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997 MORRISON DR SUITE #200,
CHARLESTON, SC 29403, USA
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Call or Text: 1-843-258-5389
InstallHotline@Palmetto.com

David C. Hernandez
Digitally signed by David C. Hernandez
Date: 2023.03.29 08:32:29 -04:00

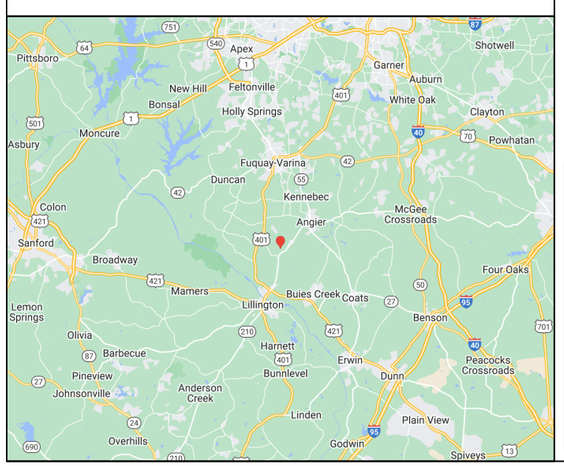
03/29/23

Exp. 12/31/23

NORTH CAROLINA PROFESSIONAL SEAL 044877 ENGINEER DAVID C. HERNANDEZ

GBE Green Building Engineer No. 832

David C. Hernandez
NC PE No. 044877



RESIDENTIAL SOLAR PHOTOVOLTAIC SYSTEM
188 CHEDWORTH DR
ANGIER, NC 27501

7.290 kW DC-STC / 6.000 kW AC
28/MAR/23

SYSTEM SPECIFICATIONS

SYSTEM SIZE: 7.290 kW
MODULE: VSUN 405-108BMH 405W
NUMBER OF PANELS: 18
INVERTER: SE6000H-US (240V)
OPTIMIZER: S440
RACKING SYSTEM: IRONRIDGE XR-10-168M

UTILITY: DUKE ENERGY PROGRESS (DEP) (NC)
GOVERNING CODE:
2018 NORTH CAROLINA BUILDING CODE
2018 NORTH CAROLINE FIRE CODE
2018 NORTH CAROLINA RESIDENTIAL CODE FOR ONE AND TWO-FAMILY DWELLINGS
NEC 2017

EXACTUS ENERGY
NEW AGE ENGINEERING

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SHEET INDEX

GENERAL NOTES:

THE INSTALLATION OF PV SYSTEM SHALL BE IN ACCORDANCE WITH THE MOST RECENT NATIONAL ELECTRICAL AND BUILDING CODES AND STANDARDS, AS AMENDED BY JURISDICTION

- PV SYSTEMS SHALL BE PERMITTED TO SUPPLY A BUILDING OR OTHER STRUCTURE IN ADDITION TO ANY OTHER ELECTRICAL SUPPLY SYSTEM(S) [NEC 690.4(A)]
- THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
- EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATIONS INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM
- INVERTERS, MOTOR GENERATORS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AC PHOTOVOLTAIC MODULES, SOURCE-CIRCUIT COMBINERS, AND CHARGE CONTROLLERS INTENDED FOR USE IN PV SYSTEMS SHALL BE LISTED OR FIELD LABELED FOR THE PV APPLICATION [NEC 690.4(B)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
- SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41
- FOR PV MODULES, EQUIPMENT GROUNDING CONDUCTORS SMALLER THAN 6AWG SHALL COMPLY WITH NEC 250.12(C) [NEC 690.46]
- ALL PV SYSTEM DC CIRCUIT AND INVERTER OUTPUT CONDUCTORS AND EQUIPMENT SHALL BE PROTECTED AGAINST OVERCURRENT UNLESS STATED OTHERWISE IN NEC 690.9(A)
- OVERCURRENT DEVICES USED IN PV SYSTEM DC CIRCUITS SHALL BE LISTED FOR USE IN PV SYSTEMS [NEC 690.9(B)]
- PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
- DISCONNECTING MEANS SHALL BE LOCATED IN A VISIBLE, READILY ACCESSIBLE LOCATION OR A MAXIMUM OF 10 FEET AWAY FROM THE SYSTEM [NEC 690.13(A)]
- ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
- CONNECTORS SHALL REQUIRE A TOOL TO OPEN AND BE MARKED "DO NOT DISCONNECT UNDER LOAD" OR "NOT FOR CURRENT INTERRUPTING". [NEC 690.33(E)]
- ALL GROUNDED CONDUCTORS SHALL BE PROPERLY COLOR IDENTIFIED AS WHITE. [NEC 200.6]
- PV SYSTEM CONNECTED ON THE LOAD SIDE OF THE SERVICE DISCONNECTING MEANS OF THE OTHER SOURCE(S) AT ANY DISTRIBUTION EQUIPMENT ON THE PREMISES SHALL MEET THE FOLLOWING [NEC 705.12(B)]:

1. EACH SOURCE CONNECTION SHALL BE MADE AT A DEDICATED CIRCUIT BREAKER OF FUSIBLE DISCONNECTING MEANS. [NEC 705.12(B)(1)]
2. 125 PERCENT OF THE POWER SOURCE OUTPUT CIRCUIT CURRENT SHALL BE USED IN AMPACITY CALCULATIONS. [NEC 705.12(B)(2)]
3. EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUS BAR OR CONDUCTOR SHALL BE MARKED TO INDICATE THE PRESENCE OF ALL SOURCES. [NEC 705.12(B)(3)]
4. CIRCUIT BREAKER, IF BACK FED, SHALL BE SUITABLE FOR SUCH OPERATION [NEC 705.12(B)(4)]

