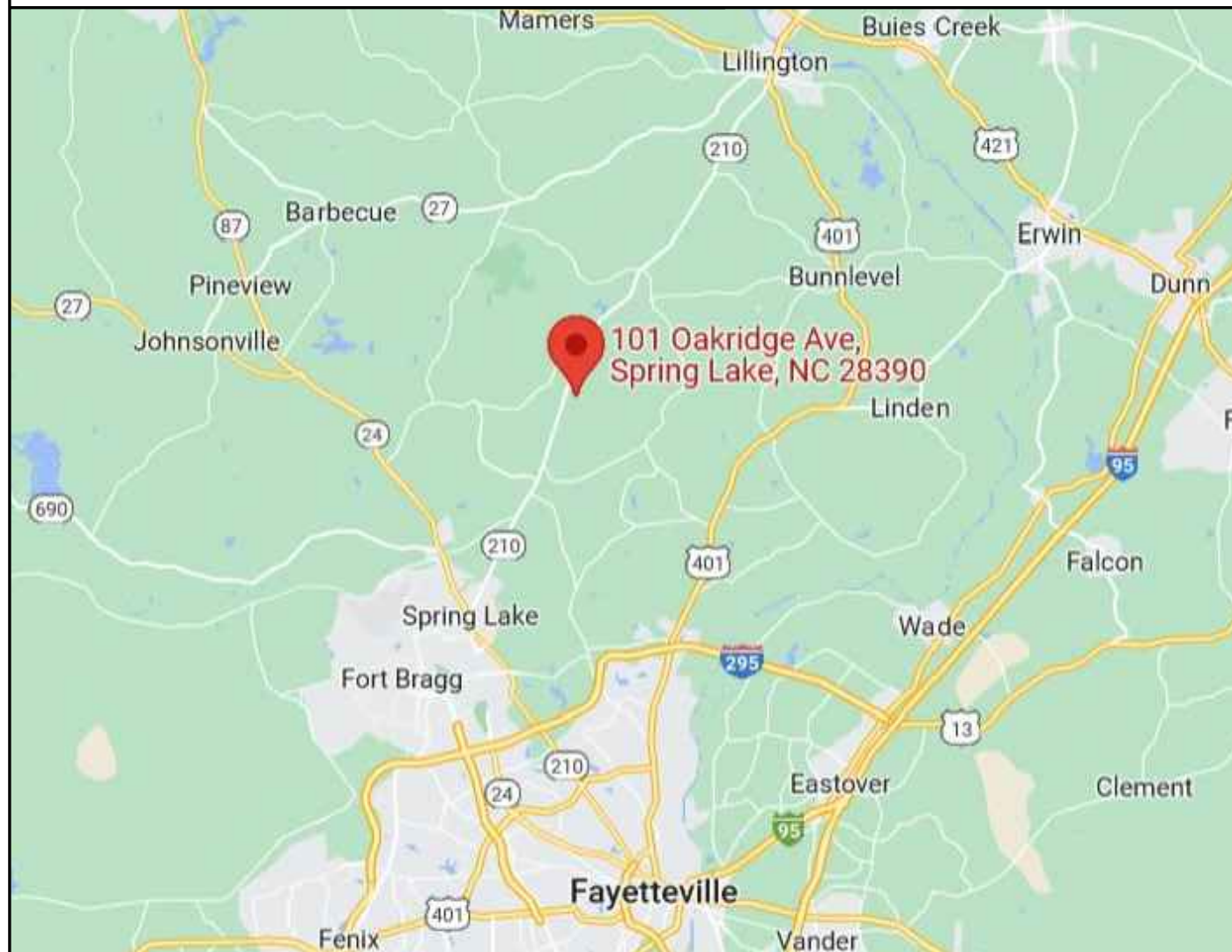
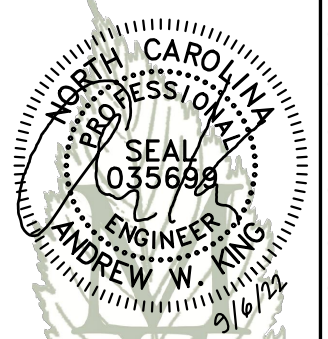


VICINITY MAP



PROPERTY MAP



MODEL ENERGY

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

JOB TITLE:

**NEW SOLAR PV SYSTEM**  
7.800 kW DC INPUT  
6.500 kW AC EXPORT  
  
Melissa G Nies  
101 Oakridge Ave,  
Spring Lake, NC 28390

CLIENT:



ISSUED FOR: DATE:  
CONSTRUCTION 9/05/22

PROJECT INFORMATION

**PV1.1**

SCOPE OF WORK

(20) CANADIAN SOLAR CS3N 390MS  
(20) ENPHASE IQ8M-72-2-US  
ROOF MOUNT: UNIRAC FLASHKIT PRO  
MOUNTING RAILS: UNIRAC LIGHT RAIL

SITE CONDITION

ASCE 7-10 WIND SPEED - 118 MPH  
EXPOSURE CATEGORY - B  
RISK CATEGORY - II

SHEET INDEX

PVI.1 - 1.2 PROJECT INFORMATION  
PV2.1 SITE INFORMATION  
PV3.1 - 3.2 STRUCTURAL INFORMATION  
PV4.1 ELECTRICAL INFORMATION  
PV5.1 - 5.5 LABELS, DETAILS & SPECS

INTERCONNECTIONS TYPE

LINE SIDE TAP

CODE REFERENCES

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

UTILITY COMPANY

SOUTH RIVER ELECTRIC COOP

LEGEND

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

NOTICE TO CONTRACTOR  
All construction must comply with current NC Building Codes and is subject to field inspection and verification.

APPROVED  
Limited building only review  
Permit holder responsible for full compliance with the code

09/14/2022

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## AURORA SOLAR SHADE ANALYSIS

MELISSA G NIES  
 101 OAKRIDGE AVE,  
 SPRING LAKE, NC 28390  
 7.800 KW DC STC  
 6.500 KW AC

### MODULES:

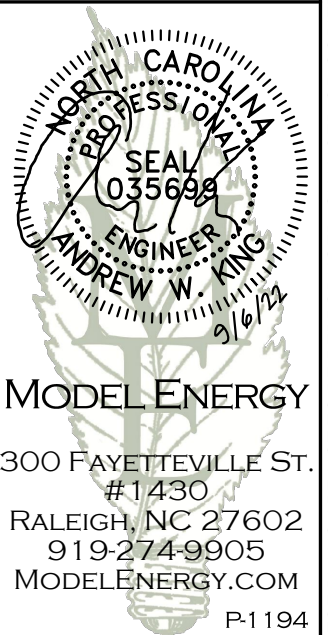
(20) CANADIAN SOLAR CS3N 390MS

### INVERTERS:

(20) ENPHASE IQ8M-72-2-US

THE SYSTEM HAS AN FIRST YEAR ANNUAL ENERGY PRODUCTION OF: 6.581 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.



