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April 23, 2022

Sigora Solar LLC  
490 Westfield Road STE A  
Charlottesville, VA 22901

Re: Engineering Services  
Platt Residence  
2018 Harnett Central Road, Angier, NC  
14.400 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:** 9 & 27 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 = 120 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.*

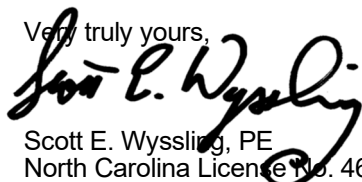
**D. Solar Panel Anchorage**

1. The solar panels shall be mounted in accordance with the most recent SnapNRack 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  $2\frac{1}{2}$ ", 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  $2\frac{1}{2}$ " 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, 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

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

# PROJECT DESCRIPTION:

36 x REC SOLAR: REC400AA PURE 400W MONO MODULES  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 DC SYSTEM SIZE: 14.400kW DC  
 AC SYSTEM SIZE: 10.440kW AC

## EQUIPMENT SUMMARY:

36 REC SOLAR: REC400AA PURE 400W MONO MODULES  
 36 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS  
 EQUIPPED WITH RAPID SHUTDOWN

ROOF ARRAY AREA #1:- 438.02 SQ FT.  
 ROOF ARRAY AREA #2:- 278.74 SQ FT.

## AUTHORITIES HAVING JURISDICTION:

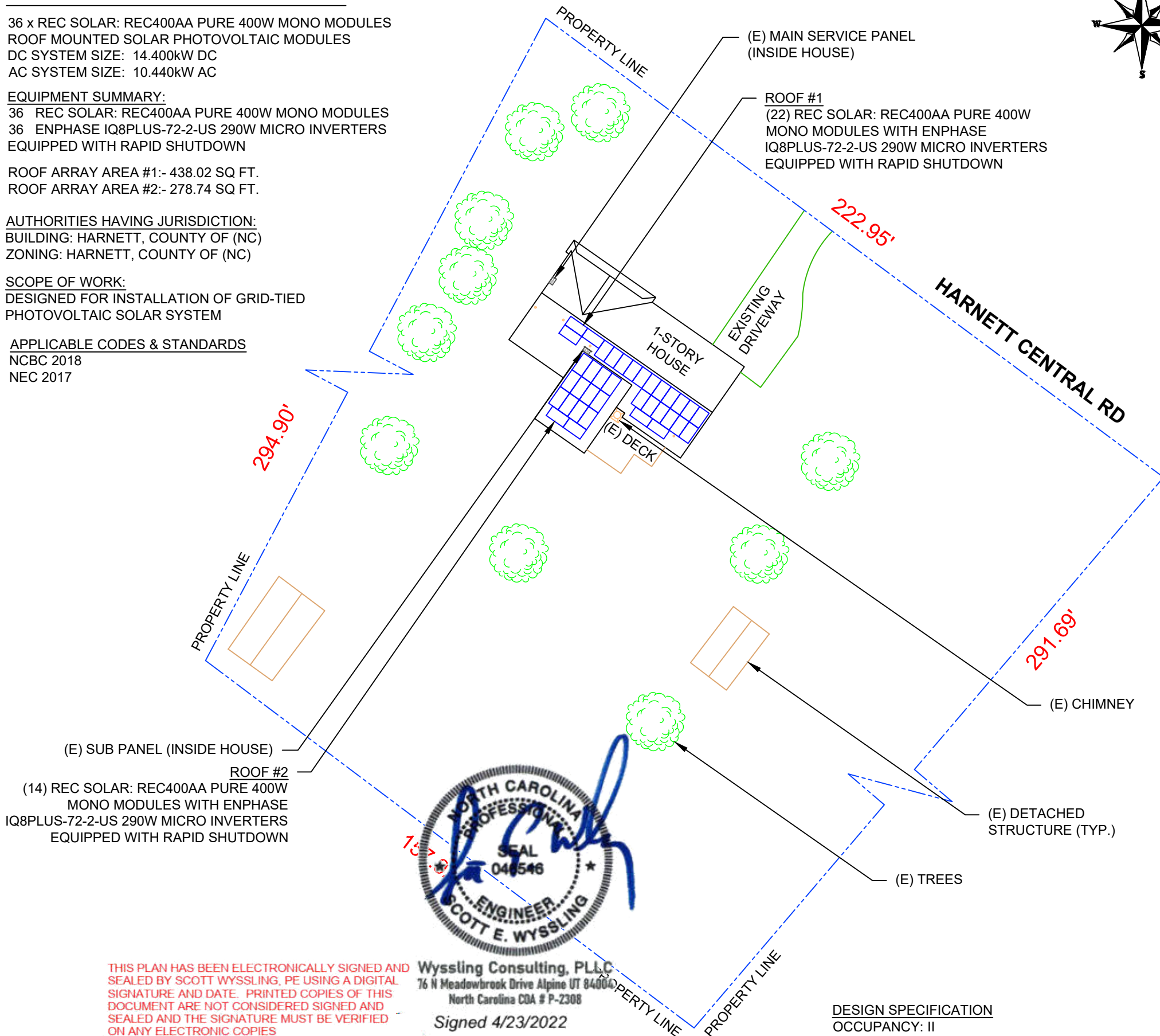
BUILDING: HARNETT, COUNTY OF (NC)  
 ZONING: HARNETT, COUNTY OF (NC)

## SCOPE OF WORK:

DESIGNED FOR INSTALLATION OF GRID-TIED  
 PHOTOVOLTAIC SOLAR SYSTEM

## APPLICABLE CODES & STANDARDS

NCBC 2018  
 NEC 2017



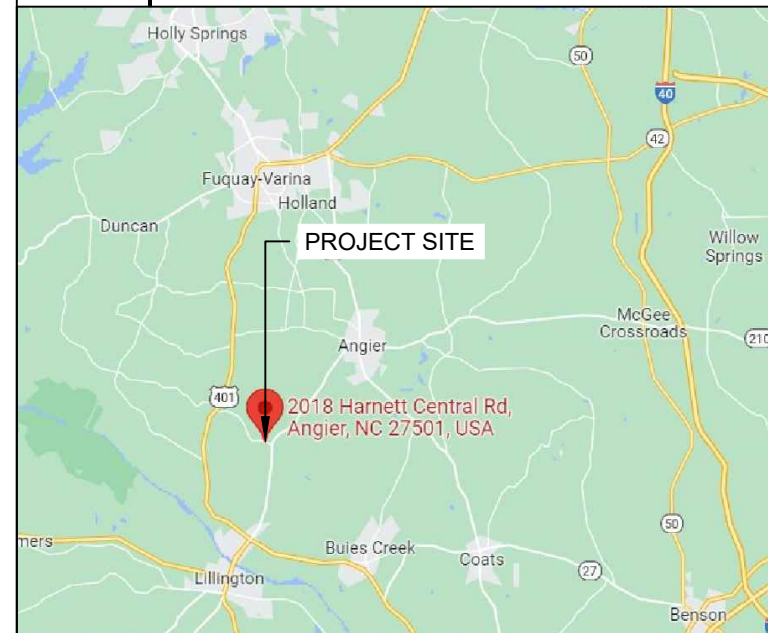
Wyssling Consulting, PLLC  
 76 N Meadowbrook Drive Alpine UT 84004  
 North Carolina CQA # P-2308  
 Signed 4/23/2022

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**DESIGN SPECIFICATION**  
 OCCUPANCY: II  
 CONSTRUCTION: SINGLE-FAMILY  
 ZONING: RESIDENTIAL  
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER  
 WIND EXPOSURE: REFER STRUCTURAL LETTER  
 WIND SPEED: REFER STRUCTURAL LETTER



**2 HOUSE PHOTO**  
 PV-1 SCALE: NTS



**3 VICINITY MAP**  
 PV-1 SCALE: NTS

**SHEET INDEX**

PV-1	PLOT PLAN WITH ROOF PLAN
PV-2	ROOF PLAN & MODULES
PV-2A	CIRCUIT LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	LABELS
PV-6	PLACARD
PV-7	MICRO INVERTER CHART
PV-8	MODULE SPECIFICATIONS
PV-9	INVERTER SPECIFICATIONS
PV-10	COMBINER SPECIFICATIONS
PV-11	RAIL SPECIFICATIONS
PV-12	ATTACHMENT SPECIFICATIONS
PV-13	SOLADECK SPECIFICATIONS

**1 PLOT PLAN WITH ROOF PLAN**  
 PV-1 SCALE: 1/32" = 1'-0"

SIGORA SOLAR LLC  
 490 WESTFIELD RD STE A  
 CHARLOTTEVILLE, VA 22901

**REVISIONS**

DESCRIPTION	DATE	REV
INITIAL	04/20/2022	

DATE: 04/20/2022

**PROJECT NAME & ADDRESS**  
 DONALD SCOTT PLATT  
 RESIDENCE  
 2018 HARNETT CENTRAL RD,  
 ANGIER, NC 27501

DRAWN BY  
 ESR

SHEET NAME  
 PLOT PLAN WITH  
 ROOF PLAN

SHEET SIZE  
 ANSI B  
 11" X 17"

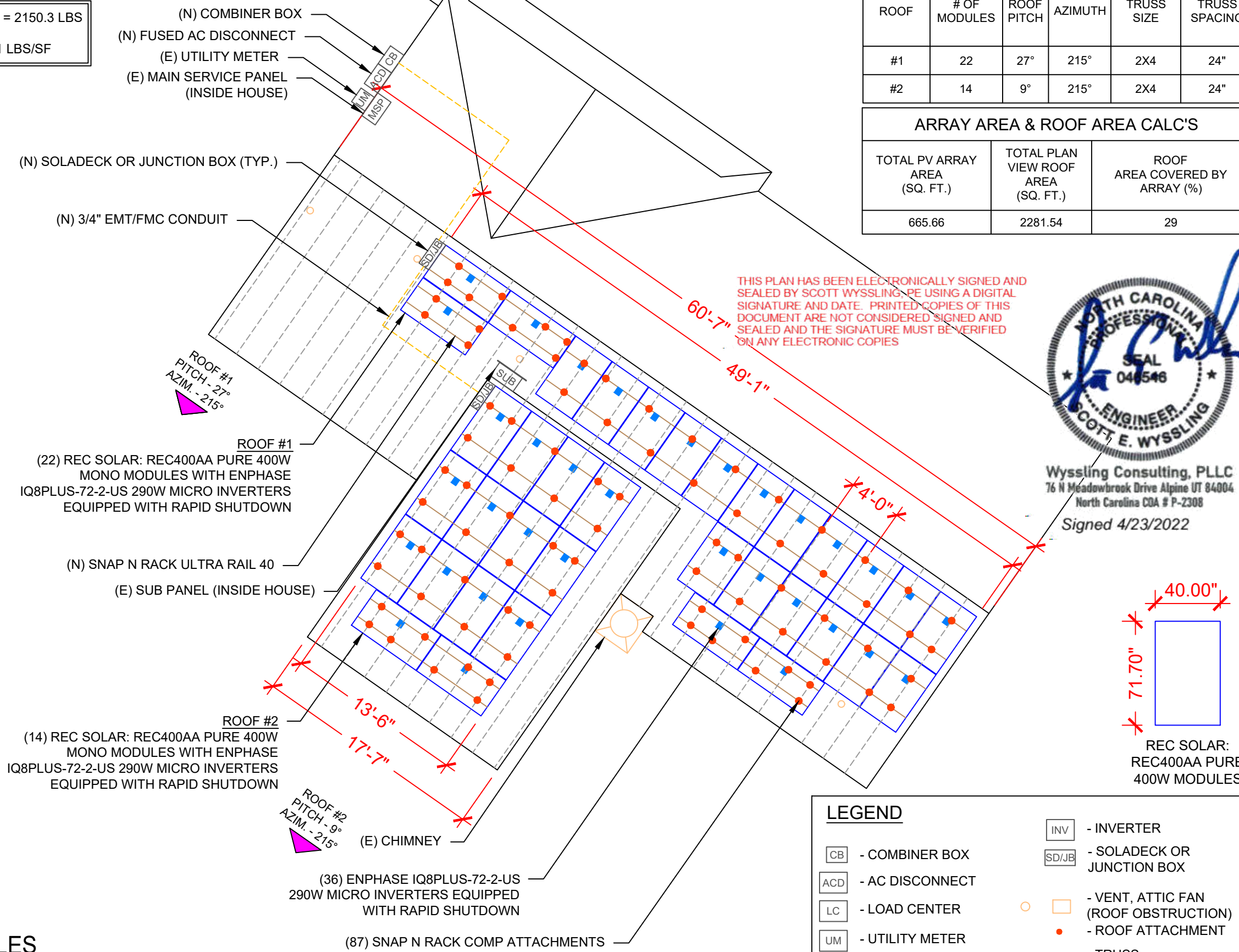
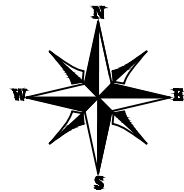
SHEET NUMBER  
 PV-1



# MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 36 MODULES  
 MODULE TYPE = REC SOLAR: REC400AA PURE 400W MONO MODULES  
 MODULE WEIGHT = 45.91 LBS / 20.8KG  
 MODULE DIMENSIONS = 71.70"x 40.00" = 19.91 SF

- TOTAL WEIGHT OF PV MODULES AND RAILS = 2150.3 LBS
- WEIGHT PER ATTACHMENT POINT = 25 LBS
- DISTRIBUTED WEIGHT OF PV MODULE = 2.31 LBS/SF



ROOF DESCRIPTION					
ROOF TYPE			ASPHALT SHINGLE		
ROOF LAYER			1 LAYER		
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	22	27°	215°	2X4	24"
#2	14	9°	215°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL PLAN VIEW ROOF AREA (SQ. FT.)	ROOF AREA COVERED BY ARRAY (%)
665.66	2281.54	29

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DATE: 04/20/2022

PROJECT NAME & ADDRESS  
**DONALD SCOTT PLATT RESIDENCE**  
 2018 HARNETT CENTRAL RD,  
 ANGIER, NC 27501

DRAWN BY  
**ESR**

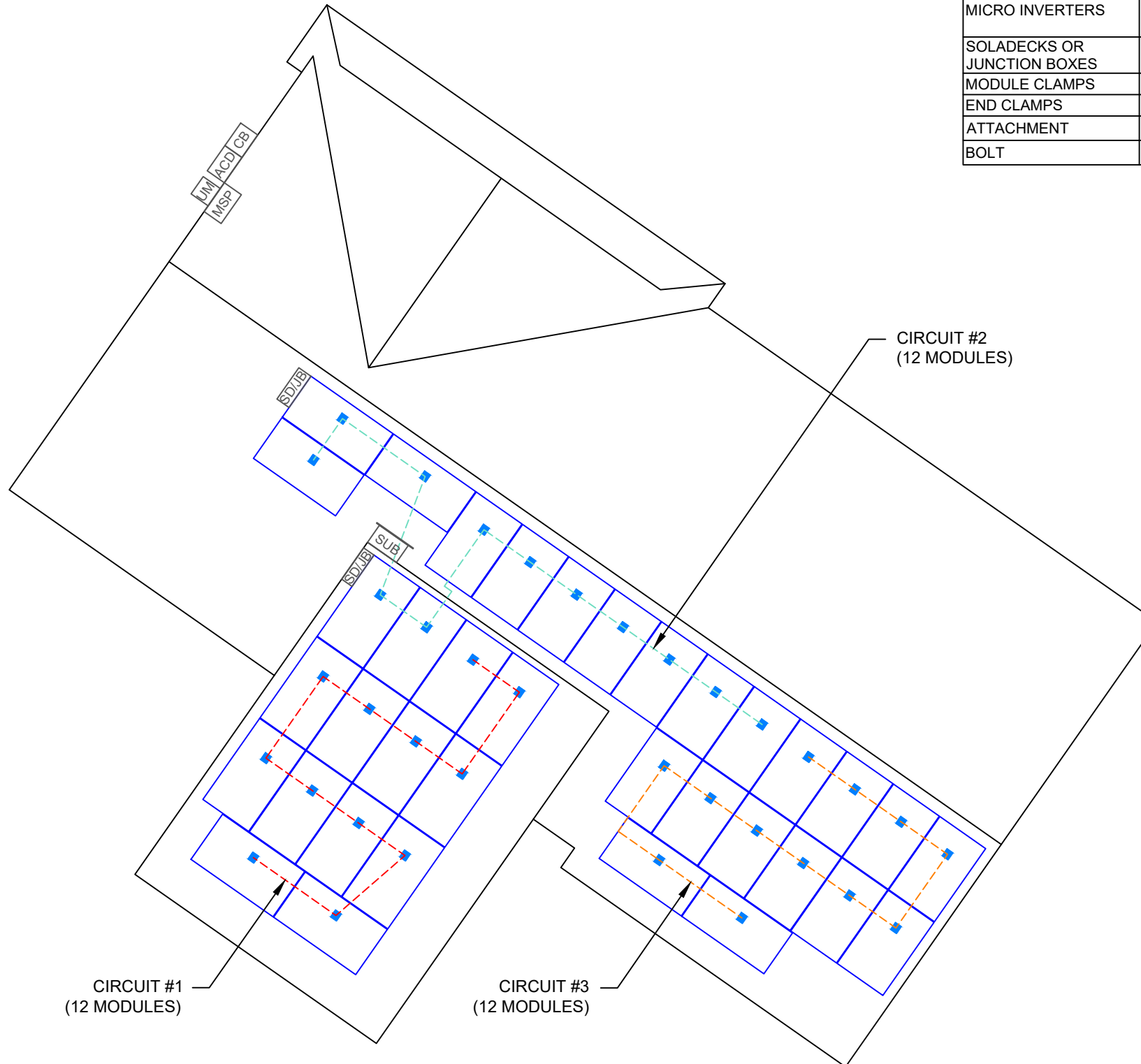
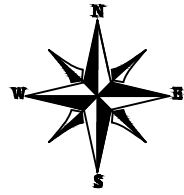
SHEET NAME  
**ROOF PLAN & MODULES**

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

SHEET NUMBER  
**PV-2**

LEGEND	
[CB]	- COMBINER BOX
[ACD]	- AC DISCONNECT
[LC]	- LOAD CENTER
[UM]	- UTILITY METER
[MSP]	- MAIN SERVICE PANEL
[INV]	- INVERTER
[SD/JB]	- SOLADECK OR JUNCTION BOX
○	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
●	- ROOF ATTACHMENT
---	- TRUSS
---	- CONDUIT

