



Scott E. Wyssling, PE  
Coleman D. Larsen, SE, PE  
Gregory T. Elvestad, PE

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

---

December 2, 2022

Sustainable Energy and Lighting Solutions  
8351 Palmetto Commerce Parkway, Ste. 203  
Ladson, SC 29456

Re: Engineering Services  
Skatell Residence  
1565 Chicora Road, Dunn, NC  
11.700 kW System

To Whom It May Concern:

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

**A. Site Assessment Information**

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
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:** 2x6 dimensional lumber at 24" on center.  
**Roof Material:** Metal Roof  
**Roof Slope:** 23 degrees  
**Attic Access:** Accessible  
**Foundation:** Permanent

**C. Loading Criteria Used**

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 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 2015 NCRC, 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.*

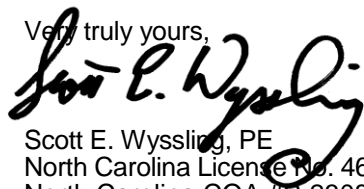
**D. Solar Panel Anchorage**

1. The solar panels shall be mounted in accordance with the most recent S-5! 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. System will be attached to the metal roofing material utilizing the patented S-5! Connection. Installation of the connections shall be in accordance with the manufacturer's recommendations.
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 72" on center.
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 2015 NCRC, 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  
North Carolina COA #P-2308



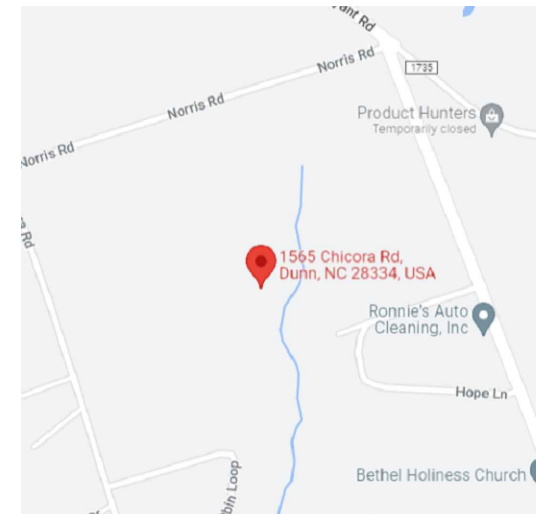
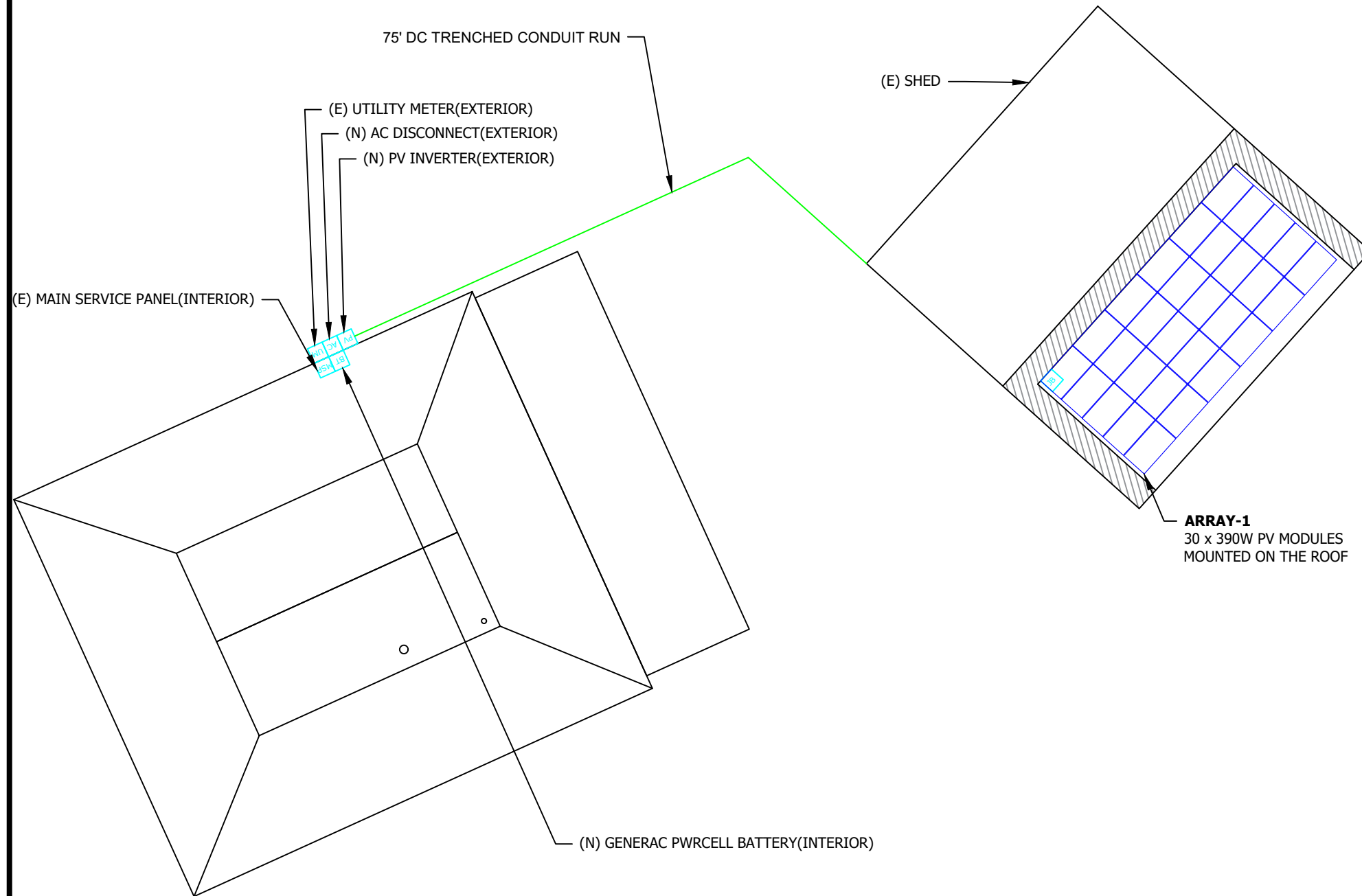
Wyssling Consulting, PLLC  
76 N Meadowbrook Drive Alpine UT 84004  
North Carolina COA # P-2308

Signed 12/2/2022

# NICK SKATELL - 11.700KW DC, 7.600KW AC, 18.000KWH STORAGE SYSTEM

## SITE PLAN

NOTE: CONDUIT RUN IS IN ATTIC



A1 VICINITY MAP  
PV-1.0 SCALE: NTS

### GENERAL INFORMATION

ELECTRIC CODE	NEC 2020
FIRE CODE	NCFC 2018
RESIDENTIAL CODE	NCRC 2015
BUILDING CODE	NCBC 2018
WIND SPEED	117 MPH
SNOW LOAD	15 PSF

### INDEX

INDEX NO.	DESCRIPTION
PV-1.0	SITE PLAN
PV-2.0	GENERAL NOTES
PV-3.0	MOUNTING DETAILS
PV-3.1	STRUCTURAL DETAILS
PV-4.0	SINGLE LINE DIAGRAM
PV-4.1	SINGLE LINE DIAGRAM
PV-5.0	WARNING PLACARDS
PV-6.0+	SPEC SHEET(S)



A SITE PLAN  
PV-1.0 SCALE: 1/16"=1'-0"



Sustainable Energy & Lighting Solutions  
Your future is brighter with us!

### SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

### ENGINEER OF RECORD



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

Signed 12/2/2022

### CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

### SITE PLAN

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED

PAPER SIZE:17"x11"

DATE:10/19/22

REV:B

PV- 1.0

## GENERAL NOTES

### GENERAL NOTES

1. MODULES ARE LISTED UNDER UL 1703 AND CONFORM TO THE STANDARDS.
2. INVERTERS ARE LISTED UNDER UL 1741 AND CONFORM TO THE STANDARDS.
3. DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION MIGHT VARY.
4. WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26(A)(1).
5. ALL GROUND WIRING CONNECTED TO THE MAIN SERVICE GROUNDING IN MAIN SERVICE PANEL/ SERVICE EQUIPMENT.
6. ALL CONDUCTORS SHALL BE 600V, 75°C STANDARD COPPER UNLESS OTHERWISE NOTED.
7. WHEN REQUIRED, A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
8. THE SYSTEM WILL NOT BE INTERCONNECTED BY THE CONTRACTOR UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND/OR THE UTILITY.
9. ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREES, WIRES OR SIGNS.
10. PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING

### EQUIPMENT LOCATION:

11. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26(A)(1).
12. WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31(A),(C) AND NEC TABLES 310.15(B)(2)(A) AND 310.15(B)(3)(C).
13. JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
14. ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
15. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
16. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

### STRUCTURAL NOTES:

17. RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAIL MANUFACTURER'S INSTRUCTIONS.
18. JUNCTION BOX WILL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.
19. ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED WITH APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.
20. ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.
21. WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

### WIRING & CONDUIT NOTES:

22. ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
23. CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
24. DC WIRING LIMITED TO MODULE FOOTPRINT. MICRO INVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY WITH SUITABLE WIRING CLIPS.
25. AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE PHASE C OR L3- BLUE, YELLOW, ORANGE\*\*, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

### INTERCONNECTION NOTES:

26. LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 690.64(B)]
27. THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS INPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(D)(2)(3)].
28. WHEN SUM OF THE PV SOURCES EQUALS >100% OF BUSBAR RATING, PV DEDICATED BACKFFED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(D)(2)(3)].
29. AT MULTIPLE PV OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVER CURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVER CURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12(D)(2)(3)(C).
30. FEEDER TAP INTER CONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12(D)(2)(1) SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12(A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42 BACK FEEDING BREAKER FOR UTILITY-INTERACTIVE INVERTER OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12(D)(5)].

### GROUNDING NOTES:

31. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
32. PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC 250.122.
33. METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).
34. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45 AND MICRO INVERTER MANUFACTURER'S INSTRUCTIONS.
35. EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
36. THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
37. GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]
38. THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.
39. GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.5 IN GENERAL AND NEC 690.5(A)(1) SPECIFICALLY.
40. DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:
41. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).
42. DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
43. RAPID SHUTDOWN OF ENERGIZED CONDUCTORS BEYOND 10 FT OF PV ARRAY OR 5 FT INSIDE A BUILDING WITHIN 10 SECONDS. CONTROLLED CONDUCTORS ≤30V AND ≤240VA [NEC 690.12]. LOCATION OF LABEL ACCORDING TO AHJ.
44. ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9 AND 240.
45. MICRO INVERTER BRANCHES CONNECTED TO A SINGLE BREAKER OR GROUPED FUSES IN ACCORDANCE WITH NEC 110.3(B). 2.6.7 IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.



Sustainable Energy & Lighting Solutions  
Your future is brighter with us!

## SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

## ENGINEER OF RECORD



Wyssling Consulting, PLLC  
76 N Meadowbrook Drive Alpine UT 84004  
North Carolina CDA # P-2308

Signed 12/2/2022

## CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

## GENERAL NOTES

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE: AS NOTED      PAPER SIZE: 17"x11"

DATE: 10/19/22      REV: B      PV-2.0



Sustainable Energy & Lighting Solutions  
Your future is brighter with us!

### SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W  
MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

### ENGINEER OF RECORD



Wyssling Consulting, PLLC  
76 N Meadowbrook Drive Alpine UT 84004  
North Carolina CDA # P-2308

Signed 12/2/2022

### CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

### MOUNTING DETAILS

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED

PAPER SIZE:17"x11"

DATE:10/19/22

REV:B

PV-3.0

### MODULES DATA

TRINA SOLAR TSM-390 DE09.05 390W

MODULE DIMS 69.06"x43.15"x1.18"

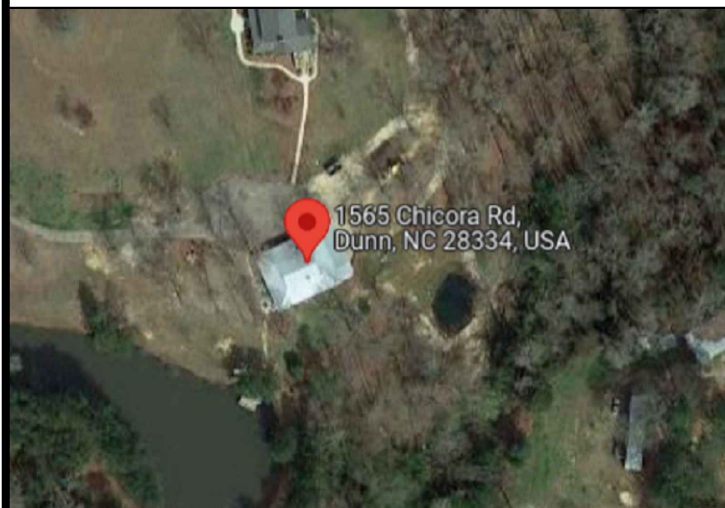
LAG SCREWS 5/16"x3.5":2.5"MIN EMBEDMENT

### FIRE SETBACK

MINIMUM FIRE ACCESS PATHWAYS PER CFC 2019  
RIDGE TO ARRAY: 1'-6"  
EAVE TO ARRAY : 3'-0"  
HIP/VALLEY W/ ADJACENT ARRAY: 1'-6"  
EACH SIDE HIP/VALLEY W/O ADJACENT ARRAY: 0'-0"

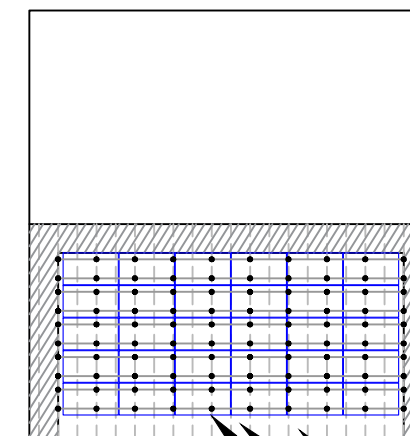
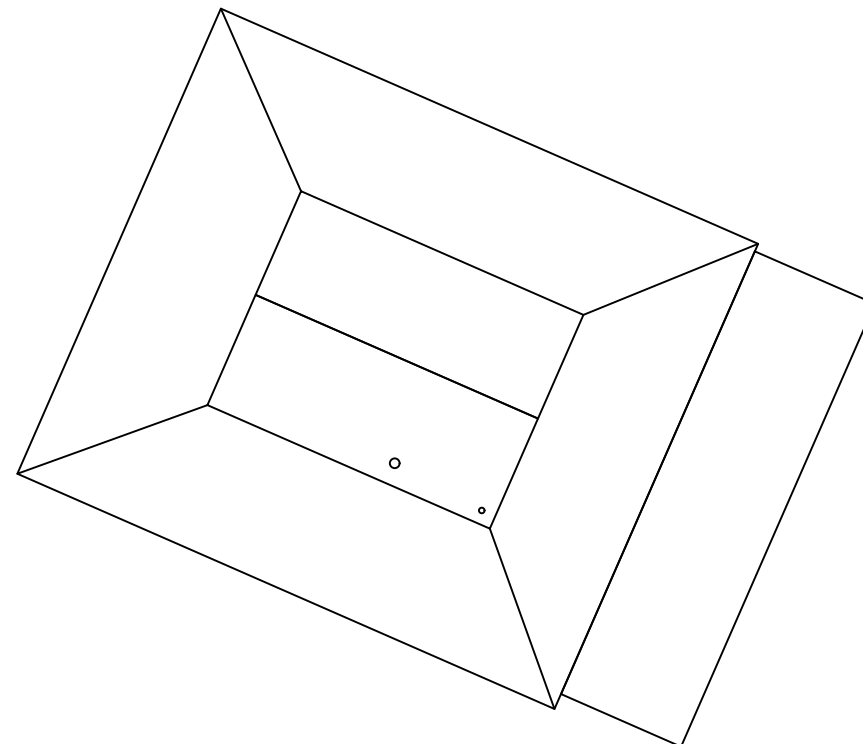
**NOTE:** INSTALLER TO VERIFY RAFTER SIZE, SPACING AND SLOPED SPANS, AND NOTIFY ANY DISCREPANCIES BEFORE PROCEEDING.

### AERIAL VIEW



### SITE INFORMATION

SR.NO	AZIMUTH	PITCH	NO. OF MODULES	ARRAY AREA (SQ. FT.)	ROOF TYPE	ATTACHMENT	ROOF EXPOSURE	FRAME TYPE	FRAME SIZE	FRAME SPACING	MAX RAIL SPAN	OVER HANG
MP-01	132°	23°	30	620.7	METAL	S-5! CORRUBRACKET	METAL DECK	RAFTERS	2 X 6	2'-0"	4'-0"	2'-0"



ARRAY MP-01  
ALUMINIUM RAILS  
2X6 RAFTERS  
@ 2'-0"SPACING



B MOUNTING DETAILS

PV-3.0 SCALE: 1"=20'-0"



Sustainable Energy & Lighting Solutions  
Your future is brighter with us!

### SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
 AC SYSTEM SIZE : 7600W  
 MODULES:  
 (30) TRINA SOLAR TSM-390 DE09.05 390W  
 INVERTER:  
 (1) GENERAC PWR CELL X7602, 7600W  
 OPTIMIZER:  
 (4) GENERAC PV LINK S2502  
 BATTERY:  
 (6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

### ENGINEER OF RECORD



Wyssling Consulting, PLLC  
 76 N Meadowbrook Drive Alpine UT 84004  
 North Carolina CDA # P-2308

Signed 12/2/2022

### CUSTOMER INFORMATION

NAME & ADDRESS:  
 NICK SKATELL  
 1565 CHICORA RD.,  
 DUNN, NC 28334  
 35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

### STRUCTURAL DETAILS

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
 SOLAROFIX

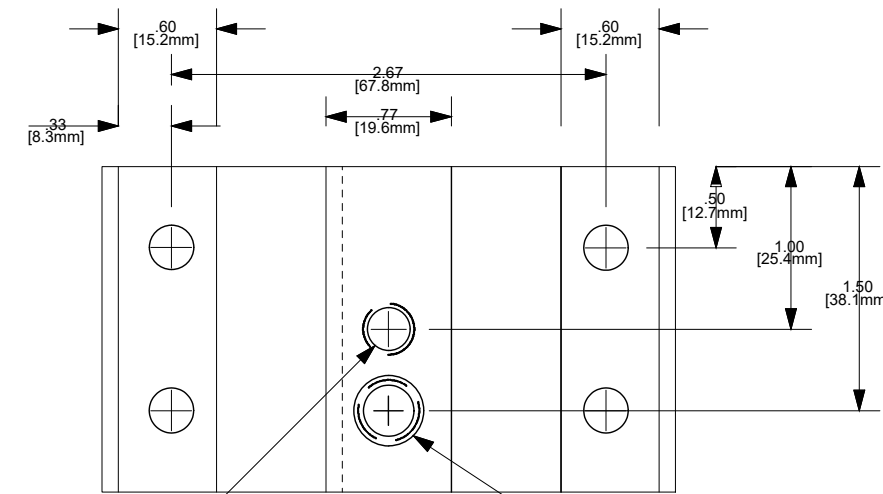
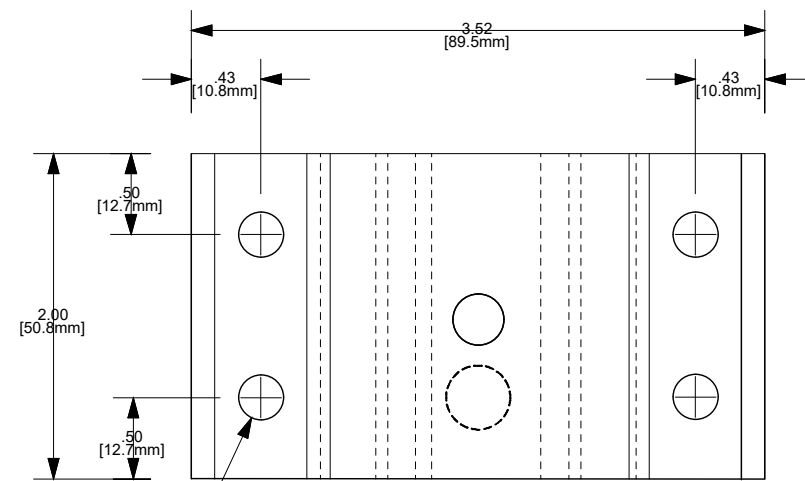
SCALE:AS NOTED

PAPER SIZE:17"x11"

DATE:10/19/22

REV:B

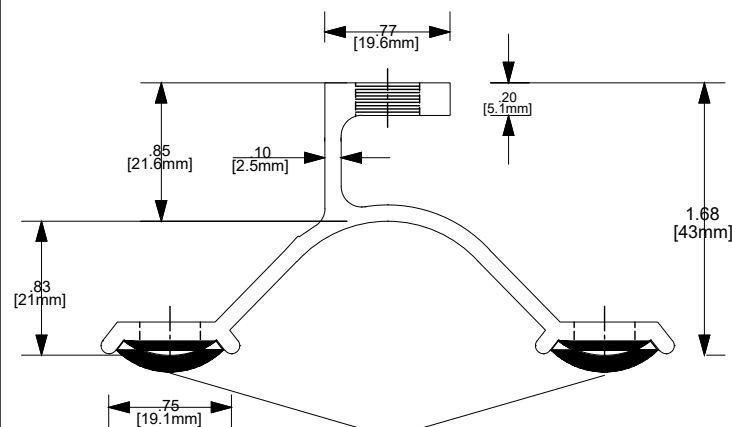
PV-3.1



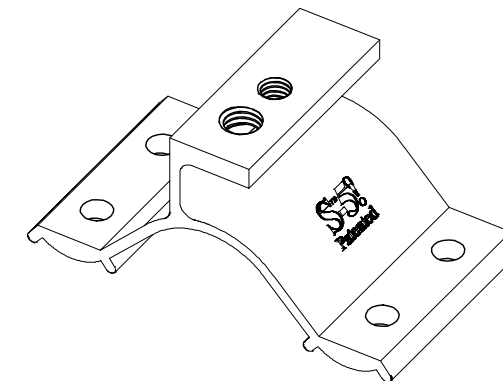
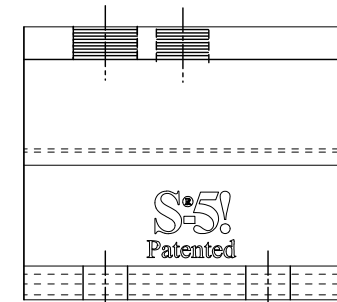
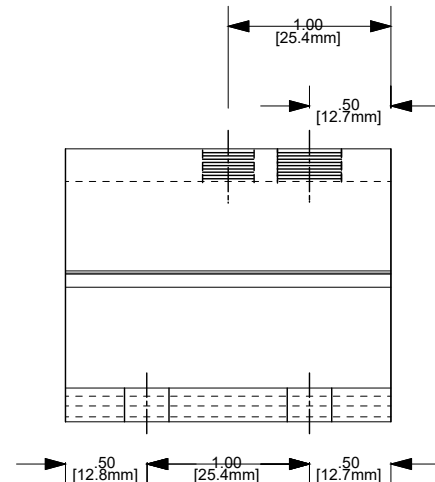
Ø .28 4X  
[Ø 7mm]

M8x1.25 THREADED HOLE

M10x1.5 THREADED HOLE



FACTORY APPLIED  
 BUTYL SEALANT  
 DIM: 3/4" X 1/8"



### S-5! CORRUBRACKET

**SINGLE LINE DIAGRAM: DC SYSTEM SIZE - 11.700KW DC, 7.600KW AC, 18.000KWH STORAGE SYSTEM**



**SYSTEM INFORMATION**

DC SYSTEM SIZE : 11700W  
 AC SYSTEM SIZE : 7600W

MODULES:  
 (30) TRINA SOLAR TSM-390 DE09.05 390W  
 INVERTER:  
 (1) GENERAC PWR CELL X7602, 7600W  
 OPTIMIZER:  
 (4) GENERAC PV LINK S2502  
 BATTERY:  
 (6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

**ENGINEER OF RECORD**

**CUSTOMER INFORMATION**

NAME & ADDRESS:  
 NICK SKATELL  
 1565 CHICORA RD.,  
 DUNN, NC 28334  
 35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

