

Historic Preservation Commission



Members:

Mr. Larry Jackson – Chairperson
Mr. Tim Hoffman - Secretary
Dr. Lincoln Wilkins, Jr.
Dr. Brian Plitnik

Mr. Justin T. Paulman
Mr. Nathan C. Williams
Ms. Lynda Lambert
Councilwoman: Laurie Marchini

Staff Liaison: Ruth Davis - Rogers, Historic Preservation Planner

AGENDA

Historic Preservation Commission
City Hall Council Chambers
January 8th, 2024, 4:00 P.M.

APPROVAL OF MINUTES

- Review and approval of Dec. 2024 meeting minutes

PUBLIC COMMENT

CERTIFICATE OF APPROPRIATENESS

Consent Agenda – these COA's received administrative approval

- No items on the consent agenda this month

Regular Agenda – to be reviewed by HPC

- 407 Washington St. COA24-000062 (solar panels on roof)
Applicant: JG Construction Co. - Nick Vaccaro

OTHER BUSINESS

ANNOUNCEMENTS

ADJOURNMENT`

MINUTES
HISTORIC PRESERVATION COMMISSION
December 11, 2024

The Cumberland Historic Preservation Commission held its regular meeting on Wednesday December 11, 2024, within the Council Chambers of City Hall. Members present were, Mr. Tim Hoffman, Councilwoman Laurie Marchini, Mr. Brian Plitnik, Dr. Lincoln Wilkins, and via phone were Ms. Lynda Lambert.

Others in attendance were, Ms. Ruth Davis-Rogers, Historic Preservation Planner/Grants Management, Councilman Eugene Frazier, and Ms. Chelsea Rexrode, Codes Technician. There were no media or citizens present.

Mr. Tim Hoffman, called the meeting to order. He read the following statement into the record: "The Cumberland Historic Preservation Commission exists pursuant to Section 11 of the City of Cumberland Municipal Zoning Ordinance. Members are appointed by the Mayor and City Council and shall possess a demonstrated special knowledge or professional or academic training in such fields as history, architecture, architectural history, planning, archeology, anthropology, curation, conservation, landscape architecture, historic preservation, urban design, or related disciplines. The Commission strives to enhance quality of life by safeguarding the historical and cultural heritage of Cumberland. Preservation is shown to strengthen the local economy, stabilize and improve property values, and foster civic beauty. The Cumberland Historic Preservation Commission operates pursuant to State of Maryland 1977 Open Meetings Act and therefore no pending applications shall be discussed between or amongst Commissioners outside the public hearing to determine the disposition of the application."

APPROVAL OF MINUTES

1. Minutes from November 2024 were approved as written. **Dr. Lincoln Wilkins, made the motion for approval and Mr. Brian Plitnik, seconded the motion. All members were in favor. Motion approved.**

PUBLIC COMMENTS

- None.

CONSENT AGENDA

- 121 N Centre St - COA24-000060 (signage)
Applicant: Community Café
- 107 S Centre St - COA24-000061 (exterior paint)
Applicant: Joann Circosta

REGULAR AGENDA

- None

Mr. Tim Hoffman read the approval statement: We have studied the application in all other relevant documents and presentation related to the for-mention cases COA24-000060, and COA24-000061. We find the properties on the approve Certificate of Appropriateness contribute to the Historic Districts where they are located and the proposed changes are consisted with guidelines and criteria found in the Historic Preservation District designed guidelines for Cumberland Maryland.

OTHER BUSINESS/STAFF UPDATES

- Approve recommendation, to be presented to the Mayor and City Council, for the consultant chosen to update the National Register listing of the City of Cumberland Downtown Historic District.

Mr. Brian Plitnik made the motion to recommend and Councilwoman, Laurie Marchini, seconded the motion. Motion approved.

ANNOUNCEMENTS

- CBS News Eye on America interviewed Mayor Morriss in regards to the Choose Cumberland Relocation Package.
- Consultants were hired to create the State of Maryland 10-year Comprehensive Plan for the City of Cumberland. The consultants will be conducting community outreach soon in the community

- *An audio of tonight's meeting is available upon request.*

ADJOURNMENT

Mr. Tim Hoffman adjourned the meeting.

Respectfully,

Mr. Tim Hoffman, Secretary

City of Cumberland - Dept. of Community Development**Internal Routing Sheet**Permit or Review #: **COA24-000062**

Permit or Review Type: Certificate of Appropriateness

Project Location: 407 WASHINGTON ST CUMBERLAND, MD 21502

Applicant Contact Information: Name: JG Construction Co.
Address: 13123 Lodi Court
City/State/Zip: Mansses VA 20112
Phone: (703) 789-3567
Email: christine@gosolarglobal.com

Contractor Contact Information: Company Name: JG Construction Co.
Contact: Nick Vaccaro
Address: 13123 Lodi Court
City/State/Zip: Mansses VA 20112
Phone: (703) 789-3567
Email: christine@gosolarglobal.com

Date of
Application: 12/18/2024

Work Description: (narrative box)

Install PV Solar System on Roof- 24.60 kw 60 solar panels

Amount Paid: 31.00

Amount Due: 0.00



PERMIT PROJECT
FILE #: 24-001723
407 WASHINGTON ST CUMBERLAND MD 21502
INSTALL PV SOLAR SYSTEM ON ROOF- 24.60 KW 60 SOLAR PANELS



PERMIT #: COA24-000062

Permit Type
Certificate of Appropriateness

Subtype
Certificate of Appropriateness

Work Description:
Install PV Solar System on Roof- 24.60 kw 60 solar panels

Applicant
JG Construction Co. - Nick Vaccaro

Status
Online Application Received

Valuation
0.00



FEES & PAYMENTS

Plan Check Fees 30.00

Permit Fees 1.00

Total Amount 31.00

Amount Paid 31.00

Balance Due 0.00

☐ Non-Billable



PERMIT DATES

Application Date
12/18/2024

Approval Date

Issue Date:

Expiration Date:

Close Date

Last Inspection

Non-Billable Comments

Contractor

JG Construction Co. - Nick Vaccaro

...

Contact

JG Construction Co. - Nick Vaccaro

▼

...

Estimated Cost of the project

\$66,000.00

Attach a full written scope of work

Scope of Work- McKay.pdf

🗑

▼

Attach photographs of the site and structure

Michael McKay- layout and pics.pdf

🗑

▼

Facade Elevations

Front of home- McKay.jpg

🗑

▼

Sample of Proposed Materials

Material List- McKay.pdf

🗑

▼

Scaled Drawings

Engineer Plans -McKay.pdf

🗑

▼

Digital Renderings, when available

▼

Color Scheme/Paint Chips

Solar Panel Specs- McKay.pdf

🗑

▼

Manufacturer Cut-Sheets or Product Specifications

[Equipment Specifications- Mc Kay.pdf](#)

Provide one (1) complete original copy of all supplementary materials

[Equipment Specifications- Mc Kay.pdf](#)

The HPC meets the second Wednesday of each month and complete applications are due the first Wednesday of each month before 4:00 p.m. You (or a representative) are required to attend the meeting scheduled for your COA review.

Preservation Guidelines (Updated 1/1/16) can be found on the City of Cumberland website at www.cumberlandmd.gov.

Do not begin work until an approval is received on Permits from both The Historic Preservation Commission and the City of Cumberland.

A signed, approved, and stamped COA and MB or RB permit form is required for application to be considered complete. These will be sent to you upon approval of the department manager or designated representative.

Signing Method

Acknowledgement

By checking this box I acknowledge that I am electronically signing this document

Type your name

Christine Roach

Today's Date

12/18/2024

INTERNAL USE ONLY

Determination of Review Path

Review Type

Determination for Tax Credit

Is this a Tax Credit Project

HPC Tax Credit Review

Decision Date

M&CC Tax Credit Review

Decision Date

State Tax Credit Review

Decision Date

FEES

FEE	DESC	QUANTITY	AMOUNT	TOTAL	
Certificate of Appropriateness Review Fee				30.00	
Convenience Fee		1.0	1.0000	1.00	
Plan Check Fees				30.00	
Permit Fees				1.00	
Total Fees				31.00	

PAYMENTS

DATE	TYPE	REFERENCE	NOTE	RECEIPT #	RECEIVED FROM	AMOUNT	
12/18/2024	Credi	56cf1eb9-d	COA2	5545	JG Constr	31.00	
Amount Paid						31.00	
Balance Due						0.00	

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	60	MISSION SOLAR ENERGY MSE410HT0B
INVERTER	60	ENPHASE IQ8PLUS -72M-US (240V)
LOAD CENTER	1	SOLAR LOAD CENTER, 125A RATED, 240V
MONITORING BOX	4	ENPHASE IQ ENVY IQ-AM1-240 (LOAD CENTER)
JUNCTION BOX	4	JUNCTION BOX, NEMA 3R, UL LISTED
FUSED AC DISCONNECT	1	100A FUSED AC DISCONNECT, (2) 100A FUSES, 240V NEMA 3R, UL LISTED
ATTACHMENT	123	HALO UL TRAGRIP - BLACK (QM-HUG-01-B1)
ATTACHMENT	246	SELF DRILLING SCREW, #14, WOOD TIP WITH WASHER, EPDM BACKED
ATTACHMENT	400	1" SELF TAPPING SCREW
ATTACHMENT	100	S-51 PROTEA BRACKET
ENPHASE Q CABLE	83	ENPHASE Q CABLE 240V (PER CONNECTOR)
BRANCH TERMINATOR	8	BRANCH TERMINATOR
IQ WATER TIGHT CAP	23	IQ WATER TIGHT CAPS
RAILS	55	IRONRIDGE BLACK XR-10 RAIL 168
BONDED SPLICE	30	SPLICE KIT
CLAMPS	160	UNIVERSAL FASTENING OBJECT (UFO)
CLAMP	80	STOPPER SLEEVE
GROUNDING LUG	20	GROUNDING LUG



(E) BACK OF RESIDENCE



(E) FRONT OF RESIDENCE
WASHINGTON ST

Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

I, the undersigned, do hereby certify that these drawings were prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 39701, Expiration Date: 12/31/2024

SOLAR GLOBAL
3959 PENNSYLVANIA AVE. SUITE 100
FAIRFAX, VA 22030, USA
PH: (703) 789-3567

SYSTEM INFO

(60) MISSION SOLAR ENERGY MSE410HT0B

(60) ENPHASE IQ8PLUS-72M-US (240V)

DC SYSTEM SIZE: 24,800 KWDC

AC SYSTEM SIZE: 18,000 MWAC

METER: 95671191

REVISIONS

DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
21502, USA
407 WASHINGTON ST APT 1, CUMBERLAND, MD
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
STRING LAYOUT & BOM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

Homeowner & Project Information / Project Proposal



Exterior Evaluation / Address Photo



Loc: 39.6518, -78.7723

Exterior Evaluation / Address Photo



Loc: 39.6518, -78.7723

Exterior Evaluation / Exterior Home Structure Walls



Loc: 39.6518, -78.7723

Exterior Evaluation / Exterior Home Structure Walls



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Exterior Evaluation / Exterior Home Structure Walls



Loc: 39.6518, -78.7723

SCOPE OF WORK

TO INSTALL A ROOF MOUNTED SOLAR PHOTOVOLTAIC SYSTEM AT THE OWNER RESIDENCE 407 WASHINGTON ST APT 1, CUMBERLAND, MD 21502, USA. THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT. THE PV SYSTEM DOES NOT INCLUDE STORAGE BATTERIES.

