

GENERAL NOTES

1. ALL ELECTRICAL MATERIALS SHALL BE NEW AND LISTED BY RECOGNIZED ELECTRICAL TESTING LABORATORY

CUSTOM MADE EQUIPMENT SHALL HAVE COMPLETE TEST DATA SUBMITTED BY THE MANUFACTURER ATTESTING TO ITS SAFETY

2. OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED OR BETTER

3. ALL METALLIC EQUIPMENT SHALL BE GROUNDED

4. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO INSTALLATION AND SHALL COORDINATE ALL INSPECTIONS, TESTING COMMISSIONING AND ACCEPTANCE WITH THE CLIENT, UTILITY CO. AND CITY INSPECTORS AS NEEDED.

5. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS OF SERVICE POINTS AND SERVICE SIZES WITH THE SERVING UTILITY COMPANY AND COMPLY WITH ALL UTILITY COMPANIES REQUIREMENTS.

6. DRAWINGS ARE DIAGRAMMATIC ONLY, ROUTING OF RACEWAYS SHALL BE OPTION OF THE CONTRACTOR UNLESS OTHERWISE NOTED AND SHALL BE COORDINATED WITH OTHER TRADES.

7. IF THE ROOF MATERIAL OR ROOF STRUCTURE NOT ADEQUATE FOR PV INSTALLATION, CALL ENGINEER PRIOR TO INSTALL. THE CONTRACTOR IS RESPONSIBLE TO VERIFY THAT THE ROOF IS CAPABLE OF WITHSTANDING THE EXTRA WEIGHT.

8. IF THE DISTANCES FOR CABLE RUNS ARE DIFFERENT THAN SHOWN, THE CONTRACTOR SHALL NOTIFY THE ELECTRICAL ENGINEER TO VALIDATE THE WIRE SIZE. FINAL DRAWINGS WILL BE RED-LINED AND UPDATED AS APPROPRIATE.

9. WHENEVER A DISCREPANCY IN 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 ARCHITECT/ENGINEERS.

10. ALL BROCHURES, OPERATION MANUALS, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE HANDED OVER TO OWNER'S REPRESENTATIVE AT THE COMPLETION OF WORK

PHOTOVOLTAIC NOTES:

1. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED AND IDENTIFIED BY RECOGNIZED ELECTRICAL TESTING LABORATORY

2. SOLAR SYSTEM SHALL NOT COVER ANY PLUMBING OR MECHANICAL VENTS

3. MODULES AND SUPPORT STRUCTURES SHALL BE GROUNDED.

4. SOLAR INVERTER SHALL BE LISTED TO UL1741.

5. 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.

6. ALL PV MODULES AND ASSOCIATED EQUIPMENT AND WIRING SHALL BE PROTECTED FROM PHYSICAL DAMAGE.

7. LIVE PARTS OF PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS OVER 150V TO GROUND SHALL NOT BE ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS WHILE ENERGIZED.

8. INVERTER IS EQUIPED WITH INTEGRATED GFDI, THUS PROVIDING GROUND FAULT PROTECTION

9. ALL CONDUCTORS SHALL BE COPPER AND 90 DEG RATED

10. ALL ELECTRICAL EQUIPMENT SHALL BE LISTED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY.

11. A SINGLE CONDUCTOR SHALL BE PERMITTED TO BE USED TO PERFORM THE MULTIPLE FUNCTIONS OF DC GROUNDING, AC GROUNDING AND BONDING BETWEEN AC AND DC SYSTEMS.

12. NON-CURRENT CARRYING METAL PARTS OF EQUIPMENT SHALL BE EFFECTIVELY BONDED TOGETHER. BOND BOTH ENDS OF RACEWAYS.

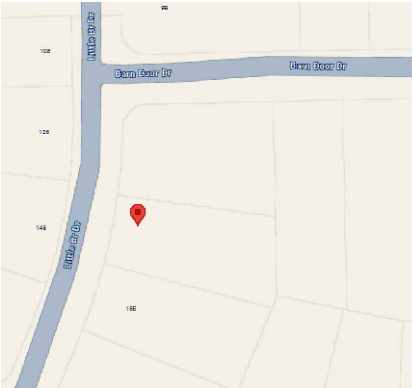
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MAIN

THE INSTALLATION OF SOLAR ARRAYS AND PHOTOVOLTAIC POWER SYSTEMS SHALL COMPLY WITH THE FOLLOWING CODES:

- 2020 NATIONAL ELECTRICAL CODE
- 2018 NORTH CAROLINA STATE BUILDING CODE: RESIDENTIAL
- 2018 NORTH CAROLINA STATE BUILDING CODE: BUILDING
- 2018 NORTH CAROLINA STATE BUILDING CODE: FIRE

AS ADOPTED BY THE STATE OF NORTH CAROLINA
ALL OTHER ORDINANCE ADOPTED BY THE
LOCAL GOVERNING AGENCIES



VICINITY MAP
SCALE: NTS



SATELLITE VIEW
SCALE: NTS

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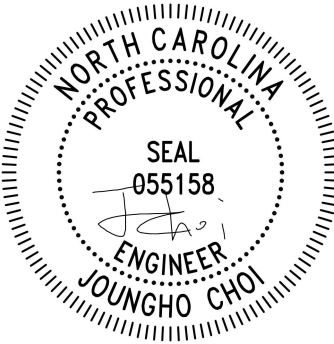
PV SOLAR SYSTEM DETAILS

SYSTEM SIZE: DC STC: 5.520 KW
SYSTEM SIZE: AC CEC: 11.500 KW
SOLAR MODULES: (12) Aptos Solar 460 WATT
SOLAR SHITDOWNS: (4) MCI-2 Solar Shutdowns
TESLA BACKUP SWITCH
INVERTER/BATTERY: (1) POWERWALL 3 #1707000-xx-y

ELECTRICAL INFORMATION:
EXISTING
MAIN SERVICE PANEL BUS SIZE: 200A
MAIN SERVICE BREAKER SIZE: 200A
MOUNTING SYSTEM: IRONRIDGE XR-100

BUILDING INFORMATION:
CONSTRUCTION TYPE: V-B
OCCUPANCY: R3
ROOF: COMP. SHINGLE

Project Name:
Joshua Newnam
Property address:
**141 Little Br Dr, Lillington,
NC 27546**



