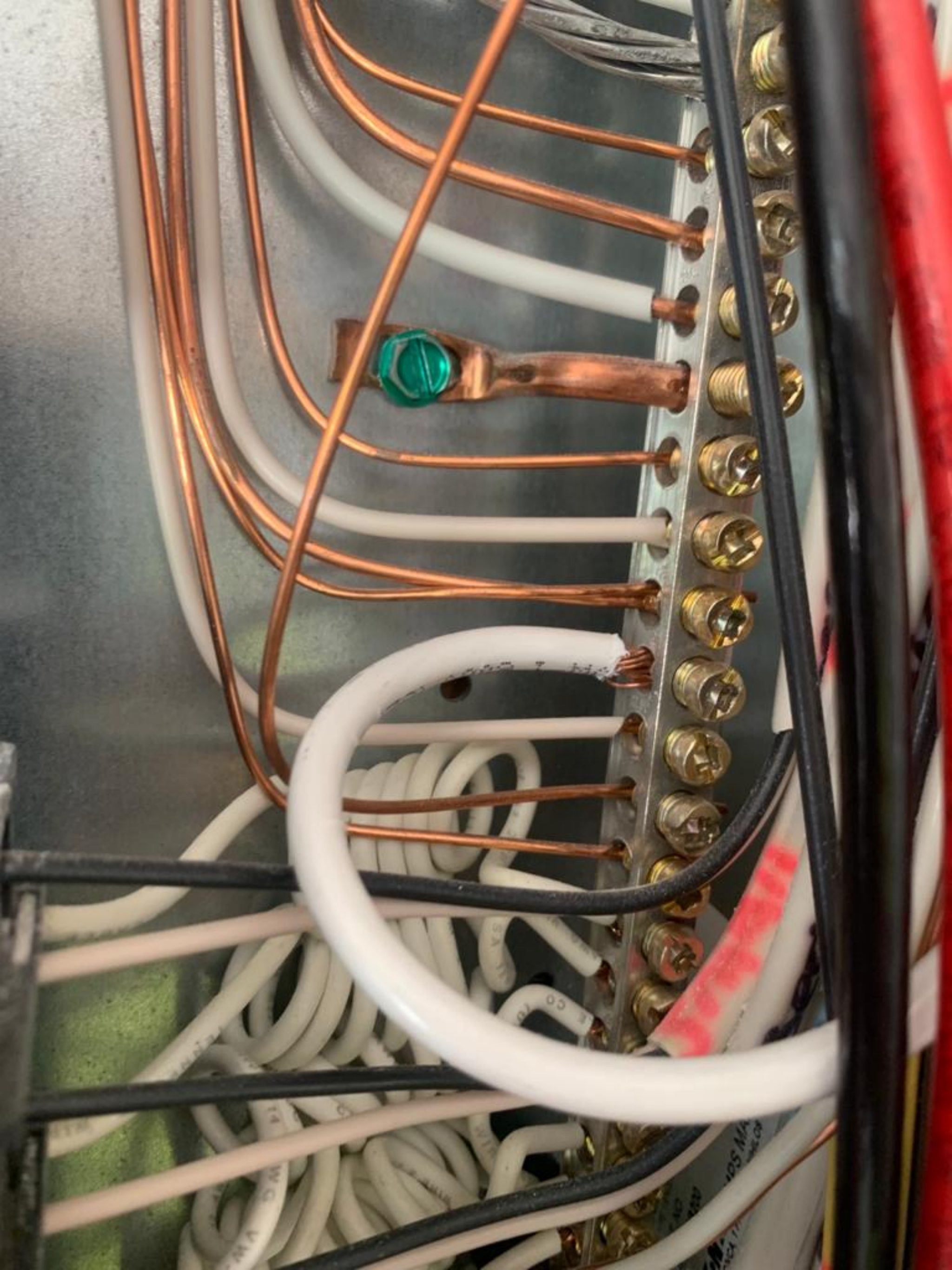
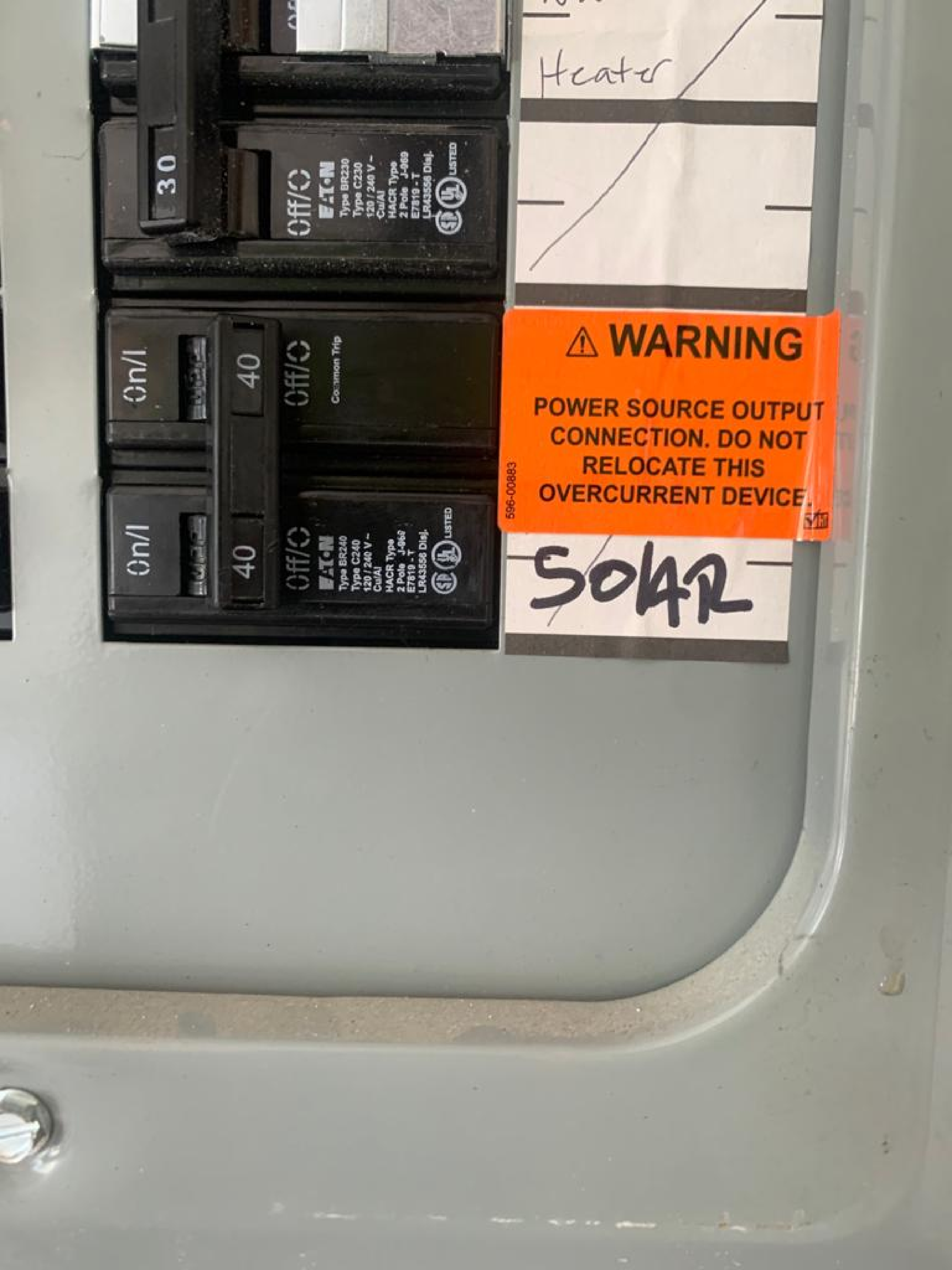

