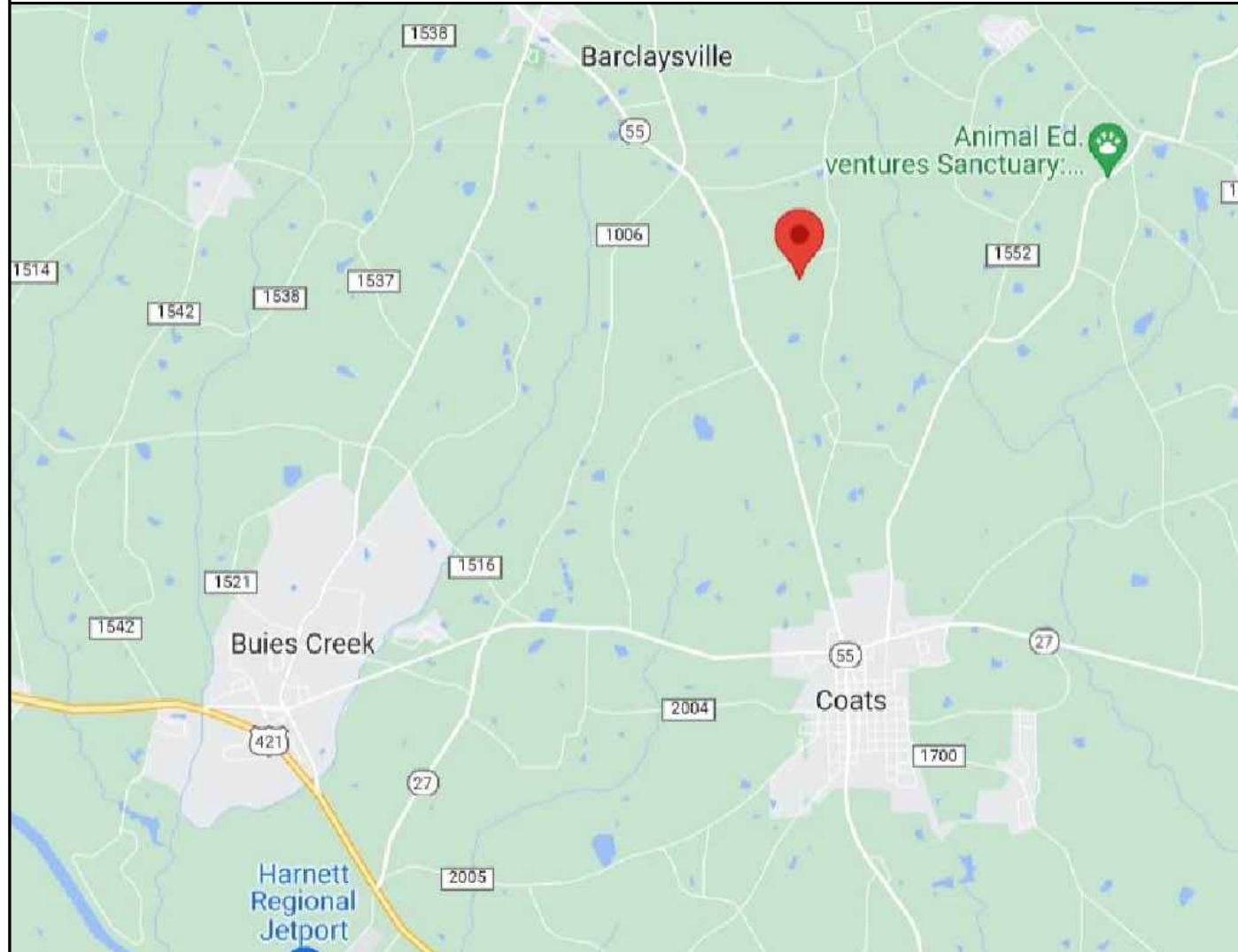


### VICINITY MAP



### PROPERTY MAP



ENGINEER:



**MODEL ENERGY**  
 300 FAYETTEVILLE ST.  
 #1430  
 RALEIGH, NC 27602  
 919-274-9905  
 MODELENERGY.COM  
 P-1194

JOB TITLE:

### NEW SOLAR PV SYSTEM

7.290 kW DC INPUT  
 8.850 kW AC EXPORT

Navar, Diana  
 45 Henry Rifle Ln  
 Angier, NC 27501

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CLIENT:



ISSUED FOR: PERMIT  
 DATE: 9/27/2023

PROJECT INFORMATION

# PV1.1

### SCOPE OF WORK

(18) Q.PEAK DUO BLK ML-G10+ 405  
 (18) ENPHASE IQ8M-72-2-US  
 ROOF MOUNT: FLASHKIT PRO  
 MOUNTING RAILS: UNIRAC SM LIGHT RAIL

### SITE CONDITION

ASCE 7-10 WIND SPEED - 117 MPH  
 EXPOSURE CATEGORY - B  
 RISK CATEGORY - II  
 SNOW LOAD - 15 LBS/SQFT

### SHEET INDEX

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

### INTERCONNECTIONS TYPE

LOAD SIDE TAP

### CODE REFERENCES

2017 NATIONAL ELECTRIC CODE  
 2018 NORTH CAROLINA FIRE CODE  
 2018 NORTH CAROLINA BUILDING CODE  
 2018 NORTH CAROLINA RESIDENTIAL CODE

### UTILITY COMPANY

DUKE ENERGY PROGRESS

### LEGEND

- DISCONNECT SWITCH
- FUSE
- CIRCUIT BREAKER
- EQUIP. GROUND







AURORA SOLAR SHADE ANALYSIS

NAVAR, DIANA  
 45 HENRY RIFLE LN  
 ANGIER, NC 27501  
 7.290 KW DC STC  
 5.850 KW AC

MODULES:

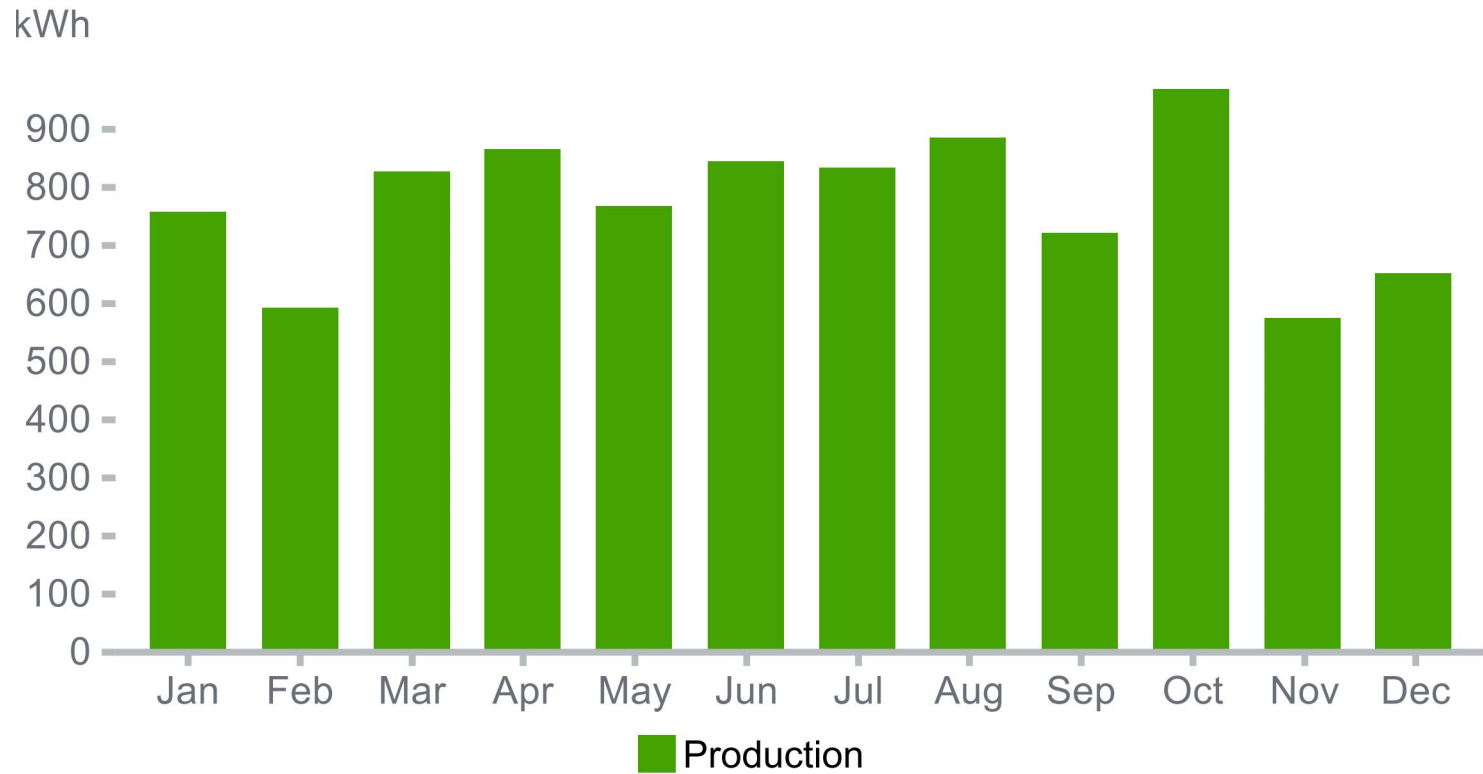
(18) Q.PEAK DUO BLK ML-G10+ 405

INVERTERS:

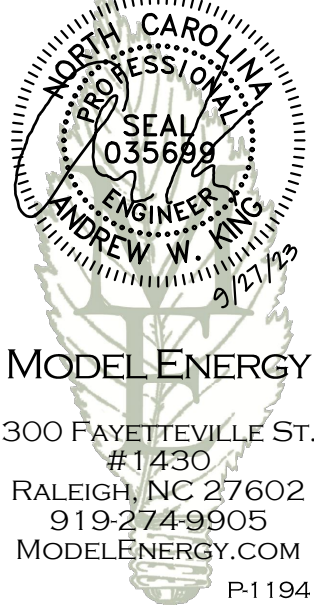
(18) ENPHASE IQ8M-72-2-US

THE SYSTEM HAS A FIRST YEAR ANNUAL ENERGY PRODUCTION OF: 9,297 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.



ENGINEER:



JOB TITLE:

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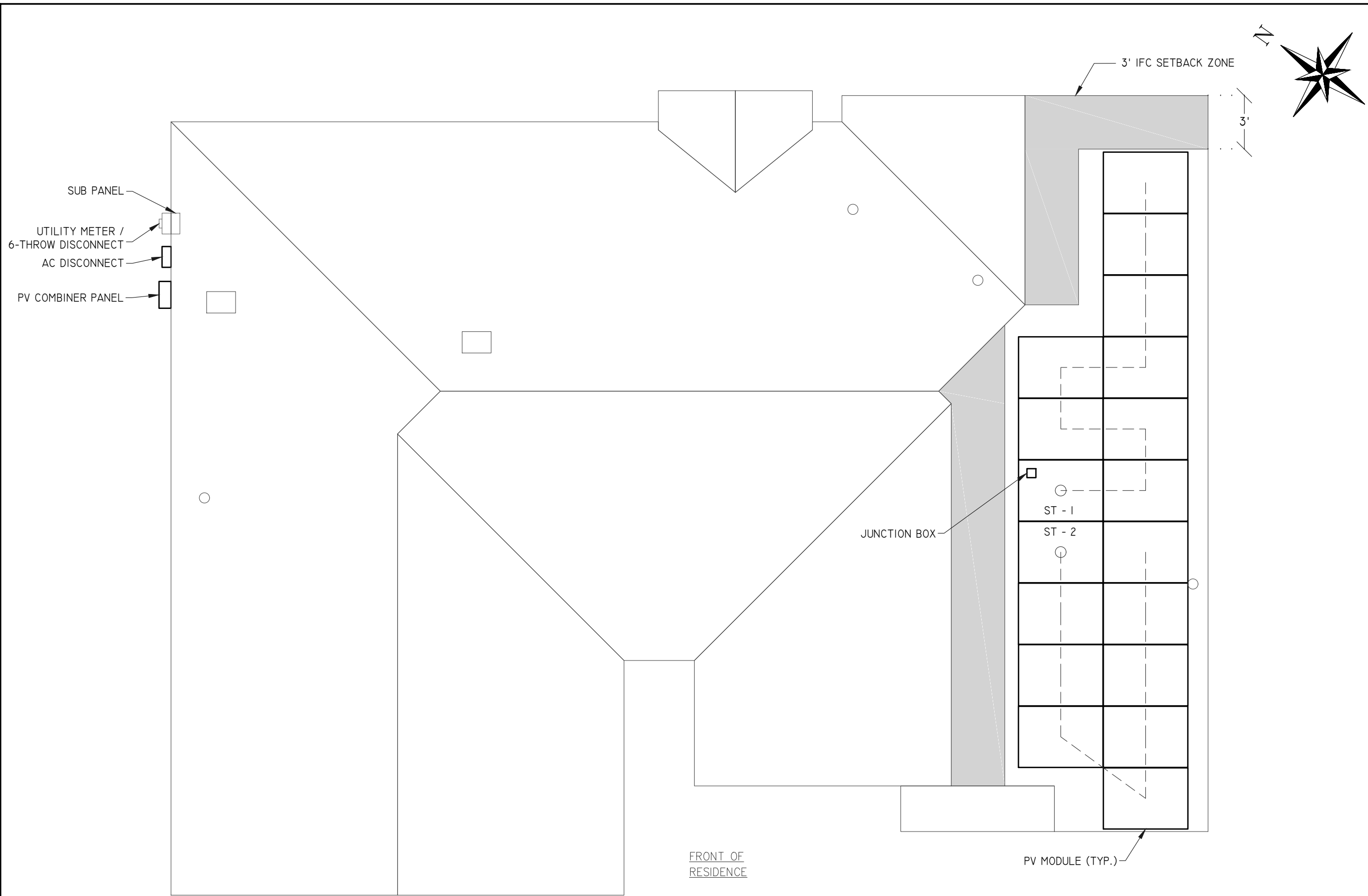
CLIENT:



ISSUED FOR:	DATE:
PERMIT	9/27/2023


PROJECT INFORMATION

PV1.2



ENGINEER:



**MODEL ENERGY**  
 300 FAYETTEVILLE ST.  
 #1430  
 RALEIGH, NC 27602  
 919-274-9905  
 MODELENERGY.COM  
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JOB TITLE:

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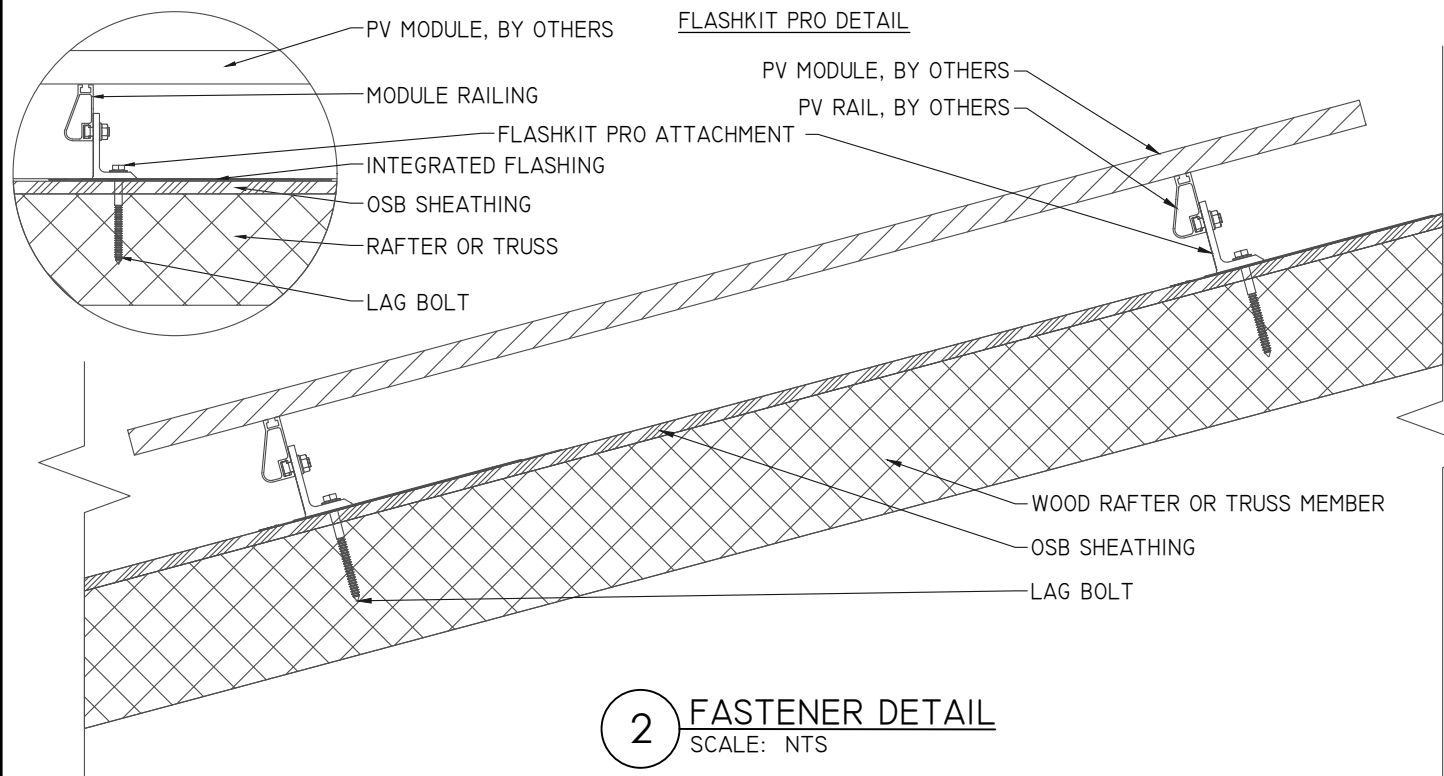

SITE INFORMATION

**PV2.1**

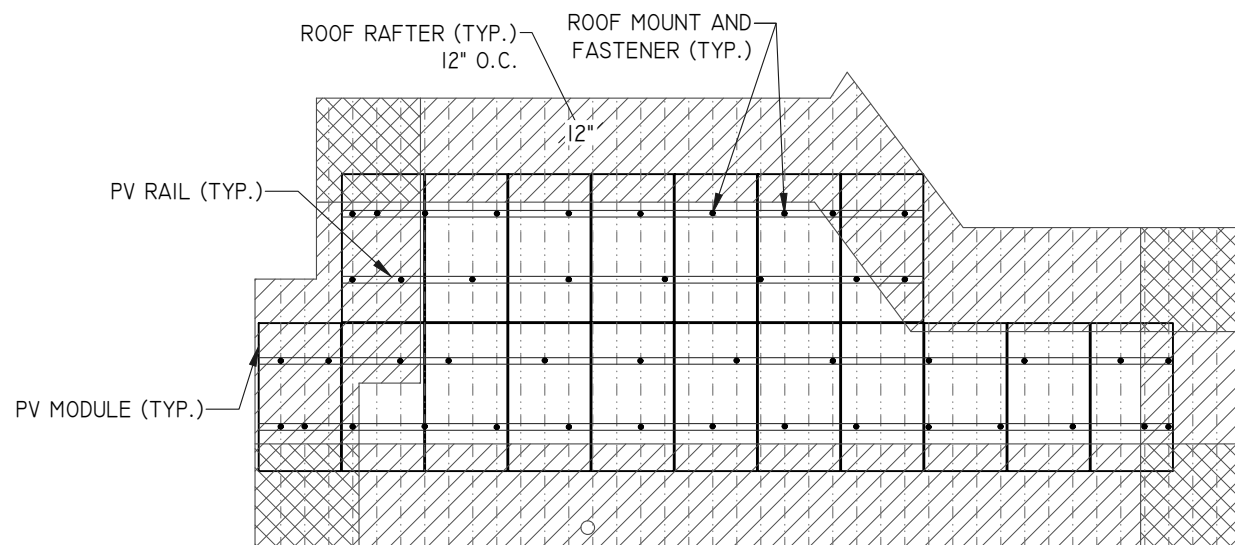
**1 SITE PLAN**  
 SCALE: 3/16" = 1' -0"

■ NFPA-1/FFPC SECTION 11.12.2.2.2 REQUIRED 3 FEET ACCESS, PATHWAYS, AND SETBACKS. DO NOT PLACE ANY PV MODULES IN THIS SPACE.





