ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING: 2018 NORTH CAROLINA BUILDING CODE 2018 NORTH CAROLINA RESIDENTIAL CODE 2018 NORTH CAROLINA PLUMBING CODE 2018 NORTH CAROLINA MECHANICAL CODE 2018 NORTH CAROLINA FUEL GAS CODE 2017 NATIONAL ELECTRICAL CODE AS ADOPTED BY HARNETT COUNTY (NC)

VICINITY MAP:



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CONSTRUCTION NOTES:

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

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

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

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

PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER 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: 130 WIND EXPOSURE: B SNOW LOAD: 15

> APPROVED 06/06/2023

SHAKIRAH GHAFUR 106 NORTH 8TH STREET, ERWIN, NC 28339 AHJ: HARNETT COUNTY (NC) UTILITY: DUKE ENERGY METER: 332303350 PHONE: (609) 665-6817 EMAIL: SHAKIRAHG1017@GMAIL.COM

<u>SYSTEM:</u> SYSTEM SIZE (DC): 19 X 410 = 7.790 kW

INANCE: OTHER

SYSTEM SIZE (AC): 6.000 kW @ 240V MODULES: 19 X REC SOLAR: REC410AA OPTIMIZERS: 19 X SOLAREDGE S440 INVERTER: SOLAREDGE SE6000H-USRGM

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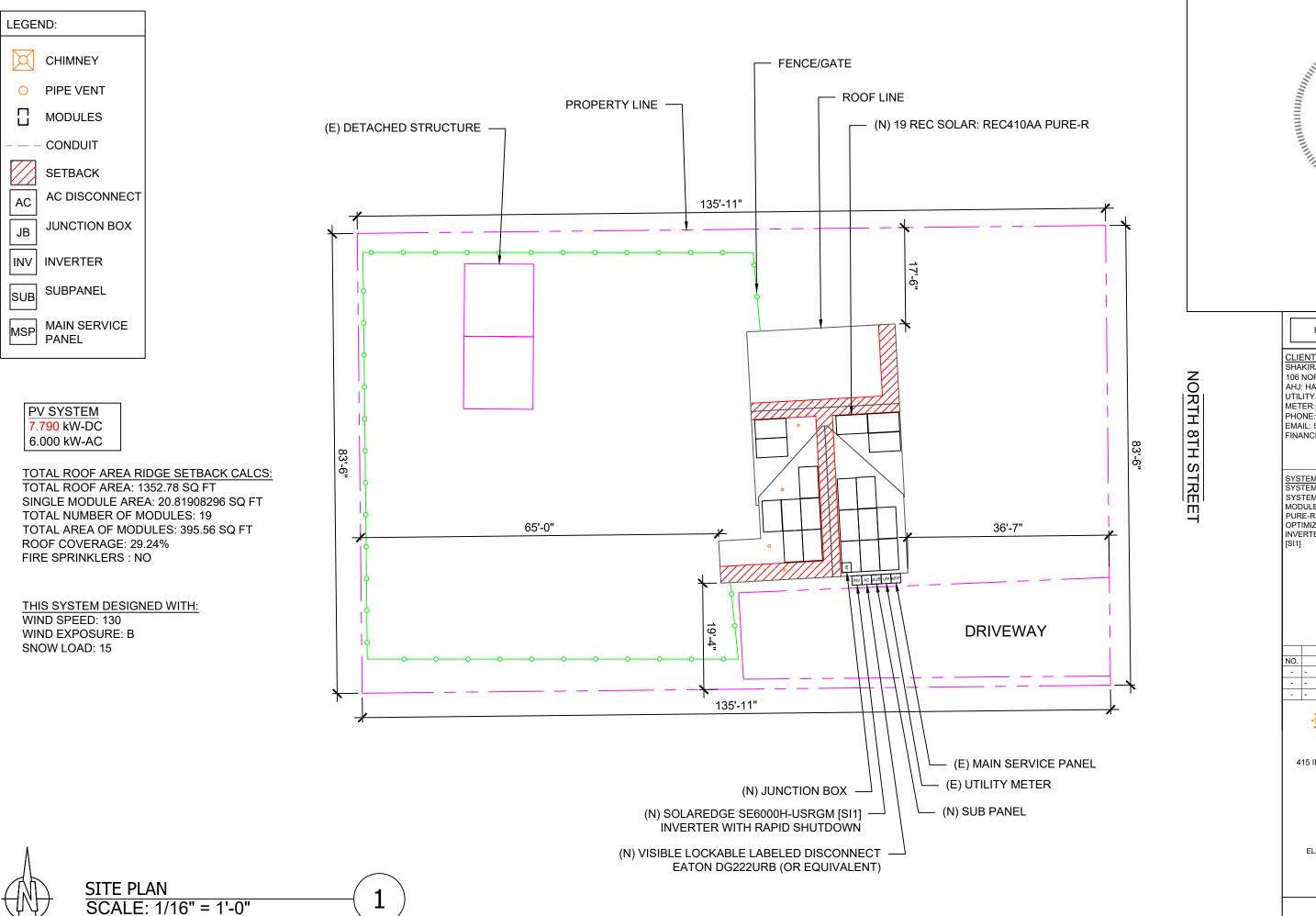


Tel: (800) 385-1075 GREG ALBRIGHT

CONTRACTOR LICENSE:

SITE LOCATION

DATE: DESIGNED BY: 333019 5/18/2023





ROOF AREA: 1352.78 SQ FT

106 NORTH 8TH STREET, ERWIN, NC 28339 AHJ: HARNETT COUNTY (NC) UTILITY: DUKE ENERGY

METER: 332303350 PHONE: (609) 665-6817

EMAIL: SHAKIRAHG1017@GMAIL.COM FINANCE: OTHER

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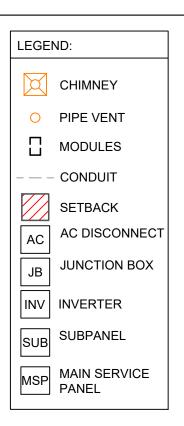


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CONTRACTOR LICENSE: ELECTRICAL CONTRACTOR U.34043

SITE PLAN

JOB NO: DATE: DESIGNED BY: 333019 5/18/2023 A.N.