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

JOB TITLE:

**NEW SOLAR PV SYSTEM**  
 7.800 KW DC INPUT  
 6.500 KW AC EXPORT  
**Melissa G Nies**  
 101 Oakridge Ave,  
 Spring Lake, NC 28390

CLIENT:

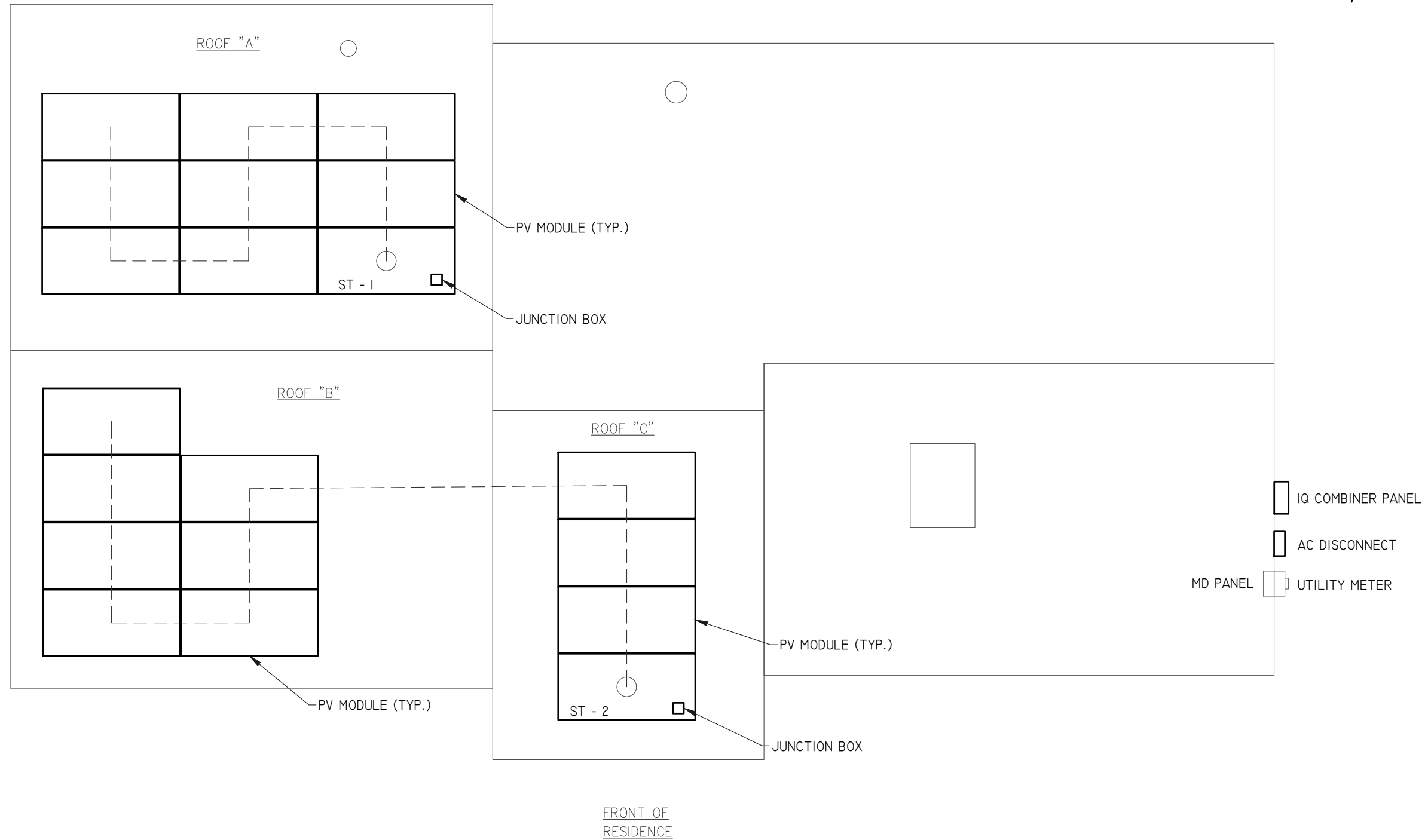
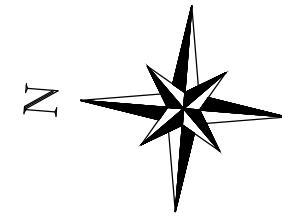


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CONSTRUCTION	9/05/22

SITE INFORMATION

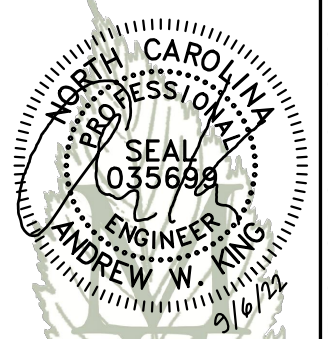
**PV1.2**

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

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

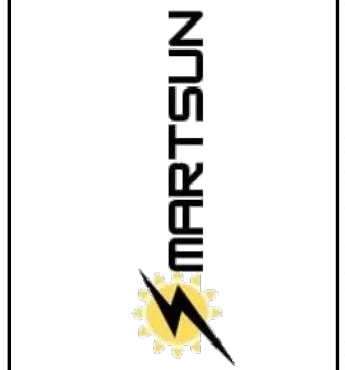


**MODEL ENERGY**  
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**Melissa G Nies**  
101 Oakridge Ave,  
Spring Lake, NC 28390

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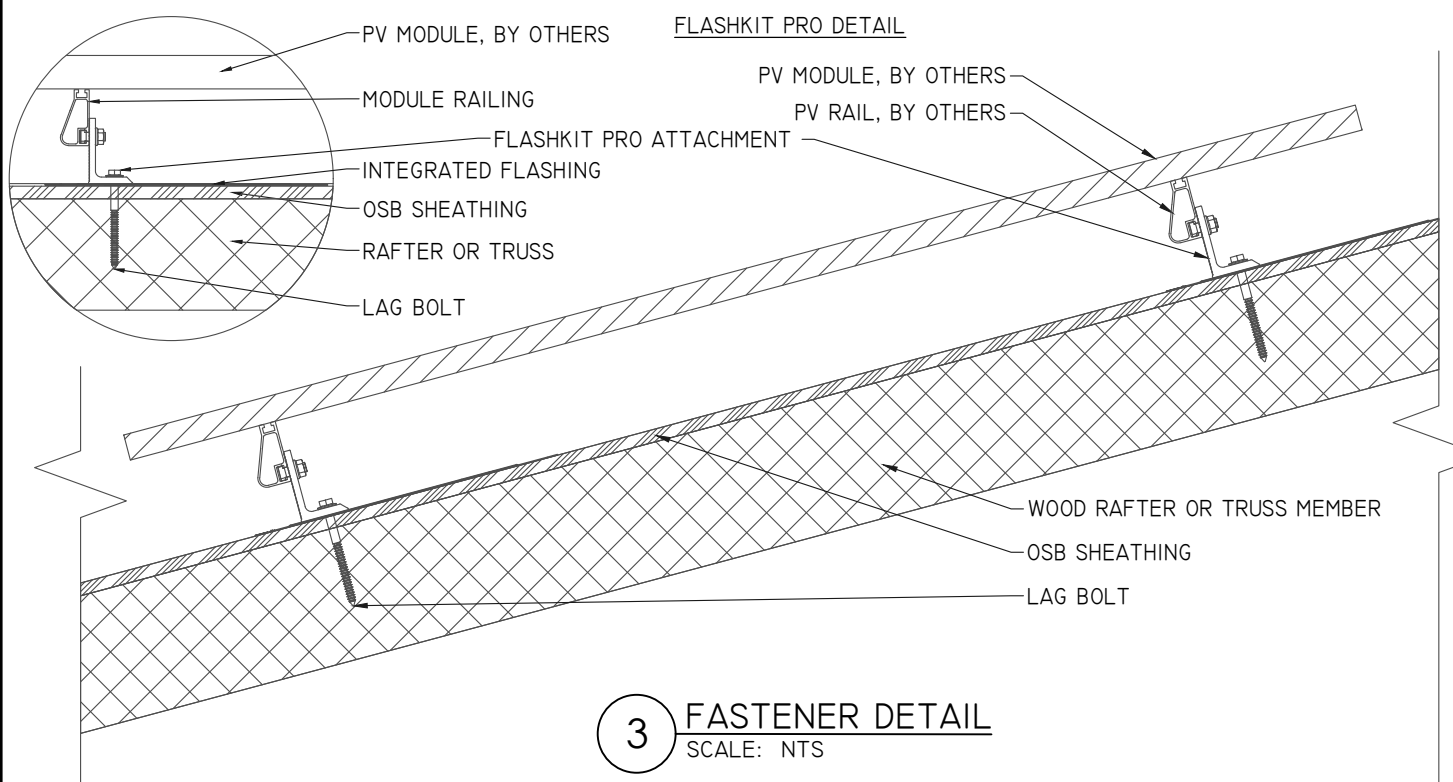


