

GENERAL NOTES

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

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.
-
- 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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- Joungh
o Choi
- Digitally signed by Joungh
o Choi
DN: cn=Joungh
o Choi, o=Joungh
o Choi, ou=Joungh
o Choi, email=Joungh
o Choi@wiring
solutionsplus.com, c=US
Date: 2025.09.09
09:33:04 -04'00'
- Project Name:
Garrett Barefoot
Property address:
**29 Sawyer MI Dr
Dunn, NC 28334**
-
- Wiring Solutions Plus LLC**
Address:
4724 Hargrove Rd, Raleigh, NC 27616
Phone Number:
984-200-7489
E-Mail:
wiring.solutions.office@gmail.com
License Number:
25181-L
-
- DATE: 09/05/2025
- PV SOLAR SYSTEM DETAILS
- SYSTEM SIZE: DC STC: 5.220 KW
SYSTEM SIZE: AC CEC: 11.500 KW
SOLAR MODULES: (12) Hyundai 435 WATT
SOLAR SHUTDOWNS: (4) MCI-2 Solar Shutdowns
INVERTER: (1) TESLA MODEL #1707000-xx-y / 11.5KW
BATTERY: (1) POWERWALL 3 MODEL# 1707000-xx-y - 13.5KWH

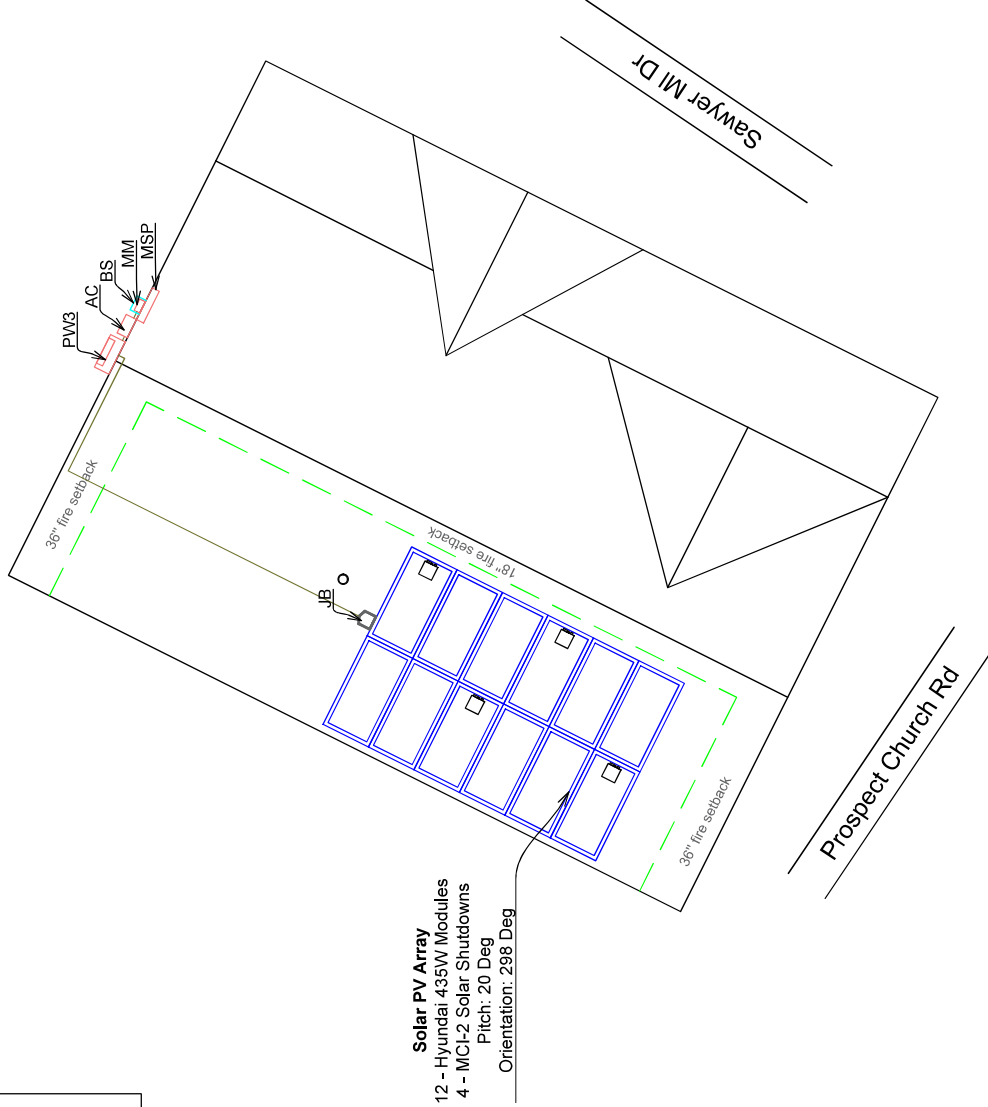
ELECTRICAL INFORMATION:
EXISTING
MAIN SERVICE PANEL BUS SIZE: 200A
MAIN SERVICE BREAKER SIZE: 200A
MOUNTING SYSTEM: IRONRIDGE XR-10

