NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

626 BAILEY RD
COATS, NC 27521
ASSESSOR'S #: 1610-40-5137.000

GENERAL NOTES

1.1.1 PROJECT NOTES:

1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.

1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION

1.1.4 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY

1.1.5 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.

1.1.6 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].

1.1.7 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

1.2.1 SCOPE OF WORK:

1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.

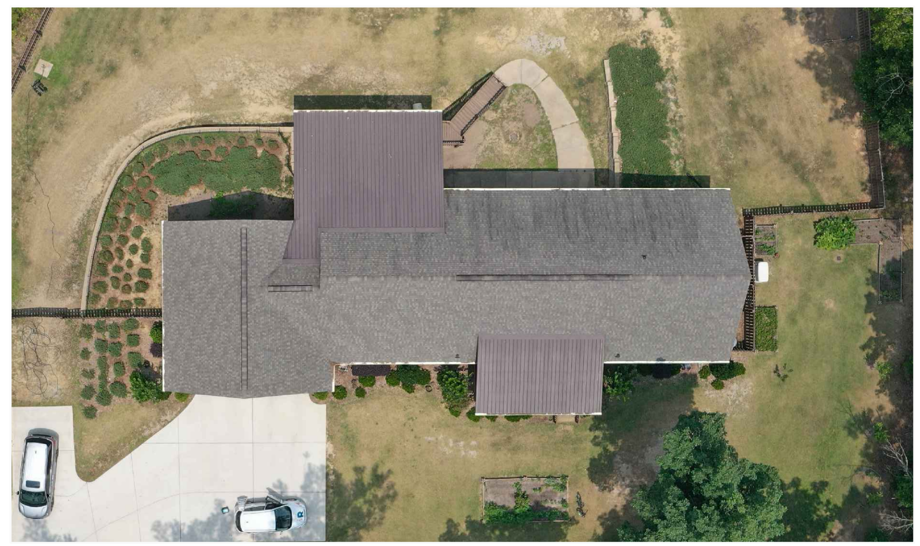
1.3.1 WORK INCLUDES:

1.3.2 PV ROOF ATTACHMENTS - RTMINI / S-5! PROTEA BRACKETS
1.3.3 PV RACKING SYSTEM INSTALLATION - QUICK MOUNT PV QMR-RS
1.3.4 PV MODULE AND INVERTER INSTALLATION - SOLARIA SOLARIA POWERX-400R / SOLAR EDGE SE7600H-US (240V) TESLA BACKUP GATEWAY / TESLA POWERWALL-2-AC 5kW
1.3.5 PV EQUIPMENT GROUNDING
1.3.6 PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX
1.3.7 PV LOAD CENTERS (IF INCLUDED)
1.3.8 PV METERING/MONITORING (IF INCLUDED)
1.3.9 PV DISCONNECTS
1.3.10 PV FINAL COMMISSIONING
1.3.11 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV
1.3.12 SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

SCOPE OF WORK

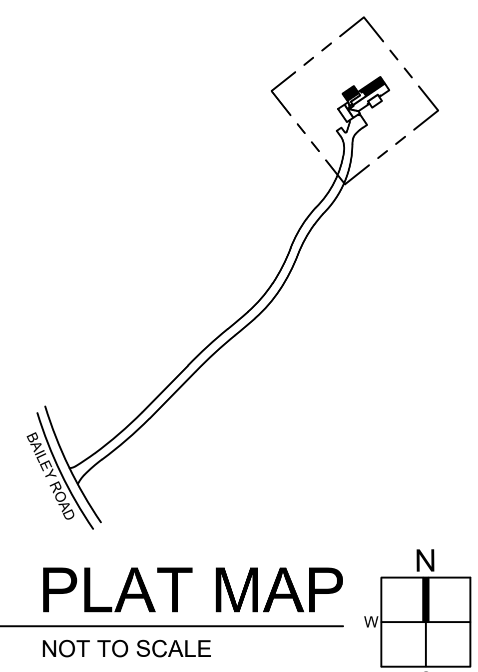
SYSTEM SIZE: STC: 57 X 400 = 22.800 kW
PTC: 57 X 374.9 = 21.369 kW DC
(57) MSOLAR TXI10-400108BB
(2) SOLAR EDGE SE7600H-US (240V)
(1) TESLA BACKUP GATEWAY
(2) TESLA POWERWALL-2-AC 5kW

ATTACHMENT TYPE: RTMINI / S-5! PROTEA BRACKETS
MSP UPGRADE: NO



01 AERIAL PHOTO
NOT TO SCALE

NOTICE TO CONTRACTOR
All construction must comply with current NC Building Codes and is subject to field inspection and verification.
APPROVED
Limited building only review
Permit holder responsible for full compliance with the code
07/21/2023
Harnett COUNTY NORTH CAROLINA



02 PLAT MAP
NOT TO SCALE

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
T-001	COVER PAGE
G-001	NOTES
A-101	SITE PLAN
A-102	ELECTRICAL PLAN
A-103	SOLAR ATTACHMENT PLAN
A-104	ELECTRICAL ELEVATION
E-601	LINE DIAGRAM
E-602	DESIGN TABLES
E-603	PLACARDS
S-501	ASSEMBLY DETAILS
R-001	RESOURCE DOCUMENT
R-002	RESOURCE DOCUMENT
R-003	RESOURCE DOCUMENT
R-004	RESOURCE DOCUMENT
R-005	RESOURCE DOCUMENT
R-006	RESOURCE DOCUMENT
R-007	RESOURCE DOCUMENT
R-008	RESOURCE DOCUMENT

PROJECT INFORMATION

OWNER
NAME: WILLIAM MILLER

PROJECT MANAGER
NAME: ANDREW O'DONNELL
PHONE: 704-525-6767

CONTRACTOR
NAME: RENU ENERGY SOLUTIONS, LLC
PHONE: 704-525-6767

AUTHORITIES HAVING JURISDICTION
BUILDING: HARNETT COUNTY
ZONING: HARNETT COUNTY
UTILITY: DUKE ENERGY CAROLINAS

DESIGN SPECIFICATIONS
OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: 15 PSF
WIND EXPOSURE: B
WIND SPEED: 115 MPH

APPLICABLE CODES & STANDARDS
BUILDING: IBC 2018, IRC 2018
ELECTRICAL: NEC 2017
FIRE: IFC 2013

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

PHONE: 704-525-6767
ADDRESS: 801 PRESSLEY ROAD SUITE 100 CHARLOTTE, NC 28217
LIC. NO.: 76615
HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp
MILLER RESIDENCE
626 BAILEY ROAD
COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

COVER PAGE

DATE: 06/22/2023
DRAFTED BY: L.J.
CHECKED BY: C.H. & D.B.
REVISIONS:

T-001.00
(SHEET 1)

2.1.1 **SITE NOTES:**
2.1.2 A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2.1.3 THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
2.1.4 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
2.1.5 PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.
2.1.6 ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.

2.2.1 **EQUIPMENT LOCATIONS:**
2.2.2 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
2.2.3 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).
2.2.3 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
2.2.4 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
2.2.5 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
2.2.6 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

2.3.1 **STRUCTURAL NOTES:**
2.3.2 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAIL MANUFACTURER'S INSTRUCTIONS.
2.3.3 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.
2.3.4 ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.
2.3.5 ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.
2.3.6 WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

2.4.1 **GROUNDING NOTES:**
2.4.2 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
2.4.3 PV SYSTEMS REQUIRE AN EQUIPMENT GROUNDING CONDUCTOR. ALL METAL ELECTRICAL EQUIPMENT AND STRUCTURAL COMPONENTS BONDED TO GROUND, IN ACCORDANCE WITH 250.134 OR 250.136(A). ONLY THE DC CONDUCTORS ARE UNGROUNDED.
2.4.4 PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.
2.4.5 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).
2.4.6 EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
2.4.7 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
2.4.8 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]
2.4.9 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.
2.4.10 DC PV ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION MEETING THE REQUIREMENTS OF 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS

2.5.1 **INTERCONNECTION NOTES:**
2.5.2 LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]
2.5.3 THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(B)(2)(3)].
2.5.4 THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(B)(2)(3)].
2.5.5 AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (B)(2)(3)(C).
2.5.6 FEEDER TAP INTERCONECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (B)(2)(1)
2.5.7 SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42
2.5.8 BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].

2.6.1 **DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:**
2.6.2 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).
2.6.3 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.
2.6.4 BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED. THEREFORE BOTH MUST OPEN WHERE A DISCONNECT IS REQUIRED, ACCORDING TO NEC 690.13.
2.6.5 ISOLATING DEVICES OR EQUIPMENT DISCONNECTING MEANS SHALL BE INSTALLED IN CIRCUITS CONNECTED TO EQUIPMENT AT A LOCATION WITHIN THE EQUIPMENT, OR WITHIN SIGHT AND WITHIN 10 FT OF THE EQUIPMENT. AN EQUIPMENT DISCONNECTING MEANS SHALL BE PERMITTED TO BE REMOTE FROM THE EQUIPMENT WHERE THE EQUIPMENT DISCONNECTING MEANS CAN BE REMOTELY OPERATED FROM WITHIN 10 FT OF THE EQUIPMENT, ACCORDING TO NEC 690.15 (A).
2.6.6 PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D)
2.6.7 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
2.6.8 BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED, THEREFORE BOTH REQUIRE OVER-CURRENT PROTECTION, ACCORDING TO NEC 240.21. (SEE EXCEPTION IN NEC 690.9)
2.6.9 IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.