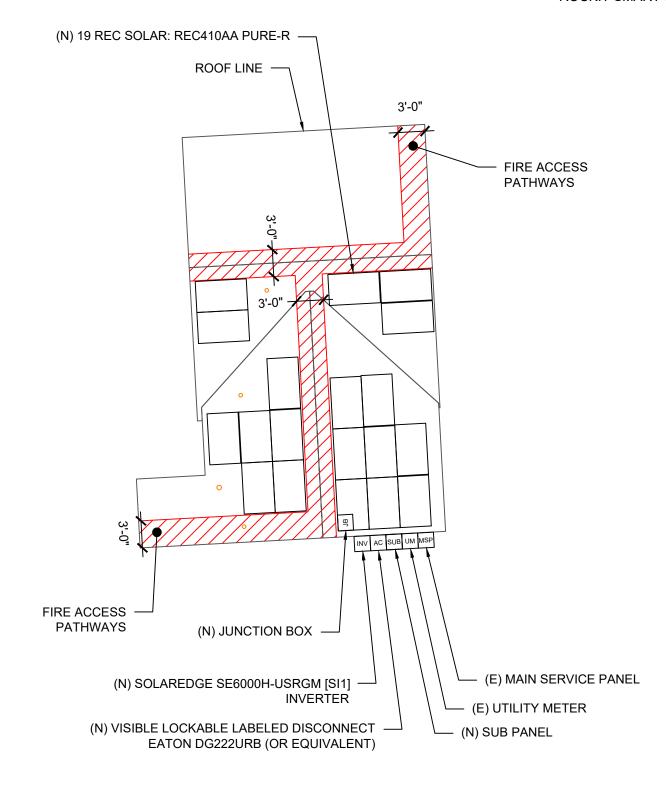


PV SYSTEM 7.790 kW-DC 6.000 kW-AC

THIS SYSTEM DESIGNED WITH:

WIND SPEED: 130 WIND EXPOSURE: B SNOW LOAD: 15

TOTAL ROOF AREA: 1352.78 SQ FT TOTAL ARRAY AREA: 395.56 SQ FT ARRAY COVERAGE: 29.24% SYSTEM DISTRIBUTED WEIGHT: 2.28 LBS **ROCKIT SMART SLIDE POINT-LOAD: 20.95 LBS**





ROOF AREA: 1352.78 SQ FT

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ROOF PLAN WITH MODULES LAYOUT

333019 5/18/2023

EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNTS

2. ATTACHED CLAMPS AT 25% FROM THE EDGE AND 50% FROM THE CENTER OF THE MODULES

JUNCTION BOX IS MOUNTED TO THE RAIL.

NOTES:



ROOF PLAN

SCALE: 3/32" = 1'-0"

ROOF DETAILS:

TOTAL ROOF AREA: 1352.78 SQ FT TOTAL ARRAY AREA: 395.56 SQFT

ARRAY COVERAGE: 29.24%

SYSTEM DISTRIBUTED WEIGHT: 2.28 LBS ROCKIT SMART SLIDE POINT-LOAD: 20.95 LBS

			ROOF ARE	A STATEMENT		
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	6	20	20	257	353.56 SQ FT	124.91 SQ FT
ROOF 2	5	20	20	177	277.75 SQ FT	104.1 SQ FT
ROOF 3	8	20	20	87	166.55 SQ FT	166.55 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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PURE-R
OPTIMIZERS: 19 X SOLAREDGE S440
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GREG ALBRIGHT

CONTRACTOR LICENSE: ELECTRICAL CONTRACTOR U.34043

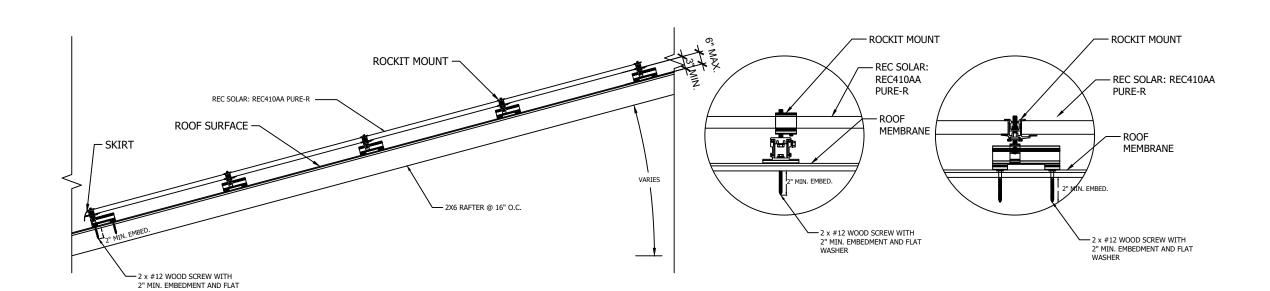
ROOF DETAILS

JOB NO: DATE: DESIGNED BY: 333019 5/18/2023

				TABLE 1 - ARRAY INS	FALLATION				
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE1	MAX UNBRACED LENGTH(FT.)1	RAFTER/TRUSS SISTERING	PENETRATION PATTERN2	MAX ATTACHMENT SPACING (IN.)2	MAX RAIL OVERHANG(I N.)3
ROOF 1	20	COMP SHINGLE	ECOFASTEN ROCKIT SMART SLIDE	2X6 RAFTER @ 16" OC	9.00'	NOT REQ'D	STAGGERED	48" OC	16"
ROOF 2	20	COMP SHINGLE	ECOFASTEN ROCKIT SMART SLIDE	2X6 RAFTER @ 16" OC	9.00'	NOT REQ'D	STAGGERED	48" OC	16"
ROOF 3	20	COMP SHINGLE	ECOFASTEN ROCKIT SMART SLIDE	2X6 RAFTER @ 16" OC	9.00'	NOT REQ'D	STAGGERED	48" OC	16"

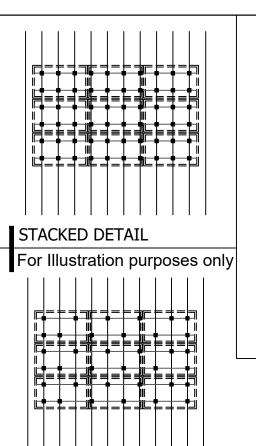


^{2.} WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.



