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

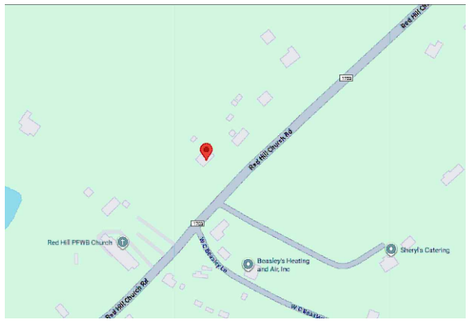
2. SOLAR SYSTEM SHALL NOT COVER ANY PLUMBING OR MECHANICAL VENTS

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.



VICINITY MAP
SCALE: NTS

SATELLITE VIEW
SCALE: NTS

INDEX

NORTH CAROLINA PROFESSIONAL SEAL 055158 ENGINEER JOUNGHO CHOI

Joungho Choi
Digitally signed by Joungho Choi
Date: 2025.08.22 06:43:25 -04'00'

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

PV SOLAR SYSTEM DETAILS

SYSTEM SIZE: DC STC: 7.360 KW
SYSTEM SIZE: AC INV: 6.128 KW
SOLAR MODULES: (16) APTOS 460 watt
MICROINVERTERS: (8) APTOS MAC-800
BATTERY: (1) FranklinWH APower 2, 10KW
SMART CONTROLLER: (1) FranklinWH AGate

ELECTRICAL INFORMATION:
EXISTING
MAIN SERVICE PANEL BUS SIZE: 200A
MAIN SERVICE PANEL BREAKER SIZE: 200A
MOUNTING SYSTEM: IRONRIDGE XR10

BUILDING INFORMATION:
CONSTRUCTION TYPE: V-B
OCCUPANCY: R3
ROOF: COMP SHINGLE
RAFTER: 2 X 6 @ 24" O.C.

Project Name:
Lisa Allison-Moon
Property address:
5445 Red Hill Church Rd, Coats, NC 27521

CONTRACTOR

Wiring Solutions Plus LLC
Address:
4724 Hargrove Rd, Raleigh, NC 27616
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984-200-7489
E-Mail.
wiringsolutionsoffice@gmail.com
License Number:
25181-L

Wiring Solutions Plus

DATE: 08/18/2025

INDEX

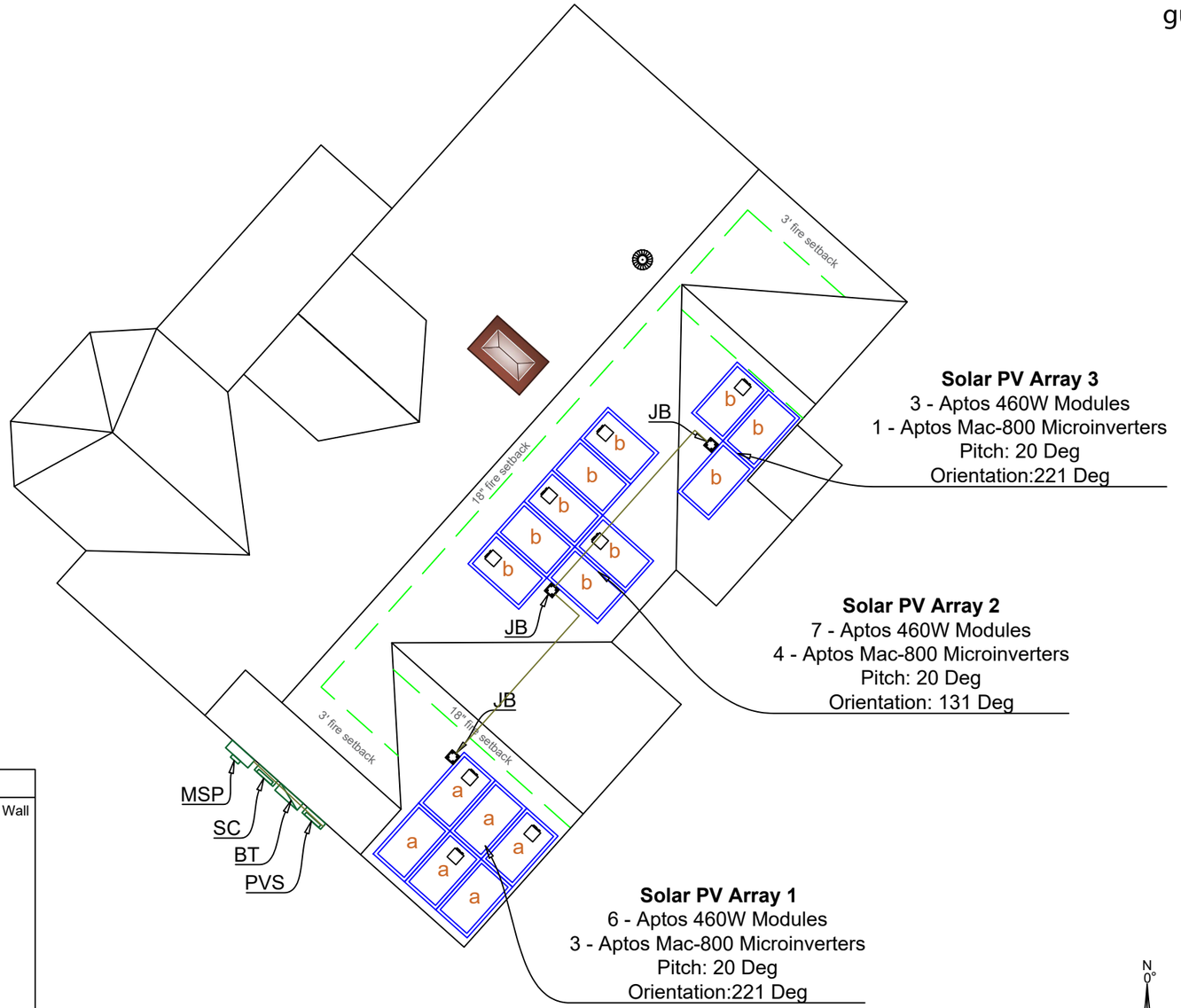
MSP	(E) Main Service Panel
PVS	(N) PV Sub Panel
SC	(N) AGate System Controller
BT	(N) Franklin APower Battery
JB	(N) Junction Box
	(N) Microinverter
	(N) Solar Module
	EMT Type Conduit

Roof Face Area:2792
Module Area:352
12.60% of Roof Coverage

Avial Lumagui
Digitally signed by Avial Lumagui
Date: 2025.08.22 08:47:21 -04'00'