CIRCUIT LEGENDS	
	CIRCUIT #1
	CIRCUIT #2
	CIRCUIT #3



BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	36	REC SOLAR: REC400AA PURE 400W
MICRO INVERTERS	36	ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
SOLADECKS OR JUNCTION BOXES	2	SOLADECKS OR JUNCTION BOXES
MODULE CLAMPS	54	MID MODULE CLAMPS
END CLAMPS	36	END CLAMPS / STOPPER SLEEVE
ATTACHMENT	87	SNAP N RACK COMP
BOLT	87	LAG BOLT

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**DONALD SCOTT PLATT  
RESIDENCE**

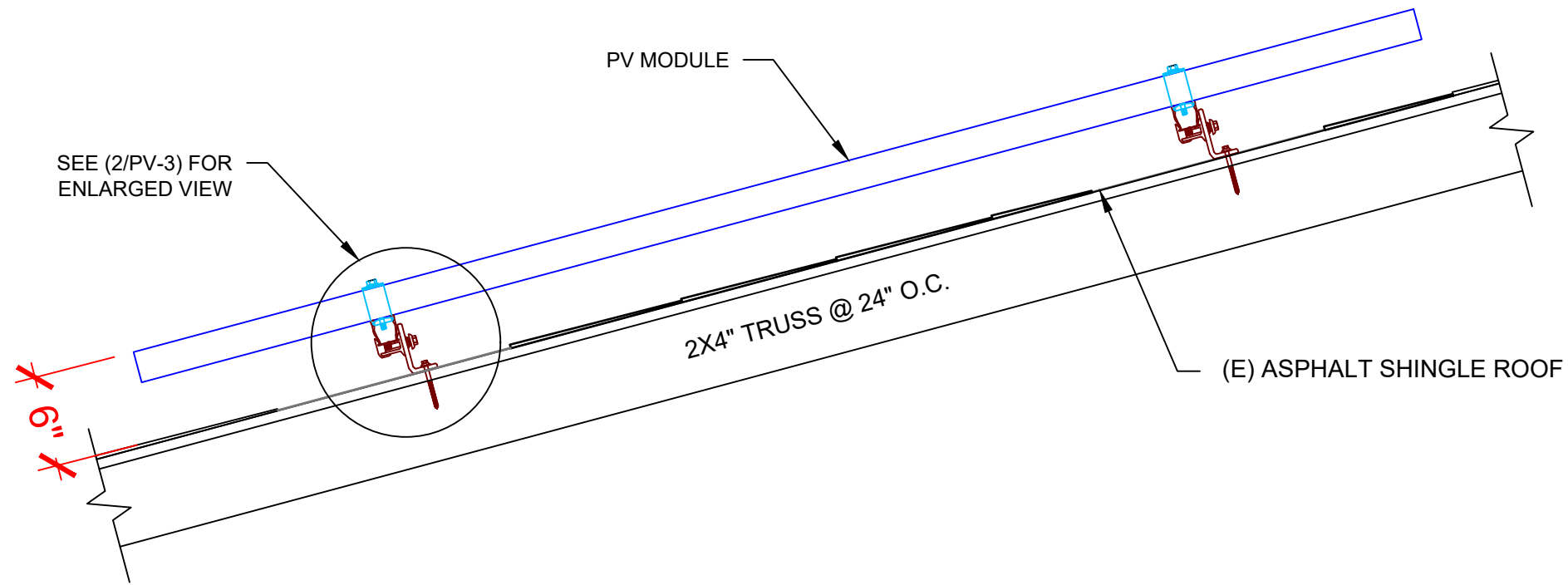
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**ESR**

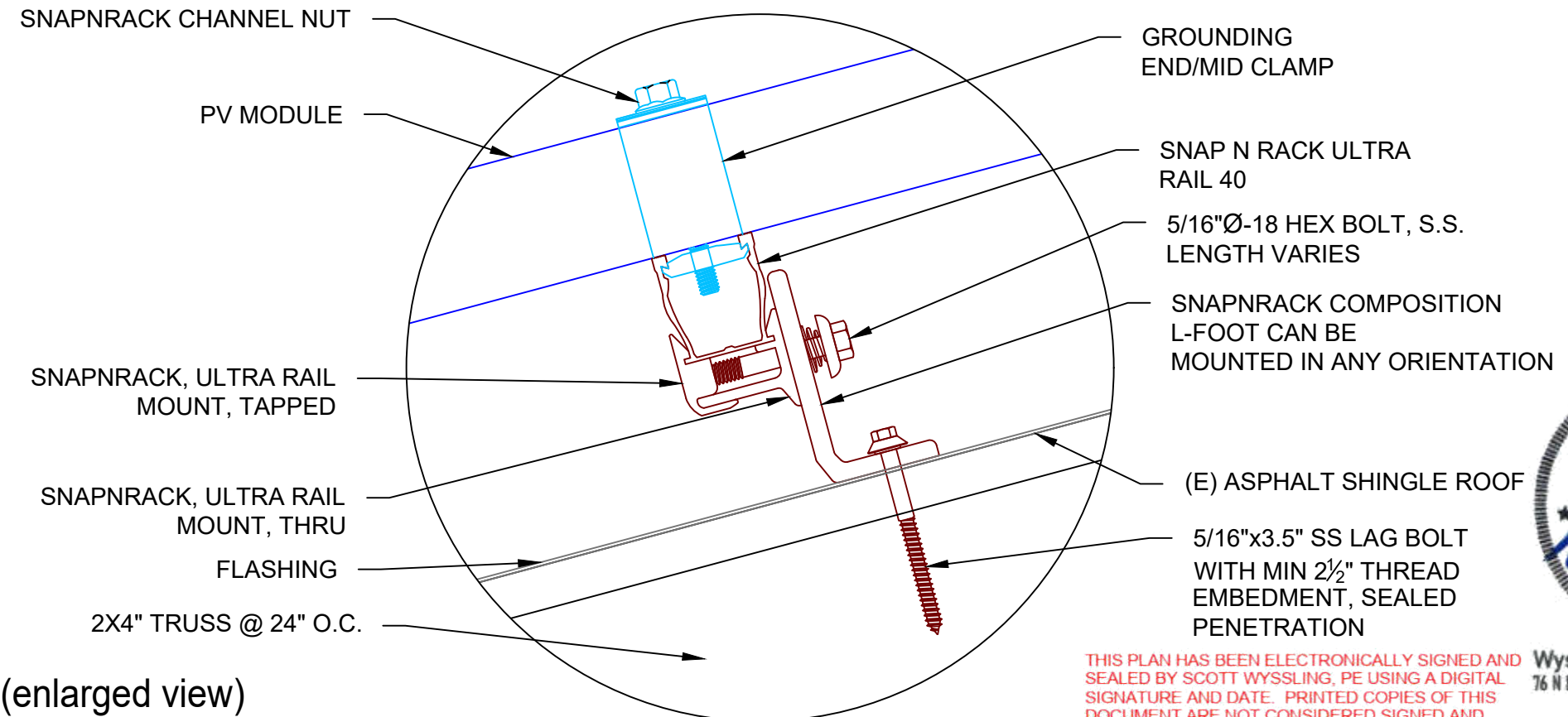
SHEET NAME  
**CIRCUIT LAYOUT**

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

SHEET NUMBER  
**PV-2A**



**1** | STRUCTURAL ATTACHMENT (SIDE VIEW)  
 PV-3 | SCALE: N.T.S



**2** | ATTACHMENT DETAIL (enlarged view)  
 PV-3 | SCALE: N.T.S

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**SIGORA SOLAR**  
 SIGORA SOLAR LLC  
 490 WESTFIELD RD STE A  
 CHARLOTTEVILLE, VA 22901

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 ANGIER, NC 27501

DRAWN BY  
 ESR

SHEET NAME  
 ATTACHMENT  
 DETAIL

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-3



DC SYSTEM SIZE: 14.400 kW DC  
AC SYSTEM SIZE: 10.440 kW AC

(36) REC SOLAR: REC400AA PURE 400W MONO MODULES  
WITH (36) ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS  
EQUIPPED WITH RAPID SHUTDOWN  
(3) BRANCH CIRCUITS OF 12 MODULES CONNECTED IN PARALLEL

**INTERCONNECTION NOTES:**

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

**DISCONNECT NOTES:**

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH

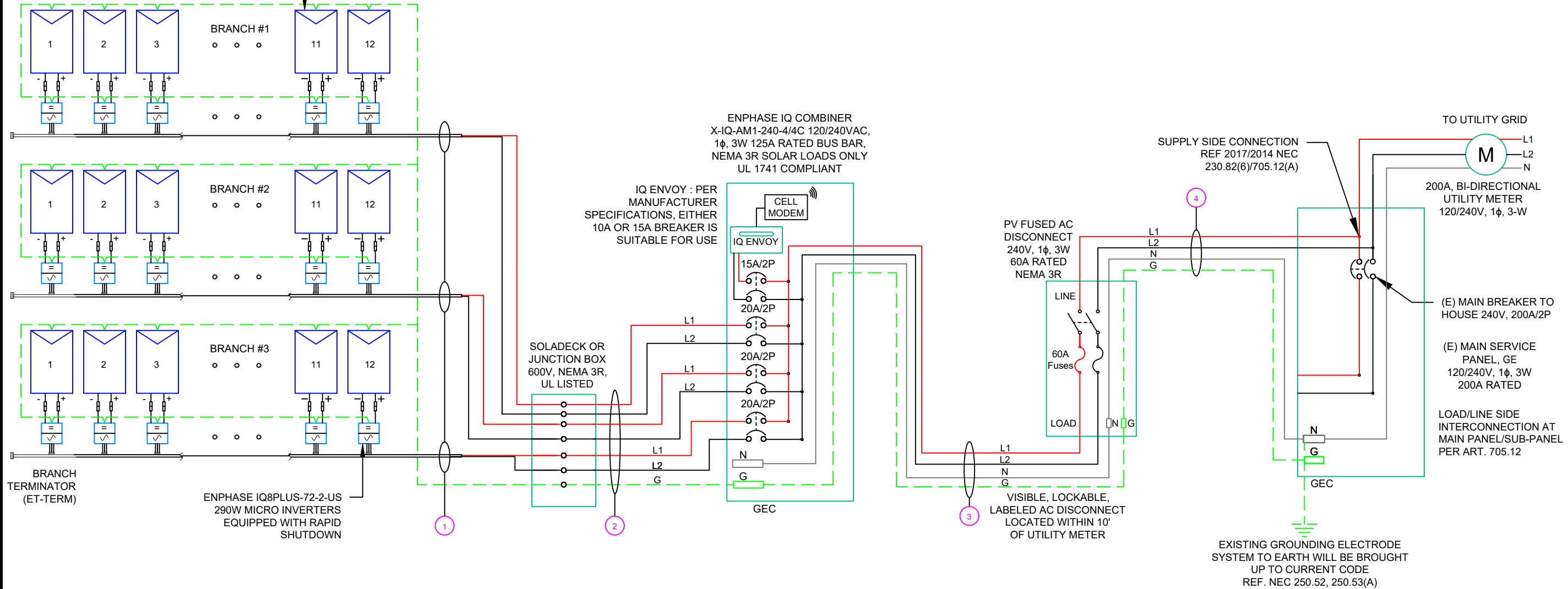
**RACKING NOTE:**

1. BOND EVERY RAIL WITH #6 BARE COPPER

**GROUNDING & GENERAL NOTES:**

1. A SECOND FACILITY GROUNDING ELECTRODE IS NOT REQUIRED PER [NEC 690.47(C)(3)]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. SOLADECK OR JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - SOLADECK OR JUNCTION BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.
8. 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.

REC SOLAR: REC400AA  
PURE 400W MODULES



BRANCH  
TERMINATOR  
(ET-TERM)

ENPHASE IQ8PLUS-72-2-US  
290W MICRO INVERTERS  
EQUIPPED WITH RAPID  
SHUTDOWN

SOLADECK OR  
JUNCTION BOX  
600V, NEMA 3R,  
UL LISTED

IQ ENVOY : PER  
MANUFACTURER  
SPECIFICATIONS, EITHER  
10A OR 15A BREAKER IS  
SUITABLE FOR USE

ENPHASE IQ COMBINER  
X-IQ-AM1-240-4/4C 120/240VAC,  
1 $\phi$ , 3W 125A RATED BUS BAR,  
NEMA 3R SOLAR LOADS ONLY  
UL 1741 COMPLIANT

PV FUSED AC  
DISCONNECT  
240V, 1 $\phi$ , 3W  
60A RATED  
NEMA 3R

VISIBLE, LOCKABLE,  
LABELED AC DISCONNECT  
LOCATED WITHIN 10'  
OF UTILITY METER

SUPPLY SIDE CONNECTION  
REF 2017/2014 NEC  
230.82(6)/705.12(A)

TO UTILITY GRID

200A, BI-DIRECTIONAL  
UTILITY METER  
120/240V, 1 $\phi$ , 3-W

(E) MAIN BREAKER TO  
HOUSE 240V, 200A/2P

(E) MAIN SERVICE  
PANEL, GE  
120/240V, 1 $\phi$ , 3W  
200A RATED

LOAD/LINE SIDE  
INTERCONNECTION AT  
MAIN PANEL/SUB-PANEL  
PER ART. 705.12

EXISTING GROUNDING ELECTRODE  
SYSTEM TO EARTH WILL BE BROUGHT  
UP TO CURRENT CODE  
REF. NEC 250.52, 250.53(A)

QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
(6)	#12AWG - ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR		
(6)	#10AWG - CU, THWN-2	EMT OR FMC IN ATTIC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#6AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#6AWG - CU, THWN-2 N		
(1)	#8AWG - CU, THWN-2 GND		
(2)	#6AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#6AWG - CU, THWN-2 N		
(1)	#8AWG - CU, THWN-2 GND		

1 ELECTRICAL LINE DIAGRAM

PV-4

SCALE: NTS



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

REVISIONS

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PROJECT NAME & ADDRESS

DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME  
ELECTRICAL LINE  
DIAGRAM

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-4

**WARNING:PHOTOVOLTAIC  
POWER SOURCE**

**LABEL 1**

AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

NEC 690.31(G)(3&4)

(NOT USED FOR ENPHASE MICROINVERTERS)

**PHOTOVOLTAIC**

**LABEL 2**

AT EACH PV DISCONNECTING MEANS

NEC 690.13(B)

(NOT USED FOR ENPHASE MICROINVERTERS)

**DC DISCONNECT**

MAXIMUM VOLTAGE  
MAXIMUM CIRCUIT CURRENT  
MAX RATED OUTPUT CURRENT OF  
THE CHARGE CONTROLLER  
OR DC-TO-DC CONVERTER  
(IF INSTALLED)

**LABEL 3**

AT DC PV SYSTEM DISCONNECT

NEC 690.53

(NOT USED FOR ENPHASE MICROINVERTERS)

**PHOTOVOLTAIC**

**LABEL 4**

AT AC DISCONNECT

NEC 690.13(B)

**AC DISCONNECT**

**PHOTOVOLTAIC AC DISCONNECT**

**LABEL 5**

AT AC DISCONNECT

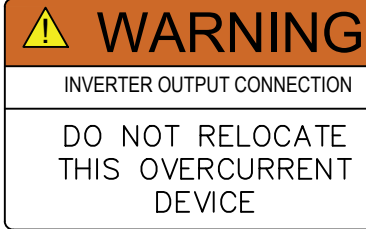
NEC 690.54

RATED AC OUTPUT CURRENT: **43.56A**  
NOMINAL OPERATING AC VOLTAGE: **240V**

36 MICROS X 1.21 AMP/MICRO = 43.56AMP

**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]



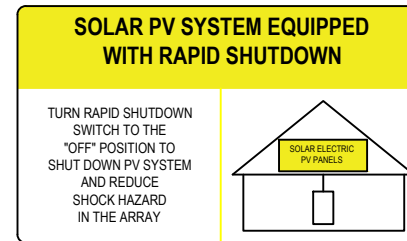
**LABEL 6**

PLACED ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER IF TIE IN CONSISTS OF LOAD SIDE CONNECTION TO BUSBAR.  
NEC 705.12(D)(2)(3)(B)



**LABEL 7**

SIGN LOCATED AT LOAD CENTER  
NEC 705.12(B)(3-4) & NEC 690.59



**LABEL 8**

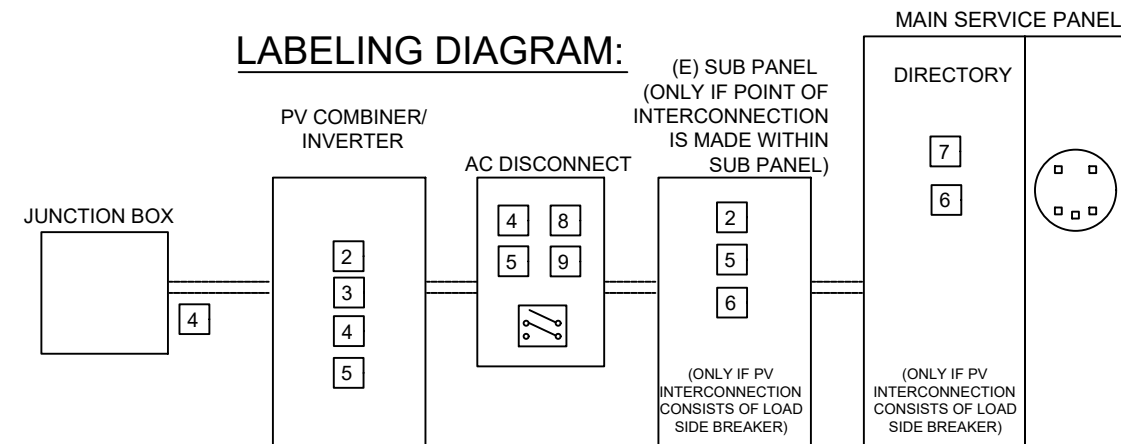
FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS LEAVING THE ARRAY:  
SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.  
[NEC 690.56(C)(1)(A)]

**RAPID SHUTDOWN  
SWITCH FOR  
SOLAR PV SYSTEM**

**LABEL 9**

AT AC DISCONNECT  
NEC 690.56(C)(3)