SOLAR PV ARRAY SECTION VIEW Scale: NTS

ATTACHMENT DETAIL Scale: NTS



STAGGERED DETAIL

For Illustration purposes only



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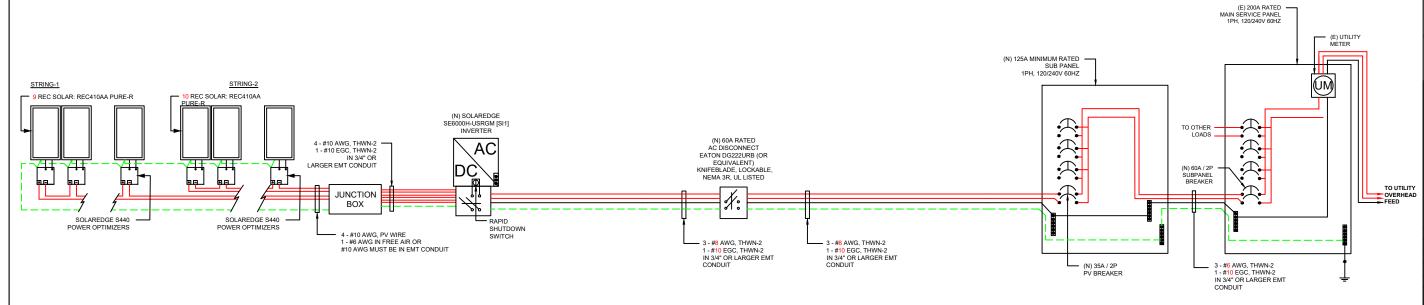
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MOUNTING DETAILS

DATE: DESIGNED BY: 333019 5/18/2023

^{3.} WHERE APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.

В	BACKFEED BREAKER SIZING						
M	AX. CONT	INI	Jous o	UTP	UT 25.00A (බු 24	IOV
	25.00	Χ	1.25	Ш	31.25AMPS		35A BREAKER - OK
S	EE 705.12	2 0	F 2017	NEC	;		
	125	Χ	1.20	Ш	150		
	150	-	60	=	90A ALLOW	/ABI	LE BACKFEED



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THREE LINE DIAGRAM

DATE: DESIGNED BY: 333019 5/18/2023 A.N.

NOTE: USE QUAD/THIN BREAKERS TO MAKE ROOM FOR THE SUB PANEL BREAKER IN MSP.

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

		WIRE SCHEDULE										
RACEWAY #		EQ	UIPMENT		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	11.05	0.91	1	36.40	13.81
2	DC	OPTIMIZER	ТО	JUNCTION BOX	2	10	40	15.00	0.91	1	36.40	18.75
3	DC	JUNCTION BOX	ТО	INVERTER	4	10	40	15.00	0.91	0.8	29.12	18.75
4	AC	INVERTER	ТО	AC DISCONNECT	3	8	55	25.00	0.91	1	50.05	31.25
5	AC	AC DISCONNECT	ТО	POI	3	8	55	25.00	0.91	1	50.05	31.25
6	AC	SUBPANEL	ТО	MSP	3	6	75	60.00	0.91	1	68.25	60.00

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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CONDUCTOR CALCULATIONS

JOB NO: DATE: DESIGNED BY: SH 333019 5/18/2023 A.N. F

OCPD SIZES: 35A BREAKER

SERVICE LIST:

OLIVAIOL LIOT.	
SUB PANEL INSERT	

TY.	PART	PART #	DESCRIPTION
19	MODULES	PV-117-410	REC SOLAR: REC410AA PURE-R
9	OPTIMIZERS	OPT-130-440-2	SOLAREDGE S440 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
1	FITTINGS/ANCHORS	RAC-260-049	600VDC NEMA 3R UL LISTED JUNCTION BOX
2	ELECTRICAL ACCESSORIES	EA-350-326	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
2	EQUIPMENT ACCESSORIES	EA-350-327	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTERS	INV-120-608	SE6000H-US [SI1] RGM 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	DISCONNECTS	EE-321-060	60A RATED 240VAC NEMA 3R UL LISTED
3	FITTINGS/ANCHORS	RAC-265-034	ROCKIT SMART SLIDE
4	FOOTINGS	RAC-241-253-NS	ROCKIT TRIM COMP DARK
6	FITTINGS/ANCHORS	RAC-261-603-NS	ROCKIT SLIDER COMP DARK
1	ENDS/MIDS	RAC-221-100-NS	N/S BONDING CLAMP
1	FOOTINGS	RAC-241-404-NS	TRIM BONDING CLAMP
0	FOOTINGS	RAC-241-405-NS	MLPE MOUNT ASSY
2	FITTINGS/ANCHORS	RAC-261-604-NS	ROCKIT SPLICE
3	RAILS	RAC-211-101-NS	ATTACHED SPLICE 8 INCH
6	FITTINGS/ANCHORS	RAC-261-606-NS	TRIMRAIL UNIV CLIP W/ HDW
5	FITTINGS/ANCHORS	RAC-261-605-NS	TRIM SPLICE DRK
)	RAILS	RAC-211-116-NS	TRIMRAIL UNIV DRK
9	FITTINGS/ANCHORS	RAC-260-587	ILSCO GROUND LUG
9	ENDS/MIDS	RAC-221-200-NS	ROCKIT TRIM END CAPS
6	SCREW	RAC-265-035	ROCKIT SCREW #12X3

