WYSSLING CONSULTING
CONSTRUCTIVE EXPERIENCE WITH SMALL BUSINESS VALUE

*Scott E. Wyssling, PE*
*Jon P. Ward, SE, PE*
*Gregory T. Elvestad, PE*

*76 North Meadowbrook Drive*
*Alpine, UT 84004*
*office (201) 874-3483*
*swyssling@wysslingconsulting.com*

April 13, 2022

Scott E Wyssling

Digitally signed by Scott E Wyssling
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, CN=Scott E Wyssling + E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2022.04.13 19:37:59-06'00'
Foxit PDF Editor Version: 11.1.0

Fluent Solar, LLC
2578 W 600 N
Lindon, UT 84042

Re: Engineering Services
Little Residence
1507 Micahs Way N, Spring Lake NC
8.030 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

***A. Site Assessment Information***

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.

***B. Description of Structure:***

| | |
|---|---|
| ***Roof Framing:*** | Prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber. |
| ***Roof Material:*** | Composite Asphalt Shingles, Metal Roofing |
| ***Roof Slope:*** | 35 degrees |
| ***Attic Access:*** | Accessible |
| ***Foundation:*** | Permanent |

***C. Loading Criteria Used***

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 10 psf
- **Wind Load** based on ASCE 7-16
  - Ultimate Wind Speed = 119 mph (based on Risk Category II)
  - Exposure Category C

*Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2018 IRC, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.*

### *D. Solar Panel Anchorage*

1. The solar panels shall be mounted in accordance with the most recent Unirac installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a $^{5}/_{16}$" lag screw is 235 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 2½", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using one $^{5}/_{16}$" diameter lag screw with a minimum of 2½" embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 72" on centers.
4. Panel supports connections shall be staggered to distribute load to adjacent framing members.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 2018 IRC, current industry standards, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
North Carolina License No. 46546

Scott E Wyssling

Digitally signed by Scott E Wyssling
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, CN=Scott E Wyssling + E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2022.04.13 19:38:13-06'00'
Foxit PDF Editor Version: 11.1.0

| DC SYSTEM SIZE: | 8.03 KW |
|---|---|

# SCOPE OF WORK:

FLUENT SOLAR INSTALL THE PROPOSED GRID-TIED PHOTOVOLTAIC SYSTEM. FLUENT SOLAR WILL BE RESPONSIBLE FOR COLLECTING THE NEEDED SITE INFORMATION TO DESIGN AND INSTALL THE PROPOSED PHOTOVOLTAIC SYSTEM.

THE PHOTOVOLTAIC SYSTEM INCLUDES:

| |
|---|
| ( 22 ) URE – F6M365E7G-BB (CS-1) |
| ( 1 ) SOLAREDGE – SE6000H-US (CS-2) |
| ( 22 ) SOLAREDGE – S440 (CS-3) |
| |

THE MODULES SHALL BE FLUSH MOUNTED USING

| |
|---|
| APPROX. ( 53 ) QUICKBOLT #16318 MOUNTS |
| ON IRONRIDGE XR-10-168A RAIL |

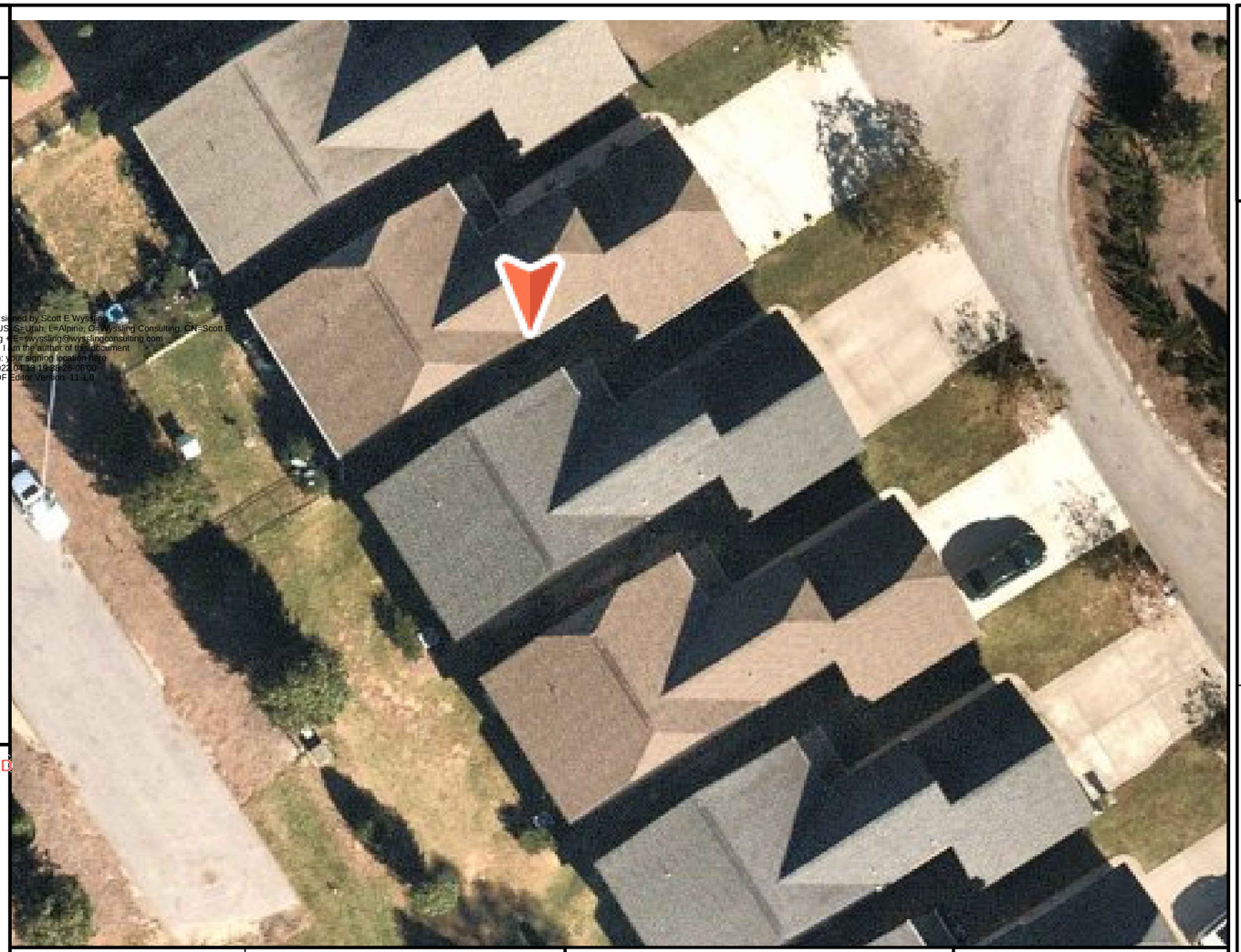
THE PHOTOVOLTAIC SYSTEM SHALL BE INTERCONNECTED BY PERFORMING A PV BREAKER
INTO THE EXISTING 200 A MAIN SERVICE PANEL

INSTALL SHALL INCLUDE:

- MODULE INSTALLATION
- OPTIMIZER INSTALLATION
- INVERTER INSTALLATION
- MOUNTING AND RACKING INSTALLATION
- AC/DC DISCONNECTS
- GROUNDING AND PV GROUNDING ELECTRODE AND BONDING TO EXISTING GEC
- SYSTEM WIRING
- NET METERING (IF NEEDED)
- PV LABELS (THAT ARE APPLICABLE TO PROJECT)

THIS PLAN HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY SCOTT WYSSLING, PE USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

Scott E Wyssling
Digitally signed by Scott E Wyssling
DN: C=US, ST=Utah, L=Alpine, O=Wyssling Consulting, CN=Scott E Wyssling, E=Wyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2022.04.13 19:34:26-06'00'
Foxit PDF Editor Version: 11.1.0



| | |
|---|---|
| ASCE 7-16 WIND SPEED: | 119PSF, EXPOSURE CATEGORY C |
| GROUND SNOW LOAD: | 15 PSF, EXPOSURE CATEGORY C |

## GENERAL NOTES

1. EACH MODULE TO BE GROUNDED USING THE SUPPLIED CONNECTION POINT PER MANUFACTURER'S REQUIREMENTS. ALL SOLAR MODULES, EQUIPMENT, AND METALLIC COMPONENTS ARE TO BE BONDED. IF THE EXISTING GROUNDING ELECTRODE SYSTEM CANNOT BE VERIFIED OR IS ONLY METALLIC WATER PIPING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
2. ALL PLAQUES AND SIGNAGE REQUIRED BY THE ADOPTED NATIONAL ELECTRIC CODE SHALL BE METAL OR PLASTIC, ENGRAVED OR MACHINED IN A CONTRASTING COLOR TO THE PLAQUE/LABEL. ALL PLAQUES/LABELS SHALL BE UV & WEATHER RESISTANT (SEE PV-2).
3. DC CONDUCTORS SHALL BE RUN IN EMT AND/OR MC (METAL CLAD CABLE) AND SHALL BE LABELED A MINIMUM OF EVERY 10' (SEE E2-E2.1)
4. EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.136(A).
5. CONFIRM LINE SIDE VOLTAGE AT ELECTRIC UTILITY SERVICE PRIOR TO CONNECTING INVERTER. VERIFY SERVICE VOLTAGE IS WITHIN INVERTER VOLTAGE OPERATIONAL RANGE.
6. ALL SIGNAGE MUST BE PERMANENTLY ATTACHED AND BE WEATHER/SUNLIGHT RESISTANT AND CANNOT BE HAND-WRITTEN(SEE E2-E2.1)
7. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
8. ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE, AND FOR ROOF-MOUNTED SYSTEMS, WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF OF THE ROOF SURFACE. NEC 110.2 – 110.4 / 300.4
9. ALL PV METERS AND RAPID SHUTDOWNS TO BE WITHIN 5' OF ANOTHER. AC DISCONNECT TO BE WITHIN 10' OF UTILITY METER. PV METER CENTER OF GLASS TO BE AT 5'
10. PV METERS TO BE INSTALLED CORRECTLY, SUPPLIED FROM THE TOP JAWS.
11. ALL ROOF PENETRATIONS MUST BE FLASHED. SIMPLY CAULKING DOES NOT SUFFICE.
12. ALL DC CONDUCTORS RUN INSIDE OF THE STRUCTURE SHALL BE INSTALLED A MINIMUM OF 18" BELOW THE ROOF DECK.
13. ALL WORK SHALL COMPLY WITH THE 2018 IBC AND 2018 IRC
14. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.
15. EQUIPMENT MAY BE SUBSTITUTED FOR SIMILAR EQUIPMENT BASED ON AVAILABILITY. SUBSTITUTED EQUIPMENT SHALL COMPLY WITH DESIGN CRITERIA

STAMPS (IF NEEDED)

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308

Signed 4-13-22

NOTICE TO CONTRACTOR: All construction to comply with current NC Building Codes and is subject to final inspection and verification.
APPROVED
Limited Building only review
Permit holder responsible for full compliance with the code
05/12/2022
Harnett COUNTY NORTH CAROLINA

CONTENTS:



Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

| | |
|---|---|
| CUSTOMER LAST NAME: | LITTLE |
| ADDRESS: | 1507 MICAHS WAY N |
| CITY: | SPRING LAKE |
| STATE: | NC |
| ZIP: | 28390 |
| JURISDICTION: | SPRING LAKE |
| UTILITY COMPANY: | TOUCHSTONE ENERGY |
| SYSTEM SIZE: | 8.03 KW (E-1) |
| | ( 22 ) URE – F6M365E7G-BB (CS-1) |
| | ( 1 ) SOLAREDGE – SE6000H-US (CS-2) |
| | ( 22 ) SOLAREDGE – S440 (CS-3) |
| | ROOF TYPE: COMP SHINGLE (PV-2) |
| | PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) |
| | INTERCONNECTION METHOD: PV BREAKER |

DESIGNED BY: DW

DESIGNED ON
4/13/2022

COVER PAGE

C-1

LEGEND:

