

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 - IRONRIDGE FLASHFOOT2
- 1.3.3

PV RACKING SYSTEM INSTALLATION - IRONRISGE XR-10
- 1.3.4

PV MODULE AND INVERTER INSTALLATION - AIONRISE AION66G1-360 / SOL-ARK 15K-2P-N
- 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: 29 X 360W = 10.440KW

PTC: 29 X 339.12W = 9.834KW

(29) AIONRISE AION66G1-360

(1) SOL-ARK 15K-2P-N

(2) PYTES V-BOX-OC BATTERY ENCLOSURES FOR (8) PYTES V5 LITHIUM BATTERIES

ATTACHMENT TYPE:

IRONRIDGE FLASHFOOT2

MSP UPGRADE:

NO



NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

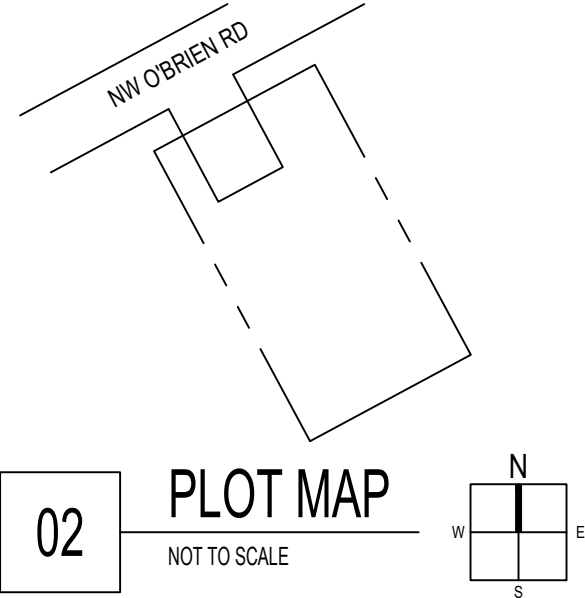
NEW PV SYSTEM: 10.440 kWp
NEW BESS SYSTEM: 40.96 kWh
MATT NEMERO RESIDENCE
2071 NW O'BRIEN RD,
LEE'S SUMMIT, MO 64081
ASSESSOR'S #: 62210120600000000



01

AERIAL PHOTO

NOT TO SCALE



PROJECT INFORMATION

OWNER

NAME:

NEMERO

PHONE:

E-MAIL:

PROJECT MANAGER

NAME:

KEVIN BENTON

PHONE:

417-590-7543

CONTRACTOR

NAME:

ESSENTIAL SOLAR

PHONE:

417-590-7543

AUTHORITIES HAVING JURISDICTION

BUILDING:

CITY OF LEE'S SUMMIT

ZONING:

CITY OF LEE'S SUMMIT

UTILITY:

DESIGN SPECIFICATIONS

OCCUPANCY:

GROUP R-3

CONSTRUCTION:

TYPE II

ZONING:

RESIDENTIAL

GROUND SNOW LOAD:

30 PSF

WIND EXPOSURE:

B

WIND SPEED:

109 MPH

APPLICABLE CODES & STANDARDS

BUILDING:

IBC 2018, IRC 2018

ELECTRICAL:

NEC 2017

FIRE:

IFC 2018




STAMPED : 06/09/2025

SHEET LIST TABLE	
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COVER PAGE

SYSTEM AC SIZE @ STC: 15.000 kW		SYSTEM DC SIZE @ STC: 10.440 kW	PAGE: G-1
(29) AIONRISE AION66G1-360		(1) SOL-ARK 15K-2P-N	
DRAWN BY:		DATE:	
M.P.		05.29.2025	
REV:			

2.1.1	SITE NOTES:	2.5.1	INTERCONNECTION NOTES:
2.1.2	A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.	2.5.2	LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]
2.1.3	THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH STORAGE BATTERIES.	2.5.3	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)].
2.1.4	THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.		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).
2.1.5	PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.	2.5.4	FEEDER TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (B)(2)(1)
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.	2.5.5	SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE
		2.5.6	ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42
2.2.1	EQUIPMENT LOCATIONS	2.5.7	BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].
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 TABLE 310.15 (B)(2)(A).	2.6.1	DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:
2.2.4	JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.	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).
2.2.5	ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.	2.6.3	DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.
2.2.6	ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.	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.
2.2.7	ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.	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).
2.3.1	STRUCTURAL NOTES:		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)
2.3.2	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.	2.6.6	ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
2.3.3	JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.	2.6.7	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)
2.3.4	ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.	2.6.8	IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.
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.	2.6.9	
2.4.1	GROUNDING NOTES:	2.7.1	WIRING & CONDUIT NOTES:
2.4.2	GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.	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.
2.4.3	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.	2.7.3	ALL CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
2.4.4	PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.	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).
2.4.5	METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).	2.7.5	PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE [NEC 200.6 (A)(6)].
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.	2.7.6	MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY.
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.	2.7.7	ACCORDING TO NEC 200.7, UNGROUNDED SYSTEMS DC CONDUCTORS COLORED OR MARKED AS FOLLOWS:
2.4.8	GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]	2.7.8	DC POSITIVE- RED, OR OTHER COLOR EXCLUDING WHITE, GRAY AND GREEN
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.	*	DC NEGATIVE- BLACK, OR OTHER COLOR EXCLUDING WHITE, GRAY AND GREEN
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		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 GRAY
			IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

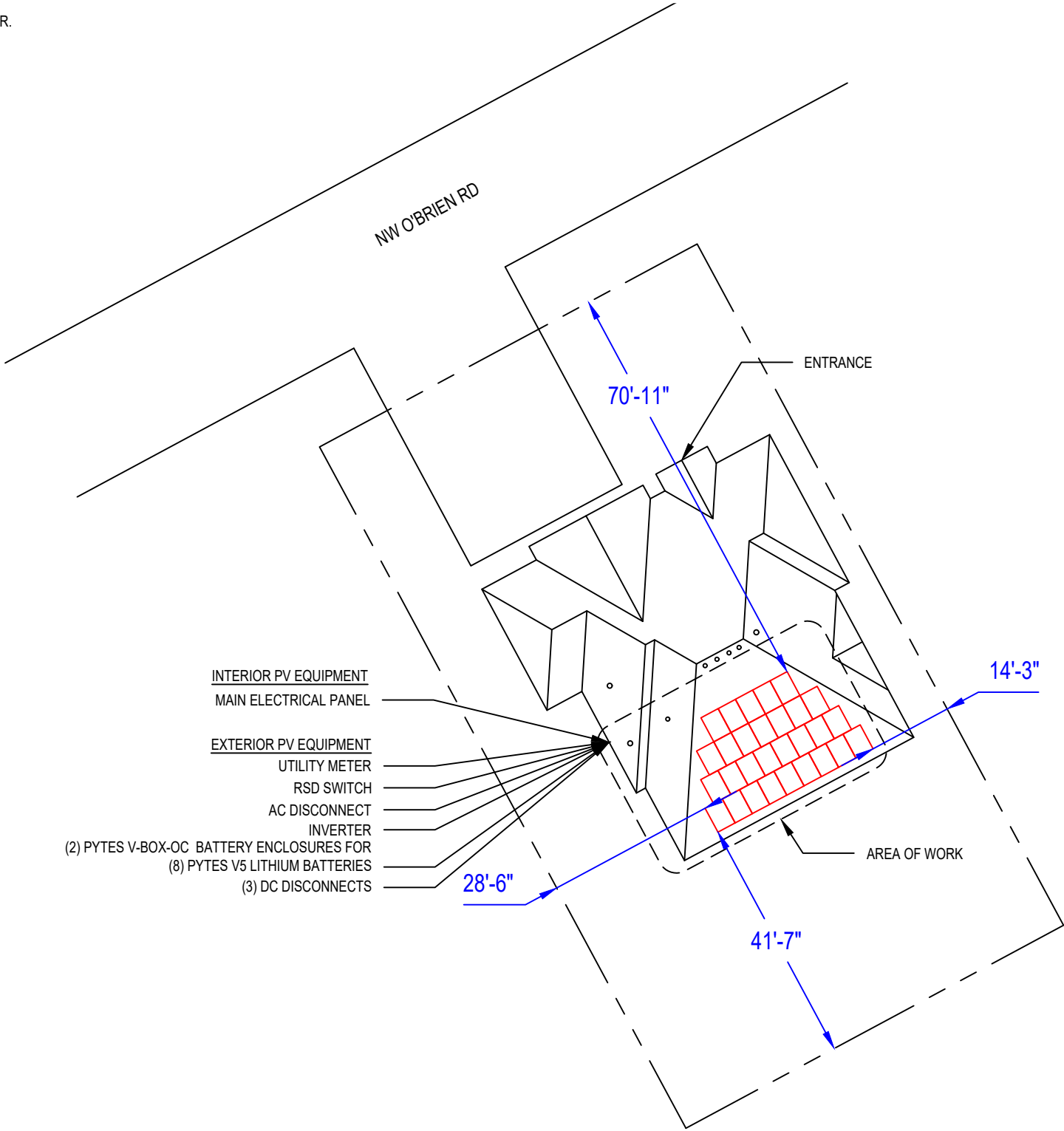
CONTRACTOR ESSENTIAL SOLAR ADDRESS: 2669 STATE HWY CC, MARSHFIELD, MO 65706, PHONE: 417-590-7543 CONTRACTOR #:		NEMERO RESIDENCE RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION 2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081 APN: 62210120600000000	NOTES	
			SYSTEM AC SIZE @ STC: 15.000 kW (29) AIONRISE AION66G1-360 (1) SOL-ARK 15K-2P-N	PAGE: G-2
			DRAWN BY: M.P.	DATE: 05.29.2025

NOTE: MAX 5' DISTANCE BETWEEN THE AC DISCONNECT AND THE UTILITY METER.