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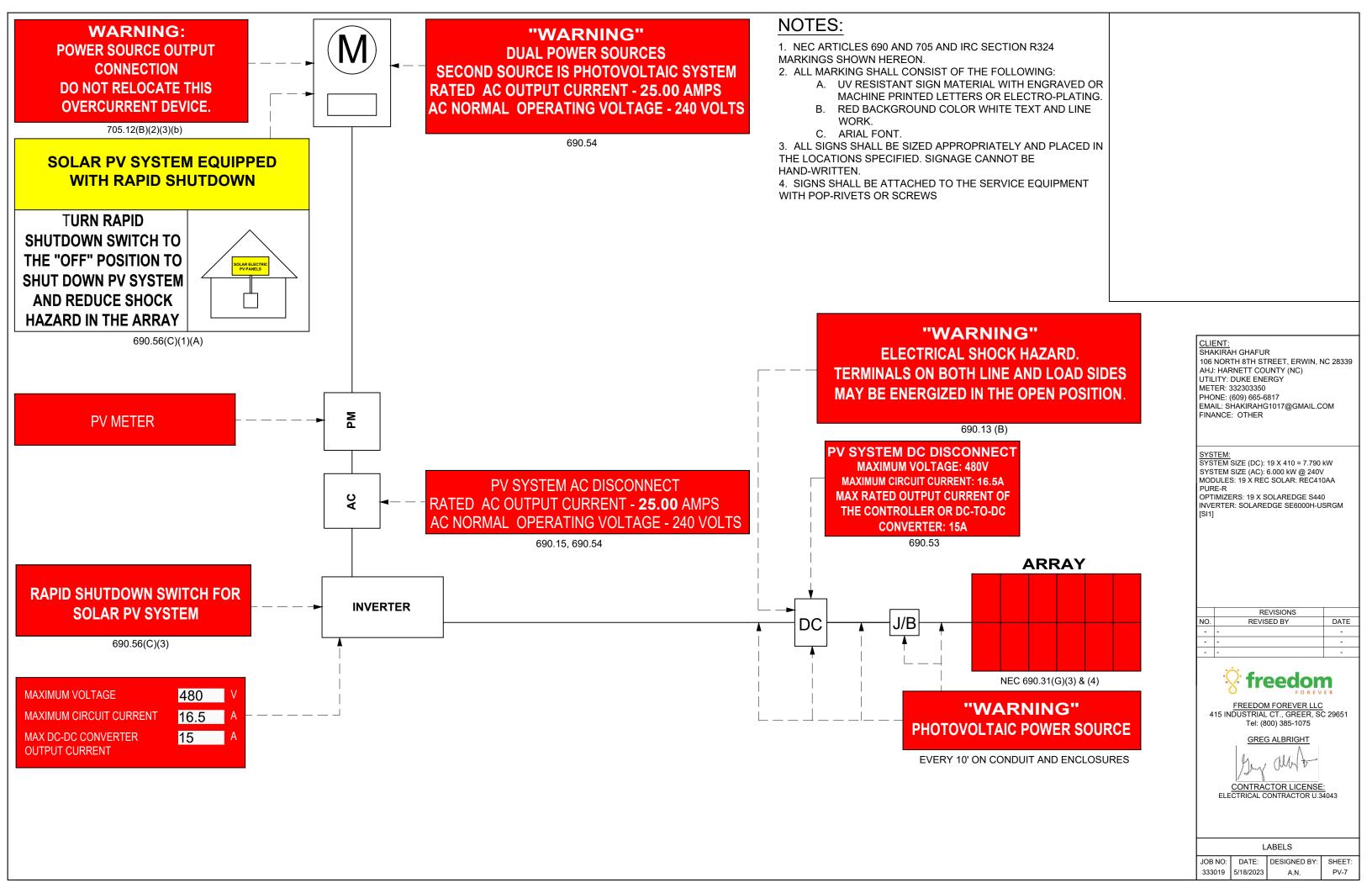
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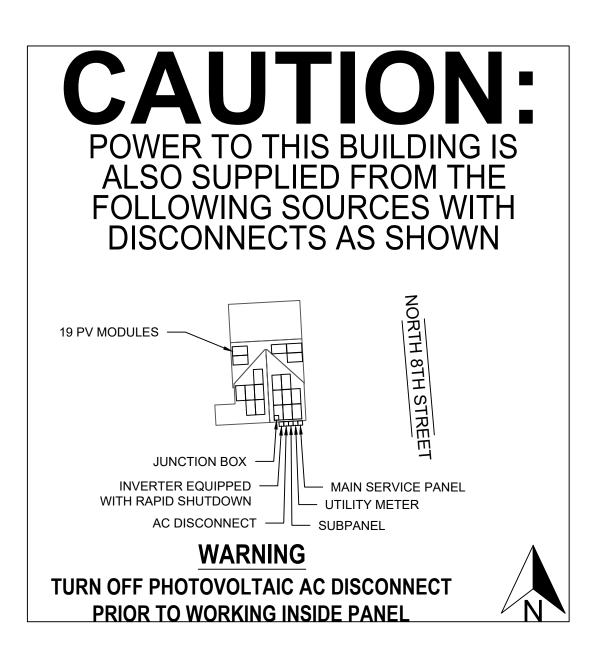
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EQUIPMENT & SERVICE LIST

JOB NO: DATE: DESIGNED BY: 333019 5/18/2023 A.N.





