

76 North Meadowbrook Drive Alpine, UT 84004 office (201) 874-3483 swyssling@wysslingconsulting.com

January 30, 2024 Revised October 16, 2024

Smartsun 635 Old Barnwell Road West Columbia, SC 29170

> Re: Engineering Services Huerta Residence 3832 US-401, Lillington, NC 11.700 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.
- 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: Assumed prefabricated wood trusses at 24" on center. All truss members

are constructed of 2x4 dimensional lumber.

Roof Material: Composite Asphalt Shingles

Roof Slope: 22.62 degrees Inaccessible Permanent

C. Loading Criteria Used

- Dead Load
 - Existing Roofing and framing = 7 psf
 - New Solar Panels and Racking = 3 psf
 - o TOTAL = 10 PSF
- Live Load = 20 psf (reducible) 0 psf at locations of solar panels
- Ground Snow Load = 15 psf
- Wind Load based on ASCE 7-10
 - Ultimate Wind Speed = 118 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 North Carolina Residential Code (2015 IRC), 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 Unirac 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 5/16" lag screw is 229 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 2½", 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 5/16" diameter lag screw with a minimum of 2½" 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 North Carolina Residential Code (2015 IRC), current industry standards, 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.

Ken Ph

Scott E. Wysslind, PE North Carolina License 1. 46546 North Carolina COA P-2308



Wyssling Consulting, PLLC 76 N Meadowbrook Drive Alpine UT 84004 North Carolina COA # P-2308 Signed 10/16/2024

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NEW PV ROOF MOUNT SYSTEM DESIGN

SCOPE OF WORK

(30) JINKO JKM390M-72HBL-V (1) SOLAREDGE SE10000H-US **ROOF MOUNT: UNIRAC FLASH KIT PRO** MOUNTING RAILS: UNIRAC SM LIGHT

SITE CONDITION

ASCE 7-10 WIND SPEED -118 **EXPOSURE CATEGORY - C RISK CATEGORY - II** SNOW LOAD - 15 LBS/SQFT

UTILITY COMPANY

DUKE ENERGY PROGRESS

INTERCONNECTION TYPE

PROTECTED LOAD SIDE TAP

CODE REFERENCES

2020 NATIONAL ELECTRICAL CODE 2018 NORTH CAROLINA FIRE CODE 2018 NORTH CAROLINA BULDING CODE 2018 NORTH CAROLINA RESIDENTIAL CODE

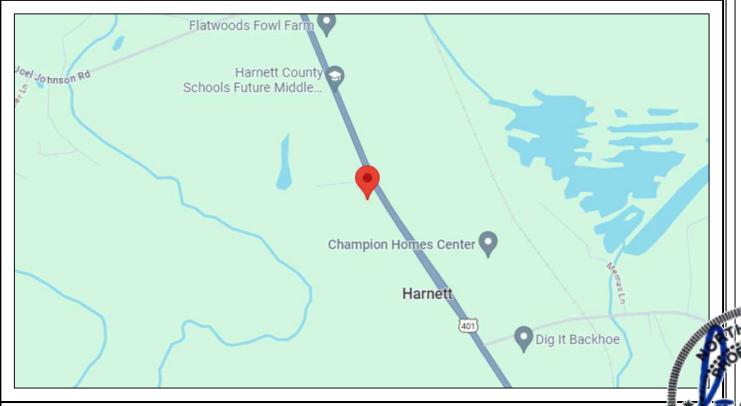
SHEET INDEX

PV1.1 - 1.2: PROJECT INFORMATION **PV2.1: SITE INFORMATION PV3.1: STRUCTURAL INFORMATION** PV4.1 - 4.2: ELECTRICAL INFORMATION, LABELS PV5.1 - 5.5: DETAILS & SPECS

