

PROJECT DESCRIPTION

SYSTEM CAPACITY: 9.36 KW DC / 6.96 KW AC

PV PANELS: (24) CS3U-390MS (390W) BY CANADIAN SOLAR

COMBINER: (24) PV LINK BY GENERAC

INVERTER: (1) PWRCELL 7600 BY GENERAC

RACKING SYSTEM: XR100 SYSTEM BY IRON RIDGE SYSTEMS

PROJECT INFORMATION

PROJECT LATITUDE	30.123397	MIN AMBIENT TEMP	-5 ° C
PROJECT LONGITUDE	-82.647421	MAX AMBIENT TEMP	35 ° C
AHJ	COLUMBIA COUNTY	WIND EXPOSURE	C
		DESIGN WIND SPEED	119 MPH

DRAWINGS INDEX

C-1	COVER SHEET
E-1	ONE LINE RISER DIAGRAM
E-2	SAFETY LABELS
S-1	STRUCTURAL PLAN
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S-3	RACKING PLAN
D-1	PV MODULES DATA SHEET
D-2	SMART MONITORING DATA SHEET
D-3	INVERTER DATA SHEET
D-4	RAPID SHUTDOWN DATA SHEET
D-5	BATTERY DATA SHEET
D-6	AUTOMATIC TRANSFER SWITCH DATA SHEET

GENERAL NOTES

PER FL. STATUTE 377.705 (REVISED 7/1/2017), I RAFAEL A. GONZALEZ SOTO, P.E. 83104 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE.

APPLICABLE CODES: 2020 FLORIDA BUILDING CODE 7TH EDITION, ASCE 7-16 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES, FFPC 7TH EDITION, NFPA 2018, NFPA 70 AND NEC 2017.

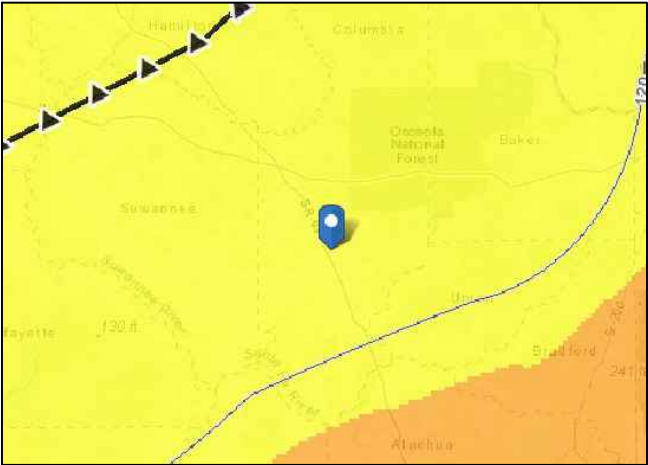
CONTRACTOR SHALL ENSURE ALL ROOF PENETRATIONS TO BE INSTALLED AND SEALED PER 2020 FLORIDA BUILDING CODE 7TH EDITION OR LOCAL GOVERNING CODE.

ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE (NEC) 2017, LOCAL STATE CODES, AND OTHER APPLICABLE LOCAL CODES. MEANS SHALL BE PROVIDED TO DISCONNECT ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS IN THE BUILDING. CONNECTORS TO BE TORQUED PER DEVICE LISTING, OR MANUFACTURERS RECOMMENDATIONS. NON-CURRENT CARRYING METAL PARTS SHALL BE CHECKED FOR PROPER GROUNDING.

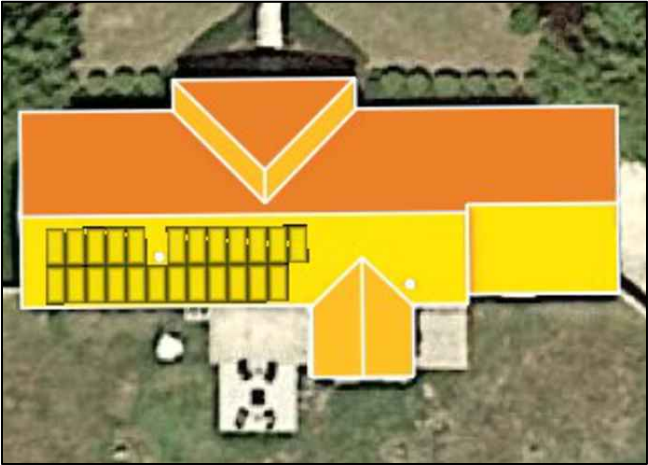
REQUIRED SAFETY SIGNS AND LABELS SHALL BE PERMANENTLY ATTACHED BY ADHESIVE, OR OTHER MECHANICAL MEANS. LABELS SHALL COMPLY WITH ARTICLE 690 VI OF THE NEC 2017 OR OTHER APPLICABLE STATE AND LOCAL CODES. SEE LABELS AND MARKING PAGE FOR MORE INFORMATION.

RACKING ROOF MOUNT SYSTEM SHALL BE INSTALLED FOLLOWING MANUFACTURERS INSTRUCTION SPEC'S, INCLUDING ALL GROUNDING WEEB CLIPS, GROUND LUGS, AND RAIL SPLICE KITS FOR ELECTRICAL CONTINUITY.

MECAWIND TOOL IS BASED ON THE C&C WIND LOADS FOR ENCLOSED BUILDINGS. DESIGN WIND PRESSURES ARE CALCULATED USING ASCE 7-16 EQUATION 30.6-1. ALL NOTES IN FIGURES ASCE 7-16 30.4-1 AND 30.4-2(A,B AND /67C) HAVE BEEN INCORPORATED. MEAN ROOF HEIGHT MUST BE LESS THAN 60 FEET.



2 LOCATION MAP / WIND ZONES
N.T.S.



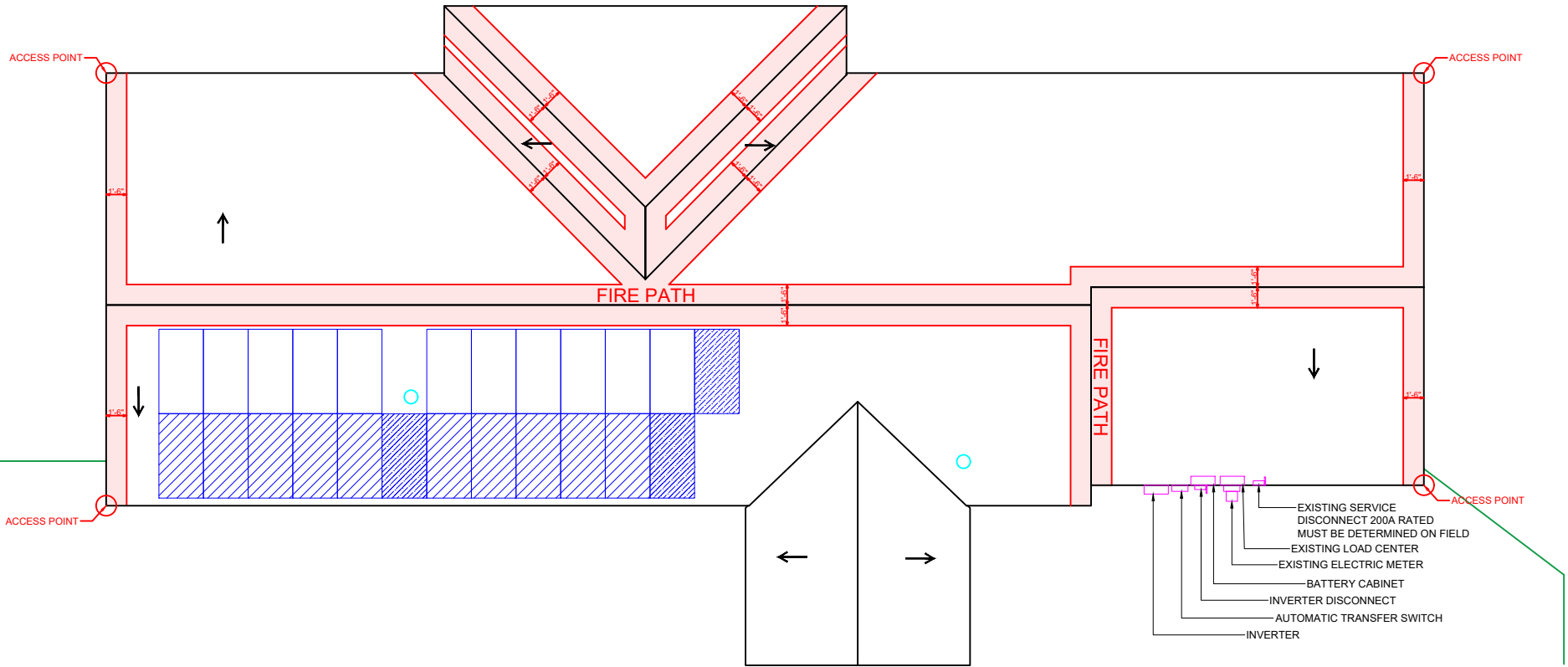
3 IRRADIANCE MAP
N.T.S.



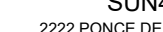
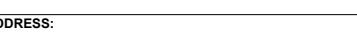
4 3D RENDERING
N.T.S.



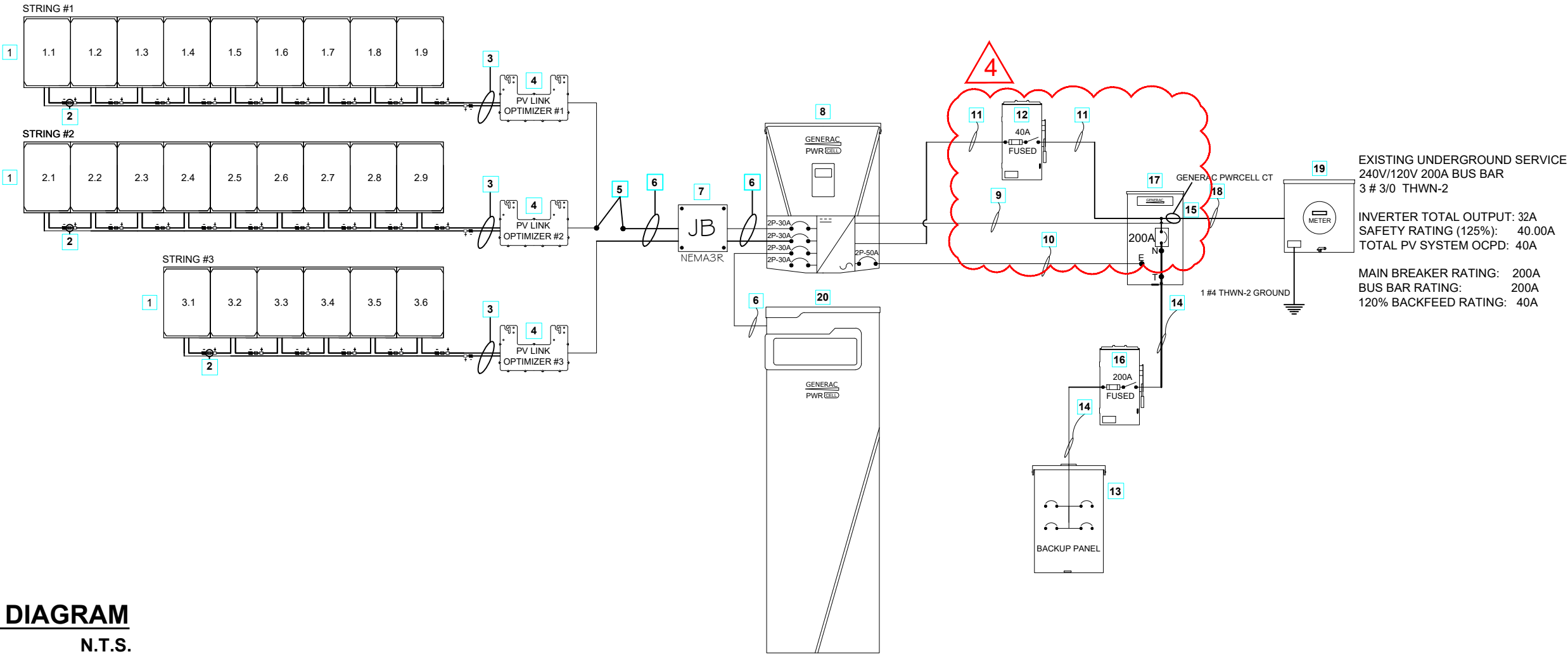
"PROPERTY SIDE FACING STREET"



