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 BUILDING CODE: ACCESSIBILITY

2020 7TH EDITION FLORIDA FIRE PREVENTION CODE

2017 NATIONAL ELECTRIC CODE

AS ADOPTED BY COUNTY OF COLUMBIA

VICINITY MAP:



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PV-2	SITE PLAN
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APPENDIX	MANUFACTURER SPECIFICATION SHEETS

CONSTRUCTION NOTES:

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

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

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

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

PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER 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 DESIGNED WITH:

WIND SPEED: 119 WIND EXPOSURE: C SNOW LOAD: 0 Date: 2023.11.01

11:19:04



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CLIENT:
SHAWN BAILEY
233 SOUTH WEST HAVEN COURT, HIGH
SPRINGS, FL 32643
AHJ: COUNTY OF COLUMBIA
UTILITY: "CLAY ELECTRIC COOPERATIVE,
INC. "

METER: 156205598 APN: 09-7S-17-09961-007 PHONE: (352) 562-5996 EMAIL: BAILSMB@LIVE.COM

SYSTEM:
SYSTEM SIZE (DC): 35 X 385 = 13.475 kW
SYSTEM SIZE (AC): 10.000 kW @ 240V
MODULES: 35 X JINKO SOLAR:
JKM385M-6RL3-B
OPTIMIZERS: 35 X SOLAREDGE S440
INVERTER: SOLAREDGE SE10000H-USRGM

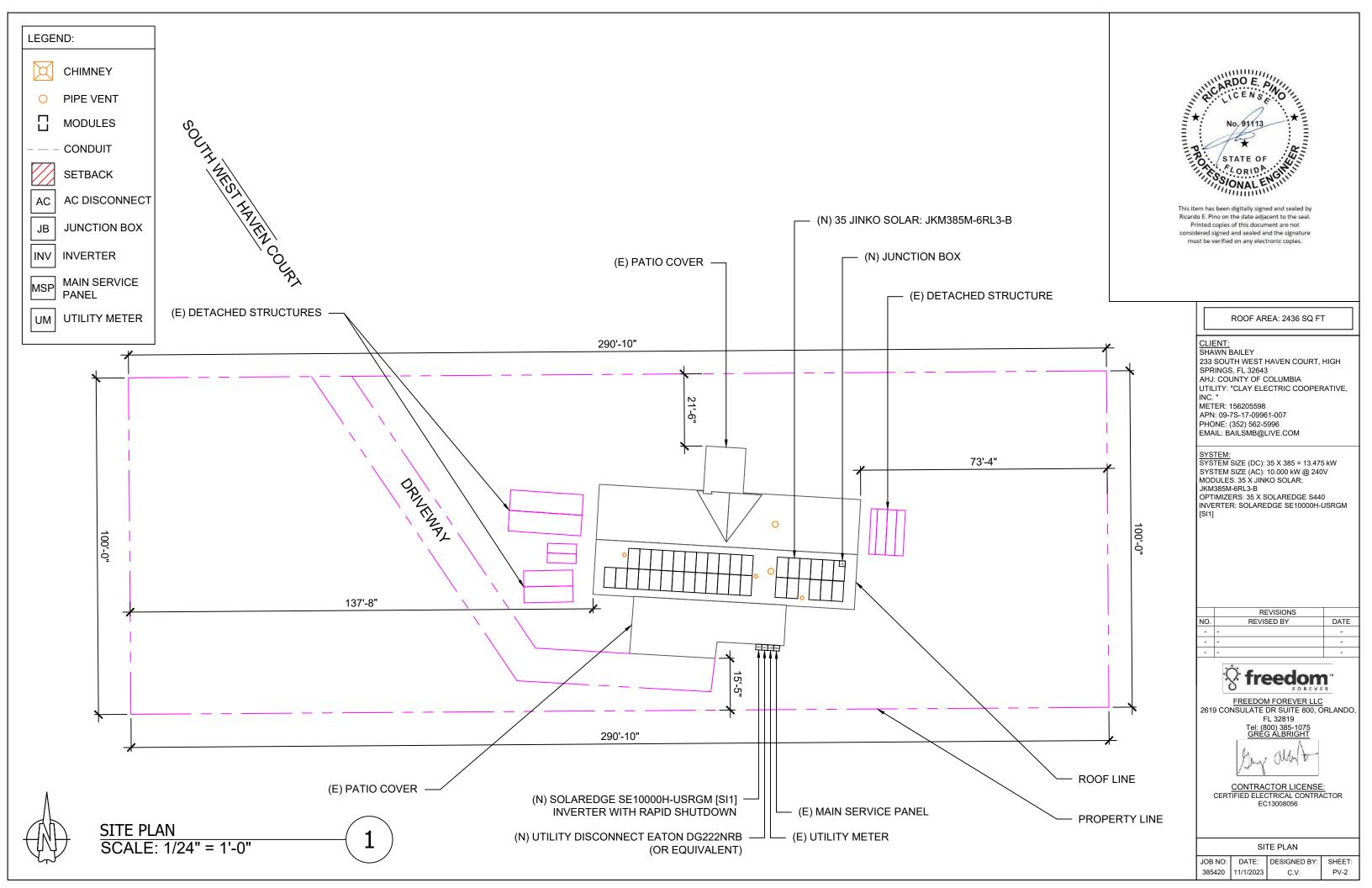
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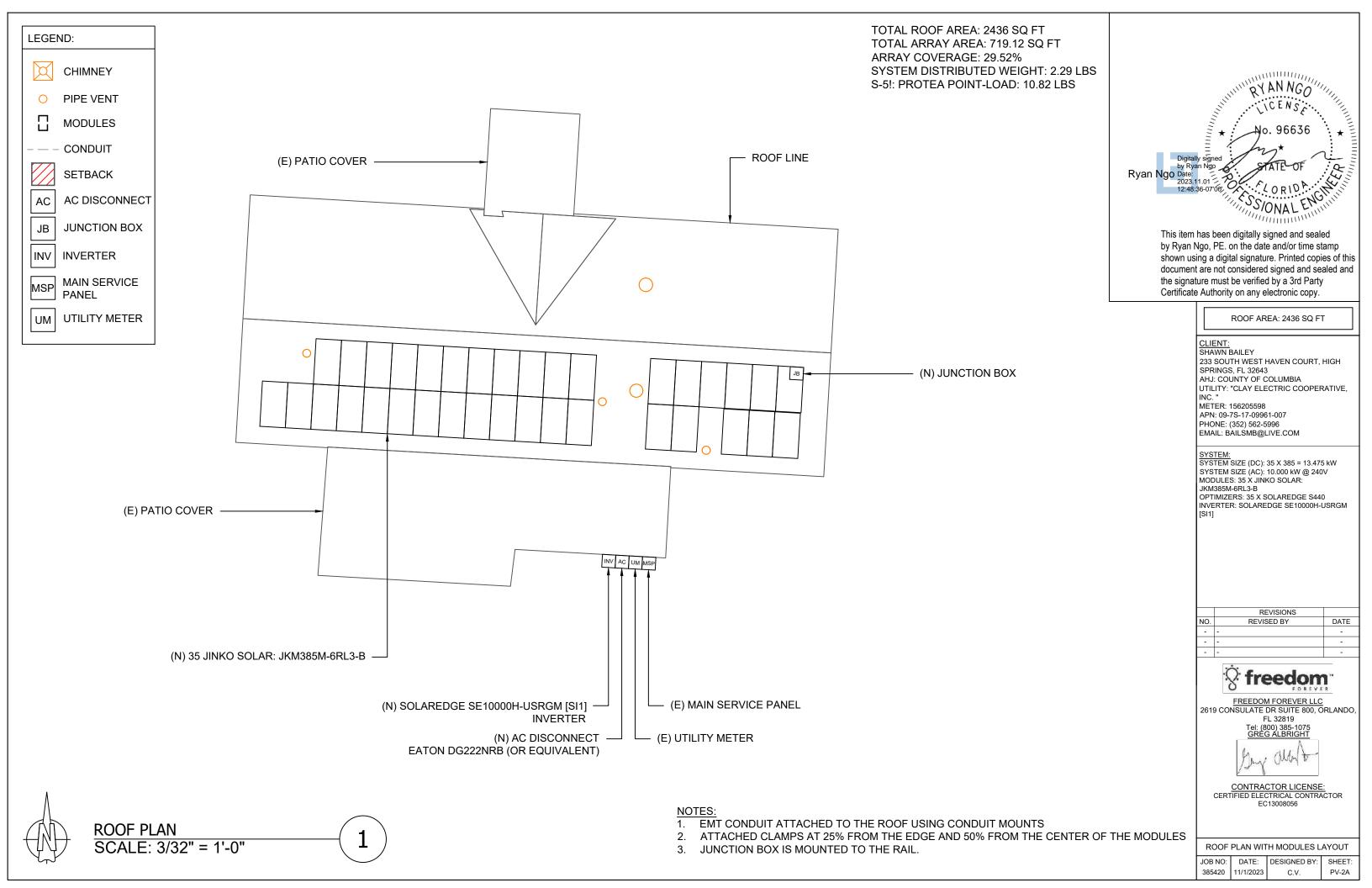


CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

SITE LOCATION

JOB NO: DATE: DESIGNED BY: 385420 11/1/2023 C.V.