- WHEN A BACKFED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, THE BREAKER SHALL BE INSTALLED AT THE OPPOSITE END OF THE BUS BAR OF THE MAIN BREAKER.
- TO REDUCE FIRE HAZARDS, DC PV SYSTEMS WILL BE EQUIPPED WITH A GROUND FAULT PROTECTION SYSTEM IN ACCORDANCE WITH NEC 690.41(B)
- WHERE GROUND-FAULT PROTECTION IS USED, THE OUTPUT OF AN INTERACTIVE SYSTEM SHALL BE CONNECTED TO THE SUPPLY SIDE OF THE GROUND FAULT PROTECTION [NEC 705.32]
- ALL PLAQUES AND SIGNAGE REQUIRED BY THE LATEST EDITION OF NATIONAL ELECTRICAL CODE. LABEL SHALL BE METALLIC OR PLASTIC, ENGRAVED OR MACHINE PRINTED IN A CONTRASTING COLOR TO THE PLAQUE. PLAQUE SHALL BE UV RESISTANT IF EXPOSED TO SUNLIGHT
- ALL THE NEC REQUIRED WARNING SIGNS, MARKINGS, AND LABELS SHALL BE POSTED ON EQUIPMENT AND DISCONNECTS PRIOR TO ANY INSPECTIONS TO BE PERFORMED BY THE BUILDING DEPARTMENT.
- CONNECTORS SHALL BE OF LATCHING OR LOCKING TYPE. CONNECTORS THAT ARE READILY ACCESSIBLE AND OPERATING AT OVER 30 VOLTS SHALL REQUIRE TOOL TO OPEN AND MARKED "DO NOT DISCONNECT UNDER LOAD" OR "NOT FOR CURRENT INTERRUPTING". [NEC 690.33(C) & (E)(2)]
- FLEXIBLE, FINE-STRANDED CABLES SHALL BE TERMINATED ONLY WITH TERMINALS, LUGS, DEVICES, OR CONNECTORS IN ACCORDANCE WITH NEC 110.14
- WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3)
- ALL EXTERIOR CONDUITS, FITTINGS AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS PER NEC 314.15.
- ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
- EACH MODULE TO BE GROUNDED USING THE SUPPLIED CONNECTION POINT PER MANUFACTURER'S REQUIREMENTS. ALL SOLAR MODULES, EQUIPMENT, AND METALLIC COMPONENTS ARE TO BE BONDED. IF THE EXISTING GROUNDING ELECTRODE SYSTEM CAN NOT BE VERIFIED OR IS ONLY METALLIC WATER PIPING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
- DC CONDUCTORS SHALL BE RUN IN EMT AND SHALL BE LABELED "CAUTION DC CIRCUIT" OR EQUIV. EVERY 5 FT
- CONFIRM LINE SIDE VOLTAGE AT ELECTRIC UTILITY SERVICE PRIOR TO CONNECTING INVERTER. VERIFY SERVICE VOLTAGE IS WITHIN INVERTER VOLTAGE OPERATIONAL RANGE.
- SERVING UTILITY TO BE NOTIFIED BEFORE ACTIVATION OF PV SYSTEM.
- ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
- THE HOMEOWNER IS RESPONSIBLE FOR ENSURING ALL EQUIPMENT OUTSIDE THE SCOPE OF WORK IS NEC COMPLIANT.

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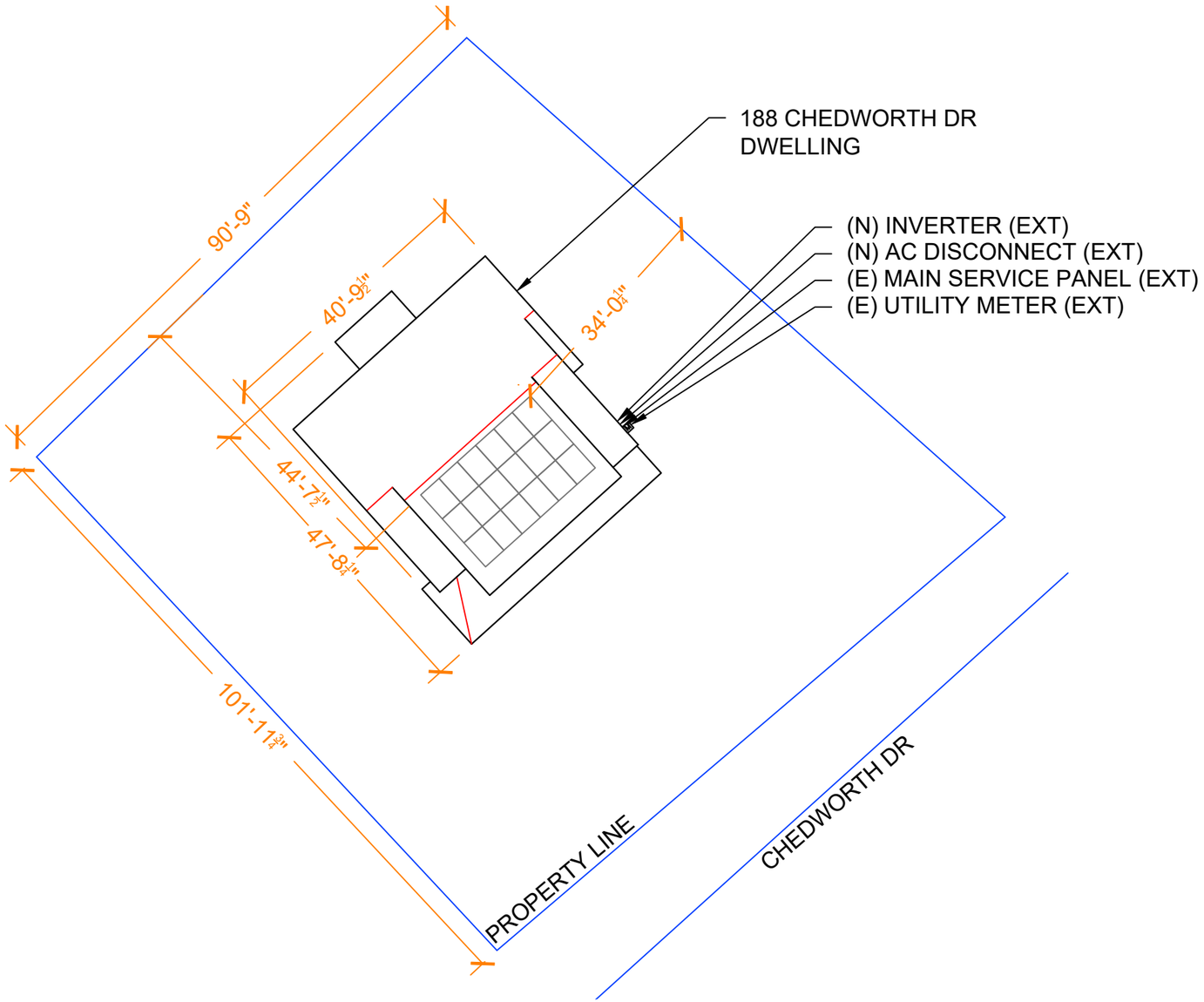

SCALE: 1"=20'

NOTES:

- SCALE AS SHOWN
- ALL DIMENSIONS IN FEET UNLESS OTHERWISE STATED

SAFETY PLAN:

- INSTALLERS SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME
- INSTALLERS SHALL UPDATE NAME, ADDRESS, AND PHONE NUMBER OF NEAREST URGENT CARE FACILITY RELATIVE TO THE SITE BEFORE STARTING WORK

NEAREST URGENT CARE FACILITY

NAME:

ADDRESS:

PHONE NUMBER:

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PROJECT: 188 CHEDWORTH DR
MUNICIPALITY: ANGIER, NC
ZIP CODE: 27501
CLIENT: MECHELLE CHAMPION
7.290 KW DC-STC / 6.000 KW AC

