

# PHOTOVOLTAIC ROOF MOUNT SYSTEM

29 MODULES-ROOF MOUNTED - 9.28 kW DC, 6.96 kW AC  
 38 DARLEY CT, LILLINGTON, NC 27546 USA



PURE ENERGY GROUP, LLC  
 3661 SUNSET AVE #617  
 ROCKY MOUNT, NC 27804

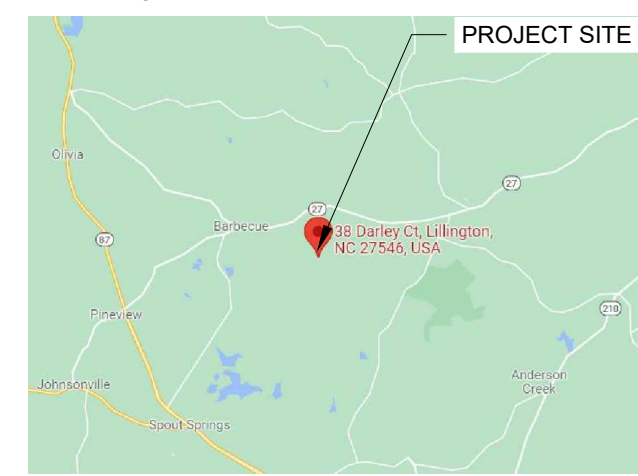
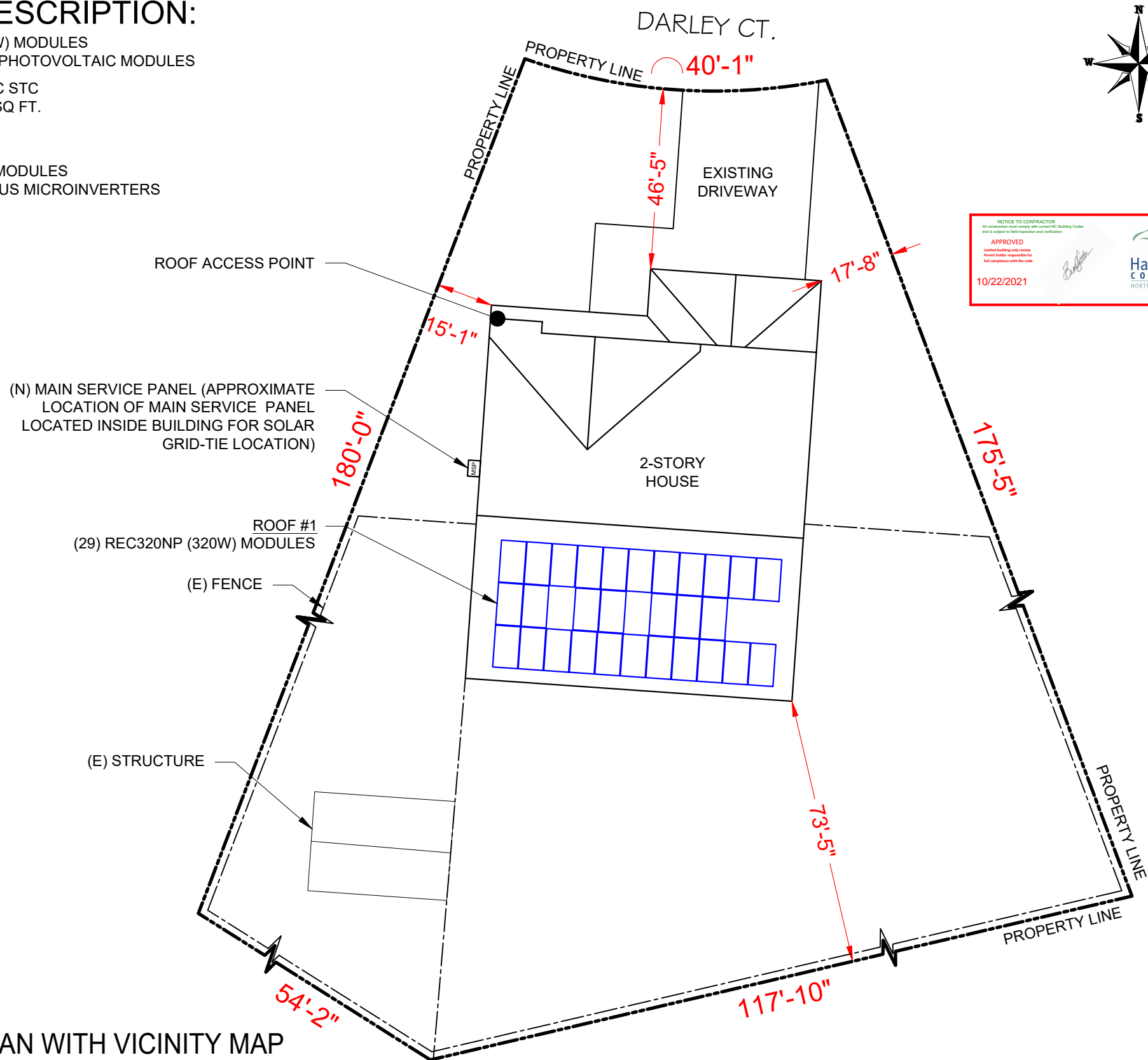
## PROJECT DESCRIPTION:

29 x 320 REC320NP (320W) MODULES  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

SYSTEM SIZE: 9.28 kW DC STC  
 ARRAY AREA #1: 521.13 SQ FT.

### EQUIPMENT SUMMARY

29 REC320NP (320W) MODULES  
 29 ENPHASE IQ7-60-2-US MICROINVERTERS



REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	10/01/2021	00

Signature with Seal

PROJECT NAME  
**BRITTANY AND JONATHAN  
 CHAPMAN RESIDENCE**  
 38 DARLEY CT,  
 LILLINGTON, NC 27546 USA

SHEET NAME  
**SITE PLAN &  
 VICINITY MAP**

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

SHEET NUMBER  
**PV-1**

1 | SITE PLAN WITH VICINITY MAP  
 PV-1 | SCALE: 1/16" = 1'-0"

SHEET INDEX

PV-1	SITE PLAN WITH VICINITY MAP
PV-2	ROOF PLAN & MODULES
PV-3	STRING LAYOUT
PV-4	ATTACHMENT DETAIL
PV-5	ELECTRICAL LINE DIAGRAM
PV-6	WIRING CALCULATIONS
PV-7	PLACARDS
PV-8 +	EQUIPMENT SPECIFICATIONS

GOVERNING CODES:  
 NORTH CAROLINA BUILDING CODE (NCBC 2018)  
 NORTH CAROLINA RESIDENTIAL CODE (NCRC 2018)  
 NORTH CAROLINA PLUMBING CODE (NCPC 2018)  
 NORTH CAROLINA MECHANICAL CODE (NMC 2018)  
 NATIONAL ELECTRICAL CODE (2017)

### MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 29 MODULES  
 MODULE TYPE = REC320NP (320W) MODULES  
 MODULE WEIGHT = 39.7 LBS / 18.00 KG.  
 MODULE DIMENSIONS = 65.94" x 39.25" = 17.97 SF  
 UNIT WEIGHT OF ARRAY = 2.21 PSF

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	29	521.13	918.06	57


ROOF DESCRIPTION				
ROOF TYPE		ASPHALT SHINGLE ROOF		
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	34°	184°	2"X4"	24" O.C.