46

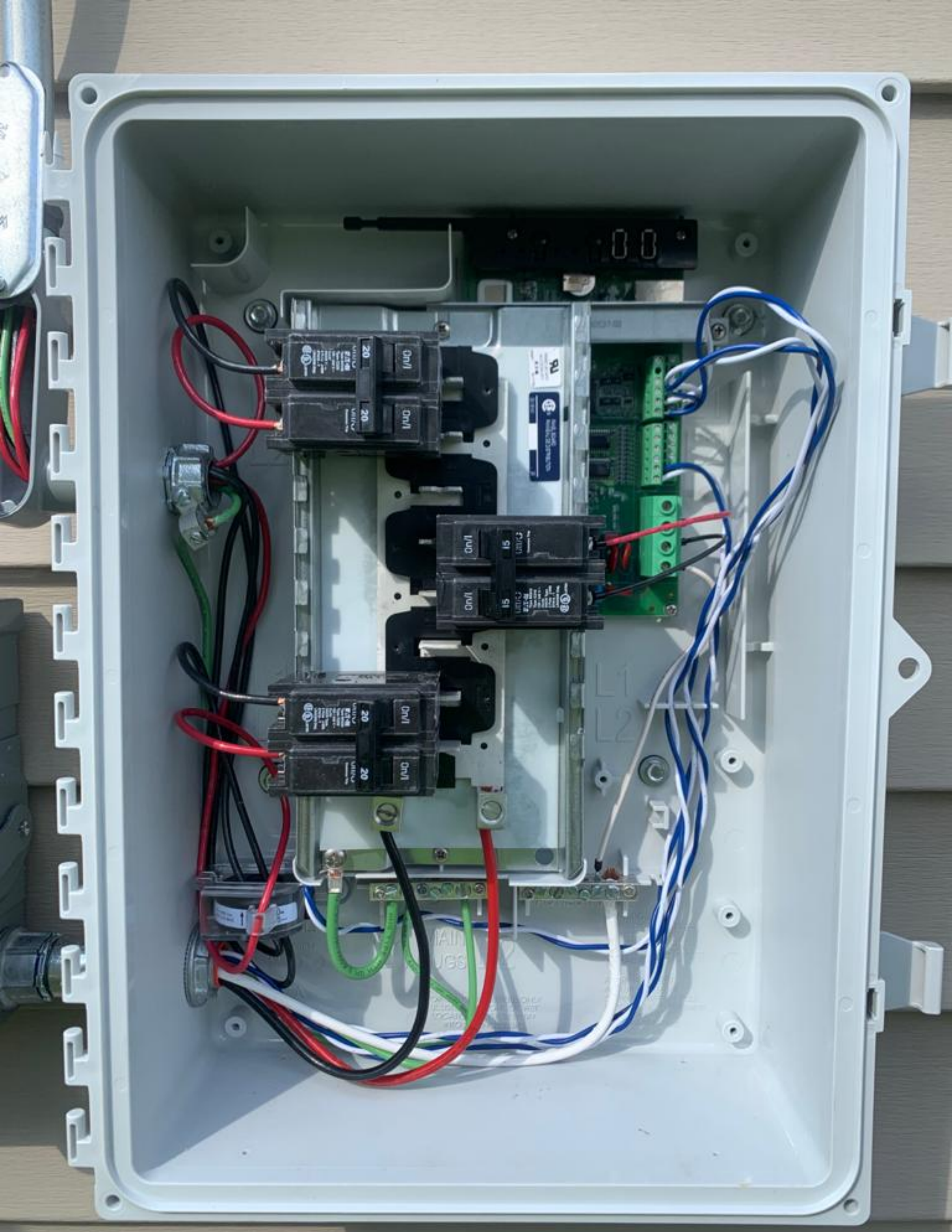


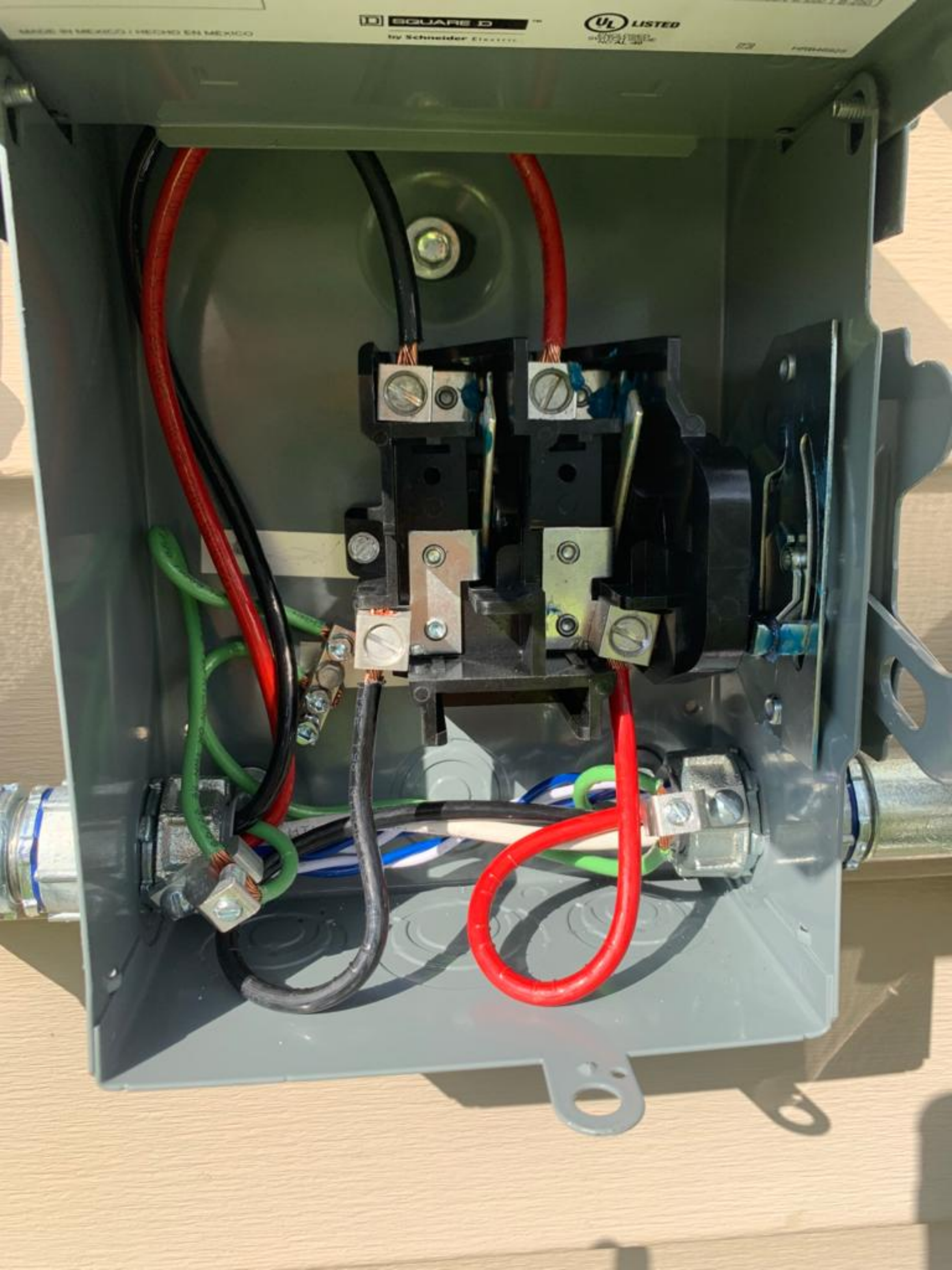

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

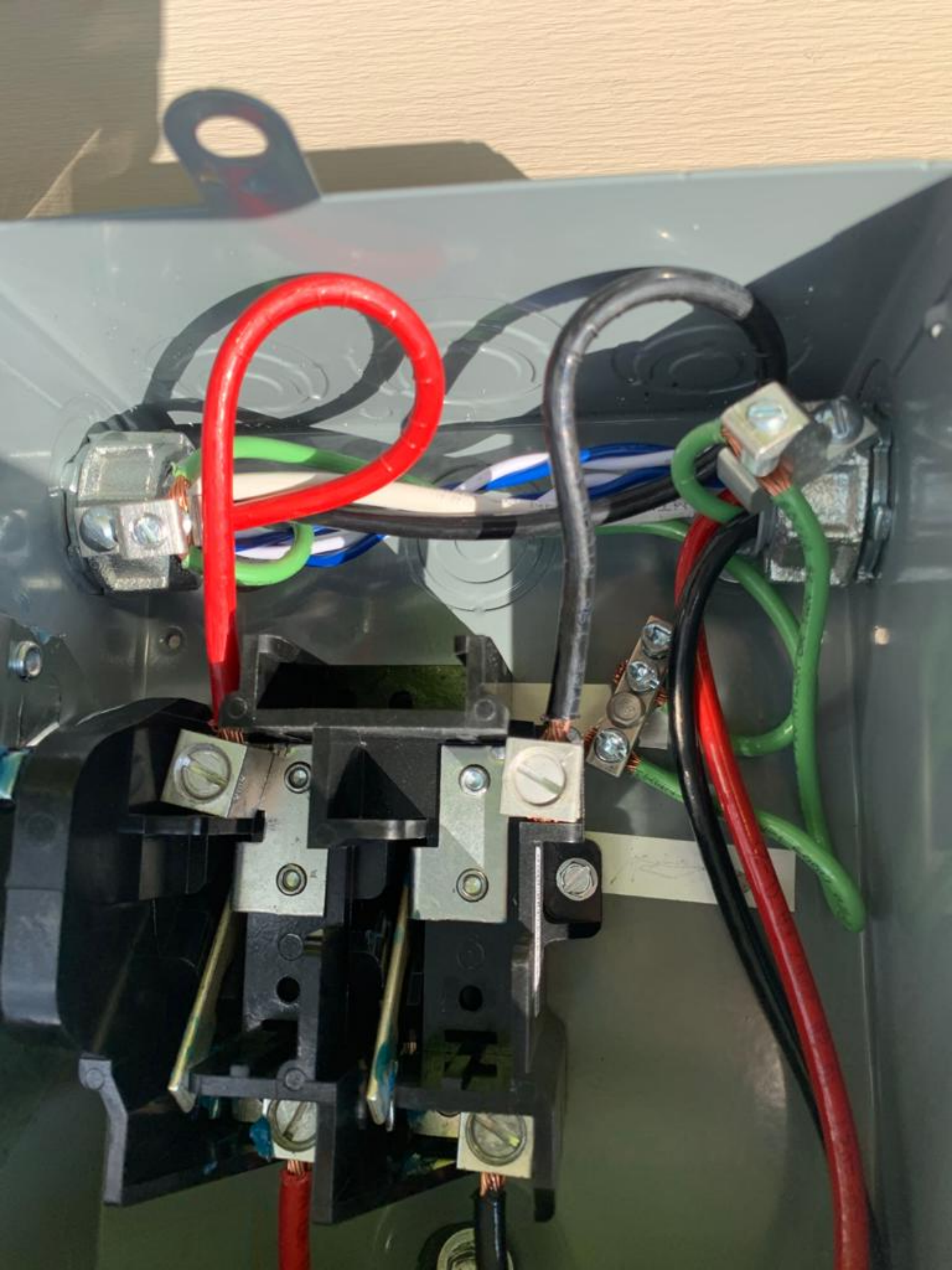


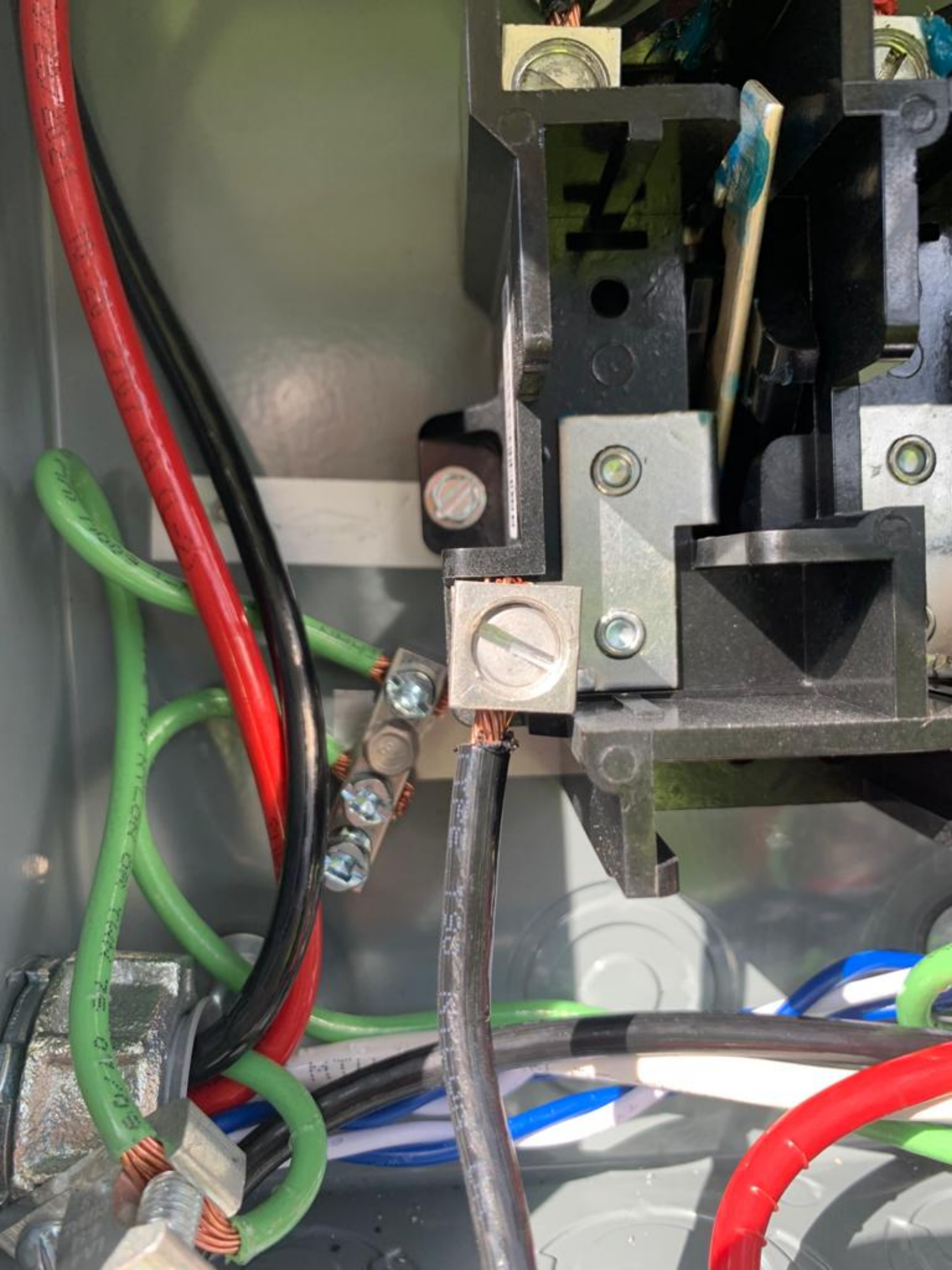
Heater
30
On/I
40
Off/O
Common Trip
WARNING
POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.
596-00883
SOLAR


DANGER
PELIGRO
Table 401.3 ENERGY EFFICIENCY CERTIFICATE
Bed 2&3
Dryer
Kt. GFI
UP
STAIR
Bath GFI
⚠ WARNING
POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE
SOLAR




EQUARE D
by Schneider Electric
UL LISTED





ENPHASE.

SIGORA SOLAR™

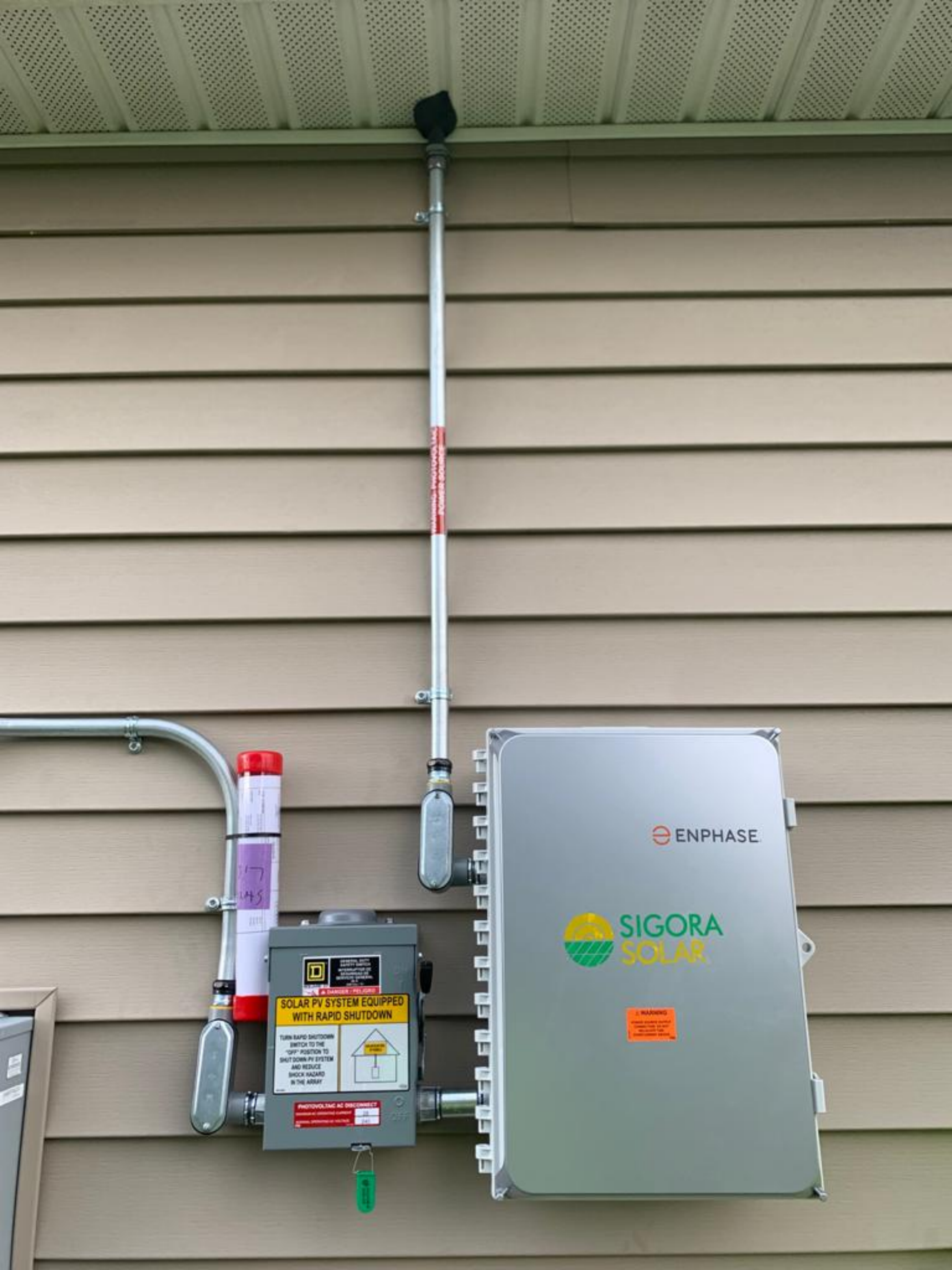
⚠ WARNING

POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

FOCUS kWh
SOUTH RIVER EMC
TWACS 83744411
120 345 919
Landis+Gyr

TALON


ENPHASE
SIGORA SOLAR
SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY
PHOTOVOLTAIC AC DISCONNECT

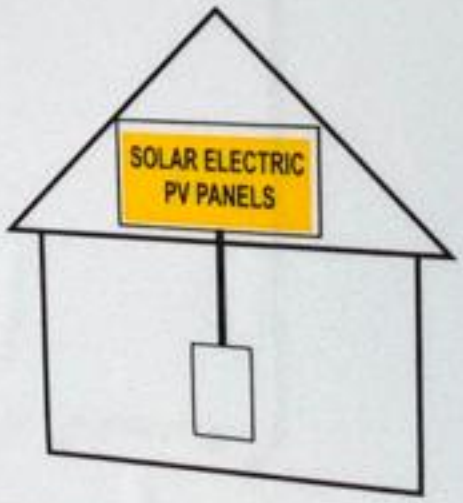
GENERAL DUTY
SAFETY SWITCH
INTERRUPTOR DE
SEGURIDAD DE
SERVICIO GENERAL
60 A
240 Vac / V~

SQUARE D®

⚠ DANGER / PELIGRO

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN
SWITCH TO THE
"OFF" POSITION TO
SHUT DOWN PV SYSTEM
AND REDUCE
SHOCK HAZARD
IN THE ARRAY



PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT:	28
NOMINAL OPERATING AC VOLTAGE:	240

OFF

SIGORA SOLAR

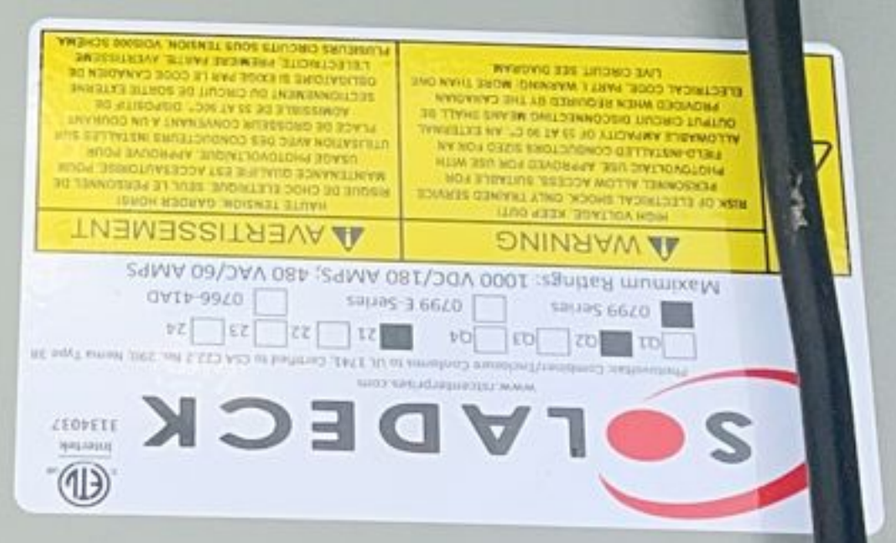
WARNING: PHOTOVOLTAIC
POWER SOURCE

WARNING: PHOTOVOLTAIC
POWER SOURCE

PV Negative/Neutral

PV Negative/Neutral

For terminal loads, see Instruction manual


SOLADECK
Maximum Ratings: 1000 VDC/180 AMPS; 480 VAC/60 AMPS
WARNING
AVERTISSEMENT

