

## **718 BRADFORD ALY**

Proposal: Install solar panels

Review Requested: Final Approval

Owner: Michael Kessler

Applicant: Evan Haberman, Pinnacle Exteriors

History: 1882, Starr's Row

Individual Designation: 12/31/1984

District Designation: None

Staff Contact: Megan Cross Schmitt, [megan.schmitt@phila.gov](mailto:megan.schmitt@phila.gov)

### **BACKGROUND:**

The building at 718 Bradford Alley is part of a row of rowhouses with mansards that was constructed by philanthropist Theodore Starr in 1882. Starr was an early housing reformer who sought to improve unsanitary slums and provide social services for the poor. This application proposes to install solar panels at the flat roof of 718 Bradford Alley. Though the staff believes the solar panels themselves will be inconspicuous from the public right-of-way, the disconnect box is proposed to be attached onto the front façade of the house and would be highly visible.

### **SCOPE OF WORK:**

- Install solar panels and associated equipment.

### **STANDARDS FOR REVIEW:**

The Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines include:

- *Roofs Guideline: Recommended: Installing mechanical and service equipment on the roof (such as heating and air conditioning units, elevator housing, or solar panels) when required for a new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.*
  - The proposed location of the six panels is at the flat roof of the house. Owing to the extremely narrow width of Bradford Alley, as well as the building's mansard, the flat portion of the roof is not visible. The proposed location of the panels is appropriate.
- *Standard 9: New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.*
  - The disconnect box is proposed to attach directly on to the front façade and would be highly visible from the public right-of-way. The staff has worked with other applicants in the past to install these boxes at less conspicuous locations and recommends that this applicant find another location, including possibly at the interior or the rear of the house. Alternatively, the applicant could consider installing the disconnect box free-standing in front of the house if possible.
  - The staff asks the applicant to explain where any associated conduit would be located and how it would interact with the mansard. The staff recommends against running conduit across or over the mansard roof.

**STAFF RECOMMENDATION:** Approval of location of panels as proposed, but denial of the disconnect box at the front façade, pursuant to the Roofs Guideline and Standard 9.

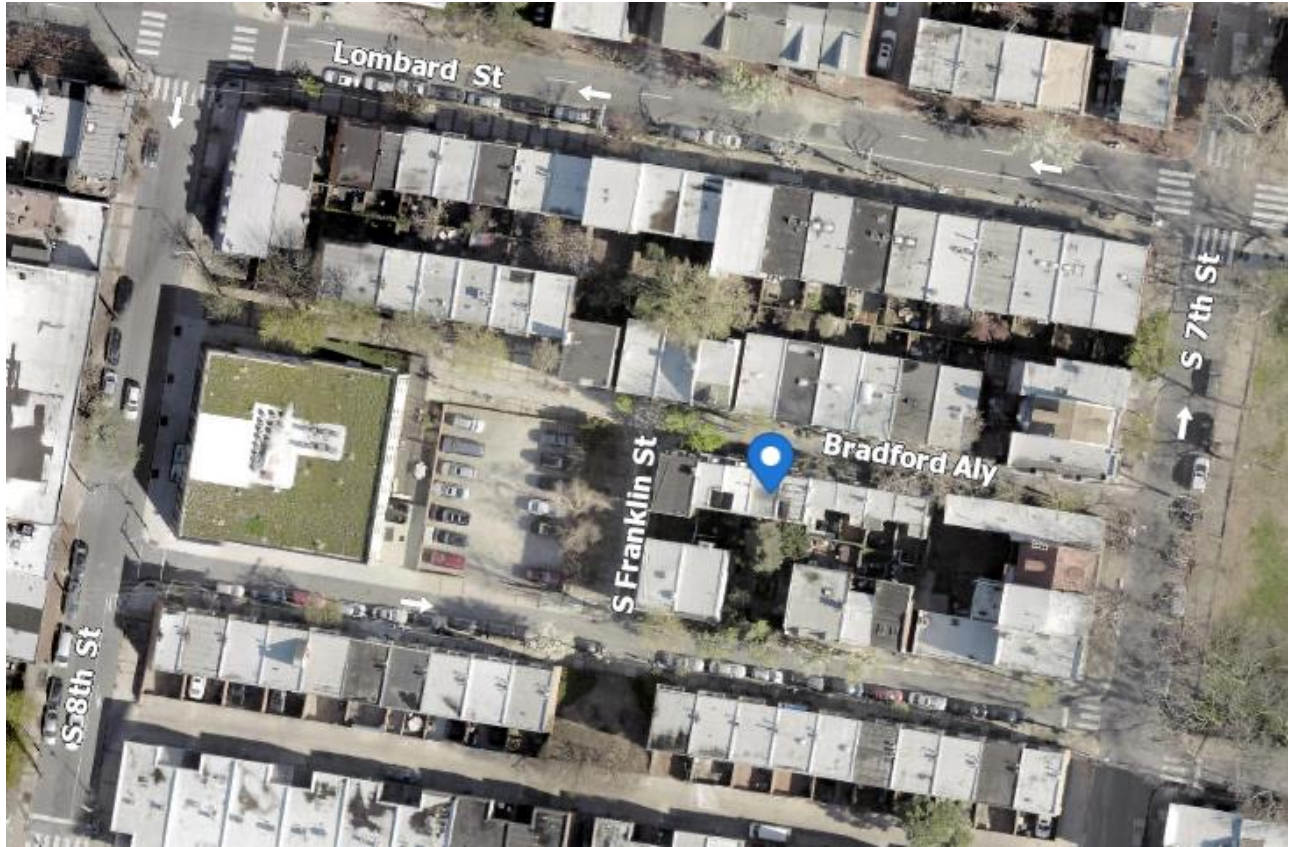


Figure 1. Aerial view of 718 Bradford Alley and surrounding context, Atlas, 2020.



Figure 2. View of 700 block of Bradford Alley, courtesy of the applicant.



Figure 3. Front façade of subject property and proposed location of disconnect box, courtesy of the applicant.



