



Freedom Forever
Planset Revision Letter

12/15/2022
REV #2

Attn. City of Lake City:

The changes outlined in Revision Details have been applied to the plans corresponding to the following customer:

JENNA HANSEN
428 NORTHWEST FOREST MEADOWS AVENUE, LAKE CITY, FL 32055

Revision Details:

POI CHANGE TO BREAKER TIE IN DERATE TO 175 ADDED LOAD CALCS TO PLANS

All corresponding changes are notated on the plans by revision clouds.

Thank you for your time in reviewing these plans. Please reach out if you have any additional questions or concerns.

Construction Engineering
Freedom Forever
engineering@freedomforever.com

BARUN CORP

December 17, 2022

Dear Whom It May Concern,

Project Name : JENNA HANSEN RESIDENCE, 428 NORTHWEST FOREST MEADOWS AVENUE, LAKE CITY, FL 32055

Installation of a 13.3 kW (DC) Rooftop PV Solar System

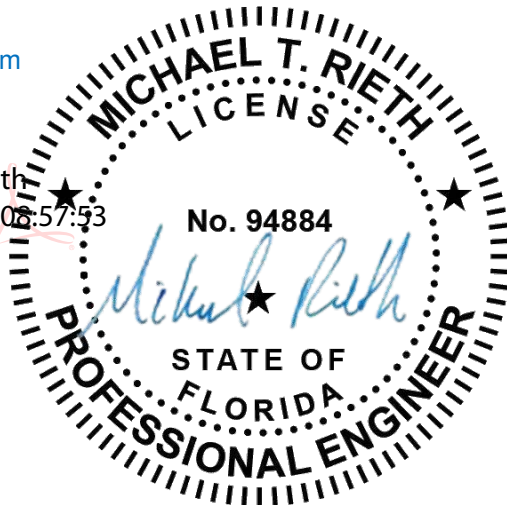
Per Florida Statute 377-705 (revised 7/01/2017), I, Mike Rieth, P.E., a licensed engineer pursuant to Chapter 471, certify that the PV electrical system and electrical components are designed and approved using the code requirements and standards contained in the Florida Building Code.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Mike Rieth, P.E.
miker@baruncorp.com

Michael Rieth
2022.12.17 08:57:53
-05'00'



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Construction Engineering
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engineering@freedomforever.com

ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING:
 2020 FLORIDA BUILDING CODE: BUILDING
 2020 FLORIDA BUILDING CODE: RESIDENTIAL
 2020 FLORIDA BUILDING CODE: MECHANICAL
 2020 FLORIDA BUILDING CODE: PLUMBING
 2020 FLORIDA BUILDING CODE: FUEL GAS
 2020 FLORIDA BUILDING CODE: ENERGY CONSERVATION
 2020 FLORIDA BUILDING CODE: EXISTING BUILDING
 2020 FLORIDA BUILDING CODE: ACCESSIBILITY
 2020 FLORIDA FIRE PREVENTION CODE
 2017 NATIONAL ELECTRIC CODE
 AS ADOPTED BY CITY OF LAKE CITY

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 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.

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 2017 NEC SEC 250.166(A).

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

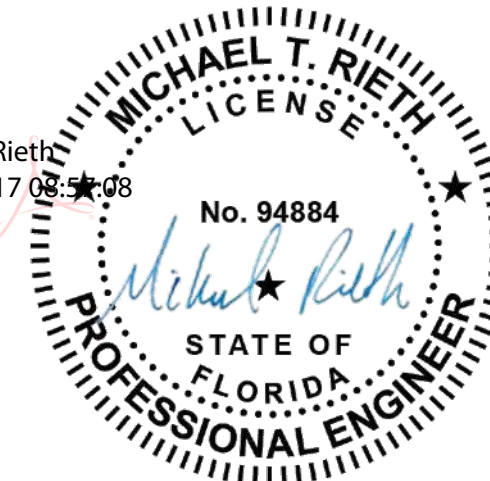
THE MAIN SERVICE PANEL WILL BE EQUIPPED WITH A GROUND ROD OR UFER

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

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

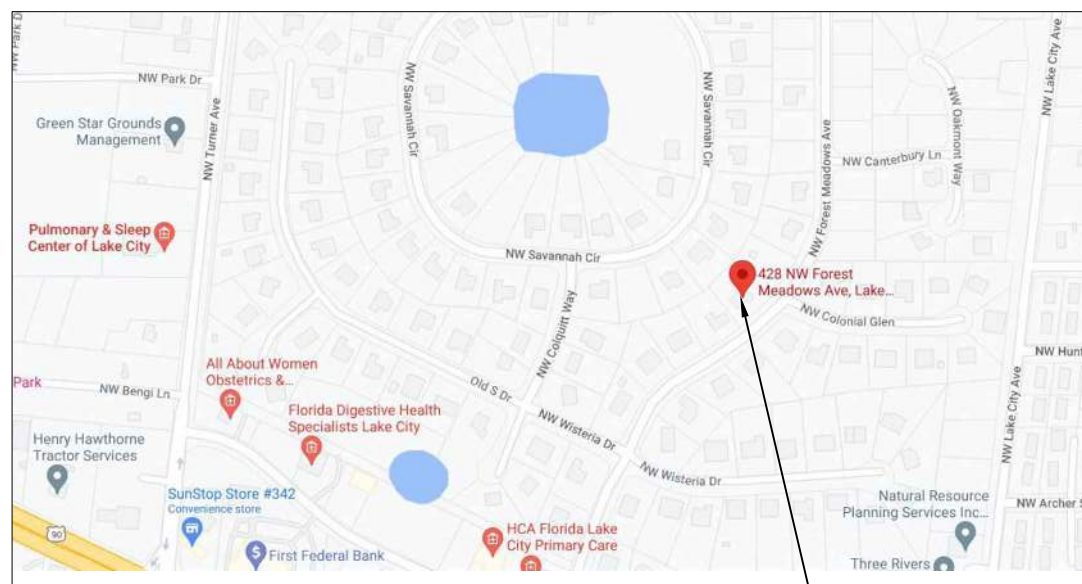
INSTALL CREW TO VERIFY ROOF STRUCTURE PRIOR TO COMMENCING WORK. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNT.