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PROJECT NAME

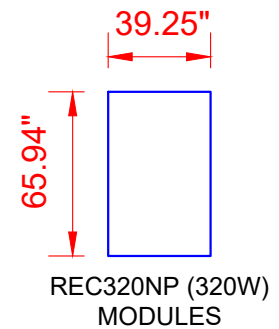
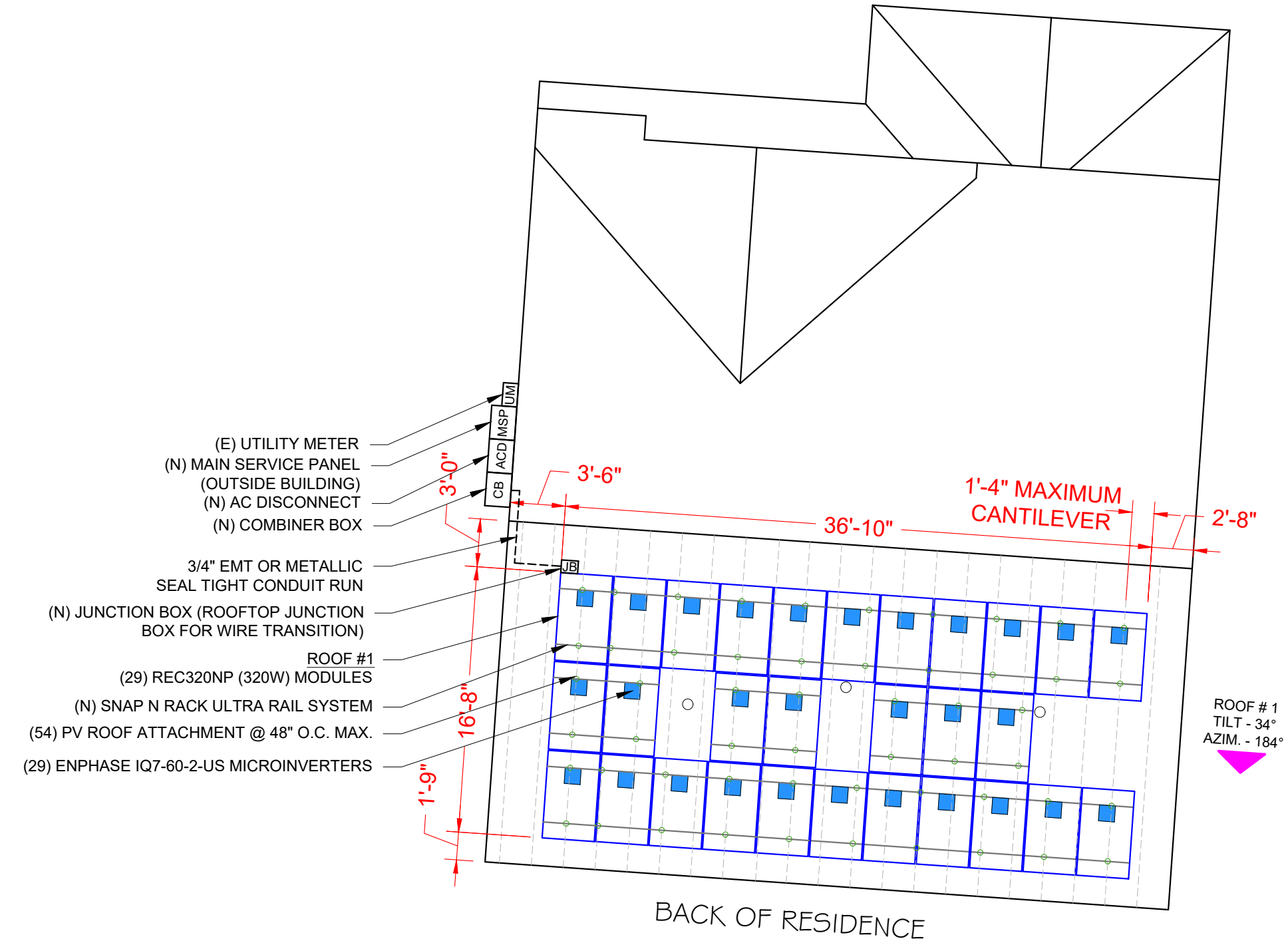
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 LILLINGTON, NC 27546 USA

SHEET NAME  
**ROOF PLAN & MODULES**

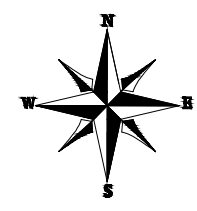
SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-2**

DARLEY CT.  
 FRONT OF RESIDENCE



LEGEND	
JB	- JUNCTION BOX
CB	- COMBINER BOX
ACD	- AC DISCONNECT
MSP	- MAIN SERVICE PANEL
UM	- UTILITY METER
■	- MICROINVERTER
---	- TRUSS
---	- CONDUIT
○ □	- VENT (ROOF OBSTRUCTIONS)





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SHEET NAME

STRING  
LAYOUT

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

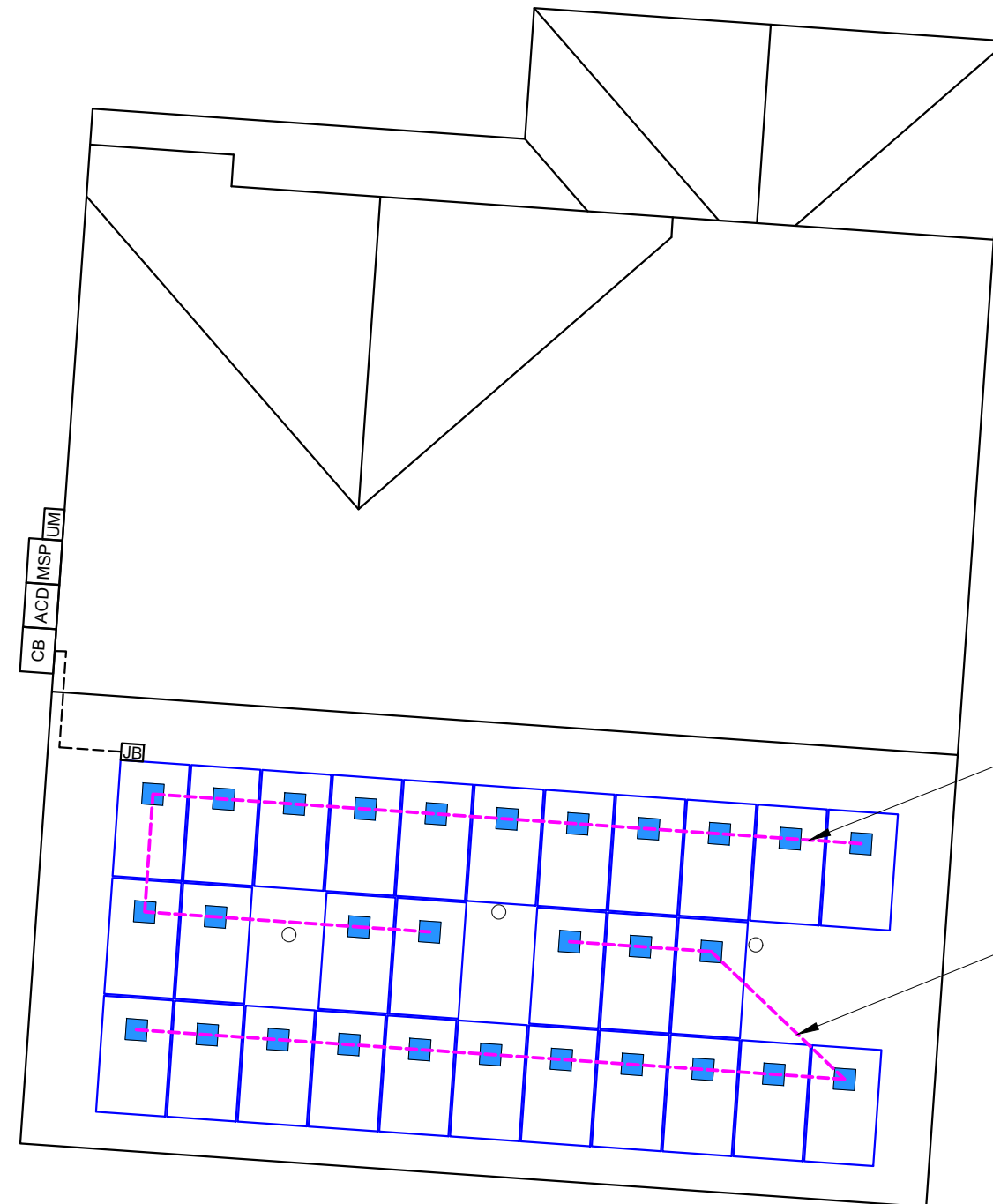
PV-3

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	29	REC320NP (320W) MODULES
INVERTER	29	ENPHASE IQ7-60-2-US MICROINVERTERS
AC DISCONNECT	1	60A NON-FUSED, 240V NEMA 3R, UL LISTED
ATTACHMENT	54	SNAPNRACK, ULTRA RAIL COMP KIT
RAILS	15	SNAPNRACK, UR-60 RAIL, 172IN, MILL (232-02539)
RAIL SPLICE	8	SNAPNRACK, UR-60 SPLICE, SILVER (242-01270)
MID CLAMPS	48	SNAPNRACK, ULTRA RAIL MID CLAM, BLACK (242-02071)
END CLAMPS	20	UNIVERSAL END CLAM (242-02215)
GROUNDING LUG	5	GROUNDING LUG R, 6-12 AWG (242-02101)