ISSUED FOR:	DATE:
CONSTRUCTION	9/05/22

SITE INFORMATION

**PV2.1**

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**3 FASTENER DETAIL**  
SCALE: NTS

PV MODULES	
MAKE	CAN. SOLAR
MODEL	CS3N-390MS
WIDTH	41.3"
LENGTH	76.4"
THICKNESS	1.4"
WEIGHT	50 LBS

ROOF "A & B" ZONES:		
ALL ZONES	MAX. RAIL OVERHANG =	16"
□ ZONE 1	MAX. FASTENER SPAN ZONE 1 =	72"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 =	48"
▩ ZONE 3	MAX. FASTENER SPAN ZONE 3 =	24"


ARRAY "B" SUMMARY	
# MODULES	7
# ROOF MOUNTS	27
RAIL LENGTH	97 FT.
ARRAY AREA	153 SQFT.
ARRAY WEIGHT	395 LBS.
AZIMUTH @ SN	274°
TILT ANGLE	27°

ARRAY "A" SUMMARY	
# MODULES	9
# ROOF MOUNTS	28
RAIL LENGTH	123 FT.
ARRAY AREA	197 SQFT.
ARRAY WEIGHT	506 LBS.
AZIMUTH @ SN	94°
TILT ANGLE	27°

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

**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

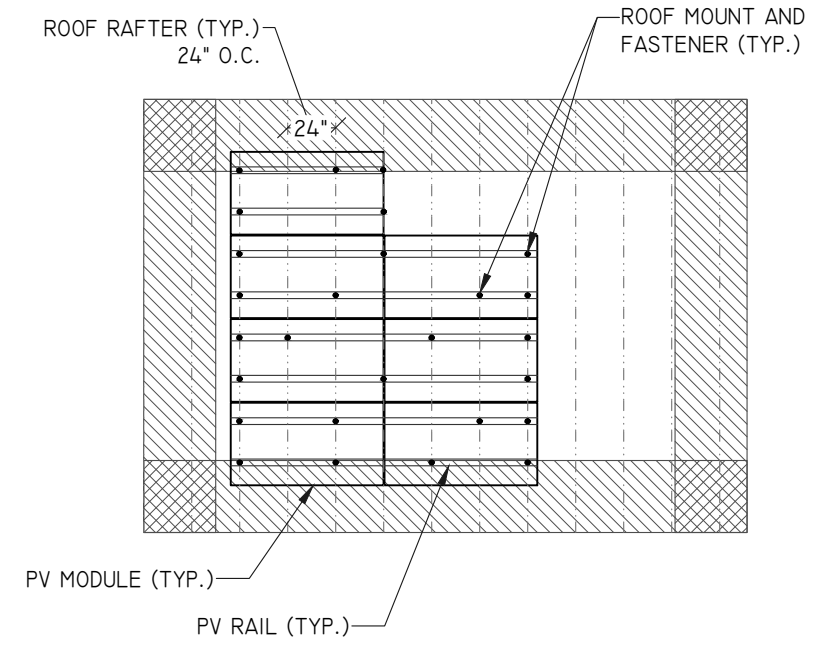
ROOF SUMMARY	
STRUCTURE:	
TYPE	TRUSS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 4"
SPACING	24"
EFF. SPAN	
ROOF "A"	16'-1"
ROOF "B"	16'-1"
PITCH	
ROOF "A"	6/12
ROOF "B"	6/12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

ROOF 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.

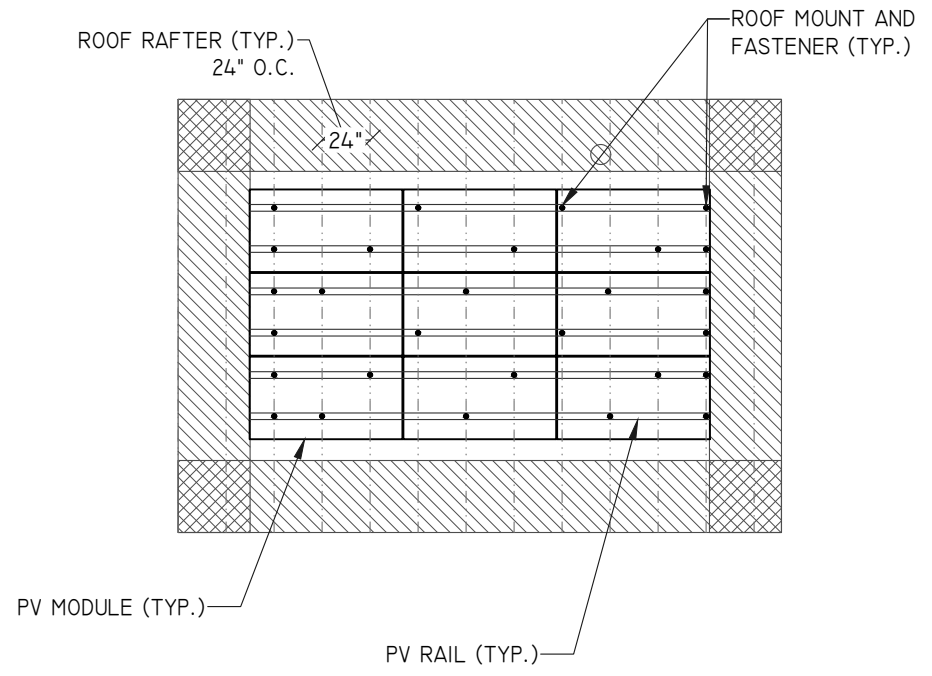
• LAG BOLT EMBEDDED WITH 2.5" OF THREAD IN WOOD RAFTER OR TRUSSES MEMBER

ROOF "B" LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	3.0 LBS./SQFT.
TOTAL	6.9 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	-254 LBS
UPLIFT ZONE 2	-200 LBS
UPLIFT ZONE 3	-100 LBS
DOWNWARD	237 LBS