EQUIPMENT SUMMARY

60 MISSION SOLAR ENERGY MSE410HT08 MODULES
60 ENPHASE IQ8PLUS-72-M-US (240V) MICROINVERTERS

GENERAL NOTES

- THESE CONSTRUCTION DOCUMENTS HAVE BEEN BASED ON FIELD INSPECTIONS AND OTHER INFORMATION AVAILABLE AT THE TIME. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS
- CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, OBTAIN ALL PERMITS, LICENSES AND PAY ALL REQUIRED FEES AND COMPLETE INSTALLATION.
- CONTRACTOR SHALL OBTAIN BUILDING PERMIT. NO WORK TO START UNLESS BUILDING PERMIT IS PROPERLY DISPLAYED.
- ALL WORKMANSHIP AND MATERIALS SHALL BE OF FIRST QUALITY AND IN COMPLIANCE WITH THE REQUIREMENTS OF THE NATIONAL BUILDING CODE, THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ALL PERTINENT AGENCIES.
- IT IS ESSENTIAL THAT ALL WORK PROCEED WITH THE MAXIMUM COOPERATION OF ALL PARTIES AND WITH MINIMUM INTERFERENCE TO THE OCCUPANTS WITHIN THE BUILDING. THE OWNER'S DIRECTIONS IN THIS REGARD SHALL BE FULLY COMPLIED WITH.
- THE CONTRACTOR SHALL PERFORM THE WORK IN STRICT CONFORMANCE WITH THE LOCAL LAWS, REGULATIONS AND THE NATIONAL ELECTRIC CODE.
- THE CONTRACTOR SHALL OBTAIN ALL PERMITS, APPROVALS, AFFIDAVITS, CERTIFICATIONS, ETC. AND PAY ALL FEES AS REQUIRED BY THE LOCAL AUTHORITIES.
- CONTRACTORS SHALL OBTAIN FIRE CERTIF. UPON COMPLETION OF WORK.

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- 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.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURERS INSTRUCTION.
- MODULE SUPPORT RAIL SHALL BE BONDED TO THE MODULE

GOVERNING CODES

- 2017 NATIONAL ELECTRICAL CODE
- 2018 INTERNATIONAL FIRE CODE
- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL RESIDENTIAL CODE

AHU NAME: CUMBERLAND CITY

WIRING AND CONDUIT NOTES

- ALL CONDUIT SIZES AND TYPES SHALL BE LISTED FOR ITS PURPOSE AND APPROVAL FOR THE SITE APPLICATIONS
- ALL PV CABLES AND HOMERUN WIRES BE #10AWG *USE-2, PV WIRE, OR PROPRIETARY SOLAR CABLEING SPECIFIED BY MFR. OR EQUIVALENT; ROUTED TO SOURCE CIRCUIT COMBINER BOXES AS REQUIRED
- ALL PV DC CONDUCTORS IN CONDUIT EXPOSED TO SUNLIGHT SHALL BE DERATED ACCORDING TO AS PER LATEST NEC CODE.
- EXPOSED ROOF PV DC CONDUCTORS SHALL BE USE-2, 90°C RATED, WET AND UV RESISTANT, AND UL LISTED RATED FOR 800V, UV RATED SPIRAL WRAP SHALL BE USED TO PROTECT WIRE FROM SHARP EDGES
- PHASE AND NEUTRAL CONDUCTORS SHALL BE DUAL RATED THHN/THWN-2 INSULATED, 90°C RATED, WET AND UV RESISTANT, RATED FOR 1000V AS PER APPLICABLE NEC
- 4-WIRE DELTA CONNECTED SYSTEMS HAVE THE PHASE WITH THE HIGHER VOLTAGE TO GROUND MARKED OR IDENTIFIED BY OTHER EFFECTIVE MEANS
- ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION
- VOLTAGE DROP LIMITED TO 2%
- AC CONDUCTORS >4AWG COLOR CODED OR MARKED: PHASE A OR L1- BLACK, PHASE B OR L2- RED, PHASE C OR L3- BLUE, NEUTRAL- WHITE/GRAY



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 38701

I hereby certify that the above
documents were prepared or approved by me, and that I am a
Professional Engineer in the State of Maryland, and that the
signature is my true and correct signature.

PHOTOVOLTAIC SYSTEM FIRE
CLASSIFICATION LISTING IN
ACCORDANCE WITH UL 1703
STANDARD.

SHEET INDEX

SYSTEM RATING	COVER PAGE
24,600 kWDC	PV1
18,000 kWAC	PV2
	PV3
	PV4
	PV5-PV7
	PV8
	PV9
	PV10-PV11
	PV12-PV17
	EQUIPMENT SPECIFICATIONS
	SIGNAGE
	SPECIFICATIONS & NOTES
	ELECTRICAL LINE & CALCUS.
	ATTACHMENT DETAILS
	STRING LAYOUT & BOM
	ROOF PLAN
	SITE PLAN

PROJECT NAME & ADDRESS

PROJECT SITE



HOUSE PHOTO

SCALE: NTS



VICINITY MAP

SCALE: NTS



SOLAR GLOBAL
3959 PENDER DR. FAIRFAX,
VA 22030, USA
PH#: (703) 785-5867

SYSTEM INFO
(60) MISSION SOLAR ENERGY MSE410HT08
(60) ENPHASE IQ8PLUS-72-M-US (240V)
DC SYSTEM SIZE: 24,600 kWDC
AC SYSTEM SIZE: 18,000 kWAC
METER: 96871191

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
COVER PAGE

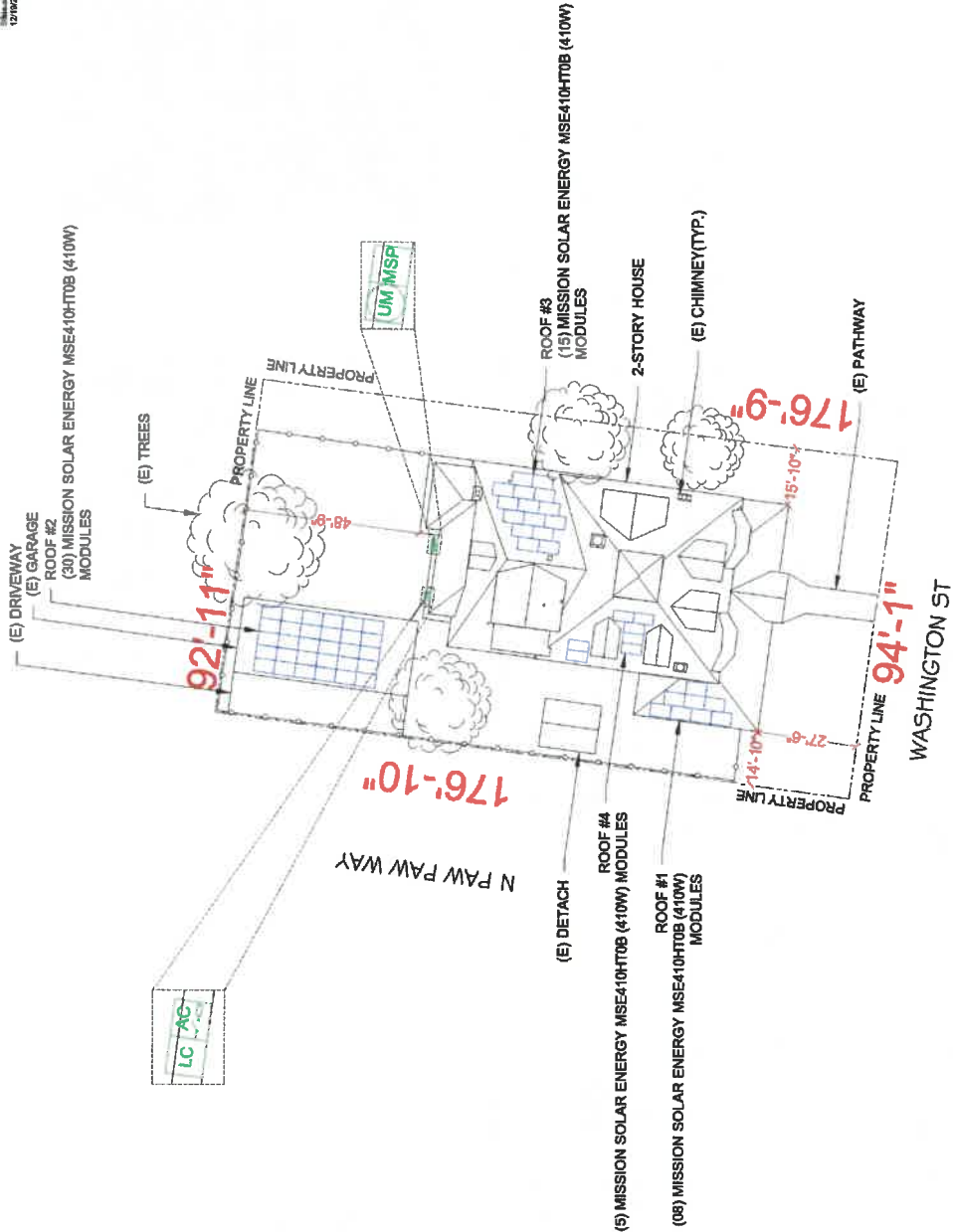
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

SITE NOTES

- A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS AN UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
- THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26]

LEGEND	
	(N) JUNCTION BOX
	(E) UTILITY METER
	(E) MAIN SERVICE PANEL
	(N) LOAD CENTER (COMBINER PANEL)
	(N) FUSED AC DISCONNECT
	VENT, ATTIC FAN, ROOF OBSTRUCTION
	ROOF ATTACHMENT
	CONDUIT
	ENPHASE IQ8PLUS-72-A-US (240V) MICROINVERTER
	MISSION SOLAR ENERGY MSE410H-T08 MODULES
	IRONRIDGE BLACK XR-10 RAIL
	TRENCH



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

METER NO#: 95671191



Reviewed and approved
Richard Panfil, P.E.
MD Lic. No. 39701

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 39701, dated 12/19/2023.