DISCLAIMER: MATERIALS REQUIRED LIST FOR CONCEPTUAL USE ONLY THE INTENT IS TO AID CONTRACTOR FOR ORDERING REQUIRED MATERIALS FOR THE PROJECT. CONTRACTOR RESPONSIBLE TO VERIFY PRIOR TO SOLAR EQUIPMENT ORDERING

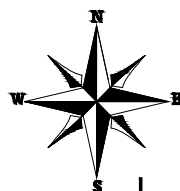
DARLEY CT.  
FRONT OF RESIDENCE



STRING #1

STRING #2

BACK OF RESIDENCE



1 STRING LAYOUT

PV-3

SCALE: 1/8" = 1'-0"

LEGEND

○ □ - VENT (ROOF OBSTRUCTION)

--- - STRINGS



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PROJECT NAME

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SHEET NAME

ATTACHMENT  
DETAILS

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-4

SNAPNRACK ULTRA RAIL UMBRELLA L FOOT WITH UMBRELLA FLASHING FOR COMPOSTION ROOF MOUNTING

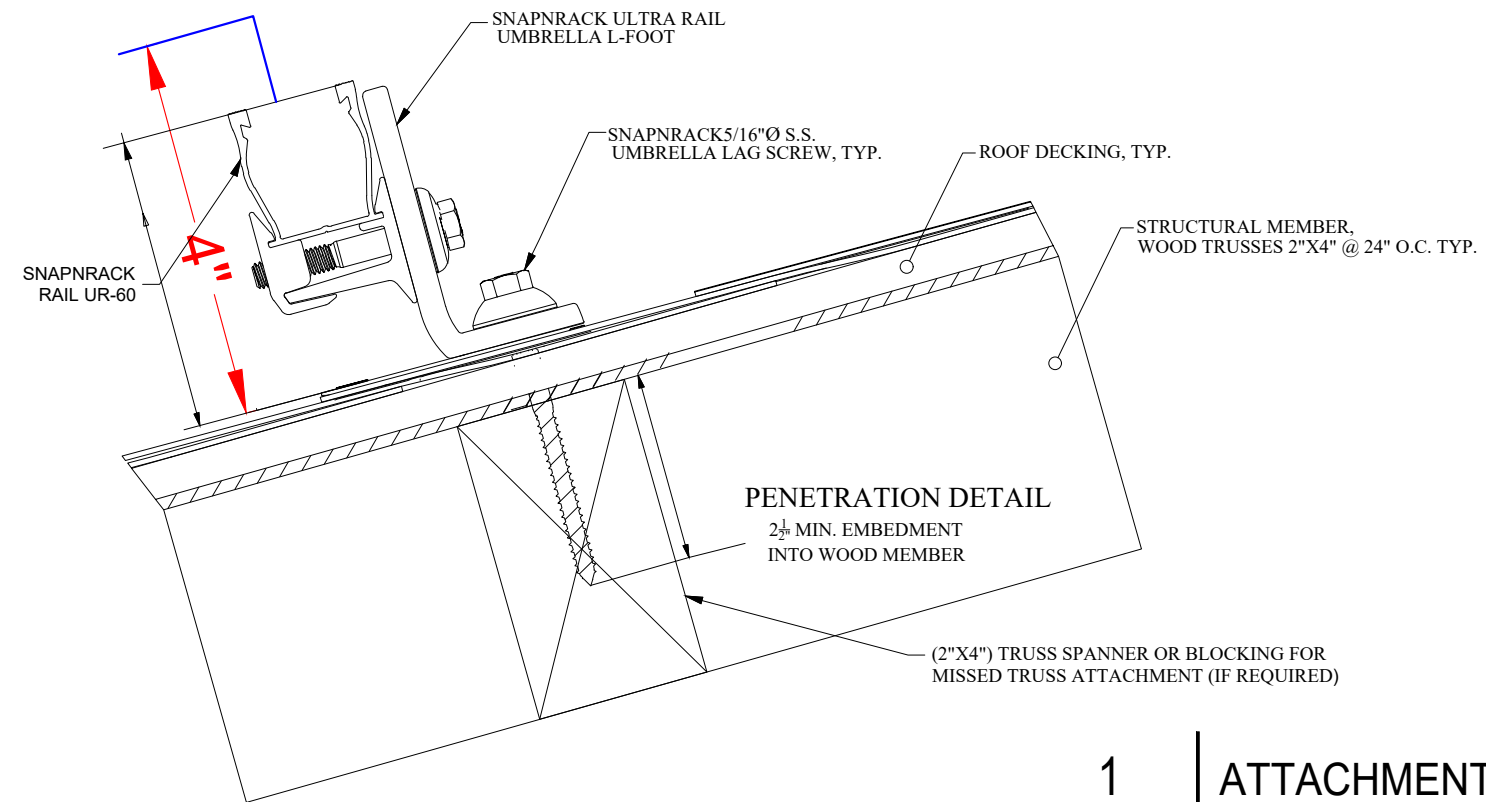
REFER TO SNAPNRACK ENGINEERING CHARTS FOR APPLICABLE RAIL SPANS. "BIN" NUMBER ON CHART SHOULD MATCH "BIN" NUMBER ON THIS DRAWING

5/16"Ø S.S. UMBRELLA LAG SCREW MUST EMBED A MIN. OF 2½ INTO STRUCTURAL MEMBER

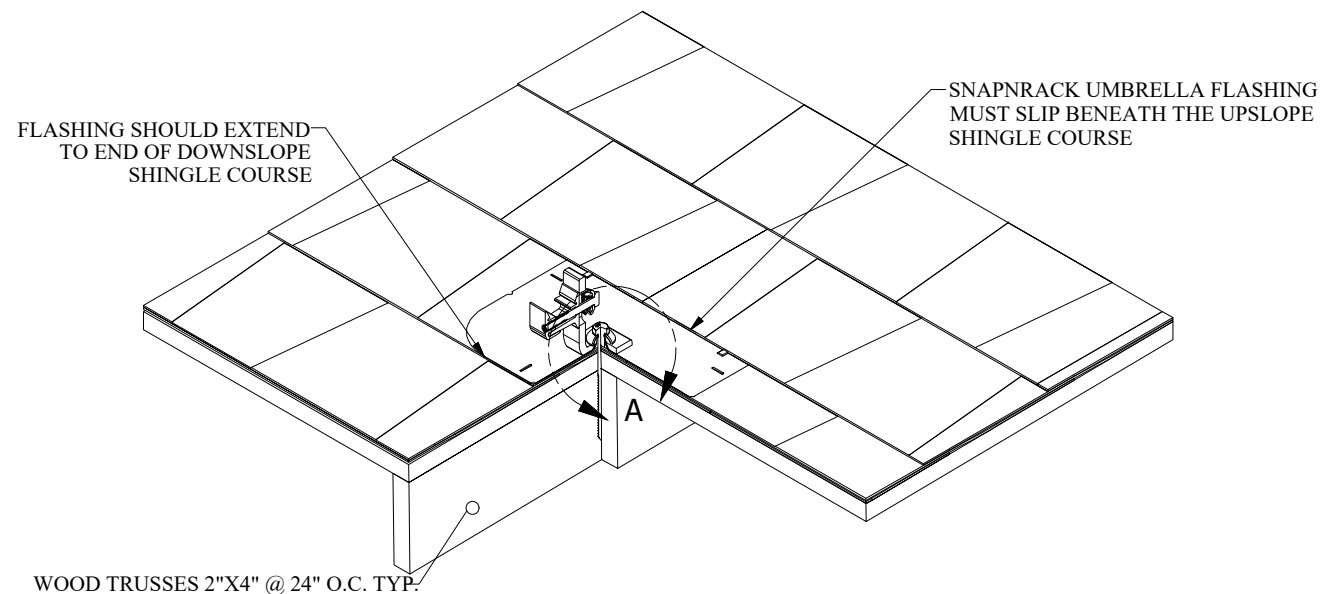
REFER TO SNAPNRACK INSTALLATION MANUAL FOR 5/16"Ø HARDWARE TORQUE SPECIFICATIONS

