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| PV MATERIAL SUMMARY: DISTRIBUTOR | |
|----------------------------------|----|
| CS6.1-54TM-460H | 27 |
| IQ8AC-72-M-US | 27 |
| X-IQ-AM1-240-5-HDK | 1 |
| Q-12-17-240 | 30 |
| Q-SEAL-10 | 3 |
| Q-TERM-10 | 3 |
| XR-10-184B | 2 |
| XR-10-168B | 13 |
| XR10-BOSS-01-M1 | 10 |
| UFO-CL-01-B1 | 46 |
| UFO-END-01-B1 | 16 |
| XR-LUG-03-A1 | 5 |
| 4 IN QB2 (NCSN provided) | 50 |
| MI-BHW | 27 |
| GC66803 Geocel Sealant | 3 |
| SOLADECK 0799-5B | 1 |
| SOLAR MESH-P-8 | 2 |
| SNRAC 242-04105 | 30 |
| FRANKLIN AGT-R1V2-US | 1 |
| FRANKLIN APR-10K15V2-US | 1 |
| FRANKLIN ACCY-SCV2-US | 1 |






CLIENT INFO

KELLI SNEED
107 WINTERBERRY WAY
FUQUAY-VARINA, NC 27526

PROJECT INFO


DC INPUT: 12.420 kW
AC EXPORT: 9.423 kW
DOI INSPT. METHOD: OPTION 2

Model Energy



300 Fayetteville St.
#1430
Raleigh, NC 27602
919-274-9905
ModelEnergy.com

P-1194



CODE REFERENCES

NATIONAL ELECTRICAL CODE v. 2017
NC FIRE PROTECTION CODE v. 2018
NC BUILDING CODE v. 2018
NC RESIDENTIAL CODE v. 2018
ACSE v. 7-10

SITE CONDITIONS

WIND SPEED: 120 MPH
RISK CATEGORY: II
EXPOSURE: B
SNOW: 15 PSF

SHEET INDEX

PV-1: COVER SHEET
PV-2: PV STRUCTURAL
PV-3: PV ELECTRICAL
PV-4: PV EQUIPMENT LABELS
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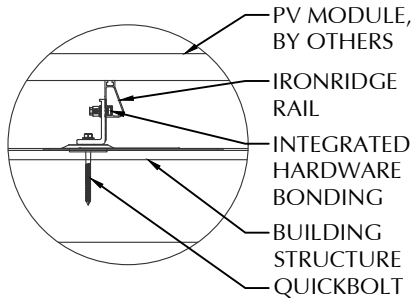
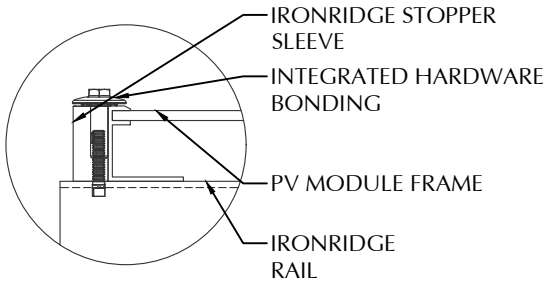
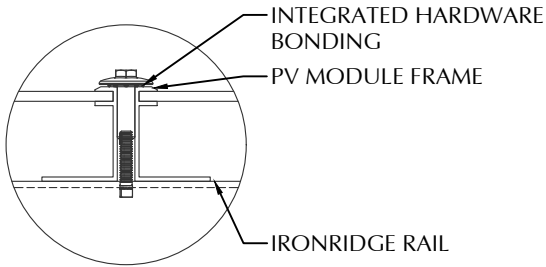
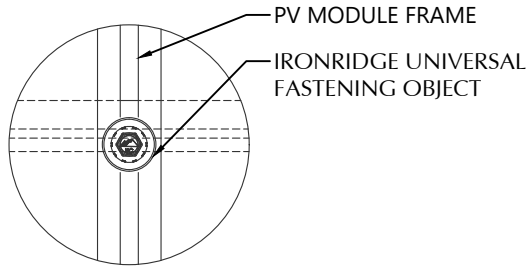
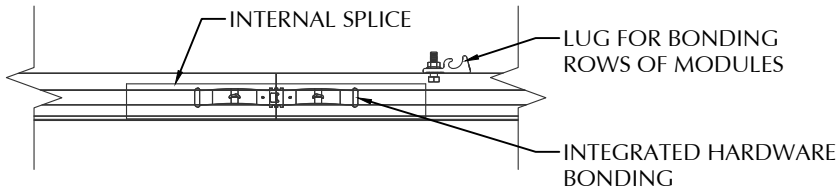
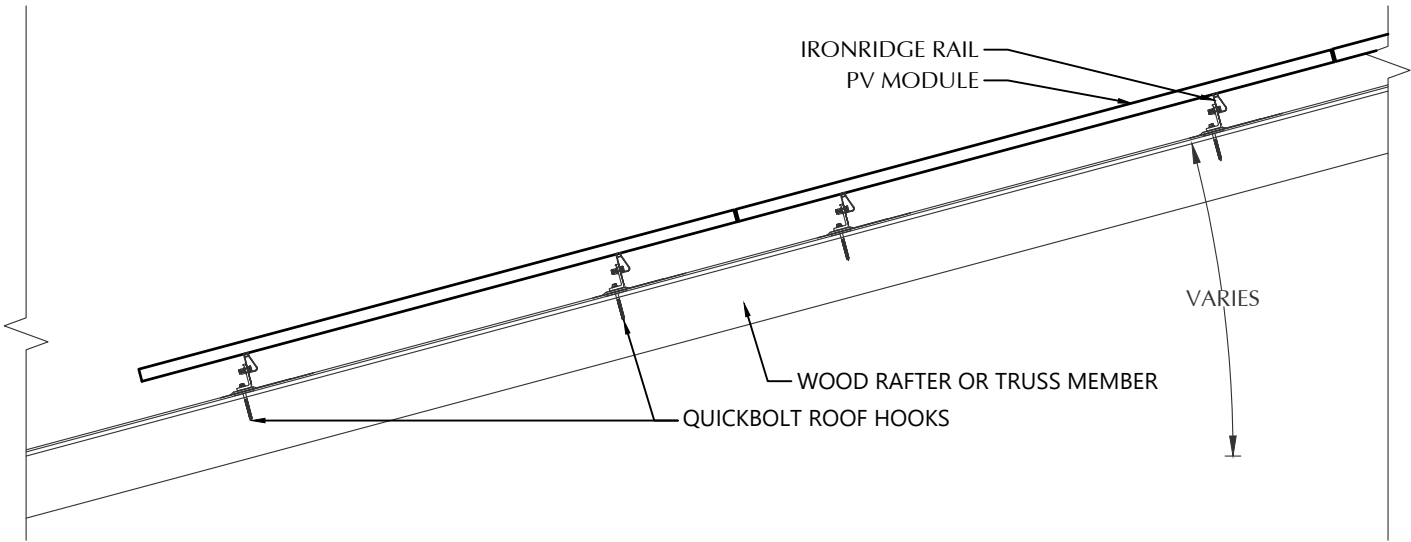
VERSIONS

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| CONSTRUCTION | CRM | 8/27/2025 |
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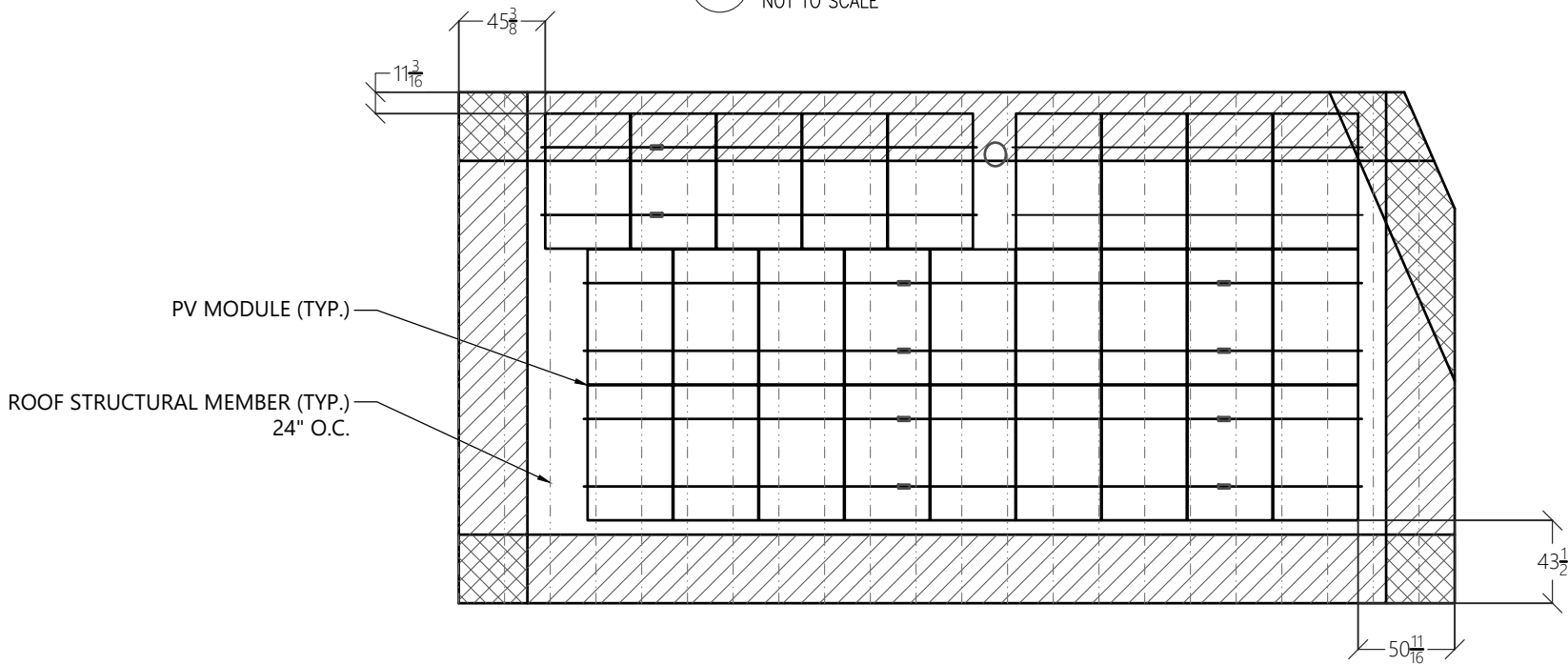
PV SYSTEM COVER PAGE