UM =UTILITY METER

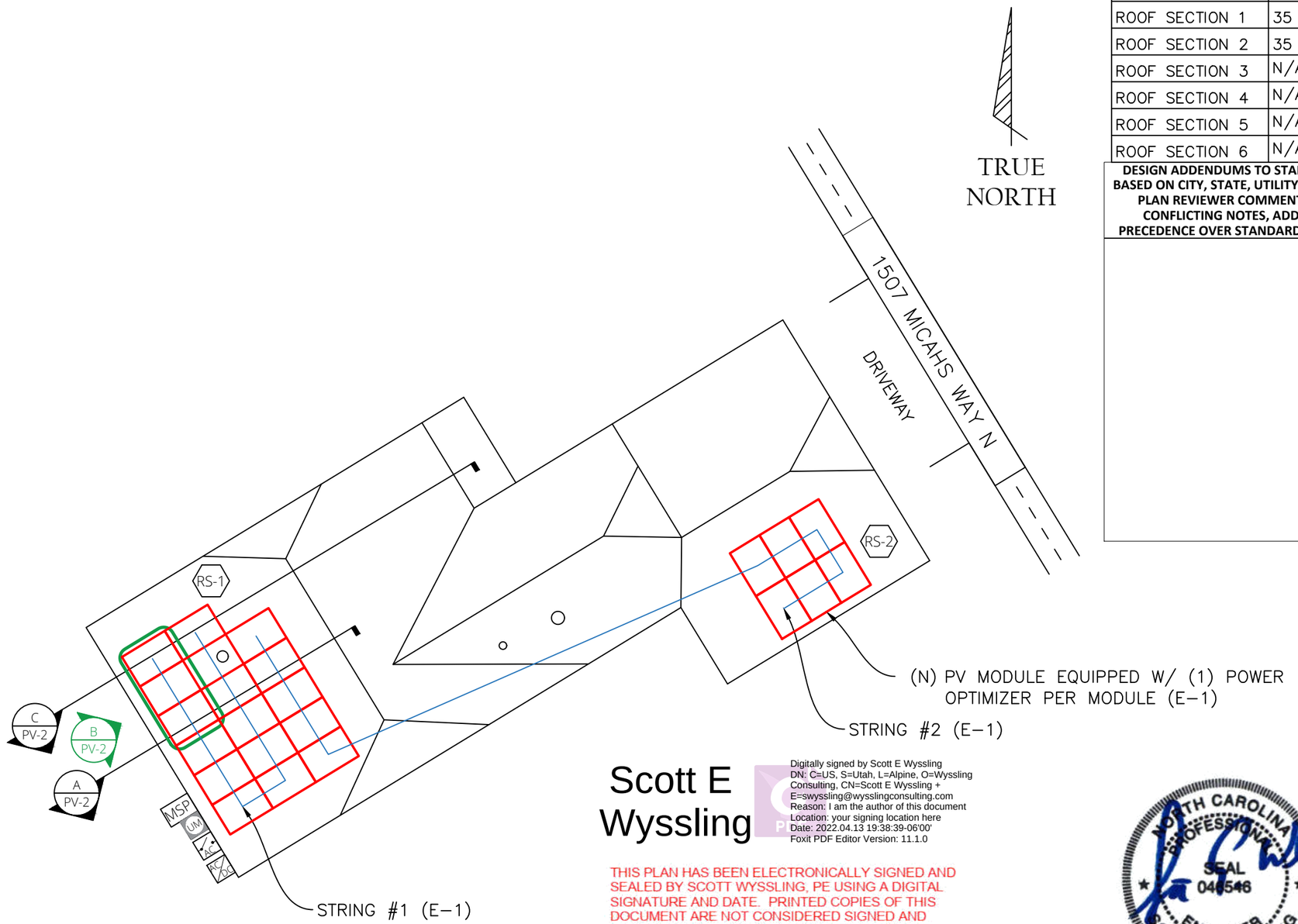
MSP =MAIN SERVICE PANEL

AC =AC DISCONNECT

AC/DC =INVERTER

| | TILT | AZIMUTH |
|---|---|---|
| ROOF SECTION 1 | 35 | 239 |
| ROOF SECTION 2 | 35 | 149 |
| ROOF SECTION 3 | N/A | N/A |
| ROOF SECTION 4 | N/A | N/A |
| ROOF SECTION 5 | N/A | N/A |
| ROOF SECTION 6 | N/A | N/A |

**DESIGN ADDENDUMS TO STANDARD TEMPLATE BASED ON CITY, STATE, UTILITY, AHJ, OR PREVIOUS PLAN REVIEWER COMMENTS IF THERE ARE CONFLICTING NOTES, ADDENDUMS TAKE PRECEDENCE OVER STANDARD TEMPLATE NOTES**




Scott E Wyssling

Digitally signed by Scott E Wyssling
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, CN=Scott E Wyssling + E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2022.04.13 19:38:39-06'00'
Foxit PDF Editor Version: 11.1.0

THIS PLAN HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY SCOTT WYSSLING, PE USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

NORTH CAROLINA PROFESSIONAL SEAL 040546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308

Signed 4-13-22

## SITE PLAN NOTES:

- VERIFY ALL OBSTRUCTIONS IN THE FIELD.
- VERIFY ALL DIMENSIONS IN THE FIELD.
- PROVIDE RAIL SPLICES AS REQUIRED BY MANUFACTURER'S GUIDELINES.
- NO SIGNIFICANT SHADING WILL RESULT FROM EXISTING ROOF OBSTRUCTIONS.
- PV MODULES CANNOT BE INSTALLED OVER OR BLOCK ATTIC VENTS, PLUMBING VENTS, FURNACE OR WATER HEATER VENTS ETC.
- WHERE INDICATED ON PLAN, MIN. DIMENSIONS ARE REQUIRED PER THE "SOLAR PV INSTALLATION GUIDELINE" PUBLISHED BY THE OFFICE OF THE STATE FIRE MARSHAL.
- SCALE $\frac{3}{32}$"=1'
- ALL PV METERS AND RAPID SHUTDOWNS TO BE WITHIN 5' OF ANOTHER. AC DISCONNECT TO BE WITHIN 10' OF UTILITY METER. PV METER CENTER OF GLASS TO BE AT 5'

HATCHED AREA WILL PROVIDE A 3' FIRECODE PATHWAY TO COMPLY WITH IFC 605.11.3.2.1


Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253


SYSTEM SIZE: 8.03 KW (E-1)

( 22 ) URE - F6M365E7G-BB (CS-1)

( 1 ) SOLAREDGE - SE6000H-US (CS-2)

( 22 ) SOLAREDGE - S440 (CS-3)

ROOF TYPE: COMP SHINGLE (PV-2)

PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)

INTERCONNECTION METHOD: PV BREAKER

| | |
|---|---|
| CUSTOMER LAST NAME: | LITTLE |
| ADDRESS: | 1507 MICAHS WAY N |
| CITY: | SPRING LAKE |
| STATE: | NC |
| ZIP: | 28390 |
| JURISDICTION: | SPRING LAKE |
| UTILITY COMPANY: | TOUCHSTONE ENERGY |

DESIGNED BY: DW

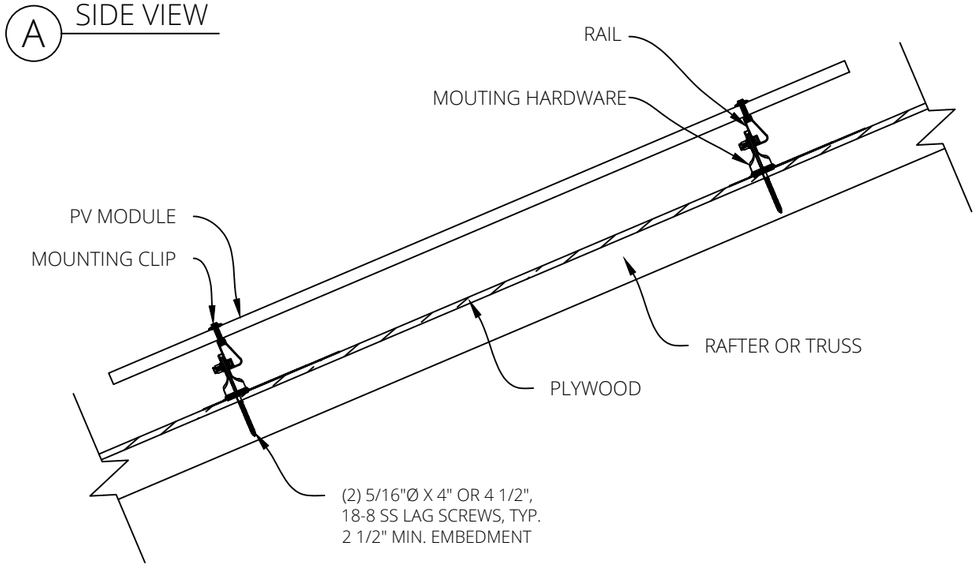
DESIGNED ON

4/13/2022

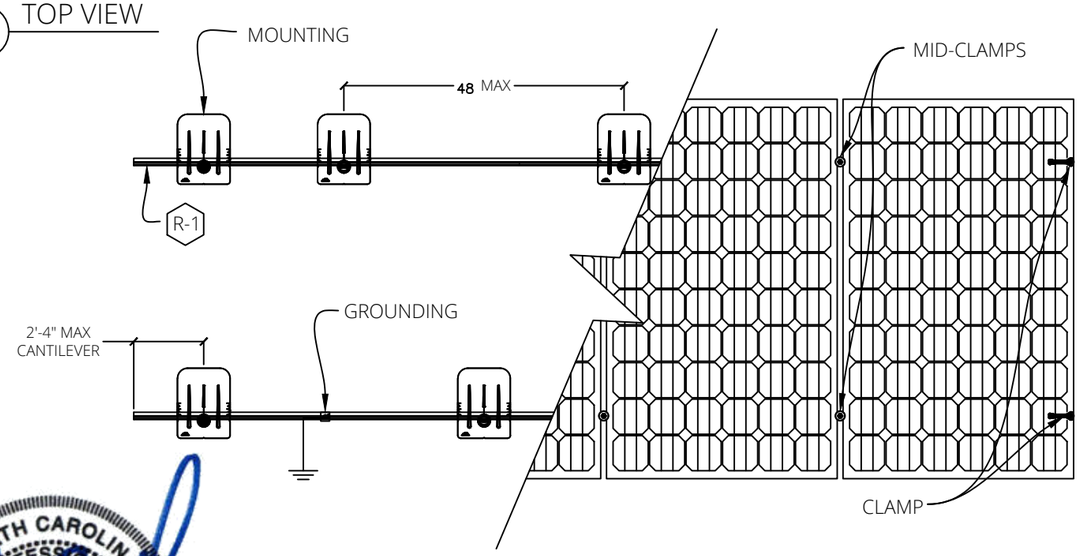
SITE PLAN

PV-1

## A SIDE VIEW

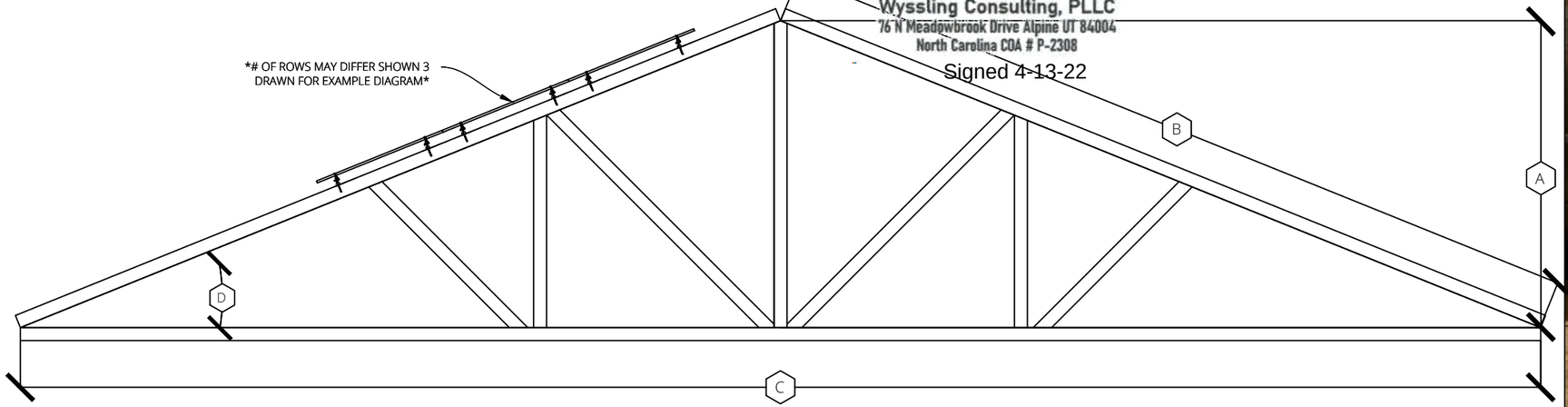



## B TOP VIEW




## C ATTIC INFO

NOT TO SCALE



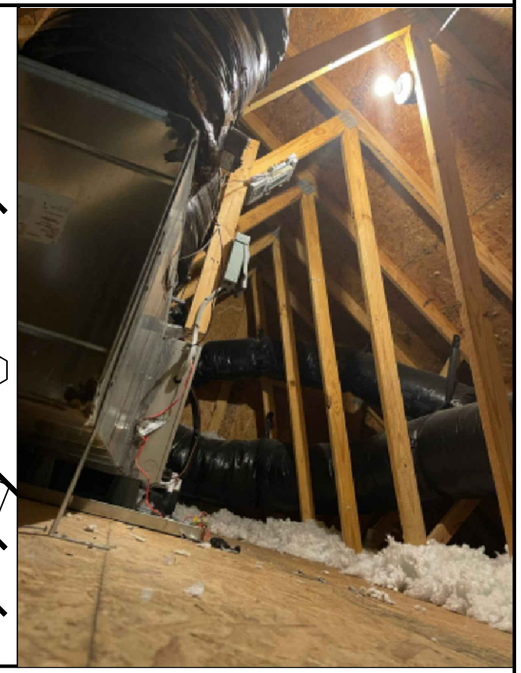

THIS PLAN HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY SCOTT WYSSLING, PE USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

Scott E Wyssling

Digitally signed by Scott E Wyssling
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, CN=Scott E Wyssling + E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2022.04.13 19:38:50-06'00'
Foxit PDF Editor Version: 11.1.0