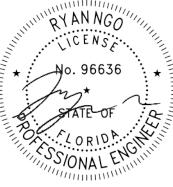
ROOF DETAILS:

TOTAL ROOF AREA: 2436 SQ FT TOTAL ARRAY AREA: 719.12 SQFT

ARRAY COVERAGE: 29.52%

SYSTEM DISTRIBUTED WEIGHT: 2.29 LBS S-5!: PROTEA POINT-LOAD: 10.82 LBS

ROOF AREA STATEMENT							
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA	
ROOF 1	35	10	10	183	1289 SQ FT	719.12 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	
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					SQ FT	SQ FT	



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FREEDOM FOREVER LLC 2619 CONSULATE DR SUITE 800, ORLANDO FL 32819

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

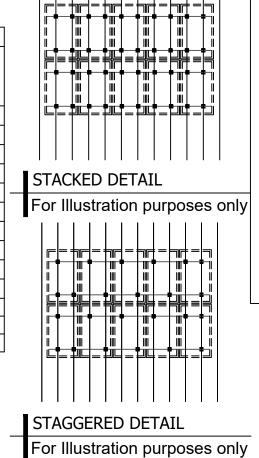
ROO	F DETAILS

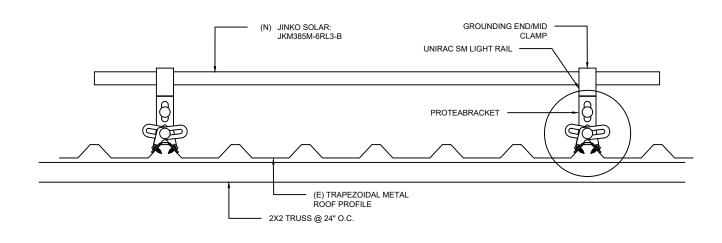
JOB NO: DATE: DESIGNED BY: SHEET: 385420 11/1/2023

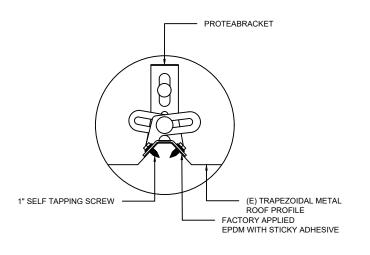
	TABLE 1 - ARRAY INSTALLATION									
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE	MAX UNBRACED LENGTH(FT.)	STRUCTURAL ANALYSIS RESULT	PENETRATION PATTERN	MAX ATTACHMENT SPACING (IN.)	MAX RAIL OVERHANG(I N.)	
ROOF 1	10	Trapezoidal Metal	S-5 Proteabracket	2x2 @ 24" O.C.	4	PASS	STACKED	45	16	



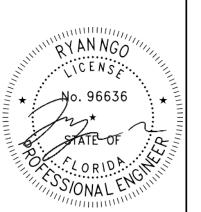
^{2.} WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.







ATTACHMENT DETAIL



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FL 32819

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

MOUNTING DETAILS

DESIGNED BY: 385420 11/1/2023

Scale: NTS

SOLAR PV ARRAY SECTION VIEW

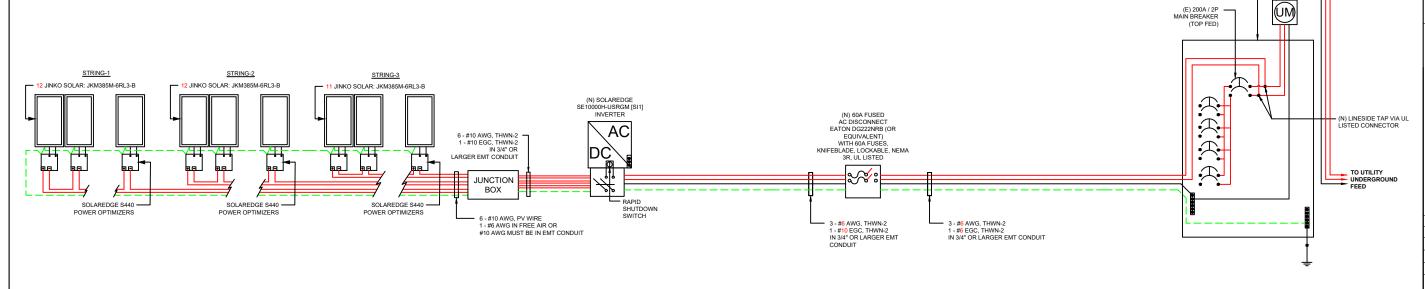
Scale: NTS

^{3.} MAX RAIL OVERHANG APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.

BACKFEED FUSE SIZING					
MAX. CONTINUOUS OUTPUT 42.00A @ 240V					
42.00	X	1.25	=	53AMPS	60A FUSES - OK



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CLIENT: SHAWN BAILEY

(E) UTILITY METER

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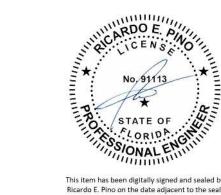
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819 Tel: (800) 385-1075 GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

THREE LINE DIAGRAM

JOB NO: DATE: DESIGNED BY: 385420 11/1/2023 C.V.

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	WIRE SCHEDULE											
RACEWAY #			JIPMENT		CONDUCTOR QTY.	AWG WIRE SIZE	STARTING ALLOWABLE AMPACITY @ 90°C 310.15(B)(16)	STARTING CURRENT APPLIED TO CONDUCTORS IN RACEWAY	TEMPERATURE CORRECTION FACTOR 310.15(B)(2)(a)	ADJUSTMENT FACTOR FOR MORE THAN 3 CONDUCTORS 310.15(B)(3)(a)	ADJUSTED CONDUCTOR AMPACITY @ 90°C	MAXIMUM CURRENT APPLIED TO CONDUCTORS IN RACEWAY
1	DC	MODULE	ТО	OPTIMIZER	2	10	40	14.03	0.96	1	38.40	17.53
2	DC	OPTIMIZER	ТО	JUNCTION BOX	2	10	40	15.00	0.96	1	38.40	18.75
3	DC	JUNCTION BOX	ТО	INVERTER	6	10	40	15.00	0.96	0.8	30.72	18.75
4	AC	INVERTER	ТО	AC DISCONNECT	3	6	75	42.00	0.96	1	72.00	52.50
5	AC	AC DISCONNECT	ТО	POI	3	6	75	42.00	0.96	1	72.00	52.50

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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[SI1]

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FREEDOM FOREVER LLC
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Tel: (800) 385-1075
GREG ALBRIGHT

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CONDUCTOR CALCULATIONS						
B NO:	DATE:	DESIGNED BY:	SH			
5420	11/1/2023	C.V.	P۱			

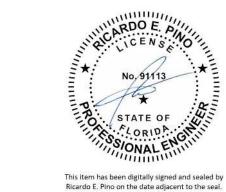
OCPD SIZES: 60A FUSES

SERVICE LIST:

<u> </u>	
E	

MATERIAL LICT.