LEGEND



VICINITY MAP



635 OLD BARNWELL ROAD WEST COLUMBIA SC 29170

NEW SOLAR PV ROOF MOUNT SYSTEM

11.7 KW DC INPUT 10 KW AC EXPORT

FERNANDO POMPA HUERTA

3832 US-401, LILLINGTON, NC, 27546

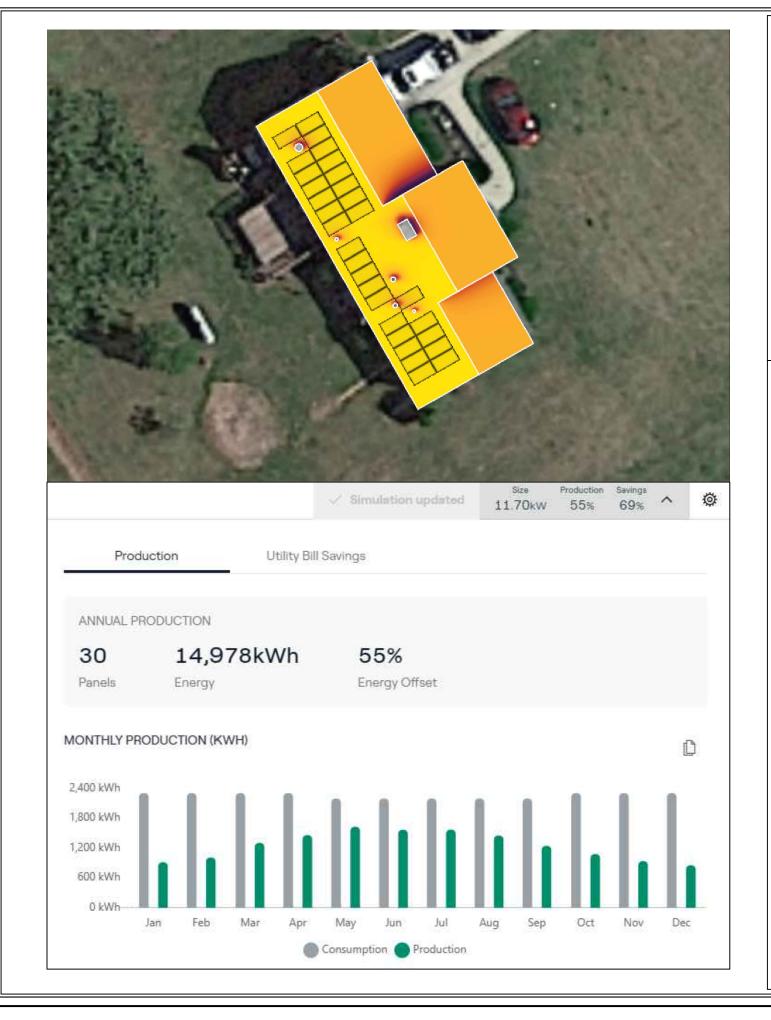
PROPERTY MAP



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> DRAWN BY: LEONI MARLOU EBO DATE: 01 - 26 - 2023 DESCRIPTION

> > **PROJECT**



AURORA SOLAR SHADE
ANALYSIS
FERNANDO POMPA HUERTA
3832 US-401,
LILLINGTON, NC, 27546
11.7 KW DC STC
10 KW AC

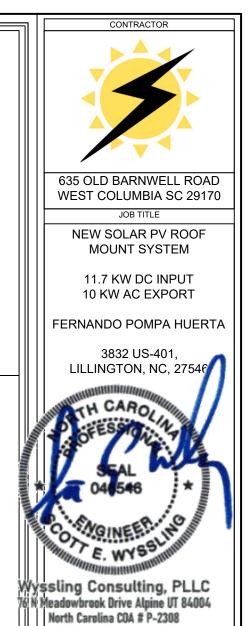
MODULES (30) JINKO JKM390M-72HBL-V

INVERTERS: (1) SOLAREDGE SE10000H-US

OPTIMIZERS: (30) S440 POWER OPTIMIZERS

THE SYSTEM HAS A FIRST YEAR ANNUAL ENERGY DOCUMENT PRODUCTION OF: 14,978 KWH/YEAR

THIS PRODUCTION IS AN ESTIMATE PREPARED USING AURORA SOLAR SHADE ANALYSIS SOFTWARE. ALL SOLAR SYSTEMS EXPERIENCE PERFORMANCE DEGRADATION OVER THEIR LIFETIME. THIS IS USUALLY APPROXIMATELY 1% PER YEAR, BUT VARIES BASED ON EQUIPMENT USED AND ENVIRONMENTAL CONDITIONS.

