

**MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION**  
**STAFF REPORT**

<b>Address:</b>	2106 Salisbury Road, Silver Spring	<b>Meeting Date:</b>	6/26/2024
<b>Resource:</b>	Non-Contributing Resource <b>Linden Historic District</b>	<b>Report Date:</b>	6/18/2024
<b>Applicant:</b>	Peter Cairns (410 Energy Solutions, agent)	<b>Public Notice:</b>	6/12/2024
<b>Review:</b>	HAWP	<b>Tax Credit:</b>	N/A
<b>Permit Number:</b>	1073361	<b>Staff:</b>	Chris Berger

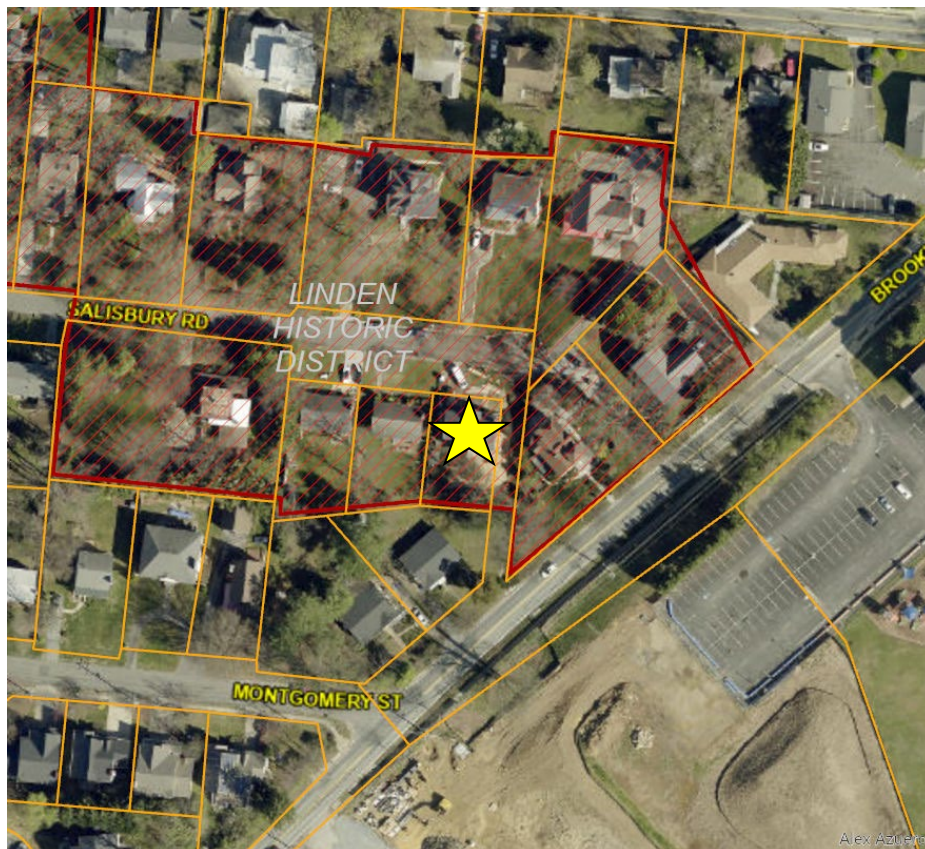
**PROPOSAL:** Solar panel installation.

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**STAFF RECOMMENDATION**

Staff recommends that the Historic Preservation Commission (HPC) **approve with one condition** the Historic Area Work Permit (HAWP) application with final approval delegated to staff:

1. The applicant must confirm the panel on the rear elevation that appears to extend over a roof valley can be installed.



**Figure 1:** The subject property at 2106 Salisbury Road is indicated with a yellow star. The red cross hatch is the boundary of the Linden Master Plan Historic District.

## ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Non-Contributing Resource within the Linden Historic District  
 STYLE: Contemporary Vernacular (formerly Ranch)  
 DATE: 1959 (second-story addition in 2023)



*Figure 2: The front and left-side elevations, left, and the front and right-side elevations, right.*

## BACKGROUND

At its May 18, 2022, meeting, the HPC approved the partial demolition and construction of new second-story addition and deck with HAWP #991353.<sup>1</sup> This followed a preliminary consultation on March 2, 2022. The addition was built in 2023.

## PROPOSAL

The applicant proposes to install 31 Q.Peak Duo solar panels on the roof (*Figures 3 and 4*). Ten will be located on the front elevation. The remaining will be on the rear elevation. Each panel will measure approximately 6 feet-by 3.5 feet. Two disconnects and a utility meter will be installed on the west elevation toward the front of the building, and the system controller, backup load panel, battery, another disconnect, and combiner will be installed on the rear elevation.

<sup>1</sup> The recording of the May 18, 2022, meeting is available here: [http://mncppc.granicus.com/MediaPlayer.php?publish\\_id=f36bd3dd-d77b-11ec-bbb4-0050569183fa](http://mncppc.granicus.com/MediaPlayer.php?publish_id=f36bd3dd-d77b-11ec-bbb4-0050569183fa)  
 The approved plans for HAWP #991353 are available here: [https://mcatlas.org/tiles6/06\\_HistoricPreservation\\_PhotoArchives/HAWP/05-18-2022/2106%20Salisbury%20Road,%20Silver%20Spring%20-%200991353%20-%20Approval.pdf](https://mcatlas.org/tiles6/06_HistoricPreservation_PhotoArchives/HAWP/05-18-2022/2106%20Salisbury%20Road,%20Silver%20Spring%20-%200991353%20-%20Approval.pdf)

**NEW MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 31 MODULES  
 MODULE TYPE = Q-CELLS Q PEAK DUO ML-G10+ (410W) MODULES  
 MODULE WEIGHT = 68 SLBS / 22.0 KG  
 MODULE DIMENSIONS = 74.00" x 41.10" = 21.12 SF  
 UNIT WEIGHT OF ARRAY = 2.30 PSF  
**EQUIPMENT SUMMARY**  
 31 Q-CELLS Q PEAK DUO ML-G10+ (410W) MODULES  
 31 ENPHASE IQ6A-72-2-US MICRO-INVERTERS, 240V  
 01 ENPHASE IQ BATTERY 5P-1P-1A BATTERY  
 01 ENPHASE IQ SYSTEM CONTROLLER 3  
 SYSTEM SIZE: 12.710 KW DC STC  
 SYSTEM SIZE: 10.819 KW AC

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 SYSTEM SIZE: 10.819 KW AC

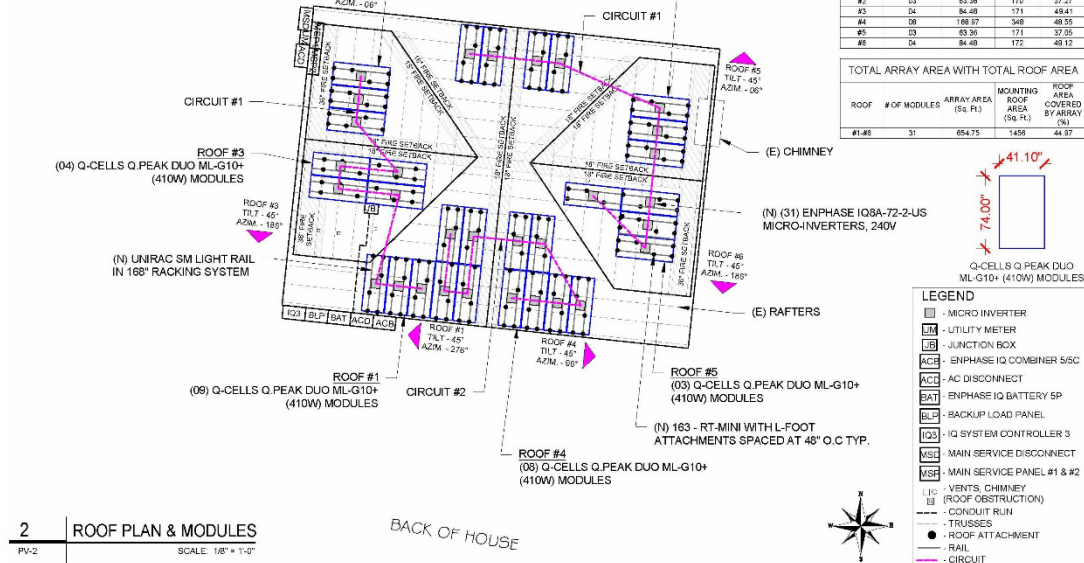


Figure 3: The roof plan for the solar panels.

**Q.PEAK DUO BLK ML-G10+ SERIES**

385-410 Wp | 132 Cells  
 20.9% Maximum Module Efficiency

Figure 4: The specification for the panels, left, and the proposed mounting plan.

**APPLICABLE GUIDELINES**

The Historic Preservation Office and HPC consult several documents when reviewing alterations and new construction within the Takoma Park Historic District. These documents include the historic preservation review guidelines in the approved and adopted amendment for the *Amendment to the Master Plan for Historic Preservation: Linden Historic District, Forest Glen Historic District, Linden/Forest Glen Individual Sites (June 4, 1993)*; *Montgomery County Code Chapter 24A (Chapter 24A)*; *the Secretary of the Interior's Standards for Rehabilitation (Standards)*; and the HPC's *Policy No. 20-01 Addressing*

*Emergency Climate Mobilization Through the Installation of Roof-Mounted Solar Panels.* The pertinent information in these documents is outlined below.

***Amendment to the Master Plan for Historic Preservation: Linden Historic District, Forest Glen Historic District, Linden/Forest Glen Individual Sites (June 4, 1993)***

The *Amendment to the Master Plan for Historic Preservation: Linden Historic District, Forest Glen Historic District, Linden/Forest Glen Individual Sites (June 4, 1993)* categorizes resources (Outstanding, Contributing, and Non-Contributing) based on their architectural and historical significance. Non-Contributing resources should be given the most lenient level of scrutiny in reviewing proposed alterations and may be considered for demolition if requested by owner.

***Montgomery County Code Chapter 24A-8***

The following guidance which pertains to this project are as follows:

- (b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to ensure conformity with the purposes and requirements of this chapter, if it finds that:
  - (1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or
  - (2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or
  - (6) In balancing the interest of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit;
- (d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

***Secretary of the Interior's Standards for Rehabilitation***

The Secretary of the Interior defines rehabilitation as “the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features, which convey its historical, cultural, or architectural values.” The applicable *Standards* are as follows:

- 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.
- 10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

***Historic Preservation Commission Policy No. 20-01: Addressing Emergency Climate Mobilization Through the Installation of Roof-Mounted Solar Panels***

Now, THEREFORE:

WHEREAS, Historic Area Work Permit decisions are guided by the criteria in Section 24A, The Secretary of the Interior’s Standards for Rehabilitation, and pertinent guidance from applicable master plan amendments and/or site or district-specific studies;

WHEREAS, The Secretary of the Interior’s Standards for Rehabilitation as interpreted by the National Park Service limit the placement of rooftop solar panels under Standards 2, 9, and 10 to less conspicuous locations;

WHEREAS, the County Council has established a Climate Emergency;

WHEREAS, the Historic Preservation is a body established by the County Executive and County Council;

WHEREAS, Section 24-8(b)(6) states, “In balancing the interest of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit;”

WHEREAS, the widespread use of solar panels, both for hot water and for electricity production, will reduce greenhouse gases in the county, in accordance with the aims of the Emergency Climate Mobilization resolution (Resolution No.: 18-974), it shall be the policy of the Historic Preservation Commission that:

1. The preferred locations for solar panel installation(s) on a designated historic site or an historic resource located within an historic district is a) on the rear of the property, b) on non-historic building additions, c) on accessory structures, or d) in ground-mounted arrays;
2. If it is not feasible to install solar panels in one of the identified preferred locations due to resource orientation or other site limitations; and,
3. The roof is determined to be neither architecturally significant, nor a character-defining feature of the resource, nor is it a slate or tile roof, that unless it can be demonstrated that the solar array will be installed without damaging the historic character of the resource or historic fabric; then
4. The public welfare is better served by approving a Historic Area Work Permit for solar panels on all visible side or front roof slopes under Section 24A-8(b)(6).
5. A Historic Area Work Permit (HAWP) is required for all work referenced in this policy.

**STAFF DISCUSSION**

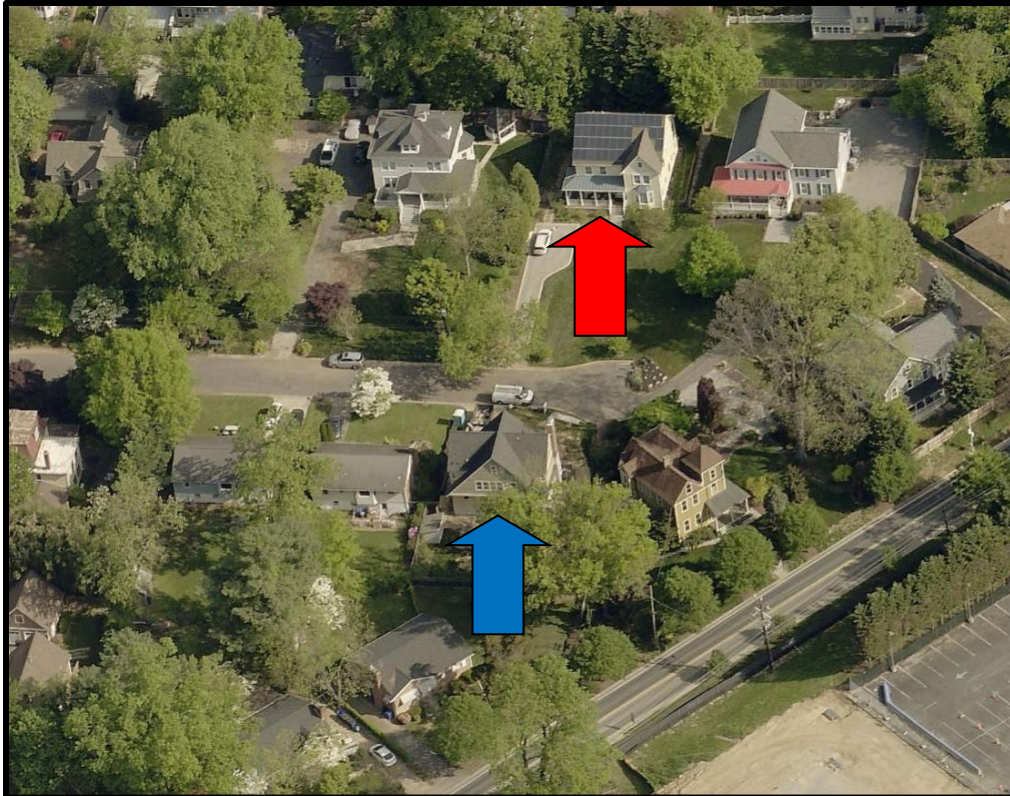
Staff supports the solar panels proposed for the subject property and recommends approval. The subject property is a Non-Contributing Resource in the Linden Historic District and features a house constructed in 1959 that was drastically altered last year when the second floor was added and a new, 12/12 pitch roof was installed. As noted in the master plan for the district, Non-Contributing Resources such as 2106 Salisbury Road should be given the most lenient level of scrutiny in reviewing proposed alterations and may be considered for demolition if requested by owner. Further, per Chapter 24A-8(d) of the County Code, the HPC is to be lenient in its judgement of plans for structures for new construction unless such plans would seriously impair the historic or architectural value of the surrounding historic resources or impair the character of the district.

The 10 panels on the north-facing roofs will be arranged in a symmetric pattern to minimize their visual impact. The other 21 panels to be installed on the south-facing roofs will not be visible from Salisbury Road because of the building's steep roof pitches. Most of the visible equipment will be located on the rear elevation. Some equipment will be installed on the west elevation toward the façade near the home's existing electrical meter (*Figure 5*). The applicant's agent said this location was necessary because the disconnect switch must be within 6 feet of the meter.



*Figure 5: Some of the panels' equipment will be installed on the west elevation near the existing electrical meter in the area clouded in red.*

Staff does not find under Chapter 24A-8(b)(1) that the installation of the panels will constitute a substantial alteration for a building that has already undergone much change. Per Chapter 24A-8(b)(2), the proposal is compatible with the architectural features of the historic district where there is precedent for solar panels on front-facing roofs for Non-Contributing Resources. In 2015, the HPC approved panels with HAWP #36/02-15B on the front-facing roofs at 2109 Salisbury Road, constructed in 2014 and located directly across the street to the north of the subject property at 2106 Salisbury Road (*Figures 6 and 7*).



**Figure 6:** In 2015, the HPC approved the installation of solar panels on the front-facing roof at the Non-Contributing Resource at 2019 Salisbury Road, indicated with a red arrow. The rear elevation of the subject property at 2106 Salisbury is visible in the foreground and indicated with a blue arrow. Source: CONNECTExplorer



**Figure 7:** In 2015, the HPC approved solar panels on the front-facing elevation of the Non-Contributing Resource at 2109 Salisbury Road, across the street from the subject property.

Staff notes that most of the adjoining and confronting properties are noncontributing to the historic district. In addition to 2109 Salisbury Road, this includes 2108 Salisbury Road, adjacent to the west, and 2103 Salisbury Road, confronting to the northeast. The adjacent property to the east at 9310 Brookville Road is an Outstanding Resource, but it fronts Brookville Road, and its rear faces the subject property. The Outstanding Resource at 2115 Salisbury Road is located to the northwest of the subject property. The adjacent property at 9302 Brookville Road is not part of the historic district.

In conformance with the relevant *Standards*, the new construction will not destroy historic materials that characterize the property and the new construction will be undertaken in such a manner that if removed in the future the essential form and integrity of the historic property and its environment will be unimpaired.

HPC Policy 20-01 regarding solar panels states that panels are preferred a) on the rear of the property; b) on non-historic building additions; c) on accessory structures, or d) in ground-mounted arrays. Two-thirds of the panels will be located on the rear of the property. All will be located on the non-historic steeply pitched cross-gable roof that was constructed last year. There is a shed on the property, but because of its small size it does not appear to be a viable option for solar. At 0.15 of an acre, the property appears to be too small for ground-mounted arrays. The policy continues that: “The public welfare is better served by approving a Historic Area Work Permit for solar panels on all visible side or front roof slopes under Section 24A-8(b)(6).”

After full and fair consideration of the applicant’s submission, staff finds the proposal, as modified by the conditions, consistent with the Criteria for Issuance in Chapter 24A-8(b)(1), (2), and (6) and Chapter 24A-8 (d), having found the proposal is consistent with the *Amendment to the Master Plan for Historic Preservation: Linden Historic District, Forest Glen Historic District, Linden/Forest Glen Individual Sites (June 4, 1993); Chapter 24A-8; Secretary of the Interior’s Standards for Rehabilitation #9 and 10, and Historic Preservation Commission Policy No. 20-01: Addressing Emergency Climate Mobilization Through the Installation of Roof-Mounted Solar Panels* outlined above.

The applicant must confirm the panel on the rear elevation that appears to extend over a roof valley can be installed and still meet building code (**Figure 8**).

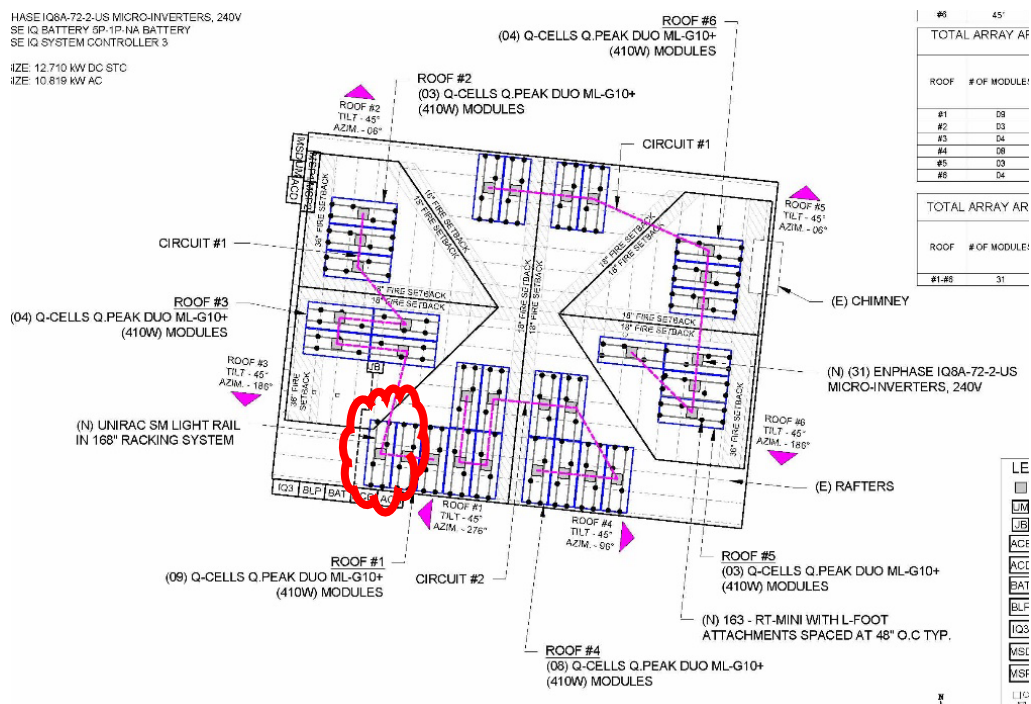


Figure 8: Staff seeks a condition the applicant confirm the panel clouded in red can extend over a roof valley.



