



ARCHITECTURAL REVIEW COMMITTEE – STAFF REPORT

Advisory Review

Address: 122 Pleasant Street
Meeting Date: October 24, 2024
Property Owner: Russell Carter
Contractor: Windfree Solar
Historic Designation: Contributing Resource in the Ridgeland - Oak Park Historic District
Zoning: R-3: Single-Family Residential
Project Description: Install solar panels on front roof slope
Guidelines: Roofing Policy



2024 photo

Architectural Review Guidelines

The purpose for architectural review is to protect the unique visual qualities of a building and its site that define their sense of history from inappropriate proposed alterations that will reduce that sense.

The relevant standards from the Secretary of the Interior's Standards for Rehabilitation include the following:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Relevant standards from the Roofing Policy include the following:

16. Solar panels, satellite dishes, and ham radio antennas:
 - a. These types of objects will be permitted only on surfaces which are not visible from the street.
 - b. If location is required to be in an area which is visible from the street, submit drawing showing proposed location along with rationale as to why the object must be located in visible area. If approved in such locations, use one or more of the following techniques to reduce visual impact of objects which are out of character with the historic district:
 - i. Do not attach such objects to historic materials, or, if that is not possible, attach to historic materials using the least intrusive methods. Submittal of method of attachment will be required by the Commission to assist in determination of acceptability for location of such objects in an area which is visible from the street.
 - ii. Provide berms or other types of enclosures to hide such objects from street view.
 - iii. Paint objects with a color to blend with historic materials to which the object is attached.
 - c. Do not damage existing building materials during installation of these objects, and assure that when the object is removed in the future, the removal process will not be likely to damage such materials

Applicant's Proposal

The applicant plans to install 16 solar panels, ten of which will be located on the front-facing roof elevation. The remaining 6 solar panels will be located on both sides of the roof. The applicant provided a letter from Windfree Solar explaining the rationale for installing the solar panels on front-facing roof elevation. Additionally, the applicant submitted a separate permit application for roof replacement of the main house (decking, shingles, etc.). The permit was approved, and the reroofing was completed. The applicant attended the HPC Meeting on October 10, 2024. The Commission requested the applicant to attend the ARC Meeting on October 24, 2024 with additional information.

During the HPC Meeting the Commission recommended the followings:

- Provide renderings/ examples of a monochromatic equipment design (panels are black on black, color matched black attachments and rails, etc.) from the contractor's previous projects that have raised skirt to hide the attachments that blends in with the roof projections.
- Incorporate interior conduits instead of exterior conduits to see only the main array on the roof
- If possible, relocate the solar panels proposed on the front facing roof slope, which will be visible from the street, to alternative locations.

Historical Summary

122 Pleasant Street was built by Foster & Frasier for the owner L. G. Varty in 1911. The building is a contributing building within the Ridgeland-Oak Park Historic District.

Staff Comments

Ten of the proposed solar panels will be located on the front-facing roof elevation which will be visible from the street. The Guidelines recommend against installing solar panels in visible locations and, if it is required, the applicant must provide rationale. It is recommended that alternatives to the front elevation be thoroughly considered. The Architectural review Committee should provide recommendations based on the Architectural Review Guidelines. Please note that this is an Advisory Review only.

Attachments

- Applicant submission packet including:
 1. 122 Pleasant St. Solar System Drawings
 2. 122 Pleasant St. Solar Rationale from Windfree Solar
 3. 122 Pleasant St. Existing Photos Submitted by the Applicant



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September 19, 2024

DBM Design and Consulting Company
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Ogden, Utah 84401

Re: Engineering Services
Carter Residence
122 Pleasant Street, Oak Park IL
6.800 kW System

To Whom it May Concern,

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

A. Site Assessment Information

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.

B. Description of Structure:

Roof Framing: Prefabricated wood trusses with all truss members constructed of 2 x 4 dimensional lumber at 24" on center.
Roof Material: Composite Asphalt Shingles
Roof Slopes: 23 degrees
Attic Access: Accessible
Foundation: Permanent

C. Loading Criteria Used

- **Dead Load**
 - Existing Roofing and framing = 7 psf
 - New Solar Panels and Racking = 3 psf
 - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 25 psf
- **Wind Load** based on ASCE 7-16
 - Ultimate Wind Speed = 115 mph (based on Risk Category II)
 - Exposure Category C

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2018 International Residential Code, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.

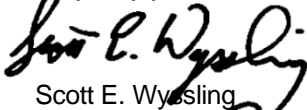
D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent Ironridge installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a $\frac{5}{16}$ " lag screw is 235 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of $2\frac{1}{2}$ ", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using one $\frac{5}{16}$ " diameter lag screw with a minimum of $2\frac{1}{2}$ " embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 2018 IRC, current industry standards and practice, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

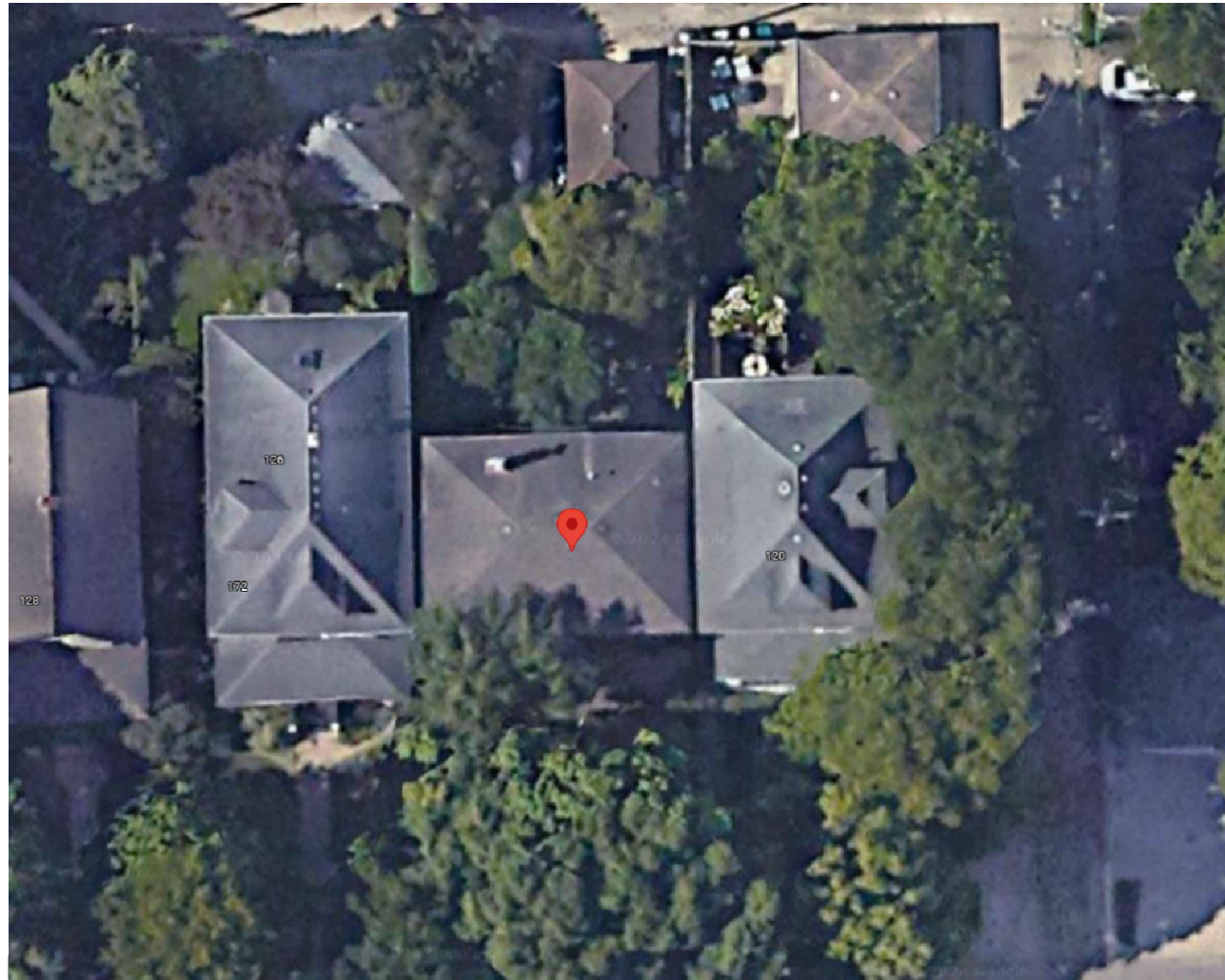


Scott E. Wyssling
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Expiration Date 11/30/2025