NORTH CAROLINA PROFESSIONAL SEAL 054960 ENGINEER AVIAL LUMAGUI

STRUCTURAL ONLY



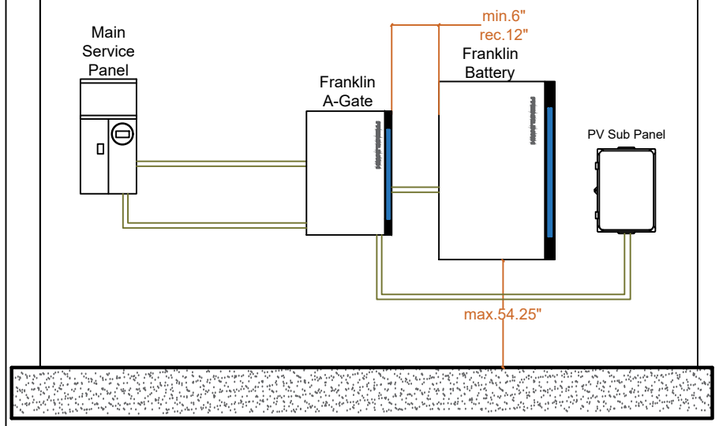
Solar PV Array 3
3 - Aptos 460W Modules
1 - Aptos Mac-800 Microinverters
Pitch: 20 Deg
Orientation:221 Deg

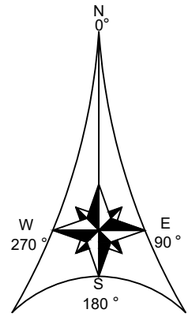
Solar PV Array 2
7 - Aptos 460W Modules
4 - Aptos Mac-800 Microinverters
Pitch: 20 Deg
Orientation: 131 Deg

Solar PV Array 1
6 - Aptos 460W Modules
3 - Aptos Mac-800 Microinverters
Pitch: 20 Deg
Orientation:221 Deg

EQUIPMENT ELEVATION

South Wall





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

1 **ROOF PLAN**

Project Name:
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wiringsolutionsoffice@gmail.com
License Number:
25181-L

Wiring Solutions Plus

DATE: 08/18/2025

#	ITEM	DESCRIPTION	QTY
1	PV MODULE	(N) APTOS 460WATT DNA-120-MF10-460W Voc 41.97V, Vmp = 35.36V Isc = 13.75A, Imp = 13.13.00A	16
2	PVC JUNCTION BOX	(N) 4"x4"x2" UL LISTED WATER TIGHT NEMA TYPE 3	3
3	SMART CONTROLLER	(N) FRANKLIN WH AGATE SMART CONTROLLER	1
4	PV SUB PANEL	(N) 125A PV SUB PANEL	1
5	MAIN SERVICE PANEL	(E) MAIN SERVICE PANEL WITH 200A BUSBAR	1
6	MAIN METER	(E) DUKE ENERGY UTILITY METER 240V	1
7	MICROINVERTER	(N) APTOS MAC-800 MICROINVERTERS MAC-800 (240V) PEAK PWR TRACKING VOLTAGE: =16-60V CEC EFFICIENCY : = 96.7 % MAXIMUM INPUT CURRENT: = 15 A MAXIMUM OUTPUT CURRENT: = 3.19 A MAXIMUM INPUT POWER: = 320 -540W+ MAXIMUM OUTPUT POWER: =766 VA	8
8	BATTERY	(N) FRANKLIN WH APOWER 2, 10KW BATTERY, MODEL #APR-10K15V2-US	1

SYSTEM SIZE: DC STC: 7.360 KW
SYSTEM SIZE: AC INV: 6.128 KW

WIRE CHART

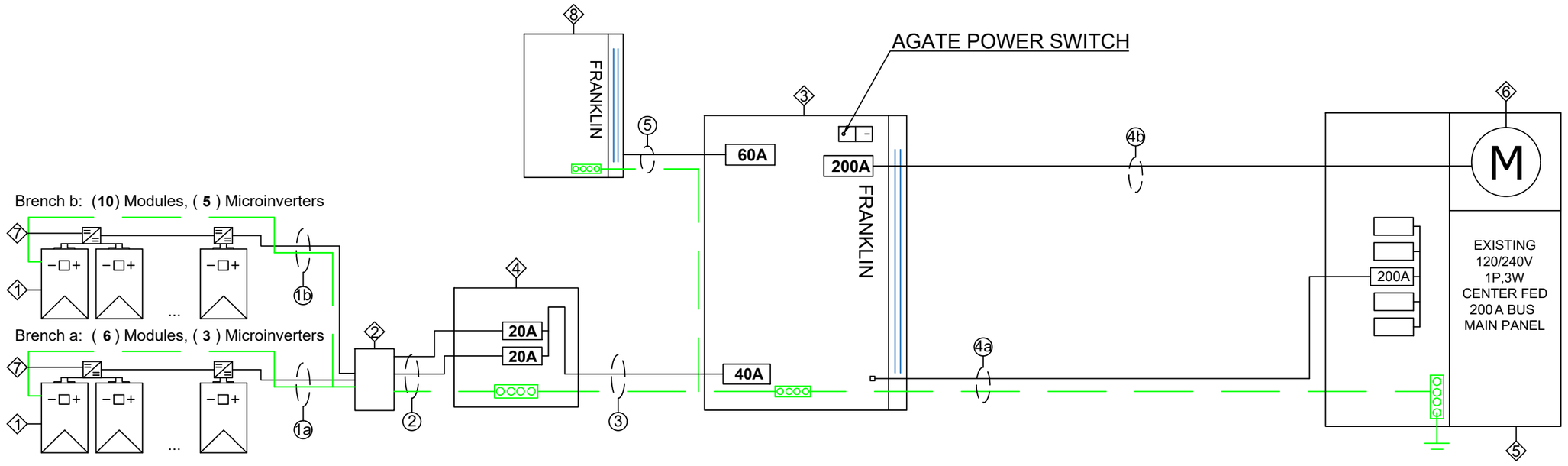
#	MODULE QTY x NEC MULT x MICROINV. OUTPUT AMPS = DESIGN AMPS	BREAKER SIZE (A)	WIRE TYPE	GEC	WIRE RATING X TEMP DERATE X CONDUCTOR DERATE = DERATED WIRE	CONDUIT SIZE
1a	3 X 1.25 X 3.19 = 11.96 A	20	(2) #12 AWG, PV CABLE	(1) #6 BARE SOLID COPPER EGC	30 X .71 X 1 = 21.3 >= 11.96	IN FREE AIR
1b	5 X 1.25 X 3.19 = 19.93 A	20	(2) #12 AWG, PV CABLE	(1) #6 BARE SOLID COPPER EGC	30 X .71 X 1 = 21.3 >= 19.93	IN FREE AIR
2	5 X 1.25 X 3.19 = 19.93 A	20	(4) #10 AWG CU-THWN-2	(1) #10 AWG CU-THWN-2 EGC	35 X .91 X .8 = 25.48>= 19.93	3/4" EMT
3	8 X 1.25 X 3.19 = 31.9 A	40	(3) #8 AWG CU-THWN-2	(1) #10 AWG CU-THWN-2 EGC	45 X .91 X 1 =40.95 >= 31.9	3/4" EMT
4a	-	200	(3) #4/0 AWG, AL	(1) #4 AWG, AL EGC	-	2" PVC
4b	-	200	(3) #4/0 AWG, AL	-	-	2" PVC
5	48 X 1.25 = 60 A	60	(2) #6 AWG, AL	(1) #10 AWG CU-THWN-2 EGC	-	3/4" EMT