11711	ERIAL LIST:		
QTY.	PART	PART#	DESCRIPTION
35	MODULES	PV-118-385-2	JINKO SOLAR: JKM385M-6RL3-B
35	OPTIMIZERS	OPT-130-440-2	SOLAREDGE S440 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
3	JUNCTION BOX	RAC-261-527	600VDC NEMA 3R UL LISTED JUNCTION BOX
3	MOUNTING BRACKET	RAC-211-201	UNIRAC E-BOSS J-BOX MOUNTING BRACKET
6	ELECTRICAL ACCESSORIES	EA-350-326	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
6	EQUIPMENT ACCESSORIES	EA-350-327	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTERS	INV-120-108	SE10000H-US [SI1] RGM 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	MONITORING EQUIPMENT	ME-180-502	SOLAREDGE CELL MODEM
1	DISCONNECTS	EE-321-061	60A RATED 240VAC NEMA 3R UL LISTED
2	FUSES	BR-330-060	60A FUSE 1 PH 240VAC
3	ELECTRICAL ACCESSORIES	EA-350-113	IDEAL B-TAP 4/0-10 AWG
152	FITTINGS/ANCHORS	RAC-240-401	S-5!: PROTEA
17	RAILS	RAC-211-100	UNIRAC SM LIGHT RAIL 168 INCH (TOTAL 237 FEET NEEDED)
152	FITTINGS/ANCHORS	RAC-261-517	BND T-BOLT AND NUT SS
37	ENDS/MIDS	RAC-221-101	SM MIDCLAMP PRO DRK
37	ENDS/MIDS	RAC-221-209	SM ENDCLAMP PRO W/ END CLAMP
12	FITTINGS/ANCHORS	RAC-261-600	BND SPLICE BAR PRO SERIES MILL
37	FITTINGS/ANCHORS	RAC-261-510	MICRO MNT BND TBOLT SS
10	RAILS	RAC-211-209-NS	E-BOSS CONDUIT MOUNT COMP KIT
20	RAILS	RAC-211-200	E-BOSS RAIL TRAY
7	RAILS	RAC-211-206	E-BOSS BRIDGE TRAY
11	RAILS	RAC-211-207	E-BOSS BRIDGE CLIPS
34	FITTINGS/ANCHORS	RAC-260-300	BURNDY GROUND WEEB-LUG
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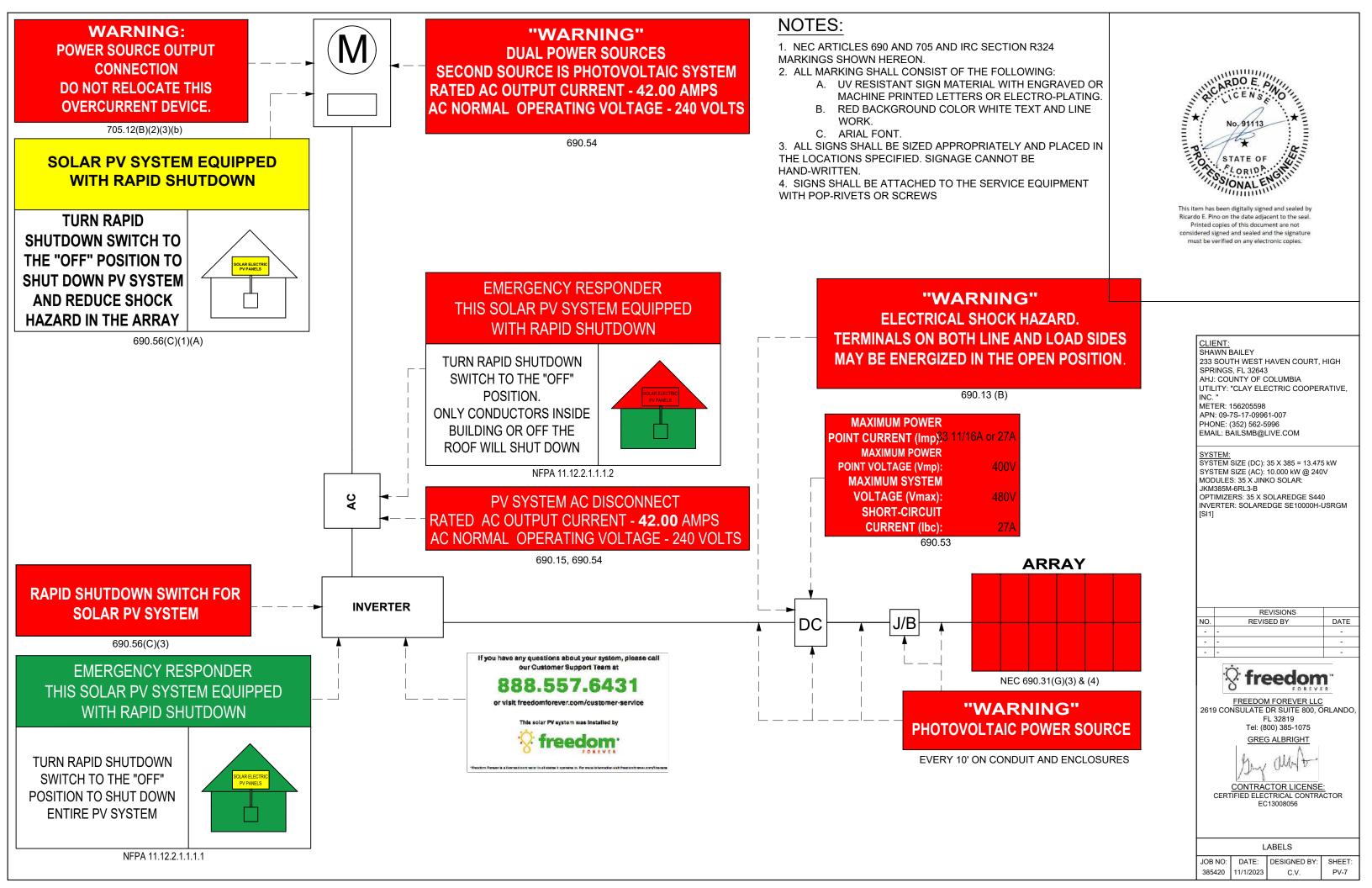


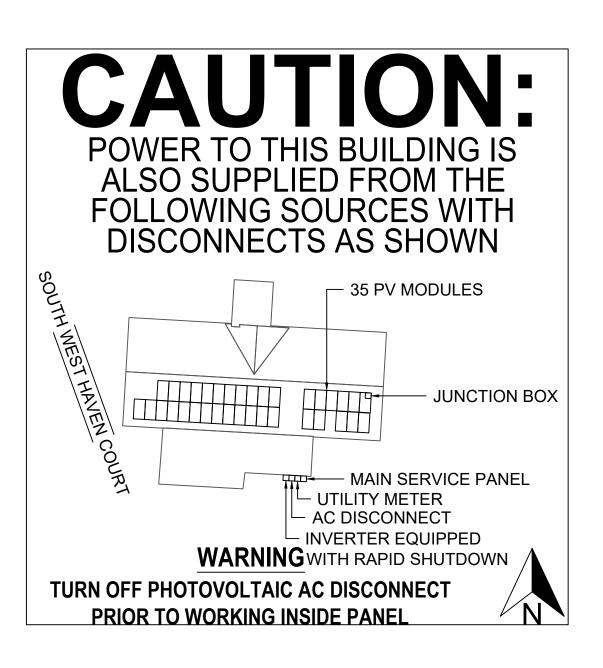
FL 32819 Tel: (800) 385-1075 GREG ALBRIGHT

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

EQUIPMENT & SERVICE LIST

JOB NO: DATE: DESIGNED BY: 385420 11/1/2023





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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REVISIONS REVISED BY

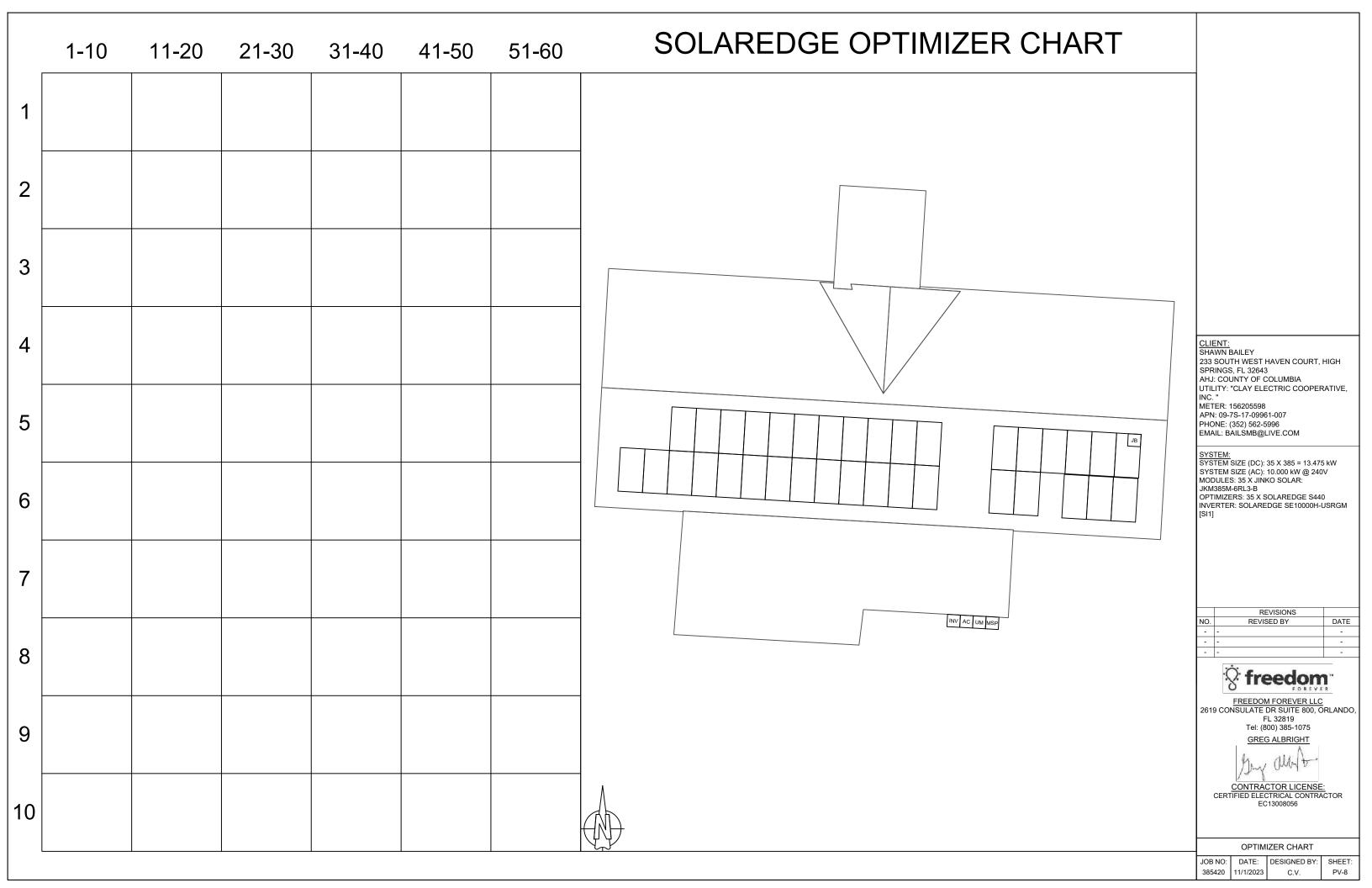


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CERTIFIED ELECTRICAL CONTRACTOR EC13008056

SITE PLACARD

385420 11/1/2023 C.V.