PV-1.1

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1 ROOF FASTENER DETAIL
NOT TO SCALE



2 ROOF A ARRAY LAYOUT
1/8" = 1'-0"

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

NAME: ANDREW W. KING, PE

SIGNED:

PV MODULES

| | |
|--------------|-----------------|
| MAKE | CANADIAN SOLAR |
| MODEL | CS6.1-54TM-460H |
| WIDTH | 44.60 IN |
| LENGTH | 70.90 IN |
| THICKNESS | 35 MM |
| WEIGHT | 50.70 LBS. |
| ARRAY AREA | 593 SQFT. |
| ARRAY WEIGHT | 1482 LBS. |

ROOF SUMMARY

| | |
|----------------|------------------|
| STRUCTURE: | |
| TYPE | TRUSSES |
| MATERIAL | SOUTHERN PINE #2 |
| SIZE | 2 X 4 |
| SPACING | 24 IN O.C. |
| ALLOWABLE SPAN | 88 IN |
| PITCH | 6/12 |
| DENSITY | 30 LBS./CU.FT. |
| DECKING: | |
| TYPE | OSB |
| MATERIAL | COMPOSITE |
| THICKNESS | 7/16 IN |
| WEIGHT | 1.60 LBS/SQFT |
| ROOFING: | |
| TYPE | ASPHALT SHINGLE |
| MATERIAL | ASPHALT |
| WEIGHT | 2.30 LBS/SQFT. |

ROOF MOUNT SUMMARY

| MAXIMUM (IN) | MOUNT SPACING | RAIL OVERHANG |
|--------------|---------------|---------------|
| WIND ZONE 1 | 72 IN | 24 IN |
| WIND ZONE 2 | 48 IN | 24 IN |
| WIND ZONE 3 | 48 IN | 21 IN |

ROOF LOADING

| | |
|-------------------|------------------|
| GROUND SNOW LOAD: | 15 LBS./SQFT. |
| LIVE LOAD | 20 LBS./SQFT. |
| DEAD LOAD | |
| ROOFING | 3.9 LBS/SQFT. |
| PV ARRAY | 2.5 LBS./SQFT. |
| TOTAL | 6.4 LBS./SQFT. |
| WIND LOAD: | |
| UPLIFT ZONE 1 | -24.6 LBS./SQFT. |
| UPLIFT ZONE 2 | -29.0 LBS./SQFT. |
| UPLIFT ZONE 3 | -29.0 LBS./SQFT. |
| DOWNWARD | 23.0 LBS./SQFT. |
| FASTENER LOAD: | |
| UPLIFT ZONE 1 | -433 LBS. |
| UPLIFT ZONE 2 | -340 LBS. |
| UPLIFT ZONE 3 | -340 LBS. |
| DOWNWARD | 404 LBS. |

ROOF MOUNT & FASTENER

| | |
|-----------------------|-----------------------|
| ROOF MOUNT: | |
| MAKE | QUICKBOLT |
| MODEL | 4 IN QB2 |
| MATERIAL | STAINLESS / EPDM |
| FASTENER: | |
| MAKE | QUICK SCREWS |
| MODEL | HEX LAG BOLT |
| MATERIAL | 304 SS |
| SIZE | 5/16" X 4" (1/2" HEX) |
| GENERAL: | |
| WEIGHT | 0.65 LBS. |
| FASTENERS PER MOUNT | 1 |
| MAX. PULL-OUT FORCE | 960.0 LBS. |
| SAFETY FACTOR | 2 |
| DESIGN PULL-OUT FORCE | 480.0 LBS. |

MOUNTING RAILS

| | |
|----------|--------------|
| MAKE | IRONRIDGE |
| MODEL | XR10 |
| MATERIAL | ALUMINUM |
| WEIGHT | 0.036 LBS/IN |
| SPACING | 35 IN |



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PV SYSTEM STRUCTURAL

PV-2.1

CONDUCTOR SCHEDULE

| TAG | CURRENT CARRYING CONDUCTORS | | | GROUNDING CONDUCTORS | | | CONDUIT/RACEWAY | | | NOTES |
|-----|-----------------------------|--------|------------|----------------------|--------|------------|-----------------|------|----------|-------|
| | QTY. | SIZE | INSULATION | QTY. | SIZE | INSULATION | QTY. | SIZE | LOCATION | |
| C1 | 6 | 12 AWG | DG CABLE | 1 | 6 AWG | BARE | - | - | FREE AIR | 1,5 |
| C2 | 6 | 10 AWG | THWN-2 | 1 | 10 AWG | THWN-2 | 1 | 3/4" | EXT/INT | 2,4,5 |
| C3 | 3 | 8 AWG | THWN-2 | 1 | 10 AWG | THWN-2 | 1 | 3/4" | EXTERIOR | 2,4,5 |
| C4 | 3 | 6 AWG | THWN-2 | 1 | 10 AWG | THWN-2 | 1 | 1" | EXTERIOR | 2,4,5 |
| C5 | 3 | 3 AWG | THWN-2 | 1 | 8 AWG | THWN-2 | 1 | 1" | EXT/INT | 2,4,5 |
| XC | - | - | - | - | - | - | - | - | - | 3 |

NOTES:

- MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
- CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
- EXISTING CONDUCTORS, FIELD VERIFY
- EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR
- PLEASE REFERENCES NOTES ON PV-4.1 FOR ADDITIONAL DETAIL
- SERVICE & FEEDER GROUNDED CONDUCTORS MAY BE SIZED SMALLER THAN UNGROUNDED CONDUCTORS PER NEC 310.15(B)(7)

ENERGY STORAGE SYSTEM

| | |
|------------------|------------|
| MAKE | FRANKLINWH |
| MODEL | APOWER 2 |
| USABLE ENERGY | 15.0 kWh |
| NOM. VOLT. | 240 VOLTS |
| REAL POWER CONT. | 8000 WATTS |
| UL LIST. (Y/N) | YES |
| OCPD | 60 AMPS |
| PROTECT RATING | NEMA 3R |

PV MODULE

| | |
|--------------------|-----------------|
| MAKE | CANADIAN SOLAR |
| MODEL | CS6.1-54TM-460H |
| NOM. POWER (PNOM) | 460 WATTS |
| NOM. VOLT. (VMPP) | 33.4 VOLTS |
| O.C. VOLT (VOC) | 39.3 VOLTS |
| MAX. SYS. VOLT. | 1000 VOLTS |
| NOM. CURR. (IMPP) | 13.8 AMPS |
| S.C. CURR. (ISC) | 14.7 AMPS |
| TEMP. COEF. (PMPP) | -0.29 %/C |
| TEMP. COEF. (Voc) | -0.25 %/C |
| MAX SERIES FUSE | 25 AMPS |
| UL COMPLIANT (Y/N) | YES |

ENERGY MANAGEMENT

| | |
|---------------------|------------|
| MAKE | FRANKLINWH |
| MODEL | AGATE 2 |
| ENCL. RATING | NEMA 3R |
| VOLT. RATING | 240 VOLTS |
| DISCONNECT CURR. | 200 AMPS |
| UL LIST. (Y/N) | YES |
| MAIN BREAKER (Y/N) | YES |
| MAIN BREAKER RATING | 200 AMPS |

- TROUGH MAY BE USED IF NECESSARY
- INSTALL MAIN BREAKER THAT WILL SERVE
- FEED BACKED-UP LOADS PANEL VIA 100A BREAKER
- LAND PV AND BATTERY ON DESIGNATED BREAKER SPACES IN ENERGY MANAGEMENT
- RELOCATE 30A A/C BREAKER FROM BACKED UP LOADS PANEL ONTO SMART CIRCUIT MODULE

PV COMBINER PANEL

| | |
|---------------------|--------------------|
| MAKE | ENPHASE |
| MODEL | X-IQ-AM1-240-5-HDK |
| INPUT: | |
| MAX BRANCH CIRCUITS | 4 TOTAL |
| BRANCH CIRCUIT OCPD | 50.00 AMPS |
| OUTPUT: | |
| MAX POWER | NA |
| NOM. VOLTAGE | 240 VOLTS |
| BUS RATING | 125.00 AMPS |
| MAIN BREAKER Y/N | NO |
| ENCL. RATING | NEMA TYPE 3R |
| UL LIST. (Y/N) | YES |

JUNCTION BOX

| | |
|-----------------|--------------|
| MAKE | SOLADECK |
| PROTECT. RATING | NEMA TYPE 3R |
| UL LIST. (Y/N) | YES |

METER COMBO (EXISTING)

| | |
|---------------------|-----------|
| MAKE | SQUARE D |
| MODEL | RC12L200C |
| ENCL. RATING | NEMA 3R |
| VOLT. RATING | 240 |
| BUS RATING | 200 AMPS |
| UL LIST. (Y/N) | YES |
| MAIN BREAKER (Y/N) | NO |
| MAIN BREAKER RATING | N/A |

- EACH BREAKER SERVES AS SERVICE DISCONNECT
- REDIRECT SUBPANEL OUTPUT TO FEED ENERGY MANAGEMENT

DC / AC INVERTER

| | |
|-----------------------|---------------|
| MAKE | ENPHASE |
| MODEL | IQ8AC-72-M-US |
| DC INPUT: | |
| POWER RANGE (WATTS) | 295-500 |
| MIN/MAX START VOLT. | 22 / 58 |
| OPERATING VOLT. RANGE | 18-58 |
| MAX. CURRENT | 20.00 AMPS |
| MODULE COMPATIBILITY | 60 & 72 CELL |
| AC OUTPUT: | |
| MAX. POWER | 366 WATTS |
| NOM. POWER | 349 WATTS |
| NOM. VOLT. | 211-240-264 |
| MAX. CURR. | 1.45 AMPS |
| DC DISC. (Y/N) | NO |
| RAPID SHUTDOWN (Y/N) | YES |
| PROTECT. RATING | NEMA TYPE 6 |
| UL LIST. (Y/N) | YES |
| MAX BRANCH CIRCUIT | YES |

