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

October 17, 2025

Luminate Energy
6706 Bourgeois Road,
Houston, TX, 77066

SCOTT WYSSLING, PE

Digitally signed by SCOTT WYSSLING, PE
DN: C=US, S=Utah, O=Wyssling Consulting, SN="WYSSLING, PE", GivenName=SCOTT, CN="SCOTT WYSSLING, PE", E=scott@wysslingconsulting.com
Reason: I am the author of this document
Location:
Date: 2025.10.17 10:53:53-06'00'
Foxit PDF Editor Version: 13.0.1

Re: Engineering Services
Sheppard Residence
228 South West Pilots Way, Lake City, FL
11.745 kW System

To Whom It May Concern:

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

A. Site Assessment Information

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

B. Description of Structure:

Roof Framing: Assumed prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber.
Roof Material: Metal Roofing
Roof Slope: 18 degrees
Attic Access: Inaccessible
Foundation: Permanent

C. Loading Criteria Used

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 0 psf
- **Wind Load** based on ASCE 7-22
  - Ultimate Wind Speed = 120 mph (based on Risk Category II)
  - Exposure Category C

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the FBC 2023, 8th edition. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.

D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent S-5! Installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. System will be attached to the metal roofing material utilizing the patented S-5! Connection. Installation of the connections shall be in accordance with the manufacturer's recommendations.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the FBC 2023, 8th edition, current industry standards, and is based on information supplied to us at the time of this report.

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

Very truly yours,

Scott E. Wyssling, PE
Florida License No. 81558
Florida Business License No. RY34912

Signed 10/17/2025

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

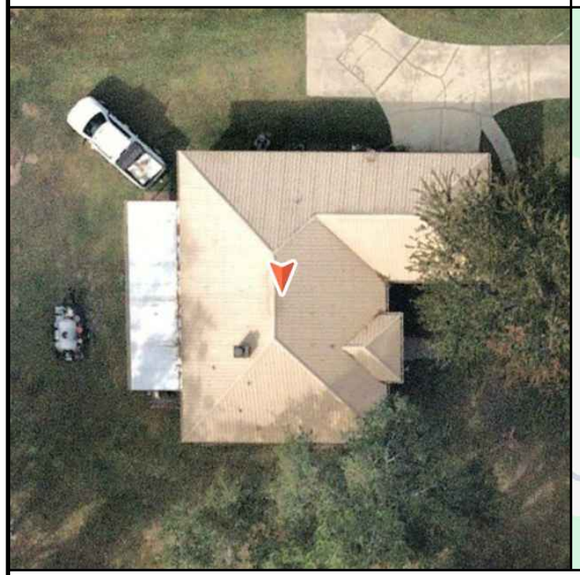
NEW PV SYSTEM DESIGN

29 MODULES - 11.745 kW DC, 7.600 kW AC SYSTEM SIZE

SHEPPARD RESIDENCE - 228 SOUTHWEST PILOTS WAY, LAKE CITY, FL 32024 APN: 114S1602911112

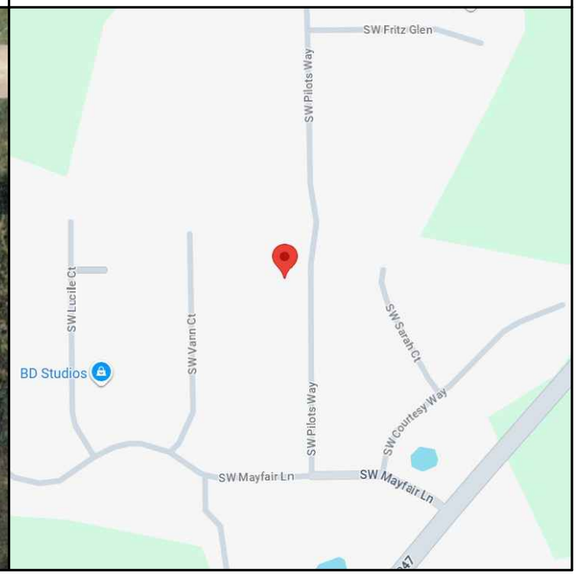
AERIAL MAP

NTS



VICINITY MAP

NTS



GOVERNING CODES

2020 NATIONAL ELECTRIC CODE
2023 8TH EDITION FLORIDA BUILDING CODE: BUILDING
2023 8TH EDITION FLORIDA BUILDING CODE: RESIDENTIAL
2023 8TH EDITION FLORIDA BUILDING CODE: EXISTING BUILDING
2023 8TH EDITION FLORIDA BUILDING CODE: ACCESSIBILITY
2023 8TH EDITION FLORIDA BUILDING CODE: PLUMBING
2023 8TH EDITION FLORIDA BUILDING CODE: MECHANICAL
2023 8TH EDITION FLORIDA BUILDING CODE: FUEL GAS
2023 8TH EDITION FLORIDA BUILDING CODE: ENERGY CONSERVATION
2023 8TH EDITION FLORIDA FIRE PREVENTION CODE (NFPA)

AS ADOPTED BY COLUMBIA COUNTY INCLUDING ANY AMENDMENTS OR ADDITIONAL LISTED REQUIREMENTS.
DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF CLAY ELECTRIC COOPERATIVE UTILITY.

EQUIPMENT IS COMPATIBLE WITH UL2703, UL1741, UL1703 / UL61730, AND UL9540 AS APPLICABLE

DESIGN CRITERIA

WIND SPEED: 120 MPH
GROUND SNOW LOAD: 0 PSF
ASCE: 7-22
EXPOSURE CATEGORY: C
BUILDING OCCUPANCY: R-3
CONSTRUCTION TYPE: TYPE V-B
SPRINKLERS: NO

SHEET INDEX

SCOPE OF WORK

SYSTEM SIZE: 11.745kW DC / 7.600kW AC SYSTEM SIZE
PV MODULE: (29) JA SOLAR JAM54S31-405/MR
INVERTER: (1) TESLA 7600
RAPID SHUTDOWN DEVICE: (11) TESLA MCI-2
AC DISCONNECT: (1) 100A FUSED AC DISCONNECT WITH 70A FUSES
COMBINER: (1) 125A LOAD CENTER

ROOF STORIES: 1
ROOF TYPE(S): TRAPEZOIDAL METAL
MOUNTING(S) & RACKING(S): S-5! PROTEA BRACKET WITH K2 CROSSRAIL
FLASHING: NONE
ROOF HEIGHT: 15 FEET

INTERCONNECTION: LINE SIDE TAP IN MAIN SERVICE PANEL
MAIN SERVICE PANEL LOCATION: BASEMENT
MAIN SERVICE PANEL RATING: (E) 200A
MAIN BREAKER RATING: (E) 200A
OCPD: 70A FUSES

CEO METER NUMBER: 190876656

ARRAY	TILT	AZIMUTH
1	18°	179°
2	18°	89°
3	18°	179°
4	18°	359°

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DATE	REVISION	COMMENT

DESIGN ENGINEER

WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

76 N. MEADOWBROOK DRIVE
ALPINE UT 84004
swyssling@wysslingconsulting.com
(201) 874-3483
LICENSE NO. RY34912

SOLAR COMPANY/CLIENT

luminate

LUMINATE
21750 HARDY OAK BLVD ST 104
SAN ANTONIO, TX
LIC #: 36582

SHEPPARD RESIDENCE
228 SOUTHWEST PILOTS WAY
LAKE CITY, FL 32024
COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

COVER PAGE

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-1

N

CEO METER NUMBER: 190876656

EXISTING EQUIPMENT DETAIL:
(15) Q.PEAK DUO BLK ML-G10+ 410W
(15) ENPHASE ENERGY IQ8PLUS-72-2-US INVERTERS

SYSTEM INFORMATION	
MODULE COUNT/TYPE	(29) JA SOLAR JAM54S31-405/MR
INVERTER COUNT/TYPE	(1) TESLA 7600
MODULE WEIGHT	47.40 LBS
MODULE DIMENSIONS	67.80" x 44.65"
UNIT WEIGHT OF ARRAY	2.25 PSF

LEGEND	
ROOF VENT (TYP.)	
PLUMBING VENT (TYP.)	
A/C UNIT	A/C
SATELLITE DISH	
ELECTRICAL MAST	
CHIMNEY	
FIRECODE PATHWAY	

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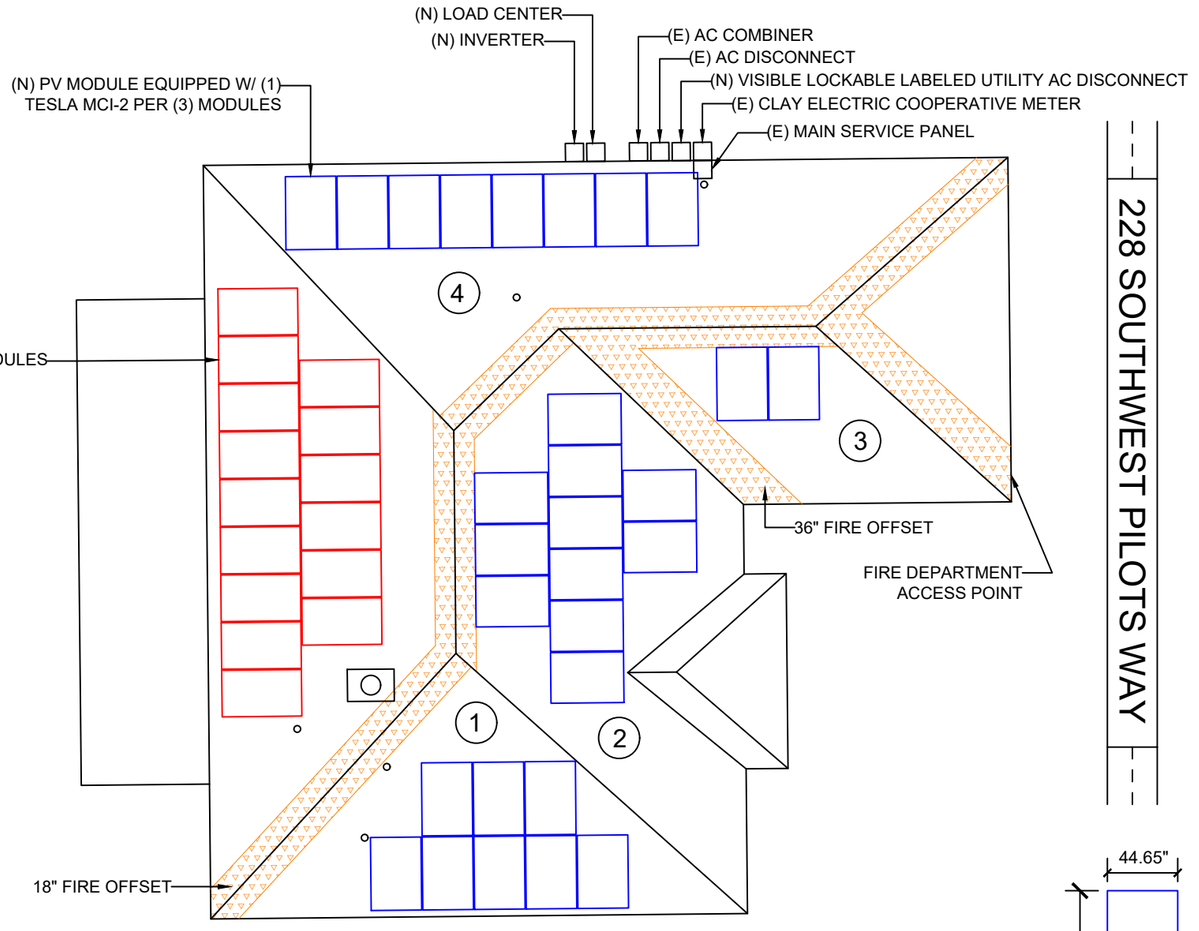
ROOF DESCRIPTION