SAFETY PLAN

INSTRUCTIONS:

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

INCIDENT REPORTING:

INJURIES - CALL INJURY HOTLINE

(855) 400-7233

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

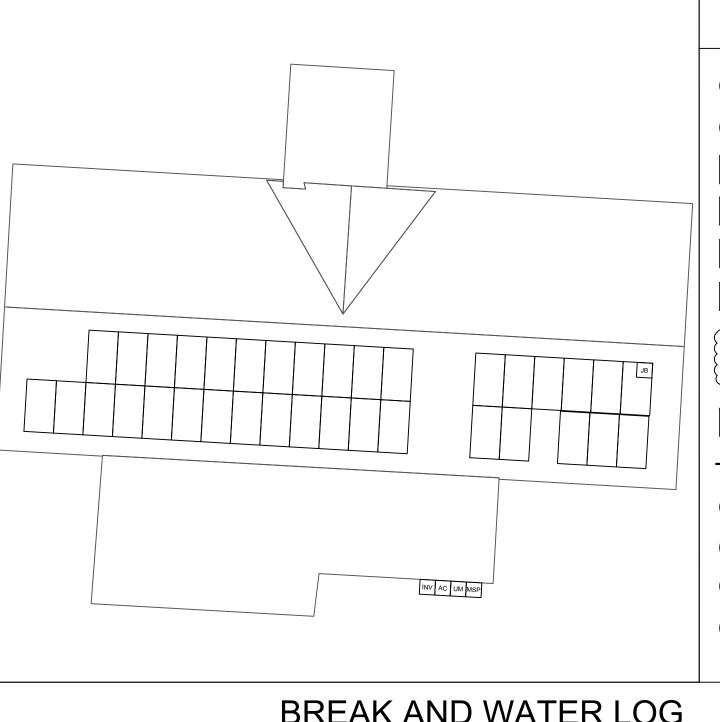
NON-INJURIES - USE MOBILE INCIDENT REPORTING (Auto, Property Damage, Near Miss)



NEAREST OCCUPATIONAL/INDUST	RIAL CLINIC:
NAME:	
ADDRESS:	
NEAREST HOSPITAL:	
NAME:	
ADDRESS:	
SAFETY COACH CONTACT INFORM	MATION:
NAME:	
PHONE NUMBER:	
ALL EMPLOYEES ON SITE SHALL BE MADE SIGN INDICATING THAT THEY ARE AWARE PLAN FOR WORKING SAFELY.	
<u>NAME</u>	SIGNATURE

TIME:

DATE:



MARK UP KEY

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

SHAWN BAILEY

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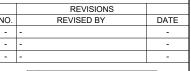
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BREAK AND WATER LOG

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

NAME	0800HRS	0900HRS	1000HRS	1100HRS	1200HRS	1300HRS	1400HRS	1500HRS	1600HRS	
										26
										JO



FL 32819

619 CONSULATE DR SUITE 800, ORLANDO Tel: (800) 385-1075 GREG ALBRIGHT

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

SAFETY PLAN OB NO: DATE: DESIGNED BY:

385420 11/1/2023

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
- 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
- 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
- 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,

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
- Crew leader (name/title):
- Crew member (name/title):

Airborne Contaminants:

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

Weather and Environment

- The site supervisor shall forecast the weather conditions at the job site, prior to crew arrival, in order to mitigate any hazards associated with inclement weather (heat, cold, wind, rain, etc.)
- The site supervisor will utilized a portable wind meter (anemometer) to verify actual onsite wind conditions, by checking at the ground and on any elevated work surface (ex, rooftop) prior to work start, at midday and prior to solar panel staging on a
- Elevated work involving the moving or maneuvering of solar panels shall cease at 25mph (sustained wind) until wind
- 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:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
i	1

CLIENT: SHAWN BAIL FY 233 SOUTH WEST HAVEN COURT. HIGH SPRINGS, FL 32643 AHJ: COUNTY OF COLUMBIA UTILITY: "CLAY ELECTRIC COOPERATIVE, METER: 156205598

APN: 09-7S-17-09961-007 PHONE: (352) 562-5996 EMAIL: BAILSMB@LIVE.COM

<u>SYSTEM:</u> SYSTEM SIZE (DC): 35 X 385 = 13.475 kW SYSTEM SIZE (AC): 10.000 kW @ 240V MODULES: 35 X JINKO SOLAR: JKM385M-6RL3-B OPTIMIZERS: 35 X SOLAREDGE S440 INVERTER: SOLAREDGE SE10000H-USRGM

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



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

CONTRACTOR LICENSE: CERTIFIED ELECTRICAL CONTRACTOR EC13008056

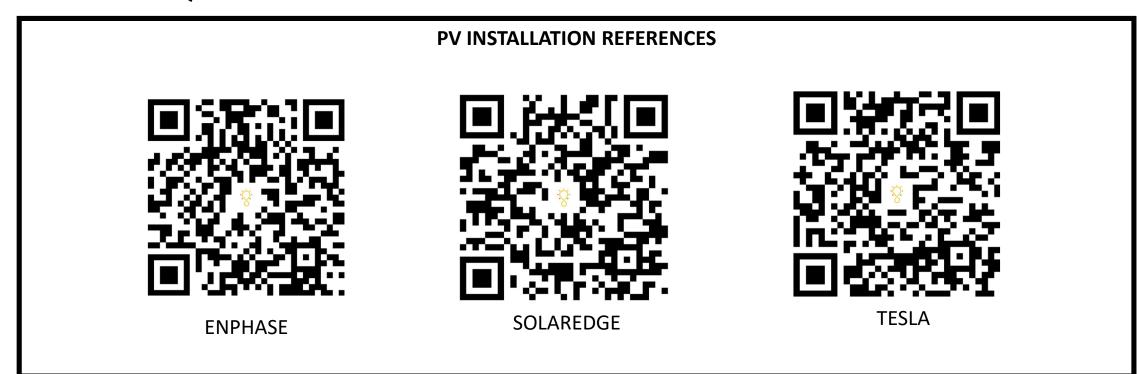
SAFETY PLAN

JOB NO: DATE: DESIGNED BY: 385420 11/1/2023 C.V.

FOR INSTALLATION REFERENCE ONLY

SCAN QR CODE TO ACCESS REFERENCE LINK











SOLAREDGE Storage Systems



BATTERY INSTALLATION REFERENCES

TESLA Storage Systems



NON-BACKUP Battery Systems



Misc. Quick Guide



EAGLE 66TR G4

380-400 WATT TILING RIBBON MODULE

Positive power tolerance of 0~+3%

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Top performance in the strictest 3rd party labs
- Premium solar factories in USA, Vietnam, and Malaysia

KEY FEATURES



TR Technology

Tiling Ribbon eliminates cell gaps to increase module efficiency and power.



9BB Half Cell Technology

Uniquely designed 9 busbar half cut solar cells deliver ultra-high power in a small footprint.



Shade Tolerant

Twin array design allows continued performance even with shading by trees or debris.





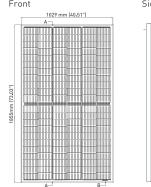
Fire Type 1 rated module engineered with a thick frame, 3.2mm front side glass, and thick backsheet for added durability.

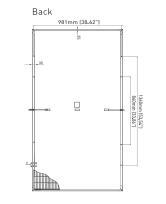


Leading Warranty

25-year product and 25-year linear power warranty; 98% guaranteed first year, max 0.55% annual loss.

ENGINEERING DRAWINGS

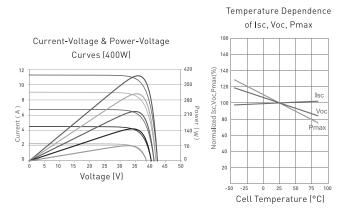




Row Pitch: +/- 2mm



ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



MECHANICAL CHARACTERISTICS

No. of Cells	132 (2x66)
Dimensions	1855x1029x35mm (73.03×40.51×1.37 in)
Weight	21.5 kg (47.40 lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP67 Rated
Output Cables	12 AWG, 2053mm (80.83in) or Customized Length
Connector	Staubli MC4
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.35%/°C
Temperature Coefficients of Voc	-0.28%/°C
Temperature Coefficients of Isc	0.048%/°C
Nominal Operating Cell Temperature (NOCT)	45 ± 2°C

MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1000VDC
Maximum Series Fuse Rating	20A

PACKAGING CONFIGURATION

2 pallets = 1 stack; 30pcs/pallets, 60pcs/stack, 720pcs/ 40'HQ Container

- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- IEC61215, IEC61730 certified products
- UL61730 Certification
- ISO45001:2018 Occupational Health & Safety Standards



ELECTRICAL CHARACTERISTICS

Module Type	JKM380M	-6RL3-B	JKM385N	И-6RL3-В	JKM390N	1-6RL3-B	JKM3951	M-6RL3-B	JKM4001	M-6RL3-B
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	380Wp	283Wp	385Wp	286Wp	390Wp	290Wp	395Wp	294Wp	400Wp	298Wp
Maximum Power Voltage (Vmp)	36.90V	33.70V	37.02V	33.90V	37.15V	34.02V	37.27V	34.13V	37.39V	34.25V
Maximum Power Current (Imp)	10.30A	8.39A	10.40A	8.45A	10.50A	8.53A	10.60A	8.61A	10.70A	8.69A
Open-circuit Voltage (Voc)	44.22V	41.74V	44.34V	41.85V	44.47V	41.97V	44.59V	42.09V	44.71V	42.20V
Short-circuit Current (lsc)	11.12A	8.98A	11.22A	9.06A	11.32A	9.14A	11.42A	9.22A	11.52A	9.30A
Module Efficiency STC (%)	19.9	1%	20.	17%	20.4	43%	20.	69%	20.	.96%