**SINGLE LINE DIAGRAM**

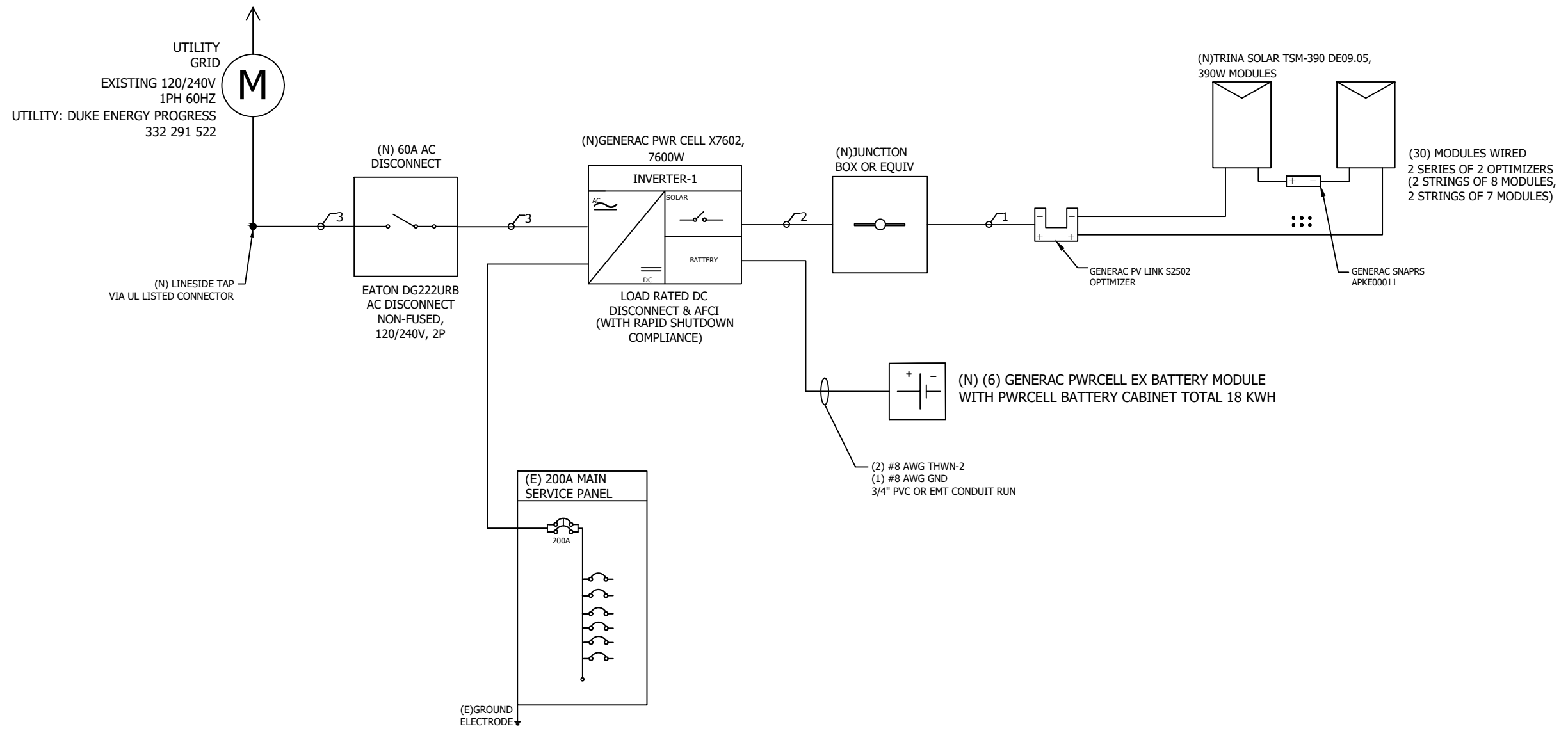
PROJECT NUMBER:

DESIGNER/CHECKED BY:  
 SOLAROFIX

SCALE:AS NOTED PAPER SIZE:17"x11"

DATE:10/19/22 REV:B PV-4.0

**NOTE:**  
 1. SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN COMPLIANT  
 2. ATS IS INBUILT WITH THE INVERTER



**SINGLE LINE DIAGRAM: DC SYSTEM SIZE - 11.700KW DC, 7.600KW AC, 18.000KWH STORAGE SYSTEM**



**SYSTEM INFORMATION**

DC SYSTEM SIZE : 11700W  
 AC SYSTEM SIZE : 7600W  
 MODULES:  
 (30) TRINA SOLAR TSM-390 DE09.05 390W  
 INVERTER:  
 (1) GENERAC PWR CELL X7602, 7600W  
 OPTIMIZER:  
 (4) GENERAC PV LINK S2502  
 BATTERY:  
 (6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

**ENGINEER OF RECORD**

**CUSTOMER INFORMATION**

NAME & ADDRESS:  
 NICK SKATELL  
 1565 CHICORA RD.,  
 DUNN, NC 28334  
 35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

**SINGLE LINE DIAGRAM**

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
 SOLAROFIX

SCALE:AS NOTED PAPER SIZE:17"x11"

DATE:10/19/22 REV:B PV-4.1

MODULE SPECIFICATION	
MODEL	TRINA SOLAR TSM-390 DE09.05 390W
MODULE POWER @ STC	390W
OPEN CIRCUIT VOLTAGE:Voc	40.8V
MAX POWER VOLTAGE:Vmp	33.8V
SHORT CIRCUIT VOLTAGE:Isc	12.14A
MAX POWER CURRENT:Imp	11.54A

INVERTER-1 SPECIFICATIONS	
MODEL	GENERAC PWE CELL 7.6KW
POWER RATING	7600W
MAX OUTPUT CURRENT	32A
CEC WEIGHTED EFFICIENCY	96.5%
MAX INPUT CURRENT	20A
MAX DC VOLTAGE	420V

**CONDUIT SCHEDULE**

TAG ID	CONDUIT SIZE	CONDUCTOR	NEUTRAL	GROUND
1	NONE	(2) PV WIRE 10AWG THHN/THWN-2	NONE	(1) 4 AWG BARE COPPER
2	3/4"EMT OR EQUIV	(4) 10AWG THHN/THWN-2	NONE	(1) 10 AWG THHN/THWN-2
3	3/4"EMT OR EQUIV	(2) 8 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2

**ELECTRICAL CALCULATION**

AC WIRE CALCULATIONS:- MATERIAL:COPPER & TEMPERATURE RATING:75°C

TAG ID	REQUIRED CONDUCTOR AMPACITY								CORRECTED AMPACITY CALCULATION								TERMINAL RATING CHECK			DERATED CONDUCTOR AMPACITY CHECK		
1	8	X	1	=	8	X	1.25	=	10.00A	35	X	0.91	X	1	=	31.85A	20.00A	<	20A	20.00A	<	31.85A
2	8	X	2	=	16	X	1.25	=	20.00A	35	X	0.91	X	0.8	=	25.48A	20.00A	<	20A	20.00A	<	25.48A
3	32	X	1	=	32	X	1.25	=	40A	50	X	0.91	X	1	=	45.5A	40A	<=	40A	40A	<	45.5A

**ELECTRICAL NOTES:**

- MAXIMUM DC/AC VOLTAGE DROP SHALL BE NO MORE THAN 2%.
- BREAKER/FUSE SIZES CONFORMS TO NEC 240.6 CODE SECTION.
- AC GROUNDING ELECTRODE CONDUCTOR SIZED PER NEC 250.66.
- AMBIENT TEMPERATURE CORRECTION FACTOR IS BASED ON NEC 690.31(A).
- AMBIENT TEMPERATURE ADJUSTMENT FACTOR IS BASED ON NEC 310.15(B)(2)(C) AND 310.15(B)(2)(B)
- AC SYSTEM VOLTAGE CORRECTION IS PER NEC 690.7(A)
- CONDUCTORS ARE SIZED PER WIRE AMPACITY TABLE NEC 310.15(B)(16).
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 310.10(D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.10(C).



## WARNING PLACARDS

### WARNING

#### ELECTRIC SHOCK HAZARD

THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

LABEL LOCATION  
DC DISCONNECT, INVERTER  
[PER CODE: NEC 690.41]  
[To be used when inverter is ungrounded]

### WARNING

#### ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS  
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION  
AC DISCONNECT, POINT OF INTERCONNECTION  
[PER CODE: NEC 690.13(B)]

### WARNING

#### ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS  
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION  
AC DISCONNECT, POINT OF INTERCONNECTION  
[PER CODE: NEC 690.13(B)]

**WARNING-Electric Shock Hazard  
No User Serviceable Parts inside  
Contact authorized service provide for assistance**

LABEL LOCATION  
INVERTER, JUNCTION BOXES(ROOF),  
AC DISCONNECT  
[PER CODE: NEC 690.13]

**WARNING:PHOTOVOLTAIC  
POWER SOURCE**

LABEL LOCATION  
CONDUIT, COMBINER BOX  
[PER CODE: NEC690.31(G)(3)]

### WARNING

**DUAL POWER SOURCE SECOND  
SOURCE IS PHOTOVOLTAIC SYSTEM**

LABEL LOCATION  
POINT OF INTERCONNECTION  
[PER CODE: NEC705.12(D)(4)]

