

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)

CONSTRUCTION NOTES:

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

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

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

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

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

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

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

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

SOLAREEDGE 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.

VICINITY MAP:

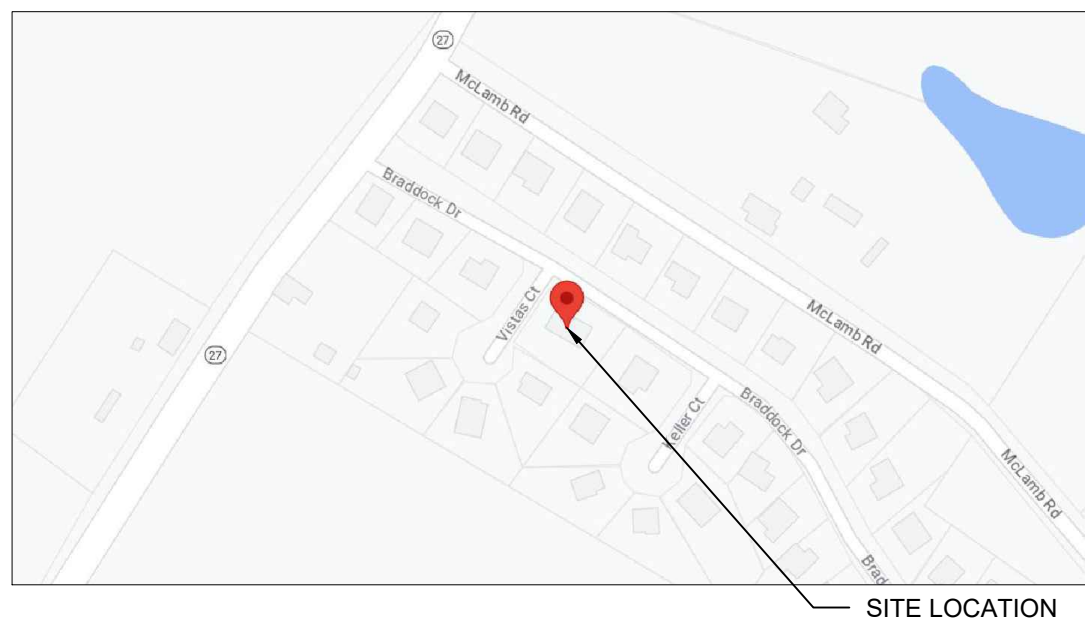


TABLE OF CONTENTS:

PV-1	SITE LOCATION
PV-2	SITE PLAN
PV-2A	ROOF PLAN WITH MODULES LAYOUT
PV-2B	ROOF AND STRUCTURAL TABLES
PV-3	MOUNTING DETAILS
PV-4	THREE LINE DIAGRAM
PV-5	CONDUCTOR CALCULATIONS
PV-6	EQUIPMENT & SERVICE LIST
PV-7	LABELS
PV-7A	SITE PLACARD
PV-8	OPTIMIZER CHART
PV-9	SAFETY PLAN
PV-10	SAFETY PLAN
APPENDIX	MANUFACTURER SPECIFICATION SHEETS

CLIENT:
 JESUS GONZALEZ
 11 VISTAS COURT, LILLINGTON, NC 27546
 AHJ: HARNETT COUNTY (NC)
 UTILITY: DUKE ENERGY
 METER: 332 281 452
 PHONE: (910) 890-5657
 EMAIL: MAGDAJESUS88@GMAIL.COM
 FINANCE: OTHER

SYSTEM:
 SYSTEM SIZE (DC): 34 X 385 = 13.090 kW
 SYSTEM SIZE (AC): 10.000 kW @ 240V
 MODULES: 34 X JINKO SOLAR:
 JKM385M-6RL3-B
 OPTIMIZERS: 34 X SOLAREEDGE S440
 INVERTER: SOLAREEDGE SE10000H-USRGM [S1]

REVISIONS		
NO.	REVISED BY	DATE
1	A.M.	12/30/2023
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




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

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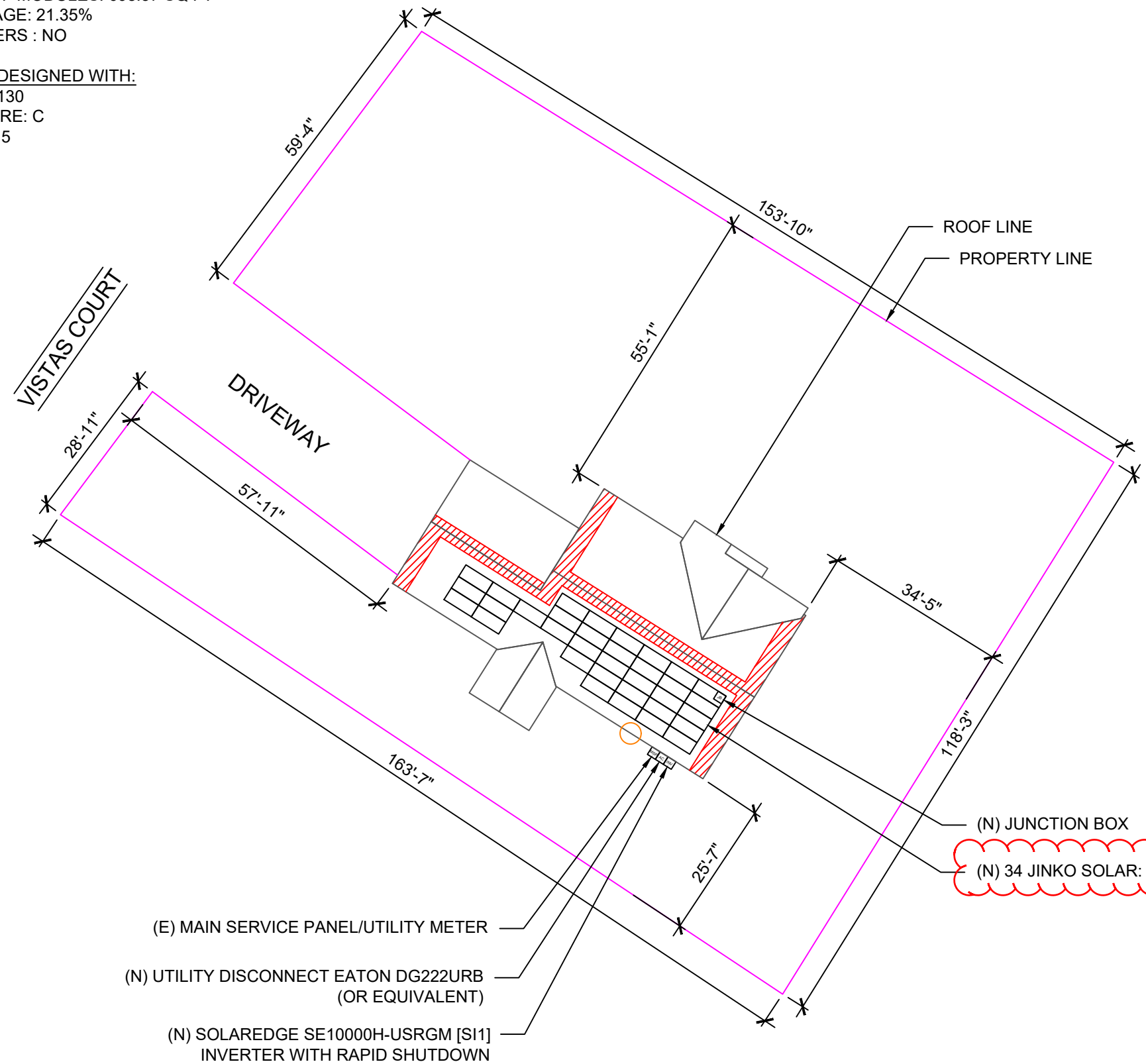
CONTRACTOR LICENSE:
 ELECTRICAL CONTRACTOR U.34043

