



Town of Erwin
Zoning Application & Permit
Planning & Inspections Department

Permit #
25-100

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	Phillips Energy Systems LLC	Property Owner	Katie Hall
Home Address	1530 Center Park Drive ..	Home Address	300 West C Street.
City, State, Zip	Charlotte NC 28217	City, State, Zip	Erwin Nc 278339
Telephone	855.997.1213	Telephone	919.427.8102
Email	permitting@phillipselec.com	Email	

Address of Proposed Property		300 West C Street, Erwin Nc 278339	
Parcel Identification Number(s) (PIN)		Estimated Project Cost	33,091.82
What is the applicant requesting to build / what is the proposed use of the subject property? Be specific.		12 Roof Mounted Solar Photovoltaic Modules on existing residence with battery back up	
Description of any proposed improvements to the building or property		12 Roof Mounted Solar Photovoltaic Modules on existing residence with battery back up	
What was the Previous Use of the subject property?		Residential	
Does the Property Access DOT road?			
Number of dwelling/structures on the property already		1	Property/Parcel size
Floodplain SFHA <u>Yes</u> <u>No</u>		Watershed <u>Yes</u> <u>No</u> Wetlands <u>Yes</u> <u>No</u>	
MUST circle one that applies to property		Existing/Proposed Septic System <u>Or</u> Existing/Proposed County/City Sewer <u>X</u>	

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		2/25/2025
Print Name	Signature of Owner or Representative	Date

For Office Use

Zoning District	BMV	Existing Nonconforming Uses or Features	
Front Yard Setback	15 ft	Other Permits Required	<u>Conditional Use</u> <u>Building</u> <u>Fire Marshal</u> <u>Other</u>
Side Yard Setback	8 ft	Requires Town Zoning Inspection(s) <u>Foundation</u> <u>Prior to C. of O.</u>	
Rear Yard Setback	15 ft	Zoning Permit Status	<u>Approved</u> <u>Denied</u>
		Fee Paid: \$25	Date Paid: Staff Initials:

Comments	Trade permits from Homett County
----------	----------------------------------

Signature of Town Representative:		Date <u>Approved</u> <u>Denied</u> : 2/25/25
-----------------------------------	---	--

PHOTOVOLTAIC ROOF MOUNT SYSTEM

12 MODULES-ROOF MOUNTED - 4.860 kW DC, 5.700 kW AC

300 W C ST, ERWIN, NC 28339



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

PROJECT DATA

PROJECT ADDRESS:
300 W C ST,
ERWIN, NC 28339

OWNER:
KATIE HALL

DESIGNER:
ESR

SCOPE: 4.860 kW DC ROOF MOUNT
SOLAR PV SYSTEM WITH
12 JA SOLAR: JAM54S31-405/MR 405W
PV MODULES WITH

12 SOLAREDDGE: S440 POWER OPTIMIZERS AND
01 SOLAREDDGE: SE5700H-US (240V/5700W)
INVERTER

01 10 kWh SOLAREDDGE ENERGY BANK

AUTHORITIES HAVING JURISDICTION:

BUILDING: HARNETT COUNTY

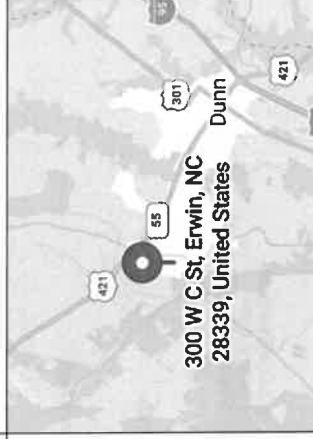
ZONING: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

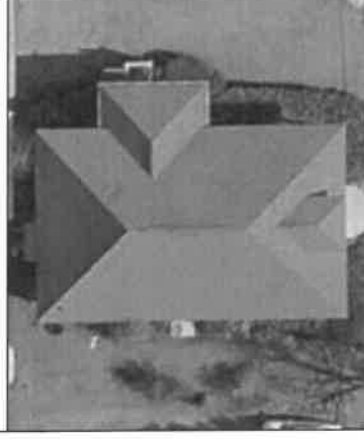
GENERAL NOTES

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 10 FT.
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 250-188 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. PHOTOVOLTAC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
9. PHOTOVOLTAC 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 PHOTOVOLTAC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL 1703
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
2017 NORTH CAROLINA FIRE CODE
2017 NATIONAL ELECTRICAL CODE

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 NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME

COVER SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-1



STRUCTURAL ONLY
2/25/2025

PROJECT DESCRIPTION:

12 X JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

DC SYSTEM SIZE: 4.860 KW DC
AC SYSTEM SIZE: 5.700 KW AC

EQUIPMENT SUMMARY

12 JA SOLAR: JAM54S31-405/MR 405W MONO MODULES

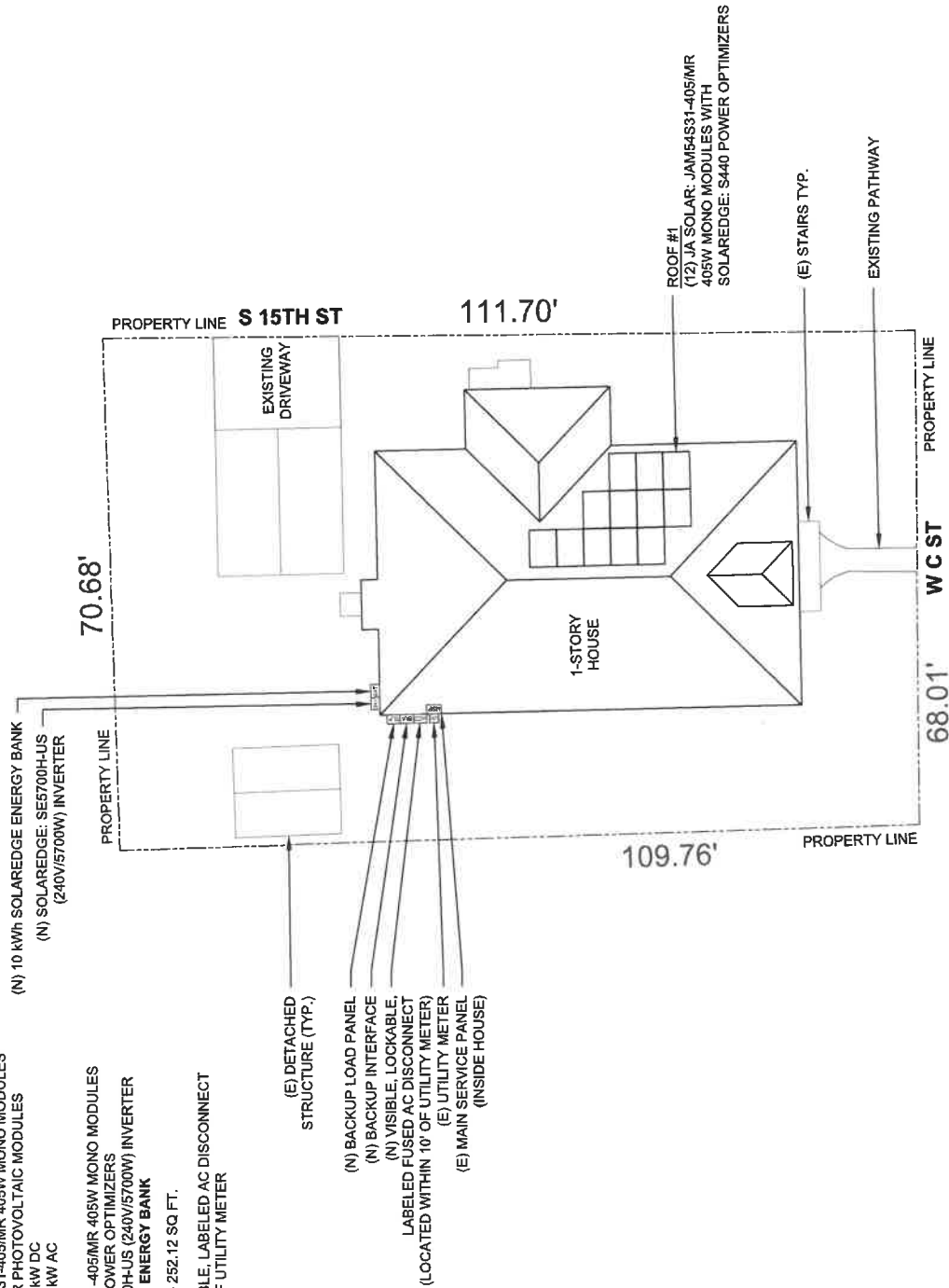
12 SOLAREDGE: S440 POWER OPTIMIZERS

01 SOLAREDGE: SE5700H-US (240V/5700W) INVERTER

01 10 kWh SOLAREDGE ENERGY BANK

ROOF ARRAY AREA #1: 252.12 SQ. FT.

