

# PHOTOVOLTAIC ROOF MOUNT SYSTEM

23 MODULES-ROOF MOUNTED - 7.935 kW DC, 6.670 kW AC

775 MAPLE RD, ANGIER, NC 27501

## PROJECT DATA

PROJECT ADDRESS: 775 MAPLE RD, ANGIER, NC 27501

OWNER: JEFFREY BANKS

DESIGNER: ESR

SCOPE: 7.935 kW DC ROOF MOUNT SOLAR PV SYSTEM WITH 23 MISSION SOLAR: MSE345SX5T 345W PV MODULES WITH 23 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN

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

## SHEET INDEX

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## 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.

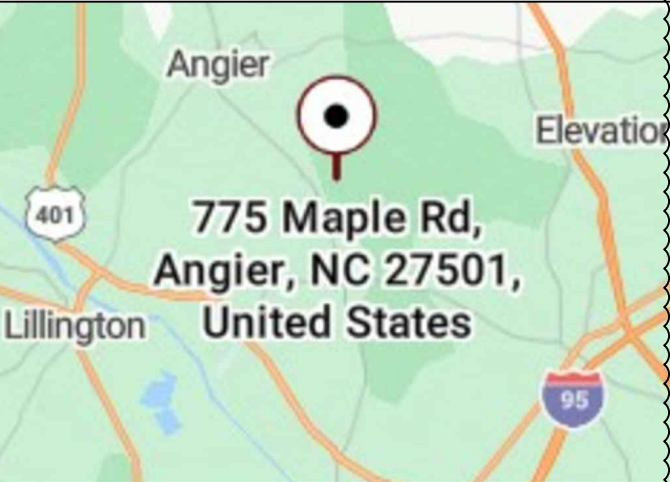
ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
20.

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

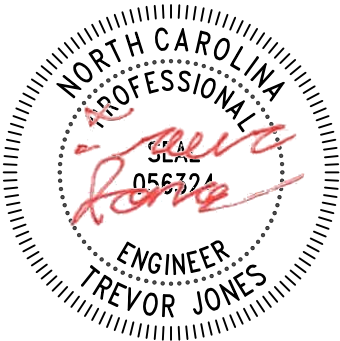
2018 NORTH CAROLINA BUILDING CODE  
2018 NORTH CAROLINA RESIDENTIAL CODE  
2018 NORTH CAROLINA FIRE CODE  
2017 NATIONAL ELECTRICAL CODE



### TOP TIER SOLAR SOLUTIONS

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

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/18/2025	
REVISION	07/25/2025	A



STRUCTURAL ONLY  
07/28/2025

### PROJECT NAME & ADDRESS

JEFFREY BANKS  
RESIDENCE  
775 MAPLE RD,  
ANGIER, NC 27501

### DRAWN BY

ESR

### SHEET NAME

COVER SHEET

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-1

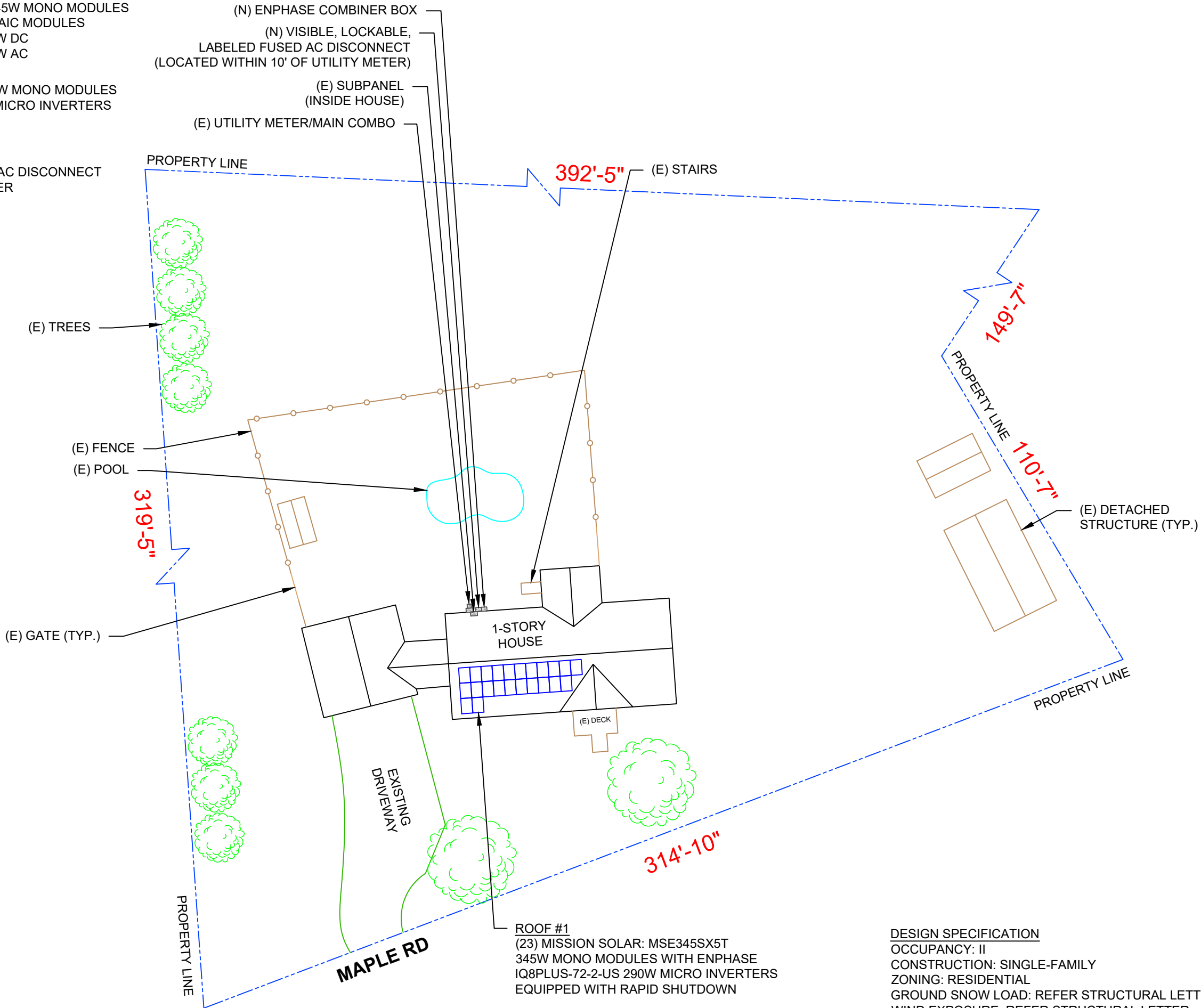
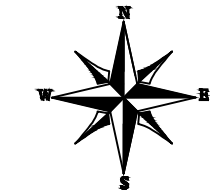
PROJECT DESCRIPTION:

23 X MISSION SOLAR: MSE345SX5T 345W MONO MODULES  
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
DC SYSTEM SIZE: 23 x 345W = 7.935 kW DC  
AC SYSTEM SIZE: 23 x 290W = 6.670 kW AC

EQUIPMENT SUMMARY  
23 MISSION SOLAR: MSE345SX5T 345W MONO MODULES  
23 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS  
EQUIPPED WITH RAPID SHUTDOWN

ROOF ARRAY AREA #1:- 456.09 SQ FT.