ROOF #	ROOF TYPE	TILT	PITCH	AZIMUTH	ROOF FRAMING	MODULE COUNT	ARRAY SQ. FT.
1	TRAPEZOIDAL METAL	18°	4:12	179°	2X4@24" O.C. TRUSSES	8	168.16
2	TRAPEZOIDAL METAL	18°	4:12	89°	2X4@24" O.C. TRUSSES	11	231.22
3	TRAPEZOIDAL METAL	18°	4:12	179°	2X4@24" O.C. TRUSSES	2	42.04
4	TRAPEZOIDAL METAL	18°	4:12	359°	2X4@24" O.C. TRUSSES	8	168.16

TOTAL ROOF AREA SQ. FT.	2834.25	TOTAL ARRAY SQ. FT.	609.58	ROOF COVER %	21.51
TOTAL EXISTING ARRAY SQ FT	315	TOTAL COMBINED SQ FT	925	COMBINED ROOF COVER %	32.64

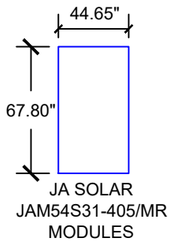


SITE PLAN NOTES

1. ALL OBSTRUCTIONS MUST BE VERIFIED BEFORE WORK COMMENCES
2. CONDUIT TO BE RUN IN ATTIC IF POSSIBLE
3. VISIBLE LOCKABLE LABELED UTILITY AC DISCONNECT WILL BE INSTALLED WITHIN 10' OF CLAY ELECTRIC COOPERATIVE METER.
4. AC DISCONNECT SHALL BE READILY ACCESSIBLE 24/7
5. REQUIRED ELECTRICAL CLEARANCE TO BE MAINTAINED
6. MAIN SERVICE PANEL LOCATION: BASEMENT
7. METER LOCATION: 1ST FLOOR

NOTE: EQUIPMENT LOCATIONS ARE DEFINED BUT MAY BE APPROXIMATE DUE TO EXISTING CONDITIONS

SCALE: 3/32" = 1'-0"



JA SOLAR
JAM54S31-405/MR
MODULES

DESIGN ENGINEER

WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

76 N. MEADOWBROOK DRIVE
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swyssling@wysslingconsulting.com
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LICENSE NO. RY34912

SOLAR COMPANY/CLIENT

luminate

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21750 HARDY OAK BLVD ST 104
SAN ANTONIO, TX
LIC #: 36582

SHEPPARD RESIDENCE
228 SOUTHWEST PILOTS WAY
LAKE CITY, FL 32024
COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

SITE PLAN

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025
SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

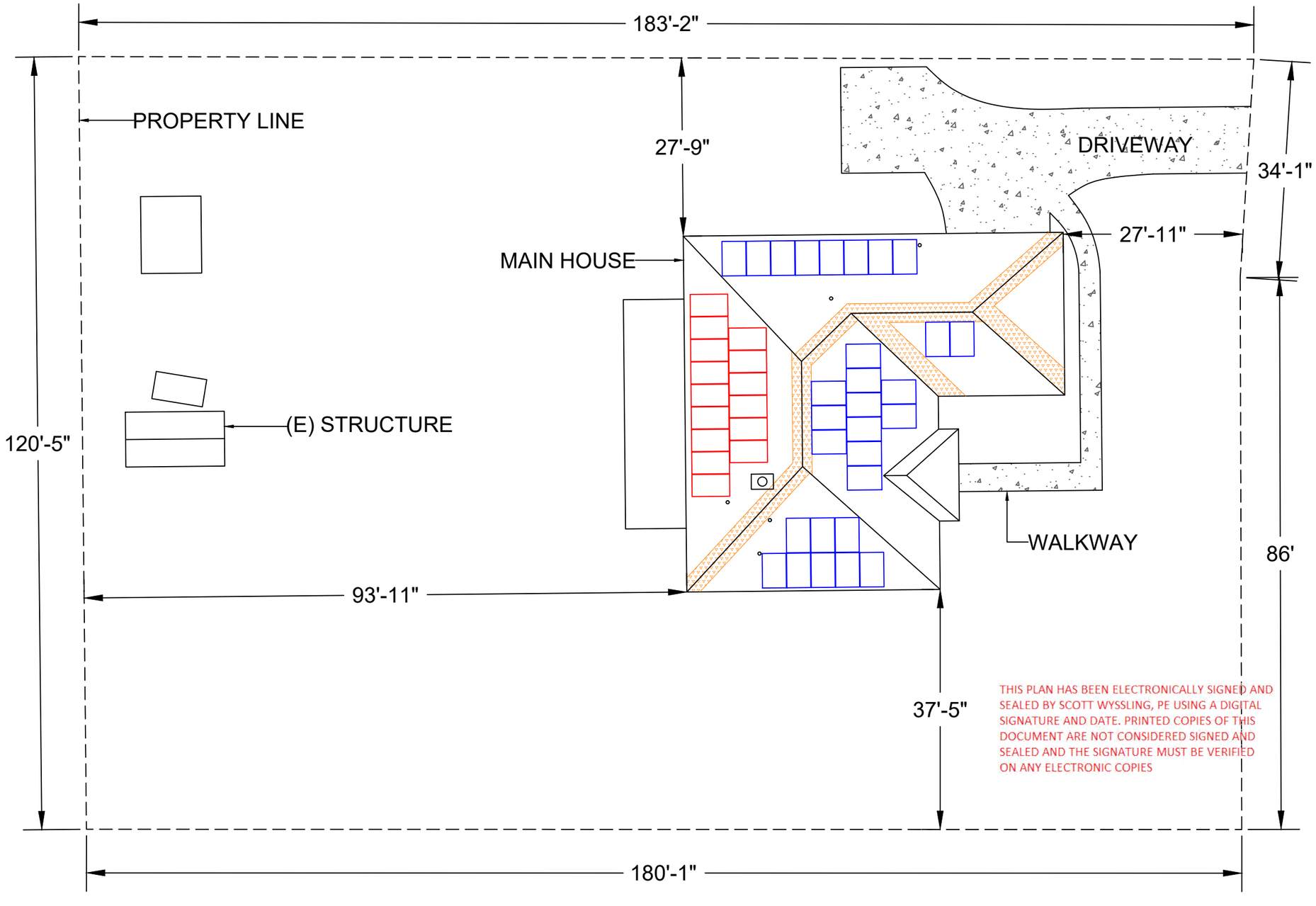
AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-2

N

CEO METER NUMBER: 190876656



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SCALE: 1/16" = 1'-0"

DESIGN ENGINEER

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COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

PROPERTY PLAN

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025
SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-3