SOLAR GLOBAL
3859 PENDER DR, FAIRFAX,
VA 22030, USA
PH#: (703) 785-3567

SYSTEM INFO	
(00) MISSION SOLAR ENERGY MSE410H-T08	
(00) ENPHASE IQ8PLUS-72-A-US (240V)	
DC SYSTEM SIZE: 24,600 MWDC	
AC SYSTEM SIZE: 10,000 KWAC	
METER: 95671191	

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21602, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

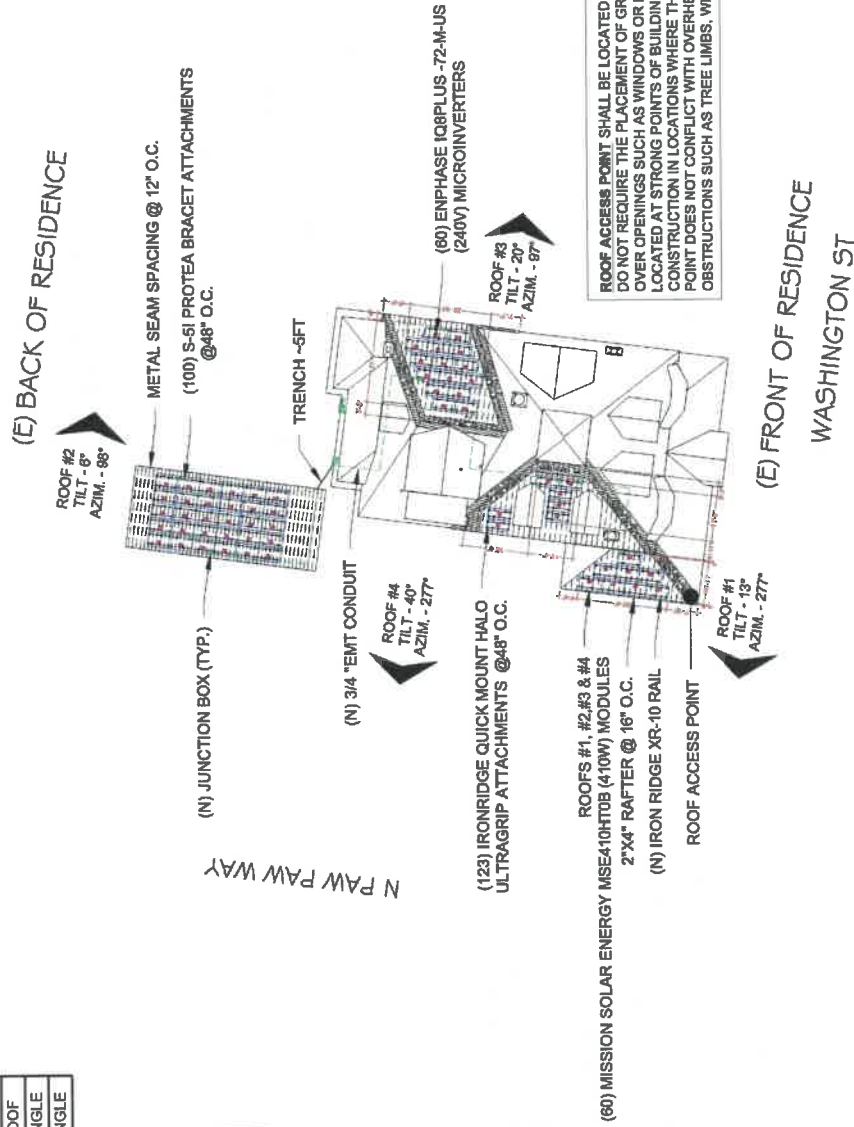
SHEET NUMBER
PV-2

DESIGN SPECIFICATION		MODULE TYPE, DIMENSIONS & WEIGHT	
RISK CATEGORY:	II	NUMBER OF MODULES:	60 MODULES
CONSTRUCTION:	SFD	MODULE TYPE:	MISSION SOLAR ENERGY MSE410HT08
ZONING:	RESIDENTIAL	MODULE WEIGHT:	42 LBS
SNOW LOAD (ASCE7-16):	0 PSF	MODULE DIMENSIONS:	67.83" X 44.68" = 21.05 SF
EXPOSURE CATEGORY:	C	UNIT WEIGHT OF AREA:	2 PSF
WIND SPEED (ASCE7-16):	110 MPH		

ROOF DESCRIPTION			
ROOF	RAFTER TILT	RAFTER SIZE	ROOF MATERIAL
#1	13°	2" x 4"	16" o.c.
#2	6°	2" x 4"	16" o.c.
#3	20°	2" x 4"	16" o.c.
#4	40°	2" x 4"	16" o.c.

ARRAY AREA & ROOF AREA CALC'S		
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)
#1	8	168.37
#2	30	631.39
#3	15	315.7
#4	7	147.33
(TOTAL ARRAY AREA/TOTAL ROOF AREA) X 100%		20.09%

LEGEND	
(N) JUNCTION BOX	(E) UTILITY METER
(E) MAIN SERVICE PANEL	(N) LOAD CENTER (COMBINER PANEL)
(N) FUSED AC DISCONNECT	(N) VENT ATTIC FAN (ROOF OBSTRUCTION)
(N) ROOF ATTACHMENT CONDUIT	(N) ENPHASE IQ8PLUS-72-M-US (240V) MICROINVERTER
MISSION SOLAR ENERGY MSE410HT08 MODULES	IRONRIDGE BLACK XR-10 RAIL
168	TRENCH



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

METER NO#: 95671191

SOLAR GLOBAL
3959 PENDER DR, FAIRFAX, VA 22030, USA
PH#: (703) 789-3957

MISSION SOLAR ENERGY (N) ENPHASE IQ8PLUS-72-M-US (240V)
DC SYSTEM SIZE: 24,000 WHDC
AC SYSTEM SIZE: 18,000 WHAC
METER: 95671191

REVISIONS

REVISION	DATE	REV
1	12/17/2024	A

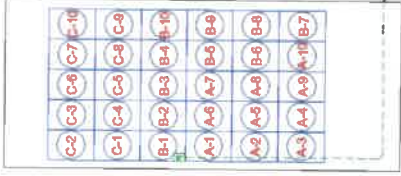
PROJECT NAME & ADDRESS
MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
EMAIL ID: DRYCLEAN@ATTANTICB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024
SHEET NAME: ROOF PLAN
SHEET SIZE: ANSI B 11" X 17"
SHEET NUMBER: PV-3

Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

Professional Engineer Seal: Richard Pantel, P.E., MD Lic. No. 39701

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	60	MISSION SOLAR ENERGY MSE410H-T08
INVERTER	60	ENPHASE IQ8PLUS-72-M-US (240V)
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JUNCTION BOX	4	JUNCTION BOX, NEMA 3R, UL LISTED
FUSED AC DISCONNECT	1	100A FUSED AC DISCONNECT (2) 100A FUSES, 240V NEMA 3R, UL LISTED
ATTACHMENT	123	HALO ULTRAGRIP - BLACK QM-HUG-01-B1)
ATTACHMENT	246	SELF DRILLING SCREW, #14, WOOD TIP WITH WASHER, EPDM BACKED
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ATTACHMENT	100	S-51 PROTEA BRACKET
ENPHASE Q CABLE	83	ENPHASE Q CABLE 240V (PER CONNECTOR)
BRANCH TERMINATOR	8	BRANCH TERMINATOR
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RAILS	55	IRONRIDGE BLACK XR-10 RAIL 168
BONDED SPLICE	30	SPLICE KIT
CLAMPS	160	UNIVERSAL FASTENING OBJECT (UFO)
CLAMP	80	STOPPER SLEEVE
GROUNDING LUG	20	GROUNDING LUG



(E) BACK OF RESIDENCE



(E) FRONT OF RESIDENCE
WASHINGTON ST

SEAL OF THE PROFESSIONAL ENGINEER
STATE OF MARYLAND
PROFESSIONAL ENGINEER
Richard Pantel, P.E.
MD Lic. No. 39701

Professional Certification: I hereby certify that these drawings were prepared or approved by me, and that I am a duly Licensed Professional Engineer in the State of Maryland.

12/16/2028

SOLAR GLOBAL

SOLAR GLOBAL
 3959 PENDER DR, FAIRFAX,
 VA 22030, USA
 PHF : (703) 785-3557

SYSTEM INFO	
(60) MISSION SOLAR ENERGY	SEES
(60) ENPHASE	IQ8PLUS-72M-US (240V)
DC SYSTEM SIZE: 24,600 WDC	
AC SYSTEM SIZE: 18,000 KWAC	
METER: 96571191	

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DESCRIPTION	DATE
REVISION	12/17/2024
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MICHAEL MCKAY
 RESIDENCE
 407 WASHINGTON ST APT 1, CUMBERLAND, MD
 21502, USA
 EMAIL ID: DRYCLEAN@ATLANTICBB.NET
 PHONE NO. (301) 697-2622

DATE: 12/17/2024
SHEET NAME
STRING LAYOUT & BOM
SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
PV-4



SCALE: 1/16"= 1'-0"



• MODULE STRINGING



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

I, the undersigned, being a duly Licensed Professional Engineer in the State of Maryland, do hereby certify that I am a duly Licensed Professional Engineer in the State of Maryland, and that I am a duly Licensed Professional Engineer in the State of Maryland, and that I am a duly Licensed Professional Engineer in the State of Maryland.