KEY NOTES:

- **SOLID BARE G.E.C (FREE-AIR) MOUNTED UNDER ARRAY**
- **PER NEC ARTICLE 690.35 INVERTER GROUND FAULT PROTECTION PROVIDED**
- **ALL GROUNDS AND NEUTRALS BONDED TO EXISTING GROUNDING CONDUCTOR W/IRREVERSIBLE 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 W/IRREVERSIBLE 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.**

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

NOTE:AC DISCONNECT IS VISIBLE AND LOCKABLE
All DC Connectors to modules or inverters must be of matching manufacture brand and style. Do not us 'compatible' connectors which have not been UL listed for compatibility. Performance and fire damage may result from mis-matched connector useage



NORTH CAROLINA PROFESSIONAL SEAL 055158 ENGINEER JOUNGHO CHOI

2 SINGLE LINE DIAGRAM

Project Name:
Lisa Allison-Moon
Property address:
5445 Red Hill Church Rd, Coats, NC 27521

CONTRACTOR

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Phone Number:
984-200-7489
E-Mail.
wiringsolutionsoffice@gmail.com
License Number:
25181-L

DATE: 08/18/2025

1

⚠ WARNING

SOURCES: UTILITY GRID AND
PV SOLAR ELECTRICAL SYSTEM

2

PHOTOVOLTAIC AC DISCONNECT

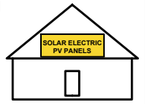
RATED OUTPUT CURRENT: ____

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

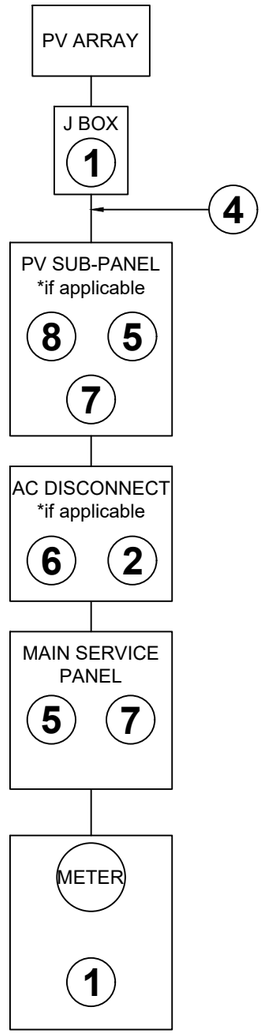
8

PV LOAD CENTER SIZED FOR PV BREAKERS ONLY OR RENDERED UNABLE TO ACCEPT ANY ADDITIONAL LOADS.

9

MAXIMUM VOLTAGE: ____ **V**

MAXIMUM CIRCUIT CURRENT: 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.Marcking 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

Permanent directory or plaque providing location of service disconnecting means and photovoltaic system disconnecting means, if not located at the same location.
(Plaques shall be metal or plastic, with engraved or machine printed letters, or electro-photo plating, in a contrasting color to the plaque. Plaques shall be permanently attached to the equipmenq or in the required location using an approved method that is suitable to withstand the environment to which it is exposed. Plaques and signage shall meet legibility, defacemet, exposure and adhesion requirements of Underwriters Laboratories marking and labeling system 969(UL969).

3 **SIGNAGE**

Project Name:
Lisa Allison-Moon
Property address:
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CONTRACTOR

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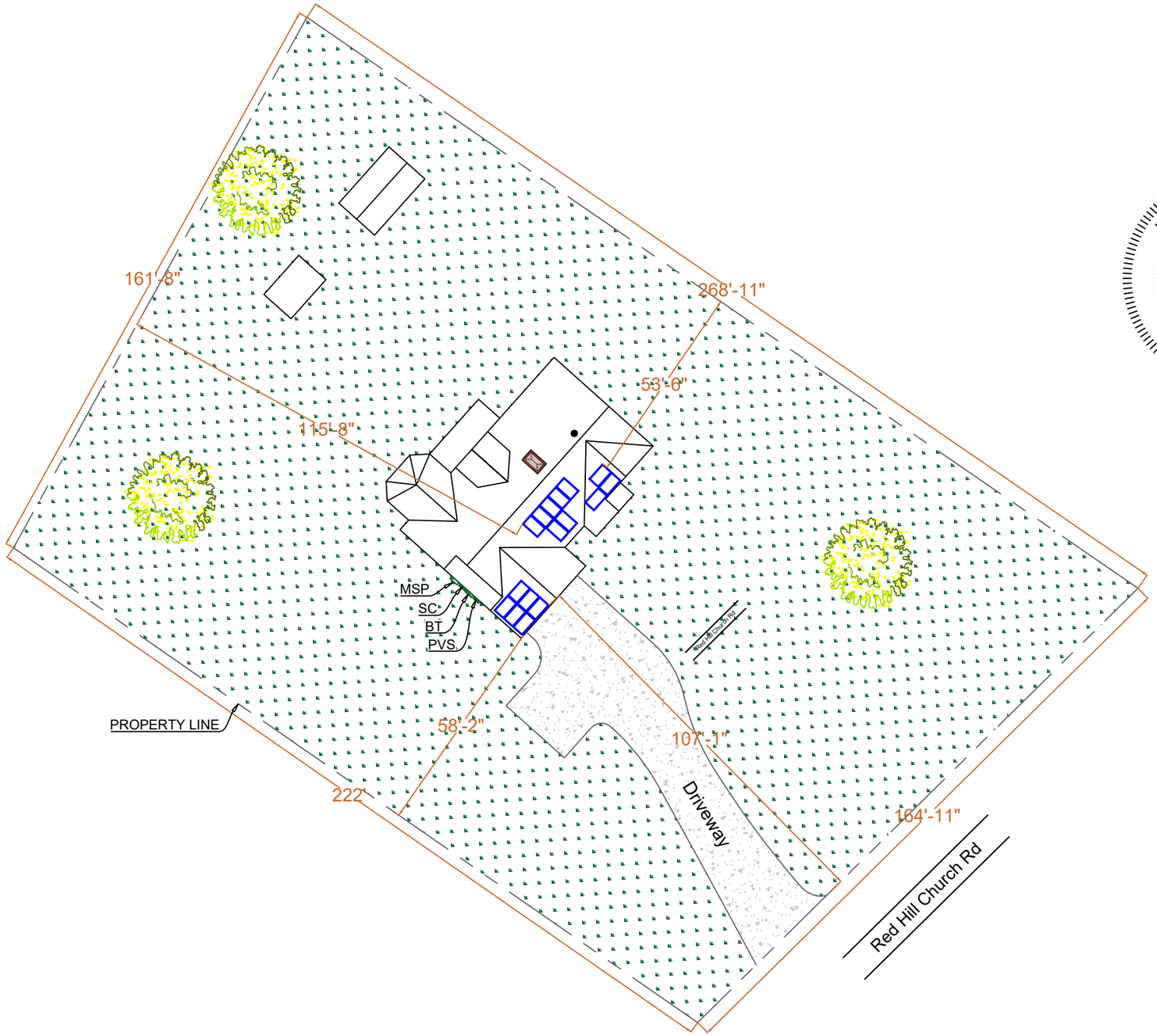
E-Mail.
wiringsolutionsoffice@gmail.com
License Number:
25181-L