2.7.1 **WIRING & CONDUIT NOTES:**
2.7.2 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
2.7.3 ALL CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
2.7.4 EXPOSED PV SOURCE CIRCUITS AND OUTPUT CIRCUITS SHALL USE WIRE LISTED AND IDENTIFIED AS PHOTOVOLTAIC (PV) WIRE [690.31 (C)]. PV MODULES WIRE LEADS SHALL BE LISTED FOR USE ON PV ARRAYS, ACCORDING TO NEC 690.31 (A).
2.7.5 PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE [NEC 200.6 (A)(6)].
2.7.6 MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY.
2.7.7 ACCORDING TO NEC 200.7, UNGROUNDED SYSTEMS DC CONDUCTORS COLORED OR MARKED AS FOLLOWS:
DC POSITIVE- RED, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN
DC NEGATIVE- BLACK, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN
2.7.8 AC CONDUCTORS COLORED OR MARKED AS FOLLOWS:
PHASE A OR L1- BLACK
PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE
PHASE C OR L3- BLUE, YELLOW, ORANGE*, OR OTHER CONVENTION
NEUTRAL- WHITE OR GREY

* IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

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HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

626 BAILEY ROAD
COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

NOTES

DATE: 06/22/2023
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CHECKED BY: C.H. & D.B.

REVISIONS:

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GENERAL NOTES

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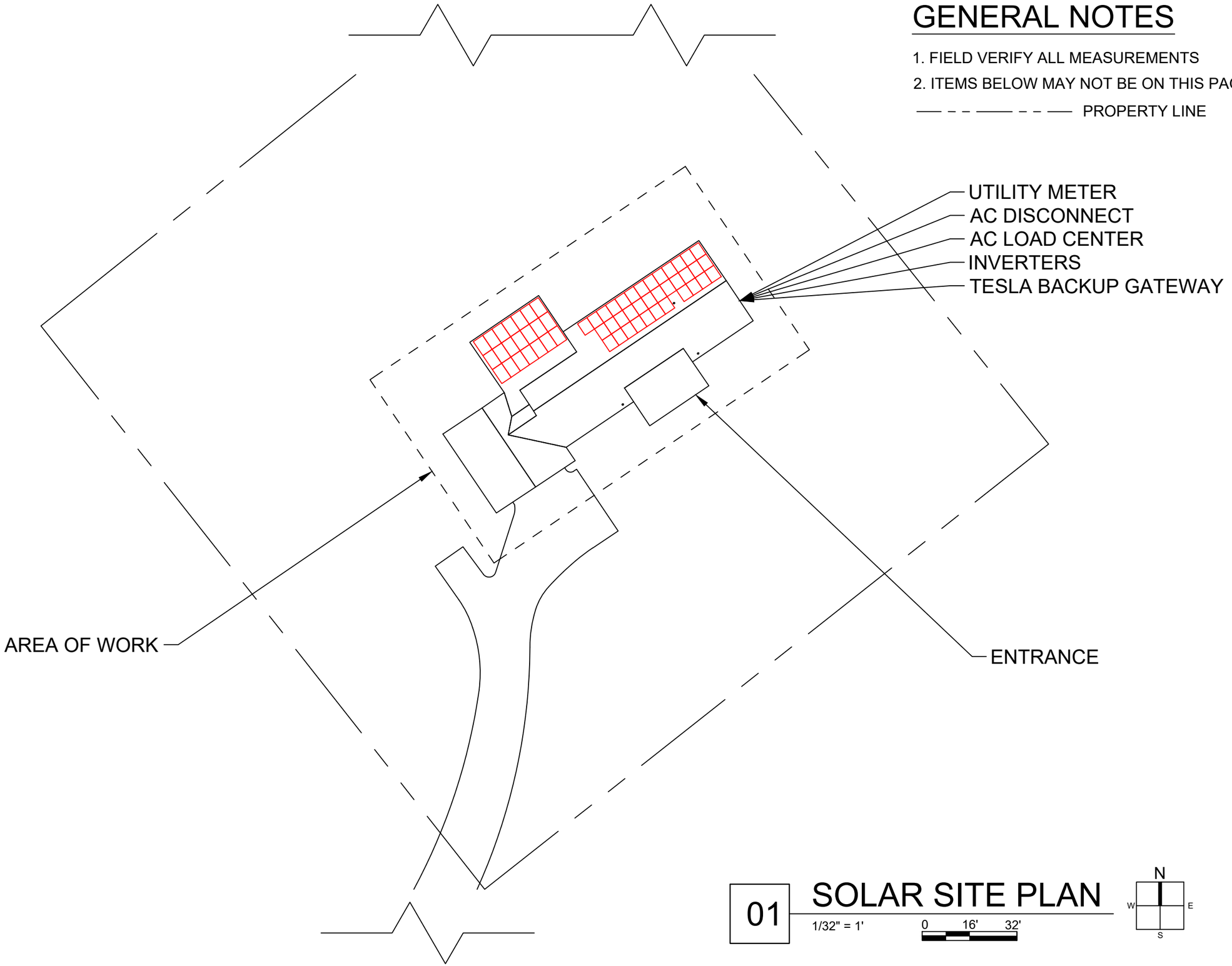

01 SOLAR SITE PLAN

1/32" = 1'

0 16' 32'

N W E S

CONTRACTOR

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SITE PLAN

DATE: 06/22/2023

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CHECKED BY: C.H. & D.B.

REVISIONS:

A-101.00

(SHEET 3)

GENERAL NOTES

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- (A) MODULE STRINGING
- (B) MODULE STRINGING
- (C) MODULE STRINGING
- (D) MODULE STRINGING

EXTERIOR PV EQUIPMENT

(E)(1) UTILITY METER

(N)(1) AC DISCONNECT

(N)(1) AC LOAD CENTER

(N)(2) INVERTERS

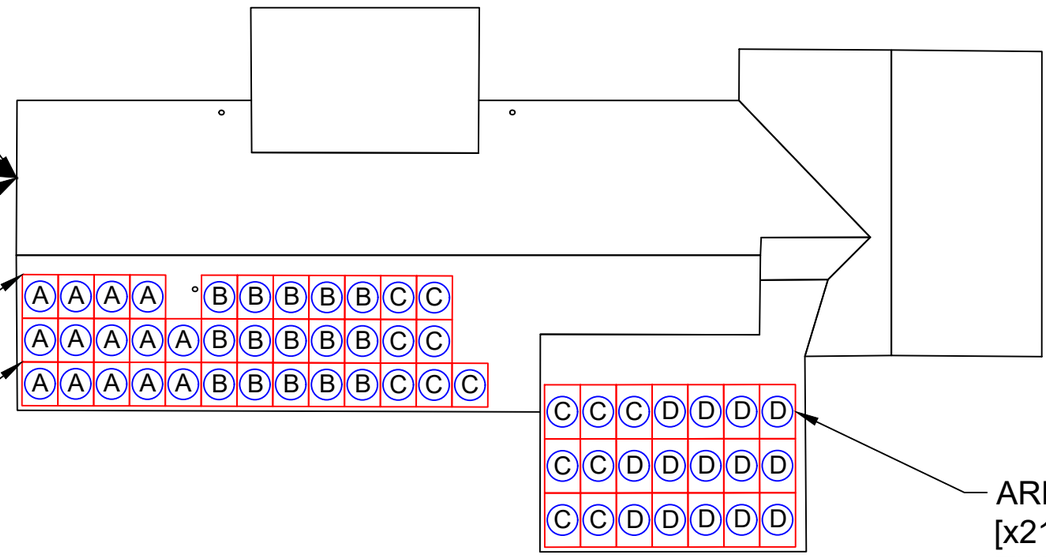
(N)(1) TESLA BACKUP GATEWAY

INTERIOR PV EQUIPMENT

(E)(1) MAIN ELECTRICAL PANEL

(N)(2) TESLA POWERWALL

(N)(1) JUNCTION BOX

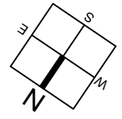


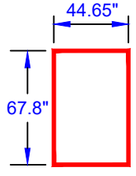
ARRAY 1 - 14.400 kW
[x36] (N) MODULES
TILT: 36 DEGREES
ROOF PITCH: 9:12
AZIMUTH: 326 DEGREES

ARRAY 2 - 8.400 kW
[x21] (N) MODULES
TILT: 13 DEGREES
ROOF PITCH: 3:12
AZIMUTH: 325 DEGREES

01 SOLAR ELECTRICAL PLAN

1/16" = 1' 0 8' 16'





MODULE:
MSOLAR
MSOLAR TXI10-400108BB
400 WATTS

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

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ELECTRICAL PLAN

DATE: 06/22/2023

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(SHEET 4)