Michael Rieth
 2022.12.17 08:57:08
 -05'00'



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VICINITY MAP:



SITE LOCATION

CLIENT:
 JENNA HANSEN
 428 NORTHWEST FOREST MEADOWS AVENUE, LAKE CITY, FL 32055
 AHJ: CITY OF LAKE CITY
 UTILITY: FPL - FLORIDA POWER & LIGHT
 METER: 401-634-840
 PHONE: (386) 292-3432
 EMAIL: JENNALYNNHANSEN@HOTMAIL.COM

SYSTEM:
 SYSTEM SIZE (DC): 38 X 350 = 13.300 kW
 SYSTEM SIZE (AC): 10.000 kW @ 240V
 MODULES: 38 X LONGI SOLAR:
 LR4-60HPB-350M
 OPTIMIZERS: 38 X SOLAREGE S440
 INVERTER: SOLAREGE SE10000H-USRGM [S11]



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REVISIONS		
NO.	REVISED BY	DATE
1	B.F.	11/30/2022
2	B.F.	12/15/2022
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







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

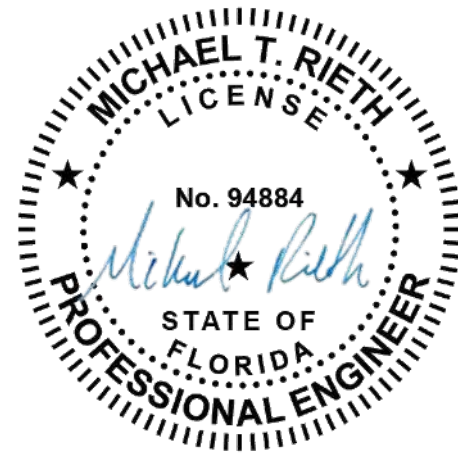
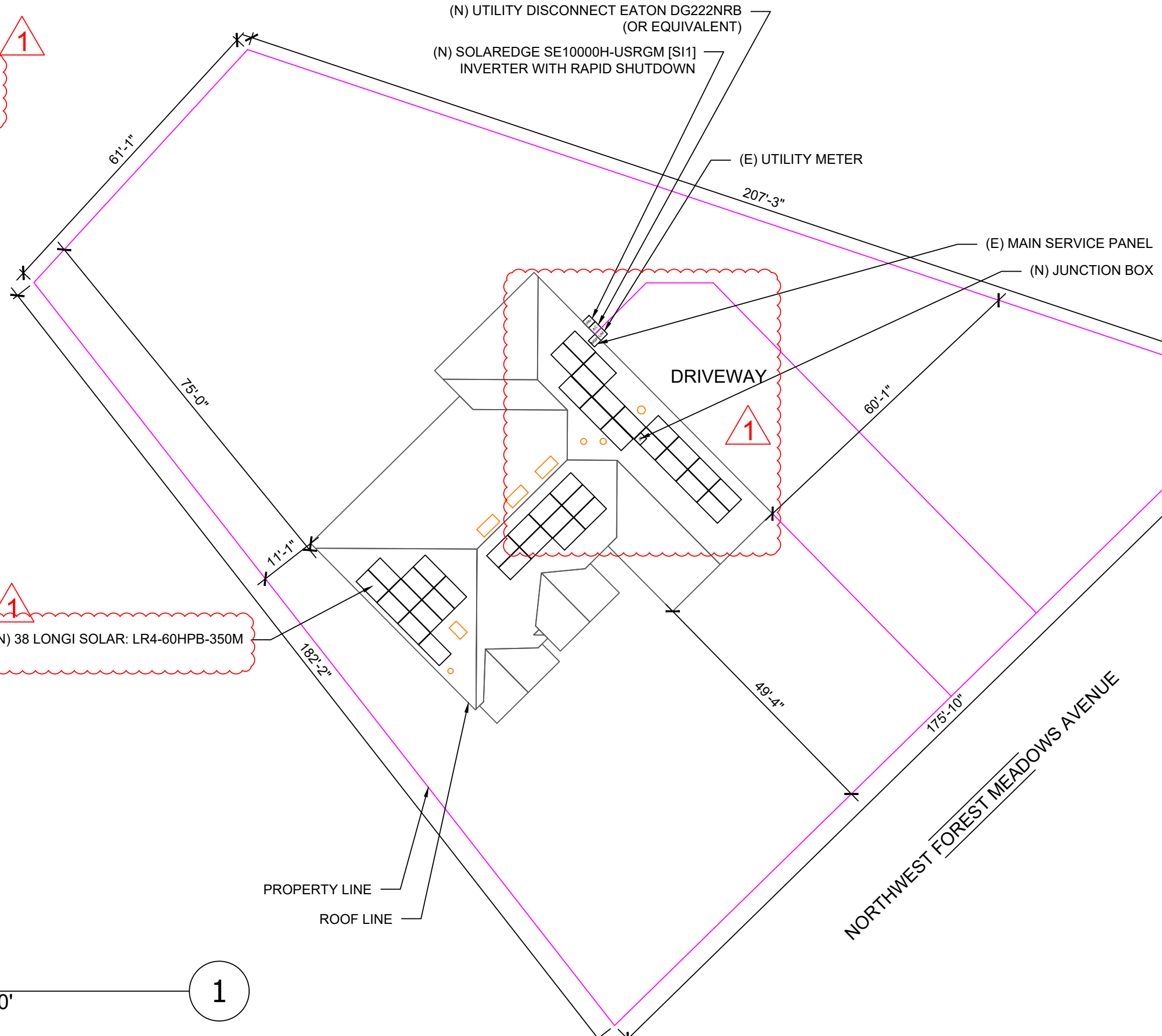
GREG ALBRIGHT

CONTRACTOR LICENSE:
 CERTIFIED ELECTRICAL CONTRACTOR
 EC13008056

SITE LOCATION			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-1

LEGEND:

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




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ROOF AREA: 4275.24 SQ FT

CLIENT:
 JENNA HANSEN
 428 NORTHWEST FOREST MEADOWS AVENUE, LAKE CITY, FL 32055
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 UTILITY: FPL - FLORIDA POWER & LIGHT
 METER: 401-634-840
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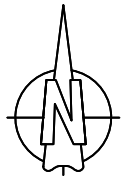
 **freedom FOREVER**

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




SITE PLAN
 SCALE: 1"=20'

1

SITE PLAN			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-2

LEGEND:

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

1

TOTAL ROOF AREA: 4275.24 SQ FT
 TOTAL ARRAY AREA: 745.13 SQ FT
 ARRAY COVERAGE: 17.43%
 SYSTEM DISTRIBUTED WEIGHT: 2.19 LBS
 ROCKIT MICRORAIL POINT-LOAD: 20.69 LBS



Xiaojian Xie Digitally signed by Xi
 Date: 2022.12.16 18:4
 -05'00'




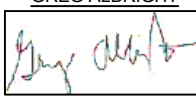
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ROOF AREA: 4275.24 SQ FT

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 JENNA HANSEN
 428 NORTHWEST FOREST MEADOWS AVENUE, LAKE CITY, FL 32055
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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.