12/16/2024



SOLAR GLOBAL
3959 PENDER DR. FAIRFAX,
VA 22030, USA
PHF : (703) 785-3567

SYSTEM INFO	
(80) MISSION SOLAR ENERGY	RESIDENTIAL
(80) EXPHASE	1038PLUS-7244US (240V)
DC SYSTEM SIZE: 24,500 WPOC	
AC SYSTEM SIZE: 10,000 WPOC	
METER: 95671191	

REVISIONS	
DESCRIPTION	DATE
REVISION	12/17/2024
A	

PROJECT NAME & ADDRESS

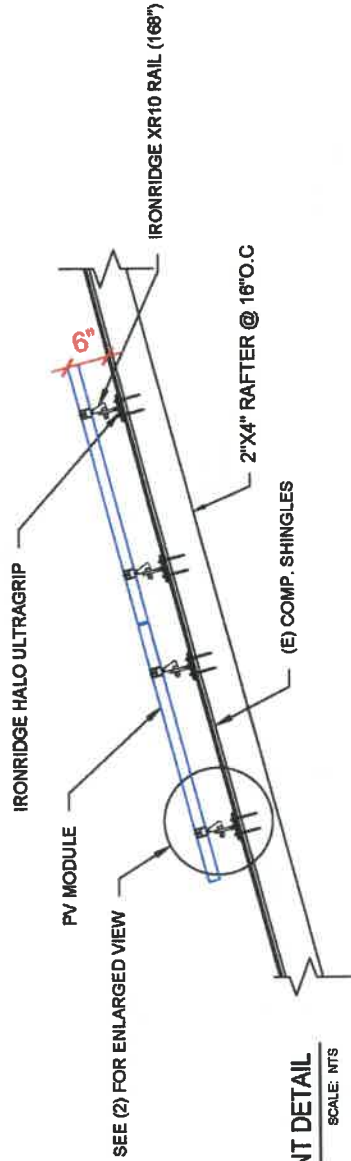
MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21602, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
ATTACHMENT
DETAILS

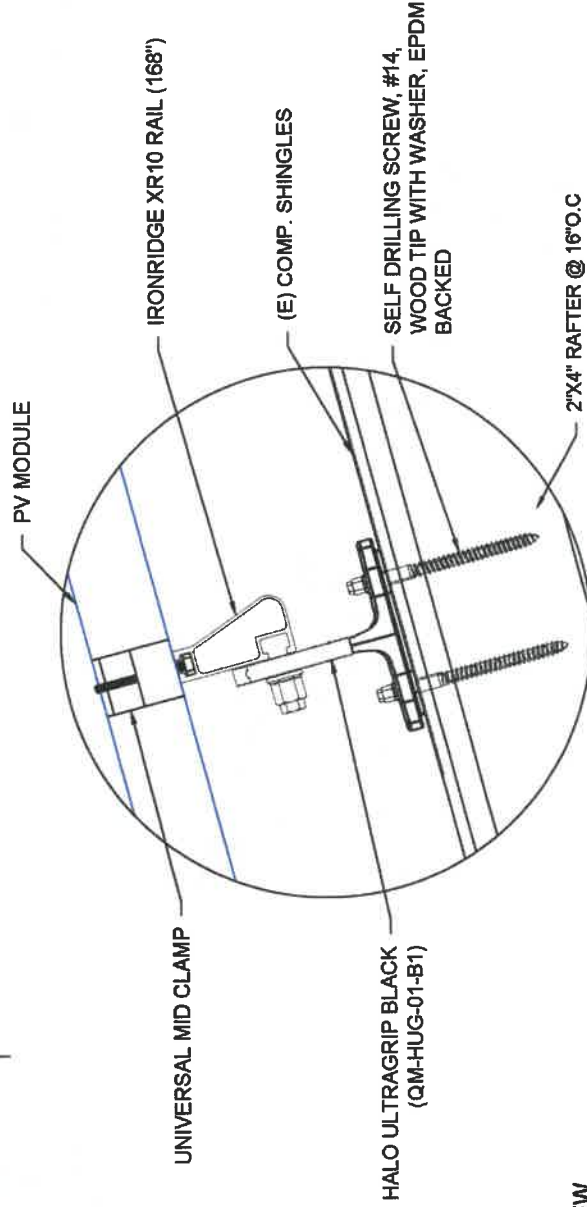
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5



1 ATTACHMENT DETAIL

SCALE: NTS



2 ENLARGED VIEW
(ATTACHMENT DETAIL)

SCALE: NTS



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 38701

I, the undersigned, being a duly Licensed Professional Engineer in the State of Maryland, hereby certify that these drawings were prepared or approved by me, and that I am a duly Licensed Professional Engineer under the laws of the State of Maryland.

12/18/2023

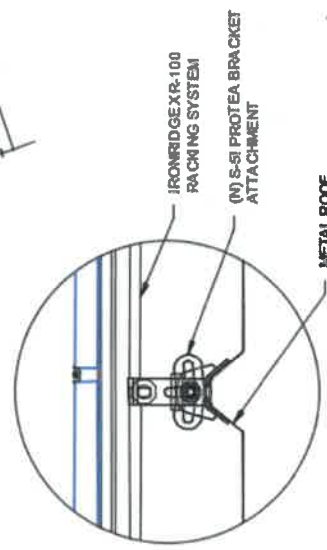
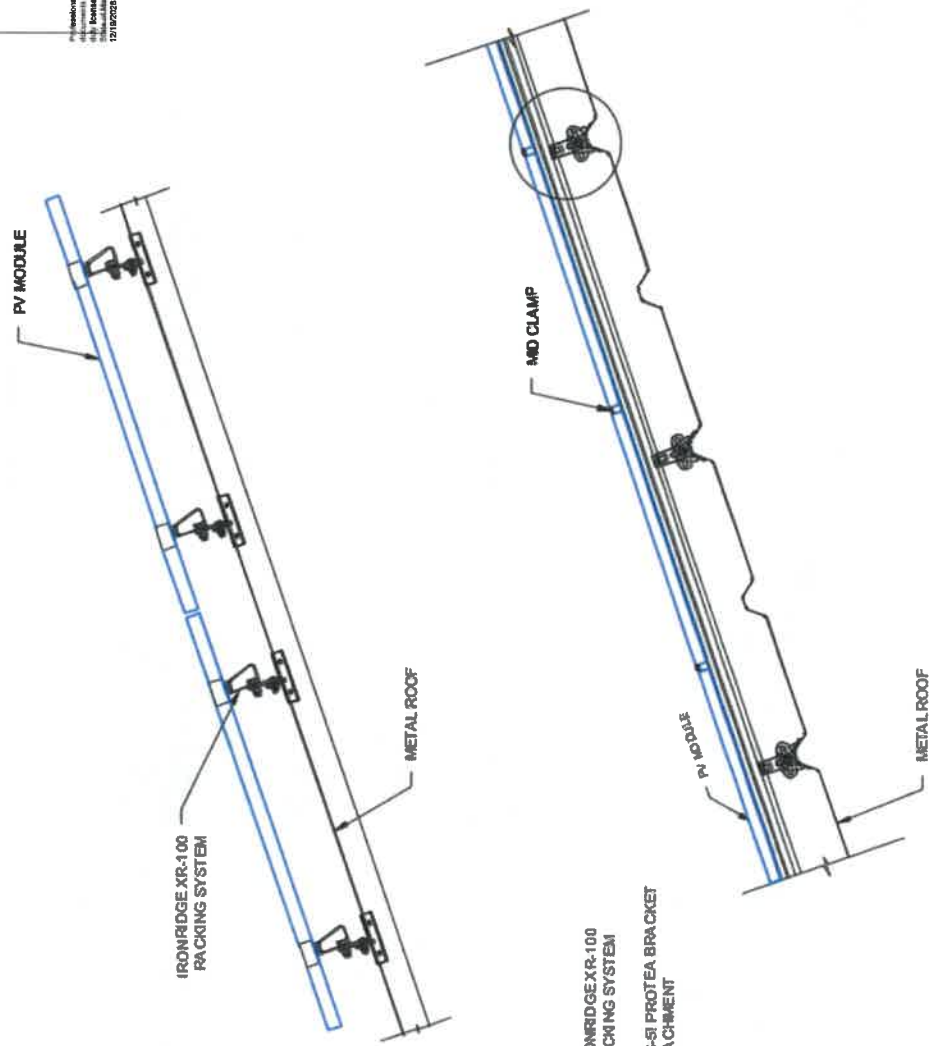


SOLAR GLOBAL
3959 PENDER DR. FAIRFAX, VA 22030, USA
PH: (703) 789-3557

SYSTEM INFO		
(60) MISSION SOLAR ENERGY		
MSE410T08		
(60) ENPHASE		
ICDP-LUS-724N-US (240V)		
DC SYSTEM SIZE: 24,600 kWDC		
AC SYSTEM SIZE: 18,000 kWAC		
METER: 95971191		
REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS
MICHAEL MCKAY
RESIDENCE
21502, USA
407 WASHINGTON ST APT 1, CUMBERLAND, MD
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024
SHEET NAME ATTACHMENT DETAILS
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-6

