GENERAL NOTES

CODE AND STANDARDS

1. ALL WORK SHALL COMPLY WITH 2017 NATIONAL ELECTRIC CODE (NEC), 2018 NORTH CAROLINA BUILDING CODE (NCBC), 2018 NORTH CAROLINA RESIDENTIAL CODE (NCRC), PLUMBING CODE (NCPC), AND ALL STATE AND LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES.
2. DRAWINGS HAVE BEEN DETAILED ACCORDING TO UL LISTING REQUIREMENTS.

SITE NOTES / OSHA REGULATION

1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM.
3. THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
4. ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SHALL SERVE TO PROTECT THE BUILDING OR STRUCTURE.

SOLAR CONTRACTOR

1. MODULE CERTIFICATIONS WILL INCLUDE UL1703, IEC61646, IEC61730.
2. IF APPLICABLE, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE MARKED GROUNDING LUG HOLES PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
3. AS INDICATED BY DESIGN, OTHER NRTL LISTED MODULE GROUNDING DEVICES MAY BE USED IN PLACE OF STANDARD GROUNDING LUGS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ.
4. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.
5. CONDUIT POINT OF PENETRATION FROM EXTERIOR TO INTERIOR TO BE INSTALLED AND SEALED WITH A SUITABLE SEALING COMPOUND.
6. DC WIRING LIMITED TO MODULE FOOTPRINT W/ ENPHASE AC SYSTEM.
7. ENPHASE WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.
8. MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC UNLESS NOT AVAILABLE.
9. ALL INVERTERS, MOTOR GENERATORS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AC PHOTOVOLTAIC MODULES, DC COMBINERS, DC-TO-DC CONVERTERS,SOURCE CIRCUIT COMBINERS, AND CHARGE CONTROLLERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER NEC 690.4(B).
10. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE.
11. TERMINALS AND LUGS WILL BE TIGHTENED TO MANUFACTURER TORQUE SPECIFICATIONS (WHEN PROVIDED) IN ACCORDANCE WITH NEC CODE 110.14(D) ON ALL ELECTRICAL CONNECTIONS.

EQUIPMENT LOCATIONS

1. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.
2. EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31(A) AND NEC TABLE 310.15(B).
3. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
4. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

PROJECT INFORMATION:

NUMBER OF STORIES: 2
CONDUIT RUN: Interior
ECOBEE QTY: 0
LIGHT BULB QTY: 0
PV METER: Not Required

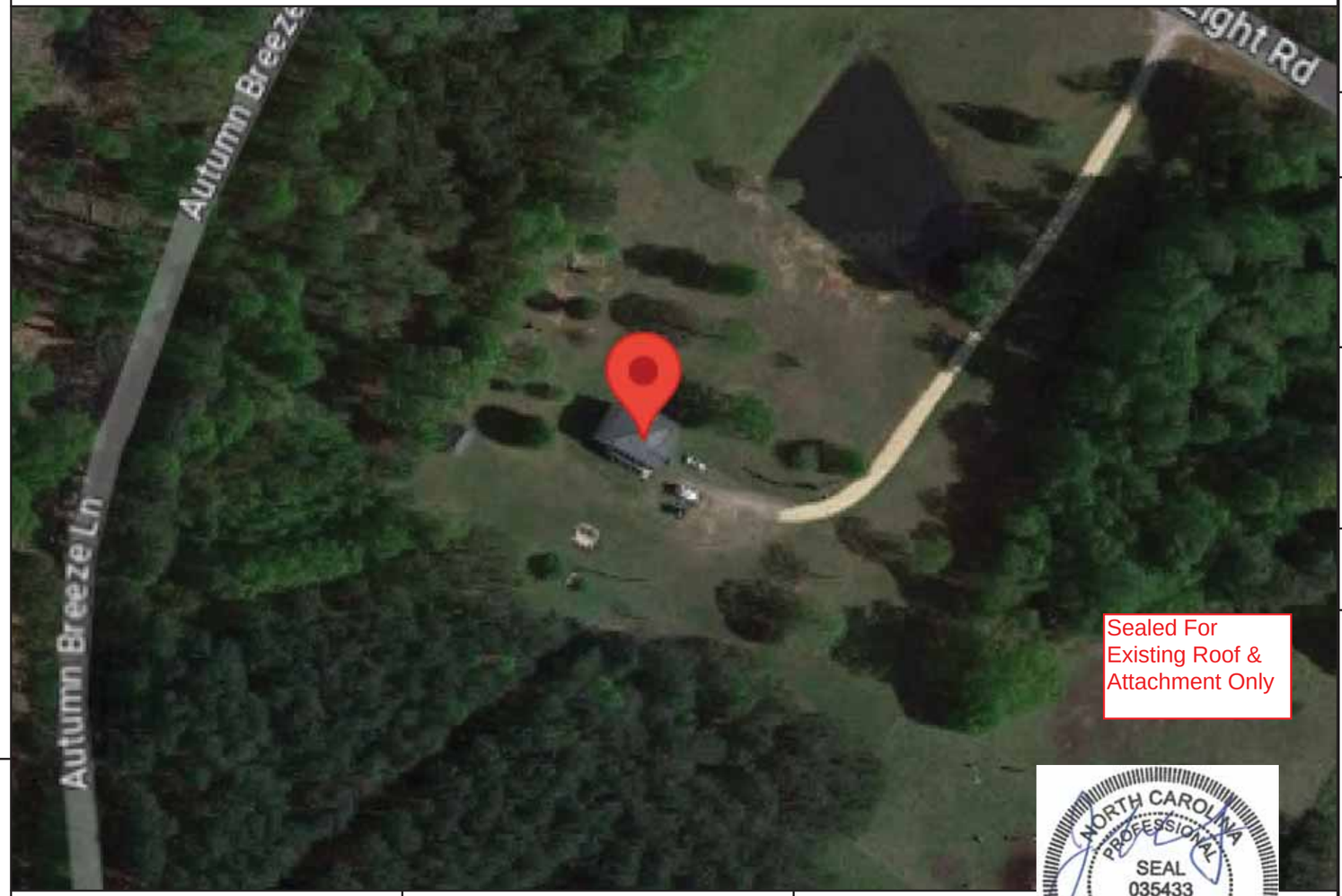
ROOF TYPE (1) INFORMATION:
ROOF TYPE: Comp Shingle
FRAMING TYPE: Rafter
SHEATHING TYPE: OSB
ATTACHMENT: Unirac FlashKit Pro
RACKING: SunPower InvisiMount Rail @ 48" OC Portrait / 64" OC Landscape
NUMBER OF ATTACHMENTS: 75

ROOF TYPE (2) INFORMATION *(IF APPLICABLE)*:
***SEE PV4.2**

SYSTEM TO BE INSTALLED INFORMATION:

DC SYSTEM SIZE: 6.375 kW DC
AC SYSTEM SIZE: 5.76 kW AC
MODULE TYPE: (15) SPR M425-BLK
INVERTER TYPE: Enphase IQ7HS
MONITORING: SunVault PVS6

AERIAL VIEW



Sealed For Existing Roof & Attachment Only

DESIGN CRITERIA

WIND SPEED: 115 mph
GROUND SNOW LOAD: 15 lb/ft²
WIND EXPOSURE FACTOR: C
SEISMIC DESIGN CATEGORY: B

SITE SPECIFICATIONS

CONSTRUCTION - V-B
ZONING: RESIDENTIAL

SCOPE OF WORK

INSTALLATION OF UTILITY INTERACTIVE PHOTOVOLTAIC SOLAR SYSTEM AND ANY NECESSARY ADDITIONAL WORK NEEDED FOR INSTALLATION.

ESS TO BE INSTALLED INFORMATION:

ESS STORAGE CAPACITY: 27.2 kWh DC
ESS NOMINAL OUTPUT: 10 kW AC
ESS TYPE: (2) FRANKLINWH aPower 13.6kWh INVERTER WITH INTEGRATED LI-ION BATTERY

SHEET INDEX

PV1 - COVER SHEET
PV2 - SITE PLAN
PV3 - ROOF PLAN
PV4 - STRUCTURAL
PV5 - ELECTRICAL 3-LINE DIAGRAM
PV6 - ELECTRICAL CALCULATIONS
PV7 - WARNING LABELS AND LOCATIONS
(ALL OTHER SHEETS AS REQUIRED)
SS - PRODUCT SPEC. SHEETS

NORTH CAROLINA PROFESSIONAL SEAL 035433 ENGINEER JOHN A. CALVERT

2/8/24
Firm No. : D-0449

Digitally signed by John A. Calvert
Date: 2024.02.08 16:29:23 -07'00'

UTILITY COMPANY:

Duke Energy NC

PERMIT ISSUER:

Harnett County

BLUE RAVEN SOLAR
1403 N. Research Way
Orem, UT 84097
800.377.4480
WWW.BLUERAVENSOLAR.COM

NABCEP CERTIFIED
PV INSTALLATION PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:
Wiyada Sorkaew
1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY: Erik Armstrong
PLOT DATE: February 8, 2024
PROJECT NUMBER: 735760
SHEET NAME: COVER SHEET
REVISION: A
PAGE NUMBER: PV1

