

ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING
 2020 7TH EDITION FLORIDA BUILDING CODE BUILDING
 2020 7TH EDITION FLORIDA BUILDING CODE RESIDENTIAL
 2020 7TH EDITION FLORIDA BUILDING CODE MECHANICAL
 2020 7TH EDITION FLORIDA BUILDING CODE PLUMBING
 2020 7TH EDITION FLORIDA BUILDING CODE FUEL GAS
 2020 7TH EDITION FLORIDA BUILDING CODE ENERGY CONSERVATION
 2020 7TH EDITION FLORIDA BUILDING CODE EXISTING BUILDING
 2020 7TH EDITION FLORIDA FIRE PREVENTION CODE (NFPA)
 2017 NATIONAL ELECTRIC CODE (NEC)
 AS ADOPTED BY COLUMBIA COUNTY (FL)

CONSTRUCTION NOTES:

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

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

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

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

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

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

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

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

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

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

THIS SYSTEM IS DESIGNED FOR
 WIND SPEED 119 MPH
 CATEGORY C EXPOSURE

NOTE :-

1. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE FRAMING SIZES, SPACINGS, AND SPANS NOTED IN THE STAMPED PLANS AND ACCOMPANYING CALCULATIONS AND NOTIFY THE ENGINEER OF RECORD OF ANY DISCREPANCIES PRIOR TO STARTING CONSTRUCTION.

2. THESE PLANS ARE STAMPED FOR STRUCTURAL CODE COMPLIANCE OF THE ROOF FRAMING SUPPORTING THE PROPOSED PV INSTALLATION REFERENCED ONLY. THESE PLANS ARE NOT STAMPED FOR WATER LEAKAGE. PV MODULES, RACKING, AND ATTACHMENT COMPONENTS MUST FOLLOW MANUFACTURER GUIDELINES AND REQUIREMENTS.

3. PLEASE SEE THE ACCOMPANYING STRUCTURAL CALCULATIONS REPORT FOR DETAILS REGARDING CALCULATIONS AS WELL AS LIMITS OF SCOPE OF WORK AND LIABILITY.



Digitally signed by
 Methode Maniraguha
 Date: 2022.09.15
 18:27:24 -07'00'

VICINITY MAP:



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CLIENT
 JOSHUA COOK
 891 SW POPLAR LN LAKE CITY, FL 32025
 ARI, COLUMBIA COUNTY (FL)
 UTILITY: FPL, FLORIDA POWER & LIGHT
 PHONE: 386.955.1991
 EMAIL: JAW.COOK@OUTLOOK.COM

SYSTEM
 SYSTEM SIZE (DC): 20 K 375 W 7.400 KW
 SYSTEM SIZE (AC): 5.000 KW @ 240V
 MODULES: 20 X FREEDOM FOREVER
 FF-60-150-375
 OPTIMIZERS: 20 X SOLAREDGE S440
 INVERTER: SOLAREDGE S65000H-US (KIT)

NO.	REVISIONS	DATE
1	REVISED BY	
2		
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freedom FOREVER
 FREEDOM FOREVER LLC
 3519 CONSLATE DR SUITE 200, ORLANDO
 FL 32819
 TEL: (407) 355-1975
 GREG ALBRIGHT

 CONTRACTOR LICENSE
 CERTIFIED ELECTRICAL CONTRACTOR
 EC-13006258

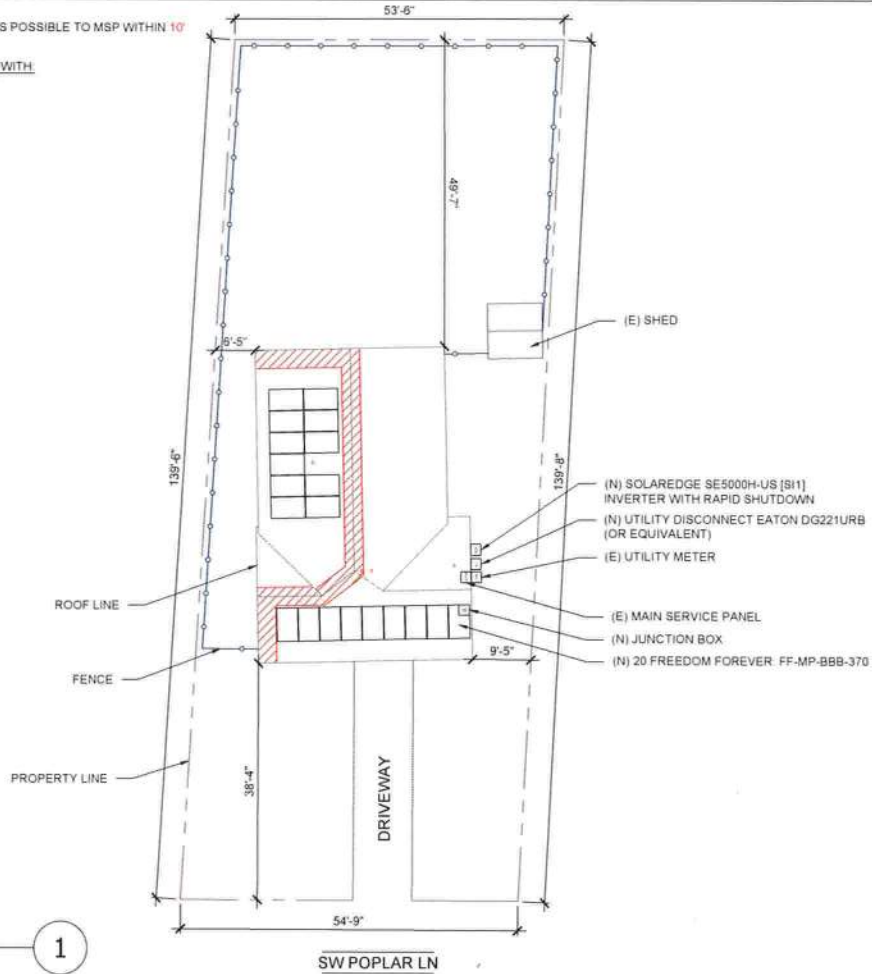
JOB NO.	DATE	DESIGNED BY	SHEET
25E421	9/15/2022	A M	PV-1

LEGEND	
	OBSTRUCTION
	PIPE VENT
	MODULES
	CONDUIT
	SETBACK
	AC DISCONNECT
	MSP
	JUNCTION BOX
	INVERTER
	PRODUCTION METER

PV SYSTEM
7.400 KW-DC
5.000 KW-AC

BOS WILL BE AS CLOSE AS POSSIBLE TO MSP WITHIN 10'

THIS SYSTEM DESIGNED WITH
WIND SPEED 119
WIND EXPOSURE C



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Date: 2022.09.15
18:27:35 -07'00'

ROOF AREA: 1721 SQ. FT.