GENERAL NOTES

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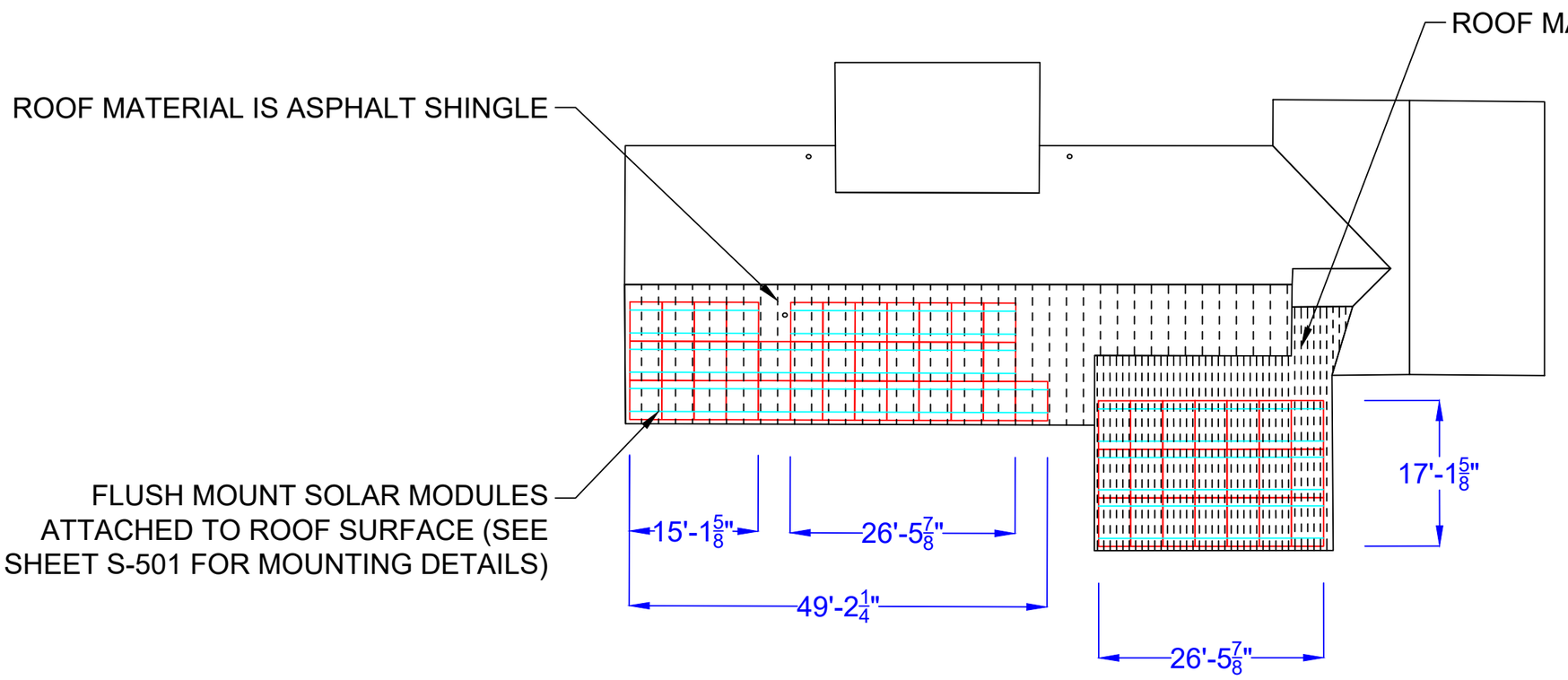
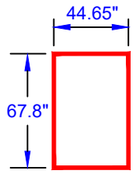


01 SOLAR ELECTRICAL PLAN

1/8" = 1' 0 4' 8'

N
W E
S



MODULE:
MSOLAR
MSOLAR TXI10-400108BB
400 WATTS

CONTRACTOR

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SOLAR ATTACHMENT PLAN

DATE: 06/22/2023

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GENERAL NOTES

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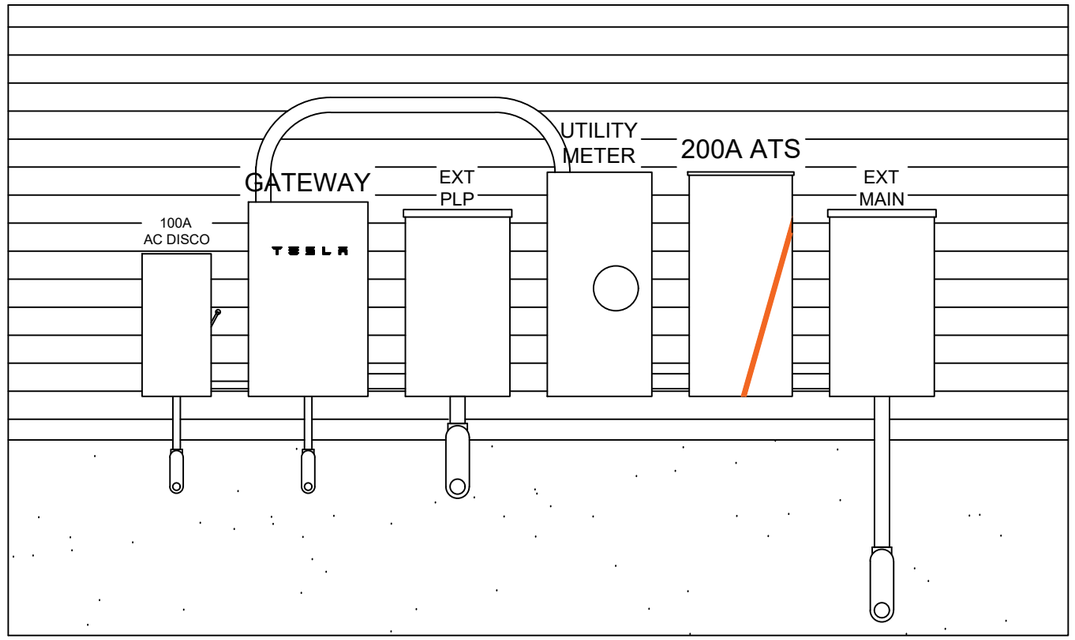
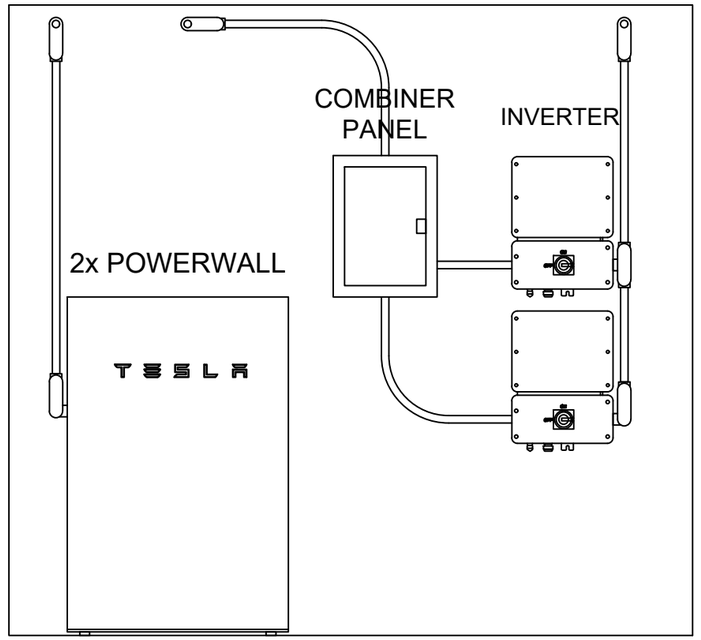
NORTH EAST EXT ELEVATION