ROOF PLAN WITH MODULES LAYOUT			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 4275.24 SQ FT
 TOTAL ARRAY AREA: 745.13 SQFT
 ARRAY COVERAGE: 17.43%
 SYSTEM DISTRIBUTED WEIGHT: 2.19 LBS
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Structural Components Only



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ROOF AREA STATEMENT

ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	17	27	27	45	985.45 SQ FT	333.35 SQ FT
ROOF 2	11	27	27	225	562.54 SQ FT	215.7 SQ FT
ROOF 3	10	27	27	135	700.06 SQ FT	196.09 SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
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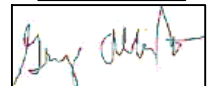
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FREEDOM FOREVER LLC
 2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
 Tel: (800) 385-1075
GREG ALBRIGHT



CONTRACTOR LICENSE:
 CERTIFIED ELECTRICAL CONTRACTOR
 EC13008056

ROOF DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-2B

BACKFEED BREAKER SIZING

MAX. CONTINUOUS OUTPUT 42.00A @ 240V

42.00 X 1.25 = 52.50AMPS 60A BREAKER - OK

SEE 705.12 OF 2017 NEC

LOCKABLE DISCONNECT WITHIN 10' OF THE METER, MUST BE PROVIDED THAT IS

READILY ACCESSIBLE AT ALL TIMES TO THE ASSOCIATION'S PERSONNEL.

240 - 175 = 65A ALLOWABLE BACKFEED



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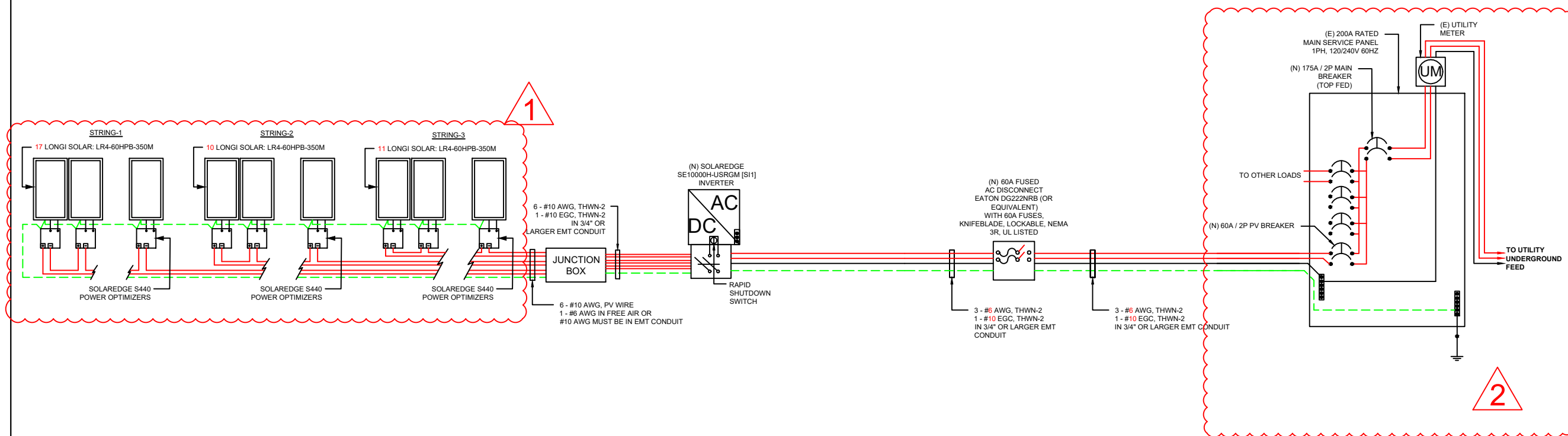
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THREE LINE DIAGRAM

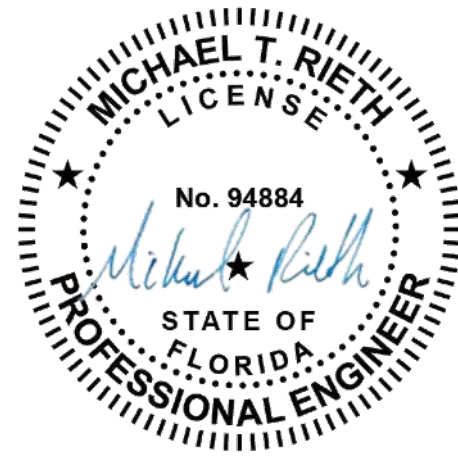
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-4



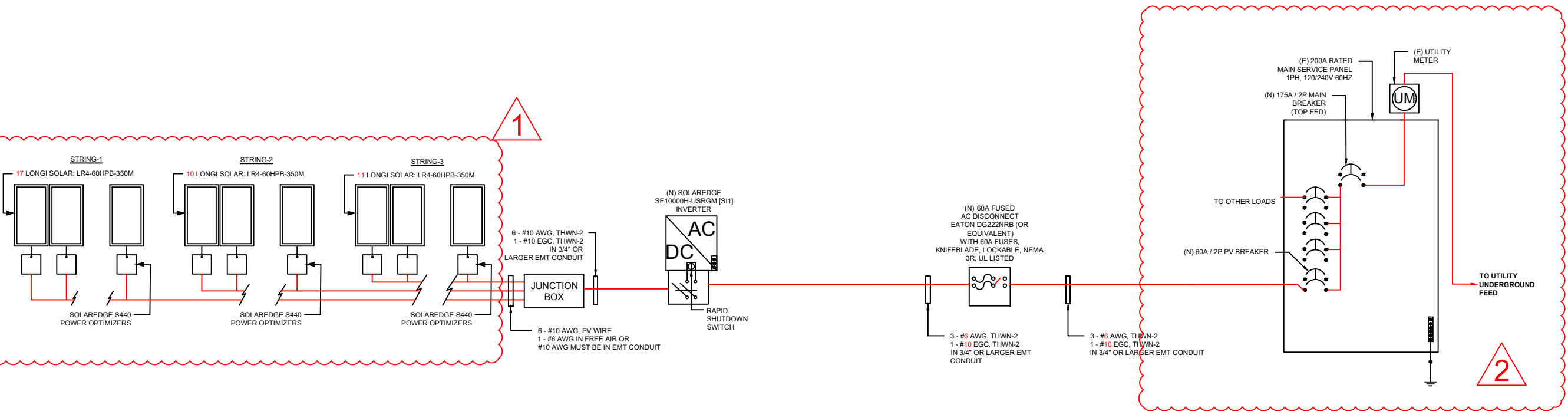
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 42.00 X 1.25 = 52.50AMPS 60A BREAKER - OK
 SEE 705.12 OF 2017 NEC
 LOCKABLE DISCONNECT WITHIN 10' OF THE METER, MUST BE PROVIDED THAT IS
 EASILY ACCESSIBLE AT ALL TIMES TO THE ASSOCIATION'S PERSONNEL.

