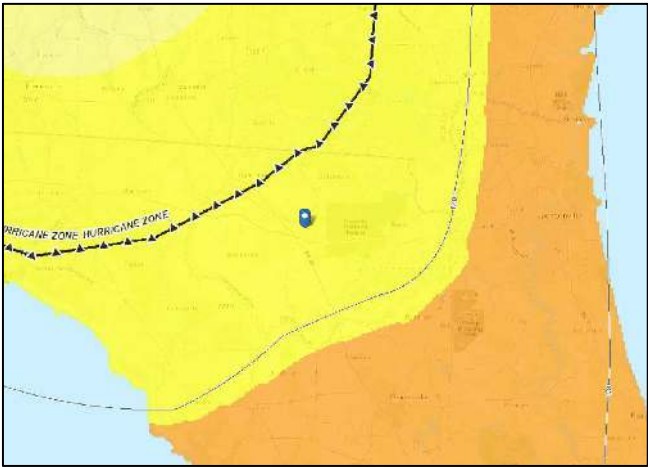




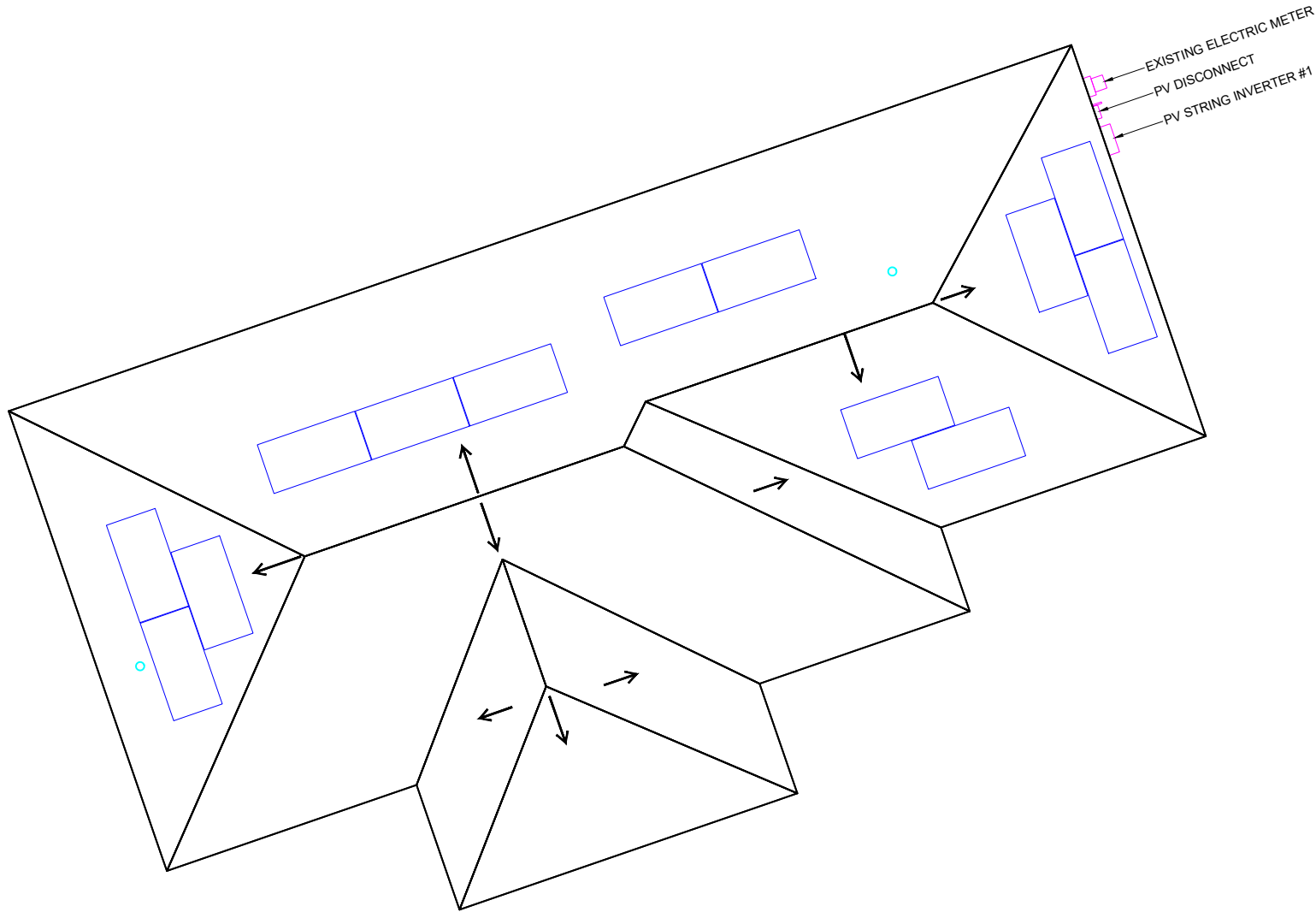
2 LOCATION MAP / WIND ZONES
N.T.S.



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.

PROJECT DESCRIPTION

SYSTEM CAPACITY: 5.1 KW DC / 3.8 KW AC

PV PANELS: (13) Q.PEAK DUO BLK ML-G10+ 395W BY Q CELL

OPTIMIZERS: (13) P505 BY SOLAREEDGE

INVERTER: (1) SE3800H-US BY SOLAREEDGE

RACKING SYSTEM: CROSS RAIL SYSTEM 44-X BY K2 SYSTEMS

PROJECT INFORMATION

PROJECT LATITUDE	30.296604	MIN AMBIENT TEMP	-7 ° C
PROJECT LONGITUDE	-82.708187	MAX AMBIENT TEMP	37 ° C
AHJ	COLUMBIA CITY	WIND EXPOSURE	C
		DESIGN WIND SPEED	117 MPH

DRAWINGS INDEX

C-1	COVER SHEET
C-2	SAFETY PLANS
E-1	ONE LINE RISER DIAGRAM
E-2	SAFETY LABELS
S-1	STRUCTURAL PLAN
S-2	RACKING PLAN
D-1	PV MODULES DATA SHEET
D-2	SMART MONITORING DATA SHEET
D-3	INVERTER 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.

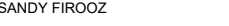
CONTRACTOR SHALL ENSURE ALL ROOF PENETRATIONS TO BE INSTALLED AND SEALED PER 2020 FLORIDA BUILDING CODE 7TH EDITION OR LOCAL GOVERNING CODE.

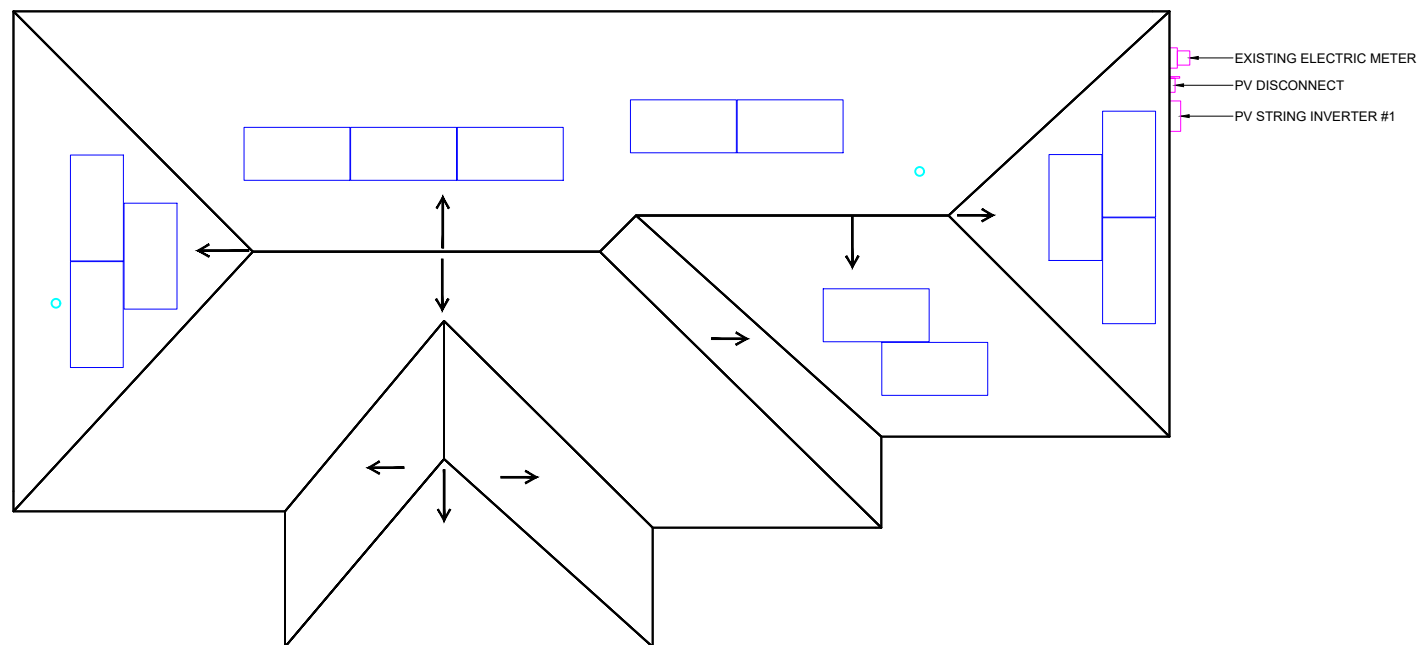
ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE (NEC) 2017, LOCAL STATE CODES, AND OTHER APPLICABLE LOCAL CODES. MEANS SHALL BE PROVIDED TO DISCONNECT ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS IN THE BUILDING. 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.

DOCUMENT CONTROL				DATE	CAD	QC	ENGINEER CONTACT INFORMATION				ENGINEERING STAMP				CONTRACTOR CONTACT INFORMATION				CONTRACTOR LOGO				CUSTOMER:				SHEET NAME:							
ISSUED FOR PERMIT				12-27-2021	BW	JG	ENGINEPARTNERS LLC								Digitally signed by Rafael A. Gonzalez Soto				TITAN SOLAR POWER FL								SANDY FIROOZ				COVER SHEET			
REV				DATE	CAD	QC	C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134								12221 N US HIGHWAY 301				161 NORTHWEST SPARR LANE LAKE CITY FL 32055															
							CORAL GABLES, FL 33134								THONOTASASSA, FL 33592																			
							DESIGN@ENGINEPARTNERS.COM								(813) 982 -9001																			
							833 - 888 - 3644								#EC13008093				22-2S-16-01716-002															
																			PROJECT ID:				ENGINEER OF RECORD:				SHEET TITLE:							
																			TSP110728				ENG. RAFAEL A. GONZALEZ SOTO, PE				C-1							
																							DATE:				SHEETS:							
																							12-27-2021				1 OF 9							



"PROPERTY SIDE FACING STREET"

1 SAFETY PLAN
N.T.S.

LOCATION OF NEAREST URGENT CARE FACILITY

NAME:

ADDRESS:

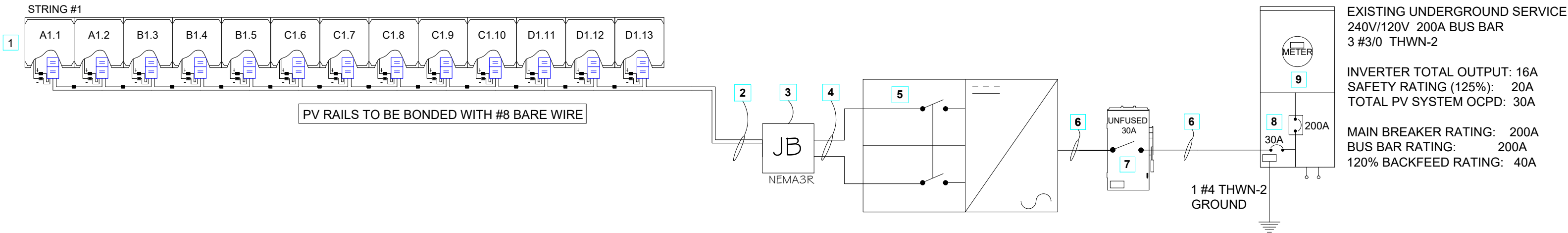
PHONE NUMBER:

NOTES:

- INSTALLERS SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME
- INSTALLERS SHALL UPDATE NAME ADDRESS AND PHONE NUMBER OF NEAREST URGENT CAR FACILITY RELATIVE TO THE SITE BEFORE STARTING WORK

DOCUMENT CONTROL				DATE	CAD	QC	ENGINEER CONTACT INFORMATION			ENGINEERING STAMP			CONTRACTOR CONTACT INFORMATION			CONTRACTOR LOGO			CUSTOMER:			SHEET NAME: SAFETY PLAN					
ISSUED FOR PERMIT				12-27-2021	BW	JG	ENGIPARTNERS LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644			 Digitally signed by Rafael A Gonzalez Soto Date: 2021.12.29 17:40:57 -04'00'			TITAN SOLAR POWER FL 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 - 9001 #EC13008093						SANDY FIROOZ						PROJECT ADDRESS: 161 NORTHWEST SPARR LANE LAKE CITY FL 32055		
REV	DESCRIPTION			DATE	CAD	QC													PARCEL NUMBER:								
																			22-2S-16-01716-002								
													PROJECT ID: TSP110728			ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE			SHEET TITLE: C-2								
																DATE: 12-27-2021			SHEETS: 2 OF 9								

	WIRE SIZES, QUANTITY & TYPE			RACEWAY SIZE, TYPE, LOCATION & INFO.			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 TEMP	# OF COND.	FINAL 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 X 0.76 X 1 = 30.4 A				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 X 0.76 X 0.8 = 24.3 A				20 FT.	350V	0.21%	8.1%
AC (INVERTER TO METER)	(2) #10 AWG THWN-2	(1)#10AWG THWN-2	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	EXTERIOR WALL	"N/A"	16A	20.0A	20A	40A X 0.76 X 1 = 30.4 A				5 FT.	240V	0.1%	7.7%

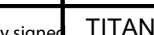
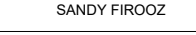


1 ONE LINE RISER DIAGRAM

N.T.S.

LEGEND:

1	(13) Q.PEAK DUO BLK ML-G10+395W BY Q CELL REFER TO D-1 SHEET	2	2 #10 PV WIRE PER STRING 1 #8 BARE WIRE GROUND 3/4" EMT CONDUIT	3	NEMA3R JUNCTION BOX
4	2 #10 THWN-2 PER STRING 1 #8 THWN-2 GROUND 3/4" EMT CONDUIT	5	SE3800H-US BY SOLAREEDGE REFER TO D-3 SHEET	6	2 #10 L1,L2 THWN-2 1 #10 THWN-2 NEUTRAL 1 #8 THWN-2 GROUND 3/4" EMT CONDUIT
7	PV SYSTEM DISCONNECT - 30A RATED	8	PV INTERCONNECTION POINT - PV BREAKER	9	UTILITY ELECTRICAL SERVICE
10	NOT USED	11	NOT USED	12	NOT USED

DOCUMENT CONTROL				DATE		CAD	QC	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:			
ISSUED FOR PERMIT				12-27-2021		BW	JG	ENGIPARTNERS LLC				TITAN SOLAR POWER FL				SANDY FIROOZ		ONE LINE RISER DIAGRAM			
REV		DESCRIPTION		DATE		CAD	QC	12221 N US HIGHWAY 301				PROJECT ADDRESS:									
								THONOTASASSA, FL 33592				161 NORTHWEST SPARR LANE LAKE CITY FL 32055									
								(813) 982 - 9001				PARCEL NUMBER:									
								#EC13008093				22-2S-16-01716-002									
								833 - 888 - 3644								PROJECT ID:		ENGINEER OF RECORD:		SHEET TITLE:	
								DESIGN@ENGIPARTNERS.COM								TSP110728		ENG. RAFAEL A. GONZALEZ SOTO, PE		E-1	
																		DATE:		SHEETS:	
																		12-27-2021		3 OF 9	

**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)

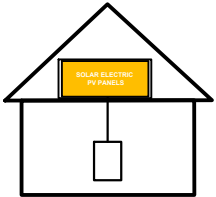
**WARNING**

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.



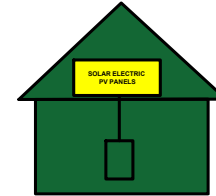
LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 690.56(C)(3)

**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

3.8 KW

MAXIMUM AC CURRENT

16 A

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

10.5 A

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

15 A

LABEL LOCATION:
INVERTER
PER CODE: NEC 690.53

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:

16 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 BACKFED

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**

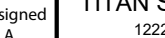
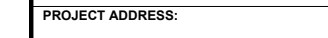
LABEL LOCATION: POINT OF INTERCONNECTION
PER CODE: NEC 690.15, NEC 690.13(B)

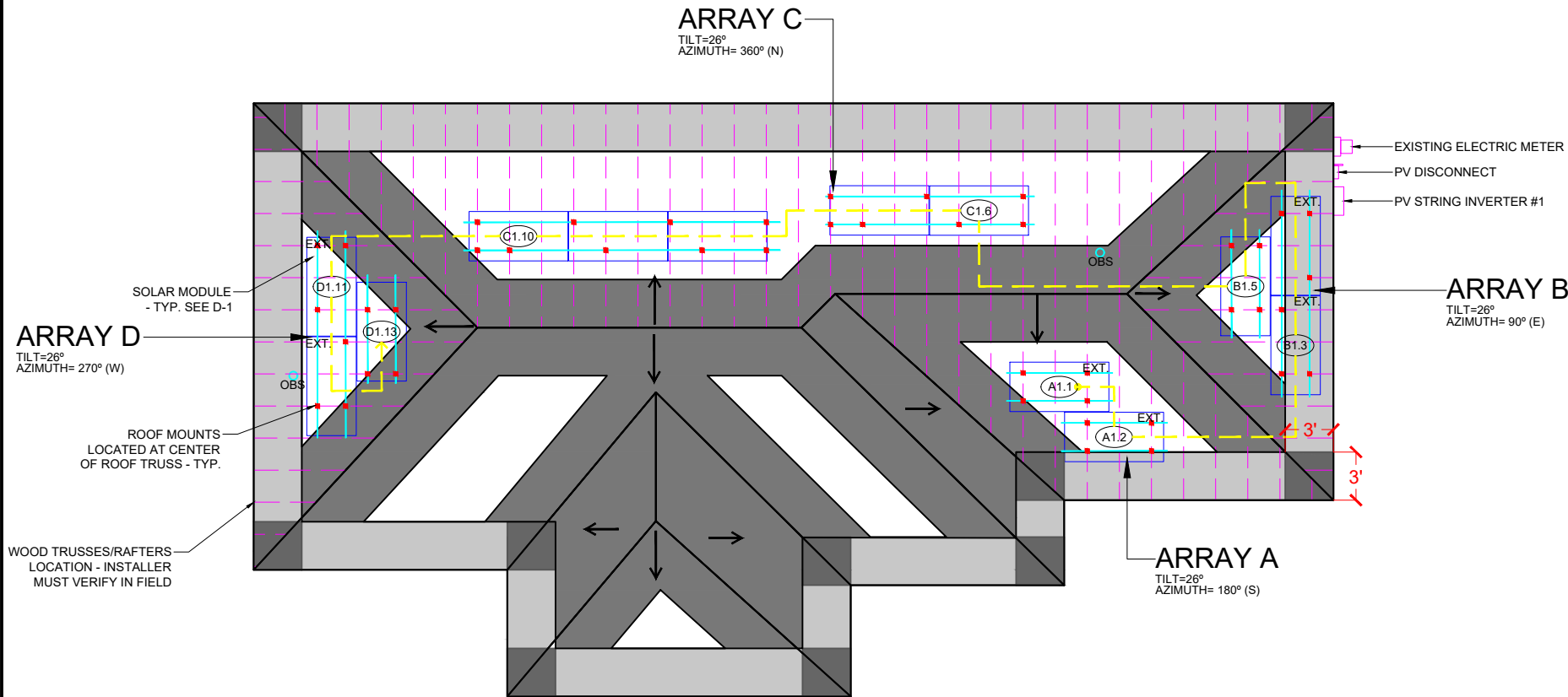
LABEL LOCATION: ADJACENT TO MAIN DISCONNECT

**TITAN**
SOLAR POWER
FLORIDA
901 ARMSTRONG BLVD, KISSIMMEE, FL 34741
1-855-SAY-SOLAR

1

PV SAFETY LABELS DATA
N.T.S.

DOCUMENT CONTROL				DATE	CAD	QC	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:					
ISSUED FOR PERMIT				12-27-2021	BW	JG	ENGIPARTNERS LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644		 Digitally signed by Rafael A Gonzalez Soto Date: 2021.12.29 17:41:15 -04'00'		TITAN SOLAR POWER FL 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093				SANDY FIROOZ PROJECT ADDRESS: 161 NORTHWEST SPARR LANE LAKE CITY FL 32055 PARCEL NUMBER: 22-2S-16-01716-002		SAFETY LABELS					
REV	DESCRIPTION			DATE	CAD	QC											PROJECT ID: TSP110728		ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE DATE: 12-27-2021		SHEET TITLE: E-2 SHEETS: 4 OF 9	



LEGEND & SYMBOLS

OBS	ROOF OBSTRUCTIONS
XX.X	ARRAY #
	MODULE #
	STRING #
	PV MODULES
	TRUSSES OR RAFTERS
	ROOF MOUNTS & RAIL
	ROOF SLOPE
EXT.	EXTERIOR PV MODULE

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:

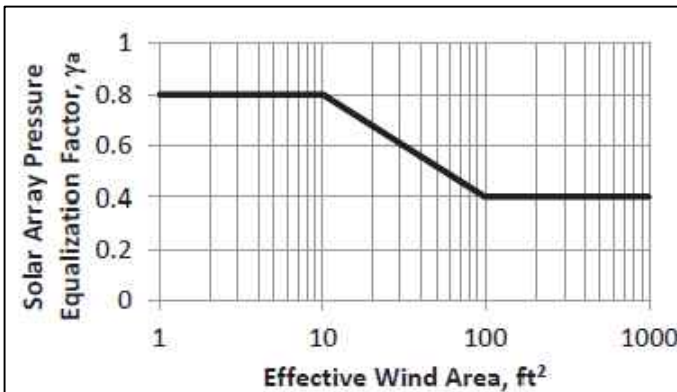
PV MODULE IN LAYOUT IS CONSIDERED NON-EXPOSED AFTER COMPLYING WITH THE FOLLOWING STATEMENTS BASED ON ASCE7-16:

- NO INDIVIDUAL PV MODULE IS MORE THAN 0.5(MEAN ROOF HEIGHT) AWAY FROM ROOF EDGE OR ANOTHER MODULE.
- NO INDIVIDUAL PV MODULE IS MORE THAN 4 FT AWAY FROM ROOF EDGE OR ANOTHER MODULE.
- INDIVIDUAL PV MODULE IS MORE THAN 1.5(MODULE LENGTH) AWAY FROM CLOSEST EXPOSED EDGE

ASCE 7.16 - 29.4-7

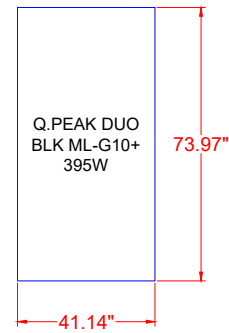
DESIGNED WIND PRESSURES:

$$p = q_h (GC_p)(\gamma_E)(\gamma_a)$$



SOLAR MODULE

UL 1703 CERTIFIED
MAX. DESIGN LOAD: 83.54 psf
APPLIED WIND LOAD : 34.12 psf



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.

WEIGHTED AVERAGE

WORST CASE MODULE:

ZONE 1: 21%

ZONE 2e: 64%

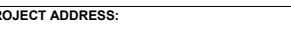
ZONE 2r: 15%

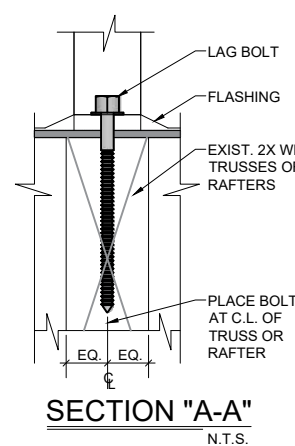
$$-25.49(0.21) + -36.41(0.64) + -36.41(0.15) = -34.12\text{psf}$$

ULTIMATE WIND SPEED				120 mph	
DESIGN WIND SPEED				117 mph	
RISK CATEGORY				II	
EXPOSURE CATEGORY				C	
ROOF SLOPE (°)				26	
ROOF TYPE				HIPPED	
MATERIAL ROOF TYPE				ASPHALT SHINGLE	
PRESSURE ZONE:				1&2	
MEAN ROOF HEIGHT:				13.73	
PERIMETER WIDTH:				3.0	
K_D				0.85	
K_{ZT}				1.00	
K_H				0.850	
VELOCITY PRESSURE (q) = $0.60 \cdot 0.00256 \cdot K_H K_{ZT} K_D V^2$					
VELOCITY PRESSURE (ASD)				15.17	
INTERIOR EDGE FACTOR: $\gamma_E = 1.0$		EXTERIOR EDGE FACTOR: $\gamma_E = 1.5$		ARRAY EQUALIZATION FACTOR: $\gamma_a = 0.8$	
EXTERNAL PRESSURE COEFFICIENT Z1				0.7	-1.4
EXTERNAL PRESSURE COEFFICIENT Z2e				0.7	-2.0
EXTERNAL PRESSURE COEFFICIENT Z2r				0.7	-2.0
EXTERNAL PRESSURE COEFFICIENT Z3				0.7	-2.0
INTERNAL PRESSURE COEFFICIENT				0.18	
ZONES	PRESSURES (PSF)	INTERIOR PRESSURES (PSF)	EXTERIOR PRESSURES (PSF)	MAX SPAN (FT)	MAX CANTI-LEVER (IN)
1	-23.97	-16.99	-25.49	6'	24"
2e	-33.07	-24.27	-36.41	6'	24"
2r	-33.07	-24.27	-36.41	4'	16"
3	-33.07	-24.27	-36.41	4'	16"
TOTAL ROOF AREA				1961.57	sq.-ft
TOTAL MODULES:				13	
TOTAL PHOTOVOLTAIC AREA:				274.69	sq.-ft
WIND LOAD (PSF):				34.12	
TOTAL WIND LOAD (LBS):				9,372.42	
TOTAL ROOF MOUNTS:				44	
TENSION FORCE PER MOUNT (LBS):				213.01	

1 STRUCTURAL ROOF PLAN & PV MODULES LAYOUT

N.T.S.

DOCUMENT CONTROL				DATE	CAD	QC	ENGINEER CONTACT INFORMATION				ENGINEERING STAMP				CONTRACTOR CONTACT INFORMATION				CONTRACTOR LOGO				CUSTOMER:				SHEET NAME:				
ISSUED FOR PERMIT				12-27-2021	BW	JG	ENGIPARTNERS LLC				 Digitally signed by Rafael A Gonzalez Soto Date: 2021.12.29 17:41:23 -04'00'				TITAN SOLAR POWER FL								CUSTOMER: SANDY FIROOZ				STRUCTURAL PLAN				
REV				DESCRIPTION	DATE	CAD	QC	C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134							12221 N US HIGHWAY 301								PROJECT ADDRESS:								
								DESIGN@ENGIPARTNERS.COM							THONOTASASSA, FL 33592								161 NORTHWEST SPARR LANE LAKE CITY FL 32055								
								833 - 888 - 3644							(813) 982 -9001								PARCEL NUMBER:								
															#EC13008093								22-2S-16-01716-002								
																				TSP110728				ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE				SHEET TITLE: S-1			
																								DATE: 12-27-2021				SHEETS: 5 OF 9			

[illegible]

LAG BOLT PULL OUT CALCULATIONS		
Spruce, Pine,	Per inch Thread Depth	266lbs
SS Lag Bolt 5/16" x 4"	Min. Thread Depth	0'-3"
Wood Strength x Thread Depth = Pull Out Strength		
266 lbs. x 3 in = 798 lbs.		
Allowable Pull Out Strength per Lag Bolt		798 lbs.
Max. Pull Out Strength Required per Lag Bolt		213.01
Lag Bolt Pull Out Strength Safety Factor		3.75

K2 SYSTEM 44-X Landscape 60-Cell										
Ground Snow Load	Exposure Category	Panel Angle	Wind Speed	120 mph						
			Roof Zone	1'	1	2e	2r	2n	3e	3r
0 psf	C	20 to 27	Array Interior	88	88	88	74	74	74	72
			Array Edge	76	76	76	64	64	64	62

DISTRIBUTED LOAD CALCULATIONS

PV MODULES & RACKING WEIGHT = (INDIVIDUAL MODULE WEIGHT
+ 3.5 LBS) * (MODULE QTY) = (52 LBS) * (13) = 676 LBS

PER SQUARE FEET (PSF) ARRAY LOAD = PV MODULES & RACKING
WEIGHT / TOTAL ARRAY AREA = 676 LBS / 274 SQFT
= 2.46 PSF

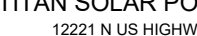
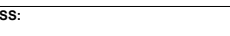
HENCE, ROOF WILL CARRY THE ADDITIONAL SOLAR SYSTEM
LOAD

STAINLESS STEEL Lag screw specifications		
	Specific gravity	$\frac{5}{16}$ " shaft, * per inch thread depth
Douglas Fir, Larch	0.50	266
Douglas Fir, South	0.46	235
Engelman Spruce, Lodgepole Pine (MSR 1650 f & higher)	0.46	235
Hem, Fir, Redwood (close grain)	0.43	212
Hem, Fir (North)	0.46	235
Southern Pine	0.55	307
Spruce, Pine, Fir	0.42	205
Spruce, Pine, Fir (E of 2 million psi and higher grades of MSR and MEL)	0.50	266



Thread depth

1 SHINGLE ROOF MOUNT DETAIL & DATA

DOCUMENT CONTROL				DATE	CAD	QC	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER: SANDY FIROOZ		SHEET NAME: RACKING PLAN		
ISSUED FOR PERMIT				12-27-2021	BW	JG	ENGIPARTNERS LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644		 Digitally signed by Rafael A Gonzalez Soto Date: 2021.12.29 17:41:31 -04'00'		TITAN SOLAR POWER FL 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 - 9001 #EC13008093				PROJECT ADDRESS: 161 NORTHWEST SPARR LANE LAKE CITY FL 32055 PARCEL NUMBER: 22-2S-16-01716-002				
REV	DESCRIPTION			DATE	CAD	QC													
							PROJECT ID: TSP110728		ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE		SHEET TITLE: S-2								
							DATE: 12-27-2021		SHEETS: 6 OF 9										

Q.PEAK DUO BLK ML-G10+ 385-410

ENDURING HIGH
PERFORMANCE



BREAKING THE 20% EFFICIENCY BARRIER
Q.ANTUM DUO Z Technology with zero gap cell layout
boosts module efficiency up to 21.1%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY
Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry. The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE
Long-term yield security with Anti-LID Technology, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT
Inclusive 25-year product warranty and 25-year linear performance warranty*.

* See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:



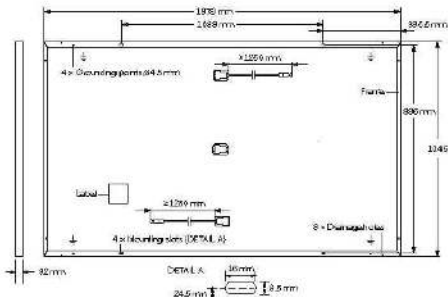
Roof-top arrays on
residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	1879mm x 1045mm x 32mm (including frame)
Weight	22.0 kg
Front Cover	3.2mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 x 22 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm x 32-60 mm x 15-18 mm Protection class IP67, with bypass diodes
Cable	4mm² Solar cable; (+) ≥1250mm, (-) ≥1250mm
Connector	Stäubli MC4, IP68

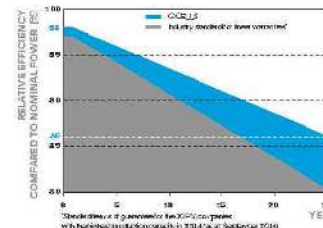


ELECTRICAL CHARACTERISTICS

POWER CLASS		385	390	395	400	405	410
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE: +5W / -0W)							
Minimum	Power at MPP ¹	P _{MPP} [W]	385	390	395	400	405
	Short Circuit Current ¹	I _{SC} [A]	11.04	11.07	11.10	11.14	11.17
	Open Circuit Voltage ¹	V _{OC} [V]	45.19	45.23	45.27	45.30	45.37
	Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.77	10.89
	Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.13	37.39
	Efficiency ¹	η [%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²							
Minimum	Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	300.1	303.8
	Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	8.97	9.00
	Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.72	42.79
	Current at MPP	I _{MPP} [A]	8.36	8.41	8.46	8.51	8.57
	Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25	35.46

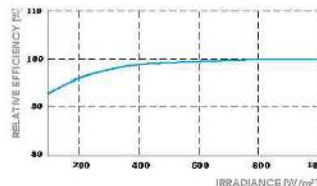
¹Measurement tolerances P_{MPP} ±3%; I_{SC}, V_{OC} ±5% at STC: 1000 W/m², 25±2°C, AM 1.5 according to IEC 60904-3; ²800 W/m², NMOT spectrum AM 1.5

Q CELLS PERFORMANCE WARRANTY



At least 88% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 88.5% of nominal power up to 10 years. At least 86% 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.



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
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT
					[°C]

PROPERTIES FOR SYSTEM DESIGN					
Maximum System Voltage	V _{sys}	[V]	1000	PV module classification	Class II
Maximum Reverse Current	I _R	[A]	20	Fire Rating based on ANSI/UL 61730	C / TYPE 2
Max. Design Load, Push/Pull		[Pa]	3600/2660	Permitted Module Temperature on Continuous Duty	-40°C - +85°C
Max. Test Load, Push/Pull		[Pa]	5400/4000		

QUALIFICATIONS AND CERTIFICATES

Quality Controlled PV - TÜV Rheinland
IEC 61215-2 018; IEC 61730 2016.
This data sheet complies with DIN EN 50380.
QCPV Certification ongoing.
Certification holder:
Hanwha Q CELLS GmbH



PACKAGING INFORMATION

	Horizontal packaging	1840mm	1100mm	1220mm	751kg	28 pallets	24 pallets	32 modules
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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.

Made in Korea

Hanwha Q CELLS Australia Pty Ltd
Suite 1, Level 1, 15 Blue Street, North Sydney, NSW 2060, Australia | TEL +61 (0)2 9016 3033 | FAX +61 (0)2 9016 3032 | EMAIL q-cells-australia@q-cells.com | WEB www.q-cells.com/au

Engineered in Germany

Q CELLS

DOCUMENT CONTROL				ENGINEER CONTACT INFORMATION				ENGINEERING STAMP				CONTRACTOR CONTACT INFORMATION			
ISSUED FOR PERMIT	DATE	CAD	QC	ENGINEPARTNERS LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 DESIGN@ENGINEPARTNERS.COM 833 - 888 - 3644				Digitally signed by Rafael A Gonzalez Soto Date: 2021.12.29 17:41:41 -04'00' #EC13008093				TITAN SOLAR POWER FL 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 - 9001 #EC13008093			
REV	DESCRIPTION	DATE	CAD												

CONTRACTOR LOGO		CUSTOMER: SANDY FIROOZ		SHEET NAME: PV MODULES DATA SHEET					
		PROJECT ADDRESS: 161 NORTHWEST SPARR LANE LAKE CITY FL 32055							
		PARCEL NUMBER: 22-2S-16-01716-002		PROJECT ID: TSP110728		ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE		SHEET TITLE: D-1	
						DATE: 12-27-2021		SHEETS: 7 OF 9	