SOUTH WEST INT ELEVATION



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ELEC ELEVATION

DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

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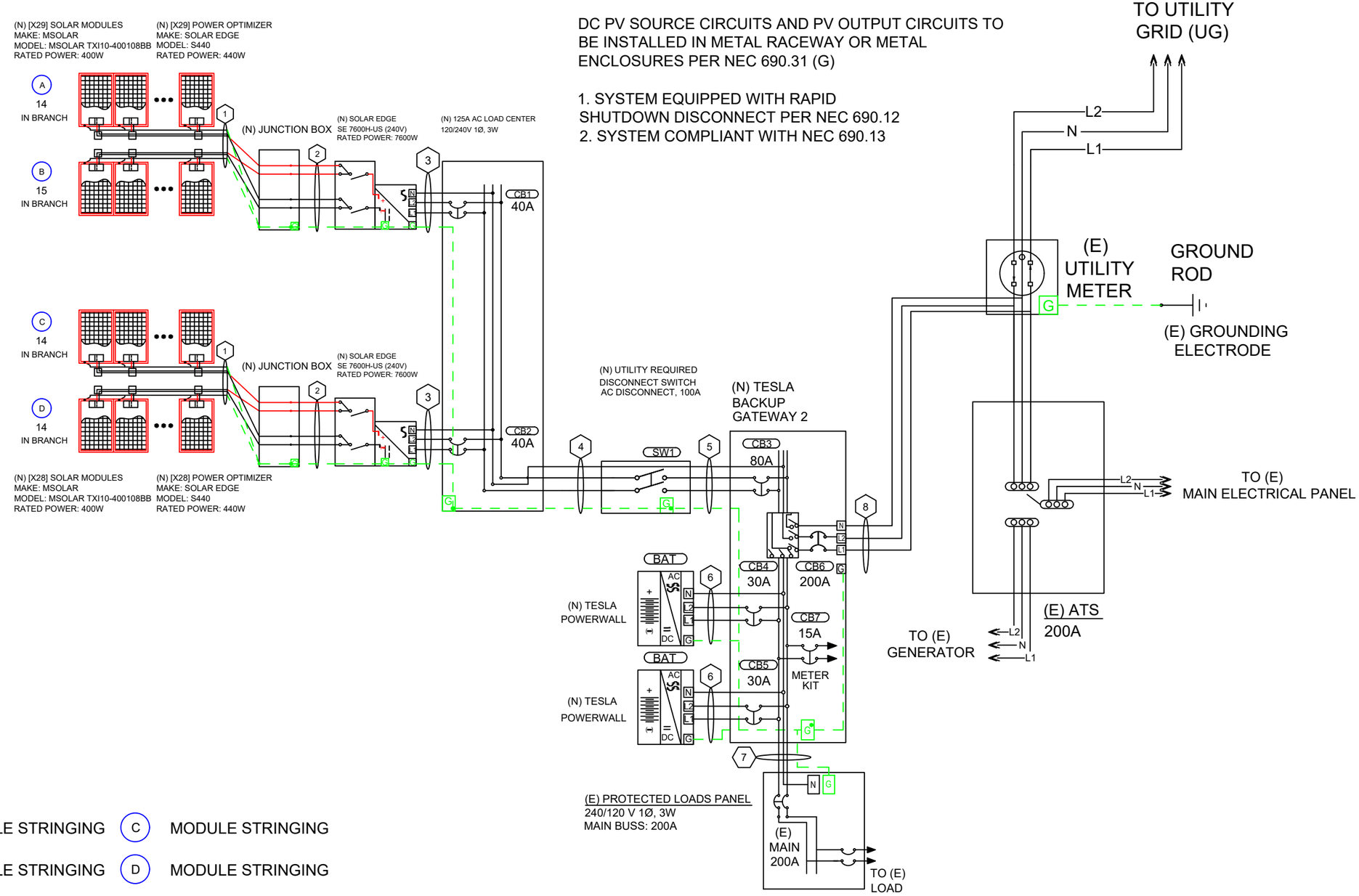
(SHEET 6)

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	NEUTRAL	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL
1	3	10 AWG PV WIRE, COPPER	FREE AIR	2	N/A	-	6 AWG BARE, COPPER	0.96 (35 °C)	1	15A	18.75A	55A	52.80A	75°C	50A
2	1	10 AWG THWN-2, COPPER	1.00" DIA	4	N/A	-	10 AWG THWN-2, COPPER	0.96 (35 °C)	0.8	15A	18.75A	40A	30.72A	75°C	35A
3	1	8 AWG THWN-2, COPPER	1.00" DIA	2	40A	8 AWG THWN-2, COPPER	10 AWG THWN-2, COPPER	0.96 (35 °C)	1	31.66A	39.58A	55A	52.80A	75°C	50A
4	1	3 AWG THWN-2, COPPER	1.00" DIA	2	N/A	3 AWG THWN-2, COPPER	8 AWG THWN-2, COPPER	0.96 (35 °C)	1	63.32A	79.15A	115A	110.4A	75°C	100A
5	1	3 AWG THWN-2, COPPER	1.00" DIA	2	80A	3 AWG THWN-2, COPPER	8 AWG THWN-2, COPPER	0.96 (35 °C)	1	63.32A	79.15A	115A	110.4A	75°C	100A
6	1	10 AWG THWN-2, COPPER	1.00" DIA	2	30A	10 AWG THWN-2, COPPER	10 AWG THWN-2, COPPER	0.96 (35 °C)	1	20.83A	26.00A	40A	38.40A	75°C	35A
7	1	4/0 AWG XHHW, ALUMINUM	2.00" DIA	2	200A	4/0 AWG XHHW, ALUMINUM	4 AWG XHHW, ALUMINUM	0.96 (35 °C)	1	-	-	205A	196.8A	75°C	180A
8	1	4/0 AWG XHHW, ALUMINUM	2.00" DIA	2	200A	4/0 AWG XHHW, ALUMINUM	N/A	0.96 (35 °C)	1	-	-	205A	196.8A	75°C	180A



DC PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS TO BE INSTALLED IN METAL RACEWAY OR METAL ENCLOSURES PER NEC 690.31 (G)

1. SYSTEM EQUIPPED WITH RAPID SHUTDOWN DISCONNECT PER NEC 690.12
2. SYSTEM COMPLIANT WITH NEC 690.13

A MODULE STRINGING
B MODULE STRINGING
C MODULE STRINGING
D MODULE STRINGING

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

PHONE: 704-525-6767
ADDRESS: 801 PRESSLEY ROAD SUITE 100
CHARLOTTE, NC 28217

LIC. NO.: 76615
HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

626 BAILEY ROAD
COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

LINE DIAGRAM

DATE: 06/22/2023
DRAFTED BY: L.J.
CHECKED BY: C.H. & D.B.

REVISIONS:

E-601.00
(SHEET 7)

SYSTEM SUMMARY

	INVERTER #1		INVERTER #2	
	STRING #1	STRING #2	STRING #1	STRING #2
POWERBOX MAX OUTPUT CURRENT	15A	15A	15A	15A
OPTIMIZERS IN SERIES	14	15	14	14
NOMINAL STRING VOLTAGE	400.4V		400.4V	
ARRAY OPERATING CURRENT	15A		15A	
ARRAY STC POWER	11,600W		11,200W	
ARRAY PTC POWER	10,872.1W		10,497.2W	
MAX AC CURRENT	31.66A		31.66A	
MAX AC POWER	7,600W		7,600W	
DERATED (CEC) AC POWER	7,600W		7,600W	

DESIGN TEMPERATURES

ASHRAE EXTREME LOW	-11.1°C (12.0°F), SOURCE: HARNETT COUNTY (35.38°;-78.73°)
ASHRAE 2% HIGH	37.1°C (98.8°F), SOURCE: HARNETT COUNTY (35.38°;-78.73°)

MODULES

REF.	QTY.	MAKE AND MODEL	PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1-57	57	MSOLAR TXI10-400108BB	400W	374.9W	13.97A	12.90A	34.88V	31.01V	-0.096V/°C (-0.275%/°C)	25A

POWER OPTIMIZERS

REF.	QTY.	MODEL	RATED INPUT POWER	MAX OUTPUT CURRENT	MAX INPUT ISC	MAX DC VOLTAGE	WEIGHTED EFFICIENCY
PO1-57	57	SOLAR EDGE S440	440W	15A	14.5A	60V	98.6%

INVERTERS

REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	OCPD RATING	RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX INPUT VOLTAGE	CEC WEIGHTED EFFICIENCY
I1	2	SOLAR EDGE SE7600H-US (240V)	240V	FLOATING	40A	7600W	32A	20A	480V	99.0%

DISCONNECTS

REF.	QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE
SW1	1	EATON DG22XXRB	100A	240VAC

OCPDS

REF.	QTY.	RATED CURRENT	MAX VOLTAGE
CB1-2	2	40A	240VAC
CB-3	1	80A	240VAC
CB4-5	2	30A	240VAC
CB-6	1	200A	240VAC
CB-7	1	15A	240VAC

CONTRACTOR

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ENGINEER OF RECORD

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DESIGN TABLES

DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

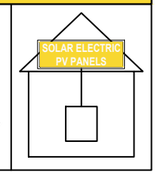
REVISIONS:

E-602.00

(SHEET 8)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LABEL 1
AT RAPID SHUTDOWN SYSTEM
[NEC 690.56(C)(1)(A)].

