

# PROJECT DESCRIPTION:

22 X HANWHA Q CELLS SOLAR Q.PEAK DUO-G5 320  
 320W MONO MODULES  
 GROUND MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 SYSTEM SIZE: 7.04 kW DC STC  
 ARRAY AREA #1: 399.08 SQ FT.

## EQUIPMENT SUMMARY

22 HANWHA Q CELLS SOLAR Q.PEAK DUO-G5 320  
 320W MONO MODULES  
 03 GENERAC PV LINK S2502 POWER OPTIMIZERS  
 01 GENERAC PWRCELL X7602 INVERTER

## APPLICABLE CODES & STANDARDS

BUILDING: NCBC 2018  
 ELECTRICAL: NEC 2017

## DESIGN SPECIFICATION

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

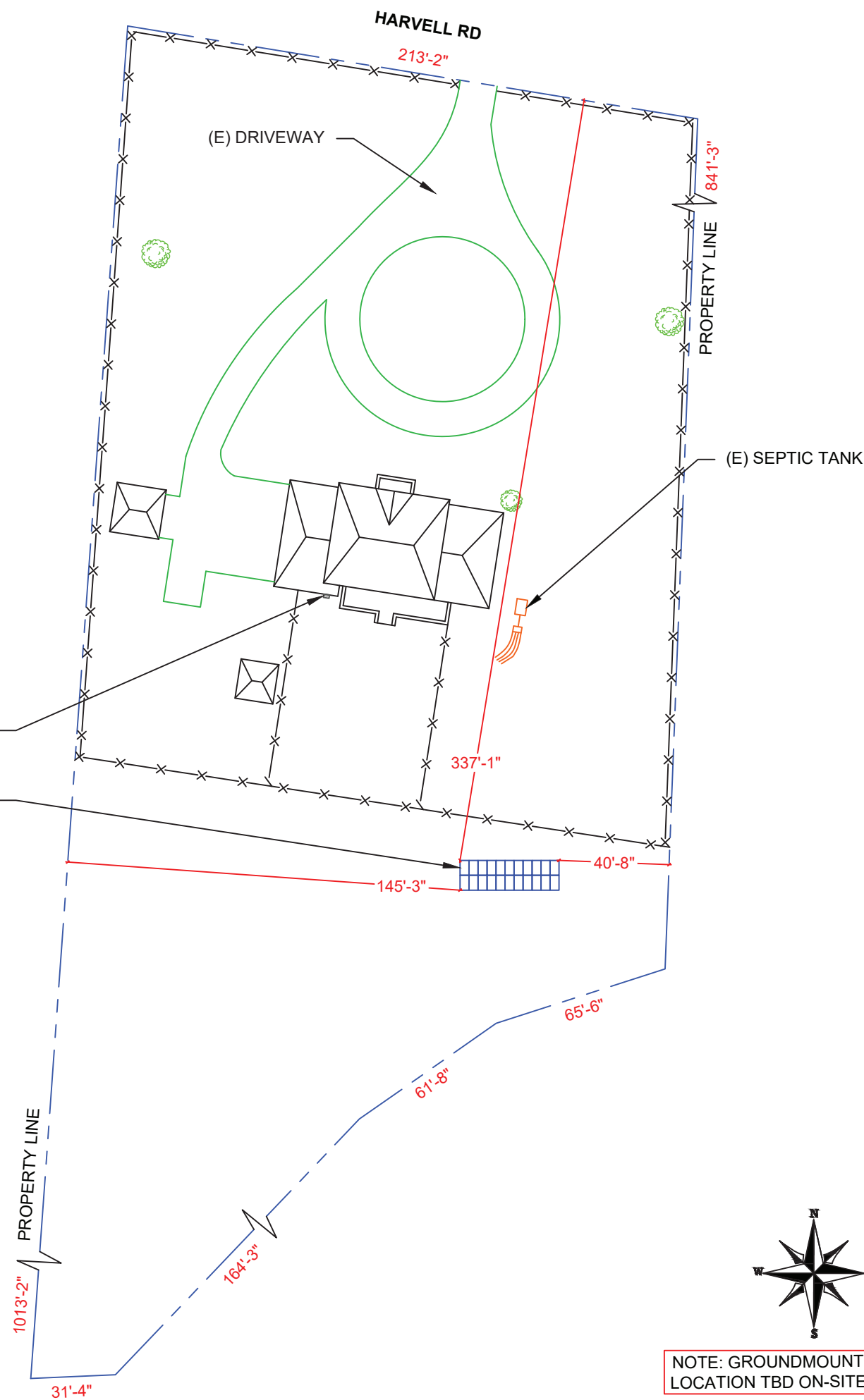
## AUTHORITIES HAVING JURISDICTION

BUILDING: HARNETT COUNTY  
 ZONING: HARNETT COUNTY  
 UTILITY: DUKE ENERGY

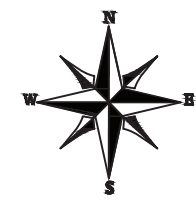
# 1 PLOT PLAN WITH ROOF PLAN

PV-1

SCALE: 1" = 50'-0"

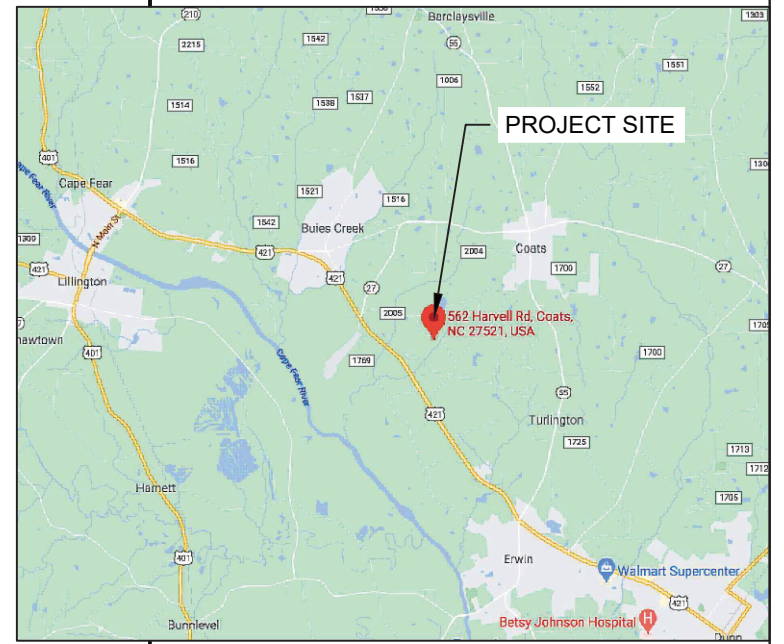


NOTE: GROUND MOUNT LOCATION TBD ON-SITE



# 2 HOUSE PHOTO

PV-1 SCALE: NTS



# 3 VICINITY MAP

PV-1 SCALE: NTS

## SHEET INDEX

- PV-1 PLOT PLAN & VICINITY MAP
- PV-2 ROOF PLAN & MODULES
- PV-2A STRING LAYOUT
- PV-3 GROUNDING DETAILS
- PV-3A GROUNDING DETAILS
- PV-4 ELECTRICAL LINE DIAGRAM
- PV-5 WIRING CALCULATIONS
- PV-6 to 10 EQUIPMENT SPECIFICATIONS

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.  
 03/03/2021  
  


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REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal  
 DATE: 02/11/2021

