## **BARUN CORP**

March 26, 2024

Dear Whom It May Concern,

Project Name: SIDNEY THOMPSON, 356 SW CALLAWAY DR, LAKE CITY, FL 32024

Installation of a 16.8 kW (DC) Rooftop PV Solar System

Per Florida Statute 377-705 (revised 7/01/2017), I, David Hoehman, 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,

David Hoehman, P.E. dxh1172@yahoo.com



Digitally signed by David Hoehman Date: 2024.03.26

Date: 2024.03.20
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#### Freedom Forever Planset Revision Letter

3/25/2024 REV #3

Attn. County of Columbia (FL):

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

SIDNEY THOMPSON 356 SW CALLAWAY DR , LAKE CITY, FL 32024

#### **Revision Details:**

Layout change at install.

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

### **ROOF MOUNT PHOTOVOLTAIC SYSTEM**

#### CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING: 2023 8TH EDITION FLORIDA BUILDING CODE: BUILDING 2023 8TH EDITION FLORIDA BUILDING CODE: RESIDENTIAL

2023 8TH EDITION FLORIDA BUILDING CODE: MECHANICAL 2023 8TH EDITION FLORIDA BUILDING CODE: PLUMBING

2023 8TH EDITION FLORIDA BUILDING CODE: FUEL GAS

2023 8TH EDITION FLORIDA BUILDING CODE: ENERGY CONSERVATION 2023 8TH EDITION FLORIDA BUILDING CODE: EXISTING BUILDING

2023 8TH EDITION FLORIDA BUILDING CODE: ACCESSIBILITY 2023 8TH EDITION FLORIDA FIRE PREVENTION CODE (NFPA)

2020 NATIONAL ELECTRIC CODE (NEC) AS ADOPTED BY COUNTY OF COLUMBIA

#### VICINITY MAP:



SITE LOCATION

#### **TABLE OF CONTENTS:**

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#### **CONSTRUCTION NOTES:**

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

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

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

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

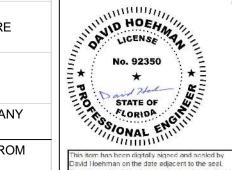
PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER 2020 NEC SEC 250.166(A).

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

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

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

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



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2024.03.26 18:22:06 -04'00'

SIDNEY THOMPSON 356 SW CALLAWAY DR, LAKE CITY, FL 32024 AHJ: COUNTY OF COLUMBIA UTILITY: "CLAY ELECTRIC COOPERATIVE,

METER: 154740121 APN: 15-4S-16-03023-249 PHONE: (386) 344-3095 EMAIL: COLLSID@COMCAST.NET

<u>SYSTEM:</u> SYSTEM SIZE (DC): 42 X 400 = 16.800 kW SYSTEM SIZE (AC): 12.180 kW @ 240V MODULES: 42 X FREEDOM FOREVER: FF-MP-BBB-400 MICROINVERTERS: 42 X ENPHASE IQ8PLUS-72-2-US

REVISIONS REVISED BY DATE 1 A.W. 3/1/2024 2 A.W. 3/11/2024

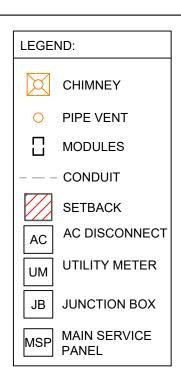


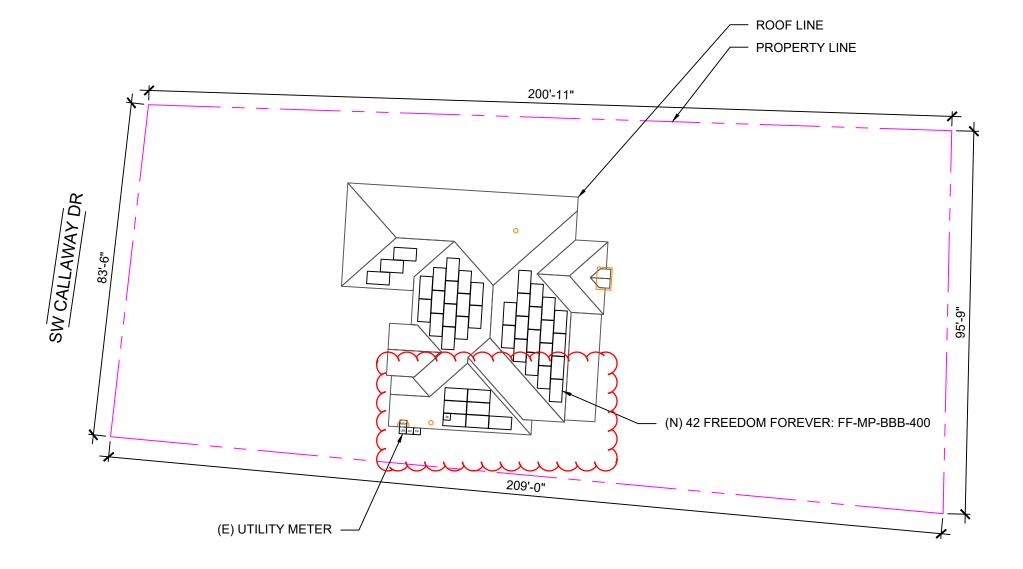
CERTIFIED ELECTRICAL CONTRACTOR EC13008056

404444 3/11/2024

SHEET:

DATE: DESIGNED BY







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ROOF AREA: 3947 SQ FT

CLIENT: SIDNEY THOMPSON

356 SW CALLAWAY DR, LAKE CITY, FL 32024 AHJ: COUNTY OF COLUMBIA UTILITY: "CLAY ELECTRIC COOPERATIVE, INC."

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

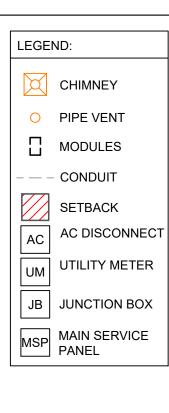
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SITE PLAN

DATE: DESIGNED BY:

JOB NO: DATE: DESIGNED BY: 404444 3/11/2024 A.W.

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



 $\bigcirc$ JB UM AC CP

TOTAL ROOF AREA: 3947 SQ FT TOTAL ARRAY AREA: 882.81 SQ FT ARRAY COVERAGE: 22.37% SYSTEM DISTRIBUTED WEIGHT: 2.32 LBS UNIRAC: FLASHLOC DUO POINT-LOAD: 10.34 LBS **ROCKIT SMART SLIDE POINT-LOAD: 27.95** LBS

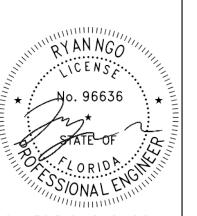


**ROOF PLAN** SCALE: 1/8" = 1'-0" NOTES:

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

JUNCTION BOX IS MOUNTED TO THE RAIL.



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REVISIONS 1 A.W. 3/1/2024 2 A.W. 3/11/2024



FREEDOM FOREVER LLC 2619 CONSULATE DR SUITE 800, ORLANDO

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

ROOF PLAN WITH MODULES LAYOUT

404444 3/11/2024

## **ROOF DETAILS:**

TOTAL ROOF AREA: 3947 SQ FT TOTAL ARRAY AREA: 882.81 SQFT

ARRAY COVERAGE: 22.37%

SYSTEM DISTRIBUTED WEIGHT: 2.32 LBS UNIRAC: FLASHLOC DUO POINT-LOAD: 10.34 LBS ROCKIT SMART SLIDE POINT-LOAD: 27.95 LBS

ROOF AREA STATEMENT							
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA	
ROOF 1	7	33	33	183.53	397.12 SQ FT	147.14 SQ FT	
ROOF 2	18	33	33	93.53	684.74 SQ FT	378.35 SQ FT	
ROOF 3	14	33	33	273.53	587.4 SQ FT	294.27 SQ FT	
ROOF 4	3	33	33	183.53	231.21 SQ FT	63.06 SQ FT	
					SQ FT	SQ FT	
					SQ FT	SQ FT	
					SQ FT	SQ FT	
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ARRAY DETAILS

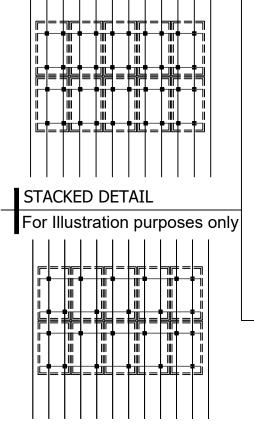
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PV-2B

	TABLE 1 - ARRAY INSTALLATION								
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE	MAX UNBRACED LENGTH(FT.)	STRUCTURAL ANALYSIS RESULT	PENETRATION PATTERN	MAX ATTACHMENT SPACING (IN.)	MAX RAIL OVERHANG(I N.)
ROOF 1	33	Comp Shingle	Unirac Flashloc Duo	2x4 @ 24" O.C.	7	PASS	STACKED	36	12
ROOF 2	33	Comp Shingle	Ecofasten RockIt Smart Slide	2x4 @ 24" O.C.	7	PASS	STACKED	72	24
ROOF 3	33	Comp Shingle	Ecofasten RockIt Smart Slide	2x4 @ 24" O.C.	7	PASS	STACKED	72	24
ROOF 4	33	Comp Shingle	Ecofasten RockIt Smart Slide	2x4 @ 24" O.C.	7	PASS	STACKED	72	24

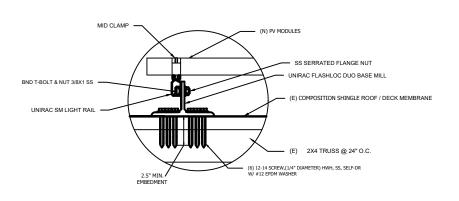


<sup>2.</sup> WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.