CLIENT:
JOSEPH A. COOK
891 SW POPLAR LN. LAKE CITY, FL 32025
AHJ: COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: 3869551091
EMAIL: JW.COOK@OUTLOOK.COM

SYSTEM:
SYSTEM SIZE (DC): 20 X 370 = 7.400 KW
SYSTEM SIZE (AC): 5.000 KW @ 240V
MODULES: 20 X FREEDOM FOREVER
FF-MP-BB9-370
OPTIMIZERS: 20 X SOLAREDGE S440
INVERTER: SOLAREDGE SE5000H-US (S11)

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SITE PLAN				
JOB NO.	DATE	DESIGNED BY	SHIRT	
246401	9/15/2022	A.M.	PV-2	



SITE PLAN
SCALE: 1"=15'

1

SW POPLAR LN

LEGEND	
	OBSTRUCTION
	PIPE VENT
	MODULES
	CONDUIT
	SETBACK
	AC DISCONNECT
	MSP
	JUNCTION BOX
	INVERTER
	PRODUCTION METER

MODIFIED SETBACKS PROPOSED AT RIDGE
TOTAL ARRAY AREA = 392 17 SF
TOTAL ROOF AREA = 1721 SF
TOTAL ARRAY AREA AS A % TO ROOF AREA = 22.79%
22.79% < 33%

BOS WILL BE AS CLOSE AS POSSIBLE TO MSP WITHIN 10'

THIS SYSTEM DESIGNED WITH
WIND SPEED: 119
WIND EXPOSURE: C

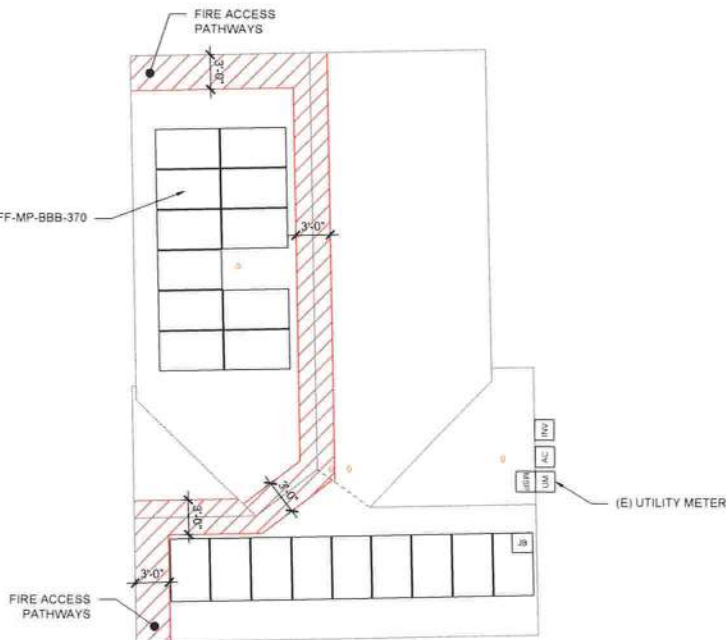
TOTAL ROOF AREA: 1721 SQ FT
ARRAY COVERAGE: 22.79%
SYSTEM DISTRIBUTED WEIGHT: 2.28 LBS
S-SI: PROTEA POINT-LOAD: 9.24 LBS



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PV SYSTEM
7.400 KW-DC
5.000 KW-AC

(N) 20 FREEDOM FOREVER: FF-MP-BBB-370



ROOF AREA 1721 SQ FT

CLIENT
JOSHUA COOK
881 SW POPLAR LN, LAKE CITY, FL 32025
AHJ: COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: 3869515391
EMAIL: JWCOK@OUTLOOK.COM

SYSTEM
SYSTEM SIZE (DC): 20 X 370 = 7.400 KW
SYSTEM SIZE (AC): 5.000 KW @ 240V
MODULES: 20 X FREEDOM FOREVER
FF-MP-BBB-370
OPTIMIZERS: 20 X SOLAREDOGE S440
INVERTER: SOLAREDOGE SB3000H-US (3P)

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EC1308886

ROOF PLAN WITH MODULES LAYOUT				
JOB NO	DATE	DESIGNED BY	SHEET	PV-0A
255401	01/15/2022	A.M.		



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.

ROOF DETAILS:

TOTAL ROOF AREA: 1721 SQ FT
ARRAY COVERAGE: 22.79%
SYSTEM DISTRIBUTED WEIGHT: 2.28 LBS
S-5: PROTEA POINT-LOAD: 9.24 LBS



The seal has been electronically signed and
issued by Methode Maniraguha under a
Digital Signature and Code issued under the
Florida Seal Act, Chapter 349, F.S.
The Seal is not a trademark and is not
intended to be used in any other way.

