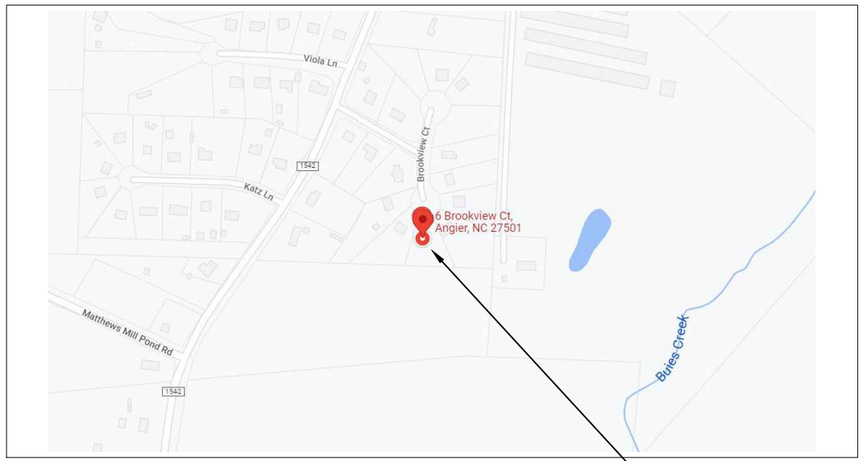
ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING:
2018 NC STATE BUILDING CODE
2015 INTERNATIONAL BUILDING CODE (IBC)
2015 INTERNATIONAL RESIDENTIAL CODE (IRC)
2018 INTERNATIONAL MECHANICAL CODE (IMC)
2018 INTERNATIONAL PLUMBING CODE (IPC)
2018 INTERNATIONAL FUEL GAS CODE (IFGC)
2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
2015 INTERNATIONAL EXISTING BUILDING CODE (IEBC)
2018 INTERNATIONAL SWIMMING POOL AND SPA CODE (ISPSC)
2020 NATIONAL ELECTRICAL CODE (NEC)
AS ADOPTED BY HARNETT COUNTY (NC)

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 CHECK AHJ NEC SEC 250.166(A).

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

CLIENT:
JACQUELINE VAUDRIN
6 BROOKVIEW COURT, ANGIER, NC 27501
AHJ: HARNETT COUNTY (NC)
UTILITY: DUKE ENERGY
PHONE: (440) 915-2885
EMAIL: JVAUDRIN@HOTMAIL.COM

SYSTEM:
SYSTEM SIZE (DC): 12 X 400 = 4.800 kW
SYSTEM SIZE (AC): 3.800 kW @ 240V
MODULES: 12 X FREEDOM FOREVER:
FF-MP-BBB-400
OPTIMIZERS: 12 X SOLAREDGE S440
INVERTER: SOLAREDGE SE3800H-US [SI1]

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

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

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SITE LOCATION

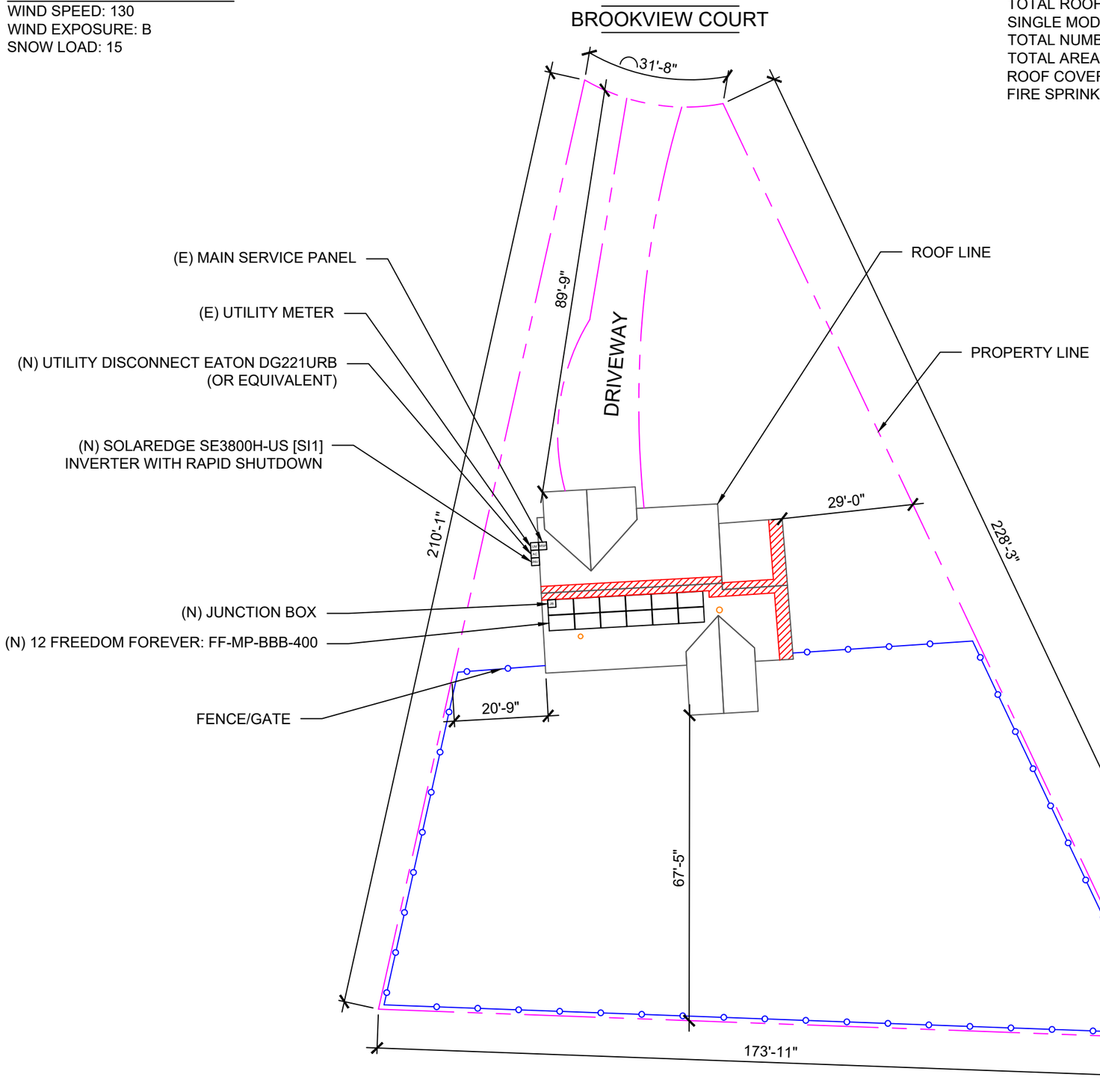
JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-1