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 4-13-22



| PREFABRICATED TRUSSES | SIZE: | 2X4 | SPACING: | 24 |
|---|---|---|---|---|

| ROOF INFO IN INCHES & DEGREES | | TAG ID |
|---|---|---|
| ROOF HEIGHT: | 160 | A |
| ROOF FACE SPAN: | 278 | B |
| ROOF LENGTH: | 456 | C |
| ROOF TILT: | 35 | D |

| PV ARRAY STRUCTURAL INFO | | | |
|---|---|---|---|
| TOTAL PV MODULE COUNT: | (TOTAL NUMBER OF MODULES BEING INSTALLED) | 22 | MODULES |
| APPROX. ATTACHMENT POINTS: | (ROUND UP (TOTAL ROWS WIDTH) / (MOUNT SPACING)) +2 | 53 | MOUNTS |
| INDIVIDUAL ARRAY AREA: | (MODULE LENGTH) X (MODULE WIDTH) | 19.88 | FT^2 |
| TOTAL ARRAY AREA: | (INDIVIDUAL ARRAY AREA) X (TOTAL MODULE COUNT) = FT^2 | 437.28 | FT^2 |
| TOTAL ROOF AREA: | (ROOF AREA TOTAL) = FT^2 | 821 | FT^2 |
| % ARRAY/ROOF: | (AREA AREA) / (ROOF AREA) = % | 53.3 | % |
| TOTAL ARRAY WEIGHT: | (TOTAL MODULE COUNT) X (MODULE WEIGHT) = LBS | 950.62 | LBS |
| TOTAL DISTRIBUTED LOAD ON ROOF: | (TOTAL ARRAY WEIGHT) / (ARRAY AREA) = LBS / FT^2 | 2.17 | LBS / FT^2 |
| LOAD ON EACH MOUNT | (TOTAL ARRAY WEIGHT) / (TOTAL NUMBER OF ATTACHMENTS) | 17.94 | LBS / ATTACH. |

## GENERAL STRUCTURAL NOTES:

THE FOLLOWING CALCULATIONS ARE INITIAL CALCULATIONS BASED OFF OF THE SITE SURVEY INFORMATION, AND THE EQUIPMENT CUT SHEETS. REFER TO STRUCTURAL LETTER FOR FINAL CALCULATIONS, SNOW AND WIND SPEEDS


Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253


| | |
|---|---|
| SYSTEM SIZE: | 8.03 KW (E-1) |
| ( 22 ) URE - F6M365E7G-BB (CS-1) | |
| ( 1 ) SOLAREDGE - SE6000H-US (CS-2) | |
| ( 22 ) SOLAREDGE - S440 (CS-3) | |
| ROOF TYPE: | COMP SHINGLE (PV-2) |
| PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) | |
| INTERCONNECTION METHOD: | PV BREAKER |
| CUSTOMER LAST NAME: | LITTLE |
| ADDRESS: | 1507 MICAHS WAY N |
| CITY: | SPRING LAKE |
| STATE: | NC |
| ZIP: | 28390 |
| JURISDICTION: | SPRING LAKE |
| UTILITY COMPANY: | TOUCHSTONE ENERGY |

DESIGNED BY: DW

DESIGNED ON 4/13/2022

ROOF INFO

PV-2


Fluent
SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

| | |
|---|---|
| SYSTEM SIZE: 8.03 KW (E-1) | |
| ( 22 ) URE - F6M365E7G-BB (CS-1) | |
| ( 1 ) SOLAREDGE - SE6000H-US (CS-2) | |
| ( 22 ) SOLAREDGE - S440 (CS-3) | |
| ROOF TYPE: COMP SHINGLE (PV-2) | |
| PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) | |
| INTERCONNECTION METHOD: PV BREAKER | |
| CUSTOMER LAST NAME: LITTLE | |
| ADDRESS: 1507 MICAHS WAY N | |
| CITY: SPRING LAKE | |
| STATE: NC | |
| ZIP: 28390 | |
| JURISDICTION: SPRING LAKE | |
| UTILITY COMPANY: TOUCHSTONE ENERGY | |

DESIGNED BY: DW

DESIGNED ON

4/13/2022

SITE PHOTOS

PV-3

## CONDUCTOR SCHEDULE

| | CONDUCTORS | | | | GROUND | | | CONDUIT |
|---|---|---|---|---|---|---|---|---|
| TAG ID | WIRES IN CONDUIT | WIRE AWG | TYPE, MATERIAL | WIRE 90°C (194°F) AMPERAGE RATING TABLE 310.15 (B)(16) | SIZE | RATING TABLE 250.122 | TYPE, MATERIAL | |
| A | 5 | #10 AWG | PV CABLE, CU | 40 | #6 AWG | 100 | BARE, CU | 3/4" EMT |
| B | 5 | #10 AWG | THWN-2, CU | 40 | #10 AWG | 20 | THWN-2, CU | 3/4" EMT |
| C | 4 | #8 AWG | THWN-2, CU | 55 | #8 AWG | 60 | THWN-2, CU | 3/4" EMT |
| D | 4 | #6 AWG | THWN-2, CU | 75 | #8 AWG | 60 | THWN-2, CU | 3/4" EMT |

* TAG D ONLY IF APPLICABLE *

| AC DISCONNECT SIZE: | ENCLOSURE TYPE: | SPECIAL NOTES: |
|---|---|---|
| 60A NON-FUSED | NEMA 3R | |

| ELECTRICAL EQUIPMENT | | | |
|---|---|---|---|
| EE-1 | EXISTING | 200A | BUS BAR RATING |
| EE-2 | EXISTING | 200A | RATED FEED THRU LUGS |
| EE-3 | NEW | 40A | PV BREAKER |
| EE-4 | | | |
| EE-5 | | | |

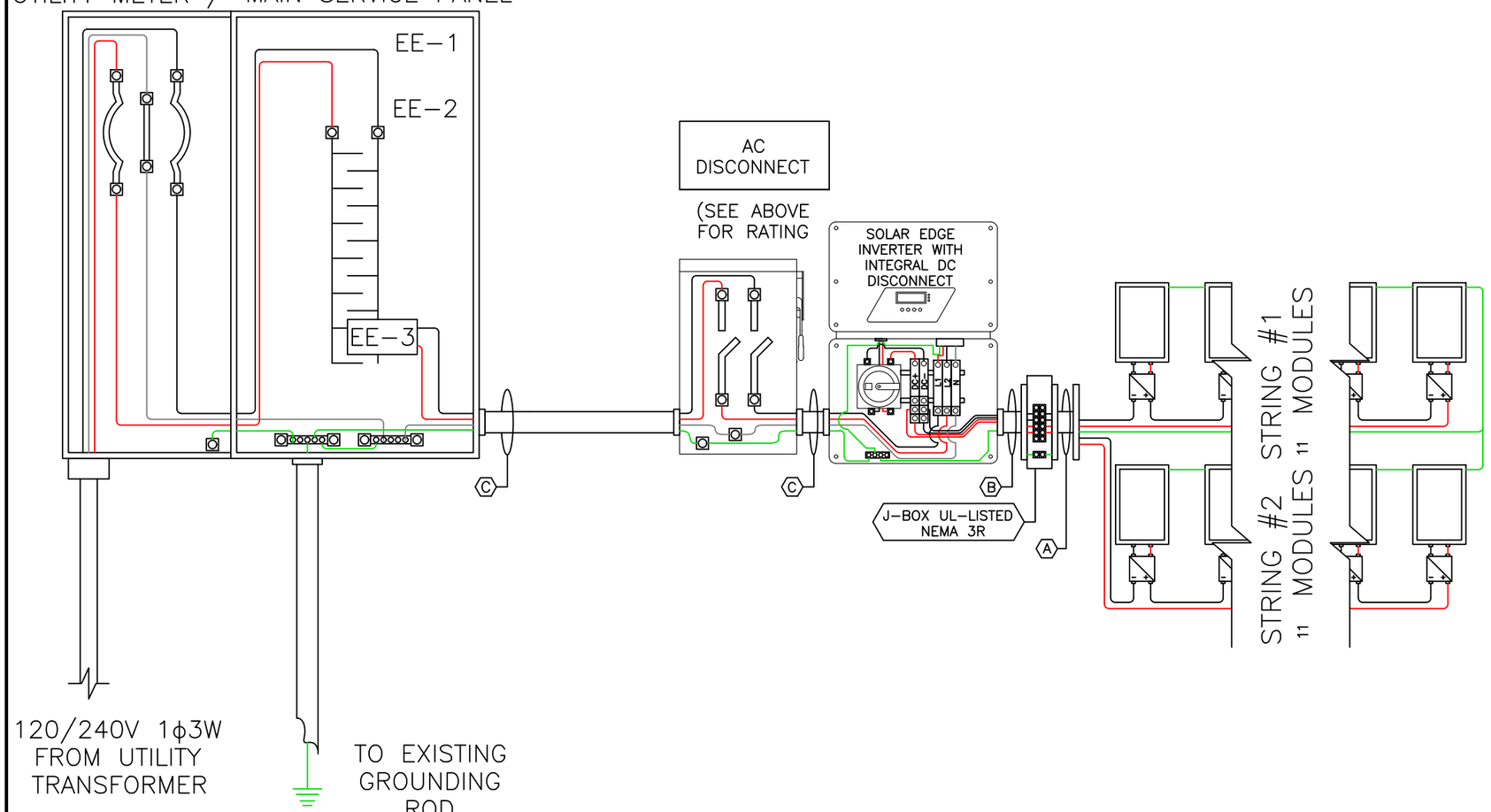
PRODUCTION METER:

NO PM REQUIRED

NO MAIN BREAKER REQUIRED NEC 230.71 6 OR LESS HANDLED DISCONNECTS

ALL PV METERS (IF REQUIRED) AND RAPID SHUTDOWNS TO BE WITHIN 5' OF ANOTHER

AC DISCONNECT TO BE WITHIN 10' OF UTILITY METER




**DESIGN ADDENDUMS TO STANDARD TEMPLATE BASED ON CITY, STATE, UTILITY, AHJ, OR PREVIOUS PLAN REVIEWER COMMENTS IF THERE ARE CONFLICTING NOTES, ADDENDUMS TAKE PRECEDENCE OVER STANDARD TEMPLATE NOTES**

INSTALLATION NOTES:

LAND PV BREAKER IN MSP LOCATED IN THE FURTHEST POSITION FROM THE MAIN FEEDER LUGS TOTAL AMPERAGE OF BREAKERS SHALL NOT EXCEED 120% OF BUSBAR RATING


Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253


SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

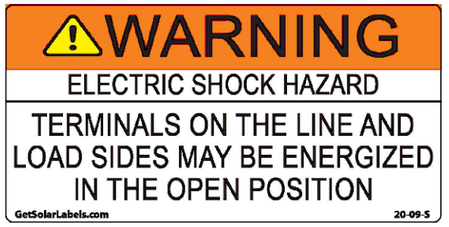
CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

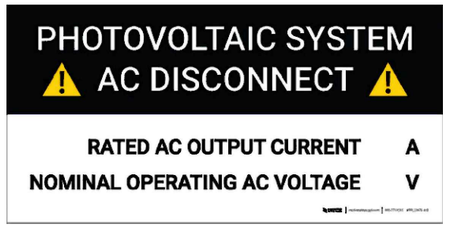
3-LINE DIAGRAM

E-1


LABEL 1
AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT, AND DEVICE WHERE ENERGIZED UNGROUNDED CONDUCTORS MAY BE EXPOSED DURING SERVICE. NEC. 690.35(F)

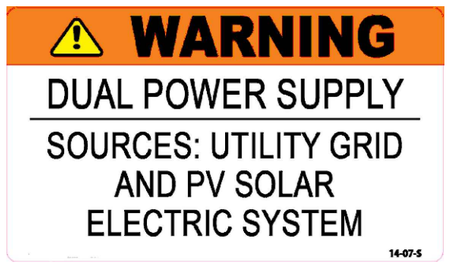



LABEL 2
FOR PV DISCONNECTING MEANS WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION.
NEC 690.17(E), NEC 705.22




LABEL 3
AT POINT OF INTERCONNECTION, MARKED AT AC DISCONNECTING MEANS.
NEC 690.54, NEC 690.13 (B)

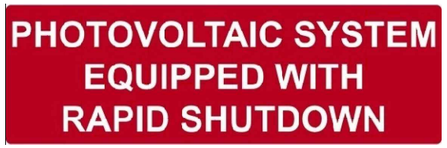
*FOR VALUES SEE ELECTRICAL CALCS PAGE, VALUES TO BE PRINTED AND NOT HAND WRITTEN*




LABEL 4
AT POINT OF INTERCONNECTION FOR EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUSBAR OR CONDUCTOR SUPPLIED FORM MULTIPLE SOURCES, EACH
SERVICE EQUIPMENT AND ALL ELECTRIC POWER PRODUCTION SOURCE LOCATIONS.
NEC 705.12(D)(3)

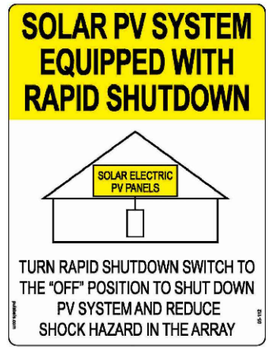

LABEL 5
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.
NEC 690.31(G)(3&4)


LABEL 6
PLACED ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER IF TIE IN CONSISTS OF LOAD SIDE CONNECTION TO BUSBAR.
NEC 705.12(D)(2)(3)(B)

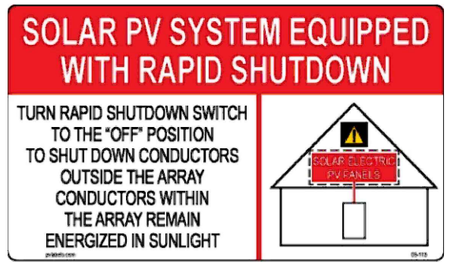



LABEL 7
SIGN LOCATED AT UTILITY SERVICE EQUIPMENT.
NEC 690.56(C)

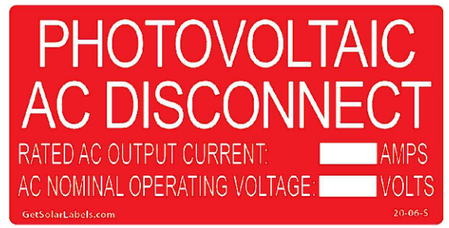

LABEL 8
(ONLY IF 3 OR MORE SUPPLY SOURCES TO A BUSBAR)
SIGN LOCATED AT LOAD CENTER IF CONTAINS 3 OR MORE POWER SOURCES. NEC 705.12(D)(2)(3)(C)




LABEL 9
FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS LEAVING THE ARRAY: SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.
[NEC 690.56(C)(1)(A)]




LABEL 10
FOR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY: SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.
[NEC 690.56(C)(1)(B)]




LABEL 11
A PERMANENT LABEL FOR THE DC PV POWER SOURCE INDICATING THE INFORMATION SPECIFIED IN (1) THROUGH (3) SHALL BE PROVIDED BY INSTALLER AT DC PV SYSTEM DISCONNECTING MEANS AND AT EACH DC EQUIPMENT DISCONNECTING MEANS REQUIRED BY 690.15. WHERE A DISCONNECTING MEANS HAS MORE THAN ONE DC PV POWER SOURCE, THE VALUES IN 690.53(1) THROUGH (3) SHALL BE SPECIFIED FOR EACH SOURCE.