1 ROOF PLAN VIEW / BOS LOCATION
N.T.S.

DOCUMENT CONTROL				DATE	sCAD	eCAD	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP	CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO	CUSTOMER:		SHEET NAME:	
ISSUED FOR PERMIT				8-2-22	JH	DM	ENGINEPARTNERS LLC C.A. 32661 1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134 DESIGN@ENGINEPARTNERS.COM 833 - 888 - 3644			Rafael A Gonzalez Soto 2022.12.06 16:14:28 -04'00'	SUN4 2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134 (786) 833 -7864 #CVC57137 #EC13008093		ISAAC HARRIS		COVER SHEET	
REV	DESCRIPTION			DATE	sCAD	eCAD							PROJECT ADDRESS:			
1	INDEX AND EQUIPMENT REVISED			09-14-22	DM	DM							456 SW HARMONY LN, LAKE CITY FL, 32025			
2	ENPHASE EQUIPMENT REVISED TO GENERAC			09-20-22	DM	DM							PARCEL NUMBER: 19-4S-17-08572-001 (31851)			
												PROJECT ID: EP15365		ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE		SHEET TITLE: C-1
												DATE: 8-1-22				

	WIRE SIZES, QUANTITY & TYPE			RACEWAY SIZE, TYPE & LOCATION			WIRE AMPACITY CALCULATIONS							ADDITIONAL INFORMATION			
WIRE TAG	CONDUCTOR QTY. SIZE & TYPE	NEUTRAL QTY. SIZE & TYPE	GROUND QTY. SIZE & TYPE	RACEWAY SIZE & TYPE	RACEWAY LOCATION	RACEWAY HEIGHT ABOVE ROOF	OUTPUT CURRENT	125% OF OUTPUT CURRRENT	MIN OCPD	WIRE DE-RATED CALCULATION				DIST.	VOLTAGE	VOLTAGE DROP %	CONDUIT FILL %
										WIRE RATING	AMBIENT TEMPERATURE COEFFICIENT	# OF CONDUCTORS COEFFICIENT	DE-RATES AMPACITY				
DC (BEFORE JB)	(4) #10 AWG PV WIRE	N/A	(1) #8 AWG BARE COPPER	NOT APPLICABLE	UNDER ARRAY	1/2" TO 3-1/2"	15A	18.8A	20A	40A	0.76	1	30A	10 FT.	350V	0.11%	6.4%
DC (AFTER JB)	(4) #10 AWG THWN-2	N/A	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	ABOVE ROOF	1/2" TO 3-1/2"	15A	18.8A	20A	40A	0.76	0.8	24.3A	20 FT.	350V	0.21%	8.1%
AC (INVERTER TO METER)	(2) #8 AWG THWN-2	(1) #8 AWG THWN-2	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	EXTERIOR WALL	"N/A"	32A	40.0A	40A	55A	1	1	55A	5 FT.	240V	0.1%	7.7%



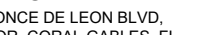
1

ONE LINE RISER DIAGRAM

N.T.S.

LEGEND:

1	(24) CS3U-390MS (390W) BY CANADIAN SOLAR REFER TO D-1 SHEET	2	GENERAC SNAP RS801 REFER TO D-4 SHEET	3	2 #10 PV WIRE PER STRING 1 #8 BARE WIRE GROUND 3/4" EMT CONDUIT	4	GENERAC PV LINK SUBSTRING OPTIMIZER S2502
5	MULTI-CONTACT 32.0018 PV-AZB4, MC4 Y-CONNECTOR (1) MALE / (2) FEMALE, 1500V, 50A	6	2 #10 THWN-2 1 #10 THWN-2 GROUND 3/4" EMT CONDUIT (21.95% CONDUIT FILL)	7	NEMA 3R JUNCTION BOX	8	PWRCELL7600A BY GENERAC REFER TO D-4 SHEET
9	CAT5 CABLE FOR RJ-45 CONNECTOR BREAKOUT ADAPTER	10	2 #6 L1,L2 THWN-2 1 #6 THWN-2 NEUTRAL 1 #8 TWHN-2 GROUND 3/4" EMT CONDUIT	11	2 #8 L1,L2 THWN-2 1 #8 THWN-2 NEUTRAL 1 #8 TWHN-2 GROUND 3/4" EMT CONDUIT	12	PV DISCONNECT - RATED 60A
13	EXISTING INTERIOR MAIN DISTRIBUTION PANEL	14	2 #3/0 L1,L2 THWN-2 1 #3/0 THWN-2 NEUTRAL 1 #4 THWN-2 GROUND 1 1/2" EMT CONDUIT	15	PV INTERCONNECTION - LST	16	EXISTING INTERIOR MAIN PANEL DISCONNECT - 200A RATED W/200A FUSES
17	PWRCELL ATS - 200A SERVICE ENTRANCE RATED BY GENERAC REFER TO D-6 SHEET	18	2 #3/0 THWN-2 1 #3/0 THWN-2 GROUND 1 1/2" EMT CONDUIT	19	UTILITY ELECTRICAL SERVICE	20	PWRCELL 18KW BATTERY BY GENERAC REFER TO D-5 SHEET

DOCUMENT CONTROL				DATE	sCAD	eCAD	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP	CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO	CUSTOMER:		SHEET NAME: ONE LINE RISER DIAGRAM					
ISSUED FOR PERMIT				8-2-22	JH	DM	ENGIPARTNERS LLC C.A. 32661 1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644			Rafael A Gonzalez Soto 2022.12.06 16:14:40 -04'00'			SUN4 2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134 (786) 833 - 7864 #CVC57137 #EC13008093					ISAAC HARRIS		
REV DESCRIPTION				DATE	sCAD	eCAD						PROJECT ADDRESS: 456 SW HARMONY LN, LAKE CITY FL, 32025								
	LEGEND AND EQUIPMENT REVISED			09-14-22	DM	DM									PARCEL NUMBER: 19-4S-17-08572-001 (31851)					
	ENPHASE EQUIPMENT REVISED TO GENERAC			09-20-22	DM	DM														
	PV DISCONNECT ADDED			10-13-22	DM	DM														
	POI AND DISCONNECT REVISED			11-14-22	DM	DM														
															PROJECT ID: EP15365		ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE		SHEET TITLE: E-1	
																	DATE: 8-1-22			

**WARNING**

ELECTRICAL SHOCK HAZARD

TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

LABEL LOCATION:
AC DISCONNECT,
POINT OF INTERCONNECTION
PER CODE: NEC 690.13 (B)

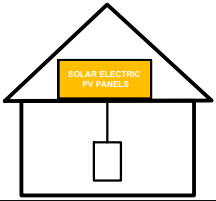
**WARNING**

TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 110.27 (C)
OSHA 1910.145(f)(7)

**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.



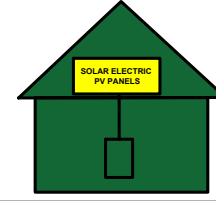
LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 690.56(C)(1)(a)

**PHOTOVOLTAIC
SYSTEM EQUIPPED
WITH RAPID SYSTEM
SHUTDOWN**

LABEL LOCATION:
AC DISCONNECT
POINT OF INTERCONNECTION
PER CODE: NEC 690.56(C)

**EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM IS
EQUIPPED WITH RAPID SHUTDOWN**

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



LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: FFPC 7TH EDITION: 11.12.2.1.1.1.1

INVERTER #1

NOMINAL OPERATING AC VOLTAGE

240 V

NOMINAL OPERATING AC FREQUENCY

60 HZ

MAXIMUM AC POWER

6.96 KW

MAXIMUM AC CURRENT

32A

MAX OVERCURRENT DEVICE RATING
FOR AC MODULE PROTECTION

N/A

LABEL LOCATION:
INVERTER
PER CODE: NEC 690.52

MAXIMUM VOLTAGE

480 VDC

MAXIMUM CIRCUIT CURRENT

30 A

MAX RATED OUTPUT CURRENT OF
THE CHARGE CONTROLLER OR DC-TO-DC
CONVERTER
(IF INSTALLED)

15A

LABEL LOCATION:
INVERTER
PER CODE: NEC 690.53

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:

32 A

NOMINAL OPERATING AC VOLTAGE:

240V

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.54

**MAIN PHOTOVOLTAIC
SYSTEM DISCONNECT**

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.13 (B)

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

LABEL LOCATION:
MAIN SERVICES
DISCONNECT, DC CONDUIT
PER CODE: NEC 690.31 (G) (3)

**WARNING**

**DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM**

LABEL LOCATION:
POINT OF
INTERCONNECTION
PER CODE: NEC 705.12 (B)(3)

**WARNING**

**POWER SOURCE OUTPUT CONNECTION. DO NOT
RELOCATE THIS OVERCURRENT DEVICE**

LABEL LOCATION:
POINT OF
INTERCONNECTION
PER CODE: NEC
705.12(B)(2)(3)(b)

**CAUTION**

PHOTOVOLTAIC SYSTEM CIRCUIT IS SUPPLY SIDE

LABEL LOCATION:
MAIN SERVICE PANEL
PER CODE: NEC 690.45(B)(5)

**DO NOT DISCONNECT
UNDER LOAD**

LABEL LOCATION:
POINT OF
INTERCONNECTION
PER CODE:
NEC 690.33(E)(2) & NEC
690.15 (C)

**CAUTION: SOLAR ELECTRIC
SYSTEM CONNECTED**

LABEL LOCATION: POINT OF INTERCONNECTION
PER CODE: NEC 690.15, NEC 690.13(B)

LABEL LOCATION: ADJACENT TO MAIN DISCONNECT

SUN4

PHONE: 786-833-7864

ADDRESS: 2222 PONCE DE LEON BLVD
3RD FLOOR CORAL GABLES, FL 33134

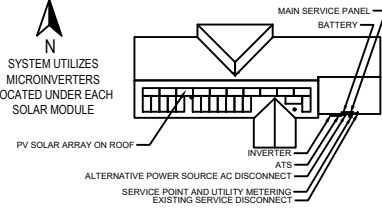
GENERAL NOTE:

ADHESIVE FASTENED SIGNS:

- THE LABEL SHALL BE VISIBLE, REFLECTIVE AND SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED [NFPA 1, 11.12.2.1]
- WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
- ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

**CAUTION**

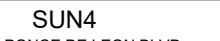
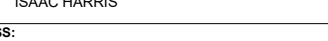
POWER TO THIS BUILDING IS ALSO
SUPPLIED FROM THE FOLLOWING SOURCES
WITH DISCONNECTS LOCATED AS SHOWN:



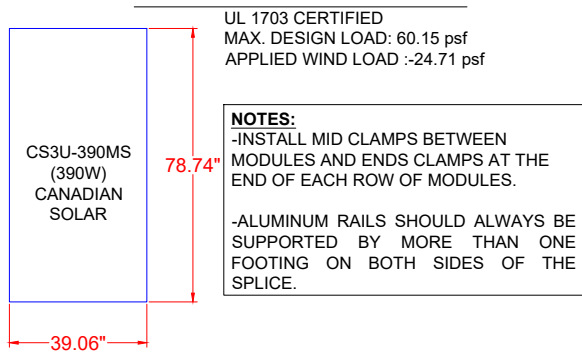
PER CODE: NEC 690.56 (B) , NEC705.10

1

PV SAFETY LABELS DATA
N.T.S.