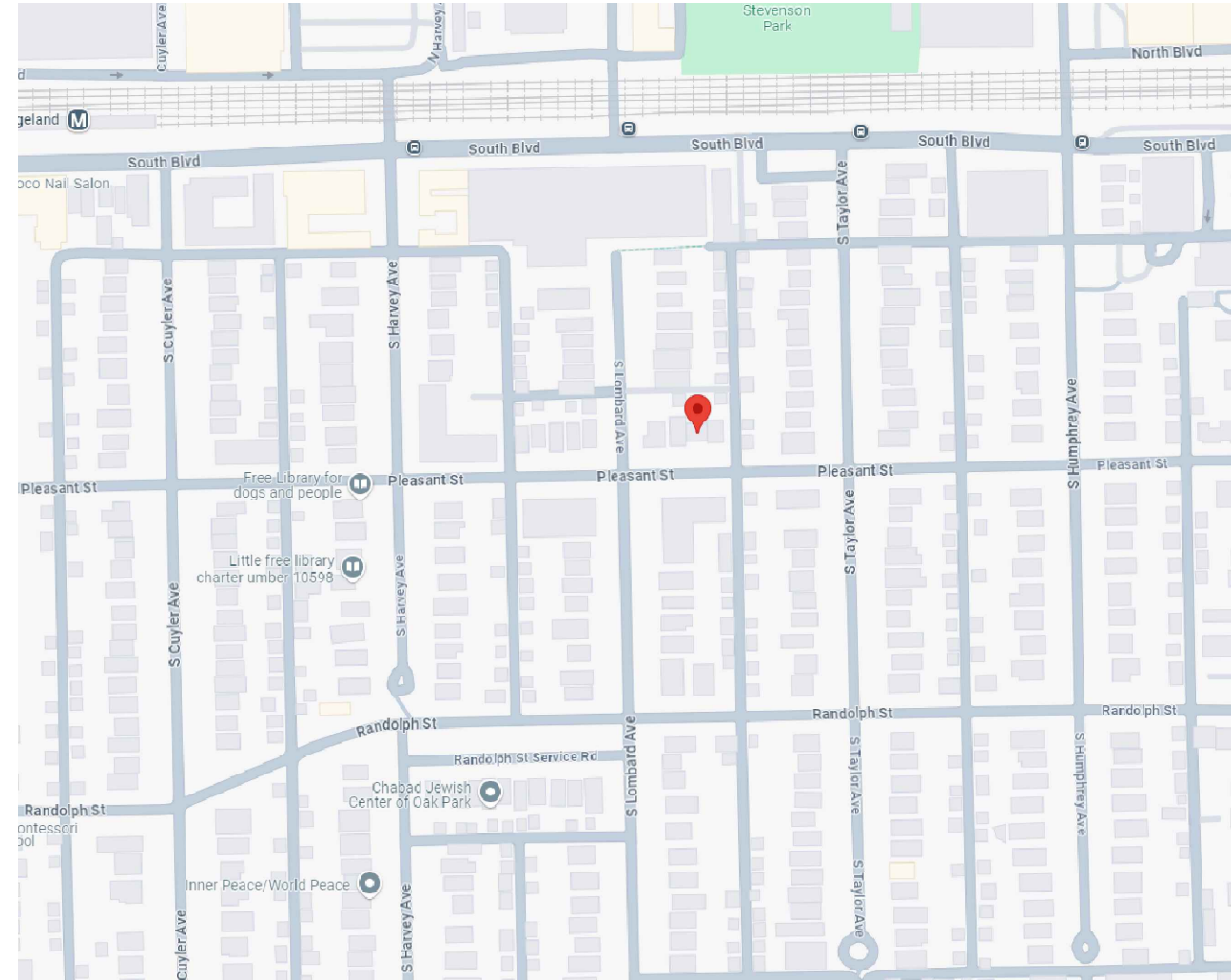


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Signed 9/19/2024

AERIAL VIEW



VICINITY MAP



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SITE INFORMATION:
Carter, Rusell
122 Pleasant St,
Oak Park, IL 60302
DC SYSTEM SIZE:
6.8kW

SHEET INDEX	
PAGE NUMBER	PAGE TITLE
PV01	TITLE PAGE
PV02	SITE PLAN
PV03	ELECTRICAL LINE DIAGRAM
PV04	ARRAY & STRINGING DETAIL
PV05/PV05-1	LABEL PLAN / PLACARD
SPECS	SPECSHEETS AND DOCUMENTS



Set Reviewed By:
PV-041115-011207

SCOPE OF WORK

DC System Size: 6.8kW
 Roof Type: Asphalt/Composite Shingle Roof
 Roof Pitch: 4/12
 Anchored on 48" centers using UL listed racking system
 UV Resistant cable ties (not zip ties) used for permanent wire management in accordance with NEC 110.2, 110.3(A-B), 300.4
 Junction boxes mounted flush with racking.

DESIGN CRITERIA

WIND SPEED: 115 MPH
 EXPOSURE CATEGORY: C



SYSTEM SUMMARY

MODULE: (16) Jinko JKM425N-54HL4-B 425W PV Module
 OPTIMIZER: (16) SOLAREEDGE S440 DC Optimizers
 INVERTER: (1) SOLAREEDGE SE6000H-US String Inverter 240VAC
 RACKING: SUNMODO SMR Roof Mounted PV System

GENERAL NOTES

- ALL WORK SHALL COMPLY WITH STATE AND LOCAL CODES.
- DRAWINGS HAVE BEEN DETAILED ACCORDING TO UL LISTING REQUIREMENTS.
- PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY DBM OF ANY INCONSISTENCIES.
- ALL EQUIPMENT SHALL BE INSTALLED AS SHOWN.
- WARNINGS PER NEC 690.
- WIRING SHALL NOT BE INSTALLED WITHIN 10 INCHES OF ROOF DECKING EXCEPT WHERE DIRECTLY BELOW PV EQUIPMENT

APPLICABLE CODES
2021 International Residential Code (IRC) w/ Amendments 2020 National Electrical Code (NEC) w/Amendments 2021 Illinois Energy Conservation Code (IECC) 2014 Illinois State Plumbing Code with no Amendments 2021 International Existing Building Code
OCCUPANCY & CONSTRUCTION TYPE
OCCUPANCY - R3 CONSTRUCTION - V-B