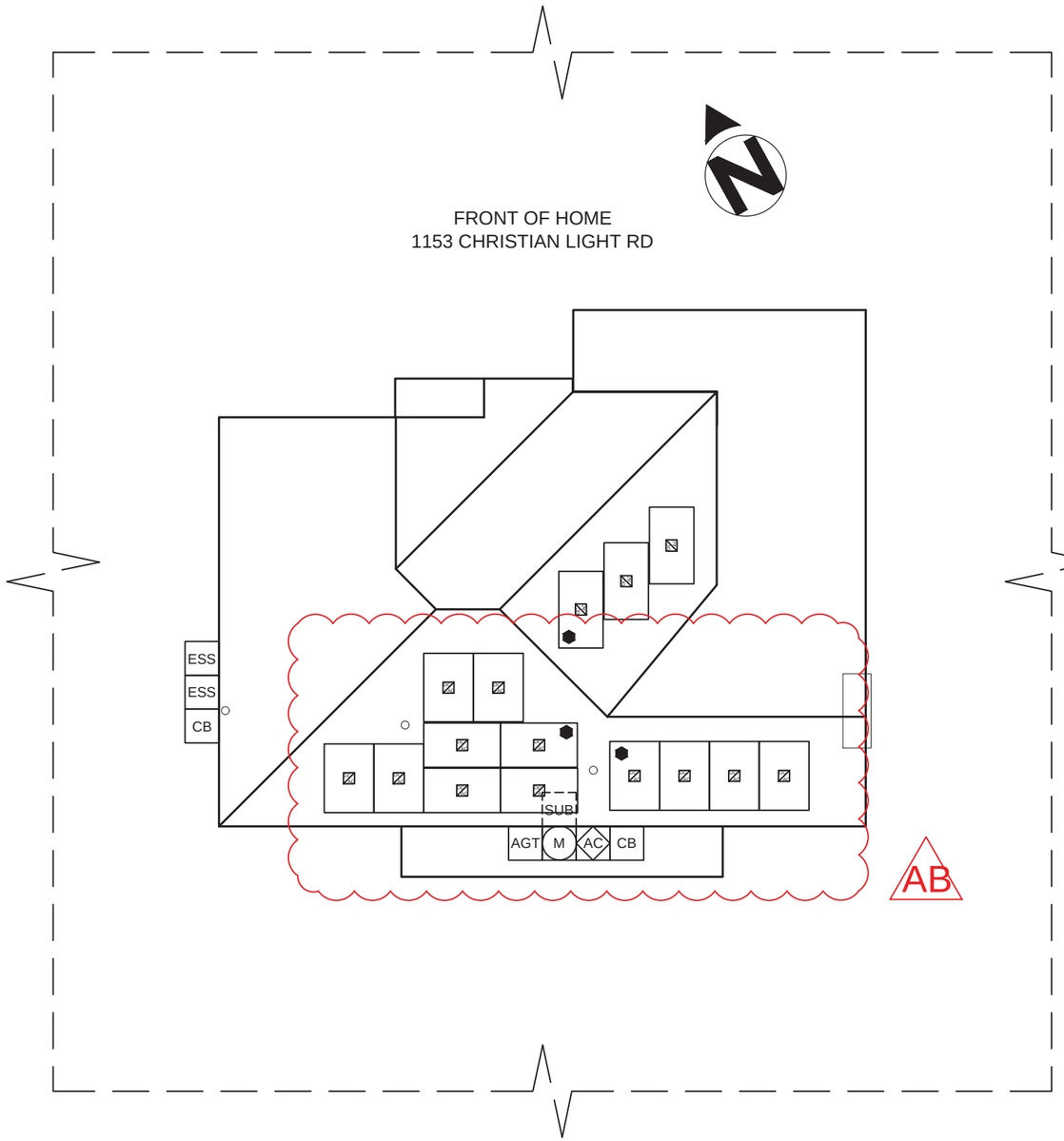
PV SYSTEM SPECIFICATIONS

TOTAL NUMBER OF MODULES: 15
MODULE MAKE AND MODEL: SPR M425-BLK
MODULE WATTAGE: 425W DC

INVERTER MAKE AND MODEL: Enphase IQ7HS
INVERTER TYPE: Microinverter (1 Inverter per PV Module)
INVERTER CURRENT OUTPUT: 1.60A AC
INVERTER NOMINAL VOLTAGE: 240V
INVERTER WATTAGE: 384W AC

NEW ENERGY STORAGE SYSTEM SPECIFICATIONS

TOTAL NUMBER OF BATTERIES: 2
TOTAL MAXIMUM CONTINUOUS OUTPUT: 10kW
TOTAL MAXIMUM PEAK OUTPUT: 20kW
TOTAL STORAGE CAPACITY: 30kWh
TOTAL USABLE STORAGE CAPACITY: 27.2kWh



LEGEND

- JUNCTION BOX
- M — UTILITY METER
- MSP — MAIN SERVICE PANEL
- AC — AC DISCONNECT
- CB — COMBINER BOX
- LC — LOAD CENTER
- SUB — SUBPANEL
- PV — PV METER
- TS — TRANSFER SWITCH
- ESS — ENERGY STORAGE SYSTEM
- AGT — AGATE SITE CONTROLLER
- RPO — REMOTE POWER OFF
- FIRE SETBACK
- TRENCHING
- PROPERTY LINE

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

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2/8/24
Firm No. : D-0449

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CUSTOMER INFORMATION:
Wiyada Sorkaew
1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY:
Erik Armstrong

PLOT DATE:
February 8, 2024

PROJECT NUMBER:
735760

SHEET NAME:
SITE PLAN

REVISION: A

PAGE NUMBER: PV2

PV SYSTEM SPECIFICATIONS

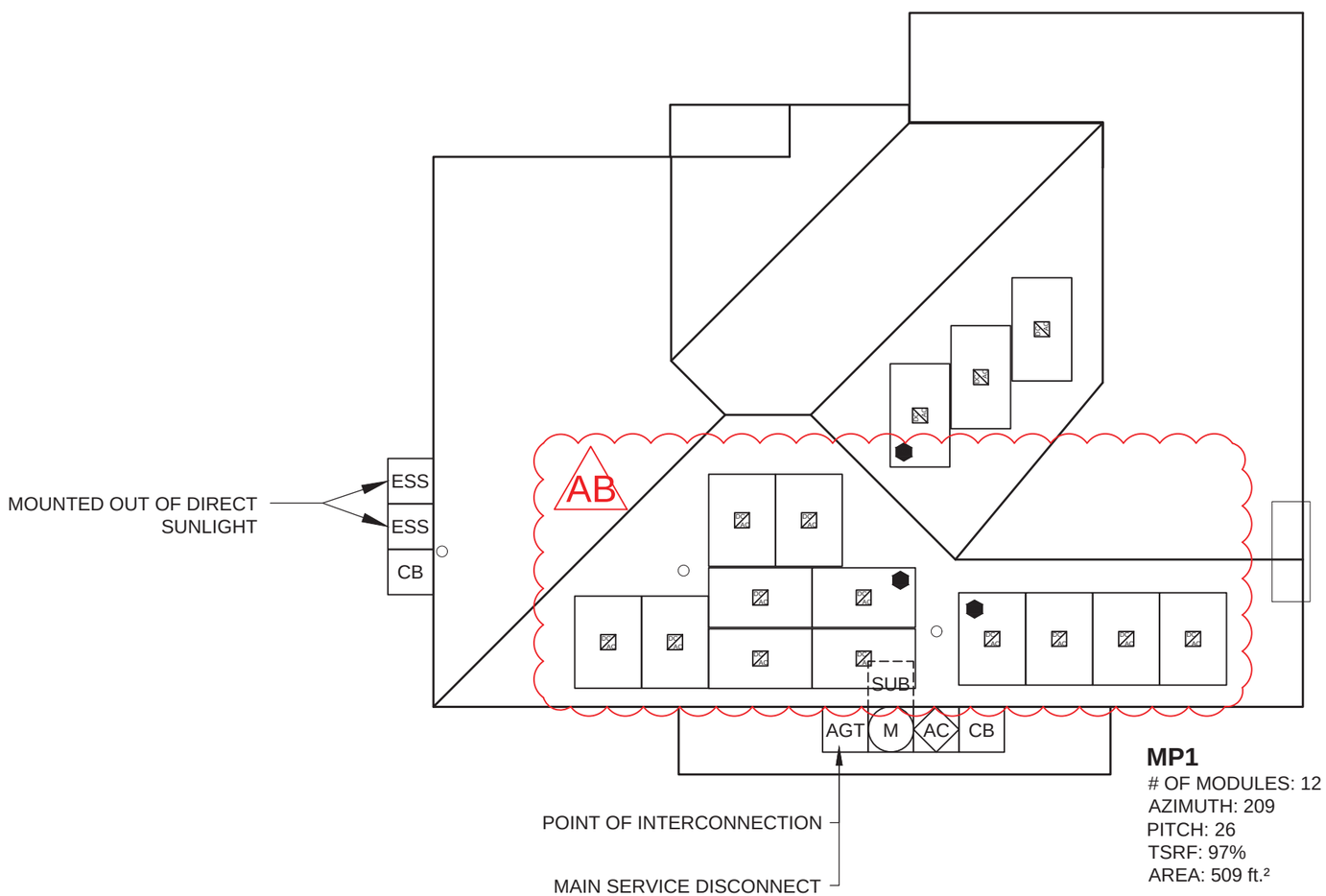
TOTAL NUMBER OF MODULES: 15
MODULE MAKE AND MODEL: SPR M425-BLK
MODULE WATTAGE: 425W DC

INVERTER MAKE AND MODEL: Enphase IQ7HS
INVERTER TYPE: Microinverter (1 Inverter per PV Module)
INVERTER CURRENT OUTPUT: 1.60A AC
INVERTER NOMINAL VOLTAGE: 240V
INVERTER WATTAGE: 384W AC

NEW ENERGY STORAGE SYSTEM SPECIFICATIONS

TOTAL NUMBER OF BATTERIES: 2
TOTAL MAXIMUM CONTINUOUS OUTPUT: 10kW
TOTAL MAXIMUM PEAK OUTPUT: 20kW
TOTAL STORAGE CAPACITY: 30kWh
TOTAL USABLE STORAGE CAPACITY: 27.2kWh

FRONT OF HOME



MP2
OF MODULES: 3
AZIMUTH: 119
PITCH: 26
TSRF: 89%
AREA: 208 ft.²

MP1
OF MODULES: 12
AZIMUTH: 209
PITCH: 26
TSRF: 97%
AREA: 509 ft.²

LEGEND

- JUNCTION BOX
- M — UTILITY METER
- MSP — MAIN SERVICE PANEL
- AC — AC DISCONNECT
- CB — COMBINER BOX
- LC — LOAD CENTER
- SUB — SUBPANEL
- PV — PV METER
- TS — TRANSFER SWITCH
- ESS — ENERGY STORAGE SYSTEM
- AGT — AGATE SITE CONTROLLER
- RPO — REMOTE POWER OFF
- FIRE SETBACK
- TRENCHING
- PROPERTY LINE

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

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2/8/24
Firm No. : D-0449

DC SYSTEM SIZE: 6.375 KW DC MODULE: SUNPOWER 425
INVERTER(S): ENPHASE IQ7HS MICROINVERTERS

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CUSTOMER INFORMATION:
Wiyada Sorkaew
1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY: Erik Armstrong
PLOT DATE: February 8, 2024
PROJECT NUMBER: 735760
SHEET NAME: ROOF PLAN
REVISION: A
PAGE NUMBER: PV3

STRUCTURAL INFORMATION:

ROOF TYPE (1):

ROOF TYPE: Comp Shingle
SHEATHING TYPE: OSB
FRAMING TYPE: Rafter
FRAMING SIZE: 2x6 @ 16" OC
CEILING JOIST SIZE: 2x8 @ 16" OC

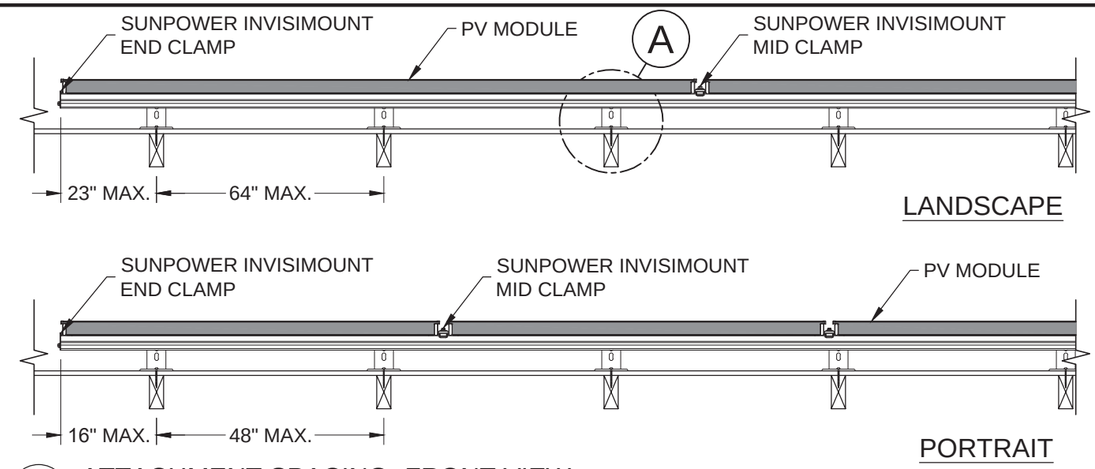
ATTACHMENT: Unirac FlashKit Pro
RACKING: SunPower InvisiMount Rail
@ 48" OC Portrait / 64" OC Landscape
NUMBER OF ATTACHMENTS: 75

