

# PHOTOVOLTAIC SYSTEM



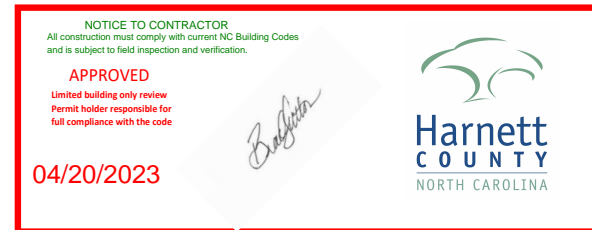
## PV SYSTEM SUMMARY: 7.200 KW

### RESIDENTIAL PHOTOVOLTAIC SYSTEM

SYSTEM SIZE (DC)	: STC: 18 X 400 = 7200W DC
	: PTC: 18 X 360 = 6480W DC
SYSTEM SIZE (AC)	: 5000W AC @ 240V
MODULES	: 18 X FREEDOM FOREVER: FF-MP-BBB-400
OPTIMIZERS	: 18 X SOLAR EDGE: S440
INVERTER	: SOLAR EDGE: SE5000H-USRGM [S11]
TILT	: 28°, 28°
AZIMUTH	: 193°, 13°
ROOF	: COMPOSITION SHINGLE
RAFTER/TRUSS SIZE	: 2X4 TRUSS @ 24" O.C.
ATTACHMENT TYPE	: ECOFASTEN: ROCKIT MICRORAIL WITH ROCKIT SMART SLIDE RAIL-LESS
MAIN SERVICE PANEL	: EXISTING 200 AMPS MSP WITH (E) 200 AMPS MAIN BREAKER ON HOT FED
INTERCONNECTION	: HOT BUS TIES IN MSP
OCPD RATING	: 30 AMPS
UTILITY	: DUKE ENERGY

## CITY NOTES:

THIS PROJECT COMPLIES WITH THE FOLLOWING:  
 2018 NORTH CAROLINA BUILDING CODE  
 2018 NORTH CAROLINA RESIDENTIAL CODE  
 2018 NORTH CAROLINA PLUMBING CODE  
 2018 NORTH CAROLINA MECHANICAL CODE  
 2018 NORTH CAROLINA FUEL GAS CODE  
 2017 NATIONAL ELECTRICAL CODE  
 AS ADOPTED BY **HARNETT COUNTY**



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.

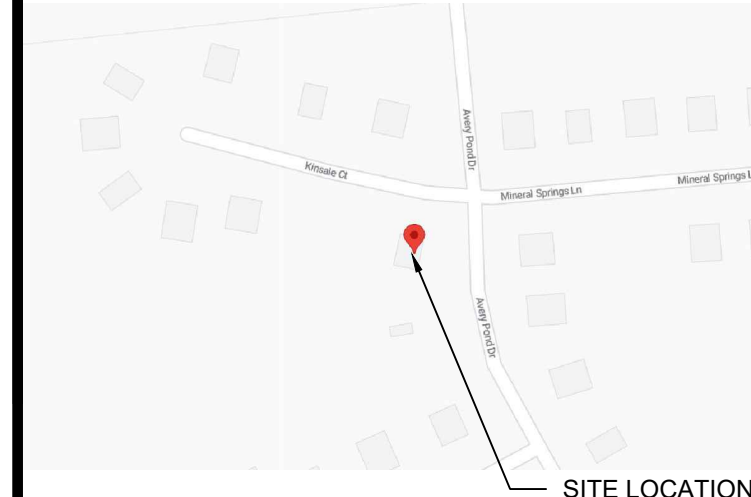
MODULES SHALL BE TESTED, LISTED AND IDENTIFIED WITH FIRE CLASSIFICATION IN ACCORDANCE WITH UL 2703. SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER SECTION R314 AND 315 TO BE VERIFIED AND INSPECTED BY INSPECTOR IN THE FIELD.

### INSTALLATION NOTES:

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

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

## SITE LOCATION:



## HOUSE AERIAL VIEW:



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FREEDOM FOREVER NORTH CAROLINA LLC  
 415 INDUSTRIAL CT., GREER, SC 29651  
 Tel: (800) 385-1075

ELECTRICAL CONTRACTOR NO. U.34043  
 GREG ALBRIGHT

CLIENT: **CONNOR OLTMAN**  
 23 KINSALE COURT,  
 FUQUAY-VARINA, NC 27526

DESCRIPTION	DATE	REVISION

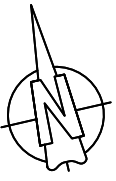
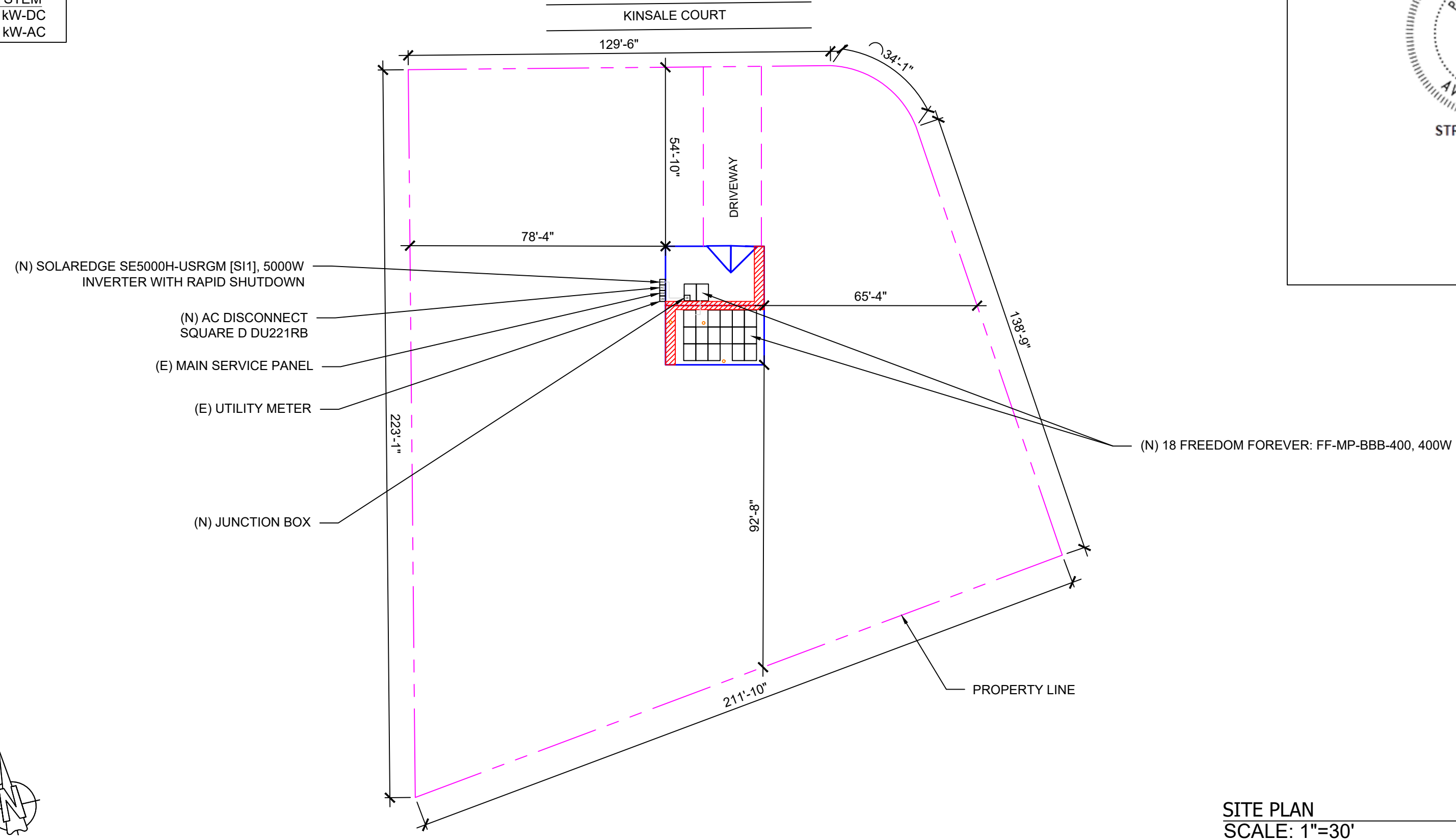
DATE:	11/03/2023
DESIGN BY:	REBB
JOB NO.:	311039