RAIL CAN BE MOUNTED ON EITHER SIDE OF THE L-FOOT

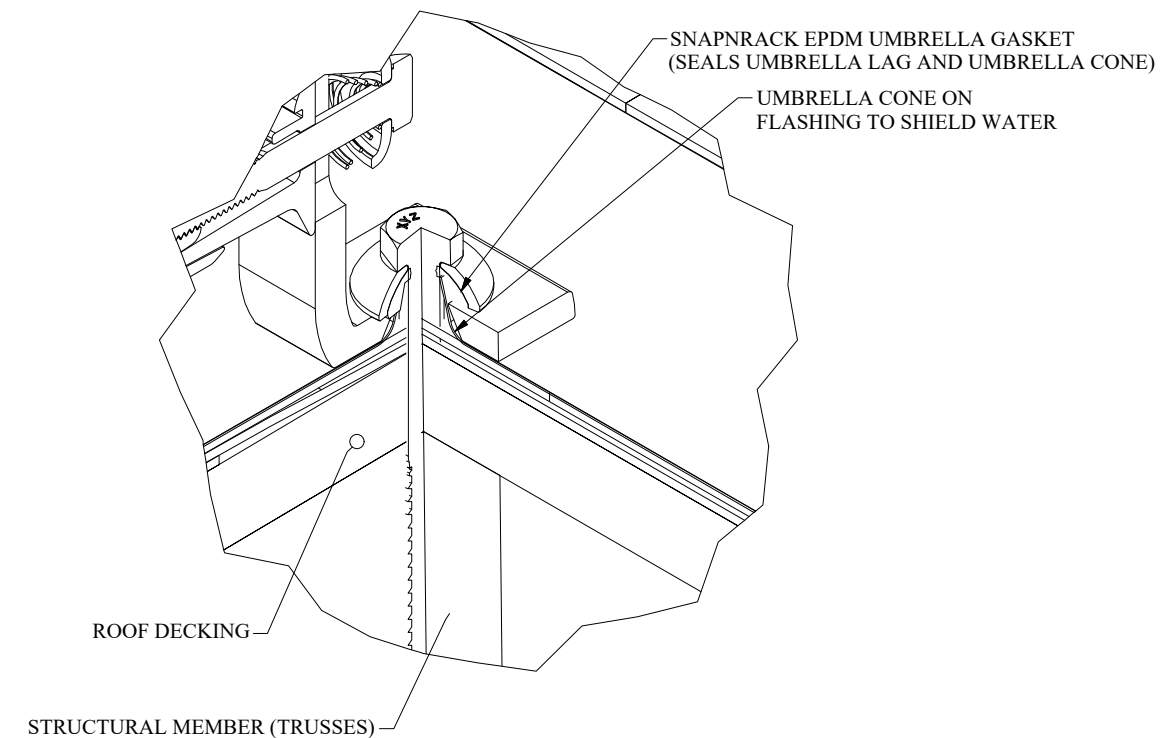
FOR LEVELING DETAILS, REFER TO SNAPNRACK DETAIL DRAWING "SNR-DC-00332 ULTRA RAIL, COMPONENT DETAIL, LEVELING EXTENSION KIT"



**1** | ATTACHMENT DETAIL  
PV-4 | SCALE: NTS



**2** | ENLARGED DETAIL A  
PV-4 | SCALE: NTS



**3** | SECTION VIEW DETAIL  
PV-4 | SCALE: NTS



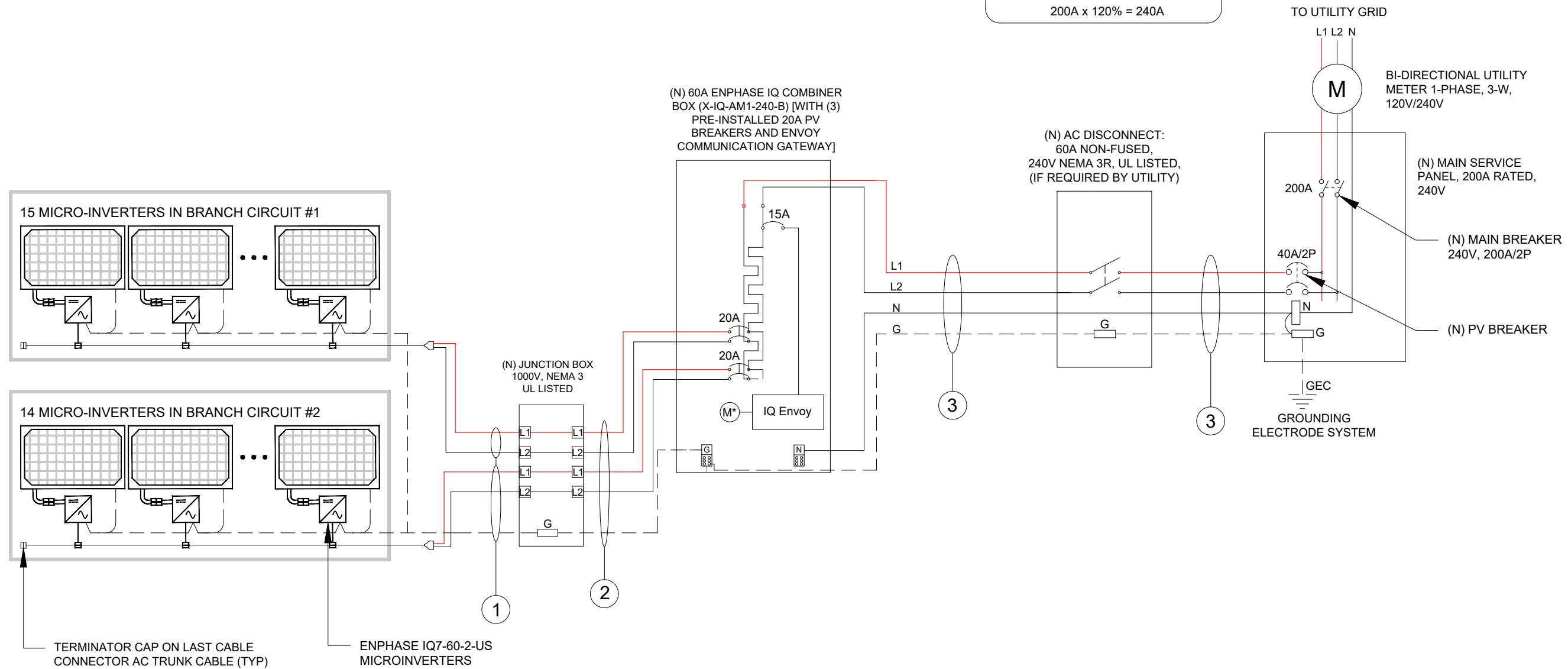
(29) REC320NP (320W) MODULES  
 (29) ENPHASE IQ7-60-2-US MICROINVERTERS  
 (01) BRANCH CIRCUIT OF 15 MODULES WITH MICROINVERTERS  
 (01) BRANCH CIRCUIT OF 14 MODULES WITH MICROINVERTERS  
 (CONNECTED IN SERIES PER BRANCH CIRCUIT)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ7-60-2-US
NOMINAL OUTPUT VOLTAGE	240V
NOMINAL OUTPUT CURRENT	1.0A

**SYSTEM SIZE:**  
 TOTAL DC SYSTEM SIZE: 9.28 kW DC  
 TOTAL AC SYSTEM SIZE: 6.96 kW AC  
 MAXIMUM AC POWER: 240 VA  
 MAXIMUM AC CURRENT: 1.0 A