## PROJECT NAME & ADDRESS

LORENZA CREEKMUR  
 RESIDENCE  
 562 HARVELL RD.,  
 COATS, NC 27521

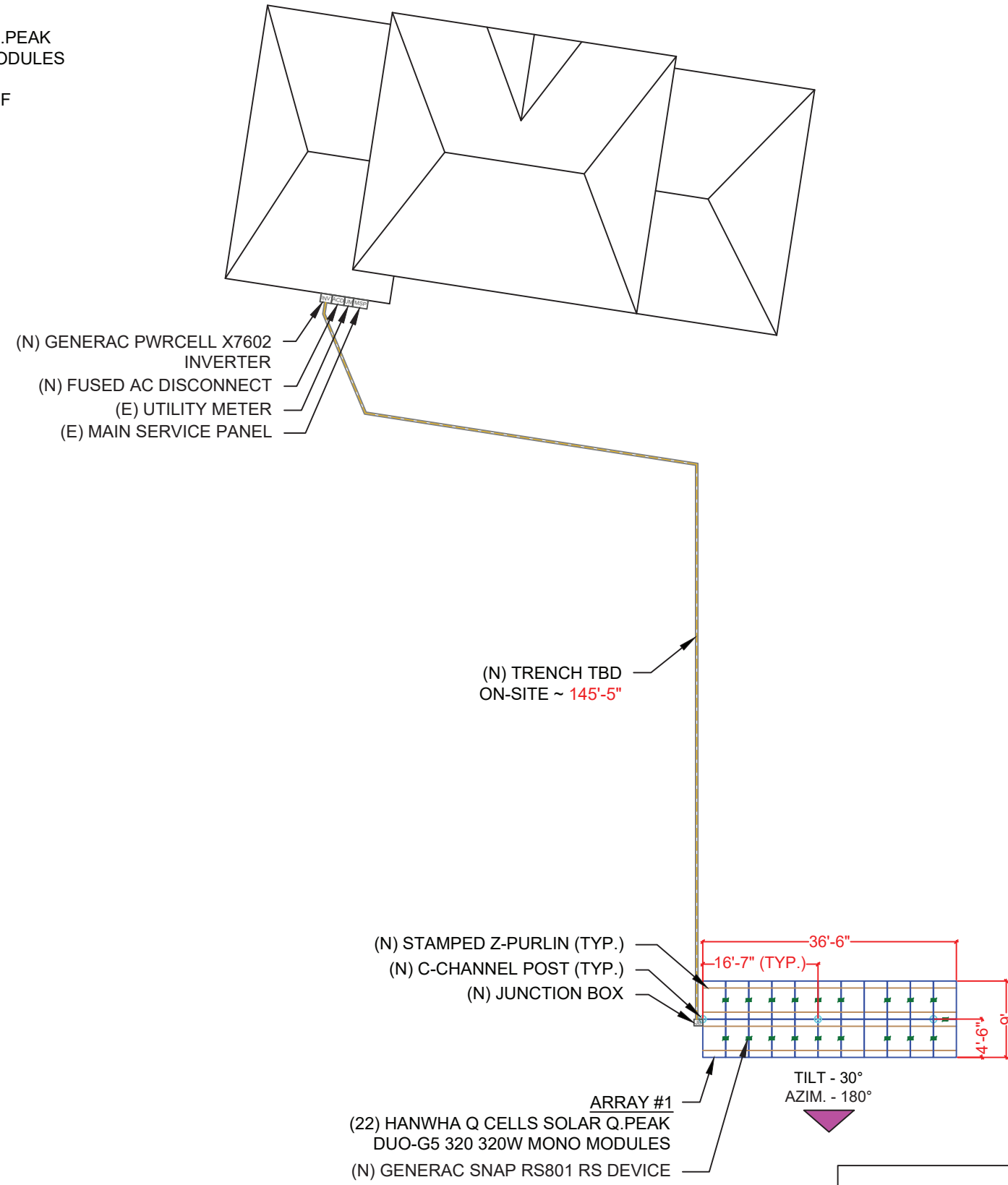
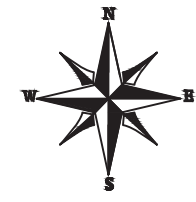
SHEET NAME  
**PLOT PLAN & VICINITY MAP**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-1**

**MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 22 MODULES  
 MODULE TYPE = HANWHA Q CELLS SOLAR Q.PEAK  
 DUO-G5 320 320W MONO MODULES  
 MODULE WEIGHT = 41.2 LBS / 18.7 KG.  
 MODULE DIMENSIONS = 66.3"x 39.4" = 18.14 SF



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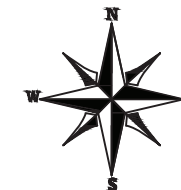
PROJECT NAME & ADDRESS  
**LORENZA CREEKMUR RESIDENCE**  
 562 HARVELL RD.,  
 COATS, NC 27521

SHEET NAME  
**ROOF PLAN & MODULES**  
 SHEET SIZE  
**ANSI B  
 11" X 17"**  
 SHEET NUMBER  
**PV-2**

ON-SITE CUSTOMER APPROVAL: \_\_\_\_\_

**LEGEND**

[JB]	- JUNCTION BOX	○	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
[INV]	- INVERTER	●	- ROOF ATTACHMENT
[DC]	- INTEGRATED DC DISCONNECT	---	- RAFTERS
[SLD]	- SOLAR LOAD CENTER	- - -	- CONDUIT
[PVM]	- PRODUCTION METER	[CB]	- COMBINER BOX
[MSP]	- MAIN SERVICE PANEL		



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SHEET NAME

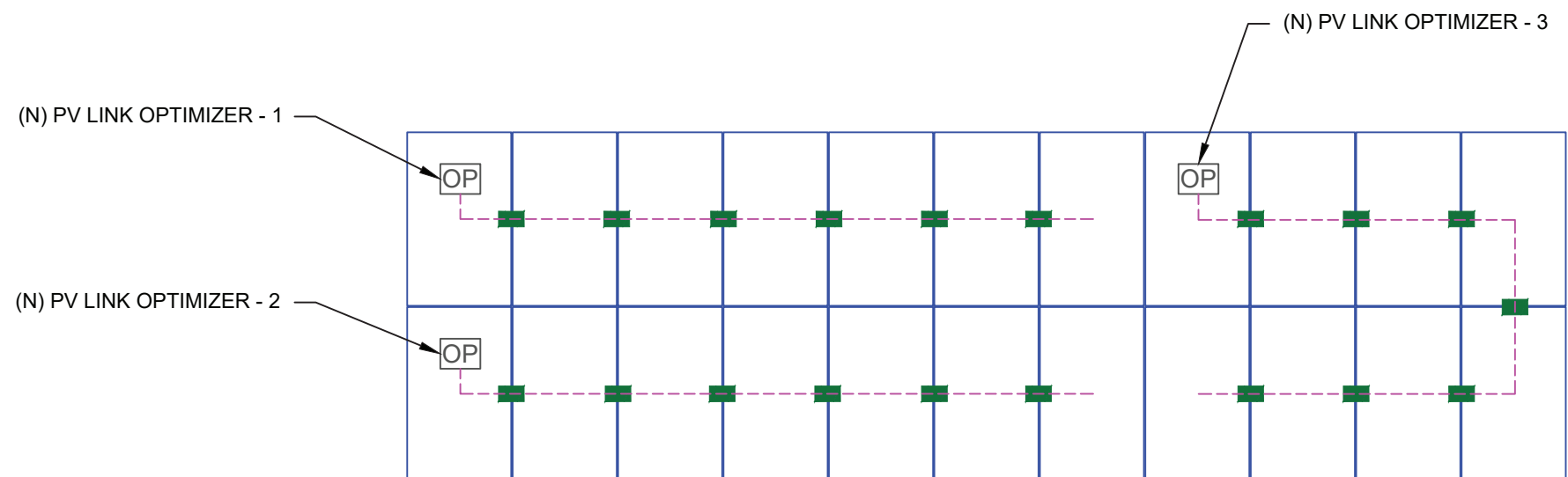
STRING  
LAYOUT

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-2A



1 ROOF PLAN WITH STRING LAYOUT

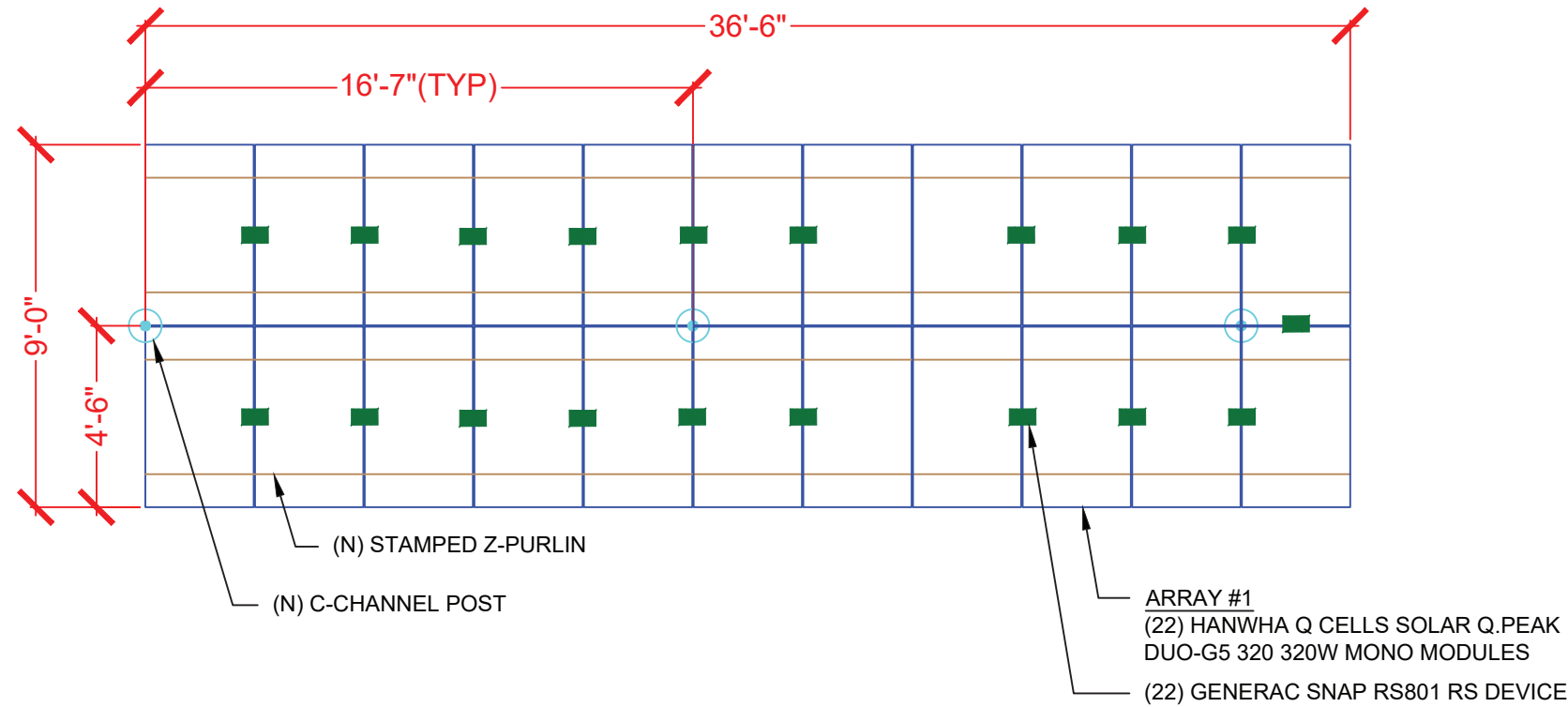
PV-2A

SCALE: 3/16" = 1'-0"

