PV SYSYEM STRUCTURAL PLAN

Contractor is responsible to verify the fit of this array prior to installation. The solar module array shown is based on the field data provided by the contractor. Contractor shall contact the engineer if the array may not fit as projected. Satellite imagery shown may not correctly indicate potential current shading of property. Contractor is responsible to verify sun exposure and shading of installation prior to installation.

Engineer liability for error/omission/FBC 2020 (7th edition Florida Building Code) & NEC 2017 is limited by adequacy and accuracy of information provided to engineer by owner/contractor and by responsibilities per EJCDC® C-700, Standard General Conditions of the Construction Contract.

CODE

FBC 2020 (7TH EDITION) FLORIDA BUILDING CODE

I CERTIFY THAT THE SHEATHING & FRAMING OF THIS STRUCTURE WILL SAFELY ACCOMMODATE PV SYSTEM MOUNTING, RACKING, AND MODULES AND WITHSTAND WIND UPLIFT / LATERAL FORCES AND EQUIPMENT DEAD LOADS WITH THE CONDITION THAT CONTRACTOR'S INSTALLATION OF THE PV SYSTEM IS IN ACCORDANCE WITH THE INSTRUCTIONS ON THIS PLAN . THIS IS ATTESTED TO BY MY SIGNATURE AND SEAL ON THIS PLAN AT THE UPPER RIGHT.

ENGINEER
ALPER ICELI
FL 90469
3753 LOCKRIDGE DR.
LAND O LAKES, FL 34638
(813) 406-7060
alper@iceli-pe.com

ALPER ICELI LICENSE No. 90469 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Alper Iceli, PE, on date shown above.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Alper Iceli 2021.10.22 09:56:16-04'00'

INSTALLATION NOTES

- **THIS PAPER PLAN IS INTENDED TO PROVIDE THE ESSENTIAL INFORMATION NEEDED BY AHJ (AUTHORITY HAVING JURISDICTION) AND INSTALLERS.**
- THIS IS A COMBINED SET OF STRUCTURAL AND ELECTRICAL PLANS.
- SOLAR EQUIPMENT ADDS LESS THAN 3 PSF (UNFACTORED) GRAVITY LOAD TO STRUCTURE.
- MODULE GRAVITY & WIND LOADS SHALL BE TRANSMITTED TO RIBS OF PURLIN BREARING 'R' (PBR) ROOFING METAL OR STANDING SEAMS OF ROOFING METAL USING S-5 CLAMPS/BRACKETS SHOWN HEREON.
- SEE DRAWINGS FOR MEANS & METHODS INFORMATION IN ADDITION TO THESE NOTES.
- CONTRACTOR SHALL INSTALL S5 CLAMPS PER OEM INSTRUCTIONS.
- CONTRACTOR SHALL INSTALL RAILS PERPENDICULAR TO STANDING SEAMS OR PBR RIBS ON IRONRIDGE XR100 RAILS ON TOP OF S5 CLAMPS.
- CONTRACTOR TO ENSURE CONTINUITY OF ALL METAL PARTS AND CONNECTIONS OF THIS INSTALLATION TO BE ELECTRICALLY GROUNDED AND BONDED TOGETHER. TORQUE ALL S-5 SET SCREWS TO 115-INCH-POUNDS.
- ADJUST C-C SPACING PLUS MINUS UP TO 4-INCHES TO HIT PBR METAL ROOF RIDGES.
- CONTRACTOR SHALL NOT INSTALL ROOF ATTACHMENTS ON ROOF AREAS OVER OVERHANGS.
- THERE SHALL BE A PV MODULE TO RAIL MOUNTING CLAMP AT EVERY MODULE/RAIL CROSSING POINT WITH MINIMUM 4 CLAMPS PER MODULE.
- ADJOINING MODULES ON SAME RAIL SHALL SHARE CLAMPS.
- MODULES SHALL BE PORTRAIT.
- ROOF IS ASSUMED TO BE COMPLIANT WITH FBC (FLORIDA BUILDING CODE) AS OF TIME OF CONSTRUCTION.
- THERE SHALL BE A MINIMUM OF TWO RAILS UNDER EACH PV MODULE.
- ROOF ATTACHMENT SPACING SHALL BE AS SHOWN IN FIGURE 08.
- RAILS SHALL NOT CANTILEVER BEYOND OUTSIDE END OF ROOF ATTACHMENT BY MORE THAN 1-FOOT.
- CONTRACTOR/INSTALLER SHALL COMPLY WITH OEM INSTALLATION INSTRUCTIONS.
- IF A CONFLICT SHOULD OCCUR BETWEEN A DRAWING AND/OR SPECIFICATION HEREON AND AN OEM DETAIL, OEM SHALL PREVAIL.
- CONTRACTOR SHALL PROVIDE AHJ WITH ADDITIONAL INFORMATION AS REQUIRED.
- ENGINEER OF RECORD (EOR) PREFERS EMAIL COMMUNICATION: alper@iceli-pe.com

