

PHOTOVOLTAIC ROOF MOUNT SYSTEM

31 MODULES-ROOF MOUNTED - 13.175 kW DC, 10.000 kW AC
 14 RINGNECK CT, LILLINGTON, NC 27546

TOP TIER
 SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

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

PROJECT DATA

PROJECT ADDRESS: 14 RINGNECK CT, LILLINGTON, NC 27546

OWNER: JAMES TANNER

DESIGNER: ESR

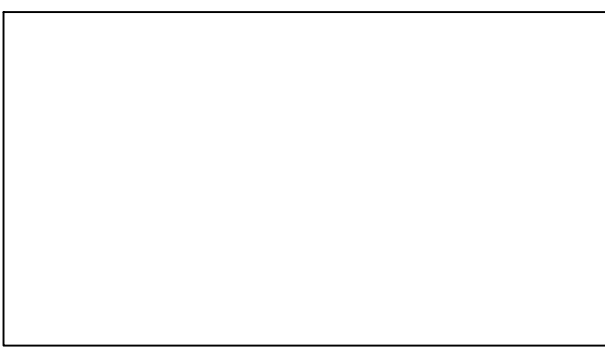
SCOPE: 13.175 kW DC ROOF MOUNT SOLAR PV SYSTEM WITH 31 JINKO SOLAR: JKM425N-54HL4-B 425W PV MODULES WITH 31 SOLAREEDGE: S440 POWER OPTIMIZERS AND 01 SOLAREEDGE: SE10000H-US (240V/10000W) INVERTER

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

SHEET INDEX

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- PV-2 SITE PLAN
- PV-3 ROOF PLAN & MODULES
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- PV-5 STRUCTURAL DETAIL
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SIGNATURE



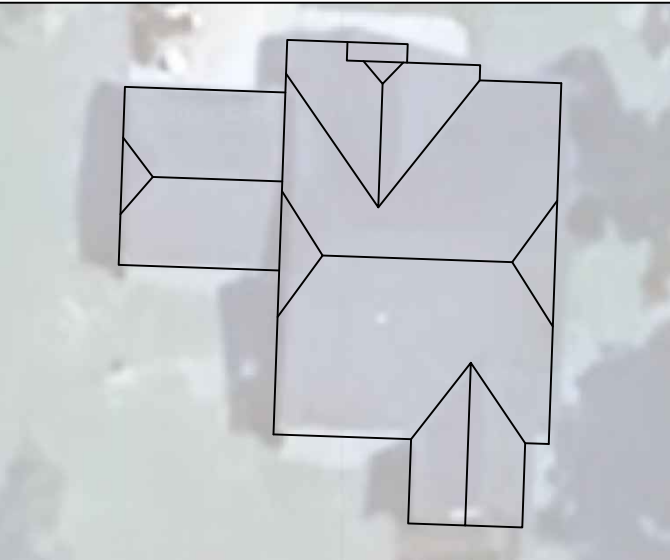
GENERAL NOTES

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

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

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

12/12/2024

REV1

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	11/14/2024	
AS BUILT	11/20/2024	A

NORTH CAROLINA PROFESSIONAL SEAL
 056324
 ENGINEER
 TREVOR JONES

STRUCTURAL ONLY
 11/20/2024

PROJECT NAME & ADDRESS

JAMES TANNER
 RESIDENCE

14 RINGNECK CT,
 LILLINGTON, NC 27546

DRAWN BY
 ESR

SHEET NAME
 COVER SHEET

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-1

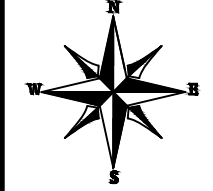
PROJECT DESCRIPTION:

31 X JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
 DC SYSTEM SIZE: 13.175 KW DC
 AC SYSTEM SIZE: 10.000 KW AC

EQUIPMENT SUMMARY
 31 JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES
 31 SOLAREEDGE: S440 POWER OPTIMIZERS
 01 SOLAREEDGE: SE10000H-US (240V/10000W) INVERTER

ROOF ARRAY AREA #1:- 189.09 SQ FT.
 ROOF ARRAY AREA #2:- 462.22 SQ FT.

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



(E) SUBPANEL (INSIDE GARAGE)
 (N) VISIBLE, LOCKABLE, LABELED FUSED AC DISCONNECT (LOCATED WITHIN 10' OF UTILITY METER)

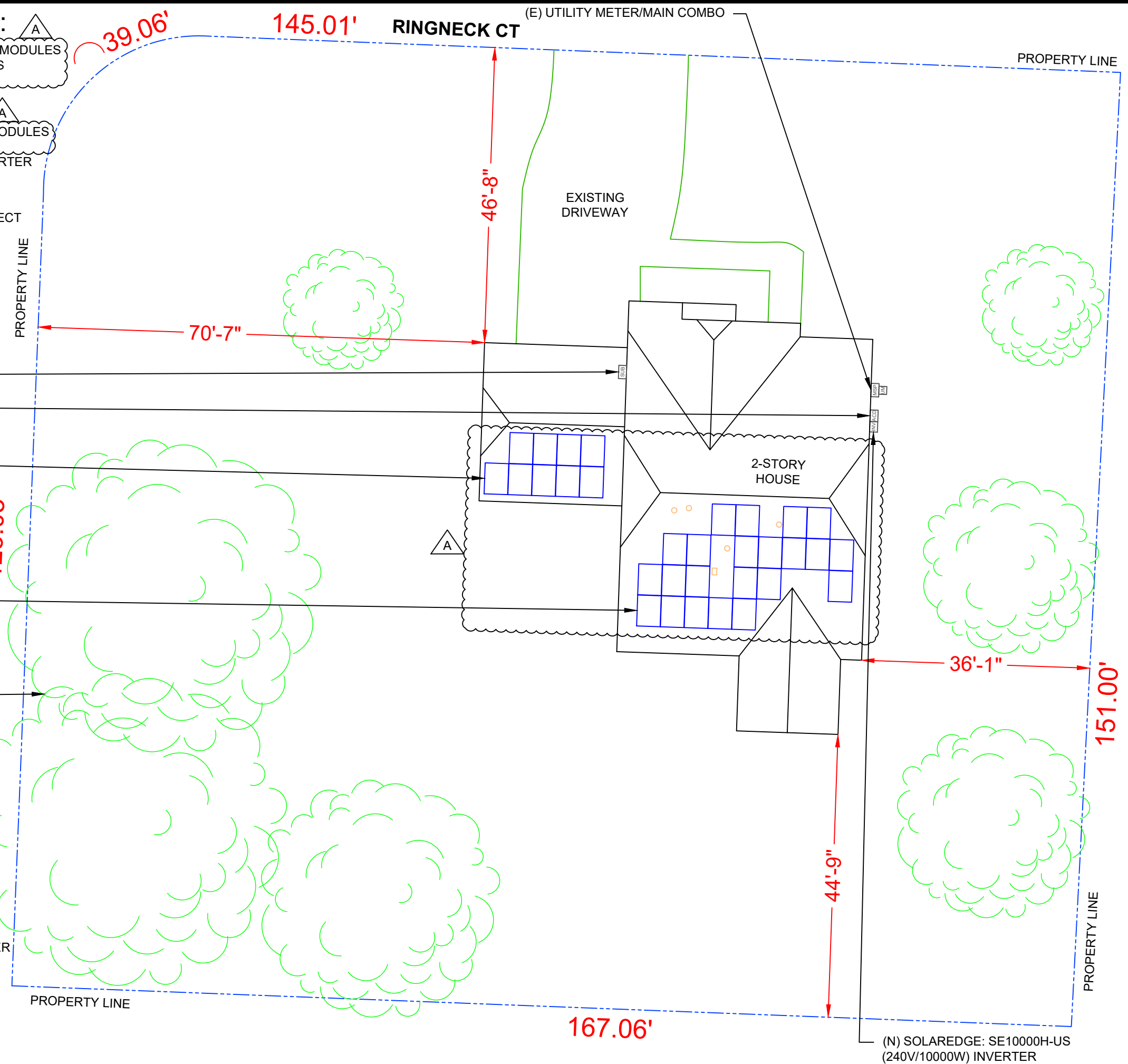
ROOF #1
 (9) JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES WITH SOLAREEDGE: S440 POWER OPTIMIZERS

ROOF #2
 (22) JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES WITH SOLAREEDGE: S440 POWER OPTIMIZERS

(E) TREES

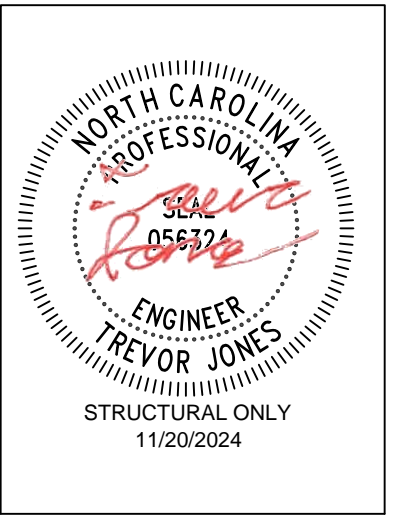
DESIGN SPECIFICATION
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER
 WIND EXPOSURE: REFER STRUCTURAL LETTER
 WIND SPEED: REFER STRUCTURAL LETTER

