

Dear Whom It May Concern,

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

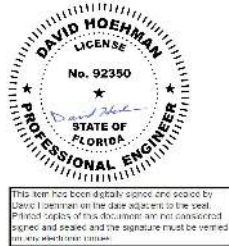
Installation of a 16.8 kW (DC) Rooftop PV Solar System

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
18:31:34 -04'00'



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

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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 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 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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-
-
-



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Hoehman
Date:
2024.03.26
18:22:06 -04'00'



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

REVISIONS		
NO.	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

JOB NO:	DATE:	DESIGNED BY:	SHEET:
404444	3/11/2024	A.W.	PV-1

LEGEND:

 CHIMNEY

 PIPE VENT

 MODULES

 CONDUIT

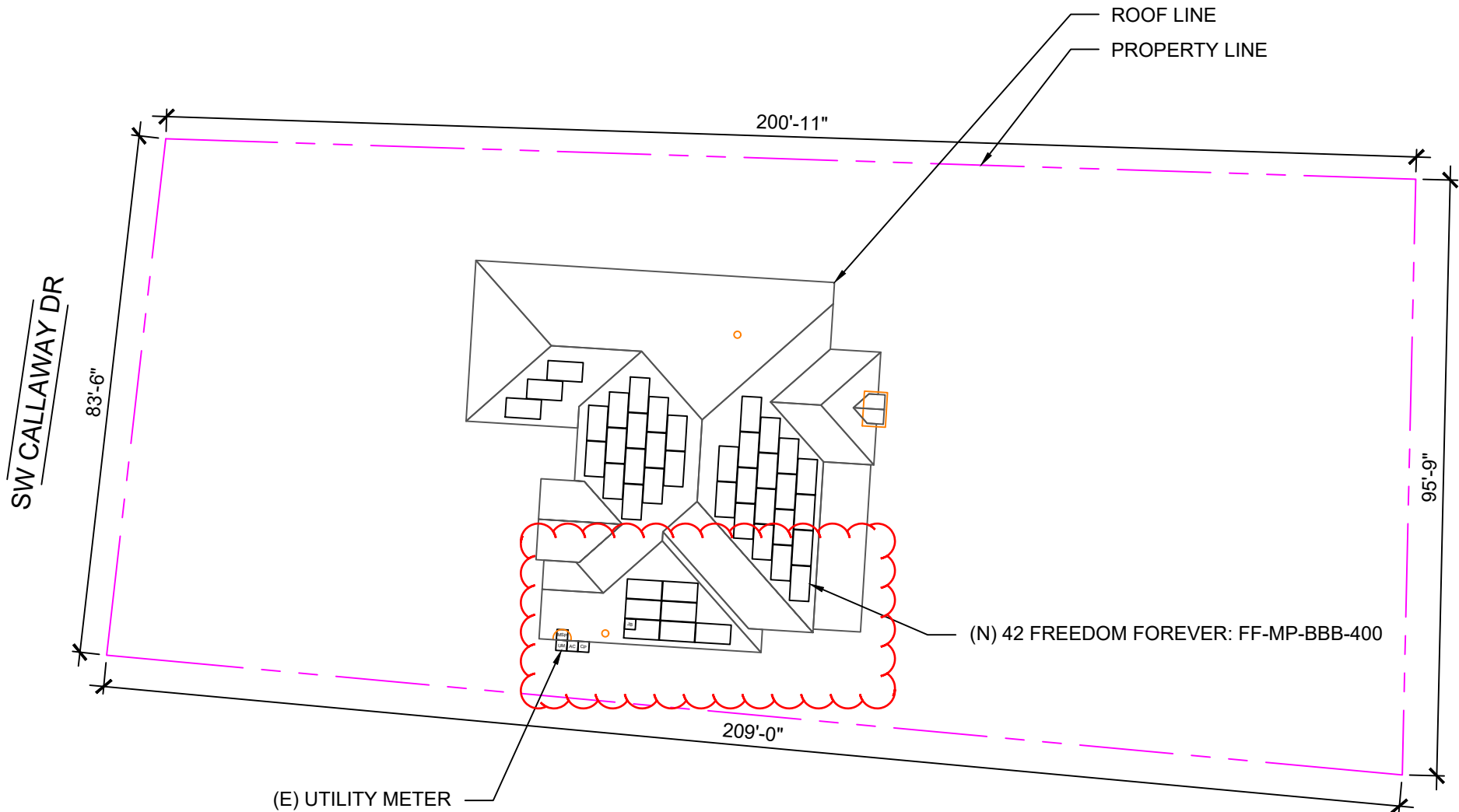
 SETBACK

 AC DISCONNECT

 UTILITY METER

 JUNCTION BOX

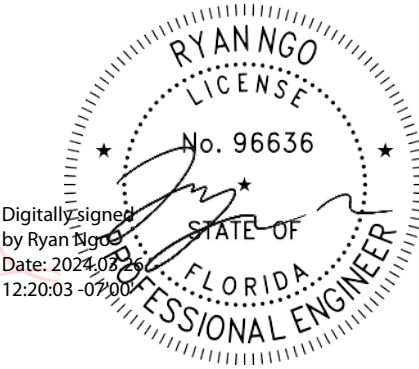
 MAIN SERVICE PANEL



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

1

Ryan
Ngo



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ROOF AREA: 3947 SQ FT

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SITE PLAN			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-2

LEGEND:

 CHIMNEY

 PIPE VENT

 MODULES

 CONDUIT

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 AC DISCONNECT

 UTILITY METER

 JUNCTION BOX

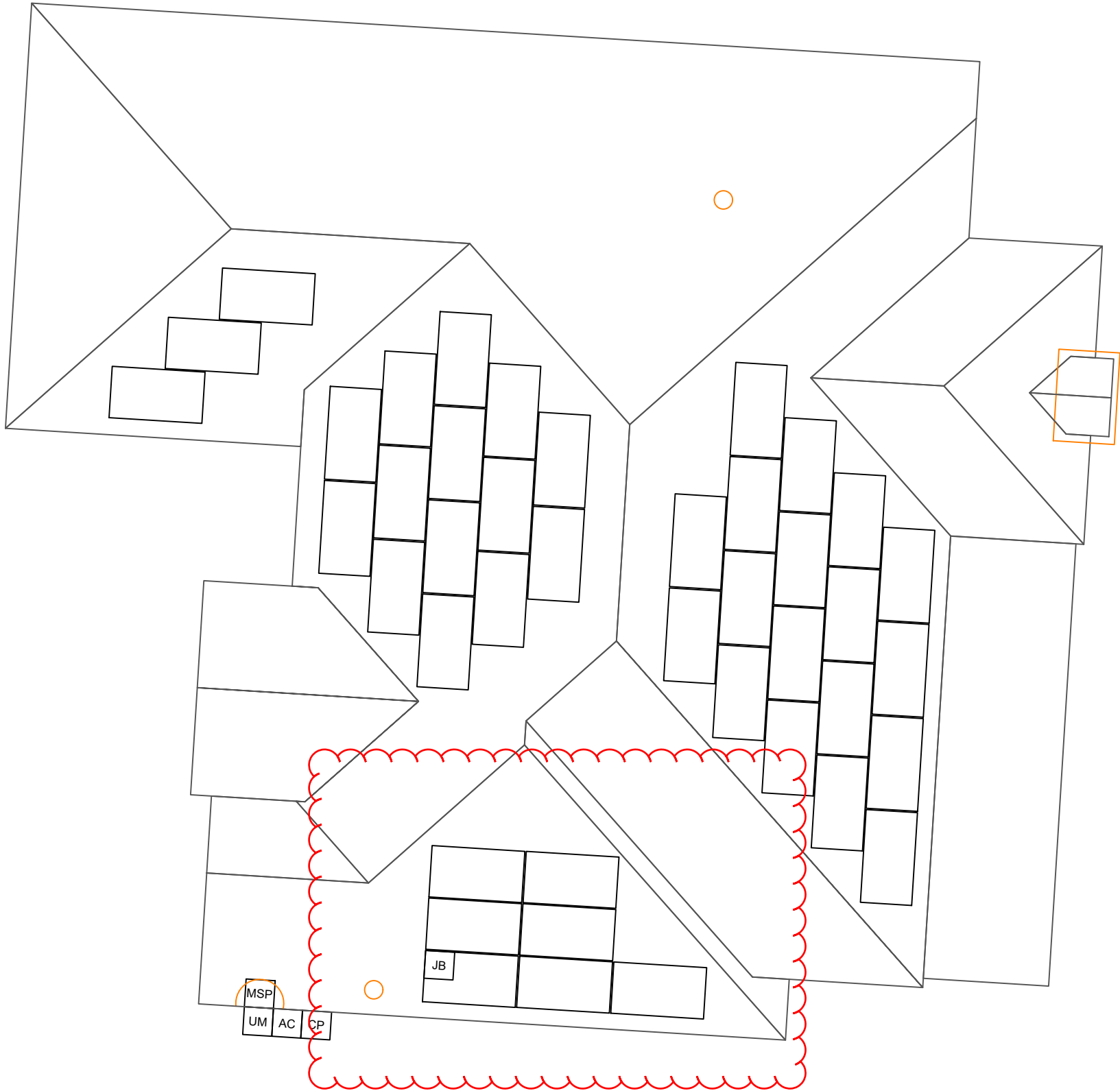
 MAIN SERVICE PANEL

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

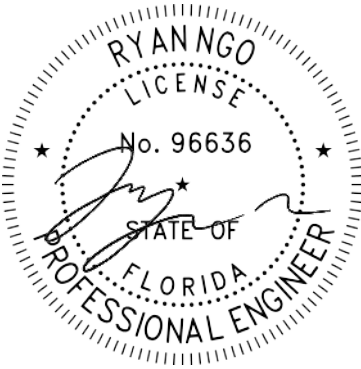


ROOF PLAN
SCALE: 1/8" = 1'-0"

1



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



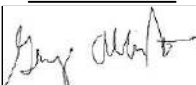
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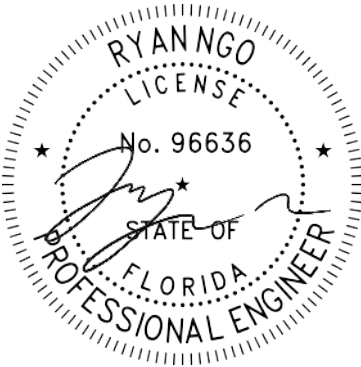
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ROOF PLAN WITH MODULES LAYOUT			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-2A

ROOF DETAILS:

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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
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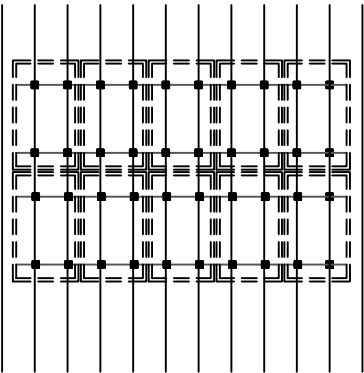
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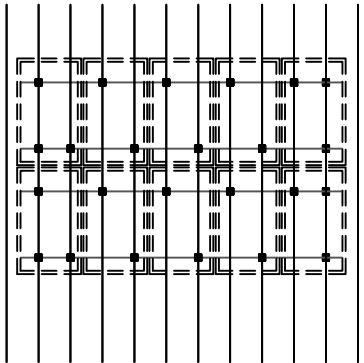
ARRAY DETAILS			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-2B

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



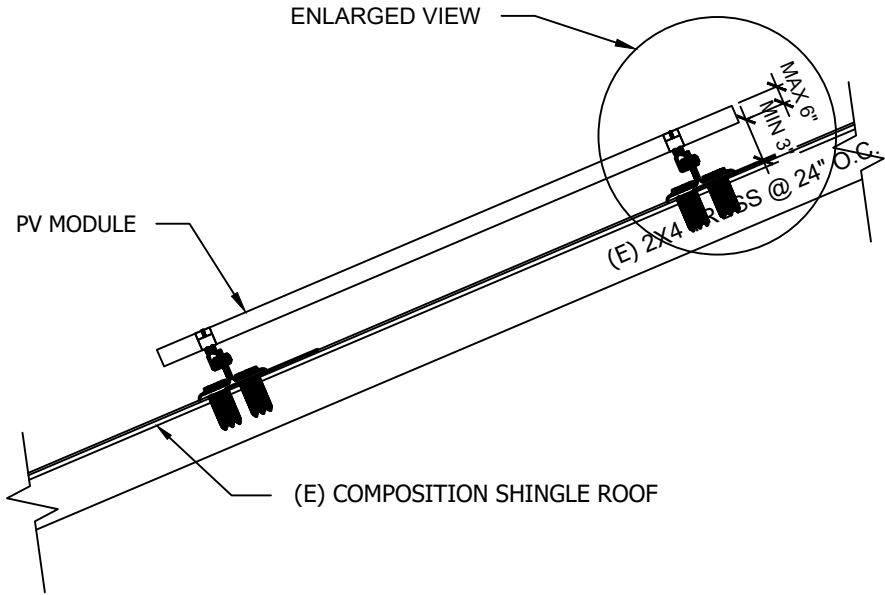
STACKED DETAIL

For Illustration purposes only



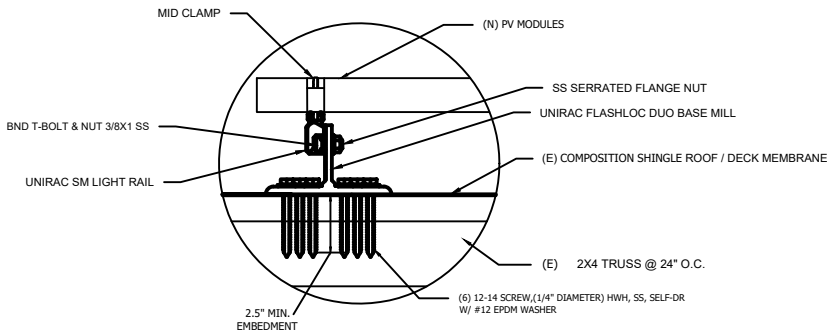
STAGGERED DETAIL

For Illustration purposes only



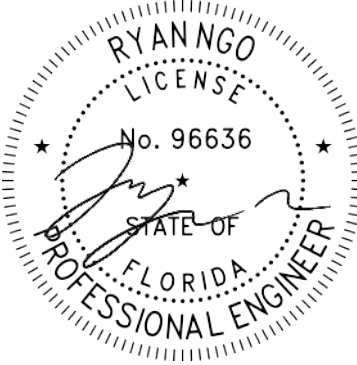
SOLAR PV ARRAY SECTION VIEW

Scale: NTS



ATTACHMENT DETAIL

Scale: NTS



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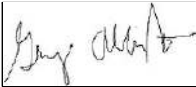
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MICROINVERTERS: 42 X ENPHASE IQ8PLUS-72-2-US

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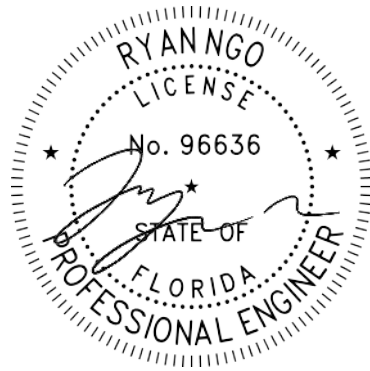


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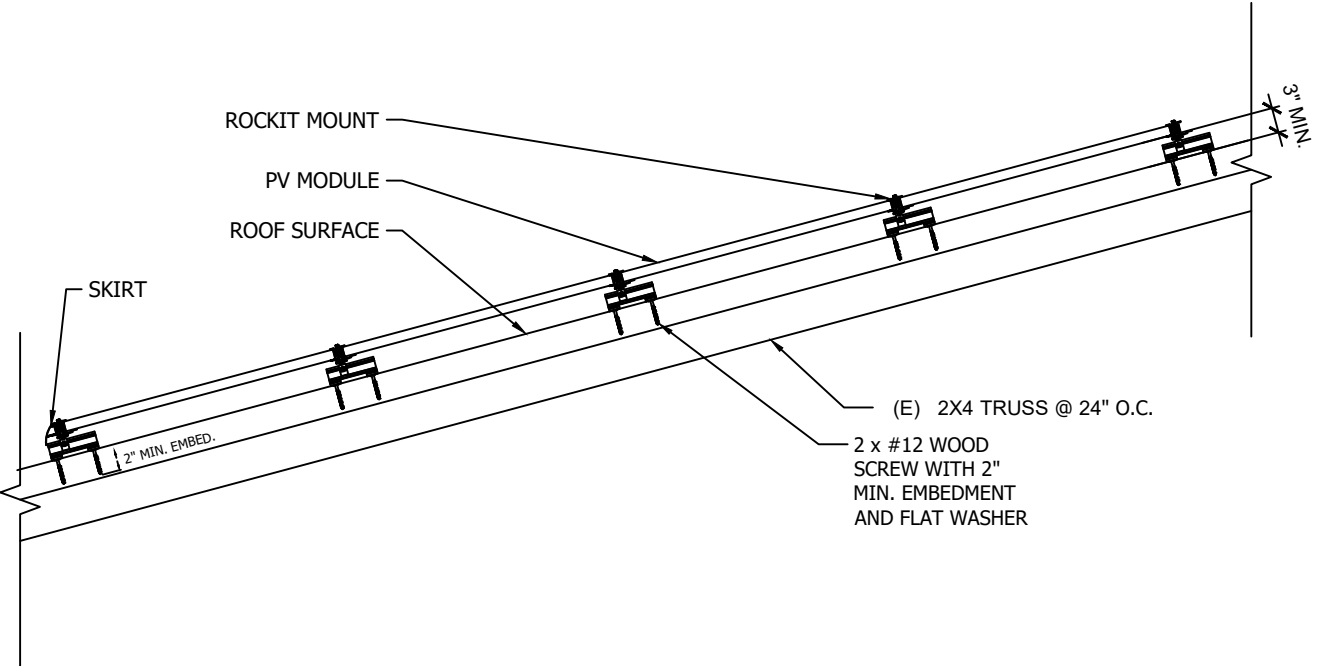


