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 20, 2022

Scott E Wyssling

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

Re: Engineering Services
Bass Residence
144 Brower Road, Cameron NC
4.380 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: 2x6 dimensional lumber at 24" on center..
Roof Material: Composite Asphalt Shingles
Roof Slope: 15 and 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 = 117 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 2015 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 QuickBolt 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 two $^{5}/_{16}$" 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 2015 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

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DC SYSTEM SIZE: 4.38 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:

(12) URE – F6M365E7G-BB (CS-1)
(1) SOLAREDGE – SE3000H-US (CS-2)
(12) SOLAREDGE – S440 (CS-3)

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THE MODULES SHALL BE FLUSH MOUNTED USING

APPROX. (33) QUICKBOLT #16318 MOUNTS
ON IRONRIDGE XR-10-168A RAIL

THE PHOTOVOLTAIC SYSTEM SHALL BE INTERCONNECTED BY PERFORMING A RATED BACK FED TAP 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)

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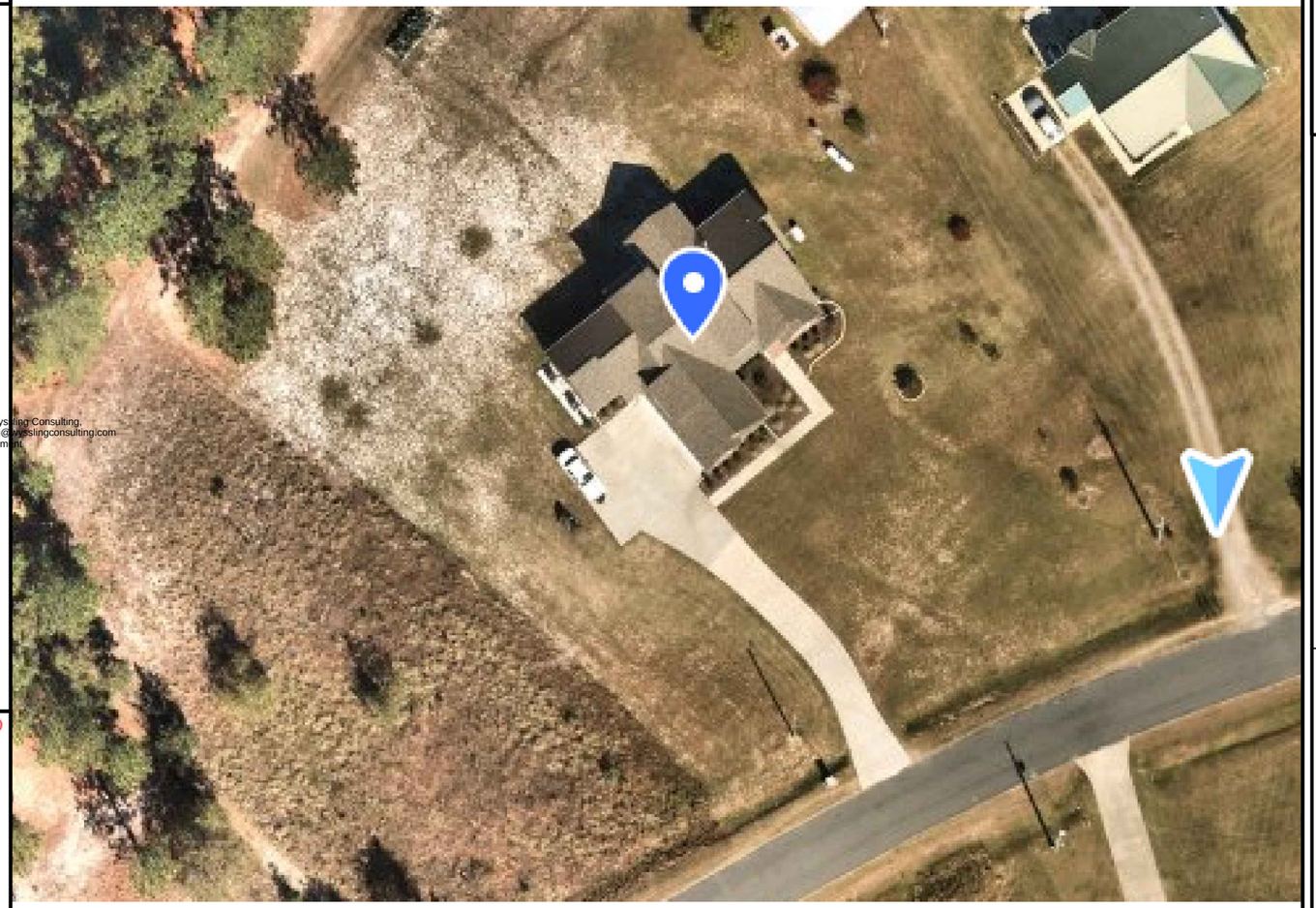


ASCE 7-10 WIND SPEED:	117PSF, EXPOSURE CATEGORY C
GROUND SNOW LOAD:	10 PSF, EXPOSURE CATEGORY C

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 2015 IBC AND 2015 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 4/20/2022

CONTENTS:

NOTICE TO CONTRACTOR
All construction must comply with current NC Building Codes and is subject to field inspection and verification.
APPROVED
Limited building only review. Additional comments for full compliance with the code
05/31/2022
Harnett COUNTY NORTH CAROLINA

Fluent SOLAR

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

CUSTOMER LAST NAME:	BASS
ADDRESS:	144 BROWER RD
CITY:	CAMERON
STATE:	NC
ZIP:	28326
JURISDICTION:	CAMERON
UTILITY COMPANY:	TOUCHSTONE ENERGY
SYSTEM SIZE:	4.38 KW (E-1)
	(12) URE – F6M365E7G-BB (CS-1)
	(1) SOLAREDGE – SE3000H-US (CS-2)
	(12) SOLAREDGE – S440 (CS-3)
	ROOF TYPE: COMP SHINGLE (PV-2)
	RAFTERS, 2X6 @ 24" (PV-2)
	INTERCONNECTION METHOD: RATED BACK FED TAP