# 1 RACKING DETAIL (Top View)

PV-3

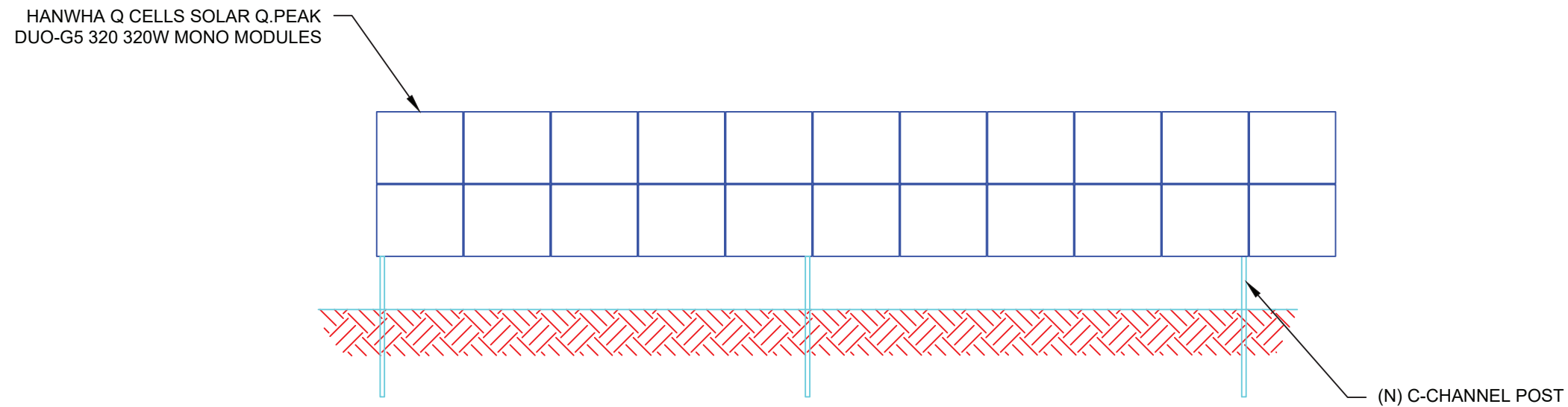
SCALE: 47/256" = 1'-0"



# 2 RACKING DETAIL (Front View)

PV-3

SCALE: 47/256" = 1'-0"

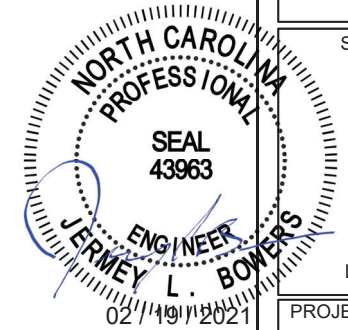


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SHEET NAME

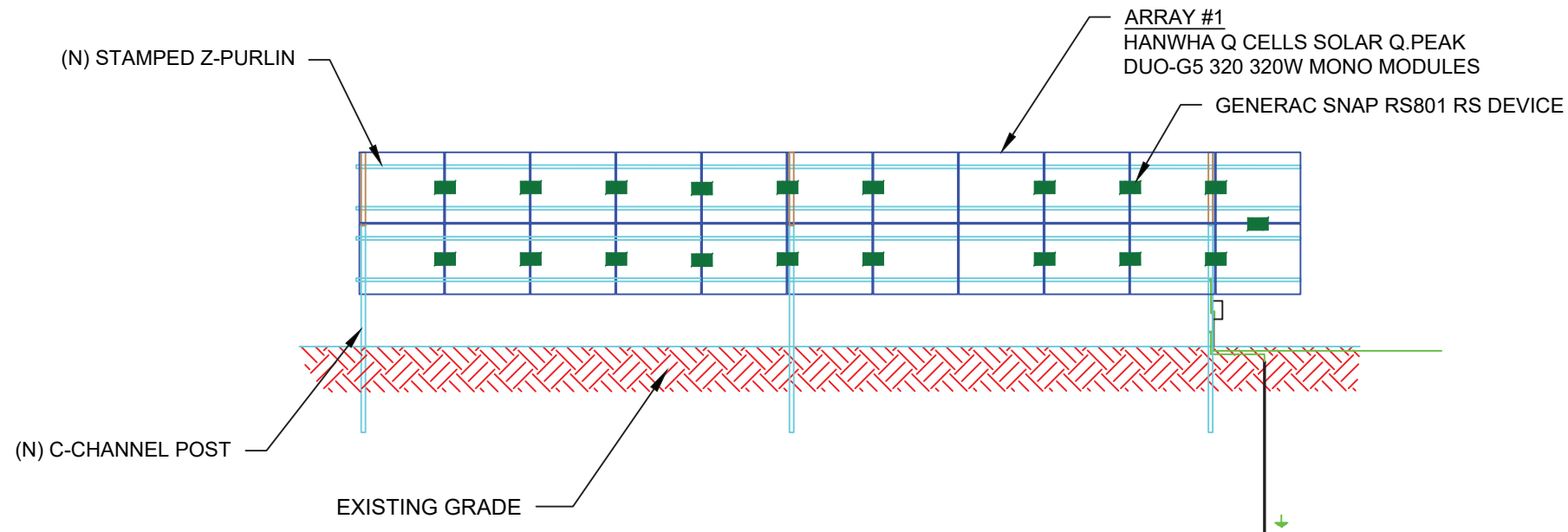
GROUNDING  
 DETAIL

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-3



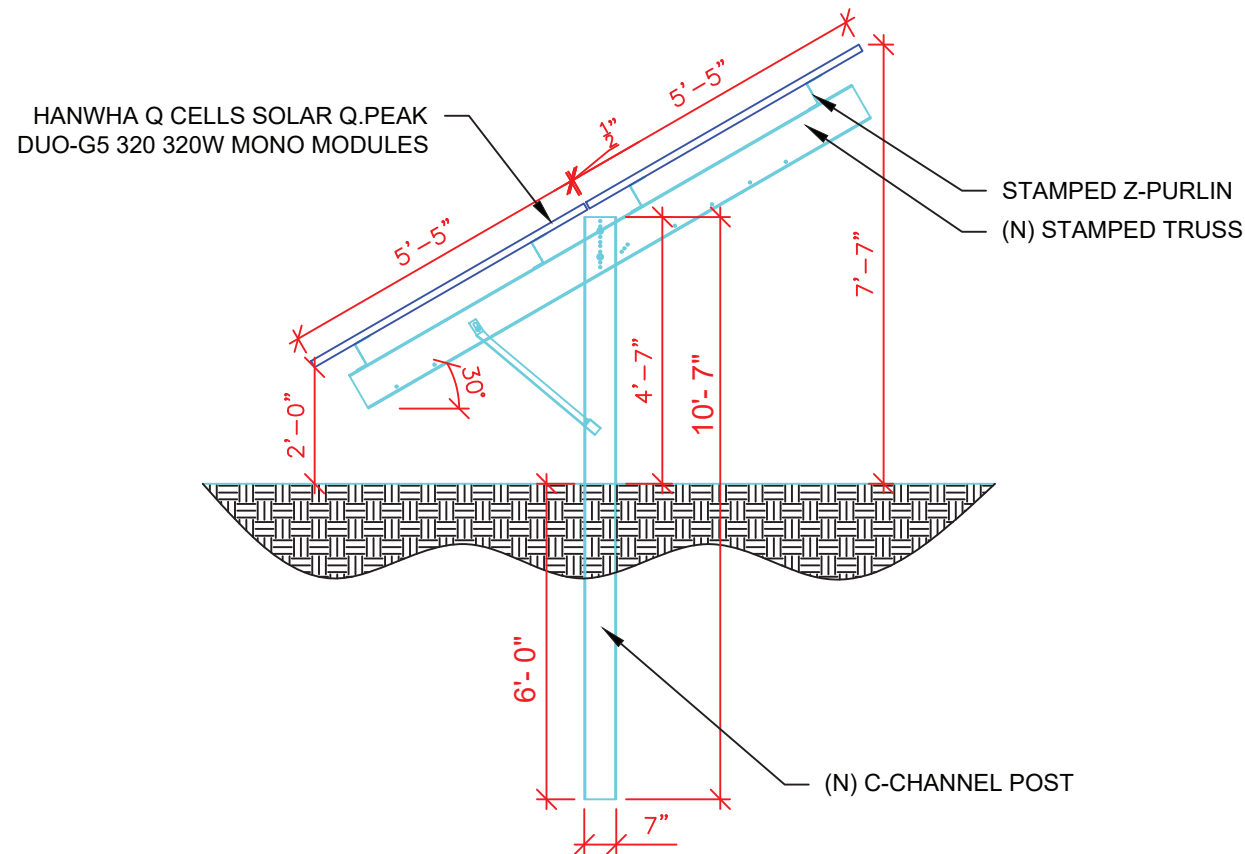
**1 RACKING DETAIL (Rear View)**

PV-3A

SCALE: 5/32" = 1'-0"