CONTRACTOR LICENSE:
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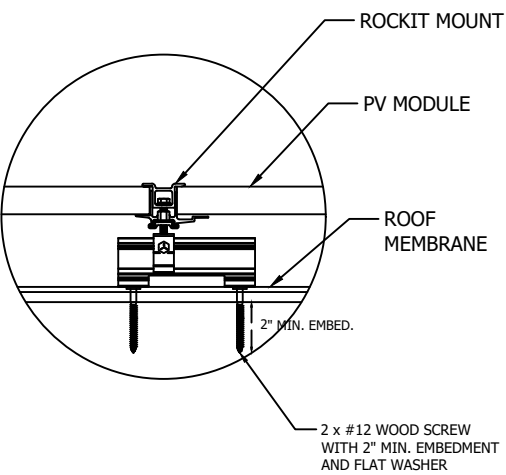
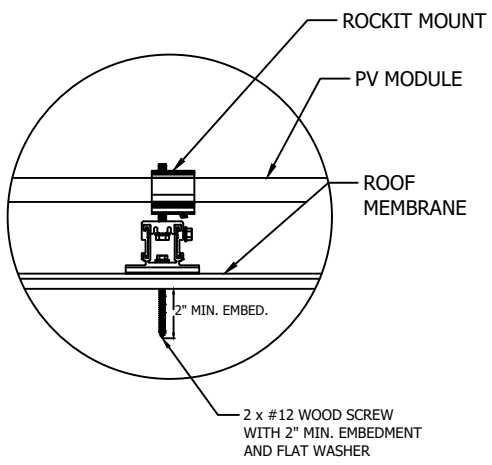
MOUNTING DETAILS			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-3



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SOLAR PV ARRAY SECTION VIEW
Scale: NTS



ATTACHMENT DETAIL
Scale: NTS

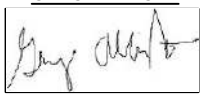
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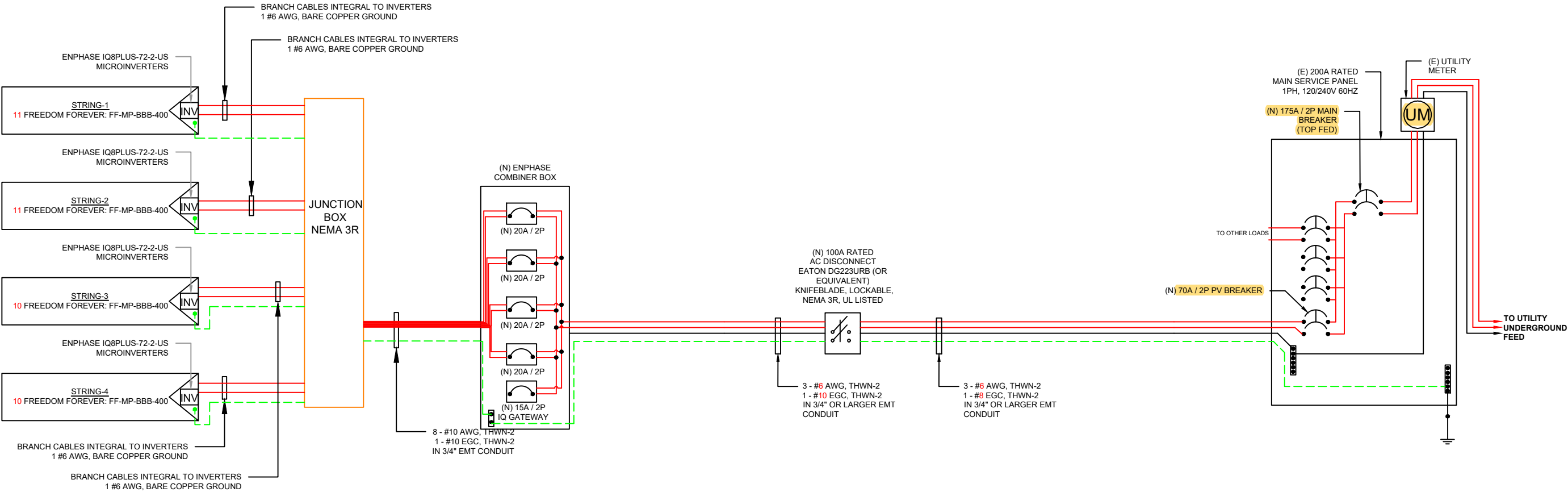
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MOUNTING DETAILS			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-3A

BACKFEED BREAKER SIZING						
MAX. CONTINUOUS OUTPUT 50.82A @ 240V						
50.82	X	1.25	=	63.53AMPS	70A BREAKER - OK	
SEE 705.12 OF 2020 NEC						
200	X	1.20	=	240		
240	-	175	=	65A ALLOWABLE BACKFEED		



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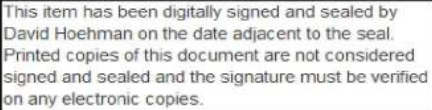
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THREE LINE DIAGRAM			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-4



CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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404444	3/11/2024	A.W.	PV-5

MAIN PHOTOVOLTAIC
SYSTEM DISCONNECT

690.13(B)

DO NOT DISCONNECT
UNDER LOAD

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

WARNING
SINGLE 120-VOLT SUPPLY
DO NOT CONNECT
MULTIWIRE BRANCH CIRCUITS

NEC 710.15(C) & 692.9 (C)

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59

WARNING
TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

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

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

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

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

NEC 705.12(B)(3)(3)

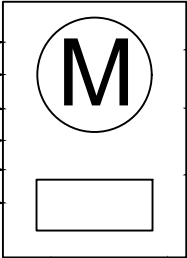
WARNING
THE DISCONNECTION OF THE
GROUNDED CONDUCTOR(S)
MAY RESULT IN OVERVOLTAGE
ON THE EQUIPMENT

NEC 690.31(E)

RAPID SHUTDOWN SWITCH FOR
SOLAR PV SYSTEM

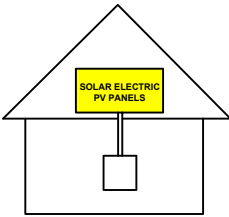
690.56(C)(3)

OPTIONAL SOLAR LOAD CENTER



SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

TURN RAPID
SHUTDOWN SWITCH TO
THE "OFF" POSITION TO
SHUT DOWN PV SYSTEM
AND REDUCE SHOCK
HAZARD IN THE ARRAY



IFC 605.11.3.1(1) & 690.56(C)

CAUTION
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

NEC 705.12(D) & NEC 690.59

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

NEC 705.12(C) & NEC 690.59

WARNING
ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED
24 INCH FLASH HAZARD BOUNDARY
3 CALCM² FLASH HAZARD AT 18 INCHES
480 VAC SHOCK HAZARD WHEN COVER IS REMOVED
42 INCH LIMITED APPROACH
12 INCH RESTRICTED APPROACH - 500 V CLASS 00 GLOVES
1 INCH PROHIBITED APPROACH - 500 V CLASS 00 GLOVES
LOCATION: 558 SW CALLAWAY DR LAKE CITY, FL 32024

