



Town of Erwin
Zoning Application & Permit
Planning & Inspections Department

Permit #
25-0112

Rev Sep2014

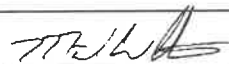
Each application should be submitted with an attached plot/site plan with the proposed use/structure showing lot shape, existing and proposed buildings, parking and loading areas, access drives and front, rear, and side yard dimensions.

Name of Applicant	Top Tier Solar Solutions LLC	Property Owner	Melinda Green
Home Address	1530 Center Park Drive	Home Address	109 Nicole Street
City, State, Zip	Charlotte NC 28217	City, State, Zip	Erwin, NC 28339
Telephone	855.997.1213	Telephone	919.906.8048
Email	nc@toptiersolarsolutions.com	Email	

Address of Proposed Property		109 Nicole Street, Erwin Drive	
Parcel Identification Number(s) (PIN)		Estimated Project Cost	50462.00
What is the applicant requesting to build / what is the proposed use of the subject property? Be specific.		21 Roof Mounted Solar Photovoltaic Modules on existing residence.	
Description of any proposed improvements to the building or property		21 Roof Mounted Solar Photovoltaic Modules on existing residence.	
What was the Previous Use of the subject property?			
Does the Property Access DOT road?			
Number of dwelling/structures on the property already		Property/Parcel size	
Floodplain SFHA <u> </u> Yes <u> </u> No	Watershed <u> </u> Yes <u> </u> No	Wetlands <u> </u> Yes <u> </u> No	
MUST circle one that applies to property		Existing/Proposed Septic System Or Existing/Proposed County/City Sewer	

Owner/Applicant Must Read and Sign

The undersigned property owner, or duly authorized agent/representative thereof certifies that this application and the forgoing answers, statements, and other information herewith submitted are in all respects true and correct to the best of their knowledge and belief. The undersigning party understands that any incorrect information submitted may result in the revocation of this application. Upon issuance of this permit, the undersigning party agrees to conform to all applicable town ordinances, zoning regulations, and the laws of the State of North Carolina regulating such work and to the specifications of plans herein submitted. The undersigning party authorizes the Town of Erwin to review this request and conduct a site inspection to ensure compliance to this application as approved.

Michael Whitson		3/10/2025
Print Name	Signature of Owner or Representative	Date

For Office Use

Zoning District	B10	Existing Nonconforming Uses or Features	NA
Front Yard Setback	35	Other Permits Required	<u> </u> Conditional Use <u> </u> Building <u> </u> Fire Marshal <u> </u> Other
Side Yard Setback	10	Requires Town Zoning Inspection(s) <u> </u> Foundation <u> </u> Prior to C. of O.	
Rear Yard Setback	35	Zoning Permit Status	<u> </u> Approved <u> </u> Denied
		Fee Paid: 825	Date Paid: Staff Initials:

Comments	Electrical permits from Harnett County
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Signature of Town Representative: 	Date <u>Approved</u> Denied: 3/10/25
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PHOTOVOLTAIC ROOF MOUNT SYSTEM

21 MODULES-ROOF MOUNTED - 8.505 kW DC, 7.600 kW AC

109 NICOLE DR, ERWIN, NC 28339

TOP TIER
SOLAR SOLUTIONS

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

PROJECT DATA

PROJECT ADDRESS:
109 NICOLE DR,
ERWIN, NC 28339

OWNER:
MELINDA GREEN

DESIGNER:
ESR

SCOPE: 8.505 kW DC ROOF MOUNT
SOLAR PV SYSTEM WITH
21 JA SOLAR JAM54S31-405/MR 405W
PV MODULES WITH
21 SOLAREDGE S440 POWER OPTIMIZERS AND
01 SOLAREDGE SE7600H-US (240V/7600W)
INVERTER

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

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 250.60 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 SHALL 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 GROUNDING 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

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME

COVER SHEET

SHEET SIZE

ANSI B
11" X 17"

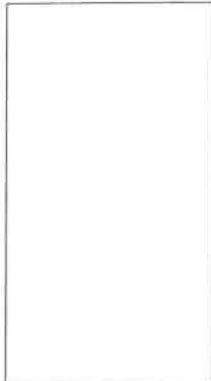
SHEET NUMBER

PV-1

SHEET INDEX

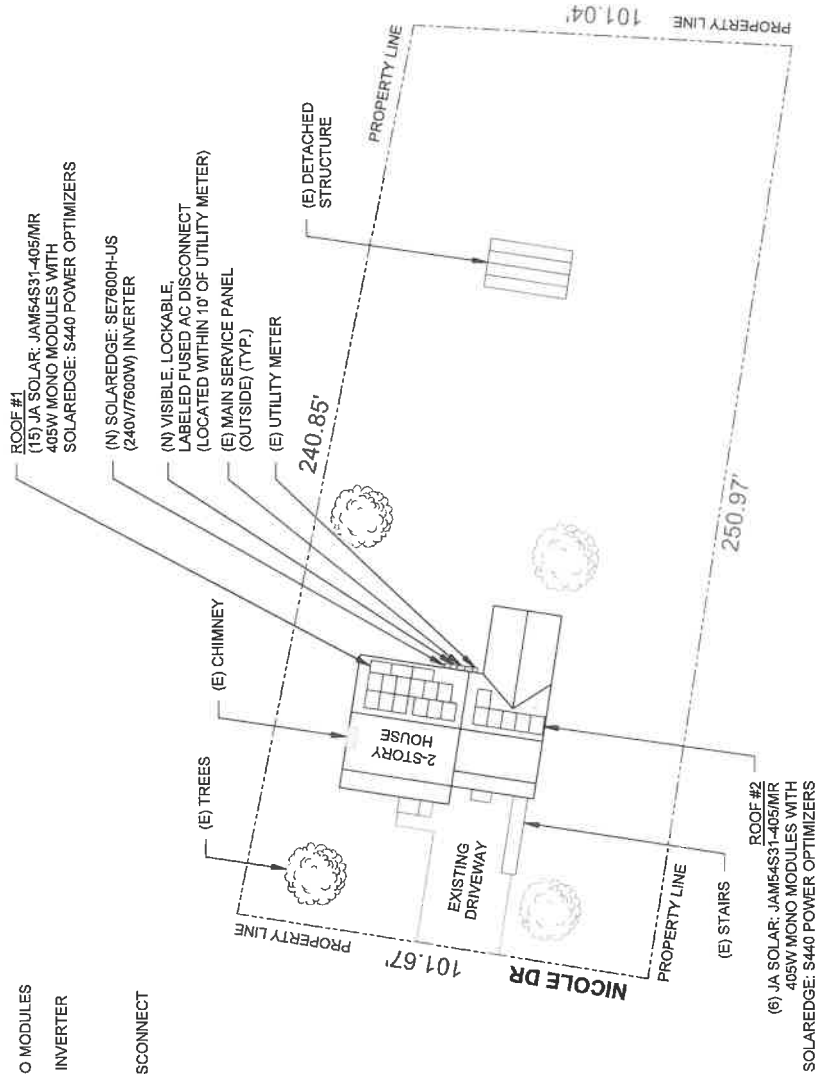
PV-1 COVER SHEET
PV-2 SITE PLAN
PV-3 ROOF PLAN & MODULES
PV-4 ELECTRICAL PLAN
PV-5 STRUCTURAL DETAIL
PV-6 ELECTRICAL LINE DIAGRAM
PV-7 WIRING CALCULATIONS
PV-8 LABELS
PV-9+ EQUIPMENT SPECIFICATIONS