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



TOP TIER SOLAR SOLUTIONS
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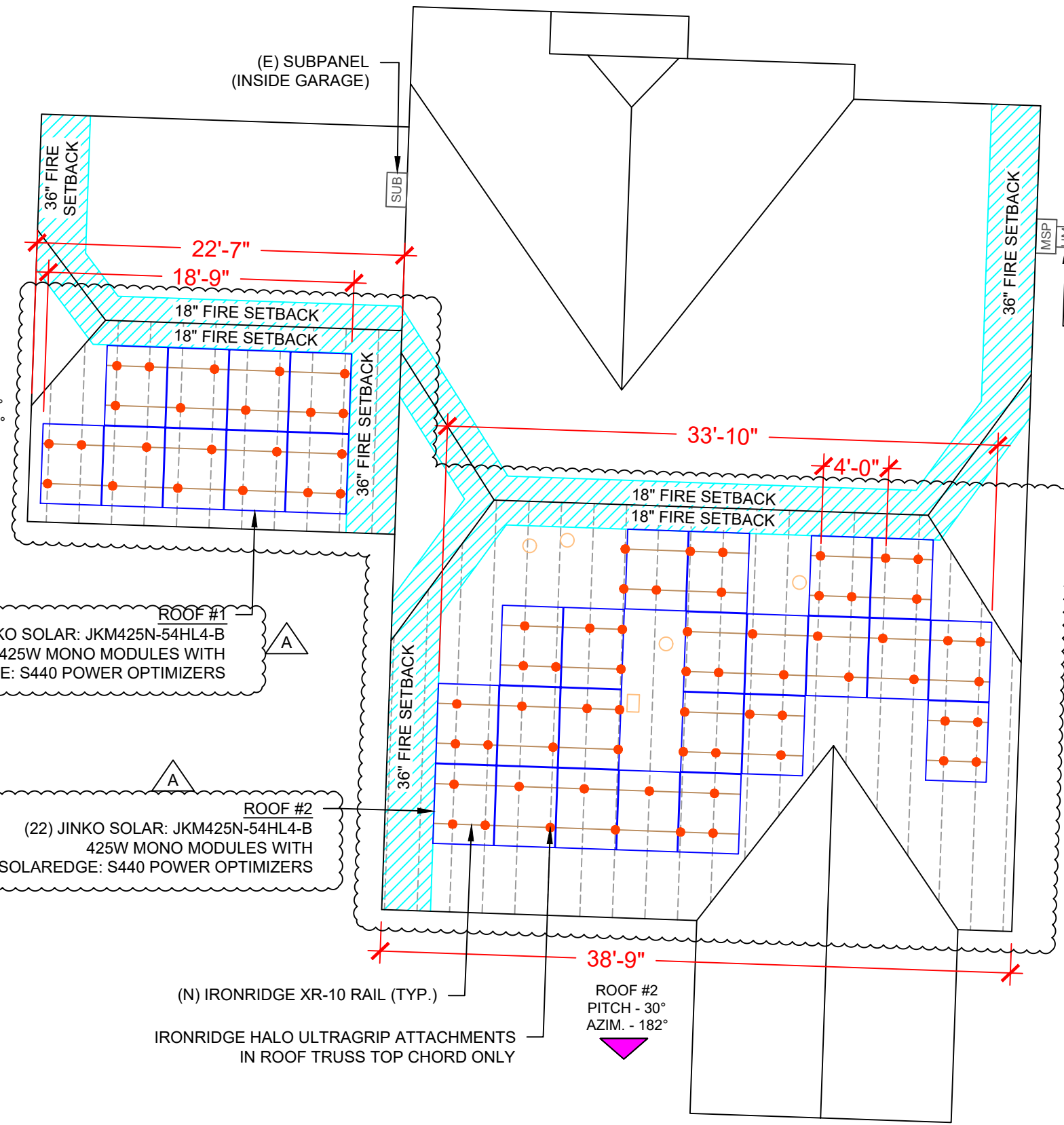
SHEET NAME
 SITE PLAN

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-2

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 31 MODULES
 MODULE TYPE = JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES
 MODULE WEIGHT = 46.3 LBS / 21.0 kg.
 MODULE DIMENSIONS = 67.79" x 44.65" = 21.01 SF



ROOF DESCRIPTION					
ROOF TYPE			ASPHALT SHINGLE		
ROOF LAYER			1 LAYER		
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	9	30°	182°	2"X4"	24"
#2	22	30°	182°	2"X4"	24"

ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
651.31	2821.54	23

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NORTH CAROLINA PROFESSIONAL ENGINEER

TREVOR JONES

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ESR

SHEET NAME
ROOF PLAN & MODULES

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

SHEET NUMBER
PV-3

LEGEND

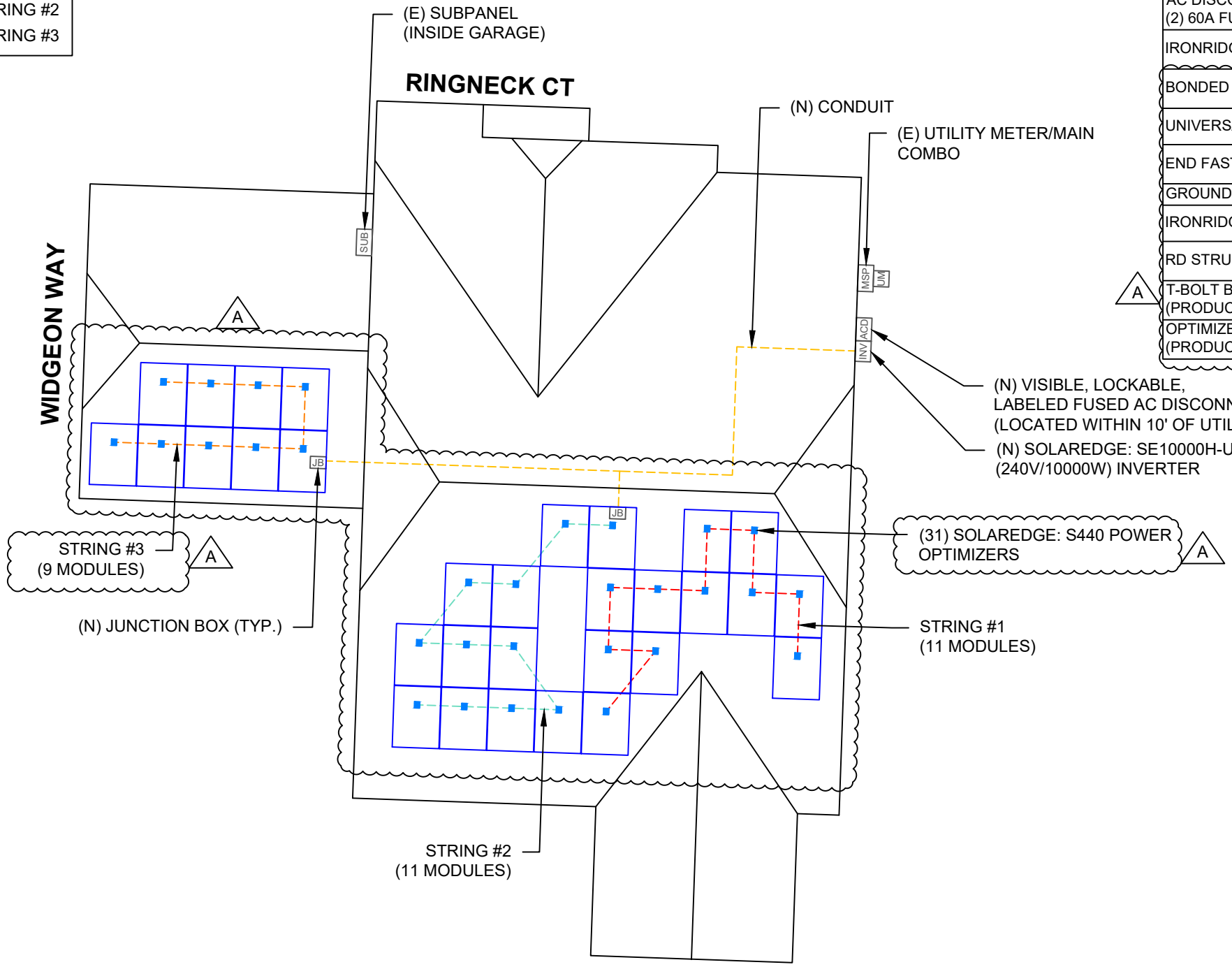
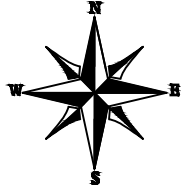
- [JB] - JUNCTION BOX
- [INV] - INVERTER
- [ACD] - AC DISCONNECT
- [UM] - UTILITY METER
- [MSP] - MAIN SERVICE PANEL
- [SUB] - SUB PANEL
- [] - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- - - - - TRUSS
- - - - - CONDUIT

DC SYSTEM SIZE: 13.175 kW DC
 AC SYSTEM SIZE: 10.000 kW AC
 (31) JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES
 WITH (31) SOLAREEDGE: S440 POWER OPTIMIZERS
 LOCATED UNDER EACH PANEL AND
 01 SOLAREEDGE: SE10000H-US (240V/10000W) INVERTER



STRING LEGENDS

---	STRING #1
---	STRING #2
---	STRING #3



BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
SOLAR PV MODULES: JINKO SOLAR: JKM425N-54HL4-B 425W MODULE	31
OPTIMIZERS: SOLAREEDGE: S440 POWER OPTIMIZERS	31
INVERTER: SOLAREEDGE: SE10000H-US (240V/10000W) INVERTER	01
JUNCTION BOXES: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO.290	2
AC DISCONNECT: FUSED AC DISCONNECT, 60A FUSED, (2) 60A FUSES 240V NEMA 3R, UL LISTED	1
IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A)	26
BONDED SPLICE, XR10 (XR10-BOSS-01-M1)	6
UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1)	42
END FASTENING OBJECT (END CLAMP, 30-40MM), MILL	40
GROUNDING LUG (XR-LUG-03-A1)	10
IRONRIDGE HALO ULTRAGRIP ATTACHMENTS (QM-HUG-01-M1)	74
RD STRUCTURAL SCREW,3.0L (HW-RD1430-01-M1)	148
T-BOLT BONDING HARDWARE (BHW-TB-02-A1) (PRODUCT CODE 590-0116)	74
OPTIMIZER BONDING HARDWARE T-BOLT (BHW-MI-01-A1) (PRODUCT CODE 270-0152)	31

(N) VISIBLE, LOCKABLE, LABELED FUSED AC DISCONNECT (LOCATED WITHIN 10' OF UTILITY METER)
 (N) SOLAREEDGE: SE10000H-US (240V/10000W) INVERTER