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ROOF AREA STATEMENT						
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	11	12	12	269	578 SQ FT	215.7 SQ FT
ROOF 2	9	12	12	179	428 SQ FT	176.48 SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT
					SQ FT	SQ FT

CLIENT
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ARJ COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: 386851391
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SYSTEM
SYSTEM SIZE (DC): 20 X 110 = 7.433 KW
SYSTEM SIZE (AC): 5.200 KW @ 240V
MODULES: 20 X FREEDOM FOREVER
PEAK 660-170
OPTIMIZERS: 20 X SOLAREDGE-S40
INVERTER: SOLAREDGE SE600H-US (2X)

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FREEDOM ENERGY LLC
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GREG ALBRIGHT

CONTRACTOR LICENSE
REGISTERED ELECTRICAL CONTRACTOR
EC 1308026

ROOF DETAILS			
JOB NO	DATE	DESIGNED BY	SHEET
281401	6/15/2022	A.M	PV-25

BACKFEED BREAKER SIZING			
MAX CONTINUOUS OUTPUT 21 00A @ 240V			
21 00	X	1.25	= 26 25AMPS 30A BREAKER - OK
SEE 705.12 OF 2017 NEC			
200	X	1.20	= 240
240	-	200	= 40A ALLOWABLE BACKFEED

PV SYSTEM	
7 400 KW-DC	
5 000 KW-AC	



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PHONE: 3865551551
EMAIL: JW.COOK@OUTLOOK.COM

SYSTEM
SYSTEM SIZE (DC): 20 X 370 W 7 400 KW
SYSTEM SIZE (AC): 5 000 KW @ 240V
MODULES 20 X FREEDOM FOREVER
FF-MP-SMB-570
OPTIMIZERS 20 X SOLAREEDGE S440
INVERTER SOLAREEDGE SE5000H-US (S1)

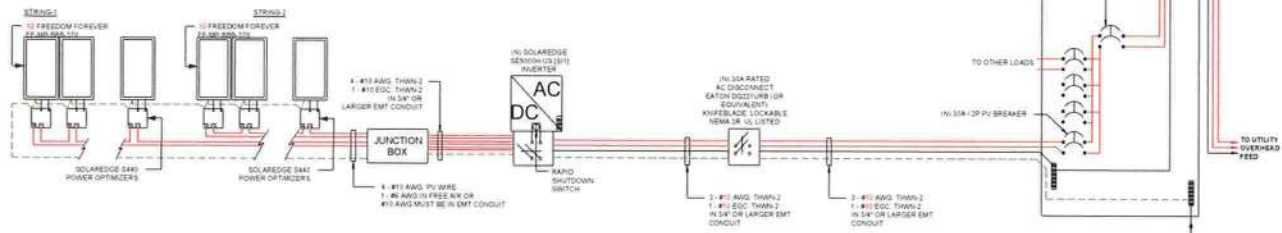
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2519 COLLINS RD SUITE 200 ORLANDO, FL 32819
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EC15008259

THREE LINE DIAGRAM				
JOB NO	DATE	DESIGNED BY	BY	SHEET
256421	9/15/2022	A.M		PV-4



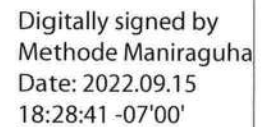
NOTE
CONDUIT AND CONDUCTORS SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS

CONDUCTOR CALCULATIONS			
JOB NO. 285421	DATE 3/15/2022	DESIGNED BY A.M.	SHEET Pv-3

30A BREAKER

[illegible]

QTY.	PART	PART #	DESCRIPTION
20	MODULES	PV-110-370	FREEDOM FOREVER FF-MP-BBB-370
20	OPTIMIZERS	S440	SOLAREDOE S440 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
1	JUNCTION BOX	460-278	600VDC NEMA 3R UL LISTED JUNCTION BOX
3	CONNECTORS	240-300	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
3	CONNECTORS	240-301	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTER	FW-120-551	BE5000H-US (S1) 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	AC DISCONNECT	321-030	30A RATED 240VAC NEMA 3R UL LISTED
194	ROOF ATTACHMENT 1	140-401	E-SI PROTRA
27	RAIL 1	211-100	UNIRAC 6M LIGHT RAIL 100 INCH (TOTAL 367 FEET NEEDED)
40	RAIL HARDWARE 1	291-517	8WD T-BOLT AND NUT SS
40	MODULE CLAMPS 1	221-101	SM MODCLAMP PRO DRW
40	MODULE CLAMPS 1	221-202	SM ENDCLAMP PRO W/END CLAMP
14	SPLICE 1	201-550	8WD SPLICE BAR PRO SERIES MLL
40	WIRE MOUNT 1	201-510	MCRG MNT 8WD T-BOLT SS
11	ACCESSORIES 1	211-202	E-BOSS CONDUIT MOUNT COMP KIT
23	ACCESSORIES 1	211-200	E-BOSS RAIL TRAY
8	ACCESSORIES 1	211-206	E-BOSS BRIDGE TRAY
12	ACCESSORIES 1	211-207	E-BOSS BRIDGE CLIPS
54	GROUNDING LUG 1	260-300	BURNDY GROUND WEEB LUG
88	LF FOOT 1	241-100	UNIRAC LF FOOT SERRATED W/IT BOLT CLEAR (KIT)