Wiring Solutions Plus LLC

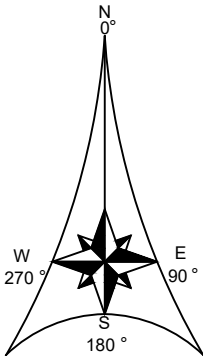
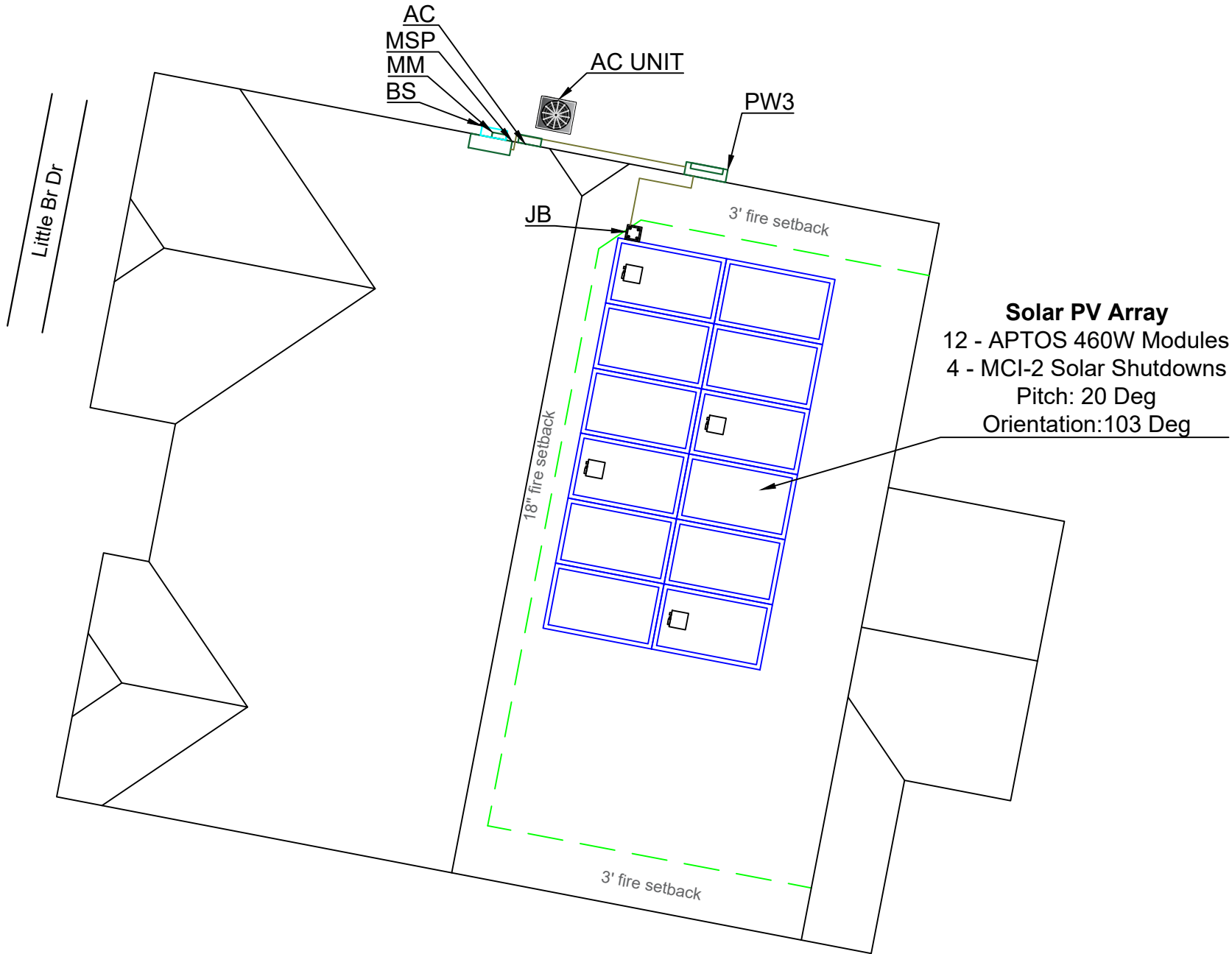
Address:
4724 Hargrove Rd, Raleigh, NC 27616
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License Number:
25181-L



Date: 09/05/2025

INDEX	
MM	(E) Main Meter
MSP	(E) Main Service Panel
BS	(N) Backup Switch
AC	(N) AC Disconnect
PW3	(N) Powerwall 3
	(N) Solar Shutdowns
	(N) Solar Modules
	EMT Conduit
	Setback

Total Roof Area: 2275
 Total Module Area: 280
 12.31% of Coverage



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

1 ROOF PLAN

Project Name:
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#	ITEM	DESCRIPTION	QTY
1	PV MODULE	APTOS SOLAR 460WATT DNA-120-MF10-460W Voc = 41.97V, Vmp = 35.36V Isc = 13.75A, Imp = 13.00A	12
2	INVERTER	TESLA POWERWALL 3 / 11.5KW MODEL #1707000-xx-y MAX. CONTINUOUS CURRENT - 48A PV DC INPUT VOLTAGE RANGE 60-550V DC PV DC MPPT VOLTAGE RANGE 150.480V DC SOLAR HOME/GRID EFFICIENCY 97.5%	1
2	BATTERY	TESLA POWERWALL 3 MODEL #: 1707000-xx-y NOMINAL BATTERY ENERGY - 13.5KWH	1
3	SOLAR SHUTDOWNS	MCI-2 SOLAR SHUTDOWNS MAX. INPUT DC CURRENT - 13A MAX. INPUT SHORT CIRCUIT CURRENT - 17A MAX. SYSTEM VOLTAGE - 1000V DC MAX. DISCONNECT VOLTAGE - 165V DC	4
4	JUNCTION BOX	4"x4"x2" UL LISTED WATER TIGHT NEMA TYPE 3	1
5	MAIN SERVICE PANEL	EXISTING MAIN SERVICE PANEL 200A BUSBAR & 200A BREAKER	1
6	MAIN METER	UTILITY METER	1
7	BACKUP SWITCH	(N)200A TESLA BACKUP SWITCH MODEL #1624171-xx-y, 120/240V	1
8	AC DISCONNECT	(N)NON FUSED 60 AMP 240VAC HP15 DISCONNECT	1

SYSTEM SIZE: DC STC: 5.520 KW
SYSTEM SIZE: AC CEC: 11.500 KW

PCS Controller Current Setting: **32A**

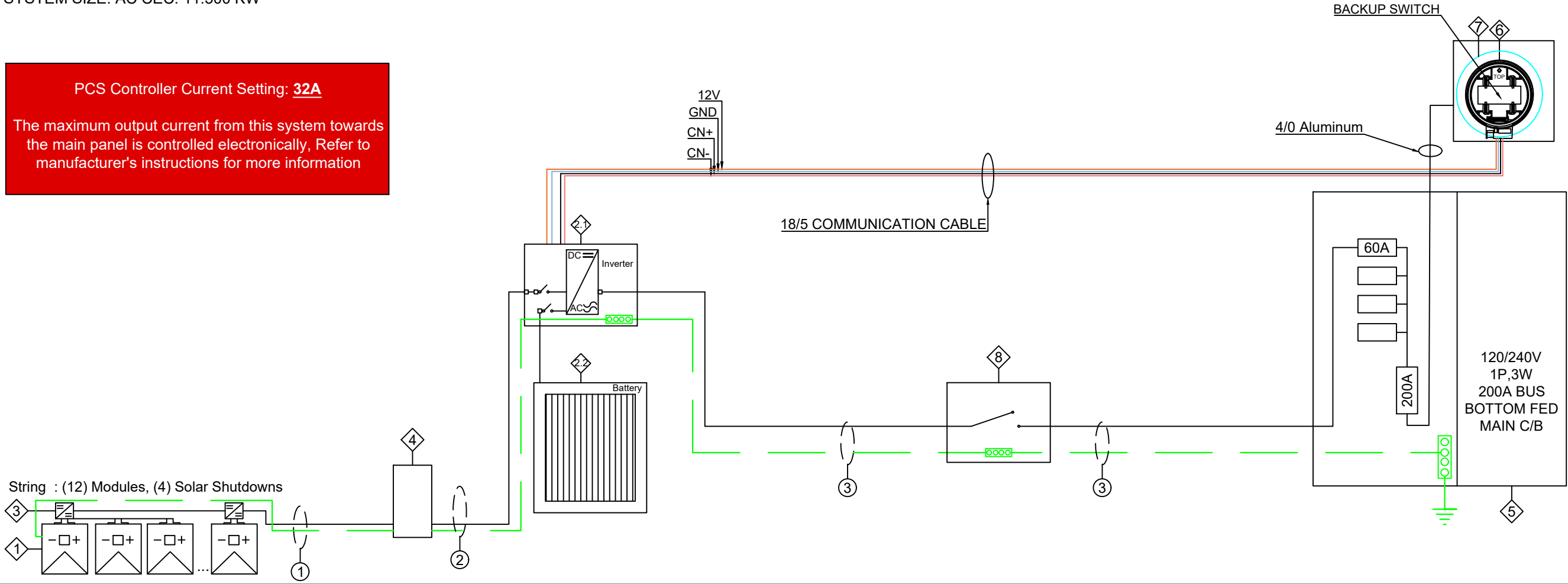
The maximum output current from this system towards the main panel is controlled electronically, Refer to manufacturer's instructions for more information

