

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

October 27, 2023 Revised December 13, 2023

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

> Re: Engineering Services Mcneely Residence 1812 SW Merryman Drive, Lees Summit, MO 6.480 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

- Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
- 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

Roof Slope: 40 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 = 20 psf
- Wind Load based on ASCE 7-16
  - Ultimate Wind Speed = 109 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 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 for a 5/16" wood screw in ½" plywood is 55 lbs per screw (per APA technical note E830d). Connection on the roof is utilizing four (4) 5/16" wood screws into the existing decking to resist uplift forces. Contractor to verify installation to be performed in accordance with the manufacturer's recommendations. Based on four (4) 5/16" wood screws into ½" plywood, 220 lbs of uplift resistance is provided per attachment.
- 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 48" on center.

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.

Scott E. Wyssling, PE

Ď11786

Missouri License No. COA #2020037943





## DC SYSTEM SIZE: 6.48 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:

( 16 ) SEG - SEG405BMDHV (CS-1)
( 1 ) SOLAREDGE - SE5000H-US000BNU4 (CS-2)
( 16 ) SOLAREDGE - S440 (CS-3)

THE MODULES SHALL BE FLUSH MOUNTED USING

APPROX. (55) QUICKBOLT #16318 MOUNTS

ON UNIRAC 315168M RAIL

THE PHOTOVOLTAIC SYSTEM SHALL BE INTERCONNECTED BY

PERFORMING A PV BREAKER

INTO THE EXISTING 125 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)

# 12 SW Merryman D E Cass Jackson Ro

109PSF, EXPOSURE CATEGORY C ASCE 7-16 WIND SPEED: GROUND SNOW LOAD: 20 PSF, EXPOSURE CATEGORY C

#### GENERAL NOTES 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. 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).
- 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)
- EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.136(A).
- CONFIRM LINE SIDE VOLTAGE AT ELECTRIC UTILITY SERVICE PRIOR TO CONNECTING INVERTER. VERIFY SERVICE VOLTAGE IS WITHIN INVERTER VOLTAGE
- ALL SIGNAGE MUST BE PERMANENTLY ATTACHED AND BE WEATHER/SUNLIGHT RESISTANT AND CANNOT BE HAND-WRITTEN(SEE E2-E2.1) ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
- 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 ALL PV METERS AND RAPID SHUTDOWNS TO BE WITHIN 5' OF ANOTHER, AC DISCONNECT TO BE WITHIN 10' OF UTILITY METER, PV METER CENTER GLASS TO BE AT 5'
- 冰O. PV METERS TO BE INSTALLED CORRECTLY, SUPPLIED FROM THE TOP JAWS.
- ALL ROOF PENETRATIONS MUST BE FLASHED. SIMPLY CAULKING DOES NOT SUFFICE.
- ALL DC CONDUCTORS RUN INSIDE OF THE STRUCTURE SHALL BE INSTALLED A MINIMUM OF 18" BELOW THE ROOF DECK.
- ALL WORK WILL COMPLY WITH THE 2018 IBC AND 2018 IRC ALL ELECTRICAL WORK WILL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.
- EQUIPMENT MAY BE SUBSTITUTED FOR SIMILAR EQUIPMENT BASED ON AVAILABILITY. SUBSTITUTED EQUIPMENT SHALL COMPLY WITH DESIGN CRITERIA



STAMPS (IF NEEDED)

76 N Meadowbrook Drive Alpine UT 84004 Missouri COA # 2020037943

Signed 12/13/2023

**CONTENTS:** 

COVER PAGE SITE PLAN ROOF INFO PV-2SITE PHOTOS PV-33-LINE DIAGRAM E-1E-2**LABELS** LABELS LOCATION E - 2.1ELEC CALCS AND EQUIPMENT INFO MOUNT M-2MOUNT CONT. EQ-1 **EQUIPMENT** 

EQUIP. CONT. EQ-2 EQ-3EQUIP. CONT. EQ-4 EQUIP. CONT. EQ-5 EQUIP. CONT. CS-1 MODULE CS-2**OPTIMIZER** CS-3**INVERTER** 

PLACARD

ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042

PHONE: 866-736-1253

16 MERRYMAN SW MCNEEL. 1812 ADDRESS: LAST CUSTOMER DESIGNED BY: MR DESIGNED ON

11/24/2023

COVER PAGE



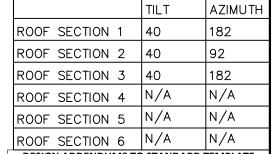
UM =UTILITY METER

MSP = MAIN SERVICE PANEL

=AC DISCONNECT

=INVERTER





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

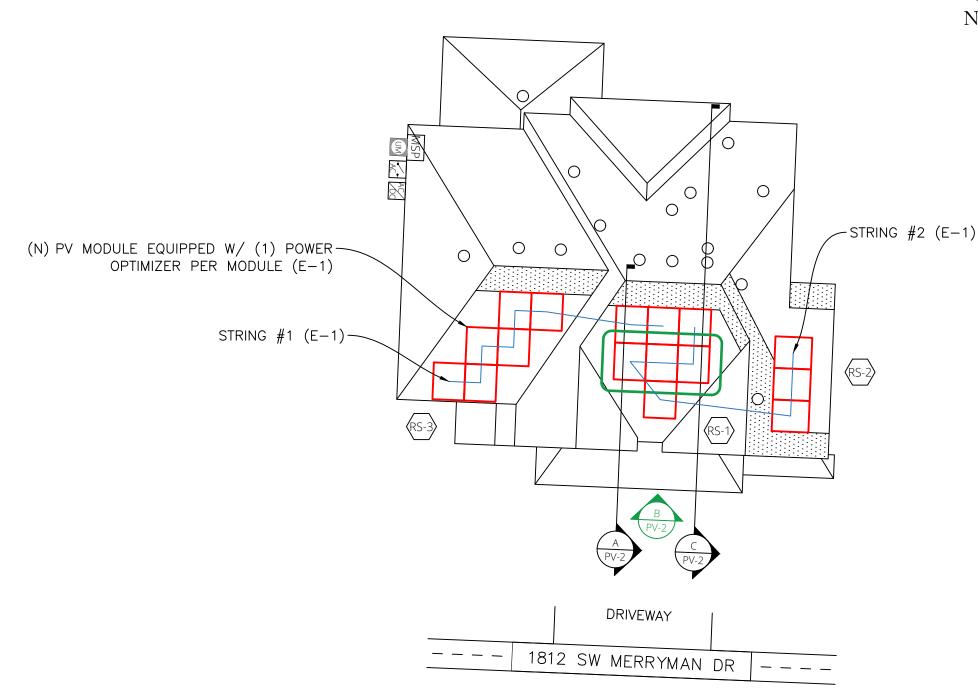
MODULE WATTAGE= 405W INVERTER WATTAGE= 5000W SYSTEM SIZE= 6480W

COTT E NUMBER PE-2019011786

Wyssling Consulting, PLLC 76 N Meadowbrook Drive Alpine UT 84004 Missouri COA # 2020037943