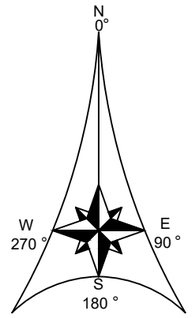
DATE: 08/18/2025

INDEX

MSP	Main Service Panel
SC	AGate System Controller
BT	Franklin APower Battery
PVS	PV Sub Panel
	Solar Module



NORTH CAROLINA PROFESSIONAL SEAL 055158 ENGINEER JOUNGHO CHOI



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

4 SITE PLAN

Project Name:
Lisa Allison-Moon
Property address:
5445 Red Hill Church Rd, Coats, NC 27521

CONTRACTOR

Wiring Solutions Plus LLC
Address:
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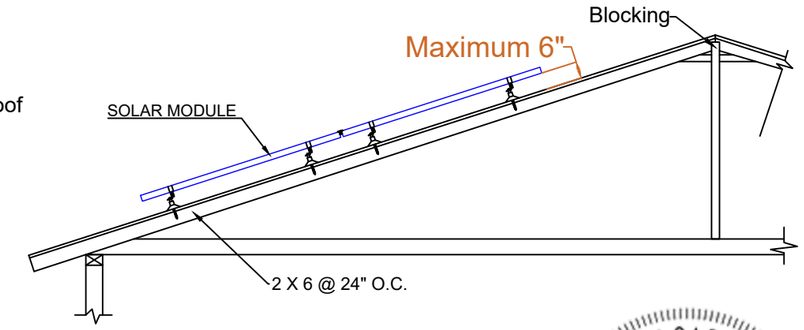
Phone Number:
984-200-7489
E-Mail.
wiringsolutionsoffice@gmail.com
License Number:
25181-L

Wiring Solutions Plus

DATE: 08/18/2025

MODULE WEIGHT (lbs)	52.9
# OF MODULES	16
TOTAL MODULE WEIGHT (lbs)	846.4
RACK WEIGHT (lbs)	169.28
MICROINVERTER WEIGHT (lbs)	45.6
TOTAL SYSTEM WEIGHT (lbs)	1061.28
# OF STANDOFFS	38
MAX SPAN BETWEEN STANDOFFS (in)	48
LOADING PER STANDOFF (lbs)	27.92
TOTAL AREA (sq.ft.)	352
LOADING (PSF)	2.90

1. Ironridge XR10 Racking System (XR-10-168A)
2. Ironridge Halo Ultra Grip Attachment (QM-HUG-01-M1)
3. Bird Mesh (BIRD-MESH-BLK-PACK)
4. Roof attachment hardware to be mounted to existing structure
   (2 X 6 @ 24" O.C. RAFTER) with 48" O.C.rail spans less.
5. Lag bolts are 1/4" X 3.5" stainless steel with 2.5" minimum embedment into the center of the roof
6. Roof sheathed with 1/2" plywood and upper surface is faced with felt paper.
   Finished roof surface is **One layer of** COMP SHINGLE .



