

# PHOTOVOLTAIC ROOF MOUNT SYSTEM

20 MODULES-ROOF MOUNTED - 7.900 kWDC, 6.50 kWAC

52 LYNCH AVE, LILLINGTON, NC 27546, USA

## SYSTEM SUMMARY:

- (N) 20 - CANADIAN SOLAR CS3N-395MS (395W) MODULES
- (N) 20 - ENPHASE ENERGY IQ8M-72-2-US MICRO-INVERTERS
- (N) JUNCTION BOX
- (E) 200A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER
- (N) 60A NON FUSED AC DISCONNECT
- (N) ENPHASE IQ COMBINER BOX 4
- (N) 200A ENPHASE IQ SYSTEM CONTROLLER 2
- (N) 100A CRITICAL BACKUP LOAD PANEL

## DESIGN CRITERIA:

ROOF TYPE: - COMP SHINGLE  
 NUMBER OF LAYERS: - 01  
 ROOF FRAME: - 2"X6" TRUSSES @ 16" O.C.  
 STORY: - TWO STORY  
 SNOW LOAD : - 15 PSF  
 WIND SPEED :- 118 MPH  
 WIND EXPOSURE:- C  
 RISK CATEGORY:- II

## GOVERNING CODES:

THIS PROJECT SHALL COMPLY WITH THE FOLLOWING CODE  
 2018 NORTH CAROLINA BUILDING CODE (NCBC)  
 2018 NORTH CAROLINA RESIDENTIAL CODE (NCRC)  
 2018 NORTH CAROLINA FIRE CODE (NCFC)  
 2018 NORTH CAROLINA PLUMBING CODE (NCPC)  
 2018 NORTH CAROLINA MECHANICAL CODE (NMC)  
 2018 NORTH CAROLINA FUEL GAS CODE (NCFG)  
 2018 NORTH CAROLINA ENERGY CONSERVATION CODE (NCECC)  
 2020 NORTH CAROLINA ELECTRICAL CODE (NCEC)

## SHEET INDEX

PV-0	COVER SHEET
PV-1	SITE PLAN WITH ROOF PLAN
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PV-3	ATTACHMENT DETAILS
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	PLACARDS & WARNING LABELS
PV-6+	EQUIPMENT SPEC SHEETS

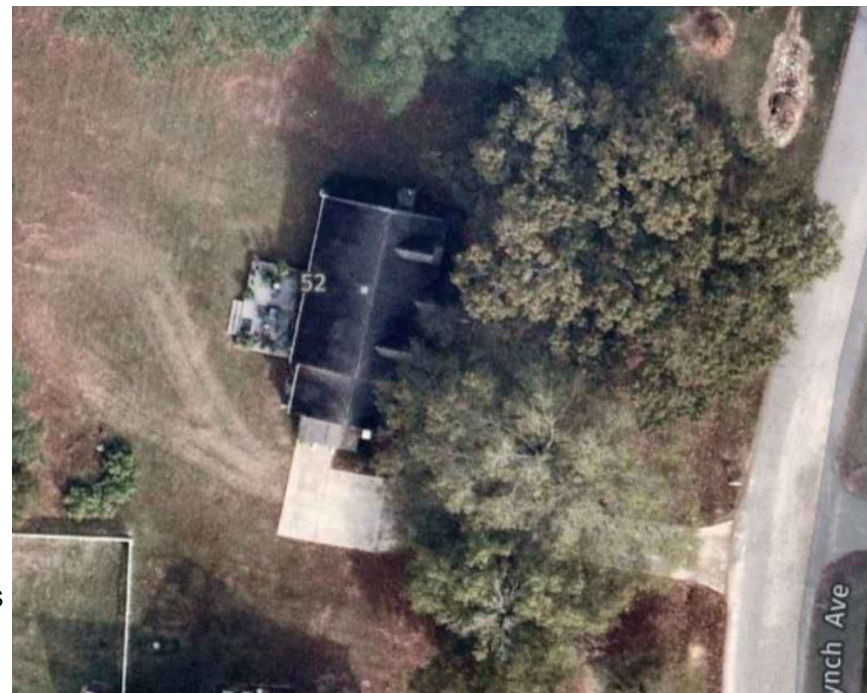
## INTERCONNECTION METHOD - BACKFEED BREAKER

## GENERAL NOTES

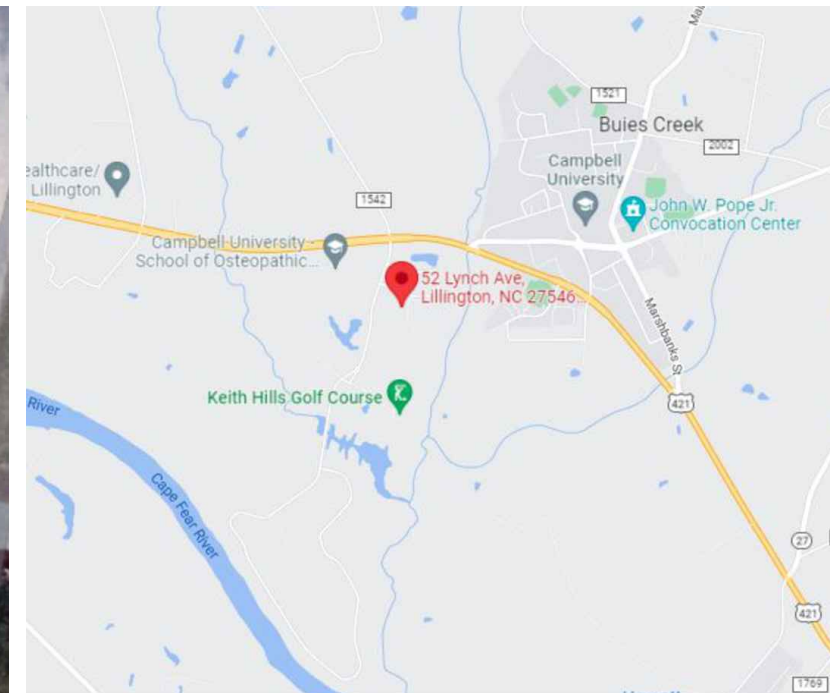
- THE CONTRACTOR/INSTALLER OF THE SOLAR PV SYSTEM OVER EXISTING ROOF SHALL CONFORM TO OSHA REQUIREMENTS DURING THE CONSTRUCTION PHASE. JOB SAFETY AND CONSTRUCTION PROCEDURES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR/INSTALLER.
- REFER TO ELECTRICAL DRAWING PV-4 FOR PANEL DETAILED INFORMATION.
- IN CASE OF CONFLICT BETWEEN STRUCTURAL DRAWINGS AND ELECTRICAL DRAWINGS, THE MOST RIGID REQUIREMENTS SHALL GOVERN.
- THE CONTRACTOR/INSTALLER SHALL VERIFY ALL EXISTING BUILDING INFORMATION SHOWN (DIMENSIONS, ROOF TOP PROJECTIONS, ETC.) AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATIONS OF PV SYSTEM.
- THE CONTRACTOR/INSTALLER SHALL VERIFY AND COORDINATE EXISTING OPENINGS, ROOF TOP UNITS, VENT PIPES, ETC. SHOWN ON DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN DRAWINGS, IT IS THE CONTRACTORS/INSTALLER'S RESPONSIBILITY TO NOTIFY ENGINEER PRIOR TO PERFORMING THE WORK.
- ALL CONSTRUCTION IS TO BE PERFORMED IN STRICT CONFORMANCE WITH ALL APPLICABLE TOWN, COUNTY & STATE REGULATIONS AND/OR ANY OTHER GOVERNING BODIES.
- DO NOT SCALE THESE DRAWINGS, USE DIMENSIONS. CONTRACTOR MUST CONDUCT ROOF SURVEY TO VERIFY DIMENSIONS SHOWN ON PLAN PRIOR TO INSTALLATION. IF THERE IS A DISCREPANCY IT IS CONTRACTOR/INSTALLER'S RESPONSIBILITY TO NOTIFY THE ENGINEER IMMEDIATELY.

## ELECTRICAL NOTES

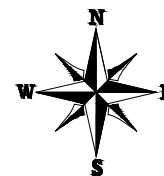
- 1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- 3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- 4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- 5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- 6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- 7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- 9.) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER E.G.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- 10.) THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE



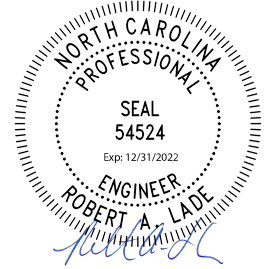
1 | AERIAL PHOTO  
 PV-0 | SCALE: NTS



2 | VICINITY MAP  
 PV-0 | SCALE: NTS



08-16-2022



DEL MAR, CA 92014, USA

## VERSION

DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

## PROJECT NAME

GEORGE JOHNSON  
 52 LYNCH AVE,  
 LILLINGTON, NC 27546, USA  
 APN# 1106700295  
 UTILITY: DUKE ENERGY NC  
 AHJ: HARNETT COUNTY

## SHEET NAME

COVER SHEET

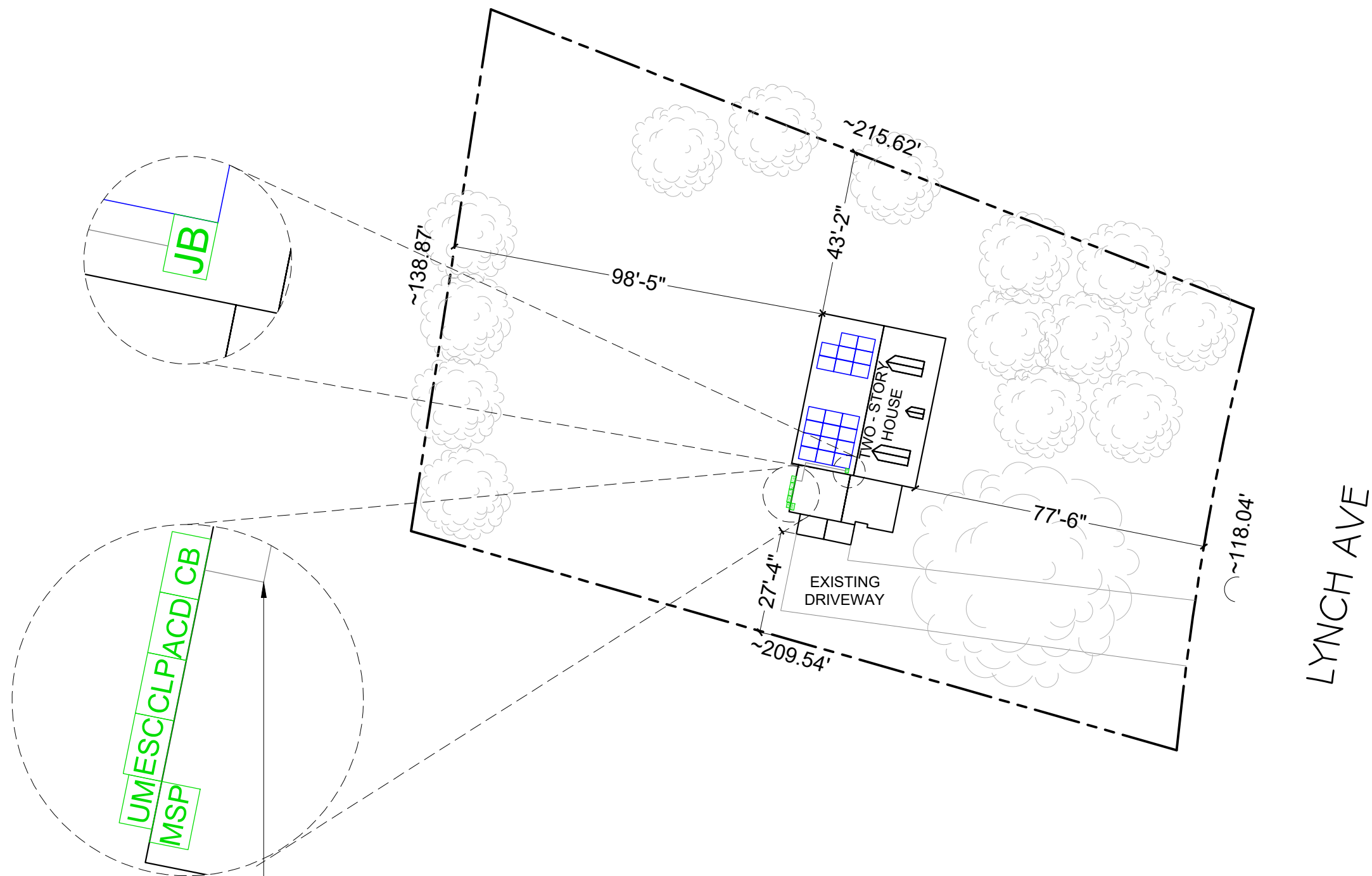
## SHEET SIZE

ANSI B  
 11" X 17"

