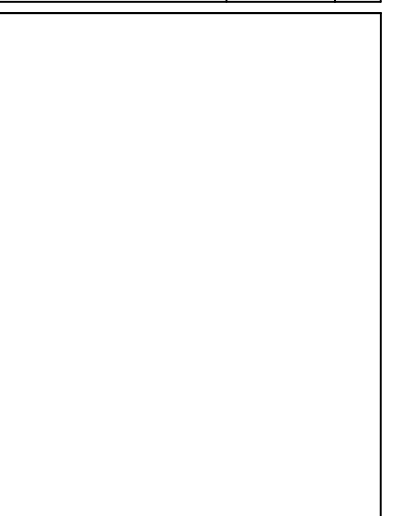
Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100						
	120						
	140	XR10		XR100		XR1000	
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						



TOP TIER SOLAR SOLUTIONS

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

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	10/05/2023	
AS-BUILT	10/26/2023	A



PROJECT NAME & ADDRESS	
REBECCA HUNTER RESIDENCE	300 BRUCE JOHNSON RD, LILLINGTON, NC 27546

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SHEET NAME EQUIPMENT SPECIFICATION
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SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-12

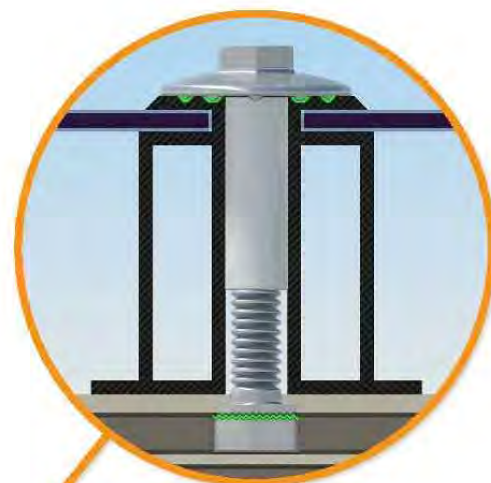


UFO Family of Components

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.



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.



Stopper Sleeve

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



Bonded Splice

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



Grounding Lug

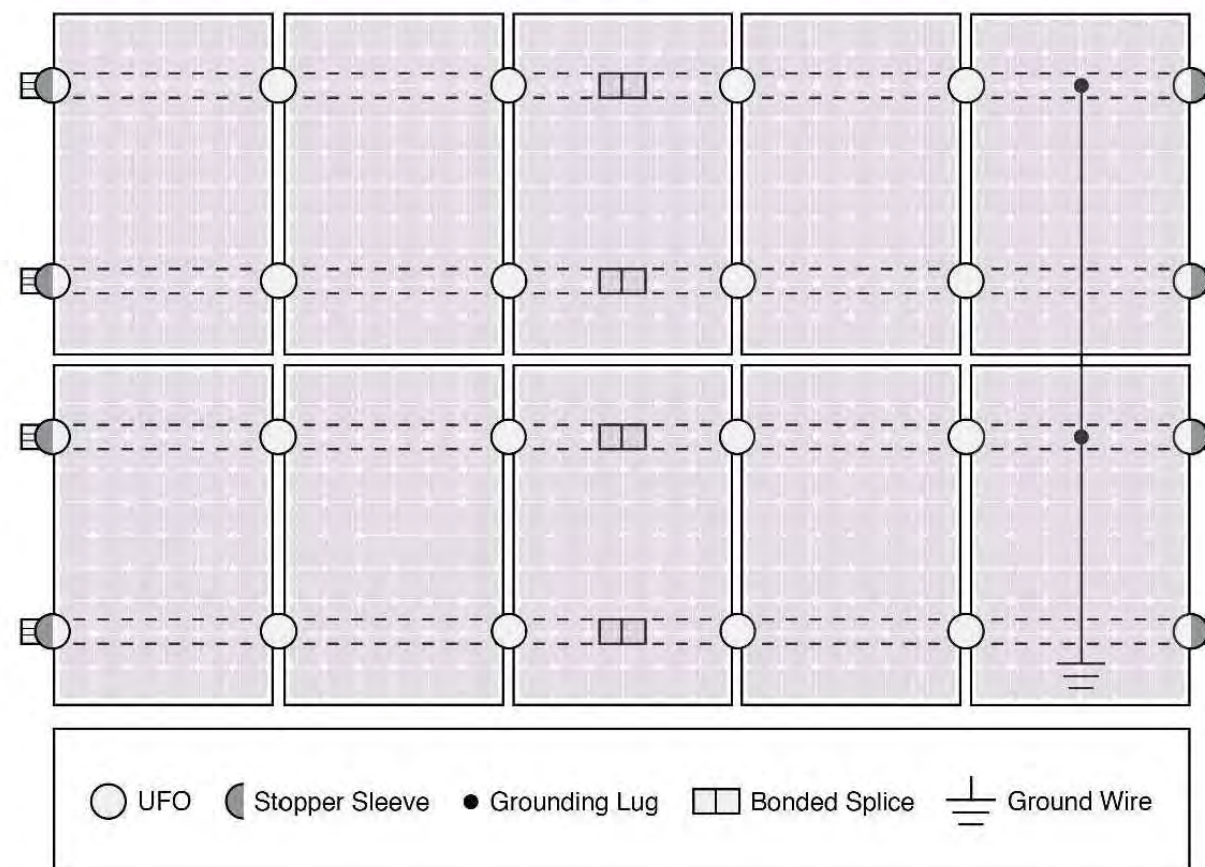
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