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

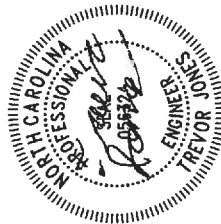


DESIGN SPECIFICATION
OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: REFER STRUCTURAL LETTER
WIND EXPOSURE: REFER STRUCTURAL LETTER
WIND SPEED: REFER STRUCTURAL LETTER



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/23/2025	



STRUCTURAL ONLY
2/25/2025

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

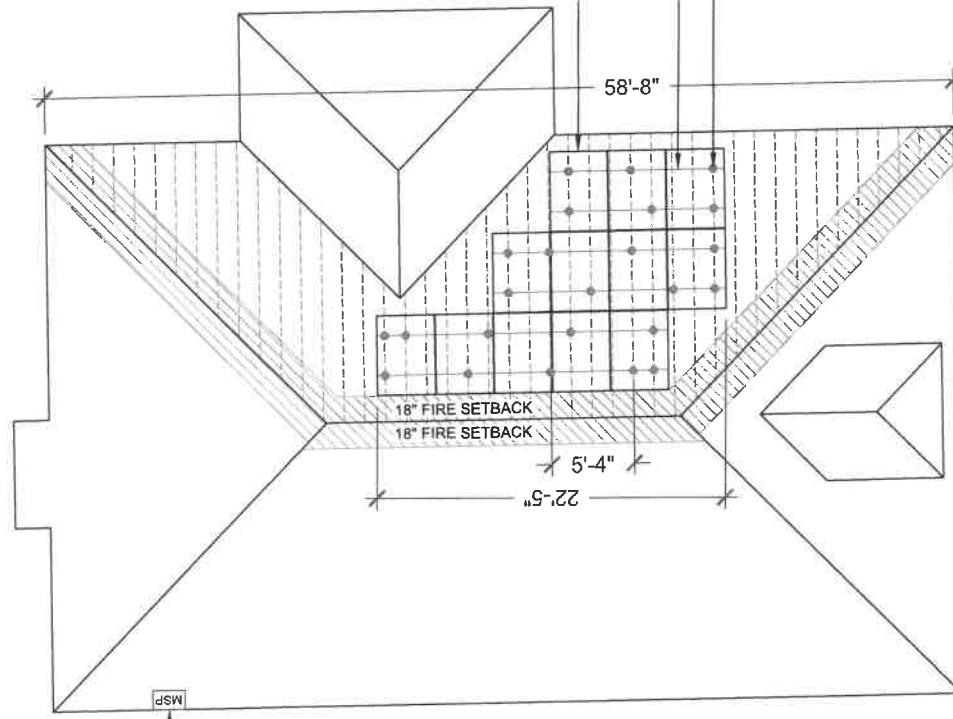
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 12 MODULES
MODULE TYPE = JA SOLAR: JAM54S31-405/MR 405W MONO MODULES
MODULE WEIGHT = 47.38 LBS / 21.5 kg.
MODULE DIMENSIONS = 67.79" x 44.65" = 21.01 SF



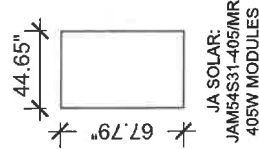
ROOF DESCRIPTION				
ROOF TYPE	ASPHALT SHINGLE			
ROOF LAYER	1 LAYER			
ROOF	# OF MODULES	ROOF PITCH	RAFTER SIZE	RAFTER SPACING
#1	12	25°	2"x6"	16"

ARRAY AREA & ROOF AREA CALC'S			
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (SQ. FT.)	ROOF AREA COVERED BY ARRAY (%)	
252.12	2309.64	11	



(E) MAIN SERVICE PANEL (INSIDE HOUSE)

ROOF #1
(12) JA SOLAR: JAM54S31-405/MR
405W MONO MODULES WITH
SOLAREGE: S440 POWER OPTIMIZERS
(N) IRONRIDGE XR-10 RAIL (TYP.)
IRONRIDGE HALO ULTRAGRIP ATTACHMENTS
IN RAFTER ONLY



LEGEND	
☒ BAT	- SOLAREGE BATTERY
☒ BLP	- BACKUP LOAD PANEL
☒ BUJ	- BACKUP INTERFACE
☒ ACD	- AC DISCONNECT
☒ UM	- UTILITY METER
☒ MSP	- MAIN SERVICE PANEL
☒ SUB	- SUB PANEL
☒ INV	- INVERTER
☒ JB	- JUNCTION BOX
☒ VENT	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
☒ RAFT	- ROOF ATTACHMENT
☒ COND	- CONDUIT

ROOF #1
PITCH - 25°
AZIM. - 91°

1 ROOF PLAN & MODULES

PV-3 SCALE: 1/8" = 1'-0"



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		REV
DESCRIPTION	DATE	
INITIAL DESIGN	02/25/2025	



STRUCTURAL ONLY
2/25/2025

**KATIE HALL
RESIDENCE**

300 W C ST,
ERWIN, NC 28339

PROJECT NAME & ADDRESS

DRAWN BY
ESR

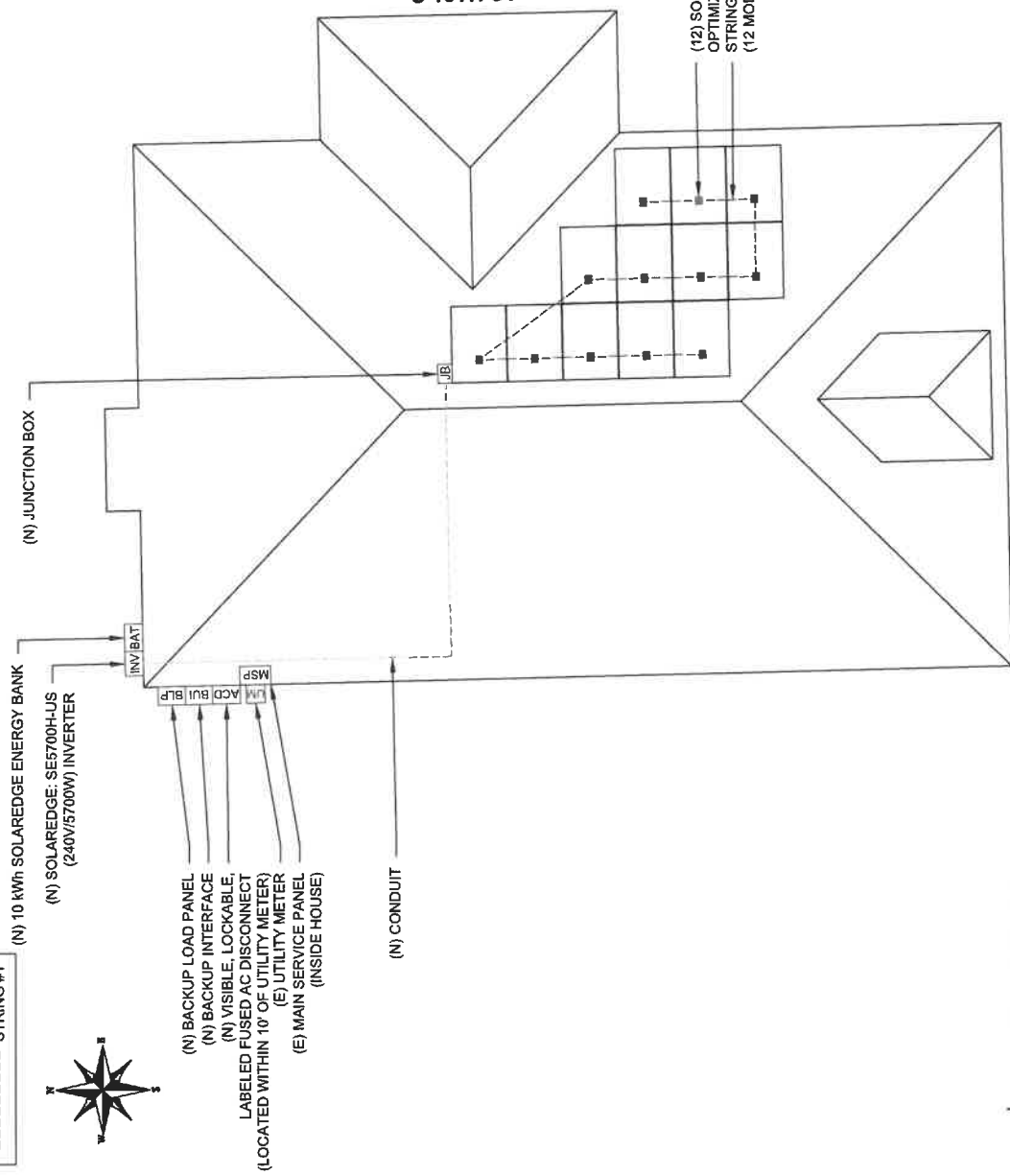
SHEET NAME
ROOF PLAN & MODULES

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

SHEET NUMBER
PV-3

DC SYSTEM SIZE: 4.860 kW DC
AC SYSTEM SIZE: 5.700 kW AC
(12) JA SOLAR: JAM54S31-405MR 405W MONO MODULES
WITH (12) SOLAREGE: S440 POWER OPTIMIZERS
LOCATED UNDER EACH PANEL AND
01 SOLAREGE: SE5700H-US (240V/5700W) INVERTER