**STAFF RECOMMENDATION**

Staff recommends that the Commission **approve with one condition** the HAWP application:

1. The applicant must confirm the panel on the rear elevation that appears to extend over a roof valley can be installed.

under the Criteria for Issuance in Chapter 24A-8(b)(1), (2), and (d), having found that the proposal is consistent with the *Amendment to the Master Plan for Historic Preservation: Linden Historic District, Forest Glen Historic District, Linden/Forest Glen Individual Sites (June 4, 1993)* and *Historic Preservation Commission Policy No. 20-01: Addressing Emergency Climate Mobilization Through the Installation of Roof-Mounted Solar Panels*, and therefore will not substantially alter the exterior features of the historic resource and is compatible in character with the district and the purposes of Chapter 24A;

and with the *Secretary of the Interior's Standards for Rehabilitation #9 and 10*;

and with the general condition that the applicant shall present an electronic set of drawings, if applicable, to Historic Preservation Commission (HPC) staff for review and stamping prior to submission for the Montgomery County Department of Permitting Services (DPS) building permits;

and with the general condition that final project design details, not specifically delineated by the Commission, shall be approved by HPC staff or brought back to the Commission as a revised HAWP application at staff's discretion;

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make any alterations to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-495-4571 or [chris.berger@montgomeryplanning.org](mailto:chris.berger@montgomeryplanning.org) to schedule a follow-up site visit.



APPLICATION FOR HISTORIC AREA WORK PERMIT
HISTORIC PRESERVATION COMMISSION
301.563.3400

FOR STAFF ONLY:
HAWP# 1073361
DATE ASSIGNED

APPLICANT:

Name: Peter Cairns
Address: 2106 Salisbury Rd
Daytime Phone: (910) 391-5548

E-mail: peter.cairns1@gmail.com
City: Silver Spring Zip: 20910
Tax Account No.: 01399932

AGENT/CONTACT (if applicable):

Name: 410 EnergySolutions
Address: 809 Barkwood Ct Suite A
Daytime Phone: 410-803-6780

E-mail: Inspections@410energysolutions.com
City: Linthicum Zip: 21090
Contractor Registration No.: 145937

LOCATION OF BUILDING/PREMISE: MIHP # of Historic Property

Is the Property Located within an Historic District? Yes/District Name Linden Historic District
No/Individual Site Name

Is there an Historic Preservation/Land Trust/Environmental Easement on the Property? If YES, include a map of the easement, and documentation from the Easement Holder supporting this application.

Are other Planning and/or Hearing Examiner Approvals /Reviews Required as part of this Application? (Conditional Use, Variance, Record Plat, etc.?) If YES, include information on these reviews as supplemental information.

Building Number: 2106 Street: Salisbury Rd
Town/City: Silver Spring Nearest Cross Street: Warren St
Lot: 32 Block: Subdivision: 0133 Parcel: 0000

TYPE OF WORK PROPOSED: See the checklist on Page 4 to verify that all supporting items for proposed work are submitted with this application. Incomplete Applications will not be accepted for review. Check all that apply:

- Checklist items: New Construction, Addition, Demolition, Grading/Excavation, Deck/Porch, Fence, Hardscape/Landscape, Roof, Shed/Garage/Accessory Structure, Solar, Tree removal/planting, Window/Door, Other.

I hereby certify that I have the authority to make the foregoing application, that the application is correct and accurate and that the construction will comply with plans reviewed and approved by all necessary agencies and hereby acknowledge and accept this to be a condition for the issuance of this permit.

Signature of owner or authorized agent: [Signature] Date: 05/23/2024

**HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFYING**  
[Owner, Owner's Agent, Adjacent and Confronting Property Owners]

<b>Owner's mailing address</b>  2106 Salisbury Rd Silver Spring, MD 20910	<b>Owner's Agent's mailing address</b>  809 Barkwood Ct, Suite A Linthicum, MD 21090
<b>Adjacent and confronting Property Owners mailing addresses</b>	
9310 Brookeville Road, Silver Spring MD 20910  2103 Salisbury Road, Silver Spring MD 20910  2109 Salisbury , Silver Spring MD 20910  2115 Salisbury Road, Silver Spring MD 20910	
2108 Salisbury Road, Silver Spring MD 20910  9302 Brookeville Road, Silver Spring MD 20910	

**Description of Property:** Please describe the building and surrounding environment. Include information on significant structures, landscape features, or other significant features of the property:

Residence is located towards the end of Salisbury Rd. Road is a dead end road surrounded by other residence.

**Description of Work Proposed:** Please give an overview of the work to be undertaken:

Installation of rooftop mounted solar panels (12.71KW) on both front and back roof;  
31 HANWHA QCELLS Q.PEAK DUO ML-G10+ (410W) panels.

Work Item 1: Solar Roof Installation

Description of Current Condition:  
Currently nothing on roof. Checked the quality of the roof and it is safe to install solar panels,

Proposed Work:  
Installation of rooftop mounted solar panels (31 panels) on all roofs of the residence.

Work Item 2: \_\_\_\_\_

Description of Current Condition:

Proposed Work:

Work Item 3: \_\_\_\_\_

Description of Current Condition:

Proposed Work:

**HISTORIC AREA WORK PERMIT  
CHECKLIST OF  
APPLICATION REQUIREMENTS**

	Required Attachments						
Proposed Work	I. Written Description	2. Site Plan	3. Plans/ Elevations	4. Material Specifications	5. Photographs	6. Tree Survey	7. Property Owner Addresses
New Construction	*	*	*	*	*	*	*
Additions/ Alterations	*	*	*	*	*	*	*
Demolition	*	*	*		*		*
Deck/Porch	*	*	*	*	*	*	*
Fence/Wall	*	*	*	*	*	*	*
Driveway/ Parking Area	*	*		*	*	*	*
Grading/Excavation/ Landscaping	*	*		*	*	*	*
Tree Removal	*	*		*	*	*	*
Siding/ Roof Changes	*	*	*	*	*		*
Window/ Door Changes	*	*	*	*	*		*
Masonry Repair/ Repoint	*	*	*	*	*		*
Signs	*	*	*	*	*		*



# PV Letters

May 22, 2024

Subject: Proposed Solar Panel Installation  
Peter Cairns Residence 2106 Salisbury Road, Silver Spring, MD  
PV Letters Job #001-1367

To Whom it May Concern,

we have reviewed information, provided by our client, related to the proposed solar panel installation at the above-referenced address. The purpose of the review was to determine if the existing roof is structurally adequate for the proposed installation. Based on our review and analysis of the given information, and in accordance with governing building codes, we certify that the capacity of the structural roof framing that directly supports the additional loading is adequate.

## **Design Parameter Summary**

Governing Building Code: 2018 International Residential Code (IRC)  
Risk Category: II  
Wind Exposure: B  
Design Wind Speed: 115 mph  
Ground Snow Load: 30 psf

## **Roof Information**

Roof Structure: 2x4 Manufactured Trusses @ 24" O.C.  
Roofing Material: Asphalt Shingles  
Roof Slope: 45 degrees

## **Roof Connection Details**

Lag Screws: 2 screws, 5/16" dia min., with min. 2.5" embedment into roof truss top chord only, at 48" O.C. max  
Stagger attachments to avoid overloading any individual truss top chord.

## **Engineering Analysis**

The proposed installation - including weight of panels, racking, mounts, and inverters where applicable - will be approximately 3 psf. In the areas where panels are installed, roof live loads will not be present. The reduction of roof live load is adequate to fully or partially compensate for the addition of the panel installation. Because the member forces in the area of the solar panels are not increased by more than 5%, and so per provisions in the adopted building codes, the structure need not be altered for gravity loading.

The proposed installation will be 6" max. above the roof surface (flush mounted) and parallel to the roof surface. Therefore, any increase in wind loading on the building structure from the solar panel installation is expected to be negligible. Wind is the governing lateral load case. Because the increase in lateral loading is not increased by more than 10%, per provisions in the adopted building codes, the structure need not be altered for lateral loading.

Wind uplift on the panels has been calculated in accordance with the relevant provisions of ASCE 7-16. This loading has been used to verify the adequacy of the connection specified above. Connection locations should be in accordance with design drawings.

UNIRAC SM Light rails will support the modules and will fasten to the roof structure with Roof Tech RT-MINI with L-Foot along the rail.

### **Conclusion**

The roof structure need not be altered for either gravity loading (including snow) or lateral loading (including wind). Therefore, the existing structure is permitted to remain unaltered. Connections to the roof must be made per the "Roof Connection Details" section above. Copies of all relevant calculations are enclosed.

### **Limitations and Disclaimers**

The opinion expressed in this letter is made in reliance on the following assumptions: the existing structure is in good condition; the existing structure is free from defects in design or workmanship; and the existing structure was code-compliant at the time of its design and construction. These assumptions have not been independently verified, and we have relied on representations made by our client with respect to the foregoing. The undersigned has not inspected the structure for defects, although we have reviewed the information provided by our client, including pictures where applicable.

Electrical design is excluded from this analysis. Waterproofing is the sole responsibility of the installer and is also excluded from this analysis. Solar panels must be installed per manufacturer specifications. Structural design and analysis of the adequacy of solar panels, racks, mounts, and other components is performed by each component's respective manufacturer; the undersigned makes no statement of opinion regarding such components. This letter and the opinions expressed herein are rendered solely for the benefit of the permitting authority (city or county building department) and your office, and may not be utilized or relied on by any other party.

If you have any questions or concerns, please contact me at (208)-994-1680, or email me directly at [Trevor@pvletters.com](mailto:Trevor@pvletters.com).

Sincerely,  
Trevor A. Jones, P.E.



5/22/2024





# PV Letters

## Standard Loading Comparison

This calculation justifies the additional solar load by comparing existing to proposed gravity loads in the location of the solar panels.

	<u>Without Solar</u>	<u>With Solar</u>	
<b>Dead Load</b>			
Asphalt Shingles	5	5	psf
1/4" Plywood	1	1	psf
Framing	4	4	psf
Insulation	1	1	psf
1/2" Gypsum Ceiling	2	2	psf
M,E, & Misc	1.5	1.5	psf
Solar Panel	0	3	psf
<b>Total Dead Load</b>	<b>14.5</b>	<b>17.5</b>	<b>psf</b>
<b>Snow Load</b>			
Ground Snow Load, $P_g$	30		psf
Exposure Factor, $C_e$	0.90		
Thermal Factor, $C_t$	1.1		
Importance Factor, $I_s$	1		
Flat Roof Snow Load	21		ASCE 7 Eqn. 7.3-1 or jurisdiction min.
Slope	45		degrees
Unobstructed Slippery Surface?	No	No	
Slope Factor, $C_s$	0.77	0.77	
<b>Sloped Roof Snow Load</b>	<b>16.0</b>	<b>16.0</b>	<b>psf</b>
<b>Live Load</b>			
Roof Live Load	20	0	psf
<b>Load Combination</b>			
D + L <sub>r</sub>	34.5	17.5	psf
D + S	30.5	33.5	psf
<b>Max. Load</b>	<b>34.5</b>	<b>33.5</b>	<b>psf</b>
% of original	<b>97.07%</b>		

**Result:**

**Because the total forces are decreased, per the relevant code provisions stated in the body of the letter, the existing roof structure is permitted to remain unaltered.**



# PV Letters

## Lag Screw Calculation (per ASCE 7-16)

This calculation justifies the connection of the solar panels to existing roof members, by showing the connection capacity is equal to or greater than the uplift force demands.

### Connection Demand

Spacing perpendicular to rail, in	37
Roof Angle, degrees	45
Roof Layout	Gable
Wind Speed, mph	115
Exposure Coefficient, $K_z$	0.67
Topographic Factor, $K_{zt}$	1.00
Directionality Factor, $K_d$	0.85
Elevation Factor, $K_e$	0.99
Velocity Pressure $q_z$ , psf	18.9

### Zones:

	<u>1</u>	<u>2n, 2r, 2e</u>	<u>3r, 3e</u>
Spacing parallel to rail, in	48	48	48
$GC_p$ (max)	1.71	1.93	2.40
Exposed Panels? ( $\gamma_E = 1.5$ )	No	No	No
Effective Wind Area on each con., $ft^2$	12.3	12.3	12.3
Pressure Equalization Factor, $\gamma_a$	0.76	0.76	0.76
Uplift Force, psf	24.7	27.8	34.6
Max. Uplift Force / Connection (0.6 WL), lbs	182.4	206.0	256.3
Solar Dead Load (0.6 DL), Lbs	22.2	22.2	22.2
Max. Uplift Force (0.6 WL - 0.6 DL), lbs	<b>160.2</b>	<b>183.8</b>	<b>234.1</b>

### Connection Capacity

Attachment FTG	Roof Tech RT-MINI with L-Foot
Attachment location	Framing
Fastener Type	Lag Screw
Fastener Diameter, in	0.3125
Embedment Length, in	2.5
Lumber Species & Grade	SPF #2 (Assumed)
Nominal Withdrawal Capacity W, lbs	512
# of Screws	2
Load Duration Factor $C_d$	1.6
Screw Adj. Withdrawal Cap. W', lbs	<b>1638</b>
Attachment FTG Strength with $C_d$ , lbs	<b>568</b>
Max applied load, lbs	234
Max allowable load, lbs	568

### Compare Adjusted Withdrawal Capacity to ASD Factored Demand

<u>Zones:</u>	<u>1</u>	<u>2n, 2r, 2e</u>	<u>3r, 3e</u>
	O.K.	O.K.	O.K.

Property Owners Name: Peter Cairns

Property Owners Address: 2106 SALISBURY ROAD, SILVER SPRING, MD 20910

Address of installation if different than owners address:  
\_\_\_\_\_

I certify that:

I prepared or approved the electrical drawings and related documents for the photovoltaic (PV) system at the above location.

The design of the PV system, and all electrical installations and equipment, meets the standards and requirements of the National Electrical Code as adopted by Montgomery County in COMCOR 17.02.01.

39549  
Maryland PE License Number

Date 05/21/2024

Signature 



Expiration : 10/12/2024  
sealed 21may2024 mike@h2dc.com  
H2DC PLLC MD CoA#: 09 - 50517  
ELECTRICAL ONLY  
- NOT AN AS-BUILT DRAWING SET -

\_\_\_\_\_  
Montgomery County Master Electrician License Number

Date \_\_\_\_\_

Signature \_\_\_\_\_

**Must Be Submitted with Plans**



Project SOLAR PANEL INSTALLATION Property Owner PETER CAIRNS

Address 2106 SALISBURY ROAD, SILVER SPRING, MD 20910

I reviewed the design of the photovoltaic (PV) system, as designed by the manufacturer, and the design criteria utilized for the mounting equipment and panel mounting assembly (rack system) for the installation of (#) panels supported by the rack system, as shown on the drawings prepared for the above referenced address. I certify that the configurations and design criteria meet the standards and requirements of the International Residential Code (IRC) and International Existing Building Code (IEBC) adopted by Montgomery County in COMCOR 08.00.02.

The attachment of the rack system to the building at the above address, including the location, number, and type of attachment points; the number of fasteners per attachment point; and the specific type of fasteners (size, diameter, length, minimum embedment into structural framing, etc.) meets the standards and requirements of the IRC and IEBC adopted by Montgomery County in COMCOR 08.00.02.

I evaluated the existing roof structure of the building at the above address and analyzed its capacity to support the additional loads imposed by the PV system. I certify that no structural modifications of the existing roof structure are required. The existing roof structure meets the standards and requirements of the IRC and IEBC, adopted by Montgomery County in COMCOR 08.00.02, necessary to support the PV system.

I evaluated the existing roof structure of the building at the above address and analyzed its capacity to support the additional loads imposed by the PV system. Structural modifications of the existing roof structure are required. I certify that the roof structure, as modified on the drawings for this project, will support the additional loads imposed by the PV system. I further certify that design of the modified roof structure meets the standards and requirements of the IRC and IEBC, adopted by Montgomery County in COMCOR 08.00.02.

I prepared or approved the construction documents for the mounting equipment, rack system, roof structure for this project.

59479  
Maryland PE License Number

Date 05/22/2024

Signature

Seal



**Must be submitted with plans**

# PROJECT DESCRIPTION:

31x410 Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 SYSTEM SIZE: 12.710 kW DC STC  
 SYSTEM SIZE: 10.819 kW AC

## EQUIPMENT SUMMARY

31 Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES  
 31 ENPHASE IQ8A-72-2-US MICRO-INVERTERS, 240V  
 01 ENPHASE IQ BATTERY 5P-1P-NA BATTERY  
 01 ENPHASE IQ SYSTEM CONTROLLER 3

### DESIGN CRITERIA

WIND SPEED	115 MPH
EXPOSURE CATEGORY	B
RISK CATEGORY	II
MOUNTING METHOD	ROOF MOUNT
GROUND SNOW LOAD	30 PSF

### CODE COMPLIANCE

ALL WORK SHALL COMPLY WITH ALL STATE AND LOCAL CODES, ORDINANCES AND ANY OTHER REGULATING AUTHORITIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK.

#### AHJ NOTES:

ALL WORK SHALL COMPLY WITH THE  
 2018 INTERNATIONAL RESIDENTIAL CODE  
 2018 INTERNATIONAL BUILDING CODE  
 2018 INTERNATIONAL FIRE CODE  
 2018 INTERNATIONAL ENERGY CONSERVATION CODE  
 2018 INTERNATIONAL PLUMBING CODE  
 2018 INTERNATIONAL FUEL GAS CODE  
 2018 INTERNATIONAL MECHANICAL CODE  
 2018 INTERNATIONAL PROPERTY MAINTENANCE CODE  
 2018 INTERNATIONAL EXISTING BUILDING CODE

#### ELECTRICAL CODE:

ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.