LEGEND:

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

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 130
WIND EXPOSURE: B
SNOW LOAD: 15

TOTAL ROOF AREA RIDGE SETBACK CALCS:
TOTAL ROOF AREA: 2335 SQ FT
SINGLE MODULE AREA: 21.01937947 SQ FT
TOTAL NUMBER OF MODULES: 12
TOTAL AREA OF MODULES: 252.23 SQ FT
ROOF COVERAGE: 10.80%
FIRE SPRINKLERS : NO



SITE PLAN
SCALE: 1"=25'

1

ROOF AREA: 2335 SQ FT

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INVERTER: SOLAREDGE SE3800H-US [SI1]

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ELECTRICAL CONTRACTOR U.34043

SITE PLAN

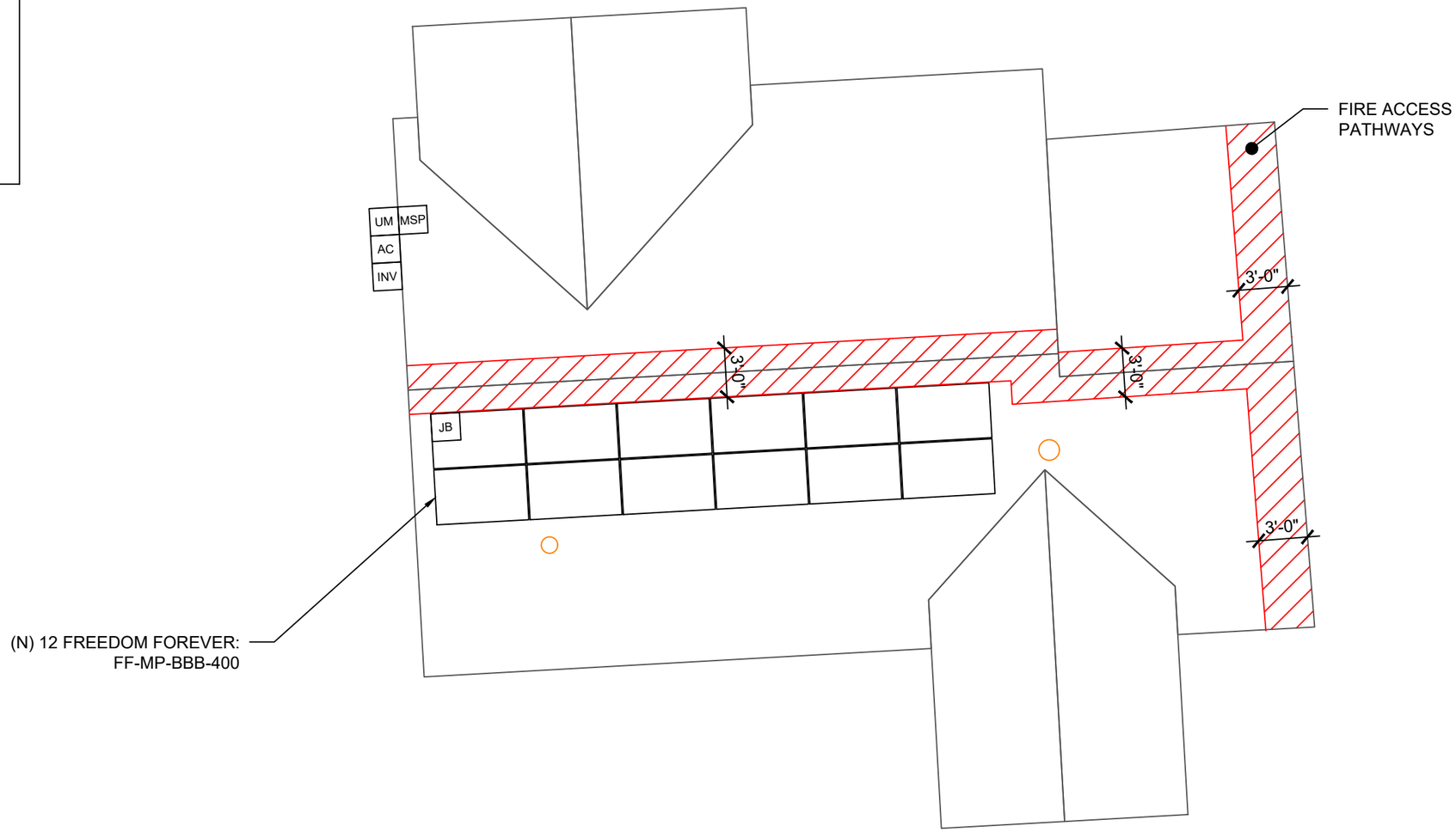
JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-2

LEGEND:

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

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 130
WIND EXPOSURE: B
SNOW LOAD: 15

TOTAL ROOF AREA: 2335 SQ FT
TOTAL ARRAY AREA: 252.23 SQ FT
ARRAY COVERAGE: 10.80%
SYSTEM DISTRIBUTED WEIGHT: 2.32 LBS
ROCKIT MICRORAIL POINT-LOAD: 20.88 LBS



ROOF PLAN
SCALE: 1/8" = 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.