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



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DRAWN BY

ESR

SHEET NAME

SITE PLAN

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-2

A

1

SITE PLAN

PV-2

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

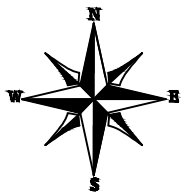
ROOF #1  
(23) MISSION SOLAR: MSE345SX5T  
345W MONO MODULES WITH ENPHASE  
IQ8PLUS-72-2-US 290W MICRO INVERTERS  
EQUIPPED WITH RAPID SHUTDOWN

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 = 23 MODULES  
MODULE TYPE = MISSION SOLAR: MSE345SX5T 345W MONO MODULES  
MODULE WEIGHT = 44.8 LBS / 20.3KG.  
MODULE DIMENSIONS = (68.82" x 41.50")/144 = 19.83 SF



ROOF DESCRIPTION					
ROOF TYPE				ASPHALT SHINGLE	
ROOF LAYER				1 LAYER	
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	RAFTER SIZE	RAFTER SPACING
#1	23	34°	178°	2"X6"	24"

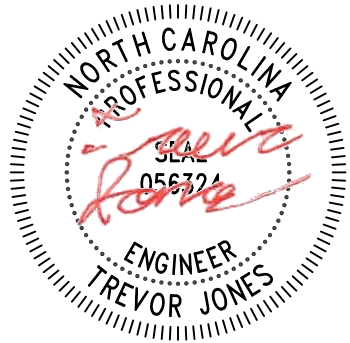
ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
456.09	2375.85	19



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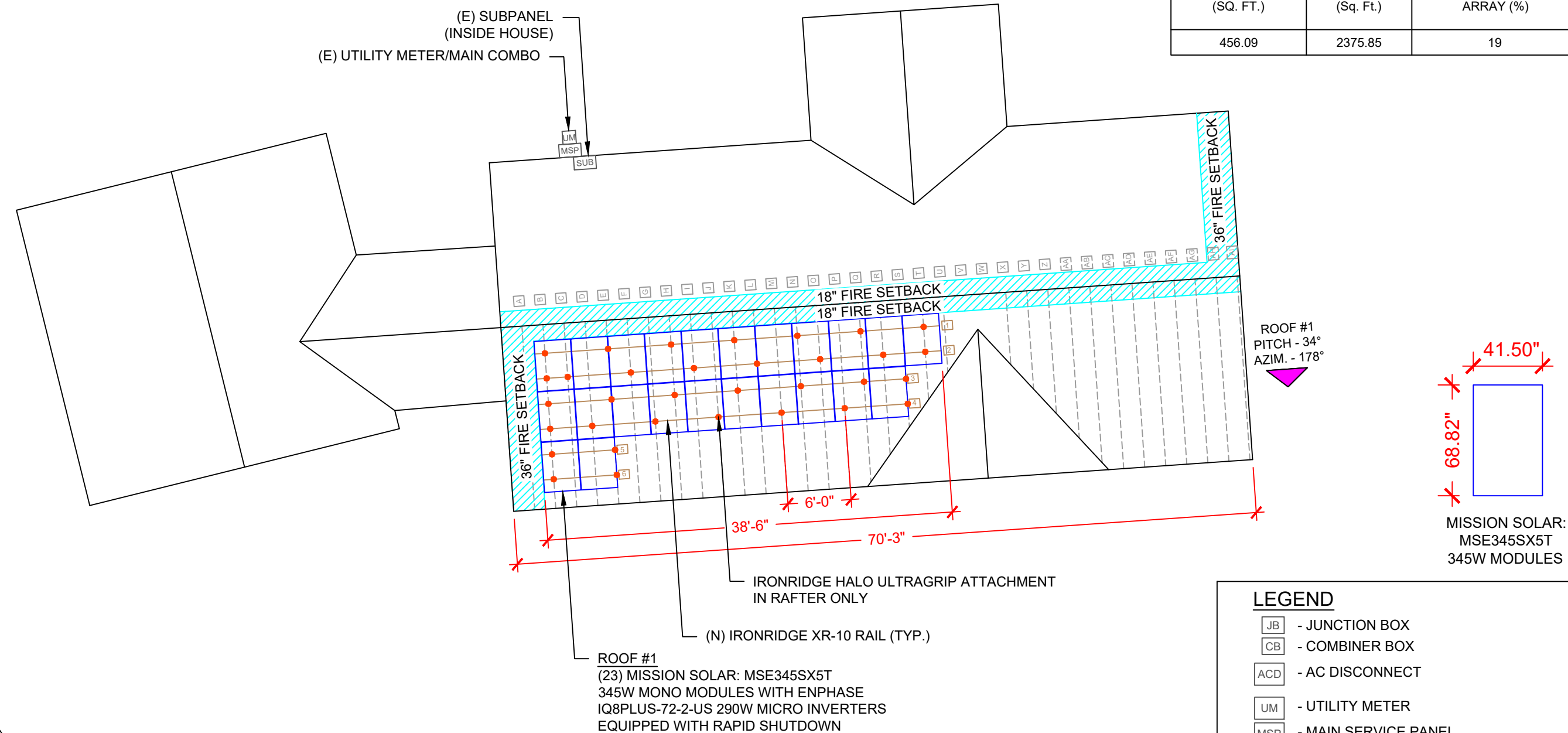
ROOF PLAN &  
MODULES

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-3



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

A

1

ROOF PLAN & MODULES

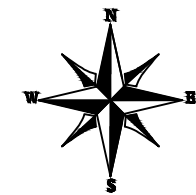
PV-3

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



DC SYSTEM SIZE: 23 x 345W = 7.935 kW DC  
AC SYSTEM SIZE: 23 x 290W = 6.670 kW AC  
(23) MISSION SOLAR: MSE345SX5T 345W MONO MODULES  
WITH (23) ENPHASE IQ8PLUS-72-2-US 290W MICRO  
INVERTERS EQUIPPED WITH RAPID SHUTDOWN  
LOCATED UNDER EACH PANEL (240V)

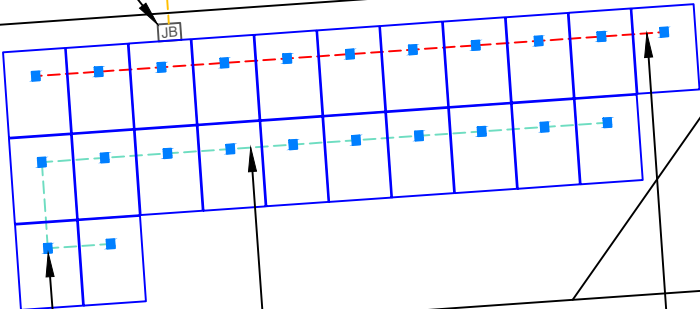
CIRCUIT LEGENDS	
<div></div>	CIRCUIT #1
<div></div>	CIRCUIT #2



(N) ENPHASE COMBINER BOX  
(N) VISIBLE, LOCKABLE,  
LABELED FUSED AC DISCONNECT  
(LOCATED WITHIN 10' OF UTILITY METER)  
(E) SUBPANEL  
(INSIDE HOUSE)  
(E) UTILITY METER/MAIN COMBO

(N) CONDUIT  
(N) JUNCTION BOX

JB  
MSP  
ACD  
CB  
SUB



CIRCUIT #2  
(12 MODULES)

CIRCUIT #1  
(11 MODULES)

(23) ENPHASE IQ8PLUS-72-2-US 290W  
MICRO INVERTERS EQUIPPED WITH  
RAPID SHUTDOWN  
LOCATED UNDER EACH PANEL (240V)