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505



POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com



Power Optimizer

For North America

P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P401 (for high power 60 and 72 cell modules)	P405 (for high-voltage modules)	P485 (for high voltage modules)	P505 (for higher current modules)
INPUT								
Rated Input DC Power ⁽¹⁾	320	350	370	400	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48	60	80	60	125 ⁽²⁾	83 ⁽³⁾		Vdc
MPPT Operating Range	8 - 48	8 - 60	8 - 80	8-60	12.5 - 105	12.5 - 83		Vdc
Maximum Short Circuit Current (IsC)	11	11.02	11	10.1	11.75	11	14	Adc
Maximum DC Input Current		13.75		12.5	14.65	12.5	17.5	Adc
Maximum Efficiency				99.5				%
Weighted Efficiency				98.8			98.5	%
Overvoltage Category				II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)								
Maximum Output Current				15				Adc
Maximum Output Voltage			60			85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)								
Safety Output Voltage per Power Optimizer				1 ± 0.1				Vdc
STANDARD COMPLIANCE								
EMC				FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety				IEC62109-1 (class II safety), UL1741				
Material				UL94 V-0, UV Resistant				
RoHS				Yes				
INSTALLATION SPECIFICATIONS								
Maximum Allowed System Voltage				1000				Vdc
Compatible inverters				All SolarEdge Single Phase and Three Phase inverters				
Dimensions (W x L x H)		129 x 153 x 27.5 / 5.1 x 6 x 1.1	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3		mm / in
Weight (including cables)		630 / 1.4	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3		gr / lb
Input Connector				MC4 ⁽⁴⁾		Single or dual MC4 ⁽⁴⁾⁽⁵⁾	MC4 ⁽⁴⁾	
Input Wire Length		0.16 / 0.52		0.16 or 0.9 / 0.52 or 2.95 ⁽⁶⁾	0.16 / 0.52			m / ft
Output Wire Type / Connector				Double Insulated / MC4				
Output Wire Length		0.9 / 2.95			1.2 / 3.9			m / ft
Operating Temperature Range ⁽⁷⁾				-40 to +85 / -40 to +185				°C / °F
Protection Rating				IP68 / NEMA6P				
Relative Humidity				0 - 100				%

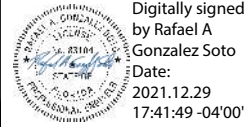
(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed.
(2) NEC 2017 requires max input voltage be not more than 800V.
(3) For other connector types please contact SolarEdge.
(4) For dual version for parallel connection of two modules use P485-4NMDMM. 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. When connecting a single module seal the unused input connectors with the supplied pair of seals.
(5) Longer inputs wire length are available for use for 0.9m module wire length under P401 and so on.
(6) For ambient temperature above +85°C / +185°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 ⁽⁷⁾⁽⁸⁾	Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid
Minimum String Length (Power Optimizers)	P320, P340, P370, P400, P401 P405, P485, P505	8	10	18
Maximum String Length (Power Optimizers)		6	8	14
		25	25	50 ⁽⁹⁾
Maximum Power per String	5700 (6000 with SE7600-US - SE11400-US)	5250	6000 ⁽¹⁰⁾	12750 ⁽¹¹⁾
Parallel Strings of Different Lengths or Orientations		Yes		

(7) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
(8) It is not allowed to mix P320/P340/P370/P400/P401 in one string.
(9) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.
(10) For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W.
(11) For 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.

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DOCUMENT CONTROL				DATE		CAD	QC	ENGINEER CONTACT INFORMATION				ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION				CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:			
ISSUED FOR PERMIT				12-27-2021		BW	JG	ENGIPARTNERS LLC						TITAN SOLAR POWER FL						SANDY FIROOZ		SMART MONITORING DATA SHEET			
REV				DATE		CAD	QC	C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134						12221 N US HIGHWAY 301						PROJECT ADDRESS:					
								DESIGN@ENGIPARTNERS.COM						THONOTASASSA, FL 33592						161 NORTHWEST SPARR LANE LAKE CITY FL 32055					
								833 - 888 - 3644						(813) 982 - 9001						22-2S-16-01716-002					
														#EC13008093						PARCEL NUMBER:		TSP110728			
																				PROJECT ID:		ENGINEER OF RECORD:		SHEET TITLE:	
																				TSP110728		ENG. RAFAEL A. GONZALEZ SOTO, PE		D-2	
																				DATE:		SHEETS:			
																				12-27-2021		8 OF 9			

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

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

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Single Phase Inverter with HD-Wave Technology for North America

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

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage 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
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	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	600mA Sensitivity							
Maximum Inverter Efficiency	99				99.2			%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

⁽¹⁾ For other regional settings please contact SolarEdge support
⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated

DOCUMENT CONTROL				ENGINEER CONTACT INFORMATION				ENGINEERING STAMP				CONTRACTOR CONTACT INFORMATION				CONTRACTOR LOGO				CUSTOMER:				SHEET NAME:			
ISSUED FOR PERMIT				12-27-2021				BW/JG				SANDY FIROOZ				PROJECT ADDRESS:				161 NORTHWEST SPARR LANE LAKE CITY FL 32055				PROJECT ID:			
REV				DATE				CAD				PARCEL NUMBER:				22-2S-16-01716-002				ENGINEER OF RECORD:				SHEET TITLE:			
																				ENG. RAFAEL A. GONZALEZ SOTO, PE				D-3			
																				DATE:				SHEETS:			
																				12-27-2021				9 OF 9			