NEC 706.15(C) AND NEC 110.16

PHOTOVOLTAIC
AC DISCONNECT

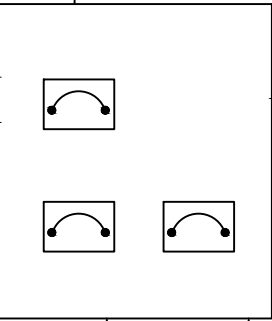
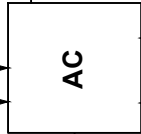
NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT
RATED AC OUTPUT CURRENT: 50.82A
NOMINAL OPERATING AC VOLTAGE: 240V

NEC 690.54

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59



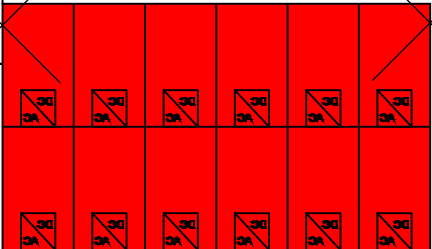
WARNING
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

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

WARNING
TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

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

ARRAY



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

NOTES:

- 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-WITTEN.
- 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

REVISIONS		
NO.	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

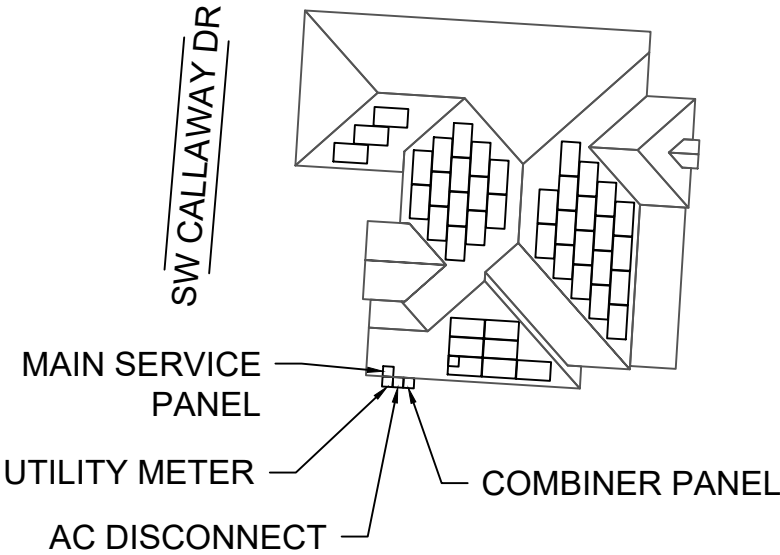
Greg Albright

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

LABELS			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
404444	3/11/2024	A.W.	PV-7

CAUTION:

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



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT
PRIOR TO WORKING INSIDE PANEL



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.



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CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

SITE PLACARD			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-7A

	1-20	21-40	41-60	ENPHASE MICROINVERTER CHART																						
1								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																		
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3																										
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6																										
7																										
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EC13008056

MICROINVERTER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
404444	3/11/2024	A.W.	PV-8

SAFETY PLAN

INSTRUCTIONS:

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

INCIDENT REPORTING:

INJURIES - CALL INJURY HOTLINE
(855) 400-7233
**If injury is life threatening, call 911 first THEN the Injury Hotline*

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

NEAREST OCCUPATIONAL/INDUSTRIAL CLINIC:

NAME: _____

ADDRESS: _____

NEAREST HOSPITAL:

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION:

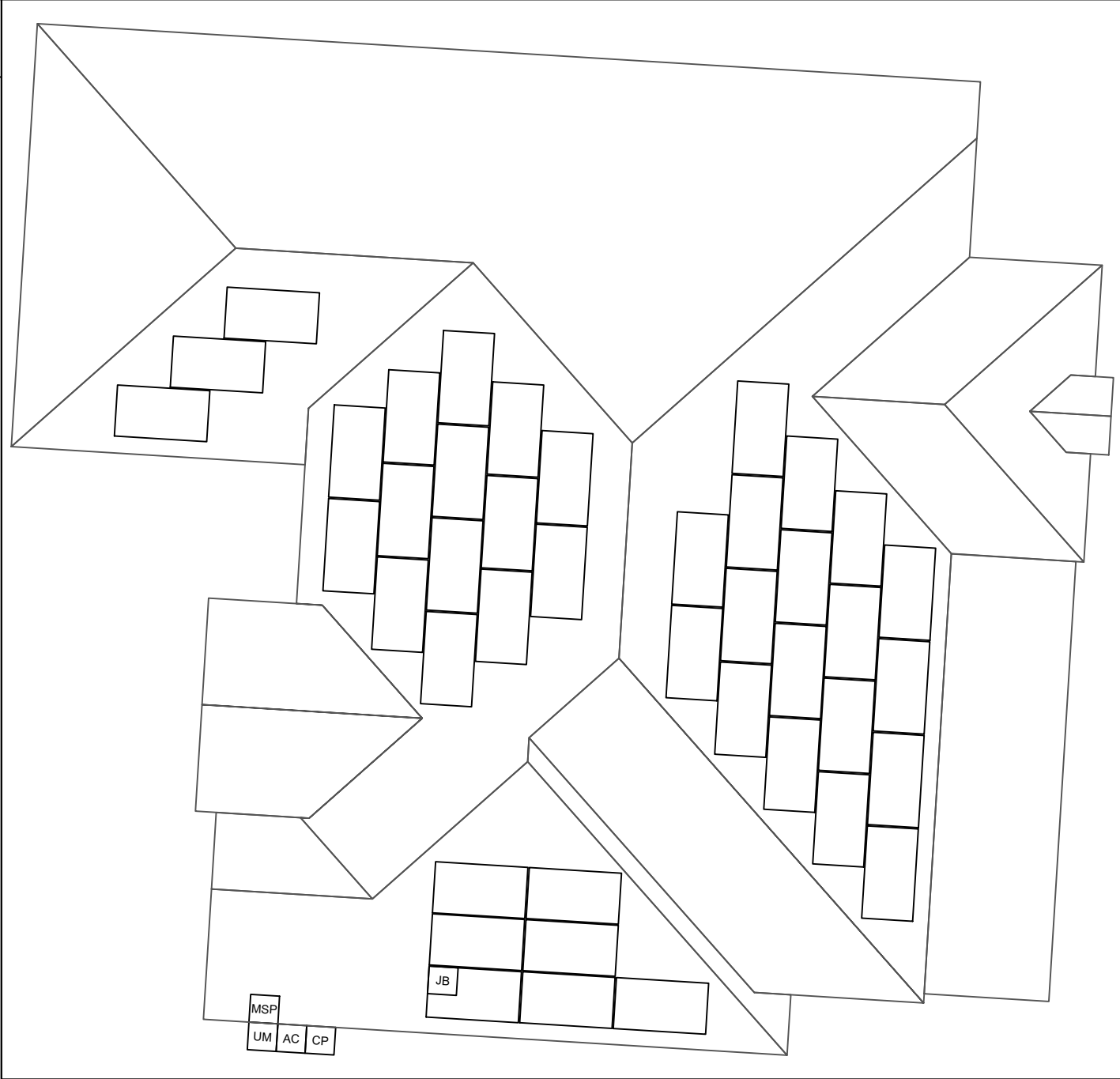
NAME: _____

PHONE NUMBER: _____

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

<u>NAME</u>	<u>SIGNATURE</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

DATE: _____ TIME: _____



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

INSTRUCTIONS:

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



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freedom™

FOREVER

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

GREG ALBRIGHT



CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
404444	3/11/2024	A.W.	PV-9

[illegible]

JOB HAZARD ANALYSIS

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

Ladder Access

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

Mobile Equipment

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

Material Handling and Storage

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

Fall Protection

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

- FPCP (name and title):
- FPU and LPD (name and title):

Electrical Safety

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

Public Protection

- The safety of the Client and Public must be maintained at all times.
- The Client and the Public shall be prevented from entering the work zone through the use of barriers and/or signage, as required.
- Company, Client and Public property shall be protected from falling objects.
- Pets (including dogs) shall be secured by their owners prior to work start.
- The Client should not leave pets, family members, or others in charge or care of Employees, Contractors, or Temporary Workers.

- Crew leader responsible for communication with the client:
- Client and public is excluded from work area by barricades (N/A, Yes, No):

Training and Pre-Job Safety Briefing

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

Airborne Contaminants:

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

- If yes, list specific tasks and protection in place:

Weather and Environment

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

Heat Related Illness Prevention

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

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

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

Restroom facilities

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

Incident Reporting Procedure

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

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

NOTE ADDITIONAL HAZARDS NOT ADDRESSED ABOVE
(add as many as necessary by using additional sheets)

Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
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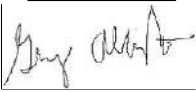
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EC13008056

SAFETY PLAN			
JOB NO: 404444	DATE: 3/11/2024	DESIGNED BY: A.W.	SHEET: PV-10

NEC 220.83 - Residential Load Calculation

Version 2.1

L1/L2 **240** V

NEC 220.83(B) "The general calculated load shall be not less than 100% of the first 8 kVA plus 40% of the remainder of the following loads..."