ROOF "A" LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	3.0 LBS./SQFT.
TOTAL	6.9 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	-254 LBS
UPLIFT ZONE 2	-200 LBS
UPLIFT ZONE 3	-100 LBS
DOWNWARD	237 LBS




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



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

  
**MODEL ENERGY**  
 300 FAYETTEVILLE ST.  
 #1430  
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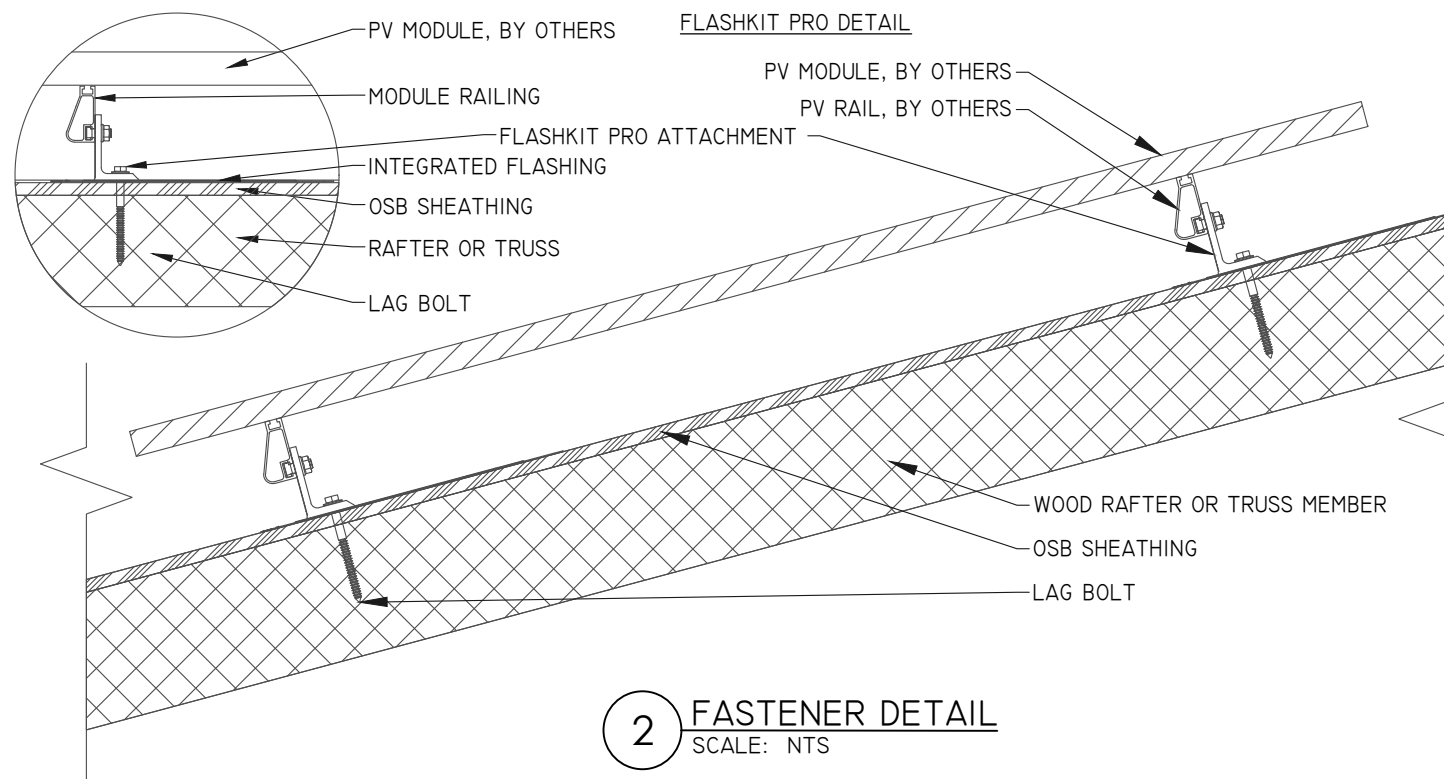
**NEW SOLAR PV SYSTEM**  
 7.800 kW DC INPUT  
 6.500 kW AC EXPORT  
  
**Melissa G Nies**  
 101 Oakridge Ave,  
 Spring Lake, NC 28390

  
 CLIENT:

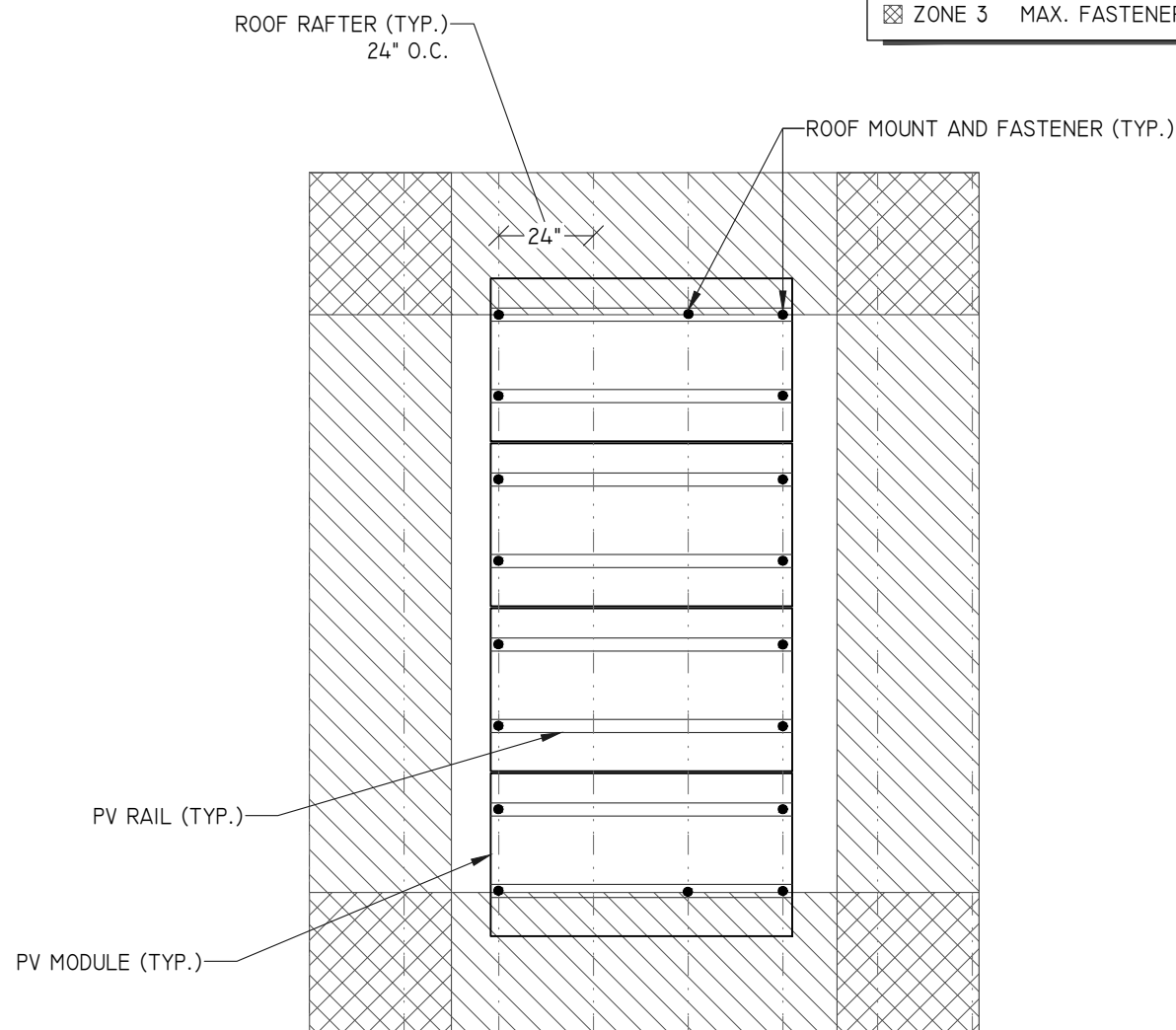
ISSUED FOR:	DATE:
CONSTRUCTION	9/05/22

STRUCTURAL INFORMATION  
**PV3.1**

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**2 FASTENER DETAIL**  
SCALE: NTS



**1 ROOF "C" PLANAR VIEW**  
SCALE: 1/4" = 1' -0"

ARRAY "C" SUMMARY	
# MODULES	4
# ROOF MOUNTS	18
RAIL LENGTH	59 FT.
ARRAY AREA	88 SQFT.
ARRAY WEIGHT	227 LBS.
AZIMUTH @ SN	274°
TILT ANGLE	27°


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

PV MODULES	
MAKE	CAN. SOLAR
MODEL	CS3N-390MS
WIDTH	41.3"
LENGTH	76.4"
THICKNESS	1.4"
WEIGHT	50 LBS

ROOF "C" ZONES:			
ALL ZONES	MAX. RAIL OVERHANG =		16"
□ ZONE 1	MAX. FASTENER SPAN ZONE 1 =		72"
▨ ZONE 2	MAX. FASTENER SPAN ZONE 2 =		48"
▩ ZONE 3	MAX. FASTENER SPAN ZONE 3 =		24"

**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 "C" LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	3.0 LBS./SQFT.
TOTAL	6.9 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	-254 LBS
UPLIFT ZONE 2	-200 LBS
UPLIFT ZONE 3	-100 LBS
DOWNWARD	237 LBS

ROOF "C" SUMMARY	
STRUCTURE:	
TYPE	TRUSS
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 4"
SPACING	24"
EFF. SPAN	16'-3"
PITCH	6/12
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.



**MODEL ENERGY**

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

JOB TITLE:

**NEW SOLAR PV SYSTEM**  
 7.800 kW DC INPUT  
 6.500 kW AC EXPORT

**Melissa G Nies**  
 101 Oakridge Ave,  
 Spring Lake, NC 28390

CLIENT:



ISSUED FOR: DATE:  
 CONSTRUCTION 9/05/22

STRUCTURAL INFORMATION

**PV3.2**

PV MODULES	
MAKE	CAN. SOLAR
MODEL	CS3N-390MS
TECHNOLOGY	MONO-CRYST.
NOM. POWER (P <sub>nom</sub> )	390 WATTS
NOM. VOLT. (V <sub>mp</sub> )	36.8 VOLTS
O.C. VOLT. (V <sub>oc</sub> )	44.1 VOLTS
MAX. SYS. VOLT.	1000 V (UL)
TEMP. COEF. (V <sub>tc</sub> )	-0.27 %/°C
NOM. CURR. (I <sub>mp</sub> )	10.6 AMPS
S.C. CURR. (I <sub>sc</sub> )	11.38 AMPS
MAX. SERIES FUSE	20 AMPS

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

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

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

- NOTES:
- MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
  - CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
  - EXISTING CONDUCTORS, FIELD VERIFY
  - EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR
  - PVC, EMT, ROMEX, LFNMC & FMC ARE ACCEPTABLE WHEN USED IN ACCORDANCE WITH ARTICLES 330, 334, 348, 350, 352, 356, & 358 OF THE 2017 NEC
  - SERVICE CONDUCTORS SHALL NOT TRAVEL MORE THAN 5' INSIDE OF THE BUILDING AND MORE THAN 10' IN TOTAL.

IQ COMBINER PANEL (NEW)	
MAKE	ENPHASE
MODEL	X-IQ-AMI-240-4
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

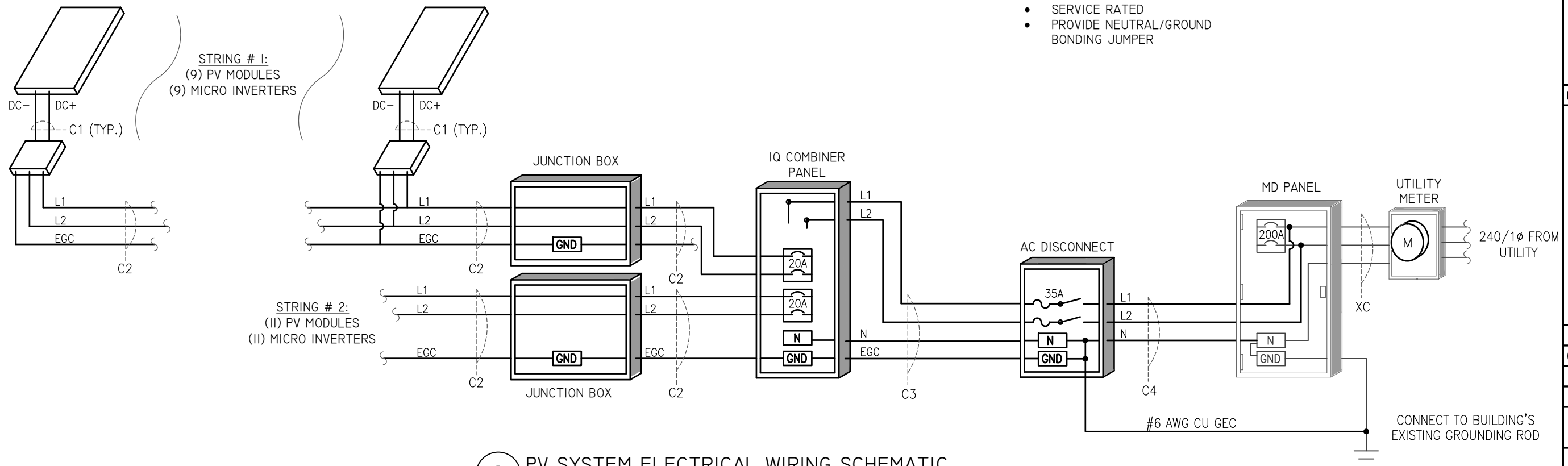
- NOTES:
- BACK-FEED INVERTER OUTPUT VIA (2) 20A BREAKERS AT THE OPPOSITE END OF THE BUS BAR FROM MAIN BREAKER.
  - PROVIDE "FED BY MULTIPLE POWER SOURCES" LABEL.