TITLE: **SITE LOCATION AND HOUSE AERIAL VIEW**

SHEET: **PV-1**

ROOF AREA : 1100.00 SQ FT

PV SYSTEM  
 7.200 kW-DC  
 5.000 kW-AC



SITE PLAN  
 SCALE: 1"=30'

1

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 FREEDOM FOREVER NORTH CAROLINA  
 LLC  
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ELECTRICAL CONTRACTOR NO:  
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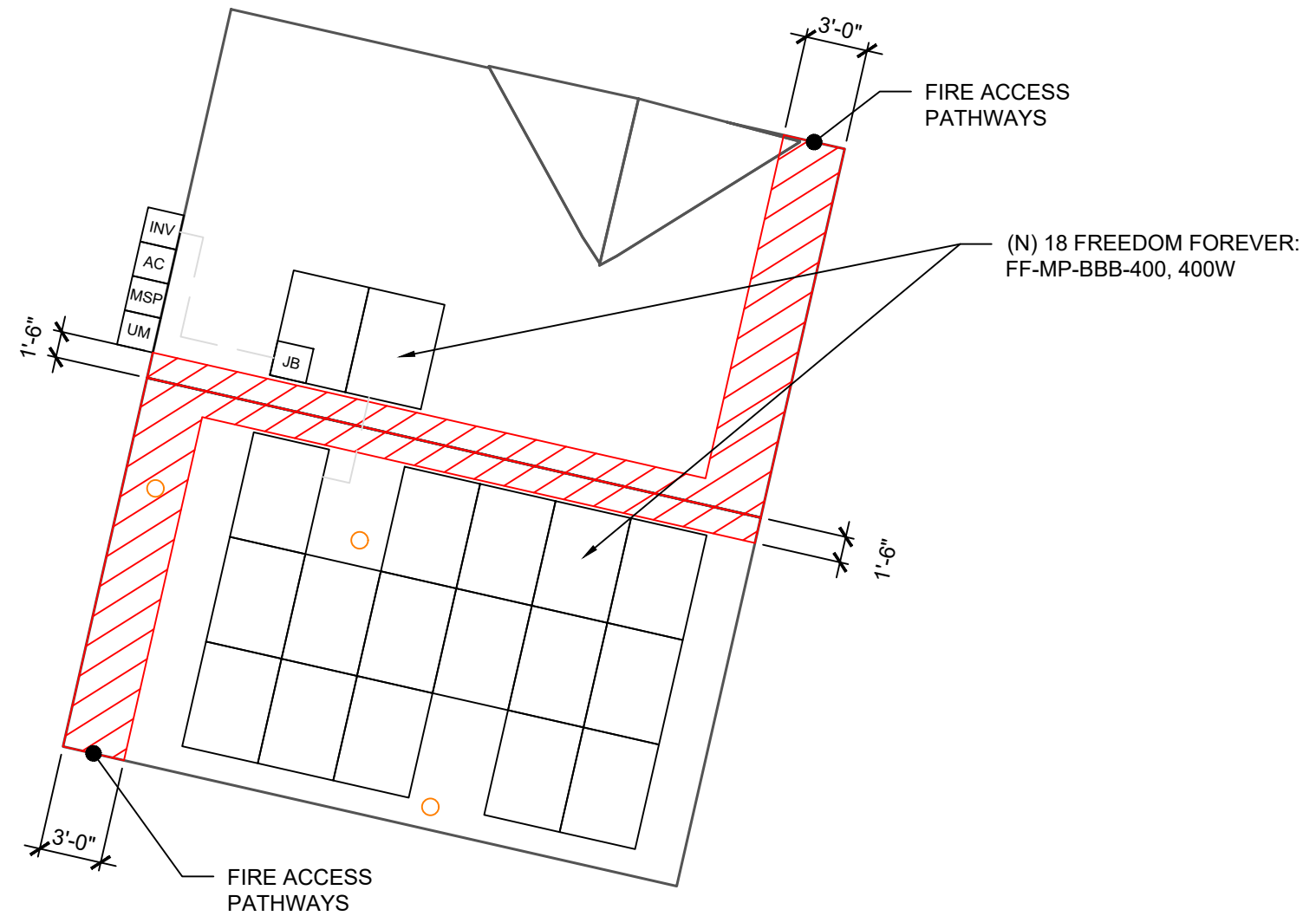
TITLE:  
**SITE PLAN**

SHEET:  
**PV-2**

ROOF AREA : 1100 SQ FT

PV SYSTEM  
**7.200** kW-DC  
 5.000 kW-AC

ROOF AREA STATEMENT							
ROOF	MODULES QTY	PITCH	AZIMUTH	ROOF AREA	ARRAY AREA	ARRAY COVERAGE %	SYSTEM DISTRIBUTED WEIGHT
1	16	28	193°	550 SQ FT	336.32 SQ FT	34.40%	2.32 PSF
2	2	28	13°	488 SQ FT	42.04 SQ FT		



LEGEND:

	OBSTRUCTION
	PIPE VENT
	MODULES
	CONDUIT
	SETBACK
	AC DISCONNECT
	MAIN SERVICE PANEL
	JUNCTION BOX
	INVERTER
	UTILITY METER