DOCUMENT CONTROL				DATE	sCAD	eCAD	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:															
ISSUED FOR PERMIT				8-2-22	JH	DM	ENGINEPARTNERS LLC C.A. 32661 1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134 DESIGN@ENGINEPARTNERS.COM 833 - 888 - 3644				Rafael A Gonzalez Soto 2022.12.06 16:14:50 -04'00'		SUN4 2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134 (786) 833 -7864 #CVC57137 #EC13008093				ISAAC HARRIS		SAFETY LABELS													
REV				DESCRIPTION	DATE	sCAD											eCAD	PROJECT ADDRESS:														
2				ENPHASE EQUIPMENT REVISED TO GENERAC	09-20-22	DM											DM	456 SW HARMONY LN, LAKE CITY FL, 32025														
																								PARCEL NUMBER:		19-4S-17-08572-001 (31851)	PROJECT ID:	EP15365	ENGINEER OF RECORD:	ENG. RAFAEL A. GONZALEZ SOTO, PE	SHEET TITLE:	E-2
																											DATE:	8-1-22				

LEGEND & SYMBOLS



NOTES:
-INSTALL MID CLAMPS BETWEEN
MODULES AND ENDS CLAMPS AT THE
END OF EACH ROW OF MODULES.

-ALUMINUM RAILS SHOULD ALWAYS BE
SUPPORTED BY MORE THAN ONE
FOOTING ON BOTH SIDES OF THE
SPLICE.

WORST CASE MODULE:

ZONE 1: 55%

ZONE 2e: 45%

$$-24.71(0.55) + -24.71(0.45) = -24.71 \text{ psf}$$

ULTIMATE WIND SPEED	120 mph
DESIGN WIND SPEED	119 mph
RISK CATEGORY	II
EXPOSURE CATEGORY	C
ROOF SLOPE (°)	20
ROOF TYPE	GABLED
MATERIAL ROOF TYPE	METAL
PRESSURE ZONE:	1&2
MEAN ROOF HEIGHT:	12.58 '
0.5 MEAN ROOF HEIGHT	6.29 '
2H ₂	12 "
PERIMETER WIDTH:	3.36 '
K _D	0.85
K _{ZT}	1.0
K _H	0.849

VELOCITY PRESSURE (q) = 0.60*0.00256* K _H K _{ZT} K _D V ²	
VELOCITY PRESSURE (ASD)	15.69

NON EXPOSED EDGE FACTOR: $\gamma_E = 1.0$	EXPOSED EDGE FACTOR: $\gamma_E = 1.5$	ARRAY EQUALIZATION FACTOR:
		$\gamma_a = 0.7$

EXTERNAL PRESSURE COEFFICIENT Z1	0.7	-1.5
EXTERNAL PRESSURE COEFFICIENT Z2e	0.7	-1.5
EXTERNAL PRESSURE COEFFICIENT Z2n	0.7	-2.5
EXTERNAL PRESSURE COEFFICIENT Z2r	0.7	-2.5
EXTERNAL PRESSURE COEFFICIENT Z3e	0.7	-2.5
EXTERNAL PRESSURE COEFFICIENT Z3r	0.7	-3.6

INTERNAL PRESSURE COEFFICIENT	0.18
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ZONES		PRESSURES (PSF)	NON EXPOSED PRESSURES (PSF)	EXPOSED PRESSURES (PSF)	MAX SPAN (FT)	MAX CANTI- LEVER (IN)
1		-26.37	-16.47	-24.71	4'	16"
2e		-26.37	-16.47	-24.71	4'	16"
2n		-42.06	-27.46	-41.19	4'	16"
2r		-42.06	-27.46	-41.19	4'	16"
3e		-42.06	-27.46	-41.19	4'	16"
3r		-59.33	-39.54	-59.31	4'	16"

TOTAL ROOF AREA	3596.07	sq.-ft
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TOTAL MODULES:	24
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TOTAL PHOTOVOLTAIC AREA:	512.53	sq.-ft
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TOTAL PERCENTAGE AREA OF PV SYSTEM:	14.25%
WIND LOAD (PSE):	21.31

WIND LOAD (PSF):	-24.71
TOTAL WIND LOAD (LBS):	-12 664.62

TOTAL WIND LOAD (LBS):	12,004.02
TOTAL ROOF MOUNTS:	32

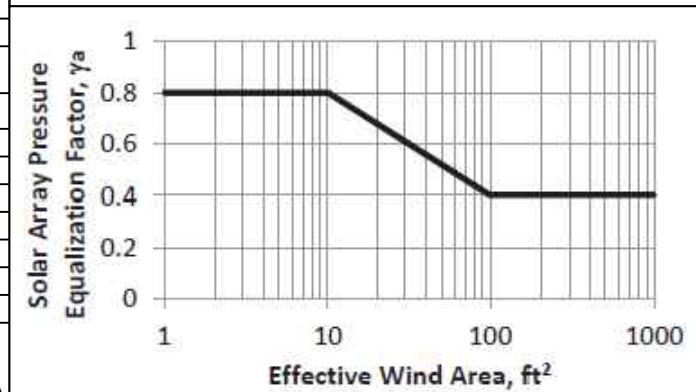
TENSION FORCE PER MOUNT (LBS):	-395.77
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[illegible]

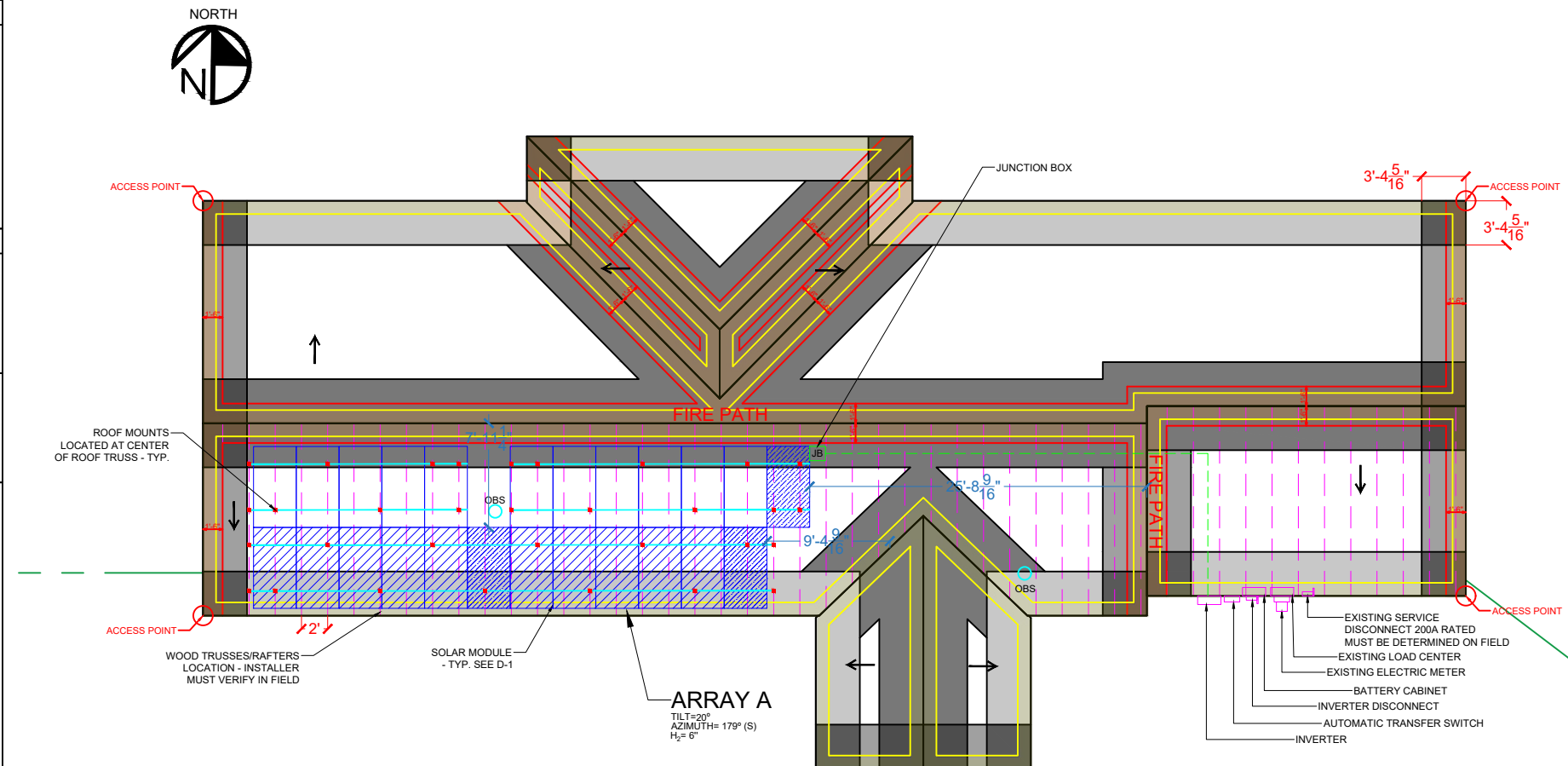
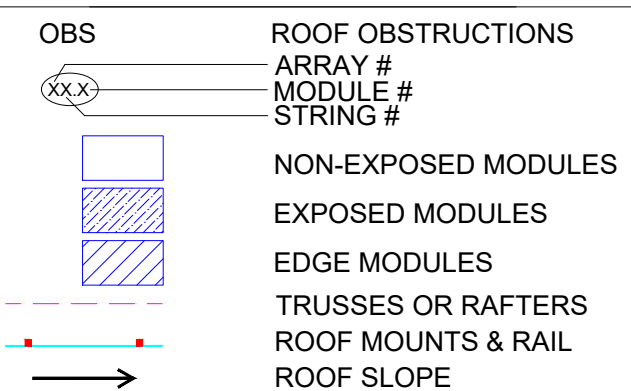
11/11/2023	ROOF'S GENERAL NOTES:
	1- CONTRACTOR/INSTALLER TO VERIFY ROOF CONDITIONS FOR PROPER INSTALLATION OF THE PV SYSTEM.
	2- CONTRACTOR/INSTALLER TO NOTIFY THE OWNER IMMEDIATELY OF ANY ROOF DEFICIENCIES AND/OR REPAIR REQUIRED TO INSTALL THE PV SYSTEM.
	3- EOR DOES NOT ASSUME ANY RESPONSIBILITY FOR THE INSTALLATION OF ANY PV SYSTEM ON DEFICIENT ROOFS.
	4-CONTRACTOR/INSTALLER ASSUMES ALL RESPONSIBILITY TO INSTALL AS PER MANUFACTURER STANDARDS.