## SHEET NUMBER

PV-0

● **ROOF ACCESS POINT** SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

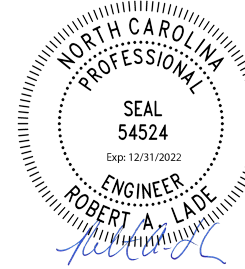


(N) 3/4" OR GREATER EMT CONDUIT RUN (7/8 INCHES ABOVE ROOF)

LEGEND	
<span style="border: 1px solid green; padding: 2px;">UM</span>	UTILITY METER
<span style="border: 1px solid green; padding: 2px;">MSP</span>	MAIN SERVICE PANEL
<span style="border: 1px solid green; padding: 2px;">ACD</span>	AC DISCONNECT
<span style="border: 1px solid green; padding: 2px;">CB</span>	COMBINER BOX 4
<span style="border: 1px solid green; padding: 2px;">JB</span>	JUNCTION BOX
<span style="border: 1px solid green; padding: 2px;">ESC</span>	ENPHASE CONTROLLER
<span style="border: 1px solid green; padding: 2px;">CLP</span>	CRITICAL LOAD PANEL
	CONDUIT
	TREES
	PROPERTY LINE

**NOTE:**  
 • ALL ELECTRICAL EQUIPMENT, INVERTERS, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.

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SHEET NAME  
 SITE PLAN WITH  
 ROOF PLAN

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-1

1

**SITE PLAN WITH ROOF PLAN**

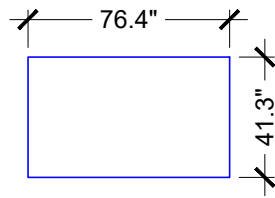
SCALE: 1/32" = 1'-0"



### MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 20 MODULES  
 MODULE TYPE = CANADIAN SOLAR CS3N-395MS (395W) MODULES  
 MODULE WEIGHT = 51.6 LBS / 23.5 KG.  
 MODULE DIMENSIONS = 76.4"X 41.3" = 21.91 SF  
 UNIT WEIGHT OF ARRAY = 2.35 PSF

PHOTOVOLTAIC MODULES  
 CANADIAN SOLAR CS3N-395MS (395W)



**R324.6.2 - PROVING ARRAYS TAKE LESS THAN 33% OF TOTAL ROOF AREA. WHEN THE ARRAYS TAKE LESS THAN 33% WE CAN JUSTIFY AN 18" SETBACK ON BOTH SIDES OF THE RIDGE. WHEN IT TAKES MORE THAN 33% OF THE ROOF AREA WE MUST USE A 3' SETBACKS AT THE RIDGE.**  
 TOTAL ROOF AREA:  
 1588.32 sqft

AREA OF ARRAYS:  
 76.4"X 41.3" ( PANEL DIMENSIONS)  
 76.4"X 41.3" = 21.91 sqft (PER PANEL)  
 21.91 sqft/panel X 20 panels = 438.24 sqft  
 (TOTAL PANEL AREA)

PERCENTAGE OF TOTAL ROOF AREA:  
 (438.24 sqft / 1588.32 sqft)(100) = 27.59%

THE PANELS USE 27.59% OF THE TOTAL ROOF AREA

# 1 ROOF PLAN WITH MODULES

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



**NOTE:** ACTUAL ROOF CONDITIONS AND TRUSSES (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

- PLUMBING VENTS, SKYLIGHTS AND MECHANICAL VENTS SHALL NOT BE COVERED, MOVED, RE-ROUTED OR RE-LOCATED.

ROOF DESCRIPTION					
ROOF TYPE				COMP SHINGLE ROOF	
ROOF	# OF MODULES	ROOF TILT	AZIMUTH	TRUSSES SIZE	TRUSSES SPACING
#1	20	45°	282°	2"x6"	16" O.C.

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
RAIL	13	UNIRAC SM LIGHT RAIL 168" MILL
SPLICE	06	BND SPLICE BAR PRO SERIES MILL
MID CLAMP	28	UNIVERSAL AF MID CLAMPS
END CLAMP	24	UNIVERSAL AF END CLAMPS
ATTACHMENT	52	UNIRAC FLASHKIT PRO
GROUNDING LUG	06	GROUND LUG

LEGEND	
<span style="border: 1px solid green; padding: 2px;">UM</span>	- UTILITY METER
<span style="border: 1px solid green; padding: 2px;">MSP</span>	- MAIN SERVICE PANEL
<span style="border: 1px solid green; padding: 2px;">ACD</span>	- AC DISCONNECT
<span style="border: 1px solid green; padding: 2px;">CB</span>	- COMBINER BOX 4
<span style="border: 1px solid green; padding: 2px;">JB</span>	- JUNCTION BOX
<span style="border: 1px solid green; padding: 2px;">ESC</span>	ENPHASE CONTROLLER
<span style="border: 1px solid green; padding: 2px;">CLP</span>	CRITICAL LOAD PANEL
<span style="display: inline-block; width: 10px; height: 10px; background-color: black;"></span>	- MICRO INVERTER
	- CHIMNEY
	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
	- ROOF ATTACHMENT @ 48" O.C.
	- RAIL
	- TRUSSES
	- CONDUIT
	- FIRE PATHWAY



VERSION		
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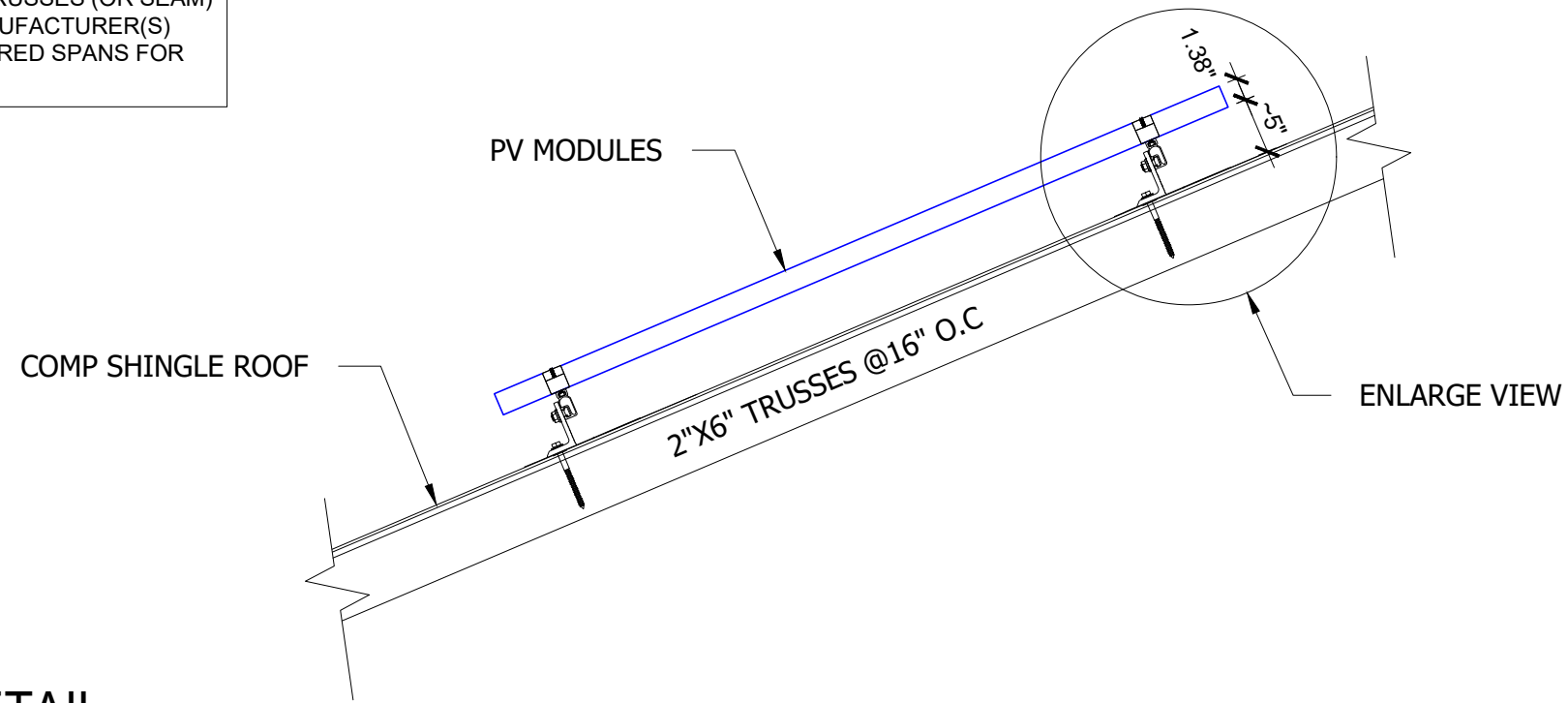
PROJECT NAME  
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SHEET NAME  
**ROOF PLAN WITH MODULES**

