WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

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Scott Wyssling, PE

December 19, 2022

Parker Schram
365 Solar
3524 Bost Street
Charlotte, NC 28208

Re: Engineering Services
Umlauf Residence
4864 Christian Light Road, Fuquay Varina, NC
7.900 kW System

To Whom It May Concern:

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

A. Site Assessment Information

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

B. Description of Structure:

Roof Framing:	Prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber.
Roof Material:	Composite Asphalt Shingles
Roof Slope:	30 degrees
Attic Access:	Accessible
Foundation:	Permanent

C. Loading Criteria Used

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 15 psf
- **Wind Load** based on ASCE 7-10
  - Ultimate Wind Speed = 117 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 North Carolina Residential Code (2018), 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 Pegasus Solar 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 235 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 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 centers.
4. Panel supports connections shall be staggered to distribute load to adjacent framing members.

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 North Carolina Residential Code (2018) 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.

Very truly yours,

Scott E. Wyssling, PE
North Carolina License No. 46546

Wyssling Consulting, PLLC
76 N Meadowbrook Drive
Alpine UT 84004 COA # P-2308

PROJECT DESCRIPTION:

20 x MISSION SOLAR: MSE395SX9R 395W MONO MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 7.900kW DC
AC SYSTEM SIZE: 7.600kW AC
AC SYSTEM SIZE D-RATED FOR CEC WEIGHTED EFFICIENCY: 7.600kW X 0.97 =7.372kW AC

EQUIPMENT SUMMARY
20 MISSION SOLAR: MSE395SX9R 395W MODULES
20 GENERAC SNAPRS802
03 GENERAC PV LINK S2502 POWER OPTIMIZERS
01 GENERAC PWRCELL: XVT076A03 7600W INVERTER
01 GENERAC PWRCELL 9kW (18kWh) BATTERY

ROOF ARRAY AREA #1:- 432.80 SQ FT.

AUTHORITIES HAVING JURISDICTION
BUILDING: HARNETT COUNTY
ZONING: HARNETT COUNTY
UTILITY: DUKE ENERGY

NORTH CAROLINA PROFESSIONAL SEAL 040546 ENGINEER SCOTT E. WYSSLING

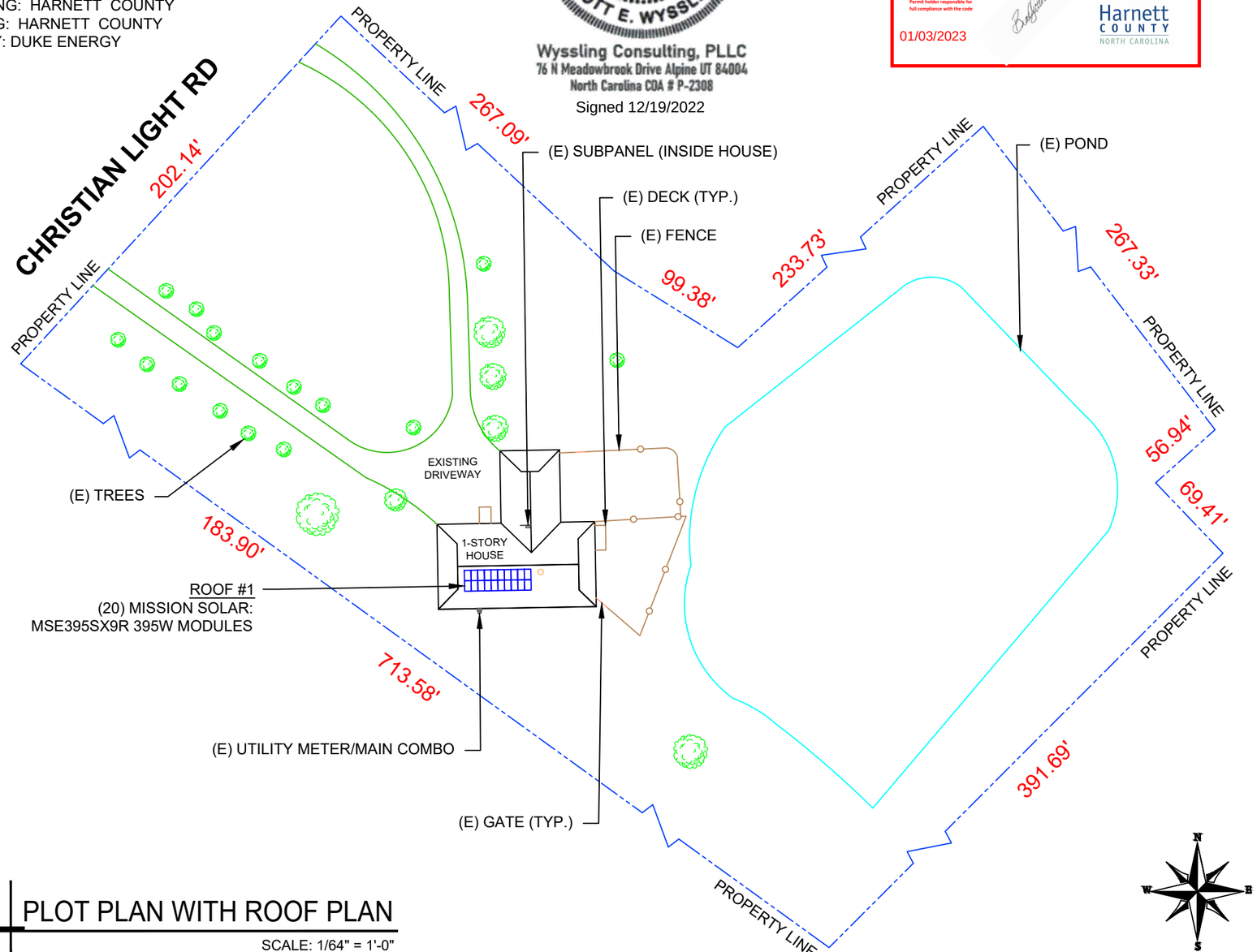
Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 12/19/2022

APPLICABLE CODES & STANDARDS
NCBC 2018
NEC 2017

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

- IFC SETBACKS ARE REQUIRED TO BE DISCUSSED WITH THE AHJ PRIOR TO CONSTRUCTION

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
01/03/2023
Harnett COUNTY NORTH CAROLINA



1 PLOT PLAN WITH ROOF PLAN
PV-1 SCALE: 1/64" = 1'-0"

2 HOUSE PHOTO
PV-1 SCALE: NTS

3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

365Solar Energy

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	12/16/2022	

SIGNATURE WITH SEAL

DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

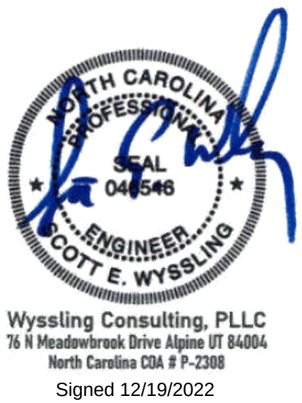
SHEET NAME
PLOT PLAN & VICINITY MAP

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 20 MODULES
MODULE TYPE = MISSION SOLAR: MSE395SX9R 395W MODULES
MODULE WEIGHT = 48.50 LBS / 22.0KG.
MODULE DIMENSIONS = 75.10"x 41.50" = 21.64 SF



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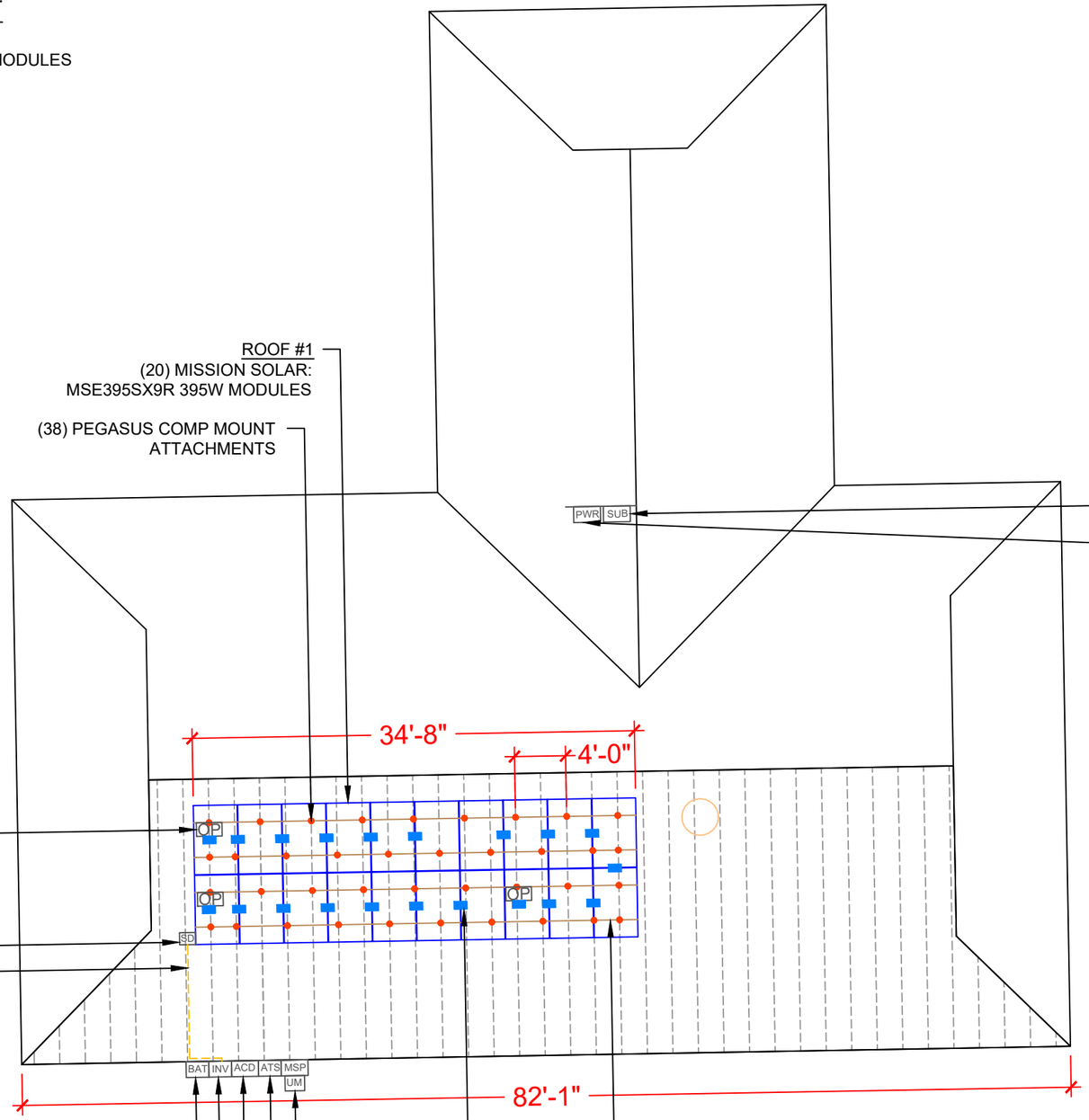
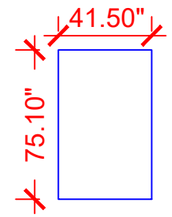