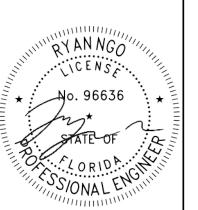
STAGGERED DETAIL For Illustration purposes only

**ENLARGED VIEW** PV MODULE (E) COMPOSITION SHINGLE ROOF



ATTACHMENT DETAIL

Scale: NTS



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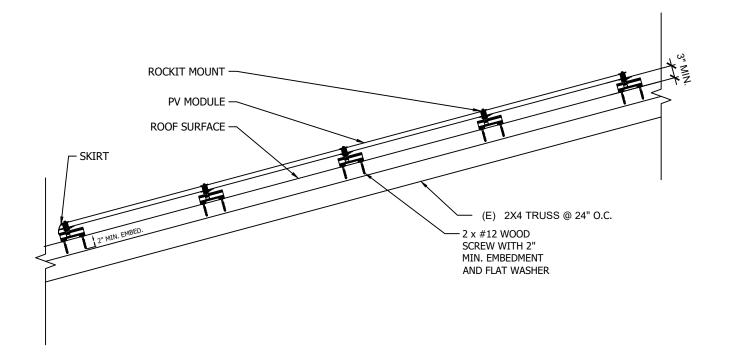
MOUNTING DETAILS

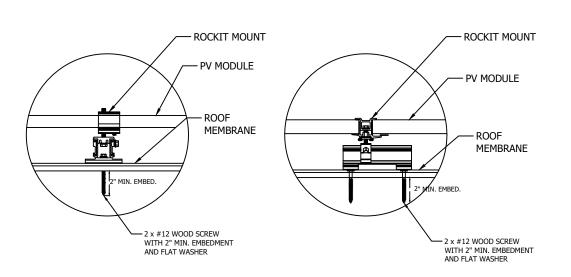
DATE: DESIGNED BY: 404444 3/11/2024

Scale: NTS

SOLAR PV ARRAY SECTION VIEW

<sup>3.</sup> MAX RAIL OVERHANG APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.





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

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

MOUNTING DETAILS

JOB NO: DATE: DESIGNED BY: S 404444 3/11/2024 A.W.

SOLAR PV ARRAY SECTION VIEW

Scale: NTS

ATTACHMENT DETAIL

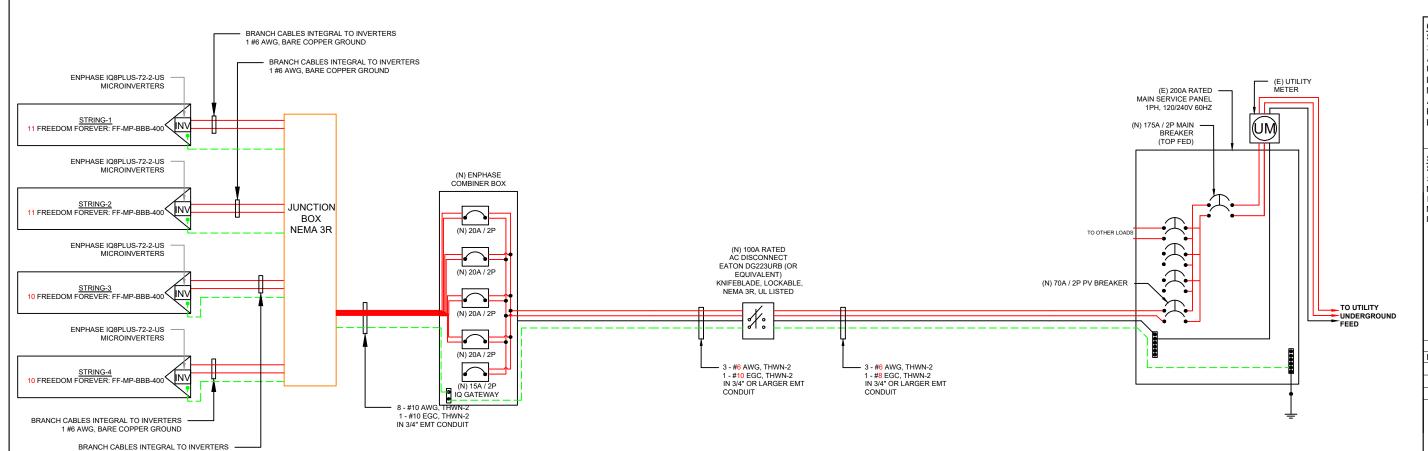
Scale: NTS

BACKFEED BREAKER SIZING							
MAX. CONTINUOUS OUTPUT 50.82A @ 240V							
50.82	Х	1.25	=	63.53AMPS		70A BREAKER - OK	
SEE 705.12 OF 2020 NEC							
200	Χ	1.20	=	240			
240	-	175	=	65A ALLOW	/ABI	_E BACKFEED	

1 #6 AWG, BARE COPPER GROUND



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	REVISIONS		
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19 CONSULATE DR SUITE 800 FL 32819 Tel: (800) 385-1075 GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR

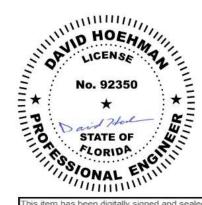
EC13008056

THREE LINE DIAGRAM

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NOTE:
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					WIRE	SCHEDU	JLE					
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	ТО	MICROINVERTER	2	10	40	17.24	0.96	1	38.40	21.55
2	AC	MICROINVERTER	TO	JUNCTION BOX	2	10	40	13.31	0.96	1	38.40	16.64
3	AC	JUNCTION BOX	то	ENPHASE COMBINER PANEL	8	10	40	13.31	0.96	0.7	26.88	16.64
4	AC	ENPHASE COMBINER PANEL	ТО	AC DISCONNECT	3	6	75	50.82	0.96	1	72.00	63.53
5	AC	AC DISCONNECT	ТО	POI	3	6	75	50.82	0.96	1	72.00	63.53

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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CONDUCTOR CALCULATIONS

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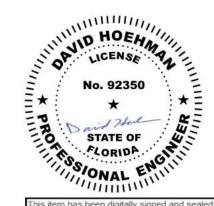
### **OCPD SIZES:**