NEC 220.83(B)(1) "The calculated floor area shall not include open porches, garages, or unused ... spaces..."

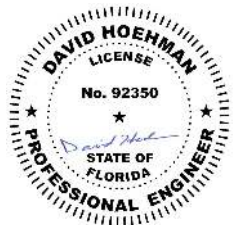
Floor Area **2,402** square feet x 3VA/sq ft **7,206** VA

NEC 220.83(B)(2) "1500 volt-amperes for each 2-wire, 20-ampere small appliance branch circuit and each laundry branch circuit..."

Small Appliance Circuits **2** circuits x 1500VA/circuit **3,000** VA
Laundry Circuits **1** circuits x 1500VA/circuit **1,500** VA

NEC 220.83(B)(3) "The nameplate rating of all appliances... ranges, wall-mounted ovens, counter-mounted cooking units... clothes dryers that are not connected to the laundry branch circuit... [and] water heaters"

Load (240V unless otherwise indicated)	Breaker	VA
Air Handler/FAU	60	11,520
Water Heater	30	5,760
Range	50	9,600
Dryer	20	5,000
	0	0
	0	0
	0	0
	0	0
	0	0
	0	0
	0	0
	0	0
	0	0
	0	0



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31,880 total VA

Total of non air-conditioning loads: **43,586** total VA

First 10 kVA of load at 100% **10,000**

Remainder of load at 40% **13,434**

Adjusted total of non air-conditioning load **23,434** VA

NEC 220.83(B) "Heating and air-conditioning load..."

	Breaker	VA
Sum of A/C Equipment Units	30	6,720
Sum of Electric Furnaces	0	0

Total of A/C Loads and All Other Loads: **30,154** total VA

Total Proposed Calculated Load: 125.64 Amps

FOR INSTALLATION REFERENCE ONLY

SCAN QR CODE TO ACCESS REFERENCE LINK

FREEDOM REFERENCES



INSTALL HOTLINE

PV INSTALLATION REFERENCES



ENPHASE



SOLAREEDGE



TESLA

BATTERY INSTALLATION REFERENCES



Enphase Storage Systems



SOLAREEDGE Storage Systems



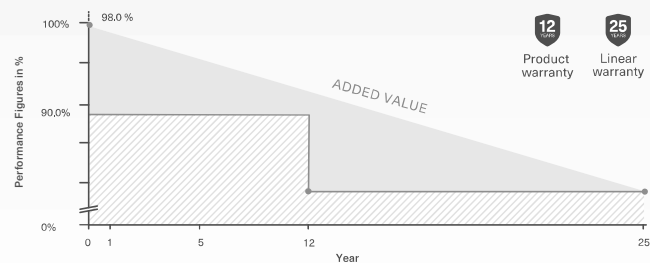
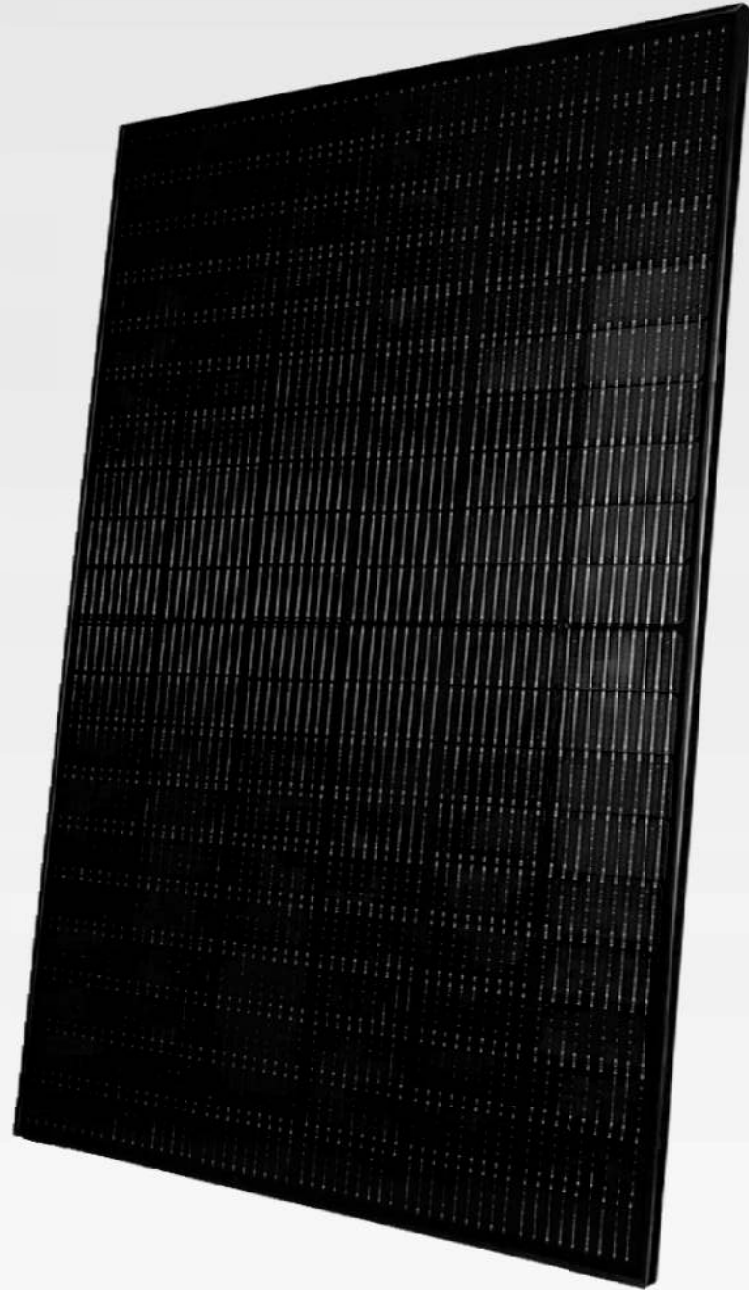
TESLA Storage Systems



NON-BACKUP Battery Systems



Misc. Quick Guide



MODULE SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Characteristics	FF-MP-BBB-400
Maximum Power (Pmax)	400W
Maximum Power Voltage (Vmp)	31.01V
Maximum Power Current (Imp)[A]	12.90A
Open Circuit Voltage (Voc)[V]	37.04V
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

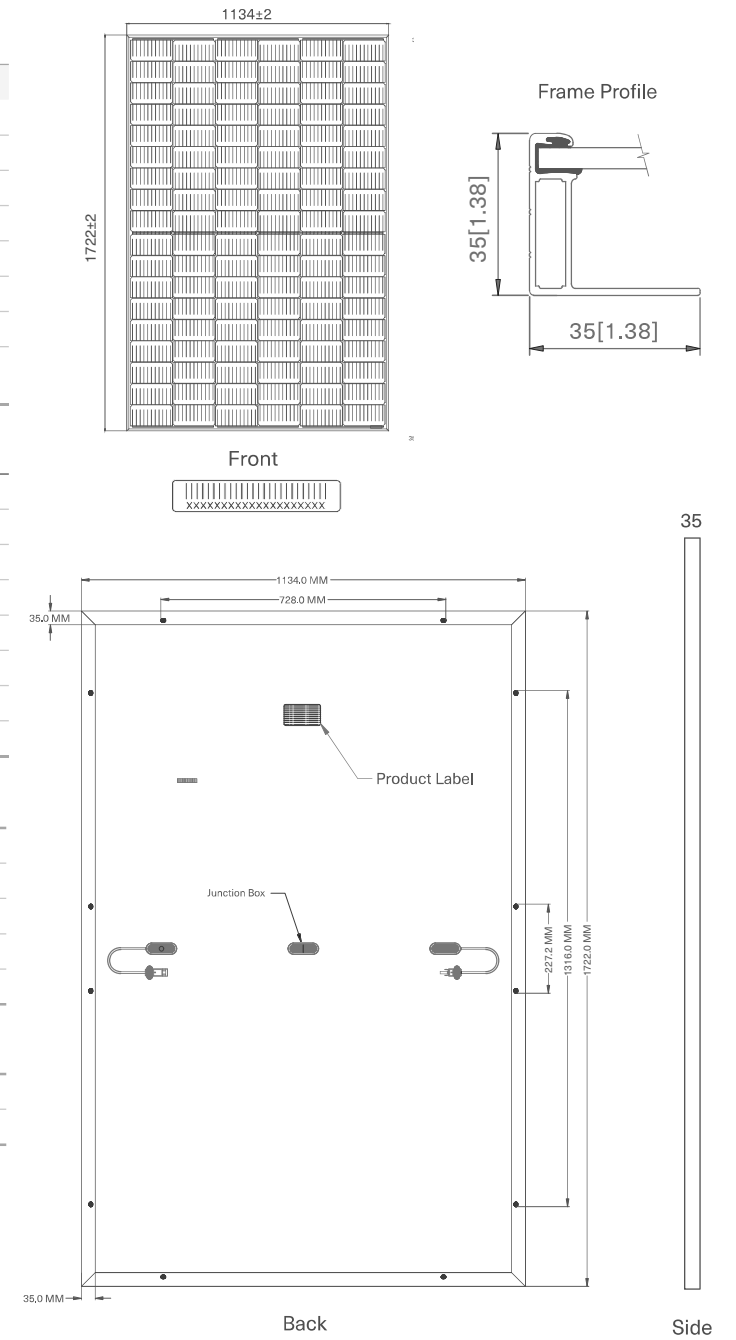
Container	20' GP	40' HC
Pallets per Container	6	26
Panels per Container	186	806
Panels per Pallet	31	31
Packaging Bon Weight	679 kg (1497 lbs)	
Panels per Pallet	1785 x 1130 x 1180 mm (70.28 x 44.49 x 46.46 in)	