01 NOTES
SCALE: N/A

ASCE 7-16, 29.4-7	GABLE ROOF 7 < Θ < 20			Θ	12	°		·13.26 kW DC SYSTEM. ·39-69." X 40." PV MODULES. ·753 SF PV ARRAY INSTALLATION ·PV MODULE UPLIFT LOAD CAPACITY: 55 PSF (AS REPORTED BY MANUFACTURER) ·UNFACTORED AVERAGE ADDITIONAL GRAVITY LOAD: 2.5 PSF ·TOTAL NUMBER OF ROOF ATTACHMENTS: 85
Exposure Category:		B		h2	0.38	FT.		
Risk Category:		2		Lp	5.71	FT.		
Mean Roof Height:	h	12	FT.	1.5 Lp	8.56	FT.		
Basic Wind Speed (mph):	V	116	MPH	Wp	3.38	FT.		
Ground elevation factor:	Ke	1		ω	0	°		
Topographic Factor:	Kzt	1		B	30	FT.		
Gust Effect Factor:	G	0.85		L	65	FT.		
Directionality Factor:	Kd	0.85		A	19.3	SF.		
Velocity Pressure Exposure Coefficient:	Kz	0.57		'Ya	0.67			
	qh	16.7	PSF	a	5	FT.		
ZONE	d1 (ft.)	d2 (ft.)						p (PSF)
ALL	-	-	-	GCp	0.45	'YE	1	5.0
1, 2e	1	0.25	d1<h/2	GCp	-2.00	'YE	1	-22.4
2n, 2r, 3e	10	0.25	d1>h/2	GCp	-2.60	'YE	1.5	-43.6
3r	3	0.25	d1<h/2	GCp	-3.15	'YE	1	-35.2

9/17/2021 ATC Hazards by Location

ATC Hazards by Location

Search Information

Address: 181 NW Suntilt Ct, White Springs, FL 32096, USA
Coordinates: 30.3191496, -82.7944718
Elevation: 97 ft
Timestamp: 2021-09-17T11:56:00.303Z
Hazard Type: Wind

ASCE 7-16		ASCE 7-10		ASCE 7-05	
MRI 10-Year	73 mph	MRI 10-Year	76 mph	ASCE 7-05 Wind Speed	100 mph
MRI 25-Year	82 mph	MRI 25-Year	84 mph		
MRI 50-Year	88 mph	MRI 50-Year	90 mph		
MRI 100-Year	96 mph	MRI 100-Year	97 mph		
Risk Category I	107 mph	Risk Category I	108 mph		
Risk Category II	116 mph	Risk Category II	117 mph		
Risk Category III	127 mph	Risk Category III-IV	126 mph		
Risk Category IV	⚠ 130 mph				

You are in a wind-borne debris region if you are also within 1 mile of the coastal mean high water line.