LEGEND

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

TOP TIER
SOLAR SOLUTIONS

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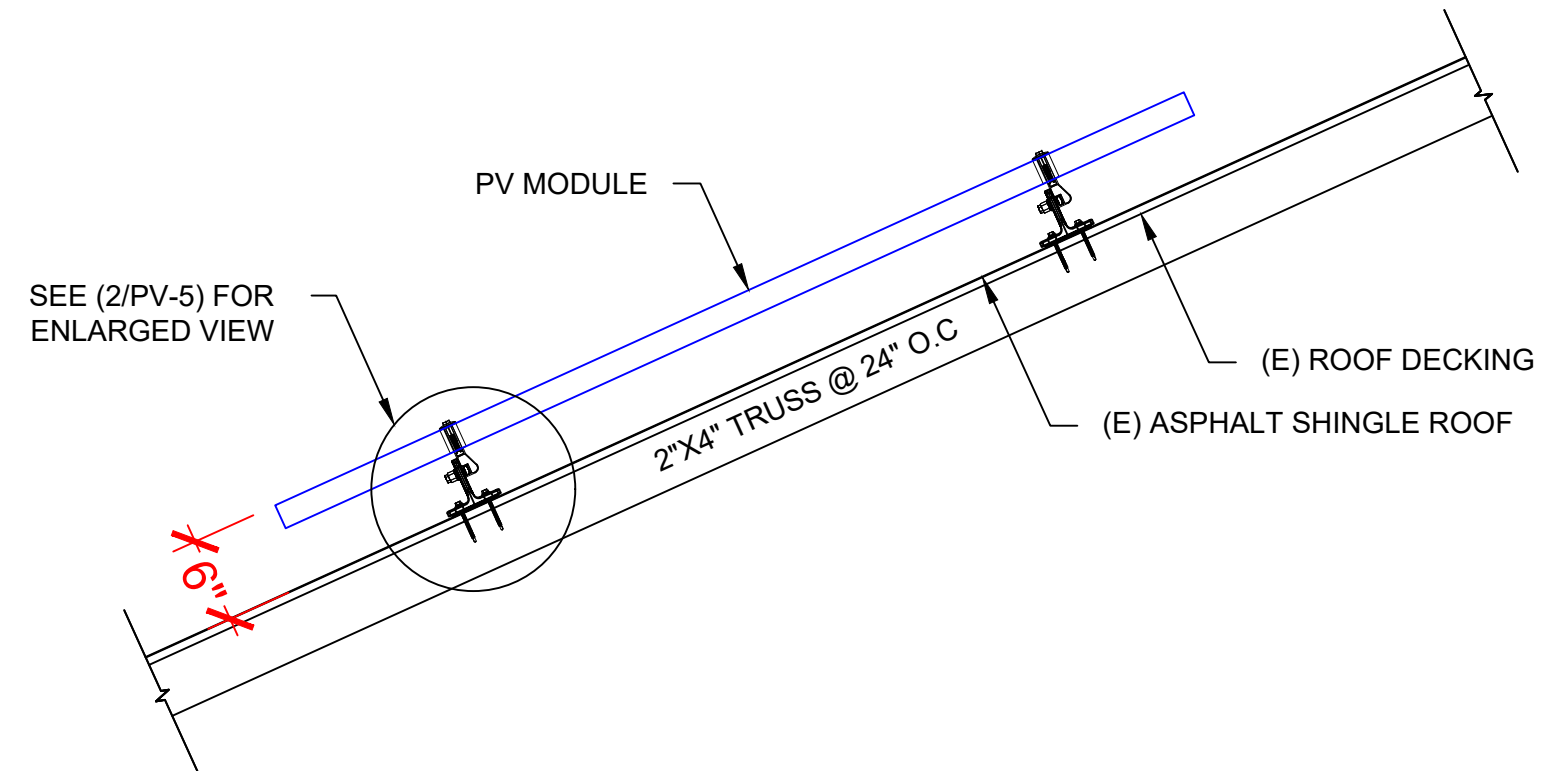
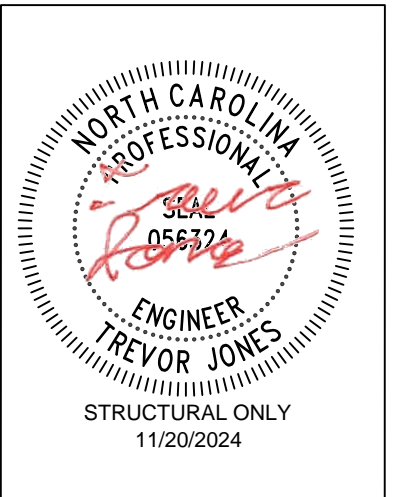
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SHEET NAME ELECTRICAL PLAN
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-4



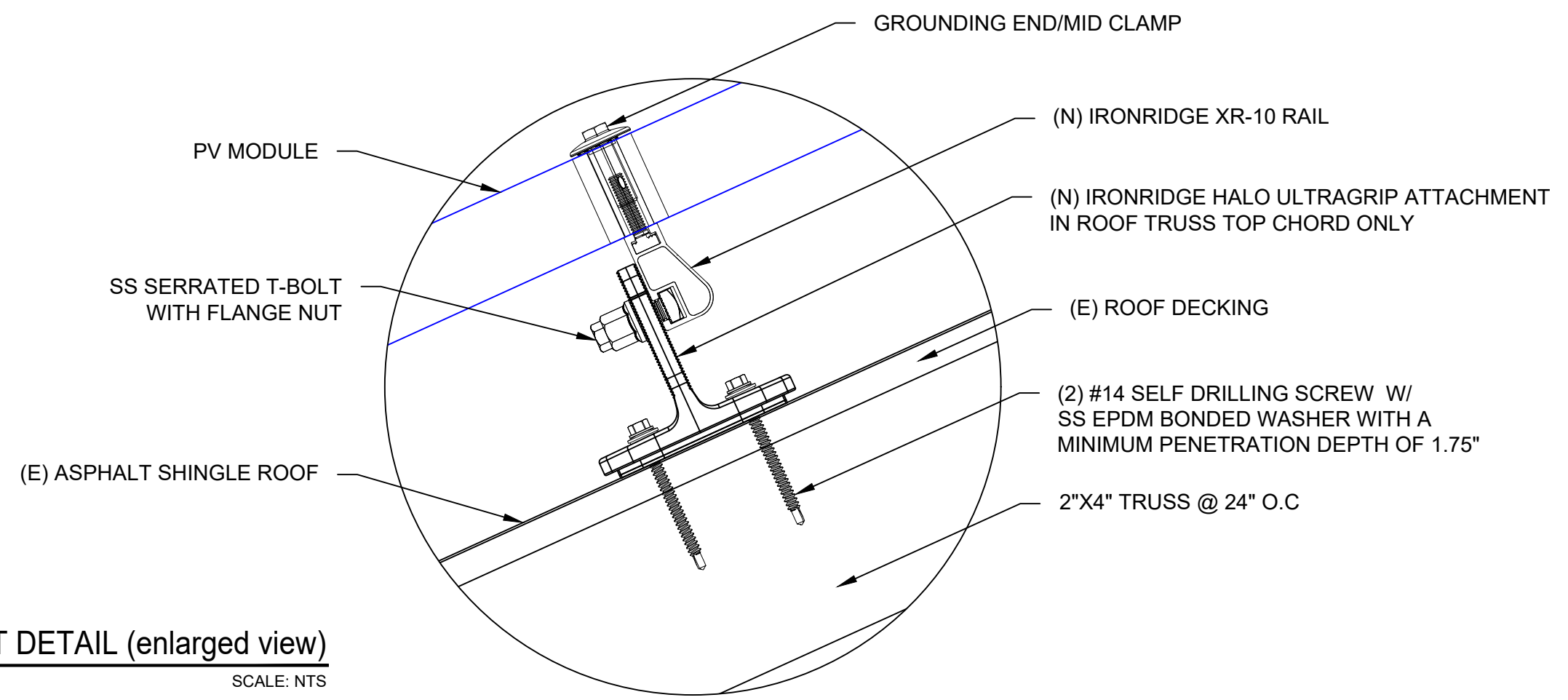
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REVISIONS		
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1 | STRUCTURAL ATTACHMENT (Side view)
PV-5 | SCALE: N.T.S



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

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ESR

SHEET NAME
STRUCTURAL DETAIL

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

SHEET NUMBER
PV-5

DC SYSTEM SIZE: 13.175 kW DC
AC SYSTEM SIZE: 10.000 kW AC

(31) JINKO SOLAR: JKM425N-54HL4-B 425W MONO MODULES WITH (31) SOLAREEDGE: S440 POWER OPTIMIZERS LOCATED UNDER EACH PANEL (240V) AND (01) SOLAREEDGE: SE10000H-US (240V/10000W) INVERTER (02) STRINGS OF 11 MODULES AND (01) STRING OF 09 MODULES ARE CONNECTED IN SERIES

INTERCONNECTION NOTES:

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

DISCONNECT NOTES:

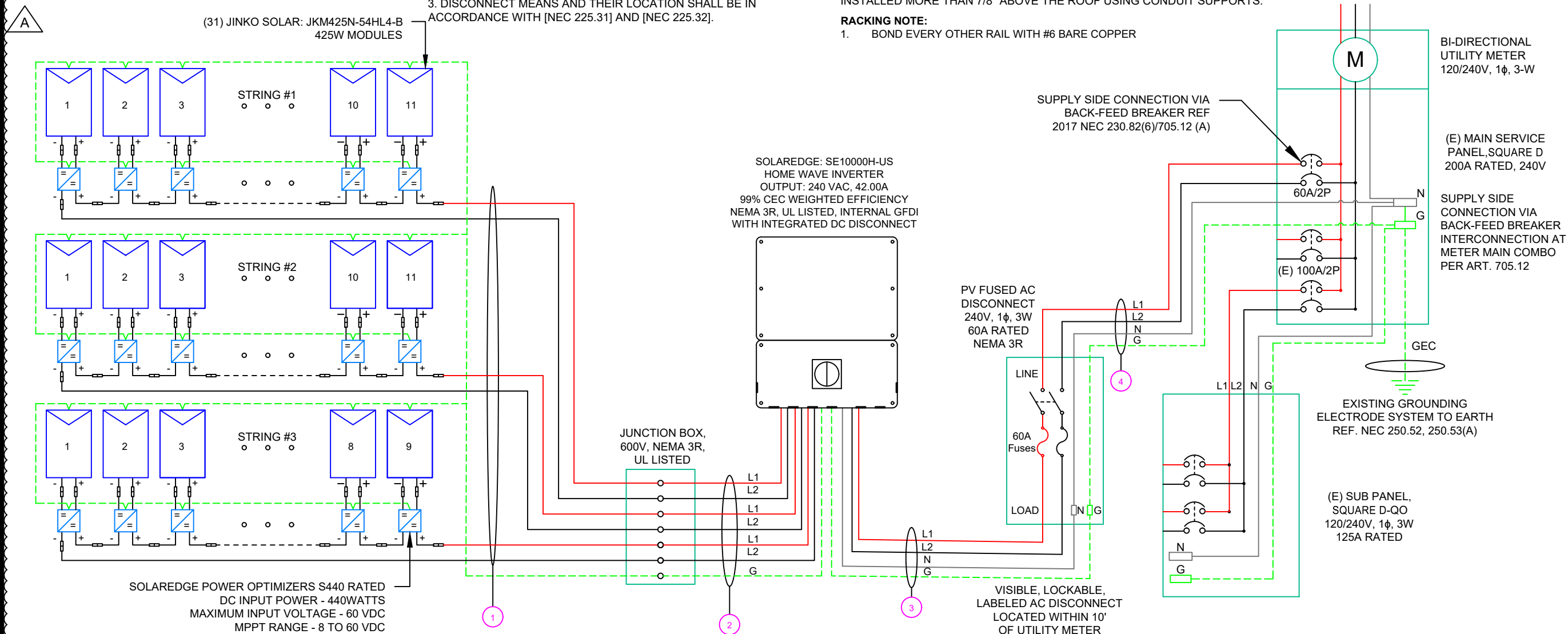
1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
3.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

GROUNDING & GENERAL NOTES:

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

RACKING NOTE:

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER



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

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

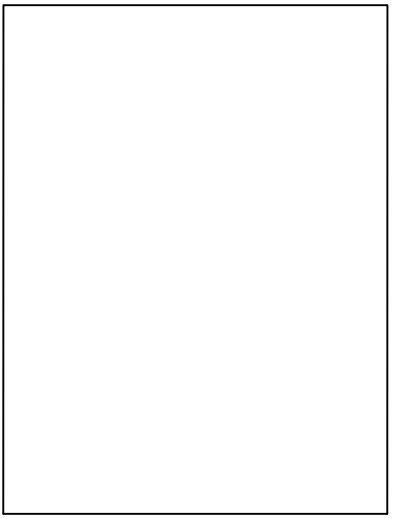
QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
1	(6) #10AWG - PV WIRE/USE-2	N/A	N/A
	(1) #6AWG - BARE COPPER IN FREE AIR		
2	(6) #10AWG - CU, THWN-2	EMT OR LFMC IN ATTIC	3/4"
	(1) #10AWG - CU, THWN-2 GND		
3	(2) #6AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
	(1) #6AWG - CU, THWN-2 N		
	(1) #10AWG - CU,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



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DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

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

SHEET NUMBER
PV-6

1 ELECTRICAL LINE DIAGRAM

PV-6 SCALE: NTS

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	JINKO SOLAR: JKM425N-54HL4-B 425W MODULE
VMP	32.37V
IMP	13.13A
VOC	38.95V
ISC	13.58A
TEMP. COEFF. VOC	-0.25%/°C
MODULE DIMENSION	67.79"L x 44.65"W x 1.38"D (In Inch)

A

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	SOLAREGE: SE10000H-US (240V/10000W) INVERTER
NOMINAL AC POWER	10.000 kW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	42.00A

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

AMBIENT TEMPERATURE SPECS	
AMBIENT TEMP (HIGH TEMP 2%)	38°
RECORD LOW TEMPERATURE	8°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.25%/°C

A

DC FEEDER CALCULATIONS																					
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
STRING 1	JUNCTION BOX	380	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.049	N/A	#N/A
STRING 2	JUNCTION BOX	380	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.049	N/A	#N/A
STRING 3	JUNCTION BOX	380	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.049	N/A	#N/A
JUNCTION BOX	INVERTER	380	15.00	18.75	20	CU #10 AWG	CU #10 AWG	35	PASS	38	6	40	0.91	0.8	29.12	PASS	30	1.24	0.294	3/4" EMT	27.71107

String 1 Voltage Drop	0.343
String 2 Voltage Drop	0.343
String 3 Voltage Drop	0.343

A

AC FEEDER CALCULATIONS																						
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
INVERTER	AC DISCONNECT	240	42	52.5	60	CU #6 AWG	CU #10 AWG	CU #6 AWG	65	PASS	38	2	75	0.91	1	68.25	PASS	5	0.491	0.086	3/4" EMT	32.4953
AC DISCONNECT	POI	240	42	52.5	60	CU #6 AWG	CU #10 AWG	CU #6 AWG	65	PASS	38	2	75	0.91	1	68.25	PASS	5	0.491	0.086	3/4" EMT	32.4953
																			CUMULATIVE VOLTAGE DROP	0.172		

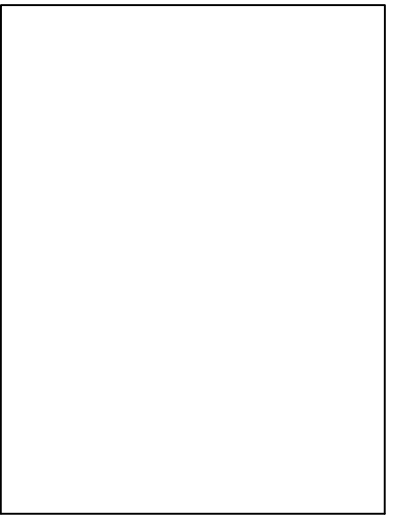
ELECTRICAL NOTES

- 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.



TOP TIER SOLAR SOLUTIONS
 1530 CENTER PARK DR #2911,
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 UNITED STATES

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DESCRIPTION	DATE	REV
INITIAL DESIGN	11/14/2024	
AS BUILT	11/20/2024	A



PROJECT NAME & ADDRESS
**JAMES TANNER
 RESIDENCE**
 14 RINGNECK CT,
 LILLINGTON, NC 27546

DRAWN BY
ESR

SHEET NAME
WIRING CALCULATIONS

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

SHEET NUMBER
PV-7

PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT & ENCLOSURES

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

WARNING

ELECTRIC SHOCK HAZARD

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

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

WARNING

DUAL POWER SUPPLY

SOURCE: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

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

SOLAR PV BREAKER:

BREAKER IS BACKFED
DO NOT RELOCATE

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

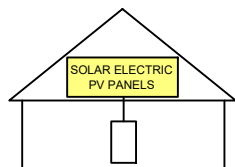
WARNING

POWER SOURCE OUTPUT
CONNECTION. DO NOT
RELOCATE THIS
OVERCURRENT DEVICE

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

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



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

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

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

DC DISCONNECT

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

AC DISCONNECT PHOTOVOLTAIC SYSTEM POWER SOURCE

NOMINAL OPERATING AC VOLATGE **240 V**
RATED AC OUTPUT CURRENT **42.00 A**

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

MAXIMUM VOLTAGE **480 V**
MAXIMUM CIRCUIT CURRENT **27.00A**
MAXIMUM RATED OUTPUT
CURRENT OF THE CHARGE
CONTROLLER OR DC-TO-DC
CONVERTER (IF INSTALLED)

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

TOP TIER

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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



**THE MOST
DEPENDABLE
SOLAR PRODUCT**

EAGLE® 54 G6R

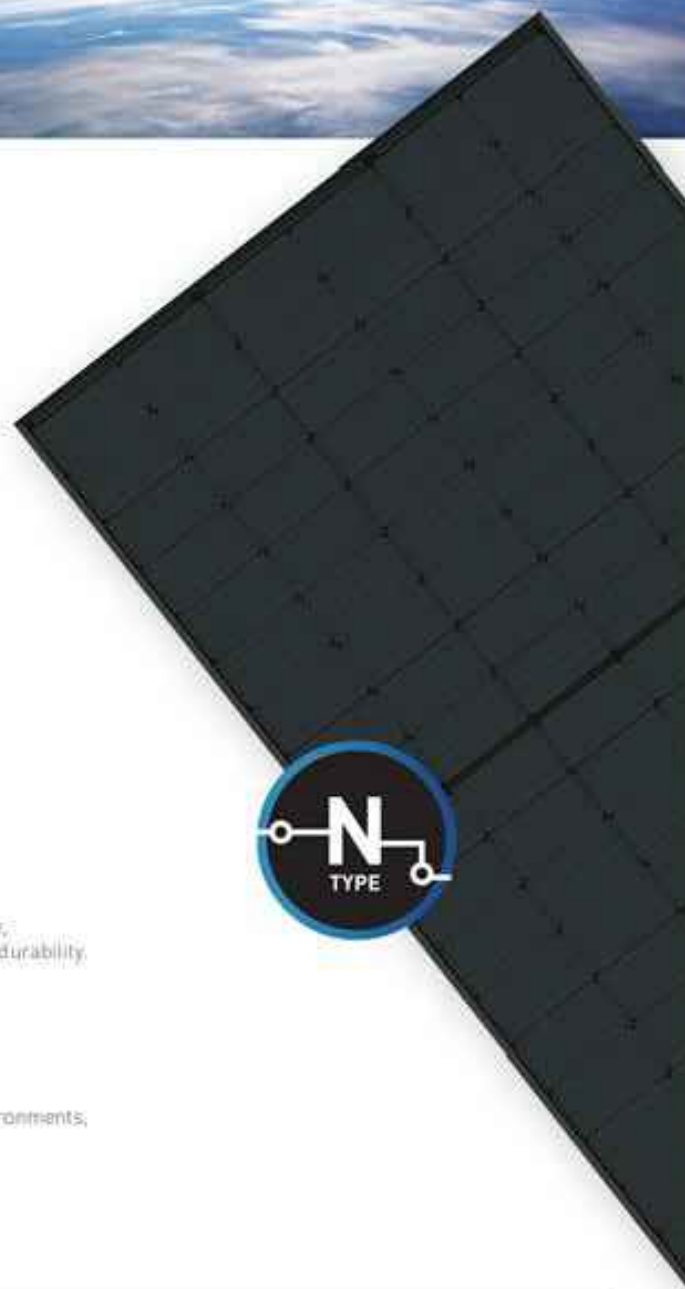
420-440 WATT • N-TYPE TOPCON

Positive power tolerance of 0~+3%

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Top performance in the strictest 3rd party labs
- Automated manufacturing utilizing artificial intelligence
- Vertically integrated, tight controls on quality
- Premium solar factories in USA, Vietnam, and Malaysia

