

PROJECT DESCRIPTION:

22 x VSUN SOLAR: VSUN400-108BMH 400W MONO MODULES
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
 DC SYSTEM SIZE: (N) 8.800 kW DC + (E) 7.800 kW DC = 16.600 kW DC
 AC SYSTEM SIZE: (N) 7.600 kW AC + (E) 7.600 kW AC = 15.200 kW AC

ROOF ARRAY AREA #1:- 315.30 SQ FT.
 ROOF ARRAY AREA #2:- 84.08 SQ FT.
 ROOF ARRAY AREA #3:- 63.06 SQ FT.

EQUIPMENT SUMMARY

(N) 22 - VSUN SOLAR: VSUN400-108BMH 400W MONO MODULES
 (N) 01 - TESLA: 1538000-XX-Y 7.6 kW (240V) INVERTER
 (N) 08 - TESLA: RSD MCI-2
 (E) 20 - JINKO SOLAR: JKM390M-72HBL-V (390W) MODULES
 (E) 01 - SOLAREGE HOME HUB: SE7600H-US (240V) INVERTER

AUTHORITIES HAVING JURISDICTION

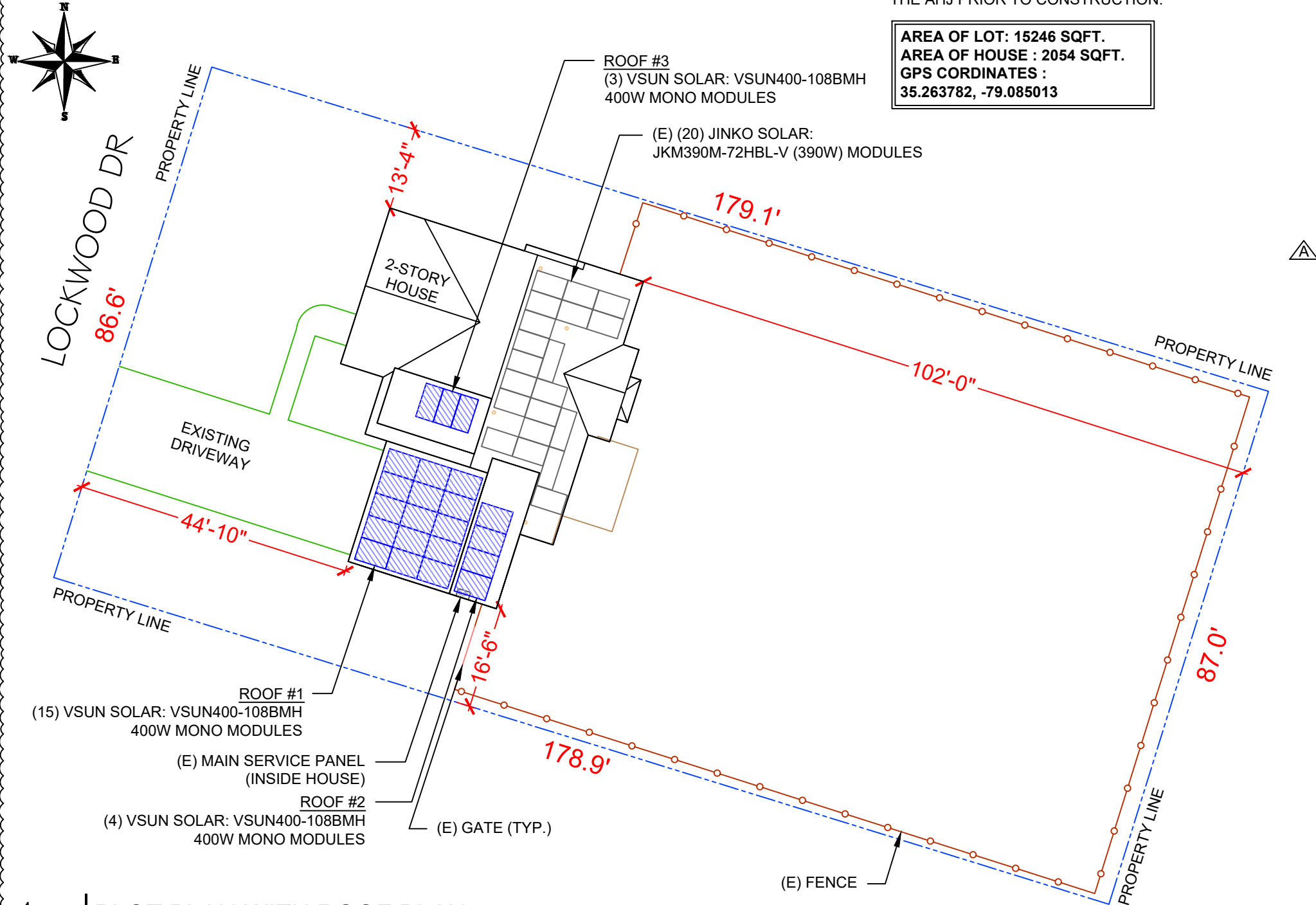
BUILDING: HARNETT COUNTY
 ZONING: HARNETT COUNTY
 UTILITY: CENTRAL EMC

APPLICABLE CODES & STANDARDS

NEC 2020
 NCFC 2018
 NCBC 2018
 NCRC 2018
 NCECC 2018

- EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATION'S INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM.
- ALL EQUIPMENT SHALL BE LISTED AND LABELED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY AND INSTALLED PER THE LISTING REQUIREMENTS AND THE MANUFACTURER'S INSTRUCTIONS. [NEC 690.4(D)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED, INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- PAINT PV CONDUIT TO MATCH THE DWELLING EXTERIOR.
- CONTACT THE SERVICING UTILITY BEFORE POWERING ON THE PHOTOVOLTAIC SYSTEM
- NCFC SETBACKS ARE REQUIRED TO BE DISCUSSED WITH THE AHJ PRIOR TO CONSTRUCTION.

AREA OF LOT: 15246 SQFT.
AREA OF HOUSE : 2054 SQFT.
GPS CORDINATES :
35.263782, -79.085013



1 PLOT PLAN WITH ROOF PLAN

PV-1

SCALE: 1"=20'-0"



2

HOUSE PHOTO

PV-1

SCALE: NTS



3

VICINITY MAP

PV-1

SCALE: NTS

SHEET INDEX

PV-1	PLOT PLAN & VICINITY MAP
PV-2	ROOF PLAN & MODULES
PV-2A	STRING LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	LABELS
PV-6+	EQUIPMENT SPECIFICATIONS



LuminaSun Smart Home LLC
 114 Morlake Drive suite 201,
 Mooresville, NC 28117

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	01/07/2025	
REVISION	02/05/2025	A

SIGNATURE WITH SEAL

RICHARD PANTEL
 PROFESSIONAL ENGINEER
 043326
 RICHARD PANTEL

Richard Pantel
 Richard Pantel, P.E.
 NC Lic. No. 043326
 02/10/2025

Digitally signed by
 Richard Pantel, P.E.
 Date: 2025.02.10
 10:39:15 -0600

PROJECT NAME & ADDRESS

STEPHEN POUNDERS
 101 LOCKWOOD DR,
 CAMERON, NC 28326

DC SIZE:8.800kW

AC SIZE:15.200kW

DRAWN BY

ESR

SHEET NAME

PLOT PLAN &
 VICINITY MAP

SHEET SIZE

ANSI B
 11" X 17"

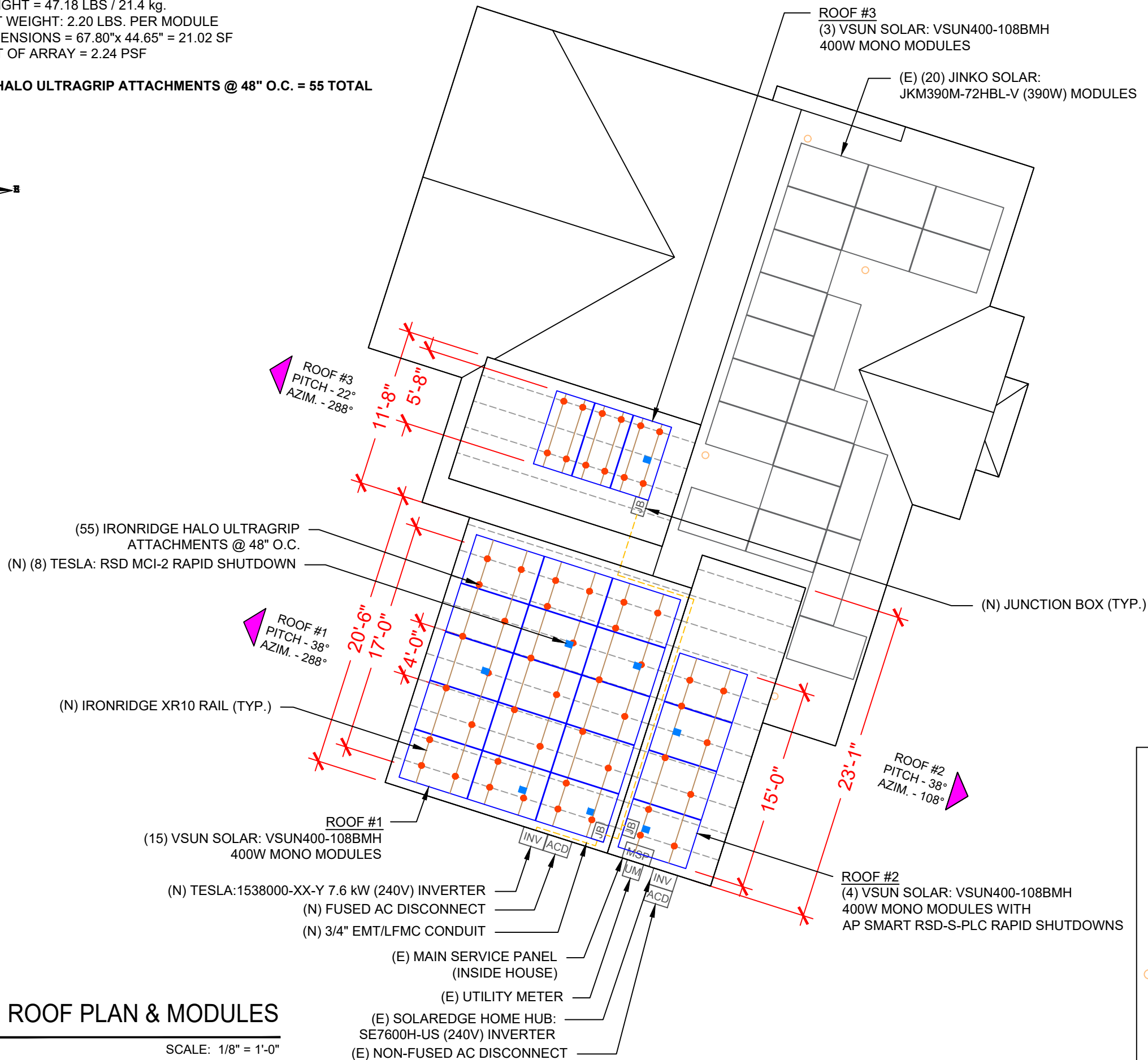
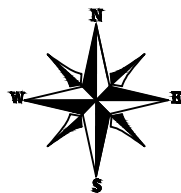
SHEET NUMBER