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

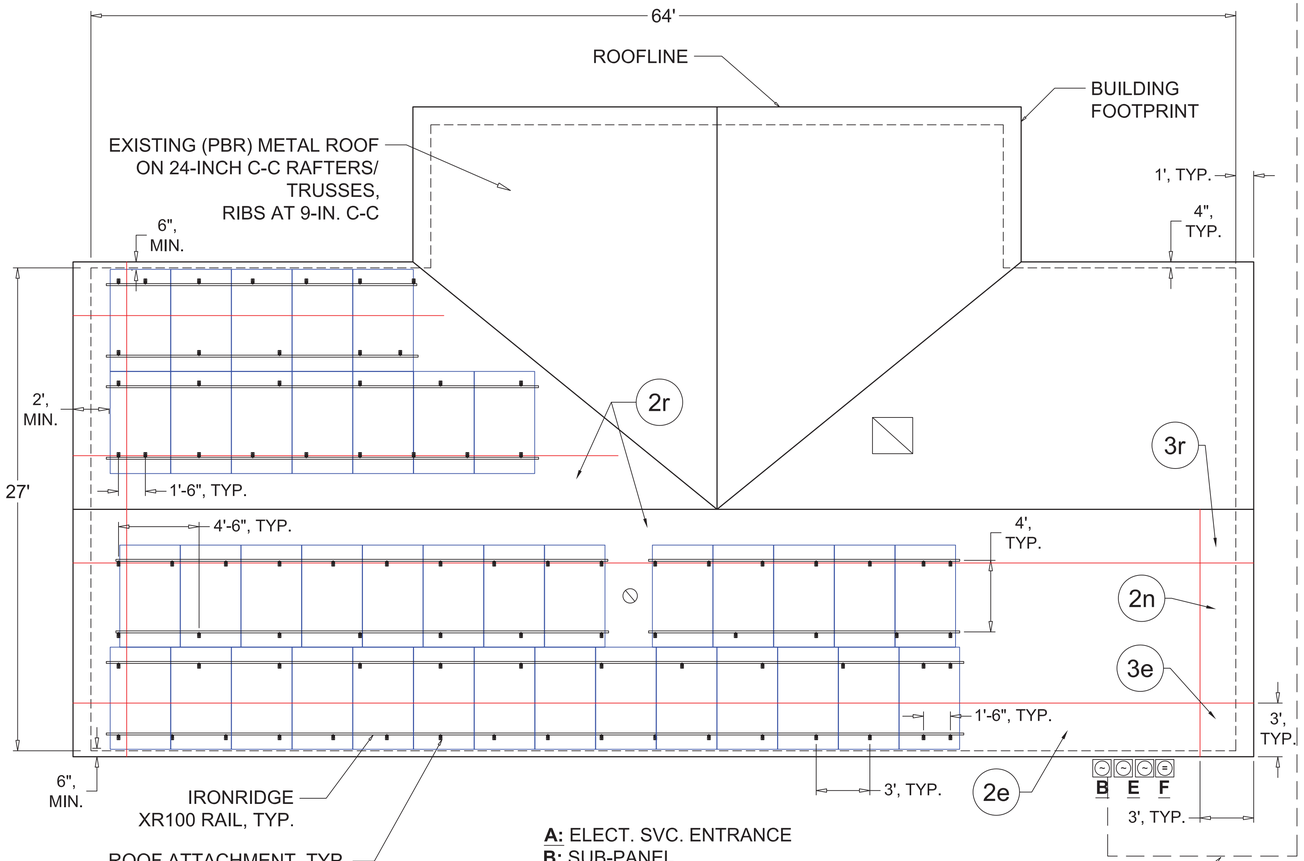
Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

05 DESIGN WIND SPEED
SCALE: NTS

- **TOTAL NUMBER OF ROOF ATTACHMENTS: 85**

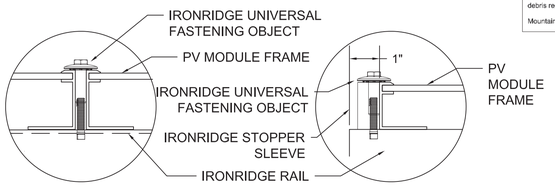
Columbia County Building Department — Plans Reviewed for Code Compliance — State of Florida



A: ELECT. SVC. ENTRANCE
B: SUB-PANEL
C: MAIN SVC. PANEL
D: AC DISCONNECT
E: INVERTERS
F: BATTERY

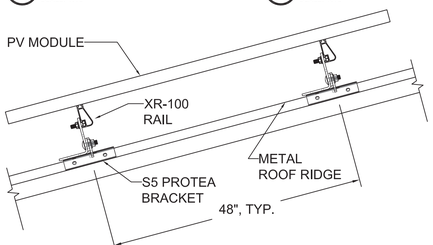
08 PLAN VIEW
SCALE: 1/4" = 1'-0"

02 WIND LOAD CALCULATIONS
SCALE: N/A

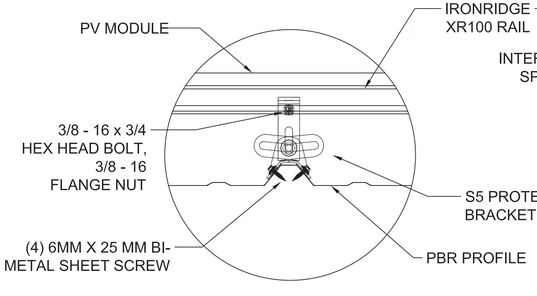


03 DETAIL, MID CLAMP FRONT
SCALE: NTS

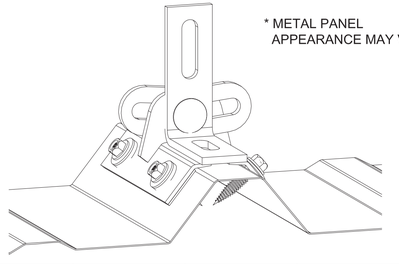
04 DETAIL, END CLAMP FRONT
SCALE: NTS



06 MODULE, RAIL, ROOF ATTACHMENT CROSS SECTION
SCALE: NTS



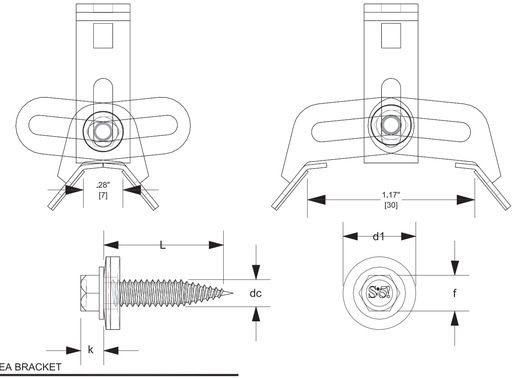
07 ROOF ATTACHMENT DETAIL
SCALE: NTS



* METAL PANEL APPEARANCE MAY VARY.