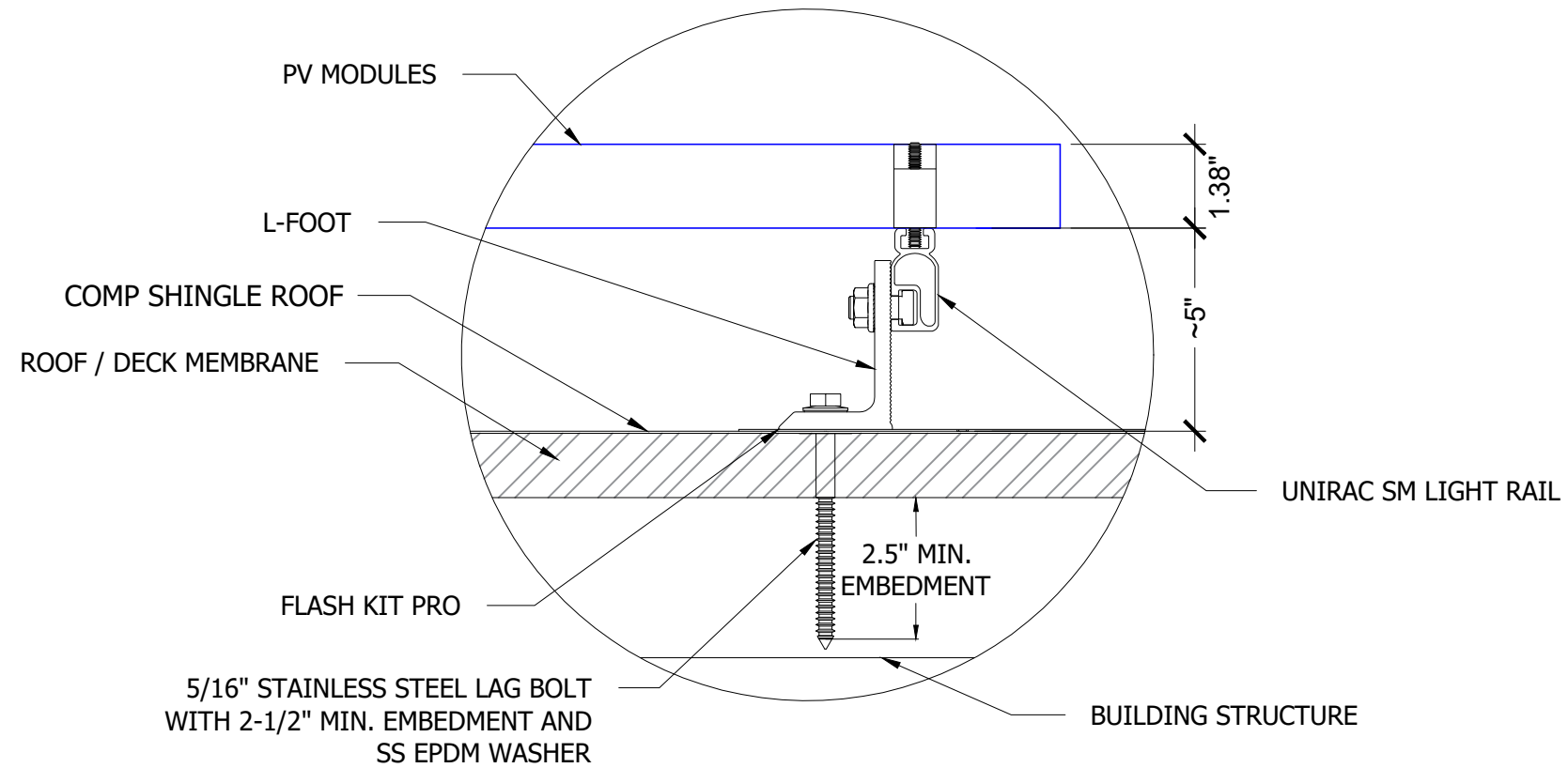
SHEET SIZE  
**ANSI B**  
 11" X 17"

SHEET NUMBER  
**PV-2**

**NOTE:** ACTUAL ROOF CONDITIONS AND TRUSSES (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

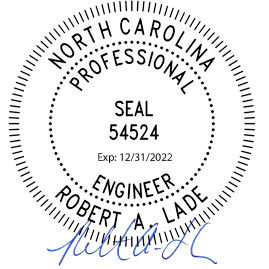


**1** ATTACHMENT DETAIL



**2** ATTACHMENT DETAIL (ENLARGED VIEW)  
SCALE: NTS

08-16-2022



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**AHJ: HARNETT COUNTY**

SHEET NAME  
**ATTACHMENT DETAIL**

SHEET SIZE  
**ANSI B**  
**11" X 17"**

SHEET NUMBER  
**PV-3**

**SOLAR MODULE SPECIFICATIONS**

MANUFACTURER / MODEL #	VMP	IMP	VOC	ISC	TEMPERATURE COEFFICIENT OF Voc
CANADIAN SOLAR CS3N-395MS (395W)	37.0	10.68	44.3	11.44	-0.27%/°C
MODULE DIMENSION	76.4" L x 41.3" W x 1.38" D				

**AMBIENT TEMPERATURE SPECIFICATIONS**

RECORD LOW TEMP	AMBIENT TEMP (HIGH TEMP 2%)	CONDUIT HEIGHT	CONDUCTOR TEMPERATURE RATE	
-12°	34°	7/8 INCHES ABOVE ROOF	ON ROOF	OFF ROOF
			90°	75°

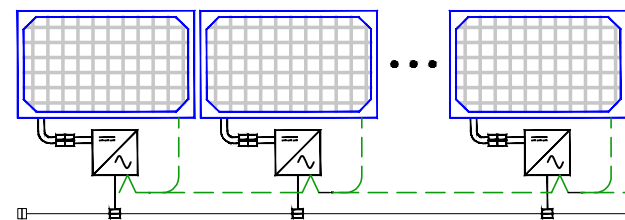
**INVERTER SPECIFICATIONS**

MANUFACTURER / MODEL #	QUANTITY	NOMINAL OUTPUT VOLTAGE	NOMINAL OUTPUT CURRENT
ENPHASE ENERGY IQ8M-72-2-US	20	240 VAC	1.35A

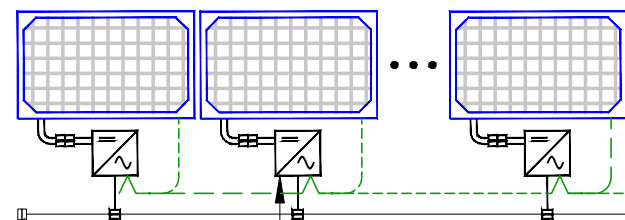
SUNLIGHT ONLY BACKUP (ENPHASE IQ8M ONLY - NO BATTERIES) - MINIMUM FOR PARTIAL HOME BACKUP FOR FOUR CIRCUITS ONLY. (EX:- LED LIGHTS, REFRIGERATOR, CHARGE PHONES, MICROWAVE, FANS, TV, INTERNET, GARAGE DOOR)

SUM OF ALL HANDLES  
RULE NEC 705.12(B)(2)(3)(C)

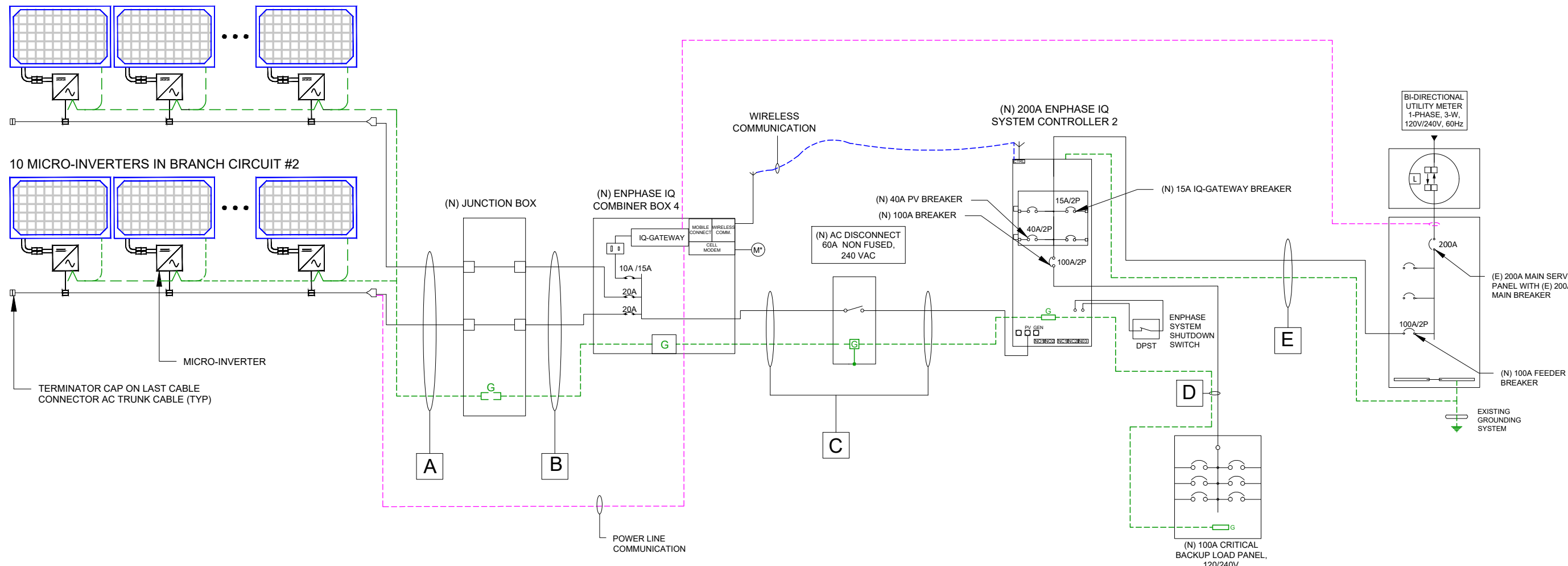
10 MICRO-INVERTERS IN BRANCH CIRCUIT #1



10 MICRO-INVERTERS IN BRANCH CIRCUIT #2



TERMINATOR CAP ON LAST CABLE CONNECTOR AC TRUNK CABLE (TYP)



WIRE TAG	CONDUIT	WIRE QTY	WIRE GAUGE	WIRE TYPE	TEMP. RATING	WIRE AMPACITY (A)	TEMP. DERATE	CONDUIT FILL DERATE	DERATED AMPACITY (A)	INVERTER QTY	NOC (A)	DESIGN CURRENT (A)	GROUND SIZE	GROUND WIRE TYPE
A	OPEN AIR	2	12 AWG	Q-CABLE	90°C	30	0.96	1.0	28.80	10	1.35	13.50	06 AWG	BARE CU GND
B	3/4" EMT	4/2	10/12 AWG	THWN-2/NM-B CABLES WHERE RUN INDOOR	90°C	40	0.96	0.80	30.72	10	1.35	13.50	10 AWG	THWN-2
C	3/4" EMT	3	8 AWG	THWN	75°C	50	0.94	1.0	47.00	20	1.35	27.00	10 AWG	THWN
D	1-1/4" EMT	3	2 AWG	THWN	75°C	115	0.94	1.0	108.10	20	1.35	100.00	8 AWG	THWN
E	1-1/4" EMT	3	2 AWG	THWN	75°C	115	0.94	1.0	108.10	20	1.35	100.00	8 AWG	THWN



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AHJ: HARNETT COUNTY

**SHEET NAME**

ELECTRICAL LINE DIAGRAM

**SHEET SIZE**

ANSI B  
11" X 17"

**SHEET NUMBER**

PV-4

**1 ELECTRICAL LINE DIAGRAM**  
SCALE: NTS

**⚠ WARNING**  
**ELECTRICAL SHOCK HAZARD**

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

LABEL LOCATION:  
 INVERTER(S), AC DISCONNECT(S), AC COMBINER PANEL (IF APPLICABLE).  
 PER CODE(S): NEC 2020: NEC 706.15 (C)(4) & NEC 690.13(B)

**PHOTOVOLTAIC**  
**AC DISCONNECT**

LABEL LOCATION:  
 AC DISCONNECT  
 NEC 690.13(B)

**⚠ WARNING DUAL POWER SOURCE**  
**SECOND SOURCE IS PHOTOVOLTAIC SYSTEM**

LABEL LOCATION:  
 POINT OF INTERCONNECTION  
 PRODUCTION METER  
 NEC 705.12(B)(3)(3) & NEC 690.59)

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

LABEL LOCATION:  
 SERVICE PANEL IF SUM OF BREAKERS EXCEEDS PANEL RATING  
 NEC 705.12 (B)(3)(2)

**PHOTOVOLTAIC AC DISCONNECT**  
 MAXIMUM AC OPERATING CURRENT: 27.00 AMPS  
 NOMINAL OPERATING AC VOLTAGE: 240 VAC

LABEL LOCATION:  
 AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.  
 PER CODE(S): NEC 2020: 690.54

**PHOTOVOLTAIC POWER SOURCE**

LABEL LOCATION:  
 EMT/CONDUIT RACEWAYS  
 (PER CODE: NEC690.31(D)(2)