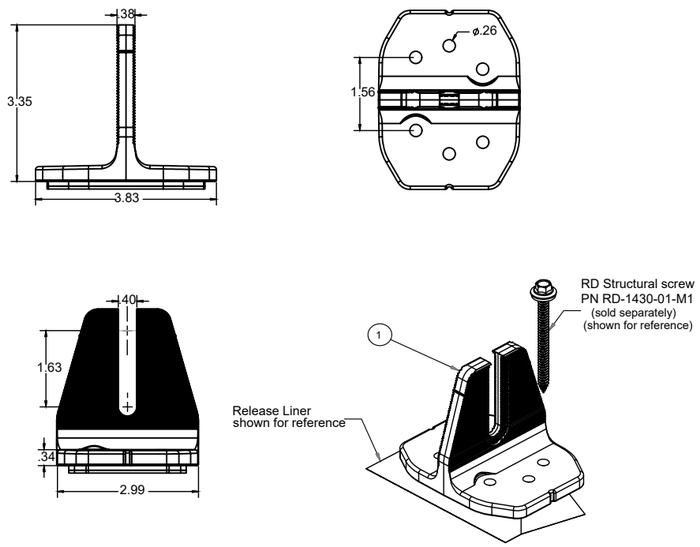
QUICKMOUNT® HALO ULTRAGRIP

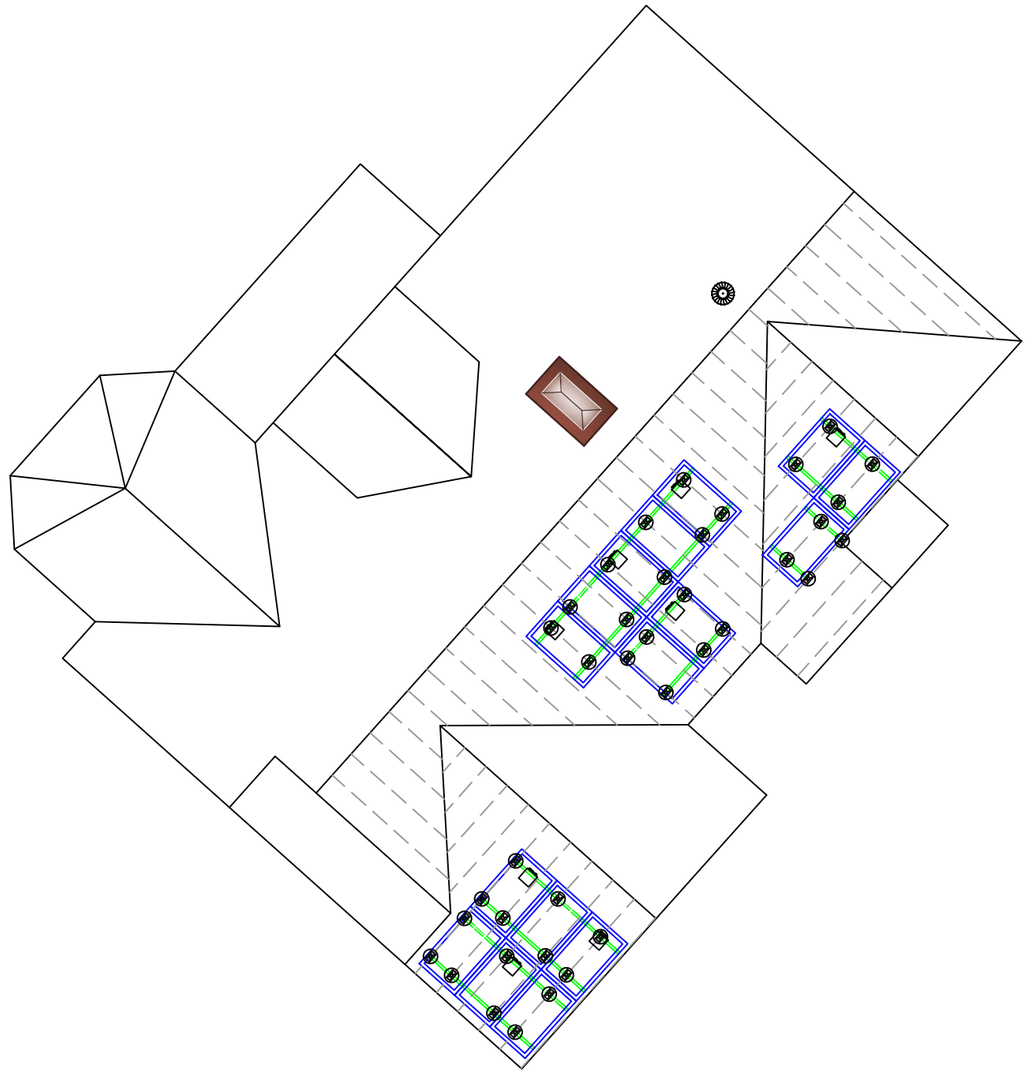
ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

PART NUMBER	DESCRIPTION
QM-HUG-01-M1	Halo UltraGrip - Mill
QM-HUG-01-B1	Halo UltraGrip - Black

Property	Value
Material	3000 Series Aluminium
Finish	Mill or Black

1. Halo UltraGrip





ATTACHMENT
RAIL
RAFTER

NORTH CAROLINA PROFESSIONAL SEAL 054960 ENGINEER AVIAL LUMAGUI

STRUCTURAL ONLY

5 ATTACHMENT LAYOUT

Project Name:
Lisa Allison-Moon
Property address:
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DATE: 08/18/2025

MAC™ 800

Solar for Innovators

High-performance 2:1 Microinverter

Up to 800W

Maximize AC Power Output

The high-performance MAC-800 dual unit microinverter is engineered for maximum AC power output when paired with Aptos Solar Technology's high-power solar panels. The MAC-800 is built for simple system integration and is compatible with third- party devices.

The MAC-800 is equipped and ready for system monitoring and trend tracking through Aptos Solar Technology's cloud based software.

In compliance with CA Rule 21 (UL 1741-SA), IEEE® 1547:2018 (UL 1741-SB 3rd Ed.)

Maximum AC Power Output

- Up to 800W
- 10% more AC power output than competing products

Superior Long-term Reliability

- Industry leading 25-year warranty
- Over 2GW of microinverters deployed across 28 countries
- NEMA6 (IP67) enclosure rated for protection in harsh outdoor conditions

Streamlined Installation

- Seperate trunk cables
- Compatible with Residential and Commercial PV Panels
- Battery integration ready

Built for Safety

- Built-in rapid shutdown feature in compliance with National Electrical Code (NEC)
- 6,000V surge protection feature

Accessories

AC Trunk Cable, 12/10 AWG Cable

AC Trunk Connector

AC Trunk Port Cap

AC Connector Cap - M

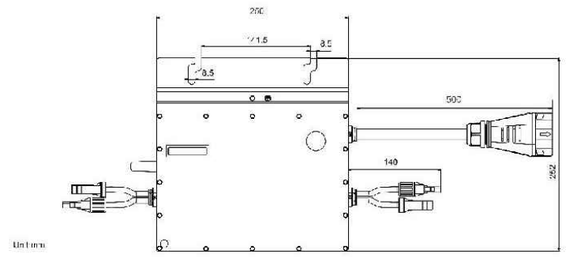
AC Trunk Port Disconnect Tool

DC Extension Cable

AC Trunk Connector Unlock Tool

MAC™ 800

Solar for Innovators



Input Data (DC)

Commonly used module power (W)	320W-540W+
Maximum input voltage(V)	60
MPPT voltage range(V)	16-60
Start-up voltage(V)	22
Maximum input current I_{sc} (A)[1]	2*15

Mechanical Data

Ambient temperature range (°C)	-40 to +65
Dimensions (W X H X D mm)	250 X 170 X 28
Weight (kG)	2.6
Enclosure rating	Outdoor-NEMA (IP67)
Cooling	Natural convection - No fans

Output Data (AC)

Peak output power(VA)	800	
Maximum continuous output power(VA)	766	
Maximum continuous output current (A)	3.19	3.68
Nominal output voltage/range(V)[2]	240/211-264	208/183-228
Nominal frequency/range (Hz)[2]	60/55-65	
Power factor (adjustable)	>0.99 default 0.8 leading...0.8 lagging	
Total harmonic distortion	<3%	
Maximum units per branch[3]	5/4	

Efficiency

CEC peak efficiency	96.7%
CEC weighted efficiency	96.5%
Nominal MPPT efficiency	99.8%
Nighttime power consumption (mW)	<50

Loading Quantity

Container	1 X 20'GP	1 X 40'GP/1 X 40'HQ
Pallet No.	10	22
Carton No.	480	1008
Total quantity	2400	5040

Features

Communication	2.4GHz Proprietary RF(Nordic)
Monitoring	AST Cloud[4]
Warranty	25 Years
Compliance	UL 1741, IEEE 1547, UL 1741 SA (240Vac), UL1741 SB (208Vac and 240Vac), CA Rule 21 (240Vac), CSA C22.2 No.107.1-16, FCC Part 15B, FCC Part 15C
PV Rapid Shutdown	Conforms with NEC-2017 and NEC-2020 Article 690.12 and CEC-2021 Sec 64-218 Rapid Shutdown of PV Systems

*1 Maximum continuous input DC current is 12.5A
*2 Nominal voltage/frequency range can be changed due to the requirements of local power department.
*3 Refer to local requirements for exact number of microinverters per branch.
*4 Aptos Monitoring System.