PV SYSTEM
 3.015 kW-DC
 2.738 kW-CEC AC



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SINGLE LINE DIAGRAM			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-4A

Residential Optional Calculation

9/25/1997

Freedom Forever LLC

by John Salsola

Version 2014

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

sq. ft	2221	General Lighting load	6,663 VA
	2	Small Appliance	3,000 VA
	1	Laundry circuit	1,500 VA
		Gen.Lgt, Sm App.& Laun. Load	11,163 VA

Company Name

Address
City, State, Zip Code
Telephone & Fax

12/15/2022 10:22

STEP 2 Article 220.82 (C)

A/C Condenser & Fixed Electric Space Heating

A/C #	Capacity	VA	AHU	kW	VA	QTY
4 ton	5,700 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	

General lighting, Sm. Appl. & Laundry **11,163 VA**

Total 1 65% Demand Factor

Heating Load	4,050 VA
CU Load	6,500 VA

Electric Space Heat @ 65% <4, 40% >3, vs. A/C @ 100% **6,500 VA**

STEP 3 Article 220.82 (B) (3)

<input type="checkbox"/>	3,500 VA	1	Water Heater	3,500 VA
<input type="checkbox"/>	1,400 VA	1	Refrigerator	1,400 VA
<input type="checkbox"/>	800 VA	1	Freezer	800 VA
<input type="checkbox"/>	1,200 VA	1	Dishwasher	1,200 VA
<input type="checkbox"/>	1,127 VA	1	Disposal	1,127 VA
<input type="checkbox"/>	540 VA	1	Range Hood	540 VA
<input type="checkbox"/>	1,400 VA	1	Microwave	1,400 VA
<input type="checkbox"/>	1,440 VA		Central Vac	VA
<input type="checkbox"/>	288 VA		Mini Refrig	VA
<input type="checkbox"/>	400 VA		Compactor	VA
<input type="checkbox"/>	12,000 VA		Tankless heater	VA
<input type="checkbox"/>	1,500 VA		Wine Cooler	VA
<input type="checkbox"/>	select		Jacuzzi Tub	VA
<input type="checkbox"/>	select		Sprinkler	VA
<input type="checkbox"/>	select		Well Pump	VA
<input type="checkbox"/>	select		Fountain Pump	VA
<input type="checkbox"/>	select		Elevator	VA
<input type="checkbox"/>			Pool Equip. Panel	VA Apply Demand
<input type="checkbox"/>	15360		Other load	15,360 VA Apply Demand
<input type="checkbox"/>	11520		Other load	11,520 VA Apply Demand

Appliance Demand Load **36,847 VA**

Dryer Demand Load **6,720 VA**

Range Demand Load **9,600 VA**

Service Demand **38,232 VA**

Demand Load @ 240V, 1ph **159 A**

Neutral Demand **88 A**

Min.Service Req. **175 A**

Total Appliance Load **36,847 VA**

STEP 4 Article 220.82 (B) (3)

Electric Clothes Dryers **6,720 VA**

STEP 5 Article 220.82 (B) (3)

Electric Ranges **9,600 W** Col C demand **8000**

or Number of appliances

<input type="checkbox"/>	Check Box for Gas Range	Cooktop	Col B demand
<input type="checkbox"/>		Cooktop	Col B demand
<input type="checkbox"/>		Oven(s)	Col B demand
<input type="checkbox"/>		Oven(s)	Col B demand
<input type="checkbox"/>		Number of appliances	Dem. Factor
<input type="checkbox"/>		Cooktop & Oven Demand Load	

Use this area for your own notes



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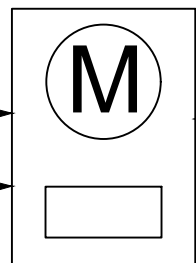
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ELECTRICAL CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-5A

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 - 42.00 AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.54

NOTES:

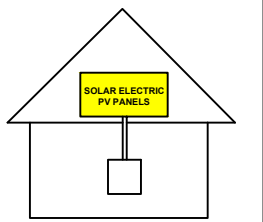
- NEC ARTICLES 690 AND 705 AND IRC SECTION R324 MARKINGS SHOWN HEREON.
- ALL MARKING SHALL CONSIST OF THE FOLLOWING:
 - UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING.
 - RED BACKGROUND COLOR WHITE TEXT AND LINE WORK.
 - ARIAL FONT.
- ALL SIGNS SHALL BE SIZED APPROPRIATELY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



This item has been digitally signed and sealed by Michael Rieth on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

**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

PM

AC

"WARNING"
PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT - 42.00 AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.15, 690.54

**RAPID SHUTDOWN SWITCH FOR
SOLAR PV SYSTEM**

690.56(C)(3)

INVERTER

MAXIMUM VOLTAGE V
MAXIMUM CIRCUIT CURRENT A
MAX DC-DC CONVERTER
OUTPUT CURRENT A

"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: 27A
MAX RATED OUTPUT CURRENT OF
THE CONTROLLER OR DC-TO-DC
CONVERTER: 15A

690.53

ARRAY



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

"WARNING"
PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES

CLIENT:
JENNA HANSEN
428 NORTHWEST FOREST MEADOWS
AVENUE, LAKE CITY, FL 32055
AHJ: CITY OF LAKE CITY
UTILITY: FPL - FLORIDA POWER & LIGHT
METER: 401-634-840
PHONE: (386) 292-3432
EMAIL: JENNALYNNHANSEN@HOTMAIL.COM

SYSTEM:
SYSTEM SIZE (DC): 38 X 350 = 13.300 kW
SYSTEM SIZE (AC): 10.000 kW @ 240V
MODULES: 38 X LONGI SOLAR:
LR4-60HPB-350M
OPTIMIZERS: 38 X SOLAREEDGE S440
INVERTER: SOLAREEDGE SE10000H-USRGM [S11]