ROOF INSPECTION NOTE:	
A PANEL IS DEFINED AS EXPOSED IF D1 TO THE ROOF EDGE >0.5H AND ONE OF THE FOLLOWING APPLIES:	
1.	D1 TO THE ADJACENT ARRAY > 4 FT (1.2 M) OR
2.	D2 TO THE NEXT ADJACENT PANEL> 4 FT. (1.2 M)

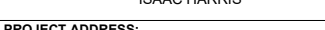
ASCE 7.16 - 29.4-7
DESIGNED WIND PRESSURES:
$$p = q_h (GC_p)(\gamma_E)(\gamma_a)$$



	ROOF'S NOTES:	
	- IN COMPLIANCE WITH 2020 FLORIDA BUILDING CODE 7TH EDITION R324.6.2 SETBACK AT RIDGE (FOR PV ARRAYS THAT OCCUPY LESS THAN 33% THAN THE TOTAL ROOF AREA, A MINIMUM SETBACK OF 1.5FT IS REQUIRED ON BOTH SIDES OF THE HORIZONTAL RIDGE).	



1 STRUCTURAL ROOF PLAN & PV MODULES LAYOUT

DOCUMENT CONTROL				DATE	sCAD	eCAD	ENGINEER CONTACT INFORMATION				ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:				
ISSUED FOR PERMIT				8-2-22	JH	DM	ENGIPARTNERS LLC						SUN4				ISAAC HARRIS		STRUCTURAL PLAN				
						C.A. 32661				2222 PONCE DE LEON BLVD,													
REV				DESCRIPTION	DATE	sCAD	eCAD	1825 PONCE DE LEON BLVD #114					3RD FLOOR, CORAL GABLES, FL				PROJECT ADDRESS:						
A				ENPHASE EQUIPMENT REVISED TO GENERAC	09-20-22	DM	DM	CORAL GABLES, FL 33134					33134				456 SW HARMONY LN,						
								DESIGN@ENGIPARTNERS.COM					(786) 833 - 7864				LAKE CITY FL, 32025						
								833 - 888 - 3644				#CVCC57137		PARCEL NUMBER:		19-4S-17-08572-001 (31851)		PROJECT ID:		ENGINEER OF RECORD:		SHEET TITLE:	
												#EC13008093				EP15365		ENG. RAFAEL A. GONZALEZ SOTO, PE					
																		DATE:		8-1-22			

Grouping of ASCE 7-16 Roof Zones (Gable)						
Roof Slope	8° - 27°			28° - 45°		
Group	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
ASCE 7-16 Roof Zones	1 2e	2n 2r 3e	3r	1 2e 2r	2n 3r	3e
= min 72" span = min 64" span = min 48" span = Shaded cells indicate conditions in which UFO Mid Clamp connection capacity is exceeded.						

S-5 BRACKET PULL OUT CALCULATIONS

Ultimate Pull Out Strength per Clamp	798 lbs.
Max. Pull Out Strength Required per Clamp	395.77
Allowable Clamp Pull Out Strength Safety Factor	2.02

RAIL: XR100		GABLE ROOF FLUSH MOUNT SYSTEM SPAN TABLE (INCHES) - PORTRAIT OR LANDSCAPE INSTALLATION MAX MODULE LENGTH: 80.0" EXPOSURE C								
WIND SPEED (MPH)	ROOF SLOPE (DEG.)	GROUND SNOW: 0 PSF			EXPOSED MOD.			EDGE MOD.		
		GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3
120 MPH	20 TO 27	107	92	88	83	73	69	64	57	52

DISTRIBUTED LOAD CALCULATIONS

PV MODULES & RACKING WEIGHT = (INDIVIDUAL MODULE WEIGHT + 3.5 LBS) * (MODULE QTY) = (53.10 LBS) * (24) = 1,274.40 LBS

PER SQUARE FEET (PSF) ARRAY LOAD = PV MODULES & RACKING WEIGHT / TOTAL ARRAY AREA = 1,274.40 LBS / 512.53 SQFT = 2.49 PSF

HENCE, ROOF WILL CARRY THE ADDITIONAL SOLAR SYSTEM LOAD

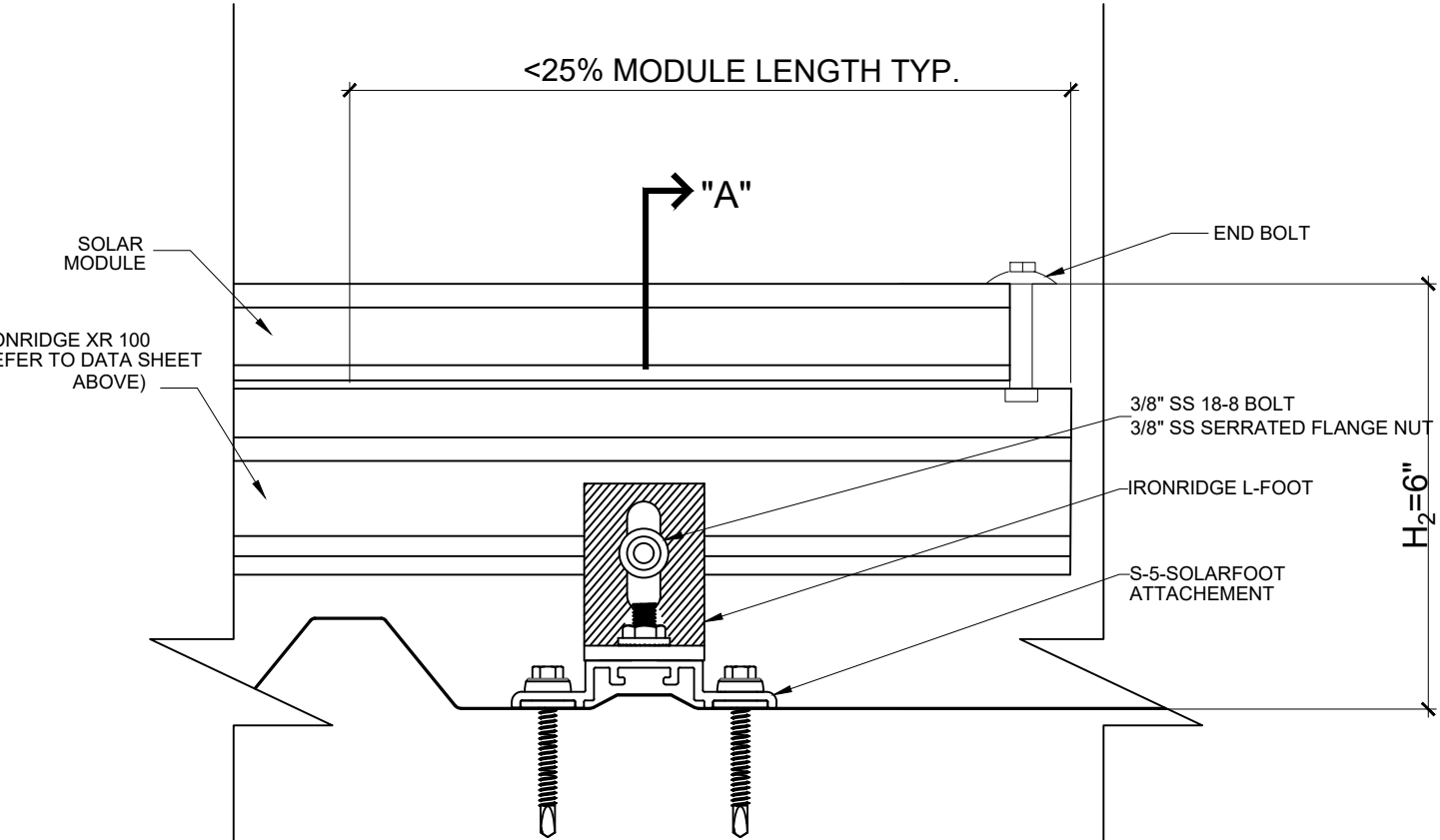
Lag Screw Installation Guidelines

- Determine location for the Mount on roof by drilling through the center of truss from bottom with 5/32" drill bit.
- Mark mounting holes for Mount on underlayment. Mounting holes should be centered on the trusses.
- Drill 15/64" pilot hole.
- Apply sealant to bottom of Mount.
- Place Mount over roof underlayment with holes in roof.
- Apply sealant to bottom of Mount, apply sealant to lag screws and fasten Mount securely to trusses.
- Apply additional sealant to top assembly to be sure all penetrations are sealed.

ASCE 7-16 Velocity Pressure
 $qz10 = 0.00256Kz Kzt Kd V^2$
Where:
 $qz10$ = ASCE 7-16 velocity pressure evaluated at mean roof height (psf)
 Kz = velocity pressure exposure coefficient
 Kzt = topographic factor
 Kd = wind directionality factor
 V = basic wind speed (mph) from ASCE 7-16 maps referred to as ultimate wind speed maps in 2020 FBC.

As an example, for an array having an area of 158.04 sq.-ft., the total uplifting (resultant) force acting on the array would be $-39.1 \text{ psf} \times 158.04 \text{ sq. ft.} = -6,179.364 \text{ lb.}$ Knowing this resultant force, the design engineer can now determine the number of attachment points and the size of the mounting hardware necessary to safely carry this load.

- Live Loads:**
Live loads associated with photovoltaic systems are usually assumed to be distributed uniformly and are small, on the order of 4 psf or less.
- Notes: (1) Thread must be embedded in the side grain of a Trusses or other structural member integral with the building structure.
(2) Lag Bolts must be located in the middle third of the structural member.
(3) These values are not valid for wet services.
(4) This table does not include shear capacities. If necessary, contact a local engineer to specify lag bolt size with regard to shear forces.
(5) Install lag bolts with head ad washer flush to surface (no gap). Do not over-torque.
(6) Withdrawal design values for lag screw connections shall be multiplied by applicable adjustment factors if necessary. See table 10.3.1 in the American Wood Council NDS for Wood Construction.



1 METAL ROOF MOUNT DETAIL & DATA N.T.S.

PRODUCT	THICKNESS MATERIAL	SCREW TENSION (inch-lbs)	ULTIMATE LOAD (lbs)	FAILURE MODE	ALLOWABLE LOAD (lbs)
Standing Seam 360	24 ga steel	115	1778	B	889
Standing Seam II Panel	24 ga steel	115	1583	B	792
Series 1000 Standing Seam	24 ga steel	115	1032	F	516
Snap-On Standing Seam	24 ga steel	115	748	A/B	374

FLORIDA PRODUCT APPROVAL
STRAIGHTENING SOLAR DESIGN & PERMITTING

The First in Florida

ASCE 7-16 Velocity Pressure

ASCE 7-16 Velocity Pressure

Approved Components & Configurations

2-Panel Configuration

3-Panel Configuration

4-Panel Configuration

5-Panel Configuration

6-Panel Configuration

7-Panel Configuration

8-Panel Configuration

9-Panel Configuration

10-Panel Configuration

11-Panel Configuration

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99-Panel Configuration

100-Panel Configuration

System Diagram

UFO

Stopper Sleeve

Grounding Lug

Bonded Splice

Ground Wire

UL Certification

The Ironridge Flush Mount, Tilt Mount, and Ground Mount System have been listed to UL 2600 by UL Intertek Group Inc.