SIGNATURE



PROJECT DESCRIPTION:

21 X JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 8.505 KW DC
AC SYSTEM SIZE: 7.600 KW AC
EQUIPMENT SUMMARY
21 JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
21 SOLAREEDGE: S440 POWER OPTIMIZERS
01 SOLAREEDGE: SE7600H-US (240V/7600W) INVERTER
ROOF ARRAY AREA #1:- 315.15 SQ. FT.
ROOF ARRAY AREA #2:- 126.06 SQ. FT.
NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT
LOCATED WITHIN 10' OF UTILITY METER



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



TOP TIER SOLAR SOLUTIONS
1530 CENTER PARK DR #2311,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	03/10/2025	



STRUCTURAL ONLY
3-10-2025

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR.
ERWMN, NC 28339

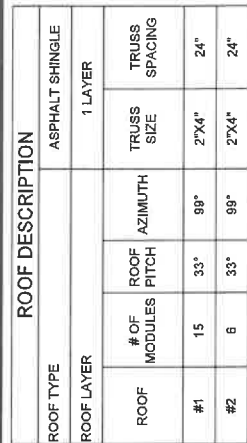
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ESR

SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

NUMBER OF MODULES = 21 MODULES
MODULE TYPE = JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
MODULE WEIGHT = 47.39 LBS / 21.5 kg.
MODULE DIMENSIONS = 67.79" x 44.65" = 21.01 SF



ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
441.21	2199.65	21%

ARRAY AREA & ROOF AREA CALC'S

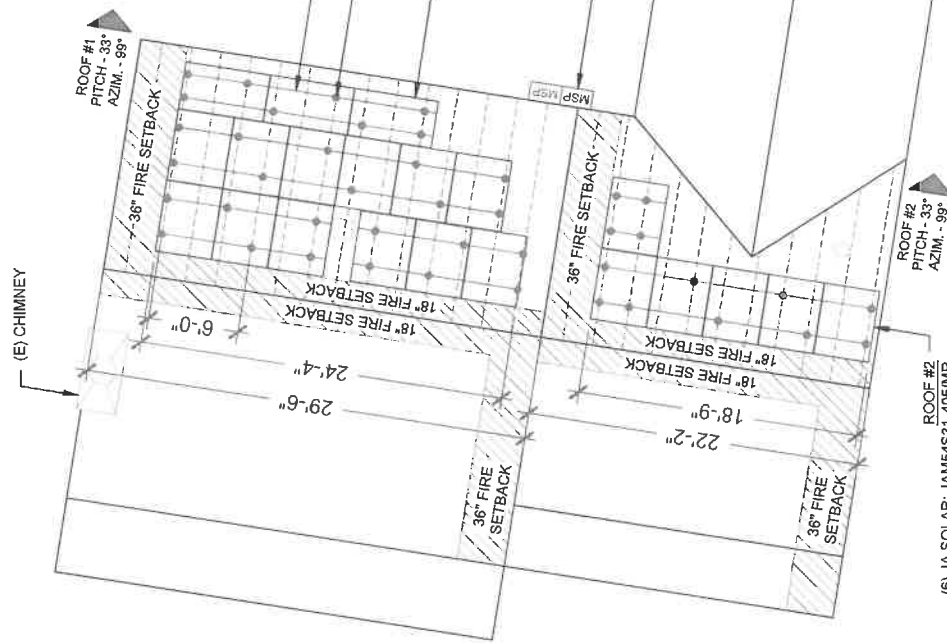
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (SQ. FT.)	ROOF AREA COVERED BY ARRAY (%)
441.21	2139.85	21

(N) IRONRIDGE XR-10 RAIL (TYP.)

IRONRIDGE HALO ULTRAGRIP ATTACHMENTS
IN ROOF TRUSS TOP CHORD ONLY

ROOF #1
(15) JA SOLAR: JAM54S31-405/MR
405W MONO MODULES WITH
SOLAREGE: S440 POWER OPTIM

(E) MAIN SERVICE PANEL
(OUTSIDE) (TYP.)



ROOF #2
(6) JA SOLAR: JAM54S31-405/MR
405W MONO MODULES WITH
SOLAREGE: S440 POWER OPTIMIZERS

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY

100

SHEET NAME
ROOF PLAN &
MODULES

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER
PV-3

LEGEND

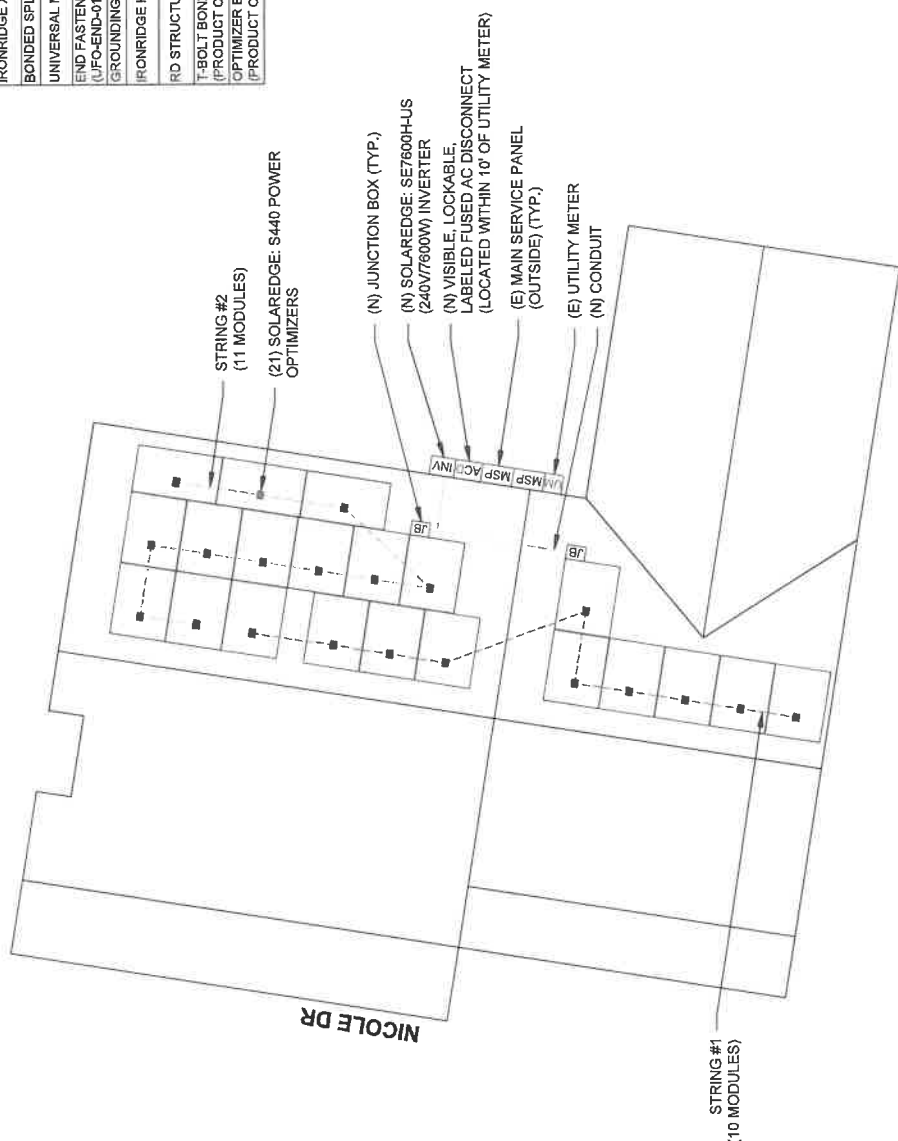
- JUNCTION BOX
- INVERTER
- AC DISCONNECT
- UTILITY METER
- MAIN SERVICE PANEL
- SUB PANEL
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- TRUSS
- CONDUIT