STRING LEGENDS
----- STRING #1



BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
SOLAR PV MODULES: JA SOLAR: JAM54S31-405MR 405W MODULE	12
OPTIMIZERS: SOLAREGE: S440 POWER OPTIMIZERS	12
INVERTER: SOLAREGE: SE5700H-US (240V/5700W) INVERTER	01
JUNCTION BOX: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO. 290	1
AC DISCONNECT: FUSED AC DISCONNECT, 60A FUSED, (2) 30A FUSES 240V NEMA 3R, UL LISTED	1
BATTERY: 10 kWh SOLAREGE ENERGY BANK	1
BACKUP INTERFACE: SOLAREGE BACKUP INTERFACE BI-HUGN-01 200A RATED, 240V NEMA 3R, UL LISTED	1
IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A)	10
BONDED SPLICE, XR10 (XR10-BOSS-01-M1)	4
UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1)	18
END FASTENING OBJECT (END CLAMP, 30-40MM), MILL (UFO-END-01-A1)	12
GROUNDING LUG (XR-LUG-03-A1)	3
IRONRIDGE HALO UL-TRAGRIP ATTACHMENTS (QM-HUG-01-M1)	25
RD STRUCTURAL SCREW 3.0L (HW-RD1430-01-M1)	50
T-BOLT BONDING HARDWARE (BHW-TB-02-A1) (PRODUCT CODE 590-0116)	25
OPTIMIZER BONDING HARDWARE T-BOLT (BHW-MI-01-A1) (PRODUCT CODE 270-0152)	12



PHILLIPS SYSTEMS
7901 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

PROJECT NAME & ADDRESS
KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
ELECTRICAL PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

LEGEND

BAT

- SOLAREGE BATTERY

BLP

- BACKUP LOAD PANEL

BUJ

- BACKUP INTERFACE

ACD

- AC DISCONNECT

UM

- UTILITY METER

MSP

- MAIN SERVICE PANEL

SUB

- SUB PANEL

INV

- INVERTER

JIB

- JUNCTION BOX

- VENT, ATTIC FAN (ROOF OBSTRUCTION)

- ROOF ATTACHMENT

- RAFTER

- CONDUIT



PHILLIPS ENERGY SYSTEMS
7801 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	



STRUCTURAL ONLY
2/25/2025

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST.
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME

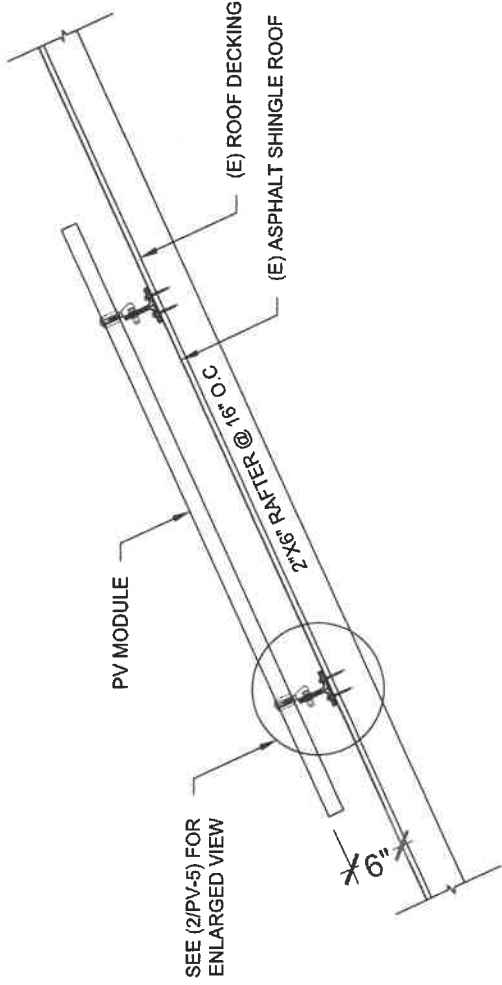
STRUCTURAL DETAIL

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

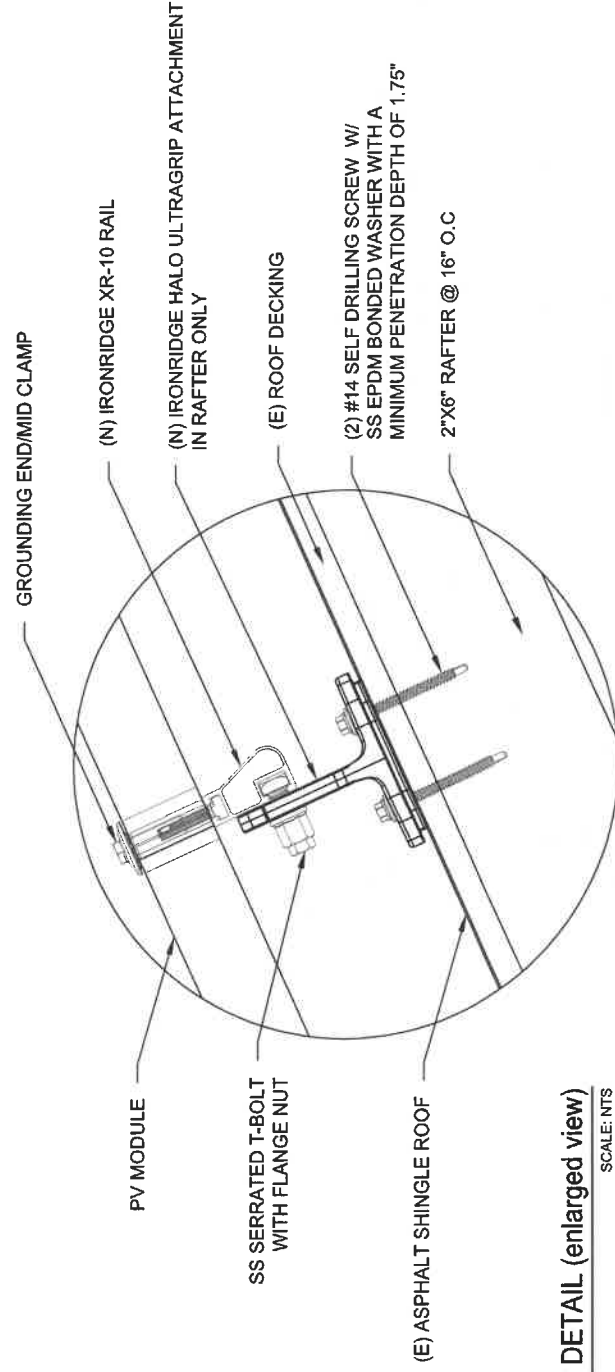
PV-5



1 STRUCTURAL ATTACHMENT (Side view)

SCALE: N.T.S

PV-5



2 ATTACHMENT DETAIL (enlarged view)

SCALE: NTS

PV-5



PHILLIPS ENERGY SYSTEMS

7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

- 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 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.

- INTERCONNECTION NOTES:
1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH (NEC 705.12), AND (NEC 690.58)

2. GROUND FAULT PROTECTION IN ACCORDANCE WITH (NEC 215.9), (NEC 230.85)

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).

DC SYSTEM SIZE: 4.880 kW DC

AC SYSTEM SIZE: 5.700 kW AC

(12) JA SOLAR: JAM54S31-405MR 405W MONO MODULES WITH (12) SOLAREGE: S440 POWER OPTIMIZERS LOCATED UNDER EACH PANEL (240V) AND (01) SOLAREGE: SE5700H-US (240V/5700W) INVERTER (01) STRING OF 12 MODULES ARE CONNECTED IN SERIES

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

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER

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).