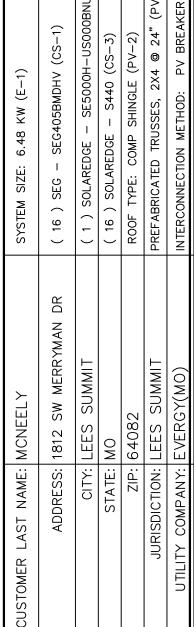
Signed 12/13/2023

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



## 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.
- SCALE  $\frac{3}{2}$ "=1"

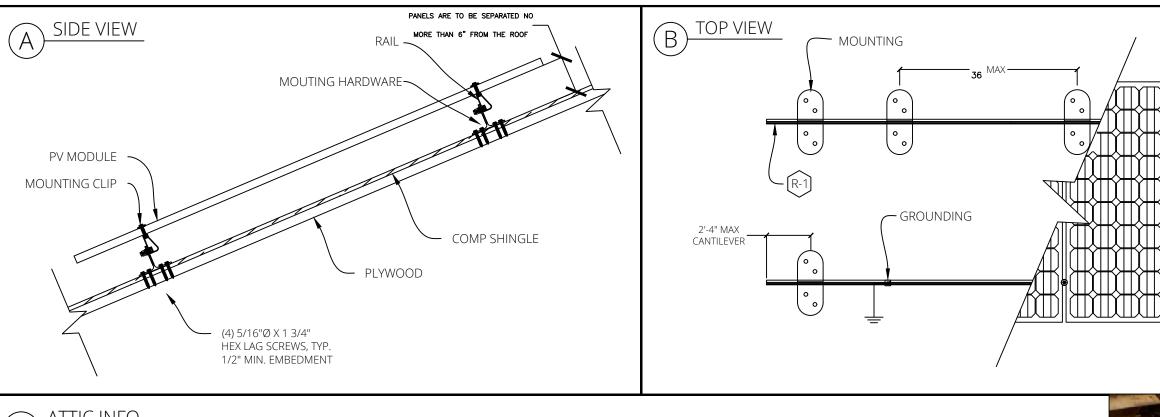


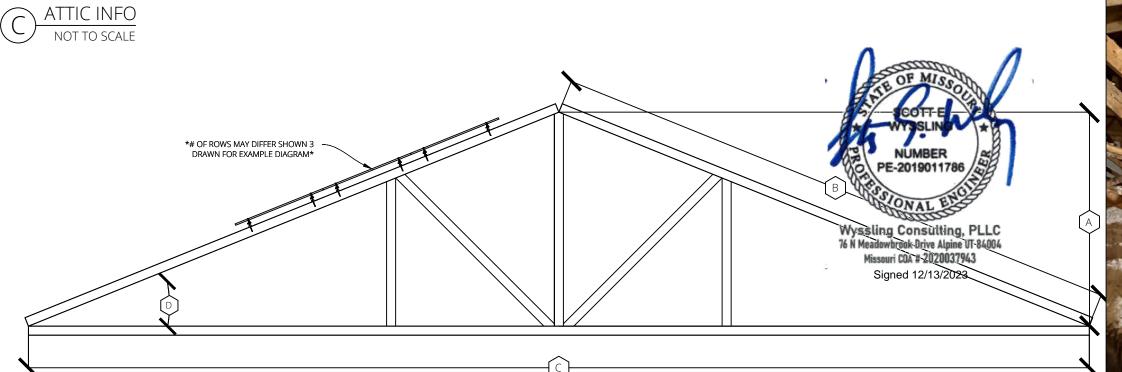
ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042 PHONE: 866-736-1253

DESIGNED BY: MR
DESIGNED ON

11/24/2023 SITE PLAN

PV-1





PREFABRICATED TRUSSES SIZE:	2X4 SPAC	CING: 24	PV ARRAY STRUCTURAL INFO
			TOTAL PV MODULE COUNT: (TOTAL NUMBER OF MODULES BEING INSTALLED)
ROOF INFO IN INCHES &	DEGREES	TAG ID	APPROX. ATTACHMENT POINTS: (ROUND UP (TOTAL ROWS WIDTH) / (MOUNT SPACING)) +
ROOF HEIGHT:	196	А	INDIVIDUAL ARRAY AREA: (MODULE LENGTH) X (MODULE WIDTH)
ROOF FACE SPAN:	305	В	(INDIVIDUAL ARRAY AREA) X (TOTAL MODULE COUNT) = TOTAL ARRAY AREA: FT^2
17.001 17.02 317.111.		<u> </u>	TOTAL ROOF AREA: (ROOF AREA TOTAL) = FT^2
ROOF LENGTH:	468	С	% ARRAY/ROOF: (AREA AREA) / (ROOF AREA) = %
ROOF TILT:	40	D	TOTAL ARRAY WEIGHT: (TOTAL MODULE COUNT) X (MODULE WEIGHT) = LBS
NOO! IIE!:	'0	D	TOTAL DISTRIBUTED LOAD ON ROOF (TOTAL ARRAY WEIGHT) / (ARRAY AREA) = LBS / FT^2

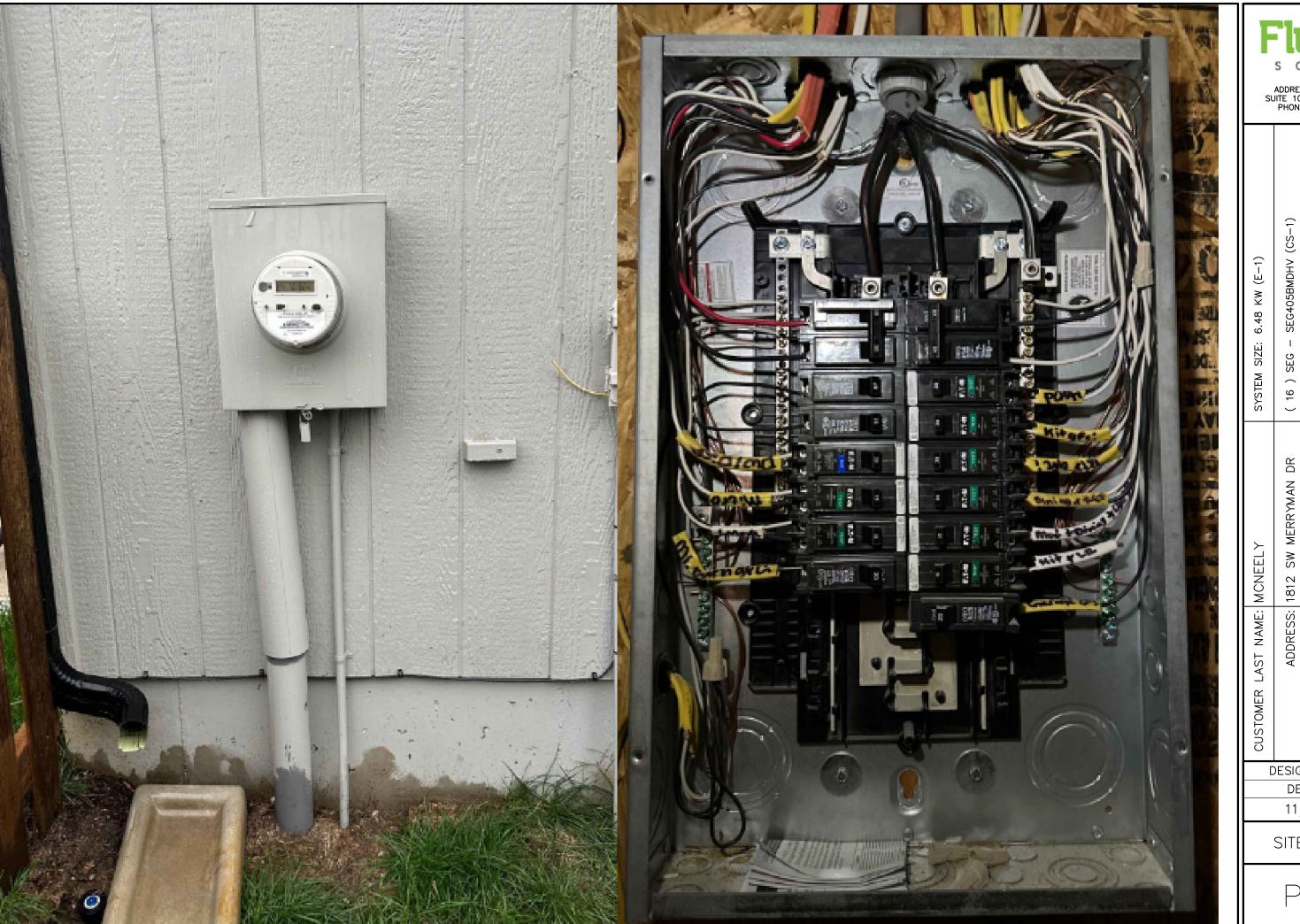
	PV ARRAY STRUCTURAL INFO		
TOTAL PV MODULE COUNT:	(TOTAL NUMBER OF MODULES BEING INSTALLED)	16	MODULES
APPROX. ATTACHMENT POINTS:	(ROUND UP (TOTAL ROWS WIDTH) / (MOUNT SPACING)) +2	55	MOUNTS
INDIVIDUAL ARRAY AREA:	(MODULE LENGTH) X (MODULE WIDTH)	21.01	FT^2
TOTAL ARRAY AREA:	(INDIVIDUAL ARRAY AREA) X (TOTAL MODULE COUNT) = FT^2	336.24	FT^2
TOTAL ROOF AREA:	(ROOF AREA TOTAL) = FT^2	724	FT^2
% ARRAY/ROOF:	(AREA AREA) / (ROOF AREA) = %	46.4	%
TOTAL ARRAY WEIGHT:	(TOTAL MODULE COUNT) X (MODULE WEIGHT) = LBS	758.24	LBS
TOTAL DISTRIBUTED LOAD ON ROOF:	(TOTAL ARRAY WEIGHT) / (ARRAY AREA) = LBS / FT^2	2.26	LBS / FT^2
LOAD ON EACH MOUNT	(TOTAL ARRAY WEIGHT) / (TOTAL NUMBER OF ATTACHMENTS)	13.79	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