SITE LOCATION			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-1

- LEGEND:**
-  CHIMNEY
 -  PIPE VENT
 -  MODULES
 -  CONDUIT
 -  SETBACK
 -  AC DISCONNECT
 -  JUNCTION BOX
 -  INVERTER
 -  MAIN SERVICE PANEL

TOTAL ROOF AREA RIDGE SETBACK CALCS:
 TOTAL ROOF AREA: 3271.65 SQ FT
 SINGLE MODULE AREA: 20.54626938 SQ FT
 TOTAL NUMBER OF MODULES: 34
 TOTAL AREA OF MODULES: 698.57 SQ FT
 ROOF COVERAGE: 21.35%
 FIRE SPRINKLERS : NO

THIS SYSTEM DESIGNED WITH:
 WIND SPEED: 130
 WIND EXPOSURE: C
 SNOW LOAD: 15



ROOF AREA: 3271.65 SQ FT

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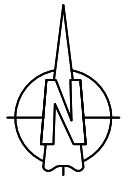


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





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

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SITE PLAN			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-2

LEGEND:

-  CHIMNEY
-  PIPE VENT
-  MODULES
-  CONDUIT
-  SETBACK
-  AC DISCONNECT
-  JUNCTION BOX
-  INVERTER
-  MAIN SERVICE PANEL

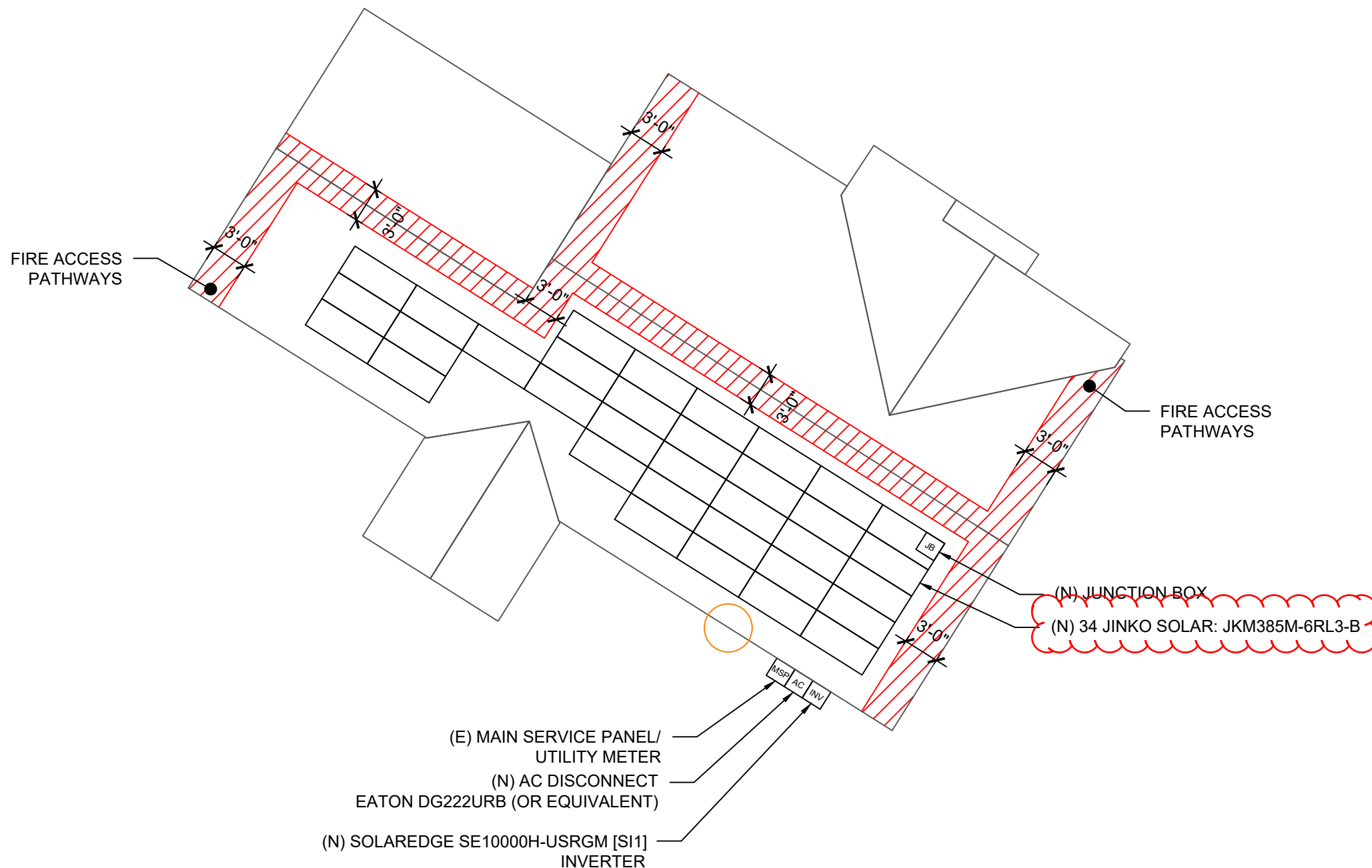
PV SYSTEM
 13.090 kW-DC
 10.000 kW-AC

MODIFIED SETBACKS PROPOSED AT RIDGE:
 TOTAL ARRAY AREA = 698.57 SF
 TOTAL ROOF AREA = 3271.65 SF
 TOTAL ARRAY AREA AS A % TO ROOF AREA = 21.35%
 21.35% < 33%