AUTHOR: ----
DATE: 28/MAR/23
REV: -

G1 - SITE PLAN

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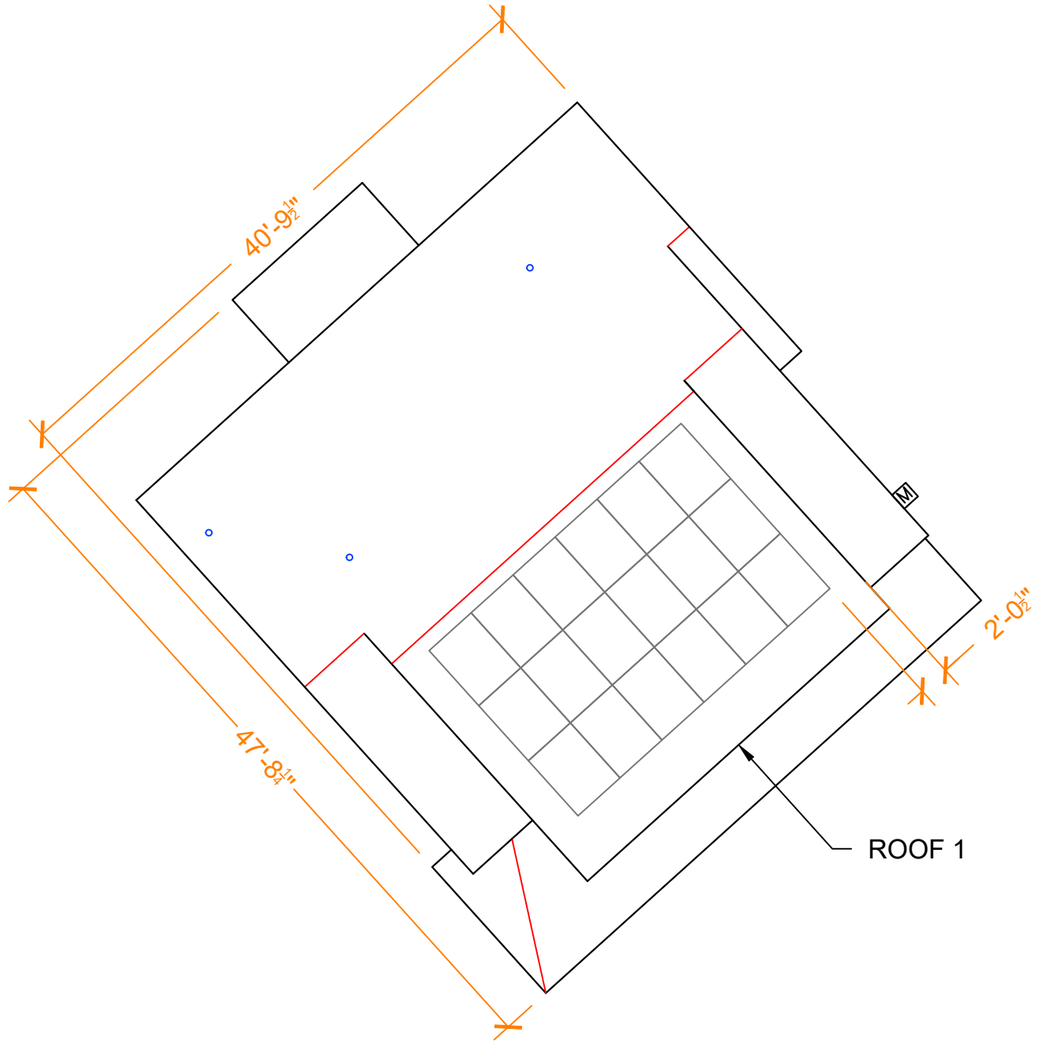
SITE INFORMATION

ARRAY	AZIMUTH	PITCH	NO. OF PANELS	ARRAY AREA (SQ. FT.)	ROOF TYPE	ATTACHMENT	FRAME SIZE & FRAME TYPE	FRAME SPACING	MAX ATTACHMENT SPAN	OVERHANG
ROOF 1	138°	30°	18	378.41	COMPOSITE SHINGLE	QUICK MOUNT L-MOUNT	2" X 4" PRE FABRICATED TRUSSES	2'-0"	4'-0"	1'-4"

LEGEND

- METER
- PVC VENT
- METAL VENT
- VENT BOX
- STRUCTURAL DELIMITER
- SERVICE MAST
- SATELLITE
- ANTENNA
- SNOW GUARD
- DOWNSPOUT
- MOUNT
- RAIL
- TOP CHORD
- CHIMNEY

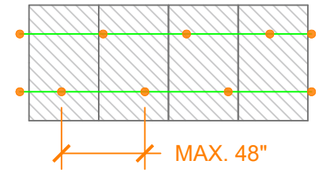


SCALE: 1"=10'

PANELS DATA

PANEL TYPE	VSUN 405-108BMH 405 W
NO. OF PANELS	18
PANEL SIZE	67.80" X 44.65"
PANEL WEIGHT (LBS)	47.18
PANEL AREA (FT^2)	21.02
UNIT WEIGHT OF AREA (LBS/FT^2)	2.24

MOUNTING PATTERN SAMPLE



MAXIMUM MOUNT SPACING: 48"
MOUNT PATTERN: STAGGERED

ALL HARDWARE, INCLUDING MOUNTING AND RACKING, TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS.

TOTAL ROOF AREA: 1933.84 FT²
TOTAL ARRAY AREA: 378.41 FT²
TOTAL ARRAY PERCENT COVERAGE: 19.57%

MODULE WATTAGE: 405 W
NUMBER OF PANELS: 18
SYSTEM SIZE: 7.290 kW

NOTES:
- SOLAR PANEL LAYOUT SUBJECT TO CHANGE ACCORDING TO EXISTING CONDITIONS
- SCALE AS SHOWN
- ALL DIMENSIONS IN FEET UNLESS OTHERWISE STATED

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ZIP CODE: 27501
CLIENT: MECHELLE CHAMPION
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AUTHOR: ----
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REV: -