KEY FEATURES

- Superior Aesthetics**
Black backsheet and black frame create ideal look for residential applications.
- N-Type Technology**
N-type cells with Jinko's in-house TOPCon technology offers better performance and improved reliability.
- Thick and Tough**
Fire Type 1 rated module engineered with a thick frame, 3.2mm front side glass, and thick backsheet for added durability.
- Shade Tolerant**
Twin array design allows continued performance even with shading by trees or debris.
- Protected Against All Environments**
Certified to withstand humidity, heat, rain, marine environments, wind, hailstorms, and packed snow.
- Warranty**
25-year product and 30-year linear power warranty.



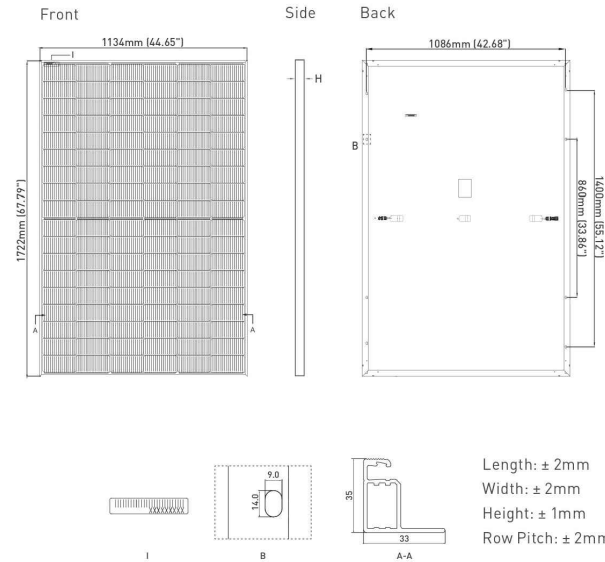
- ISO9001:2015 Quality Standards
- ISO14001:2015 Environmental Standards
- IEC61215, IEC61730 certified products
- ISO45001:2018 Occupational Health & Safety Standards
- UL61730 certified products



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A

ENGINEERING DRAWINGS



MECHANICAL CHARACTERISTICS

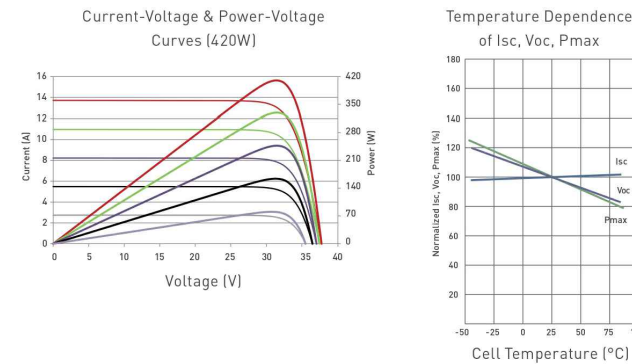
No. of Half Cells	108 (2 x 54)
Dimensions	1722 x 1134 x 35mm (67.79 x 44.65 x 1.38 inch)
Weight	21.0kg (46.3lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68 Rated
Output Cables	12 AWG, 1400mm (55.12in) or Customized Length
Connector	Staubli MC4
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)*

*see Supplemental Installation Manual for higher wind pressure rating solutions

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.29%/°C
Temperature Coefficients of Voc	-0.25%/°C
Temperature Coefficients of Isc	0.045%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1000VDC
Maximum Series Fuse Rating	25A

PACKAGING CONFIGURATION

(Two pallets = One stack)
31pcs/pallets, 62pcs/stack, 806pcs/40 HQ Container

WARRANTY

25-year product and 30-year linear power warranty
1st year degradation not to exceed 1%, each subsequent year not to exceed 0.4%, minimum power at year 30 is 87.4% or greater.

ELECTRICAL CHARACTERISTICS

Module Type	JKM420N-54HL4-B		JKM425N-54HL4-B		JKM430N-54HL4-B		JKM435N-54HL4-B		JKM440N-54HL4-B	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	420Wp	316Wp	425Wp	320Wp	430Wp	323Wp	435Wp	327Wp	440Wp	331Wp
Maximum Power Voltage (Vmp)	32.16V	29.95V	32.37V	30.19V	32.58V	30.30V	32.78V	30.50V	32.99V	30.73V
Maximum Power Current (Imp)	13.06A	10.55A	13.13A	10.60A	13.20A	10.66A	13.27A	10.72A	13.34A	10.77A
Open-circuit Voltage (Voc)	38.74V	36.80V	38.95V	37.00V	39.16V	37.20V	39.36V	37.39V	39.57V	37.59V
Short-circuit Current (Isc)	13.51A	10.91A	13.58A	10.96A	13.65A	11.02A	13.72A	11.08A	13.80A	11.14A
Module Efficiency STC (%)	21.51%		21.76%		22.02%		22.28%		22.53%	

*STC: ☀ Irradiance 1000W/m² 🌡 Cell Temperature 25°C ☁ AM = 1.5
 NOCT: ☀ Irradiance 800W/m² 🌡 Ambient Temperature 20°C ☁ AM = 1.5 🌬 Wind Speed 1m/s

*Power measurement tolerance: ±3%

The company reserves the final right for explanation on any of the information presented hereby. JKM400-420N-54HL4-B-F4-US

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DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-9



CERTIFICATE OF COMPLIANCE

Certificate Number E362479
Report Reference E362479-20200410
Date 2023-July-16

Issued to: JINKO SOLAR CO LTD
No.1, Yingbin Road, Economic Development Zone
Shangrao Jiangxi Sheng 334100 CN

This is to certify that representative samples of PHOTOVOLTAIC MODULES AND PANELS WITH SYSTEM VOLTAGE RATINGS OVER 600 VOLTS
See Addendum Page for Product Designation(s).
Have been evaluated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 61730-1 - Standard for Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction, Edition 2, Issue Date 10/28/2022 and UL 61730-2, Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing, Edition 2, Revision Date 04/25/2023 and CSA C22.2 No. 61730-1:19 December 2019, Photovoltaic (PV) module safety qualification — Part 1: Requirements for construction and CSA C22.2 No. 61730-2:19 December 2019, Photovoltaic (PV) module safety qualification — Part 2: Requirements for testing.

Additional Information: See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Deborah Jennings-Conner
Deborah Jennings-Conner, VP Regulatory Services
UL LLC



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CERTIFICATE OF COMPLIANCE

Certificate Number E362479
Report Reference E362479-20200410
Date 2023-July-16

JKM525N-72HL4-V, JKM530N-72HL4-V, JKM535N-72HL4-V, JKM540N-72HL4-V, JKM545N-72HL4-V, JKM550N-72HL4-V, JKM555N-72HL4-V, JKM560N-72HL4-V, JKM565N-72HL4-V, JKM570N-72HL4-V, JKM575N-72HL4-V.

JKM480N-66HL4-V, JKM485N-66HL4-V, JKM490N-66HL4-V, JKM495N-66HL4-V, JKM500N-66HL4-V, JKM505N-66HL4-V, JKM510N-66HL4-V, JKM515N-66HL4-V, JKM520N-66HL4-V, JKM525N-66HL4-V

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JKM395N-54HL4-V, JKM400N-54HL4-V, JKM405N-54HL4-V, JKM410N-54HL4-V, JKM415N-54HL4-V, JKM420N-54HL4-V, JKM425N-54HL4-V, JKM430N-54HL4-V.

JKM565M-78HL4-V, JKM570M-78HL4-V, JKM575M-78HL4-V, JKM580M-78HL4-V, JKM585M-78HL4-V, JKM590M-78HL4-V, JKM595M-78HL4-V, JKM600M-78HL4-V, JKM605M-78HL4-V

JKM370M-72HBL-V, JKM375M-72HBL-V, JKM380M-72HBL-V, JKM385M-72HBL-V, JKM390M-72HBL-V, JKM395M-72HBL-V, JKM400M-72HBL-V, JKM405M-72HBL-V, JKM410M-72HBL-V, JKM415M-72HBL-V, JKM420M-72HBL-V.

JKM330M-60HBL-V, JKM335M-60HBL-V, JKM340M-60HBL-V, JKM345M-60HBL-V, JKM350M-60HBL-V.

JKM515N-72HL4-B-V, JKM520N-72HL4-B-V, JKM525N-72HL4-B-V, JKM530N-72HL4-B-V, JKM535N-72HL4-B-V, JKM540N-72HL4-B-V, JKM545N-72HL4-B-V, JKM550N-72HL4-B-V, JKM555N-72HL4-B-V, JKM560N-72HL4-B-V, JKM565N-72HL4-B-V, JKM570N-72HL4-B-V.