GENERAL NOTES

- 1. FIELD VERIFY ALL MEASUREMENTS
- 2. ITEMS BELOW MAY NOT BE ON THIS PAGE

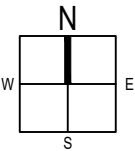
--- PROPERTY LINE



01

SITE PLAN

1/24" = 1'-0"



CONTRACTOR
ESSENTIAL SOLAR
ADDRESS: 2669 STATE HWY CC,
MARSHFIELD, MO 65706,
PHONE: 417-590-7543
CONTRACTOR #:



NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

SITE PLAN

SYSTEM AC SIZE @ STC: 15.000 kW SYSTEM DC SIZE @ STC: 10.440 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

DRAWN BY:
M.P.

REV:

DATE:
05.29.2025

PAGE:

PV-1

NOTE: MAX 5' DISTANCE BETWEEN THE AC DISCONNECT AND THE UTILITY METER.

SQUARE FOOTAGE OF ROOF: 2507.2 SQ. FT.
SQUARE FOOTAGE OF ARRAY: 573.15 SQ. FT.
PERCENTAGE OF ROOF COVERED BY THE ARRAYS: 22.86%

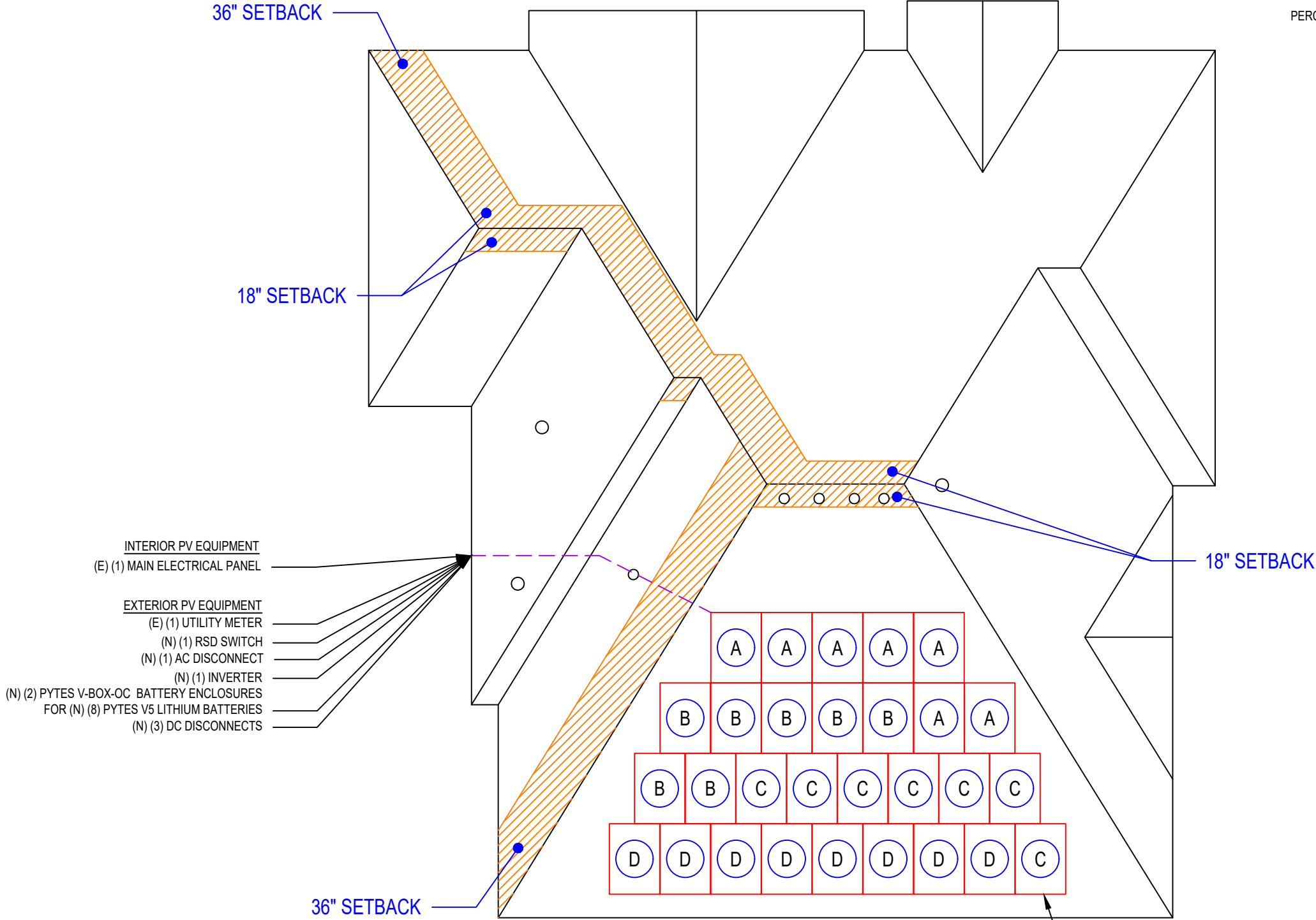
GENERAL NOTES

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- SETBACK
- CONDUIT (IN ATTIC)
- A MODULE STRINGING
- B MODULE STRINGING
- C MODULE STRINGING
- D MODULE STRINGING



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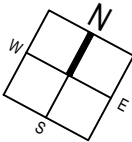


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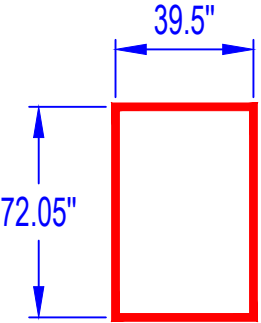
ELECTRICAL PLAN

1/8" = 1'-0"

0 4' 8'



ARRAY 1 - 10.440 kW
[x29] (N) MODULES
TILT: 40 DEGREES
ROOF PITCH: 10:12
AZIMUTH: 152 DEGREES



MODULE:
AIONRISE
AION66G1-360
360 WATTS

CONTRACTOR
ESSENTIAL SOLAR
ADDRESS: 2669 STATE HWY CC,
MARSHFIELD, MO 65706,
PHONE: 417-590-7543
CONTRACTOR #:



NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

ELECTRICAL PLAN

SYSTEM AC SIZE @ STC: 15.000 kW SYSTEM DC SIZE @ STC: 10.440 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

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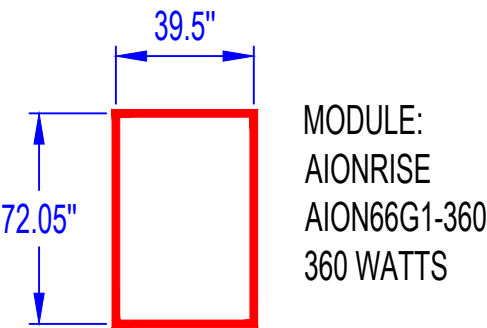
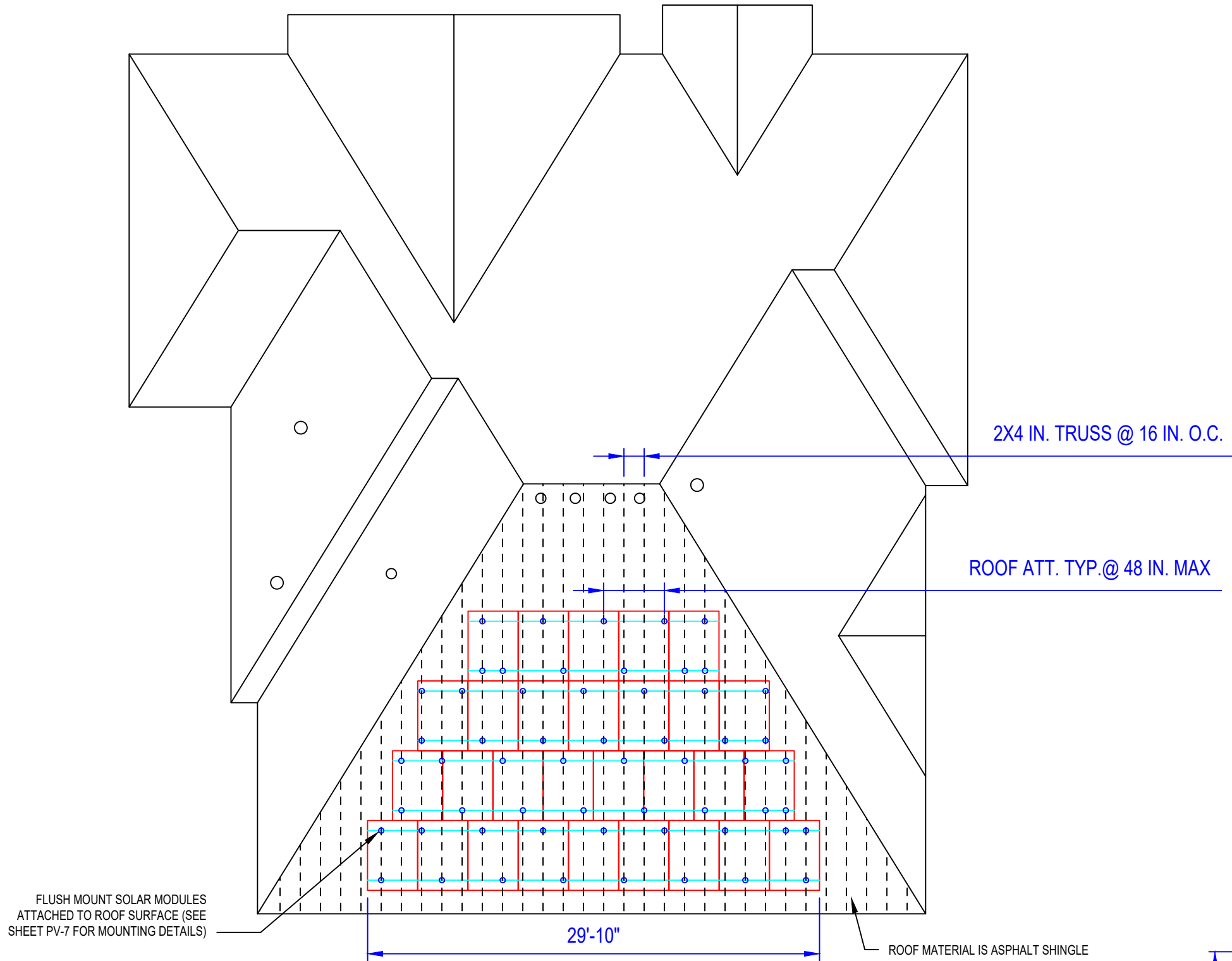
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GENERAL NOTES