*STC: Irradiance 1000W/m²
NOCT: Irradiance 800W/m²

Cell Temperature 25°CAmbient Temperature 20°C

AM = 1.5 AM = 1.5

⇒ Wind Speed 1m/s

^{*}Power measurement tolerance: +/- 3%









TOUGH

FRAME

Power Optimizer For North America

S440, S500



PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- * Expected availability in 2022

- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)



/ Power Optimizer For North America

S440, S500

	S440	S500	Unit		
INPUT	· · · · ·				
Rated Input DC Power ⁽¹⁾	440	500	W		
Absolute Maximum Input Voltage (Voc)	60		Vdc		
MPPT Operating Range	8 - 60		Vdc		
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc		
Maximum Efficiency	99.5		%		
Weighted Efficiency	98.6		%		
Overvoltage Category	II				
OUTPUT DURING OPERATION					
Maximum Output Current	15		Adc		
Maximum Output Voltage	60		Vdc		
OUTPUT DURING STANDBY (POWER OPTIMIZER DISC	ONNECTED FROM INVERTER OR IN	IVERTER OFF)	<u>'</u>		
Safety Output Voltage per Power Optimizer	1+/-0.1		Vdc		
STANDARD COMPLIANCE					
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020				
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety	IEC62109-1 (class II saf	ety), UL1741			
Material	UL94 V-0, UV Re	sistant			
RoHS	Yes				
Fire Safety	VDE-AR-E 2100-712	2:2013-05			
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage	1000		Vdc		
Dimensions (W x L x H)	129 x 153 x 30 / 5.07 x	6.02 x 1.18	mm / i		
Weight (including cables)	655 / 1.5		gr/lb		
Input Connector	MC4 ⁽²⁾				
Input Wire Length	0.1 / 0.32		m / fi		
Output Connector	MC4				
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.	54, (-) 0.32	m/ft		
Operating Temperature Range ⁽³⁾	-40 to +85		°C		
Protection Rating	IP68 / Type6	В			
Relative Humidity	0 - 100		%		

⁽¹⁾ Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed

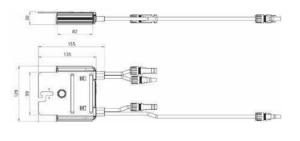
⁽³⁾ For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Usir Inverter	ng a SolarEdge	Single Phase HD-Wave	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	S440, S500	8	14	18	
Maximum String Length (Power	Optimizers)	25		50(4)	
Maximum Nominal Power per S	itring	5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connected P (Permitted only when the difference in		Refer to Footnote 5	One String 7200W	15.000W	
strings is 1,000W or less)	ir connected power between	Refer to Footificte 3	Two strings or more 7800W	13,0000	
Parallel Strings of Different Leng	ths or Orientations		Υ		

⁽⁴⁾ A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(5) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf (6) It is not allowed to mix S-series and P-series Power Optimizers in new installations







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solaredge.com

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-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)



solaredge.com

/ 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			SE.	XXXXH-XXXXX	BXX4			
OUTPUT	•							
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage MinNomMax. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	√	-	✓	-	-	✓	Vac
AC Frequency (Nominal)				59.3 - 60 - 60.5 ⁽¹⁾				Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	А
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	А
Power Factor			1	, Adjustable - 0.85 to	0.85			
GFDI Threshold				1				А
Utility Monitoring, Islanding Protection, Country Configurable Thresholds				Yes				
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded				Yes				
Maximum Input Voltage				480				Vdc
Nominal DC Input Voltage		3	880			400		Vdc
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current				45				Adc
Reverse-Polarity Protection				Yes				
Ground-Fault Isolation Detection				600kΩ Sensitivity				
Maximum Inverter Efficiency	99			9	9.2			%
CEC Weighted Efficiency				99			99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption				< 2.5				W

⁽¹⁾ For other regional settings please contact SolarEdge support

⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated

/ Single Phase Inverter with HD-Wave Technology for North America

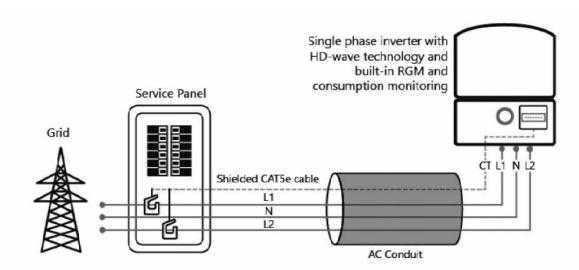
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US SE3800H-U	JS SE5000H-US S	E6000H-US SE7600H	H-US SE10000H-US SE11400H-US	
ADDITIONAL FEATURES		<u>'</u>	'	<u> </u>	•
Supported Communication Interfaces		RS485, Ethernet, Zig	Bee (optional), Cellular (optio	nal)	
Revenue Grade Metering, ANSI C12.20			O-ti1(2)		
Consumption metering			Optional ⁽³⁾		
Inverter Commissioning	With the S	etApp mobile application us	ing Built-in Wi-Fi Access Point	for Local Connection	
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12		Automatic Rapid Shu	utdown upon AC Grid Disconr	nect	
STANDARD COMPLIANCE					
Safety	UL174	41, UL1741 SA, UL1699B, CSA	C22.2, Canadian AFCI accord	ling to T.I.L. M-07	
Grid Connection Standards		IEEE1547	, Rule 21, Rule 14 (HI)		
Emissions		FCC	Part 15 Class B		
INSTALLATION SPECIFICAT	IONS				
AC Output Conduit Size / AWG Range		1" Maximum / 14-6 AWG		1" Maximum /14-4 AWG	
DC Input Conduit Size / # of Strings / AWG Range	1" N	Maximum / 1-2 strings / 14-6	AWG	1" Maximum / 1-3 strings / 14-6 AWG	
Dimensions with Safety Switch (HxWxD)	17	.7 x 14.6 x 6.8 / 450 x 370 x	174	21.3 x 14.6 x 7.3 / 540 x 370 x 185	in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6	lb/kg
Noise		< 25		<50	dBA
Cooling		Nat	ural Convection		
Operating Temperature Range		-40 to	+140 / -40 to +60 ⁽⁴⁾		°F/°C
Protection Rating		NEMA 4X (In	verter with Safety Switch)		

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

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

Product specifications

Eaton DG222NRB

Catalog Number: DG222NRB

Eaton General duty cartridge fuse safety switch, 60 A, NEMA 3R, Painted galvanized steel, Class H fuses, Fusible with neutral, Two-pole, Three-wire, Category: general duty safety switch, 240 V

General specifications

Product Name Catalog Number Eaton general duty cartridge fuse safety DG222NRB

switch

UPC

782113144221

Product Length/Depth Product Height 7.35 in 14.37 in

Product Width Product Weight

8.4 in 10 lb

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

from the date of installation of the

Catalog Notes

Product or eighteen (18) months from the

date of shipment of the Product,

Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp

whichever occurs first. rating shown is a grounded B phase

rating, UL listed.

Powering Business Worldwide

Physical Attributes

Amperage Rating

NEMA 3R

Enclosure

Enclosure material Fuse class provision Painted galvanized steel Class H fuses

Fuse configuration Voltage rating Fusible with neutral 240V

Number Of Poles

Two-pole

Number of wires

Type

General duty, cartridge fused

Miscellaneous

Product Category

General duty safety switch

Performance Ratings

60A

Resources

Catalogs

Eaton's Volume 2—Commercial Distribution

Multimedia

Double Up on Safety

Switching Devices Flex Center

Specifications and datasheets Eaton Specification Sheet - DG222NRB



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

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Pressure Cable Connectors File No. E-5238 Suitable for use on the line side of the service equipment.

INSULATION-PIERCING TAP CONNECTORS CONECTORES DE DERIVACIÓN QUE PERFORAN EL AISLAMIENTO

Installation Instructions:



▲ Warning

Improperly installed electrical wiring can be dangerous and cause electrical fires. The connector chosen must be sized to the wires being used. Consult local building code before doing any electrical work. For assistance, refer to an instructional book or consult a qualified electrician.



♠ Warning

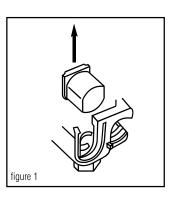
Contact with electricity can cause serious injury or death. Use on insulated cable only. [RHH, RHW(-2), THHN, THHW, THWN, USE, XHHW(-2). Consult factory for other insulation types]. If the installation is to be made on an energized run, the tap conductor must be under no load and must not be grounded. Use electrically insulated gloves. De-energize the run cable if there are any questions of these conditions being met.