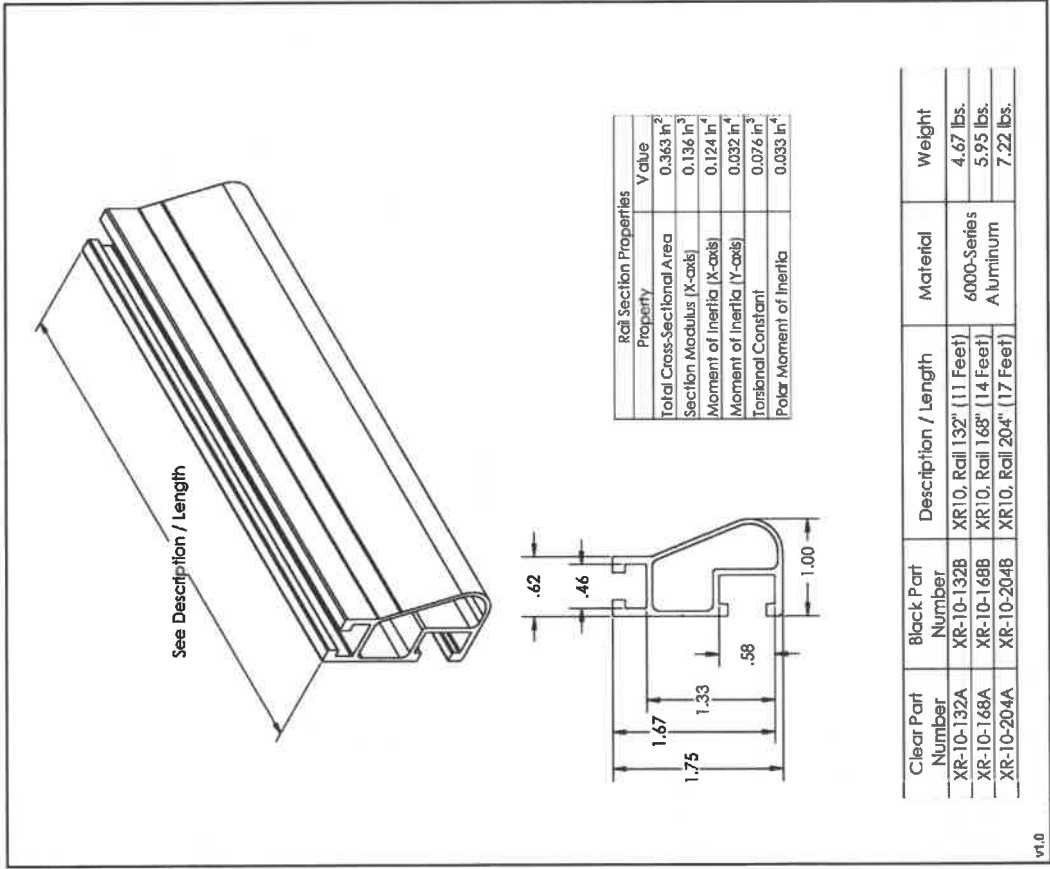


ENLARGE DETAIL

1 ATTACHMENT DETAIL (ENLARGED VIEW)
SCALE: NTS



XR10 Rail



v1.0



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

Professional Engineer Seal: I hereby certify that these documents were prepared or approved by me, and that I am a duly Licensed professional engineer under the laws of the State of Maryland.



SOLAR GLOBAL
3959 PENDER DR, FAIRFAX,
VA 22030, USA
PH# : (703) 785-3957

SYSTEM INFO	(80) MISSION: SOLAR ENERGY
	NSE-10H10B
	(60) ENPHASE
	IDBPLUS-72KVAUS (240V)
DC SYSTEM SIZE: 24,000 KWDC	AC SYSTEM SIZE: 18,000 KWAC
	METER: 99871191

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
EMAIL: DRYCLEAN@ATLANTICBB.NET
21502, USA
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
ATTACHMENT
DETAILS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

SOLAR MODULE SPECIFICATIONS		
MANUFACTURER / MODEL	MISSION SOLAR ENERGY MSE410HT0B	
VMP	31.38 V	
IMP	13.07 A	
VOC	37.41 V	
ISC	13.9 A	
TEMP. COEFF. VOC	-0.25%/K	
PTC RATING	383.9 W	
MODULE DIMENSION	67.83"(L) x 44.68"(W)	
PANEL WATTAGE	410 W	
INVERTER SPECIFICATIONS		
MANUFACTURER / MODEL	ENPHASE IQ8PLUS-72-M-US (240V)	
MAX DC SHORT CIRCUIT CURRENT	15 A	
CONTINUOUS OUTPUT CURRENT	1.21 A	
AMBIENT TEMPERATURE SPECS		
RECORD LOW TEMP	-20°C	
AMBIENT TEMP (HIGH TEMP 2%)	29°C	
CONDUIT HEIGHT	7/8"	
ROOF TOP TEMP	51°C	
CONDUCTOR TEMPERATURE RATE	90°C	
MODULE TEMPERATURE COEFFICIENT OF VOC	-0.25%/K	
PERCENT OF VALUES		NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
0.80		4-6
0.70		7-9
0.50		10-20



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

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VOLTAGE RISE IN Q CABLE FROM THE MICROINVERTERS TO THE JUNCTION BOX

FOR BRANCH CIRCUIT #1 OF 10 IQ8PLUS MICROS, THE VOLTAGE RISE ON THE 240 VAC Q CABLE IS 0.71%
FOR BRANCH CIRCUIT #2 OF 10 IQ8PLUS MICROS, THE VOLTAGE RISE ON THE 240 VAC Q CABLE IS 0.71%
FOR BRANCH CIRCUIT #3 OF 10 IQ8PLUS MICROS, THE VOLTAGE RISE ON THE 240 VAC Q CABLE IS 0.71%
FOR BRANCH CIRCUIT #4 OF 10 IQ8PLUS MICROS, THE VOLTAGE RISE ON THE 240 VAC Q CABLE IS 0.71%
FOR BRANCH CIRCUIT #5 OF 10 IQ8PLUS MICROS, THE VOLTAGE RISE ON THE 240 VAC Q CABLE IS 0.71%
FOR BRANCH CIRCUIT #6 OF 10 IQ8PLUS MICROS, THE VOLTAGE RISE ON THE 240 VAC Q CABLE IS 0.71%
VOLTAGE RISE FROM THE JUNCTION BOX 2 TO THE LOAD CENTER
VRISE = (AMPS/INVERTER X NUMBER OF INVERTERS) X (RESISTANCE IN OHMS/FT.) X (2-WAY WIRE LENGTH IN FT.)
= (1.21 AMP X 10) X (0.00129 OHMS/FT) X (50 FT X 2)
= 12.10 AMPS X 0.00129 OHMS/FT) X 100 FT
= 1.56 VOLTS
%VRISE = 1.56 VOLTS ÷ 240 VOLTS = 0.65%
THE VOLTAGE RISE FROM THE JUNCTION BOX 2 TO THE LOAD CENTER IS 0.65%

VOLTAGE RISE FROM THE LOAD CENTER TO THE FUSED AC DISCONNECT

VRISE = (AMPS/INVERTER X NUMBER OF INVERTERS) X (RESISTANCE IN OHMS/FT.) X (2-WAY WIRE LENGTH IN FT.)
= (1.21 AMP X 60) X (0.000254 OHMS/FT) X (10 FT X 2)
= 72.60 AMPS X 0.000254 OHMS/FT) X 20 FT
= 0.37 VOLTS
%VRISE = 0.37 VOLTS ÷ 240 VOLTS = 0.15%
THE VOLTAGE RISE FROM THE LOAD CENTER TO THE FUSED AC DISCONNECT IS 0.15%

VOLTAGE RISE FROM THE FUSED AC DISCONNECT TO THE MSP

VRISE = (AMPS/INVERTER X NUMBER OF INVERTERS) X (RESISTANCE IN OHMS/FT.) X (2-WAY WIRE LENGTH IN FT.)
= (1.21 AMP X 60) X (0.000254 OHMS/FT) X (10 FT X 2)
= 72.60 AMPS X 0.000254 OHMS/FT) X 20 FT
= 0.37 VOLTS
%VRISE = 0.37 VOLTS ÷ 240 VOLTS = 0.15%
THE VOLTAGE RISE FROM THE FUSED AC DISCONNECT TO THE MSP IS 0.15%

TOTAL SYSTEM VOLTAGE RISE FOR ALL WIRE SECTIONS

0.71% + 0.65% + 0.15% + 0.15% = 1.66%



SOLAR GLOBAL
3959 PENDER DR, FAIRFAX,
VA 22030, USA
PH# : (703) 788-3567

SYSTEM INFO	
(90) MISSION SOLAR ENERGY MSE410HT0B	
(99) ENPHASE IQ8PLUS-72-M-US (240V)	
DC SYSTEM SIZE: 34,600 KWDC	
AC SYSTEM SIZE: 18,000 KWAC	
METER: 95571191	

REVISIONS	
DESCRIPTION	DATE
REVISION	12/17/2024
	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME

SPECIFICATIONS
& NOTES

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9

1

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT 72.6 AMPS
NOMINAL OPERATING AC VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.54

2

**RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM**

LABEL LOCATION:
INVERTER 4' OR WITHIN 3' OF THE DC COMBINER SWITCH OR AC DISCONNECT
PER CODE: NEC 690.56(C)(3)

3

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

LABEL LOCATION:
POINT OF INTERCONNECTION, MAIN SERVICE
DISCONNECT, AC DISCONNECT, AC COMBINER,
INVERTER
PER CODE: NEC 690.13(B)

4

**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

**SOLAR ELECTRIC
PV PANELS**

LABEL LOCATION:
MAIN SERVICE DISCONNECT IF MSD IS OUTSIDE
ARRAY / IF MSD IS INSIDE PLACE ON THE
AC DISCONNECT
PER CODE: NEC 690.56(C)(1)(a)

5

CAUTION : SOLAR CIRCUIT

LABEL LOCATION:
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR CONDUIT, RACEWAYS,
ENCLOSURES, AND CABLE ASSEMBLIES AT LEAST EVERY 10 FT. AT TURNS AND
ABOVE/BELOW PENETRATIONS AND ALL COMBINER/JUNCTION BOXES
PER CODE: IFC 605.11.1.4

6

PHOTOVOLTAIC
AC DISCONNECT

LABEL LOCATION:
AC DISCONNECT/BREAKER/POINTS OF CONNECTION
PER CODE: NEC 2017, 690.13(B)

7

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY AND PV
POWER SOURCE ELECTRIC
SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
PER CODE: NEC 2017, 705.12(B)

8

**CAUTION : SOLAR ELECTRIC
SYSTEM CONNECTED**

LABEL LOCATION:
POINT OF INTERCONNECTION & INVERTER
PER CODE: NEC 690.15 & 690.13(B)

9

WARNING - Electric Shock Hazard
No user serviceable parts inside
Certified authorized service personnel for assistance

LABEL LOCATION:
INVERTER & JUNCTION BOXES (ROOF)
PER CODE: NEC 690.13 (G)(3) & 690.13 (G)(4)

10

CAUTION
DUAL POWER SOURCE
SECOND SOURCE IS
PHOTOVOLTAIC

LABEL LOCATION:
MAIN SERVICE DISCONNECT/ AC DISCONNECT/
MAIN SERVICE PANEL/ REVENUE METER/ AC
COMBINER
PER CODE: NEC 705.12(B)(3)



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

I hereby certify that these drawings were prepared or approved by me, and that I am a duly Licensed Professional Engineer in the State of the State of Maryland, License No. 39701, Exp. 12/31/2025


SOLAR GLOBAL
3959 PENDER DR, FAIRFAX,
VA 22030, USA
PH# : (703) 788-3567

SYSTEM INFO	
(69) MISSION SOLAR ENERGY	MISSION
(69) ENCASE	100 PLUS (100 PLUS)
(69) ENCASE	100 PLUS (100 PLUS)
DC SYSTEM SIZE: 24,500 KWDC	
AC SYSTEM SIZE: 18,000 KWAC	
METER: 95871191	

REVISIONS	
DESCRIPTION	DATE
REVISION	12/17/2024
	A

PROJECT NAME & ADDRESS
MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
SIGNAGE

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

- ADHESIVE FASTENED SIGNS**
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
 - WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNING AND MARKINGS SHOULD COMPLY WITH ANSI Z39.4 (NEC 110.21(B) FIELD MARKING).
 - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]



CAUTION!

