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 (NFPA)
2017 NATIONAL ELECTRIC CODE (NEC)
AS ADOPTED BY COLUMBIA COUNTY (FL)

VICINITY MAP:

TABLE OF CONTENTS:

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 IS DESIGNED WITH
WIND SPEED: 119 MPH
CATEGORY C EXPOSURE

Joseph J Bravo:A01410D0001 77CA32C5A D0001228B
Digitally signed by Joseph J Bravo:A01410D0001 77CA32C5A D0001228B
Date: 2021.10.22 12:55:09 -06'00'

JOSEPH GARRETT BRAVO LICENSE 90803 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Joseph J. Bravo on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

CLIENT:
MICHAEL ALLEN
227 SOUTHWEST BELLFLOWER DRIVE,
LAKE CITY, FL 32024
AHJ: COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: (386) 288-6939

SYSTEM:
SYSTEM SIZE (DC): 17 X 420 = 7.140 kW
SYSTEM SIZE (AC): 5.000 kW @ 240V
MODULES: 17 X TESLA: T420S
OPTIMIZERS: 17 X SOLAREDGE P505
INVERTER: SOLAREDGE SE5000H-US [SI1]

REVISIONS

NO.	DESCRIPTION	DATE

FREEDOM FOREVER LLC
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
Tel: (800) 385-1075
GREG ALBRIGHT
CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

SITE LOCATION

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-1

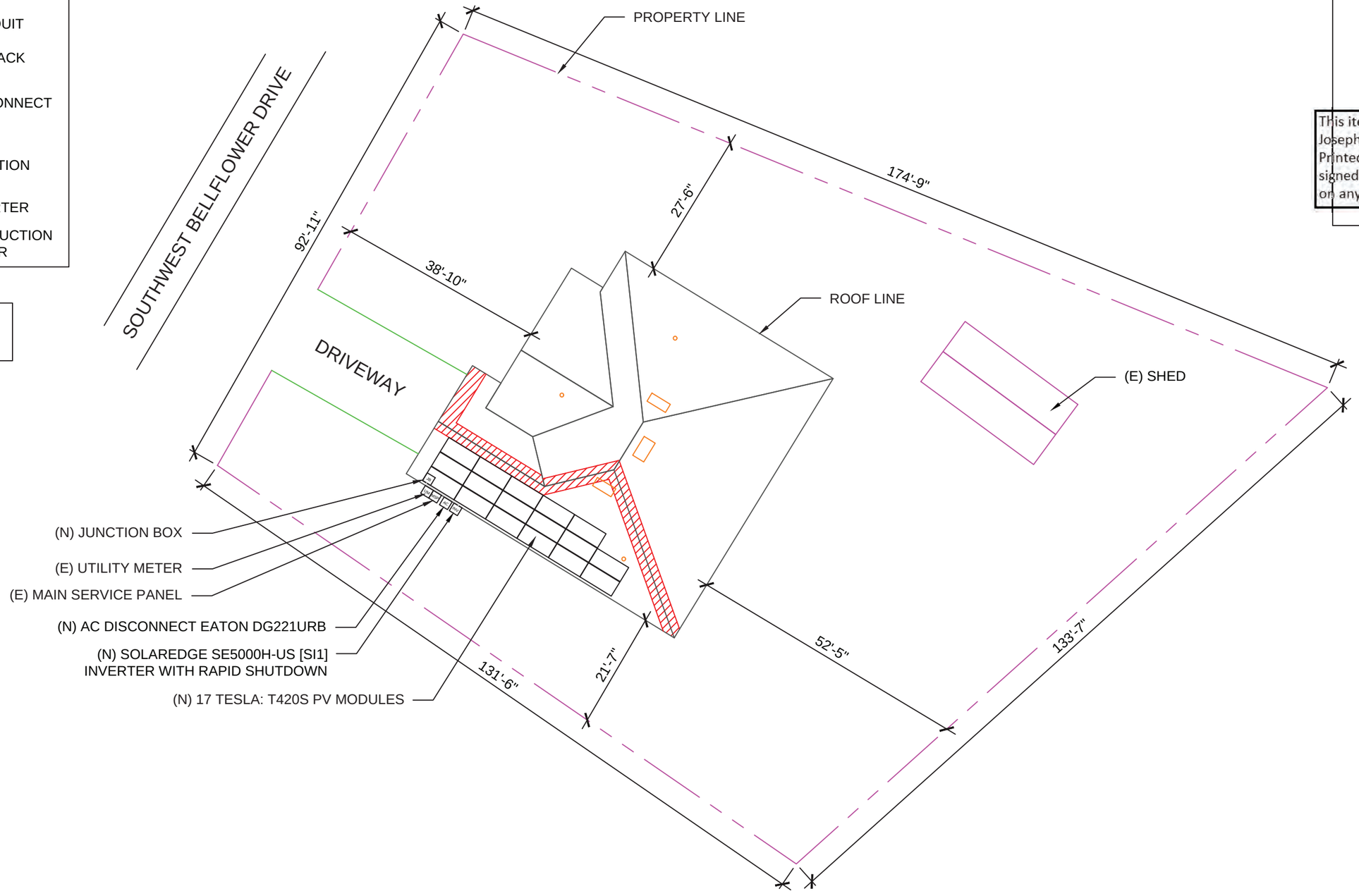
LEGEND:

- OBSTRUCTION
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- MSP — MSP
- JB — JUNCTION BOX
- INV — INVERTER
- PM — PRODUCTION METER

PV SYSTEM
7.140 kW-DC
5.000 kW-AC

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

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



SITE PLAN
SCALE: 1"=20'

1

Joseph J Bravo:A01410D00000177CA32C5AD0001228B

Digitally signed by Joseph J Bravo:A01410D00000177CA32C5AD0001228B
Date: 2021.10.22 12:55:19 -06'00'

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STATE OF FLORIDA
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ROOF AREA: 3331 SQ FT

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EC13008056

SITE PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-2

LEGEND:

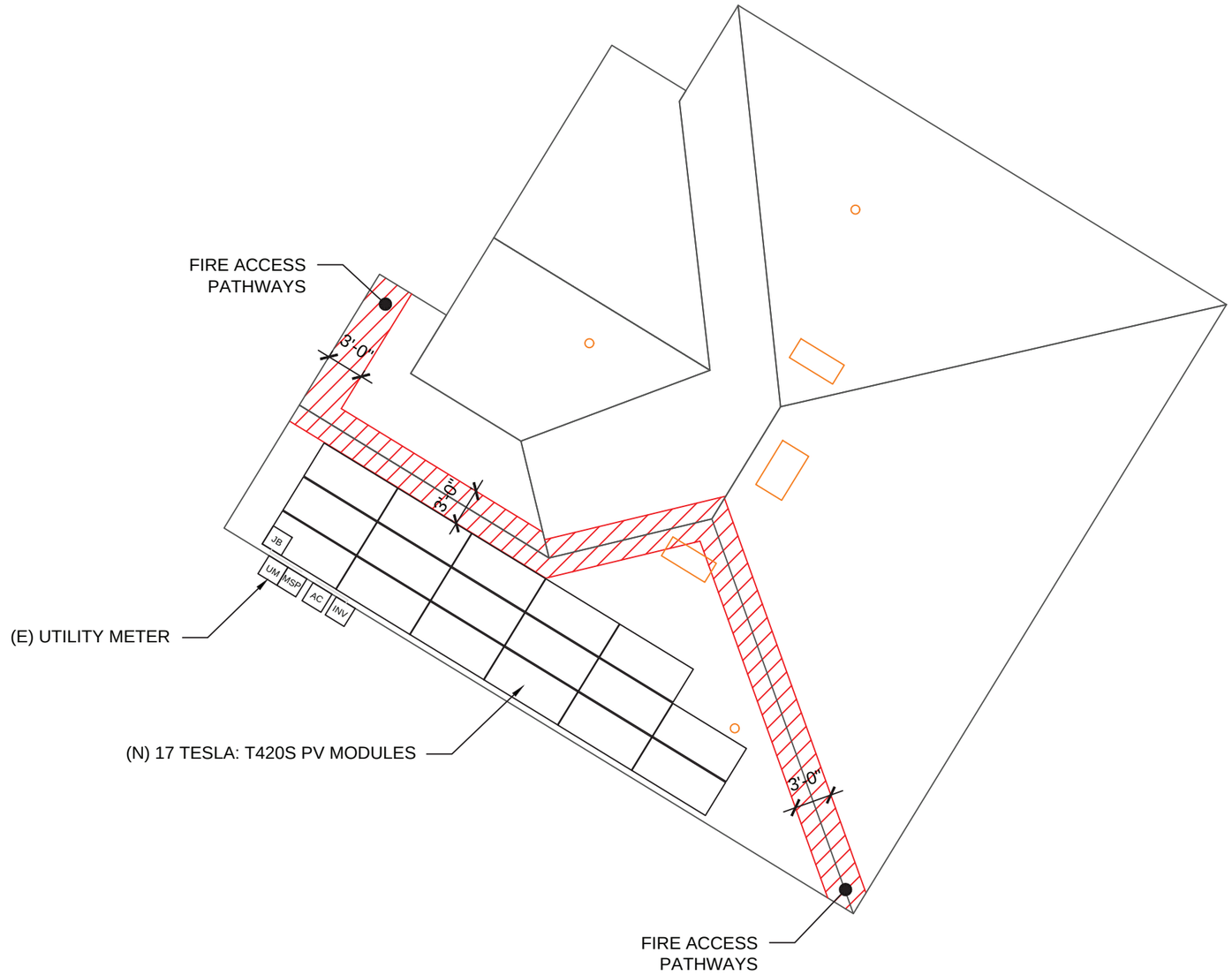
- OBSTRUCTION
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- MSP — MSP
- JB — JUNCTION BOX
- INV — INVERTER
- PM — PRODUCTION METER

PV SYSTEM
7.140 kW-DC
5.000 kW-AC

MODIFIED SETBACKS PROPOSED AT RIDGE:
TOTAL ARRAY AREA = 397.8 SF
TOTAL ROOF AREA = 3331 SF
TOTAL ARRAY AREA AS A % TO ROOF AREA = 11.94%
11.94% < 33%

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

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



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.

Yurianto Yurianto

FL
YURIANTO YURIANTO
LICENSE
No. 86261
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Digitally signed by Yurianto Yurianto
DN: cn=Yurianto Yurianto, c=US, o=Unaffiliated ou=A01410D000001768E2C1250000A7A2
Reason: I am the author of this document
Location:
Date: 2021-10-22 13:44-05:00

By Yuri at 1:43:53 PM, 10/22/2021

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ROOF AREA: 3331 SQ FT

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227 SOUTHWEST BELLFLOWER DRIVE,
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ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 3331 SQ FT
ARRAY COVERAGE: 11.94%
SYSTEM DISTRIBUTED WEIGHT: 2.38 LBS
SFM INFINITY \ ROCKIT MICRORAIL POINT-LOAD: 30.6 LBS

ROOF AREA STATEMENT						
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
1	17	25°	25°	211°	774 SQ FT	397.8 SQ FT

Yurianto Yurianto

Digitally signed by Yurianto Yurianto
DN: cn=Yurianto Yurianto, c=US o=Unaffiliated, ou=A01410D000001C63 7CBF250000A7A2
Reason: I am the author of this document
Location:
Date: 2021-10-22 13:44-05:00

FL
YURIANTO YURIANTO
LICENSE
No. 86261
STATE OF FLORIDA
PROFESSIONAL ENGINEER

By Yuri at 1:43:57 PM, 10/22/2021

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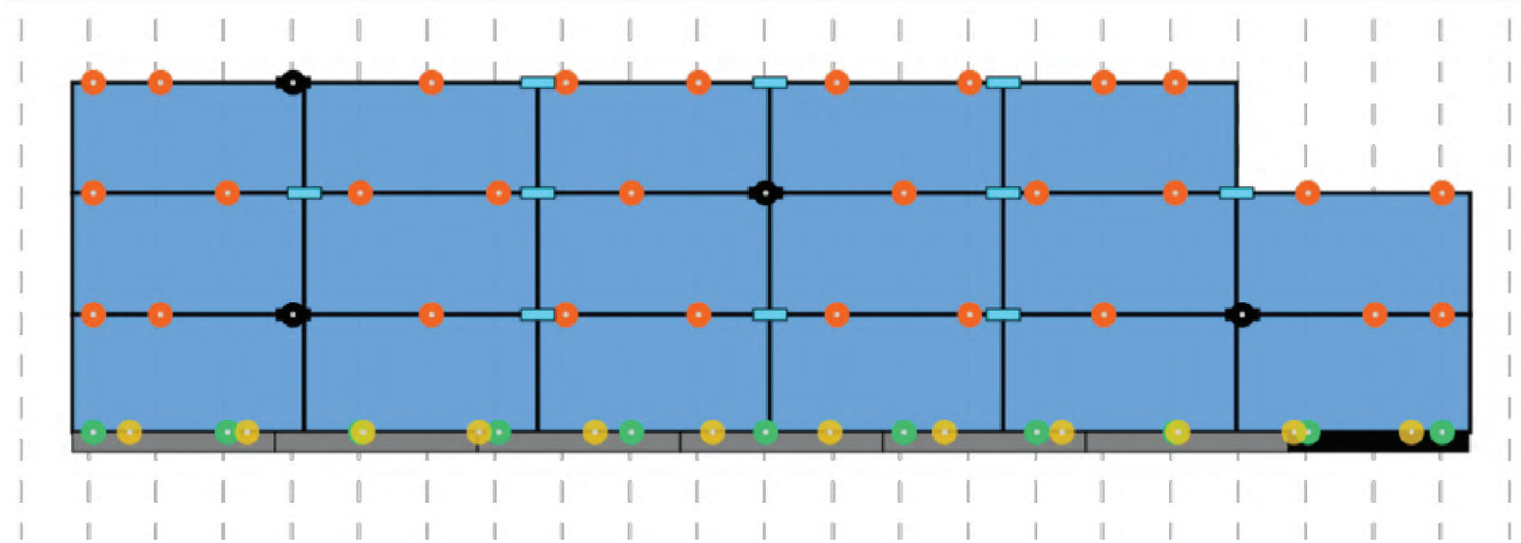
ROOF DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-2B



ARRAY FLOOR PLAN WITH MODULES LAYOUT

Scale: NTS

MAX ATTACHMENT SPAN - 4' STAGGERED

LEGEND

Module (Roof Zones)

- Zone 1
- Zone 2
- Zone 3

SFM Components

- SFM Microrail 2"
- SFM Splice 6.5"
- SFM Attached Splice 8"
- SFM Trim Attachment
- SFM Trim Univ Clip
- Full Trim Section
- Cut Trim Section

Yurianto Yurianto

FL

YURIANTO YURIANTO LICENSE No. 86261 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by Yurianto Yurianto
DN: cn=Yurianto Yurianto c=US o=Unaffiliated ou=A01410D000001768E2C2F250000A7A2
Reason: I am the author of this document
Location:
Date: 2021-10-22 13:44-05:00

By Yuri at 1:44:01 PM, 10/22/2021

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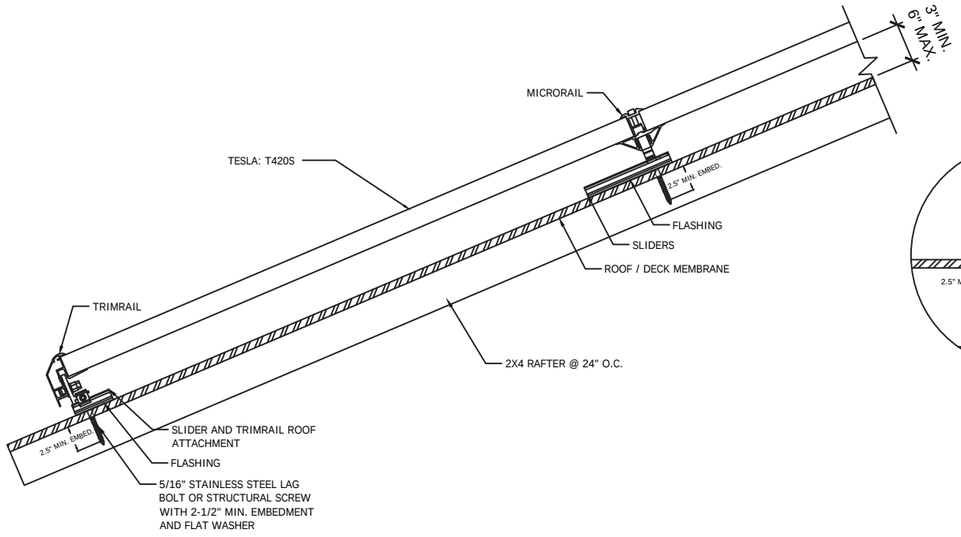
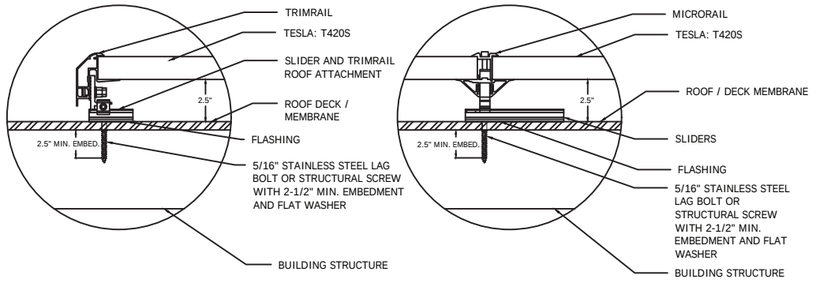


SOLAR PV ARRAY SECTION VIEW

Scale: NTS



ATTACHMENT DETAIL

Scale: NTS

CLIENT:
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227 SOUTHWEST BELLFLOWER DRIVE,
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MOUNTING DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-3

BACKFEED BREAKER SIZING					
MAX. CONTINUOUS OUTPUT 21.00A @ 240V					
21.00	X	1.25	=	26.25AMPS	30A BREAKER - OK
SEE 705.12 OF 2017 NEC					
200	X	1.20	=	240	
240	-	200	=	40A ALLOWABLE BACKFEED	

PV SYSTEM
7.140 kW-DC
5.000 kW-AC

Joseph J Bravo:A01410D00000177CA32C5AD0001228B

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Date: 2021.10.22 12:55:31 -06'00'

JOSEPH JARRETT BRAVO
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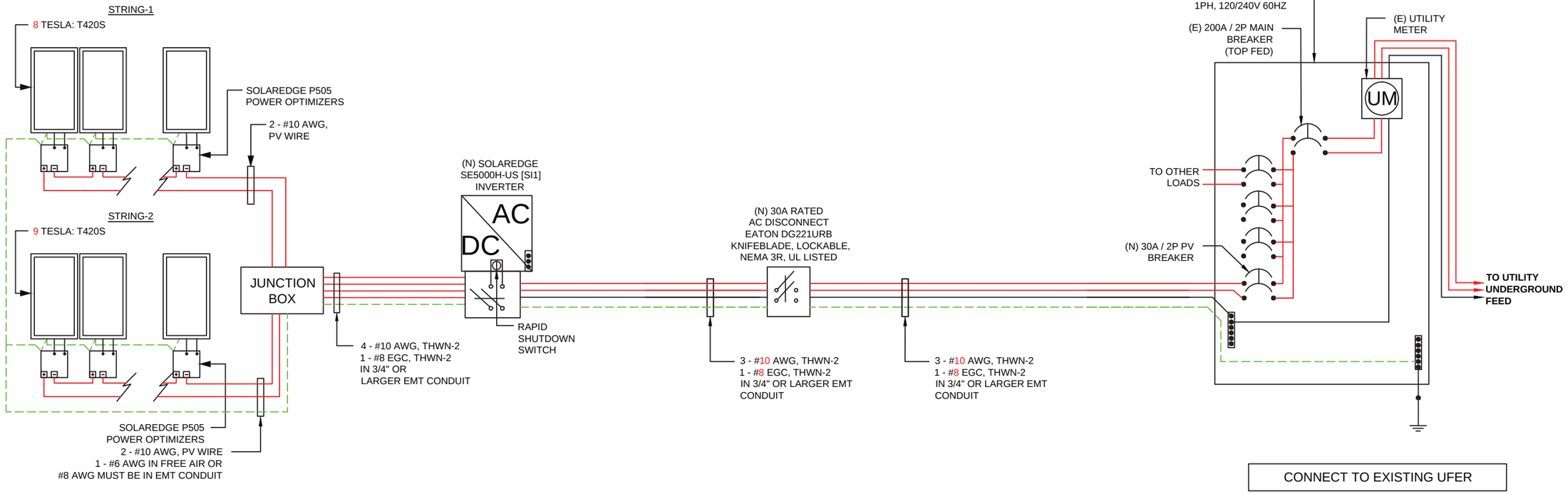

NOTE:
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THREE LINE DIAGRAM

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-4

Joseph J Bravo:A01410D000001770CA32C5AD0001228B

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Date: 2021.10.22 12:55:44 -06'00'

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WIRE SCHEDULE

RACEWAY #	EQUIPMENT				WIRE LOCATION	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	TO	OPTIMIZER	ROOF / FREE-AIR	2	10	40	13.95	0.96	1	38.40	17.44
2	DC	OPTIMIZER	TO	JUNCTION BOX	ROOF / FREE-AIR	2	10	40	15.00	0.96	1	38.40	18.75
3	DC	JUNCTION BOX	TO	INVERTER	EXTERIOR WALL	4	10	40	15.00	0.96	0.8	30.72	18.75
4	AC	INVERTER	TO	AC DISCONNECT	EXTERIOR WALL	3	10	40	21.00	0.96	1	38.40	26.25
5	AC	AC DISCONNECT	TO	POI	EXTERIOR WALL	3	10	40	21.00	0.96	1	38.40	26.25

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

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CONDUCTOR CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-5

BREAKER SIZES:

30A PV BREAKER

SERVICE LIST:

NONE

MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
17	MODULES	120-420	TESLA: T420S
17	OPTIMIZERS	130-505	SOLAREDGE P505 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
1	JUNCTION BOX	480-276	600VDC NEMA 3R UL LISTED JUNCTION BOX
2	CONNECTORS	240-300	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
2	CONNECTORS	240-301	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTER	120-501	SOLAREDGE SE5000H-US [SI1] 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	AC DISCONNECT	321-030	30A RATED 240VAC NEMA 3R UL LISTED
31	ROOF ATTACHMENT 1	261 -602	SFM INFINITY \ ROCKIT MICRORAIL
13	SFM TRIM 1	241-253	FLASHKIT SFM / ROCK-IT TRIM COMP DARK
33	SFM SLIDER 1	261-603	FLASHKIT SFM / ROCK-IT SLIDER COMP DARK
10	BONDING CLAMP 1	221-100	N/S BONDING CLAMP
4	BONDING CLAMP 1	241-404	TRIM BONDING CLAMP
18	MOUNT ASSEMBLY 1	241-405	MLPE MOUNT ASSY
11	SFM SPLICE 1	261-604	SFM / ROCK-IT SPLICE
3	SFM ATTACHED SPLICE 1	211-101	ATTACHED SPLICE 8 INCH
14	TRIMRAIL 1	261-606	TRIMRAIL UNIV CLIP W/ HDW
5	TRIM SPLICE 1	261-605	TRIM SPLICE DRK
8	TRIMRAIL 1	211-115	TRIMRAIL UNIV DRK
17	GROUND LUG 1	260-585	ILSCO GROUND LUG
17	TRIM END CAPS 1	221-200	UNIRAC SFM / ROCK-IT TRIM END CAPS

PART NUMBER	PART TYPE	DESCRIPTION	QUANTITY	SUGGESTED QUANTITY
256072U	Trim	SFM TRIMRAIL 72 UNIV DRK	7	7
250120U	Trim Splice	SFM TRIM SPLICE DRK	6	6
250020U	MicroRail (3)	SFM MICRORAIL 2"	29	29
004200D	Roof Attachment	FLASHKIT SFM TRIM COMP DARK	11	11
250030U	MicroRail Att Splice	SFM ATT SPLICE 8"	4	4
250010U	MicroRail Splice	SFM SPLICE 6.5"	10	10
004270D	Roof Attachment	FLASHKIT SFM SLIDER COMP DARK	33	33
008100U	Bonding Clamp	SFM TRIM BONDING CLAMP	1	1
250110U	Clip	SFM TRIMRAIL UNIV CLIP W/HDW	12	12
008009P	Grounding Lug	ILSCO LAY IN LUG (GBL4DBT)	1	1
008000U	N-S Wire Clip	SFM N/S BONDING CLAMP	2	2
250130U	End Cap	SFM TRIM END CAPS	1	1

Joseph J Bravo:A01410D00000177CA32C5AD0001228B

Digitally signed by Joseph J Bravo:A01410D00000177CA32C5AD0001228B
Date: 2021.10.22 12:55:58 -06'00'

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GREG ALBRIGHT
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EC13008056

EQUIPMENT & SERVICE LIST

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-6

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

705.12(B)(2)(3)(b)

M

"WARNING"
DUAL POWER SOURCES
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM
RATED AC OUTPUT CURRENT - 21.00 AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.54

NOTES:

1. NEC ARTICLES 690 AND 705 AND FBC 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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Joseph J Bravo.A01410D00000177CA32C5AD0001228B
Digitally signed by Joseph J Bravo.A01410D00000177CA32C5AD0001228B
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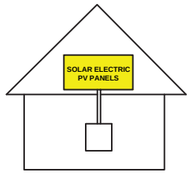
SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



690.56(C)(1)(A)

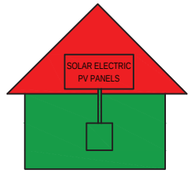
PV METER

PM

AC

EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION.
ONLY CONDUCTORS INSIDE BUILDING OR OFF THE ROOF WILL SHUT DOWN



NFPA 11.12.2.1.1.1.2

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT - **21.00** AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.15, 690.54

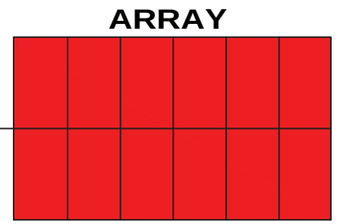
"WARNING"
ELECTRICAL SHOCK HAZARD.
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

690.13 (B)

PV SYSTEM DC DISCONNECT
MAXIMUM VOLTAGE: 480V
MAXIMUM CIRCUIT CURRENT: 13.5A
MAX RATED OUTPUT CURRENT OF THE CONTROLLER OR DC-TO-DC CONVERTER: 15A

690.53

ARRAY



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

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

690.56(C)(3)

INVERTER

DC

J/B

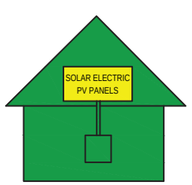
If you have any questions about your system, please call our Customer Support Team at
888.557.6431
or visit freedomforever.com/customer-service
This solar PV system was installed by
freedom FOREVER

"WARNING"
PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES

EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN ENTIRE PV SYSTEM



NFPA 11.12.2.1.1.1.1

CLIENT:
MICHAEL ALLEN
227 SOUTHWEST BELLFLOWER DRIVE,
LAKE CITY, FL 32024
AHJ: COLUMBIA COUNTY (FL)
UTILITY: FPL - FLORIDA POWER & LIGHT
PHONE: (386) 288-6939

SYSTEM:
SYSTEM SIZE (DC): 17 X 420 = 7.140 kW
SYSTEM SIZE (AC): 5.000 kW @ 240V
MODULES: 17 X TESLA: T420S
OPTIMIZERS: 17 X SOLAREDGE P505
INVERTER: SOLAREDGE SE5000H-US [SI1]

REVISIONS

NO.	DESCRIPTION	DATE

freedom FOREVER

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

GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

LABELS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-7

Joseph J Bravo:A01410D00000177CA32C5AD00012 28B

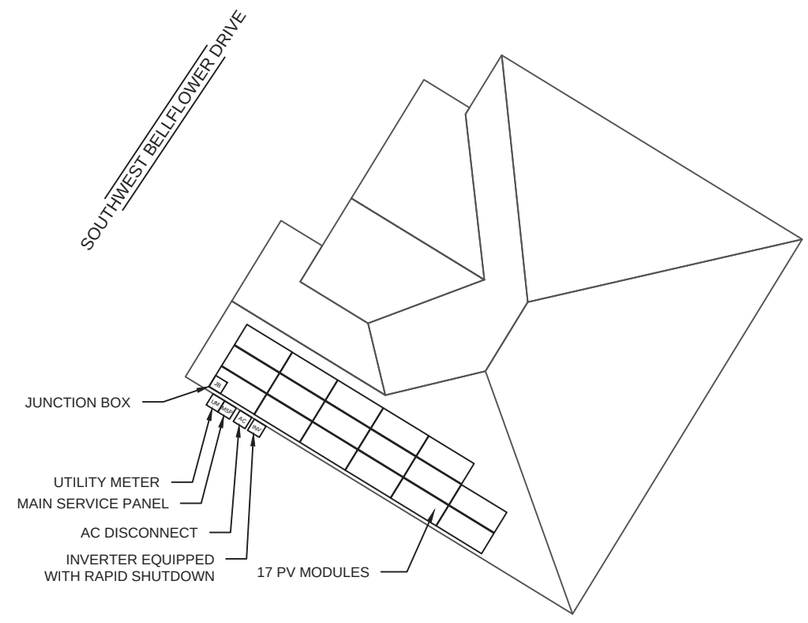
Digitally signed by Joseph J Bravo:A01410D00000177CA32C5AD00012 28B
Date: 2021.10.22 12:56:29 -06'00'

JOSEPH JARRETT BRAVO
LICENSE
No. 90803
STATE OF FLORIDA
PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Joseph J. Bravo on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

CAUTION:

MULTIPLE SOURCES OF POWER LOCATED AS SHOWN.
DANGEROUS VOLTAGE MAY BE PRESENT AT ALL TIMES



6X8" TYP - NEC 705.10

NOTES:

1. NEC ARTICLES 690 AND 705 AND FBC 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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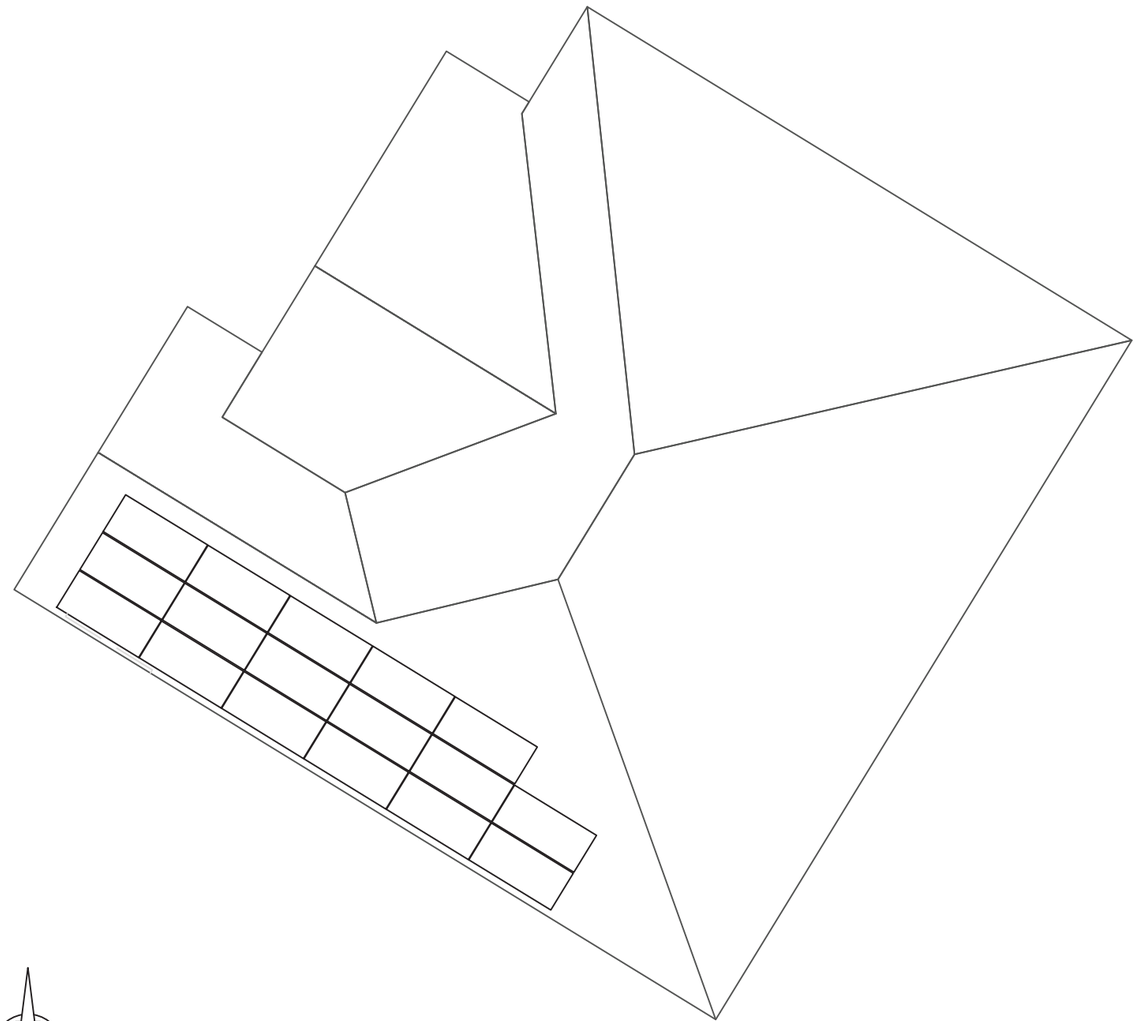
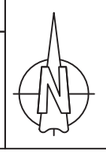
SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-7A

SOLAREDGE OPTIMIZER CHART

	1-10	11-20	21-30	31-40	41-50	51-60
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						





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EC13008056

OPTIMIZER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-8

SAFETY PLAN

INSTRUCTIONS:

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

IN CASE OF EMERGENCY

NEAREST HOSPITAL OR OCCUPATIONAL/INDUSTRIAL CLINIC

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION

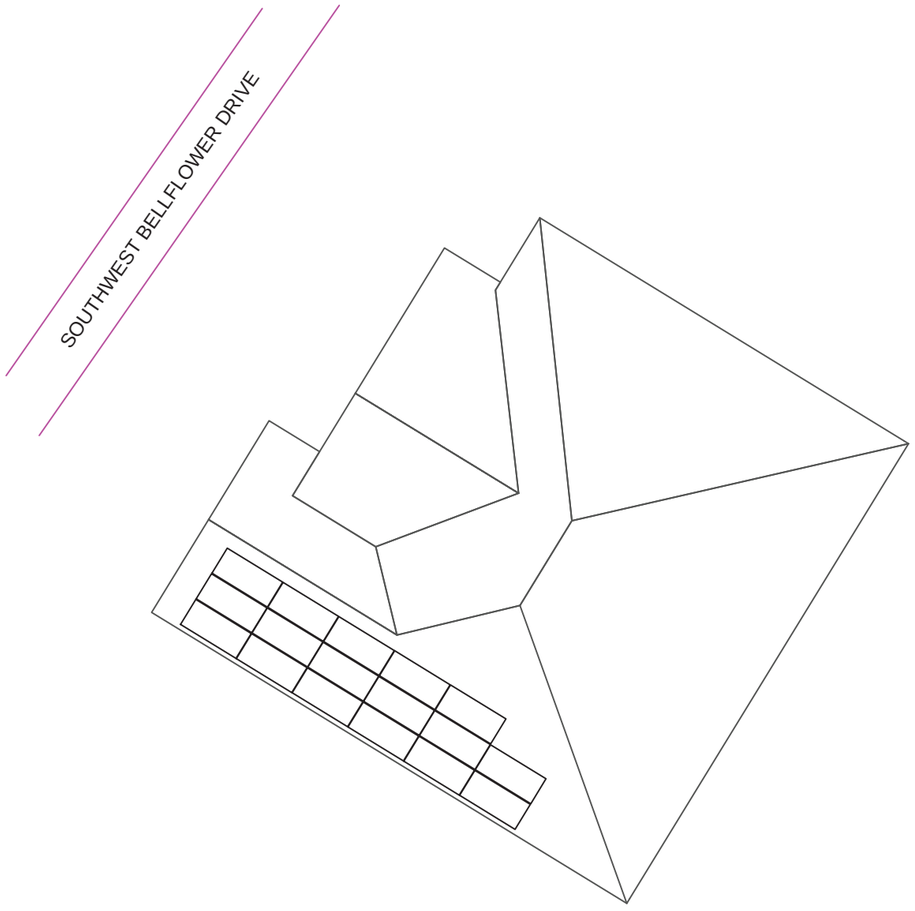
NAME: _____

PHONE NUMBER: _____

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

NAME	SIGNATURE

DATE: _____ TIME:_____



MARK UP KEY

- (P) PERMANENT ANCHOR
- (T) TEMPORARY ANCHOR
- [IL] INSTALLER LADDER
- [B] JUNCTION / COMBINER BOX
- [S] STUB-OUT
- [X] SKYLIGHT
- NO LADDER ACCESS (STEEP GRADE OR GROUND LEVEL OBSTRUCTIONS)
- [ ] RESTRICTED ACCESS
- CONDUIT
- (GAS) GAS SHUT OFF
- (H_2O) WATER SHUT OFF
- (7) SERVICE DROP
- (Z) POWER LINES

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SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-9

JOB HAZARD ANALYSIS

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

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

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

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

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

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

Public Protection
- The safety of the Client and Public must be maintained at all times.
- The Client and the Public shall be prevented from entering the work zone through the use of barriers and/or signage, as required.
- Company, Client and Public property shall be protected from falling objects.
- Pets (including dogs) shall be secured by their owners prior to work start.
- The Client should not leave pets, family members, or others in charge or care of Employees, Contractors, or Temporary Workers.
- Crew leader responsible for communication with the client:
- Client and public is excluded from work area by barricades (N/A, Yes, No):

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

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

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

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

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

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

What is the specific plan to provide and replenish sufficient water for all employees on site?
- If offsite replenish is necessary, where will you go to replenish water (location/address):
- Who will replenish the drinking water (name):

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

Incident Reporting Procedure
- Contact your Site Supervisor
  - Name:
  - Phone:
- Contact your Manager
  - Name:
  - Phone:
- Contact your Site Supervisor
  - Name:
  - Phone:

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

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

Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
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SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
F108278	10/18/2021	ANTON	PV-10

Tesla
Photovoltaic Module

T420S, T425S, and T430S

Maximum Power
The Tesla module is one of the most powerful residential photovoltaic modules available. Our system requires up to 20 percent fewer modules to achieve the same power as a standard system. The module boasts a high conversion efficiency and a half-cell architecture that improves shade tolerance.

Beautiful Solar
Featuring our proprietary Zep Groove design, the all-black module connects easily with Tesla ZS components to keep panels close to your roof and close to each other for a blended aesthetic with simple drop-in and precision quarter-turn connections.

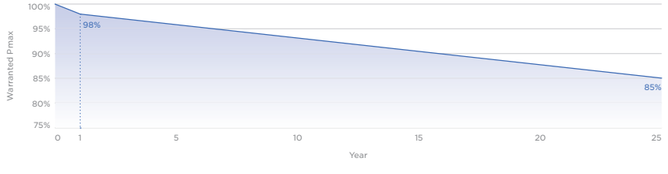
Reliability
Tesla modules are subject to automotive-grade engineering scrutiny and quality assurance, far exceeding industry standards.
Modules are certified to IEC / UL 61730 - 1, IEC / UL 61730 - 2 and IEC / UL 61215.

Limited Warranty

Materials and Processing	25 years
Extra Linear Power Output	25 years

The maximum Pmax degradation is 2% in the 1st year and 0.54% annually from the 2nd to 25th year.

Linear Power Warranty



Module Specifications

Electrical Characteristics

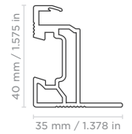
Power Class	T420S		T425S		T430S	
Test Method	STC	NOCT	STC	NOCT	STC	NOCT
Max Power, P_{MAX} (W)	420	313.7	425	317.4	430	321.1
Open Circuit Voltage, V_{OC} (V)	48.5	45.47	48.65	45.61	48.8	45.75
Short Circuit Current, I_{SC} (A)	11.16	9.02	11.24	9.09	11.32	9.15
Max Power Voltage, V_{MP} (V)	40.90	38.08	41.05	38.22	41.20	38.36
Max Power Current, I_{MP} (A)	10.27	8.24	10.36	8.3	10.44	8.37
Module Efficiency (%)	19.3		19.6		19.8	
STC	1000 W/m², 25°C, AM1.5					
NOCT	800 W/m², 20°C, AM1.5, wind speed 1m/s					

Temperature Rating (STC)

Temperature Coefficient of Isc	+0.040% / °C
Temperature Coefficient of V_{OC}	-0.260% / °C
Temperature Coefficient of P_{MAX} (W)	-0.331% / °C

Mechanical Loading

Front Side Design Load	3600 Pa | 75 lb/ft²
Rear Side Design Load	1600 Pa | 33 lb/ft²
Hailstone Test	25 mm Hailstone at 23 m/s

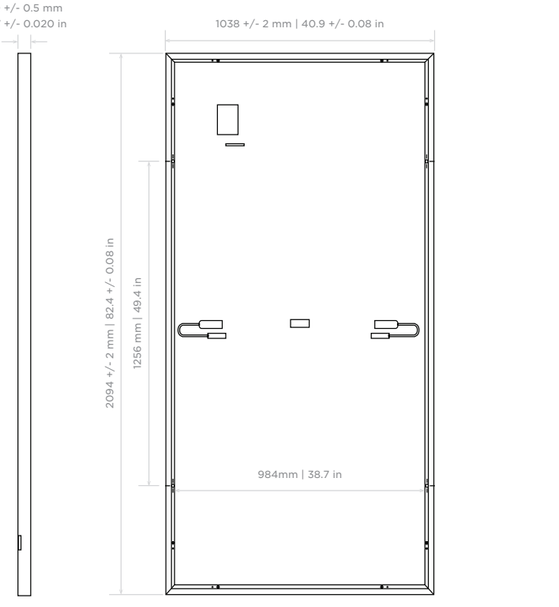


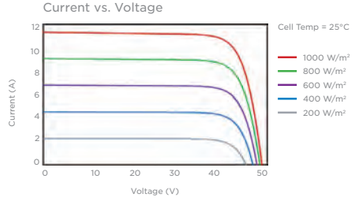
Mechanical Parameters

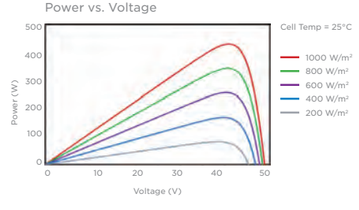
Cell Orientation	144 (6 x 24)
Junction Box	IP68, 3 diodes
Cable	4 mm² | 12 AWG, 1400 mm | 55.1 in. Length
Connector	Staubli MC4 or EVO2
Glass	3.2 mm ARC Glass
Frame	Black Anodized Aluminum Alloy
Weight	25.3 kg | 55.8 lb
Dimension	2094 mm x 1038 mm x 40 mm 82.4 in x 40.9 in x 1.57 in

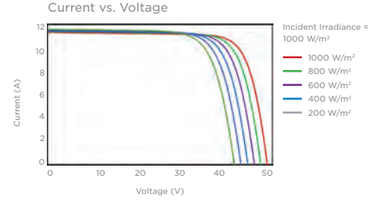
Operation Parameters

Operational Temperature	-40°C - +85°C
Power Output Tolerance	-0 /+5 W
V_{OC} & I_{SC} Tolerance	+/- 3%
Max System Voltage	DC 1000 V (IEC/UL)
Max Series Fuse Rating	20 A
NOCT	45.7 +/- 2°C
Safety Class	Class II
Fire Rating	UL Type 1 or 2









Power Optimizer

P370 / P401 / P404 / P485 / P500 / P505 / P601

POWER OPTIMIZER

25 YEAR WARRANTY

PV power optimization at the module level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Next generation maintenance with module-level monitoring
- Mitigates all types of modules mismatch-loss, from manufacturing tolerance to partial shading
- Superior efficiency (99.5%)
- Flexible system design for maximum space utilization
- Module-level voltage shutdown for installer and firefighter safety
- Fast installation with a single bolt

solaredge.com

solaredge

/ Power Optimizer

P370 / P401 / P404 / P485 / P500 / P505 / P601

OPTIMIZER MODEL (typical module compatibilty)	P370 (60&70 Cell modules)	P401 (60&70 Cell modules)	P404 (for 60-cell and 72 cell, short strings)	P485 (for high voltage modules)	P500 (for 96-cell modules)	P505 (for higher current modules)	P601 (for 1 x high power PV module)	UNIT
INPUT								
Rated Input DC Power(1)	370	400	405	485	500	505	600	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	60		80	125	80	83	65	Vdc
MPPT Operating Range	8 - 60		12.5 - 80	12.5 - 105	8 - 80	12.5-83	12.5 - 65	Vdc
Maximum Short Circuit Current (Isc)	11	12.5	11		10.1	14		Adc
Maximum Efficiency	99.5							%
Weighted Efficiency	98.8						98.6	%
Overvoltage Category	II							
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)								
Maximum Output Current	15							Adc
Maximum Output Voltage	60		80		60	80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)								
Safety Output Voltage per Power Optimizer	1 ± 0.1							Vdc
STANDARD COMPLIANCE								
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3							
Safety	IEC62109-1 (class II safety), UL1741							
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 27.5 / 5.1 x 6 x 1.1	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 153 x 42.5 / 5.1 x 6 x 1.7	129 x 159 x 49.5 / 5.1 x 6.2 x 1.9	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 162 x 59 / 5.1 x 6.4 x 2.3	129 x 153 x 52 / 5.1 x 6 x 2	mm / in
Weight (including cables)	655 / 1.5		775 / 1.7	845 / 1.9	750 / 1.7	1064 / 2.3		gr / lb
Input Connector	MC4(2)			Single or Dual MC4(2)(3)	MC4(2)			
Input Wire Length	0.16 / 0.52, 0.9 / 2.95	0.16 / 0.52						m / ft
Output Connector	MC4							
Output Wire Length	1.2 / 3.9						1.4 / 4.5	m / ft
Operating Temperature Range(4)	-40 to +85 / -40 to +185							˚C / ˚F
Protection Rating	IP68							
Relative Humidity	0 - 100							%

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For dual version for parallel connection of two modules use the P485. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer connected to one PV module is supported. When connecting a single module, seal the unused input connectors using the supplied pair of seals
(4) 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(5)		Single Phase HD-WAVE	Single Phase	Three Phase	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	P370, P401, P500(6)	8		16	18	
	P404, P485, P505, P601	6		14 (13 with SE3K(7))	14	
Maximum String Length (Power Optimizers)		25		50	50	
Maximum Nominal Power per String(8)		5700	5250	11250(9)	12750(10)	W
Parallel Strings of Different Lengths or Orientations		Yes				

(5) It is not allowed to mix P404/P485/P505/P601 with P370/P401/P500 in one string
(6) The P370/P401/P500 cannot be used with the SE3K three phase inverter (available in some countries; refer to the three phase inverter SE3K-SE10K datasheet)
(7) Exactly 10 when using SE3K-RW010BNN4
(8) 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
(9) For the 230/400V grid: it is allowed to install up to 13,500W per string when the maximum power difference between each string is 2,000W
(10) For the 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W

CE

Single Phase Inverter with HD-Wave Technology

for North America

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

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

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

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
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 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	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
GFDI Threshold	1							A
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	380				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	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Data, ANSI C12.20	Optional[3]							
Rapid Shutdown - NEC 2014 and 2017 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 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 (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	Natural Convection							
Operating Temperature Range	-13 to +140 / -25 to +60[4] (-40°F / -40°C option)[5]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

[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
[3] Revenue grade inverter P/N: SExxxxH-US000NNC2
[4] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[5] -40 version P/N: SExxxxH-US000NNU4

RoHS

pe.eaton.com

Eaton general duty non-fusible safety switch

DG221URB

UPC:782113120232

Dimensions:

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

Weight:6 LB

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

Warranties:

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

Specifications:

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

Supporting documents:

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

Certifications:

- UL Listed

Product compliance: No Data

SFM INFINITY

UNIRAC®
BETTER SOLAR STARTS HERE

Take your business to the next level with **SFM** INFINITY, UNIRAC's rail-less PV mounting system for flush mount installations on comp shingle and tile roofs. An advanced 3rd generation product platform in use by top solar contractors nationwide, **SFM** INFINITY optimizes your operations on and off the roof, with approximately 40% less labor, 30% logistics savings, and 20% fewer roof attachments than traditional solar racking. Plus, 87% of homeowners prefer **SFM** INFINITY's aesthetics.

UNIVERSAL COMPONENTS
FIT 32 – 40MM MODULES

SUPERIOR PERFORMANCE
Enhance your business with two installs per day and 30% less cost.

EASY INSTALLATION
Pre-assembled components, 20% fewer roof attachments, and level array in seconds with post height adjustment.

HOMEOWNER PREFERRED
More than 4 out of 5 homeowners prefer **SFM** INFINITY'S aesthetics over a leading rail brand.

REVOLUTIONIZING ROOFTOP SOLAR

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

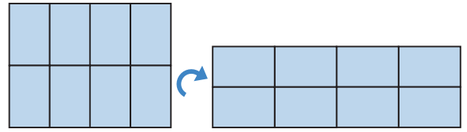
SFM INFINITY
DESIGN GUIDELINES

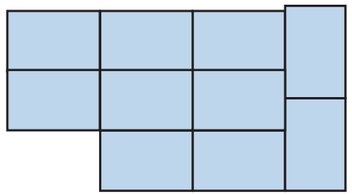
UNIRAC®
BETTER SOLAR STARTS HERE

While you will see advantages simply from switching to **SFM** INFINITY, the following guidelines will help you to maximize its benefits.

DEFAULT TO LANDSCAPE

When possible, design in landscape orientation in order to fit more modules on the roof and minimize roof attachments.





MIX MODULE ORIENTATIONS

SFM INFINITY is easily configured in mixed array shapes and module orientations to maximize array density and to avoid vent pipes and other obstacles. Because mounting locations are not constrained by rails, **SFM** INFINITY has unmatched flexibility to enhance your projects.

CONSULT THE QUICK TIPS VIDEOS

Visit UNIRAC's mobile-friendly library of short, topic-specific videos which answer common questions and demonstrate how simple it is to install **SFM** INFINITY.

Quick Tips Videos: **https://unirac.com/SFM-Infinity/**

DESIGN IN U-BUILDER

Layout your arrays in **U-Builder**, UNIRAC's free solar design software, to optimize **SFM** INFINITY'S capabilities, including mixing module orientations and minimizing roof attachments. Quickly create layouts on Google or Bing Maps and generate project documents.

U-Builder: **https://design.unirac.com/**

REVOLUTIONIZING ROOFTOP SOLAR

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

2.0 Product Description	
Product	Photovoltaic Mounting System, Sun Frame Microrail - Installed Using Unirac Installation Guide, Rev PUB2019MAR01 with Annex North Row Extension Installation Guide Rev PUB2019FEB20
Brand name	Unirac
Description	The product covered by this report is the Sun Frame Micro Rail roof mounted Photovoltaic Rack Mounting System. This system is designed to provide bonding and grounding to photovoltaic modules. The mounting system employs anodized or mill finish aluminum brackets that are roof mounted using the slider, outlined in section 4 of this report. There are no rails within this product, whereas the 3" Micro Rail, Floating Splice, and 9" Attached Splice electrically bond the modules together forming the path to ground. The Micro Rails are installed onto the module frame by using a stainless steel bolt anodized with black oxide with a stainless type 300 bonding pin, torqued to 20 ft-lbs, retaining the modules to the bracket. The bonding pin of the Micro Rail when bolted and torqued, penetrate the anodized coating of the photovoltaic module frame to contact the metal, creating a bonded connection from module to module. The grounding of the entire system is intended to be in accordance with the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems. Any local electrical codes must be adhered in addition to the national electrical codes. The Grounding Lug is secured to the photovoltaic module, torqued in accordance with the installation manual provided in this document. Other optional grounding includes the use of the Enphase UL2703 certified grounding system, which requires a minimum of 2 micro-inverters mounted to the same rail, and using the same engage cable.
Models	Unirac SFM

2.0 Product Description	
Model Similarity	NA
Ratings	**Fuse Rating:** 30A **Module Orientation:** Portrait or Landscape **Maximum Module Size:** 17.98 ft² **UL2703 Design Load Rating:** 33 PSF Downward, 33 PSF Upward, 10 PSF Down-Slope Tested Loads - 50 psf/2400Pa Downward, 50psf/2400Pa Uplift, 15psf/720Pa Down Slope Trina TSM-255PD05.08 and Sunpower SPR-E20-327 used for Mechanical Loading Increased size ML test: **Maximum Module Size:** 22.3 ft² **UL2703 Design Load Rating:** 113 PSF Downward, 50 PSF Upward, 30 PSF Down-Slope LG355S2W-A5 used for Mechanical Loading test. **Mounting configuration:** Four mountings on each long side of panel with the longest span of 24" **UL2703 Design Load Rating:** 46.9 PSF Downward, 40 PSF Upward, 10 PSF Down-Slope LG395N2W-A5, LG360S2W-A5 and LG355S2W-A5 used for used for Mechanical Loading test. **Mounting configuration:** Six mountings for two modules used with the maximum span of 74.5" Fire Class Resistance Rating: - Class A for Steep Slope Applications when using Type 1 Modules. Can be installed at any interstitial gap. Installations must include Trim Rail. - Class A for Steep Slope Applications when using Type 2 Modules. Can be installed at any interstitial gap. Installations must include Trim Rail. - Class A Fire Rated for Low Slope applications with Type 1 or 2 listed photovoltaic modules. This system was evaluated with a 5” gap between the bottom of the module and the roof’s surface *See section 7.0 illustraction # 1 and 1a for a complete list of PV modules evaluated with these racking systems*
Other Ratings	NA

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Applicant:	Unirac, Inc	**Manufacturer:**	Cixi Emeka Aluminum Co. Ltd
Address:	1411 Broadway Blvd NE Albuquerque, NM 87102	**Address:**	No. 688 ChaoSheng Road Cixi City Zhejiang Province 315311
Country:	USA	**Country:**	China
Contact:	Klaus Nicolaedis Tom Young	**Contact:**	Jia Liu Robin Luo
Phone:	505-462-2190 505-843-1418	**Phone:**	+86-15267030962 +86-13621785753
FAX:	NA	**FAX:**	NA
Email:	klaus.nicolaedis@unirac.com toddg@unirac.com	**Email:**	jia.liu@cxymj.com buwan.luo@cxymj.com

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Lake Forest, CA U.S.A.

Control Number: 5003705 **Authorized by:** Natalie Tohmey

for Dean Davidson, Certification Manager

This document supersedes all previous Authorizations to Mark for the noted Report Number.

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

Standard(s):	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703: 2015 Ed.1]
Product:	Photovoltaic Mounting System, Sun Frame Microrail - Installed Using Unirac Installation Guide, Rev PUB2019MAR01 with Annex North Row Extension Installation Guide Rev PUB2019FEB20
Brand Name:	Unirac
Models:	Unirac SFM

May 21, 2021

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 Florida

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 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
2. 2020 FBC - Building, 7th Edition, Based on 2018 International Building Code
3. 2020 FRC - Residential, 7th Edition, Based on 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, by The Aluminum Association, Inc.
6. ANSI/AWC NDS-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.

DIGITALLY SIGNED
PAUL K. ZACHER LICENSE No. 73522 STATE OF FLORIDA PROFESSIONAL ENGINEER EXP. 02/28/2023
05/21/2021

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

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY PAUL K. ZACHER, PE ON 05/21/2021 USING A SHA-1 AUTHENTICATION CODE.

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