1 | ROOF PLAN & MODULES

SCALE: 1/8" = 1'-0"

DC SYSTEM SIZE: 8.505 kW DC
AC SYSTEM SIZE: 7.500 kW AC
(21) JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
WITH (21) SOLAREDDGE: S440 POWER OPTIMIZERS
LOCATED UNDER EACH PANEL AND
01 SOLAREDDGE: SE7600H-US (240V/7600W) INVERTER

STRING LEGENDS
--- STRING #1
--- STRING #2



BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
SOLAR PV MODULES: JA SOLAR: JAM54S31-405/MR 405W MODULE	21
OPTIMIZERS: SOLAREDDGE: S440 POWER OPTIMIZERS	21
INVERTER: SOLAREDDGE: SE7600H-US (240V/7600W) INVERTER	01
JUNCTION BOXES: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO 280	2
AC DISCONNECT FUSED AC DISCONNECT, 80A FUSED, (2) 40A FUSES 240V NEMA 3R, UL LISTED	1
IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A)	18
BONDED SPLICE, XR10 (XR10-BOSS-01-M1)	6
UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1)	30
END FASTENING OBJECT (END CLAMP, 30-40MM), MILL (UFO-END-01-A1)	24
GROUNDING LUG (XR-LUG-03-A1)	6
IRONRIDGE HALO ULTRAGRIP ATTACHMENTS (GM-HUG-01-M1)	44
RD STRUCTURAL SCREW, 3.0L (HW-RD1430-01-M1)	88
T-BOLT BONDING HARDWARE (BHW-TB-02-A1) (PRODUCT CODE 580-0116)	44
OPTIMIZER BONDING HARDWARE T-BOLT (BHW-AM-01-A1) (PRODUCT CODE 270-0152)	21

LEGEND

JB

INV

ACD

UM

MSP

SUB

- JUNCTION BOX

- INVERTER

- AC DISCONNECT

- UTILITY METER

- MAIN SERVICE PANEL

- SUB PANEL

- VENT, ATTIC FAN (ROOF OBSTRUCTION)

- ROOF ATTACHMENT

- TRUSS

- CONDUIT

TOP TIER

SOLAR SOLUTIONS

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

REVISIONS	DESCRIPTION	DATE	REV
	INITIAL DESIGN	03/10/2025	

PROJECT NAME & ADDRESS
MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
ELECTRICAL PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	03/10/2025
REV	



STRUCTURAL ONLY
3-10-2025

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

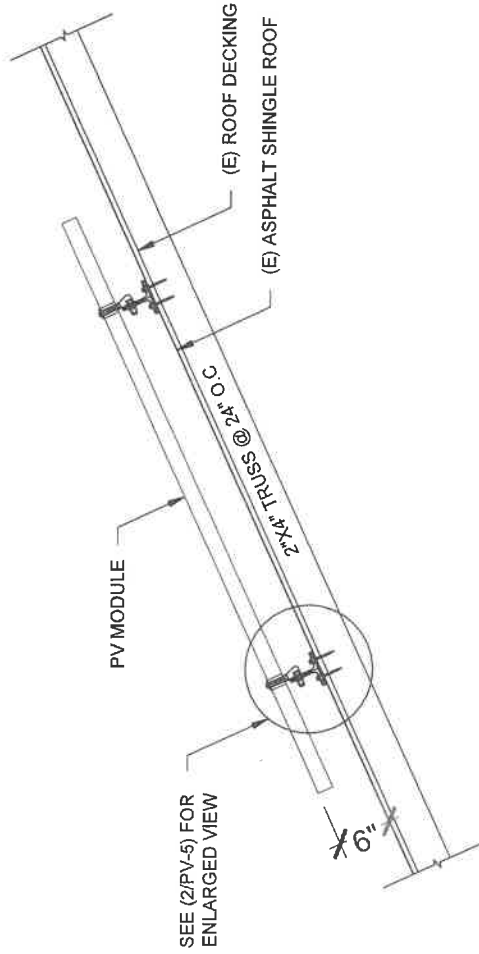
DRAWN BY
ESR

SHEET NAME

STRUCTURAL DETAIL

SHEET SIZE
ANSI B
11" X 17"

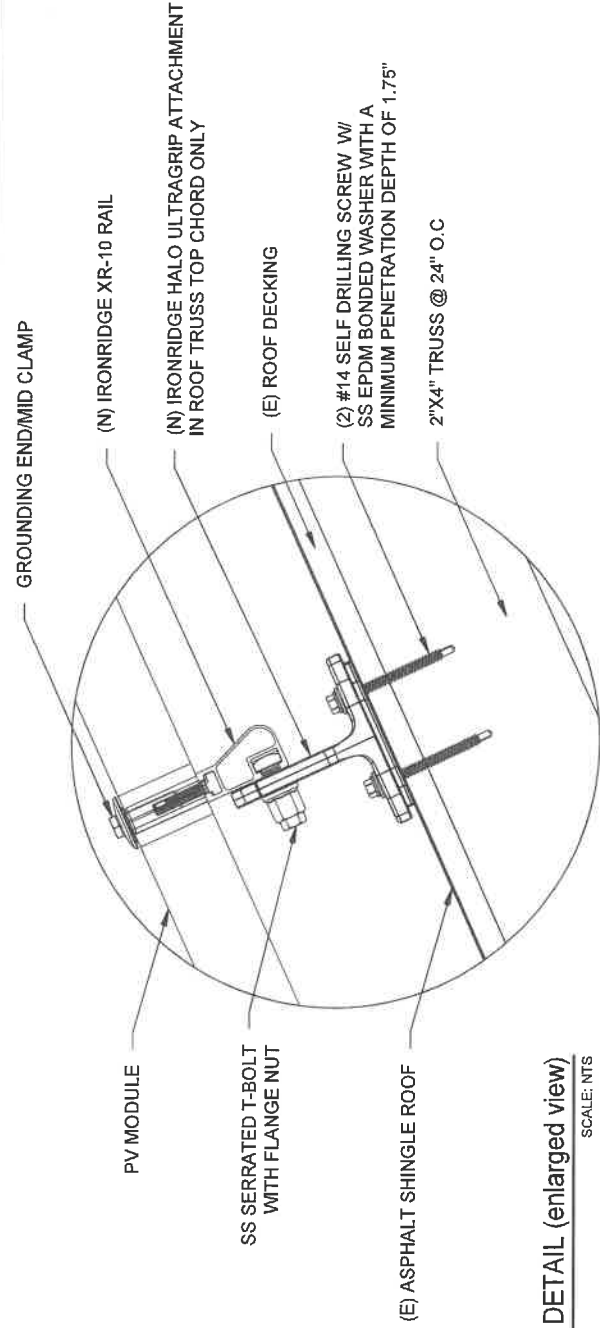
SHEET NUMBER
PV-5



1 STRUCTURAL ATTACHMENT (Side view)

SCALE: N.T.S.

