COLUMBIA BOROUGH - HISTORICAL ARCHITECTURAL REVIEW BOARD

Paul W. Myers Council Chambers
May 8, 2024 - 7:00 PM

AGENDA

This meeting will be live streamed via the Borough's YouTube Channel as a convenience and is not meant to replace in-person participation in the meeting.

1) Call to Order and Roll Call

2) Moment of Silence

3) Pledge to the Flag

4) Minutes for Approval – April 10, 2024 - HARB Meeting

5) New Business
   a) Consider motion to recommend to Borough Council for the COA – 401 Walnut St

APPLICANT/OWNER:	Christopher Prestia
AGENT:	N/A
CONTRACTOR:	Solar Energy World
ALTERATION:	Installation of roof mounted PV solar panels, total area coverage is 392 sq. feet.

6) Presentation of Administrative Approvals / In-Kind (information only)
   - 128 S 5th St – In-kind replacement of fence
   - 233 N 2nd St – In-kind replacement of rubber roof
   - 243 Locust St – In-kind replacement of railing
   - 448 Avenue I – In-kind replacement of railing
   - 22 N 3rd St - In-kind replacement of roof
   - 250 N 3rd St – In-kind replacement of siding, gutters and roof
   - 17 S 3rd St - In-kind replacement of roof

7) Public Comments and Questions

8) Other Business

9) Motion to Adjourn

Civility and Decorum: Borough officials and members of the public are expected to conduct themselves with civility and to accord each other a measure of dignity and respect. Shouting, foul language, personal insults, threats, and attacks or any conduct that disrupts the flow of business is out of order.

(Next Meeting June 12, 2024)

If you are a person with a disability wishing to attend this meeting and require an accommodation to participate in the meeting, please contact the Columbia Borough Office at (717) 684-2467 at least 24 hours prior to the meeting.

COLUMBIA BOROUGH - HISTORICAL ARCHITECTURAL REVIEW BOARD
Paul W. Myers Council Chambers
April 10, 2024 - 7:00PM

MINUTES

1. Chairman Lutz called the meeting to order at 7:03 p.m.

   Board Members present: Brandt, Carrigan, Architect Kerekgyarto, & Lutz.

   Board Members absent: Mountain & Barley

   Staff Present: Code Compliance Manager Diffenderfer

2. There was a moment of silence observed.

3. Chairman Lutz led the pledge to the flag.

4. Minutes for Approval.

   Motion to approve minutes for the March 13, 2024, meeting.

Motion by:	Second by:	Voice Vote:
P. Kerekgyarto	A. Carrigan	All Favored – Motion Carried

5. New Business

   a) Motion to recommend to Borough Council approval for the COA – 12 S 5th Street as presented conditioned upon retaining ½ round front and down spout and contoured molded mill work on exterior surfaces.

Motion by:	Second by:	Voice Vote:
P. Kerekgyarto	A. Carrigan	All Favored – Motion Carried

   APPLICANT/OWNER: Thomas and Eileen Nikolaus
   AGENT: N/A
   CONTRACTOR: TBD
   ALTERATIONS: Replace doors and windows. Replace siding and roof. Wrap exposed wood surfaces with aluminum. Repaint brick surfaces and trim.

   The applicant was present and addressed the Board to review the proposed work and answer questions.

6. Presentation of Administrative Approvals/In-Kind (information only)
   - 26 S 4th St. – In-kind replacement of siding

7. Public Comments and Questions

8. Other Business

   NEXT MEETING, Wednesday May 8th, 2024, 7 p.m.

9. Motion to adjourn the meeting at 7:17 p.m.

Motion by:	Second by:	Voice Vote:
B. Brant	P. Kerekgyarto	All Favored – Motion Carried

MOTIONED AND APPROVED this 8th day of May 2024, by the Historical Architectural Review Board of the Borough of Columbia, Lancaster County, Pennsylvania, in lawful session duly assembled.

BOROUGH OF COLUMBIA, LANCASTER COUNTY, PENNSYLVANIA

By:

_____

Jonathan Lutz, Chairperson of the Board

RECEIVED COLUMBIA APR 09 2024 Your Town

BOROUGH OF COLUMBIA
HARB REVIEW APPLICATION

Permit / COA # 240037

PRINT LEGIBLY AND COMPLETE THIS FORM IN ITS ENTIRETY

BY: _____

DATE OF APPLICATION: 4/5/24

STREET ADDRESS OF PROPERTY TO BE REVIEWED: 401 Walnut St, Columbia PA 17512

DATE BUILDING CONSTRUCTED: 1890 DATE OF ADDITIONS / ALTERATIONS: N/A

PROPERTY OWNER NAME: Christopher Prestia

ADDRESS: 401 Walnut Street, Columbia PA 17512

PHONE: (862)266-7333 EMAIL: chris.prestia@gmail.com

If Applicant is not the equitable owner of the property, please indicate below:

- [x] Owner's Agent / Representative
- [ ] Other _____

A letter is required by the property owner, authorizing the agent / representative to act on their behalf.

- [x] Letter received

AGENT/REPRESENTATIVE NAME (if applicable): Evan Graves / Solar Energy World

ADDRESS: 7930 National Hwy Suite 201 Pennsauken NJ 08110

PHONE: (856)242-5051 EMAIL: permitsnj@solarenergy.world.com

CONTRACTOR NAME: Solar Energy World

ADDRESS: 7930 National Hwy Suite 201 Pennsauken NJ 08110

PHONE: (856)242-5051 EMAIL: permitsnj@solarenergyworld.com

ARCHITECT / ENGINEER NAME (if applicable): Exactus Energy / Dave Hernandez PE

ADDRESS: 4912 Prospect Ave, Blue Ash OH 45242

PHONE: (513)418-8812 EMAIL: davehernandezpe@gmail.com

PROPERTY USE (check all that apply):

- [ ] MULTI-FAMILY RESIDENCE
- [ ] SINGLE FAMILY RESIDENCE
- [ ] COMMERCIAL/RETAIL
- [ ] INDUSTRIAL
- [ ] INSTITUTIONAL
- [ ] VACANT

BUILDING TYPE:

- [ ] SINGLE, DETACHED
- [ ] DUPLEX
- [ ] ROW
- [ ] APARTMENT BUILDING
- [ ] WAREHOUSE
- [ ] OTHER: _____

BOROUGH OF COLUMBIA

PERMIT APPLICATION

☒ BUILDING ☒ ZONING

Permit # 240037 (HARB)

PRINT LEGIBLY AND COMPLETE THIS FORM IN ITS ENTIRETY

Required Information - All applications must include the following items:

- Applicable plans submitted digitally as a PDF
- Contractor General Liability Insurance Certificate
- Site plan submitted digitally as a PDF **(If applicable)**
- Stormwater Exception Form for all new impervious
- Workers Compensation Affidavit **(building permit only)**
- PA ONE CALL notification of underground service (800.242.1776) ☐Yes ☐No

PROPERTY ADDRESS: 401 Walnut Street, Columbia PA 17512 **DATE OF APPLICATION:** 4/5/24

Check all that apply: ☒ **HARB District** ☐ **Residential** ☐ **Commercial**

PROPERTY OWNER NAME: Christopher Prestia **PHONE:** (862) 266-7333

ADDRESS: 401 Walnut Street, Columbia PA 17512 **EMAIL:** chris.prestia@gmail.com

AGENT NAME (if applicable): Evan Graves / Solar Energy World **PHONE:** (856) 242-5051

ADDRESS: 7930 National Hwy, Pennsauken NJ 08110 **EMAIL:**

CONTRACTOR NAME: Solar Energy World **PHONE:** permitsnj@solarenergyworld.com

ADDRESS: 7930 National Hwy, Pennsauken NJ 08110 **EMAIL:**

Description of Work:

☐ New Construction	☐ Demolition	☐ Deck / Porch over 30" in height
☐ Addition	☐ Sign	☐ Deck / Porch up to 30" in height
☒ Renovation	☐ Pool / Spa	☐ Accessory Structure over 400 sq ft
☐ Fire Alarm / Sprinkler	☒ Electrical	☐ Accessory Structure up to 400 sq ft
☐ Shed	☐ Fence	☐ Roof Construction
☐ Retaining Wall	☒ Other: Roof mount PV solar array (7.79KW)	

Brief Project Description: Install of a 7.79KW roof mount PV solar array with (19) Silfab 410watt panels. Total roof area: 392 sf, no structural changes per PE letter included. SnapNRack TopSpeed mounting system used to install

Project Costs: $ 34,920 **Project Footprints (sqft):** 392 sf

I, the undersigned, understand that any work affecting existing ordinances must be in compliance with those ordinances, that major work is subject to inspection, that new structures require a certificate of occupancy upon completion, that any misrepresentation of the proposed work is cause for withdrawal of this permit and any work done beyond the scope of this permit is cause for a civil action complaint. The minimum penalty as prescribed by the municipal planning code of PA is $500.00

SIGNATURE OF PROPERTY OWNER/AGENT: Evan Graves / Solar Energy World DATE: 4/5/24

SIGNATURE OF ZONING OFFICER: DATE:

SIGNATURE OF BUILDING/PERMIT OFFICER: DATE:

APPLICATION STATUS: ☐ APPROVED ☐ DENIED

REASON FOR DENIAL:

Please Note: A third-party review, including inspections, may be required for some projects. The Borough of Columbia reserves the right to require additional information. The first $1,000.00 of project costs is $25.00 and each additional $1,000.00 is $5.00. Additional fee for 3rd party review. Permit fees are doubled for work performed without a permit.