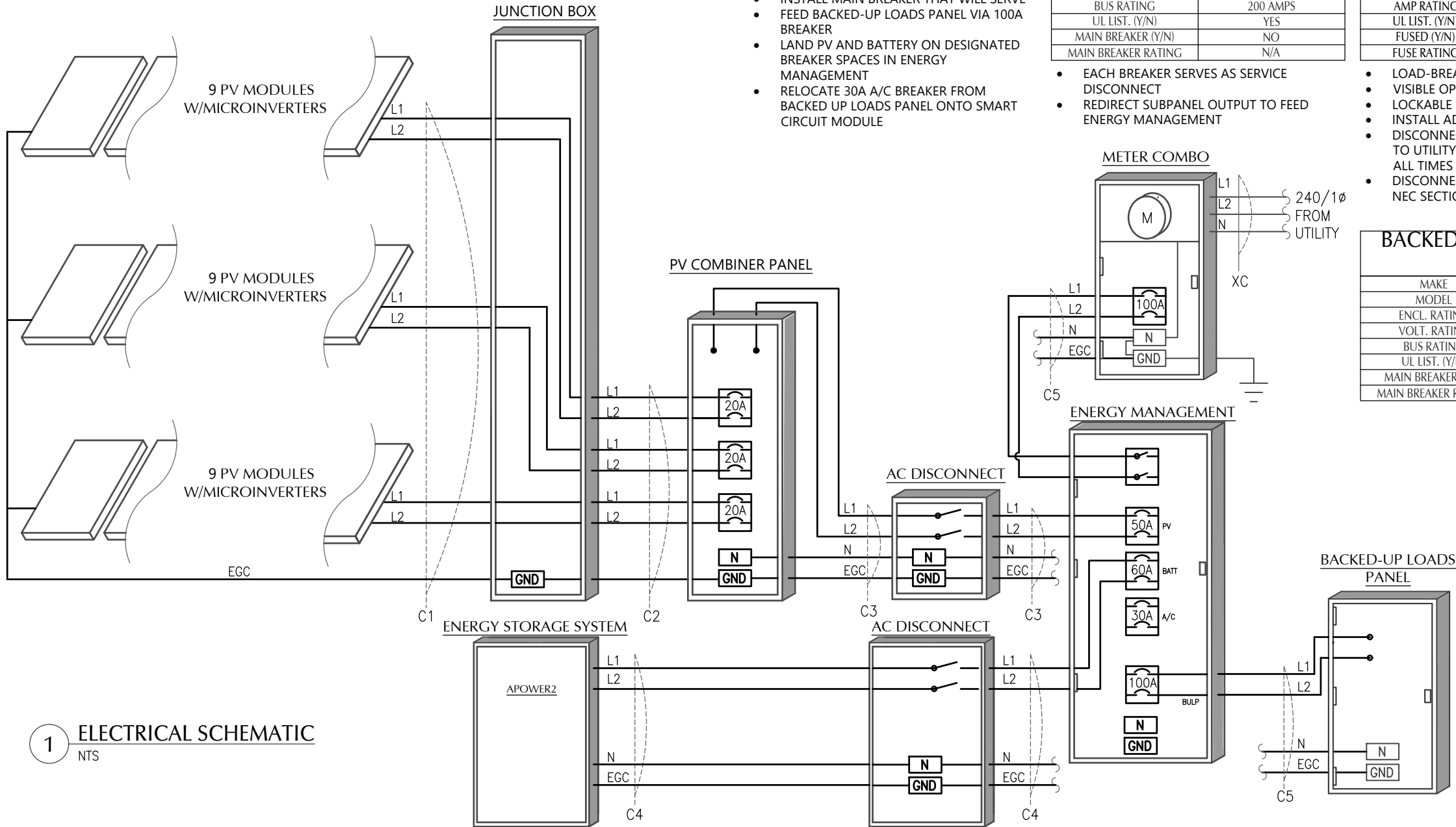
PV AC DISCONNECT

| | |
|----------------|-----------|
| MAKE | GENERIC |
| MODEL | NA |
| ENCL. RATING | NEMA 3R |
| VOLT. RATING | 240 VOLTS |
| AMP RATING | 60 AMPS |
| UL LIST. (Y/N) | YES |
| FUSED (Y/N) | NO |
| FUSE RATING | N/A |

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION
- INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILY ACCESSIBLE TO UTILITY COMPANY PERSONNEL AT ALL TIMES
- DISCONNECT MARKED AND RATED PER NEC SECTION 690.13 AND 705.10

BACKED-UP LOADS PANEL (EXISTING)

| | |
|---------------------|----------|
| MAKE | SQUARE D |
| MODEL | HOMC30UC |
| ENCL. RATING | NEMA 1 |
| VOLT. RATING | 240 |
| BUS RATING | 225 AMPS |
| UL LIST. (Y/N) | YES |
| MAIN BREAKER (Y/N) | NO |
| MAIN BREAKER RATING | N/A |



1 ELECTRICAL SCHEMATIC
NTS



CLIENT INFO

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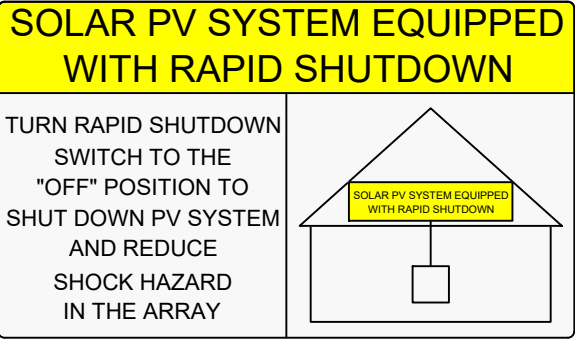
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| FOR: | DESIGNER | DATE |
| CONSTRUCTION | CRM | 8/27/2025 |

PV SYSTEM
ELECTRICAL

PV-3.1

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56 (C)(3)
PLACE ON RAPID SHUTDOWN SWITCH OR EQUIPMENT WITH INTEGRATED RAPID SHUTDOWN *REFLECTIVE*



NEC 690.56 (C)(1)(a)
PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

WARNING

THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE SHALL NOT EXCEED AMPACITY OF BUSBAR.

NEC 705.12 (B)(2)(3)(c)

WARNING

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

NEC 705.12(B)(3)
PLACE ON ALL EQUIPMENT THAT IS SUPPLIED BY THREE POWER SOURCES

SERVICE DISCONNECT LOCATED:

BATTERY DISCONNECT LOCATED:

PV DISCONNECT LOCATED:

NEC 705.10
PLACE AT SERVICE EQUIPMENT AND PV SYSTEM DISCONNECTING MEANS.

WARNING

PHOTOVOLTAIC SYSTEM COMBINER PANEL
DO NOT ADD LOADS

NEC 705.12 (C)(3)
PLACE ON PV COMBINER PANEL

PV SYSTEM DISCONNECT

NEC 690.13 (B)
PLACE ON PV SYSTEM DISCONNECTING MEANS.

PHOTOVOLTAIC SYSTEM AC DISCONNECT

OPERATING VOLTAGE 240 VOLTS
OPERATING CURRENT 39.15 AMPS

NEC 690.54
PLACE ON INTERCONNECTION DISCONNECTING MEANS

LABEL NOTES:

- LABELS SHOWN ARE NOT TO SCALE.
- LABEL MATERIAL SHALL BE SUITABLE FOR THE EQUIPMENT ENVIRONMENT.
- DC CONDUIT SHALL BE MARKED WITH REQUIRED LABEL EVERY 10 FEET.
- PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED AND THAT VARIOUS DANGERS ARE PRESENT.
- EACH PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT.
- WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT.
- A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED AT THE DC DISCONNECT MEANS.
- A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
- LABELS WILL BE APPLIED IN ACCORDANCE WITH THE NEC. SOME LABELS SHOWN MAY NOT BE NECESSARY.

WIRING NOTES:

- CONDUCTORS SHALL BE COPPER OR ALUMINUM, RATED AT NOT LESS THAN 600 VOLTS
- MINIMUM SIZE SHALL BE #14 AWG UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- EXPOSED WIRING CONDUCTOR INSULATION SHALL BE TYPE PV WIRE, USE-2, OR RHW-2 WHERE THE OUTER LAYER OF THE INSULATION IS UV, SUNLIGHT, AND MOISTURE RESISTANT. CABLE ASSEMBLIES SHALL BE TYPE DG. BARE CONDUCTORS SHALL BE A MINIMUM OF #6 AWG.
- EXTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THWN-2 AND INSTALLED IN ELECTRICAL METALLIC TUBING(EMT), RIGID POLYVINYL CHLORIDE CONDUIT(PVC), RIGID METALLIC CONDUIT (RMC), LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC), OR LIQUIDTIGHT FLEXIBLE NON METALLIX CONDUIT (LFNC). SE-TYPE CABLE CAN BE USED AS AN ALTERNATIVE. ADDITIONAL WIRING METHODS SHALL BE PERMITTED ONLY WHEN IN COMPLIANCE WITH ALL NEC REQUIREMENTS.
- INTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THWN-2 OR XHHW AND INSTALLED IN ELECTRICAL METALLIC TUBING (EMT), FLEXIBLE METAL CONDUIT(FMC), LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC), LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC). TYPE SE, NM, AND MC CABLE ASSEMBLIES SHALL ALSO BE PERMITTED. ADDITIONAL WIRING METHODS SHALL BE PERMITTED ONLY WHEN IN COMPLIANCE WITH ALL NEC REQUIREMENTS.
- BURIED WIRING CONDUCTOR INSULATION SHALL BE RATED FOR DIRECT BURIAL WHEN INSTALLED OUTSIDE OF RACEWAY. CONDUCTOR INSULATION SHALL BE TYPE THWN-2 OR XHHW AND INSTALLED IN RIGID PVC, RIGID METALLIC CONDUIT, OR HDPE. ADDITIONAL WIRING METHODS SHALL BE PERMITTED ONLY WHEN IN COMPLIANCE WITH ALL NEC REQUIREMENTS.
- USE SCHEDULE 40 PVC OUTDOORS WHERE NOT SUBJECT TO PHYSICAL DAMAGE OR BELOW FLOOR SLAB. USE SCHEDULE 80 PVC OUTDOORS WHERE SUBJECT TO PHYSICAL DAMAGE
- MINIMUM CONDUIT SIZE TO BE 1/2".
- WIRING METHODS TO CONFORM TO CHAPTER 3 OF THE NEC.