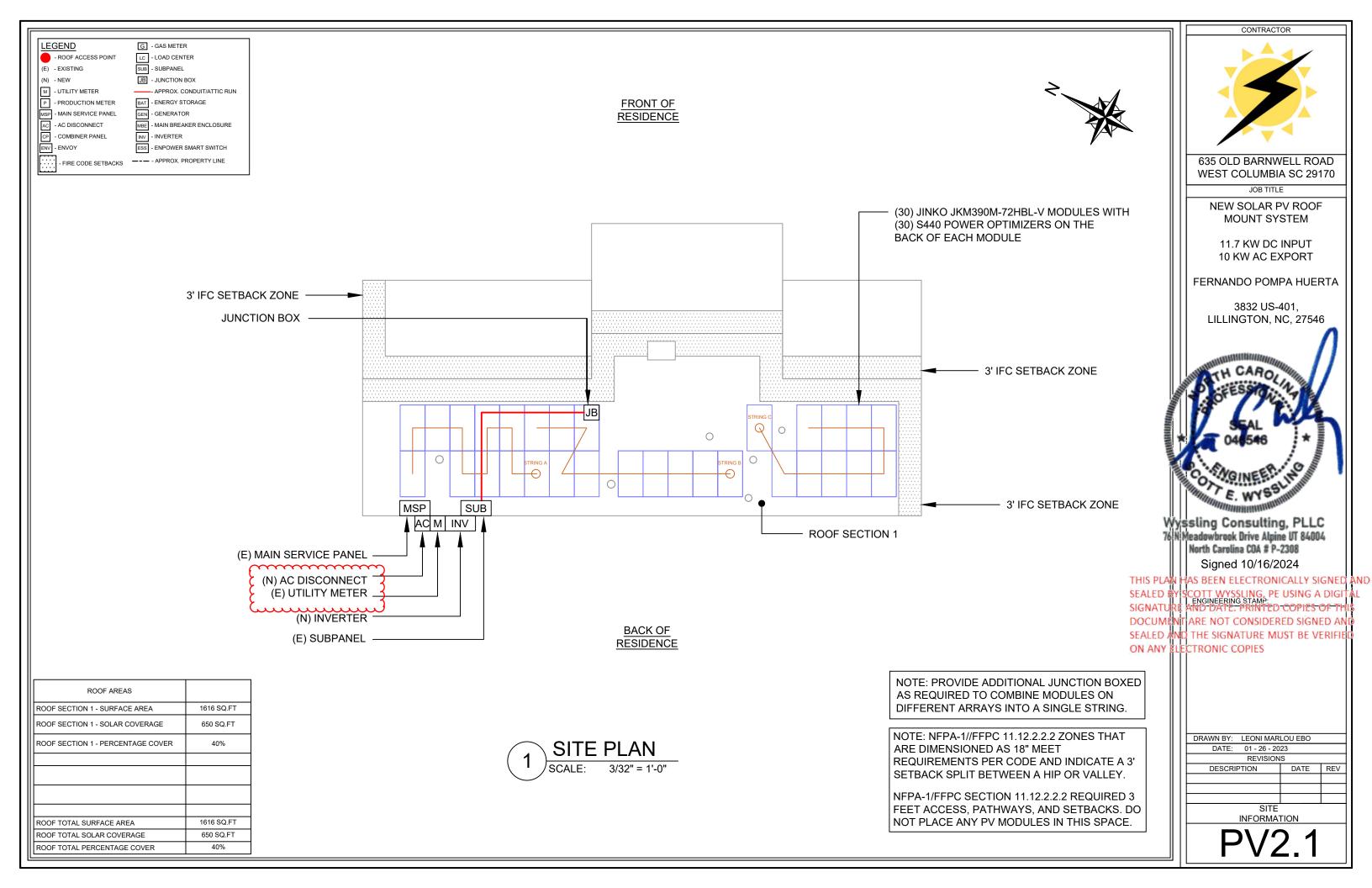


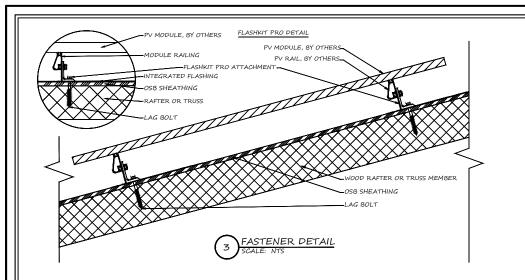
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DRAWN BY: LEONI MARLOU EBO							
DATE:	DATE: 01 - 26 - 2023						
REVISIONS							
DESCRIF	DESCRIPTION						
·	·						
PROJECT							

PV1.2





(30) JINKO JKM390M-72HBL-V MODULES WITH

ROOF SECTION 1

(30) S440 POWER OPTIMIZERS ON THE

BACK OF EACH MODULE

(3R)

ROOF INFO									FT	SQ.FT	LBS	
Layout	Count	Azimuth	Tilt	Solar Access	Roof Type	Portrait	Landscape	Count	Rail Length	Array Area	Array Weight	Surface Area
Roof Section 1	30	238	5/12 (22.62°)	94	Comp Shingle		86	86	200	650	400	1615.94

DEAD LOAD CALCULATIONS								
LOAD	QTY	WEIGHT	TOTAL					
MODULE	30	49.6	1488					
MICROINVERTER	30	2.38	71.4					
RAILS LINEAR FT	1133	0.5	566.5					
ATTACHMENT	86	0.74	63.64					
TOTAL ARRAY WEIG	2189.54							
AREA NAME	QTY	FT2	TOTAL FT2					
MODULES	30	21.66	649.77					
POINT LOAD (TOTAL ATTACHMENTS)	T / # OF	25.45976744						
DISTRIBUTED LOAD AREA	3.37							

2R)

1

(N) UNIRAC FLASH KIT PRO

(N) UNIRAC SM LIGHT RAIL

R	OOF SUMMARY	ROOF MOUNT, FASTENER	RAND
STRUCTURE		ROOF MOUNT:	
TYPE	TRUSS	MAKE	UNIR
MATERIAL	SOUTHERN PINE #2	MODEL	FLAS
SIZE	2"x4"	MATERIAL	ALUN
SPACING	24"	FASTENER:	
DECKING:		MAKE	GENE
TYPE	OSB	MODEL	LAG I
MATERIAL	WOOD COMPOSITE	MATERIAL	SS LA
THICKNESS	7/16"	SIZE	5/16
WEIGHT	1.6 LBS/SQFT	GENERAL	
ROOFING:		WEIGHT	1 LBS
TYPE	ARCH SHINGLE	FASTENERS PER MOUNT	1 PEF
MATERIAL	ASPHALT	MAX. PULL-OUT FORCE	800 I
WEIGHT	2.3 LBS/SQFT	SAFETY FACTOR	2
		DESIGN PULL-OUT	400.

MAKE

MODEL

MATERIAL

WEIGHT SPACING

ATTACHN	MENTS
ROOF MOUNT	86
RAIL COUNT	15
SPLICE BAR	12
MID CLAMPS	46
END CLAMPS	28

	,					
	ROOF MOUNT:					
	MAKE	UNIRAC				
	MODEL	FLASH KIT PRO				
	MATERIAL	ALUMINUM				
	FASTENER:					
	MAKE	GENERIC				
	MODEL	LAG BOLT				
	MATERIAL	SS LAG W/EPDM WASHER				
	SIZE	5/16" X4"				
	GENERAL					
	WEIGHT	1 LBS				
	FASTENERS PER MOUNT	1 PER MOUNT				
	MAX. PULL-OUT FORCE	800 LBS				
	SAFETY FACTOR	2				
1	DESIGN PULL-OUT FORCE	400 LBS				
	LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OT TRUSSES MEMBER					
ł	MOUNTING RAIL:					

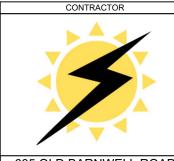
Unirac

1 LBS

SM Light

ALUMINUM

PV	PV MODULES								
MAKE	JINKO								
MODEL	JKM390M-72HBL-V								
WIDTH	39 INCHES								
LENGTH	79 INCHES								
THICKNESS	2 INCHES								
WEIGHT	50 LBS								
	•								