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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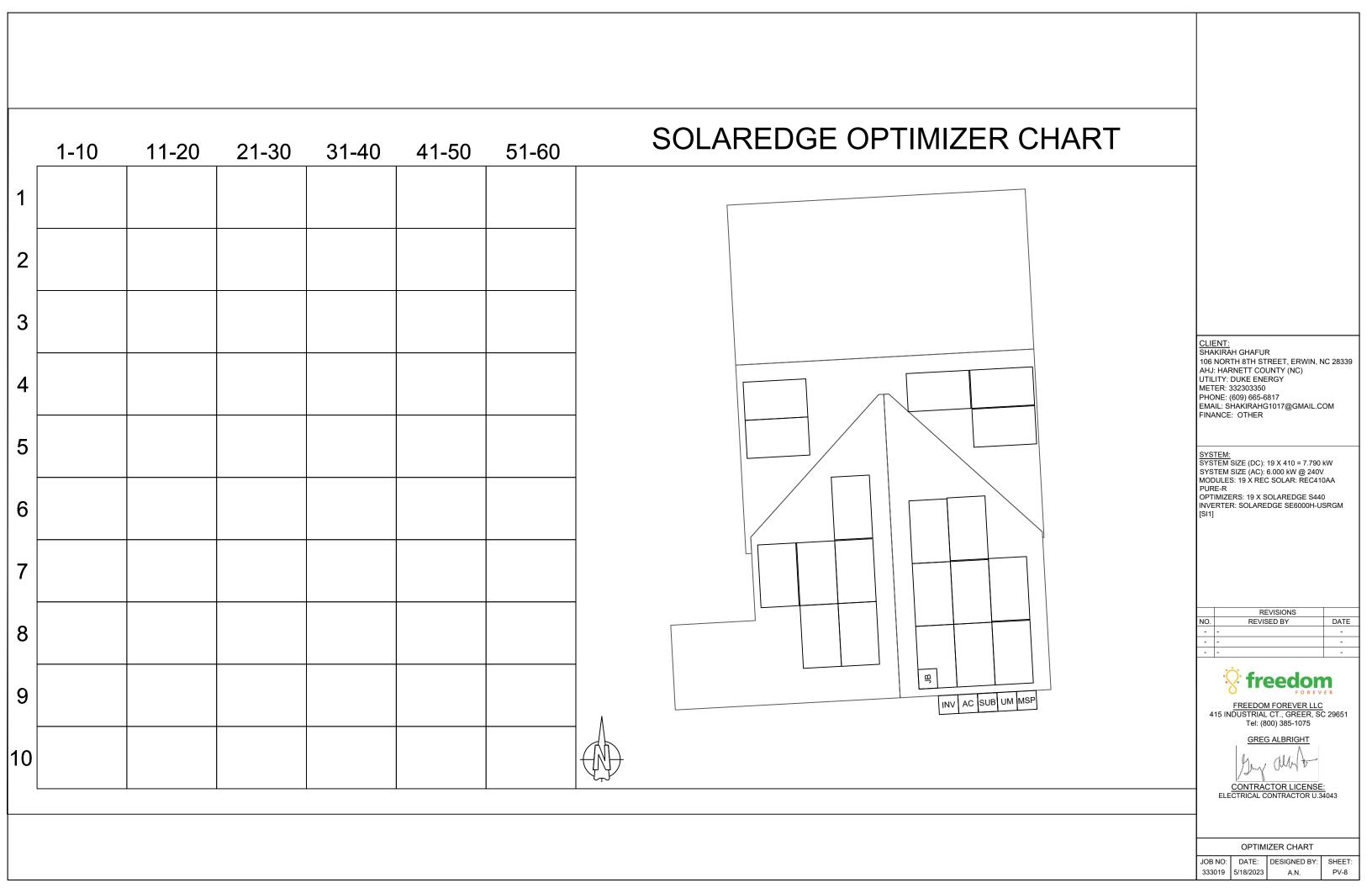
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SITE PLACARD

333019 5/18/2023



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

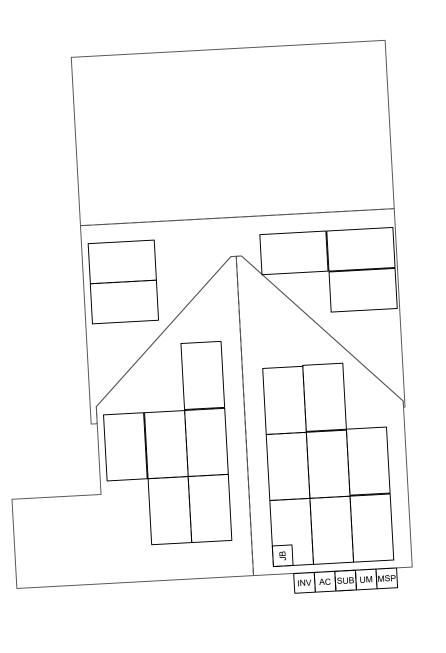
NON-INJURIES - USE MOBILE INCIDENT REPORTING (Auto, Property Damage, Near Miss)



NEAREST OCCUPATIONAL/II	NDUSTRIAL CLINIC:
NAME:	
ADDRESS:	
NEAREST HOSPITAL:	
NAME:	
ADDRESS:	
SAFETY COACH CONTACT II	<u></u>
7 122 2 1 1 1 2 1 2 2 2 2 3 1 1 2 1 2 3 1 1 2 2 3 1 1 2 2 3 1 1 1 2 3 1	E MADE AWARE OF THE SAFETY PLAN ANI AWARE OF THE HAZARDS ON-SITE AND TH
<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**

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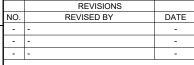
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BREAK AND WATER LOG

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	
1	I	I	I		I	l l				_





FREEDOM FOREVER LLC 415 INDUSTRIAL CT., GREER, SC 29651 Tel: (800) 385-1075

SAFETY PLAN

JOB NO: DATE: DESIGNED BY: 333019 5/18/2023

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 operated
- Type(s) of mobile equipment (Type/Make/Model):
- Qualified operator(s):

Material Handling and Storage

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

Fall Protection

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

Electrical Safety

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

Public Protection

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

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

Training and Pre-Job Safety Briefing

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

Airborne Contaminants:

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

Weather and Environment

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

Heat Related Illness Prevention

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

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

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

Restroom facilities

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

Incident Reporting Procedure

Contact your Site Supervisor

Name:

Phone:

Contact your Manager

Name:

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: SHAKIRAH GHAFUR

106 NORTH 8TH STREET, ERWIN, NC 28339 AHJ: HARNETT COUNTY (NC) UTILITY: DUKE ENERGY

METER: 332303350 PHONE: (609) 665-6817 EMAIL: SHAKIRAHG1017@GMAIL.COM

FINANCE: OTHER

SYSTEM:
SYSTEM SIZE (DC): 19 X 410 = 7.790 kW
SYSTEM SIZE (AC): 6.000 kW @ 240V
MODULES: 19 X REC SOLAR: REC410AA
PURL-R
OPTIMIZERS: 19 X SOLAREDGE S440

INVERTER: SOLAREDGE SE6000H-USRGM



FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075
GREG ALBRIGHT

Dry Wint

CONTRACTOR LICENSE: ELECTRICAL CONTRACTOR U.340

SAFETY PLAN

JOB NO: DATE: DESIGNED BY:

JOB NO: DATE: DESIGNED BY: 333019 5/18/2023 A.N.



