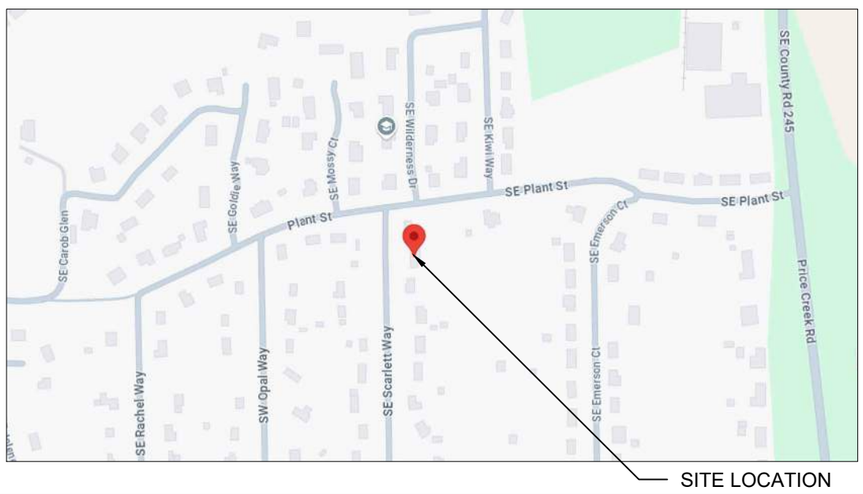
ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROPOSED INSTALLATION COMPLIES WITH THE FOLLOWING:
2023 8TH EDITION FLORIDA BUILDING CODE: BUILDING
2023 8TH EDITION FLORIDA BUILDING CODE: RESIDENTIAL
2023 8TH EDITION FLORIDA BUILDING CODE: MECHANICAL
2023 8TH EDITION FLORIDA BUILDING CODE: PLUMBING
2023 8TH EDITION FLORIDA BUILDING CODE: FUEL GAS
2023 8TH EDITION FLORIDA BUILDING CODE: ENERGY CONSERVATION
2023 8TH EDITION FLORIDA BUILDING CODE: EXISTING BUILDING
2023 8TH EDITION FLORIDA BUILDING CODE: ACCESSIBILITY
2023 8TH EDITION FLORIDA FIRE PREVENTION CODE (NFPA)
2020 NATIONAL ELECTRIC CODE (NEC)
AS ADOPTED BY COUNTY OF COLUMBIA

VICINITY MAP:



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CONSTRUCTION NOTES:

CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.

ALL SOLAR ENERGY SYSTEM EQUIPMENT SHALL BE SCREENED TO THE MAXIMUM EXTENT POSSIBLE AND SHALL BE PAINTED A COLOR SIMILAR TO THE SURFACE UPON WHICH THEY ARE MOUNTED.

MODULES SHALL BE TESTED , LISTED AND INDENTIFIED WITH FIRE CLASSIFICATION IN ACCORDANCE WITH UL 2703. SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER SECTION R314 AND 315 TO BE VERIFIED AND INSPECTED BY INSPECTOR IN THE FIELD.

DIG ALERT (811) TO BE CONTACTED AND COMPLIANCE WITH EXCAVATION SAFETY PRIOR TO ANY EXCAVATION TAKING PLACE

PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER 2020 NEC SEC 250.166(A).

SOLAR PHOTOVOLTAIC SYSTEM EQUIPMENT WILL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF ART. 690 OF THE 2020 NEC

THE MAIN SERVICE PANEL WILL BE EQUIPPED WITH A GROUND ROD OR UFER

UTILITY COMPANY WILL BE NOTIFIED PRIOR TO ACTIVATION OF THE SOLAR PV SYSTEM

SOLAREDGE OPTIMIZERS ARE LISTED TO IEC 62109-1 (CLASS II SAFETY) AND UL 1741 STANDARDS

INSTALL CREW TO VERIFY ROOF STRUCTURE PRIOR TO COMMENCING WORK. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNT.

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 119
WIND EXPOSURE: C
SNOW LOAD: 0

Taqi Khawaja

Digitally signed by Taqi Khawaja
Date: 2024.09.26 09:43:15 -07'00'

TAQI KHAWAJA LICENSE No. 86163 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Taqi Khawaja, PE on 09/26/2024 using a Digital Signature. Printed copies of this document are not considered signed and sealed and the signatures must be verified on any electronic copies.

Columbia County Building Department
Plans Reviewed for Code Compliance
State of Florida

CLIENT:
FRANK VOIGT
135 SOUTHEAST SCARLETT WAY, LAKE CITY, FL 32025
AHJ: COUNTY OF COLUMBIA
UTILITY: FPL - FLORIDA POWER & LIGHT
METER: ACD7965
APN: 03-4S-17-07570-066
PHONE: (402) 290-9386
EMAIL: USN1RET@GMAIL.COM

SYSTEM:
SYSTEM SIZE (DC): 18 X 430 = 7.740 kW
SYSTEM SIZE (AC): 6.000 kW @ 240V
MODULES: 18 X SILFAB SOLAR: SIL-430QD
OPTIMIZERS: 18 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM
[SI1]

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

PROJECT DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-1

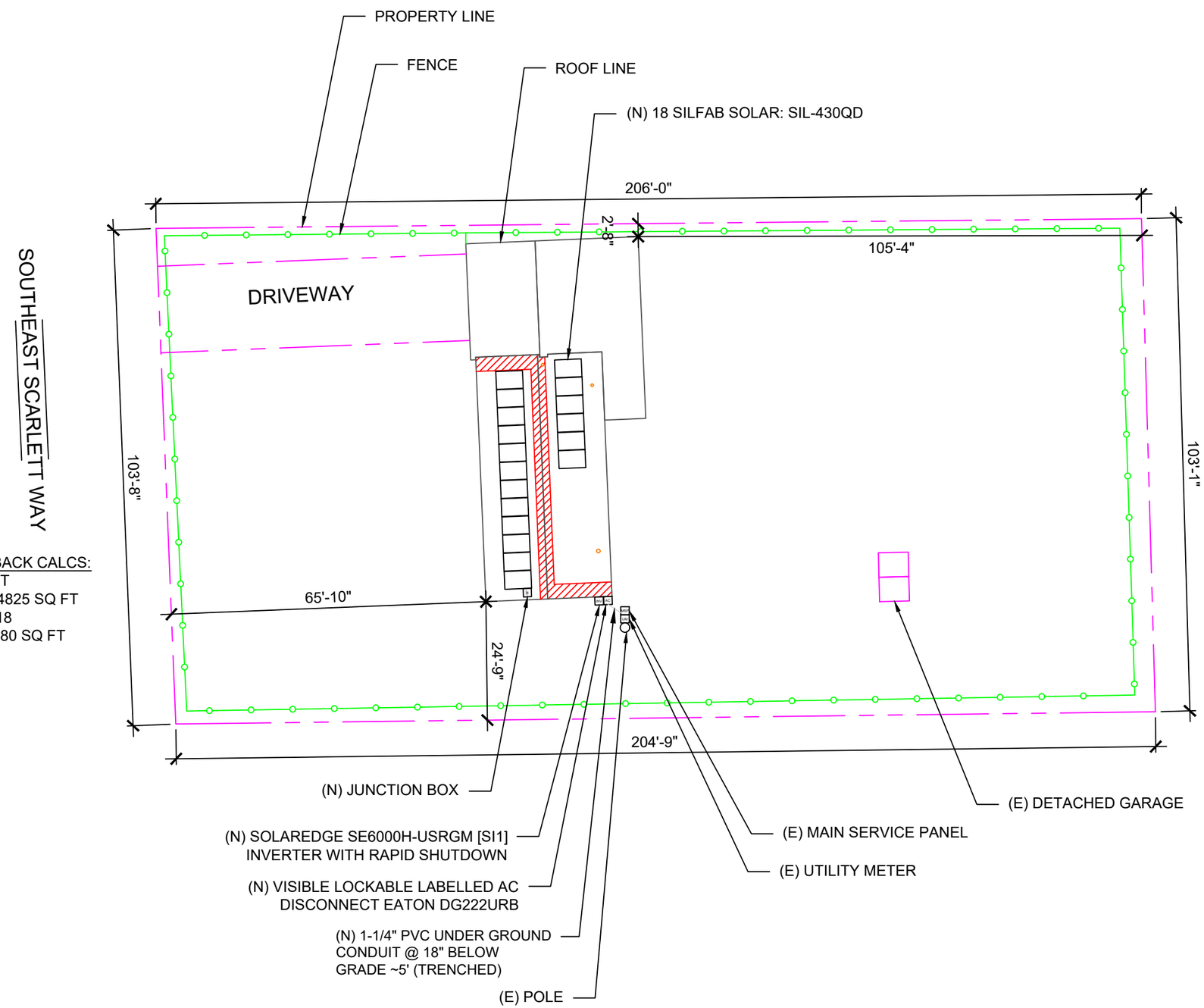
LEGEND:

- CHIMNEY
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- UM — UTILITY METER
- JB — JUNCTION BOX
- INV — INVERTER
- SUB — SUBPANEL
- MSP — MAIN SERVICE PANEL