**LABELING DIAGRAM:**



\*\* ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE. \*\*



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**DONALD SCOTT PLATT  
RESIDENCE**  
  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

**DRAWN BY**

**ESR**

**SHEET NAME**

**LABELS**

**SHEET SIZE**

**ANSI B  
11" X 17"**

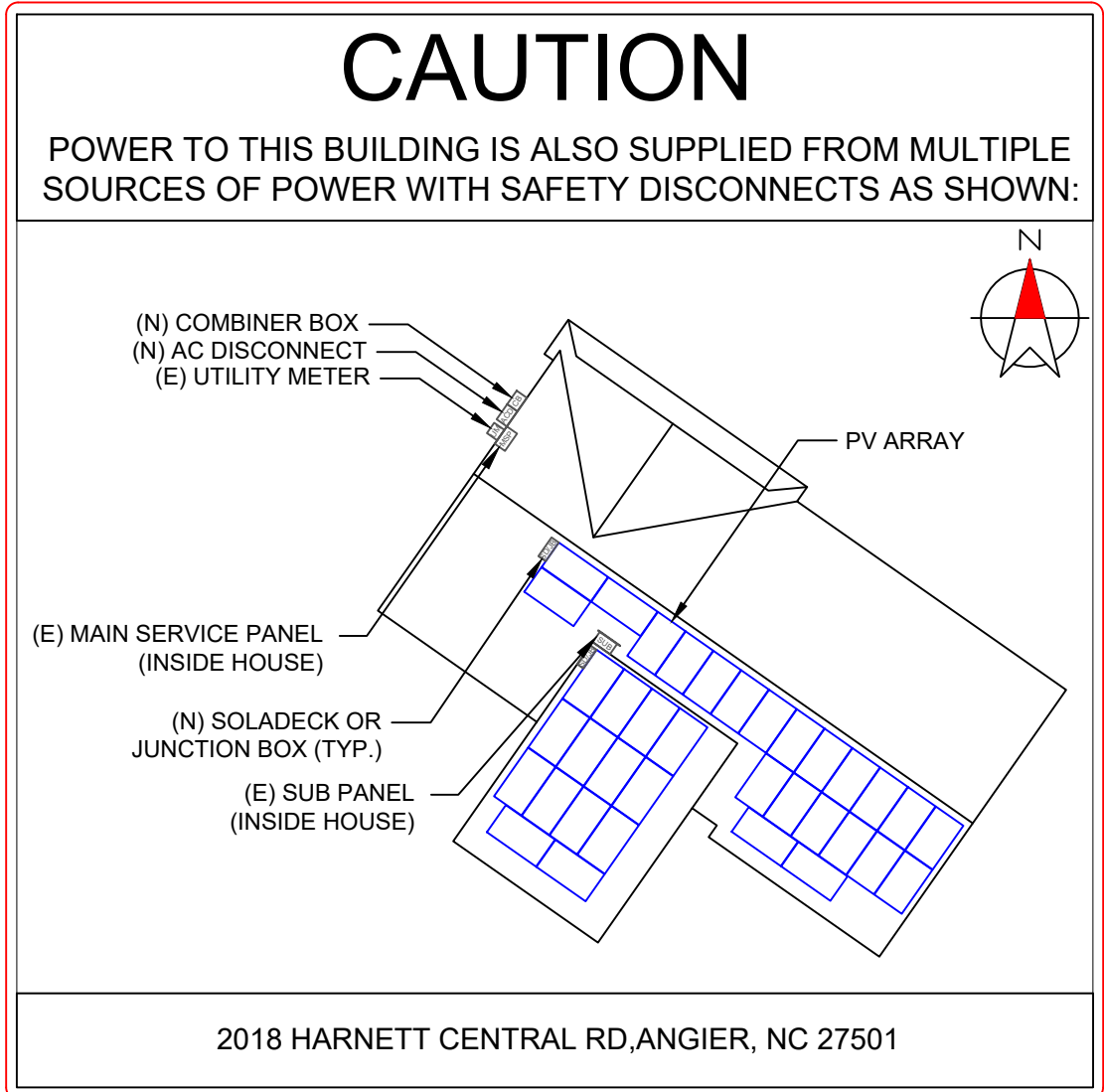
**SHEET NUMBER**

**PV-5**





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ANGIER, NC 27501

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**ESR**

SHEET NAME

**PLACARD**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-6**

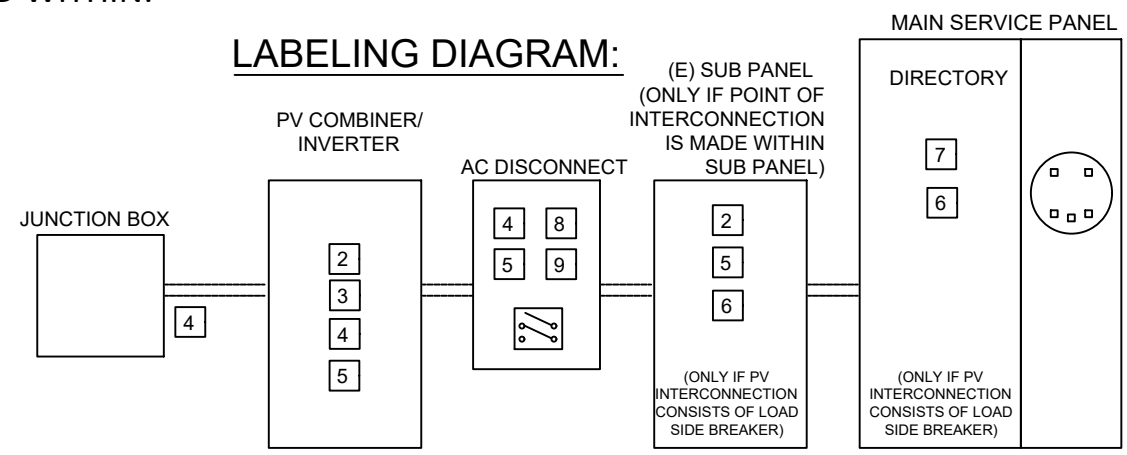
**DIRECTORY**  
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(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]

**LABELING DIAGRAM:**



\*\* ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE. \*\*

# MICRO INVERTER CHART



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL	04/20/2022	

DATE:04/20/2022

### PROJECT NAME & ADDRESS

**DONALD SCOTT PLATT  
RESIDENCE**

**2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501**

### DRAWN BY

**ESR**

### SHEET NAME

**MICRO INVERTER  
CHART**

### SHEET SIZE

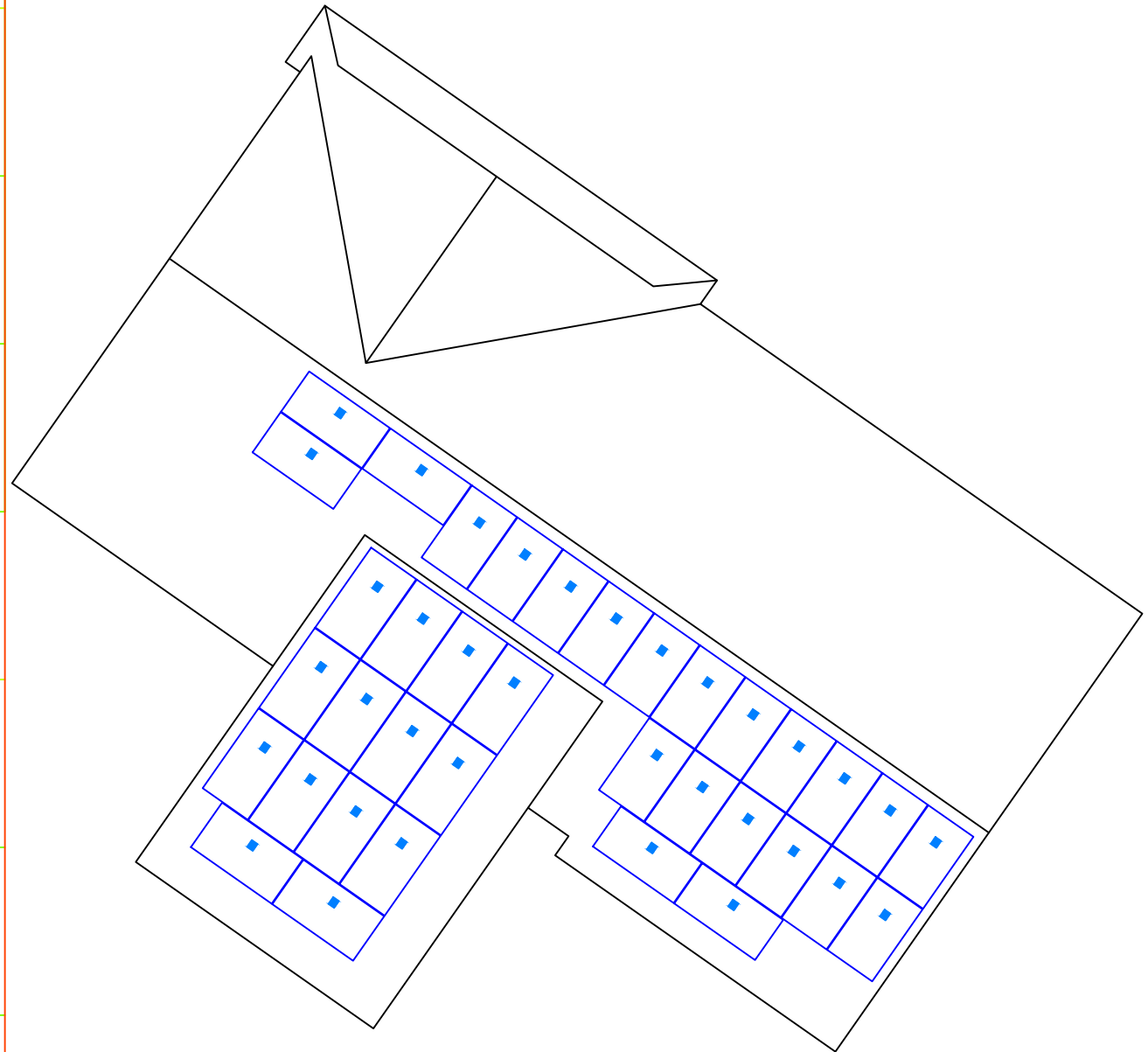
**ANSI B  
11" X 17"**

### SHEET NUMBER

**PV-7**

1-10    11-20    21-30    31-40    41-50    51-60    61-70

1  
2  
3  
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5  
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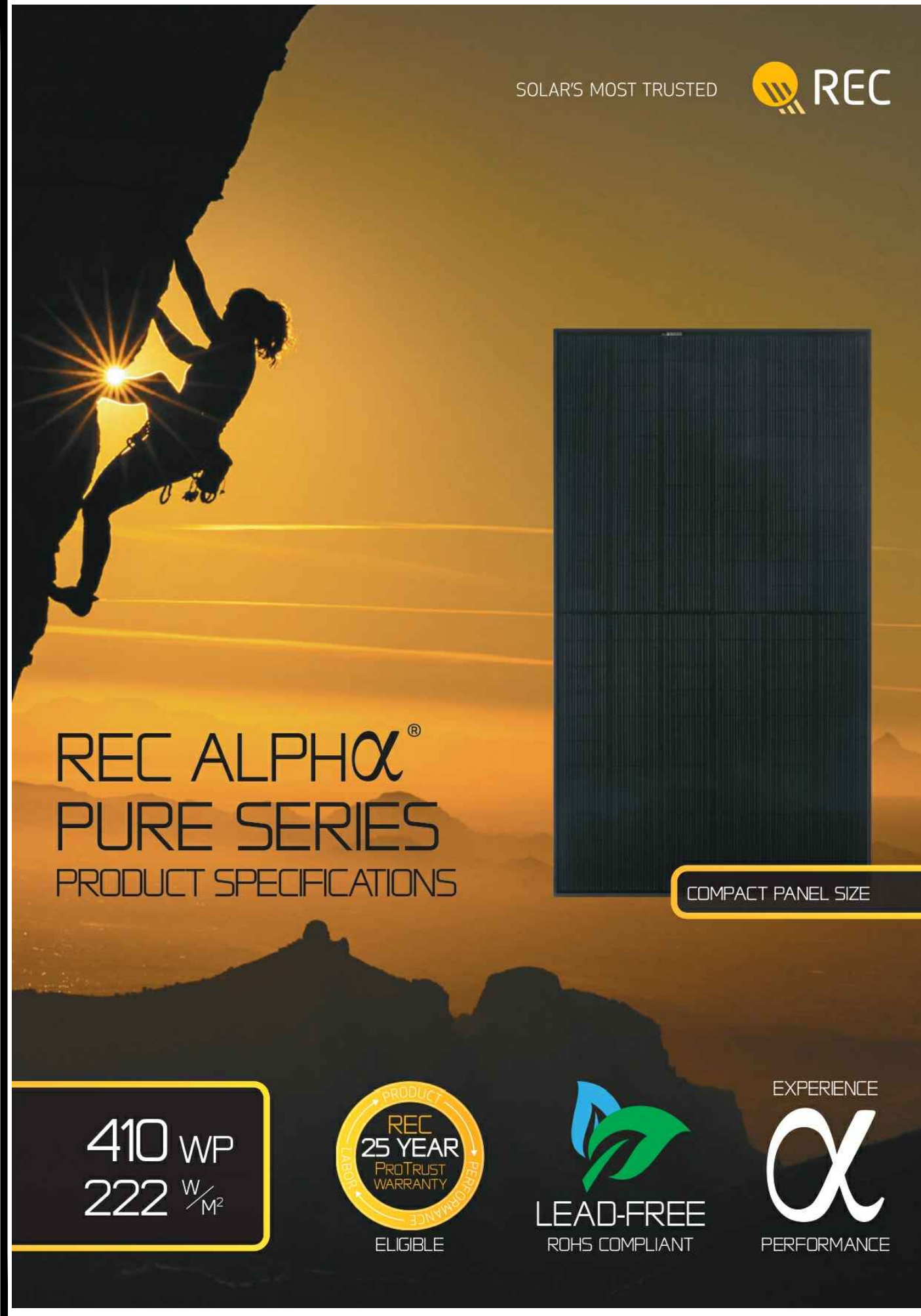


SOLAR'S MOST TRUSTED



# REC ALPHA PURE SERIES

## PRODUCT SPECIFICATIONS



# REC ALPHA<sup>®</sup> PURE SERIES

## PRODUCT SPECIFICATIONS

COMPACT PANEL SIZE

410 WP  
222 W/M<sup>2</sup>



ELIGIBLE



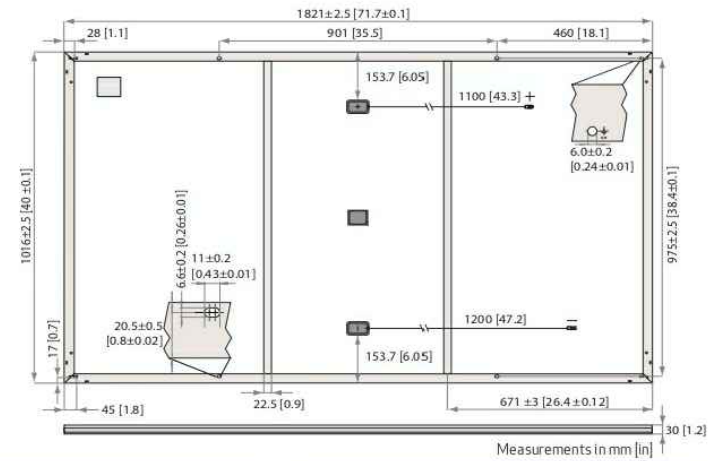
LEAD-FREE  
ROHS COMPLIANT



PERFORMANCE

### GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology, 6 strings of 22 cells in series
Glass:	3.2 mm solar glass with anti-reflective surface treatment in accordance with EN 12150
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black)
Junction box:	3-part, 3 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (4 mm <sup>2</sup> ) in accordance with IEC 62852, IP68 only when connected
Cable:	4 mm <sup>2</sup> solar cable, 1.1 m + 1.2 m in accordance with EN 50618
Dimensions:	1821 x 1016 x 30 mm (1.85 m <sup>2</sup> )
Weight:	20.5 kg
Origin:	Made in Singapore



### ELECTRICAL DATA

	Product Code*: RECxxxAA Pure					
Power Output - P <sub>MAX</sub> (Wp)	385	390	395	400	405	410
Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - V <sub>MPP</sub> (V)	41.2	41.5	41.8	42.1	42.4	42.7
Nominal Power Current - I <sub>MPP</sub> (A)	9.35	9.40	9.45	9.51	9.56	9.61
Open Circuit Voltage - V <sub>OC</sub> (V)	48.5	48.6	48.7	48.8	48.9	49.0
Short Circuit Current - I <sub>SC</sub> (A)	10.18	10.19	10.20	10.25	10.30	10.35
Power Density (W/m <sup>2</sup> )	208	211	214	216	219	222
Panel Efficiency (%)	20.8	21.1	21.4	21.6	21.9	22.2
Power Output - P <sub>MAX</sub> (Wp)	293	297	301	305	309	312
Nominal Power Voltage - V <sub>MPP</sub> (V)	38.8	39.1	39.4	39.7	40.0	40.2
Nominal Power Current - I <sub>MPP</sub> (A)	7.55	7.59	7.63	7.68	7.72	7.76
Open Circuit Voltage - V <sub>OC</sub> (V)	45.7	45.8	45.9	46.0	46.1	46.2
Short Circuit Current - I <sub>SC</sub> (A)	8.16	8.20	8.24	8.28	8.32	8.36

Values at standard test conditions (STC: air mass AM 1.5, irradiance 1000 W/m<sup>2</sup>, temperature 25°C), based on a production spread with a tolerance of P<sub>MAX</sub>, V<sub>OC</sub> & I<sub>SC</sub> ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM 1.5, irradiance 800 W/m<sup>2</sup>, temperature 20°C, windspeed 1 m/s). \* Where xxx indicates the nominal power class (P<sub>MAX</sub>) at STC above.

### MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (713 kg/m <sup>2</sup> )
Maximum test load (rear):	-4000 Pa (407 kg/m <sup>2</sup> )
Max series fuse rating:	25 A
Max reverse current:	25 A

\* See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

### WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	≤25 kW 25-500 kW	
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply

### CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730
IEC 62804 PID
IEC 61701 Salt Mist
IEC 62716 Ammonia Resistance
ISO 11925-2 Ignitability (Class E)
IEC 62782 Dynamic Mechanical Load
IEC 61215-2:2016 Hailstone (35mm)
IEC 62321 Lead-free acc. to RoHS EU 863/2015
ISO 14001, ISO 9001, IEC 45001, IEC 62941



### TEMPERATURE RATINGS\*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P <sub>MAX</sub> :	-0.26 %/°C
Temperature coefficient of V <sub>OC</sub> :	-0.24 %/°C
Temperature coefficient of I <sub>SC</sub> :	0.04 %/°C

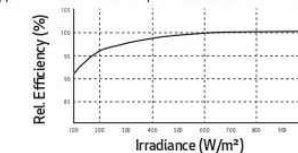
\* The temperature coefficients stated are linear values

### DELIVERY INFORMATION

Panels per pallet:	33
Panels per 40 ft GP/high cube container:	792 (24 pallets)
Panels per 13.6 m truck:	924 (28 pallets)
Panels per 53 ft truck:	891 (27 pallets)

### LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Specifications subject to change without notice.

Ref: PIM-DS-12-06-Rev-E 11/21



www.recgroup.com

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.



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RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

### DRAWN BY

ESR

SHEET NAME  
MODULE SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-8





## IQ8 and IQ8+ Microinverters

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



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



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



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



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

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IQ8SP-DS-0002-01-EN-US-2022-03-17

### Easy to install

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

### High productivity and reliability

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

### Microgrid-forming

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

\* Only when installed with IQ System Controller 2, meets UL 1741.

\*\* IQ8 and IQ8Plus supports split phase, 240V installations only.

## IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings <sup>1</sup>	W	235 - 350	235 - 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 - 37	29 - 45
Operating range	V	25 - 48	25 - 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current <sup>2</sup> [module Isc]	A		15
Overvoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range <sup>3</sup>	V	240 / 211 - 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 - 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit <sup>4</sup>		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading - 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection - no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01	
Certifications		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

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

IQ8SP-DS-0002-01-EN-US-2022-03-17

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DONALD SCOTT PLATT  
 RESIDENCE  
 2018 HARNETT CENTRAL RD,  
 ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME  
 INVERTER  
 SPECIFICATION

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-9



# Enphase IQ Combiner 4/4C

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



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



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

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

### Smart

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

### Simple

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

### Reliable

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



## Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

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

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SIGORA SOLAR LLC  
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CHARLOTTEVILLE, VA 22901

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2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

### DRAWN BY

ESR

### SHEET NAME


COMBINER  
SPECIFICATION

### SHEET SIZE

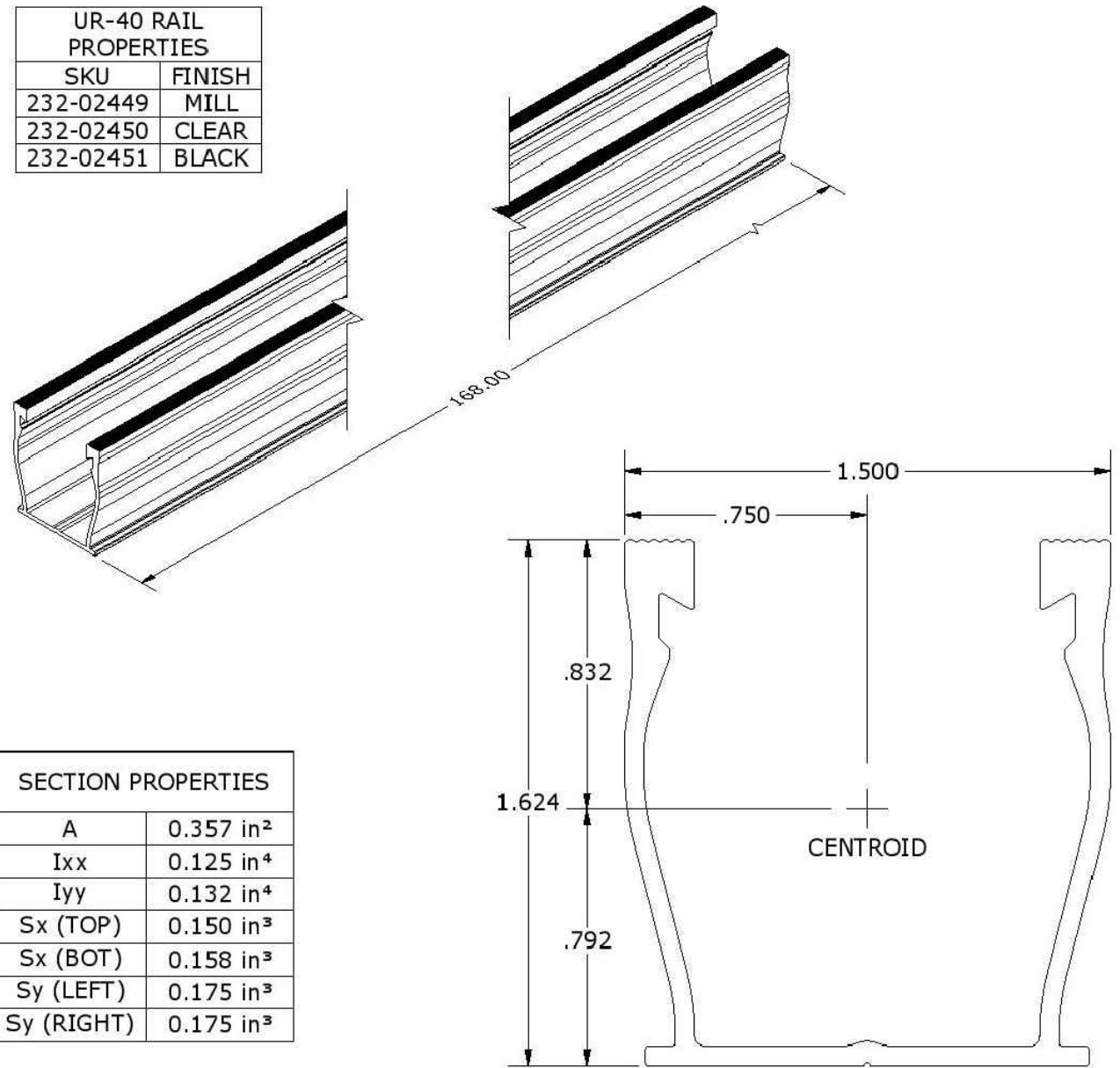
ANSI B  
11" X 17"

### SHEET NUMBER

PV-10

DESCRIPTION: SNAPNRACK, UR-40 RAIL	DRAWN BY: mwatkins	 595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 550-6900 • FAX (415) 550-6902 <small>THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF SUNRUN SOUTH LLC.</small>
PART NUMBER(S): 232-02449, 232-02450, 232-02451	REVISION: <b>B</b>	

UR-40 RAIL PROPERTIES	
SKU	FINISH
232-02449	MILL
232-02450	CLEAR
232-02451	BLACK



SECTION PROPERTIES	
A	0.357 in <sup>2</sup>
Ixx	0.125 in <sup>4</sup>
Iyy	0.132 in <sup>4</sup>
Sx (TOP)	0.150 in <sup>3</sup>
Sx (BOT)	0.158 in <sup>3</sup>
Sy (LEFT)	0.175 in <sup>3</sup>
Sy (RIGHT)	0.175 in <sup>3</sup>

ALL DIMENSIONS IN INCHES

MATERIALS:	6000 SERIES ALUMINUM	OPTIONS:
DESIGN LOAD (LBS):	N/A	CLEAR / BLACK ANODIZED
ULTIMATE LOAD (LBS):	N/A	MILL FINISH
TORQUE SPECIFICATION:	N/A LB-FT	BUNDLES OF 144
CERTIFICATION:	UL 2703, FILE E359313	BOXES OF 8
WEIGHT (LBS):	5.85	



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

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RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY  
**ESR**

SHEET NAME  
**RAIL SPECIFICATION**

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

SHEET NUMBER  
**PV-11**

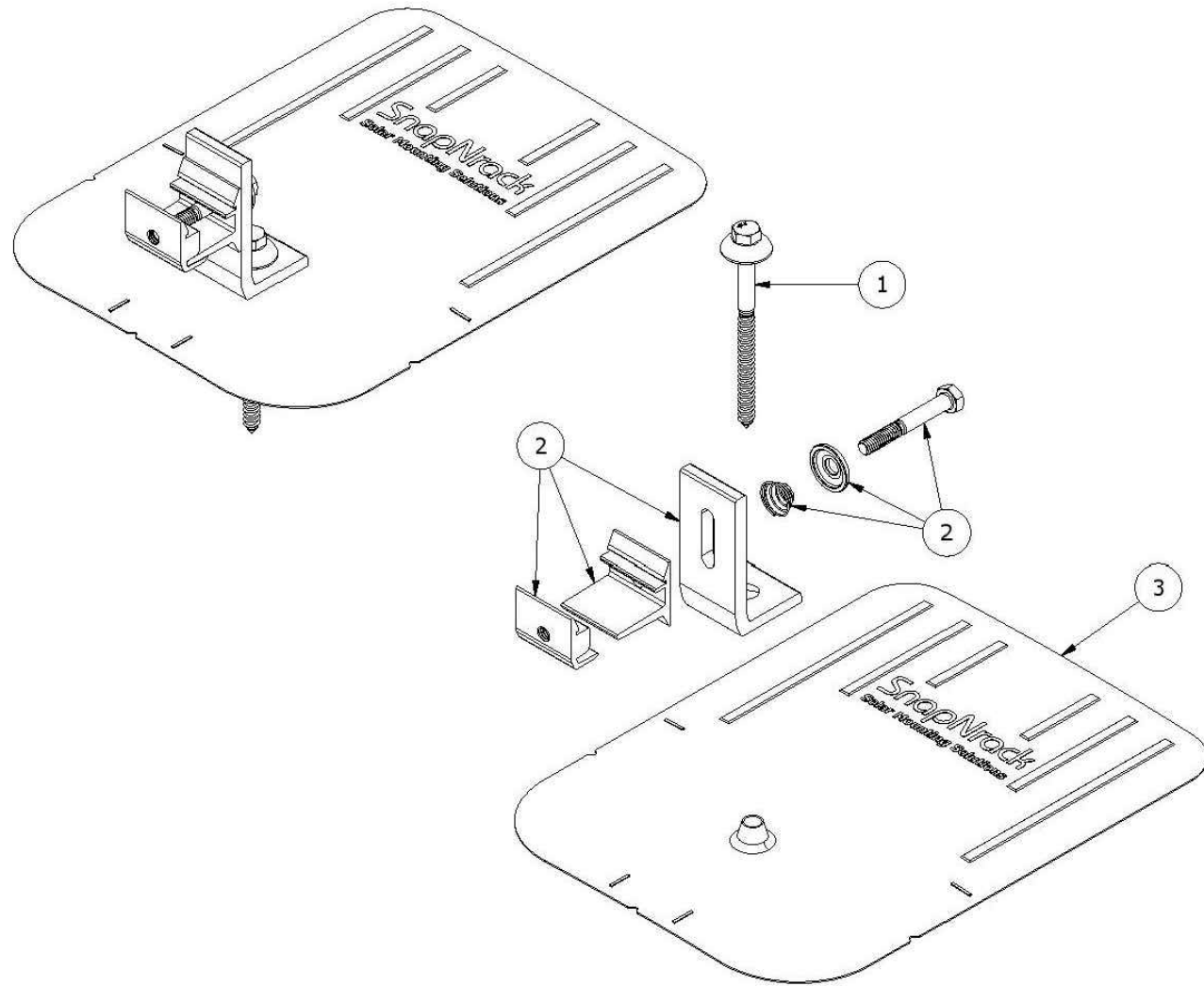


DESCRIPTION: SNAPNRACK, ULTRA RAIL COMP KIT	DRAWN BY: mwatkins	
PART NUMBER(S): SEE BELOW	REVISION: <b>B</b>	

595 MARKET STREET, 20TH FLOOR • SAN FRANCISCO, CA 94105 USA  
PHONE (415) 580-6900 • FAX (415) 580-6902  
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PART NUMBER(S): SEE BELOW	REVISION: <b>B</b>	

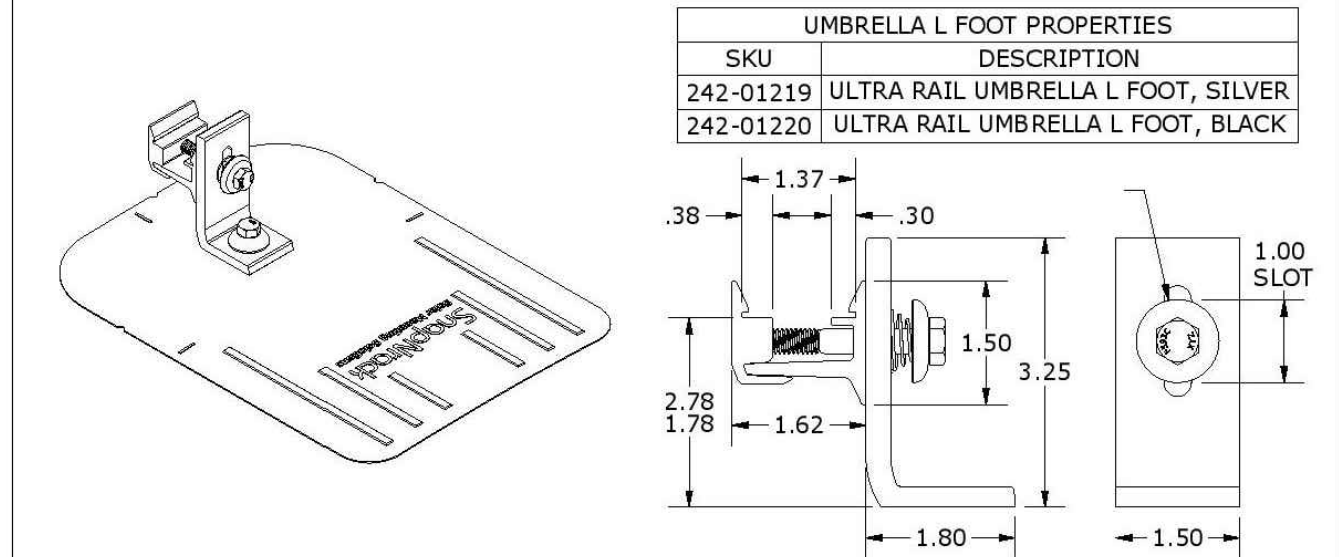
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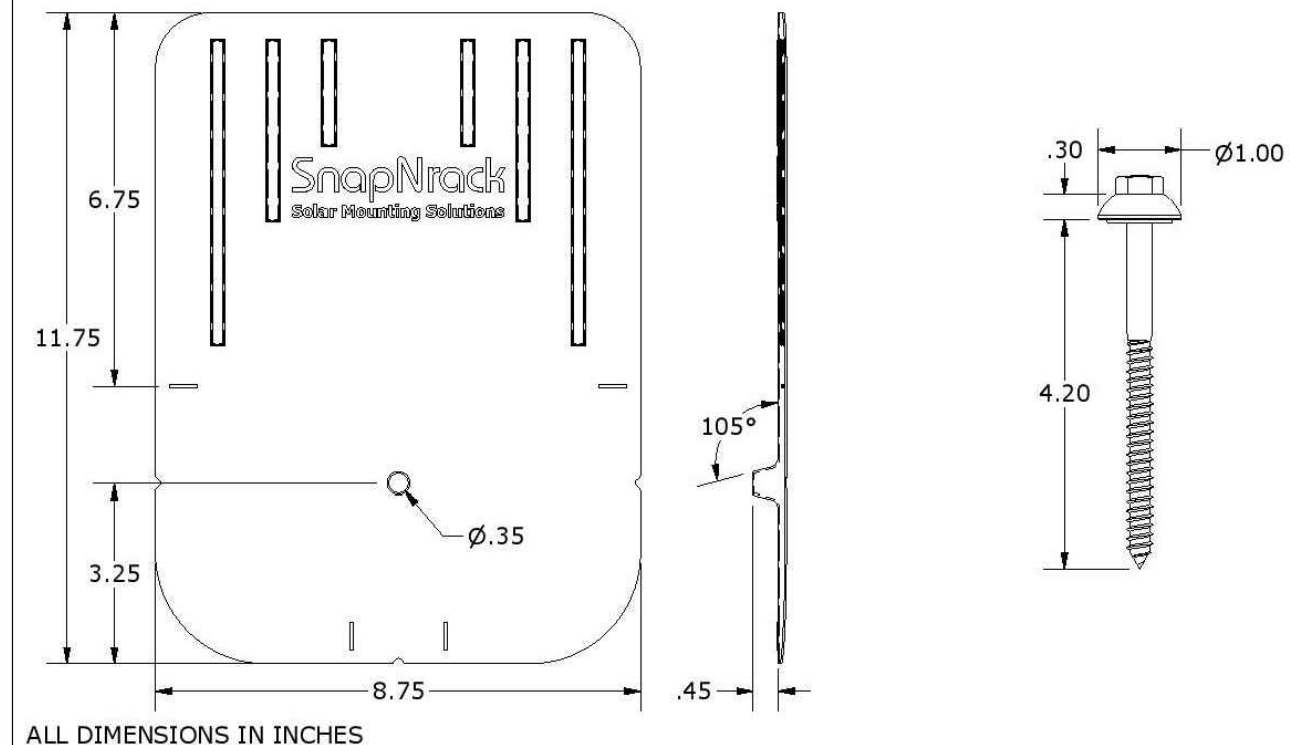
PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	802 UP, 1333 DOWN, 356 SIDE
ULTIMATE LOAD (LBS):	2005 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM UL SUBJECT 2582
WEIGHT (LBS):	0.80



COMP FLASHING PROPERTIES	
SKU	DESCRIPTION
232-01375	COMP FLASHING, 9" X 12", BLACK ALUM
232-01376	COMP FLASHING, 9" X 12", SILVER ALUM



ALL DIMENSIONS IN INCHES



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INITIAL	04/20/2022	

DATE:04/20/2022

PROJECT NAME & ADDRESS

DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME

ATTACHMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-12

# 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 Claire, WI 54703  
For product information call 1(866) 367-7782



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

## REVISIONS

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DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME

SOLADECK  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-13



# PROJECT DESCRIPTION:

36 x REC SOLAR: REC400AA PURE 400W MONO MODULES  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 DC SYSTEM SIZE: 14.400kW DC  
 AC SYSTEM SIZE: 10.440kW AC

### EQUIPMENT SUMMARY:

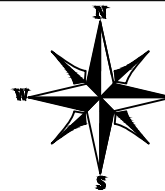
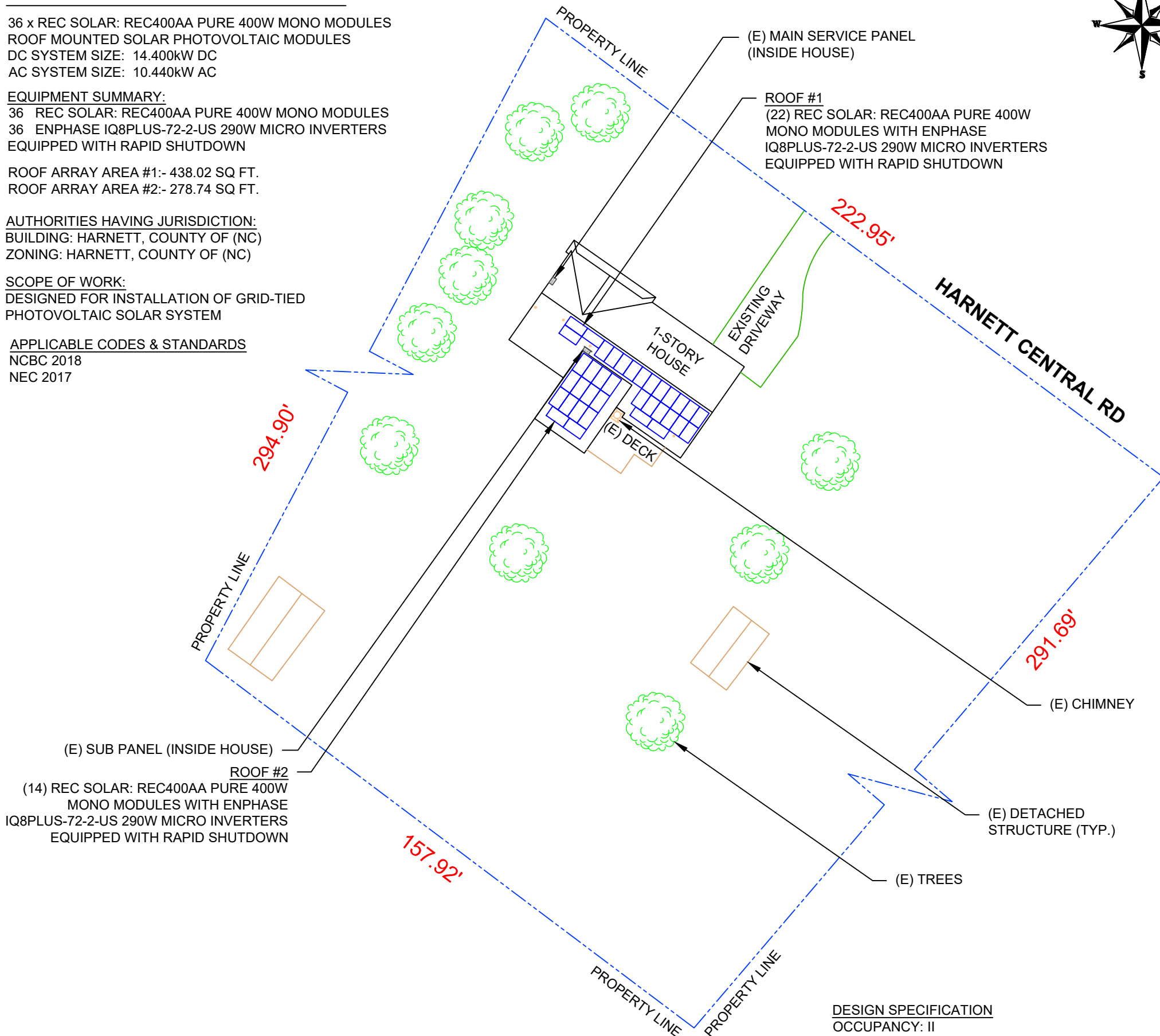
36 REC SOLAR: REC400AA PURE 400W MONO MODULES  
 36 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS  
 EQUIPPED WITH RAPID SHUTDOWN

ROOF ARRAY AREA #1:- 438.02 SQ FT.  
 ROOF ARRAY AREA #2:- 278.74 SQ FT.

**AUTHORITIES HAVING JURISDICTION:**  
 BUILDING: HARNETT, COUNTY OF (NC)  
 ZONING: HARNETT, COUNTY OF (NC)

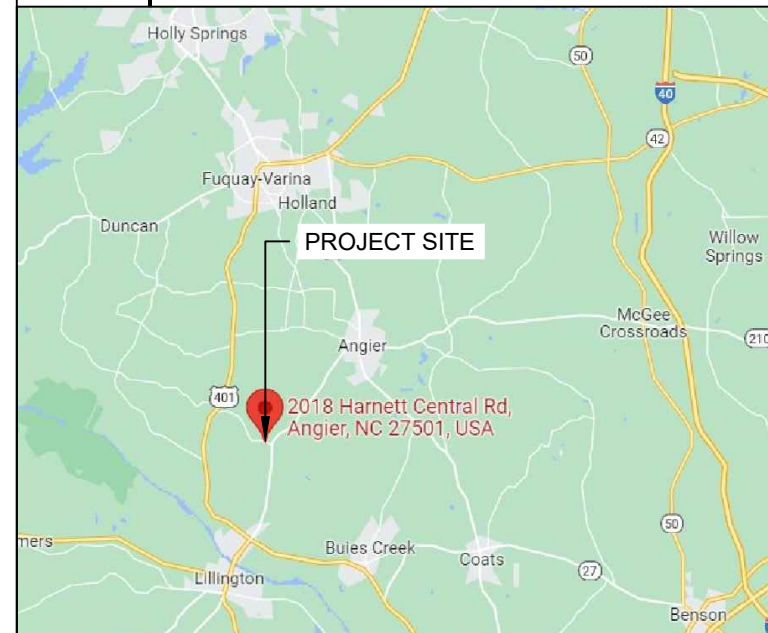
**SCOPE OF WORK:**  
 DESIGNED FOR INSTALLATION OF GRID-TIED  
 PHOTOVOLTAIC SOLAR SYSTEM

**APPLICABLE CODES & STANDARDS**  
 NCBC 2018  
 NEC 2017



**2 HOUSE PHOTO**

PV-1 SCALE: NTS



**3 VICINITY MAP**

PV-1 SCALE: NTS

**SHEET INDEX**

PV-1	PLOT PLAN WITH ROOF PLAN
PV-2	ROOF PLAN & MODULES
PV-2A	CIRCUIT LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	LABELS
PV-6	PLACARD
PV-7	MICRO INVERTER CHART
PV-8	MODULE SPECIFICATIONS
PV-9	INVERTER SPECIFICATIONS
PV-10	COMBINER SPECIFICATIONS
PV-11	RAIL SPECIFICATIONS
PV-12	ATTACHMENT SPECIFICATIONS
PV-13	SOLADECK SPECIFICATIONS

**1 PLOT PLAN WITH ROOF PLAN**

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

**DESIGN SPECIFICATION**  
 OCCUPANCY: II  
 CONSTRUCTION: SINGLE-FAMILY  
 ZONING: RESIDENTIAL  
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER  
 WIND EXPOSURE: REFER STRUCTURAL LETTER  
 WIND SPEED: REFER STRUCTURAL LETTER

SIGORA SOLAR LLC  
 490 WESTFIELD RD STE A  
 CHARLOTTEVILLE, VA 22901

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 RESIDENCE  
 2018 HARNETT CENTRAL RD,  
 ANGIER, NC 27501

DRAWN BY  
**ESR**

SHEET NAME  
**PLOT PLAN WITH  
 ROOF PLAN**

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

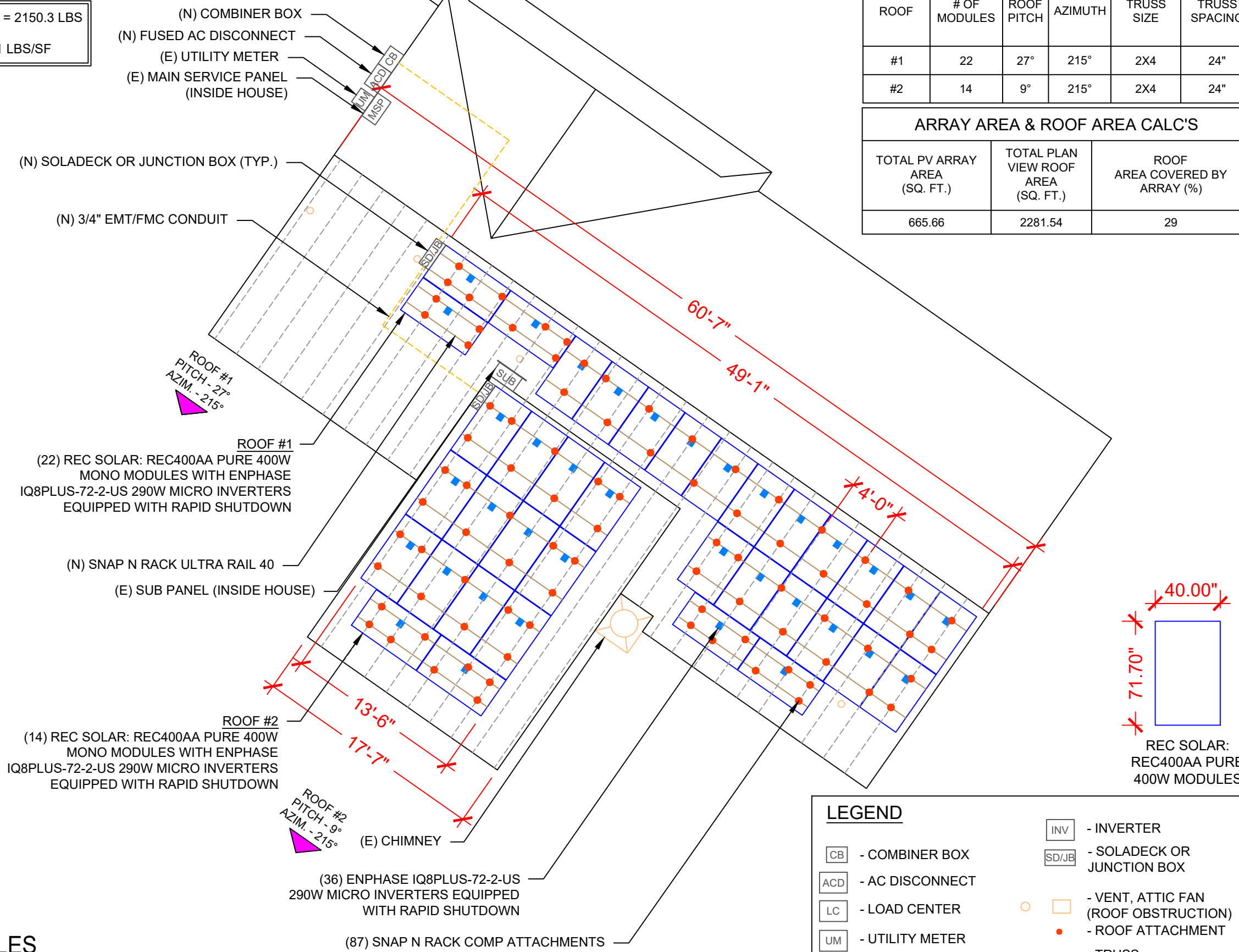
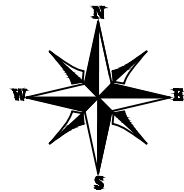
SHEET NUMBER  
**PV-1**



# MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 36 MODULES  
 MODULE TYPE = REC SOLAR: REC400AA PURE 400W MONO MODULES  
 MODULE WEIGHT = 45.91 LBS / 20.8KG  
 MODULE DIMENSIONS = 71.70"x 40.00" = 19.91 SF

- TOTAL WEIGHT OF PV MODULES AND RAILS = 2150.3 LBS
- WEIGHT PER ATTACHMENT POINT = 25 LBS
- DISTRIBUTED WEIGHT OF PV MODULE = 2.31 LBS/SF



ROOF DESCRIPTION					
ROOF TYPE				ASPHALT SHINGLE	
ROOF LAYER				1 LAYER	
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	22	27°	215°	2X4	24"
#2	14	9°	215°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL PLAN VIEW ROOF AREA (SQ. FT.)	ROOF AREA COVERED BY ARRAY (%)
665.66	2281.54	29

SIGORA SOLAR LLC  
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 CHARLOTTEVILLE, VA 22901

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PROJECT NAME & ADDRESS  
**DONALD SCOTT PLATT RESIDENCE**  
 2018 HARNETT CENTRAL RD,  
 ANGIER, NC 27501

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**ESR**

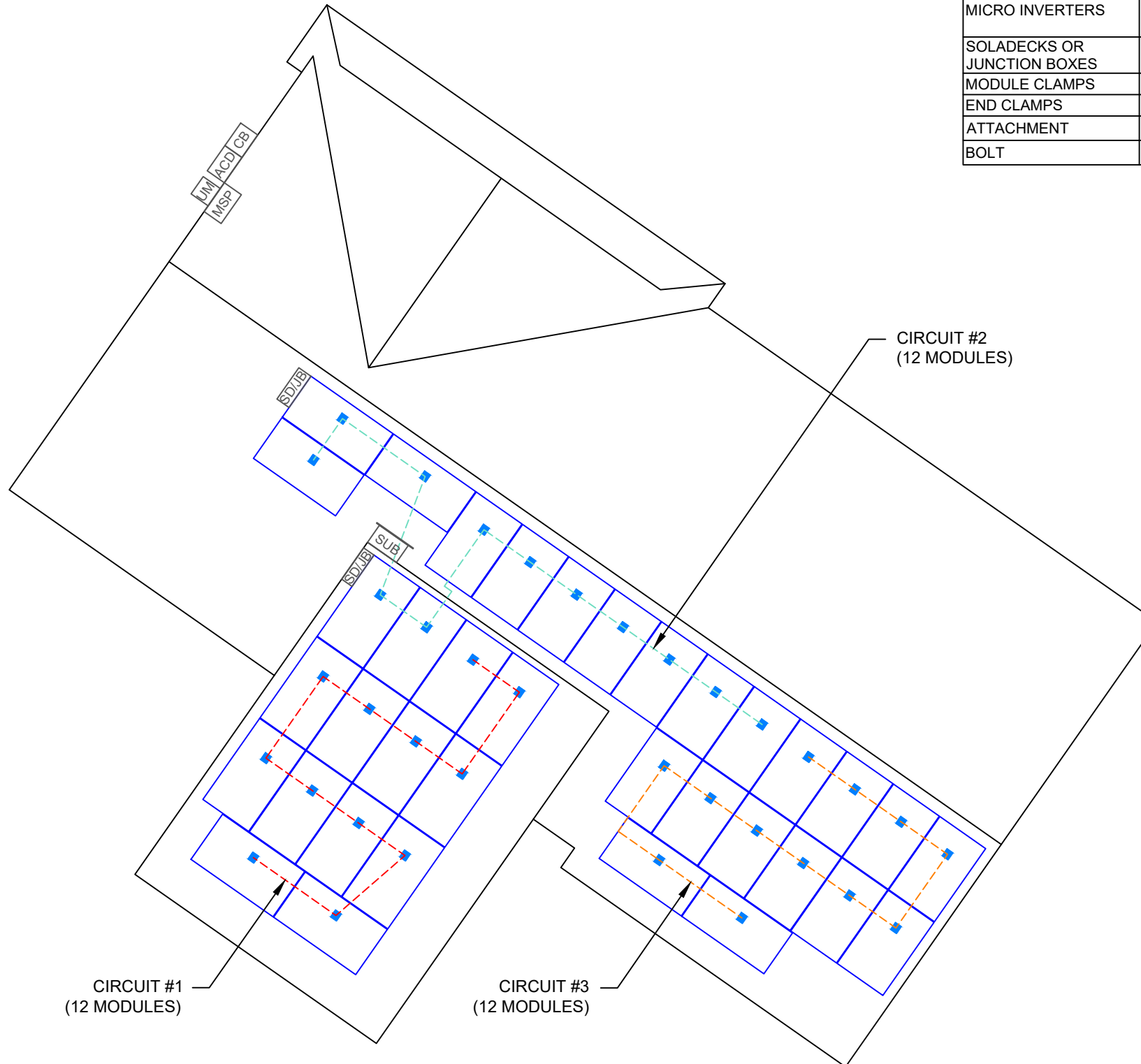
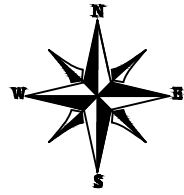
SHEET NAME  
**ROOF PLAN & MODULES**

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

SHEET NUMBER  
**PV-2**

LEGEND	
[CB]	- COMBINER BOX
[ACD]	- AC DISCONNECT
[LC]	- LOAD CENTER
[UM]	- UTILITY METER
[MSP]	- MAIN SERVICE PANEL
[INV]	- INVERTER
[SD/JB]	- SOLADECK OR JUNCTION BOX
○	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
●	- ROOF ATTACHMENT
- - -	- TRUSS
- - - -	- CONDUIT

CIRCUIT LEGENDS	
	CIRCUIT #1
	CIRCUIT #2
	CIRCUIT #3



BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	36	REC SOLAR: REC400AA PURE 400W
MICRO INVERTERS	36	ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
SOLADECKS OR JUNCTION BOXES	2	SOLADECKS OR JUNCTION BOXES
MODULE CLAMPS	54	MID MODULE CLAMPS
END CLAMPS	36	END CLAMPS / STOPPER SLEEVE
ATTACHMENT	87	SNAP N RACK COMP
BOLT	87	LAG BOLT

SIGORA SOLAR LLC  
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RESIDENCE**