	k	dc	L	d1	f
MM	5.5	6	25	16	8
INCH	.22	.24	1	.63	.30

6mm X 25mm (8mm Hex W/16mm Washer)



09 S5 PROTEA BRACKET
SCALE: NTS

NAME OF OWNER: ZIMMERMAN ROBERT A
ADDRESS: 181 NW SUNTILT CT
WHITE SPRINGS, FL 32096
PROPERTY ID#: 14-2S-15-00053-000 (99)

CONTRACTOR:

Sky Solar Energy Inc.
40415 Chancey Rd.
Unit #104 Zephyrhills,FL 33542
352-443-6580
EC 13010029

SKYSOLAR-ZIMMERMAN

STRUCTURAL
OCT.22-21

PV SYSYEM W/ BATTERY BACKUP ELECTRICAL PLAN

THIS PLAN IS CERTIFIED BY ENGINEER OF RECORD AS CODE COMPLIANT & APPROVED FOR FLORIDA USE IN ACCORDANCE WITH HB 1021 ON ELECTRICAL PLANS.
https://www.flsenate.gov/Session/Bill/2017/01021

SYSTEM: 39-Q CELLS Q.PEAK DUO BLK-G6+ 340 PV MODULES
2-GENERAC PWRCELL X7602 INVERTERS
1-GENERAC PWRCELL 18 KWH BATTERY

CONTRACTOR SHALL COMPLY WITH SOLAR PROVISIONS 2018 NFPA 1.

1. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR RESPONSIBLE FOR COMPLYING WITH ALL LOCAL OR NATIONAL CODE REQUIREMENTS AND EQUIPMENT INSTALLATION INSTRUCTIONS.
2. ALL COMPONENTS MUST BE GROUNDED PER ARTICLES NEC (2017) 250 AND 690.
3. ALL EQUIPMENT SHALL BE LISTED PER NEC 690.4(B).
4. PER NEC 690.17, PROVIDE A WARNING SIGN AT ALL LOCATIONS WHERE TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION. SIGN SHALL READ "WARNING- ELECTRIC SHOCK HAZARD- DO NOT TOUCH TERMINALS- OR EQUIVALENT.
5. PER NEC 690.56, PROVIDE A PERMANENT PLAQUE OR DIRECTORY SHOWING ALL ELECTRIC POWER SOURCES ON THE PREMISES AT SERVICE ENTRANCE.
6. INTERCONNECTION METHOD SHALL COMPLY WITH NEC (2017) 705.12.
7. PV PERFORMANCE METER MAY OR MAY NOT BE REQUIRED BY THE AHJ AND/OR UTILITY FOR INTERCONNECTION.
8. ALL CONDUCTORS MUST BE COPPER, RATED FOR 600 V, 90 C° WET ENVIRONMET, TERMINALS ARE RATED FOR 75 C°.
9. UTILITY CONNECTION SHALL BE MADE BY LINE-SIDE TAP PER NEC ARTICLE 705.12(A) AND 705.31, LOCATED INSIDE PANEL BOARD ENCLOSURE USING UNUSED TERMINALS, TERMINALS THAT ARE SUITABLE FOR DOUBLE LUGGING, OR USING OTHER LOCALLY-APPROVED METHODS AND HARDWARE, IN COMPLIANCE WITH NEC 705.12(A). THE PANEL BOARD SHALL HAVE SUFFICIENT SPACE TO ALLOW FOR ANY TAP HARDWARE AS REQUIRED BY NEC 110.3 AND NEC 312.8(A).
10. PV SYSTEM DISCONNECT SHALL BE A VISIBLE KNIFE-BLADE TYPE DISCONNECT THAT IS ACCESSIBLE AND LOCKABLE BY THE UTILITY. THE DISCONNECT SHALL BE LOCATED WITHIN 5 FT OF UTILITY METER. DISCONNECT SHALL BE GROUPED IN ACCORDANCE WITH NEC 230.72
11. ALL CONDUCTORS MUST BE COPPER.
12. ALL CONDUCTORS AND RACEWAYS SHALL BE SUPPORTED ON INTERVALS AND BY METHODS REQUIRED BY NEC (2017).
13. CONTRACTOR SHALL PROVIDE ADDITIONAL INFORMATION IF REQUIRED BY AHJ.
14. EOR PREFERS EMAIL COMMUNICATIONS
alper@iceli-pe.com