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

TOTAL ROOF AREA: 3271.65 SQ FT
 TOTAL ARRAY AREA: 698.57 SQ FT
 ARRAY COVERAGE: 21.35%
 SYSTEM DISTRIBUTED WEIGHT: 2.29 LBS
 ROCKIT SMART SLIDE POINT-LOAD: 22.81 LBS

THIS SYSTEM DESIGNED WITH:
 WIND SPEED: 130
 WIND EXPOSURE: C
 SNOW LOAD: 15



ROOF AREA: 3271.65 SQ FT

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

1

NOTES:

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

ROOF PLAN WITH MODULES LAYOUT

JOB NO: 354438	DATE: 1/22/2024	DESIGNED BY: A.W.	SHEET: PV-2A
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ROOF DETAILS:

TOTAL ROOF AREA: 3271.65 SQ FT
 TOTAL ARRAY AREA: 698.57 SQFT
 ARRAY COVERAGE: 21.35%
 SYSTEM DISTRIBUTED WEIGHT: 2.29 LBS
 ROCKIT SMART SLIDE POINT-LOAD: 22.81 LBS



STRUCTURAL ONLY

ROOF AREA STATEMENT

ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	34	40	40	212	1455.79 SQ FT	698.57 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
----	----	----	----	----	SQ FT	SQ FT

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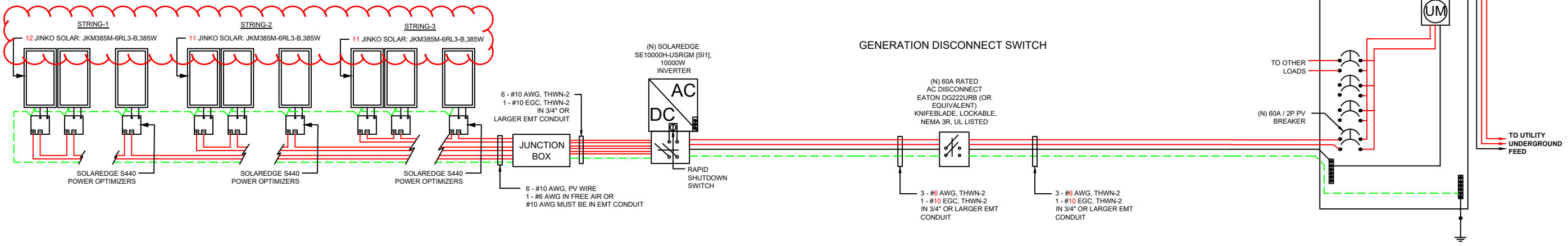
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ROOF DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-2B

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

PV SYSTEM
13.090 kW-DC
 10.000 kW-AC



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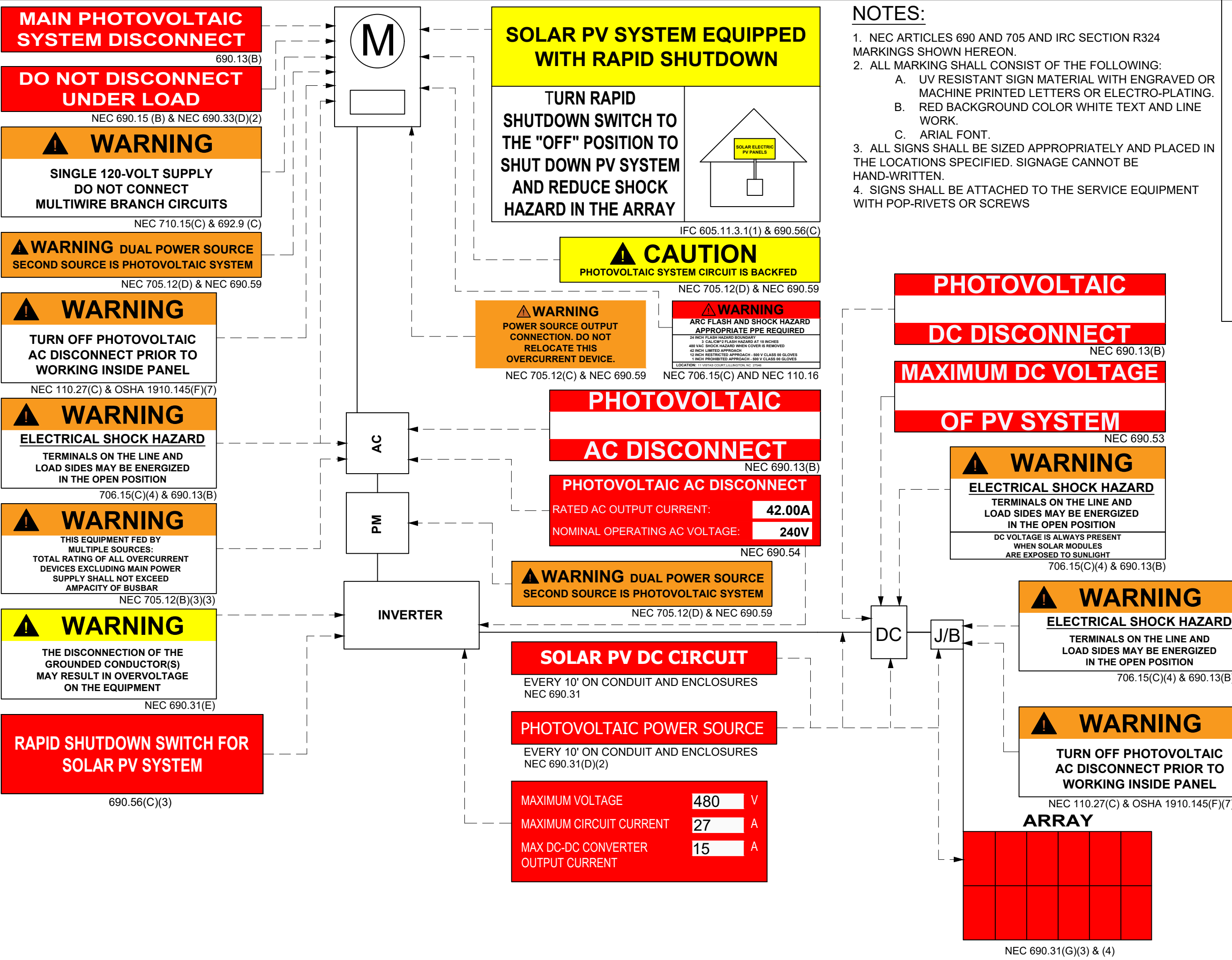
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NOTE:
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THREE LINE DIAGRAM			
JOB NO: 354438	DATE: 1/22/2024	DESIGNED BY: A.W.	SHEET: PV-4