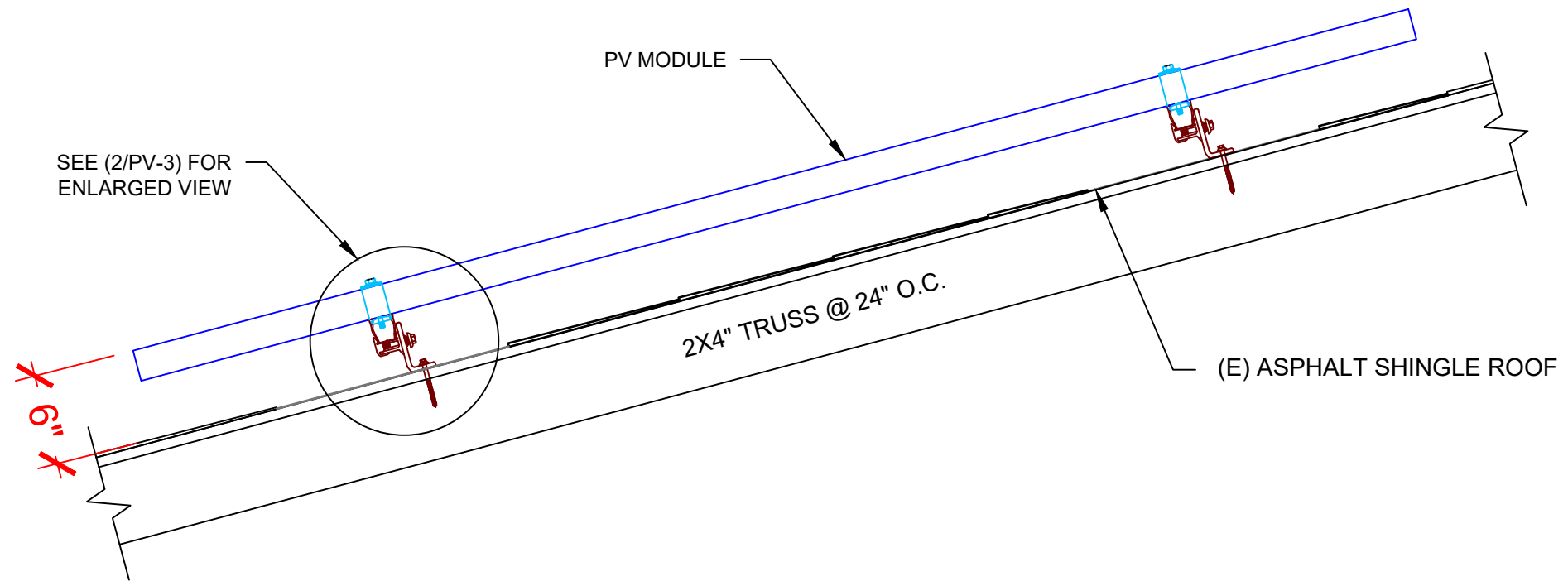
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**ESR**

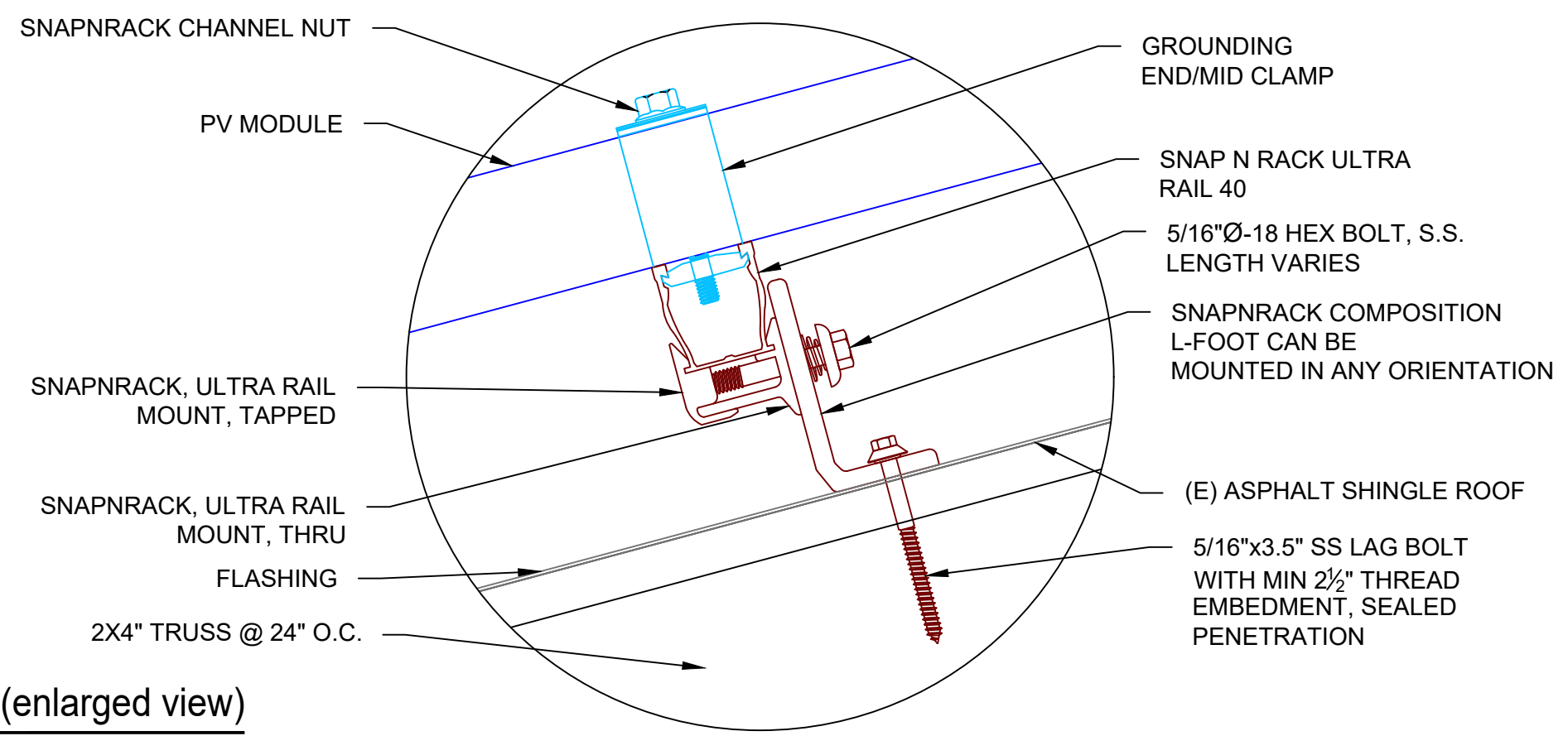
SHEET NAME  
**CIRCUIT LAYOUT**

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

SHEET NUMBER  
**PV-2A**



**1** | STRUCTURAL ATTACHMENT (SIDE VIEW)  
 PV-3 | SCALE: N.T.S



**2** | ATTACHMENT DETAIL (enlarged view)  
 PV-3 | SCALE: N.T.S

**SIGORA SOLAR**  
 SIGORA SOLAR LLC  
 490 WESTFIELD RD STE A  
 CHARLOTTEVILLE, VA 22901

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 ANGIER, NC 27501

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**ESR**

SHEET NAME  
**ATTACHMENT  
 DETAIL**

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

SHEET NUMBER  
**PV-3**



DC SYSTEM SIZE: 14.400 kW DC  
AC SYSTEM SIZE: 10.440 kW AC

(36) REC SOLAR: REC400AA PURE 400W MONO MODULES  
WITH (36) ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS  
EQUIPPED WITH RAPID SHUTDOWN  
(3) BRANCH CIRCUITS OF 12 MODULES CONNECTED IN PARALLEL

**INTERCONNECTION NOTES:**

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

**DISCONNECT NOTES:**

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH

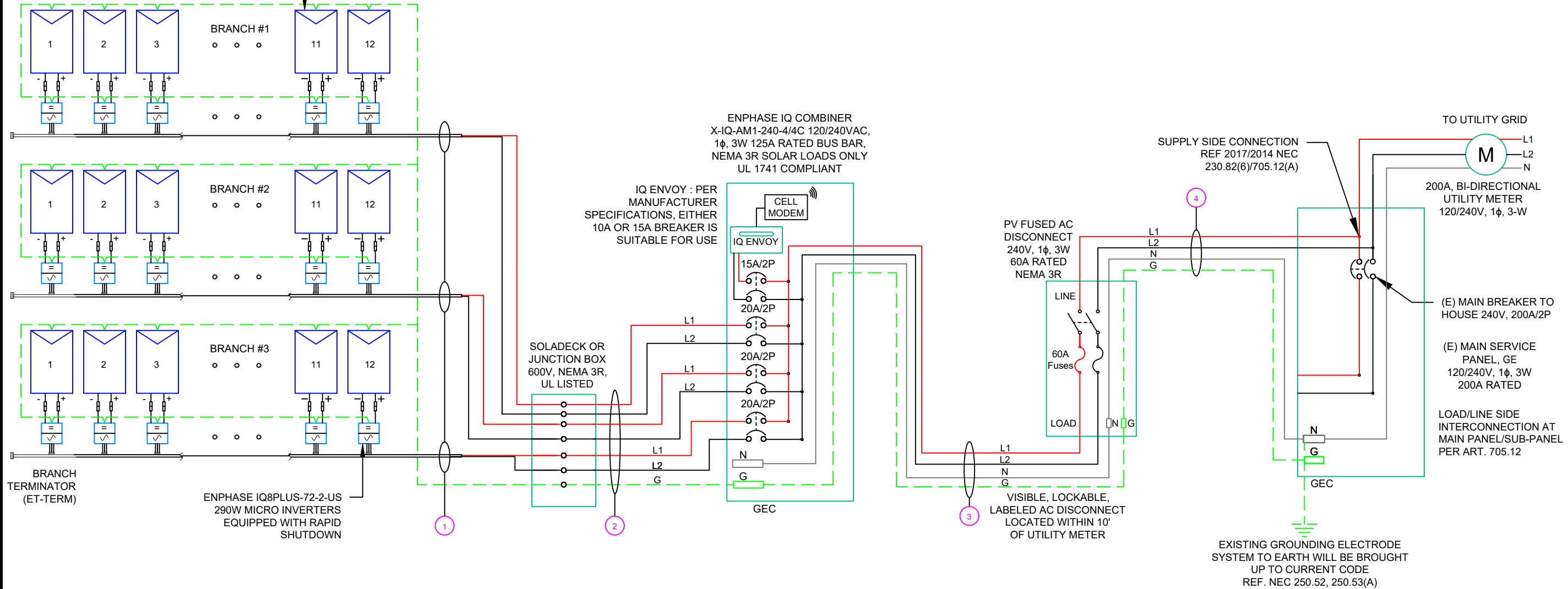
**RACKING NOTE:**

1. BOND EVERY RAIL WITH #6 BARE COPPER

**GROUNDING & GENERAL NOTES:**

1. A SECOND FACILITY GROUNDING ELECTRODE IS NOT REQUIRED PER [NEC 690.47(C)(3)]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. SOLADECK OR JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - SOLADECK OR JUNCTION BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.
8. 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.

REC SOLAR: REC400AA  
PURE 400W MODULES



BRANCH  
TERMINATOR  
(ET-TERM)

ENPHASE IQ8PLUS-72-2-US  
290W MICRO INVERTERS  
EQUIPPED WITH RAPID  
SHUTDOWN

SOLADECK OR  
JUNCTION BOX  
600V, NEMA 3R,  
UL LISTED

IQ ENVOY : PER  
MANUFACTURER  
SPECIFICATIONS, EITHER  
10A OR 15A BREAKER IS  
SUITABLE FOR USE

ENPHASE IQ COMBINER  
X-IQ-AM1-240-4/4C 120/240VAC,  
1 $\phi$ , 3W 125A RATED BUS BAR,  
NEMA 3R SOLAR LOADS ONLY  
UL 1741 COMPLIANT

PV FUSED AC  
DISCONNECT  
240V, 1 $\phi$ , 3W  
60A RATED  
NEMA 3R

SUPPLY SIDE CONNECTION  
REF 2017/2014 NEC  
230.82(6)/705.12(A)

TO UTILITY GRID

200A, BI-DIRECTIONAL  
UTILITY METER  
120/240V, 1 $\phi$ , 3-W

(E) MAIN BREAKER TO  
HOUSE 240V, 200A/2P

(E) MAIN SERVICE  
PANEL, GE  
120/240V, 1 $\phi$ , 3W  
200A RATED

LOAD/LINE SIDE  
INTERCONNECTION AT  
MAIN PANEL/SUB-PANEL  
PER ART. 705.12

EXISTING GROUNDING ELECTRODE  
SYSTEM TO EARTH WILL BE BROUGHT  
UP TO CURRENT CODE  
REF. NEC 250.52, 250.53(A)

QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
(6)	#12AWG - ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR		
(6)	#10AWG - CU, THWN-2	EMT OR FMC IN ATTIC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#6AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#6AWG - CU, THWN-2 N		
(1)	#8AWG - CU, THWN-2 GND		
(2)	#6AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#6AWG - CU, THWN-2 N		
(1)	#8AWG - CU, THWN-2 GND		

1 ELECTRICAL LINE DIAGRAM

PV-4

SCALE: NTS



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
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RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME

ELECTRICAL LINE  
DIAGRAM

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-4

**WARNING:PHOTOVOLTAIC  
POWER SOURCE**

**LABEL 1**

AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

NEC 690.31(G)(3&4)

(NOT USED FOR ENPHASE MICROINVERTERS)

**PHOTOVOLTAIC**

**LABEL 2**

AT EACH PV DISCONNECTING MEANS

NEC 690.13(B)

(NOT USED FOR ENPHASE MICROINVERTERS)

**DC DISCONNECT**

MAXIMUM VOLTAGE  
MAXIMUM CIRCUIT CURRENT  
MAX RATED OUTPUT CURRENT OF  
THE CHARGE CONTROLLER  
OR DC-TO-DC CONVERTER  
(IF INSTALLED)

**LABEL 3**

AT DC PV SYSTEM DISCONNECT

NEC 690.53

(NOT USED FOR ENPHASE MICROINVERTERS)

**PHOTOVOLTAIC**

**LABEL 4**

AT AC DISCONNECT

NEC 690.13(B)

**AC DISCONNECT**

**PHOTOVOLTAIC AC DISCONNECT**

**LABEL 5**

AT AC DISCONNECT

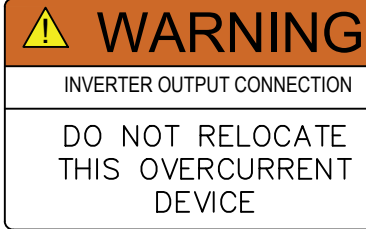
NEC 690.54

RATED AC OUTPUT CURRENT: **43.56A**  
NOMINAL OPERATING AC VOLTAGE: **240V**

36 MICROS X 1.21 AMP/MICRO = 43.56AMP

**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]



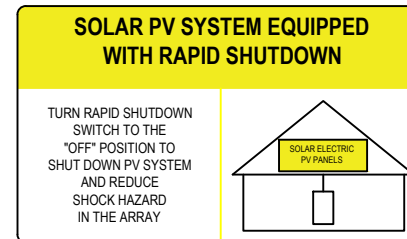
**LABEL 6**

PLACED ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER IF TIE IN CONSISTS OF LOAD SIDE CONNECTION TO BUSBAR.  
NEC 705.12(D)(2)(3)(B)



**LABEL 7**

SIGN LOCATED AT LOAD CENTER  
NEC 705.12(B)(3-4) & NEC 690.59



**LABEL 8**

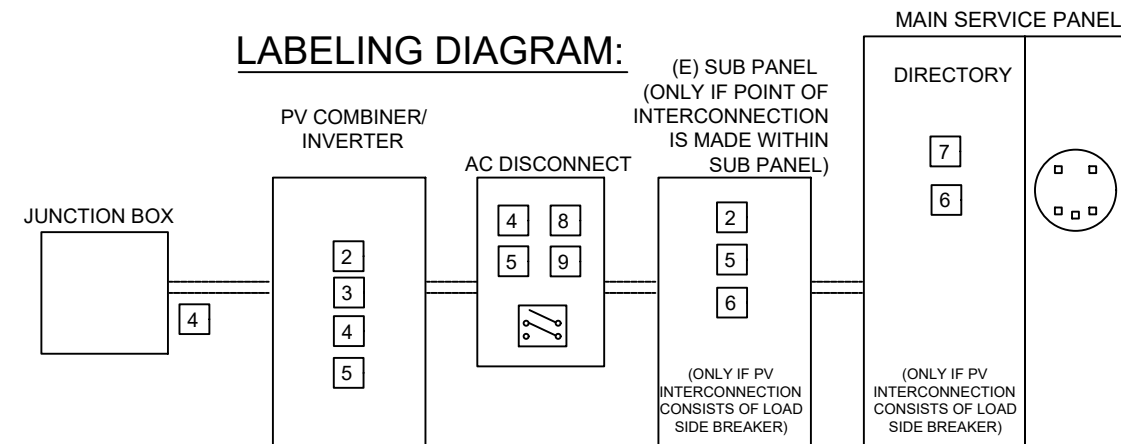
FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS LEAVING THE ARRAY:  
SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.  
[NEC 690.56(C)(1)(A)]

**RAPID SHUTDOWN  
SWITCH FOR  
SOLAR PV SYSTEM**

**LABEL 9**

AT AC DISCONNECT  
NEC 690.56(C)(3)