PV-1

MODULES TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULE = 22 MODULES
 MODULE TYPE = VSUN SOLAR: VSUN400-108BMH 400W MONO MODULES
 MODULE WEIGHT = 47.18 LBS / 21.4 kg.
 COMPONENT WEIGHT: 2.20 LBS. PER MODULE
 MODULE DIMENSIONS = 67.80"x 44.65" = 21.02 SF
 UNIT WEIGHT OF ARRAY = 2.24 PSF

IRONRIDGE HALO ULTRAGRIP ATTACHMENTS @ 48" O.C. = 55 TOTAL



ROOF DESCRIPTION				
ROOF TYPE		COMPOSITION SHINGLE		
ROOF LAYER		1 LAYER		
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	38°	288°	2"X4"	24"
#2	38°	108°	2"X4"	24"
#3	22°	288°	2"X4"	24"

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	15	315.30	352.42	89
#2	4	84.08	184.29	46
#3	3	63.06	155.33	41
TOTAL	(N) 22 + (E) 20	917.09	2054.77	45

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SHEET NAME
ROOF PLAN & MODULES

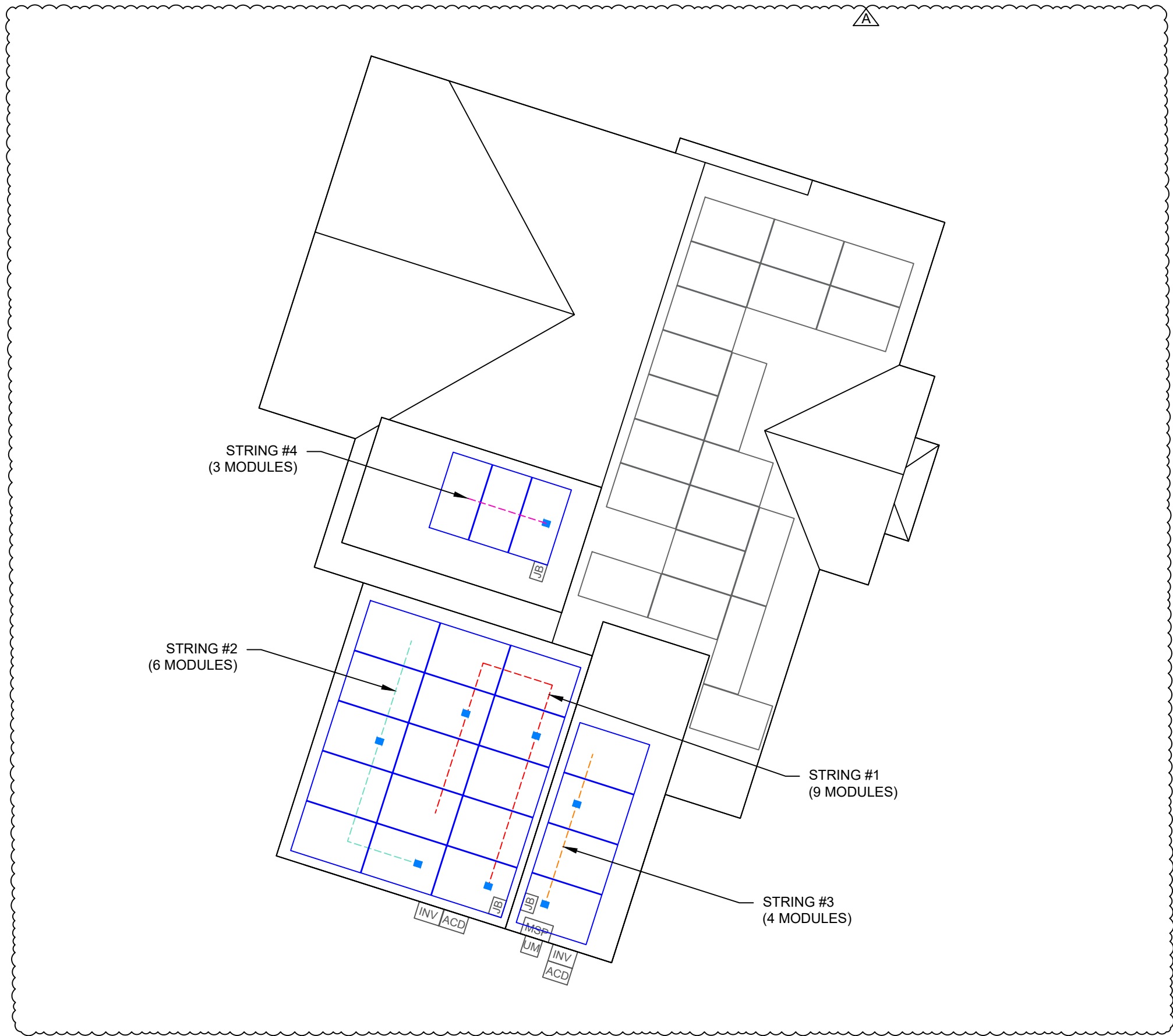
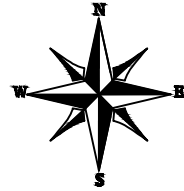
SHEET SIZE
**ANSI B
 11" X 17"**

SHEET NUMBER
PV-2

LEGEND

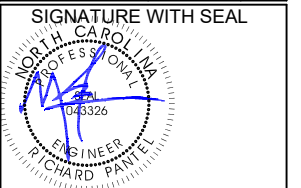
- CP - COMBINER PANEL
- JB - JUNCTION BOX
- INV - INVERTER
- ACD - AC DISCONNECT
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- - TESLA: RSD MCI-2 RAPID SHUTDOWN
- □ - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- - TRUSS
- - - - CONDUIT

STRING LEGENDS	
	STRING #1
	STRING #2
	STRING #3
	STRING #4



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AC SIZE:15.200kW

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SHEET NAME
STRING
LAYOUT

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2A

1 ARRAY PLAN WITH STRING LAYOUT

PV-2A

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

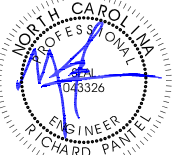


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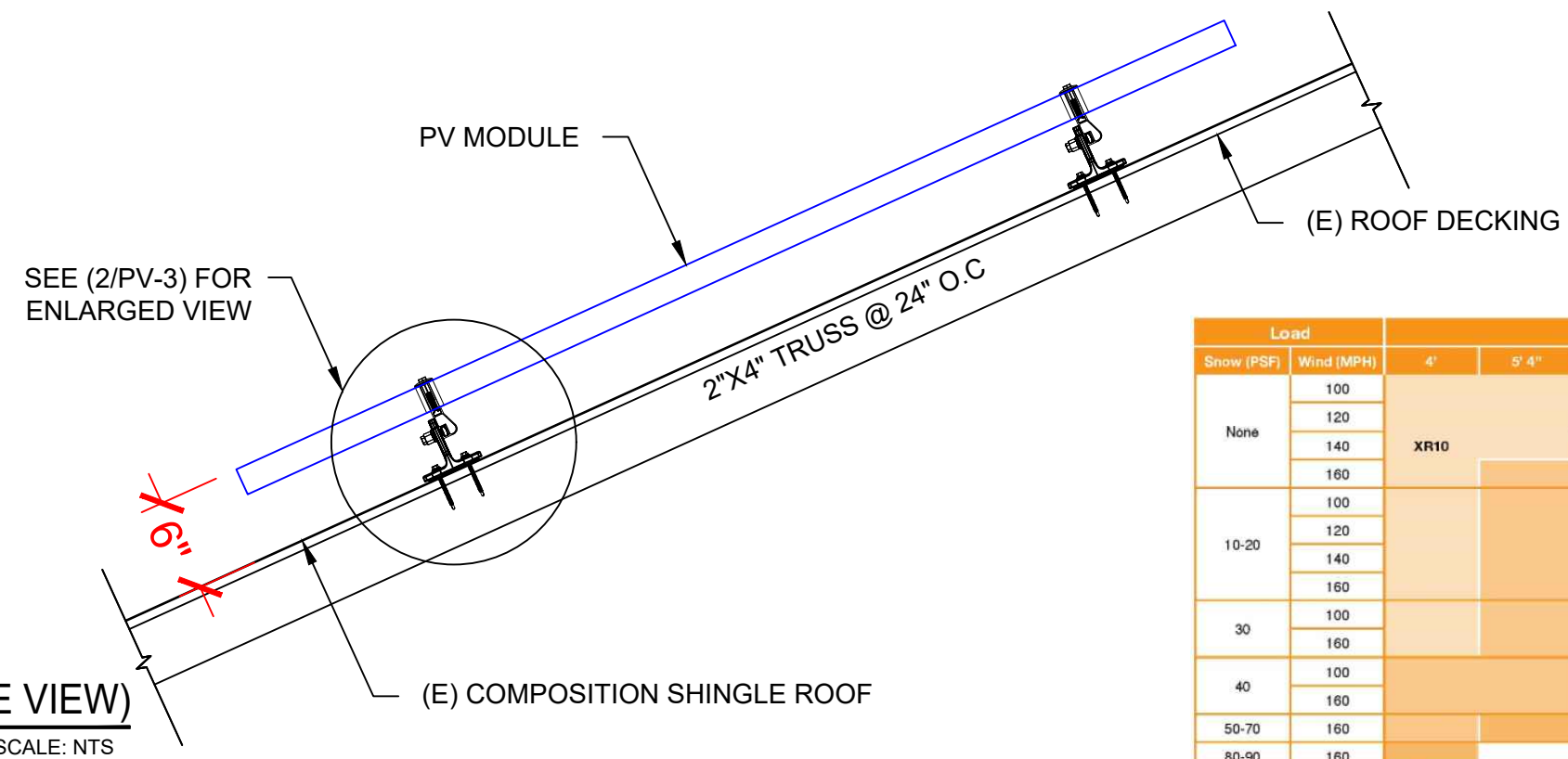
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SHEET SIZE