N

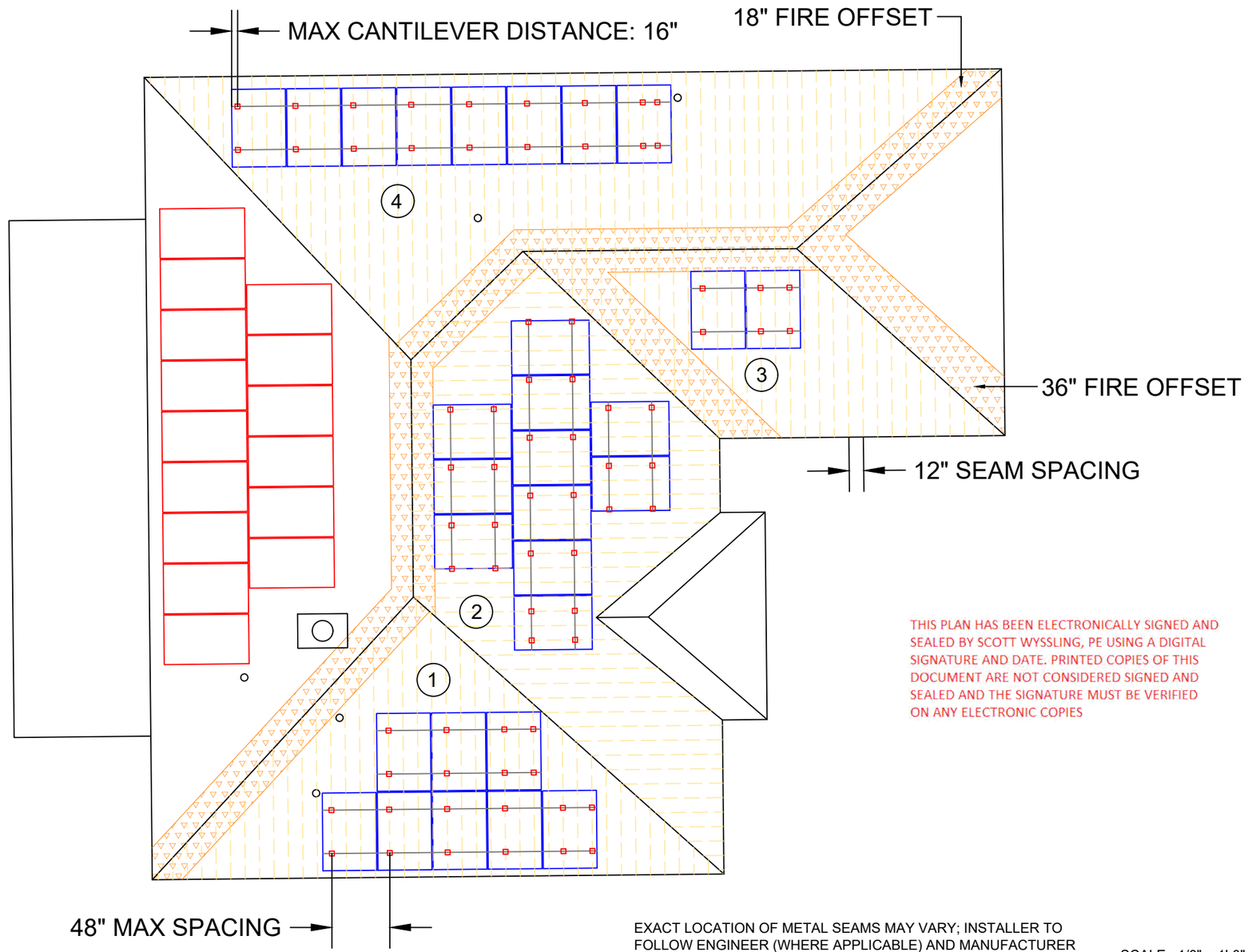
CEO METER NUMBER: 190876656

PV MODULES: (29) JA SOLAR JAM54S31-405/MR
ROOF TYPE(S): TRAPEZOIDAL METAL
ROOF CONDITION: GOOD
MOUNTING TYPE(S): S-5! PROTEA BRACKET WITH K2 CROSSRAIL
FLASHING: NONE
ROOF HEIGHT: 15'
ROOF FRAMING MATERIAL: WOOD
DECKING THICKNESS: 1/2"

TOTAL ATTACHMENTS: 72

ATTACHMENT DESCRIPTION

ROOF #	ROOF TYPE	TILT	ARRAY TILT	AZIMUTH	ROOF FRAMING	TOTAL POINTS	MAX SPACING	MAX CANTILEVER	ATTACHMENT	MIN EMBEDMENT
1	TRAPEZOIDAL METAL	18°	18°	179°	2X4@24" O.C. TRUSSES	20	48"	16"	(4) 1/4" HEX HEAD SS	N/A"
2	TRAPEZOIDAL METAL	18°	18°	89°	2X4@24" O.C. TRUSSES	28	48"	16"	(4) 1/4" HEX HEAD SS	N/A"
3	TRAPEZOIDAL METAL	18°	18°	179°	2X4@24" O.C. TRUSSES	6	48"	16"	(4) 1/4" HEX HEAD SS	N/A"
4	TRAPEZOIDAL METAL	18°	18°	359°	2X4@24" O.C. TRUSSES	18	48"	16"	(4) 1/4" HEX HEAD SS	N/A"



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EXACT LOCATION OF METAL SEAMS MAY VARY; INSTALLER TO FOLLOW ENGINEER (WHERE APPLICABLE) AND MANUFACTURER INSTRUCTIONS/GUIDELINES WHEN INSTALLING.

SCALE: 1/8" = 1'-0"

DESIGN ENGINEER

WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

76 N. MEADOWBROOK DRIVE
ALPINE UT 84004
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SOLAR COMPANY/CLIENT

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LIC #: 36582

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COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

ATTACHMENT PLAN

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

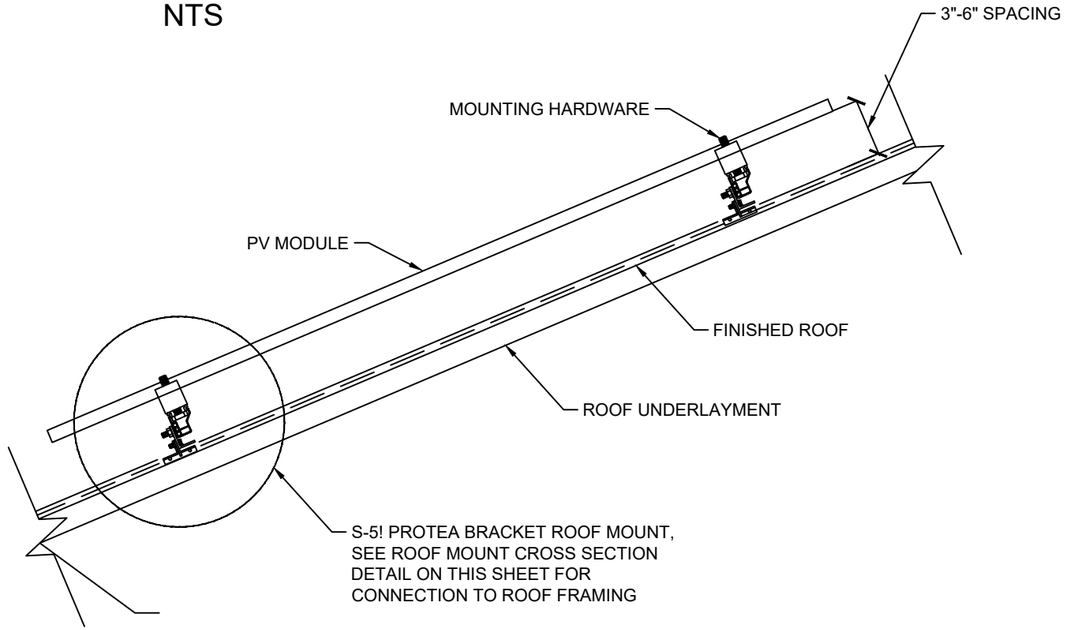
DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-4

ROOF SECTIONS	R1, R2, R3, R4	WIND SPEED: 120 MPH	GROUND SNOW LOAD: 0 PSF	ROOF TYPE: TRAPEZOIDAL METAL	ROOF LAYERS (IF APPLICABLE): 1

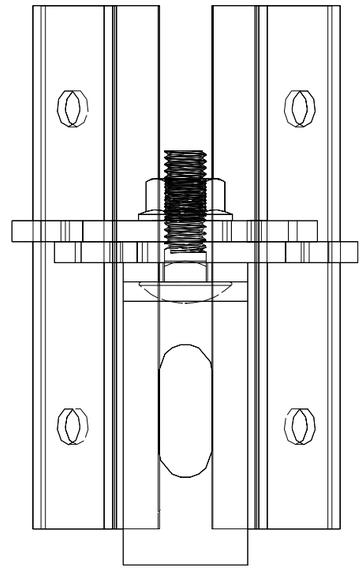
GENERAL ROOF MOUNT DETAIL

NTS



ROOF MOUNT PLAN VIEW DETAIL

NTS



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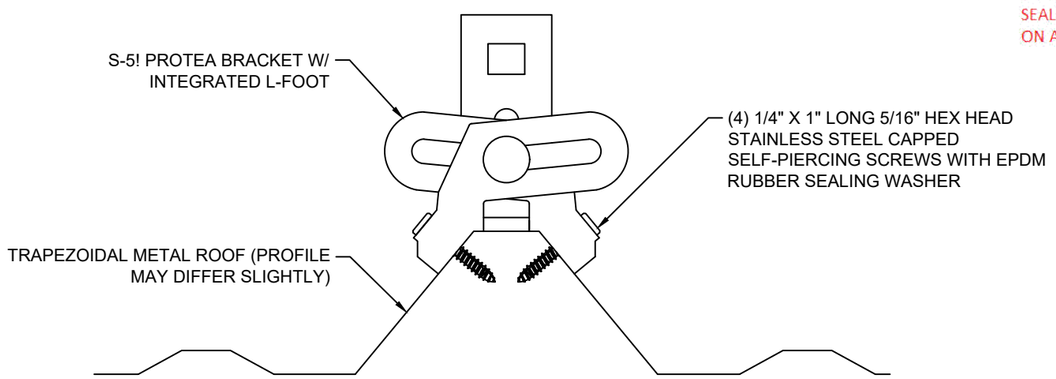
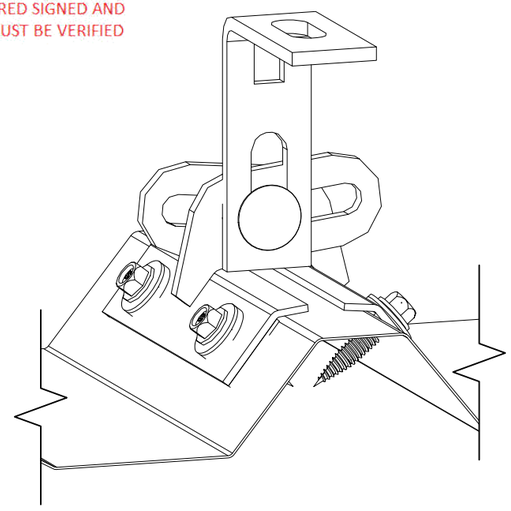


NOTE: ALL ROOF PENETRATIONS MUST BE SEALED OR FLASHED USING APPROVED MEANS

ROOF MOUNT CROSS SECTION DETAIL

NTS



ROOF MOUNT

NTS

DESIGN ENGINEER

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SOLAR COMPANY/CLIENT

luminate

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SAN ANTONIO, TX
LIC #: 36582

SHEPPARD RESIDENCE
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COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