MID-CLAMPS

CLAMP

				CUSTOMER LAST NAME: MCNEELY	MCNEELY	SYSTEM SIZE: 6.48 KW (E-1)	Su
Р'	RO	11/	DESIGN	ADDRESS:	ADDRESS: 1812 SW MERRYMAN DR	( 16 ) SEG - SEG405BMDHV (CS-1)	S O  ADDRESS  JITE 100 PHONES
\/ .	)F		NED SIGN	CITY:	CITY: LEES SUMMIT	(1) SOLAREDGE - SE5000H-US000BNU4 (CS-2)	S: 25
	IN		BY IFD	STATE: MO	MO	(16 ) SOLAREDGE - S440 (CS-3)	A 578 V 500N, 5-736
2	IFC		<u>′:</u> ON	ZIP:	ZIP: 64082	ROOF TYPE: COMP SHINGLE (PV-2)	V 600 UT 8
	)	5	MR	JURISDICTION:	JURISDICTION: LEES SUMMIT	PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)	) N 84042
				UTILITY COMPANY: EVERGY(MO)	EVERGY(MO)	INTERCONNECTION METHOD: PV BREAKER	2



S O L A ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042 PHONE: 866-736-1253 (16) SEG - SEG405BMDHV (CS-1) PREFABRICATED TRUSSES, 2X4 @ 24"

( 16 ) ROOF

DR

SUMMIT

JURISDICTION: LEES SUMMIT

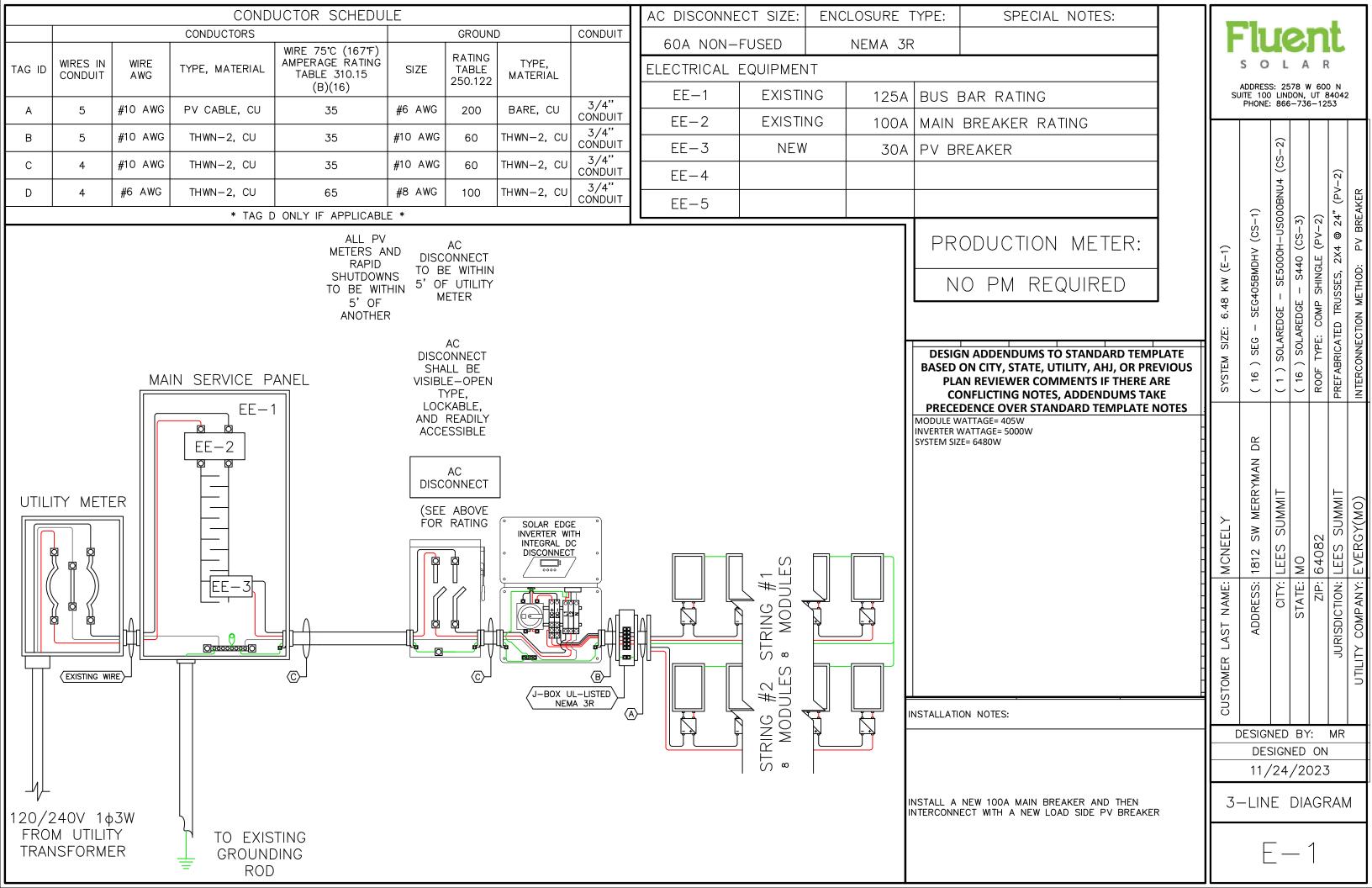
UTILITY COMPANY: EVERGY(MO)

DESIGNED BY:

DESIGNED ON 11/24/2023

SITE PHOTOS

PV-3



# **WARNING**

**ELECTRIC SHOCK HAZARD** 

THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY **BE ENERGIZED** 

LABEL 1 AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT, AND DEVICE WHERE ENERGIZED UNGROUNDED CONDUCTORS MAY BE EXPOSED

## **△WARNING**

**ELECTRIC SHOCK HAZARD** 

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

PHOTOVOLTAIC SYSTEM

AC DISCONNECT 1

RATED AC OUTPUT CURRENT

NOMINAL OPERATING AC VOLTAGE

## WARNING

**DUAL POWER SUPPLY** 

**SOURCES: UTILITY GRID** AND PV SOLAR **ELECTRIC SYSTEM** 

**WARNING: PHOTOVOLTAIC POWER SOURCE** 

## **WARNING**

INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS OVERCURRENT **DEVICE** 

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

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)

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

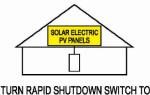
PLACED ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER IF TIE IN CONSISTS OF LOAD SIDE CONNECTION TO BUSBAR. NEC 705.12(D)(2)(3)(B)

## PHOTOVOLTAIC SYSTEM **EQUIPPED WITH** RAPID SHUTDOWN

## **△WARNING**

THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE. SHALL NOT EXCEED AMPACITY OF BUSBAR.

> **SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**



THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

## **SOLAR PV SYSTEM EQUIPPED** WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT



# **PHOTOVOLTAIC** AC DISCONNECT

AC NOMINAL OPERATING VOLTAGE: VOLTS

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

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)]

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)]

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\*

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 (3 IN.), IN WHITE ON RED BACKGROUND)

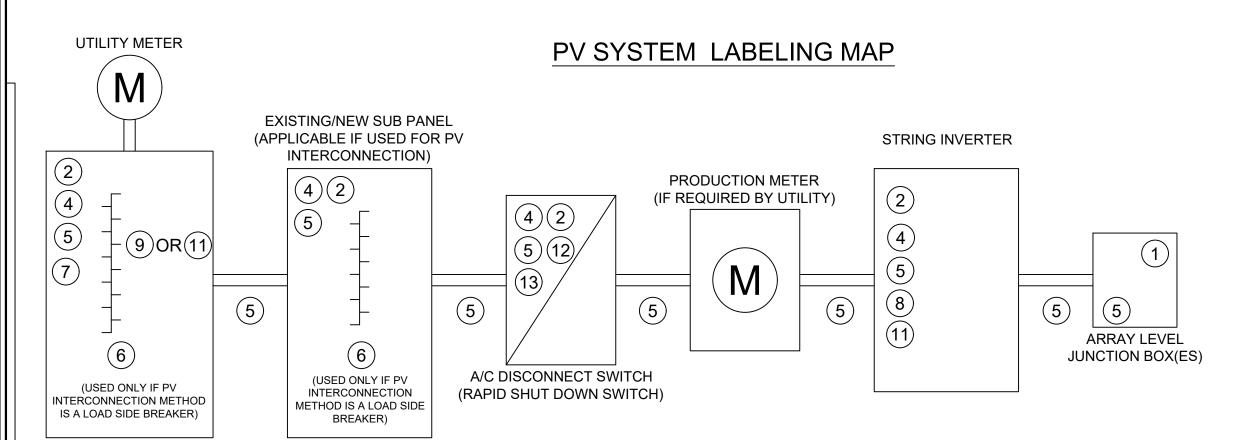


ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042 PHONE: 866-736-1253

2) ⊚ SYSTEM ROOF ( 16 16 DR MERRYMAN SUMMIT SUMMI-EVERGY(MO) MCNEELY SW 64082 LEES 1812 UTILITY COMPANY: ADDRESS: JURISDICTION: LAST CUSTOMER DESIGNED BY: DESIGNED ON

LABELS

11/24/2023



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:

MAIN SERVICE PANEL

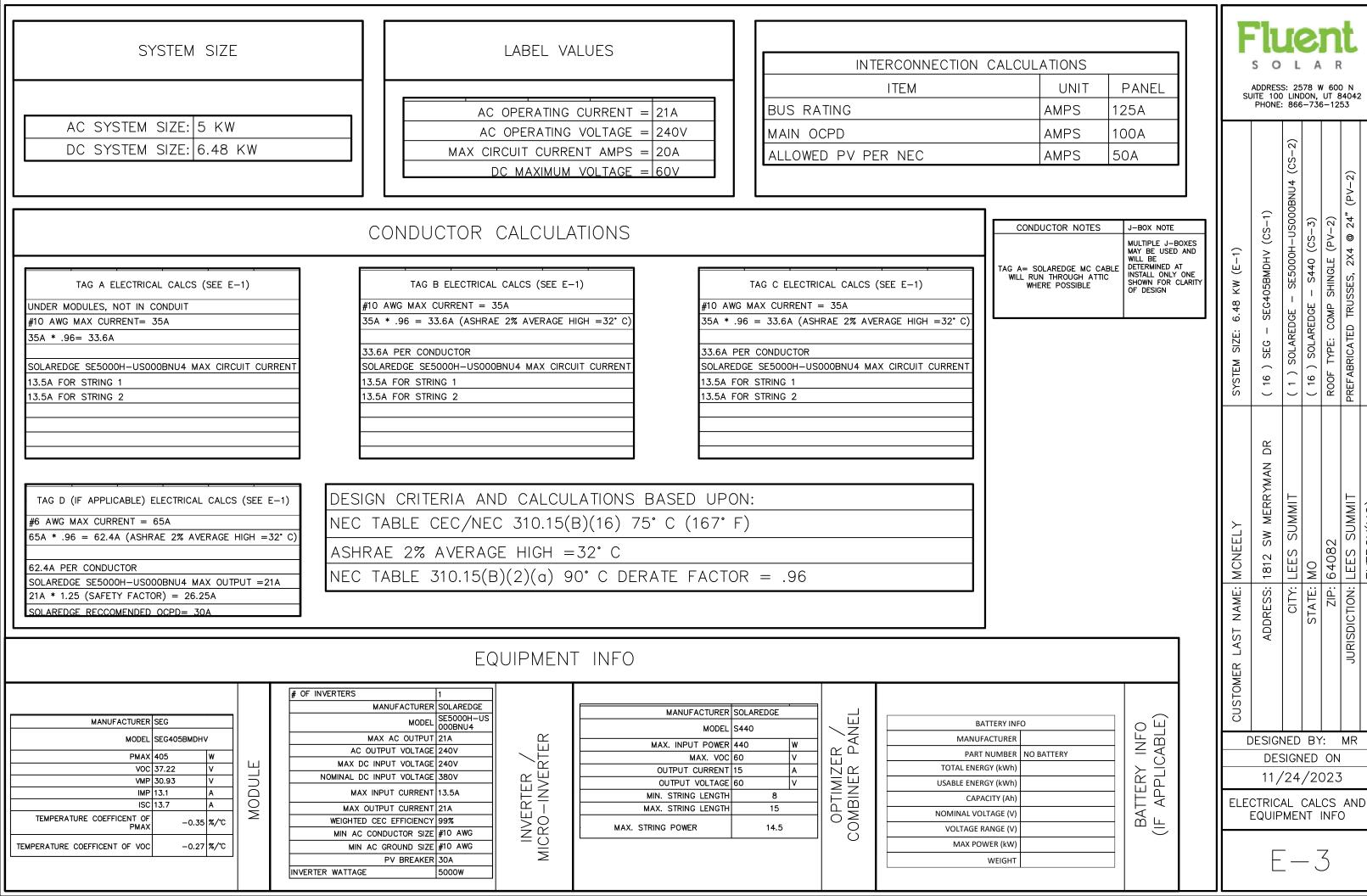
- 1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS IN ADOPTED NATIONAL ELECTRIC CODE (SEE C-1). ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER DESIGN CONFIGURATION, CURRENT, NEC, AND LOCAL CODES.
- 2. LABELING REQUIREMENTS BASED ON THE ADOPTED NATIONAL ELECTRIC CODE (SEE C-1),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

PV SYSTEM

DISCONNECT FOR
UTILITY OPERATION

LABEL 13
TO BE PLACED AT AC DISCONNECT
PER NEC 690.13(B)

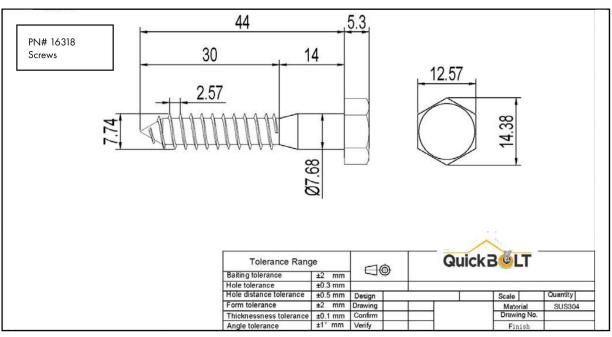
SL	S O ADDRES: JITE 100 PHONE:	) LIN[ : 866	A 578 V 500N, 5-736	V 600 UT 8 3-12		
SYSTEM SIZE: 6.48 KW (E-1)	(16) SEG - SEG405BMDHV (CS-1)	(1) SOLAREDGE - SE5000H-US000BNU4 (CS-2)	(16) SOLAREDGE - S440 (CS-3)	ROOF TYPE: COMP SHINGLE (PV-2)	PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)	INTERCONNECTION METHOD: PV BREAKER
MCNEELY	ADDRESS: 1812 SW MERRYMAN DR	CITY: LEES SUMMIT	MO	ZIP: 64082	LEES SUMMIT	EVERGY(MO)
CUSTOMER LAST NAME: MCNEELY	ADDRESS:	CITY:	OM STATE: MO	:dIZ	JURISDICTION: LEES SUMM	UTILITY COMPANY: EVERGY(MO)
DESIGNED BY: MR DESIGNED ON						
DESIGNED ON 11/24/2023						
	L	AΒ	EL:	S		
	<u> </u>		2	•		

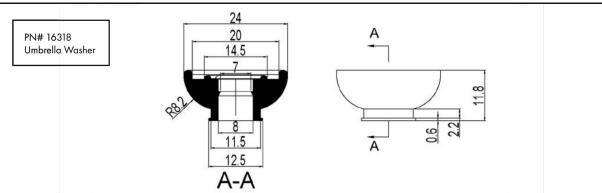


INTERCONNECTION METHOD:

EVERGY(MO)

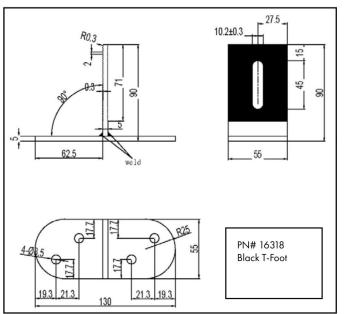
UTILITY COMPANY:

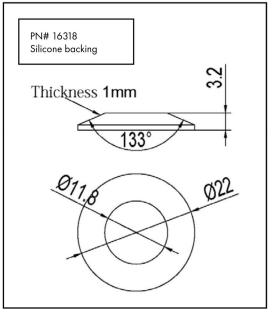




5830 Las Positas Road, Livermore CA 94551 | 3948 Airway Drive, Rock Hill SC 29732

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  $5/16" \times 1-3/4"$  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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MCNEELY	ADDRESS: 1812 SW MERRYMAN DR	CITY: LEES SUMMIT	MO	ZIP: 64082	SDICTION: LEES SUMMIT	COMPANY: EVERGY(MO)	
CUSTOMER LAST NAME: MCNEELY	ADDRESS:	CITY:	STATE: MO	ZIP:	JURISDICTION:	UTILITY COMPANY:	
	ESIGN DES		BY IED	í: ON	MR		
		DESIGNED ON					

11/24/2023

MOUNT

M - 1

## **UL CERTIFICATION**

#### CERTIFICATE OF COMPLIANCE

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

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.

UL 2703 Standard for Mounting Systems, Mounting Standard(s) for Safety:

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.

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 <u> 17519 17520 17521 17522 17523 17524 17525 17526 17527 17536 17537 17538 17539 17540 17541</u> 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

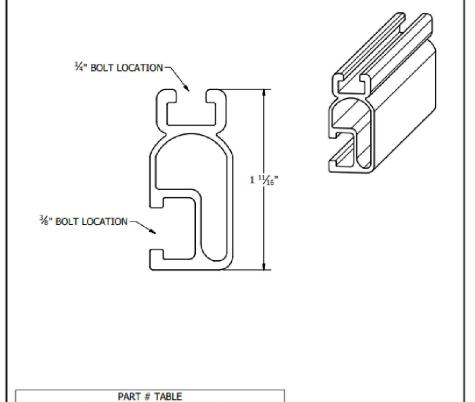
Ratings: Overcurrent Protection Rating - 25 Amps

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.