ROOF DESCRIPTION				
ROOF TYPE			COMPOSITE SHINGLE	
ROOF LAYER			1 LAYER	
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	30°	179°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	20	432.80	910.04	48



MISSION SOLAR:
MSE395SX9R
395W MODULES

LEGEND

ATS	- AUTOMATIC TRANSFER SWITCH	SD	- SOLADECK
BAT	- BATTERY	OP	- PV LINK -S2502
INV	- INVERTER		- SNAPRS802
ACD	- AC DISCONNECT		- VENT, ATTIC FAN (ROOF OBSTRUCTION)
MSP	- MAIN SERVICE PANEL		
	- CONDUIT		- ROOF ATTACHMENT
	- TRUSS		

CUSTOMER APPROVAL

SIGNATURE:- DATE:-

1 ROOF PLAN & MODULES

PV-2 SCALE: 3/32" = 1'-0"

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REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	12/16/2022	

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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

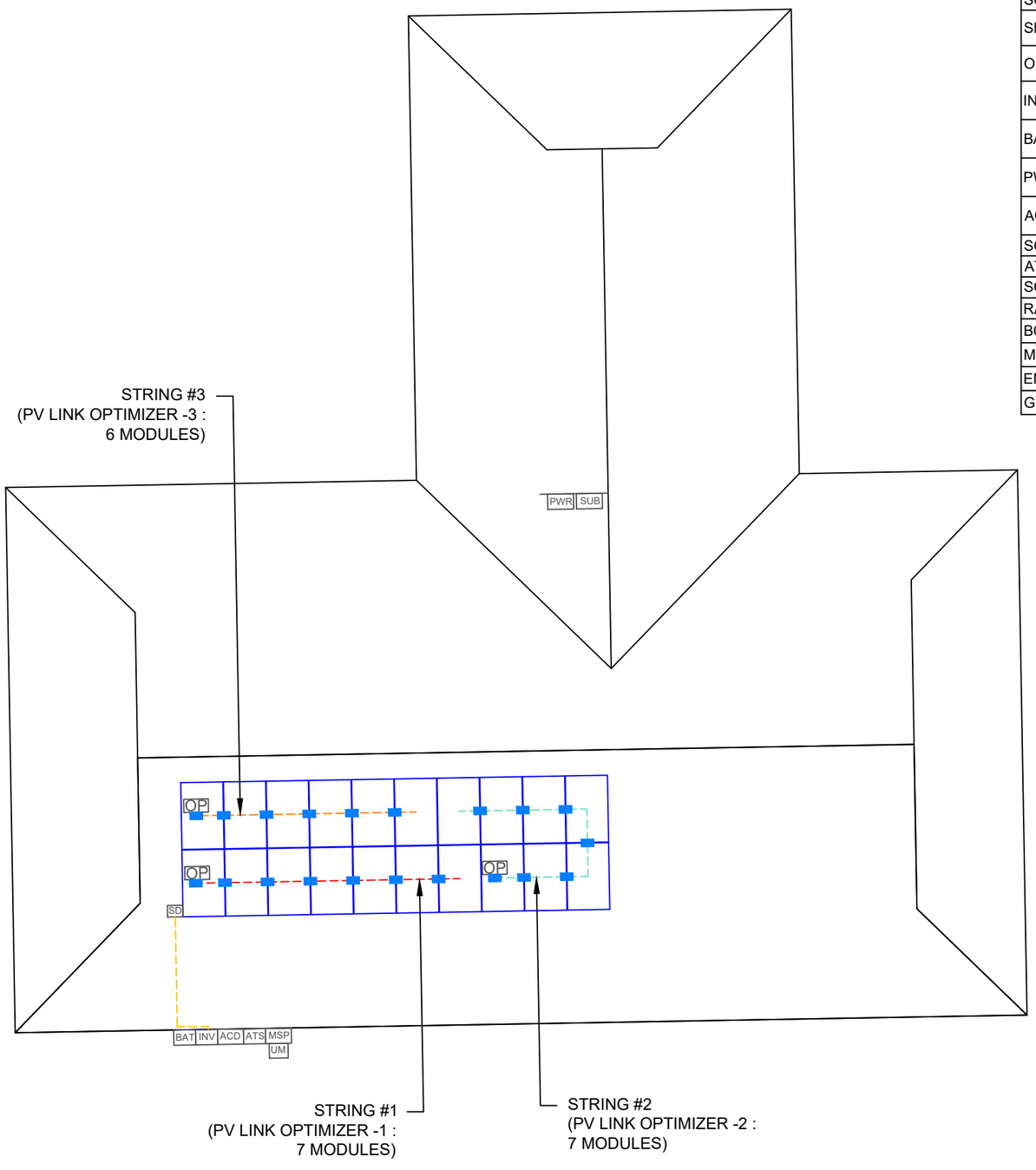
DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

STRING LEGENDS
STRING #1
STRING #2
STRING #3



BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	20	MISSION SOLAR: MSE395SX9R 395W MODULES
SNAPRS	20	GENERAC SNAPRS802
OPTIMIZER	3	GENERAC PV LINK S2502 POWER OPTIMIZERS
INVERTER	1	GENERAC PWRCELL: XVT076A03 7600W INVERTER
BATTERY	1	GENERAC PWRCELL 9kW (18kWh) BATTERY
PWR MANAGER	1	GENERAC PWR MANAGER #G0080090
AC DISCONNECT	1	60A FUSED AC DISCONNECT, (2) 40A FUSES, 240V NEMA 3R, UL LISTED
SOLADECK	1	SOLADECK 600V,NEMA 3R, UL LISTED
ATTACHMENT	38	PEGASUS COMP MOUNT ATTACHMENT
SQUARE-BOLT	38	SQUARE-BOLT BONDING ATTACHMENT HARDWARE
RAILS	10	PEGASUS RAIL (14 FEET) SILVER
BONDED SPLICE	8	SPLICE KIT
MODULE CLAMPS	36	UNIVERSAL MODULE CLAMPS
END CLAMPS	8	END CLAMPS / STOPPER SLEEVE
GROUNDING LUG	2	PEGASUS GROUNDING LUG

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SIGNATURE WITH SEAL

DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF
RESIDENCE

4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

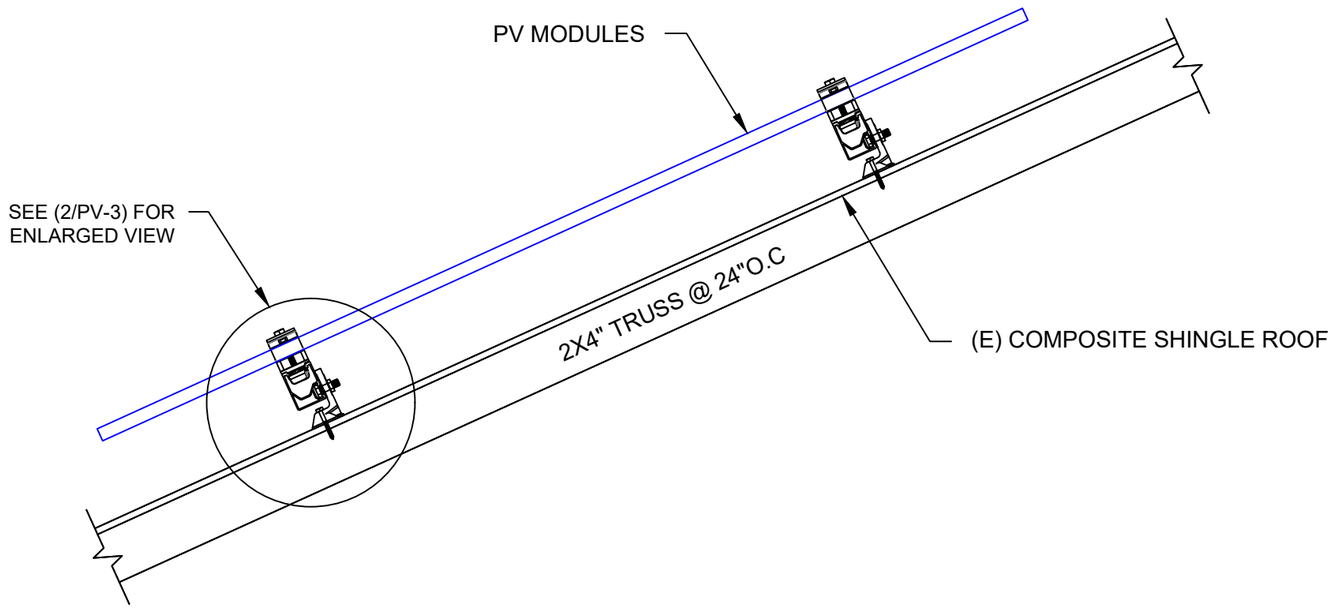
SHEET NAME
STRING LAYOUT

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2A

1 ROOF PLAN WITH STRING LAYOUT

PV-2A SCALE: 3/32" = 1'-0"