OFFICIAL USE ONLY

DATE APPLICATION WAS **RECEIVED** AND **STAMPED**: _____ ISSUANCE DATE: _____

DATE FEE WAS PAID: AMOUNT $ CASH / CREDIT CARD / CHECK#

Proposed Alteration(s): Addition, Renovation, Restoration, Demolition or New Construction (list each item separately)

EXAMPLES: 1. *Replace existing front door with wood four-panel door* 2. *Install storm Door*

Install 7.79KW roof mount PV Solar array with (18) 5.1fab 410 watt panels, total roof area: 392 sq ft

No structural changes of modifications needed per PE letter

SnapN Rack TopSpeed mounting system used.

ESTIMATION OF TOTAL COSTS OF THE ALTERATION(S): $ 34,920.00

CHECKLIST FOR SUBMISSION

☑ **HARB Letter of Intent**

☑ **Photographs must be submitted with ALL applications.**

It is important for the HARB to get a clear idea of the full extent of the work and the project's surroundings. They must include the entire side of building that is being worked on as well as adjacent buildings and objects. Include close up photos of any work which can provide accurate information and details of the work being done. If the project is new construction or an addition of a structure or sign, include photographs of the future location.

☑ **Drawings must be submitted with ALL applications.**

Drawings convey a lot of information regarding the intention and extent of the work being done and must be included with the application.

Drawings should be in the scale of 1/8" = 1', or 1/4" = 1', except for signs. Signs should be at a scale large enough to see the intent and any text can be read clearly. All drawings must include dimensions. Provide (10) copies of blueprints, or (1) copy if drawing is on 8.5" x 11" or 11" x 17" paper.

☑ **Clear Descriptions**

Describe your project as clearly and comprehensively as possible. Provide any information regarding the details of your project. This includes paint color chips, material samples, pictures of fixtures, and manufacturer's specifications.

☑ **Material samples**

☑ **Brochure or Catalog cuts**

I, the undersigned, understand that any work affecting existing ordinances must be in compliance with those ordinances, that major work is subject to inspection, that new structures require a certificate of occupancy upon completion, that any misrepresentation of the proposed work is cause for withdrawal of this permit and any work done beyond the scope of this permit is cause for a civil action complaint. The minimum penalty as prescribed by the municipal planning code of PA is $500.00

SIGNATURE OF PROPERTY OWNER: Christopher Prestia **DATE:** 04/08/2024

SIGNATURE OF ZONING/MUNICIPAL OFFICIAL: **DATE:**

OFFICIAL USE ONLY

Date of Site Visit by Official: _____ Official's Name: _____

Date Applicant Was Given the following items: _____

☐ Pink placard (to be prominently displayed on the property where alterations are proposed)

☐ Meeting notice (provide applicant with date, time and location of the meeting at which the application will be reviewed)

DATE APPLICATION WAS **RECEIVED** AND **STAMPED**: _____ ISSUANCE DATE: _____

DATE FEE WAS PAID: AMOUNT $ CASH / CREDIT CARD / CHECK#

BOROUGH OF COLUMBIA
ZONING DETERMINATION LETTER

PRINT LEGIBLY AND COMPLETE THIS FORM IN ITS ENTIRETY

DATE OF APPLICATION: 4/5/24

STREET ADDRESS OF PROPERTY TO BE REVIEWED: 401 Walnut Street, Columbia PA 17512

PROPERTY OWNER NAME: Christopher Prestia

ADDRESS: 401 Walnut Street, Columbia PA 17512

PHONE: (856) 242-5051 EMAIL: chris.prestia@gmail.com

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A letter is required by the property owner, authorizing the agent / representative to act on their behalf.

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AGENT/REPRESENTATIVE NAME (if applicable): Evan Graves / Solar Energy World

ADDRESS: 7930 National Hwy Suite 201 Pennsauken NJ 08110

PHONE: (856) 242-5051 EMAIL: permitsnj@solarenergyworld.com

PROPOSED USE(S): Provide a detailed description of all intended uses for the property. Clearly indicate the purpose of the letter in order that the Borough my satisfy your intended needs.

Existing home in Historic District - seeking approval to install roof mount PV solar array (7.79KW) with (19) Silfab 410 watt panels, total area: 392 sf roof solars.

No structural changes or alterations to stated building site needed per stamped PE letter.

YOUR COMPLETED APPLICATION MUST INCLUDE:

- [ ] $25 for a simple zoning verification letter
- [ ] $100 for a complex zoning verification letter

SIGNATURE OF APPLICANT: Evan Graves **DATE:** 4/5/24

OFFICIAL USE ONLY

DATE APPLICATION WAS **RECEIVED** AND **STAMPED:** _____

DATE LETTER WAS FORWARDED: _____

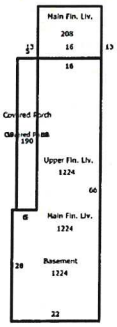
DATE FEE WAS PAID: AMOUNT $ CASH / CREDIT CARD / CHECK#

Property Information

Property ID	110-87442-0-0000	**Property Use**	100 - RESIDENTIAL
Tax Year	2024	**Land Use**	114 - TWO FAMILY DWELLING
Township	110 Columbia Boro		
Site Address	401 WALNUT ST	**Tax Status**	Taxable
		Clean & Green	No

Property Sketches & Photos

1-1



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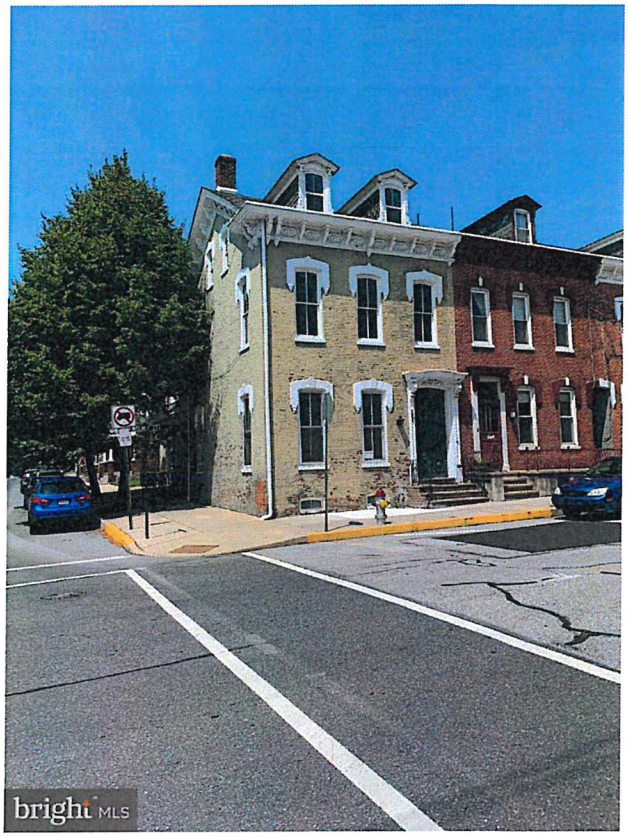


Related Names

Parcel Owner	PRESTIA, CHRISTOPHER R 401 WALNUT ST COLUMBIA, PA 17512
Status	Current

Assessments

Annual Billing

	Land	Building	Total	Pref. Land	Pref. Building	Pref. Total
Non-Exempt	23,200	101,000	**124,200**	0	0	**0**
Exempt	0	0	**0**	0	0	**0**
Total	**23,200**	**101,000**	**124,200**	**0**	**0**	**0**

Note: Preferential assessment values are used for taxation when preferential values are greater than zero.

Property Characteristics

Electric	Gas	Sewage	Water
HOOKED-UP	PUBLIC SYSTEM	PUBLIC SYSTEM	PUBLIC SYSTEM

Market Land Valuation

Property Type	Land Type	Sq. Ft.	Calc. Acres
RES - Residential	2 - PRIMARY HOMESITE	2,178	0.0500
RES - Residential	6 - RESIDUAL	436	0.0100

Structure 1 of 1

Property Type	Description	Style	Total Living Area	Year Built
RES - Residential	ROW-HS-END #1	Two Story End Unit	2,656	1890

Accommodations

Extra Fixtures	4
Full Baths	1
Half Baths	2
Number of Bedrooms	4
Number of Families	2
Number of Rooms	9

Miscellaneous Non-Residence

PERM-STAIRS	1.00 Units

Roofing

Composition Shingle	2656.00 Sq.Ft.