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

SYSTEM SIZE: 6.48 KW (E-1)	( 16 ) SEG — SEG405BMDHV (CS—1)	(1) SOLAREDGE - SE5000H-US000BNU4 (CS-2)	(16 ) SOLAREDGE - S440 (CS-3)	ROOF TYPE: COMP SHINGLE (PV-2)	PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)	INTERCONNECTION METHOD: PV BREAKER
NAME: MCNEELY	DDRESS: 1812 SW MERRYMAN DR	CITY: LEES SUMMIT	МО	ZIP: 64082	DICTION: LEES SUMMIT	EVERGY(MO)
CUSTOMER LAST NAME:	ADDRESS:	CITY:	STATE: MO	ZIP:	JURISDICTION:	UTILITY COMPANY: EVERGY(MO)
	DESIGN	NED	BY		MR	
		SIGN		ON		
	11/	24	/20	)23	5	

MOUNT CONT.



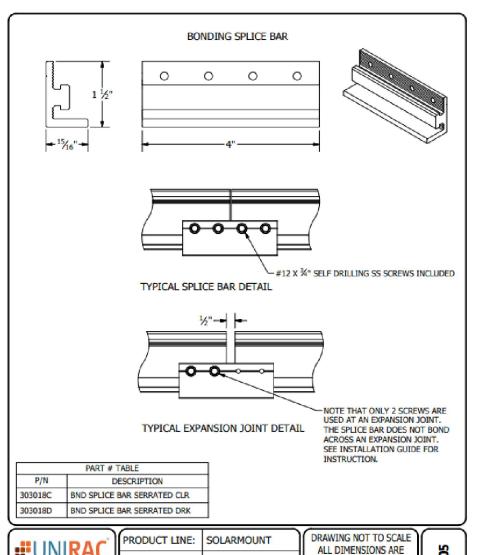
LENGTH

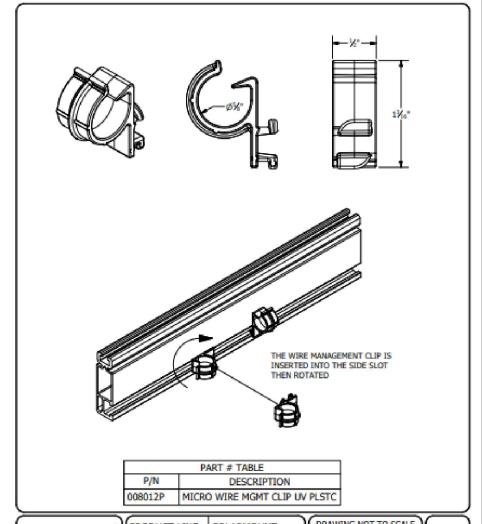
168"

168"

240"

240"





$\overline{}$	
SHEET	1411 BROADWAY BLVD. NE ALBUQUERQUE, NM 87102 USA PHONE: 505.242.6411 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	ASSEMBLY
DESCRIPTION:	WIRE MGMT CLIP
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL PRODUCT PROTECTED BY ONE OR MORE US PATENTS LEGAL NOTICE

SHEET

DESIGNED BY: MR DESIGNED ON

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

SEG405BMDHV

16

 $\mathsf{DR}$ 

MERRYMAN

SW

1812

ADDRESS:

CITY:

×

6.48

SIZE:

SYSTEM

MCNEELY

NAME:

LAST

CUSTOMER

PV BREAKER

INTERCONNECTION METHOD: PREFABRICATED TRUSSES,

-2)

16)

2X4 @

LEES SUMMIT EVERGY(MO)

JURISDICTION:

UTILITY COMPANY:

64082

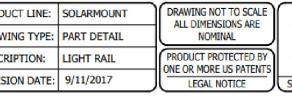
11/24/2023

**EQUIPMENT** 

1	315168M	SM LIGH	T RAIL 168" MILL
1	315168D	SM LIGH	T RAIL 168" DRK
1	315240M	SM LIGH	T RAIL 240" MILL
1	315240D	SM LIGH	T RAIL 240" DRK
\			
	<b>#</b> UNIR	۸۲۰)[	PRODUCT LINE:
ı	1411 BROADWAY BU	[	DRAWING TYPE:
1	ALBUQUERQUE, NM 87 PHONE: 505.242.6	102 USA [	DESCRIPTION:
l	WWW.UNIRAC.O		REVISION DATE:

P/N

DESCRIPTION



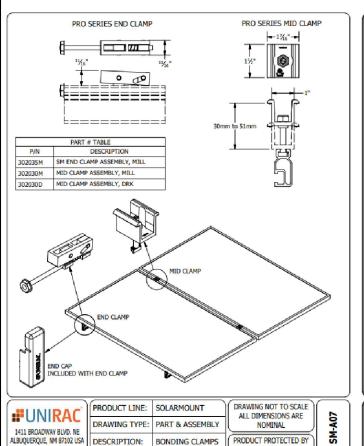
**SM-P02** SHEET

1411 BROADWAY BLVD. NE ALBUQUERQUE, NM 87102 USA PHONE: 505.242.6411 WWW.UNIRAC.COM

DRAWING TYPE: PART & ASSEMBLY BONDING SPLICE DESCRIPTION: REVISION DATE: 9/27/2017

NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS LEGAL NOTICE



DRAWING TYPE: PART & ASSEMBLY

REVISION DATE: 9/14/2017

DESCRIPTION:

BONDING CLAMPS

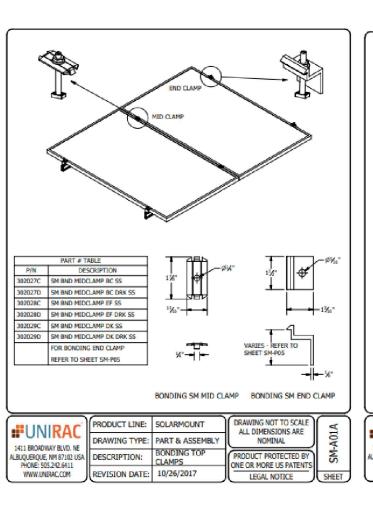
1411 BROADWAY BLVD. NE ALBUQUERQUE, NM 87102 USA

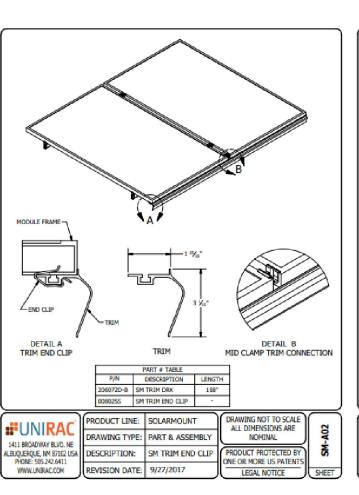
PHONE: 505.242.6411 WWW.UNIRAC.COM

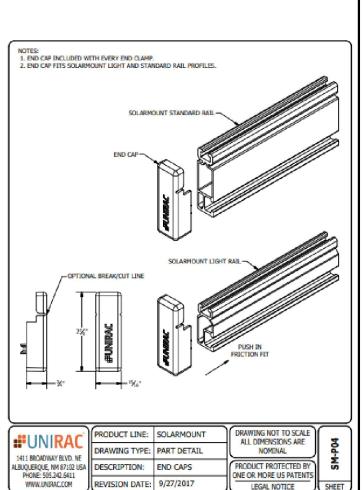
NOMINAL

ONE OR MORE US PATENTS

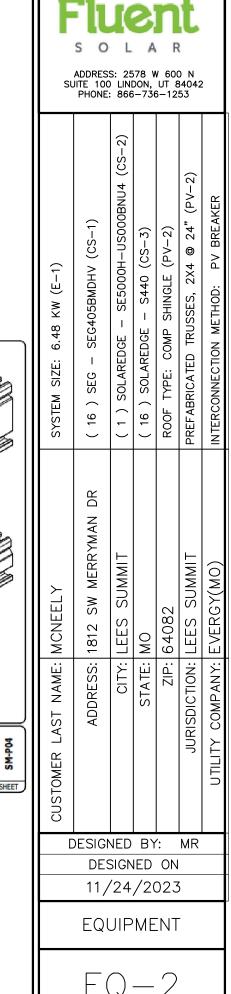
LEGAL NOTICE







LEGAL NOTICE



#### UNIRAC SPLICE T-BOLT AND NUT - 009020S

UniRac, SolarMount Integrated Bonding, T-Bolt & Nut, 3/8" X 3/4", Clear SS, Qty. 1, 009020S

SolarMount defined the standard in solar racking. Recent enhancements are designed to get installers off the roof faster than ever before. Components are preassembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process reduces copper wire and eliminates grounding straps or bonding jumpers to reduce costs.