TEMPERATURE RATINGS

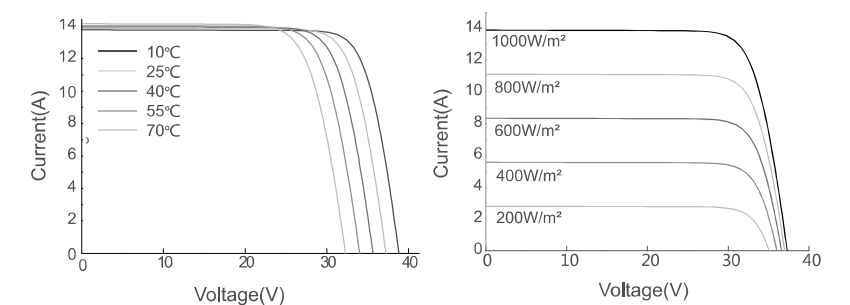
Temperature Coefficient of P _{max}	-0.350%/°C
Temperature Coefficient of V _{oc}	-0.275%/°C
Temperature Coefficient of I _{sc}	+0.045%/°C
Nominal Operating cell Temperature (NOCT)	42°C±2°C



UL 61730 | UL 61215 | ISO 9001 | ISO 14001



CURRENT-VOLTAGE CURVE



CERTIFICATE OF COMPLIANCE



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 KOMPLEK KABIL INDONUSA ESTATE, BLOK A NOMOR 19B, BATU BESAR, Batam	Multiple Listee:	Freedom Forever Procurement LLC 43445 Business Park Drive, Suite 110, Temecula, CA 92590
Address:		Address:	
Country:	Indonesia	Country:	USA

Party Authorized to Apply Label: PT IDN SOLAR TECH
Report Issuing Office: Intertek Testing Services Shanghai Limited

Control Number: 5019087 **Authorized by:** *Jordan Holbert*
for L. Matthew Snyder, Certification Manager

VALID LISTING MARKS



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

Standard(s):	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 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 OF COMPLIANCE



	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [CSA C22.2#61730-2:2019 Ed.2]	
	Terrestrial Photovoltaic (Pv) Modules - Design Qualification And Type Approval - Part 1: Test Requirements [UL 61215-1:2017 Ed.1]	
	Terrestrial Photovoltaic (PV) Modules - Design Qualification And Type Approval - Part 1-1: Special Requirements For Testing of Crystalline Silicon Photovoltaic (PV) Modules [UL 61215-1-1:2017 Ed.1]	
	Terrestrial Photovoltaic (Pv) Modules - Design Qualification And Type Approval - Part 2: Test Procedures[UL 61215-2:2017 Ed.1]	
Product:	Crystalline Silicon Photovoltaic (PV) Modules	
Brand Name:	Freedom Forever	
Models:	MULTIPLE LISTEE 12 MODELS	BASIC LISTEE 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.



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.



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.



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 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-n-play 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 3rd Ed.)

Note:

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

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	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	A	10	12
Max. input DC short-circuit current	A	25	
Max. module I _{sc}	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1 x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max. continuous output power	VA	240	290
Nominal (L-L) voltage / range ²	V	240 / 211 – 264	
Max. continuous output current	A	1.0	1.21
Nominal frequency	Hz	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 circuit ³		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.7	
CEC weighted efficiency	%	97	
Night-time power consumption	mW	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 rd 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.

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)
- 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, 3rd Ed.)

IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) 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 X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) 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 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 CELLMODEM-M1-06-AT-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 - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support 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 • Always follow local code requirements for conductor sizing.
Altitude	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 rd 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
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

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
Eaton general duty non-fusible safety switch	DG223URB
	UPC
	782114731154
Product Length/Depth	Product Height
7.38 in	19.25 in
Product Width	Product Weight
9.13 in	12 lb
Warranty	Certifications
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.	UL Listed
	Catalog Notes
	WARNING! Switch is not approved for service entrance unless a neutral kit is installed.



Product specifications

Product Category
General duty safety switch

Enclosure material
Painted galvanized steel

Type
Non-fusible, single-throw

Fuse configuration
Non-fusible

Number of wires
2

Enclosure
NEMA 3R

Voltage rating
240V

Amperage Rating
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



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Eaton.com/socialmedia

FLASHLOC™ DUO

THE MOST VERSATILE DIRECT TO DECK ATTACHMENT

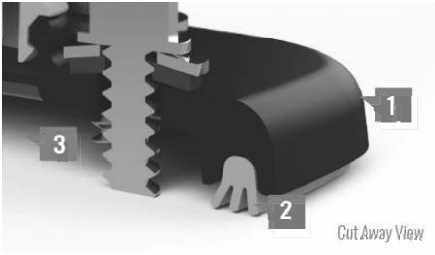


FLASHLOC™ DUO is the most versatile direct to deck and rafter attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the required number of screws to secure the mount and inject sealant into the base. **FLASHLOC'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.



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 seal.

FLASHLOC™ DUO

INSTALLATION GUIDE

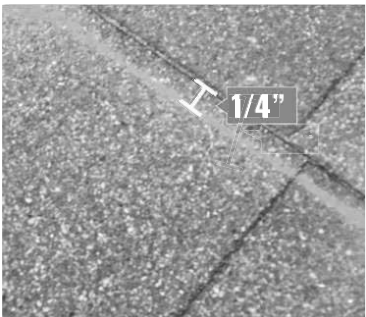


PRE-INSTALL: CLEAN SURFACE AND MARK LOCATION

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 course. This line will be used to align the upper edge of the mount.

NOTE: Space mounts per racking system installation specifications.

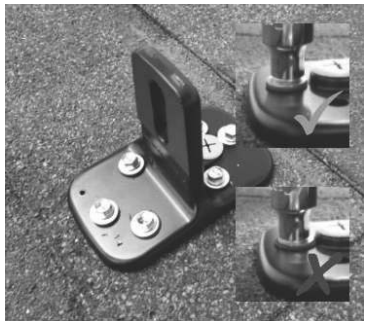


STEP ONE: SECURE

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

Insert tip of UNIRAC approved sealant into port and inject until sealant exits vent. Follow sealant manufacturer's instructions. Follow sealant manufacturer's cold weather application guidelines, if applicable.

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.