#### PHOTOVOLTAIC SYSTEM DC DISCONNECT

**MAX VOLTAGE 480 VDC  
MAX CIRCUIT CURRENT 32 ADC  
MAX RATED OUTPUT CURRENT OF THE  
CHARGE CONTROLLER OR DC TO DC  
CONVERTER (IF INSTALLED) ADC**

LABEL LOCATION  
DC DISCONNECT SWITCH, INVERTER  
[PER. CODE:NEC 690.53]

#### PHOTOVOLTAIC SYSTEM AC DISCONNECT SWITCH

**RATED AC OPERATING CURRENT 32.0 AMPS AC  
AC NOMINAL OPERATING VOLTAGE 240 VAC**

LABEL LOCATION  
AC DISCONNECT , POINT OF INTERCONNECTION  
[PER CODE: NEC 690.54]

### WARNING

**INVERTER OUTPUT CONNECTION  
DO NOT RELOCATE THIS  
OVER-CURRENT DEVICE**

LABEL LOCATION  
POINT OF INTERCONNECTION  
(PER CODE: NEC 705.12(2)(b))  
[ Not Required if Panel board is rated not less than sum of ampere ratings of all overcurrent devices supplying it]

### CAUTION: SOLAR CIRCUIT

LABEL LOCATION  
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLES AT LEAST EVERY 10 FT, AT TURNS AND ABOVE/BELOW PENETRATIONS AND ALL COMBINER/JUNCTION BOXES.  
(PER CODE: NEC1204.5)

### SOLAR DISCONNECT

LABEL LOCATION  
DISCONNECT, POINT OF INTERCONNECTION  
[PER CODE: NEC 690.13(B)]

### CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

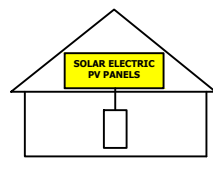
LABEL LOCATION  
WEATHER RESISTANT MATERIAL, DURABLE ADHESIVE, UL969 AS STANDARD TO WEATHER RATING (UL LISTING OF MARKINGS NOT REQUIRED), MIN 3/8" LETTER HEIGHT ARIAL OR SIMILAR FONT NON-BOLD, PLACED WITHIN THE MAIN SERVICE DISCONNECT, PLACED ON THE OUTSIDE OF THE COVER WHEN DISCONNECT IS OPERATED WITH THE SERVICE PANEL CLOSED.  
(PWER CODE: NEC690.15 ,690.13(B))

### RAPID SHUTDOWN SWITCH FOR SOLAR SYSTEM

LABEL LOCATION  
INVERTER, POINT OF INTERCONNECTION  
[PER CODE: NEC 690.56(C)(3)]

### 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**



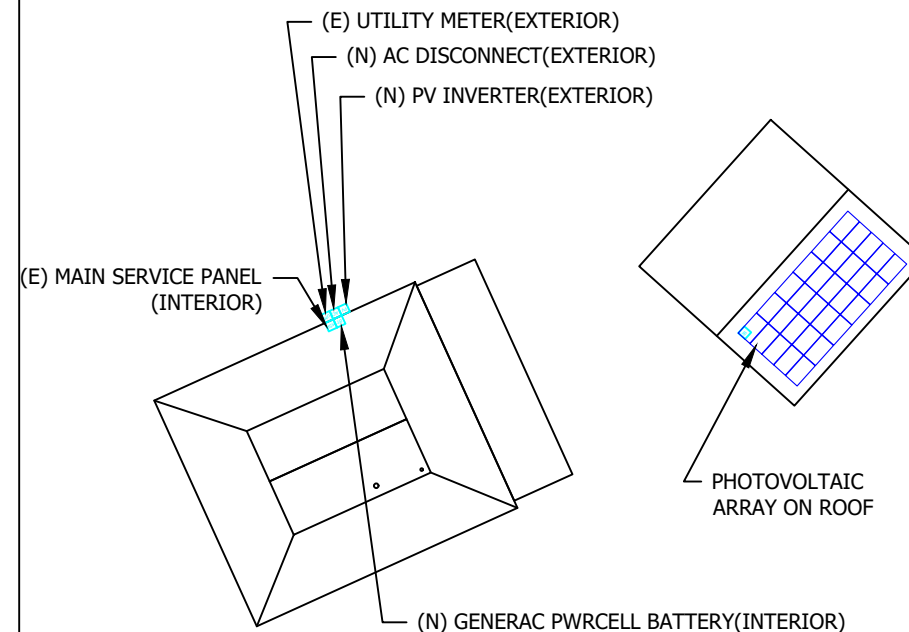
LABEL LOCATION  
AC DISCONNECT, DC DISCONNECT, POINT OF INTERCONNECTION  
(PER CODE: NEC690.56(C)(1)(A))

ALL PLACARDS SHALL BE OF WEATHER PROOF CONSTRUCTION, BACKGROUND ON ALL PLACARDS SHALL BE RED WITH WHITE LETTERING U.O.N.  
PLACARD SHALL BE MOUNTED DIRECTLY ON THE EXISTING UTILITY ELECTRICAL SERVICE.FASTENERS APPROVED BY THE LOCAL JURISDICTION

NOTE:ALL SIGNAGE CANNOT BE HAND WRITTEN NEC 110.21

WARNING

POWER TO THIS BUILDING IS ALSO  
SUPPLIED FROM THE FOLLOWING  
SOURCES WITH DISCONNECTS LOCATED  
AS SHOWN



SYSTEM UTILIZES  
MICRO-INVERTERS  
LOCATED UNDER  
SOLAR MODULE

1565 CHICORA RD., DUNN, NC 28334



### SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

### ENGINEER OF RECORD

### CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

### WARNING PLACARDS

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED

PAPER SIZE:17"x11"

DATE:10/19/22

REV:B

PV-5.0

# Vertex S

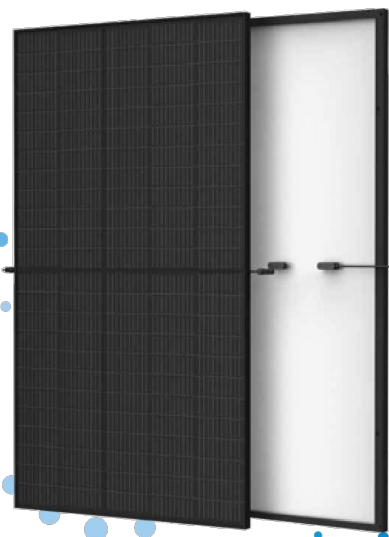
BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE09.05  
POWER RANGE: 380-400 W

**400 W+**  
MAXIMUM POWER OUTPUT

**0/+5 W**  
POSITIVE POWER TOLERANCE

**20.8 %**  
MAXIMUM EFFICIENCY



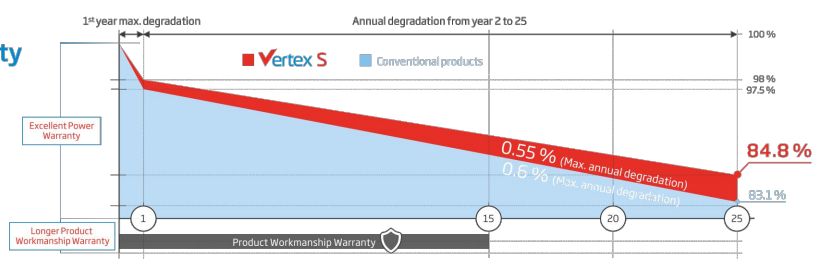
- Outstanding Visual Appearance**
  - Designed with aesthetics in mind
  - Ultra-thin, virtually invisible busbars
  - Excellent cell color control by machine selection
- Small in size, big on power**
  - Generates up to 400 W, 20.8 % module efficiency with high density interconnect technology
  - Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
  - Excellent low light performance (IAM) with cell process and module material optimization
- Universal solution for residential and C&I rooftops**
  - Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
  - Perfect size and low weight for easy handling. Optimized transportation cost
  - Reduces installation cost with higher power bin and efficiency
  - Flexible installation solutions for system deployment
- High Reliability**
  - 6,000 Pa snow load (test load)
  - 4,000 Pa wind load (test load)