INTERCONNECTION  
 120% RULE - NEC 705.12(B)(2)(3)(b)

UTILITY FEED + SOLAR BACKFEED  
 200A + 40A = 240A  
 BUSS RATING x 120%  
 200A x 120% = 240A



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Conduit Conductor Schedule (ALL CONDUCTORS MUST BE COPPER)					
Tag #	Description	Wire Gauge	# of Conductors/Color	Conduit Type	Conduit Size
1	PV WIRE	10 AWG	2 (1V+, 1V-)	N/A-Free Air	N/A-Free Air
1	Bare Copper Ground (EGC/GEC)	6 AWG	1 BARE	N/A-Free Air	N/A-Free Air
2	THWN-2	10 AWG	4 (2V+, 2V-) B/R	EMT OR METALLIC SEAL TIGHT	3/4"
2	THWN-2 - Ground (EGC/GEC)	8 AWG	1 (GRN)	EMT OR METALLIC SEAL TIGHT	3/4"
3	THWN-2	8 AWG	3 (1L1, 1L2, 1N) B/R/W	EMT OR METALLIC SEAL TIGHT	3/4"
3	THWN-2 - Ground (GEC)	8 AWG	1 (GRN)	EMT OR METALLIC SEAL TIGHT	3/4"

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER	REC SOLAR
MODEL #	REC320NP
PMAX	320W
VMP	34.2V
IMP	9.37A
VOC	40.8V
ISC	10.18A
MODULE DIMENSION	65.94"L x 39.25"W x 1.1"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ7-60-2-US
NOMINAL OUTPUT VOLTAGE	240V
NOMINAL OUTPUT CURRENT	1.0A

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

### OCPD Calculations

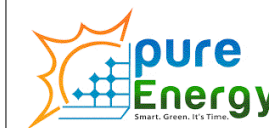
Breakers sized according to continuous duty output current. PV circuit nominal current based off # of modules per Circuit X (1.25[art. 210.19(A)(1)(a)]X (1.0 Max AC current per micro-inverter)  
 Circuit #1 = 15 modules, Output Current w/ continuous duty = 18.75 <= 20A Breaker  
 Circuit #2 = 14 modules, Output Current w/ continuous duty = 17.50 <= 20A Breaker  
 System output current w/ continuous duty = 36.25 <= 40A (System OCPD)

### Conductor Calculations

Wire gauge calculated from art. code 310.15(B)(16) with ambient temperature calculations from art. 310.15(2)(a).  
 For "On Roof" conductors we use the 90°C column ampacity, 0.5"-3.5" off-the-roof temperature adjustment from 310.15(B)(3)(c), and raceway fill adjustments from 310.15(B)(16).  
 For "Off Roof" conductors we use the 75°C column ampacity, or the 90°C column ampacity with the relevant ambient temperature and raceway fill adjustments, whichever is less.  
 The rating of the conductor after adjustments MUST be greater than, or equal to, the continuous duty uprated output current.  
 Calculation Example - Wire Rating (90°C) x Ambient Temperature Adjustment x Conduit Fill Adjustment >= Continuous Duty Output Current  
 (On Roof): 10 gauge wire rated for 40A, 40A x 0.96 x 0.8 (4 Conductors) = 30.72A > 18.75A  
 (Off Roof): 8 gauge wire rated for 50A, 50A > 40A

### 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.



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### PROJECT NAME

BRITTANY AND JONATHAN  
 CHAPMAN RESIDENCE  
 38 DARLEY CT,  
 LILLINGTON, NC 27546 USA

### SHEET NAME

WIRING  
 CALCULATIONS

### SHEET SIZE

ANSI B  
 11" X 17"

### SHEET NUMBER

PV-6

# ⚠ WARNING

## ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION:  
DC DISCONNECT, INVERTER  
(PER CODE: NEC 690.35(F))  
[To be used when inverter is ungrounded]

## WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION:  
CONDUIT, COMBINER BOX  
(PER CODE: NEC690.31(G)(E)(4) 10 FT  
MAX SPACING OF LABELS

## ⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:  
POINT OF INTERCONNECTION  
(PER CODE: NEC 690.59)

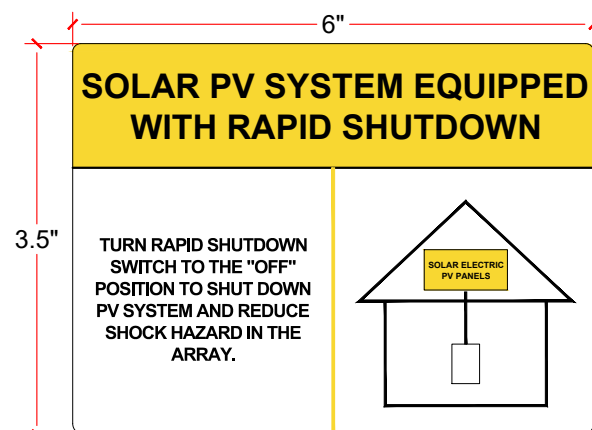
- ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
  - WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
  - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

## PHOTOVOLTAIC SYSTEM AC DISCONNECT RATED AC OPERATING CURRENT 29.0 AMPS AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:  
AC DISCONNECT, POINT OF INTERCONNECTION  
(PER CODE: NEC690.54)

## WARNING INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:  
POINT OF INTERCONNECTION  
(PER CODE: NEC 705.12(B)(2)(c))  
[Not required if panelboard is rated not less than sum of ampere ratings of all overcurrent devices supplying it]



LABEL LOCATION:  
MAIN SERVICE PANEL  
(PER CODE: NEC 690.56(C)(1)(a))

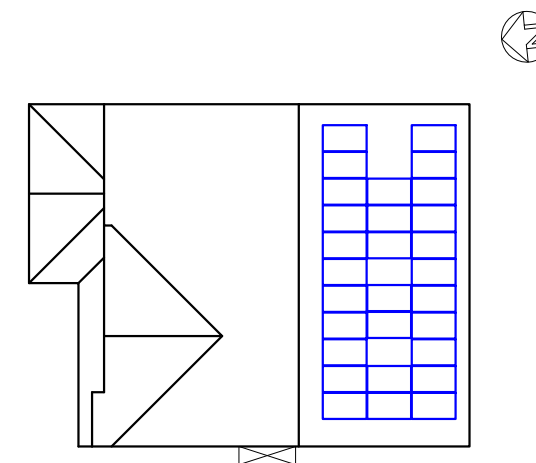
## PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL PER NEC 690.56(C)- PROVIDE AT NEW  
SUB PANEL OR SERVICE PANEL FOR RAPID  
SHUTDOWN COMPLIANT SYSTEM

## CAUTION:

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

AT: ☒ METER AND MAIN SERVICE PANEL  
AC DISCONNECT  
ENPHASE COMBINER BOX



### MARKING CONTENT AND FORMAT

NOTE : LABELS MAY COME IN DIFFERENT COLORS

### ELECTRICAL NOTES :

- 1). UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
- 2). WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
- 3). ALL EQUIPMENT INSTALLED SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) PER NEC ARTICLE 110.3.
- 4). RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
- 5). ALL LABELS OR MARKINGS SHALL BE VISIBLE AFTER INSTALLATION. THE LABELS SHALL BE REFLECTIVE, AND ALL LETTERS SHALL BE CAPITALIZED AND SHALL BE A MINIMUM HEIGHT OF 9.5 MM (3/8 IN) IN WHITE ON A RED BACKGROUND.
- 6). CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.8 (D).
- 7). CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.8 (C).