IBC 2015	
1603.1.1 Floor Live Load	N/A
1603.1.2 Roof Live Load	20 psf
1603.1.3 Roof Snow Load	
$P_g =$	15 psf
$P_f =$	9.07 psf
$C_e =$	0.9
$I_s =$	0.80
$C_t =$	1.2
1603.1.4 Wind Load	
$V =$	108 MPH
$I_w =$	1.00
Exposure	C
1603.1.5 Earthquake Design Data	
$S_{D_s} =$	0.188
$S_{D1} =$	0.134
Site Class	D
$I_e =$	1.00
SDC	C
Base Shear V	18.96 lb

Soil Assumed to be Stiff



Column	C3.9x6.9x.14
Main	C3.9x6.9x.12
Purlin	Z5.15x2.1x0.12
Main Beam Column Connection	(2) Diameter 3/4 Bolts
Purlin to Main Beam Connection	(1) Diameter 3/4 Bolts

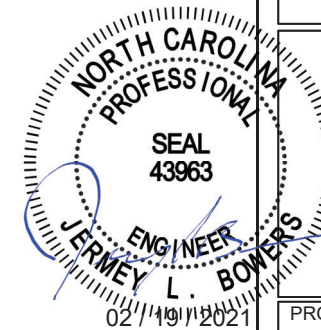
**2 RACKING DETAIL (Side View)**

PV-3A

SCALE: NTS



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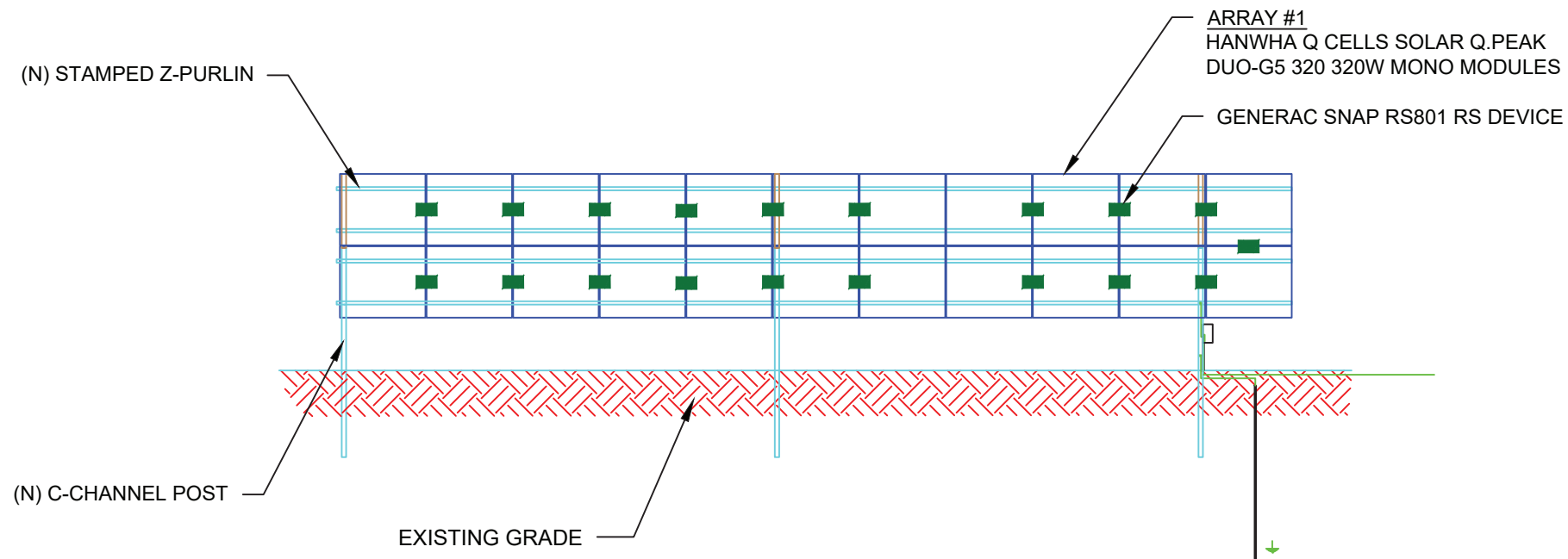
PROJECT NAME & ADDRESS

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SHEET NAME  
**GROUNDING DETAIL**

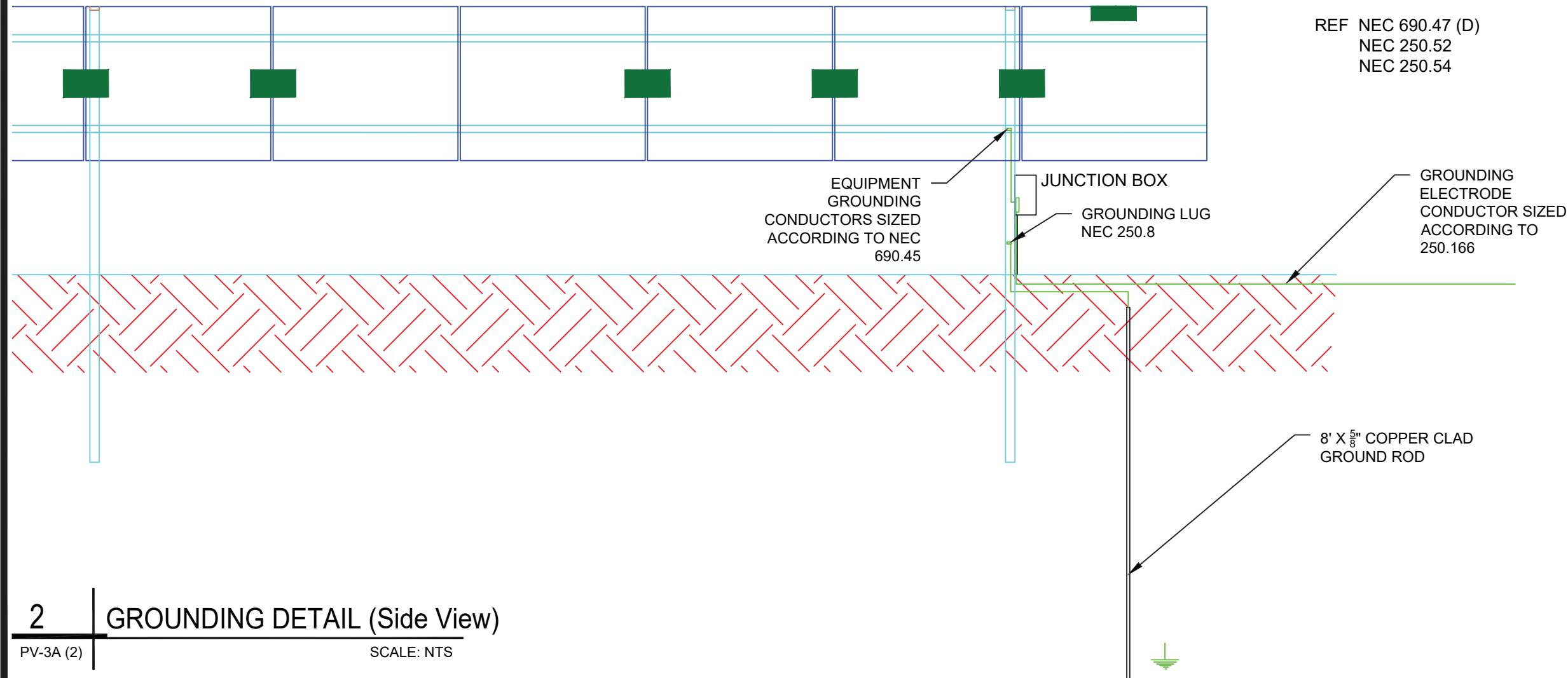
SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-3A**



**1** RACKING DETAIL (Rear View)

PV-3A (2) SCALE: 5/32" = 1'-0"