DESIGNED BY: J. Fairchild
 DATE: 9/4/2024
 PROJECT #: 2024-WINDFREE
 SHEET NAME: COVER PAGE
 PAGE #: PV01
 REVISION: 0

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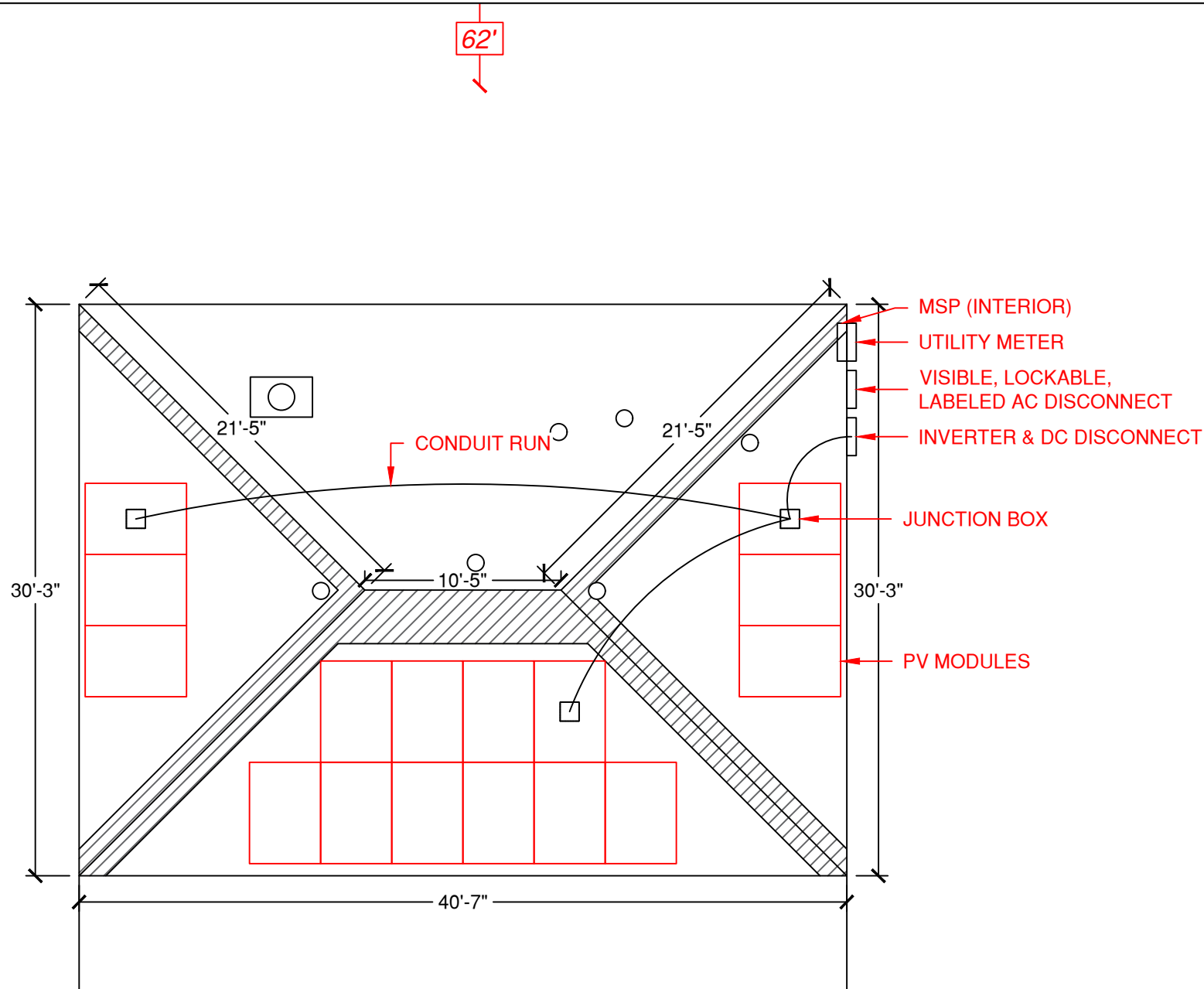
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DC SYSTEM SIZE:
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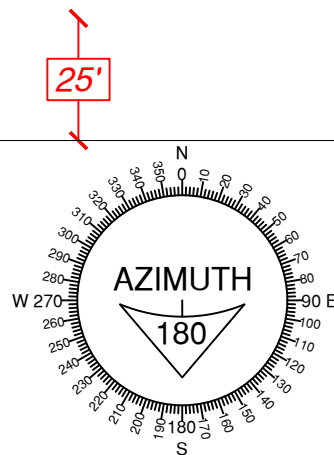
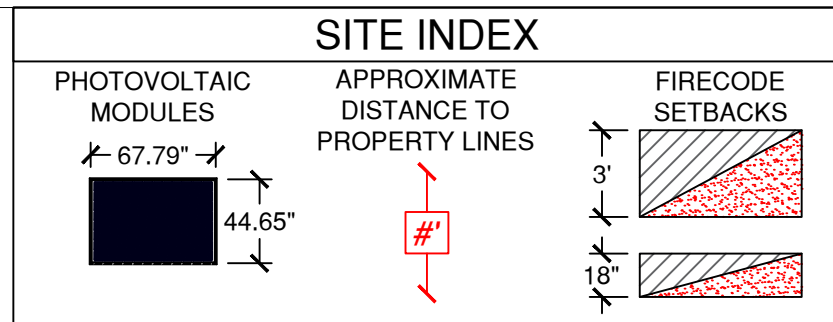
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PROJECT #:
2024-WINDFREE
SHEET NAME:
PROPERTY DETAIL
PAGE #
PV02 REVISION:
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- AC DISCONNECT LOCATED 10' OR LESS FROM UTILITY METER
- CONDUIT RUNS AND JUNCTION BOX LOCATIONS TO BE DETERMINED IN THE FIELD.
- EQUIPMENT LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD
- WIRES LOCATED IN READILY ACCESSIBLE LOCATIONS SHALL BE GUARDED PER NEC 690.31(A)



ARRAY DETAIL

	A	B	C	D
AZIMUTH	270°	180°	90°	
TILT ANGLE	21°	21°	21°	
MODULE COUNT	3	10	3	
ROOF SUPPORTS	Rafter = 2x6 @ 24" O.C.			

PV MODULE SPECIFICATIONS	
MANUFACTURER	JINKO SOLAR
MODEL	JKM425N-54HL4-B
MAX POWER-POINT VOLTAGE (Vmp)	32.37V
MAX POWER-POINT CURRENT (Imp)	13.13A
OPEN CIRCUIT VOLTAGE (Voc)	38.95V
SHORT CIRCUIT CURRENT (Isc)	13.58A
MAX SERIES FUSE (OCPD)	25A
MAX POWER (Pmax)	425W
MAX VOLTAGE (Vdc)	1000V

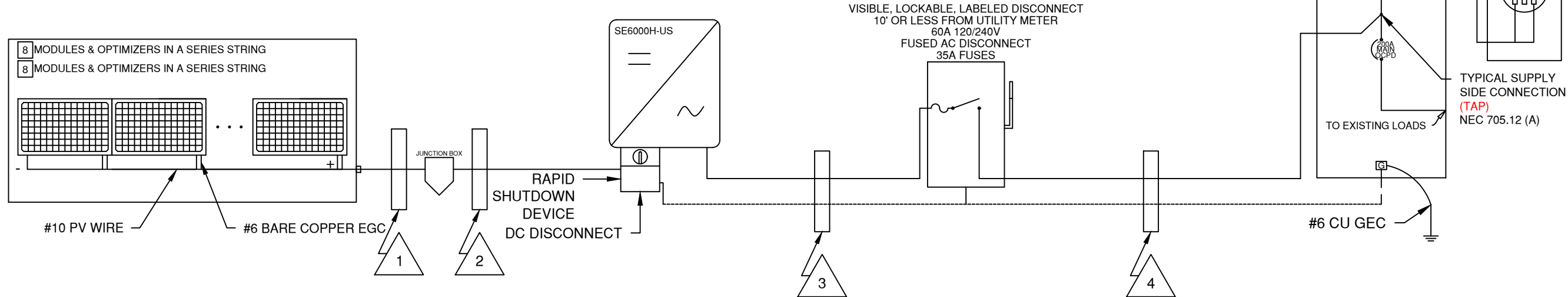
INVERTER SPECIFICATIONS	
MANUFACTURER	SolarEdge
MODEL	SE6000H-US (240V)
MAX DC INPUT VOLTAGE	480 V
MAX OUTPUT POWER	6000 W
NOMINAL AC OUTPUT VOLTAGE	240 V
NOMINAL AC OUTPUT CURRENT	25 A
MAX FUSE (OCPD)	35 A

PHOTOVOLTAIC AC OUTPUT LABEL	
AC OUTPUT CURRENT	25A
NOMINAL AC VOLTAGE	240V

DC DISCONNECT CALCS	
MAX DC VOLTAGE =	480V
MAX DC CIRCUIT CURRENT =	30A
MAXIMUM RATED DC OUTPUT CURRENT OF DC TO DC CONVERTER (IF INSTALLED) =	15A

PV LOAD CALCULATIONS: SUPPLY SIDE TIE-IN	
200A RATED FEEDER WIRES	
$200A \div 1.25 = 160A$	
160A (FEEDER WIRES ALLOWABLE SOLAR)	
160A AVAILABLE FOR PV	
705.12(A) & 690.59	