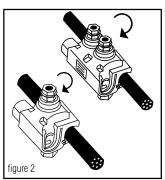
- 1. Determine the direction for the tap conductor to exit and discard one end cap. **See figure 1.**
- Position the main (or feeder) side of the connector around the run cable and tighten the bolt finger tight. See figure 2. If required, loosen the bolt slightly to allow the connector to open completely. DISASSEMBLY NOT RECOMMENDED. The plastic "Turbo" spacer holds the connector open which eases installation and ensures proper connections
- Cut the end of the tap cable squarely. DO NOT STRIP CABLE INSULATION.
- 4. Insert the tap cable into the tap side of the connector until it is seated in the remaining end cap. **See figure 3.**
- 5. Continue tightening the torque regulating bolt with a standard box or socket wrench until the torque regulating piece breaks away. If the connector has two (2) assembly bolts, alternately tighten until the hexagonal torque devices break away. See figures 4a & 4b. Note that the plastic "turbo" spacer on the side will also break. To make the installation even easier and to relieve torque from the cables, a second wrench can be used on the hexagonal piece on the bottom of the connector.

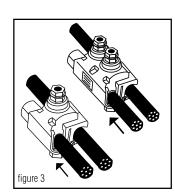
DO NOT use gripping type pliers, pipe, open ended or adjustable wrenches as these may damage the hexagonal torque regulating device. A torque wrench is not required.

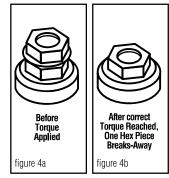
MAKE SURE ONLY THE TOP HEXAGONAL TORQUE DEVICE OF THE BOLT HEAD IS USED FOR ASSEMBLY. THE SECOND HEX PIECE [CLOSER TO THE BODY OF THE CONNECTOR] IS USED FOR DISASSEMBLY.

Note: The torque regulating bolt ensures the correct torque is applied to the conductors without using a torque wrench. Important information such as run and tap ranges, voltage ratings and material/temperature ratings is marked on the connector.









Instalación Instrucciones:

A Advertencia



Los cables eléctricos mal instalados pueden ser peligrosos y provocar incendios. El conector escogido debe ser de un tamaño adecuado para los cables que se utilicen. Consulte los códigos de construcción locales antes de efectuar trabajos eléctricos. Si necesita ayuda, consulte un libro de instrucciones o consulte con un electricista capacitado.

♠ Advertencia



Use sólo en cable aislado. [RHH, RHW(-2), THHN, THHW, THW, THWN, USE, XHHW(-2). Consulte con la fábrica para obtener información sobre otros tipos de aislamiento]. Si se va a hacer la instalación sobre un cable con corriente el conductor derivado debe estar libre de carga y no debe estar aterado. Use guantes con aislamiento eléctrico. Quite le la corriente al cable del cual se hace la derivación si no se pueden cumplir estas condiciones. El contacto con electricidad puede producir lesiones graves o mortales.

- Determine la dirección en la que el conductor derivado saldrá y deseche la tapa terminal sobrante. Vea la ilustración 1.
- 2. Coloque el lado principal (o de alimentación) del conector alrededor del cual se hace la derivación y apriete firmemente el dedo del perno. Vea la ilustración 2. Si hace falta, afloje el perno ligeramente para permitir que el conector se abra completamente. NO ES RECOMENDABLE DESARMAR EL CONECTOR. El espaciador "Turbo" de plástico mantiene al conector abierto, lo cual facilita la instalación y asegura que las conexiones se hagan correctamente.
- 3. Corte el extremo del cable de derivación perpendicularmente a su eje. **NO PELE EL AISLAMIENTO DEL CABLE.**
- Inserte el cable de derivación en el lado de derivación del conector hasta que tope contra la tapa terminal que queda. Vea la ilustración 3.
- 5. Continué apretando este perno que regula la torsión con una llave estándar o de cubo hasta que la pieza que regula la torsión se parta y se separe. Si el conector tiene dos (2) pernos de ensamblaje, apriételos alternativamente hasta que el dispositivo de regulación de torció se parta. Vea la ilustración 4a y 4b. Observe que el espaciador "turbo" de plástico en el costado también se fracturará. Para hacer esta instalación aún más fácil y para aliviar la torsión de los cables, se puede usar una segunda llave sobre la pieza hexagonal al fondo del conector.

NO USE alicates de presión, llaves de turbo, llaves comunes o ajustables ya que éstas pueden dañar el dispositivo hexagonal que regula la torsión. No se requiere una llave de torsión.

ASEGÚRESE QUE SE USE, PARA EL ENSAMBLADO, SÓLO EL DISPOSITIVO SUPERIOR DE REGULACIÓN DE TORSIÓN DE LA CABEZA DEL PERNO. LA SEGUNDA PIEZA HEXAGONAL (LA MÁS CERCANA AL CUERPO DEL CONECTOR) SE USA SÓLO PARA DESARMAR EL CONECTOR.

Nota: El perno regulador de torsión garantiza la aplicación de la torsión correcta a los conductores sin usar una llave de torsión. La información importante de longitud de cable pelado y de toma, las clasificaciones de materiales y temperatura está marcada en el conector

B-TAP® INSULATION PIERCING TAP CONNECTORS TORQUE AND CURRENT RATINGS

(Solid and/or Stranded)

CATALOG#	MAIN	TAP	NOMINAL Torque	TAP CURRENT RATIING (IN AMPS)*
BTC2/0-14	2/0-4	10-14 ⁺	80 IN. LBS.	40
BTC1/0-10	1/0-8	2-10++	80 IN. LBS.	130
BTC4/0-10	4/0-3	2-10+++	125 IN. LBS.	130
BTC4/0-6	4/0-2	1/0-6	160 IN. LBS.	170
BTC4/0-2	4/0-2	4/0-2	160 IN. LBS.	260
BTC250-6	250-4	4/0-6	160 IN. LBS.	260
BTC250-4	250-1	3/0-4	160 IN. LBS.	225
BTC250-2	250-1/0	4/0-2	160 IN. LBS.	260
BTC350-1/0	350-1/0	350-1/0	330 IN. LBS.	350
BTC500-4	500-2/0	4/0-4	330 IN. LBS.	260
BTC500-1/0	500-4/0	350-1/0	330 IN. LBS.	350
BTC500-14	750-3/0	10-14 ****	80 IN. LBS.	40
BTC750-250	750-250	500-250	330 IN. LBS.	430

+10-14 Cu SOLID/STRANDED; 10-12 AI SOLID/STRANDED

++2-10 Cu SOLID/STRANDED; 2-10 AI STRANDED

+++2-10 Cu SOLID/STRANDED; 2-8 AI STRANDED ++++10-14 Cu SOLID/STRANDED: 10-12 AI STRANDED

Full line is 600V dual-rated, 194°F(90°C)

<u>⟨!</u>\

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One year limited warranty. See idealind.com for more information.

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> ND 9053-2 1839420

^{*} Based on NEC Table 310-16 1996 (Not more than 3 insulated conductors in a raceway at ambient temperature of 30° C) for the largest tap wire size.



IDEAL INDUSTRIES, INC.

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2/9/23

ALL IDEAL Customers

Subject: The Buchanan B-TAP® splice/tap connectors meet the 2020 NEC

article 230.46 requirement for "line side applications"

The Buchanan B-TAP® brand of insulation piercing connectors which correspond to part numbers beginning with "BTC" meet the requirements of article 230.46 of the 2020 NEC. These products have already been tested to the newer requirements. The installation instructions are in the process of being updated to show the required notation: "suitable for use on the line side of the service equipment". This change will take a few weeks to get into our production.

In addition, the marking "SR" will be added to the product. That addition is in process and will take a few months to complete.

This notice will provide confirmation to the inspectors that B-TAP® products meet the requirements of the 2020 and 2023 NEC article 230.46 "Spliced and Tapped Conductors".

Sushil Keswani

Director of Engineering IDEAL Industries, Inc.,

Sull Hon

UL Product iQ®



ZMVV.E5238 - Wire Connectors and Soldering Lugs

Note: We are enhancing our systems and you may notice duplicate entries/missing/outdated data. During this interim period, please contact our Customer Service at https://www.ul.com/about/locations.

Wire Connectors and Soldering Lugs

IDEAL INDUSTRIES INC E5238

1375 Park Ave

SYCAMORE, IL 60178 United States

View model for additional information

Insulated butt splice crimp type connectors, Model(s): BVS1, BVS2, BVS5

Insulated flange spade type crimp cconnectors, Model(s): SV5-3.7, SVL5-4, SVL5-6

Insulated flange spade type crimp connectors, Model(s): <u>FSNYD1-3.7</u>, <u>FSNYD1-4</u>, <u>FSNYD1-5</u>, <u>FSNYD2-3.7</u>, <u>FSNYD2-3.7</u>, <u>FSNYD5-4</u>, <u>FSNYD5-5</u>

Insulated hook type crimp connectors, Model(s): <u>HNYD1-3.7</u>, <u>HNYD1-4</u>, <u>HNYD1-5</u>, <u>HNYD2-3.7</u>, <u>HNYD2-4</u>, <u>HNYD2-5</u>, <u>HNYD5-3.7</u>, HNYD5-4, HNYD5-5, HVY1-3.7, HVY1-4, HVY1-5, HVY2-4, HVY2-5, HVY5-3.7, HVY5-4, HVY5-5

Insulated locking spade crimp connectors, Model(s): <u>LSNYD1-3.7</u>, <u>LSNYD2-3.7</u>, <u>LSNYD5-3.7</u>, <u>LSNYD5-4</u>, <u>LSNYD5-5</u>, <u>LSNYDL1-4</u>, <u>LSNYDL2-5</u>