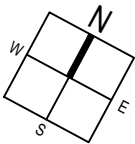
- 1. FIELD VERIFY ALL MEASUREMENTS
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— — — ROOF TRUSSES



01 SOLAR ATTACHMENT PLAN

1/8" = 1'-0"



CONTRACTOR
ESSENTIAL SOLAR
ADDRESS: 2669 STATE HWY CC,
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NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

SOLAR ATTACHMENT PLAN

SYSTEM AC SIZE @ STC: 15.000 kW SYSTEM DC SIZE @ STC: 10.440 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

DRAWN BY: M.P. REV: DATE: 05.29.2025

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CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS														
ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL
1	4	10 AWG PV WIRE, COPPER	FREE AIR	2	N/A	6 AWG BARE, COPPER	0.91 (36.2 °C)	1	12.39A	15.48A	55A	50.05A	75°C	50A
2	2	10 AWG THWN-2, COPPER	0.75" DIA EMT	2	N/A	10 AWG THWN-2, COPPER	0.91 (36.2 °C)	1	12.39A	15.48A	40A	36.4A	75°C	35A
3	1	10 AWG THWN-2, COPPER	0.75" DIA EMT	4	N/A	10 AWG THWN-2, COPPER	0.91 (36.2 °C)	0.8	12.39A	15.48A	40A	29.12A	75°C	35A
4	1	250 kcmil THWN-2, ALUMINUM	2" DIA EMT	2	200A	6 AWG THWN-2, COPPER	0.91 (36.2 °C)	1	-	200A	230A	209.3A	75°C	205A
5	1	250 kcmil THWN-2, ALUMINUM	2" DIA EMT	2	N/A	6 AWG THWN-2, COPPER	0.91 (36.2 °C)	1	-	200A	230A	209.3A	75°C	205A
6	1	250 kcmil THWN-2, ALUMINUM	2" DIA EMT	2	200A	6 AWG THWN-2, COPPER	0.91 (36.2 °C)	1	-	200A	230A	209.3A	75°C	205A
7	1	2/O AWG THWN-2, COPPER	2" DIA EMT	2	200A	6 AWG THWN-2, COPPER	0.91 (36.2 °C)	1	-	200A	195A	177.45A	75°C	175A

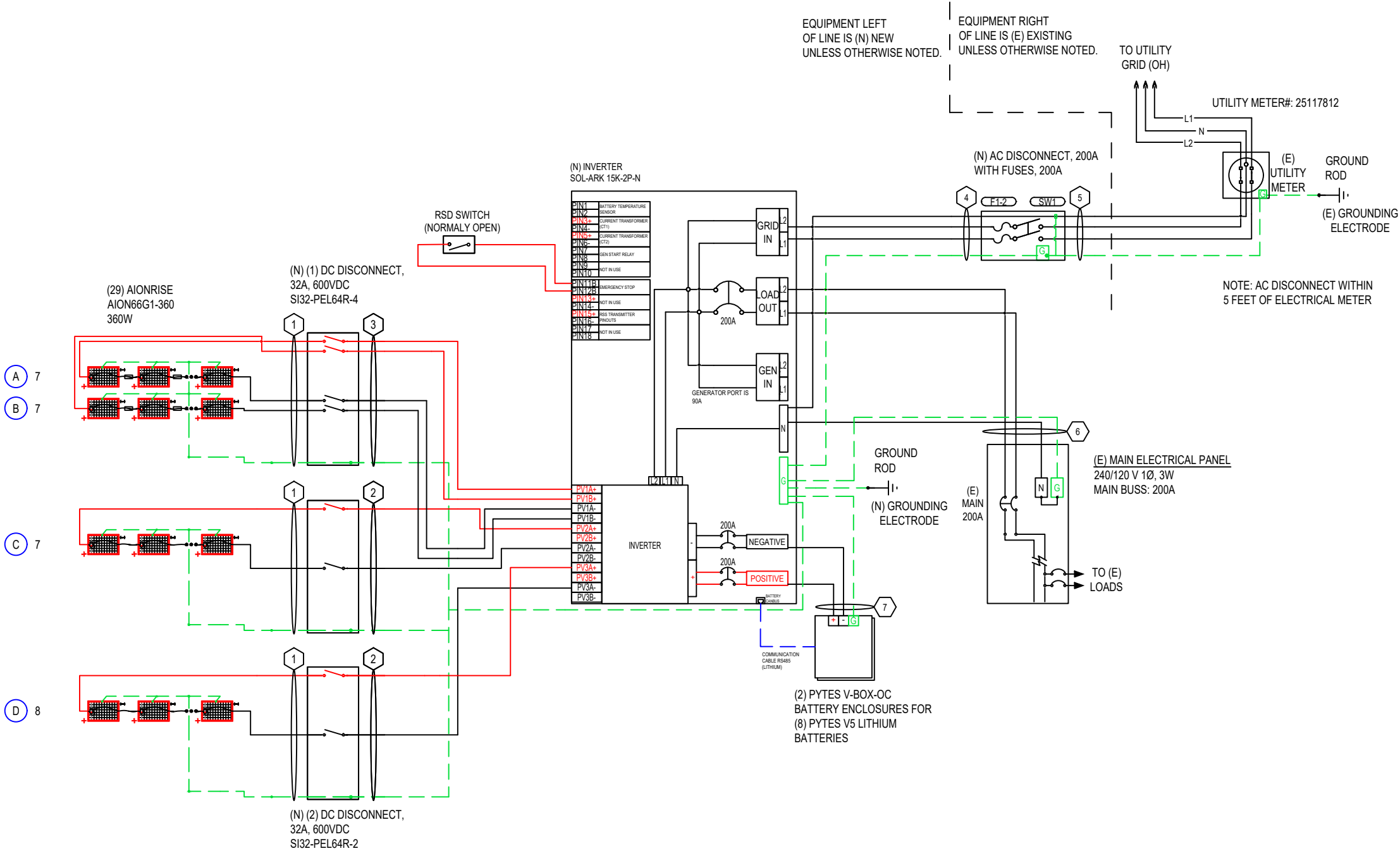
- A

MODULE STRINGING
- B

MODULE STRINGING
- C

MODULE STRINGING
- D

MODULE STRINGING



STATE OF MISSOURI
METHODE MANIRAGUHA
PE - 2019005893
Exp. 12/31/2025
STAMPED : 06/09/2025

CONTRACTOR ESSENTIAL SOLAR ADDRESS: 2669 STATE HWY CC, MARSHFIELD, MO 65706, PHONE: 417-590-7543 CONTRACTOR #:		NEMERO RESIDENCE RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION 2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081 APN: 62210120600000000	LINE DIAGRAM		PAGE: PV-4
			SYSTEM AC SIZE @ STC: 15.000 kW SYSTEM DC SIZE @ STC: 10.440 kW (29) AIONRISE AION66G1-360 (1) SOL-ARK 15K-2P-N		
			DRAWN BY: DATE: M.P. REV: 05.29.2025		

SYSTEM SUMMARY			
	INVERTER #1		
	MPPT #1	MPPT #2	MPPT #3
MODULES IN SERIES	14	7	8
ARRAY VMP	275.1V	275.1V	314.4V
ARRAY IMP	18.34A	9.17A	9.17A
ARRAY VOC	343.7V	343.7V	392.8V
ARRAY MAX VOC	391V	391V	446.9V
ARRAY ISC	19.82A	9.91A	9.91A
ARRAY STC POWER	10,440W		
ARRAY PTC POWER	9,834W		
MAX AC CURRENT	62.5A		
MAX AC POWER	15,000W		
DERATED (CEC) AC POWER	9,490W		

MODULES										
REF.	QTY.	MAKE AND MODEL	PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1-29	29	AIONRISE AION66G1-360	360W	339.12W	9.91A	9.17A	49.1V	39.3V	-0.142V/°C (-0.29%/°C)	20A

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	1	SOL-ARK 15K-2P-N	240V	FLOATING	80A	15000W	62.5A	3x26A	500V	96.5%

DISCONNECTS				
REF.	QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE
SW1	1	EATON DG224NRK OR EQUIV.	200A	240VAC

OCPDS			
REF.	QTY.	RATED CURRENT	MAX VOLTAGE
F1-2	2	200A	240VAC

ASHRAE EXTREME LOW	-22.6°C (-8.7°F), SOURCE: CHARLES B WHEELER D (39.12°; -94.59°)
ASHRAE 2% HIGH	36.2°C (97.2°F), SOURCE: CHARLES B WHEELER D (39.12°; -94.59°)

BATTERY ENERGY STORAGE SYSTEM					
REF.	QTY.	MAKE AND MODEL	CAPACITY	MAX. CONT. CURRENT	NOM. VOLTAGE
B1-8	8	PYTES V5 LITHIUM IRON PHOSPHATE	5.12KWH	100A	51.2V



STAMPED : 06/09/2025

CONTRACTOR ESSENTIAL SOLAR ADDRESS: 2669 STATE HWY CC, MARSHFIELD, MO 65706, PHONE: 417-590-7543 CONTRACTOR #:		<h1>NEMERO RESIDENCE</h1> <p>RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION 2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081 APN: 62210120600000000</p>	DESIGN TABLES		PAGE: <h1>PV-5</h1>
			SYSTEM AC SIZE @ STC: 15.000 kW (29) AIONRISE AION66G1-360 (1) SOL-ARK 15K-2P-N	SYSTEM DC SIZE @ STC: 10.440 kW	
			DRAWN BY: M.P.	DATE: 05.29.2025	

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

WARNING

ELECTRICAL SHOCK HAZARD

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

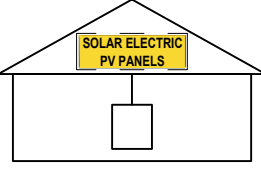
LABEL 1
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (2" X 4").
[NEC 690.13].