GPS COORDINATES: 39.008255, -77.047088

## GENERAL INSTALLATION NOTES

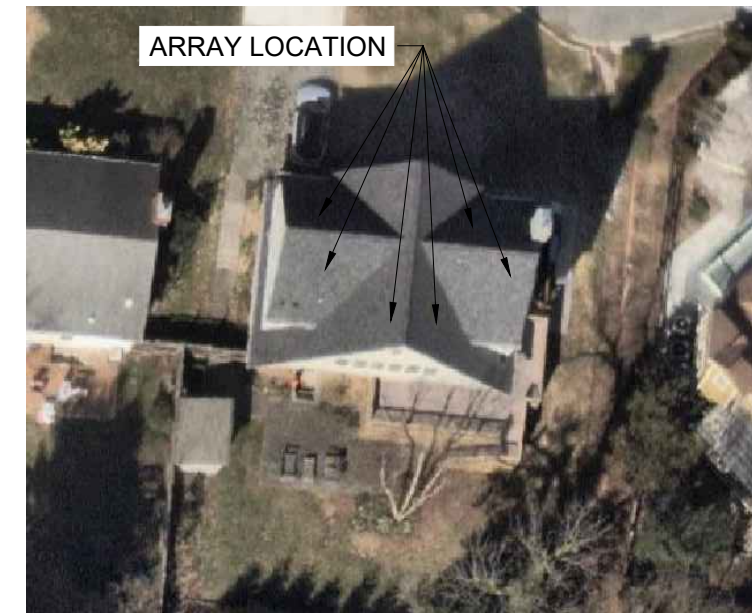
1. INSTALLER SHALL ASSUME FULL RESPONSIBILITY AND LIABILITY FOR COMPLIANCE WITH REGULATIONS PER FEDERAL OSHA AND LOCAL REGULATIONS PERTAINING TO WORK PRACTICES, PROTECTION OF WORKERS AND VISITORS TO THE SITE.
2. INSTALLER SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AT SITE BEFORE COMMENCING WORK.
3. CONTRACTOR SHALL FURNISH ALL MATERIAL EXCEPT AS SPECIFIED IN THE CONTRACT AND/OR THESE DRAWINGS.
4. ALL MATERIALS SHALL BE IN NEW AND UNUSED CONDITION.
5. MANUFACTURER'S MATERIAL EQUIPMENT, ETC. SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
6. THE INSTALLER SHALL BECOME FAMILIAR WITH ALL UTILITY AS-BUILT PLANS AND THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES, PAVEMENT OR IMPROVEMENTS.
7. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY THE OWNER OF DISCREPANCIES REQUIRING FURTHER CLARIFICATION BEFORE PROCEEDING WITH THE WORKS.
8. INSTALL ALL ASPECTS OF THIS PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS AND AS NOTED ON DRAWINGS ISSUED FOR CONSTRUCTION.
9. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER 310.0(D)
10. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26
11. EXACT CONDUIT RUN LOCATIONS SUBJECT TO CHANGE
12. ROOF PENETRATIONS ARE SEALED.
13. INVERTER IS LISTED TO UL-1741 "UTILITY INTERACTIVE"

### SHEET INDEX

PV-0	COVER SHEET
PV-1	PLOT PLAN WITH ROOF PLAN
PV-2	ROOF PLAN WITH MODULES
PV-2A	ATTACHMENT PLAN
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-4A	ELECTRICAL CALCULATIONS
PV-5	WARNING LABELS & PLACARD
PV-6	ADDITIONAL NOTES
PV-7+	EQUIPMENT SPECIFICATIONS

AHJ: MONTGOMERY COUNTY

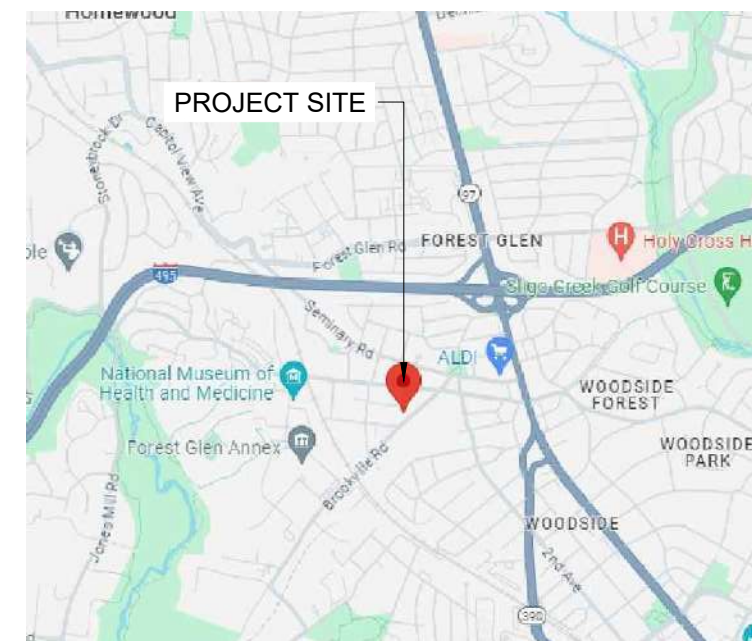
UTILITY: PHI



1 HOUSE PHOTO

PV-0

SCALE: NTS



2 VICINITY MAP

PV-0

SCALE: NTS



410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

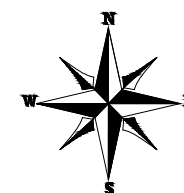
COVER SHEET

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-0



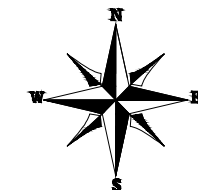
**ROOF ACCESS POINT**

ROOF ACCESS POINT SHALL NOT 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.

**EQUIPMENT SUMMARY**

- 31 Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES
- 31 ENPHASE IQ8A-72-2-US MICRO-INVERTERS, 240V
- 01 ENPHASE IQ BATTERY 5P-1P-NA BATTERY
- 01 ENPHASE IQ SYSTEM CONTROLLER 3

SYSTEM SIZE: 12.710 kW DC STC  
SYSTEM SIZE: 10.819 kW AC



**410 ENERGY SOLUTIONS LLC**  
809 BARKWOOD CT SUITES  
A/B, LINTHICUM HEIGHTS,  
MD 21090, USA  
PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

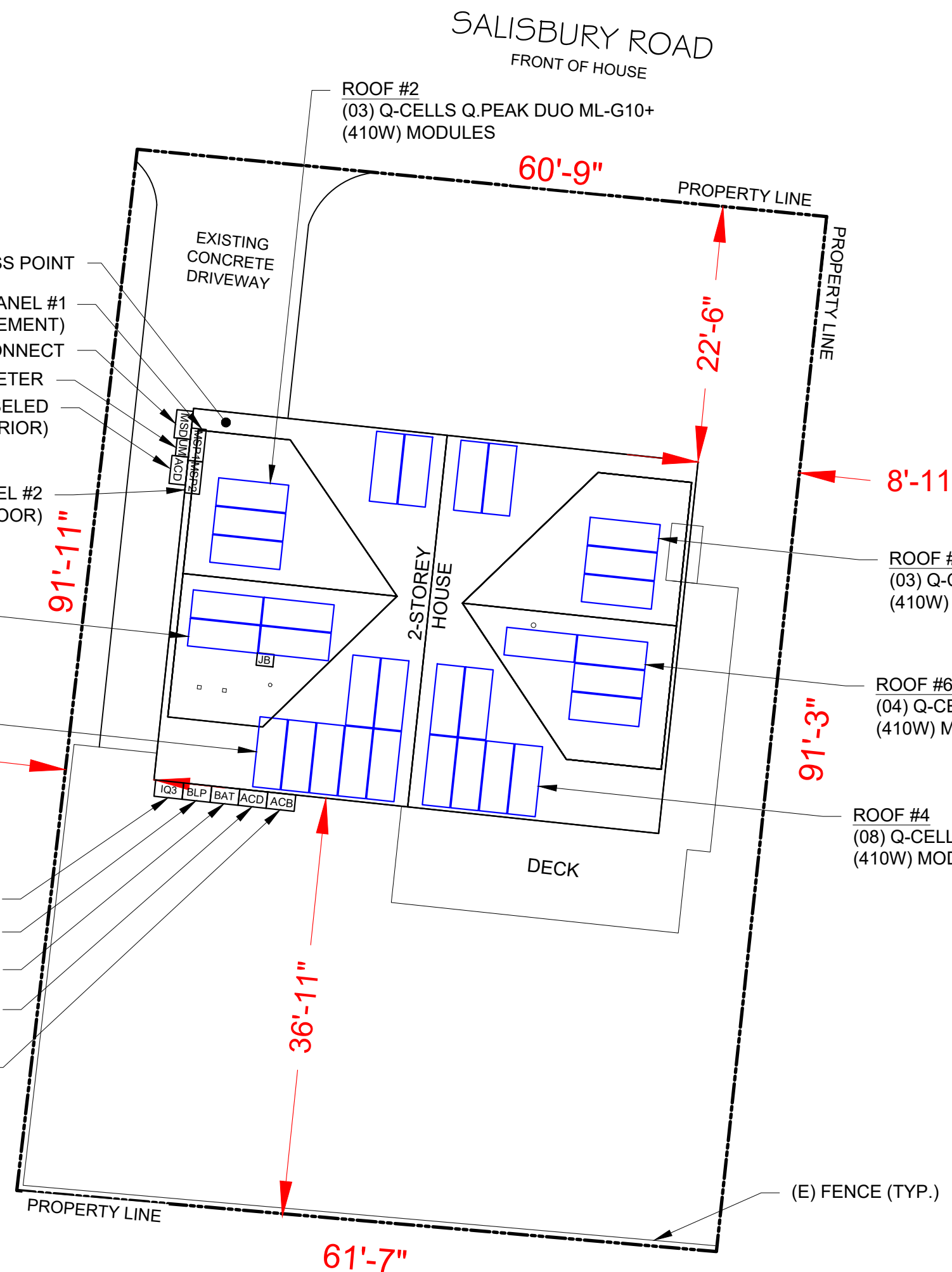
**CUSTOMER INFORMATION**

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME  
**PLOT PLAN WITH ROOF PLAN**

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

SHEET NUMBER  
**PV-1**



- ROOF ACCESS POINT
- (E) MAIN SERVICE PANEL #1 (INSIDE BASEMENT)
- (E) MAIN SERVICE DISCONNECT
- (E) UTILITY METER
- (N) VISIBLE, LOCKABLE, LABELED FUSED AC DISCONNECT (EXTERIOR)
- (E) MAIN SERVICE PANEL #2 (INSIDE 2ND FLOOR)
- ROOF #3 (04) Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES
- ROOF #1 (09) Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES
- (N) ENPHASE IQ SYSTEM CONTROLLER 3
- (N) BACKUP LOAD PANEL
- (N) ENPHASE IQ BATTERY 5P
- (N) VISIBLE, LOCKABLE, LABELED FUSED NON-FUSED AC DISCONNECT (EXTERIOR)
- (N) ENPHASE IQ COMBINER 5/5C

**NEW MODULE TYPE, DIMENSIONS & WEIGHT**

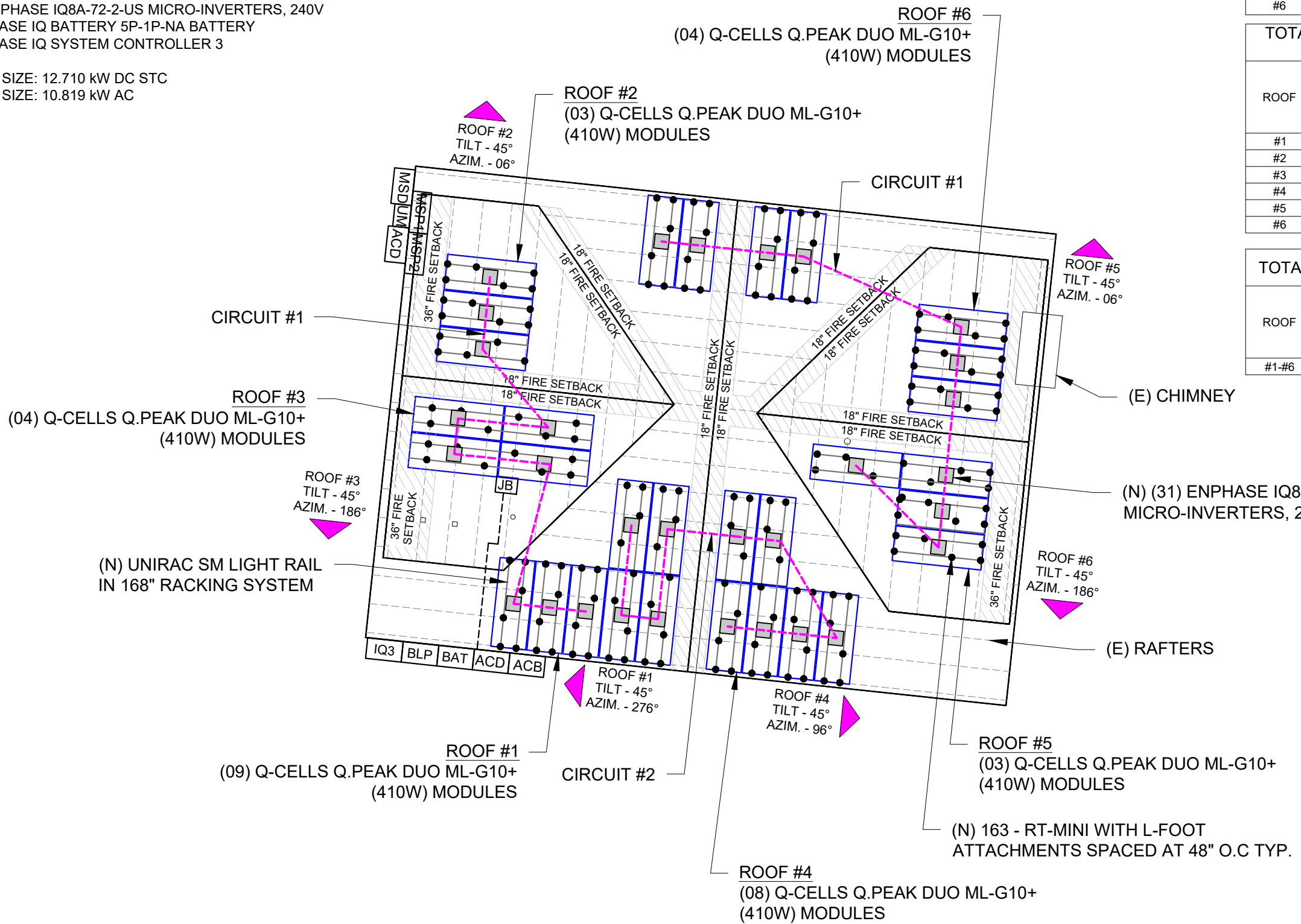
NUMBER OF MODULES = 31 MODULES  
 MODULE TYPE = Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES  
 MODULE WEIGHT = 48.5 LBS / 22.0 KG.  
 MODULE DIMENSIONS = 74.00"x 41.10" = 21.12 SF  
 UNIT WEIGHT OF ARRAY = 2.30 PSF

**EQUIPMENT SUMMARY**

31 Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES  
 31 ENPHASE IQ8A-72-2-US MICRO-INVERTERS, 240V  
 01 ENPHASE IQ BATTERY 5P-1P-NA BATTERY  
 01 ENPHASE IQ SYSTEM CONTROLLER 3

SYSTEM SIZE: 12.710 kW DC STC  
 SYSTEM SIZE: 10.819 kW AC

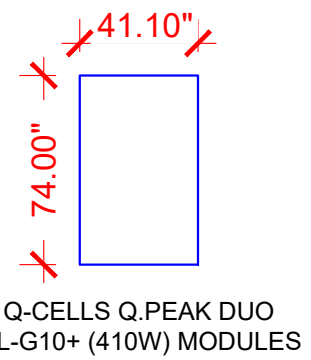
SALISBURY ROAD  
 FRONT OF HOUSE



ROOF DESCRIPTION				
ROOF TYPE		ASPHALT SHINGLE		
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	45°	276°	2"x4"	24" O.C.
#2	45°	06°	2"x4"	24" O.C.
#3	45°	186°	2"x4"	24" O.C.
#4	45°	96°	2"x4"	24" O.C.
#5	45°	06°	2"x4"	24" O.C.
#6	45°	186°	2"x4"	24" O.C.

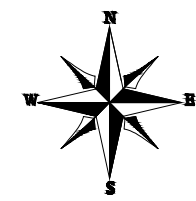
TOTAL ARRAY AREA WITH MOUNTING ROOF AREA				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	MOUNTING ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	09	190.09	390	48.74
#2	03	63.36	170	37.27
#3	04	84.48	171	49.41
#4	08	168.97	348	48.55
#5	03	63.36	171	37.05
#6	04	84.48	172	49.12

TOTAL ARRAY AREA WITH TOTAL ROOF AREA				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	MOUNTING ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1-#6	31	654.75	1456	44.97



**LEGEND**

- - MICRO INVERTER
- UM - UTILITY METER
- JB - JUNCTION BOX
- ACB - ENPHASE IQ COMBINER 5/5C
- ACD - AC DISCONNECT
- BAT - ENPHASE IQ BATTERY 5P
- BLP - BACKUP LOAD PANEL
- IQ3 - IQ SYSTEM CONTROLLER 3
- MSD - MAIN SERVICE DISCONNECT
- MSP - MAIN SERVICE PANEL #1 & #2
- - VENTS, CHIMNEY (ROOF OBSTRUCTION)
- - - - CONDUIT RUN
- - - - TRUSSES
- - ROOF ATTACHMENT
- - - - RAIL
- - - - CIRCUIT



410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

**CUSTOMER INFORMATION**

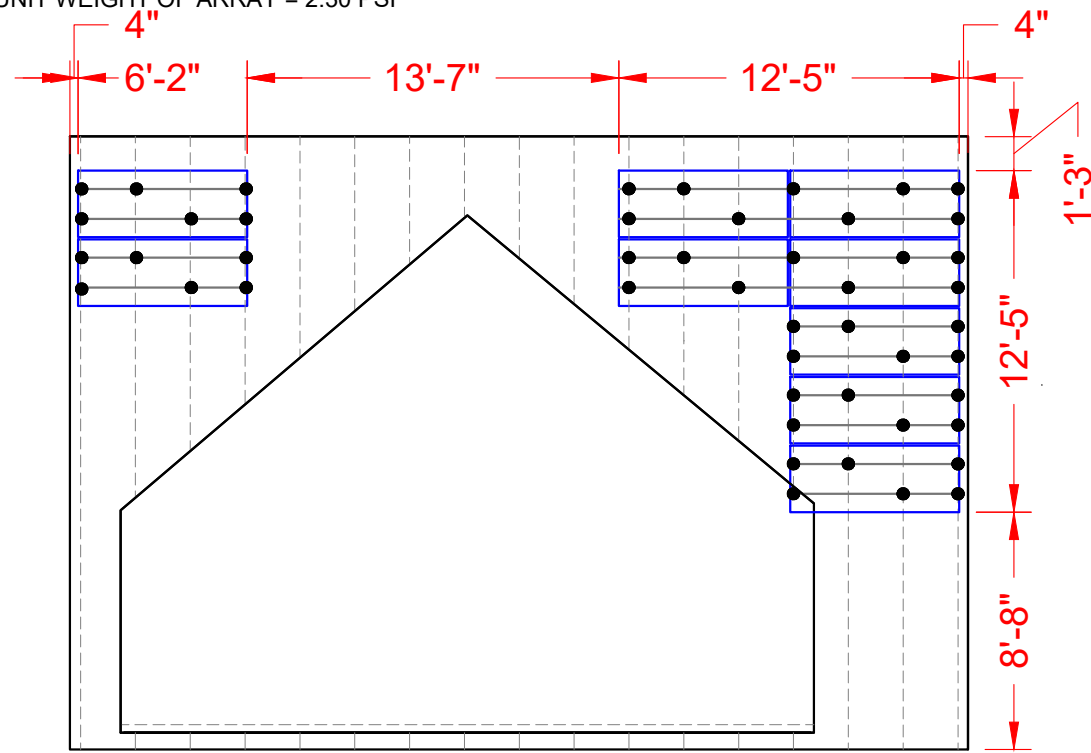
**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME	<b>ROOF PLAN WITH MODULES</b>
SHEET SIZE	<b>ANSI B 11" X 17"</b>
SHEET NUMBER	<b>PV-2</b>

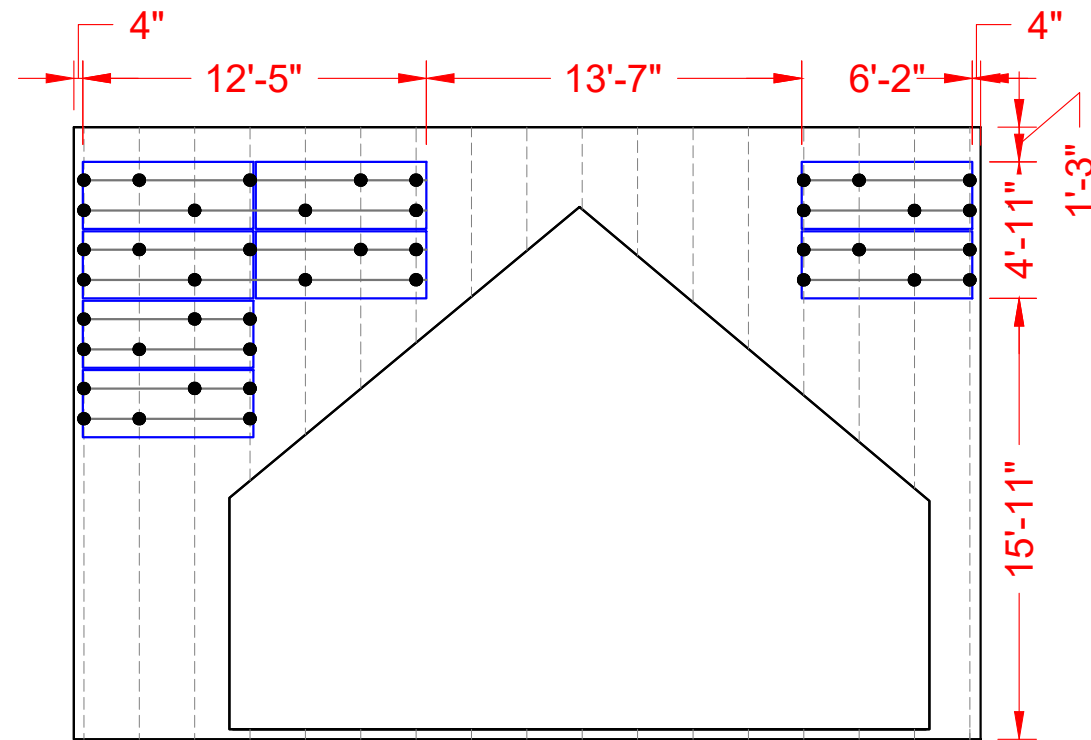
BACK OF HOUSE

**NEW MODULE TYPE, DIMENSIONS & WEIGHT**

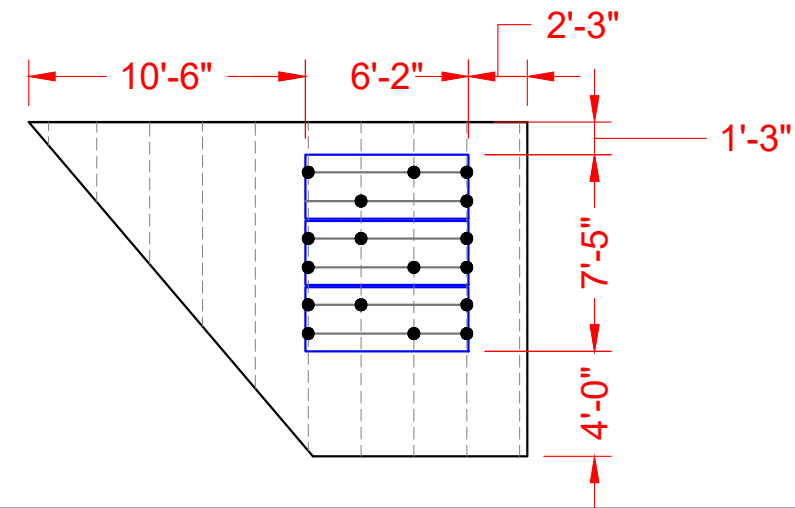
NUMBER OF MODULES = 31 MODULES  
 MODULE TYPE = Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES  
 MODULE WEIGHT = 48.5 LBS / 22.0 KG.  
 MODULE DIMENSIONS = 74.00"x 41.10" = 21.12 SF  
 UNIT WEIGHT OF ARRAY = 2.30 PSF