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

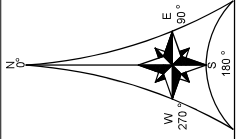
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MM	(E) Main Meter
MSP	(E) Main Service Panel
BS	(N) Backup Switch
PW3	(N) Powerwall 3
AC	(N) AC Disconnect
JB	(N) Junction Box
	(N) Solar Shutdowns
	(N) Solar Modules
	EMT Conduit
	Setback

Total Roof Area: 1858
Total Module Area: 252.24
13.57% of Coverage



Solar PV Array
12 - Hyundai 435W Modules
4 - MC1-2 Solar Shutdowns
Pitch: 20 Deg
Orientation: 298 Deg



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

1

ROOF PLAN

Project Name:
Garrett Barefoot
Property address:
**29 Sawyer MI Dr
Dunn, NC 28334**



**Mehdi
Zomorodian**

Digitally signed by
Mehdi Zomorodian
Date: 2025-09-08
12:48:26 -0500

Wiring Solutions Plus LLC

Address:
4724 Hargrove Rd, Raleigh, NC 27616
Phone Number:
984-200-7489

E-Mail:
wiringolutionsoffice@gmail.com
License Number:
25181-L



DATE: 09/05/2025

#	ITEM	DESCRIPTION	QTY
1	PV MODULE	HYUNDAI 435WATT Voc = 38.60V, Vmp = 32.10V Isc = 14.32A, Imp = 13.56A (N) TESLA POWERWALL 3 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 TO HOME/GRID EFFICIENCY 97.5%	12
2	POWERWALL 3	MCH-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"x4"x2" UL LISTED WATER TIGHT NEMA TYPE 3	1
3	SOLAR SHUTDOWNS	EXISTING MAIN SERVICE PANEL 200A BUSBAR & 200A BREAKER	4
4	JUNCTION BOX	UTILITY METER	1
5	MAIN SERVICE PANEL	(N)200A TESLA BACKUP SWITCH MODEL #1624171-xx-y, 120/240V	1
6	MAIN METER	(N)60A NON-FUSED AC DISCONNECT	1
7	BACKUP SWITCH		
8	AC DISCONNECT		

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

SYSTEM SIZE: DC STC: 5.220 KW
SYSTEM SIZE: AC CEC: 11.500 KW

WIRE CHART

#	CONTINUOUS 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	14.32 X 1.25 = 17.9A	20	(2) #10 AWG, PV WIRE		40 X .71 X 1 = 28.4 >= 17.9	IN FREE AIR
2	14.32 X 1.25 = 17.9 A	20	(2) #10 AWG, CU-THWN-2		40 X .71 X 1 = 28.4 >= 17.9	3/4" EMT
3	48 X 1.25 = 60 A	60	(3) #6 AWG, CU-THWN-2		75 X .91 X 1 = 68.25 >= 60	3/4" EMT

600V CALCULATION		
MAX NUMBER MODULES PER STRING:	12	
Voc	38.60	V
CORRECTION FACTOR:	1.12	
MAX SYSTEM VOLTAGE	12 x 38.60 x 1.12	= 518.78V

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

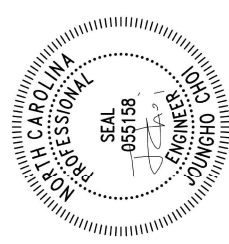
KEY NOTES:

- SOLID BARE G.E.C (FREE-AMP) MOUNTED UNDER ARRAY
- PER NEC ARTICLE 690.35 INVERTER GROUND FAULT PROTECTION PROVIDED
- ALL GROUNDS AND NEUTRALS BONDED TO EXISTING GROUNDING CONDUCTOR
- WIRREVERSIBLE CRIP CONNECTOR.
- BACKFED BREAKERS MUST BE LOCATED @ OPPOSITE END OF BUS BAR FROM MAIN BREAKER OR MAIN LUG ON GRID SIDE. WHEN A BACKFED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, BREAKER SHALL NOT READ 'LINE OR LOAD'.
- PER CEC 250.65(C); CONDUCTOR SPLICES ONLY ALLOWED WITH COMPRESSION CONNECTORS OR EXOTHERMIC WELDING
- ALL GROUNDS AND NEUTRALS BONDED TO EXISTING GROUNDING CONDUCTOR
- WIRREVERSIBLE CRIP CONNECTOR.
- VERIFY (E) UFER GROUND NEAR MSP. IF (E) UFER IS NOT ACCESSIBLE OR VERIFIABLE, INSTALL A NEW 5/8" Ø X 8' LONG GROUNDING ROD AND BOND SOLAR SYSTEM EQUIPMENT GROUNDING ACCORDINGLY.

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 useage.