**LABELING DIAGRAM:**



\*\* ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE. \*\*



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**ESR**

**SHEET NAME**

**LABELS**

**SHEET SIZE**

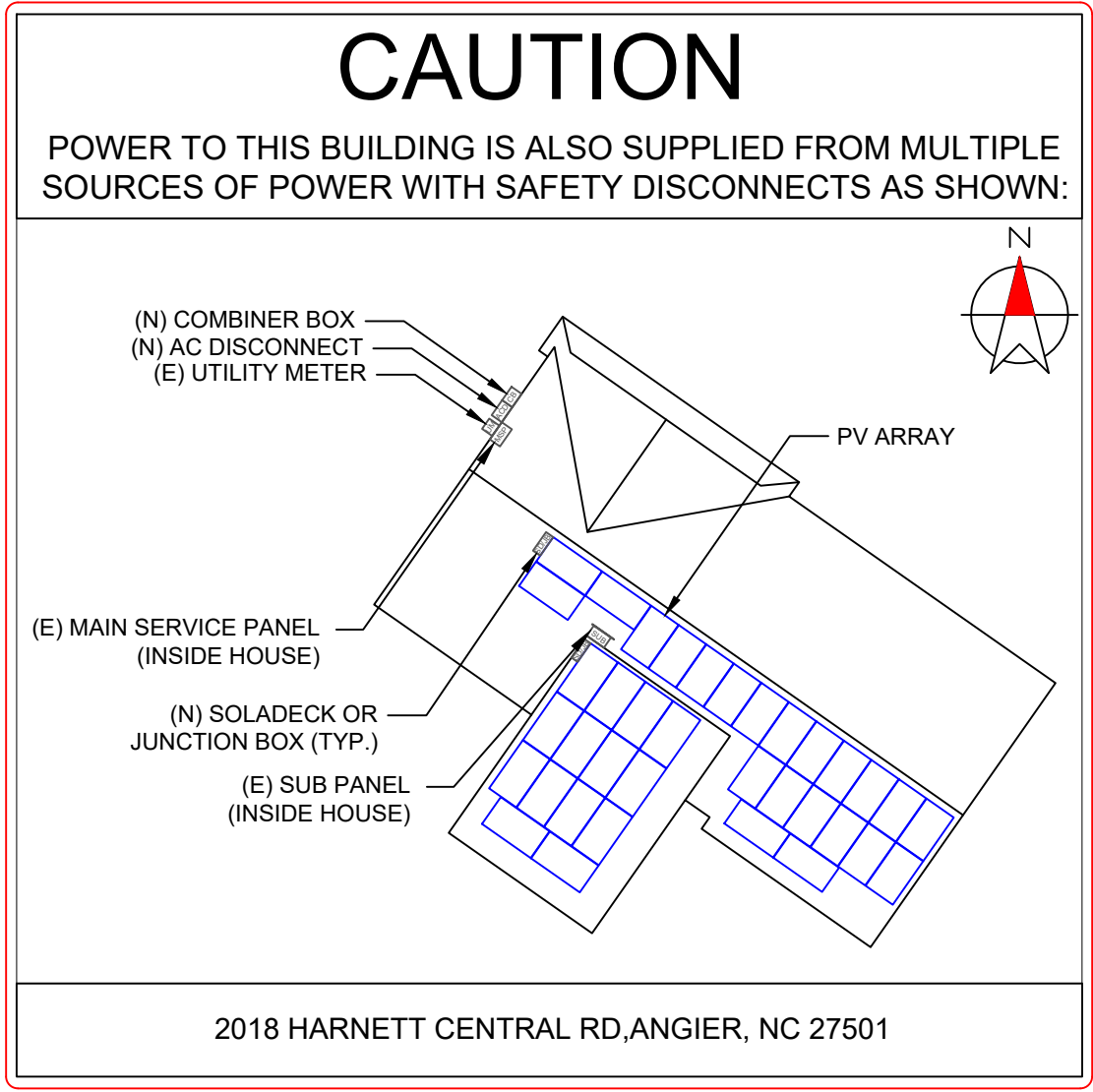
**ANSI B  
11" X 17"**

**SHEET NUMBER**

**PV-5**



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
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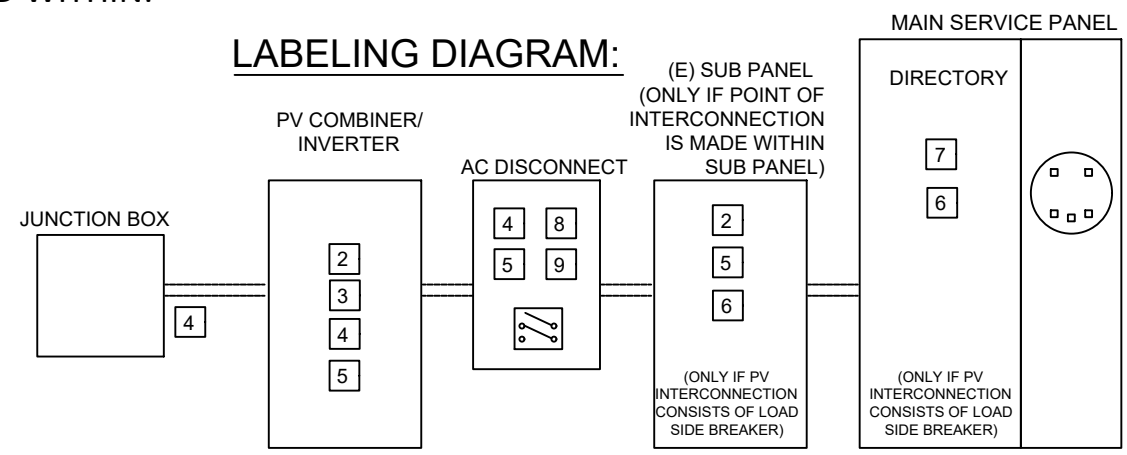
**DIRECTORY**  
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(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]

**LABELING DIAGRAM:**



\*\* ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE. \*\*

DRAWN BY

ESR

SHEET NAME

PLACARD

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-6



# MICRO INVERTER CHART



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
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RESIDENCE**

**2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501**

### DRAWN BY

**ESR**

### SHEET NAME

**MICRO INVERTER  
CHART**

### SHEET SIZE

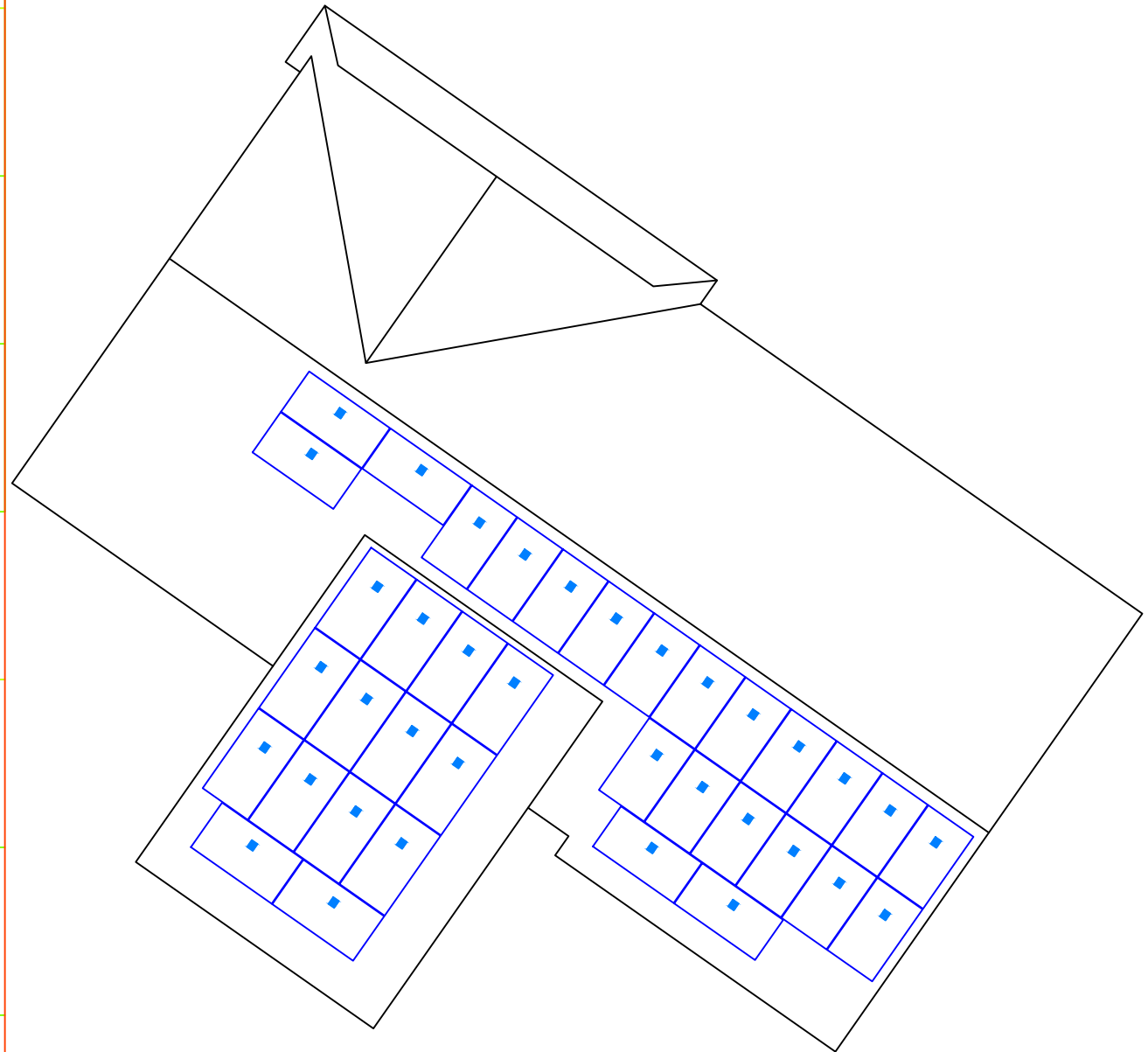
**ANSI B  
11" X 17"**

### SHEET NUMBER

**PV-7**

1-10    11-20    21-30    31-40    41-50    51-60    61-70

1  
2  
3  
4  
5  
6  
7  
8  
9  
10

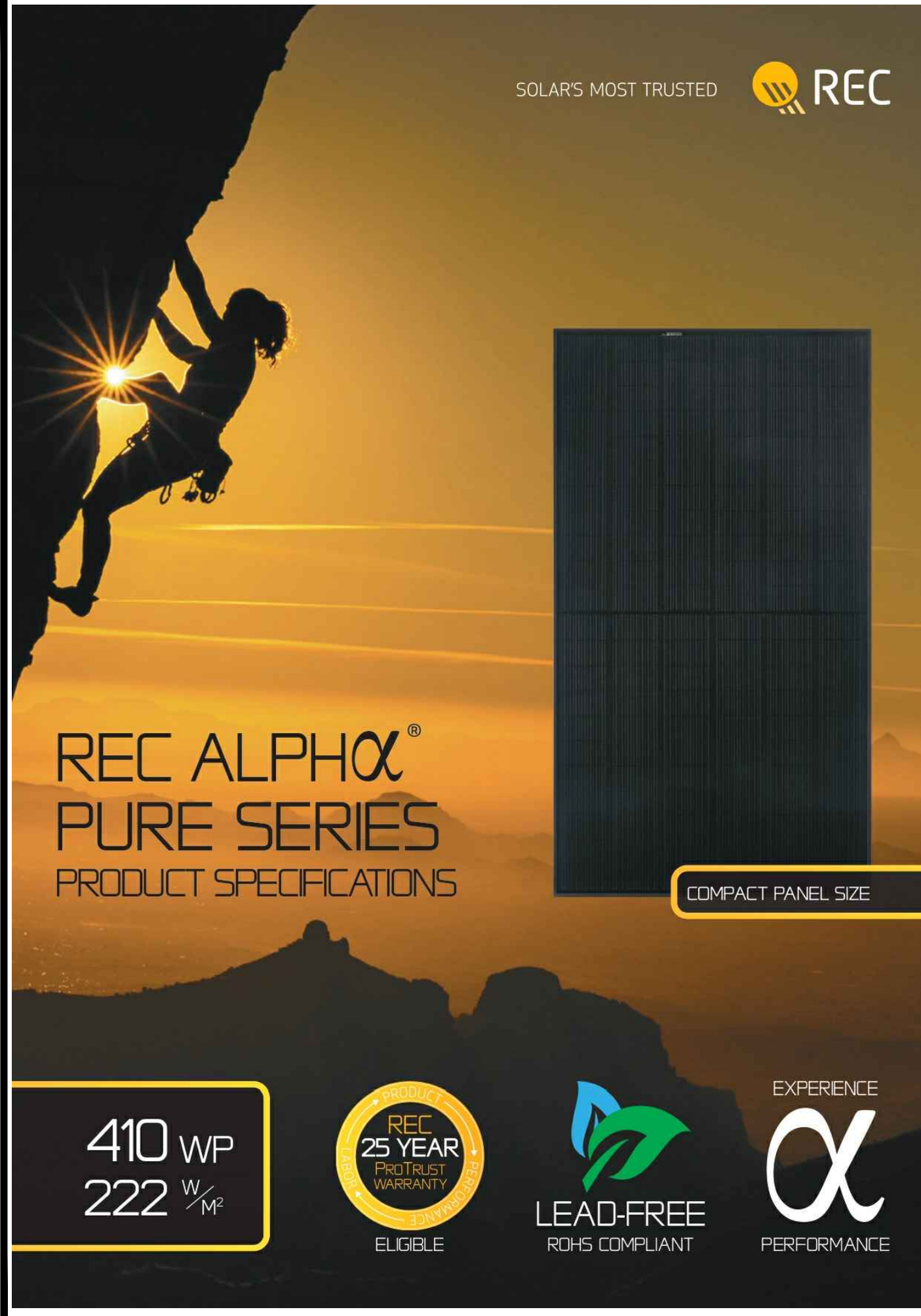


SOLAR'S MOST TRUSTED



# REC ALPHA PURE SERIES

## PRODUCT SPECIFICATIONS



# REC ALPHA<sup>®</sup> PURE SERIES

## PRODUCT SPECIFICATIONS

COMPACT PANEL SIZE

410 WP  
222 W/M<sup>2</sup>



ELIGIBLE



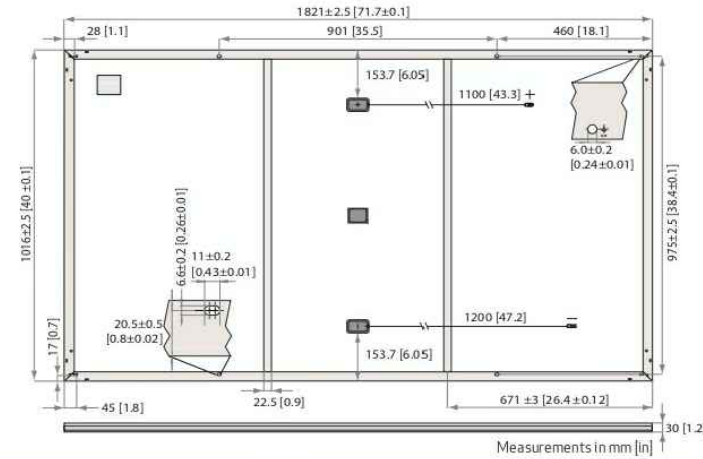
LEAD-FREE  
ROHS COMPLIANT



PERFORMANCE

### GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology, 6 strings of 22 cells in series
Glass:	3.2 mm solar glass with anti-reflective surface treatment in accordance with EN 12150
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black)
Junction box:	3-part, 3 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (4 mm <sup>2</sup> ) in accordance with IEC 62852, IP68 only when connected
Cable:	4 mm <sup>2</sup> solar cable, 1.1 m + 1.2 m in accordance with EN 50618
Dimensions:	1821 x 1016 x 30 mm (1.85 m <sup>2</sup> )
Weight:	20.5 kg
Origin:	Made in Singapore



### ELECTRICAL DATA

	Product Code*: RECxxxAA Pure					
Power Output - P <sub>MAX</sub> (Wp)	385	390	395	400	405	410
Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - V <sub>MPP</sub> (V)	41.2	41.5	41.8	42.1	42.4	42.7
Nominal Power Current - I <sub>MPP</sub> (A)	9.35	9.40	9.45	9.51	9.56	9.61
Open Circuit Voltage - V <sub>OC</sub> (V)	48.5	48.6	48.7	48.8	48.9	49.0
Short Circuit Current - I <sub>SC</sub> (A)	10.18	10.19	10.20	10.25	10.30	10.35
Power Density (W/m <sup>2</sup> )	208	211	214	216	219	222
Panel Efficiency (%)	20.8	21.1	21.4	21.6	21.9	22.2
Power Output - P <sub>MAX</sub> (Wp)	293	297	301	305	309	312
Nominal Power Voltage - V <sub>MPP</sub> (V)	38.8	39.1	39.4	39.7	40.0	40.2
Nominal Power Current - I <sub>MPP</sub> (A)	7.55	7.59	7.63	7.68	7.72	7.76
Open Circuit Voltage - V <sub>OC</sub> (V)	45.7	45.8	45.9	46.0	46.1	46.2
Short Circuit Current - I <sub>SC</sub> (A)	8.16	8.20	8.24	8.28	8.32	8.36

STC

NMOT

Values at standard test conditions (STC: air mass AM 1.5, irradiance 1000 W/m<sup>2</sup>, temperature 25°C), based on a production spread with a tolerance of P<sub>MAX</sub>, V<sub>OC</sub> & I<sub>SC</sub> ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM 1.5, irradiance 800 W/m<sup>2</sup>, temperature 20°C, windspeed 1 m/s). \* Where xxx indicates the nominal power class (P<sub>MAX</sub>) at STC above.

### MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (713 kg/m <sup>2</sup> )
Maximum test load (rear):	-4000 Pa (407 kg/m <sup>2</sup> )
Max series fuse rating:	25 A
Max reverse current:	25 A

\* See installation manual for mounting instructions. Design load = Test load / 15 (safety factor)

### WARRANTY

	Standard	REC ProTrust
Installed by an REC Certified Solar Professional	No	Yes
System Size	All	≤25 kW 25-500 kW
Product Warranty (yrs)	20	25
Power Warranty (yrs)	25	25
Labor Warranty (yrs)	0	25
Power in Year 1	98%	98%
Annual Degradation	0.25%	0.25%
Power in Year 25	92%	92%

See warranty documents for details. Conditions apply

### CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730
IEC 62804 PID
IEC 61701 Salt Mist
IEC 62716 Ammonia Resistance
ISO 11925-2 Ignitability (Class E)
IEC 62782 Dynamic Mechanical Load
IEC 61215-2:2016 Hailstone (35mm)
IEC 62321 Lead-free acc. to RoHS EU 863/2015
ISO 14001, ISO 9001, IEC 45001, IEC 62941



### TEMPERATURE RATINGS\*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P <sub>MAX</sub> :	-0.26 %/°C
Temperature coefficient of V <sub>OC</sub> :	-0.24 %/°C
Temperature coefficient of I <sub>SC</sub> :	0.04 %/°C

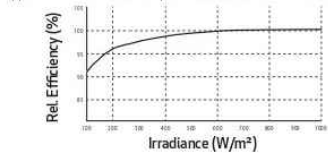
\* The temperature coefficients stated are linear values

### DELIVERY INFORMATION

Panels per pallet:	33
Panels per 40 ft GP/high cube container:	792 (24 pallets)
Panels per 13.6 m truck:	924 (28 pallets)
Panels per 53 ft truck:	891 (27 pallets)

### LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Specifications subject to change without notice.

Ref: PIM-DS-12-06-Rev-E 11/21



www.recgroup.com

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL	04/20/2022	

DATE: 04/20/2022

### PROJECT NAME & ADDRESS

DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

### DRAWN BY

ESR

SHEET NAME  
MODULE SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-8





## IQ8 and IQ8+ Microinverters

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



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



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



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



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

### Easy to install

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

### High productivity and reliability

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

### Microgrid-forming

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

\* Only when installed with IQ System Controller 2, meets UL 1741.