*FOR VALUES SEE ELECTRICAL CALCS PAGE, VALUES TO BE PRINTED AND NOT HAND WRITTEN*


LABEL 12
A RAPID SHUTDOWN SWITCH SHALL HAVE A LABEL LOCATED ON OR NO MORE THAN 1M (3FT) FROM THE SWITCH THAT INCLUDES THE FOLLOWING WORDING "RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM" THE LABEL SHALL BE REFLECTIVE WITH ALL LETTERS CAPITALIZED AND HAVING A MINIMUM HEIGHT OF 9.5MM (⅜ IN.), IN WHITE ON RED BACKGROUND)

Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

| | |
|---|---|
| SYSTEM SIZE: 8.03 KW (E-1) | |
| ( 22 ) URE - F6M365E7G-BB (CS-1) | |
| ( 1 ) SOLAREDGE - SE6000H-US (CS-2) | |
| ( 22 ) SOLAREDGE - S440 (CS-3) | |
| ROOF TYPE: COMP SHINGLE (PV-2) | |
| PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) | |
| INTERCONNECTION METHOD: PV BREAKER | |
| CUSTOMER LAST NAME: LITTLE | |
| ADDRESS: 1507 MICAHS WAY N | |
| CITY: SPRING LAKE | |
| STATE: NC | |
| ZIP: 28390 | |
| JURISDICTION: SPRING LAKE | |
| UTILITY COMPANY: TOUCHSTONE ENERGY | |

DESIGNED BY: DW

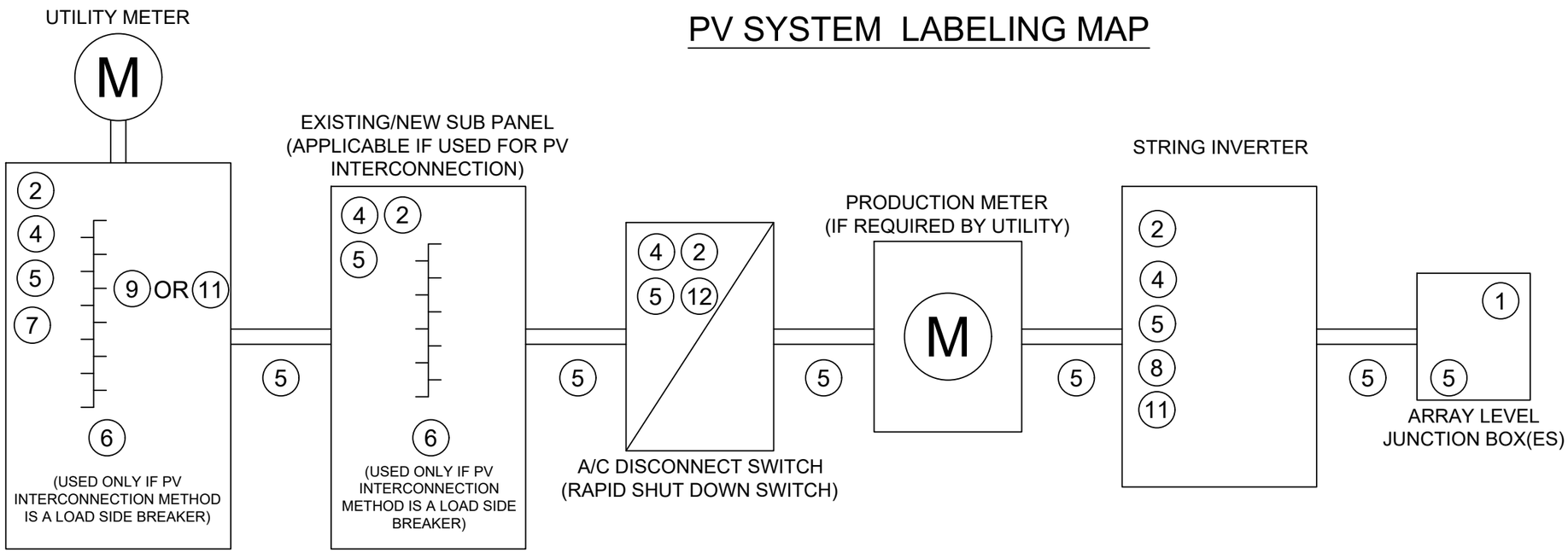
DESIGNED ON

4/13/2022

LABELS

E-2

# PV SYSTEM LABELING MAP




* DIRECTORY PLACARD REQUIRED BY NEC 705.10, TO BE PLACED ON THE MAIN SERVICE PANEL COVER (SHOWN AS LABEL "DP"). SEE DIRECTORY PLACARD ATTACHED TO PLANSET FOR REFERENCE.

LABELING NOTES:

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS IN ADOPTED NATIONAL ELECTRIC CODE (SEE C-1). ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER DESIGN CONFIGURATION, CURRENT, NEC, AND LOCAL CODES.

2. LABELING REQUIREMENTS BASED ON THE ADOPTED NATIONAL ELECTRIC CODE (SEE C-1), OSHA STANDARD 19010.145, ANSI Z535.

3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21] THEY SHALL BE PERMANENTLY ATTACHED, WEATHER/SUNLIGHT RESISTANT, AND WILL NOT BE HAND WRITTEN NEC 11.21(B)

5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

6. FOR LOCATION OF LABEL SEE CODE REFERENCED NEXT TO LABEL FOR.


Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253


| | |
|---|---|
| SYSTEM SIZE: 8.03 KW (E-1) | |
| ( 22 ) URE - F6M365E7G-BB (CS-1) | |
| ( 1 ) SOLAREDGE - SE6000H-US (CS-2) | |
| ( 22 ) SOLAREDGE - S440 (CS-3) | |
| ROOF TYPE: COMP SHINGLE (PV-2) | |
| PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) | |
| INTERCONNECTION METHOD: PV BREAKER | |
| CUSTOMER LAST NAME: | LITTLE |
| ADDRESS: | 1507 MICAHS WAY N |
| CITY: | SPRING LAKE |
| STATE: | NC |
| ZIP: | 28390 |
| JURISDICTION: | SPRING LAKE |
| UTILITY COMPANY: | TOUCHSTONE ENERGY |

DESIGNED BY: DW

DESIGNED ON

4/13/2022

LABELS

E-2.1

## SYSTEM SIZE

| | |
|---|---|
| AC SYSTEM SIZE: | 6 KW |
| DC SYSTEM SIZE: | 8.03 KW |

## LABEL VALUES

| | |
|---|---|
| AC OPERATING CURRENT = | 25A |
| AC OPERATING VOLTAGE = | 240V |
| MAX CIRCUIT CURRENT AMPS = | 27.5A |
| DC MAXIMUM VOLTAGE = | 60V |

## INTERCONNECTION CALCULATIONS

| ITEM | UNIT | PANEL |
|---|---|---|
| BUS RATING | AMPS | 200A |
| MAIN OCPD | AMPS | 200A |
| ALLOWED PV PER NEC | AMPS | 40A |

## CONDUCTOR CALCULATIONS

| TAG A ELECTRICAL CALCS (SEE E-1) |
|---|
| UNDER MODULES, NOT IN CONDUIT |
| #10 AWG MAX CURRENT= 40A |
| 40A * .96= 38.4A |
| |
| SOLAREDGE SE6000H-US MAX CIRCUIT CURRENT |
| 16.73A FOR STRING 1 |
| 16.73A FOR STRING 2 |
| |
| |
| |
| |

| TAG B ELECTRICAL CALCS (SEE E-1) |
|---|
| #10 AWG MAX CURRENT = 40A |
| 40A * .96 = 38.4A (ASHRAE 2% AVERAGE HIGH =32° C) |
| |
| 38.4A PER CONDUCTOR |
| SOLAREDGE SE6000H-US MAX CIRCUIT CURRENT |
| 16.73A FOR STRING 1 |
| 16.73A FOR STRING 2 |
| |
| |
| |
| |

| TAG C ELECTRICAL CALCS (SEE E-1) |
|---|
| #8 AWG MAX CURRENT = 55A |
| 55A * .96 = 52.8A (ASHRAE 2% AVERAGE HIGH =32° C) |
| |
| 52.8A PER CONDUCTOR |
| SOLAREDGE SE6000H-US MAX CIRCUIT CURRENT |
| 16.73A FOR STRING 1 |
| 16.73A FOR STRING 2 |
| |
| |
| |
| |

| CONDUCTOR NOTES | J-BOX NOTE |
|---|---|
| TAG A= SOLAREDGE MC CABLE WILL RUN THROUGH ATTIC WHERE POSSIBLE | MULTIPLE J-BOXES MAY BE USED AND WILL BE DETERMINED AT INSTALL ONLY ONE SHOWN FOR CLARITY OF DESIGN |

| TAG D (IF APPLICABLE) ELECTRICAL CALCS (SEE E-1) |
|---|
| #6 AWG MAX CURRENT = 75A |
| 75A * .96 = 72A (ASHRAE 2% AVERAGE HIGH =32° C) |
| |
| 72A PER CONDUCTOR |
| SOLAREDGE SE6000H-US MAX OUTPUT =25A |
| 25A * 1.25 (SAFETY FACTOR) = 31.25A |
| SOLAREDGE RECCOMENDED OCPD= 40A |

| DESIGN CRITERIA AND CALCULATIONS BASED UPON: |
|---|
| NEC TABLE CEC/NEC 310.15(B)(16) 90° C (194° F) |
| ASHRAE 2% AVERAGE HIGH =32° C |
| NEC TABLE 310.15(B)(2)(a) 90° C DERATE FACTOR = .96 |

## EQUIPMENT INFO

### MODULE

| | | |
|---|---|---|
| MANUFACTURER | URE | |
| MODEL | F6M365E7G-BB | |
| PMAX | 365 | W |
| VOC | 40.7 | V |
| VMP | 39.5 | V |
| IMP | 9.13 | A |
| ISC | 11.43 | A |
| TEMPERATURE COEFFICENT OF PMAX | -0.35 | %/°C |
| TEMPERATURE COEFFICENT OF VOC | -0.27 | %/°C |

### INVERTER / MICRO-INVERTER

| | |
|---|---|
| # OF INVERTERS | 1 |
| MANUFACTURER | SOLAREDGE |
| MODEL | SE6000H-US |
| MAX AC OUTPUT | 25A |
| AC OUTPUT VOLTAGE | 240V |
| MAX DC INPUT VOLTAGE | 240V |
| NOMINAL DC INPUT VOLTAGE | 380V |
| MAX INPUT CURRENT | 16.5A |
| MAX OUTPUT CURRENT | 25A |
| WEIGHTED CEC EFFICIENCY | 99% |
| MIN AC CONDUCTOR SIZE | #8 AWG |
| MIN AC GROUND SIZE | #8 AWG |
| PV BREAKER | 40A |
| INVERTER WATTAGE | 6000W |

### OPTIMIZER / COMBINER PANEL

| | | |
|---|---|---|
| MANUFACTURER | SOLAREDGE | |
| MODEL | S440 | |
| MAX. INPUT POWER | 440 | W |
| MAX. VOC | 60 | V |
| OUTPUT CURRENT | 15 | A |
| OUTPUT VOLTAGE | 60 | V |
| MIN. STRING LENGTH | 8 | |
| MAX. STRING LENGTH | 15 | |
| MAX. STRING POWER | 14.5 | |