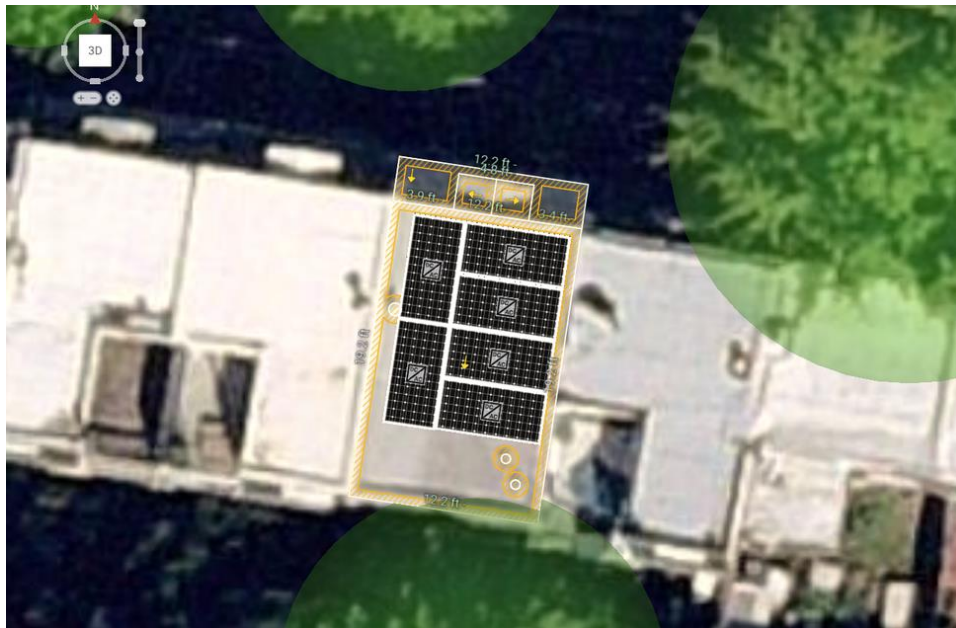


Figure 4. Proposed layout of arrays, courtesy of the applicant.



Figure 5. Starr's Row, c. 1900, Temple Universities Library.



## Application for Construction Permit

Use this application to obtain permits for a residential or commercial construction proposal.  
Mechanical / Fuel Gas, Electrical, Plumbing, and Fire Suppression trade details are found on page 2.

<b>Address</b> Identify the location of work for the permit(s).  If the activity will take place in a specific building, tenant space, floor level, or suite, note that detail in the 'Specific Location' field. If applicable, list PR #.	<b>1</b>	<b>718 Bradford Alley</b> <u>Parcel Address</u>  <u>Specific Location</u>  <input type="checkbox"/> Check box if this application is part of a project and provide project number: <b>PR- 2   0                    </b>
<b>Applicant</b> Identify how you are associated with the property.  Licensed professionals include design professionals, attorneys, and expeditors. A tradesperson must have an active Philadelphia license for their trade or hold a PA Home Improvement Contractor Registration.	<b>2</b>	I am the: <input type="checkbox"/> Property Owner <input type="checkbox"/> Tenant <input type="checkbox"/> Equitable Owner <input checked="" type="checkbox"/> Licensed Professional or Tradesperson  <b>Evan Haberman</b> <b>Pinnacle Exteriors</b> <u>Name</u> <u>Company</u>  <b>333 W Union St Allentown, PA 18102</b> <u>Address</u>  <b>permits@pinnacle-exteriors.com</b> <b>4 8 4 3 5 0 6 8 2 9</b> <u>Email</u> <u>Phone</u>
<b>Property Owner</b> Identify the deeded property owner.  If there was a recent change of ownership, documentation such as a deed or settlement sheet will be required.	<b>3</b>	<b>Michael Kessler</b> <input type="checkbox"/> Check box if new owner is being listed <u>Name</u>  <b>718 Bradford Alley Philadelphia, PA 19147</b> <u>Address</u>  <b>mikeyckess@gmail.com</b> <b>9 1 7 9 6 9 2 4 1 2</b> <u>Email</u> <u>Phone</u>
<b>Design Professional in Responsible Charge</b> Identify the PA- licensed design professional who is legally responsible.	<b>4</b>	<u>Name</u> <u>Firm</u>  <u>PA License #</u> <u>Phila. Commercial Activity License #</u>  <u>Email</u> <u>Phone</u>
<b>Project Scope</b> Use this section to provide project details; all fields are mandatory.  (a) Choose the proposed occupancy of the entire building. If not one- or two-family, provide a description of group(s) per code.  (b) Identify if the project will be new construction, an addition, or interior/exterior alterations.  (c) List the site area that will be disturbed by construction, if any. Enter 'zero' if no disturbance.  (d) Note the new floor area created, including basements, cellars, and occupiable roofs. Where existing areas will be altered, list those areas separately.  (e) State the number of new or affected stories.  (f) Provide a detailed description of the work proposed.  (g) Select all conditions that apply to this project (if any).	<b>5</b>	<b>(a) Occupancy</b> <input checked="" type="checkbox"/> Single-Family <input type="checkbox"/> Two-Family <input type="checkbox"/> Other, please describe: _____ <b>(b) Scope of Work</b> <input type="checkbox"/> New Construction <input checked="" type="checkbox"/> Addition and/or Alteration <input type="checkbox"/> Shell (No Fit Out) – Option for Commercial Permits Only <b>(c) Earth Disturbance</b> <u>Area of Earth Disturbance</u> <b>N/A</b> (Sq. Ft.) <b>(d) Building Floor Areas</b> <u>New Floor Area</u> <b>N/A</b> (Sq. Ft.) <u>Existing Altered Area</u> (Sq. Ft.) <b>(e) Number of Stories</b> _____ <b>(f) Description of Work</b> <u>Installation of rooftop solar panels onto an existing single family dwelling</u> _____ _____ <b>(g) Project Conditions</b> <input type="checkbox"/> Project Impacts Street/Right-of-Way <input type="checkbox"/> New High Rise <input type="checkbox"/> Green Roof Included <input type="checkbox"/> Modular Construction <input type="checkbox"/> Façade Work <input type="checkbox"/> Initial Fit Out of Newly Constructed Space



Department of  
**Licenses and Inspections**  
CITY OF PHILADELPHIA

\*\*\*DO NOT MAIL THIS APPLICATION\*\*\*

Job Number: (for office use only)

(PERMIT TYPE PREFIX – YEAR – NUMBER)

**Project Details &  
Contractor Information**

(a) Select all disciplines of work for which permits are being requested. If 'Building' is not requested, provide the number of the associated permit that was previously issued (where applicable). If a Zoning Permit was issued for this work, provide the related permit number.

(b) Identify the general contractor and estimated cost of building construction.