POWER TO THIS SERVICE IS ALSO SUPPLIED FROM THE FOLLOWING SOURCE WITH DISCONNECTS LOCATED AS SHOWN

WASHINGTON ST

ROOFTOP PV
MODULES

ROOFTOP PV
MODULES

N PAW PAW WAY

(1) RACKS SHOWN WITH
UTILITY METER

(2) 1/2" SPLIT LOCK-BUT LABEL FUSED AC DISCONNECT
(4) SOLAR LOAD CENTER

LABEL LOCATION:
EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S)
FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED
(PER CODE: NEC 705.10)



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

I, the undersigned, being a duly licensed professional engineer under the laws of the State of Maryland, hereby certify that these drawings were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.



SOLAR GLOBAL
3859 PENDER DR, FAIRFAX,
VA 22030, USA
PH: (703) 785-3567

SYSTEM INFO	
(60) MISSION SOLAR ENERGY	INSE-104708
(60) INVERTER	IOBPL-US-2504US (240V)
DC SYSTEM SIZE: 24.000 kWDC	
AC SYSTEM SIZE: 18.000 kWAC	
METER: 98071191	

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21602, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
SIGNAGE

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

MSE PERC 108HC

410W

Class leading power output
-0 to +3%

Positive Power Reserve



True American Quality True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas where we manufacture our modules. We produce American, high-quality solar modules ensuring the highest-in-class power output and best-in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long term.

Demand the best. Demand Mission Solar Energy.

- Certified Reliability**
 - Tested to UL 61700 & IEC Standards
 - PID resistant
 - Resistance to salt mist corrosion
- Advanced Technology**
 - Half-cut cells with 10 Busbar
 - Preheated fronter Silver Contact
 - Good for all applications
- Extreme Weather Resilience**
 - Up to 5,400 Pa front load & 5,400 Pa back load
 - 100% hail resistance (1" hail @ 88 mph)
 - 10-year hot spot resistant (25 mm)
- BAA Compliant for Government Projects**
 - American Recovery & Reinvestment Act

FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.35% annually thereafter for the next 25 years, capacity guaranteed in Year 1.5.
For more information, visit www.missionsolar.com

CERTIFICATIONS



If you have questions
about our products or
certification of our
products in your area,
contact Mission Solar Energy.

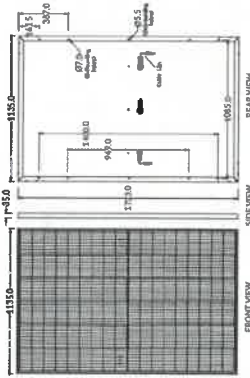
UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

C-543-14-UTC-0000 REV 0 07/07/2022

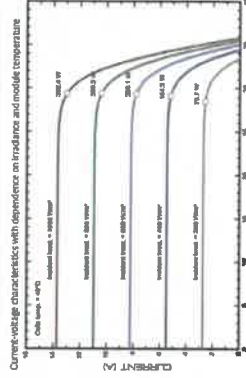
www.missionsolar.com | info@missionsolar.com

Class Leading 400-410W

BASIC DIMENSIONS



CURRENT-VOLTAGE CURVE



CERTIFICATIONS AND TESTS



Mission Solar Energy
8303 S. New Braunfels Ave., San Antonio, Texas 78235
www.missionsolar.com | info@missionsolar.com

Mission Solar Energy reserves the right to make specification changes without notice.
C-543-14-UTC-0000 REV 0 07/07/2022

MSE PERC 108HC

ELECTRICAL SPECIFICATION

PRODUCT TYPE	MSE	108HC	410W
Power Output	P _{max}	400W	410W
Module Efficiency	η _p	20.5	20.7
Tolerance	%	0/+3	0/+3
Short Circuit Current	I _{sc}	13.75	13.82
Open Circuit Voltage	V _{oc}	37.09	37.27
Rated Current	I _{mp}	12.72	12.80
Rated Voltage	V _{mp}	32.16	32.38
Power Rating	P _{max}	25A	25A
System Voltage	V	1,000	1,000

TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	-45.3°C (53.7°F)
Temperature Coefficient of P _{max}	-0.54%/°C
Temperature Coefficient of V _{oc}	-0.25%/°C
Temperature Coefficient of I _{sc}	0.027%/°C

OPERATING CONDITIONS

Minimum System Voltage	1,000Vdc
Operating Temperature Range	-40°F to 157°F (-40°C to +65°C)
Maximum Series Fuse Rating	25A
Pre Safety Classification	Type 1*
Front & Back Load	Up to 5,400 Pa front and 5,400 Pa back load, tested to UL 61720
Hail Safety Impact Velocity	25mm at 23m/s

MECHANICAL DATA

Solar Cells	Polysilicon monocrystalline silicon
Cell Orientation	100 half-cuts
Module Dimension	3725mm x 1135mm x 35mm
Weight	42 lbs (19kg)
Front Glass	3.2mm tempered, low-iron, anti-reflective
Frame	35mm Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.2m, White 4mm ² (12AWG)
Connector	MCS Standard PV4/ST4 (6)-UL and PV4/ST4/68-UL

SHIPPING INFORMATION

Container Type	Ship To	Material	Weight	Length
30'	Mid States	30'	333.90 kg	7.7 ft
Double Stack	CA	20'	273.78 kg	115.58 cm
Weight	47.26 in	Weight	46 in	Length
1,500 lbs	157.3 kg	1,500 lbs	157.3 kg	115.58 cm

www.missionsolar.com | info@missionsolar.com



Reviewed and approved
Richard Pantele, P.E.
MD Lic. No. 39701

Professional Engineer (I hereby certify that these documents were prepared or approved by me, and that I am a duly Licensed Professional Engineer under the laws of the State of Maryland, License No. 39701, dated 12/16/2020)



SOLAR GLOBAL
3859 PENDER DR. FAIRFAX,
VA 22030, USA
PH# : (703) 795-3587

SYSTEM INFO	
(60) MISSION SOLAR ENERGY	MSE1010105
(60) ENHANCE	IQAP LUS-FIN-UCS (240V)
DC SYSTEM SIZE: 24,600 KWDC	
AC SYSTEM SIZE: 16,000 KWAC	
METER: 89971191	
REVISIONS	
DESCRIPTION	DATE
REVISION	12/17/2024

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21602, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024
SHEET NAME EQUIPMENT SPECIFICATIONS
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-12



Our newest QM Microconverters are the industry's first microgrid-forming, software-defined microconverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microconverter is its proprietary application specific integrated circuit (ASIC) which enables the microconverter to operate in grid-tied or self-powered mode. This chip is built in advanced 95nm technology with high speed digital logic and has sophisticated response time to changing loads and grid events, alleviating constraints on battery aging for home energy systems.



Q15 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.



QJB 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 1009 and 1008a, a model anti-backflow, 2.6GPM flow alarm only.

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- **Easy to install**
- Lightweight and compact with plug-in play connectors
- Power Line Communication (PLC)
- Faster installation with simple two-wire cabling

- High productivity and reliability
- Produces power even when the grid is down*
- More than one million customers

- Class II double-insulated enclosure
- Optimized for the latest high-powered DLT work files

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 3rd Ed.)

Note:
IOS Microconverters cannot be used together with previous generations of Erphase microconverters (DOP Series, IOS Series, etc.) in the same system.

10750-10754-12 A-12 A-09-00729-03 EN 111 2012-12-27

Commonly used model pastings*	#	235 ~ 300	60-cell / 120 half-cell	34-cell / 68 half-cell / 10-cell / 120 half-cell / 00-cell / 123 half-cell / 14 half-cell	235 ~ 440
Module compatibility					
MPT voltage range	V	27~37	27~46		
Operating range	V	19~48	16~58		
Mfr. / Max start voltage	V	22/48	22/58		
Max input DC voltage	V	50	60		
Min. continuous input DC current	A	10	12		
Max. input DC short-circuit current	A	20			
Max. module I _L	A	20			
Overvoltage class DC port		B	B		
DC port fused-load current	mA	0			

* 1. & 2. Items indicated by red No. are optional configurations. DC cable protection required AC side protection required max. 20A per branch circuit.

	W1	W2	W3
Peak output power	240	240	240
Max. continuous output power	240	240	240
Nominal (0-1) voltage / range	240 / 241 - 264		
Max. continuous output current	A	1.0	1.21
Nominal frequency	Hz	50	
Extended frequency range	Hz	47 - 68	
AC input circuit, full current over 3 cycles	Amps	2	3
Max. units per 20-ft (6.1-m) branch circuit*		50	
Total harmonic distortion		<0%	
Overvoltage class AC port		III	
AC port backfeed current		30	
Power factor setting		1.0	
On-Off power factor (adjustable)		0.88 leading - 0.88 lagging	
Peak efficiency	%	97.2	
CEC weighted efficiency	%	97	
Light time power consumption	W/h	60	

Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (noncondensing)
DC Connector type	Shielded MLC4
Dimensions (H x W x D)	22 mm (0.87") x 275 mm (10.8") x 304.2 mm (12.7")
Weight	13 kg (28.43 lbs)
Cooling	Natural convection - no fan
Approved for wet locations	Yes
Pollution degree	P03
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure

[illegible]

10159-MCA-121-04-0070-03-5413-2022-02-27



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly Licensed professional engineer under the laws of the State of Maryland. License No. 34231. Eng. John C. Baker.

SOLAR GLOBAL
3959 PENDER DR, FAIRFAX,
VA 22030, USA
PH#: (703) 789-3567

SYSTEM INFO
(60) MISSION SOLAR ENERGY MSE410HT08
(60) ENPHASE IQ8PLUS-72AM-US (240V)
DC SYSTEM SIZE: 24,600 kWDC
AC SYSTEM SIZE: 18,000 kWAC
METER: 95671191

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

SHEET NAME
EQUIPMENT
SPECIFICATIONS

SHEET NUMBER
PV-13

Enphase IQ Envoy

The **Enphase IQ Envoy™** communications gateway delivers solar production and energy consumption data to Enphase Enlighten™ monitoring and analysis software for comprehensive, remote maintenance and management of the Enphase IQ System.