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



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

1

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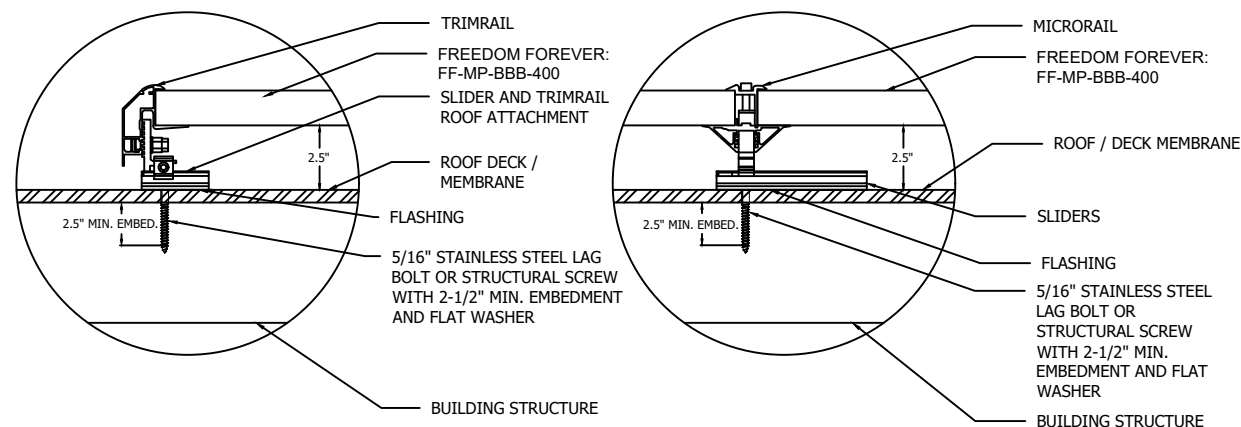
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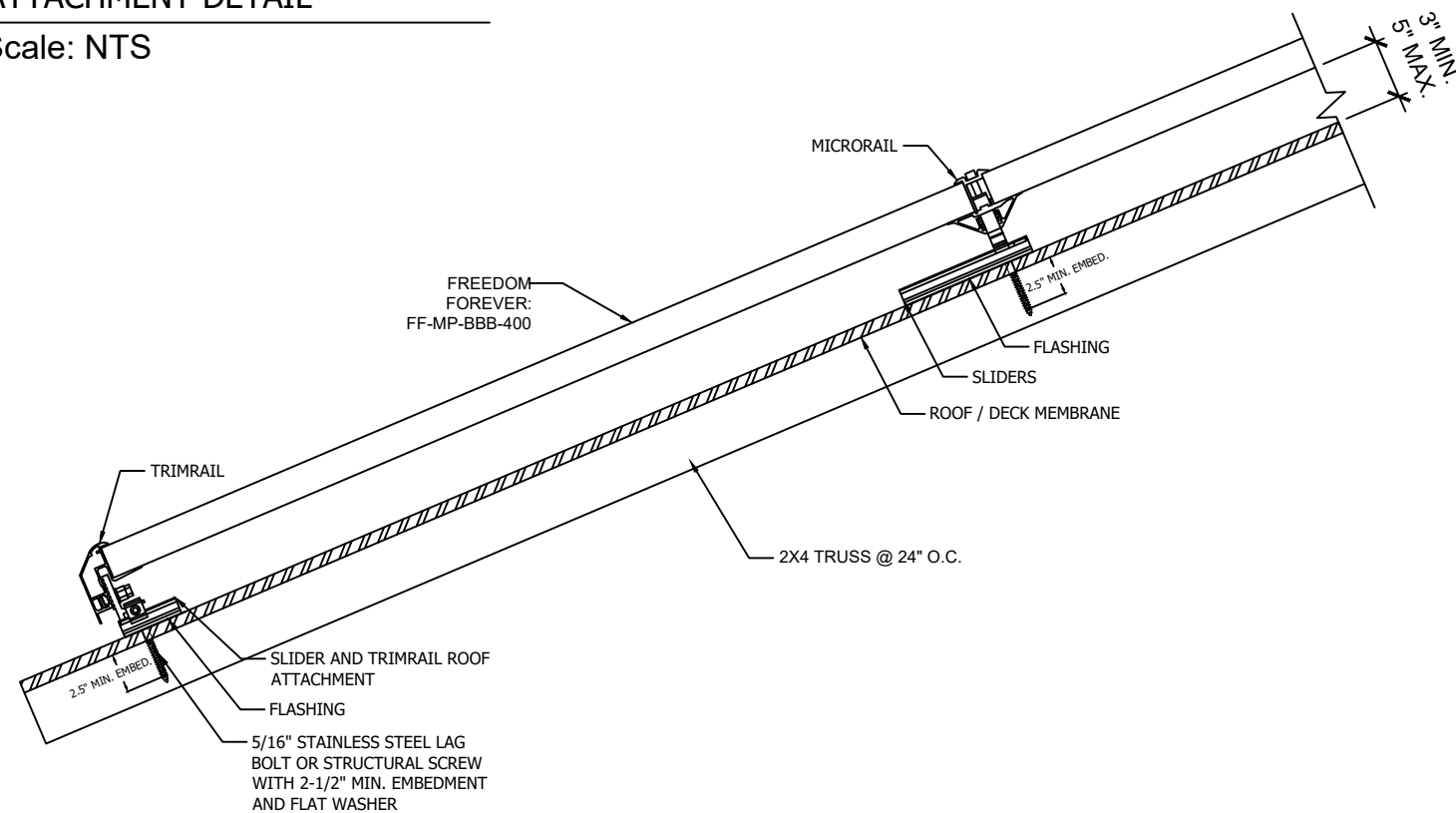
TITLE: **ROOF PLAN W/  
 MODULES LAYOUT**

SHEET: **PV-2A**



**ATTACHMENT DETAIL**

Scale: NTS



**MAX ATTACHMENT SPAN - 48" MAX STAGGERED**

**SOLAR PV ARRAY SECTION VIEW**

Scale: NTS

**PARTIAL ROOF FRAMING PLAN**

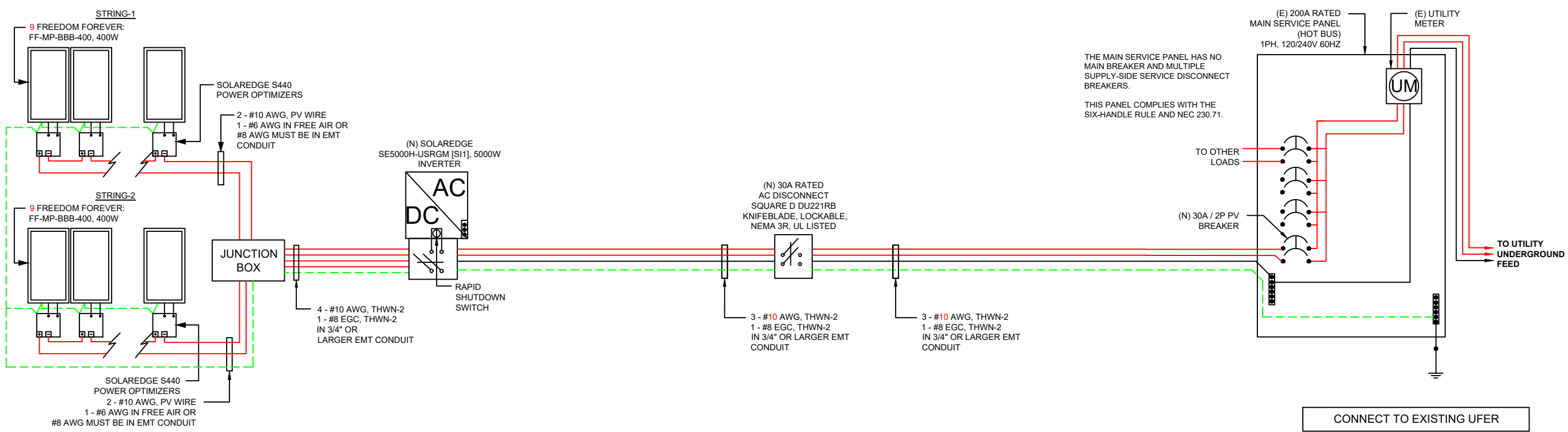
Scale: NTS

DESCRIPTION	DATE	REVISION

**BACKFEED BREAKER SIZING**  
 MAX. CONTINUOUS OUTPUT 21.00A @ 240V  
 21.00 X 1.25 = 26AMPS 30A BREAKER - OK

CONDUCTOR AMPACITY DE-RATE CALCULATION											
EQUIPMENT				WIRE LOCATION	CONDUCTOR QTY.	AWG WIRE SIZE	NEC FACTORS TABLE 310.15(B)(16)	NEC FACTORS TABLE 310.15(B)(2)(a)	CONDUCTOR AMPACITY @90C ADJ.	NEC FACTORS TABLE 310.15(B)(3)(a)	
1	AC	INVERTER	TO	AC DISCONNECT	EXTERIOR WALL	3	10	35	1	35	1.00
2	AC	AC DISCONNECT	TO	POI	EXTERIOR WALL	3	10	35	1	35	1.00

**PV SYSTEM**  
 7.200 kW-DC  
 5.000 kW-AC



NOTE:  
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TITLE: **THREE LINE DIAGRAM**

SHEET: **PV-4**

2023-03-03 05:39:02 PST



2023-03-03 05:40:11 PST



REVISIONS:		
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## GENERAL NOTES:

18 FREEDOM FOREVER WIRED AND LISTED TO UL1703 STANDARDS

THE SOLAREEDGE INVERTER IS INTEGRATED WITH DC DISCONNECTION AND ARC FAULT PROECTION. IT IS ATTACHED WITH SYSTEM ELECTRICAL SPECIFICATIONS W/ GROUND FAULT PROTECTION & LISTED TO UL 1741 STANDARDS.

PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER 2017 NEC SEC 250.166(A).

SOLAR PHOTOVOLTAIC SYSTEM EQUIPMENT WILL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF ART. 690 OF THE 2017 NEC

CONDUIT ABOVE ROOF SHALL BE NO LESS THAN 1 INCH FROM TOP OF THE ROOF TO BOTTOM OF RACEWAY. TABLE NEC 310.15(B)(3)(C)

PHOTOVOLTAIC DC CONDUCTORS ENTERING THE BUILDING SHALL BE INSTALLED IN METALLIC RACEWAY AND SHALL BE IDENTIFIED EVERY 10 FEET -- AND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES WALLS OR BARRIERS -- WITH MINIMUM 3/8-INCH-HIGH WHITE LETTERING ON RED BACKGROUND READING: WARNING: PHOTOVOLTAIC POWER SOURCE.