635 OLD BARNWELL ROAD WEST COLUMBIA SC 29170

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STRUCTURAL INFORMATION

DATE REV

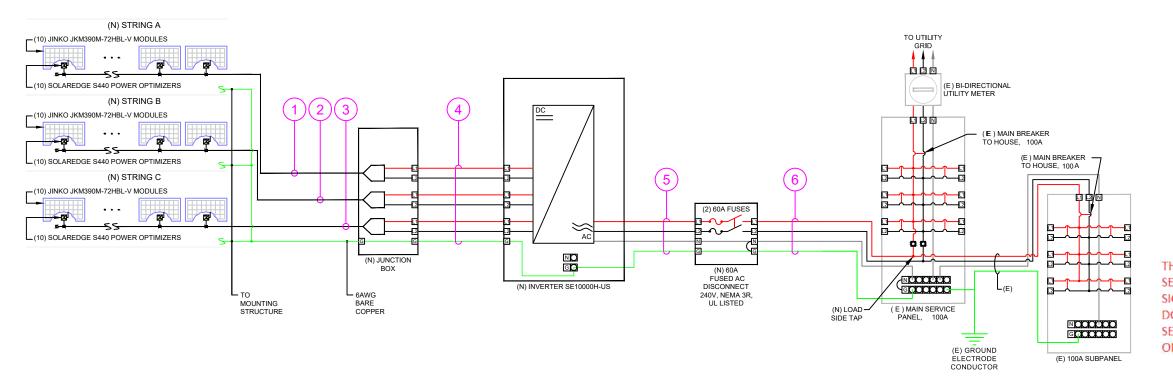
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		DATE:	01 - 26 - 20	23
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· /		DESCRI	PTION	DATE
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	111		INIEODMY.	TION

<u>LEGEND</u>	G - GAS METER
- ROOF ACCESS POINT	LC - LOAD CENTER
(E) - EXISTING	SUB - SUBPANEL
(N) - NEW	JB - JUNCTION BOX
M - UTILITY METER	
P - PRODUCTION METER	BAT - ENERGY STORAGE
MSP - MAIN SERVICE PANEL	GEN - GENERATOR
AC - AC DISCONNECT	MBE - MAIN BREAKER ENCLOSURE
CP - COMBINER PANEL	INV - INVERTER
ENV - ENVOY	ESS - ENPOWER SMART SWITCH
- FIRE CODE SETBACKS	——— - APPROX. PROPERTY LINE

ROOF SECTION SCALE:

ID	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	МІ	N. CONDUCTOR SIZE (AWG)	MIN. DIA CONDUIT SIZE (IN.)	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD (A)		MIN. EGC SIZE (AWG)	TEMP. COR	RR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT (A)	MAX. CURRENT (A)	BASE AMP. (A)	DERATED AMP.	TERM. AMP. RATING (A)	LENGTH (FT)	VOLTAGE DROP (%)
1	STRING A	JUNCTION BOX	10	PV WIRE	N/A	1	2	N/A	6	BARE COPPER	0.76	55°C	N/A	15.73	19.66	40	N/A	N/A	55.00	0.90
2	STRING B	JUNCTION BOX	10	PV WIRE	N/A	1	2	N/A	6	BARE COPPER	0.76	55°C	N/A	15.73	19.66	40	N/A	N/A	55.00	0.90
3	STRING C	JUNCTION BOX	10	PV WIRE	N/A	1	2	N/A	6	BARE COPPER	0.76	55°C	N/A	15.73	19.66	40	N/A	N/A	55.00	0.90
4	JUNCTION BOX	INVERTER	~10~	THWN-2 COPPER	0.75 L TNM	måm	~~~	~20~	~10~	THWN-2 COPPER	0.76~	55°C	~%~~	15.73	19.66	~4 0~	243	35	35.00	~0.57~~
5	INVERTER	AC DISCONNECT	6	THWN-2 COPPER	0.75 LTNM	1	3	60	6	THWN-2 COPPER	0.96	33°C	1	47.19	58.99	75	72.0	65	5.00	0.10
The same	AC DISCONNECT	W MSP	m	THWN-2 COPPER	0.75 LTNM	uyu	wyw	· ·	ugu.	THWN-2 COPPER	10.96	33-62	uyu	~47.7g~	58.99	uyeu	172.011	Uggu	<u>~5.60~</u>	weight

LIST OF EQUIPMENT								
EQUIPMENT	DESCRIPTION							
SOLAR PV MODULE	30	JINKO JKM390M-72HBL-V						
POWER OPTIMIZER	30	SOLAREDGE S440 POWER OPTIMIZER						
JUNCTION BOX	1	JUNCTION BOX, NEMA 3R, UL LISTED						
INVERTER	1	SOLAREDGE SE10000H-US						
AC DISCONNECT	1	60A FUSED AC DISCONNECT, 240V, NEMA 3R, UL LISTED						
SUBPANEL	1	100A SUBPANEL						





WEST COLUMBIA SC 29170

JOB TITLE **NEW SOLAR PV ROOF**

MOUNT SYSTEM

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DRAWN BY:	LEONI MAR	LOU EBO				
DATE:	01 - 26 - 20	23				
REVISIONS						
DESCRI	DESCRIPTION					