With integrated revenue grade production metering and optional consumption monitoring, Envoy IQ is the platform for total energy management and integrates with the Enphase Ensemble™ and the Enphase IQ Battery™.



- | | | |
|---|---|---|
| Smart <ul style="list-style-type: none"> • Enables web-based monitoring and control • Bidirectional communications for remote upgrades • Supports power export limiting and zeroexport applications | Simple <ul style="list-style-type: none"> • Easy system configuration using Ephraim installer "toolkit" mobile app • Flexible networking with Wi-Fi, Ethernet, or cellular | Reliable <ul style="list-style-type: none"> • Designed for installation indoors or outdoors • Five-year warranty |
|---|---|---|



To learn more about Enphase offerings, visit enphase.com



To learn more about Enphase offerings, visit enphase.com

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Enphase IQ Envoy

MODEL NUMBERS		Epiphany IQ Envoys™ ENV-IQ-AIM-74-0
ACCESSORIES (Order Separately)		Epiphany Mobile Connect™ Epiphany Mobile Connect™ (4G based LTE M/5-year data plan) Epiphany Mobile Connect™ (4G based LTE M/5-year data plan) Consumption Monitoring CT CF-200-SFAT Example Communications IoT COMMS-IOT-01
POWER REQUIREMENTS		Power requirements Typical Power Consumption CAPACITY Number of microconverters polled
MECHANICAL DATA		Dimensions (Height) Weight Ambient temperature range Environmental rating Altitude Protection CT Consumption CT
INTERNET CONNECTION OPTIONS		Integrated WiFi Ethernet Modem
COMPLIANCE		Compliance

Epiphany IQ Envoys communications gateway with integrated revenue grade PV metering (ANSI C12.20 4-0.5%) and optional consumption monitoring (+/- 2.5%). Includes one 200A continuous rated production CT (current transformer).

Plug and play industrial grade cellular modem with data plan for systems up to 60 microconverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is a separate cellular service in the installation area.) Split-core consumption CTs enable whole home metering.

Integrates with the IQ Envoys™ for communications with Epiphany Enphase™ charge and Enphase Enpower™ smart meter. Includes USB cable for connection to IQ Envoys or Enphase IQ Connect™ and allows wireless communication with Enphase and Enpower.

120/240 VAC split-phase.
Max 20 A overcurrent protection required.
DW

Up to 500

21.3 x 12.6 x 4.6 cm (8.4" x 5" x 1.8")
774 gm (498 g)
40° to 55° C (40° to 145° F)
40° to 45° C (40° to 115° F)
P200 For installation in boxes or in an NRTL-certified, NEMA type 3R enclosure.
To 2000 feet (630 feet)
- Limited to 200A of continuous current / 350A DCPS - 72kW AC
- Internal surge protection 19.5kVrms to support 250kVA THWN conductors (max)
- For electrical services to 350A with parallel runs up to 500A
- Internal surge protection 0.84" x 0.96" (21.33mm x 24.38mm) to support 3/0 THWN conductor
- CT wire insulation rating of 600V

802.11b/g/n
802.3 Cat5e (or Cat 6) UTP Ethernet cable (not included)
CELLMOD-INT (4G) or CELLMOD-INT-S (4G). Not included. Note that an Epiphany Mobile Connect cellular modem is required for all Enphase installations.

UL 51010-1
UL 51010-2
UL 51010-3
47 CFR Part 15, Class II, Emission Class II, Emission Class II, Emission Class II
EN50606-1, EN50606-2, EN50606-3, EN50606-4, EN50606-5, EN50606-6, EN50606-7, EN50606-8, EN50606-9, EN50606-10, EN50606-11, EN50606-12, EN50606-13, EN50606-14, EN50606-15, EN50606-16, EN50606-17, EN50606-18, EN50606-19, EN50606-20, EN50606-21, EN50606-22, EN50606-23, EN50606-24, EN50606-25, EN50606-26, EN50606-27, EN50606-28, EN50606-29, EN50606-30, EN50606-31, EN50606-32, EN50606-33, EN50606-34, EN50606-35, EN50606-36, EN50606-37, EN50606-38, EN50606-39, EN50606-40, EN50606-41, EN50606-42, EN50606-43, EN50606-44, EN50606-45, EN50606-46, EN50606-47, EN50606-48, EN50606-49, EN50606-50, EN50606-51, EN50606-52, EN50606-53, EN50606-54, EN50606-55, EN50606-56, EN50606-57, EN50606-58, EN50606-59, EN50606-60, EN50606-61, EN50606-62, EN50606-63, EN50606-64, EN50606-65, EN50606-66, EN50606-67, EN50606-68, EN50606-69, EN50606-70, EN50606-71, EN50606-72, EN50606-73, EN50606-74, EN50606-75, EN50606-76, EN50606-77, EN50606-78, EN50606-79, EN50606-80, EN50606-81, EN50606-82, EN50606-83, EN50606-84, EN50606-85, EN50606-86, EN50606-87, EN50606-88, EN50606-89, EN50606-90, EN50606-91, EN50606-92, EN50606-93, EN50606-94, EN50606-95, EN50606-96, EN50606-97, EN50606-98, EN50606-99, EN50606-100, EN50606-101, EN50606-102, EN50606-103, EN50606-104, EN50606-105, EN50606-106, EN50606-107, EN50606-108, EN50606-109, EN50606-110, EN50606-111, EN50606-112, EN50606-113, EN50606-114, EN50606-115, EN50606-116, EN50606-117, EN50606-118, EN50606-119, EN50606-120, EN50606-121, EN50606-122, EN50606-123, EN50606-124, EN50606-125, EN50606-126, EN50606-127, EN50606-128, EN50606-129, EN50606-130, EN50606-131, EN50606-132, EN50606-133, EN50606-134, EN50606-135, EN50606-136, EN50606-137, EN50606-138, EN50606-139, EN50606-140, EN50606-141, EN50606-142, EN50606-143, EN50606-144, EN50606-145, EN50606-146, EN50606-147, EN50606-148, EN50606-149, EN50606-150, EN50606-151, EN50606-152, EN50606-153, EN50606-154, EN50606-155, EN50606-156, EN50606-157, EN50606-158, EN50606-159, EN50606-160, EN50606-161, EN50606-162, EN50606-163, EN50606-164, EN50606-165, EN50606-166, EN50606-167, EN50606-168, EN50606-169, EN50606-170, EN50606-171, EN50606-172, EN50606-173, EN50606-174, EN50606-175, EN50606-176, EN50606-177, EN50606-178, EN50606-179, EN50606-180, EN50606-181, EN50606-182, EN50606-183, EN50606-184, EN50606-185, EN50606-186, EN50606-187, EN50606-188, EN50606-189, EN50606-190, EN50606-191, EN50606-192, EN50606-193, EN50606-194, EN50606-195, EN50606-196, EN50606-197, EN50606-198, EN50606-199, EN50606-200, EN50606-201, EN50606-202, EN50606-203, EN50606-204, EN50606-205, EN50606-206, EN50606-207, EN50606-208, EN50606-209, EN50606-210, EN50606-211, EN50606-212, EN50606-213, EN50606-214, EN50606-215, EN50606-216, EN50606-217, EN50606-218, EN50606-219, EN50606-220, EN50606-221, EN50606-222, EN50606-223, EN50606-224, EN50606-225, EN50606-226, EN50606-227, EN50606-228, EN50606-229, EN50606-230, EN50606-231, EN50606-232, EN50606-233, EN50606-234, EN50606-235, EN50606-236, EN50606-237, EN50606-238, EN50606-239, EN50606-240, EN50606-241, EN50606-242, EN50606-243, EN50606-244, EN50606-245, EN50606-246, EN50606-247, EN50606-248, EN50606-249, EN50606-250, EN50606-251, EN50606-252, EN50606-253, EN50606-254, EN50606-255, EN50606-256, EN50606-257, EN50606-258, EN50606-259, EN50606-260, EN50606-261, EN50606-262, EN50606-263, EN50606-264, EN50606-265, EN50606-266, EN50606-267, EN50606-268, EN50606-269, EN50606-270, EN50606-271, EN50606-272, EN50606-273, EN50606-274, EN50606-275, EN50606-276, EN50606-277, EN50606-278, EN50606-279, EN50606-280, EN50606-281, EN50606-282, EN50606-283, EN50606-284,



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 24721. Expiration Date: 12/31/2006.



SOLAR GLOBAL
3959 PENDER DR, FAIRFAX,
VA 22030, USA
PH# : (703) 789-3567

SYSTEM INFO		
(60) MISSION SOLAR ENERGY		
MSL410HT08		
(60) ENPHASE		
IO8PLUS-72-M-US (240V)		
DC SYSTEM SIZE: 24.600 KWDC		
AC SYSTEM SIZE: 18.000 KWAC		
METER: 85671181		
REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

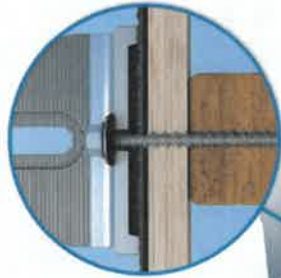
DATE: 12/17/2024	SHEET NAME EQUIPMENT SPECIFICATIONS	SHEET SIZE ANSI B 11" X 17"	SHEET NUMBER PV-14
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The Respect Your Roof Deserves

When integrating with a home, solar attachments must be dependable for the lifetime of the rooftop. Due to recent innovations, many asphalt shingles have bonded courses. A mount that speeds without the need to pry shingles can really speed things up.

Halo UltraGrip™ (HUG™) is here to respect the roof. Its Halo is a cast-aluminum barrier that encases the UltraGrip, our industrial-grade, beam-and-mastic seal. This allows HUG to accelerate the installation process and provide the utmost in waterproofing protection. Give your roof a HUG!



Multi-Tiered Waterproofing
HUG utilizes a multi-tiered deck of components to provide revolutionary waterproofing. The Halo is a cast-aluminum, reinforced-penetrator foundation that encases the UltraGrip beam — a four-layered mastic seal combination that provides a multi-tiered seal by allowing the beam to penetrate the shingle surface.

HUG UltraGrip™ is part of the QuickMount™ product line.