- 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. ARIAL 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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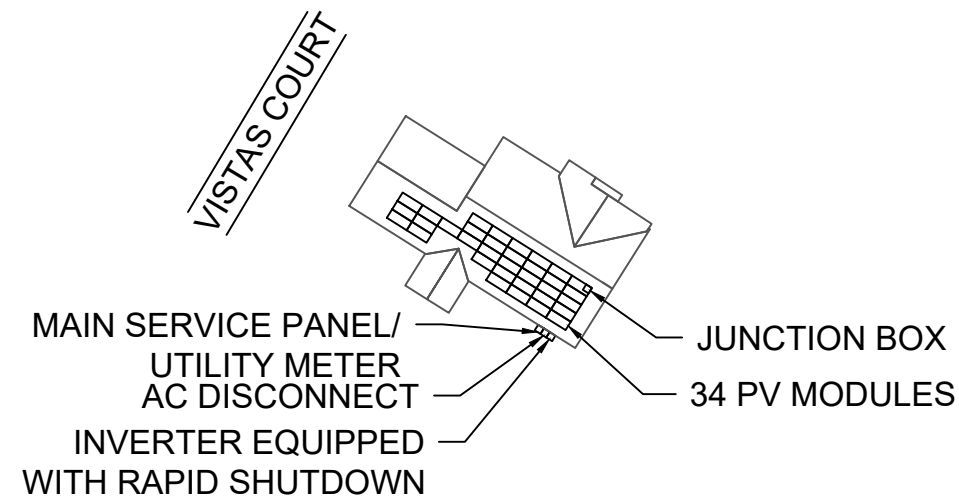
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LABELS			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-7

CAUTION:

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



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT
PRIOR TO WORKING INSIDE PANEL



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SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-7A

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 - 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.
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1-15

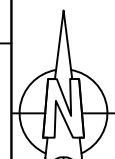
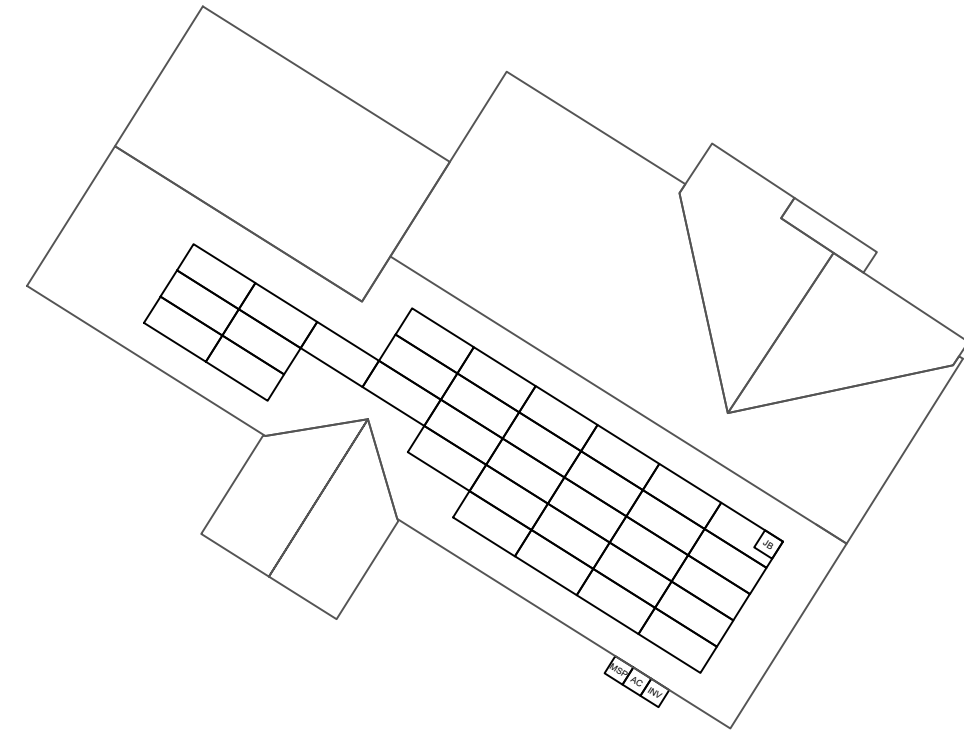
16-30

31-45

46-60

SOLAREEDGE OPTIMIZER CHART

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11
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13
14
15



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OPTIMIZER CHART			
JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-8

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 identified and protected from contact, as neccessary.

EQP (name and tile):

Public Protection

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

Crew leader responsible for communication with the client:

Client and public is excluded from work area by barricades (N/A, Yes, No):

Training and Pre-Job Safety Briefing

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

Crew leader (name/title):

Crew member (name/title):

Crew member (name/title):

Crew member (name/title):

Crew member (name/title):

Crew member (name/title):

Airborne Contaminants:

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

If yes, list specific tasks and protection in place:

Weather and Environment

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

Forecasted weather maximum temp (degrees f):

Heat Related Illness Prevention

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

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

If offsite replenish is necessary, where will you go to replenish water (location/address):

Who will replenish the drinking water (name):

Restroom facilities

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

Restroom facilities will be (circle one): Onsite - Offsite

If Offsite, add location name and address:

Incident Reporting Procedure

Contact your Site Supervisor

Name:

Phone:

Contact your Manager

Name:

Phone:

Contact your Site Supervisor

Name:

Phone:

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

NOTE ADDITIONAL HAZARDS NOT ADDRESSED ABOVE

(add as many as necessary by using additional sheets)

Define the Hazard:	Method/steps to prevent incident:
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 PHONE: (910) 890-5657
 EMAIL: MAGDAJESUS88@GMAIL.COM
 FINANCE: OTHER

SYSTEM:
 SYSTEM SIZE (DC): 34 X 385 = 13.090 kW
 SYSTEM SIZE (AC): 10.000 kW @ 240V
 MODULES: 34 X JINKO SOLAR:
 JKM385M-6RL3-B
 OPTIMIZERS: 34 X SOLAREEDGE S440
 INVERTER: SOLAREEDGE SE10000H-USRGM [S11]

REVISIONS		
NO.	REVISED BY	DATE
1	A.M.	12/30/2023
2	A.W.	1/22/2024
-	-	-



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

GREG ALBRIGHT

CONTRACTOR LICENSE:
 ELECTRICAL CONTRACTOR U.34043

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
354438	1/22/2024	A.W.	PV-10

FOR INSTALLATION REFERENCE ONLY

SCAN QR CODE TO ACCESS REFERENCE LINK

FREEDOM REFERENCES



INSTALL HOTLINE

PV INSTALLATION REFERENCES



ENPHASE



SOLAREEDGE



TESLA

BATTERY INSTALLATION REFERENCES



Enphase Storage Systems



SOLAREEDGE Storage Systems



TESLA Storage Systems



NON-BACKUP Battery Systems



Misc. Quick Guide



EAGLE
MODULES

**THE MOST
DEPENDABLE
SOLAR PRODUCT**

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.