**2 FASTENER DETAIL**  
SCALE: NTS



**1 ROOF "A" PLANAR VIEW**  
SCALE: 1/8" = 1' -0"

ARRAY SUMMARY	
# MODULES	18
# ROOF MOUNTS	45
RAIL LENGTH	131 FT.
ARRAY AREA	380 SQFT.
ARRAY WEIGHT	937 LBS.
AZIMUTH @ SN	145°
TILT ANGLE	40°


MOUNTING RAILS	
MAKE	UNIRAC
MODEL	SM LIGHT RAIL
MATERIAL	ALUMINUM
WEIGHT	0.49 LBS/SQFT
SPACING	34"

PV MODULES	
MAKE	HANWHA Q-CELL
MODEL	Q.PEAK DUO BLK ML-G10+ 405
WIDTH	41.1"
LENGTH	74.0"
THICKNESS	1.3"
WEIGHT	49 LBS

ROOF ZONES:		
ALL ZONES	MAX. RAIL OVERHANG =	10"
□ ZONE 1	MAX. FASTENER SPAN ZONE 1 =	60"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 =	48"
▩ ZONE 3	MAX. FASTENER SPAN ZONE 3 =	36"

**STATEMENT OF STRUCTURAL COMPLIANCE**

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PURPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

SIGNED:   
 NAME: ANDREW W. KING, PE  
 TITLE: PROFESSIONAL ENGINEER

ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	UNIRAC
MODEL	FLASHKIT PRO
MATERIAL	ALUMINUM
FASTENER	
MAKE	GENERIC
MODEL	LAG BOLT
MATERIAL	SS LAG W/EPDM WASHER
SIZE	5/16" x 4"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1 PER MOUNT
MAX. PULL-OUT FORCE	800 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	400 LBS.

- LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ROOF SUMMARY	
STRUCTURE:	
TYPE	RAFTER
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 6"
SPACING	12"
EFF. SPAN	14'-6"
PITCH	10/12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

ROOF LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.5 LBS./SQFT.
STRUCTURAL	1.1 LBS./SQFT.
TOTAL	7.5 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS/SQFT
UPLIFT ZONE 2	-29.0 LBS/SQFT
UPLIFT ZONE 3	-29.0 LBS/SQFT
DOWNWARD	23.0 LBS/SQFT
FASTENER LOAD:	
UPLIFT ZONE 1	-379 LBS
UPLIFT ZONE 2	-358 LBS
UPLIFT ZONE 3	-268 LBS
DOWNWARD	355 LBS

ENGINEER:



JOB TITLE:

**NEW SOLAR PV SYSTEM**

7.290 kW DC INPUT  
5.850 kW AC EXPORT

Navar, Diana  
45 Henry Rifle Ln  
Angier, NC 27501

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CLIENT:



ISSUED FOR: PERMIT  
DATE: 9/27/2023

STRUCTURAL INFORMATION

**PV3.1**



PV MODULES	
MAKE	HANWHA Q-CELL
MODEL	Q.PEAK DUO BLK ML-G10+ 405
TECHNOLOGY	MONO-CRYST.
NOM. POWER (P <sub>nom</sub> )	405 WATTS
NOM. VOLT. (V <sub>mp</sub> )	37.39 VOLTS
O.C. VOLT. (V <sub>oc</sub> )	45.34 VOLTS
MAX. SYS. VOLT.	1000 V (UL)
TEMP. COEF. (V <sub>tc</sub> )	-0.27 %/°C
NOM. CURR. (I <sub>mp</sub> )	10.83 AMPS
S.C. CURR. (I <sub>sc</sub> )	11.17 AMPS
MAX. SERIES FUSE	20 AMPS

DC/AC INVERTER	
MAKE	ENPHASE ENERGY
MODEL	IQ8M-72-2-US
TECHNOLOGY	MICRO INVERTER
DC INPUT:	
MAX. POWER	460 WATTS
VOLT. RANGE	25-58 VOLTS
MAX. CURRENT	15 AMPS
AC OUTPUT:	
NOM. POWER	325 WATTS
NOM. VOLT.	240 VOLTS
MAX. CURR.	1.35 AMPS
GFP (Y/N)	YES
GFCI (Y/N)	YES
AFCI (Y/N)	YES
DC DISC. (Y/N)	NO
RAPID SHUTDOWN	YES
FUSE RATING	15 AMPS
PROTECT. RATING	NEMA 6R

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

**NOTES:**

- PROVIDE ADDITIONAL JUNCTION BOXED AS REQUIRED TO COMBINE MODULES ON DIFFERENT ARRAYS INTO A SINGLE STRING

CONDUCTOR SCHEDULE													
TAG	CURRENT CARRYING CONDUCTORS				GROUNDING CONDUCUTORS				CONDUIT/RACEWAY			NOTES	
	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL		LOCATION
C1	2	12 AWG	COPPER	PV WIRE	1	6 AWG	COPPER	BARE	-	-	-	FREE AIR	1
C2	2	12 AWG	COPPER	MANU. CAB.	1	10 AWG	COPPER	MANU. CAB.	-	-	-	FREE AIR	1
C3	4	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	1/2"	NOTE 5	INT/EXT	2,4,5
C4	3	8 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	NOTE 5	INT/EXT	2,4,5
C5	3	8 AWG	COPPER	THWN	1	6 AWG	COPPER	THWN	1	3/4"	NOTE 5	INT/EXT	2,4,5
XC	-	-	-	-	-	-	-	-	-	-	-	-	3

**NOTES:**

1. MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
2. CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
3. EXISTING CONDUCTORS, FIELD VERIFY
4. EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR
5. PVC, EMT, ROMEX, LFNMC & FMC ARE ACCEPTABLE WHEN USED IN ACCORDANCE WITH ARTICLES 330, 334, 348, 350, 352, 356, & 358 OF THE 2017 NEC

IQ4 COMBINER PANEL (NEW)	
MAKE	N/A
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	125 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	NO
BREAKER RATING	N/A

**NOTES:**

- BACK-FEED INVERTER OUTPUT VIA (2) 20A BREAKERS AT THE OPPOSITE END OF THE BUS BAR FROM MAIN BREAKER.
- PROVIDE "FED BY MULTIPLE POWER SOURCES" LABEL.