UltraGrip™ Seal Technology
HUG UltraGrip utilizes a state-of-the-art seal design that uses a unique beam-and-mastic combination. The beam-and-mastic combination provides an effective seal that conforms to the shape and contour of composition shingles, and conforms and adheres to every rock, tile, and slate surface (up to 1/2" in height).

Rafter & Deck Mounting Options
Mount HUG to the roof rafters, the roof deck, or the roof joists using the HUG's (recessed) Structural Screws. The RD Structural Screw anchors HUG to the roof joists with an EPDM sealing washer, complying with the International Building Code (IBC) for rafter and deck mounting.



Triple Rated & Certified to Respect the Roof™
UL 2703, 441 (ET) TAS 100(A)-95

Tech Brief

QuickMount™ HUG

Adaptive, Rafter-Friendly Installation



Still no luck? Install the rest.

Miss the rafter? Try it again.

Hit the rafter? Good to go!

Trusted Strength & Less Hassle



Structural capacities of HUG™ were reviewed in many load directions, with racking rail running cross-slope or up-slope in relation to roof pitch.

For further details, see the HUG certification letters for attaching to rafters and decking.

IronRidge designed the HUG, in combination with the RD Structural Screw to streamline installs, which means the following:

- No prying shingles
- No roof nail interference
- No pilot holes necessary
- No sealant (in most cases)
- **No third parties needed!**

Attachment Loading

The rafter-mounted HUG has been tested and rated to support 1004 (lbs) of uplift and 385 (lbs) of lateral load.

Structural Design

Parts are designed and certified for compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings

HUG passed both the UL 441 Section 27 "Rain Test" and TAS 100(A)-95 "Wind Driven Rain Test" by Intertek.

UL 2703 System

Systems conform to UL 2703 mechanical and bonding requirements. See Flush Mount Rain for more info.

SOLAR GLOBAL

SOLAR GLOBAL
3959 PENDER DR. FAIRFAX,
VA 22030, USA
PH# : (703) 785-3557

SYSTEM INFO
(80) MISSION SOLAR ENERGY NSE10HT03
(80) ENPHASE ICBPLUS-724H-US (240V)
DC SYSTEM SIZE: 24,000 KWDC
AC SYSTEM SIZE: 18,000 KWAC
METER: 35871181

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	12/17/2024	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCLEAN@ATLANTICNET.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME

EQUIPMENT
SPECIFICATIONS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-15



Reviewed and approved
Richard Pantei, P.E.
MD Lic. No. 39701

I, the undersigned, being a duly licensed Professional Engineer under the laws of the State of Maryland, do hereby certify that the foregoing is a true and correct copy of the original design and specifications for the project, and that I am a duly licensed Professional Engineer under the laws of the State of Maryland.

12/18/2024



SOLAR GLOBAL
 3959 PENDER DR. FAIRFAX,
 VA 22030, USA
 PH# : (703) 789-3567

SYSTEM INFO
 (69) MISSION SOLAR ENERGY
 INSE 10/10/05
 (60) ENPHASE
 IQMP12-12-10-05 (240V)
 DC SYSTEM SIZE: 24,000 KWDC
 AC SYSTEM SIZE: 16,000 KWAC
 METER: 56871191

REVISIONS	DATE	REV
DESCRIPTION	12/17/2024	A

PROJECT NAME & ADDRESS
 MICHAEL MCKAY
 RESIDENCE
 407 WASHINGTON ST APT 1, CUMBERLAND, MD
 21502, USA
 EMAIL ID: DRYCLEAN@ATLANTICBB.NET
 PHONE NO. (301) 697-2622

DATE: 12/17/2024
 SHEET NAME
EQUIPMENT SPECIFICATIONS

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

SHEET NUMBER
PV-16



Reviewed and approved
 Richard Pantel, P.E.
 MD Lic. No. 39701
 Professional Certification: I hereby certify that these
 calculations were prepared or approved by me, and that I am a
 duly licensed Professional Engineer under the laws of the
 State of Maryland. My commission expires on 12/31/2028.



The Right Way!

ProteabBracket™ is the perfect solar after-market solution for most trapezoidal rib, exposed fastened metal roof profiles!

ProteabBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

Note: All four pre-punched holes must be used to achieve tested strength. Reinforce the product.

For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including mechanical compatibilities and specifications.

S-5! holding strength is unmatched in the industry.

Multiple Attachment Options:



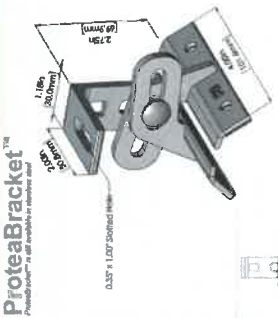
Side Mount Rail



Bottom Mount Rail



W/S-5! PVKIT™ (rail-free)



ProteabBracket™
ProteabBracket™ is an available in aluminum and steel.

1 lip (20.0mm)
2.75" (69mm)
0.35" x 1.00" Slotted Hole
1.5" (38mm)

ProteabBracket fits profiles up to 3 inches

INSTALLATION:
No surface preparation needed. (1) Wipe away excess oil and debris. (2) Peel off adhesive release paper. (3) Align and mount bracket directly onto rows of panel. (4) Tighten fastener through pre-punched holes, using pre-drilled 5/8" screws.

ProteabBracket™ can be used for rail mounting or "direct-attach" with S-5! PVKIT™

Distributed by

S-5! Warning! Please use this product responsibly!
 Products are designed for specific U.S. and foreign climates. For published data regarding building
 products, including performance, visit www.S-5.com. Visit the S-5! website at www.S-5.com.
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The Right Way!

ProteabBracket™

A versatile bracket for mounting solar PV to trapezoidal roof profiles

NEW

NOW AVAILABLE IN ALUMINUM



ProteabBracket™

The right way to attach solar PV to trapezoidal roof profiles!

ProteabBracket™ is now made in aluminum, giving the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteabBracket™ not just better, but better.

The bracket features an adjustable attachment base and module, allowing options to accommodate different roof profile dimensions and mounting systems.

Our pre-applied EPDM gasket with peel-and-stick adhesive makes installation direct, ensuring accurate and secure placement the first time.

With no messy solvents, tedious installation, and a weather-proof, hydrophobic coating, you'll find the most versatile solar attachment solution available.

Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*

ProteabBracket™ can be used for rail mounting or "direct-attach" with S-5! PVKIT™

888-825-3432 | www.S-5.com

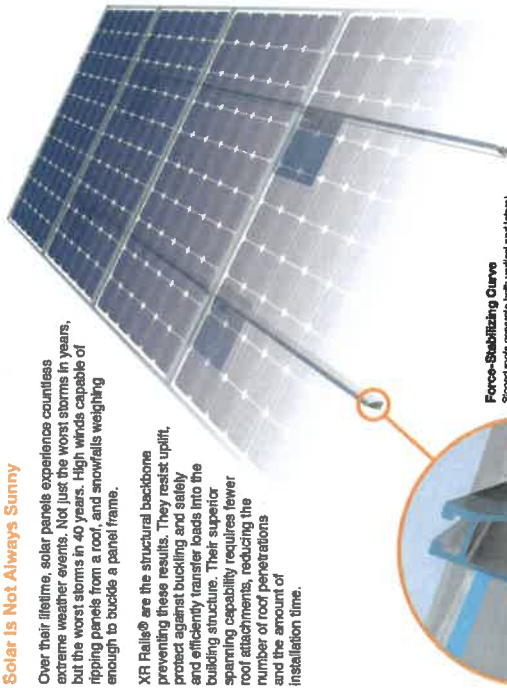


XR Rail® Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails® are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Powered by a patented force-stabilizing curve, XR Rails are designed to resist uplift, wind, and snow loads on most roof pitches which can cause them to bend and twist. The curved shape of XR Rails® is specially designed to increase strength in both directions while resisting the twisting. This unique feature allows XR Rails to resist extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails® are compatible with a range of lag bolt and rafter tie rod mounting attachments.

Corrosion-Resistant Materials

All XR Rails® are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface corrosion and also provides a more attractive appearance.

XR Rail® Family

The XR Rail® Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail® to match.



XR10

XR10 is a sleek, low-profile mounting rail designed for residential and commercial applications. It supports a range of panel sizes up to 6 feet, while remaining light and economical.

- 8' spanning capability
- Maximum load capacity
- Clear & black anodized finish
- Internal splice available



XR100

XR100 is a residential and commercial mounting rail. It supports a range of panel sizes up to 10 feet, maximizing spans up to 10 feet.

- 10' spanning capability
- Maximum load capacity
- Clear & black anodized finish
- Internal splice available



XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle commercial applications up to 12 feet for commercial applications.

- 12' spanning capability
- Maximum load capacity
- Clear & black anodized finish
- Internal splice available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Pitch Mount, Roof Zones 1 & 2a, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit ironridge.com for detailed certification letters.

Load		Rail Span					
Span (ft)	Wind (MPH)	4'	6'	8'	10'	12'	
None	90	XR10	XR100	XR1000			
	120						
	140						
	160						
20	90	XR10	XR100	XR1000			
	120						
	140						
	160						
30	90	XR10	XR100	XR1000			
	120						
	140						
	160						
40	90	XR10	XR100	XR1000			
	120						
	140						
	160						
80	90	XR10	XR100	XR1000			
	120						
	140						
	160						

*Based on request to provide a simplified span chart for comparing general rail capabilities. Not intended for use as a design reference.



Reviewed and approved
Richard Pantel, P.E.
MD Lic. No. 39701

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 39701, expires 12/31/2023.



SOLAR GLOBAL
3959 PENDER DR. FAIRFAX,
VA 22030, USA
PH#: (703) 788-3557

SYSTEM INFO	
(80) MISSION SOLAR ENERGY	MSE410HT08
(60) ENPHASE	IQ8P-US-724H-US (240V)
DC SYSTEM SIZE: 24.600 kWDC	
AC SYSTEM SIZE: 18.000 kWAC	
METER: 95971191	

REVISIONS	
DESCRIPTION	DATE
REVISION	12/17/2024
	A

PROJECT NAME & ADDRESS

MICHAEL MCKAY
RESIDENCE
407 WASHINGTON ST APT 1, CUMBERLAND, MD
21502, USA
EMAIL ID: DRYCLEAN@ATLANTICBB.NET
PHONE NO. (301) 697-2622

DATE: 12/17/2024

SHEET NAME
EQUIPMENT
SPECIFICATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