CONSTRUCTION NOTES:

- ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH THE NEC, STATE, AND LOCAL APPLICABLE CODES.
- FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS.
- ENSURE REQUIRED MAINTENANCE ACCESS AND CLEARANCES ARE
- FUSES 0 - 600 AMPS SHALL BE UL CLASS "RK-1" LOW PEAK DUAL ELEMENT TIME DELAY WITH 200,000 AMPERE INTERRUPTING RATING A, UNLESS NOTED OTHERWISE.
- ALL TERMINALS, SPlicing CONNECTORS, LUGS, ETC SHALL BE IDENTIFIED FOR USE WITH THE MATERIAL (CU/AL) OF THE CONDUCTOR AND SHALL BE PROPERLY INSTALLED.
- ALL PENETRATIONS THROUGH EXTERIOR ROOFS SHALL BE FLASHED IN A WATERPROOF MANNER.
- ALL PENETRATIONS THROUGH ATTIC FIRE BARRIERS SHALL BE SEALED WITH FIRE-BARRIER SEALANT CAULK.
- SUPPORT ALL CONDUIT AND EQUIPMENT IN ACCORDANCE W/ NEC. ANY SUSPENDED MATERIALS SHALL BE DIRECTLY SUPPORTED BY THE BUILDING STRUCTURE.
- A NORTH CAROLINA REGISTERED DESIGN PROFESSIONAL WILL BE REQUIRED TO SEAL THE STRUCTURAL DESIGN AT THE TIME OF PERMIT APPLICATION IF ANY OF THE FOLLOWING EXIST AND ARE ATTESTED TO BY THE APPLICANT:
 - THE WEIGHT OF THE PV SYSTEM EXCEEDS THREE (3) POUNDS PER SQUARE FOOT(PSF)
 - THE ROOF POSSESSES MORE THAN ONE (1) LAYER OF ASPHALT SHINGLES
 - THE ROOFING MATERIAL CONSISTS OF A TYPE OTHER THAN ASPHALT SHINGLES OR METAL
 - THE ROOF IS LOCATED IN A 140 MPH OR GREATER WIND ZONE



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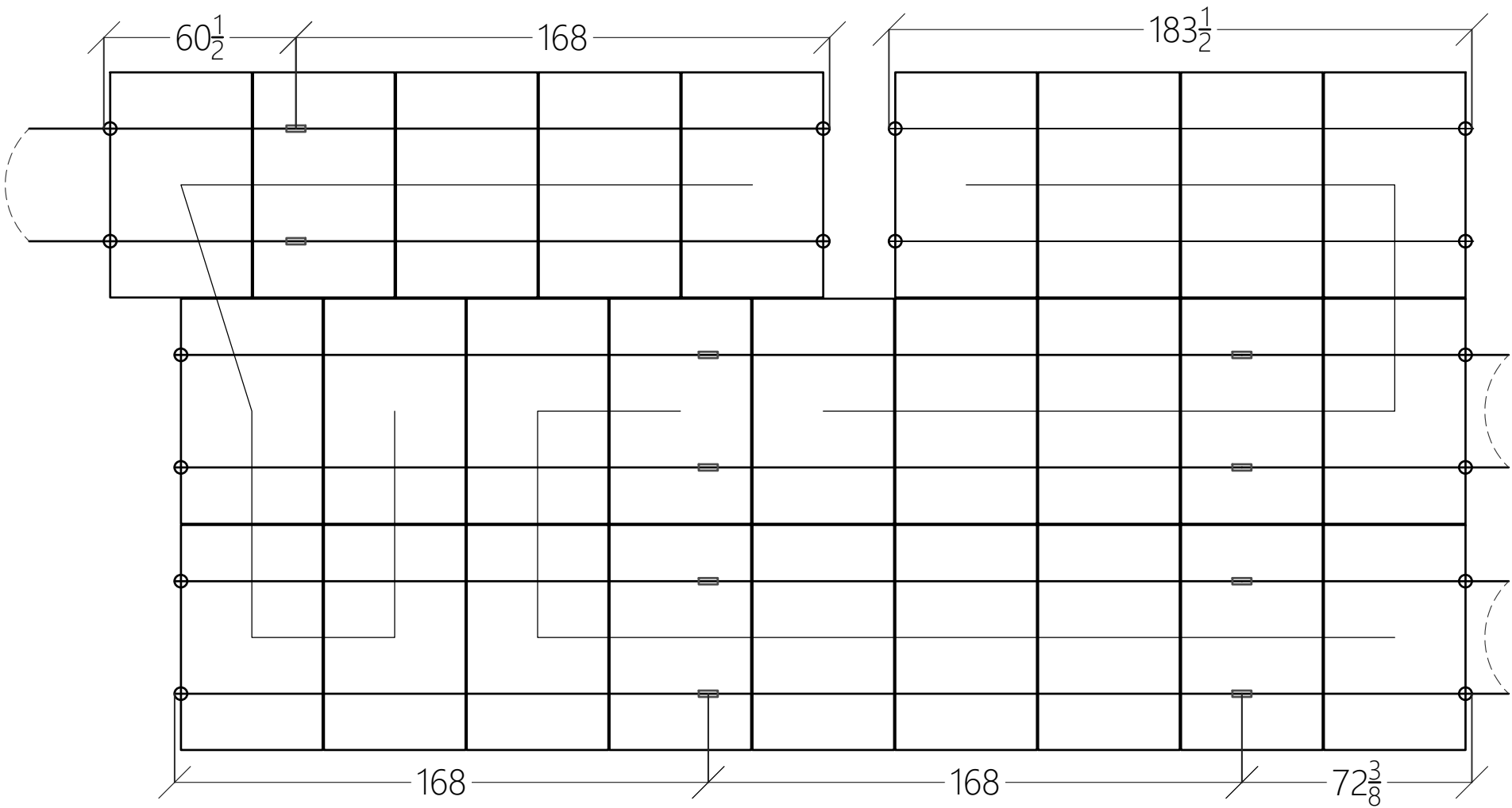
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PV SYSTEM EQUIPMENT LABELS

PV-4.1

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NOT TO SCALE



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| PROJECT INFO | |
| DC INPUT: | 12.420 kW |
| AC EXPORT: | 9.423 kW |
| DOI INSPT. METHOD: | OPTION 2 |

Model Energy
300 Fayetteville St.
#1430
Raleigh, NC 27602
919-274-9905
ModelEnergy.com
P-1194



| CODE REFERENCES | |
|----------------------------------|--|
| NATIONAL ELECTRICAL CODE v. 2017 | |
| NC FIRE PROTECTION CODE v. 2018 | |
| NC BUILDING CODE v. 2018 | |
| NC RESIDENTIAL CODE v. 2018 | |
| ACSE v. 7-10 | |

| SITE CONDITIONS | |
|-----------------|---------|
| WIND SPEED: | 120 MPH |
| RISK CATEGORY: | II |
| EXPOSURE: | B |
| SNOW: | 15 PSF |

| SHEET INDEX | |
|-------------|---------------------|
| PV-1: | COVER SHEET |
| PV-2: | PV STRUCTURAL |
| PV-3: | PV ELECTRICAL |
| PV-4: | PV EQUIPMENT LABELS |
| PV-5: | PV INSTALL GUIDE |

| VERSIONS | | |
|--------------|----------|-----------|
| FOR: | DESIGNER | DATE |
| CONSTRUCTION | CRM | 8/27/2025 |
| | | |
| | | |

PV SYSTEM INSTALL
GUIDE

PV-5.1

NEW QB2

NO
LIFTING
SHINGLES

NO
REMOVING
NAILS

SEALANT IS
NOW YOUR
CHOICE

FOR ASPHALT, TPO, & EPDM ROOFS

LAYERS OF PROTECTION

OPTIONAL SEALANT

We recommend that sealant is inserted into the predrilled hole to fill the penetration and ensure that the Microflashing® adheres completely to the roof.

MICROFLASHING®

Our innovative Microflashing® is placed over the predrilled hole to flash the penetration.

QB2 SHOULDER

The shoulder of the QB2 compresses the Microflashing® to create a leak-proof seal and acts like a cork to plug the hole.

THE FASTEST, SIMPLEST,
MOST EFFICIENT QUICKBOLT

ERROR-PROOF COMPRESSION

The QB2 doesn't leave any room for user error when it comes to Microflashing® compression. Once the Dual Drive Shoulder Screw is secured, the Microflashing® is compressed!

ONLY 3 COMPONENTS

The QB2 is comprised of Microflashing®, an L-Foot, and a Dual Drive Shoulder Screw. No more Nuts needed to tighten and secure the L-Foot! Not only does this simplify the installation process, it also cuts down the installation time!

DUAL DRIVE

The new Dual Drive Shoulder Screw design can be driven using a standard ½" Hex Nut Setter or a 6mm Hex Driver. Installers can use the drive that works best with the rest of the components of their array.

INDEPENDENT LAB TEST RESULTS

| | | |
|--|--|------------|
| ASTM E331 (modified) | Water pressure test at 15psf for 120 minutes | NO LEAKAGE |
| ASTM E2140 | Static water pressure test in 6" water column for 7 days | NO LEAKAGE |
| BOTH TESTS PASSED WITH AND WITHOUT SEALANT | | |

Complete Test Results available online in the AHJ Packets
Patent# 8448407



3" QB2: PN 17662 | 4" QB2: PN 17663

QUICKBOLT.COM

(844) 671-6045 • MON-FRI: 7AM-5PM PST



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 20-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.