PV SYSTEM
7.740 kW-DC
6.000 kW-AC

TOTAL ROOF AREA RIDGE SETBACK CALCS:
TOTAL ROOF AREA: 2354.4 SQ FT
SINGLE MODULE AREA: 20.98864825 SQ FT
TOTAL NUMBER OF MODULES: 18
TOTAL AREA OF MODULES: 377.80 SQ FT
ROOF COVERAGE: 16.05%
FIRE SPRINKLERS : NO

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 119
WIND EXPOSURE: C
SNOW LOAD: 0



SITE PLAN
SCALE: 1/24" = 1'-0"

1

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ROOF AREA: 2354.4 SQ FT

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135 SOUTHEAST SCARLETT WAY, LAKE CITY, FL 32025
AHJ: COUNTY OF COLUMBIA
UTILITY: FPL - FLORIDA POWER & LIGHT
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SITE PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-2

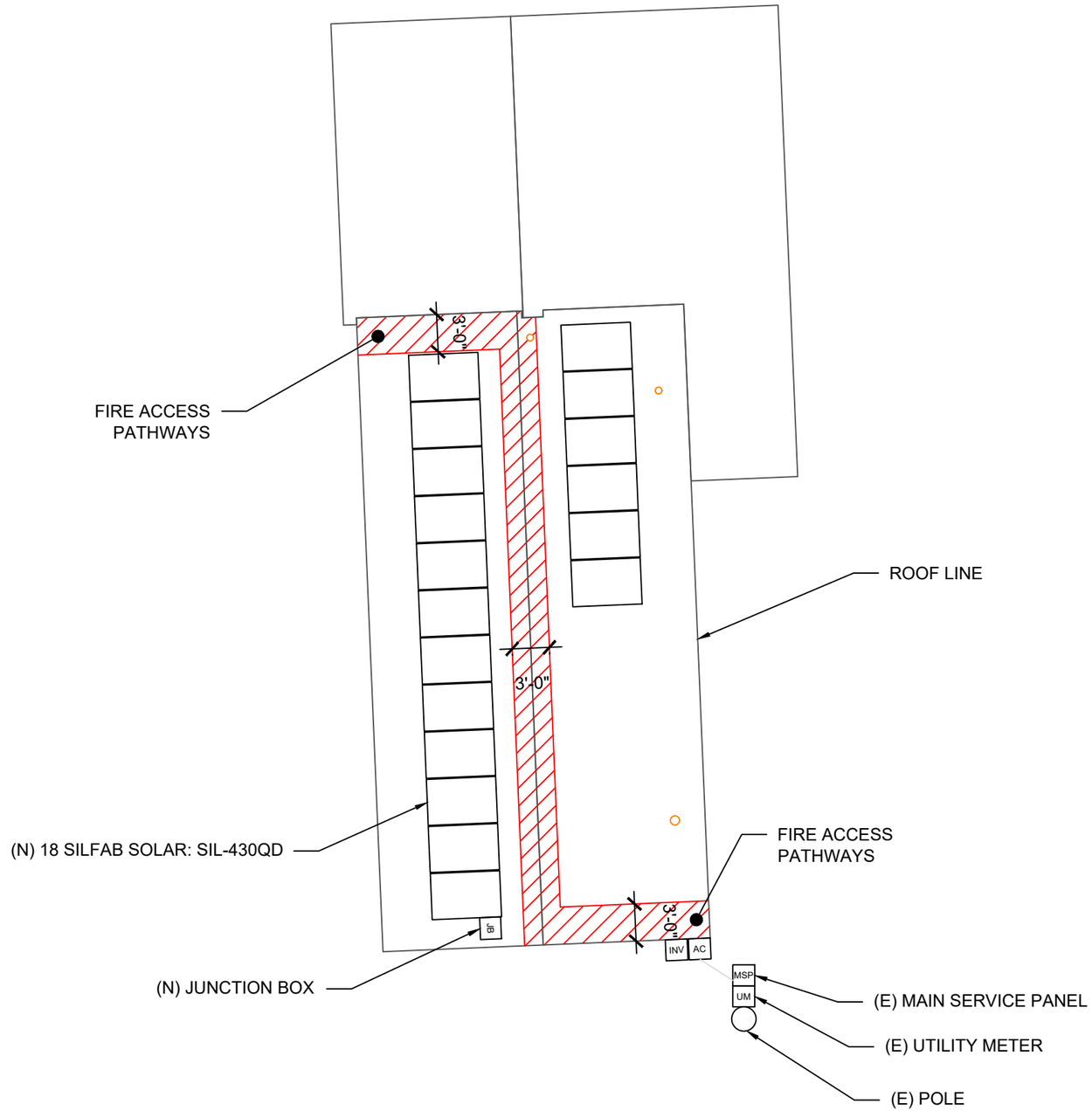
LEGEND:

- CHIMNEY
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- UM — UTILITY METER
- JB — JUNCTION BOX
- INV — INVERTER
- SUB — SUBPANEL
- MSP — MAIN SERVICE PANEL

PV SYSTEM
7.740 kW-DC
6.000 kW-AC

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 119
WIND EXPOSURE: C
SNOW LOAD: 0

TOTAL ROOF AREA: 2354.4 SQ FT
TOTAL ARRAY AREA: 377.80 SQ FT
ARRAY COVERAGE: 16.05%
SYSTEM DISTRIBUTED WEIGHT: 2.71 LBS
SOLARFOOT POINT-LOAD: 11.42 LBS



ROOF PLAN
SCALE: 3/32" = 1'-0"

1

NOTES:
1. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNTS
2. ATTACHED CLAMPS AT 25% FROM THE EDGE AND 50% FROM THE CENTER OF THE MODULES
3. JUNCTION BOX IS MOUNTED TO THE RAIL.

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ROOF AREA: 2354.4 SQ FT

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135 SOUTHEAST SCARLETT WAY, LAKE CITY, FL 32025
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UTILITY: FPL - FLORIDA POWER & LIGHT
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[SI1]

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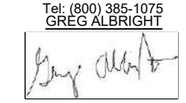

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EC13008056

ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 2354.4 SQ FT
TOTAL ARRAY AREA: 377.80 SQFT
ARRAY COVERAGE: 16.05%
SYSTEM DISTRIBUTED WEIGHT: 2.71 LBS
SOLARFOOT POINT-LOAD: 11.42 LBS

ROOF AREA STATEMENT						
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	6	8	8	88	694.44 SQ FT	125.93 SQ FT
ROOF 2	12	8	8	268	667.13 SQ FT	251.86 SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
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[SI1]

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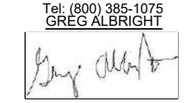

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EC13008056

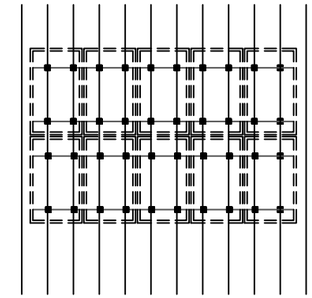
ARRAY DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-2B

TABLE 1 – ARRAY INSTALLATION

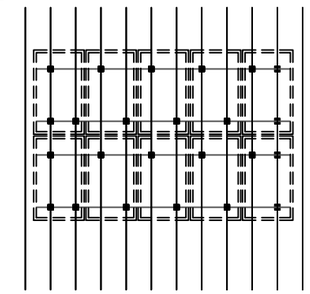
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE	MAX UNBRACED LENGTH(FT.)	STRUCTURAL ANALYSIS RESULT	PENETRATION PATTERN	MAX ATTACHMENT SPACING (IN.)	MAX RAIL OVERHANG(IN.)
ROOF 1	8	Trapezoidal Metal	S–5 Solarfoot	2x2 @ 24" O.C.	6.66	PASS	STAGGERED	48	16
ROOF 2	8	Trapezoidal Metal	S–5 Solarfoot	2x2 @ 24" O.C.	6.66	PASS	STAGGERED	48	16

1. CONTRACTOR TO VERIFY FRAMING TYPE AND MAX UNBRACED LENGTH PRIOR TO INSTALLATION. IF THE ABOVE INFORMATION DOES NOT MATCH FIELD CONDITIONS, NOTIFY ENGINEER OF RECORD IMMEDIATELY.
2. WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.
3. MAX RAIL OVERHANG APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.