JKM475N-66HL4-B-V, JKM480N-66HL4-B-V, JKM485N-66HL4-B-V, JKM490N-66HL4-B-V, JKM495N-66HL4-B-V, JKM500N-66HL4-B-V, JKM505N-66HL4-B-V, JKM510N-66HL4-B-V, JKM515N-66HL4-B-V, JKM520N-66HL4-B-V.

JKM430N-60HL4-B-V, JKM435N-60HL4-B-V, JKM440N-60HL4-B-V, JKM445N-60HL4-B-V, JKM450N-60HL4-B-V, JKM455N-60HL4-B-V, JKM460N-60HL4-B-V, JKM465N-60HL4-B-V, JKM470N-60HL4-B-V.

JKM385N-54HL4-B-V, JKM390N-54HL4-B-V, JKM395N-54HL4-B-V, JKM400N-54HL4-B-V, JKM405N-54HL4-B-V, JKM410N-54HL4-B-V, JKM415N-54HL4-B-V, JKM420N-54HL4-B-V, JKM425N-54HL4-B-V, JKM430N-54HL4-B-V, JKM435N-54HL4-B-V, JKM440N-54HL4-B-V.

JKM585N-78HL4R-V, JKM590N-78HL4R-V, JKM595N-78HL4R-V, JKM600N-78HL4R-V, JKM605N-78HL4R-V, JKM610N-78HL4R-V, JKM615N-78HL4R-V, JKM620N-78HL4R-V, JKM625N-78HL4R-V, JKM630N-78HL4R-V, JKM635N-78HL4R-V, JKM640N-78HL4R-V, JKM645N-78HL4R-V, JKM650N-78HL4R-V

Deborah Jennings-Conner
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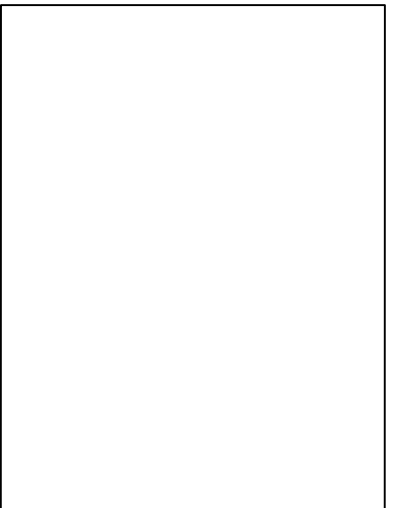
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11" X 17"

SHEET NUMBER

PV-10

Power Optimizer For Residential Installations

S440 / S500 / S500B / S650B



POWER OPTIMIZER

Enabling PV power optimization at the module level

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

*Functionality subject to inverter model and firmware version

solaredge.com

solaredge

Power Optimizer For Residential Installations

S440 / S500 / S500B / S650B

	S440	S500	S500B	S650B	UNIT
INPUT					
Rated Input DC Power ⁽¹⁾	440	500		650	W
Absolute Maximum Input Voltage (Voc)	60		125	85	Vdc
MPPT Operating Range	8 – 60		12.5 – 105	12.5 – 85	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5		15		Adc
Maximum Efficiency		99.5			%
Weighted Efficiency		98.6			%
Overvoltage Category		II			
OUTPUT DURING OPERATION					
Maximum Output Current		15			Adc
Maximum Output Voltage	60		80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)					
Safety Output Voltage per Power Optimizer		1 ± 0.1			Vdc
STANDARD COMPLIANCE⁽²⁾					
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011				
Safety	IEC62109-1 (class II safety), UL1741				
Material	UL94 V-0, UV Resistant				
RoHS	Yes				
Fire Safety	VDE-AR-E 2100-712:2018-12				
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage		1000			Vdc
Dimensions (W x L x H)	129 x 155 x 30		129 x 165 x 45		mm
Weight	720		790		gr
Input Connector		MC4 ⁽³⁾			
Input Wire Length		0.1			m
Output Connector		MC4			
Output Wire Length		(+) 2.3, (-) 0.10			m
Operating Temperature Range ⁽⁴⁾		-40 to +85			°C
Protection Rating		IP68			
Relative Humidity		0 – 100			%

(1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.

(2) For details about CE compliance, see [Declaration of Conformity - CE](#).

(3) For other connector types please contact SolarEdge.

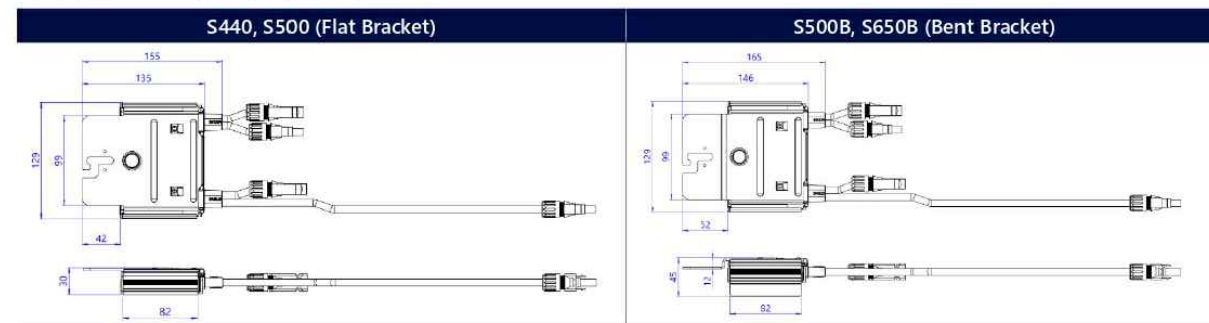
(4) Power de-rating is applied for ambient temperatures above +85°C for S440 and S500, and for ambient temperatures above +75°C for S500B. Refer to the [Power Optimizers Temperature De-Rating Technical Note](#) for details.

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

(5) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.

(6) If the inverter's rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverter's maximum input DC power.

Refer to [Application Note: Single String Design Guidelines](#).



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CE RoHS

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SolarEdge Home Wave Inverter For North America

SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / **SE10000H-US** / SE11400H-US



INVERTERS

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014-2023 per articles 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

solaredge.com



/ SolarEdge Home Wave Inverter For North America

SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / **SE10000H-US** / SE11400H-US

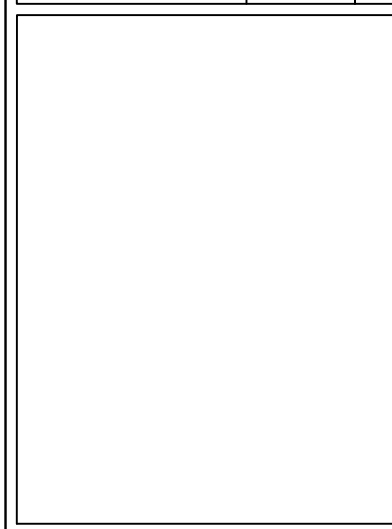
Applicable to inverters with part number	SEX000H-XXXXBXX4					SE11400H-XXXXBXX5	Units
	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT							
Rated AC Power Output	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5*						Hz
Maximum Continuous Output Current @240V	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85						
GFDI Threshold	1						A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes						
INPUT							
Maximum DC Power @240V	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes						
Maximum Input Voltage	480						Vdc
Nominal DC Input Voltage	380						Vdc
Maximum Input Current @240V ⁽²⁾	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V ⁽²⁾	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45						Adc
Reverse-Polarity Protection	Yes						
Ground-Fault Isolation Detection	600k Sensitivity						
Maximum Inverter Efficiency	99.2						%
CEC Weighted Efficiency	99					99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5						W

(1) For other regional settings please contact SolarEdge support.
(2) A higher current source may be used; the inverter will limit its input current to the values stated.



TOP TIER SOLAR SOLUTIONS
1530 CENTER PARK DR #2911,
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DESCRIPTION	DATE	REV
INITIAL DESIGN	11/14/2024	
AS BUILT	11/20/2024	A



PROJECT NAME & ADDRESS

**JAMES TANNER
RESIDENCE**

**14 RINGNECK CT,
LILLINGTON, NC 27546**

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-12



TOP TIER SOLAR SOLUTIONS

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

REVISIONS		
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AS BUILT	11/20/2024	A

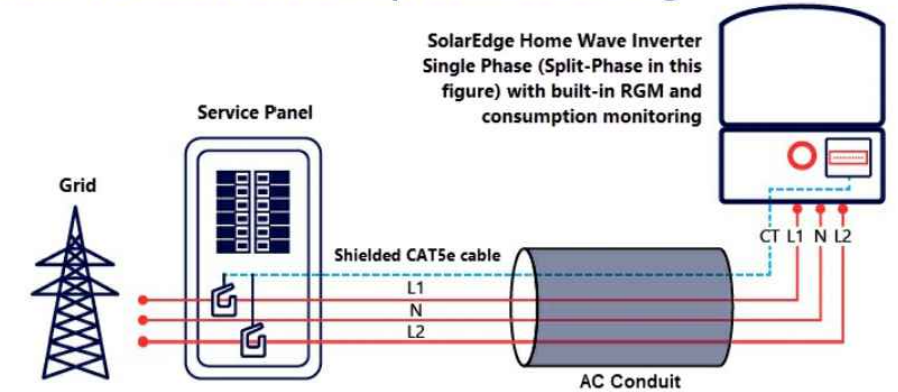
/ SolarEdge Home Wave Inverter For North America

SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / **SE10000H-US** / SE11400H-US