AC DISCONNECT	
MAKE	GENERIC
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
AMP RATING	60 AMPS
UL LIST. (Y/N)	YES
FUSED (Y/N)	YES
FUSE RATING	35A

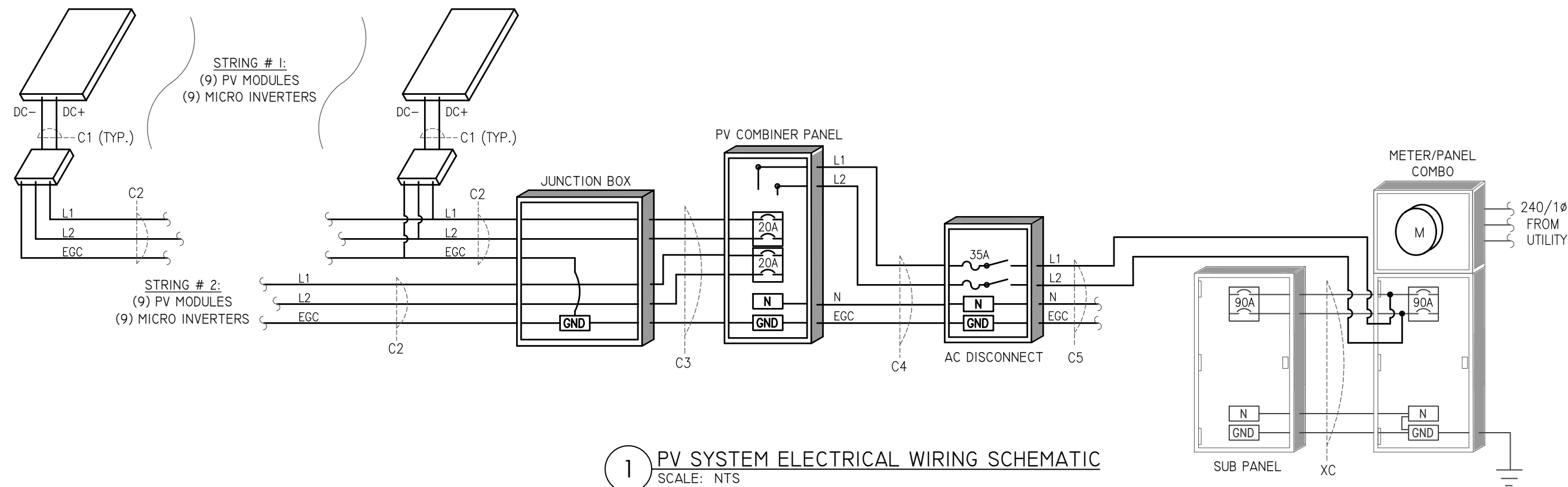
**NOTES:**

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION
- INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILY ACCESSIBLE TO UTILITY COMPANY PERSONNEL AT ALL TIMES

METER/ 6 THROW (EXISTING)	
MAKE	N/A
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	N/A
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	YES
BREAKER RATING	N/A

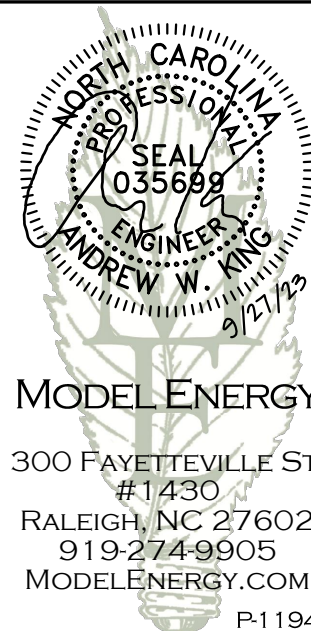
**NOTES:**

- BACK-FEED SOLAR OUTPUT VIA FEEDER TAP INSIDE OF METER/ 6 THROW DISCONNECT COMBO



**1 PV SYSTEM ELECTRICAL WIRING SCHEMATIC**  
SCALE: NTS

ENGINEER:



**MODEL ENERGY**

300 FAYETTEVILLE ST.  
#1430  
RALEIGH, NC 27602  
919-274-9905  
MODELENERGY.COM  
P-1194

JOB TITLE:

**NEW SOLAR PV SYSTEM**

7.290 kW DC INPUT  
8.850 kW AC EXPORT

Navar, Diana  
45 Henry Rifle Ln  
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ISSUED FOR: PERMIT  
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ELECTRICAL INFORMATION

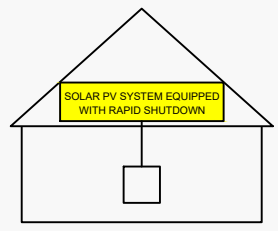
**PV4.1**



## 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



NEC 690.56 (C)(1)(a)  
PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

### PV SYSTEM DISCONNECT

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

### ⚠ WARNING

#### 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.

### ⚠ WARNING

POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

NEC 705.12 (B)(2)(3)(b)  
PLACE ADJACENT TO BACK-FED BREAKER

### WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31 (G)(3)&(4)  
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.

### ⚠ WARNING

#### FED BY MULTIPLE POWER SOURCES

TOTAL RATING OF ALL OVERCURRENT DEVICES EXCLUDING UTILITY OVERCURRENT DEVICE SHALL NOT EXCEED AMPACITY OF BUSBAR

NEC 705.12 (B)(2)(3)(c)  
PLACE ADJACENT TO BACK-FED BREAKER

### RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56 (C)(3)  
PLACE ON RAPID SHUTDOWN SWITCH OR EQUIPMENT WITH INTEGRATED RAPID SHUTDOWN \*REFLECTIVE\*

#### EQUIPMENT LABEL NOTES

1. LABELS SHOWN ARE 1/2 THEIR ACTUAL REQUIRED SIZE.
2. LABEL MATERIAL SHALL BE SUITABLE FOR THE EQUIPMENT ENVIRONMENT.
3. CONDUIT SHALL BE MARKED WITH REQUIRED LABEL EVERY 10 FEET.