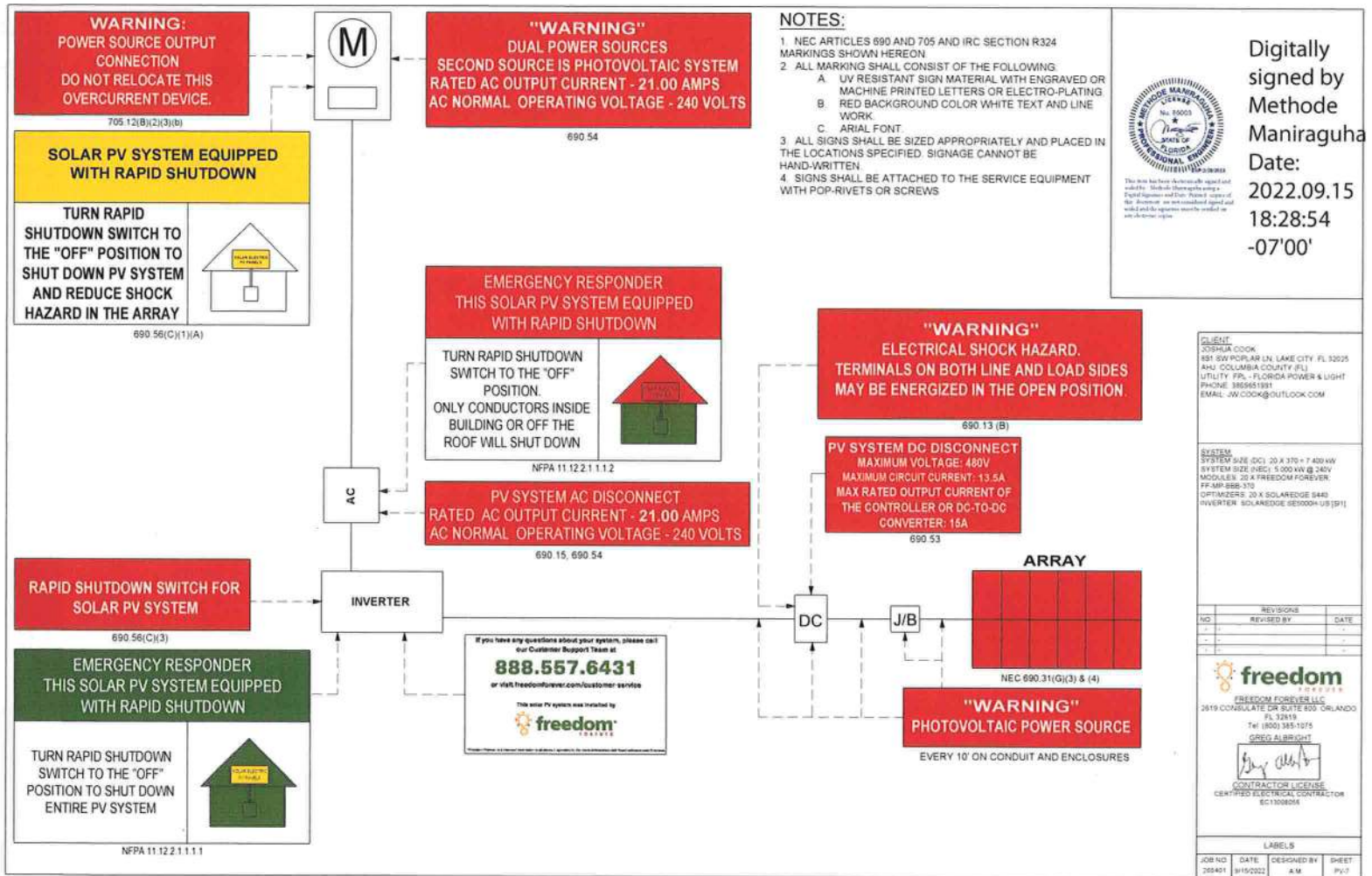


SYSTEM
SYSTEM SIZE (DC): 20 X 370 = 7 400 W
SYSTEM SIZE (AC): 5 000 W @ 240V
MODULES: 20 X FREEDOM FOREVER
FF-MP 385-370
OPTIMIZERS: 20 X SOLAREGE S440
INVERTER: SOLAREGE SE5000H-US [S1]

 **freedom**
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EC13000508

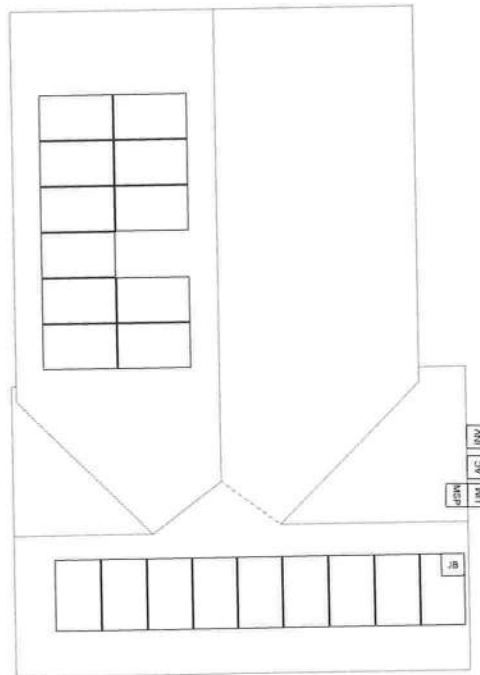
EQUIPMENT & SERVICE LIST			
JOB NO. 265401	DATE 11/15/2022	DESIGNED BY A.M.	SHEET 215-2



SOLAREEDGE OPTIMIZER CHART

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

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10						



CLIENT
JOSHUA COOK
891 SW POPLAR LN LAKE CITY, FL 32025
AMJ COLUMBIA COUNTY (FL)
UTILITY FPL - FLORIDA POWER & LIGHT
PHONE 3859511951
EMAIL JW COOK@OUTLOOK.COM

SYSTEM
SYSTEM SIZE (DC): 35 X 375 = 7,430 kW
SYSTEM SIZE (AC): 5,000 kW @ 240V
MODULES: 20 X FREEDOM FOREVER
FF-MP155-375
OPTIMIZERS: 20 X SOLAREEDGE S440
INVERTER: SOLAREEDGE SE5000H-US (501)

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2619 CONSLATE DR SUITE 600 ORLANDO
FL 32819
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GREG ALBRIGHT

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CENTRO ELECTRICAL CONTRACTOR
EC11008058

JOB NO	DATE	DESIGNED BY	SHEET
265401	9/15/2022	A.M.	PV2

SAFETY PLAN

INSTRUCTIONS:

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

IN CASE OF EMERGENCY

INJURY HOTLINE
(855) 400-7233

NEAREST HOSPITAL OR OCCUPATIONAL/INDUSTRIAL CLINIC

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION

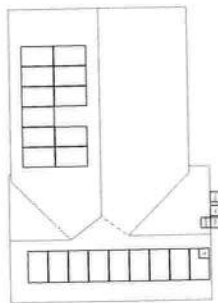
NAME: _____

PHONE NUMBER: _____

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

NAME _____

SIGNATURE



SW POPLAR LN

MARK UP KEY

-  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

CLIENT:
JOSHUA COOK
891 SW POPLAR LN, LAKE CITY, FL 32025
ADJ. COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: 3866651951
EMAIL: JW.COOK@OUTLOOK.COM

SYSTEM
SYSTEM SIZE (DC): 20 X 370 + 7 400 kW
SYSTEM SIZE (AC): 5 000 kW @ 240V
MODULES: 20 X FREEDOM FOREVER
FF-MP-660-370
OPTIMIZERS: 20 X SOLAREDGE S440
INVERTER: SOLAREDGE SE5000+US [51]