DC SYSTEM SIZE: 4.880 kW DC

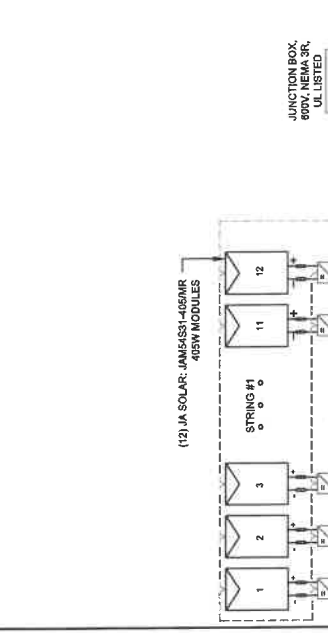
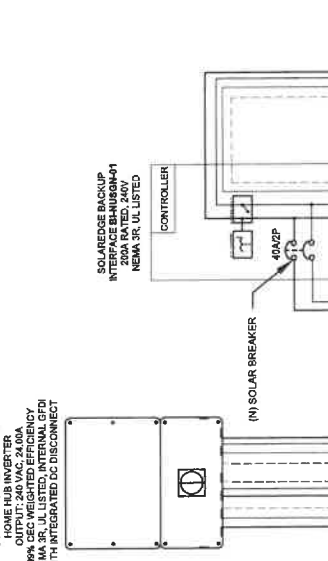
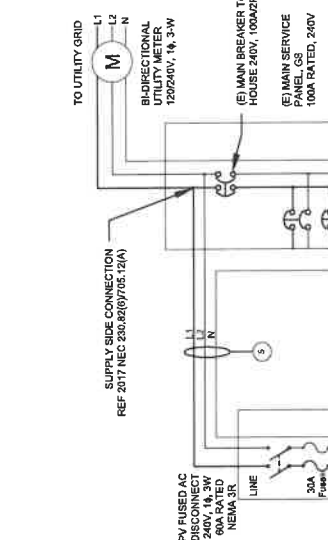
AC SYSTEM SIZE: 5.700 kW AC

(12) JA SOLAR: JAM54S31-405MR 405W MONO MODULES WITH (12) SOLAREGE: S440 POWER OPTIMIZERS LOCATED UNDER EACH PANEL (240V) AND (01) SOLAREGE: SE5700H-US (240V/5700W) INVERTER (01) STRING OF 12 MODULES ARE CONNECTED IN SERIES

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

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339



REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025

REVISIONS	
DESCRIPTION	DATE
INITIAL DESIGN	02/25/2025



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS	DESCRIPTION	DATE	REV
	INITIAL DESIGN	02/25/2025	

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	JAM64S31-405/MR 405W MODULE
VMP	31.21V
IMP	12.98A
VOC	37.23V
ISC	13.87A
TEMP. COEFF. VOC	-0.275%/°C
MODULE DIMENSION	67.79" L x 44.65" W x 1.18" D (in inch)

INVERTER SPECIFICATIONS	
SOLAREEDGE: SE5700H-US (240V/5700W)	
MANUFACTURER / MODEL #	INVERTER
NOMINAL AC POWER	5,700 kW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	24.00A

PERCENT OF VALUES	
CARRYING CONDUCTORS IN EMT	
4-6	
7-9	
10-20	

AMBIENT TEMPERATURE SPECS	
AMBIENT TEMP (HIGH TEMP 2%)	38°
RECORD LOW TEMPERATURE	-8°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.275%/°C

DC FEEDER CALCULATIONS

CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCBP SIZE (A)	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1 (A)	AMBIENT TEMP. (°C)	TOTAL CC ORS IN RACEWAY	90°C AMPACITY (A)	DEBATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DEBATION 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 (%)	CONDUCTOR SIZE	CONDUIT FILL (%)
STRING 1	JUNCTION BOX	380	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.049	N/A	#N/A
JUNCTION BOX	INVERTER	380	15.00	18.75	20	CU #10 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	20	1.24	0.196	3/4" EMT	11.87617
SOLAREEDGE BANK	INVERTER	380	13.16	16.45	20	CU #10 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.043	3/4" EMT	11.87617
String 1 Voltage Drop																			0.245		

String 1 Voltage Drop: 0.345

AC FEEDER CALCULATIONS

CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS (A)	FLA*1.25 (A)	OCBP SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	90°C AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/FT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)	
INVERTER	BACKUP INTERFACE	240	24	30	40	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	PASS	5	0.778	0.078	3/4" EMT	24.5591
BACKUP INTERFACE	BACKUP LOAD PANEL	240	60	60	60	CU #4 AWG	CU #6 AWG	CU #4 AWG	85	PASS	38	2	95	PASS	5	0.308	0.077	1" EMT	34.4792
BACKUP INTERFACE	AC DISCONNECT	240	24	30	30	CU #4 AWG	CU #6 AWG	CU #4 AWG	85	PASS	38	2	95	PASS	5	0.308	0.031	1" EMT	34.4792
AC DISCONNECT	MAIN SERVICE PANEL	240	24	30	30	CU #4 AWG	N/A	CU #4 AWG	85	PASS	38	2	95	PASS	5	0.308	0.031	1" EMT	28.6111
CUMULATIVE VOLTAGE DROP																	0.136		

CUMULATIVE VOLTAGE DROP: 0.185

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.

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

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 LOCATION:
DCEMT CONDUIT RACEWAY
SOLA/DECK / 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 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**
RATED AC OUTPUT CURRENT **24.00 A**

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

MAXIMUM VOLTAGE **480 V**

MAXIMUM CIRCUIT CURRENT **30.50 A**

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

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



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

**KATIE HALL
RESIDENCE**
**300 W C ST,
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 Series

Mono

Introduction

Assembled with 11BB Hetero-junction cells, the half-cell configuration of the modules offers the advantages of higher power output, better interconnection performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced resistance to mechanical loading.



Higher output power



Lower LOEC



Less shading and lower resistive loss



Better mechanical loading tolerance

Superior Warranty

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



■ New linear power warranty ■ Standard module linear power warranty

Comprehensive Certificates

- IEC 61215, IEC 61730, UL 6171, UL 6173
- 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 Terrestrial photovoltaic (PV) modules - Guidelines for increased confidence in PV module design qualification and type approval



JASOLAR

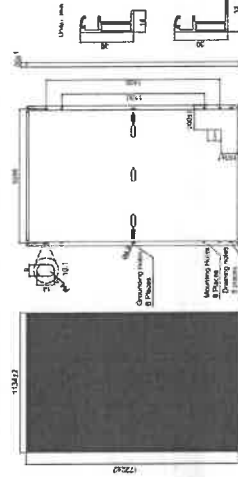
www.jasolar.com

Copyright © 2018 JASOLAR. All rights reserved.

JASOLAR is a registered trademark of JASOLAR.

JA SOLAR

MECHANICAL DIAGRAMS



JAM54S31 380-405/MR

SPECIFICATIONS

Cell	Mono
Weight	21.5kg±3%
Dimensions	1722±2mm×1342±2mm×30±1mm
Cable Cross Section Size	4mm ² (IEC) 12 AWG (UL)
No. of cells	108 (6x18)
Junction Box	IP68, 3 fuses
Connector	MC4-EVOC2 (1500V)
Cable Length (Including Connector)	Portrait: 300mm±100mm×1 Landscape: 1200mm±1100mm×1
Packaging Configuration	380±20mm×1400±20mm×120mm

ELECTRICAL PARAMETERS AT STC

TYPE	JAM54S31-380MR	JAM54S31-380MR	JAM54S31-380MR	JAM54S31-405MR	JAM54S31-405MR
Rated Maximum Power (P _{max}) [W]	380	385	390	400	405
Open Circuit Voltage (V _{oc}) [V]	36.58	36.71	36.86	37.07	37.23
Maximum Power Voltage (V _{mp}) [V]	30.28	30.46	30.64	31.01	31.21
Short Circuit Current (I _{sc}) [A]	13.44	13.52	13.61	13.70	13.87
Maximum Power Current (I _{mp}) [A]	12.55	12.64	12.73	12.81	12.96
Module Efficiency [%]	19.5	19.7	20.0	20.2	20.7

Power Tolerance

Temperature Coefficient of P_{max} (P_{oc})

Temperature Coefficient of V_{oc} (V_{oc})

Temperature Coefficient of P_{max} (P_{mp})

STC

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

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL PARAMETERS AT NOCT

TYPE	JAM54S31-380MR	JAM54S31-380MR	JAM54S31-380MR	JAM54S31-405MR	JAM54S31-405MR
Rated Max Power (P _{max}) [W]	285	290	294	302	306
Open Circuit Voltage (V _{oc}) [V]	34.38	34.49	34.75	34.86	35.12
Max Power Voltage (V _{mp}) [V]	28.61	28.68	28.98	29.26	29.47
Short Circuit Current (I _{sc}) [A]	10.75	10.82	10.89	10.96	11.10
Max Power Current (I _{mp}) [A]	10.03	10.11	10.18	10.25	10.38
NOCT	45±2	45±2	45±2	45±2	45±2