DESIGNED BY: SR

DESIGNED ON
4/19/2022

COVER PAGE

C-1

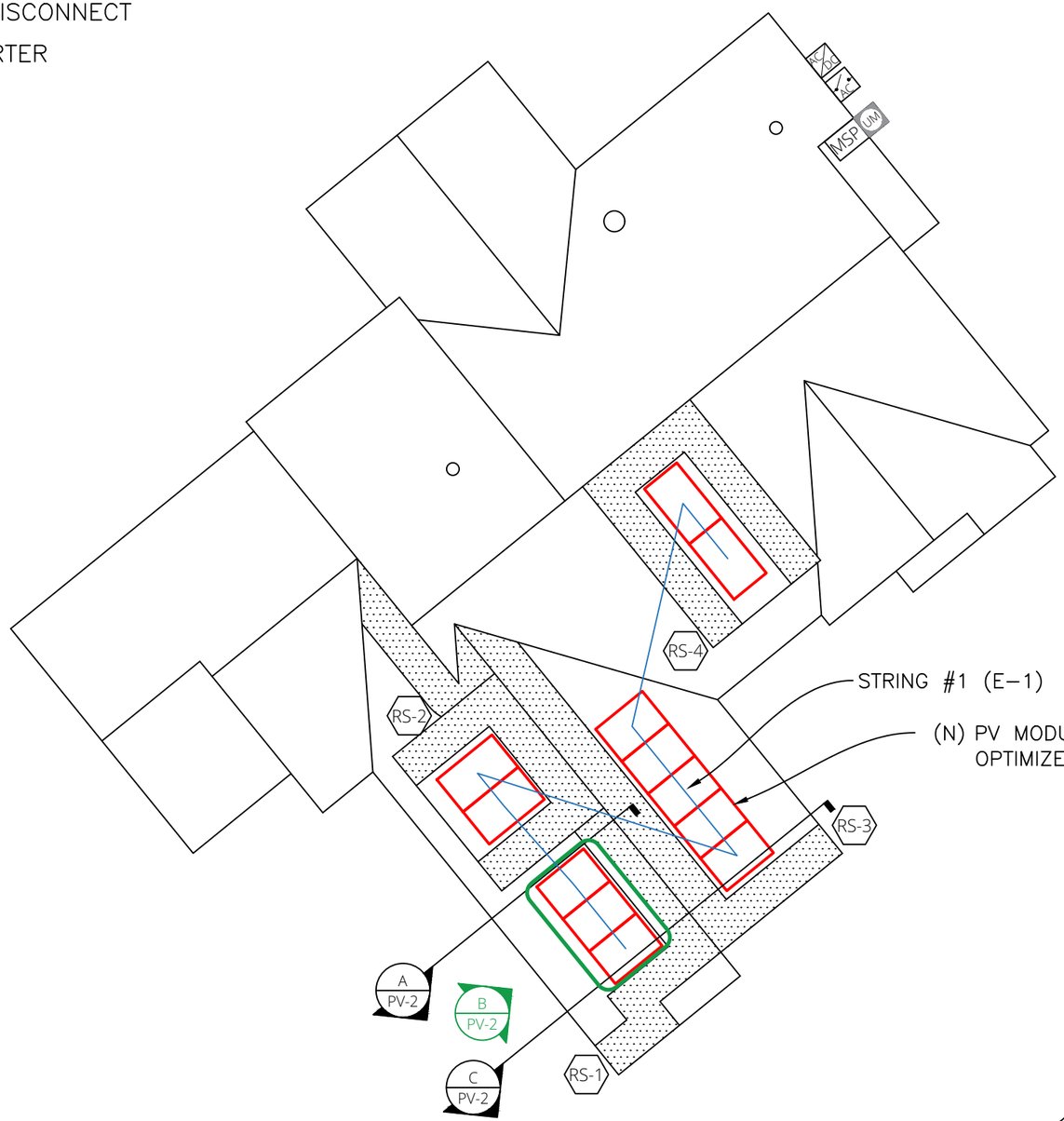
LEGEND:

UM =UTILITY METER

MSP =MAIN SERVICE PANEL

AC =AC DISCONNECT

AC/DC =INVERTER



TRUE NORTH

	TILT	AZIMUTH
ROOF SECTION 1	35	231
ROOF SECTION 2	15	231
ROOF SECTION 3	35	51
ROOF SECTION 4	15	141
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

NORTH CAROLINA PROFESSIONAL SEAL 040546 ENGINEER SCOTT E. WYSSLING

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

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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

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RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

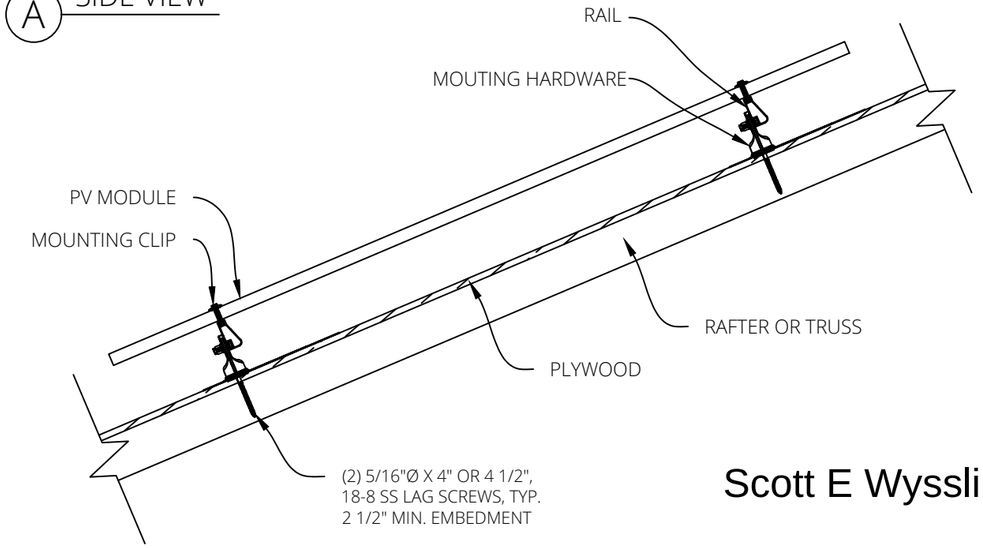
CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