STACKED DETAIL

For Illustration purposes only



STAGGERED DETAIL

For Illustration purposes only

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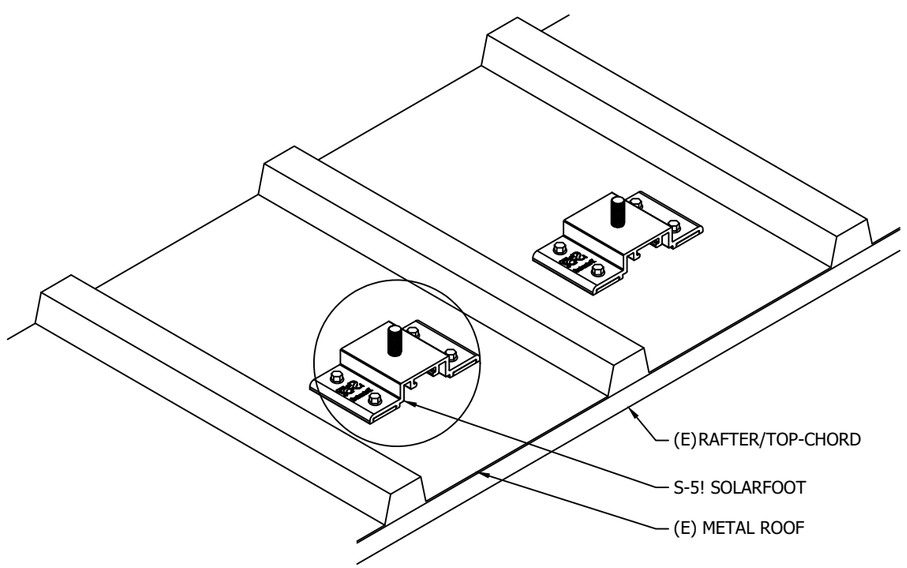
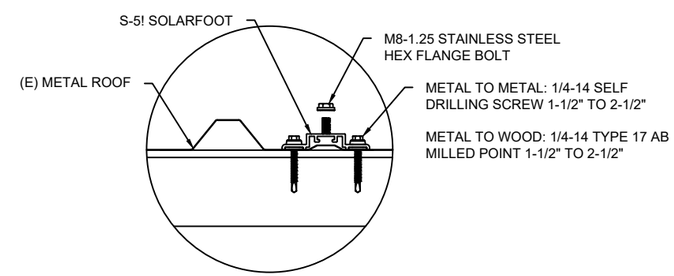


SOLAR PV ARRAY SECTION VIEW

Scale: NTS



ATTACHMENT DETAIL

Scale: NTS

CLIENT:
FRANK VOIGT
135 SOUTHEAST SCARLETT WAY, LAKE CITY, FL 32025
AHJ: COUNTY OF COLUMBIA
UTILITY: FPL - FLORIDA POWER & LIGHT
METER: ACD7965
APN: 03-4S-17-07570-066
PHONE: (402) 290-9386
EMAIL: USN1RET@GMAIL.COM

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SYSTEM SIZE (AC): 6.000 kW @ 240V
MODULES: 18 X SILFAB SOLAR: SIL-430QD
OPTIMIZERS: 18 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM
[SI1]

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freedom FOREVER

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Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

MOUNTING DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-3

BACKFEED BREAKER SIZING					
MAX. CONTINUOUS OUTPUT 25.00A @ 240V					
25.00	X	1.25	=	31.25AMPS	35A BREAKER - OK
SEE 705.12 OF 2020 NEC					
200	X	1.20	=	240	
240	-	200	=	40A ALLOWABLE BACKFEED	

PV SYSTEM
7.740 kW-DC
6.000 kW-AC

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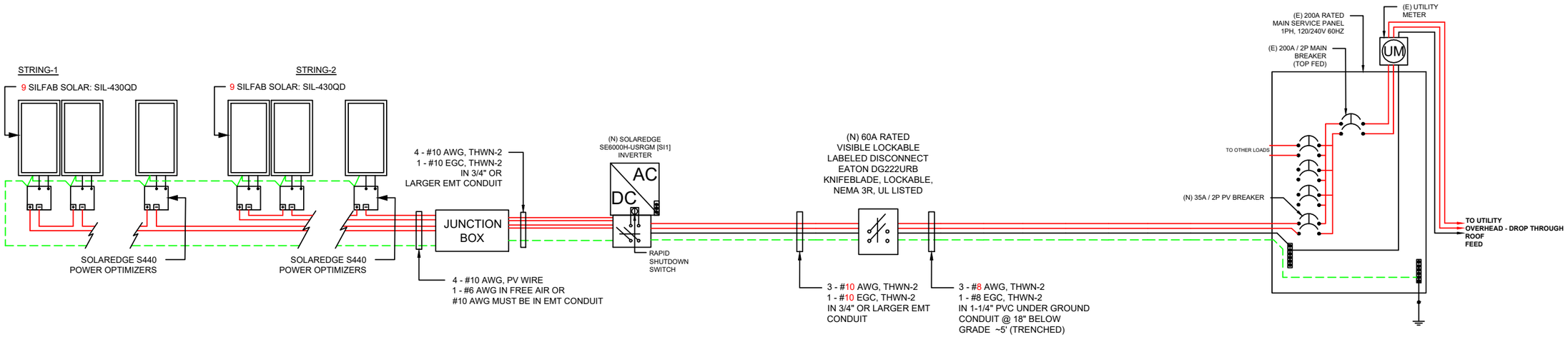

NOTE:
CONDUIT AND CONDUCTORS SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS

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THREE LINE DIAGRAM

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-4

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WIRE SCHEDULE

RACEWAY #	EQUIPMENT				CONDUCTOR QTY.	AWG WIRE SIZE	STARTING ALLOWABLE AMPACITY @ 90°C 310.15(B)(16)	STARTING CURRENT APPLIED TO CONDUCTORS IN RACEWAY	TEMPERATURE CORRECTION FACTOR 310.15(B)(2)(a)	ADJUSTMENT FACTOR FOR MORE THAN 3 CONDUCTORS 310.15(B)(3)(a)	ADJUSTED CONDUCTOR AMPACITY @ 90°C	MAXIMUM CURRENT APPLIED TO CONDUCTORS IN RACEWAY
1	DC	MODULE	TO	OPTIMIZER	2	10	40	17.34	0.96	1	38.40	21.67
2	DC	OPTIMIZER	TO	JUNCTION BOX	2	10	40	15.00	0.96	1	38.40	18.75
3	DC	JUNCTION BOX	TO	INVERTER	4	10	40	15.00	0.96	0.8	30.72	18.75
4	AC	INVERTER	TO	AC DISCONNECT	3	10	40	25.00	0.96	1	38.40	31.25
5	AC	AC DISCONNECT	TO	POI	3	10	40	25.00	0.96	1	38.40	31.25

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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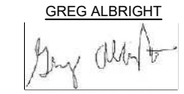

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CONDUCTOR CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-5

OCPD SIZES:

35A BREAKER

SERVICE LIST:

TRENCHING

MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
18	110 - MODULES	PV-110-430-SIL	"MFG: SILFAB, 430W BOB, MFG SKU: SIL-430QD"
1	120 - INVERTERS	INV-120-608	"MFG: SOLAREDGE, 6.0 KW RGM SCREENLESS W/CONSUMPTION MONITORING, MFG SKU: SE6000H-US000BEI4"
1	180 - MONITORING EQUIPMENT	ME-180-502	"MFG: SOLAREDGE, CELL MODEM W/5 YRS, MFG SKU: SE-CELL-B-R05-US-S-S2"
2	160 - EQUIPMENT ACCESSORIES	EA-163-508	"MFG: SOLAREDGE, 225A CT, MFG SKU: SECT-SPL-225A-T-20"
1	160 - EQUIPMENT ACCESSORIES	EA-163-304	"MFG: SOLAREDGE, ENERGY NET PLUG-IN, MFG SKU: ENET-HBNP-01"
18	130 - OPTIMIZERS	OPT-130-440-2	"MFG: SOLAREDGE, 440W 60V OPTIMIZER, MFG SKU: S440"
2	260 - FITTINGS/ANCHORS	RAC-261-527	"MFG: UNIRAC, JUNCTION BOX, COMP SHINGLE AND RAIL MOUNT APPLICATIONS, MFG SKU: SOLOBOX-D"
2	210 - RAILS	RAC-211-201	"MFG: UNIRAC, E-BOSS J-BOX MOUNTING BRACKET, MFG SKU: 00802JB"
1	320 - DISCONNECTS	EE-321-060	"MFG: EATON, DISCONNECT, GENERAL DUTY, 2P, 240V, 60A, NON FUSIBLE, NEMA 3R, MFG SKU: DG222URB"
200	260 - FITTINGS/ANCHORS	RAC-260-550	"MFG: BURNDY, PV WILEY CABLE CLIP THICKNESS RANGE: 1.3 TO 3MM MFG SKU: ACC-FPV180"
3	350 - ELECTRICAL ACCESSORIES	EA-350-585	"MFG: ILSCO, GROUND LUG, MFG SKU: SGB-4"
73	240 - FOOTINGS	RAC-240-406	"MFG: S-5!, S-5! SOLARFOOT, MFG SKU: SOLARFOOT"
21	210 - RAILS	RAC-211-117	"MFG: UNIRAC, NXT HORIZON RAIL - 84"" MILL, MFG SKU: 084RLM1"
18	260 - FITTINGS/ANCHORS	RAC-261-123	"MFG: UNIRAC, NXT HORIZON COMBO CLAMP - DARK, MFG SKU: CCLAMPD1"
9	210 - RAILS	RAC-211-119	"MFG: UNIRAC, NXT HORIZON RAIL SPLICE, MFG SKU: RLSPLCM1 / RLSPLCM2"
73	260 - FITTINGS/ANCHORS	RAC-261-118	"MFG: UNIRAC, STRONGHOLD RAIL CLAMP MILL, MFG SKU: SHCLMPM1 / SHCLMPM2"
18	260 - FITTINGS/ANCHORS	RAC-261-124	"MFG: UNIRAC, NXT MLPE & GND LUG CLAMP, MFG SKU: NULGMLP1"
18	260 - FITTINGS/ANCHORS	RAC-261-113	"MFG: UNIRAC, NXT HORIZON NS WIRE MGMT CLIP, MFG SKU: WRMCNSD1"
100	260 - FITTINGS/ANCHORS	RAC-261-114	"MFG: UNIRAC, NXT HORIZON RL & CLMP CAP KIT, MFG SKU: ENDCAPD1"
18	260 - FITTINGS/ANCHORS	RAC-261-115	"MFG: UNIRAC, NXT HORIZON WIRE MGMT CLIP, MFG SKU: WRMCLPD1"