8207 Callaghan Rd, STE 100
San Antonio, Texas 78230
www.aptossolar.com I info@aptossolar.com

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

6 **INVERTER DATA SHEET**

Project Name:
Lisa Allison-Moon
Property address:
5445 Red Hill Church Rd, Coats, NC 27521

CONTRACTOR

Wiring Solutions Plus LLC
Address:
4724 Hargrove Rd, Raleigh, NC 27616
Phone Number:
984-200-7489
E-Mail.
wiringsolutionsoffice@gmail.com
License Number:
25181-L

DATE: 08/18/2025

DNA™ 120-Monofacial

Solar for Innovators

aptos™
solar technology

DNA-120-MF10-460W

Residential | Commercial

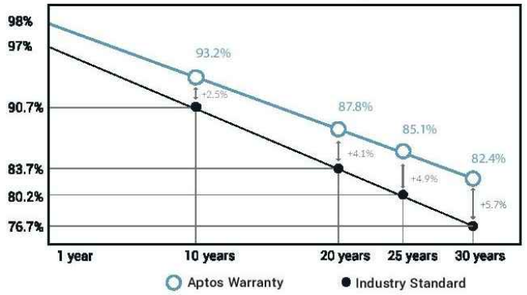
Our DNA Split Cell Series uses advanced selective emitter PERC technology with thin film layers to improve heat tolerance, maximize energy harvest, minimize resistive loss, and use 5% more of the available active area for optimal power performance.

Industry Leading 30 Years Product and Performance Warranty

445W | 450W | 455W | 460W

Designed & Engineered In Silicon Valley

Linear Performance Warranty



Key Features

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

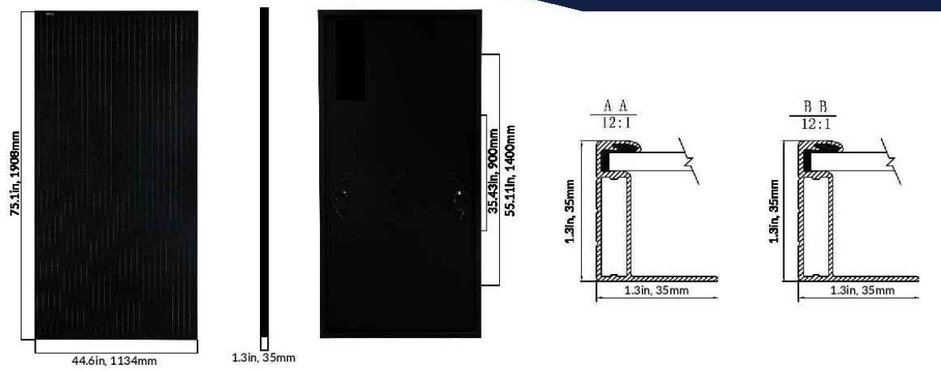
Miami-Dade Approved
Maximum Durability: LEVEL 6 SALT MIST Tested, 5400 Pa Wind Load Certified Panels

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.

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

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

DNA™ 120 Monofacial



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_{mpp} (W)	445W	333W	450W	336W	455W	341W	460W	344W
Open Circuit Voltage V_{VOC} (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_{mp} (V)	35.03	32.32	35.15	32.39	35.27	32.46	35.36	32.53
Rated Voltage I_{mp} (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

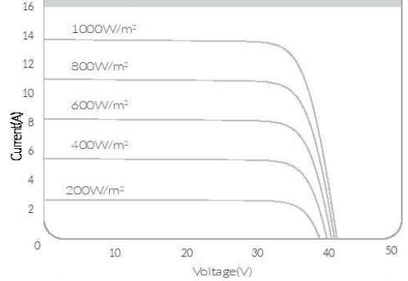
Mechanical Properties	
Cell Type	SE-PERC
Glass	3.2mm, anti-reflection coating, high transmission, low iron, tempered glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68
Dimensions	75.1 X 44.6 X 1.3 in, 1908 X 1134 X 35 mm
Weight	52.9lbs.(24.2kg)
Output Cable	4mm2 (EU)12AWG,39.37in.(1200mm)
Cable Length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

Temperature Coefficients	
Temperature Coefficients P_{mpp}	-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

I-V Curve



Certifications

UL61730-1, UL61730-2
IEC61730-1 IEC61730-2

Ref_11.13.24

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7 MODULE DATA SHEET

Project Name:
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CONTRACTOR

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Phone Number:
984-200-7489
E-Mail.
wiringsolutionsoffice@gmail.com
License Number:
25181-L

Wiring Solutions Plus

DATE: 08/18/2025

Datasheet

IRONRIDGE

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.

PE Certified
Pre-stamped engineering letters available in most states.

Class A Fire Rating
Certified to maintain the fire resistance rating of the existing roof.

Design Assistant
Online software makes it simple to create, share, and price projects.

UL 2703 Listed System
Entire system and components meet newest effective UL 2703 standard.

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 ¾" 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

© 2019 IronRidge, Inc. All rights reserved. U.S. Patents: #8,695,290; #9,819,303; #9,865,938; Others Pending. Version 1.70

8	RACKING DATA SHEET

Project Name:
Lisa Allison-Moon
Property address:
5445 Red Hill Church Rd, Coats, NC 27521

CONTRACTOR

Wiring Solutions Plus LLC
Address:
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License Number:
25181-L

Wiring Solutions Plus

DATE: 08/18/2025

Tech Brief

IRONRIDGE

QuickMount® HUG

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 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.

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).

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

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.

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

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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9 **ATTACHMENT DATA SHEET**

Project Name:
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License Number:
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Wiring Solutions Plus

DATE: 08/18/2025

DATASHEET

FRANKLINWH

Franklin Home Power

The Franklin Home Power (FHP) system integrates the grid, solar generation, batteries and even generators, into a robust energy control system that is managed via a simple mobile app. The FHP provides real time monitoring and control for a home's day-to-day energy usage, and supplies energy from multiple power sources during grid outages.