(c) Identify the mechanical contractor, estimated cost of mechanical work, equipment type, and quantity as:

- Number of registers/diffusers (separate new/relocated)
- Number of appliances
- Number of Type I / Type II kitchen hoods

Where fuel gas work is included, note the estimated cost of fuel gas work.

(d) Identify the licensed electrical contractor, estimated cost of electrical work, and a registered third-party electrical inspection agency.

(e) Identify the registered master plumber, estimated cost of plumbing work, number of fixtures, and check location of work as:

- Interior
- Exterior Drainage and/or Water Distribution

(f) Identify the licensed fire suppression contractor, estimated cost of fire suppression work, and number of devices:

- Sprinkler Heads (separate new/relocated quantities)
- Standpipes
- Fire Pumps
- Stand-alone Backflow Prevention Devices
- Kitchen Extinguishing Systems
- Hydrants

\*ROUGH-IN NOTICE: If you are seeking a rough-in permit, an application for plan review must be submitted already.

**(a) Check all that apply:**

☒ Building ☐ Mechanical & Fuel Gas ☐ Electrical ☐ Plumbing ☐ Fire Suppression

**Note:** Trades listed below are mandatory for all residential new construction jobs.

RP or CP- 2 0 | | - | | | | | | | |

Provide the associated Zoning Permit number for this construction, if applicable: ZP- 2 0 | | - | | | | | | | |

**(b) General Building Construction Contractor Information**

Name Pinnacle Exteriors Cost of Building Work \$ 900  
License Number PA-076641 Phone 4 8 4 3 5 0 6 8 2 9

**(c) Mechanical/Fuel Gas Work & Contractor Information**

Name \_\_\_\_\_ Cost of Mechanical Work \$ \_\_\_\_\_  
License Number \_\_\_\_\_ Cost of Fuel Gas Work \$ \_\_\_\_\_  
Equipment Types: ☐ Registers / Diffusers ☐ Appliances ☐ Hoods Phone \_\_\_\_\_  
Equipment Detail & Quantities \_\_\_\_\_

**(d) Electrical Work & Contractor Information**

☐ New Installation ☐ Alteration ☐ \*Rough-In

Name \_\_\_\_\_ Cost of Electrical Work \$ \_\_\_\_\_  
License Number \_\_\_\_\_ Phone \_\_\_\_\_  
Third-Party Inspection Agency Name \_\_\_\_\_

**(e) Plumbing Work & Contractor Information**

☐ New Installation ☐ Alteration ☐ \*Rough-In

Name \_\_\_\_\_ Cost of Plumbing Work \$ \_\_\_\_\_  
License Number \_\_\_\_\_ Phone \_\_\_\_\_  
Number of Fixtures \_\_\_\_\_  
Check one: ☐ Interior Work ☐ Exterior Building Drainage  
☐ Exterior Water Distribution: line size \_\_\_\_\_ (in.)

**(f) Fire Suppression Work & Contractor Information**

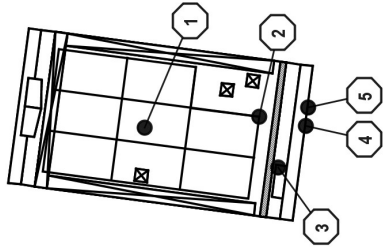
☐ New Installation ☐ Alteration ☐ \*Rough-In

Name \_\_\_\_\_ Cost of Fire Supp. Work \$ \_\_\_\_\_  
License Number \_\_\_\_\_ Phone \_\_\_\_\_  
Sprinkler Heads: \_\_\_\_\_ Standpipes: \_\_\_\_\_ Fire Pumps: \_\_\_\_\_  
Commercial Kitchen Systems: \_\_\_\_\_ Backflow Devices: \_\_\_\_\_ Hydrants: \_\_\_\_\_

**Declaration & Signature**

All provisions of the Building Code and other City ordinances will be complied with, whether specified herein or not. Plans approved by the Department form a part of this application. I hereby certify that the statements contained herein are true and correct to the best of my knowledge and belief. I further certify that I am authorized by the owner to make the foregoing application, and that, before I accept my permit for which this application is made, the owner shall be made aware of all conditions of the permit. I understand that if I knowingly make any false statements herein, I am subject to such penalties as may be prescribed by law or ordinance, inclusive of the penalties contained in 18 Pa. C.S. § 4904.

Applicant Signature: Evan Haberman Date: 3 / 31 / 21



SCALE: 1" = 10'

SCALE: 1" = 10'

GENERAL NOTES	
1	EQUIPMENT LIKELY TO BE WORKED UPON WHILE ENERGIZED SHALL BE INSTALLED IN LOCATIONS THAT SATISFY MINIMUM WORKING CLEARANCES PER NEC 110.26.
2	CONTRACTOR SHALL USE ONLY COMPONENTS LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE INTENDED USE.
3	CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL EQUIPMENT, CABLES, ADDITIONAL CONDUITS, RACEWAYS, AND OTHER ACCESSORIES NECESSARY FOR A COMPLETE AND OPERATIONAL PV SYSTEM.

- 1 (N) PROPOSED ROOF-MOUNTED PHOTOVOLTAIC ARRAY, FLAT ROOF, 8-PV MODULES (BLACK FRAME, BLACK BACKSHEET), 0" TILT, 187° AZIMUTH
- 2 (N) TRANSITION BOX, OUTDOOR, OUTPUT CIRCUIT CONDUCTORS SHALL BE RUN IN PVC-40 CONDUIT OVER ROOF, NO CLOSER THAN 0.0" ABOVE ROOF SURFACE
- 3 (E) MAIN SERVICE PANEL (MSP), OUTDOOR
- 4 (E) UTILITY METER, OUTDOOR
- 5 (N) VISIBLE, LOCKABLE, READILY-ACCESSIBLE AC DISCONNECT LOCATED WITHIN 10 FT OF UTILITY METER, OUTDOOR

P-153972

GRID-TIED SOLAR POWER SYSTEM

# SITE PLAN

DOC ID: 153972-189748-1

DATE: 2/17/21

CREATOR: M.C.