2 SINGLE LINE DIAGRAM

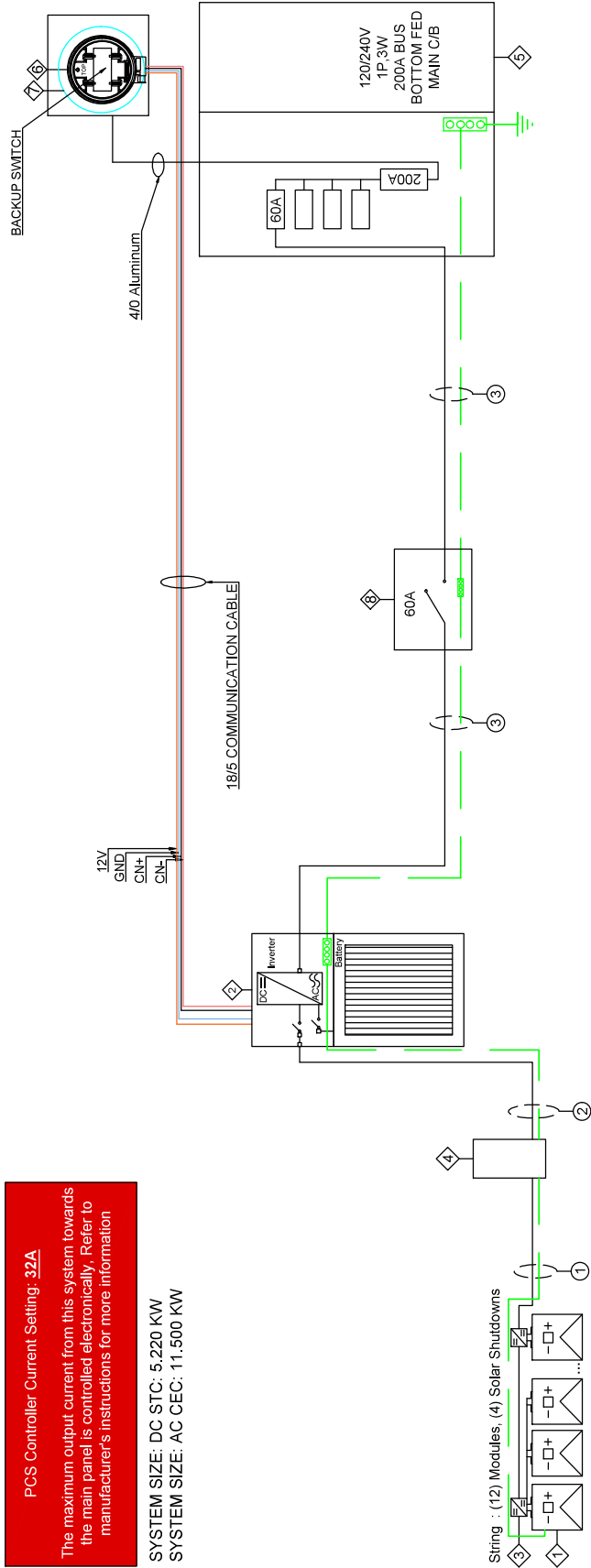
Project Name:
Garrett Barefoot
Property address:
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Dunn, NC 28334

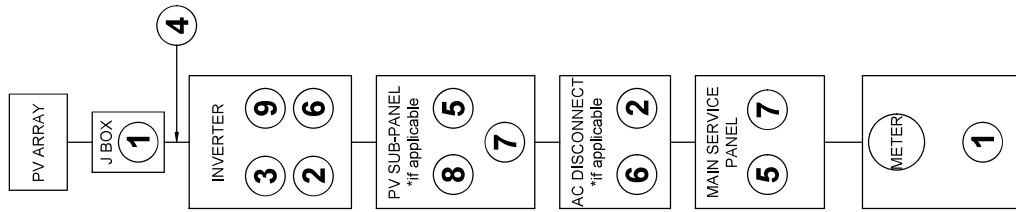


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License Number:
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DATE: 09/05/2025





a. Purpose. Provide emergency responders, with appropriate warning and guidance via respect to isolating solar electric system.

b. 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

1. Residential buildings - The marking must be placed within the main service disconnect. The marking shall be placed

2. Commercial buildings - The main service disconnect is operable with the service panel closed, outside cover of the main service disconnect is operable with the service panel closed, disconnected clearly visible from the exterior where the level is operated

a. Verbiage: CANNOT 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-1000 or equivalent material). Durable adhesive material suitable for the environment.

d. Marking Requirements: On conductors, raceways, enclosures, cable assemblies, DC combinations 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 conductors, raceways, enclosures, and cable assemblies.

b. Marking: Verbiage: Format and Type of Material.

c. Marking: Verbiage: CANNOT SOLAR CIRCUIT Note: The format and type of material shall adhere to "V, Vc3b, c" of this requirement.

c. Inverters are not required to have caution markings

1. Marking is required on all interior and exterior DC conduct raceways enclosures cable assemblies and junction boxes

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.