WIRE CHART						
#	CONTINUES CURRENT x NECMULT x COMBINED STRING =DESIGN AMPS	BREAKER SIZE (A)	WIRE TYPE	EGC	WIRE RATING X TEMP DERATE X CONDUCTOR DERATE = ERATED WIRE	CONDUIT SIZE
1	13.75 X 1.25 = 17.18A	20	(2) #10 AWG, PV WIRE	(1) #6 BARE SOLID COPPER GEC	40 X .71 X 1 = 28.4 >= 17.18	IN FREE AIR
2	13.75 X 1.25 = 17.18 A	20	(2) #10 AWG, CU-THWN-2	(1) #10 AWG CU-THWN-2 EGC	40 X .71 X 1 = 28.4 >= 17.18	3/4" EMT
3	48 X 1.25 = 60 A	60	(3) #6 AWG, CU-THWN-2	(1) #10 AWG CU-THWN-2 EGC	75 X .91 X 1 = 68.25 >= 60	3/4" EMT

600V CALCULATION		
MAX NUMBER MODULES PER STRING:	12	
Voc:	41.97	V
CORRECTION FACTOR:	1.12	
MAX SYSTEM VOLTAGE	12 x 41.97 x 1.12	= 564.07V

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
.80	4-6
.70	7-9
.50	10-20

All DC Connectors to modules or inverters must be of matching manufacture brand and style. Do not use 'compatible' connectors which have not been UL listed for compatibility. Performance and fire damage may result from mismatched connector usage.



2 SINGLE LINE DIAGRAM

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Date: 09/05/2025

1

! WARNING

SOURCES: UTILITY GRID AND
PV SOLAR ELECTRICAL SYSTEM

2

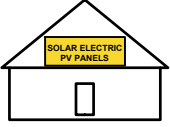
PHOTOVOLTAIC AC DISCONNECT

RATED OUTPUT CURRENT:
NOMINAL OPERATING VOLTAGE:

3

**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

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



4

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

5

PV SOLAR BREAKER
DO NOT RELOCATE
THIS OVERCURRENT
DEVICE

6

! WARNING

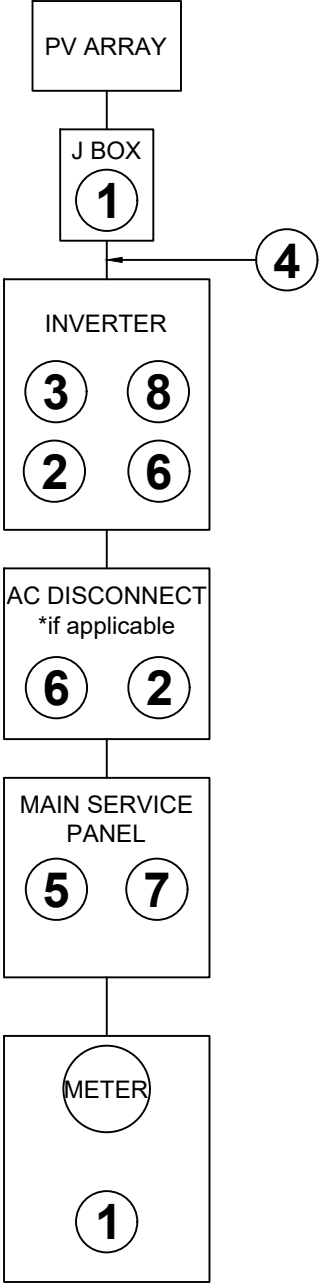
TERMINALS ON THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

7

WARNING!
INVERTER OUTPUT CONNECTION. DO NOT
RELOCATE THIS OVERCURRENT DEVICE

8

MAXIMUM VOLTAGE: V
MAXIMUM CIRCUIT CURRENT: A
MAX RATED OUTPUT CURRENT OF
THE CHARGE CONTROLLER OR
DC-TO-DC CONVERTER
(IF INSTALLED): A



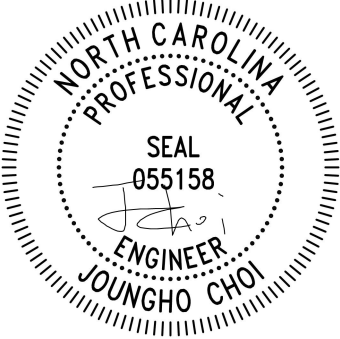
MARKINGS, LABELS AND WIRING SIGNS

- A. Purpose: Provide emergency responders with appropriate warning and guidance with respect to isolating solar electric system.
This can facilitate identifying energized electrical lines that connect solar panels to the inverter, as these should not be cut when venting for smoke removal
- B. Main Service Disconnect.
1. Residential buildings - The marking main be placed within the main service disconnect. The marking shall be placed outside cover if the main service disconnect is operable with the service panel closed.
2. Commercial buildings - Tha marking shall be placed adjacent to the main service disconnect clearly visible from the location where the level is operated
3. Markings: Verbiage, Format and Type of Material.
- a. Verbiage: CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED
- b. Format: White lettering on a red background. Minimum 3/8 inches letter height. All letters shall be capitalized. Arial or similar font, non bold.
- c. Material: Reflective, weather resistant material suitable for the environment (use UL - 969 as standard for weather rating). Durable adhesive materials meet this requirement.
- C. Marking Requirements on DC conduit, raceways, enclosures, cable assemblies, DC combiners and junction boxes:
1. Markings: Verbiage, Format and Type of Material.
- a. Placement : Markings shall be placed every 10 feet on all interior and exterior DC conduits, raceways, enclosures, and cable assemblies,
- at turns, above and for below penetrations, all DC combiners and junction boxes
- b. Verbiage: CAUTION: SOLAR CIRCUIT Note: The format and type of material shall adhere to "V. V-3b, c" of this requirement.
- c. Inverters are not required to have caution markings
1. Marking is required on all interior and exterior DC conduit raceways, enclosures, cable assemblies, and junction boxes, combiner boxes and disconnects.
2. The materials used for marking shall be reflective, weather resistant material suitable for the environment.
- Minimum 3/8 "letter height; all upper case letters Arial or similar font; Red background with white lettering.
3. Marking shall contain the words: **WARNING : PHOTOVOLTAIC POWER SOURCE.**
4. Marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated

3

SIGNAGE

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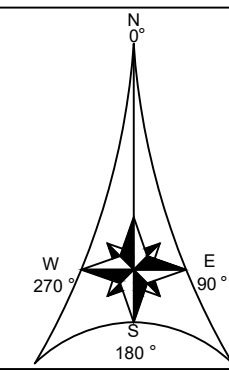