MOUNTING DETAILS

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-5

CEO METER NUMBER: 190876656

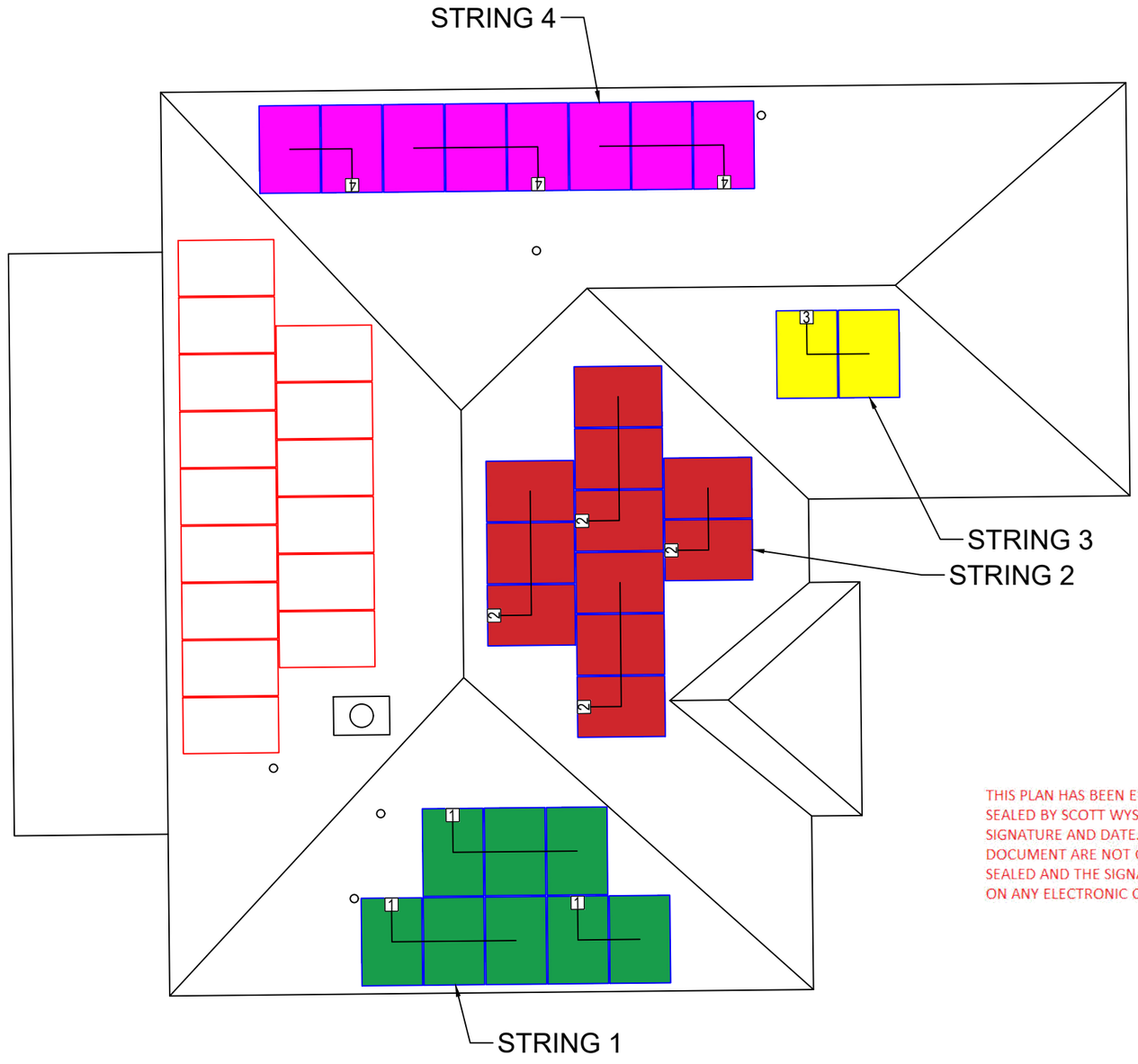
MODULE: (29) JA SOLAR JAM54S31-405/MR
INVERTER: (1) TESLA 7600
RAPID SHUTDOWN DEVICE: (11) TESLA MCI-2

STRING 1: (8) MODULES

STRING 2: (11) MODULES

STRING 3: (2) MODULES

STRING 4: (8) MODULES



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SCALE: 1/8" = 1'-0"

DESIGN ENGINEER

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CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE

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LIC #: 36582

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COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

STRING PLAN

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

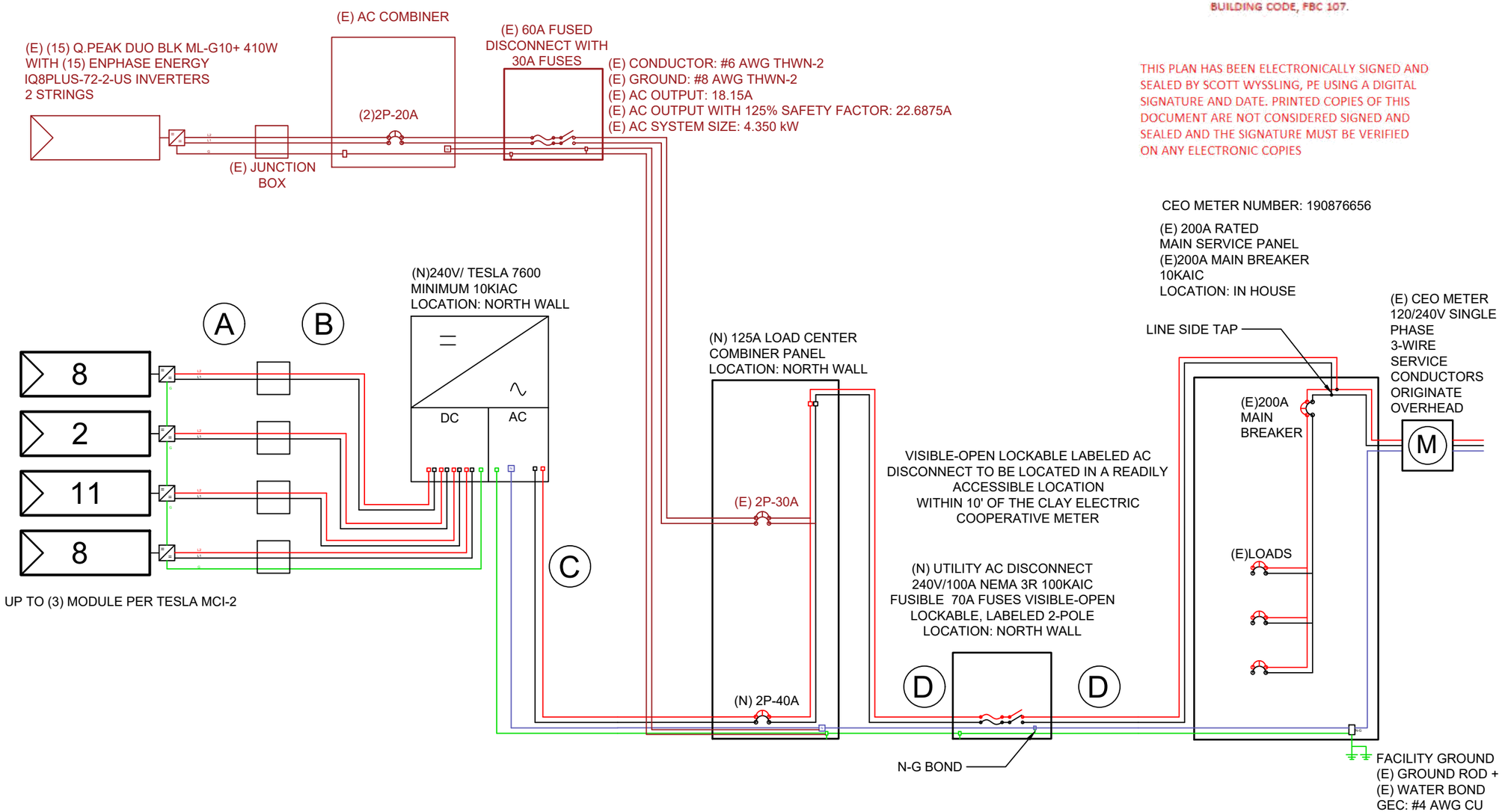
EE-1

MODULE TYPE: (29) JA SOLAR JAM54S31-405/MR
INVERTER TYPE: (1) TESLA 7600 240V

NOTE: ALL EQUIPMENT MUST BE UTILIZED IN ACCORDANCE WITH MANUFACTURER'S INTENDED USE AND DESIGN SPECIFICATIONS.

CONDUCTOR SCHEDULE

TAG	# WIRES IN CONDUIT	MINIMUM WIRE SIZE	TYPE, MATERIAL	MINIMUM GROUND WIRE SIZE	GROUND TYPE,MATERIAL	CONDUIT	AMPS (BEFORE 125% SAFETY FACTOR)	TOTAL AMPS	WIRE AMPERAGE RATING TABLE 310.15(B)(16)	MINIMUM OCPD
A	3	#10 AWG	THWN-2, CU	#6 AWG	BARE CU	FREE AIR	17.34	21.68	35	30
B	3	#10 AWG	THWN-2, CU	#10 AWG	THWN-2, CU	3/4 EMT	17.34	21.68	35	30
C	4	#8 AWG	THWN-2, CU	#10 AWG	THWN-2, CU	3/4 EMT	32	40	50	40
D	4	#4 AWG	THWN-2, CU	#8 AWG	THWN-2, CU	1 EMT	50.15	62.69	85	70



I, SCOTT WYSSLING, PE#81558, AN ENGINEER PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE, FBC 107.

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COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

THREE LINE DIAGRAM

SCOTT E WYSSLING LICENSE No. 81558 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

EE-2

PV MODULE	
MODEL	JA SOLAR JAM54S31-405/MR
PMAX	405W
VOC	37.23V
VMP	31.21V
IMP	12.98A
ISC	13.87A
MAX SERIES FUSE RATING	25A

INVERTER	
MODEL	TESLA 7600
MAX INPUT DC VOLTAGE	550V
MAX DC CURRENT	52A
MAX OUTPUT POWER	7600W
MAXIMUM CONT. OUTPUT CURRENT	32A
CEC EFFICIENCY	0.98
NOMINAL AC VOLTAGE	240V

INTERCONNECTION PER NEC 705.12 (B)	
BACK FEED REQUIRED	62.69A
MINIMUM FUSE RATING	70A

ELECTRICAL CALCULATIONS

TAG A
FROM MODULES TO JUNCTION BOX

LARGEST STRING: 11 MODULES
AMPS DETERMINED BY ISC OF MODULE
13.87A *1.25 *1.25 = 21.68A TOTAL AMPS

CONDUCTOR SIZE: #10 AWG
CONDUCTOR MAX: 35A, GOOD
OCPD: 30A, GOOD

TAG B
FROM JUNCTION BOX TO INVERTER

LARGEST STRING: 11 MODULES
AMPS DETERMINED BY ISC OF MODULE
13.87A *1.25 *1.25 = 21.68A TOTAL AMPS

CONDUCTOR SIZE: #10 AWG
CONDUCTOR MAX: 35A, GOOD
OCPD: 30A, GOOD

TAG C
FROM INVERTER TO LOAD CENTER

TOTAL MODULES: 29
TOTAL INVERTERS: 1
AMPS PER INVERTER: 32A
1 x 32A = 32A * 1.25 = 40A TOTAL AMPS

CONDUCTOR SIZE: #8 AWG
CONDUCTOR MAX: 50A, GOOD
OCPD: 40A, GOOD

TAG D
FROM LOAD CENTER TO INTERCONNECTION

TOTAL NEW MODULES: 29
TOTAL NEW INVERTERS: 1
AMPS PER INVERTER: 32A
TOTAL EXISTING MODULES: 15
TOTAL EXISTING INVERTERS: 15
AMPS PER INVERTER: 1.21A
(1 x 32) + (15 x 1.21)A = (32 + 18.15) A * 1.25 =
62.69A TOTAL AMPS