DC OPTIMIZERS OUTPUT 1Voc PER MODULE & LIMIT VOLTAGE TO MAX POWER POINT VOLTAGE OF THE INVERTER



ELECTRICAL NOTES	
A. ALL COMPONENTS SHALL COMPLY WITH NECAS AMENDED.	
B. PHASE CONDUCTORS SHALL BE IDENTIFIED	
C. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF UPON ENTRY INTO BOXES, REFER TO MANUFACTURERS INSTALLATION MANUAL FOR REQUIRED TORQUE VALUES	
D. THE DC GEC, IF USED, SHALL BE CONTINUOUS FROM THE INVERTER GROUND BUS TO THE MAIN SERVICE GROUNDING ELECTRODE SYSTEM	
E. ATTACHMENT TO GROUND ELECTRODE SHALL USE IRREVERSIBLE CLAMP.	
F. ALL EXPOSED METAL PARTS SHALL BE GROUNDED USING TIN PLATED COPPER LAY IN LUGS OR GROUNDING CLIPS LISTED FOR THE PURPOSE	
G. MIN #10 BARE COPPER EGC AT SOURCE CIRCUITS SHALL BE ROUTED SECURELY TO MOUNTING HARDWARE THAT PROTECTS FROM PHYSICAL DAMAGE	
H. #6 FOR AREAS THAT MAY BE SUBJECT TO DAMAGE	
I. BOTH ENDS OF ALL METALLIC CONDUIT SHALL BE BONDED PER NEC250	
J. INTERCONNECTION PER NEC690	
K. ALL WIRES WILL BE RATED AT THHN/THWN-2	
L. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS	
M. PV PRODUCTION TERMINATED IN LOAD SIDES OF ALL AC DISCONNECTS	

INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN FOR NEC 2011, 2014, 2017 AND 2020 690.11 AND 690.12

- All Exposed PV rooftop conductors that are not located under the array modules, shall be installed in a listed raceway, and shall include listed junction boxes at both ends of the raceway to transition from exposed conductors to the listed raceways. In Accordance with NEC 690.31(A) & (B)**
- ROMEX AMPACITY LIMITED TO 60° VALUES. IF USED, SIZE ACCORDING TO NEC TABLE 310.15
- DC Conduit must be marked in accordance with NEC 690.31. Labeling must be every 10' and must comply with NEC 690.31. See PV05 for Label plan
- ALL DC Conductors must be protected with metal conduit

CONDUCTOR SCHEDULE WITH NEC ELECTRICAL CALCULATIONS												
ID	CONDUCTOR	CONDUIT	NO. OF CNDRS. IN CNDT.	RATED AMPS	EGC	TEMP. CORR. FACTOR	FILL ADJ. FACTOR	CONT. CURRENT	MAX. CURRENT	BASE AMPACITY	DERATED AMPACITY	WIRE RUN DISTANCE
1	PV WIRE	FREE AIR	N/A	15.00A	#6 BARE COPPER	0.96	N/A	15.00A	18.75A	35A	33.60A	20ft
2	10 AWG THWN-2 CU	3/4" DIA EMT	4	15.00A	10 AWG THWN-2 CU	0.96	0.8	15.00A	18.75A	35A	26.88A	20ft
3	8 AWG THWN-2 CU	3/4" DIA EMT	3	25A	10 AWG THWN-2 CU	0.96	1.0	25.00A	31.25A	50A	48.00A	5ft
4	6 AWG THWN-2 CU	3/4" DIA EMT	3	25A	8 AWG THWN-2 CU	0.96	1.0	25.00A	31.25A	65A	62.40A	5ft



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SITE INFORMATION:
Carter, Rusell

122 Pleasant St,
Oak Park, IL 60302

DC SYSTEM SIZE:
6.8kW



DBM DESIGN

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DATE:
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PV03

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GROUNDING DETAIL



ATTACHMENT DIAGRAM

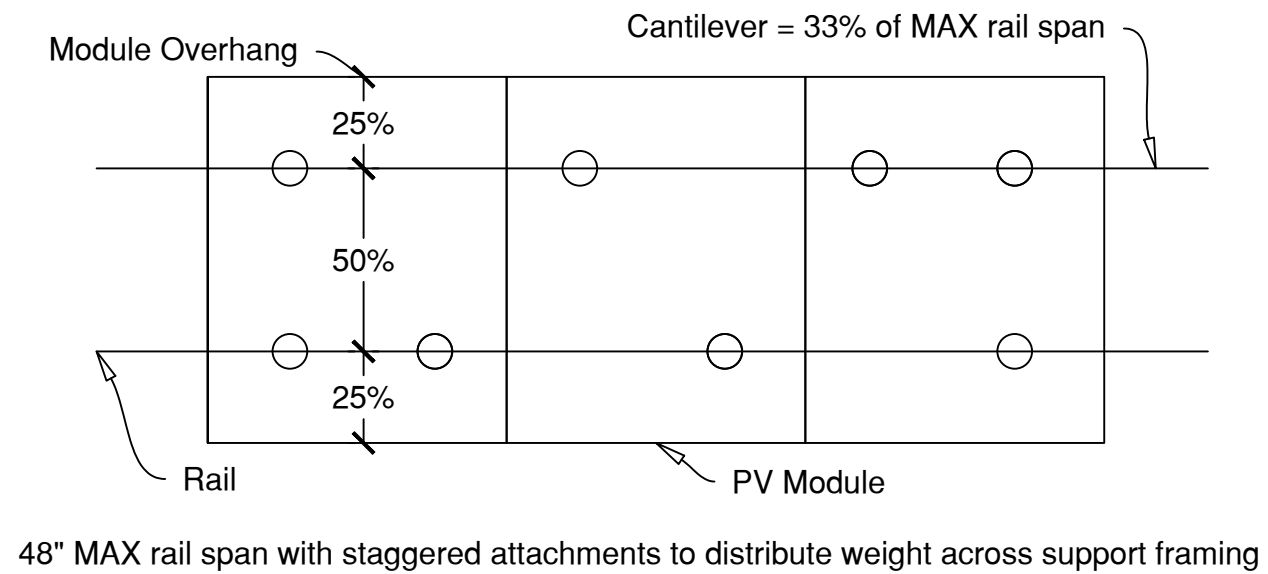
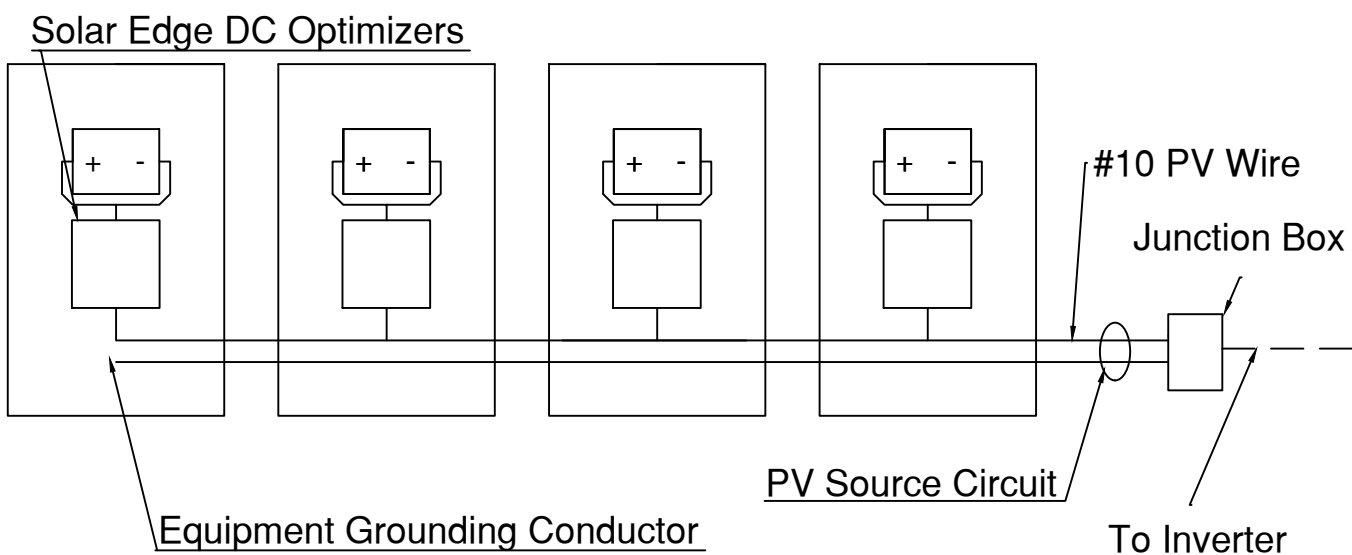
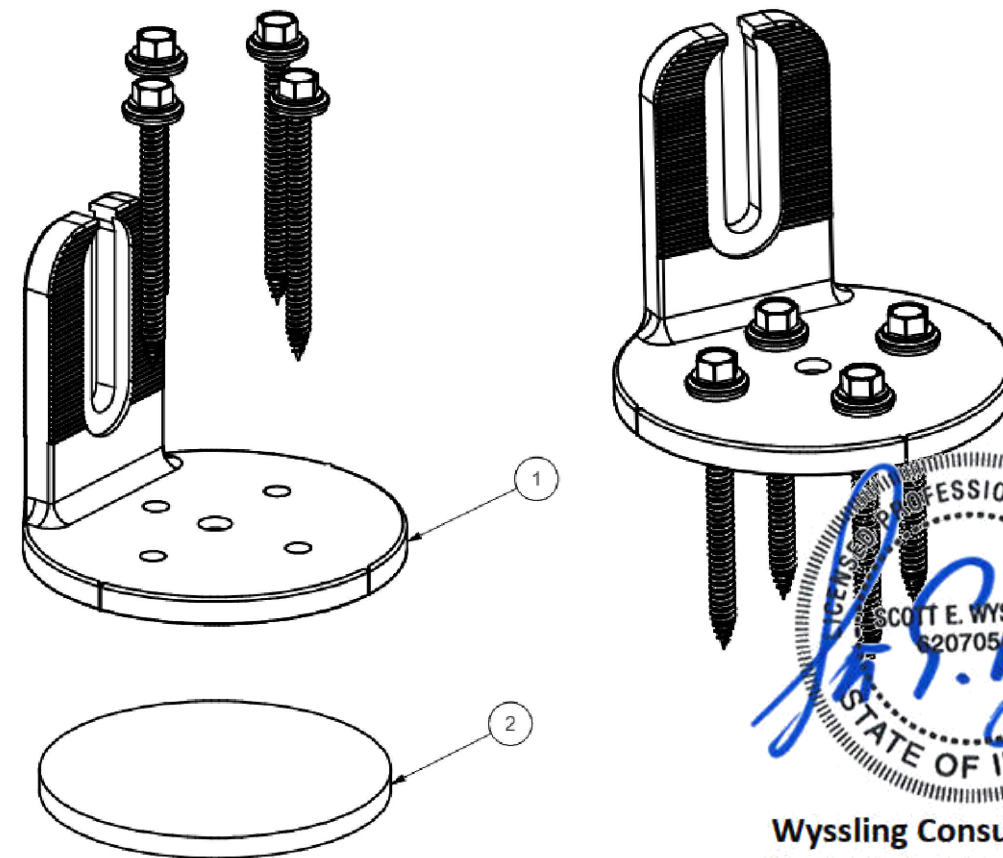
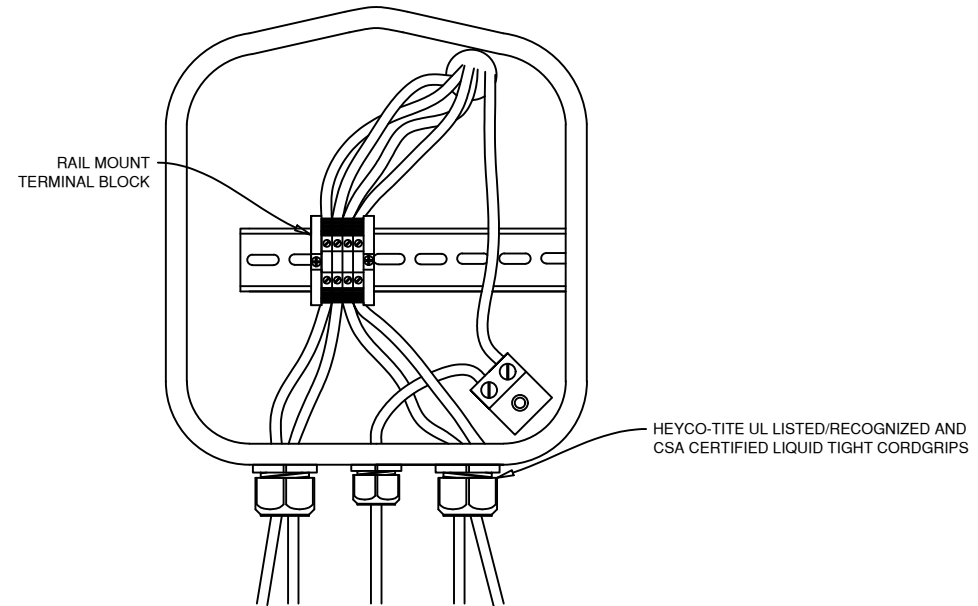