Style

Style	ROW-HS-END

Basement

Total Basement Area	1224.00 Sq.Ft.

Exterior Walls

Masonry, Common Brick	2656.00 Sq.Ft.

Fuel Type

Fuel Type	Gas

Heating/Cooling

Radiators, Hot Water	2656.00 Sq.Ft.

Porches, Decks, Breezeways

Slab Porch with Roof	380.00 Sq.Ft.

Story Height

Number of Stories	2.00

Exemptions

Exemption Type	Status	Farmstead
Homestead	Appl Approved (Full)	No

Sales History

Year	Document #	Sale Type	Sale Date	Sold By	Sold To	Price
2021	6577390	DEED	1/28/2021	DONALD MURPHY	CHRISTOPHER PRESTIA	$150,000
2013	6073603		4/25/2013	DONALD MURPHY	BECKY MURPHY	$1
2011	5964482		11/23/2011	THOMAS BUCHER	DONALD MURPHY	$70,000

Billing & Collection info for this District is not available for display. Please contact the following person or office:

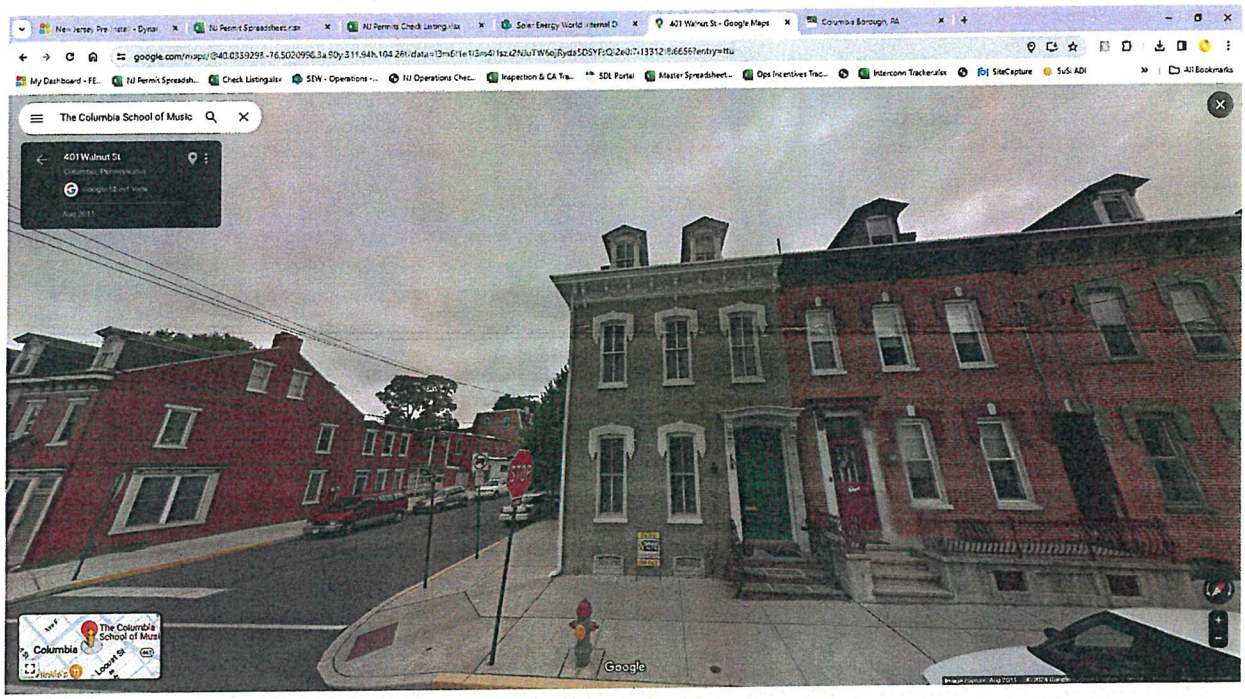
Columbia Borough, Tax Collector
308 Locust Street
Columbia, PA 17512
(717) 684-2467

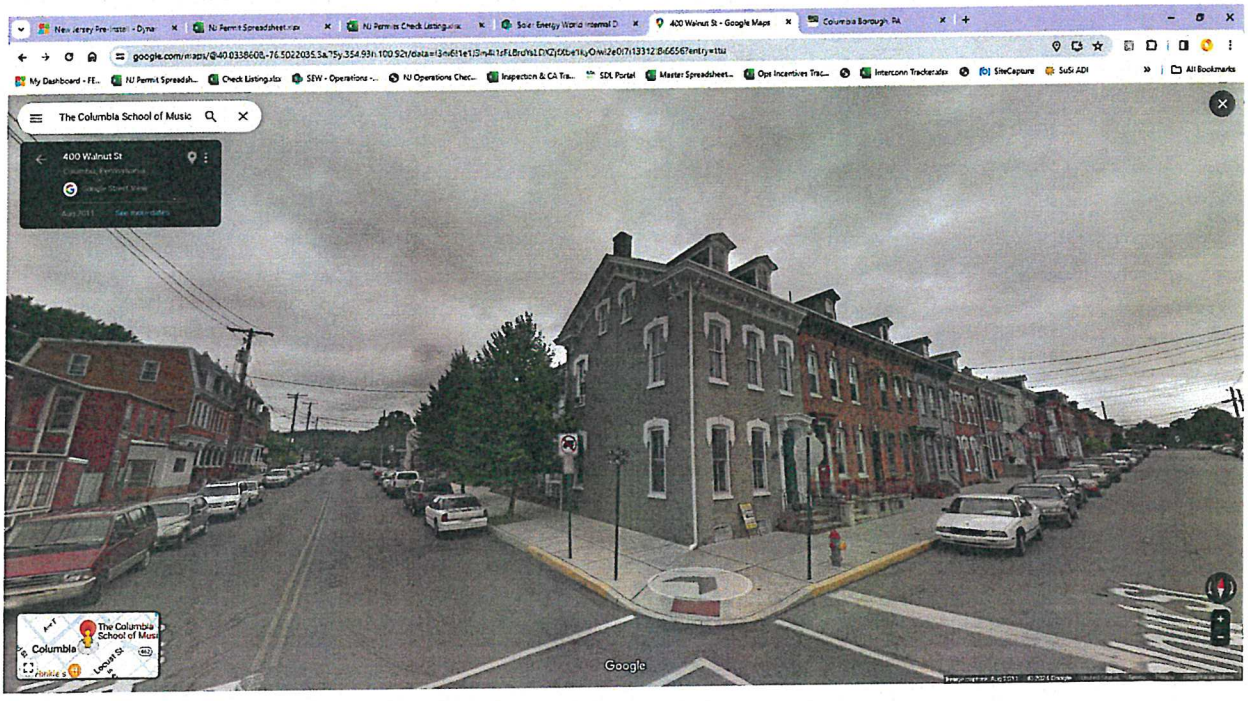
Delinquent Taxes

NOT A CERTIFIED COPY - FOR INFORMATIONAL PURPOSES ONLY

Tax Year	Due	Paid	Total Due

Data updated: 2024-04-02 17:15:00
wEdge Version 4.0.8755.27488
Assembly Date: 2023/12/21


The Columbia School of Music
401 Walnut St
Google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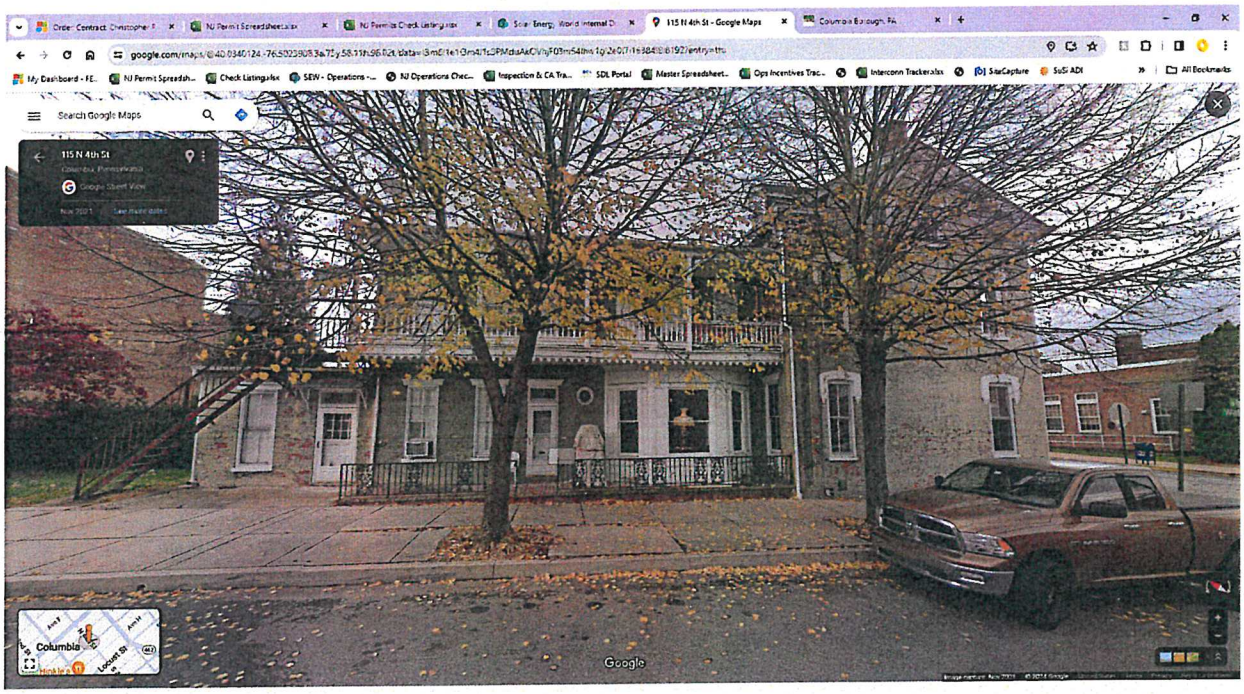
115 N 4th St - Google Maps
google.com/maps
Search Google Maps
115 N 4th St
Columbia
Locust St
Google