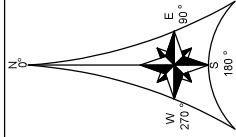
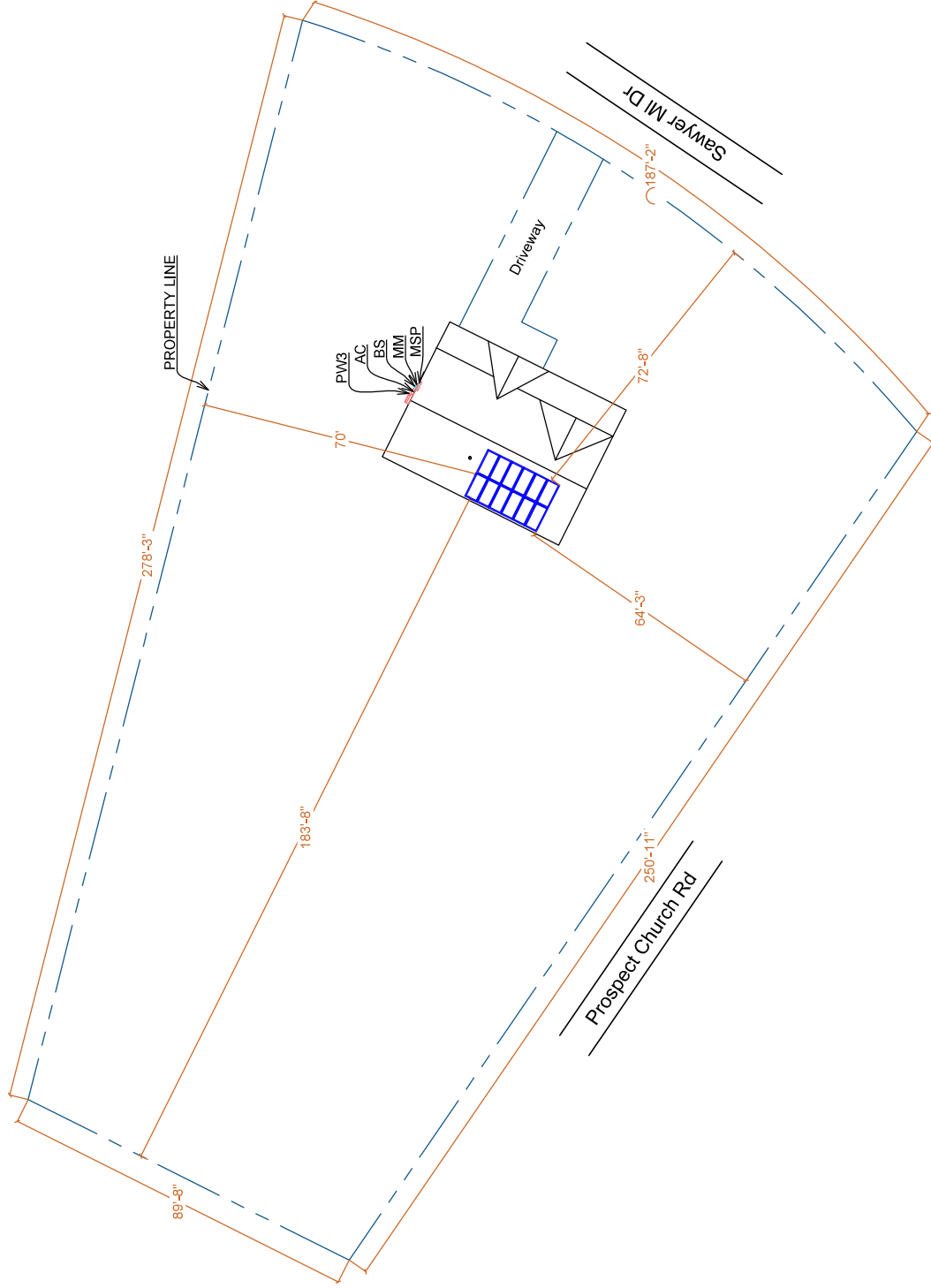
3. Marking shall contain the words **WARNING: PHOTOVOLTAIC POWER SOURCE**.

4. Marking shall be placed on the main service disconnect in a location clearly visible from the location where the disconnect is operated.

3	SIGNAGE
<i>Project Name:</i> Garrett Barefoot <i>Property address:</i> 29 Sawyer MI Dr Dunn, NC 28334	
	
Wiring Solutions Plus LLC Address: 4724 Hargrove Rd., Raleigh, NC 27616 Phone Number: 984-200-7489 E-Mail: wiringolutionsoffice@gmail.com License Number: 25181-L	
	
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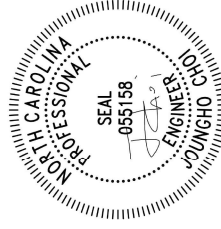


SCALE: 1/32" = 1'-0"