Avial Lumagui

Digitally signed by Avial Lumagui
Date: 2022.11.10 13:00:12 -05'00'

NORTH CAROLINA PROFESSIONAL SEAL 054960 ENGINEER AVIAL LUMAGUI

STRUCTURAL ONLY

ROOF AREA: 2335 SQ FT

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GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 2335 SQ FT
TOTAL ARRAY AREA: 252.23 SQFT
ARRAY COVERAGE: 10.80%
SYSTEM DISTRIBUTED WEIGHT: 2.32 LBS
ROCKIT MICRORAIL POINT-LOAD: 20.88 LBS

ROOF AREA STATEMENT						
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	12	25	25	177	927 SQ FT	252.23 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
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT

NORTH CAROLINA PROFESSIONAL SEAL 054960 ENGINEER AVIAL LUMAGUI
STRUCTURAL ONLY

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CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

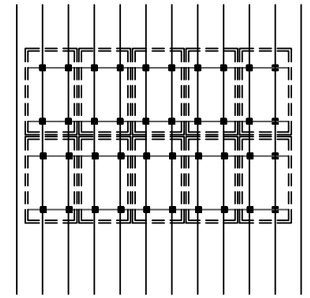
ROOF DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-2B

TABLE 1 - ARRAY INSTALLATION

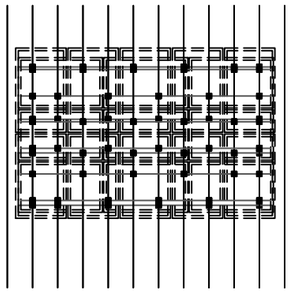
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE1	MAX UNBRACED LENGTH(FT.)1	RAFTER/TRUSS SISTERING	PENETRATION PATTERN2	MAX ATTACHMENT SPACING (IN.)2	MAX RAIL OVERHANG(IN.)3
ROOF 1	25	COMP SHINGLE	ECOFASTEN ROCKIT SLIDE	2X4 TRUSS @ 24" OC	8.00'	NOT REQ'D	STAGGERED	48" OC	16"

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. WHERE APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.



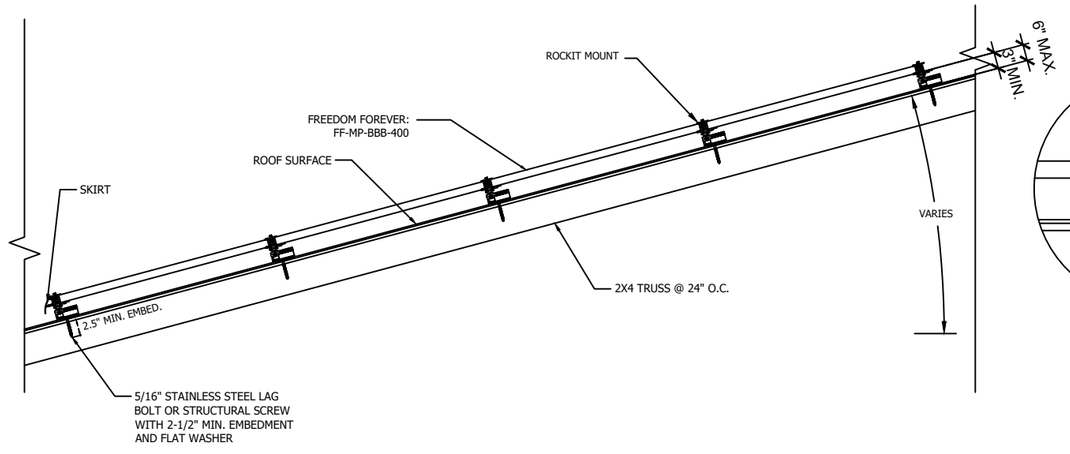
STACKED DETAIL

For Illustration purposes only



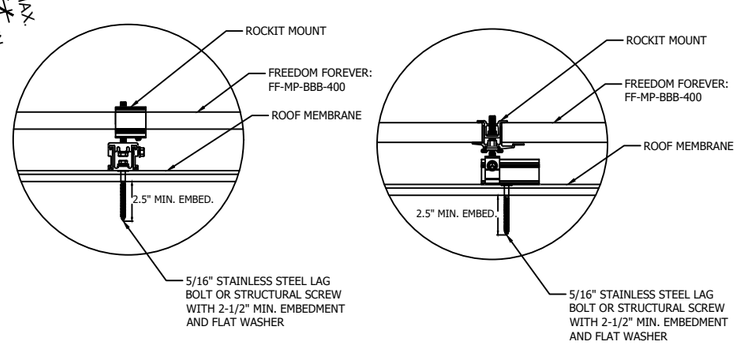
STAGGERED DETAIL

For Illustration purposes only



SOLAR PV ARRAY SECTION VIEW

Scale: NTS



ATTACHMENT DETAIL

Scale: NTS

NORTH CAROLINA PROFESSIONAL SEAL 054960 ENGINEER AVIAL LUMAGUI

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NO.	REVISED BY	DATE
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freedom FOREVER

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
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GREG ALBRIGHT