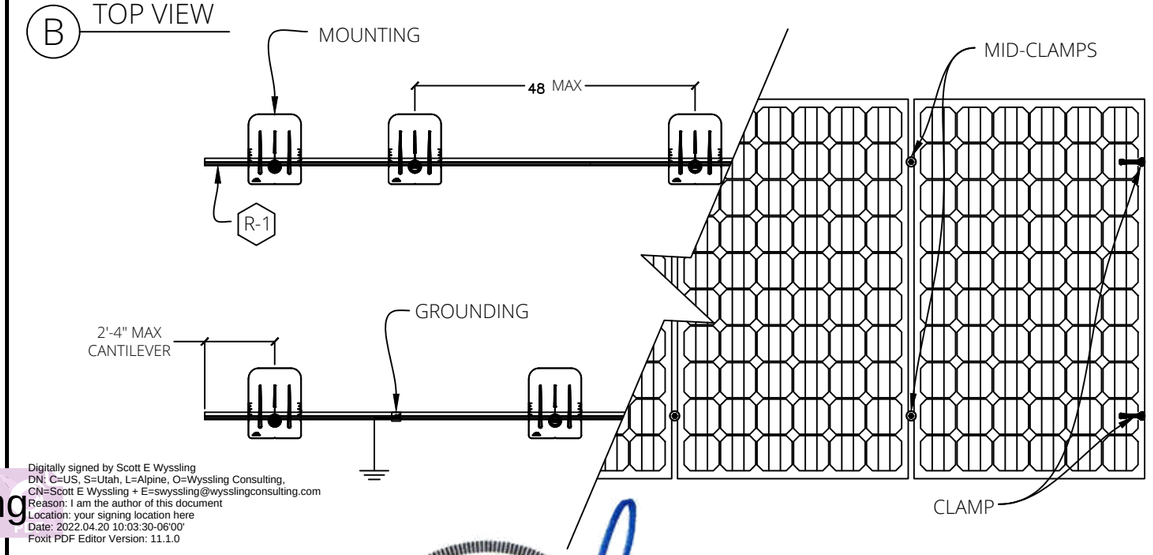
SITE PLAN

PV-1

A SIDE VIEW



B TOP VIEW



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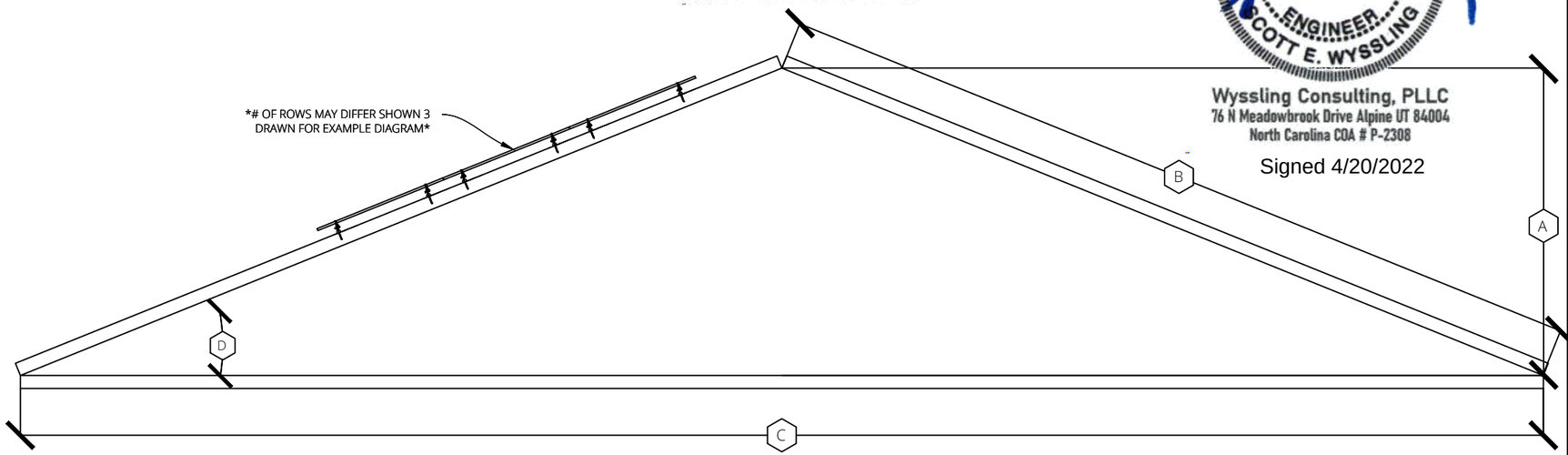
C ATTIC INFO

NOT TO SCALE



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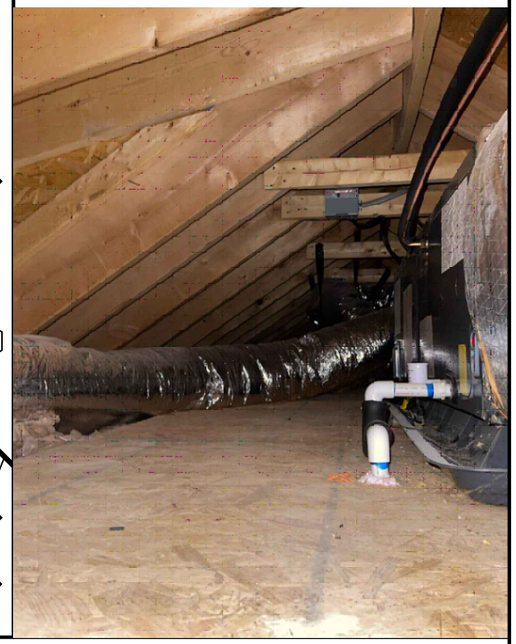

RAFTERS	SIZE:	2X6	SPACING:	24

ROOF INFO IN INCHES & DEGREES		TAG ID
ROOF HEIGHT:	109	A
ROOF FACE SPAN:	190	B
ROOF LENGTH:	312	C
ROOF TILT:	35	D

PV ARRAY STRUCTURAL INFO			
TOTAL PV MODULE COUNT:	(TOTAL NUMBER OF MODULES BEING INSTALLED)	12	MODULES
APPROX. ATTACHMENT POINTS:	(ROUND UP (TOTAL ROWS WIDTH) / (MOUNT SPACING)) +2	33	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	238.52	FT^2
TOTAL ROOF AREA:	(ROOF AREA TOTAL) = FT^2	950	FT^2
% ARRAY/ROOF:	(AREA AREA) / (ROOF AREA) = %	25.1	%
TOTAL ARRAY WEIGHT:	(TOTAL MODULE COUNT) X (MODULE WEIGHT) = LBS	518.52	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)	15.71	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

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SUITE 100 LINDON, UT 84042
PHONE: 866-736-1253

SYSTEM SIZE: 4.38 KW (E-1)
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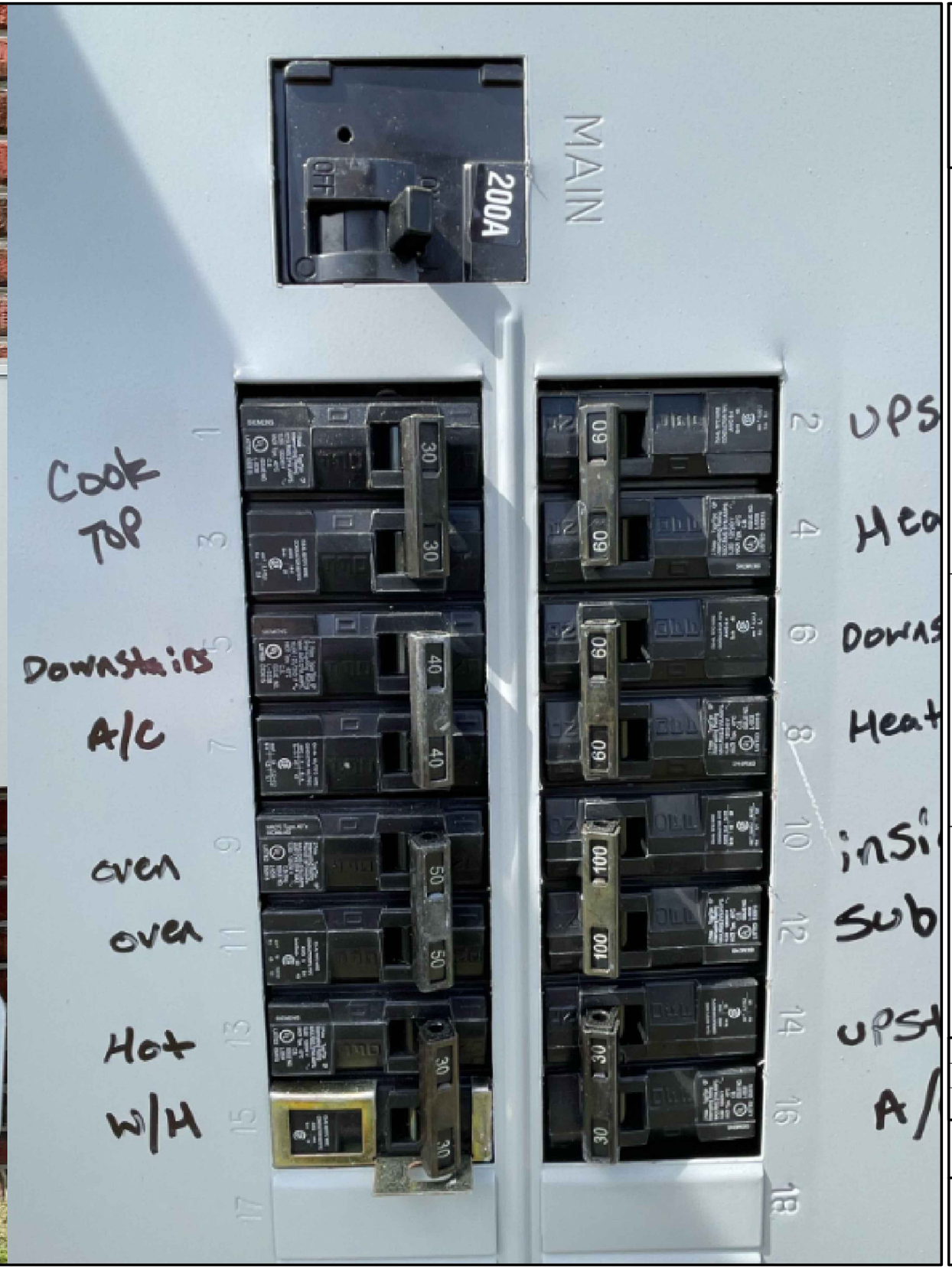
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