ELECTRICAL INFORMATION

MODULE OPTIMIZER					
MAKE	SOLAREDGE				
MODEL	S440				
DC INPUT:					
RATED POWER	440 WATTS				
VOLT. RANGE	8-60				
MAX. SCC	14.5 AMPS				
MAX. DC INPUT CURRENT	14.5 AMPS				
DC OUTPUT:					
MAX. CURRENT	15 AMPS				
MX. VOLT.	60 VOLTS				
MAX. SYSTEM VOLT.	1000 VOLTS				
MIN. STRING	8 OPTIMIZERS				
MAX. STRING	25 OPTIMIZERS				
MAX. POWER					
INVERTERS: SE3800H-SE6000H	5700 WATTS				
INVERTERS: SE7600H-SE114000H	6000 WATTS				

DC/ AC INVERTER (NEW)				
MANUFACTURER/ MODEL	SOLAREDGE SE10000H-US (240V)			
MAX AC OUTPUT	42			
AC OUTPUT VOLTAGE	240			
MAX DC INPUT VOLTAGE	480			
MAX INPUT CURRENT	27			
WEIGHTED CEC EFFICIENCY	99%			
INVERTER WATTAGE	10000 W			
IOTES:				

NOTES:

USE MODEL SE10000H-US INVERTER WITH REVENUE GRADE PRODUCTION AND CONSUMPTION METER

AC DISCONNECT						
MAKE	N/A					
MODEL	N/A					
ENCL. RATING	NEMA 3R					
VOLT. RATING	240 VOLTS					
BUS RATING	60 AMPS					
UL LIST. (Y/N)	YES					
FUSED (Y/N)	YES					
FUSE RATING	40 AMPS					
NOTES:						

NOTES:

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILYACCESSIBLE TO UTILITY COMPANYPERSONNEL AT ALL TIMES
- SERVICE RATED
- PROVIDE NEUTRAL/GROUND **BONDING JUMPER**

MD PANEL (EXISTING)					
MAKE	N/A				
MODEL	120/240				
ENCL. RATING	NEMA 3R				
VOLT. RATING	240 VOLTS				
BUS RATING	100 AMPS				
UL LIST. (Y/N)	YES				
MAIN BREAKER (Y/N)	NO				
BREAKER RATING	100 AMPS				

NOTES:

- BACK-FEED SOLAR OUTPUT VIA FEEDER TAP INSIDE OF METER/ 6-THROW DISCONNECT COMBO SUBPANEL FED VIA 100A BREAKER IN
- 6-THROW DISCONNECT

SUBPANEL (EXISTING)					
MAKE	N/A				
MODEL	N/A				
ENCL. RATING	NEMA 3R				
VOLT. RATING	240 VOLTS				
BUS RATING	100 AMPS				
UL LIST. (Y/N)	YES				
FUSED (Y/N)	100 AMPS				
FUSE RATING	N/A				

JUNCTION BOX				
MAKE SOLADECK				
MODEL	0783-3R			
PRO. RATING	NEMA 3R			
VOLT. RATING	600 VOLTS			
AMP RATING	120 AMPS			
UL LISTING	UL 50			

PROVIDE ADDITIONAL JUNCTION BOXED AS REQUIRED TO COMBINE MODULES ONDIFFERENT ARRAYS INTO A SINGLESTRING

EQUIPMENT LABELS

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



PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

WARNING: PHOTOVOLTAIC POWER SOURCE

PLACE ON ALL JUNCTION BOXES, EXPOSED RACEWAYS, AND OTHER WIRING METHODS EVERY 10' AND ON EVERY SECTION SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

RAPID SHUTDOWN **SWITCH FOR** SOLAR PV SYSTEM

PLACE ON RAPID SHUTDOWN SWITCH OR EOUIPMENT WITH INTEGRATED RAPID SHUTDOWN *REFLECTIVE

AWARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

NEC 705.12 (B)(3) PLACE ON ALL EQUIPMENT THAT IS SUPPLIED BY BOTH POWER SOURCES

!WARNING

ELECTRIC SHOCK HAZARD

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

NEC 690.13 (B) PLACE ON PV SYSTEM DISCONNECTING MEANS.

BQUIPMENT LABEL NOTES

PHOTOVOLTAIC POWER SOURCE

PERATING AC VOLT. 240 VAC MAXIMUM OPERATING AC OUTPUT CURRENT

NEC 690.54 PLACE ON INTERCONNECTION

DIRECT CURRENT

PHOTOVOLTAIC POWER SOURCE

MAXIMUM VOLTAGE 600 VDC MAX CIR. CURRENT 37.5 AMPS

NEC 690.53
PLACE ON ALL DC DISCONNECTING MEANS

PV SYSTEM DISCONNECT

PLACE ON PV SYSTEM DISCONNECTING MEANS.