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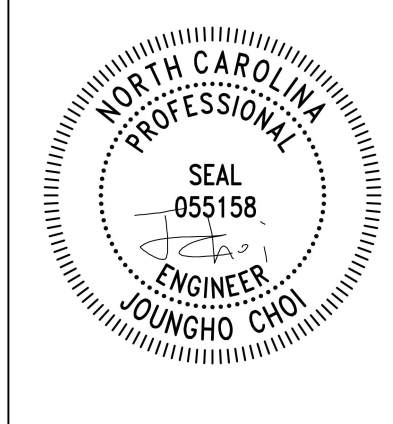


SCALE: 1/16" = 1'-0"

4

SITE PLAN

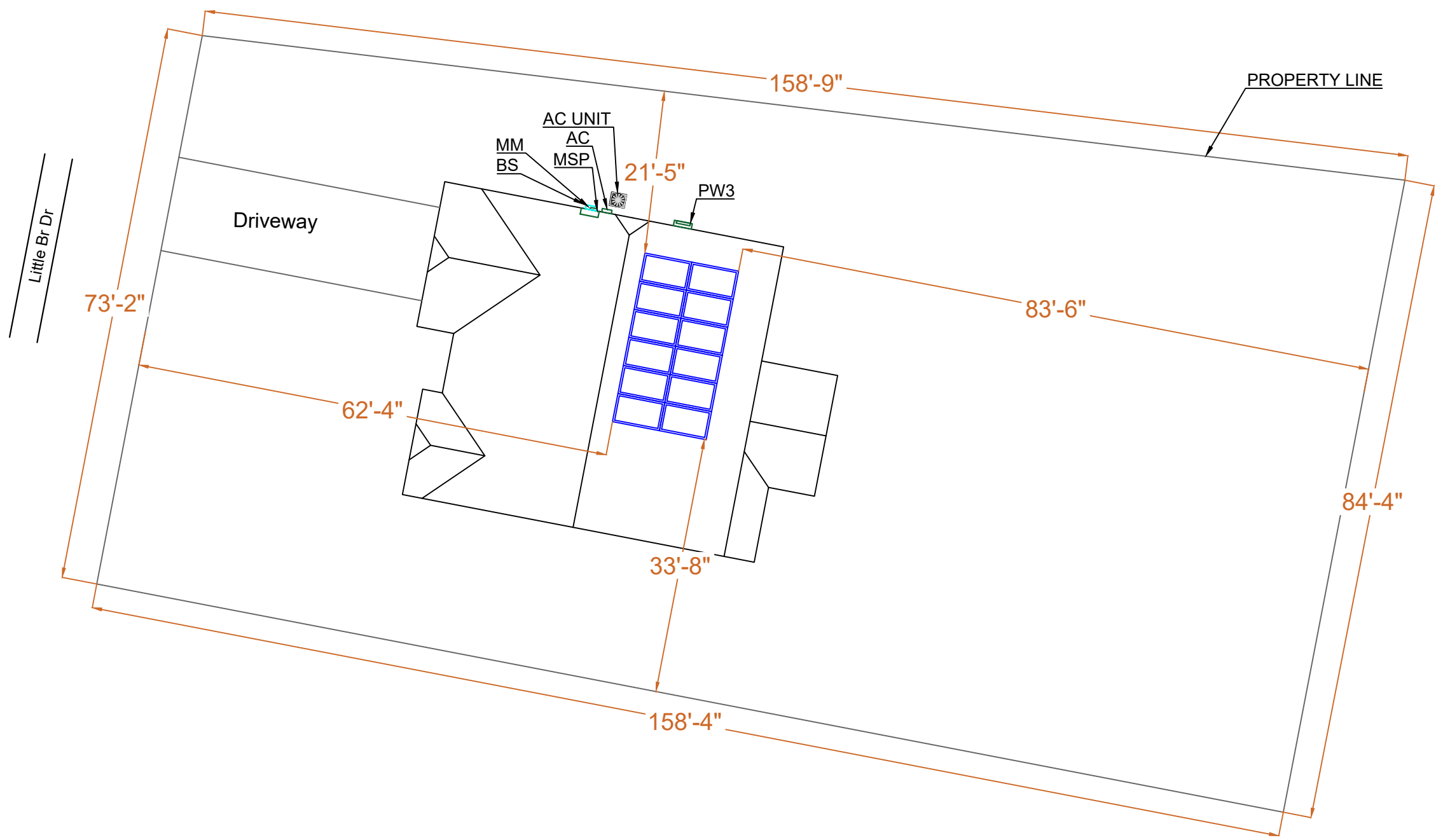
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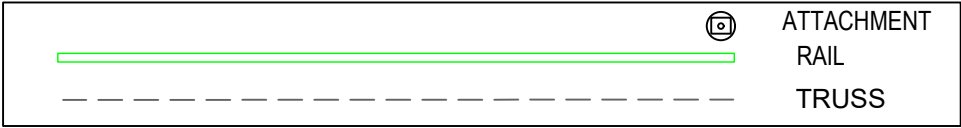
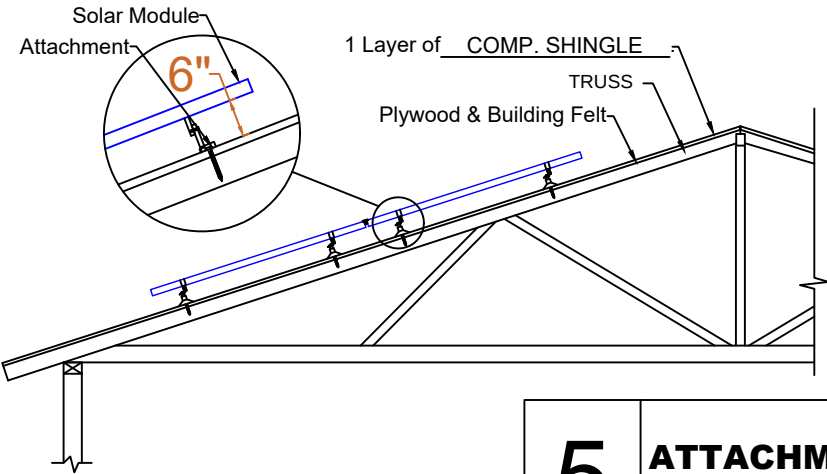


Date: 09/05/2025



MODULE WEIGHT (lbs)	52.9
# OF MODULES	12
TOTAL MODULE WEIGHT (lbs)	634.8
RACK WEIGHT (lbs)	126.96
SOLAR SHUTDOWNS WEIGHT (lbs)	3.12
TOTAL SYSTEM WEIGHT (lbs)	764.88
# OF STANDOFFS	26
MAX SPAN BETWEEN STANDOFFS (in)	48
LOADING PER STANDOFF (lbs)	29.41
TOTAL AREA (sq.ft.)	280
LOADING (PSF)	2.91

1. Ironridge XR-10 Racking System (XR-10-168A)
2. Ironridge Halo Ultra Grip Attachment (QM-HUG-01-M1)
3. Roof attachment hardware to be mounted to existing structure with 48" O.C.rail spans less.
4. Roof sheathed with 1/2" plywood and upper surface is faced with felt paper. Finished roof surface is One layer of COMP. SHINGLE .