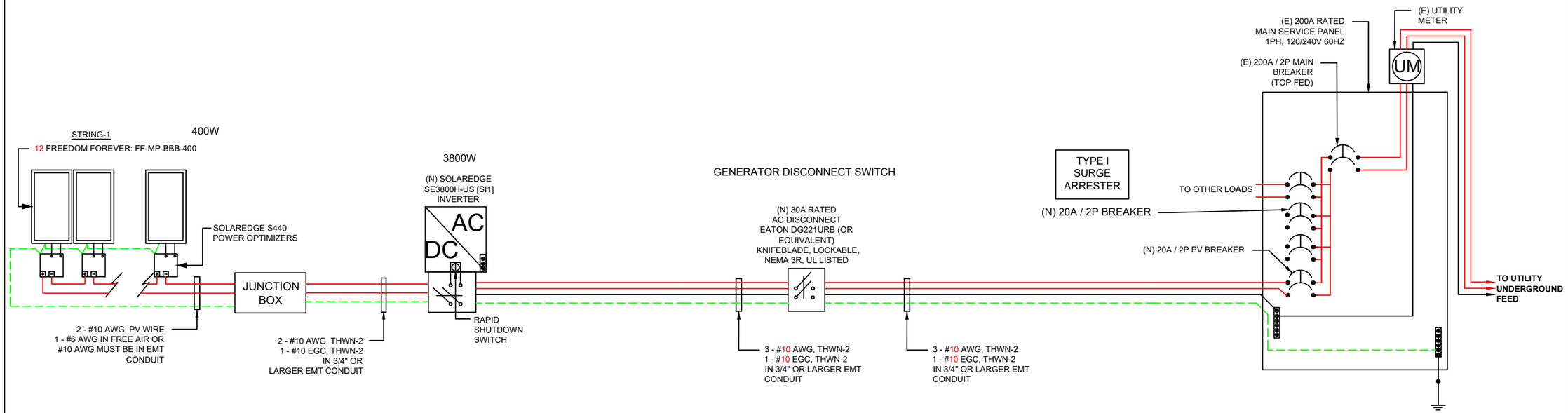
CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

MOUNTING DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-3

BACKFEED BREAKER SIZING					
MAX. CONTINUOUS OUTPUT 16.00A @ 240V					
16.00	X	1.25	=	20.00AMPS	20A BREAKER - OK
SEE 705.12 OF CHECK AHJ NEC					
200	X	1.20	=	240	
240	-	200	=	40A ALLOWABLE BACKFEED	

LOCKABLE DISCONNECT, WITHIN 10' OF THE METER, MUST BE PROVIDED THAT IS READILY ACCESSIBLE AT ALL TIMES TO THE ASSOCIATION'S PERSONNEL.



NOTE:
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GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

THREE LINE DIAGRAM

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-4

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	17.24	1	1	40.00	21.55
2	DC	OPTIMIZER	TO	JUNCTION BOX	2	10	40	15.00	1	1	40.00	18.75
3	DC	JUNCTION BOX	TO	INVERTER	2	10	40	15.00	1	1	40.00	18.75
4	AC	INVERTER	TO	AC DISCONNECT	3	10	40	16.00	1	1	40.00	20.00
5	AC	AC DISCONNECT	TO	POI	3	10	40	16.00	1	1	40.00	20.00

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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CONDUCTOR CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-5

Residential Optional Calculation

by: John Sokolik

Version 2011 L

9/25/1997

Freedom Forever LLC

Jacqueline Vaudrin
6 Brookview Court
Angier, NC 27501
(440) 915-2885

11/1/2022 18:13

STEP 1 Article 220.82 (B) (1),(2)

sq. ft	1352	General Lighting load	4,056 VA
	2	Small Appliance	3,000 VA
	1	Laundry circuit	1,500 VA
	Gen.Lgt, Sm App.& Laun. Load		8,556 VA

STEP 2 Article 220.82 (C) ☑

General lighting, Sm. Appl. & Laundry **8,556 VA**

A/C Condenser & Fixed Electric Space Heating

					QTY
2.5 ton	3,600 VA	AHU 1	5kW	5,800 VA	1
A/C #2	VA	AHU 2	Select	VA	Qty
A/C #3	VA	AHU 3	Select	VA	Qty
A/C #4	VA	AHU 4	Select	VA	Qty
A/C #5	VA	AHU 5	Select	VA	Qty

Total 1

Heating Load	4,050 VA
CU Load	4,400 VA

Electric Space Heat @ 65% <4, 40% >3, vs. A/C @ 100% **4,400 VA**

STEP 3 Article 220.82 (B) (3)

6,000 VA	1	Water Heater	6,000 VA	
1,400 VA	1	Refrigerator	1,400 VA	
600 VA	1	Freezer	600 VA	
1,030 VA	1	Dishwasher	1,030 VA	
690 VA	1	Disposal	690 VA	
400 VA	1	R / Hood	400 VA	
1,000 VA	1	Microwave	1,000 VA	
☐ 4,000 VA		Microwave	VA	
170 VA		Mini Refrig	VA	
☐ 400 VA		Wine Clr	VA	
☐ 5,000 VA		Insta Hot	VA	
1,500 VA		Ironing Center	VA	
☐ select		Jacuzzi Tub	VA	
☐ select		Sprinkler Pump	VA	
☐ select		Well Pump	VA	
select		Fountain Pump	VA	
select		Elevator	VA	
		Pool Equip. Panel	VA	Apply Demand
☐			VA	No Demand
☐			VA	No Demand

Appliance Demand Load	**11,120 VA**
Dryer Demand Load	**5,760 VA**
Range Demand Load	**7,680 VA**
Service Demand	**23,646 VA**
Demand Load	**99 A**
Neutral Demand	**77 A**
Min.Service Req.	**100 A**
Min. Feeder size	**4**
Min. Neutral size	**4**
Eq. Grding Cond.	**8**
☐	**Copper**
Total Appliance Load	**11,120 VA**

STEP 4 Article 220.82 (B) (3)

Electric Clothes Dryers **5,760 VA**

STEP 5 Article 220.82 (B) (3)

Electric Ranges **7,680 W** Col C demand **8000**

or Number of appliances

☐ Check Box for Gas Range

Cooktop	Col B demand
Cooktop	Col B demand
Oven(s)	Col B demand
Oven(s)	Col B demand
Number of appliances	**0** Dem. Factor
Cooktop & Oven Demand Load	

jmp1ids@comcast.net

>>>

OCPD SIZES:

20A BREAKER

SERVICE LIST:

NONE

MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
12	MODULES	PV-110-400	FREEDOM FOREVER: FF-MP-BBB-400
12	OPTIMIZERS	S440	SOLAREDGE S440 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
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	INV-120-381	SE3800H-US [SI1] 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	AC DISCONNECT	321-030	30A RATED 240VAC NEMA 3R UL LISTED
28	ROOF ATTACHMENT 1	261-602	ROCKIT MICRORAIL
9	TRIM 1	241-253	ROCK-IT TRIM COMP DARK
23	SLIDER 1	261-603	ROCK-IT SLIDER COMP DARK
7	BONDING CLAMP 1	221-100	N/S BONDING CLAMP
3	BONDING CLAMP 1	241-404	TRIM BONDING CLAMP
13	MOUNT ASSEMBLY 1	241-405	MLPE MOUNT ASSY
8	SPLICE 1	261-604	ROCK-IT SPLICE
2	ATTACHED SPLICE 1	211-101	ATTACHED SPLICE 8 INCH
10	TRIMRAIL 1	261-606	TRIMRAIL UNIV CLIP W/ HDW
3	TRIM SPLICE 1	261-605	TRIM SPLICE DRK
6	TRIMRAIL 1	211-115	TRIMRAIL UNIV DRK
12	GROUND LUG 1	260-585	ILSCO GROUND LUG
12	TRIM END CAPS 1	221-200	ROCK-IT TRIM END CAPS

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)

M

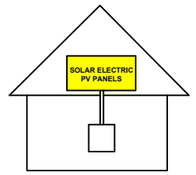
AC

PM

INVERTER

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: 6 BROOKVIEW COURT,ANGIER, NC 27501

NEC 706.15(C) AND NEC 110.16

PHOTOVOLTAIC AC DISCONNECT

NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT: 16.00A
NOMINAL OPERATING AC VOLTAGE: 240V

NEC 690.54

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59

SOLAR PV DC CIRCUIT

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

PHOTOVOLTAIC POWER SOURCE

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

MAXIMUM VOLTAGE	480	V
MAXIMUM CIRCUIT CURRENT	10.5	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

CLIENT:
JACQUELINE VAUDRIN
6 BROOKVIEW COURT, ANGIER, NC 27501
AHJ: HARNETT COUNTY (NC)
UTILITY: DUKE ENERGY
PHONE: (440) 915-2885
EMAIL: JVAUDRIN@HOTMAIL.COM

SYSTEM:
SYSTEM SIZE (DC): 12 X 400 = 4.800 kW
SYSTEM SIZE (AC): 3.800 kW @ 240V
MODULES: 12 X FREEDOM FOREVER: FF-MP-BBB-400
OPTIMIZERS: 12 X SOLAREDGE S440
INVERTER: SOLAREDGE SE3800H-US [SI1]

REVISIONS		
NO.	REVISED BY	DATE
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FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

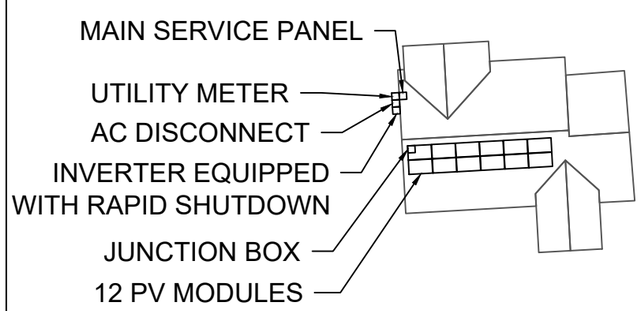
LABELS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-7

CAUTION:

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

BROOKVIEW COURT



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

N

NOTES:

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

GREG ALBRIGHT

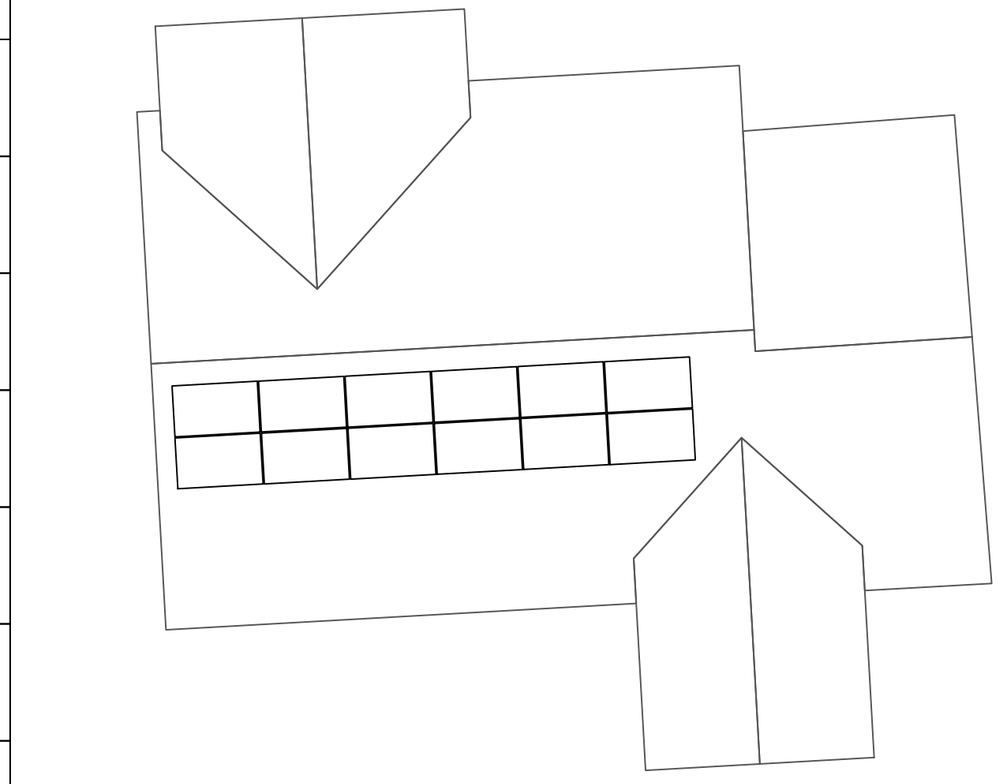
CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	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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CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

OPTIMIZER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	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