20A BREAKER
20A BREAKER
20A BREAKER
20A BREAKER
70A BREAKER
3A BREAKER

#### **SERVICE LIST:**

OLIVIOL LIGIT		
NONE		

TY.	PART	PART#	DESCRIPTION
42	MODULES	PV-110-400	FREEDOM FOREVER: FF-MP-BBB-400
1	JUNCTION BOX	RAC-261-527	600VDC NEMA 3R UL LISTED JUNCTION BOX
1	MOUNTING BRACKET	RAC-211-201	UNIRAC E-BOSS J-BOX MOUNTING BRACKET
4	ELECTRICAL ACCESSORIES	EA-350-326	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
4	EQUIPMENT ACCESSORIES	EA-350-327	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
42	INVERTERS	INV-120-015	ENPHASE IQ8PLUS-72-2-US
1	MONITORING EQUIPMENT	ME-180-201-4C	ENPHASE: COMBINER PANEL 4C
49	ELECTRICAL ACCESSORIES	EA-160-106	"ENPHASE, Q CABLE PORTRAIT FOR 60/72 CELL"
49	ELECTRICAL ACCESSORIES	EA-160-105	"ENPHASE, Q CABLE LANDSCAPE 60 CELL"
1	MONITORING EQUIPMENT	ME-180-201	"ENPHASE, AC COMBINER W/ IQ GATEWAY PCBA, 80A, 240V"
1	WIRE	WR-310-300	"ENPHASE, RAW TRUCK CABLE (300 FT. ROLL)"
336	ELECTRICAL ACCESSORIES	EA-160-110	ENPHASE TIE WRAPS / CABLE CLIPS
11	ELECTRICAL ACCESSORIES	EA-160-107	ENPHASE SEALING CAPS FOR Q CABLE
5	ELECTRICAL ACCESSORIES	EA-160-109	ENPHASE TERMINATOR
1	DISCONNECTS	EE-321-100	100A RATED 240VAC NEMA 3R UL LISTED
33	FITTINGS/ANCHORS	RAC-241-263	UNIRAC: FLASHLOC DUO
61	FITTINGS/ANCHORS	RAC-265-034	ROCKIT SMART SLIDE
6	RAILS	RAC-211-100	UNIRAC SM LIGHT RAIL 168 INCH (TOTAL 80 FEET NEEDED)
33	FITTINGS/ANCHORS	RAC-261-517	BND T-BOLT AND NUT SS
8	ENDS/MIDS	RAC-221-101	SM MIDCLAMP PRO DRK
8	ENDS/MIDS	RAC-221-209	SM ENDCLAMP PRO W/ END CLAMP
3	FITTINGS/ANCHORS	RAC-261-600	BND SPLICE BAR PRO SERIES MILL
8	FITTINGS/ANCHORS	RAC-261-510	MICRO MNT BND TBOLT SS
2	RAILS	RAC-211-209-NS	E-BOSS CONDUIT MOUNT COMP KIT
4	RAILS	RAC-211-200	E-BOSS RAIL TRAY
2	RAILS	RAC-211-206	E-BOSS BRIDGE TRAY
3	RAILS	RAC-211-207	E-BOSS BRIDGE CLIPS
12	FITTINGS/ANCHORS	RAC-260-300	BURNDY GROUND WEEB-LUG
12	FOOTINGS	RAC-241-100	UNIRAC L-FOOT SERRATED W/T-BOLT CLEAR (KIT)
61	FITTINGS/ANCHORS	RAC-241-100 RAC-261-517	BND T-BOLT AND NUT SS
	ENDS/MIDS		
37 37		RAC-221-101	SM MIDCLAMP PRO DRK
	ENDS/MIDS	RAC-221-202-NA	SM ENDCLAMP PRO W/ END CLAMP
12	FITTINGS/ANCHORS	RAC-261-600	BND SPLICE BAR PRO SERIES MILL
37	FITTINGS/ANCHORS	RAC-261-510	MICRO MNT BND TBOLT SS
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7	RAILS	RAC-211-200	E-BOSS RAIL TRAY
7	RAILS	RAC-211-206	E-BOSS BRIDGE TRAY
11	RAILS	RAC-260-300	E-BOSS BRIDGE CLIPS
	FITTINGS/ANCHORS	RAC-260-300	BURNDY GROUND WEEB-LUG
60	FOOTINGS	RAC-241-100	UNIRAC L-FOOT SERRATED W/T-BOLT CLEAR (KIT)
			UNIRAC L-FOOT SERRATED W/T-BOLT CLEAR (KIT)



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PHONE: (386) 344-3095 EMAIL: COLLSID@COMCAST.NET

SYSTEM:
SYSTEM SIZE (DC): 42 X 400 = 16.800 kW
SYSTEM SIZE (AC): 12.180 kW @ 240V
MODULES: 42 X FREEDOM FOREVER: FF-MP-BBB-400 MICROINVERTERS: 42 X ENPHASE IQ8PLUS-72-2-US

	REVISIONS	
10.	REVISED BY	DATE
1	A.W.	3/1/2024
2	A.W.	3/11/2024
-	-	-



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

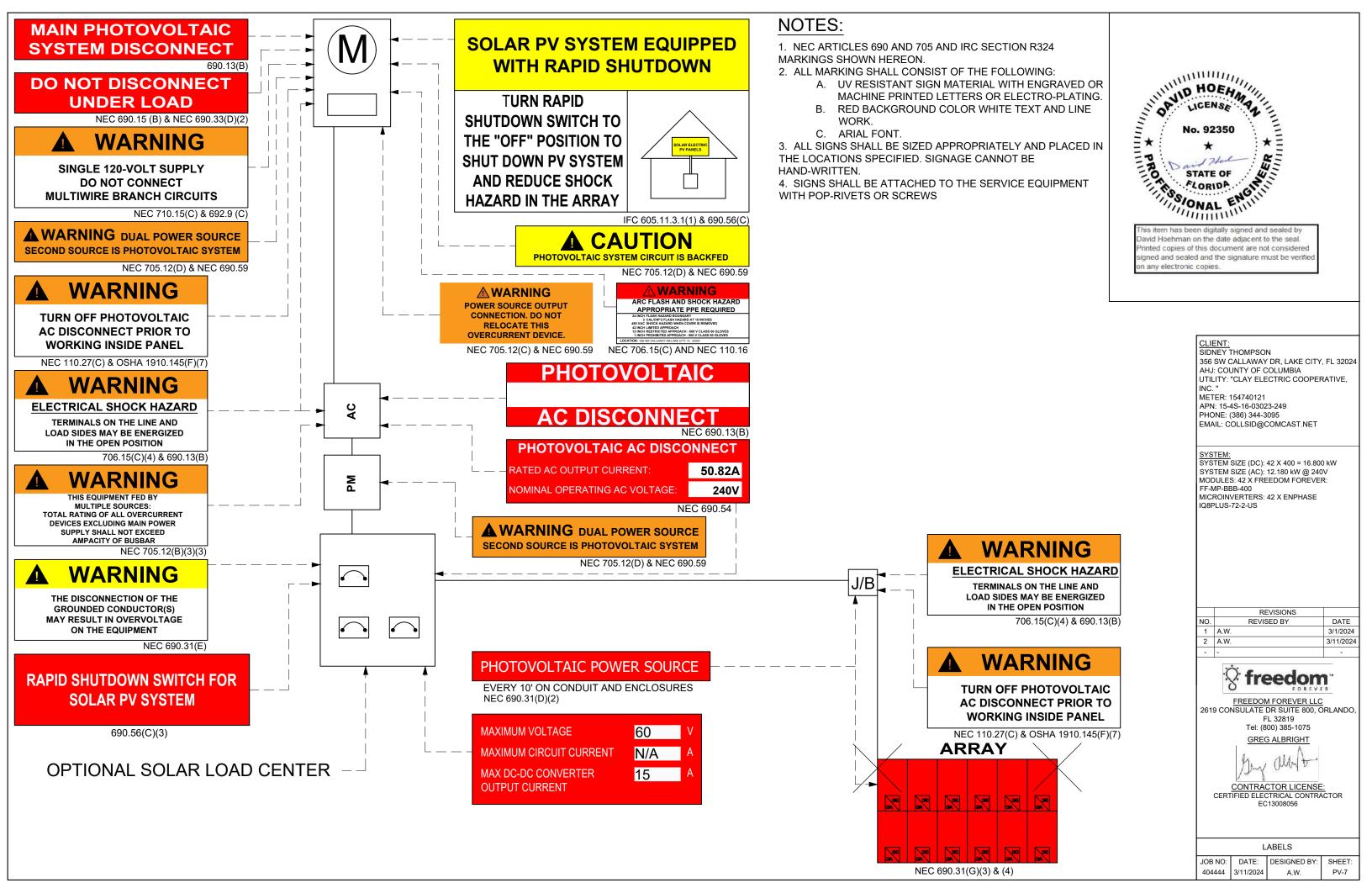
GREG ALBRIGHT

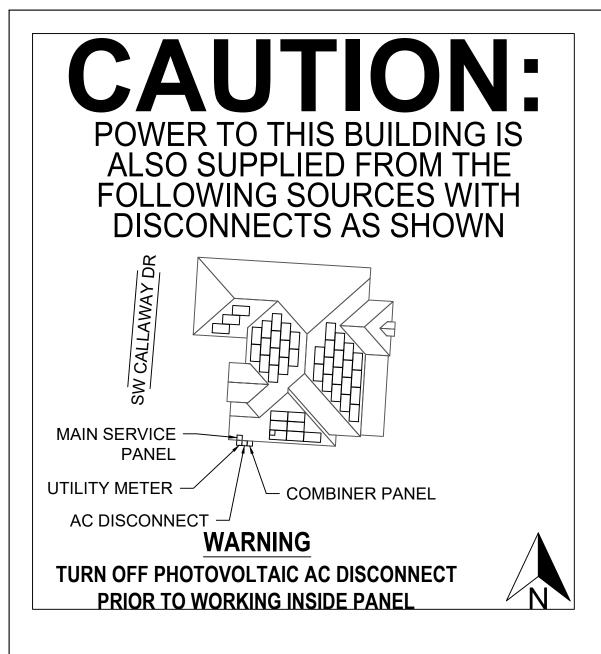
CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

**EQUIPMENT & SERVICE LIST** 

JOB NO: DATE: DESIGNED BY:

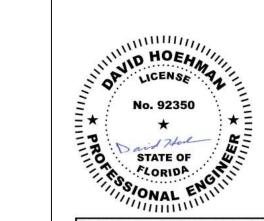
404444 3/11/2024 A.W.





#### 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. AERIAL 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.



This item has been digitally signed and sealed by David Hoehman 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.

CLIENT:
SIDNEY THOMPSON
356 SW CALLAWAY DR, LAKE CITY, FL 32024
AHJ: COUNTY OF COLUMBIA
UTILITY: "CLAY ELECTRIC COOPERATIVE,
INC."