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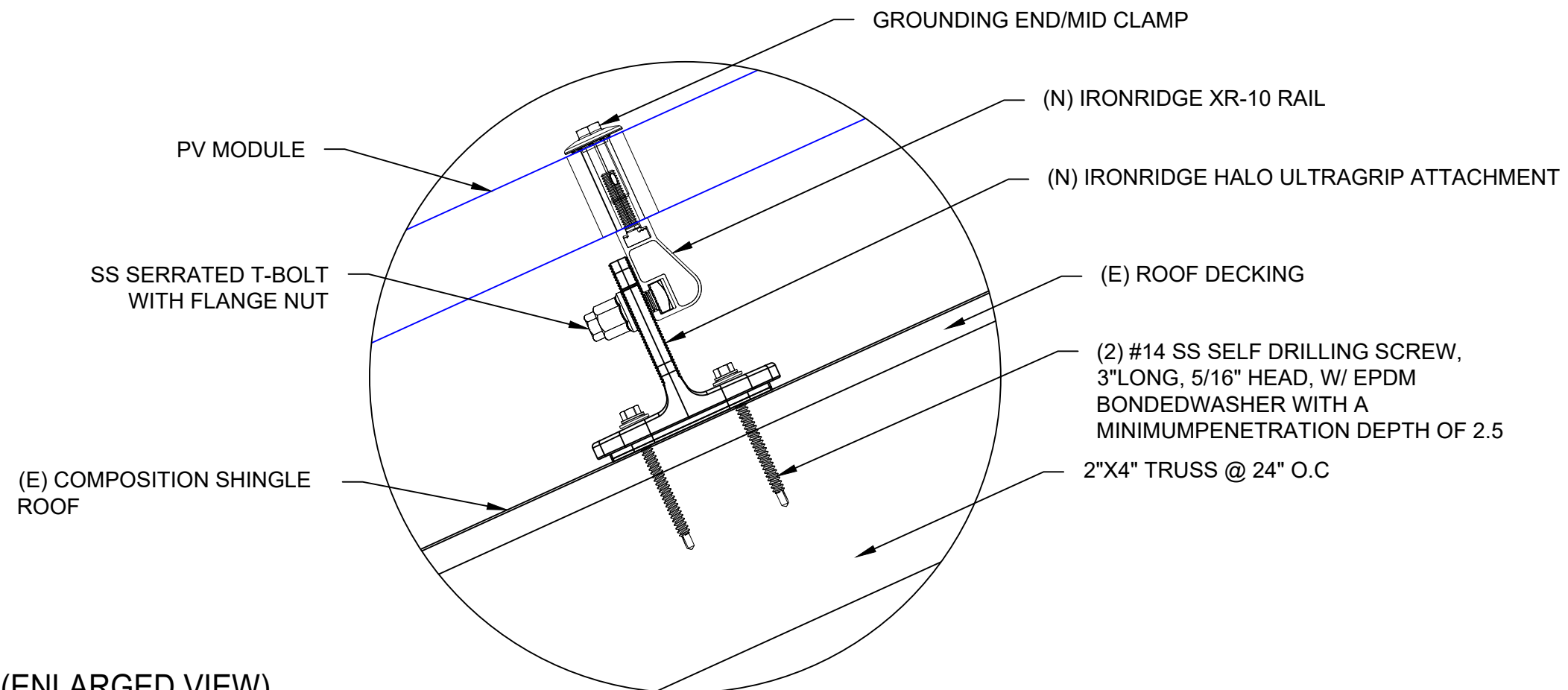


Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100						
	120						
	140	XR10		XR100		XR1000	
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

1 ATTACHMENT DETAIL (SIDE VIEW)

SCALE: NTS

PV-3



2 ATTACHMENT DETAIL (ENLARGED VIEW)

SCALE: NTS

PV-3

2

DC SYSTEM SIZE: (N) 8.800 kW DC + (E) 7.800 kW DC = 16.600 kW DC
 AC SYSTEM SIZE: (N) 7.600 kW AC + (E) 7.600 kW AC = 15.200 kW AC

(N) (22) VSUN SOLAR: VSUN400-108BMH 400W MONO MODULES
 (N) (08) TESLA: RSD MCI-2
 (E) (20) JINKO SOLAR: JKM390M-72HBL-V (390W) MODULES

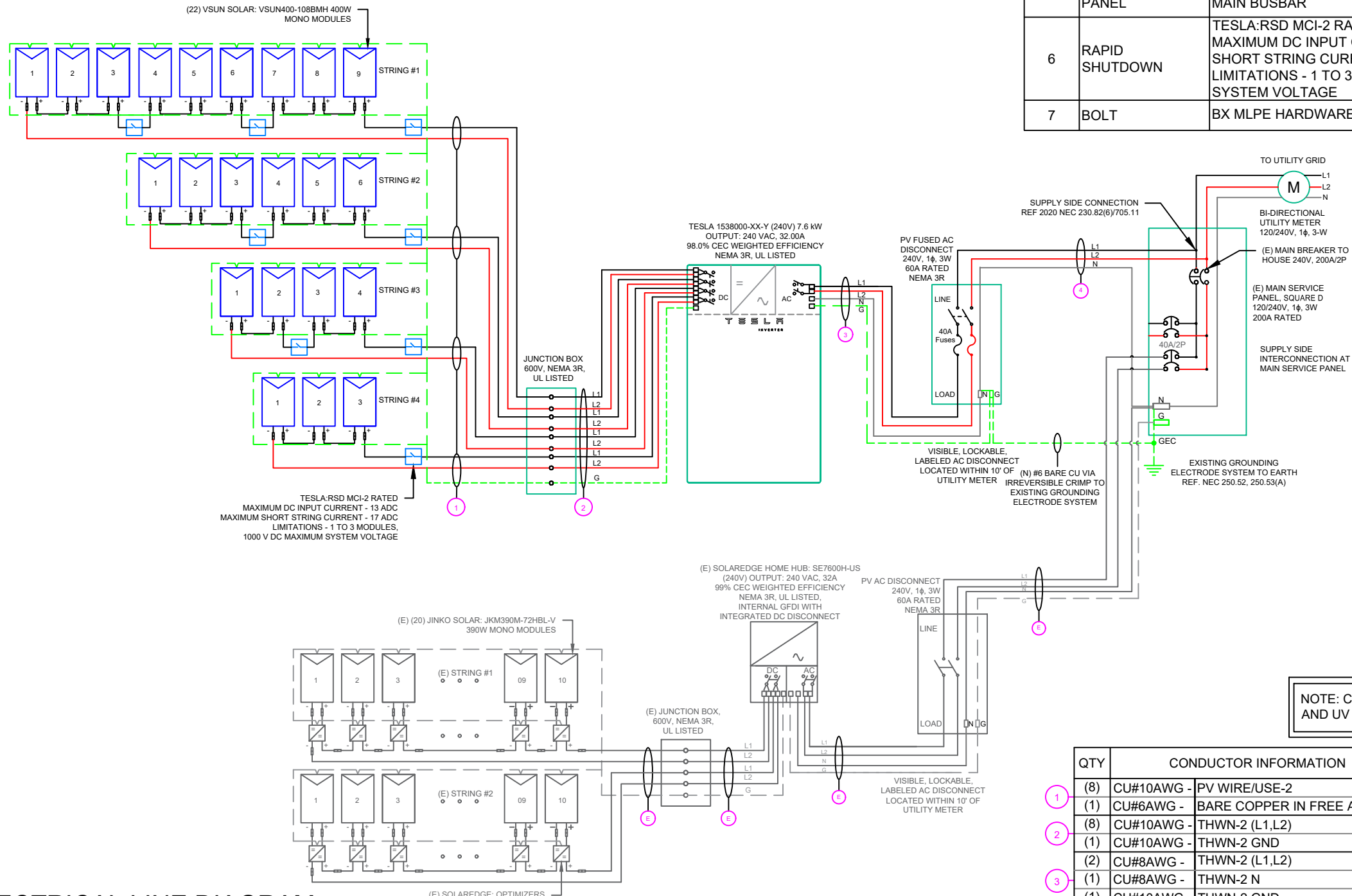
(01) STRING OF 09 MODULES
 (01) STRING OF 06 MODULES &
 (01) STRING OF 04 MODULES AND
 (01) STRING OF 3 MODULES ARE CONNECTED IN SERIES

NOTE:-

1. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.
2. 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.
3. THE GINLONG SOLIS INVERTER MONITORS VOLTAGE BETWEEN THE L1 AND L2, THE NEUTRAL CONDUCTOR IS OPTIONAL WHEN TYING THE INVERTER TO A 240V GRID (240 3Y SYSTEM). GROUND MUST BE CONNECTED TO THE PE TERMINAL. (REF: SHEET PV-9 FOR INSTALLATION MANUAL)
4. ALL NEW SERVICE INSTALLATIONS AND REPLACEMENTS REQUIRE A SURGE-PROTECTIVE DEVICE (SPD) IN ACCORDANCE WITH [NEC 230.67]. THE SPD SHALL BE TYPE 1 OR TYPE 2 AND IS REQUIRED TO BE AN INTEGRAL PART OF THE SERVICE EQUIPMENT OR LOCATED IMMEDIATELY ADJACENT THERETO.

INSTALLER/ELECTRICIAN NOTE:

EC IS TO MEASURE VOLTAGE BEFORE STARTING WORK. IF RESULT IS ANY OTHER VOLTAGE MEASURED THAN 120/240V IS OBSERVED, DO NOT PROCEED. CONTACT ENGINEER.