REVISIONS		
NO.	REVISED BY	DATE
1	B.F.	11/30/2022
2	B.F.	12/15/2022
-	-	-



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

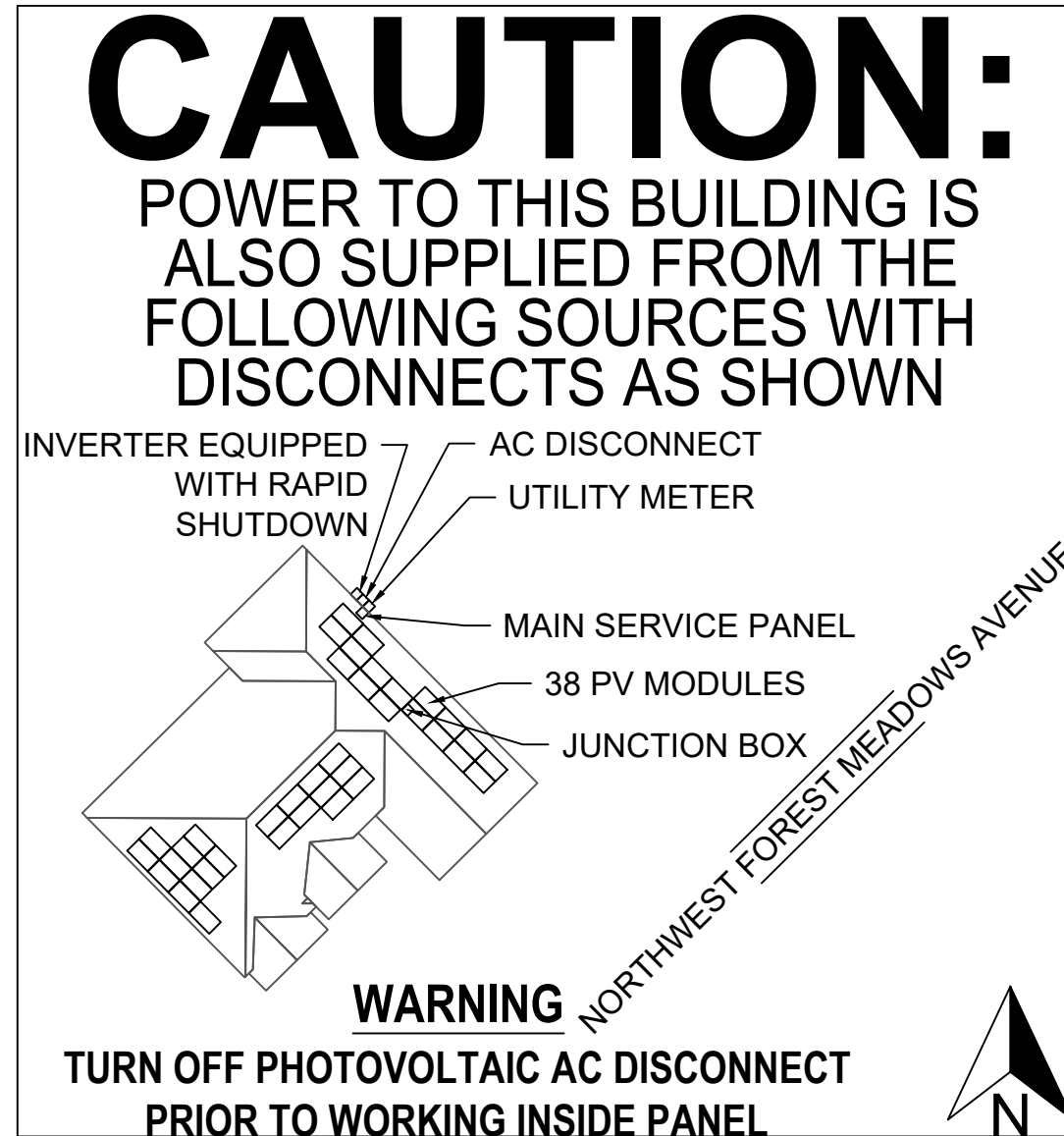
Greg Albright

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

LABELS			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
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 JENNA HANSEN
 428 NORTHWEST FOREST MEADOWS AVENUE, LAKE CITY, FL 32055
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 INVERTER: SOLAREEDGE SE10000H-USRGM [S1]

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-	-	-



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



CONTRACTOR LICENSE:
 CERTIFIED ELECTRICAL CONTRACTOR
 EC13008056

SITE PLACARD			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-7A

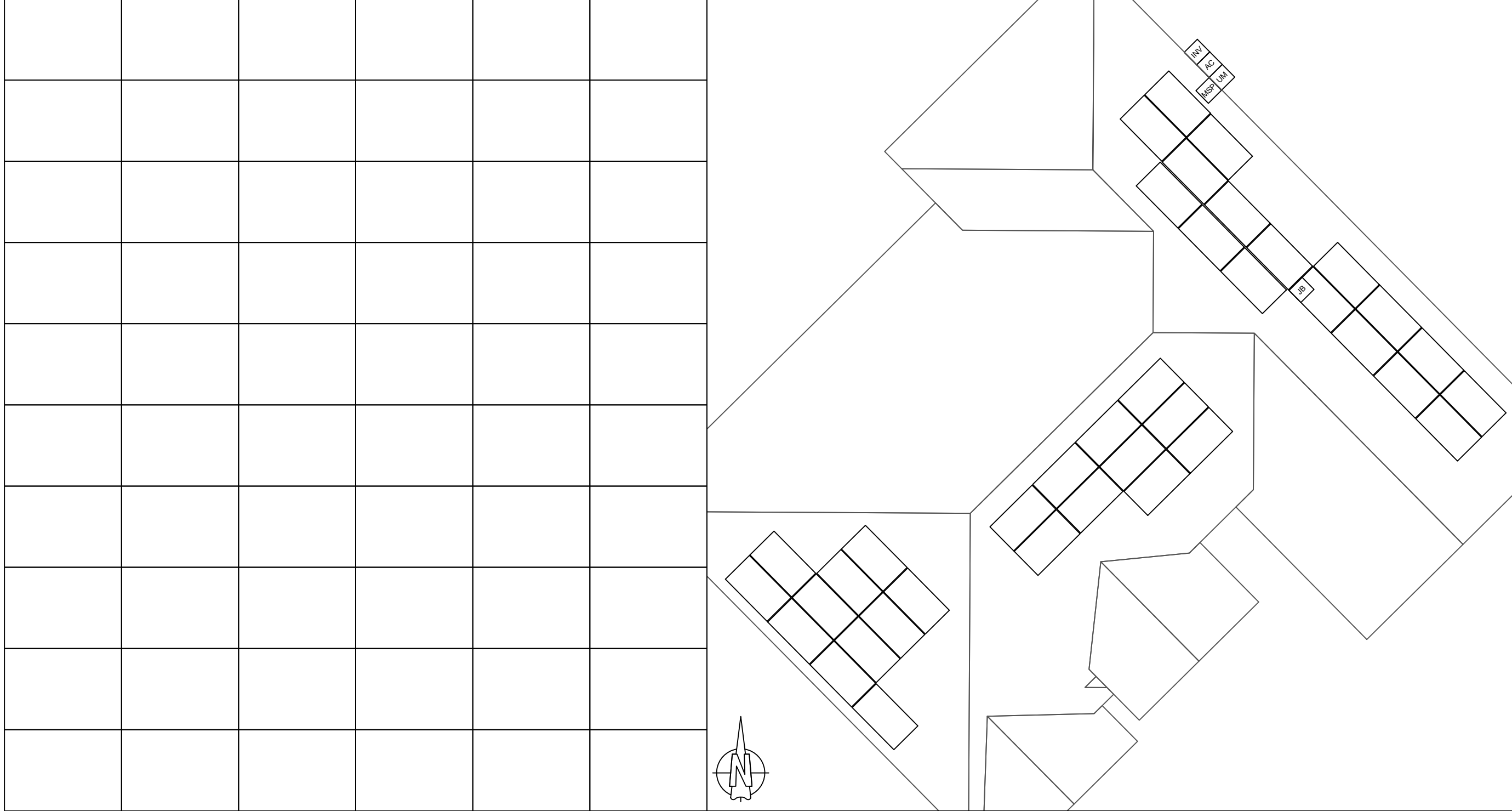
NOTES:

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 - C. AERIAL FONT.
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4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

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



CLIENT:
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 428 NORTHWEST FOREST MEADOWS
 AVENUE, LAKE CITY, FL 32055
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FREEDOM FOREVER LLC
 2619 CONSULATE DR SUITE 800, ORLANDO,
 FL 32819
 Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
 CERTIFIED ELECTRICAL CONTRACTOR
 EC13008056

OPTIMIZER CHART

JOB NO: 276016	DATE: 12/15/2022	DESIGNED BY: B.F.	SHEET: PV-8
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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

INJURY HOTLINE
(855) 400-7233

NEAREST HOSPITAL OR OCCUPATIONAL/INDUSTRIAL CLINIC

NAME: _____

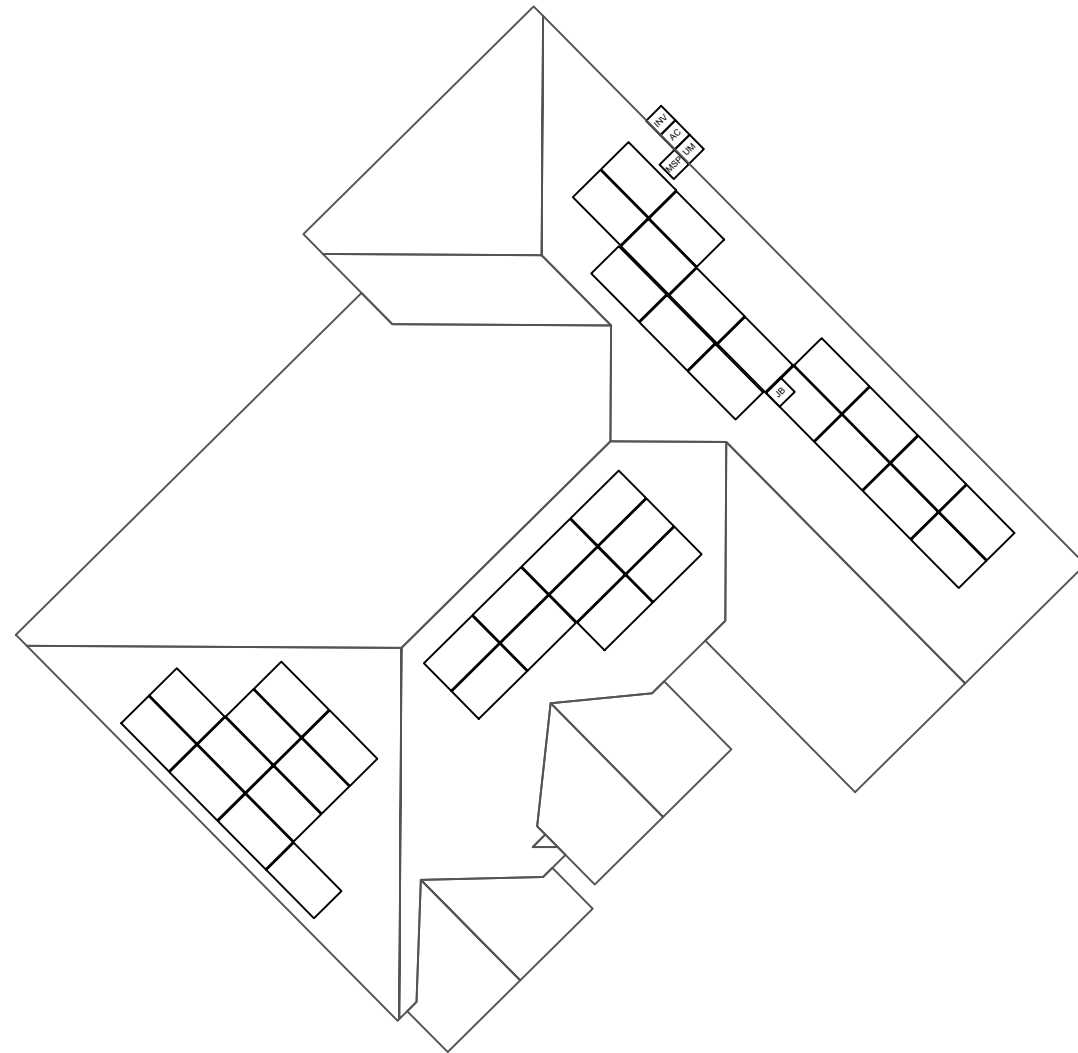
ADDRESS: _____

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.