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

UL Type 1

Fire Performance

Current-Voltage Curve JAM54S31-405MR



Power-Voltage Curve JAM54S31-405MR



Current-Voltage Curve JAM54S31-405MR



Premium Cells, Premium Modules

Version: Rev. 1.0 Date: 11/11/2018



PHILIPS ENERGY SYSTEMS
7801 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS	DATE	REV
DESCRIPTION	INITIAL DESIGN	02/26/2023

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

Residential Power Optimizer

For North America

S440/ S500B / S650B



PV power optimization at the module level

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

solaredge.com



POWER OPTIMIZER

/ Residential Power Optimizer

For North America

S440/ S500B / S650B

INPUT		S440	S500B	S650B
Rated Input DC Power ¹	W	440 ^a	500 ^b	650
Absolute Maximum Input Voltage (Voc)	V	80	125	155
MPPT Operating Range	V	8 - 60	12.5 - 105	12.5 - 82
Maximum Input Current (Maximum I _{sc} of Connected PV Module) ²	A	14.5	15	15
Maximum Input Short-Circuit Current ³	A	18.75	18.75	18.75
Maximum Efficiency	%	99.5	99.5	99.5
Overvoltage Protection	Yes	Yes	Yes	Yes
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)				
Maximum Output Voltage	V	80	125	155
Maximum Output Current	A	14.5	15	15
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR INVERTER OFF)				
Standby Output Voltage	V	11.0	11.0	11.0
Standby Output Current	A	1.0	1.0	1.0
STANDARD COMPLIANCE				
Photovoltaic Rapid Shutdown System	Yes	Yes	Yes	Yes
EMC	Yes	Yes	Yes	Yes
Safety	Yes	Yes	Yes	Yes
Material	Yes	Yes	Yes	Yes
RoHS	Yes	Yes	Yes	Yes
Fire Safety	Yes	Yes	Yes	Yes
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage	V	150	150	150
Dimensions (W x L x H)	mm/in	150 x 150 x 30 / 5.9 x 5.9 x 1.18	150 x 150 x 30 / 5.9 x 5.9 x 1.18	150 x 150 x 30 / 5.9 x 5.9 x 1.18
Weight	g/lb	720 / 1.6	720 / 1.6	720 / 1.6
Input Wire Length	m/ft	0.1 / 0.32	0.1 / 0.32	0.1 / 0.32
Output Wire Length	m/ft	0.1 / 0.32	0.1 / 0.32	0.1 / 0.32
Operating Temperature Range ⁴	°C	-40 to +85	-40 to +85	-40 to +85
Relative Humidity	%	0 - 100	0 - 100	0 - 100
Protection Rating		IP65 / NEMA4P	IP65 / NEMA4P	IP65 / NEMA4P

¹ If rated power of the module is 500W, it will not exceed the power optimizer rated power DC Power Modules with up to 15% power tolerance are allowed.
² For PV modules with a maximum input current of 15A, the maximum input current is 15A.
³ For PV modules with a maximum input current of 15A, the maximum input current is 15A.
⁴ The maximum input short-circuit current is 18.75A for S440, 18.75A for S500B and 18.75A for S650B. Items in the "Power Optimizer" are subject to change without notice.
⁵ Power derating is required for ambient temperature above +40°C / +104°F for S440, and for ambient temperature above +40°C / +104°F for S500B and S650B. Items in the "Power Optimizer" are subject to change without notice.
⁶ Contact technical sales for more details.

⁷ Parallel strings of different lengths or orientations.
⁸ If it is not above 210 mm (8.27 in) 5-pins and 4-series Power Optimizers in new installations in the same string.
⁹ If a string with more than 30 optimizers does not meet NEC rapid shutdown requirements, safety voltage will be above the 30V requirement.
¹⁰ Refer to the SolarEdge Rapid Shutdown specification for more details.
¹¹ For the S440, the maximum input current is 14.5A. For the S500B, the maximum input current is 15A. For the S650B, the maximum input current is 15A.
¹² For the S440 or S500B, the maximum input current is 14.5A. For the S650B, the maximum input current is 15A.

PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		DATE	REV
DESCRIPTION	INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS	KATIE HALL RESIDENCE 300 W C ST, ERWIN, NC 28339
------------------------	---

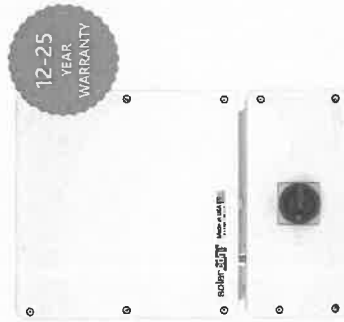
DRAWN BY	ESR
SHEET NAME	EQUIPMENT SPECIFICATION
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-10

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



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
- / 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 within inverter

solaredge.com



HOME BACKUP

/ 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 3300 @ 208V	5760 @ 240V 5000 @ 208V	7680 @ 240V 6600 @ 208V	10000 @ 240V 8600 @ 208V	11400 @ 240V 9800 @ 208V	W
Maximum AC Power Output	3800 @ 240V 3300 @ 208V	5760 @ 240V 5000 @ 208V	7680 @ 240V 6600 @ 208V	10000 @ 240V 8600 @ 208V	11400 @ 240V 9800 @ 208V	W
AC Output Voltage (Nominal)	240V	240V	240V	240V	240V	VAC
AC Output Voltage Range	208V - 264V	208V - 264V	208V - 264V	208V - 264V	208V - 264V	VAC
AC Frequency Range (min - nom - max)	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	Hz
Maximum Continuous Output Current	16A @ 240V 14A @ 208V	24A @ 240V 20A @ 208V	32A @ 240V 27A @ 208V	42A @ 240V 36A @ 208V	48A @ 240V 41A @ 208V	A
GFCL Threshold	100%	100%	100%	100%	100%	%
Total Harmonic Distortion (THD)	< 3%	< 3%	< 3%	< 3%	< 3%	%
Power Factor	1.0	1.0	1.0	1.0	1.0	
Battery Monitoring, Blanking Protection, Country Configurable Thresholds	Yes	Yes	Yes	Yes	Yes	
Charge Battery from AC (if allowed)	Yes	Yes	Yes	Yes	Yes	
Typical Nocturnal Power Consumption	< 2.5W	< 2.5W	< 2.5W	< 2.5W	< 2.5W	W
OUTPUT – AC STAND-ALONE (BACKUP) (AUX)						
Rated AC Power in Stand-alone Operation	3800 @ 240V 3300 @ 208V	5760 @ 240V 5000 @ 208V	7680 @ 240V 6600 @ 208V	10000 @ 240V 8600 @ 208V	11400 @ 240V 9800 @ 208V	W
Maximum Stand-alone Capacity	3800 @ 240V 3300 @ 208V	5760 @ 240V 5000 @ 208V	7680 @ 240V 6600 @ 208V	10000 @ 240V 8600 @ 208V	11400 @ 240V 9800 @ 208V	W
AC L-L Output Voltage Range in Stand-alone Operation	208V - 264V	208V - 264V	208V - 264V	208V - 264V	208V - 264V	VAC
AC L-N Output Voltage Range in Stand-alone Operation	120V - 144V	120V - 144V	120V - 144V	120V - 144V	120V - 144V	VAC
AC L-N Output Voltage Range in Stand-alone Operation	120V - 144V	120V - 144V	120V - 144V	120V - 144V	120V - 144V	VAC
AC Frequency Range in Stand-alone (min - nom - max)	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	Hz
Maximum Continuous Output Current in Stand-alone Operation	16A @ 240V 14A @ 208V	24A @ 240V 20A @ 208V	32A @ 240V 27A @ 208V	42A @ 240V 36A @ 208V	48A @ 240V 41A @ 208V	A
GFCL	100%	100%	100%	100%	100%	%
THD	< 3%	< 3%	< 3%	< 3%	< 3%	%
OUTPUT – SOLAREGE HOME EV CHARGER AC						
Rated AC Power	9600	9600	9600	9600	9600	W
AC Output Voltage Range	211V - 264V	211V - 264V	211V - 264V	211V - 264V	211V - 264V	VAC
On-Grid AC Frequency Range (min - nom - max)	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	Hz
Maximum Continuous Output Current @ 240V	40A	40A	40A	40A	40A	A
INPUT – DC (PV AND BATTERY)						
Grid PV and battery	Yes	Yes	Yes	Yes	Yes	
Transformer-less, Ungrounded	Yes	Yes	Yes	Yes	Yes	
Max Input Voltage	480V	480V	480V	480V	480V	VDC
Nom DC Input Voltage	380V	380V	380V	380V	380V	VDC
Reverse-Polarity Protection	Yes	Yes	Yes	Yes	Yes	
Ground-Fault Isolation Detection	600VDC Sensitivity	600VDC Sensitivity	600VDC Sensitivity	600VDC Sensitivity	600VDC Sensitivity	
INPUT – DC (PV)						
Maximum DC Power @ 240V	11,400	11,520	15,200	20,000	22,800	W
Maximum DC Power @ 208V	6600	10,000	13,200	18,000	20,000	W
Minimum Input Current @ 240V	20A	30A	40A	53A	60A	A
Minimum Input Current @ 208V	17.5A	27A	36A	48A	53A	A
Maximum Input Short Circuit Current	45A	45A	45A	45A	45A	A
Maximum Inverter Efficiency	99.2%	99.2%	99.2%	99.2%	99.2%	%
CEC Weighted Efficiency	98.5%	98.5%	98.5%	98.5%	98.5%	%
2-Pole Disconnection	Yes	Yes	Yes	Yes	Yes	