PV MODULE COUNT: 15 Modules
TOTAL ARRAY AREA: 306.0 ft² (20.4ft²/panel)
TOTAL ROOF AREA: 1837 ft²
ARRAY/ROOF AREA: 16.7%
ARRAY WEIGHT: 750 lbs (50 lbs/panel)
DISTRIBUTED LOAD: 2.45 lbs/ft²
POINT LOAD: 10 lbs/attachment

STRUCTURAL NOTES:

None

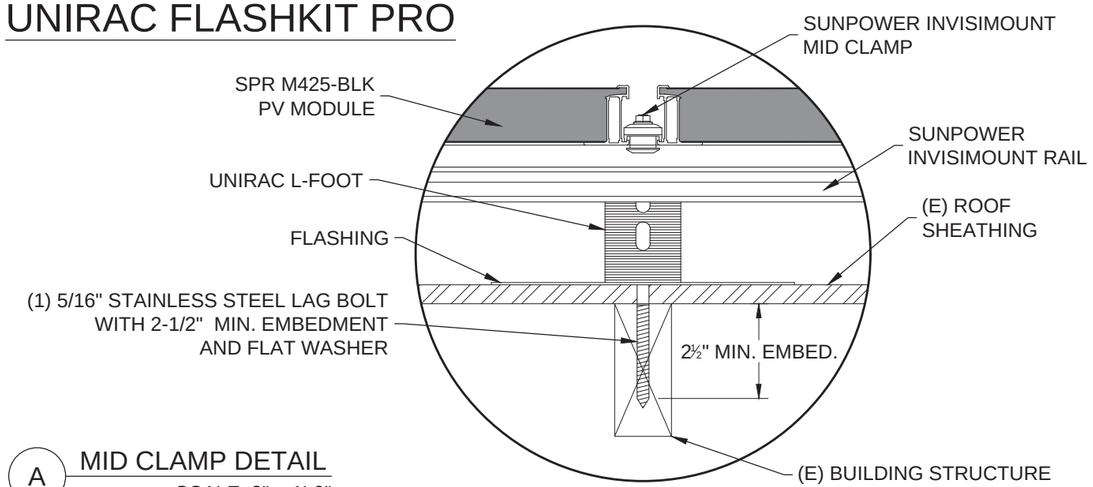
*NOTE: LISTED NUMBER OF ATTACHMENT POINTS ARE AN ESTIMATE ONLY AND MAY VARY BASED ON FIELD CONDITIONS. MAXIMUM ATTACHMENT SPACING TO BE FOLLOWED PER ENGINEER OF RECORD SPECIFICATIONS.



C ATTACHMENT SPACING- FRONT VIEW
SCALE: 3/4" = 1'-0"

-RACKING ATTACHMENTS TO BE STAGGERED

UNIRAC FLASHKIT PRO



A MID CLAMP DETAIL
SCALE: 3" = 1'-0"

D ATTACHMENT SPACING- SIDE VIEW
SCALE: 1/2" = 1'-0"

B END CLAMP DETAIL
SCALE: 3" = 1'-0"

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2/8/24
Firm No. : D-0449

NORTH CAROLINA PROFESSIONAL SEAL 035433 ENGINEER JOHN A. CALVERT

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CUSTOMER INFORMATION:
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AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY:
Erik Armstrong

PLOT DATE:
February 8, 2024

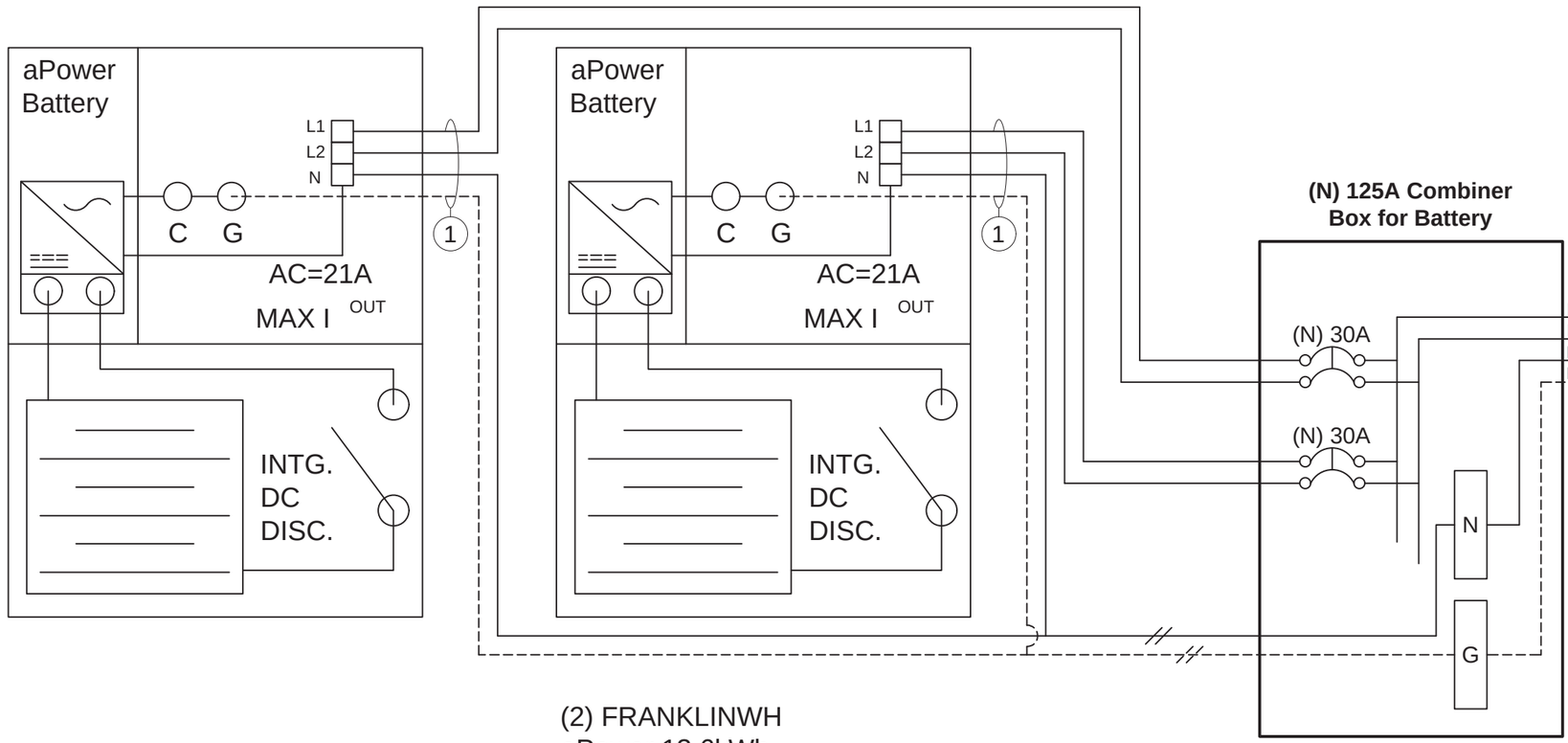
PROJECT NUMBER:
735760

SHEET NAME:
STRUCTURAL

REVISION: A

PAGE NUMBER: PV4

1	(1) 10-3 UF-B W/G, SOLID COPPER	21 A AC 240 V AC	2	(1) 6 AWG THHN/THWN-2, CU., BLACK (L1) 6 AWG THHN/THWN-2, CU., RED (L2) 6 AWG THHN/THWN-2, CU., WHITE (N) 10 AWG THHN/THWN-2, CU., GREEN (EGC)	42 A AC 240 V AC
	(1) 3/4 INCH EMT	EXTERIOR		(1) 3/4 INCH EMT	EXTERIOR



(2) FRANKLINWH
aPower 13.6kWh
INVERTER WITH
INTEGRATED LI-ION
BATTERY AND ON/OFF
(DC) SWITCH

ON/OFF (DC) SWITCH IS
NEC 706.7(A) & (E)(1)
COMPLIANT

UTILITY COMPANY: Duke Energy NC
PERMIT ISSUER: Harnett County

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CONTRACTOR:
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CUSTOMER INFORMATION:
Wiyada Sorkaew
1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY: Erik Armstrong

PLOT DATE: February 8, 2024

PROJECT NUMBER: 735760

SHEET NAME: ELECTRICAL

REVISION: A

PAGE NUMBER: PV5

INTERCONNECTION NOTES

705.12(B)(2)(3)(c) THE SUM OF THE AMPERE RATINGS OF ALL OVERCURRENT DEVICES ON PANELBOARDS, BOTH LOAD AND SUPPLY DEVICES, EXCLUDING THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR, SHALL NOT EXCEED THE AMPACITY OF THE BUSBAR. THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED THE RATING OF THE PERMANENT WARNING LABELS SHALL BE APPLIED TO DISTRIBU TION EQUIPMENT DISPLAYING THE FOLLOWING OR EQUIVALENT WORDING:

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

THE WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH 110.21(B).