4

SITE PLAN

Project Name:
Garrett Barefoot
Property address:
29 Sawyer MI Dr
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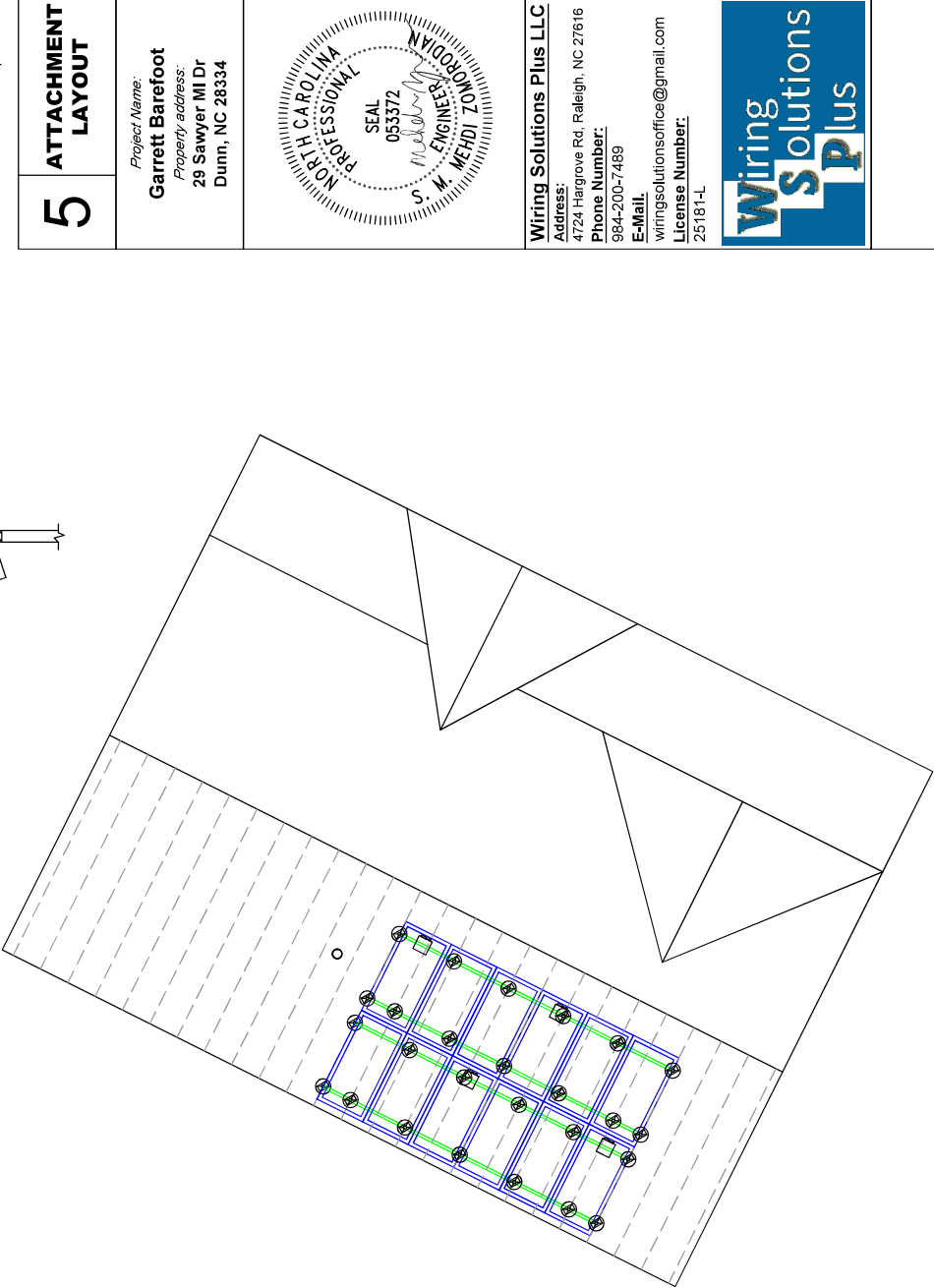
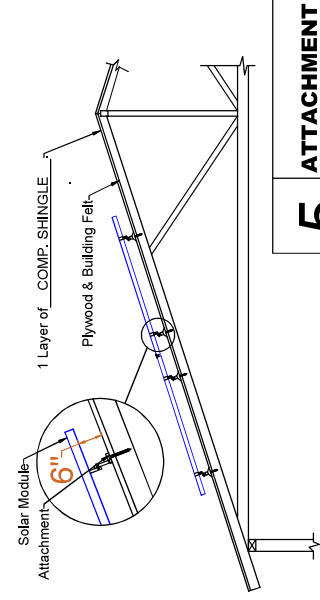
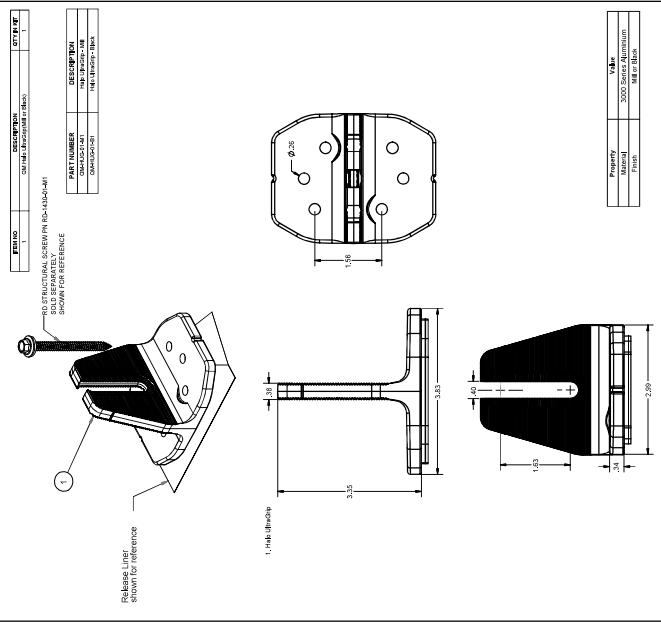
DATE: 09/05/2025

1. Ironridge XR-10 Racking System
2. Ironridge Halo Ultragrip Attachment
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**.