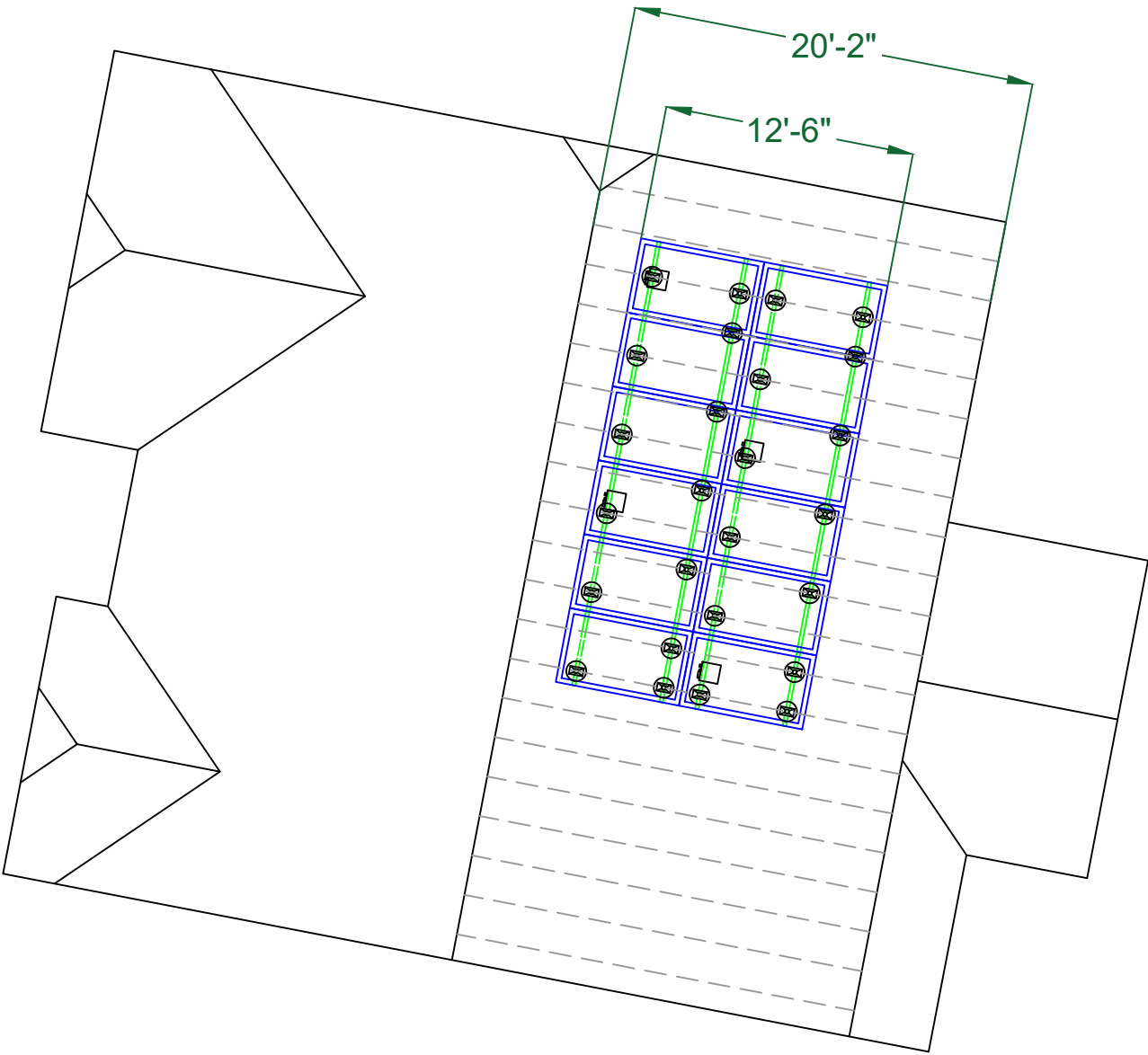
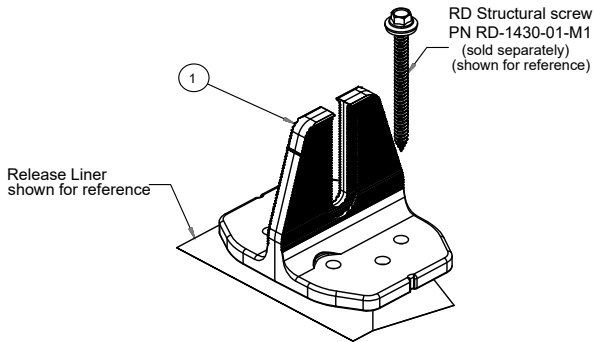
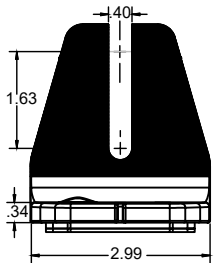
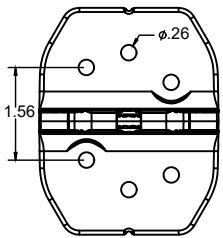
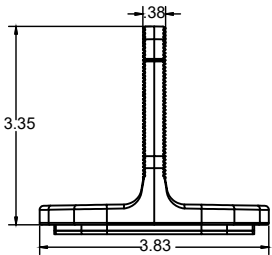


QUICKMOUNT® HALO ULTRAGRIP

ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

PART NUMBER	DESCRIPTION	Property	Value
QM-HUG-01-M1	Halo UltraGrip - Mill	Material	3000 Series Aluminium
QM-HUG-01-B1	Halo UltraGrip - Black	Finish	Mill or Black

1. Halo UltraGrip



5 ATTACHMENT LAYOUT

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Powerwall 3

Power Everything

Powerwall 3 is a fully integrated solar and battery system, designed to accelerate the transition to sustainable energy. Customers can receive whole home backup, cost savings, and energy independence by producing and consuming their own energy while participating in grid services. Once installed, customers can manage their system using the Tesla App to customize system behavior to meet their energy goals.

Powerwall 3 achieves this by supporting up to 20 kW DC of solar and providing up to 11.5 kW AC of continuous power per unit. It has the ability to start heavy loads rated up to 185 LRA, meaning a single unit can support the power needs of most homes. Powerwall 3 Expansions make it easier and more affordable to scale up customers' systems to meet their current or future needs. Powerwall 3 is designed for fast and efficient installations, modular system expansion, and simple connection to any electrical service.



Powerwall 3 Technical Specifications

System Technical Specifications	Model Number	1707000-xx-y			
	Nominal Grid Voltage (Input & Output)	120/240 VAC			
	Grid Type	Split phase			
	Frequency	60 Hz			
	Nominal Battery Energy	13.5 kWh AC ¹			
	Nominal Output Power (AC)	5.8 kW	7.6 kW	10 kW	11.5 kW
	Maximum Apparent Power	5,800 VA	7,600 VA	10,000 VA	11,500 VA
	Maximum Continuous Current	24 A	31.7 A	41.7 A	48 A
	Overcurrent Protection Device ²	30 A	40 A	60 A	60 A
	Configurable Maximum Continuous Discharge Power Off-Grid (PV Only, -20°C to 25°C)	15.4 kW ³			
	Maximum Continuous Charge Current / Power (Powerwall 3 only)	20.8 A AC / 5 kW			
	Maximum Continuous Charge Current / Power (Powerwall 3 with up to (3) Expansion units)	33.3 A AC / 8 kW			
	Output Power Factor Rating	0 - 1 (Grid Code configurable)			
	Maximum Output Fault Current (1 s)	160 A			
	Maximum Short-Circuit Current Rating	10 kA			
	Load Start Capability	185 LRA			
	Solar to Battery to Home/Grid Efficiency	89% ^{1,4}			
	Solar to Home/Grid Efficiency	97.5% ⁵			
	Power Scalability	Up to 4 Powerwall 3 units supported			
	Energy Scalability	Up to 3 Expansion units (for a maximum total of 7 units)			
	Supported Islanding Devices	Gateway 3, Backup Switch, Backup Gateway 2			
	Connectivity	Wi-Fi (2.4 and 5 GHz), Ethernet, Cellular (LTE/4G ⁶)			
	Hardware Interface	Dry contact relay, Rapid Shutdown (RSD) certified switch and 2-pin connector, RS-485 for meters			
	AC Metering	Revenue Grade (+/- 0.5%, ANSI C12.20)			
	Protections	Integrated arc fault circuit interrupter (AFCI), Isolation Monitor Interrupter (IMI), PV Rapid Shutdown (RSD) using Tesla Mid-Circuit Interrupters			
	Customer Interface	Tesla Mobile App			
	Warranty	10 years			