CONSTRUCTION NOTES

- ALL WORK AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL, STATE, AND LOCAL CODES AND ORDINANCES
- FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS
- WIRES SHALL BE RATED AND LABELED "SUNLIGHT RESISTANT" WHERE EXPOSED TO AMBIENT CONDITIONS
- THE PHOTOVOLTAIC SYSTEM SHALL NOT EXCEED 600 VOLTS OR 800 AMPS
- EACH ELECTRICAL APPLIANCE SHALL BE PROVIDED WITH A NAMEPLATE GIVING THE IDENTIFYING NAME AND THE RATING IN VOLTS AND AMPERES, OR VOLTS AND WATTS. IF THE APPLIANCE IS TO BE USED ON A SPECIFIC FREQUENCY OR REQUENCIES. IT SHALL BE SO MARKED, WHERE MOTOR OVERLOAD PROTECTION EXTERNAL TO THE APPLIANCES IS REQUIRED. THE APPLIANCE SHALL BE SO MARKED
- WHERE APPLICABLE. GROUNDING ELECTRODE CONDUCTOR TO BE CONTINUOUS.GROUNDING CRIMPS TO BE IRREVERSIBLE
- IN ONE- AND TWO-FAMILY DWELLINGS, LIVE PARTS IN PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS OVER 150 VOLTS TO GROUND, SHALL ONLY BE ACCESSIBLE TO QUALIFIED PERSONS WHILE ENERGIZED.
- PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED NATUR AND THAT VARIOUS DANGERS ARE PRESENT.
- PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED ALL TERMINALS OF THE SIGNATURE MUST BE VERIFIED WHEED A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED WHEED WHEED A DISCONNECT OF THE SIGNATURE MUST BE VERIFIED WHEED WHEED
- WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THEON ANY ELECTRONIC COPIES OPENPOSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT
- A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED BY THE INSTALLED AT THE DC DISCONNECT MEANS
- A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENTLOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
- A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED DENOTING THE LOCATIONSOF THE SERVICE DISCONNECT MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTMEANS IF THEY ARE NOT LOCATED AT THE SAME LOCATION.
- ALL MODULE GROUND CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC SECTION 690.4 (C)



WEST COLUMBIA SC 29170 JOB TITLE

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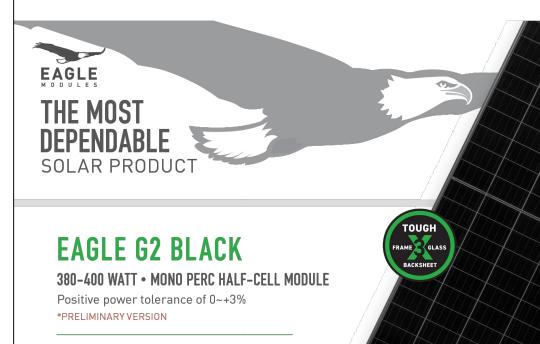


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> DRAWN BY: LEONI MARLOU EBO DATE: 01 - 26 - 2023 REVISIONS DESCRIPTION DATE REV

ELECTRICAL



- 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 module factory in Jacksonville, Florida

KEY FEATURES



Black backsheet and black frame create ideal look for residential applications.



Diamond Half-Cell Technology

World-record breaking efficient mono PERC half-cells deliver high power in a small footprint.



Fire Type 1 rated module engineered with a thick frame, 3.2mm front side glass, and thick backsheet for added durability.



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.

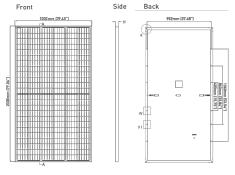


12-year product and 25-year linear power warranty.

- ISO9001:2008 Quality Standards
- ISO 45001 2018 Occupational

- IEC61215, IEC61730 certification pending UL1703/61730 certification pending

ENGINEERING DRAWINGS



Length: ± 2mm Width: ± 2mm Height: ± 1mm Row Pitch: ± 2mm

ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE

ltage & Power-Voltage	Temperature Dependence
urves (400W)	of Isc, Voc, Pmax
489 350 280 210 21 21 21 21 21 21 21 21 21 21 21 21 21	160 160 160 160 160 170 170 170 170 170 170 170 170 170 17

Cell Temperature (°C)

Cells	Mono PERC Diamond Cell (158.75 x 158.75mm)
No. of Half Cells	144 [6 x 24]
Dimensions	2008 x1002 x 40mm (79.06 x 39.45 x 1.57in)
Weight	22.5kg (49.6lbs)
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)
Connector	Staubli MC4 Series
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)
Hailstone Test	50mm Hailstones at 35m/s

TEMPERATURE CHARACTERISTICS

MECHANICAL CHARACTERISTICS

Temperature Coefficients of Pmax	-0.35%/°C
Temperature Coefficients of Voc	-0.29%/°C
Temperature Coefficients of Isc	0.048%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1500VDC (UL and IEC)
Maximum Series Fuse Rating	20A

PACKAGING CONFIGURATION

(Two pallets = One stack)

27pcs/pallet, 54pcs/stack, 594pcs/40'HQ Container

WARRANTY

12-year product and 25-year linear power warranty

1st year degradation not to exceed 2.5%, each subsequent year not to exceed 0.6%, minimum power at year 25 is 83.1% or greater.

ELECTRICAL CHARACTERISTICS

Module Type	JKM380M-72HBL-V		JKM385M-72HBL-V		JKM390M-72HBL-V		JKM395M-72HBL-V		JKM400M-72HBL-V	
	STC	NOCT	STC	NOCT	SCT	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	380Wp	279Wp	385Wp	283Wp	390Wp	287Wp	395Wp	291Wp	400Wp	294Wp
Maximum Power Voltage (Vmp)	39.10V	36.5V	39.37V	36.8V	39.64V	37.0V	39.90V	37.4V	40.16V	37.6V
Maximum Power Current (Imp)	9.72A	7.67A	9.78A	7.71A	9.84A	7.75A	9.90A	7.77A	9.96A	7.82A
Open-circuit Voltage (Voc)	48.2V	45.4V	48.4V	45.6V	48.6V	45.8V	48.8V	46.0V	49.1V	46.2V
Short-circuit Current (lsc)	10.30A	8.32A	10.38A	8.38A	10.46A	8.45A	10.54A	8.51A	10.61A	8.57A
Module Efficiency STC (%)	18.8	9%	19.14%		19.38%		19.63%		19.88%	
			L							