1) These specifications apply to inverters with part numbers SE3800H-US and SE5700H-US and connection and mode number DC0-IPH-US-Field 2 < 4.
2) For other regional settings please refer to the SolarEdge website. Please contact your local distributor for more information.
3) For other regional settings please refer to the SolarEdge website. Please contact your local distributor for more information.
4) Not designed for non-grid connected applications and requires AC for commissioning. Stand-alone (backup) functionality is only supported for the 240V grid.
5) For more information on the SolarEdge Home Hub Inverter, please visit the SolarEdge website.
6) For models SE3800H-US and SE5700H-US, the maximum AC output current is limited to 40A. For models SE7600H-US and SE10000H-US, the maximum AC output current is limited to 42A. For models SE11400H-US, the maximum AC output current is limited to 48A.
7) A higher current value may be used. The inverter will limit its output current to the value stated.

© SolarEdge Technologies, Ltd. All rights reserved. SOLAREGE, the SolarEdge logo, OPTIMIZED BY SOLAREGE are trademarks or registered trademarks of SolarEdge Technologies, Inc. All other trademarks are the property of their respective owners. SOLAR 11-2023-05-001227-1000. Subject to change without notice.



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD, MINT HILL
NC 28227, UNITED STATES

REVISIONS	DATE	REV
INITIAL DESIGN	10/20/2025	

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

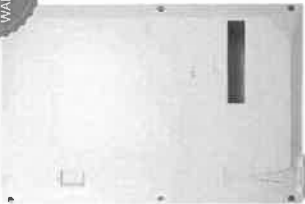
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

Backup Interface for North America

BI-EUSGN-01 / BI-NUSGN-01

12
YEAR
WARRANTY



STOREDGE®

Backup Interface for Flexible Backup

- / Automatically provides backup power to home loads in the event of grid interruption
- / Full flexibility in which loads to backup - the entire home or selected loads
- / Scalable solution to support higher power & higher capacity⁽¹⁾
- / Built-in Auto Transformer and Energy Meter for easier and faster installation
- / Seamless integration with the Energy Hub Inverter with Prism Technology to manage and monitor both PV generation and energy storage
- / Generator connection support⁽¹⁾

⁽¹⁾ Requires supporting inverter firmware

solaredge.com

solaredge

/ Backup Interface for North America

BI-EUSGN-01 / BI-NUSGN-01

INPUT FROM GRID		BI EUSGN 01	BI NUSGN 01
AC Current Input		200	A
AC Output Voltage (Nominal)		240	Vac
AC Output Voltage Range		211 - 264	Vac
AC Frequency (Nominal)		60	Hz
AC Frequency Range		59.3 - 60.5	Hz
Microgrid Interconnection Device Rated Current		200	A
Service Side AC Main Circuit Breaker Rated Current		200	A
Service Side AC Main Circuit Breaker Interrupt Current		10k	N/A
Grid Disconnection Switchover Time			< 800 ms
OUTPUT TO MAIN DISTRIBUTION PANEL			
Maximum AC Current Output		200	A
AC L-L Output Voltage (Nominal)		240	Vac
AC L-L Output Voltage Range		211 - 264	Vac
AC Frequency (Nominal)		60	Hz
AC Frequency Range		59.3 - 60.5	Hz
Minimum Inverters AC Current Output in Backup Operation		78	A
Impedance Compensation in Backup Operation		5000	W
AC L-N Output Voltage in Backup (Nominal)		120	V
AC L-N Output Voltage Range in Backup		105 - 132	V
AC Frequency Range in Backup		55 - 65	Hz
INPUT FROM INVERTER			
Number of Inverter Inputs		3	4
Rated AC Power		7500	W
Maximum Continuous Input Current @ 240V		32	A
Rated AC Power in Continuous Backup Operation		6,100	W
Maximum Continuous Input Current in Backup Operation		26	A
Peak AC Power (< 10 sec) in Backup Operation		10,000	W
Peak AC Current (< 10 sec) in Backup Operation		30	A
Inverter Input AC Circuit Breaker		40	A
Upgradability		Up to 3 x 6.3A CB ⁽¹⁾	
GENERATOR ⁽¹⁾			
Maximum Rated AC Power		15,000	W
Maximum Continuous Input Current		63	Ac
Dry Contact Switch Voltage Rating		250/30	Vac/Vdc
Dry Contact Switch Current Rating		5	A
2 wire Start Switch		Yes	
ADDITIONAL FEATURES			
Installation Type		Surtable for use at service equipment	For multi lug only
Number of Communication Inputs		2	
Communication		RS485	
Energy Meter (for Input/Output)		Yes	Yes accuracy
Manual Control Over Memory of Interconnection Device		Yes	Yes

in 120V AC CB inputs up to one 7.5kW inverter with each 6.3A CB supporting a one 15kW and one 1.4kW inverter. The CB upgrade kit is available with the BI-EUSGN-01 and BI-NUSGN-01. CB upgrade kit is available with the BI-EUSGN-01 and BI-NUSGN-01.



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

**KATIE HALL
RESIDENCE**
300 W C ST,
ERWIN, NC 28339

DRAWN BY

ESR

**SHEET NAME
EQUIPMENT
SPECIFICATION**

SHEET SIZE

**ANSI B
11" X 17"**

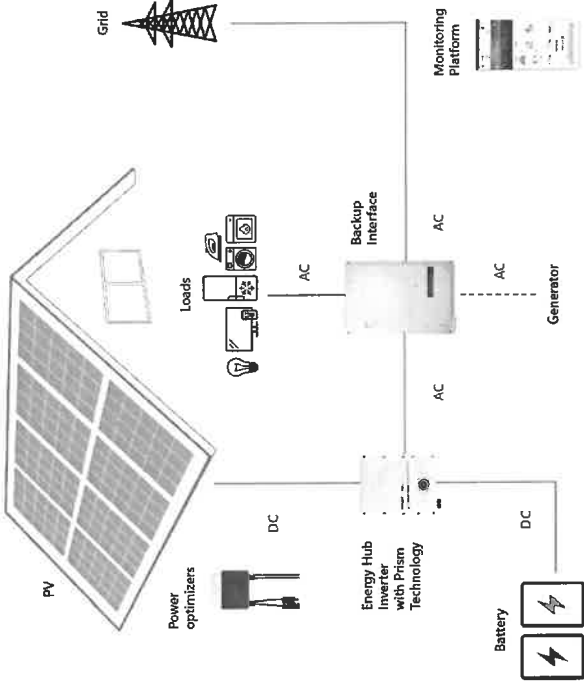
SHEET NUMBER

PV-13

/ Backup Interface for North America

BI-EUSGN-01 / BI-NUSGN-01

STANDARD COMPLIANCE		BI-EUSGN-01	BI-NUSGN-01
Safety		UL1741, CSA 22.2 NO. 107	
Emissions		UL1859A	FCC part 15 class B
INSTALLATION SPECIFICATIONS			
Supported Inverters			
Single phase Energy Hub Inverter with Prism technology			
Storage single phase Inverter			
2" conduit / 40 - 40 AWG			
1" conduit / 14 - 4 AWG			
1" conduit / 8 - 3 AWG			
3/4" / 24 - 10 AWG			
Weight		73 / 33	
Cooling		Fan (user replaceable)	
Noise		< 50	
Operating Temperature Range		-40 to +122 / -40 to +50	
Protection Rating		NEMA 3R IP64	
Dimensions (HxWxD)		20.59 x 13.88 x 8.62 / 523.5 x 352.5 x 219	
			in / mm



© SolarEdge Technologies, Ltd. All rights reserved. SOLAREDGE, the SolarEdge logo, OPTIMIZED BY SOLAREDGE are trademarks or registered trademarks of SolarEdge Technologies, Inc. All other trademarks mentioned herein are trademarks of their respective owners. EUSGN01/USGN01. Subject to change without notice.