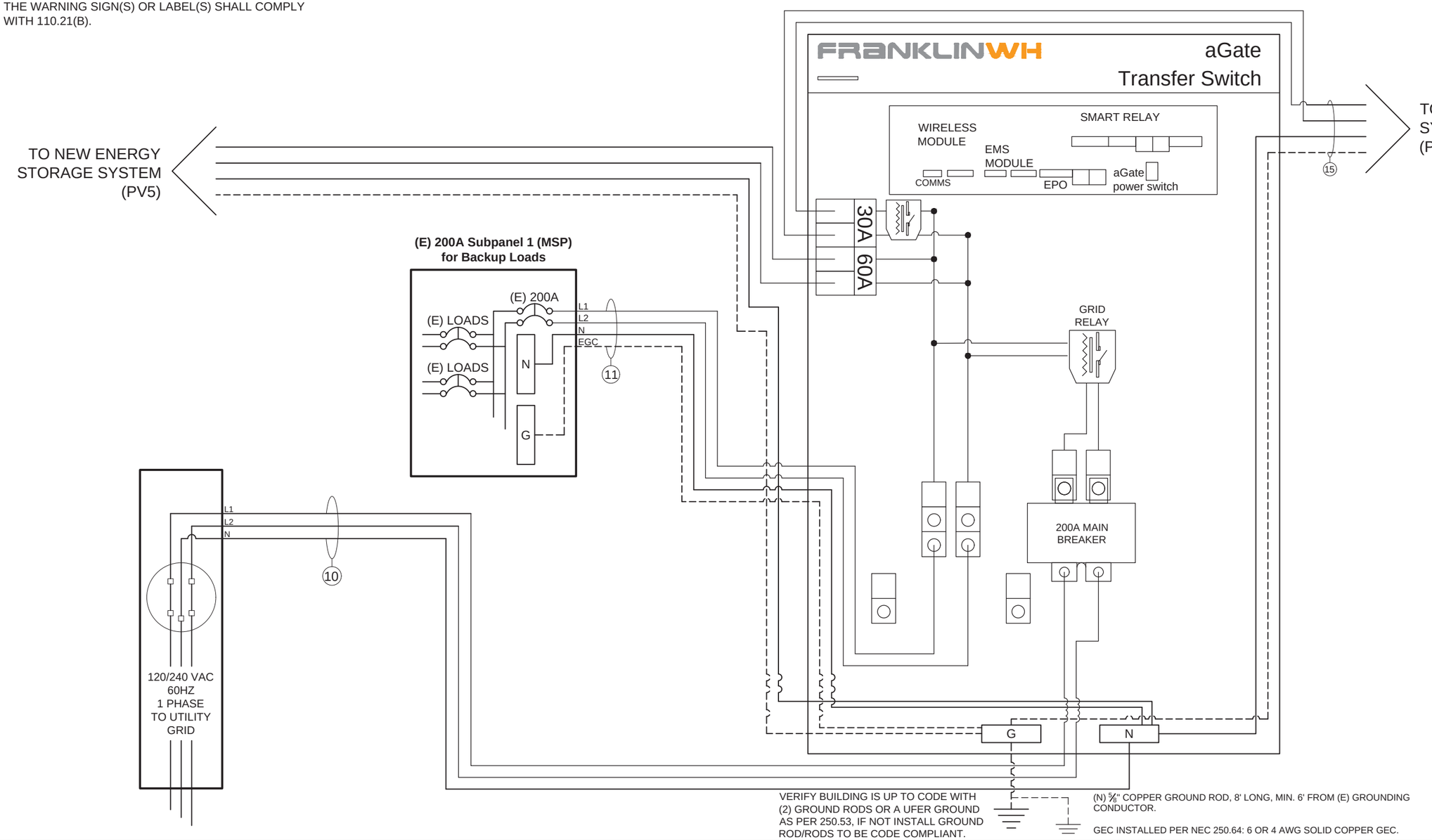
10	(1) 2/0 AWG THHN/THWN-2, CU., BLACK (L1) (1) 2/0 AWG THHN/THWN-2, CU., RED (L2) (1) 2/0 AWG THHN/THWN-2, CU., WHITE (N) (1) 2 INCH EMT	EXTERIOR	11	(1) 4/0-4/0-4/0-2/0.SER.AL.BLACK	INTERIOR	15	(1) 10 AWG THHN/THWN-2, CU., BLACK (L1) (1) 10 AWG THHN/THWN-2, CU., RED (L2) (1) 10 AWG THHN/THWN-2, CU., RED (L2) (1) 10 AWG THHN/THWN-2, CU., WHITE (N) (1) 3/4 INCH EMT 24.0 A AC 240 V AC EXTERIOR

AB

UTILITY COMPANY: Duke Energy NC
PERMIT ISSUER: Harnett County

DESIGNER NOTES:

CONNECT PV TO AGATE. REFEED MSP FROM AGATE. FEED AGATE FROM UTILITY CONDUCTORS.



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CUSTOMER INFORMATION:
Wiyada Sorkaew
1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY:
Erik Armstrong

PLOT DATE:
February 8, 2024

PROJECT NUMBER:
735760

SHEET NAME:
ELECTRICAL

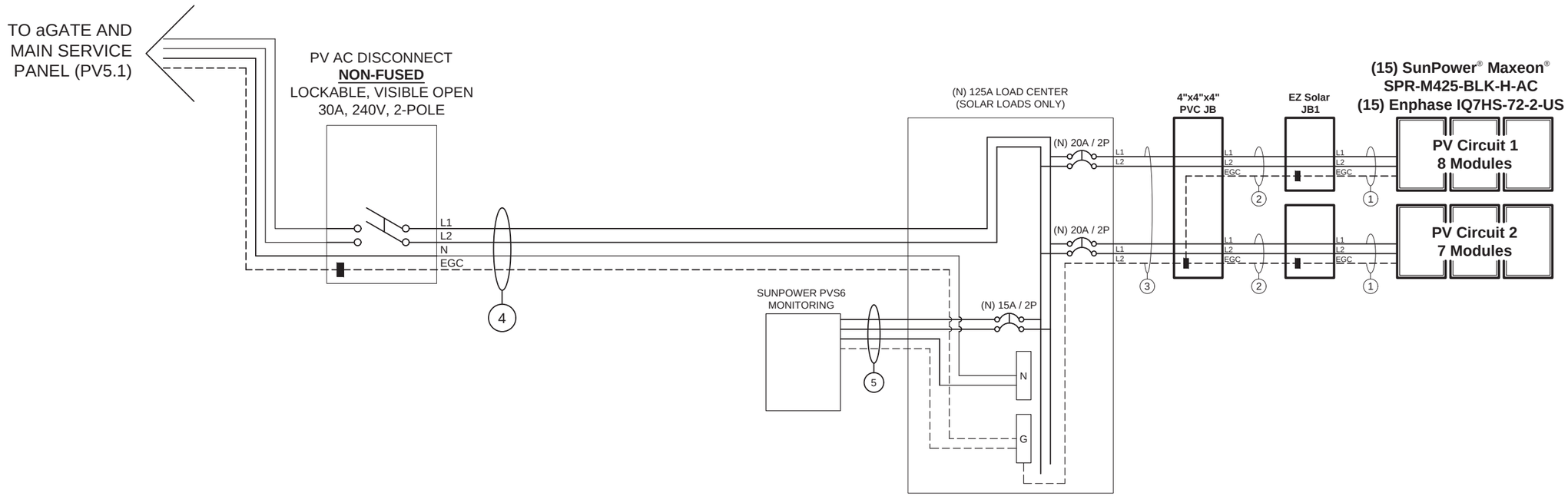
REVISION: A

PAGE NUMBER: PV5.1

4	(1) 10 AWG THHN/THWN-2, CU., BLACK (L1) (1) 10 AWG THHN/THWN-2, CU., RED (L2) (1) 10 AWG THHN/THWN-2, CU., WHITE (N) (1) 10 AWG THHN/THWN-2, CU., GREEN (EGC) C 3/4 INCH MIN. EMT or SCH 80 PVC	MAX 24.0 A AC 240 V AC EXTERIOR	3	(1) 10 AWG THHN/THWN-2, CU., BLACK (L1) (1) 10 AWG THHN/THWN-2, CU., RED (L2) (1) 10 AWG THHN/THWN-2, CU., GREEN (EGC) C 3/4 INCH MIN. EMT or SCH 80 PVC	MAX 12.8 A AC 240 V AC EXTERIOR	2	(1) 10-2 UF-B (or NM), SOLID, CU.	MAX 12.8 A AC 240 V AC INTERIOR	1	(1) 12 AWG THHN/THWN-2, CU. (1) 6 AWG BARE, CU. (EGC)	MAX 12.8 A AC 240 V AC EXTERIOR
5	(1) 10 AWG THHN/THWN-2, CU., BLACK (L1) (1) 10 AWG THHN/THWN-2, CU., RED (L2) (1) 10 AWG THHN/THWN-2, CU., WHITE (N) (1) 10 AWG THHN/THWN-2, CU., GREEN (EGC) C 3/4 INCH MIN. EMT or SCH 80 PVC										

ELECTRICAL NOTES:

15 MICROINVERTERS X 384 W AC = 5.76 KW AC; PANEL WATTAGE = 425 W DC



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AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY:
Erik Armstrong

PLOT DATE:
February 8, 2024

PROJECT NUMBER:
735760

SHEET NAME:
ELECTRICAL

REVISION:	PAGE NUMBER:
A	PV5.2

LOAD CALCS FOR ENTIRE HOME ELECTRICAL SYSTEM

Residential Electrical Load Calculations — NEC 220.83

		Total VA
Home Square Footage	2,772	8,316 VA

General Loads (Small Appliances)

Small appliances fed by a 15A or 20A 1-pole breaker.

	Qty.	Total VA
Washing Machine	1	1,500 VA
Microwave	1	1,500 VA
Dishwasher	1	1,500 VA
Disposal	1	1,500 VA
Refrigerator	1	1,500 VA
Freezer		
Compactor		
Window A/C Unit		
Dehumidifier		
Ice Maker		
Water Cooler		
Air Handler		
Range Hood		
Other		
Other		
Other		

General Loads (Large Appliances)

Large appliances fed by a 2-pole (240V) breaker

	Breaker Rating	Total VA
Range (Electric)	50	9,600 VA
Oven (Electric)		
Stovetop (Electric)		
Dryer (Electric)	30	5,760 VA
Water Heater (Electric)	30	5,760 VA

Large appliances fed by a 1-pole (120V) breaker

Range (Gas)		
Oven (Gas)		
Stovetop (Gas)		
Dryer (Gas)		
Water Heater (Gas)		
Water Pump (120V)		
Sump Pump (120V)		
Water Pump (240V)	30	5,760 VA
Sump Pump (240V)		
Other 120V		
Other 240V	60	11,520 VA
EV Charger (240V)		

Heating and Air Conditioning Loads

	Sum of Breakers	Total VA
A/C Units	60	11,520 VA
Furnace (Electric)(240V)	20	3,840 VA
Furnace (Gas)(120V)		

Existing Load	158 A	38,006 VA

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CUSTOMER INFORMATION:
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1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY: Erik Armstrong

PLOT DATE: February 8, 2024

PROJECT NUMBER: 735760

SHEET NAME: LOAD CALCS

REVISION: A

PAGE NUMBER: PV5.3

(E) MSP TO CONTAIN BACKUP LOADS
(SUB PANEL 1) 200A - 120/240V

1	A/B	AC 60A/2P	30A/2P	A/B	2
3	A/B			A/B	4
5	A/B	15A/1P	AC/FURNANCE 20A/2P	A/B	6
7	A/B	15A/1P		A/B	8
9	A/B	15A/1P	30A/2P	A/B	10
11	A/B	15A/1P		A/B	12
13	A/B	15A/1P	30A/2P	A/B	14
15	A/B	15A/1P		A/B	16
17	A/B	20A/1P	20A/2P	A/B	18
19	A/B	20A/1P		A/B	20
21	A/B	20A/1P	30A/2P	A/B	22
23	A/B	20A/1P		A/B	24
25	A/B	20A/1P	20A/1P	A/B	26
27	A/B	RANGE 50A/2P	15A/1P	A/B	28
29	A/B		20A/1P	A/B	30

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#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:
Wiyada Sorkaew
1153 Christian Light Rd
Fuquay-varina North Carolina 27526

AC SYSTEM SIZE: 5.76 kW AC
DC SYSTEM SIZE: 6.375 kW DC

DRAWING BY:
Erik Armstrong

PLOT DATE:
February 8, 2024

PROJECT NUMBER:
735760

SHEET NAME:
BREAKER SCHED.