ELECTRICAL EQUIPMENT LIST

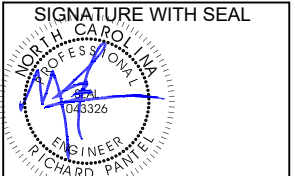
SL NO:	ITEM	DESCRIPTION	QTY
1	PV MODULE	VSUN SOLAR: VSUN400-108BMH 400W MONO MODULES VOC = 37.2 V, VMP = 31.17 V ISC = 13.68 A, IMP = 12.84 A	22
2	INVERTER	TESLA:1538000-XX-Y 7.6 kW INVERTER OUTPUT: 240 VAC, 32A 98.0% CEC WEIGHTED EFFICIENCY NEMA 3R, UL LISTED	01
3	JUNCTION BOXES	JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO.290	03
4	AC DISCONNECT	EATON AC DISCONNECT: 60A FUSED WITH 40A FUSES, 240V NEMA 3R, UL LISTED	01
5	MAIN SERVICE PANEL	(E) MAIN SERVICE PANEL AND METER: 200A MAIN BUSBAR	01
6	RAPID SHUTDOWN	TESLA:RSD MCI-2 RATED MAXIMUM DC INPUT CURRENT - 13 ADC MAXIMUM SHORT STRING CURRENT - 17 ADC LIMITATIONS - 1 TO 3 MODULES, 1000 V DC MAXIMUM SYSTEM VOLTAGE	8
7	BOLT	BX MLPE HARDWARE (BX-CMA-MI-M1)	8



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 101 LOCKWOOD DR,
 CAMERON, NC 28326

DC SIZE:8.800kW
 AC SIZE:15.200kW

DRAWN BY

ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-4

NOTE: WIRE SCHEDULE CALLOUT (E) IS EXISTING SYSTEM

NOTE: CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED (EX.- EMT,PVC OR EQUIVALENT)

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

LABEL 1
 LABEL LOCATION:
 EMT/CONDUIT RACEWAY
 SOLADECK / JUNCTION BOX
 CODE REF: NEC 690.13 (G)
 ON ALL CONDUITS SPACED AT MAX 10FT

**WARNING: PHOTOVOLTAIC
 POWER SOURCE**

LABEL 2
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.13(B)

⚠ WARNING

**ELECTRIC SHOCK HAZARD
 TERMINALS ON THE LINE AND
 LOAD SIDES MAY BE ENERGIZED
 IN THE OPEN POSITION**

LABEL 3
 LABEL LOCATION:
 MAIN SERVICE PANEL, AC DISCONNECT
 AND SUB PANEL (IF APPLICABLE)
 CODE REF: NEC 705.12(C) & NEC 690.59

⚠ WARNING

**DUAL POWER SUPPLY
 SOURCE: UTILITY GRID AND
 PV SOLAR ELECTRIC SYSTEM**

LABEL 4
 LABEL LOCATION:
 MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
 SUB PANEL (ONLY IF SOLAR IS BACK-FED)
 CODE REF: NEC 705.12(B)(3)(2)

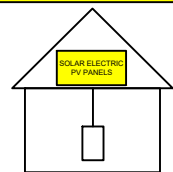
⚠ WARNING

**POWER SOURCE OUTPUT
 CONNECTION. DO NOT
 RELOCATE THIS
 OVERCURRENT DEVICE**

LABEL 5
 LABEL LOCATION:
 INVERTER
 CODE REF: [NEC 690.56(C)(1)(A)]

**SOLAR PV SYSTEM EQUIPPED
 WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN
 SWITCH TO THE
 "OFF" POSITION TO
 SHUT DOWN PV SYSTEM
 AND REDUCE
 SHOCK HAZARD
 IN THE ARRAY



LABEL 6
 LABEL LOCATION:
 AC DISCONNECT
 MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
 CODE REF: NEC 690.56(C)(2)

**RAPID SHUTDOWN SWITCH
 FOR SOLAR PV SYSTEM**

LABEL 7
 LABEL LOCATION:
 INVERTER
 CODE REF: NEC 690.13(B)

DC DISCONNECT

LABEL 8
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.54

**AC DISCONNECT
 PHOTOVOLTAIC SYSTEM
 POWER SOURCE**

NOMINAL OPERATING AC VOLTAGE
 RATED AC OUTPUT CURRENT

LABEL 9
 LABEL LOCATION:
 INVERTER
 CODE REF: NEC 690.53

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

LABEL 10
 LABEL LOCATION:
 MAIN SERVICE PANEL AND SUB PANEL
 CODE REF: NEC 110.27(C) & OSHA 1910.145 (f) (7)

⚠ WARNING

**TURN OFF PHOTOVOLTAIC
 AC DISCONNECT PRIOR TO
 WORKING INSIDE PANEL**

LABEL 11
 LABEL LOCATION:
 UTILITY METER
 CODE REF: NEC 690.13(B)

⚠ WARNING

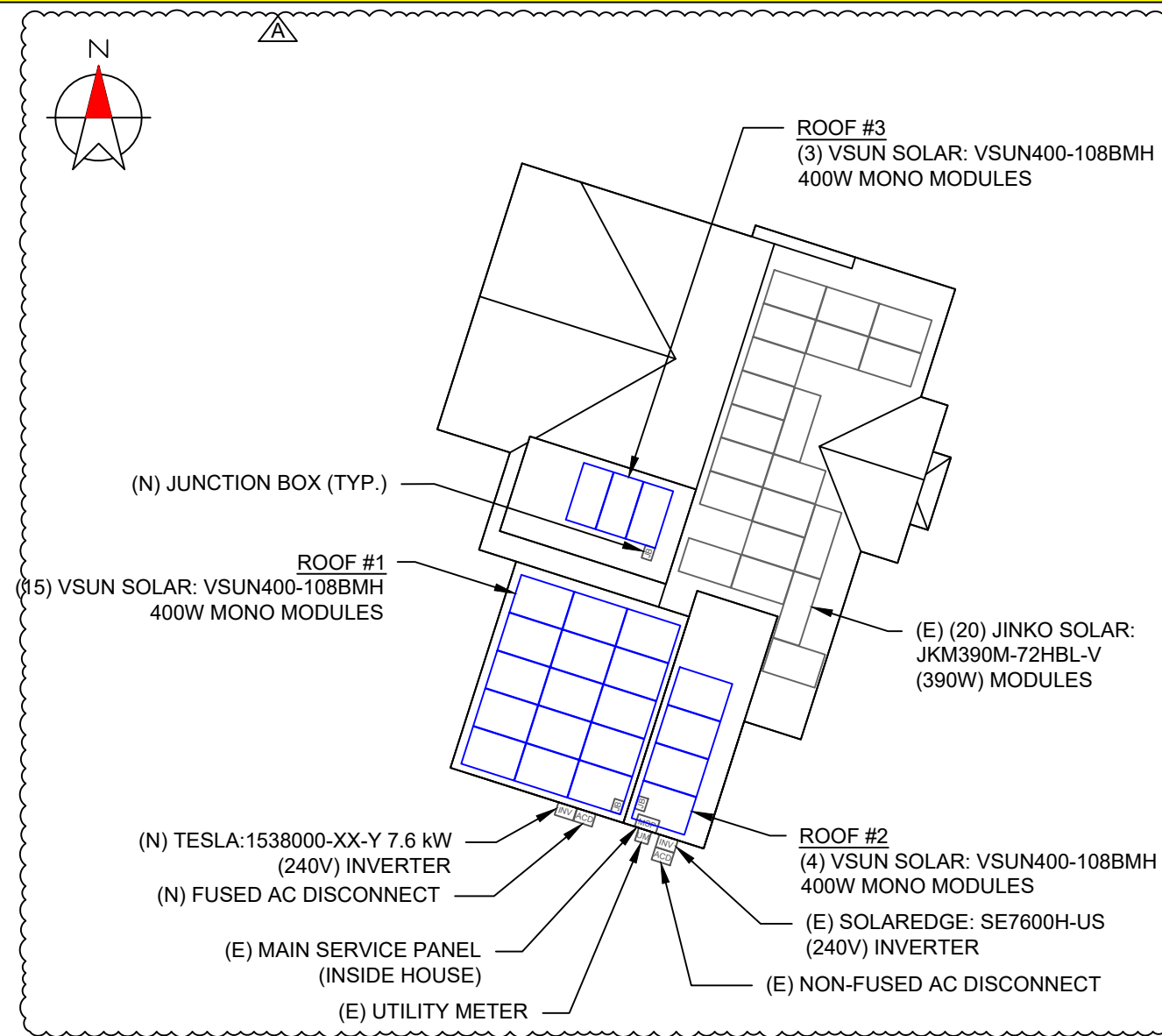
**THIS SERVICE METER
 IS ALSO SERVED BY A
 PHOTOVOLTAIC SYSTEM**

NOTES

- NEC ARTICLES 690 AND 705 AND CRC SECTION R324 MARKINGS SHOWN HEREON
- ALL MARKINGS SHALL CONSIST OF THE FOLLOWING:
 - UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING
 - RED BACKGROUND COLOUR WITH WHITE TEXT AND LINE WORK
 - ARIAL FONT
- ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATION SPECIFIED
- SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT USING POP-RIVETS OR SCREW
- PLACARD ONLY REQUIRED WHEN PV UTILITY DISCONNECT & METER ARE NOT WITH IN 10'.

CAUTION:

MULTIPLE SOURCES OF POWER



101 LOCKWOOD DR, CAMERON, NC 28326

"WARNING"

PHOTOVOLTAIC ARRAY
 DISCONNECTION OF NEUTRAL OR GROUNDED CONDUCTORS MAY RESULT IN OVERVOLTAGE ON ARRAY
 OR INVERTER

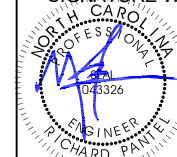


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DC SIZE: 8.800kW

AC SIZE: 15.200kW

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SHEET NAME

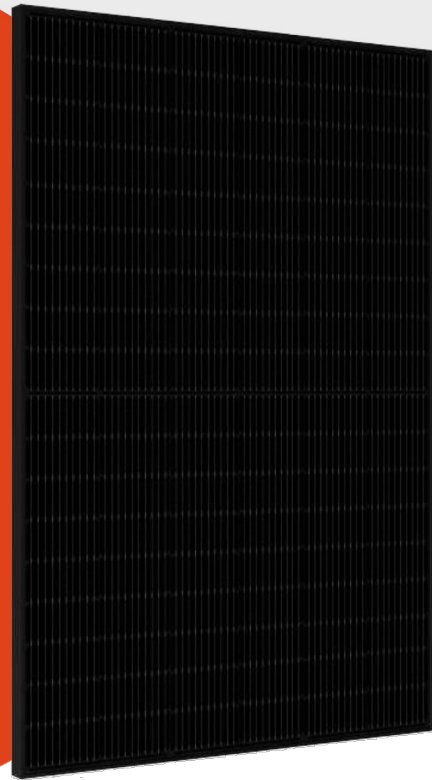
LABELS

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-5



VSUN
Innovative & Smart

25
YEAR
QUALITY ASSURANCE

30
YEAR
POWER OUTPUT GUARANTEE

VSUN405-108BMH

VSUN405-108BMH

VSUN395-108BMH

VSUN400-108BMH

VSUN390-108BMH

405W

Highest power output

20.74%

Module efficiency

2.0%

First-year degradation warranty

0.45%

Annual degradation over 30 years

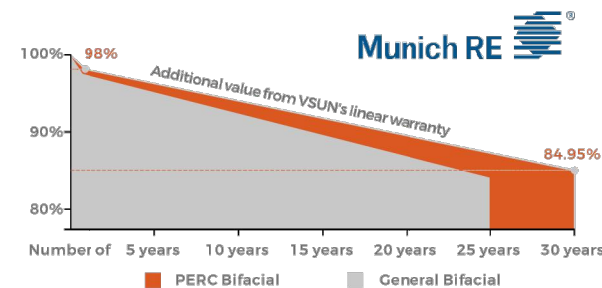
ABOUT VSUN

Invested by Fuji Solar. VSUN SOLAR is a solar solution provider with headquartered in Tokyo, Japan that offers reliability, high efficiency solar products and technology globally. VSUN is rated as BNEF Tier 1 PV module manufacturer, PVEL Lab "Best performer" and EcoVadis "Bronze Award".