WARNING
ELECTRIC SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 2
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT
[NEC 690.15]

ALL SIGNAGE MUST BE PERMANENTLY ATTACHED AND BE WEATHER RESISTANT/SUNLIGHT RESISTANT AND CANNOT BE HAND-WRITTEN PER NEC 110.21(B)

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

LABEL 3
AT POINT OF INTERCONNECTION; LABEL, SUCH AS LABEL 4 OR LABEL 5 MUST IDENTIFY PHOTOVOLTAIC SYSTEM [NEC 705.12(B)(4)]

PHOTOVOLTAIC SYSTEM DC DISCONNECT

OPERATING VOLTAGE:	240 VDC
OPERATING CURRENT:	31.66 A
MAX SYSTEM VOLTAGE:	480 VDC
SHORT CIRCUIT CURRENT:	45 A
CHARGE CONTROLLER MAX:	N/A

LABEL 4
AT EACH DC DISCONNECTING MEANS
[NEC 690.53]

PHOTOVOLTAIC SYSTEM AC DISCONNECT

RATED AC OUTPUT CURRENT:	63.32AAC
NOMINAL OPERATING VOLTAGE:	240/480 V AC

LABEL 5
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT
[NEC 690.15]

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

LABEL 6
AT POINT OF INTERCONNECTION; LABEL, SUCH AS LABEL 4 OR LABEL 5 MUST IDENTIFY PHOTOVOLTAIC SYSTEM [NEC 705.12(B)(4)]

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 7
AT POINT OF INTERCONNECTION; LABEL, SUCH AS LABEL 4 OR LABEL 5 MUST IDENTIFY PHOTOVOLTAIC SYSTEM [NEC 705.12(B)(4)]

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL 8
AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10 FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.
[NEC 690.31(G)]
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE
[IFC 605.11.1.1]

RAPID SHUTDOWN PV ARRAY

LABEL 8
AT RAPID SHUTDOWN SWITCH
[NEC 690.56(C)].
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE
[IFC 605.11.1.1]

DIRECTORY
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION
[NEC 690.56(B)]
WHERE THE PV SYSTEMS ARE REMOTELY LOCATED FROM EACH OTHER, A DIRECTORY IN ACCORDANCE WITH 705.10 SHALL BE PROVIDED AT EACH PV SYSTEM DISCONNECTING MEANS. PV SYSTEM EQUIPMENT AND DISCONNECTING MEANS SHALL NOT BE INSTALLED IN BATHROOMS
[NEC 690.4(D),(E)]

LABELING NOTES
1.1 LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRICAL CODE, INTERNATIONAL FIRE CODE 605.11, OSHA STANDARD 1910.145, ANSI Z535
1.2 MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
1.3 LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
1.4 LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
1.5 ALERTING WORDS TO BE COLOR CODED. "DANGER" WILL HAVE RED BACKGROUND; "WARNING" WILL HAVE ORANGE BACKGROUND; "CAUTION" WILL HAVE YELLOW BACKGROUND. [ANSI Z535]

CONTRACTOR

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COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

PLACARDS

DATE: 06/22/2023
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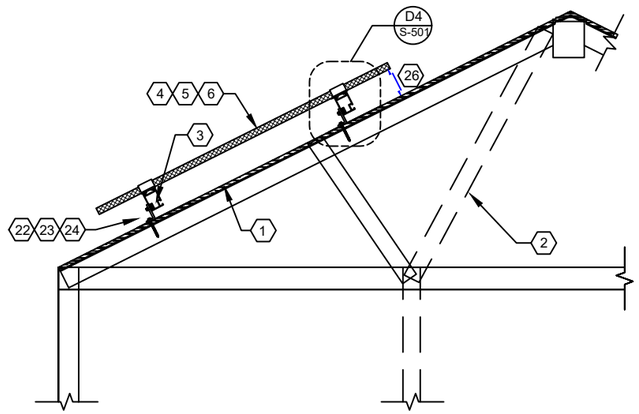
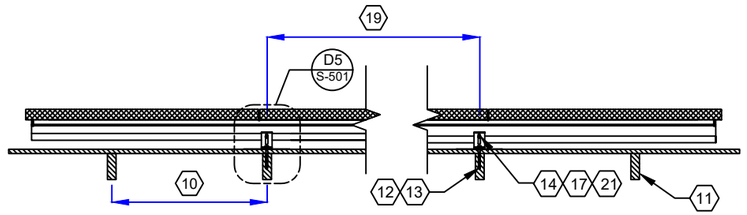
(SHEET 9)



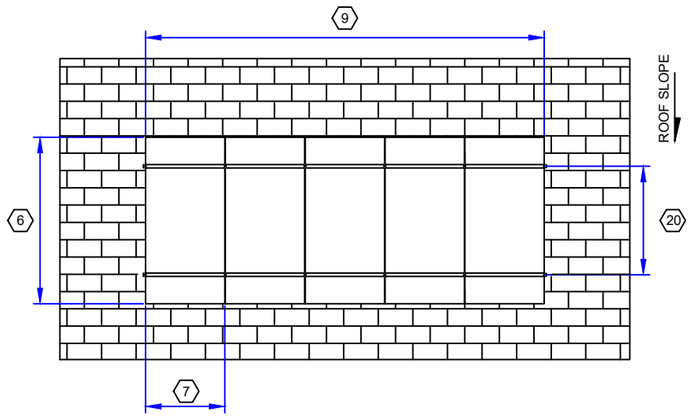
D1 RACKING DETAIL (TRANSVERSE)

NOT TO SCALE



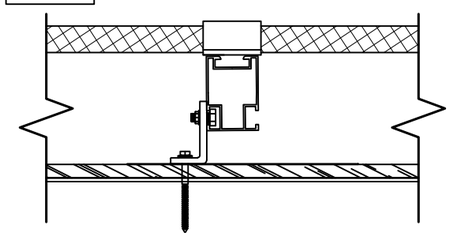
D2 RACKING DETAIL (LONGITUDINAL)

NOT TO SCALE



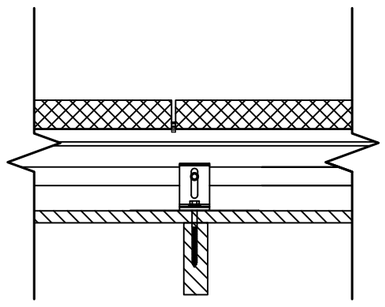
D3 RACKING DETAIL (TOP)

NOT TO SCALE



D4 DETAIL (TRANSVERSE)

NOT TO SCALE



D5 DETAIL (LONGITUDINAL)

NOT TO SCALE

SHEET KEYNOTES

1. ROOF MATERIAL: ASPHALT SHINGLE/METAL TRAP
2. ROOF STRUCTURE: TRUSS
3. ATTACHMENT TYPE: RTMINI/S-5! PROTEA BRACKET
4. MODULE MANUFACTURER: MSOLAR
5. MODULE MODEL: MSOLAR TXI10-400108BB
6. MODULE LENGTH: 67.8"
7. MODULE WIDTH: 44.65"
8. MODULE WEIGHT: 46.3 LBS.
9. SEE SHEET A-103 FOR DIMENSION(S)
10. MIN. FIRE OFFSET: NO FIRE CODE ENFORCED
11. TRUSS SPACING: 18/24 IN. O.C.
12. TRUSS SIZE: 2X8
13. LAG BOLT DIAMETER: 5/16"
14. LAG BOLT EMBEDMENT: 2-3/4"
15. TOTAL # OF ATTACHMENTS: 57/60
16. TOTAL AREA: 756.818/441.477 SQ. FT.
17. TOTAL WEIGHT: 1886.535/1086.717 LBS.
18. WEIGHT PER ATTACHMENT: 32.297/17.312 LBS.
19. DISTRIBUTED LOAD: 2.493/2.461 PSF
20. MAX. HORIZONTAL STANDOFF: 48 IN.
21. MAX. VERTICAL STANDOFF:
    LANDSCAPE: 26 IN., PORTRAIT: 33 IN.
22. STANDOFF STAGGERING: YES
23. RAIL MANUFACTURER (OR EQUIV.): QUICK MOUNT
24. RAIL MODEL (OR EQUIVALENT): QUICK MOUNT PV QMR-RS
25. RAIL WEIGHT: 0.42 PLF.
26. MAX. TRUSS SPAN: 179/88 IN.
27. MODULE CLEARANCE: 3 IN. MIN., 6 IN. MAX.

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

PHONE: 704-525-6767
ADDRESS: 801 PRESSLEY ROAD SUITE 100
CHARLOTTE, NC 28217

LIC. NO.: 76615
HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

626 BAILEY ROAD
COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

ASSEMBLY DETAILS

DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

S-501.00

(SHEET 10)

INXEPTION

msolar 108BB 400W HC Series

mSolar 10BB Half-Cell Black Monocrystalline PERC PV Module

Excellent efficiency
10 busbar technology increases power by decreasing the distance between busbars and the finger grid line

Improved weak illumination response
More power output even in lower light conditions such as overcast days or off-peak sunlight hours

Anti PID
Panels rigorously tested to limit power degradation caused by 'stray' currents

High wind and snow resistance
5,400Pa Snow Load
2,400Pa Wind Load

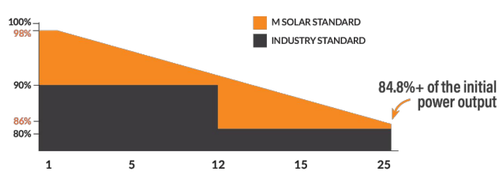
25-year warranty
M Solar modules are guaranteed to retain at least 84.3% of the initial power output

Appealing Aesthetics
Fully black module creates a sleek, uniform array

25-year product warranty, 25-year output warranty

Warranty backed by Mission Solar Energy

0.5% annual degradation over 25 years



CEC

UL 61730 | IEC 61215 | IEC 61730
ISO9001, ISO14001, ISO45001

energy.inxeption.com
888-852-4783

108BB 400W HC Series | msolar 10BB Half-Cell, All-Black Monocrystalline PERC PV Module

msolar

Electrical Characteristics | STC*			
Module Type	TXI10-395108BB	TXI10-400108BB	TXI10-405108BB
Nominal Power Watt Pmax (W)*	395	400	405
Power Output Tolerance Pmax (W)	0~+5	0~+5	0~+5
Maximum Power Voltage Vmp (V)	30.84	31.01	31.21
Maximum Power Current Imp (A)	12.81	12.90	12.98
Open Circuit Voltage (V)	36.98	37.07	37.23
Short Circuit Current Isc (A)	13.70	13.97	13.87
Module Efficiency (%)	20.23	20.48	20.74