#### **Features**

· Highlights - Easy installation, and high compatibility.

#### General Information

Manufacturer:

**Product Line:** Model ID:

SolarMount 0090208

Certifications and Safety Ratings:

**(II)** 

UniRac

#### Mechanical Data

Technology: Dimensions: T-Bolt and Nut 1.50 x 1.25 x 0.75 Inches

Weight:

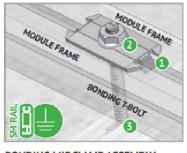
Application:

Integrated Bonding



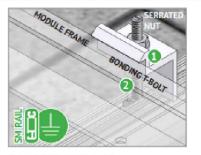


# BONDING CONNECTION GROUND PATHS



#### BONDING MIDCLAMP ASSEMBLY

- Stainless steel Midclamp points, 2 per module, pierce module frame anodization to bond module to module through clamp.
- 2 Serrated flange nut bonds stainless steel clamp to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to



#### ENDCLAMP ASSEMBLY

- Serrated flange nut bonds aluminum Endclamp to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization 2 to bond T-bolt, nut, and Endclamp to grounded

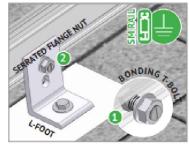
Note: End clamp does not bond to module frame



#### **BONDING RAIL SPLICE BAR**

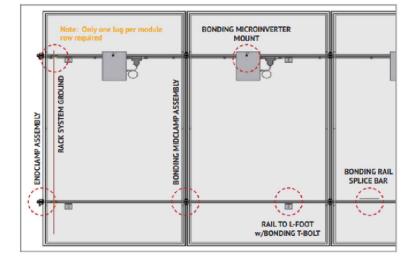
- Stainless steel self drilling screws drill and tap into splice bar and rail creating bond between splice bar and each rail section
- Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

Note: Splice bar and bolted connection are non-structural. The splice bar function is rail alignment and bonding.



#### RAIL TO L-FOOT w/BONDING T-BOLT

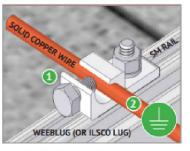
- Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization 2 Serrated 1-bolt need periodical to bond T-bolt, nut, and L-foot to grounded SM





#### BONDING MICROINVERTER MOUNT

- Hex nut with captive lock washer bonds metal microinverter flange to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail be achieved through the trunk cable of approved microinverter systems. See page I for details



#### RACK SYSTEM GROUND

- WEEB washer dimples pierce anodized rail to create bond between rail and lug
- Solid copper wire connected to lug is routed to provide final system ground connection.

NOTE: Ilsco lug can also be used when secured to the side of the rail. See page I-3 for details



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

SYSTEM SIZE: 6.48 KW (E-1)	(16) SEG - SEG405BMDHV (CS-1)	(1) SOLAREDGE - SE5000H-US000BNU4 (CS-2)	( 16 ) SOLAREDGE - S440 (CS-3)	ROOF TYPE: COMP SHINGLE (PV-2)	PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)	INTERCONNECTION METHOD: PV BREAKER
NAME: MCNEELY	ADDRESS: 1812 SW MERRYMAN DR	CITY: LEES SUMMIT	MO	ZIP: 64082	CTION: LEES SUMMIT	IPANY: EVERGY(MO)
CUSTOMER LAST NAME:	ADDRESS:	CITY:	STATE: MO	ZIP:	JURISDICTION:	UTILITY COMPANY:
DESIGNED BY: MR  DESIGNED ON						
	11/				5	
	EQI	JIP	ME	NT	-	



## **Certificate of Compliance**

Certificate: 70131735 Master Contract: 266909 (266909)

70185553 Project: Date Issued: 2018-10-08

Issued to: Unirac

1411 Broadway NE

Albuquerque, New Mexico 87102

Attention: Klaus Nicolaedis

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Michael Hoffnagle

Michael Hoffnagle

CLASS - C531302 - POWER SUPPLIES- PHOTOVOLTAICS--PV Racking

CLASS - C531382 - POWER SUPPLIES- PHOTOVOLTAICS-PV Racking and clamping systems-Certified to

Models: SM SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.

ULA Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules.

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs. Fire ratings of Class A with Type 1, 2, 3, or 10 for steep slope. Tested at 5" interstitial gap which allows installation at any stand-off

DOD 507 Rev. 2016-02-18



Certificate: 70131735 Master Contract: 266909 70185553 Date Issued: 2018-10-08 Project:

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation

Mechanical ratings:

Downward Design Load (lb/fl²)	113.4
Upward Design Load (lb/ft²)	50.4
Down-Slope Load (lb/ft²)	14.7

Conditions of acceptability: Installation is subject to acceptance of the local inspection authorities having jurisdiction. The certification of these products relates only to the methods of installation, bonding, and grounding as outlined in the Installation Manual for each product.

Unirac Large Array

ULA is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules. ULA aluminum components merge with SM rails and installer-supplied steel pipe. The SM rail system is secured to the horizontal Pipe using the Rail Bracket components. The Rear and Front cap secures the horizontal Pipe to the vertical Pipe. The Front cap is also used to secure the Cross brace. A Slider is attached to the vertical Pipe to secure the Cross brace. The SM rails, caps, slider, rail brackets, and cross braces materials are 6105-T5 aluminum extrusion. Fasteners materials are 304 stainless steel. Horizontal and vertical pipe materials meet the minimum requirements of ASTM A53 for galvanized steel

The mechanical load ratings from the SM test data will be applied to the ULA model.

Fire Testing is not applicable due to being a ground mount system.

#### APPLICABLE REQUIREMENTS

UL 2703-1st Edition Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground

Lugs for Use with Flat-Plate Photovoltaic Modules and Panels.

LTR AE-001-2012 - List of Technical Requirements for Photovoltaic Module and Panel racking Systems

#### MARKINGS

The manufacturer is required to apply the following markings:

- Products shall be marked with the markings specified by the particular product standard.
- Products certified for Canada shall have all Caution and Warning markings in both English and French.



Certificate: 70131735 Master Contract: 266909 70185553 Date Issued: 2018-10-08 Project:

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having Jurisdiction. It is the responsibility of the manufacturer to provide and apply these additional markings, where applicable, in accordance with the requirements of those authorities.

The products listed are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and U.S. Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only.

The following markings appear on the rail by adhesive label:

- 1. Submitter's name and/or CSA Master Contract number "266909";
- Model designation;
- Manufacturing date;
- 4. System fire class rating/designation of information location in Installation Manual;
- 5. Design load rating/designation of information location in Installation Manual;

The following markings appear on the Mid clamp by stamping:

- 1. Submitter's name and/or CSA Master Contract number "266909";
- CSA mark
- 3. Mil ID for factory location

ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042

000						
COSTOMER LAST NAME:	ADDRESS:	CITY:	STATE: MO	ZIP:	JURISDICTION:	UTILITY COMPANY:
I NAME: MONEELT	ADDRESS: 1812 SW MERRYMAN DR	CITY: LEES SUMMIT	МО	ZIP: 64082	URISDICTION:  LEES SUMMIT	/ COMPANY: EVERGY(MO)
3131EM 312E: 0:40 NW (E-1)	( 16 ) SEG — SEG405BMDHV (CS-1)	(1) SOLAREDGE - SE5000H-US000BNU4 (CS-2)	(16 ) SOLAREDGE - S440 (CS-3)	ROOF TYPE: COMP SHINGLE (PV-2)	PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)	INTERCONNECTION METHOD: PV BREAKER

**EQUIPMENT** 





The SOLARMOUNT system has been certified and listed to the UL 2703 standard (Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels). This standard included electrical grounding, electrical bonding, mechanical load and fire resistance testing.

In conducting these tests, specific modules are selected for their physical properties so that the certifications can be broadly applied. The following lists the specific modules that were tested and the applicability of those certifications to other modules that might come onto the market.

In addition to UL 2703 certification, Unirac performs internal testing beyond the requirements of certification tests in order to establish system functional limits, allowable loads, and factors of safety. These tests include functional system tests, and destructive load testing.