ROOF INFO

PV-2



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SOLAR

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DESIGNED BY: SR

DESIGNED ON
4/19/2022

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	3	#10 AWG	PV CABLE, CU	40	#6 AWG	100	BARE, CU	3/4" EMT
B	3	#10 AWG	THWN-2, CU	40	#10 AWG	20	THWN-2, CU	3/4" EMT
C	4	#10 AWG	THWN-2, CU	40	#10 AWG	20	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 FUSED	NEMA 3R	20A FUSES

ELECTRICAL EQUIPMENT

EE-1	EXISTING	200A	BUS BAR RATING
EE-2	EXISTING	200A	MAIN BREAKER RATING
EE-3	NEW	160A	RATED BACK FED TAP
EE-4			
EE-5			

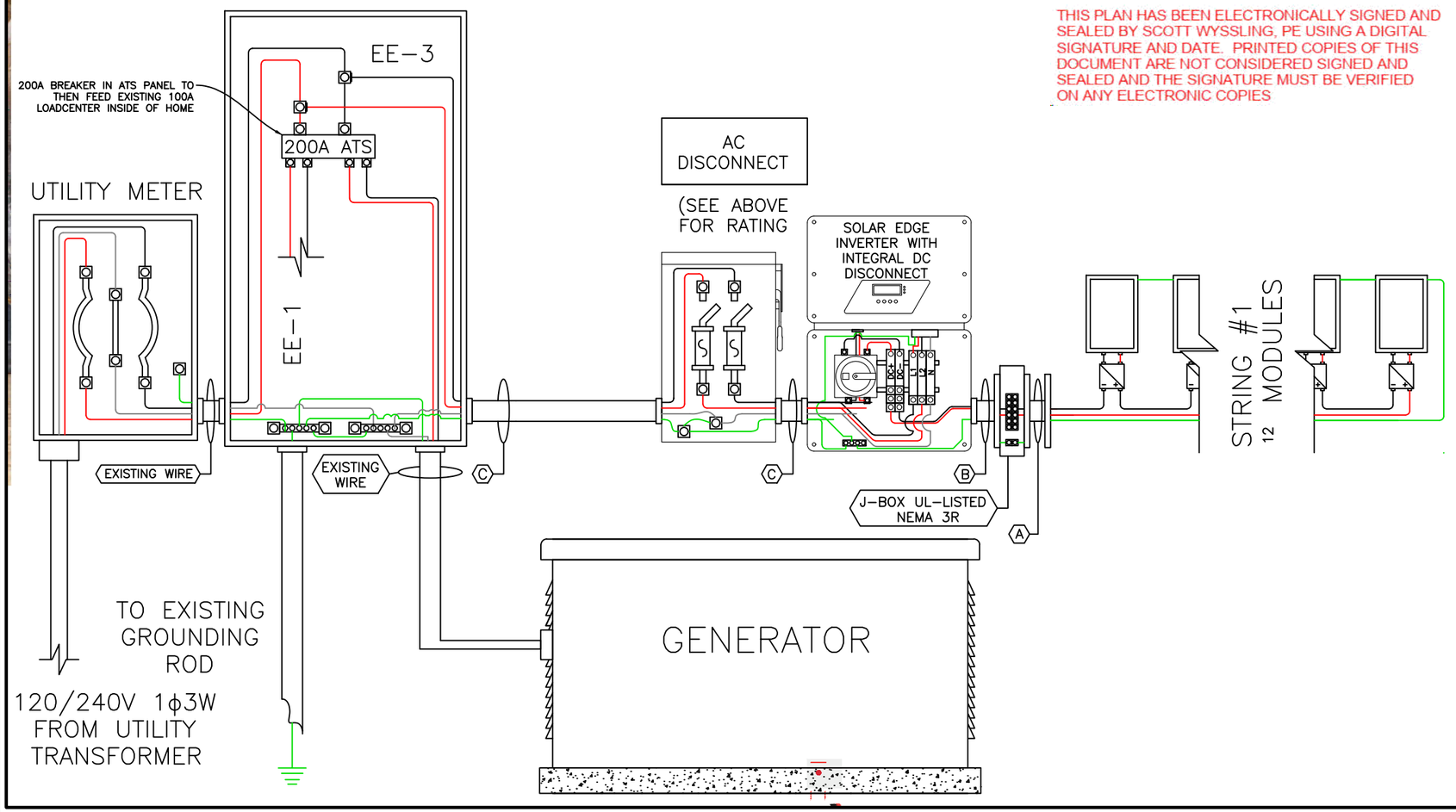
PRODUCTION METER:

NO PM REQUIRED

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

AC DISCONNECT TO BE WITHIN 10' OF UTILITY METER

MAIN SERVICE PANEL



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INSTALLATION NOTES:

PREFORM TAP USING POLARIS AWG INSULATED TAP CONNECTERS ON THE LINE SIDE OF THE SERVICE WIRES

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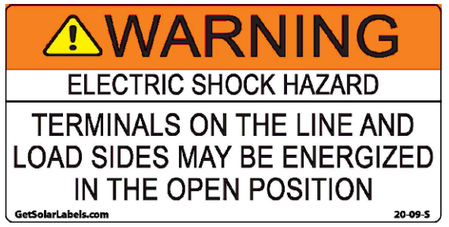
DESIGNED ON
4/19/2022

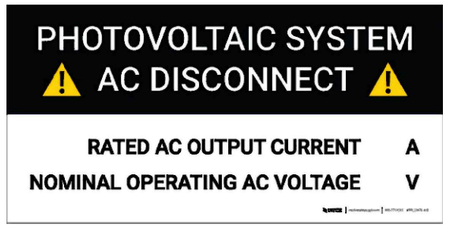
3-LINE DIAGRAM

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)

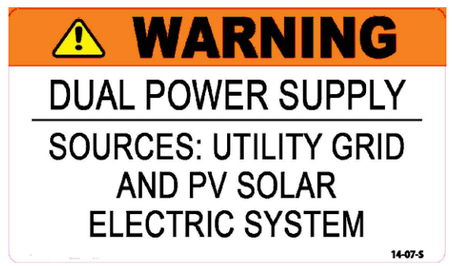


LABEL 2
FOR PV DISCONNECTING MEANS WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION.
NEC 690.17(E), NEC 705.22



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

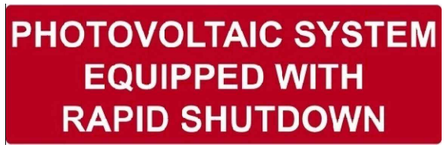
FOR VALUES SEE ELECTRICAL CALCS PAGE, VALUES TO BE PRINTED AND NOT HAND WRITTEN



LABEL 4
AT POINT OF INTERCONNECTION FOR EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUTS 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)

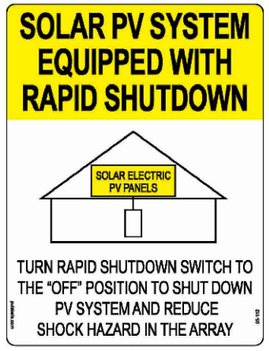
LABEL 5
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.
NEC 690.31(G)(3&4)

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)

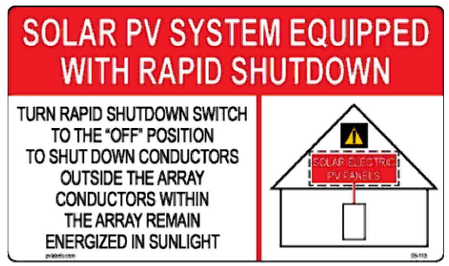


LABEL 7
SIGN LOCATED AT UTILITY SERVICE EQUIPMENT.
NEC 690.56(C)