G2 - PANEL LAYOUT

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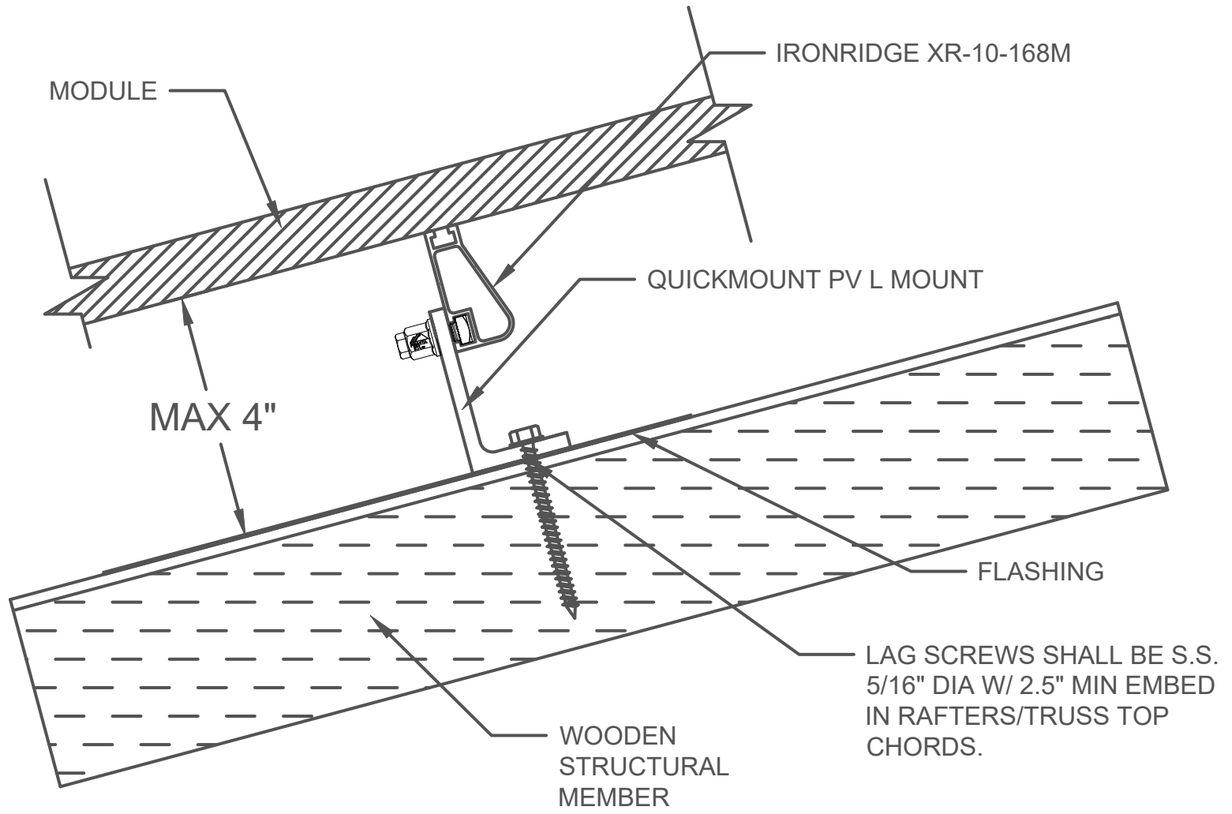

SCALE: NTS

PANEL TYPE: VSUN 405-108BMH 405W
PANEL SIZE: 67.80" X 44.65"
RACKING TYPE: IRONRIDGE XR-10-168M
MOUNT TYPE: QUICK MOUNT L-MOUNT
SOLAR SYSTEM DEAD LOAD: 3.0 PSF

NOTES:
- SCALE AS SHOWN
- ALL DIMENSIONS IN FEET UNLESS OTHERWISE STATED

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G3 - MOUNTING DETAIL

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UTILITY METER NUMBER: 332 252 189

NABCEP PV PROFESSIONAL LICENSE: PV-102415-012615

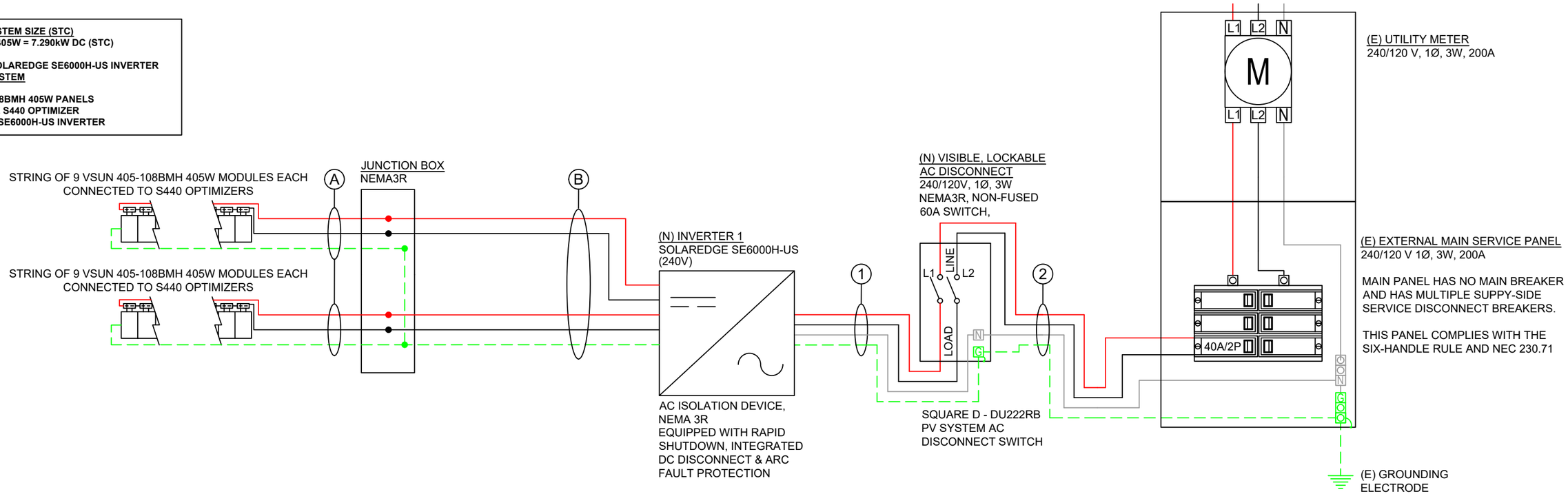
ELECTRICAL CONTRACTOR LICENSE: U.32289

NOTE:

7.2900kW DC SYSTEM SIZE (STC)
MODULES: 18 X 405W = 7.290kW DC (STC)

INVERTER: 1X SOLAREDGE SE6000H-US INVERTER
= 6.000kW AC SYSTEM

(18) VSUN 405-108BMH 405W PANELS
(18) SOLAREDGE S440 OPTIMIZER
(1) SOLAREDGE SE6000H-US INVERTER



AC CONDUCTOR SCHEDULE

ID	From	To	Phase	AC Voltage	Circuit Current	80% or 100% Rated OCPD?	Circuit Current x 125%	OCPD (If Present)	Material	Conductor Type	# of CCCs	Fill Factor	Ambient Temp.	Temp. Factor	Conductor Size	Ampacity @ 75°C	Max Ampacity	Derated Ampacity	# of Neutrals	Neutral Size	Ground	Ground Material	Ground Type	Ground Size	Conduit Type	Conduit Size
1	SolarEdge Inverter 1	AC Disconnect	1Φ	240 (V)	25.0 (A)	80%	31.3 (A)	40 (A)	CU	THWN-2	2	1.00	32.9 (°C)	0.96	8 AWG	50 (A)	55 (A)	52.8 (A)	1	8 AWG	EGC	CU	THWN-2	10 AWG	EMT	0.75 (in.)
2	AC Disconnect	POI	1Φ	240 (V)	25.0 (A)	80%	31.3 (A)	40 (A)	CU	THWN-2	2	1.00	32.9 (°C)	0.96	8 AWG	50 (A)	55 (A)	52.8 (A)	1	8 AWG	EGC	CU	THWN-2	10 AWG	EMT	0.75 (in.)