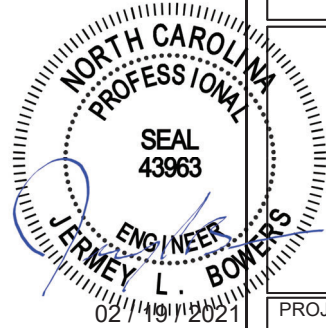


**2** GROUNDING DETAIL (Side View)

PV-3A (2) SCALE: NTS

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SHEET NAME  
**GROUNDING  
 DETAIL**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-3A (2)**

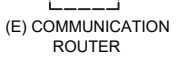
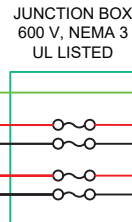
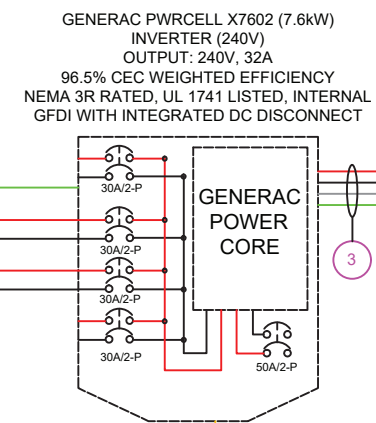
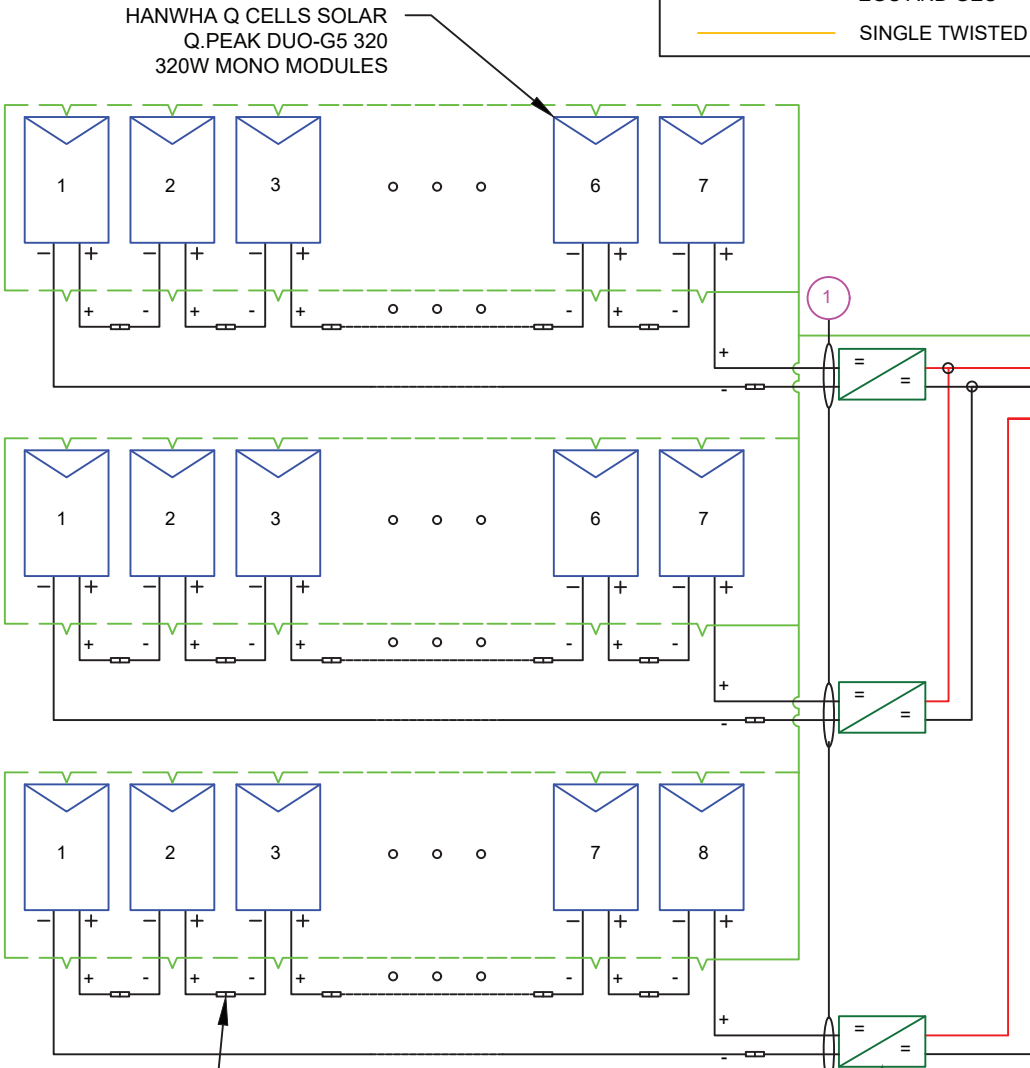
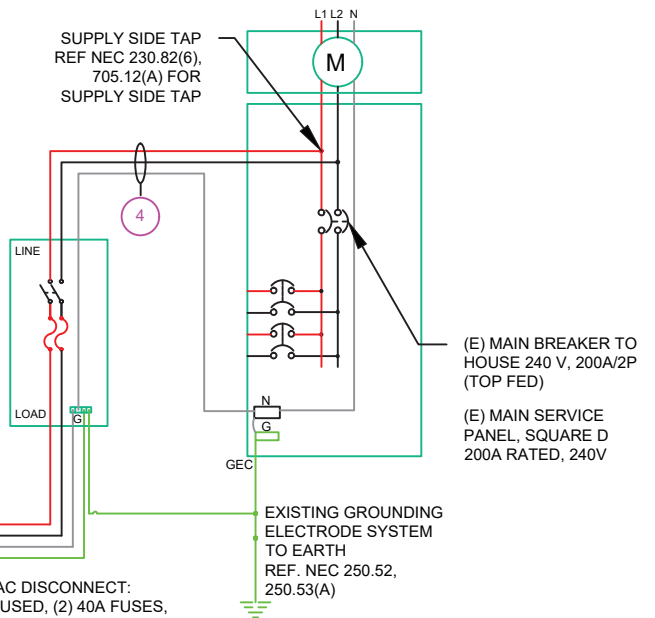
(22) HANWHA Q CELLS SOLAR Q.PEAK DUO-G5 320 320W MONO MODULES  
 (2) PV LINK OF 7 MODULES &  
 (1) PV LINK OF 8 MODULES  
 CONNECTED IN SERIES

**WIRE LEGEND**

	PV ARRAY +VE CONDUCTOR AND L1
	PV ARRAY -VE CONDUCTOR AND L2
	NEUTRAL CONDUCTOR
	EGC AND GEC
	SINGLE TWISTED PAIR, CAT 5 WIRE

**SERVICE INFO**

UTILITY PROVIDER: DUKE ENERGY  
 MAIN SERVICE VOLTAGE: 240V  
 MAIN PANEL BRAND: SQUARE D  
 MAIN SERVICE PANEL: 200A  
 MAIN CIRCUIT BREAKER RATING: 200A  
 MAIN SERVICE LOCATION: NORTH  
 SERVICE FEED SOURCE: UNDERGROUND



- ! WARNING !**  
 DUAL POWER SOURCES  
 SECOND SOURCE IS PV SYSTEM  
**LABEL 8**  
 AT MEP
- ! CAUTION !**  
 SOLAR POINT OF INTERCONNECTION  
**LABEL 10**  
 AT UTILITY METER
- ! WARNING !**  
 SOLAR SYSTEM CONNECTED AND ENERGIZED  
**LABEL 9**  
 AT MEP
- ! WARNING !**  
 THE SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM  
**LABEL 11**  
 AT UTILITY METER
- ! WARNING !**  
 PHOTOVOLTAIC POWER SOURCE  
**LABEL 1**  
 ON ALL CONDUITS SPACED AT MAX 10FT
- ! CAUTION !**  
 SOLAR ELECTRIC SYSTEM CONNECTED AND ENERGIZED  
**LABEL 3**  
 AT INVERTER
- ! WARNING !**  
 ELECTRIC SHOCK HAZARD  
 DO NOT TOUCH TERMINALS  
 TERMINALS ON BOTH LINE AND LOAD SIDES  
 MAY BE ENERGIZED IN THE OPEN POSITION  
**LABEL 5**  
 AT EACH AC DISCONNECT
- PHOTOVOLTAIC DC DISCONNECT**  
**LABEL 4**  
 AT EACH DC DISCONNECT
- PHOTOVOLTAIC AC DISCONNECT**  
**LABEL 6**  
 AT EACH AC DISCONNECT  
 NOTE: AC DISCONNECT TO BE PLACED WITHIN 4' FROM THE METER

**SOLAR MODULE SPECIFICATIONS**

MANUFACTURER / MODEL #	HANWHA Q CELLS SOLAR Q.PEAK DUO-G5 320 320W MONO MODULES
VMP	33.32V
IMP	9.60A
VOC	40.13V
ISC	10.09A
TEMP. COEFF. VOC	-0.280%/°C
MODULE DIMENSION	66.3"L x 39.4"W x 1.26"D (In Inch)