METER: 154740121 APN: 15-4S-16-03023-249 PHONE: (386) 344-3095 EMAIL: COLLSID@COMCAST.NET

SYSTEM:
SYSTEM SIZE (DC): 42 X 400 = 16.800 kW
SYSTEM SIZE (AC): 12.180 kW @ 240V
MODULES: 42 X FREEDOM FOREVER:
FF-MP-BBB-400
MICROINVERTERS: 42 X ENPHASE
IQ8PLUS-72-2-US



2619 CONSULATE DR SUITE 800, ÖRLANDO FL 32819 Tel: (800) 385-1075

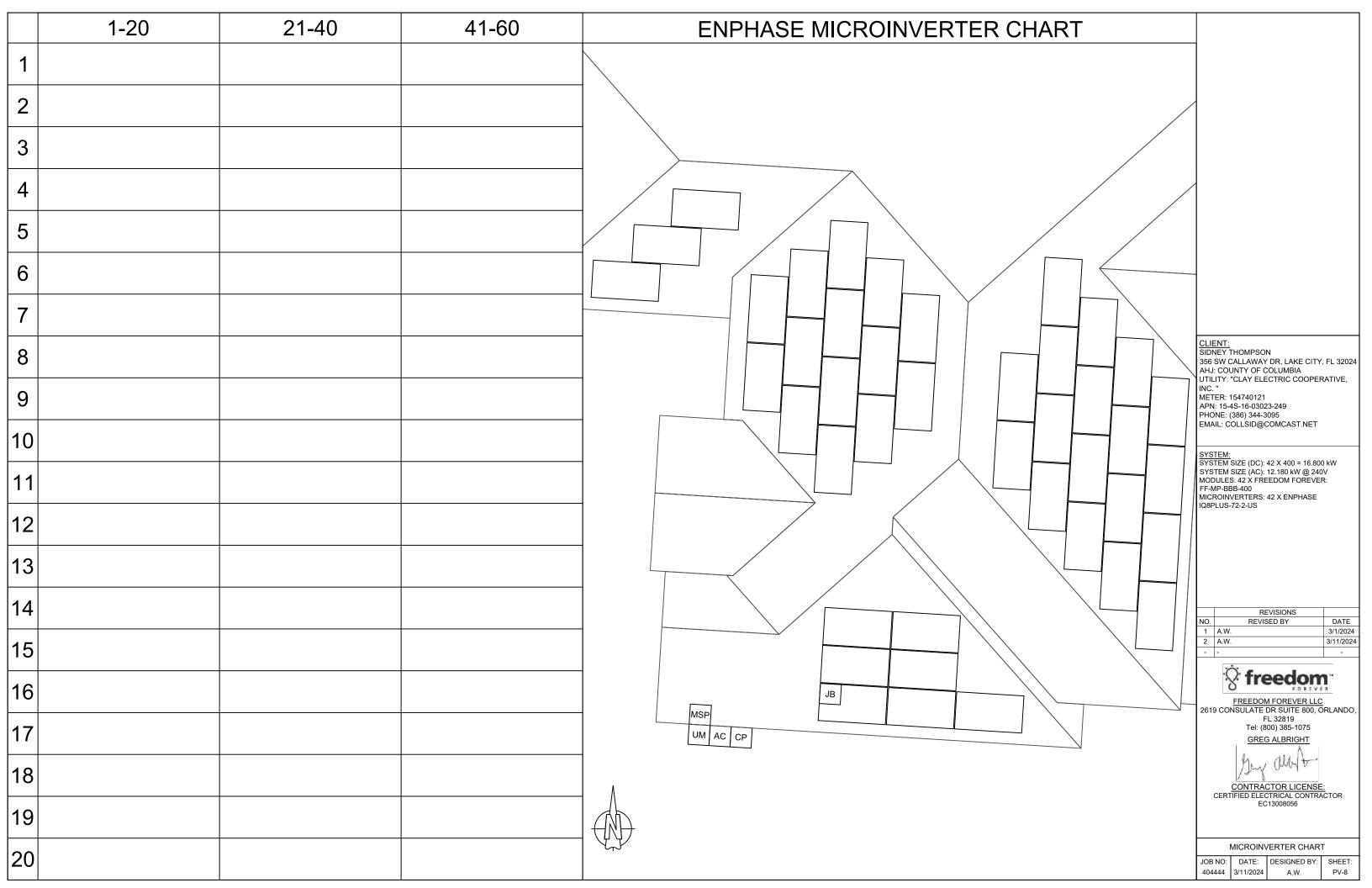
CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

SITE PLACARD

JOB NO: DATE: DESIGNED

404444 3/11/2024 A.W.

PV-7A



## SAFETY PLAN

#### INSTRUCTIONS:

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

#### **INCIDENT REPORTING:**

**INJURIES - CALL INJURY HOTLINE** 

(855) 400-7233

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

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



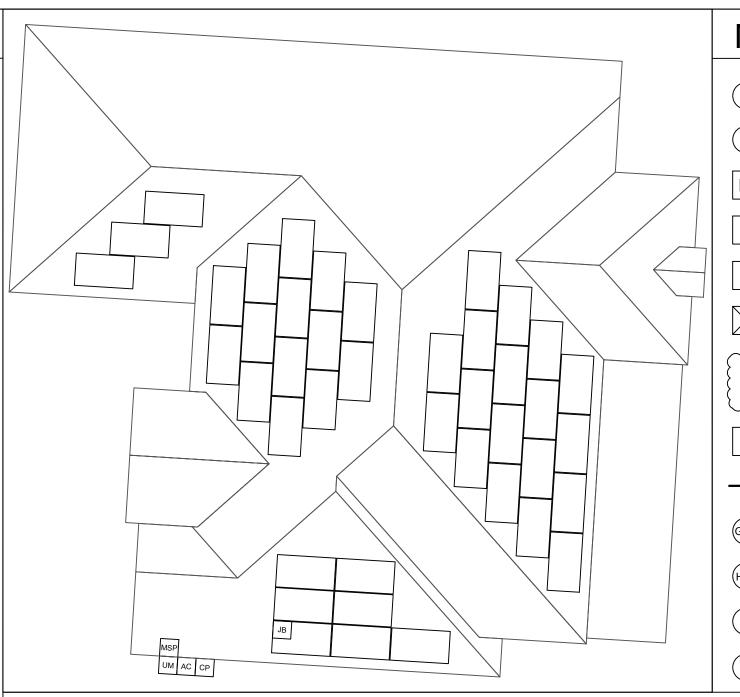
PHONE NUMBER:

NEAREST	OCCUPATIONAL/INDUSTRIAL CLINIC:

NAME:
ADDRESS:
NEAREST HOSPITAL:
NAME:
ADDRESS:
SAFETY COACH CONTACT INFORMATION:
NAME:

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.

<u>NAME</u>	SIGNATURE
	<del></del>
	<del></del>
	<del>-</del>
DATE:	TIME:



COMPLETED AND UPLOADED AT THE END OF EVERYDAY WHEN TEMPS EXCEED 90 DEGREES

NAME

**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

0800HRS | 0900HRS | 1000HRS | 1100HRS |

## MARK UP KEY

#### (P) PERMANENT ANCHOR

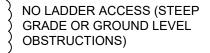
### TEMPORARY ANCHOR











RESTRICTED ACCESS

CONDUIT

(GAS) **GAS SHUT OFF** 

WATER SHUT OFF

SERVICE DROP

**POWER LINES** 

#### **INSTRUCTIONS:**

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

**POLICIES** 



SIDNEY THOMPSON 356 SW CALLAWAY DR, LAKE CITY, FL 32024 AHJ: COUNTY OF COLUMBIA UTILITY: "CLAY ELECTRIC COOPERATIVE, METER: 154740121 APN: 15-4S-16-03023-249

PHONE: (386) 344-3095 EMAIL: COLLSID@COMCAST.NET

<u>SYSTEM:</u> SYSTEM SIZE (DC): 42 X 400 = 16.800 kW SYSTEM SIZE (AC): 12.180 kW @ 240V MODULES: 42 X FREEDOM FOREVER: MICROINVERTERS: 42 X ENPHASE

IQ8PLUS-72-2-US

#### REVISIONS 1 A.W

1600HRS

#### REVISED BY 3/1/2024 2 A.W. 3/11/2024

## freedom

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

**CONTRACTOR LICENSE** CERTIFIED ELECTRICAL CONTRACTOR

EC13008056

SAFETY PLAN

DATE: DESIGNED BY: 404444 3/11/2024

#### **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):

#### 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:

Contact your Site Supervisor

Name:

Phone:

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

#### NOTE ADDITIONAL HAZARDS NOT ADDRESSED ABOVE

(add as many as necessary by using additional sheets)

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

CLIENT:
SIDNEY THOMPSON
356 SW CALLAWAY DR, LAKE CITY, FL 32024
AHJ: COUNTY OF COLUMBIA
UTILITY: "CLAY ELECTRIC COOPERATIVE,
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IQ8PLUS-72-2-US

EMAIL: COLLSID@COMCAST.NET

0.	REVISED BY	DATE
1	A.W.	3/1/2024
2	A.W.	3/11/2024
-	-	-

REVISIONS



FL 32819 Tel: (800) 385-1075 GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

SAFETY PLAN

JOB NO: DATE: DESIGNED BY: 404444 3/11/2024 A.W.