ELECTRICAL RESIDENTIAL

Harnett COUNTY NORTH CAROLINA

910-893-7525

www.harnett.org

PERMIT NUMBER

ERES2107-0060

JOB ADDRESS: 473 WOOD POINT DR	**PERMIT SUBTYPE:** RESIDENTIAL SOLAR PANELS	**PARCEL NO:** 0506-86-8804.000
DESCRIPTION: 23 roof top solar panels	**DATE ISSUED:** 8/10/2021	**DATE EXPIRED:**
PLAN NAME:	**ZONING DISTRICT:** RA-20R - 0.28 acres (100.0%)	

APPLICANT: Sigora Solar 1222 Harris Street Charlottesville, VA 22903	**PHONE:** (434)465-6788 **EMAIL:** permitting@sigorasolar.com
CONTRACTOR: Sigora Solar 1222 Harris Street Charlottesville, VA 22903	**PHONE:** (434)465-6788 **EMAIL:** permitting@sigorasolar.com
OWNER: STRYCHARZ STEPHEN 473 WOOD POINT DR LILLINGTON, NC 27546 LILLINGTON, NC 27546-5968	**PHONE:** **EMAIL:**

REQUIRED INSPECTIONS

INSPECTION TYPE	APPROVAL	DATE	COMMENTS
FINAL**			
ROUGH IN			

W CONSULTING
Scott E. Wyssling, PE, PP, CME

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

July 21, 2021

Sigora Solar
1222 Harris Street
Charlottesville, VA 22903

Re: Engineering Services
Strycharz Residence
473 Wood Point Drive, Lillington, NC
8.280 kW System Size

To Whom it May Concern:

Pursuant to your request, we have reviewed the following information regarding solar panel installation on the roof of the above referenced home:

1. Site Visit/Verification Form prepared by a Sigora Solar representative identifying specific site information including size and spacing of rafters for the existing roof structure.
2. Photographs of the interior and exterior of the roof system identifying existing structural members and their conditions.

Based on the above information we have evaluated the structural capacity of the existing roof system to support the additional loads imposed by the solar panels and have the following comments related to our review and evaluation:

Description of Residence:

The existing residence is typical wood framing construction with the roof system consisting of truss system with all chords constructed of 2 x 4 dimensional lumber at 24" on center. The attic space is unfinished and photos indicate that there was free access to visually inspect the size and condition of the roof rafters. All wood material utilized for the roof system is assumed to be Doug-Fir #2 or better with standard construction components. The existing roofing material consists of composite asphalt shingles. Photos of the dwelling also indicate that there is a permanent foundation.

A. Loading Criteria Used

- 120 MPH wind loading based on ASCE 7-10 Exposure Category "C" at a slope of 34 & 45 degrees
- 7 PSF = Dead Load roofing/framing Live Load = 20 PSF Snow Load = 15 PSF
- 3 PSF = Dead Load solar panels/mounting hardware

Total Dead Load =10 PSF

The above values are within acceptable limits of recognized industry standards for similar structures in accordance with the North Carolina Residential Code (2012). Analysis performed of the existing roof structure utilizing the above loading criteria indicates that the existing rafters will support the additional panel loading without damage, if installed correctly.

B. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent "*SnapNrack Installation Manual*", which can be found on the SnapNrack website (*http://snapnrack.com/*). 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.

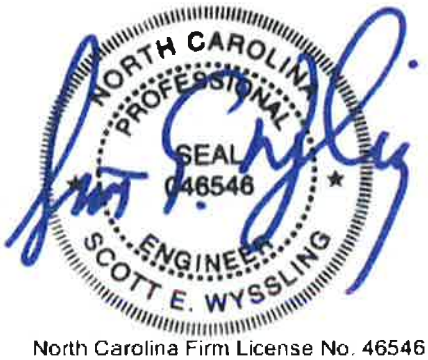
2. Maximum allowable pullout per lag screw is 235 lbs/inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications for Southern Pine *assumed*. Based on our evaluation, the pullout value, utilizing a penetration depth of 2 ½", is less than what is allowable per connection and therefore is adequate. Based on the variable factors for the existing roof framing and installation tolerances, using a thread depth of 2 ½" with a minimum size of 5/16" lag screw per attachment point for panel anchor mounts should be adequate with a sufficient factor of safety.
3. Considering the roof slopes, the size, spacing, condition of roof, the panel supports shall be placed no greater than 48" o/c.
4. Panel supports connections shall be staggered to distribute load to adjacent trusses.

Based on the above evaluation, it is the opinion of this office that with appropriate panel anchors being utilized the roof system will adequately support the additional loading imposed by the solar panels. This evaluation is in conformance with the North Carolina Residential Code, current industry and standards, and 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



North Carolina Firm License No. 46546

PROJECT DESCRIPTION:

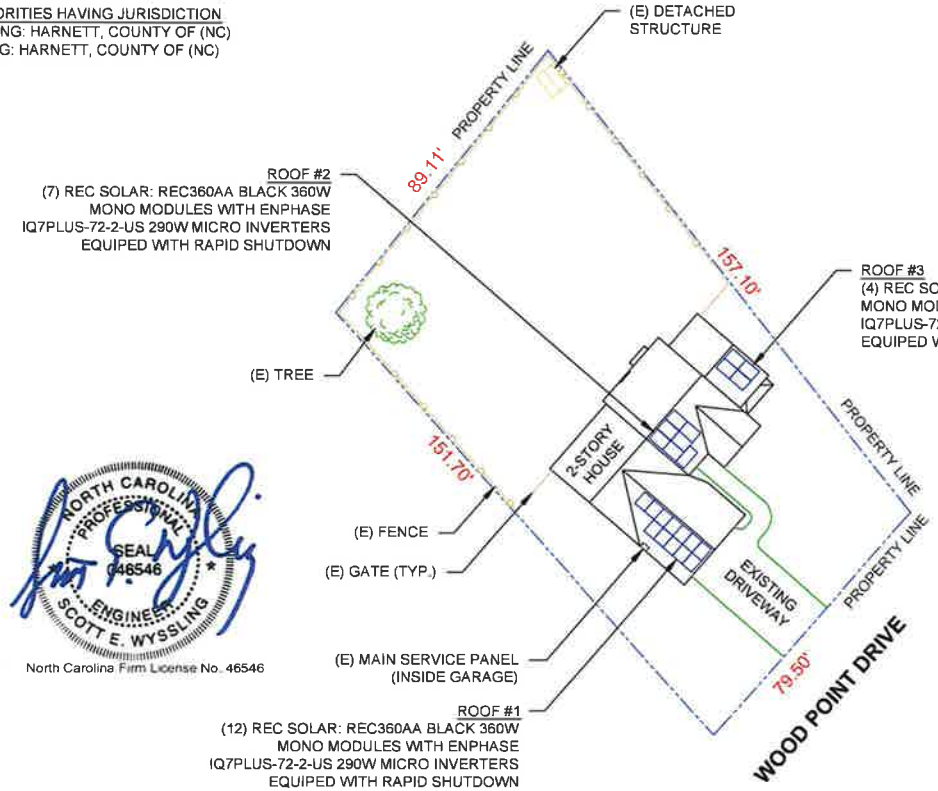
23 x REC SOLAR: REC360AA BLACK 360W MONO MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
DC SYSTEM SIZE: 8.280kW DC
AC SYSTEM SIZE: 6.670kW AC

EQUIPMENT SUMMARY
23 REC SOLAR: REC360AA BLACK 360W MONO MODULES
23 ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS
EQUIPED WITH RAPID SHUTDOWN

ROOF ARRAY AREA #1:- 225.84 SQ FT.
ROOF ARRAY AREA #2:- 131.74 SQ FT.
ROOF ARRAY AREA #3:- 75.28 SQ FT.

AUTHORITIES HAVING JURISDICTION
BUILDING: HARNETT, COUNTY OF (NC)
ZONING: HARNETT, COUNTY OF (NC)

APPROVED
08/03/2021
Harnett COUNTY



NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING
North Carolina Firm License No. 46546

1 PLOT PLAN WITH ROOF PLAN
PV-1 SCALE: 1/32" = 1'-0"

APPLICABLE CODES & STANDARDS
NCBC 2018
NEC 2017

DESIGN SPECIFICATION
OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: REFER STRUCTURAL LETTER
WIND EXPOSURE: REFER STRUCTURAL LETTER
WIND SPEED: REFER STRUCTURAL LETTER

2 HOUSE PHOTO
PV-1 SCALE: NTS

3 VICINITY MAP
PV-1 SCALE: NTS

SHEET INDEX

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS
LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY
ESR