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.

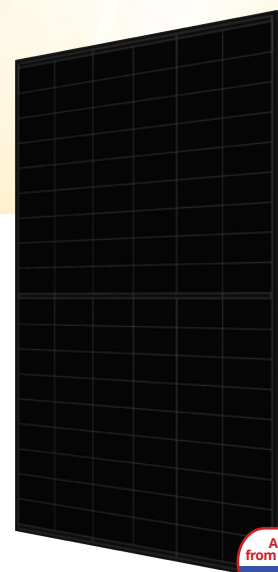
[Go to IronRidge.com/design](https://www.ironridge.com/design)



NABCEP Certified Training

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

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



Assembled in the US
from imported components
USA

TOPHiKu6 (All-Black)

N-type TOPCon Technology

435 W ~ 465 W

CS6.1-54TM-435 | 440 | 445 | 450 | 455 | 460 | 465H

MORE POWER



Module power up to 465 W
Module efficiency up to 22.8 %



Excellent anti-LeTID & anti-PID performance.
Low power degradation, high energy yield



Lower temperature coefficient (Pmax): -0.29%/°C,
increases energy yield in hot climate



Lower LCOE & system cost

MORE RELIABLE



Minimizes micro-crack impacts



Heavy snow load up to 8100 Pa,
wind load up to 6000 Pa*



Industry Leading Product Warranty on Materials and Workmanship*



Linear Power Performance Warranty*

**1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%**

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety
IEC62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE / CGC
CEC listed (US California) / FSEC (US Florida)
UL 61730 / IEC 61701 / IEC 62716 / IEC 60068-2-68
UNI 9177 Reaction to Fire: Class 1



* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

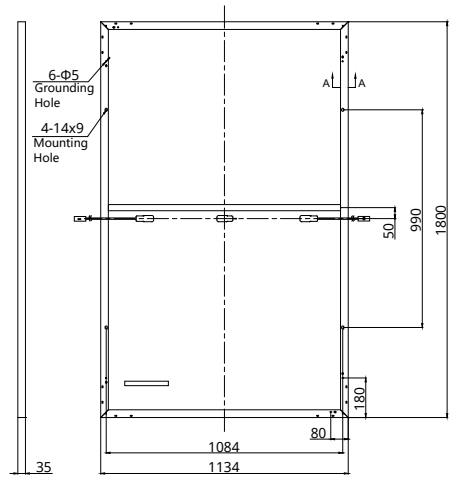
CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 23 years, it has successfully delivered over 150 GW of premium-quality solar modules across the world.

* For detailed information, please refer to the Installation Manual.

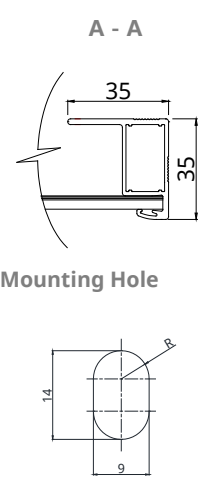
CSI Solar Co., Ltd.
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94597 | www.csisolar.com/na | service.ca@csisolar.com

ENGINEERING DRAWING (mm)

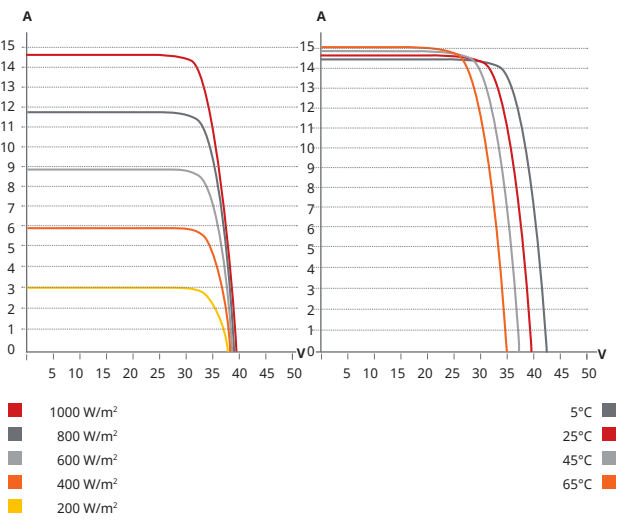
Rear View



Frame Cross Section



CS6.1-54TM-455H / I-V CURVES



ELECTRICAL DATA | STC*

| CS6.1-54TM | 435H | 440H | 445H | 450H | 455H | 460H | 465H |
|------------------------------|--|---------|---------|---------|---------|---------|---------|
| Nominal Max. Power (Pmax) | 435 W | 440 W | 445 W | 450 W | 455 W | 460 W | 465 W |
| Opt. Operating Voltage (Vmp) | 32.4 V | 32.6 V | 32.8 V | 33.0 V | 33.2 V | 33.4 V | 33.6 V |
| Opt. Operating Current (Imp) | 13.45 A | 13.52 A | 13.59 A | 13.66 A | 13.72 A | 13.78 A | 13.85 A |
| Open Circuit Voltage (Voc) | 38.3 V | 38.5 V | 38.7 V | 38.9 V | 39.1 V | 39.3 V | 39.5 V |
| Short Circuit Current (Isc) | 14.33 A | 14.41 A | 14.48 A | 14.55 A | 14.61 A | 14.69 A | 14.77 A |
| Module Efficiency | 21.3% | 21.6% | 21.8% | 22.0% | 22.3% | 22.5% | 22.8% |
| Operating Temperature | -40°C ~ +85°C | | | | | | |
| Max. System Voltage | 1000V (IEC/UL) | | | | | | |
| Module Fire Performance | TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730) | | | | | | |
| Max. Series Fuse Rating | 25 A | | | | | | |
| Protection Class | Class II | | | | | | |
| Power Tolerance | 0 ~ + 10 W | | | | | | |

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

| Specification | Data |
|---------------------------------------|---|
| Cell Type | TOPCon cells |
| Cell Arrangement | 108 [2 X (9 X 6)] |
| Dimensions | 1800 × 1134 × 35 mm (70.9 × 44.6 × 1.38 in) |
| Weight | 23 kg (50.7 lbs) |
| Front Cover | 3.2 mm tempered glass with anti-ref- lective coating |
| Frame | Anodized aluminium alloy |
| J-Box | IP68, 3 bypass diodes |
| Cable | 4 mm² (IEC), 12 AWG (UL) |
| Connector | T6 or MC4 or MC4-EVO2 or MC4- EVO2A |
| Cable Length (Including Connector) | 1500 mm (61.0 in) (+) / 1100 mm (43.3 in) (-) |
| Per Pallet | 30 pieces |
| Per Container (40' HQ) | 720 pieces |

ELECTRICAL DATA | NMOT*

| CS6.1-54TM | 435H | 440H | 445H | 450H | 455H | 460H | 465H |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|
| Nominal Max. Power (Pmax) | 328 W | 332 W | 335 W | 339 W | 343 W | 347 W | 351 W |
| Opt. Operating Voltage (Vmp) | 30.5 V | 30.7 V | 30.9 V | 31.1 V | 31.3 V | 31.5 V | 31.7 V |
| Opt. Operating Current (Imp) | 10.74 A | 10.80 A | 10.85 A | 10.91 A | 10.96 A | 11.02 A | 11.07 A |
| Open Circuit Voltage (Voc) | 36.2 V | 36.4 V | 36.5 V | 36.7 V | 36.9 V | 37.1 V | 37.3 V |
| Short Circuit Current (Isc) | 11.56 A | 11.63 A | 11.68 A | 11.74 A | 11.79 A | 11.85 A | 11.92 A |

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

| Specification | Data |
|--------------------------------------|--------------|
| Temperature Coefficient (Pmax) | -0.29 % / °C |
| Temperature Coefficient (Voc) | -0.25 % / °C |
| Temperature Coefficient (Isc) | 0.05 % / °C |
| Nominal Module Operating Temperature | 42 ± 3°C |

PARTNER SECTION



* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.



X-IQ-AM1-240-5-HDK
X-IQ-AM1-240-5C-HDK
X-IQ-AM1-240-5
X-IQ-AM1-240-5C

IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provide a complete grid-agnostic Enphase Energy System.



IQ Series Microinverters

The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) simplify the installation process.



IQ System Controller 3/3G

Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.



IQ Battery 5P

Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.



IQ Load Controller

Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect (CELLMODEM-M1-06-SP-05), only with IQ Combiner 5C
- Supports flexible networking: Wi-Fi, Ethernet, or cellular
- Provides production metering (revenue grade) and consumption monitoring

Easy to install

- Mounts to one stud with centered brackets
- Supports bottom, back, and side conduit entries
- Supports up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV branch circuits
- Factory installed hold-down kit
- Bluetooth-based Wi-Fi provisioning for easy Wi-Fi setup

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- 5-year limited warranty
- 2-year labor reimbursement program coverage included for IQ Combiner SKUs*
- UL1741 Listed



5-year limited warranty



*For country-specific warranty information, see the <https://enphase.com/installers/resources/warranty> page.