#### Mechanical Load Test Modules

The modules selected for UL 2703 mechanical load testing were selected to represent the broadest range possible for modules on the market. The tests performed cover the following basic module parameters:

- Frame thicknesses greater than or equal to 1.0 mm
- Basic single and double wall frame profiles (some complex frame profiles could require further analysis to determine applicability)
- · Clear and dark anodized aluminum frames
- UL2703 Certification Load Ratings:
  - o Down-113.4 PSF, Up 50.4 PSF, Down-Slope 14.7 PSF
- Tested Loads:
  - o Down 170.10 PSF, Up 75.60 PSF, Down-Slope 22.05 PSF
- Maximum Area of Module = 21.06 sqft

Tested M	odules
Module Manufacturer	Model/Series
Hyundai	HIS-S325TI

#### System Level Fire Classification

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. Class A system level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes ≥ 2 inches per foot, or 9.5 degrees). There is no required minimum or maximum height limitation above the roof deck to maintain the system fire rating for SOLARMOUNT. Module Types & System Level Fire Ratings are listed below:

ail Type	Module Type	System Level Fire Rating	Rail Direction	Module Orientation	Mitigation Required
tandard ail	Type 1, Type 2, Type 3, & Type 10	Class A, B, & C	East-West North-South	Landscape OR Portrait	None Required
ight Rail	Type 1 & Type 2	Class A, B, & C	East-West North-South	Landscape OR Portrait	None Required



August 7, 2019

UniRac 1411 Broadway Boulevard NE Albuquerque, New Mexico 87102-1545 TEL: (505) 242-6411 FAX: (505) 242-6412

Attn.: Engineering Department,

Re: Engineering Certification for UniRac's PUB16JAN05 edition of the "SolarMount Design & Engineering Guide"

PZSE, Inc.-Structural Engineers has reviewed UniRac's "SolarMount Design & Engineering Guide" published January 05, 2016 and specifically the enhancements of the SolarMount Flush-to-Roof System, Pressure Lookup Tables, and Downward & Upward Span Length Tables.

This certification excludes connections to building structures and the effects on building structure components.

All information, data and analysis contained within the Design & Engineering Guide are based on, and comply with the following:

- 1. 2006, 2009, 2012, 2015 International Building Code, by International Code Council, Inc.
- ASCE/SEI 7-05 & ASCE/SEI 7-10 Minimum Design Loads for Buildings and other Structures, by ASCE
- 3. 2005, 2010, 2015 Aluminum Design Manual, by The Aluminum Association

This letter certifies that the structural calculations contained within UniRac's "SolarMount Design & Engineering Guide" are in compliance with the above Codes.

If you have any questions on the above, do not hesitate to call.

Prepared By: PZSE, Inc. - Structural Engineers Roseville, CA



FIRM NUMBER F-15844

1478 Stone Point Drive, Suite 190, Roseville, CA 95661 T 916.961.3960 F 916.961.3965 W www.pzse.com Experience | Integrity | Empowerment

ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042 5 SE5000H-US000BNU4 PV BREAKER 2) 0 SEG405BMDHV SHINGLE INTERCONNECTION METHOD: PREFABRICATED TRUSSES, × 6.48 SOLAREDGE SIZE: SEG SYSTEM  $\overline{\phantom{a}}$ ROOF ( 16 16 DR MERRYMAN SUMMIT SUMMIT EVERGY(MO) MCNEELY SW 64082 LEES 1812 CITY: UTILITY COMPANY: ADDRESS: JURISDICTION:

CUSTOMER LAST NAME: MC
CUSTOMER LAST NAME: MC
DESIGNED BA: WL
DESIGNED BA: WL
DESIGNED BA: WL
DESIGNED BA: MC
ALL
STATE: MC
ALL



SIV SERIES

Small Changes, Big Accomplishments

SEG Solar INC. (SEG) redefined the high-efficiency module series by

Less power loss by minimizing the shading impact

Ideal choice for utility and commercial scale projects

integrating 182mm silicon wafers with multi-busbar and half-cut cell

technologies. SEG panel combined creative technology effectively

and extremely improved the module efficiency and power output.

Less mismatch to get more power

Competitive low light performance

3 times EL test to ensure best quality

by reduced BoS and improved ROI

Outstanding reliability proven by PVEL for stringent environment condition:

405-420W

**SEG SOLAR INC. (SEG)** 

www.segsolar.com



#### SEG SOLAR INC. (SEG)

www.segsolar.com

## **Electrical Characteristics**

Module Type	SEG-40	5-BMD-HV	SEG-41	D-BMD-HV	SEG-415	-BMD-HV	SEG-420	-BMD-HV
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power at STC (Pmp)	405	304	410	308	415	311	420	315
Open Circuit Voltage (Voc)	37.22	34.73	37.32	34.81	37.42	34.90	37.52	34.99
Short Circuit Current (Isc)	13.70	11.07	13.80	11.15	13.90	11.23	14.00	11.32
Maximum Power Voltage (Vmp)	30.93	28.91	31.05	29.05	31.16	29.19	31.28	29.33
Maximum Power Current (Imp)	13.10	10.51	13.21	10.59	13.32	10.66	13.43	10.74
Module Efficiency at STC(ηm)	20	.74	21	.00	21	.25	21	.51
Power Tolerance	(0, +3%)							
Maximum System Voltage	1500V DC							
Maximum Series Fuse Rating				25	5 A			

STC: Irradiance 1000 W/m² module temperature 25°C AM=1.5 NOCT: Irradiance 800W/m² ambient temperature 20°C module temperature 45°C wind speed: 1m/s Power measurement tolerance: +/-3%

#### **Temperature Characteristics**

**Mechanical Specifications** 

**External Dimensions** 

Weight

Frame

Solar Cells

Front Glass

Junction Box

Connector Type

Cable Type / Length

Mechanical Load (Front)

Mechanical Load (Rear)

•	
Pmax Temperature Coefficient	-0.35 %/°C
Voc Temperature Coefficient	-0.27 %/°C
Isc Temperature Coefficient	+0.05 %/°C
Operating Temperature	-40∼+85 °C
Nominal Operating Cell Temperature (NOCT)	45±2 °C

1722 x 1134 x 35 mm

21.5 kg

PERC Mono (108 pcs)

Black anodized aluminium alloy

IP68 / 3 diodes

MC4

12 AWG PV Wire (UL/IEC) / 1200 mm

5400 Pa / 113 psf\*

3600 Pa / 75 psf\*

3.2 / mm AR coating tempered glass / low iron

\*Refer to SEG installation Manual for details

#### PRODUCT CERTIFICATION

IEC61215:2016; IEC 61730:2016;	UL1703; UL61730/CSA/CEC
IEC62804	PID
IEC61701	Salt Mist
IEC62716	Ammonia Resistance
IEC60068	Dust and Sand
IEC61215	Hailstone(25mm)
Fire Type (UL61730):1/29 (Type1-	HV Type29-BG)
ISO14001:2015; ISO9001:2015; IS	SO45001:2018











## INSURANCE

## PKC

#### WARRANTY



· Sand, acid, salt and hailstones · Anti-PID

SIV SERIES

KEY FEATURES

**SEG SOLAR INC. (SEG)** SEG Headquarter California office: 6200 Stoneridge Mall Rd., Ste 300 Pleasanton, CA 94588 SEG San Antonio, Texas office: 973 Isom Road San Antonio, TX 78216 Tel: 925-468-4198 Web: www.segsolar.com

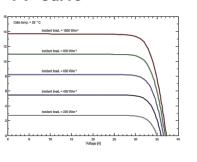


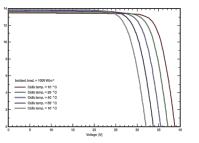
\*Refer to SEG installation Manual for details

	1722 x 113	34 x 35 mm
Container	20'GP	40'HQ
Pieces per Pallet	31	31
Pallets per Container	6	26
Pieces per Container	186	806

For details, please consult SEG.

#### **I-V Curve**





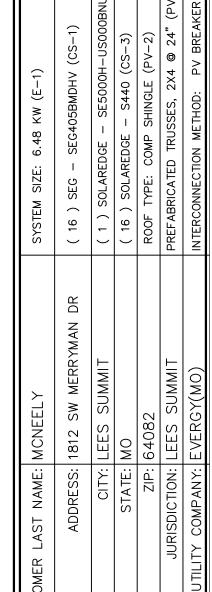
Specifications are subject to change without further notification SEG-DS-EN-2022V1.0 © Copyright 2022 SEG

#### **SEG SOLAR INC. (SEG)**

SEG Headquarter California office: 6200 Stoneridge Mall Rd., Ste 300 Pleasanton, CA 94588 SEG San Antonio, Texas office: 973 Isom Road San Antonio, TX 78216 Tel: 925-468-4198 Web: www.segsolar.com







ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042

24" 2)