REVIEWER:

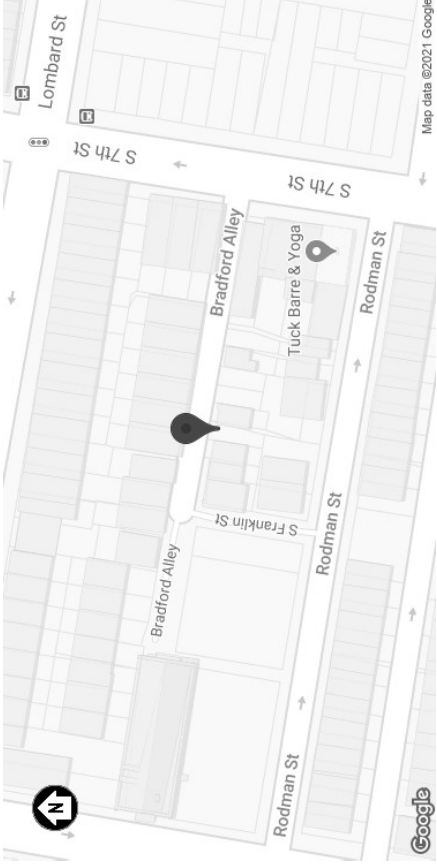
REVISIONS

**PV-2**

DIRECTORY OF PAGES	
PV-1	PROJECT SUMMARY
PV-2	SITE PLAN
PV-3	SINGLE-LINE DIAGRAM
PV-4	SAFETY LABELS
PV-7	FIRE SAFETY PLAN
APPENDIX	ELECTRICAL CALCULATIONS
	MODULE DATASHEET
	ARRAY WIRING BOX DATASHEET
	INVERTER DATASHEET

PROJECT DETAILS	
PROPERTY ADDRESS	718 BRADFORD ALLEY, PHILADELPHIA, PA 19147 US
ZONING	RESIDENTIAL
USE AND OCCUPANCY CLASSIFICATION	ONE- OR TWO-FAMILY DWELLING GROUP (GROUP R3)
UTILITY COMPANY	PECO ENERGY CO
ELECTRICAL CODE	2014 NEC (NFPA 70)
FIRE CODE	2015 IFC
OTHER BUILDING CODES	IBC 2015 IRC 2015 IMC 2015

CONTRACTOR INFORMATION	
CONTRACTOR SIGNATURE	



1 PLOT  
PV-1 SCALE: NTS



2 LOCALE  
PV-1 SCALE: NTS

**SCOPE OF WORK**

THIS PROJECT INVOLVES THE INSTALLATION OF A GRID-INTERACTIVE PV SYSTEM. PV MODULES WILL BE MOUNTED USING A PREENGINEERED MOUNTING SYSTEM. THE MODULES WILL BE ELECTRICALLY CONNECTED WITH DC TO AC POWER INVERTERS AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSE OF DESCRIBING THE DESIGN OF A PROPOSED PV SYSTEM WITH ENOUGH DETAIL TO DEMONSTRATE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS. THE DOCUMENT SHALL NOT BE RELIED UPON AS A SUBSTITUTE FOR FOLLOWING MANUFACTURER INSTALLATION INSTRUCTIONS. THE SYSTEM SHALL COMPLY WITH ALL MANUFACTURERS LISTING AND INSTALLATION INSTRUCTIONS, AS WELL AS ALL APPLICABLE CODES. NOTHING IN THIS DOCUMENT SHALL BE INTERPRETED IN A WAY THAT OVERRIDES THEM. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ALL CONDITIONS, DIMENSIONS, AND DETAILS IN THIS DOCUMENT.

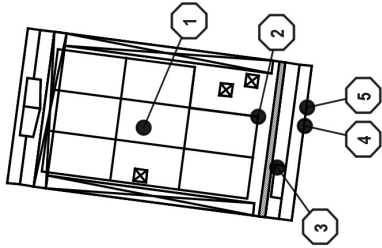
SYSTEM DETAILS	
DESCRIPTION	NEW GRID-INTERACTIVE PV SYSTEM WITH NO ENERGY STORAGE
DC RATING OF SYSTEM	2.56KW
AC RATING OF SYSTEM	1.92KW
AC OUTPUT CURRENT	8.0A
INVERTER(S)	8 X ENPHASE IQT-60-2-US
MODULE	Q-CELLS Q.PEAK DUO BLK-G5 320
ARRAY WIRING	(1) BRANCH OF 8 IQT-60-2-US MICROINVERTERS

INTERCONNECTION DETAILS	
POINT OF CONNECTION	NEW SUPPLY SIDE AC CONNECTION PER NEC 705.12(A)
UTILITY SERVICE	120/240V 1Ø
LOCATION	INSIDE PANELBOARD, PROTECTED BY FUSED SQUARE D D222NRB, 2-POLE, 60A, 240VAC

SITE DETAILS	
ASHRAE EXTREME LOW	-14°C (7°F)
ASHRAE 2% HIGH	34°C (93°F)
CLIMATE DATA SOURCE	PHILADELPHIA INTERNATIONAL AIRPORT (KPHL)
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	C

P-153972	GRID-TIED SOLAR POWER SYSTEM	718 BRADFORD ALLEY PHILADELPHIA, PA 19147
PROJECT SUMMARY		
DOC ID: 153972-189748-1		
DATE: 2/17/21		
CREATOR: M.C.		
REVIEWER:		
REVISIONS		
PV-1		





1  
PV-2

SITE PLAN

SCALE: 1" = 10'

GENERAL NOTES

1	EQUIPMENT LIKELY TO BE WORKED UPON WHILE ENERGIZED SHALL BE INSTALLED IN LOCATIONS THAT SATISFY MINIMUM WORKING CLEARANCES PER NEC 110.26.
2	CONTRACTOR SHALL USE ONLY COMPONENTS LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE INTENDED USE.
3	CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL EQUIPMENT, CABLES, ADDITIONAL CONDUITS, RACEWAYS, AND OTHER ACCESSORIES NECESSARY FOR A COMPLETE AND OPERATIONAL PV SYSTEM.

1

(N) PROPOSED ROOF-MOUNTED PHOTOVOLTAC ARRAY, FLAT ROOF, 8 PV MODULES (BLACK FRAME, BLACK BACKSHEET), 0° TILT, 187° AZIMUTH

2

(N) TRANSITION BOX, OUTDOOR, OUTPUT CIRCUIT CONDUCTORS SHALL BE RUN IN PVC-40 CONDUIT OVER ROOF NO CLOSER THAN 0.0" ABOVE ROOF SURFACE

3

(E) MAIN SERVICE PANEL (MSP), OUTDOOR

4

(E) UTILITY METER, OUTDOOR

5

(N) VISIBLE, LOCKABLE, READILY-ACCESSIBLE AC DISCONNECT LOCATED WITHIN 10 FT OF UTILITY METER, OUTDOOR

P-153972

GRID-TIED SOLAR POWER SYSTEM

718 BRADFORD ALLEY  
PHILADELPHIA, PA 19147

SITE PLAN

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PV-2



SW1 - DISCONNECT  
(SQUARE D D222NRB)

1

2

3

MSP - MAIN SERVICE PANEL

4

1

EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (SW1)

2

AC SOLAR DISCONNECT (SW1)

3

AC DISCONNECT (SW1)

1

WARNING !

ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

2

PHOTOVOLTAIC AC DISCONNECT

3

MAXIMUM AC OPERATING CURRENT: 8.0A  
MAXIMUM AC OPERATING VOLTAGE: 240V

4

ANY AC ELECTRICAL PANEL THAT IS FED BY BOTH THE UTILITY AND THE PHOTOVOLTAIC SYSTEM (MSP)

1

WARNING !

DUAL POWER SOURCE. SECOND SOURCE IS PHOTOVOLTAIC SYSTEM.

NEC690.17(E)

NEC690.13(B)

NEC690.54

NEC690.17(E)

NEC705.12(D)(3)

LABELING NOTES

1

ALL PLAQUES AND SIGNAGE REQUIRED BY 2014 NEC AND 2015 IFC WILL BE INSTALLED AS REQUIRED.

2

LABELS, WARNINGS(S) AND MARKING SHALL COMPLY WITH ANSI Z35.4 WHICH REQUIRES THAT DANGER, WARNING, AND CAUTION SIGNS USED THE STANDARD HEADER COLORS, HEADER TEXT, AND SAFETY ALERT SYMBOL ON EACH LABEL. THE ANSI STANDARD REQUIRES A HEADING THAT IS AT LEAST 50% TALLER THAN THE BODY TEXT, IN ACCORDANCE WITH NEC 110.21(B).

3

A PERMANENT PLAQUE OR DIRECTORY SHALL BE INSTALLED PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION IN ACCORDANCE WITH NEC 690.56(B).

GRID-TIED SOLAR POWER SYSTEM

718 BRADFORD ALLEY  
PHILADELPHIA, PA 19147

SAFETY LABELS

DOC ID: 153972-189748-1

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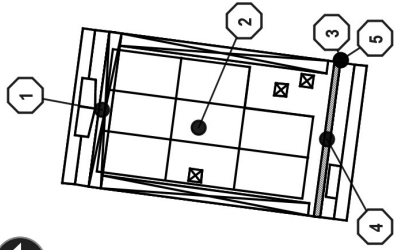
CREATOR: M.C.

REVIEWER:

REVISIONS

PV-4

P-153972



1  
PV-7  
FIRE SAFETY PLAN  
SCALE: 1" = 10'

GENERAL NOTES

- |   |   |
|---|---|
| 1 | ROOF ACCESS POINTS 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. (IFC 605.11.1.1)  |
| 2 | PANELS AND MODULES INSTALLED ON GROUP R-3 BUILDINGS SHALL BE LOCATED NOT LESS THAN 3 FEET (914 MM) FROM THE RIDGE IN ORDER TO ALLOW FOR FIRE DEPARTMENT SMOKE VENTILATION OPERATIONS, EXCEPT IN SUCH CASES WHERE AN ALTERNATIVE VENTILATION METHOD APPROVED BY THE FIRE CHIEF HAS BEEN PROVIDED OR WHERE THE FIRE CHIEF HAS DETERMINED VERTICAL VENTILATION TECHNIQUES WILL NOT BE EMPLOYED. (IFC 605.11.1.2.5) |

- |   |   |
|---|---|
| 1 | 0.5 FT. WIDE FIRE ACCESS PATHWAY  |
| 2 | PV MODULES INSTALLED ON ROOF WITH IRON RIDGE ROOF MOUNTING SYSTEM. THE MOUNTING SYSTEM IS UL 1703 CLASS A FIRE RATED ON A FLAT SLOPED ROOF WHEN INSTALLED WITH TYPE 1 MODULES. THE Q-CELLS Q-PEAK DUO BLK-GS 320 IS TYPE 1. |
| 3 | ROOF ACCESS POINT   |
| 4 | 0.5 FT. WIDE FIRE ACCESS PATHWAY  |
| 5 | ROOF ACCESS POINT   |
| 6 | TOTAL PLAN VIEW ARRAY AREA IS 145.9 SQ.FT. WHICH REPRESENTS 50.9% OF TOTAL PLAN VIEW ROOF AREA (286.8 SQ.FT)  |
| 7 | THIS SYSTEM UTILIZES MICROINVERTERS. THERE ARE NO DC CIRCUITS OUTSIDE OF THE ARRAY PERIMETER OR INSIDE THE BUILDING.  |
| 8 | CABLES, WHEN RUN BETWEEN ARRAYS, SHALL BE ENCLOSED IN CONDUIT.  |

P-153972

GRID-TIED SOLAR POWER SYSTEM	718 BRADFORD ALLEY PHILADELPHIA, PA 19147
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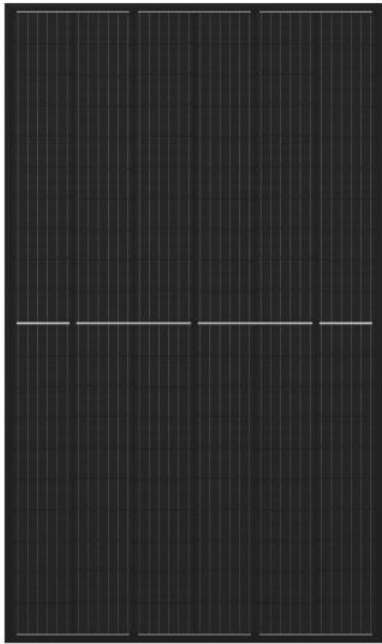
FIRE SAFETY  
PLAN

DOC ID: 153972-189748-1
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REVISIONS


PV-7





Q.Peak Duo BLK-G5 300-320



Enphase X-IQ-AM1-240-B



Enphase IQ7+ Micro Inverter



Enphase IQ7 Micro Inverter

## Product data sheet

### Characteristics

## D222NRB

Safety switch, general duty, fusible, 60A, 2 poles, 15 hp, 120 VAC, NEMA 3R, bolt-on provision, neutral factory installed