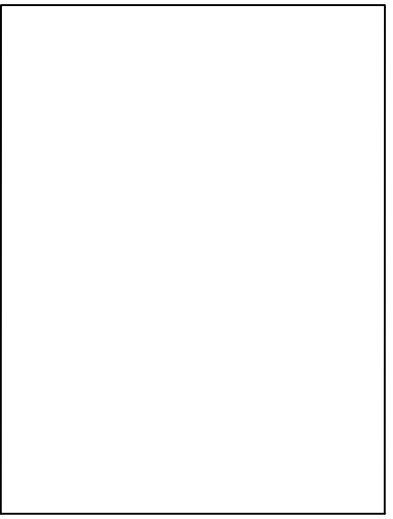
Applicable to inverters with part number	SEXXXXH-XXXXBXX4					SE11400H-XXXXBXX5
	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
ADDITIONAL FEATURES						
Supported Communication Interfaces:	RS485, Ethernet, ZigBee (optional), wireless SolarEdge Home Network (optional) ⁽³⁾ , Wi-Fi (optional), Cellular (optional)					
Revenue Grade Metering, ANSI C12.20	Optional ⁽⁴⁾					
Consumption Metering	Optional ⁽⁴⁾					
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection					
Rapid Shutdown - NEC 2014-2023 per articles 690.11 and 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect					
STANDARD COMPLIANCE						
Safety	UL1741, UL1741 SA, UL1741 SB, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07					
Grid Connection Standards	IEEE1547-2018, Rule 21, Rule 14 (H), CSA C22.3 No. 9					
Emissions	FCC Part 15 Class B					
INSTALLATION SPECIFICATIONS						
AC Output Conduit Size / AWG Range	1" Maximum / 14 – 6 AWG			1" Maximum / 14 – 4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1 – 2 strings / 14 – 6 AWG			1" Maximum / 1 – 3 strings / 14 – 6 AWG		
Dimensions with Safety Switch (H x W x D)	17.7 x 14.6 x 6.8 / 450 x 370 x 174			21.06 x 14.6 x 7.3 / 535 x 370 x 185	21.06 x 14.6 x 8.2 / 535 x 370 x 208 ⁽⁵⁾	in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6	44.9 / 20.4 ⁽⁶⁾	lb / kg
Noise	< 25			< 50		dBA
Cooling	Natural Convection					
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽⁶⁾					
Protection Rating	NEMA 4X (Inverter with Safety Switch)					

(3) For more information, refer to the SolarEdge Home Network datasheet
 (4) Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BEI4. For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box.
 (5) SE11400H-USxxxBox5 is the updated PN, though SE11400H-USxxxBox4 will still be available. All specifications are similar for both models, EXCLUDING the weight and dimensions [HxWxD]. The weight and dimensions of SE11400H-USxxxBox4 are 17.6 [kg] and 21.06-14.6-7.3 / 535-370-185 [in/mm], accordingly.
 (6) Full power up to at least 50°C / 122°F; for power de-rating information refer to the Temperature De-rating Technical Note for North America.

How to Enable Consumption Monitoring



By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills.



PROJECT NAME & ADDRESS

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RESIDENCE**

14 RINGNECK CT,
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SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-13



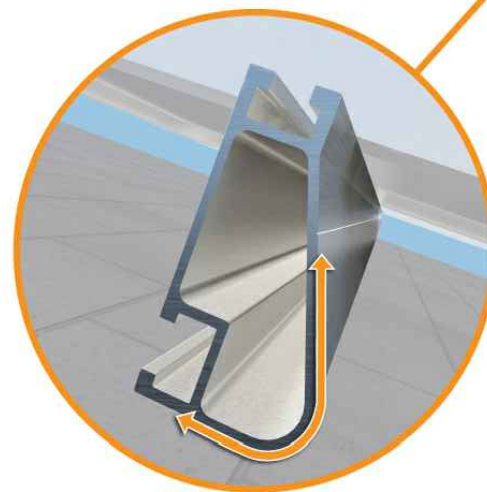
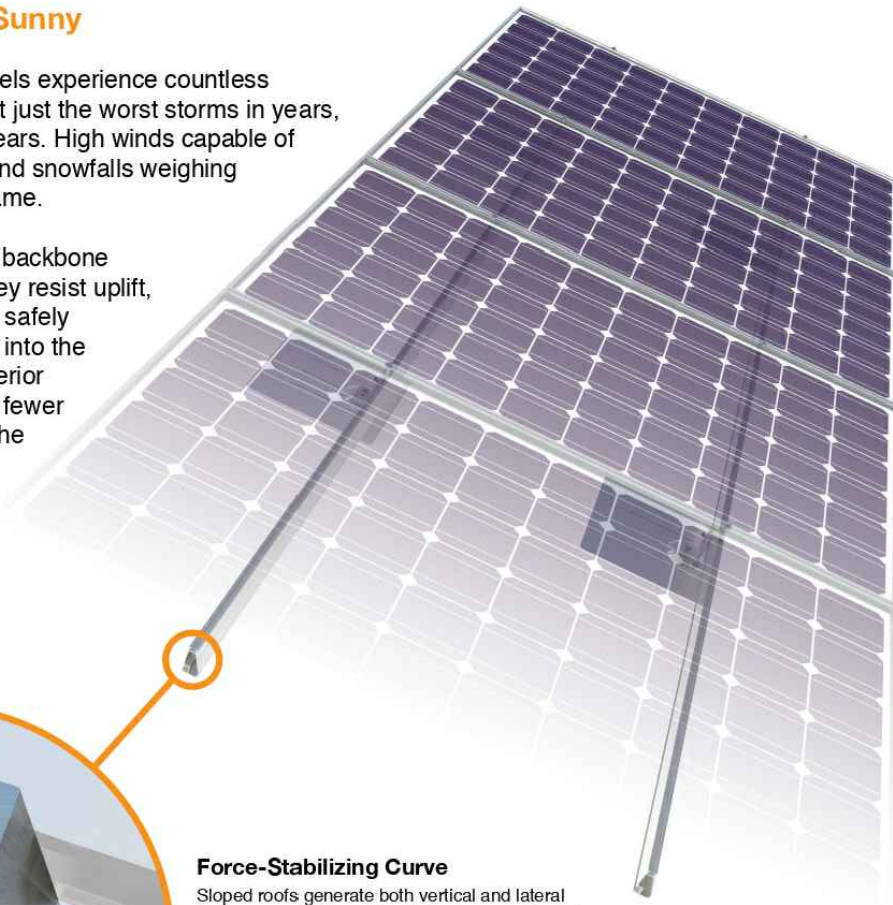


XR Rail® Family

Solar Is Not Always Sunny

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

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



Force-Stabilizing Curve

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

Compatible with Flat & Pitched Roofs



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



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

Corrosion-Resistant Materials

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



XR Rail® Family

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



XR10

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

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



XR100

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

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



XR1000

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

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

Rail Selection

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

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

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



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SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER

PV-14



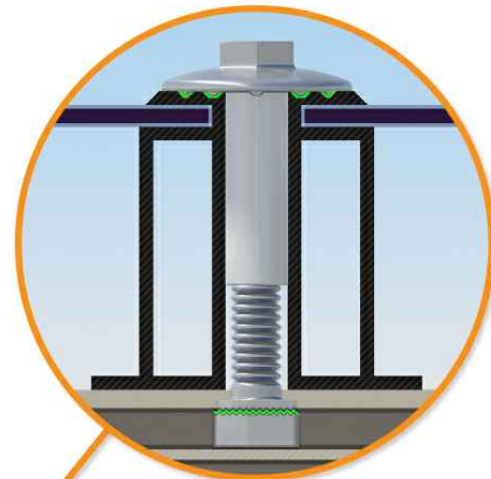
UFO® Family of Components

Simplified Grounding for Every Application

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

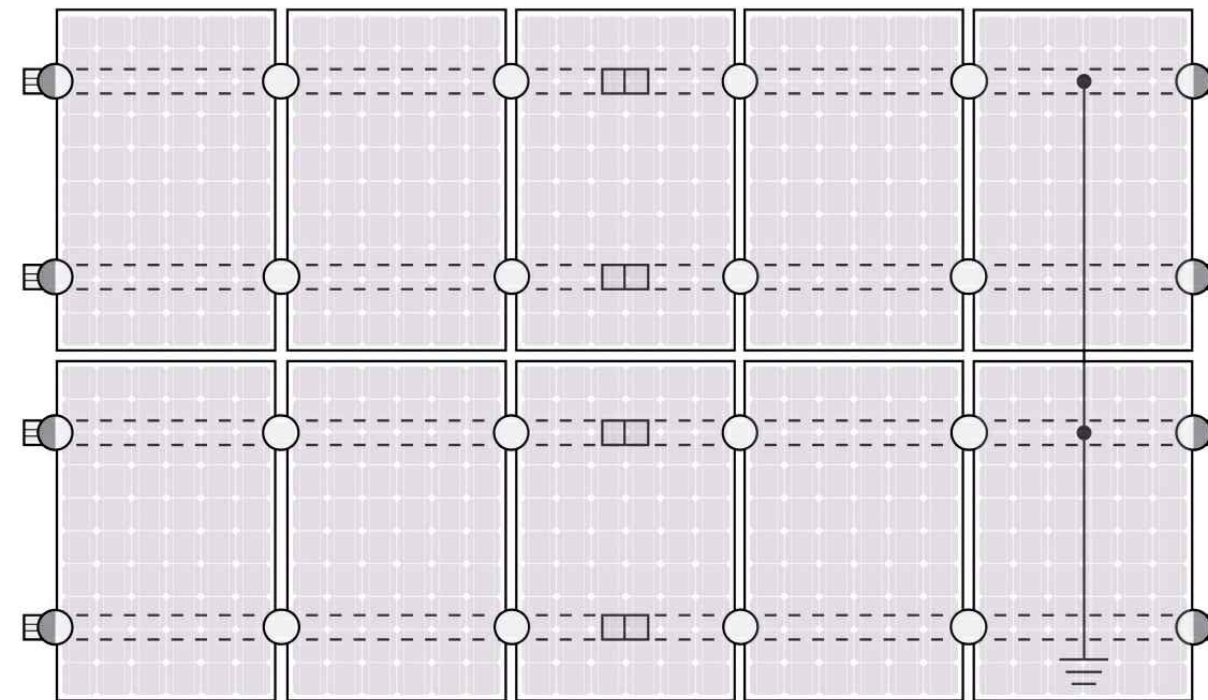
UFO® hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.