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.

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

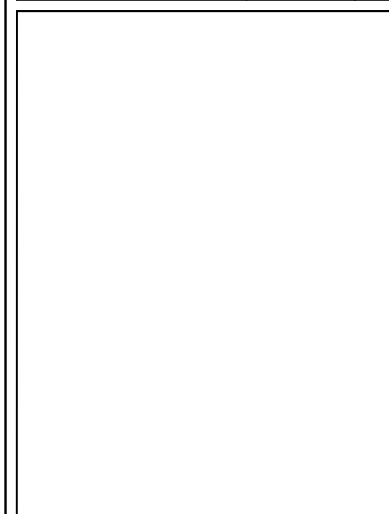
Cross-System Compatibility			
Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✓	✓	XR1000 Only
UFO/Stopper	✓	✓	✓
Bonded Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 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 Refer to installation manuals for a detailed list.		



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PROJECT NAME & ADDRESS

REBECCA HUNTER
RESIDENCE

300 BRUCE JOHNSON RD,
LILLINGTON, NC 27546

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SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-13

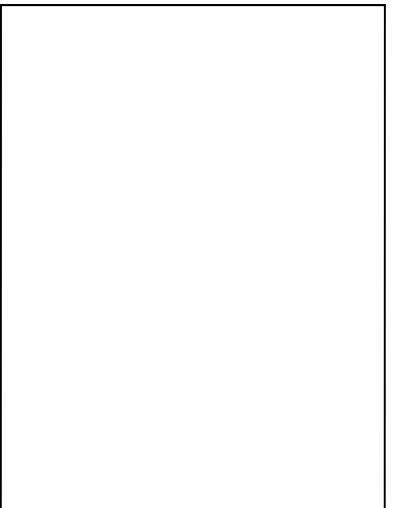
ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

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

1. Halo UltraGrip

Property	Value
Material	3000 Series Aluminium
Finish	Mill or Black

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	10/05/2023	
AS-BUILT	10/26/2023	A



PROJECT NAME & ADDRESS	
REBECCA HUNTER RESIDENCE	300 BRUCE JOHNSON RD, LILLINGTON, NC 27546

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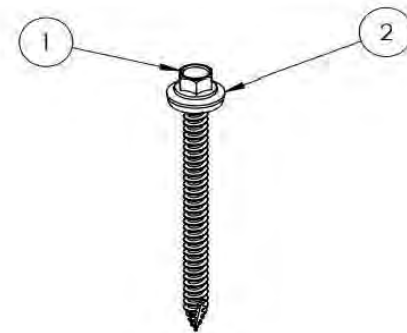
SHEET NAME EQUIPMENT SPECIFICATION

SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-14



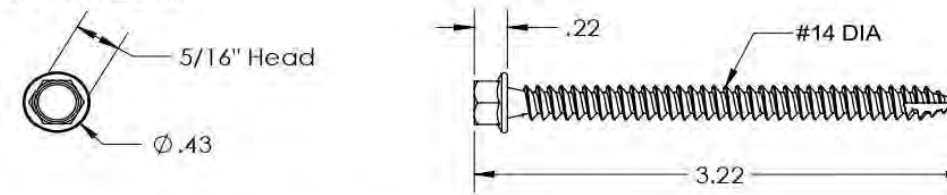
QuickMount® RD Structural Screw



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

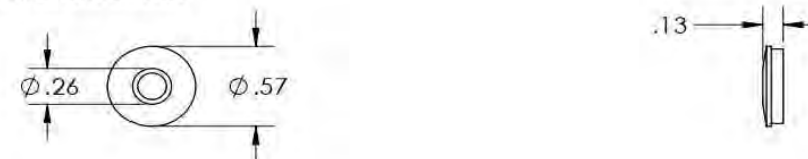
PART NUMBER	DESCRIPTION
RD-1430-01-M1	RD Structural Screw

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



TOP TIER SOLAR SOLUTIONS

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PROJECT NAME & ADDRESS

REBECCA HUNTER
RESIDENCE

300 BRUCE JOHNSON RD,
LILLINGTON, NC 27546

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SHEET NAME	EQUIPMENT SPECIFICATION
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SHEET SIZE	ANSI B 11" X 17"
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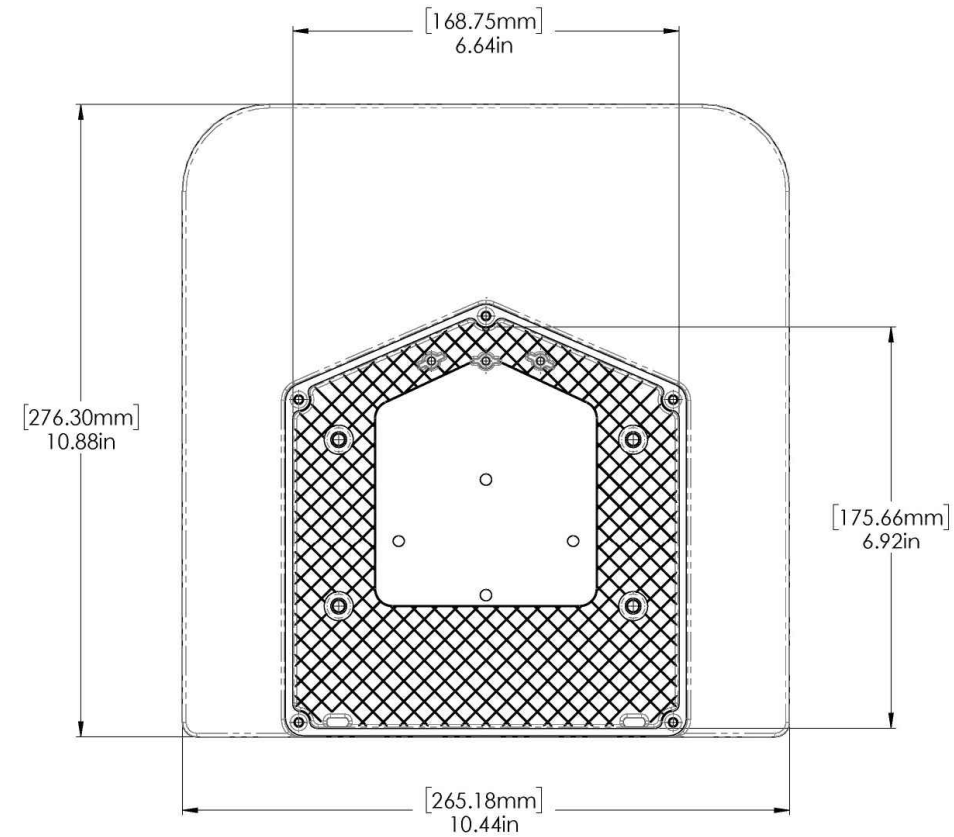
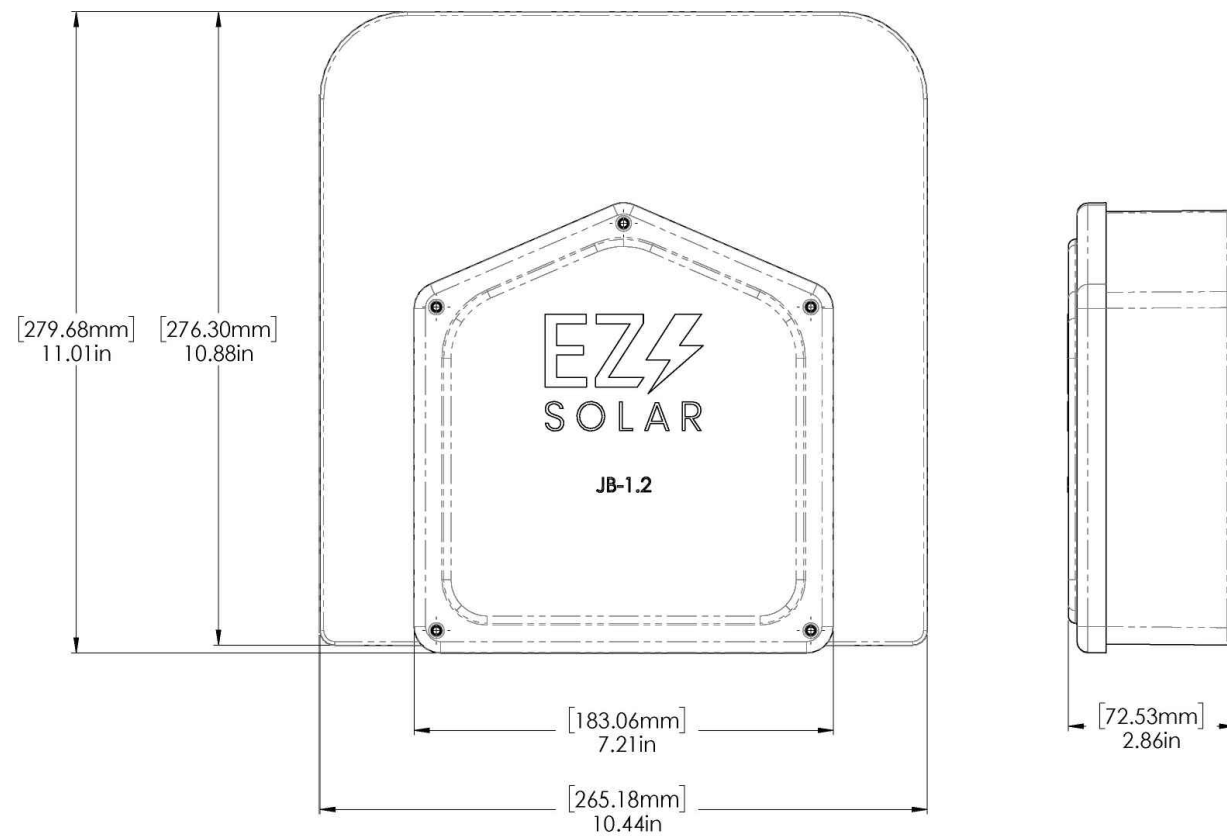
SHEET NUMBER	PV-15