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UTILITY: FPL - FLORIDA POWER & LIGHT
METER: ACD7965
APN: 03-4S-17-07570-066
PHONE: (402) 290-9386
EMAIL: USN1RET@GMAIL.COM

SYSTEM:
SYSTEM SIZE (DC): 18 X 430 = 7.740 kW
SYSTEM SIZE (AC): 6.000 kW @ 240V
MODULES: 18 X SILFAB SOLAR: SIL-430QD
OPTIMIZERS: 18 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM
[SI1]

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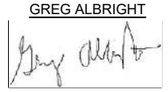
freedom FOREVER

FREEDOM FOREVER LLC
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
Tel: (800) 385-1075

GREG ALBRIGHT



CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

EQUIPMENT & SERVICE LIST

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-6

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

690.13(B)

DO NOT DISCONNECT UNDER LOAD

NEC 690.15 (B) & NEC 690.33(D)(2)

⚠ WARNING

SINGLE 120-VOLT SUPPLY
DO NOT CONNECT
MULTIWIRE BRANCH CIRCUITS

NEC 710.15(C) & 692.9 (C)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59

⚠ WARNING

TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

NEC 110.27(C) & OSHA 1910.145(F)(7)

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

706.15(C)(4) & 690.13(B)

⚠ WARNING

THIS EQUIPMENT FED BY
MULTIPLE SOURCES:
TOTAL RATING OF ALL OVERCURRENT
DEVICES EXCLUDING MAIN POWER
SUPPLY SHALL NOT EXCEED
AMPACITY OF BUSBAR

NEC 705.12(B)(3)(3)

⚠ WARNING

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

NEC 690.31(E)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

690.56(C)(3)

If you have any questions about your system, please call our Customer Support Team at

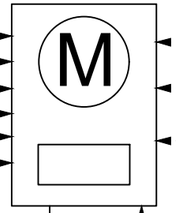
888.557.6431

or visit freedomforever.com/customer-service

This solar PV system was installed by

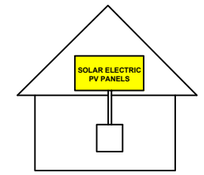
freedom FOREVER

*Freedom Forever is a licensed contractor in all states it operates in. For more information visit freedomforever.com/license



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



IFC 605.11.3.1(1) & 690.56(C)

⚠ CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

NEC 705.12(D) & NEC 690.59

⚠ WARNING

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

NEC 705.12(C) & NEC 690.59

⚠ WARNING

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

24 INCH FLASH HAZARD BOUNDARY
3 CAL/CM^2 FLASH HAZARD AT 18 INCHES
480 VAC SHOCK HAZARD WHEN COVER IS REMOVED
42 INCH LIMITED APPROACH
12 INCH RESTRICTED APPROACH - 500 V CLASS 00 GLOVES
1 INCH PROHIBITED APPROACH - 500 V CLASS 00 GLOVES

LOCATION: 135 SOUTHEAST SCARLETT WAY,LAKE CITY, FL 32025

NEC 706.15(C) AND NEC 110.16

PHOTOVOLTAIC AC DISCONNECT

NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:	25.00A
NOMINAL OPERATING AC VOLTAGE:	240V

NEC 690.54

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59

AC

PM

INVERTER

SOLAR PV DC CIRCUIT

EVERY 10' ON CONDUIT AND ENCLOSURES
NEC 690.31

PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES
NEC 690.31(D)(2)

MAXIMUM VOLTAGE	480	V
MAXIMUM CIRCUIT CURRENT	16.5	A
MAX DC-DC CONVERTER OUTPUT CURRENT	15	A

DC

J/B

PHOTOVOLTAIC DC DISCONNECT

NEC 690.13(B)

MAXIMUM DC VOLTAGE OF PV SYSTEM

NEC 690.53

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

DC VOLTAGE IS ALWAYS PRESENT
WHEN SOLAR MODULES
ARE EXPOSED TO SUNLIGHT

706.15(C)(4) & 690.13(B)

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

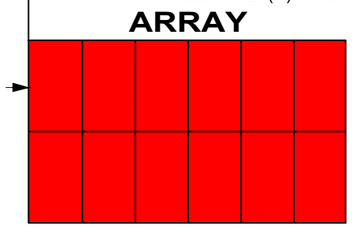
706.15(C)(4) & 690.13(B)

⚠ WARNING

TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

NEC 110.27(C) & OSHA 1910.145(F)(7)

ARRAY



NEC 690.31(G)(3) & (4)

NOTES:

1. NEC ARTICLES 690 AND 705 AND IRC SECTION R324 MARKINGS SHOWN HEREON.
2. ALL MARKING SHALL CONSIST OF THE FOLLOWING:
   A. UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING.
   B. RED BACKGROUND COLOR WHITE TEXT AND LINE WORK.
   C. ARIAL FONT.
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED. SIGNAGE CANNOT BE HAND-WRITTEN.
4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS

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EMAIL: USN1RET@GMAIL.COM

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MODULES: 18 X SILFAB SOLAR: SIL-430QD
OPTIMIZERS: 18 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM [SI1]

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freedom FOREVER

FREEDOM FOREVER LLC
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
Tel: (800) 385-1075

GREG ALBRIGHT

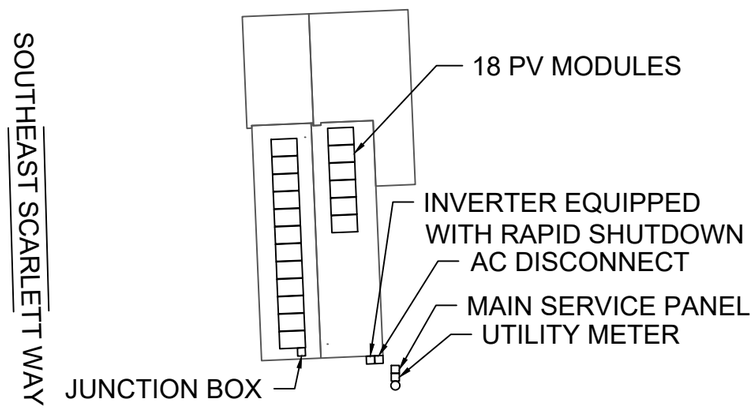
CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

LABELS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-7

CAUTION:

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



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

N

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[SI1]

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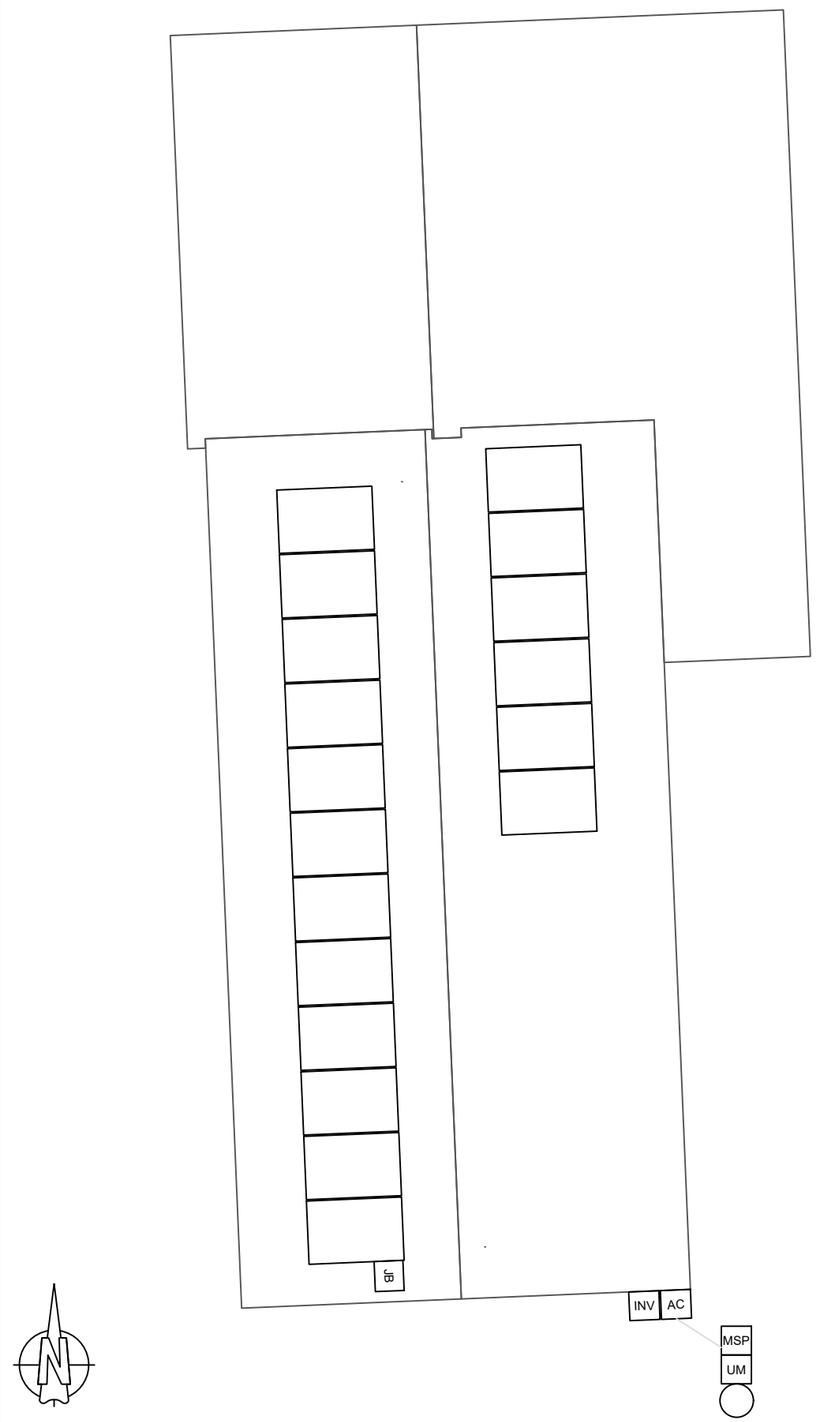
SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-7A