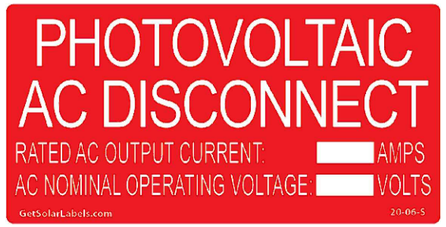
LABEL 8
(ONLY IF 3 OR MORE SUPPLY SOURCES TO A BUSBAR)
SIGN LOCATED AT LOAD CENTER IF CONTAINS 3 OR MORE POWER SOURCES. NEC 705.12(D)(2)(3)(C)



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 ($\frac{3}{8}$ IN.), IN WHITE ON RED BACKGROUND)

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

SYSTEM SIZE: 4.38 KW (E-1)
(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

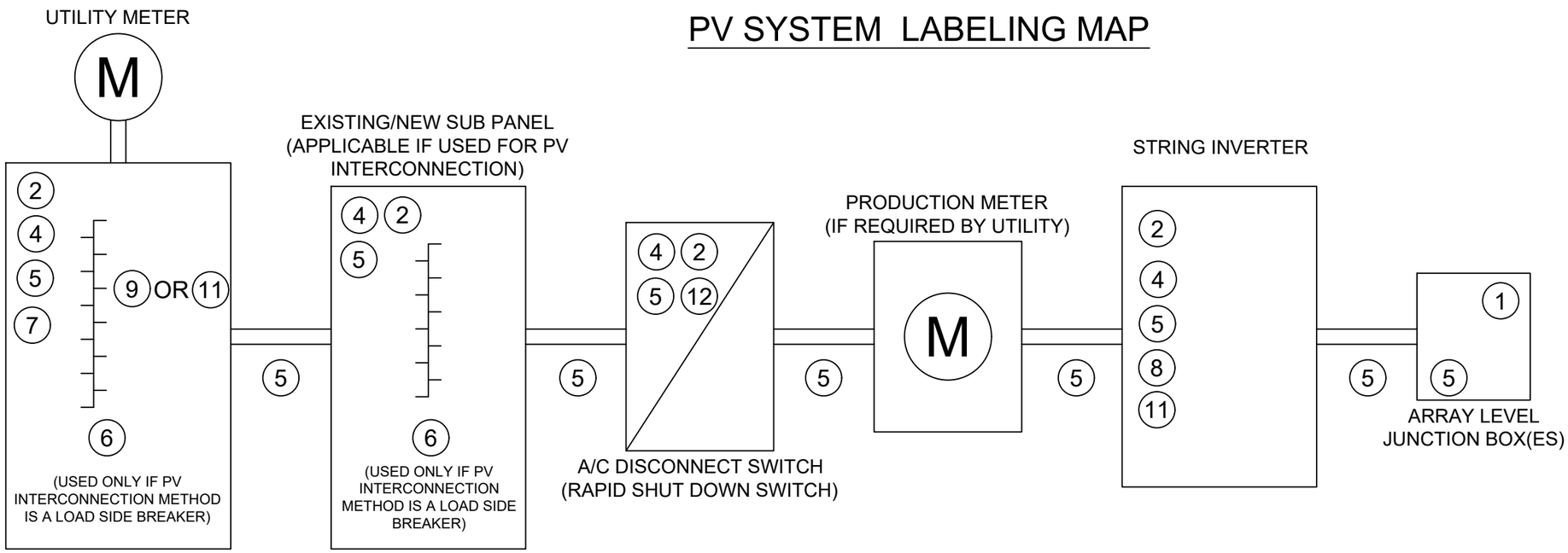
CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

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.

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

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

CUSTOMER LAST NAME:	BASS
ADDRESS:	144 BROWER RD
CITY:	CAMERON
STATE:	NC
ZIP:	28326
JURISDICTION:	CAMERON
UTILITY COMPANY:	TOUCHSTONE ENERGY
INTERCONNECTION METHOD:	RATED BACK FED TAP
RAFTERS, 2X6 @ 24" (PV-2)	
ROOF TYPE: COMP SHINGLE (PV-2)	
(12) SOLAREDGE - S440 (CS-3)	
(1) SOLAREDGE - SE3000H-US (CS-2)	
(12) URE - F6M365E7G-BB (CS-1)	
SYSTEM SIZE: 4.38 KW (E-1)	

DESIGNED BY: SR

DESIGNED ON

4/19/2022

LABELS

E-2.1

SYSTEM SIZE

AC SYSTEM SIZE:	3 KW
DC SYSTEM SIZE:	4.38 KW

LABEL VALUES

AC OPERATING CURRENT =	12.5A
AC OPERATING VOLTAGE =	240V
MAX CIRCUIT CURRENT AMPS =	15A
DC MAXIMUM VOLTAGE =	60V

INTERCONNECTION CALCULATIONS

ITEM	UNIT	PANEL
BUS RATING	AMPS	200A
MAIN OCPD	AMPS	200A
ALLOWED PV PER NEC	AMPS	240A

CONDUCTOR CALCULATIONS

TAG A ELECTRICAL CALCS (SEE E-1)
UNDER MODULES, NOT IN CONDUIT
#10 AWG MAX CURRENT= 40A
40A * .96= 38.4A
SOLAREDGE SE3000H-US MAX CIRCUIT CURRENT
18.25A FOR STRING 1

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 SE3000H-US MAX CIRCUIT CURRENT
18.25A FOR STRING 1

TAG C 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 SE3000H-US MAX CIRCUIT CURRENT
18.25A FOR STRING 1

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 SE3000H-US MAX OUTPUT =12.5A
12.5A * 1.25 (SAFETY FACTOR) = 15.625A
SOLAREDGE RECCOMENDED OCPD= 20A

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

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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	SE3000H-US
MAX AC OUTPUT	12.5A
AC OUTPUT VOLTAGE	240V
MAX DC INPUT VOLTAGE	240V
NOMINAL DC INPUT VOLTAGE	380V
MAX INPUT CURRENT	8.5A
MAX OUTPUT CURRENT	12.5A
WEIGHTED CEC EFFICIENCY	99%
MIN AC CONDUCTOR SIZE	#10 AWG
MIN AC GROUND SIZE	#10 AWG
PV BREAKER	20A
INVERTER WATTAGE	3000W

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
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PHONE: 866-736-1253

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(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

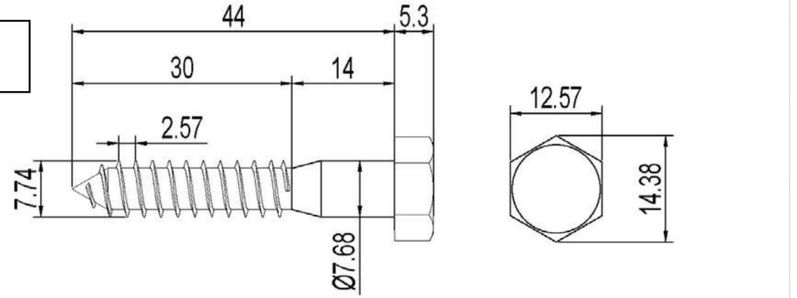
CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

ELECTRICAL CALCS AND EQUIPMENT INFO

E-3

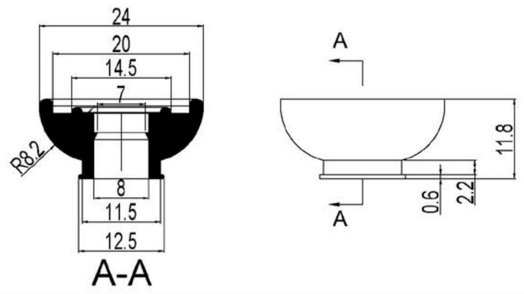
PN# 16318
Screws

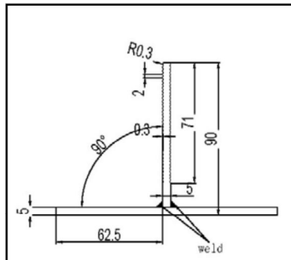


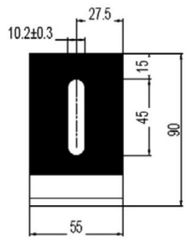
Tolerance Range							
Baiting tolerance	±2 mm						
Hole tolerance	±0.3 mm						
Hole distance tolerance	±0.5 mm	Design				Scale	Quantity
Form tolerance	±2 mm	Drawing				Material	SUS304
Thicknessness tolerance	±0.1 mm	Confirm				Drawing No.	
Angle tolerance	±1° mm	Verify				Finish	