MAPLE RD

BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
SOLAR PV MODULES: MISSION SOLAR: MSE345SX5T 345W MODULE	23
MICRO INVERTERS: ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN	23
JUNCTION BOX: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO.290	1
COMBINER BOX: ENPHASE IQ COMBINER X-IQ-AM1-240-4/4C 120/240VAC, 1φ, 3W 125A RATED BUS BAR, NEMA 3R SOLAR LOADS ONLY UL 1741 COMPLIANT	1
20A BREAKERS	2
AC DISCONNECT: FUSED AC DISCONNECT, 60A FUSED, (2) 40A FUSES 240V NEMA 3R, UL LISTED	1
IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A)	14
BONDED SPLICE, XR10 (XR10-BOSS-01-M1)	8
UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1)	40
STOPPER SLEEVE, 40MM, MILL (UFO-STP-40MM-M1)	12
GROUNDING LUG (XR-LUG-03-A1)	3
IRONRIDGE HALO ULTRAGRIP ATTACHMENTS (QM-HUG-01-M1)	33
RD STRUCTURAL SCREW,3.0L (HW-RD1430-01-M1)	66
T-BOLT BONDING HARDWARE (BHW-TB-02-A1) (PRODUCT CODE 590-0116)	33
MICRO INVERTER BONDING HARDWARE T-BOLT (BHW-MI-01-A1) (PRODUCT CODE 270-0152)	23

LEGEND

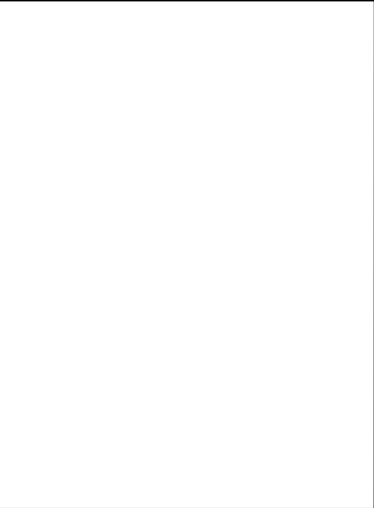
<div></div>	- JUNCTION BOX
<div></div>	- COMBINER BOX
<div></div>	- AC DISCONNECT
<div></div>	- UTILITY METER
<div></div>	- MAIN SERVICE PANEL
<div></div>	- SUBPANEL
<div></div>	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
<div></div>	- ROOF ATTACHMENT
<div></div>	- RAFTER
<div></div>	- CONDUIT



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RESIDENCE

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DRAWN BY

ESR

SHEET NAME

ELECTRICAL PLAN

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-4

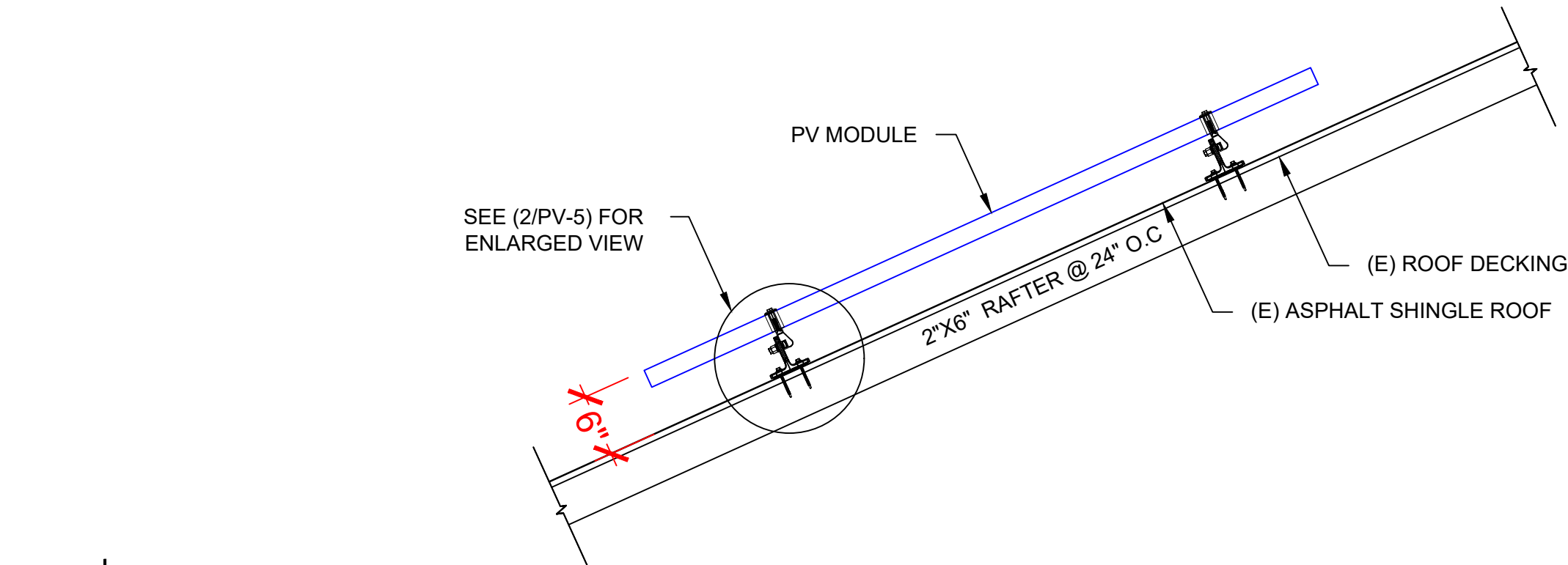
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1