PRODUCT CERTIFICATION



WARRANTY



Update Time:2023.5.13

Electrical Characteristics at Standard Test Conditions(STC)

Module Type	VSUN405-108BMH	VSUN400-108BMH	VSUN395-108BMH	VSUN390-108BMH
Maximum Power - Pmax (W)	405	400	395	390
Open Circuit Voltage - Voc (V)	37.36	37.2	37.03	36.84
Short Circuit Current - Isc (A)	13.78	13.68	13.59	13.5
Maximum Power Voltage - Vmpp (V)	31.36	31.17	31	30.82
Maximum Power Current - Imp (A)	12.92	12.84	12.75	12.66
Module Efficiency	20.74%	20.48%	20.23%	19.97%

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1.5; module temperature 25°C. Pmax Sorting : 0~5W. Measuring Tolerance: ±3%.
Remark: Electrical data do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

Electrical Characteristics with different rear side power gain(reference to 400 front)

Pmax (W)	Voc (V)	Isc (A)	Vmpp (V)	Imp (A)	Pmax gain
420	37.1	14.36	31.17	13.48	5%
440	37.1	15.05	31.17	14.12	10%
479	37.2	16.42	31.12	15.41	20%
499	37.2	17.10	31.12	16.05	25%

Material Characteristics

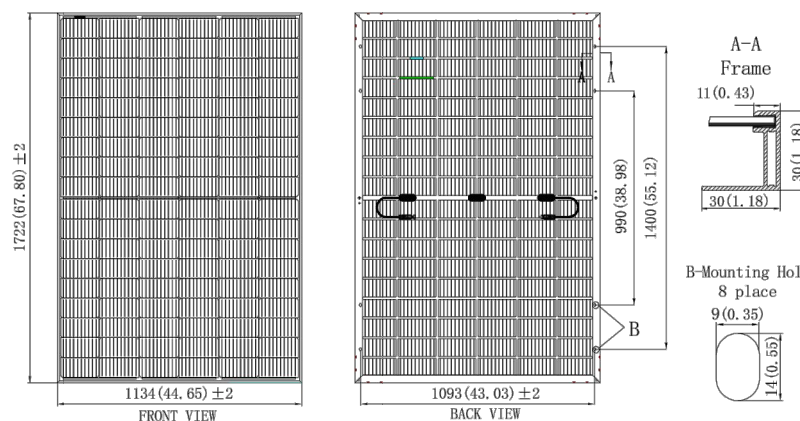
Dimensions	1722×1134×30mm (L×W×H) 67.80×44.65×1.18 inches (L×W×H)
Weight	21.4kg / 47.18lbs
Frame	Black anodized aluminum profile
Front Glass	AR-Coating toughened glass, 3.2 mm
Back sheet	Transparent black-mesh backsheet
Cells	12×9 pcs mono solar cells series strings
Junction Box	IP68, 3 diodes
Cable& Connector	Potrait: 1200 mm , 1×4 mm2 or 12AWG, Staubli MC4 Connector

Packaging

Dimensions(L×W×H)	1760×1125×1253mm / 69.29×44.29×49.33inches
Quantity per pallet	36 pcs
Container 20'	216
Container 40'	468
Container 40'HC	936 or 828 for US

Dimensions

Note:mm (inch)



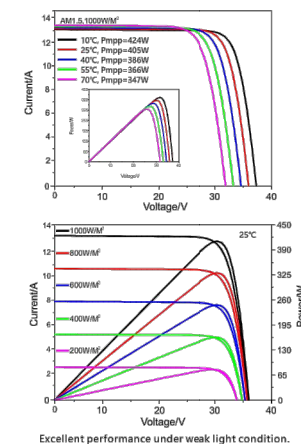
System Design

Maximum System Voltage [V]	1500
Series Fuse Rating [A]	30
Bifaciality	70%±10%
Fire Rating	Class C for IEC and TYPE 1 for US
Protection Class	Class II
Temperature Range	-40 °C to + 85 °C
Maximum Surface Load	+5400/-2400 Pa +113/-50 psf
Application class	Class A
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s

Temperature Characteristics

NOCT	45°C(±2°C)
Voltage Temperature Coefficient	-0.27%/°C
Current Temperature Coefficient	+0.048%/°C
Power Temperature Coefficient	+0.32%/°C

IV-Curves



Update Time:2023.5.13



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SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-6

Tesla Solar Inverter with Site Controller

Tesla Solar Inverter completes the Tesla home solar system, converting DC power from solar to AC power for home consumption. Tesla's renowned expertise in power electronics has been combined with robust safety features and a simple installation process to produce an outstanding solar inverter that is compatible with both Solar Roof and traditional solar panels. Once installed, homeowners use the Tesla mobile app to manage their solar system and monitor energy consumption, resulting in a truly unique ecosystem experience.

KEY FEATURES

- Built on Powerwall technology for exceptional efficiency and reliability
- Wi-Fi, Ethernet, and cellular connectivity with easy over-the-air updates
- Designed to integrate with Tesla Powerwall and Tesla App
- 0.5% revenue-grade metering for Solar Renewable Energy Credit (SREC) programs included



March 17, 2024

Tesla Solar Inverter Technical Specifications

Electrical Specifications:	Model Number	1538000-xx-y			
Output (AC)	Output (AC) ¹	3.8 kW	5 kW	5.7 kW	7.6 kW
	Nominal Power	3,800 W	5,000 W	5,700 W	7,600 W
	Maximum Apparent Power	3,840 VA	5,040 VA	6,000 VA	7,680 VA
	Maximum Continuous Current	16 A	21 A	24 A	32 A
	Breaker (Overcurrent Protection)	20 A	30 A	30 A	40 A
	Nominal Power Factor	1 - 0.9 (leading / lagging)			
	THD (at Nominal Power)	<5%			

Electrical Specifications:	MPPT	4
Input (DC)	Input Connectors per MPPT	1-2-1-2
	Maximum Input Voltage	600 VDC
	DC Input Voltage Range	60 - 550 VDC
	DC MPPT Voltage Range	60 - 480 VDC ¹
	Maximum Current per MPPT (I_{mp})	13 A ²
	Maximum Short Circuit Current per MPPT (I_{sc})	17 A ²

¹Maximum current.

²Where the DC input current exceeds an MPPT rating, jumpers can be used to allow a single MPPT to intake additional DC current up to 26 A I_{mp} / 34 A I_{sc} .

Performance Specifications	Peak Efficiency	98.6% at 240 V
	CEC Efficiency	98.0% at 240 V
	Allowable DC/AC Ratio	1.7
	Customer Interface	Tesla Mobile App
	Internet Connectivity	Wi-Fi (2.4 GHz, 802.11 b/g/n), Ethernet, Cellular (LTE/4G) ³
	Revenue Grade Meter	Revenue Accurate (+/- 0.5%)
	AC Remote Metering Support	Wi-Fi (2.4 GHz, 802.11 b/g/n)
	Protections	Integrated arc fault circuit interrupter (AFCI), Rapid Shutdown
	Supported Grid Types	60 Hz, 240 V Split Phase
	Warranty	12.5 years

³Cellular connectivity subject to network operator service coverage and signal strength.

Tesla Solar Inverter and Solar Shutdown Device Datasheet



LuminaSun Smart Home LLC
114 Morlake Drive suite 201,
Mooresville, NC 28117

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	01/07/2025	
REVISION	02/05/2025	A

SIGNATURE WITH SEAL

PROJECT NAME & ADDRESS

STEPHEN POUNDERS
101 LOCKWOOD DR,
CAMERON, NC 28326

DC SIZE:8.800kW

AC SIZE:15.200kW

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

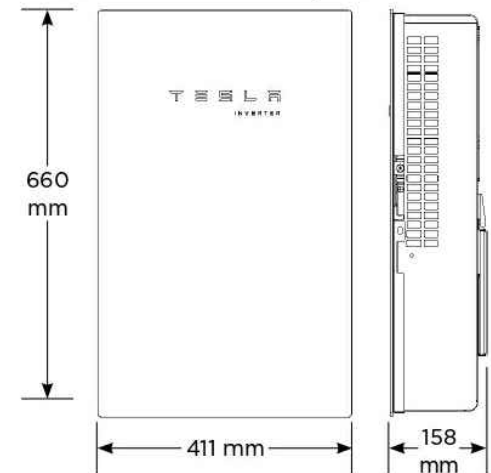
PV-7

Tesla Solar Inverter Technical Specifications

Mechanical Specifications

Dimensions

660 mm x 411 mm x 158 mm (26 in x 16 in x 6 in)



Weight 52 lb⁴
Mounting Options Wall mount (bracket)

⁴Door and bracket can be removed for a mounting weight of 37 lb.

Environmental Specifications

Operating Temperature -30°C to 45°C (-22°F to 113°F)⁵
Operating Humidity (RH) Up to 100%, condensing
Storage Temperature -30°C to 70°C (-22°F to 158°F)
Maximum Elevation 3000 m (9843 ft)
Environment Indoor and outdoor rated
Enclosure Rating Type 3R
Ingress Rating IP55 (Wiring compartment)
Pollution Rating PD2 for power electronics and terminal wiring compartment, PD3 for all other components
Operating Noise @ 1 m < 40 db(A) nominal, < 50 db(A) maximum

⁵Performance may be de-rated to 6.2 kW at 240 V when operating at temperatures greater than 45°C.

Compliance Information

Grid Certifications UL 1741, UL 1741 SA, UL 1741 SB, UL 1741 PCS, IEEE 1547-2018, IEEE 1547.1
Safety Certifications UL 1741 PVRSS, UL 1699B, UL 1998 (US), UL 3741
Emissions EN 61000-6-3 (Residential), FCC 47CFR15.109 (a)



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EQUIPMENT SPECIFICATION

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

SHEET NUMBER
PV-8

Solar Shutdown Device Technical Specifications

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with Tesla Solar Inverter, solar array shutdown is initiated by any loss of AC power.