MODULE WEIGHT (lbs)	50.01
# OF MODULES	12
TOTAL MODULE WEIGHT (lbs)	600.12
RACK WEIGHT (lbs)	120.02
SOLAR SHUTDOWNS WEIGHT (lbs)	3.08
TOTAL SYSTEM WEIGHT (lbs)	723.22
# OF STANDOFFS	26
MAX SPAN BETWEEN STANDOFFS (in)	48
LOADING PER STANDOFF (lbs)	27.81
TOTAL AREA (sq.ft.)	252.24
LOADING (PSF)	2.86

6	ATTACHMENT RAIL TRUSS
---	-----------------------

QUICKMOUNT® HALO ULTRAGRIP



5 ATTACHMENT LAYOUT

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DATE: 09/05/2025

Power Everything

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.

Customer Interface	Tested Mobile App	Tested Mac/Chrom. Interceptors
Warranty	10 years	
Values provided for 25°C (77°F), 1.3W, dry-plasma/chemical power. See Section 3.4.4.14.14 for max requirements if using as an overcurrent protection. If handling the 1.5A/4W (1.3W) for maximum continuous discharge power, forward must be installed with an 80°F breather and appropriate heat conduction. are appropriately rated conductors. Typical solar air inlet use case. Values provided for 25°C (77°F), 1.3W, dry-plasma/chemical power. See Section 3.4.4.14.14 for max requirements if using as an overcurrent protection. If handling the 1.5A/4W (1.3W) for maximum continuous discharge power, forward must be installed with an 80°F breather and appropriate heat conduction. are appropriately rated conductors. Typical solar air inlet use case. Values provided for 25°C (77°F), 1.3W, dry-plasma/chemical power. See Section 3.4.4.14.14 for max requirements if using as an overcurrent protection. If handling the 1.5A/4W (1.3W) for maximum continuous discharge power, forward must be installed with an 80°F breather and appropriate heat conduction. are appropriately rated conductors. Typical solar air inlet use case.		

Certifications	UL 1910, UL 9540A, UL 1741, WHI FCS, UL 1741, UL 1741SE, 1773, UL 1699B, CSA-222.2 No. 0, CSA (C22.2) No. 1071, CSA C22.2 No. 330, CSA222.2 No. 3, IEEE 1597, IEEE 347A, IEEE 5471, CA Rule No. 22
Grid Connection	United States and Canada
Emissions	FCC Part 15 Class E, IES Q3
Environmental	RoHS Directive 2011/65/EU
Safety	AS/NZS (IEEE 603-2005) High

Project Name:
Garrett Barefoot

Property address:
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Dunn, NC 28334**

Address:

② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ ㉛ ㉜ ㉝ ㉞ ㉟ ㊱ ㊲ ㊳ ㊴ ㊵ ㊶ ㊷ ㊸ ㊹ ㊺ ㊻ ㊼ ㊽ ㊾ ㊿

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License Number:



HD HYUNDAI SOLAR MODULE

NF(BK) Series

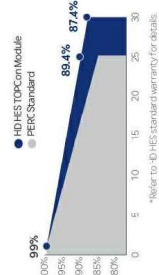
Premium N-Type TOPCon Module
HIN-T430NF(BK) | HIN-T435NF(BK) | HIN-T440NF(BK)



- 22.53% High Efficiency
- High-End Technology
- Higher Brightness
- Long-Term Reliability
- Compatible with Residential Applications
- For Residential (Full Black Design)

HD Hyundai's Warranty Provisions

- 25 Years** Product Warranty
- Materials and workmanship
- 30 Years** Performance Warranty
- First-year degradation: 1%
- Annual degradation: 0.35%
- With a 0% initial degradation,
87.4% is guaranteed up to 30 years



Certification

- ISO 9001 Quality management system
- ISO 14001 Environmental management system
- UL 61730 Photovoltaic (PV) module safety qualification (USA)
- IEC 61730 Photovoltaic (PV) module safety qualification (EU)
- IEC 61215 Performance comparison testing
- IEC 62084 Potential induced degradation (PID) testing
- IEC 60068-2-68 Salt and acid mist testing for environmental durability

Electrical Characteristics

Item	HIN-TxxxNF (BK)	Unit	HIN-T430NF (BK)	HIN-T435NF (BK)	HIN-T440NF (BK)
Nominal output (Pmax)	430	W	476	482	440
Open-circuit voltage (Voc)	38.4	V	38.4	38.6	38.8
Short-circuit current (Isc)	14.25	A	15.79	14.32	14.39
Voltage at Pmax (Vmpp)	31.9	V	31.9	32.1	32.3
Current at Pmax (Impp)	13.48	A	14.94	13.56	13.63
Module efficiency	22.02	%	24.40	22.28	22.13
Power Class Sorting	W		0~+5		
Temperature coefficient of Pmax	%/K		-0.30		
Temperature coefficient of Voc	%/K		-0.26		
Temperature coefficient of Isc	%/K		0.046		
Bifaciality	%		80~84.10%		

*STC: Irradiance: 1,000 W/m², cell temperature: 25°C, AM 1.5, Test uncertainty for Pmax: ±5%, Voc: ±2%, Isc: ±3%, Vmpp: ±2%, Impp: ±3%, Temperature coefficient: ±0.5%.

**The electrical properties of BK are measured under the module corresponding to 1000 W/m² on the module front and 135 W/m² on the module rear.