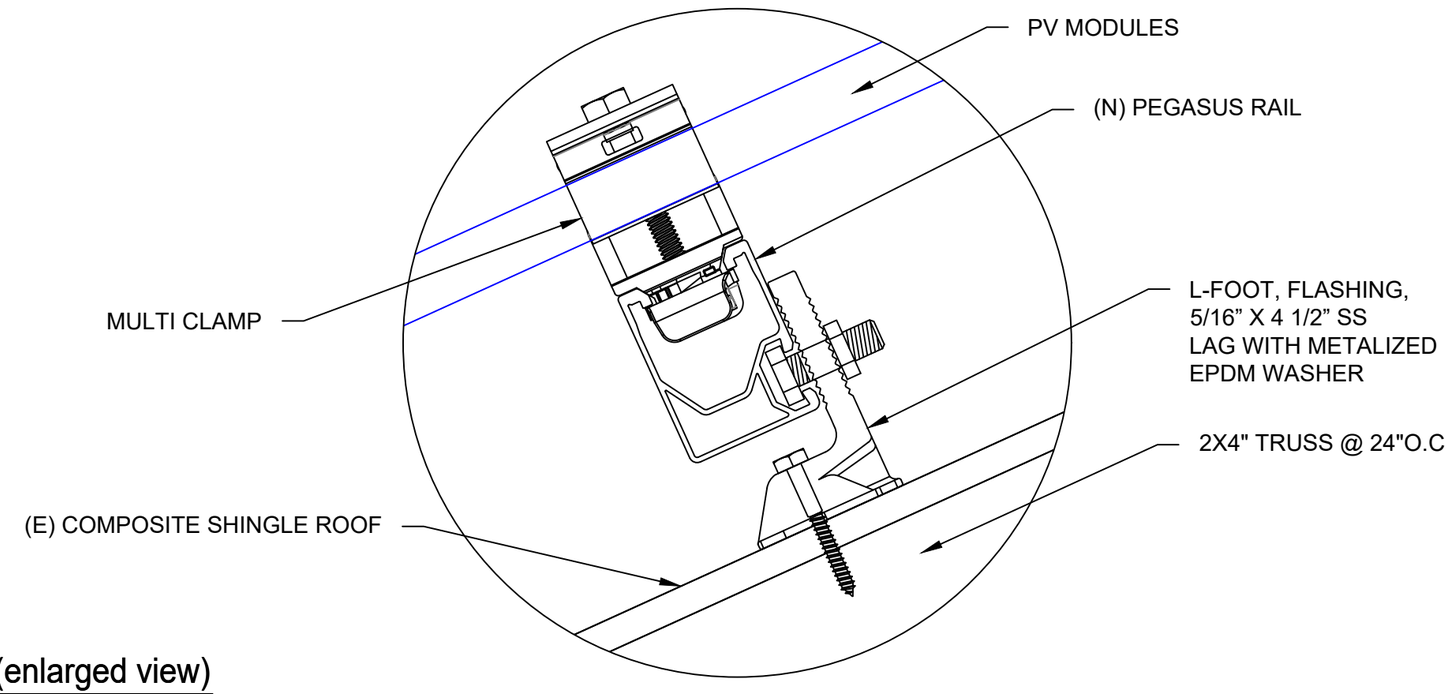


1 ATTACHMENT DETAIL

PV-3 SCALE: NTS

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 12/19/2022



2 ATTACHMENT DETAIL (enlarged view)

PV-3 SCALE: NTS

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REVISIONS

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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

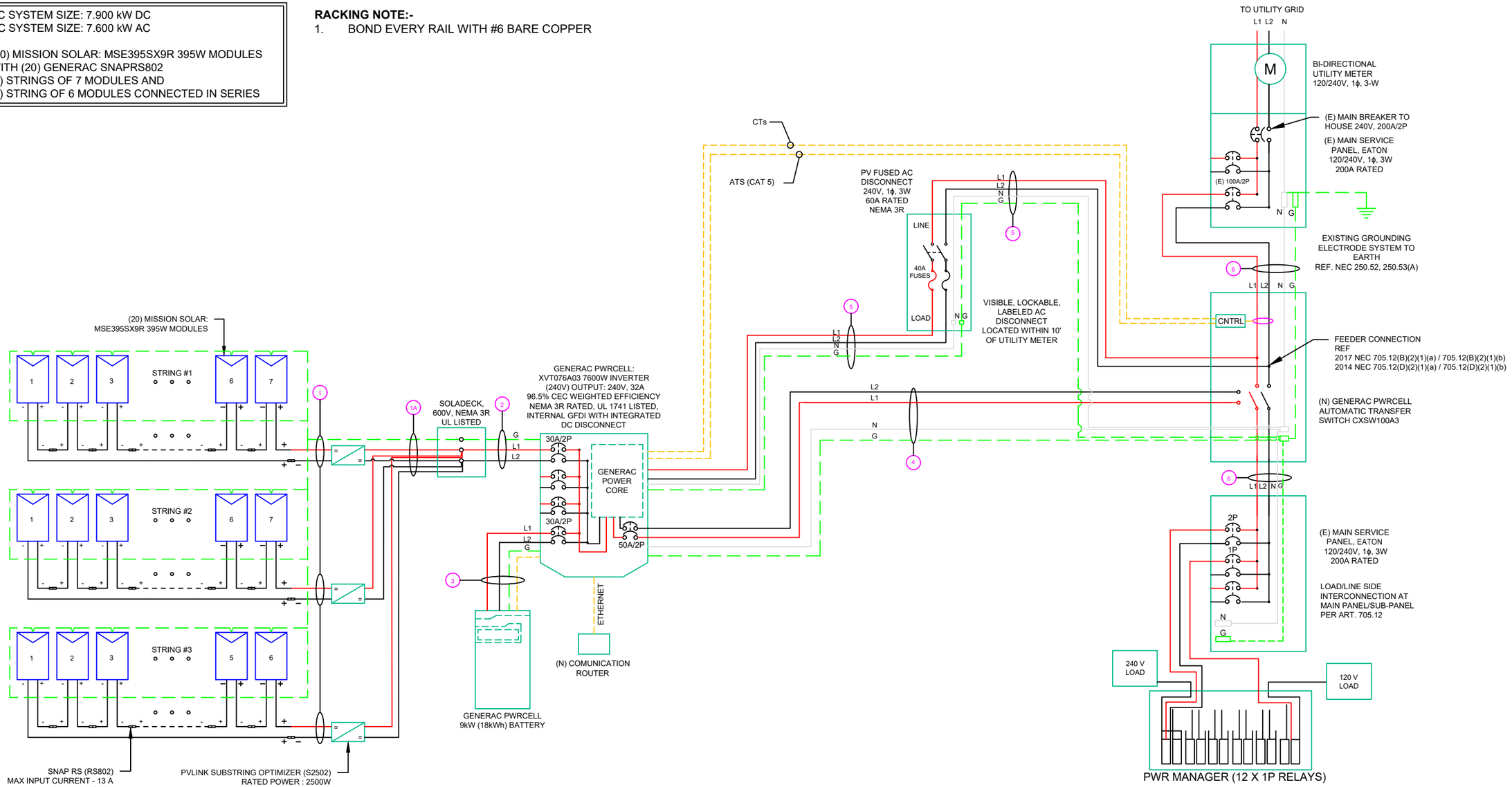
SHEET NUMBER
PV-3

DC SYSTEM SIZE: 7.900 kW DC
AC SYSTEM SIZE: 7.600 kW AC

(20) MISSION SOLAR: MSE395SX9R 395W MODULES
WITH (20) GENERAC SNAPRS802
(2) STRINGS OF 7 MODULES AND
(1) STRING OF 6 MODULES CONNECTED IN SERIES

RACKING NOTE:-

1. BOND EVERY RAIL WITH #6 BARE COPPER



SERVICE INFO	
UTILITY PROVIDER:	**DUKE ENERGY**
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	EATON
MAIN SERVICE PANEL:	200A
MAIN STRING BREAKER RATING:	200A
MAIN SERVICE LOCATION:	SOUTH
SERVICE FEED SOURCE:	UNDERGROUND

	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(6)	CU#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	CU#6AWG -	BARE COPPER IN FREE AIR		
1A	(6)	CU#10AWG -	PV WIRE/USE-2	N/A	N/A
	(1)	CU#6AWG -	BARE COPPER IN FREE AIR		
2	(2)	CU#10AWG -	THHN (L1,L2)	EMT OR LFMC IN ATTIC	3/4"
	(1)	CU#10AWG -	THHN GND		
3	(2)	CU#10AWG -	THHN (L1,L2)	EMT OR LFMC	3/4"
	(1)	CU#10AWG -	THHN GND		
4	(2)	CU#6AWG -	THHN (L1,L2)	EMT OR LFMC	3/4"
	(1)	CU#6AWG -	THHN NEUTRAL		
	(1)	CU#6AWG -	THHN GND		
5	(2)	CU#6AWG -	THHN (L1,L2)	EMT OR LFMC	3/4"
	(1)	CU#6AWG -	THHN NEUTRAL		
	(1)	CU#6AWG -	THHN GND		
6	(2)	CU#4AWG -	THHN (L1,L2)	EMT OR LFMC	1"
	(1)	CU#6AWG -	THHN NEUTRAL		
	(1)	CU#8AWG -	THHN GND		