REVISION: A

PAGE NUMBER: PV5.4

Electrical Calculations for Photovoltaic Circuits

PV System Specifications	
Module Type:	SunPower 425
Module Model Number:	SPR M425-BLK
Number of Modules:	15
DC Module Wattage:	425 W DC
Integrated Microinverter:	Enphase IQ7HS
Max. Continuous AC Output Current:	1.60 A AC
Nominal AC Voltage:	240 V AC
Max. Continuous AC Output Power:	384 W AC
Nominal AC Operating Frequency:	60 Hz
Electrical System Phase:	Single Phase

Design Location and Temperatures	
Temperature Date Source:	ASHRAE Weather Station Data
State:	North Carolina
City:	Fuquay-varina
Weather Station:	SEYMOUR-JOHNSON AFB
ASHRAE 2% Avg. High:	35°C
ASHRAE Extreme Low:	-10°C

AC Voltage Drop Calculations			
	Distance (ft.)	Conductor Size	Calculated Voltage Drop
Wire Tag #1:	28 FT	12 AWG	0.74%
Wire Tag #2:	12 FT	10 AWG	0.20%
Wire Tag #3:	20 FT	10 AWG	0.33%
Total V_{DROP}:			**1.27%**
Wire Tag #4:	20 FT	10 AWG	0.50%

PV Circuit Specifications	Circuit 1	Circuit 2	Circuit 3	Circuit 4	Circuit 5	Circuit 6
Number of Modules per Circuit:	8	7				
AC Output Current (I_{OUT}):	12.8 A	11.2 A				
NEC Adjusted (I_{OUT} x 125%):	16.0 A	14.0 A				
PV Breaker Rating per Circuit:	20 A	20 A				
Combined AC Output Current (C_{OUT}):	24.0 A					
NEC Adjusted (C_{OUT} x 125%):	30.0 A					
Combined PV Breaker Rating:	30 A					

Conductor Size Calculations for PV Circuits

Wire Tag #1		Wire Tag #2	
Max. Total AC Output Current (I_{OUT}):	12.8 A AC	Max. Total AC Output Current (I_{OUT}):	12.8 A AC
Min. Conductor Ampacity (I_{OUT} x 125%):	16.0 A AC	Min. Conductor Ampacity (I_{OUT} x 125%):	16.0 A AC
Conductor Material:	Copper	Conductor Material:	Copper
Conductor Type:	THHN/THWN-2	Conductor Type:	UF-B
Conductor Size:	12 AWG	Conductor Size:	10 AWG
Conductor Ampacity Rating:	30 A	Conductor Ampacity Rating:	30 A
Conductor Temperature Rating:	90°C	Conductor Temperature Rating:	60°C
Ambient Temperature Correction Factor:	0.96	Ambient Temperature Correction Factor:	0.96
Adjusted Conductor Ampacity:	28.8 A	Adjusted Conductor Ampacity:	28.8 A

Wire Tag #3		Wire Tag #4	
Max. Total AC Output Current (I_{OUT}):	12.8 A AC	Max. Total AC Output Current (I_{OUT}):	24.0 A AC
Min. Conductor Ampacity (I_{OUT} x 125%):	16.0 A AC	Min. Conductor Ampacity (I_{OUT} x 125%):	30.0 A AC
Conductor Material:	Copper	Conductor Material:	Copper
Conductor Type:	THHN/THWN-2	Conductor Type:	THHN/THWN-2
Conductor Size:	10 AWG	Conductor Size:	10 AWG
Conductor Ampacity Rating:	35 A	Conductor Ampacity Rating:	35 A
Conductor Temperature Rating:	75°C	Conductor Temperature Rating:	75°C
Ambient Temperature Correction Factor:	0.96	Ambient Temperature Correction Factor:	0.96
Conduit Fill Adjustment Factor:	0.80	Adjusted Conductor Ampacity:	33.6 A
Adjusted Conductor Ampacity:	26.9 A		

GROUNDING NOTES

1. A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH [NEC 690.47] AND [NEC 250.50-60] SHALL BE PROVIDED. PER [NEC 690.47], THE GROUNDING ELECTRODE SYSTEM OF AN EXISTING BUILDING MAY BE USED AND BE BONDED AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT GROUND ROD WITH ACORN CLAMP.
2. THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE PER [NEC 250.64(B)]. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER [NEC 250.64(C)].
3. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN 8 AWG AND NO GREATER THAN 6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
4. PV SYSTEM SHALL BE GROUNDED IN ACCORDANCE TO [NEC 250.21], [NEC TABLE 250.122], AND ALL METAL PARTS OR MODULE FRAMES ACCORDING TO [NEC 690.46].
5. MODULE SOURCE CIRCUITS SHALL BE GROUNDED IN ACCORDANCE TO [NEC 690.42].
6. THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDED CONDUCTOR TO ANOTHER MODULE.
7. EACH MODULE WILL BE GROUNDED USING THE SUPPLIED CONNECTION POINTS IDENTIFIED IN THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
8. ENCLOSURES SHALL BE PROPERLY PREPARED WITH REMOVAL OF PAINT/FINISH AS APPROPRIATE WHEN GROUNDING EQUIPMENT WITH TERMINATION GROUNDING LUGS.
9. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR DIRECT BURIAL.
10. GROUNDING AND BONDING CONDUCTORS SHALL BE COPPER, SOLID OR STRANDED, AND BARE WHEN EXPOSED.
11. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO [NEC 690.45] AND BE A MINIMUM OF 10 AWG WHEN NOT EXPOSED TO DAMAGE (6 AWG SHALL BE USED WHEN EXPOSED TO DAMAGE).
12. GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN (OR MARKED GREEN IF 4 AWG OR LARGER).
13. ALL CONDUIT BETWEEN THE UTILITY AC DISCONNECT AND THE POINT OF CONNECTION SHALL HAVE GROUNDED BUSHINGS AT BOTH ENDS.
14. SYSTEM GEC SIZED ACCORDING TO [NEC 690.47], [NEC TABLE 250.66], DC SYSTEM GEC SIZED ACCORDING TO [NEC 250.166], MINIMUM 8 AWG WHEN INSULATED, 6 AWG WHEN EXPOSED TO DAMAGE.
15. EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENTS, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH [NEC 250.134] OR [NEC 250.136(A)] REGARDLESS OF VOLTAGE.

WIRING & CONDUIT NOTES

1. ALL CONDUIT SIZES AND TYPES, SHALL BE LISTED FOR ITS PURPOSE AND APPROVED FOR THE SITE APPLICATIONS.
2. BOLTED CONNECTION REQUIRED IN DC DISCONNECTS ON THE WHITE GROUNDED CONDUCTOR (USE POLARIS BLOCK OR NEUTRAL BAR).
3. ANY CONNECTION ABOVE LIVE PARTS MUST BE WATERTIGHT. REDUCING WASHERS DISALLOWED ABOVE LIVE PARTS, MEYERS HUBS RECOMMENDED
4. UV RESISTANT CABLE TIES (NOT ZIP TIES) USED FOR PERMANENT WIRE MANAGEMENT OFF THE ROOF SURFACE IN ACCORDANCE WITH [NEC 110.2,110.3(A-B)].
5. SOLADECK JUNCTION BOXES MOUNTED FLUSH WITH ROOF SURFACE TO BE USED FOR WIRE MANAGEMENT AND AS FLASHED ROOF PENETRATIONS FOR INTERIOR CONDUIT RUNS.
6. ALL PV CABLES AND HOMERUN WIRES BE TYPE USE-2, AND SINGLE-CONDUCTOR CABLE LISTED AND IDENTIFIED AS PV WIRE, TYPE TC-ER, OR EQUIVALENT; ROUTED TO SOURCE CIRCUIT COMBINER BOXES AS REQUIRED.
7. ALL CONDUCTORS AND OCPD SIZES AND TYPES SPECIFIED ACCORDING TO [NEC 690.8] FOR MULTIPLE CONDUCTORS.
8. ALL PV DC CONDUCTORS IN CONDUIT EXPOSED TO SUNLIGHT SHALL BE INSTALLED AT LEAST 7/8" ABOVE THE ROOF SURFACE AND DERATED ACCORDING TO [NEC TABLE 310.15 (B)(2)(A)], [NEC TABLE 310.15(B)(3)(A)],& [NEC 310.15(B)(3)(C)].
9. EXPOSED ROOF PV DC CONDUCTORS SHALL BE USE-2, 90°C RATED, WET AND UV RESISTANT, AND UL LISTED RATED FOR 600V, UV RATED SPIRAL WRAP SHALL BE USED TO PROTECT WIRE FROM SHARP EDGES.
10. PHASE AND NEUTRAL CONDUCTORS SHALL BE DUAL RATED THHN/THWN-2 INSULATED, 90°C RATED, WET AND UV RESISTANT, RATED FOR 600V
11. 4-WIRE DELTA CONNECTED SYSTEMS HAVE THE PHASE WITH THE HIGHER VOLTAGE TO GROUND MARKED ORANGE OR IDENTIFIED BY OTHER EFFECTIVE MEANS.
12. ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION
13. VOLTAGE DROP LIMITED TO 2% FOR DC CIRCUITS AND 3% FOR AC CIRCUITS
14. NEGATIVE GROUNDED SYSTEMS DC CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS: DC POSITIVE- RED (OR MARKED RED), DC NEGATIVE- GREY (OR MARKED GREY)
15. POSITIVE GROUNDED SYSTEMS DC CONDUCTORS COLOR CODED:
DC POSITIVE- GREY (OR MARKED GREY), DC NEGATIVE- BLACK (OR MARKED BLACK)
16. AC CONDUCTORS >4AWG COLOR CODED OR MARKED: PHASE A OR L1- BLACK, PHASE B OR L2- RED, PHASE C OR L3- BLUE, NEUTRAL- WHITE/GRAY
* USE-2 IS NOT INDOOR RATED BUT PV CABLE IS RATED THWN/THWN-2 AND MAY BE USED INSIDE
** USE-2 IS AVAILABLE AS UV WHITE
17. RIGID CONDUIT, IF INSTALLED, (AND/OR NIPPLES) MUST HAVE A PULL BUSHING TO PROTECT WIRES.
18. IF CONDUIT DETERMINED TO BE RAN THROUGH ATTIC IN FIELD THEN CONDUIT WILL BE EITHER EMT, FMC, OR MC CABLE IF DC CURRENT COMPLYING WITH [NEC 690.31], [NEC 250.118(10)]. DISCONNECTING MEANS SHALL COMPLY WITH [NEC 690.13] AND [NEC 690.15],
19. CONDUIT RAN THROUGH ATTIC WILL BE AT LEAST 18" BELOW ROOF SURFACE COMPLYING WITH [NEC 230.6(4)] AND SECURED NO GREATER THAN 6' APART PER [NEC 330.30(B)].