IN CASE OF EMERGENCY

INJURY HOTLINE
(855) 400-7233

NEAREST HOSPITAL OR OCCUPATIONAL/INDUSTRIAL CLINIC

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION

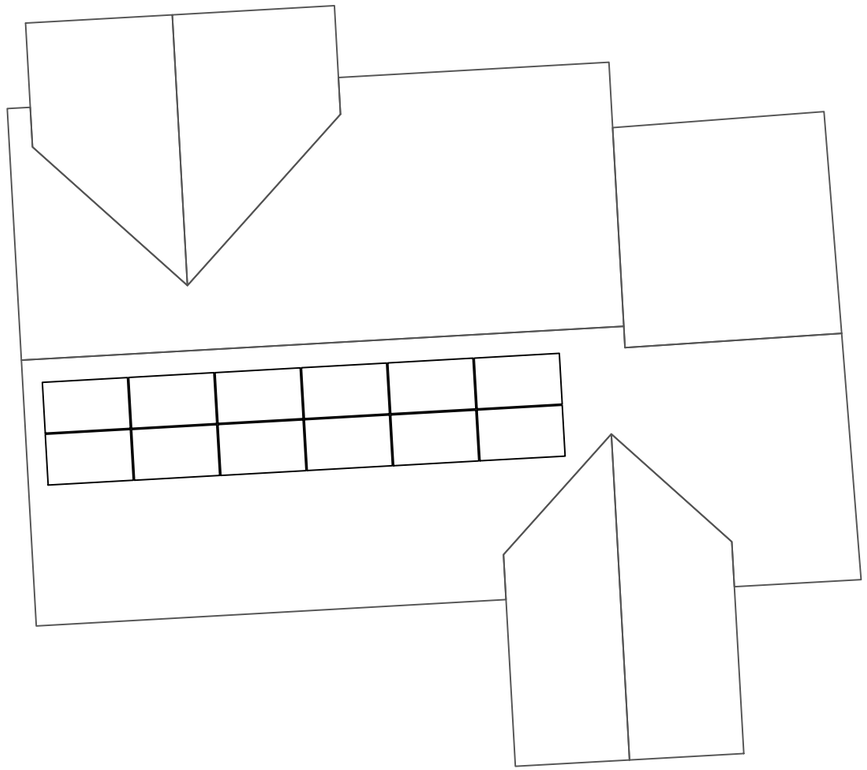
NAME: _____

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

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

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freedom FOREVER

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

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	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:
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OPTIMIZERS: 12 X SOLAREDGE S440
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SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
275255	11/9/2022	J.F.	PV-10