bright MLS

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Date: 2024.04.02 16:30:29 -04:00

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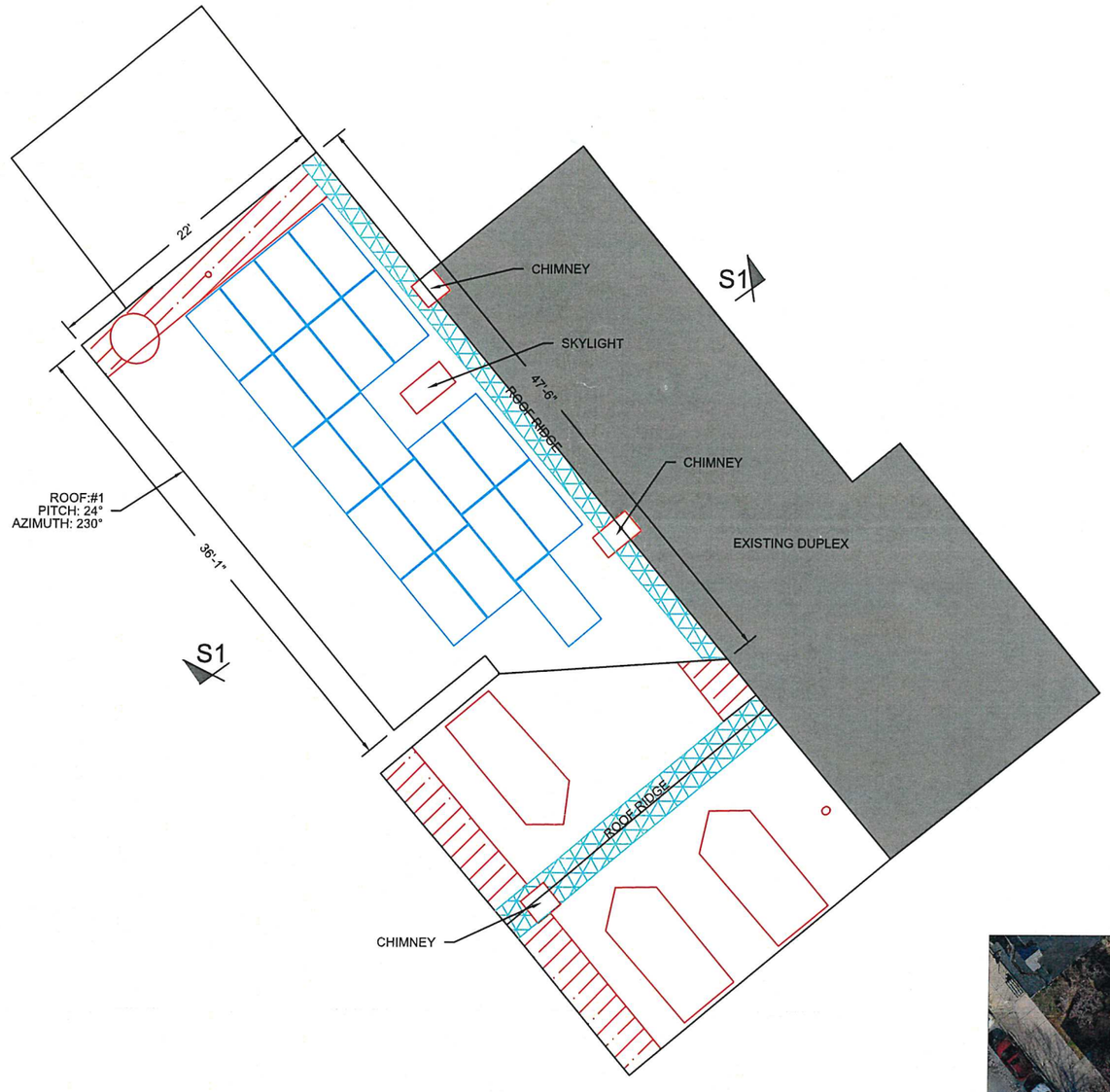
REGISTERED PROFESSIONAL
DAVID C HERNANDEZ
ENGINEER
PE087541
Exp. 09/30/25
DCH GLOBAL



N
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KEY

FIRE SAFETY ZONE

3' PATHWAYS FROM LOWEST ROOF EDGE TO RIDGE PROVIDED PER R324.6.1

1'6" PATHWAYS PROVIDED ON BOTH SIDES OF RIDGE PER R324.6.2

PLAN VIEW TOTAL ROOF AREA: 1906 SQFT

SOLAR ARRAY AREA: 392.35 SQFT

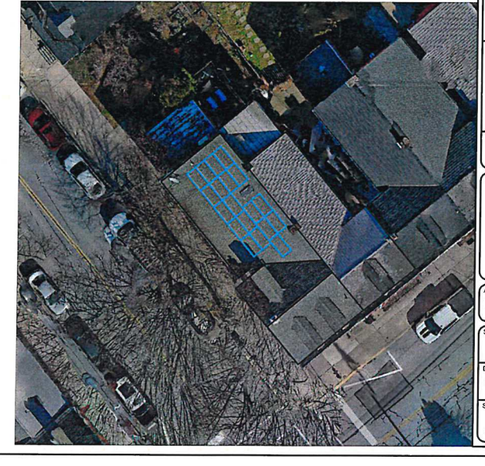
THE SOLAR ARRAY IS 20.6% OF THE PLAN VIEW TOTAL ROOF AREA

NOTES:

1. THE SYSTEM SHALL INCLUDE (19) SILFAB SIL-410 BG.
2. SNAPNRACK TOPSPEED WILL BE INSTALLED IN ACCORDANCE WITH SNAPNRACK INSTALLATION MANUAL.
3. REFER TO STRUCTURAL DRAWING FOR SECTIONS MARKED AND ADDITIONAL NOTES.