Insulated multiple stud ring type crimp connectors, Model(s): MSRNYD1-3753, MSRNYD2-3753, MSRNYD5-3753

Insulated parallel connectors, Model(s): PVT1, PVT14, PVT2, PVT22, PVT5, PVT8

Insulated pin type connectors, Model(s): PTNYD1-12, PTNYD2-12, PTNYD5-13

Insulated ring type crimp connectors, Model(s): RNYB14-11, RNYB22-11, RNYD1-10, RNYD1-3.2, RNYD1-5, RNYD1-6, RNYD1-8, RNYD2-10, RNYD2-10, RNYD2-2, RNYD2-3.2, RNYD2-6, RNYD2-8, RNYD5-10, RNYD5-12, RNYD5-3.2, RNYD5-3.7, RNYD5-5, RNYD5-6, RNYD5-8, RNYDL1-3.7, RNYDL1-4, RNYDL2-3.7, RNYDL2-4, RNYDL5-3.7, RNYDL5-4, RNYDM2-3.7, RNYDS1-3.7, RNYDS1-4, RNYDS2-4, RNYDS2-5, RNYDS5-4, RV1-3.2, RV1-5, RV1-6, RV2-3.2, RV5-10, RV5-3.7, RV5-5, RV5-6, RV5-8, RVL1-4, RVL2-4, RVL5-4, RVM1-3.7, RVM2-3.7, RVY1-3.2

Insulated spade type crimp connectors, Model(s): SNYD1-3.2, SNYD5-3.7, SNYD5-5, SNYDL1-3.7, SNYDL1-4, SNYDL2-3.7, SNYDL2-4, SNYDL2-5, SNYDL5-4, SNYDL1-3.7, SNYDL1-3.7, SNYDL1-3.7, SNYDL2-3.7, SNYDL2-3.7, SNYDL2-4, SNYDS1-5, SN

Insulated splice connectors, Model(s): PB1-, PB2-, PB5-

Insulating caps or covers, for use on manufacturer's splice caps, for 2006-S, 2008-S connectors, Model(s): 2007

Insulating caps or covers, for use on manufacturer's splice caps, for 2011-S connector, Model(s): 2014

Listed pressure cable connectors, Model(s): <u>BHT1</u>, <u>BHT2</u>, <u>BHT5</u>, <u>BN1</u>, <u>BN2</u>, <u>BN5</u>, <u>BNT1-16</u>, <u>BNT14</u>, <u>BNT2-16</u>, <u>BNT2-16</u>, <u>BNT22</u>, <u>BNT5-20</u>, <u>BNT8</u>, <u>BNYDF1</u>, BNYDF2, BNYDF5, BNYT1, BNYT2, BNYT5, BV1, BV2, BV5, BVT14, BVT22, BVT8

Listed pressure ring terminal connectors, Model(s): RNYB14-8, RNYB8-11, RNYBL22-5, RNYBL22-6

Listed splicing wire connectors, Model(s): <u>L12</u>, <u>L13</u>, <u>L15</u>

Non-insulated flange spade crimp connectors, Model(s): <u>FSN1-3.7, FSN1-4, FSN1-5, FSN2-3.7, FSN2-4, FSN2-5, FSNB1-3.7, FSNB1-4, FSNB1-5, FSNB1-3.7, FSNB1-4, FSNB1-5, FSNB2-3.7, FSNB2-4, FSNB2-5, FSNB5-3.7, FSNB5-4, FSNB5-5, FSNL1-3.7, FSNL2-5</u>

Non-insulated hook crimp connectors, Model(s): HN1-4, HN1-5, HN2-3.7, HN2-4, HN2-5, HN5-3.7, HN5-4, HN5-5

Non-insulated locking type crimp connectors, Model(s): <u>LSN1-3.7</u>, <u>LSN2-3.7</u>, <u>LSN5-3.7</u>, <u>LSN5-4</u>, <u>LSN5-5</u>, <u>LSN5-6</u>, <u>LSN1-4</u>, <u>LSNL1-4</u>, <u>LSNL1-5</u>, LSNL2-5

Non-insulated multiple stud ring type crimp connectors, Model(s): MSRNB1-3753

Non-insulated parallel crimp connectors, Model(s): PNT 1, PNT 14, PNT 2, PNT 22, PNT 5, PNT 8, PNT 1, PNT2, PNT5

Non-insulated pin type crimp connectors, Model(s): PTN1-12, PTN2-12, PTN5-13

Non-insulated ring type crimp connector, Model(s): <u>RNB1-10</u>, <u>RNB1-3.2</u>, <u>RNB14-11</u>, <u>RNB14-12</u>, <u>RNB14-16</u>, <u>RNB1-6</u>, <u>RNB1-8</u>, <u>RNB1-8</u>, <u>RNB2-10</u>, <u>RNB2-2</u>, <u>RNB2-6</u>, <u>RNB5-12</u>, <u>RNB8-12</u>, <u>RNBL1-4</u>

Non-insulated ring type crimp connectors, Model(s): RNB1-3.2, RNB14-10, RNB14-5, RNB14-8, RNB1-5, RNB2-10, RNB22-10, RNB22-12, RNB22-8, RNB2-3.2, RNB5-10, RNB5-3.2, RNB5-3.7, RNB5-3.7, RNB5-5, RNB5-6, RNB5-8, RNB8-10, RNB8-11, RNB8-16, RNB8-8, RNBL1-3.7, RNBL2-5, RNBL2-6, RNBL2-3.7, RNBL2-5, RNBL38-10, RNBL5-3.7, RNBL5-3.7, RNBM1-3.7, RNBM2-3.7, RNBM2-3.7, RNBM2-3.7, RNBM2-3.7, RNBM8-5, RNBS1-4, RNBS1-4, RNBS1-4, RNBS2-4, RNBS2-4, RNBS2-5, RNBS5-4, RNBS8-6

Non-insulated spade type crimp connectors, Model(s): <u>SN1-3.2</u>, <u>SN2-3.2</u>, <u>SN5-3.7</u>, <u>SN5-5</u>, <u>SNB1-3.2</u>, <u>SNB1-3.2</u>, <u>SNB5-3.7</u>, <u>SNB5-5</u>, <u>SNBL1-3.7</u>, <u>SNBL1-4</u>, <u>SNBL2-4</u>, <u>SNBL2-5</u>, <u>SNBL5-4</u>, <u>SNBL5-6</u>, <u>SNBLL1-3.7</u>, <u>SNBLL1-3.7</u>, <u>SNBM1-4</u>, <u>SNBS1-5</u>, <u>SNBS5-4</u>, <u>SNL1-3.7</u>, <u>SNL1-4</u>, <u>SNL2-3.7</u>, <u>SNL2-4</u>, <u>SNL2-3.7</u>, <u>SNL1-3.7</u>, <u>SNL1-4</u>, <u>SNM2-4</u>, <u>SNS1-5</u>, <u>SNS5-4</u>

Pressure cable connectors, Model(s): <u>KB - 1000</u>, <u>KB - 2/0</u>, <u>KB - 350</u>, <u>KB - 4/0</u>, <u>KB - 500</u>, <u>KB - 800</u>, <u>KS - 1000</u>, <u>KS - 2/0</u>, <u>KS - 350</u>, <u>KS - 4/0</u>, <u>KS - 500</u>, <u>KS - 800</u>

Pressure terminal connectors, Model(s): FSVY1-3.7, FSVY1-4, FSVY1-5, FSVY2-3.7, FSVY2-4, FSVY2-5, FSVY5-3.7, FSVY5-4, FSVY5-5, K-5655, K-5656, LSV1-3.7, LSV2-3.7, LSV5-4, LSV5-5, LSV5-6, LSVL2-4, LSVS1-4, LSVS1-5, LSVS2-5, LSVY1-3.7, LSVY2-3.7, LSVY5-3.7, LSVY5-4, LSVY5-5, LSVY5-6, LSVYL1-4, LSVYL1-5, LSVYL2-4, LSVYL2-5, MSRNB2-3753, MSRVY1-3753, MSRVY2-3753, MSRVY2-3753, MSRVY2-3753, MSRVY2-12, PTVY2-12, PTVY5-13, RVY1-10, RVY1-5, RVY1-6, RVY1-8, RVY2-10, RVY2-2, RVY2-3.2, RVY2-6, RVY2-8, RVY5-10, RVY5-12, RVY5-3.2, RVY5-3.7, RVY5-5, RVY5-6, RVY5-8, RVYL1-3.7, RVYL1-4, RVYL2-3.7, RVYL2-4, RVYL2-5, RVYL5-3.7, RVYL5-4, RVYM2-3.7, RVYS1-4, RVYS2-3.7, RVYS2-4, RVYS2-4, RVYS2-5, RVYS5-4, SNBM2-4, SNYD2-3.2, TLK16-6, TLK25-10

Pressure Terminal Connectors, Model(s): RNYB14-10, RNYB14-12, RNYB14-5, RNYB22-12, RNYB22-8, RNYB8-10, RNYB8-12, RNYB8-8, RNYBM8-5, RNYBS14-6

Slicing wire connectors, Model(s): <u>OK-2 (Pkg. cat No. 84)</u>, <u>OK-3 (Pkg. cat No. 85)</u>, <u>OK-4 (Pkg. cat No. 86)</u>, <u>OK-5 (Pkg. cat No. 87)</u>, <u>OK-6W (Pkg. cat No. 88)</u>, <u>OK-8 (Pkg. cat No. 90)</u>, <u>OK-8W (NA)</u>