BREAK AND WATER LOG

THIS LOG IS TO BE FILLED OUT ANY TIME THE TEMP EXCEEDS 90 DEGREES. THE CREW LEAD AND ROOF LEAD ARE RESPONSIBLE FOR ENSURING THIS IS COMPLETED AND UPLOADED AT THE END OF EVERYDAY WHEN TEMPS EXCEED 90 DEGREES

[illegible]

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NO	REVISION BY	DATE	
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 freedom ELECTRIC			
FREEDOM ELECTRIC LLC 2610 CONSULATE DR SUITE 200 GILMANO FL 32818 Tel: (800) 385-1075 GREG ALBRIGHT  CONTRACTOR LICENSE CERTIFIED ELECTRICAL CONTRACTOR EC11008048			
SAFETY PLAN			
JOB NO	DATE	DESIGNED BY	SHEET

DATE: _____ TIME: _____

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 falling or sliding off.

Fall Protection

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

- FPCP (name and title):

- FPU and LPD (name and title):

Electrical Safety

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

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 utilize 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 closest 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 onsite 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:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:

CLIENT:
JOSHUA COOK
891 SW POPLAR LN LAKE CITY FL 32025
HAW COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: 3869581931
EMAIL: JW.COOK@OUTLOOK.COM

SYSTEM:
SYSTEM SIZE (DC): 20 X 370 = 7 400 kW
SYSTEM SIZE (AC): 5 000 kW @ 240V
MODULES: 20 X FREEDOM FOREVER
FF-MP-668-170
OPTIMIZERS: 20 X SOLAREDGE S440
INVERTER: SOLAREDGE SB5000A-US (381)

NO.	REVISIONS	DATE
1	REVISED BY	
2		
3		
4		


FREEDOM FOREVER LLC
2519 CONSULATE DR SUITE 800 ORLANDO
FL 32819
TEL: (407) 385-1275
DREW ALBRIGHT

CONTRACTOR LICENSE
CERTIFIED ELECTRICAL CONTRACTOR
EC11034084

JOB NO	DATE	DESIGNED BY	SHEET
25401	8/15/2022	A M	PG-10



370 Watt

120 HALF-CELL MONOFACIAL MODULE
FF-MP-BBB-370

- High module conversion efficiency up to 20.31%
- Excellent weak light performance
- Withstanding harsh environment
- Lower operating temperature
- Extreme weather loading

INDUSTRY-LEADING PERFORMANCE WARRANTY



CERTIFICATIONS AND STANDARDS



UL 61730 / UL 61218 / ISO 9001 / ISO 14001 / IEC 61701 / IEC 17025 / IEC 61718 / DIN EN 50609-2-08

FF-MP-BBB-370 Module Specifications



ELECTRICAL CHARACTERISTICS

Characteristics	FF-MP-BBB-370
Maximum Power (P _{max})	370W
Maximum Power Voltage (V _{mp})	34.40V
Maximum Power Current (I _{mp}) [A]	10.76A
Open Circuit Voltage (V _{oc}) [V]	41.90V
Short Circuit Current (I _{sc}) [A]	11.29A
Module Efficiency	20.31%
Operating Module Temperature	-40 °C to +85 °C
Power Tolerance	0/+5W
STC	Irradiance of 1000W/m ² , AM1.5, cell Temperature 25 °C

MECHANICAL CHARACTERISTICS

Cell Type	Mono perc, 186mm-half cells, 120(6x10-6x10)
Weight	20.3 kgs (44.8 lbs.)
Dimension	1755 x 1038 x 35mm. (69.09449 x 40.87 x 1.38in.)
Superstructure	High Transmission, Low Iron & Semi-Tempered Glass (3.2 mm)
Junction Box	1200 mm
Connector	Stäubli EVG2
Frame & Installation	Anodized aluminum profile

OPERATIONS CHARACTERISTICS

Operational Temperature	-40°C ~ +35°
Max System Voltage	1500VDC (EU)
Max Series Fuse Rating	20A (EU)
Safety Class	Class II
Fire Rating	Type 1

TEMPERATURE RATINGS

Temperature Coefficient of P _{max}	-0.36%/°C
Temperature Coefficient of V _{oc}	-0.304%/°C
Temperature Coefficient of I _{sc}	+0.656%/°C
Nominal Operating cell Temperature (NOCT)	42°C±2°C

MECHANICAL LOADS

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

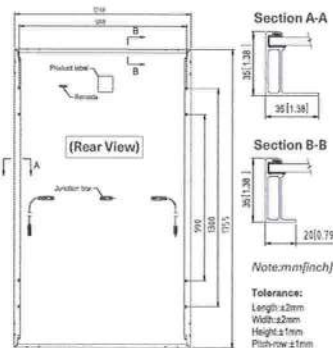
PACKAGING INFORMATION

Container	20' GP	40' HC
Pallets per Container	6	26
Pieces per Container	186	806
Pieces per Pallet	31	31
Packaging Box Weight	679 kg. (1497 lbs.)	
Packaging Box Dimensions	1755 x 1130 x 1180 mm. (70.28 x 44.49 x 46.46 in.)	

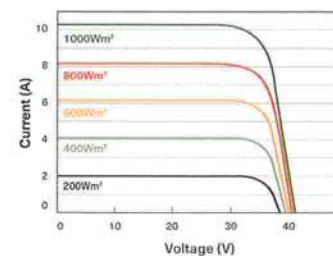
CERTIFICATIONS AND STANDARDS



UL 61730 / UL 61218 / ISO 9001 / ISO 14001 / IEC 61701 / IEC 17025 / IEC 61718 / DIN EN 50609-2-08



CURRENT-VOLTAGE CURVE



Power Optimizer For North America

S440, S500



POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Faster installations with simplified cable management and easy assembly using a single bolt
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Flexible system design for maximum space utilization
- Module-level voltage shutdown for installer and firefighter safety
- Compatible with bifacial PV modules
- Superior efficiency (99.5%)
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading

*Expected availability in 2021

solaredge.com

solaredge

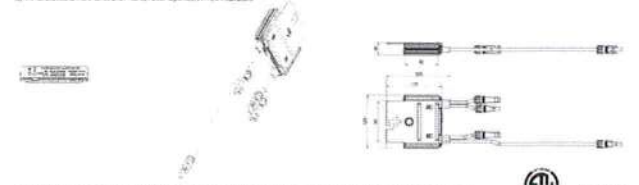
Power Optimizer For North America S440, S500

	S440	S500	Unit
INPUT			
Rated Input DC Power ¹	440	500	W
Absolute Maximum Input Voltage (V _{oc})	60	60	VDC
MVMT Operating Range	8...30	8...30	VDC
Maximum Short Circuit Current (I _{sc}) of Connected PV Module	14.5	15	A DC
Maximum Efficiency	99.5	99.5	%
Weighted Efficiency	98.6	98.6	%
Overvoltage Category	II	II	
OUTPUT DURING OPERATION			
Maximum Output Current	15	15	A DC
Maximum Output Voltage	60	60	VDC
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1x1/0.1		VDC
STANDARD COMPLIANCE			
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020		
EMC	FCC Part 15 Class B, CECE005-6-2, CECE006-6-2		
Safety	IEC60709-1 (Safety), UL1741		
Material	UL94 V-0 (V0 Resistant)		
RoHS	Yes		
Fire Safety	VDE AR 410-1:2008-12:2018-05		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	1000		
Dimensions (W x L x H)	129 x 153 x 30 / 5.07 x 6.02 x 1.18		
Weight (including cables)	655 / 1.5		
Input Connector	MC4		
Input Wire Length	0.17 / 0.02		
Output Connector	MC4		
Output Wire Length	1x1.2.3, 1x0.5.10 / 1x1.754, 1x0.5.02		
Operating Temperature Range ²	-40 to +85		
Protection Rating	IP68 / Type6H		
Relative Humidity	0 - 100		

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +1% power tolerance are allowed.
(2) For other connection types please contact SolarEdge.
(3) For ambient temperature above +50°C / +122°F power derating is applied. Refer to Power Optimizers Temperature Derating Technical Note for more details.

PV System Design Using a SolarEdge Inverter	Single Phase HD-Wave	Three Phase for 208V grid	Three Phase for 277/480V grid
Minimum String Length (Power Optimizers)	S440, S500	8	16
Maximum String Length (Power Optimizers)		25	50
Maximum Nominal Power per String	5700-6000 with SE7600-V5-SE1400-V5	6000	12750
Maximum Allowed Connected Power per String ¹		One String 7200W	15,000W
Maximum Allowed Connected Power per String ²		One String 7200W	15,000W
Maximum Allowed Connected Power per String ³		One String 7200W	15,000W
Maximum Allowed Connected Power per String ⁴		One String 7200W	15,000W
Maximum Allowed Connected Power per String ⁵		One String 7200W	15,000W
Maximum Allowed Connected Power per String ⁶		One String 7200W	15,000W
Maximum Allowed Connected Power per String ⁷		One String 7200W	15,000W
Maximum Allowed Connected Power per String ⁸		One String 7200W	15,000W
Maximum Allowed Connected Power per String ⁹		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁰		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹¹		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹²		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹³		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁴		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁵		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁶		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁷		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁸		One String 7200W	15,000W
Maximum Allowed Connected Power per String ¹⁹		One String 7200W	15,000W
Maximum Allowed Connected Power per String ²⁰		One String 7200W	15,000W

1) A string with more than 20 optimizers does not meet NEC rapid shutdown requirements, safety voltage will be above the 30V requirement.
2) For the maximum rated AC power & maximum nominal power per string, refer to the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to 1) https://www.solaredge.com/...
3) For the maximum rated AC power & maximum nominal power per string, refer to the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to 1) https://www.solaredge.com/...
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17) For the maximum rated AC power & maximum nominal power per string, refer to the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to 1) https://www.solaredge.com/...
18) For the maximum rated AC power & maximum nominal power per string, refer to the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to 1) https://www.solaredge.com/...
19) For the maximum rated AC power & maximum nominal power per string, refer to the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to 1) https://www.solaredge.com/...
20) For the maximum rated AC power & maximum nominal power per string, refer to the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to 1) https://www.solaredge.com/...



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RoHS
Intertek

Single Phase Inverter with HD-Wave Technology for North America

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



Optimized installation with HD-Wave technology

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

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INVERTERS

Single Phase Inverter with HD-Wave Technology for North America

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

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXBXX4						
OUTPUT							
Rated AC Power Output	3000	3800	5000	6000	7600	10000	11400
Maximum AC Power Output	3000	3800	5000	6000	7600	10000	11400
AC Output Voltage Min./Nom./Max. (V)	120/120/120	120/120/120	120/120/120	120/120/120	120/120/120	120/120/120	120/120/120
AC Output Voltage Min./Nom./Max. (V)	120/120/120	120/120/120	120/120/120	120/120/120	120/120/120	120/120/120	120/120/120
AC Frequency (Hz)	60	60	60	60	60	60	60
Maximum Continuous Output Current (A)	12.5	16	21	25	32	42	47.5
Maximum Continuous Output Current (A)	12.5	16	21	25	32	42	47.5
Power Factor	1.0 (Adjustable: 0.95 to 1.0)						
25°C Efficiency	99.0%						
UL1741 Monitoring, including production, country configuration, and more	Yes						
INPUT							
Maximum DC Power (kW)	4500	5800	7500	9000	11400	14000	15800
Maximum DC Power (kW)	4500	5800	7500	9000	11400	14000	15800
Open-circuit Voltage (V)	600	600	600	600	600	600	600
Maximum Input Voltage	600	600	600	600	600	600	600
Maximum Input Current (A)	7.5	9.5	12.5	15.0	19.0	23.0	26.0
Maximum Input Current (A)	7.5	9.5	12.5	15.0	19.0	23.0	26.0
Max. Input Short-Circuit Current	15	19	25	30	38	46	52
Reverse Polarity Protection	Yes						
Ground Fault Protection (GFP)	Yes (Optional)						
Maximum Inverter Efficiency	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
TEC Weighted Efficiency	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
Lightning Protection	Yes						

1. For small-scale residential applications, the inverter is designed to operate at 120V AC. For larger-scale commercial applications, the inverter is designed to operate at 240V AC.