¹Values provided for 25°C (77°F), at beginning of life. 3.3 kW charge/discharge power.
²See [Powerwall 3 Installation Manual](#) for fuse requirements if using fuse for overcurrent protection.
³If enabling the 15.4 kW off-grid maximum continuous discharge power, Powerwall 3 must be installed with an 80 A breaker and appropriately sized conductors.
⁴Typical solar shifting use case.
⁵Tested using CEO weighted efficiency methodology.
⁶The customer is expected to provide Internet connectivity for Powerwall 3; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

Powerwall 3 Technical Specifications

Solar Technical Specifications	Maximum Solar STC Input	20 kW
	Withstand Voltage	600 V DC
	PV DC Input Voltage Range	60 — 550 V DC
	PV DC MPPT Voltage Range	60 — 480 V DC
	MPPTs	6
	Maximum Current per MPPT (I _{mp})	13 A ⁷
	Maximum Short Circuit Current per MPPT (I _{sc})	15 A ⁷
⁷ Where the DC input current exceeds the MPPT rating, a jumper can be used to combine two MPPTs into a single input to intake DC current up to 26 A I _{sc} / 30 A I _{sc} .		

Environmental Specifications	Operating Temperature	-20°C to 50°C (-4°F to 122°F) ⁸
	Operating Humidity (RH)	Up to 100%, condensing
	Storage Temperature	-20°C to 30°C (-4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial
	Maximum Elevation	3000 m (9843 ft)
	Environment	Indoor and outdoor rated
	Enclosure Rating	NEMA 3R
	Ingress Rating	IP67 (Battery & Power Electronics) IP55 (Wiring Compartment)
	Pollution Rating	PD3
	Operating Noise @ 1 m	< 50 db(A) typical < 62 db(A) maximum
	⁸ Performance may be de-rated at operating temperatures above 40°C (104°F).	

Compliance Information	Certifications	UL 1741, UL 9540, UL 9540A, UL 3741, UL 1741 PCS, UL 1741 SA, UL 1741 SB, UL 1973, UL 1699B, UL 1998, CSA C22.2 No. 0.8, CSA C22.2 No. 107.1, CSA C22.2 No. 330, CSA 22.3 No. 9, IEEE 1547, IEEE 1547A, IEEE 1547.1, CA Rule No.21
	Grid Connection	United States and Canada
	Emissions	FCC Part 15 Class B, ICES 003
	Environmental	RoHS Directive 2011/65/EU
	Seismic	AC156, IEEE 693-2005 (high)
	Fire Testing	Meets the unit level performance criteria of UL 9540A

6 POWERWALL 3 DATA SHEET

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DNA™ 120-Monofacial

Solar for Innovators

DNA™ 120 Monofacial

DNA-120-MF10-460W

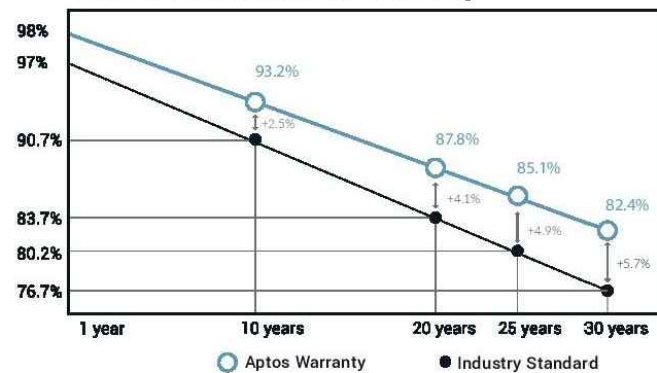
Residential | Commercial

Our DNA Split Cell Series uses advanced selective emitter PERC technology with thin film layers to improve heat tolerance, maximize energy harvest, minimize resistive loss, and use 5% more of the available active area for optimal power performance.

Industry Leading 30 Years Product and Performance Warranty

445W | 450W | 455W | 460W

Linear Performance Warranty



Key Features



Advanced Technology
Patented DNA™ technology boosts power performance & module efficiency.



Miami-Dade Approved
Maximum Durability: LEVEL 6 SALT MIST Tested, 5400 Pa Wind Load Certified Panels



Bankable Investment
Comprehensive warranty that covers both **30-year product** and **30-year power** performance.



Awards

Winners of the Leadership in Solar Energy award for three consecutive years and listed as one of the Top Solar Products from 2021-2022.

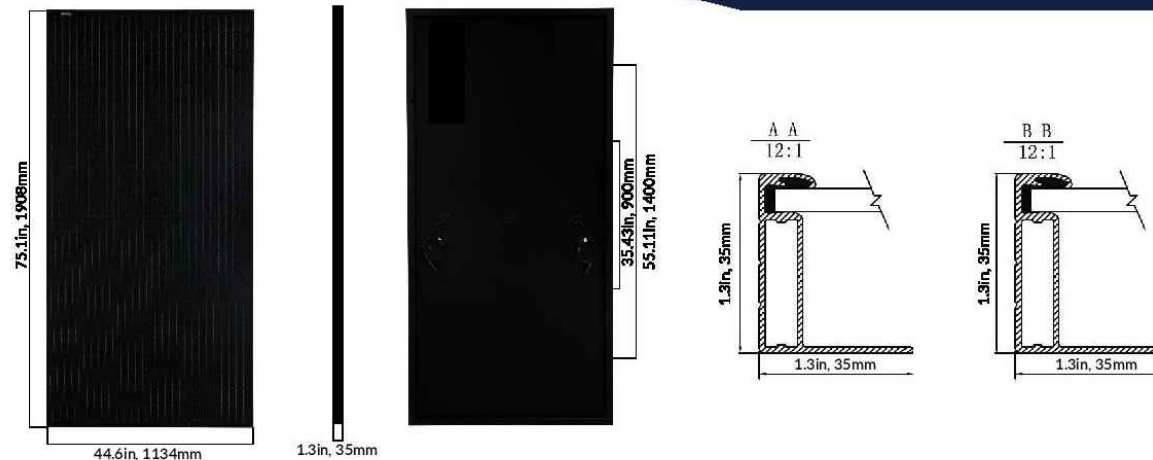


Aesthetics

All black design with advanced split cell technology features 10 ultra-thin busbars that allow for less resistance and greater energy harvest.