SOLAREDGE DC CONDUCTOR SCHEDULE

(A) FREE AIR

*TEMPERATURE FACTOR IS BASED ON 2% DRY BULB HIGH TEMPERATURE OF 32.9°C WITH A 0°C TEMPERATURE ADDER THEREFORE RACEWAYS MUST BE AT LEAST 0.875 INCHES ABOVE ROOF AS PER NEC 310.15(B)(3)(C)

Number of Strings	Conductor Material	Conductor Type	Conductor Size	Base Ampacity @ 90°C	*Temperature Factor	Fill Factor	Derated Ampacity	Circuit Current	Min. OCPD (If Required)	EGC Material	EGC Type	EGC Size	Conduit
No Limit	CU	PV Wire	10 AWG	40A	0.96	1.00	38.40A	15.00A	20A	CU	BARE	6 AWG	N/A - Free Air

(B) IN CONDUIT

*TEMPERATURE FACTOR IS BASED ON 2% DRY BULB HIGH TEMPERATURE OF 32.9°C WITH A 0°C TEMPERATURE ADDER THEREFORE RACEWAYS MUST BE AT LEAST 0.875 INCHES ABOVE ROOF AS PER NEC 310.15(B)(3)(C)
**CALCULATIONS ARE BASED ON THE LARGEST CIRCUIT CURRENT (WORST CASE SCENARIO).
***TABLE ASSUMES ONE EGC PER CONDUIT. MINIMUM ONE EGC IS REQUIRED PER INVERTER PER CONDUIT.

Number of Strings	Conductor Material	Conductor Type	Conductor Size	Base Ampacity @ 90°C	*Temperature Factor	Fill Factor	Derated Ampacity	**Circuit Current	Min. OCPD (If Required)	EGC Material	EGC Type	EGC Size	Min. EMT Size
1	CU	THWN-2	10 AWG	40A	0.96	1.00	38.40A	15.00A	20A	CU	THWN-2	10 AWG	0.50 in.
2	CU	THWN-2	10 AWG	40A	0.96	0.80	30.72A	15.00A	20A	CU	THWN-2	10 AWG	0.50 in.

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E1 - LINE DIAGRAM

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WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE
ENERGIZED IN THE OPEN POSITION

CODE REF: [NEC 690.13(B)]
LOCATION: PLACE ON **ALL** DISCONNECTING MEANS WHERE ENERGIZED IN AN OPEN POSITION

WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

CODE REF: [NEC 110.27(C) & OSHA 1910.14(f)7)]
LOCATION: PLACE ON **ALL** COMBINER BOX/ENCLOSURES, MAIN SERVICE DISCONNECT, BREAKER PANEL & PULL BOXES

WARNING

THIS EQUIPMENT FED BY MULTIPLE SOURCES

TOTAL RATING OF ALL OVERCURRENT DEVICES EXCLUDING MAIN POWER SUPPLY SHALL NOT EXCEED AMPACITY OF BUSBAR

CODE REF: [NEC 705.12(B)(2)(3)(c)]
LOCATION: PLACE THIS LABEL AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT
(I.E. MAIN PANEL OR SUB-PANEL) IF APPLICABLE

WARNING

THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT

CODE REF: [NEC 690.31(I)]
LOCATION: PLACE ON **ALL** DISCONNECTING MEANS WHERE ENERGIZED IN AN OPEN POSITION

WARNING

DUAL POWER SOURCE

SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

CODE REF: [NEC 705.12(B)(3) & 690.59]
LOCATION: PLACE LABEL ON ALL EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER
TO A BUSBAR OR CONDUCTORS SUPPLIED FROM MULTIPLE SOURCES

WARNING

POWER SOURCE OUTPUT CONNECTION

DO NOT RELOCATE THIS OVERCURRENT DEVICE

CODE REF: [NEC 705.12(B)(2)(3)(b)]
LOCATION: PLACE LABEL ON ALL EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER
TO A BUSBAR OR CONDUCTORS SUPPLIED FROM MULTIPLE SOURCES

CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

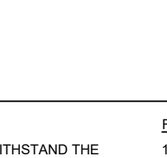
CODE REF: [NEC 705.12(B)(4) & 690.59]
LOCATION: PLACE LABEL ON ALL EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER
TO A BUSBAR OR CONDUCTORS SUPPLIED FROM MULTIPLE SOURCES

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

CODE REF: [NEC 690.56(C)(3)]
LOCATION: PLACE NO MORE THAN 1m (3FT) FROM SWITCH

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.



CODE REF: [NEC 690.56(C)]
LOCATION: PLACE AT MAIN SERVICE PANEL

WARNING: PHOTOVOLTAIC POWER SOURCE

CODE REF: [NEC 690.31 (G)(3) & 690.31 (G)(4)]
LOCATION: PLACE ON ALL JUNCTION BOXES. EXPOSED RACEWAYS EVERY 10'

MAXIMUM VOLTAGE	480 V
MAXIMUM CIRCUIT CURRENT	30 A
MAX RATED OUTPUT CURRENT OF DC-TO-DC CONVERTER (IF INSTALLED)	15 A

CODE REF: [NEC 690.53]
LOCATION: PLACE AT INVERTER 1

DO NOT DISCONNECT UNDER LOAD

CODE REF: [NEC 690.15(C) & 690.33(E)(2)]
LOCATION: PLACE ON **ALL** DISCONNECTING MEANS WHERE ENERGIZED IN AN OPEN POSITION

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT	25A
NOMINAL OPERATING AC VOLTAGE	240V

CODE REF: [NEC 690.54]
LOCATION: PLACE AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT / AC DISCONNECT / PULL BOXES

PHOTOVOLTAIC AC DISCONNECT

CODE REF: [NEC 690.13(B)]
LOCATION: PLACE AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT / AC DISCONNECT / PULL BOXES

PHOTOVOLTAIC DC DISCONNECT

CODE REF: [NEC 690.13(B)]
LOCATION: PLACE ON DC DISCONNECT

NOTES:

1) ALL LABELING USED OUTDOORS MUST BE ENGRAVED METAL, UV STABILIZED ENGRAVED PLASTIC OR OF A MATERIAL SUFFICIENTLY DURABLE TO WITHSTAND THE ENVIRONMENT INVOLVED. VALUES HAND WRITTEN OR IN WRITTEN IN MARKER ARE NOT ACCEPTABLE PER NEC 2017.
2) LABELS USED INDOORS MAY BE MADE OF DURABLE VINYL OR PAPER
3) DO NOT COVER ANY EXISTING MANUFACTURER APPLIED LABELS WITH INSTALLATION SPECIFIC LABELS
4) LABEL COLORS CHOSEN PER NFPA 70 2017 DIRECTION THAT ANSI Z535-2011 BE USED
5) REQUIREMENTS COMPLY WITH NEC 2017
6) ADDITIONALLY, IT IS HIGHLY RECOMMENDED THAT THE INSTALLER ATTACH A LABEL WITH THE COMPANY NAME AND CONTACT INFORMATION AT THE INVERTER
7) ALL WARNING SIGNS OR LABELS SHALL COMPLY WITH NEC 110.21(B)

FORMAT

1. WHITE LETTERING ON A RED BACKGROUND
2. MINIMUM 3/8 INCHES LETTER HEIGHT
3. ALL LETTERS SHALL BE CAPITALIZED
4. ARIAL OR SIMILAR FONT (NON-BOLD)

MATERIAL

REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (USE UL-969 AS STANDARD FOR WEATHER RATING). DURABLE ADHESIVE MATERIALS