SYSTEM GROUNDING ELECTRODE CONDUCTOR FOR PV SYSTEM TO BE SIZED TO MEET THE REQUIREMENTS OF 2017 NEC

THE EXISTING 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

TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION

SOLAREEDGE INVERTERS ARE LISTED TO UL 1741 AND UL 1699B STANDARDS

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

## MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
18	MODULES	FF-MP-BBB-400	FREEDOM FOREVER: FF-MP-BBB-400
18	OPTIMIZERS	SOLAREEDGE	SOLAREEDGE: S440 POWER OPTIMIZER
1	JUNCTION BOX	480-276	600VDC NEMA 3R UL LISTED JUNCTION BOX
2	CONNECTORS	240-300	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
2	CONNECTORS	240-301	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTER	120-503	SE5000H-USRGM [S11] 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	AC DISCONNECT	323-030	30A RATED 240VAC NEMA 3R UL LISTED
33	ROOF ATTACHMENT 1	261-602	ECOFASTEN: ROCKIT MICRORAIL
32	MICRORAIL 1	261-602	ROCKIT SMART SLIDE RAIL-LESS
13	SFM TRIM 1	241-253	FLASHKIT SFM TRIM COMP DARK
35	SFM SLIDER 1	261-603	FLASHKIT SFM SLIDER COMP DARK
10	BONDING CLAMP 1	221-100	SFM N/S BONDING CLAMP
4	BONDING CLAMP 1	241-404	SFM TRIM BONDING CLAMP
19	MOUNT ASSEMBLY 1	241-405	MLPE MOUNT ASSY
11	SFM SPLICE 1	261-604	SFM SPLICE
3	SFM ATTACHED SPLICE 1	211-101	SFM ATTACHED SPLICE 8 INCH
15	TRIMRAIL 1	261-606	SFM TRIMRAIL UNIV CLIP W/ HDW
5	TRIM SPLICE 1	261-605	SFM TRIM SPLICE DRK
8	TRIMRAIL 1	211-115	SFM TRIMRAIL UNIV DRK
18	GROUND LUG 1	260-585	ILSCO GROUND LUG
18	TRIM END CAPS 1	221-200	UNIRAC SFM TRIM END CAPS

## BREAKER SIZES:

30A PV BREAKER

## SERVICE:



FREEDOM FOREVER NORTH CAROLINA  
LLC

415 INDUSTRIAL CT., GREER, SC 29651  
Tel: (800) 385-1075

ELECTRICAL CONTRACTOR NO:  
ELECTRICAL CONTRACTOR U.34043

GREG ALBRIGHT

CLIENT:

**CONNOR OLTMAN**

23 KINSALE COURT,  
FUQUAY-VARINA, NC 27526

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DATE: 11/03/2023

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JOB NO.: 311039

TITLE:

NOTES AND  
EQUIPMENT LIST

SHEET:

PV-6

**NOTES:**

1. NEC ARTICLES 690 AND 705 AND NEC 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. AERIAL FONT.
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED. SIGNAGE CANNOT BE HAND-WRITTEN.
3. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

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

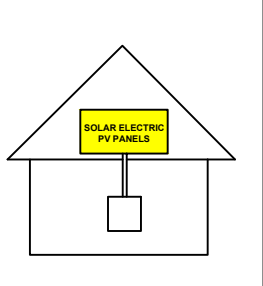
705.12(B)(2)(3)(b)

**"WARNING"**  
DUAL POWER SOURCES  
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM  
RATED AC OUTPUT CURRENT - 21.00 AMPS  
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.54

**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

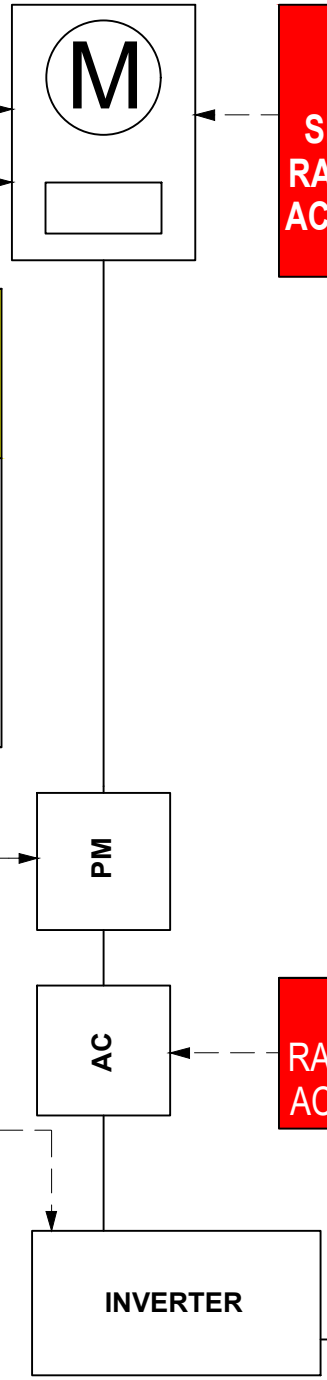


690.56(C)(1)(A)

PV METER

RAPID SHUTDOWN SWITCH FOR  
SOLAR PV SYSTEM

690.56(C)(3)



**"WARNING"**  
ELECTRICAL SHOCK HAZARD.  
TERMINALS ON BOTH LINE AND LOAD SIDES  
MAY BE ENERGIZED IN THE OPEN POSITION.

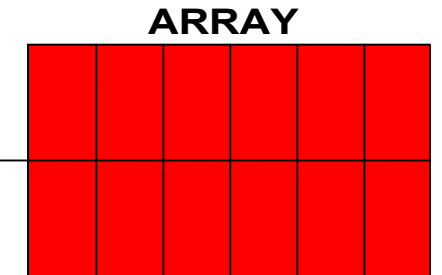
690.13 (B)

PV SYSTEM DC DISCONNECT  
MAXIMUM VOLTAGE: 480V  
MAXIMUM CIRCUIT CURRENT: 21A  
MAX RATED OUTPUT CURRENT OF  
THE CONTROLLER OR DC-TO-DC  
CONVERTER: 15A

690.53

PV SYSTEM AC DISCONNECT  
RATED AC OUTPUT CURRENT - 21.00 AMPS  
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.15, 690.54