SOLAREDGE OPTIMIZER CHART

	1-10	11-20	21-30	31-40	41-50	51-60
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						



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OPTIMIZER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-8

SAFETY PLAN

INSTRUCTIONS:

1. USE SYMBOLS IN KEY TO MARK UP THIS SHEET.
2. SAFETY PLAN MUST BE MARKED BEFORE JOB STARTS AS PART OF THE PRE-PLAN
3. DOCUMENT ALL ADDITIONAL HAZARDS ON THIS PAGE & MAKE NOTES ON THE JHA SHEET

INCIDENT REPORTING:

INJURIES - CALL INJURY HOTLINE

(855) 400-7233

**If injury is life threatening, call 911 first THEN the Injury Hotline*

NON-INJURIES - USE MOBILE INCIDENT REPORTING
(Auto, Property Damage, Near Miss)

NEAREST OCCUPATIONAL/INDUSTRIAL CLINIC:

NAME: _____

ADDRESS: _____

NEAREST HOSPITAL:

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION:

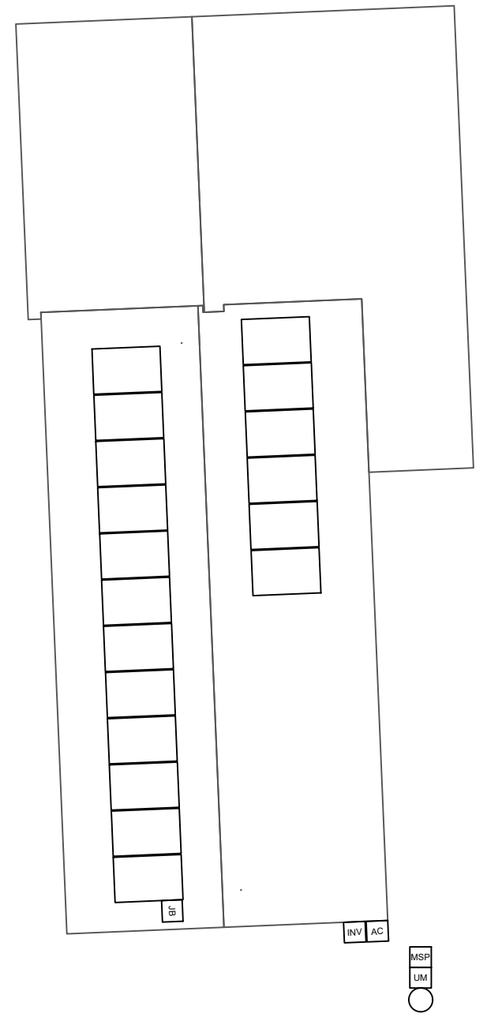
NAME: _____

PHONE NUMBER: _____

ALL EMPLOYEES ON SITE SHALL BE MADE AWARE OF THE SAFETY PLAN AND SIGN INDICATING THAT THEY ARE AWARE OF THE HAZARDS ON-SITE AND THE PLAN FOR WORKING SAFELY.

NAME	SIGNATURE

DATE: _____ TIME: _____



MARK UP KEY

- (P) PERMANENT ANCHOR
- (T) TEMPORARY ANCHOR
- [IL] INSTALLER LADDER
- [B] JUNCTION / COMBINER BOX
- [S] STUB-OUT
- [X] SKYLIGHT
- NO LADDER ACCESS (STEEP GRADE OR GROUND LEVEL OBSTRUCTIONS)
- RESTRICTED ACCESS
- CONDUIT
- (GAS) GAS SHUT OFF
- (H_2O) WATER SHUT OFF
- (7) SERVICE DROP
- (Z) POWER LINES

POLICIES

INSTRUCTIONS:

1. SCAN QR LINK BELOW TO ACCESS ALL FREEDOM FOREVER SAFETY POLICIES AND PROGRAMS.

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BREAK AND WATER LOG

THIS LOG IS TO BE FILLED OUT ANY TIME THE TEMP EXCEEDS **90** DEGREES. THE CREW LEAD AND ROOF LEAD ARE RESPONSIBLE FOR ENSURING THIS IS COMPLETED AND UPLOADED AT THE END OF EVERYDAY WHEN TEMPS EXCEED **90** DEGREES

NAME	0800HRS	0900HRS	1000HRS	1100HRS	1200HRS	1300HRS	1400HRS	1500HRS	1600HRS

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-9

JOB HAZARD ANALYSIS

Crew leader to fill out all sections below, hold a pre-job safety meeting with all personnel, and upload this completed document and the Safety Plan to Site Capture

Ladder Access

- Ladders must be inspected before each use.
- Extension ladders must be set up on a firm and level surface at a 4-to-1 rise to run angle (or 75 degrees) and the top must be secured to the structure. Extension style ladders placed on uneven, loose or slippery surfaces must additionally have the base firmly anchored or lashed so the base will not slip out.
- Extension ladders must be used with walk-through devices or the ladder must extend 36" above the stepping off point.
- A-frame ladders must only be climbed with the ladder spreader bars locked in the open position; A-frame ladders shall not be climbed while in the closed position (ex, closed and used while leaned against a structure).
- Additional notes:

Mobile Equipment

- Only Qualified operators will operate equipment; operators must maintain a certification on their person for the equipment being operated.
- Type(s) of mobile equipment (Type/Make/Model):
- Qualified operator(s):

Material Handling and Storage

- Materials will be staged/stored in a way that does not present a hazard to client, personnel or public. Materials stored on the roof will be physically protect from failing or sliding off.

Fall Protection

- A site-specific plan for fall prevention and protection is required prior to starting work and must remain onsite at all times until work is complete; a fall rescue plan must be outlined and discussed among the crew prior to work start.
- First-person-Up (FPU) must install their anchor and connect before any other task, including installing other anchors. The Last-Person-Down (LPD) must be the only person on a roof uninstalling fall protection.
- FPCP (name and title):
- FPU and LPD (name and title):

Electrical Safety

- The Electrical Qualified Person (EQP) is required onsite to perform electrical work.
- All electrical work will be performed with equipment in an electrically safe condition (de-energized) unless approval has been granted prior to work.
- Service drops and overhead electrical hazards will be indentified and protected from contact, as neccessary.
- EQP (name and tile):

Public Protection

- The safety of the Client and Public must be maintained at all times.
- The Client and the Public shall be prevented from entering the work zone through the use of barriers and/or signage, as required.
- Company, Client and Public property shall be protected from falling objects.
- Pets (including dogs) shall be secured by their owners prior to work start.
- The Client should not leave pets, family members, or others in charge or care of Employees, Contractors, or Temporary Workers.
- Crew leader responsible for communication with the client:
- Client and public is excluded from work area by barricades (N/A, Yes, No):

Training and Pre-Job Safety Briefing

- All employees onsite shall be made aware of the specific hazards of this project and review this HJA during a pre-job briefing, and their signature indicates awareness of site conditions and the plan to eliminate any hazards identified prior to and during the project.
- Crew leader (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):

Airborne Contaminants:

- Asbestos-containing (Transite) piping (ACP) - Do not disturb (move, drill, cut fracture, etc.)
- Asbestos-containing thermal insulation (ACI) and Asbestos-containing duct wrapping (ACW) - do not disturb, no attic or crawlspace access is allowed if work to be performed could cause exposure to personnel, client or public.
- If yes, list specific tasks and protection in place:

Weather and Environment

- The site supervisor shall forecast the weather conditions at the job site, prior to crew arrival, in order to mitigate any hazards associated with inclement weather (heat, cold, wind, rain, etc.)
- The site supervisor will utilized a portable wind meter (anemometer) to verify actual onsite wind conditions, by checking at the ground and on any elevated work surface (ex, rooftop) prior to work start, at midday and prior to solar panel staging on a roof.
- Elevated work involving the moving or maneuvering of solar panels shall cease at 25mph (sustained wind) until wind subsides.
- Forecasted weather maximum temp (degrees f):