## Extended Vertex S Warranty

**2 %**  
1<sup>st</sup> year max. degradation

**0.55 %**  
Max. annual degradation from year 2 to 25

**15 Years**  
Product Workmanship Warranty

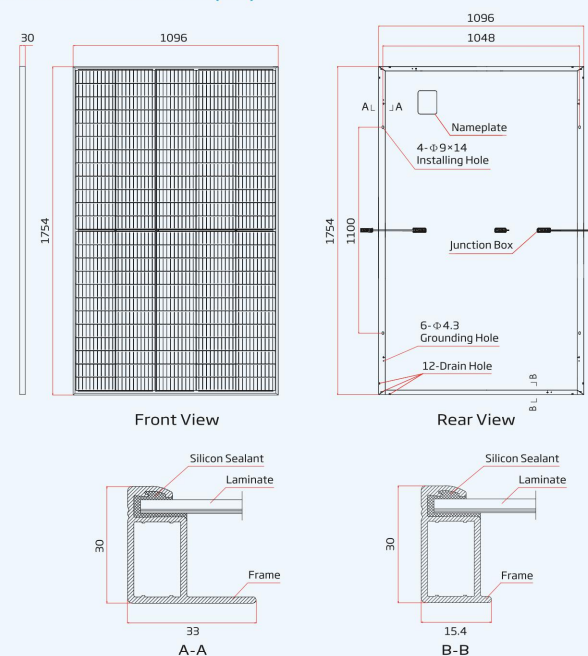


## Comprehensive Product and System Certificates

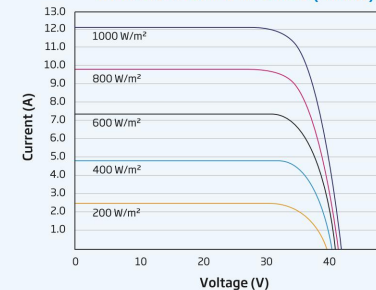


# Vertex S

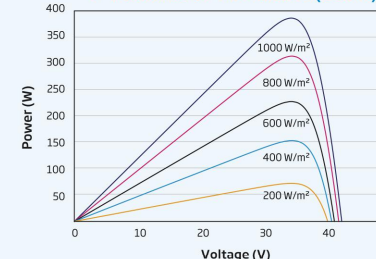
## DIMENSIONS OF PV MODULE (mm)



## I-V CURVES OF PV MODULE (390 W)



## P-V CURVES OF PV MODULE (390 W)



ELECTRICAL DATA (STC)	TSM-380 DE09.05	TSM-385 DE09.05	TSM-390 DE09.05	TSM-395 DE09.05	TSM-400 DE09.05
Peak Power Watts-P <sub>max</sub> (Wp)*	380	385	390	395	400
Power Tolerance-P <sub>max</sub> (W)	0/+5	0/+5	0/+5	0/+5	0/+5
Maximum Power Voltage-V <sub>MPP</sub> (V)	33.4	33.6	33.8	34.0	34.2
Maximum Power Current-I <sub>MPP</sub> (A)	11.38	11.46	11.54	11.62	11.70
Open Circuit Voltage-V <sub>oc</sub> (V)	40.4	40.5	40.8	41.0	41.2
Short Circuit Current-I <sub>sc</sub> (A)	12.00	12.07	12.14	12.21	12.28
Module Efficiency η <sub>m</sub> (%)	19.8	20.0	20.3	20.5	20.8

STC: Irradiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM1.5 \*Measuring tolerance: ±3%

ELECTRICAL DATA (NOCT)	TSM-380 DE09.05	TSM-385 DE09.05	TSM-390 DE09.05	TSM-395 DE09.05	TSM-400 DE09.05
Maximum Power-P <sub>max</sub> (Wp)	286	290	294	298	302
Maximum Power Voltage-V <sub>MPP</sub> (V)	31.4	31.6	31.8	31.9	32.1
Maximum Power Current-I <sub>MPP</sub> (A)	9.12	9.18	9.24	9.32	9.38
Open Circuit Voltage-V <sub>oc</sub> (V)	38.0	38.2	38.4	38.6	38.8
Short Circuit Current-I <sub>sc</sub> (A)	9.67	9.73	9.78	9.84	9.90

NOCT: Irradiance at 800 W/m², Ambient Temperature 20 °C, Wind Speed 1 m/s.

MECHANICAL DATA	
Solar Cells	Monocrystalline
No. of cells	120 cells
Module Dimensions	1754 × 1096 × 30 mm
Weight	21.0 kg
Glass	3.2 mm, High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Backsheet	Black-White
Frame	30 mm Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0 mm² Landscape: 1100/1100 mm Portrait: 280/280 mm*
Connector	TS4/MC4 EV02*

\*Special order only

TEMPERATURE RATINGS	MAXIMUM RATINGS
NOCT (Nominal Operating Cell Temperature)	43 °C (±2 K)
Temperature Coefficient of P <sub>max</sub>	-0.34 %/K
Temperature Coefficient of V <sub>oc</sub>	-0.25 %/K
Temperature Coefficient of I <sub>sc</sub>	0.04 %/K
Operational Temperature	-40 to +85 °C
Maximum System Voltage	1500 V DC (IEC)
Max Series Fuse Rating	20 A

WARRANTY	PACKAGING CONFIGURATION
15 Year product workmanship warranty	Modules per box 36 pieces
25 Year power warranty	Modules per 40' container 936 pieces
2% First year degradation	
0.55% Annual power degradation	

(Please refer to the applicable limited warranty for details)



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.  
© 2021 Trina Solar Limited, All rights reserved, Specifications included in this datasheet are subject to change without notice. Version number: TSM\_EN\_2021\_C

www.trinasolar.com



Sustainable Energy & Lighting Solutions  
Your future is brighter with us!

## SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KW

## ENGINEER OF RECORD

## CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

## MODULE SPECSHEET

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE: AS NOTED

PAPER SIZE: 17"x11"

DATE: 10/19/22

REV: B

PV-6.0



## SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

## ENGINEER OF RECORD

## CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

## INVERTER SPECSHEET

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED PAPER SIZE:17"x11"

DATE:10/19/22 REV:B PV-6.1

## Specifications

### FEATURES AND MODES

ISLANDING <sup>4</sup> :	Yes
GRID SELL:	Yes
SELF CONSUMPTION:	Yes
PRIORITIZED CHARGING FROM RENEWABLES:	Yes
GRID SUPPORT - ZERO EXPORT:	Yes
ESS PCS OPERATION MODES (IMPORT ONLY, EXPORT ONLY):	Yes

### ADDITIONAL FEATURES

SUPPORTED COMMUNICATION INTERFACES:	REbus™, CANbus, Ethernet
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
BACKUP LOADS DISCONNECT <sup>5</sup> :	Yes, 50 A Circuit Breaker
INVERTER BYPASS SWITCH:	Automatic
WARRANTY:	10 Years

### STANDARDS COMPLIANCE

SAFETY:	UL 1741 SA, CSA 22.2, UL 1998
GRID CONNECTION STANDARDS:	IEEE 1547, Rule 21, Rule 14H, 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)
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 - FAHRENHEIT (CELSIUS):	-4 to 122 °F (-20 to 50 °C) <sup>6</sup>
ENCLOSURE TYPE:	Type 3R

### INSTALLATION GUIDELINES

BATTERY TYPES SUPPORTED:	PWRcell™ Battery
MODULE STRING SIZE PER PV LINK OPTIMIZER:	Varies, refer to PV Link Installation Manual
MAXIMUM RECOMMENDED DC POWER FROM PV <sup>6</sup> :	10 kW (10), 15 kW (30)

<sup>4</sup>3Ø inverters offer islanding for 1Ø loads.

<sup>5</sup>Includes ambient temperature rising from inverter operation. Reduced power at extreme temperatures.

Specifications listed in this document are achieved with firmware version 13310 or greater. Confirm inverter has latest firmware to ensure full performance.

<sup>6</sup>Values provided for PV-only or small storage systems. Additional PV power is permissible if sufficient battery storage capacity is installed.

Generac Power Systems, Inc.  
545 W29290 Hwy. 59, Waukesha, WI 53189  
[www.Generac.com](http://www.Generac.com) | 888-GENERAC (436-3722)

A0000528185 REV G

©2020 Generac Power Systems. All rights reserved.  
Specifications are subject to change without notice.

# GENERAC<sup>®</sup> PWRCELL

7.6kW 1Ø PWRcell Inverter with CTs  
Model #: X7602 (Ordering SKU: APKE00014)

11.4 kW 3Ø PWRcell Inverter with CTs  
Model #: X11402 (Ordering SKU: APKE00013)



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. Ideal for self-supply, backup power, zero-export and energy cost management, the PWRcell Inverter is the industry's most feature-rich line of inverters, available in single-phase and three-phase models.