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14

SolarEdge Energy Bank 10kWh Battery For North America



solar edge

HOME BACKUP

Optimized for SolarEdge Energy Hub Inverters⁽¹⁾

- Maximized system performance, gaining more energy to store and use for on-grid and backup power applications
- Integrates with the complete SolarEdge residential offering, providing a single point of contact for warranty, support, training, and simplified logistics & operations
- DC coupled battery featuring superior overall system efficiency, from PV to battery to grid
- Scalable solution for increased power and capacity with multiple SolarEdge inverters and batteries
- Solar storage, EV charging, and smart devices all monitored and managed by a single app to optimize solar production, consumption and backup* power
- Wireless communication to the inverter, reducing wiring, labor and installation faults
- Simple plug and play installation, with automatic SetApp-based configuration
- Includes multiple safety features for battery protection

⁽¹⁾ Back to applications are subject to local regulation and may require additional components and firmware updates

solareedge.com



/ SolarEdge Energy Bank 10kWh Battery For North America

BATTERY SPECIFICATION		BAT-10K1P ¹	
Usable Energy (100% depth of discharge)	Wh	9700	
Continuous Output Power	W	5000	
Peak Output Power (for 10 seconds)	W	7500	
Peak Roundtrip Efficiency	%	94.5	
Warranty ²	Years	10	
Voltage Range	Vdc	300-450	
Communication Interfaces		Wi-Fi, RS-485 ³	
Batteries per Inverter		Up to 3 ⁴	
STANDARD COMPLIANCE			
Safety		UL1642, UL1973, IEC62479, UN38.3	
Emissions		FCC Part 15 Class B	
MECHANICAL SPECIFICATIONS			
Dimensions (W x H x D)	in./mm	31.1 x 46.4 x 9.94 / 790 x 1178 x 250	
Weight	lb / kg	267 / 121	
Mounting ⁵		Floor or wall mount ⁶	
Operating Temperature ⁷	°F / °C	+14 to +122 / 5 to +50	
Storage Temperature (less than 3 months)	°F / °C	+14 to +167 / 5 to +100	
Storage Temperature (less than 3 months)	°F / °C	-22 to +140 / -30 to +100	
Altitude	ft / m	6500 / 2000	
Enclosure Protection		IP55 / NEMA 3R (indoor and outdoor (water and dust protection))	
Cooling		Natural convection	
Noise (at 1m distance)	dB(A)	42 ⁸	

¹ The SolarEdge line 2.0 Bank is designed for use with SolarEdge Energy Hub for wireless communication. The inverter might require a matching SolarEdge Energy Hub (ing in newer models below).
² Please refer to the SolarEdge Energy Bank Limited Warranty for details.
³ Please refer to the SolarEdge Energy Bank Limited Warranty for details.
⁴ For warranty details please refer to the SolarEdge Energy Bank Limited Warranty.
⁵ Mounting options are subject to local regulations and may require additional components and firmware updates.
⁶ For warranty details please refer to the SolarEdge Energy Bank Limited Warranty.
⁷ The SolarEdge Energy Bank is designed for use with SolarEdge Energy Hub for wireless communication. The inverter might require a matching SolarEdge Energy Hub (ing in newer models below).
⁸ Please refer to the SolarEdge Energy Bank Limited Warranty for details.

SolarEdge Energy Bank Battery Accessories (purchased separately)	
Accessory	P/N
Rack stand	JAC-RBAT-FURSTD-01
Branch connectors set (includes a pair of DC+ and DC- connectors)	JAC-RBAT-USBCKB-01
Required for installations with multiple SolarEdge Energy Bank batteries with a single inverter	JAC-RBAT-HANDIE-01
Handles	ENET-HBND-01
SolarEdge Energy Net Plug-in	JAC-RBAT-NNAL20-01
Battery inverter extension cable (2m long (6'6" to terminal block))	

¹ SolarEdge Energy Bank 10kWh Battery is a registered trademark of SolarEdge Energy Bank. All other trademarks are the property of their respective owners. © 2023 SolarEdge Energy Bank. All rights reserved.

☒ RoHS

PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2023	

PROJECT NAME & ADDRESS
KATIE HALL RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY ESR
SHEET NAME EQUIPMENT SPECIFICATION
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-15



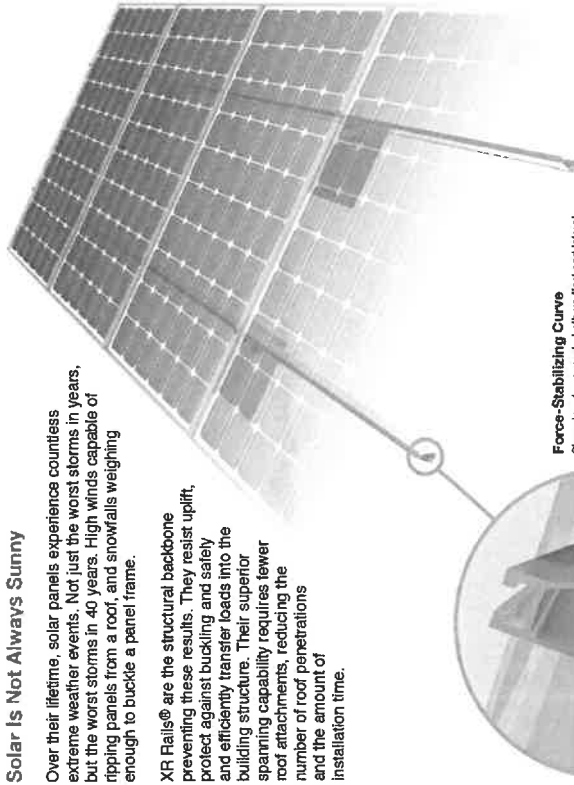
XR Rail® Family

Tech Brief

Solar Is Not Always Sunny

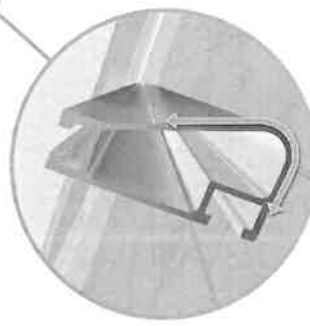
Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

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 twist. XR Rails have a built-in force-stabilizing curve 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 FlashCoat® and other pitched roof attachments.



Ironridge® offers a range of tie 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 retaining 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.

Snow Design Load (psf)	Wind Speed (mph)	Rail Span					
		4'	5'-4"	6'	8'	10'	12'
None	90	XR10					XR1000
	120						
	140						
	160						
20	90			XR100			
	120						
	140						
	160						
30	90						
	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 design chart for crewing/given rail capabilities. Use approved certification letters for actual design judgments.



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-16



UFO® Family of Components

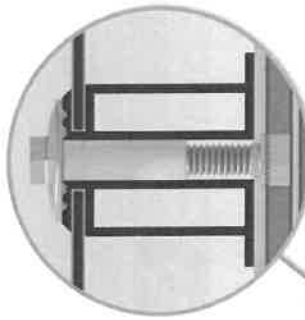
Techn Brief

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®. It comes 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. No lugs or bonding paths. No lugs or hardware needed.



Grounding Lug

A single Grounding Lug bonds the rail to the ground conductor.

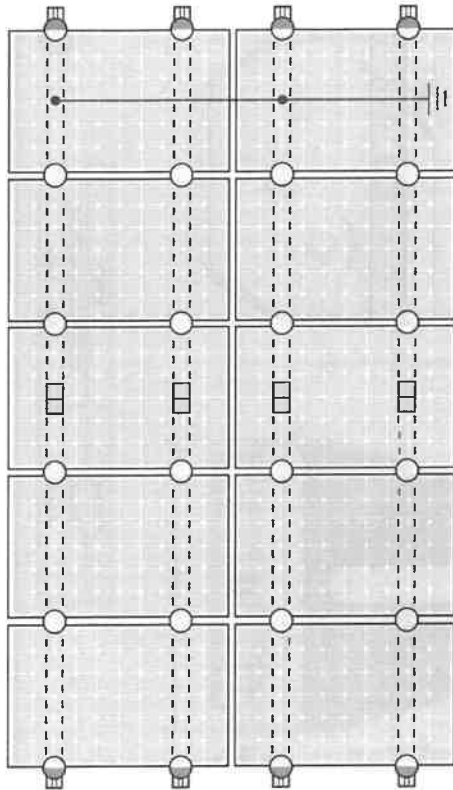


Bonded Attachments

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



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 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	1 per Array
Microinverters & Power Optimizers	Compatible with most MLPE manufacturers. Refer to system installation manual.			
Fire Rating	Class A	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules. Refer to installation manual for a detailed list.			