MACH 2
400W MODULE

FF-MP-BBB-400

High module conversion efficiency up to 20.48%

Excellent weak light performance

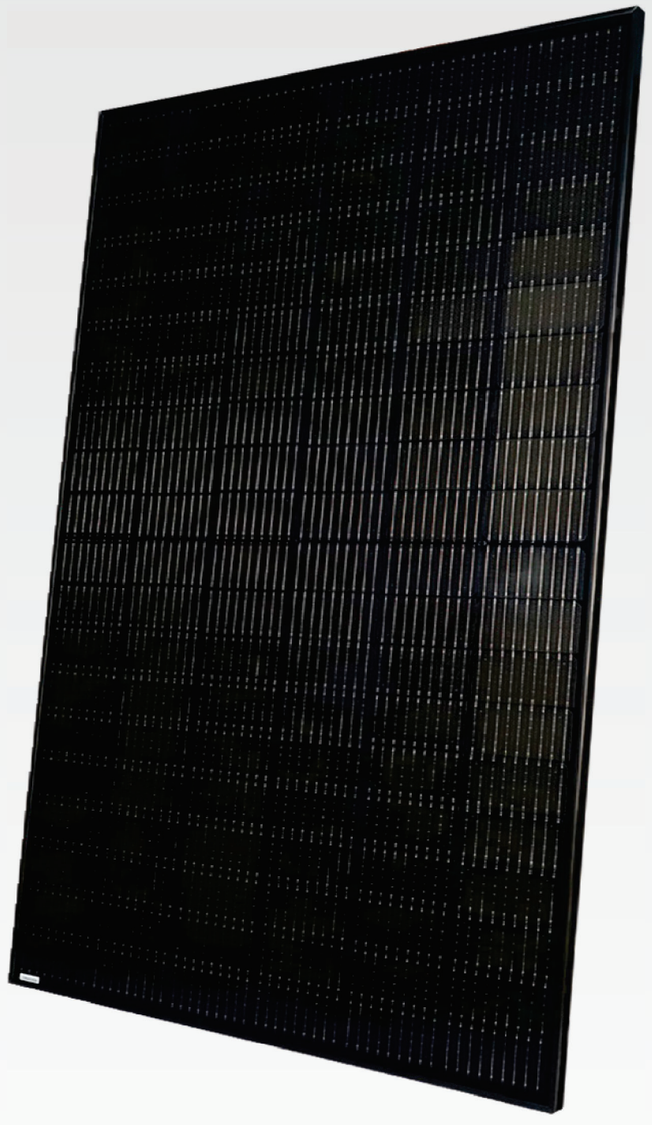
Withstanding harsh environment

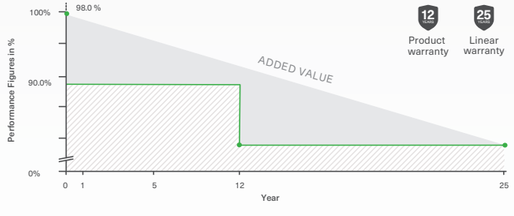
Lower operating temperature

Extreme weather loading

12-year material & workmanship

25-year linear power output



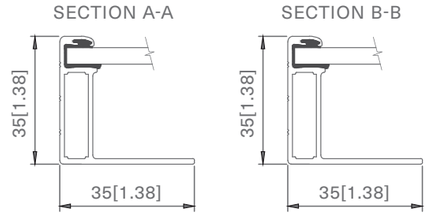


MODULE SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

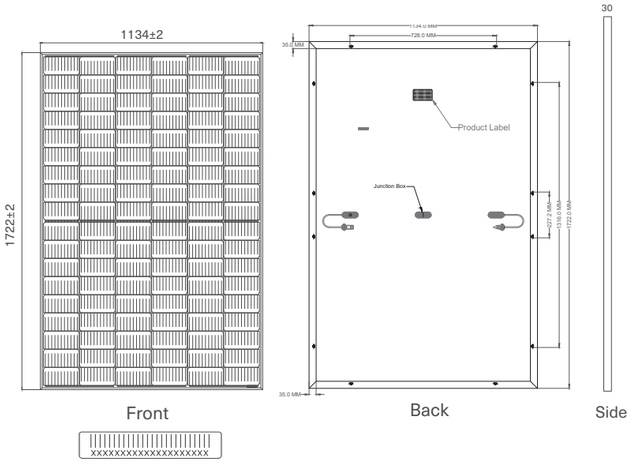
Characteristics	FF-MP-BBB-400
Maximum Power (Pmax)	400W
Maximum Power Voltage (Vmp)	31.01V
Maximum Power Current (Imp)[A]	12.90A
Open Circuit Voltage (Voc)[V]	37.07V
Short Circuit Current (Isc)[A]	13.79A
Module Efficiency	20.48%
Power Tolerance	0/+5W
STC	Irradiance of 1000W/m², AM1.5, cell Temperature 25°C

FRAME PROFILE



MECHANICAL CHARACTERISTICS

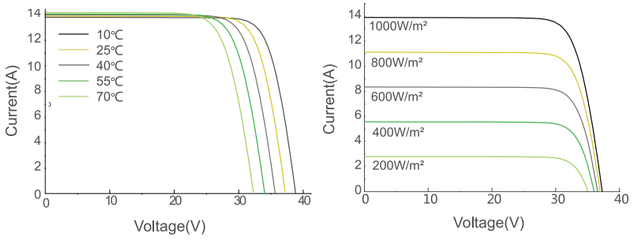
Cell Type	Mono perc, 182 mm-half cells, 108 (6x9+6x9)
Weight	22.1 kgs (48.7 lbs)
Dimension	1722 x 1134 x 35 mm (67.80 x 44.65 x 1.38)
Front Glass	3.2 mm (.13 in), High Transmission, Low Iron & Semi-Tempered Glass
Junction Box	IP68 (3 Bypass Diodes)
Output Cables	1200 mm (47 in)
Connector	Staubli EVO2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

CURRENT-VOLTAGE CURVE



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_{max}	-0.350%/°C
Temperature Coefficient of V_{oc}	-0.275%/°C
Temperature Coefficient of I_{sc}	+0.045%/°C
Nominal Operating cell Temperature (NOCT)	42°C±2°C

CERTIFICATIONS AND STANDARDS PENDING

UL 61730 | UL 61215 | ISO 9001 | ISO 14001

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

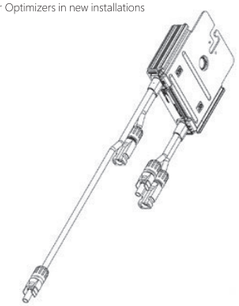
S440, S500

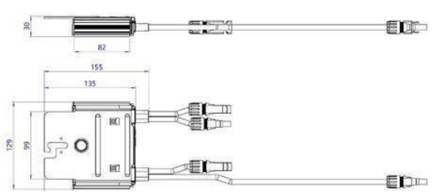
	S440	S500	Unit
INPUT			
Rated Input DC Power(1)	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING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

Single Phase Inverter with HD-Wave Technology

for North America

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

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

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

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology

for North America

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

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5(1)							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V(2)	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V(2)	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

(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

Single Phase Inverter with HD-Wave Technology

for North America

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

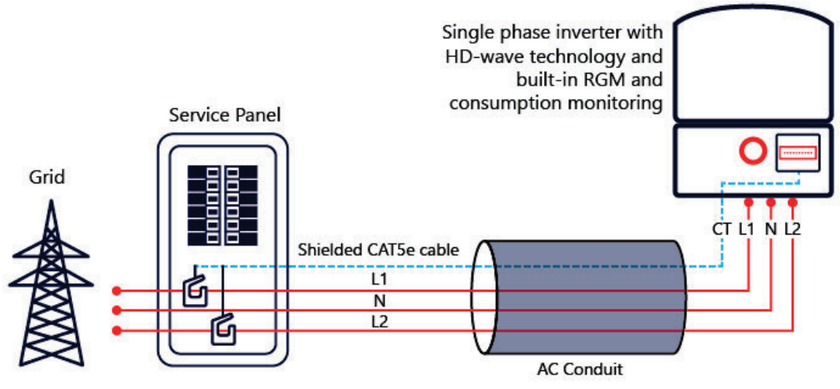
MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Metering, ANSI C12.20	Optional[3]							
Consumption metering								
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection							
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4	26.2 / 11.9		38.8 / 17.6		lb / kg
Noise	< 25				<50			dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

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

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

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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RoHS

pe.eaton.com

Eaton general duty non-fusible safety switch

DG221URB

UPC:782113120232

Dimensions:

- **Height:** 10.81 IN
- **Length:** 6.88 IN
- **Width:** 6.38 IN

Weight:6 LB

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

Warranties:

- 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.

Specifications:

- **Type:** Non-fusible, single-throw
- **Amperage Rating:** 30A
- **Enclosure:** NEMA 3R, Rainproof
- **Enclosure Material:** Painted galvanized steel
- **Fuse Configuration:** Non-fusible
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Two-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

Supporting documents:

- Eatons Volume 2-Commercial Distribution
- Eaton Specification Sheet - DG221URB

Certifications:

- UL Listed

Product compliance: No Data

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EcoFasten
For Installers. By Installers.