UL 2600 is the standard for evaluating solar mounting systems. It ensures these systems will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor service conditions.

Go to ironridge.com/UL

System	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✓	✓	✓
UFO/Stopper	✓	✓	✓
Bonded Splice	✓	✓	✓
Grounding Lugs	✓	✓	✓
Microinverters & Power Optimizers	✓	✓	✓
Wire Rating	✓	✓	✓
Modules	✓	✓	✓

DOCUMENT CONTROL				DATE		eCAD		ENGINEER CONTACT INFORMATION				ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION				CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:			
ISSUED FOR PERMIT				8-2-22		JH DM		ENGIPARTNERS LLC						SUN4 2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134 (786) 833 - 7864 #CVC57137 #EC13008093						ISAAC HARRIS		RACKING PLAN			
REV				DATE		eCAD		1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644																PROJECT ADDRESS:	
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SFS GROUP USA, INC. TEST REPORT

SCOPE OF WORK
ASTM 12140 TESTING ON SYSTEM 1 AND SYSTEM 2, ROOF ATTACHMENTS

REPORT NUMBER
MS602.01.109.44

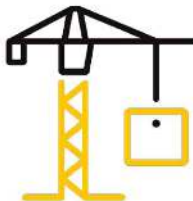
TEST DATE
07/26/21

ISSUE DATE
07/26/21

RECORD RETENTION END DATE
07/26/25

PAGES
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DOCUMENT CONTROL NUMBER
ASTM12140-07/26/21
RT-RANKER-Test-2005
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TEST REPORT FOR SFS GROUP USA, INC.
Report No.: MS602.01-109-44
Date: 07/26/21

SECTION 1 TEST METHOD(S)

The specimens were evaluated in accordance with the following:

ASTM E2349-01(2017), Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Method

SECTION 2 MATERIAL SOURCE/INSTALLATION

Test specimen(s) were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek BCC for a minimum of four years from the test completion date.

The specimens were installed into a 3/4" x 1/2" x 1/2" wood test deck. The test deck for System 1 had an interior dimension of 33 3/4" x 72 1/4" with joist spaced 24" on center with 2" x 2" plywood nailed into place for the valley mount attachments. A sheet of 30-gauge metal roofing was secured to the test deck for mounting the attachments. The test deck for System 2 had an interior dimension of 33 1/2" x 66 1/4" with 1/2" plywood nailed into place for the valley mount attachments. A sheet of 30-gauge metal roofing was secured to the test deck for mounting the attachments. The interior perimeter of the test deck was sealed with silicone.

SECTION 3 EQUIPMENT

Pressure Load Cell/Indicator - 63495
Stopwatch - 1750374
Weather Station - 65186
Tape Measure Verification - 63788

SECTION 4 LIST OF CRITICAL OBSERVERS

NAME	COMPANY
James Cole	SFS Group USA, Inc.
Jan Moore	SFS Group USA, Inc.
Vicki L. McElwain	Intertek BCC
Kyle W. Smith	Intertek BCC

Version: 07/26/21

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RT-RANKER-Test-2005

TEST REPORT FOR SFS GROUP USA, INC.
Report No.: MS602.01-109-44
Date: 07/26/21

SECTION 5 TEST SPECIMEN DESCRIPTION

System 01

ITEM NUMBER	PRODUCT NAME	DESCRIPTION	ATTACHMENT
1	Protek B-25446 TFE	3" wide by 4" long by 2 1/2" high with steel attachment with TFE weathering pads	
2	Protek B-25446 TFE	3" wide by 4" long by 2 1/2" high with steel attachment with TFE weathering pads	
3	KB-B25446 (1/2) 1/2" x 1/2" x 1/2"	2 1/2" wide by 3 1/2" long by 2 1/2" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers
4	KB-B25446 (1/2) 1/2" x 1/2" x 1/2"	2 1/2" wide by 3 1/2" long by 2 1/2" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers
5	SolarFoot (Bolt)	2 1/2" wide by 2 1/2" long by 1 1/2" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers
6	SolarFoot (Bolt)	2 1/2" wide by 2 1/2" long by 1 1/2" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers
7	Veratrac (Bolt) 4" Bolt	2 1/2" wide by 2 1/2" long by 1 1/2" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers
8	Veratrac (Bolt) 4" Bolt	2 1/2" wide by 2 1/2" long by 1 1/2" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers
9	BT-T2 0.25 Hole TFE	1 1/2" wide by 2 1/2" long by 3/4" high with steel attachment with TFE weathering pads	Four 1/8" x 1 1/2" hex weather head screws with DREM washers

TEST REPORT FOR SFS GROUP USA, INC.
Report No.: MS602.01-109-44
Date: 07/26/21

SECTION 6 CONCLUSION

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Intertek BCC will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, photographs, representative samples of test specimens, or other pertinent project documentation, will be retained for the entire test record retention period.

Unless differently required, Intertek reports apply the "Normal Acceptance" rule, also called "Shred Risk approach," of ISO 9001:2015, Guidelines on Decision Rules and Statements of Conformity.

SECTION 7 PHOTOGRAPHS



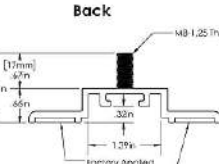
Photo No. 1
System 01

Version: 07/26/21

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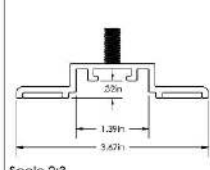
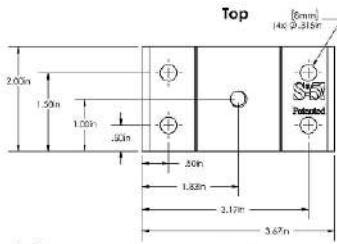
RT-RANKER-Test-2005

SolarFoot



General Notes:

1. SolarFoot
2. M8-1.25 Stainless Steel Hex Flange Nut (13mm Socket)
3. Metal to Metal: 1/4-14 Self Drilling Screw 1-1/2" to 2-1/2"
4. Metal to Wood: 1/4-14 Type 17 AS Milled Point 1-1/2" to 2-1/2"



FOR STANDING SEAM SPECIFIC MECHANICAL LOAD TEST INFORMATION AND CLAMP INSTALLATION INFORMATION PLEASE VISIT: WWW.S-5.COM

Method: S-5! The Right Way!

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S-5!® The Right Way!

NEW PRODUCT
SolarFoot™

Introducing the new SolarFoot™ for exposed fastener metal roofing with the strength, testing, quality, and time-proven integrity you expect from S-5! The SolarFoot provides an ideal mounting platform to attach the L-Foot (not included) of a rail-mounted PV system to the roof. This solution is The Right Way to secure rail-mounted solar systems to exposed fastener metal, such as AG Panel or R Panel.

The right way to attach almost anything to metal roofs!

SolarFoot Features:

- Manufactured in the U.S.A. from certified raw material
- Fabricated to meet with ISO 9001:2015 certified factory
- All aluminum and stainless components
- 15-year limited warranty
- Compatible with all commercial L-Foot products on the market
- Factory applied 10-year assembly clear protective coating, easy to maintain for reliable weatherproofing
- Sealant resistant to prevent color compromise of panels
- Low-to-fact are tested Normal to Seem by a nationally accredited laboratory on numerous metal roof materials and substrates
- Four points of attachment into structure or deck with tested bolting strength for engineered applications
- Integrates M8 1.25x 7mm stud and M8 1.25x 16mm stainless flange nut included

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

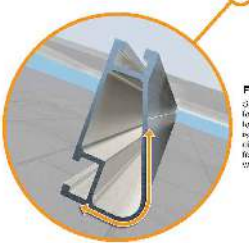
IRONRIDGE

XR Rail Family

Solar is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rail is the structural backbone preventing these results. They resist uplift, protect against buckling and safely & efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curves

Closest to the ground, XR Rail is the structural backbone preventing these results. They resist uplift, protect against buckling and safely & efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.

Compatible with Flat & Pitched Roofs



Corrosion-Resistant Materials

All XR Rail are made of 6000-series aluminum alloy, then protected with an anodized finish, ensuring long-term durability and resistance to corrosion while also providing a clean, attractive appearance.

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light to moderate wind speeds. It is made of solid aluminum, anodized for long-term durability and resistance to corrosion.

- 10' spanning capability
- Moderate load capacity
- Clear 8" flange for easy fit
- 1" flange for easy fit

XR100

XR100 is the ultimate residential solar mounting rail. It is made of solid aluminum, anodized for long-term durability and resistance to corrosion.

- 10' spanning capability
- Heavy load capacity
- Clear 8" flange for easy fit
- 1" flange for easy fit

XR1000

XR1000 is a heavy-weight mounting rail, designed for regions with light to moderate wind speeds. It is made of solid aluminum, anodized for long-term durability and resistance to corrosion.

- 10' spanning capability
- Extreme load capacity
- Clear 8" flange for easy fit
- 1" flange for easy fit

Rail Selection

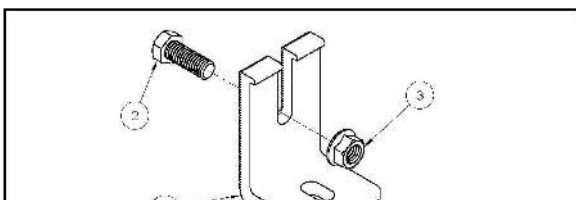
The table below was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-16, Gable Roof Pitch Mount, Roof Zones 1 & 2a, Exposure B, Roof Slope of 0 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load (PSF)	Wind (MPH)	Rail Span					
		4'	6'	8'	10'	12'	
None	90						
	100						
	140	XR10					
	150		XR100				
20	90						
	100						
	140						
	150						
30	90						
	100						
	140						
	150						
40	90						
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	150						
60	90						
	100						
	140						
	150						
120	90						
	100						
	140						
	150						

*Values are based on a 30 ft. building height. For other building heights, contact your local design engineer.

IRONRIDGE

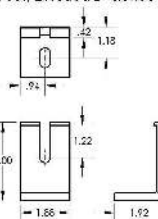
Slotted L-Foot



Item Number	Component	Qty in Kit
1	FOOT EXTRUDER - SLOTTED	4
2	SOIL, 3/8-16 x 1 1/2 HEX CS SS	4
3	W/ FLANGE HEX 3/8-16 CS	4

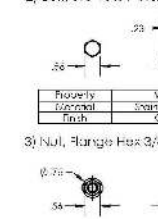
Part Number	Description
RS-L-F01	Set of 4, Slotted L-Foot (All Finish)
RS-L-F01B	Set of 4, Slotted L-Foot (Black Finish)

1 Foot, Slotted L-Foot



Property	Value
Material	Aluminum
Finish	Mt. 2.0

2 Foot, 3/8-16 x 1 1/2 Hex CS SS



Property	Value
Material	Stainless Steel
Finish	2.0

3 Foot, Flange Hex 3/8-16 CS



Property	Value
Material	Stainless Steel
Finish	Clear

S-5!®
The Right Way!