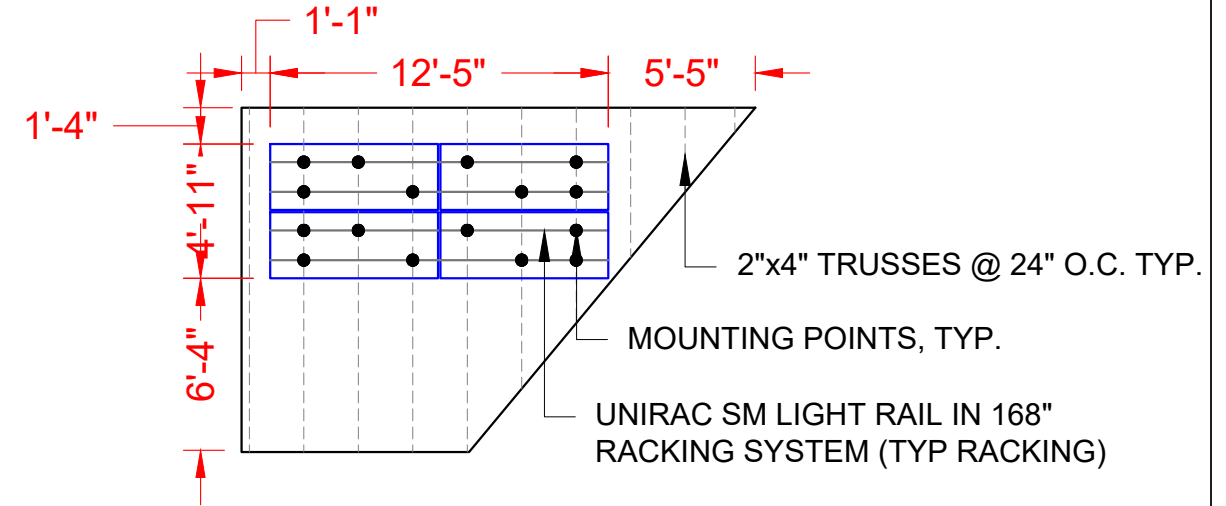
ROOF #1



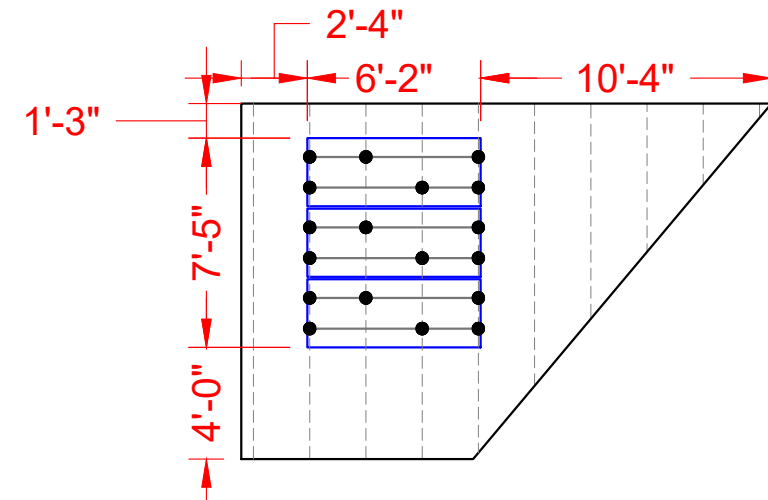
ROOF #4



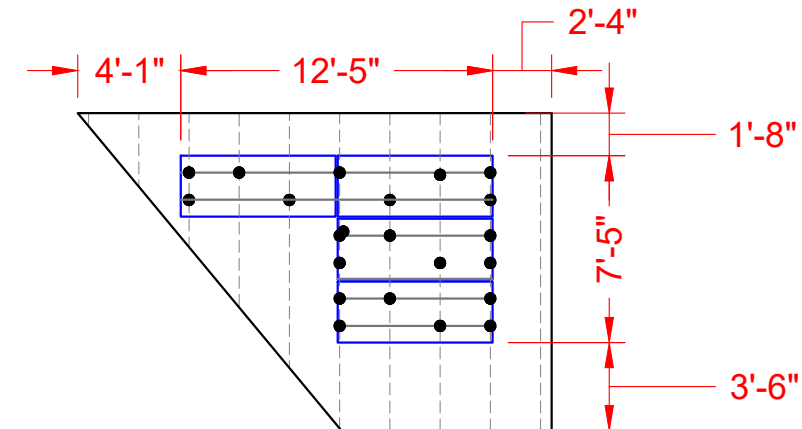
ROOF #2



ROOF #3



ROOF #6



ROOF #5



410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

ATTACHMENT  
 PLAN

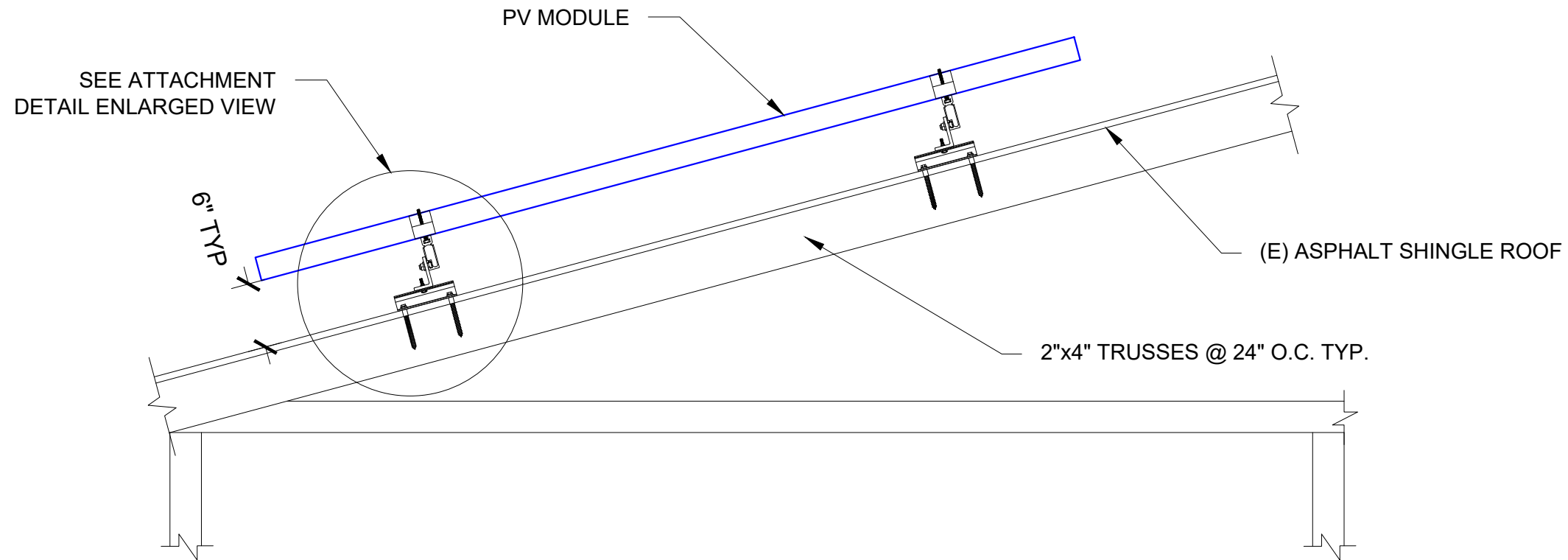
SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-2A

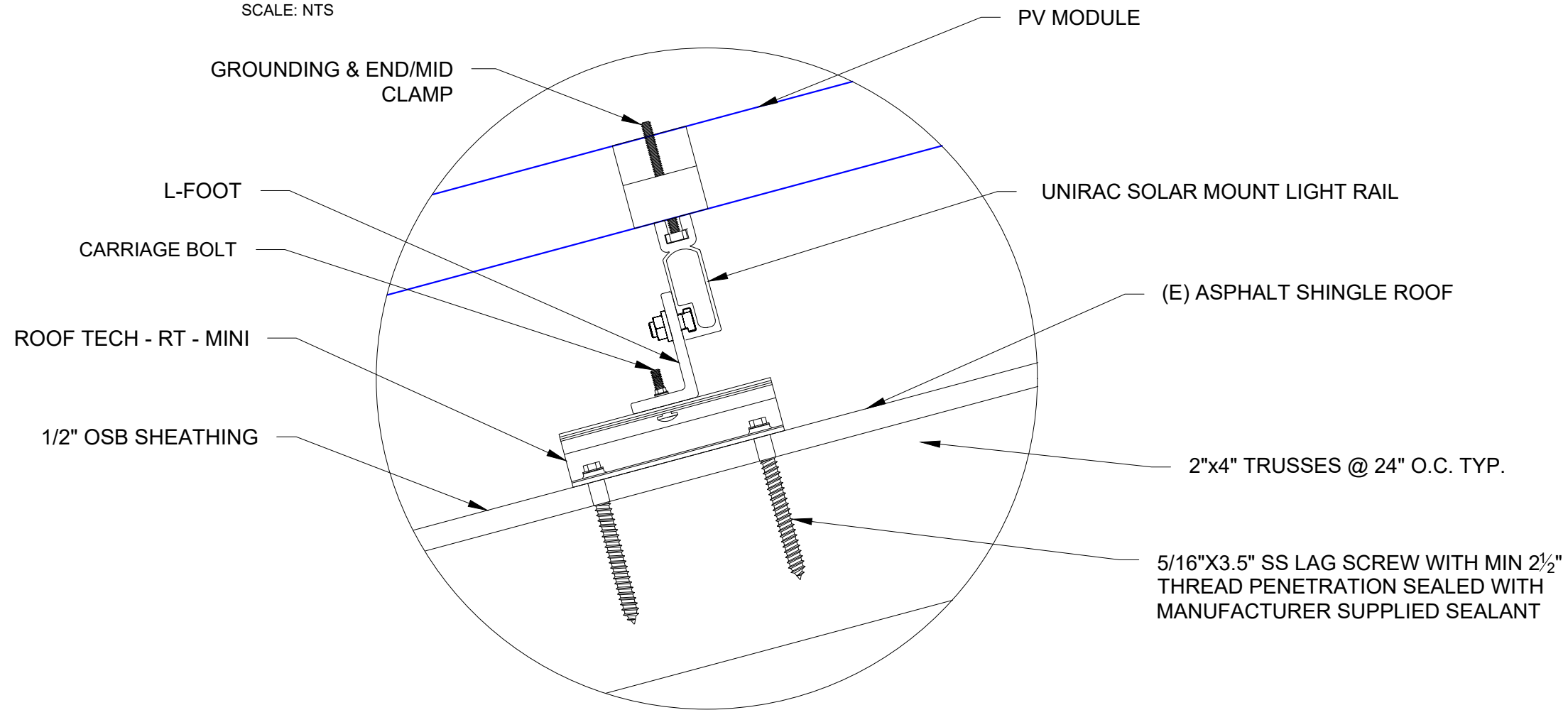




**1 ATTACHMENT DETAIL (SIDE VIEW)**

PV-3

SCALE: NTS



**2 ATTACHMENT DETAIL ENLARGED VIEW**

PV-3

SCALE: NTS



410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

ATTACHMENT  
 DETAIL

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-3

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

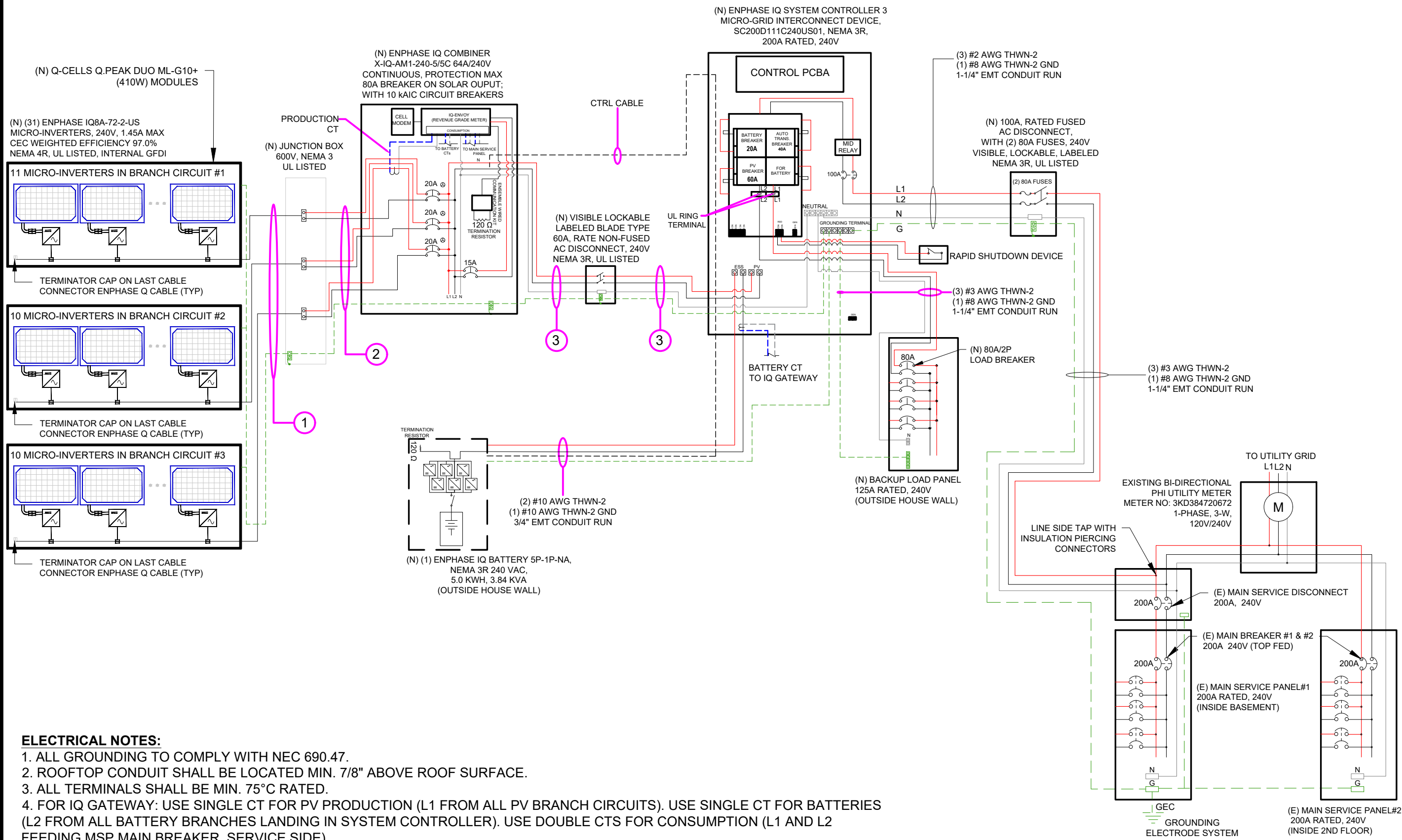
**ELECTRICAL LINE  
 DIAGRAM**

SHEET SIZE

**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-4**



**ELECTRICAL NOTES:**

1. ALL GROUNDING TO COMPLY WITH NEC 690.47.
2. ROOFTOP CONDUIT SHALL BE LOCATED MIN. 7/8" ABOVE ROOF SURFACE.
3. ALL TERMINALS SHALL BE MIN. 75°C RATED.
4. FOR IQ GATEWAY: USE SINGLE CT FOR PV PRODUCTION (L1 FROM ALL PV BRANCH CIRCUITS). USE SINGLE CT FOR BATTERIES (L2 FROM ALL BATTERY BRANCHES LANDING IN SYSTEM CONTROLLER). USE DOUBLE CTS FOR CONSUMPTION (L1 AND L2 FEEDING MSP MAIN BREAKER, SERVICE SIDE).
5. IQ COMBINER 5/5C REQUIRES ENPHASE HOLD DOWN KIT X-IQ-NA-HD-125A.
6. WHEN IQ SYSTEM CONTROLLER 3 NOT AT SERVICE ENTRANCE, REMOVE N-G JUMPER WIRE FROM CONTROLLER.
7. SINGLE LARGEST BREAKER, BASELINE LOAD, AND LRA OF LARGEST LOAD IN BACKUP LOAD PANEL CANNOT EXCEED STORAGE (ESS) OUTPUT CAPACITY, PER NEC 710.15.
8. IQ SYSTEM CONTROLLER 3 MAIN INPUT & OUTPUT LUGS RATED FOR #6-300 KCMIL, FOR WIRES SMALLER THAN #6 REMOVE LUG AND USE AN APPROVED UL RING TERMINAL.
9. IQ SYSTEM CONTROLLER 3 COMES WITH FACTORY-INSTALLED HOLD DOWN KIT ARM, ADDITIONAL KIT NOT REQUIRED.

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	Q-CELLS Q.PEAK DUO ML-G10+ (410W)
VMP	37.64V
IMP	10.89A
VOC	45.37A
ISC	11.20A
MODULE DIMENSION	74.00"L x 41.10"W x 1.26"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER	ENPHASE IQ8A-72-2-US
MAX. DC VOLT RATING	60 VOLTS
MAX. POWER AT 40 C	349 WATTS
NOMINAL AC VOLTAGE	240 VOLTS
MAX. AC CURRENT	1.45 AMPS
MAX. OCPD RATING	20 AMPS
MAX. PANELS/CIRCUIT	13
SHORT CIRCUIT CURRENT	15 AMPS

(31) Q-CELLS Q.PEAK DUO ML-G10+ (410W) MODULES  
 (31) ENPHASE IQ8A-72-2-US MICRO-INVERTERS, 240V  
 (01) CIRCUITS OF 11 MODULES WITH MICRO INVERTERS  
 (02) CIRCUITS OF 10 MODULES WITH MICRO INVERTERS  
 CONNECTED IN PARALLEL PER CIRCUIT  
 SYSTEM SIZE: 12.710 kW DC STC  
 SYSTEM SIZE: 10.819 kW AC

Rooftop conductor ampacities designed in compliance with art. 690.8, Tables 310.15(B)(2)(a), 310.15(B)(3)(a), 310.15(B)(3)(c), 310.15(B)(16), Chapter 9 Table 4, 5, & 9. Location specific temperature obtained from ASHRAE 2017 data tables

RECORD LOW TEMP	-15°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	56°
CONDUCTOR TEMPERATURE RATE	90°

THIS PANEL IS FED BY MULTIPLE SOURCES (UTILITY, BATTERY AND SOLAR )	
AC OUTPUT CURRENT	60.95A
NOMINAL AC VOLTAGE	240V

ENPHASE IQBATTERY 5P-1P-NA	
MANUFACTURER	IQBATTERY 5P-1P-NA
NOMINAL VOLTAGE /RANGE	240 /211-264 VAC
PEAK OUTPUT POWER	6.14 KVA (10 SECONDS)
PEAK OUTPUT POWER	7.68 KVA (3 SECONDS)
RATED CONTINUOUS OUTPUT POWER	3.84 KVA
RATED OUTPUT CURRENT	16 AMPS
PEAK OUTPUT CURRENT	25.6A (10 SECONDS)
PEAK OUTPUT CURRENT	32A (3 SECONDS)
NOMINAL DC VOLTAGE	76.8 V
MAX. DC VOLTAGE	86.4 V

ENPHASE IQ SYSTEM CONTROLLER 3	
MANUFACTURER	SC200D111C240US01
NOMINAL VOLTAGE / RANGE	240 VAC / 100 - 310 VAC
MAX. CONT. CURRENT	160 AMPS
MAX. OUTPUT OCPD	200 AMPS
MAX. OCPD FOR STORAGE BRANCH	80 AMPS
MAX. OCPD FOR PV COMBINER BRANCH	80 AMPS

**NOTE:**  
 1.CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.

ENPHASE Q CABLE TO BE ATTACHED TO RAIL MIN. 3-1/2" ABOVE ROOF SURFACE

**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 600V AND 90°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 G.E.C.VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- 10) PV EQUIPMENT SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NEC 690.
- 11) EXACT LOCATION OF AUXILIARY GROUNDING TO BE DETERMINED AT TIME OF INSTALL.
- 12) EXISTING WIRES MUST BE REPLACED IF SMALLER THAN LISTED MINIMUM SIZES PER NEC 310.15(B)(16).
- 13) FOR IQ GATEWAY: USE SINGLE CT FOR PV PRODUCTION (L1 FROM ALL PV BRANCH CIRCUITS). USE SINGLE CT FOR BATTERIES (L2 FROM ALL BATTERY BRANCHES LANDING IN SYSTEM CONTROLLER).
- 14) USE DOUBLE CTs FOR CONSUMPTION (L1 AND L2 FEEDING MSP MAIN BREAKER,SERVICE SIDE).
- 15) IQ COMBINER 5/5C REQUIRES ENPHASE HOLD DOWN KIT X-IQ-NA-HD-125A.
- 16) WHEN IQ SYSTEM CONTROLLER 3 NOT AT SERVICE ENTRANCE, REMOVE N-G JUMPER WIRE FROM CONTROLLER.
- 17) SINGLE LARGEST BREAKER, BASELINE LOAD, AND LRA OF LARGEST LOAD IN BACKUP LOAD PANEL CANNOT EXCEED STORAGE (ESS) OUTPUT CAPACITY, PER NEC 710.15.
- 18) IQ SYSTEM CONTROLLER 3 MAIN INPUT & OUTPUT LUGS RATED FOR #6-300 KCMIL, FOR WIRES SMALLER THAN #6 REMOVE LUG AND USE AN APPROVED UL RING TERMINAL.
- 19) IQ SYSTEM CONTROLLER 3 COMES WITH FACTORY-INSTALLED HOLD DOWN KIT ARM, ADDITIONAL KIT NOT REQUIRED.