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

**KATIE HALL
RESIDENCE**
300 W C ST,
ERWIN, NC 28339

DRAWN BY

ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-17



QuickMount® Halo UltraGrip

Cut Sheet

Release Liner shown for reference

RD STRUCTURAL SCREW PN RD-1430-01-M1
SOLD SEPARATELY
SHOWN FOR REFERENCE

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

© 2022 Ironridge, Inc. All rights reserved. Visit www.ironridge.com for patent information. QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0

Cut Sheet

1. Halo UltraGrip

Ø.26

Property	Value
Material	3000 Series Aluminium
Finish	Mill or Black

© 2022 Ironridge, Inc. All rights reserved. Visit www.ironridge.com for patent information. QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0

PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

**KATIE HALL
RESIDENCE**
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

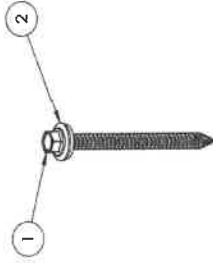
SHEET NUMBER
PV-18



IRONRIDGE

QuickMount® RD Structural Screw

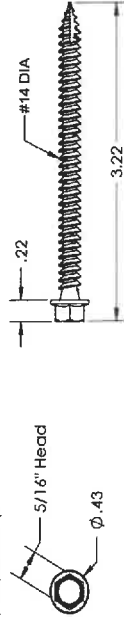
Cut Sheet



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

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

1. Self Drilling Screw, #14, Wood Tip



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

2. Washer, EPDM Backed



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

© 2022 Ironridge, Inc. All rights reserved. Visit www.ironridge.com for patent information.

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



PHILLIPS ENERGY SYSTEMS
7801 ALLEN BLACK RD, MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2025	

PROJECT NAME & ADDRESS

KATIE HALL
RESIDENCE
300 W C ST,
ERWIN, NC 28339

DRAWN BY
ESR

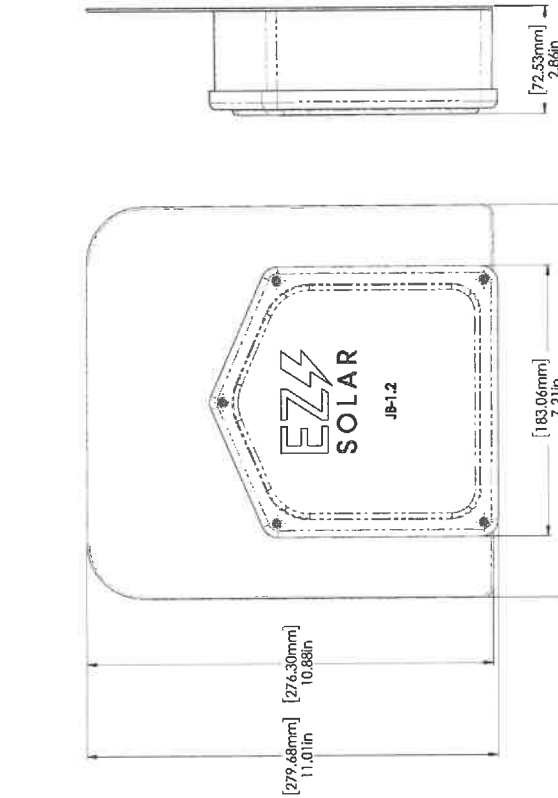
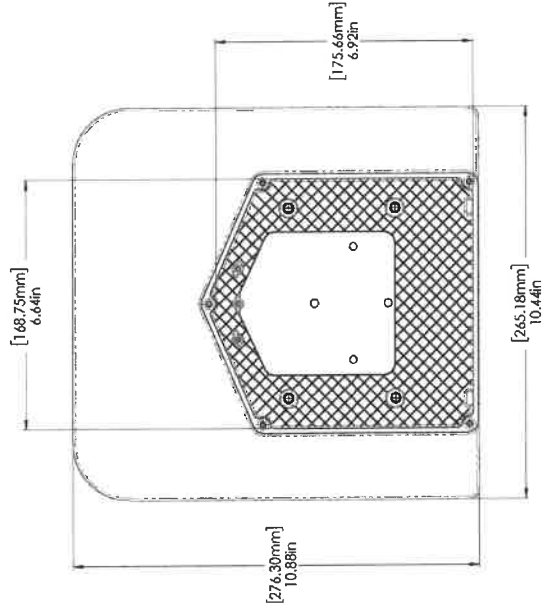
SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-19

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		



PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF EZ SOLAR. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF EZ SOLAR IS PROHIBITED.



PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF EZ SOLAR. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF EZ SOLAR IS PROHIBITED.



PHILLIPS ENERGY SYSTEMS
7901 ALLEN BLACK RD. MINT HILL,
NC 28227, UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	02/25/2015	

**KATIE HALL
RESIDENCE**
300 W C ST,
ERWIN, NC 28339

**DRAWN BY
ESR**

**SHEET NAME
EQUIPMENT
SPECIFICATION**

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

**SHEET NUMBER
PV-20**



PV LETTERS

Phillips Energy Systems

Contractor Address: 7901 Allen Black Rd, Mint Hill,
NC 28227

February 25, 2025

Subject: Proposed Solar Panel Installation
Katie Hall Residence, 300 W C St, Erwin, NC
DC System Size: 4.860 kW
PV Letters Job #004-19433

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: 2x6 Rafters @ 16" O.C.
Roofing Material: Asphalt Shingles (1 layer)
Roof Slope: 25 degrees

Roof Connection Details

Framing Mount Wood Screws: (2) #14 Self-Drilling Screw with a minimum penetration depth of 1.75" into rafter only, at 64" O.C. max
Decking Mount Wood Screws: (6) #14 Self-Drilling Screw with a minimum penetration depth of 0.25", at 64" O.C. max
Note: Required installation of 75% / 25% between Framing and Decking Mounts.

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.

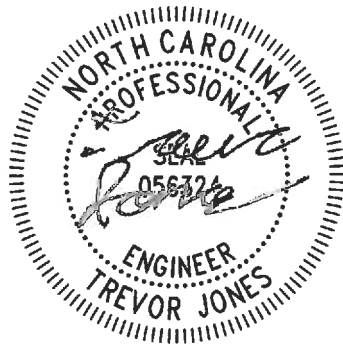
If you have any questions or concerns, please contact us at (208)-994-1680, or by email at Projects@pvletters.com.

Sincerely,



Trevor A. Jones, P.E.

2/25/2025





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	2	2	psf
Insulation	--	--	psf
1/2" Gypsum Ceiling	--	--	psf
M,E, & Misc	--	--	psf
Solar Panel	0	3	psf
Total Dead Load	6	9	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	25		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 + Lr	26.0	9.0	psf
D + S	17.6	20.6	psf
Max. Load	26.0	20.6	psf
% of original		79.04%	

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	25	
Roof Layout	Hip	
Wind Speed, mph	120	
Exposure Coefficient, K_z	0.85	(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	26.5	(Table 26.10-1)

Zones:

	<u>1</u>	<u>2</u>	<u>3</u>
Spacing parallel to rail, in	64	64	64
GC_p (max)(Figure 29.4-7)	0.90	2.20	2.60
Exposed Panels? ($\gamma_E = 1.5$) (Fig. 29.4-7)	No	No	No
Effective Wind Area on each con., ft ²	15.1	15.1	15.1
Pressure Equalization Factor, γ_a (Figure 29.4-8)	0.73	0.73	0.73
Uplift Force, psf (Equation 29.4-7)	17.4	42.5	50.2
Max. Uplift Force / Connection (0.6 WL), lbs	157.1	384.1	453.9
Solar Dead Load (0.6 DL), Lbs	27.1	27.1	27.1
Max. Uplift Force (0.6 WL - 0.6 DL), lbs	130.0	357.0	426.8

Connection Capacity

Attachment FTG	IronRidge QuickMount Halo Ultragrip	
Attachment location	Framing	Decking
Fastener Type	Wood Screw	Wood Screw
Fastener Diameter, in	0.242	0.242
Embedment Length, in	1.75	0.25
Lumber Species & Grade	SPF #2 (Assumed)	
Nominal Withdrawal Capacity W, lbs	213	30.4
# of Screws	2	6
Load Duration Factor C_d	1.6	1.6
Screw Adj. Withdrawal Cap. W', lbs	681	292
Attachment FTG Strength with C_d , lbs	1606	374
Assumed attachment distribution	75%	25%
Max applied load, lbs	427	
Max allowable load, lbs	584	

Compare Adjusted Withdrawal Capacity to ASD Factored Demand

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