WARNING

POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 2
AT POINT OF INTERCONNECTION OVERCURRENT DEVICE (2" X 4").
[NEC 705.12(B)(2)(3)(B)].

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN



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

LABEL 3
AT RAPID SHUTDOWN SYSTEM (3 3/4" X 5 1/4"). [NEC 690.56(C)(1)(A)].

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL 4
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 (5 3/4" X 1 1/8").
[NEC 690.31(G)]
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE
[IFC 605.11.1.1]

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL 5
AT RAPID SHUTDOWN DISCONNECT SWITCH (5 1/4" X 2").
[NEC 690.56(C)(3)].

CAUTION

SOLAR ELECTRIC SYSTEM CONNECTED

LABEL 6
AT UTILITY METER (5 3/4" X 1 1/8").
[NEC 690.56(B)]

WARNING

TRIPLE POWER SUPPLY SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRIC SYSTEM

LABEL 7
AT POINT OF INTERCONNECTION (2 3/4" X 1 5/8").
[NEC 705.12(B)(3)]

WARNING

SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFED

LABEL 8
AT POINT OF INTERCONNECTION (2" X 1").
[NEC 705.12(B)(3)]

INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED PHOTOVOLTAIC SYSTEM DISCONNECT LOCATED SW SIDE OF THE HOUSE

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 (5 3/4" X 1 1/8").
[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)]

PHOTOVOLTAIC SOLAR AC DISCONNECT

LABEL 9
AT EACH AC DISCONNECTING MEANS (4" X 1").
[NEC 690.13(B)].

PHOTOVOLTAIC SOLAR DC DISCONNECT

LABEL 10
AT EACH DC DISCONNECTING MEANS (4" X 1").
[NEC 690.13(B)].

PHOTOVOLTAIC SYSTEM AC DISCONNECT

RATED AC OUTPUT CURRENT 62.5 A
NOMINAL OPERATING AC VOLTAGE 240 V

LABEL 11
AT POINT OF INTERCONNECTION, MARKED AT DISCONNECTING MEANS (4" X 2").
[NEC 690.54]

DIRECT CURRENT PHOTOVOLTAIC POWER SOURCE

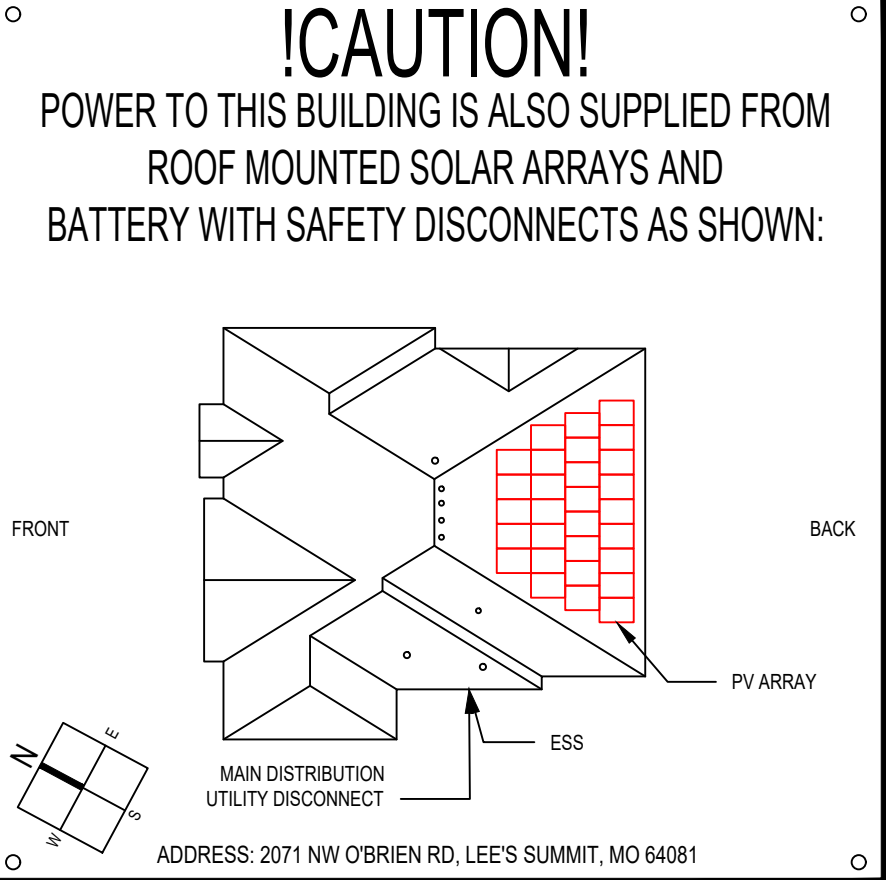
MAXIMUM VOLTAGE 446.9 VDC
MAX CIRCUIT CURRENT 19.82 AMPS

LABEL 12
AT EACH DC DISCONNECTING MEANS (3" X 4").
[NEC 690.53].

ENERGY STORAGE SYSTEM DISCONNECT

NOMINAL ESS AC VOLTAGE: 240V
NOMINAL ESS DC VOLTAGE: 51.2V

LABEL 13
ESS DISCONNECT LABEL PER NEC 706.7(D)

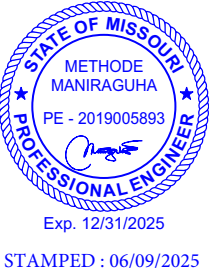


EMERGENCY CONTACT

EMERGENCY CONTACT:

ESSENTIAL SOLAR

417-590-7543



STAMPED : 06/09/2025

CONTRACTOR
ESSENTIAL SOLAR
ADDRESS: 2669 STATE HWY CC,
MARSHFIELD, MO 65706,
PHONE: 417-590-7543
CONTRACTOR #:



NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

PLACARDS

SYSTEM AC SIZE @ STC: 15.000 kW SYSTEM DC SIZE @ STC: 10.440 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

DRAWN BY: M.P. REV: DATE: 05.29.2025

PAGE:

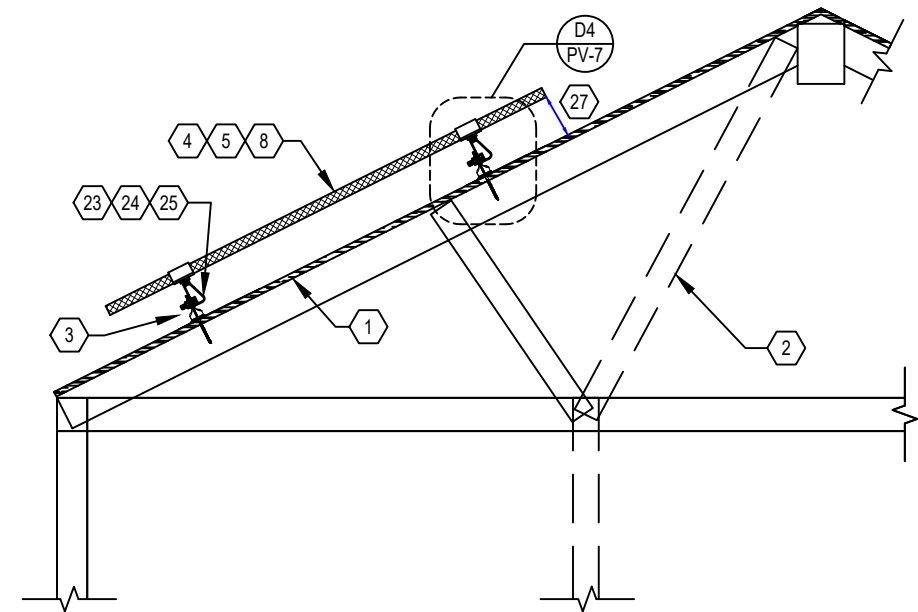
PV-6

GENERAL NOTES

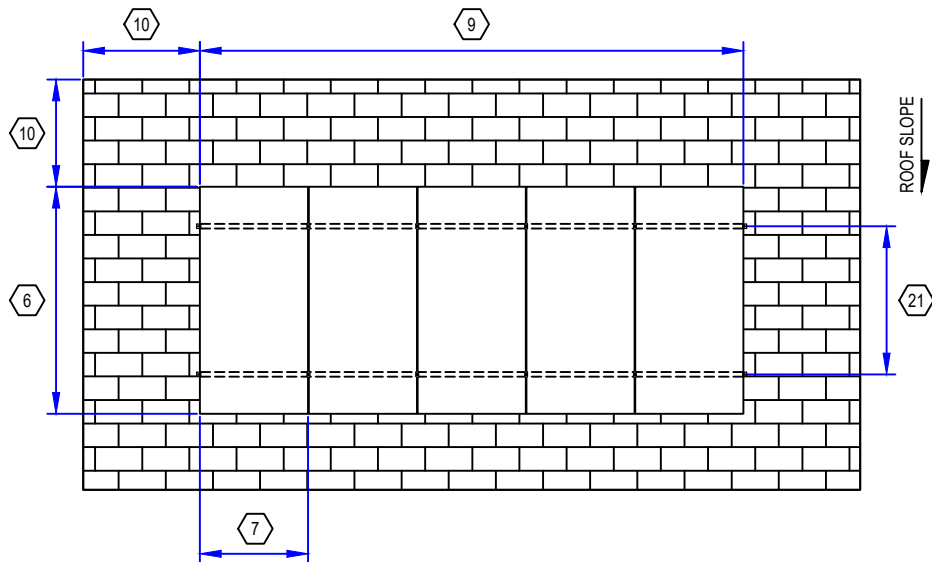
1. FIELD VERIFY ALL MEASUREMENTS

SHEET KEYNOTES

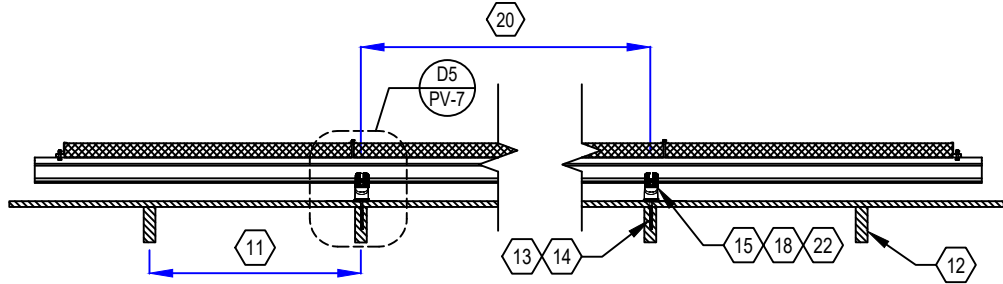
1. ROOF MATERIAL: ASPHALT SHINGLE
2. ROOF STRUCTURE: TRUSS
3. ATTACHMENT TYPE: IRONRIDGE FLASHFOOT2
4. MODULE MANUFACTURER: AIONRISE
5. MODULE MODEL: AION66G1-360
6. MODULE LENGTH: 72.05"
7. MODULE WIDTH: 39.5"
8. MODULE WEIGHT: 44.75 LBS.
9. SEE SHEET PV-3 FOR DIMENSION(S)
10. MIN. FIRE OFFSET: 18" FROM RIDGE, 36" FROM EDGE
11. TRUSS SPACING: 16 IN. O.C.
12. TRUSS SIZE: 2X4 IN. NOMINAL
13. LAG BOLT DIAMETER: 5/16 IN.
14. LAG BOLT EMBEDMENT: 2.5 IN.
15. TOTAL # OF ATTACHMENTS: 58.
16. TOTAL AREA: 573.15 SQ. FT.
17. TOTAL WEIGHT: 1380.99 LBS.
18. WEIGHT PER ATTACHMENT: 23.81 LBS.
19. DISTRIBUTED LOAD: 2.41 PSF
20. MAX. HORIZONTAL STANDOFF: 48 IN.
21. MAX. VERTICAL STANDOFF: IN ACCORDANCE WITH MODULE MANUFACTURER'S INSTRUCTIONS.
22. STANDOFF STAGGERING: YES
23. RAIL MANUFACTURER (OR EQUIV.): IRONRISGE
24. RAIL MODEL (OR EQUIVALENT): XR-10
25. RAIL WEIGHT: 0.436 PLF
26. MAX. TRUSS SPAN: N/A.
27. MODULE CLEARANCE: 3 IN. MIN., 6 IN. MAX.



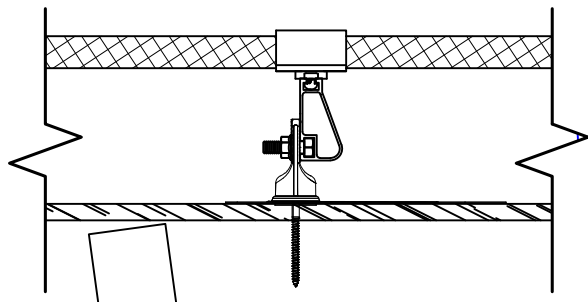
D1 RACKING DETAIL (TRANSVERSE)
NOT TO SCALE



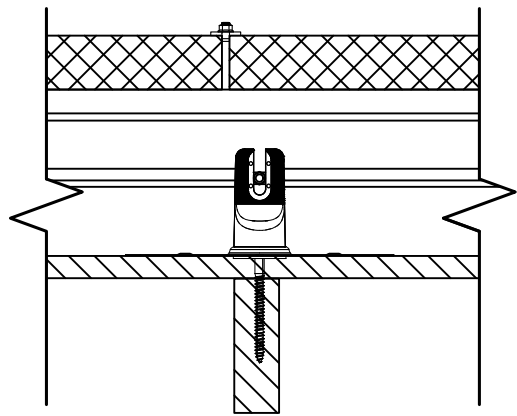
D3 RACKING DETAIL (TOP)
NOT TO SCALE



D2 RACKING DETAIL (LONGITUDINAL)
NOT TO SCALE



D4 DETAIL (TRANSVERSE)
NOT TO SCALE



D5 DETAIL (LONGITUDINAL)
NOT TO SCALE

CONTRACTOR
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NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

ASSEMBLY DETAILS

SYSTEM AC SIZE @ STC: 15.000 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

SYSTEM DC SIZE @ STC: 10.440 kW

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M.P.

REV:

DATE:
05.29.2025

PAGE:

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AIONRISE

Generate | Store | Utilise

PHOTOVOLTAIC MODULE

ALL BLACK PERC

AION66G1 360Wp

MADE IN GEORGIA

AIONRISE PV modules are manufactured only in-house at the own fully automated facilities with an integrated uncompromising multi-step quality check using the latest available technology

REDUCING LCOE

Compounded by the European bill of materials AIONRISE products deliver long-term higher output comparing to other analogs and provide lower LCOE

COMMITMENTS

We provide linear 30 years performance guarantee and 12 years product warranty.

CERTIFIED QUALITY

AIONRISE is certified by all key quality programs of TUV Rhineland, which considerably expand tests of IEC 61215 / 61730 / 62716 / 61701 and UL 61730 with Regular Production Surveillance performed every six months. Extensive participation in the testing programs of the global independent certification authority ensures the high reliability, safety, and quality of our modules.



CELLS



MICRO-CRACK
FREE



PID RESISTANT



SALT CORROSION
RESISTANT



SAND RESISTANT



HIGHLY STABLE
AND TOUGH

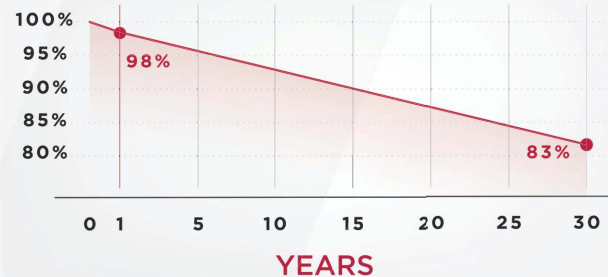


AMMONIA RESISTANT

25 YEARS
EXTENDED
WARRANTY

TERMS AND CONDITIONS APPLY

GUARANTEED MODULE PERFORMANCE



MADE IN GEORGIA

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AIONRISE

MATERIAL CHARACTERISTICS

Dimensions	72.05 x 39.5 x 1.6 in / 1830 x 1002 x 40 mm
Weight	44.75 lb / 20.3 kg
Number of cells	66 pcs (6 x 11)
Cells type	Mono-crystalline
Cells size	158.75 x 158.75 mm, G1
Glass	3.2 mm double layer, AR coated, Iron free
Backsheet	Black, 390 µm
Junction box	IP 67 rated, 3 bypass diodes
Output cable	4.0 mm ² , 3.94 ft
Connector	Staßli MC4-Evo 2

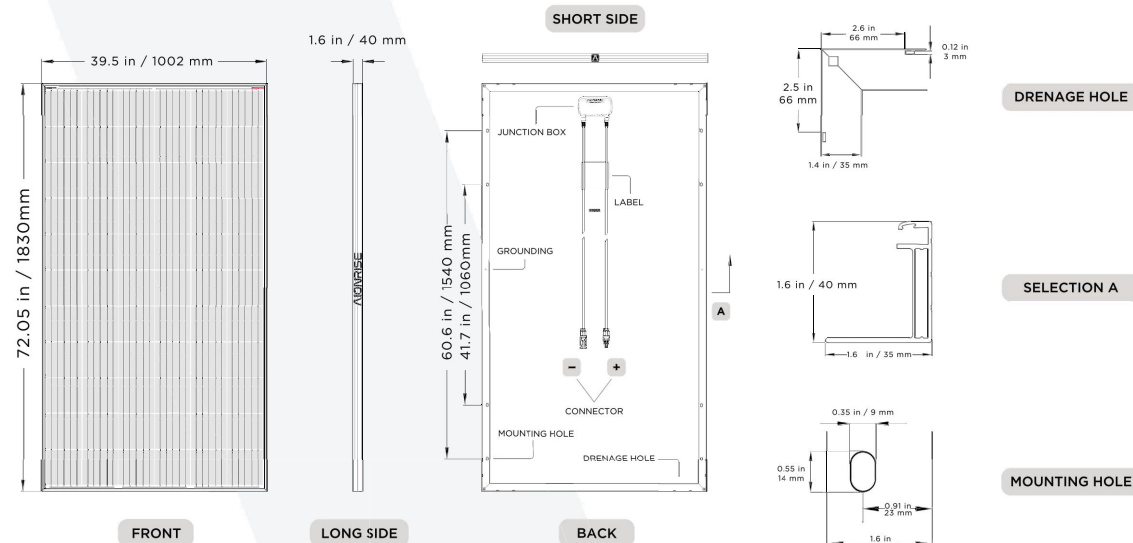
PACKAGING INFORMATION

One pallet quantity	26 pcs
Pallet size	73.3 x 43.1 x 44.3 in / 1861 x 1095 x 1125 mm
Pallet weight	1232.4 lb / 559 kg
Double pallet quantity	52 pcs + 6 pcs
Double pallet size	73.3 x 43.1 x 96.5 in / 1861 x 1095 x 2550 mm
Double pallet weight	2777.8 lb / 1260 kg

LOADING INFORMATION

20 ft HC / HQ Container	348 pcs maximum
40 ft HC / HQ Container	696 pcs maximum
Truck	840 pcs maximum

DIMENSIONS



CERTIFICATES



ELECTRICAL CHARACTERISTICS

AION66G1-360

Nominal maximum power	P _{max} (Wp)	360
Maximum power voltage	V _{mp} (V)	39.3
Maximum power current	I _{mp} (A)	9.17
Open-circuit voltage	V _{oc} (V)	49.1
Short-circuit current	I _{sc} (A)	9.91
Module efficiency	(%)	20.5
Power tolerance	P _{max} (Wp)	0 / +5
Maximum system voltage DC	(V)	1500
Maximum system fuse rating	(A)	20
Operating temperature	(°C)	-40 to +85
Temperature coefficients of P _{max}	(% / °C)	-0.36
Temperature coefficients of V _{oc}	(% / °C)	-0.29
Temperature coefficients of I _{sc}	(% / °C)	0.048
Normal operating cell temperature (NOCT)	(°C)	45 ± 2

The electrical data apply to standard test conditions (STC):
Irradiance of 1000 W/m² with spectrum AM 1.5 and a cell temperature of 25°C

MAXIMUM LOAD*

Uplift load (wind)	5400 Pa (550 kg/m ²)
Downforce load (snow)	5400 Pa (550 kg/m ²)

*For more information please refer to Instruction Manual

CONTACT INFORMATION

AIONRISE Holding Inc.