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	35 AMPS

- 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
  - SERVICE RATED
  - PROVIDE NEUTRAL/GROUND BONDING JUMPER

MD PANEL (EXISTING)	
MAKE	N/A
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	YES
BREAKER RATING	200 AMPS

- NOTES:
- BACK-FEED SOLAR OUTPUT VIA SUPPLY SIDE TAP INSIDE OF MD PANEL



1 PV SYSTEM ELECTRICAL WIRING SCHEMATIC  
SCALE: NTS

**MODEL ENERGY**  
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**Melissa G Nies**  
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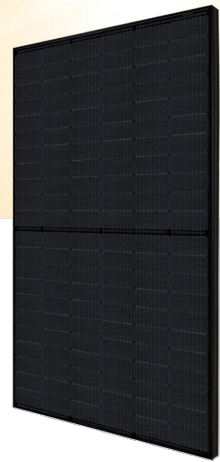
**MARTSUN**

ISSUED FOR:	DATE:
CONSTRUCTION	9/05/22

ELECTRICAL INFORMATION

**PV4.1**

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# HiKu Mono PERC (All-Black)

380 W ~ 400 W

CS3N-380 | 385 | 390 | 395 | 400MS

### MORE POWER

**425 W** Module power up to 400 W  
Module efficiency up to 19.7%

**\$** Lower LCOE & BOS cost

**Bar Chart** Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation

**+** Better shading tolerance

### MORE RELIABLE

**Shield** Minimizes micro-crack impacts

**Snow** Heavy snow load up to 5400 Pa, enhanced wind load up to 2400 Pa\*

**12 Years** Enhanced Product Warranty on Materials and Workmanship\*

**25 Years** Linear Power Performance Warranty\*

1<sup>st</sup> year power degradation no more than 2%  
Subsequent annual power degradation no more than 0.55%

\*According to the applicable Canadian Solar Limited Warranty Statement.

### MANAGEMENT SYSTEM CERTIFICATES\*

ISO 9001: 2015 / Quality management system  
ISO 14001: 2015 / Standards for environmental management system  
ISO 45001: 2018 / International standards for occupational health & safety

### PRODUCT CERTIFICATES\*

IEC 61215 / IEC 61730 / CE  
PSEC (US Florida)  
UL 61730 / IEC 61701 / IEC 62716  
UN1 9177 Reaction to Fire: Class 1 / Take-e-way



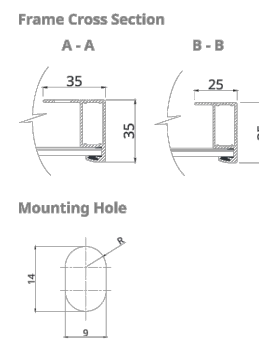
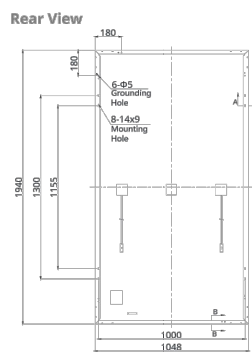
\* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

Canadian Solar (USA) Inc. is committed to providing high quality solar products, solar system solutions and services to customers around the world. Canadian Solar was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey, and is a leading PV project developer and manufacturer of solar modules, with over 52 GW deployed around the world since 2001.

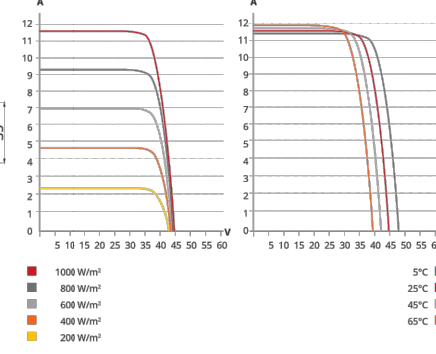
\* For detailed information, please refer to the Installation Manual.

Canadian Solar (USA) Inc.  
3000 Oak Road, Suite 400, Walnut Creek, CA 94597, USA, www.csisolar.com/na, service.ca@csisolar.com

### ENGINEERING DRAWING (mm)



### CS3N-400MS / I-V CURVES



### ELECTRICAL DATA | STC\*

CS3N	380MS	385MS	390MS	395MS	400MS
Nominal Max. Power (Pmax)	380 W	385 W	390 W	395 W	400 W
Opt. Operating Voltage (Vmp)	36.4 V	36.6 V	36.8 V	37.0 V	37.2 V
Opt. Operating Current (Imp)	10.44 A	10.52 A	10.60 A	10.68 A	10.76 A
Open Circuit Voltage (Voc)	43.7 V	43.9 V	44.1 V	44.3 V	44.5 V
Short Circuit Current (Isc)	11.26 A	11.32 A	11.38 A	11.44 A	11.50 A
Module Efficiency	18.7%	18.9%	19.2%	19.4%	19.7%
Operating Temperature	-40°C ~ +85°C				
Max. System Voltage	1000V (IEC/UL)				

Module Fire Performance	TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)
Max. Series Fuse Rating	20 A
Application Classification	Class A
Power Tolerance	0 ~ + 10 W

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C.

### ELECTRICAL DATA | NMOT\*

CS3N	380MS	385MS	390MS	395MS	400MS
Nominal Max. Power (Pmax)	283 W	287 W	291 W	295 W	298 W
Opt. Operating Voltage (Vmp)	33.9 V	34.1 V	34.3 V	34.5 V	34.7 V
Opt. Operating Current (Imp)	8.36 A	8.42 A	8.49 A	8.56 A	8.6 A
Open Circuit Voltage (Voc)	41.1 V	41.3 V	41.5 V	41.7 V	41.9 V
Short Circuit Current (Isc)	9.08 A	9.13 A	9.18 A	9.23 A	9.28 A

\* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

### MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	132 [2 X (11 X 6)]
Dimensions	1940 X 1048 X 35 mm (76.4 X 41.3 X 1.38 in)
Weight	22.5 kg (49.6 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4 mm <sup>2</sup> (IEC), 12 AWG (UL)
Cable Length (Including Connector)	Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-); landscape: 1250 mm (49.2 in)*
Connector	T4 series or MC4
Per Pallet	30 pieces
Per Container (40' HQ)	720 pieces

\* For detailed information, please contact your local Canadian Solar sales and technical representatives.

### TEMPERATURE CHARACTERISTICS

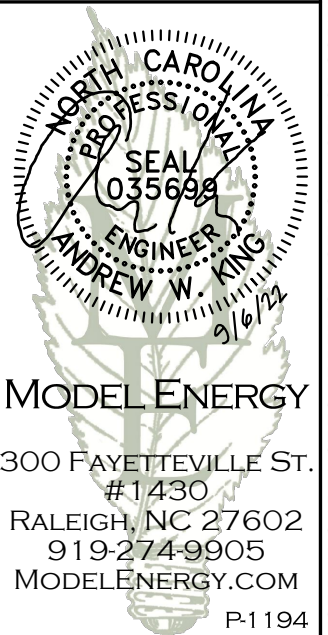
Specification	Data
Temperature Coefficient (Pmax)	-0.35 % / °C
Temperature Coefficient (Voc)	-0.27 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