### PHOTOVOLTAIC POWER SOURCE

OPERATING AC VOLT. 240 VAC

MAXIMUM OPERATING AC OUTPUT CURRENT 25 AMPS

NEC 690.54  
PLACE ON INTERCONNECTION DISCONNECTING MEANS

## CONSTRUCTION NOTES

1. ALL WORK AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL, STATE, AND LOCAL CODES AND ORDINANCES
2. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS
3. WIRES SHALL BE RATED AND LABELED "SUNLIGHT RESISTANT" WHERE EXPOSED TO AMBIENT CONDITIONS
4. THE PHOTOVOLTAIC SYSTEM SHALL NOT EXCEED 600 VOLTS OR 800 AMPS
5. 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 FREQUENCIES, IT SHALL BE SO MARKED. WHERE MOTOR OVERLOAD PROTECTION EXTERNAL TO THE APPLIANCES IS REQUIRED, THE APPLIANCE SHALL BE SO MARKED
6. WHERE APPLICABLE, GROUNDING ELECTRODE CONDUCTOR TO BE CONTINUOUS. GROUNDING CRIMPS TO BE IRREVERSIBLE
7. 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.
8. PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED AND THAT VARIOUS DANGERS ARE PRESENT.
9. EACH PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT
10. WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT
11. A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED BY THE INSTALLED AT THE DC DISCONNECT MEANS
12. A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
13. A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED DENOTING THE LOCATIONS OF THE SERVICE DISCONNECT MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECT MEANS IF THEY ARE NOT LOCATED AT THE SAME LOCATION.
14. ALL MODULE GROUND CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC SECTION 690.4 (C)

ENGINEER:



MODEL ENERGY

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CLIENT:



ISSUED FOR:	DATE:
PERMIT	9/27/2023


ELECTRICAL  
INFORMATION

# PV4.2



powered by  
**Q.ANTUM DUO Z**

# Q.PEAK DUO BLK ML-G10+

## 385-405

ENDURING HIGH PERFORMANCE



### BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



### THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



### INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



### ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology<sup>1</sup>, Hot-Spot Protect and Traceable Quality Tra.Q™.



### EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



### A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty<sup>2</sup>.

<sup>1</sup> APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96h)

<sup>2</sup> See data sheet on rear for further information.

### THE IDEAL SOLUTION FOR:



Rooftop arrays on residential buildings

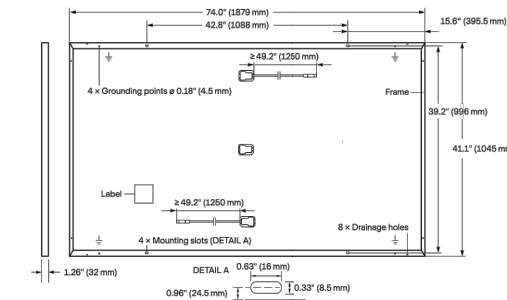
6 BUSBAR CELL TECHNOLOGY      12 BUSBAR CELL TECHNOLOGY

Engineered in Germany



### MECHANICAL SPECIFICATION

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm <sup>2</sup> Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68

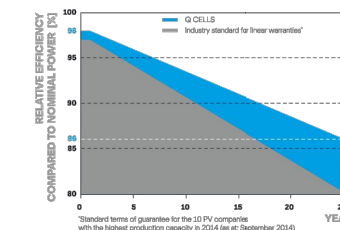


### ELECTRICAL CHARACTERISTICS

POWER CLASS	385	390	395	400	405	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC <sup>1</sup> (POWER TOLERANCE +5W / -0W)						
Power at MPP <sup>2</sup>	P <sub>MPP</sub> [W]	385	390	395	400	405
Short Circuit Current <sup>2</sup>	I <sub>SC</sub> [A]	11.04	11.07	11.10	11.14	11.17
Open Circuit Voltage <sup>2</sup>	V <sub>OC</sub> [V]	45.19	45.23	45.27	45.30	45.34
Current at MPP	I <sub>MPP</sub> [A]	10.59	10.65	10.71	10.77	10.83
Voltage at MPP	V <sub>MPP</sub> [V]	36.36	36.62	36.88	37.13	37.39
Efficiency <sup>2</sup>	η [%]	≥ 19.6	≥ 19.9	≥ 20.1	≥ 20.4	≥ 20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT <sup>2</sup>						
Power at MPP	P <sub>MPP</sub> [W]	288.8	292.6	296.3	300.1	303.8
Short Circuit Current	I <sub>SC</sub> [A]	8.90	8.92	8.95	8.97	9.00
Open Circuit Voltage	V <sub>OC</sub> [V]	42.62	42.65	42.69	42.72	42.76
Current at MPP	I <sub>MPP</sub> [A]	8.35	8.41	8.46	8.51	8.57
Voltage at MPP	V <sub>MPP</sub> [V]	34.59	34.81	35.03	35.25	35.46

<sup>1</sup> Measurement tolerances P<sub>MPP</sub> ± 3%; I<sub>SC</sub>; V<sub>OC</sub> ± 5% at STC: 1000 W/m<sup>2</sup>, 25 ± 2°C, AM 1.5 according to IEC 60904-3 • <sup>2</sup> 800 W/m<sup>2</sup>, NMOT, spectrum AM 1.5

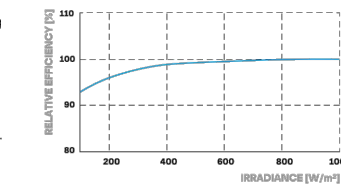
### Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

### PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m<sup>2</sup>)

### TEMPERATURE COEFFICIENTS

Temperature Coefficient of I <sub>SC</sub>	α [%/K]	+0.04	Temperature Coefficient of V <sub>OC</sub>	β [%/K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ [%/K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3°C)

### PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V <sub>sys</sub>	[V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push / Pull <sup>2</sup>	[lbs/ft <sup>2</sup> ]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push / Pull <sup>2</sup>	[lbs/ft <sup>2</sup> ]	113 (5400 Pa) / 84 (4000 Pa)		

<sup>2</sup> See Installation Manual

### QUALIFICATIONS AND CERTIFICATES

UL 61790, CE-compliant.  
Quality Controlled PV - TÜV Rheinland,  
IEC 61215:2016, IEC 61730:2016,  
U.S. Patent No. 9,893,215 (solar cells),



### PACKAGING INFORMATION

Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1656 lbs 751 kg	24 pallets	32 modules
----------------------	--------------------	--------------------	--------------------	--------------------	---------------	---------------

**Note:** Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

ENGINEER:



MODEL ENERGY

300 FAYETTEVILLE ST.  
#1430

RALEIGH, NC 27602  
919-274-9905

MODELENERGY.COM

P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM

7.290 kW DC INPUT

5.850 kW AC EXPORT

Navar, Diana

45 Henry Rifle Ln

Angier, NC 27501

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CLIENT:



ISSUED FOR:

DATE:

PERMIT

9/27/2023

LABELS,  
DETAILS & SPECS

# PV5.1

Specifications subject to technical changes © Q CELLS Q.PEAK DUO BLK ML-G10+-385-405-DA\_2022-02\_Rev01\_LNA



# Power Optimizer For Residential Installations

S440, S500



POWER OPTIMIZER

## Enabling PV power optimization at the module level

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

\* Functionality subject to inverter model and firmware version

[solaredge.com](http://solaredge.com)