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ELEC CALCS

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PAGE NUMBER: PV6

STANDARD LABELS

⚠ WARNING
ELECTRIC SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 1
FOR PV SYSTEM DISCONNECTING MEANS WHERE THE LINE AND LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN POSITION.
[2017 NEC 690.13(B)]
[2020 NEC 690.13(B)]

PHOTOVOLTAIC SYSTEM
⚠ AC DISCONNECT ⚠
RATED AC OUTPUT CURRENT 24 A
NOMINAL OPERATING AC VOLTAGE 240 V

LABEL 2
SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE AND WITH THE RATED AC OUTPUT CURRENT AND THE NOMINAL OPERATING AC VOLTAGE.
[2017 NEC 690.54]
[2020 NEC 690.54]

⚠ WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

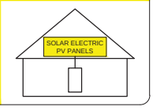
LABEL 3
IF INTERCONNECTING LOAD SIDE, INSTALL THIS LABEL ANYWHERE THAT IS POWERED BY BOTH THE UTILITY AND THE SOLAR PV SYSTEM, IE. MAIN SERVICE PANEL AND SUBPANELS.
[2017 NEC 705.12(B)(3)]
[2020 NEC 705.12(B)(3)]

⚠ WARNING
POWER SOURCE OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 4
APPLY TO THE DISTRIBUTION EQUIPMENT ADJACENT TO THE BACK-FED BREAKER FROM THE POWER SOURCE.
[2017 NEC 705.12(B)(2)(3)(b)]
[2020 NEC 705.12(B)(3)(2)]

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

LABEL 5
APPLY TO THE PV COMBINER BOX
[2017 NEC 705.12(B)(2)(3)(c)]
[2020 NEC 705.12(B)(3)(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


LABEL 6
BUILDINGS WITH PV SYSTEMS SHALL HAVE A PERMANENT LABEL LOCATED AT EACH SERVICE EQUIPMENT LOCATION TO WHICH THE PV SYSTEMS ARE CONNECTED OR AT AN APPROVED READILY VISIBLE LOCATION AND SHALL INDICATE THE LOCATION OF RAPID SHUTDOWN INITIATION DEVICES.
[2017 NEC 690.56(C)(1)(a)]
[2020 NEC 690.56(C)]

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL 7
SIGN LOCATED AT RAPID SHUT DOWN DISCONNECT SWITCH
[2017 NEC 690.56(C)(3)]
[2020 NEC 690.56(C)(2)]

⚠ WARNING
MAIN DISTRIBUTION UTILITY DISCONNECT(S)
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM A ROOF MOUNTED SOLAR ARRAY WITH A RAPID SHUTDOWN DISCONNECTING MEANS GROUPED AND LABELED WITHIN LINE OF SITE AND 10 FT OF THIS LOCATION

LABEL 8
PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED.
[2017 NEC 705.10]
[2020 NEC 705.10]

⚠ WARNING
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM MAIN DISTRIBUTION UTILITY DISCONNECT LOCATED

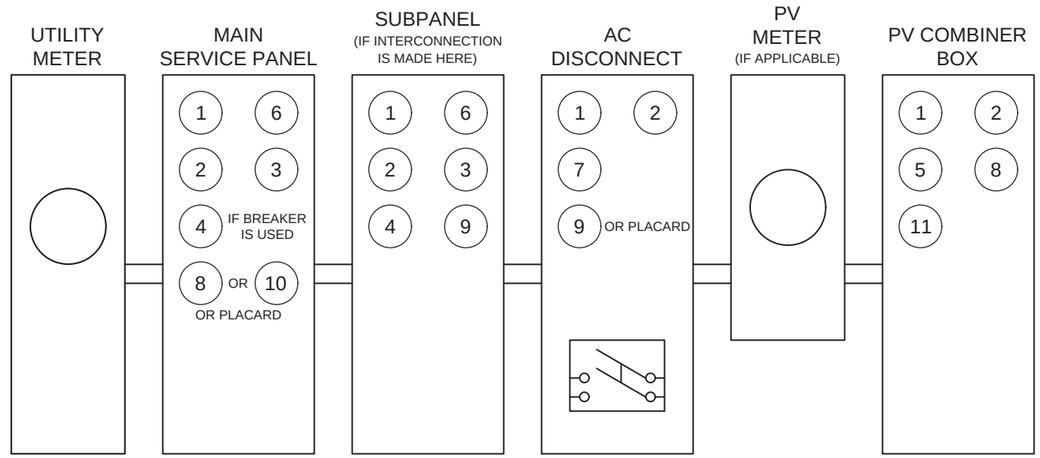
LABEL 9
PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED.
[2017 NEC 705.10]
[2020 NEC 705.10]

⚠ WARNING
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM A ROOF MOUNTED SOLAR ARRAY. SOLAR ARRAY RAPID SHUTDOWN DISCONNECT IS LOCATED OUTSIDE NEXT TO THE UTILITY METER.

LABEL 10
PERMANENT PLAQUE OR DIRECTORY TO BE LOCATED AT MAIN SERVICE EQUIPMENT DENOTING THE LOCATION OF THE RAPID SHUTDOWN SYSTEM DISCONNECTING MEANS IF SOLAR ARRAY RAPID SHUTDOWN DISCONNECTING SWITCH IS NOT GROUPED AND WITHIN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS.
[2017 NEC 705.10 AND 690.56(C)(1)(a)]
[2020 NEC 705.10 AND 690.56(C)]

⚠ WARNING
PHOTOVOLTAIC SYSTEM COMBINER PANEL
DO NOT ADD LOADS

LABEL 11
PERMANENT PLAQUE OR DIRECTORY TO BE LOCATED AT AC COMBINER PANEL.
[2017 NEC 110.21(B)]
[2020 NEC 110.21(B)]



ADDITIONAL LABELS

LABELING NOTES

1) LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2) LABELING REQUIREMENTS BASED ON THE 2017 & 2020 NEC CODE, OSHA STANDARD 19010.145, ANSIZ535.
3) MATERIAL BASED ON THE REQUIREMENTS OF THE AHJ.
4) LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED AND SHALL NOT BE HANDWRITTEN [NEC 110.21]

*ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ON 3 LINE DIAGRAM. 3 LINE DIAGRAM ON PV5 TO REFLECT ACTUAL REPRESENTATION OF PROPOSED SCOPE OF WORK.

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LABELS

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PAGE NUMBER: PV7

STANDARD LABELS

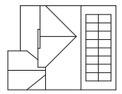
WARNING LABELS FOR BATTERY SYSTEMS

UTILITY METER

(E) HOUSE LOAD CENTER

aGATE

CAUTION
MULTIPLE SOURCES OF POWER
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:
PER NEC 690.56(B) / NEC 706.11(A)



ENERGY STORAGE SYSTEM DISCONNECT

WARNING

ELECTRIC SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
PER NEC 705.22

ENERGY STORAGE SYSTEM DISCONNECT

NOTICE

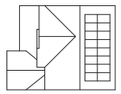
THIS STRUCTURE CONTAINS A STAND-ALONE ELECTRICAL POWER SYSTEM
PER NEC 690.56(A)
/ NEC 706.11(B)

ENERGY STORAGE SYSTEM DISCONNECT
NOMINAL ESS AC VOLTAGE: 240 VOLTS
MAXIMUM ESS DC VOLTAGE: ____ Vdc

BACKUP LOAD CENTER

PV SYSTEM DISCONNECT

CAUTION
MULTIPLE SOURCES OF POWER
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:
PER NEC 690.56(B) / NEC 706.11(A)



ESS COMBINER BOX

WARNING

ENERGY STORAGE SYSTEM
COMBINER PANEL

DO NOT ADD LOADS

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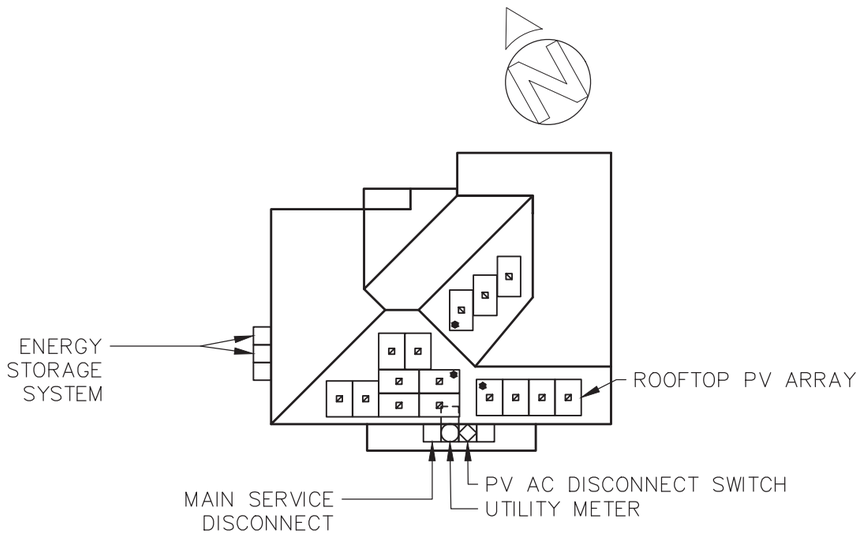
PAGE NUMBER: PV7.1

CAUTION

MULTIPLE SOURCES OF POWER

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:

FRONT OF HOME



1153 CHRISTIAN LIGHT RD,
FUQUAY-VARINA NORTH CAROLINA 27526

DIRECTORY PLACARD NOTES

[NEC 705.10] A PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED. THE MARKING SHALL COMPLY WITH *[110.21(B)]*.

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FLASHKIT PRO

UNIRAC FEATURING EcoFasten Solar® TECHNOLOGY

FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Unirac partnered with EcoFasten Solar to bring best-in-class design and performance together in one package. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With **FLASH**KIT PRO, you have everything you need for a quick, professional installation.

UNIRAC 25 YEAR FULL SYSTEM WARRANTY

TRUSTED WATER SEAL FLASHINGS
FEATURING EcoFasten Solar® TECHNOLOGY

YOUR COMPLETE SOLUTION
Flashings, lags, continuous slot L-Feet and hardware

CONVENIENT 10 PACKS
Packaged for speed and ease of handling

THE COMPLETE ROOF ATTACHMENT SOLUTION

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FLASHKIT PRO

INSTALLATION GUIDE

UNIRAC FEATURING EcoFasten Solar® TECHNOLOGY

FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.

INSTALL **FLASH**KIT PRO FLASHING

INSTALL L-FOOT

ATTACH L-FOOT TO RAIL

PRE-INSTALL SYSTEM LAYOUT

- Locate rafters and snap horizontal and vertical lines to mark the installation position for each flashing.
- Drill a pilot hole (1/4" diameter) for the lag bolt. Backfill with sealant.

STEP 1 INSTALL **FLASH**KIT PRO FLASHING

- Insert the flashing so the top part is under the next row of shingles and pushed far enough upslope to prevent water infiltration through vertical joint in shingles.
- The leading edge of flashing must butt against upper row of nails to prevent turning when torqued.

QUICK TIP:

- For vertical adjustment when leading edge of flashing hits nails in upper shingle courses, slide flashing up under shingles until leading edge engages nails. Measure remaining distance to adjust upslope.
- Remove flashing and cut a "V" notch at marks where nail shafts engaged leading edge of flashing the distance desired in Step 1. Notch depth not to exceed 2" in length by 1/2" in width.
- Re-install flashing with notched area upslope, and position notched leading edge underneath nail heads.

STEP 2 INSTALL L-FOOT

- Line up pilot hole with **FLASH**KIT PRO fastener hole.
- Insert the lag bolt through the EPDM washer, the top L-101-3 compression bracket, and the gasketed hole in the flashing and into the rafter.
- Torque to 100-140 torque inch-pounds depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners be careful not to over torque the fastener. You may need to stop and use a ratchet to finish the install.

STEP 3 ATTACH L-FOOT TO RAIL

- Slide the 3/8"-16 racking hardware into rail slot, spacing bolts to match the spacing of the attachments.
- Torque 3/8" nut to 30ft-lbs. Use anti-seize to prevent galling.
- If attaching L-Foot to light rail, ensure the L-Foot does not protrude above the top edge of the rail.

FASTER INSTALLATION. 25-YEAR WARRANTY.