Diagram: Grid-Tied System w/ Optimizers



*See Attached Data Sheets For More Information

JUNCTION BOX DETAIL



	FOS=2	FOS=3
UPLIFT (LBF)	250	165
PERPENDICULAR (LBF)	145	95
PARALLEL (LBF)	280	185



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Carter, Russell
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DC SYSTEM SIZE:
6.8kW



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DATE:	9/4/2024
PROJECT #	2024-WINDFREE
SHEET NAME:	ARRAY/STRINGING DETAIL
PAGE #	PV04
REVISION:	0

3"

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
ON BOTH LINE AND
LOAD SIDE MAY BE ENERGIZED
IN THE OPEN POSITION

4.5"

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

DC DISCONNECT CALCS	
MAX DC VOLTAGE =	480V
MAX DC CIRCUIT CURRENT =	30A
MAXIMUM RATED DC OUTPUT CURRENT OF DC TO DC CONVERTER (IF INSTALLED) =	15A

4.5"

CAUTION:
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED



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SHEET NAME:
LABEL PLAN

PAGE #
PV05 REVISION:
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LOCATION: (1) COMBINER BOX (2) JUNCTION BOX
(3) BREAKER PANEL (4) DISCONNECT SWITCH
(5) INVERTER (IF USED)

LOCATION: DC CONDUIT (EVERY 10 FEET)
(REFLECTIVE CONDUIT LABEL)
PER NEC 690.31(B)(1-4)

LOCATION: STRING INVERTER (IF USED)

LOCATION: (1) MAIN SERVICE

4.5"

WARNING: DUAL POWER SOURCE
SECOND SOURCE IS A PHOTOVOLTAIC SYSTEM

LOCATION: MAIN SERVICE

4.5"

PHOTOVOLTAIC AC DISCONNECT
MAXIMUM AC OPERATING CURRENT: 25A
NOMINAL AC OPERATING VOLTAGE: 240V

MAIN SERVICE & ALL BACK FED PANEL BOARDS

4.5"

WARNING:
DO NOT ADD ADDITIONAL CIRCUITS TO PANEL

LOCATION: (1) MAIN SERVICE
(2) AC COMBINER PANEL

4.5"

WARNING:
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE SOLAR BREAKER

LOCATION: (1) MAIN SERVICE
(2) AC COMBINER PANEL
(3) ALL BACKFED PANELS

LABEL NOTES

- A. RED BACKGROUND WITH WHITE LETTERING
OR YELLOW / ORANGE BACKGROUND WITH
BLACK LETTERING
- B. MINIMUM 3/8" LETTER HEIGHT
- C. ALL CAPITAL LETTERS
- D. NON BOLD TEXT
- E. MATERIAL SUITABLE FOR ENVIRONMENT
- F. SIGNS MUST BE REFLECTIVE
- G. SIGNS MUST NOT BE HAND WRITTEN

"PHOTOVOLTAIC SYSTEM EQUIPPED
WITH RAPID SHUTDOWN"

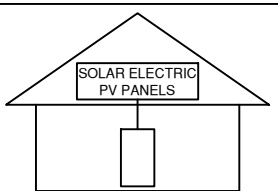
"RAPID SHUTDOWN
SWITCH FOR SOLAR PV SYSTEM"

"PHOTOVOLTAIC SYSTEM
CONNECTED"