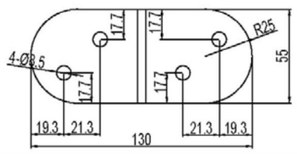
QuickBOLT

PN# 16318
Umbrella Washer



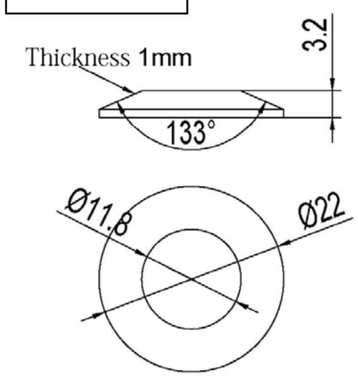






PN# 16318
Black T-Foot

PN# 16318
Silicone backing



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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

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

SYSTEM SIZE: 4.38 KW (E-1)
(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

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

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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

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SYSTEM SIZE: 4.38 KW (E-1)
(12) URE – F6M365E7G-BB (CS-1)
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INTERCONNECTION METHOD: RATED BACK FED TAP

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STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

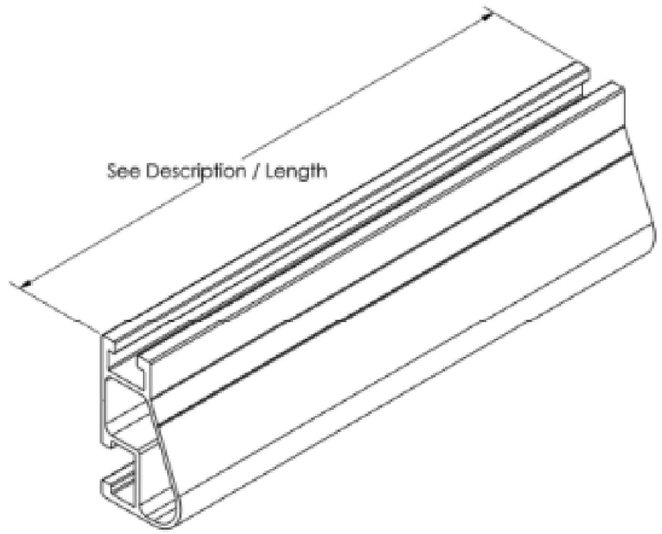
MOUNT CONT.

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

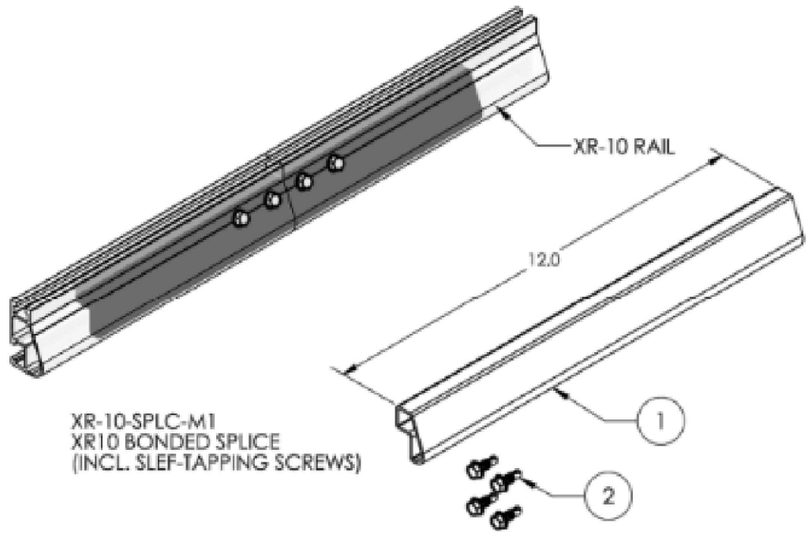
Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-10-132A	XR-10-132B	XR10, Rail 132" (11 Feet)	6000-Series Aluminum	4.67 lbs.
XR-10-168A	XR-10-168B	XR10, Rail 168" (14 Feet)		5.95 lbs.
XR-10-204A	XR-10-204B	XR10, Rail 204" (17 Feet)		7.22 lbs.

v1.0

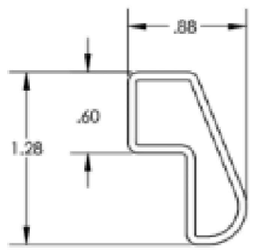
Cut Sheet

IRONRIDGE

XR10 Bonded Splice

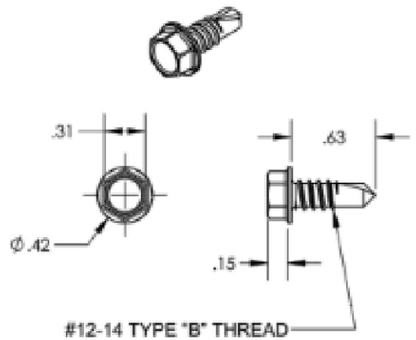


1) Splice, XR10, Mill 12" long



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
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SYSTEM SIZE: 4.38 KW (E-1)
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ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

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JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

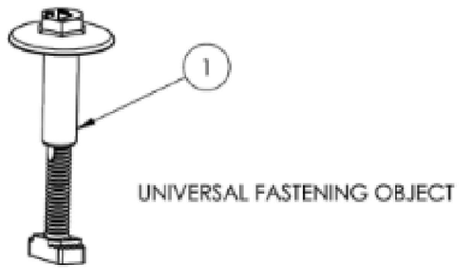
EQUIPMENT

EQ-1

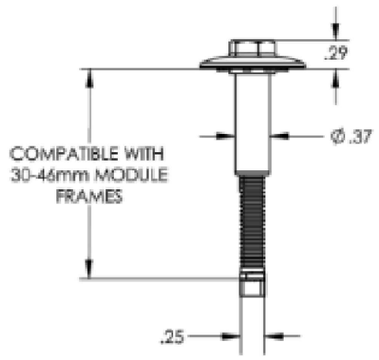
Cut Sheet

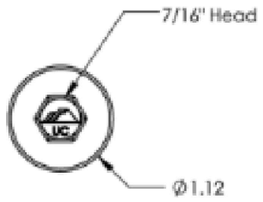
IRONRIDGE

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





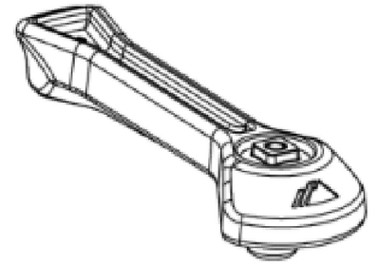
Property	Value
Material	300 Series Stainless Steel
Finish	Clear and Black

v1.20

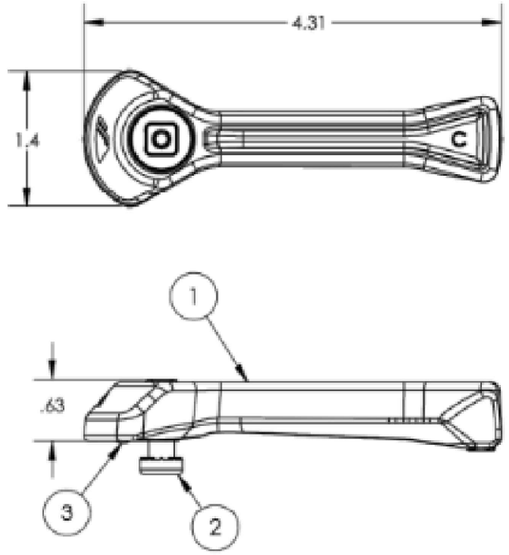
Cut Sheet

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: 4.38 KW (E-1)
(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

EQUIPMENT

EQ-2

IRONRIDGE
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.