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38 DARLEY CT,  
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### SHEET NAME

PLACARD

### SHEET SIZE

ANSI B  
11" X 17"

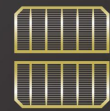
### SHEET NUMBER

PV-7



# REC N-PEAK SERIES

PREMIUM MONO N-TYPE SOLAR PANELS WITH SUPERIOR PERFORMANCE



MONO N-TYPE: THE MOST EFFICIENT C-SI TECHNOLOGY



NO LIGHT INDUCED DEGRADATION



SUPER-STRONG FRAME UP TO 7000 PA SNOW LOAD



FLEXIBLE INSTALLATION OPTIONS



IMPROVED PERFORMANCE IN SHADED CONDITIONS



GUARANTEED HIGH POWER OVER LIFETIME

330 W<sub>P</sub> POWER

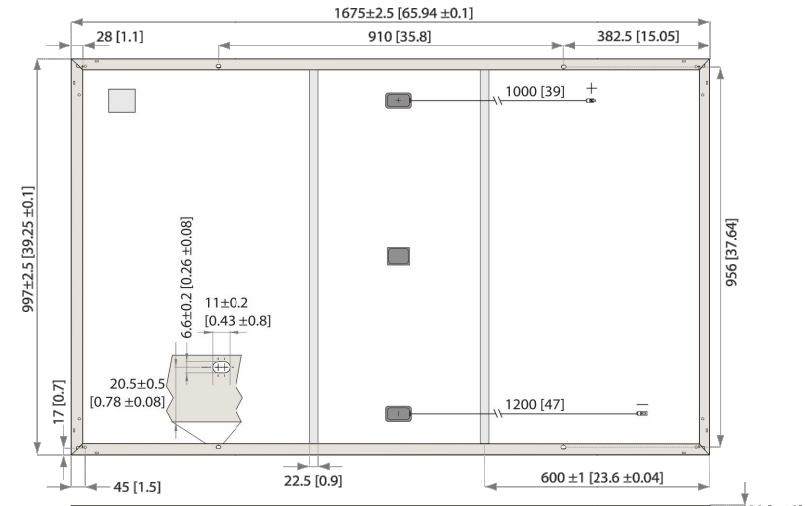
20 YEAR PRODUCT WARRANTY

0.5% ANNUAL DEGRADATION OVER 25-YEAR POWER WARRANTY

SOLAR'S MOST TRUSTED



## REC N-PEAK SERIES



### ELECTRICAL DATA @ STC

	Product code*: RECxxxNP				
Nominal Power - P <sub>MPP</sub> (Wp)	310	315	320	325	330
Watt Class Sorting - (W)	-0/+5	-0/+5	-0/+5	-0/+5	-0/+5
Nominal Power Voltage - V <sub>MPP</sub> (V)	33.6	33.9	34.2	34.4	34.6
Nominal Power Current - I <sub>MPP</sub> (A)	9.24	9.31	9.37	9.46	9.55
Open Circuit Voltage - V <sub>OC</sub> (V)	40.2	40.5	40.8	41.0	41.3
Short Circuit Current - I <sub>SC</sub> (A)	10.01	10.09	10.18	10.27	10.36
Panel Efficiency (%)	18.6	18.9	19.2	19.5	19.8

Values at standard test conditions (STC: air mass AM1.5, irradiance 1000 W/m<sup>2</sup>, temperature 25°C), based on a production spread with a tolerance of V<sub>OC</sub> & I<sub>SC</sub> ±3% within one watt class. \*Where xxx indicates the nominal power class (P<sub>MPP</sub>) at STC above.

### ELECTRICAL DATA @ NOCT

	Product code*: RECxxxNP				
Nominal Power - P <sub>MPP</sub> (Wp)	234	238	241	245	249
Nominal Power Voltage - V <sub>MPP</sub> (V)	31.1	31.4	31.7	31.9	32.1
Nominal Power Current - I <sub>MPP</sub> (A)	7.51	7.56	7.62	7.69	7.76
Open Circuit Voltage - V <sub>OC</sub> (V)	37.3	37.5	37.8	38.0	38.3
Short Circuit Current - I <sub>SC</sub> (A)	8.01	8.07	8.14	8.22	8.29

Nominal operating cell temperature (NOCT: air mass AM1.5, irradiance 800 W/m<sup>2</sup>, temperature 20°C, windspeed 1 m/s). \*Where xxx indicates the nominal power class (P<sub>MPP</sub>) at STC above.

### CERTIFICATIONS



### WARRANTY

20 year product warranty  
25 year linear power output warranty, maximum degradation in performance of 0.5% p.a., giving 86% at end of year 25.  
See warranty conditions for further details.

### GENERAL DATA

Cell type: 120 half-cut n-type mono c-Si cells  
6 strings of 20 cells in series  
Glass: 0.13" (3.2 mm) solar glass with anti-reflection surface treatment  
Backsheet: Highly resistant polymeric construction  
Frame: Anodized aluminum (black)  
Junction box: 3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790  
Cable: 12 AWG (4 mm<sup>2</sup>) PV wire, 39 + 47" (1 m + 1.2 m) in accordance with EN 50618  
Connectors: Stäubli MC4 PV-KBT4/KST4, 12 AWG (4 mm<sup>2</sup>) in accordance with IEC 62852 IP68 only when connected  
Origin: Made in Singapore

### MECHANICAL DATA

Dimensions: 65.9 x 39.25 x 1.1" (1675 x 997 x 30 mm)  
Area: 17.98 ft<sup>2</sup> (1.67 m<sup>2</sup>)  
Weight: 39.7 lbs (18 kg)

### MAXIMUM RATINGS

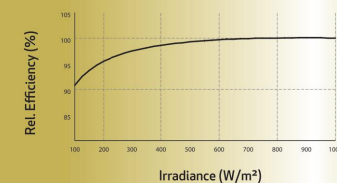
Operational temperature: -40 ... +85°C  
Maximum system voltage: 1000 V  
Design load (+): snow 4666 Pa (97.5 lbs/ft<sup>2</sup>)  
Maximum test load (+): 7000 Pa (146 lbs/ft<sup>2</sup>)  
Design load (-): wind 1600 Pa (33.4 lbs/ft<sup>2</sup>)  
Maximum test load (-): 2400 Pa (50 lbs/ft<sup>2</sup>)  
Max series fuserating: 25 A  
Max reverse current: 25 A  
\* Calculated using a safety factor of 1.5  
\* See installation manual for mounting instructions

### TEMPERATURE RATINGS \*

Nominal Operating Cell Temperature: 44°C (±2°C)  
Temperature coefficient of P<sub>MPP</sub>: -0.35%/°C  
Temperature coefficient of V<sub>OC</sub>: -0.27%/°C  
Temperature coefficient of I<sub>SC</sub>: 0.04%/°C  
\*The temperature coefficients stated are linear values

### LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC.



Ref: NE-05-11-Rev-B-0119  
Specifications subject to change without notice.



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### REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	10/01/2021	00

Signature with Seal

### PROJECT NAME

BRITTANY AND JONATHAN  
CHAPMAN RESIDENCE  
38 DARLEY CT,  
LILLINGTON, NC 27546 USA

SHEET NAME  
EQUIPMENT  
SPECIFICATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-8

Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs more than 2,000 people worldwide, producing 1.5 GW of solar panels annually.



www.recgroup.com



## Enphase IQ 7, IQ7+, and IQ 7X Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7, IQ 7+ and IQ 7X Micro integrate seamlessly with the Enphase IQ Envoy™, Enphase Q Aggregator™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



### Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

### Productive and Reliable

- Optimized for high powered 60-cell, 72-cell\*, and 96-cell\*\* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

### Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

\* The IQ 7+ Micro is required to support 72-cell modules.

\*\* The IQ 7X is required to support 96-cell modules.