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

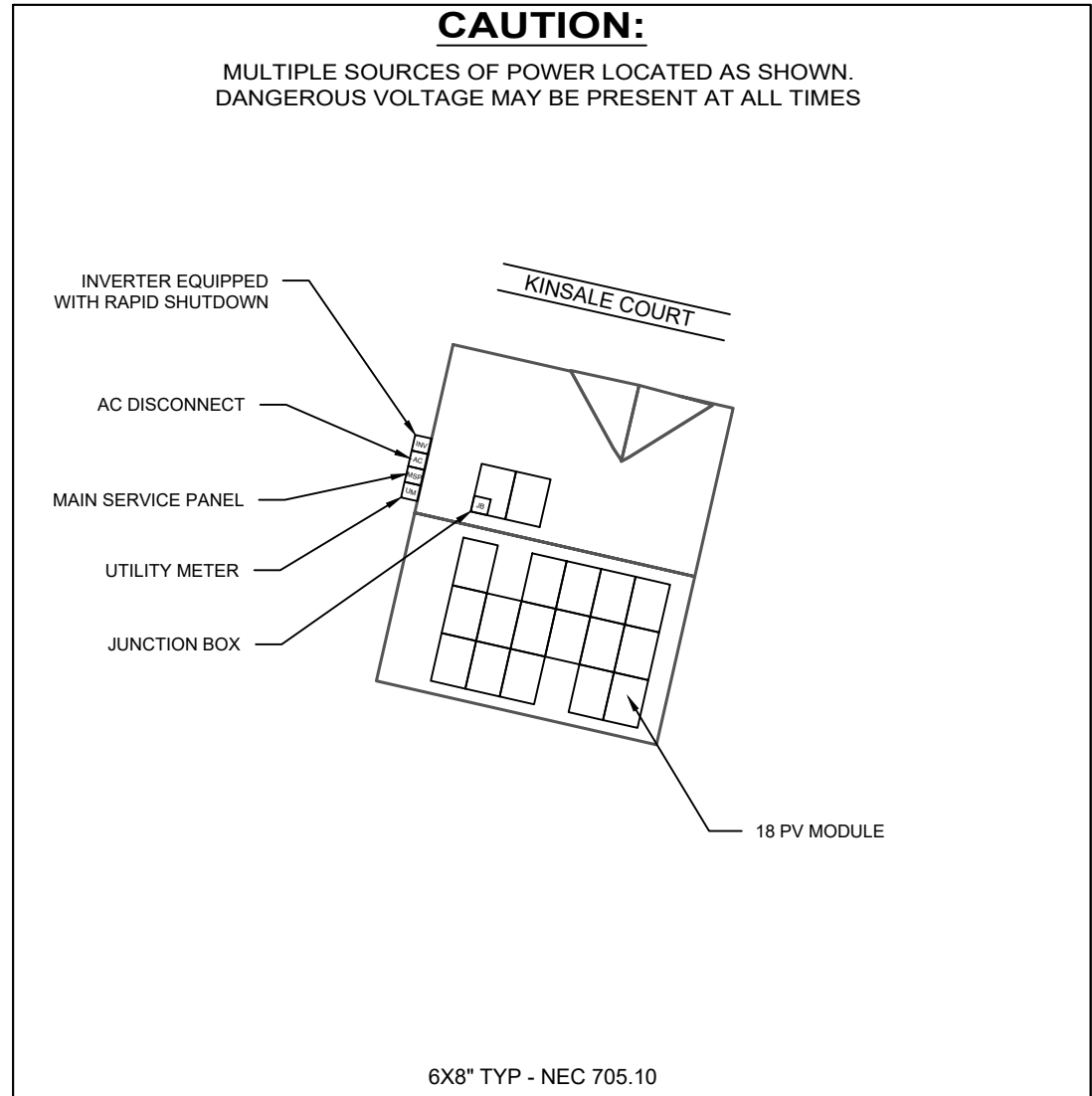
**"WARNING"**  
PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES

REVISIONS:		
DESCRIPTION	DATE	REVISION

DATE:	11/03/2023
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JOB NO.:	311039





**NOTES:**

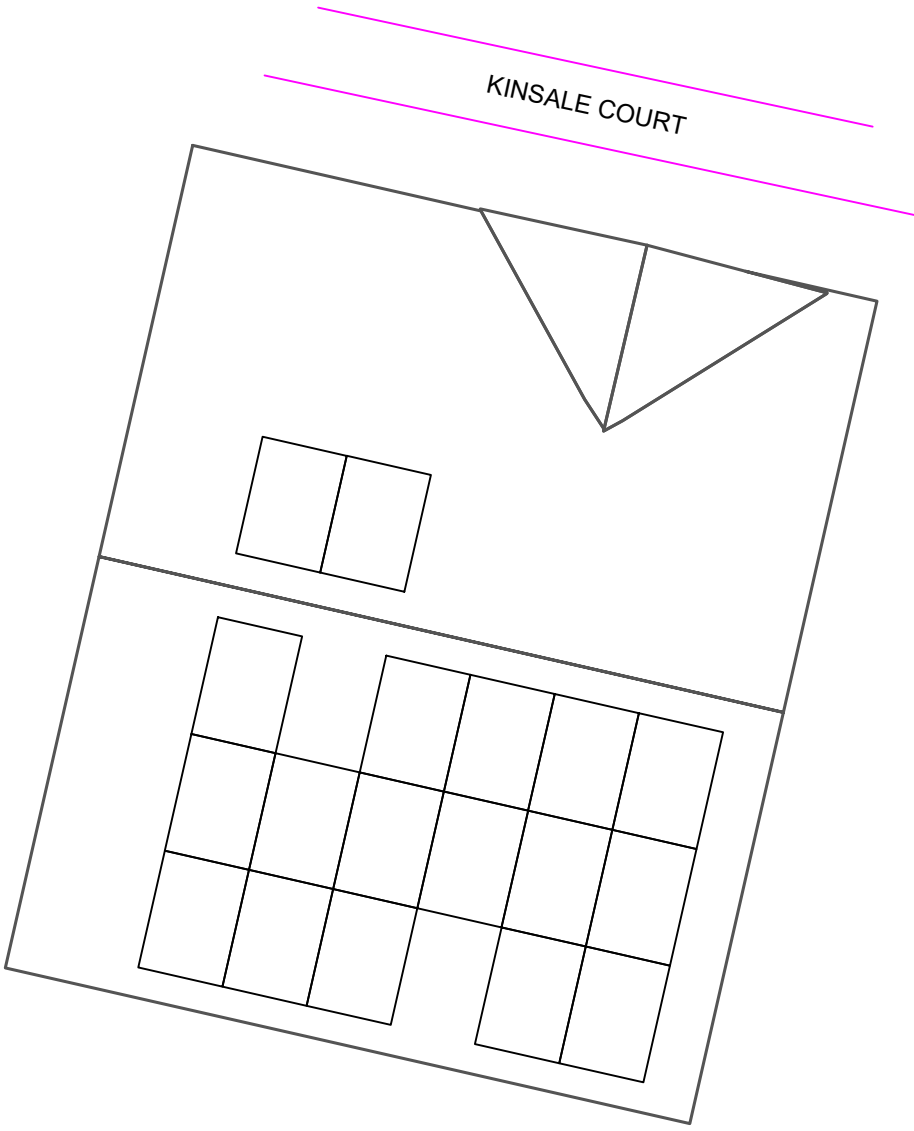
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DESCRIPTION	DATE	REVISION

# SOLAREEDGE OPTIMIZER CHART

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

1  
2  
3  
4  
5  
6  
7  
8  
9  
10

REVISIONS:		
DESCRIPTION	DATE	REVISION

DATE:	11/03/2023
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JOB NO.:	311039