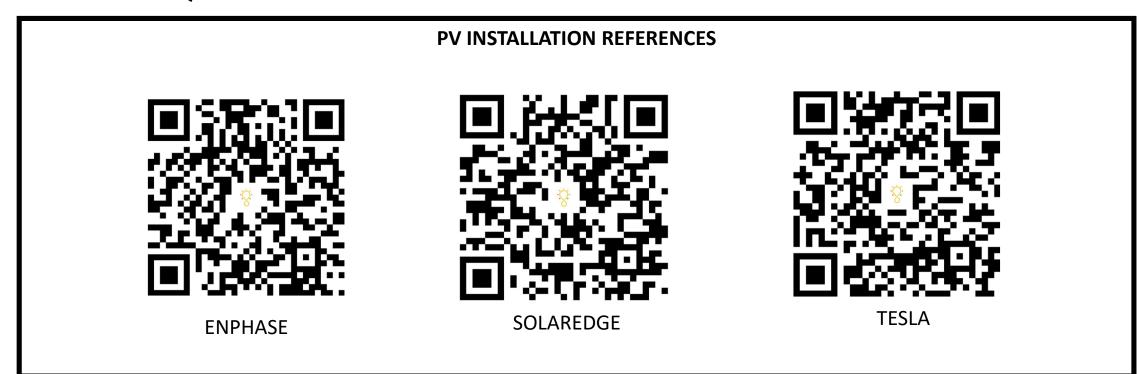
D BY: SHEE

	NEC 220.83 - Residential L	_oad Calculation Version 2.
		L1/L2 240 V
NEC 220.83(B)		100% of the first 8 kVA plus 40% of the remainder of ing loads"
NEC 220.83(B)(1)	"The calculated floor area shall not include o	pen porches, garages, or unused spaces"
	Floor Area 2,402 square feet x	3VA/sq ft 7,206 VA
NEC 220.83(B)(2)		all appliance branch circuit and each laundry branch
	Small Appliance Circuits Laundry Circuits  2 circuits x 150 1 circuits x 150	,
NEC 220.83(B)(3)		s, wall-mounted ovens, counter-mounted cooking the laundry branch circuit [and] water heaters"
	Load (240V unless otherwise indicated)  Air Handler/FAU  Water Heater  Range  Dryer  Total of non air-conditioning loads:	Breaker
	First 10 kVA of load at 100%  Remainder of load at 40%  Adjusted total of non air-conditioning load	10,000 13,434 <b>23,434</b> VA
NEC 220.83(B)	"Heating and air-conditiong load…" i Breaker i VA i	
	Sum of A/C Equipment Units Sum of Electric Furnaces	Breaker VA 30 6,720 0 0
	Total of A/C Loads and All Other Loads:	<b>30,154</b> total VA
	Total Proposed Calculated Load:	125.64 Amps

#### FOR INSTALLATION REFERENCE ONLY

## SCAN QR CODE TO ACCESS REFERENCE LINK











**SOLAREDGE Storage Systems** 



**BATTERY INSTALLATION REFERENCES** 

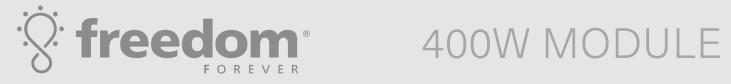
**TESLA Storage Systems** 

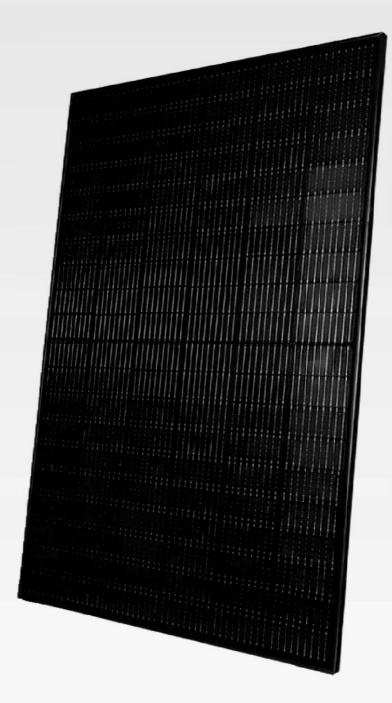


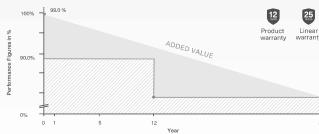
NON-BACKUP Battery Systems



Misc. Quick Guide







#### MODULE SPECIFICATIONS

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]	37.04V
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

#### 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 in)
Front Glass	3.2 mm (.13 in)
Junction Box	IP68 (3 Bypass Diodes)
Output Cables	1200 mm (47.24 in)
Connector	Staubli MC4
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
Panels per Pallet	31	31
Packaging Bon Weight	679 kg (1497 lbs)	
Panels per Pallet	1785 x 1130 x 118 ( 70.28 x 44.49 x 4	

#### TEMPERATURE RATINGS

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









#### UL 61730 | UL 61215 | ISO 9001 | ISO 14001



Frame Profile

35[1.38]

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]	37.04V
Short Circuit Current (Isc)[A]	13.79A
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Power Tolerance	0/+5W
STC	Irradiance of 1000W/m², AM1.5, Cell Temperature 25°C

Operational Temperature	-40°C~+85°
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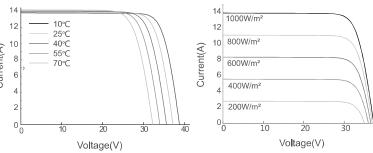
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Rear Side Design Load	2,400Pa (50lb/ft2)

Container	20' GP	40' HC
Pallets per Container	6	26
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Panels per Pallet	1785 x 1130 x 118 ( 70.28 x 44.49 x 4	

#### CURRENT-VOLTAGE CURVE

1134±2

Front



Back

Product Label

Freedom 400W Module Datasheet | Version No: FF-MP-BBB-400

Side



## CERTIFICATE **OF COMPLIANCE**

CERTIFICATE



This certificate confirms the model(s) for the product listed are in compliance and authorized to bear the Certification Mark(s) shown below when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This document is for use with the Design Light Consortium or California Energy Commission application only.

**Basic Listee:** PT IDN SOLAR TECH Freedom Forever Procurement LLC Multiple Listee:

KOMPLEK KABIL INDONUSA ESTATE,

43445 Business Park Drive, Suite 110, BLOK A NOMOR 19B, BATU BESAR, Address:

Temecula, CA 92590

Indonesia USA Country: Country:

Party Authorized to Apply Label: PT IDN SOLAR TECH

Batam

Address:

**Report Issuing Office:** Intertek Testing Services Shanghai Limited

Authorized by: **Control Number:** *5019087* 

for L. Matthew Snyder, Certification Manager

VALID LISTINĞ MARKS



This Certificate of Compliance is for the exclusive use of Intertek's Client and is provided pursuant to the Certification Agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the Agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the Agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the Agreement and in this Certificate. Any further use of the Intertek name for the sale or advertisement of the tested material, product or  $service must first be approved in writing by Intertek.\ Initial Factory Assessments and Follow up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance and appropriate usage of the Certification mark in accordance and the contract of the contract of the Certification mark in accordance and the contract of t$ with the Agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect

> Intertek Testing Services NA Inc. 545 East Algonquin Road, Arlington Heights, IL 60005 Telephone 800-345-3851 or 847-439-5667

Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [UL 61730-1:2017 Ed.1+R:30Apr2020]

Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [CSA Standard(s):

C22.2#61730-1:2019 Ed.2]

Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [UL 61730-2:2017

Ed.1+R:30Apr2020]

Certificate for Report: 200900855SHA-001 Page **1** of **2** Certificate Issued: June 16, 2022

# **OF COMPLIANCE**

	Photovoltaic (PV) Module Safety Qualification - 2:2019 Ed.2]	Part 2: Requirements for Testing [CSA C22.2#61730-
	Terrestrial Photovoltaic (Pv) Modules - Design C Requirements [UL 61215-1:2017 Ed.1]	Qualification And Type Approval - Part 1: Test
	, ,	Qualification And Type Approval - Part 1-1: Special Photovoltaic (PV) Modules [UL 61215-1-1:2017 Ed.1]
	Terrestrial Photovoltaic (Pv) Modules - Design C Procedures[UL 61215-2:2017 Ed.1]	Qualification And Type Approval - Part 2: Test
Product:	Crystalline Silicon Photovoltaic (PV) Modules	
Brand Name:	Freedom Forever	
	MULTIPLE LISTEE 12 MODELS	BASIC LISTEE MODELS
Models:	FF-MP-BBB- followed by 365, 370, 375 or 380.	NUSA120H- followed by 365, 370, 375 or 380; followed by MB.
	FF-MP-BBB- followed by 395, 400, 405 or 410.	NUSA108H- followed by 395, 400, 405 or 410; followed by MB.