SOLAR PANEL LAYOUT

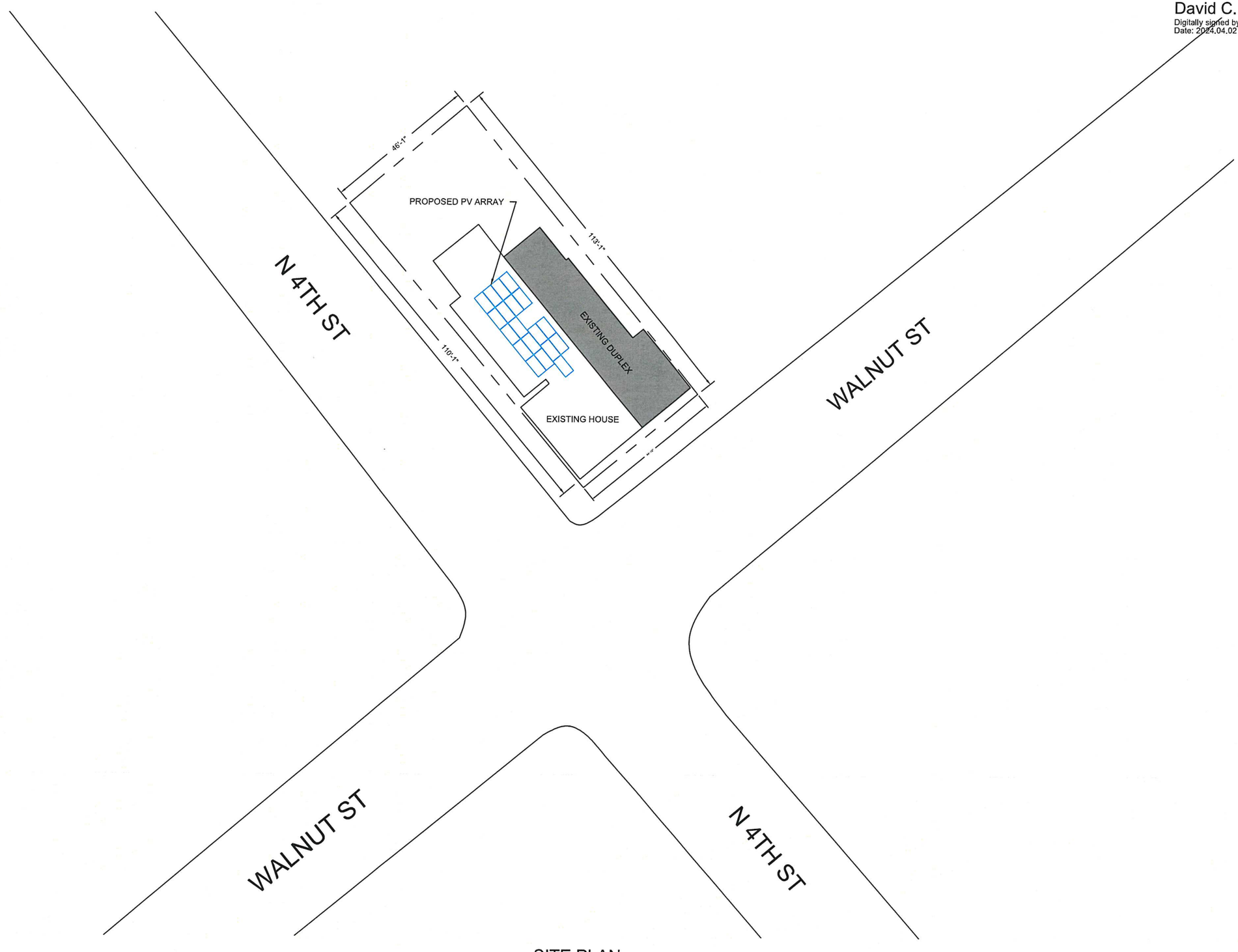
Scale: 1/8" = 1'-0"



Solar Energy World
Because Tomorrow Matters

Solar Energy World LLC.
14880 Sweitzer Lane
Laurel, MD 20707
(888) 497-3233

Building Code	International Residential Code (IRC) 2018
Electrical Code	National Electrical Code (NEC) 2017
Wind Speed	115 MPH
Snow Load	30 PSF
Modules	(19) SILFAB SIL-410 BG
Inverter(s)	(19) IQ8M-72-2-US
DC System Size	7.790 kW
AC System Size	6.175 kW
Customer Information	Christopher Prestia 401 Walnut St Columbia, PA 17512
AHJ	Lancaster
Utility	PPL
Sheet Name	Solar Panel Layout
Drawn By	CB
Date	April 2, 2024
Scale	AS NOTED
Job Number	PA18294
Sheet	A-1



SITE PLAN
Scale: 1" = 30'-0"

David C. Hernande
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Date: 2024.04.02 16:30:29 -04:00

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(888) 497-3233

Building Code: International Residential Code (IRC) 2018

Electrical Code: National Electrical Code (NEC) 2017

Wind Speed	Snow Load
115 MPH	30 PSF

Modules: (19) SILFAB SIL-410 BG

Inverter(s): (19) IQ8M-72-2-US

DC System Size	AC System Size
7.790 kW	6.175 kW

Customer Information:
Christopher Prestia
401 Walnut St
Columbia, PA 17512

AHJ	Utility
Lancaster	PPL

Sheet Name: Site Plan

Drawn By	Date
CB	April 2, 2024

Scale	Job Number	Sheet
AS NOTED	PA18294	A-2

David C. Hernande
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Date: 2024.04.02 16:30:29 -04:00

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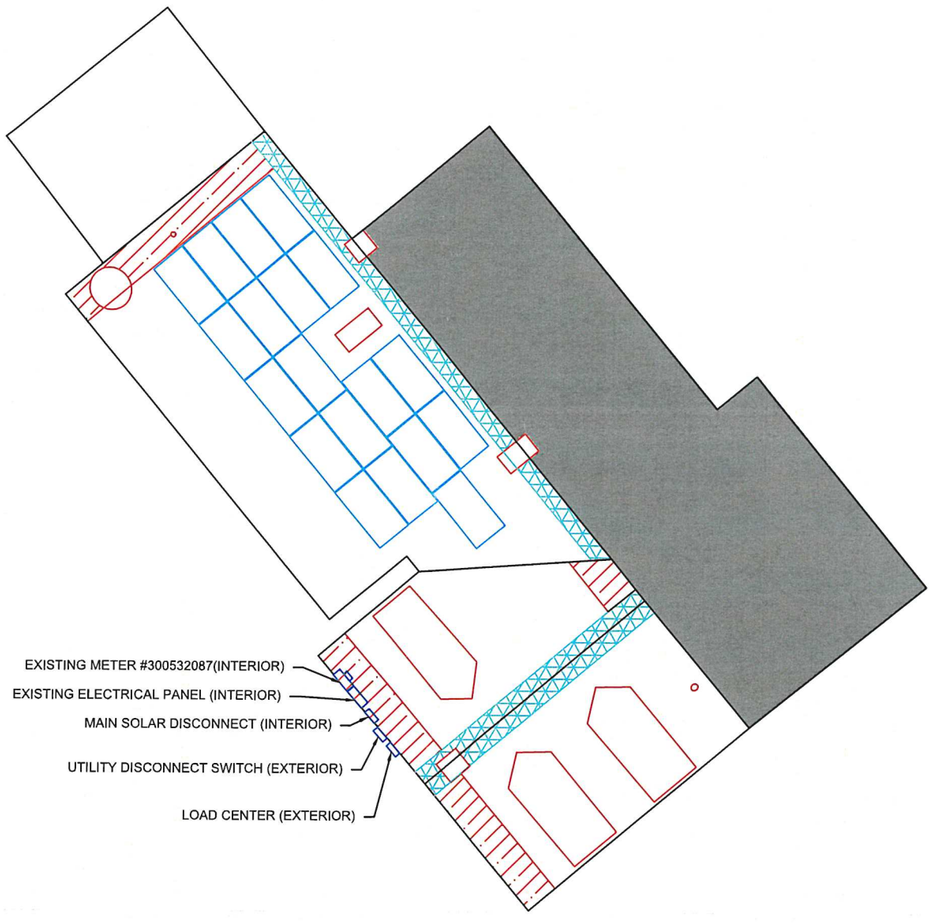

EQUIPMENT LOCATION PLAN

Scale: NTS

NOTE:

EQUIPMENT LOCATION PLAN IS APPROXIMATE, EXACT LOCATION TO BE VERIFIED WITH INSTALLATION CREW AND HOME OWNER AT THE TIME OF INSTALLATION.

Solar Energy World
Because Tomorrow Matters

Solar Energy World LLC.
14880 Sweitzer Lane
Laurel, MD 20707
(888) 497-3233

Building Code	International Residential Code (IRC) 2018
Electrical Code	National Electrical Code (NEC) 2017
Wind Speed: 115 MPH	Snow Load: 30 PSF
Modules	(19) SILFAB SIL-410 BG
Inverter(s)	(19) IQ8M-72-2-US
DC System Size: 7.790 kW	AC System Size: 6.175 kW
Customer Information	Christopher Prestia 401 Walnut St Columbia, PA 17512
AHJ: Lancaster	Utility: PPL
Sheet Name	Equipment Location Plan
Drawn By: CB	Date: April 2, 2024
Scale: AS NOTED	Job Number: PA18294
Sheet: E-1	

David C. Hernande
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Date: 2024.04.02 16:30:29 -04:00