PV-5



2 ATTACHMENT DETAIL (enlarged view)

SCALE: N.T.S.

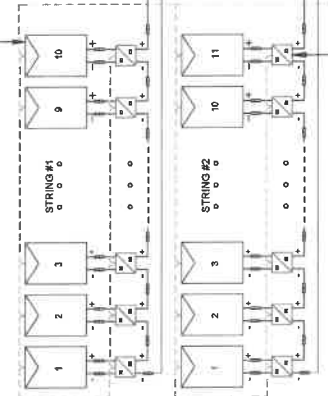
PV-5

DC SYSTEM SIZE: 8.505 KW DC
AC SYSTEM SIZE: 7.800 KW AC

(21) JA SOLAR: JAM9431-405MR 405W MONO MODULES
WITH (21) SOLAREGE: S440 POWER OPTIMIZERS
LOCATED UNDER EACH PANEL (240V) AND
(01) STRING OF 11 MODULES (240V/7600W) INVERTER
(01) STRING OF 11 MODULES ARE CONNECTED IN SERIES

BACKFEED BREAKER CALCULATION (12% RULE)
(MAIN BUS X 1.2 = MAIN BREAKER) >= (PV BREAKER)
(200A X 1.2 = 240A) >= (60A)
(60A) >= (40A) HENCE OK

(21) JA SOLAR: JAM9431-405MR
405W MODULES



SOLAREGE POWER OPTIMIZERS S440 RATED
DC INPUT VOLTAGE: 60V TO 150V
MAXIMUM INPUT VOLTAGE: 150V
MPPT RANGE: 8 TO 40 VDC
MAXIMUM SHORT CIRCUIT CURRENT: 14.5 ADC
MAXIMUM OUTPUT CURRENT: 15 ADC
MAXIMUM POWER: 405W
5700 WATTS STC PER STRING MAXIMUM

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].
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 CONDUCTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINAL).
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:

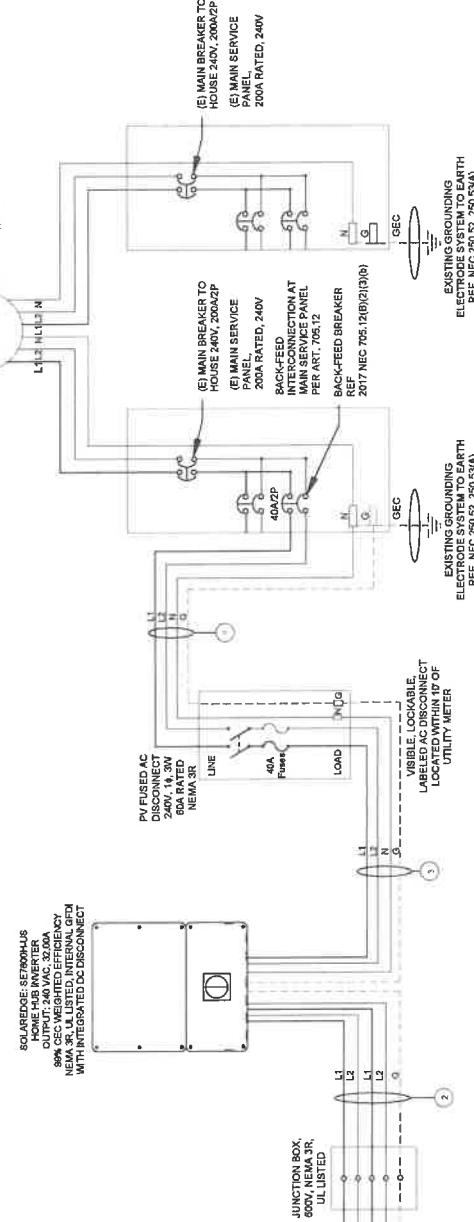
1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE
3. DC GEC AND AC GEC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE 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 78" ABOVE THE ROOF USING CONDUIT SUPPORTS.

RACKING NOTE:

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER

TO UTILITY GRID

BIDIRECTIONAL
METER
120/240V 11, 3-W



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

EXISTING GROUNDING
ELECTRODE SYSTEM TO EARTH
REF. NEC 250.52, 250.53(A)

EXISTING GROUNDING
ELECTRODE SYSTEM TO EARTH
REF. NEC 250.52, 250.53(A)

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

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

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

1 ELECTRICAL LINE DIAGRAM
SCALE: NTS
PV-5

TOP TIER
SOLAR SOLUTIONS

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

REVISIONS
DESCRIPTIONDATEREV
INITIAL DESIGN03/10/2025

PROJECT NAME & ADDRESS
MELINDA GREEN
RESIDENCE
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

SOLAR MODULE SPECIFICATIONS				INVERTER SPECIFICATIONS				AMBIENT TEMPERATURE SPECS			
MANUFACTURER / MODEL # JA SOLAR: JAM64S31-405/MR 405W MODULE				SOLAREEDGE: SE7600H-US (240V/7600W)				AMBIENT TEMP (HIGH TEMP 2%) 38°			
VMP 31.21V				NOMINAL AC POWER 7.600 KW				RECORD LOW TEMPERATURE -8°			
IMP 12.98A				NOMINAL OUTPUT VOLTAGE 240 VAC				MODULE TEMPERATURE COEFFICIENT OF Voc -0.275%/°C			
VOC 37.23V				NOMINAL OUTPUT CURRENT 32.00A							
ISC 13.87A				PERCENT OF CURRENT VALUES							
TEMP. COEFF. VOC -0.275%/°C				CARRYING CONDUCTORS IN EMT							
MODULE DIMENSION 57.75"L x 44.65"W x 1.18"D (in inch)				7-9							
				10-20							

DC FEEDER CALCULATIONS											
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "ILA" (A)	FLA*1.25 (A)	OCBP SIZE (A)	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPS CHECK #1	AMPS CHECK #2	AMPS CHECK #3
STRING 1	JUNCTION BOX	360	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	PASS	PASS
STRING 2	JUNCTION BOX	360	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	PASS	PASS
JUNCTION BOX	INVERTER	360	15.00	18.75	20	CU #10 AWG	CU #10 AWG	35	PASS	PASS	PASS
Spring 1 Voltage Drop 0.343											
Spring 2 Voltage Drop 0.343											

AC FEEDER CALCULATIONS											
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "ILA" (A)	FLA*1.25 (A)	OCBP SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPS CHECK #1	AMPS CHECK #2
INVERTER	AC DISCONNECT	240	32	40	40	CU #10 AWG	CU #10 AWG	50	PASS	PASS	PASS
AC DISCONNECT	POL	240	32	40	40	CU #10 AWG	CU #10 AWG	50	PASS	PASS	PASS
CUMULATIVE VOLTAGE DROP 0.307											

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE RATED UP TO 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.

PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT & ENCLOSURES

LABEL-1:
LABEL LOCATION:
DCEMT 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(E)

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

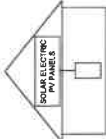
WARNING

**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 VOLTAGE: **240 V**
GATED AC OUTPUT CURRENT: **32.00 A**

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

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

480 V
40.00A

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



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

REVISIONS			
DESCRIPTION	DATE	REV	
INITIAL DESIGN	03/10/2025		



PROJECT NAME & ADDRESS

**MELINDA GREEN
RESIDENCE**
**109 NICOLE DR,
ERWIN, NC 28339**

DRAWN BY
ESR

SHEET NAME
LABELS

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

SHEET NUMBER
PV-8

Harvest the Sunshine

DEEP BLUE 3.0 Light

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

Mono

Introduction

Assembled with 1155 P15C cells, the half-cell configuration of the modules offers the advantage of higher power output in low-irradiance conditions and improved performance in high temperatures. The half-cell configuration also provides a more uniform power output across the module, reducing the risk of hot spots and increasing the overall system efficiency.



Higher output power



Lower LCOE



Less shading and lower resistive loss

Better mechanical loading tolerance

Superior Warranty

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

Comprehensive Certifications

- IEC 61215, IEC 61730, UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC TS 62941: 2016 Tera-level photovoltaic (PV) module qualification and type approval

New linear power warranty ■ Standard module linear power warranty



JASOLAR

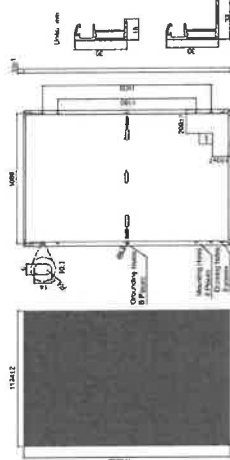
www.jasolar.com
Contact us for more information or to request a quote.



JAM54S31 380-405/MR

JASOLAR

MECHANICAL DIAGRAMS



SPECIFICATIONS

Cell	Mono
Weight	21.5kg±5%
Dimensions	1722mm x 1134mm x 30mm
Cable Cross Section Size	4mm ² (IEC: 12 AWG(L))
No. of cells	108(6x18)
Junction Box	(IP68, 3 diodes)
Connector	MCK-EV02(1500V)
Cable Length (Including Connector)	Female: 300mm (11.81in) Male: 1200mm (47.24in)
Packaging Configuration	30pcs/Pallet, 840pcs/40' Container

ELECTRICAL PARAMETERS AT STC

TYPE	JAM54S31 380-405/MR	JAM54S31 380-405/MR	JAM54S31 380-405/MR	JAM54S31 380-405/MR	JAM54S31 380-405/MR
Rated Maximum Power (P _{max}) [W]	380	385	390	395	400
Open Circuit Voltage (V _{oc}) [V]	36.56	36.71	36.86	37.01	37.16
Maximum Power Voltage (V _{mp}) [V]	32.78	32.93	33.08	33.23	33.38
Short Circuit Current (I _{sc}) [A]	13.44	13.59	13.74	13.89	14.04
Maximum Power Current (I _{mp}) [A]	12.55	12.70	12.85	13.00	13.15
Module Efficiency [%]	19.5	19.7	20.0	20.3	20.7

Power Tolerance	±5%
Temperature Coefficient of P _{max} [1/°C]	-0.045%/°C
Temperature Coefficient of V _{oc} [1/°C]	-0.275%/°C
Temperature Coefficient of P _{mp} [1/°C]	-0.300%/°C

irradiance 1000W/m², cell temperature 25°C, AM1.5G

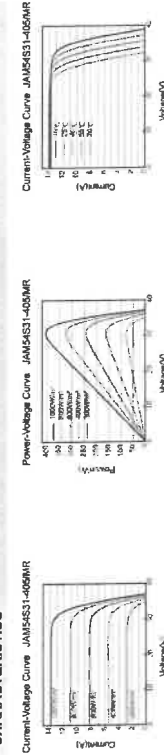
Remark: Electrical data in this catalog is for reference only. The actual data may vary due to the difference in the manufacturing process and the testing conditions.

ELECTRICAL PARAMETERS AT NOCT

TYPE	JAM54S31 380-405/MR	JAM54S31 380-405/MR	JAM54S31 380-405/MR	JAM54S31 380-405/MR	JAM54S31 380-405/MR
Rated Maximum Power (P _{max}) [W]	380	385	390	395	400
Open Circuit Voltage (V _{oc}) [V]	36.56	36.71	36.86	37.01	37.16
Maximum Power Voltage (V _{mp}) [V]	32.78	32.93	33.08	33.23	33.38
Short Circuit Current (I _{sc}) [A]	13.44	13.59	13.74	13.89	14.04
Maximum Power Current (I _{mp}) [A]	12.55	12.70	12.85	13.00	13.15

irradiance 800W/m², ambient temperature 20°C, wind speed 1m/s, AM1.5G

CHARACTERISTICS



Premium Cells, Premium Modules

TOP TIER
SOLAR SOLUTIONS

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

REVISIONS	DATE	REV
DESCRIPTION	INITIAL DESIGN	03/02/2025

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

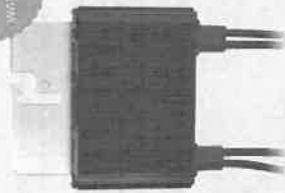
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ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

S440 / S500B / S650B



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

solaréda

S440 / S500B / S650B

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RoHS

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

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	03/10/2025	

MELINDA GREEN
RESIDENCE

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

ANSI B 11" X 17"