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CONTRACTOR:
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SHEET NAME
SPEC SHEET

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REVISION
0

SunPower® InvisiMount™ | Residential Mounting System

Simple and Fast Installation

- Integrated module-to-rail grounding
- Pre-assembled mid and end clamps
- Levitating mid clamp for easy placement
- Mid clamp width facilitates consistent, even module spacing
- UL 2703 Listed integrated grounding

Flexible Design

- Addresses nearly all sloped residential roofs
- Design in landscape and portrait with up to 8' rail span
- Pre-drilled rails and rail splice
- Rails enable easy obstacle management

Customer-Preferred Aesthetics

- #1 module and #1 mounting aesthetics
- Best-in-class system aesthetics
- Premium, low-profile design
- Black anodized components
- Hidden mid clamps and capped, flush end clamps

Part of Superior System

- Built for use with SunPower DC and AC modules
- Best-in-class system reliability and aesthetics
- New optional rooftop transition flashing, rail-mounted J-box, and wire management rail clips
- Combine with SunPower modules and SunPower EnergyLink® monitoring app

Elegant Simplicity

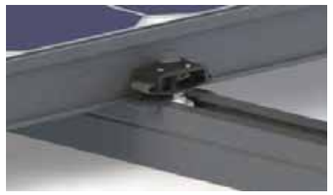
SunPower® InvisiMount™ is a SunPower-designed rail-based mounting system. The InvisiMount system addresses residential sloped roofs and combines faster installation time, design flexibility, and superior aesthetics. The InvisiMount product was specifically envisioned and engineered to pair with SunPower modules. The resulting system-level approach amplifies the aesthetic and installation benefits—for homeowners and for installers.

sunpower.com

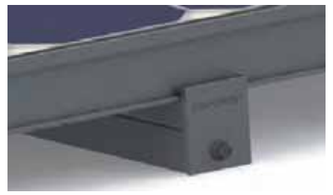
SunPower® InvisiMount™ | Residential Mounting System

InvisiMount Components

Module[1] / Mid Clamp and Rail



Module[1] / End Clamp and Rail



Mid Clamp

End Clamp

Rail & Rail Splice

Ground Lug Assembly (*for DC systems only*)

InvisiMount Component Details		
Mid clamp	Black oxide stainless steel 300 series	63 g (2.2 oz)
End clamp	Black anodized aluminum 6000 series	110 g (3.88 oz)
Rail	Black anodized aluminum 6000 series	830 g/m (9 oz/ft)
Rail splice	Aluminum alloy 6000 series	830 g/m (9 oz/ft)
Rail bolt	M10-1.5 × 25 mm; DIN 933 SS304	nominal
Rail nut	M10-1.5; DIN 6923 SS304	nominal
Ground lug assembly	SS304; A2-70 bolt; tin-plated copper lug	106.5 g/m (3.75 oz)

InvisiMount Component LRFD Capacities[2]		
Mid clamp	Uplift	664 lbf
	Shear	540 lbf
End clamp	Uplift	899 lbf
	Shear	220 lbf
Rail	Moment: upward	548 lbf-ft
	Moment: downward	580 lbf-ft
Rail splice	Moment: upward	548 lbf-ft
	Moment: downward	580 lbf-ft
L-foot	Uplift	1000 lbf
	Shear	390 lbf

InvisiMount Operating Conditions	
Temperature	–40° C to 90° C (–40° F to 194° F)
Max. Load (LRFD)	• 3000 Pa uplift • 6000 Pa downforce

Roof Attachment Hardware Supported by Design Tool	
Application	• Composition Shingle Rafter Attachment • Composition Shingle Roof Decking Attachment • Curved and Flat Tile Roof Attachment • Universal interface for other roof attachments

InvisiMount Warranties And Certifications	
Warranties	• 25-year product warranty • 5-year finish warranty
Certifications	• UL 2703 Listed • Class A Fire Rated

Roof Attachment Hardware Warranties
Refer to roof attachment hardware manufacturer's documentation.

[1] Mod . ware interoperability.

[2] SunPower recommends that all Equinox™, InvisiMount™, and AC module systems always be designed using the SunPower Design Tool. If a designer decides to instead use the component capacities listed in this document to design a system, note that the capacities shown are Load and Resistance Factor Design (LRFD) design loads, and are NOT to be used for Allowable Stress Design (ASD) calculations; and that a licensed Professional Engineer (PE) must then stamp all calculations. Should you have any questions please contact SunPower Technical Support at 1-800-SUNPOWER (1-800-786-7693).

sunpower.com
509506 RevF

Datasheet SUNPOWER®

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M SERIES

SUNPOWER®

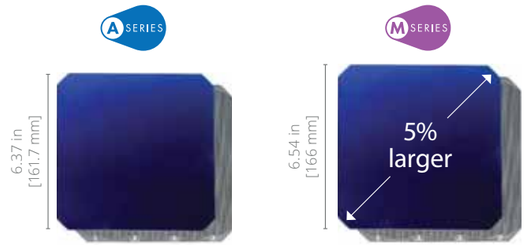
425-410 W Residential Black AC Module

SunPower® Maxeon® Technology

Built specifically for use with the SunPower Equinox® system, the only fully integrated solution designed, engineered, and warranted by one company.

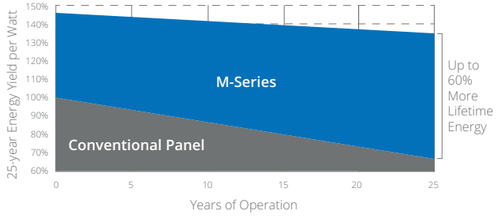
Highest Power Density Available

The patented, solid-copper foundation Maxeon Gen 6 cell is over 5% larger than prior generations, delivering the highest-efficiency all-black AC solar module available.[1]



Highest Lifetime Energy and Savings

Designed to deliver 60% more energy over 25 years in real-world conditions like partial shade and high temperatures.[2]



Best Reliability, Best Warranty

With more than 42.6 million and 15 GW of modules deployed around the world, SunPower technology is proven to last. That's why we stand behind our module and microinverter with the industry's best 25-year Combined Power and Product Warranty, including the highest Power Warranty in solar.

Part of the SunPower Equinox® Solar System

- Seamless aesthetics
- Compatible with mySunPower monitoring

Factory-integrated Microinverter

- Highest-power integrated AC module in solar
- Engineered and calibrated by SunPower for SunPower AC modules

M425-BLK | M415-BLK | M410-BLK SunPower Residential Black AC Module

AC Electrical Data		
Inverter Model: Type H (Enphase IQ7HS)	**@240 VAC**	**@208 VAC**
Max. Continuous Output Power (VA)	384	369
Nom. (L–L) Voltage/Range[3] (V)	240 / 211–264	208 / 183–229
Max. Continuous Output Current (A)	1.60	1.77
Max. Units per 20 A (L–L) Branch Circuit[4]	10	9
CEC Weighted Efficiency	97.0%	96.5%
Nom. Frequency	60 Hz	60 Hz
Extended Frequency Range	47–68 Hz	47–68 Hz
AC Short Circuit Fault Current Over 3 Cycles	4.82 A	4.82 A
Overvoltage Class AC Port	III	III
AC Port Backfeed Current	18 mA	18 mA
Power Factor Setting	1.0	1.0
Power Factor (adjustable)	0.85 (inductive) / 0.85 (capacitive)	0.85 (inductive) / 0.85 (capacitive)

DC Power Data			
	SPR-M425-BLK-H-AC	SPR-M415-BLK-H-AC	SPR-M410-BLK-H-AC
Nom. Power[6] (Pnom) W	425	415	410
Power Tolerance	+5/–0%	+5/–0%	+5/–0%
Module Efficiency	22.0%	21.5%	21.2%
Temp. Coef. (Power)	–0.29% / °C	–0.29% / °C	–0.29% / °C
Shade Tolerance	Integrated module-level max. power point tracking		

Tested Operating Conditions	
Operating Temp.	–40° F to +185° F (–40° C to +85° C)
Max. Ambient Temp.	122° F (50° C)
Max. Test Load[8]	Wind: 125 psf, 6000 Pa, 611 kg/m² back Snow: 187 psf, 9000 Pa, 917 kg/m² front
Max. Design Load	Wind: 75 psf, 3600 Pa, 367 kg/m² back Snow: 125 psf, 5400 Pa, 550 kg/m² front
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)

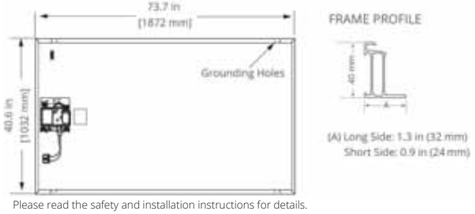
Mechanical Data	
Solar Cells	66 Maxeon Gen 6
Front Glass	High-transmission tempered glass with anti-reflective coating
Environmental Rating	Outdoor rated
Frame	Class 1 black anodized (highest AAMA rating)
Weight	48 lbs (21.8 kg)
Recommended Max. Module Spacing	1.3 in. (33 mm)

Warranties, Certifications, and Compliance	
Warranties	• 25-year limited power warranty • 25-year limited product warranty
Certifications and Compliance	• UL 1741 / IEEE-1547 • UL 1741 AC Module • UL 61730 (Type 2 fire rated) • UL 62109-1 / IEC 62109-2 • FCC Part 15 Class B • ICES-0003 Class B • CAN/CSA-C22.2 NO. 107.1-01 • CA Rule 21 (UL 1741 SA)[5] (includes Volt/Var and Reactive Power Priority) • UL Listed PV Rapid Shutdown Equipment[7] Enables installation in accordance with: • NEC 690.6 (AC module) • NEC 690.12 Rapid Shutdown (inside and outside the array) • NEC 690.15 AC Connectors, 690.33(A)–(E)(1) When used with AC module Q Cables and accessories (UL 6703 and UL 2238)[7] • Rated for load break disconnect
PID Test	1000 V: IEC 62804

Packaging Configuration	
Modules per pallet	25
Packaging box dimensions	75.4 × 42.2 × 48.0 in. (1915 × 1072 × 1220 mm)
Pallet gross weight	1300 lb (590 kg)
Pallets per container	32
Net weight per container	18,880 kg

1 Based on datasheet review of websites of top 20 manufacturers per IHS, as of July 2021.
2 Maxeon 435 W, 22.5% efficient, compared to a Conventional Panel on same-sized arrays (300 W, 19% efficient, approx. 1.6 m²), 7.9% more energy per watt (based on PVSyst pan files for avg. US climate), 0.5%/yr slower degradation rate (Jordan, et. al. "Robust PV Degradation Methodology and Application."PVSC 2018).
3 Based on search of datasheet values from websites of top 10 manufacturers per IHS, as of June 2021.
4 Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.
5 Factory set to IEEE 1547a-2014 default settings. CA Rule 21 default settings profile set during commissioning.
6 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25°C). All DC voltage is fully contained within the module.
7 UL Listed as PVRSE and conforms with NEC 2014 and NEC 2017 690.12; and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors; when installed according to manufacturer's instructions.
8 Please read the safety and installation instructions for more information regarding load ratings and mounting configurations.

See www.sunpower.com/company for more reference information.
For more details, see extended datasheet: www.sunpower.com/solar-resources.
Specifications included in this datasheet are subject to change without notice.



Please read the safety and installation instructions for details.

UL LISTED E478330 — AC MODULE, GRID SUPPORT UTILITY INTERACTIVE, PV RAPID SHUTDOWN EQUIPMENT
Module Fire Performance: Type 2

544400 RevA
January 2022

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Data Sheet
Enphase Microinverter
Region: AMERICAS

IQ7HS Microinverter

The high-powered smart grid-ready **IQ7HS Microinverter** with integrated MC4 connectors dramatically **simplifies** the installation process while achieving the highest system efficiency.