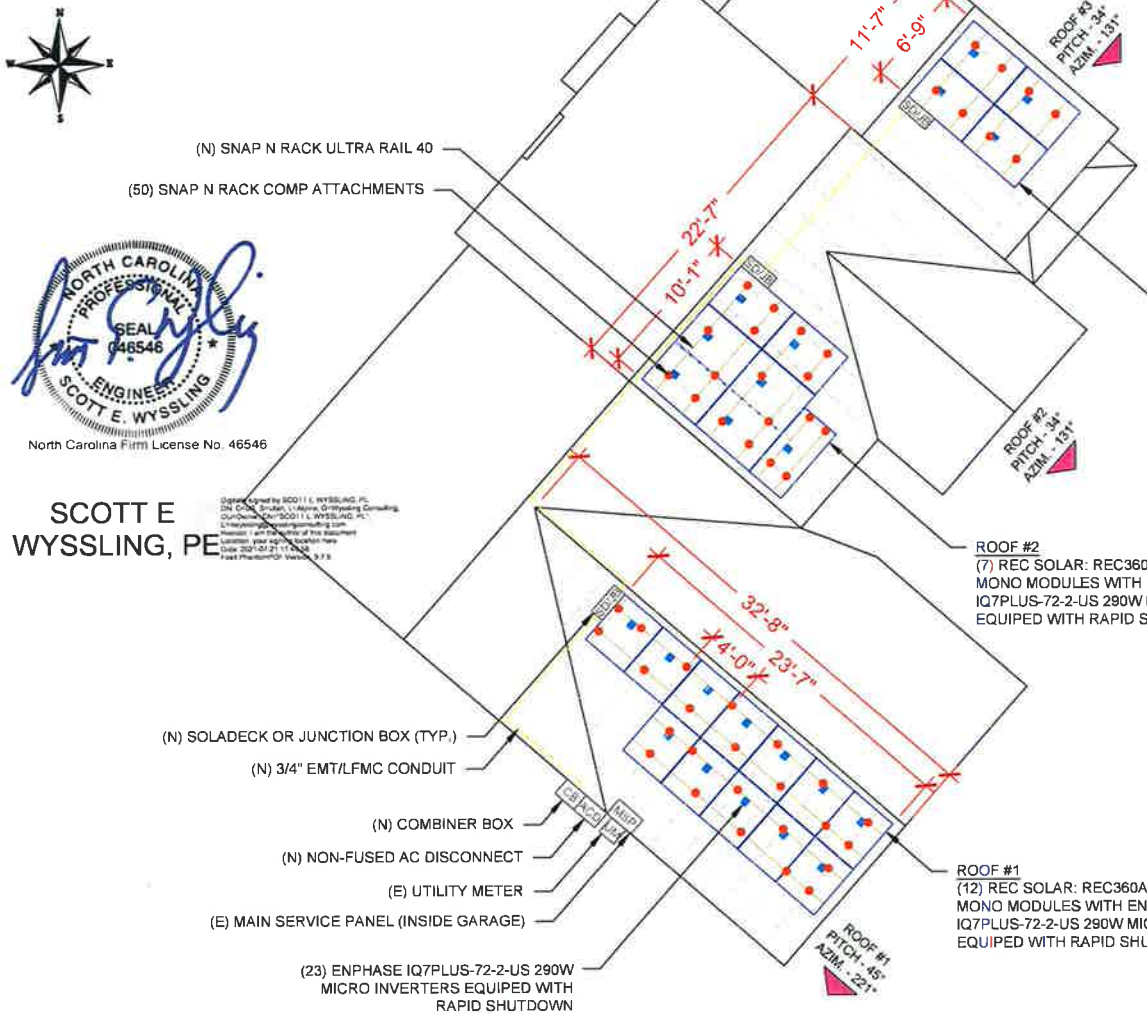
SHEET NAME
PLOT PLAN WITH ROOF PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

MODULE TYPE, DIMENSIONS & WEIGHT

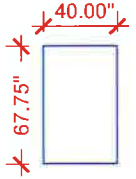
NUMBER OF MODULES = 23 MODULES
MODULE TYPE = REC SOLAR: REC360AA BLACK 360W MONO MODULES
MODULE WEIGHT = 42.99 LBS / 19.5KG
MODULE DIMENSIONS = 67.75"x 40.00" = 18.82 SF



ROOF #3
(4) REC SOLAR: REC360AA BLACK 360W MONO MODULES WITH ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN

ROOF #2
(7) REC SOLAR: REC360AA BLACK 360W MONO MODULES WITH ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN

ROOF #1
(12) REC SOLAR: REC360AA BLACK 360W MONO MODULES WITH ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN



REC SOLAR:
REC360AA BLACK
360W MODULES

ROOF DESCRIPTION

ROOF TYPE	ASPHALT SHINGLE
ROOF LAYER	1 LAYER

ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	12	45°	221°	2X4	24"
#2	7	34°	131°	2X4	24"
#3	4	34°	131°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S

TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
432.66	2178.77	20

LEGEND

- SDJB - SOLADECK OR JUNCTION BOX
- INV - INVERTER
- CB - COMBINER BOX
- ACD - AC DISCONNECT
- LC - LOAD CENTER
- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- - TRUSS
- - CONDUIT

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

North Carolina Firm License No. 46546

SCOTT E WYSSLING, PE

1 ROOF PLAN & MODULES
PV-2 SCALE: 1/8" = 1'-0"

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS
LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY
ESR

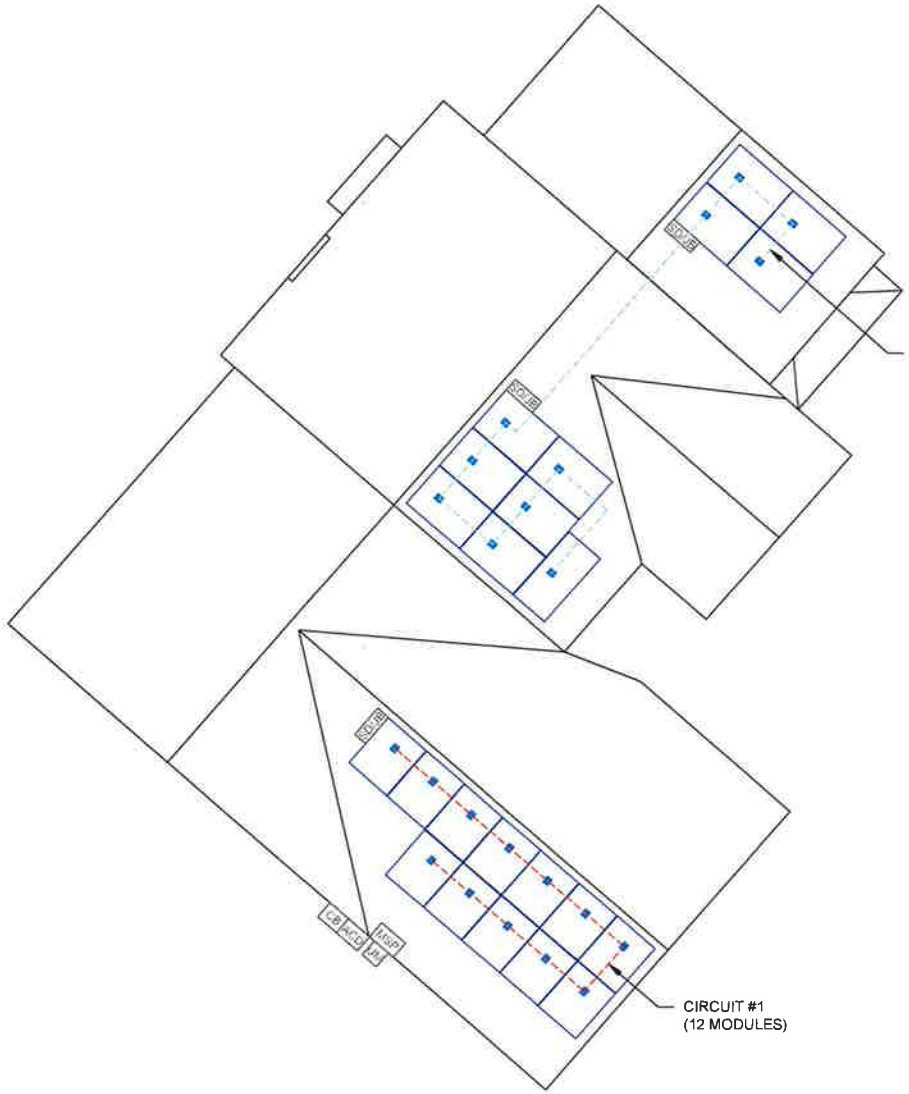
SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

CIRCUIT LEGENDS
CIRCUIT #1
CIRCUIT #2

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	23	REC SOLAR: REC360AA BLACK 360W
MICRO INVERTERS	23	ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS EQUIPED WITH RAPID SHUTDOWN
SOLADECKS OR JUNCTION BOXES	3	SOLADECKS OR JUNCTION BOXES
MODULE CLAMPS	32	MID MODULE CLAMPS
END CLAMPS	28	END CLAMPS / STOPPER SLEEVE
ATTACHMENT	50	SNAP N RACK COMP
BOLT	50	LAG BOLT



1 ROOF PLAN WITH CIRCUIT LAYOUT
PV-2A
SCALE: 1/8" = 1'-0"

SIGORA SOLAR
SIGORA SOLAR LLC
450 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE 07/21/2021

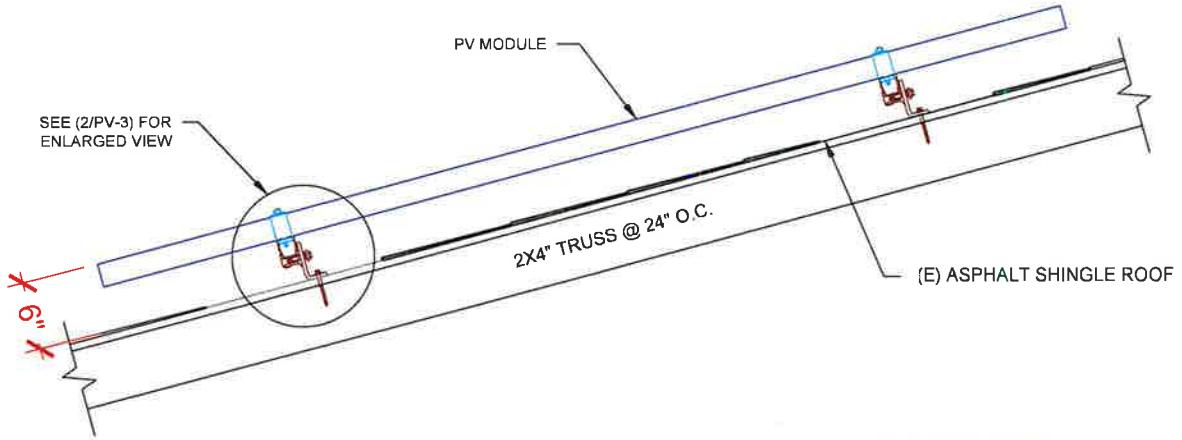
PROJECT NAME & ADDRESS
LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY
ESR