CONDUCTOR SIZE: #4 AWG
CONDUCTOR MAX: 85A, GOOD
OCPD: 70A, GOOD

TEMPERATURE CORRECTED VOC				
MODULE VOC	VOC COEFFICIENT	COLDEST TEMPERATURE	ADJUSTED VOC	INVERTER/ OPTIMIZER MAX
37.23	-0.275	-6.00	444.40	550, GOOD

CEO METER NUMBER: 190876656

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DESIGN ENGINEER

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LICENSE NO. RY34912

SOLAR COMPANY/CLIENT

luminate

LUMINATE
21750 HARDY OAK BLVD ST 104
SAN ANTONIO, TX
LIC #: 36582

SHEPPARD RESIDENCE
228 SOUTHWEST PILOTS WAY
LAKE CITY, FL 32024
COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

ELECTRICAL NOTES

SCOTT E WYSSLING
LICENSE
No. 81558
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

EE-3

1) **PHOTOVOLTAIC AC DISCONNECT**
MAXIMUM AC OPERATING CURRENT: 50.15
NOMINAL OPERATING AC VOLTAGE: 240

AT POINT OF INTERCONNECTION, MARKED AT DISCONNECTING MEANS [NEC 690.54]

2) **⚠WARNING** DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

AT POINT OF INTERCONNECTION [NEC 705.12(C),690.59]

3) **MAIN PHOTOVOLTAIC SYSTEM DISCONNECT**

EACH PV SYSTEM DISCONNECTING MEANS SHALL PLAINLY INDICATE WHETHER IN THE OPEN (OFF) OR CLOSED (ON) POSITION AND BE PERMANENTLY MARKED {NEC 690.13(B)]

4) PHOTOVOLTAIC
DC DISCONNECT

AT EACH DC DISCONNECTING MEANS [NEC 690.13(B)]

5) PHOTOVOLTAIC
AC DISCONNECT

AT EACH AC DISCONNECTING MEANS [NEC 690.13(B)]

6) **WARNING: PHOTOVOLTAIC POWER SOURCE**

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(D)(2)]

7) **⚠WARNING**
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES
MAY BE ENERGIZED IN THE OPEN POSITION

AT BUILDING OR STRUCTURE MAIN DISCONNECTING MEANS [NEC 690.12(E), NEC 690.13(B)]

8) ⚠ WARNING
PHOTOVOLTAIC SYSTEM
COMBINER PANEL
DO NOT ADD LOADS

AT AC COMBINER PANEL [NEC690.13(B)]

9) **⚠WARNING**
INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

A PERMANENT WARNING LABEL SHALL BE APPLIED TO THE DISTRIBUTION EQUIPMENT ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER [NEC 705.12(B)(3)(2)] (FOR BREAKER INTERCONNECTION ONLY)

10) EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN

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

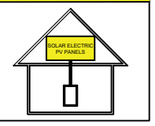
RAPID SHUTDOWN
NEC 690.56(C)(1) AND
NFPA 11.12.2.1.1.1.1 / 11.12.2.1.1.3
MUST BE LOCATED ON THE MAIN SERVICE PANEL

11) RAPID SHUTDOWN SWITCH FOR SOLAR PV

A RAPID SHUTDOWN SWITCH SHALL HAVE A LABELED LOCATED ON OR NO MORE THAN 8 FT FROM THE SWITCH THAT INCLUDES THIS WORDING. THE LABEL SHALL BE REFLECTIVE, WITH ALL LETTERS CAPITALIZED AND HAVING A MINIMUM HEIGHT OF 3/8 IN., IN WHITE ON RED BACKGROUND [NEC 690.58(C)(2)]

12) SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS LEAVING THE ARRAY: THE TITLE "SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN" SHALL UTILIZED CAPITALIZED CHARACTERS WITH A MINIMUM HEIGHT OF 3/8 IN. IN BLACK ON YELLOW BACKGROUND, AND THE REMAINING CHARACTERS SHALL BE CAPITALIZED WIWTH A MINIMUM HEIGHT OF 3/16 IN. IN BLACK ON WHITE BACKGROUND [NEC 690.56(C)(1)(A)]

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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 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] THEY SHALL BE PERMANENTLY ATTACHED, WEATHER/SUNLIGHT RESISTANT, AND SHALL NOT BE HAND WRITTEN PER NEC 110.21(B)
5. APPLICABLE LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

DESIGN ENGINEER

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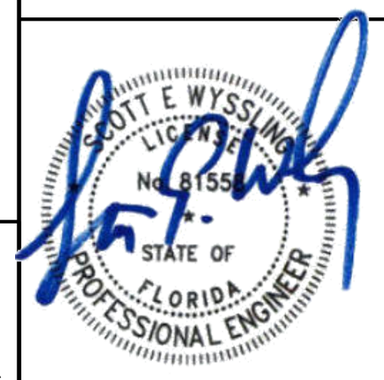
LAKE CITY, FL 32024
COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

LABELS



Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

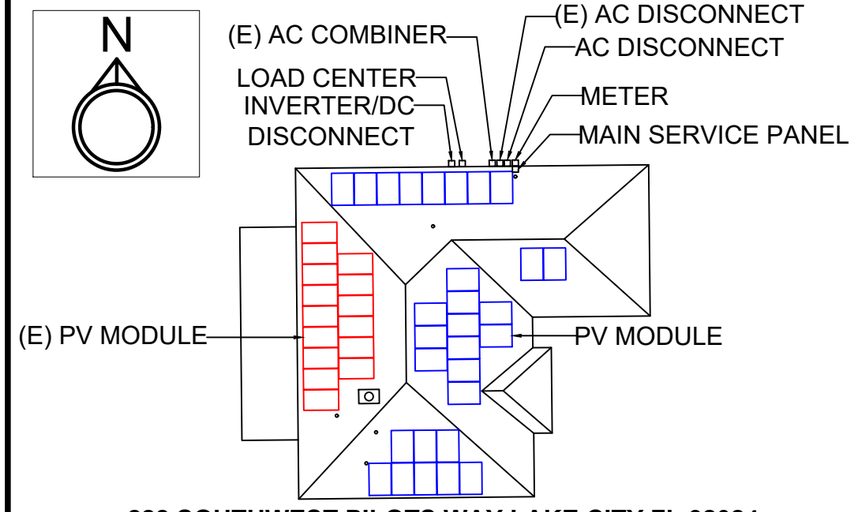
AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

EE-4

CAUTION

MULTIPLE SOURCES OF POWER
POWER IS SUPPLIED TO THIS BUILDING FROM THE FOLLOWING SOURCES WITH DISCONNECTS AS SHOWN.



228 SOUTHWEST PILOTS WAY LAKE CITY,FL 32024

LOCATION: MSP
NEC 705.10

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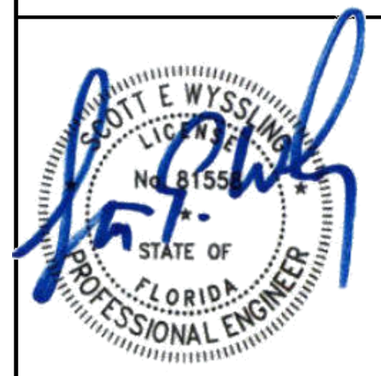
PLACARD



Signed 10/17/2025

SCOTT E WYSSLING, PE
FL LICENSE NO 81558

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

EE-5

GENERAL NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
2. ALL COMPONENTS SHALL BE NEW AND LISTED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY AND LISTED FOR THEIR SPECIFIC APPLICATION.
3. OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED OR BETTER.
4. ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFIED PERSONNEL.
5. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO INSTALLATION AND SHALL COORDINATE ALL INSPECTIONS, TESTING COMMISSIONING, AND ACCEPTANCE WITH THE HOMEOWNER, UTILITY CO. AND CITY INSPECTORS AS NEEDED.
6. EACH MODULE TO BE GROUNDED USING THE SUPPLIED CONNECTION POINT PER THE MANUFACTURER'S REQUIREMENTS. ALL PV MODULES, EQUIPMENT, AND METALLIC COMPONENTS ARE TO BE BONDED. IF THE EXISTING GROUNDING ELECTRODE SYSTEM CANNOT BE VERIFIED OR IS ONLY METALLIC WATER PIPING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
7. DC CONDUCTORS SHALL BE RUN IN EMT AND/OR MC (METAL CLAD CABLE) AND SHALL BE LABELED.
8. EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH APPLICABLE NEC.
9. CONFIRM LINE SIDE VOLTAGE AT THE ELECTRIC UTILITY SERVICE PRIOR TO CONNECTING INVERTER. VERIFY SERVICE VOLTAGE IS WITHIN INVERTER VOLTAGE OPERATIONAL RANGE.
10. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER CODE.
11. ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE, AND FOR ROOF-MOUNTED SYSTEMS, WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF OF THE ROOF SURFACE.
12. ALL ROOF PENETRATIONS MUST BE SEALED OR FLASHED.
13. EQUIPMENT MAY BE SUBSTITUTED FOR SIMILAR EQUIPMENT BASED ON AVAILABILITY, SUBSTITUTED EQUIPMENT SHALL COMPLY WITH DESIGN CRITERIA.
14. REMOVAL OF AN INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTORS.
15. WHENEVER A DISCREPANCY IN THE QUALITY OF EQUIPMENT ARISES ON THE DRAWING OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL AND SERVICES REQUIRED BY THE STRICTEST CONDITIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS TO ENSURE COMPLETE COMPLIANCE AND LONGEVITY OF THE OPERABLE SYSTEM REQUIRED BY THE ENGINEERS.
16. AC DISCONNECT SHALL BE LOCATED WITHIN 10' OF CLAY ELECTRIC COOPERATIVE METER. AC DISCONNECT SHALL BE LOCATED ON SAME WALL OF HOUSE WHERE POSSIBLE. IF AC DISCONNECT CANNOT BE WITHIN 10' OF METER, THEN PHOTOS SHALL BE PROVIDED OF THE OBSTRUCTION FOR REVIEW.
17. IF APPLICABLE, ENERGY STORAGE SYSTEM (ESS) CAN BE USED DURING ON-GRID OPERATION TO SHIFT GENERATION FOR TIME OF USE (TOU) AND WILL NOT OPERATE OFF GRID.