651 N Broad St, Middletown, DE 19709, USA

Manufacturing:

AIONRISE LLC

88 Avtomshenebeli St, 4600 Kutaisi, Georgia

1 888 885 AION (toll free)

info@aionrise.com | www.aionrise.com

MADE IN GEORGIA

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CONTRACTOR
ESSENTIAL SOLAR
ADDRESS: 2669 STATE HWY CC,
MARSHFIELD, MO 65706,
PHONE: 417-590-7543
CONTRACTOR #:



NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 15.000 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

SYSTEM DC SIZE @ STC: 10.440 kW

PAGE:

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DRAWN BY:
M.P.

REV:

DATE:
05.29.2025

DATASHEET

15K-2P-N

Residential Hybrid Inverter

Inverter Model:	Limitless 15K-LV
SKU:	15K-2P
Input Data (PV)	
Max. Allowed PV Power (STC)	19,500W
Rated MPPT Operating Voltage Range	175 - 425V
MPPT Voltage Range	150 - 500V
Startup Voltage	125V
Max. DC Input Voltage ¹	500V
Max. Operating Input Current per MPPT	26A
Max. Short Circuit Current per MPPT	44A
No. of MPP Trackers	3
No. of PV Strings per MPPT	2
Max. AC Coupled Input	19,200W
Output Data (AC)	
Nominal AC Voltage	120/240V, 120/208V, 220V
Grid Frequency	50 / 60Hz
Real Power, max continuous	15,000W
Max. Output Current	62.5A
Real Power, max continuous (batteries only, no PV)	12,000W (50A @ 240V)
Peak Apparent Power (10s, off-grid)	24,000VA @ 240V
Peak Apparent Power (100ms, off-grid)	30,000VA @ 240V
Max Output Fault Current (5s)	94A with PV, 75A (batteries only)
Max Output Fault Current (100ms)	120A
Max. Grid Passthrough Current	200A
Power Factor Output Range	+/- 0.9 adjustable
Backup Transfer Time	5ms
CEC Efficiency	96.5%
Max Efficiency	97.5%
Design (DC to AC)	Transformerless DC
Stackable	Up to 12 in parallel
Battery Input Data (DC)	
Battery Technologies	Lithium / Lead Acid
Nominal DC Voltage	48V
Operating Voltage Range	43 - 63V
Capacity	50 – 9900Ah
Max. Battery Charge / Discharge Current	275A
Battery Disconnecting Means	200A/pole x 2
Charging Controller	3-Stage with Equalization
Grid to Battery Charging Efficiency	96.0%
External Battery Temperature Sensor (BTS)	Included
Automatic Generator Start (AGS)	2 Wire Start - Integrated
BMS Communication	CANBus & RS485 MODBUS
General Data	
Dimensions (H x W x D)	807 x 494 x 306 mm (31.8 x 19.4 x 12 in)
Weight	61.2 Kg / 135 lb.
Enclosure	IP65 / NEMA 3R
Ambient Temperature	-25~55°C, > 45°C Derating
Noise	< 30 dB @ 25°C (77°F)
Idle Consumption - No Load	90W
Communication and Monitoring	Wi-Fi & LAN Hardware Included
Standard Warranty	10 Years
Protection and Certifications	
Certifications and Listings	UL1741-2010/2018, IEEE1547a 2003/2014, FCC 15 Class B, UL1741SB, CA Rule 21, HECO Rule 14H
PV DC Disconnect Switch – NEC 240.15	Integrated
Ground Fault Detection – NEC 690.5	Integrated
PV Rapid Shutdown Control – NEC 690.12	Integrated
PV Arc Fault Detection – NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
AC Output Breaker - 200A	Integrated
Surge Protection	DC Type II / AC Type II

1. See Installation Guide for more details on sizing array strings. The highest input voltage is based on the open-circuit voltage of the array at the minimum design temperature.

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SYSTEM DC SIZE @ STC: 10.440 kW

DRAWN BY: M.P. REV: DATE: 05.29.2025

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Pytes

V5°α Plus



Features

- Remote Monitoring and Upgrading
- Higher Charge/Discharge Rate
- Wider Operation Temperature
- Higher Energy Density
- Greater scalability
- Tripple Safe Protections

Inverter Compatibility List

Main Inverter Partner



V5°α Plus Specifications



Electrical	
Nominal Voltage	51.2V
Voltage Range	47.5V~57.6V
Nominal Capacity	100Ah
Nominal Energy	5.12kWh
Recommended Charge/Discharge Current	75A
Max Continuous Charge/Discharge Current	100A
Peak Charge/Discharge Current	101A~120A(3min) ; 121A~200A(15sec)
Integrated Breaker	DC 125V/125A

General	
Power Terminal	Amphenol Surlok Plus 8.0mm
Chemistry	LFP
Communication Protocol	CAN / RS485
Dimensions (L x W x H)	19.05 x 22.76 x 5.51 inch (3.2U) / 484 x 578.2 x 140 mm (3.2U)
Weight	100 lbs / 45.34 kg
Operating Temperature	Charge:32°F~131°F/10°C~55°C Discharge:-4°F~131°F/-20°C~55°C
Round-Trip Efficiency	≥ 95%
Cycle Life	≥ 6000 Cycles
Warranty	10 Years

Add-on Functionalities	
WIFI Connection	Remote monitoring and upgrade
Heating Pad	Temperature Rise: 18°F/h/10°C/ h
Scalability	Operation Temperature: -0.4°F~50°F/-18°C~10°C 16 pcs (81.92kWh) in a group 6 groups (491.52kWh) in a system w / a Hub

Certifications (On-going)
UL9540 Ed.2 (2020), UL9540A, UL1973, CEC, SGIP, CE, IEC62619, UN38.3

Pytes

PYTES (USA) ENERGY, INC
Address: 13921 Senlac Dr, Farmer's Branch, TX 75234
Site: www.pytesusa.com
Email: pytesusa@pytesgroup.com



CONTRACTOR
ESSENTIAL SOLAR
ADDRESS: 2669 STATE HWY CC,
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(1) SOL-ARK 15K-2P-N

SYSTEM DC SIZE @ STC: 10.440 kW

DRAWN BY: M.P. REV: DATE: 05.29.2025

PAGE:
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Features



Safe & Reliable



Scalable for demand



Easy Installation



Modular & Elegant Design



Remote Monitoring and Upgrading



Outdoor & Indoor Installation

V-Box-OC Specs

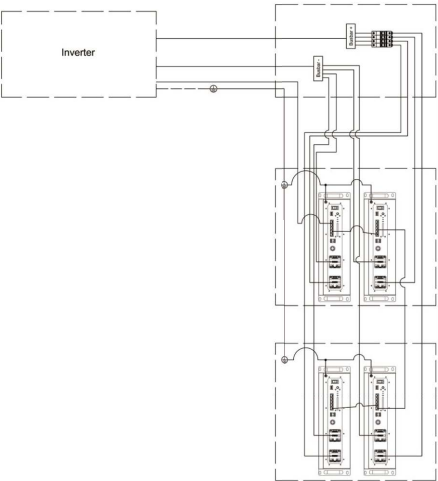
Mechanical

Load Capacity	4*V5°
Structure	Busbar & DC Circuit Breaker Integrated
Dimensions (L*W*H)	25.4*15.6*54.9 inch
Weight	194lbs
Mount	Floor Mount
Enclosure Rating	IP55
Enclosure Material	SGCC(Galvanized Steel)
Cooling	Natural Convection

3D image



Mechanical wiring



Installation Guide

Scan Me



Make
the Installation
Easier

Pytes

PYTES (USA) ENERGY, INC
Address: 920 S Holgate St, STE 106, Seattle, Washington, 98134 USA
Site: www.pytesusa.com
Email: pytesusa@pytesgroup.com



More Catalogs



LinkedIn



Facebook



YouTube



www.pytesusa.com
Pytes

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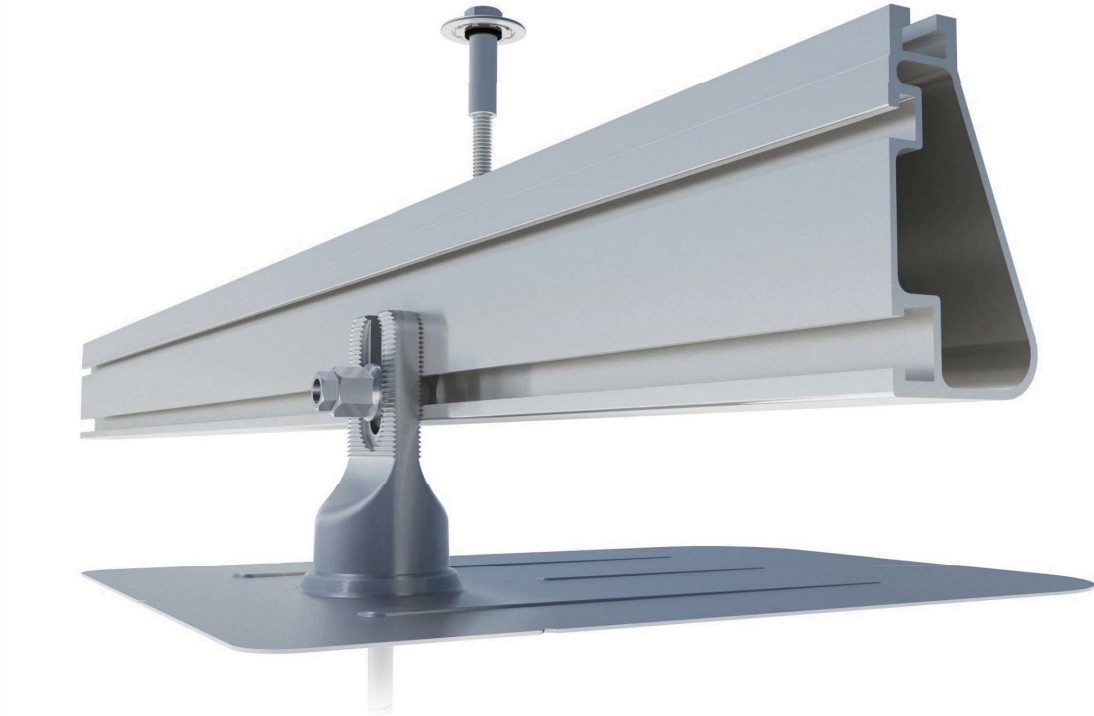
DRAWN BY:
M.P.