**MAIN PHOTOVOLTAIC SYSTEM DISCONNECT**

LABEL LOCATION:  
 MAIN SERVICE DISCONNECT / UTILITY METER  
 (PER CODE: NEC 690.13(B))

**⚠ WARNING**

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

LABEL LOCATION:  
 POINTS OF CONNECTION/BREAKER  
 CODE: NEC 705.12(B)(3)(3)

**RAPID SHUTDOWN FOR SOLAR PV SYSTEM**

LABEL LOCATION:  
 UTILITY SERVICE ENTRANCE/METER, INVERTER/DC DISCONNECT IF REQUIRED BY LOCAL AHJ, OR OTHER LOCATIONS AS REQUIRED BY LOCAL AHJ.  
 PER CODE(S): NEC 2020: 690.56(C)(2)

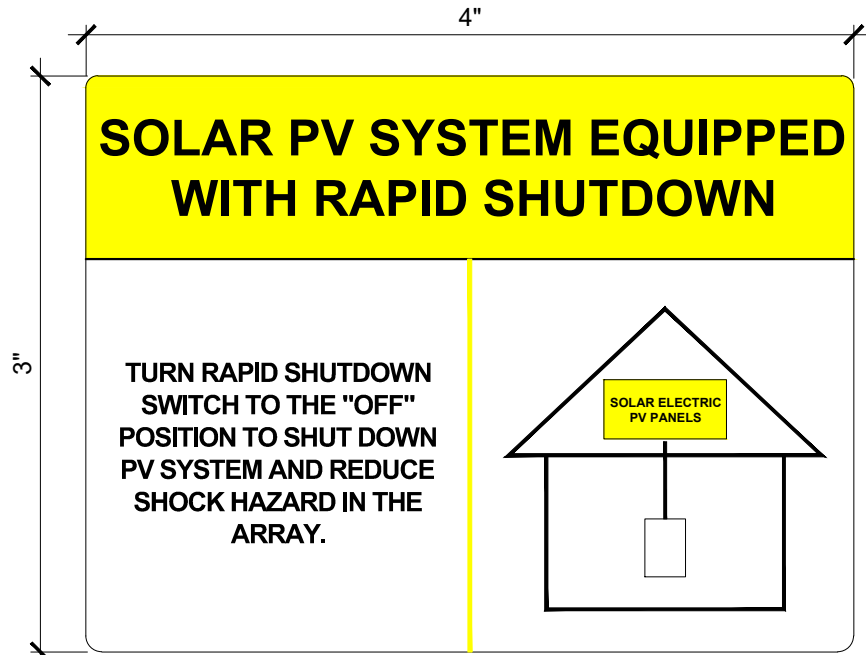
**⚠ CAUTION**  
**PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED**

LABEL LOCATION:  
 MSP (PER CODE: NEC 705.12(D) & NEC 690.59

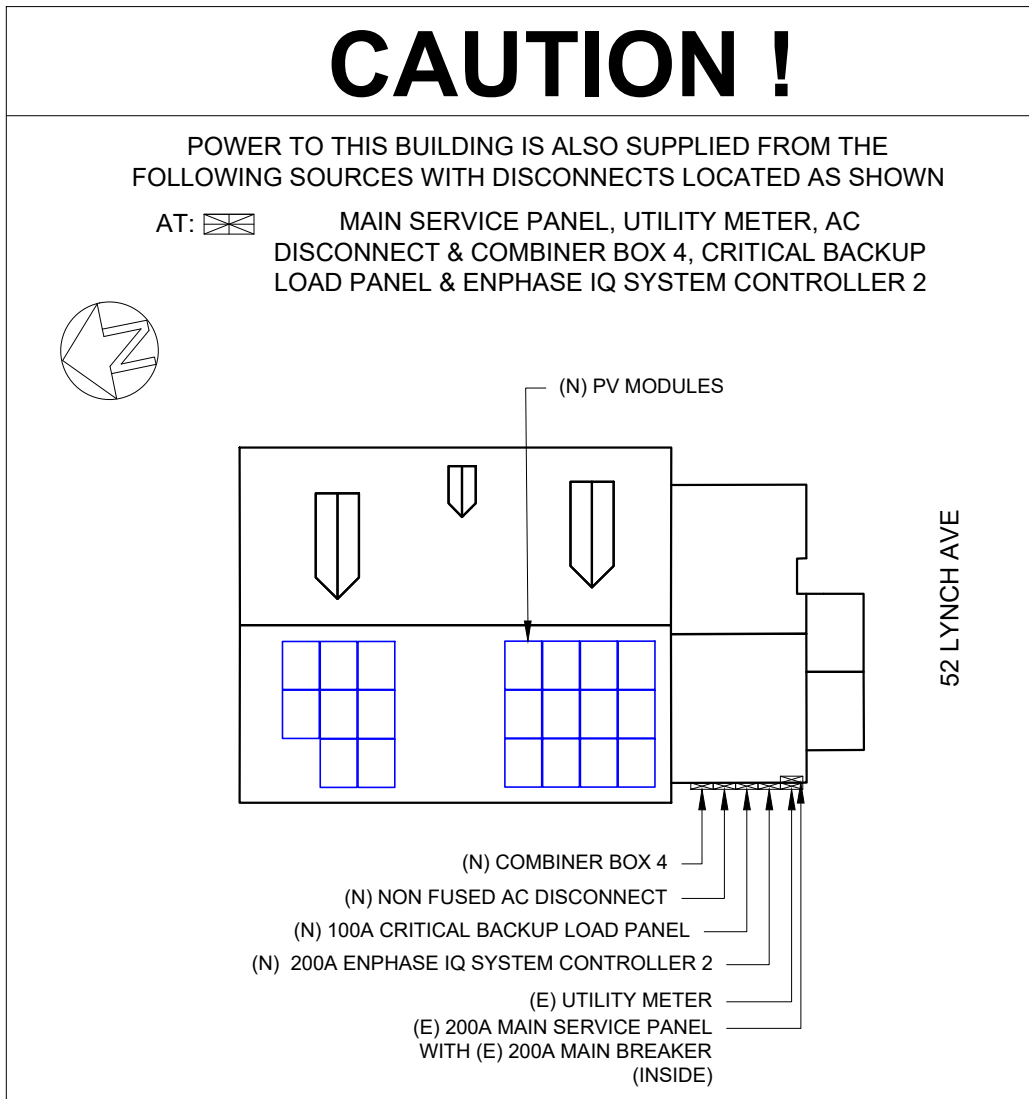
**⚠ WARNING**  
**THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT**

LABEL LOCATION:  
 INVERTER  
 PER CODE: NEC 690.31(E)

- NOTES AND SPECIFICATIONS:
- SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF THE 2020 ARTICLE 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
  - SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING EFFECTIVE WORDS, COLORS AND SYMBOLS.
  - LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
  - LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
  - SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4-2011, PRODUCT SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
  - DO NOT COVER EXISTING MANUFACTURER LABELS.



LABEL LOCATION:  
 ON OR NO MORE THAN 1 M (3 FT) FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED.  
 PER CODE(S): NEC 2020: IFC 690.56(C)



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SHEET NAME

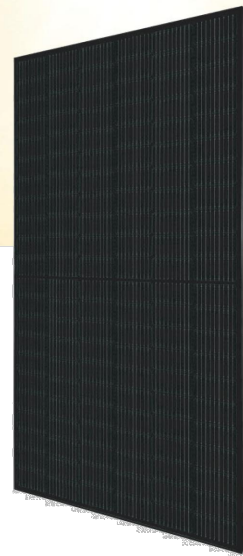
**WARNING LABELS & PLACARD**

SHEET SIZE

**ANSI B**  
**11" X 17"**

SHEET NUMBER

**PV-5**



# HiKuBlack Mono PERC

## BLACK FRAME ON BLACK BACKSHEET

### F23 Frame

#### 380 W ~ 410 W

#### CS3N-380 | 385 | 390 | 395 | 400 | 405 | 410MS

#### MORE POWER

- 410 W** Module power up to 410 W  
Module efficiency up to 20.2 %
- \$** Lower LCOE & BOS cost
- Bar Chart** Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation
- +** Better shading tolerance
- Shield** Minimizes micro-crack impacts
- \*\*\*** Heavy snow load up to 8100 Pa, enhanced wind load up to 6000 Pa\*

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

#### CSI SOLAR (USA) CO., LTD.

1350 Treat Blvd. Suite 500, Walnut Creek, CA 94598, USA | www.csisolar.com/na | service.ca@csisolar.com

**25 Years** Industry Leading Product Warranty on Materials and Workmanship\*

**25 Years** Linear Power Performance Warranty\*

**1<sup>st</sup> year power degradation no more than 2%**  
**Subsequent annual power degradation no more than 0.55%**

\*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 residential 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

#### PRODUCT CERTIFICATES\*

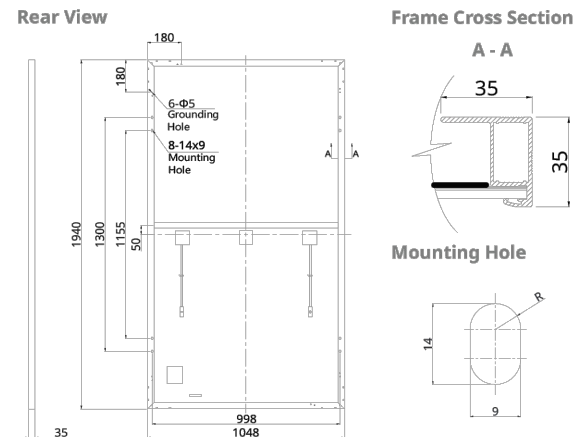
IEC 61215 / IEC 61730 / CE  
FSEC (US Florida) / UL 61730 / IEC 61701 / IEC 62716



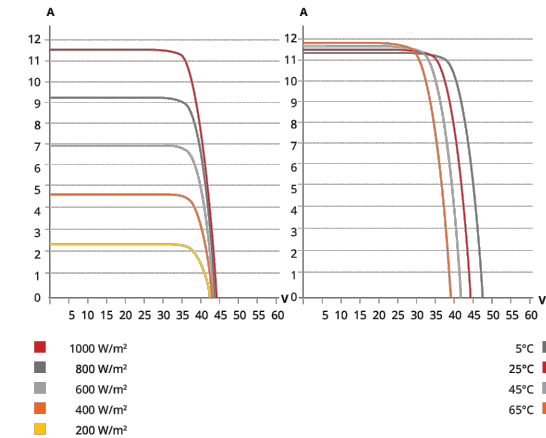
\* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates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

**CSI SOLAR (USA) 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 20 years, it has successfully delivered over 63 GW of premium-quality solar modules across the world.

#### ENGINEERING DRAWING (mm)



#### CS3N-400MS / I-V CURVES



#### ELECTRICAL DATA | STC\*

CS3N	380MS	385MS	390MS	395MS	400MS	405MS	410MS
Nominal Max. Power (Pmax)	380 W	385 W	390 W	395 W	400 W	405 W	410 W
Opt. Operating Voltage (Vmp)	36.4 V	36.6 V	36.8 V	37.0 V	37.2 V	37.4 V	37.6 V
Opt. Operating Current (Imp)	10.44 A	10.52 A	10.60 A	10.68 A	10.76 A	10.83 A	10.92 A
Open Circuit Voltage (Voc)	43.7 V	43.9 V	44.1 V	44.3 V	44.5 V	44.7 V	44.9 V
Short Circuit Current (Isc)	11.26 A	11.32 A	11.38 A	11.44 A	11.50 A	11.56 A	11.62 A
Module Efficiency	18.7%	18.9%	19.2%	19.4%	19.7%	19.9%	20.2%
Operating Temperature	-40°C ~ +85°C						
Max. System Voltage	1000V (UL)						
Module Fire Performance	TYPE 2 (UL 61730 1000V)						
Max. Series Fuse Rating	20 A						
Application Classification	Class A						
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.