- 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
- H₂O WATER SHUT OFF
- 7 SERVICE DROP
- Z POWER LINES

CLIENT:
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AVENUE, LAKE CITY, FL 32055
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OPTIMIZERS: 38 X SOLAREEDGE S440
INVERTER: SOLAREEDGE SE10000H-USRGM [S11]

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

REVISIONS		
NO.	REVISED BY	DATE
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2	B.F.	12/15/2022
-	-	-


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

 CONTRACTOR LICENSE:
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 EC13008056

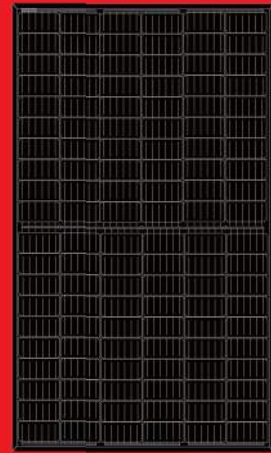
<u>NAME</u>	<u>SIGNATURE</u>
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_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
DATE: _____	TIME: _____

SAFETY PLAN			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
276016	12/15/2022	B.F.	PV-9

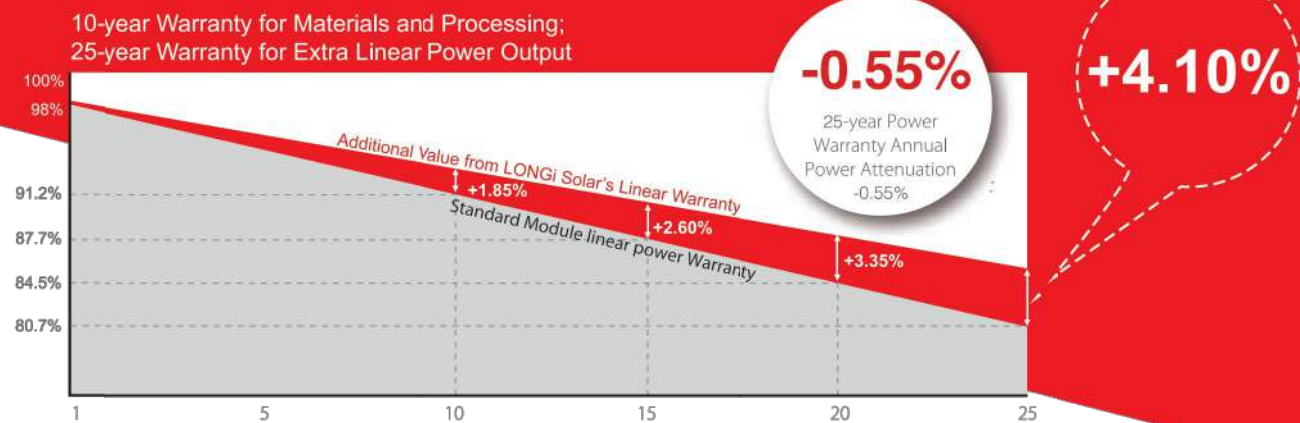
LR4-60HPB 345~365M

Hi-MO 4m
NEW

High Efficiency
Low LID Mono PERC with
Half-cut Technology



*Both 6BB & 9BB are available



Complete System and Product Certifications

IEC 61215, IEC61730, UL61730
ISO 9001:2008: ISO Quality Management System
ISO 14001: 2004: ISO Environment Management System
TS62941: Guideline for module design qualification and type approval
OHSAS 18001: 2007 Occupational Health and Safety



* Specifications subject to technical changes and tests. LONGI Solar reserves the right of interpretation.

Positive power tolerance (0 ~ +5W) guaranteed

High module conversion efficiency (up to 20%)

Slower power degradation enabled by Low LID Mono PERC technology: first year <2%, 0.55% year 2-25

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

LONGI

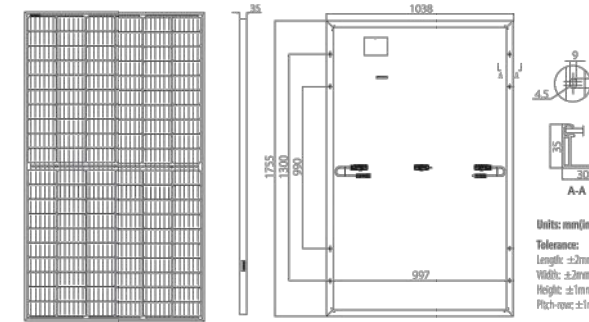
Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGI Solar

Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGI have the sole right to make such modification at anytime without further notice; Demanding party shall request for the latest datasheet for such as contract need, and make it a consisting and binding part of lawful documentation duly signed by both parties.

20200106-Draft

LR4-60HPB 345~365M

Design (mm)



Mechanical Parameters

Cell Orientation: 120 (6x20)
Junction Box: IP68, three diodes
Output Cable: 4mm², 300mm in length, length can be customized
Glass: Single glass
3.2mm coated tempered glass
Frame: Anodized aluminum alloy frame
Weight: 19.5kg
Dimension: 1755x1038x35mm
Packaging: 30pcs per pallet
180pcs per 20'GP
780pcs per 40'HC

Operating Parameters

Operational Temperature: -40°C ~ +85°C
Power Output Tolerance: 0 ~ +5 W
Voc and Isc Tolerance: ±3%
Maximum System Voltage: DC1000V (IEC/UL)
Maximum Series Fuse Rating: 20A
Nominal Operating Cell Temperature: 45±2°C
Safety Class: Class II
Fire Rating: UL type 1 or 2

Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-60HPB-345M		LR4-60HPB-350M		LR4-60HPB-355M		LR4-60HPB-360M		LR4-60HPB-365M	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	345	255.6	350	259.3	355	263.0	360	266.7	365	270.4
Open Circuit Voltage (Voc/V)	40.2	37.5	40.4	37.7	40.6	37.9	40.8	38.1	41.0	38.3
Short Circuit Current (Isc/A)	11.06	8.92	11.16	8.99	11.25	9.06	11.33	9.13	11.41	9.20
Voltage at Maximum Power (Vmp/V)	34.2	31.6	34.4	31.8	34.6	32.0	34.8	32.1	35.0	32.3
Current at Maximum Power (Imp/A)	10.09	8.09	10.18	8.16	10.27	8.23	10.35	8.30	10.43	8.36
Module Efficiency(%)	18.9		19.2		19.5		19.8		20.0	

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25°C, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/S

Temperature Ratings (STC)

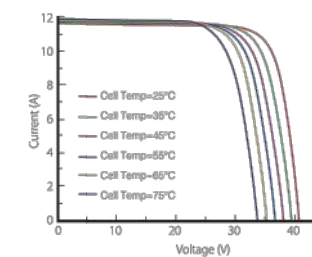
Temperature Coefficient of Isc: +0.057%/°C
Temperature Coefficient of Voc: -0.286%/°C
Temperature Coefficient of Pmax: -0.370%/°C