The FHP's energy management is provided by the aGate X, an intelligent controller that integrates all power sources and automatically detects grid outages to seamlessly transition a home to backup power within 16ms.

An aGate X Smart Circuits Module is available for controlling of and automated load shedding for heavy energy loads during an outage. It provides custom scheduling of unique loads for more efficient use. A Generator Module can also be added to the aGate X for standby generator integration, providing maximum energy resilience and independence. The FHP is designed for daily cycling and emergency backup power. The aGate X complies with NEC 2017, NEC 2020, and UL1741 PCS Certification for main panel upgrade (MPU) avoidance.

The FHP system pairs the aGate X with the aPower X, a lithium iron phosphate (LFP) battery designed by FranklinWH. A single battery has large 13.6kWh capacity with continuous power of 5kW, and its peak power 10kW can last for 10s. Up to 15 aPower X batteries can be connected to a single aGate X.

One aGate X

aPower X Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Capacity(kWh)	13.6	27.2	40.8	54.4	68	81.6	95.2	108.8	122.4	136	149.6	163.2	176.8	190.4	204
Cont. power(kW)	5	10	15	20	25	30	35	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4
Peak power(kW)	10	20	30	40	50	60	70	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8

For FHP system > 15 units, please reach out to info@franklinwh.com

Safe

- Lithium iron phosphate battery
- Automotive grade lithium cells
- Advanced Battery Management System (BMS) with Sate of Heath (SOH) pro-active battery technology.

Intelligent

- Micro-grid interconnect device (MID) functionality
- Auto-detect grid outages, seamless power transfer
- Black-start functionality; daily PV restart capabilities

Reliable

- 12-year warranty
- NEMA 3R enclosure
- Corrosion-proof

Scalable

- Up to 15 aPower X units can be used with a single aGate X
- Usable energy expandable from 13.6kWh to 204kWh
- Continuous output power ranges from 5kW to 38.4kW

Easy & Flexible

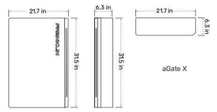
- Compatible with any solar inverter/standby generator
- Generator monitoring and controls via the FranklinWH app
- Pre-assembled, indoor/outdoor/wall/floor installation
- Multiple conduit entries
- App-based, remote commissioning

WWW.FRANKLINWH.COM

AGATE X DATASHEET

The **aGate X** is available with two optional accessories that can be added to customize the homeowner's FHP experience:

- **Smart Circuits Module:** manual and scheduled control for unique electric circuits, via the FranklinWH app.
- **Generator Module:** standby generator integration, redundant power source to the aPower X.



Performance

Switch Over Time (grid to micro-grid)	< 16ms
User Interface	FranklinWH app
Warranty	12 years
Maximum Supply Fault Current	20 kA
Communications	Ethernet / 4G / Wifi

Electrical Connections

aPower Over Current Protection Device	100A Max
Solar Input Over Current Protection Device	80A Max
Backup Load Port Over Current Protection Device	200A Max
Generator Over Current Protection Device[1]	200A Max
Smart Circuits Over Current Protection Device[2]	Option A: (1) x 80A Max @240V & (2) x 50A Max @120V Option B: (1) x 80A Max @240V & (1) x 50A Max @240V

Electrical Interface

Coupling	AC Coupled
Feed-in Phase	Split Phase
Split Phase	L1 / L2 / N / PE

Mechanical

Dimensions (W*H*D)	aGate X: 21.7 x 31.5 x 6.3 in (550 x 800 x 160 mm)
Weight	aGate X: 50 lb (23 Kg)
Installation	Wall mount

Compliance & Certificates

aGate X	UL1741 PCS, UL 67[3], UL 869A[3], UL 916[3]
Seismic	AC156, OSHPD, IEEE 693-2005 (high)
Environmental	California Proposition 65 RoHS Directive 2011 / EU
Emissions	FCC Part 15 Class B, ICES 003

Environmental

Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Operating Humidity (RH)	Up to 100% RH, condensing
Altitude	Maximum 9,843 ft (3,000 m)
Storage Condition	14°F to 113°F (-10°C to 45°C) Up to 95% RH, non-condensing
Enclosure Type	NEMA 3R
Environment	Indoor and outdoor rated

1. Generator Module is optional.
2. Smart Circuit Module is optional.
3. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

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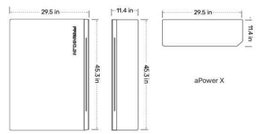
APOWER X DATASHEET

The **aPower X** is a lithium iron phosphate (LFP), AC-coupled battery that is proprietary to the FHP system. With an all-in-one form factor, the aPower X battery is self-contained with battery cells, a battery management system, and an AC inverter.



Performance

Battery Chemistry	Lithium Iron Phosphate (LFP)
Usable System Energy	13.6 kWh per unit, scalable up to 15 units[4]
Warranted Energy Throughput (12yrs)	43 Mwh
Inverter Topology	Isolated
Nominal AC Voltage	120V / 240V, 60 Hz
Maximum Continuous / Peak Discharge Power (10 s)	5 kW / 10 kW
Round Trip Efficiency	89%[5]
Noise Emission (optimal)	<30 dB (A)
User Interface	FranklinWH app
Warranty	12 years

Electrical Interface

Coupling	AC-Coupled
Feed-in Phase	Split Phase
Split Phase	L1 / L2 / N / PE

Application Mode Programming

- Self-Consumption
- Load Shifting
- Backup Standby

Mechanical

Dimensions(W*H*D)	aPower X:29.5 x 45.3 x 11.4 in (750 x 1150 x 290mm)
Weight	aPower X: 408 lb (185 Kg)
Installation	Wall mount or floor mount

Compliance & Certificates

aPower X	UL 9540, UL 1741SA, UL 1741SB, UL 1973, UL 9540A, IEEE 1547, IEEE 1547.1, UN 38.3
Seismic	AC156, OSHPD, IEEE 693-2005 (high)
Environmental	California Proposition 65 RoHS Directive 2011 / EU
Emissions	FCC Part 15 Class B, ICES 003

Environmental

Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Operating Humidity (RH)	Up to 100% RH, condensing
Altitude	Maximum 9,843 ft (3,000 m)
Ingress Rating	IP67 (Battery and power converter system) IP56 (Wiring compartment)
Storage Condition	14°F to 113°F (-10°C to 45°C) Up to 95% RH, non-condensing
Enclosure Type	NEMA 3R
Environment	Indoor and outdoor rated

4. Please contact us for solution design support if you have large capacity requirements.
5. At beginning of life. AC to battery to AC, 50% power rating.