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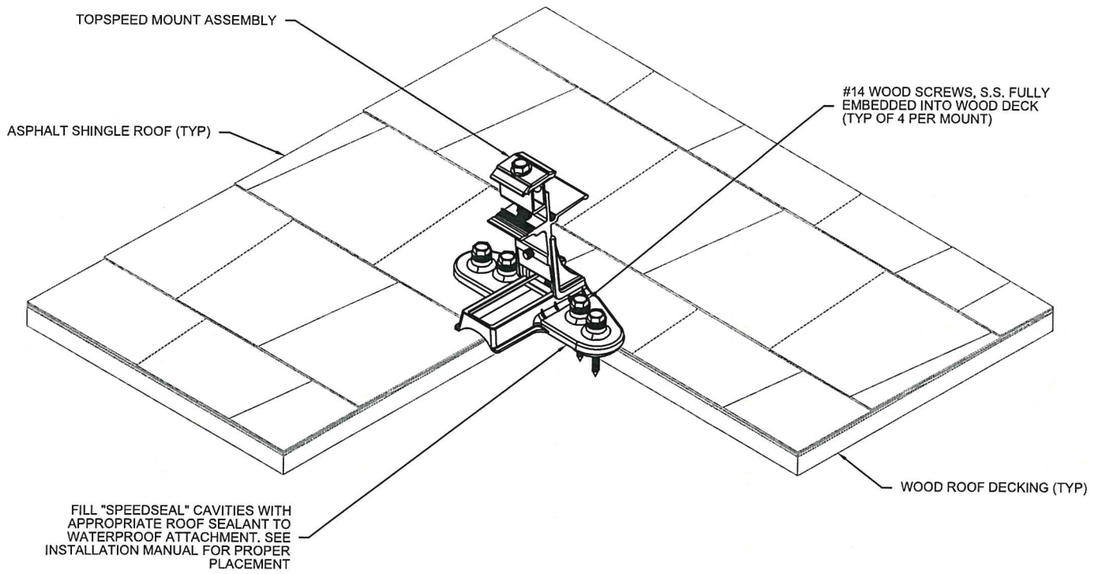
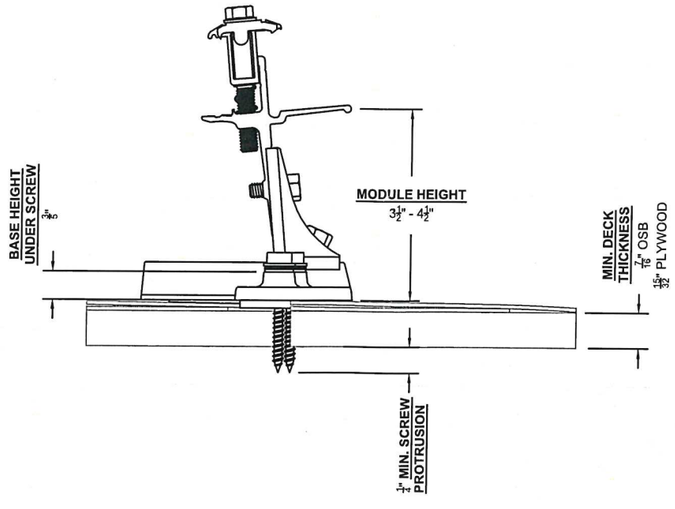


Structural Details		
S1	Rafter	3x6 O.C. 24"



STRUCTURAL ATTACHMENT DETAIL

NOTES:

1. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF INTERNATIONAL RESIDENTIAL CODE (IRC 2018), LOADING CODE (ASCE 7-16), WOOD DESIGN CODE (NDS 2015), AND LOCAL REQUIREMENTS.
2. LOAD CRITERIA PER :
   - EXPOSURE CATEGORY "B"
   - GROUND SNOW LOAD, Pg = 30 PSF
   - LATERAL LOAD RISK CATEGORY "II"
   - ULTIMATE DESIGN WIND SPEED = 115 MPH
3. SOLAR PANELS AND RACKING SYSTEMS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
4. FOLLOW ALL LOCAL AND FEDERAL SAFETY REQUIREMENTS.

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Because Tomorrow Matters

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14880 Sweitzer Lane
Laurel, MD 20707
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Building Code: International Residential Code (IRC) 2018
Electrical Code: National Electrical Code (NEC) 2017
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DC System Size: 7.790 kW | AC System Size: 6.175 kW
Customer Information: Christopher Prestia, 401 Walnut St, Columbia, PA 17512
AHJ: Lancaster | Utility: PPL
Sheet Name: Structural Attachment Details
Drawn By: CB | Date: April 2, 2024
Scale: AS NOTED | Job Number: PA18294 | Sheet: S-1

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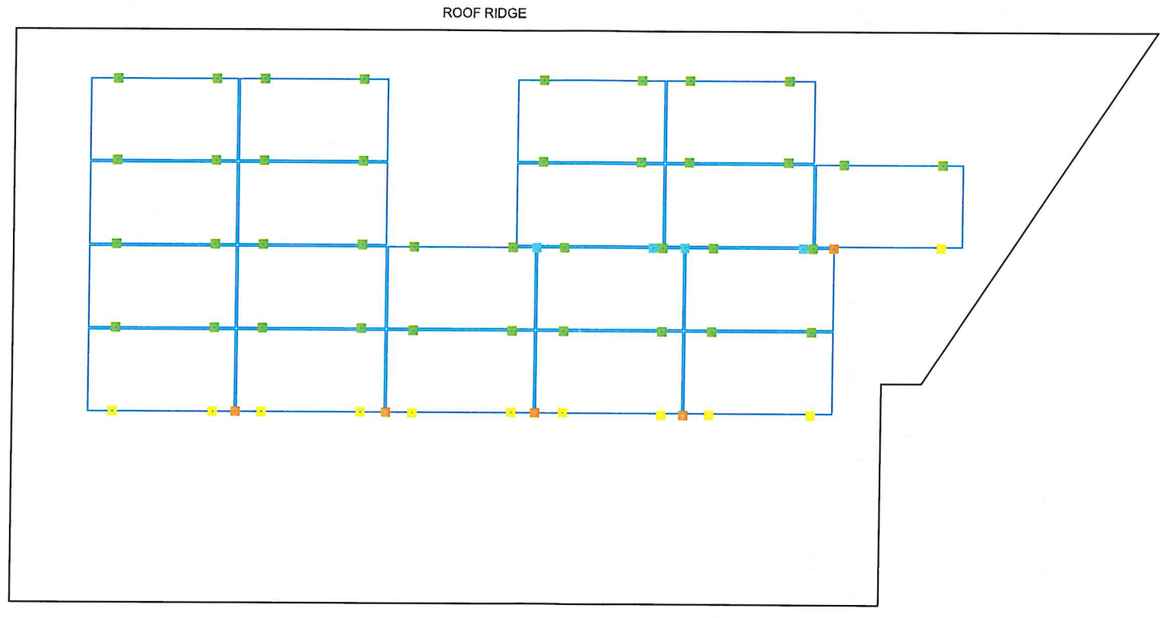
Exp. 09/30/25
DCH GLOBAL



SOLAR PANEL FOOTING PLAN R1

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

ROOF RIDGE

KEY

- MOUNTS WITHOUT SPACERS
- MOUNTS WITH SPACERS
- CLAMPS WITHOUT SPACERS
- CLAMPS WITH SPACERS

NOTES:

1. SNAPNRACK TOPSPEED SHALL BE INSTALLED IN ACCORDANCE WITH SNAPNRACK INSTALLATION MANUAL.
2. ADD TOPSPEED CLAMP IF GREATER THAN (SOLAR PANEL LENGTH / 4) FOR LANDSCAPE OR (SOLAR PANEL WIDTH /4) FOR PORTRAIT
3. NO SOLAR PANEL SHALL CANTILEVER MORE THAN 1/4 SOLAR PANEL LENGTH OR WIDTH DEPENDING ON ORIENTATION. UNLESS FOR MANUFACTURER SPECIFIED CLAMPING ZONE