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IQ Combiner 5/5C

| MODEL NUMBER | |
|--|--|
| IQ Combiner 5 (X-IQ-AM1-240-5/ X-IQ-AM1-240-5-HDK) | IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat. IQ-AM1-240-5-HDK includes a factory installed hold-down kit compatible with all the circuit breakers mentioned in the Accessories and Replacement Parts section. |
| IQ Combiner 5C (X-IQ-AM1-240-5C / X-IQ-AM1-240-5C-HDK) | IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%), and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05) ¹ . Includes a silver solar shield to deflect heat. IQ-AM1-240-5C-HDK includes a factory installed hold-down kit compatible with all the circuit breakers mentioned in the Accessories and Replacement Parts section. |
| WHAT'S IN THE BOX | |
| IQ Gateway printed circuit board | IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System |
| Busbar | 80 A busbar with support for one IQ Gateway breaker and four 20 A breakers for installing IQ Series Microinverters and IQ Battery 5P |
| IQ Gateway breaker | Circuit breaker, 2-pole, 10 A/15 A |
| Production CT | Pre-wired revenue-grade solid-core CT, accurate up to ±0.5% |
| Consumption CT | Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5% |
| IQ Battery CT | One battery metering clamp CT, shipped with the box, accurate up to ±2.5% |
| CTRL board | Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P |
| Enphase Mobile Connect (only with IQ Combiner 5C) | 4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan |
| Accessories kit | Spare control headers for the COMMS-KIT-2 board |
| ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY) | |
| CELLMODEM-M1-06-SP-05 | 4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan |
| CELLMODEM-M1-06-AT-05 | 4G-based LTE-M1 cellular modem with a 5-year AT&T data plan |
| Circuit breakers (off-the-shelf) | Supports Eaton BR2XX, Siemens Q2XX, and GE/ABB THQL21XX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with the hold-down kit. |
| Circuit breakers (provided by Enphase) | BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the “Accessories” section) |
| XA-SOLARSHIELD-ES | Replacement solar shield for IQ Combiner 5/5C |
| XA-ENV2-PCBA-5 | IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C |
| X-IQ-NA-HD-125A | Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws). Not required for X-IQ-AM1-240-5-HDK/X-IQ-AM1-240-5C-HDK. |
| XA-COMMS2-PCBA-5 | Replacement COMMS-KIT-2 printed circuit board (PCB) for IQ Combiner 5/5C |
| ELECTRICAL SPECIFICATIONS | |
| Rating | 80 A |
| System voltage and frequency | 120/240 VAC or 120/208 VAC, 60 Hz |
| Busbar rating | 125 A |
| Fault current rating | 10 kAIC |
| Maximum continuous current rating (input from PV/storage) | 64 A |
| Branch circuits (solar and/or storage) | Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included) |
| Maximum total branch circuit breaker rating (input) | 80 A of distributed generation/95 A with IQ Gateway breaker included |
| IQ Gateway breaker | 10 A or 15 A rating GE/Siemens/Eaton included |
| Production metering CT | 200 A solid core pre-installed and wired to IQ Gateway |

¹ A plug-and-play industrial-grade cell modem for systems of up to 60 microinverters. Available in the United States, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.

| ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY) | | |
|--|------------------------|---|
| Consumption monitoring CT (CT-200-CLAMP) | | A pair of 200 A clamp-style current transformers is included with the box |
| IQ Battery metering CT | | 200 A clamp-style current transformer for IQ Battery metering, included with the box |
| MECHANICAL DATA | | |
| Dimensions (W × H × D) | | 37.5 cm × 49.5 cm × 16.8 cm (14.75" × 19.5" × 6.63"). Height is 53.5 cm (21.06") with mounting brackets. |
| Weight | | 7.5 kg (16.5 lb) |
| Ambient temperature range | | -40°C to 46°C (-40°F to 115°F) |
| Cooling | | Natural convection, plus heat shield |
| Enclosure environmental rating | | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction |
| Wire sizes | | <ul style="list-style-type: none"> 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors 60 A breaker branch input: 4 to 1/0 AWG copper conductors Main lug combined output: 10 to 2/0 AWG copper conductors Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing |
| Communication (in-premise connectivity) | | Built-in CTRL board for wired communication with the IQ Battery 5P and the IQ System Controller 3/3G. Integrated power line communication for IQ Series Microinverters. |
| Altitude | | Up to 2,600 meters (8,530 feet) |
| COMMUNICATION INTERFACES | | |
| Integrated Wi-Fi | | 802.11b/g/n (dual band 2.4 GHz/5 GHz) for connecting the Enphase Cloud through the internet. |
| Wi-Fi range (recommended) | | 10 m (32.8 feet) |
| Bluetooth | | BLE4.2, 10 m range to configure Wi-Fi SSID |
| Ethernet | | Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) for connecting to the Enphase Cloud through the internet. |
| Cellular/Mobile Connect | | CELLMODEM-M1-06-SP-05 or CELLMODEM-M1-06-AT-05 (included with the IQ Combiner 5C) |
| Digital I/O | | Digital input/output for grid operator control |
| USB 2.0 | | Mobile Connect, COMMS-KIT-01 for IQ Battery 3/3T/10/10T, COMMS-KIT-02 for IQ Battery 5P |
| Access point (AP) mode | | For connection between the IQ Gateway and a mobile device running the Enphase Installer App |
| Metering ports | | Up to two Consumption CTs, one IQ Battery CT, and one Production CT |
| Power line communication | | 90–110 kHz |
| Web API | | See https://developer-v4.enphase.com |
| Local API | | See Guide for local API |
| COMPLIANCE | | |
| IQ Combiner with IQ Gateway | | UL 1741, CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003, NOM-208-SCFI-2016, UL 61010-1, CAN/CSA 22.2 No. 61010-1, IEEE 1547: 2018 (UL 1741-SB, 3rd Ed.), IEEE 2030.5/CSIP Compliant, Production metering: ANSI C12.20 accuracy class 0.5 (PV production) |
| COMPATIBILITY | | |
| PV | Microinverters | IQ6, IQ7, and IQ8 Series Microinverters |
| COMMS-KIT-01 ² | IQ System Controller | EP200G101-M240US00 |
| | IQ System Controller 2 | EP200G101-M240US01 |
| | IQ Battery | ENCHARGE-3-1P-NA, ENCHARGE-10-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA |
| COMMS-KIT-02 ³ | IQ System Controller 3 | SC200D111C240US01, SC200G111C240US01 |
| | IQ Battery | IQBATTERY-5P-1P-NA |

² For information about IQ Combiner 5/5C compatibility with the 2nd-generation batteries, refer to the [compatibility matrix](#).

³ IQ Combiner 5/5C comes pre-equipped with COMMS-KIT-02.

Accessories

Mobile Connect



4G-based LTE-M1 cellular modem with a 5-year data plan (CELLMODEM-M1-06-SP-05 for T-Mobile and CELLMODEM-M1-06-AT-05 for AT&T)

Circuit breakers



BRK-10A-2-240V Circuit breaker, 2-pole, 10 A, Eaton BR210
BRK-15A-2-240V Circuit breaker, 2-pole, 15 A, Eaton BR215
BRK-20A-2P-240V Circuit breaker, 2-pole, 20 A, Eaton BR220
BRK-15A-2P-240V-B Circuit breaker, 2-pole, 15 A, Eaton BR215B with hold-down kit support
BRK-20A-2P-240V-B Circuit breaker, 2-pole, 20 A, Eaton BR220B with hold-down kit support

CT-200-SOLID



200 A revenue-grade solid-core Production CT with <0.5% error rate (replacement SKU)

CT-200-CLAMP



200 A clamp-style consumption and battery metering CT with <2.5% error rate (replacement SKU)

Revision history

| REVISION | DATE | DESCRIPTION |
|---------------|----------------|--|
| DSH-00007-6.0 | September 2024 | Included the X-IQ-AM1-240-5-HDK and X-IQ-AM1-240-5C-HDK SKU. |
| DSH-00007-5.0 | July 2024 | Updated the system voltage value and compliance. Updated Sprint plan to T-Mobile data plan. |
| DSH-00007-4.0 | April 2024 | Updated the UL smart mark. |
| DSH-00007-3.0 | March 2024 | Updated accessories and replacement parts, communication interfaces, and compatibility specifications. |
| DSH-00007-2.0 | September 2023 | Included Bluetooth specifications. |
| DSH-00007-1.0 | May 2023 | Initial release. |



IQ8AC Microinverter

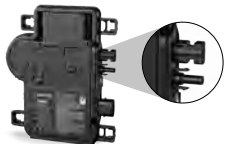
Our newest IQ8 Series Microinverters are the industry's first microgrid-forming*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55 nm technology with high-speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to the IQ8 Series Microinverters that have integrated MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conform with various regulations when installed according to the manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-and-play connectors
- Power line communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produces power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB)

NOTE:

- IQ8 Series Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, and so on) in the same system.
- IQ Microinverters ship with default settings that meet North America's IEEE 1547 interconnection standard requirements. Region-specific adjustments may be requested by an Authority Having Jurisdiction (AHJ) or utility representative according to the IEEE 1547 interconnection standard. An IQ Gateway is required to make these changes during installation.

*Meets UL 1741 only when installed with IQ System Controller 2 or 3.