/ Single Phase Inverter with HD-Wave Technology

for North America

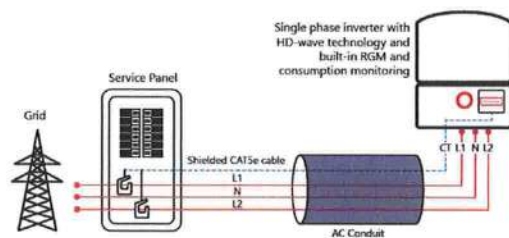
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
ADDITIONAL FEATURES							
Supported Communication Interface	485, 3 thermal, ZigBee (optional), Cellular (optional)						
Real-time Energy Monitoring (ANSI 115.22)	Optional*						
Consumption Monitoring	With the Sense module application using built-in Wi-Fi (Access Point) or external connection						
Inverter Communication	A compatible Rapid Shutdown (RS) AC and DC disconnect						
Rated Frequency - 50/60 Hz	50/60 Hz						
STANDARD COMPLIANCE							
Safety	UL 1741, UL 1741 SA, UL 1741B, CSA C1010, Canadian AC/DC according to IEC 62109						
2016 California Standards	CEC 647, Rule 21, Rule 24 (a)						
Efficiency	97.6% (Class B)						
INSTALLATION SPECIFICATIONS							
AC Output Capacity (Up to 6000 Amps)	1. Maximum 275 A RMS			1. Maximum 275 A RMS			
DC Input Capacity (Up to 4000 Amps)	1. Maximum 275 A RMS			1. Maximum 275 A RMS			
Dimensions (W x H x D) (mm)	774 x 185 x 110 / 30.5 x 7.3 x 4.3			774 x 185 x 110 / 30.5 x 7.3 x 4.3			
Weight (kg)	11.5 / 25.3			11.5 / 25.3			
Operating Temperature Range	-25 to +55			-25 to +55			
Protection Rating	NEMA 4X, Inverter with Safety feature			NEMA 4X, Inverter with Safety feature			

* Inverter with Real-time Energy Monitoring (ANSI 115.22) is available with optional AC/DC disconnect and communication module. For more information, please refer to the Real-time Energy Monitoring (ANSI 115.22) option. For more information, please refer to the Real-time Energy Monitoring (ANSI 115.22) option.

How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills.



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RoHS

pe.eaton.com



Eaton general duty non-fusible safety switch

DG221URB

UPC:782113120232

Dimensions:

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

Weight:6 LB

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

Warranties:

- Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

Specifications:

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

Supporting documents:

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

Certifications:

- UL Listed

Product compliance: No Data

S-5!® The Right Way!™

**NOW AVAILABLE
IN ALUMINUM**

NEW

ProteaBracket™

ProteaBracket™

A versatile bracket for mounting solar PV to trapezoidal roof profiles

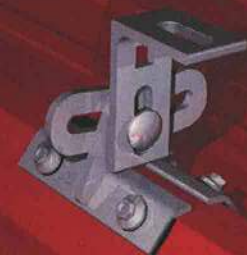
ProteaBracket™ is now made in aluminum. Still the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteaBracket just got better!

The bracket features an adjustable attachment base and module attachment options to accommodate different roof profile dimensions and mounting options.

Our pre-applied EPDM gasket with peel and stick adhesive makes installation a snap, ensuring accurate and secure placement the first time.

With no messy sealants, faster installation, and a weather-proof fit, ProteaBracket offers you the most versatile solar attachment solution available.

ProteaBracket* can be used for rail mounting or "direct-attach" with S-5! PVKIT™



Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*



888-825-3432 | www.S-5.com

*When ProteaBracket is used in conjunction with the S-5! PVKIT, an additional 10% is required during installation.

*See www.S-5.com for details.

The right way to attach solar PV to trapezoidal roof profiles!

S-5!®
The Right Way!™

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal rib, exposed-fastened metal roof profiles!

ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

Note: All four pre-punched holes must be used to achieve tested strength. Fasteners are provided.

For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:



*Side
Mount Rail*



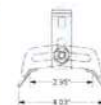
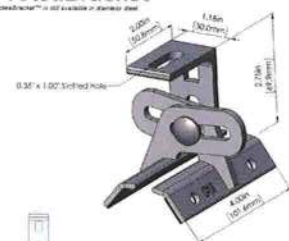
*Bottom
Mount Rail*



*w/ S-5!
PVKIT™
(rail-less)*

ProteaBracket™

ProteaBracket™ is not available in aluminum yet.



ProteaBracket fits profiles up to 3 inches

INSTALLATION:

No surface preparation needed. (1) Wipe away excess oil and debris. (2) Peel off adhesive release paper. (3) Align and mount bracket directly onto crown of panel. (4) Secure ProteaBracket through pre-punched holes, using pre-drilled S-5! screws.



ProteaBracket™ and the S-5! PVKIT™ 2.0 mounted on a trapezoidal roof profile

S-5!® Warning! Please use this product responsibly!

Products are provided for multiple U.S. and foreign panels. For published data regarding building strength, bolt torque, perforations, and trademarks, visit the S-5! website at www.S-5.com. Copyright 2015 S-5! Inc. All rights reserved. S-5! is a registered trademark of S-5! Inc. and/or its affiliates. All other trademarks are the property of their respective owners.

Distributed by

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!



New & Improved:
THE PROFESSIONALS' CHOICE
With Superior Aesthetics



NOW FEATURING FLASHKIT PRO
The new design allows for faster and easier
INSTALLATION WITH SHED & SEAL TECHNOLOGY



NOW WITH UNIVERSAL MIDCLAMPS
Accommodates 10mm-36mm module frames
(One tool, one person installs are here!)



REVOLUTIONARY NEW ENDCLAMPS
One tool, one person, one install. The only.