Electrical Specifications	Model	MCI-1	MCI-2
	Nominal Input DC Current Rating (I_{mp})	12 A	13 A
	Maximum Input Short Circuit Current (I_{sc})	19 A	17 A
	Maximum System Voltage (PVHCS)	600 V DC	1000 V DC ⁷
	⁷ Maximum System Voltage is limited by Tesla Solar Inverter to 600 V DC.		
RSD Module Performance	Maximum Number of Devices per String	5	5
	Control	Power Line Excitation	Power Line Excitation
	Passive State	Normally Open	Normally Open
	Maximum Power Consumption	7 W	7 W
	Warranty	25 years	25 years
Environmental Specifications	Operating Temperature	-40°C to 50°C (-40°F to 122°F)	-45°C to 70°C (-49°F to 158°F)
	Storage Temperature	-30°C to 70°C (-22°F to 158°F)	-30°C to 70°C (-22°F to 158°F)
	Enclosure Rating	NEMA 4X / IP65	NEMA 4X / IP65
Mechanical Specifications	Electrical Connections	MC4 Connector	MC4 Connector
	Housing	Plastic	Plastic
	Dimensions	125 x 150 x 22 mm (5 x 6 x 1 in)	173 x 45 x 22 mm (6.8 x 1.8 x 1 in)
	Weight	350 g (0.77 lb)	120 g (0.26 lb)
	Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip
Compliance Information	Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)	
	RSD Initiation Method	PV System AC Breaker or Switch	

UL 3741 PV Hazard Control (and PVRSA) Compatibility

The following categories of solar module meet the UL 3741 PVHCS listing when installed with Tesla Solar Inverter and Solar Shutdown Devices.

Tesla Solar Roof	PV Hazard Control System: BIPV compliance document
Tesla or Hanwha (Q.Peak Duo BLK or BLK-G6+) Modules certified for use with ZEP racking	PV Hazard Control System: ZS PVHCS compliance document
Other module and racking combinations	PV Hazard Control System: Generic PV Array compliance document



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11" X 17"

SHEET NUMBER
PV-9



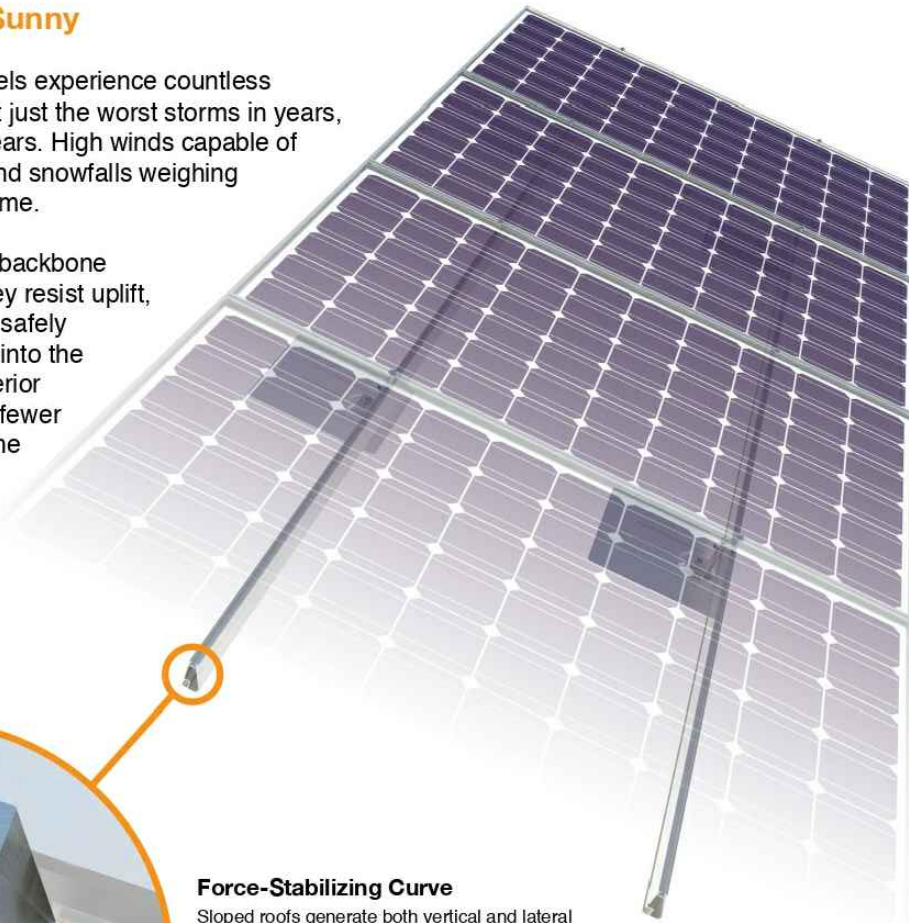
Tech Brief

XR Rail® Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails® are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails® is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs



XR Rails® are compatible with FlashFoot® and other pitched roof attachments.



IronRidge® offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails® are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.



XR Rail® Family

The XR Rail® Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail® to match.



XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available



XR100

XR100 is a residential and commercial mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	90	XR10		XR100		XR1000	
	120						
	140						
	160						
20	90			XR100		XR1000	
	120						
	140						
	160						
30	90			XR100		XR1000	
	160						
40	90			XR100		XR1000	
	160						
80	160			XR100		XR1000	
	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.



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101 LOCKWOOD DR,
CAMERON, NC 28326

DC SIZE:8.800kW

AC SIZE:15.200kW

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SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10



UFO® Family of Components

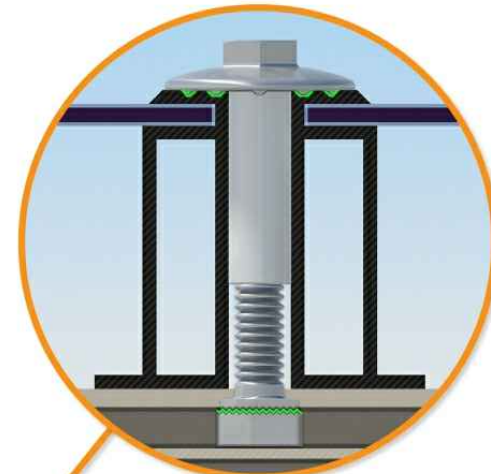
Tech Brief

Simplified Grounding for Every Application

The UFO® family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge® XR Rails®. All system types that feature the UFO® family—Flush Mount®, Tilt Mount® and Ground Mount®—are fully listed to the UL 2703 standard.

UFO® hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.

Only for installation and use with IronRidge products in accord with written instructions. See IronRidge.com/UFO



Universal Fastening Object (UFO®)
The UFO® securely bonds solar modules to XR Rails®. It comes assembled and lubricated, and can fit a wide range of module heights.



Stopper Sleeve
The Stopper Sleeve snaps onto the UFO®, converting it into a bonded end clamp.



BOSS® Splice
Bonded Structural Splice connects rails with built-in bonding teeth. No tools or hardware needed.

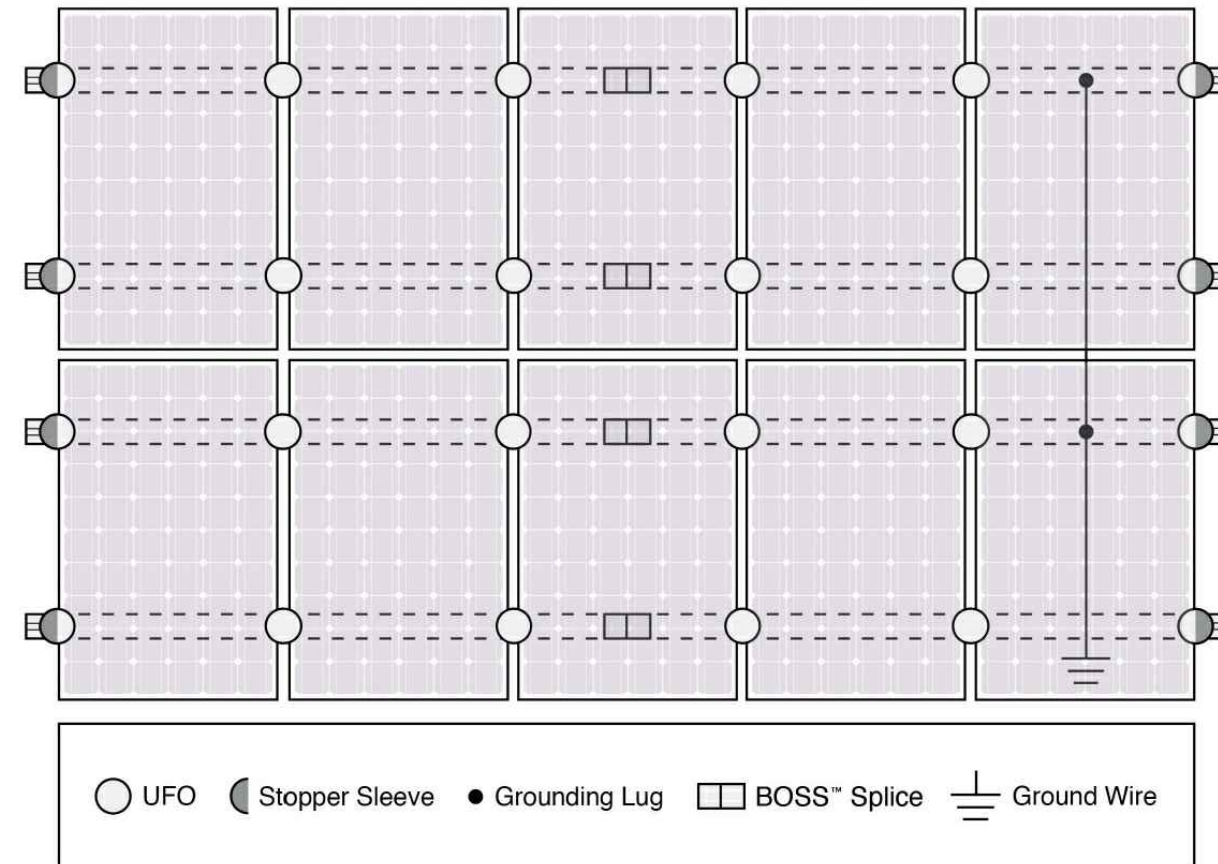


Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



Bonded Attachments
The bonding bolt attaches and bonds the L-foot® to the rail. It is installed with the same socket as the rest of the system.

System Diagram



⚠ Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge® Flush Mount®, Tilt Mount®, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

Go to IronRidge.com/UFO

Cross-System Compatibility

Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails®	✓	✓	XR100 & XR1000
UFO®/Stopper	✓	✓	✓
BOSS® Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Compatible with most MLPE manufacturers. Refer to system installation manual.		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules. Refer to installation manuals for a detailed list.		