**SYSTEM CALCULATION**

WIRE TAG #	WIRE FROM --	CONDUIT	WIRE QTY	WIRE GAUGE:	WIRE TYPE ENPHASE Q-CABLE INCLUDES #12 GROUND	TEMP RATING:	WIRE AMP	TEMP DE-RATE:	CONDUIT FILL:	WIRE OCP:	TERMINAL 75°C RATING:	INVERTER QTY:	NOC:	NEC:	STRING AMPS	GRND SIZE	GRND WIRE TYPE
①	ARRAY TO JUNCTION BOX	-	3	#12	Q-CABLE	90°	30A	x 0.96	x 1.00	= 28.80A	25A	11	x 1.45	x 1.25	= 19.93A	#6	BARE CU
②	JUNCTION BOX TO AC COMBINER BOX	3/4" EMT	6	#10	THWN-2	90°	40A	x 0.96	x 0.80	= 30.72A	35A	11	x 1.45	x 1.25	= 19.93A	#8	THWN-2
③	AC COMBINER BOX TO IQ CONTROLLER 3	3/4" EMT	3	#6	THWN-2	75°	65A	x 0.94	x 1.00	= 61.10A	65A	31	x 1.45	x 1.25	= 56.18A	#8	THWN-2



**410 ENERGY SOLUTIONS LLC**  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

**ELECTRICAL  
 CALCULATIONS**

SHEET SIZE

**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-4A**

**! WARNING**  
ELECTRICAL SHOCK HAZARD  
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION: INVERTERS, AC DISCONNECTS, AC COMBINER BOXES, AC JUNCTION BOXES  
CODE REF: NEC 2017 - 690.13(B)

**! WARNING !**  
ELECTRICAL SHOCK HAZARD  
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION: AC DISCONNECTS, AC COMBINER BOXES, SERVICE PANELS  
CODE REF: NEC 2017 - 690.5(C)

**PV SYSTEM DISCONNECT**  
MAXIMUM AC OPERATING CURRENT: 60.95 AMPS  
NOMINAL OPERATING AC VOLTAGE: 240.0 VAC

LABEL LOCATION: INTERCONNECTION Placard (MSP BACKFEED BREAKER OR TAP BOX IF LINE SIDE TAP), AC DISCONNECTS  
CODE REF: NEC 2017 - 690.54

**PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH**

LABEL LOCATION: AC DISCONNECTS FOR UTILITY ACCESS  
CODE REF: UTILITY

**! WARNING**  
PHOTOVOLTAIC SYSTEM COMBINER PANEL  
DO NOT ADD LOADS

LABEL LOCATION: AC COMBINER BOX  
CODE REF: NEC 2017 - 690.12(B)

**! CAUTION**  
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

LABEL LOCATION: INTERCONNECTION Placard (MSP BACKFEED BREAKER OR TAP BOX IF LINE SIDE TAP)  
CODE REF: NEC 2017 - 705.2(4)

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

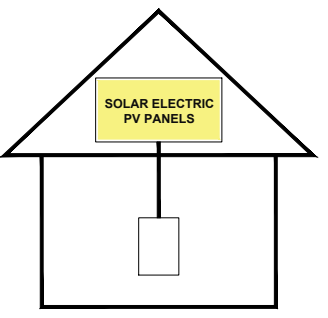
LABEL LOCATION: MSP  
CODE REF: NEC 2017 - 690.56(C)(3)

**! CAUTION**  
DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC

LABEL LOCATION: MSP, UTILITY METER (IF SEPARATE)  
CODE REF: UTILITY

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY.



LABEL LOCATION: INTERCONNECTION POINT (MSP OR AC DISCONNECT IF LINE SIDE TAP)  
CODE REF: NEC 2017 - 690.12, NEC 2017 - 690.56(C)

**WARNING**  
A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE MAIN SERVICE DISCONNECT. FOLLOW THE PROPER LOCK-OUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE

LABEL LOCATION: MSP JUNCTION BOX (FOR LINE SIDE TAP)  
CODE REF: UTILITY

**LABELING NOTES:**

1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
2. LABELING REQUIREMENTS BASED ON THE NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21] THEY SHALL BE PERMANENTLY ATTACHED, WEATHER/SUNLIGHT RESISTANT, AND SHALL NOT BE HAND WRITTEN NEC 11.21(B)
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]



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PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

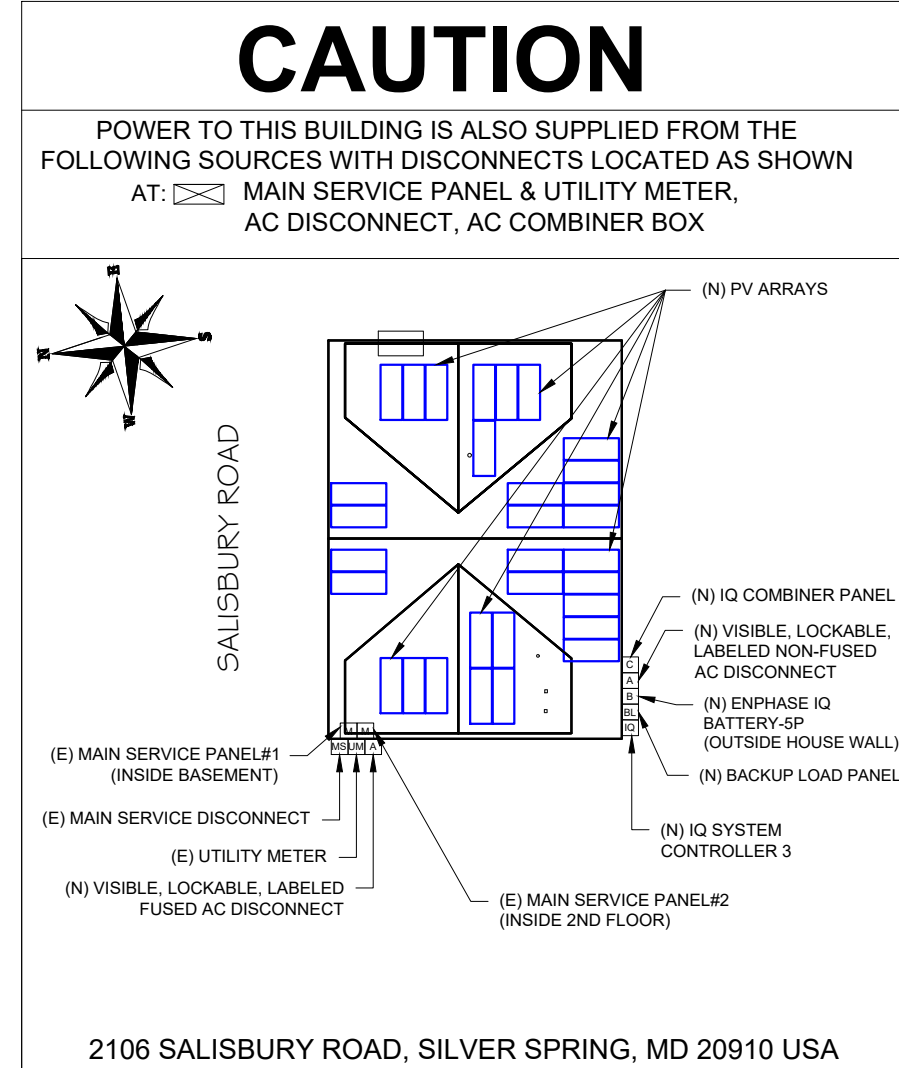
**CUSTOMER INFORMATION**

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME  
**WARNING LABELS & PLACARDS**

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

SHEET NUMBER  
**PV-5**



**ELECTRICAL NOTES:**

1. EACH MODULE TO BE GROUNDED USING THE SUPPLIED CONNECTION POINT PER MANUFACTURER'S REQUIREMENTS. ALL SOLAR MODULES, EQUIPMENT, AND METALLIC COMPONENTS ARE TO BE BONDED. IF THE EXISTING GROUNDING ELECTRODE SYSTEM CAN NOT BE VERIFIED OR IS ONLY METALLIC WATER PIPING.
2. ALL PLAQUES AND SIGNAGE REQUIRED BY THE LATEST EDITION OF NATIONAL ELECTRICAL CODE. LABEL SHALL BE METALLIC OR PLASTIC, ENGRAVED OR MACHINE PRINTED IN ACCORDANCE WITH NEC REQUIREMENTS. PLAQUE SHALL BE UV RESISTANT IF EXPOSED TO SUNLIGHT.
3. EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.138(A).
4. CONFIRM LINE SIDE VOLTAGE AT ELECTRIC UTILITY SERVICE PRIOR TO CONNECTING INVERTER. VERIFY SERVICE VOLTAGE IS WITHIN INVERTER VOLTAGE OPERATIONAL RANGE.
5. OUTDOOR EQUIPMENT SHALL BE NEMA-3R RATED OR BETTER.
6. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
7. ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE, AND FOR ROOF-MOUNTED SYSTEMS, WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF OF THE ROOF SURFACE. NEC 110.2 - 110.4 / 300.4



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PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME

ADDITIONAL NOTES

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-6

# Q.PEAK DUO BLK ML-G10+ SERIES



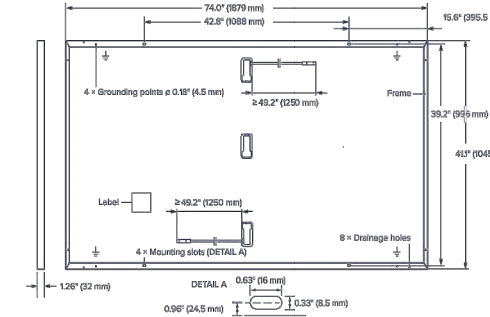
385-410 Wp | 132 Cells  
20.9% Maximum Module Efficiency

MODEL Q.PEAK DUO BLK ML-G10+

## Q.PEAK DUO BLK ML-G10+ SERIES

### Mechanical Specification

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm <sup>2</sup> Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68



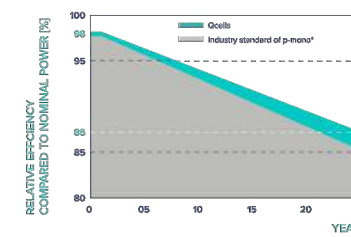
### Electrical Characteristics

POWER CLASS		385	390	395	400	405	410	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC <sup>1</sup> (POWER TOLERANCE +5 W/-0 W)								
Minimum	Power at MPP <sup>1</sup>	P <sub>MPP</sub> [W]	385	390	395	400	405	410
	Short Circuit Current <sup>1</sup>	I <sub>SC</sub> [A]	11.04	11.07	11.10	11.14	11.17	11.20
	Open Circuit Voltage <sup>1</sup>	V <sub>OC</sub> [V]	45.19	45.23	45.27	45.30	45.34	45.37
	Current at MPP	I <sub>MPP</sub> [A]	10.59	10.65	10.71	10.77	10.83	10.89
	Voltage at MPP	V <sub>MPP</sub> [V]	36.36	36.62	36.88	37.13	37.39	37.64
	Efficiency <sup>1</sup>	η [%]	≥ 19.6	≥ 19.9	≥ 20.1	≥ 20.4	≥ 20.6	≥ 20.9

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT <sup>2</sup>								
Minimum	Power at MPP	P <sub>MPP</sub> [W]	288.8	292.6	296.3	300.1	303.8	307.6
	Short Circuit Current	I <sub>SC</sub> [A]	8.90	8.92	8.95	8.97	9.00	9.03
	Open Circuit Voltage	V <sub>OC</sub> [V]	42.62	42.65	42.69	42.72	42.76	42.79
	Current at MPP	I <sub>MPP</sub> [A]	8.35	8.41	8.46	8.51	8.57	8.62
Voltage at MPP	V <sub>MPP</sub> [V]	34.59	34.81	35.03	35.25	35.46	35.68	

<sup>1</sup>Measurement tolerances P<sub>MPP</sub> ± 3%; I<sub>SC</sub>; V<sub>OC</sub> ± 5% at STC: 1000 W/m<sup>2</sup>, 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • <sup>2</sup>800 W/m<sup>2</sup>, NMOT, spectrum AM 1.5

### Qcells PERFORMANCE WARRANTY

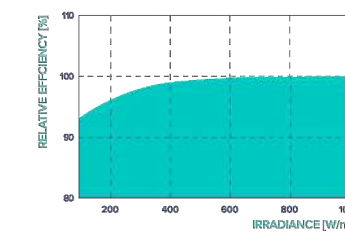


At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organisation of your respective country.

\*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

### PERFORMANCE AT LOW IRRADIANCE



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

### TEMPERATURE COEFFICIENTS

Temperature Coefficient of I <sub>SC</sub>	α [%/K]	+0.04	Temperature Coefficient of V <sub>OC</sub>	β [%/K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ [%/K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3 °C)

### Properties for System Design

Maximum System Voltage	V <sub>sys</sub> [V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push/Pull <sup>3</sup>	[lbs/ft <sup>2</sup> ]	75 (3600 Pa)/55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push/Pull <sup>3</sup>	[lbs/ft <sup>2</sup> ]	113 (5400 Pa)/84 (4000 Pa)		

### Qualifications and Certificates

UL 61730, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells),



6 busbar cell technology

12 busbar cell technology



### Breaking the 20% efficiency barrier

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



### A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty<sup>1</sup>.



### Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology<sup>2</sup> and Hot-Spot Protect.



### Extreme weather rating

High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



### Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



### The most thorough testing programme in the industry

Qcells is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

<sup>1</sup> See data sheet on rear for further information.

<sup>2</sup> APT test conditions according to IEC/TS 62804-1:2015, method A (-1500V, 96 h)



### The ideal solution for:

Rooftop arrays on residential buildings

Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product. Hanwha Q CELLS America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL: +1 949 748 59 96 | EMAIL: hq-inquiry@qcells.com | WEB: www.qcells.com



410 ENERGY SOLUTIONS LLC  
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A/B, LINTHICUM HEIGHTS,  
MD 21090, USA  
PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

PETER CAIRNS  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-7

Specifications subject to technical changes © Qcells Q.PEAK DUO BLK ML-G10+ series\_385-410\_2023-01\_Rev.03\_VA



DATA SHEET



## IQ8M and IQ8A 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 superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



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



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



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



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

\*Only when installed with IQ System Controller 2, meets UL 1741.  
\*\*IQ8M and IQ8A support split-phase, 240V installations only.

### 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) and IEEE 1547:2018 (UL 1741-SB 3<sup>rd</sup> Ed.)

### Note:

IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc.) in the same system.

IQ8MA-MC4-12A-DS-0080-03-EN-US-2022-12-27

## IQ8M and IQ8A Microinverters

INPUT DATA [DC]		IQ8M-72-M-US	IQ8A-72-M-US
Commonly used module pairings <sup>1</sup>	W	260 – 460	295 – 500
Module compatibility		54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half-cell and 72-cell / 144 half-cell	
MPPT voltage range	V	30 – 45	32 – 45
Operating range	V	16 – 58	
Min. / Max. start voltage	V	22 / 58	
Max. input DC voltage	V	60	
Max. continuous input DC current	A	12	
Max. input DC short-circuit current	A	25	
Max. module I <sub>sc</sub>	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA [AC]		IQ8M-72-M-US	IQ8A-72-M-US
Peak output power	VA	330	366
Max. continuous output power	VA	325	349
Nominal (L-L) voltage / range <sup>2</sup>	V	240 / 211 – 264	
Max. continuous output current	A	1.35	1.45
Nominal frequency	Hz	60	
Extended frequency range	Hz	47 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max. units per 20 A (L-L) branch circuit <sup>3</sup>		11	
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	%	97.8	97.7
CEC weighted efficiency	%	97.5	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		Stäubli MC4	
Dimensions (H x W x D)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.1 kg (2.43 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
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, IEEE 1547:2018 (UL 1741-SB 3 <sup>rd</sup> Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN / CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shutdown Equipment and conforms with NEC 2014, NEC 2017, 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) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at <https://link.enphase.com/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.