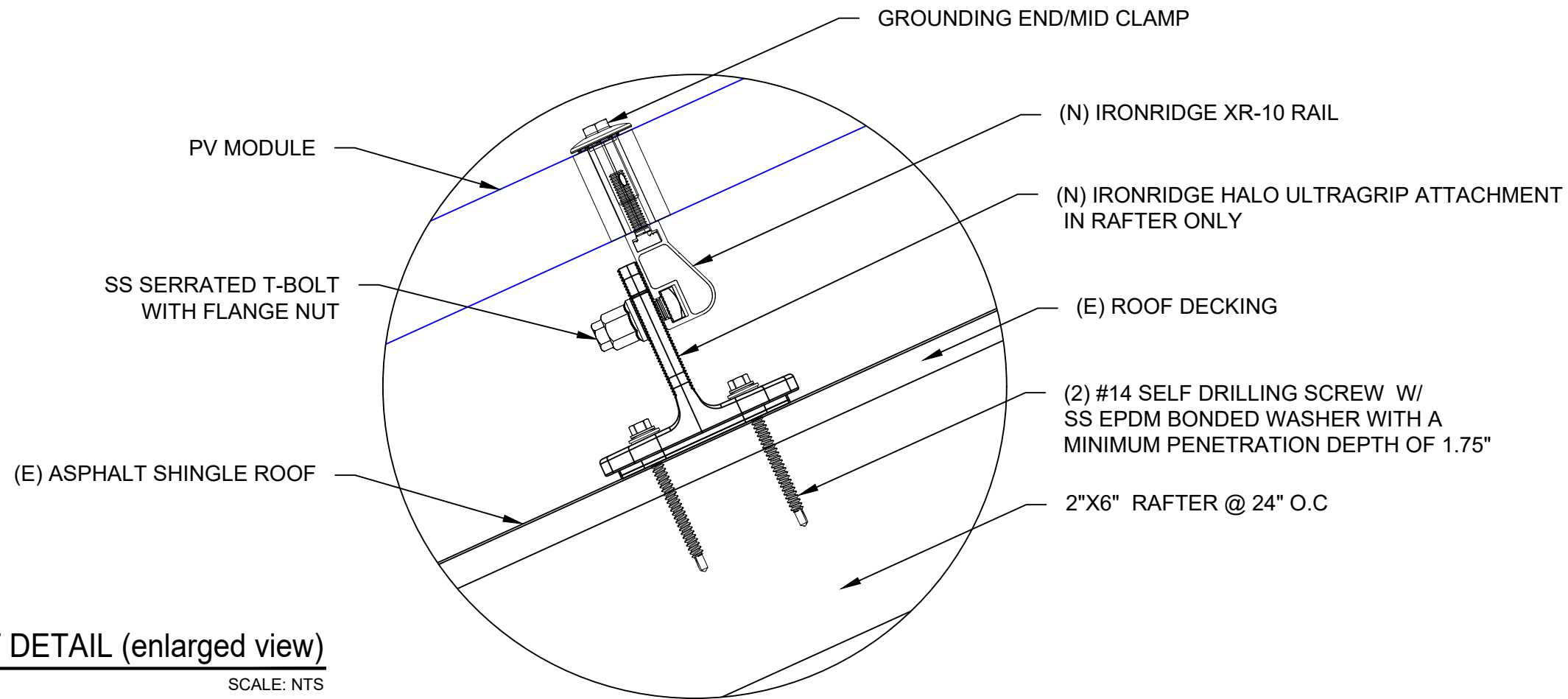
ELECTRICAL PLAN

PV-4

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



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



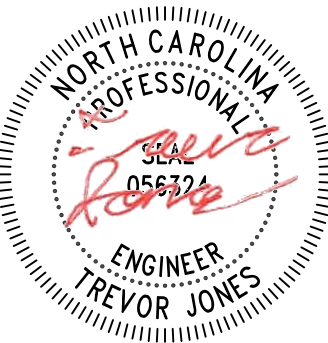
2 | ATTACHMENT DETAIL (enlarged view)  
PV-5 | SCALE: NTS



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ESR

SHEET NAME

STRUCTURAL DETAIL

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-5

DC SYSTEM SIZE: 23 x 345W = 7.935 kW DC  
AC SYSTEM SIZE: 23 x 290W = 6.670 kW AC

(23) MISSION SOLAR: MSE345SX5T 345W MONO MODULES  
WITH (23) ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS  
EQUIPPED WITH RAPID SHUTDOWN  
LOCATED UNDER EACH PANEL (240V)  
(1) BRANCH CIRCUIT OF 11 MODULES AND  
(1) BRANCH CIRCUIT OF 12 MODULES ARE CONNECTED IN PARALLEL

**BACKFEED BREAKER CALCULATION (120% RULE):**  
(MAIN BUS X 1.2 - MAIN BREAKER) >= (PV BREAKER)  
(200A X 1.2 - 200A) >= (40A)  
(40A) >= (40A) HENCE OK

**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:**

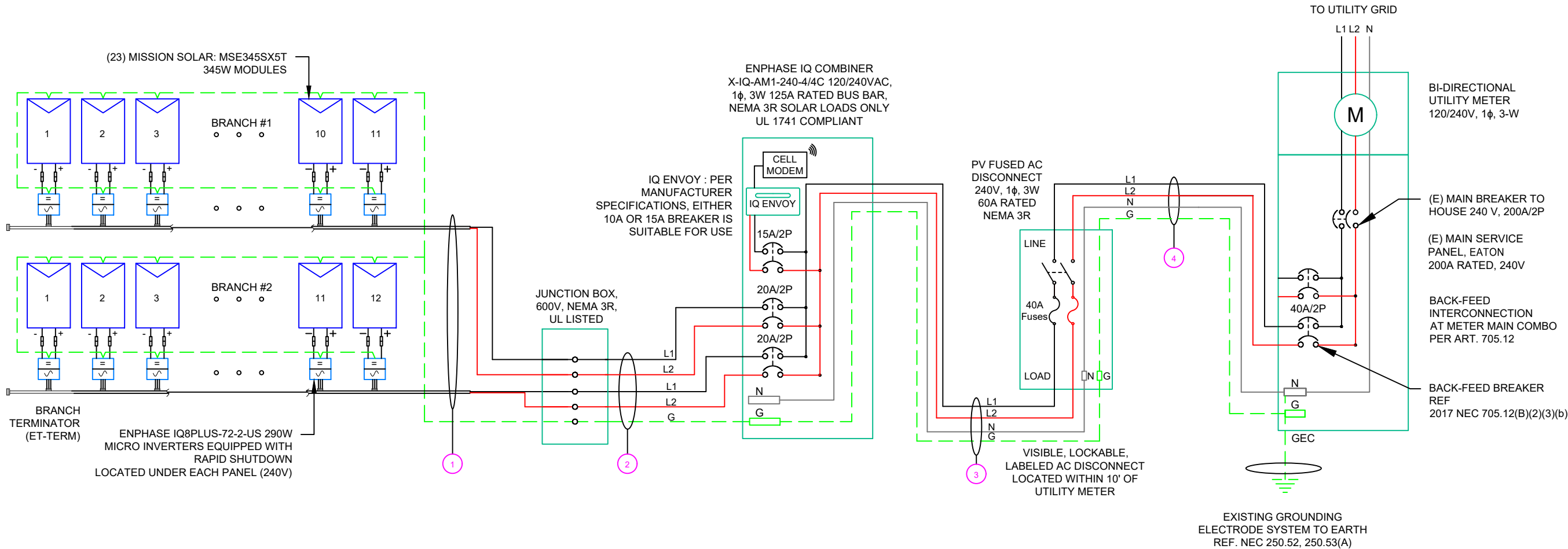
1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
3. 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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ANGIER, NC 27501

DRAWN BY  
**ESR**

SHEET NAME  
**ELECTRICAL LINE DIAGRAM**

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

SHEET NUMBER  
**PV-6**

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

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

A

1

**ELECTRICAL LINE DIAGRAM**

PV-6

SCALE: NTS

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: MSE345SX5T 345 W MODULE
VMP	33.37V
IMP	10.34A
VOC	41.00V
ISC	10.92A
TEMP. COEFF. VOC	-0.275%/°C
MODULE DIMENSION	68.82"L x 41.50"W x 1.18"D (In Inch)

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

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

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 (%)
CIRCUIT 1	JUNCTION BOX	240	13.31	16.64	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS			0.55	N/A	#N/A
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
JUNCTION BOX	COMBINER BOX	240	14.52	18.15	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	38	4	40	0.91	0.8	29.12	PASS	15	1.24	0.225	3/4" EMT	19.79%
COMBINER BOX	AC DISCONNECT	240	27.83	34.79	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	1	0.778	0.018	3/4" EMT	24.56%
AC DISCONNECT	POI	240	27.83	34.79	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	1	0.778	0.018	3/4" EMT	24.56%

Circuit 1 Voltage Drop	0.811
Circuit 2 Voltage Drop	0.911

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ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE RATED UPTO 600V FOR RESIDENTIAL AND 1000V FOR COMMERCIAL AND 90 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOX, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR 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.

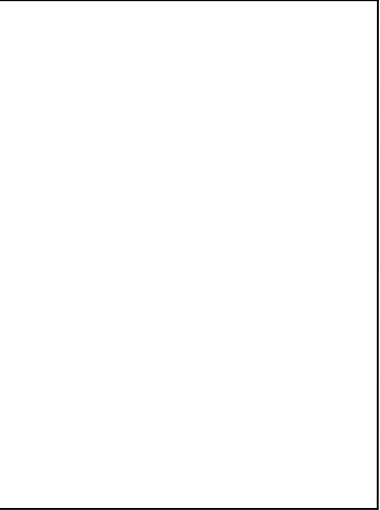
TOP TIER

SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

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

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/18/2025	
REVISION	07/25/2025	A



PROJECT NAME & ADDRESS

JEFFREY BANKS  
RESIDENCE

775 MAPLE RD,  
ANGIER, NC 27501


DRAWN BY  
ESR

SHEET NAME  
WIRING CALCULATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-7



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)

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

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)

CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS  
BACKFEED

LABEL- 4:  
LABEL LOCATION:  
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)  
SUBPANEL (ONLY IF SOLAR IS BACK-FED)  
CODE REF: NEC 705.12(B)(3-4) & NEC 690.59