CUSTOMER APPROVAL

SIGNATURE:- DATE:-

1 ELECTRICAL LINE DIAGRAM

PV-4 SCALE: NTS

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REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	12/16/2022	

SIGNATURE WITH SEAL

DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	MISSION SOLAR: MSE395SX9R 395W MODULES
VMP	36.68V
IMP	10.63A
VOC	45.18V
ISC	11.24A
TEMP. COEFF. VOC	-0.259%/°C
MODULE DIMENSION	75.10"L x 41.50"W x 1.60"D (In Inch)

POWER OPTIMIZER (GENERAC PV LINK S2502 POWER OPTIMIZERS)	
RATED POWER	2500W
MAXIMUM INPUT VOLTAGE	420Voc
MPPT VOLTAGE RANGE	60-360Vmp
NOMINAL OUTPUT	380Vdc
MAXIMUM OUTPUT	420Voc
MAXIMUM OUTPUT CURRENT	8A
MAXIMUM SHORT CIRCUIT CURRENT	18A

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-9°
AMBIENT TEMP (HIGH TEMP 2%)	38°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.259%/°C

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL: XVT076A03 7600W INVERTER
NOMINAL AC POWER	7.600 KW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	32A

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
0.80	4-6
0.70	7-9
0.50	10-20

AC FEEDER CALCULATIONS

CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
INVERTER 1	AC DISCONNECT	240	32	40	40	CU #6 AWG	CU #6 AWG	CU #6 AWG	65	PASS	38	2	75	0.91	1	68.25	PASS	5	0.491	0.065	3/4" EMT	38.0488
AC DISCONNECT	POI	240	32	40	40	CU #6 AWG	CU #6 AWG	CU #6 AWG	65	PASS	38	2	75	0.91	1	68.25	PASS	5	0.491	0.065	3/4" EMT	38.0488

CUMULATIVE VOLTAGE DROP	0.13

DC FEEDER CALCULATIONS

CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
STRING 1	SOLADECK	380	8.00	10.00	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.026	N/A	#N/A
STRING 2	SOLADECK	380	8.00	10.00	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.026	N/A	#N/A
STRING 3	SOLADECK	380	8.00	10.00	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.026	N/A	#N/A
SOLADECK	INVERTER 1	380	24.00	30.00	30	CU #10 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	30	1.24	0.470	3/4" EMT	11.87617

String 1 Voltage Drop	0.496
String 2 Voltage Drop	0.496
String 3 Voltage Drop	0.496

ELECTRICAL NOTES

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
3. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
4. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6. WHERE SIZES OF SOLADECK, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8. 8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
10. TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.

365Solar Energy

REVISIONS

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PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE

4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

CAUTION:
AUTHORIZED SOLAR
PERSONNEL ONLY!

LABEL-1:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.13(B)

WARNING: PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT & ENCLOSURES

LABEL- 2:
LABEL LOCATION:
EMT/CONDUIT RACEWAY
SOLADECK / JUNCTION BOX
CODE REF: NEC 690.31 (G)(3)(4)

⚠ WARNING ⚠

THREE POWER SOURCES

SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRICSYSTEM

LABEL-3:
LABEL LOCATION:
INVERTER,
MAIN SERVICE PANEL,
SUBPANEL,
MAIN SERVICE DISCONNECT
CODE REF: NEC 690.13(B)

⚠ WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

LABEL- 4:
LABEL LOCATION:
MAIN SERVICE PANEL
SUBPANEL
MAIN SERVICE DISCONNECT
CODE REF: NEC 110.27(C) & OSHA 1910.145 (f) (7)

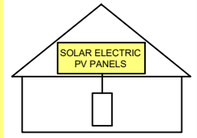
⚠ CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFEED

LABEL- 5:
LABEL LOCATION:
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
SUBPANEL (ONLY IF SOLAR IS BACK-FED)
CODE REF: NEC 690.13 (f), 705.12(B)(3-4) & NEC 690.59

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



LABEL- 6:
LABEL LOCATION:
AC DISCONNECT
CODE REF: IFC 605.11.3.1(1) & NEC 690.56(C)(1)(a)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL- 7:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.13(B)

PHOTOVOLTAIC

AC DISCONNECT

LABEL- 8:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.13(B)

PHOTOVOLTAIC

DC DISONNECT

LABEL- 9:
LABEL LOCATION:
INVERTER
CODE REF: NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

NOMINAL OPERATING AC VOLATGE	240 V
RATED AC OUTPUT CURRENT	32.00 A

LABEL- 10:
LABEL LOCATION:
MAIN SERVICE PANEL
SUBPANEL
AC DISCONNECT
CODE REF: NEC 690.54

MAXIMUM VOLTAGE	380 V
MAXIMUM CIRCUIT CURRENT	24 A
MAXIMUM RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED)	

LABEL- 11:
LABEL LOCATION:
INVERTER
CODE REF: NEC 690.53

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL- 12:
LABEL LOCATION:
MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)
CODE REF: NEC 690.13(B)

PRODUCTION METER

LABEL- 13:
LABEL LOCATION:
PRODUCTION METER (ONLY IF PRODUCTION METER IS USED)

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REVISIONS

DESCRIPTION	DATE	REV
INITIAL	12/16/2022	

SIGNATURE WITH SEAL

DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE

4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME

LABELS

SHEET SIZE

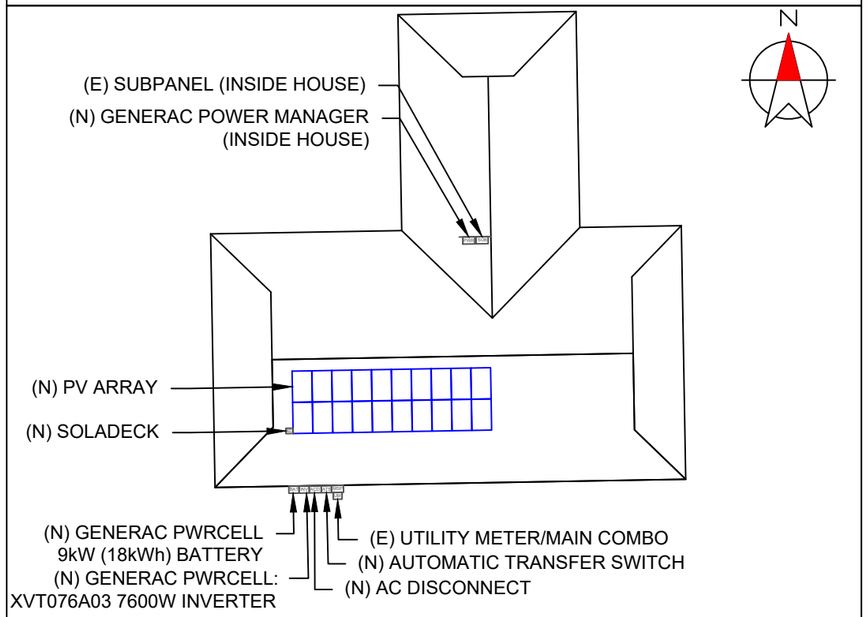
ANSI B
11" X 17"

SHEET NUMBER

PV-6

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM MULTIPLE SOURCES OF POWER WITH SAFETY DISCONNECTS AS SHOWN:



4864 CHRISTIAN LIGHT RD, FUQUAY VARINA, NC 27526

DIRECTORY

PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS OUTLINED WITHIN: NEC 690.56(B)&(C), [NEC 705.10])

LABELING NOTES:

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

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REVISIONS		
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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE

4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME

PLACARD

SHEET SIZE

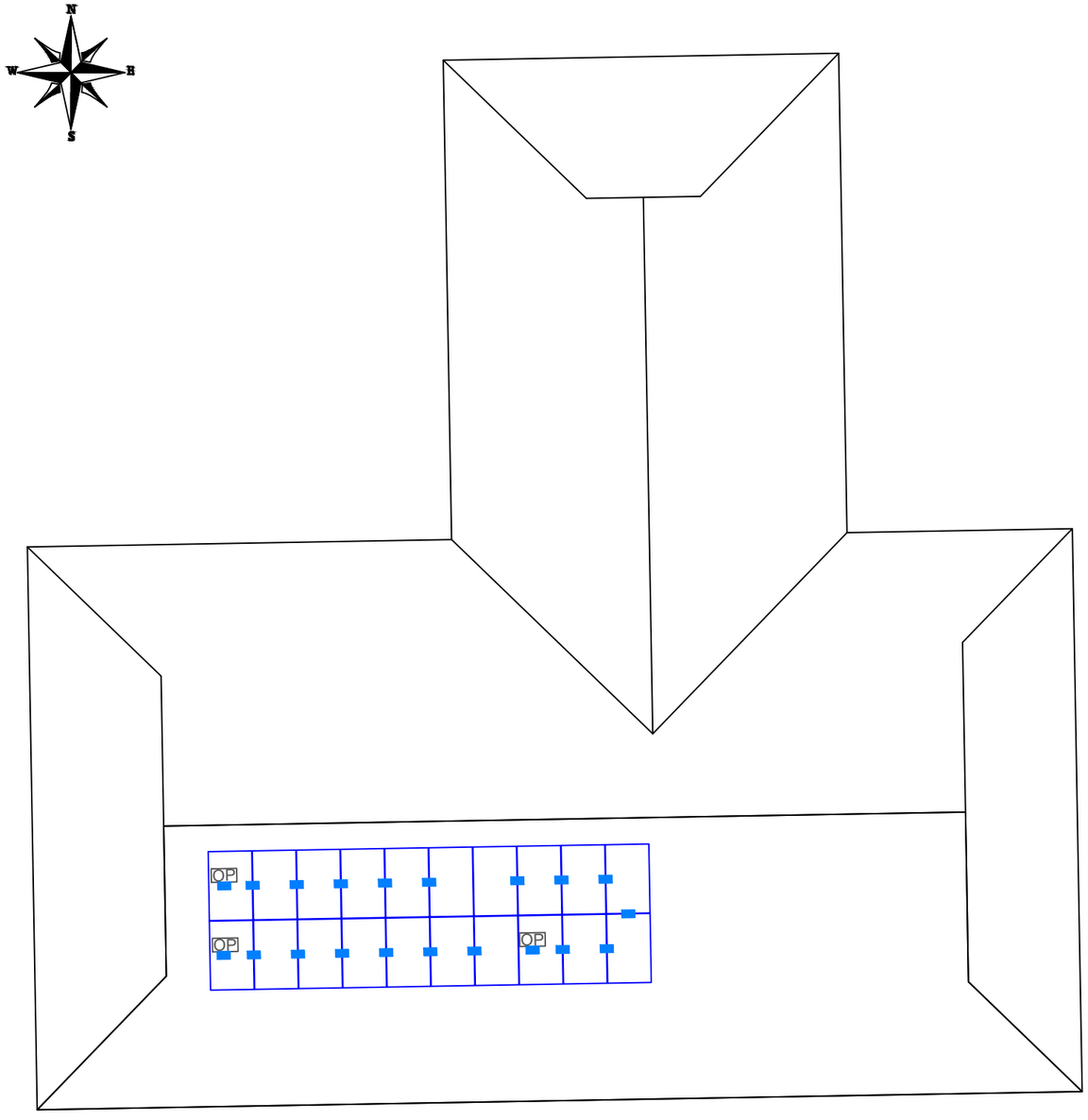
ANSI B
11" X 17"

SHEET NUMBER

PV-7

	1-10	11-20	21-30	31-40	41-50	51-60
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

POWER OPTIMIZER CHART



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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF
RESIDENCE

4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
POWER
OPTIMIZER CHART

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

MSE PERC 66

MISSION SOLAR ENERGY

395W
Class leading power output

Positive Power Tolerance
-0 to +3%

FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.58% annually from years two to 30 with 84.08% capacity guaranteed in year 25.
For more information, visit www.missionsolar.com/warranty

CERTIFICATIONS

CEC · TÜV SUD · c UL us LISTED

UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

If you have questions or concerns about certification of our products in your area, please contact Mission Solar Energy.

True American Quality
True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas where we manufacture our modules. We produce American, high-quality solar modules ensuring the highest-in-class power output and best-in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long term.

Demand the best. Demand Mission Solar Energy.

Certified Reliability
- Tested to UL 61730 & IEC Standards
- PID resistant
- Resistance to salt mist corrosion

Advanced Technology
- 9 Busbar
- Passivated Emitter Rear Contact
- Ideal for all applications

Extreme Weather Resilience
- Up to 5,400 Pa front load & 3,600 Pa back load
- Tested load to UL 61730
- 40 mm frame

BAA Compliant for Government Projects
- Buy American Act
- American Recovery & Reinvestment Act

MODULES ASSEMBLED DESIGNED & ENGINEERED IN THE USA

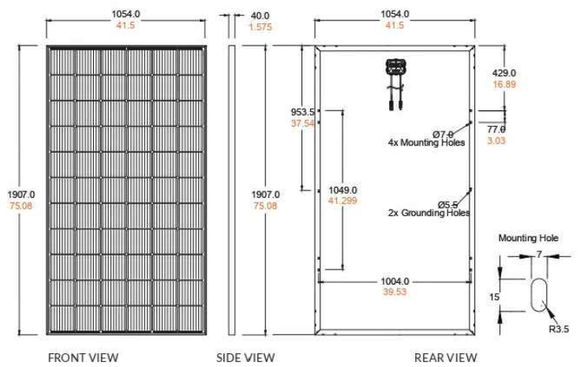
25 YEAR FRAME-TO-FRAME WARRANTY

Class Leading
390-400W

MSE PERC 66

BASIC DIMENSIONS

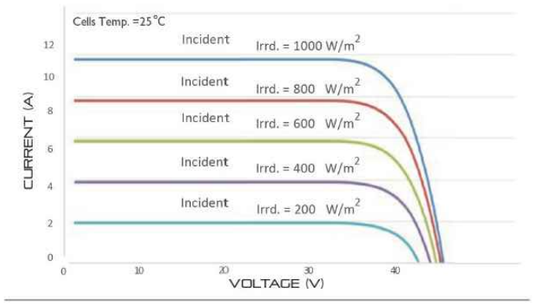
[UNITS: MM/IN]



CURRENT-VOLTAGE CURVE

MSE385SX9R: 385WP, 66 CELL SOLAR MODULE

Current-voltage characteristics with dependence on irradiance and module temperature



CERTIFICATIONS AND TESTS

IEC	61215, 61730, 61701
UL	61730

TÜV SUD · CEC · c UL us LISTED

Mission Solar Energy
8303 S. New Braunfels Ave., San Antonio, Texas 78235
www.missionsolar.com | info@missionsolar.com

ELECTRICAL SPECIFICATION

PRODUCT TYPE			MSExxxSX9R (xxx = Pmax)		
Power Output	P_{max}	W_p	390	395	400
Module Efficiency		%	19.4	19.7	19.9
Tolerance		%	0/+3	0/+3	0/+3
Short Circuit Current	I_{sc}	A	11.19	11.24	11.31
Open Circuit Voltage	V_{oc}	V	45.04	45.18	45.33
Rated Current	I_{mp}	A	10.63	10.68	10.79
Rated Voltage	V_{mp}	V	36.68	36.99	37.07
Fuse Rating		A	20	20	20
System Voltage		V	1,000	1,000	1,000

TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	43.75°C (±3.7%)
Temperature Coefficient of Pmax	-0.367%/°C
Temperature Coefficient of Voc	-0.259%/°C
Temperature Coefficient of Isc	0.033%/°C

OPERATING CONDITIONS

Maximum System Voltage	1,000Vdc
Operating Temperature Range	-40°F to 185°F (-40°C to +85°C)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1*
Front & Back Load (UL Standard)	Up to 5,400 Pa front and 3,600 Pa back load, Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

*Mission Solar Energy uses quality sourced materials that result in a Type 1 fire rating. Please note, the 'Fire Class' Rating is designated for the fully-installed PV system, which includes, but is not limited to, the module, the type of mounting used, pitch and roof composition.

MECHANICAL DATA

Solar Cells	P-type mono-crystalline silicon
Cell Orientation	66 cells (6x11)
Module Dimension	1,907mm x 1,054mm x 40mm
Weight	48.5 lbs. (22 kg)
Front Glass	3.2mm tempered, low-iron, anti-reflective
Frame	40mm Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.2m, Wire 4mm2 (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-8

SHIPPING INFORMATION

Container Feet	Ship To	Pallet	Panels	390W Bin
53'	Most States	30	780	304.20 kW
Double Stack	CA	26	676	263.64 kW

PALLET [26 PANELS]

Weight	Height	Width	Length
1,300 lbs. (572 kg)	47.56 in (120.80 cm)	46 in (116.84 cm)	77 in (195.58 cm)

Mission Solar Energy reserves the right to make specification changes without notice.

C-SA2-MKTG-0027 REV 4 03/18/2022
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REVISIONS		
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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

GENERAC

SnapRS™ 802

Inline Disconnect Switch
Model #: RS802

Generac SnapRS are a simple way to satisfy rapid shutdown compliance for solar + storage systems. Generac SnapRS are 2017/2020 NEC 690.12 compliant, don't require any extra hardware to mount, and need no pairing or fussy digital communications.

FEATURES & BENEFITS

- Safe and reliable
- Fast, easy, and simple to install
- One SnapRS device per PV module
- Achieves PVRSS Compliance
- Low cost, high efficiency solution

SYSTEM DESIGN

Snap a Generac SnapRS disconnect device (RS) to the negative lead (-) of each module in the solar array for simple module-level rapid shutdown compliance. SnapRS devices isolate array voltage when a rapid shutdown is initiated at a PWRcell™ Inverter. When rapid shutdown is initiated, SnapRS units isolate each PV module in the array, reducing array voltage to <80V in seconds.