### PARTNER SECTION



\* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

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## MODEL ENERGY

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

### JOB TITLE:

**NEW SOLAR PV SYSTEM**  
7.800 kW DC INPUT  
6.500 kW AC EXPORT  
  
**Melissa G Nies**  
101 Oakridge Ave,  
Spring Lake, NC 28390

### CLIENT:



ISSUED FOR: CONSTRUCTION  
DATE: 9/05/22

LABELS, DETAILS & SPECS

# PV5.1

**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.

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

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

**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

**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.

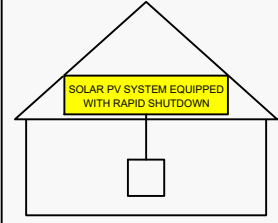
**PHOTOVOLTAIC POWER SOURCE**

OPERATING AC VOLT. 240 VAC  
  
MAXIMUM OPERATING AC OUTPUT CURRENT 27 AMPS

NEC 690.54  
PLACE ON INTERCONNECTION DISCONNECTING MEANS

**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

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DATA SHEET



## IQ8 Series Microinverters

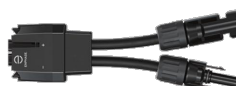
Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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IQ8SE-DS-0001-01-EN-US-2021-10-19

### Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

### High productivity and reliability

- Produce power even when the grid is down
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

### Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

## IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US <sup>1</sup>	
Commonly used module pairings <sup>2</sup>	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+	
Module compatibility		60-cell/120 half-cell		60-cell/120 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45	
Operating range	V	25 – 48		25 – 58				
Min/max start voltage	V	30 / 48		30 / 58				
Max input DC voltage	V	50		60				
Max DC current <sup>3</sup> [module Isc]	A			15				
Overtoltage class DC port				II				
DC port backfeed current	mA			0				
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit						
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US	
Peak output power	VA	245	300	330	366	384	366	
Max continuous output power	VA	240	290	325	349	380	360	
Nominal (L-L) voltage/range <sup>4</sup>	V	240 / 211 – 264					208 / 183 – 250	
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73	
Nominal frequency	Hz	60						
Extended frequency range	Hz	50 – 68						
Max units per 20 A (L-L) branch circuit <sup>5</sup>		16	13	11	11	10	9	
Total harmonic distortion		<5%						
Overtoltage class AC port		III						
AC port backfeed current	mA	30						
Power factor setting		1.0						
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging						
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4	
CEC weighted efficiency	%	97	97	97	97.5	97	97	
Night-time power consumption	mW	60						
MECHANICAL DATA								
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)						
Relative humidity range		4% to 100% (condensing)						
DC Connector type		MC4						
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")						
Weight		1.08 kg (2.38 lbs)						
Cooling		Natural convection – no fans						
Approved for wet locations		Yes						
Acoustic noise at 1 m		<60 dBA						
Pollution degree		PD3						
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure						
Environ. category / UV exposure rating		NEMA Type 6 / outdoor						
COMPLIANCE								
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01						
		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.						

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2021-10-19



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7.800 kW DC INPUT  
6.500 kW AC EXPORT

**Melissa G Nies**  
101 Oakridge Ave,  
Spring Lake, NC 28390

CLIENT:



ISSUED FOR: CONSTRUCTION DATE: 9/05/22

EQUIPMENT SPEC SHEETS

# PV5.2

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# Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4  
X-IQ-AM1-240-4C



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

### Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

### Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

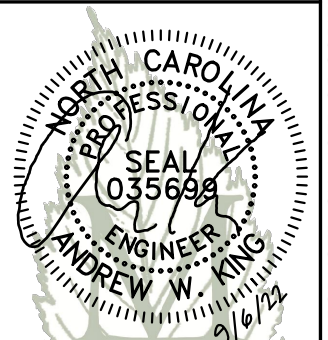


## Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"> <li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li> <li>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors</li> <li>• Main lug combined output: 10 to 2/0 AWG copper conductors</li> <li>• Neutral and ground: 14 to 1/0 copper conductors</li> </ul> Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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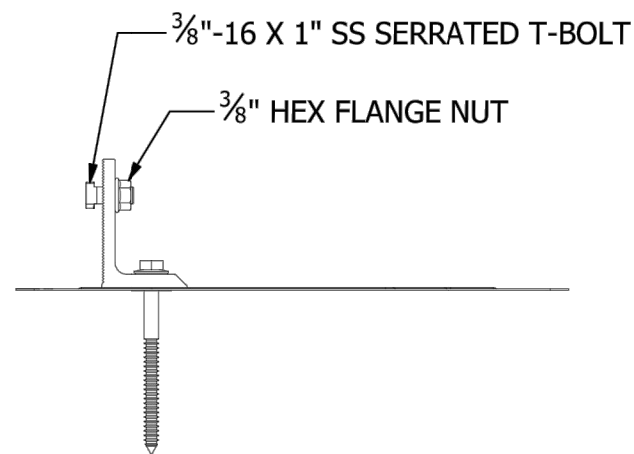
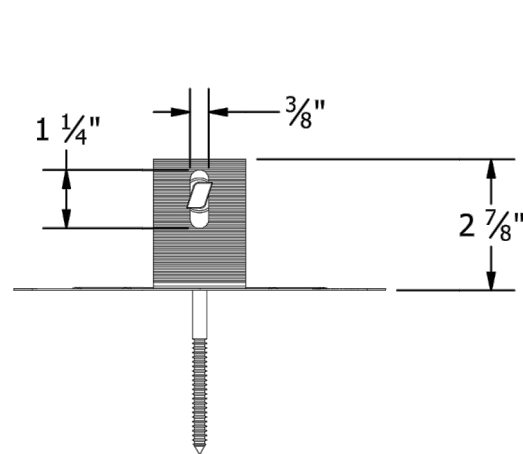
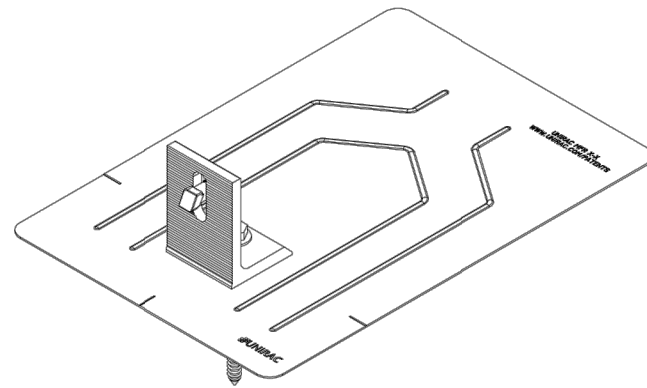
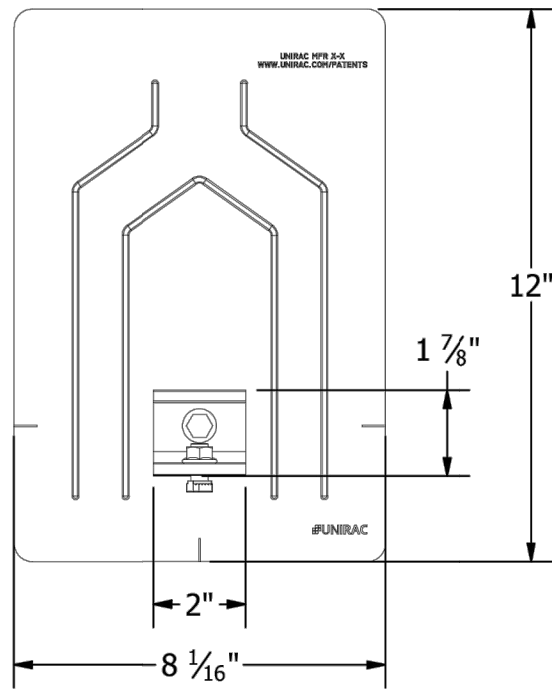
EQUIPMENT SPEC SHEETS