IQ8MA-MC4-12A-DS-0080-03-EN-US-2022-12-27



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### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

PETER CAIRNS  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME

EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-8



## IQ Combiner 5/5C

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

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



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



**IQ System Controller 3/3G**  
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.



**IQ Battery 5P**  
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.



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



5-year limited warranty



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

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### Smart

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

### Easy to install

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

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- 5-year limited warranty
- 2-year labor reimbursement program coverage included for both the IQ Combiner SKUs<sup>1</sup>
- UL1741 Listed

## IQ Combiner 5/5C

MODEL NUMBER	
IQ Combiner 5 (X-IQ-AM1-240-5)	IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat.
IQ Combiner 5C (X-IQ-AM1-240-5C)	IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%) and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05) <sup>1</sup> . Includes a silver solar shield to deflect heat.
WHAT'S IN THE BOX	
IQ Gateway printed circuit board	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System
Busbar	80 A busbar with support for 1 × IQ Gateway breaker and 4 × 20 A breaker for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%
Consumption CT	Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5%
IQ Battery CT	One battery metering clamp CT, shipped with the box, accurate up to ±2.5%
CTRL board	Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P
Enphase Mobile Connect (only with IQ Combiner 5C)	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan
Accessories kit	Spare control headers for the COMMS-KIT-02 board
ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY)	
CELLMODEM-M1-06-SP-05	4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan
CELLMODEM-M1-06-AT-05	4G-based LTE-M1 cellular modem with a 5-year AT&T data plan
Circuit breakers (off-the-shelf)	Supports Eaton BR2XX, Siemens Q2XX and GE/ABB THQL21XX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with the hold-down kit.
Circuit breakers (provided by Enphase)	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the "Accessories" section)
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 5/5C
XA-ENV2-PCBA-5	IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws)
XA-COMMS2-PCBA-5	Replacement COMMS-KIT-02 printed circuit board (PCB) for IQ Combiner 5/5C
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage and frequency	120/240 VAC, 60 Hz
Busbar rating	125 A
Fault current rating	10 kAIC
Maximum continuous current rating (input from PV/storage)	64 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	80 A of distributed generation/95 A with IQ Gateway breaker included
IQ Gateway breaker	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-CLAMP)	A pair of 200 A clamp-style current transformers is included with the box
IQ Battery metering CT	200 A clamp-style current transformer for IQ Battery metering, included with the box

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

### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

### SHEET NAME

EQUIPMENT SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-9



MECHANICAL DATA		
Dimensions (W × H × D)	37.5 cm × 49.5 cm × 16.8 cm (14.75" × 19.5" × 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°F to 115°F)	
Cooling	Natural convection, plus heat shield	
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction	
Wire sizes	<ul style="list-style-type: none"> <li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li> <li>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors</li> <li>• Main lug combined output: 10 to 2/0 AWG copper conductors</li> <li>• Neutral and ground: 14 to 1/0 copper conductors</li> <li>• Always follow local code requirements for conductor sizing</li> </ul>	
Communication (in-premise connectivity)	Built-in CTRL board for wired communication with IQ Battery 5P and IQ System Controller 3/3G. Integrated power line communication for IQ Series Microinverters	
Altitude	Up to 2,600 meters (8,530 feet)	
COMMUNICATION INTERFACES		
Integrated Wi-Fi	802.11b/g/n (dual band 2.4 GHz/5 GHz), for connecting the Enphase Cloud through the internet	
Wi-Fi range (recommended)	10 m (32.8 feet)	
Bluetooth	BLE4.2, 10 m range to configure Wi-Fi SSID	
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included), for connecting to the Enphase Cloud through the internet	
Cellular/Mobile Connect	CELLMODEM-M1-06-SP-05 or CELLMODEM-M1-06-AT-05 (included with IQ Combiner 5C)	
Digital I/O	Digital input/output for grid operator control	
USB 2.0	Mobile Connect, COMMS-KIT-01 for IQ Battery 3/3T/10/10T, COMMS-KIT-02 for IQ Battery 5P	
Access point (AP) mode	For connection between the IQ Gateway and a mobile device running the Enphase Installer App	
Metering ports	Up to two Consumption CTs, one IQ Battery CT, and one Production CT	
Power line communication	90-110 kHz	
Web API	See <a href="https://developer-v4.enphase.com">https://developer-v4.enphase.com</a>	
Local API	See <a href="#">guide for local API</a>	
COMPLIANCE		
IQ Combiner with IQ Gateway	UL 1741, CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003, NOM-208-SCFI-2016, UL 60601-1/CANCSA 22.2 No. 61010-1, IEEE 1547: 2018 (UL 1741-SB, 3rd Ed.), IEEE 2030.5/CSIP Compliant, Production metering: ANSI C12.20 accuracy class 0.5 (PV production)	
COMPATIBILITY		
PV	Microinverters IQ6, IQ7, and IQ8 Series Microinverters	
COMMS-KIT-01 <sup>2</sup>	IQ System Controller	EP200G101-M240US00
	IQ System Controller 2	EP200G101-M240US01
	IQ Battery	ENCHARGE-3-1P-NA, ENCHARGE-10-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA
COMMS-KIT-02 <sup>3</sup>	IQ System Controller 3	SC200D111C240US01, SC200G111C240US01
	IQ Battery	IQBATTERY-5P-1P-NA

## Accessories



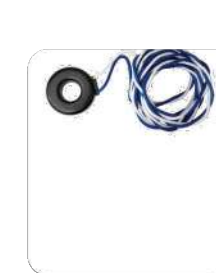
### Mobile Connect

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



### Circuit breakers

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



### CT-200-SOLID

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



### CT-200-CLAMP

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



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### REVISIONS

DESCRIPTION	DATE	REV

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### CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
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SHEET NAME

**EQUIPMENT  
 SPECIFICATION**

SHEET SIZE

**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-10**

2. For information about IQ Combiner 5/5C compatibility with the 2<sup>nd</sup>-generation batteries, refer to the [compatibility matrix](#).  
 3. IQ Combiner 5/5C comes pre-equipped with COMMS-KIT-02.

## Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.

### Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste







### Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

## Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS				
Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable			
Flame test rating	FT4			
Compliance	RoHS, OIL RES I, CE, UV Resistant, combined UL for Canada and United States			
Conductor type	THHN/THWN-2 dry/wet			
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Q CABLE TYPES / ORDERING OPTIONS				
Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200
ENPHASE Q CABLE ACCESSORIES				
Name	Model Number	Description		
Raw Q Cable	Q-12-RAW-300	300 meters of 12 AWG cable with no connectors		
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector		
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector		
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling		
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount		
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling		
Terminator	Q-TERM-10	Terminator cap for unused cable ends		
Enphase EN4 to MC4 adaptor <sup>1</sup>	ECA-EN4-S22	Connect PV module using MC4 connectors to IQ micros with EN4 (TE PV4-S SOLARLOK). 150mm/5.9" to MC4.		
Enphase EN4 non-terminated adaptor <sup>1</sup>	ECA-EN4-FW	For field wiring of UL certified DC connectors. EN4 (TE PV4-S SOLARLOK) to non-terminated cable. 150mm/5.9"		
Enphase EN4 to MC4 adaptor (long) <sup>1</sup>	ECA-EN4-S22-L	Longer adapter cable for EN4 (TE PV4-S SOLARLOK) to MC4. Use with split cell modules or PV modules with short DC cable. 600mm/23.6"		
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)		
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)		

1. Qualified per UL subject 9703.

	<b>TERMINATOR</b> Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)		<b>SEALING CAPS</b> Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)
	<b>DISCONNECT TOOL</b> Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)		<b>CABLE CLIP</b> Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

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

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 2020-06-26



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 809 BARKWOOD CT SUITES  
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 LICENSE NO: MHIC #145937

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### CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

**EQUIPMENT  
 SPECIFICATION**

SHEET SIZE

**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-11**



PRELIMINARY DATA SHEET



# IQ System Controller 3/3G

The Enphase IQ System Controller 3/3G connects the home to grid power, the IQ Battery system, and solar PV. It provides microgrid interconnect 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.



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



**IQ Battery 5**  
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT microinverters



**IQ Combiner 5/5C**  
Consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications



**IQ Load Controller**  
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life



10-year limited warranty

### Easy to Install

- Connects to service entrance<sup>1</sup> or main load center
- Includes neutral-forming transformer
- Mounts on single stud with centered brackets
- Provides conduit entry from bottom, left, or right
- Includes color coded wires for ease of wiring Enphase Energy System Shutdown Switch

### Flexible

- Can be used for Sunlight Backup, Home Essentials Backup, or Full Energy Independence
- IQ System Controller 3 integrates with IQ Battery
- IQ System Controller 3G integrates with select AC standby generators. See [Generator Integration Tech Brief](#) for list of generators
- Provides seamless transition to backup

### Safe and Reliable

- Enphase Energy System Shutdown Switch can be used to disconnect PV, battery, and generator systems
- It acts as a rapid shutdown initiator of grid forming IQ8 PV Microinverters for safety of maintenance technicians/first responders
- IQ System Controller 3 has a 10-year limited warranty

(1) IQ System Controller 3 is not suitable for use as service equipment in Canada.

# IQ System Controller 3

PRELIMINARY

MODEL NUMBER	
SC200G111C240US01	IQ System Controller 3 with neutral-forming transformer (NFT) and microgrid interconnect device (MID). Includes Enphase Energy System Shutdown Switch (EP200G-NA-02-RSD) with red, black, orange and purple 12 AWG wire. Streamlines grid-independent capabilities of PV and storage installations. Wired control cable for communication within EES. Supports additional DER integration.
SC200G111G240US01	IQ System Controller 3 with neutral-forming transformer (NFT) and microgrid interconnect device (MID). Includes Enphase Energy System Shutdown Switch (EP200G-NA-02-RSD) with red, black, orange and purple 12 AWG wires. Streamlines grid-independent capabilities of PV and storage installations. Wired control cable for communication within EES. Supports generator integration.
ACCESSORIES AND REPLACEMENT PARTS	
EP200G-NA-HD-200A	Eaton type BR circuit breaker hold-down screw kit, <b>BRHDK125</b>
CT-200-SPLIT	200A 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-B: Circuit breaker, 2 pole, 30A, 10kAIC, BR230B
• BRK-150A-2P-240V: Main breaker, 2 pole, 150A, 25kAIC, CSR2150N	• BRK-40A-2P-240V-B: 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 3 installation handle kit (order separately)
EP200G-LITKIT	IQ System Controller 3 literature kit, including labels, CTRL headers, screws, filler plates, and QIG
BRK-20A40A-4P-240V	Quad breaker, 20A/40A, 10kAIC, Eaton BQC220240
CTRL-SC3-NA-01	Control communication wire, 500 ft. spool
EP200G-NA-02-RSD	2 pole Enphase Energy System Shutdown Switch
ELECTRICAL SPECIFICATIONS	
Nominal voltage/range (L-L)	240 VAC±20%
Voltage measurement accuracy	±1% V nominal (±1.2V L-N and ±2.4V L-L)
Auxiliary (dry)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	±0.1Hz
Maximum continuous current rating	160A
Maximum input overcurrent protection device <sup>4</sup>	200A
Maximum output overcurrent protection device <sup>4</sup>	200A
Maximum overcurrent protection device rating for generator circuit	80A
Maximum overcurrent protection device rating for storage circuit	80A
Maximum overcurrent protection device rating for PV combiner unit	80A
Neutral-forming transformer (NFT)	<ul style="list-style-type: none"> <li>• Maximum continuous unbalance current: 30A @ 120V</li> <li>• Peak rated power: 8,800VA for 30 seconds</li> <li>• Peak unbalanced current: 80A @ 120V for 30 seconds</li> </ul>
• Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral	
• Continuous rated power: 3,600 VA	
MECHANICAL DATA	
Dimensions (WxHxD)	50 cm x 91.6 cm x 24.6 cm (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
Maximum Altitude	2,500 meters (8,200 feet)

(2) Compatible with BRHDK125 hold-down kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.  
 (3) The IQ System Controller 3 is rated at 22kAIC.  
 (4) CSR breakers are not included in EP200G-SC2-RSD-BRK-KIT. Installer must provide correctly rated breakers.

IQSC-3-DS-0091-01-EN-US-2023-01-09

IQSC-3-DS-0091-01-EN-US-2023-01-09



410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
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### REVISIONS

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### CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

### SHEET NAME

**EQUIPMENT SPECIFICATION**

### SHEET SIZE

**ANSI B  
 11" X 17"**

### SHEET NUMBER

**PV-12**

PRELIMINARY

WIRE SIZES		
Connections (All lugs are rated to 90°C)	Main lugs and backup load lugs CSR breaker bottom wiring lugs AC combiner lugs, IQ Battery lugs, and generator lugs Neutral (large lugs)	Cu/Al: 6 AWG - 300 KCMIL Cu/Al: 2 AWG - 300 KCMIL 14 AWG - 2 AWG  Cu/Al: 6 AWG - 300 KCMIL
Neutral and ground bars	Large holes (5/16-24 UNF) Small holes (10-32 UNF)	14 AWG - 1/0 AWG 14 AWG - 6 AWG
COMPLIANCE		
Compliance (under progress)	UL 1741, UL 1741 SA, IEEE 1547:2018 (UL 1741-SB, 3rd Ed.), UL 1741 PCS CRD, UL1998, UL 869A <sup>5</sup> , UL 675, UL 508 <sup>5</sup> , UL 50E <sup>5</sup> CSA 22.2 No. 107.1, 47 CFR Part 15 Class B, ICES 003, ICC ES AC156. IQ System Controller 3 is approved for use as service equipment in the United States	
WARRANTY		
Limited warranty (Restrictions apply)	Up to 10 years	



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SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-13**

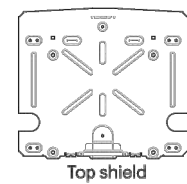
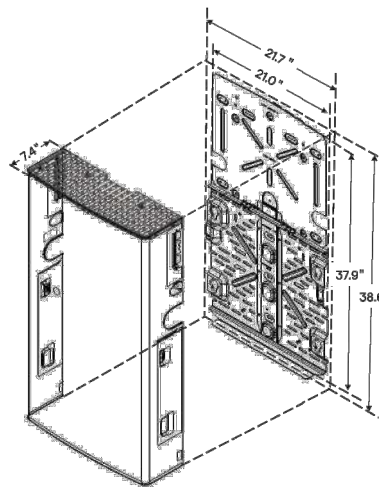
(5) Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.



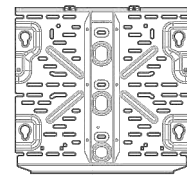
## IQ Battery 5P

The IQ Battery 5P all-in-one AC-coupled system is powerful, reliable, simple, and safe. It has a total usable energy capacity of 5.0 kWh and includes six embedded grid-forming microinverters with a 3.84 kVA continuous power rating. It provides backup capability, and installers can quickly design the right system size to meet the customer needs.

### Dimensions



Top shield



Bottom mounting bracket



15-year limited warranty



LISTED



UL 9540A Certified

### Powerful

- Provides 3.84 kVA continuous and 7.68 kVA peak power
- Doubles the available power per kWh of prior generations of IQ Battery
- Includes six embedded IQ8D-BAT Microinverters

### Reliable

- 15-year limited warranty
- Cools passively with no moving parts or fans
- Uses wired communication for fast and consistent connection
- Updates software and firmware remotely

### Simple

- Fully integrated AC battery system
- Installs and commissions easily
- Supports Backup, Self-Consumption, and time-of-use (TOU) modes
- Offers homeowners remote monitoring and control from the Enphase App
- Field replaceable components

### Safe

- Evaluated to UL 9540A for large scale fire testing and reduced separation distance as required in 2021 IRC R328.3.1, 2021 IFC 1207.1.5, and 2023 NFPA 855 15.3.1 and 9.1.5.<sup>1</sup>
- Uses lithium iron phosphate (LFP) chemistry for maximum safety and longevity

<sup>1</sup>Follow all installation instructions when installing Enphase ESS.

## IQ Battery 5P

MODEL NUMBER	
IQBATTERY-5P-1P-NA	The IQ Battery 5P system with integrated IQ Microinverters and battery management system (BMS) with battery controller
WHAT'S IN THE BOX	
IQ Battery 5P unit	IQ Battery 5P unit (B05-T02-US00-1-3)
ID cover and conduit cover	IQ Battery 5P cover with two conduit covers for the left and right sides of the unit
Bottom mounting bracket and top shield	Bottom mounting bracket for mounting the battery on the wall. One top shield is required for UL9540A
M5 seismic screws	Two M5 seismic screws for securing the battery unit on the bottom mounting bracket
M4 grounding screws	Two M4 grounding screws for securing the top shield on the bottom mounting bracket
M5 ID cover grounding screws	Two M5 ID cover grounding screws for the EMI/EMC requirement
Cable ties	Six cable ties for securing field cables to the unit
Control (CTRL) connector	Spare CTRL connector without resistor for CTRL wiring
Control (CTRL) connector with resistor	Spare CTRL connector with resistor for CTRL wiring
Quick Install Guide (QIG)	QIG for IQ Battery unit installation instructions
OPTIONAL ACCESSORIES AND REPLACEMENT PARTS	
IQ8D-BAT-RMA	IQ8D-BAT Microinverter for field replacement
B05-T02-US00-1-3-RMA	IQ Battery 5P Battery unit for field replacement
B05-CX-0550-O	IQ Battery 5P cover for field replacement
B05-PI-0550-O	IQ Battery 5P pedestal mount
B05-CP-096-O	IQ Battery 5P conduit plates for field replacement. Includes one left-side and one right-side conduit plate
B05-WB-0543-O	IQ Battery 5P wall bracket for field replacement. Includes one bottom mounting bracket and one top shield
IQBATTERY-HNDL-5	IQ Battery 5P lifting handles. Includes one left-side and one right-side lifting handle
B05-ACFB-080-O	IQ Battery 5P AC filter board for field replacement
B05-BMSNA-0490-O	IQ Battery 5P BMS board for field replacement
B05-CANB-063-O	IQ Battery 5P control communication board for field replacement
B05-NICS-0524-O, B05-NUCS-0524-O	IQ Battery 5P control switch is preinstalled on the wiring cover for field replacement
OUTPUT (AC)	
	@240 VAC <sup>2</sup>
Rated (continuous) output power	3.84 kVA
Peak output power	7.68 kVA (3 seconds), 6.14 kVA (10 seconds)
Nominal voltage/range	240/211-264 VAC
Nominal frequency/range	60/57-63 Hz
Rated output current (@240 VAC)	16 A
Peak output current (@240 VAC)	32 A (3 seconds), 25.6 A (10 seconds)
Load start capability	Up to 48 A LRA <sup>3</sup>
Power factor (adjustable)	0.85 leading...0.85 lagging
Maximum units per 20 A branch circuit	One unit (single-phase)
Maximum conductor size supported	3 AWG
Overcurrent protection device (OCPD) for 3 AWG cable	80 A
Interconnection	Single-phase
AC round-trip efficiency <sup>4</sup>	90%

<sup>2</sup>Supported in both grid-connected and backup/off-grid operation

<sup>3</sup>Load start capability may vary

<sup>4</sup>AC to the battery to AC at 50% power rating

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SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-14

# IQ Battery 5P

BATTERY	
Total capacity	5.0 kWh
Usable capacity	5.0 kWh
DC round-trip efficiency	96%
Nominal DC voltage	76.8 V
Maximum DC voltage	86.4 V
Ambient operating temperature range (charging)	-20°C to 50°C (-4°F to 122°F) non-condensing
Ambient operating temperature range (discharging)	-20°C to 55°C (-4°F to 131°F) non-condensing
Optimum operating temperature range	0°C to 30°C (32°F to 86°F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (HxWxD)	980 mm x 550 mm x 188 mm (38.6 in x 21.7 in x 7.4 in)
Lifting weight	66.3 kg (146.1 lbs)
Total installed weight	78.9 kg (174 lbs)
Enclosure	Outdoor-NEMA 3R
IQ8D-BAT Microinverter enclosure	NEMA type 6
Cooling	Natural convection
Altitude	Up to 2,500 meters (8,202 feet)
Mounting	Wall-mount or pedestal-mount (sold separately)
FEATURES AND COMPLIANCE	
Compatibility	Compatible with IQ and M Series Microinverters, IQ System Controller 3/3G, IQ Combiner 5/5C, and IQ Gateway for grid-tied and backup operation
Communication	Wired control communication
Services	Backup, Self-Consumption, TOU, and NEM integrity
Monitoring	Enphase Installer Platform and Enphase App monitoring options; API integration
Compliance	CA Rule 21 (UL 1741-SA), IEEE 1547:2018 (UL 1741-SB, 3rd Ed.) CAN/CSA C22.2 No. 107.1-16 UL 9540, UL 9540A, UN 38.3, UL 1998, UL 991, NEMA Type 3R, AC156 EMC: 47 CFR, Part 15, Class B, ICES 003 Cell module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2
LIMITED WARRANTY	
Limited warranty	>60% capacity, up to 15 years or 6,000 cycles <sup>5</sup>

<sup>5</sup>Whichever occurs first. Restrictions apply

## Revision history

REVISION	DATE	DESCRIPTION
DSH-00010-2.0	July 2023	• Added battery isometric view on the first page. • Editorial updates.
DSH-00010-1.0	May 2023	Initial release.



**410 ENERGY SOLUTIONS LLC**  
809 BARKWOOD CT SUITES  
A/B, LINTHICUM HEIGHTS,  
MD 21090, USA  
PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME  
**EQUIPMENT SPECIFICATION**

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

SHEET NUMBER  
**PV-15**

# RT-MINI

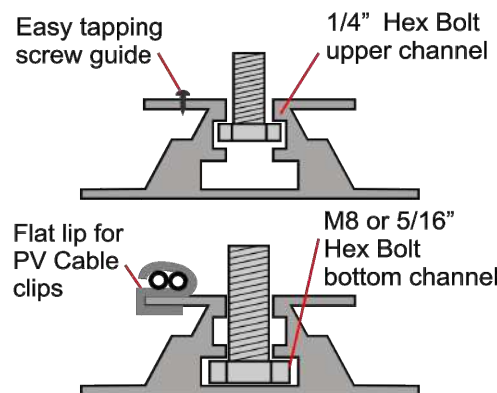
Self-flashing base for asphalt & metal roof-top PV mounting systems

RT-MINI is suitable for mounting any rail system with a conventional L-Foot.



**Dual bolt design:**  
**M8 or 5/16" for L-Foot**  
**& 1/4" for EMC**

Call Now for more detail  
 619-551-7029



# RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

**Engineered to ASTM D 1761** (Standard Test Methods for Mechanical Fasteners in Wood)

## Components

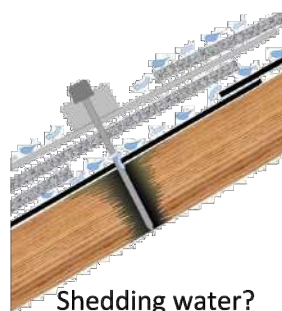
RT2-00-MINIBK  
 PAT : PENDING



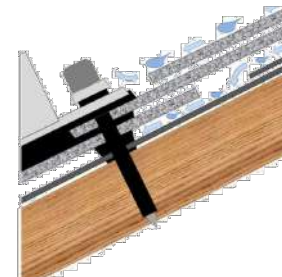
MINI base : 20 ea.  
 Screw : 40 ea.  
 Extra RT-Butyl : 10 ea.