REC ALPHA PURE SERIES PRODUCT SPECIFICATIONS



GENERAL D	ATA
Cell type:	132half-cutRECheterojunctionbifacialcellswithlead-free, gaplesstechnology, 6stringsof22cellsinseries
Glass:	$0.13in (3.2mm) solar glass with anti-reflective surface treatment\\in accordance with EN12150$
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black)
Junction box:	3-part, 3 bypass diodes, lead-free IP68rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (4 mm²) in accordance with IEC 62852, IP68 only when connected
Cable:	12 AWG (4 mm²) PV wire, 43+ 47 in (1.1+1.2 m) in accordance with EN50618
Dimensions:	$71.7 \times 40 \times 1.2 \text{ in } (19.91 \text{ft}^2) / 1821 \times 1016 \times 30 \text{mm} (1.85 \text{m}^2)$
Weight:	45 lbs (20.5 kg)
Origin:	Made in Singapore

_	- [28[1.1]		2.5 [71.7±0.1] 01 [35.5]	-1-	460 [18.1]	
1016±25[40±0.1]	17 (0.7)	20.5±0.5 [0.8±0.02]	0.2 33:0.011	153.7 [6.05]	1100 [43.3] +	0.10.2 6.0±0.2 [0.24±0.01]	97542.5[38.440.1]
		45 [1.8]					30 [1.

	ELECTRICAL DATA		Product (Code*: RECxx	AA Pure	
STC	Power Output - P _{MAX} (Wp)	390	395	400	405	410
	Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5
	Nominal Power Voltage - V _{MPP} (V)	41.5	41.8	42.1	42.4	42.7
	Nominal Power Current - I _{MPP} (A)	9.40	9.45	9.51	9.56	9.61
	Open Circuit Voltage - V _{oc} (V)	48.6	48.7	48.8	48.9	49.0
	Short Circuit Current - I _{sc} (A)	10.22	10.25	10.28	10.30	10.35
	Power Density (W/ft²)	211	214	216	219	222
	Panel Efficiency (%)	21.1	21.4	21.6	21.9	22.2
	Power Output - P _{MAX} (Wp)	297	301	305	309	312
_	Nominal Power Voltage - $V_{MPP}(V)$	39.1	39.4	39.7	40.0	40.2
NMOT	Nominal Power Current - I _{MPP} (A)	7.59	7.63	7.68	7.72	7.76
	Open Circuit Voltage - V _{oc} (V)	45.8	45.9	46.0	46.1	46.2
	Short Circuit Current - I _{sc} (A)	8.20	8.24	8.28	8.32	8.36

ICAL DATA		Product (Code*: RECxx	xAA Pure	
itput - P _{Max} (Wp)	390	395	400	405	410
s Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5
Power Voltage - V _{MPP} (V)	41.5	41.8	42.1	42.4	42.7
Power Current - I _{MPP} (A)	9.40	9.45	9.51	9.56	9.61
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Power Voltage - V _{MPP} (V)	39.1	39.4	39.7	40.0	40.2
Power Current - I _{MPP} (A)	7.59	7.63	7.68	7.72	7.76
uit Voltage - V _{oc} (V)	45.8	45.9	46.0	46.1	46.2

Values at standard test conditions (STC air mass AM1.5, irradiance 10.75 W/sq.ft (1000 W/m²) temperature 7.7F (25°C) based on a production spread with a tolerance of $P_{\rm cov}$, $V_{\rm col.}$ $Q_{\rm col.}$ 2.39% within one wat to tass. Nominal module operating temperature PNVOT air mass AM1.5, irradiance 800 W/m², temperature 60°F (20°C) windispect 3.31% of light 50°C independs 430°C in 30°C is always and 50°C independs 430°C in 30°C independs 430°C independent 430°C independs 430°C independs 430°C independs 430°C independs 430°C independs 430°C independent 430°C independs 430°C independent 430°

MAXIMUM RATINGS	
Operational temperature:	-40+85°C
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (146 lbs/ft²)"
Maximum test load (rear):	-4000 Pa (83.5 lbs/ft²)"
Max series fuse rating:	25 A
Max reverse current:	25 A
"See installation i Design lo	manual for mounting instructions oad = Test load / 1.5 (safety factor

	WARRANTY			
С		Standard	REC	ProTrust
V	Installed by an REC Certified Solar Professional	No	Yes	Yes
)-	System Size	All	≤25 kW	25-500 kW
)"	Product Warranty (yrs)	20	25	25
A	Power Warranty (yrs)	25	25	25
A.	Labor Warranty (yrs)	0	25	10
ΠS.	Power in Year 1	98%	98%	98%
or)	Annual Degradation	0.25%	0.25%	0.25%
	Power in Year 25	92%	92%	92%
	See warranty docu	ments for d	etails Con	ditions apply

IEC 61215:2016, IEC 6	1730:2016, UL 61730
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 61730	Fire Type Class 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
IEC 62321	Lead-free acc. to RoHS EU 863/2015
ISO 14001, ISO 9001, I	EC 45001, IEC 62941
•	



Temperature coefficient of V_{oc} :





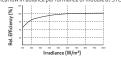


-0.24 %/°C

Temperature coefficient of I_c.: 0.04 %/°C *The temperature coefficients stated are linear values

DELIVERY INFORMATION	
Panels per pallet:	3
Panels per 40 ft GP/high cube container:	792 (24 pallet
Panels per 53 ft truck:	891 (27 pallet

Typical low irradiance performance of module at STC:



Available from:

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarter is in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.