Product availability : Stock - Normally stocked in distribution facility



Price\* : 326.00 USD



### Main

Product	Single Throw Safety Switch
Current Rating	60 A
Certifications	UL listed file E2875
Enclosure Rating	NEMA 3R
Disconnect Type	Fusible disconnect switch
Factory Installed Neutral	Neutral (factory installed)
Short Circuit Current Rating	100 kA maximum depending on fuse H, K or R
Mounting Type	Surface
Number of Poles	2
Electrical Connection	Lugs
Duty Rating	General duty
Voltage Rating	240 V AC
Wire Size	AWG 12...AWG 3 aluminium AWG 14...AWG 3 copper

### Complementary

Maximum Horse Power Rating	1.5 hp 120 V AC 60 Hz 1 phase NEC 240.6 3 hp 120 V AC 60 Hz 3 phase NEC 430.52 3 hp 240 V AC 60 Hz 1 phase NEC 240.6 7.5 hp 240 V AC 60 Hz 3 phase NEC 240.6 10 hp 240 V AC 60 Hz 1 phase NEC 430.52 15 hp 240 V AC 60 Hz 3 phase NEC 430.52
Tightening torque	35 lbf.in (3.95 N.m) 0.00...0.01 in <sup>2</sup> (2.08...5.26 mm <sup>2</sup> ) AWG 14...AWG 10) 35 lbf.in (3.95 N.m) AWG 14...AWG 10) 45 lbf.in (5.08 N.m) 0.01 in <sup>2</sup> (8.37 mm <sup>2</sup> ) AWG 8) 45 lbf.in (5.08 N.m) 0.02...0.03 in <sup>2</sup> (12.3...21.12 mm <sup>2</sup> ) AWG 6...AWG 4) 50 lbf.in (5.65 N.m) 0.04 in <sup>2</sup> (26.67 mm <sup>2</sup> ) AWG 3)

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

Feb 23, 2021

Height	14.88 in (377.95 mm)
Maximum Width	7.45 in (189.23 mm)
Maximum Depth	4.87 in (123.70 mm)

### Ordering and shipping details

Category	00106 - D & DU SW,NEMA3R, 30-200A
Discount Schedule	DE1A
GTIN	00785901460640
Nbr. of units in pkg.	1
Package weight(Lbs)	8.25 lb(US) (3.74 kg)
Returnability	Yes
Country of origin	US

### Packing Units

Unit Type of Package 1	PCE
Package 1 Height	5.20 in (13.208 cm)
Package 1 width	7.70 in (19.558 cm)
Package 1 Length	16.20 in (41.148 cm)
Unit Type of Package 2	PAL
Number of Units in Package 2	120
Package 2 Weight	1022.00 lb(US) (463.571 kg)
Package 2 Height	45.00 in (114.3 cm)
Package 2 width	40.00 in (101.6 cm)
Package 2 Length	48.00 in (121.92 cm)

### Offer Sustainability

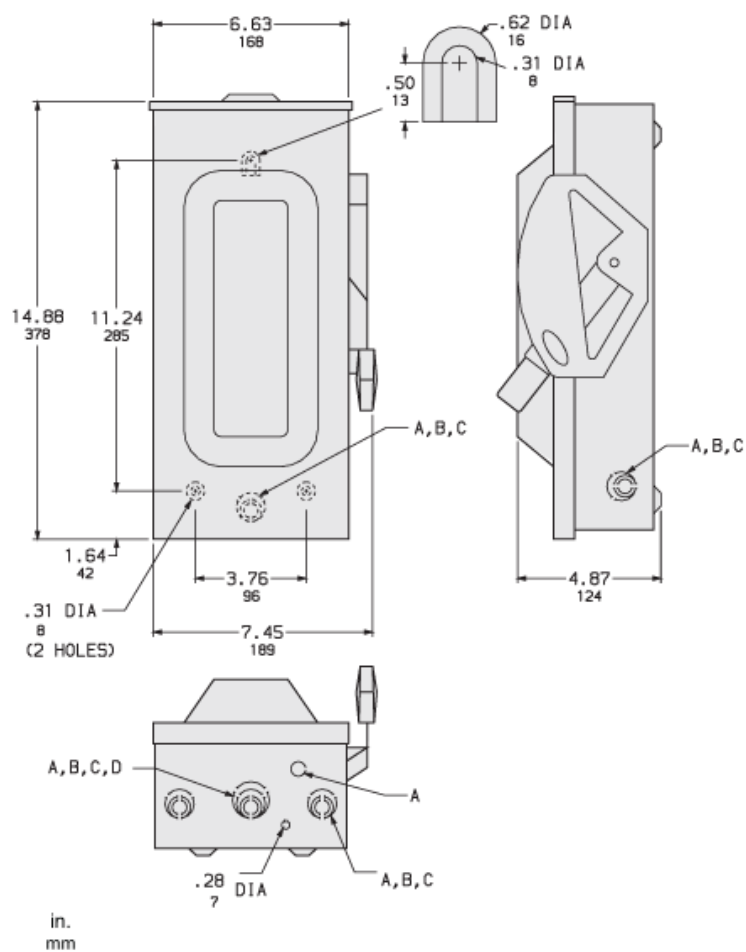
Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a>
REACH Regulation	<a href="#">REACH Declaration</a>
REACH free of SVHC	Yes
EU RoHS Directive	Compliant <a href="#">EU RoHS Declaration</a>
Mercury free	Yes
RoHS exemption information	<a href="#">Yes</a>
China RoHS Regulation	<a href="#">China RoHS declaration</a> Product out of China RoHS scope. Substance declaration for your information.
Environmental Disclosure	<a href="#">Product Environmental Profile</a>
PVC free	Yes

### Contractual warranty

Warranty	18 months
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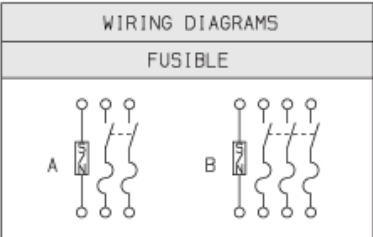


Approximate Dimensions



KNOCKOUTS				
SYMBOL	CONDUIT SIZE		DIAMETER	
	IN	MM	IN	MM
A	.50	13	.88	22
B	.75	19	1.13	29
C	1.00	25	1.38	35
D	1.25	32	1.75	45