0

DESIGNED BY: MR

CUSTOMER

DESIGNED ON

11/24/2023

MODULE

CS-1

# **Power Optimizer** For Residential Installations

S440, S500



## **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



## / Power Optimizer For Residential Installations S440, S500

	S440	S500	UNIT
			'
Rated Input DC Power <sup>(1)</sup>	440	500	W
Absolute Maximum Input Voltage (Voc)	6	0	Vdc
MPPT Operating Range	8 -	60	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99	0.5	%
Weighted Efficiency	98	3.6	%
Overvoltage Category	I	I	
OUTPUT DURING OPERATION			·
Maximum Output Current	1:	5	Adc
Maximum Output Voltage	6	0	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DIS	CONNECTED FROM INVERTER OR	INVERTER OFF)	'
Safety Output Voltage per Power Optimizer	1	1	Vdc
STANDARD COMPLIANCE			'
EMC	FCC Part 15 Class B, IEC61000-6-2	2, IEC61000-6-3, CISPR11, EN-55011	
Safety	IEC62109-1 (class	II safety), UL1741	
Material	UL94 V-0, U	JV Resistant	
RoHS	Ye	es	
Fire Safety	VDE-AR-E 210		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	100	00	Vdc
Dimensions (W x L x H)	129 x 15	55 x 30	mm
Weight (including cables)	655	/ 1.5	gr / lb
Input Connector	MC	[42]	
Input Wire Length	0.	.1	m
Output Connector	Mo	C4	
Output Wire Length	(+) 2.3,	(-) 0.10	m
Operating Temperature Range <sup>(3)</sup>	-40 to	+85	°C
Protection Rating	IP68 / N	IEMA6P	
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

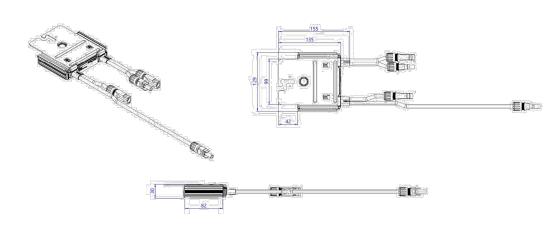
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a Inverter	a SolarEdge	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	5	50	
Maximum Nominal Power per String <sup>(4)</sup>		5700	5700 11250 <sup>(5)</sup>		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** 



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

	L	CUSTOMER LAST	NAME: MCNEELY	SYSTEM SIZE: 6.48 KW (E-1)
 11/	ESIGN DES	AD	DRESS: 1812 SW MERRYMAN DR	(16 ) SEG - SEG405BMDHV (CS-1)
 24	SIGN		CITY: LEES SUMMIT	(1) SOLAREDGE - SE5000H-US000BNU4 (CS-2)
 /20	BY IED	STATE: MO	МО	( 16 ) SOLAREDGE - S440 (CS-3)
)23			ZIP: 64082	ROOF TYPE: COMP SHINGLE (PV-2)
5	MR	JURISE	DICTION: LEES SUMMIT	PREFABRICATED TRUSSES, 2X4 @ 24" (PV-2)
		UTILITY COMPANY:	MPANY: EVERGY(MO)	INTERCONNECTION METHOD: PV BREAKER

OPTIMIZER

CS-2

<sup>\*</sup> Functionality subject to inverter model and firmware version

## Single Phase Inverter with HD-Wave Technology

#### for North America

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



#### Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
  UL1741 SA certified, for CPUC Rule 21 grid compliance
- 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

**INVERTERS** 

- 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,

solaredge.com



#### / 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			SE	xxxxh-xxxxx	BXX4			
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 MinNomMax. (211 - 240 - 264)	·	✓	✓	✓	<b>✓</b>	✓	✓	Vac
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	✓	-	✓	-	-	<b>√</b>	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	А
Maximum Continuous Output Current @208V	-	16		24	-	-	48.5	А
Power Factor			1	, Adjustable - 0.85 to	0.85			
GFDI Threshold				1				А
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		3	180			400		Vdc
Maximum Input Current @240V <sup>™</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Add
Maximum Input Current @208V <sup>™</sup>	-	9	-	13.5	-	-	27	Add
Max. Input Short Circuit Current				45				Add
Reverse-Polarity Protection				Yes				
Ground-Fault Isolation Detection				600kΩ Sensitivity				
Maximum Inverter Efficiency	99			g	19.2			%
CEC Weighted Efficiency				99			99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption				< 2.5				W

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

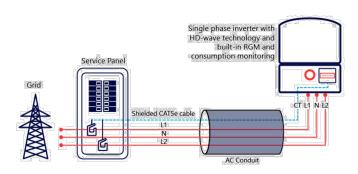
## / Single Phase Inverter with HD-Wave Technology for North America

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   5	E11400H-US				
ADDITIONAL FEATURES											
Supported Communication Interfaces		RS485, Ethernet, ZigBee (optional), Cellular (optional)									
Revenue Grade Metering, ANSI C12.20		Optional <sup>(3)</sup>									
Consumption metering	1			Optional							
Inverter Commissioning		With the SetA	pp mobile applicatio	n using Built-in Wi-Fi	Access Point for Lo	cal Connection					
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12			Automatic Rapid	Shutdown upon AC	Grid Disconnect						
STANDARD COMPLIANCE											
Safety		UL1741, U	L1741 SA, UL1699B,	CSA C22.2, Canadian	AFCI according to	T.I.L. M-07					
Grid Connection Standards		IEEE1547, Rule 21, Rule 14 (HI)									
Emissions				FCC Part 15 Class B							
INSTALLATION SPECIFICAT	IONS										
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 37	'0 x 174		21.3 x 14.6 x 7.3 / 5	40 x 370 x 185	in / mm			
Weight with Safety Switch	22	/ 10	25.1 / 11.4	26.2	/ 11.9	38.8 / 1	7.6	lb / kg			
Noise	< 25 <50						dBA				
Cooling		Natural Convection									
Operating Temperature Range			-40	to +140 / -40 to +6	O <sub>Hd</sub>			°F/°C			
Protection Rating			NEMA 4	X (Inverter with Safet	y Switch)						

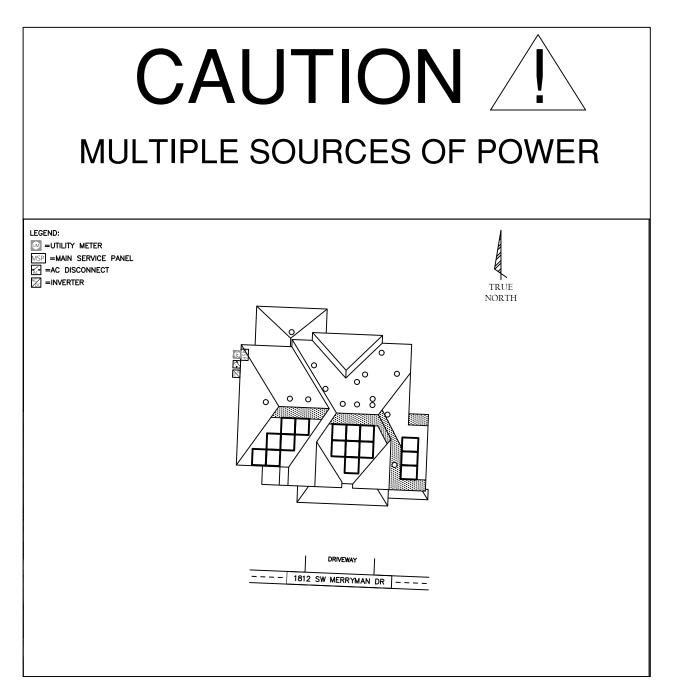
#### **How to Enable Consumption Monitoring**

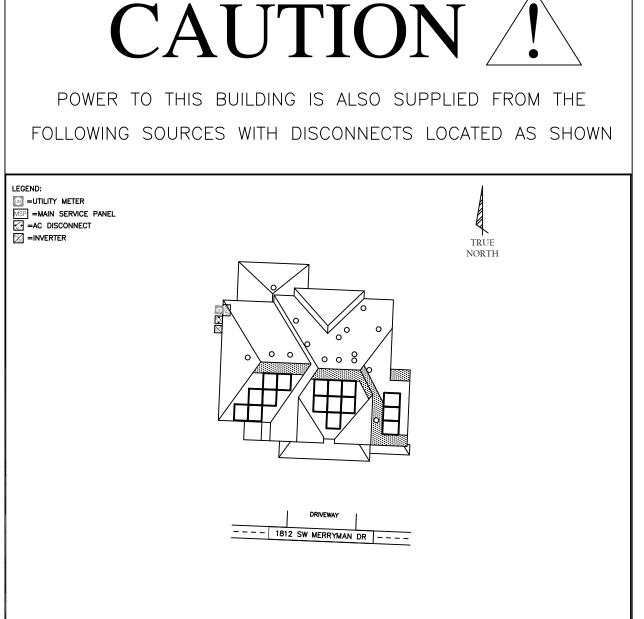
By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills



**RoHS** 

ADDRESS: 2578 W 600 N SUITE 100 LINDON, UT 84042 PHONE: 866-736-1253 -2) 24" SEG405BMDHV 6.48 SYSTEM 16 16 SUMMIT EVERGY(MO) MCNEELY SW 64082 LEES 1812 NAME: UTILITY COMPANY: ADDRESS: LAST CUSTOMER DESIGNED BY: MR DESIGNED ON 11/24/2023 INVERTER





2020 NEC LABEL (FOR FIELD USE ONLY) 2017 NEC LABEL (FOR FIELD USE ONLY)