### BATTERY INFO (IF APPLICABLE)

| BATTERY INFO | |
|---|---|
| MANUFACTURER | |
| PART NUMBER | NO BATTERY |
| TOTAL ENERGY (kWh) | |
| USABLE ENERGY (kWh) | |
| CAPACITY (Ah) | |
| NOMINAL VOLTAGE (V) | |
| VOLTAGE RANGE (V) | |
| MAX POWER (kW) | |
| WEIGHT | |

Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

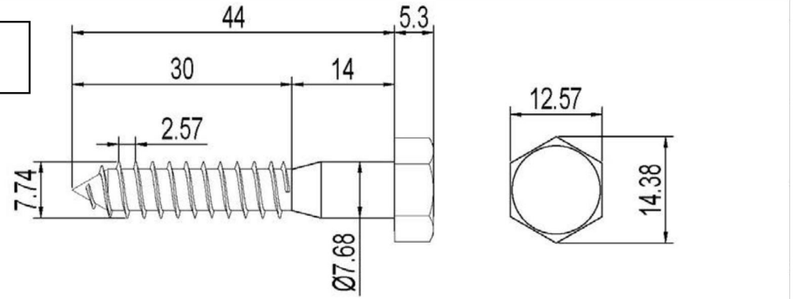
CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

ELECTRICAL CALCS AND EQUIPMENT INFO

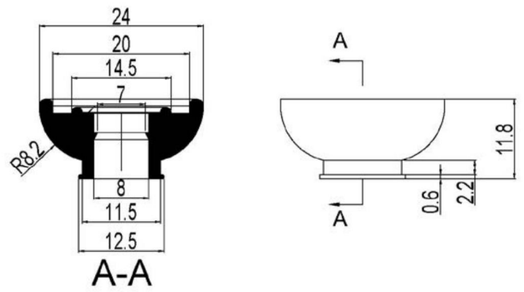
E-3

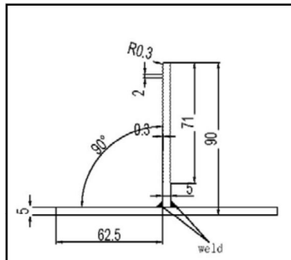
PN# 16318
Screws

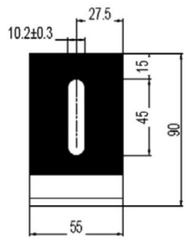


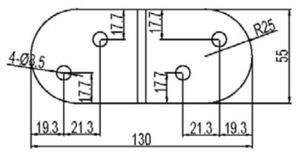

| Tolerance Range | | | | | | |
|---|---|---|---|---|---|---|
| Baiting tolerance | ±2 mm | | QuickBOLT | | | |
| Hole tolerance | ±0.3 mm | | | | | |
| Hole distance tolerance | ±0.5 mm | Design | | | Scale | Quantity |
| Form tolerance | ±2 mm | Drawing | | | Material | SUS304 |
| Thicknessness tolerance | ±0.1 mm | Confirm | | | Drawing No. | |
| Angle tolerance | ±1° mm | Verify | | | Finish | |

PN# 16318
Umbrella Washer



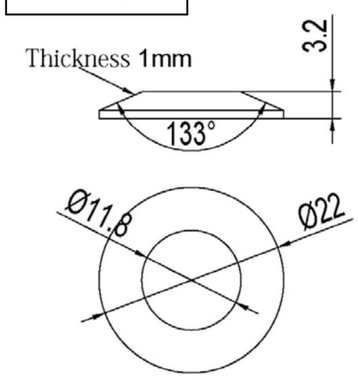




PN# 16318
Black T-Foot

PN# 16318
Silicone backing






5830 Las Positas Road, Livermore CA 94551 | 3948 Airway Drive, Rock Hill SC 29732
Phone: (844) 671-6045 | Fax: (800) 689-7975 | www.quickbolt.com
QuickBOLT is a division of Quickscrews International Corp.

# INSTALL INSTRUCTIONS







## BLACK DECK MOUNT (16318)

## RECOMMENDED MATERIALS

- MFG approved sealant
- 1/2" Nut Setter

## INSTALLATION INSTRUCTIONS

1. Install anywhere on roof. No need to locate rafters
2. Place sealant around the bottom of the T-Foot
3. Place the T-Foot onto the roof
4. Insert first 5/16" x 1-3/4" Hex Lags into T-Foot
5. Drive the screw until the Umbrella Washer is compressed
6. Repeat with remaining screws

* Do not predrill

* To Drive Screws and Set Umbrella Washers Properly Torque PSI should not Exceed 57 Lbs/Inch



5830 Las Positas Road, Livermore CA 94551 | 3948 Airway Drive, Rock Hill SC 29732
Phone: (844) 671-6045 | Fax: (800) 689-7975 | www.quickbolt.com
QuickBOLT is a division of Quickscrews International Corp.

Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

MOUNT

M-1

# UL CERTIFICATION

## CERTIFICATE OF COMPLIANCE

**Certificate Number** 20191115-E493748
**Report Reference** E493748-20170817
**Issue Date** 2019-NOVEMBER-15

**Issued to:** QUICKBOLT A DIVISION OF QUICKSCREWS INTERNATIONAL CORP
5830 Las Positas Rd
Livermore, CA 94551

**This is to certify that representative samples of** COMPONENT - MOUNTING SYSTEMS, MOUNTING DEVICES, CLAMPING DEVICES AND GROUND LUGS FOR USE WITH PHOTOVOLTAIC MODULES AND PANELS
(See Adendum for Additional Information.)

Have been investigated by UL in accordance with the component requirements in the Standard(s) indicated on this Certificate. UL Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for installation in complete equipment submitted for investigation to UL LLC.

**Standard(s) for Safety:** UL 2703 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels.

**Additional Information:** See the UL Online Certifications Directory at www.ul.com/database for additional information

This *Certificate of Compliance* does not provide authorization to apply the UL Recognized Component Mark.

Only those products bearing the UL Recognized Component Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Recognized Component Mark on the product.

Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

Page 1 of 2



5830 Las Positas Road, Livermore CA 94551 | 3948 Airway Drive, Rock Hill SC 29732
Phone: (844) 671-6045 | Fax: (800) 689-7975 | www.quickbolt.com
QuickBOLT is a division of Quickscrews International Corp.

## CERTIFICATE OF COMPLIANCE

**Certificate Number** 20191115-E493748
**Report Reference** E493748-20170817
**Issue Date** 2019-NOVEMBER-15

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

**Addendum -**

**Models/Product**

USR – Component, Roof Mounting Hook Units, Models 15891 15893 15987 16000 16317 16318 16988 16990 16991 16993 17508 17509 17510 17511 17512 17513 17514 17515 17516 17517 17518 17519 17520 17521 17522 17523 17524 17525 17526 17527 17536 17537 17538 17539 17540 17541 17542 17543 17544 17545 17546 17547 17548 17549 17550 17551 17552 17553 17554 17555 17556 17558 17559 17560 17568 17569 17570 17571 17572 17573 17574 17575 17576 17577 17578 17579 17580 17585 17586 17587 17588 17589 17592 17596 17600 17601 17606 17607 17608 17609 17610 17611 17612 17613 17614 17615 17616 17617 17618 17620 17621 17622 17623 17624 17625 17626 17627 17628 17629 17630 17631 17632 17633 17636 17637 17638 17639 17642 17643 17646 17647 17648 17649 17650 17651 17659 17664 17667 17669 17670 17671 17672 17673 17678 17679 17680 17681 17686 17687 17688 17689 17700 17701 17702 17703 17704 17705 17706 17707 17708 17709 17710 17711 17712 17717 17718 17759 15891-10 15891BLK-10 15987A 15987B 17667SS 17672SS 17680SS 17688SS 17713SS 17720 17721SS 17723 17724SS 17726 17727SS 17729 17730SS 15894SS 15891SS 15987BSS 17660 17661 17662 17663

Ratings: Overcurrent Protection Rating – 25 Amps

Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

Page 2 of 2



5830 Las Positas Road, Livermore CA 94551 | 3948 Airway Drive, Rock Hill SC 29732
Phone: (844) 671-6045 | Fax: (800) 689-7975 | www.quickbolt.com
QuickBOLT is a division of Quickscrews International Corp.

Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

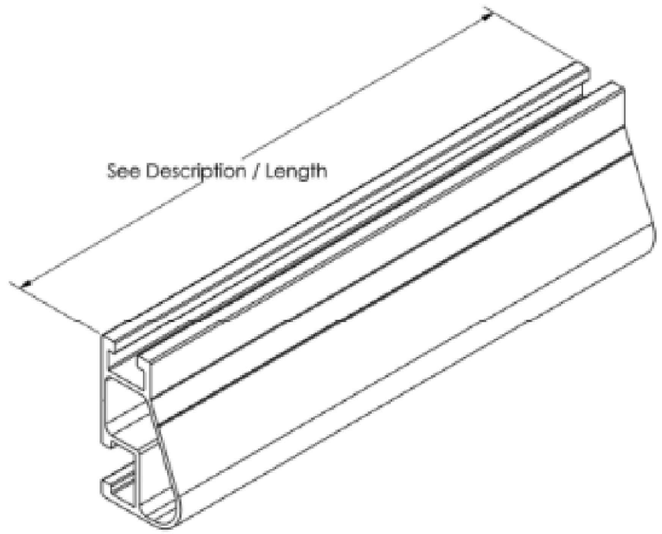
MOUNT CONT.

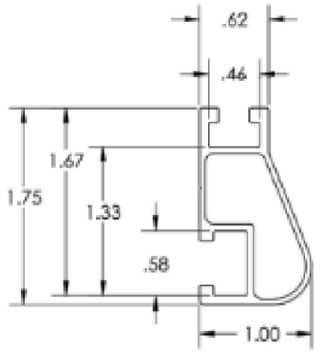
M-2

Cut Sheet

IRONRIDGE

# XR10 Rail




| Rail Section Properties | |
|---|---|
| Property | Value |
| Total Cross-Sectional Area | 0.363 $in^2$ |
| Section Modulus (X-axis) | 0.136 $in^3$ |
| Moment of Inertia (X-axis) | 0.124 $in^4$ |
| Moment of Inertia (Y-axis) | 0.032 $in^4$ |
| Torsional Constant | 0.076 $in^3$ |
| Polar Moment of Inertia | 0.033 $in^4$ |

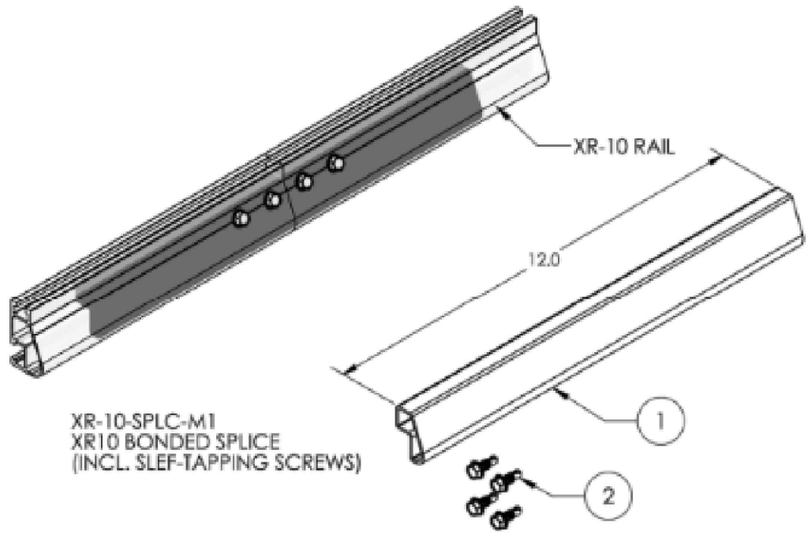
| Clear Part Number | Black Part Number | Description / Length | Material | Weight |
|---|---|---|---|---|
| XR-10-132A | XR-10-132B | XR10, Rail 132" (11 Feet) | 6000-Series Aluminum | 4.67 lbs. |
| XR-10-168A | XR-10-168B | XR10, Rail 168" (14 Feet) | | 5.95 lbs. |
| XR-10-204A | XR-10-204B | XR10, Rail 204" (17 Feet) | | 7.22 lbs. |

v1.0

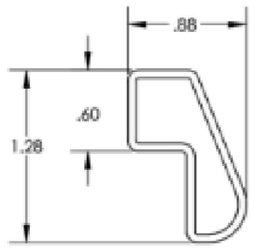
Cut Sheet

IRONRIDGE

# XR10 Bonded Splice

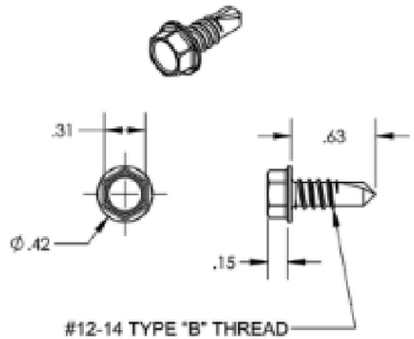



**1) Splice, XR10, Mill 12" long**




| Property | Value |
|---|---|
| Material | 6000 Series Aluminum |
| Finish | Mill |