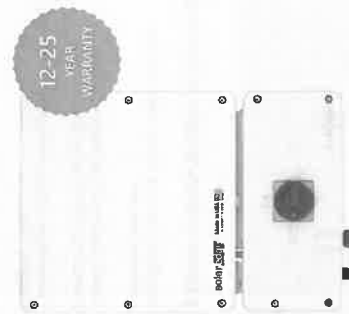
SHEET NUMBER
PV-11

SolarEdge Home Hub Inverter

Single Phase, for North America

For Inverters Assembled in the USA

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



12-25
YEAR
WARRANTY

Single phase inverter for storage and backup applications

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

*Requires additional hardware and firmware upgrade

solaredge.com

solaredge

/ SolarEdge Home Hub Inverter

Single Phase, for North America

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

Model Number	SE3800H-US	SE5700H-US	SE7600H-US	SE10000H-US	SE11400H-US	Units
OUTPUT – AC ON GRID						
Rated AC Power	3800 @ 240V 11400 @ 208V	5700 @ 240V 17100 @ 208V	7600 @ 240V 22800 @ 208V	10000 @ 240V 30000 @ 208V	11400 @ 240V 34200 @ 208V	W
Maximum AC Power Output (100% duty cycle, 100% THD)	3800 @ 240V 11400 @ 208V	5700 @ 240V 17100 @ 208V	7600 @ 240V 22800 @ 208V	10000 @ 240V 30000 @ 208V	11400 @ 240V 34200 @ 208V	W
AC Output Voltage (Nominal)	208 / 240	208 / 240	208 / 240	208 / 240	208 / 240	Vac
AC Output Voltage (Range)	183 – 264	183 – 264	183 – 264	183 – 264	183 – 264	Vac
AC Frequency Range (min - max)	59.3 – 60.3	59.3 – 60.3	59.3 – 60.3	59.3 – 60.3	59.3 – 60.3	Hz
Minimum Continuous Output Current (C12 Threshold)	15	24	32	42	48	A
Total Harmonic Distortion (THD)	< 3	< 3	< 3	< 3	< 3	%
Power Factor	1, adjustable -0.95 to 0.95	1, adjustable -0.95 to 0.95	1, adjustable -0.95 to 0.95	1, adjustable -0.95 to 0.95	1, adjustable -0.95 to 0.95	%
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes	Yes	Yes	Yes	Yes	
Charge Battery from AC (if allowed)	Yes	Yes	Yes	Yes	Yes	
Typical Nighttime Power Consumption	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	W
OUTPUT – AC STAND-ALONE (BACKUP)(H1)						
Rated AC Power in Stand-alone Operation	11400*	11400*	11400*	11400*	11400*	W
Maximum Stand-alone Capacity	11400	11400	11400	11400	11400	W
AC L-L Output Voltage Range in Stand-alone Operation	211 – 264	211 – 264	211 – 264	211 – 264	211 – 264	Vac
AC L-L Output Voltage Range in Stand-alone Operation	185 – 132	185 – 132	185 – 132	185 – 132	185 – 132	Vac
AC Frequency Range in Stand-alone (min - max)	55 – 60 – 65	55 – 60 – 65	55 – 60 – 65	55 – 60 – 65	55 – 60 – 65	Hz
Maximum Continuous Output Current in Stand-alone Operation	48	48	48	48	48	A
THD	< 3	< 3	< 3	< 3	< 3	%
OUTPUT – SOLAREGE HOME EV CHARGER AC						
Rated AC Power	5600	5600	5600	5600	5600	W
AC Output Voltage Range	211 – 264	211 – 264	211 – 264	211 – 264	211 – 264	Vac
On-Grid AC Frequency Range (min - max)	58.3 – 60.5	58.3 – 60.5	58.3 – 60.5	58.3 – 60.5	58.3 – 60.5	Hz
Minimum Continuous Output Current @240V (H1, PV and battery)	40	40	40	40	40	A
INPUT – DC (PV AND BATTERY)						
Transformer-less, Ungrounded	Yes	Yes	Yes	Yes	Yes	
Max Input Voltage	480	480	480	480	480	Vac
Non-DC Input Voltage	380	380	380	380	380	Vac
Reverse-Polarity Protection	Yes	Yes	Yes	Yes	Yes	
Ground-Fault Protection	600VDC Sensitivity	600VDC Sensitivity	600VDC Sensitivity	600VDC Sensitivity	600VDC Sensitivity	
INPUT – DC (PV)						
Maximum DC Power @ 240V	11,400	11,400	11,400	11,400	11,400	W
Maximum DC Power @ 208V	6600	6600	6600	6600	6600	W
Maximum Input Current @ 240V	20	30.5	40	53	60	A
Maximum Input Current @ 208V	17.5	27	35	45	53	A
Maximum Input Short Circuit Current	99.2	99.2	99.2	99.2	99.2	A
Maximum Inverter Efficiency	98.5	98.5	98.5	98.5	98.5	%
C12 Weighted Efficiency	99	99	99	99	99	%
2-pole Disconnection	Yes	Yes	Yes	Yes	Yes	

(1) These specifications apply to inverters with part numbers SE3800H-US and SE5700H-US and connection unit model number DCO-SPH-US PH1-F-2.
(2) Inverters with part number SE7600H-US are intended for upgrade installations only, as part of the "The Charger" program. Use on non-upgrade installations will void the product warranty.
(3) For power output, please refer to the SolarEdge Inverter AC Power Output Capacity table.
(4) For power output, please refer to the SolarEdge Inverter AC Power Output Capacity table.
(5) For LRA (Locked Rotor Amps) values please refer to the LRA for LRA table.
(6) For model SE7600H-US and below, the rated AC stand-alone power is configurable between 7000W or 11400W from CPU version 4.20 or later.
(7) A higher current value may be used. The inverter will limit its input current to the value stated.

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TOP TIER
SOLAR SOLUTIONS

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

REVISIONS	DATE	REV
INITIAL DESIGN	03/10/2025	

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR.
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-12

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

(8) Discharge power is limited up to the inverter's rated AC power for on-grid and stand-alone applications, as well as up to the installed battery rating.

Of course, the purpose of the study was to test the hypothesis that the effect of the intervention on the outcome variable was mediated by the change in the level of the mediator variable. The results of the study showed that the effect of the intervention on the outcome variable was mediated by the change in the level of the mediator variable.

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SHEET NUMBER
PV-13

109 NICOLE DR,
ERWIN, NC 28339

PV-13



IRONRIDGE

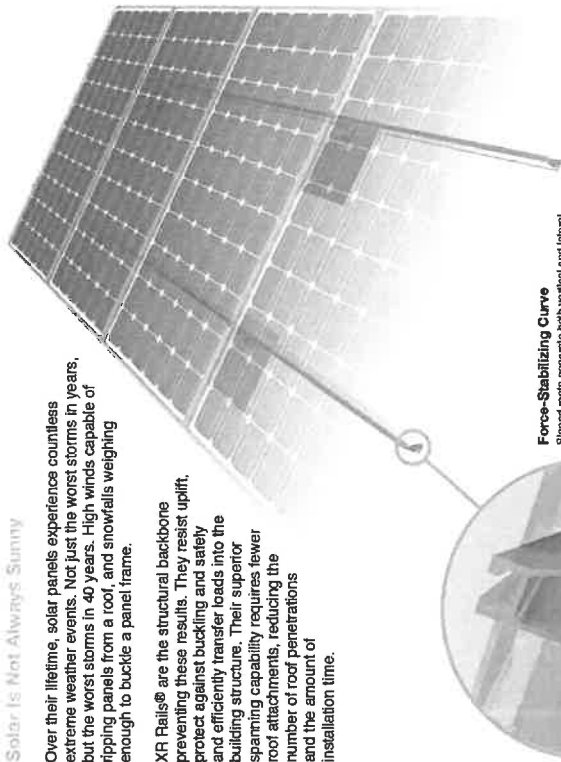
XR Rail® Family

Techn Detail

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 warp and pull away from the roof. XR Rail's Force-Stabilizing Curve is specifically designed to counteract these forces in all 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 Flat-Roof® and Pitched-Roof® attachments.



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

Techn Detail

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.

XR110

XR110 is a sleek, low-profile mounting rail designed for residential and commercial applications. It supports a range of solar panel sizes up to 8 ft, while remaining light and economical.