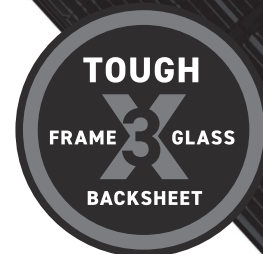
Thick and Tough

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

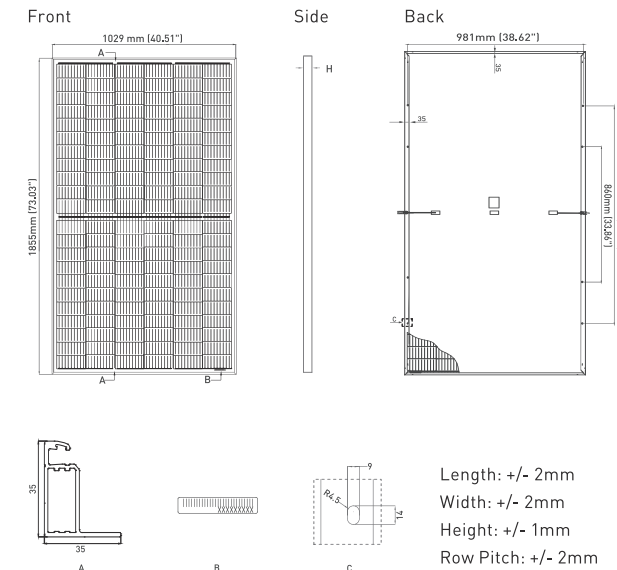


Leading Warranty

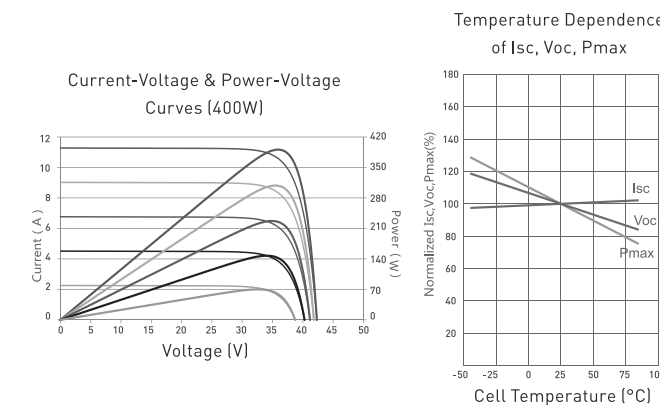
25-year product and 25-year linear power warranty; 98% guaranteed first year, max 0.55% annual loss.



ENGINEERING DRAWINGS



ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



ELECTRICAL CHARACTERISTICS

Module Type	JKM380M-6RL3-B		JKM385M-6RL3-B		JKM390M-6RL3-B		JKM395M-6RL3-B		JKM400M-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 (Isc)	11.12A	8.98A	11.22A	9.06A	11.32A	9.14A	11.42A	9.22A	11.52A	9.30A
Module Efficiency STC (%)	19.91%		20.17%		20.43%		20.69%		20.96%	

*STC: ☀ Irradiance 1000W/m² 🌡 Cell Temperature 25°C ☁ AM = 1.5
 NOCT: ☀ Irradiance 800W/m² 🌡 Ambient Temperature 20°C ☁ AM = 1.5 🌬 Wind Speed 1m/s

*Power measurement tolerance: +/- 3%

MECHANICAL CHARACTERISTICS

No. of Cells	132 (2x66)
Dimensions	1855x1029x35mm [73.03x40.51x1.37 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



Power Optimizer

For North America

S440, S500



POWER OPTIMIZER

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)

* Expected availability in 2022

solaredge.com



/ 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		%
Ovenvoltage Category	II		
OUTPUT DURING OPERATION			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
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 safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
Fire Safety	VDE-AR-E 2100-712:2013-05		
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 / in
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4 ⁽²⁾		
Input Wire Length	0.1 / 0.32		m / ft
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 / Type6B		
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

(2) For other connector types please contact SolarEdge

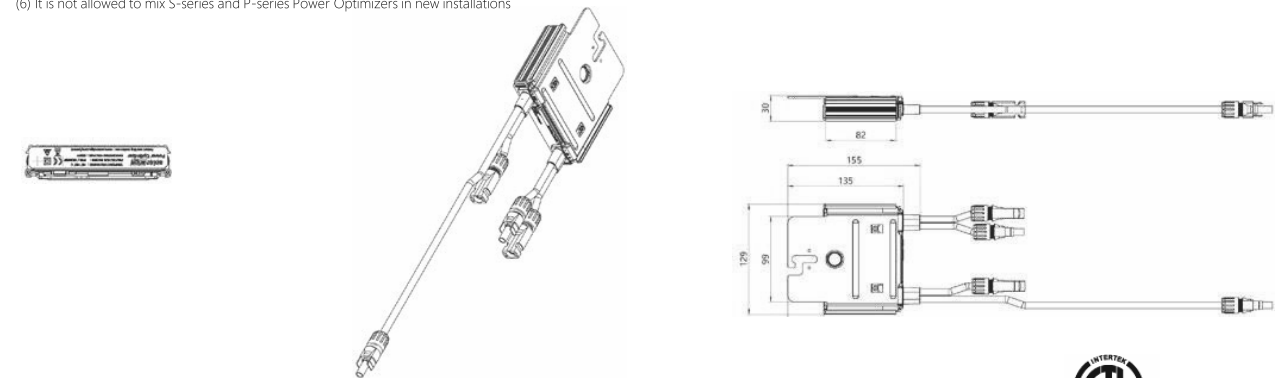
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design 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 Two strings or more 7800W	15,000W	
Parallel Strings of Different Lengths or Orientations	Y			

(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 \leq 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 Home Wave Inverter For North America

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



INVERTERS

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 SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014-2023 per articles 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 Home Wave Inverter For North America

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

Applicable to inverters with part number	SEXXXXH-XXXXBXX4					SE11400H-XXXXBXX5	Units
	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT							
Rated AC Power Output	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5 ⁽¹⁾						Hz
Maximum Continuous Output Current @240V	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85						
GFDI Threshold	1						A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes						
INPUT							
Maximum DC Power @240V	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	380						Vdc
Maximum Input Current @240V ⁽²⁾	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	600k Sensitivity						
Maximum Inverter Efficiency	99.2						%
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.