#### ELECTRICAL DATA | NMOT\*

CS3N	380MS	385MS	390MS	395MS	400MS	405MS	410MS
Nominal Max. Power (Pmax)	284 W	288 W	291 W	295 W	299 W	303 W	306 W
Opt. Operating Voltage (Vmp)	34.0 V	34.2 V	34.4 V	34.6 V	34.7 V	34.9 V	35.1 V
Opt. Operating Current (Imp)	8.35 A	8.42 A	8.48 A	8.54 A	8.60 A	8.66 A	8.73 A
Open Circuit Voltage (Voc)	41.2 V	41.4 V	41.6 V	41.8 V	41.9 V	42.1 V	42.3 V
Short Circuit Current (Isc)	9.08 A	9.13 A	9.18 A	9.23 A	9.28 A	9.33 A	9.37 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.

#### MECHANICAL DATA

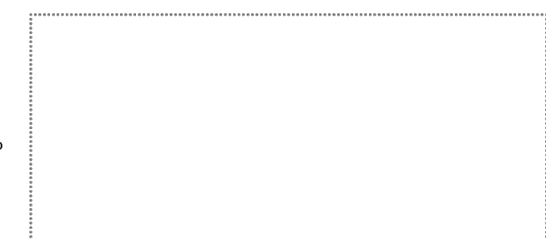
Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	132 [2 X (11 X 6)]
Dimensions	1940 X 1048 X 35 mm (76.4 X 41.3 X 1.38 in)
Weight	23.4 kg (51.6 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	12 AWG (UL)
Cable Length (Including Connector)	Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-) (supply additional cable jumper: 2 lines/pallet); landscape: 1250 mm (49.2 in)*
Connector	T4 or MC4 series
Per Pallet	30 pieces
Per Container (40' HQ)	720 pieces

\* For detailed information, please contact your local Canadian Solar sales and technical representatives.

#### TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.34 % / °C
Temperature Coefficient (Voc)	-0.26 % / °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.

CSI SOLAR (USA) CO., LTD.

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DEL MAR, CA 92014, USA

#### VERSION

DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

#### PROJECT NAME

GEORGE JOHNSON  
52 LYNCH AVE,  
LILLINGTON, NC 27546, USA  
APN# 1106700295  
UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

#### SHEET NAME

SPEC SHEETS

#### SHEET SIZE

ANSI B  
11" X 17"

#### SHEET NUMBER

PV-6



## IQ8 Series Microinverters

Our newest IQ8 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 55nm technology with high speed digital logic and has super-fast 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 Enphase IQ Battery, Enphase 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 IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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IQ8SE-DS-0001-01-EN-US-2021-10-19

### Easy to install

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

### High productivity and reliability

- Produce 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) requirements

## IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US <sup>1</sup>	
Commonly used module pairings <sup>2</sup>	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+	
Module compatibility		60-cell/120 half-cell		60-cell/120 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45	
Operating range	V	25 – 48		25 – 58				
Min/max start voltage	V	30 / 48		30 / 58				
Max input DC voltage	V	50		60				
Max DC current <sup>3</sup> [module Isc]	A			15				
Overvoltage class DC port				II				
DC port backfeed current	mA			0				
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit						
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US	
Peak output power	VA	245	300	330	366	384	366	
Max continuous output power	VA	240	290	325	349	380	360	
Nominal (L-L) voltage/range <sup>4</sup>	V	240 / 211 – 264					208 / 183 – 250	
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73	
Nominal frequency	Hz	60						
Extended frequency range	Hz	50 – 68						
Max units per 20 A (L-L) branch circuit <sup>5</sup>		16	13	11	11	10	9	
Total harmonic distortion		<5%						
Overvoltage class AC port		III						
AC port backfeed current	mA	30						
Power factor setting		1.0						
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging						
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4	
CEC weighted efficiency	%	97	97	97	97.5	97	97	
Night-time power consumption	mW	60						
MECHANICAL DATA								
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)						
Relative humidity range		4% to 100% (condensing)						
DC Connector type		MC4						
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")						
Weight		1.08 kg (2.38 lbs)						
Cooling		Natural convection – no fans						
Approved for wet locations		Yes						
Acoustic noise at 1 m		<60 dBA						
Pollution degree		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, UL1741/IEE1547, 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 Shut Down 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) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2021-10-19



DEL MAR, CA 92014, USA

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APN# 1106700295  
UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

### SHEET NAME

SPEC SHEETS

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-7



# Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4  
X-IQ-AM1-240-4C



X-IQ-AM1-240-4C

X-IQ-AM1-240-4

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

### Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

### Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed



## Enphase IQ Combiner 4/4C

### MODEL NUMBER

IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.

### ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)

Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.

### ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

### MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 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.
Altitude	To 2000 meters (6,560 feet)

### INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

### COMPLIANCE

Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)

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DEL MAR, CA 92014, USA

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INITIAL RELEASE	08/10/2022	UR

### PROJECT NAME

GEORGE JOHNSON  
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UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

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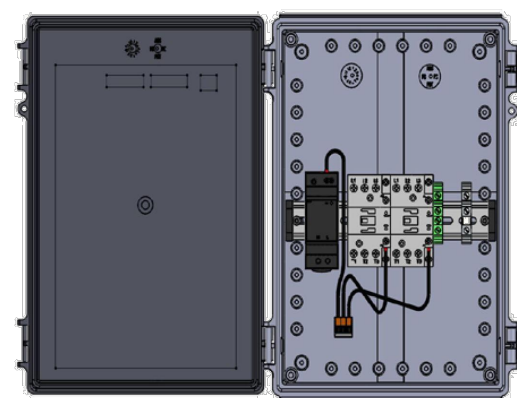
### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-8

## Enphase IQ Load Controller



The **Enphase IQ Load Controller**, when used in conjunction with the IQ System Controller, enables control of up to 2 loads running 240VAC L-L or shedding of up to 2 solar circuits when operating in an off-grid mode with the Enphase energy management system.

The IQ Load Controller can also be used for controlling 4 loads running 120VAC L-L.

Up to 2 IQ Load Controllers can be integrated with each IQ System Controller on a site.

### Powerful

- Control up to 2, 36A resistive loads or 3HP/25A inductive loads running at 240VAC or 4 loads running at 120VAC
- Shed up to 2 excess IQ6, IQ7, M215 or M250 solar branch circuits (up to 32A each) to maintain Solar-To-Storage ratio when off-grid
- Prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life
- Choose from three load control modes for flexibility or manually control loads from the Enphase App

### Simple

- A complete solution for use with the IQ System Controller's load control feature
- DIN rail mounted components enable easy installation and servicing
- Easy configuration via Enphase Installer App

### Reliable

- Designed for indoor or outdoor installations
- 5 years warranty
- Durable NEMA 4X Enclosure

## Enphase IQ Load Controller

<b>EP-NA-LK02-040</b>	IQ Load Controller for use with IQ System Controller's auxiliary contacts to shed non-essential loads or M-series, IQ series microinverters	
<b>INPUT DATA</b>		
DC Power Supply input voltage	120Vac	
DC Power Supply input Current rating	12A	
<b>CAPACITY</b>		
Total loads controlled	2 loads running at 240Vac or 4 loads at 120Vac	
Max load controlled	36A resistive, 25A inductive for dedicated loads, 32A resistive for branch circuits with 2 or more loads	
<b>MECHANICAL DATA</b>		
Ambient temperature range	-25 to 40 °C	
Dimensions (WxHxD)	12.58 x 14.58 x 5.96 (in)	
Weight	6.61 (lbs)	
Cooling	Natural Convection	
Enclosure	Outdoor, NEMA type 4X, polycarbonate construction	
<b>WIRE SIZES</b>		
Contactor	• Line/Load power terminals • Contactor A1/A2 control terminals	14-8AWG 18-16AWG
Power Supply	• 120V L-N input terminals • 120V V+/V- output terminals	14-12AWG 18-16AWG
Ground terminal block	24-6AWG	
Neutral terminal block	24-6AWG	
<b>COMPLIANCE</b>		
Compliance	UL1741	
<b>WARRANTY</b>		
Limited Warranty	5 years	

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



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### SHEET NAME

SPEC SHEETS

### SHEET SIZE

ANSI B  
 11" X 17"

### SHEET NUMBER

PV-8.1

# Enphase IQ System Controller 2

The **Enphase IQ System Controller 2** connects the home to grid power, the IQ Battery system, and solar PV. It provides microgrid interconnection device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.

### Reliable

- Durable NEMA type 3R enclosure
- Ten-year limited warranty

### Smart

- Controls safe connectivity to the grid
- Automatically detects grid outages
- Provides seamless transition to backup

### Simple

- Connects to the load or service equipment<sup>1</sup> side of the main load panel
- Centered mounting brackets support single stud mounting
- Supports conduit entry from the bottom, bottom left side, and bottom right side
- Supports whole home and partial home backup and subpanel backup
- Up to 200A main breaker support
- Includes neutral-forming transformer for split phase 120/240V backup operation
- IQ System Controller supports backward compatibility with older generation of PV microinverters (M215, M250 and S series), making it simple for home owners to upgrade their systems
- Easy integration with generator from major manufacturers

1. IQ System Controller 2 is not suitable for use as service equipment in Canada.

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



## Enphase IQ System Controller 2

MODEL NUMBER	
EP200G101-M240US01	Enphase IQ System Controller 2 with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and battery installations.

ACCESSORIES and REPLACEMENT PARTS	
EP200G-NA-XA-E3	Replacement IQ System Controller 2 printed circuit board
EP200G-NA-HD-200A	Eaton type BR circuit breaker hold-down screw kit, BRHDK125
CT-200-SPLIT	200 A split core current transformers for Generator metering (+/- 2.5%)
Circuit breakers (as needed) <sup>2,3</sup>	Not included, must order separately:
• BRK-100A-2P-240V: Main breaker, 2 pole, 100A, 25kAIC, CSR2100	• BRK-20A-2P-240V-B: Circuit breaker, 2 pole, 20A, 10kAIC, BR220B
• BRK-125A-2P-240V: Main breaker, 2 pole, 125A, 25kAIC, CSR2125N	• BRK-30A-2P-240V: Circuit breaker, 2 pole, 30A, 10kAIC, BR230B
• BRK-150A-2P-240V: Main breaker, 2 pole, 150A, 25kAIC, CSR2150N	• BRK-40A-2P-240V: Circuit breaker, 2 pole, 40A, 10kAIC, BR240B
• BRK-175A-2P-240V: Main breaker, 2 pole, 175A, 25kAIC, CSR2175N	• BRK-60A-2P-240V: Circuit breaker, 2 pole, 60A, 10kAIC, BR260
• BRK-200A-2P-240V: Main breaker, 2 pole, 200A, 25kAIC, CSR2200N	• BRK-80A-2P-240V: Circuit breaker, 2 pole, 80A, 10kAIC, BR280
EP200G-HNDL-R1	IQ System Controller 2 installation handle kit (order separately)
EP200G-LITKIT	IQ System Controller 2 literature kit, including labels, feed-through headers, screws, filler plates, and QIG
BRK-20A40A-2P-240V	2 pole, 20A/40A, 10kAIC, BQC220240