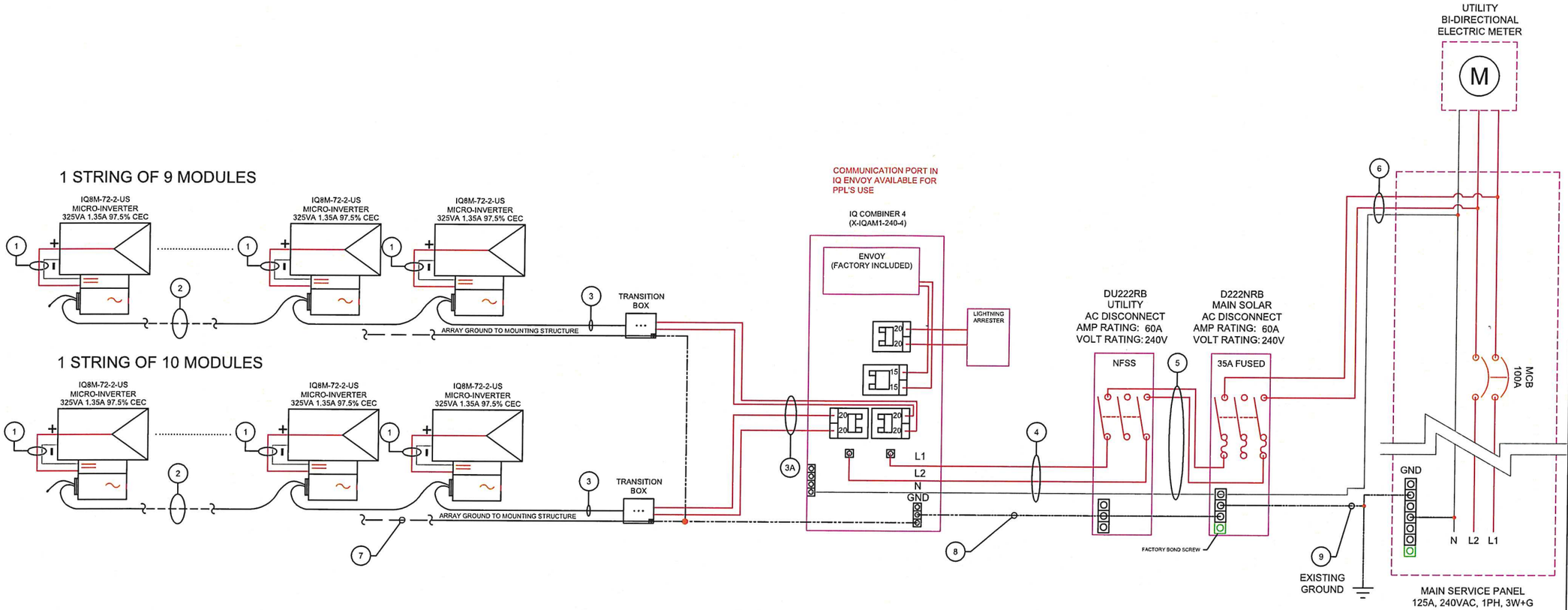
SOLAR PANEL FOOTING PLAN R2

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

Solar Energy World
Because Tomorrow Matters

Solar Energy World LLC.
14880 Sweitzer Lane
Laurel, MD 20707
(888) 497-3233

Building Code	International Residential Code (IRC) 2018
Electrical Code	National Electrical Code (NEC) 2017
Wind Speed	115 MPH
Snow Load	30 PSF
Modules	(19) SILFAB SIL-410 BG
Inverter(s)	(19) IQ8M-72-2-US
DC System Size	7.790 kW
AC System Size	6.175 kW
Customer Information	Christopher Prestia 401 Walnut St Columbia, PA 17512
AHJ	Lancaster
Utility	PPL
Sheet Name	Solar Panel Footing Plan
Drawn By	CB
Date	April 2, 2024
Scale	AS NOTED
Job Number	PA18294
Sheet	S-2



3-LINE DIAGRAM

MODULE SPECIFICATIONS	
MODEL NUMBER	SIL-410 BG
PEAK POWER	410 W
RATED VOLTAGE (Vmpp)	38.07 V
RATED CURRENT (Imp)	10.77 A
OPEN CIRCUIT VOLTAGE (Voc)	45.92 V
SHORT CIRCUIT CURRENT (Isc)	11.30 A
MAXIMUM SYSTEM VOLTAGE	1000VDC
INVERTER SPECIFICATIONS	
MODEL NUMBER	IQ8M-72-2-US
MAXIMUM DC VOLTAGE	60 V
MAXIMUM POWER OUTPUT	325 W
NOMINAL AC VOLTAGE	240 VAC
MAXIMUM AC CURRENT	1.35 A

ARRAY DETAILS		
NO. OF MODULES PER STRING	9	10
NO. OF STRINGS	1	1
ARRAY WATTS AT STC	3690	4100
MAX. VOLTAGE	480 V	480 V

WIRE/CONDUIT SCHEDULE ARRAY			
TAG	DESCRIPTION	WIRE SIZE/TYPE	NOTES
1	Panel to Micro Inverter	PV Wire (Factory Made)	INTEGRATED
2	Micro Inverter to Micro Inverter	Pre-Manufactured Cable	
3	Micro Inverter to Transition Box	Pre-Manufactured Cable	
3A	Transition Box to Load Center	#10 THHN/THWN-2	INTEGRATED
4	Load Center to AC Disconnect	#8 Cu THHN/THWN-2	
5	AC Disconnect to AC Disconnect	#8 Cu THHN/THWN-2	
6	AC Disconnect to Interconnection Point	#6 Cu THHN/THWN-2	
7	Equipment Grounding Conductor	#8 Cu Bare Copper Wire	
8	Equipment Grounding Conductor	#8 Cu THHN/THWN-2	
9	Grounding Electrode Conductor	#6 Cu	

GENERAL ELECTRIC NOTES: NEC2017

1. EQUIPMENT USED SHALL BE NEW, UNLESS OTHERWISE NOTED.
2. EQUIPMENT USED SHALL BE UL LISTED, UNLESS OTHERWISE NOTED.
3. EQUIPMENT SHALL BE INSTALLED PROVIDING ADEQUATE PHYSICAL WORKING SPACE AROUND THE EQUIPMENT AND SHALL COMPLY WITH NEC.
4. COPPER CONDUCTORS SHALL BE USED AND SHALL HAVE AN INSULATION RATING OF 600V, 90°C, UNLESS OTHERWISE NOTED
5. CONDUCTORS SHALL BE SIZED IN ACCORDANCE TO THE NEC. CONDUCTORS AMPACITY SHALL BE DE-RATED FOR TEMPERATURE INCREASE, CONDUIT FILL AND VOLTAGE DROP.
6. ALL CONDUCTORS, EXCEPT PV WIRE SHALL BE INSTALLED IN APPROVED CONDUITS OR RACEWAY. CONDUITS SHALL BE ADEQUATELY SUPPORTED AS PER NEC.
7. AC DISCONNECT SHOWN IS REQUIRED IF THE UTILITY REQUIRES VISIBLE-BLADE SWITCH.
8. EXPOSED NON-CURRENT CARRYING METAL PARTS SHALL BE GROUNDED AS PER NEC.
9. LINE SIDE INTER-CONNECTION SHALL COMPLY WITH NEC.
10. SMS MONITORING SYSTEM AND IT'S CONNECTION SHOWN IS OPTIONAL. IF USED, REFER TO SMS INSTALLATION MANUAL FOR WIRING METHODS AND OPERATION PROCEDURE.
11. ASHRAE FUNDAMENTAL OUTDOOR DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE U.S. (PHOENIX, AZ OR PALM SPRINGS, CA)
12. FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF MOUNTED SUNLIGHT CONDUIT USING THE OUTDOOR TEMPERATURE OF 47°C
    - 12.1. 10AWG CONDUCTOR ARE GENERALLY ACCEPTABLE FOR MODULES WITH AN Isc OF 9.6 AMPS WITH A 15 AMP FUSE.

WIRE SIZING FOR OCPD
EX (Isc *(1.25)(1.25)(# OF STRINGS IN PARALLEL) = WIRE AMPACITY OR USING NEC TABLE 690.8

Solar Energy World
Because Tomorrow Matters
Solar Energy World LLC.
14880 Sweitzer Lane
Laurel, MD 20707
(888) 497-3233

Building Code: International Residential Code (IRC) 2018

Electrical Code: National Electrical Code (NEC) 2017

Wind Speed	Snow Load
115 MPH	30 PSF

Modules: (19) SILFAB SIL-410 BG

Inverter(s): (19) IQ8M-72-2-US

DC System Size	AC System Size
7.790 kW	6.175 kW

Customer Information:
Christopher Prestia
401 Walnut St
Columbia, PA 17512

AHJ	Utility
Lancaster	PPL

Sheet Name: Electrical 3-Line Diagram

Drawn By	Date
CB	April 2, 2024

Scale	Job Number	Sheet
AS NOTED	PA18294	E-2

CAUTION

SOLAR CIRCUIT

CAUTION

PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION:
CONDUIT (10' SPACING)
(PER CODE: NEC 690.31 (D)(2))

WARNING

ELECTRIC SHOCK HAZARD
THE CONDUCTORS OF THIS
PHOTOVOLTAIC SYSTEM ARE
UNGROUNDED AND MAY BE ENERGIZED

LABEL LOCATION:
ALL SOLAR JUNCTION BOXES
(PER CODE: NEC 690.13 (B))

WARNING

INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION:
AC DISCONNECT
(PER CODE: NEC 705.12 (B)(3)(2))

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL LOCATION:
SOLAR MAIN DISCONNECT
(PER CODE: NEC 690.13 (B))

PHOTOVOLTAIC DISCONNECT FOR UTILITY OPERATION

LABEL LOCATION:
UTILITY DISCONNECT
(PER CODE: NEC 690.59)

WARNING

AC VOLTAGE = 240V
MAX FUSE: 35 A
RATED AC OUTPUT CURRENT: 25.65 A

LABEL LOCATION:
PV AC DISCONNECT
(PER CODE: NEC 690.54)

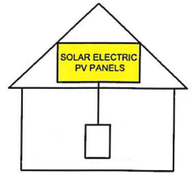
WARNING

DUAL POWER SOURCE
SECOND SOURCE IS PV SYSTEM

LABEL LOCATION:
ELECTRICAL PANELS
(PER CODE: NEC 690.59 & NEC 705.12 (C))

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LABEL LOCATION:
DC DISCONNECT
(PER CODE: NEC 690.56 (C))

INFORMATIONAL NOTE: LABELS TO COMPLY WITH NEC110.21(B)

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Solar Energy World LLC.
14880 Sweitzer Lane
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(888) 497-3233