SolarFoot™ Mounting for Exposed Fastener Roofing

The SolarFoot is a simple, roof-effective pedestal for L-Foot (not included) attachment of aluminum solar PV. The unique design is compatible with all rail product L-Foot components. The new SolarFoot assembly ensures a durable weather-tight solution for the life of the roof. Special factory-applied epoxy



KuMax
HIGH EFFICIENCY MONO PERC MODULE
CS3U-380|385|390|395|400MS
(1000 V / 1500 V)

MORE POWER

- Low power loss in cell connection
- Low NMOT: $42 \pm 3^\circ\text{C}$
Low temperature coefficient (Pmax): $-0.36\% / ^\circ\text{C}$
- Better shading tolerance
- High PTC rating of up to: 93.24 %

25 years linear power output warranty*

12 years enhanced product warranty on materials and workmanship*

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES
ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / CQC / MCS / KS / INMETRO
UL 1703 / IEC 61215 performance: CEC listed (US) / PSEC (US Florida)
UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / IEC 60068-2-68: SGS
Take-e-way



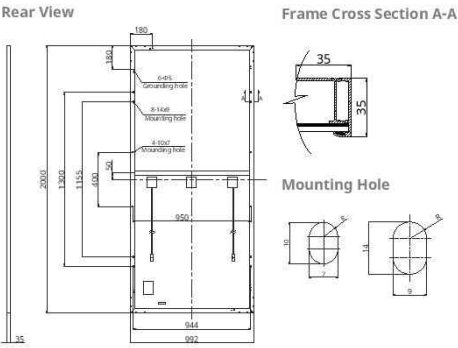
* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. No. 1 module supplier for quality and performance / price ratio in IHS Module Customer Insight Survey. As a leading PV project developer and manufacturer of solar modules with over 40 GW deployed around the world since 2001.

* For detailed information, please refer to the Installation Manual.

CANADIAN SOLAR INC.
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

ENGINEERING DRAWING (mm)



ELECTRICAL DATA | STC*

CS3U	380MS	385MS	390MS	395MS	400MS
Nominal Max. Power (Pmax)	380 W	385 W	390 W	395 W	400 W
Opt. Operating Voltage (Vmp)	40.0 V	40.2 V	40.4 V	40.6 V	40.8 V
Opt. Operating Current (Imp)	9.50 A	9.58 A	9.66 A	9.73 A	9.81 A
Open Circuit Voltage (Voc)	47.8 V	48.0 V	48.2 V	48.4 V	48.6 V
Short Circuit Current (Isc)	10.01 A	10.09 A	10.17 A	10.25 A	10.33 A
Module Efficiency	19.2%	19.4%	19.7%	19.9%	20.2%
Operating Temperature	-40°C ~ +85°C				
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)				
Module Fire Performance	TYPE 1 (UL 1703) or Class C (IEC 61730)				
Max. Series Fuse Rating	30 A				
Application Classification	Class A				
Power Tolerance	0 ~ +10 W				

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

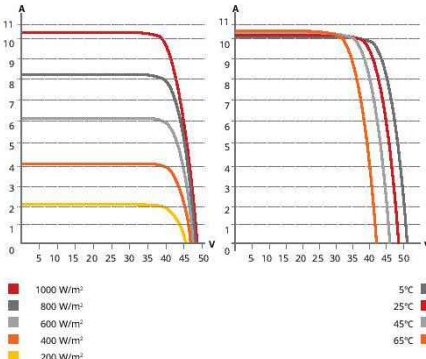
CS3U	380MS	385MS	390MS	395MS	400MS
Nominal Max. Power (Pmax)	283 W	287 W	290 W	294 W	298 W
Opt. Operating Voltage (Vmp)	37.2 V	37.4 V	37.6 V	37.8 V	38.0 V
Opt. Operating Current (Imp)	7.60 A	7.66 A	7.72 A	7.78 A	7.84 A
Open Circuit Voltage (Voc)	44.8 V	45.0 V	45.2 V	45.4 V	45.6 V
Short Circuit Current (Isc)	8.08 A	8.14 A	8.20 A	8.27 A	8.33 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustments to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

CANADIAN SOLAR INC.
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

CS3U-400MS / I-V CURVES



MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	144 [2 X (12 X 6)]
Dimensions	2000 X 992 X 35 mm (78.7 X 39.1 X 1.38 in)
Weight	22.5 kg (49.6 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy, crossbar enhanced
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC), 12 AWG (UL)
Cable Length (Including Connector)	Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-); landscape: 1250 mm (49.2 in); leap-frog connection: 1670 mm (65.7 in)*
Connector	T4 series or H4 UTX or MC4-EVO2
Per Pallet	30 pieces
Per Container (40' HQ)	660 pieces

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

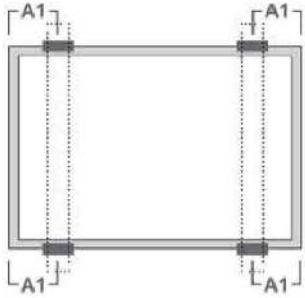
TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.36 % / °C
Temperature Coefficient (Voc)	-0.29 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION



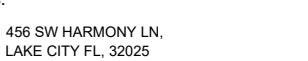
6.2.1 Four clamps on long side of frame and rails perpendicularly to the long side frame



Module Types	Max Mechanical Load (Pa)					
	+2000/ -2000	+2400/ -2400	+3600/ -2400	+5400/ -2400	+5400/ -3600	+7000/ -5400
	A1 Range (mm)					
CS1H	0-219	220-440	/	/	270-330	/
CS1VL/CS1HA	0-219	220-440	/	270-330	/	/
CS1V	0-239	331-550	/	240-330	/	/
CS3K	0-239	331-550	/	/	240-330	/
CS3U/CS3W	/	340-550	/	/	410-490	/
CS1U	/	340-550	/	410-490	/	/
CS1Y	/	/	300-600	/	350-550	400-500
CS3L/CS3LA/CS3LB	0-240	331-550	/	/	240-330	/
CS3N < F30 Frame >	/	300-600	/	/	400-500	/
CS3N < F23 Frame >	/	/	200-650	/	300-600	450-550
CS3Y/CS6W/CS7L/CS7N	/	300-600	/	400-500	/	/
CS3SA	/	/	300-600	400-500	/	/
CS6R	0-100	100-600	200-500	300-400	/	/

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DOCUMENT CONTROL				DATE	sCAD	eCAD	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME: PV MODULES DATA SHEET			
ISSUED FOR PERMIT				8-2-22	JH	DM	ENGIPARTNERS LLC		Rafael A Gonzalez Soto		SUN4				ISAAC HARRIS					
REV	DESCRIPTION			DATE	sCAD	eCAD	1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134		2022.12.06		2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134				PROJECT ADDRESS:					
							DESIGN@ENGIPARTNERS.COM		16:15:30		(786) 833 - 7864				456 SW HARMONY LN, LAKE CITY FL, 32025					
							833 - 888 - 3644		-04'00'		#CVC57137				PARCEL NUMBER:					
											#EC13008093				19-4S-17-08572-001 (31851)					
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															EP15365		ENG. RAFAEL A. GONZALEZ SOTO, PE			
																	DATE:			
																	8-1-22			

GENERAC

PV Link™

2500W MPPT Substring Optimizer
Model #: S2502 (Ordering SKU: APKE00010)

PV Link is the simple solar optimizer for quick installation and long-lasting performance. Connect PV modules to each PV Link to overcome shading and challenging roof lines.

FEATURES & BENEFITS

- Fast, simple installation
- Lower failure risk than module-level optimizers
- 2017/2020 NEC rapid shutdown compliant with SnapRS™
- Quick connections with MC4 connectors
- Exports up to 2500W
- Compatible with PWRcell™ Inverters
- Cost-effective solution for high-performance PV
- Ground-fault protection

SINGLE-STRING PV ARRAY WITH SnapRS DEVICES

Where PV module-level rapid shutdown is required (NEC 690.12), a SnapRS device (RS) is installed to negative (-) lead of each PV module.

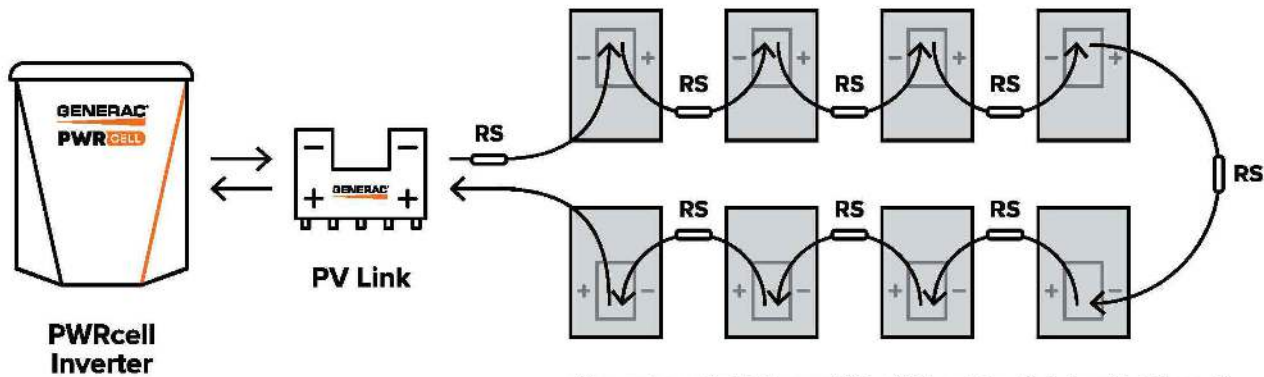


Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.



Specifications

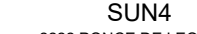
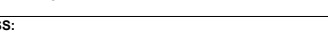
PV Link™ (APKE00010)	
RATED POWER*:	2500W
PEAK EFFICIENCY:	99%
MPPT VOLTAGE RANGE:	60-360 VMP
MAX INPUT VOLTAGE:	420 VOC; max when cold
MAX OUTPUT:	420 VOC
NOMINAL OUTPUT (REBUS®):	380 VDC
MAX OUTPUT CURRENT (CONTINUOUS):	8 A
MAX OUTPUT CURRENT (FAULT):	10 A
MAX INPUT CURRENT (CONTINUOUS):	13 A @ 50°C, 10 A @ 70°C
MAX INPUT SHORT CIRCUIT CURRENT (ISC):	18 A
STANDBY POWER:	< 1 W
PROTECTIONS:	Ground-fault, Arc-fault (Arc-fault Type 1 AFCI, Integrated), PVRSE
MAX OPERATING TEMP: FAHRENHEIT (CELSIUS)	158 °F (70 °C)
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
ENCLOSURE:	Type 4X
WEIGHT - LB (KG):	7.3 lb (3.3 kg)
DIMENSIONS, L x W x H - IN (MM):	15.4" x 2" x 9.6" (391.2 x 50.8 x 243.8)
COMPLIANCE:	UL 1741, CSA 22.2
WARRANTY:	25 Years

*PV Link can tolerate higher than rated power at its input if Max Input Voltage and Short Circuit Current specifications are not exceeded



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 ENPHASE EQUIPMENT REVISED TO GENERAC				09-20-22	DM	DM	DESIGN@ENGIPARTNERS.COM				(786) 833 - 7864 #CVC57137 #EC13008093				456 SW HARMONY LN, LAKE CITY FL, 32025		PROJECT ID:			
							833 - 888 - 3644								PARCEL NUMBER:		EP15365		ENGINEER OF RECORD:	
																	19-4S-17-08572-001 (31851)		ENG. RAFAEL A. GONZALEZ SOTO, PE	
															DATE: 8-1-22					

GENERAC®

PWRCELL

7.6kW 1Ø PWRcell Inverter with CTs
Model #: X7602 (Ordering SKU: APKE00014)
11.4 kW 3Ø PWRcell Inverter with CTs
Model #: X11402 (Ordering SKU: APKE00013)



Solar + storage is simple with the Generac PWRcell® Inverter. This bi-directional, REbus™-powered inverter offers a simple, efficient design for integrating smart batteries with solar. Ideal for self-supply, backup power, zero-export and energy cost management, the PWRcell Inverter is the industry's most feature-rich line of inverters, available in single-phase and three-phase models.