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

XR100

XR100 is a residential and commercial mounting rail. It supports a range of solar panel sizes up to 10 ft, maximizing space up to 10 feet.

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

XR1000

XR1000 is a heavy-weight, among solar mounting rails. It's built to handle commercial applications up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capacity
- Clear anodized finish
- Internal splice 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.

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

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

REVISIONS	DATE	REV
DESCRIPTION	INITIAL DESIGN	08/10/2025

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14



UFO® Family of Components

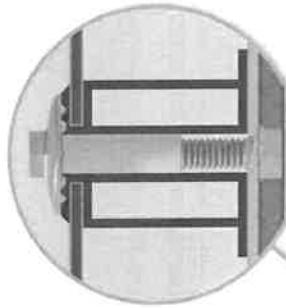
Tech Brief

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



Universal Fastening Object (UFO)
The UFO® securely bonds solar modules to XR Rails®, X corners assembled and installed, 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 length. No code or hardware needed.



Grounding Lug

A single Grounding Lug connects one rail to one row of PV conductors to the grounding conductor.



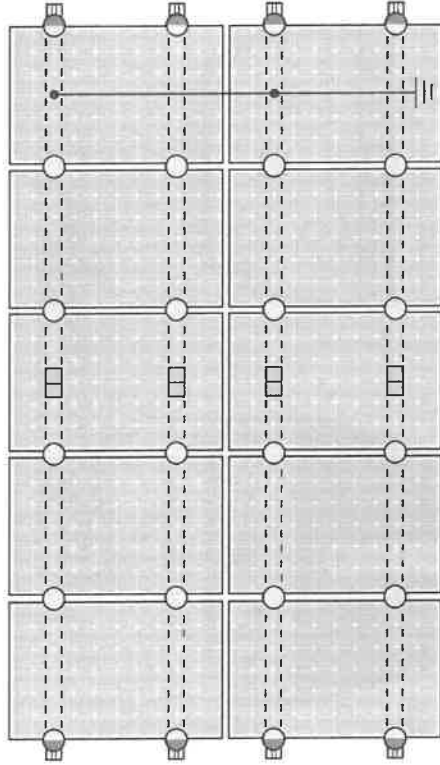
Bonded Attachments

The bonding bolt attaches the rail to the module. The rail is installed with the same access as the rest of the system.



System Diagram

Tech Brief



○ 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 Enphase cable is required. Refer to installation manuals for additional details.

UL Certification

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

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

Go to IronRidge.com/UFO

Cross-System Compatibility

Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails®	✓	✓	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
1530 CENTER PARK DR #2911,
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REV	

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-15



QuickMount® Halo UltraGrip

Cut Sheet

Release Liner shown for reference

HD STRUCTURAL SCREW PN RD-1430-Q1-M1
SOLD SEPARATELY
SHOWN FOR REFERENCE

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

PART NUMBER	DESCRIPTION
QMH-HUG-Q1-M1	Halo UltraGrip - Mill
QMH-HUG-Q1-B1	Halo UltraGrip - Black

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QMH-HUG-Q1-B1 or QMH-HUG-Q1-M1 Cut Sheet Rev 1.0

Cut Sheet

1. Halo UltraGrip

Property	Value
Material	3000 Series Aluminum
Finish	Mill or Black

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QMH-HUG-Q1-B1 or QMH-HUG-Q1-M1 Cut Sheet Rev 1.0



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1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
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INITIAL DESIGN	09/10/2025	

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR.
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-16



QuickMount® RD Structural Screw

Cut Sheet



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

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	03/10/2026	

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME

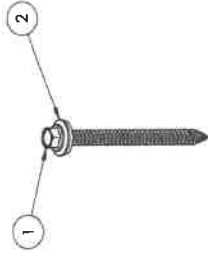
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

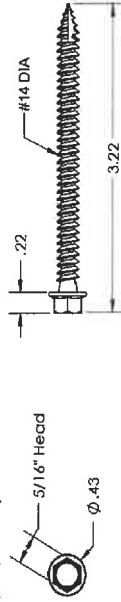
PV-17



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

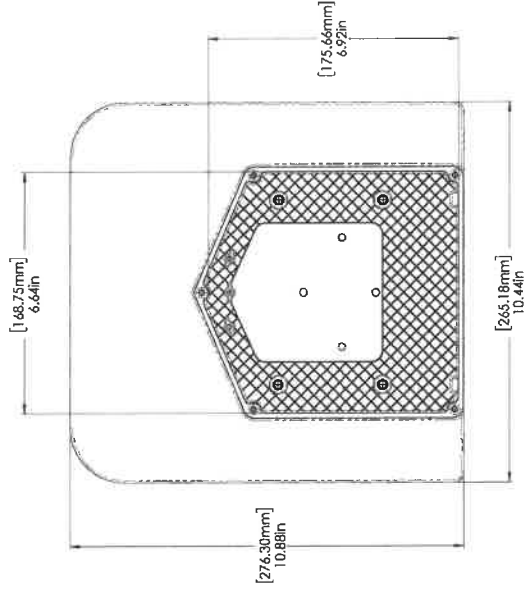
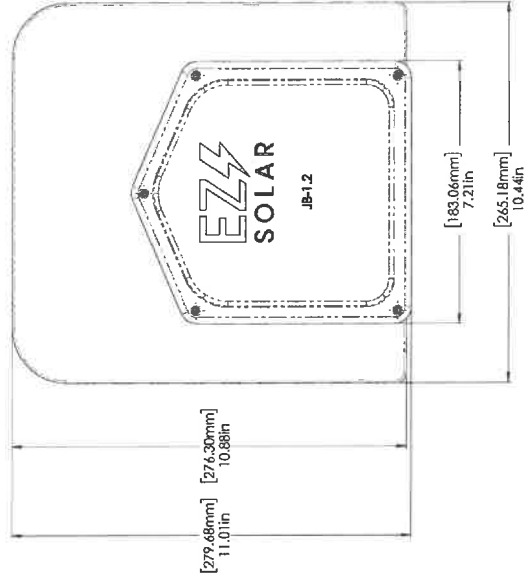
2. Washer, EPDM Backed



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	JB-12 BODY	POLYCARBONATE WITH UV INHIBITORS	1
2	JB-12 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-12	
SCALE: 1/2"	WEIGHT: 1.45 LBS	SHEET 1 OF 3
TORQUE SPECIFICATION:	15-20 LBS	
CERTIFICATION:	UL 1741, NEMA 3R CSA C22.2 NO. 290	
WEIGHT:	1.45 LBS	



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REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	03/10/2025	

PROJECT NAME & ADDRESS

MELINDA GREEN
RESIDENCE
109 NICOLE DR.
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-18



PV LETTERS

Top Tier Solar Solutions

Contractor Address: 1530 Center Park Dr #2911, Charlotte, NC 28217

March 10, 2025

Subject: Proposed Solar Panel Installation
Melinda Green Residence, 109 Nicole Dr, Erwin, NC
DC System Size: 8.505 kW
PV Letters Job #004-19925

To Whom it May Concern,

We have reviewed information, provided by our client, related to the proposed solar panel installation at the above-referenced address. The purpose of the review was to determine if the existing roof is structurally adequate for the proposed installation. Based on our review and analysis of the given information, and in accordance with governing building codes, I certify that the capacity of the structural roof framing that directly supports the additional gravity loading due to the solar panel supports and modules had been reviewed and determined to meet or exceed the requirements in accordance with the Design Criteria.