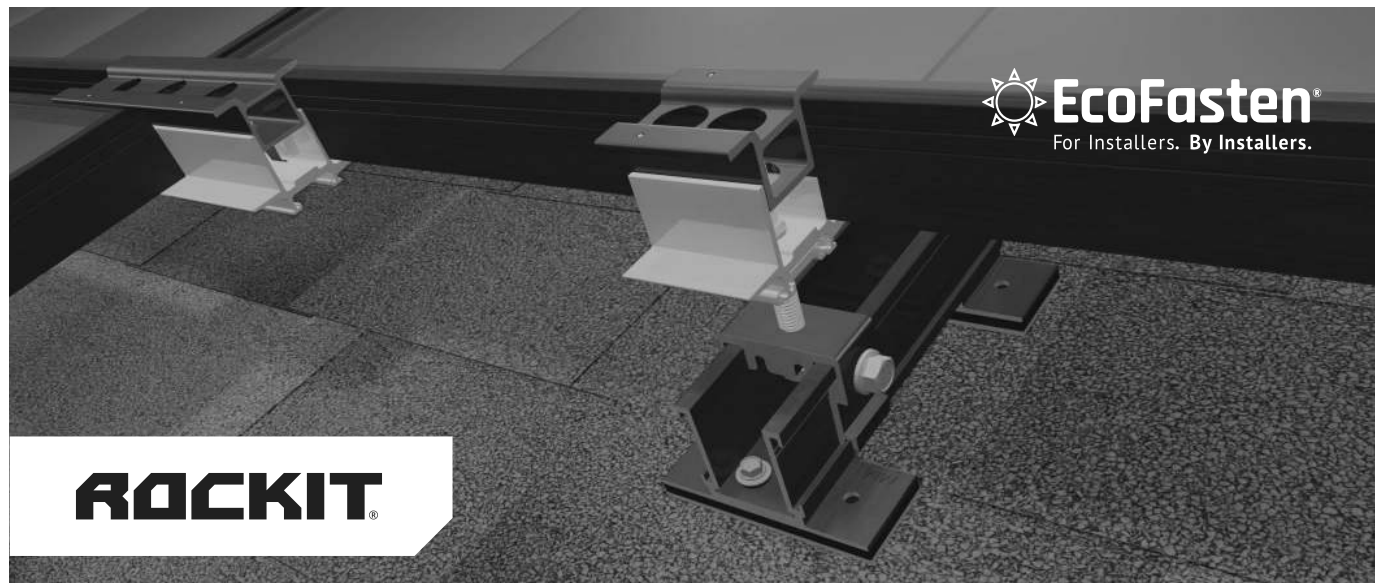
Continue array installation. Refer to SOLARMOUNT or NXT HORIZON Installation Guide for the remaining system installation.

FASTER INSTALLATION. 25-YEAR WARRANTY.

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

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



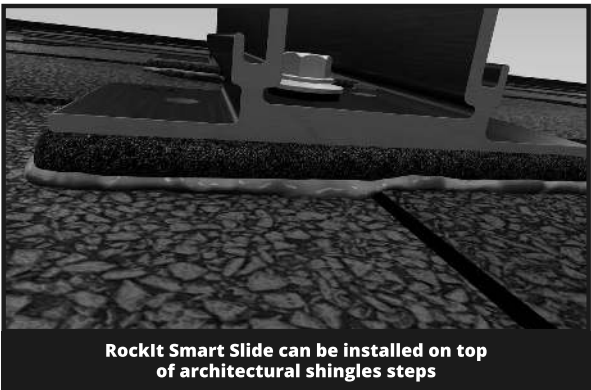
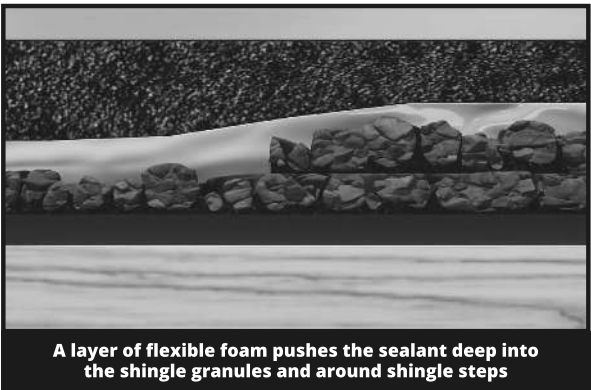
Required Components:

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

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

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



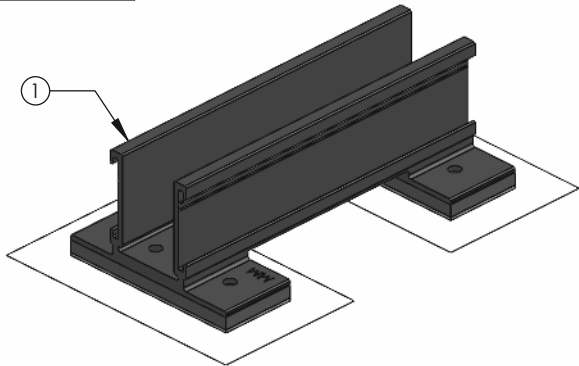
VERSION 1.1



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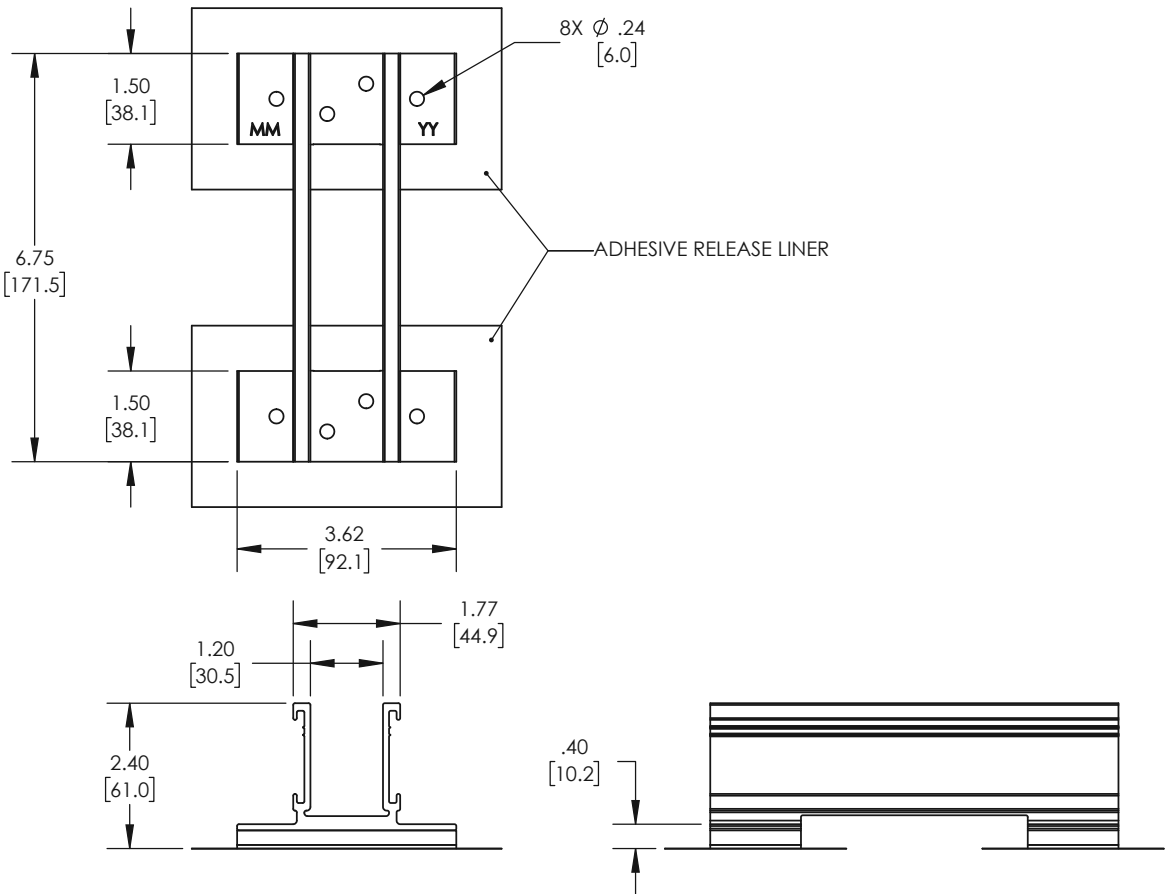
RI SMART SLIDE BLK 6.75"

PART NUMBER	DESCRIPTION
2011024	RI SMART SLIDE BLK 6.75"