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E2 - WARNING LABELS

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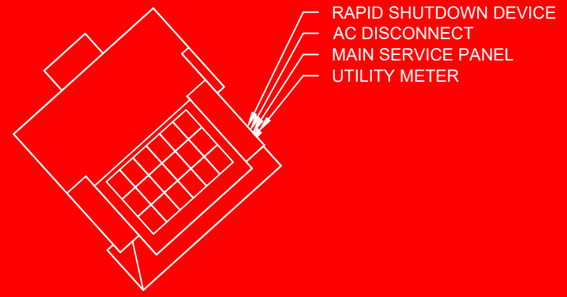
CAUTION:

MULTIPLE SOURCES OF POWER

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



[NEC 705.10 & NEC 706.11] CUSTOMER SERVICE PANEL, PV/AC DISCONNECT AND
RAPID SHUTDOWN DEVICE

03/29/23

Exp. 12/31/23

NORTH CAROLINA PROFESSIONAL SEAL 044877 ENGINEER DAVID C. HERNANDEZ

GBE Green Building Engineer No. 832

David C. Hernandez
NC PE No. 044877

PALMETTO
PHONE: +1 843-720-1844
WWW.PALMETTO.COM

PROJECT: 188 CHEDWORTH DR
MUNICIPALITY: ANGIER, NC
ZIP CODE: 27501
CLIENT: MECHELLE CHAMPION
7.290 KW DC-STC / 6.000 KW AC

AUTHOR: ----
DATE: 28/MAR/23
REV: -

E3 - PLACARD

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InstallHotline@Palmetto.com

VSUN
Innovative & Smart

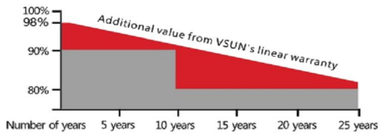
VSUN405-108BMH

405W
Highest power output

20.74%
Module efficiency

25years
Material & Workmanship warranty

30years
Linear power output warranty



Munich RE

VSUN405-108BMH VSUN400-108BMH
VSUN395-108BMH VSUN390-108BMH

- MBB technology with Circular Ribbon
- Higher output power
- Half-cell Technology
- Positive tolerance offer
- Micro Gap
- Up to 30% extra power generation yield from the back side
- Certified for salt/ammonia corrosion resistance
- Load certificates: wind to 2400Pa and snow to 5400Pa
- Lower LCOE

VSUN, a BNEF Tier-1 PV module manufacturer invested by Fuji Solar, has been committed to providing greener, cleaner and more intelligent renewable energy solutions. VSUN is dedicated to bringing reliable, customized and high-efficient products into various markets and customers worldwide

Engineered in Japan
www.vsun-solar.com

最も信頼出来る再エネパートナー

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 - Impp (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)	Impp (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%

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

Maximum Ratings

Maximum System Voltage [V]	1500
Series Fuse Rating [A]	30
Bifaciality	70%±10%

Material Characteristics

Dimensions	1722×1134×30mm (L×W×H
Weight	21.4kg
Frame	Black anodized aluminum profile
Front Glass	White toughened safety glass, 3.2 mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate) or POE
Back Sheet	Transparent black-mesh backsheet
Cells	12×9 pieces monocrystalline solar cells series strings
Junction Box	IP68, 3 diodes
Cable&Connector	Potrait: 500 mm (cable length can be customized, 1×4 mm2, compatible with MC4

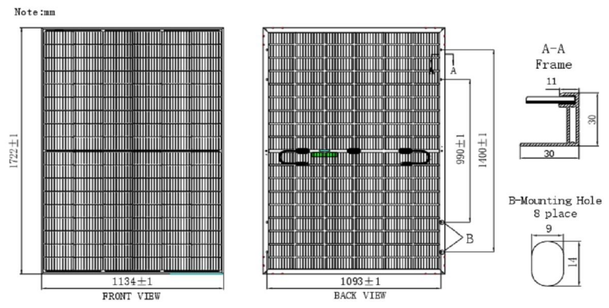
Packaging

Dimensions(L×W×H)	1760×1125×1253mm
Container 20'	216
Container 40'	468
Container 40'HC	936

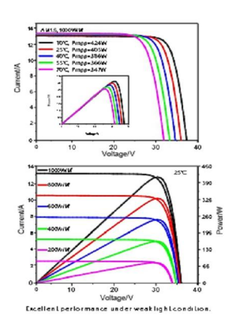
System Design

Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s
Maximum Surface Load	5,400 Pa
Application class	class A

Dimensions



IV-Curves



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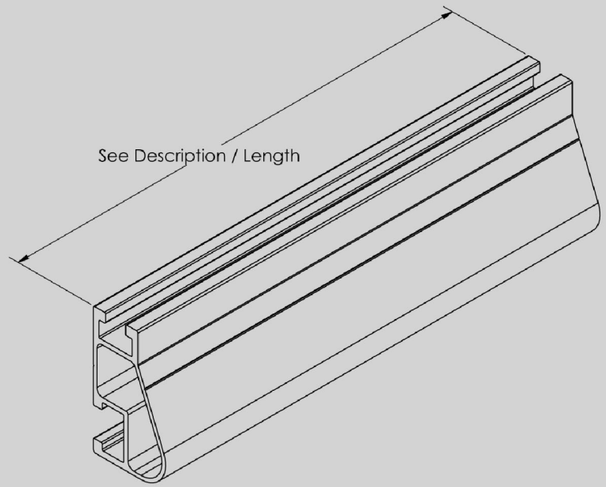
Cut Sheet

IRONRIDGE

XR10 Rail



Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.363 in^2
Section Modulus (X-axis)	0.136 in^3
Moment of Inertia (X-axis)	0.124 in^4
Moment of Inertia (Y-axis)	0.032 in^4
Torsional Constant	0.076 in^3
Polar Moment of Inertia	0.033 in^4

Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-10-132A	XR-10-132B	XR10, Rail 132" (11 Feet)	6000-Series Aluminum	4.67 lbs.
XR-10-168A	XR-10-168B	XR10, Rail 168" (14 Feet)		5.95 lbs.
XR-10-204A	XR-10-204B	XR10, Rail 204" (17 Feet)		7.22 lbs.