*STC (Standard Test Condition): Irradiance 1000W/m², Module Temperature 25°C, AM 1.5
*Measuring tolerance: ±

Electrical Characteristics | NMOT*			
Maximum Power Watt Pmax (Wp)	298	270	274
Maximum Power Voltage Vmpp (V)	29.08	29.26	29.47
Maximum Power Current Impp (A)	10.25	10.32	10.38
Open Circuit Voltage Voc (V)	34.75	34.88	35.12
Short Circuit Current Isc (A)	10.96	11.03	11.10

*NMOT(Nominal module operating temperature): Irradiance 800W/m². Ambient Temperature 20°C, AM 1.5, Wind Speed 1m/s

Mechanical Data	
Solar Cells	Mono PERC, 182mm half cells
Cells orientation	108 (6x9+6x9)
Module dimension	67.80x44.65x1.38 in. (1,722x1,134x35 mm)
Weight	46.30 lb (21.00 kg)
Glass	3.2mm, High Transmission, Low Iron & Semi-Tempered Glass
Junction Box	IP 68, 3 Diodes
Cables	1,200mm
Connectors	MC4 EVO2

Temperature Ratings	
NOCT	42°C±2°C
Temperature coefficient of Pmax	-0.350%/°C
Temperature coefficient of Voc	-0.275%/°C
Temperature coefficient of Isc	+0.045%/°C

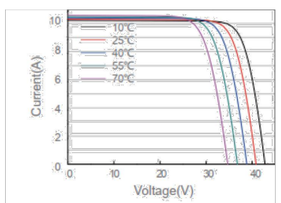
Working Conditions	
Maximum System Voltage	1500VDC
Operating Temperature	-40°C ~+85°C
Maximum Series Fuse	25A
Maximum Load (Snow/Wind)	5,400Pa / 2,400Pa
Fire Rating	UL Type 1**

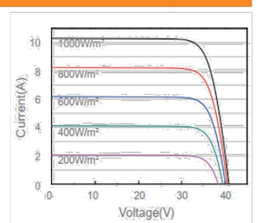
* Do not connect Fuse In Combiner Box with two or more strings in parallel connection

* Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

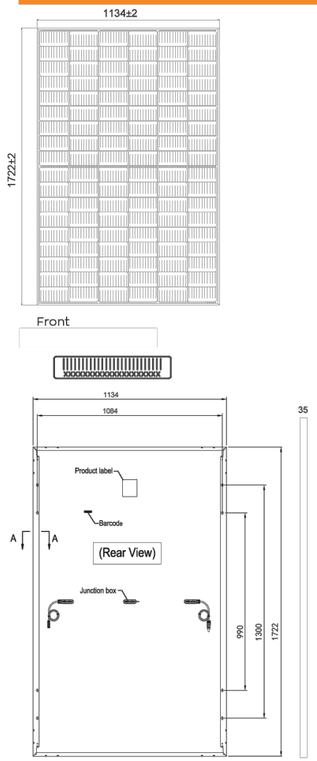
** Please note, the 'Fire Class' Rating is designated for the full installed PV system, which includes, but is not limited to, the module, the type of mounting used, pitch and roof composition.

I-V Curves of PV Module (365W)





Dimensions (MM)



Tolerance:
Length: ±2mm
Width: ±2mm
Height: ±1mm
Pitch-row: ±1mm

Packaging Details

31 Panels per pallet	Pallet Stack Weight	Truck Weight
26 Pallets per truck	2,934 lbs. (1341.98 kg)	38,461.2 lbs. (17,445.7 kg)

INXEPTION
energy.inxeption.com | 888-852-4783

CONTRACTOR

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ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

R-001.00
(SHEET 11)

Single Phase Inverter with HD-Wave Technology

for North America

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

INVERTERS

Optimized installation with HD-Wave technology

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

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology

for North America

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

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXX3XX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600ku Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

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

Single Phase Inverter with HD-Wave Technology

for North America

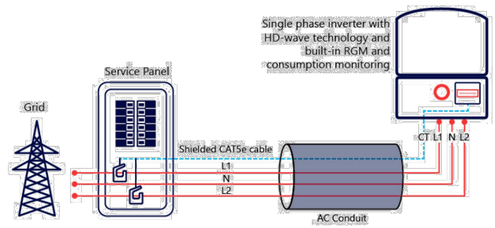
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Metering, ANSI C12.20	Optional[3]							
Consumption metering								
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection							
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, 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 SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9		38.8 / 17.6	lb / kg
Noise	< 25					<50		dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

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

How to Enable Consumption Monitoring

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



RoHS

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

PHONE: 704-525-6767
ADDRESS: 801 PRESSLEY ROAD SUITE 100
CHARLOTTE, NC 28217

LIC. NO.: 76615
HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

626 BAILEY ROAD
COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

R-002.00

(SHEET 12)

Power Optimizer
For Residential Installations

S440, S500, S500B

POWER OPTIMIZER

Enabling PV power optimization at the module level

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

* Functionality subject to inverter model and firmware version

solaredge.com

solaredge

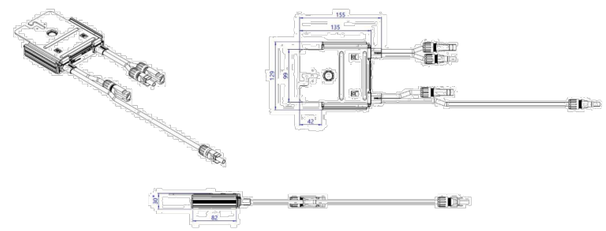
Power Optimizer
For Residential Installations
S440, S500, S500B

	S440	S500	S500B	UNIT
Rated Input DC Power(1)	440	500		W
Absolute Maximum Input Voltage (Voc)	60		125	Vdc
MPPT Operating Range	8 - 60		12.5 - 105	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15		Adc
Maximum Efficiency	99.5			%
Weighted Efficiency	98.6			%
Overvoltage Category	II			
OUTPUT DURING OPERATION				
Maximum Output Current	15			Adc
Maximum Output Voltage	60		80	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)				
Safety Output Voltage per Power Optimizer	1 +/- 0.1			Vdc
STANDARD COMPLIANCE				
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011			
Safety	IEC62109-1 (class II safety), UL1741			
Material	UL94 V-0, UV Resistant			
RoHS	Yes			
Fire Safety	VDE-AR-E 2100-712:2013-05			
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage	1000			Vdc
Dimensions (W x L x H)	129 x 155 x 30		129 x 155 x 45	mm
Weight (including cables)	655			gr
Input Connector	MC4(2)			
Input Wire Length	0.1			m
Output Connector	MC4			
Output Wire Length	(+) 2.3, (-) 0.10			m
Operating Temperature Range(3)	-40 to +85			°C
Protection Rating	IP68			
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 power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for details.

PV System Design Using a SolarEdge Inverter(4)		Single Phase HD-Wave	Three Phase SExxK-RWB	Three Phase for 230/400V Grid	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	9	16	18	
	S500B	6	8	14		
Maximum String Length (Power Optimizers)		25	20	50		
Maximum Continuous Power per String		5700	5625	11250	12750	W
Maximum Allowed Connected Power per String (Permitted only when the power difference between strings is less than 2,000W)		See(5)	See(5)	13500	15000	W
Parallel Strings of Different Lengths or Orientations		Yes				

(4) It is not allowed to mix S-series and P-series Power Optimizers in new installations.
(5) If the inverter's 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 DCpower. Refer to https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf.



*45mm for S500B

CE RoHS

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

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ADDRESS: 801 PRESSLEY ROAD SUITE 100
CHARLOTTE, NC 28217

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HIC. NO.:
ELE. NO.: 20334U

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COATS, NC 27521
APN: 1610-40-5137.000

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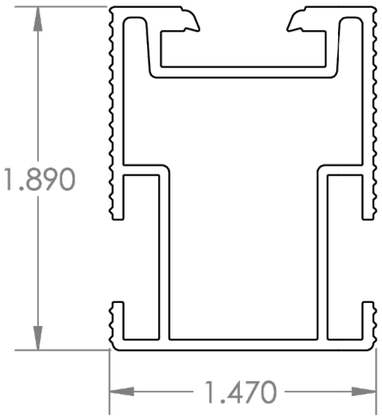
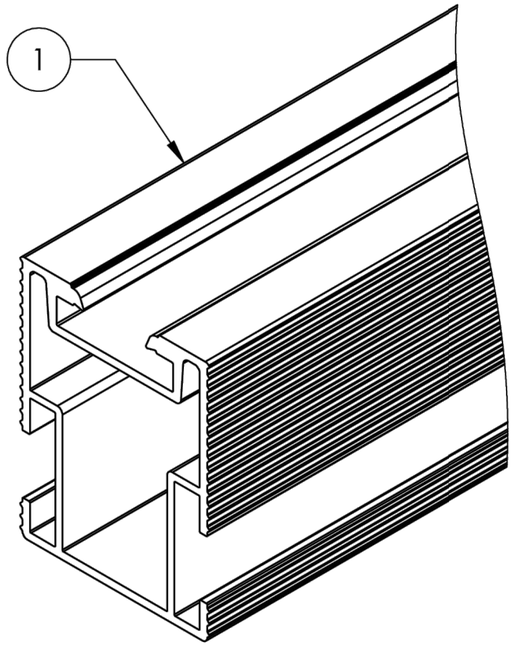
CHECKED BY: C.H. & D.B.