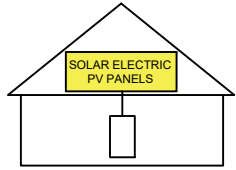
WARNING

**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  
CODE REF: NEC 690.56(C)(2)

**PHOTOVOLTAIC**

**AC DISCONNECT**

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

**PHOTOVOLTAIC  
AC DISCONNECT**

NOMINAL OPERATING AC VOLATGE

240 V

RATED AC OUTPUT CURRENT

27.83 A

LABEL- 9:  
LABEL LOCATION:  
MAIN SERVICE PANEL  
SUBPANEL  
AC DISCONNECT  
CODE REF: NEC 690.54

**MAIN PHOTOVOLTAIC  
SYSTEM DISCONNECT**

LABEL- 10:  
LABEL LOCATION:  
MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)  
CODE REF: NEC 690.13(B)

TOP TIER

SOLAR SOLUTIONS

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 60

MISSION SOLAR  
ENERGY

345W

Class leading power output -0 to +3%

Positive  
Power  
ToleranceTrue 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

- 6 Busbar
- Passivated Emitter Rear Contact
- Ideal for all applications



## Extreme Weather Resilience

- Up to 5,600 Pa front load & 5,631 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](http://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.



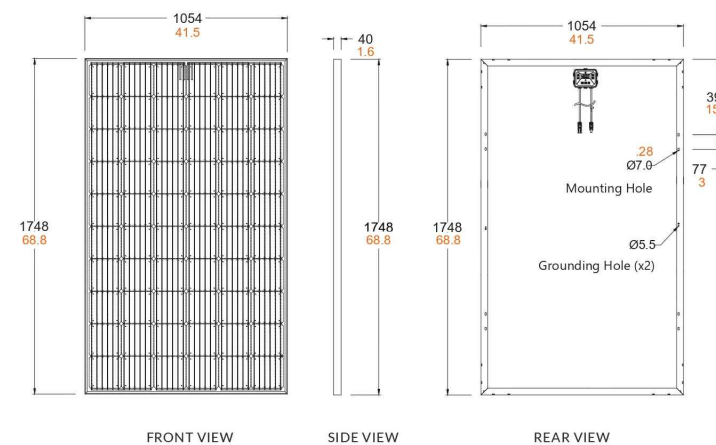
C-SA2-MKTG-0025 REV 4 05/05/2021

[www.missionsolar.com](http://www.missionsolar.com) | [info@missionsolar.com](mailto:info@missionsolar.com)Class Leading  
340-350W

MSE PERC 60

## BASIC DIMENSIONS

[UNITS: MM/IN]



FRONT VIEW

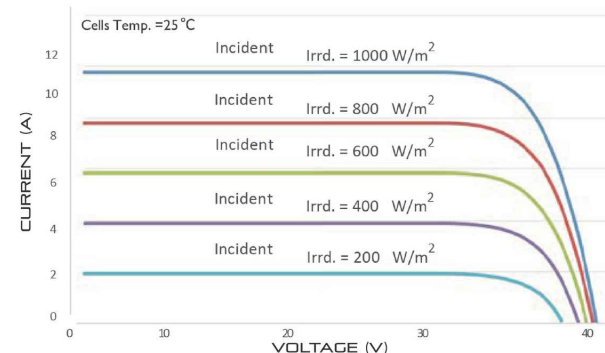
SIDE VIEW

REAR VIEW

## CURRENT-VOLTAGE CURVE

MSE345SX5T: 345WP, 60 CELL SOLAR MODULE

Current-voltage characteristics with dependence on irradiance and module temperature



## 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](http://www.missionsolar.com) | [info@missionsolar.com](mailto:info@missionsolar.com)

Mission Solar Energy reserves the right to make specification changes without notice.  
C-SA2-MKTG-0025 REV 4 05/05/2021

## ELECTRICAL SPECIFICATION

PRODUCT TYPE	MSExxxSX5T (xxx = P <sub>max</sub> )			
Power Output	P <sub>max</sub> W <sub>p</sub>	340	345	350
Module Efficiency	%	18.5	18.7	19.0
Tolerance	%	0/+3	0/+3	0/+3
Short Circuit Current	I <sub>sc</sub> V	10.86	10.92	10.97
Open Circuit Voltage	V <sub>oc</sub> A	40.82	41.00	41.18
Rated Current	I <sub>mp</sub> V	10.24	10.34	10.44
Rated Voltage	V <sub>mp</sub> V	33.20	33.37	33.52
Fuse Rating	A	20	20	20
System Voltage	V	1,000	1,000	1,000

## TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44.43°C (±3.7%)
Temperature Coefficient of P <sub>max</sub>	-0.361%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.262%/°C
Temperature Coefficient of I <sub>sc</sub>	0.039%/°C

## OPERATING CONDITIONS

Maximum System Voltage	1,000Vdc
Operating Temperature Range	-40°C (-40°F) to +85°C (185°F)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1
Front & Back Load (UL Standard)	Up to 5,600 Pa front and 5,631 Pa back load, Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

## MECHANICAL DATA

Solar Cells	P-type mono-crystalline silicon
Cell Orientation	60 cells (6x10)
Module Dimension	1,748mm x 1,054mm x 40mm
Weight	20.3 kg (44.8 lbs.)
Front Glass	3.2mm, tempered, low-iron, anti-reflective
Frame	Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.0m, Wire 4mm <sup>2</sup> (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-8

## SHIPPING INFORMATION

Container Feet	Ship To	Pallet	Panels	345 W Bin
53'	Most States	34	884	304.98 kW
Double Stack	CA	28	728	251.16 kW
PALLET [26 PANELS]				
Weight	Height	Width	Length	
1,263 lbs. (573 kg)	47.5 in (120.65 cm)	46 in (116.84 cm)	70.25 in (178.43 cm)	

TOP TIER  
SOLAR SOLUTIONS

## TOP TIER SOLAR SOLUTIONS

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UNITED STATES

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REVISION	07/25/2025	A

## PROJECT NAME &amp; ADDRESS

JEFFREY BANKS  
RESIDENCE775 MAPLE RD,  
ANGIER, NC 27501

## DRAWN BY

ESR

## SHEET NAME

SPECIFICATION

## SHEET SIZE

ANSI B  
11" X 17"

## SHEET NUMBER

PV-9







DATA SHEET



# 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 <sup>1</sup>	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 <sup>2</sup> [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 <sup>3</sup>	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 <sup>4</sup>		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/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01  This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) 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

TOP TIER  
SOLAR SOLUTIONS

## TOP TIER SOLAR SOLUTIONS

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

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## PROJECT NAME & ADDRESS

JEFFREY BANKS  
RESIDENCE

775 MAPLE RD,  
ANGIER, NC 27501

## 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



To learn more about Enphase offerings, visit [enphase.com](https://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	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	(not included, order separately) - 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
Envoy 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](https://enphase.com)

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TOP TIER  
SOLAR SOLUTIONS

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DRAWN BY

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ANSI B  
11" X 17"