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PROJECT NAME & ADDRESS

STEPHEN POUNDERS
101 LOCKWOOD DR,
CAMERON, NC 28326

DC SIZE:8.800kW

AC SIZE:15.200kW

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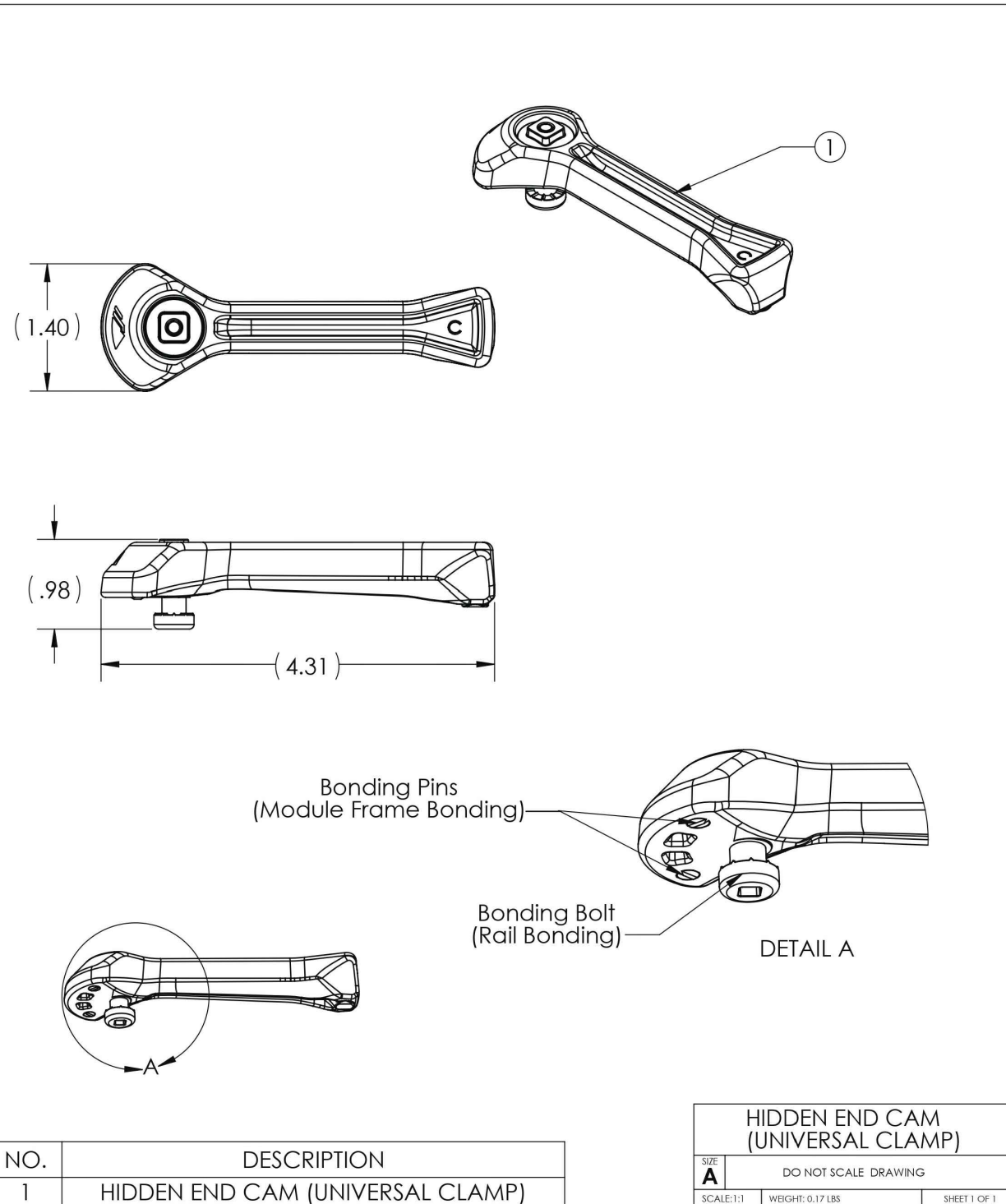
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EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

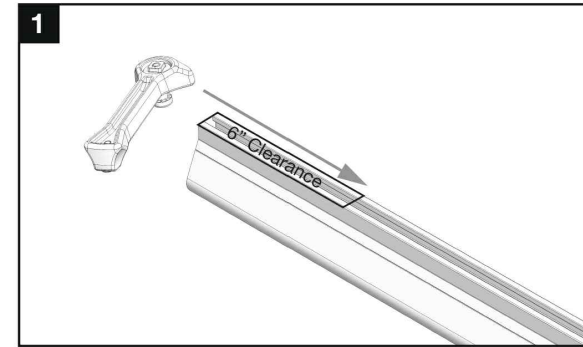
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PV-11

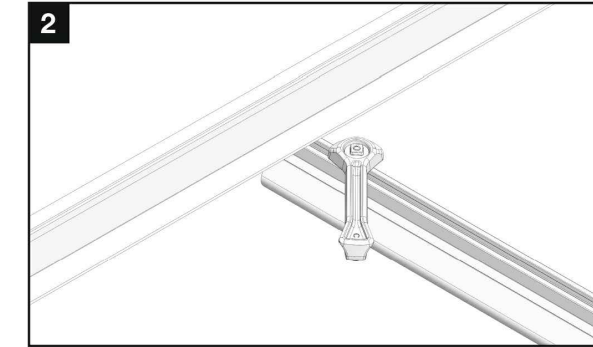


Installation

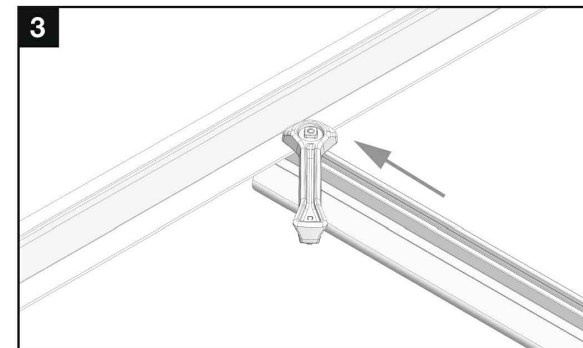
Compatibility: Fits modules with bottom flanges noted below. See IronRidge Flush, Tilt, Ground, or Ground Mount On The Roof Manual for full ratings and list of compatible modules.



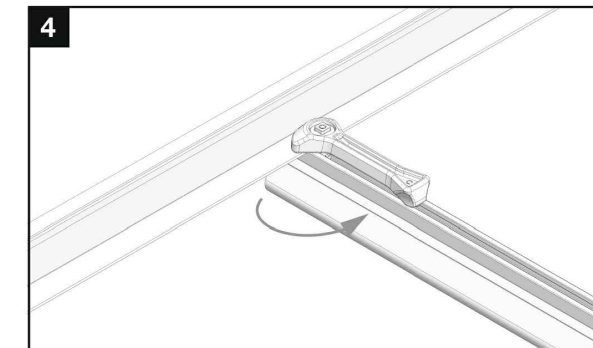
Slide CAMO into rail channel far enough to clear the module frame. CAMO requires 6" of clearance from end of rail.



Place module on rails (module cells not shown for clarity).

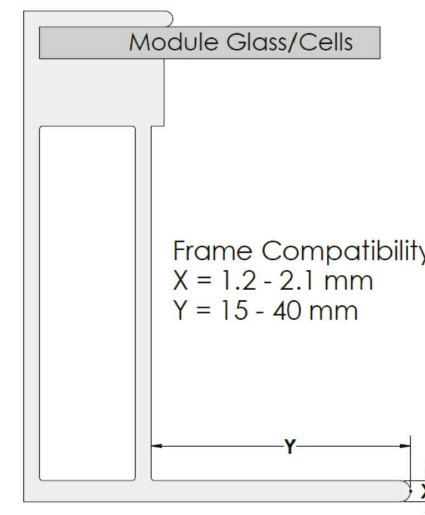


Pull CAMO towards rail ends, at 45 deg angle, so the bonding bolt contacts the module flange edge.



Rotate handle with an upwards motion until CAMO snaps into rail channel. Ensure Camo bonding pins are fully seated on top of module frame.

Module Compatibility and Certifications



UL 2703

Conforms to STD UL 2703 (2015) requirements. See IronRidge Flush, Tilt, Ground, or Ground Mount On The Roof Manual for full ratings and list of compatible modules.

Allowable Design Load Rating

50 PSF downward, 50 PSF upward, 15 PSF lateral. Actual system structural capacity is defined by PE stamped [certification letters](#).



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STEPHEN POUNDERS
101 LOCKWOOD DR,
CAMERON, NC 28326

DC SIZE: 8.800kW

AC SIZE: 15.200kW

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ESR

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EQUIPMENT
SPECIFICATION

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ANSI B
11" X 17"

SHEET NUMBER

PV-12

ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

PART NUMBER	DESCRIPTION
QM-HUG-01-M1	Halo UltraGrip - Mill
QM-HUG-01-B1	Halo UltraGrip - Black

1. Halo UltraGrip

Property	Value
Material	3000 Series Aluminium
Finish	Mill or Black



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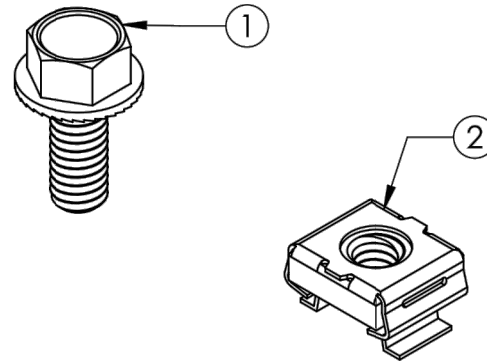
ANSI B
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SHEET NUMBER