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



## Enphase IQ 7, IQ 7+, and IQ 7X Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US		IQ7X-96-2-US	
Commonly used module pairings <sup>1</sup>	195 W - 330 W +		235 W - 400 W +		235 W - 400 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules		96-cell PV modules	
Maximum input DC voltage	48 V		60 V		80 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V		53 V - 64 V	
Operating range	16 V - 48 V		16 V - 60 V		25 V - 80 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V		30 V / 80 V	
Max DC short circuit current (module Isc)	15 A		15 A		10 A	
Oversoltage class DC port	II		II		II	
DC port backfeed current	0 A		0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter		IQ 7X Microinverter	
Peak output power	250 VA		295 VA		320 VA	
Maximum continuous output power	240 VA		290 VA		315 VA	
Nominal (L-L) voltage/range <sup>2</sup>	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A	1.15 A	1.21 A	1.39 A	1.31 A	1.51 A
Nominal frequency	60 Hz		60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit	16 (240 VAC) 13 (208 VAC)		13 (240 VAC) 11 (208 VAC)		12 (240 VAC) 10 (208 VAC)	
Oversoltage class AC port	III		III		III	
AC port backfeed current	0 A		0 A		0 A	
Power factor setting	1.0		1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V	@240 V	@208 V
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	96.5 %	97.0 %	96.5 %
MECHANICAL DATA	IQ 7 Microinverter		IQ 7+ Microinverter		IQ 7X Microinverter	
Ambient temperature range	-40°C to +65°C		-40°C to +65°C		-40°C to +60°C	
Relative humidity range	4% to 100% (condensing)					
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)					
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)					
Weight	.92 kg (2.03 lbs)					
Cooling	Natural convection - No fans					
Approved for wet locations	Yes					
Pollution degree	PD3					
Enclosure	Class II double-insulated					
Environmental category / UV exposure rating	NEMA Type 6 / outdoor					
FEATURES	Power line					
Communication	Power line					
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase IQ Envoy					
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.					
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.					

1. No enforced DC/AC ratio. See the compatibility calculator at [enphase.com/en-us/support/module-compatibility](http://enphase.com/en-us/support/module-compatibility).  
2. Nominal voltage range can be extended beyond nominal if required by the utility.

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

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PURE ENERGY GROUP, LLC

3661 SUNSET AVE #617  
ROCKY MOUNT, NC 27804

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SHEET NAME  
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SPECIFICATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-9

# Enphase IQ Combiner

(X-IQ-AM1-240-B)

The **Enphase IQ Combiner™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.



### Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular

### Simple

- Three pre-installed 20 A / 240 VAC circuit breakers
- Provides production metering and optional consumption monitoring.

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty

## Enphase IQ Combiner

MODEL NUMBER	
IQ Combiner X-IQ-AM1-240-B	IQ Combiner with Enphase IQ Envoy™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%).
ACCESSORIES (order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan)	Plug and play industrial grade cellular modem with data plan 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.)
Consumption Monitoring CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
Solar branch circuit breakers	Three 2-pole 20 A/240 VAC DIN rail-mounted breakers
Maximum system voltage	240 VAC
Rated output current	48 A
Rated input current, each input	16 A
Maximum fuse/circuit breaker rating (output)	60 A
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	38.0 x 38.7 x 20.3 cm (15.0" x 15.3" x 8.0")
Weight	5.1 kg (11.2 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Vented, natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire size	14 to 6 AWG copper conductors for branch inputs. 14 to 4 AWG copper conductors for combined output. Follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable - not included
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) - not included
COMPLIANCE	
Compliance, Combiner	UL 1741
Compliance, IQ Envoy	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5

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

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2017-08-17



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SHEET NAME  
EQUIPMENT  
SPECIFICATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-10



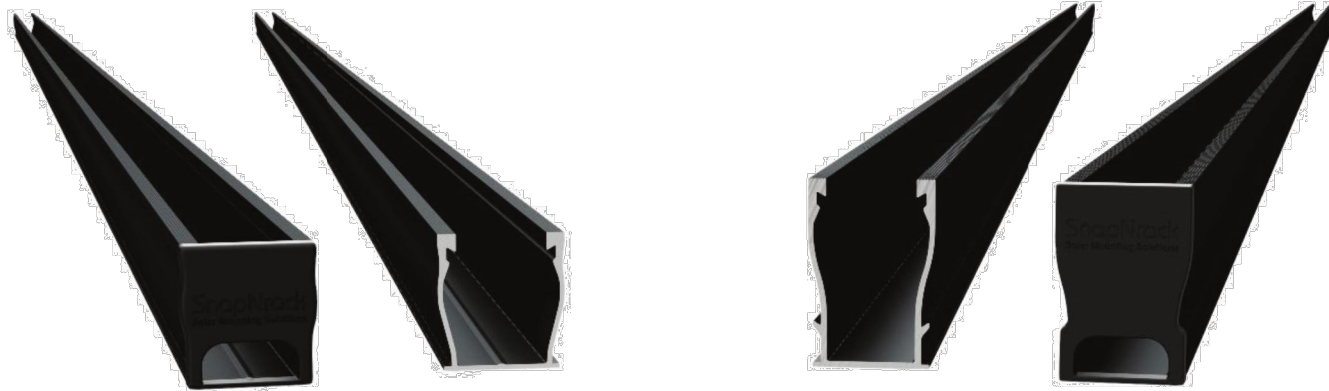
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# Ultra Rail

UR-40  
UR-60



## SnapNrack Ultra Rail System

A sleek, straightforward rail solution for mounting solar modules on all roof types. Ultra Rail features two rail profiles; UR-40 is a lightweight rail profile that is suitable for most geographic regions and maintains all the great features of SnapNrack rail, while UR-60 is a heavier duty rail profile that provides a larger rail channel and increased span capabilities. Both are compatible with all existing mounts, module clamps, and accessories for ease of install.

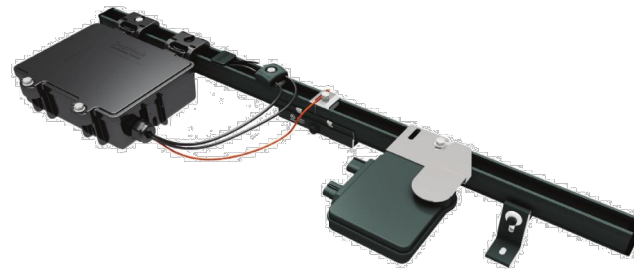
### The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with all the SnapNrack Mid Clamps and End Clamps customers love
- Universal End Clamps and snap-in End Caps provide a clean look to the array edge



### Unparalleled Wire Management

- Open rail channel provides room for running wires resulting in a long-lasting quality install
- Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits, and Conduit Clamps
- System is fully bonded and listed to UL 2703 Standard



## The Ultimate Value in Rooftop Solar



Industry leading Wire Management Solutions



Mounts available for all roof types



Single Tool Installation



All SnapNrack Module Clamps & Accessories are compatible with both rail profiles

### Heavy Duty UR-60 Rail

- UR-60 rail profile provides increased span capabilities for high wind speeds and snow loads
- Taller, stronger rail profile includes profile-specific rail splice and end cap
- All existing mounts, module clamps, and accessories are retained for the same great install experience



**Start Installing Ultra Rail Today**

**RESOURCES**  
**DESIGN**  
**WHERE TO BUY**

[snapnrack.com/resources](http://snapnrack.com/resources)  
[snapnrack.com/configurator](http://snapnrack.com/configurator)  
[snapnrack.com/where-to-buy](http://snapnrack.com/where-to-buy)

# Quality. Innovative. Superior.

SnapNrack Solar Mounting Solutions are engineered to optimize material use and labor resources and improve overall installation quality and safety.

877-732-2860

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[contact@snapnrack.com](mailto:contact@snapnrack.com)

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38 DARLEY CT,  
LILLINGTON, NC 27546 USA