v1.0

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

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A2 - RACKING SPECIFICATIONS

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Tech Brief

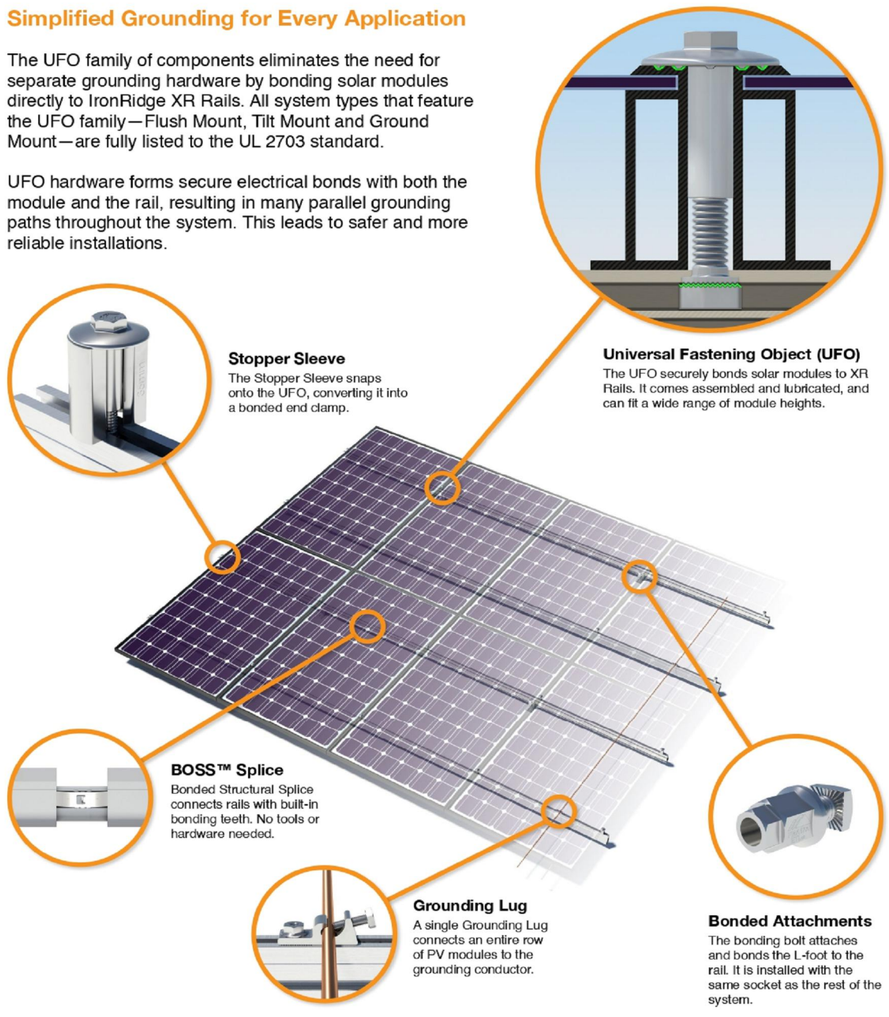
IRONRIDGE

UFO Family of Components

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.



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

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.

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

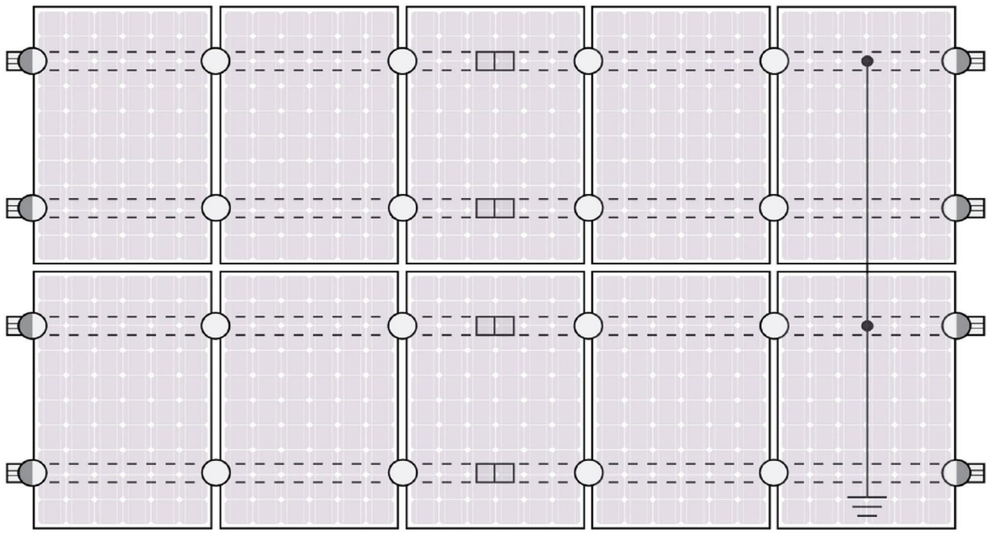
Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.

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.

VSUN	VSUN modules with 30, 35 and 40 mm frames VSUNxxx-YYz-aa Where "YY" can be 60, 72, 108, 120, or 144; "z" can be M, P, MH, PH, or BMH; and "aa" can be blank, BB, BW, or DG

Tech Brief

System Diagram



UFO · Stopper Sleeve · Grounding Lug · BOSS™ Splice · Ground Wire

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	✔	✔	XR1000 Only
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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A3 - BONDING AND GROUNDING SPECIFICATIONS

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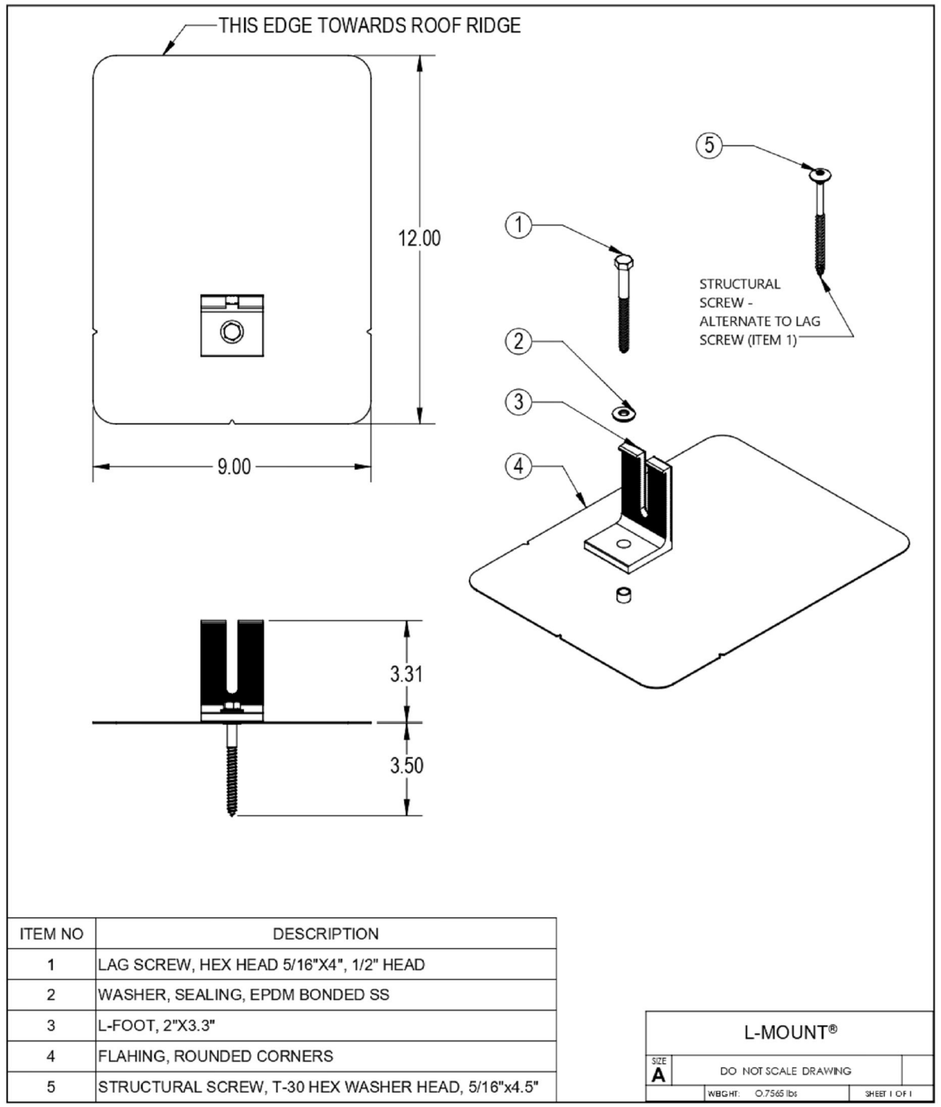
QuickMount®