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

- 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)	- 1	60	Vdc
MPPT Operating Range	8	- 60	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	9	9.5	%
Weighted Efficiency	9	8.6	%
Overvoltage Category		II	
OUTPUT DURING OPERATION			
Maximum Output Current		15	Adc
Maximum Output Voltage	- 1	60	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISC	ONNECTED FROM INVERTER O	R INVERTER OFF)	'
Safety Output Voltage per Power Optimizer	1+	-/-0.1	Vdc
STANDARD COMPLIANCE			
Photovoltaic Rapid Shutdown System	NEC 2014, 2	2017 & 2020	
EMC	FCC Part 15 Class B, IEC	61000-6-2, IEC61000-6-3	
Safety	IEC62109-1 (clas	s II safety), UL1741	
Material	UL94 V-0,	UV Resistant	
RoHS	Υ	/es	
Fire Safety	VDE-AR-E 21	00-712:2013-05	
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	10	000	Vdc
Dimensions (W x L x H)	129 x 153 x 30 /	5.07 x 6.02 x 1.18	mm / in
Weight (including cables)	655	5 / 1.5	gr/lb
Input Connector	M	C4 ⁽²⁾	
Input Wire Length	0.1,	/ 0.32	m/ft
Output Connector		1C4	
Output Wire Length	(+) 2.3, (-) 0.10 /	' (+) 7.54, (-) 0.32	m/ft
Operating Temperature Range ⁽³⁾	-40 t	to +85	°C
Protection Rating	IP68 /	Туре6В	
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

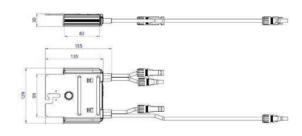
 $⁽³⁾ For ambient temperature above +70^{\circ}\text{C} / +158^{\circ}\text{F} power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details$

PV System Design Using a SolarEdge Inverter		Single Phase HD-Wave	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	S440, S500	8	14	18	
Maximum String Length (Power Optimizers)		25		50(4)	
Maximum Nominal Power per String		5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connected Power per String ⁽⁵⁾ (Permitted only when the difference in connected power between strings is 1,000W or less)		Refer to Footnote 5	One String 7200W		
		Refer to Foothote 5	Two strings or more 7800W	15,000W	
Parallel Strings of Different Lengths 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 s 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

^{*} Expected availability in 2022

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)



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	SEXXXXH-XXXXXBXX4							
OUTPUT	'							
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage 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	600k₂ Sensitivity							
Maximum Inverter Efficiency	99	99 99.2					%	
CEC Weighted Efficiency	99 99 0 240V 98.5 © 208V						%	
Nighttime Power Consumption	< 2.5 V					W		

⁽¹⁾ For other regional settings please contact SolarEdge support

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

Single Phase Inverter with HD-Wave Technology for North America

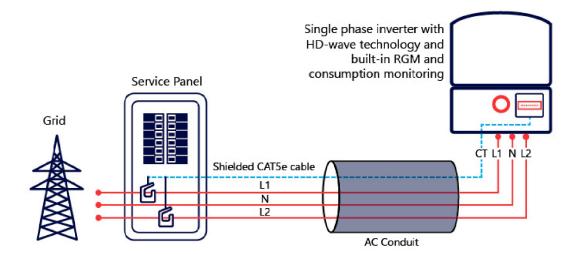
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US SE11400H-US		
ADDITIONAL FEATURES	1				•			
Supported Communication Interfaces		RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Metering, ANSI C12.20								
Consumption metering		Optional ⁽³⁾						
Inverter Commissioning		With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection						
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12		Automatic Rapid Shutdown upon AC Grid Disconnect						
STANDARD COMPLIANCE								
Safety		UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07						
Grid Connection Standards		IEEE1547, Rule 21, Rule 14 (HI)						
Emissions		FCC Part 15 Class B						
INSTALLATION 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" Maximum / 1-2 strings / 14-6 AWG 1" Maximum / 1-3 strings / 14-6 A				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				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				Natural Convection				
Operating Temperature Range		-40 to +140 / -40 to +60 ⁽⁴⁾					°F/°C	
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

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

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





⁽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

FATON

Powering Business Worldwide

Eaton DG222URB

Catalog Number: DG222URB

Eaton General duty non-fusible safety switch, single-throw, 60 A, NEMA 3R, Rainproof, Painted galvanized steel, Two-pole, Two-wire, 240 V

General specifications

Product Name Catalog Number DG222URB Eaton general duty non-fusible safety

switch

UPC

782113144238

Product Length/Depth Product Height 7.38 in 14.38 in

Product Width Product Weight

9 lb 8.69 in

Warranty Certifications

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

from the date of installation of the

Product or eighteen (18) months from the Catalog Notes

date of shipment of the Product,

WARNING! Switch is not approved for

service entrance unless a neutral kit is whichever occurs first. installed.

Product specifications

Product Category

General duty safety switch

Enclosure material

Painted galvanized steel

Non-fusible, single-throw

Fuse configuration

Non-fusible

Number of wires

Enclosure

NEMA 3R

Voltage rating

240V

Amperage Rating

60A

Number Of Poles

Two-pole

Resources

Catalogs

Eaton's Volume 2—Commercial Distribution

Multimedia

Double Up on Safety

Switching Devices Flex Center

Specifications and datasheets

Eaton Specification Sheet - DG222URB

Warranty guides

Selling Policy 25-000 - Distribution and Control Products and Services



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

Eaton is a registered trademark.

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INTRODUCING ROCKIT SMART SLIDE!