Additional Power Gain from rear side

Item	Unit	Value
Pmpo gain	W	458
1%	%	493
25%	%	528

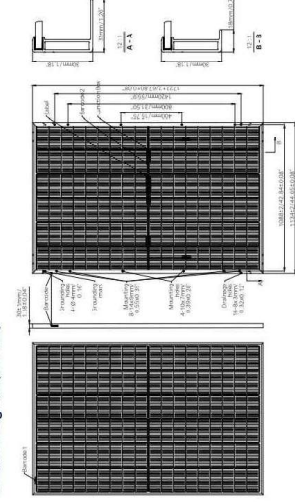
Mechanical Characteristics

Dimensions	1,722mm(L) x 1,134mm(W) x 30mm(H)
Weight	24.5 kg (50.01lbs)
Solar Cells	N-Type TOPCon, 106 (6x18) monocrystalline 1BB half-cut bifacial cells
Output Cables	Cable: (+/-1,202mm(47.2in), (-/-1,202mm(47.2in)) / Customized length available
Junction Box	3-part, 3 bypass diodes, IP68 rated
Construction	Front: 2.0mm(0.08in) anti-tempered solar glass with high transmittance Rear: 2.0mm(0.08in) anti-tempered solar glass with high transmittance
Frame	Anodized aluminum alloy

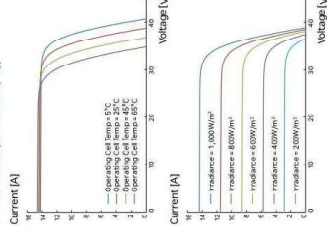
Shipping Configurations

Packing Direction	Vertical
Container Size (HC)	40'
Pallets Per Container	26
Modules Per Container (pcs)	935

Module Diagram (unit: mm)



I-V Curves (HIN-T440NF (BK))



Sales & Marketing

HD Hyundai Energy Solutions reserves the right to update or modify the specific details and features listed in this datasheet without notice. Please refer to the latest version of this datasheet for the most up-to-date information. We make a change of final version product.

HD HYUNDAI ENERGY SOLUTIONS

7 MODULE DATA SHEET

Project Name:
Garrett Barefoot
Property address:
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Flush Mount System

Datasheet



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.

XR Rails

XR10 Rail



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

- 8' 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
- Form's 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 saving completely hidden.

- Universal end-clamp design
- 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](http://GoToIronRidge.com/design)



NABCEP Certified Training

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

[Go to IronRidge.com/training](http://GoToIronRidge.com/training)

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RACKING DATA SHEET

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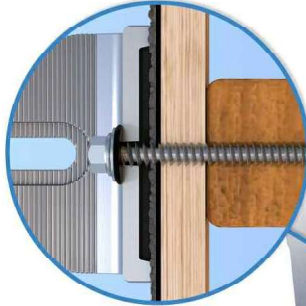
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The Respect Your Roof Deserves

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®.



Multi-Tiered Waterproofing

HUG® utilizes a multi-tiered stack of waterproofing materials to ensure superior 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.



UltraGrip™ Seal Technology
HUG UltraGrip™ utilizes a state-of-the-art seal design that uses a unique, foam-and-mastic combination. The entirely new flashing system that surrounds the UltraGrip base provides an extra layer of protection against wind-blown debris and shingle step-downs (up to 1/8" in height).



Rafter & Deck Mounting Options
Mount HUG® to the roof rafters, the roof deck, or the roof joists using the RD (Rafter-Driven Rain) Structural Screw washers. The RD Structural Screw anchors HUG® to the roof joists with an EPDM sealing washer, completing the stack of waterproofing barriers. See backside for more installation information.

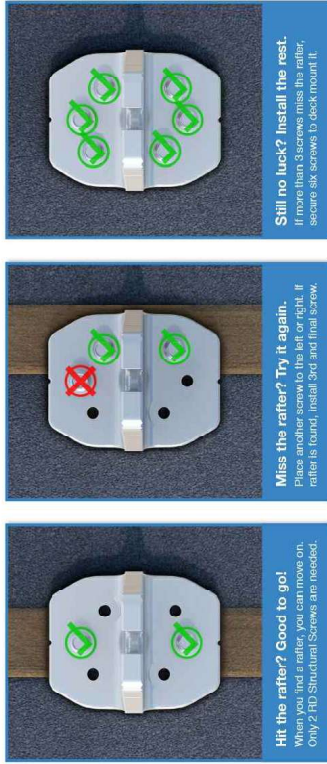


Rated & Certified to Respect the Roof™
UL 2703, UL 2703A, UL 2703B, 441 (27), TAS 100(A)-95



Tech Brief

Adaptive, Rafter-Friendly Installation



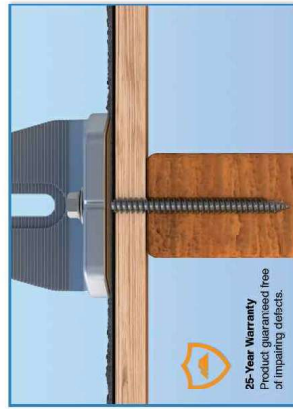
Hit the rafter? Good to go!
When you find a rafter, you can move on. Only 2 RD Structural Screws are needed.

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

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.



25-Year Warranty
Product guaranteed free of impairing defects.

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 bulky 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 & 2703A

Systems conform to UL 2703 and HUG® also conforms to UL 2703A. See Flush Mount Manual for more info.