**2) Screw, Self Drilling**




| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

v1.10

Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

| | |
|---|---|
| CUSTOMER LAST NAME: | LITTLE |
| ADDRESS: | 1507 MICAHS WAY N |
| CITY: | SPRING LAKE |
| STATE: | NC |
| ZIP: | 28390 |
| JURISDICTION: | SPRING LAKE |
| UTILITY COMPANY: | TOUCHSTONE ENERGY |
| SYSTEM SIZE: | 8.03 KW (E-1) |
| | ( 22 ) URE - F6M365E7G-BB (CS-1) |
| | ( 1 ) SOLAREDGE - SE6000H-US (CS-2) |
| | ( 22 ) SOLAREDGE - S440 (CS-3) |
| ROOF TYPE: | COMP SHINGLE (PV-2) |
| | PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) |
| INTERCONNECTION METHOD: | PV BREAKER |

DESIGNED BY: DW

DESIGNED ON

4/13/2022

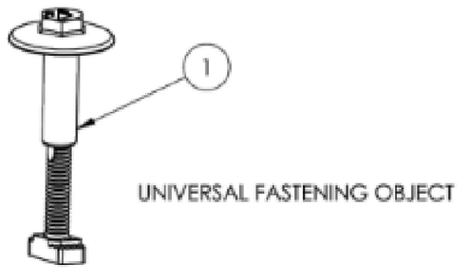
EQUIPMENT

EQ-1

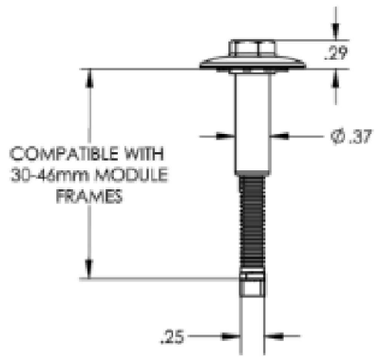
Cut Sheet

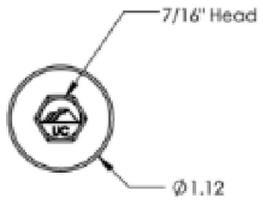
IRONRIDGE

# Universal Fastening Object




| ITEM NO. | DESCRIPTION | QTY. IN KIT |
|---|---|---|
| UFO-CL-001 | KIT, 4PCS, UNIVERSAL MODULE CLAMP, CLEAR | 4 |
| UFO-CL-001-B | KIT, 4PCS, UNIVERSAL MODULE CLAMP, BLACK | 4 |



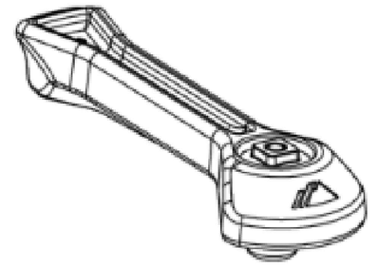

| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear and Black |

v1.20

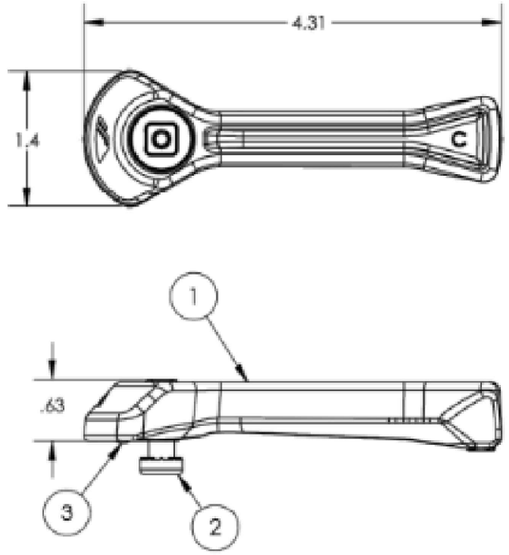
Cut Sheet

IRONRIDGE

# CAMO



| PART NO. | DESCRIPTION |
|---|---|
| CAMO-01-M1 | HIDDEN END CAM (UNIVERSAL CLAMP) |




| Item No. | Description | Material | Finish |
|---|---|---|---|
| 1 | Handle | Aluminum | Mill |
| 2 | Bolt, Bonding Shoulder | 300 Series Stainless Steel | Clear |
| 3 | Bonding Pins, Linear | 300 Series Stainless Steel | Clear |

v1.0

Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

EQUIPMENT

EQ-2

1495 Zephyr Avenue
Hayward, CA 94544
1-800-227-9523
IronRidge.com

**Attn:** Corey Geiger, COO, IronRidge Inc.
**Date:** September 7th, 2018

**Re:** Structural Certification and Span Tables for IronRidge Flush Mount System

This letter addresses the structural performance and code compliance of IronRidge's Flush Mount System. The Flush Mount System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum XR Rails and secured to the rails with IronRidge mounting clamps. The XR Rails are side mounted to a selected roof attachment with 3/8" stainless steel bonding hardware and then attached directly to the roof structure or to a stanchion that is fastened to the underlying roof structure. Assembly details of a typical Flush Mount installation and its core components are shown in Exhibit EX-0015.

The IronRidge Flush Mount System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- 2015 International Building Code (IBC-2015)
- 2016 California Building Code (CBC-2016)
- 2015 Aluminum Design Manual (ADM-2015)

The tables included in this letter provide the maximum allowable spans of XR Rails in the Flush Mount System for the respective loads and configurations listed, covering wind exposure categories B, C, & D, roof zones 1, 2 & 3, and roof slopes from 0° to 45°. The span tables are applicable provided that the following conditions are met:

1. *Span* is the distance between two adjacent roof attachment points (measured at the center of the attachment fastener)
2. The underlying roof pitch, measured between roof surface and horizontal plane, is 45° or less.
3. The *mean roof height*, defined as the average of the roof eave height and the roof ridge height measured from grade, does not exceed 30 feet.
4. Module length shall not exceed the listed maximum dimension provided for the respective span table and module width shall not exceed 48".
5. All Flush Mount components shall be installed in a professional workmanlike manner per IronRidge's *Flush Mount installation manual* and other applicable standards for general roof construction practice.

© 2018 IronRidge, Inc.


1495 Zephyr Avenue
Hayward, CA 94544
1-800-227-9523
IronRidge.com

The parameters and adjustments allowed in the span tables are defined as the following:

1. The Flush Mount System is designed as a Risk Category II structure as defined by ASCE 7-10 Chart 1.5-1.
2. When designing with a roof slope not listed in the span tables, but no greater than 45°, the lesser of the two span values listed immediately below and above the desired slope shall be used. For instance, if one is designing to a roof slope of 12°, use the lesser of the two span values associated with 10° and 15°.
3. The wind speed selection shall conform to ASCE 7-10 Fig. 26.5-1A (Risk Category II wind) and any state & local county/city amendments to the IBC. No special wind topographic features are included in the span tables and the topographic coefficient (Kzt) is taken as 1.0.
4. The snow load used in the span tables is the *ground snow* and shall conform to ASCE 7-10 Fig. 7-1. If a more restrictive snow load is imposed by a local building code/amendment to the IBC, such snow load requirement shall also be complied with. If the local jurisdiction specified snow load is in the format of a flat roof snow load, it shall first be converted to a ground snow following the local building code/amendment before the application of the attached span tables. No special snow conditions are considered including unbalanced, drifting, sliding or ponding snow. Snow load conditions presented in the span tables do not include buildings which are intentionally kept below freezing, kept just above freezing, or unheated.
5. The span tables reflect the ASCE 7 prescribed earthquake loads with the maximum magnitudes being:
   1) For ground snow no greater than 42psf: $S_s \leq 2.0g$ for Site Class A, B, C, or D.
   2) For ground snow greater than 65psf: $S_s \leq 1.0g$ for Site Class A, B, C, or D.
   3) For ground snow between 42 and 65psf: $S_s \leq 1.5g$ for Site Class A, B, C, or D.
6. Roof zone size and definition conforms to ASCE 7-10 Fig. 30.4-2A.
7. Allowable span length in the charts may be multiplied by a factor of 1.08 if the rails are continuous over a minimum of three spans.
8. An array to roof clearance of 2" minimum must be provided.
9. The maximum cantilever length measured from the rail end to the nearest attachment point shall not exceed 40% of the *allowable span* provided for the respective load & configuration condition from the span tables.
10. No rail splices are allowed in the cantilever, outer 2/3 of end spans, or middle 1/3 of interior spans.
11. For shaded cells of the span tables, UFO Mid Clamps shall not be installed closer than 20" to the shaded cell's associated Roof Zone.
12. When a roof attachment listed in IronRidge's Flush Mount *installation manual* is considered, the span values provided in this letter can be adjusted using IronRidge's online Design Assistant by checking the capacity of the selected roof attachment against the reaction forces provided in Design Assistant.

© 2018 IronRidge, Inc.


1495 Zephyr Avenue
Hayward, CA 94544
1-800-227-9523
IronRidge.com

13. Systems using CAMO module clamps shall be installed with the following guidance:
    1) For single module installations ("orphan modules") using modules with a length greater than 67.5", CAMO clamps shall not be installed in regions that experience ground snow loads of 70psf and greater; such scenarios are shown by asterisks in the applicable span table.
    2) CAMO will function within a module's design load ratings. Be sure the specific module being used with CAMO is listed in IronRidge's installation manual, is suitable for the environmental conditions of a particular project, and meets the dimensional requirements shown in the figure below.

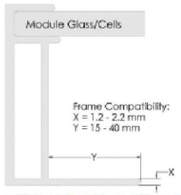



*Figure 1: CAMO Module Frame Dimensional Requirements*

© 2018 IronRidge, Inc.


1495 Zephyr Avenue
Hayward, CA 94544
1-800-227-9523
IronRidge.com

The span tables provided in this letter are certified based on the structural performance of IronRidge XR Rails only with no consideration of the structural adequacy of the chosen roof attachments, PV modules, or the underlying roof supporting members. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the aforementioned system components in regards to the applied or resultant loads of any chosen array configuration.

Sincerely,

REGISTERED PROFESSIONAL ENGINEER
GANG XUAN
NO. 6504
STRUCTURAL
STATE OF CALIFORNIA

Date: 2018.09.18 10:17:09 -07'00'

Gang Xuan, SE
Senior Structural Engineer

© 2018 IronRidge, Inc.


Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

EQUIPMENT

EQ-3

| Rail: XR10 | | Flush Mount System Span Table (inches)<br>Portrait Installation (Maximum Module Length 67.5")<br>Exposure C | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind Speed (mph) | Roof Slope (degs.) | Ground Snow: 0 psf | | | 10 psf | | | 20 psf | | | 30 psf | | | 40 psf | | | 50 psf | | | 60 psf | | | 70 psf | | | 80 psf | | | 90 psf | | |
| | | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 |
| 110 | 0-7 | 83 | 72 | 55 | 81 | 72 | 55 | 68 | 68 | 55 | 67 | 67 | 55 | 60 | 60 | 55 | 54 | 54 | 54 | 50 | 50 | 50 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 8-27 | 85 | 72 | 56 | 80 | 72 | 56 | 67 | 67 | 56 | 66 | 66 | 56 | 60 | 60 | 56 | 54 | 54 | 54 | 50 | 50 | 50 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 28-45 | 81 | 79 | 79 | 76 | 76 | 76 | 66 | 66 | 66 | 65 | 65 | 65 | 61 | 61 | 61 | 57 | 57 | 57 | 53 | 53 | 53 | 50 | 50 | 50 | 47 | 47 | 47 | 45 | 45 | 45 |
| 115 | 0-7 | 84 | 66 | 53 | 81 | 66 | 53 | 68 | 66 | 53 | 67 | 66 | 53 | 60 | 60 | 53 | 54 | 54 | 53 | 50 | 50 | 50 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 8-27 | 84 | 66 | 54 | 80 | 66 | 54 | 67 | 66 | 54 | 66 | 66 | 54 | 60 | 60 | 54 | 54 | 54 | 53 | 50 | 50 | 50 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 28-45 | 79 | 76 | 76 | 74 | 74 | 74 | 65 | 65 | 65 | 64 | 64 | 64 | 60 | 60 | 60 | 56 | 56 | 56 | 53 | 53 | 53 | 50 | 50 | 50 | 47 | 47 | 47 | 45 | 45 | 45 |
| 120 | 0-7 | 81 | 64 | 50 | 81 | 64 | 50 | 68 | 64 | 50 | 67 | 64 | 50 | 60 | 60 | 50 | 54 | 54 | 50 | 50 | 50 | 50 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 8-27 | 84 | 64 | 51 | 80 | 64 | 51 | 67 | 64 | 51 | 66 | 64 | 51 | 60 | 60 | 51 | 54 | 54 | 51 | 50 | 50 | 50 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 28-45 | 76 | 73 | 73 | 73 | 73 | 73 | 64 | 64 | 64 | 64 | 64 | 64 | 59 | 59 | 59 | 55 | 55 | 55 | 52 | 52 | 52 | 50 | 50 | 50 | 47 | 47 | 47 | 45 | 45 | 45 |
| 130 | 0-7 | 77 | 58 | 46 | 77 | 58 | 46 | 68 | 58 | 46 | 67 | 58 | 46 | 60 | 58 | 46 | 54 | 54 | 46 | 50 | 50 | 46 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 8-27 | 80 | 59 | 47 | 79 | 59 | 47 | 66 | 59 | 47 | 65 | 59 | 47 | 60 | 58 | 47 | 54 | 54 | 47 | 50 | 50 | 47 | 46 | 46 | 46 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 28-45 | 72 | 68 | 68 | 72 | 68 | 68 | 64 | 64 | 64 | 61 | 61 | 61 | 57 | 57 | 57 | 54 | 54 | 54 | 51 | 51 | 51 | 49 | 49 | 49 | 47 | 47 | 47 | 45 | 45 | 45 |
| 140 | 0-7 | 73 | 54 | 43 | 73 | 54 | 43 | 68 | 54 | 43 | 67 | 54 | 43 | 60 | 54 | 43 | 54 | 54 | 43 | 50 | 50 | 43 | 46 | 46 | 43 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 8-27 | 74 | 54 | 44 | 74 | 54 | 44 | 65 | 54 | 44 | 64 | 54 | 44 | 59 | 54 | 44 | 54 | 54 | 44 | 50 | 50 | 44 | 46 | 46 | 44 | 43 | 43 | 43 | 41 | 41 | 41 |
| | 28-45 | 67 | 64 | 64 | 67 | 64 | 64 | 60 | 60 | 60 | 59 | 59 | 59 | 56 | 56 | 56 | 53 | 53 | 53 | 50 | 50 | 50 | 48 | 48 | 48 | 46 | 46 | 46 | 44 | 44 | 44 |
| 150 | 0-7 | 68 | 50 | 40 | 68 | 50 | 40 | 68 | 50 | 40 | 67 | 50 | 40 | 60 | 50 | 40 | 54 | 50 | 40 | 50 | 50 | 40 | 46 | 46 | 40 | 43 | 43 | 40 | 41 | 41 | 40 |
| | 8-27 | 72 | 51 | 41 | 72 | 51 | 41 | 64 | 51 | 41 | 64 | 51 | 41 | 57 | 51 | 41 | 53 | 51 | 41 | 50 | 50 | 41 | 46 | 46 | 41 | 43 | 43 | 41 | 41 | 41 | 41 |
| | 28-45 | 64 | 59 | 59 | 64 | 59 | 59 | 58 | 58 | 58 | 57 | 57 | 57 | 54 | 54 | 54 | 51 | 51 | 51 | 49 | 49 | 49 | 47 | 47 | 47 | 45 | 45 | 45 | 43 | 43 | 43 |
| 160 | 0-7 | 64 | 48 | 38 | 64 | 48 | 38 | 64 | 48 | 38 | 64 | 48 | 38 | 60 | 48 | 38 | 54 | 48 | 38 | 50 | 48 | 38 | 46 | 46 | 38 | 43 | 43 | 38 | 41 | 41 | 38 |
| | 8-27 | 65 | 48 | 39 | 65 | 48 | 39 | 64 | 48 | 39 | 61 | 48 | 39 | 56 | 48 | 39 | 53 | 48 | 39 | 49 | 48 | 39 | 46 | 46 | 39 | 43 | 43 | 39 | 41 | 41 | 39 |
| | 28-45 | 60 | 55 | 55 | 60 | 55 | 55 | 56 | 55 | 55 | 55 | 55 | 55 | 52 | 52 | 52 | 50 | 50 | 50 | 48 | 48 | 48 | 46 | 46 | 46 | 44 | 44 | 44 | 42 | 42 | 42 |
| 170 | 0-7 | 60 | 44 | 35 | 60 | 44 | 35 | 60 | 44 | 35 | 60 | 44 | 35 | 60 | 44 | 35 | 54 | 44 | 35 | 50 | 44 | 35 | 46 | 44 | 35 | 43 | 43 | 35 | 41 | 41 | 35 |
| | 8-27 | 61 | 45 | 36 | 61 | 45 | 36 | 61 | 45 | 36 | 60 | 45 | 36 | 55 | 45 | 36 | 52 | 45 | 36 | 49 | 45 | 36 | 46 | 45 | 36 | 43 | 43 | 36 | 41 | 41 | 36 |
| | 28-45 | 57 | 52 | 52 | 57 | 52 | 52 | 54 | 52 | 52 | 54 | 52 | 52 | 51 | 51 | 51 | 48 | 48 | 48 | 46 | 46 | 46 | 45 | 45 | 45 | 43 | 43 | 43 | 42 | 42 | 42 |
| 180 | 0-7 | 56 | 42 | 33 | 56 | 42 | 33 | 56 | 42 | 33 | 56 | 42 | 33 | 56 | 42 | 33 | 54 | 42 | 33 | 50 | 42 | 33 | 46 | 42 | 33 | 43 | 42 | 33 | 41 | 41 | 33 |
| | 8-27 | 58 | 42 | 34 | 58 | 42 | 34 | 58 | 42 | 34 | 58 | 42 | 34 | 54 | 42 | 34 | 51 | 42 | 34 | 48 | 42 | 34 | 46 | 42 | 34 | 43 | 42 | 34 | 41 | 41 | 34 |
| | 28-45 | 54 | 50 | 50 | 54 | 50 | 50 | 52 | 50 | 50 | 52 | 50 | 50 | 49 | 49 | 49 | 47 | 47 | 47 | 45 | 45 | 45 | 44 | 44 | 44 | 42 | 42 | 42 | 41 | 41 | 41 |

= min 72" span = min 64" span = min 48" span = Note: additional installation requirement on UFO middle clamps. Please refer to Note 10 on Page 2 for details.

REV 5/09/2018


Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253


SYSTEM SIZE: 8.03 KW (E-1)

( 22 ) URE - F6M365E7G-BB (CS-1)

( 1 ) SOLAREDGE - SE6000H-US (CS-2)

( 22 ) SOLAREDGE - S440 (CS-3)

ROOF TYPE: COMP SHINGLE (PV-2)

PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)

INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE

ADDRESS: 1507 MICAHS WAY N

CITY: SPRING LAKE

STATE: NC

ZIP: 28390

JURISDICTION: SPRING LAKE

UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW

DESIGNED ON 4/13/2022

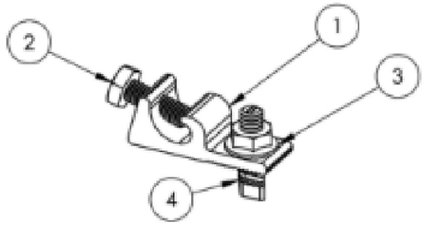
EQUIPMENT

EQ-4

Cut Sheet

IRONRIDGE

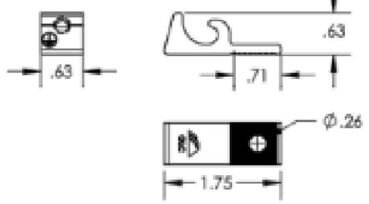
# Grounding Lug




| ITEM NO. | DESCRIPTION | QTY. IN KIT |
|---|---|---|
| 1 | LUG, GROUNDING, LAY-IN - LOW PROFILE | 2 |
| 2 | BOLT, 1/4-28 X .750' HEX CS SST | 2 |
| 3 | NUT, FLANGE HEX 1/4-20 SST | 2 |
| 4 | BOLT, T CSTM 1/4-20 X 1.188' LOCK SS | 2 |

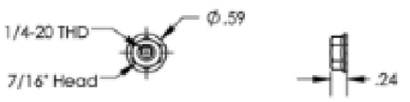
| Part Number | Description | Wire Size Range (AWG) |
|---|---|---|
| GD-LUG-003 | KIT, 2PCS, GROUNDING LUG, LOW PROFILE | 4-10 |

1)Lug, Grounding



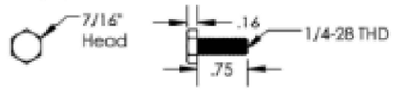

| Property | Value |
|---|---|
| Material | Tin Plated Copper |
| Finish | Clear Matte |

3) Nut, Flange Hex 1/4-20



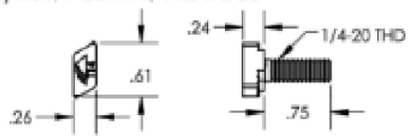

| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

2) Bolt, 1/4-28 x .750 Hex




| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

4) Bolt, T CSTM 1/4-20 x .750



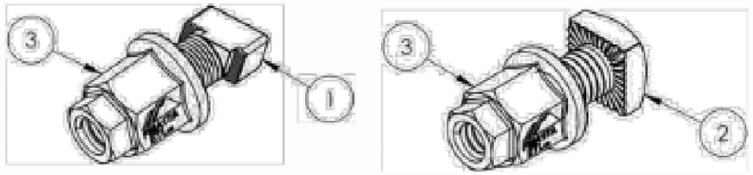

| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

v1.0

Cut Sheet

IRONRIDGE

# Bonding Hardware

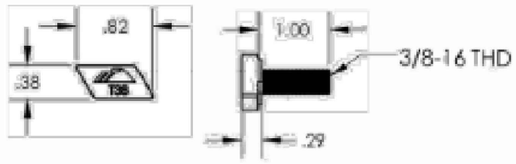



| ITEM NO. | DESCRIPTION |
|---|---|
| 1 | BOLT, T CSTM, 3/8-16 |
| 2 | BOLT, BONDING 3/8-16 SQ HEAD |
| 3 | NUT, BONDING STEP |

BONDING HARDWARE

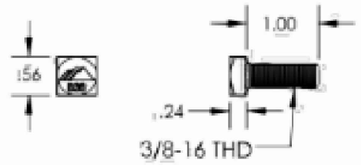
| Part Number | Description |
|---|---|
| BHW-TB-02-A1 | T-BOLT, BONDING HARDWARE |
| BHW-SQ-02-A1 | SQUARE-BOLT, BONDING HARDWARE |

1) BOLT, T CSTM, 3/8-16



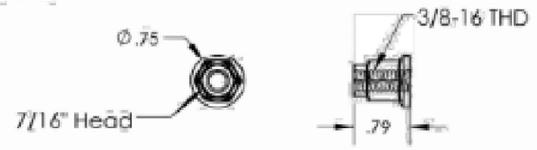

| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

2) BOLT, BONDING 3/8-16 SQ HEAD




| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

3) NUT, BONDING STEP




| Property | Value |
|---|---|
| Material | 300 Series Stainless Steel |
| Finish | Clear |

v1.30

Fluent
SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

EQUIPMENT

EQ-5

# UNITED RENEWABLE ENERGY

F6M_E7G-BB / 120 cells
345W - 365 W
Mono-Crystalline PV Module

URE modules use URE's state-of -the art cell cutting technology and advanced module manufacturing experience.

## Key Features

+ Publicly Traded Taiwanese Company. Formed as the merger of four Cell and Module Manufacturers in 2018. All four founding companies (Neo Solar Power, Gintech, Solartech, NDF) were in existence since 2008 or earlier.

+ Over 400MW Of Projects Installed in the United States.

+ 25 Year Output Warranty and 25 Year Product Guarantee

+ Winner of Taiwan Excellence Award 7 Consecutive Years for Highest Efficiency Module.

+ Super All Black Design for High Profile Residential and Commercial Installations.

+ High Quality Solar Cell Technology allows URE to be a major international exporter to Solar Module manufacturers in the United States and Europe.

UNITED RENEWABLE ENERGY

For more information, please visit us at ***www.urecorp.com***

Copyright © 2021 URE Corp. All rights reserved

UNITED RENEWABLE ENERGY

## Electrical Data

| Model - STC | | F6M345E7G-BB | F6M350E7G-BB | F6M355E7G-BB | F6M360E7G-BB | F6M365E7G-BB |
|---|---|---|---|---|---|---|
| Maximum Rating Power (Pmax) | [W] | 345 | 350 | 355 | 360 | 365 |
| Module Efficiency | [%] | 18.68 | 18.95 | 19.22 | 19.50 | 19.77 |
| Open Circuit Voltage (Voc) | [V] | 39.90 | 40.10 | 40.30 | 40.50 | 40.70 |
| Maximum Power Voltage | [V] | 33.40 | 33.60 | 33.80 | 34.00 | 34.20 |
| Short Circuit Current (Isc) | [A] | 11.13 | 11.19 | 11.26 | 11.35 | 11.43 |
| Maximum Power Current | [A] | 10.33 | 10.42 | 10.51 | 10.59 | 10.68 |

*Standard Test Condi on (STC): Cell Temperature 25 °C, Irradiance 1000 W/m², AM 1.5
*Values without tolerance are typical numbers.Measurement tolerance: ± 3%

## Mechanical Data

| Item | Specification |
|---|---|
| Dimensions | 1762 mm (L)[1] x 1048 mm (W)[1] x 35 mm (D)[2] / 69.37"(L)[1] x 41.26"(W)[1] x 1.38"(D)[2] |
| Weight | 19.6 kg / 43.21 lbs |
| Solar Cell | Mono / 83 mm x 166mm |
| Front Glass | White toughened safety glass, 3.2mm thickness |
| Frame | Black anodized aluminum profile |
| Junction Box | IP ≥67, 3 diodes |
| Connectors Type | MC4 Compatible |
| Cable | 1.2M (cable length can be customized), 4mm² |
| Packaging Configuration | 31 pcs Per Pallet, 806 pcs per 40' HQ container |

[1] : With assembly tolerance of ± 2 mm [ ± 0.08" ]
[2] : With assembly tolerance of ± 0.8 mm [ ± 0.03" ]

## Operating Conditions

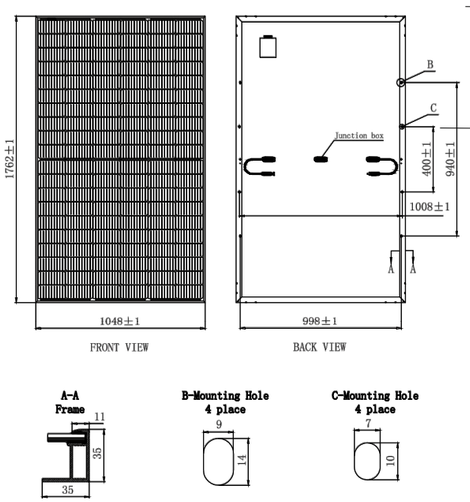
| Item | Specification |
|---|---|
| Mechanical Load | 5400 Pa |
| Maximum System Voltage | 1000 VDC |
| Series Fuse Rating | 20 A |
| Operating Temperature | -40 to 85 °C |

## Temperature Characteristics

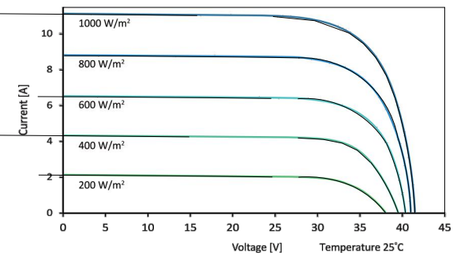
| Item | Specificatio |
|---|---|
| Nominal Module Operating Temperature | 45 °C ± 2°C |
| Temperature Coefficient of Isc | 0.048 % / °C |
| Temperature Coefficient of Voc | -0.27 % / °C |
| Temperature Coefficient of Pmax | -0.35 % / °C |

*Nominal module operating temperature (NMOT): Air mass AM 1.5, irradiance 800W/m², temperature 20°C, windspeed 1 m/s.
*Reduction in efficiency from 1000W/m² to 200W/m² at 25°C: 3.5 ± 2%.