01 ELECTRICAL NOTES.
SCALE:NTS

VOLTAGE DROP CALCULATIONS (39 PV MODULES)											
VD=2*L*R*I / 1000											
PV LINK	MODULES	WIRE RUN	Vmp	Imp (AMPS)	Ampacity (AMPS)	R (ohms)	L (ft)	VD	% VD	AWG WIRE SIZE	OCPD (AMPS)
#1 (INV. #1)	7	BRANCH TO COMBINER	380	7.00	8.75	2.01	50	1.41	0.37	#12	N/A
#2, (INV. #1) #3, #4, #5 (INV. #2)	8	BRANCH TO COMBINER	380	8.00	10.00	2.01	50	1.61	0.42	#12	N/A
(INV.#1) MPP1	15	COMBINER TO INVERTER	380	15.00	18.75	0.786	20	0.47	0.12	#8	1x30
(INV. #2)	24	COMBINER TO INVERTER	380	24.00	30.00	0.786	20	0.75	0.20	#8	1X30
(INV. #1 & #2)	32	INVERTER TO SUB-PANEL	240	32.00	40.00	0.786	10	0.50	0.21	#8	50
	64	SUB PANEL TO AC DISCONNECT	240	64.00	80.00	0.160	200	4.10	1.71	#1	100
	64	AC DISCONNECT TO INTERCONNECTION	240	64.00	80.00	0.160	10	0.20	0.09	#1	80

INVERTER RATINGS		
INVERTER MAKE	GENERAC	
INVERTER MODEL	PWRCELL X7602	
RATED OUTPUT POWER	7600	W
MAX. INPUT POWER	15000	WDC
NOMINAL AC VOLTAGE	240	V
MAX. INPUT VOLTAGE	420	V
MAX. CONT. OUTPUT CURRENT	32	A
MPPT VOLTAGE RANGE	360-420	V
CEC INVERTER EFFICIENCY	96.5	%

PHOTOVOLTAIC DC PER OPTIMIZER (PV LINK)		
RATED MPP CURRENT	8	A
RATED MPP VOLTAGE	60-360	V
MAX. OUTPUT VOLTAGE	420	V
NOMINAL OUTPUT VOLTAGE	380	V
MAX INPUT SHORT CURCUIT CURRENT	18	A

PV MODULE RATINGS		
MODULE MAKE	Q CELLS	
MODULE MODEL	Q.PEAK DUO BLK-G6+ 340	
MAX. POWER	340	W
OPEN CIRCUIT VOLTAGE	40.24	V
VOLTAGE AT MPP	33.45	V
CURRENT AT MPP	10.16	A
SHORT CURCUIT CURRENT	10.68	A

PHOTOVOLTAIC DC OUTPUT INVERTER #1		
NOMINAL DC VOLTAGE	380	V
PV LINK 1 AC OUTPUT CURRENT	7	A
PV LINK 2 AC OUTPUT CURRENT	8	A

PHOTOVOLTAIC DC OUTPUT INVERTER #2		
NOMINAL DC VOLTAGE	380	V
PV LINK 3 AC OUTPUT CURRENT	8	A
PV LINK 4 AC OUTPUT CURRENT	8	A
PV LINK 5 AC OUTPUT CURRENT	8	A

02 SPECIFICATIONS, CALCULATIONS
SCALE:NTS

WARNING: PHOTOVOLTAIC POWER SOURCE

- ALL PLAQUES AND SIGNAGE REQUIRED BY 2017 NEC AND 2018 NFPA 1 WILL BE INSTALLED AS REQUIRED.
- LABELS, WARNING(S) AND MARKING SHALL COMPLY WITH ANSI Z535.4, WHICH REQUIRES THAT DANGER, WARNING, AND CAUTION SIGNS USED THE STANDARD HEADER COLORS, HEADER TEXT, AND SAFETY ALERT SYMBOL ON EACH LABEL. THE ANSI STANDARD REQUIRES A HEADING THAT IS AT LEAST 50% TALLER THAN THE BODY TEXT, IN ACCORDANCE WITH NEC 110.21(B).
- A PERMANENT PLAQUE OR DIRECTORY SHALL BE INSTALLED PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION IN ACCORDANCE WITH NEC 690.56(B)
- LABEL(S) WITH MARKING, "TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUT DOWN THE ENTIRE PV SYSTEM," SHALL BE LOCATED WITHIN 3 FT OF SERVICE DISCONNECTING MEANS THE TITLE SHALL UTILIZE CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8" IN BLACK ON A RED BACKGROUND, AND REMAINING TEXT SHALL BE CAPITALIZED WITH A MINIMUM HEIGHT OF 3/16" IN BLACK ON WHITE BACKGROUND.