**INVERTER SPECIFICATIONS**

MANUFACTURER / MODEL #	GENERAC PWRCELL X7602
AC POWER OUTPUT (LOADS/GRID)	7600VA
AC POWER OUTPUT (BACKUP)	8000VA
NOMINAL OUTPUT VOLTAGE	240 VAC
MAX OUTPUT CURRENT @240V (LOADS/GRID)	32A
MAX OUTPUT CURRENT @240V (BACKUP)	50A
NOMINAL DC INPUT VOLTAGE	380Vdc
MAX DC INPUT VOLTAGE	420Vdc
CEC WEIGHTED EFFICIENCY	96.5%
MAX INPUT CURRENT (PV)	10000W
MAX INPUT CURRENT (PV)	20A <sub>dc</sub>
CONT. PEAK POWER (BATTERY)	8000W

QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
(6)	#10AWG - PV WIRE/USE-2	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR		
(4)	#10AWG - THWN-2	IMC IN TRENCH	3/4"
(1)	#6AWG - THWN-2 GND		
(3)	#6AWG - THWN-2	EMT OR FLEX	3/4"
(1)	#6AWG - THWN-2 GND		
(3)	#6AWG - THWN-2	EMT OR FLEX	3/4"



**REVISIONS**

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 562 HARVELL RD.,  
 COATS, NC 27521

SHEET NAME  
**ELECTRICAL LINE DIAGRAM**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-4**

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	HANWHA Q CELLS SOLAR Q.PEAK DUO-G5 320 320W MONO MODULES
VMP	33.32V
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VOC	40.13V
ISC	10.09A
TEMP. COEFF. VOC	-0.280%/°C
MODULE DIMENSION	66.3"L x 39.4"W x 1.26"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	GENERAC PWRCELL X7602
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NOMINAL DC INPUT VOLTAGE	380Vdc
MAX DC INPUT VOLTAGE	420Vdc
CEC WEIGHTED EFFICIENCY	96.5%
MAX INPUT CURRENT (PV)	10000W
MAX INPUT CURRENT (PV)	20Adc
CONT. PEAK POWER (BATTERY)	8000W

SERIES SUB STRING OPTIMIZER SPECIFICATIONS	
MANUFACTURER / MODEL #	PV LINK S2502
RATED POWER	2500W
MPPT VOLTAGE RANGE	60-360 Vmp
MAXIMUM INPUT VOLTAGE	420Voc
MAXIMUM OUTPUT	420 Adc
NOMINAL OUTPUT	380 Vdc
MAXIMUM OUTPUT CURRENT	8 A
MAXIMUM SHORT CIRCUIT CURRENT	18 A

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-10°
AMBIENT TEMP (HIGH TEMP 2%)	36°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	58°

#### 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 JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- 7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 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.) THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE

#### DC CONDUCTOR AMPACITY CALCULATIONS: ARRAY TO SOLADECK:

EXPECTED WIRE TEMP (In Celsius)	58°
TEMP CORRECTION PER TABLE 310.15 (B) (2) (a)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	6
CONDUIT FILL CORRECTION PER NEC 310.15 (B) (3) (a)	0.8
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	10A
1.25 X I <sub>max</sub>	
DERATED AMPACITY OF CIRCUIT CONDUCTORS : 310.15 (B) (16)	
CONDUIT FILL CORRECTION PER NEC 310.15 (B) (3) (a) X CIRCUIT CONDUCTOR AMPACITY X TEMP CORRECTION PER TABLE 310.15 (B) (2) (a)	22.72A
Result should be greater than (10A) otherwise less the entry for circuit conductor size and ampacity	

#### FROM SOLADECK TO INVERTER:

AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c)	+22°
EXPECTED WIRE TEMP (In Celsius)	36°+22° = 58°
TEMP CORRECTION PER TABLE 310.15 (B) (2) (a)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	4
CONDUIT FILL CORRECTION PER NEC 310.15 (B) (3) (a)	0.8
CIRCUIT CONDUCTOR SIZE	10AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20A
1.25 X I <sub>max</sub> X # of PV LINKS PER INPUT	
DERATED AMPACITY OF CIRCUIT CONDUCTORS : 310.15 (B) (16)	
CONDUIT FILL CORRECTION PER NEC 310.15 (B) (3) (a) X CIRCUIT CONDUCTOR AMPACITY X TEMP CORRECTION PER TABLE 310.15 (B) (2) (a)	22.72A
Result should be greater than (20A) otherwise less the entry for circuit conductor size and ampacity	

#### AC CONDUCTOR AMPACITY CALCULATIONS:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	36°
TEMP. CORRECTION PER TABLE (310.16)	0.91
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC 310.15 (B) (3) (a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B)	40A
1.25 X MAX INVERTER OUTPUT CURRENT (LOADS/GRID)	
DERATED AMPACITY OF CIRCUIT CONDUCTORS : 310.15 (B) (16)	
CONDUIT FILL CORRECTION PER NEC 310.15 (B) (3) (a) X CIRCUIT CONDUCTOR AMPACITY X TEMP CORRECTION PER TABLE 310.15 (B) (2) (a)	68.25A
Result should be greater than (40A) otherwise less the entry for circuit conductor size and ampacity	



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SHEET NAME

WIRING  
CALCULATIONS

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-5





The new Q.PEAK DUO-G5 solar module from Q CELLS impresses thanks to innovative Q.ANTUM DUO Technology, which enables particularly high performance on a small surface. Q.ANTUM's world-record-holding cell concept has now been combined with state-of-the-art circuitry half cells and a six-busbar design, thus achieving outstanding performance under real conditions - both with low-intensity solar radiation as well as on hot, clear summer days.

- Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY**  
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.9%.
- INNOVATIVE ALL-WEATHER TECHNOLOGY**  
Optimal yields, whatever the weather with excellent low-light and temperature behavior.
- ENDURING HIGH PERFORMANCE**  
Long-term yield security with Anti LID and Anti PID Technology<sup>1</sup>, Hot-Spot Protect and Traceable Quality Tra.Q™.
- EXTREME WEATHER RATING**  
High-tech aluminum alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa) regarding IEC.
- A RELIABLE INVESTMENT**  
Inclusive 12-year product warranty and 25-year linear performance guarantee<sup>2</sup>.
- STATE OF THE ART MODULE TECHNOLOGY**  
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

THE IDEAL SOLUTION FOR:

- Rooftop arrays on residential buildings
- Rooftop arrays on commercial/industrial buildings

Engineered in Germany

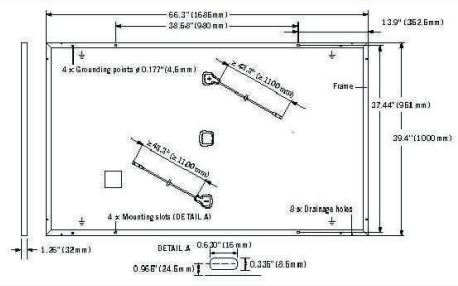


<sup>1</sup> APT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 168 h)  
<sup>2</sup> See data sheet on rear for further information.



**MECHANICAL SPECIFICATION**

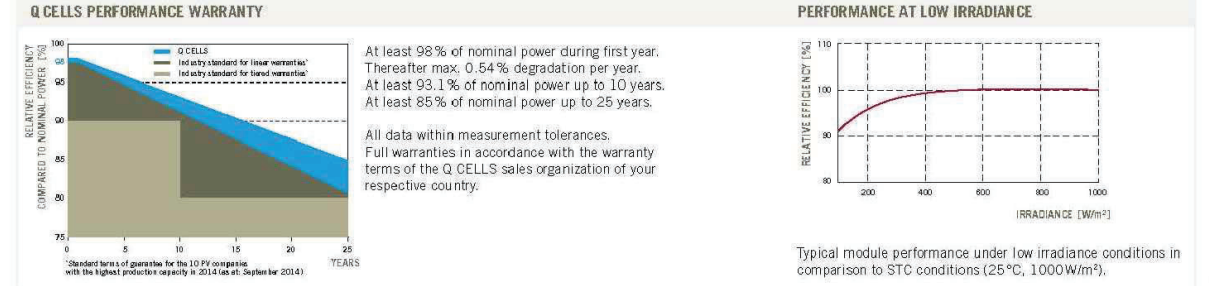
<b>Format</b>	66.3 in x 39.4 in x 1.26 in (including frame) (1685 mm x 1000 mm x 32 mm)
<b>Weight</b>	41.2 lbs (18.7 kg)
<b>Front Cover</b>	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
<b>Back Cover</b>	Composite film
<b>Frame</b>	Black anodized aluminum
<b>Cell</b>	6 x 20 monocrystalline Q.ANTUM solar half-cells
<b>Junction box</b>	2.76-3.35 in x 1.97-2.76 in x 0.51-0.83 in (70-85 mm x 50-70 mm x 13-21 mm), decentralized, IP67
<b>Cable</b>	4 mm <sup>2</sup> Solar cable; (+) ≥ 43.3 in (1100 mm), (-) ≥ 43.3 in (1100 mm)
<b>Connector</b>	Multi-Contact MC4, IP68