### FEATURES & BENEFITS

- Single inverter for grid-tied solar with smart battery 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
- Free system monitoring included via PWRview™ Web Portal and Mobile App

AC OUTPUT/GRID-TIE	MODEL X7602	MODEL X11402
CONT. GRID-TIED AC POWER @ 50°C (122°F):	7600 W	11400 W
AC OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY:	60 Hz	
MAXIMUM CONTINUOUS OUTPUT CURRENT:	32 A, RMS	
GROUND-FAULT ISOLATION DETECTION:	Included	
CHARGE BATTERY FROM AC:	Yes	
THD (CURRENT):	< 2%	
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7 W	

DC INPUT	MODEL X7602	MODEL X11402
DC INPUT VOLTAGE RANGE:	360-420 VDC	
NOMINAL DC BUS VOLTAGE:	380 VDC	
DC DISTRIBUTION INPUT BREAKERS:	4 x 2P30 A	
MAX INPUT CURRENT PER DC INPUT:	30 A	
REVERSE-POLARITY PROTECTION:	Yes	
TRANSFORMERLESS, UNGROUNDED:	Yes	
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7 W	
DC BUS EXPORT FUSES (+/-):	40 A	
2-POLE DISCONNECTION:	Yes	

AC OUTPUT/ISLANDED	MODEL X7602	MODEL X11402
MAX. CONT. ISLANDED AC POWER WITHOUT AN EXTERNAL TRANSFER SWITCH <sup>1</sup> :	7600 W	
MAX. CONT. ISLANDED AC POWER W/ EXTERNAL TRANSFER SWITCH AND SINGLE 6 MODULE BATTERY CABINET <sup>2</sup> :	9000 W	
MAX. CONT. ISLANDED AC POWER W/ EXTERNAL TRANSFER SWITCH AND 2 BATTERY CABINETS (8 MODULES MINIMUM) <sup>3</sup> :	11000 W	9600 W-11000 W <sup>4</sup>
PEAK MOTOR STARTING CURRENT (2 SEC):	50 A, RMS	
AC BACKUP OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 1Ø VAC
AC FREQUENCY:	60 Hz	
THD (VOLTAGE):	< 2%	
ALLOWABLE SPLIT PHASE IMBALANCE:	Up to 30%	

<sup>1</sup>When islanded, continuous power output is restricted to 7.6kW unless backup power is routed through an external transfer switch.

<sup>2</sup>Peak performance, values provided for 40°C (104°F).

<sup>3</sup>In Island mode X11402 protected loads only supply 2 phases 120 VAC L-N, 208 L-L which results in lower power than in grid tied 3 phase mode. The low value of the range is for full L-L loading while high value of the range is full L-N loading

### SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

### ENGINEER OF RECORD

### CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

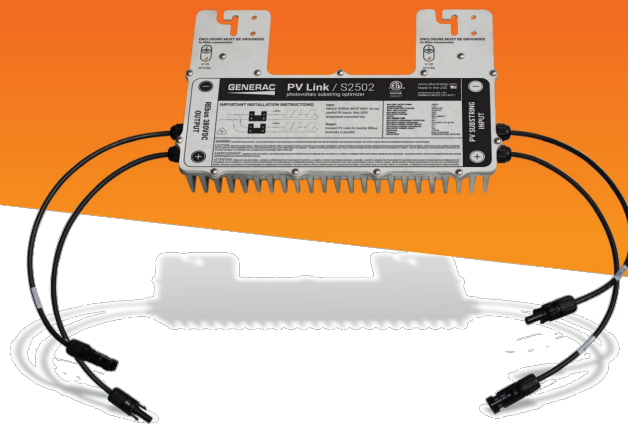
### OPTIMIZER SPECSHEET

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED PAPER SIZE:17"x11"

DATE:10/19/22 REV:B PV-6.2



#### FEATURES:

Fast, simple installation

Lower failure risk than module-level optimizers

NEC 2017 rapid shutdown compliant with SnapRS™

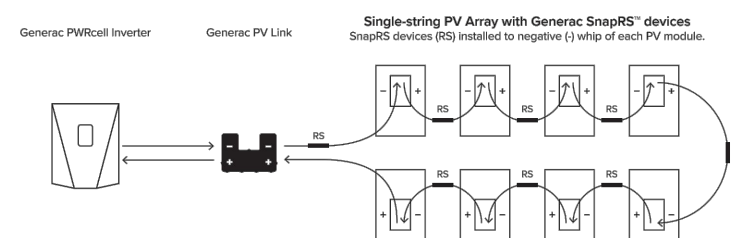
## PV Link™

2500W MPPT Substring Optimizer  
Model: APKE00010 Certification Model Reference: S2502

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

#### ADDITIONAL FEATURES

- Quick connections with MC4 connectors
- 2500W capacity
- Compatible with high-voltage smart batteries
- Cost-effective solution for high-performance PV
- Ground-fault protection



**GENERAC**

Generac Power Systems, Inc.  
S45 W29290 Hwy. 59, Waukesha, WI 53189  
www.Generac.com 1-888-GENERAC (1-888-436-3722)

## Specifications

### PWRCELL PV LINK (APKE00010)

RATED POWER	2500 W	PROTECTIONS	Ground-fault, Arc-fault (Arc-fault Type 1 AFCL, Integrated)
PEAK EFFICIENCY	99%	MAX OPERATING TEMP	70 °C
MPPT VOLTAGE RANGE	60-360 VMP	SYSTEM MONITORING	PWRview Web Portal and Mobile App
MAX INPUT VOLTAGE	420 VOC; max when cold	ENCLOSURE	Type 3R
MAX OUTPUT	420 VOC	WEIGHT	7.3 lb
NOMINAL OUTPUT (REBUS™)	380 VDC	DIMENSIONS (L,W,H)	2" x 15.4" x 9.6"
MAX OUTPUT CURRENT	8 A	COMPLIANCE	UL 1741, CSA 22.2
MAX SHORT CIRCUIT CURRENT (ISC)	18 A	WARRANTY	25 Years
STANDBY POWER	< 1 W		

Specifications subject to change without notice.

**GENERAC**

Generac Power Systems, Inc.  
S45 W29290 Hwy. 59, Waukesha, WI 53189  
www.Generac.com 1-888-GENERAC (1-888-436-3722)

Part No. A0000528162 REV A

## SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

## ENGINEER OF RECORD

## CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

ENPHASE ENERGY ENCHARGE  
10 SPECSHEET

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED

PAPER SIZE:17"x11"

DATE:10/19/22

REV:B

PV-6.3

## Specifications

### PWRcell™ BATTERY CONFIGURATIONS

BATTERY MODULE SERIES:	EX			DCB				
BATTERY MODULES:	3	4	5	6	3	4	5	6
USABLE ENERGY:	9 kWh	12 kWh	15 kWh	18 kWh	8.6 kWh	11.4 kWh	14.3 kWh	17.1 kWh
AVG. AC POWER OVER COMPLETE DISCHARGE CYCLE:	3.4 kW	4.5 kW	5.6 kW	6.7 kW	3.4 kW	4.5 kW	5.6 kW	6.7 kW
MAX. CONT. AC POWER @ 40°C (104°F):	4.5 kW	6 kW	7.5 kW	9 kW	4.5 kW	6 kW	7.5 kW	9 kW
PEAK MOTOR STARTING CURRENT (2 SEC) - A, RMS	25	33	42	50	25	33	42	50
REbus™ VOLTAGE - INPUT/OUTPUT:	360-420 VDC							
NOMINAL VOLTAGE:	43.2 VDC			46.8 VDC				
DC-DC ROUND-TRIP EFFICIENCY:	96.5%							
MAX. AMBIENT OPERATING TEMPERATURE RANGE:	14 to 122 °F (-10 to 50 °C)			41 to 113 °F (5 to 45 °C)				
RECOMMENDED AMBIENT OPERATING TEMPERATURE (FULL POWER)*:	32 to 104 °F (0 to 40 °C)			55 to 86 °F (13 to 30 °C)				
MAXIMUM INSTALLATION ALTITUDE - FT (M):	9834 (3000)							
DIMENSIONS, L x W x H - IN (MM):	22" x 10" x 68" (559 x 254 x 1727)							
WEIGHT, ENCLOSURE - LB (KG):	111 (50)							
WEIGHT, INSTALLED - LB (KG):	282 (128)	340 (154)	397 (180)	454 (206)	276 (125)	331 (150)	386 (175)	441 (200)
WARRANTY - LI-ION MODULES:	10 Years, (7.56MWh)							
WARRANTY - ELECTRONICS AND ENCLOSURE:	10 Years							
COMMUNICATION PROTOCOL:	REbus™ DC Nanogrid™							
COMPLIANCE:	UL 9540, UL 1973, UL 1642, CSA 22.2 #107.1							

\*Performance may be limited outside of recommended operating temperature range

### PWRcell ACCESSORIES

The PWRcell Battery Cabinet (APKE00007) is rated for indoor use only. If installing outdoors, the PWRcell Outdoor Rated Battery Cabinet (APKE00028) must be used. 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.