PV-13



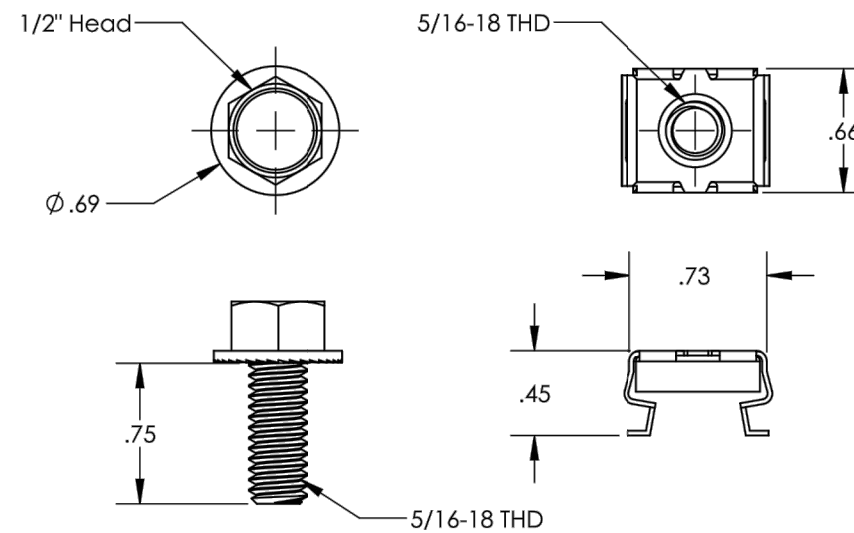
BX MLPE Hardware



ITEM NO.	DESCRIPTION	QTY.
1	FLANGE HEAD CAP SCREW 5/16-18	20
2	CAGENUT, 5/16	20

Part Number	Description
BX-CMA-MI-M1	BX MLPE MOUNTING ASSEMBLY

- 1) Flange Head Cap Screw 5/16-18 2) Cagenut, 5/16-18



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.0



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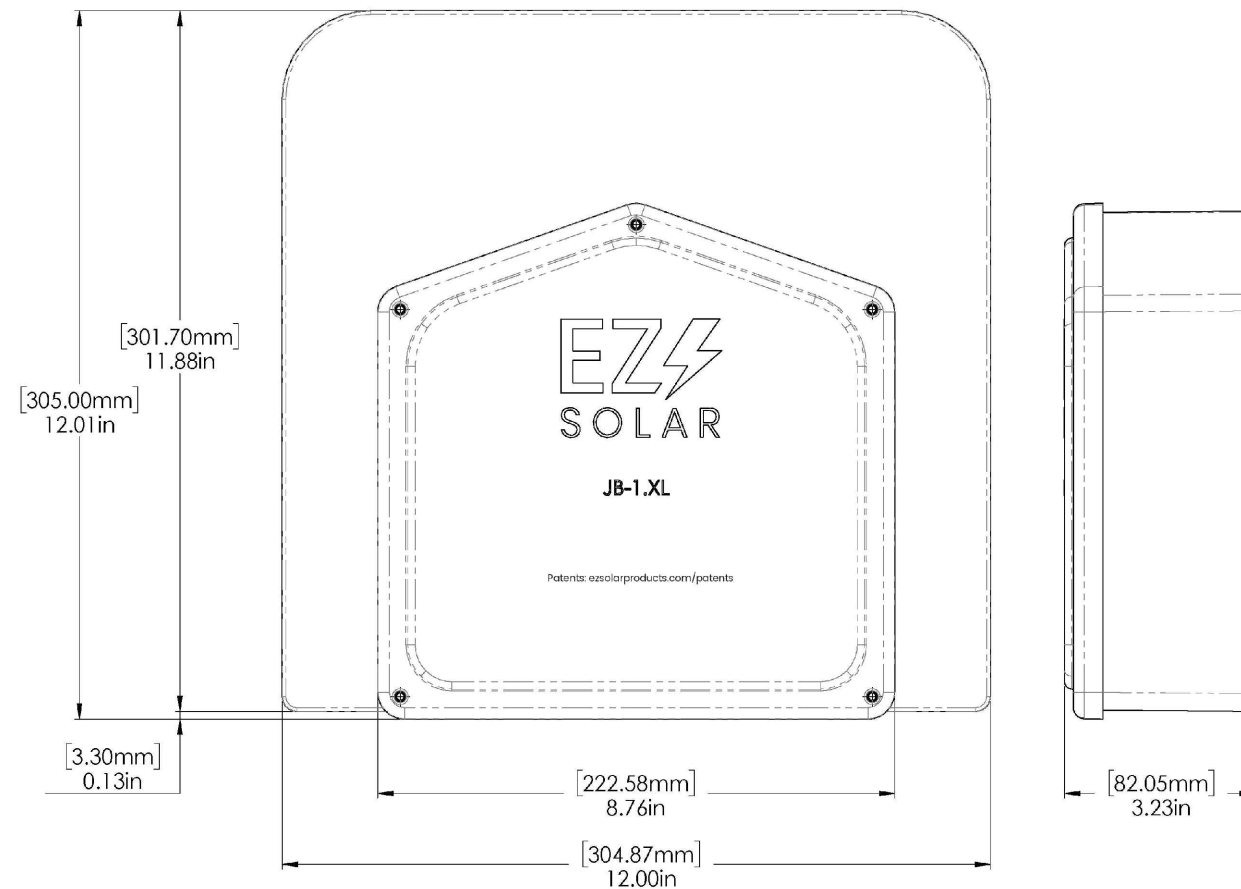
SHEET NAME
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SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	JB-1.XL BODY	POLYCARBONATE WITH UV INHIBITORS	1
2	JB-1.XL LID	POLYCARBONATE WITH UV INHIBITORS	1
3	#10 X 1-1/4" PHILLIPS PAN HEAD SCREW		4
4	#8 X 3/4" PHILLIPS PAN HEAD SCREW		6

SIZE	DWG. NO.	REV
B	JB-1.XL	
SCALE: 1:2	WEIGHT: 1.9 LBS	SHEET 1 OF 3
TORQUE SPECIFICATION:	15-20 LBS	
CERTIFICATION:	UL 1741, NEMA 3R CSA C22.2 NO. 290	
WEIGHT:	1.9 LBS	



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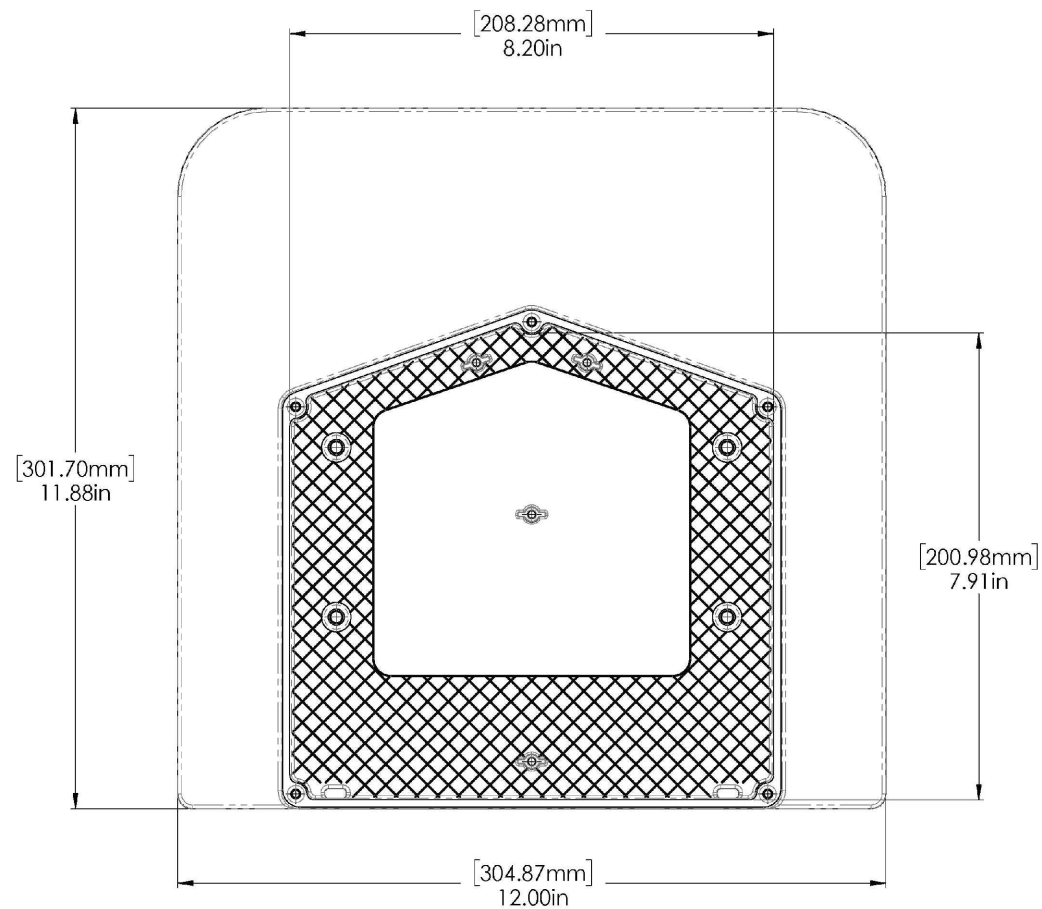
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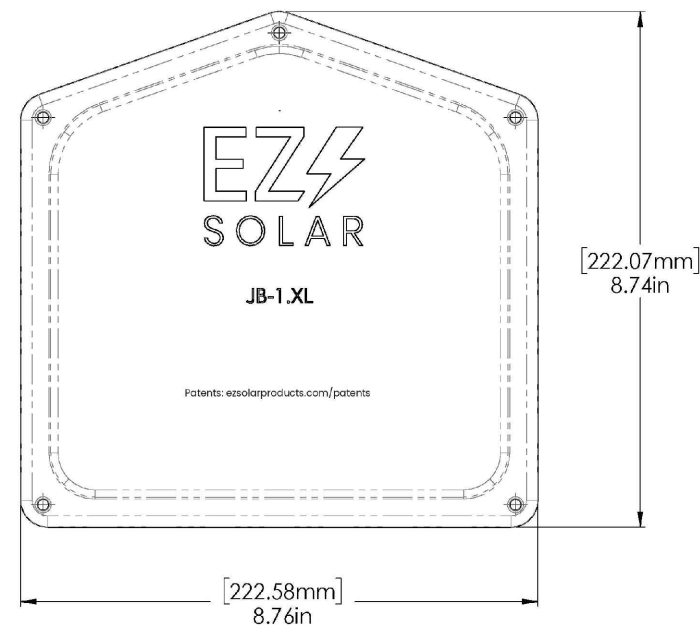
PV-15

SIZE B	DWG. NO. JB-1.XL	REV
SCALE: 1:2	WEIGHT: 1.9 LBS	SHEET 2 OF 3

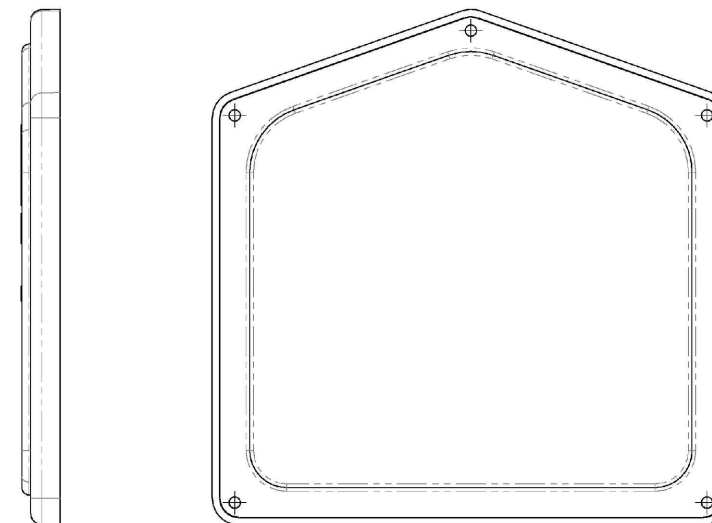
SIZE B	DWG. NO. JB-1.XL	REV
SCALE: 1:2	WEIGHT: 1.9 LBS	SHEET 3 OF 3



OUTSIDE



INSIDE



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PV-16