WARNING
ELECTRICAL SHOCK HAZARD,
IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.
LABEL PLACEMENT: COMBINER & INVERTER

WARNING
ELECTRICAL SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.
LABEL PLACEMENT: AC DISCONNECT, NEAR BREAKER, (FRONT OF PANEL / DEAD FRONT)

WARNING
DUAL POWER SOURCES.
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM.
LABEL PLACEMENT: MAIN PANEL NEAR METER

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.
SOLAR ELECTRIC PV PANELS
NFPA 111,12.2,1.1.1,1,11,12.2,1.4 AND NEC 690.56(C)(1)
LABEL PLACEMENT: PV AC DISCONNECT,INTERCONNECTION, MAIN SERVICE PANEL

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN
LABEL PLACEMENT: DC DISCONNECT/INVERTER

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED
LABEL PLACEMENT: DC DISCONNECT/INVERTER

IN CASE OF EMERGENCY CALL
SKYSOLAR, INC.
352-443-6580
LABEL PLACEMENT: PV AC DISCONNECT,INTERCONNECTION, MAIN PANEL

WARNING
DC SHOCK HAZARD.
V_{MAX} : 420 V
V_{MPP} : 380 V
I_{MAX}: 30 A
I_{MMP}: 15 A
I_{MMP2}: 24 A
LABEL PLACEMENT: COMBINER BOX

WARNING
ELECTRICAL SHOCK HAZARD.
NO USER-SERVICABLE PARTS INSIDE.
CONTACT AUTHORIZED SERVICER FOR ASSISTANCE.
LABEL PLACEMENT: AC DISCONNECT, PCP

PV AC DISCONNECT
V_{OPT} : 240 V
I_{OPT} : 64 A
LABEL PLACEMENT: PV AC DISCONNECT

PHOVOLTAIC POWER SOURCE
LABEL PLACEMENT: RACEWAY & COMBINER BOX

03 LABELS
SCALE:NTS

NEC 2017, TABLE C.11 MAXIMUM NUMBER OF CONDUCTORS OR FIXTURE WIRES IN RIGID PVC CONDUIT, SCHEDULE 40 AND HDPE CONDUIT (TYPE PVC SCH. 40)

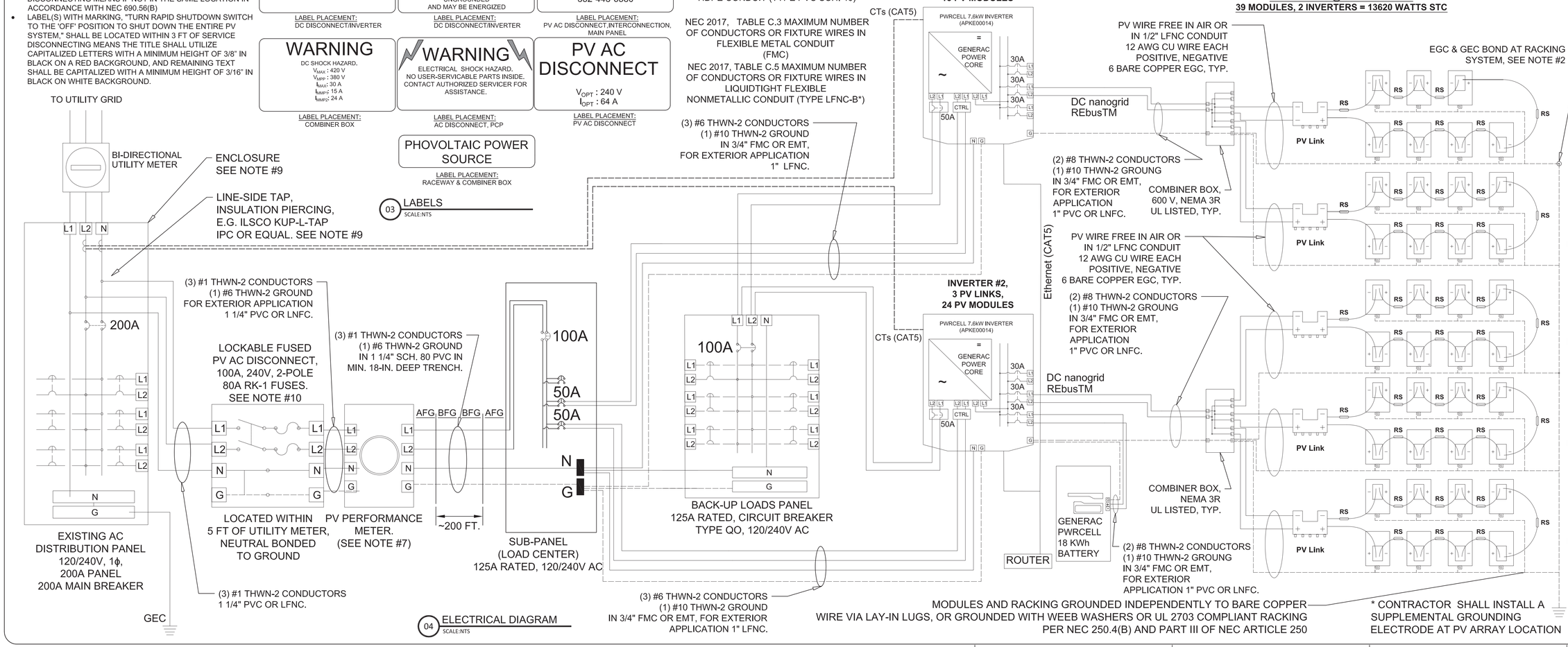
NEC 2017, TABLE C.3 MAXIMUM NUMBER OF CONDUCTORS OR FIXTURE WIRES IN FLEXIBLE METAL CONDUIT (FMC)