SHEET NUMBER

PV-11







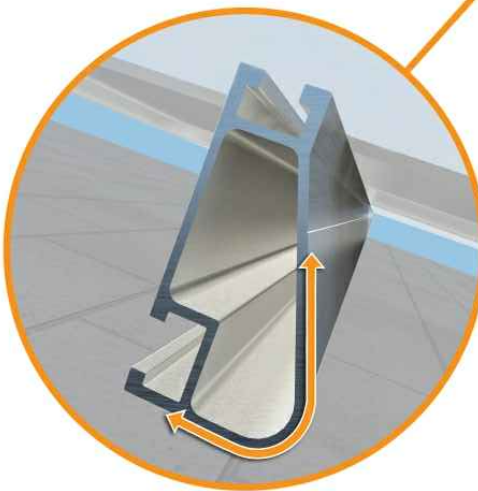
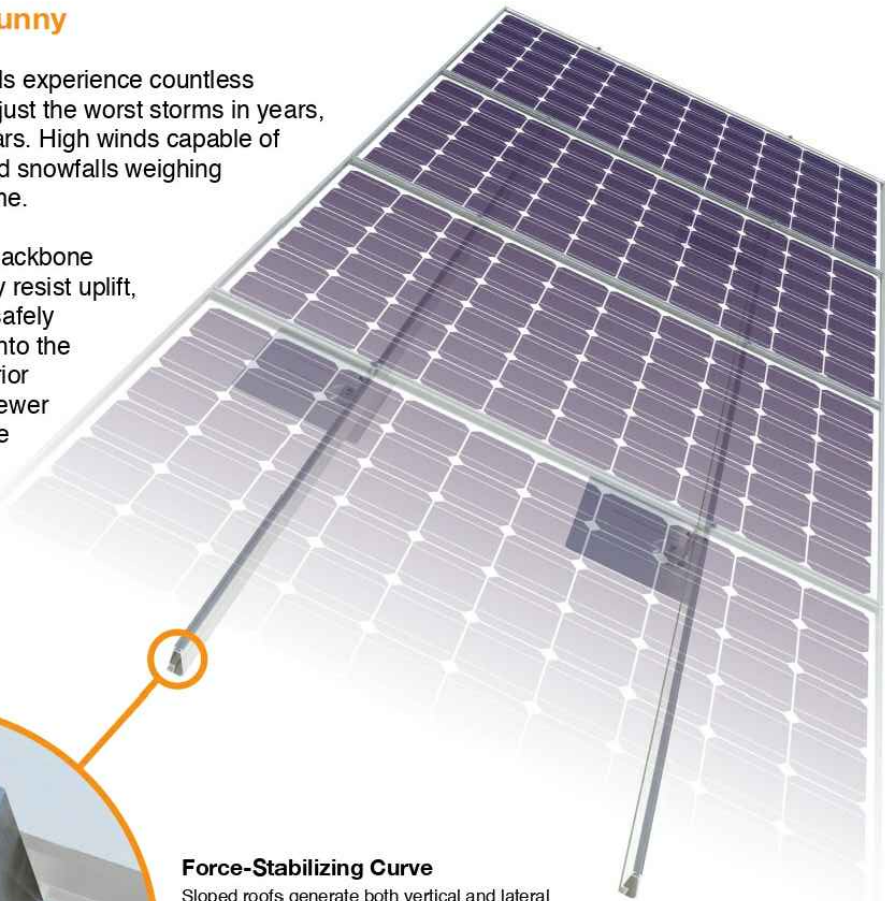
Tech Brief

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 6000-series 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 spans up to 6 feet, while remaining light and economical.

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



**XR100**

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

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



**XR1000**

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

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

Rail Selection

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

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

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



**TOP TIER SOLAR SOLUTIONS**  
1530 CENTER PARK DR #2911,  
CHARLOTTE, NC 28217,  
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	07/18/2025	
REVISION	07/25/2025	A



PROJECT NAME & ADDRESS

JEFFREY BANKS  
RESIDENCE

775 MAPLE RD,  
ANGIER, NC 27501

DRAWN BY  
**ESR**

SHEET NAME  
**EQUIPMENT  
SPECIFICATION**

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

SHEET NUMBER  
**PV-12**





## UFO® Family of Components

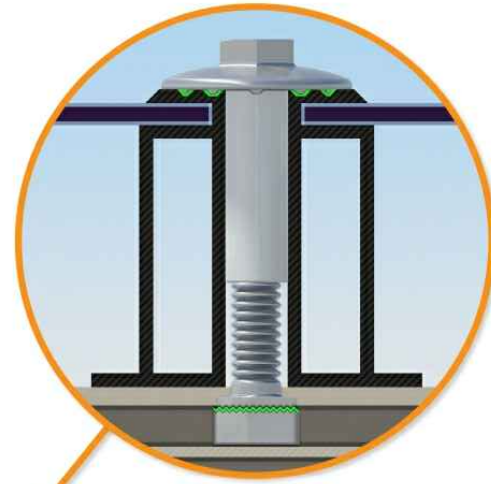
Tech Brief

### Simplified Grounding for Every Application

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

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

Only for installation and use with IronRidge products in accord with written instructions. See [IronRidge.com/UFO](https://www.ironridge.com/UFO)



#### Universal Fastening Object (UFO®)

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



#### Stopper Sleeve

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



#### BOSS® Splice

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



#### Grounding Lug

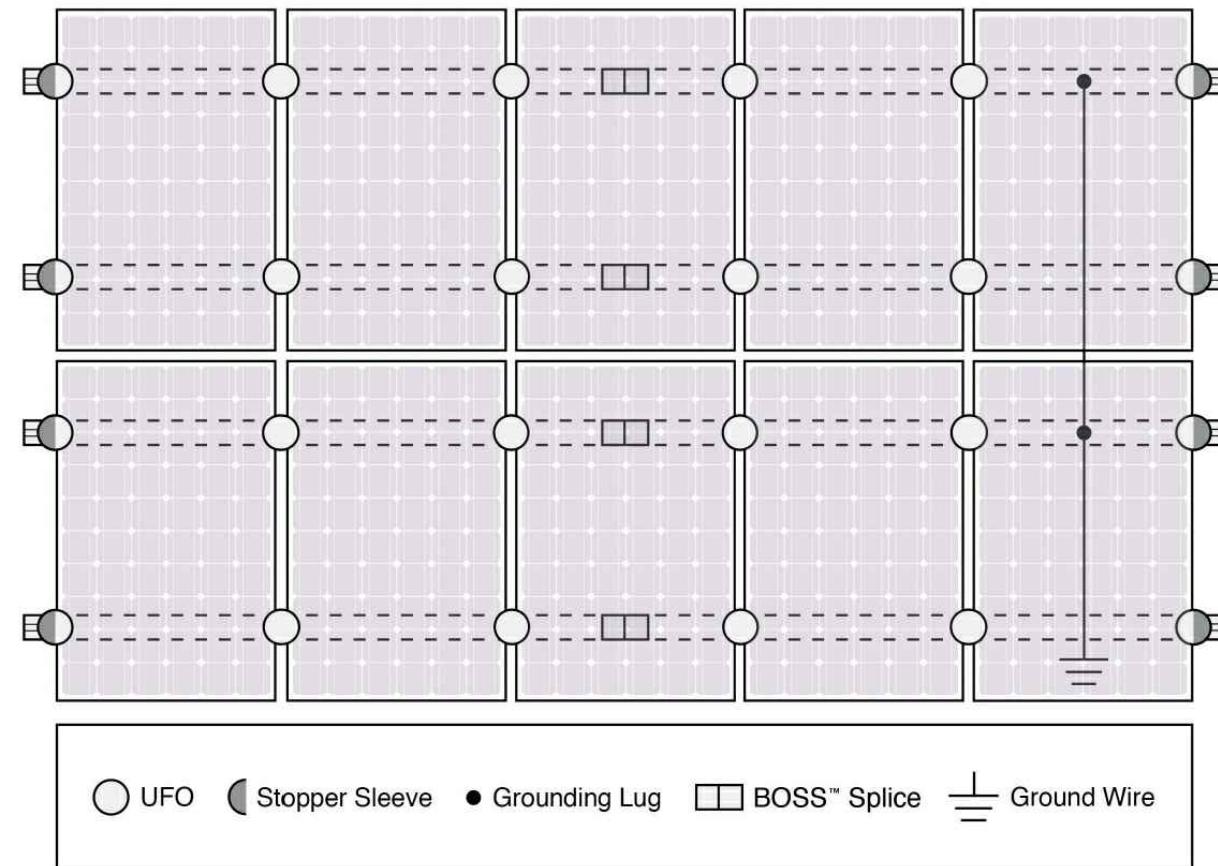
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