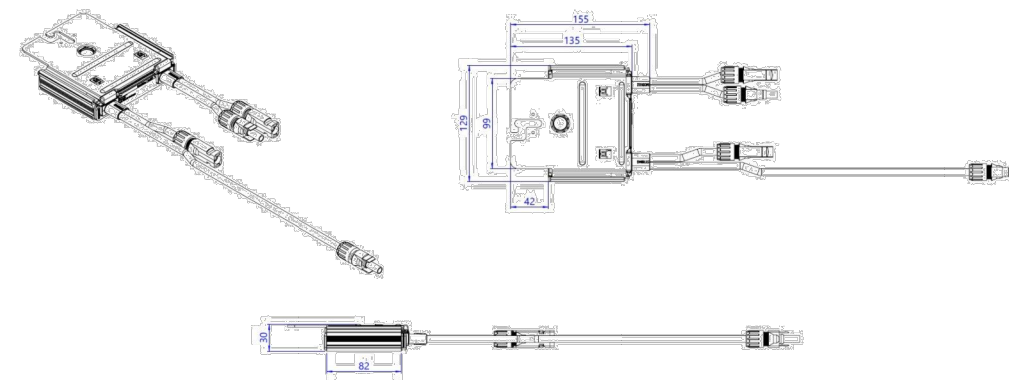
## Power Optimizer For Residential Installations S440, S500

	S440	S500	UNIT
Rated Input DC Power <sup>(1)</sup>	440	500	W
Absolute Maximum Input Voltage (Voc)		60	Vdc
MPPT Operating Range		8 - 60	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency		99.5	%
Weighted Efficiency		98.6	%
Overtoltage Category		II	
<b>OUTPUT DURING OPERATION</b>			
Maximum Output Current		15	Adc
Maximum Output Voltage		60	Vdc
<b>OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)</b>			
Safety Output Voltage per Power Optimizer		1	Vdc
<b>STANDARD COMPLIANCE</b>			
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 2100-712:2013-05		
<b>INSTALLATION SPECIFICATIONS</b>			
Maximum Allowed System Voltage		1000	Vdc
Dimensions (W x L x H)		129 x 155 x 30	mm
Weight (including cables)		655 / 1.5	gr / lb
Input Connector		MC4 <sup>(2)</sup>	
Input Wire Length		0.1	m
Output Connector		MC4	
Output Wire Length		(+) 2.3, (-) 0.10	m
Operating Temperature Range <sup>(3)</sup>		-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) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter		Single Phase HD-Wave	Three Phase	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	16	18	
Maximum String Length (Power Optimizers)		25	50	50	
Maximum Nominal Power per String <sup>(4)</sup>		5700	11250 <sup>(5)</sup>	12750 <sup>(6)</sup>	W
Parallel Strings of Different Lengths or Orientations			Yes		

(4) If the inverters rated AC power  $\leq$  maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power Refer to: <https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf>  
 (5) For the 230/400V grid: it is allowed to install up to 13,500W per string when the maximum power difference between each string is 2,000W  
 (6) For the 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W  
 (7) It is not allowed to mix S-series and P-series Power Optimizers in new installations



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CE RoHS

ENGINEER:



MODEL ENERGY  
 300 FAYETTEVILLE ST.  
 #1430  
 RALEIGH, NC 27602  
 919-274-9905  
 MODELENERGY.COM  
 P-1194

JOB TITLE:

NEW SOLAR PV SYSTEM

7.290 kW DC INPUT  
 5.850 kW AC EXPORT

Navar, Diana  
 45 Henry Rifle Ln  
 Angier, NC 27501

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CLIENT:



ISSUED FOR: PERMIT  
 DATE: 9/27/2023


EQUIPMENT SPEC SHEETS

PV5.2



# 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](http://solaredge.com)



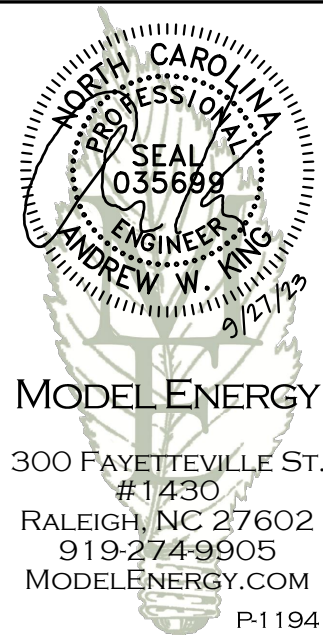
## Single Phase Inverter with HD-Wave Technology for North America

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		
<b>OUTPUT</b>									
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 <sup>(1)</sup>							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								
<b>INPUT</b>									
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 <sup>(2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Adc	
Maximum Input Current @208V <sup>(2)</sup>	-	9	-	13.5	-	-	27	Adc	
Max. Input Short Circuit Current	45							Adc	
Reverse-Polarity Protection	Yes								
Ground-Fault Isolation Detection	600k $\Omega$ Sensitivity								
Maximum Inverter Efficiency	99	99.2				99 @ 240V 98.5 @ 208V		%	
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%	
Nighttime Power Consumption	< 2.5							W	
<b>ADDITIONAL FEATURES</b>									
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)								
Revenue Grade Data, ANSI C12.20	Optional <sup>(3)</sup>								
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect								
<b>STANDARD COMPLIANCE</b>									
Safety	UL1741, UL1741 SA, UL1599B, CSA C22.2, Canadian AFCI according to T.I.L. M-07								
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)								
Emissions	FCC Part 15 Class B								
<b>INSTALLATION SPECIFICATIONS</b>									
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 <sup>(4)</sup> (-40°F / -40°C option) <sup>(5)</sup>							°F / °C	
Protection Rating	NEMA 4X (Inverter with Safety Switch)								

<sup>(1)</sup> For other regional settings please contact SolarEdge support  
<sup>(2)</sup> A higher current source may be used; the inverter will limit its input current to the values stated  
<sup>(3)</sup> Revenue grade inverter P/N: SExxxxH-US000NNC2  
<sup>(4)</sup> For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>  
<sup>(5)</sup> -40 version P/N: SExxxxH-US000NNU4

ENGINEER:



JOB TITLE:

NEW SOLAR PV SYSTEM

7.290 kW DC INPUT  
8.850 kW AC EXPORT

Navar, Diana  
45 Henry Rifle Ln  
Angier, NC 27501

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CLIENT:



ISSUED FOR: DATE:

PERMIT 9/27/2023

EQUIPMENT SPEC SHEETS

PV5.3



# 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 **FLASHKIT pro**, you have everything you need for a quick, professional installation.



**TRUSTED WATER SEAL FLASHINGS**  
FEATURING SHED & SEAL TECHNOLOGY



**YOUR COMPLETE SOLUTION**  
Flashings, lags, continuous slot L-Feet and hardware



**CONVENIENT 10 PACKS**  
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

## INSTALLATION GUIDE



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



INSTALL **FLASHKIT PRO** FLASHING



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 FLASHKIT 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.

#### TIP:

- Use caution to avoid over-torquing 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 bolt to 30ft-lbs.