ITEM NO.	DESCRIPTION
1	ROCKIT SMART SLIDE ASSEMBLY

1) ROCKIT FLASHLESS SLIDE ASSEMBLY

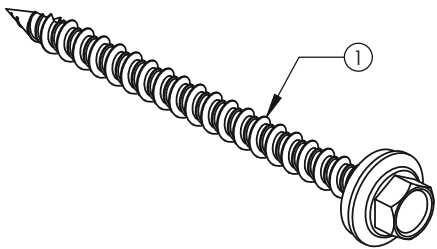


MATERIAL	ALUMINUM, EPDM, ADHESIVE, TREATED PAPER
FINISH	BLACK

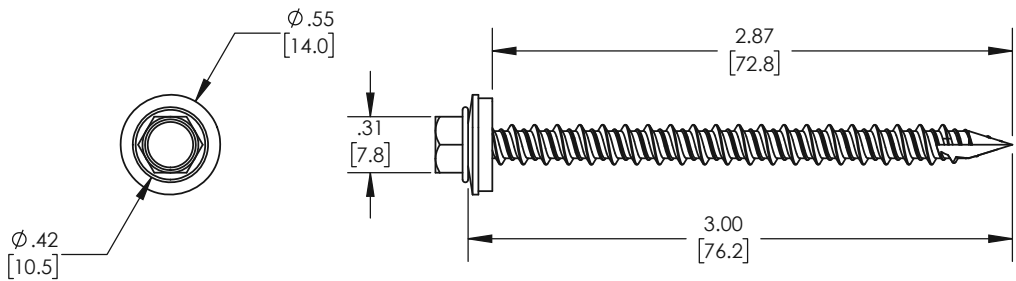
Rev: CS-3

RI SMART SCREW #12X3" W/BW

PART NUMBER	DESCRIPTION
2011025	RI SMART SCREW #12X3" W/BW



ITEM NO.	DESCRIPTION
1	SELF TAPPING SCREW #12 WITH SEALING WASHER ASSEMBLY



MATERIAL	STAINLESS STEEL, EPDM RUBBER
FINISH	MILL, BLACK

Rev: CS-2

SOLARMOUNT



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

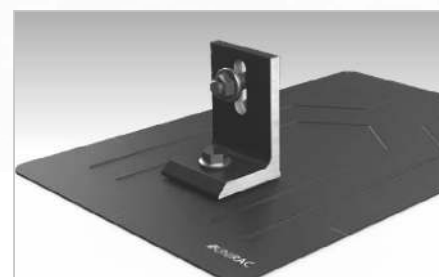


CONCEALED
UNIVERSAL
CLAMPS

OPTIONAL
FRONT TRIM

UNIRAC
25
YEAR
FULL-SYSTEM
WARRANTY

New & Improved:
THE PROFESSIONALS' CHOICE
With Superior Aesthetics



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

BEST INSTALLATION EXPERIENCE • CURB APPEAL • COMPLETE SOLUTION • UNIRAC SUPPORT

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SOLARMOUNT



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 and aesthetics.

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

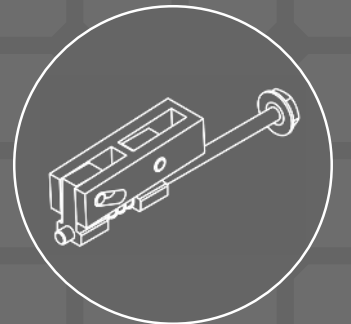
Professional support for professional installers and designers. You have access to our technical support and training groups. Whatever your support needs, we've got you covered. Visit Unirac.com/solarmount for more information.



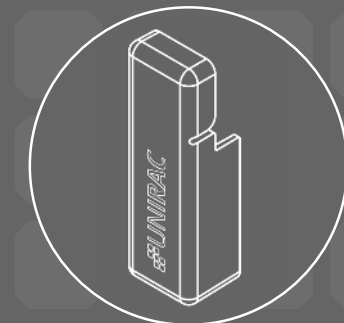
UL2703

BONDING & GROUNDING
MECHANICAL LOADING
SYSTEM FIRE CLASSIFICATION

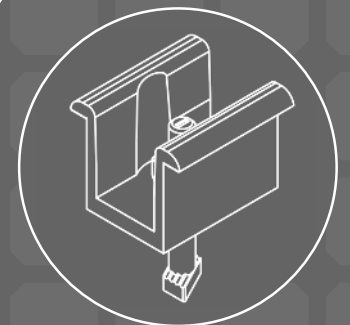
CONCEALED UNIVERSAL
ENDCLAMPS



END CAPS INCLUDED
WITH EVERY ENDCLAMP



UNIVERSAL SELF
STANDING MIDCLAMPS



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TOOL SAVES TIME & MONEY**
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UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



UNMATCHED
EXPERIENCE



CERTIFIED
QUALITY



ENGINEERING
EXCELLENCE



BANKABLE
WARRANTY



DESIGN
TOOLS



PERMIT
DOCUMENTATION

TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

BANKABLE WARRANTY

Don't leave your project to chance. Unirac has the financial strength to back our products and reduce your risk. 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 - PRINTED UPDATE

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.

Issued by: 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



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/ft ²)	113.5
Upward Design Load (lb/ft ²)	50.7
Down-Slope Load (lb/ft ²)	16.13

Test Loads:

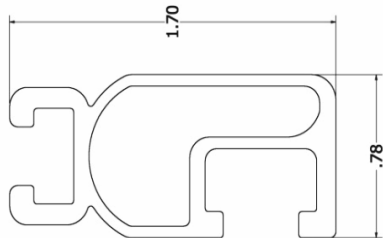
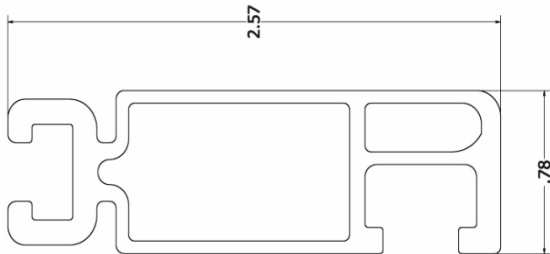
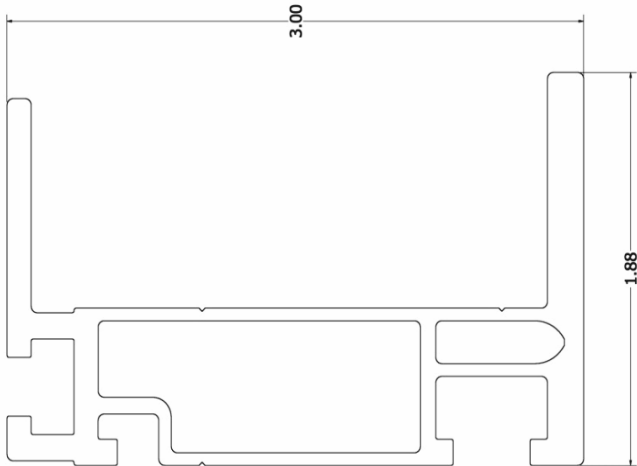
Downward Load (lb/ft ²)	170.20
Upward Load (lb/ft ²)	76.07
Down-Slope Load (lb/ft ²)	24.2

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.



Properties	SOLARMOUNT Light	SOLARMOUNT Rail Profile 2	SOLARMOUNT HD	Units
BEAM HEIGHT	1.70	2.57	3.00	in
APPROX WEIGHT	0.491	0.728	1.271	plf
CROSS SECTION AREA	0.409	0.625	1.059	in ²
SECTION MODULUS (X-AXIS)	0.15	0.363	0.898	in ³
SECTION MODULUS (Y-AXIS)	0.067	0.113	0.221	in ³
MOMENT OF INERTIA (X-AXIS)	0.13	0.467	1.45	in ⁴
MOMENT OF INERTIA (Y-AXIS)	0.026	0.045	0.267	in ⁴
RADIUS OF GYRATION (X-AXIS)	0.564	0.865	1.17	in
RADIUS OF GYRATION (Y-AXIS)	0.254	0.269	0.502	in

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
USA

Test report no.: USA- 31440029 005 Client Reference: Tom Young
Tested to: UL 2703:2015

Certified Product: Module Rack Mounting System License Fee - Units
Model Designation: SolarMount (SM) 7

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

Licensed Test mark: 	Date of Issue (day/mo/yr) 27/07/2016
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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-RockIt_CS-SS_FL: Engineering Certification for the EcoFasten RockIt System with Smart Slide and Comp Slide for Gable and Hip roofs.

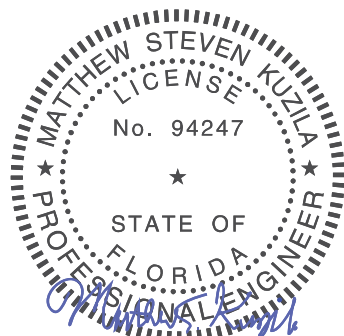
This letter certifies the loading criteria and design basis used for the structural analysis of the EcoFasten - RockIt System as shown in Report # 7.22-RockIt_CS-SS_FL "Engineering Certification for the EcoFasten - RockIt System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications. 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



Matthew S Kuzila, P.E.

Sealed 02.16.2024
Expires 02.28.2025

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.



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