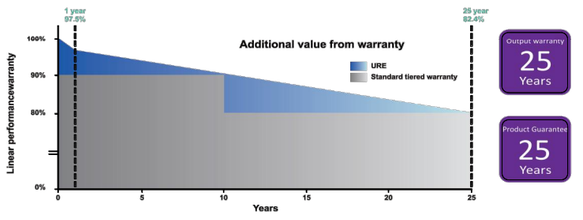
## Engineering Drawing (mm)




## Dependence on Irradiance




## Reliability with Warranty




For more information, please visit us at ***www.urecorp.com***

**United Renewable Energy Co., Ltd.**

Copyright © 2021 URE Corp. All rights reserved

UNITED RENEWABLE ENERGY

For more information, please visit us at ***www.urecorp.com***

Copyright © 2021 URE Corp. All rights reserved

Fluent SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: DW
DESIGNED ON
4/13/2022

MODULE

CS-1

Missing or invalid reference
File: ..\..\..\Desktop\Fluent OS 1.8\DOCS\DWG ONLY\PDF Files\DESIGN OPTIMIZER.pdf
Sheet: 1

Missing or invalid reference
File: ..\..\..\Desktop\NEW Fluent OS 1.8\DOCS\DWG ONLY\PDF Files\DESIGN OPTIMIZER.pdf
Sheet: 2


Fluent
SOLAR

ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253


| | |
|---|---|
| SYSTEM SIZE: 8.03 KW (E-1) | |
| ( 22 ) URE - F6M365E7G-BB (CS-1) | |
| ( 1 ) SOLAREDGE - SE6000H-US (CS-2) | |
| ( 22 ) SOLAREDGE - S440 (CS-3) | |
| ROOF TYPE: COMP SHINGLE (PV-2) | |
| PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) | |
| INTERCONNECTION METHOD: PV BREAKER | |
| CUSTOMER LAST NAME: | LITTLE |
| ADDRESS: | 1507 MICAHS WAY N |
| CITY: | SPRING LAKE |
| STATE: | NC |
| ZIP: | 28390 |
| JURISDICTION: | SPRING LAKE |
| UTILITY COMPANY: | TOUCHSTONE ENERGY |

DESIGNED BY: DW

DESIGNED ON

4/13/2022

OPTIMIZER

CS-2

# Single Phase Inverter with HD-Wave Technology

## for North America

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

INVERTERS


### Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020 per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

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

| MODEL NUMBER | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|---|---|---|---|---|---|---|---|---|
| APPLICABLE TO INVERTERS WITH PART NUMBER | SEXXXXH-XXXXXBXX4 | | | | | | | |
| **OUTPUT** | | | | | | | | |
| Rated AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | VA |
| Maximum AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | VA |
| AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Vac |
| AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229) | - | ✓ | - | ✓ | - | - | ✓ | Vac |
| AC Frequency (Nominal) | 59.3 - 60 - 60.5[1] | | | | | | | Hz |
| Maximum Continuous Output Current @240V | 12.5 | 16 | 21 | 25 | 32 | 42 | 47.5 | A |
| Maximum Continuous Output Current @208V | - | 16 | - | 24 | - | - | 48.5 | A |
| Power Factor | 1, Adjustable - 0.85 to 0.85 | | | | | | | |
| GFDI Threshold | 1 | | | | | | | A |
| Utility Monitoring, Islanding Protection, Country Configurable Thresholds | Yes | | | | | | | |
| **INPUT** | | | | | | | | |
| Maximum DC Power @240V | 4650 | 5900 | 7750 | 9300 | 11800 | 15500 | 17650 | W |
| Maximum DC Power @208V | - | 5100 | - | 7750 | - | - | 15500 | W |
| Transformer-less, Ungrounded | Yes | | | | | | | |
| Maximum Input Voltage | 480 | | | | | | | Vdc |
| Nominal DC Input Voltage | 380 | | | | 400 | | | Vdc |
| Maximum Input Current @240V[2] | 8.5 | 10.5 | 13.5 | 16.5 | 20 | 27 | 30.5 | Adc |
| Maximum Input Current @208V[2] | - | 9 | - | 13.5 | - | - | 27 | Adc |
| Max. Input Short Circuit Current | 45 | | | | | | | Adc |
| Reverse-Polarity Protection | Yes | | | | | | | |
| Ground-Fault Isolation Detection | 600kΩ Sensitivity | | | | | | | |
| Maximum Inverter Efficiency | 99 | 99.2 | | | | | | % |
| CEC Weighted Efficiency | 99 | | | | | | 99 @ 240V<br>98.5 @ 208V | % |
| Nighttime Power Consumption | < 2.5 | | | | | | | W |

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

# Single Phase Inverter with HD-Wave Technology

## for North America

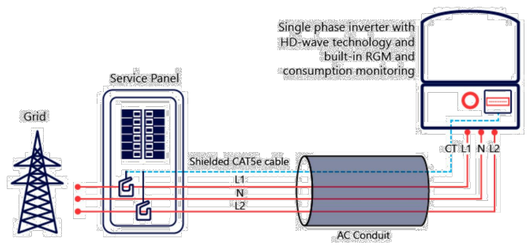
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

| MODEL NUMBER | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|---|---|---|---|---|---|---|---|---|
| **ADDITIONAL FEATURES** | | | | | | | | |
| Supported Communication Interfaces | RS485, Ethernet, ZigBee (optional), Cellular (optional) | | | | | | | |
| Revenue Grade Metering, ANSI C12.20 | Optional[3] | | | | | | | |
| Consumption metering | | | | | | | | |
| Inverter Commissioning | With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection | | | | | | | |
| Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12 | Automatic Rapid Shutdown upon AC Grid Disconnect | | | | | | | |
| **STANDARD COMPLIANCE** | | | | | | | | |
| Safety | UL1741, UL1741 SA, UL16998, 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 | -40 to +140 / -40 to +60[4] | | | | | | | °F / °C |
| Protection Rating | NEMA 4X (Inverter with Safety Switch) | | | | | | | |

(3) Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BNI4 . For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box
(4) Full power up to at least 50°C / 122°F; for power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

### How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills




© SolarEdge Technologies, Inc. All rights reserved. SOLAREDGE, the SolarEdge logo, OPTIMIZED BY SOLAREDGE are trademarks or registered trademarks of SolarEdge Technologies, Inc. All other trademarks mentioned herein are trademarks of their respective owners. Date: 12/2020/V01/ENG NAM. Subject to change without notice.

RoHS

Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 8.03 KW (E-1)
( 22 ) URE - F6M365E7G-BB (CS-1)
( 1 ) SOLAREDGE - SE6000H-US (CS-2)
( 22 ) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
INTERCONNECTION METHOD: PV BREAKER

CUSTOMER LAST NAME: LITTLE
ADDRESS: 1507 MICAHS WAY N
CITY: SPRING LAKE
STATE: NC
ZIP: 28390
JURISDICTION: SPRING LAKE
UTILITY COMPANY: TOUCHSTONE ENERGY

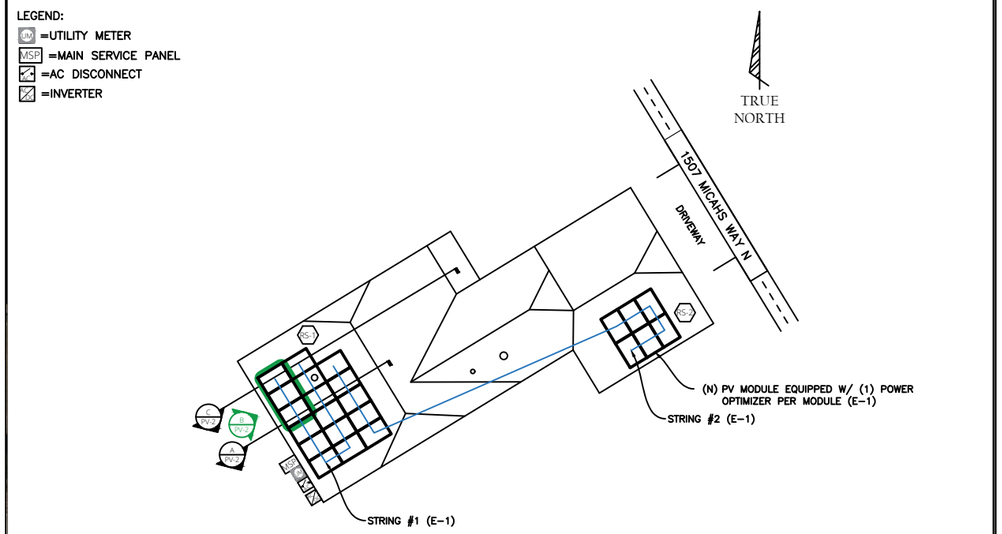
DESIGNED BY: DW
DESIGNED ON
4/13/2022

INVERTER

CS-3

# CAUTION

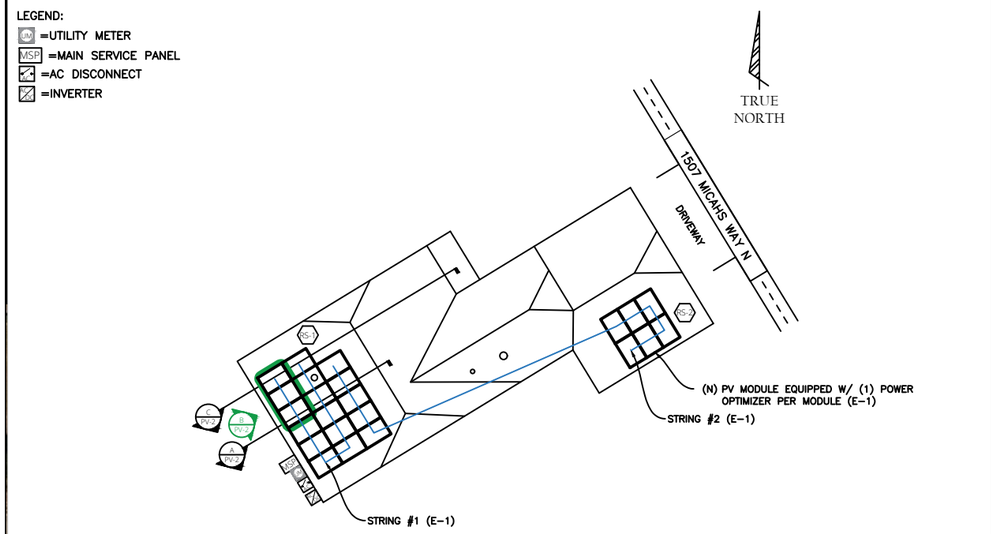
## MULTIPLE SOURCES OF POWER




2020 NEC
LABEL (FOR FIELD USE ONLY)

# CAUTION

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




2017 NEC
LABEL (FOR FIELD USE ONLY)

Fluent SOLAR
ADDRESS: 2578 W 600 N
SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

| | |
|---|---|
| SYSTEM SIZE: 8.03 KW (E-1) | |
| ( 22 ) URE - F6M365E7G-BB (CS-1) | |
| ( 1 ) SOLAREDGE - SE6000H-US (CS-2) | |
| ( 22 ) SOLAREDGE - S440 (CS-3) | |
| ROOF TYPE: COMP SHINGLE (PV-2) | |
| PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2) | |
| INTERCONNECTION METHOD: PV BREAKER | |
| CUSTOMER LAST NAME: LITTLE | |
| ADDRESS: 1507 MICAHS WAY N | |
| CITY: SPRING LAKE | |
| STATE: NC | |
| ZIP: 28390 | |
| JURISDICTION: SPRING LAKE | |
| UTILITY COMPANY: TOUCHSTONE ENERGY | |

DESIGNED BY: DW

DESIGNED ON

4/13/2022

PLACARD

PL-1