SHEET NAME
CIRCUIT LAYOUT

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2A

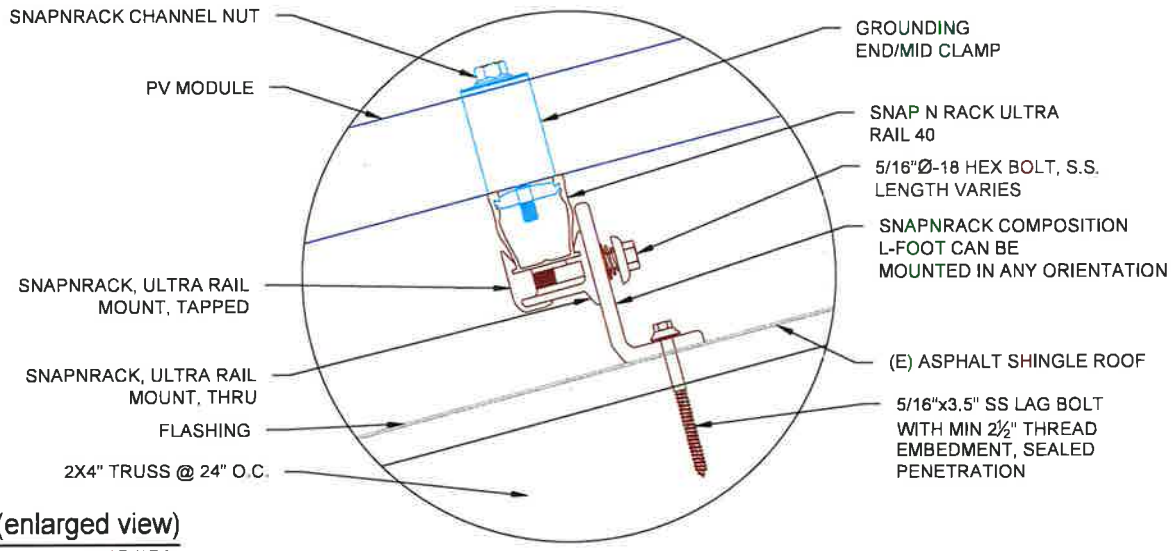


1 STRUCTURAL ATTACMENT (SIDE VIEW)
PV-3 SCALE: N.T.S

SCOTT E WYSSLING, PE

Digitally signed by SCOTT E WYSSLING, PE
DN: C=US, S=Utah, L=Alpine, O=Wysling Consulting, OU=Owner, CN=SCOTT E WYSSLING, PE, E=eswysling@wyslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2021-07-21 11:50:05
Foxit PhantomPDF Version: 9.7.5

North Carolina Firm License No. 46546



2 ATTACHMENT DETAIL (enlarged view)
PV-3 SCALE: N.T.S

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE 07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE,
LILLINGTON, NC 27546

DRAWN BY
ESR

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

DC SYSTEM SIZE: 6.260 kW DC
AC SYSTEM SIZE: 6.670 kW AC

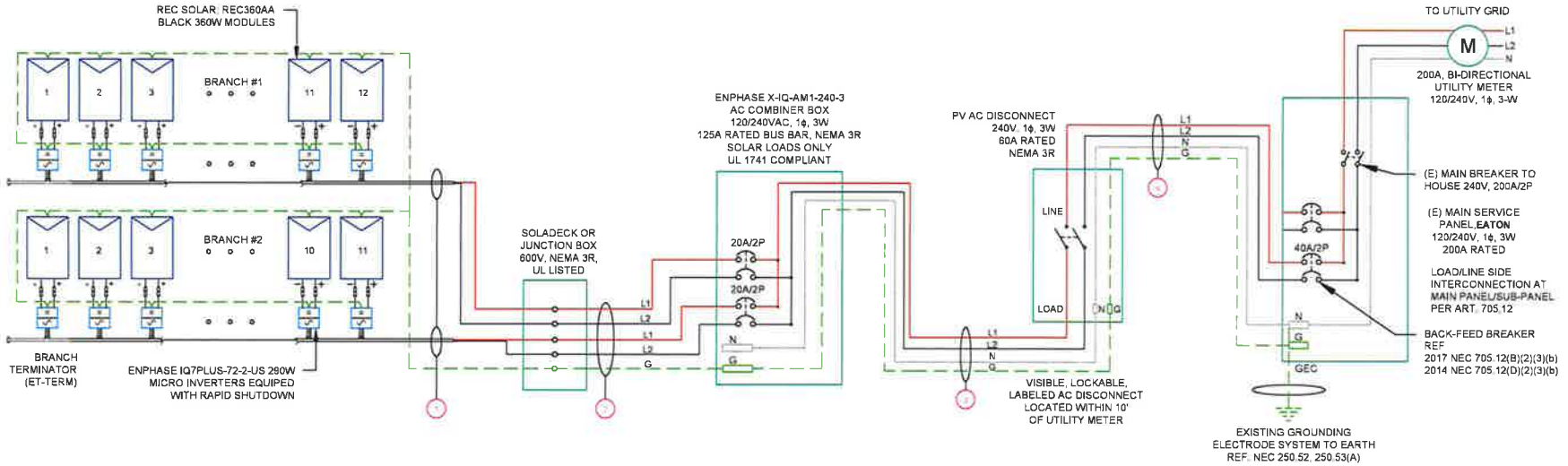
(23) REC SOLAR: REC360AA BLACK 360W MONO MODULES
WITH (23) ENPHASE IQ7PLUS-72-2-US 290W MICRO INVERTERS
EQUIPED WITH RAPID SHUTDOWN
(1) BRANCH CIRCUIT OF 12 MODULES AND
(1) BRANCH CIRCUIT OF 11 MODULES CONNECTED IN PARALLEL

INTERCONNECTION NOTES:
1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES:
1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH

RACKING NOTE:
1. BOND EVERY RAIL WITH #6 BARE COPPER

GROUNDING & GENERAL NOTES:
1. A SECOND FACILITY GROUNDING ELECTRODE IS NOT REQUIRED PER [NEC 690.47(C)(3)]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE.
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. SOLADECK OR JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - SOLADECK OR JUNCTION BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.
8. TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.



	QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
1	(4)	#12AWG -	ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
	(1)	#6AWG -	BARE COPPER IN FREE AIR		
2	(4)	#10AWG -	CU,THWN-2	EMT OR LFMC IN ATTIC	3/4"
	(1)	#10AWG -	CU,THWN-2 GND		
3	(2)	#8AWG -	CU,THWN-2	EMT,LFMC OR PVC	3/4"
	(1)	#8AWG -	CU,THWN-2 N		
	(1)	#10AWG -	CU,THWN-2 GND		
4	(2)	#8AWG -	CU,THWN-2	EMT, LFMC OR PVC	3/4"
	(1)	#8AWG -	CU,THWN-2 N		
	(1)	#10AWG -	CU,THWN-2 GND		

1 ELECTRICAL LINE DIAGRAM
PV-4 SCALE: NTS

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE: 07/21/2021

PROJECT NAME & ADDRESS
LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY
ESR

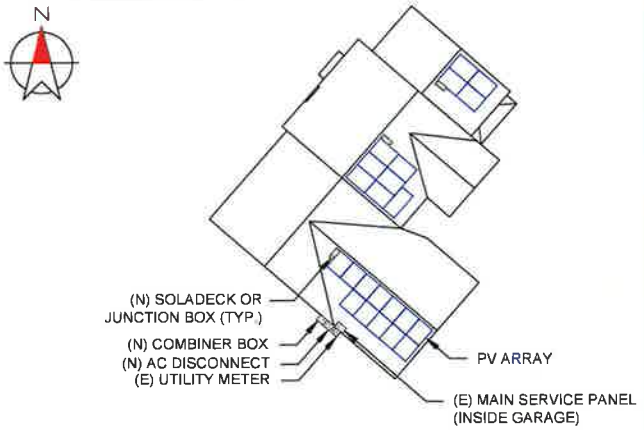
SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM MULTIPLE SOURCES OF POWER WITH SAFETY DISCONNECTS AS SHOWN:



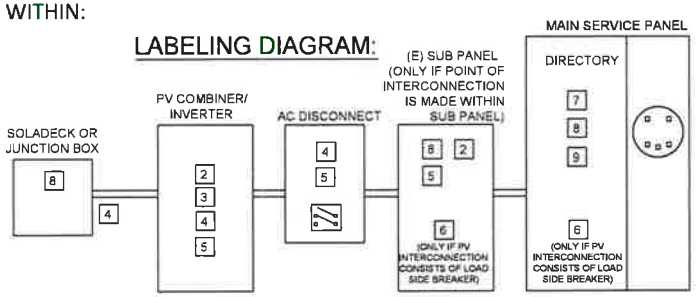
473 WOOD POINT DRIVE,LILLINGTON, NC 27546

DIRECTORY

PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS OUTLINED WITHIN: NEC 690.56(B)&(C), [NEC 705.10])

LABELING DIAGRAM:



** ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY, NOT AN ACTUAL REPRESENATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VERY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE. **

LABELING NOTES:

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS, ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, 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]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE

473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY

ESR

SHEET NAME

PLACARD

SHEET SIZE

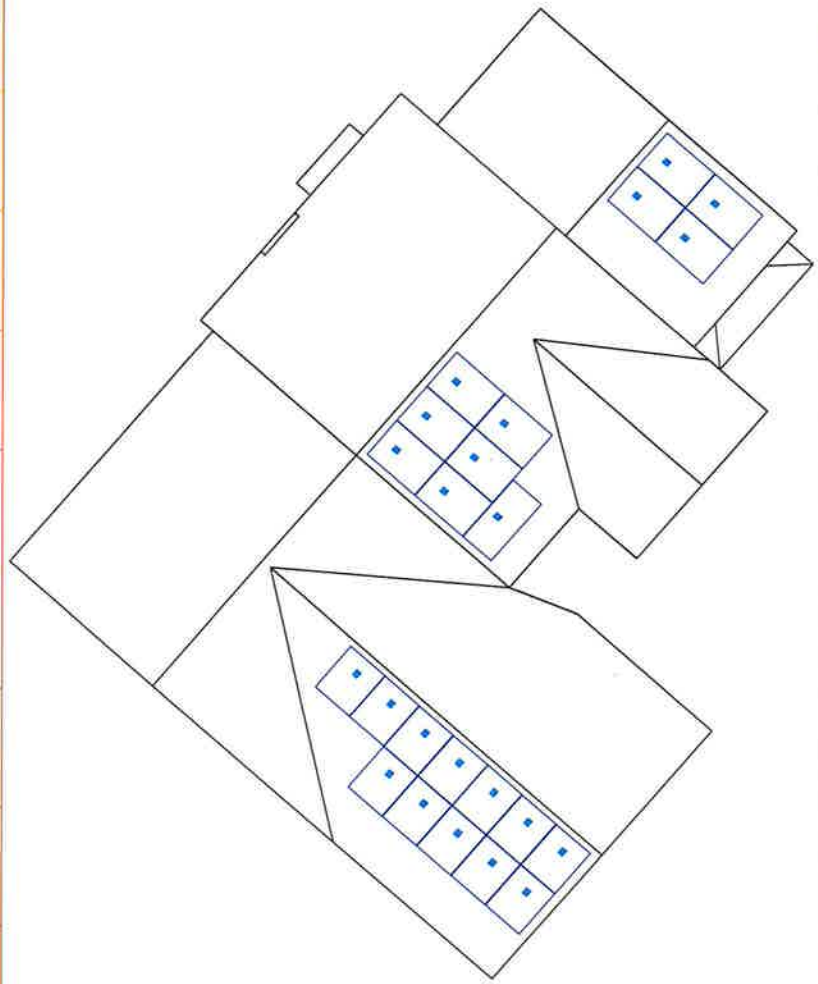
ANSI B
11" X 17"