## FASTER INSTALLATION. 25-YEAR WARRANTY.

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

ENGINEER:



MODEL ENERGY

300 FAYETTEVILLE ST.  
#1430  
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919-274-9905  
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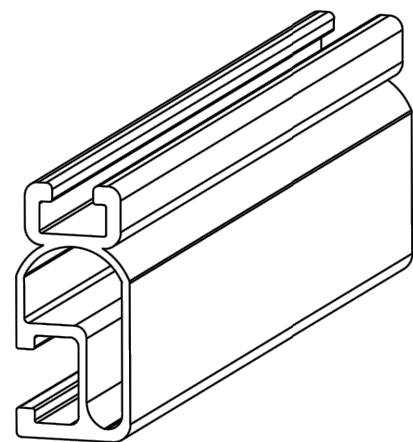
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EQUIPMENT SPEC SHEETS

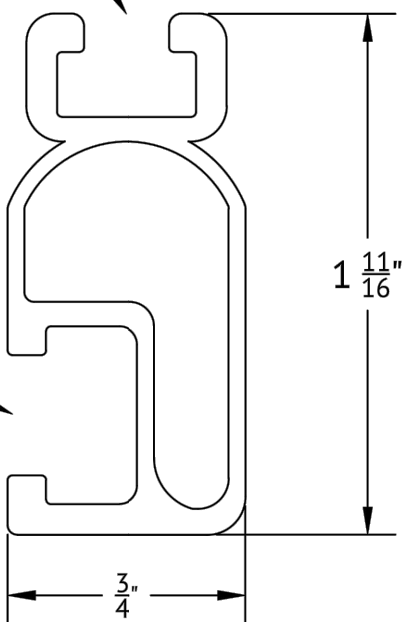
PV5.4



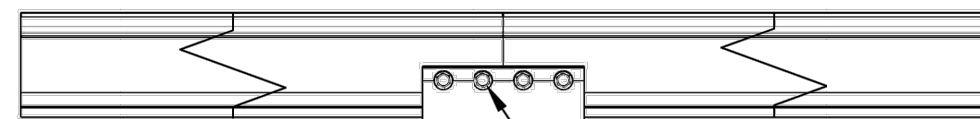
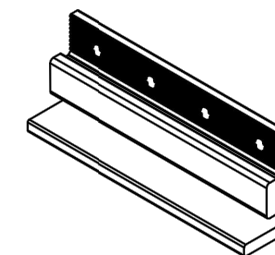
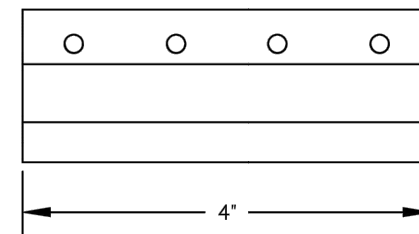
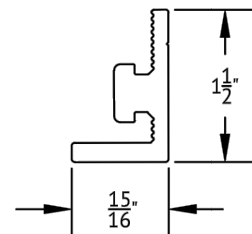


1/4" BOLT LOCATION

3/8" BOLT LOCATION

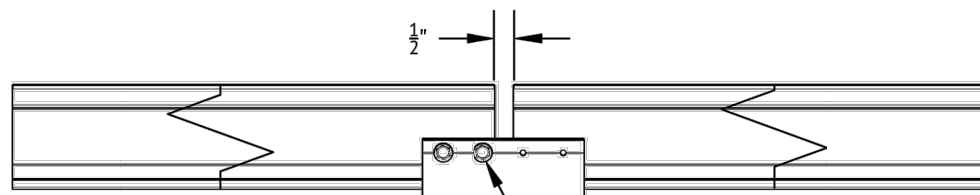


BONDING SPLICE BAR



#12 X 3/4" SELF DRILLING SS SCREWS INCLUDED

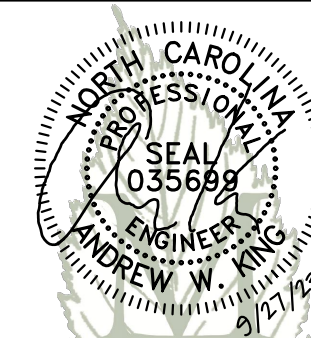
TYPICAL SPLICE BAR DETAIL



NOTE THAT ONLY 2 SCREWS ARE USED AT AN EXPANSION JOINT. THE SPLICE BAR DOES NOT BOND ACROSS AN EXPANSION JOINT.

TYPICAL EXPANSION JOINT DETAIL

ENGINEER:



MODEL ENERGY

300 FAYETTEVILLE ST.  
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RALEIGH, NC 27602  
919-274-9905  
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JOB TITLE:

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CLIENT:



ISSUED FOR:	DATE:
PERMIT	9/27/2023

**UNIRAC**  
1411 BROADWAY BLVD NE  
ALBUQUERQUE, NM 87102 USA  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	LIGHT RAIL
REVISION DATE:	APRIL 2016

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE  
OR MORE US PATENTS

LEGAL NOTICE

SM-P02

SHEET

**UNIRAC**  
1411 BROADWAY BLVD NE  
ALBUQUERQUE, NM 87102 USA  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING SPLICE BAR
REVISION DATE:	APRIL 2016

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE  
US PATENTS

LEGAL NOTICE

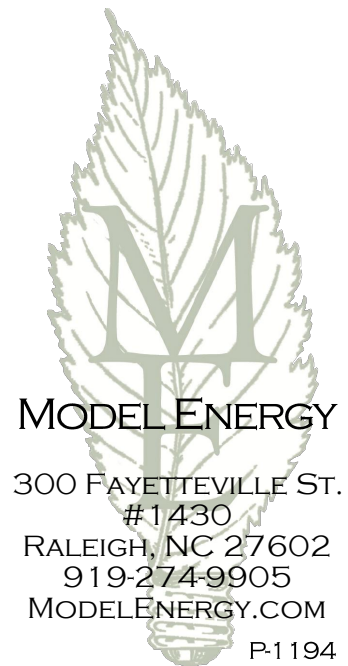
SM-A01

SHEET

EQUIPMENT  
SPEC SHEETS

PV5.5

Customer: Navar, Diana  
Installer: SmartSun  
Subject: PV System Structural Compliance  
Date: 9/27/2023



To whom it may concern:

Model Energy, PLLC has reviewed the installation details of the proposed PV system that is to be installed by SmartSun at 45 Henry Rifle Ln, Angier, NC 27501. The conditions of the existing structure have been reviewed and validated by Model Energy, PLLC. The existing roof structure has been designed to support the additional loads of the proposed PV system. In addition, the racking and fastening system shall be capable of securing the system to the structure under design conditions when installed properly and in accordance with the racking and fastening arrangement detailed within the accompanying permit set. The installation design is compliant with current 2018 North Carolina state and national building codes.

Thank you,

Andrew King, PE