/ SolarEdge Home Wave Inverter

For North America

SE3800H-US / SE5000H-US / SE6000H-US/

SE7600H-US / SE10000H-US / SE11400H-US

Applicable to inverters with part number	SEXXXXH-XXXXXBXX4					SE11400H-XXXXXBXX5	
	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), wireless SolarEdge Home Network (optional) ⁽³⁾ , Wi-Fi (optional), Cellular (optional)						
Revenue Grade Metering, ANSI C12.20	Optional ⁽⁴⁾						
Consumption Metering							
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection						
Rapid Shutdown - NEC 2014-2023 per articles 690.11 and 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1741 SB, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07						
Grid Connection Standards	IEEE1547-2018, Rule 21, Rule 14 (H1), CSA C22.3 No. 9						
Emissions	FCC Part 15 Class B						
INSTALLATION SPECIFICATIONS							
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 AWG			
Dimensions with Safety Switch (H x W x D)	17.7 x 14.6 x 6.8 / 450 x 370 x 174			21.06 x 14.6 x 7.3 / 535 x 370 x 185	21.06 x 14.6 x 8.2 / 535 x 370 x 208 ⁽⁵⁾		in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6	44.9 / 20.4 ⁽⁵⁾		lb / kg
Noise	< 25			< 50			dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽⁶⁾						°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)						

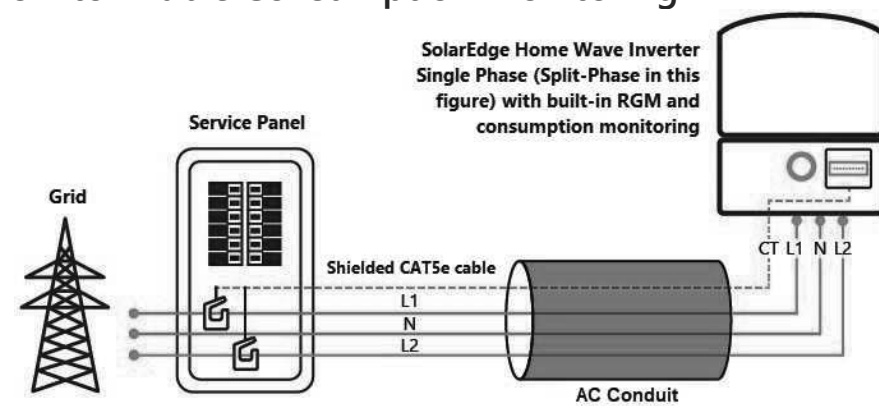
(3) For more information, refer to the [SolarEdge Home Network](#) datasheet

(4) Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BEI4. For consumption metering, current transformers should be ordered separately: SEACT0750-400NA-20 or SEACT0750-400NA-20. 20 units per box.

(5) SE11400H-USxxxBox5 is the updated PN, though SE11400H-USxxxBox4 will still be available. All specifications are similar for both models, **EXCLUDING** the weight and dimensions [HxWxD]. The weight and dimensions of SE11400H-USxxxBox4 are 17.6 [kg] and 21.06-14.6-7.3 / 535-370-185 [in/mm], accordingly.

(6) Full power up to at least 50°C / 122°F; for power de-rating information refer to the [Temperature De-rating Technical Note for North America](#).

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.

Product specifications

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
Eaton general duty non-fusible safety switch	DG222URB
	UPC
	782113144238
Product Length/Depth	Product Height
7.38 in	14.38 in
Product Width	Product Weight
8.69 in	9 lb
Warranty	Certifications
Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.	UL Listed
	Catalog Notes
	WARNING! Switch is not approved for service entrance unless a neutral kit is installed.



Product specifications

Product Category
General duty safety switch
Enclosure material
Painted galvanized steel
Type
Non-fusible, single-throw
Fuse configuration
Non-fusible
Number of wires
2
Enclosure
NEMA 3R
Voltage rating
240V
Amperage Rating
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

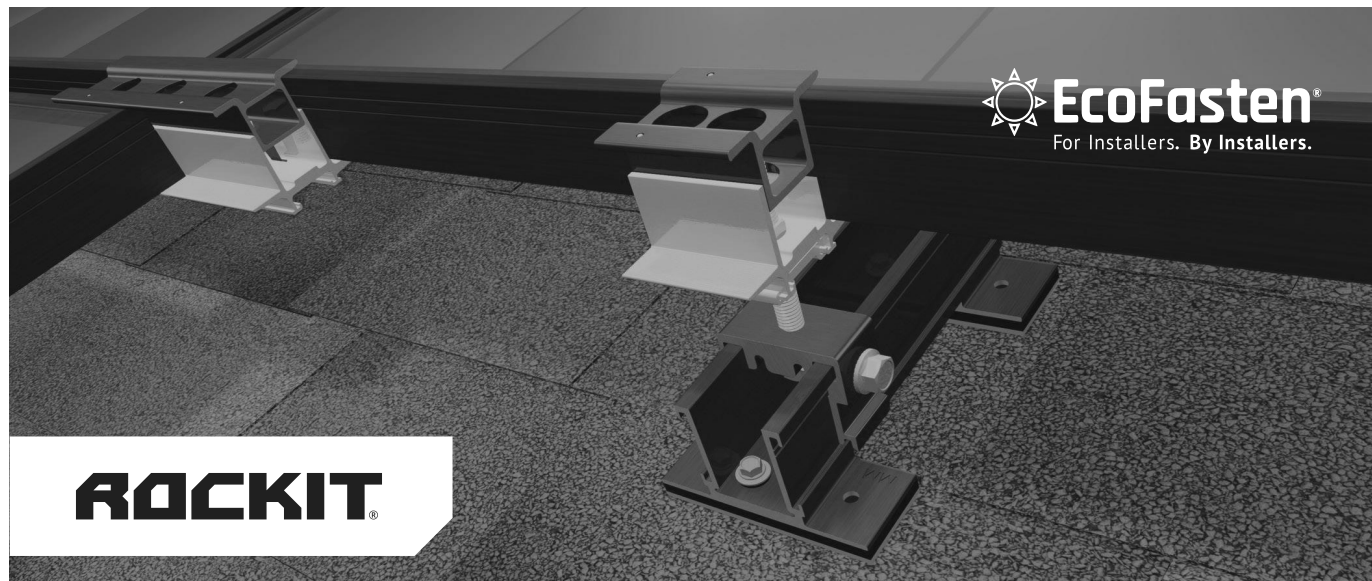


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ROCKIT

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



ROCKIT SMART SLIDE

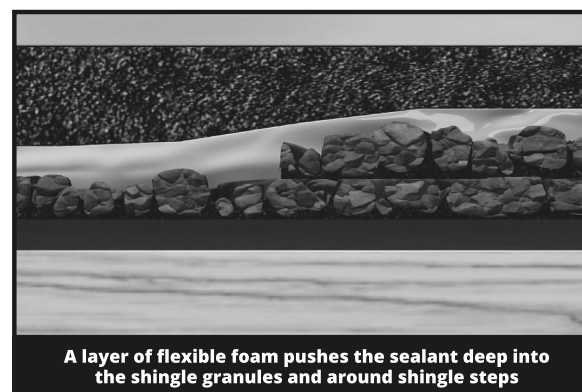
Required Components:

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

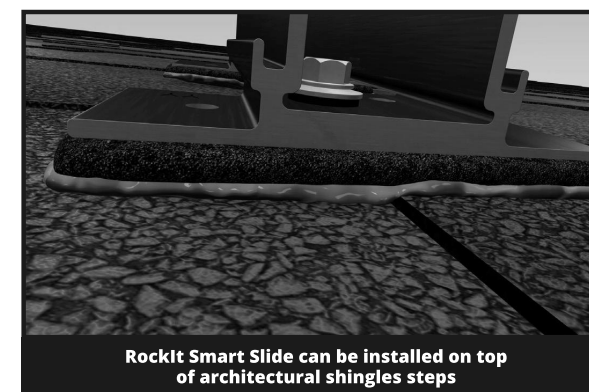
ROCKIT SMART SLIDE

Integrated UltraGrip Technology™

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



A layer of flexible foam pushes the sealant deep into the shingle granules and around shingle steps



RockIt Smart Slide can be installed on top of architectural shingles steps

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](#)



RI SMART SLIDE BLK 6.75"

PART NUMBER	DESCRIPTION
2011024	RI SMART SLIDE BLK 6.75"

ITEM NO.	DESCRIPTION
1	ROCKIT SMART SLIDE ASSEMBLY

1) ROCKIT FLASHLESS SLIDE ASSEMBLY

MATERIAL	ALUMINUM, EPDM, ADHESIVE, TREATED PAPER
FINISH	BLACK

Rev: CS-3

RI SMART SCREW #12X3" W/BW

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

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

MATERIAL	STAINLESS STEEL, EPDM RUBBER
FINISH	MILL, BLACK

Rev: CS-2



ROCKIT®

COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a top-down leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install
- Florida Product Approved for composition shingle roofs

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS



ROCKIT

ROCKIT COUPLING

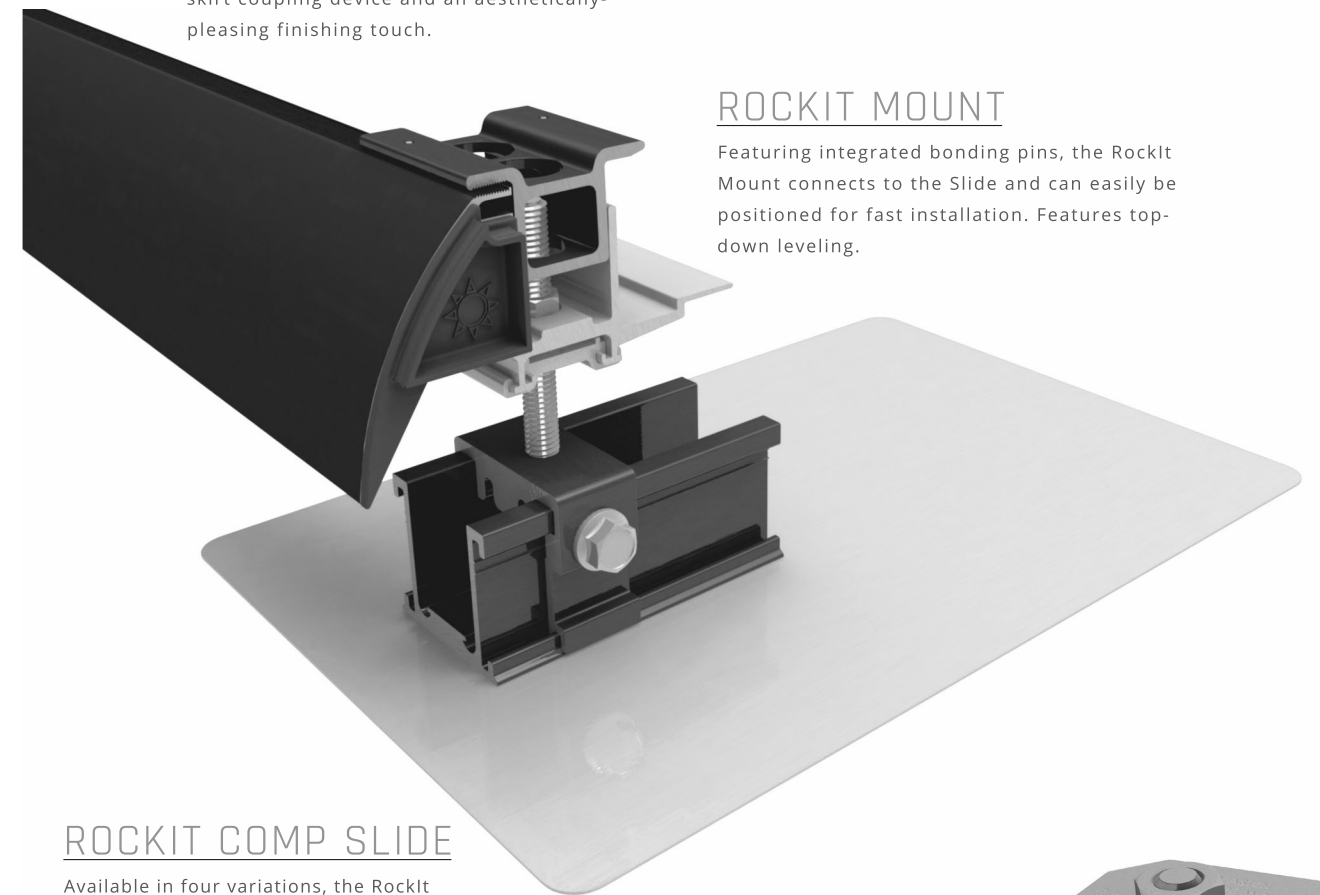
The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.

SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aesthetically-pleasing finishing touch.

ROCKIT MOUNT

Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

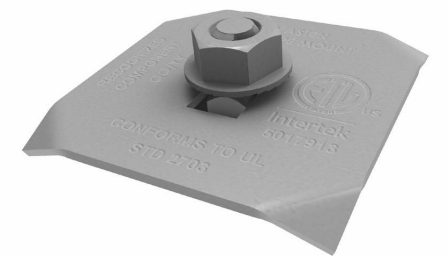


ROCKIT COMP SLIDE

Available in four variations, the RockIt Slide allows installation on composition shingle, tile, and metal roofs.

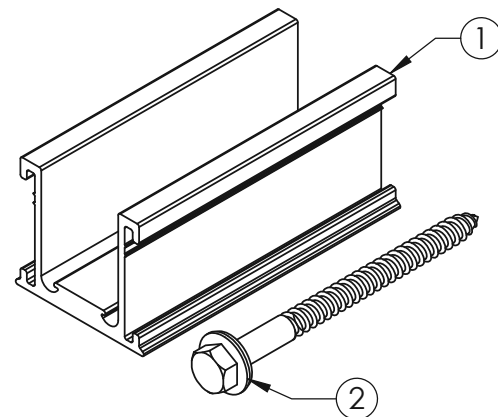
FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.



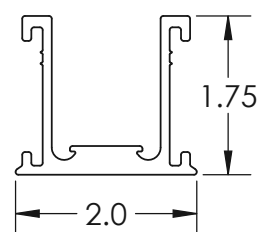
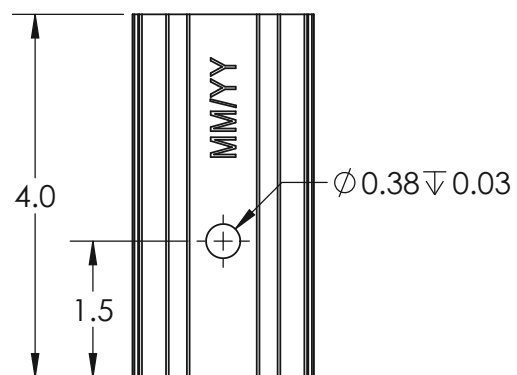
RI COMP SLIDE AL BLK

PART NUMBER	DESCRIPTION
2011013	RI COMP SLIDE AL BLK



ITEM NO.	DESCRIPTION
1	ROCKIT V3 SLIDECOMP
2	LAG SCREW, 5/16-4", THREAD 3", EPDM BACKED WASHER

1) ROCKIT V3 SLIDECOMP

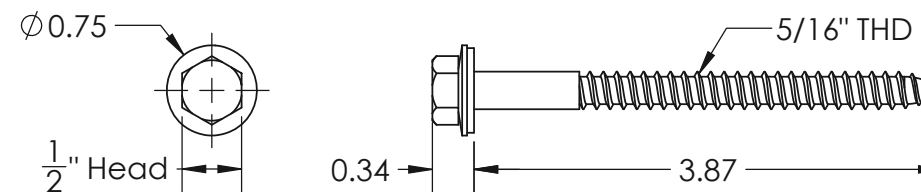


Material	Aluminum
Finish	Black

REV.- CS1

RI COMP SLIDE AL BLK

2) LAG SCREW, 5/16-4", THREAD 3", EPDM BACKED WASHER

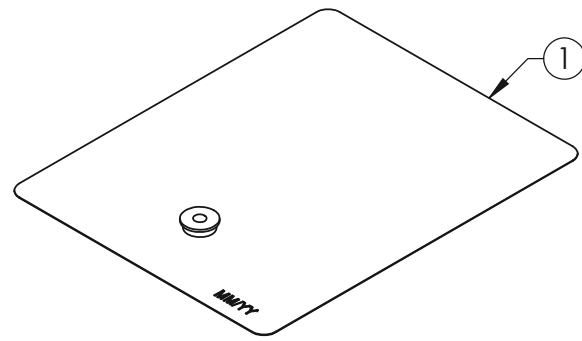


Material	Stainless Steel
Finish	Mill

REV.- CS1

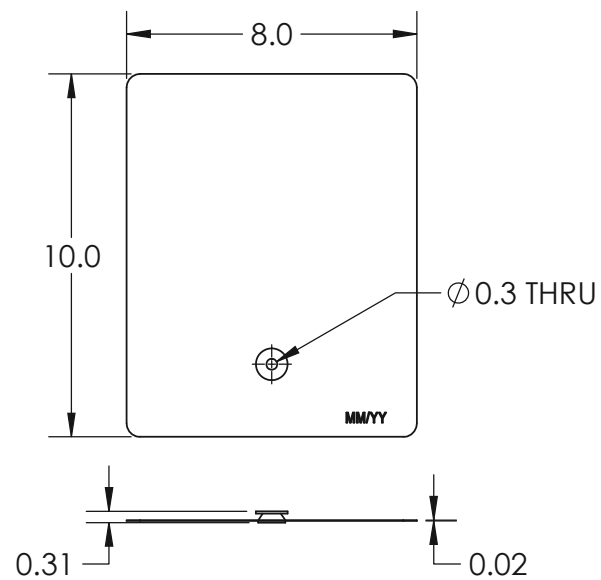
GF-1 FLASHING GLV BLK 8X10"

PART NUMBER	DESCRIPTION
3012020	GF-1 FLASHING GLV BLK 8X10"



ITEM NO.	DESCRIPTION
1	GF1M-GAL-BLK-810 W/O WASHER ASSEMBLY

1) GF1M-GAL-BLK-810 W/O WASHER ASSEMBLY



Material	Corrosion Resistant Steel
Finish	Black

REV.- CS1



June 22, 2023

EcoFasten
4141 West Van Buren St.
Phoenix, AZ 85009

Attn.: EcoFasten Solar Engineering Department

Re: EcoFasten *RockIt System, with Comp Slide or Smart Slide*, Engineering Certification for Gable and Hip roofs.

This letter addresses the structural performance and code compliance of EcoFasten's RockIt Flush Mount System. The contents of the letter shall be reviewed in its entirety before application to any project design. The RockIt System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum RockIt Mount assemblies which are connected to a RockIt roof attachment, either the RockIt Comp Slide or RockIt Smart Slide, which is attached directly to the roof structure. Assembly details of a typical RockIt system and its core components are shown in Exhibit ECO 1.0. The RockIt Comp Slide assembly is shown in drawing EX-1 and the RockIt Smart Slide assembly is shown in drawing 850076. The EcoFasten RockIt System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16
- 2021 International Building Code, by the International Code Council, Inc.
- 2021 International Residential Code, by the International Code Council, Inc.
- SEAOC (Structural Engineer Association of California) report PV2-2017 Wind Design for Solar Arrays
- Aluminum Design Manual 2015, by The Aluminum Association, Inc.
- NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

The span tables provided in this letter are certified based on the structural performance of EcoFasten RockIt System in conjunction with RockIt Comp Slide or Smart Slide only, with no consideration of the structural adequacy of the PV modules, or the underlying roof supporting members. The certified capacities in these tables shall be used when all EcoFasten provided components are installed with no generic replacement parts. These tables are intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the system components regarding the applied or resultant loads of any chosen array configuration.

Sincerely,

Matthew S Kuzila, PE



Digitally Sealed 6.22.2023
Expires 12.31.2023