\*\* IQ8 and IQ8Plus supports split phase, 240V installations only.

## IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings <sup>1</sup>	W	235 - 350	235 - 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 - 37	29 - 45
Operating range	V	25 - 48	25 - 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current <sup>2</sup> [module Isc]	A		15
Overvoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range <sup>3</sup>	V	240 / 211 - 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 - 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit <sup>4</sup>		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading - 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection - no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01	
Certifications		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

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

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL	04/20/2022	

DATE:04/20/2022

### PROJECT NAME & ADDRESS

DONALD SCOTT PLATT  
 RESIDENCE  
 2018 HARNETT CENTRAL RD,  
 ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME  
 INVERTER  
 SPECIFICATION

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-9



# Enphase IQ Combiner 4/4C

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



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



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

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

### Smart

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

### Simple

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

### Reliable

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



## Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

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

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SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

### REVISIONS

DESCRIPTION	DATE	REV
INITIAL	04/20/2022	

DATE:04/20/2022

### PROJECT NAME & ADDRESS

DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

### DRAWN BY

ESR

### SHEET NAME


COMBINER  
SPECIFICATION

### SHEET SIZE

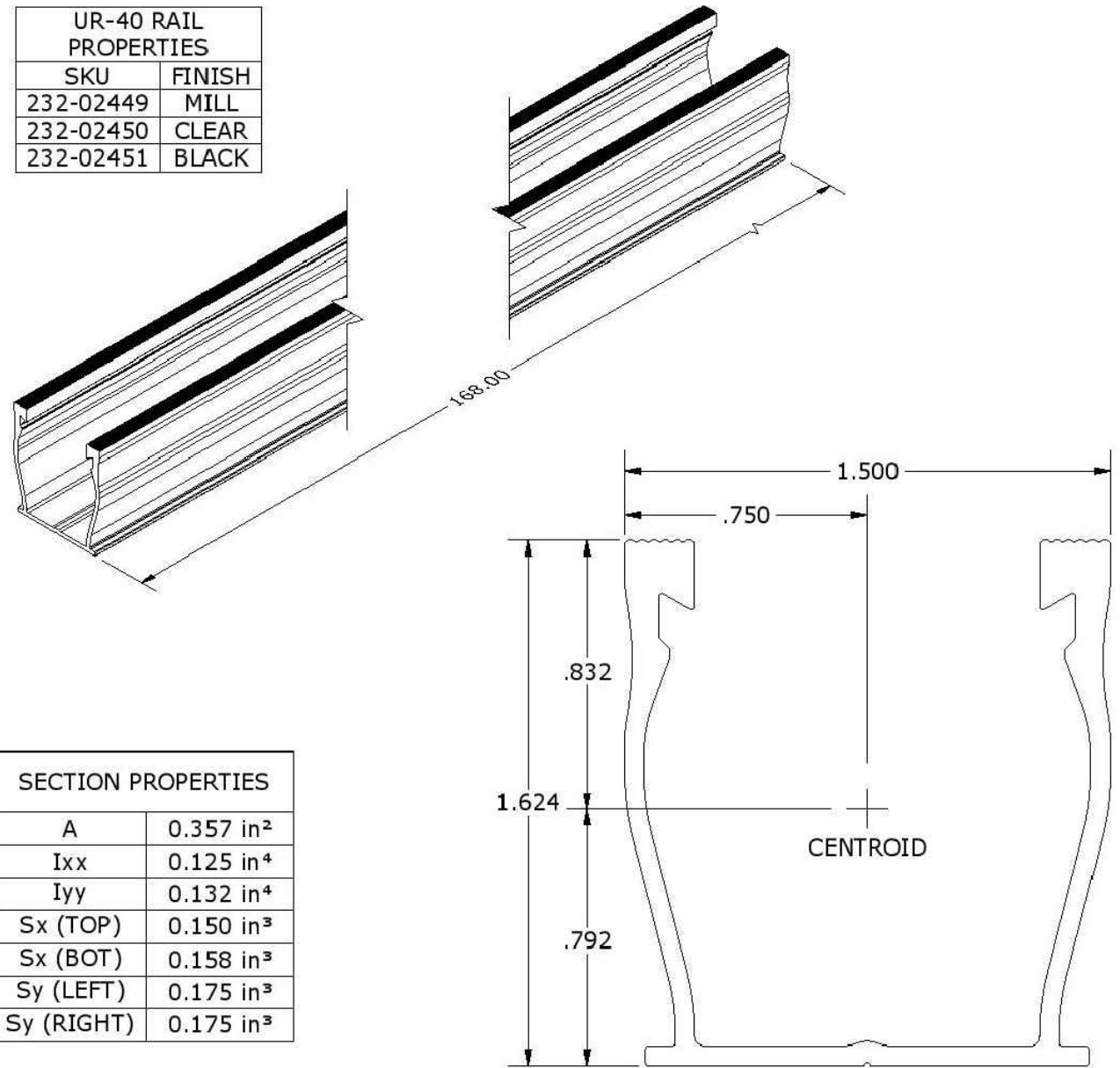
ANSI B  
11" X 17"

### SHEET NUMBER

PV-10

DESCRIPTION: SNAPNRACK, UR-40 RAIL	DRAWN BY: mwatkins	 595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 550-6900 • FAX (415) 550-6902 <small>THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF SUNWIN SOUTH LLC.</small>
PART NUMBER(S): 232-02449, 232-02450, 232-02451	REVISION: <b>B</b>	

UR-40 RAIL PROPERTIES	
SKU	FINISH
232-02449	MILL
232-02450	CLEAR
232-02451	BLACK



SECTION PROPERTIES	
A	0.357 in <sup>2</sup>
Ixx	0.125 in <sup>4</sup>
Iyy	0.132 in <sup>4</sup>
Sx (TOP)	0.150 in <sup>3</sup>
Sx (BOT)	0.158 in <sup>3</sup>
Sy (LEFT)	0.175 in <sup>3</sup>
Sy (RIGHT)	0.175 in <sup>3</sup>

ALL DIMENSIONS IN INCHES

MATERIALS:	6000 SERIES ALUMINUM	OPTIONS:
DESIGN LOAD (LBS):	N/A	CLEAR / BLACK ANODIZED
ULTIMATE LOAD (LBS):	N/A	MILL FINISH
TORQUE SPECIFICATION:	N/A LB-FT	BUNDLES OF 144
CERTIFICATION:	UL 2703, FILE E359313	BOXES OF 8
WEIGHT (LBS):	5.85	



SIGORA SOLAR LLC  
490 WESTFIELD RD STE A  
CHARLOTTEVILLE, VA 22901

REVISIONS		
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DATE: 04/20/2022

PROJECT NAME & ADDRESS  
DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY  
**ESR**

SHEET NAME  
**RAIL SPECIFICATION**

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

SHEET NUMBER  
**PV-11**

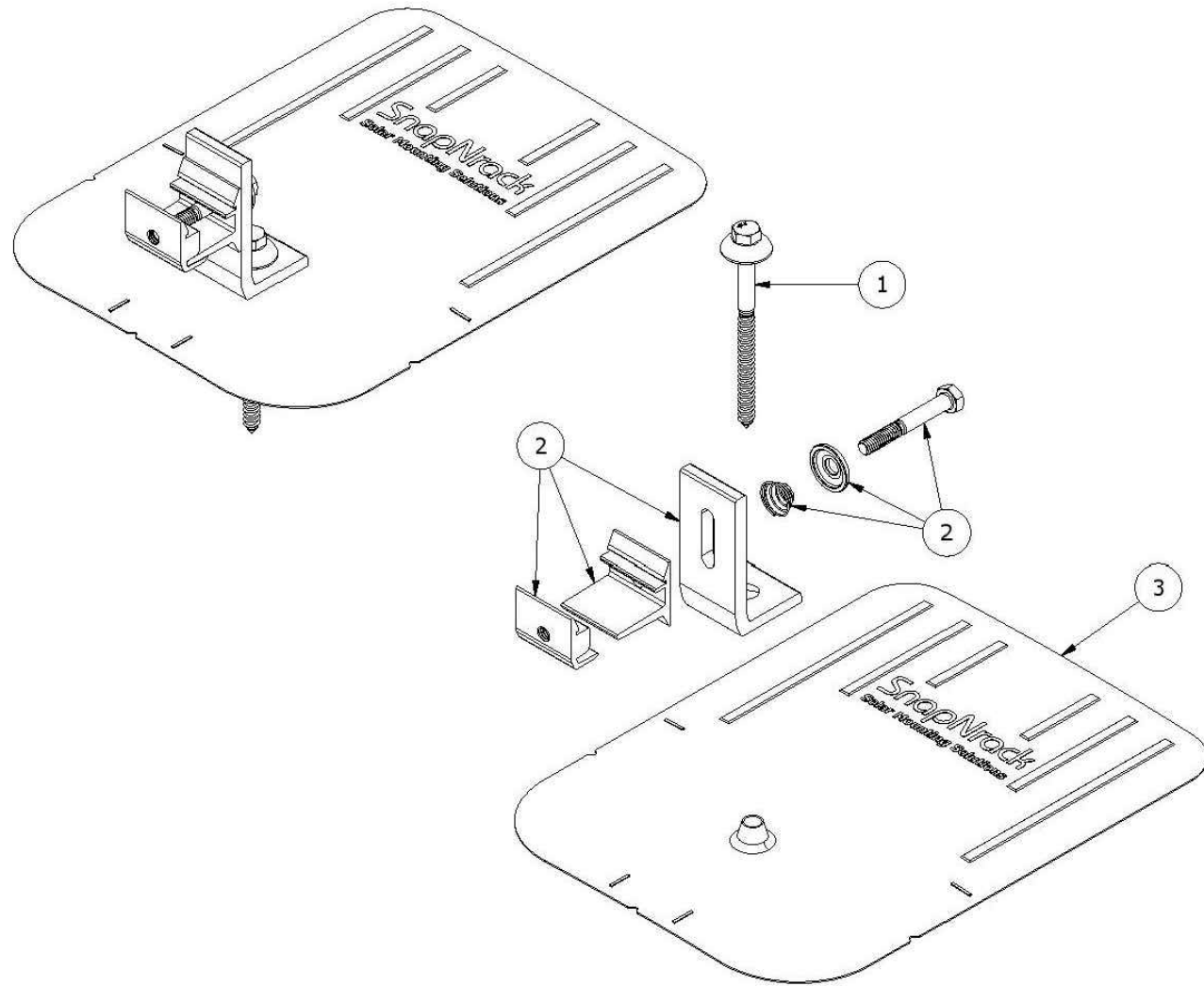


DESCRIPTION: SNAPNRACK, ULTRA RAIL COMP KIT	DRAWN BY: mwatkins	
PART NUMBER(S): SEE BELOW	REVISION: <b>B</b>	

595 MARKET STREET, 20TH FLOOR • SAN FRANCISCO, CA 94105 USA  
PHONE (415) 580-6900 • FAX (415) 580-6902  
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DESCRIPTION: SNAPNRACK, ULTRA RAIL COMP KIT	DRAWN BY: mwatkins	
PART NUMBER(S): SEE BELOW	REVISION: <b>B</b>	

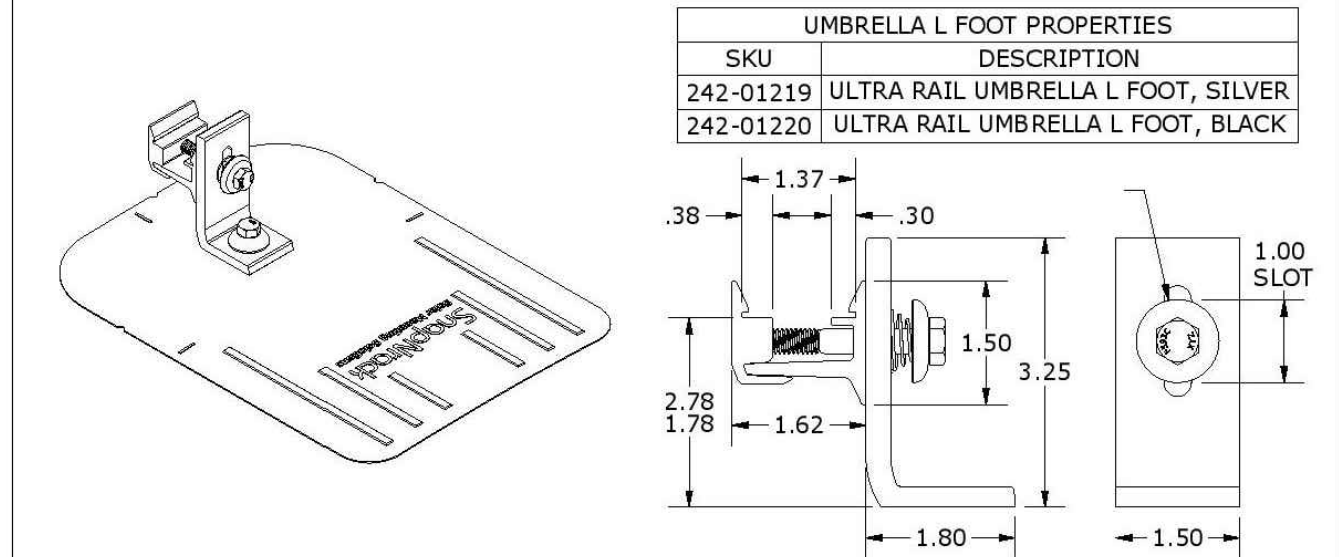
595 MARKET STREET, 20TH FLOOR • SAN FRANCISCO, CA 94105 USA  
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PARTS LIST

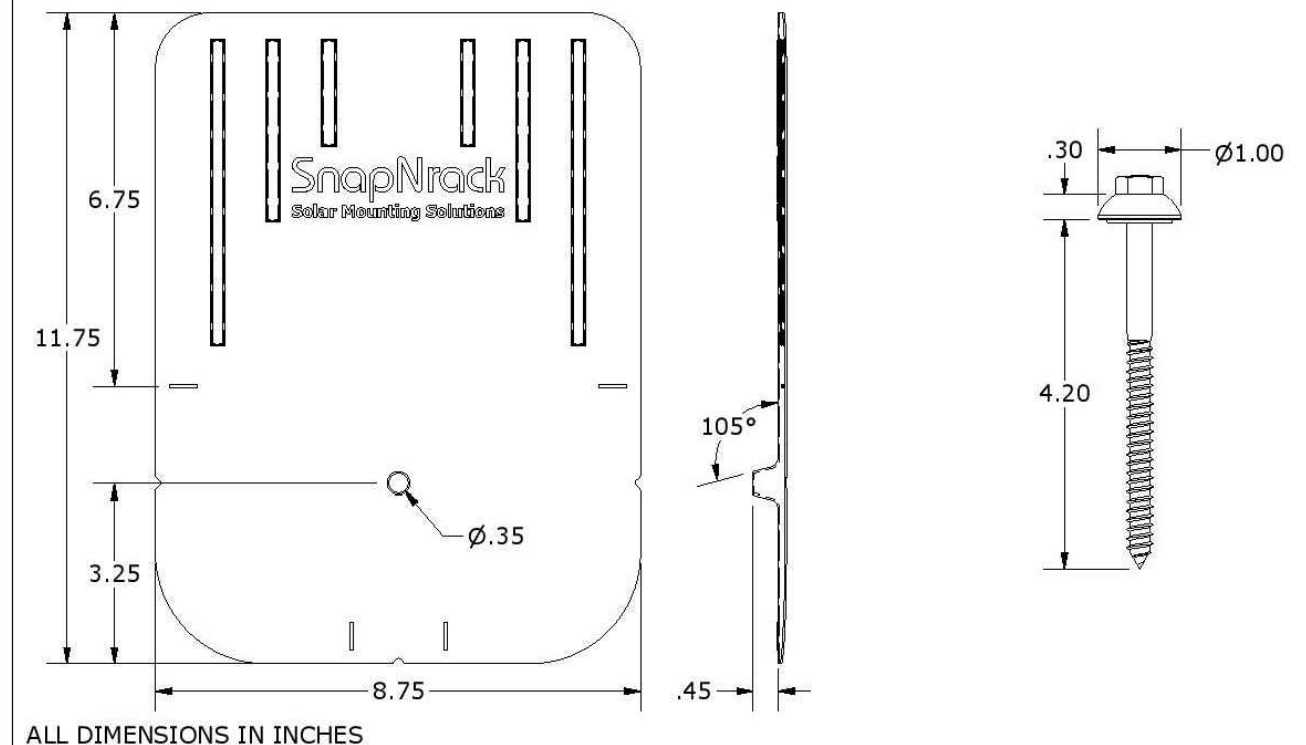
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	802 UP, 1333 DOWN, 356 SIDE
ULTIMATE LOAD (LBS):	2005 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM UL SUBJECT 2582
WEIGHT (LBS):	0.80



UMBRELLA L FOOT PROPERTIES	
SKU	DESCRIPTION
242-01219	ULTRA RAIL UMBRELLA L FOOT, SILVER
242-01220	ULTRA RAIL UMBRELLA L FOOT, BLACK

COMP FLASHING PROPERTIES	
SKU	DESCRIPTION
232-01375	COMP FLASHING, 9" X 12", BLACK ALUM
232-01376	COMP FLASHING, 9" X 12", SILVER ALUM



ALL DIMENSIONS IN INCHES



REVISIONS		
DESCRIPTION	DATE	REV
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PROJECT NAME & ADDRESS

DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME

ATTACHMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-12



# 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.



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DONALD SCOTT PLATT  
RESIDENCE  
2018 HARNETT CENTRAL RD,  
ANGIER, NC 27501

DRAWN BY

ESR

SHEET NAME

SOLADECK  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-13