Designed & Engineered In
Silicon Valley



Electrical Specifications	DNA-120-MF10-445W		DNA-120-MF10-450W		DNA-120-MF10-455W		DNA-120-MF10-460W	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
STC Rated Output P _{max} (W)	445W	333W	450W	336W	455W	341W	460W	344W
Open Circuit Voltage V _{oc} (V)	41.79	39.42	41.79	39.50	41.88	39.58	41.97	39.67
Short Circuit Current I _{sc} (A)	13.36	11.89	13.51	11.99	13.63	12.09	13.75	12.20
Rated Voltage V _m (V)	35.03	32.32	35.15	32.39	35.27	32.46	35.36	32.53
Rated Voltage I _m (A)	12.70	10.31	12.80	10.40	12.90	10.49	13.00	10.58
Module Efficiency	20.57%		20.79%		21.03%		21.26%	

STC for front-face of panel: 1000 W/m², 25°C, measurement uncertainty ±3%
NOCT for front-face of panel: 800W/m², 45°C, Wind speed 1 m/s

Temperature Coefficients

Temperature Coefficients P _{max}	-0.35%/°C
Temperature Coefficients I _{sc}	+0.054%/°C
Temperature Coefficients V _{oc}	-0.27%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

Test Operating Conditions

Maximum Series Fuse	25A
Maximum System Voltage	1,500 VDC (UL&IEC)
Maximum Load Capacity (Per UL 1703)	5400 PA Snow Load / 5400 Pa Wind Load
Fire Performance Type	Type 1

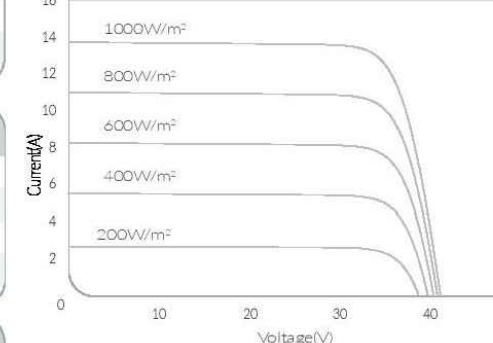
Packaging Configuration

Number of Modules per Pallet	31
Number of Pallets per 40ft. Container	24
Pallet Dimensions	76.29 X 44.48 X 49.76 in, 1938 X 1130 X 1264 mm
Pallet Weight (lbs)	1640
Module per 40ft Container	744

Mechanical Properties

Cell Type	SE-PERC
Glass	3.2mm, anti-reflection coating, high transmission, low iron, tempered glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68
Dimensions	75.1 X 44.6 X 1.3 in, 1908 X 1134 X 35 mm
Weight	52.9lbs.(24.2kg)
Output Cable	4mm² (EU)12AWG,39.37in.(1200mm)
Cable Length	47.2 in
Encapsulant	POE
Connector Type	Staubli EVO2

I-V Curve



Certifications



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MODULE DATA SHEET

Project Name:
Joshua Newnam
Property address:
**141 Little Br Dr, Lillington,
NC 27546**

Wiring Solutions Plus LLC

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License Number:
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8207 Callaghan Rd, Ste 100,
San Antonio, Texas 78230
www.aptossolar.com | sales@aptossolar.com

Aptos Solar Technology reserves the right to make specification changes without notice.

Ref_11.13.24

Date: 09/05/2025



Datasheet

Flush Mount System



Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Every component has been tested to the limit and proven in extreme environments.

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.

Datasheet

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

Bonded Splices



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding ☺

UFOs



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

Grounding Lugs



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

Attachments ☺

FlashFoot2



Flash and mount XR Rails with superior waterproofing.

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

Conduit Mount



Flash and mount conduit, strut, or junction boxes.

- Twist-on Cap eases install
- Wind-driven rain tested
- Secures 3/4" or 1" conduit

Slotted L-Feet



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

Bonding Hardware



Bond and attach XR Rails to roof attachments.

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

Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

Go to IronRidge.com/design



NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

Go to IronRidge.com/training

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RACKING DATA SHEET

Project Name:

Joshua Newnam

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Phone Number:

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E-Mail:

wiringsolutionsoffice@gmail.com

License Number:

25181-L



Date: 09/05/2025



The Respect Your Roof Deserves

When integrating with a home, solar attachments must be dependable for the lifetime of the rooftop. Due to recent innovations, many asphalt shingles have bonded courses. A mount that protects without the need to pry shingles can really speed things up.

Halo UltraGrip™ (HUG™) is here to respect the roof. Its Halo is a cast-aluminum barrier that encases the UltraGrip, our industrial-grade, foam-and-mastic seal. This allows HUG to accelerate the installation process and provide the utmost in waterproofing protection. Give your roof a HUG.™



UltraGrip™ Seal Technology

HUG UltraGrip utilizes a state-of-the-art seal design that uses a unique, foam-and-mastic combination. The foam-backed adhesive provides an entirely new flashing system that conforms and adheres to every nook and cranny of composition shingles, filling gaps and shingle step-downs (up to 1/8" in height).

Multi-Tiered Waterproofing
HUG utilizes a multi-tiered stack of components to provide revolutionary waterproofing protection. The Halo cast-aluminum, raised-perimeter foundation surrounds the UltraGrip base—a foam-backed mastic seal combination that prevents water intrusion by adhering and sealing with the shingle surface.

Halo UltraGrip™ is part of the QuickMount® product line.



Rafter & Deck Mounting Options

Mount HUG to the roof rafters, the roof deck, or both with our custom-engineered RD (rafter-or-deck) Structural Screw. The RD Structural Screw anchors HUG to the roof with an EPDM sealing washer, completing the stack of waterproofing barriers. See backside for more installation information.



Triple Rated & Certified to Respect the Roof™
UL 2703, 441 (27)
TAS 100(A)-95

Tech Brief

QuickMount® HUG

Adaptive, Rafter-Friendly Installation



Hit the rafter? Good to go!

When you find a rafter, you can move on. Only 2 RD Structural Screws are needed.



Miss the rafter? Try it again.

Place another screw to the left or right. If rafter is found, install 3rd and final screw.



Still no luck? Install the rest.

If more than 3 screws miss the rafter, secure six screws to deck mount it.

Trusted Strength & Less Hassle



25-Year Warranty
Product guaranteed free of impairing defects.

Structural capacities of HUG™ were reviewed in many load directions, with racking rail running cross-slope or up-slope in relation to roof pitch.

For further details, see the HUG certification letters for attaching to rafters and decking.

IronRidge designed the HUG, in combination with the RD Structural Screw to streamline installs, which means the following:

- No prying shingles
- No roof nail interference
- No pilot holes necessary
- No sealant (in most cases)
- No butyl shims needed

Attachment Loading



The rafter-mounted HUG has been tested and rated to support 1004 (lbs) of uplift and 368 (lbs) of lateral load.

Structural Design



Parts are designed and certified for compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings



HUG passed both the UL 441 Section 27 "Rain Test" and TAS 100(A)-95 "Wind Driven Rain Test" by Intertek.

UL 2703 System



Systems conform to UL 2703 mechanical and bonding requirements. See Flush Mount Manual for more info.

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ATTACHMENT DATA SHEET

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Property address:
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Wiring Solutions Plus LLC

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wiringsolutionsoffice@gmail.com
License Number:
25181-L

Wiring Solutions Plus

Date: 09/05/2025

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 ¹⁴	1000 V DC ¹⁴
	Maximum Disconnect Voltage ¹⁵	600 V DC	165 V DC	165 V DC
¹⁴ Maximum System Voltage is limited by Powerwall to 600 V DC.				
¹⁵ 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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MCI DATA SHEET

Project Name:

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Wiring Solutions Plus

Date: 09/05/2025

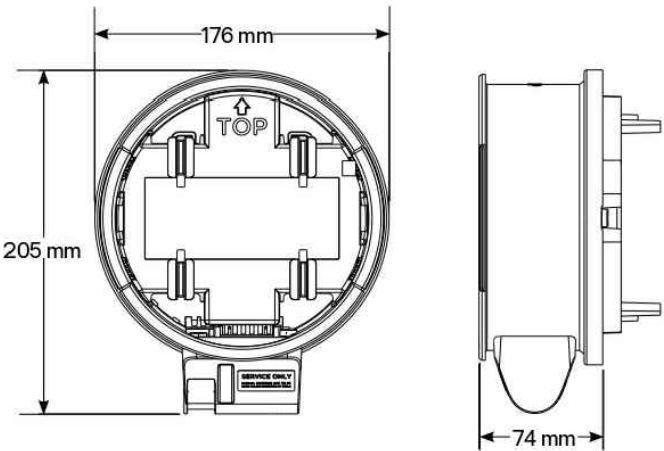
Backup Switch

The Tesla Backup Switch controls connection to the grid in a Powerwall system, and can be easily installed behind the utility meter or in a standalone meter panel downstream of the utility meter.