# SAFETY PLAN

# MARK UP KEY

## 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

## IN CASE OF EMERGENCY

NEAREST HOSPITAL OR OCCUPATIONAL/INDUSTRIAL CLINIC

NAME: \_\_\_\_\_

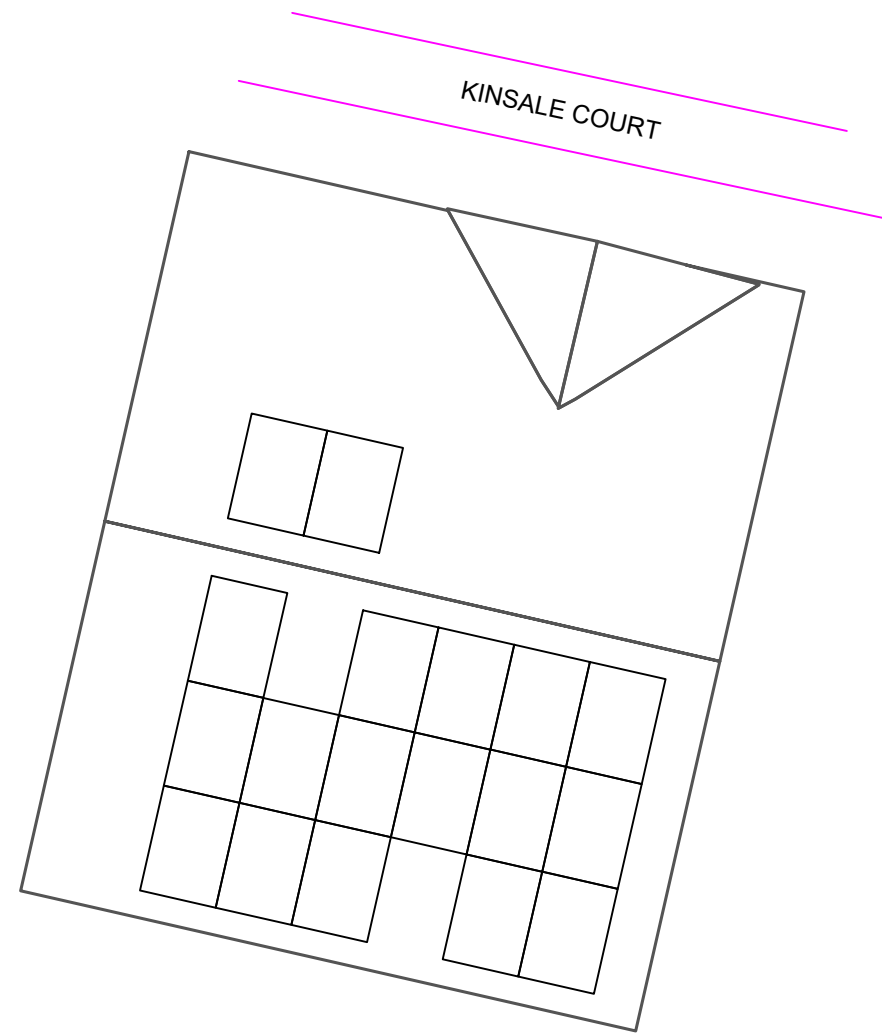
ADDRESS: \_\_\_\_\_

### SAFETY COACH CONTACT INFORMATION

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

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.



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

NAME                      SIGNATURE


DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

CLIENT: **CONNOR OLTMAN**  
 23 KINSALE COURT,  
 FUQUAY-VARINA, NC 27526

REVISIONS:		
DESCRIPTION	DATE	REVISION

DATE: 11/03/2023  
 DESIGN BY: REBB  
 JOB NO.: 311039

TITLE: SAFETY PLAN

SHEET: PV-9



ELECTRICAL CONTRACTOR NO. U.34043  
 GREG ALBRIGHT

# 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 identified and protected from contact, as necessary.

EQP (name and tile):

### Public Protection

- The safety of the Client and the 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 protect 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 the 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)

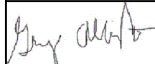
Define the Hazard:	Method/steps to prevent incident:
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**FREEDOM FOREVER NORTH CAROLINA LLC**  
415 INDUSTRIAL CT., GREER, SC 29651  
Tel: (800) 385-1075

ELECTRICAL CONTRACTOR NO. U.34043  
ELECTRICAL CONTRACTOR U.34043

GREG ALBRIGHT



CLIENT: **CONNOR OLTMAN**  
23 KINSALE COURT,  
FUQUAY-VARINA, NC 27526

REVISIONS:		
DESCRIPTION	DATE	REVISION

DATE: 11/03/2023

DESIGN BY: REBB

JOB NO.: 311039

TITLE: **SAFETY PLAN**

SHEET: **PV-10**



# HALO 2 400W MODULE

## FF-MP-BBB-400

High module conversion efficiency up to 20.48%

Excellent weak light performance

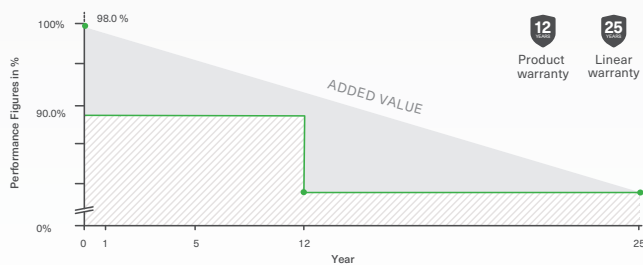
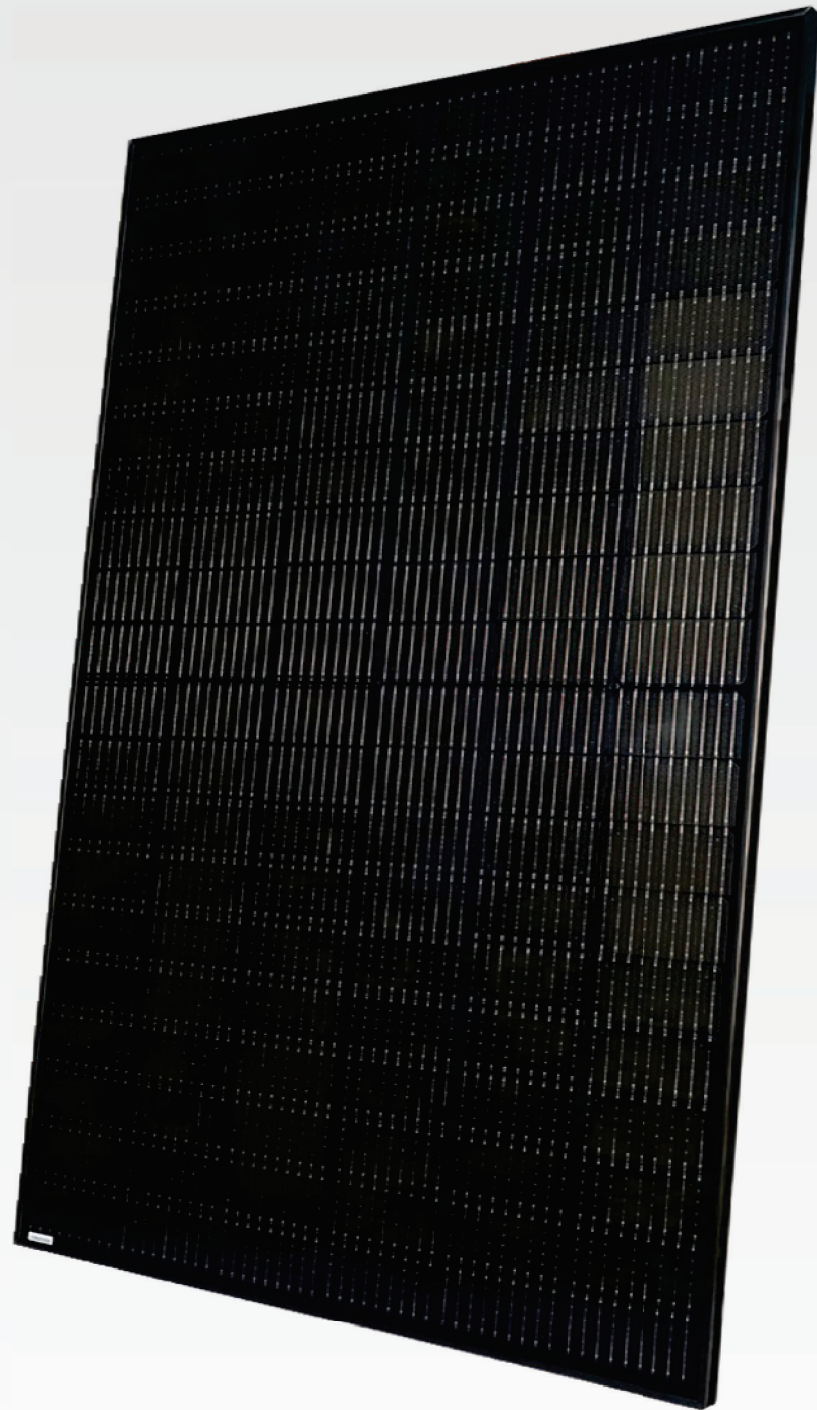
Withstanding harsh environment

Lower operating temperature

Extreme weather loading

12-year material & workmanship

25-year linear power output

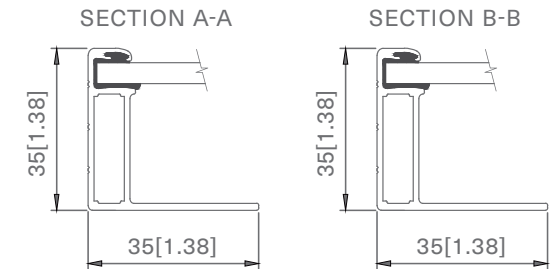


## MODULE SPECIFICATIONS

### ELECTRICAL CHARACTERISTICS

Characteristics	FF-MP-BBB-400
Maximum Power (P <sub>max</sub> )	400W
Maximum Power Voltage (V <sub>mp</sub> )	31.01V
Maximum Power Current (I <sub>mp</sub> )[A]	12.90A
Open Circuit Voltage (V <sub>oc</sub> )[V]	37.07V
Short Circuit Current (I <sub>sc</sub> )[A]	13.79A
Module Efficiency	20.48%
Power Tolerance	0/+5W
STC	Irradiance of 1000W/m <sup>2</sup> , AM1.5, cell Temperature 25°C