ELECTRICAL SPECIFICATIONS	
Assembly rating	Continuous operation at 100% of its rating
Nominal voltage / range (L-L)	240 VAC / 100 - 310 VAC
Voltage measurement accuracy	±1% V nominal (±1.2V L-N and ±2.4V L-L)
Auxiliary contact for load control, excess PV control, and generator two-wire control	24V, 1A
Nominal frequency / range	60 Hz / 56 - 63 Hz
Frequency measurement accuracy	±0.1 Hz
Maximum continuous current rating	160A
Maximum input overcurrent protection device	200A
Maximum output overcurrent protection device	200A
Maximum overcurrent protection device rating for Generator circuit <sup>4</sup>	80A
Maximum overcurrent protection device rating for storage branch circuit <sup>4</sup> (the storage branch circuit can be replaced with PV)	80A
Maximum overcurrent protection device rating for IQ8 PV combiner branch circuit <sup>4</sup>	80A
Neutral Forming Transformer (NFT)	<ul style="list-style-type: none"> <li>• Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral</li> <li>• Continuous rated power: 3600VA</li> <li>• Maximum continuous unbalance current: 30A @ 120V</li> <li>• Peak rated power: 8800VA for 30 seconds</li> <li>• Peak unbalanced current: 80A @ 120V for 30 seconds</li> </ul>

MECHANICAL DATA	
Dimensions (WxHxD)	50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in)
Weight	39.4 kg (87 lbs)
Ambient temperature range	-40° C to +50° C (-40° F to 122° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NEMA type 3R, polycarbonate construction
Altitude	To 2500 meters (8200 feet)

WIRE SIZES		
Connections (All lugs are rated to 90C)	<ul style="list-style-type: none"> <li>• Main lugs and backup load lugs</li> <li>• CSR breaker bottom wiring lugs</li> <li>• BR breakers (wire provided)</li> <li>• AC combiner lugs, Encharge lugs, and generator lugs</li> <li>• Neutral (large lugs)</li> </ul>	<ul style="list-style-type: none"> <li>Cu/Al: 1 AWG - 300 KCMIL</li> <li>Cu/Al: 2 AWG - 300 KCMIL</li> <li>6 AWG</li> <li>14 AWG - 2 AWG</li> <li>Cu/Al: 6 AWG - 300 KCMIL</li> </ul>
Neutral and ground bars	<ul style="list-style-type: none"> <li>Large holes (5/16-24 UNF)</li> <li>Small holes (10-32 UNF)</li> </ul>	<ul style="list-style-type: none"> <li>14 AWG - 1/0 AWG</li> <li>14 AWG - 6 AWG</li> </ul>

COMPLIANCE	
Compliance	UL 1741, UL 1741 SA, UL 1741 PCS, UL1998, UL869A <sup>5</sup> , UL67 <sup>5</sup> , UL508 <sup>5</sup> , UL50E <sup>5</sup> , CSA 22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, AC156. IQ System Controller 2 is approved for Use as Service Equipment in the United States <sup>5</sup> .

2. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.  
3. The IQ System Controller 2 is rated 22 kAIC  
4. Not included. Installer must provide properly rated breaker per circuit breaker list above.  
5. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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DEL MAR, CA 92014, USA

VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

PROJECT NAME  
**GEORGE JOHNSON**  
**52 LYNCH AVE,**  
**LILLINGTON, NC 27546, USA**  
**APN# 1106700295**  
**UTILITY: DUKE ENERGY NC**  
**AHJ: HARNETT COUNTY**

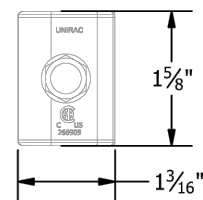
SHEET NAME  
**SPEC SHEETS**

SHEET SIZE  
**ANSI B**  
**11" X 17"**

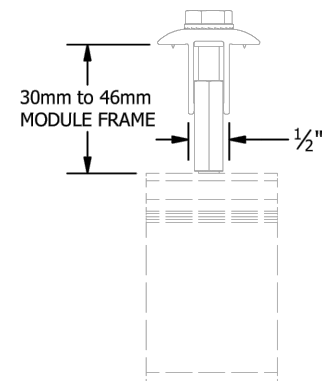
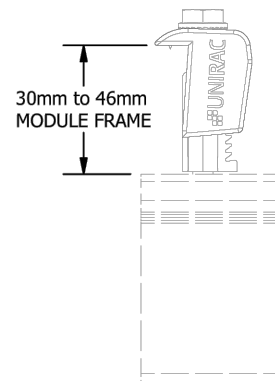
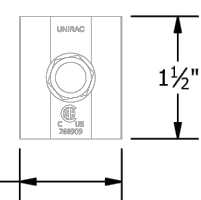
SHEET NUMBER  
**PV-8.2**

PART # TABLE	
P/N	DESCRIPTION
302045M	UNIVERSAL AF MID CLAMP - MILL
302045D	UNIVERSAL AF MID CLAMP - DRK
302050M	UNIVERSAL AF END CLAMP - MILL
302050D	UNIVERSAL AF END CLAMP - DRK

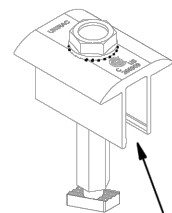
UNIVERSAL AF  
END CLAMP



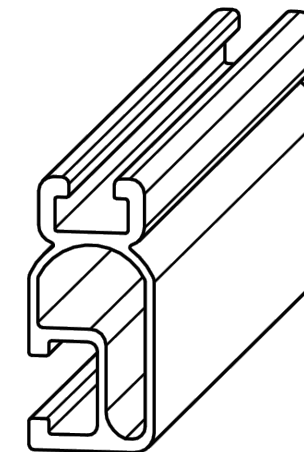
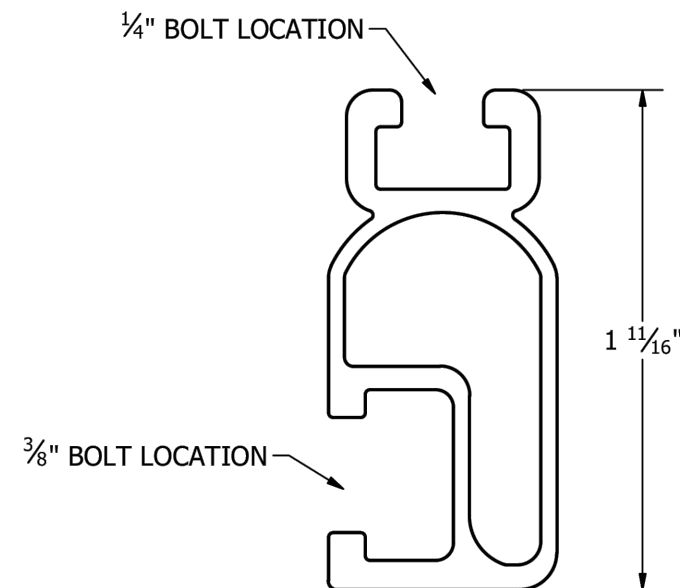
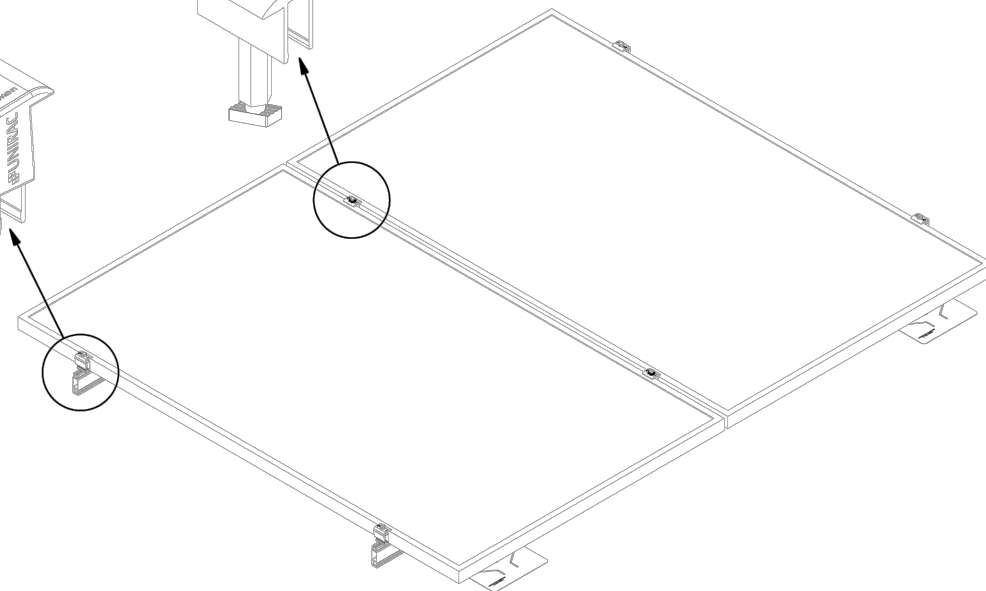
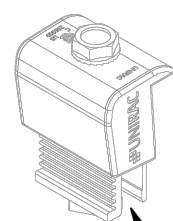
UNIVERSAL AF  
MID CLAMP



UNIVERSAL  
MID CLAMP



UNIVERSAL  
END CLAMP



PART # TABLE		
P/N	DESCRIPTION	LENGTH
315168M	SM LIGHT RAIL 168" MILL	168"
315168D	SM LIGHT RAIL 168" DRK	168"
315240M	SM LIGHT RAIL 240" MILL	240"
315240D	SM LIGHT RAIL 240" DRK	240"



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	UNIVERSAL AF CLAMPS
REVISION DATE:	9/28/2020

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A01B

SHEET



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	LIGHT RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-P02

SHEET



DEL MAR, CA 92014, USA

VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

PROJECT NAME

GEORGE JOHNSON  
52 LYNCH AVE,  
LILLINGTON, NC 27546, USA  
APN# 1106700295  
UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-9

# FLASHKIT PRO



FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Featuring Unirac's patented SHED & SEAL technology, a weather proof system which provides the ultimate protection against roof leaks. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With FLASHKIT pro, you have everything you need for a quick, professional installation.



**TRUSTED WATER SEAL FLASHINGS**  
FEATURING SHED & SEAL 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



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



INSTALL FLASHKIT PRO FLASHING



INSTALL L-FOOT



ATTACH L-FOOT TO RAIL

### PRE-INSTALL

- Locate roof rafters and snap chalk lines to mark the installation point for each roof attachment.
- Drill a 7/32" pilot hole at each roof attachment. Fill each pilot hole with sealant.

### STEP 1 INSTALL FLASHKIT PRO FLASHING

- Add a U-shaped bead of roof sealant to the underside of the flashing with the open side of the U pointing down the roof slope. Slide the aluminum flashing underneath the row of shingles directly up slope from the pilot hole as shown. Align the indicator marks on the lower end of the flashing with the chalk lines on the roof to center the raised hole in the flashing over the pilot hole in the roof. When installed correctly, the flashing will extend under the two courses of shingles above the pilot hole.

### STEP 2 INSTALL L-FOOT

- Fasten L-foot and Flashing into place by passing the included lag bolt and pre-installed stainless steel-backed EPDM washer through the L-foot EPDM grommet, and the raised hole in the flashing, into the pilot hole in the roof rafter.

- Drive the lag bolt down until the L-foot is held firmly in place. It is normal for the EPDM on the underside of the stainless steel backed EPDM washer to compress and expand beyond the outside edge of the steel washer when the proper torque is applied.

#### TIP:

- Use caution to avoid over-torquing the lag bolt if using an impact driver.
- Repeat Steps 1 and 2 at each roof attachment point.

### STEP 3 ATTACH L-FOOT TO RAIL

- Insert the included 3/8"-16 T-bolts into the lower slot on the Rail (sold separately), spacing the bolts to match the spacing between the roof attachments.
- Position the Rail against the L-Foot and insert the threaded end of the T-Bolt through the continuous slot in the L-Foot. Apply anti-seize to bolt threads to prevent galling of the T-bolt and included 3/8" serrated flange nut. Place the 3/8" flange nut on the T-bolt and finger tighten. Repeat STEP 3 until all L-Feet are secured to the Rail with a T-bolt. Adjust the level and height of the Rail and torque each bolt to 30ft-lbs.