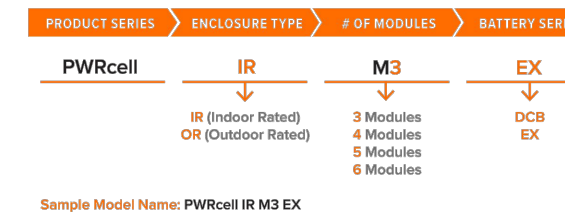
Note: When adding modules, be sure all modules within an individual cabinet are of the same series type (i.e. EX or DCB).

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

A0000528139 REV F

©2020 Generac Power Systems. All rights reserved.  
Specifications are subject to change without notice.

### PWRcell MODEL BUILDER



GENERAC

# PWRCELL

PWRcell Battery Cabinet (Ordering SKU: APKE00007)  
3.0kWh PWRcell EX Battery Module  
Model # / Ordering SKU: G0080000  
2.85kWh PWRcell DCB Battery Module  
Model #: BJ-DCB05ZKAX (Ordering SKU: A0000391219)

The PWRcell™ Battery Cabinet is a modular smart battery platform that allows for a range of configurations to suit any need, small or large. No other smart battery offers the power and flexibility of PWRcell. Whether for backup power or smart energy management, PWRcell has power and capacity options for every need, without sacrificing flexibility or function.



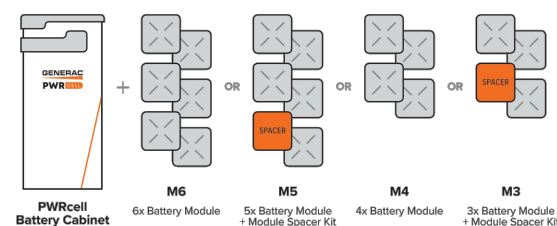
### PWRcell BATTERY CABINET DESIGN

The PWRcell Battery Cabinet allows system owners the flexibility to scale from an economical 8.6kWh to a massive 18kWh by installing additional battery modules to the PWRcell Battery Cabinet. When needs change, 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.

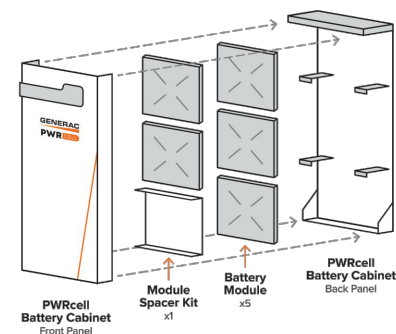
### FEATURES & BENEFITS

- Connect 2 PWRcell Battery Cabinets to a single PWRcell Inverter for up to 36kWh of storage
- Best-in-class battery backup power
- Plug-and-play with PWRcell Inverter and PV Link™
- Time-of-use (TOU) and zero-export ready
- Residential and commercial application ready.
- Outdoor-rated battery cabinet available as an upgrade

### BATTERY CONFIGURATION GUIDE



### BATTERY CABINET ASSEMBLY



The right way to attach almost anything to metal roofs!

# S-5!<sup>®</sup>

## The Right Way!

### CorruBracket™

CorruBracket™ can be used to mount almost anything to corrugated metal roofing and is compatible with 7/8" and 3/4" corrugated roofing. No messy sealants to apply! No chance for leaks! The CorruBracket comes with factory-applied butyl sealant already in the base, and the S-5!<sup>®</sup> patented reservoir conceals the sealant, preventing UV degradation.

Installation is simple! CorruBracket is mounted directly into the supporting structure of the roof, i.e. roof decking, wood or steel purlins, or trusses. No surface preparation is necessary; simply wipe away excess oils and debris, peel the release paper, align, and apply. Secure through the pre-punched holes using the appropriate screws for the supporting structure.

CorruBracket is so strong, it will even support heavy-duty applications like snow retention. For corrugated profiles, the CorruBracket is the perfect match for our ColorGard<sup>®</sup> snow retention system. CorruBracket is economical and facilitates quick and easy installation.



CorruBracket™



S-5!<sup>®</sup> CorruBracket™ is the right way to attach almost anything to 7/8" and 3/4" corrugated roofing, including PV via DirectAttached™ or rail methods.

888-825-3432 | www.S-5.com

# S-5!<sup>®</sup>

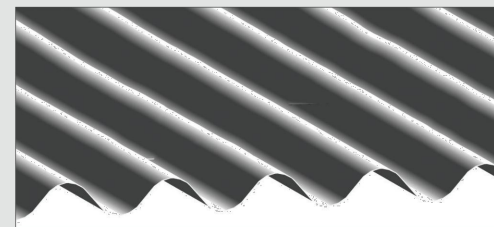
## The Right Way!

CorruBracket™ is extremely versatile. It can be used for almost any attachment need on 7/8" and 3/4" corrugated metal roofing. No messy sealants to apply. The factory-applied butyl sealant waterproofs and makes installation a snap!

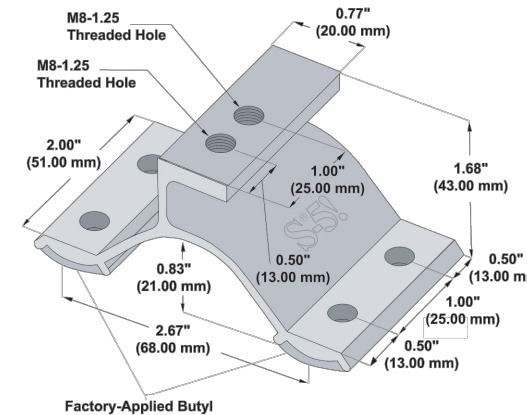
Each CorruBracket™ comes with factory-applied butyl sealant in the base. CorruBracket is compatible with most common metal roofing materials. For design assistance, ask your distributor, or use our web-based calculator at [www.S-5.com](http://www.S-5.com) for job-specific system engineering and design of your next snow retention project. Also, please visit our website for more information including CAD details, metallurgical compatibilities and specifications.

The CorruBracket has been tested for load-to-failure results on wood decking, and metal and wood purlins. The independent lab test data found at [www.S-5.com](http://www.S-5.com) can be used for load-critical designs and applications. S-5!<sup>®</sup> holding strength is unmatched in the industry.

### Example Profile



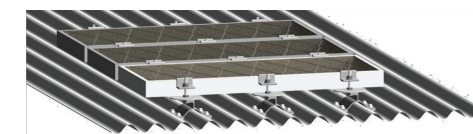
### CorruBracket™



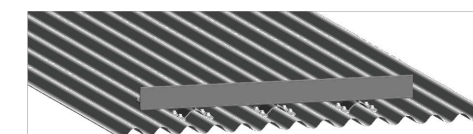
Please note: All measurements are rounded to the second decimal place. Contact your distributor for information about hardware requirements.

### Example Applications

S-5-PV Kit (DirectAttached™ or Rail)



ColorGard<sup>®</sup>



#### S-5!<sup>®</sup> Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents and trademarks visit the S-5! website at [www.S-5.com](http://www.S-5.com).

Copyright 2013, Metal Roof Innovations, Ltd. S-5! products are patent protected. S-5! aggressively protects its patents, trademarks, and copyrights. Version 120517.

Distributed by



### SYSTEM INFORMATION

DC SYSTEM SIZE : 11700W  
AC SYSTEM SIZE : 7600W

MODULES:  
(30) TRINA SOLAR TSM-390 DE09.05 390W  
INVERTER:  
(1) GENERAC PWR CELL X7602, 7600W  
OPTIMIZER:  
(4) GENERAC PV LINK S2502  
BATTERY:  
(6) GENERAC PWRCELL EX BATTERY MODULE, 12.0KWH

### ENGINEER OF RECORD

### CUSTOMER INFORMATION

NAME & ADDRESS:  
NICK SKATELL  
1565 CHICORA RD.,  
DUNN, NC 28334  
35°30'54.4"N 78°67'48.1"W

AHJ: HARNETT COUNTY

UTILITY: DUKE ENERGY PROGRESS

### RACKING SPECSHEET

PROJECT NUMBER:

DESIGNER/CHECKED BY:  
SOLAROFIX

SCALE:AS NOTED

PAPER SIZE:17"x11"

DATE:10/19/22

REV:B

PV-6.4