*STC: * Irradiance 1000W/m² NOCT: * Irradiance 800W/m²

 Cell Temperature 25°C Ambient Temperature 20°C

AM = 1.5 AM = 1.5 Swind Speed 1m/s

 $The\ company\ reserves\ the\ final\ right\ for\ explanation\ on\ any\ of\ the\ information\ presented\ hereby.\ JKM380-400M-72HBL-V-D1-US$

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635 OLD BARNWELL ROAD WEST COLUMBIA SC 29170

NEW SOLAR PV ROOF MOUNT SYSTEM

11.7 KW DC INPUT 10 KW AC EXPORT

FERNANDO POMPA HUERTA

3832 US-401, LILLINGTON, NC, 27546

ENGINEERING STAMP:

DRAWN BY: LEONI MARLOU EBO DATE: 01 - 26 - 2023

REVISIONS DESCRIPTION DATE REV

BUILDING YOUR TRUST IN SOLAR. WWW.JINKOSOLAR.US

Single Phase Inverter with HD-Wave Technology

for North America

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



Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency

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- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for
 Optional: Revenue grade data, ANSI C12.20 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
- Class 0.5 (0.5% accuracy)



INVERTERS

/ 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 MinNomMax. (211 - 240 - 264)	✓	✓	√	✓	√	✓		Vac	
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac	
AC Frequency (Nominal)				59.3 - 60 - 60.5 ⁽¹⁾				Hz	
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	А	
Maximum Continuous Output Current @208V	-	16	-	24	-,	-	48.5	А	
GFDI Threshold				1				Α	
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		31	80			400		Vdo	
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Add	
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Add	
Max. Input Short Circuit Current				45				Add	
Reverse-Polarity Protection		Yes							
Ground-Fault Isolation Detection				600ka Sensitivity					
Maximum Inverter Efficiency	99			9	99.2			%	
CEC Weighted Efficiency			9	99			99 @ 240V 98.5 @ 208V	%	
Nighttime Power Consumption				< 2.5				W	
ADDITIONAL FEATURES									
Supported Communication Interfaces			RS485, Etherne	et, ZigBee (optional), (Cellular (optional)				
Revenue Grade Data, ANSI C12.20				Optional ⁽³⁾					
Rapid Shutdown - NEC 2014 and 2017 690.12			Automatic Rap	id Shutdown upon AC	Grid Disconnect				
STANDARD COMPLIANCE									
Safety		UL1741	, UL1741 SA, UL1699B	s, CSA C22.2, Canadiar	n AFCI according to T.	I.L. M-07			
Grid Connection Standards			IEE	E1547, Rule 21, Rule 14	4 (HI)				
Emissions				FCC Part 15 Class B	ł				
INSTALLATION SPECIFICATION	ONS								
AC Output Conduit Size / AWG Range		1'	" Maximum / 14-6 AV	VG		1" Maximum	1/14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range		1" Maxii	mum / 1-2 strings / 14	1-6 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					21.3 x 14.6 x 7.3 ,	/ 540 x 370 x 185	in / mn	
Weight with Safety Switch	22	/ 10	25.1 / 11.4	26.2	2 / 11.9	38.8	/ 17.6	lb/l	
Noise		<	25			<50		dB/	
Cooling				Natural Convection	ı				
Operating Temperature Range	-13 to +140 / -25 to +60 ⁽⁴⁾ (-40°F / -40°C option) ⁽⁵⁾							°F/	
Protection Rating	NEMA 4X (Inverter with Safety Switch)								

[®] For other regional settings please contact SolarEdge support
[®] A higher current source may be used; the inverter will limit its input current to the values stated
[®] Revenue grade inverter P/N. Sbook1+USDONNC2

RoHS



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DRAWN BY: LEONI MARLOU EBO DATE: 01 - 26 - 2023 REVISIONS DESCRIPTION

EQUIPMENT

Power Optimizer For Residential Installations

S440 / S500 / S500B / S650B



Enabling 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
- Compatible with bifacial PV modules

* Functionality subject to inverter model and firmware version

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/ Power Optimizer

For Residential Installations

S440 / S500 / S500B / S650B

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

- (1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
- (2) For details about CE compliance, see Declaration of Conformity CE.
- (a) for detains about compliance, be <u>Declaration for Continuity C.</u>.
 (3) For other connector types please contact SolarEdge.
 (4) Power de-rating is applied for ambient temperatures above +85°C for S440 and S500, and for ambient temperatures above +75°C for S500B. Refer to the <u>Power Optimizers Temperature De-Rating Technical Note</u> for details.

PV System Design Usin	g a SolarEdge Inverter ⁽⁵⁾	SolarEdge Home Wave Inverter Single Phase	SolarEdge Home Short String Inverter Three Phase	Three Phase for 230/400V Grid	Three Phase for 277/480V Grid	
Minimum String Length	S440, S500	8	9	16	18	
(Power Optimizers)	S500B, S650B	6	8	14		
Maximum String Length (Power Optimizers)		25	20	50		
Maximum Continuous Power per String		5700	5625	11,250	12,750	W
Maximum Allowed Connected Power per String ⁽⁶⁾ (In multiple string designs, the maximum is permitted only when the difference in connected power between strings is 2,000W or less)		6800 ⁽⁷⁾	See ⁽⁶⁾	13,500	15,000	w
Darallal Strings of Different Langths or Orientations		Voc				

- Parallel Strings of Different Lengths or Orientations

 Yes

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

 (6) If the inverter's rated AC power ≤ maximum continuous power per string, then the maximum connected power per string will be able to reach up to the inverters maximum input DC power. Refer to the Single String Design Guidelines, application note.