RT-Butyl is Roof Tech's flexible flashing used in 550,000 residential PV systems for the last 20 years. It is the first PV mounting system with Flexible Flashing certified by the ICC.

Metal Flashing Retrofit



Flexible Flashing



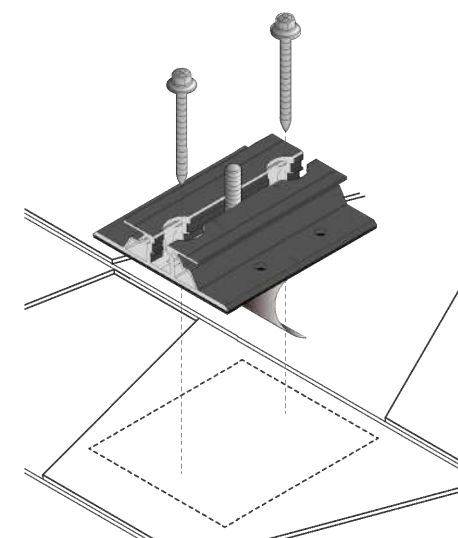
ICC ESR-3575

ASTM2140 testing

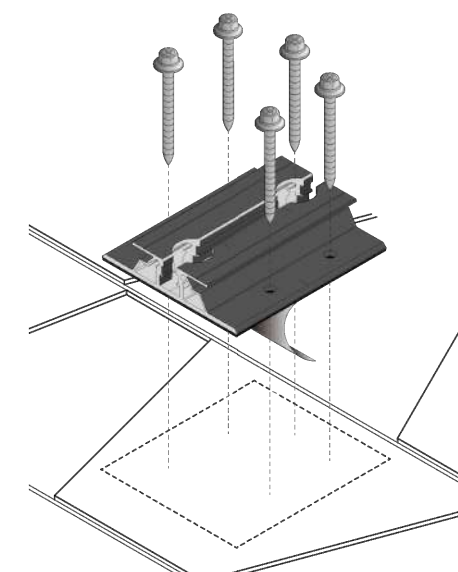
UV testing (7500 hrs.)



## Rafter installation



## Deck installation



P.E. Stamped Letters available at [www.roof-tech.us/support](http://www.roof-tech.us/support)



410 ENERGY SOLUTIONS LLC  
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### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

### SHEET NAME

EQUIPMENT  
 SPECIFICATION

### SHEET SIZE

ANSI B  
 11" X 17"

### SHEET NUMBER

PV-16

**Roof Tech**  
 Smarter PV mounting solutions from top of roof to bottom line®  
[www.roof-tech.us](http://www.roof-tech.us) [info@roof-tech.us](mailto:info@roof-tech.us)

Roof Tech Inc.  
[www.roof-tech.us](http://www.roof-tech.us) [info@roof-tech.us](mailto:info@roof-tech.us)  
 333 H Street, Suite 5000, Chula Vista, CA 91910  
 619.551.7029

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

EQUIPMENT  
 SPECIFICATION

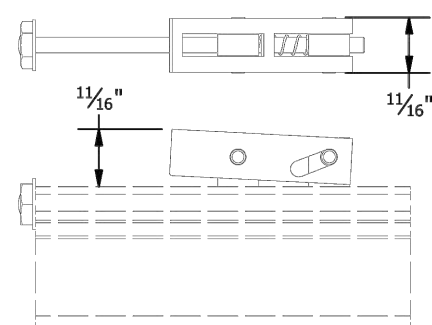
SHEET SIZE

ANSI B  
 11" X 17"

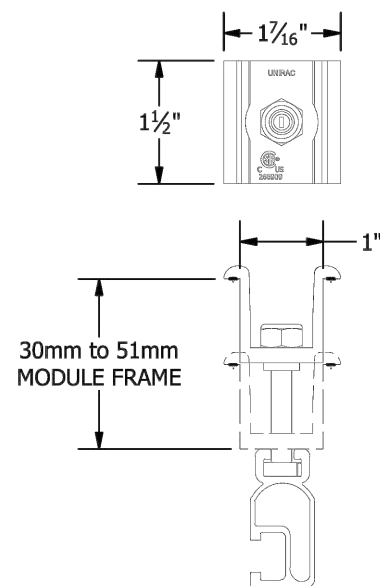
SHEET NUMBER

PV-17

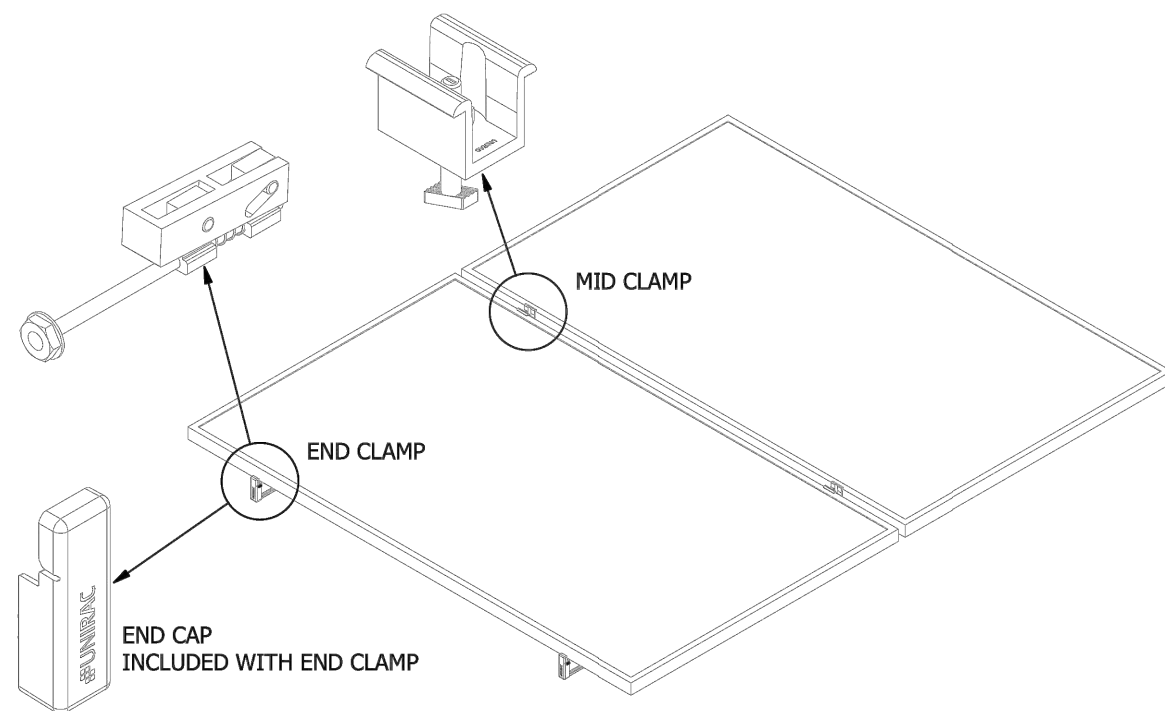
PRO SERIES END CLAMP



PRO SERIES MID CLAMP

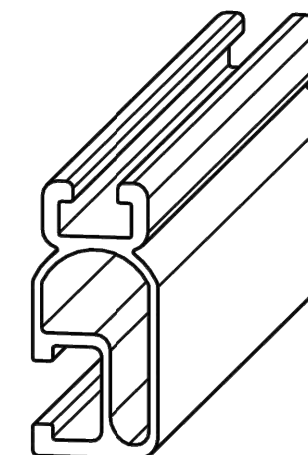
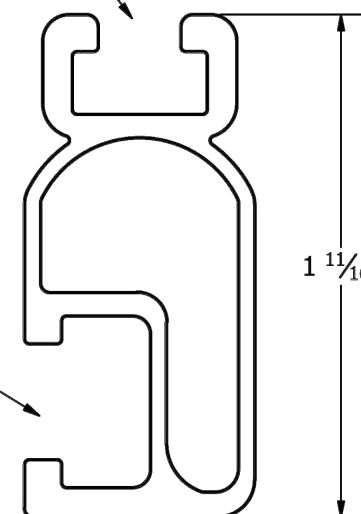


PART # TABLE	
P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK



1/4" BOLT LOCATION

3/8" BOLT LOCATION



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:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

SM-A01

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



### SYSTEM LEVEL FIRE CLASSIFICATION

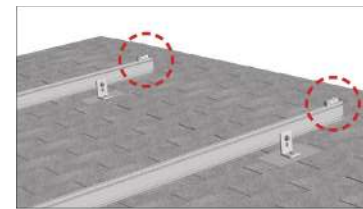
The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved 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

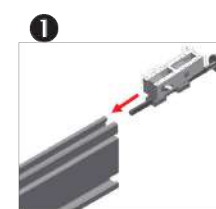
This racking system may be used to ground and/or mount a PV module complying with UL1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

### UL2703 CERTIFICATION MARKING LABEL

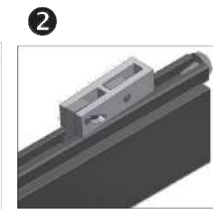
Unirac SOLARMOUNT is listed to UL 2703. Certification marking is embossed on all mid clamps as shown. Labels with additional information will be provided. After the racking system is fully assembled, a single label should be applied to the SOLARMOUNT rail at the edge of the array. Note: The sticker label should be placed such that it is visible, but not outward facing.



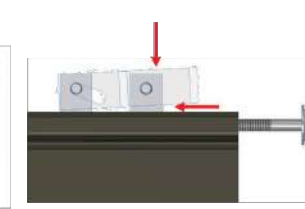
**INSTALL MODULE END CLAMPS:** The End clamp is supplied as an assembly with a 1/2" hex head bolt that is accessible at the ends of rails. The clamp should be installed on the rails prior to installing end modules.



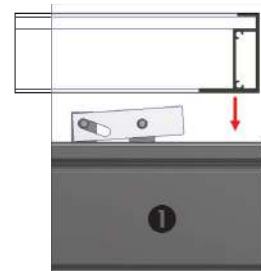
**INSTALL END CLAMPS ON RAIL:** Slide end clamp on to rail by engaging the two t-guide brackets with the top slot of the rails. **Ensure bolt is extended as far as possible so that clamp is positioned at max. distance from end of rail.**



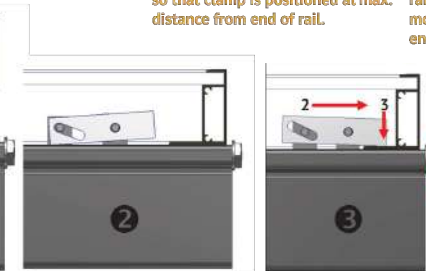
**POSITION END CLAMPS:** Slide end clamp assembly on to rail until bolt head engages with end of rail. End clamps are positioned on rails prior to the first end module and prior to the last end module.



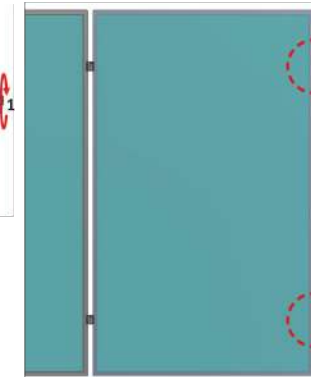
**NOTE:** To assist insertion of clamp into rail slot, Pressure may be applied to top or side of bracket as shown. Do not force clamp into rail by pushing on bolt with excessive force.



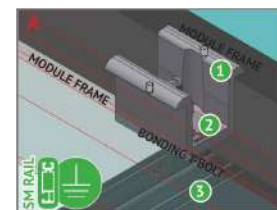
**INSTALL FIRST MODULE:** Install the first end module onto rails with the flange of the module frame positioned between end clamps at an ends of rails.



**ENGAGE CLAMP:** While holding module in position and with flange in full contact with rail, rotate end clamp bolt until clamp engages with flange to provide clamp force. **To ensure bolt is not over-torqued, use low torque setting on drill or if using an impact driver, stop rotation as soon as impact action of driver begins. TORQUE VALUE (See table and notes on PG. 1) End clamp bolt to 3 ft-lbs, No anti-seize**



For best appearance, position module flush with ends of rails. Rails should not extend more than 1/2" beyond module. Module must be fully supported by rails and cannot overhang ends of rails.



### BONDING MIDCLAMP ASSEMBLY

- Aluminum mid clamp with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
- Stainless steel nut bonds aluminum clamp to stainless steel T-bolt
- Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to SM rail



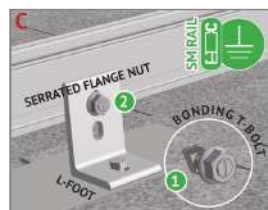
### BONDING MIDCLAMP ASSEMBLY

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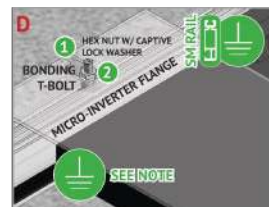
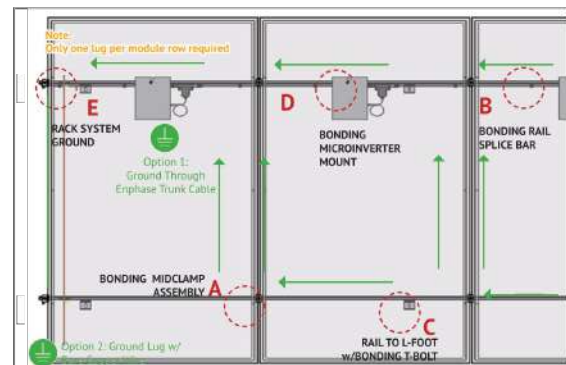
### BONDING RAIL SPLICE BAR

- Stainless steel self drilling screws drill and tap into splice bar and rail, creating 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.



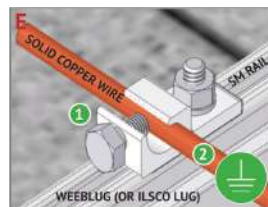
### RAIL TO L-FOOT w/BONDING T-BOLT

- 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 with 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 module and modules may be achieved through the trunk cable of approved microinverter systems. See page 1 for details

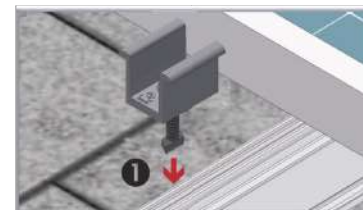


### RACK SYSTEM GROUND

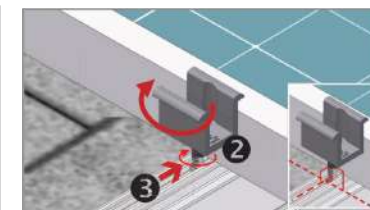
- WEEB washer dimples pierce anodized rail to create bond between rail and lug
- Solid copper wire connected to lug is routed to provide final system ground connection. **NOTE:** Ilcoo lug can also be used when secured to the side of the rail. See page 1-5 for details



**INSTALL MIDCLAMPS:** Midclamp is supplied as an assembly with a T-bolt for module installation. Clamp assemblies may be positioned in rail near point of use prior to module placement.



**INSERT MIDCLAMP ASSEMBLY:** Insert 1/4" T-Bolt into top slot of rail

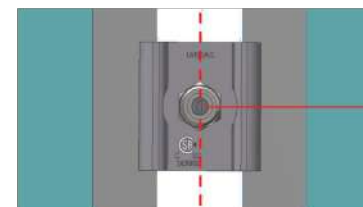


**MIDCLAMP:** Rotate midclamp assembly and slide until clamp is against module frame. Do not tighten nut until next module is in position. Ensure bolt is perpendicular to rail.



**PLACE ADJACENT MODULE AGAINST CLAMPS:** Modules must be tight against clamps with no gaps. Tighten nut to required torque.

**TORQUE VALUE (See table and notes on PG. A) 1.1 ft-lbs. No anti-seize.**



**POSITION INDICATOR - SERRATED T-BOLT:** Verify the T-bolt position indicator is perpendicular to the rail.

410 ENERGY SOLUTIONS LLC  
809 BARKWOOD CT SUITES  
A/B, LINTHICUM HEIGHTS,  
MD 21090, USA  
PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME

EQUIPMENT SPECIFICATION

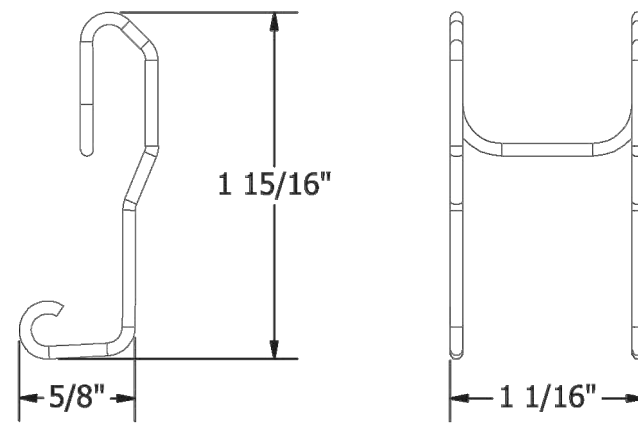
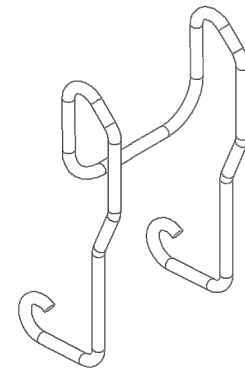
SHEET SIZE

ANSI B  
11" X 17"

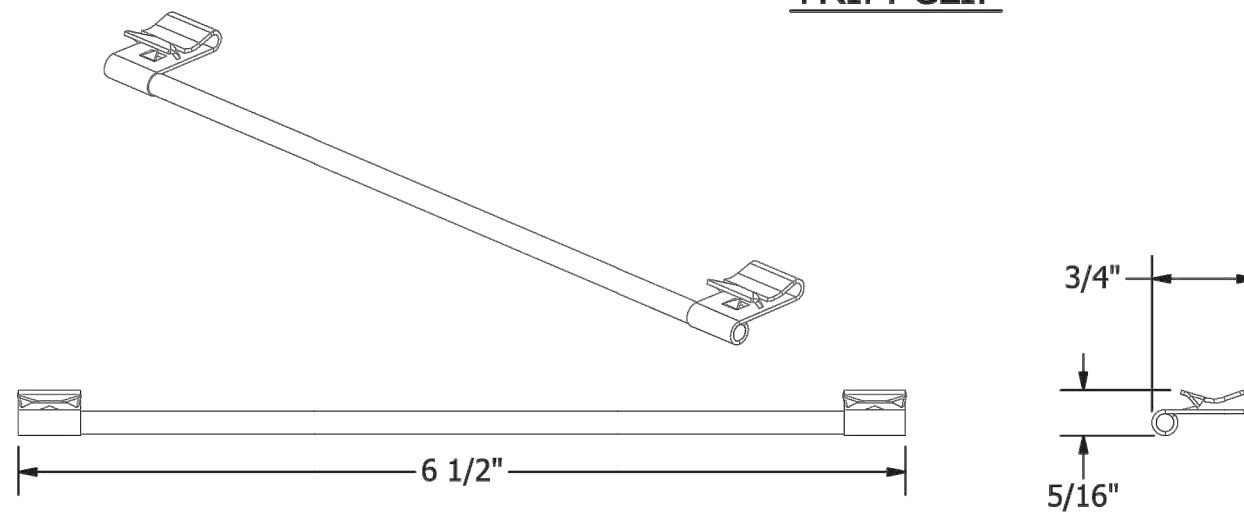
SHEET NUMBER

PV-18

PART # TABLE	
P/N	DESCRIPTION
240905C	SFM TRIM CLIP
008015S	SFM WIRE BONDING CLIP



**TRIM CLIP**



**WIRE BONDING CLIP**

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

PRODUCT LINE:	SFMC
DRAWING TYPE:	PART
DESCRIPTION:	TRIM CLIP / WIRE BONDING CLIP
REVISION DATE:	6/27/2018

DRAWING NOT TO SCALE  
 ALL DIMENSIONS ARE  
 NOMINAL

PRODUCT PROTECTED BY  
 ONE OR MORE US PATENTS  
 LEGAL NOTICE

SFMC-P04  
 SHEET



**410 ENERGY SOLUTIONS LLC**  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

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 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
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SHEET NAME  
**EQUIPMENT SPECIFICATION**

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

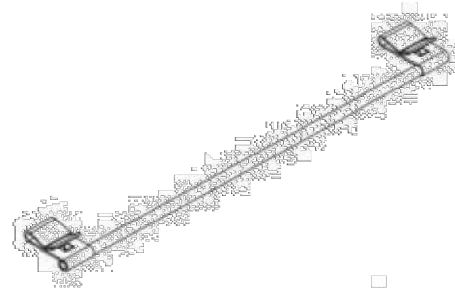
SHEET NUMBER  
**PV-19**



August 23, 2022

Dear customer,

Thank you for your inquiry regarding the Wire Bond Clip (Part Number 008015S, pictured below) and the electrical bonding capabilities.