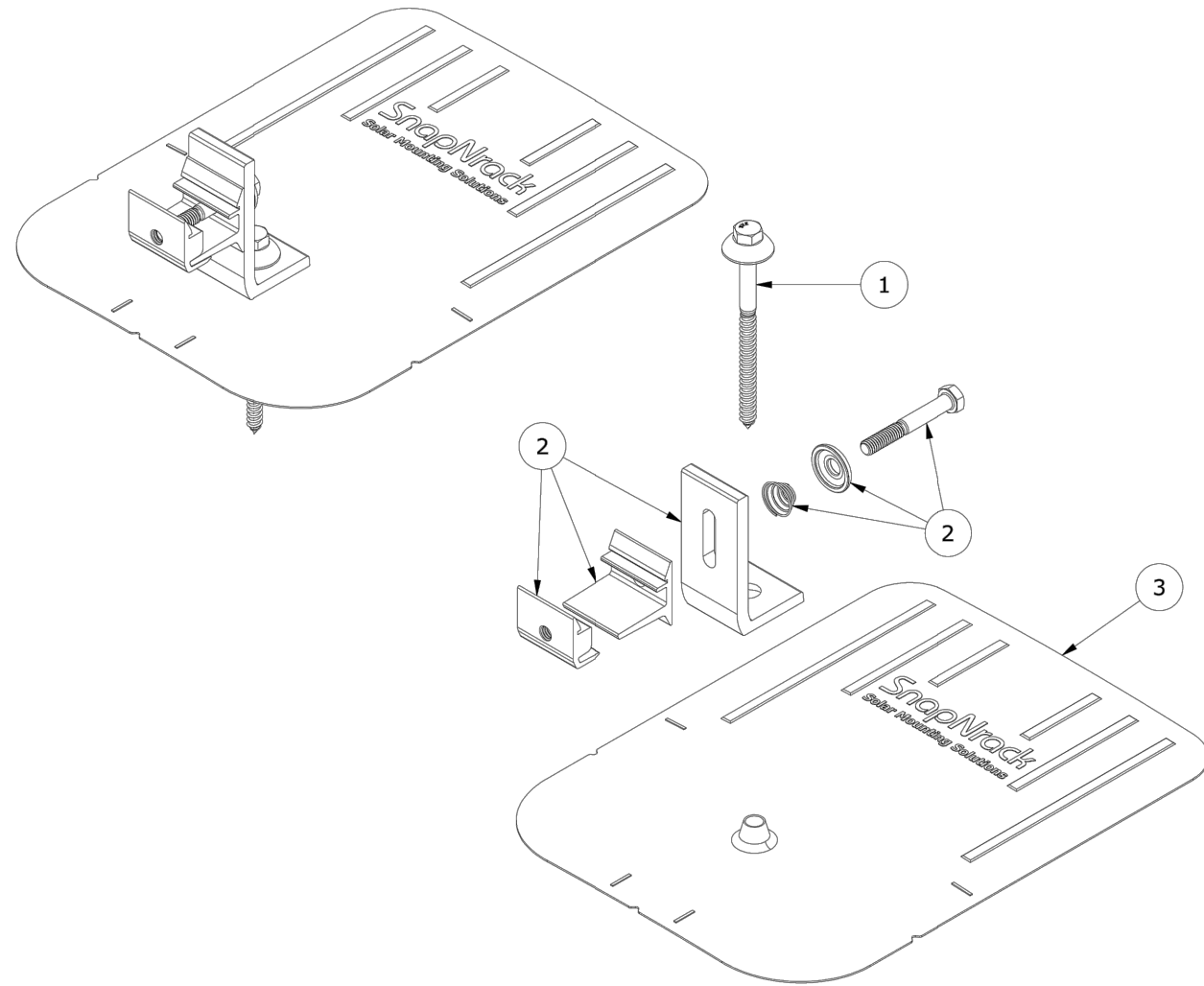
SHEET NAME  
EQUIPMENT  
SPECIFICATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-11

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

595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA  
PHONE (415) 580-6900 • FAX (415) 580-6902  
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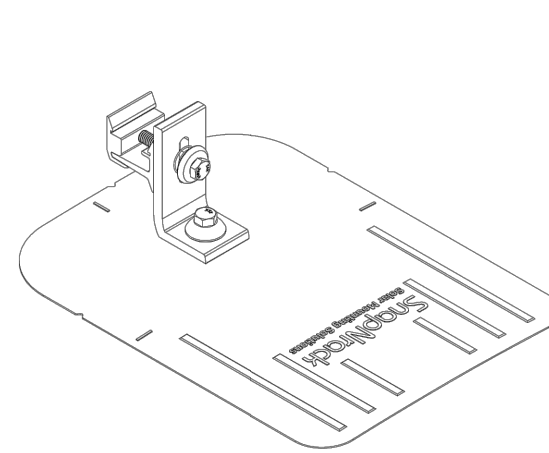


PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

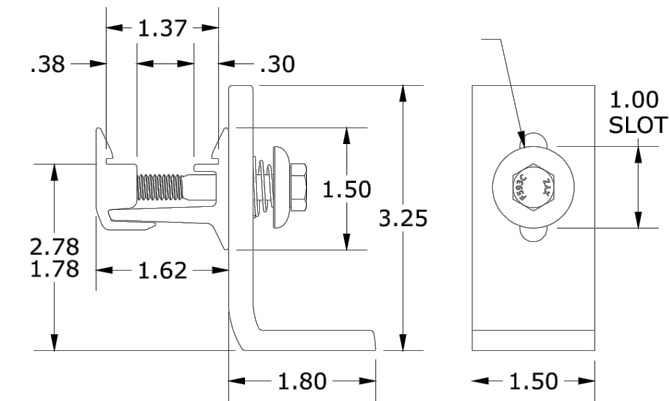
MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	802 UP, 1333 DOWN, 356 SIDE
ULTIMATE LOAD (LBS):	2005 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM UL SUBJECT 2582
WEIGHT (LBS):	0.80

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

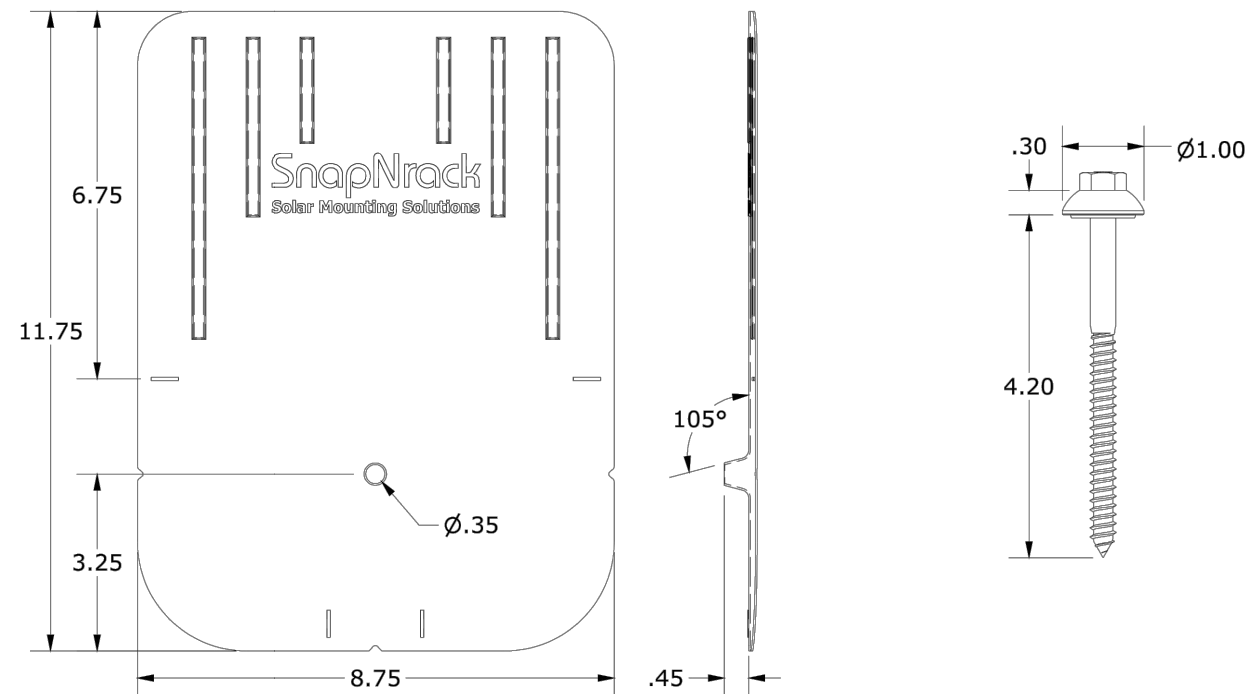
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UMBRELLA L FOOT PROPERTIES	
SKU	DESCRIPTION
242-01219	ULTRA RAIL UMBRELLA L FOOT, SILVER
242-01220	ULTRA RAIL UMBRELLA L FOOT, BLACK



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



PURE ENERGY GROUP, LLC  
3661 SUNSET AVE #617  
ROCKY MOUNT, NC 27804

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CHAPMAN RESIDENCE**  
**38 DARLEY CT,  
LILLINGTON, NC 27546 USA**

SHEET NAME  
**EQUIPMENT  
SPECIFICATIONS**

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

SHEET NUMBER  
**PV-12**