#### Bonded Attachments

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

### 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](https://www.ironridge.com/UFO)

### Cross-System Compatibility

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

**TOP TIER**  
SOLAR SOLUTIONS

### TOP TIER SOLAR SOLUTIONS

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#### DRAWN BY

ESR

SHEET NAME  
**EQUIPMENT  
SPECIFICATION**

#### SHEET SIZE

ANSI B  
11" X 17"

#### SHEET NUMBER

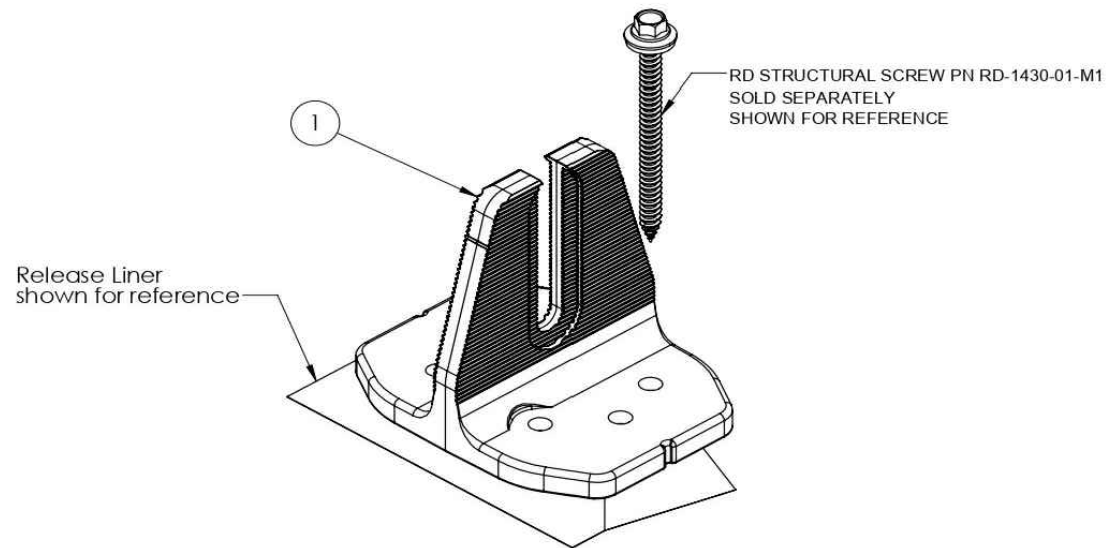
PV-13





QuickMount® Halo UltraGrip

Cut Sheet



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

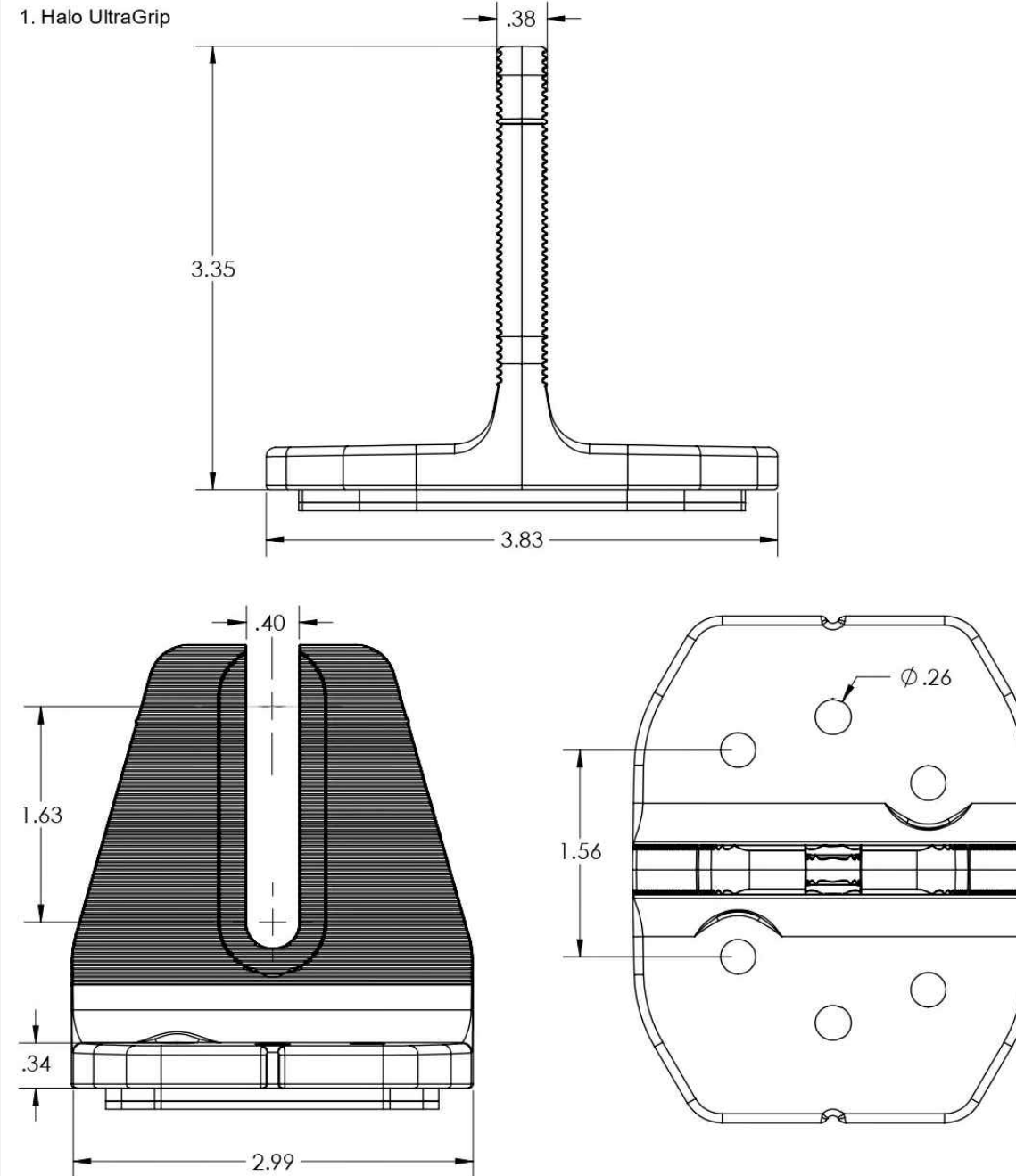


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QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0

Cut Sheet

1. Halo UltraGrip



Property	Value
Material	3000 Series Aluminium
Finish	Mill or Black



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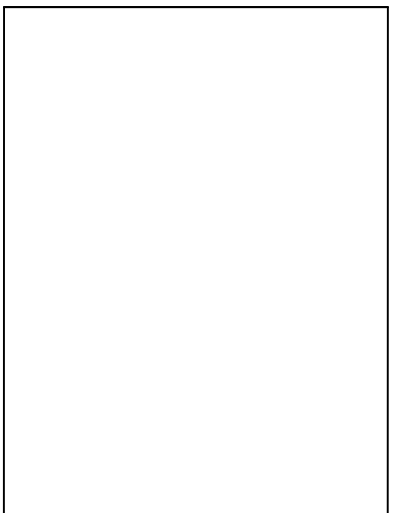
QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0