 (7) For inverters with a rated AC power ≥ 8000W that are connected to at least two strings.

S440, S500 (Flat Bracket)	S500B, S650B (Bent Bracket)		
1955 1988 1988 1988 1988 1988 1988			

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EQUIPMENT

FLASHKIT PRO



FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Featuring Unirac's patented **SHED & SEAL** technology, a weather proof system which provides the ultimate protection against roof leaks. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With **FLASH**KIT pro, you have everything you need for a quick, professional installation.





TRUSTED WATER SEAL FLASHINGS FEATURING O SHED & SEAL TECHNOLOGY



YOUR COMPLETE SOLUTION Flashings, lags, continuous slot L-Feet and hardware Packaged for speed and ease of handling



THE COMPLETE ROOF ATTACHMENT SOLUTION

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FLASHKIT PRO



FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.







INSTALL L-FOOT



ATTACH L-FOOT TO RAIL

PRE-INSTALL

- · Locate roof rafters and snap chalk lines to mark the installation point for each roof attachment.
- Drill a 7/32" pilot hole at each roof attachment. Fill each pilot hole with sealant.

STEP 1 INSTALL **FLASH**KIT PRO FLASHING

· Add a U-shaped bead of roof sealant to the underside of the flashing with the open side of the U pointing down the roof slope. Slide the aluminum flashing underneath the row of shingles directly up slope from the pilot hole as shown. Align the indicator marks on the lower end of the flashing with the chalk lines on the roof to center the raised hole in the flashing over the pilot hole in the roof. When installed correctly, the flashing will extend under the two courses of shingles above the pilot hole.

STEP 2 INSTALL L-FOOT

· Fasten L-foot and Flashing into place by passing the included lag bolt and pre-installed stainless steel-backed EPDM washer through the L-foot EPDM grommet, and the raised hole in the flashing, into the pilot hole in the roof rafter.

• Drive the lag bolt down until the L-foot is held firmly in place. It is normal for the EPDM on the underside of the stainless steel backed EPDM washer to compress and expand beyond the outside edge of the steel washer when the proper torque is applied.

- Use caution to avoid over-torqueing the lag bolt if using an impact driver.
- Repeat Steps 1 and 2 at each roof attachment point.

STEP 3 ATTACH L-FOOT TO RAIL

- Insert the included 3/8"-16 T-bolts into the lower slot on the Rail (sold separately), spacing the bolts to match the spacing between the roof attachments.
- · Position the Rail against the L-Foot and insert the threaded end of the T-Bolt through the continuous slot in the L-Foot. Apply anti-seize to bolt threads to prevent galling of the T-bolt and included 3/8" serrated flange nut. Place the 3/8" flange nut on the T-bolt and finger tighten. Repeat STEP 3 until all L-Feet are secured to the Rail with a T-bolt. Adjust the level and height of the Rail and torque each holt to 30ft-lhs.

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EQUIPMENT

CONTRACTOR

635 OLD BARNWELL ROAD

WEST COLUMBIA SC 29170 JOB TITLE **NEW SOLAR PV ROOF** MOUNT SYSTEM

11.7 KW DC INPUT

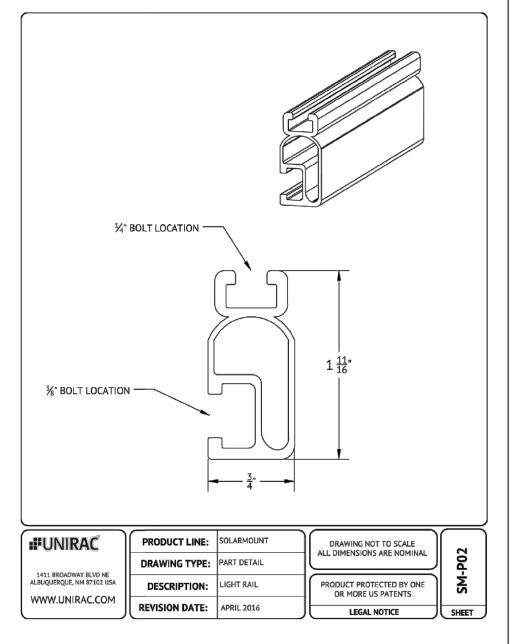
10 KW AC EXPORT

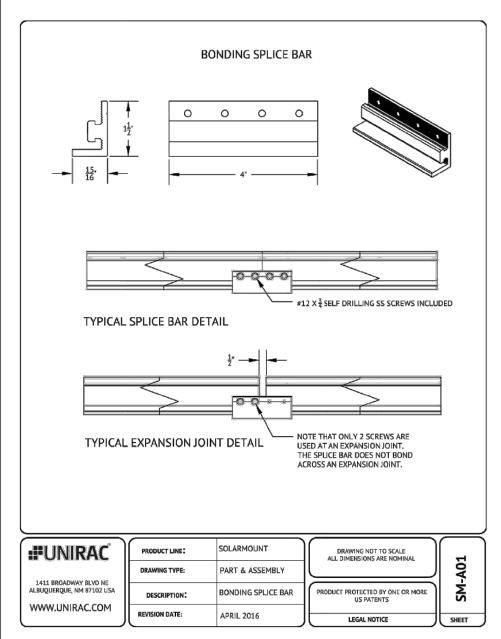
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EQUIPMENT SPEC SHEET

PV5.5