Certificate for Report: 200900855SHA-001 Page 2 of 2 Certificate Issued: June 16, 2022





## IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



IQ8 Series Microinverters are UL listed as PV Rapid Shutdown Equipment and conform with various regulations, when installed according to manufacturer's instructions.

#### Easy to install

- Lightweight and compact with plug-nplay connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

#### High productivity and reliability

- Produce power even when the grid is down\*
- More than one million cumulative hours of testing
- · Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

#### Microgrid-forming

- Complies with the latest advanced grid support\*\*
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3<sup>rd</sup> Ed.)

#### Note:

IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc.) in the same system.

NPUT DATA (DC)		108-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings <sup>1</sup>	W	235 – 350	235 - 440
Module compatibility		60-cell / 120 half-cell	54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half- cell and 72-cell / 144 half-cell
MPPT voltage range	V	27 – 37	27 - 45
Operating range	V	16 – 48	16 – 58
Min. / Max. start voltage	V	22 / 48	22 / 58
Max. input DC voltage	V	50	60
Max. continuous input DC current	Α	10	12
Max. input DC short-circuit current	Α		25
Max. module I <sub>sc</sub>	Α	2	20
Overvoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1Ungrounded array; No additional DC side protection req	uired; AC side protection requires max 20A per branch circuit
DUTPUT DATA (AC)		108-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max. continuous output power	VA	240	290
Nominal (L-L) voltage / range <sup>2</sup>	V	240 / 2	211 – 264
Max. continuous output current	Α	1.0	1.21
Nominal frequency	Hz	6	60
Extended frequency range	Hz	47	- 68
AC short circuit fault current over 3 cycles	Arms		2
Max. units per 20 A (L-L) branch circu	it <sup>3</sup>	16	13
Total harmonic distortion		<	5%
Overvoltage class AC port			III
AC port backfeed current	mA	3	30
Power factor setting		1	1.0
Grid-tied power factor (adjustable)		0.85 leading	- 0.85 lagging
Peak efficiency	%	9	7.7
CEC weighted efficiency	%		97
Night-time power consumption	mW	6	60

MECHANICAL DATA	
Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (condensing)
DC Connector type	MC4
Dimensions (H x W x D)	212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection - no fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environ. category / UV exposure rating	NEMA Type 6 / outdoor

#### COMPLIANCE

Certifications

CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3<sup>rd</sup> Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN / CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shutdown Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at https://link.enphase.com/module-compatibility. (2) Nominal voltage range can be extended beyond nominal if required by the utility. (3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

<sup>\*</sup>Only when installed with IQ System Controller 2, meets UL 1741.

\*\*IQ8 and IQ8Plus support split-phase, 240V installations only.

## IQ Combiner 4/4C



The IQ Combiner 4/4C with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It streamlines IQ Microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

#### Smart

- · Includes IQ Gateway for communication and control
- Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- · Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

#### Simple

- Mounts on single stud with centered brackets
- · Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC plug-in breakers (not included)
- ullet 80A total PV or storage branch circuits

#### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3<sup>rd</sup> Ed.)





### IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4	IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 $\pm$ 0.5%)
X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	and consumption monitoring (± 2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 $\pm$ 0.5%)
X-IQ-AM1-240-4C	and consumption monitoring (± 2.5%). Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the
X2-IQ-AM1-240-4C (IEEE 1547:2018)	US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Supported microinverters	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
Communications Kit	
COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan
CELLMODEM-M1-06-AT-05	- 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers.  Circuit breaker, 2 pole, 10A, Eaton BR210
BRK-15A-2-240V	Circuit breaker, 2 pole, 15A, Eaton BR215
BRK-20A-2P-240V	Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support
BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation/95A with IQ Gateway breaker included
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to +46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	20A to 50A breaker inputs: 14 to 4 AWG copper conductors
	60A breaker branch input: 4 to 1/0 AWG copper conductors     Main lug combined output: 10 to 2/0 AWG copper conductors
	Neutral and ground: 14 to 1/0 copper conductors  About a full way look and appropriate for conductors in the second conductors.
Altitude	Always follow local code requirements for conductor sizing.  Up to 3,000 meters (9,842 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA)
	IEEE 1547:2018 - UL 1741-SB, 3 <sup>rd</sup> Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C)
	CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5

<sup>© 2022</sup> Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ Combiner 4/4C, and other names are trademarks of Enphase Energy, Inc. Data subject to change.

IQ-C-4-4C-DS-0103-EN-US-12-29-2022

#### Product specifications

## Eaton DG223URB

#### Catalog Number: DG223URB

Eaton General duty non-fusible safety switch, single-throw, 100 A, NEMA 3R, Rainproof, Painted galvanized steel, Two-pole, Two-wire, 240 V

#### General specifications

Product Name Catalog Number DG223URB Eaton general duty non-fusible safety

switch

UPC

782114731154

Product Length/Depth Product Height 7.38 in 19.25 in

Product Width Product Weight

12 lb 9.13 in

Warranty Certifications Eaton Selling Policy 25-000, one (1) year UL Listed

from the date of installation of the

whichever occurs first.

Product or eighteen (18) months from the Catalog Notes

date of shipment of the Product,

WARNING! Switch is not approved for service entrance unless a neutral kit is

installed.



#### **Product specifications**

Product Category

General duty safety switch

Enclosure material

Painted galvanized steel

Non-fusible, single-throw

Fuse configuration

Non-fusible

Number of wires

Enclosure NEMA 3R

Voltage rating

240V

Amperage Rating

100A

Number Of Poles

Two-pole

#### Resources

Catalogs

Eaton's Volume 2—Commercial Distribution

Multimedia

Switching Devices Flex Center

Double Up on Safety

Specifications and datasheets

Eaton Specification Sheet - DG223URB



Eaton Corporation plc Eaton House 30 Pembroke Road Dublin 4. Ireland Eaton.com

Eaton is a registered trademark.

All other trademarks are © 2023 Eaton. All Rights property of their respective



## FLASHLOC™ DUO





**FLASH**LOC™ **DUO** is the most versatile direct to deck and rafter attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the required number of screws to secure the mount and inject sealant into the base. **FLASH**LOC's patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with two rafter screws, sealant and hardware for maximum convenience (deck screws sold separately). Don't just divert water, **LOC it out!** 



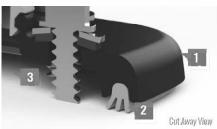




#### PROTECT THE ROOF

Install a high-strength waterproof attachment without lifting, prying or damaging shingles.

APRIL2021\_FLASHLOCDUO\_V1



#### LOC OUT WATER

With an outer shield 1 contour-conforming gasket 2 and pressurized sealant chamber 3 the Triple Seal technology delivers a 100% waterproof connection.



#### HIGH-SPEED INSTALL

Simply drive the required number of screws and inject sealant into the port 4 to create a permanent pressure

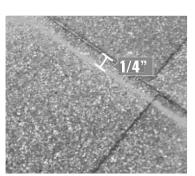
## FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

## FLASHLOC™ DUO

**INSTALLATION GUIDE** 





#### PRE-INSTALL: CLEAN SURFACE AND MARK LOCATION

Ensure existing roof structure is capable of supporting the roof attachment point loads stated in the racking system engineering specifications. Clean roof surface of dirt, debris, snow and ice.

Snap chalk lines for attachment rows. On shingle roofs, snap lines 1/4" below upslope edge of shingle coarse. This line will be used to align the upper edge of the mount.

**NOTE:** Space mounts per racking system installation specifications.





ATTACHING TO A RAFTER: Place FLASHLOC DUO over rafter location with sealant port on up-slope side and align upper edge of mount with horizontal chalk line. Secure mount with the two (2) provided rafter screws. BACKFILL ALL PILOT HOLES WITH SEALANT.

ATTACHING TO SHEATHING: Place FLASHLOC DUO over desired location with sealant port on up-slope side and align upper edge of mount with horizontal chalk line. Secure mount with the two (2) provided rafter screws. Next, secure mount with four (4) deck screws by drilling through the FLASHLOC DUO deck mount hole locations. Unirac recommends using a drill as opposed to an impact gun to prevent over-tightening or stripping roof sheathing.

IMPORTANT: SECURELY ATTACH MOUNT BUT DO NOT OVERTIGHTEN SCREWS.



#### **STEP TWO:** SEAL



NOTE: When FLASHLOC DUO is installed over gap between shingle tabs or vertical joints, fill gap/joint with sealant between mount and upslope edge of shingle course.