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JEFFREY BANKS RESIDENCE	775 MAPLE RD, ANGIER, NC 27501

DRAWN BY ESR
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SHEET NAME EQUIPMENT SPECIFICATION
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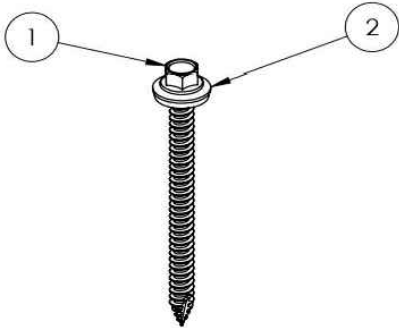
SHEET SIZE ANSI B 11" X 17"
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SHEET NUMBER PV-14
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QuickMount® RD Structural Screw

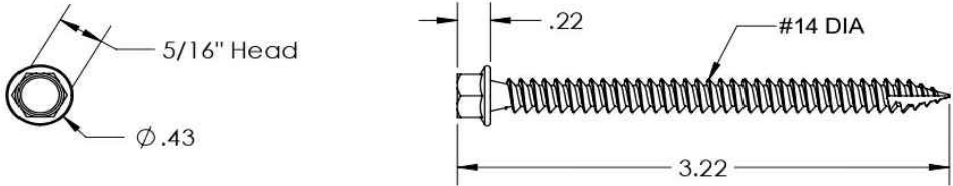
Cut Sheet



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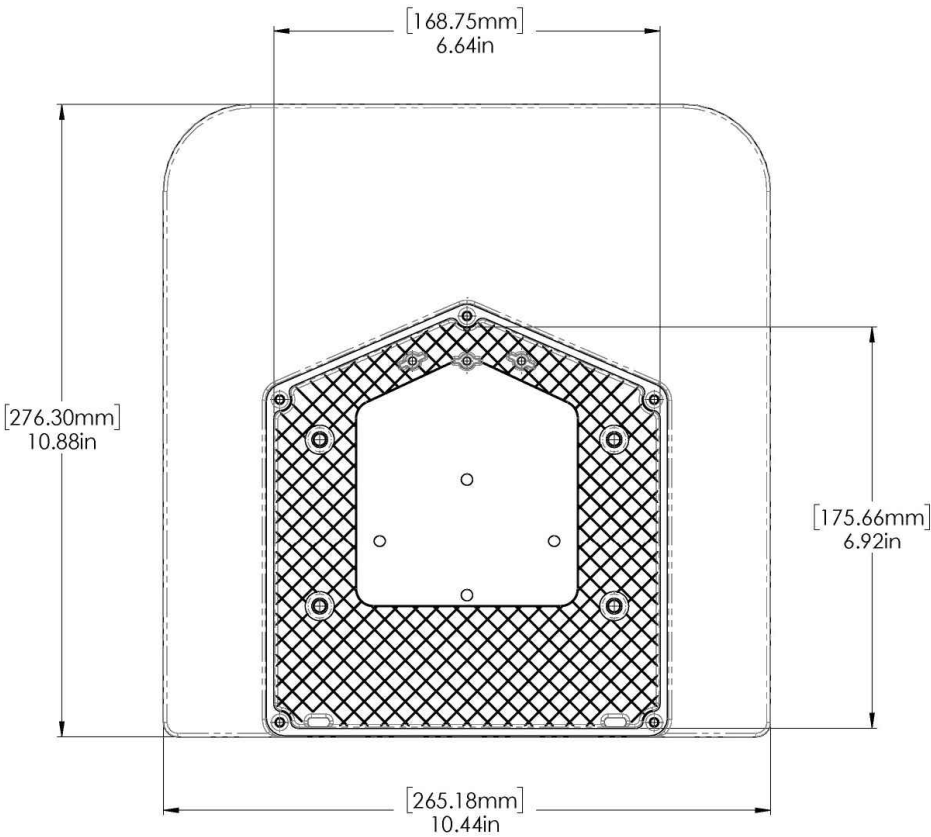
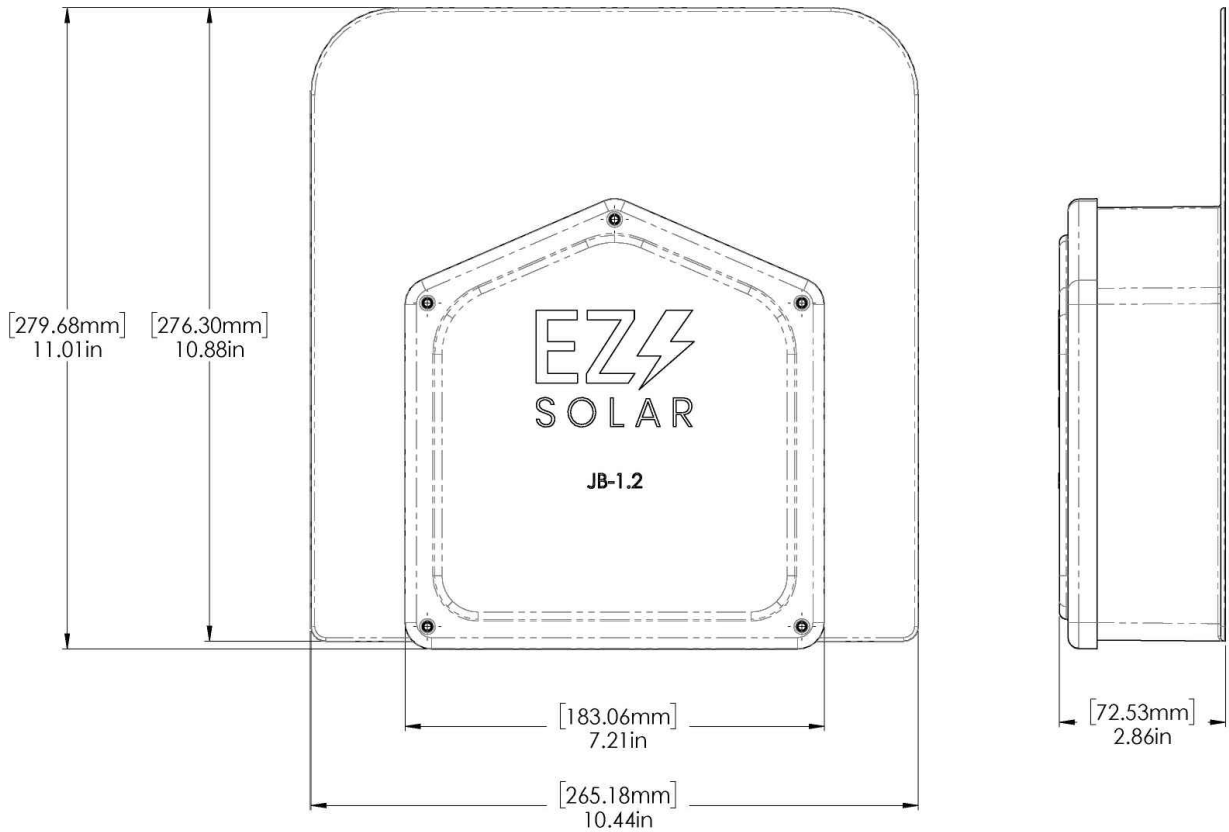
SHEET SIZE ANSI B 11" X 17"
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SHEET NUMBER PV-15
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	JB-1.2 BODY	POLYCARBONATE WITH UV INHIBITORS	1
2	JB-1.2 LID	POLYCARBONATE WITH UV INHIBITORS	1
3	#10 X 1-1/4"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

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



REVISIONS		
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PROJECT NAME & ADDRESS	
JEFFREY BANKS RESIDENCE	775 MAPLE RD, ANGIER, NC 27501

DRAWN BY <b>ESR</b>
SHEET NAME <b>EQUIPMENT SPECIFICATION</b>
SHEET SIZE <b>ANSI B 11" X 17"</b>
SHEET NUMBER <b>PV-16</b>