ROCKIT

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

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS

ROOF TYPE — **Composition Shingle, Tile, Metal**

RACKING — **Rail-Less**

ATTACHMENT — **Structural-Attach Direct-Attach**

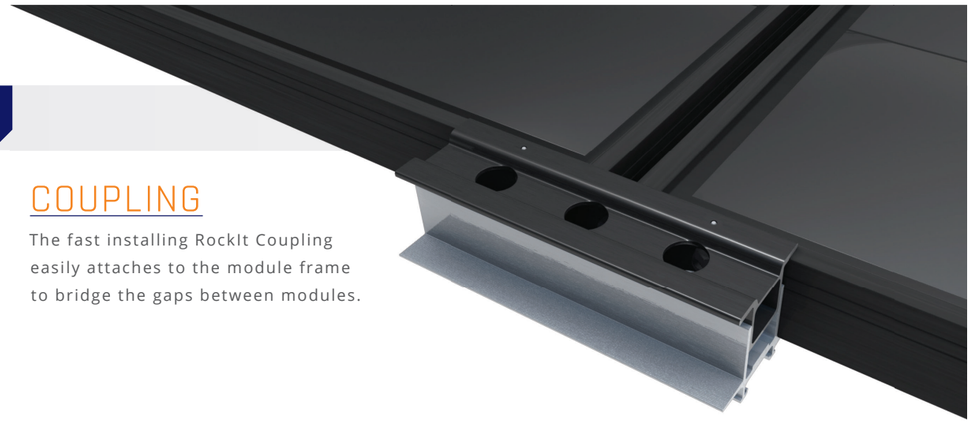
WATER TIGHT TECHNOLOGY

25 YEAR WARRANTY

ROCKIT

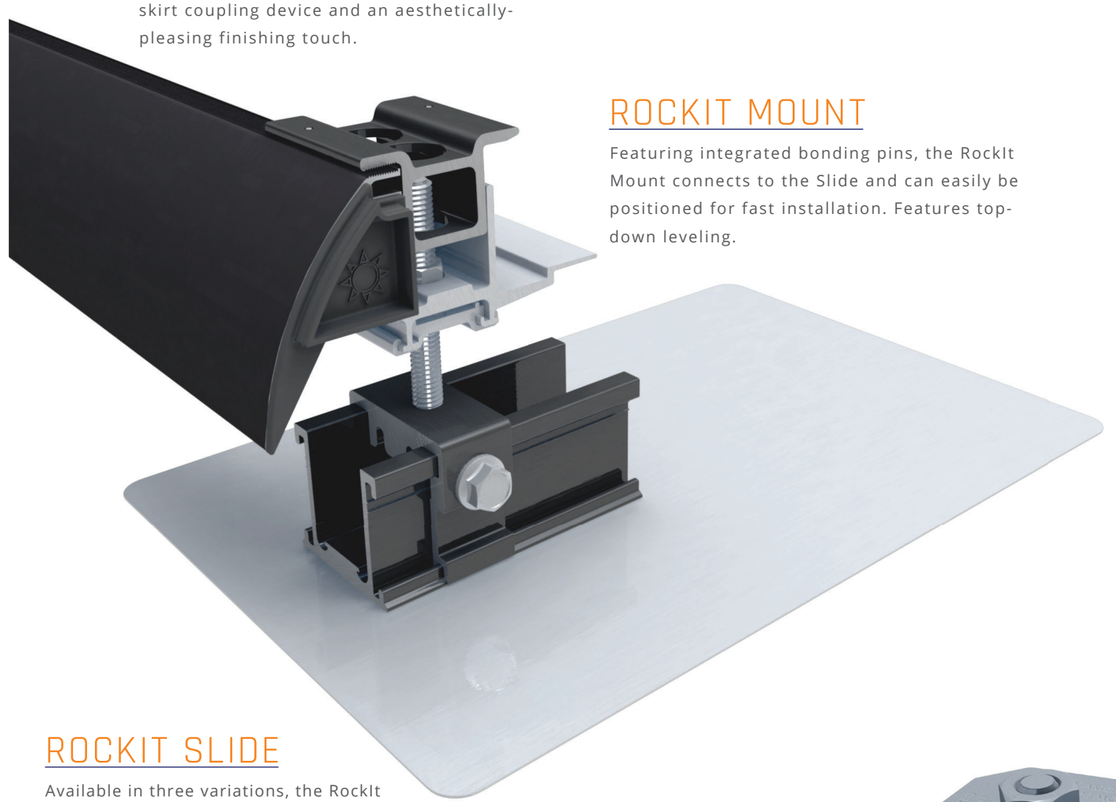
COUPLING

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

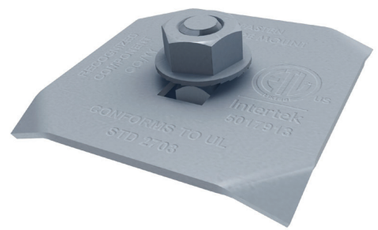
Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

ROCKIT SLIDE

Available in three 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.



May 20, 2021

EcoFasten Solar LLC
4141 W Van Buren St, Ste 2
Phoenix, AZ 85009
TEL: (877) 859-3947

Attn.: Eco Fasten Solar LLC - Engineering Department

Re: Report # 2015-05584HG.07.01 – EcoFasten - Rock-It System for Gable and Hip Roofs
Subject: Engineering Certification for the State of North Carolina

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - Rock-It System, as presented in PZSE Report # 2015-05584HG.07.01, "Engineering Certification for the EcoFasten - ClickFit System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications:

Building Codes:

1. ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
2. 2018 International Building Code, by International Code Council, Inc.
3. 2018 International Residential Code, by International Code Council, Inc.
4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
5. Aluminum Design Manual 2015, by The Aluminum Association, Inc.
6. ANSI/AWC NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

Design Criteria:

Risk Category II
Seismic Design Category = A - E
Exposure Category = B, C & D
Basic Wind Speed (ultimate) per ASCE 7-16 = 90 mph to 180 mph
Ground Snow Load = 0 to 60 (psf)

This letter certifies that the loading criteria and design basis for the EcoFasten - Rock-It System Span Tables are in compliance with the above codes.

DIGITALLY SIGNED

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA