



# City of Belle Isle Job Site Card **Electrical PERMIT 2019-07-068**

**PERMIT MUST BE POSTED ON SITE** - 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 of all your inspections -

**Permit Number:** 2019- 07-068

**Issue Date:** 07/26/2019

**Site Address:** 3042 Hoffner Ave 32812

**Parcel #:** 19-23-30-4382-02-380

**Class:**  Residential **Subdivision:**

**Description of Work:** **Electrical - ADDING SOLAR ELECTRIC PANELS TO HOME - PHOTO - VOLTAIC**

Issued: **SUNLIGHT SOLAR**

Business Phone: 321 886-3388

Name: **SCARLATO, ALDO**

Contractor License: EC13008138

Payment Date & Method: 8 / 1 / 2019  Picked up or sent by Gloria Pagan  Emailed

Visa  Master Card  Amex  Discover  Check / Money Order # 6848

Schedule Inspections via Email at: [BDscheduling@universalengineering.com](mailto:BDscheduling@universalengineering.com) BY 3:00 PM CUT OFF TIME  
Inspection Results Will Be Sent Out the Following Business Day

**"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."**

ELECTRICAL	INSPECTOR	DATE	COMMENTS
300 Temp Pole			
310 TUG			
320 Underground			
330 Rough			
340 Footer Steel Bonding			
350 Pool Light			
360 PrePower			
370 Meter ReSet			
380 Final			

Inspection requests are to be emailed to [BDscheduling@UniversalEngineering.com](mailto:BDscheduling@UniversalEngineering.com); a confirmation email will be sent back to you upon scheduling. **Next-Day Inspection requests must be made by 3pm.** Please include the following in your request: Permit #, project address, type of inspection, date of the requested inspection, a contact name & a contact phone number. AM or PM may be requested but cannot be guaranteed.  
Universal Engineering Sciences - 3532 Maggie Blvd., Orlando, FL 32811 Tel 407-581-8161 Fax 407-581-0313  
[www.universalengineering.com](http://www.universalengineering.com)



**City of Belle Isle**  
 Universal Engineering Sciences 3532 Maggie Blvd., Orlando, FL 32811  
 Tel 407-581-8161 \* Fax 407-581-0313 \* [www.universaleengineering.com](http://www.universaleengineering.com)



**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: 7.23-19 PERMIT NUMBER: 2019-07-668

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

Project Address 3042 Hoffner Avenue, Orlando, FL 3042 Hoffner Ave Belle Isle FL 32809 32812

Property Owner David & Christine Woods Woods, David Phone 407 340 8373

Property Owner's Mailing Address 3042 Hoffner Avenue City Orlando

State FL Zip Code 32812 Parcel Id Number: 19-23-30-4382-02-380

To obtain this information, please visit <http://www.ocpaff.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

**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) \_\_\_\_\_

1511C 37  
 3925 195  
 232.2  
 116  
 348

Temporary Construction Pole \_\_\_\_\_ One (1) New Meter Service \_\_\_\_\_ Amperage/Voltage/Phase \_\_\_\_\_

Meter Service Upgrade from \_\_\_\_\_ to \_\_\_\_\_ = \_\_\_\_\_  
 Amperage/Voltage/Phase Amperage/Voltage/Phase Difference in Size

Relocate Existing Meter Service (No Service Size Change) \_\_\_\_\_

Other: Adding solar electric panels to home Photo-Voltaic

check # 6848  
 PAID  
 8-1-19

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) \$ 39,235

Building Official: PSR Anson Date 7-25-2019  
 Verified Contractor's Licenses & Insurance are on file SW Date 7-23-19  
SW NOC ✓

need LTR

Permit Fee = \$ 232  
 Review Fee = \$ 116  
 1% BCAIB Fee = \$ 3.48  
 1.5% DCA Fee = \$ 5.22  
 TOTAL Permit = \$ 356.70

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 Aldo Scariato LICENSE # EC13008138  
 LICENSE HOLDER NAME Aldo Scariato COMPANY NAME Sunlight Enterprises Inc  
 Street Address 4854 Distribution Court, Suite 14  
 City Orlando State FL Zip Code 32822 Phone Number 321 888 3388  
 Email Address sunlightflorida@gmail.com 321-888-3388

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.

sunlightflorida@gmail.com Building Permit Number \_\_\_\_\_

2019-07-06 8

AFTER RECORDING - RETURN TO:

Sunlight Enterprises, Inc  
4854 Distribution Ct. Ste 14  
Orlando, FL 32822

DOCH 20190452388  
07/23/2019 11:55:35 AM Page 1 of 1  
Rec Fee: \$10.00  
Phil Diamond, Comptroller  
Orange County, FL  
IP - Ret To: SUNLIGHT ENTERPRISES INC



NOTICE OF COMMENCEMENT

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 & street address, if available) TAX FOLIO NO.: 19-23-30-4382-02-380

SUBDIVISION Lake Conway Estates BLOCK TRACT LOT BLDG UNIT  
Lake Conway Estates section 4 Y/36 LOT 238

2. GENERAL DESCRIPTION OF IMPROVEMENT:  
Adding solar electric panels to home

3. OWNER INFORMATION OR LESSEE INFORMATION IF THE LESSEE CONTRACTED FOR THE IMPROVEMENT:

a. Name and address: David + Christine Woods 3042 Hoffner Ave. Belle Isle, FL 32812  
b. Interest in property: Home Owner

c. Name and address of fee simple titleholder (if different from Owner listed above):

4. a. CONTRACTOR'S NAME: Sunlight Enterprises, Inc

Contractor's address: 4854 Distribution Court Suite 14 Orlando, FL 32817 Phone number: 321-888-3388

5. SURETY (if applicable, a copy of the payment bond is attached):

a. Name and address:

b. Phone number: c. Amount of bond: \$

6. b. LENDER'S NAME:

Lender's address: b. Phone number:

7. Persons within the State of Florida designated by Owner upon whom notices or other documents may be served as provided by Section 713.13 (1) (a) 7., Florida Statutes:

a. Name and address:

b. Phone numbers of designated persons:

8. a. In addition to himself or herself, Owner designates of to receive a copy of the Lienor's Notice as provided in Section 713.13 (1) (b), Florida Statutes.

b. Phone number of person or entity designated by Owner:

9. Expiration date of notice of commencement (the expiration date will be 1 year from the date of recording unless a different date is specified): 20

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.

*[Signature]*  
(Signature of Owner or Lessee, or Owner's or Lessee's Authorized Officer/Director/Partner/Manager)

Home Owner  
(Print Name and Provide Signatory's Title/Office)

State of FL

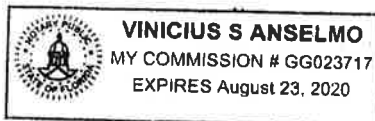
County of Orange

The foregoing instrument was acknowledged before me this 15 day of July, 2019.

by David Woods as Home Owner  
(name of person) (type of authority, ... e.g. officer, trustee, attorney in fact)

for (name of party on behalf of whom instrument was executed)

Personally Known or Produced Identification X Type of Identification Produced FL DL



*[Signature]*  
(Signature of Notary Public)  
(Print, Type, or Stamp Commissioned Name of Notary Public)

State of FLORIDA, County of ORANGE  
I hereby certify that this is a true copy of the document as reflected in the Official Records  
PHIL DIAMOND, COUNTY COMPTROLLER  
BY: *[Signature]* D.C.  
DATED: 7-23-19



# LIMITED POWER OF ATTORNEY

Date: 07/15/19

I hereby name and appoint Gloria Pagan to be my lawful attorney in fact to act for me and apply for a permit for work to be performed at the location described as:

3042 Hoffner Ave. Orlando, FL 32812

(Address of Job)

And to sign in my name and do all things necessary to obtain this permit.

Aldo Scarlato



EC13008138

(Signature of Certified Contractor)

(Contractor License Number included)

## County of Orange

## State of Florida

The foregoing instrument was acknowledged before me this 15 day of July 2018<sup>9</sup>,

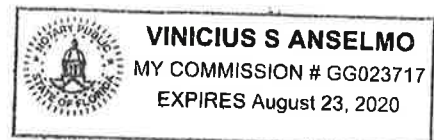
By Aldo Scarlato who is \_\_\_ personally known to me, or has x produced

FL DL as type of identification



(SEAL)

Signature of notary public, State of Florida



2:55:59 PM 7/23/2019

**Data Contained In Search Results Is Current As Of 07/23/2019 01:47 PM.**

### Search Results

Please see our [glossary of terms](#) for an explanation of the license status shown in these search results.

For additional information, including any complaints or discipline, click on the name.

License Type	Name	Name Type	License Number/ Rank	Status/Expires
Certified Electrical Contractor	<a href="#">SCARLATO, ALDO</a>	Primary	EC13008138 Cert Electrical	Current, Active 08/31/2020
	<b>License Location Address*:</b>	4854 DISTRIBUTION CT, UNIT 14 ORLANDO, FL 32822		
	<b>Main Address*:</b>	5048 TINKHAM AVENUE ORLANDO, FL 32812		
Certified Electrical Contractor	<a href="#">SUNLIGHT SOLAR</a>	DBA	EC13008138 Cert Electrical	Current, Active 08/31/2020
	<b>License Location Address*:</b>	4854 DISTRIBUTION CT, UNIT 14 ORLANDO, FL 32822		
	<b>Main Address*:</b>	5048 TINKHAM AVENUE ORLANDO, FL 32812		

[Back](#)
[New Search](#)

**\* denotes**

Main Address - This address is the Primary Address on file.

Mailing Address - This is the address where the mail associated with a particular license will be sent (if different from the Main or License Location addresses).

License Location Address - This is the address where the place of business is physically located.

[2601 Blair Stone Road, Tallahassee FL 32399](#) :: Email: [Customer Contact Center](#) :: Customer Contact Center: 850.487.1395

The State of Florida is an AA/EEO employer. [Copyright 2007-2010 State of Florida, Privacy Statement](#)

Under Florida law, email addresses are public records. If you do not want your email address released in response to a public-records request, do not send electronic mail to this entity. Instead, contact the office by phone or by traditional mail. If you have any questions, please contact 850.487.1395. \*Pursuant to Section 455.275(1), Florida Statutes, effective October 1, 2012, licensees licensed under Chapter 455, F.S. must provide the Department with an email address if they have one. The emails provided may be used for official communication with the licensee. However email addresses are public record. If you do not wish to supply a personal address, please provide the Department with an email address which can be made available to the public.

**Collector Scott Randolph**      **Local Business Tax Receipt**      **Orange County, Florida**  
 Local Business Tax Receipt is in addition to and not in lieu of any other tax required by law or municipal ordinance. Businesses are subject to regulation of zoning, health and other lawful authorities. This receipt is valid from October 1 through September 30 of receipt year. **Delinquent penalty is added October 1.**

2018      **EXPIRES**      9/30/2019      3100-0592061  
 \$100      SOLAR PANEL INSTALLS      \$30.00      2 EMPLOYEES ; 5000      BUSINESS OFFICE      \$30.00      1 EMPLOYEE ;



ANSELMO PEDRO LUIZ PRESIDENT  
 SUNLIGHT ENTERPRISES INC  
 4854 DISTRIBUTION CT STE 14  
 ORLANDO FL 32822-4922

TOTAL TAX      \$60.00  
 PREVIOUSLY PAID      \$60.00  
 TOTAL DUE      \$0.00

4626 ETHANS GLENN AVE (MOBILE)  
 U - ORLANDO 32812  
 CVC56975  
 PAID \$60.00 (Multiple)      2502-04365168      10/1/2018

This receipt is official when validated by the Tax Collector.



SUNLENT-01

SSTUART

# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
7/15/2019

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).

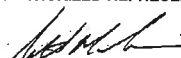
<b>PRODUCER</b> INSURICA Express 2420 Springer Dr, Suite 105 Norman, OK 73069	<b>CONTACT NAME:</b> PHONE (A/C, No, Ext): (405) 310-1583 E-MAIL ADDRESS: service@INSURICAexpress.com	FAX (A/C, No): (405) 556-2332
	<b>INSURER(S) AFFORDING COVERAGE</b> INSURER A : U.S. Specialty Insurance Company INSURER B : INSURER C : INSURER D : INSURER E : INSURER F :	
<b>INSURED</b>  Sunlight Enterprises, Inc 4854 Distribution Court 14 Orlando, FL 32822		

**COVERAGES**    **CERTIFICATE NUMBER:**    **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 SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	<input checked="" type="checkbox"/> <b>COMMERCIAL GENERAL LIABILITY</b> <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:		U19AC110519-00	1/25/2019	1/25/2020	EACH OCCURRENCE	\$ 1,000,000
						DAMAGE TO RENTED PREMISES (Ea occurrence)	\$ 100,000
						MED EXP (Any one person)	\$ 5,000
						PERSONAL & ADV INJURY	\$ 1,000,000
						GENERAL AGGREGATE	\$ 2,000,000
						PRODUCTS - COMP/OP AGG	\$ 2,000,000
							\$
	<b>AUTOMOBILE LIABILITY</b> <input type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS ONLY					COMBINED SINGLE LIMIT (Ea accident)	\$
						BODILY INJURY (Per person)	\$
						BODILY INJURY (Per accident)	\$
						PROPERTY DAMAGE (Per accident)	\$
							\$
	<b>UMBRELLA LIAB</b> <input type="checkbox"/> OCCUR <b>EXCESS LIAB</b> <input type="checkbox"/> CLAIMS-MADE DED      RETENTION \$					EACH OCCURRENCE	\$
						AGGREGATE	\$
							\$
	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) <input type="checkbox"/> Y/N <input checked="" type="checkbox"/> N/A If yes, describe under DESCRIPTION OF OPERATIONS below					PER STATUTE	OTH-ER
						E.L. EACH ACCIDENT	\$
						E.L. DISEASE - EA EMPLOYEE	\$
						E.L. DISEASE - POLICY LIMIT	\$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

<b>CERTIFICATE HOLDER</b>  City of Belle Isle 1600 Nela Avenue Belle Isle, FL 32809	<b>CANCELLATION</b>  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 
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# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

07/15/2019

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**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).**

<b>PRODUCER</b>  FrankCrum Insurance Agency, Inc. 100 South Missouri Avenue Clearwater, FL 33756	CONTACT NAME: PHONE (A/C, No, Ext): (800) 277-1620 X 4800      FAX (A/C, No): (727) 797-0704 E-MAIL ADDRESS: INSURER(S) AFFORDING COVERAGE INSURER A: <b>Frank Winston Crum Insurance Company</b> NAIC# <b>11600</b>
<b>INSURED</b>  FrankCrum L/C/F Sunlight Enterprises, Inc 100 South Missouri Avenue Clearwater, FL 33756	INSURER B: INSURER C: INSURER D: INSURER E: INSURER F:

**COVERAGES      CERTIFICATE NUMBER: 573595      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 INSRD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS																
	COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:						EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS-COMP/OP AGG \$																
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$																
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED      RETENTION \$						EACH OCCURENCE \$ AGGREGATE \$																
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N <input type="checkbox"/>	N/A	WC201900000	01/01/2019	01/01/2020 ✓	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">X</td> <td style="width: 15%;">PER STATUTE</td> <td style="width: 10%;">OTHER</td> <td style="width: 80%;"></td> </tr> <tr> <td colspan="3">E L EACH ACCIDENT</td> <td style="text-align: right;">\$1,000,000</td> </tr> <tr> <td colspan="3">E L DISEASE-EA EMPLOYEE</td> <td style="text-align: right;">\$1,000,000</td> </tr> <tr> <td colspan="3">E L DISEASE-POLICY LIMIT</td> <td style="text-align: right;">\$1,000,000</td> </tr> </table>	X	PER STATUTE	OTHER		E L EACH ACCIDENT			\$1,000,000	E L DISEASE-EA EMPLOYEE			\$1,000,000	E L DISEASE-POLICY LIMIT			\$1,000,000
X	PER STATUTE	OTHER																					
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E L DISEASE-EA EMPLOYEE			\$1,000,000																				
E L DISEASE-POLICY LIMIT			\$1,000,000																				

**DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)**  
 Effective 02/13/2019, coverage is for 100% of the employees of FrankCrum leased to Sunlight Enterprises, Inc (Client) for whom the client is reporting hours to FrankCrum. Coverage is not extended to statutory employees.

<b>CERTIFICATE HOLDER</b>  City of Belle Isle 1600 Nela Avenue Belle Isle, FL 32809	<b>CANCELLATION</b>  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 
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# PROJECT DESCRIPTION:

30x295 COOL PV PN:09629 (295W) MODULES AND  
 08x295 CANADIAN SOLAR CS6K 295MS (295W) MODULES  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 SYSTEM SIZE: 11.21 kW DC STC  
 ARRAY AREA #1 : 542.70 SQ FT.  
 ARRAY AREA #2 : 141.20 SQ FT.

## EQUIPMENT SUMMARY

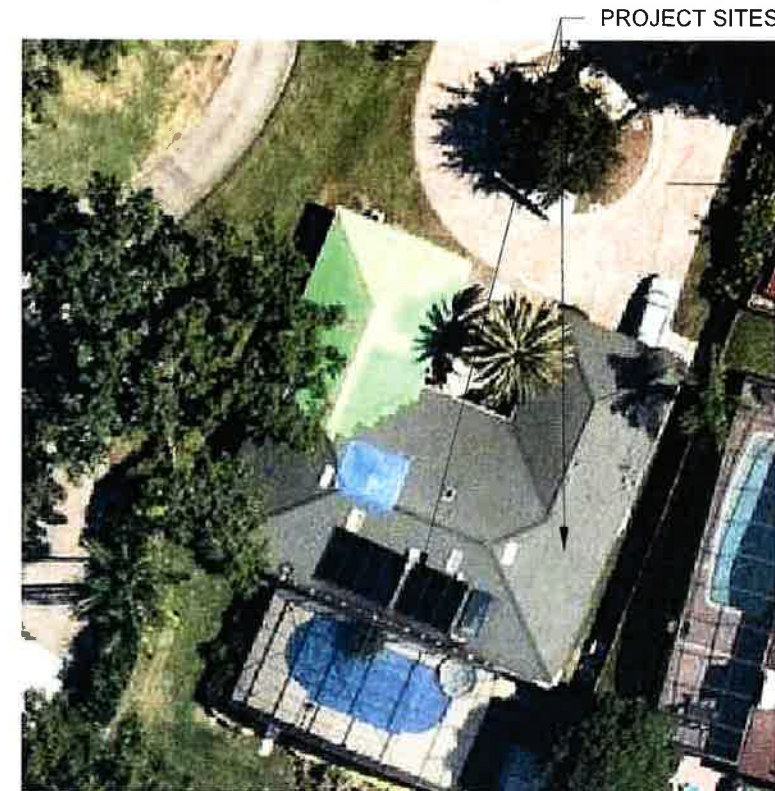
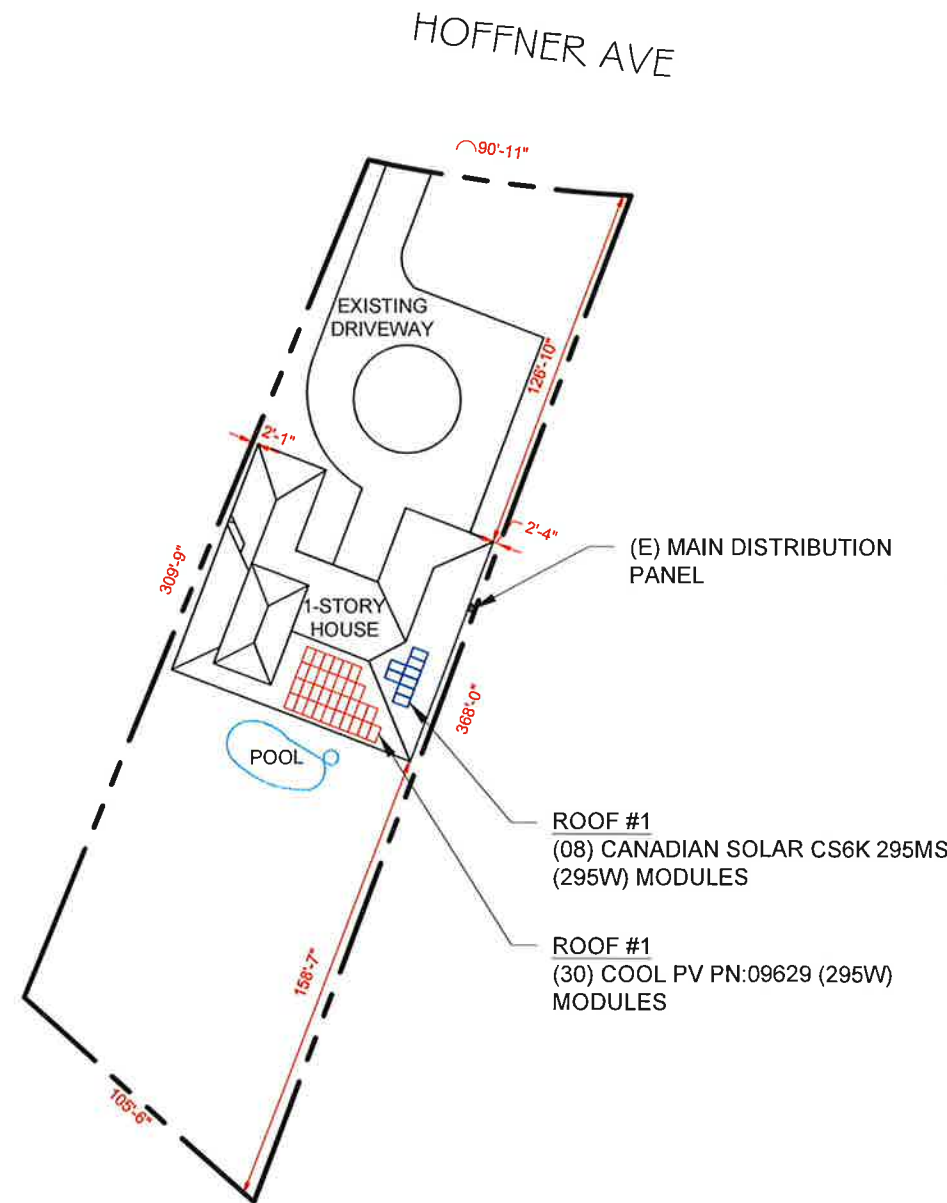
30 COOL PV PN:09629 (295W) MODULES AND  
 08 HANWHA Q.PEAK BLK-G4.1 (295W) MODULES  
 38 ENPHASE IQ7-60-2-US MICROINVERTERS

## SHEET INDEX

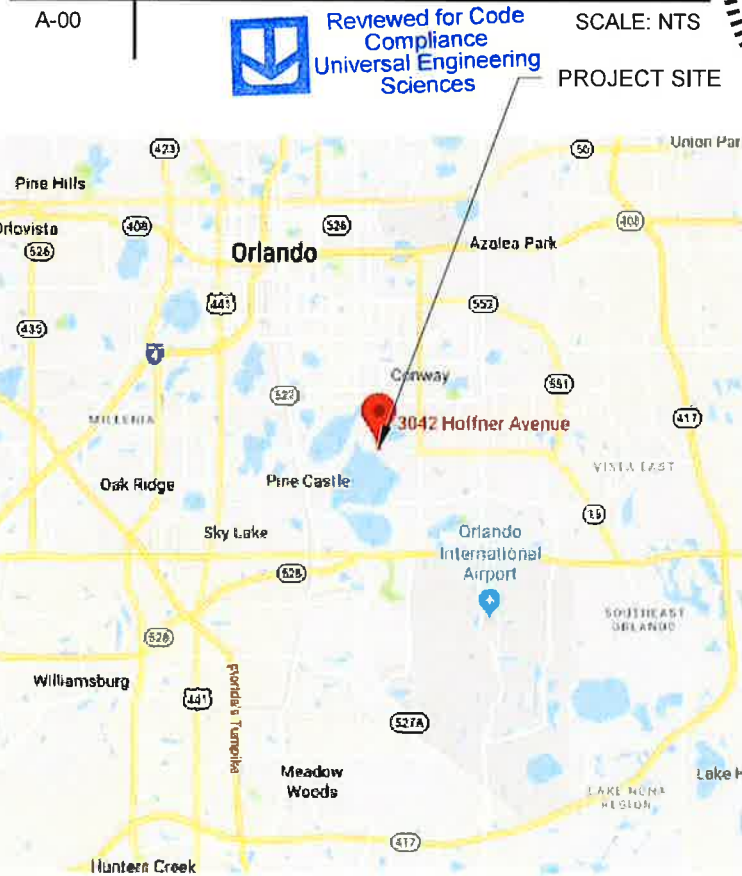
A-00 PLOT PLAN & VICINITY MAP  
 A-01 SYMBOLS & SYSTEM DESCRIPTION  
 S-01 ROOF PLAN & MODULES  
 S-02 STRUCTURAL ATTACHMENT DETAILS  
 E-01 ELECTRICAL LINE DIAGRAM  
 E-02 WIRING CALCULATIONS  
 E-02.1 WIRING CALCULATIONS  
 E-03 SYSTEM LABELING

DS-01 DATA SHEET  
 DS-02 DATA SHEET  
 DS-03 DATA SHEET  
 DS-04 DATA SHEET  
 DS-05 DATA SHEET  
 DS-06 DATA SHEET

GOVERNING CODES :  
 FLORIDA RESIDENTIAL CODE, 6TH EDITION 2017 (FRC)  
 FLORIDA PLUMBING CODE, 6TH EDITION 2017 (FPC)  
 FLORIDA BUILDING CODE, 6TH EDITION 2017 EDITION (FBC)  
 FLORIDA MECHANICAL CODE, 6TH EDITION 2017 (FMC)  
 NEC 2014 CODE BOOK



2 HOUSE PHOTO



3 VICINITY MAP

**Castillo Engineering**  
 DESIGNED TO PERMIT  
 CASTILLO ENGINEERING SERVICES, LLC  
 COA # 28345  
 2925 W. STATE ROAD 434, SUITE 111  
 LONGWOOD, FL 32779  
 TEL: (407) 289-2575  
 ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



JUL 12 2019

**WOODS RESIDENCE**  
 3042 HOFFNER AVE,  
 BELLE ISLE, FL 32812

SHEET NAME  
**PLOT PLAN & VICINITY MAP**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**A-00**







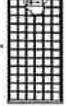




1 PLOT PLAN WITH ROOF PLAN

A-00 SCALE: 1/64" = 1'-0"

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A-00 SCALE: NTS

**Symbols:**

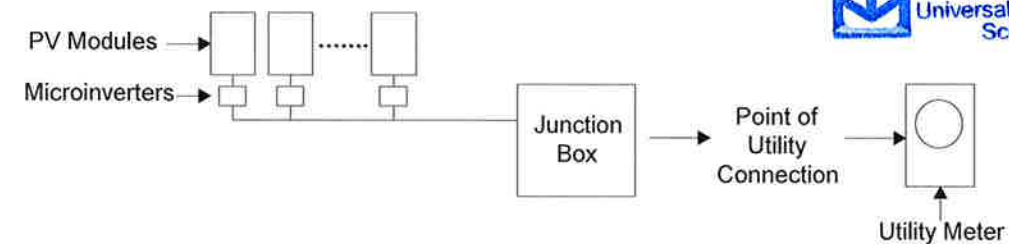
- Section.....  Sheet where section is located
- Elevation .....  Detail ID Letter  
Sheet where section is located
- Detail .....  Detail ID Letter  
Sheet where section is located
- Detail .....  Detail ID Letter  
(Enlarged Plan) ← Area to be enlarged  
Sheet where section is located
- Keyed Notes ..... 1 Keyed note designation on applicable sheet
- Ground Terminal ..... 
- Grounding Point/rod.... 
- Solar Panel .....  or 00 ← Module with Source Circuit number
- Combiner Box ..... CB
- DC Disconnect ..... DCD
- Main Distribution Panel ..... MDP
- Fuse ..... 
- Overcurrent Breaker .. 
- Inverter ..... 
- Transformer ..... 
- Automatic ..... ATS  
Transfer Switch

**Abbreviations:**

- AC Alternating Current
- APPROX Approximate
- AWG American Wire Gauge
- CB Combiner Box
- DC Direct Current
- DCD Direct Current Disconnect
- DISC Disconnect
- (E) Existing
- EL Elevation
- EQ Equal
- JB Junction Box
- MCB Main Combiner Box
- MFR Manufacturer
- MIN Minimum
- MISC Miscellaneous
- (N) New
- OCPD OverCurrent Protection Device
- POCC Point Of Common Coupling
- PV Photovoltaic
- SF Squarefoot/feet
- STC Standard Test Conditions
- TBD To Be Determined
- TYP Typical
- VIF Verify In Field
- WP Weather Proof

**System Description**

This system is a grid-tied, PV system, with PV generation consisting of 30 COOL PV PN:09629 (295W) MODULES AND 08 CANADIAN SOLAR CS6K 295MS (295W) MODULES with a combined STC rated dc output power of 11,210W. The modules are connected into 38 ENPHASE IQ7-60-2-US MICROINVERTERS. The inverter has electronic maximum power point tracking to maximize energy captured by the PV modules. The inverter also has an internal ground fault detection and interruption device that is set to disconnect the array in the event that a ground fault that exceeds one ampere should occur. The inverter has DC and AC disconnect integrated system and labels are provided as required by the *National Electric Code*



When the sun is shining, power from the PV array is fed into the inverter, where it is converted from DC to AC. The inverter output is then used to contribute to the power requirements of the occupancy. If PV power meets the requirements of the loads of the occupancy, any remaining PV power is sold back to the utility. When utility power is available, but PV power is not available, building loads are supplied by the utility.

The inverter meets the requirements of IEEE 1547 and UL 1741. This means that if it detects a loss of utility power, it will automatically disconnect from the utility. When utility voltage is restored, the inverter automatically reconnects to the utility grid after verifying utility voltage and frequency stability.

On a day with average Florida sunshine, this system outputs 45.58 kWh per day on site.

**Castillo Engineering**  
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 LONGWOOD, FL 32779  
 TEL: (407) 289-2575  
 ERMOCRATES E. CASTILLO - FL PE 52580

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER  




**WOODS RESIDENCE**  
 JUL 12 2019  
 3042 HOFFNER AVE,  
 BELLE ISLE, FL 32812

SHEET NAME  
**SYMBOLS & SYSTEM DESCRIPTION**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**A-01**

**MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 30 MODULES  
 MODULE TYPE = COOL PV PN:09629 (295W) MODULES  
 WEIGHT = 62.6 LBS / 28.39 KG.  
 MODULE DIMENSIONS = 66.1" x 39.4" = 18.09 SF  
 UNIT WEIGHT OF ARRAY = 3.47 PSF

**ARRAY & ROOF AREA**

**CALC'S (ROOF #1)**

ARRAY AREA = 542.70 SQ. FT.  
 ROOF FACE AREA = 1341.22 SQ. FT.  
 542.70 / 1341.22 = 40.63% OF ROOF  
 FACE AREA COVERED BY ARRAY

**DESCRIPTION (ROOF #1)**

ROOF TYPE - ASPHALT SHINGLE ROOF  
 ROOF TILT - 22.6°  
 ROOF AZIMUTH -201°  
 RAFTERS SIZE - 2"X4" @ 24" O.C.

**ARRAY & ROOF AREA**

**CALC'S (ROOF #2)**

ARRAY AREA = 141.20 SQ. FT.  
 ROOF FACE AREA = 1125.11 SQ. FT.  
 141.20 / 1125.11 = 12.55% OF ROOF  
 FACE AREA COVERED BY ARRAY

**DESCRIPTION (ROOF #2)**

ROOF TYPE - ASPHALT SHINGLE ROOF  
 ROOF TILT - 22.6°  
 ROOF AZIMUTH -111°  
 RAFTERS SIZE - 2"X4" @ 24" O.C.

**MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 08 MODULES  
 MODULE TYPE = CANADIAN SOLAR CS6K 295MS (295W) MODULES  
 MODULE WEIGHT = 40.1 LBS / 18.2 KG.  
 MODULE DIMENSIONS = 65.0"x 39.1" = 17.65 SF  
 UNIT WEIGHT OF ARRAY = 2.27 PSF



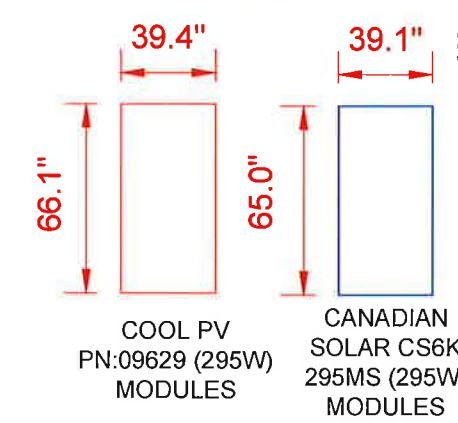
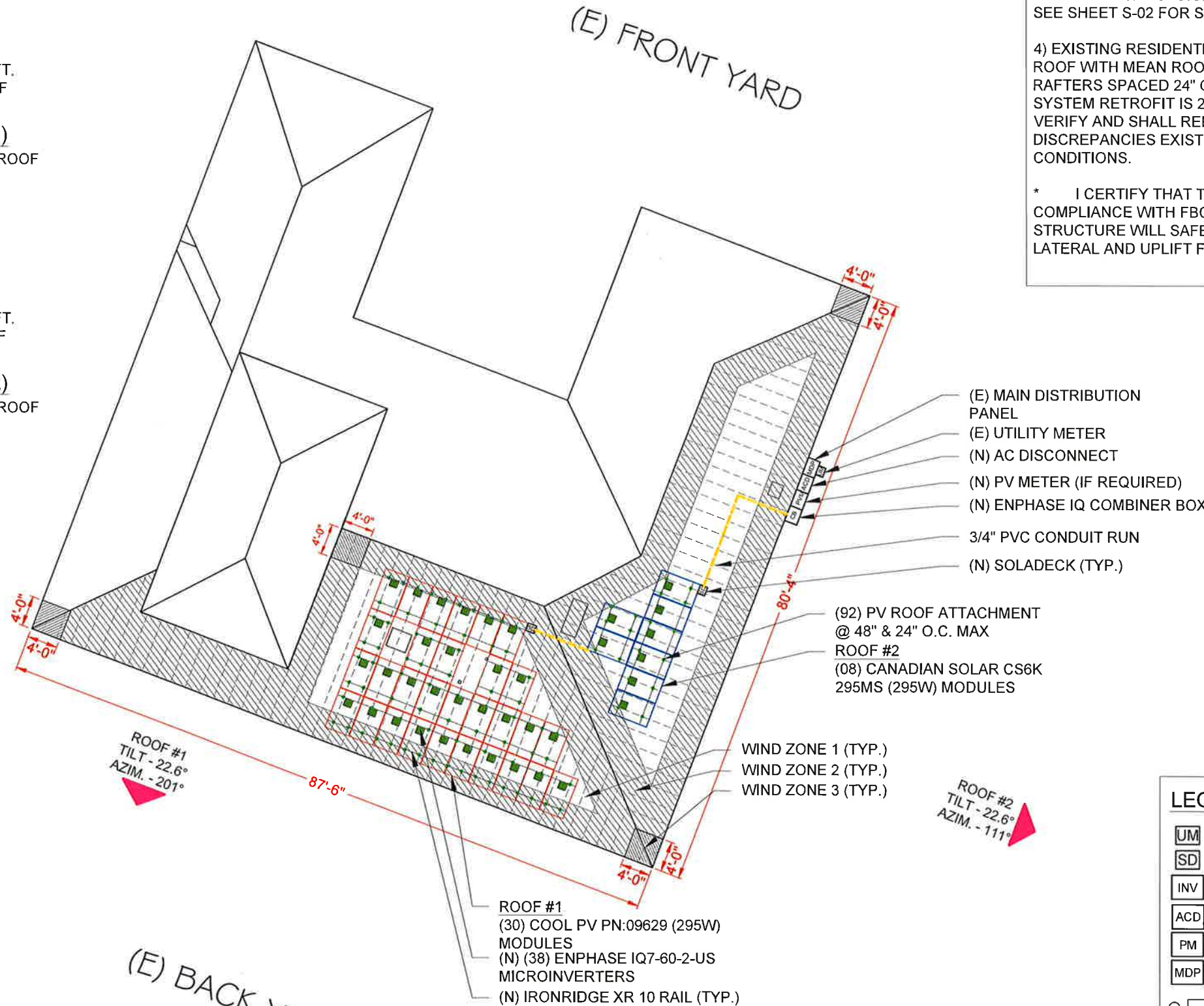
**GENERAL INSTALLATION PLAN NOTES:**

1) ROOF ATTACHMENTS SHALL BE INSTALLED AS SHOWN IN SHEET S-02 AND AS FOLLOWS FOR EACH WIND ZONE:

WIND ZONE 1: 4'-0" O.C.  
 WIND ZONE 2: 2'-0" O.C.  
 WIND ZONE 3: 2'-0" O.C..  
 SEE SHEET S-02 FOR SUPPORTING CALCULATIONS.

4) EXISTING RESIDENTIAL BUILDING IS AN ASPHALT SHINGLE ROOF WITH MEAN ROOF HEIGHT 25 FT AND SYP 2X4 WOOD ROOF RAFTERS SPACED 24" O.C. EXISTING ROOF SLOPE FOR SOLAR SYSTEM RETROFIT IS 22.6 DEGREES. CONTRACTOR TO FIELD VERIFY AND SHALL REPORT TO THE ENGINEER IF ANY DISCREPANCIES EXIST BETWEEN PLANS AND IN FIELD CONDITIONS.

\* I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC: RESIDENTIAL 2017, CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE CALCULATION WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS. \*



**LEGEND**

- UM - UTILITY METER
- SD - SOLADECK
- INV - INVERTER
- ACD - AC DISCONNECT
- PM - PRODUCTION METER
- MDP - MAIN DISTRIBUTION PANEL
- □ - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - PV ROOF ATTACHMENT
- - RAFTERS
- - CONDUIT
- CB - COMBINER BOX

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 ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

Reviewed for Code Compliance  
 Universal Engineering Sciences

**WOODS RESIDENCE**  
 3042 HOFFNER AVE,  
 BELLE ISLE, FL 32812

SHEET NAME  
**ROOF PLAN & MODULES**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**S-01**

REVISIONS		
DESCRIPTION	DATE	REV

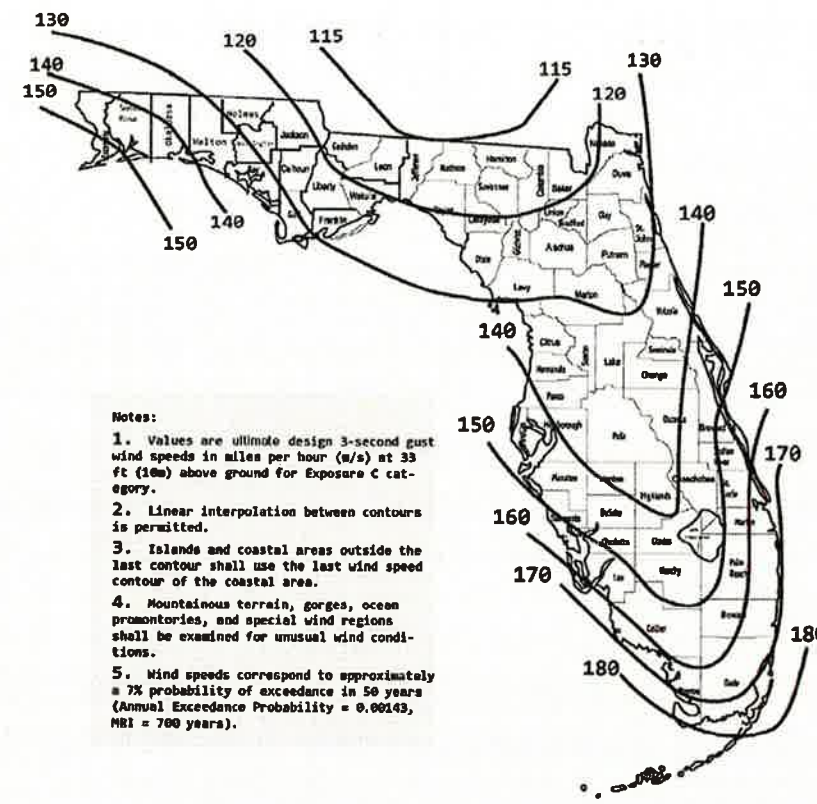


**WOODS RESIDENCE**  
 JUL 12 2019  
 3042 HOFFNER AVE,  
 BELLE ISLE, FL 32812

SHEET NAME  
**STRUCTURAL ATTACHMENT DETAILS**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**S-02**



- Notes:**
1. Values are ultimate design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10m) above ground for Exposure C category.
  2. Linear interpolation between contours is permitted.
  3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
  4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.
  5. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MREI = 700 years).

**FIGURE 1609.3(1)**

**ULTIMATE DESIGN WIND SPEEDS,  $V_{ULT}$ , FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES**

Wind Speed Ult (mph)	140
Risk Category	II
Wind Speed ASD (mph)	110
Exposure Category	D
Mean Roof Height (ft)	25
Roof Slope (degrees)	25
Module Area (sq ft)	20
Kzt	1
Height Adjustment Factor, $\lambda$	1.61

Roof Slope Calculator		
Rise	Run	Slope (°)
5	12	22.6

Maximum Uplift per *fastener <b>Wind Zone 1</b>	343.6
Per American Wood Council - NDS Max Withdraw Load for 5/16" LAG with 2.5" Embedment	476

\*Roof attachments w 2 rails at: 4 ft O/C

Maximum Uplift per *fastener <b>Wind Zone 2</b>	282.5
Per American Wood Council - NDS Max Withdraw Load for 5/16" LAG with 2.5" Embedment	476

\*Roof attachments w 2 rails at: 2 ft O/C

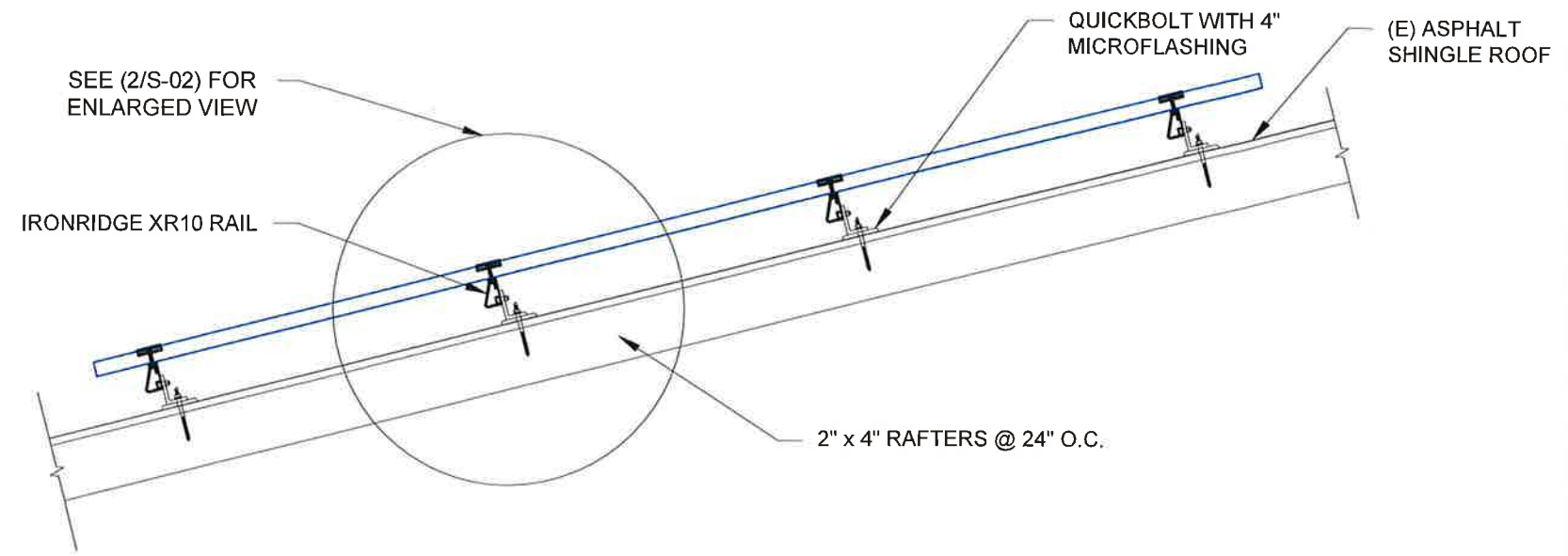
Maximum Uplift per *fastener <b>Wind Zone 3</b>	424.2
Per American Wood Council - NDS Max Withdraw Load for 5/16" LAG with 2.5" Embedment	476

\*Roof attachments w 2 rails at: 2 ft O/C

Roof Zone	Pnet (30)	
1	11.4	-19.4
2	11.4	-31.9
3	11.4	-47.9

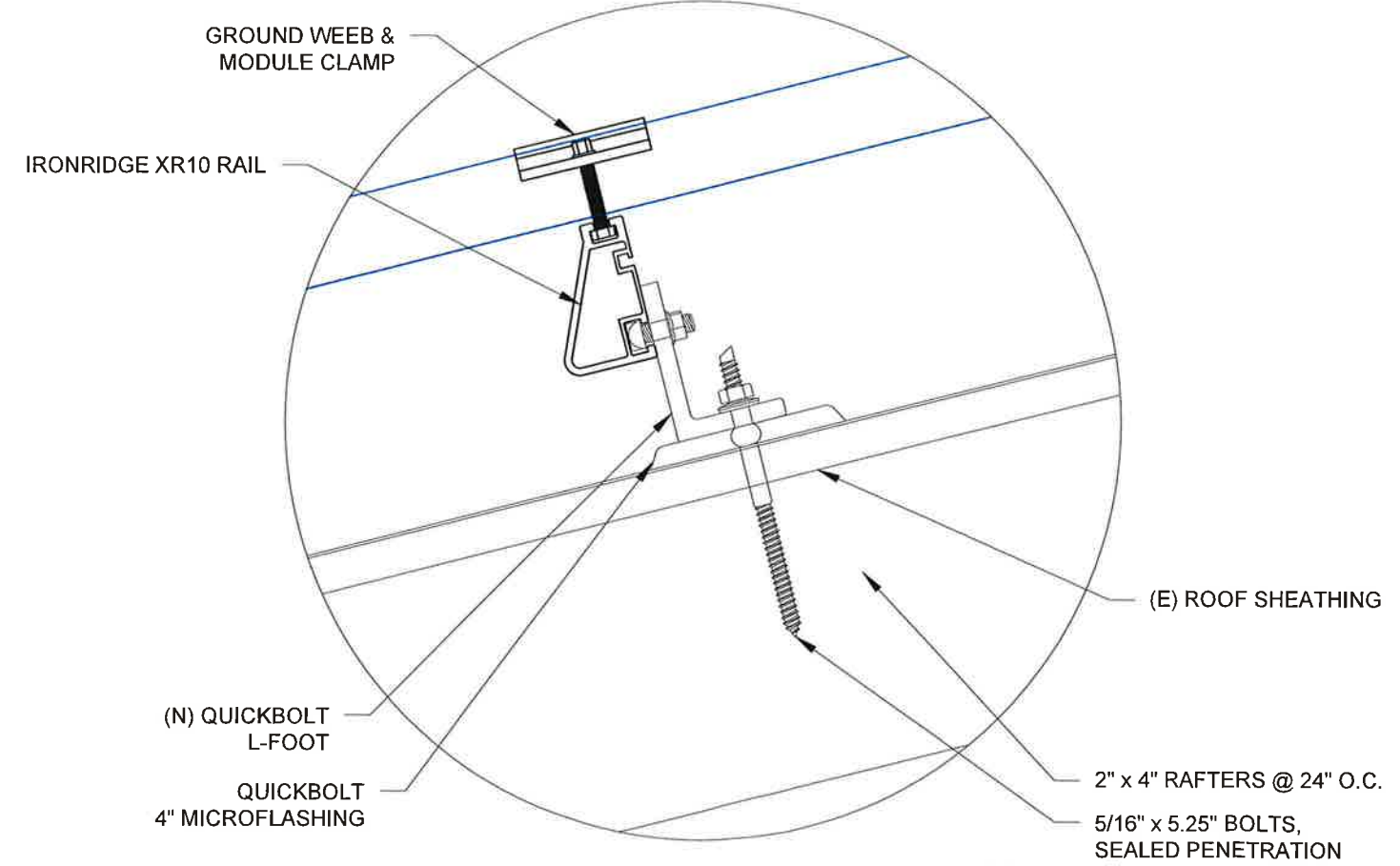
$P_{net} = [\lambda K]_{zt} P_{net}(30)$

Roof Zone	Pnet	
1	18.354	-31.234
2	18.354	-51.359
3	18.354	-77.119



**1 ATTACHMENT DETAIL**

S-02 SCALE - 1" = 1'-0"



**2 ATTACHMENT DETAIL (ENLARGED SECTION VIEW)**

S-02 SCALE: NTS

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REVISIONS		
DESCRIPTION	DATE	REV



**WOODS RESIDENCE**  
 3042 HOFFNER AVE 1  
 BELLE ISLE, FL 32812 2019

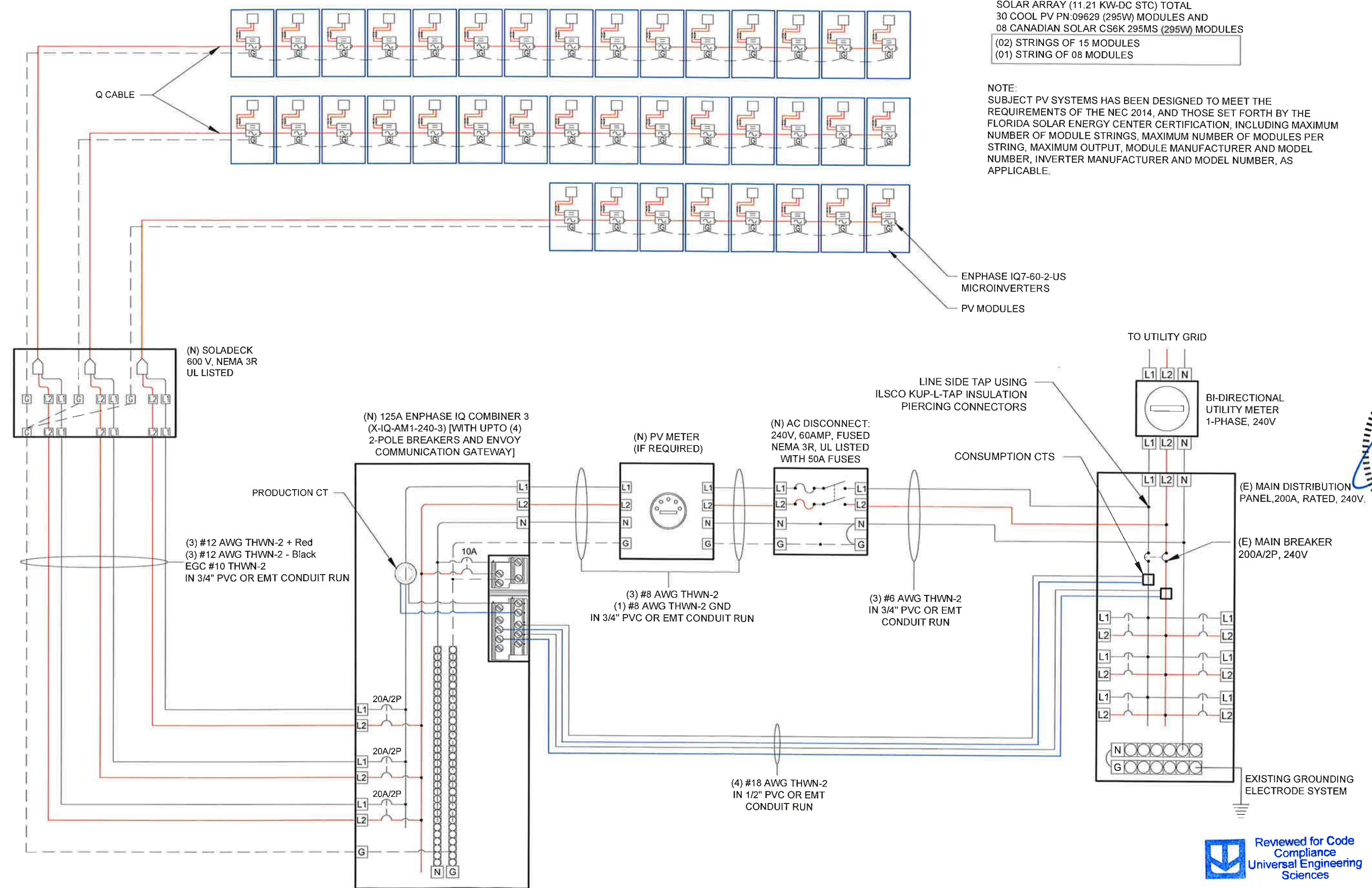
SHEET NAME  
**ELECTRICAL LINE DIAGRAM**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**E-01**

SOLAR ARRAY (11.21 KW-DC STC) TOTAL  
 30 COOL PV PN:09629 (295W) MODULES AND  
 08 CANADIAN SOLAR CS6K 295MS (295W) MODULES  
 (02) STRINGS OF 15 MODULES  
 (01) STRING OF 08 MODULES

NOTE:  
 SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE NEC 2014, AND THOSE SET FORTH BY THE FLORIDA SOLAR ENERGY CENTER CERTIFICATION, INCLUDING MAXIMUM NUMBER OF MODULE STRINGS, MAXIMUM NUMBER OF MODULES PER STRING, MAXIMUM OUTPUT, MODULE MANUFACTURER AND MODEL NUMBER, INVERTER MANUFACTURER AND MODEL NUMBER, AS APPLICABLE.



**1 | ELECTRICAL LINE DIAGRAM**

E-01

SCALE: NTS

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## AC CONDUCTOR AMPACITY CALCULATIONS: FROM ROOF TOP SOLADECK TO LOAD CENTER

MODULE MANUFACTURER	SOLARWORLD
MODULE MODEL	SW 295 MONO
INVERTER MANUFACTURER	ENPHASE
INVERTER MODEL	ENPHASE IQ 7
CIRCUIT 2 (COOL PV W/ SOLARWORLD 295W)	15
CIRCUIT 2 (COOL PV W/ SOLARWORLD 295W)	15
TOTAL ARRAY POWER (KW)	8.85
SYSTEM AC VOLTAGE	240V 1-PHASE

DESIGN TEMPERATURE	
MIN. AMBIENT TEMP. °F	32
MAX. AMBIENT TEMP. °F	117
CALCULATED MAX. VDC	43
CALCULATED MIN VMP	26

AMPACITY CALCULATIONS										
CIRCUIT	MAX AMPS	1.25 x MAX AMPS	AWG	90 °C AMPACITY	AMBIENT TEMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM CIRCUIT BREAKER
CIRCUIT 1	15.0	18.8	#12	30	130	0.76	2	1	22.8	20 A
CIRCUIT 2	15.0	18.8	#12	30	130	0.76	2	1	22.8	20 A
AC COMBINER PANEL OUTPUT	30.0	37.5	#8	55	95	0.96	2	1	52.8	40 A

MAXIMUM CIRCUIT VOLTAGE DROP	2%
------------------------------	----

VOLTAGE DROP CALCULATIONS					
CIRCUIT	AWG	CIRCULAR MILLS	I	V	MAX LENGTH
CIRCUIT 1	#12	6530	15.0	240	81 FEET
CIRCUIT 2	#12	6530	15.0	240	81 FEET
COMBINER PANEL OUTPUT	#8	16510	30.0	240	102 FEET

NOTES	
CALCULATIONS HAVE BEEN BASED ON SOLARWORLD 295W MODULE TO ACCOUNT FOR HIGHEST AMPERAGE AS WORST CASE SCENARIO	
TEMP DERATE BASED ON NEC TABLE 310.15(B)(2)(A)	
CONDUIT FILL DERATE BASED ON NEC TABLE 310.15(B)(3)(A)	
MAXIMUM VDC CALCULATED USING MODULE MANUFACTURE TEMPERATURE COEFFICIENTS PER NEC 690.7(A)	
UNLESS OTHERWISE SPECIFIED, ALL WIRING MUST BE THHN OR THWN-2 COPPER	
ALL WIRE SIZES LISTED ARE THE MINIMUM ALLOWABLE	
IN ANY CELL INDICATES THAT THE SYSTEM IS SAFE AND COMPLIES WITH NEC REQUIREMENTS	
IN ANY CELL INDICATES A POTENTIALLY UNSAFE CONDITION	
INFORMATION INPUT BY SYSTEM DESIGNER	
INFORMATION OBTAINED FROM MANUFACTURER DATASHEETS	

## AC CONDUCTOR AMPACITY CALCULATIONS: FROM AC COMBINER BOX TO MSP

MODULE PROPERTIES			
VOC	39.8	IBC	9.78
VMPP	32.3	IMP	9.25
TC VOC	-0.29% / °C	TC VMP	-0.39% / °C
PMP	295.0	NOCT	45 °C

INVERTER PROPERTIES	
OUTPUT VOLTAGE	240 L-L 1-PH
MAX INPUT DC VOLTAGE	48 VDC
OPERATING RANGE	16 - 48 VDC
MPPT VOLTAGE RANGE	27 - 37 VDC
START VOLTAGE	22 VDC
MAX INPUT POWER	350 WDC
CONTINUOUS AC POWER	240 VA

### ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE.
- UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
- MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
- RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).



ENPHASE IQ7-60-2-US MICROINVERTER		
Input Data (DC)		
Recommended Input Power (STC)		235-350W +
Maximum Input DC Voltage		48V
Peak Power Tracking Voltage		27V-37V
Operating Range		16V-48V
Min. / Max. Start Voltage		22V / 48V
Max DC Short Circuit Current		15A
Output Data (AC)		
Maximum Output Power		240W
Nominal Output Current		1.0A
Nominal Voltage / Range		240V/211-264V
Nominal Frequency / Range		60 Hz
Extended Frequency / Range		47-68 Hz
Power Factor at rated power		1.0
Maximum unit per 20A Branch Circuit		16 (240 VAC)

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CASTILLO ENGINEERING SERVICES, LLC  
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2925 W. STATE ROAD 434, SUITE 111  
LONGWOOD, FL 32779  
TEL: (407) 289-2575  
ERMOCRATES E. CASTILLO - FL PE 62590

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



WOODS RESIDENCE

3042 HOFFNER AVE,  
BELLE ISLE, FL 32812

SHEET NAME  
WIRING  
CALCULATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
E-02

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## AC CONDUCTOR AMPACITY CALCULATIONS: FROM ROOF TOP SOLADECK TO LOAD CENTER

MODULE MANUFACTURER	CANADIAN SOLAR
MODULE MODEL	CS6K-295MS
INVERTER MANUFACTURER	ENPHASE
INVERTER MODEL	ENPHASE IQ 7
MODULES/BRANCH CIRCUIT 1	8
TOTAL ARRAY POWER (KW)	2.36
SYSTEM AC VOLTAGE	240V 1-PHASE

DESIGN TEMPERATURE	
MIN. AMBIENT TEMP. °F	32
MAX. AMBIENT TEMP. °F	117
CALCULATED MAX. VDD	43
CALCULATED MIN VMP	26

AMPACITY CALCULATIONS										
CIRCUIT	MAX AMPS	1.25 x MAX AMPS	AWG	90 °C AMPACITY	AMBIENT TEMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM CIRCUIT BREAKER
CIRCUIT 1	8.0	10.0	#12	30	130	0.76	2	1	22.8	20 A
AC COMBINER PANEL OUTPUT	8.0	10.0	#10	40	95	0.96	2	1	38.4	20 A

MAXIMUM CIRCUIT VOLTAGE DROP	2%
------------------------------	----

VOLTAGE DROP CALCULATIONS					
CIRCUIT	AWG	CIRCULAR MILLS	I	V	MAX LENGTH
CIRCUIT 1	#12	6530	8.0	240	152 FEET
COMBINER PANEL OUTPUT	#10	10380	8.0	240	241 FEET

### NOTES

TEMP DERATE BASED ON NEC TABLE 310.15(B)(2)(A)
CONDUIT FILL DERATE BASED ON NEC TABLE 310.15(B)(3)(A)
MAXIMUM VDD CALCULATED USING MODULE MANUFACTURE TEMPERATURE COEFFICIENTS PER NEC 690.7(A)
UNLESS OTHERWISE SPECIFIED, ALL WIRING MUST BE THHN OR THWN-2 COPPER
ALL WIRE SIZES LISTED ARE THE MINIMUM ALLOWABLE
IN ANY CELL INDICATES THAT THE SYSTEM IS SAFE AND COMPLIES WITH NEC REQUIREMENTS
IN ANY CELL INDICATES A POTENTIALLY UNSAFE CONDITION
INFORMATION INPUT BY SYSTEM DESIGNER
INFORMATION OBTAINED FROM MANUFACTURER DATASHEETS

## AC CONDUCTOR AMPACITY CALCULATIONS: FROM AC COMBINER BOX TO MSP

MODULE PROPERTIES			
VDD	39.5	IBC	9.75
VMPP	32.5	IMP	9.14
TC VDD	-0.30%/°C	TC VMP	-0.39%/°C
PMP	295.0	NOCT	45 °C

INVERTER PROPERTIES	
OUTPUT VOLTAGE	240 L-L 1-PH
MAX INPUT DC VOLTAGE	48 VDD
OPERATING RANGE	16 - 48 VDD
MPPT VOLTAGE RANGE	27 - 37 VDD
START VOLTAGE	22 VDD
MAX INPUT POWER	350 WDD
CONTINUOUS AC POWER	240 VA

### ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
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- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE.
- UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
- MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
- RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
- CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).

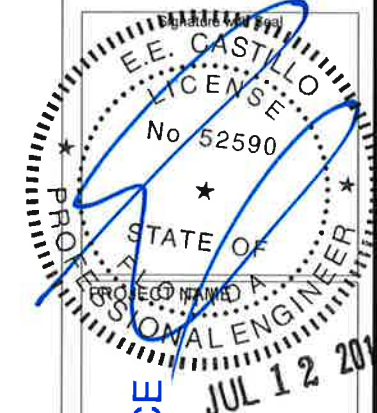


ENPHASE IQ7-60-2-US MICROINVERTER		
Input Data (DC)		
Recommended Input Power (STC)		235-350W +
Maximum Input DC Voltage		48V
Peak Power Tracking Voltage		27V-37V
Operating Range		16V-48V
Min. / Max. Start Voltage		22V / 48V
Max DC Short Circuit Current		15A
Output Data (AC)		
Maximum Output Power		240W
Nominal Output Current		1.0A
Nominal Voltage / Range		240V/211-264V
Nominal Frequency / Range		60 Hz
Extended Frequency / Range		47-68 Hz
Power Factor at rated power		1.0
Maximum unit per 20A Branch Circuit		16 (240 VAC)

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LONGWOOD, FL 32779  
TEL: (407) 289-2575  
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER  
**SunLight solar**



**WOODS RESIDENCE**  
3042 HOFFNER AVE,  
BELLE ISLE, FL 32812

SHEET NAME  
**WIRING CALCULATIONS**

SHEET SIZE  
**ANSI B 11" X 17"**

SHEET NUMBER  
**E-02.1**

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

LABEL LOCATION:  
 AC DISCONNECT, POINT OF INTERCONNECTION  
 (PER CODE: NEC 690.17(E), CB)

**WARNING: PHOTOVOLTAIC  
 POWER SOURCE**

LABEL LOCATION:  
 CONDUIT, COMBINER BOX  
 (PER CODE: NEC690.31(G)(3)(4) & NEC 690.13(G)(4))

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

LABEL LOCATION:  
 POINT OF INTERCONNECTION  
 (PER CODE: NEC 705.12(D)(4))

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

**PHOTOVOLTAIC SYSTEM AC DISCONNECT**  
 RATED AC OPERATING CURRENT 38.0 AMPS  
 AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:  
 AC DISCONNECT, POINT OF INTERCONNECTION  
 (PER CODE: NEC690.54)

**⚠ WARNING**  
 INVERTER OUTPUT CONNECTION DO NOT  
 RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:  
 POINT OF INTERCONNECTION  
 (PER CODE: NEC 705.12(D)(7))  
 [Not required if panelboard is rated not less than sum of ampere ratings  
 of all overcurrent devices supplying it]

DATA PER PANEL

NOMINAL OPERATING AC VOLTAGE -	240	V
NOMINAL OPERATING AC FREQUENCY-	60	Hz
MAXIMUM AC POWER-	295	VA
MAXIMUM AC CURRENT-	1.0	A
MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION PER CIRCUIT-	20	A

LABEL LOCATION:  
 COMBINER BOX  
 (PER CODE: NEC690.52)

**PHOTOVOLTAIC SYSTEM  
 EQUIPPED WITH RAPID  
 SHUTDOWN**

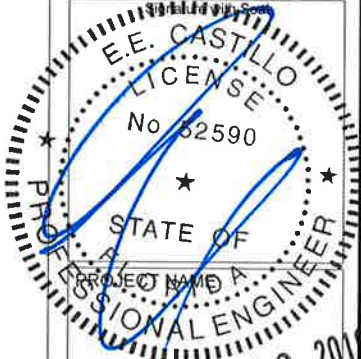
LABEL LOCATION:  
 AC DISCONNECT, DC DISCONNECT, POINT OF  
 INTERCONNECTION  
 (PER CODE: NEC690.56(C))



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 LONGWOOD, FL 32779  
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 ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS		
DESCRIPTION	DATE	REV



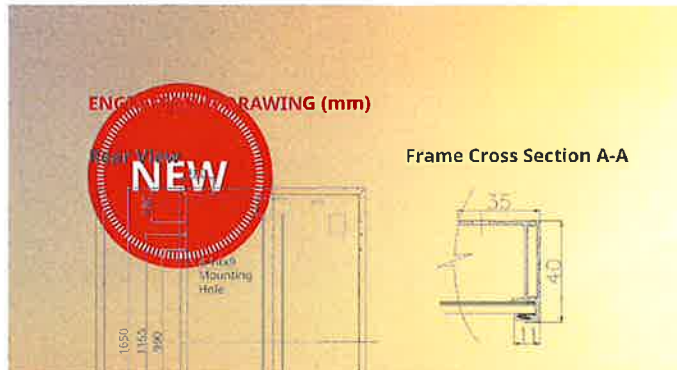
**WOODS RESIDENCE**  
 JUL 12 2011  
 3042 HOFFNER AVE,  
 BELLE ISLE, FL 32812

SHEET NAME  
**SYSTEM LABELING**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**E-03**





## NEW SUPERPOWER CS6K-290|295|300MS

Canadian Solar's new SuperPower modules with **EXCELLENT DATA** significantly improve efficiency and reliability. The innovative technology offers superior Max. Power (Pmax) for 200 W to 300 W. Opt. Operating Voltage (Vmp) of 29.0 V to 29.4 V. Opt. Operating Current (Imp) of 7.25 A to 7.35 A. Open Circuit Voltage (Voc) of 36.2 V to 36.6 V. Short Circuit Current (Isc) of 9.67 A to 9.83 A. Module Efficiency of 17.72% to 18.33%. Operating Temperature of -40°C to +85°C. Max. System Voltage of 1000 V (IEC) or 1000 V (UL). Module Fire Performance of TYPE 1 (UL 1703) or CLASS C (IEC 61730). 11% more power than Class C (IEC 61730). Max. Series Fuse Rating of 15 A. Application Classification of Class A. Power Tolerance of 0 ~ + 5 W.

Excellent performance at low irradiance. Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C, up to 97.5%.

CS6K	290MS	295MS	300MS
Nominal Max. Power (Pmax)	210 W	213 W	216 W
Opt. Operating Voltage (Vmp)	29.0 V	29.2 V	29.4 V
Opt. Operating Current (Imp)	7.25 A	7.30 A	7.35 A
Open Circuit Voltage (Voc)	36.2 V	36.4 V	36.6 V
Short Circuit Current (Isc)	9.67 A	9.75 A	9.83 A

\* Under Nominal Operating Cell Temperature (NOCT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

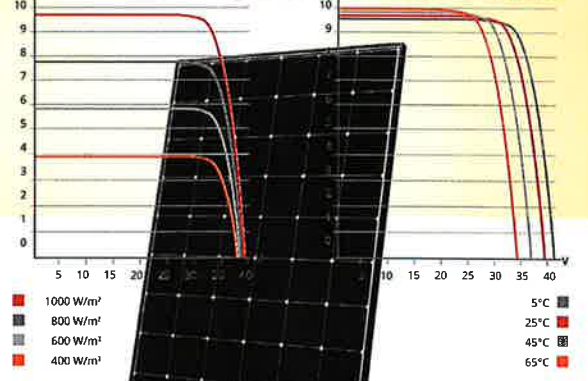
**PERFORMANCE AT LOW IRRADIANCE**  
Excellent performance at low irradiance, with an average relative efficiency of 97.5% from irradiances, between 200 W/m<sup>2</sup> and 1000 W/m<sup>2</sup> (AM 1.5, 25°C), wind load up to 4000 Pa \*

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

Caution: For professional use only. The installation and handling of PV modules requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the modules.

CANADIAN SOLAR (USA), INC.  
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## CS6K-295MS / I-V CURVES CanadianSolar



**MECHANICAL DATA**

Specification	Data
Cell Type	Monocrystalline, 6 inch
Cell Arrangement	60 (6 x 10)
Dimensions	1650 x 992 x 40 mm (65.0 x 39.1 x 1.57 in)
Weight	18.2 kg (40.1 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	anodized aluminium alloy
J-Box	IP67, 3 diodes
Cable	4 mm <sup>2</sup> (IEC) or 4 mm <sup>2</sup> & 12 AWG
Connector	1000 V (UL), 1000 mm (39.4 in)
Per Pallet	26 pieces, 520 kg (1146.4 lbs)
Per Container (40' HQ)	728 pieces

**MANAGEMENT SYSTEM CERTIFICATES\***

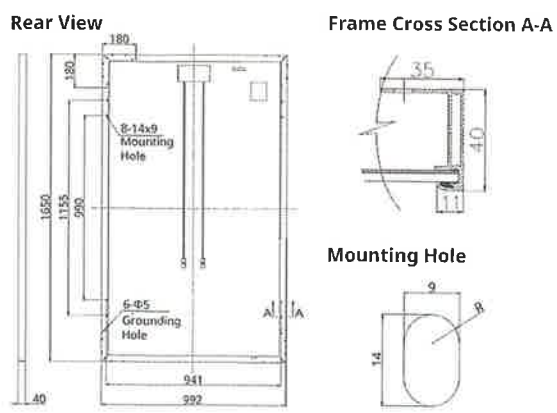
ISO 9001:2008 / Quality management system  
 ISO 14001:2004 / Environmental management system  
 OHSAS 18001 / International standards for occupational health & safety  
 Temp. Coefficient (Pmax) -0.39 % / °C  
 Temp. Coefficient (Voc) -0.30 % / °C  
 Temp. Coefficient (Isc) -0.053 % / °C  
 Normal Operating Cell Temperature (US) / (IEC) 45±2 °C  
 UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE  
 UNI 9177 Reaction to Fire: Class 1  
 IEC 60068-2-68: SGS  
 Take-e-way  
 PARTNER SECTION

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

CANADIAN SOLAR (USA), INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading PV project developer and manufacturer of solar modules with over 17 GW deployed around the world since 2001, Canadian Solar Inc. (NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

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## ENGINEERING DRAWING (mm)



**ELECTRICAL DATA / STC\***

CS6K	290MS	295MS	300MS
Nominal Max. Power (Pmax)	290 W	295 W	300 W
Opt. Operating Voltage (Vmp)	32.1 V	32.3 V	32.5 V
Opt. Operating Current (Imp)	9.05 A	9.14 A	9.24 A
Open Circuit Voltage (Voc)	39.3 V	39.5 V	39.7 V
Short Circuit Current (Isc)	9.67 A	9.75 A	9.83 A
Module Efficiency	17.72%	18.02%	18.33%
Operating Temperature	-40°C ~ +85°C		
Max. System Voltage	1000 V (IEC) or 1000 V (UL)		
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)		
Max. Series Fuse Rating	15 A		
Application Classification	Class A		
Power Tolerance	0 ~ + 5 W		

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C

**ELECTRICAL DATA / NOCT\***

CS6K	290MS	295MS	300MS
Nominal Max. Power (Pmax)	210 W	213 W	216 W
Opt. Operating Voltage (Vmp)	29.0 V	29.2 V	29.4 V
Opt. Operating Current (Imp)	7.25 A	7.30 A	7.35 A
Open Circuit Voltage (Voc)	36.2 V	36.4 V	36.6 V
Short Circuit Current (Isc)	7.74 A	7.83 A	7.92 A

\* Under Nominal Operating Cell Temperature (NOCT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

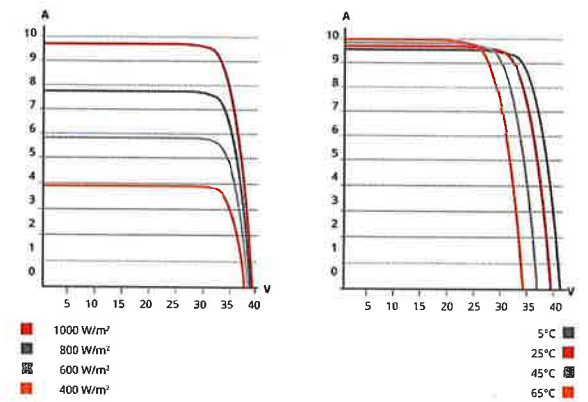
**PERFORMANCE AT LOW IRRADIANCE**  
Excellent performance at low irradiance, with an average relative efficiency of 97.5% from irradiances, between 200 W/m<sup>2</sup> and 1000 W/m<sup>2</sup> (AM 1.5, 25°C).

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

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## CS6K-295MS / I-V CURVES



**MECHANICAL DATA**

Specification	Data
Cell Type	Mono-crystalline, 6 inch
Cell Arrangement	60 (6 x 10)
Dimensions	1650 x 992 x 40 mm (65.0 x 39.1 x 1.57 in)
Weight	18.2 kg (40.1 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
J-Box	IP67, 3 diodes
Cable	4 mm <sup>2</sup> (IEC) or 4 mm <sup>2</sup> & 12 AWG
Connector	1000 V (UL), 1000 mm (39.4 in)
Per Pallet	26 pieces, 520 kg (1146.4 lbs)
Per Container (40' HQ)	728 pieces

**TEMPERATURE CHARACTERISTICS**

Specification	Data
Temp. Coefficient (Pmax)	-0.39 % / °C
Temp. Coefficient (Voc)	-0.30 % / °C
Temp. Coefficient (Isc)	0.053 % / °C
Nominal Operating Cell Temperature	45±2 °C

## PARTNER SECTION



**Castillo Engineering**  
 DESIGNED TO PERMIT™  
 CASTILLO ENGINEERING SERVICES, LLC  
 COA # 28345  
 2925 W. STATE ROAD 434, SUITE 111  
 LONGWOOD, FL 32779  
 TEL: (407) 289-2575  
 ERMOCRATES E. CASTILLO - FL PE 52590

**REVISIONS**

DESCRIPTION	DATE	REV

**PROJECT INSTALLER**  

 SunLight Solar



**WOODS RESIDENCE**  
 JUL 12 2019  
 3042 HOFFNER AVE,  
 BELLE ISLE, FL 32812

SHEET NAME  
**DATA SHEET**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**DS-01**



## Enhanced Solar Electric and Solar Water Heating System



## Enhanced Solar Electric and Solar Water Heating System

### CoolPV® Benefits

Solar PV Module

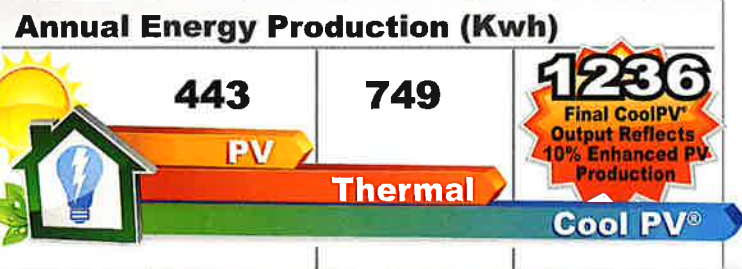
- ✓ Improved PV Electrical Output with Energy to Heat Your Pool
- ✓ Unique Design Provides Unmatched Performance
- ✓ Maximum Energy Output From Available Roof Space



FAFCO



FAFCO® and SolarWorld® combine their industry leading technology to produce the world's best performing solar product.



\*295W module, South-facing roof, typical June Day, Northern CA, constant inlet temp of 77F



By **FAFCO**

www.CoolPVSolar.com

P/N 09629 Rev: C 8/18



By **FAFCO**

www.CoolPVSolar.com

P/N 09629 Rev: C 8/18

### Thermal Specifications

Heat Output	1 kW	3400 btu/hr
Operating Pressure	-35/+35 kPa	-5/+5 psi
Test Pressure	345 kPa	50 psi
Flow Rate (Typical)	5.68 lpm	1.5 gpm

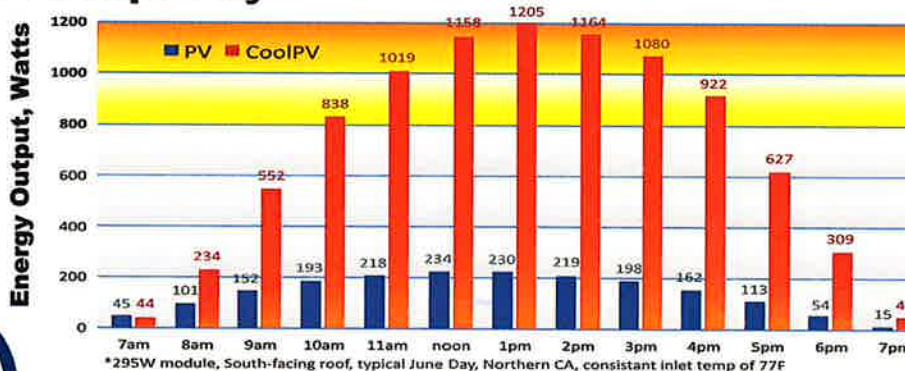
### Mechanical Specifications

Panel Dimensions	1.00 x 1.68 m	39.4 x 66.1 in
Panel Area	1.68 m <sup>2</sup>	18.1 ft <sup>2</sup>
Roof Load (dry)	15.1 kg/m <sup>2</sup>	3.1 psf
Fluid Capacity	3.2 L	0.84 gal
Fluid Connection Type	FAFCO Proprietary	
Electrical Connection Type	Per UL4703 with H4/UTX connectors	



Reviewed for Code Compliance  
Universal Engineering Sciences

### CoolPV Example Day



By **FAFCO**

www.CoolPVSolar.com

P/N 09629 Rev: C 8/18

Castillo Engineering

DESIGNED TO PERMIT™

CASTILLO ENGINEERING SERVICES, LLC  
COA # 28345  
2925 W. STATE ROAD 434, SUITE 111  
LONGWOOD, FL 32779  
TEL: (407) 289-2575  
ERMOCRATES E. CASTILLO - FL PE 62590

#### REVISIONS

DESCRIPTION	DATE	REV

#### PROJECT INSTALLER



WOODS RESIDENCE

3042 HOFFNER AVE,  
BELLE ISLE, FL 32812

SHEET NAME  
DATA SHEET

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
DS-02

## Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate seamlessly with the Enphase IQ Envoy™, Enphase Q Aggregator™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

### Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

### Productive and Reliable

- Optimized for high powered 60-cell and 72-cell\* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

### Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

\* The IQ 7+ Micro is required to support 72-cell modules.



To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)



## Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings <sup>1</sup>	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range <sup>2</sup>	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A	1.15 A	1.21 A	1.39 A
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit <sup>3</sup>	16 (240 VAC) 13 (208 VAC)		13 (240 VAC) 11 (208 VAC)	
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak CEC efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA	IQ 7 Microinverter			
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.  
 2. Nominal voltage range can be extended beyond nominal if required by the utility.  
 3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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 TEL: (407) 289-2575  
 ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER

WOODS RESIDENCE  
 3042 HOFFNER AVE.  
 BELLE ISLE, FL 32812  
 JUL 12 2019

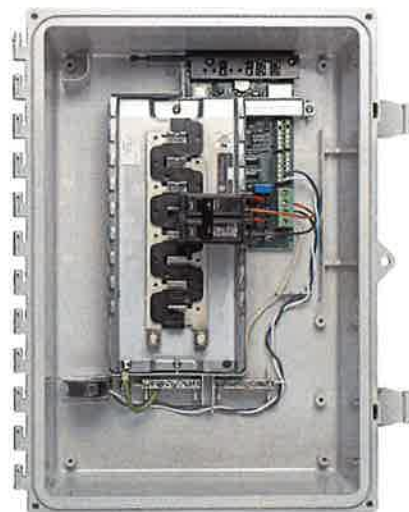
SHEET NAME  
**DATA SHEET**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**DS-03**

## Enphase IQ Combiner 3 (X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



### Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

### Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed



To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)



## Enphase IQ Combiner 3

### MODEL NUMBER

IQ Combiner 3 X-IQ-AM1-240-3

IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional\* consumption monitoring (+/- 2.5%).

### ACCESSORIES and REPLACEMENT PARTS (not included, order separately)

Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3

### ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy

### MECHANICAL DATA

Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"> <li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li> <li>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors</li> <li>• Main lug combined output: 10 to 2/0 AWG copper conductors</li> <li>• Neutral and ground: 14 to 1/0 copper conductors</li> </ul> Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

### INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)

### COMPLIANCE

Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

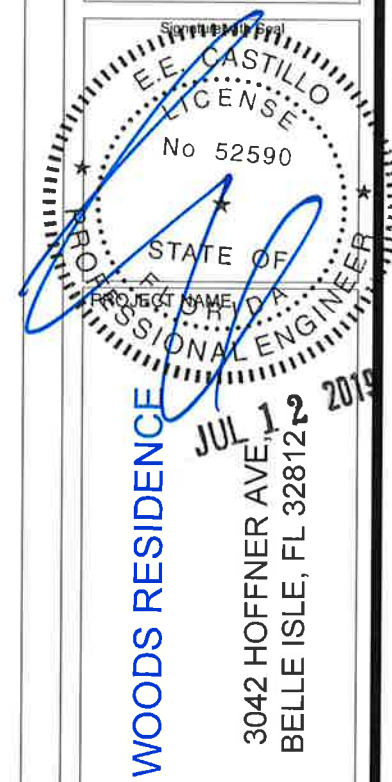
\* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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2018-09-13



REVISIONS		
DESCRIPTION	DATE	REV



SHEET NAME  
**DATA SHEET**

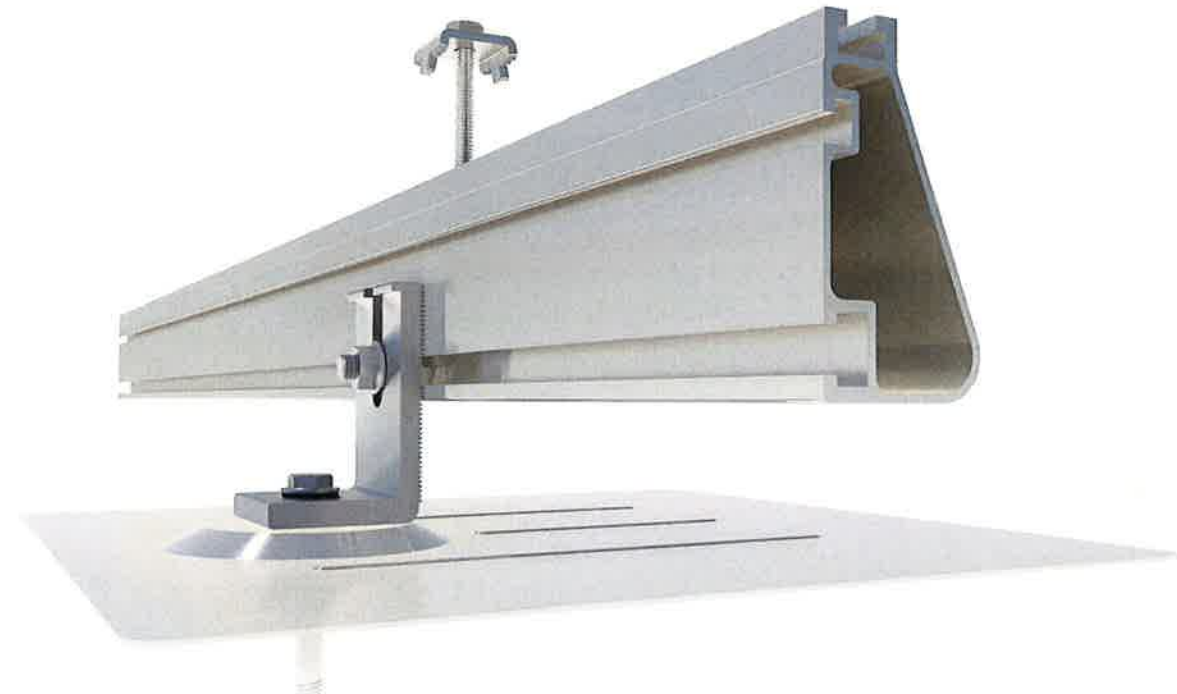
SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**DS-04**



# Roof Mount System

Datasheet



## Built for solar's toughest roofs.

IronRidge builds the strongest roof mounting system in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.



### Strength Tested

All components evaluated for superior structural performance.



### PE Certified

Pre-stamped engineering letters available in most states.



### Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



### Design Software

Online tool generates a complete bill of materials in minutes.



### Integrated Grounding

UL 2703 system eliminates separate module grounding components.



### 20 Year Warranty

Twice the protection offered by competitors.

Datasheet

## XR Rails ☺

### XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish

### XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

### XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

### Bonded Splices



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

## Clamps & Grounding ☺

### UFOs



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

### Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

### Grounding Lugs



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

### Microinverter Kits



Mount MIs or POs to XR Rails.

- Bonds devices to rails
- Kit comes assembled
- Listed to UL 2703

## Attachments ☺

### FlashFoot2



Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

### Slotted L-Feet



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

### Bonding Hardware



Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

### Flush Standoffs



Raise Flush Mount System to various heights.

- Works with vent flashing
- 4" and 7" lengths
- Ships assembled

Reviewed for Code Compliance  
Universal Engineering Sciences

## Resources



### Design Assistant

Go from rough layout to fully engineered system. For free.

Go to [IronRidge.com/design](http://IronRidge.com/design)



### NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

Go to [IronRidge.com/training](http://IronRidge.com/training)

Castillo Engineering

DESIGNED TO PERMIT™

CASTILLO ENGINEERING SERVICES, LLC  
COA # 28345  
2925 W. STATE ROAD 434, SUITE 111  
LONGWOOD, FL 32779  
TEL: (407) 289-2575  
ERMOCRATES E. CASTILLO - FL PE 52590

### REVISIONS

DESCRIPTION	DATE	REV

### PROJECT INSTALLER



WOODS RESIDENCE

JUL 12 2019  
3042 HOFFNER AVE  
BELLE ISLE, FL 32812

SHEET NAME

DATA SHEET

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

DS-05



# ASPHALT SHINGLE ROOF MOUNTS







SolarRoofHook has the most innovative line of Asphalt Shingle Roof Mounts in the industry.

Our QuickBOLT with Microflashing™ is the future of Asphalt Shingle Roof solar mounting. Use the QuickBOLT to save time and money by installing faster, eliminating the need for bulky aluminum flashing, and completing more residential jobs. The installers' liability is also reduced, as Microflashing™ can be installed directly over the shingles and does not require the removal of any nails. Try the QuickBOLT with Microflashing™ today.

We also carry a line of Flashed L-Foot and U-Foot products.



## AVAILABLE ONLINE:

-   
UL Certification
-   
Specs & Test Results
-   
AZ Test Results
-   
Racking Compatibility
-   
Installation Instructions
-   
Videos



### LOW PROFILE QUICKBOLT With 3" Microflashing™ | Fixed Height

-   
Asphalt Shingle
-   
Side Mount
-   
3" Microflashing™
-   
LP Low Profile

PN#	BOX QTY
17664	5.25" Bolts (10)
17666	Bolts + 3" Microflashing™ (10ea.)
17667SS	Bolts + 3" Microflashing™ + SS L-Foot + Nuts (10ea.)

First & only Microflashing™ in the industry  
Stainless Steel L-Foot  
Fastest installation in the industry  
UL Certified



### LOW PROFILE QUICKBOLT With 4" Microflashing™ | Fixed Height

-   
Asphalt Shingle
-   
Side Mount
-   
4" Microflashing™
-   
LP Low Profile

PN#	BOX QTY
17664	5.25" Bolts (10)
17720	Bolts + 4" Microflashing™ (10ea.)
17721SS	Bolts + 4" Microflashing™ + SS L-Foot + Nuts (10ea.)

First & only Microflashing™ in the industry  
Stainless Steel L-Foot  
4" Microflashing™ provides more coverage  
Fastest installation in the industry  
UL Certified



### 7" QUICKBOLT With 3" Microflashing™ | Adjustable

-   
Asphalt Shingle
-   
Side Mount
-   
3" Microflashing™
-   
ADJ Adjustable

PN#	BOX QTY
17670	7" Bolts (10)
17671	Bolts + 3" Microflashing™ (10ea.)
17672SS	Bolts (10) + 3" Microflashing™ (10) + SS L-Foot (10) + Nuts (20)

First & only Microflashing™ in the industry  
Stainless Steel L-Foot  
UL Certified



### 7" QUICKBOLT With 4" Microflashing™ | Adjustable

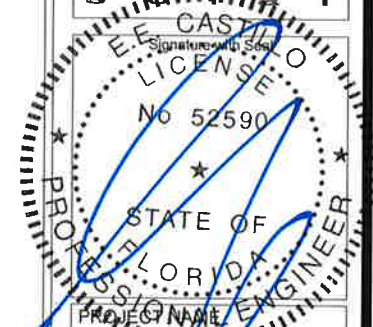
-   
Asphalt Shingle
-   
Side Mount
-   
4" Microflashing™
-   
ADJ Adjustable

PN#	BOX QTY
17670	7" Bolts (10)
17723	Bolts + 4" Microflashing™ (10ea.)
17724SS	Bolts (10) + 4" Microflashing™ (10) + SS L-Foot (10) + Nuts (20)

First & only Microflashing™ in the industry  
Stainless Steel L-Foot  
4" Microflashing™ provides more coverage  
UL Certified

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT INSTALLER



WOODS RESIDENCE

3042 HOFFNER AVE,  
BELLE ISLE, FL 32812

SHEET NAME

**DATA SHEET**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**DS-06**