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



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

System Diagram



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

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

UL Certification

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

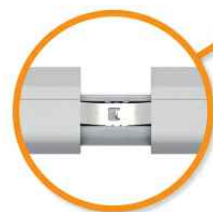
UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

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

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



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



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



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



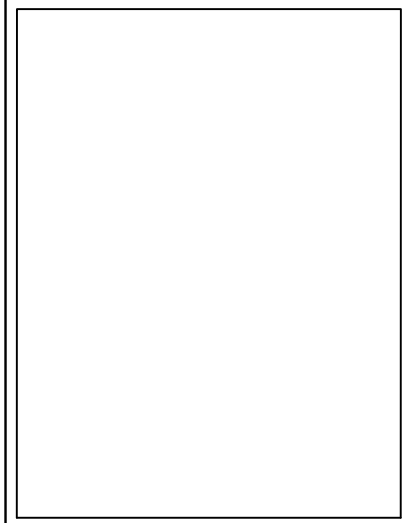
Bonded Attachments
The bonding bolt attaches and bonds the L-foot® to the rail. It is installed with the same socket as the rest of the system.



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SHEET NAME
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SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

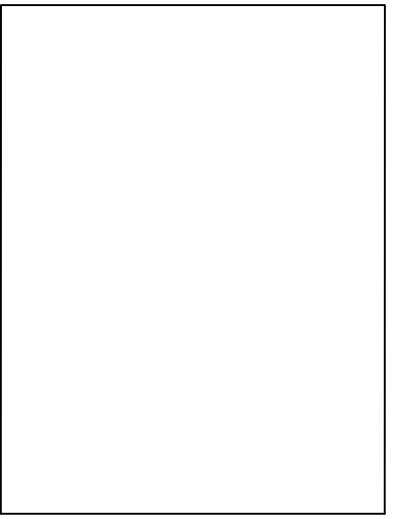
ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

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

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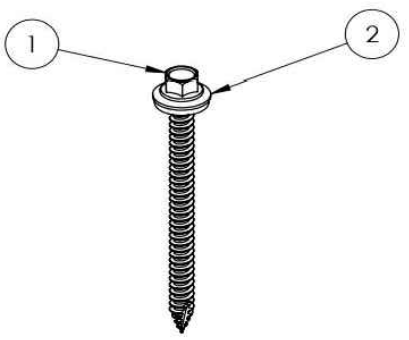
SHEET NUMBER
PV-16



QuickMount® RD Structural Screw



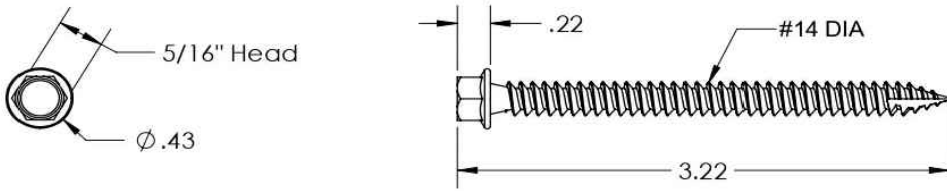
TOP TIER SOLAR SOLUTIONS
 1530 CENTER PARK DR #2911,
 CHARLOTTE, NC 28217,
 UNITED STATES



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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QM-RD-1430-01-M1 Cut Sheet Rev 1.0

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LILLINGTON, NC 27546

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**EQUIPMENT
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SHEET SIZE
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11" X 17"**

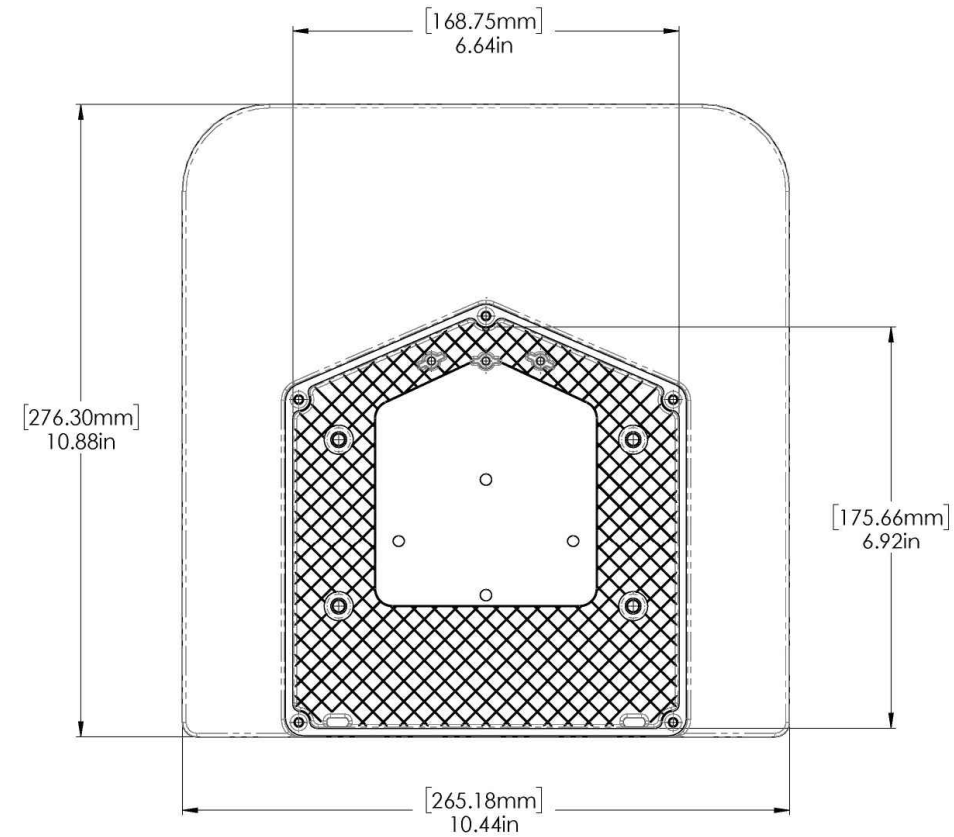
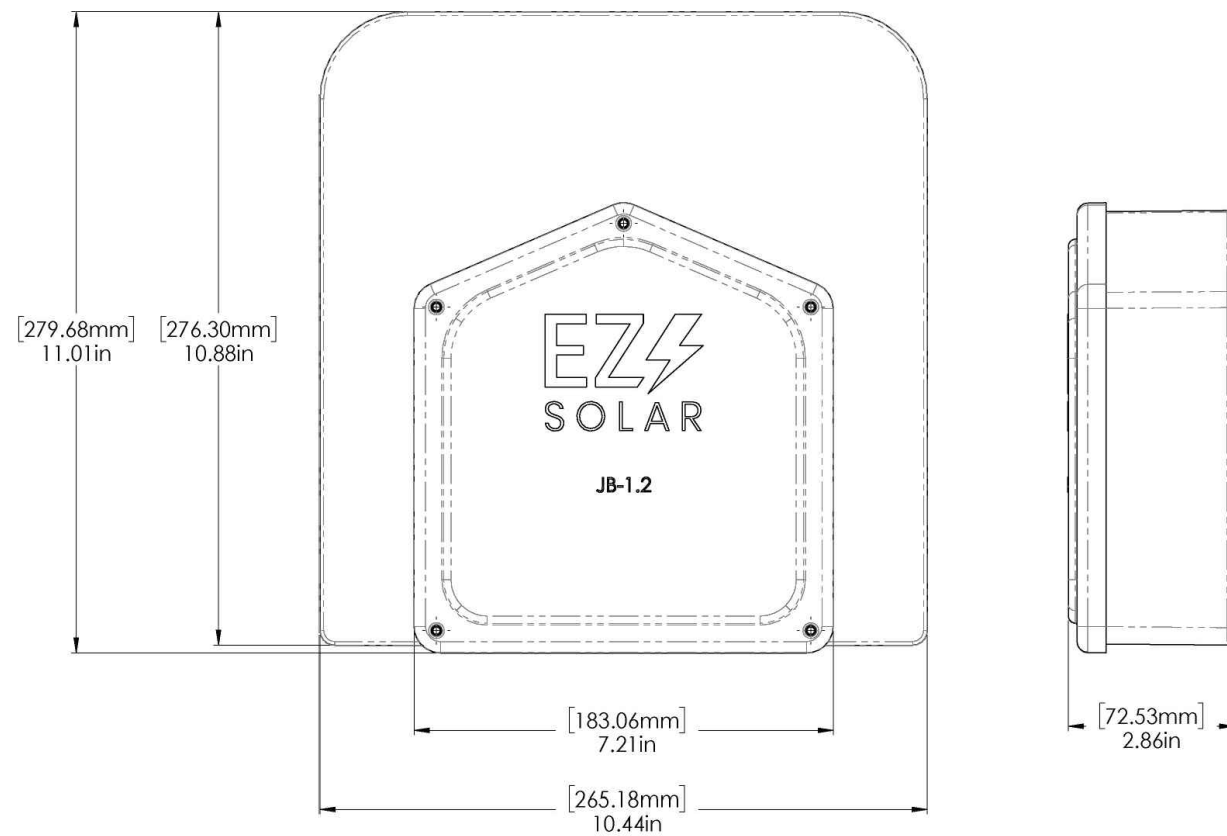
SHEET NUMBER
PV-17

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

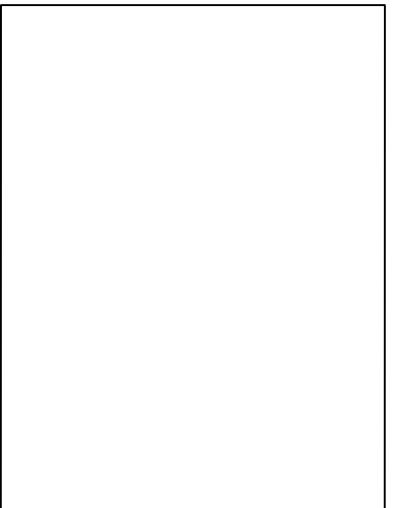
SIZE	DWG. NO.	REV
B	JB-1.2	
SCALE: 1:2	WEIGHT: 1.45 LBS	SHEET 1 OF 3

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

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



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SHEET NAME
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SPECIFICATION**

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

SHEET NUMBER
PV-18