GENERAL ELECTRICAL NOTES

1. CONDUIT A AND B AMPS EQUAL TO LARGEST STRING ON TAG.
2. CONDUIT A SHALL BE RUN THROUGH ATTIC IF POSSIBLE.
3. ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND/OR LISTED FOR SUCH USE, AND FOR ROOF-MOUNTED SYSTEMS, WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF OF THE ROOF SURFACE.
4. EQUIPMENT MAY BE SUBSTITUTED FOR SIMILAR EQUIPMENT BASED ON AVAILABILITY, SUBSTITUTED EQUIPMENT SHALL COMPLY WITH DESIGN CRITERIA. WIRE SIZES ARE BASED ON MINIMUMS AND ARE NOT MEANT TO LIMIT UPSIZING AS REQUIRED BY FIELD CONDITIONS/AVAILABILITY.
5. WIRING SHALL COMPLY WITH MAXIMUM CONTINUOUS CURRENT OUTPUT AT 25°C AND MAXIMUM VOLTAGE AT 550V; WIRE SHALL BE WET RATED AT 90°C.
6. EXPOSED PHOTOVOLTAIC SYSTEM CONDUCTORS ON THE ROOF WILL BE TYPE 2 OR PV-TYPE WIRE.
7. PHOTOVOLTAIC SYSTEM CONDUCTORS SHALL BE IDENTIFIED AND GROUPED. THE MEANS OF IDENTIFICATION SHALL BE PERMITTED BY SEPARATE COLOR-CODING, MARKING TAPE, TAGGING OR OTHER APPROVED MEANS.
8. ALL CONDUCTORS AND TERMINATIONS SHALL BE RATED FOR INSTALL LOCATION
9. ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS.
10. ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS.
11. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
12. REMOVAL OF A UTILITY-INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BUILDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PV SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR.
13. FOR GROUNDED SYSTEMS, THE PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUITS SHALL BE PROVIDED WITH A GROUND-FAULT PROTECTION DEVICE OR SYSTEM THAT DETECTS A GROUND FAULT, INDICATES THAT FAULT HAS OCCURRED, AND AUTOMATICALLY DISCONNECTS ALL CONDUCTORS OR CAUSES THE INVERTER TO AUTOMATICALLY CEASE SUPPLYING POWER TO OUTPUT CIRCUITS.
14. FOR UNGROUNDED SYSTEMS, THE INVERTER IS EQUIPPED WITH GROUND FAULT PROTECTION AND A GFI FUSE PORT FOR GROUND FAULT INDICATION.
15. PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER GEC/GEC PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
16. PV MODULE RACKING RAIL SHALL BE BONDED TO BARE COPPER GEC VIA WEEB LUG, IL SCO GBL-4DBT LAY IN LUG, OR EQUIVALENT LISTED LUG.
17. THE PHOTOVOLTAIC INVERTER WILL BE LISTED AS UL 1741 COMPLIANT.
18. RACKING AND BONDING SYSTEM TO BE UL2703 RATED.
19. ANY REQUIRED GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AS BUSBARS WITHIN LISTED EQUIPMENT
20. WHEN BACKFEED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, THE BREAKERS SHALL NOT READ "LINE AND LOAD."
21. WHEN APPLYING THE 120% RULE, THE SOLAR BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR FROM THE MAIN BREAKER.
22. THE WORKING CLEARANCE AROUND THE EXISTING ELECTRICAL EQUIPMENT AS WELL AS THE NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED.
23. LISTED CONDUIT AND CONDUCTOR SIZES ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UPSIZING AS REQUIRED BY FIELD CONDITIONS/AVAILABILITY.
24. TESLA 7600 INVERTERS HAVE INTEGRATED GROUND AND DOUBLE INSULATION. NO GEG OR EGC IS REQUIRED. THE DC CIRCUIT IS ISOLATED AND INSULATED FROM GROUND AND MEETS THE REQUIREMENTS OF NEC.
25. CALCULATIONS ARE BASED ON A) ASHRAE #2 AVERAGE HIGH = 32°C B)NEC TABLE 310.15(B)2(a) 75° DERATE FACTOR = 0.96 C) NEC TABLE NEC 310.15(B)(16) 75°C.
26. SUPPLEMENTAL GROUNDING ELECTRODE TO BE INSTALLED NO CLOSER THAN 6' FROM EXISTING WHEN REQUIRED. NEC 250.53(A)(2) DOES NOT REQUIRE IT IF CONTRACTOR CAN PROVE THAT A SINGLE ROD HAS A RESISTANCE TO EARTH OF 25 OHMS OR LESS.
27. WHEN CABLE, INCLUDING PV CABLE(S), IS RUN BETWEEN ARRAYS OR TO JUNCTION BOXES IT SHALL BE ENCLOSED IN CONDUIT. [NEC 300.4, 690.31(A) AND (C)]
28. THE CABLE CONNECTORS USED ON THE OUTPUT SIDE OF THE OPTIMIZER OR MICROINVERTER TOGETHER WITH THE ARRAY CABLE USED BETWEEN THEM ARE OF THE SAME MANUFACTURER OR ARE LISTED FOR COMPATIBILITY. [NEC 690.33(C)]
29. SOME WIRE CONNECTORS SUPPLY INSTRUCTIONS FOR THE PRELIMINARY PREPARATION OF CONDUCTORS, SUCH AS USE OF CONDUCTOR TERMINATION COMPOUND (ANTIOXIDANT COMPOUND). SOME CONNECTORS ARE SHIPPED PRE-FILLED WITH CONDUCTOR TERMINATION COMPOUND (ANTIOXIDANT COMPOUND). FOR NON-PREFILLED CONNECTORS, CONDUCTOR TERMINATION COMPOUND MAY BE USED IF RECOMMENDED BY THE CONNECTOR MANUFACTURER AS PRELIMINARY PREPARATION OF THE CONDUCTOR.

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COORDINATES: 30.161271, -82.688761
APN: 114S1602911112

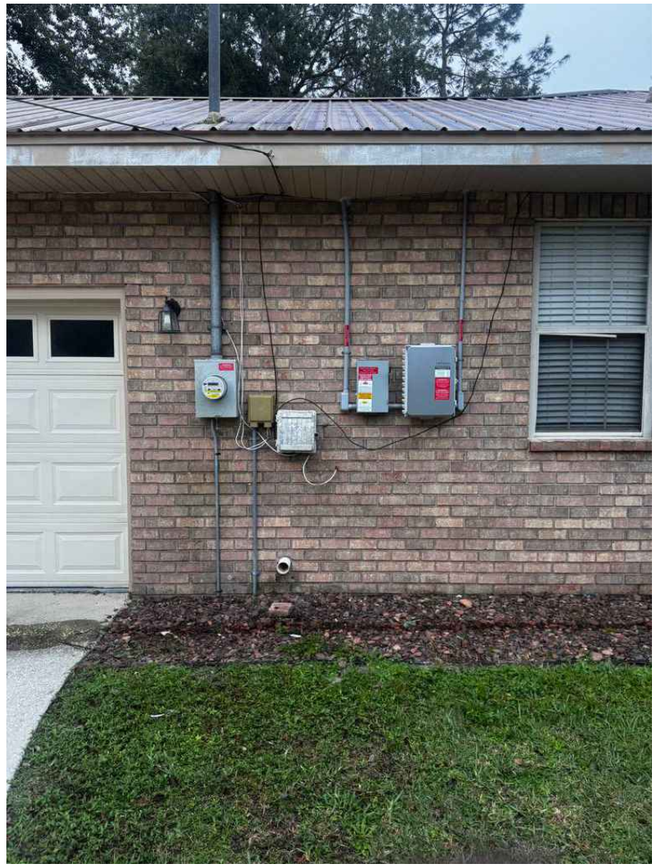
DESIGN NOTES

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-6



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SITE PHOTOS

DC SYSTEM SIZE: 11.745kW
AC SYSTEM SIZE: 7.600kW

AHJ: COLUMBIA COUNTY
UTILITY: CEO

DRAWN BY: VSP
INITIAL DESIGN DATE: 10/17/2025 REV: A

PV-7

Introduction

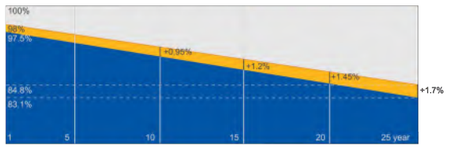
Assembled with 11BB PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.

- Higher output power
- Lower LCOE
- Less shading and lower resistive loss
- Better mechanical loading tolerance

Superior Warranty

- 12-year product warranty
- 25-year linear power output warranty

0.55% Annual Degradation Over 25 years



New linear power warranty ■ Standard module linear power warranty

Comprehensive Certificates

- IEC 61215, IEC 61730,UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval

JA SOLAR

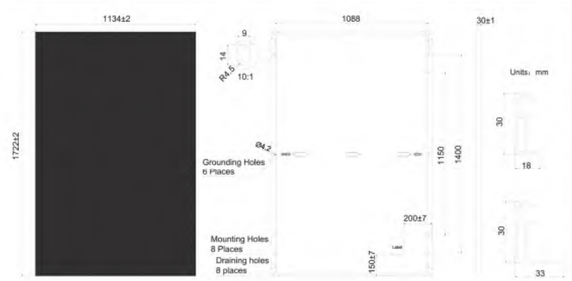
www.jasolar.com

Specifications subject to technical changes and tests.
JA Solar reserves the right of final interpretation.

JA SOLAR

JAM54S31 380-405/MR Series

MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

Cell	Mono
Weight	21.5kg±3%
Dimensions	1722±2mm×1134±2mm×30±1mm
Cable Cross Section Size	4mm² (IEC) , 12 AWG(UL)
No. of cells	108(6x18)
Junction Box	IP68, 3 diodes
Connector	MC4(1000V) MC4-EVO2(1500V)
Cable Length (Including Connector)	Portrait: 300mm(+)/400mm(-); Landscape: 1200mm(+)/1200mm(-)
Packaging Configuration	36pcs/Pallet, 936pcs/40ft Container

ELECTRICAL PARAMETERS AT STC

TYPE	JAM54S31 -380/MR	JAM54S31 -385/MR	JAM54S31 -390/MR	JAM54S31 -395/MR	JAM54S31 -400/MR	JAM54S31 -405/MR
Rated Maximum Power(Pmax) [W]	380	385	390	395	400	405
Open Circuit Voltage(Voc) [V]	36.58	36.71	36.85	36.98	37.07	37.23
Maximum Power Voltage(Vmp) [V]	30.28	30.46	30.64	30.84	31.01	31.21
Short Circuit Current(Isc) [A]	13.44	13.52	13.61	13.70	13.79	13.87
Maximum Power Current(Imp) [A]	12.55	12.64	12.73	12.81	12.90	12.98
Module Efficiency [%]	19.5	19.7	20.0	20.2	20.5	20.7
Power Tolerance	0~+5W					
Temperature Coefficient of Isc(α_Isc)	+0.045%/℃					
Temperature Coefficient of Voc(β_Voc)	-0.275%/℃					
Temperature Coefficient of Pmax(γ_Pmp)	-0.350%/℃					
STC	Irradiance 1000W/m², cell temperature 25℃, AM1.5G					

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.