IQ8AC Microinverter

| INPUT DATA (DC) | | UNITS | IQ8AC-72-M-US | | | |
|---|--|---|---|--|-------------------------------|--|
| Commonly used module pairings ¹ | | W | 295–500 | | | |
| Module compatibility | | – | To meet compatibility, PV modules must be within the maximum input DC voltage and maximum module I _{sc} listed below. Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator . | | | |
| MPPT voltage range | | V | 28–45 | | | |
| Operating range | | V | 18–58 | | | |
| Minimum/Maximum start voltage | | V | 22/58 | | | |
| Max. input DC voltage | | V | 60 | | | |
| Max. continuous input DC current | | A | 14 | | | |
| Max. input DC short-circuit current | | A | 25 | | | |
| Max. module (I _{sc}) | | A | 20 | | | |
| Overvoltage class DC port | | – | II | | | |
| DC port backfeed current | | mA | 0 | | | |
| PV array configuration | | – | Ungrounded array; no additional DC side protection required; AC side protection requires max 20 A per branch circuit | | | |
| OUTPUT DATA (AC) | | UNITS | IQ8AC-72-M-US @240 VAC | | IQ8AC-72-M-US @208 VAC | |
| Peak output power | | VA | 366 | | 350 | |
| Max. continuous output power | | VA | 349 | | 345 | |
| Nominal grid voltage (L-L) | | V | 240, split-phase (L-L), 180° | | 208, single-phase (L-L), 120° | |
| Minimum and maximum grid voltage ² | | V | 211-264 | | 183-229 | |
| Max. continuous output current | | A | 1.45 | | 1.66 | |
| Nominal frequency | | Hz | 60 | | | |
| Extended frequency range | | Hz | 47–68 | | | |
| AC short circuit fault current over three cycles | | Arms | 2.70 | | | |
| Max. units per 20 A (L-L) branch circuit ³ | | – | 11 | | 9 | |
| Total harmonic distortion | | % | < 5 | | | |
| Overvoltage class AC port | | – | III | | | |
| AC port backfeed current | | mA | 18 | | | |
| Power factor setting | | – | 1.0 | | | |
| Grid-tied power factor (adjustable) | | – | 0.85 leading ... 0.85 lagging | | | |
| Peak efficiency | | % | 97.3 | | 97.2 | |
| CEC weighted efficiency | | % | 97.0 | | 96.5 | |
| Nighttime power consumption | | mW | 30 | | 22 | |
| MECHANICAL DATA | | | UNITS | | | |
| Ambient temperature range | | | –40°C to 65°C (–40°F to 149°F) | | | |
| Relative humidity range | | | 4% to 100% (condensing) | | | |
| DC connector type | | | Stäubli MC4 | | | |
| Dimensions (H × W × D); Weight | | | 212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs) | | | |
| Cooling | | | Natural convection – no fans | | | |
| Approved for wet locations; Pollution degree | | | Yes; PD3 | | | |
| Enclosure | | | Class II double-insulated, corrosion-resistant polymeric enclosure | | | |
| Environ. category; UV exposure rating | | | NEMA Type 6; outdoor | | | |
| COMPLIANCE | | | | | | |
| Certifications | | CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020 and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to manufacturer’s instructions. | | | | |

(1) No enforced DC/AC ratio.

(2) Nominal voltage range can be extended beyond nominal if required by the utility.

(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

Revision history

| REVISION | DATE | DESCRIPTION |
|---------------|----------------|--|
| DSH-00046-4.0 | February 2024 | Updated the information about IEEE 1547 interconnection standard requirements. |
| DSH-00046-3.0 | October 2023 | Included NEC 2023 specification in the "Compliance" section. |
| DSH-00046-2.0 | September 2023 | Updated module compatibility information. |
| DSH-00046-1.0 | May 2023 | Preliminary release. |

RSTC Enterprises, Inc.
2214 Heimstead Road
Eau Claire, WI 54703
715-830-9997



Outdoor Photovoltaic Enclosures

Composition/Cedar Roof System

ETL listed and labeled

Report # 3171411PRT-002 Revised May, 2018

- UL50 Type 3R, 11 Edition Electrical equipment enclosures
- CSA C22.2 No. 290 Nema Type 3R
- Conforms to UL 1741 Standard

0799 Series Includes:

0799 - 2 Wire size 2/0-14

0799 - 5 Wire size 14-6

0799 - D Wire size 14-8

Models available in Grey, Black or Stainless Steel

Basic Specifications

Material options:

- Powder coated, 18 gauge galvanized 90 steel (1,100 hours salt spray)
- Stainless steel

Process - Seamless draw (stamped)

Flashing - 15.25" x 17.25"

Height - 3"

Cavity - 255 Cubic inches

Base Plate:

- Fastened to base using toggle fastening system
- 5 roof deck knockouts
- Knockout sizes: (3) .5", (1) .75" and (1) 1"
- 8", 35mm slotted din rail
- Ground Block

Passthrough and combiner kits are available for either AC or DC applications.

0799 Series



aGate

Intelligent energy management system

The aGate serves as the controller for all home power sources by interconnecting solar, grid, batteries, and a standby generator to supply electricity to the home. It seamlessly transitions the home supply from grid power to backup power so that always-on appliances, such as the refrigerator and network router, will not be affected when the grid goes down.

The aGate can be installed at the service entrance, connected to the main load center, or used as a load center.



Robust

- ✓ Micro-grid interconnect device (MID)
- ✓ EMS Integrated PV and grid metering
- ✓ UL1741 certified PCS function & 280A busbar to avoid Main Panel Upgrades
- ✓ 12-year limited warranty



Hassle-free

- ✓ Precise control of electricity usage through Smart Circuits Module
- ✓ Standby generator integration via generator module
- ✓ Remarkable black start function ensures battery charge after a prolonged outage or extended trip
- ✓ Vehicle to loads (V2L) function to power essential home appliances during an emergency
- ✓ Commissioning through the aGate Wifi hotspot or Bluetooth



Flexible

- ✓ Compatible with micro and string solar inverter
- ✓ Indoor and outdoor / wall-mounted



Easy installation

- ✓ Built-in design Smart Circuits and Generator Modules
- ✓ Conduit entry options from the bottom, left, or right



PERFORMANCE SPECIFICATIONS

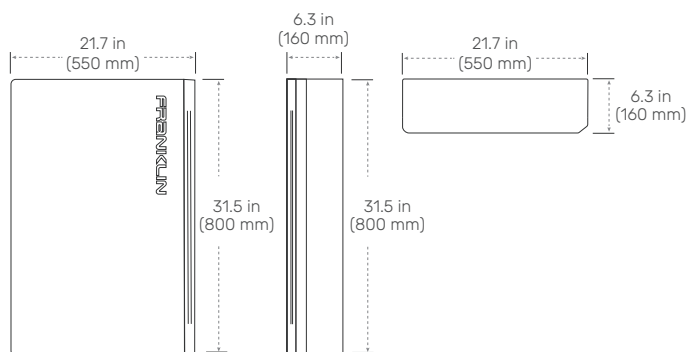
| | |
|--|--|
| SKU | AGT-RIV2-US |
| Model Number | aGate X |
| Coupling | AC-coupled |
| Nominal AC Voltage | 120 / 208 V, 120 / 240 V, 60 Hz |
| Phase | 2 W+N+PE |
| Grid Input Over Current Protection Device | 200 A Max |
| aPower Over Current Protection Device | 125 A Max |
| Solar Input Over Current Protection Device | 80 A Max |
| Backup Load Port Over Current Protection Device | 200 A Max |
| Non-backup Load Port Over Current Protection Device | 200 A Max |
| Generator Over Current Protection Device ¹ | 200 A Max |
| Smart Circuits Over Current Protection Device ² | Opt. a 1 × 80 A Max @ 208 V / 240 V & 1 × 50 A Max @ 208 V / 240 V Opt. b 1 × 80 A Max @ 208 V / 240 V & 2 × 50 A Max @ 120 V |
| Maximum Supply Fault Current | 22 kA |
| Busbar Rating | 280 A |
| Work Modes | Self-Consumption, Time of Use, Emergency Backup |
| Communications | Ethernet / 4G / Wifi / Bluetooth |
| User Interface | FranklinWH App |
| Warranty | 12-year limited |
| IEC Protective Class | Class I |
| Over voltage Category | Category II |
| AC Meter | +/- 0.5% |

COMPLIANCE INFORMATION

| | |
|----------------|--|
| Certifications | UL 1741, UL 1741 PCS, UL 67, UL 869A, UL 916, CAN / CSA C22.2 No. 107.1-16, CSA C22.2 No. 29, CSA C22.2 No. 0.19 |
| Seismic | AC 156, OSHPD, IEEE 693-2005 (high) |
| Environmental | California Proposition 65 RoHS Directive 2011 / EU |
| Emissions | FCC Part 15 Class B, ICES 003 |

MECHANICAL SPECIFICATIONS

| | |
|------------------------|--|
| Dimensions (H × W × D) | 31.5 in × 21.7 in × 6.3 in (800 mm × 550 mm × 160 mm) |
| Weight | 38.6 lb (17.5 kg) |
| Mounting | Wall mount |



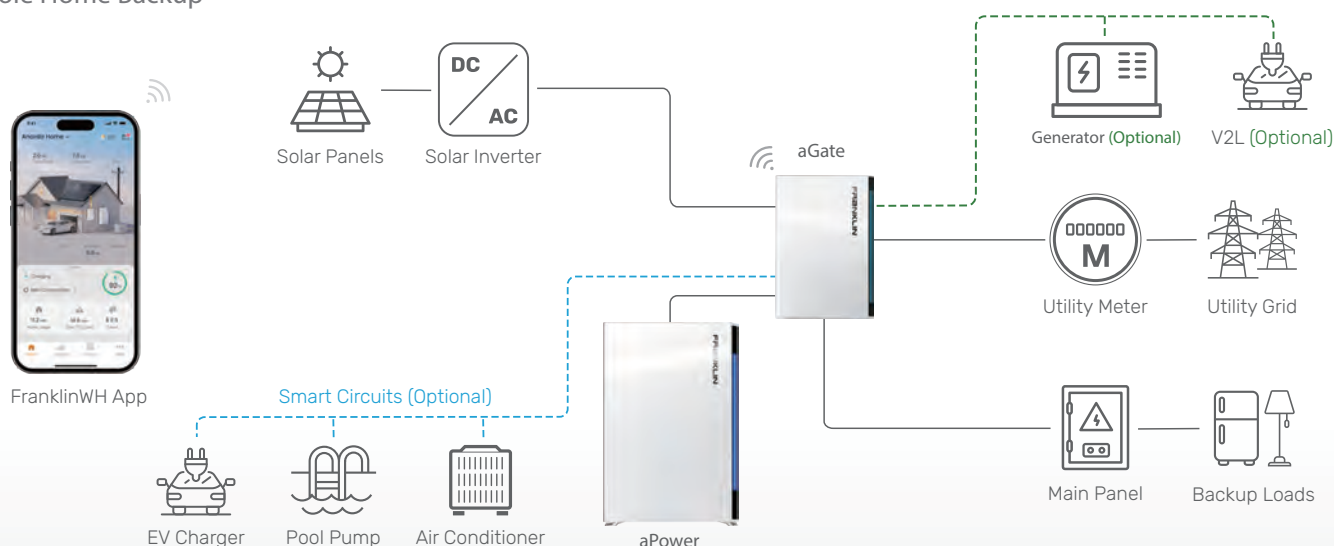
1. Generator Module is optional.
2. Smart Circuit Module is