CUT SHINGLES AS REQUIRED: DO NOT INSTALL THE FLASHLOC SLIDER ACCROSS THICKNESS VARIATIONS GREATER THAN 1/8" SUCH AS THOSE FOUND IN HIGH DEFINITION SHINGLES.



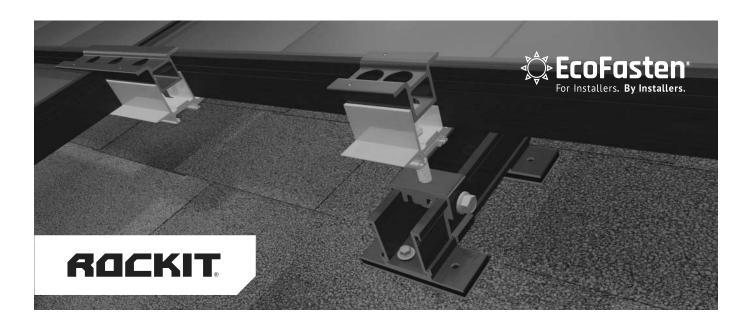
NOTE: If an exploratory hole falls outside of the area covered by the sealant, flash hole accordingly. NOTE: Read and comply with the Flashloc Duo Design & Engineering Guide prior to design and installation of the system.

USE ONLY UNIRAC APPROVED SEALANTS. PLEASE CONTACT UNIRAC FOR FULL LIST OF COMPATIBLE SEALANTS.

Continue array installation. Refer to SOLARMOUNT or NXT HORIZON Installation Guide for the remaining system installation.

## FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702



## INTRODUCING ROCKIT SMART SLIDE!

Introducing EcoFasten's patent pending RockIt Smart Slide, our simple solution for quickly installing the popular RockIt rail-less racking system to composition shingle roofs.

#### **Features & Benefits**

- 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



### **Required Components:**

Part Number:	Description:
2011024	RI SMART SLIDE BLK 6.75"
2011025	RI SMART SCRW #12X3" W/BW

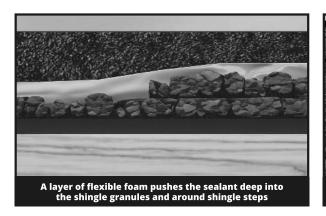
ECOFASTENSOLAR.COM ()

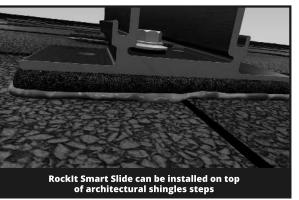
## **ROCKIT SMART SLIDE**

### Integrated UltraGrip Technology™

Pre-installed sealing pads are compatible with all composition shingle roofs. The compression achieved when fastened to the roof creates a super strong watertight seal. In most cases, the slide can be mounted to the deck without the need for sealant. A layer of flexible foam provides cushioning, which allows the waterproofing sealant to embed deep into the granules of the shingle as well as to flexibly conform over the steps found on architectural-style shingles.







## **Testing & Documentation**

- <u>UL441 Rain Report</u>
- TAS 100 (A)-95 Wind and Wind Driven Rain Resistance
- Mechanical Load Test/Structural Capacity Certification
- Florida Product Approval
- RockIt Installation Manual
- RockIt CutSheets





**4141 W. VAN BUREN ST, SUITE 2, PHOENIX AZ 85009** 1 - 8 7 7 - 8 5 9 - 3 9 4 7 | INFO@ECOFASTENSOLAR.COM

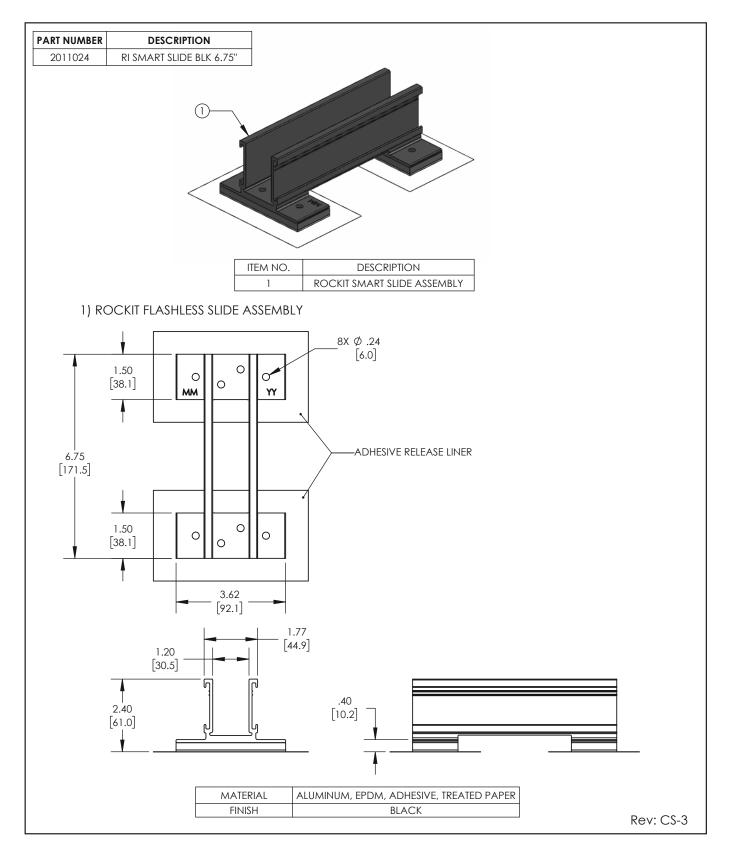
## PRODUCT CUT SHEET



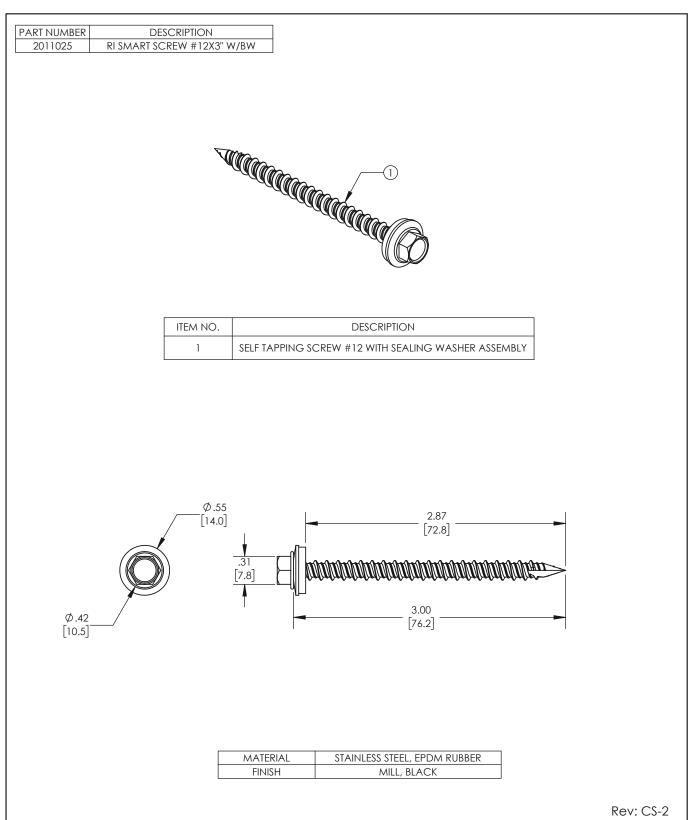
## PRODUCT CUT SHEET



## RI SMART SLIDE BLK 6.75"



## RI SMART SCREW #12X3" W/BW

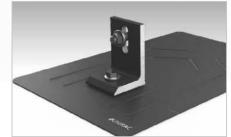


## SOLARMOUNT



**SOLAR**MOUNT is the professionals' choice for residential PV mounting applications. Every aspect of the system is designed for an easier, faster installation experience. **SOLAR**MOUNT is a complete solution with revolutionary universal clamps, **FLASHKIT** PRO, full system UL 2703 certification and 25-year warranty. Not only is **SOLAR**MOUNT easy to install, but best-in-class aesthetics make it the most attractive on any block!





NOW FEATURING FLASHKIT PRO The Complete Roof Attachment Solution FEATURING SHED & SEAL TECHNOLOGY



NOW WITH UNIVERSAL MIDCLAMPS Accommodates 30mm-51mm module frames One tool, one-person installs are here!