ELECTRICAL PARAMETERS AT NOCT

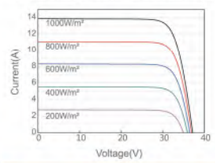
TYPE	JAM54S31 -380/MR	JAM54S31 -385/MR	JAM54S31 -390/MR	JAM54S31 -395/MR	JAM54S31 -400/MR	JAM54S31 -405/MR
Rated Max Power(Pmax) [W]	286	290	294	298	302	306
Open Circuit Voltage(Voc) [V]	34.36	34.49	34.62	34.75	34.88	35.12
Max Power Voltage(Vmp) [V]	28.51	28.68	28.87	29.08	29.26	29.47
Short Circuit Current(Isc) [A]	10.75	10.82	10.89	10.96	11.03	11.10
Max Power Current(Imp) [A]	10.03	10.11	10.18	10.25	10.32	10.38
NOCT	Irradiance 800W/m², ambient temperature 20°C,wind speed 1m/s, AM1.5G					

OPERATING CONDITIONS

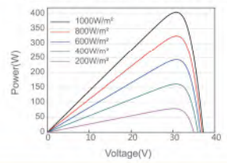
Maximum System Voltage	1000V/1500V DC
Operating Temperature	-40℃~+85℃
Maximum Series Fuse Rating	25A
Maximum Static Load,Front* Maximum Static Load,Back*	5400Pa(112lb/ft²) 2400Pa(50lb/ft²)
NOCT	45±2℃
Safety Class	Class Ⅱ
Fire Performance	UL Type 1

CHARACTERISTICS

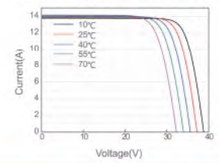
Current-Voltage Curve JAM54S31-405/MR



Power-Voltage Curve JAM54S31-405/MR



Current-Voltage Curve JAM54S31-405/MR



Premium Cells, Premium Modules

Version No. : Global_EN_20210119

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MODULE

Tesla Solar Inverter
with Site Controller

—

Tesla Solar Inverter completes the Tesla home solar system, converting DC power from solar to AC power for home consumption. Tesla's renowned expertise in power electronics has been combined with robust safety features and a simple installation process to produce an outstanding solar inverter that is compatible with both Solar Roof and traditional solar panels. Once installed, homeowners use the Tesla mobile app to manage their solar system and monitor energy consumption, resulting in a truly unique ecosystem experience.

KEY FEATURES

- Built on Powerwall technology for exceptional efficiency and reliability
- Wi-Fi, Ethernet, and cellular connectivity with easy over-the-air updates
- Designed to integrate with Tesla Powerwall and Tesla App
- 0.5% revenue-grade metering for Solar Renewable Energy Credit (SREC) programs included

October 25, 2024

Tesla Solar Inverter Technical Specifications

Electrical Specifications: Output (AC)

Model Number	1538000-xx-y			
Output (AC) [1]	3.8 kW	5 kW	5.7 kW	7.6 kW
Nominal Power	3,800 W	5,000 W	5,700 W	7,600 W
Maximum Apparent Power	3,840 VA	5,040 VA	6,000 VA	7,680 VA
Maximum Continuous Current	16 A	21 A	24 A	32 A
Breaker (Overcurrent Protection)	20 A	30 A	30 A	40 A
Nominal Power Factor	1 - 0.9 (leading / lagging			
THD (at Nominal Power)	<5%			

Electrical Specifications: Input (DC)

MPPT	4
Input Connectors per MPPT	1-2-1-2
Maximum Input Voltage	600 VDC
DC Input Voltage Range	60 - 550 VDC
DC MPPT Voltage Range	60 - 480 VDC [1]
Maximum Current per MPPT (I_{MP})	13 A [2]
Maximum Short Circuit Current per MPPT (I_{SC})	17 A [2]

[1] Maximum current.

[2] Where the DC input current exceeds an MPPT rating, jumpers can be used to allow a single MPPT to intake additional DC current up to 26 A IMP / 34 A ISC.

Performance Specifications

Peak Efficiency	98.6% at 240 V
CEC Efficiency	98.0% at 240 V
Allowable DC/AC Ratio	1.7
Customer Interface	Tesla Mobile App
Internet Connectivity	Wi-Fi (2.4 GHz, 802.11 b/g/n), Ethernet, Cellular (LTE/4G) [3]
Revenue Grade Meter	Revenue Accurate (+/- 0.5%)
AC Remote Metering Support	Wi-Fi (2.4 GHz, 802.11 b/g/n)
Protections	Integrated arc fault circuit interrupter (AFCI), Rapid Shutdown
Supported Grid Types	60 Hz, 240 V Split Phase
Warranty	12.5 years

[3] Cellular connectivity subject to network operator service coverage and signal strength.

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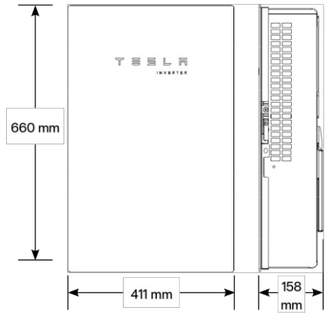
INVERTER

Tesla Solar Inverter Technical Specifications

Mechanical Specifications

Dimensions	660 mm x 411 mm x 158 mm (26 in x 16 in x 6 in)



Weight	52 lb [4]
Mounting Options	Wall mount (bracket)

[4] Door and bracket can be removed for a mounting weight of 37 lb.

Environmental Specifications

Operating Temperature	–30°C to 45°C (–22°F to 113°F) [5]
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	–30°C to 70°C (–22°F to 158°F)
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	Type 3R
Ingress Rating	IP55 (Wiring compartment)
Pollution Rating	PD2 for power electronics and terminal wiring compartment, PD3 for all other components
Operating Noise @ 1 m	< 40 db(A) nominal, < 50 db(A) maximum

[5] Performance may be de-rated to 6.2 kW at 240 V when operating at temperatures greater than 45°C.

Compliance Information

Grid Certifications	UL 1741, UL 1741 SA, UL 1741 SB, UL 1741 PCS, IEEE 1547-2018, IEEE 1547.1
Safety Certifications	UL 1741 PVRSS, UL 1699B, UL 1998 (US), UL 3741
Emissions	EN 61000-6-3 (Residential), FCC 47CFR15.109 (a)

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INVERTER

Solar Shutdown Device Technical Specifications

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is integral to the rapid shutdown (RSD) function required for rooftop PV systems in accordance with Article 690 of the NEC. When paired with Powerwall 3, solar array shutdown is initiated by an External System Shutdown Switch or the On/Off Enable switch located on Powerwall 3. Systems not subject to rapid shutdown requirements must still install one or more MCIs for functional purposes; see the Powerwall 3 installation manual for details.

Electrical Specifications

Model	MCI-1	MCI-2	MCI-2 High Current
Nominal Input DC Current Rating (I_{MP})	13 A	13 A	15 A
Maximum Input Short Circuit Current (I_{SC})	19 A	17 A	19 A
Maximum System Voltage	600 V DC	1000 V DC [15]	1000 V DC [15]
Maximum Disconnect Voltage [16]	600 V DC	165 V DC	165 V DC

[15] Maximum System Voltage is limited by Powerwall to 600 V DC.

[16] Maximum Disconnect Voltage is the maximum voltage allowed across each MCI in the open position (Rapid Shutdown Initiated). An individual MCI-2 has a voltage rating of 165V but in combination (connected in the same string) their voltage ratings are additive.

RSD Module Performance

Maximum Number of Devices per String	5
Control	Power Line Excitation
Passive State	Normally Open
Maximum Power Consumption	7 W
Warranty	25 years

Environmental Specifications

Operating Temperature	-40°C to 50°C (-40°F to 122°F)	-45°C to 70°C (-49°F to 158°F)
Storage Temperature	–30°C to 70°C (–22°F to 158°F)	–30°C to 70°C (–22°F to 158°F)
Enclosure Rating	NEMA 4X / IP65	

Mechanical Specifications

Electrical Connections	MC4 Connector	
Housing	Plastic	
Dimensions	125 x 150 x 22 mm (5 x 6 x 1 in)	173 x 45 x 22 mm (6.8 x 1.8 x 1 in)
Weight	350 g (0.77 lb)	120 g (0.26 lb)
Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip

Compliance Information

Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)
RSD Initiation Method	External System Shutdown Switch or Powerwall 3 Enable Switch

UL 3741 PV Hazard Control (and PVRSA) Compatibility

See UL 3741 Application Addendum

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RAPID SHUTDOWN

S-5!®
The Right Way

The right way to attach almost anything to metal roofs!

ProteaBracket™

ProteaBracket™ is the most versatile attachment solution on the market, fitting most metal trapezoidal sheet profiles with and without intermediate insulation. It features an adjustable attachment base and multiple solar module attachment options (illustrated on back) to accommodate varying widths and heights. There are no messy sealants to apply and no chance for leaks; the ProteaBracket comes with factory-applied, adhesive rubber sealant to ensure quick installation and a weather-proof fit.

The ProteaBracket is mounted directly onto the crown of the panel, straddling the profile. No surface preparation is necessary; simply wipe away excess oil and debris, align, and apply. Secure ProteaBracket through all 6 pre-punched holes.

ProteaBracket is the perfect match for the S-5-PV Kit, for a solar attachment solution that is both economical and easy to use.

S-5!® ProteaBracket™ is a versatile bracket that adjusts easily to most trapezoidal roof profiles.

S-5! PV kits have an M8 bolt and are suitable for use with all S-5! clamps.




ProteaBracket™

S-5!®
The Right Way

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal exposed-fastened metal roof profiles. No messy sealants to apply: the factory-applied adhesive rubber sealant weather-proofs and makes installation easy.