**ELECTRICAL CHARACTERISTICS**

POWER CLASS		315	320	325	330	
<b>MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC<sup>1</sup> (POWER TOLERANCE +5 W / -0 W)</b>						
<b>Minimum</b>	<b>Power at MPP<sup>1</sup></b>	<b>P<sub>MPP</sub> [W]</b>	315	320	325	330
	<b>Short Circuit Current<sup>1</sup></b>	<b>I<sub>SC</sub> [A]</b>	10.04	10.09	10.14	10.20
	<b>Open Circuit Voltage<sup>1</sup></b>	<b>V<sub>OC</sub> [V]</b>	39.87	40.13	40.40	40.66
	<b>Current at MPP<sup>1</sup></b>	<b>I<sub>MPP</sub> [A]</b>	9.55	9.60	9.66	9.71
	<b>Voltage at MPP</b>	<b>V<sub>MPP</sub> [V]</b>	32.98	33.32	33.65	33.98
	<b>Efficiency<sup>1</sup></b>	<b>η [%]</b>	≥ 18.7	≥ 19.0	≥ 19.3	≥ 19.6
<b>MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT<sup>2</sup></b>						
<b>Minimum</b>	<b>Power at MPP</b>	<b>P<sub>MPP</sub> [W]</b>	235.3	239.0	242.8	246.5
	<b>Short Circuit Current</b>	<b>I<sub>SC</sub> [A]</b>	8.09	8.13	8.17	8.22
	<b>Open Circuit Voltage</b>	<b>V<sub>OC</sub> [V]</b>	37.52	37.77	38.02	38.27
	<b>Current at MPP</b>	<b>I<sub>MPP</sub> [A]</b>	7.52	7.56	7.60	7.64
	<b>Voltage at MPP</b>	<b>V<sub>MPP</sub> [V]</b>	31.30	31.62	31.94	32.25

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



**TEMPERATURE COEFFICIENTS**

<b>Temperature Coefficient of I<sub>SC</sub></b>	<b>α [%/K]</b>	+0.04	<b>Temperature Coefficient of V<sub>OC</sub></b>	<b>β [%/K]</b>	-0.28
<b>Temperature Coefficient of P<sub>MPP</sub></b>	<b>γ [%/K]</b>	-0.37	<b>Normal Module Operating Temperature</b>	<b>NMOT [°F]</b>	109 ± 5.4 (43 ± 3°C)

**PROPERTIES FOR SYSTEM DESIGN**

<b>Maximum System Voltage V<sub>sys</sub></b>	[V]	1000 (IEC) / 1000 (UL)	<b>Safety Class</b>	II
<b>Maximum Series Fuse Rating</b>	[A DC]	20	<b>Fire Rating</b>	C (IEC) / TYPE 1 (UL)
<b>Max. Design Load, push<sup>2</sup></b>	[lbs/ft <sup>2</sup> ]	75 (3600 Pa) / 55 (2667 Pa)	<b>Permitted module temperature on continuous duty</b>	-40°F up to +185°F (-40°C up to +85°C)
<b>Max. Test Load, Push / Pull<sup>2</sup></b>	[lbs/ft <sup>2</sup> ]	113 (5400 Pa) / 84 (4000 Pa)	<sup>2</sup> see installation manual	

**QUALIFICATIONS AND CERTIFICATES**

UL 1703; VDE Quality Tested; CE-compliant; IEC 61215:2016; IEC 61730:201, application class A

**PACKAGING INFORMATION**

<b>Number of Modules per Pallet</b>	32
<b>Number of Pallets per 53' Trailer</b>	30
<b>Number of Pallets per 40' High Cube Container</b>	26
<b>Pallet Dimensions (L x W x H)</b>	69.3 in x 45.3 in x 46.9 in (1760 mm x 1150 mm x 1190 mm)
<b>Pallet Weight</b>	1415 lbs (642 kg)

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

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300 Spectrum Center Drive, Suite 1250, Irvine, CA 92618, USA | TEL +1 949 748 89 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us



**REVISIONS**

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 02/11/2021

**PROJECT NAME & ADDRESS**

LORENZA CREEKMUR RESIDENCE

562 HARVELL RD.,  
COATS, NC 27521

SHEET NAME  
**EQUIPMENT SPECIFICATION**

SHEET SIZE  
**ANSI B 11" X 17"**

SHEET NUMBER  
**PV-6**

Specifications subject to technical changes © Hanwha Q CELLS Q.PEAK DUO-G5, 315-330, 2018-02, Rev003, JNA

# GENERAC<sup>®</sup> PWRCELL

7.6kW 1Ø, 11.4kW 3Ø PWRcell Inverter with CTs  
Model: APKE00014, APKE00013  
Certification Model Reference: X7602, X11402



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 and zero-export
- Free system monitoring included via PWRview™ Web Portal and Mobile App

AC OUTPUT/GRID-TIE	MODEL APKE00014	MODEL APKE00013
RATED AC POWER OUTPUT:	7600W	11400W
AC OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT:	32 A, RMS	32 A, RMS
GROUND-FAULT ISOLATION DETECTION:	Included	Included
CHARGE BATTERY FROM AC:	Yes	Yes
THD (CURRENT):	< 2%	< 2%
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7W	< 7W

DC INPUT	MODEL APKE00014	MODEL APKE00013
DC INPUT VOLTAGE RANGE:	360-420 VDC	360-420 VDC
NOMINAL DC BUS VOLTAGE:	380 VDC	380 VDC
MAX IMPORT CURRENT <sup>1</sup> :	20 A	30 A
MAX INPUT CURRENT <sup>2</sup> :	30 A	30 A
REVERSE-POLARITY PROTECTION:	Yes	Yes
GROUND-FAULT ISOLATION DETECTION:	Yes	Yes
TRANSFORMERLESS, UNGROUNDED:	Yes	Yes
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7W	< 7W

AC OUTPUT/BACKUP	MODEL APKE00014	MODEL APKE00013
RATED AC BACKUP POWER OUTPUT (ISLANDED):	8000W	8000W
MAXIMUM AC BACKUP POWER OUTPUT:	10000W	10000W
AC BACKUP OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/240, 1Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
AC CIRCUIT BREAKER:	50 A	50 A
THD (VOLTAGE):	< 2%	< 2%
AUTOMATIC SWITCHOVER TIME:	< 1 Seconds	< 1 Seconds
TYPICAL NIGHTTIME POWER CONSUMPTION:	30W	30W

DC INPUT/ BATTERY	MODEL APKE00014	MODEL APKE00013
MAXIMUM CONTINUOUS POWER:	8000W	8000W
INTERNAL DC DISTRIBUTION BREAKERS:	4x 2p30A	4x 2p30A
DC FUSES ON PLUS AND MINUS:	40 A	40 A
2-POLE DISCONNECTION:	Yes	Yes

EFFICIENCY	MODEL APKE00014	MODEL APKE00013
PEAK EFFICIENCY:	97%	98%
CEC WEIGHTED EFFICIENCY:	96.50%	97.50%

<sup>1</sup>Inverter limits DC current import to AC power rating. Total DC current from multiple DC inputs may safely exceed this value up to Max. Input Current. The inverter safely limits the amount utilized  
<sup>2</sup>Per input, four DC inputs total

## Specifications

### FEATURES AND MODES

ISLANDING <sup>3</sup> :	Yes
GRID SELL:	Yes
SELF CONSUMPTION:	Yes
PRIORITIZED CHARGING FROM RENEWABLES:	Yes
GRID SUPPORT - ZERO EXPORT:	Yes

### ADDITIONAL FEATURES

SUPPORTED COMMUNICATION INTERFACES:	REbus™, CANbus, RS485 <sup>4</sup> , Ethernet
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
BACKUP LOADS DISCONNECT <sup>5</sup> :	Yes
MANUAL INVERTER BYPASS SWITCH:	Automatic
WARRANTY:	10 Years

### STANDARDS COMPLIANCE

SAFETY:	UL1741 SA, CSA 22.2
GRID CONNECTION STANDARDS:	IEEE1547, Rule 21, Rule 14H, CSIP
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
NOISE:	< 40 dBA
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-4 to 122 °F (-20 to 50 °C) <sup>5</sup>
PROTECTION RATING:	NEMA 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:	15kW

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

<sup>4</sup>Modbus

<sup>5</sup>Reduced power at extreme temperatures

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# GENERAC<sup>®</sup>



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Web: [www.powerhome.com](http://www.powerhome.com)

### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 02/11/2021

PROJECT NAME & ADDRESS

LORENZA CREEKMUR  
RESIDENCE

562 HARVELL RD.,  
COATS, NC 27521

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-7

**GENERAC**

# 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 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.

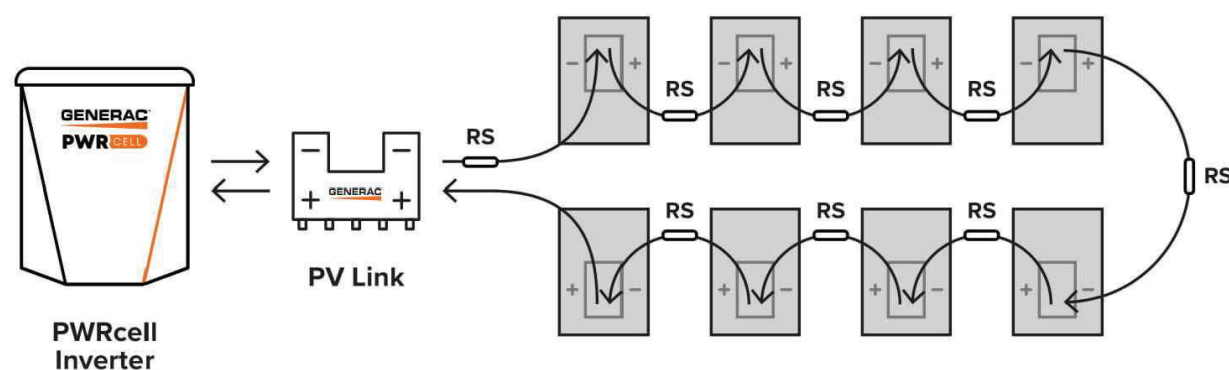
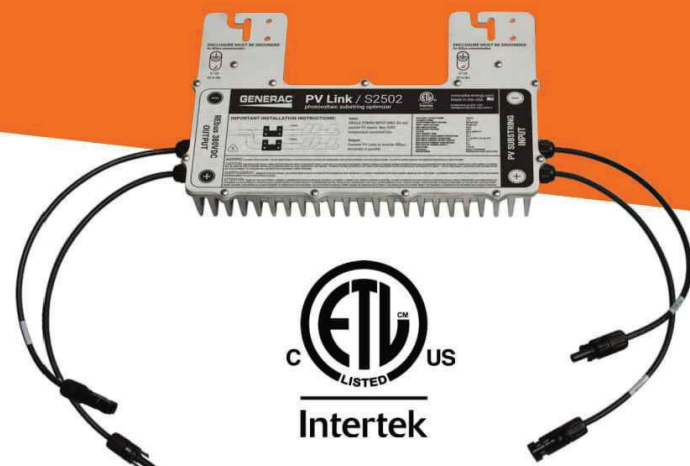


Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.



## 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 3R
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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### REVISIONS

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PROJECT NAME & ADDRESS

LORENZA CREEKMUR  
 RESIDENCE  
 562 HARVELL RD.,  
 COATS, NC 27521

SHEET NAME  
**EQUIPMENT  
 SPECIFICATION**

SHEET SIZE

**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-8**

**GENERAC**

# SnapRS™

Inline Disconnect Switch  
Model: APKE00011  
Certification Model Reference: RS801



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

- 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.

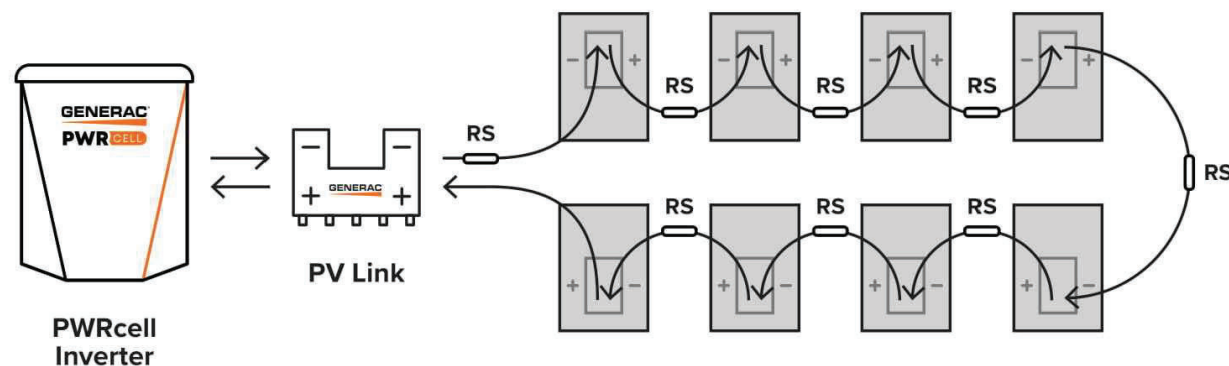


Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

## Specifications

SnapRS™ (APKE00011)	
PV MODULE MAX VOC:	75 V
EFFICIENCY:	99.8%*
MAX INPUT CURRENT:	13 A
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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562 HARVELL RD.,  
COATS, NC 27521

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-9



# Sinclair Designs & Engineering

## Your One-Stop-Shop for Solar Racking Solutions

Carport Systems Pole Mount Trackers Ground Mount Systems Commercial Roof Mount Systems



T - Y - L - A Carports Fixed, Single, Dual Axis Sun Trackers 5 - 45 Degree GroPost/Ballast Mount Systems 5 - 7 - 10 Degree Roof Mounts

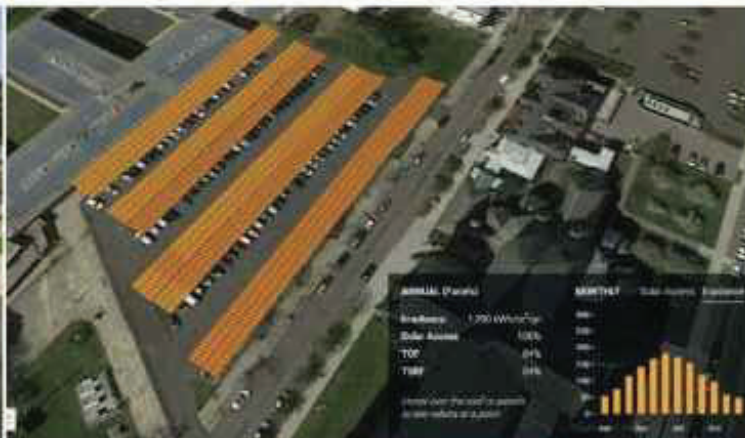
SDE: Project Development Support (Using Aurora PV Software & Solid-Works)

Our NABCEP certified PV designers and Engineers can support you through every phase of your project.

Preliminary Designs for Quick Proposals: 3D Modeling, PV Production, Shade Analysis, & Site Drawings

Ballast Calculations with PSF Analysis

Accurate Component Pricing & Project Bill of Materials



**Need Installation Support?** Our new business partners can provide geotechnical support and offer installation pricing for all of our racking systems. Together, we are on track to install over 80 Megawatts of power throughout the USA in 2019.

# Sinclair Designs & Engineering

Integrated Project Development & System Manufacturing

## Sky Rack 2.0 Ground Mount System



**Introducing the New Sky Rack 2.0 Ground Mount**  
The new design increases the overall structural integrity of the assembly and provides more efficient installation techniques.

Based on your module choice and the size of the project, this system can offer a direct hardware to module solution; eliminating the need to purchase expensive panel clamp kits (10% Savings).

APPLICATION	OPEN FIELD		
Tilt Angle	5-45 Degrees	Terrain	5 Degree E/W
Module Orientation	2 High Portrait	Wire Management	Included
Wind Load	115 MPH	Warranty	25 Years
Snow Load	60 PSF	Material	11GA G90 CHEM TREAT Steel
Ground Clearance	24in Standard (Customer Req)	Manufacturing	Made in Michigan, USA

### 4 Main Components For Efficient Installation

- 1. 4 x 7 IN C-CHANNEL POST**  
Optional Lengths = 8 - 17 Feet
- 2. SLR-STRUT-50**  
Reinforcement Brace
- 3. TRUSS - 120**  
5-40 Degree Angle Adjustment
- 4. Z-PURLIN-(2-5 Panel Lengths Available)**  
Wire Tie Management Holes  
Additional Slots for direct module tie-in

### Additional Components Available to Increase Spec Requirements

- Z-PURLIN BRACE**  
For high wind/heavy snow areas
- SLR-DBLL STRUT- 50**  
For high wind/heavy snow areas
- SLR-STRONGBACK**  
For high wind/heavy snow areas
- Z-PURLIN CANTILEVER-44**  
Allows additional modules to be installed at the beginning and end of each array.

### Minimal Hardware Requirements For Efficient Installation

- ALL HDW & CLAMP KITS ARE STORED IN HIGH VOLUMES**
- 2x 5/8-11 x 1 3/4 Serrated Flanged Heads
  - 7x 1/2-13 x 1 1/2 Serrated Flanged Heads
  - AK Solar UL-467 SS MID CLAMP KITS
  - AK Solar UL-467 SS END CLAMP KITS



**PRODUCT AVAILABILITY:** All racking systems are manufactured "IN HOUSE" from "Prime" 11 Gage Grade 50 USA Steel. This allows us to control 100% of the production schedule and deploy your system ahead of the installation date. We inventory 1-2 Megawatts of racking product to maintain an average lead time of 7-10 days.



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SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-10