**REVOLUTIONARY NEW ENDCLAMPS** Concealed design and included End Caps

## THE PROFESSIONALS' CHOICE FOR RESIDENTIAL RACKING

BESTINSTALLATION EXPERIENCE • CURB APPEAL • COMPLETE SOLUTION • UNIRAC SUPPORT

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

## **SOLAR**MOUNT

## **#**UNIRAC

## **BETTER DESIGNS**

#### TRUST THE INDUSTRY'S BEST DESIGN TOOL

Start the design process for every project in our U-Builder on-line design tool. It's a great way to save time and money

## **BETTER SYSTEMS**

#### **ONE SYSTEM - MANY APPLICATIONS**

Quickly set modules flush to the roof on steep pitched roofs. Orient a large variety of modules in Portrait or Landscape. Tilt the system up on flat or low slow roofs. Components available in mill, clear, and dark finishes to optimize your design financials

### **BETTER RESULTS**

#### MAXIMIZE PROFITABILITY ON EVERY JOB

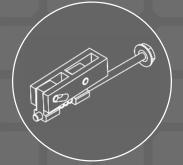
Trust Unirac to help you minimize both system and labor costs from the time the job is quoted to the time your teams get off the roof. Faster installs. Less Waste. More Profits

## **BETTER SUPPORT**

#### **WORK WITH THE INDUSTRIES MOST EXPERIENCED TEAM**

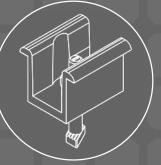
Professional support for professional installers and designers. You have access to our technical support and training groups. Whatever your support needs, we've got you covered. Visit Unirac.com/solarmount for more information

#### **CONCEALED UNIVERSAL ENDCLAMPS**





**END CAPS INCLUDED** WITH EVERY ENDCLAMP



**UNIVERSAL SELF** STANDING MIDCLAMPS



**U-BUILDER ONLINE DESIGN TOOL SAVES TIME & MONEY** 

Visit design.unirac.com

### UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT





BONDING & GROUNDING MECHANICAL LOADING SYSTEM FIRE CLASSIFICA











#### TECHNICAL SUPPORT CERTIFIED OUALITY PROVIDER

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An onlir stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

## Unirac is the only PV mounting vendor with ISO

certifications for 9001:2008, 14001:2004 and OHSAS

#### **BANKABLE WARRANTY**

Don't leave your project to chance, Unirac has the Have peace of mind knowing you are providing products of exceptional quality. SOLARMOUNT is covered by a 25 year limited product warranty and a 5 year limited finish warranty

ENHANCE YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN PUB2018AUG31-PRINTEDUPDATE FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702



## **Certificate of Compliance**

**Certificate:** 70131735 Master Contract: 266909

**Project:** 80082031 **Date Issued:** 2021-06-02

**Issued To:** Unirac

1411 Broadway NE

Albuquerque, New Mexico, 87102

**United States** 

**Attention: Klaus Nicolaedis** 

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Michael Hoffnagle

Michael Hoffnagle



#### **PRODUCTS**

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems

- CLASS C531382 POWER SUPPLIES PHOTOVOLTAICS-PV Racking and clamping systems -

Certified to US Standards

Models:	SM	-	SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.
	ULA	-	Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules.

Solarmount

DOD 507 Rev. 2019-04-30 © 2018 CSA Group. All rights reserved



Certificate: 70131735 **Project:** 80082031

Master Contract: 266909 Date Issued: 2021-06-02

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

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

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.

UL 2703 Mechanical Load ratings:

Downward Design Load (lb/ft²)	113.5
Upward Design Load (lb/ft²)	50.7
Down-Slope Load (lb/ft²)	16.13

Test Loads:

Downward Load (lb/ft²)	170.20
Upward Load (lb/ft²)	76.07
Down-Slope Load (lb/ft²)	24.2

#### **Unirac Large Array**

ULA is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules. ULA aluminum components merge with SM rails and installer-supplied steel pipe. The SM rail system is secured to the horizontal Pipe using the Rail Bracket components. The Rear and Front cap secures the horizontal Pipe to the vertical Pipe. The Front cap is also used to secure the Cross brace. A Slider is attached to the vertical Pipe to secure the Cross brace. The SM rails, caps, slider, rail brackets, and cross braces materials are 6105-T5 aluminum extrusion. Fasteners materials are 304 stainless steel. Horizontal and vertical pipe materials meet the minimum requirements of ASTM A53 for galvanized steel pipe in 2" and 3" diameter.

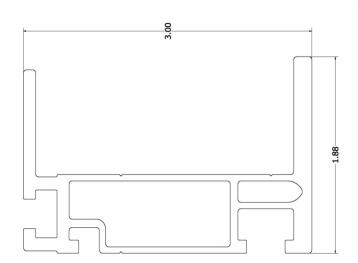
The mechanical load ratings from the SM test data will be applied to the ULA model.

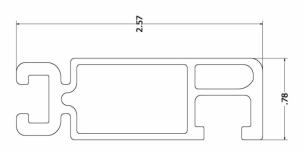
Fire Testing is not applicable due to being a ground mount system.

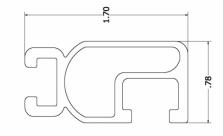
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S M SOLAR MOUNT







Properties	SOLARMOUNT Light	SOLARMOUNT Rail Profile 2	SOLARMOUNT HD	Units
BEAM HEIGHT	1.70	2.57	3.00	Ξ.
APPROX WEIGHT	0.491	0.728	1.271	plf
CROSS SECTION AREA	0.409	0.625	1.059	in <sup>2</sup>
SECTION MODULUS (X-AXIS)	0.15	0.363	868:0	in³
SECTION MODULUS (Y-AXIS)	0.067	0.113	0.221	in³
MOMENT OF INERTIA (X-AXIS)	0.13	0.467	1.45	<sub>t</sub> ui
MOMENT OF INERTIA (Y-AXIS)	0.026	0.045	0.267	in <sup>4</sup>
RADIUS OF GYRATION (X-AXIS)	0.564	0.865	1.17	in
RADIUS OF GYRATION (Y-AXIS)	0.254	697.0	205.0	٤.





## Certificate

Certificate no.

US 82160015 01

License Holder: Unirac Inc. 1411 Broadway NE Albuquerque NM 87102 USA Manufacturing Plant: Unirac Inc. 1411 Broadway NE Albuquerque NM 87102

Test report no.: USA- 31440029 005
Tested to: UL 2703:2015

Client Reference: Tom Young

Certified Product: Module Rack Mounting System

License Fee - Units

Model Designation: SolarMount (SM)

9

Max System Voltage of PV Module: 1000 VDC
Max Size of PV Module: 20.8 sq.ft. surface area
Max Overcurrent Protection Rating of PV Module:
30 A when using the qualified grounding lugs;
20 A when using the Enphase micro inverter EGC.

Fire Rating: Class A when installed with Type 1, Type 2, Type3, or Type 10 fire rated modules.

(continued)

Appendix: 1,1-5

7

Licensed Test mark:



Date of Issue (day/mo/yr) 27/07/2016

 $T\ddot{\text{U}}\text{V Rheinland PTL, LLC, } 1107\text{ W. Fairmont Drive, Building A, Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Fax } (775) 314-6458 \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Fax } (775) 314-6458 \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Fax } (775) 314-6458 \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Fax } (775) 314-6458 \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Fax } (775) 966-1700, \\ \text{Fax } (775) 966-1700, \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Tempe, Arizona } 85282, \\ \text{Tel } (480) 966-1700, \\ \text{Tempe, Arizona } 85282, \\ \text{Tempe, Arizona } 8$ 



ECOFASTEN SOLAR LLC 4141 W. VAN BUREN ST., SUITE 2 PHOENIX, AZ 85009

877-859-3947 INFO@ECOFASTENSOLAR.COM

February 16, 2024

EcoFasten 4141 West Van Buren St. Phoenix, AZ 85009

Attn.: EcoFasten Solar Engineering Department

**Re:** Report # 7.22-Rocklt\_ CS-SS\_FL: Engineering Certification for the EcoFasten Rocklt System with Smart Slide and Comp Slide for Gable and Hip roofs.

This letter certifies the loading criteria and design basis used for the structural analysis of the EcoFasten - Rocklt System as shown in Report # 7.22-Rocklt\_CS-SS\_FL "Engineering Certification for the EcoFasten - Rocklt 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. The Span Tables provided in the referenced report may be used when all conditions of the design criteria provided therein are met.

#### **Building Codes:**

- 1. ASCE/SEI 7-22, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
- 2. 2023 Florida Building Code, 8th edition
- 3. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
- 4. Aluminum Design Manual 2020, by The Aluminum Association, Inc.
- 5. ANSI/AWC NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

Please note our evaluation only applies to EcoFasten products and excludes the structural adequacy of the chosen roof attachments, PV modules, or underlying roof supporting members. It shall be the responsibility of the installer or system designer to verify the structural capacity and adequacy of the referenced system components with respect to the applied or resultant loads of the chosen array configuration.

#### Sincerely



This item has been electronically signed and sealed by Matthew S Kuzila on the date adjacent to the seal using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Matthew S Kuzila, P.E.

Sealed 02.16.2024 Expires 02.28.2025

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ECOFASTENSOLAR.COM



#### Freedom Forever Planset Revision Letter

3/25/2024 REV #3

Attn. County of Columbia (FL):

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

SIDNEY THOMPSON 356 SW CALLAWAY DR , LAKE CITY, FL 32024

#### **Revision Details:**

Layout change at install.

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