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

Each **ProteaBracket™** comes with a factory-applied, adhesive rubber sealant on the base. A structural A2 stainless steel bimetal attachment bracket, ProteaBracket is compatible with most common metal roofing materials.

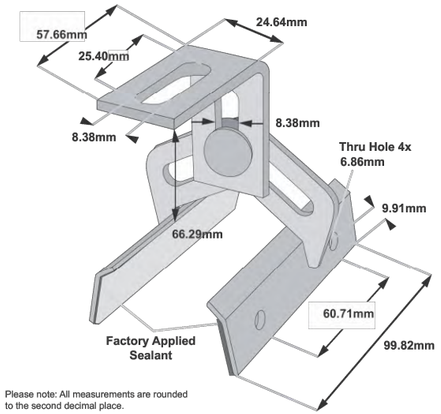
All four pre-punched holes must be used to achieve tested strength. For design assistance, contact Safintra South Africa (and see our website **www.safintra.co.za**), or visit **www.S-5.com** for the independent lab test data that can be used for load-critical designs and applications. Also, please visit S-5! website for more information including metallurgical compatibilities and specifications.

Multiple Attachment Options:

ProteaBracket™ with Top Rail option for PV attachment

ProteaBracket™ with S-5-PV Kit option (if not using a rail)

ProteaBracket™



Please note: All measurements are rounded to the second decimal place.

FLUTELINE

VERSATILE

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

S-5! Brackets and clamps are not tested for performance as part of a Fall Arrest or Personal Safety system. These applications need to be tested as a dynamic system and warranties or test results must be issued by the system provider.
Safintra, Safal Group and its subsidiaries provide no warranties or any assurances in this application, and will accept no claims of any nature whatsoever arising out of any such applications.

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

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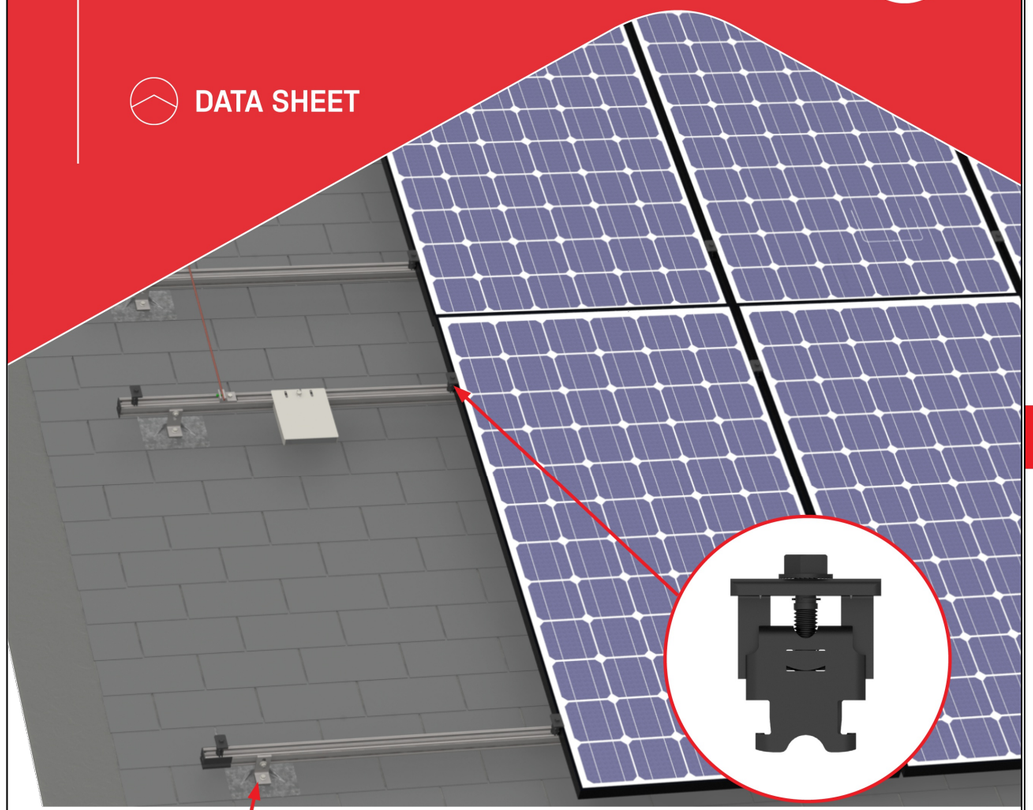
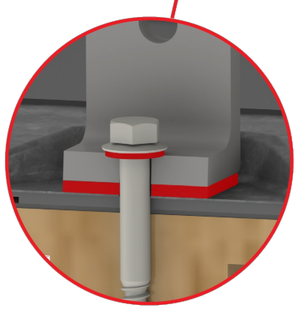
ATTACHMENT

CrossRail System

DATA SHEET





In-Rail Wire Management
/ 4 open channel rail types available
/ Clamps and wire management clips help secure cables
/ 4 clip types available

K2 Flash Comp Kit Waterproofing
/ Water Shield redirects water away from penetration
/ K2 EverSeal preassembled on L-Foot
/ EPDM backed sealing washing on lag screw

PRODUCT FEATURES

/ High quality, German-engineered system for residential and commercial installations

/ 4 rail sizes available to suit all structural conditions

/ Universal components for all rail types

/ Use 2 innovative components to turn this system into Tilt Up or Simple Tilt

/ Roof attachments for all roof types

/ 100% code compliant, structural validation for all solar states

/ Fast installation with minimal component count result in low total installed cost

TECHNICAL DATA

	CrossRail System
Roof Type	Composition shingle, tile, standing seam, corrugated metal, trapezoidal metal
Material	High corrosion resistance stainless steel and high grade aluminum
Flexibility	Modular construction, suitable for any system size, height adjustable
PV Modules	For all common module types
Module Orientation	Portrait and landscape
Roof Connection	Rafter or deck connection depending on selected roof attachment
Structural Validity	IBC compliant, stamped engineering letters available for all solar states
Certifications	UL 2703, ASCE 7-16, Class A Fire Rating
Warranty	25 years

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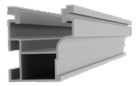
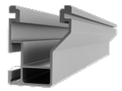
RAIL

Components



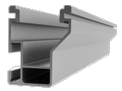
CrossRail 44-X

Part Number	Description
4000719	CrossRail 44-X, 172", Mill
4000720	CrossRail 44-X, 172", Dark
4000721	CrossRail 44-X, 185", Mill
4000722	SPO CrossRail 44-X, 185", Dark



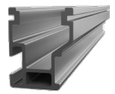
CrossRail 44-X Max

Part Number	Description
4000819-US	CrossRail 44-X Max 172", Mill, DC
4000820-US	CrossRail 44-X Max 172", Dark, DC
4000919	CrossRail 44-X Max 185", Mill
4000920	CrossRail 44-X Max 185", Dark



CrossRail 48-X

Part Number	Description
4000723	CrossRail 48-X, 172", Mill
4000724	CrossRail 48-X, 172", Dark
4000725	CrossRail 48-X, 185", Mill
4000726	CrossRail 48-X, 185", Dark



CrossRail 48-XL

Part Number	Description
4000727	CrossRail 48-XL, 172", Mill
4000728	CrossRail 48-XL, 172", Dark
4000729	CrossRail 48-XL, 185", Mill
4000730	CrossRail 48-XL, 185", Dark

CrossRail 80

Part Number	Description
4000708	CrossRail 80 172", Mill

L-Foot & T-Foot

Part Number	Description
4000630	L-Foot Slotted Set, Mill
4000631	L-Foot Slotted Set, Dark
4000080	T-Foot X 6" Kit, Mill
4000559	K2 Armor w/ Big Foot, Kit

K2 Metal Flashings

Part Number	Description
4000156	K2 Flash Comp Kit, Mill
4000157	K2 Flash Comp Kit, Dark

Splice Foot X & XL

Part Number	Description
4000113	Splice Foot X, Set, Mill
4000165	Splice Foot XL #14 Kit, Dark
4000300	Splice Foot XL #14 Kit, Mill

Multi Mount

Part Number	Description
4000282-US	K2 Multi Mount Kit, Mill, DC
4000284-US	K2 Multi Mount Kit, Dark, DC

EverSeal Tile Hooks

Part Number	Description
4000140-B	USH, 9", Base Kit, w/Butyl
4000141-B	Flat Tile Hook X Kit, w/Butyl
4000142-B	USH +2, 5.5" Base Kit, w/Butyl

Standing Seam PowerClamps

Part Number	Description
4000016	Standing Seam PowerClamp, Mini, Set
4000017	Standing Seam PowerClamp, Standard, Set

Corrugated Power Clamp, Kit

Part Number	Description
4000307	Corrugated PowerClamp, Kit

Trapezoidal Power Clamp, Kit

Part Number	Description
4000308	Trapezoidal PowerClamp, Kit

Yeti Clamp

Part Number	Description
4000050-B	Yeti Clamp 2.0, Set

K2 Cross Clamp

Part Number	Description
4000135-US	K2 Cross Clamp Set, Mill, DC
4000145-US	K2 Cross Clamp Set, Dark, DC

Bonding & Grounding

Part Number	Description
4000629-H	CR Microinverter & Opt, 13mm Hex Kit
4000006-H	Everest Ground Lug, 13mm Hex
4000083	MLPE, Module Frame Mount, Kit

CrossRail Rail Connector

Part Number	Description
4000051-US	Rail Connector CR 44-X, Set, Mill, DC
4000052-US	Rail Connector CR 44-X, Set, Dark, DC
4000051-T	Tool-less Rail Connector 44-X, Set, Mill
4000052-T	Tool-less Rail Connector 44-X, Set, Dark
4000385	RailConn CR48-X,48-XL Struct Set, Mill
4000386	RailConn CR48-X,48-XL Struct Set, Dark
4001196	Rail Connecctor UL 2703 Set, CR80, Mill

End Caps

Part Number	Description
4000176	EndCap 44-X, K2
4000431	CrossRail Flat EndCap, CR 48-X, 48-XL
4001221	EndCap, Black, CR80

Wire Management

Part Number	Description
4000069	Wire Management Clip, TC
4000382	HEYClip SunRunner Cable Slip SS, S6404
4005394	Wire Mangement Clip, Omega, Black
4000400	K2 4 Wire Dragon Clip

CR 48-X/48-XL Sleeve

Part Number	Description
4000177	Sleeve CR 44-X
4000583	CrosRail 3" Black Sleeve 48-X, 48-XL

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