FEATURES & BENEFITS

- Single inverter for grid-tied solar with smart battery integration
- Simplified system design: No autotransformer or battery inverter needed
- User-selectable modes for backup power, self-supply, time-of-use, zero-import and export limiting
- Free system monitoring included via PWRview™ Web Portal and Mobile App

AC OUTPUT/GRID-TIE	MODEL X7602	MODEL X11402
MAX. CONT. GRID-TIED AC POWER @ 50°C (122°F):	7600 W	11400 W
AC OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 3Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT:	32 A, RMS	32 A, RMS
GROUND-FAULT ISOLATION DETECTION:	Included	Included
CHARGE BATTERY FROM AC:	Yes	Yes
THD (CURRENT):	< 2%	< 2%
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7 W	< 7 W
AC OUTPUT/ISLANDED	MODEL X7602	MODEL X11402
MAX. CONT. AC POWER @ 40°C (104°F) W/ SINGLE 6 MODULE BATTERY CABINET ¹ :	9,000 W	9,000 W
MAX. CONT. AC POWER @ 40°C (104°F) WITH 2 BATTERY CABINETS (8 MODULES MINIMUM):	11,000 W	9,600-11,000 W ²
MAX. CONT. AC POWER @ 50°C (122°F):	8,800 W	7,500-8,800 W ²
PEAK MOTOR STARTING CURRENT (2 SEC):		50 A, RMS
AC BACKUP OUTPUT VOLTAGE:	120/240, 1Ø VAC	120/208, 1Ø VAC
AC FREQUENCY:	60 Hz	60 Hz
THD (VOLTAGE):	< 2%	< 2%
AUTOMATIC SWITCHOVER TIME:	< 1 Seconds	< 1 Seconds

DC INPUT	MODEL X7602	MODEL X11402
DC INPUT VOLTAGE RANGE:	360-420 VDC	360-420 VDC
NOMINAL DC BUS VOLTAGE:	380 VDC	380 VDC
DC DISTRIBUTION INPUT BREAKERS:	4 x 2P30 A	4 x 2P30 A
MAX INPUT CURRENT PER DC INPUT:	30 A	30 A
REVERSE-POLARITY PROTECTION:	Yes	Yes
TRANSFORMERLESS, UNGROUNDED:	Yes	Yes
TYPICAL NIGHTTIME POWER CONSUMPTION:	< 7 W	< 7 W
DC BUS EXPORT FUSES (1+):	40 A	40 A
2-POLE DISCONNECTION:	Yes	Yes
EFFICIENCY	MODEL X7602	MODEL X11402
PEAK EFFICIENCY:	97.3%	97.7%
CEC WEIGHTED EFFICIENCY:	96.5%	97.5%

¹Peak Performance
²In Island mode X11402 protected loads only supply 2 phases 120 VAC L-N, 208 L-L which results in lower power than in grid tied 3 phase mode. The low value of the range is for full L-L loading while high value of the range is full L-N loading

Specifications

FEATURES AND MODES	
ISLANDING ³ :	Yes
GRID SELL:	Yes
SELF CONSUMPTION:	Yes
PRIORITIZED CHARGING FROM RENEWABLES:	Yes
GRID SUPPORT - ZERO EXPORT:	Yes
ESS PCS OPERATION MODES (IMPORT ONLY, EXPORT ONLY):	Yes

ADDITIONAL FEATURES	
SUPPORTED COMMUNICATION INTERFACES:	REbus™, CANbus, Ethernet
SYSTEM MONITORING:	PWRview™ Web Portal and Mobile App
BACKUP LOADS DISCONNECT ¹ :	Yes, 50 A Circuit Breaker
INVERTER BYPASS SWITCH:	Automatic
WARRANTY:	10 Years

STANDARDS COMPLIANCE	
SAFETY:	UL 1741 SA, CSA 22.2, UL 1998
GRID CONNECTION STANDARDS:	IEEE 1547, Rule 21, Rule 14H, CSIP, UL 1741 PCS CRD (Import Only, Export Only)
EMISSIONS:	FCC Part 15 Class B

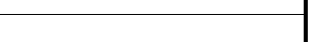
DIMENSIONS AND INSTALLATION SPECIFICATIONS	
ENCLOSURE KNOCKOUTS - QTY, SIZE - IN (MM):	6 x Combo 3/4" x 1" (19 x 25.4) 7 x Combo 1/2" x 3/4" (12.7 x 19)
DIMENSIONS L x W x H - IN (MM):	24.5" x 19.25" x 8" (622.3 x 488.9 x 203.2)
WEIGHT - LB (KG):	62.7 (28.4)
COOLING:	Forced convection
AUDIBLE NOISE:	< 40 dBA
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-4 to 122 °F (-20 to 50 °C) ⁴
PROTECTION RATING:	NEMA 3R

INSTALLATION GUIDELINES	
BATTERY TYPES SUPPORTED:	PWRcell™ Battery
MODULE STRING SIZE PER PV LINK OPTIMIZER:	Varies, refer to PV Link Installation Manual
MAXIMUM RECOMMENDED DC POWER FROM PV:	15 kW

³3Ø inverters offer islanding for 1Ø loads.
⁴Includes ambient temperature rising from inverter operation. Reduced power at extreme temperatures.
Specifications listed in this document are achieved with firmware version 13310 or greater. Confirm inverter has latest firmware to ensure full performance.

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ISSUED FOR PERMIT				8-2-22		JH	DM	ENGINEPARTNERS LLC				SUN4				ISAAC HARRIS		INVERTER DATA SHEET					
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				ENPHASE EQUIPMENT REVISED TO GENERAC		09-20-22		DM	DM			16:15:52											
												-04'00'											

GENERAC®

SnapRS™

Inline Disconnect Switch
Model: APKE00011
Certification Model Reference: RS801



Generac SnapRS are a simple way to satisfy rapid shutdown compliance for solar + storage systems. Generac SnapRS are 2017/2020 NEC 690.12 compliant, don't require any extra hardware to mount, and need no pairing or fussy digital communications.

FEATURES & BENEFITS

- Fast, easy, and simple to install
- One SnapRS device per PV module
- Achieves PVRSS Compliance
- Low cost, high efficiency solution

SYSTEM DESIGN

Snap a Generac SnapRS disconnect device (RS) to the negative lead (-) of each module in the solar array for simple module-level rapid shutdown compliance. SnapRS devices isolate array voltage when a rapid shutdown is initiated at a PWRcell™ Inverter. When rapid shutdown is initiated, SnapRS units isolate each PV module in the array, reducing array voltage to <80V in seconds.

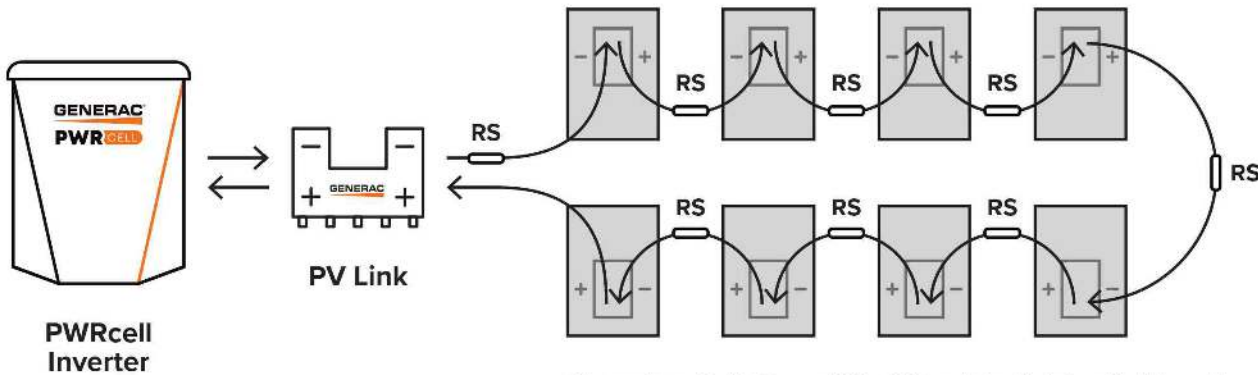


Diagram is applicable for most 60 cell PV modules. Modules with higher cell count may require a different arrangement. Contact Generac for more details.

Specifications

SnapRS™ (APKE00011)	
PV MODULE MAX VOC:	75 V
EFFICIENCY:	99.8%*
MAX INPUT CURRENT:	13 A
SHUTDOWN TIME:	< 10 Seconds
ENCLOSURE RATING:	NEMA 6P
OPERATING TEMPERATURE - FAHRENHEIT (CELSIUS):	-40 to 158 °F (-40 to 70 °C)
CERTIFICATIONS:	UL1741
PROTECTIONS:	PVRSE
WEIGHT - LB (KG):	0.17 (0.08)
DIMENSIONS, L x W x H - IN (MM):	7" x 1" x 1" (177.8 x 25.4 x 25.4)
WARRANTY:	25 Years

*When used with a 50V panel

Connect one SnapRS device to the negative lead of each PV module in the PV Link controlled array for complete PV Rapid shutdown performance



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DOCUMENT CONTROL				DATE		sCAD	eCAD	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:			
ISSUED FOR PERMIT				8-2-22		JH	DM	ENGINEPARTNERS LLC C.A. 32661 1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134 DESIGN@ENGINEPARTNERS.COM 833 - 888 - 3644				Rafael A Gonzalez Soto 2022.12.06 16:16:04 -04'00'		SUN4 2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134 (786) 833 - 7864 #CVC57137 #EC13008093				ISAAC HARRIS		RAPID SHUTDOWN DATA SHEET	
REV				DATE		sCAD	eCAD											PROJECT ADDRESS:			
 GENERAC INVERTER ADDED				09-14-22		DM	DM											456 SW HARMONY LN, LAKE CITY FL, 32025			
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								EP15365		ENGINEER OF RECORD:		SHEET TITLE:									
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										DATE:											
										8-1-22											

GENERAC

PWRCELL

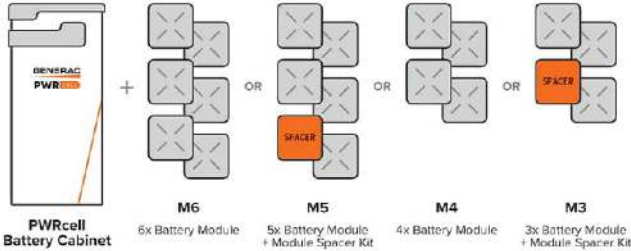
PWRcell Battery Cabinet (Ordering SKU: APKE00007)
3.0kWh PWRcell EX Battery Module
Model #: / Ordering SKU: G0080000
2.85kWh PWRcell DCB Battery Module
Model #: BJ-DCB05ZKAX (Ordering SKU: A0000391219)

The PWRcell™ Battery Cabinet is a modular smart battery platform that allows for a range of configurations to suit any need, small or large. No other smart battery offers the power and flexibility of PWRcell. Whether for backup power or smart energy management, PWRcell has power and capacity options for every need, without sacrificing flexibility or function.