Heat Related Illness Prevention

- Employees shall have access to potable drinking water that is fresh, pure, and suitably cool. The water shall be located as close as practicable to the areas where employees are working. Water shall be supplied in sufficient quantity at the beginning of the work shift to provide at least one quart per employee per hour for drinking for the entire shift. Employees may begin the shift with smaller quantities of water if they identify the location and have effective means for replenishment during the shift to allow employees to drink on quart or more per hour. The frequent drinking of water shall be encouraged.
- Shade shall be present when temperature exceeds 80 degrees Fahrenheit. When the outdoor temperature in the work exceeds 80 degrees Fahrenheit, employees shall have and maintain one or more areas with shade at all times.
- New employees must be acclimatized. New employees will be monitored by their Crew Leader (site supervisor) for the first two (2) weeks of employment or longer when necessary.
- Employees will be allowed and encouraged to implement scheduled breaks during each shift. Employees must take cool-down breaks in the shade any time they feel the need to do so to protect them from overheating. Supervisors are REQUIRED to allow employees any break period they need during high heat conditions.
- Cool Vests are encouraged for all employees at all times during periods of high heat.
- Identify the location of the closet Occupational/Industrial Clinic or Hospital in case a crew member becomes ill.

What is the specific plan to provide and replenish sufficient water for all employees on site?

- If offsite replenish is necessary, where will you go to replenish water (location/address):
- Who will replenish the drinking water (name):

Restroom facilities

- Employees shall have access to restroom facilities with hand-washing stations. Use of onsite restroom is at the client's discretion (location is annotated below). If client does not give permission, location of suitable restroom facilities with hand-washing stations offsite will be provided. The onsite supervisor will identify location and make arrangements to ensure all employees have access at any point.
- Restroom facilities will be (circle one): Onsite - Offsite
- If Offsite, add location name and address:

Incident Reporting Procedure

- Contact your Site Supervisor
  - Name:
  - Phone:
- Contact your Manager
  - Name:
  - Phone:
- Contact your Site Supervisor
  - Name:
  - Phone:

With: Your full name, phone number, office location, brief description of what happen and when.

NOTE ADDITIONAL HAZARDS NOT ADDRESSED ABOVE

(add as many as necessary by using additional sheets)

Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:

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SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
496748	9/20/2024	R.N.	PV-10

FOR INSTALLATION REFERENCE ONLY

SCAN QR CODE TO ACCESS REFERENCE LINK

FREEDOM REFERENCES

INSTALL HOTLINE

PV INSTALLATION REFERENCES

ENPHASE

SOLAREDGE

TESLA

BATTERY INSTALLATION REFERENCES

Enphase Storage Systems

SOLAREDGE Storage Systems

TESLA Storage Systems

NON-BACKUP Battery Systems

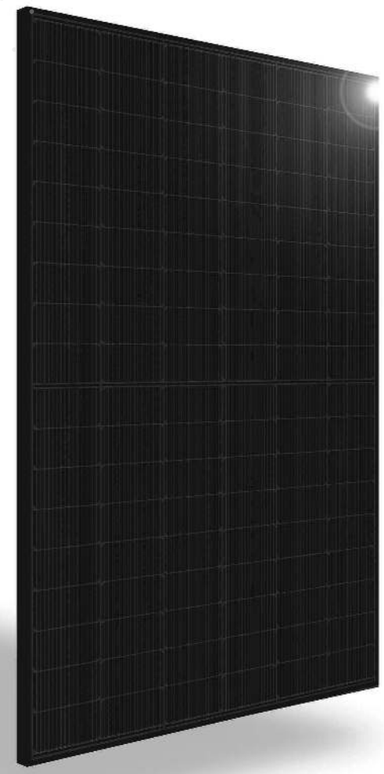
Misc. Quick Guide

V1.4

SILFAB PRIME NTC

SIL-430 QD

SILFAB SOLAR®



INTRODUCING NEXT-GENERATION N-TYPE CELL TECHNOLOGY

- Improved Shade Tolerance
- Improved Low-Light Performance
- Increased Performance in High Temperatures
- Enhanced Durability
- Reduced Degradation Rate
- Industry-Leading Warranty

SILFABSOLAR.COM

ELECTRICAL SPECIFICATIONS		430	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	430	321
Maximum power voltage (Vpmax)	V	33.25	31.02
Maximum power current (Ipmax)	A	12.93	10.33
Open circuit voltage (Voc)	V	38.91	36.58
Short circuit current (Isc)	A	13.87	11.15
Module efficiency	%	22.1%	20.6%
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	25	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m² • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10 W.

MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	21 kg ± 0.2 kg	46.3 lbs ± 0.4 lbs
Dimensions (H x L x D)	1721 mm x 1133 mm x 35 mm	67.8 in x 44.6 in x 1.37 in
Maximum surface load (wind/snow)*	4000 Pa rear load / 5400 Pa front load	83.5 lb/ft² rear load / 112.8 lb/ft² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	108 Half cells - N-Type Silicon solar cell 182 mm x 91 mm	108 Half cells - N-Type Silicon solar cell 7.16 in x 3.58 in
Glass	3.2 mm high transmittance, tempered, antireflective coating	0.126 in high transmittance, tempered, antireflective coating
Cables and connectors (refer to installation manual)	1350 mm, ø 5.7 mm, MC4 from Staubli	53.1 in, ø 0.22 in (12 AWG), MC4 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV backsheet	
Frame	Anodized aluminum (Black)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP68 rated, 3 diodes	

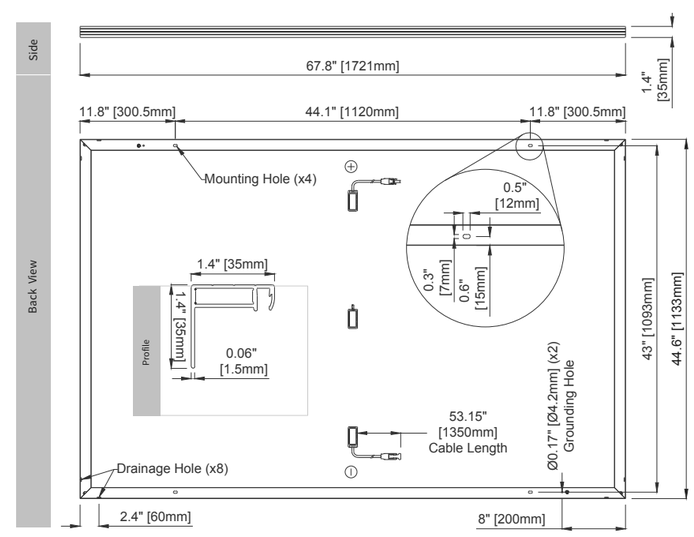
TEMPERATURE RATINGS	
Temperature Coefficient Isc	0.04 %/°C
Temperature Coefficient Voc	-0.24 %/°C
Temperature Coefficient Pmax	-0.29 %/°C
NOCT (± 2 °C)	45 °C
Operating temperature	-40/+85 °C

WARRANTIES	
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years
	≥ 98% end 1st yr ≥ 94.7% end 12th yr ≥ 90.8% end 25th yr ≥ 89.3% end 30th yr

CERTIFICATIONS	
Product	UL 61215, UL 61730, CSA C22.2#61730, IEC 61215, IEC 61730, IEC 61701 (Salt Mist Corrosion), IEC 62716 (Ammonia Corrosion), CEC Listed, UL Fire Rating: Type 2
Factory	ISO9001:2015

SHIPPING SPECS	
Modules Per Pallet:	26 or 26 (California)
Pallets Per Truck	32 or 30 (California)
Modules Per Truck	832 or 780 (California)

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.
** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com.
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads.



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SolarEdge Home Wave Inverter

For North America

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 SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014-2023 per articles 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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/ SolarEdge Home Wave Inverter

For North America

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

Applicable to inverters with part number	SEXXXXH-XXXXXBXX4					SE11400H-XXXXXBXX5	
	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	Units
OUTPUT							
Rated AC Power Output	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	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	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	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						Vdc
Maximum Input Current @240V[2]	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	600k Sensitivity						
Maximum Inverter Efficiency	99.2						%
CEC Weighted Efficiency	99					99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5						W

(1) For other regional settings please contact SolarEdge support.
(2) A higher current source may be used; the inverter will limit its input current to the values stated.