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	JB-1.2 BODY	POLYCARBONATE WITH UV INHIBITORS	1
2	JB-1.2 LID	POLYCARBONATE WITH UV INHIBITORS	1
3	#10 X 1-1/4" PHILLIPS PAN HEAD SCREW		6
4	#8 X 3/4" PHILLIPS PAN HEAD SCREW		6

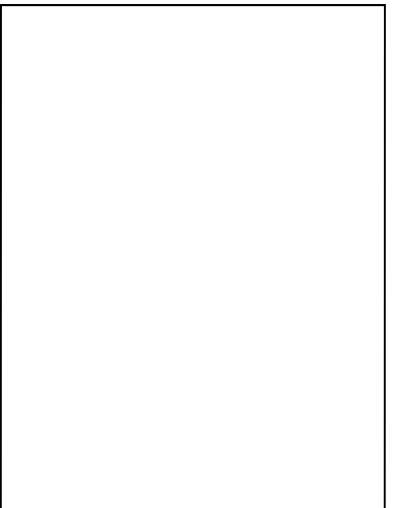
SIZE B	DWG. NO. JB-1.2	REV
SCALE: 1:2	WEIGHT: 1.45 LBS	SHEET 1 OF 3

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

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



REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	10/05/2023	
AS-BUILT	10/26/2023	A



PROJECT NAME & ADDRESS	
REBECCA HUNTER RESIDENCE	300 BRUCE JOHNSON RD, LILLINGTON, NC 27546

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SHEET NAME EQUIPMENT SPECIFICATION
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SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-16