REV:

DATE:
05.29.2025

PAGE:

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Built for solar's toughest roofs.

IronRidge builds dependable systems for mounting solar on homes. XR Rail® components have been tested to the limit and proven to endure extreme environments, including Florida's high-velocity hurricane zones. Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully-certified, code-compliant and backed by a 25-year warranty.

- Strength Tested**
All components evaluated for superior structural performance.
- Class A Fire Rating**
Certified to maintain the fire resistance rating of the existing roof.
- UL 2703 Listed System**
Entire system and components meet newest effective UL 2703 standard.

- PE Certified**
Pre-stamped engineering letters available in most states.
- Design Assistant**
Online software makes it simple to create, share, and price projects.
- 25-Year Warranty**
Products guaranteed to be free of impairing defects.

XR Rails® ☺

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish

XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

BOSS® Bonded Splices



Bonded Structural Splices connect XR Rails together.

- Integrated bonding
- No tools or hardware
- Self-centering stop tab

Clamps & Grounding ☺

UFO®



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

CAMO



Bond modules to rails while staying completely hidden.

- Universal end-cam clamp
- Tool-less installation
- Fully assembled

Bonding Hardware



Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

Attachments ☺

HUG™ Halo UltraGrip™



Advanced flashing system adheres to top of shingles.

- Foam-backed mastic seal
- Multi-tiered waterproofing
- Rafter and deck options

FlashVue®



Flash, then mount rails with fast and nimble installation.

- Fits between roofing nails
- Easily align pilot holes
- 360° orientation

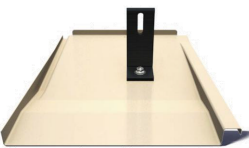
FlashFoot2®



Flash, then mount rails with our classic, robust design.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

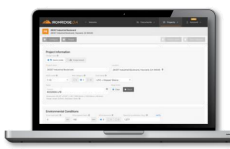
Knockout Tile



Replace tiles and ensure superior waterproofing.

- Flat, S, & W tile profiles
- Form-fit compression seal
- Other tile hooks available

Resources



Design Assistant
Go from rough layout to fully engineered system. For free.
[Go to IronRidge.com/design](https://ironridge.com/design)



Endorsed by FL Building Commission
Flush Mount is the first mounting system to receive Florida Product approval for 2017 Florida Building Code compliance.
[Learn More at bit.ly/floridacert](https://bit.ly/floridacert)



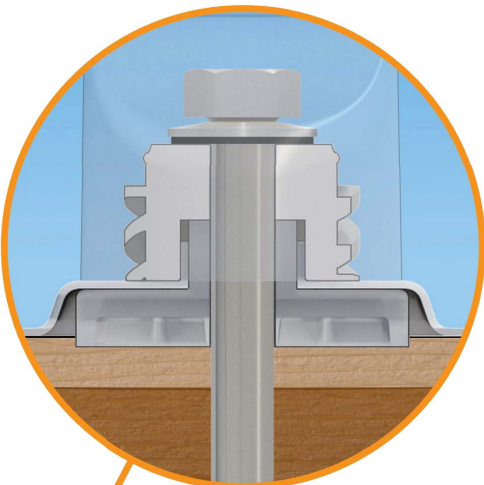
FlashFoot2®

The Strongest Attachment in Solar

IronRidge® FlashFoot2® raises the bar in solar roof protection. The unique water seal design is both elevated and encapsulated, delivering redundant layers of protection against water intrusion. In addition, the twist-on Cap perfectly aligns the rail attachment with the lag bolt to maximize mechanical strength.

Twist-On Cap

FlashFoot2®'s unique Cap design encapsulates the lag bolt and locks into place with a simple twist. The Cap helps FlashFoot2® deliver superior structural strength, by aligning the rail and lag bolt in a concentric load path.

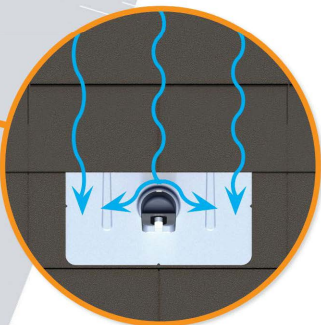


Three-Tier Water Seal

FlashFoot2®'s seal architecture utilizes three layers of protection. An elevated platform diverts water away, while a stack of rugged components raises the seal an entire inch. The seal is then fully-encapsulated by the Cap. FlashFoot2® is the first solar attachment to pass the TAS-100 Wind-Driven Rain Test.

Single Socket Size

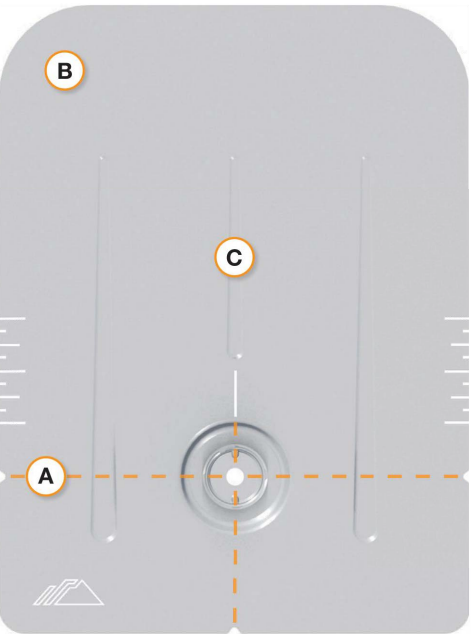
A custom-design lag bolt allows you to install FlashFoot2® with the same 7/16" socket size used on other Flush Mount System components.



Water-Shedding Design

An elevated platform diverts water away from the water seal.

Installation Features



A Alignment Markers

Quickly align the flashing with chalk lines to find pilot holes.

B Rounded Corners

Makes it easier to handle and insert under the roof shingles.

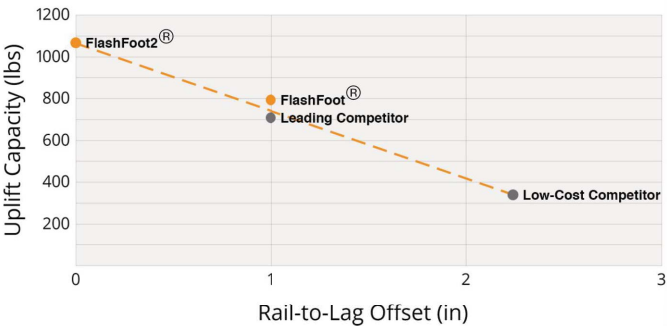
C Reinforcement Ribs

Help to stiffen the flashing and prevent any bending or crinkling during installation.

Benefits of Concentric Loading

Traditional solar attachments have a horizontal offset between the rail and lag bolt, which introduces leverage on the lag bolt and decreases uplift capacity.

FlashFoot2® is the only product to align the rail and lag bolt. This concentric loading design results in a stronger attachment for the system.



Testing & Certification

Structural Certification

Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings

Water Sealing Tested to UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind Driven Rain Test" by Intertek. Ratings applicable for composition shingle roofs having slopes between 2:12 and 12:12.

UL 2703

Conforms to UL 2703 Mechanical and Bonding Requirements. See Flush Mount Install Manual for full ratings.

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ESSENTIAL SOLAR
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MARSHFIELD, MO 65706,
PHONE: 417-590-7543
CONTRACTOR #:



NEMERO RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR AND ENERGY STORAGE INSTALLATION
2071 NW O'BRIEN RD, LEE'S SUMMIT, MO 64081
APN: 62210120600000000

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 15.000 kW
(29) AIONRISE AION66G1-360
(1) SOL-ARK 15K-2P-N