Connections and Wiring Diagrams

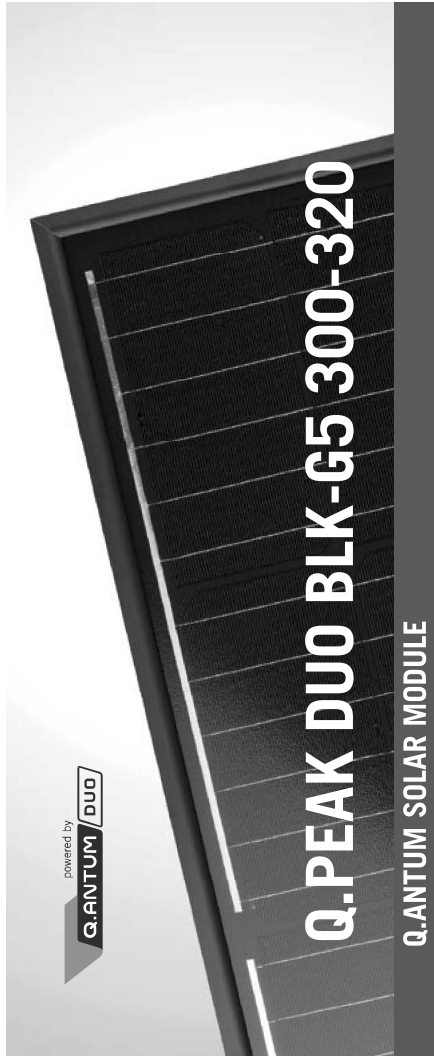


TERMINAL LUGS ‡			
AMPERES	MAX. WIRE	MIN. WIRE	TYPE
60	# 3 AWG	#14 AWG	CU OR AL

‡ LUGS SUITABLE FOR 60°C OR 75°C CONDUCTORS.

CATALOG NUMBER	VOLTAGE RATINGS	WIRING DIAG.	AMPERE RATING	HORSEPOWER RATINGS			
				240VAC			
				STD.		MAX.	
				1 Ø	3 Ø	1 Ø	3 Ø
D222NRB	240VAC	A	60	3	7.50 ●	10	15 ●
D322NRB	240VAC	B	60	3 ✱	7.50	10	15

✱ USE OUTER SWITCHING POLES.  
● FOR CORNER GROUNDED DELTA SYSTEMS ONLY.



# Q-ANTUM SOLAR MODULE



Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

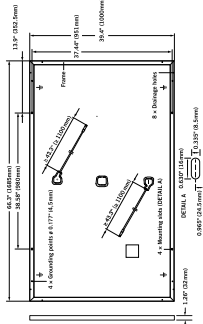
## Engineered in Germany



<sup>1</sup> APT test conditions according to IEC/TS 62804-1:2015, method B (–1500V, 168h)



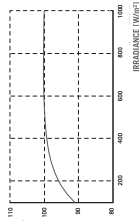
Format	56.3 in x 39.4 in x 1.25 in (including frame) (1685 mm x 1000 mm x 32 mm)
Weight	41.2 lbs (18.7 kg)
Front Cover	0.13 in (3.2 mm) thermally prestressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 x 20 monocrystalline QANTUM solar half-cells
Function box	776-9.35 in x 1.97-2.76 in x 0.51-0.83 in (20-9.85 mm x 50-70 mm x 13-21 mm), decentralized, IP67
Cable	4 mm <sup>2</sup> solar cable; (–) ≈ 4.3 in (1100 mm), (+) ≈ 4.3 in (1100 mm)
Connector	Multi-Contact MC4, IP68



POWER CLASS	300	305	310	315	320
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC (POWER TOLERANCE +5 W, -0 W)					
Power at MPP <sup>1</sup>	$P_{MPP}$ [W]	300	305	310	315
Short Circuit Current <sup>1</sup>	$I_{sc}$ [A]	9.72	9.78	9.83	9.89
Open Circuit Voltage <sup>1</sup>	$V_{oc}$ [V]	39.48	39.75	40.02	40.56
Current at MPP	$I_{MPP}$ [A]	9.25	9.31	9.36	9.41
Voltage at MPP	$V_{MPP}$ [V]	32.43	32.78	33.12	33.46
Efficiency <sup>1</sup>	$\eta$ [%]	$\geq 17.8$	$\geq 18.1$	$\geq 18.4$	$\geq 19.0$
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMO <sup>2,3</sup>					
Power at MPP	$P_{MPP}$ [W]	224.1	227.8	231.6	235.3
Short Circuit Current	$I_{sc}$ [A]	7.83	7.88	7.92	7.97
Open Circuit Voltage	$V_{oc}$ [V]	37.15	37.40	37.66	37.91
Current at MPP	$I_{MPP}$ [A]	7.28	7.32	7.37	7.41
Voltage at MPP	$V_{MPP}$ [V]	30.78	31.11	31.44	31.76
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC (POWER TOLERANCE +3%, -5%) <sup>1</sup>					
Power at MPP	$P_{MPP}$ [W]	224.1	227.8	231.6	235.3
Short Circuit Current	$I_{sc}$ [A]	7.83	7.88	7.92	7.97
Open Circuit Voltage	$V_{oc}$ [V]	37.15	37.40	37.66	37.91
Current at MPP	$I_{MPP}$ [A]	7.28	7.32	7.37	7.41
Voltage at MPP	$V_{MPP}$ [V]	30.78	31.11	31.44	31.76
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMO <sup>2,3</sup>					
Power at MPP	$P_{MPP}$ [W]	224.1	227.8	231.6	235.3
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Current at MPP	$I_{MPP}$ [A]	7.28	7.32	7.37	7.41
Voltage at MPP	$V_{MPP}$ [V]	30.78	31.11	31.44	31.76

Years	nominal	nominal (reduced by time averaging)	nominal (reduced by frequency averaging)	nominal (reduced by both)
0	50	50	50	50
5	50	45	45	40
10	50	40	40	25
15	50	35	35	25
20	50	30	30	25
25	50	25	25	25

At least 98% of nominal power during first year.  
Thereafter max. 0.54% degradation per year.  
At least 93.1% of nominal power up to 10 years.  
At least 85% of nominal power up to 25 years.



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m<sup>2</sup>).