IRONRIDGE
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.

IRONRIDGE
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.

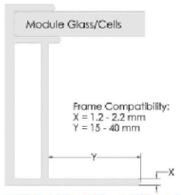


Figure 1: CAMO Module Frame Dimensional Requirements

IRONRIDGE
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,

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

Gang Xuan, SE
Senior Structural Engineer

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

SYSTEM SIZE: 4.38 KW (E-1)
(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

EQUIPMENT

EQ-3

Rail: XR10		Flush Mount System Span Table (inches) Portrait Installation (Maximum Module Length 67.5") 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: 4.38 KW (E-1)

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

(1) SOLAREDGE - SE3000H-US (CS-2)

(12) SOLAREDGE - S440 (CS-3)

ROOF TYPE: COMP SHINGLE (PV-2)

RAFTERS, 2X6 @ 24" (PV-2)

INTERCONNECTION METHOD: RATED BACK FED TAP

CUSTOMER LAST NAME: BASS

ADDRESS: 144 BROWER RD

CITY: CAMERON

STATE: NC

ZIP: 28326

JURISDICTION: CAMERON

UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR

DESIGNED ON 4/19/2022

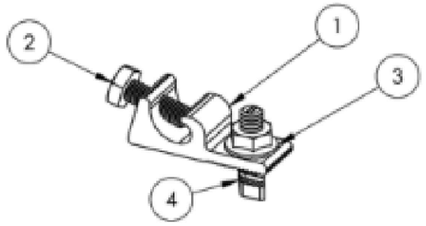
EQUIPMENT

EQ-4

Cut Sheet

IRONRIDGE

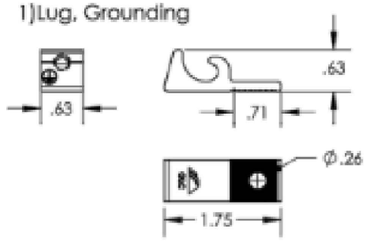
Grounding Lug



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

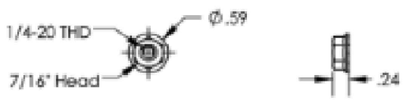
Part Number	Description	Wire Size Range (AWG)
GD-LUG-003	KIT, 2PCS, GROUNDING LUG, LOW PROFILE	4-10

1)Lug, Grounding



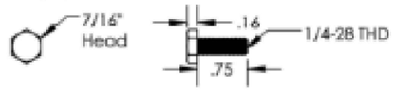
Property	Value
Material	Tin Plated Copper
Finish	Clear Matte

3) Nut, Flange Hex 1/4-20



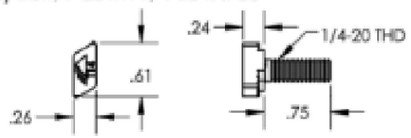
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

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



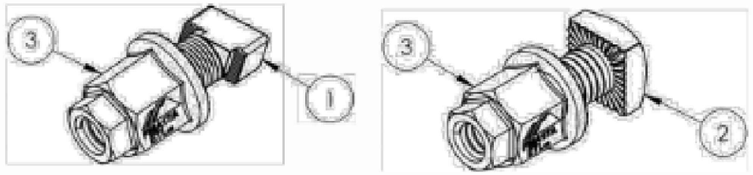
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.0

Cut Sheet

IRONRIDGE

Bonding Hardware

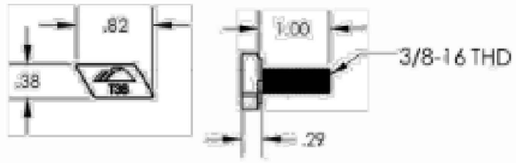


ITEM NO.	DESCRIPTION
1	BOLT, T CSTM, 3/8-16
2	BOLT, BONDING 3/8-16 SQ HEAD
3	NUT, BONDING STEP

BONDING HARDWARE

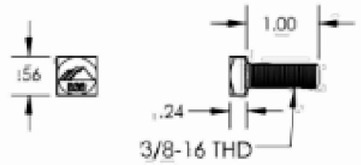
Part Number	Description
BHW-TB-02-A1	T-BOLT, BONDING HARDWARE
BHW-SQ-02-A1	SQUARE-BOLT, BONDING HARDWARE

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: 4.38 KW (E-1)
(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
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ROOF TYPE: COMP SHINGLE (PV-2)
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STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

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***

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

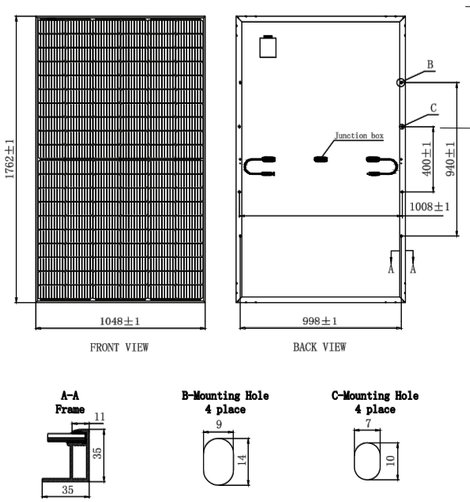
Item	Specification
Mechanical Load	5400 Pa
Maximum System Voltage	1000 VDC
Series Fuse Rating	20 A
Operating Temperature	-40 to 85 °C

Temperature Characteristics

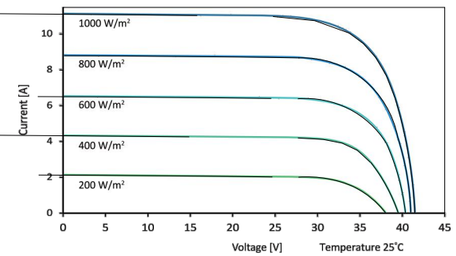
Item	Specificatio
Nominal Module Operating Temperature	45 °C ± 2°C
Temperature Coefficient of Isc	0.048 % / °C
Temperature Coefficient of Voc	-0.27 % / °C
Temperature Coefficient of Pmax	-0.35 % / °C

*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%.

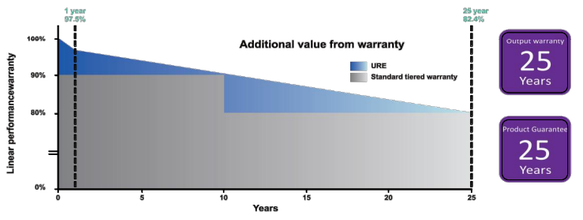
Engineering Drawing (mm)



Dependence on Irradiance



Reliability with Warranty



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

United Renewable Energy Co., Ltd.