## FASTER INSTALLATION. 25-YEAR WARRANTY.

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



DEL MAR, CA 92014, USA

#### VERSION

DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

#### PROJECT NAME

GEORGE JOHNSON  
52 LYNCH AVE,  
LILLINGTON, NC 27546, USA  
APN# 1106700295  
UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

#### SHEET NAME

SPEC SHEETS

#### SHEET SIZE

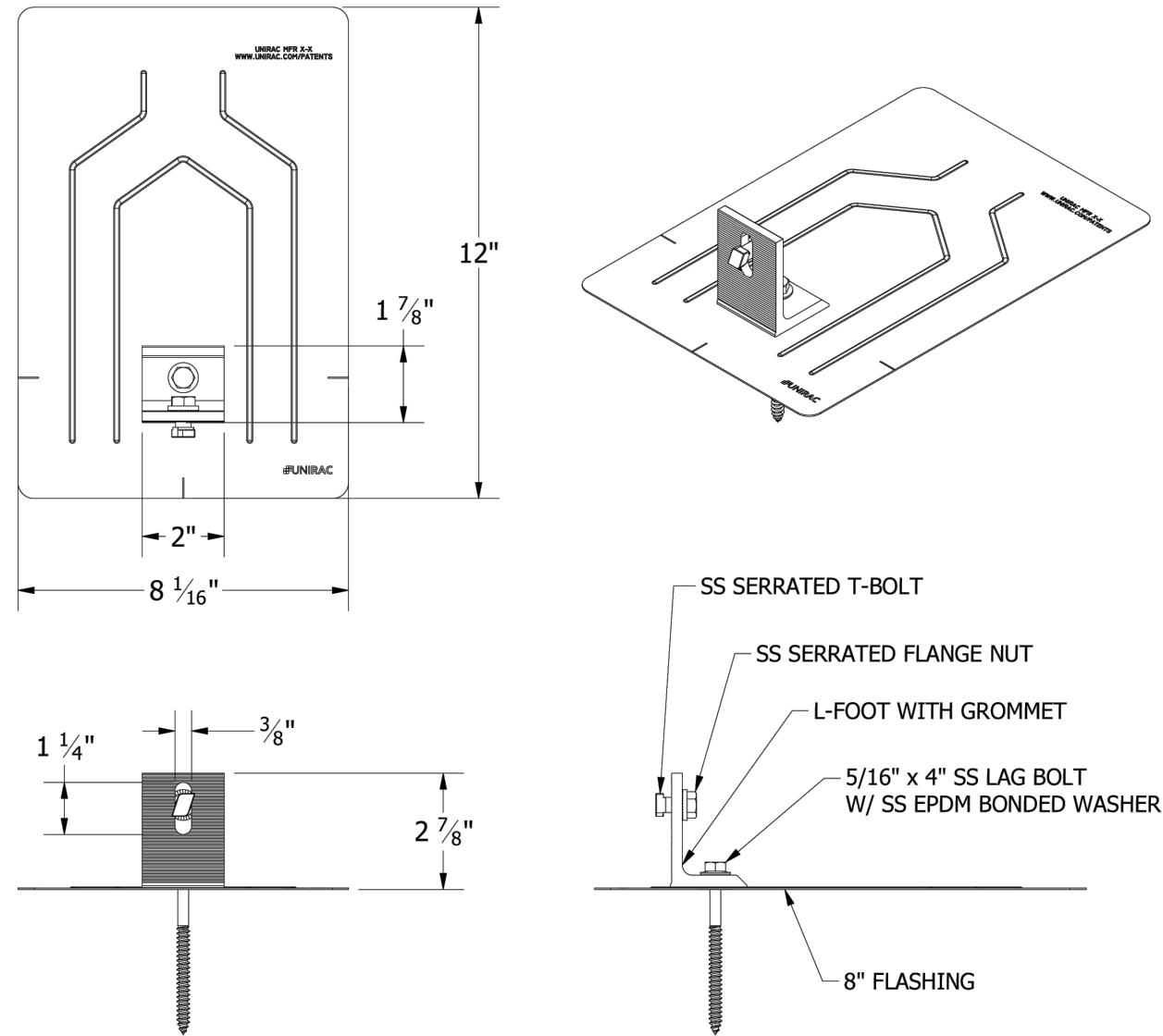
ANSI B  
11" X 17"

#### SHEET NUMBER

PV-10

NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. PACKAGING: KITS OF 10



PART # TABLE	
P/N	DESCRIPTION
004055M	FLASHKIT PRO MILL
004055D	FLASHKIT PRO DRK

**UNIRAC**  
 1411 BROADWAY BLVD. NE  
 ALBUQUERQUE, NM 87102 USA  
 PHONE: 505.242.6411  
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	KIT DETAIL
DESCRIPTION:	FLASHKIT PRO
REVISION DATE:	4/28/2020

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS

LEGAL NOTICE

**SM-A03**  
 SHEET



DEL MAR, CA 92014, USA

VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

PROJECT NAME

**GEORGE JOHNSON**  
 52 LYNCH AVE,  
 LILLINGTON, NC 27546, USA  
 APN# 1106700295  
 UTILITY: DUKE ENERGY NC  
 AHJ: HARNETT COUNTY

SHEET NAME	SPEC SHEETS
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-11

# UNIVERSAL AF

## EXPECT MORE

FROM A UNIVERSAL FASTENER.

### Ditch the Spacers

The Universal Aesthetic Fastener (Universal AF) accommodates every module between 30 and 46 mm without extra spacers, while providing the fast intuitive install experience that installers require, and a refined aesthetic home owners will love.

### More than just Universal

- Self standing, twist-and-lock install
- Guaranteed T-bolt engagement
- 1-tool installation
- Integrated bonding mid and end clamps

### Sleek Aesthetics

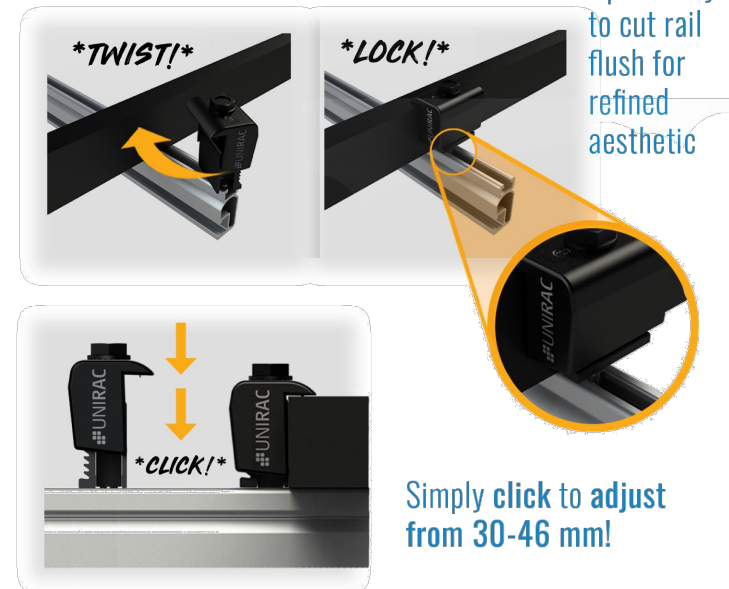
- Low profile hardware
- 1/2" module gap, end caps
- Optionality to cut rail flush
- Rail endcaps available for refined finish.

### Product Specifications

PART #	PRODUCT DESCRIPTION	LIST PRICE	PACK SIZE
#302045M	UNIVERSAL AF SERIES MID CLAMP MILL	\$2.33	20
#302045D	UNIVERSAL AF SERIES MID CLAMP DRK	\$2.52	20
#302050M	UNIVERSAL AF SERIES END CLAMP MILL	\$2.69	20
#302050D	UNIVERSAL AF SERIES END CLAMP DRK	\$2.90	20

## END-CLAMP

Twist and Lock engagement feature

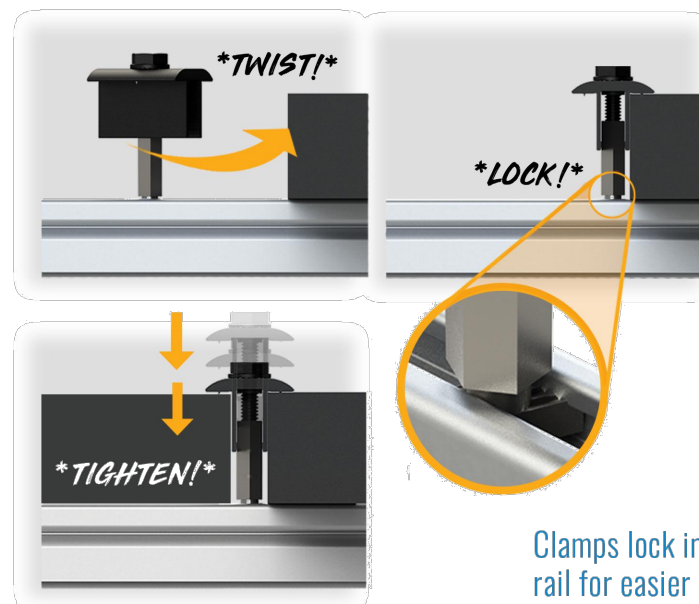


Optionality to cut rail flush for refined aesthetic

Simply click to adjust from 30-46 mm!

## MID-CLAMP

Twist and Lock engagement feature



Clamps lock into rail for easier panel placement

Tighten to adjust from 30-46 mm!

CONTACT: 505-242-6411 | SALES@UNIRAC.COM | WWW.UNIRAC.COM



DEL MAR, CA 92014, USA

#### VERSION

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INITIAL RELEASE	08/10/2022	UR

#### PROJECT NAME

GEORGE JOHNSON  
52 LYNCH AVE,  
LILLINGTON, NC 27546, USA  
APN# 1106700295  
UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

#### SHEET NAME

SPEC SHEETS

#### SHEET SIZE

ANSI B  
11" X 17"

#### SHEET NUMBER

PV-12

### SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved system level performance for steep sloped roofs. System level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes  $\geq$  2 inches per foot, or 9.5 degrees). The system is to be mounted over fire resistant roof covering rated for the application. There is no required minimum or maximum height limitation above the roof deck to maintain the system fire rating for SOLARMOUNT. Module Types & System Level Fire Ratings are listed below:

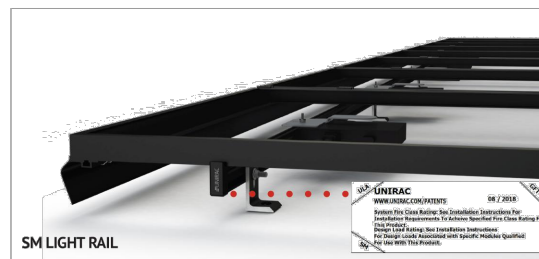
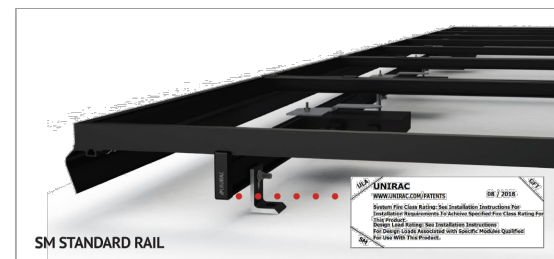
Rail Type	Module Type	System Level Fire Rating	Rail Direction	Module Orientation	Mitigation Required
Standard Rail	Type 1, Type 2, Type 3 & Type 10	Class A, Class B & Class C	East-West	Landscape OR Portrait	None Required
			North-South	Landscape OR Portrait	None Required
Light Rail	Type 1 & Type 2	Class A, Class B & Class C	East-West	Landscape OR Portrait	None Required
			North-South	Landscape OR Portrait	None Required

This racking system may be used to ground and/or mount a PV module complying with UL1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

### UL2703 CERTIFICATION MARKING LABEL

Unirac SOLARMOUNT is listed to UL 2703. Certification marking is embossed on all mid clamps as shown. Labels with additional information will be provided. After the racking system is fully assembled, a single label should be applied to the SOLARMOUNT rail at the edge of the array. Before applying the label, the corners of the label that do not pertain to the system being installed must be removed so that only the installed system type is showing.