Design Parameter Summary

Governing Building Code: 2018 North Carolina Residential Code
Risk Category: II
Wind Exposure: C
Design Wind Speed: 120 mph
Ground Snow Load: 15 psf

Roof Information

Roof Structure: 2x4 Manufactured Trusses @ 24" O.C. (assumed)
Roofing Material: Asphalt Shingles (1 layer)
Roof Slope: 33 degrees

Roof Connection Details

Framing Mount Wood Screws: (2) #14 Self-Drilling Screw with a minimum penetration depth of 1.75" into roof truss top chord only, at 72" O.C. max
Stagger attachments to avoid overloading any individual truss top chord.

Engineering Analysis

The proposed installation - including weight of panels, racking, mounts, and inverters where applicable - will be approximately 3 psf. In the areas where panels are installed, roof live loads will not be present. The reduction of roof live load is adequate to fully or partially compensate for the addition of the panel installation. Because the member forces in the area of the solar panels are not increased by more than 5%, and so per provisions in the adopted building codes, the structure need not be altered for gravity loading.

The proposed installation will be 6" max. above the roof surface (flush mounted) and parallel to the roof surface. Therefore, any increase in wind loading on the building structure from the solar panel installation is expected to be negligible. Wind is the governing lateral load case. Because the increase in lateral loading is not increased by more than 10%, per provisions in the adopted building codes, the structure need not be altered for lateral loading.

Wind uplift on the panels has been calculated in accordance with the relevant provisions of ASCE 7-10. This loading has been used to verify the adequacy of the connection specified above. Connection locations should be in accordance with design drawings.

IronRidge XR10 rails will support the modules and will fasten to the roof structure with IronRidge QuickMount Halo Ultragrip along the rail.

Conclusion

The roof structure need not be altered for either gravity loading (including snow) or lateral loading (including wind). Therefore, the existing structure is permitted to remain unaltered. Connections to the roof must be made per the "Roof Connection Details" section above. Copies of all relevant calculations are enclosed.

Limitations and Disclaimers

The opinion expressed in this letter is made in reliance on the following assumptions: the existing structure is in good condition; the existing structure is free from defects in design or workmanship; and the existing structure was code-compliant at the time of its design and construction. These assumptions have not been independently verified, and we have relied on representations made by our client with respect to the foregoing. The undersigned has not inspected the structure for defects, although we have reviewed the information provided by our client, including pictures where applicable.

Electrical design is excluded from this analysis. Waterproofing is the sole responsibility of the installer and is also excluded from this analysis. Solar panels must be installed per manufacturer specifications. Structural design and analysis of the adequacy of solar panels, racks, mounts, and other components is performed by each component's respective manufacturer; the undersigned makes no statement of opinion regarding such components. This letter and the opinions expressed herein are rendered solely for the benefit of the permitting authority (city or county building department) and your office, and may not be utilized or relied on by any other party.

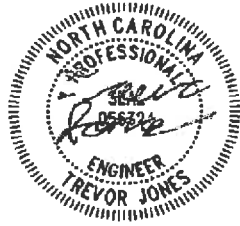
If you have any questions or concerns, please contact us at (208)-994-1680, or by email at Projects@pvletters.com.

Sincerely,



Trevor A. Jones, P.E.

3/10/2025





PV LETTERS

Standard Loading Comparison

This calculation justifies the additional solar load by comparing existing to proposed gravity loads in the location of the solar panels.

	<u>Without Solar</u>	<u>With Solar</u>	
Dead Load			
Asphalt Shingles	3	3	psf
1/4" Plywood	1	1	psf
Framing	4	4	psf
Insulation	1	1	psf
1/2" Gypsum Ceiling	2	2	psf
M,E, & Misc	1.5	1.5	psf
Solar Panel	0	3	psf
Total Dead Load	12.5	15.5	psf
Snow Load			
Ground Snow Load, P_g	15		psf
Exposure Factor, C_e	1.00		
Thermal Factor, C_t	1.1		
Importance Factor, I_s	1		
Flat Roof Snow Load	12		ASCE 7 Eqn. 7.3-1 or jurisdiction min.
Slope	33		degrees
Unobstructed Slippery Surface?	No	No	
Slope Factor, C_s	1.00	1.00	
Sloped Roof Snow Load	11.6	11.6	psf
Live Load			
Roof Live Load	20	0	psf
Load Combination			
D + L _r	32.5	15.5	psf
D + S	24.1	27.1	psf
Max. Load	32.5	27.1	psf
% of original		83.23%	

Result:

Because the total forces are decreased, per the relevant code provisions stated in the body of the letter, the existing roof structure is permitted to remain unaltered.



PV LETTERS

Wood Screw Calculation (per ASCE 7-10)

This calculation justifies the connection of the solar panels to existing roof members, by showing the connection capacity is equal to or greater than the uplift force demands.

Connection Demand

Spacing perpendicular to rail, in	34	
Roof Angle, degrees	33	
Roof Layout	Gable	
Wind Speed, mph	120	
Exposure Coefficient, K_z	0.95	(Table 26.10-1)
Topographic Factor, K_{zt}	1.00	(Table 26.8.1)
Directionality Factor, K_d	0.85	(Table 26.6-1)
Elevation Factor, K_e	1.00	(Table 26.9-1)
Velocity Pressure q_z , psf	29.5	(Table 26.10-1)

Zones:

	<u>1</u>	<u>2</u>	<u>3</u>
Spacing parallel to rail, in	72	72	72
GC_p (max)(Figure 29.4-7)	1.00	2.00	2.00
Exposed Panels? ($\gamma_E = 1.5$) (Fig. 29.4-7)	No	No	No
Effective Wind Area on each con., ft^2	17.0	17.0	17.0
Pressure Equalization Factor, γ_a (Figure 29.4-8)	0.71	0.71	0.71
Uplift Force, psf (Equation 29.4-7)	20.9	41.8	41.8
Max. Uplift Force / Connection (0.6 WL), lbs	212.6	425.2	425.2
Solar Dead Load (0.6 DL), Lbs	30.5	30.5	30.5
Max. Uplift Force (0.6 WL - 0.6 DL), lbs	182.1	394.7	394.7

Connection Capacity

Attachment FTG	IronRidge QuickMount Halo Ultragrip
Attachment location	Framing
Fastener Type	Wood Screw
Fastener Diameter, in	0.242
Embedment Length, in	1.75
Lumber Species & Grade	SPF #2 (Assumed)
Nominal Withdrawal Capacity W, lbs	213
# of Screws	2
Load Duration Factor C_d	1.6
Screw Adj. Withdrawal Cap. W', lbs	681
Attachment FTG Strength with C_d , lbs	1606
Max applied load, lbs	395
Max allowable load, lbs	681

Compare Adjusted Withdrawal Capacity to ASD Factored Demand

Zones:	<u>1</u>	<u>2</u>	<u>3</u>
	O.K.	O.K.	O.K.