NEC 2017, TABLE C.5 MAXIMUM NUMBER OF CONDUCTORS OR FIXTURE WIRES IN LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (TYPE LFNC-B*)

INVERTER #1, 2 PV LINKS, 15 PV MODULES

INVERTER #2, 3 PV LINKS, 24 PV MODULES

PV MODULES @ 340 WATTS STC
39 MODULES, 2 INVERTERS = 13620 WATTS STC



04 ELECTRICAL DIAGRAM
SCALE:NTS

NATIONAL ELECTRICAL CODE, NEC (2017)
ENGINEER

ALPER ICELI
FL 90469

3753 LOCKRIDGE DR.
LAND O LAKES, FL 34638
(813) 406-7060
alper@iceli-pe.com

ALPER ICELI LICENSE No. 90469 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Alper Iceli, PE, on date shown above.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

NAME OF OWNER: ZIMMERMAN ROBERT A
ADDRESS: 181 NW SUNTILT CT
WHITE SPRINGS, FL 32096
PROPERTY ID#: 14-2S-15-00053-000 (99)

CONTRACTOR:

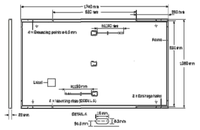
Sky Solar Energy Inc.
40415 Chancey Rd.
Unit #104 Zephyrhills,FL
33542
352-443-6580
EC 13010029

SKYSOLAR-ZIMMERMAN

ELECTRICAL
OCT.22-21

MECHANICAL SPECIFICATION

Format	1740 mm × 1080 mm × 32 mm (including frame)
Weight	18.8 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥1150 mm, (-) ≥1150 mm
Connector	Stäubli MC4, Amphenol UTX, Renne DS-6, Tongling TL-Cable/LB, JMTHY JMBOL IP68 or Friends PV2a IP67

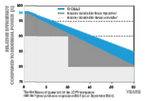


ELECTRICAL CHARACTERISTICS

POWER CLASS			330	335	340	345
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC¹ (POWER TOLERANCE +5 W / −0 W)						
Power at MPP	P_{MPP}	[W]	330	335	340	345
Short Circuit Current²	I_{SC}	[A]	10.41	10.47	10.53	10.58
Open Circuit Voltage³	V_{OC}	[V]	40.16	40.41	40.66	40.92
Current at MPP	I_{MPP}	[A]	9.91	9.97	10.02	10.07
Voltage at MPP	V_{MPP}	[V]	33.29	33.62	33.94	34.25
Efficiency⁴	η	[%]	≥18.4	≥18.7	≥19.0	≥19.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT²						
Power at MPP	P_{MPP}	[W]	247.0	250.7	254.5	258.2
Short Circuit Current	I_{SC}	[A]	8.39	8.43	8.48	8.52
Open Circuit Voltage	V_{OC}	[V]	37.86	38.10	38.34	38.59
Current at MPP	I_{MPP}	[A]	7.82	7.84	7.89	7.93
Voltage at MPP	V_{MPP}	[V]	31.56	31.97	32.27	32.57

¹Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 G according to IEC 60904-3 • ²800 W/m², NMOT, spectrum AM 1.5 G

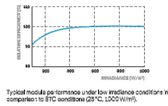
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.54 % degradation per year. At least 93.1 % of nominal power up to 10 years. At least 85 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.38	Nominal Module Operating Temperature	NMOT	[°C]	43 ± 3

PROPERTIES FOR SYSTEM DESIGN					
Maximum System Voltage	V_{SYS}	[V]	1000	Safety Class	II
Maximum Reverse Current	I_R	[A]	20	Fire Rating	C
Max. Design Load, Push / Pull		[Pa]	3600 / 2667	Permitted Module Temperature on Continuous Duty	−40 °C – +85 °C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES	PACKAGING INFORMATION	
VDE Quality Tested, IEC 61215 (2016); IEC 61730 (2016), Application Class II; This data sheet complies with DIN EN 50380.	Number of Modules per Pallet	32
	Number of Pallets per Trailer (24')	28
	Number of Pallets per 40' HC-Container (28')	24
	Pallet Dimensions (L × W × H)	1815 × 1150 × 1190 mm
	Pallet Weight	683 kg