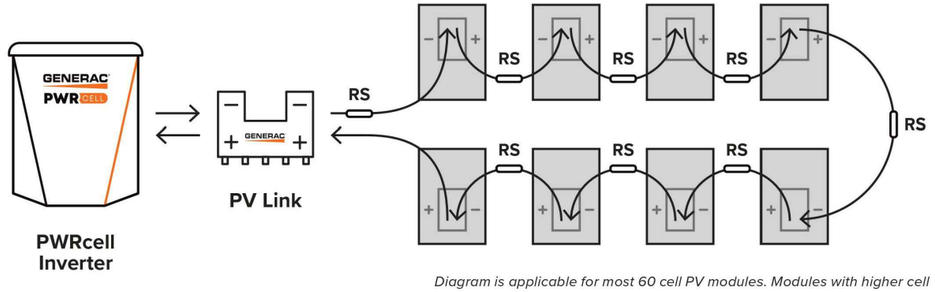

Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

SnapRS™ (RS802)	
PV MODULE MAX VOC:	75 V
EFFICIENCY:	99.8%*
MAX INPUT CURRENT:	15 A
MAX STC ISC OF STRING:	12 A
MAX TOTAL QTY IN SUBSTRING:	10
SHUTDOWN TIME:	< 10 Seconds
ENCLOSURE RATING:	NEMA 6P
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-40 to 158 °F (-40 to 70 °C)
CERTIFICATIONS:	UL1741
PROTECTIONS:	PVRSE
WEIGHT - LB (KG):	0.17 (0.08)
DIMENSIONS, L x W x H - IN (MM):	7" x 1" x 1" (177.8 x 25.4 x 25.4)
WARRANTY:	25 Years

**When used with a 50V panel*

Connect one SnapRS device to the negative lead of each PV module in the PV Link controlled array for complete PV Rapid shutdown performance

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GENERAC

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PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

GENERAC

PV Link™

2500W MPPT Substring Optimizer
Model #: S2502 (Ordering SKU: APKE00010)

PV Link is the simple solar optimizer for quick installation and long-lasting performance. Connect PV modules to each PV Link to overcome shading and challenging roof lines.

FEATURES & BENEFITS

- Fast, simple installation
- Lower failure risk than module-level optimizers
- 2017/2020 NEC rapid shutdown compliant with SnapRS™
- Quick connections with MC4 connectors
- Exports up to 2500W
- Compatible with PWRcell™ Inverters
- Cost-effective solution for high-performance PV
- Ground-fault protection

SINGLE-STRING PV ARRAY WITH SnapRS DEVICES

Where PV module-level rapid shutdown is required (NEC 690.12), a SnapRS device (RS) is installed to negative (-) lead of each PV module.

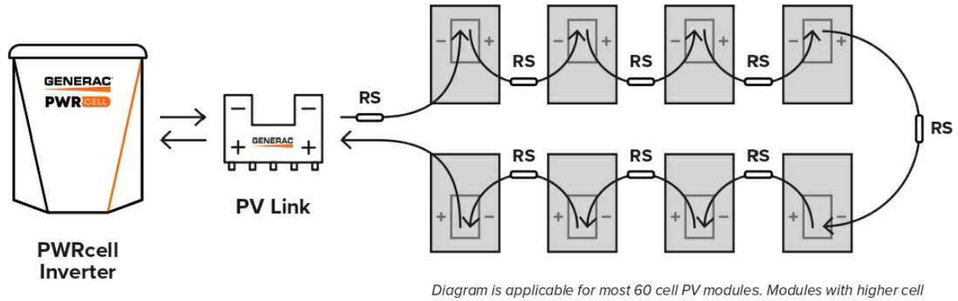

Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

PV Link™ (APKE00010)	
RATED POWER*:	2500W
PEAK EFFICIENCY:	99%
MPPT VOLTAGE RANGE:	60-360 VMP
MAX INPUT VOLTAGE:	420 VOC; max when cold
MAX OUTPUT:	420 VOC
NOMINAL OUTPUT (REbus™):	380 VDC
MAX OUTPUT CURRENT (CONTINUOUS):	8 A
MAX OUTPUT CURRENT (FAULT):	10 A
MAX INPUT CURRENT (CONTINUOUS):	13 A @ 50°C, 10 A @ 70°C
MAX INPUT SHORT CIRCUIT CURRENT (ISC):	18 A
STANDBY POWER:	< 1 W
PROTECTIONS:	Ground-fault, Arc-fault (Arc-fault Type 1 AFCI, Integrated), PVRSE
MAX OPERATING TEMP: FAHRENHEIT (CELSIUS)	158 °F (70 °C)
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
ENCLOSURE:	Type 4X
WEIGHT - LB (KG):	7.3 lb (3.3 kg)
DIMENSIONS, L x W x H - IN (MM):	15.4" x 2" x 9.6" (391.2 x 50.8 x 243.8)
COMPLIANCE:	UL 1741, CSA 22.2
WARRANTY:	25 Years

**PV Link can tolerate higher than rated power at its input if Max Input Voltage and Short Circuit Current specifications are not exceeded*

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GENERAC

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REVISIONS		
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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

GENERAC

PWRCELL

7.6 KW 1Ø PWRCELL INVERTER

Model #: XVT076A03 (includes CTs)

Intertek

Solar + storage is simple with the Generac PWRcell™ Inverter. This bi-directional, REbus™-powered inverter offers a simple, efficient design for integrating smart batteries with solar and Generac generators. Ideal for backup power applications, as well as self-supply and zero-export energy cost management, PWRcell Inverters are among the most feature-rich in the industry.

FEATURES & BENEFITS

- Single inverter for solar + battery storage and generator integration
- Simplified system design: No autotransformer or battery inverter needed
- User-selectable modes for backup power, self-supply, time-of-use, zero-import and export limiting
- Integrated system monitoring for installers and users via PWRfleet web portal and PWRview™ mobile apps

AC OUTPUT/GRID-TIE	
CONT. GRID-TIED AC POWER @ 50°C (122°F):	7600 W
AC OUTPUT VOLTAGE:	120/240, 1Ø VAC
AC FREQUENCY:	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT:	32 A, RMS
CHARGE BATTERY FROM AC:	Yes[1]
THD (CURRENT):	< 2%
TYPICAL NIGHTTIME POWER CONSUMPTION[2]:	< 7 W

DC INPUT	
DC INPUT VOLTAGE RANGE:	360-420 VDC
NOMINAL DC BUS VOLTAGE:	380 VDC
MAX INPUT CURRENT PER DC INPUT:	24 A
DC DISTRIBUTION INPUT BREAKERS:	4 x 2-Pole 30 A
DC BUS EXPORT FUSES (+/-):	40 A
REVERSE-POLARITY PROTECTION:	Yes
TRANSFORMERLESS, UNGROUNDED:	Yes
2-POLE DISCONNECTION:	Yes
GROUND-FAULT ISOLATION DETECTION:	Included

AC OUTPUT (ISLAND MODE)	
MAX. AC POWER[3]:	7600 W
MAX. AC POWER WITH EXTERNAL TRANSFER SWITCH AND SINGLE 6 MODULE BATTERY CABINET[4]:	9000 W
MAX. AC POWER WITH EXTERNAL TRANSFER SWITCH AND 2X BATTERY CABINETS (8 MODULES MIN.)[4]:	11000 W
PEAK MOTOR STARTING CURRENT (2 SEC):	50 A, RMS
AC BACKUP OUTPUT VOLTAGE:	120/240, 1Ø VAC
AC FREQUENCY:	60 Hz
THD (VOLTAGE):	< 2%
ALLOWABLE SPLIT PHASE IMBALANCE:	Up to 30%

EFFICIENCY	
PEAK EFFICIENCY:	97.3%
CEC WEIGHTED EFFICIENCY:	97%
TYPICAL ROUNDTRIP EFFICIENCY[5]:	90%

[1]Where permitted by utility.
[2]Nighttime power consumption depends on the system mode and accessories.
[3]In Island Mode, continuous power output is restricted to 7.6 kW unless backup power is routed through an external transfer switch in a whole home backup application.
[4]Peak performance, values provided for 40°C (104°F).
[5]AC to Battery to AC.

Specifications

FEATURES AND MODES	
MODES:	Island Mode, Grid Sell, Self-Consumption, Zero Export, Zero Import, Time-of-Use, Grid Support
COMPATIBLE EQUIPMENT:	PWRcell Battery, PWRzone Solar, AC Coupled PV[6], PWRgenerator, PWRmanager, PWRcell Automatic Transfer Switches, Smart Management Modules (SMMs)
ESS PCS OPERATION MODES (IMPORT ONLY, EXPORT ONLY):	Yes

ADDITIONAL FEATURES	
SUPPORTED COMMUNICATION INTERFACES:	REbus™, Ethernet
SYSTEM MONITORING:	PWRfleet and PWRview™ Mobile App
BACKUP LOADS DISCONNECT:	50 A Circuit Breaker
INVERTER BYPASS SWITCH:	Automatic
WARRANTY:	10 Years

STANDARDS COMPLIANCE	
SAFETY:	UL 1741 +SA, CSA 22.2 #107.1, UL 1998
GRID CONNECTION STANDARDS:	IEEE 1547, Rule 21, Rule 14H (HECO V1.1), CSIP, UL 1741 PCS CRD (Import Only, Export Only)
EMISSIONS:	FCC Part 15 Class B

DIMENSIONS AND INSTALLATION SPECIFICATIONS	
ENCLOSURE KNOCKOUTS - QTY, SIZE - IN (MM):	6 x Combo 3/4" x 1" (19 x 25.4) 7 x Combo 1/2" x 3/4" (12.7 x 19) 1 x 0.575" exclusively for optional LTE antenna mounting
DIMENSIONS L x W x H - IN (MM):	24.5" x 19.25" x 8" (622.3 x 488.9 x 203.2)
WEIGHT - LB (KG):	62.7 (28.4)
COOLING:	Forced convection
AUDIBLE NOISE:	< 40 dBA
OPERATING TEMPERATURE:	-4 to 122 °F (-20 to 50 °C)[7]
ENCLOSURE TYPE:	Type 3R

INSTALLATION GUIDELINES	
BATTERY TYPES SUPPORTED:	PWRcell™ Battery
PV SUBSTRING SIZE PER PV LINK OPTIMIZER:	Varies, refer to PV Link Installation Manual
MAXIMUM RECOMMENDED DC POWER FROM PV[8]:	10 kW

[6]Up to 7.68 kW of AC Coupled PV. May not combine AC Coupled and DC Coupled PV sources. Requires M6 PWRcell Battery. SMMs must be set to lockout loads during backup.
[7]Includes ambient temperature rising from inverter operation. Reduced power at extreme temperatures.
[8]Values provided for PV-only or small energy storage systems. Additional PV power is permissible if sufficient battery storage capacity is installed.