YELLOW BACKGROUND WITH BLACK TEXT

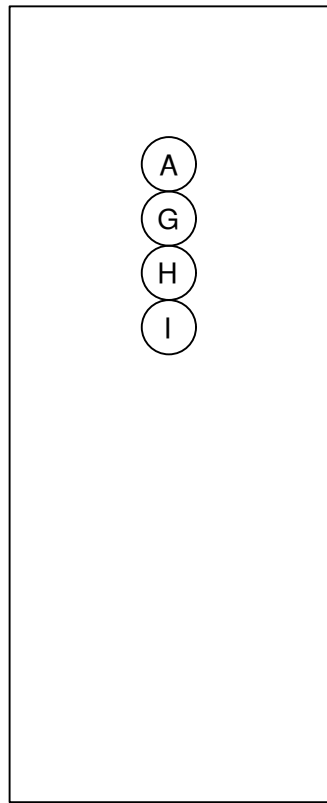
**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

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

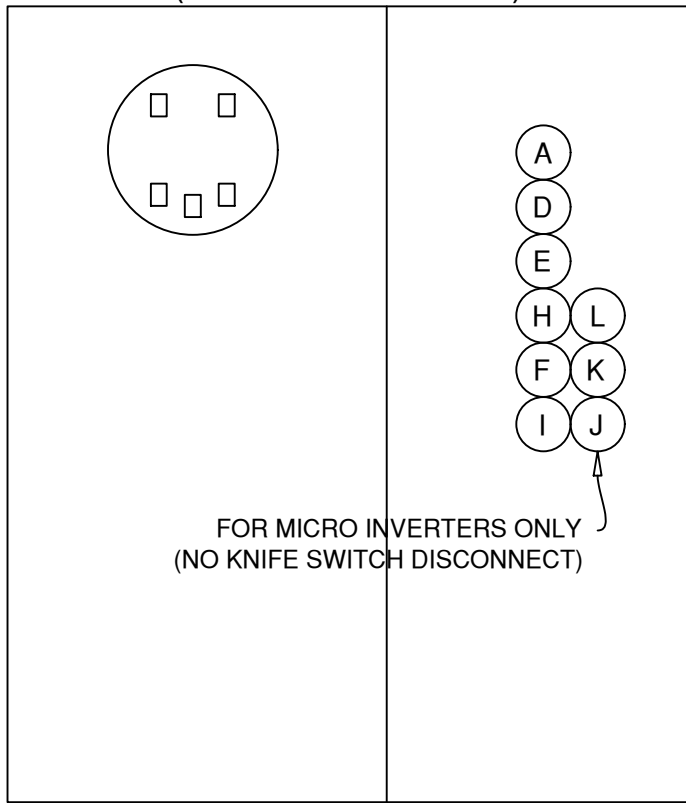


(YELLOW WITH BLACK LETTERING)

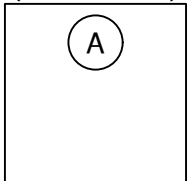
**PV SUB PANEL
(IF USED)**



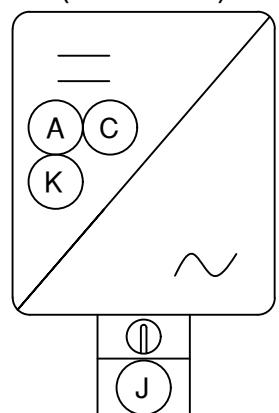
**MAIN SERVICE PANEL
FOR ILLUSTRATION ONLY
(NOT ACTUAL MSP)**



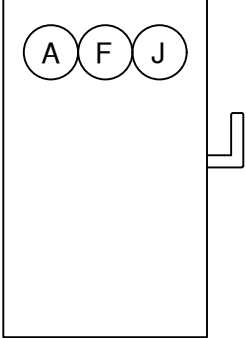
**JUNCTION
BOX
(IF USED)**



**STRING
INVERTER
(IF USED)**



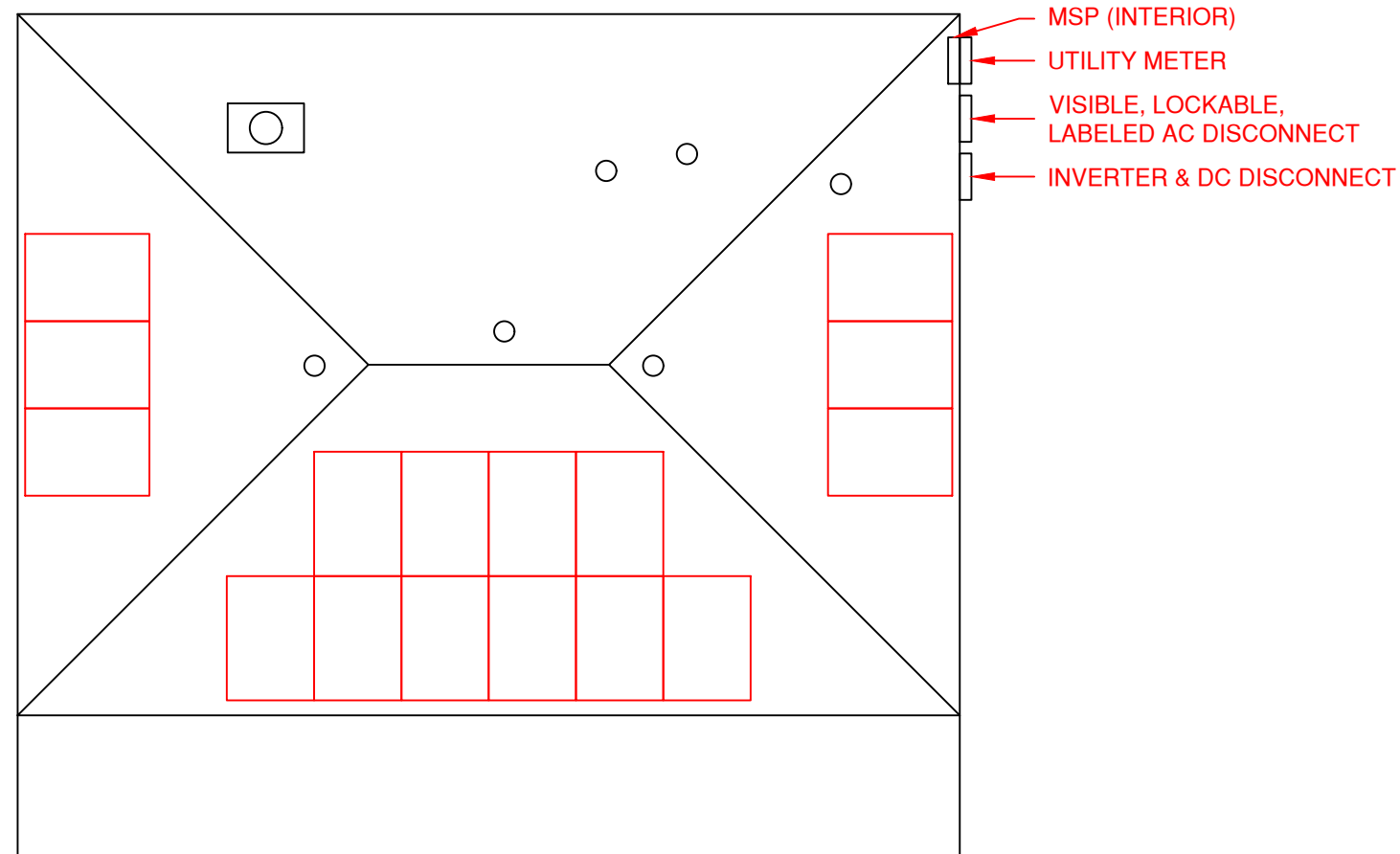
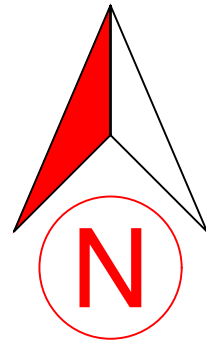
**AC
DISCONNECT
(IF USED)**



PHOTOVOLTAIC SYSTEM SITE PLACARD

CAUTION

THIS SERVICE SUPPLIED BY ALTERNATIVE POWER SOURCES WITH DISCONNECTS LOCATED AS SHOWN



**WINDFREE
SOLAR**

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SITE INFORMATION:
Carter, Rusell