THE PROFESSIONALS' CHOICE FOR RESIDENTIAL RACKING

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

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

SOLARMOUNT



BETTER DESIGNS

TRUST THE INDUSTRY'S BEST DESIGN TOOL

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

BETTER SYSTEMS

ONE SYSTEM - MANY APPLICATIONS

Whether you're looking for the right on steep pitched roofs, design a large number of modules to protect the landscape. Tilt the system up on flat or low slope roofs. Components available to suit, clean, and dark finishes to optimize your design functionality and aesthetics.

BETTER RESULTS

MAXIMIZE PROFITABILITY ON EVERY JOB

Invest time to help you maximize both system and labor costs from the time the job is quoted to the time your team gets off the roof. Faster install. 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

INSTALLATION & PERMANENT
MECHANICAL FASTENING
SYSTEM FOR CLASSIC RACKING

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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QUALITY



ENGINEERING
EXCELLENCE



BANKABLE
WARRANTY



DESIGN
TOOLS



PERMIT
DOCUMENTATION

TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing your needs 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 provider with ISO certification for ISO 9001, ISO 14001 and OHSAS 18001, which means we deliver the highest standards in QA, safety, and workforce. These certifications demonstrate our excellence and commitment to best 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. Store your records and know you are getting the 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 BACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

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 bays. 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:

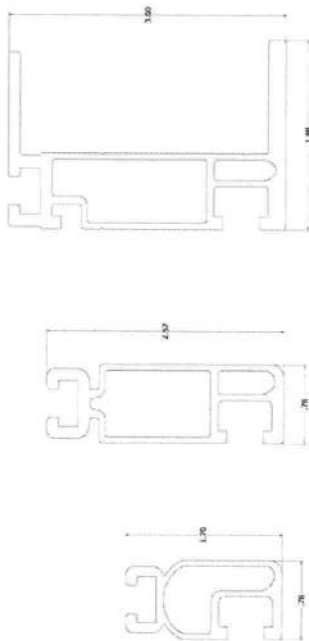
Downward Load (lb/ft ²)	170.20
Upward Load (lb/ft ²)	76.07
Down-Slope Load (lb/ft ²)	24.2

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)	0.115	0.363	0.898	in ³
SECTION MODULUS (Y-AXIS)	0.067	0.113	0.221	in ³
MOMENT OF INERTIA (X-AXIS)	0.113	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

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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

Tested to: UL 2703:2015

Client Reference: Tom Young

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/month/year)
27/07/2016



January 20, 2021

Unirac
1411 Broadway Blvd. NE
Albuquerque, NM 87102

Attn.: Unirac - Engineering Department

Re: Engineering Certification for the Unirac U-Builder 2.0 SOLARMOUNT Flush Rail

PZSE, Inc. - Structural Engineers has reviewed the Unirac SOLARMOUNT rails, proprietary mounting system constructed from modular parts which is intended for rooftop installation of solar photovoltaic (PV) panels; and has reviewed the U-Builder Online tool. This U-Builder software includes analysis for the SOLARMOUNT LIGHT rail, SOLARMOUNT STANDARD rail, and SOLARMOUNT HEAVY DUTY rail with Standard and Pro Series hardware. All information, data and analysis contained within are based on, and comply with the following codes and typical specifications:

1. 2020 Florida Building Code, by Florida Building Commission
2. Minimum Design Loads for Buildings and other Structures, ASCE/SEI 7-16
3. 2018 International Building Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
4. 2018 International Residential Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
5. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES.
6. 2015 Aluminum Design Manual, by The Aluminum Association, 2015

Following are typical specifications to meet the above code requirements:

Design Criteria:	Ground Snow Load = 0 - 100 (psf) Basic Wind Speed = 85 - 190 (mph) Roof Mean Height = 0 - 60 (ft) Roof Pitch = 0 - 45 (degrees) Exposure Category = B, C & D
Attachment Spacing:	Per U-builder Engineering report.
Cantilever:	Maximum cantilever length is L/3, where "L" is the span noted in the U-Builder online tool.
Clearance:	2" to 10" clear from top of roof to top of PV panel.
Tolerance(s):	1.0" tolerance for any specified dimension in this report is allowed for installation.
Installation Orientation:	See SOLARMOUNT Rail Flush Installation Guide. Landscape - PV Panel long dimension is parallel to ridge/eave line of roof and the PV panel is mounted on the long side. Portrait - PV Panel short dimension is parallel to ridge/eave line of roof and the PV panel is mounted on the short side.

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
☎ 916.961.3960 | 📠 916.961.3965 | 🌐 www.pzse.com
Experience | Integrity | Empowerment



Components and Cladding Roof Zones:

The Components and Cladding Roof Zones shall be determined based on ASCE 7-16 Component and Cladding design.

- Notes:
- 1) U-builder Online tool analysis is only for Unirac SM SOLARMOUNT Rail Flush systems only and do not include roof capacity check.
 - 2) Risk Category II per ASCE 7-16.
 - 3) Topographic factor, k_{zt} is 1.0.
 - 4) Array Edge Factor $Y_e = 1.5$
 - 5) Average parapet height is 0.0 ft.
 - 6) Wind speeds are LRFD values.
 - 7) Attachment spacing(s) apply to a seismic design category E or less.

Design Responsibility:

The U-Builder design software is intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. In all cases, this U-builder software should be used under the direction of a design professional with sufficient structural engineering knowledge and experience to be able to:

- Evaluate whether the U-Builder Software is applicable to the project, and
- Understand and determine the appropriate values for all input parameters of the U-Builder software.

This letter certifies that the Unirac SM SOLARMOUNT Rails Flush, when installed according to the U-Builder engineering report and the manufacture specifications, is in compliance with the above codes and loading criteria.

This certification excludes evaluation of the following components:

- 1) The structure to support the loads imposed on the building by the array; including, but not limited to: strength and deflection of structural framing members, fastening and/or strength of roofing materials, and/or the effects of snow accumulation on the structure.
- 2) The attachment of the SM SOLARMOUNT Rails to the existing structure.
- 3) The capacity of the solar module frame to resist the loads.

This requires additional knowledge of the building and is outside the scope of the certification of this racking system.

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

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

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY PAUL K. ZACHER, PE ON 01/20/2021 USING A SHA-1 AUTHENTICATION CODE.
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DIGITAL SIGNATURE



01/20/2021

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