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SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

GENERAC®

PWRCELL

OUTDOOR RATED BATTERY

PWRcell Outdoor Rated Battery Cabinet (Ordering SKU: APKE00028)

3.0kWh PWRcell DCB Battery Module
Model #: BJ-DCB05ZKBG (Ordering SKU: G0080040)

3.0kWh PWRcell EX Battery Module
Model #: G0080001, G0080003

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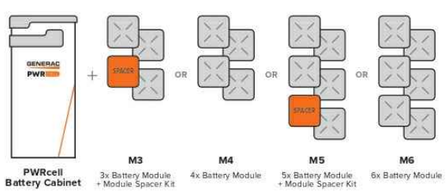
Intertek

The PWRcell™ Outdoor Rated (OR) Battery Cabinet is a Type 3R smart battery enclosure that allows for a range of storage configurations to suit any need. DC-couple to Generac PWRzone solar, PWRgenerator, or AC-couple to a third party PV array. No other smart battery offers the power and flexibility of PWRcell.

PWRcell BATTERY CABINET DESIGN

The PWRcell Battery Cabinet allows system owners the flexibility to scale from an economical 9kWh to a massive 18kWh by installing additional battery modules to the PWRcell Battery Cabinet. An existing PWRcell Battery Cabinet can be upgraded with additional modules. Use the graphic below and the chart on the back of this sheet to understand what components you need for your chosen PWRcell configuration.

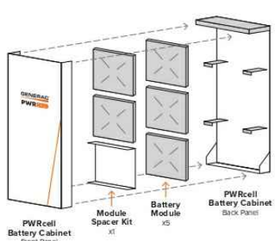
BATTERY CONFIGURATION GUIDE



FEATURES & BENEFITS

- Best-in-class battery backup power - AC-couple to third party solar array
- Connect 2 PWRcell Battery Cabinets to a single PWRcell Inverter for up to 36kWh of usable storage
- Plug-and-play with all PWRcell products
- Time-of-use (TOU) and zero-export ready
- 3R cabinet for outdoor and indoor installations
- Floor standing or wall-mounted design

BATTERY CABINET ASSEMBLY



Specifications

PWRcell™ BATTERY CONFIGURATIONS	M3	M4	M5	M6
BATTERY MODULES:	3	4	5	6
USABLE ENERGY[1]:	9 kWh	12 kWh	15 kWh	18 kWh
NOMINAL CONT. AC POWER[1,2]:	3.4 kW	4.5 kW	5.6 kW	6.7 kW
MAX. AC POWER[1,3]:	4.5 kW	6 kW	7.5 kW	9 kW
NOMINAL CONT. DC (CHARGE/DISCHARGE) - A:	11.6	15.5	19.4	23.3
PEAK MOTOR STARTING CURRENT (2 SEC) - A, RMS:	25	33	42	50
COMPATIBLE BATTERY MODULES[4]:	Generac PWRcell EX 3.0 kWh, Generac PWRcell DCB 3.0 kWh, Generac PWRcell DCB 2.85 kWh			
REbus™ VOLTAGE - INPUT/OUTPUT:	360-420 VDC			
NOMINAL VOLTAGE:	380 VDC			
DC-DC ROUND-TRIP EFFICIENCY:	96.5%			
MAXIMUM AMBIENT OPERATING TEMPERATURE:	14 TO 122 °F (-10 TO 50 °C)			
OPTIMAL AMBIENT OPERATING TEMPERATURE:	41 to 104 °F (5 to 40 °C)			
MAXIMUM INSTALLATION ALTITUDE - FT (M):	6560 (2000)			
DIMENSIONS, L x W x H - IN (MM):	22" x 10" x 68" (559 x 254 x 1727)			
WEIGHT, ENCLOSURE - LB (KG):	115 (52)			
WEIGHT, INSTALLED W/ DCB MODULES - LB (KG):	280 (127)	335 (152)	390 (177)	445 (202)
WEIGHT, INSTALLED W/ EX MODULES - LB (KG):	287 (130)	344 (156)	401 (182)	459 (208)
WEIGHT, ACCESSORY MOUNTING HARDWARE - LB (KG):	21 (10)			
ENCLOSURE TYPE:	Type 3R			
WARRANTY - LI-ION MODULES:	10 Years, (7.56MWh)			
WARRANTY - ELECTRONICS AND ENCLOSURE:	10 Years			
COMMUNICATION PROTOCOL:	REbus™ DC Nanogrid™			
SEISMIC RATING:	IEEE 693-2018 (HIGH)			
COMPLIANCE:	UL 9540, UL 9540A[5], UL 1973, UL 1642, CSA 22.2 #107.1			

[1]Assumes use of 3.0kWh battery module. | [2]Average AC power over a complete discharge cycle. | [3]Values provided for 40°C (104°F). | [4]All PWRcell battery models used in a PWRcell Battery Cabinet must be the same model. Do NOT combine module SKUs in a single battery cabinet. | [5]Meets residential indoor requirement as per UL9540A ed 4 in PWRcell OR M DCB configuration.*
Note: Charge/discharge rate may be reduced at temperature extremes

PWRcell ACCESSORIES

Inside of the PWRcell Battery Cabinet, battery modules are stacked two deep on three levels, allowing for up to six modules to be connected in series. You can upgrade an existing PWRcell Battery Cabinet by adding Battery Modules and a Module Spacer (APKE00008). A Module Spacer is only required for battery configurations with an odd number of modules (i.e. 3 or 5).

Generac offers a convenient PWRcell Battery Upgrade Kit (APKE00009) to help replace lost or misplaced hardware.

Note: When adding modules, be sure all modules within a cabinet are the same model (i.e., EX or DCB). Instructions are provided in product manual.

PWRcell MODEL BUILDER

PRODUCT SERIES	ENCLOSURE TYPE	# OF MODULES	BATTERY SERIES
PWRcell	OR	M6	DCB
	IR (Indoor Rated) OR (Outdoor Rated)	3 Modules 4 Modules 5 Modules 6 Modules	DCB EX

Sample Model Name: **PWRcell OR M6 DCB**

Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com | 888-GENERAC (436-3722)

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GENERAC®

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REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	12/16/2022	

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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF
RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-13

GENERAC

PWRCELL

AUTOMATIC TRANSFER SWITCH

100A Non-Service Entrance Rated
Model #: CXSC100A3
UPC #: 696471081701

100A Service Entrance Rated
Model #: CXSW100A3
UPC #: 696471081718

200A Service Entrance Rated
Model#: CXSW200A3
UPC #: 696471081725

ETL LISTED US
Intertek

An integraged solar + storage system with load management for whole home coverage is made easy with the PWRcell™ Automatic Transfer Switch (ATS). Power the entire home and manage up to four individual HVAC (24 Vac controlled) loads with the PWRcell ATS. This built-in capability requires no additional hardware. When used in tandem with Generac Smart Management Modules (SMM) up to eight additional circuits can be controlled by the PWRcell Inverter. Make the most of your Generac solar + storage system with this comprehensive load management solution.

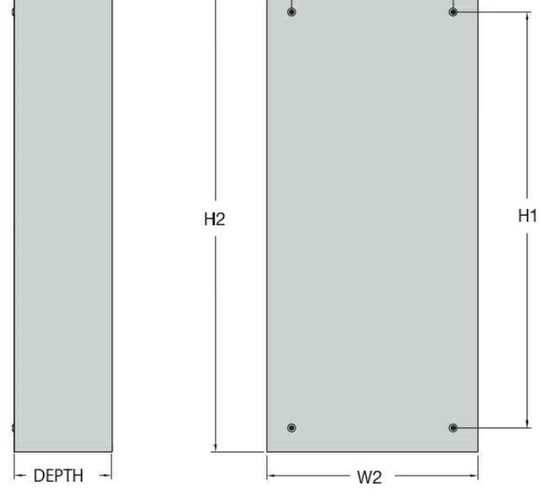
FEATURES & BENEFITS

- Unlock whole home backup power capability for PWRcell solar + storage systems
- Manage up to four HVAC systems, and an additional eight circuits with optional Smart Management Modules (SMMs)
- Aluminum type 3R enclosure with durable finish for indoor or outdoor installation
- Heavy Duty Generac Contactor is an ETL recognized device, designed for years of service and reliability

Specifications

SPECIFICATIONS	CXSC100A3	CXSW100A3	CXSW200A3
AMPS:	100	100	200
VOLTAGE	120/240 1Ø	120/240 1Ø	120/240 1Ø
LOAD TRANSITION TYPE (AUTOMATIC)	OPEN TRANSITION	OPEN TRANSITION SERVICE RATED	OPEN TRANSITION SERVICE RATED
ENCLOSURE TYPE	NEMA 3R	NEMA 3R	NEMA 3R
COMPLIANCE	UL 1008	UL 1008	UL 1008
WITHSTAND RATING (AMPS)	10,000	10,000	20,000
LUG RANGE	1/0 - #14	1/0 - #14	250 MCM - #6

DIMENSIONS		CXSC100A3	CXSW100A3	CXSW200A3
HEIGHT (IN/MM)	H1	17.24/437.9	17.24/437.9	26.75/679.4
	H2	20/508	20/508	30/762
WIDTH (IN/MM)	W1	12.5/317.5	12.5/317.5	10.5/266.7
	W2	14.6/370.8	14.6/370.8	13.5/342.9
DEPTH (IN/MM)		7.09/180.1	7.09/180.1	6.3/160.1
WEIGHT (LBS/KG)		20/9.07	22.5/10.21	39/17.69



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A0000915134 REV A

GENERAC

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PROJECT NAME & ADDRESS

SIRAN UMLAUF
RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14

GENERAC®

PWR MANAGER

Advanced Load Management
Model # G0080090

Add unbeatable flexibility and value to the PWRcell System by enabling whole home backup controlled via the user-friendly PWRview app. The PWRmanager enables data-driven efficient control of home loads to extend battery backup. This easy-to-install load management device integrates seamlessly with PWRcell, dramatically improving system performance.