122 Pleasant St,
Oak Park, IL 60302

DC SYSTEM SIZE:
6.8kW



DBM DESIGN

DBM SOLAR DESIGN AND
CONSULTING COMPANY, LLC
P: (801) 690-4873
E: SUPPORT@DBMSOLAR.COM
WWW.DBMSOLAR.COM

DESIGNED BY:
J. Fairchild

DATE:
9/4/2024

PROJECT #
2024-WINDFREE

SHEET NAME:
SITE-PLACARD

PAGE #
PV05-1

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PICTURES



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Wyssling Consulting, PLLC
76 N. Main Street, Drive, Alpine UT 84004
Illinois COA # 184.008886-0006
Signed 9/19/2024



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DESIGNED BY:	J. Fairchild
DATE:	9/4/2024
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SOLAR MODULE SPECSHEET



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THE MOST DEPENDABLE SOLAR PRODUCT

EAGLE® 54 G6R

420-440 WATT • N-TYPE TOPCON

Positive power tolerance of 0~+3%

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

KEY FEATURES

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

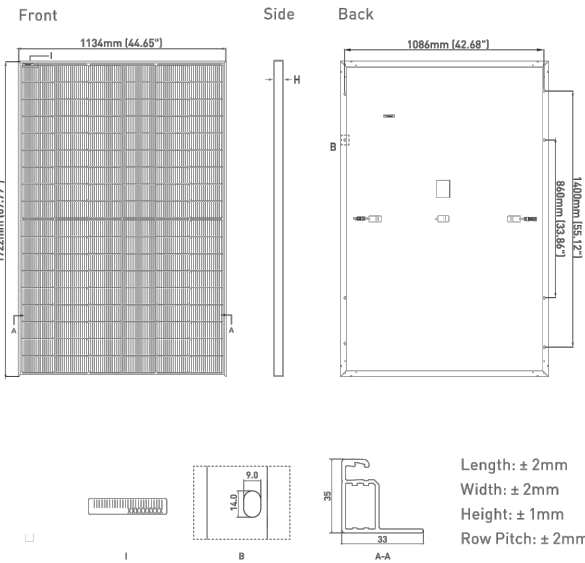
- ISO9001:2015 Quality Standards
- ISO14001:2015 Environmental Standards
- IEC61215, IEC61730 certified products
- ISO45001:2018 Occupational Health & Safety Standards
- UL61730 certified products



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ENGINEERING DRAWINGS



MECHANICAL CHARACTERISTICS

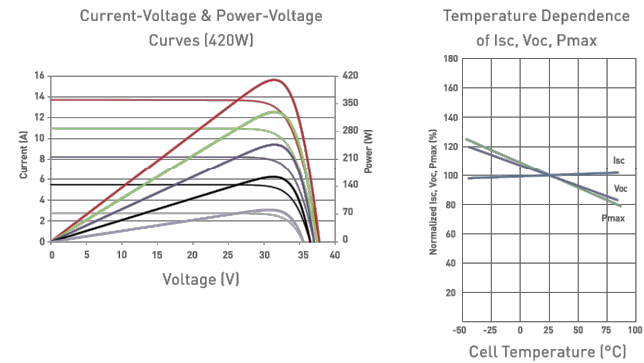
No. of Half Cells	108 (2 x 54)
Dimensions	1722 x 1134 x 35mm (67.79 x 44.65 x 1.38 inch)
Weight	21.0kg (46.3lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68 Rated
Output Cables	12 AWG, 1400mm (55.12in) or Customized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

*see Supplemental Installation Manual for higher wind pressure rating solutions

TEMPERATURE CHARACTERISTICS

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

ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



MAXIMUM RATINGS

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

PACKAGING CONFIGURATION

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

WARRANTY

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

ELECTRICAL CHARACTERISTICS

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

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

*Power measurement tolerance: ±3%

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

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INVERTER SPECSHEET

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

12-25
YEAR
WARRANTY



INVERTERS

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com



Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US		
OUTPUT									
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA	
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA	
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac	
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac	
AC Frequency (Nominal)	59.3 - 60 - 60.5 ^{*)}							Hz	
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A	
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A	
GFDI Threshold	1							A	
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes								
INPUT									
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W	
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W	
Transformer-less, Ungrounded	Yes								
Maximum Input Voltage	480							Vdc	
Nominal DC Input Voltage	380				400			Vdc	
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc	
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Adc	
Max. Input Short Circuit Current	45							Adc	
Reverse-Polarity Protection	Yes								
Ground-Fault Isolation Detection	600ka Sensitivity								
Maximum Inverter Efficiency	99	99.2						%	
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%	
Nighttime Power Consumption	< 2.5							W	
ADDITIONAL FEATURES									
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)								
Revenue Grade Data, ANSI C12.20	Optional ⁽³⁾								
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect								
STANDARD COMPLIANCE									
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCEI according to T.I.L. M-07								
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)								
Emissions	FCC Part 15 Class B								
INSTALLATION SPECIFICATIONS									
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG				1" Maximum / 14-4 AWG				
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG				1" Maximum / 1-3 strings / 14-6 AWG				
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.3 x 14.6 x 7.3 / 540 x 370 x 185				in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6				lb / kg	
Noise	< 25							<50	dBA
Cooling	Natural Convection								
Operating Temperature Range	-13 to +140 / -25 to +60 ⁽⁴⁾ (-40 ⁽⁴⁾ / -40 ⁽⁴⁾ option) ⁽⁵⁾							*F / °C	
Protection Rating	NEMA 4X (Inverter with Safety Switch)								

⁽¹⁾ For other regional settings please contact SolarEdge support
⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated
⁽³⁾ Revenue grade inverter P/N: SExxxxH-US000N12C
⁽⁴⁾ For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>
⁽⁵⁾ -40 version P/N: SExxxxH-US000N1U4



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SITE INFORMATION:
Carter, Rusell
122 Pleasant St,
Oak Park, IL 60302
DC SYSTEM SIZE:
6.8kW



DESIGNED BY:
J. Fairchild

DATE:
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RoHS

OPTIMIZER SPECSHEET



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Residential Power Optimizer For North America

S440 / S500B / S650B



POWER OPTIMIZER

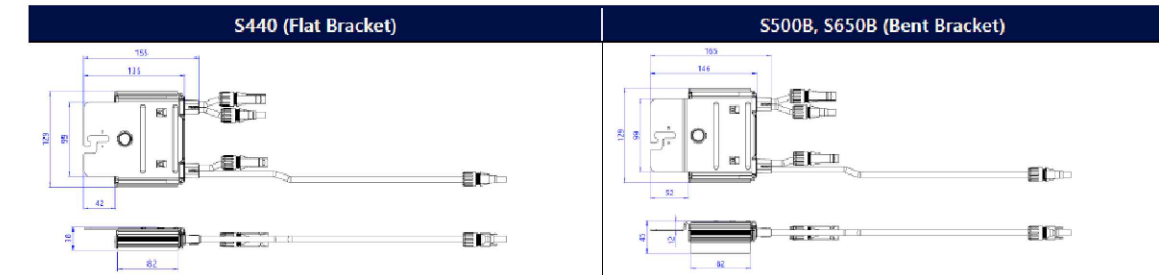
Residential Power Optimizer For North America S440 / S500B / S650B

	S440	S500B	S650B	
INPUT				
Rated Input DC Power ⁽¹⁾	440	500	650	W
Absolute Maximum Input Voltage (Voc)	60	125	85	Vdc
MPPT Operating Range	8 – 60	12.5 – 105	12.5 – 85	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15		Adc
Maximum Efficiency	99.5			%
Weighted Efficiency	98.6			%
Overtolerance Category	II			
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREGE INVERTER)				
Maximum Output Current	15			Adc
Maximum Output Voltage	60	80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREGE INVERTER OR INVERTER OFF)				
Safety Output Voltage per Power Optimizer	1 ± 0.1			Vdc
STANDARD COMPLIANCE				
Photovoltaic Rapid Shutdown System	NEC 2014 – 2023			
EMC	FCC Part 15 Class B, IEC 61000-6-2, IEC 61000-6-3			
Safety	IEC 62109-1 (class II safety), UL 1741			
Material	UL 94 V-0, UV Resistant			
RoHS	Yes			
Fire Safety	VDE-AR-E 2100-712:2013-05			
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage	1000			Vdc
Dimensions (W x L x H)	129 x 155 x 30 / 5.07 x 6.10 x 1.18	129 x 165 x 45 / 5.07 x 6.49 x 1.77		mm / in
Weight	720 / 1.6	790 / 1.74		gr / lb
Input Connector	MC4 ⁽²⁾			
Input Wire Length	0.1 / 0.32			m / ft
Output Connector	MC4			
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32			m / ft
Operating Temperature Range ⁽³⁾	-40 to +85			°C
Protection Rating	IP68 / NEMA6P			
Relative Humidity	0 – 100			%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
(2) For other connector types please contact SolarEdge.
(3) Power de-rating is applied for ambient temperatures above +85°C / +185°F for S440, and for ambient temperatures above +75°C / 167°F for S500B. Refer to the Power Optimizers Temperature Derating Technical Note for more details.