# PV5.3

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NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. PACKAGING: KITS OF 10



PART # TABLE	
P/N	DESCRIPTION
004055M	FLASHKIT PRO MILL
004055D	FLASHKIT PRO DRK



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

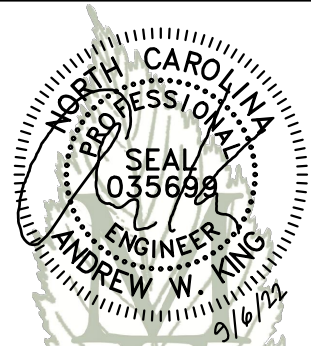
PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	KIT DETAIL
DESCRIPTION:	FLASHKIT PRO
REVISION DATE:	9/24/2018

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

**SM-A03**

SHEET



MODEL ENERGY

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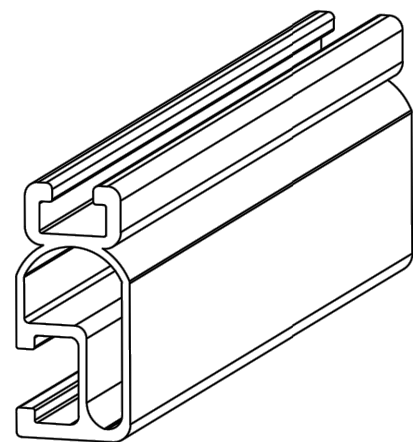
CLIENT:



ISSUED FOR:	DATE:
CONSTRUCTION	9/05/22

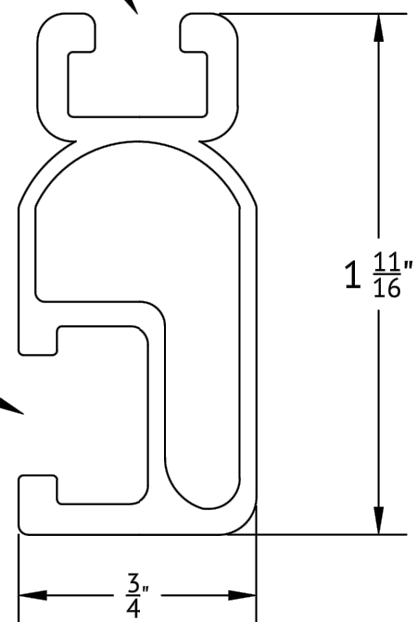
EQUIPMENT  
SPEC SHEETS

**PV5.4**



1/4" BOLT LOCATION

3/8" BOLT LOCATION



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

<b>PRODUCT LINE:</b>	SOLARMOUNT
<b>DRAWING TYPE:</b>	PART DETAIL
<b>DESCRIPTION:</b>	LIGHT RAIL
<b>REVISION DATE:</b>	APRIL 2016

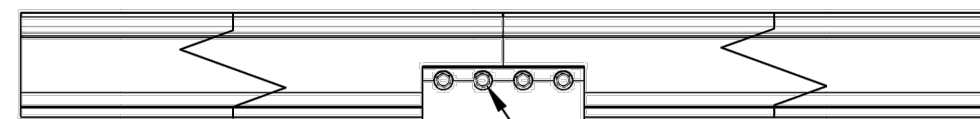
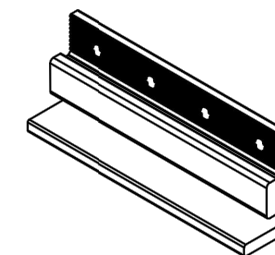
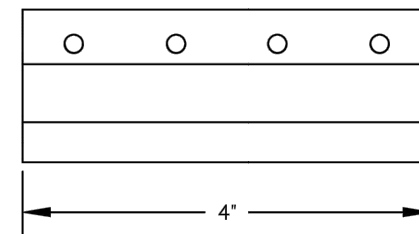
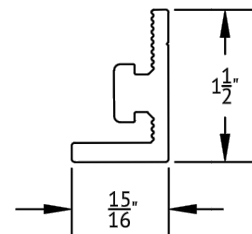
DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE  
 OR MORE US PATENTS

**LEGAL NOTICE**

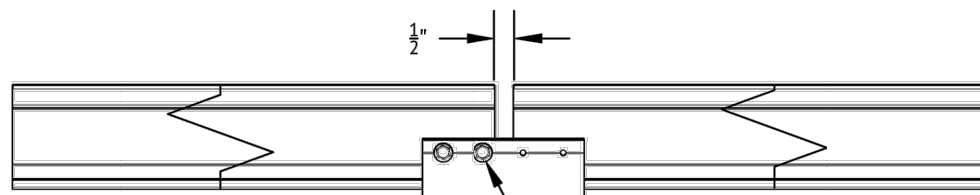
**SM-P02**  
 SHEET

**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

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

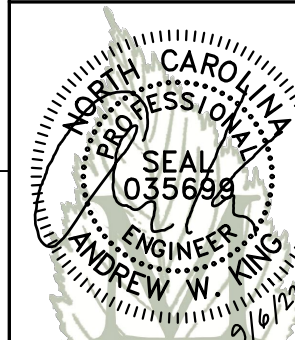
<b>PRODUCT LINE:</b>	SOLARMOUNT
<b>DRAWING TYPE:</b>	PART & ASSEMBLY
<b>DESCRIPTION:</b>	BONDING SPLICE BAR
<b>REVISION DATE:</b>	APRIL 2016

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE  
 US PATENTS

**LEGAL NOTICE**

**SM-A01**  
 SHEET



**MODEL ENERGY**

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

JOB TITLE:

**NEW SOLAR PV SYSTEM**  
 7.800 kW DC INPUT  
 6.500 kW AC EXPORT

**Melissa G Nies**  
 101 Oakridge Ave,  
 Spring Lake, NC 28390

CLIENT:

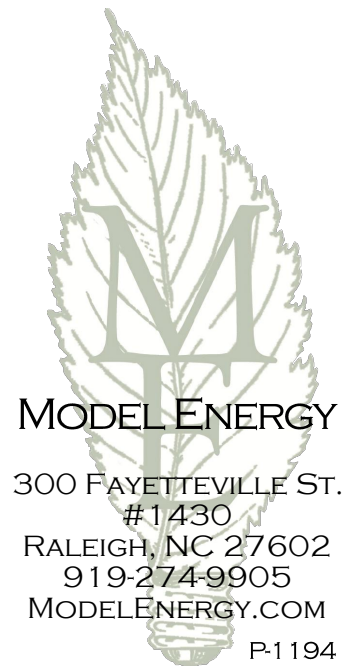


ISSUED FOR: CONSTRUCTION  
 DATE: 9/05/22

EQUIPMENT  
 SPEC SHEETS

**PV5.5**

Customer: Melissa G Nies  
Installer: SmartSun  
Subject: PV System Structural Compliance  
Date: 9/05/22



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 Energy at 101 Oakridge Ave, Spring Lake, NC 28390. 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