### FRAME PROFILE



### MECHANICAL CHARACTERISTICS

Cell Type	Mono perc, 182 mm-half cells, 108 (6x9+6x9)
Weight	22.1 kgs (48.7 lbs)
Dimension	1722 x 1134 x 35 mm (67.80 x 44.65 x 1.38)
Front Glass	3.2 mm (.13 in), High Transmission, Low Iron & Semi-Tempered Glass
Junction Box	IP68 (3 Bypass Diodes)
Output Cables	1200 mm (47 in)
Connector	Staubli EVO2
Frame & Installation	Anodized aluminum profile

### OPERATIONS CHARACTERISTICS

Operational Temperature	-40°C~+85°
Max System Voltage	1500V
Max Series Fuse Rating	25A
Safety Class	Class II
Fire Rating	Type 1

### MECHANICAL LOADING

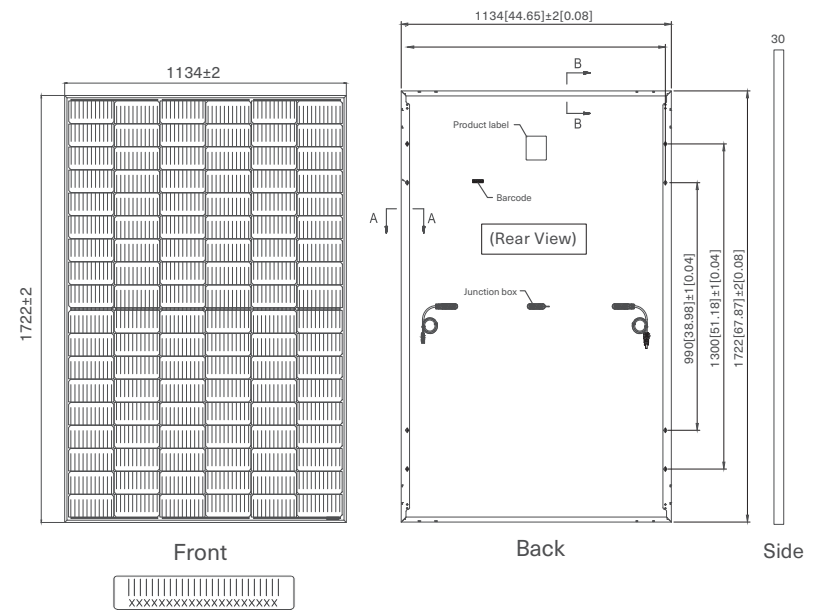
Snow Load	5,400Pa (113lb/ft2)
Rear Side Design Load	2,400Pa (50lb/ft2)

### PACKAGING INFORMATION

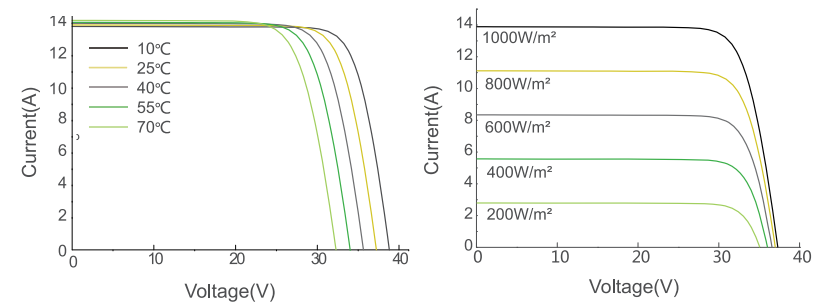
Container	20' GP	40' HC
Pallets per Container	6	26
Panels per Container	186	806

### TEMPERATURE RATINGS

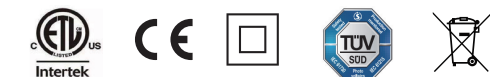
Temperature Coefficient of P <sub>max</sub>	-0.350%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.275%/°C
Temperature Coefficient of I <sub>sc</sub>	+0.045%/°C
Nominal Operating cell Temperature (NOCT)	42°C±2°C



### CURRENT-VOLTAGE CURVE



### CERTIFICATIONS AND STANDARDS PENDING



UL 61730 | UL 61215 | ISO 9001 | ISO 14001 | IEC 61701 | IEC 17025 | IEC61716 | DIN EN 60068-2-68



# Single Phase Inverter with HD-Wave Technology

for North America

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

12-25  
YEAR  
WARRANTY



INVERTERS

## / Single Phase Inverter with HD-Wave Technology for North America

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

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US		
<b>OUTPUT</b>									
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 <sup>(1)</sup>							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	
GFDI Threshold	1							A	
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes								
<b>INPUT</b>									
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 <sup>(2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Adc	
Maximum Input Current @208V <sup>(2)</sup>	-	9	-	13.5	-	-	27	Adc	
Max. Input Short Circuit Current	45							Adc	
Reverse-Polarity Protection	Yes								
Ground-Fault Isolation Detection	600ka Sensitivity								
Maximum Inverter Efficiency	99	99.2						%	
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%	
Nighttime Power Consumption	< 2.5							W	
<b>ADDITIONAL FEATURES</b>									
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)								
Revenue Grade Data, ANSI C12.20	Optional <sup>(3)</sup>								
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect								
<b>STANDARD COMPLIANCE</b>									
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								
<b>INSTALLATION SPECIFICATIONS</b>									
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	-13 to +140 / -25 to +60 <sup>(4)</sup> (-40°F / -40°C option) <sup>(5)</sup>							°F / °C	
Protection Rating	NEMA 4X (Inverter with Safety Switch)								

<sup>(1)</sup> For other regional settings please contact SolarEdge support  
<sup>(2)</sup> A higher current source may be used; the inverter will limit its input current to the values stated  
<sup>(3)</sup> Revenue grade inverter P/N: SExxxxH-US000NNC2  
<sup>(4)</sup> For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>  
<sup>(5)</sup> -40 version P/N: SExxxxH-US000NNU4

### Optimized installation with HD-Wave technology

- / Specifically designed to work with power optimizers
- / Record-breaking efficiency
- / Fixed voltage inverter for longer strings
- / Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- / UL1741 SA certified, for CPUC Rule 21 grid compliance
- / Extremely small
- / Built-in module-level monitoring
- / Outdoor and indoor installation
- / Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

# Power Optimizer

S440, S500



POWER OPTIMIZER

## PV power optimization at the module level

- / Specifically designed to work with SolarEdge residential inverters
- / 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
- / Detects abnormal PV connector behavior, preventing potential safety issues\*
- / Module-level voltage shutdown for installer and firefighter safety
- / Flexible system design for maximum space utilization
- / Compatible with bifacial PV modules

\* Functionality subject to inverter model and firmware version

[solaredge.com](http://solaredge.com)

**solaredge**

## / Power Optimizer

S440, S500

	S440	S500	UNIT
<b>INPUT</b>			
Rated Input DC Power <sup>(1)</sup>	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		Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overtoltage Category	II		
<b>OUTPUT DURING OPERATION</b>			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
<b>OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)</b>			
Safety Output Voltage per Power Optimizer	1		Vdc
<b>STANDARD COMPLIANCE</b>			
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011		
Safety	IEC62109-1 (class II safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
Fire Safety	VDE-AR-E 2100-712:2013-05		
<b>INSTALLATION SPECIFICATIONS</b>			
Maximum Allowed System Voltage	1000		Vdc
Dimensions (W x L x H)	129 x 153 x 30		mm
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4 <sup>(2)</sup>		
Input Wire Length	0.1		
Output Connector	MC4		
Output Wire Length	(+ ) 2.3, (- ) 0.10		
Operating Temperature Range <sup>(3)</sup>	-40 to +85		
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