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ATTACHMENT DATA SHEET

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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_{in})	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

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Wiring Solutions Plus

DATE: 09/05/2025



Keep Solar Wires Nested & Protected

JayBox® is an ever-adaptable junction box, designed to securely enclose wires on nearly any solar panel—with ample space to shelter up to 4 module strings.

The box is UL-listed, NEMA-3P-rated, and supports up to 1500-volt systems. It is made of a NORYL™ resin, known for its long-lasting UV-resistance and impact strength.

JayBox® is available in two options: Roof Mount and Rail Mount. When installed on the roof deck, its low profile allows it to safely fit under the wings of the module array.

Tech Brief

QuickMount® JayBox®



Two Mounting Types: Roof & Rail

The roof-mounted JayBox® comes with two deck screws and a simple flashing that only goes under one shingle course—without the need to cut shingles or remove nails. The rail-mounted JayBox® comes with a pre-drilled hole for the rail and is secured using our Microwater Bonding Hardware.

This component is part of the QuickMount® product line.



Multiple Configuration Options

Threaded standoffs give you the freedom to mount electrical components—including DIN rail, grounding bays, and terminal blocks—on the inside of the box for running conduit into the enclosure.



10-Year Warranty
Product guaranteed free of material defects.



Durable NORYL™ Resin

JayBox® is fabricated from SABIC's NORYL™ resin, giving it greater strength and resistance to UV radiation. It is well known for its lasting stability and performance in extreme environments.

SABIC and NORYL are trademarks of SABIC. © 2022 IronRidge, Inc. All rights reserved. Visit www.ironridge.com for patent information, Version 1.01.

Abundant Feature Set

Trustworthy Flashing & Waterproofing

The JayBox® Roof Mount utilizes QuickMount's Elevated Water Seal Technology®, coming with a raised flashing that integrates with an EPDM sealing gasket on the underside of the box to fully protect roof penetrations. This waterproof assembly has passed the TAS-100 wind-driven rain test.

The flashing only installs in one direction, with an "upslope" marking to ensure proper placement. Simply align the box with the flashing and secure it to the roof with the supplied deck screws. No need to cut shingles or remove nails.

Hassle-Free Lid & Captive Hardware

JayBox® has a detachable, hinged lid to reduce interference and deliver maximum ease—staying open and out of the way even on up to 70° roof slopes.

Once the lid is closed, the single, pre-installed, captive screw and nut keeps it snug and secure. Because this hardware is embedded into the lid, there is no need to worry about it getting lost on the roof.

Drilling Guides & Draining Weep Holes

The enclosure includes easy-to-drill guide marks on three sides of the box. In addition, it has guides on the interior when drilling through the bottom for attic cond. It runs. Weep holes also prevent any condensation from accumulating inside the box.

Certification & Performance

Technical Specifications	
Maximum System Voltage	1500V
Max Current (Isc)	100A
Max Current per Circuit (String)	30A
Max Number of Input Circuits	4
Ambient Operating Conditions	-40°C to 75°C
Enclosure Rating (NEMA)	Type 3R - Rainproof
Allowable Wire Inputs	12 - 10 AWG
Allowable Wire Outputs	12 - 8 AWG
Equipment Grounding Conductor	10 - 6 AWG



Water Seal Ratings
Passed the UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind-Driven Rain Test".

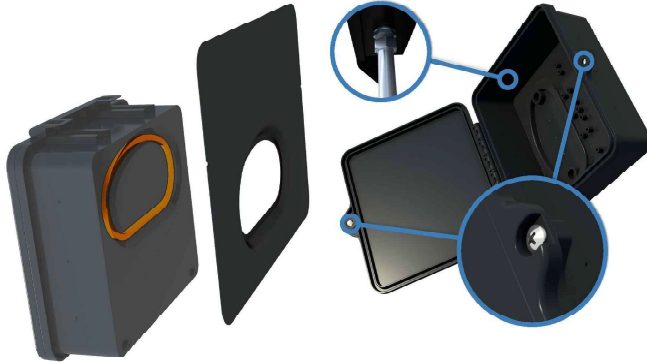


UL Electrical Rating
Tested and evaluated to conform to UL 1741 by Intertek Group p.c.



Durable NORYL™ Resin
Made of a high-strength Noryl resin, with stability that surpasses polycarbonate.

Tech Brief



11 JUNCTION BOX DATA SHEET

Project Name:
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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	162471-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

¹⁷ Breaker maximum supply short circuit current rating must be equal to or greater than the available fault current.

Environmental Specifications

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

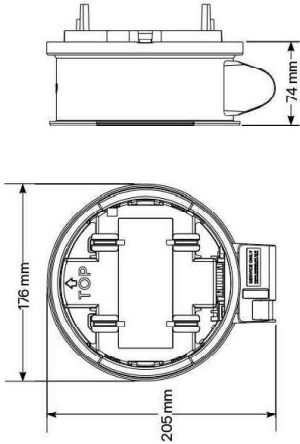
Compliance Information

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	Contact manual override ¹⁸ Reset button
Conduit Compatibility	1/2-inch NPT

¹⁸ Manually overrides the contactor position during a service event.



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BACKUP SWITCH DATA SHEET

Project Name:
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