REVISIONS:

R-003.00
(SHEET 13)

ITEM NO.	DESCRIPTION	QTY.
1	QRAIL, STANDARD, AL, MILL	1





NOTES:
1. AVAILABLE IN MILL FINISH AND BLACK FINISH
2. WEIGHT = 0.65 POUNDS PER FOOT

DO NOT SCALE DRAWING

Quick Mount PV

TITLE:

QMR-RS: QRAIL STANDARD

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: RAD	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ±.19 THREE PLACE DECIMAL ±.094	A	DATE: 10/7/2019	4
	SCALE: 1:1	WEIGHT: 0.65	SHEET 1 OF 1

CONTRACTOR

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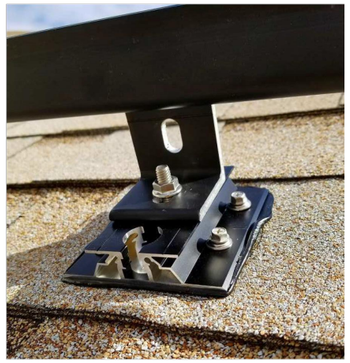
REVISIONS:

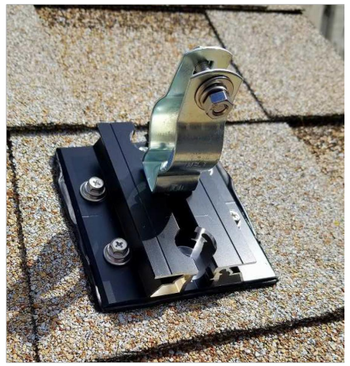
R-004.00
(SHEET 14)

RT-MINI

Self-flashing base for asphalt & metal roof-top PV mounting systems

RT-MINI is suitable for mounting any rail system with a conventional L-Foot.



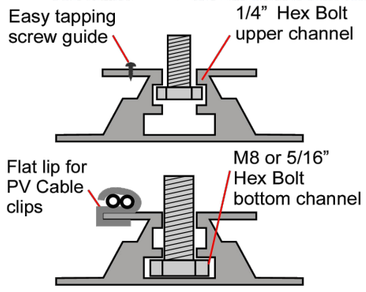


Dual bolt design: M8 or 5/16” for L-Foot & 1/4” for EMC

ICC ES ICC ESR 3575

Call Now for more details

858-935-6064



RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

Engineered to ASTM D 1761 (Standard Test Methods for Mechanical Fasteners in Wood)

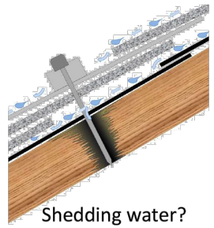
Components

RT2-00-MINIBK
PAT : PENDING

MINI base : 20 ea.
Screw : 40 ea.
Extra RT-Butyl : 10 ea.

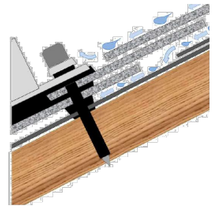
RT-Butyl is Roof Tech’s flexible flashing used in 550,000 residential PV systems for the last 20 years. It is the first PV mounting system with Flexible Flashing certified by the ICC.

Metal Flashing Retrofit



Shedding water?

Flexible Flashing



100% Waterproof

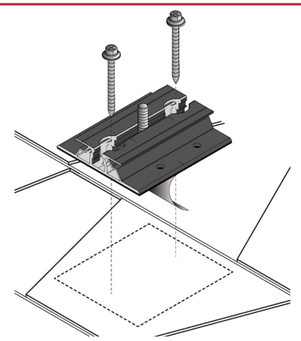
ICC ESR-3575

ASTM2140 testing

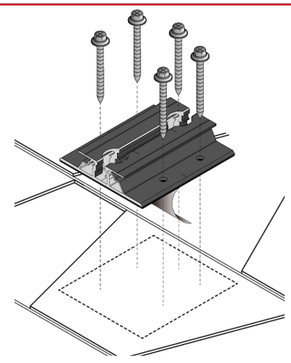
UV testing (7500 hrs.)

Dimensions in (mm)

Rafter installation



Deck installation



P.E. Stamped Letters available at www.roof-tech.us/support

Roof Tech
Smarter PV mounting solutions from top of roof to bottom line®
www.roof-tech.us info@roof-tech.us

Roof Tech Inc.
www.roof-tech.us info@roof-tech.us
10620 Treena Street, Suite 230, San Diego, CA 92131
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CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

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ADDRESS: 801 PRESSLEY ROAD SUITE 100 CHARLOTTE, NC 28217

LIC. NO.: 76615
HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

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COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

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DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

R-005.00
(SHEET 15)

S-5!®

The Right Way!™

NEW

NOW AVAILABLE IN ALUMINUM

ProteaBracket™

ProteaBracket™

A versatile bracket for mounting solar PV to trapezoidal roof profiles

ProteaBracket™ is now made in aluminum. Still the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteaBracket just got better!

The bracket features an adjustable attachment base and module attachment options to accommodate different roof profile dimensions and mounting options.

Our pre-applied EPDM gasket with peel and stick adhesive makes installation a snap, ensuring accurate and secure placement the first time.

With no messy sealants, faster installation, and a weather-proof fit, ProteaBracket offers you the most versatile solar attachment solution available.

ProteaBracket* can be used for rail mounting or "direct-attach" with S-5! PVKIT™

*When ProteaBracket is used in conjunction with the S-5! PVKIT, an additional nut is required during installation.

Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*

*See www.S-5.com for details.

The right way to attach solar PV to trapezoidal roof profiles!

888-825-3432 | www.S-5.com

MADE IN THE USA

S-5!®

The Right Way!™

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal rib, exposed-fastened metal roof profiles!

ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

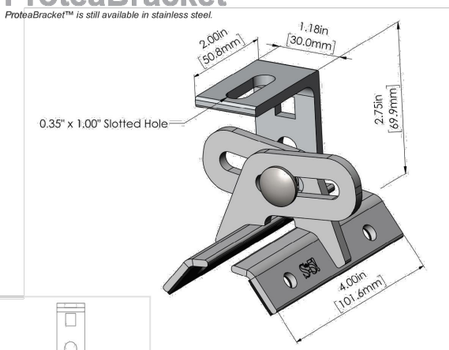
Note: All four pre-punched holes must be used to achieve tested strength. Fasteners are provided.

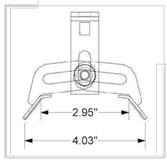
For design assistance, ask your distributor, or visit **www.S-5.com** for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

S-5!® holding strength is unmatched in the industry.

ProteaBracket™

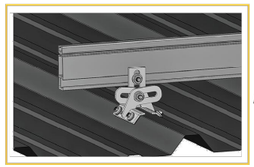
ProteaBracket™ is still available in stainless steel.



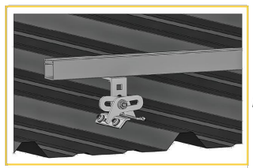


ProteaBracket fits profiles up to 3 inches

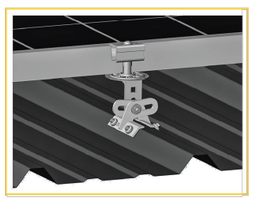
Multiple Attachment Options:



Side Mount Rail



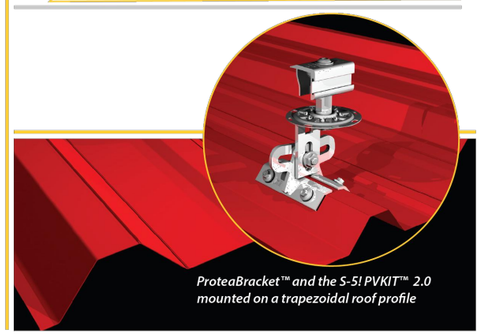
Bottom Mount Rail



w/ S-5! PVKIT™ (rail-less)

INSTALLATION:

No surface preparation needed. (1) Wipe away excess oil and debris. **(2)** Peel off adhesive release paper. **(3)** Align and mount bracket directly onto crown of panel. **(4)** Secure ProteaBracket through pre-punched holes, using piercing-point S-5! screws.