ENVIRONMENTAL SPECIFICATIONS

| | |
|-------------------------|-------------------------------|
| Enclosure Type | NEMA Type 3R |
| 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) |
| Environment | Indoor and outdoor rated |

Franklin Home Power Solution

Whole Home Backup



Address: 1731 Technology Dr., Suite 530 San Jose, CA 95110 **Telephone:** +1 888-837-2655 **Email:** info@franklinwh.com **Website:** www.franklinwh.com

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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 AC¹ 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 | | | | |
| Noise Emission | 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

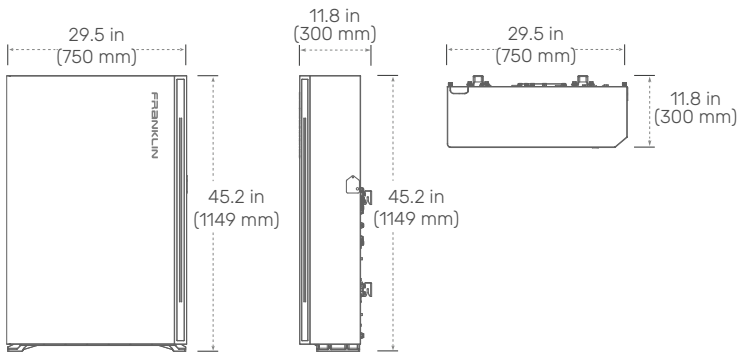
| | |
|----------------|---|
| Certifications | UL 9540, UL 9540A, UL 1973, UL 1741, UL1741 SB, UL 1741 PCS, UL 60730-1, IEEE 1547, IEEE 1547.1, UN 38.3, CSA C22.2 No. 107.1 |
| Seismic | AC 156, OSHPD, IEEE 693-2005 (high) |
| Environmental | California Proposition 65 RoHS Directive 2011 / EU |
| Emissions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



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.

Product data sheet

Specifications



Safety switch, general duty, non fusible, 60A, 2 pole, 10hp, 240VAC, NEMA 3R, bolt on provision

DU222RB

Product availability : Stock - Normally stocked in distribution facility

Price* : 353.00 USD

Main

| | |
|---------------------------|--|
| Product | Single Throw Safety Switch |
| Duty Rating | General duty |
| Device Application | Residential |
| Disconnect Type | Non-fusible disconnect switch |
| Factory Installed Neutral | None |
| Phase | 3 phase |
| Number of Poles | 2 |
| Current Rating | 60 A |
| Voltage Rating | 240 V AC |
| Enclosure Rating NEMA | NEMA 3R |
| Motor power hp | 10 hp at 240 V AC 60 Hz for 1 phase motors |

Complementary

| | |
|-----------------------|--|
| Mounting Type | Surface |
| Electrical Connection | Lugs |
| Wiring configuration | 2 wires |
| Wire Size | AWG 12...AWG 3 aluminium AWG 14...AWG 3 copper |
| Tightening torque | 35 lbf.in (3.95 N.m) 0.00...0.01 in² (2.08...5.26 mm²) (AWG 14...AWG 10) 35 lbf.in (3.95 N.m) (AWG 14...AWG 10) 45 lbf.in (5.08 N.m) 0.01 in² (8.37 mm²) (AWG 8) 45 lbf.in (5.08 N.m) 0.02...0.03 in² (12.3...21.12 mm²) (AWG 6...AWG 4) 50 lbf.in (5.65 N.m) 0.04 in² (26.67 mm²) (AWG 3) |
| Depth | 3.75 in (95.25 mm) |
| Width | 7.75 in (196.85 mm) |
| Height | 9.63 in (244.60 mm) |
| Net Weight | 16.98 lb(US) (7.7 kg) |

Environment

| | |
|----------------|----------------------|
| Certifications | UL listed file E2875 |
|----------------|----------------------|

* Price is “List Price” and may be subject to a trade discount – check with your local distributor or retailer for actual price.

Ordering and shipping details

| | |
|-------------------|---------------------------------|
| Category | 00106-D & DU SW,NEMA3R, 30-200A |
| Discount Schedule | DE1A |
| GTIN | 785901491491 |
| Returnability | Yes |
| Country of origin | MX |

Packing Units

| | |
|------------------------------|----------------------------|
| Unit Type of Package 1 | PCE |
| Number of Units in Package 1 | 1 |
| Package 1 Height | 5.30 in (13.462 cm) |
| Package 1 Width | 7.20 in (18.288 cm) |
| Package 1 Length | 10.00 in (25.4 cm) |
| Package 1 Weight | 4.65 lb(US) (2.109 kg) |
| Unit Type of Package 2 | PAL |
| Number of Units in Package 2 | 120 |
| Package 2 Height | 36.50 in (92.71 cm) |
| Package 2 Width | 40.00 in (101.6 cm) |
| Package 2 Length | 48.00 in (121.92 cm) |
| Package 2 Weight | 610.00 lb(US) (276.691 kg) |
| Unit Type of Package 3 | CAR |
| Number of Units in Package 3 | 5 |
| Package 3 Height | 10.70 in (27.178 cm) |
| Package 3 Width | 10.20 in (25.908 cm) |
| Package 3 Length | 23.50 in (59.69 cm) |
| Package 3 Weight | 24.60 lb(US) (11.158 kg) |

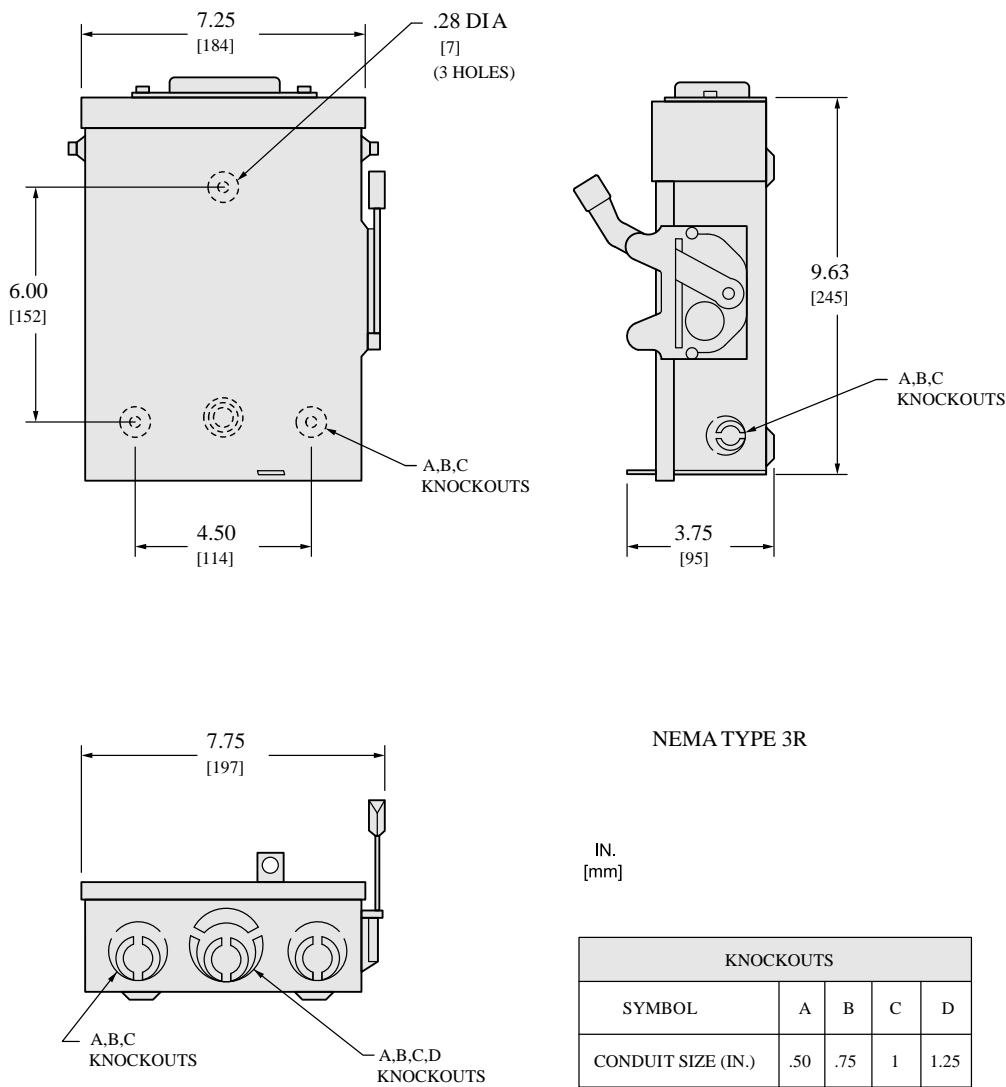
Offer Sustainability

| | |
|----------------------------|---|
| Sustainable offer status | Green Premium product |
| California proposition 65 | WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov |
| REACH Regulation | REACH Declaration |
| REACH free of SVHC | Yes |
| EU RoHS Directive | Compliant EU RoHS Declaration |
| Toxic heavy metal free | Yes |
| Mercury free | Yes |
| China RoHS Regulation | China RoHS declaration Pro-active China RoHS declaration (out of China RoHS legal scope) |
| RoHS exemption information | Yes |
| Environmental Disclosure | Product Environmental Profile |
| PVC free | Yes |

Contractual warranty

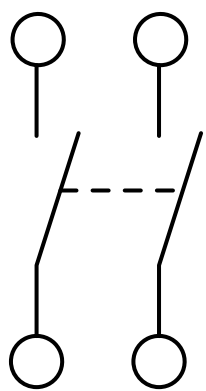
| | |
|----------|-----------|
| Warranty | 18 months |
|----------|-----------|

Dimensions



TOP OF NEMA TYPE 3R SWITCHES HAVE PROVISIONS FOR MAXIMUM 2 1/2" BO LT-ON HUB.
ALL DIMENSIONS ARE APPROXIMATE. REFER TO TECHNICAL DRAWINGS AND DOCUMENTATION.

Wiring Diagram



DU222RB

Recommended replacement(s)