/ SolarEdge Home Wave Inverter

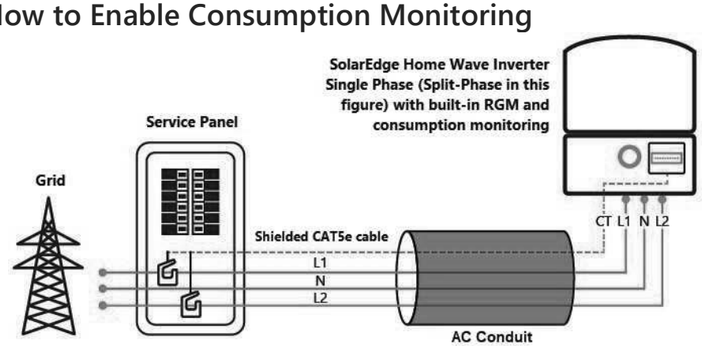
For North America

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

Applicable to inverters with part number	SEXXXXH-XXXXXBXX4					SE11400H-XXXXXBXX5	
	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), wireless SolarEdge Home Network (optional)(3), Wi-Fi (optional), Cellular (optional)						
Revenue Grade Metering, ANSI C12.20	Optional(4)						
Consumption Metering							
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection						
Rapid Shutdown - NEC 2014-2023 per articles 690.11 and 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1741 SB, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07						
Grid Connection Standards	IEEE1547-2018, Rule 21, Rule 14 (HI), CSA C22.3 No. 9						
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 (H x W x D)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.06 x 14.6 x 7.3 / 535 x 370 x 185	21.06 x 14.6 x 8.2 / 535 x 370 x 208(5)	in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9		38.8 / 17.6	44.9 / 20.4(5)	lb / kg
Noise	< 25			<50			dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60(6)						˚F / ˚C
Protection Rating	NEMA 4X (Inverter with Safety Switch)						

(3) For more information, refer to the SolarEdge Home Network datasheet
(4) Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BEI4. For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box.
(5) SE11400H-USxxxBxx**5** is the updated PN, though SE11400H-USxxxBxx**4** will still be available. All specifications are similar for both models, **EXCLUDING** the weight and dimensions [HxWxD]; The weight and dimensions of SE11400H-USxxxBxx**4** are 17.6 [kg] and 21.06-14.6-7.3 / 535-370-185 [in/mm], accordingly.
(6) Full power up to at least 50˚C / 122˚F; for power de-rating information refer to the Temperature De-rating Technical Note for North America.

How to Enable Consumption Monitoring



By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills.

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CE

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

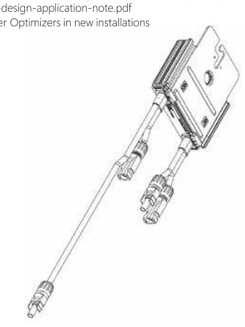
S440, S500

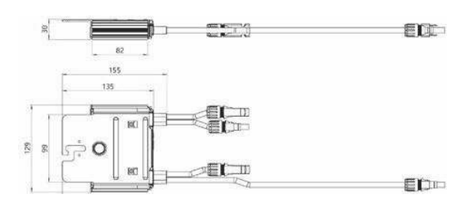
	S440	S500	Unit
INPUT			
Rated Input DC Power(1)	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING 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 / Type6B		
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	14	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 7200W Two strings or more 7800W	15,000W	
Parallel Strings of Different Lengths or Orientations		Y			

(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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Intertek

RoHS

Product specifications

Eaton DG222URB

Catalog Number: DG222URB

Eaton General duty non-fusible safety switch, single-throw, 60 A, NEMA 3R, Rainproof, Painted galvanized steel, Two-pole, Two-wire, 240 V

General specifications

Product Name
Eaton general duty non-fusible safety switch

Catalog Number
DG222URB

UPC
782113144238

Product Length/Depth
7.38 in

Product Height
14.38 in

Product Width
8.69 in

Product Weight
9 lb

Warranty
Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

Certifications
UL Listed

Catalog Notes
WARNING! Switch is not approved for service entrance unless a neutral kit is installed.

Product specifications

Product Category
General duty safety switch

Enclosure material
Painted galvanized steel

Type
Non-fusible, single-throw

Fuse configuration
Non-fusible

Number of wires
2

Enclosure
NEMA 3R

Voltage rating
240V

Amperage Rating
60A

Number Of Poles
Two-pole

Resources

Catalogs
Eaton's Volume 2—Commercial Distribution

Multimedia
Double Up on Safety
Switching Devices Flex Center

Specifications and datasheets
Eaton Specification Sheet - DG222URB

Warranty guides
Selling Policy 25-000 - Distribution and Control Products and Services

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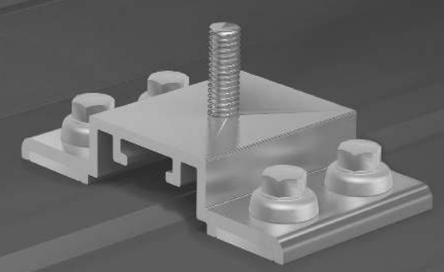
S-5!®

The Right Way!

NEW PRODUCT
SolarFoot™

Introducing the new SolarFoot™ for exposed fastener metal roofing with the strength, testing, quality, and time-proven integrity you expect from S-5!. The SolarFoot provides an ideal mounting platform to attach the L-Foot (not included) of a rail-mounted PV system to the roof. This solution is The Right Way to secure rail-mounted solar systems to exposed fastener metal such as AG-Panel or R-Panel.

The right way to attach almost anything to metal roofs!



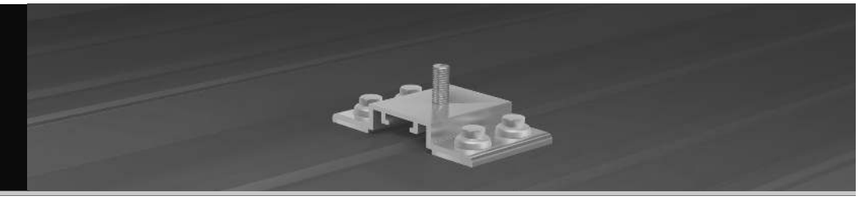
SolarFoot Features:

- Manufactured in the U.S.A. from certified raw material
- Fabricated in our own ISO 9001:2015 certified factory
- All aluminum and stainless components
- 25yr limited warranty
- Compatible with all commercial L-Foot products on the market
- Factory applied 40-year isobutylene/ isoprene crosslink polymer sealant for reliable weathertightness
- Sealant reservoir to prevent over-compression of sealant
- Load-to-failure tested Normal to Seam by a nationally accredited laboratory on numerous metal roof materials and substrates
- Four points of attachment into structure or deck with tested holding strength for engineered applications
- Integrated M8-1.25x17mm stud and M8-1.25 stainless steel hex flange nut included

888-825-3432 | www.S-5.com |

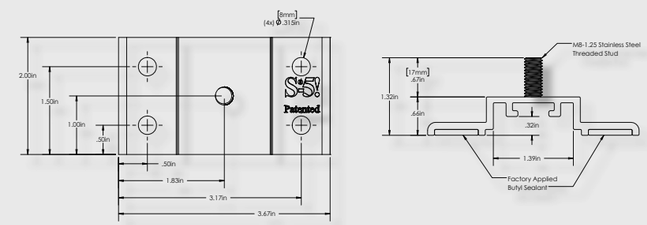
MADE IN USA

S-5!® The Right Way!



SolarFoot™ Mounting for Exposed Fastener Roofing

The SolarFoot is a simple, cost-effective pedestal for L-Foot (not included) attachment of rail-mounted solar PV. The unique design is compatible with all rail producer L-Foot components. The new SolarFoot assembly ensures a durable weathertight solution for the life of the roof. Special factory applied butyl co-polymeric sealant contained in a reservoir is The Right Way, allowing a water-tested seal. Stainless integrated stud and hex flange lock-nut secure the L-Foot into position. A low center of gravity reduces the moment arm commonly associated with L-Foot attachments. Direct attachment of the SolarFoot to the structural member or deck provides unparalleled holding strength.



**Fasteners sold separately. Fastener type varies with substrate. Contact S-5! on how to purchase fasteners and obtain our test results. L-Foot also sold separately.*

Fastener Selection

Metal to Metal:
1/4-14 Self Drilling Screw
1-1/2" to 2-1/2"

Metal to Wood:
1/4-14 Type 17 AB Milled Point
1-1/2" to 2-1/2"

To source fasteners for your projects, contact S-5!

When other brands claim to be "just as good as S-5!", tell them to PROVE IT.

SolarFoot Advantages:

- Exposed fastener mounting platform for solar arrays attached via L-Foot and Rails
- Weatherproof attachment to exposed fastener roofing
- Butyl sealant reservoir provides long-term waterproof seal
- M8-1.25x17mm stud with M8 hex flange nut for attachment of all popular L-Foot/rail combinations
- Tool: 13 mm Hex Socket or ½" Hex Socket
- Tool Required: Electric screw gun with hex drive socket for self-tapping screws.
- Low Center of Gravity reduces moment arm commonly associated with L-Foot/Rail solar mounting scenarios
- Attaches directly to structure or deck for optimal holding strength
- S-5! Recommended substrate-specific (e.g. steel purlin, wood 2x4, OSB, etc.) fasteners provide excellent waterproofing and pull-out strength
- Fastener through-hole locations comply with NDS (National Design Specification)for Wood Construction

S-5!® Warning! Please use this product responsibly!

The independent lab test data found at www.S-5.com can be used for load-critical designs and applications.

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, fastener torque, patents, and trademarks, visit the S-5! website at www.S-5.com. Copyright 2017, Metal Roof Innovations, Ltd. S-5! products are patent protected.