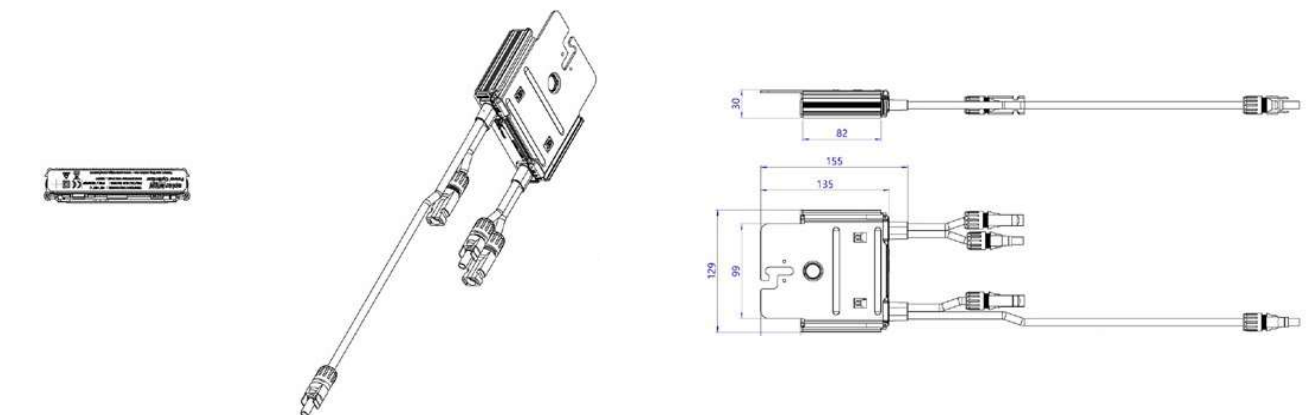
PV System Design Using a SolarEdge Inverter	Single Phase HD-Wave	Single Phase	Three Phase	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	S440, S500	8	16	18	
Maximum String Length (Power Optimizers)		25	50		
Maximum Nominal Power per String <sup>(4)</sup>		5700	5250	11250 <sup>(5)</sup>	12750 <sup>(6)</sup>
Parallel Strings of Different Lengths or Orientations		Yes			

(4) If the inverters rated AC power  $\leq$  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>

(5) For the 230/400V grid: it is allowed to install up to 13,500W per string when the maximum power difference between each string is 2,000W

(6) For the 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W

(7) It is not allowed to mix S-series and P-series power optimizers in new installations



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CE RoHS



## ROCKIT<sup>®</sup>

### COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a top-down leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

### FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install
- Florida Product Approved for composition shingle roofs

### STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS



## ROCKIT

### ROCKIT COUPLING

The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.

### SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aesthetically-pleasing finishing touch.

### ROCKIT MOUNT

Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

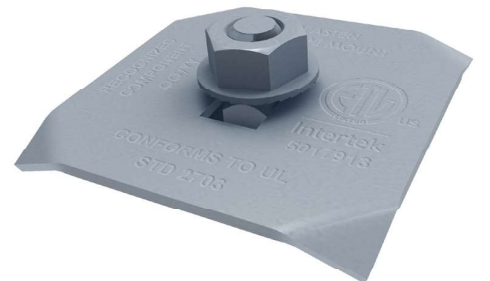


### ROCKIT COMP SLIDE

Available in four variations, the RockIt Slide allows installation on composition shingle, tile, and metal roofs.

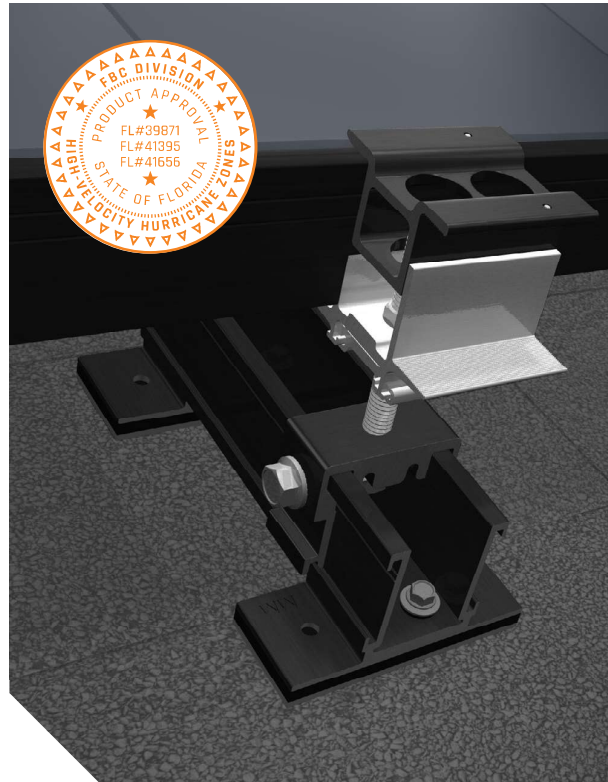
### FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.





# COMPOSITION SHINGLE ROOFS



## SMART SLIDE

Patent pending, fast installing simple solution for composition shingle roofs. Eliminates the need to pry up shingle courses and install a metal flashing.

- Multiple opportunities to find the rafter
- No need for additional material when architectural shingles are not level
- Longer 6.75" slide avoids overlaps in shingle courses
- Integrated flashing utilizes UltraGrip Technology™ to create a watertight seal



ROCKIT SMART SLIDE

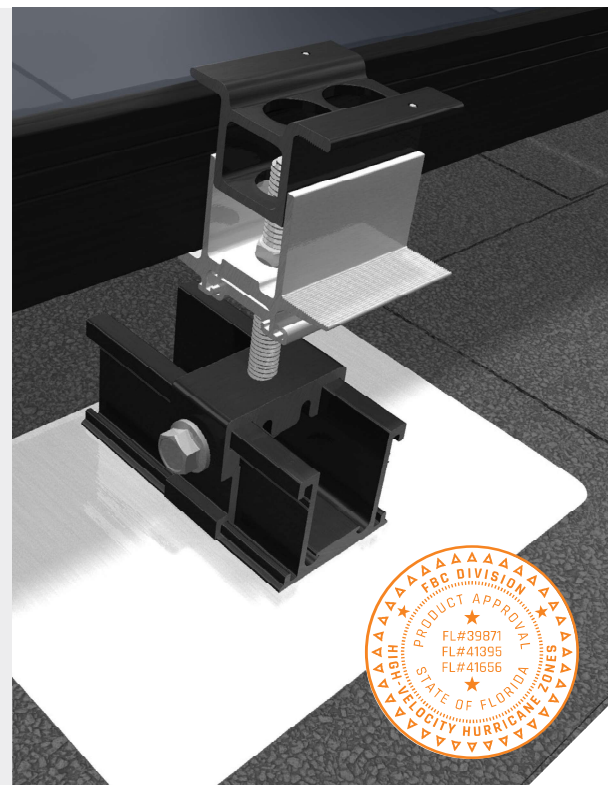
## COMP SLIDE

Combine the GF-1 Flashing with the Rockit Slide for a flashed composition shingle roof application.

- Installs without removing shingles
- One lag bolt for single penetration
- Compatible with a variety of EcoFasten compression brackets



GF-1 FLASHING & ROCKIT COMP SLIDE



**ROCKIT**



## ECOFASTEN SOLAR

EcoFasten has established a reputation for being one of the industry's leading innovators by providing expert solutions for mounting solar PV on any type of roof. Our broad portfolio of solutions stems from the needs of, and direct inputs by solar PV installers. We take pride in providing the right solution for every application. We educate our customers, so they purchase the best, most cost-effective solutions to fit their needs, and we complement that with on-site installation training to ensure 100% satisfaction. We are honest with ourselves, our customers, and our employees, fostering a culture of idea-sharing, innovation, and creativity.



VERSION 2.1



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