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH
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Engineered in Germany

Q CELLS

01 PV MODULE SPEC. SHEET
SCALE: N/A

Pika ENERGY

PV Link™
S2500 Series substring optimizer

Advantages:
- Fast, simple installation
- Lower failure risk than module-level optimizers
- Rapid Shutdown compliant
- Accurate monitoring for each substring
- Ground-fault protection
- Robust ceramic capacitors

Features:
- Quick connections with MC4 connectors
- 2500W capacity
- Compatible with high-voltage smart batteries
- Cost-effective solution for high-performance PV
- 25-year limited warranty

Fast. Flexible. Safe.

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

Specification	PV Link Model S2501	Unit
Rated power	2500	W
Peak efficiency	99%	-
MPPT voltage range	60-360	VMP
Max input voltage	420; max when cold	VOC
Max output	420	VOC
Nominal output (REbus™)	380	VDC
Max output current	8	A
Standby power	<1	W
Topology	Boost converter	-
Protections	Ground-fault protection	-
Max operating temp	70	°C
Remote monitoring	Via REview™ web dashboard	-
Enclosure	Type 3R	-
Weight	7.3	Lb
Dimensions	2 x 15.4 x 9.6	In
Limited warranty	25 years	-

www.pika-energy.com / sales@pika-energy.com / made in the USA

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03 POWER OPTIMIZER SPEC. SHEET
SCALE: N/A

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)

Intertek

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	33 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 5 MODULE BATTERY CAB NET¹:	8,000 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 W²
MAX. CONT. AC POWER @ 50°C (122°F):	8,800 W	7,500-8,800 W²
PEAK MOTOR STARTING CURRENT (3 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 (+/-):	40 A	40 A
3-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

02 INVERTER SPEC. SHEET
SCALE: N/A

Specifications

PWRcell™ BATTERY CONFIGURATIONS				
BATTERY MODULE SERIES:	3.0 kWh DCB			
BATTERY MODULES:	3	4	5	6
USABLE ENERGY:	9 kWh	12 kWh	15 kWh	18 kWh
NOMINAL CONT. AC POWER¹	3.4 kW	4.5 kW	5.6 kW	6.7 kW
MAX. CONT. AC POWER²	4.5 kW	6 kW	7.5 kW	9 kW
PEAK MOTOR STARTING CURRENT (2 SEC) - A, RMS	25	33	42	50
REbus™ VOLTAGE - INPUT/OUTPUT:	360-420 VDC			
NOMINAL VOLTAGE:	46.8 VDC			
DC-DC ROUND-TRIP EFFICIENCY:	96.5%			
MAXIMUM AMBIENT OPERATING TEMPERATURE:	14 TO 122 °F (-10 TO 50 °C)			
RECOMMENDED AMBIENT OPERATING TEMPERATURE:	41 to 104 °F (5 to 40 °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):	115 (52)			
WEIGHT, INSTALLED - LB (KG):	280 (127)	335 (152)	390 (177)	445 (202)
WEIGHT, ACCESSORY MOUNTING HARDWARE - LB (KG):	21 (10)			
ENCLOSURE TYPE:	Type 3R			
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			

¹Average AC power over a complete discharge cycle.
²Peak Performance, values provided for 40°C (104°F).
Note: Charge/discharge rate may be reduced at temperature extremes

PWRcell ACCESSORIES

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.

PWRcell MODEL BUILDER

PRODUCT SERIES	ENCLOSURE TYPE	# OF MODULES	BATTERY SERIES
PWRcell	OR IR (Indoor Rated) OR (Outdoor Rated)	M3 3 Modules 4 Modules 5 Modules 6 Modules	DCB DCB

Sample Model Name: PWRcell OR M3 DCB

Generac Power Systems, Inc.
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A0000949454 REV C

GENERAC®

05 BATTERY SPEC. SHEET
SCALE: N/A

NATIONAL ELECTRICAL CODE, NEC (2017)

ENGINEER

ALPER ICELI
FL 90469

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ALPER ICELI LICENSE No. 90469 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Alper Iceli, PE, on date shown above.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

NAME OF OWNER: ZIMMERMAN ROBERT A
ADDRESS: 181 NW SUNTILT CT
WHITE SPRINGS, FL 32096
PROPERTY ID#: 14-2S-15-00053-000 (99)

CONTRACTOR:

Sky Solar Energy Inc.
40415 Chancey Rd.
Unit #104 Zephyrhills,FL
33542
352-443-6580
EC 13010029

SKYSOLAR-ZIMMERMAN

DATA
SEP.17-21