ProteaBracket™ and the S-5! PVKIT™ 2.0 mounted on a trapezoidal roof profile

S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

Distributed by

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

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DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

R-006.00

(SHEET 16)

POWERWALL

Tesla Powerwall is a fully-integrated AC battery system for residential or light commercial use. Its rechargeable lithium-ion battery pack provides energy storage for solar self-consumption, time-based control, and backup.

Powerwall's electrical interface provides a simple connection to any home or building. Its revolutionary compact design achieves market-leading energy density and is easy to install, enabling owners to quickly realize the benefits of reliable, clean power.

PERFORMANCE SPECIFICATIONS

AC Voltage (Nominal)	120/240 V
Feed-In Type	Split Phase
Grid Frequency	60 Hz
Total Energy	14 kWh
Usable Energy	13.5 kWh
Real Power, max continuous	5 kW (charge and discharge)
Real Power, peak (10 s, off-grid/backup)	7 kW (charge and discharge)
Apparent Power, max continuous	5.8 kVA (charge and discharge)
Apparent Power, peak (10 s, off-grid/backup)	7.2 kVA (charge and discharge)
Maximum Supply Fault Current	10 kA
Maximum Output Fault Current	32 A
Overcurrent Protection Device	30 A
Imbalance for Split-Phase Loads	100%
Power Factor Output Range	+/– 1.0 adjustable
Power Factor Range (full-rated power)	+/– 0.85
Internal Battery DC Voltage	50 V
Round Trip Efficiency[1,3]	90%
Warranty	10 years

[1]Values provided for 25°C (77°F), 3.3 kW charge/discharge power.
[2]In Backup mode, grid charge power is limited to 3.3 kW.
[3]AC to battery to AC, at beginning of life.

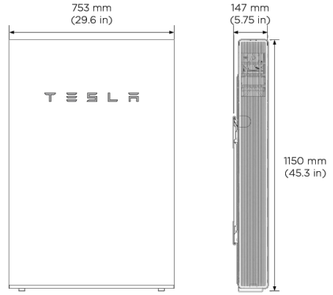
COMPLIANCE INFORMATION

Certifications	UL 1642, UL 1741, UL 1973, UL 9540, IEEE 1547, UN 38.3
Grid Connection	Worldwide Compatibility
Emissions	FCC Part 15 Class B, ICES 003
Environmental	RoHS Directive 2011/65/EU
Seismic	AC156, IEEE 693-2005 (high)

MECHANICAL SPECIFICATIONS

Dimensions[1]	1150 mm x 755 mm x 147 mm (45.3 in x 29.6 in x 5.75 in)
Weight[1]	114 kg (251.3 lbs)
Mounting options	Floor or wall mount

[1]Dimensions and weight differ slightly if manufactured before March 2019. Contact Tesla for additional information.

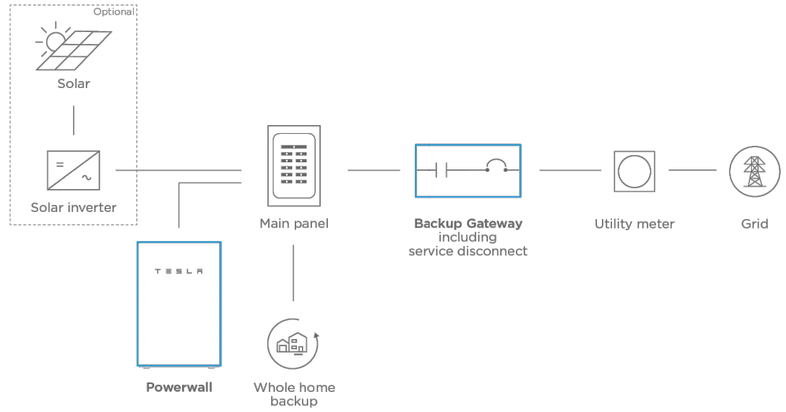


ENVIRONMENTAL SPECIFICATIONS

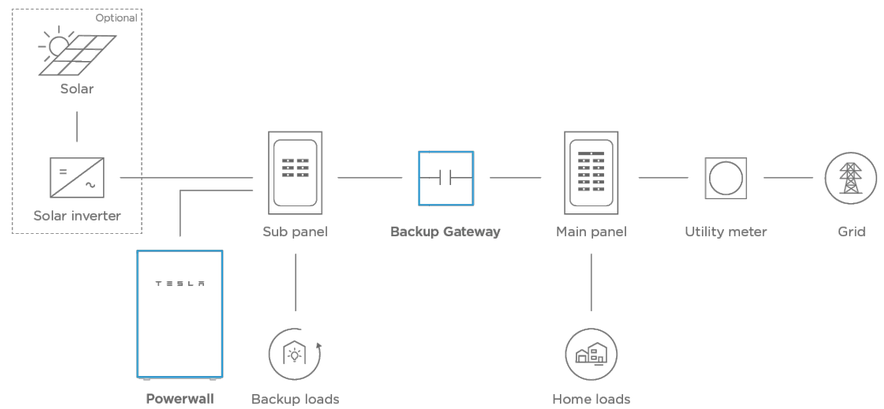
Operating Temperature	–20°C to 50°C (–4°F to 122°F)
Recommended Temperature	0°C to 30°C (32°F to 86°F)
Operating Humidity (RH)	Up to 100%, condensing
Storage Conditions	–20°C to 30°C (–4°F to 86°F) Up to 95% RH, non-condensing State of Energy (SoE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R
Ingress Rating	IP67 (Battery & Power Electronics) IP56 (Wiring Compartment)
Wet Location Rating	Yes
Noise Level @ 1m	< 40 dBA at 30°C (86°F)

TYPICAL SYSTEM LAYOUTS

WHOLE HOME BACKUP



PARTIAL HOME BACKUP



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REVISIONS:

R-007.00
(SHEET 17)

POWERWALL
Backup Gateway 2

The Backup Gateway 2 for Tesla Powerwall provides energy management and monitoring for solar self-consumption, time-based control, and backup.

The Backup Gateway 2 controls connection to the grid, automatically detecting outages and providing a seamless transition to backup power. When equipped with a main circuit breaker, the Backup Gateway 2 can be installed at the service entrance. When the optional internal panelboard is installed, the Backup Gateway 2 can also function as a load center.

The Backup Gateway 2 communicates directly with Powerwall, allowing you to monitor energy use and manage backup energy reserves from any mobile device with the Tesla app.

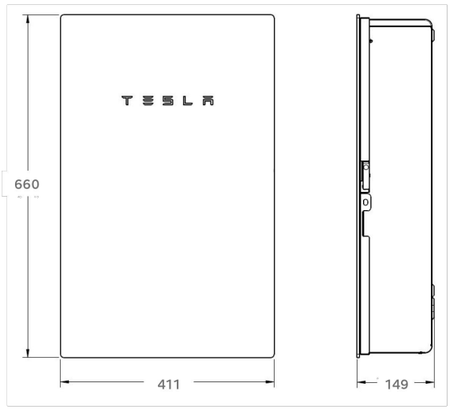
PERFORMANCE SPECIFICATIONS

AC Voltage (Nominal)	120/240V
Feed-In Type	Split Phase
Grid Frequency	60 Hz
Current Rating	200 A
Maximum Input Short Circuit Current	10 kA[1]
Overcurrent Protection Device	100-200A; Service Entrance Rated[1]
Overvoltage Category	Category IV
AC Meter	Revenue accurate (+/– 0.2 %)
Primary Connectivity	Ethernet, Wi-Fi
Secondary Connectivity	Cellular (3G, LTE/4G)[2]
User Interface	Tesla App
Operating Modes	Support for solar self-consumption, time-based control, and backup
Backup Transition	Automatic disconnect for seamless backup
Modularity	Supports up to 10 AC-coupled Powerwalls
Optional Internal Panelboard	200A 6-space / 12 circuit Eaton BR Circuit Breakers
Warranty	10 years

[1] When protected by Class J fuses, Backup Gateway 2 is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.
[2] The customer is expected to provide internet connectivity for Backup Gateway 2; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

MECHANICAL SPECIFICATIONS

Dimensions	660 mm x 411 mm x 149 mm (26 in x 16 in x 6 in)
Weight	20.4 kg (45 lb)
Mounting options	Wall mount, Semi-flush mount



COMPLIANCE INFORMATION

Certifications	UL 67, UL 869A, UL 916, UL 1741 PCS CSA 22.2 0.19, CSA 22.2 205
Emissions	FCC Part 15, ICES 003

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	–20°C to 50°C (–4°F to 122°F)
Operating Humidity (RH)	Up to 100%, condensing
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R

CONTRACTOR

RENU ENERGY SOLUTIONS, LLC

PHONE: 704-525-6767
ADDRESS: 801 PRESSLEY ROAD SUITE 100
CHARLOTTE, NC 28217

LIC. NO.: 76615
HIC. NO.:
ELE. NO.: 20334U

NEW PV SYSTEM: 22.800 kWp

MILLER RESIDENCE

626 BAILEY ROAD
COATS, NC 27521
APN: 1610-40-5137.000

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 06/22/2023

DRAFTED BY: L.J.

CHECKED BY: C.H. & D.B.

REVISIONS:

R-008.00
(SHEET 18)