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014, 2017 & 2020)

Efficient and Reliable

- Highest CEC efficiency of 97.0%
- More than a million hours of power-on testing
- Class II double-insulated enclosure
- UL listed

Smart Grid-Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates and responds to changing grid-requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL1741-SA) and IEEE 1547:2018 (UL1741-SB)

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

IQ7HS Microinverter

INPUT DATA (DC)	IQ7HS-66-M-US	
Commonly used module pairings[1]	320W - 460W	
Module compatibility[2]	66 cell/120 half-cell/132 half-cell	
Maximum input DC voltage	59V	
Peak power tracking voltage	38V - 43V	
Operating range	20V - 59V	
Min/Max start voltage	30V/59V	
Max DC short circuit current (module Isc)	15A	
Overvoltage class DC port	II	
DC port backfeed current	0A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)	**@240 VAC**	**@208 VAC**
Peak output power	384 VA	369 VA
Maximum continuous output power	384 VA	369 VA
Nominal (L-L) voltage/range[3]	240V/211-264V	208V/183-229V
Maximum continuous output current	1.60A (240V)	1.77A (208V)
Nominal frequency	60 Hz	60 Hz
Extended frequency range	47 Hz to 68 Hz	47 Hz to 68 Hz
AC short circuit fault current over 3 cycles	4.82A	4.82 A
Maximum units per 20 A (L-L) branch circuit[4]	10	9
Overvoltage class AC port	III	III
AC port backfeed current	18 mA	18 mA
Power factor setting	1.0	1.0
Power factor (adjustable)	0.85 leading ...0.85 lagging	0.85 leading ...0.85 lagging
EFFICIENCY	**@240V**	**@208V**
CEC weighted efficiency	97.0 %	96.5 %
MECHANICAL DATA		
Ambient temperature range	-40ºC to +60ºC	
Relative humidity range	4% to 100% (condensing)	
Connector type	Staubli made MC4	
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)	
Weight	1.08 kg (2.38 lbs)	
Cooling	Natural convection - No fans	
Approved for wet locations	Yes	
Pollution degree	PD3	
Enclosure	Class II, corrosion resistant polymeric enclosure	
Environmental category/UV exposure rating	NEMA type 6/outdoor	
Altitude	2000 m	
FEATURES		
Communication	Power Line Communication (PLC)	
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect means required by NEC 690 and C22.1-2018 Rule 64-220.	
Compliance	CA Rule 21 (UL1741-SA), IEEE 1547:2018 (UL1741-SB), UL 62109-1, FCC Part 15 Class B, HECO v1.1, 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, and NEC 2020 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. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
2. Provided the module is compatible with all other parameters in the datasheet.
3. Nominal voltage range can be extended beyond nominal if required by the utility.
4. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

12-15-2022

ENPHASE

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SunPower® Monitoring | Residential SunPower PV Supervisor

Improve Support, Reduce Costs

An intuitive monitoring website enables you to:

- See a visual map of customer sites
- Remotely manage hundreds of sites
- Remotely diagnose and troubleshoot system issues
- Drill down for the status of individual devices

Add Value for Customers

With mySunPower™ monitoring customers can:

- Track their energy production by day, month, year and in different weather conditions
- See their energy use and estimated bill savings
- Maximize their savings with automatic system alerts and tips
- Customize storage settings and easily monitor and track available battery power
- Receive elective system reports

SunPower® Monitoring—Plug-and-Play Installation

This complete solution for residential monitoring and control includes the SunPower® PV Supervisor (PVS) which improves the installation process, overall system reliability, and customer experience:

- Compact footprint for improved aesthetics
- Robust cloud connectivity and comprehensive local connectivity
- Flexible configuration of devices during installation
- Consumption metering
- Revenue-quality production metering
- Web-based commissioning
- Remote diagnostics of PVS and inverters
- Durable UL Type 3R enclosure helps reduce maintenance costs
- Easy integration with SunPower eBOS

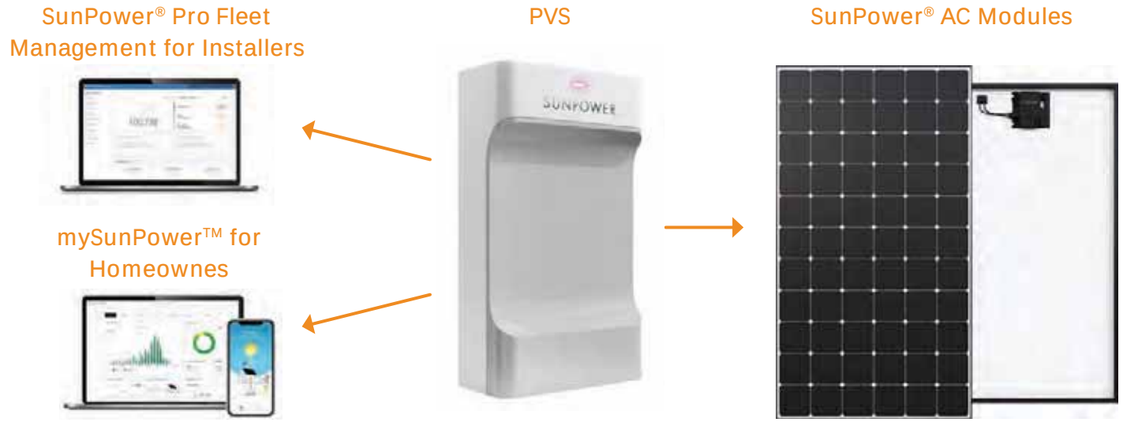
Robust Cloud Connectivity

Multiple options to maintain optimal connectivity:

- Hardwired Ethernet
- WiFi
- Cellular backup

sunpower.com

SUNPOWER®



Site Requirements	
Number of modules supported per PVS	• 85 (SunPower AC modules)
Internet access	• High-speed internet access via accessible router or switch
Power	• 100–240 VAC (L–N), 50 or 60 Hz • 208 VAC (L–L in phase 3), 60 Hz

Mechanical	
Weight	• 5.5 lb (2.5 kg)
Dimensions	• 11.8 × 8.0 × 4.2 in. (30.5 × 20.5 × 10.8 cm)
Enclosure rating	• UL 50E Type 3R

Operating Conditions	
Temperature	• –22°F to +140°F (–30°C to +60°C)
Humidity (max.)	• 95%, non-condensing

Warranty and Certifications	
Warranty	• 10-year Limited Warranty
Certifications	• UL, cUL, CE, UL 61010-1 and -2, FCC Part 15 (Class B)

Communication	
RS-485	• Supports string inverters, external meters, and other auxiliary devices
Integrated metering	• One channel of revenue-quality production metering • Two channels of consumption metering
Ethernet	• 1 LAN (or optional WAN) port
PLC	• Supports SunPower AC modules
WiFi	• 802.11b/g/n 2.4 GHz and 5 GHz
Cellular	• LTE Cat-M1/3G UMTS
ZigBee	• IEEE 802.15.4 MAC, 2.4 GHz ISM band
Data storage	• 60 days
Upgrades	• Automatic firmware upgrades

Web and Mobile Device Support	
Customer site	• mysunpower.com
Partner site	• monitor.sunpower.com
Browsers	• Firefox, Safari, and Chrome
Mobile devices	• iPhone®, iPad®, and Android™
Customer app	1 Create account online at mysunpower.com 2 On a mobile device, download the SunPower Monitoring app from Apple App Store or Google Play™ Store 3 Sign in using account email and password

CLASSIFIED UL

SUNPOWER®

530536 Rev D

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 ＞8 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 Health (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

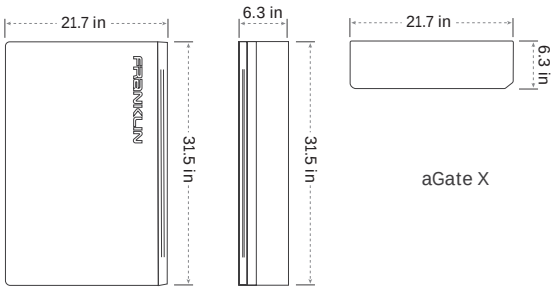
- Up to 15 aPower X units can be used with a single aGate X
- Usable energy expandable from 13.6kWh to 204kWh
- Continuous output power ranges from 5kW to 38.4kW

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

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.



aGate X

Performance

Switch Over Time (grid to micro-grid)	<16ms
User Interface	FranklinWH app
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) × 80A Max @240V & (2) × 50A Max @120V Option B: (1) × 80A Max @240V & (1) × 50A Max @240V

Electrical Interface

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

Mechanical

Dimensions (W x H x 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

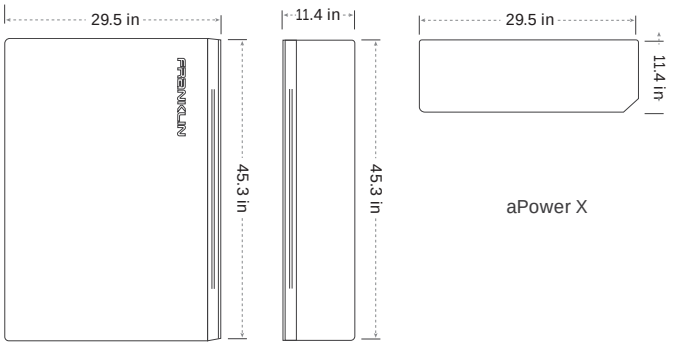
aGate X	UL1741 PCS, UL 67[3], UL 869A[3], UL 916[3]
Seismic	AC156, OSHPD, IEEE 693-2005 (high)
Environmental	California Proposition 65 RoHS Directive 2011 / EU
Emissions	FCC Part 15 Class B, ICES 003

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.

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

Electrical Interface

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

Application Mode Programming

Self-Consumption
Time of Use
Emergency Backup

Mechanical

Dimensions (W x H x 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.

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
  - Time of Use
  - Emergency Backup
- 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

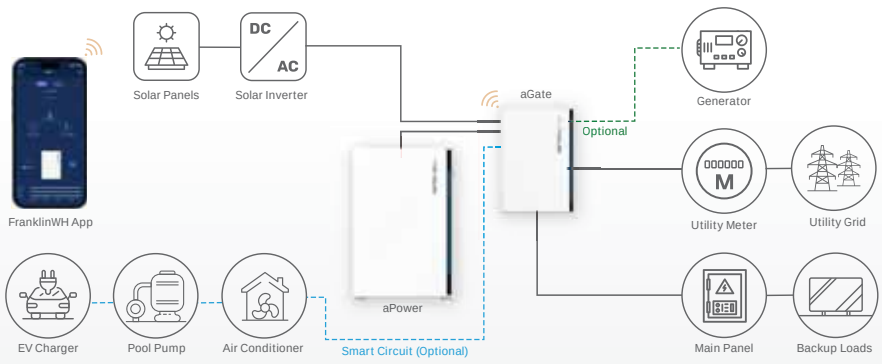
Functionality

Operating System	Android & iOS
Generator Output Setting	Power, current, voltage frequency, time plan
Smart Circuit Setting	Time plan, manual switch, circuits merge, SOC threshold
Storm Hedge Setting	Enable & Disable
SOC Setting	Self-consumption, Time of Use
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 1741 SA, 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
Time of Use
Emergency Backup

FranklinWH's solution for Whole Home backup



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