L-Mount®



ITEM NO	DESCRIPTION
1	LAG SCREW, HEX HEAD 5/16"X4", 1/2" HEAD
2	WASHER, SEALING, EPDM BONDED SS
3	L-FOOT, 2"X3.3"
4	FLAHING, ROUNDED CORNERS
5	STRUCTURAL SCREW, T-30 HEX WASHER HEAD, 5/16"x4.5"

L-MOUNT®		
SIZE A	DO NOT SCALE DRAWING	
	WEIGHT: 0.7565 lbs	SHEET 1 OF 1

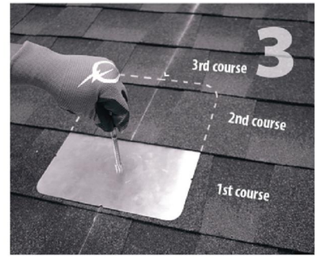
L-Mount® Installation Instructions

Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" or 1/8" bit, drill or impact gun with 1/2" socket.

WARNING: Quick Mount© products are NOT designed for and should NOT be used to anchor fall protection equipment.

Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.

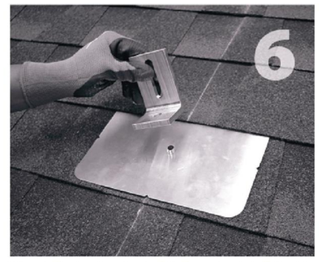
Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required and backfill holes with aproved sealant. See "Proper Flashing Placement" on next page.



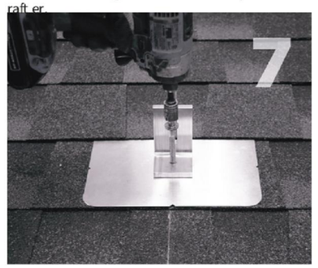
Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least ¾" higher than the butt-edge of the 3rd course and lower flashing edge is above the butt-edge of 1st course. Mark center for drilling.

If attaching with lag bolt use a 1/4" bit (Lag). Use a ⅛" bit (ST) for attaching with the structural screw. Drill pilot hole into roof and raft er, taking care to drill square to the roof. Do not use mount as a drill guide. Drill a 2" deep hole into raft er.

Clean off any sawdust, and fill hole with sealant compatible with roofing materials.



Place L-foot onto elevated flute and rotate L-foot to desired orientation.



Prepare lag bolt or structural screw with sealing washer. Using a ½-inch socket on an impact gun, drive prepared lag bolt through L-foot until L-foot can no longer easily rotate. **DO NOT over-torque.** NOTE: Structural screw can be driven with T-30 hex head bit.

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer. NOTE: Make sure top of L-Foot makes solid contact with racking.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Consult the roof manufacturer's specs and instructions prior to working on the roof.

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A4 - MOUNTING SPECIFICATIONS

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Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020 per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

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Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Metering, ANSI C12.20	Optional[3]							
Consumption metering								
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection							
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG				1" Maximum /14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG				1" Maximum / 1-3 strings / 14-6 AWG			
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.3 x 14.6 x 7.3 / 540 x 370 x 185			in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9		38.8 / 17.6			lb / kg
Noise	< 25				<50			dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

(3) Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BNI4 . For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box

(4) Full power up to at least 50°C / 122°F; for power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

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A5 - INVERTER SPECIFICATIONS

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Power Optimizer

For North America

S440, S500

POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

* Expected availability in 2022

solaredge.com

solaredge

Power Optimizer

For North America

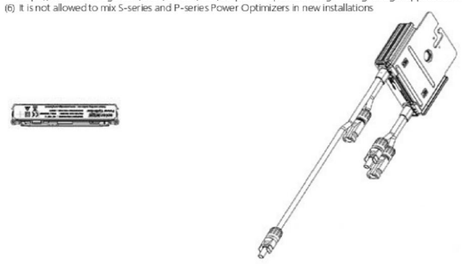
S440, S500

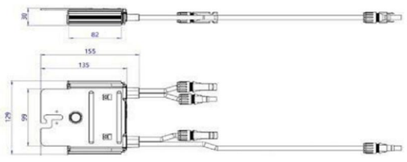
	S440	S500	Unit
INPUT			
Rated Input DC Power[1]	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING OPERATION			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1+/-0.1		Vdc
STANDARD COMPLIANCE			
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020		
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3		
Safety	IEC62109-1 (class II safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
Fire Safety	VDE-AR-E 2100-712:2013-05		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	1000		Vdc
Dimensions (W x L x H)	129 x 153 x 30 / 5.07 x 6.02 x 1.18		mm / in
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4[2]		
Input Wire Length	0.1 / 0.32		m / ft
Output Connector	MC4		
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32		m / ft
Operating Temperature Range[3]	-40 to +85		°C
Protection Rating	IP68 / NEMA6P		
Relative Humidity	0 - 100		%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter		Single Phase HD-Wave	Three Phase for 208V Grid	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	10	18	
Maximum String Length (Power Optimizers)		25		50[4]	
Maximum Nominal Power per String		5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connected Power per String[5] (Permitted only when the difference in connected power between strings is 1,000W or less)		Refer to Footnote 5	One string 7200 Two strings or more 7800	15000	W
Parallel Strings of Different Lengths or Orientations		Yes			

(4) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(5) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(6) It is not allowed to mix S-series and P-series Power Optimizers in new installations





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03/29/23

Exp. 12/31/23

NORTH CAROLINA PROFESSIONAL SEAL 044877 ENGINEER DAVID C. HERNANDEZ

GBE Green Building Engineer No. 832

David C. Hernandez
NC PE No. 044877

PALMETTO PHONE: +1 843-720-1844 WWW.PALMETTO.COM	PROJECT: 188 CHEDWORTH DR MUNICIPALITY: ANGIER, NC ZIP CODE: 27501 CLIENT: MECHELLE CHAMPION 7.290 KW DC-STC / 6.000 KW AC	AUTHOR: ---- DATE: 28/MAR/23 REV: -	A6 - OPTIMIZERS SPECIFICATIONS **Need on-site installation support?** Palmetto Installation Hotline Call or Text: 1-843-258-5389 InstallHotline@Palmetto.com	