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Distributed by:

NXT HORIZON®

UNIRAC®
BETTER SOLAR STARTS HERE

UNIRAC
25 YEAR
FULL-SYSTEM WARRANTY

DISCOVER YOUR **NXT** HORIZON®

The culmination of over two decades of experience. Thoughtful design, rigorous engineering, world-class support, and a reliable supply chain are the foundation of what makes us confident that NXT HORIZON® is the NXT Level of DESIGN, SIMPLICITY, and VALUE.

STRONGHOLD™ RAIL CLAMP

DARK: SHCLMPD1
MILL: SHCLMPM1

Adaptable rail connection to attachments allows click-in feature compatibility with almost all of Unirac's attachments.

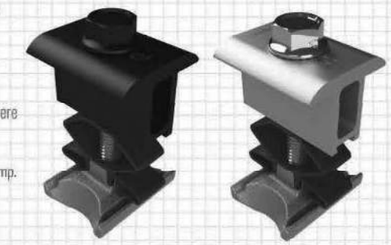
1/2 inch module spacing for efficiency.

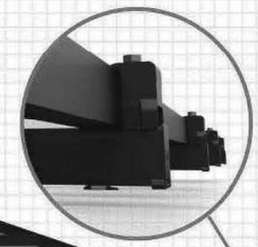
Unirac-quality bonding that works both as mid and end clamps.

NXT HORIZON® COMBO CLAMP

DARK: CCLAMPD1
MILL: CCLAMPM1

Clicks into rail anywhere (even where there are cables!)
Self-standing clamp with spring combines as both mid and end clamp.
Clamps 30-40 mm modules

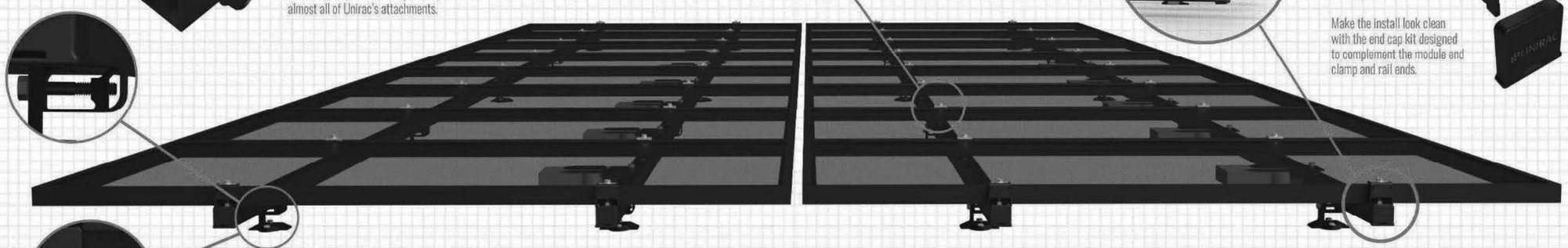


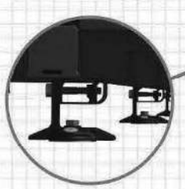


NXT HORIZON® CAP KIT

ENDCAPD1

Make the install look clean with the end cap kit designed to complement the module end clamp and rail ends.





FlashLoc technology combined with new features: click-in rail & open slot L-Foot for the best flash-less install experience.

STRONGHOLD™ ATTACHMENT KIT

DARK: SHCPKTD1
MILL: SHCPKTM1

Rail clicks into the clamps attached to the Stronghold™ base. Open slot in L-foot allows drop-in rail clamp.

Alternative attachment options:

SOLARHOOKS

All variables

FLASHKIT PRO

DARK: 004055D
MILL: 004055M

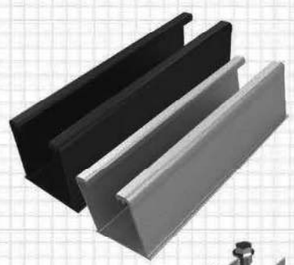
FLASHLOC™ DUO

DARK: 004275D
MILL: 004275M

NXT HORIZON® RAIL

DARK: 168RLD1
MILL: 168RLM1

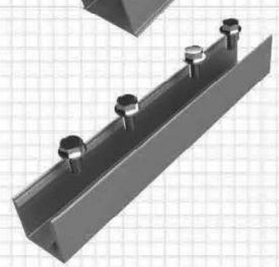
Strong, lightweight open channel rail with invisible, easy, unfailing and integrated wire management system.



NXT HORIZON® RAIL SPLICE

RLSPLCM1

Structural internal splice that does not interfere with roof connection nor module connection.
Pre-assembled thread cutting bolts.



WIRE MANAGEMENT OPTONS

NXT HORIZON® MLPE & LUG CLAMP

LUGMLPE1

Works as either MLPE Mount or Grounding Lug connection to the rail. Why source two parts when one can do the job?

NXT HORIZON® WIRE MANAGEMENT CLIP

WRMCLPD1

Aesthetic, yet functional accessory that works to help installers keep wires inside the rail.
No zip-ties required. Optional zip tie loop for extra wire management capabilities!

NXT HORIZON® NORTH/SOUTH WIRE MANAGEMENT CLIP

WRMCNSD1

An elegant solution to help installers get to the home run. The same hardware works to provide both easy entry to rail and adjustability for cable thickness.

ALL NXT HORIZON® SYSTEMS INCLUDE A FREE PERMITTING PLANSET DESIGN - FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR EMAIL NXTPERMITS@UNIRAC.COM

Downward Design Load (lb/ft²)	33.9
Upward Design Load (lb/ft²)	33.9
Down-Slope Load (lb/ft²)	16.5

Model	NXT UMOUNT	-	Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.

NXT UMOUNT

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with aluminum mid clamps and aluminum end clamps. The modules are bonded to the racking system with bonding mid and end clamps with piercing points. Fire ratings of Class A with Type 1, 2, 3 (with metallic frame), 10(with metallic frame), 19, 22, 25, 29, or 30 for steep and low slope. Tested at 5" interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

Latest Install Manual revision: PUB2023NOV10

UL 2703 Mechanical Load ratings for tested module area 21.86 sq ft:

NXT Systems without DTD Butyl Attachment P30817211, Rail Splice P30808218, or Rail Clamp P30817214	
Downward Design Load (lb/ft²)	113.7
Upward Design Load (lb/ft²)	51.1
Down-Slope Load (lb/ft²)	16.8

NXT Systems with DTD Butyl Attachment P30817211, Rail Splice P30808218, or Rail Clamp P30817214	
Downward Design Load (lb/ft²)	51.1
Upward Design Load (lb/ft²)	51.1

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Down-Slope Load (lb/ft²)	16.8

UL 2703 and TIL Mechanical Load ratings tested module area 27.76 sq ft:

NXT Systems without DTD Butyl Attachment P30817211, Rail Splice P30808218, or Rail Clamp P30817214	
Downward Design Load (lb/ft²)	50.1
Upward Design Load (lb/ft²)	22.2
Down-Slope Load (lb/ft²)	8.0

NXT Systems with DTD Butyl Attachment P30817211, Rail Splice P30808218, or Rail Clamp P30817214	
Downward Design Load (lb/ft²)	39.47
Upward Design Load (lb/ft²)	22.2
Down-Slope Load (lb/ft²)	8.0

UL 2703 and TIL Mechanical Load ratings tested module area 29.49 sq ft:

NXT Systems with all components included in PUB2023NOV10 Install Manual	
Downward Design Load (lb/ft²)	37.06
Upward Design Load (lb/ft²)	20.97
Down-Slope Load (lb/ft²)	7.53

Model	SM Ascender	-	One or two row elevated or non-elevated roof system is an extruded aluminum rail PV racking system that is installed to the roof in portrait orientation.

SM Ascender

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with aluminum mid clamps and aluminum end clamps. Fire rating of Class A when installed over non-combustible roofing materials.

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February 5, 2024

Unirac, Inc.
1411 Broadway Boulevard NE
Albuquerque, New Mexico 87102
TEL: (505) 242-6411
FAX: (505)242-6512

Re.: Innova Technologies No.: 124-099-1000
Unirac NXT U-Mount Design Tool – Florida

Attn: Engineering Services

Innova Technologies Inc. has reviewed Unirac's NXT U-Mount design tool and analysis, including the U-Builder online tool. NXT U-mount is a proprietary system to support Photovoltaic (PV) panels on a rooftop structure.

All analysis and information in the NXT design tool's formulas and tables comply with the following:

- 2009-2021 International Building Code by International Code Council Inc. with provisions from SEAOC PV-2
- ASCE/SEI 7-05 through 7-22 Minimum Design Loads and Other Structures, by American Society of Civil Engineers.
- Florida Building Code 2020, and 2023 Editions
- 2005 - 2020 Aluminum Design Manual, by the Aluminum Association.

This letter certifies that the structural analysis of the racking members and their direct components comply with the above codes and methodologies. This Design tool does not review the existing roof structure, or the PV panels themselves.

The U-Builder tool should be used under review of a registered design professional where required by the authority having jurisdiction.

For more information, see the construction drawings, and manufacturer installation instructions.

Best Regards,

COA # 29916

Adriana Gonorazky
Sr. Vice President
Innova Technologies, Inc.

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No. 69684
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Exp 02/28/2025
02/06/2024

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