City of Belle Isle Job Site Card ELECTRICAL PERMIT 2020-01-002

Site Address: 5344 Chiswick Cir 32812 **Subdivision**

Class: Residential **Parcel Number:** 20-23-30-9373-00-190

Description of Work: **Electrical – Solar PV Installation**

Issued: TITAN SOLAR POWER FL INC WILLIAMS, KENNETH M

License # EC13008093 Contact # 813 982-9001

Payment Date & Method: 1 / 6 / **2020** ☐ Picked up by _____ ☑ Emailed

☐ Visa ☑ Master Card ☐ Amex ☐ Discover ☐ Check / Money Order#

7284

FOR POOL INSPECTIONS, PLEASE REFER TO MAIN POOL PERMIT FOR SPECIFIC POOL INSPECTIONS & CODES

Schedule Inspections via Email at: BIDscheduling@universalengineering.com BY 3:00 PM CUT OFF TIME

Inspection Results Will Be Sent Out the Following Business Day

ELECTRICAL	INSPECTOR	DATE	COMMENTS
300 Temp Pole			
310 TUG			
320 Underground			
325 Electrical Above – Ceiling			
330 Rough			
340 Footer Steel Bonding			
350 Pool Light			
360 Pre Power			
370 Meter Re Set			
380 Final			

LOW VOLTAGE ONLY	INSPECTOR	DATE	COMMENTS
335 Rough			This inspection is only for low voltage!
375 Final			This inspection is only for low voltage!

PLEASE NOTE: In order to schedule any inspections, the **PERMIT / plans-specs.** must be issued and **POSTED** on the **JOB SITE! THIS WILL AVOID ANY FAILED INSPECTIONS & RE-INSPECTION FEES.** A permit **expires** in 6 months if approved inspections are not recorded /scheduled within that time frame. You are responsible for scheduling and keeping track all of your inspections -

☆ **Inspection requests are to be emailed to BIDscheduling@UniversalEngineering.com; a confirmation email will be sent back to you upon scheduling.** Next-Day Inspection requests must be made by 3:00 p.m. **Please include the following requirements in your request:**

1) Project Address 2) Corresponding Permit Number 3) Type of Inspection (Please reference your permit card for inspection codes) **4) Date of Inspection** (If no date is specified, the inspection will be scheduled for the next business day)
5) Contact Name 6) Contact Phone Number 7) Gate / Entry code (If applicable)
8) AM, PM, or Any Time (We do our best to accommodate time requests but cannot guarantee an exact arrival)

Universal Engineering Sciences - 3532 Maggie Blvd., Orlando, FL 32811407-581-8161 *
Fax 407-581-0313 www.universalengineering.com

"WARNING TO OWNER: YOUR FAILURE TO RECORD A NOTICE OF COMMENCEMENT MAY RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE RECORDING YOUR NOTICE OF COMMENCEMENT."

Susan Manchester

From: Susan Manchester
Sent: Monday, December 14, 2020 8:24 AM
To: 'Doug Nguyen'
Cc: Becky Jean; CobiPermits
Subject: RE: Jean St. Charles / 5344 Chiswick Cr. Belle Isle 32812 - PV system never installed

Hello,

This email will be sufficient to close out the permit as "work never performed".

Thank you,

Susan Manchester
Permit Administration for the City of Belle Isle
Building Inspections and Code Compliance Department

3532 Maggie Blvd
Orlando, Fl 32811
p 407-423-0504 Ext 23309 | f 407-423-3106

UNIVERSAL ENGINEERING SCIENCES

From: Doug Nguyen <doug@alliancetitlefl.com>
Sent: Friday, December 11, 2020 3:35 PM
To: Susan Manchester <SManchester@universalengineering.com>
Cc: Becky Jean <beckyjean91@yahoo.com>
Subject: Fw: Jean St. Charles / 5344 Chiswick Cr. Belle Isle 32812

Permit 2020-01-002 attached, the work was never done, what will the homeowner need to do to close it out?

Doug D. Nguyen
407.340.3344
321.733.5615 Direct Fax

Alliance Title Insurance Agency, Inc.
5401 S. Kirkman Rd. #310 (Regions Bank Building, 3rd Floor)
Orlando, Florida 32819
407.926.5780

Alliance Title Insurance Agency, Inc.
37 N. Orange Avenue, Suite 500
Orlando, Florida 32801
407.774.8353

STOP!!! PLEASE CALL US TO CONFIRM WIRE INSTRUCTIONS BEFORE SENDING WIRE TRANSFER.

Due to the new FAR BAR contract language requiring collected funds at closing (as stipulated in the Florida Administrative Code 690-186.08), as well as the overwhelming number of fraudulent cashier's checks circulating in Florida, Alliance Title requires all cash to close to be tendered in the form of a wire transfer.

From: Doug Nguyen
Sent: Friday, December 11, 2020 10:39 AM
To: cporasik@titansolarpower.com <cporasik@titansolarpower.com>
Cc: Becky Jean <beckyjean91@yahoo.com>
Subject: Jean St. Charles / 5344 Chiswick Cr. Belle Isle 32812

Dear Sir or Madam:

The City of Belle Isle says the attached permit can not be closed out until a final inspection has been completed. Are you able to take care of this for the homeowner?

Regards,

Doug D. Nguyen
407.340.3344
321.733.5615 Direct Fax

Alliance Title Insurance Agency, Inc.
5401 S. Kirkman Rd. #310 (Regions Bank Building, 3rd Floor)
Orlando, Florida 32819
407.926.5780

Alliance Title Insurance Agency, Inc.
37 N. Orange Avenue, Suite 500
Orlando, Florida 32801
407.774.8353

STOP!!! PLEASE CALL US TO CONFIRM WIRE INSTRUCTIONS BEFORE SENDING WIRE TRANSFER.

Due to the new FAR BAR contract language requiring collected funds at closing (as stipulated in the Florida Administrative Code 690-186.08), as well as the overwhelming number of fraudulent cashier's checks circulating in Florida, Alliance Title requires all cash to close to be tendered in the form of a wire transfer.

City of Belle Isle

Universal Engineering Sciences 3532 Maggie Blvd., Orlando, FL 32811
Tel 407-581-8161 * Fax 407-581-0313 * www.universalengineering.com

RECEIVED JAN 02 2020 BY

APPLICATION FOR ELECTRICAL PERMIT

WARNING TO OWNER: YOUR FAILURE TO RECORD A NOTICE OF COMMENCEMENT MAY RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. A NOTICE OF COMMENCEMENT MUST BE RECORDED AND POSTED ON THE JOB SITE BEFORE THE FIRST INSPECTION. IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE RECORDING YOUR NOTICE OF COMMENCEMENT.

DATE OF APPLICATION: 1-2-2020 **PERMIT NUMBER** 2020-01-002

The undersigned hereby applies for a permit to make electrical installations as indicated below. PLEASE PRINT

Project Address 5344 Chiswick Cir 5344 Chiswick Circle Belle Isle FL ___32809 ___32812

Property Owner St Charles Jean St. Charles Jean Phone ____

Property Owner's Mailing Address 5344 Chiswick Cir City Belle Isle

State FL Zip Code 32812 **Parcel Id Number:** 20-23-30-9373-00-190 20-23-30-9373-00-190

To obtain this information, please visit http://www.ocpafl.org/Searches/ParcelSearch.aspx

Class of Building: Old ☒ New ☐ **Type of Building:** Residential ☐ Commercial ☐ Other ☐

Type of Work: New ☐ Alteration ☒ Addition ☐ Repair ☐ Low Voltage New ☐ Existing ☐

solar PV installation

INDICATE THE QUANTITY OF ALL EQUIPMENT TO BE INSTALLED

Dishwasher ____	Exhaust Fan ____	Disposal ____	Water Heater ____
Hood Fan ____	Dryer ____	Paddle Fan ____	Outlets ____
Fixtures ____	Spa ____	Pool ____	Switches ____
Electric Signs ____	Meter Reset ____	Low Voltage ____	Stoves ____
Pumps ____	Motors ____	Air Conditioning (tons) ____	Furnace (KW) ____

Temporary Construction Pole ____ **One (1) New Meter Service** ____ Amperage/Voltage/Phase

PAID 1-6-20

EC 7284

Meter Service Upgrade from ____ to ____ = ____

Amperage/Voltage/Phase Amperage/Voltage/Phase Difference in Size

Relocate Existing Meter Service (No Service Size Change) ____

Other: solar PV installation Install Photovoltaic system per plans

☐ **PERMIT FEE BASED ON METER SERVICE SIZE SCHEDULE** .... $____

(IF NO METER SERVICE WORK BEING DONE, USE VALUATION OF JOB FOR PERMIT FEE)

☒ **VALUATION OF JOB (VALUATION OF ALL MATERIALS, LABOR, AND FIXTURES INSTALLED $** 67000 67,000

Permit Fee = $ 367.–

Building Official: Benjamin Guried **Date** 1/3/2020.

Verified Contractor's Licenses & Insurance are on file (initials) Date 1.2.20

Review Fee = $ 183.50

1% BCAIB Fee = $ 5.51

1.5% DCA Fee = $ 8.26

TOTAL Permit = $ 564.27

NOC✓ read FL Lic, GL & WC, LTR ✓ rec'd

I hereby certify that the above is true and correct to the best of my knowledge.

I hereby make Application for Permit as outlined above, and if same is granted I agree to conform to all Florida Building Code Regulations and City Ordinances regulating same and in accordance with plans submitted. The issuance of this permit does not grant permission to violate any applicable Town and/or State of Florida codes and/or ordinances.

LICENSE HOLDER SIGNATURE (signature) LICENSE # EC13008093

LICENSE HOLDER NAME Kenneth Williams COMPANY NAME Titan Solar Power FL

Street Address 525 W Baseline Rd

City Mesa State AZ Zip Code 85210 Phone Number 813-982-9001

Email Address CPorasik@titansolarpower.com

NOTE: The Building Permit Number is required if the Electrical Installation is associated with any construction or alteration where a Building Permit has been issued. 1551K 5×66

37
330
367÷2
183.50
550.50

Building Permit Number ____

170032

DOC # 20190703094
11/08/2019 07:43 AM Page 1 of 1
Rec Fee: $10.00
Deed Doc Tax: $0.00
Mortgage Doc Tax: $0.00
Intangible Tax: $0.00
Phil Diamond, Comptroller
Orange County, FL
Ret To: SIMPLIFILE LC

RECEIVED
JAN 02 2020
BY:

Permit Number: 2020-01-002
Folio/Parcel Identification Number: 20-23-30-9373-00-190
Prepared by: Cori Porasik

Return to:

NOTICE OF COMMENCEMENT

State of Florida, County of Orange

The undersigned hereby gives notice that improvement will be made to certain real property, and in accordance with Chapter 713, Florida Statutes, the following information is provided in this Notice of Commencement.

1. **Description of property** (legal description of the property, and street address if available)
   WINDSOR PLACE PHASE 1 30/28 LOT 19 5344 Chiswick Cir Belle Isle FL 32812
2. **General description of improvement**
   Roof Top Solar
3. **Owner information or Lessee information if the Lessee contracted for the improvement**
   Name St Charles Jean
   Address 5344 Chiswick Cir
   Interest in Property Owner
   Name and address of fee simple titleholder (if different from Owner listed above)
   Name
   Address
4. **Contractor**
   Name Titan Solar Power FL Telephone Number 813-982-9001
   Address 12221 N US 301 Thonotosassa FL 33592
5. **Surety** (if applicable, a copy of the payment bond is attached)
   Name Telephone Number
   Address Amount of Bond $
6. **Lender**
   Name Telephone Number
   Address
7. **Persons within the State of Florida designated by Owner upon whom notices or other documents may be served as provided by §713.13(1)(a)7, Florida Statutes.**
   Name Telephone Number
   Address
8. **In addition to himself or herself, Owner designates the following to receive a copy of the Lienor's Notice as provided in §713.13(1)(b), Florida Statutes.**
   Name Telephone Number
   Address
9. **Expiration date of notice of commencement** (the expiration date may not be before the completion of construction and final payment to the contractor, but will be 1 year from the date of recording unless a different date is specified)

WARNING TO OWNER: ANY PAYMENTS MADE BY THE OWNER AFTER THE EXPIRATION OF THE NOTICE OF COMMENCEMENT ARE CONSIDERED IMPROPER PAYMENTS UNDER CHAPTER 713, PART I, SECTION 713.13, FLORIDA STATUTES, AND CAN RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. A NOTICE OF COMMENCEMENT MUST BE RECORDED AND POSTED ON THE JOB SITE BEFORE THE FIRST INSPECTION. IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE COMMENCING WORK OR RECORDING YOUR NOTICE OF COMMENCEMENT.

Under penalty of perjury, I declare that I have read the foregoing notice of commencement and that the facts stated in it are true to the best of my knowledge and belief.

Jean St Charles
Signature of Owner or Lessee, or Owner's or Lessee's Authorized Officer/Director/Partner/Manager

Owner
Signatory's Title/Office

The foregoing instrument was acknowledged before me this 6 day of Nov (month) 19 (year) by JEAN ST CHARLES (name of person)

as Owner (type of authority, e.g., officer, trustee, attorney in fact) for (name of party on behalf of whom instrument was executed)

Signature of Notary Public—State of Florida

Print, Type or Stamp Commissioned Name of Notary Public

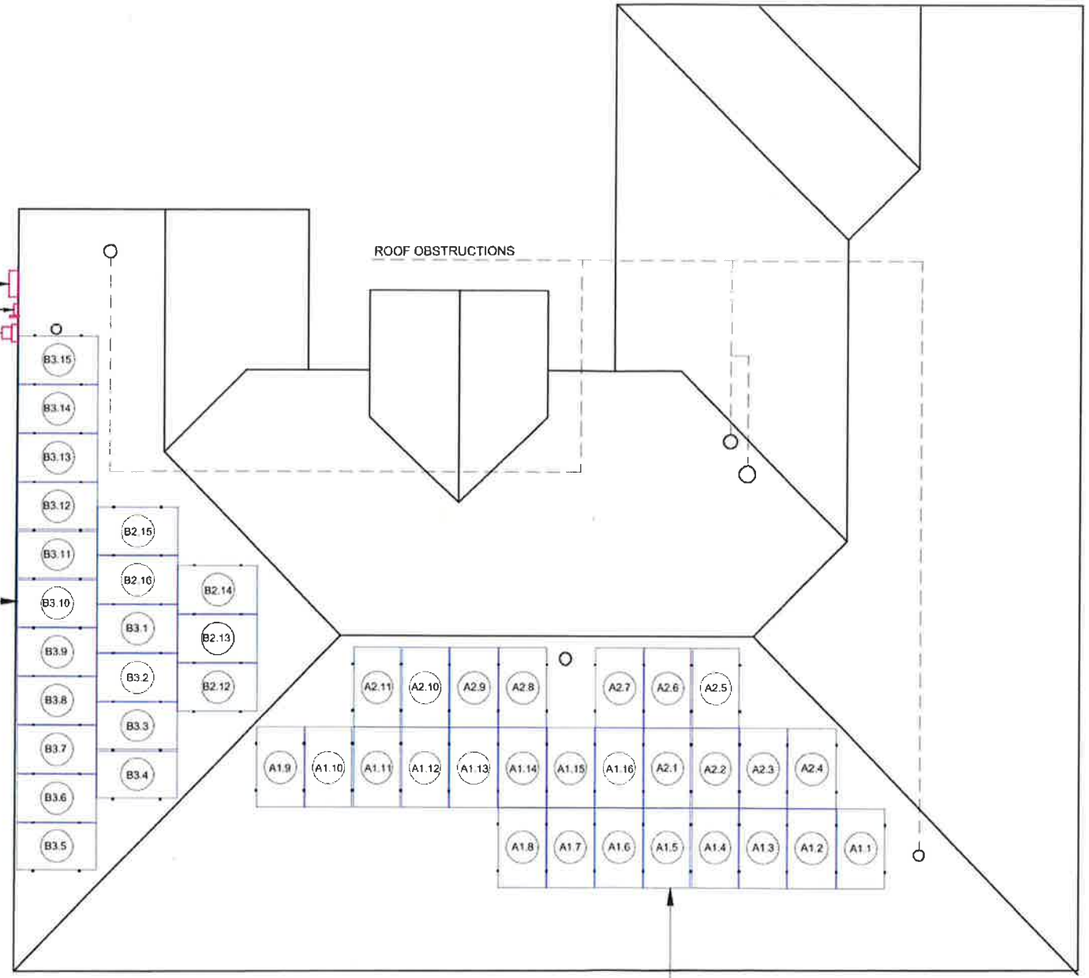
JOSE DAVID VELEZ
Notary Public, State of Florida
Commission # GG 305477
My Commission Expires
February 25, 2023

Personally Known ____ OR Produced ID ✓
Type of ID Produced FL DL

LOCATION MAP

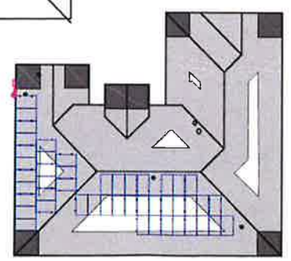
IRRADIANCE MAP

3D RENDERING



ARRAY LAYOUT

SCALE: 3/16" = 1'-0"



Reviewed for Code Compliance
Universal Engineering Sciences

PROJECT DESCRIPTION

INSTALLATION OF GRID-TIED PHOTOVOLTAIC STRING INVERTER SYSTEM ON SHINGLE ROOF OF EXISTING FAMILY RESIDENCE.

SYSTEM CAPACITY: 15.04 KW DC / 11.4 KW AC

PV PANELS: (47) Q.PEAK DUO G5 - 320W - 60 CELL

OPTIMIZERS: (47) OPTIMIZERS P320

INVERTER: (1) SE11400H-US 240V INVERTER FROM SOLAR EDGE

RACKING SYSTEM: IRONRIDGE XR RAIL FAMILY MODEL XR100

ARRAY-A: 27 PANELS ON PORTRAIT SETUP FACING SOUTHEAST, RAILS NORTHEAST TO SOUTHWEST ON PITCHED ROOF

ARRAY-B: 20 PANELS ON PORTRAIT SETUP FACING SOUTHWEST, RAILS SOUTHEAST TO NORTHWEST ON PITCHED ROOF

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: 2017 FLORIDA BUILDING CODE 6TH, ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES, NEC 2014 ELECTRICAL CODE

ALL WIND DESIGN CRITERIA AND PARAMETERS ARE FOR HIP AND GABLE RESIDENTIAL ROOFS, CONSIDERING FROM A 7° TO A MAXIMUM 27° (2/12 TO A MAXIMUM 6/12 PITCH ROOF IN SCHEDULE. ALL RESIDENTIAL ROOFS SHALL NOT EXCEED 30'-0" MEAN ROOF HEIGHT. ROOF SEALANTS SHALL CONFORM TO ASTM C920 AND ASTM 6511. AND
IS RESPONSIBILITY OF THE CONTRACTOR TO PILOT FILL ALL HOLES. CONTRACTOR SHALL ENSURE ALL ROOF PENETRATIONS TO BE INSTALLED AND SEALED PER 2017 FLORIDA BUILDING CODE OR LOCAL GOVERNING CODE.

ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE (NEC) 2014, 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 2014 OR OTHER APPLICABLE STATE AND LOCAL CODES. SEE LABELS AND MARKING PAGE FOR MORE INFORMATION.

SHEET SUMMARY	
C-1	COVER SHEET
E-1	SINGLE LINE
E-2	LABELS
S-1	STRUCTURAL PLAN
S-2	RACKING PLAN
D-1	DATA SHEET
D-2	DATA SHEET
D-3	DATA SHEET

PROJECT INFORMATION			
PROJECT LATITUDE	28.477326	MIN AMBIENT TEMP	-5 ° C
PROJECT LONGITUDE	-81.335878	MAX AMBIENT TEMP	35 ° C
UTILITY NAME	FPL	WIND EXPOSURE	C
AHJ	BELLE ISLE	MAX WIND SPEED	136 MPH

REV	DESCRIPTION	DATE

DESIGNER CONTACT INFORMATION

ENGIPARTNERS, LLC
C.A. 32661
235 GIRALDA AVE
CORAL GABLES, FL 33134
RGONZALEZ@ENGIPARTNERS.COM
786 - 393 - 4740

ENGINEERING STAMP

Digitally signed by Rafael A. Gonzalez Soto
Date: 2020.01.03 10:09:14 -05'00'

COMPANY CONTACT INFO

TITAN SOLAR POWER FL, INC
12221 N US HIGHWAY 301
THONOTASASSA, FL 33592
(813) 982 -9001
#EC13008093

COMPANY LOGO

TITAN SOLAR POWER

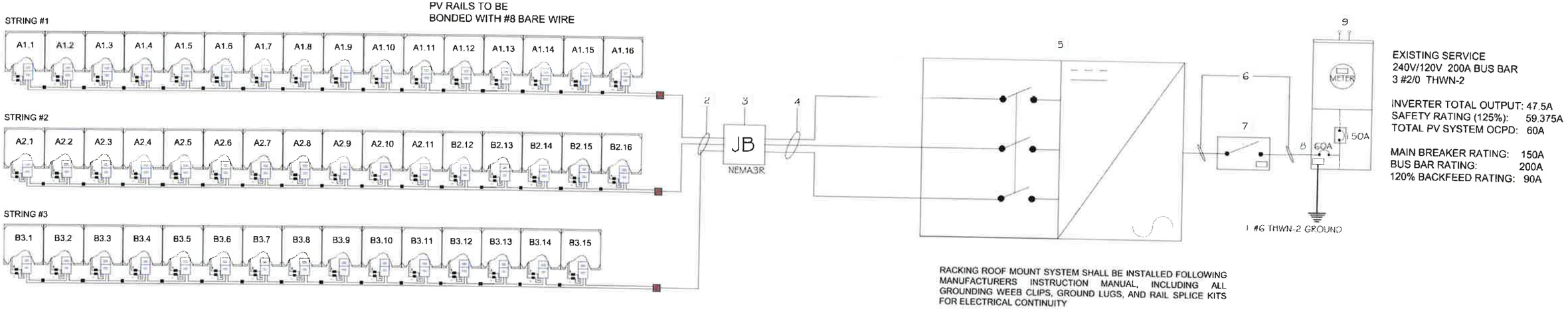
CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC /11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190

SHEET NAME

COVER SHEET

PROJECT ID: TSP32470	DESIGNED BY: ENG. RAFAEL A. GONZALEZ SOTO, PE	SHEET TITLE: C-1	
INSTALL DETAILS: SHINGLE	DATE: 11-18-2019	SHEETS: 1 OF 8	

WIRE TAG	WIRE SIZES, QUANTITY & TYPE			RACEWAY SIZE, TYPE, LOCATION & INFO.			WIRE AMPACITY CALCULATIONS							ADDITIONAL INFORMATION			
	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.1 (BEFORE JB) DC.2 (AFTER JB) AC.1(FROM INVERTER TO SERVICE)	#10 AWG PV WIRE (6)#10 AWG THWN-2 (2) #6 AWG THWN-2	(1) #6 AWG THWN-2	(1) #8 AWG BARE COPPER (1) #8 AWG THWN-2 (1) #8 AWG THWN-2	NOT APPLICABLE 3/4" EMT CONDUIT 1" EMT CONDUIT	UNDER ARRAY ABOVE ROOF EXTERIOR WALL	1/2" TO 3-1/2" 1/2" TO 3-1/2" "N/A"	15A 15A 47.5A	18.8A 18.8A 59.375A	20A 20A 60A	40A X 0.76 X 1 = 30.4 A 40A X 0.76 X 0.8 = 24.3 A 55A X 0.76 X 1 = 41.8 A				10 FT. 20 FT. 5 FT.	350V 350V 240V	0.11% 0.21% 0.1%	6.4% 8.1% 7.7%



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

PV MODULE

MANUFACTURER: QCELLS SOLAR
MODEL: Q.PEAK DUO G5 320W
QUANTITY..... (47)
POWER AT STC..... 320W
POWER AT PTC..... 240W
V-OC (OPEN-CIRCUIT VOLTAGE)..... 40.40V
V-MP (MAX-POWER VOLTAGE) 33.65V
I-SC (SHORT-CIRCUIT CURRENT)..... 10.14A
I-MP (MAX-POWER CURRENT)..... 9.66A
MNFR V.OC TEMP COEFFICIENT: -0.30%/C

PV OPTIMIZER

MANUFACTURER: SOLAREDGE
MODEL: P320
QUANTITY.....47
MAXIMUM I-SC INPUT.....11A
MAXIMUM V-OC INPUT.....48V
MAXIMUM POWER PER STRING...5700W

INVERTER

SOLAREDGE_TECHNOLOGIES
SE-11400H-US(240V)
MODEL: SE-11400H-US
MAX.OUTPUT CURRENT..... 47.5A
MINIMUM OCPD..... .....60A
MAX NUMBER OF STRINGS..... 3
NUMBER OF MPPT'S.....1
MAXIMUM INPUT VOLTAGE..... 480V
TRANSFORMERLESS (Y/N)..... YES

OPERATING CURRENT.....15A
OPERATING VOLTAGE.....380V
MAXIMUM SYSTEM VOLTAGE.....500V
SHORT CIRCUIT CURRENT.....12.8A

LEGEND:

1	PV MODULES SLA-M 320 FROM SILFAB SOLAR 60 CELL P:320W, VMP: 32.8V, VOC: 39.85V, IMP: 9.16A, ISC: 9.71A	6	2 #6 L1,L2 THWN-2 1 #8 TWHN-2 GROUND 1" EMT CONDUIT
2	2 #10 PV WIRE 1 #8 BARE WIRE GROUND 3/4" EMT CONDUIT	7	PV SYSTEM DISCONNECT RATED FOR 60A AIC RATING 100KA
3	NEMA3R JUNCTION BOX	8	PV BACKFEED BREAKER 2P-60A
4	6 #10 THWN-2 1 #10 THWN-2 GROUND 3/4" EMT CONDUIT	8	EXISTING FPL UTILITY METER BASE 200A RATED WITH 150A MAIN BREAKER AIC 10KA
5	SE11400H-US 240V INVERTER FROM SOLAR EDGE POWER: 11.4 KW, IMAX: 59.375A EFF @240V: 99% WITH INTEGRATED RAPID SHUTDOWN MECHANICAL DC 2P SWITCH		

SINGLE LINE DIAGRAM

Reviewed for Code Compliance
Universal Engineering Sciences

REV	DESCRIPTION	DATE

DESIGNER CONTACT INFORMATION
ENGIPARTNERS, LLC
C.A. 32661
255 GIRALDA AVE
CORAL GABLES, FL 33134
RGONZALEZ@ENGIPARTNERS.COM
786 - 393 - 4740

ENGINEERING STAMP
Digitally signed by Rafael A. Gonzalez Soto
Date: 2020.01.03 10:09:47 -05'00'

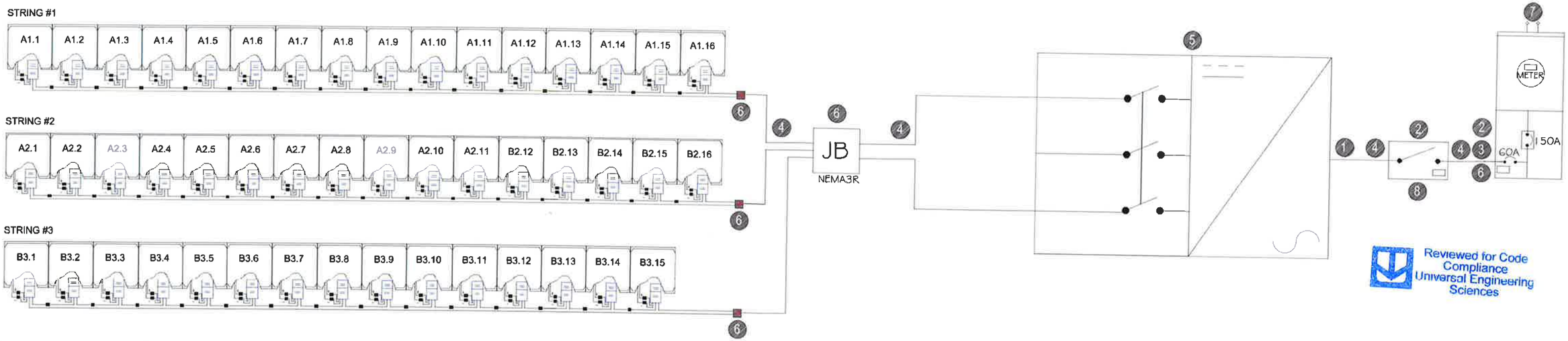
COMPANY CONTACT INFO
TITAN SOLAR POWER FL, INC
12221 N US HIGHWAY 301
THONOTASASSA, FL 33592
(813) 982 -9001
#EC13008093

COMPANY LOGO
TITAN SOLAR POWER

CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC /11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190

SHEET NAME: SINGLE LINE

PROJECT ID: TSP32470	DESIGNED BY: ENG. RAFAEL A. GONZALEZ SOTO, PE	SHEET TITLE: E-1
INSTALL DETAILS: SHINGLE	DATE: 11-18-2019	SHEETS: 2 OF 8



Reviewed for Code Compliance
Universal Engineering Sciences

1 Combiner Box / Circuits / Conduit Combiner Box / Enclosures / EMT Enclosures

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.17 (E) | Part No. 596-00497

WARNING
ELECTRICAL SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

NEC 690.35 (E) | Part No. 596-00588

WARNING
TURN OFF PHOTVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 110.27 (C) & OSHA 1910.145 (f)(7)
Part No. 596-00499

2 AC Disconnect / Breaker / Points of Connection

PHOTOVOLTAIC
DC DISCONNECT

IFC 605.11.1, IFC 605.11.1.4, NEC 690.15, NEC 690.14(C)(2), NEC 690.13 (B) | Part No. 596-00237

NOMINAL OPERATING AC VOLTAGE	120/240V
NOMINAL OPERATING AC FREQUENCY	60Hz
MAXIMUM AC POWER	11.4KW
MAXIMUM AC CURRENT	47.5A
MAX OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION	60

NEC 690.52 | Part No. 558-00252

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.17 (E) | Part No. 558-00497

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT	47.5A
NOMINAL OPERATING AC VOLTAGE	240V

NEC 690.54 | Part No. 596-00239

3 Main Service Disconnect

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.17 (E) | Part No. 558-00497

WARNING
TURN OFF PHOTVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 690.5(C) | Part No. 558-00499

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

NEC 690.15 & NEC 690.13(B) | Part No. 558-00613

4 EMT / Conduit Raceways

(Reflective Material Required)

WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31 | Part No. 558-00206

5 Inverter

WARNING
ELECTRICAL SHOCK HAZARD
IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

NEC 690.5 (C) | Part No. 596-00498

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT	47.5A
NOMINAL OPERATING AC VOLTAGE	240V

NEC 690.54 | Part No. 596-00239

6 Breaker Panel / Pull Boxes

WARNING
ELECTRICAL SHOCK HAZARD
IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

NEC 690.5 (C) | Part No. 558-00498

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT	47.5A
NOMINAL OPERATING AC VOLTAGE	240V

NEC 690.54 | Part No. 558-00239

WARNING
TURN OFF PHOTVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 110.27 (C) & OSHA 1910.145 (f)(7)
Part No. 558-00499

DO NOT DISCONNECT UNDER LOAD

NEC 690.33 (E)(2) | Part No. 558-00244

CAUTION
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

NEC 705.15(D)(4) & NEC 690.64
Part No. 558-00495

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.17 (E) | Part No. 558-00497

WARNING DUAL POWER SOURCE
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

NEC 705.12(D)(4) & NEC 690.64 | Part No. 558-00495

WARNING
INVERTER OUTPUT CONNECTION: DO NOT RELOCATE THIS OVERCURRENT DEVICE

NEC 705.12(D)(2)(C) | Part No. 558-00589

7 Main Service Disconnect / Utility Meter

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

8 AC Disconnect

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

PV SAFETY LABELS

REV	DESCRIPTION	DATE

DESIGNER CONTACT INFORMATION
ENGIPARTNERS, LLC
C.A. 32861
255 GIRALDA AVE
CORAL GABLES, FL 33134
RGONZALEZ@ENGIPARTNERS.COM
786 - 393 - 4740

ENGINEERING STAMP
Digitally signed by Rafael A. Gonzalez Soto
Date: 2020.01.03 10:10:03 -05'00'

COMPANY CONTACT INFO
TITAN SOLAR POWER FL, INC.
12221 N US HIGHWAY 301
THONOTASASSA, FL 33592
(813) 982 -9001
#EC13008093

COMPANY LOGO
TITAN SOLAR POWER

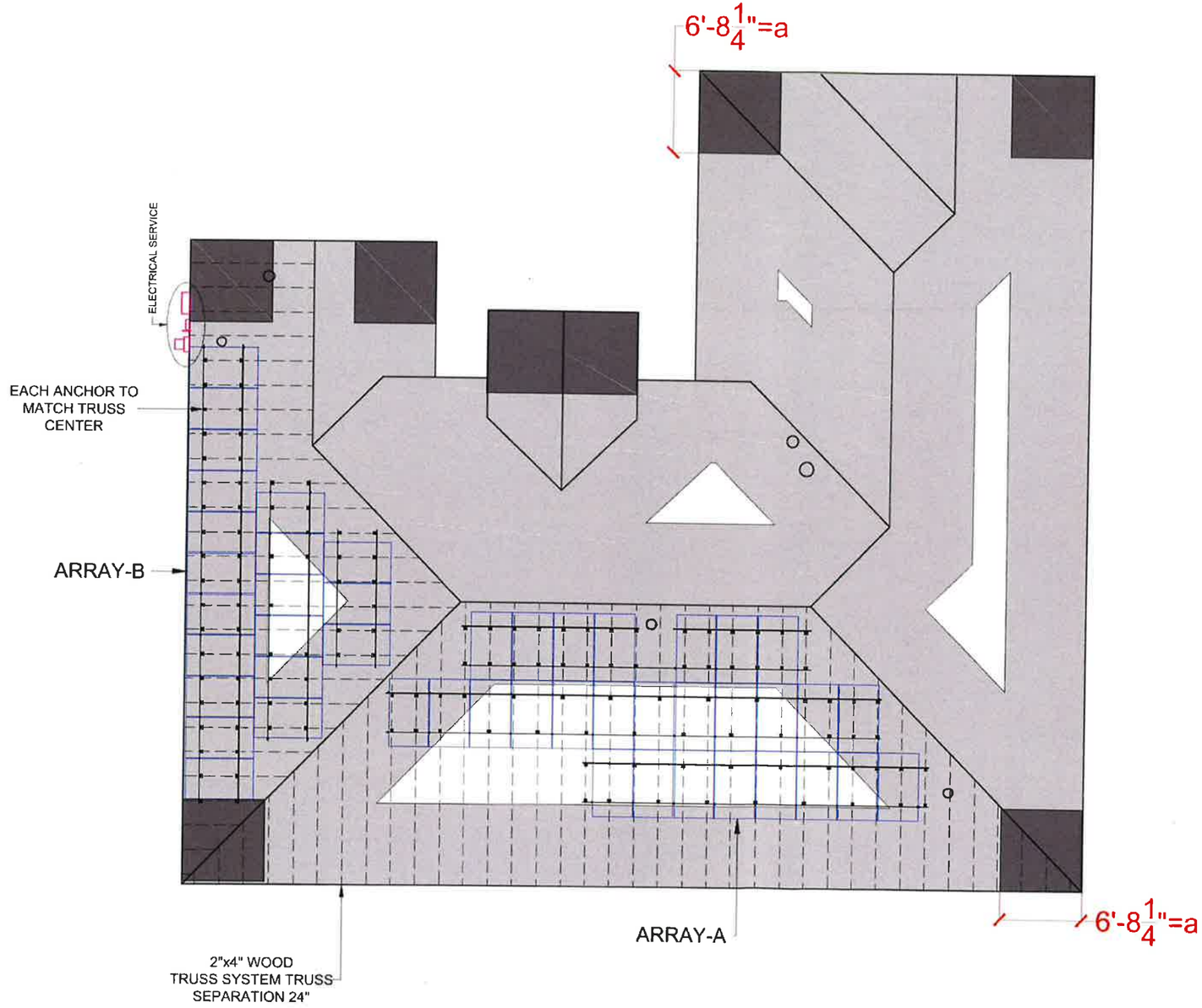
CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC /11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190

SHEET NAME: LABELS

PROJECT ID: TSP32470	DESIGNED BY: ENG. RAFAEL A. GONZALEZ SOTO, PE	SHEET TITLE: E-2
INSTALL DETAILS: SHINGLE	DATE: 11-18-2019	SHEETS: 3 OF 8

ROOF AREA	
EXISTING SHINGLE ROOF	
TOTAL ROOF AREA:	5263.70 sq.-ft
TOTAL PHOTOVOLTAIC AREA:	852.11 sq.-ft
PERIMETER WIDTH:	6.68 ft
PRESSURE ZONE:	1 & 2
MEAN ROOF HEIGHT:	17.1 ft
ROOF SLOPE:	6/12 ft
TOTAL MODULES:	47
TOTAL ROOF MOUNTS:	139

ZONE 1	- 22.76	psf
ZONE 2	- 39.62	psf
ZONE 3	- 39.62	psf



Reviewed for Code Compliance
Universal Engineering Sciences

SCALE: 3/16"=1'-0"

REV	DESCRIPTION	DATE

DESIGNER CONTACT INFORMATION

ENGIPARTNERS, LLC

C.A. 32661

255 GIRALDA AVE
CORAL GABLES, FL 33134

RGONZALEZ@ENGIPARTNERS.COM

786 - 393 - 4740

ENGINEERING STAMP

Digitally signed by Rafael A. Gonzalez Soto
Date: 2020.01.03 10:10:16 -05'00'

COMPANY CONTACT INFO

TITAN SOLAR POWER FL, INC

12221 N US HIGHWAY 301

THONOTASASSA, FL 33592

(813) 982 -9001

#EC13008093

COMPANY LOGO

TITAN SOLAR POWER

CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC /11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190

SHEET NAME

STRUCTURAL PLAN

PROJECT ID: TSP32470	DESIGNED BY: ENG. RAFAEL A. GONZALEZ SOTO, PE	SHEET TITLE: S-1
INSTALL DETAILS: SHINGLE	DATE: 11-18-2019	SHEETS: 4 OF 8

Slotted L-Foot

Our Slotted L-feet are engineered for most roof mounting applications. Vertical slots allow for easily dropping in rails with attached hardware and provide adjustability to account for roof irregularities.

Property	Value
Material	6000 Series Aluminum
Finish	Mill & Black
Height	3"
Width	2"
Depth	2"
Length of Vertical Slot	1.125"
Weight	0.22 Lbs
Hardware	3/8" SS

XR100 Rail

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans.

Property	Value
Material	6000 Series Aluminum
Finish	Clear & Black Anodized
Beam Height	2.44"
Weight / Linear Foot	0.68 Lbs
Total Cross-Sectional Area	0.582 in^2
Section Modulus (X-axis)	0.297 in^3
Moment of Inertia (X-axis)	0.390 in^4
Moment of Inertia (Y-axis)	0.085 in^4
Torsional Constant	0.214 in^3
Polar Moment of Inertia	0.126 in^4

KEY FEATURES

DESCRIPTION

APPLICABLE STANDARDS

BASIC USES

INSTALLATION PROTOCOL

Mid Clamp

IronRidge Mid Clamps secure PV modules to the rail when there are multiple modules in a row.

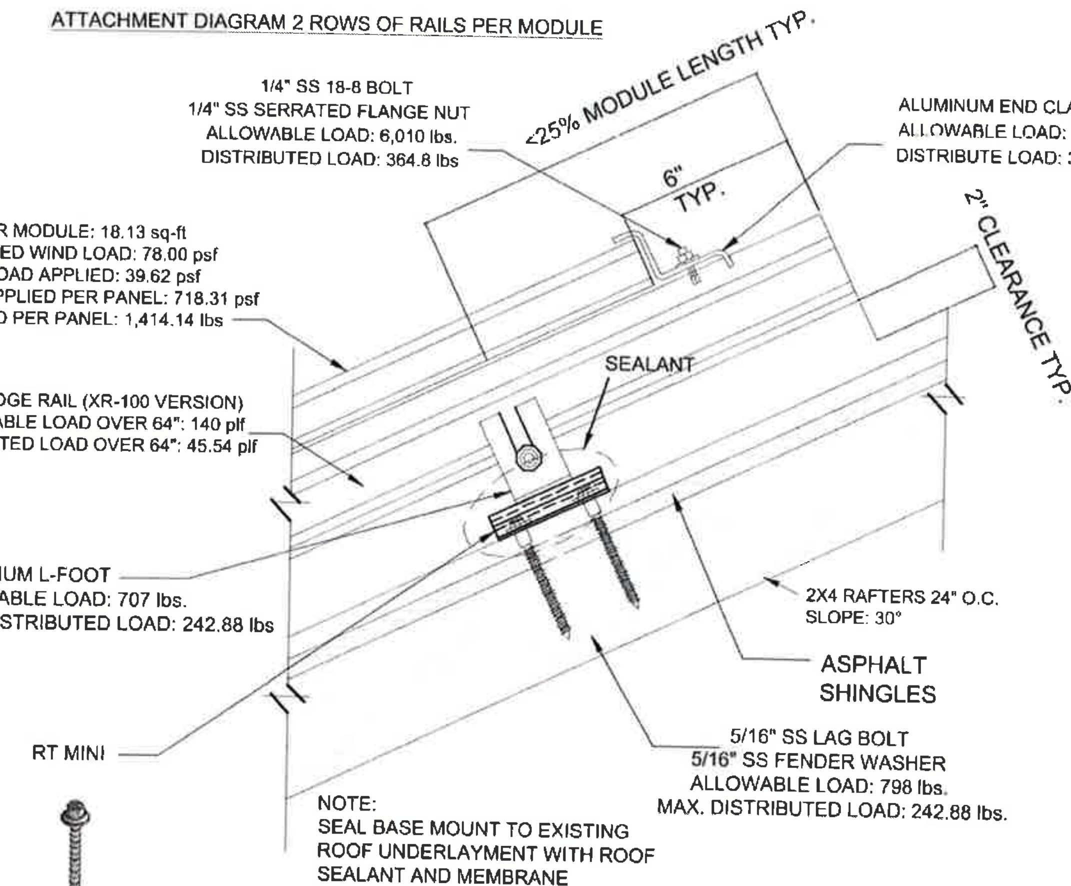
Property	Value
Material	5000 Series Aluminum
Finish	Mill & Black
Spacing between Modules	¼"
Width	1"
Depth	1.5"
Weight	0.05 Lbs
Hardware	¼"-20 SS Nut and Bolt

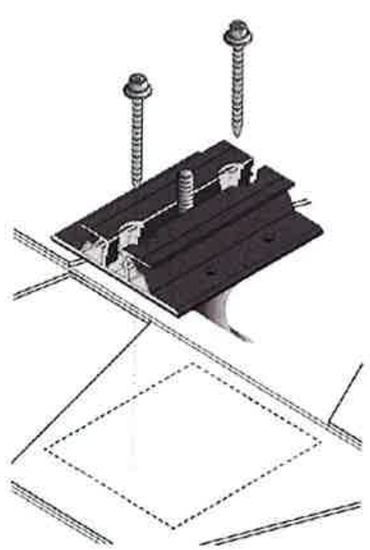
End Clamp

IronRidge End Clamps secure PV modules to XR Rails using the top slot, independent upon the module's mounting holes.

Property	Value
Material	5000 & 6000 Series Aluminum
Finish	Mill & Black
Height	Varies depending on Module
Width	1.5"
Depth	1.5"
Weight	0.05 Lbs
Hardware	¼"-20 SS Nut and Bolt

ATTACHMENT DIAGRAM 2 ROWS OF RAILS PER MODULE





Exposure Category	Roof Angle	Roof Zone	110	115	120	130	140	150	160	170	180
PORTRAIT 60CELL C	0 to 6 Degrees	1	8	8	9	8	6	5	5	4	4
		2	6	5	5	4	3	3	2	2	2
	7 to 27 Degrees	1	8	8	8	8	7	5	5	4	4
		2	6	5	5	4	3	3	2	2	2
	28 to 45 Degrees	1	8	8	6	7	6	5	4	4	[illegible]
		2	8	7	6	5	5	4	3	3	3
PORTRAIT 72CELL C	0 to 6 Degrees	1	8	8	9	7	6	5	4	3	3
		2	5	4	4	3	3	2	2	2	0
	7 to 27 Degrees	1	8	8	8	7	6	5	4	4	1
		2	5	4	4	3	3	2	2	2	0
	28 to 45 Degrees	1	8	7	7	6	5	4	4	1	1
		2	7	6	6	5	4	3	3	3	2
LANDSCAPE C	0 to 6 Degrees	1	8	8	8	8	8	8	8	7	6
		2	8	8	8	7	6	5	4	4	1
	7 to 27 Degrees	1	8	8	8	8	8	8	8	8	7
		2	8	8	8	7	6	5	4	4	1
	28 to 45 Degrees	1	8	8	8	5	8	8	8	7	6
		2	8	8	8	8	8	7	6	5	5

(Basic Wind Speed, V (mph))

RAIL XR100		FLUSH MOUNT SYSTEM SPAN TABLE (Inches) PORTRAIT INSTALLATION (MAXIMUM MODULE LENGTH 67.5") EXPOSURE B		
		GROUND SNOW: 0 psf		
WIND SPEED (mph)	ROOF SLOPE (degs.)	ZONE 1	ZONE 2	ZONE 3
160	5	93	70	57
	10	97	72	58
	15	96	71	58
	20	95	71	58
	25	94	70	57
	30	85	81	81
	35	85	81	81
	40	84	80	80
	45	84	79	79

ARRAY WIND LOAD CALCULATIONS

SOLAR PANEL	42
Total Area (SF)	852.11
Wind Load (PSF)	-39.62
Total Wind Load (lbs.)	-33,760.6
Total Roof Mounts (#)	139
Tension Force per Mount (lbs.)	242.88

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		242.88
Lag Bolt Pull Out Strength Safety Factor		3.29

DESIGN WIND PRESSURE CALCULATIONS FOR SOLAR MODULES INSTALLED ON ROOF

ABOUT THIS TOOL: This tool is based on the C&C Wind Loads for Enclosed buildings. Design wind pressures are calculated using ASCE 7-10 equation 30.6-1. All notes in Figures 30.4-1 and 30.4-2(A,B, and C) have been incorporated. Mean roof height must be less than 60 feet.

SITE INFORMATION

FDC VERSION	2017	RISK CATEGORY	II
MEAN ROOF HEIGHT (ft)	17.1	EXPOSURE CATEGORY	C
LENGTH (ft)	73.7	ROOF SLOPE (°)	30
WIDTH (ft)	66.8	ROOF TYPE	HIPPED
PARAPET HEIGHT (ft)	0	ULTIMATE WIND SPEED	157mph
MODULE LENGTH (ft)	5.53	NOMINAL WIND SPEED	143mph
MODULE WIDTH (ft)	3.28	K_D	0.85
# OF MODULES IN ROW	12	K_{ZT}	1.0
EFFECTIVE WIND AREA (ft^2)	44.62	K_Z	0.85

DESIGN CALCULATIONS

VELOCITY PRESSURE (q) = 0.00256 * $K_Z K_{ZT} K_D V^2$

VELOCITY PRESSURE (ASD) 20.50

WIDTH OF PRESSURE COEFFICIENT WIDTH 6.68'

EXTERNAL PRESSURE COEFFICIENT		
ZONE 1	0.5	-0.9
ZONE 2	0.5	-1.7
ZONE 3	0.5	-1.7

INTERNAL PRESSURE COEFFICIENT (+/-) 0.18

DESIGN PRESSURES

ROOF ZONE	DOWN	UP	
1	14.33	-22.76	psf
2	14.33	-39.62	psf
3	14.33	-39.62	psf

ASCE 7-10 Velocity Pressure

Where

Live Loads

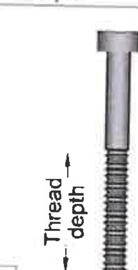
Lag Screw Installation Guidelines

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

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 nor 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.

Uni-Rac Specs. Lag pull-out (withdrawal) capacities (lbs) in typical roof lumber (ASD)

	Specific gravity	STAINLESS STEEL Lag screw specifications: 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



Sources: American Wood Council, NDS 2005, Table 11.2A, 11.3A

REV	DESCRIPTION	DATE

DESIGNER CONTACT INFORMATION	ENGIPARTNERS, LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 RGONZALEZ@ENGIPARTNERS.COM 786 - 393 - 4740
ENGINEERING STAMP	Digitally signed by Rafael A. Gonzalez Soto Date: 2020.01.03 10:10:35 -05'00'
COMPANY CONTACT INFO	TITAN SOLAR POWER FL, INC 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093
COMPANY LOGO	TITAN SOLAR POWER
CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC /11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir Ft. 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 29-23-30-9373-00-190
SHEET NAME	RACKING PLAN
PROJECT ID	TSP32470
INSTALL DETAILS	SHINGLE
DESIGNED BY	ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE	11-18-2019
SHEET TITLE	S-2
SHEETS	5 OF 8

Q.PEAK DUO-G5 315-330

Q.ANTUM SOLAR MODULE

The new Q.PEAK DUO-G5 solar module from Q CELLS impresses thanks to innovative Q.ANTUM DUO Technology, which enables particularly high performance on a small surface. Q.ANTUM's world-record-holding cell concept has now been combined with state-of-the-art circuitry half cells and a six-busbar design, thus achieving outstanding performance under real conditions — both with low-intensity solar radiation as well as on hot, clear summer days.

Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.9%.

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, Anti PID Technology[1], 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 12-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

THE IDEAL SOLUTION FOR:

Rooftop arrays on residential buildings

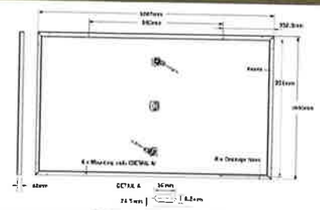
Rooftop arrays on commercial/industrial buildings

Engineered in **Germany**

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (–1500 V, 168 h)
[2] See data sheet on rear for further information.

MECHANICAL SPECIFICATION

Format	1685 mm × 1000 mm × 32 mm (including frame)
Weight	18.7 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	70–85 mm × 50–70 mm × 13–21 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (–) 1100 mm, (+) 1100 mm
Connector	Multi-Contact, MC4, IP65 and IP68

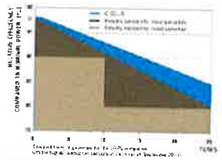


ELECTRICAL CHARACTERISTICS

POWER CLASS			315	320	325	330
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W)						
Minimum: Power at MPP[2]	P_{MPP}	[W]	315	320	325	330
Minimum: Short Circuit Current[2]	I_{SC}	[A]	10.04	10.09	10.14	10.20
Minimum: Open Circuit Voltage[2]	V_{OC}	[V]	39.87	40.13	40.40	40.66
Minimum: Current at MPP[2]	I_{MPP}	[A]	9.55	9.60	9.66	9.71
Minimum: Voltage at MPP[2]	V_{MPP}	[V]	32.98	33.32	33.65	33.98
Minimum: Efficiency[2]	η	[%]	≥18.7	≥19.0	≥19.3	≥19.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NOCT[1]						
Minimum: Power at MPP[2]	P_{MPP}	[W]	233.4	237.2	240.9	244.6
Minimum: Short Circuit Current[2]	I_{SC}	[A]	8.09	8.14	8.18	8.22
Minimum: Open Circuit Voltage[2]	V_{OC}	[V]	37.30	37.54	37.79	38.04
Minimum: Current at MPP[2]	I_{MPP}	[A]	7.51	7.56	7.60	7.64
Minimum: Voltage at MPP[2]	V_{MPP}	[V]	31.07	31.39	31.70	32.01

[1] 1000 W/m², 25°C, spectrum AM 1.5G [2] Measurement tolerances STC ±3%; NOCT ±5% [3] 800 W/m², NOCT, spectrum AM 1.5G *Typical values, actual values may differ

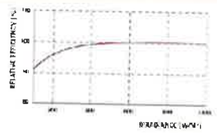
Q CELLS PERFORMANCE WARRANTY



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]	–0.28
Temperature Coefficient of P_{MPP}	γ	[%/K]	–0.37	Normal Operating Cell Temperature	NOCT	[°C]	45

PROPERTIES FOR SYSTEM DESIGN					
Maximum System Voltage	V_{SYS}	[V]	1000	Safety Class	II
Maximum Reverse Current	I_R	[A]	20	Fire Rating	C
Push/Pull Load (Test load in accordance with IEC 61215)		[Pa]	5400/4000	Permitted Module Temperature On Continuous Duty	–40 °C up to +85 °C

QUALIFICATIONS AND CERTIFICATES	PARTNER
VDE Quality Tested, IEC 61215 (Ed. 2); IEC 61730 (Ed. 1), Application class A This data sheet complies with DIN EN 50380.	

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
Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | TEL +49 (0)3494 66 99-23444 | FAX +49 (0)3494 66 99-23000 | EMAIL sales@q-cells.com | WEB www.q-cells.com

Engineered in **Germany**

Reviewed for Code Compliance Universal Engineering Sciences

REV	DESCRIPTION	DATE

DESIGNER CONTACT INFORMATION	ENGINEERING STAMP	COMPANY CONTACT INFO	COMPANY LOGO
ENGIPARTNERS, LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 RGONZALEZ@ENGIPARTNERS.COM 786 - 393 - 4740	Digitally signed by Rafael A. Gonzalez Soto Date: 2020.01.03 10:10:47 -05'00'	TITAN SOLAR POWER FL, INC. 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093	TITAN SOLAR POWER

CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC / 11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190

SHEET NAME		
DATA SHEET		
PROJECT ID: TSP32470	DESIGNED BY: ENG. RAFAEL A. GONZALEZ SOTO, PE	SHEET TITLE: D-1
INSTALL DETAILS: SHINGLE	DATE: 11-18-2019	SHEETS: 6 OF 8

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / 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

solaredge

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / 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)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT							
Rated Input DC Power[1]	320	340	370	400	405	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125	83	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1		14	Adc
Maximum DC Input Current	13.75			12.63		17.5	Adc
Maximum Efficiency	99.5						%
Weighted Efficiency	98.8					98.6	%
Overvoltage Category	II						
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)							
Maximum Output Current	15						Adc
Maximum Output Voltage	60			85			Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)							
Safety Output Voltage per Power Optimizer	1 ± 0.1						Vdc
STANDARD COMPLIANCE							
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62109-1 (class II safety), UL1741						
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 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	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4[3]						
Output Wire Type / Connector	Double Insulated; MC4						
Output Wire Length	0.95 / 3.0		1.2 / 3.9				m / ft
Input Wire Length	0.16 / 0.52						m / ft
Operating Temperature Range	-40 - +85 / -40 - +185						°C / °F
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100						%

(1) Rated STC power of the module. Module of up to +5% power tolerance allowed
(2) [illegible]
(3) For other connector types please contact SolarEdge

PV System Design Using a SolarEdge Inverter[4][5]		Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400	8		10	18	
	P405 / P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50[6]	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000[7]	12750[8]	W
Parallel Strings of Different Lengths or Orientations		Yes				

[illegible]

CE RoHS

Reviewed for Code Compliance
Universal Engineering Sciences

REV	DESCRIPTION	DATE	DESIGNER CONTACT INFORMATION	ENGINEERING STAMP	COMPANY CONTACT INFO	COMPANY LOGO
			ENGIPARTNERS, LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 RGONZALEZ@ENGIPARTNERS.COM 786 - 393 - 4740	Digitally signed by Rafael A. Gonzalez Soto Date: 2020.01.03 10:11:02 -05'00'	TITAN SOLAR POWER FL, INC. 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093	TITAN SOLAR POWER

CUSTOMER	JEAN STCHARLES
PROJECT	PV GRID-TIED 15.04 KW DC / 11.4 KW AC STRING INVERTER SYSTEM
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190
SHEET NAME	DATA SHEET
PROJECT ID	TSP32470
INSTALL DETAILS	SHINGLE
DESIGNED BY	ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE	11-18-2019
SHEET TITLE	D-2
SHEETS	7 OF 8

Single Phase Inverter with HD-Wave Technology

for North America

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

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

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

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

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

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V		16	-	24			48.5	A
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380					400		Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Data, ANSI C12.20	Optional[3]							
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG				1" Maximum / 14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG				1" Maximum / 1-3 strings / 14-6 AWG			
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.3 x 14.6 x 7.3 / 540 x 370 x 185			in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4		26.2 / 11.9	38.8 / 17.6			lb / kg
Noise	< 25				< 50			dBA
Cooling	Natural Convection							
Operating Temperature Range	-13 to +140 / -25 to +60[4] (-40°F / -40°C option)[5]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

[1] For other regional settings please contact SolarEdge support.
[2] A higher current source may be used; the inverter will limit its input current to the values stated.
[3] Revenue grade inverter P/N: SExxxxH-USxxxNNC2.
[4] For power derating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[5] -40 version P/N: SExxxxH-USxxxNNU4

Reviewed for Code Compliance Universal Engineering Sciences

RoHS

REV	DESCRIPTION	DATE	DESIGNER CONTACT INFORMATION	ENGINEERING STAMP	COMPANY CONTACT INFO	COMPANY LOGO
			ENGIPARTNERS, LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 RGONZALEZ@ENGIPARTNERS.COM 786 - 393 - 4740	Digitally signed by Rafael A. Gonzalez Soto Date: 2020.01.03 10:11:16 -05'00'	TITAN SOLAR POWER FL, INC 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093	TITAN SOLAR POWER

CUSTOMER	JEAN STCHARLES	SHEET NAME	DATA SHEET
PROJECT	PV GRID-TIED 15.04 KW DC / 11.4 KW AC STRING INVERTER SYSTEM		
ADDRESS	5344 Chiswick Cir FL 3281, Belle Isle, FL 32812, USA		
PARCEL NUMBER	FOLIO: 20-23-30-9373-00-190	PROJECT ID: TSP32470	DESIGNED BY: ENG. RAFAEL A. GONZALEZ SOTO, PE
		INSTALL DETAILS: SHINGLE	DATE: 11-18-2019
		SHEET TITLE: D-3	SHEETS: 8 OF 8

RICK SCOTT, GOVERNOR

JONATHAN ZACHEM, SECRETARY

Florida dbpr

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

ELECTRICAL CONTRACTORS LICENSING BOARD

THE ELECTRICAL CONTRACTOR HEREIN IS CERTIFIED UNDER THE PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

WILLIAMS, KENNETH M

TITAN SOLAR POWER FL INC
210 N SUNWAY DR
GILBERT AZ 85233

LICENSE NUMBER: EC13008093

EXPIRATION DATE: AUGUST 31, 2020

Always verify licenses online at MyFloridaLicense.com

Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/31/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Lovitt & Touché A Marsh and McLennan Agency, LLC
1050 W Washington Street, Suite 233
Tempe AZ 85281

CONTACT NAME: Deb Streeter
PHONE (A/C, No, Ext): 602-778-7005 **FAX (A/C, No):** 480-708-0973
E-MAIL ADDRESS: dstreeter@lovitt-touche.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Gotham Insurance Company	25569
INSURER B : New York Marine and General Insurance Co	16608
INSURER C : Endurance Specialty Insurance Ltd.	
INSURER D : Berkley Assurance Co	39462
INSURER E : AMERISURE MUT INS CO	23396
INSURER F :	

INSURED PM&MELE-C1
Titan Solar Power FL, Inc
525 West Baseline Road
Mesa AZ 85210

COVERAGES **CERTIFICATE NUMBER:** 1809356241 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:	Y	Y	PK201900016453	3/10/2019	3/10/2020	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY X HIRED AUTOS ONLY SCHEDULED AUTOS X NON-OWNED AUTOS ONLY	Y	Y	AU201900016721	3/10/2019	3/10/2020	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ $ $ $
C	UMBRELLA LIAB X OCCUR X EXCESS LIAB CLAIMS-MADE DED RETENTION $			ELD30000980800	3/10/2019	3/10/2020	EACH OCCURRENCE AGGREGATE $	$ 10,000,000 $ 10,000,000 $
E	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	WC2111454	4/1/2019	4/1/2020	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
D	Professional/Pollution			PCAB50089420319	3/10/2019	3/10/2020	Each Aggregate	$1,000,000 $2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Certificate Holder is included as Additional Insured as respects General Liability and Automobile Liability if required in a written contract. Waiver of Subrogation applies to the General Liability, Automobile Liability and Workers' Compensation coverage if required in a written contract. The General Liability insurance is primary and certificate holder's insurance is non-contributory if required by written contract.

Coverage is subject to all policy terms, conditions, definitions, exclusions, forms & endorsements.

CERTIFICATE HOLDER
City of Belle Isle
1600 Nela Avenue
Belle Isle FL 32809

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

2019 - 2020 HILLSBOROUGH COUNTY BUSINESS TAX RECEIPT

EXPIRES SEPTEMBER 30, 2020

ACCOUNT NO.
43400
RENEWAL

OCC. CODE

090.008002 ELECTRICAL CONTRACTOR

1 Employees

Receipt Fee	18.00
Hazardous Waste Surcharge	0.00
Law Library Fee	0.00

EC13008093

BUSINESS TITAN SOLAR POWER FL INC
12221 N US HWY 301
THONOTOSASSA, FL 33592

2019 - 2020

NAME TITAN SOLAR POWER FL INC
MAILING ADDRESS 12221 N US HWY 301
THONOTOSASSA, FL 33592

Paid 18-0-387588
09/25/2019 18.00

BUSINESS TAX RECEIPT

HAS HEREBY PAID A PRIVILEGE TAX TO ENGAGE IN BUSINESS, PROFESSION, OR OCCUPATION SPECIFIED HEREON

DOUG BELDEN, TAX COLLECTOR
813-635-5200
THIS BECOMES A TAX RECEIPT WHEN VALIDATED.