PV System Design Using a SolarEdge Inverter ⁽⁴⁾	SolarEdge Home Wave/Hub Single Phase	Three Phase for 208V Grid	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440: 8 S500B, S650B: 6	10	18	
Maximum String Length (Power Optimizers)	25	8	14	50 ⁽⁵⁾
Maximum Nominal Power per String	5700	6000	12,750	W
Maximum Allowed Connected Power per String ⁽⁶⁾	6800 ⁽⁷⁾	One string: 7200 Two strings or more: 7800 ⁽⁸⁾	15,000 ⁽⁹⁾	W
Parallel Strings of Different Lengths or Orientations	Yes			

(4) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.
(5) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.
(6) If the inverter's rated AC power ≤ maximum nominal power per string, then the maximum connected power per string will be able to reach up to the inverter's maximum input DC power. Refer to the Single String Design Guidelines Application Note for more details.
(7) For inverters with a rated AC power ≥ 7500W that are connected to at least two strings.
(8) For the 208V grid, the maximum is permitted only when the difference in connected power between strings is 1,000W or less.
(9) For 277/480V grid, the maximum is permitted only when the difference in connected power between strings is 2,000W or less.



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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 cable 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)

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RACKING SPECSHEET



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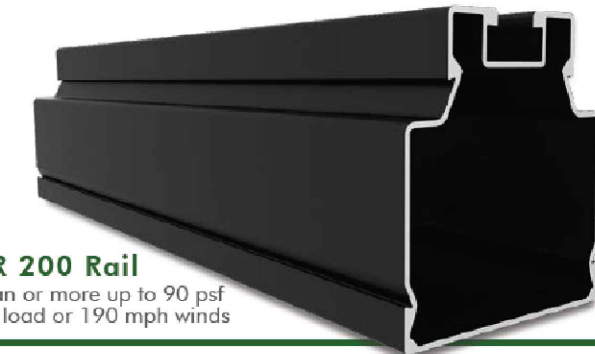
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Key Features of the SMR System



The SMR System represents a huge leap in racking technology. Optimized design makes the SMR Rails not only the lightest but also the strongest rails on the market. One tool assembly and Pop-On technology allow fast and worry-free installation. The cost and performance cannot be beaten.



Clamps & Grounding



Mid Clamp
The Bonding Pop-On Universal Mid Clamps accommodate PV module frame heights ranging from 30mm to 48mm. The fastest installing Mid Clamps on the market.



L Foot Adaptor
Fast and easy Pop-On L-Foot Adaptor speeds installation and eliminates old-fashioned T-Bolts. Install fast with full confidence in every attachment.



End Clamp
End Clamps are adjustable for different module frame heights and provide fast and secure attachment of modules.



Rail Splice
Structural bonding splice with fast and easy single bolt installation



Shared Rail Mid/End Clamp
Easily adapt racking to Shared Rail install. Uses the same Pop-On technology to provide fast and easy install.



Grounding Lug
The Lug provides proper grounding of the PV System

SunModo introduces the SMR Pitched Roof System, the best value pitched roof mounting system on the market.

With fast and easy Pop-On Clamps and L-Foot adaptors, professional installers can mount, adjust, and secure PV panels with a single tool.

Whether rafter or deck, portrait or landscape, the SMR System is the ideal solution for your solar installation. Save money on materials and installation time.

The SMR System Advantage

- ✓ The best value, best performing rail system on the market
- ✓ Lag-to-Panel single tool installation
- ✓ Pop-On universal clamps make installation fast, reliable and flexible
- ✓ A full range of roof attachments to meet every need
- ✓ Fastest install and lowest cost

Technical Data

Application	Pitched Roof
Roof Type	Composition shingle, Metal and Tile
Material	High grade aluminum and 304 stainless steel hardware
PV Modules	Compatible with all common module types
Module Orientation	Portrait and landscape
Roof Attachment	Rafter and decking
Structural Integrity	IBC compliant, stamped engineering letters available
Certificate	UL 2703 listed by ETL
Warranty	25 years

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ATTACHMENT SPECSHEET



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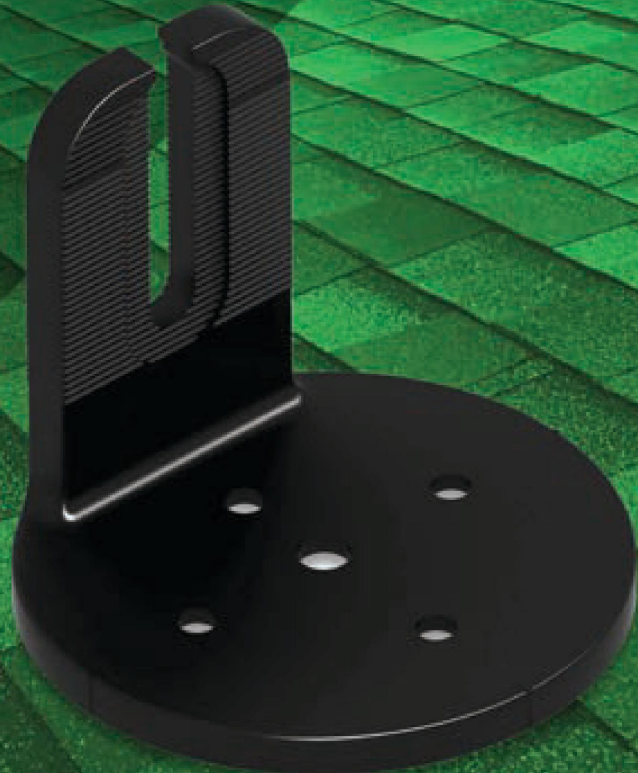
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SOLAR'S FASTEST ATTACHMENT

NanoMount®

Rafter or Deck Mount



Damaging roof shingles used to be one of a solar installers' worst challenges.

Now, the easy, affordable solution is NanoMount®, SunModo's patented solar mounting innovation.

The mount eliminates the need for lifting shingles and dramatically reduces the installation time.

The NanoMount® Advantage

- ✓ The fastest roof attachment in solar.
- ✓ Versatile mounting options including direct-to-decking.
- ✓ Eliminates the need to lift shingles and prevents damage to shingles.
- ✓ High-Velocity Hurricane Zone Approved - Passed TAS 100 (a) Wind-Driven Rain Test.
- ✓ All materials are compatible with asphalt shingles and single-ply roof membranes.

Key Features of NanoMount®



5 levels of protection against water penetration



Technical Data

Application	Residential roof coverings, commercial single-ply roof membranes
Material	High grade aluminum, 304 stainless steel hardware
Finish	Black powder coating
Roof Attachment	Rafter and decking
Structural integrity	IBC and IRC Compliant
Warranty	25 years

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9/16/2024

To Whom it May Concern,

Windfree Solar has been contracted by Russell Carter for a proposed solar installation on the residence at 122 Pleasant St. in Oak Park. The proposed location for the system includes street-facing panels, which has raised an issue with the Historic Preservation review process in the building department. The street-facing roof section on this property is also the south-facing part of the home, which makes it the most viable for solar. We have already maximized the limit for the eastern and western roof sections (which can only fit a total of 6 panels while maintaining Fire-Code setbacks). The northern roof section would drastically reduce the panel production. We also looked at the garage as a possibility, but this is also deemed not viable, as it is heavily affected by shading by surrounding trees.

Please consider this rationale when making a determination about the approval of this proposed solar system.

Regards,



Eric Ullrich

Project Manager, Windfree Solar

5022 W. Foster Ave.

Chicago, IL 60630



3 HR PARKING
8AM - 8PM
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