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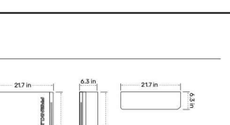
FRANKLINWH APP DATASHEET

The FranklinWH app allows remote monitoring and management of your whole home energy management system at any time, from anywhere. Homeowners can see historical and real-time energy usage and patterns, can set and choose personalized energy-saving plans for family, and enjoy life with the help of our robust features. Installers can use it for a rapid commissioning and faster debugging.



Smart Energy Management

- Use energy per homeowner's discretion:
  - Self-consumption
  - Backup Standby
  - Load Shifting
- Fully visibility into energy production and consumption
- Remotely control household's energy from anywhere at any time
- Heavy load shedding/controls via Smart Circuits to manage backup energy supply
- Local & remote debugging supported

Simple & Reliable

- Intuitive, easy to use
- Real-time and historic energy activity
- One app to monitor and control all power generation
- Multiple comms: Ethernet/Wifi/4G

APP Features

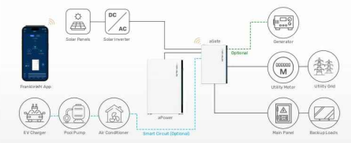
Functionality

Operating System	Android & iOS
Generator Output Setting	Power, current, voltage frequency, time plan
Smart Circuit Setting	Time plan, manual switch, circuits merge, SOC threshold
Emergency Backup Setting	Enable & Disable
SOC Setting	Self-consumption, load shifting
LED Strip Setting	Switch on/off, time plan
Access Point Setting	Modify name and password
Power Sources Monitor	Working status, current flow
Backup Remaining Display	Duration
History Data	Daily, monthly, yearly
Summary Report	Daily, monthly, yearly
Downtime Maintenance	Keep home powered during aPower X maintenance
Grid Compliance	HECO SRD V2.0, CA UL 1741SA, User Defined
Grid Program	NEM+ / CSS / CGS / CGS+ / NEM 2.0 / BB & NEM / BB & CSS / BB & CGS+ / Smart export
Account Security	Password verification support

Application Mode Programming

- Self-Consumption
- Load Shifting
- Backup Standby

FranklinWH's solution for Whole Home backup



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Email: info@franklinwh.com
Website: www.franklinwh.com

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10 **A GATE DATA SHEET**

Project Name:
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wiringsolutionsoffice@gmail.com
License Number:
25181-L

Wiring Solutions Plus

DATE: 08/18/2025

FRANKLINWH

aPower 2

AC-coupled battery

Store solar generated power while the sun is shining. Use the stored energy when needed to lower electric bills. Run heavy loads such as air conditioners and water heaters as usual even during grid outages. Provide homeowner peace of mind by fully charging before severe weather events.

The system is off-grid ready, designed to operate independently from the main power grid to deliver reliable energy in any situation.

- ✓ 10 kW continuous / 15 kW peak for 10s
- ✓ 8 kW charge power
- ✓ 15 kWh AC[1] per unit, up to 225 kWh (15 units) per aGate
- ✓ 60 MWh warranty throughput

PERFORMANCE SPECIFICATIONS

SKU	APR-10K15V2-US				
Model Number	aPower 2				
Nameplate /Certification	aPower X-20				
CEC Listing Name	aPower Xyyy				
Battery Chemistry	Lithium Iron Phosphate (LFP)				
Usable System Energy	15 kWh AC[1] per unit, up to 15 units per aGate				
Aggregate Throughput	60 MWh				
Real Power (charge)	8 kW continuous				
Nominal Output Power (AC)	2.5 kW	5 kW	6.7 kW	8.4 kW	10 kW[2]
Maximum Apparent Power	2.9 kVA	5.8 kVA	7.7 kVA	9.6 kVA	11.5 kVA
Maximum Continuous Current	12 A	24 A	32 A	40 A	48 A
Nominal AC Voltage	120 / 240 V, 120 / 208 V (single phase), 60 Hz				
Coupling	AC-coupled				
Phase	2 W+N+PE				
Round Trip Efficiency	90%[1]				
Maximum Short-Circuit Current Rating	10 kA				
Load Start Capability	Up to a 5-ton air conditioner				
Work Modes	Self-Consumption Time of Use Emergency Backup				
Noise Emission	30 dB(A) Typical / 45 dB(A) Maximum				
Flood Resistance	Up to 29" from the aPower 2 base				
User Interface	FranklinWH App				
Warranty	15 years[3]				

COMPLIANCE INFORMATION

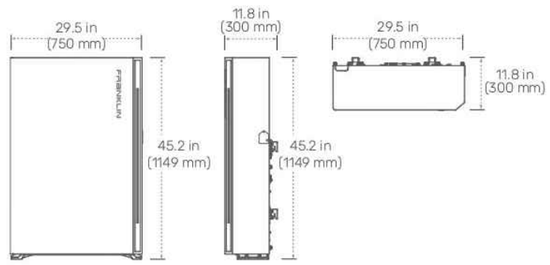
Certifications	UL 9540, UL 9540A, UL 1973, UL 1741, UL1741 SB, UL 1741 PCS, UL 60730-1, IEEE 1547, IEEE 1547.1, UN 38.3, CSA C22.2 No. 107.1
Seismic	AC 156, OSHPD, IEEE 693-2005 (high)
Environmental	California Proposition 65 RoHS Directive 2011 / EU
Emissions	FCC Part 15 Class B, ICES 003

1. At beginning of life, 3 kW charge/discharge power, 77 °F (25 °C).
2. Refer to the installation manual and commissioning guide for proper wire and OCPD sizes.
3. For more details, please refer to the FranklinWH System Limited Warranty for End Users available in the Documentation Center on the FranklinWH website.

WWW.FRANKLINWH.COM

MECHANICAL SPECIFICATIONS

Dimensions (H × W × D)	45.2 in × 29.5 in × 11.8 in (1149 mm × 750 mm × 300 mm)
Weight, aPower 2 Complete	357 lb. (162 kg)
Weight, without Cover	335 lb. (152 kg)
Weight, Cover	22 lb. (10 kg)
Mounting	Wall or floor mount
Cooling	Natural air-cooled design



ENVIRONMENTAL SPECIFICATIONS

Enclosure Type	Type 3R
Ingress Protection	IP56 (Wiring) IP67 (Battery Pack & Inverter)
Operating Temperature	-4 °F to 122 °F (-20 °C to 50 °C) Operates up to 131 °F (55 °C) at 5kW derated output
Operating Humidity (RH)	Up to 100% RH, condensing
Altitude	Maximum 9,843 ft (3,000 m)
Environment	Indoor and outdoor rated

Compatibility Notice: At launch, the aPower 2 is compatible with the aGate 1.3 only. Compatibility with earlier aGate and aPower versions is anticipated in Q2 2025.

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11 **A - POWER DATA SHEET**

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