SHEET NUMBER

PV-5

MICRO INVERTER CHART

	1-10	11-20	21-30	31-40	41-50	51-60	61-70
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							



SIGORA SOLAR

SIGORA SOLAR LLC
480 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE: 07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE

473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY

ESR

SHEET NAME

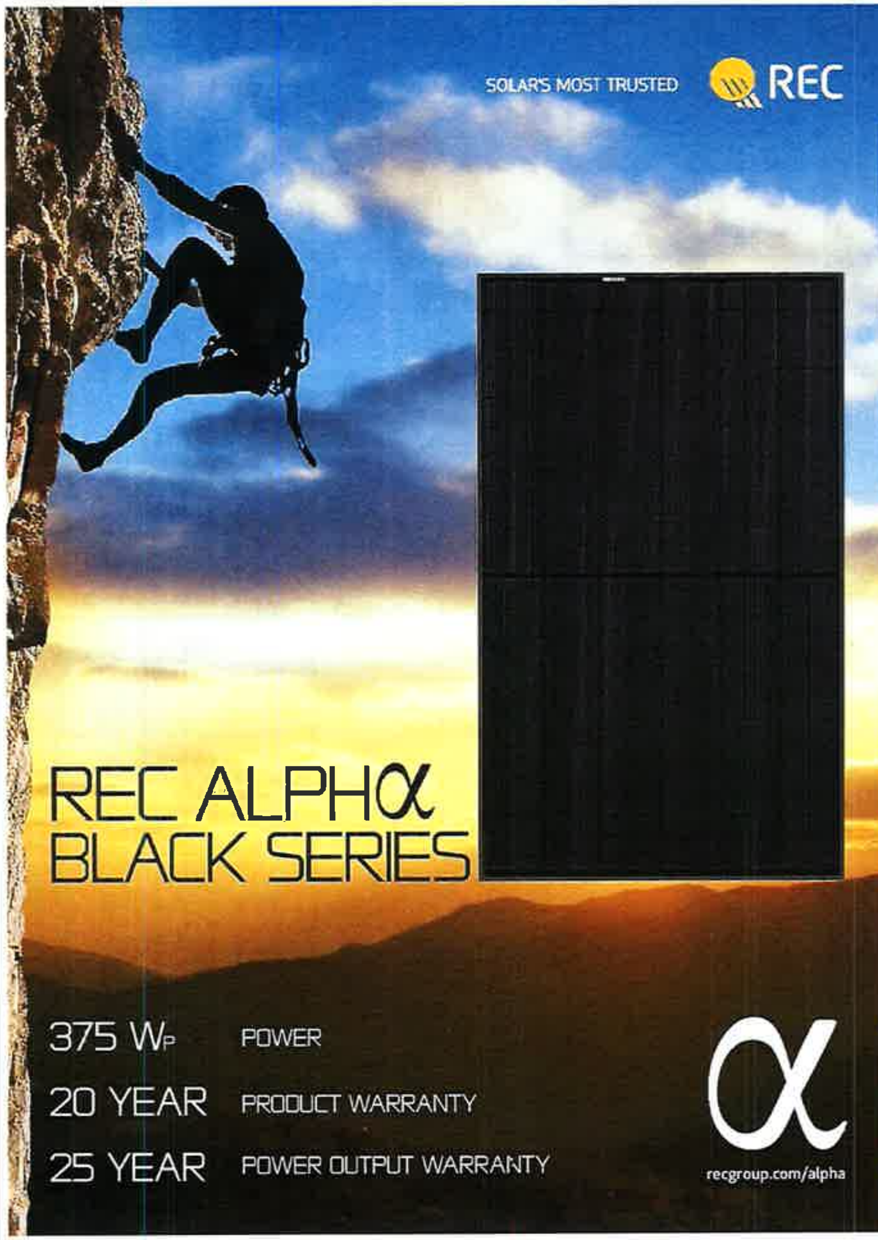
MICRO INVERTER CHART

SHEET SIZE

ANSI B
11" X 17"

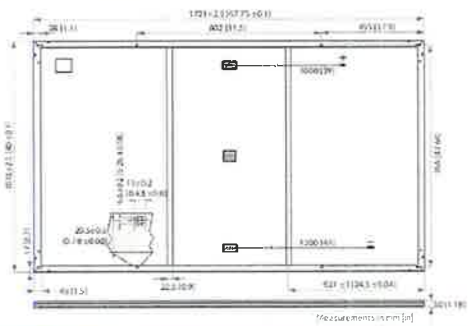
SHEET NUMBER

PV-6



REC ALPHα BLACK SERIES

PRODUCT DATASHEET



GENERAL DATA

Cell type	120 half-cut cells with REC heterojunction cell technology 6 strings of 20 cells in series	Junction box	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790
Glass	3.2 mm solar glass with anti-reflection surface treatment	Cable	4 mm² solar cable, 1.0 m + 1.2 m
Backsheet	Highly resistant polymeric construction	Connectors	Stäubli MC4 PV-KBT4/KST4 (4 mm²)
Frame	Anodized aluminum (black)	Origin	Made in Singapore

ELECTRICAL DATA @ STC

Product Code*: RECxxxAA Black

Nominal Power - P_{MPP} (Wp)	355	360	365	370	375
Watt Class Sorting - (W)	-0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - V_{MPP} (V)	37.4	37.7	38.0	38.3	38.7
Nominal Power Current - I_{MPP} (A)	9.50	9.55	9.60	9.66	9.72
Open Circuit Voltage - V_{OC} (V)	44.0	44.1	44.3	44.5	44.6
Short Circuit Current - I_{SC} (A)	10.19	10.23	10.26	10.30	10.40
Panel Efficiency (%)	20.3	20.6	20.9	21.2	21.4

ELECTRICAL DATA @ NMOT

Product Code*: RECxxxAA Black

Nominal Power - P_{MPP} (Wp)	270	274	278	282	286
Nominal Power Voltage - V_{MPP} (V)	35.2	35.5	35.8	36.1	36.4
Nominal Power Current - I_{MPP} (A)	7.67	7.71	7.76	7.80	7.85
Open Circuit Voltage - V_{OC} (V)	41.4	41.6	41.7	41.9	42.0
Short Circuit Current - I_{SC} (A)	8.23	8.26	8.29	8.32	8.40

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 1703, UL 61730

IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
ISO 11925-2	Ignitability (Class E)
UNI 8457/9174	Ignitability (Class 1)
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
AS4040.2 NCC 2016	Cyclic Wind Load

ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007

WARRANTY

20 year product warranty
25 year linear power output warranty
Maximum annual power degression of 0.25% p.a.
Guarantees 92% of power after 25 years
See warranty conditions for further details

MECHANICAL DATA

Dimensions	1721 x 1016 x 30 mm
Area	1.75 m²
Weight	19.5 kg

MAXIMUM RATINGS

Operational temperature	-40 ... +85°C
Maximum system voltage	1000 V
Design load (+): snow Maximum test load (+)	4666 Pa (475 kg/m²) 7000 Pa (713 kg/m²)*
Design load (-): wind Maximum test load (-)	2666 Pa (272 kg/m²) 4000 Pa (407 kg/m²)*
Max series fuse rating	25 A
Max reverse current	25 A

*Calculated using a safety factor of 1.5
See installation manual for mounting instructions

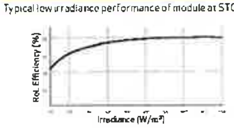
TEMPERATURE RATINGS*

Nominal Module Operating Temperature	44°C (±2°C)
Temperature coefficient of P_{MPP}	-0.26 %/°C
Temperature coefficient of V_{OC}	-0.24 %/°C
Temperature coefficient of I_{SC}	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Specifications subject to change without notice

Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs around 2,000 people worldwide, producing 1.5 GW of solar panels annually.