The Backup Switch automatically detects grid outages, providing a seamless transition to backup power. It communicates directly with Powerwall, allowing home energy usage monitoring from any mobile device with the Tesla app.

Performance Specifications	Model Number	1624171-xx-y
	Continuous Load Rating	200 A, 120/240 V split phase
	Maximum Supply Short Circuit Current	22 kA with breaker ¹⁷
	Communication	CAN
	AC Meter	+/- 0.5%
	Expected Service Life	21 years
	Warranty	10 years
Environmental Specifications	¹⁷ Breaker maximum supply short circuit current rating must be equal to or greater than the available fault current.	
	Operating Temperature	−40°C to 50°C (−40°F to 122°F)
	Storage Temperature	−40°C to 85°C (−40°F to 185°F)
	Enclosure Rating	NEMA 3R
	Pollution Rating	PD3
Compliance Information	Safety Standards	USA: UL 414, UL 414 SB, UL 2735, UL 916, CA Prop 65
	Emissions	FCC Part 15, Class B, ICES 003
Mechanical Specifications	Dimensions	176 x 205 x 74 mm (6.9 x 8.1 x 2.9 in)
	Weight	2.8 lb
	Meter and Socket Compatibility	ANSI Type 2S, ringless or ring type
	External Service Interface	Contactor manual override ¹⁸ Reset button
	Conduit Compatibility	1/2-inch NPT

¹⁸ Manually overrides the contactor position during a service event.



11 BACKUP SWITCH DATA SHEET

Project Name:
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License Number:
25181-L



Product	Powerwall
Last Revised	November 10, 2023
Revision	1



SETTING SITE EXPORT LIMITS FOR POWERWALL SYSTEMS

Power Control Systems (PCS): Site Export Limit

Tesla systems listed to UL 1741 PCS can limit the AC output power (AC kW) through the Site Export Limit setting within the PCS software. This feature is used when there is a utility-imposed limit on how much power a site is allowed to export. It can also be used when there is an existing infrastructure limitation (e.g., small service feeder). A Site Export Limit has been set on the following customer site:

Site Export Limit	12	W
Customer Name	Joyce Robinson	
Customer Address	1408 Woodgreen Drive, Greensboro, NC 27405	

Tesla Products Listed to UL 1741 PCS

The following products, and their associated model number(s), have been certified to the standards in UL 1741 PCS and have the Site Export Limit function. The unit(s) installed on the customer site listed above are indicated by checked boxes next to the appropriate model number(s).

Tesla Product	Model Number(s)	Site Controller Location	Nationally Recognized Testing Laboratory (NRTL) Test Report
Powerwall 2	☐ 1092170-xx-y	Gateway 2 or integrated in Powerwall+ solar assembly (when installed in conjunction with Powerwall+)	Intertek: 104267560CRT-001 Intertek: 103879962CRT-003
	☐ 2012170-xx-y		
	☐ 3012170-xx-y		
Powerwall+	☐ 1850000-xx-y	Gateway 2 or integrated in Powerwall+ solar assembly	TÜVRheinland: 32195439.001
Powerwall 3	☒ 1707000-xx-y	Integrated in Powerwall 3	TÜVRheinland: US23U76C.003

Setting the Export Limit and Access Protection

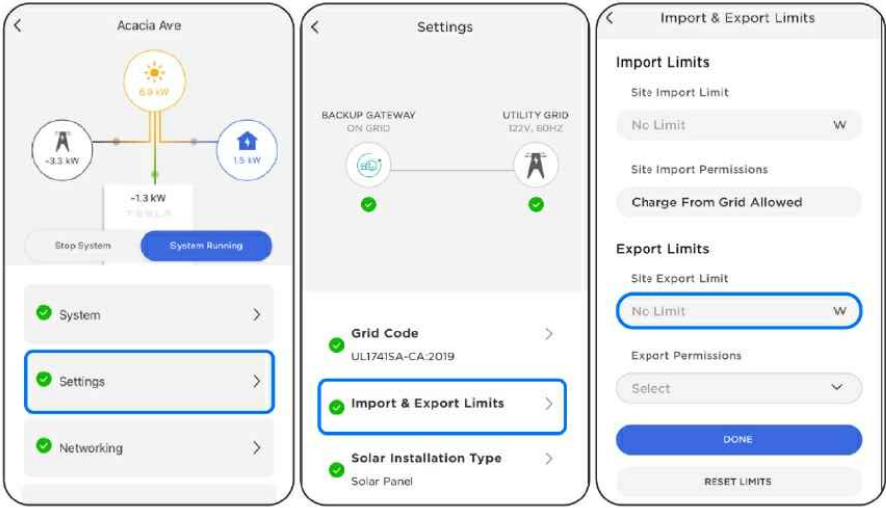
The Site Export Limit is set at the time of installation by qualified personnel. In compliance with Article 750.30(C)(3)(5) of the 2023 National Electric Code, it is password protected. To set a Site Export Limit:

1. Open the Tesla Pros app and launch the **Commissioning** experience from the main menu. Follow the prompts to connect to the system.
2. Select **Settings** from the landing page.
3. Select **Import & Export Limits**.

SETTING SITE EXPORT LIMITS FOR POWERWALL SYSTEMS



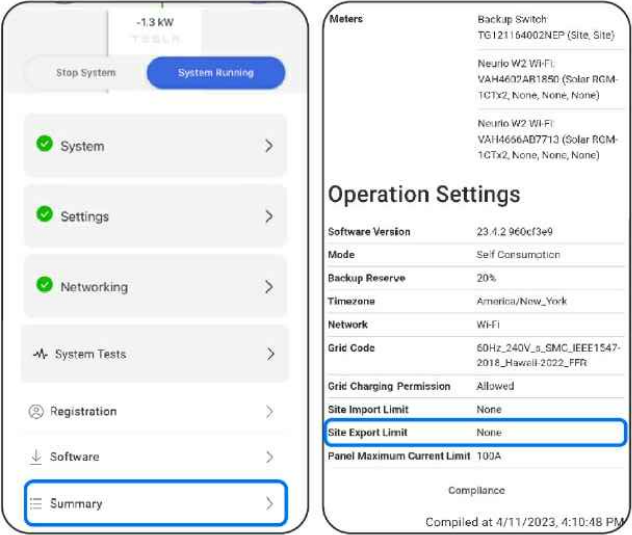
4. Enter the **Site Export Limit** and select **Done**.



Site Export Limit Setting Verification

Settings should be verified by the utility or AHJ after the system has been installed and commissioned. Verification of settings can be accomplished by viewing the site's Setup App *Summary* page, included with the PCS *Settings Application* document. To verify the setting:

1. Follow the steps above to launch Tesla Pros and connect to the system.
2. Select **Summary** from the landing page.
3. View the **Site Export Limit** in the *Operation Settings* section.



Tesla Product Safety Compliance

codecompliance@tesla.com

12 CURTAILMENT LETTER

Project Name:
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