UNITED RENEWABLE ENERGY

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Fluent SOLAR

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

SYSTEM SIZE: 4.38 KW (E-1)
(12) URE - F6M365E7G-BB (CS-1)
(1) SOLAREDGE - SE3000H-US (CS-2)
(12) SOLAREDGE - S440 (CS-3)
ROOF TYPE: COMP SHINGLE (PV-2)
RAFTERS, 2X6 @ 24" (PV-2)
INTERCONNECTION METHOD: RATED BACK FED TAP

CUSTOMER LAST NAME: BASS
ADDRESS: 144 BROWER RD
CITY: CAMERON
STATE: NC
ZIP: 28326
JURISDICTION: CAMERON
UTILITY COMPANY: TOUCHSTONE ENERGY

DESIGNED BY: SR
DESIGNED ON
4/19/2022

MODULE

CS-1

Power Optimizer
For Residential Installations

S440, S500

POWER OPTIMIZER

Enabling PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules

* Functionality subject to inverter model and firmware version

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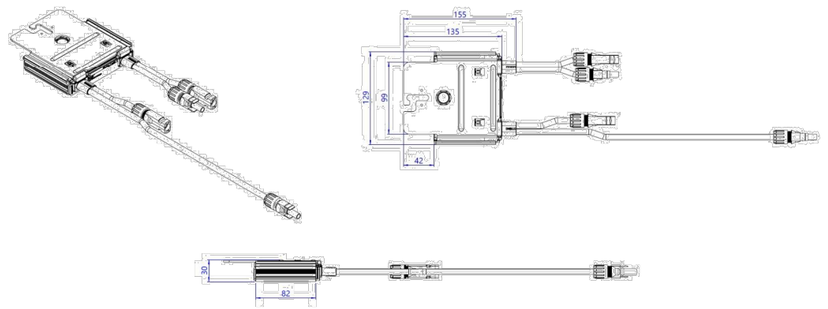
Power Optimizer
For Residential Installations
S440, S500

	S440	S500	UNIT
Rated Input DC Power(1)	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING OPERATION			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1		Vdc
STANDARD COMPLIANCE			
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011		
Safety	IEC62109-1 (class II safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
Fire Safety	VDE-AR-E 2100-712:2013-05		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	1000		Vdc
Dimensions (W x L x H)	129 x 155 x 30		mm
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4(2)		
Input Wire Length	0.1		m
Output Connector	MC4		
Output Wire Length	(+) 2.3, (-) 0.10		m
Operating Temperature Range(3)	-40 to +85		°C
Protection Rating	IP68 / NEMA6P		
Relative Humidity	0 - 100		%

(1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter		Single Phase HD-Wave	Three Phase	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	16	18	
Maximum String Length (Power Optimizers)		25	50		
Maximum Nominal Power per String(4)		5700	11250(5)	12750(6)	W
Parallel Strings of Different Lengths or Orientations		Yes			

(4) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(5) For the 230/400V grid: it is allowed to install up to 13,500W per string when the maximum power difference between each string is 2,000W
(6) For the 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W
(7) It is not allowed to mix S-series and P-series Power Optimizers in new installations



CE RoHS

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DESIGNED BY: SR
DESIGNED ON
4/19/2022

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

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Single Phase Inverter with HD-Wave Technology

for North America

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

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

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

Single Phase Inverter with HD-Wave Technology

for North America

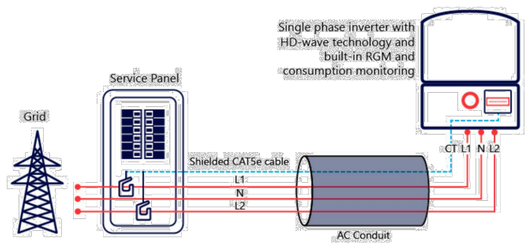
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

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



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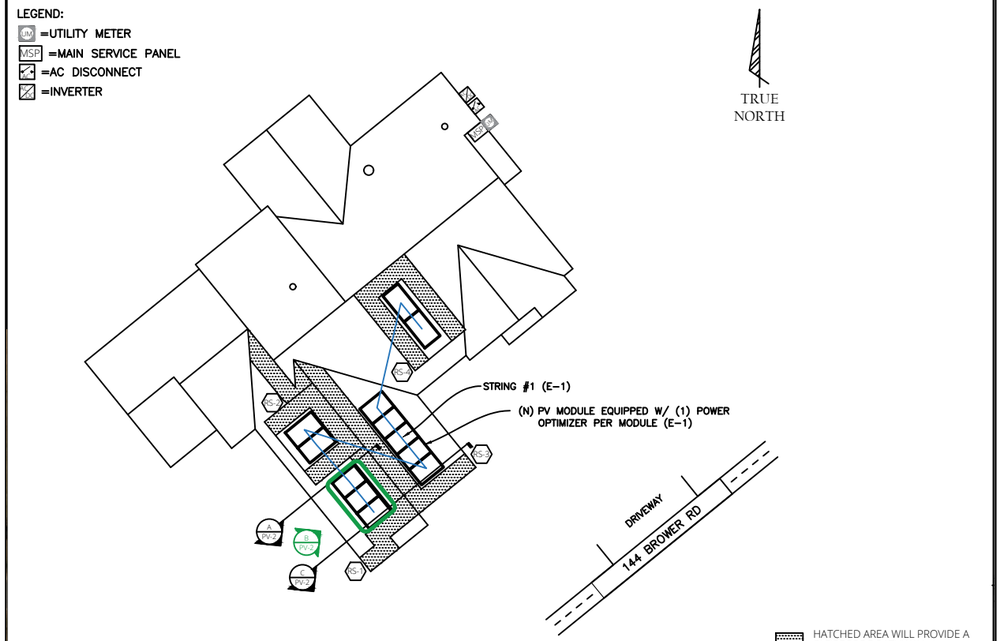
DESIGNED BY: SR
DESIGNED ON
4/19/2022

INVERTER

CS-3

CAUTION

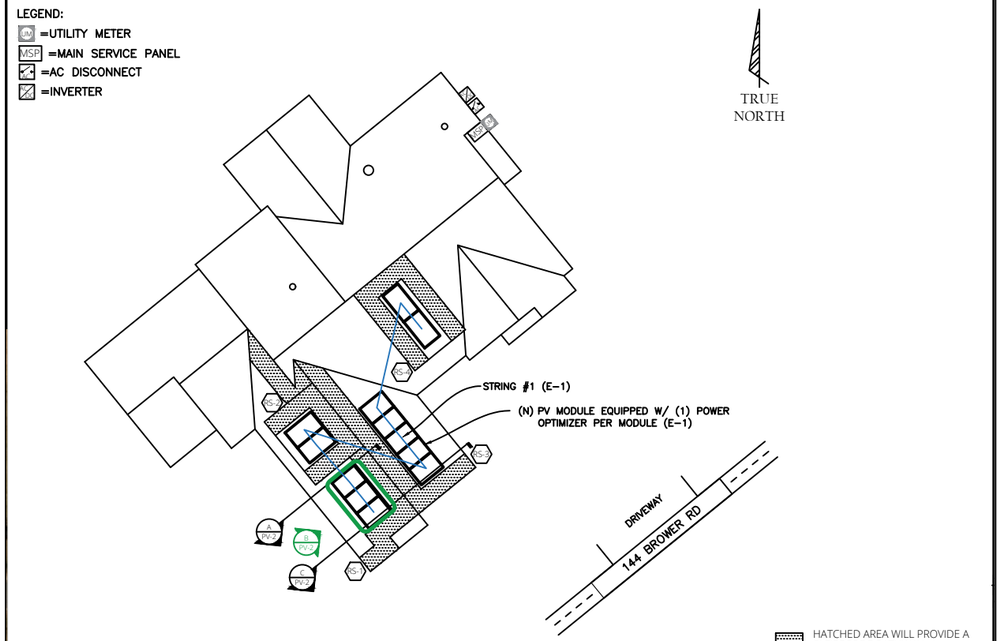
MULTIPLE SOURCES OF POWER



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)

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DESIGNED BY: SR
DESIGNED ON
4/19/2022

PLACARD

PL-1