SYSTEM DC SIZE @ STC: 10.440 kW

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UFO® Family of Components

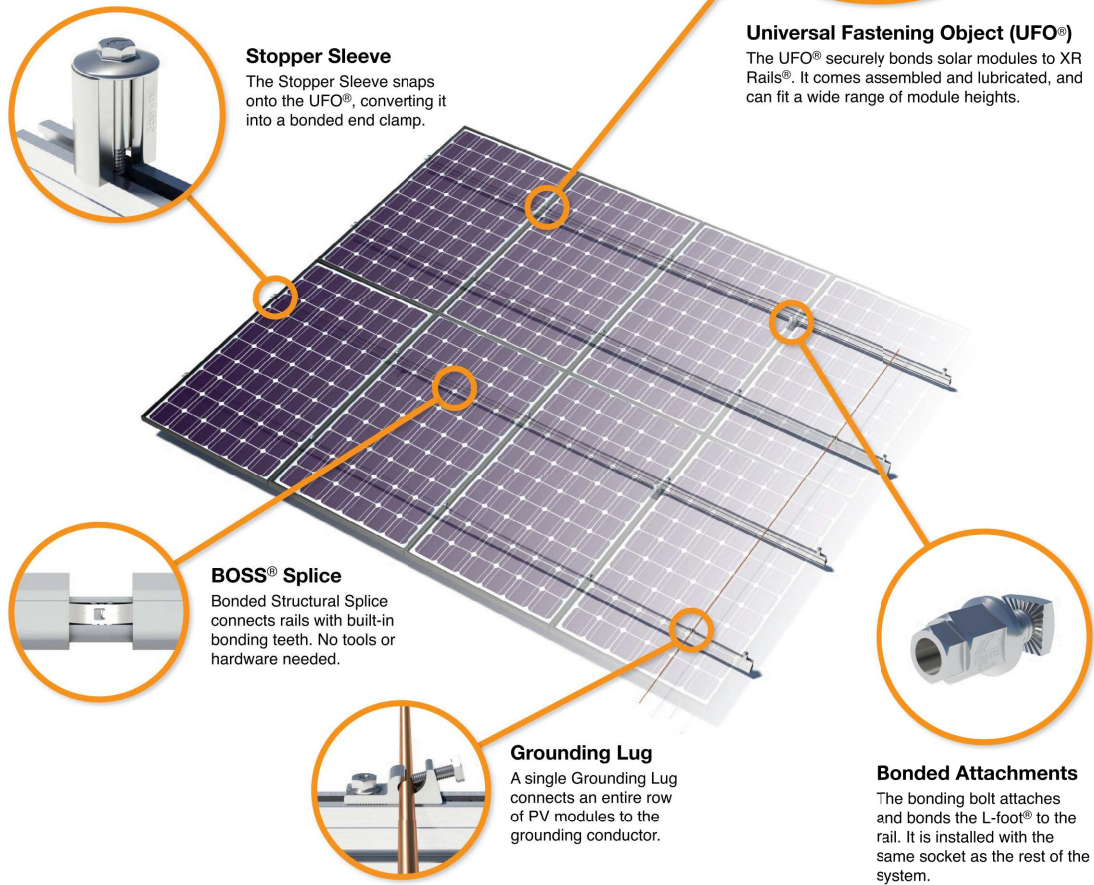
Tech Brief

Simplified Grounding for Every Application

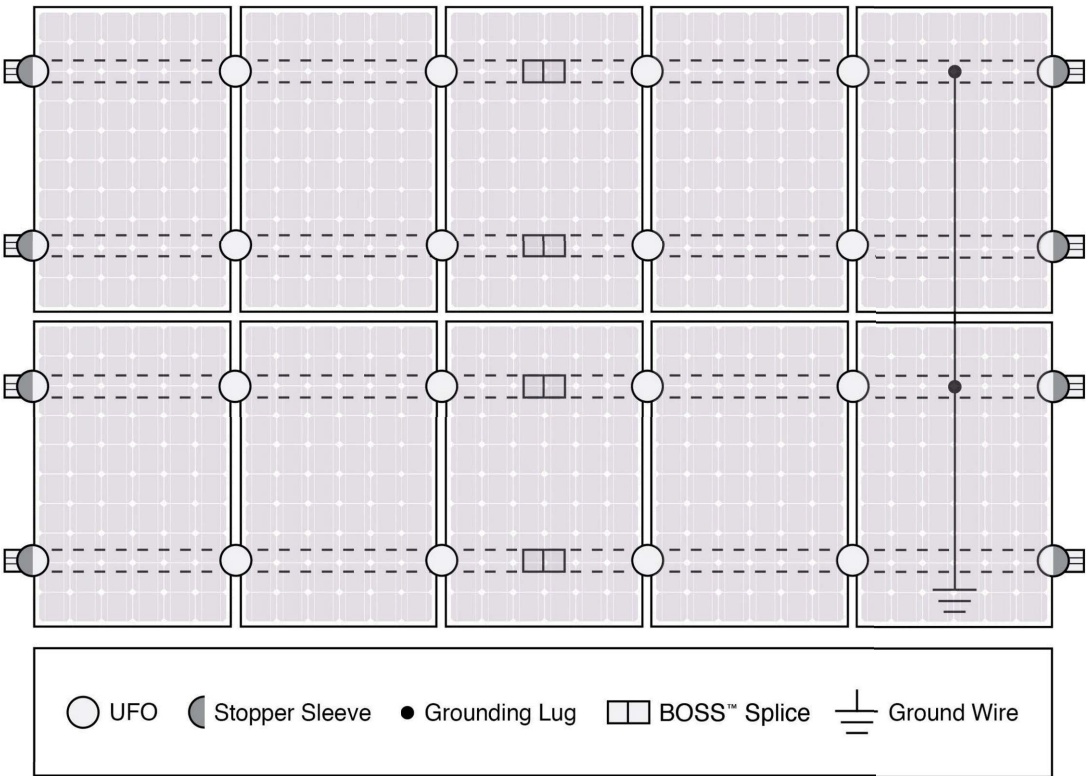
The UFO® family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge® XR Rails®. All system types that feature the UFO® family—Flush Mount®, Tilt Mount® and Ground Mount®—are fully listed to the UL 2703 standard.

UFO® hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.

Only for installation and use with IronRidge products in accord with written instructions. See IronRidge.com/UFO



System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge® Flush Mount®, Tilt Mount®, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

Go to [IronRidge.com/UFO](https://www.ironridge.com/UFO)

Cross-System Compatibility

Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails®	✓	✓	XR100 & XR1000
UFO®/Stopper	✓	✓	✓
BOSS® Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Compatible with most MLPE manufacturers. Refer to system installation manual.		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules. Refer to installation manuals for a detailed list.		

Tech Brief

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Tech Brief

Class A Fire Rating

Background

All roofing products are tested and classified for their ability to resist fire.

Recently, these fire resistance standards were expanded to include solar equipment as part of the roof system. Specifically, this requires the modules, mounting hardware and roof covering to be tested together as a system to ensure they achieve the same fire rating as the original roof covering.



These new requirements are being adopted throughout the country in 2016.

IronRidge Certification

IronRidge was the first company to receive a Class A Fire Rating—the highest possible rating—from Intertek Group plc., a Nationally Recognized Testing Laboratory.

IronRidge Flush Mount and Tilt Mount Systems were tested on sloped and flat roofs in accordance with the new UL 1703 & UL 2703 test standards. The testing evaluated the system's ability to resist flame spread, burning material and structural damage to the roof.

Refer to the table below to determine the requirements for achieving a Class A Fire Rating on your next project.

System	Roof Slope	Module	Fire Rating*
Flush Mount 	Any Slope	Type 1, 2, & 3	Class A
Tilt Mount 	≤ 9.5 Degrees	Type 1, 2, & 3	Class A

*Class A rated PV systems can be installed on Class A, B, and C roofs.

Fire Testing Process

Test Setup

Solar Modules

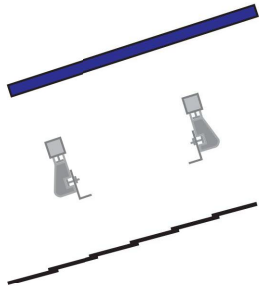
Solar modules are given a Type classification based on their materials and construction.

Mounting System

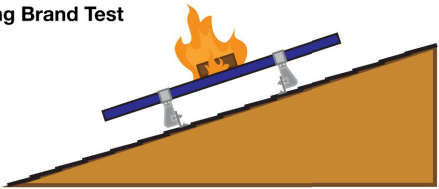
Mounting is tested as part of a system that includes type-tested modules and fire-rated roof covering.

Roof Covering

Roof covering products are given a Fire Class Rating of A, B or C based on their tested fire resistance.

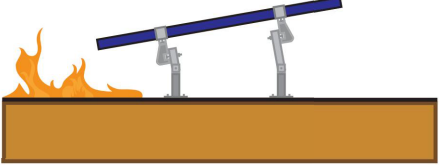


Burning Brand Test



A burning wooden block is placed on module as a fan blows at 12 mph. Flame cannot be seen on underside of roof within 90 minutes.

Spread of Flame Test



Flame at southern edge of roof is aimed up the roof as a fan blows at 12 mph. The flame cannot spread 6 feet or more in 10 minutes.

Frequently Asked Questions

What is a “module type”?

The new UL1703 standard introduces the concept of a PV module type, based on 4 construction parameters and 2 fire performance parameters. The purpose of this classification is to certify mounting systems without needing to test it with every module.

What roofing materials are covered?

All fire rated roofing materials are covered within this certification including composition shingle, clay and cement tile, metal, and membrane roofs.

What if I have a Class C roof, but the jurisdiction now requires Class A or B?

Generally, older roofs will typically be “grandfathered in”, and will not require re-roofing. However, if 50% or more of the roofing material is replaced for the solar installation the code requirement will be enforced.

Where is the new fire rating requirement code listed?

2012 IBC: 1509.7.2 Fire classification. Rooftop mounted photovoltaic systems shall have the same fire classification as the roof assembly required by Section 1505.

Where is a Class A Fire Rating required?

The general requirement for roofing systems in the IBC refers to a Class C fire rating. Class A or B is required for areas such as Wildland Urban Interface areas (WUI) and for very high fire severity areas. Many of these areas are found throughout the western United States. California has the most Class A and B roof fire rating requirements, due to wild fire concerns.

Are standard mid clamps covered?

Mid clamps and end clamps are considered part of the PV “system”, and are covered in the certification.

What attachments and flashings are deemed compatible with Class A?

Attachments and their respective flashings are not constituents of the rating at this time. All code-compliant flashing methods are acceptable from a fire rating standpoint.

What mounting height is acceptable?

UL fire testing was performed with a gap of 5”, which is considered worst case in the standard. Therefore, the rating is applicable to any module to roof gap.

Am I required to install skirting to meet the fire code?

No, IronRidge achieved a Class A fire rating without any additional racking components.

What determines Fire Classification?

Fire Classification refers to a fire-resistance rating system for roof covering materials based on their ability to withstand fire exposure.

Class A - effective against severe fire exposure
Class B - effective against moderate fire exposure
Class C - effective against light fire exposure

What if the roof covering is not Class A rated?

The IronRidge Class A rating will not diminish the fire rating of the roof, whether Class A, B, or C.

What tilts is the tilt mount system fire rated for?

The tilt mount system is rated for 1 degrees and up and any roof to module gap, or mounting height.

More Resources



Installation Manuals

Visit our website for manuals that include UL 2703 Listing and Fire Rating Classification.

[Go to IronRidge.com](#)



Engineering Certification Letters

We offer complete engineering resources and pre-stamped certification letters.

[Go to IronRidge.com](#)

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