REC
www.recgroup.com

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE

473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY: ESR

SHEET NAME: MODULE SPECIFICATION

SHEET SIZE: ANSI B 11" X 17"

SHEET NUMBER: PV-7

Enphase IQ 7 and IQ 7+ Microinverters

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

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

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

Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings[1]	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	**IQ 7 Microinverter**		**IQ 7+ Microinverter**	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range[2]	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[3]	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	**@240 V**	**@208 V**	**@240 V**	**@208 V**
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA); UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01. This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

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

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE 07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE

473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY: ESR

SHEET NAME: INVERTER SPECIFICATION

SHEET SIZE: ANSI B 11" X 17"

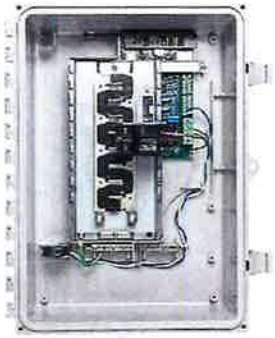
SHEET NUMBER: PV-8

Enphase Networking

Enphase IQ Combiner 3

(X-IQ-AM1-240-3)

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



Smart

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

Simple

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

Reliable

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

UL LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and **REPLACEMENT PARTS** (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5 year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat-5E (or Cat-6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741 CAN/CSA-C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES-003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CAN/CSA-22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE 07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE

473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY

ESR

SHEET NAME

COMBINER SPECIFICATION

SHEET SIZE

ANSI B 11" X 17"

SHEET NUMBER

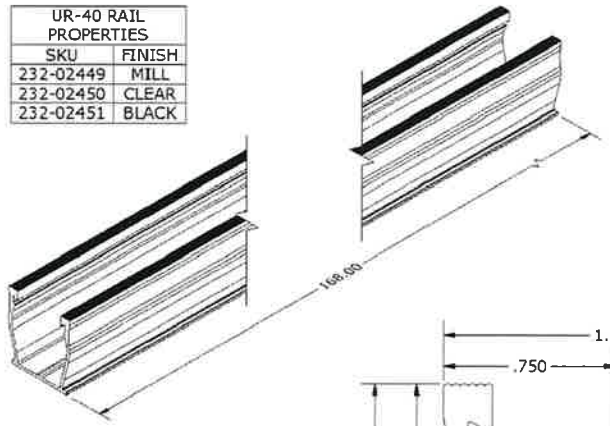
PV-9

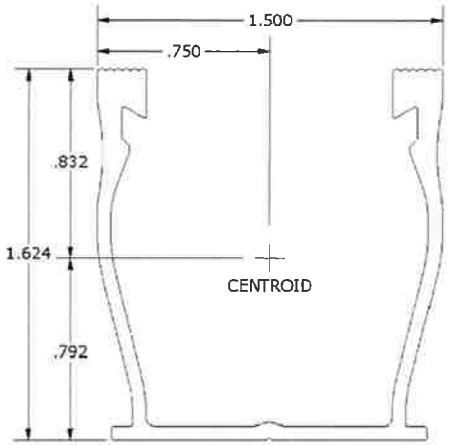
DESCRIPTION:	DRAWN BY:
SNAPNRACK, UR-40 RAIL	mwatkins
PART NUMBER(S):	REVISION:
232-02449, 232-02450, 232-02451	B

SnapNrack
Solar Mounting Solutions

685 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA
PHONE (415) 580-6900 • FAX (415) 580-6902

UR-40 RAIL PROPERTIES	
SKU	FINISH
232-02449	MILL
232-02450	CLEAR
232-02451	BLACK





SECTION PROPERTIES	
A	0.357 in²
Ixx	0.125 in⁴
Iyy	0.132 in⁴
Sx (TOP)	0.150 in³
Sx (BOT)	0.158 in³
Sy (LEFT)	0.175 in³
Sy (RIGHT)	0.175 in³

ALL DIMENSIONS IN INCHES

MATERIALS:	6000 SERIES ALUMINUM	OPTIONS:
DESIGN LOAD (LBS):	N/A	CLEAR / BLACK ANODIZED
ULTIMATE LOAD (LBS):	N/A	MILL FINISH
TORQUE SPECIFICATION:	N/A LB-FT	BUNDLES OF 144
CERTIFICATION:	UL 2703, FILE E359313	BOXES OF 8
WEIGHT (LBS):	5.85	

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD, STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE, LILLINGTON, NC 27546

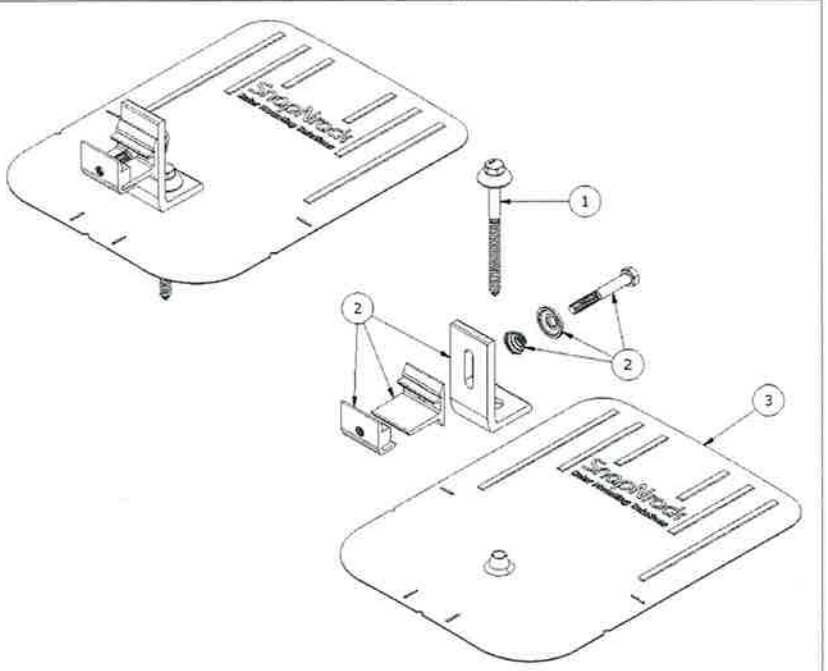
DRAWN BY
ESR

SHEET NAME
RAIL SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

DESCRIPTION:	DRAWN BY:	SnapNrack Solar Mounting Solutions
SNAPNRACK, ULTRA RAIL COMP KIT	mwatkins	
PART NUMBER(S):	REVISION:	585 MARKET STREET 30TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 580-6900 • FAX (415) 580-6902
SEE BELOW	B	THE INFORMATION WITHIN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF SNAPNRACK, LLC.



PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	802 UP, 1333 DOWN, 356 SIDE
ULTIMATE LOAD (LBS):	2005 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM UL SUBJECT 2582
WEIGHT (LBS):	0.80

DESCRIPTION:	DRAWN BY:	SnapNrack Solar Mounting Solutions
SNAPNRACK, ULTRA RAIL COMP KIT	mwatkins	
PART NUMBER(S):	REVISION:	585 MARKET STREET 30TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE (415) 580-6900 • FAX (415) 580-6902
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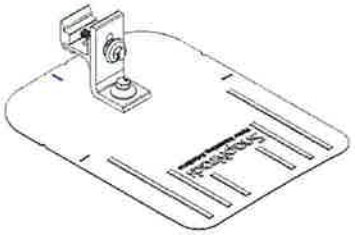
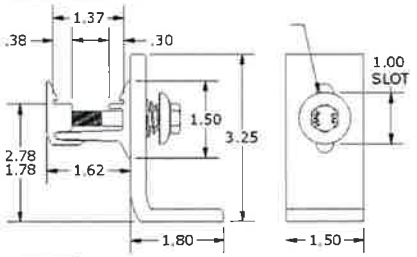
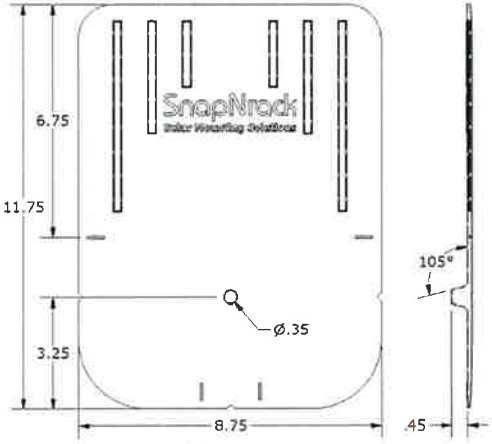
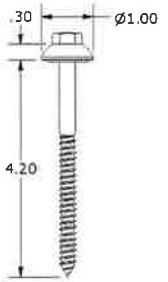


UMBRELLA L FOOT PROPERTIES	
SKU	DESCRIPTION
242-01219	ULTRA RAIL UMBRELLA L FOOT, SILVER
242-01220	ULTRA RAIL UMBRELLA L FOOT, BLACK



COMP FLASHING PROPERTIES	
SKU	DESCRIPTION
232-01375	COMP FLASHING, 9" X 12", BLACK ALUM
232-01376	COMP FLASHING, 9" X 12", SILVER ALUM





ALL DIMENSIONS IN INCHES

SIGORA SOLAR

SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ
RESIDENCE

473 WOOD POINT DRIVE,
LILLINGTON, NC 27546

DRAWN BY
ESR

SHEET NAME
ATTACHMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included

SolaDeck Model SD 0783

SolaDeck UL50 Type 3R Enclosures

Available Models:
Model SD 0783 - (3" fixed Din Rail)
Model SD 0786 - (6" slotted Din Rail)

SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

****Typical System Configuration**

4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
1- Power Distribution Block 600VDC 175AMP
1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

****Typical System Configuration**

4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
4- Din Rail Mounted Terminal Blocks
Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.

Cover is trimmed to allow conduit or fittings. base is center dimpled for fitting locations.

Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.

Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Claire, WI 54703
For product information call 1(866) 367-7782

SIGORA SOLAR
SIGORA SOLAR LLC
490 WESTFIELD RD STE A
CHARLOTTESVILLE, VA 22901

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	07/21/2021	

DATE:07/21/2021

PROJECT NAME & ADDRESS

LISA STRYCHARZ RESIDENCE
473 WOOD POINT DRIVE, LILLINGTON, NC 27546

DRAWN BY
ESR

SHEET NAME
SOLADECK SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

W CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

Scott E. Wyssling, PE, PP, CME

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August 23, 2021

Sigora Solar
1222 Harris Street
Charlottesville, VA 22903

Re: Engineering Services (Post Installation)
Strycharz Residence
473 Wood Point Drive, Lillington NC
8.280 kW System Size

To Whom it May Concern:

Pursuant to your request, a representative from this office, under my supervision, conducted a site inspection at the above referenced home to inspect the solar panel installation. As you are aware, this office initially prepared a structural assessment of the proposed solar panel installation, the adequacy of the connections for this system and identified maximum spacing of the connections. The information from our site visit shows panel support locations and spacing which conform to our structural assessment. Acceptable minor changes to the layout include; the panel positions support spacing less than the maximum, and/or additions or deletions of panels at roof locations.

Based upon the site-specific information provided by Sigora Solar and the site inspection, our office certifies that the structural installation for this roof was in general conformance to our structural assessment report dated July 21, 2021, the SnapNRack product installation criteria, and the layout plan as specified in our report. This letter pertains only to the panel support attachments to the roof framing and not the engineered photovoltaic panel products, components, panel positioning, or electrical related installations/connections.

This certification is based on applicable building codes. The installation is in compliance with the 2018 North Carolina Residential Code Book, professional engineering assessment and judgment and covers this dwellings assessment for solar panel connections and support only.

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

Very truly yours,

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

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

North Carolina Firm License No. 46546