Splicing wire connectors, Model(s): 12, 13, 14, 14-6, 15, 199, 1995, 200, 2002, 2006-S, 2008-S, 2011-S, 22-10, 22-12, 29, 299, 2995, 30, 300, 32, 33, 34, 340, 36, 37, 38, 39, 399, 400, 400AL, 42, 50, 615069, 66, 70, 800, AS-1/0, AS-2, AS-2/0, AS-350, AS-4, AS-4/0, AS-500, AS-6, B1, B2, B4, BT-2, BTC 1/0-10, BTC 1/0-14, BTC 2/0-14, BTC 250-4, BTC 350-1/0, BTC 4/0-10, BTC 4/0-2, BTC 4/0-6, BTC 500-1/0, BTC

Splicing Wire Connectors, Model(s): <u>BNT1</u>, <u>BNT2</u>

Splicing Wire Connectors:, Model(s): 46-404, 46-405

Splicinig wire connectors, Model(s): <u>H-1566</u>, <u>H-1567</u>, <u>H-1570</u>, <u>H-1571</u>, <u>H-1572</u>, <u>H-1591</u>, <u>H-1592</u>, <u>H-1594</u>

Terminal connectors, Model(s): 10, 11, 22, 250, 300, 341, 342, 410 with insulating cap No. 415, 411 with insulating cap No. 417, 412 with insulating cap No. 417, 451, 452, 454, 48, 49, 49 Black, 53-B, 59B, 600, 71B#, 72B#, 73B#, 73B+, 74B, 76B, 76B+, 78B+, 82, K-5504, LSNL2-4, M-3, PV3-750, PV3-750, PV3-750, PV4-750, PV4-750, RNBL2-4, RNBS14-6, RNBS38-6, RNBS38-8, RNYB22-10, RNYBS8-6, RV2-6, RVL2-5, SV5-5, WT1, WT2, WT3, WT4, WT41, WT51, WT52, WT53, WT54, WT6

Terminal Connectors, Model(s): RNB22-11

Wire Connectors, Model(s): 65, 653

Wire Connectors and Soldering Lugs, Model(s): <u>L22</u>, <u>L23</u>, <u>L25</u>, <u>PS10</u>, <u>PS12</u>, <u>PS2</u>, <u>PS3</u>, <u>PS4</u>, <u>PS4S</u>, <u>PS5</u>, <u>PS6</u>, <u>PS8</u>

- # The equipment (71B, 72B and 73B) were also evaluated to the requirements of UL 2043 and are suitable for use in air handling spaces.
- * May be followed by suffix B, J, T or X.

NOTE - All models may be provided with or without prefix "V" or suffix "MP" or "V" and prefix "BP". All models may be followed by suffixes BT, UB or UF with or without a two or four digit number, with or without suffixes B, LP, NP, PF, PH, SP and/or T. Die Series terminals may be followed by Suffixes UI, UT, UF, US, or UB, with or without a two to four digit number, with or without Suffix T or B, followed by Suffixes SP, LP, NP, PF, or and/or NM, by PH or BE, with or without Suffixes NT, BS, and /or G.

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Feedback

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roof

to trapezoidal

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



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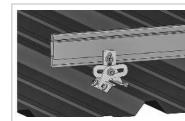
ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on

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

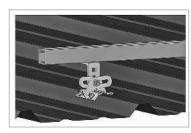
For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

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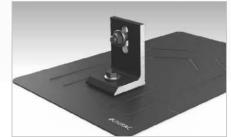
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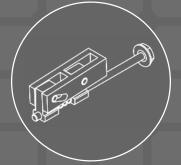
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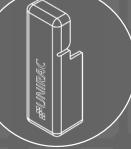
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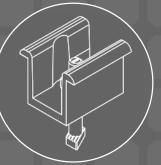
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DESIGN TOOLS



TECHNICAL SUPPORT CERTIFIED OUALITY PROVIDER

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

Unirac is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS

BANKABLE WARRANTY

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

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



Certificate of Compliance

Certificate: 70131735 Master Contract: 266909

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

Issued To: Unirac

1411 Broadway NE

Albuquerque, New Mexico, 87102

United States

Attention: Klaus Nicolaedis

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

Michael Hoffnagle

Michael Hoffnagle



PRODUCTS

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

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

Certified to US Standards

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

Solarmount

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Certificate: 70131735 **Project:** 80082031

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

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

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

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

UL 2703 Mechanical Load ratings:

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

Test Loads:

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

Unirac Large Array

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

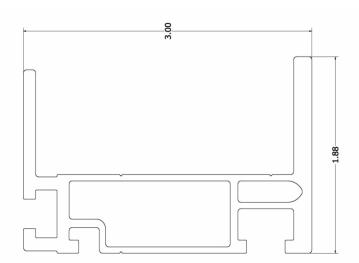
The mechanical load ratings from the SM test data will be applied to the ULA model.

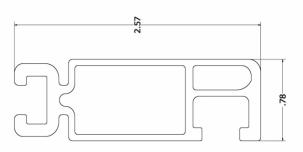
Fire Testing is not applicable due to being a ground mount system.

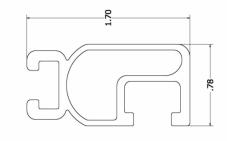
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SM SOLAR MOUNT







Properties	SOLARMOUNT Light	SOLARMOUNT Rail Profile 2	SOLARMOUNT HD	Units
BEAM HEIGHT	1.70	2.57	3.00	.⊑
APPROX WEIGHT	0.491	0.728	1.271	plf
CROSS SECTION AREA	0.409	0.625	1.059	in²
SECTION MODULUS (X-AXIS)	0.15	0.363	0.898	in³
SECTION MODULUS (Y-AXIS)	0.067	0.113	0.221	in³
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	697:0	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

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)

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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

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Licensed Test mark:



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

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



Engineering Alliance, Inc

https://www.eng-alliance.com

12-May-2023

Unirac

1411 Broadway Blvd. NE Albuquerque, NM 87101

Tel: 505 242 6411

Attn.: Engineering Department

Subject: Engineering Certification for the Unirac SOLARMOUNT Flush Rail System to Support Photovoltaic Panels.

The Unirac SOLARMOUNT Flush-to-Roof is an extruded aluminum rail system that is engineered to hold most framed solar modules to a roof structure and installed parallel to the roof.

We have reviewed the SOLARMOUNT system, a proprietary mounting system constructed from modular parts which are intended for rooftop installation of solar photovoltaic (PV) panels; and have reviewed the U-Builder 2.0 Online tool. This U-Builder 2.0 software includes analysis for the SOLARMOUNT rails (SM LIGHT rail, SM STANDARD rail, and SM HEAVY DUTY rail) with Standard, Universal AF, and Pro Series hardware. All information, data, and analysis are in compliance with the following codes, city ordinances, and typical specifications:

Codes:

- 1. 2014-2020 Florida Building Code.
- 2. ASCE/SEI 7-10, 7-16 Minimum Design Loads for Buildings and Other Structures.
- 3. International Building Code, 2012- 2018 Edition w/ Provisions from SEAOC PV-2 2017.
- 4. International Residential Code, 2012- 2018 Edition 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. Aluminum Design Manual, 2015 & 2020 Edition.

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: Shingle Roof:

L-Foot, Flashkit Pro, Flashloc Comp, Flashloc Duo, Flashkit Pro SB

Metal Roof:

Standing Seam attachments, PM-9000S, PM Adjust Slotted

Tile Roofs:

Solar Hooks, Tile Replacement

Attachment Spacing: Per U-Builder 2.0 Engineering report.

Cantilever: The maximum cantilever length is L/3, where "L" is the span noted in the U-Builder 2.0 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

4603 April Meadow Way, Sugar Land, TX 77479. Ph: 832 865 4757



Engineering Alliance, Inc

https://www.eng-alliance.com

Installation Orientation:

See SOLARMOUNT Rail Flush Installation Guide.

Landscape - PV Panel long dimension is parallel to ridge/eave line of the roof and the PV panel is

mounted on the long side.

Portrait - PV Panel short dimension is parallel to ridge/eave line of the roof and the PV panel is

mounted on the short side.

Components and Cladding Roof Zones:

The Components and Cladding Roof Zones shall be determined based on ASCE 7-10 & 7-16 Component and Cladding design.

Notes:

- 1. U-Builder 2.0 Online tool analysis is only for Unirac SM SOLARMOUNT Rail Flush systems and do not include roof capacity check.
- 2. Risk Category II per ASCE 7-16.
- 3. Topographic factor, kzt 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 2.0 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 2.0 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 2.0 Software is applicable to the project, and
- Understand and determine the appropriate values for all input parameters of the U-Builder 2.0 software.

This letter certifies that the Unirac SM SOLARMOUNT Rails Flush, when installed according to the U-Builder 2.0 engineering report and the manufacturer specifications are 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.

Please feel free to call for any questions or clarifications.

Prepared By: Engineering Alliance, Inc Sugar Land, TX

Saddam Digitally signed by Saddam Ahmad Date: 2023.05.12 08:33:34 -05'00'

This item has been electronically signed and sealed by Saddam Ahmad PE using a Digital Signature and date. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies

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