	$\alpha$	$\beta$	$\gamma$
Temperature Coefficient of $I_{SC}$	0.04	0.28	0.37
Temperature Coefficient of $I_{SC}$	0.04	0.28	0.37
Temperature Coefficient of $P_{MPP}$	0.04	0.28	0.37
Temperature Coefficient of $P_{MPP}$	0.04	0.28	0.37
Temperature Coefficient of $V_{OC}$	0.04	0.28	0.37
Temperature Coefficient of $V_{OC}$	0.04	0.28	0.37
Normal Operating Module Temperature	37	28	37
Normal Operating Module Temperature	37	28	37
Normal Operating Module Temperature	37	28	37
Normal Operating Module Temperature	37	28	37

PROPERTIES FOR SYSTEM DESIGN			
(V)	Maximum System Voltage $V_{ms}$	1000 (IEC) / 1000 (UL)	II
(A DC)	Maximum Series Fuse Rating	20	Fire Rating
(lb-ft/ft <sup>2</sup> )	Max. Design Load, Push / Pull (UL) <sup>2</sup>	75 (3600 Pa) / 55 (2667 Pa)	Permitted module temperature on continuous duty
(lb-ft/ft <sup>2</sup> )	Max. Test Load, Push / Pull (UL) <sup>2</sup>	113 (5400 Pa) / 84 (4000 Pa)	<sup>2</sup> see installation manual

## PACKAGING INFORMATION

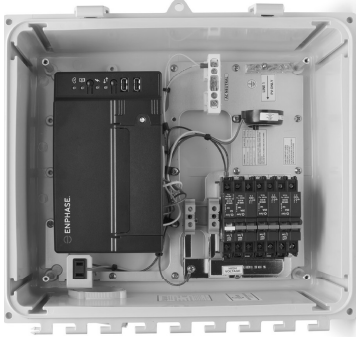
	UL 7303, VDE Quality Tested, CE compliant, IEC 61215-2016; IEC 61730-2016, Application class A		
32	Number of Modules per Pallet	26	Pallet Weight 1415lbs (642 kg)
30	Number of Pallets per 53' Trailer	69.3in x 45.3in x 46.9in (1760 mm x 1150mm x 1190mm)	

**NOTE:** Installation of this product.

**Amnha Q CELLS America Inc.**  
40 Spectrum Center Drive, Suite 1250, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL [inquiry@us.q-cells.com](mailto:inquiry@us.q-cells.com) | WEB [www.q-cells.us](http://www.q-cells.us)

## Enphase IQ Combiner (X-IQ-AM1-240-B)

The Enphase IQ Combiner™ with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.



### Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular

### Simple

- Three pre-installed 20 A / 240 VAC circuit breakers
- Provides production metering and optional consumption monitoring

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty



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



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2017-09-17



## Enphase IQ Combiner

MODEL NUMBER	
IQ Combiner X-IQ-AM1-240-B	IQ Combiner with Enphase IQ Envoy™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%).
ACCESSORIES (order separately)	
Enphase Mobile Connect™ CELLMODEM-Q3 (4G / 12-year data plan) CELLMODEM-Q1 (5G / 5-year data plan)	Plug and play industrial grade cellular modem with data plan 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.)
Consumption Monitoring CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
Solar branch circuit breakers	Three 2-pole 20 A/240 VAC DIN rail-mounted breakers
Maximum system voltage	240 VAC
Rated output current	48 A
Rated input current, each input	16 A
Maximum fuse/circuit breaker rating (output)	60 A
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	38.0" x 38.7" x 20.3 cm (15.0" x 15.3" x 8.0")
Weight	5.1 kg (11.2 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Vented, natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire size	14 to 6 AWG copper conductors for branch inputs. 14 to 4 AWG copper conductors for combined output. Follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable - not included
Cellular	Optional CELLMODEM-Q1 (3G) or CELLMODEM-Q3 (4G) - not included
COMPLIANCE	
Compliance, Combiner	UL 1741
Compliance, IQ Envoy	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR Part 15, Class B, ICES 003 IEC/EN 61010-1:2010 EN50065-1 EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5



## Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready Enphase IQ 7 Micro™ and Enphase IQ 7+ Micro™ dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

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)

### Productive and Reliable

- Optimized for high powered 60-cell and 72-cell\* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

### Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

\* The IQ 7+ Micro is required to support 72-cell modules.



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

## Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)		IQ7-60-2-US / IQ7-60-B-US	IQ7PLUS-72-2-US / IQ7PLUS-72-B-US
Commonly used module pairings <sup>1</sup>		235 W - 350 W +	235 W - 440 W +
Module compatibility		60-cell PV modules only	60-cell and 72-cell PV modules
Maximum input DC voltage		48 V	60 V
Peak power tracking voltage		27 V - 37 V	27 V - 45 V
Operating range		16 V - 48 V	16 V - 60 V
Min/Max start voltage		22 V / 48 V	22 V / 60 V
Max DC short circuit current (module Isc)		15 A	15 A
Overvoltage class DC port		II	II
DC port backfeed current		0 A	0 A
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)		IQ 7 Microinverter	IQ 7+ Microinverter
Peak output power		250 VA	295 VA
Maximum continuous output power		240 VA	290 VA
Nominal (L-L) voltage/range <sup>2</sup>		240 V / 183-229 V	208 V / 240 V / 211-264 V
Maximum continuous output current		1.0 A (240 V)	1.15 A (208 V) 1.21 A (240 V) 1.39 A (208 V)
Nominal frequency		60 Hz	60 Hz
Extended frequency range		47 - 68 Hz	47 - 68 Hz
AC short circuit fault current over 3 cycles		5.8 Arms	5.8 Arms
Maximum units per 20 A (L-L) branch circuit <sup>3</sup>		16 (240 VAC)	13 (208 VAC) 13 (240 VAC) 11 (208 VAC)
Overvoltage class AC port		III	III
AC port backfeed current		0 A	0 A
Power factor setting		1.0	1.0
Power factor (adjustable)		0.85 leading ... 0.85 lagging	0.85 leading ... 0.85 lagging
EFFICIENCY		@240 V	@208 V @240 V
Peak efficiency		97.6 %	97.5 % 97.3 %
CEC weighted efficiency		97.0 %	97.0 % 97.0 %
MECHANICAL DATA			
Ambient temperature range		-40°C to +65°C	
Relative humidity range		4% to 100% (condensing)	
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)		MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)	
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)		Friends PV2 (MC4 interchangeable). Adaptors for modules with MC4 or UTX connectors: -PV2 to MC4; order ECA-S20-S22 -PV2 to UTX; order ECA-S20-S25	
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 double-insulated, corrosion resistant polymeric enclosure	
Environmental category / UV exposure rating		NEMA Type 6 / outdoor	
FEATURES			
Communication		Power Line Communication (PLC)	
Monitoring		Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.	
Disconnecting means		The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.	
Compliance		CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.	

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.

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

3. Limits may vary, refer to local requirements to define the number of microinverters per branch in your area.

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