FEATURES & BENEFITS

- Enhances PWRcell whole home backup
- Flexibility and reliability during outages
- Turn home loads on and off on-the-fly with PWRview app
- Control up to twelve 120 V circuits or six 240 V circuits + two thermostats
- Easy to install: no need for a new load panel

FEATURE	SPECIFICATIONS
NO. OF 120 V RELAYS	12
HVAC RELAYS	2
CURRENT RATING	60 Amps per relay
CONNECTIONS	WiFi, Ethernet
DIMENSIONS, L X W X H - IN (MM):	17.7" x 12.2" x 5.5" (449.58 x 309.88 x 139.7)
WEIGHT - LB (KG):	13.23 (5.2)
COMPLIANCE	UL-916, FCC Part 15 Class B, IC, Surge IEC 61000-4-5
ENCLOSURE	NEMA 3R
WIRE GAUGE	#14 to #6 AWG
OPERATING TEMPERATURE	-40°F to + 122°F (-40°C to + 50°C)
WARRANTY	10 YEAR LIMITED

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PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE

4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

PEGASUS SOLAR™
A Better Day on the Job

RAIL SYSTEM

Instant Bonding
The N-S Bonding Jumper bonds row to row with no tools.

One Clamp Anywhere
The Multi-Clamp works as mid- or end-clamp, and fits standard 30-40mm frames.

Lifetime Wire Management
Open rail channel holds and protects wires. Clamps won't pinch wires after tightening.

Bonding Structural Splice
Connect rails instantly, without tools, interference or limitations.

Next-Level Solar Mounting

A complete system for hassle-free rooftop installation, from watertight mounts to lifetime wire management.

Simplicity
1/2"socket for everything.
One clamp for mid or end.
No tool splicing and bonding.
Easy wire management.

Code Compliant
UL2703 listed
LTR-AE-001-2012 listed
Class A fire rating for any slope
ASCE 7-16 PE Certified

Premium Aesthetics
The narrowest panel gap available. Optional Hidden End Clamps and End Caps provide a flush look on the edge of the array.

Watertight for Life
Secured on industry-leading Pegasus Mounts, for composite shingle and tile roofs. Backed by a 25-year warranty.

Pegasus Solar Inc | 506 West Ohio Avenue, Richmond, CA 94804 | T: 510.210.3797 | **www.pegasussolar.com**

PEGASUS SOLAR

RAIL SYSTEM

Pegasus Rail

Available in 14' and 7' lengths for easy layout and shipping.
Open-channel design holds MC4 connectors, PV wire and trunk cables.
Black and Mill finish

Pegasus Max Rail

Maximum-strength design.
Meets specifications for high snow-load and hurricane zones.
Black and Mill finish

Splice and Max Splice

Installs by hand.
Works over mounts.
Structurally connects and bonds rails automatically; UL2703 listed as reusable.

Dovetail T-bolt

Dovetail shape for extra strength.
Uses ½" socket.

Multi-Clamp

Fits 30-40mm PV frames, as mid- or end-clamp.
Twist-locks into position; doesn't pinch wires in rail.
Bonds modules to rail; UL2703 listed as reusable

Hidden End Clamp

Offers premium edge appearance.
Preinstalled pull-tab grips rail edge, allowing easy, one-hand installation.
Tucks away for reuse.

Ground Lug

Holds 6 or 8 AWG wire.
Mounts on top or side of rail.
Assembled on MLPE Mount.
UL2703 listed as reusable.

N-S Bonding Jumper

Installs by hand, eliminates row-to-row copper wire.
UL2703 listed as reusable only with Pegasus Rail.

MLPE Mount

Secures and bonds most micro-inverters and optimizers to rail.
Connectors and wires easily route underneath after installation.
UL2703 listed as reusable.

Cable Grip

Secures four PV wires or two trunk cables.
Stainless-steel backing provides durable grip.
Eliminates sagging wires.

Wire Clip

Hand operable.
Holds wires in channel.
Won't slip.

End Cap and Max End Cap

Fits flush to PV module and hides raw or angled cuts.
Hidden drain quickly clears water from rail.

Certifications:
- UL 2703, Edition 1
- LTR-AE-001-2012
- ASCE 7-16 PE certified
- Class A fire rating for any slope roof

C SP US

FREE
PEGASUS SOLAR
Design Tool

Quickly calculate the most efficient layout, spans and materials needed to suit your job. Visit the Pegasus Customer Portal. **pegasussolar.com/portal**

LOAD		SPAN			
SNOW (PSF)	WIND (MPH)	32"	4'	6'	8'
0	120				
	160				
	190				
15	140				
	160				
	190				
30	160				
	190				
45	190				
70	190				
110	190				

PEGASUS RAIL PEGASUS MAX RAIL

For reference only. Spans above are calculated using ASCE 7-16 for a Gable Roof, Exposure Category B, 7-20deg roof angle, 30ft mean roof height with non-exposed modules. For PE certified span tables, visit www.pegasussolar.com/spans.

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DATE: 12/16/2022

PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-16

PEGASUS SOLAR™
A Better Day on the Job

COMP MOUNT

One-Piece Flashing with Elevated Cone
No press-fits or deck-level EPDM washers to fail

Encapsulating Design
Raises the water seal 0.9" Above roof deck


PSCR-UBB0


PSCR-UBBDT


PSCR-UMM0


PSCR-UMMDT

Simple 3-Piece Design Watertight For Life

Pegasus solar's comp mounts are a cost effective, high-quality option for rail installations on composition shingle roofs. Designed to last decades, the one-piece flashing with elevated cone means there is simply nothing to fail.

25-Year Warranty
Manufactured with advanced materials and coatings to outlast the roof itself

Code Compliant
Fully IBC/CBC Code Compliant Exceeds ASCE 7-16 Standards

Superior Waterproofing
Tested to AC286 without sealant Water seal elevated 0.9" above

All-In-One Kit Packaging
Flashings, L-Feet and SS lags with bonded EPDM washers are included in each 24-pack

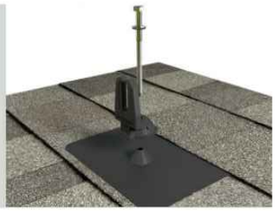
PEGASUS SOLAR

COMP MOUNT

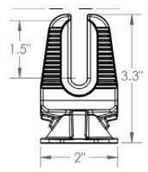
1
Drill pilot hole in the center of the rafter.

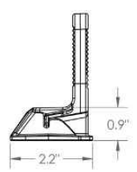
2
Optional: Apply a "u-shape" of sealant to the underside of the flashing and position under 2nd shingle course, cone over pilot hole.

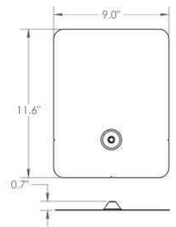
3
Place L-Foot over cone and install lag with washer through L-Foot.

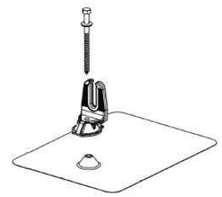


4
Drive lag to required depth. Attach rail per rail manufacturer's instructions.









SPECIFICATIONS	COMP MOUNT INSTALL KITS				
SKU	PSCR-UBB0	PSCR-UBBDT	SPCR-UBBH	PSCR-UMM0	PSCR-UMMDT
Finish	Black L-Foot And Black Flashing			Mill L-Foot And Mill Flashing	
L-Foot Type	Open Slot	Open Slot	Open Slot	Open Slot	Open Slot
Kit Contents	L-Foot, Flashing, 5/16" x 4 1/2" SS Lag with metalized EPDM washer	L-Foot, Flashing, 5/16" x 4 1/2" SS Lag with metalized EPDM washer and Pegasus Dovetail T-bolt w/ Nut	L-Foot, Flashing, 5/16" x 4 1/2" SS Lag with metalized EPDM washer and M10 Hex Bolt w/ Nut	L-Foot, Flashing, 5/16" x 4 1/2" SS Lag with metalized EPDM washer	L-Foot, Flashing, 5/16" x 4 1/2" SS Lag with metalized EPDM washer and Pegasus Dovetail T-bolt w/ Nut
Roof Type	Composition Shingle				
Certifications	IBC, ASCE/SEI 7-16, AC286				
Install Application	Railed Systems				
Compatible Rail	Most				
Kit Quantity	24				
Boxes per Pallet	72				

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PROJECT NAME & ADDRESS

SIRAN UMLAUF RESIDENCE
4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included

SolaDeck Model SD 0783

SolaDeck UL50 Type 3R Enclosures

Available Models:
Model SD 0783 - (3" fixed Din Rail)
Model SD 0786 - (6" slotted Din Rail)

SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

****Typical System Configuration**

4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
1- Power Distribution Block 600VDC 175AMP
1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

****Typical System Configuration**

4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
4- Din Rail Mounted Terminal Blocks
Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.

Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.

Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.

Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Cliare, WI 54703
For product information call 1(866) 367-7782

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4864 CHRISTIAN LIGHT RD
FUQUAY VARINA, NC 27526

DC SIZE: 7.900 KW
AC SIZE: 7.600 KW

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-18