Mechanical Loading

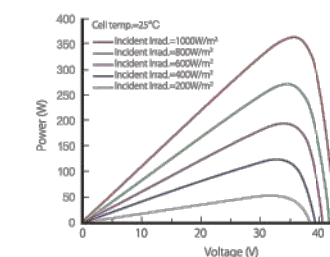
Front Side Maximum Static Loading: 5400Pa
Rear Side Maximum Static Loading: 2400Pa
Hailstone Test: 25mm Hailstone at the speed of 23m/s

I-V Curve

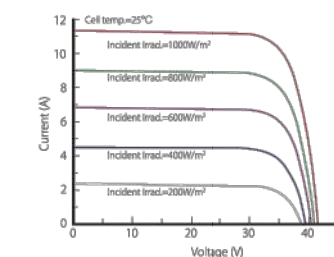
Current-Voltage Curve (LR4-60HPB-360M)



Power-Voltage Curve (LR4-60HPB-360M)



Current-Voltage Curve (LR4-60HPB-360M)



LONGI

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGI Solar

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20200106-Draft

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



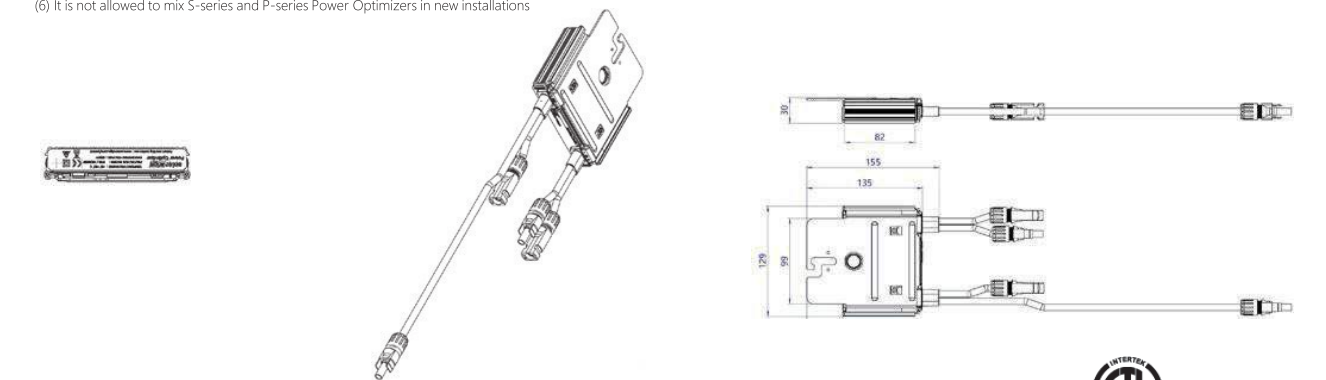
Power Optimizer For North America S440, S500

	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		%
Oversvoltage 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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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

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)

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							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	600k _a 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

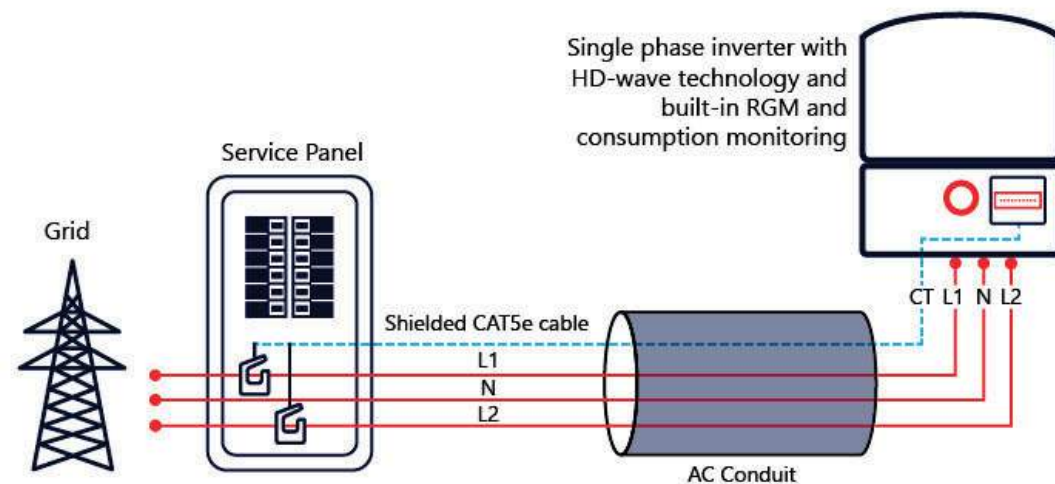
MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Metering, ANSI C12.20	Optional ⁽³⁾						
Consumption metering							
Inverter 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			
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6			
Noise	< 25			< 50			
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽⁴⁾						
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



pe.eaton.com

Eaton general duty cartridge fuse safety switch

DG222NRB

UPC:782113144221

Dimensions:

- **Height:** 14.37 IN
- **Length:** 7.35 IN
- **Width:** 8.4 IN

Weight:10 LB

Notes:Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

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:** General duty, cartridge fused
- **Amperage Rating:** 60A
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Painted galvanized steel
- **Fuse Class Provision:** Class H fuses
- **Fuse Configuration:** Fusible with neutral
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Three-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

Supporting documents:

- [Eatons Volume 2-Commercial Distribution](#)
- [Eaton Specification Sheet - DG222NRB](#)

Certifications:

- UL Listed

Product compliance: No Data





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



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 21, 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 # 2015-05884HG.07.01 – EcoFasten - RockIt System for Gable and Hip Roofs
Subject: Engineering Certification for the State of Florida

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - RockIt System, as presented in PZSE Report # 2015-05884HG.07.01, "Engineering Certification for the EcoFasten - RockIt 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:

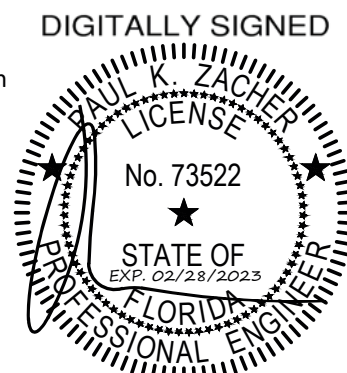
- Building Codes:
1. ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
 2. 2020 FBC - Building, 7th Edition, Based on 2018 International Building Code
 3. 2020 FRC - Residential, 7th Edition, Based on 2018 International Residential Code
 4. 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 - RockIt System Span Tables are in compliance with the above codes.

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

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



05/21/2021

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY PAUL K. ZACHER, PE ON 05/21/2021 USING A SHA-1 AUTHENTICATION CODE.
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