PWRcell BATTERY CABINET DESIGN

The PWRcell Battery Cabinet allows system owners the flexibility to scale from an economical 8.6kWh to a massive 18kWh by installing additional battery modules to the PWRcell Battery Cabinet. When needs change, an existing PWRcell Battery Cabinet can be upgraded with additional modules. Use the graphic below and the chart on the back of this sheet to understand what components you need for your chosen PWRcell configuration.

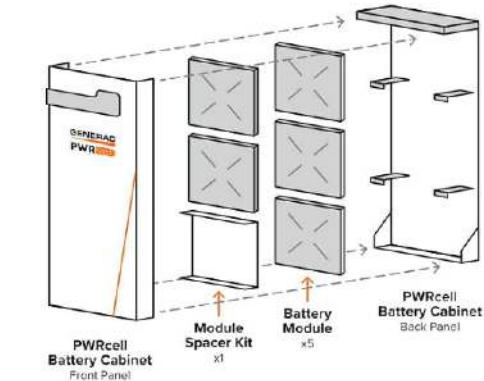
BATTERY CONFIGURATION GUIDE



FEATURES & BENEFITS

- Connect 2 PWRcell Battery Cabinets to a single PWRcell Inverter for up to 36kWh of storage
- Best-in-class battery backup power
- Plug-and-play with PWRcell Inverter and PV Link™
- Time-of-use (TOU) and zero-export ready
- Residential and commercial application ready.
- Outdoor-rated battery cabinet available as an upgrade

BATTERY CABINET ASSEMBLY



Specifications

PWRcell™ BATTERY CONFIGURATIONS								
BATTERY MODULE SERIES:		EX			DCB			
BATTERY MODULES:	3	4	5	6	3	4	5	6
USABLE ENERGY:	9 kWh	12 kWh	15 kWh	18 kWh	8.6 kWh	11.4 kWh	14.3 kWh	17.1 kWh
AVG. AC POWER OVER COMPLETE DISCHARGE CYCLE:	3.4 kW	4.5 kW	5.6 kW	6.7 kW	3.4 kW	4.5 kW	5.6 kW	6.7 kW
MAX. CONT. AC POWER @ 40°C (104°F):	4.5 kW	6 kW	7.5 kW	9 kW	4.5 kW	6 kW	7.5 kW	9 kW
PEAK MOTOR STARTING CURRENT (2 SEC) - A, RMS	25	33	42	50	25	33	42	50
REbus™ VOLTAGE - INPUT/OUTPUT:	360-420 VDC							
NOMINAL VOLTAGE:	43.2 VDC				46.8 VDC			
DC-DC ROUND-TRIP EFFICIENCY:	96.5%							
MAX. AMBIENT OPERATING TEMPERATURE RANGE:	14 to 122 °F (-10 to 50 °C)				41 to 113 °F (5 to 45 °C)			
RECOMMENDED AMBIENT OPERATING TEMPERATURE (FULL POWER)*:	32 to 104 °F (0 to 40 °C)				55 to 86 °F (13 to 30 °C)			
MAXIMUM INSTALLATION ALTITUDE - FT (M):	9834 (3000)							
DIMENSIONS, L x W x H - IN (MM):	22" x 10" x 68" (559 x 254 x 1727)							
WEIGHT, ENCLOSURE - LB (KG):	111 (50)							
WEIGHT, INSTALLED - LB (KG):	282 (128)	340 (154)	397 (180)	454 (206)	276 (125)	331 (150)	386 (175)	441 (200)
WARRANTY - LI-ION MODULES:	10 Years, (7.56MWh)							
WARRANTY - ELECTRONICS AND ENCLOSURE:	10 Years							
COMMUNICATION PROTOCOL:	REbus™ DC Nanogrid™							
COMPLIANCE:	UL 9540, UL 1973, UL 1642, CSA 22.2 #107.1							

*Performance may be limited outside of recommended operating temperature range

PWRcell ACCESSORIES

The PWRcell Battery Cabinet (APKE00007) is rated for indoor use only. If installing outdoors, the PWRcell Outdoor Rated Battery Cabinet (APKE00028) must be used. Inside of the PWRcell Battery Cabinet, battery modules are stacked two deep on three levels, allowing for up to six modules to be connected in series. You can upgrade an existing PWRcell Battery Cabinet by adding Battery Modules and a Module Spacer (APKE00008). A Module Spacer is only required for battery configurations with an odd number of modules (i.e. 3 or 5).

Generac offers a convenient PWRcell Battery Upgrade Kit (APKE00009) to help replace lost or misplaced hardware.

Note: When adding modules, be sure all modules within an individual cabinet are of the same series type (i.e. EX or DCB).

PWRcell MODEL BUILDER



Sample Model Name: PWRcell IR M3 EX

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	GENERAC BATTERY ADDED			09-14-22		DM	DM	DESIGN@ENGINEPARTNERS.COM		456 SW HARMONY LN, LAKE CITY FL, 32025							
								833 - 888 - 3644		PARCEL NUMBER:		PROJECT ID:		ENGINEER OF RECORD:		SHEET TITLE: D-5	
										19-4S-17-08572-001 (31851)		EP15365		ENG. RAFAEL A. GONZALEZ SOTO, PE			
														DATE: 8-1-22			

GENERAC®

PWRCELL

AUTOMATIC TRANSFER SWITCH

100A Non-Service Entrance Rated
Model #: CXSC100A3
UPC #: 696471081701

100A Service Entrance Rated
Model #: CXSW100A3
UPC #: 696471081718

200A Service Entrance Rated
Model #: CXSW200A3
UPC #: 696471081725



An integrated solar + storage system with load management for whole home coverage is made easy with the PWRcell™ Automatic Transfer Switch (ATS). Power the entire home and manage up to four individual HVAC (24 Vac controlled) loads with the PWRcell ATS. This built-in capability requires no additional hardware. When used in tandem with Generac Smart Management Modules (SMM) up to eight additional circuits can be controlled by the PWRcell Inverter. Make the most of your Generac solar + storage system with this comprehensive load management solution.

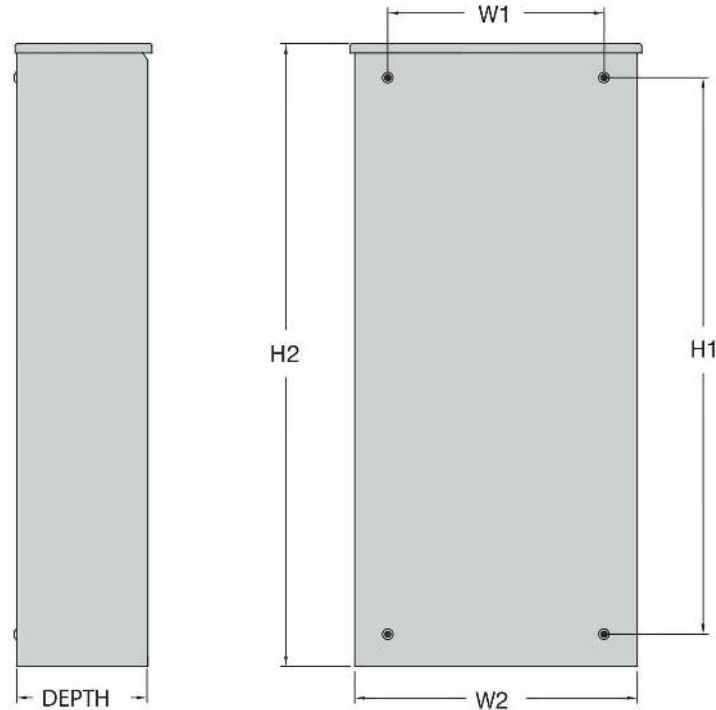
FEATURES & BENEFITS

- Unlock whole home backup power capability for PWRcell solar + storage systems
- Manage up to four HVAC systems, and an additional eight circuits with optional Smart Management Modules (SMMs)
- Aluminum type 3R enclosure with durable finish for indoor or outdoor installation
- Heavy Duty Generac Contactor is an ETL recognized device, designed for years of service and reliability

Specifications

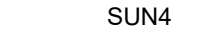
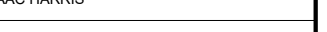
SPECIFICATIONS	CXSC100A3	CXSW100A3	CXSW200A3
AMPS:	100	100	200
VOLTAGE	120/240 1Ø	120/240 1Ø	120/240 1Ø
LOAD TRANSITION TYPE (AUTOMATIC)	OPEN TRANSITION	OPEN TRANSITION SERVICE RATED	OPEN TRANSITION SERVICE RATED
ENCLOSURE TYPE	NEMA 3R	NEMA 3R	NEMA 3R
COMPLIANCE	UL 1008	UL 1008	UL 1008
WITHSTAND RATING (AMPS)	10,000	10,000	20,000
LUG RANGE	1/0 - #14	1/0 - #14	250 MCM - #6

DIMENSIONS	CXSC100A3	CXSW100A3	CXSW200A3
HEIGHT (IN/MM)	H1	17.24/437.9	26.75/679.4
	H2	20/508	30/762
WIDTH (IN/MM)	W1	12.5/317.5	10.5/266.7
	W2	14.6/370.8	13.5/342.9
DEPTH (IN/MM)	7.09/180.1	7.09/180.1	6.3/160.1
WEIGHT (LBS/KG)	20/9.07	22.5/10.21	39/17.69



Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha, WI 53189
www.Generac.com | 888-GENERAC (436-3722)
A0000915134 REV A
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Specifications are subject to change without notice.



DOCUMENT CONTROL				DATE	sCAD	eCAD	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:					
ISSUED FOR PERMIT				8-2-22	JH	DM	ENGIPARTNERS LLC C.A. 32661 1825 PONCE DE LEON BLVD #114 CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644				Rafael A Gonzalez Soto 2022.12.06 16:16:28 -04'00'		SUN4 2222 PONCE DE LEON BLVD, 3RD FLOOR, CORAL GABLES, FL 33134 (786) 833 - 7864 #CVC57137 #EC13008093							ISAAC HARRIS		
REV				DESCRIPTION		DATE											sCAD	eCAD	PROJECT ADDRESS:			
				GENERAC ATS ADDED		09-14-22	DM	DM							456 SW HARMONY LN, LAKE CITY FL, 32025		PROJECT ID: EP15365		ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE DATE: 8-1-22		SHEET TITLE: D-6	
															PARCEL NUMBER: 19-4S-17-08572-001 (31851)							