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

Features & Benefits

- Eliminates the need to pry up shingle courses and install a metal flashing
- Multiple opportunities to find the rafter
- No need for additional material when architectural shingles are not level
- Longer 6.75" slide avoids overlaps in shingle courses
- Integrated flashing utilizes
 UltraGrip Technology™ to create
 a watertight seal



Required Components:

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

ECOFASTENSOLAR.COM ()

ROCKIT SMART SLIDE

Integrated UltraGrip Technology™

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







Testing & Documentation

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



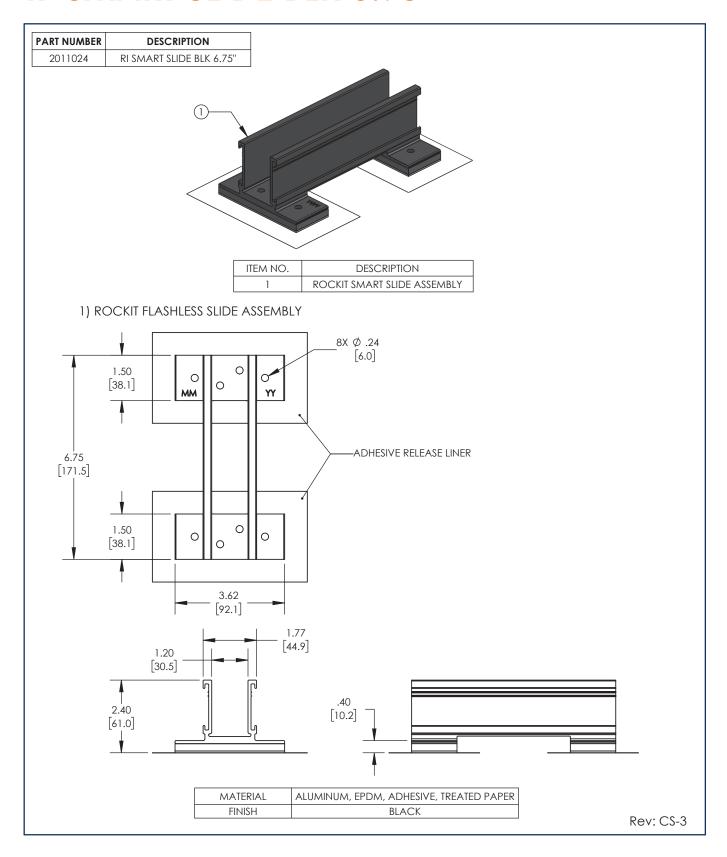


4141 W. VAN BUREN ST, SUITE 2, PHOENIX AZ 85009 1 - 8 7 7 - 8 5 9 - 3 9 4 7 | INFO@ECOFASTENSOLAR.COM

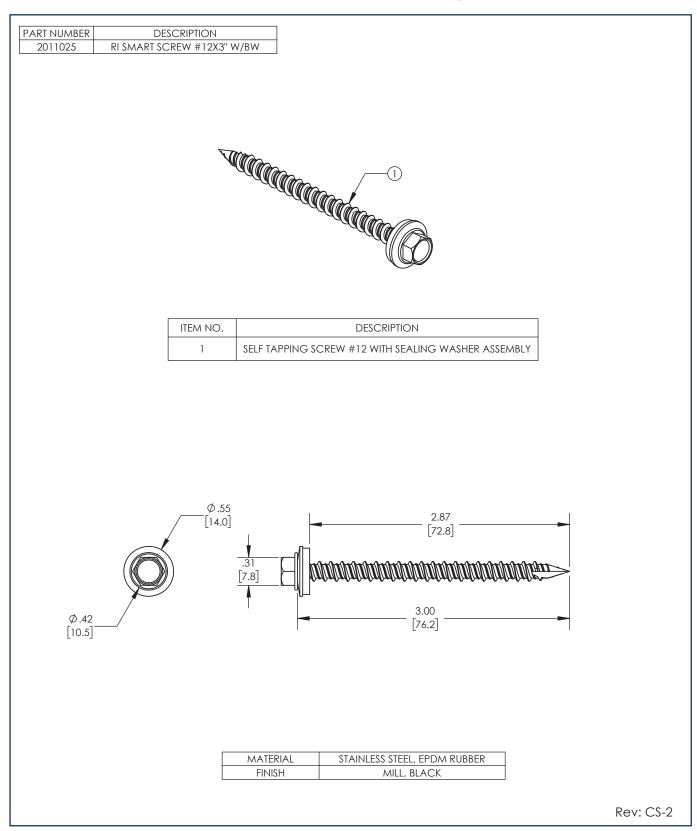




RI SMART SLIDE BLK 6.75"



RI SMART SCREW #12X3" W/BW





May 16, 2022

EcoFasten Solar LLC 4141 W Van Buren St, Ste 2 Phoenix, AZ 85009 TEL: (877) 859-3947

Attn.: Eco Fasten Solar LLC - Engineering Department

Re: Report # 2015-05884HG.07.01 – EcoFasten - RockIt System for Gable and Hip Roofs Subject: Engineering Certification for the State of North Carolina

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - RockIt System, as presented in PZSE Report # 2015-05884HG.07.01, "Engineering Certification for the EcoFasten - RockIt System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications:

Building Codes:

- 1. ASCE/SEI 7-10, 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
- 2. 2015 & 2018 International Building Code
- 3. 2015 & 2018 International Residential Code
- 4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
- 5. Aluminum Design Manual 2015 & 2018, by The Aluminum Association, Inc.
- 6. ANSI/AWC NDS-2015 & 2018, National Design Specification for Wood Construction, by the American Wood Council

Design Criteria: Risk Category II

Seismic Design Category = A - E Exposure Category = B, C & D

Basic Wind Speed (ultimate) per ASCE 7-16 = 90 mph to 180 mph

Ground Snow Load = 0 to 60 (psf)

This letter certifies that the loading criteria and design basis for the EcoFasten - RockIt System Span Tables are in compliance with the above codes.

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

Prepared by:

PZSE, Inc. – Structural Engineers

Roseville, CA



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