Note: The sticker label should be placed such that it is visible, but not outward facing.



**BONDING MIDCLAMP ASSEMBLY**

- Stainless steel Midclamp points, 2 per module, pierce module frame anodization to bond module to module through clamp.
- Serrated flange nut bonds stainless steel clamp to stainless steel T-bolt.
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to grounded SM rail.

**ENDCLAMP ASSEMBLY**

- Serrated flange nut bonds aluminum Endclamp to stainless steel T-bolt.
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and Endclamp to grounded SM rail.

Note: End clamp does not bond to module frame.

**BONDING RAIL SPLICE BAR**

- Bonding Hardware creates bond between splice bar and each rail section.
- Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

Note: Splice bar and bolted connection are non-structural. The splice bar function is rail alignment and bonding.

**RAIL TO L-FOOT w/BONDING T-BOLT**

- Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-bolt.
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail.

**BONDING MICROINVERTER MOUNT**

- Hex nut w/ captive lock washer bonds metal microinverter flange to stainless steel T-bolt.
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail. System ground including racking and modules may be achieved through the trunk cable of approved microinverter systems. See page 1 for details.

**RACK SYSTEM GROUND**

- WEEB washer dimples pierce anodized rail to create bond between rail and lug.
- Solid copper wire connected to lug is routed to provide final system ground connection.

NOTE: Iloco lug can also be used when secured to the side of the rail. See page 2 for details.

- Position clamp to align T-bolt with rail slot. Lower clamp and insert T-bolt into rail slot.
- Rotate clamp clockwise 2/3 of a turn to engage T-bolt inside rail slot.
- Place module at least 3/4" from end of rail and position clamp against module frame.
- While applying pressure to hold the clamp against the module, push down on the module side of the clamp cap.
- When the cap contacts the module frame, release and it will re-engage to the clamp base.
- Tighten bolt and torque to 15 ft-lbs.
- Confirm clamp is engaged in correct module height position and that the top of the cap is sitting level with the module frame.

NOTE: When installing 46mm modules, loosen bolt by 1 turn before positioning clamp against module frame. Do not force clamp onto module frame as this may damage the bonding pin.

- Position clamp to align T-bolt with rail slot. Lower clamp and insert T-bolt into rail slot.
- Rotate clamp clockwise 2/3 of a turn to engage T-bolt inside rail slot.
- Slide clamp into position against module.
- Place second module.
- Tighten bolt and torque to 15 ft-lbs.

NOTE: If excessive force is applied in step 2, the cap may over-rotate causing it to be mis-aligned with the module frame. If this occurs, keep rotating the cap clockwise until it returns to the original position.



DEL MAR, CA 92014, USA

VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

PROJECT NAME

GEORGE JOHNSON  
 52 LYNCH AVE,  
 LILLINGTON, NC 27546, USA  
 APN# 1106700295  
 UTILITY: DUKE ENERGY NC  
 AHJ: HARNETT COUNTY

SHEET NAME  
 SPEC SHEETS

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-13





# Descriptive Report and Test Results

**MASTER CONTRACT:** 266909  
**REPORT:** 70131735  
**PROJECT:** 80128750

**Edition 1:** September 20, 2017; Project 70131735– Albuquerque  
Issued by Michael Hoffnagle

**Edition 17:** April 22, 2022; Project 80116723 - Irvine  
Prepared By: Michael Hoffnagle  
Authorized By: Michael Hoffnagle

**Edition 18:** June 8, 2022; Project 80128750 - Irvine  
Prepared By: Michael Hoffnagle  
Authorized By: Michael Hoffnagle

Report pages reissued

**Contents:** Certificate of Compliance - Pages 1 to 6  
Supplement to Certificate of Compliance - Pages 1 to 3  
Description and Tests - Pages 1 to 27  
Att1 Installation Manual SM– Pages 1 to 36  
Att2 Schematics SM/ULA– Pages 1 to 72  
Att3 Installation Manual ULA– Pages 1 to 22  
Att4 RM5\_Installation Guide - 1 to 19  
Att5 RMDT\_Installation Guide - 1 to 20  
Att6 RM series schematics – 1 to 32  
Att7 Installation Manual, GFT Shared Rail – Pages 1 to 40  
Att8 Installation Manual, GFT 4-Rail – Pages 1 to 39  
Att9 GFT Schematics – Pages 1 to 42  
Att10 NXT Horizon Installation Manual – Pages 1 to 22  
Att11 Schematics NXT Horizon – Pages 1 to 13

### PRODUCTS

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems  
CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -  
Certified to US Standards

The reader is responsible for any liability arising from actions taken in interpreting or applying the results presented in this report. This report shall not be reproduced except in full, without written approval from CSA Group Testing & Certification Inc. The results of this report only relate to those items tested.

34 Bunsen, Irvine, CA, U.S.A. 92618  
Telephone: 949.733.4300 1.800.463.6727 Fax: 949.733.4320 www.csagroup.org



DEL MAR, CA 92014, USA

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AHJ: HARNETT COUNTY

#### SHEET NAME

SPEC SHEETS

#### SHEET SIZE

ANSI B  
11" X 17"

#### SHEET NUMBER

PV-14



### Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the SOLARMOUNT system.

Manufacture	Module Model / Series
Aionrise	AION60G1, AION72G1
Aleo	P-Series & S-Series
Aptos Solar	DNA-120-MF10 DNA-120-(MF/BF)23 DNA-144-(MF/BF)23 DNA-120-(MF/BF)26 DNA-144-(MF/BF)26
Astronergy	CHSM6612 M, M/HV CHSM6612P Series CHSM6612P/HV Series CHSM72M-HC CHSM72M(DG)/F-BH
Auxin	AXN6M610T AXN6P610T AXN6M612T AXN6P612T
Axitec	AC-xxx(M/P)/60S, AC-xxx(M/P)/72S AC-xxxP/156-60S AC-xxxMH/120(S/V/SB/VB) AC-xxxMH/144(S/V/SB/VB)
Boviet	BVM6610, BVM6612
BYD	P6K & MHK-36 Series
Canadian Solar	CS1(H/K/U/Y)-MS CS3K-(MB/MB-AG/MS/P/P HE/PB-AG) CS3L-(MS/P) <b>CS3N-MS</b> CS3U-(MB/MB-AG/MS/P/P HE/PB/PB-AG) CS3W-(MS/P/P-PB-AG)

Manufacture	Module Model / Series
Canadian Solar (cont.)	CS5A-M CS6K-(M/MS/MS AllBlack/P/P HE) CS6P-(M/P) CS6U-(M/P/P HE) CS6X-P, CSX-P ELPS CS6(A/P)-MM
Centrosolar America	C-Series & E-Series
CertainTeed	CT2xxMxx-01, CT2xxPxx-01, CTxxMxx-01 CTxxPxx-01, CTxxMxx-02, CTxxMxx-03 CTxxMxx-04, CTxxHC11-04
Eco Solargy	Orion 1000 & Apollo 1000
ET Solar	ET AC Module, ET Module
First Solar	FS-6XXX(A) FS-6XXX(A)-P, FS-6XXX(A)-P-I
Flextronics	FXS-xxxBB
FreeVolt	PVGraf
GCL	GCL-P6 & GCL-M6 Series
Hanwha SolarOne	HSL 60
Hansol	TD-AN3, TD-AN4 UB-AN1, UD-AN1
Heliene	36M, 36P 60M, 60P, 72M & 72P Series 144HC M6
HT Solar	HT72-156(M/P) HT72-156P-C, HT72-156P(V)-C HT72-156M(PDV)-BF, HT72-156M(PD)-BF HT60-156M-C HT60-156M(V)-C

Manufacture	Module Model / Series
Hyundai	KG, MG, RW, TG, RI, RG, TI, KI, HI Series HiA-SxxxHG, HiD-SxxxRG(BK), HiS-S400PI
ITEK	iT-SE Series
Japan Solar	JPS-60 & JPS-72 Series
JA Solar	JAM72D30MB, JAM78D10MB JAP6 60-xxx JAM6(K)-60/xxx, JAP6(k)-72-xxx/4BB JAP72S##-xxx/** JAP6(k)-60-xxx/4BB, JAP60S##-xxx/** JAM6(k)-72-xxx/**, JAM72S##-xxx/** JAM6(k)-60-xxx/**, JAM60S##-xxx/** i. ##: 01, 02, 03, 09, 10 ii. **: SC, PR, BP, HiT, IB, MW, MR ** = Backsheet, ## Cell technology
Jinko	JKM & JKMS Series JKMxxxM-72HL-V JKMxxxM-72HL4-(T)V JKMxxxM-7RL3-V
Kyocera	KD-F & KU Series
LA Solar	LSxxxHC(166)
LG Electronics	LGxxx(E1C/E1K/N1C/N1K/N2T/N2W/S1C/ S2W/Q1C/Q1K)-A5 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/ QAC/QAK)-A6 LGxxxN2W-B3 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- **Listed models can be used to achieve a Class A fire system rating for steep slope applications. See Appendix A, page A**



DEL MAR, CA 92014, USA

#### VERSION

DESCRIPTION	DATE	REV
INITIAL RELEASE	08/10/2022	UR

#### PROJECT NAME

GEORGE JOHNSON  
52 LYNCH AVE,  
LILLINGTON, NC 27546, USA  
APN# 1106700295  
UTILITY: DUKE ENERGY NC  
AHJ: HARNETT COUNTY

#### SHEET NAME

SPEC SHEETS

#### SHEET SIZE

ANSI B  
11" X 17"

#### SHEET NUMBER

PV-15



# Certificate of Compliance

Certificate: 70131735

Master Contract: 266909

Project: 80128750

Date Issued: 2022-06-08

Issued To: **Unirac**  
1411 Broadway NE  
Albuquerque, New Mexico, 87102  
United States

Attention: **Rob D'Anastasio**

*The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.*



Issued by: *Michael Hoffnagle*  
Michael Hoffnagle

### PRODUCTS

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems  
CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -  
Certified to US Standards



Certificate: 70131735

Project: 80128750

Master Contract: 266909

Date Issued: 2022-06-08

Models:	SM	-	SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.
	ULA	-	Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules.

### Solarmount

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless-steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs. Fire ratings of Class A with Type 1, 2, 3 (with metallic frame), 4 (with trim), 5 (with trim), 10(with metallic frame), 19, 22, 25, 29, or 30 for steep slope. Tested at 5" interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.

UL 2703 Mechanical Load ratings:

Downward Design Load (lb/ft <sup>2</sup> )	113.5
Upward Design Load (lb/ft <sup>2</sup> )	50.7
Down-Slope Load (lb/ft <sup>2</sup> )	16.13

Test Loads:

Downward Load (lb/ft <sup>2</sup> )	170.20
Upward Load (lb/ft <sup>2</sup> )	76.07
Down-Slope Load (lb/ft <sup>2</sup> )	24.2



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SPEC SHEETS

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-16