This letter is to report that when properly installed along the outside edge of an array, connecting two rows of panels, the connection accomplishes the bonding required by UL2703. The part has been tested and meets the requirements stated in UL2703. The part is a UL2703-recognized part, meeting NEC 690.43(A) requirements.

For further information, please contact Unirac, Inc. We're looking forward to seeing you making solar happen with us!

Best regards,

*Keegan Sutanto*

Keegan Sutanto  
Product Manager, Residential  
Unirac, Inc.

Unirac, Inc. • www.unirac.com

1411 Broadway Blvd. NE • Albuquerque, NM • 87102-1545 • Ph: (505) 242-6411 • Fax: (505) 242-6412



**410 ENERGY SOLUTIONS LLC**  
809 BARKWOOD CT SUITES  
A/B, LINTHICUM HEIGHTS,  
MD 21090, USA  
PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME

**EQUIPMENT  
SPECIFICATION**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-20**



# Certificate of Compliance

**Certificate:** 70131735                      **Master Contract:** 266909  
**Project:** 80060420                      **Date Issued:** 2021-02-23  
**Issued To:** **Unirac**  
**1411 Broadway NE**  
**Albuquerque, New Mexico, 87102**  
**United States**

**Attention: Klaus Nicolaedis**

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

**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.



**Certificate:** 70131735  
**Project:** 80060420

**Master Contract:** 266909  
**Date Issued:** 2021-02-23

**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, or 10 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> )	16.1

Test Loads:

Downward Load (lb/ft <sup>2</sup> )	112.8
Upward Load (lb/ft <sup>2</sup> )	50.13
Down-Slope Load (lb/ft <sup>2</sup> )	7.5

**Unirac Large Array**

ULA is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules. ULA aluminum components merge with SM rails and installer-supplied steel pipe. The SM rail system is secured to the horizontal Pipe using the Rail Bracket components. The Rear and Front cap secures the horizontal Pipe to the vertical Pipe. The Front cap is also used to secure the Cross brace. A Slider is attached to the vertical Pipe to secure the Cross brace. The SM rails, caps, slider, rail brackets, and cross braces materials are 6105-T5 aluminum extrusion. Fasteners materials are 304 stainless steel. Horizontal and vertical pipe materials meet the minimum requirements of ASTM A53 for galvanized steel pipe in 2" and 3" diameter.

The mechanical load ratings from the SM test data will be applied to the ULA model.

Fire Testing is not applicable due to being a ground mount system.



**410 ENERGY SOLUTIONS LLC**  
809 BARKWOOD CT SUITES  
A/B, LINTHICUM HEIGHTS,  
MD 21090, USA  
PHONE NO: (410) 803-6780  
LICENSE NO: MHIC #145937

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

**PETER CAIRNS**  
2106 SALISBURY ROAD,  
SILVER SPRING, MD 20910 USA  
APN# 1301399932

SHEET NAME

**EQUIPMENT SPECIFICATION**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-21**



# Certificate of Compliance

Certificate: 80048527 Master Contract: 254141  
 Project: 80133054 Date Issued: 2022-07-05  
 Issued To: Hanwha Q.CELLS GmbH  
 17-21 Sonnenallee  
 Thalheim  
 Bitterfeld-Wolfen, Sachsen-Anhalt, 06766  
 Germany  
 Attention: Wiebke Engler

*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: Tom Yang

### PRODUCTS

CLASS - C531110 - POWER SUPPLIES Photovoltaic Modules and Panels  
 CLASS - C531190 - POWER SUPPLIES Photovoltaic Modules and Panels - Certified to US Standards

Photovoltaic Modules with Maximum System Voltage of 1000 V dc or 1500 V dc, Class II / Application Class A, Fire Resistance Class C, Module Fire Performance Type 1, Type 2 or Type 5 (for US). Module Types:  
 Q.PLUS L-G4.2 XXX (XXX = 305 to 375, in steps of 5W),  
 B.LINE PLUS L-G4.2 XXX (XXX = 305 to 375, in steps of 5W),  
 Q.PLUS BFR-G4.1 XXX (XXX = 270 to 295, in steps of 5W and 282W),  
 B.LINE PLUS BFR-G4.1 XXX (XXX = 270 to 295, in steps of 5W and 282W),  
 Q.PLUS DUO L-G5.2 XXX (XXX = 340 to 385, in steps of 5W),  
 B.LINE PLUS DUO L-G5.2 XXX (XXX = 340 to 385, in steps of 5W),  
 Q.PEAK DUO L-G5 XXX (XXX = 360 to 425, in steps of 5W),



Certificate: 80048527  
 Project: 80133054

Master Contract: 254141  
 Date Issued: 2022-07-05

Module Type	Power Range (Watts)	Rated Maximum Power (Watts)	Open Circuit Voltage (V dc)	Short Circuit Current (A dc)	Rated Voltage (V dc)	Rated Current (A dc)
Q.PEAK DUO BLK ML-G10.a XXX		380	45.16	11.01	36.09	10.53
Q.PEAK DUO BLK ML-G10.a+ XXX		385	45.19	11.04	36.36	10.59
B.LINE PEAK DUO BLK ML-G10 XXX		390	45.23	11.07	36.62	10.65
B.LINE PEAK DUO BLK ML-G10+ XXX		395	45.27	11.10	36.88	10.71
B.LINE PEAK DUO BLK ML-G10.a XXX		400	45.30	11.14	37.13	10.77
B.LINE PEAK DUO BLK ML-G10.a XXX		405	45.34	11.17	37.39	10.83
B.LINE PEAK DUO BLK ML-G10.a+ XXX		410	45.37	11.20	37.64	10.89
B.LINE PEAK DUO BLK ML-G10.a+ XXX		415	45.41	11.23	37.89	10.95
B.LINE PEAK DUO BLK ML-G10.a+ XXX		420	45.45	11.27	38.13	11.01
Q.PEAK DUO BLK ML-G10.a+/TS XXX		425	45.48	11.30	38.37	11.08
Q.PEAK DUO-G10 XXX Q.PEAK DUO-G10+ XXX Q.PEAK DUO-G10.a XXX Q.PEAK DUO-G10.a+ XXX B.LINE PEAK DUO-G10 XXX B.LINE PEAK DUO-G10.a XXX	340	41.06	11.11	32.80	10.37	
	345	41.10	11.14	33.07	10.43	
	350	41.13	11.17	33.34	10.50	
	355	41.16	11.21	33.62	10.56	
	360	41.20	11.24	33.89	10.62	
	365	41.23	11.27	34.16	10.68	
	370	41.26	11.31	34.43	10.75	
	375	41.30	11.34	34.69	10.81	
	380	41.33	11.37	34.95	10.87	
	385	41.36	11.41	35.21	10.94	
Q.PEAK DUO BLK-G10 XXX Q.PEAK DUO BLK-G10+ XXX Q.PEAK DUO BLK-G10.a XXX Q.PEAK DUO BLK-G10.a+ XXX B.LINE PEAK DUO BLK-G10 XXX B.LINE PEAK DUO BLK-G10.a XXX	390	41.40	11.44	35.46	11.00	
	395	41.43	11.47	35.71	11.06	
	400	41.46	11.51	35.96	11.12	
	405	41.50	11.54	36.21	11.19	
	340	41.04	10.90	33.20	10.24	
	345	41.07	10.94	33.48	10.31	
	350	41.11	10.97	33.76	10.37	
	355	41.14	11.00	34.03	10.43	
	360	41.18	11.04	34.31	10.49	
	365	41.21	11.07	34.58	10.56	
Q.PEAK DUO BLK-G10+HL XXX Q.PEAK DUO BLK-G10.a XXX Q.PEAK DUO BLK-G10.a+ XXX B.LINE PEAK DUO BLK-G10 XXX B.LINE PEAK DUO BLK-G10.a XXX	370	41.24	11.10	34.84	10.62	
	375	41.28	11.14	35.10	10.68	
	380	41.31	11.17	35.36	10.75	
	385	41.35	11.20	35.62	10.81	
	390	41.38	11.24	35.87	10.87	
	395	41.42	11.27	36.13	10.93	
Q.TRON ML-G1 XXX Q.TRON ML-G1+ XXX B.LINE TRON ML-G1 XXX	385	45.92	11.08	37.04	10.40	
	390	45.96	11.11	37.31	10.45	
	395	45.99	11.14	37.59	10.51	



410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
 A/B, LINTHICUM HEIGHTS,  
 MD 21090, USA  
 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

### CUSTOMER INFORMATION

PETER CAIRNS  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME  
 EQUIPMENT SPECIFICATION

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-22

# CERTIFICATE OF COMPLIANCE

**Certificate Number** 20211109-E341165  
**Report Reference** E341165-20210317  
**Issue Date** 2021-11-09  
**Issued to:** Enphase Energy Inc.  
 1420 N. McDowell Blvd. Petaluma, CA 94954-6515

**This is to certify that representative samples of** Grid Support, Utility Interactive Supporting Energy Storage, Multimode, Bi-directional Microinverters

Models IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E, or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

Has been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

**Standard(s) for Safety:** See Page 2

**Additional Information:** See the UL Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database) for additional information

This *Certificate of Compliance* is provided as a courtesy to help our customers communicate product compliance information, as documented in our UL Follow-Up Services procedure. This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark shall be considered as being UL Certified and covered under UL's Follow-Up Services. Look for the UL Certification Mark on the product.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

  
 Bruce Mahrenholz, Director North American Certification Program  
 UL LLC

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# CERTIFICATE OF COMPLIANCE

**Certificate Number** 20211109-E341165  
**Report Reference** E341165-20210317  
**Issue Date** 2021-11-09  
**Issued to:** Enphase Energy Inc.  
 1420 N. McDowell Blvd. Petaluma, CA 94954-6515

**This is to certify that representative samples of** Grid Support, Utility Interactive Supporting Energy Storage, Multimode, Bi-directional Microinverters

Models IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E, or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

Has been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

**Standard(s) for Safety:** See Page 2

**Additional Information:** See the UL Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database) for additional information

This *Certificate of Compliance* is provided as a courtesy to help our customers communicate product compliance information, as documented in our UL Follow-Up Services procedure. This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark shall be considered as being UL Certified and covered under UL's Follow-Up Services. Look for the UL Certification Mark on the product.

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 Bruce Mahrenholz, Director North American Certification Program  
 UL LLC

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410 ENERGY SOLUTIONS LLC  
 809 BARKWOOD CT SUITES  
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 PHONE NO: (410) 803-6780  
 LICENSE NO: MHIC #145937

## REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

## CUSTOMER INFORMATION

**PETER CAIRNS**  
 2106 SALISBURY ROAD,  
 SILVER SPRING, MD 20910 USA  
 APN# 1301399932

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-23

**From:** [Inspections Daily](#)  
**To:** [Berger, Chris](#)  
**Cc:** [Alison Hopkins](#); [Ana Diaz](#); [Peter Cairns](#)  
**Subject:** Re: 2106 Salisbury Road, Silver Spring (HAWP No. 1073361)  
**Date:** Monday, June 17, 2024 4:06:25 PM

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**[EXTERNAL EMAIL]** Exercise caution when opening attachments, clicking links, or responding.

Hi Chris,

No we can't do that, the NEC code requires a disconnect within 6 ft of the meter.

On Mon, Jun 17, 2024 at 3:53 PM Berger, Chris <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)> wrote:

Ana,

The equipment for the panels is located in two different locations: at the front corner of the house and on the rear? Is it possible to consolidate that equipment in one location on the rear?

**Chris Berger, AICP**

**Cultural Resources Planner III**

Montgomery County Planning Department

[2425 Reedie Drive](#), 13<sup>th</sup> Floor, Wheaton, MD 20902

[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)

Office: 301-495-4571

---

**From:** Berger, Chris  
**Sent:** Monday, June 17, 2024 12:11 PM  
**To:** Ana Diaz <[ana@410energysolutions.com](mailto:ana@410energysolutions.com)>  
**Cc:** Alison Hopkins <[alielephant@gmail.com](mailto:alielephant@gmail.com)>; Peter Cairns <[petercairns1@gmail.com](mailto:petercairns1@gmail.com)>; [inspections@410energysolutions.com](mailto:inspections@410energysolutions.com)  
**Subject:** RE: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

Thank you. We're just missing photos of the residence. Just a few from the street would be fine.

## Chris Berger, AICP

### Cultural Resources Planner III

Montgomery County Planning Department

[2425 Reedie Drive](#), 13<sup>th</sup> Floor, Wheaton, MD 20902

[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)

Office: 301-495-4571

---

**From:** Ana Diaz <[ana@410energysolutions.com](mailto:ana@410energysolutions.com)>

**Sent:** Monday, June 17, 2024 12:01 PM

**To:** Berger, Chris <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)>

**Cc:** Alison Hopkins <[alielephant@gmail.com](mailto:alielephant@gmail.com)>; Peter Cairns <[petercairns1@gmail.com](mailto:petercairns1@gmail.com)>; [inspections@410energysolutions.com](mailto:inspections@410energysolutions.com)

**Subject:** Re: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

**[EXTERNAL EMAIL]** Exercise caution when opening attachments, clicking links, or responding.

Hello Chris,

Here is the new set of plans

On Fri, Jun 14, 2024 at 9:56 AM Berger, Chris <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)> wrote:

Hello,

I'm following up on the status of the revised plans and photos of the residence. Please email them ASAP, so we do not have to postpone your application.



## Chris Berger, AICP

Cultural Resources Planner III

Montgomery County Planning Department

[2425 Reedie Drive](#), 13<sup>th</sup> Floor, Wheaton, MD 20902

[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)

Office: 301-495-4571

---

**From:** Berger, Chris  
**Sent:** Monday, June 10, 2024 11:54 AM  
**To:** Alison Hopkins <[alielephant@gmail.com](mailto:alielephant@gmail.com)>  
**Cc:** Ana Diaz <[ana@410energysolutions.com](mailto:ana@410energysolutions.com)>; Peter Cairns <[petercairns1@gmail.com](mailto:petercairns1@gmail.com)>;  
[inspections@410energysolutions.com](mailto:inspections@410energysolutions.com)  
**Subject:** RE: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

Alison,

Historic Preservation staff discussed your project further this morning, and we have a more efficient path forward for your solar panels.

First, we no longer believe your project needs a Preliminary Consultation by the Historic Preservation Commission and can proceed straight to the Historic Area Work Permit review by the Commission on June 26. However, staff still does not support the current configuration of the panels on the north-facing roofs, and we recommend the removal of at least 4 panels so the panels can be laid out symmetrically. We also would like confirmation that the panels that appear to abut the roof valleys can be installed in those locations. See the markup attached. Please note that the Commission may want additional panels removed from the north-facing roofs when they review on June 26, but staff's opinion is that the removal of the 4 panels will satisfy our regulations in regard to compatibility in the historic district.

If you are in agreement with the revised panel layout we would need the revised plans emailed to me by the end of the day Thursday, June 13.

## Chris Berger, AICP

### Cultural Resources Planner III

Montgomery County Planning Department

[2425 Reedie Drive](#), 13<sup>th</sup> Floor, Wheaton, MD 20902

[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)

Office: 301-495-4571

---

**From:** Alison Hopkins <[alielephant@gmail.com](mailto:alielephant@gmail.com)>  
**Sent:** Monday, June 10, 2024 7:54 AM  
**To:** Berger, Chris <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)>  
**Cc:** Ana Diaz <[ana@410energysolutions.com](mailto:ana@410energysolutions.com)>; Peter Cairns <[petercairns1@gmail.com](mailto:petercairns1@gmail.com)>; [inspections@410energysolutions.com](mailto:inspections@410energysolutions.com)  
**Subject:** Re: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

**[EXTERNAL EMAIL]** Exercise caution when opening attachments, clicking links, or responding.

Hi Chris,

Thanks for the clarification about the right of way. We also have a drainage right of way on our property so I was confused about the terminology. :)

We would also prefer to have more panels on the south side and a more symmetrical placement of the panels, but state and county regulations are limiting how we can configure the panels. Our company, 410 Solar, can speak to this at the HPC hearing. We will get you the requested information soonest.

Thanks,

Alison

On Fri, Jun 7, 2024 at 4:03 PM Berger, Chris <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)> wrote:

Right of way refers to Salisbury Road.

The solar panels on 2109 Salisbury were approved in 2015. The panels were approved on the front because it faces south and solar otherwise would not be feasible on the building if the panels were not allowed there. Also note that the panels are mostly somewhat symmetrically grouped.

I'll look for your photos of your home.

### **Chris Berger, AICP**

**Cultural Resources Planner III**

Montgomery County Planning Department

[2425 Reedie Drive](#), 13<sup>th</sup> Floor, Wheaton, MD 20902

[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)

Office: 301-495-4571

---

**From:** Alison Hopkins <[alielephant@gmail.com](mailto:alielephant@gmail.com)>

**Sent:** Friday, June 7, 2024 3:32 PM

**To:** Berger, Chris <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)>

**Cc:** Peter Cairns <[petercairns1@gmail.com](mailto:petercairns1@gmail.com)>; [inspections@410energysolutions.com](mailto:inspections@410energysolutions.com);  
Ana Diaz <[ana@410energysolutions.com](mailto:ana@410energysolutions.com)>

**Subject:** Fwd: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

**[EXTERNAL EMAIL]** Exercise caution when opening attachments, clicking links, or responding.

Hi Chris,

Thanks for your email, which my husband forwarded. I wanted to follow up with a couple of questions:

1. What exactly are you referring to as the right of way? Does that refer to the NE corner of our property, where there is a point at which drainage water flows from Salisbury Rd onto the easement along the east boundary of our property line? That is not an area visible to the public or even to most houses on Salisbury Rd. Welcome any clarification you can provide on what location you are asking about.

2. With respect to the solar panel visibility, the roof of the house directly across the street from ours (2109 Salisbury) is almost entirely covered in solar panels. Is that house subject to the same regulations as ours, or is there some reason that the coverage or visibility of panels on our rooftop would be subject to a different standard?

We appreciate any clarification you can provide on the above questions. At least one project representative will be available to attend the 26 June meeting.

Thanks,

Alison Cairns

----- Forwarded message -----

From: **Peter Cairns** <[peter.cairns1@gmail.com](mailto:peter.cairns1@gmail.com)>

Date: Fri, Jun 7, 2024 at 2:59 PM

Subject: Fwd: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

To: Ana Diaz <[ana@410energysolutions.com](mailto:ana@410energysolutions.com)>, Alison Hopkins Cairns <[alielephant@gmail.com](mailto:alielephant@gmail.com)>

Sincerely,

Peter Cairns  
910-391-5548

----- Forwarded message -----

From: **Berger, Chris** <[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)>

Date: Fri, Jun 7, 2024, 2:25 PM

Subject: [2106 Salisbury Road, Silver Spring](#) (HAWP No. 1073361)

To: [peter.cairns1@gmail.com](mailto:peter.cairns1@gmail.com) <[peter.cairns1@gmail.com](mailto:peter.cairns1@gmail.com)>

Cc: [Inspections@410energysolutions.com](mailto:Inspections@410energysolutions.com) <[Inspections@410energysolutions.com](mailto:Inspections@410energysolutions.com)>

Good afternoon,

Staff has received your Historic Area Work Permit (HAWP) application for solar panels at 2106 Salisbury Road, and it is tentatively scheduled for the June 26 Historic Preservation Commission meeting.

First, please email me photos of the residence from all 4 elevations. We are particularly interested in the view from the right of way.

Staff has no concerns with the 17 panels proposed for the rear facing roofs, because they do not appear to be visible from the right of way and they conform with the [Commission's policy on solar panels](#). But the 14 panels on the front-facing elevations will necessitate first a Preliminary Consultation at the June 26 meeting followed by a Historic Area Work Permit review at a later Commission meeting.

If you were to remove the panels on the front elevations, your application would immediately be reviewed as a HAWP and not require a Preliminary Consultation. Removal of the 14 front panels may also allow staff to approve the HAWP immediately--if none of the panels will be visible from the right of way.

If you would like to proceed with the panels on the front elevation as currently proposed, we will need a project representative to attend the June 26 meeting to present the proposal to the Commission and respond to questions. Staff will prepare a report that recommends the 14 front panels are either completely removed from the proposal or reduced in number to accommodate a more symmetrical panel layout than what is currently proposed. The commissioners will likely ask how much of the home's energy needs will be met by the 14 north-facing solar panels, and they will most likely seek a reduced number of front panels.

Let me know how you would like to proceed, and please email those photos.

**Chris Berger, AICP**

**Cultural Resources Planner III**

Montgomery County Planning Department

[2425 Reedie Drive](#), 13<sup>th</sup> Floor, Wheaton, MD 20902

[Chris.Berger@montgomeryplanning.org](mailto:Chris.Berger@montgomeryplanning.org)

Office: 301-495-4571



2106

93349E

4R80147Z





2106

933496

1682107

LIFETIME

SPALDING