Building Code	International Residential Code (IRC) 2018
Electrical Code	National Electrical Code (NEC) 2017
Wind Speed: 115 MPH	Snow Load: 30 PSF
Modules	(19) SILFAB SIL-410 BG
Invarter(s)	(19) IQ8M-72-2-US
DC System Size: 7.790 kW	AC System Size: 6.175 kW
Customer Information	Christopher Prestia 401 Walnut St Columbia, PA 17512
AHJ: Lancaster	Utility: PPL
Sheet Name	Labels
Drawn By: CB	Date: April 2, 2024
Scale: AS NOTED	Job Number: PA18294
Sheet	E-3

JOB LEAD : _____ NEAREST HOSPITAL ADDRESS : _____

_____

KEY

FIRE SAFETY ZONE

LADDER

ROOF ANCHOR

EXCLUSION ZONE

CREW SIGNATURES

_____

_____

_____

_____

_____

_____

_____

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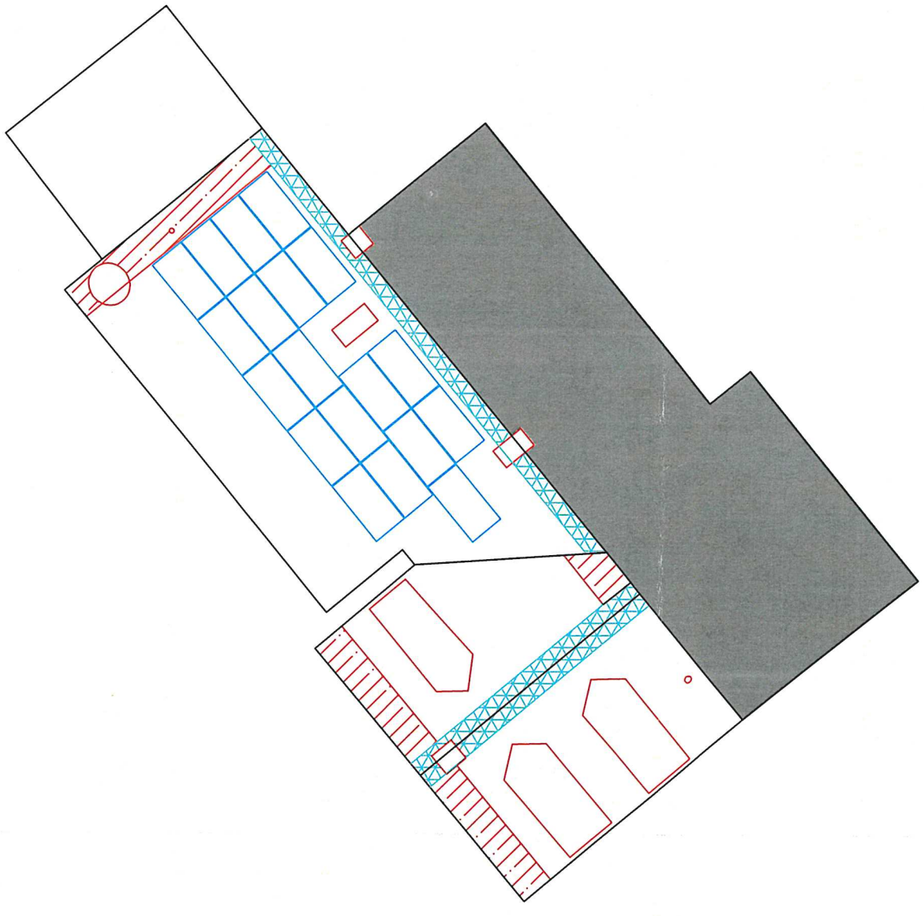
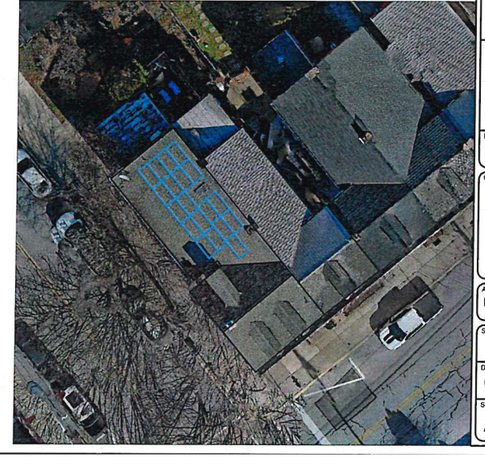


SAFETY PLAN

Anchor distance from leading edge	Working distance along roof edge (from perpendicular)
6'-0"	8'-0"
10'-0"	9'-9"
15'-0"	11'-7"
20'-0"	13'-3"
25'-0"	14'-6"
30'-0"	16'-0"
35'-0"	17'-2"

Please Note Hazards
(overhead powerlines, tree branches, uneven terrain, etc)



Solar Energy World
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Solar Energy World LLC.
14880 Sweitzer Lane
Laurel, MD 20707
(888) 497-3233

Building Code: International Residential Code (IRC) 2018

Electrical Code: National Electrical Code (NEC) 2017

Wind Speed: 115 MPH | Snow Load: 30 PSF

Modules: (19) SILFAB SIL-410 BG

Inverter(s): (19) IQ8M-72-2-US

DC System Size: 7.790 kW | AC System Size: 6.175 kW

Customer Information:
Christopher Prestia
401 Walnut St
Columbia, PA 17512

AHJ: Lancaster | Utility: PPL

Sheet Name: Safety Plan

Drawn By: CB | Date: April 2, 2024

Scale: AS NOTED | Job Number: PA18294 | Sheet: JHA

DAVID C. HERNANDEZ, PE

513-418-8812 4912 Prospect Ave., Blue Ash OH 45242 davehernandezpe@gmail.com

DATE: April 2, 2024

RE: 401 Walnut St, Columbia, PA 17512, USA

To Whom It May Concern,

As per your request, Exactus Energy has conducted a site assessment of the building at the above address.

PV solar panels are proposed to be installed on roof areas as shown in the submitted plans. The panels are clamped and attached to the roof decking with a rail-less mounting system. The PV system (PV modules, racking, mounting hardware, etc.) shall be installed according to the manufacturer's approved installation specifications. The Engineer of Record and Exactus Energy claim no responsibility for misuse or improper installation.

It was found that the roof structures satisfactorily meet the applicable standards included in the 2018 IBC/IRC, 2018 IEBC, and ASCE 7-16 as well as the design criteria shown below:

Design Criteria:

Risk Category	= II
Exposure Category	= B
Wind speed	= 115 mph
Ground snow load	= 30 psf
Roof dead load	= 12 psf
Solar system dead load	= 3 psf

Overall, the roof area is structurally adequate to support the PV alteration with no modifications or reinforcements as required per 2018 IEBC Sections 502.4 and 502.5

This letter was completed in accordance to recognized design standards, professional engineering experience, and judgement. Prior to installation, the on-site contractor must notify Exactus Energy if there are any discrepancies, or damages to the members, that was not addressed in the plan set. The on-site contractor must confirm that the rails will run perpendicular to the rafters.

If you have any further questions, please do not hesitate to contact me.

Acknowledged by:

David C. Hernandez, PE

Digitally signed by David C. Hernandez, PE
Date: 2024.04.02 16:30:29 -04:00

aee Green Building Engineer #832

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
DAVID C HERNANDEZ
ENGINEER
PE087541

Exp. 09/30/25

DCH GLOBAL

Spd.04/02/24

ELECTRICAL SPECIFICATIONS		410	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	410	305
Maximum power voltage (Vpmax)	V	38.07	35.35
Maximum power current (Ipmax)	A	10.77	8.64
Open circuit voltage (Voc)	V	45.92	42.14
Short circuit current (Isc)	A	11.30	9.16
Module efficiency	%	21.4%	19.9%
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m2 • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10W.

MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	20.8±0.2	45.8±0.4 lbs
Dimensions (H x L x D)	1864 mm x 1029 mm x 35 mm	73.4 in x 40.5 in x 1.4 in
Maximum surface load (wind/snow)*	5400 Pa rear load / 5400 Pa front load	112.8 lb/ft² rear load / 112.8 lb/ft² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	66 high-efficiency mono-PERC MWT c-Si cells 166 x 166 mm	66 high-efficiency mono-PERC MWT c-Si cells 6.53x6.53 in
Glass	3.2 mm high transmittance, tempered, DSM anti-reflective coating	0.126 in high transmittance, tempered, DSM anti-reflective coating
Cables and connectors (refer to installation manual)	1200 mm ø 5.7 mm, MC4 from Staubli	47.2 in, ø 0.22 (12AWG), MC4 from Staubli
Backsheet	Multilayer, integrated insulation film and electrically conductive backsheet, superior hydrolysis and UV resistance, fluorine-free PV backsheet	
Frame	Anodized Aluminum (Black)	
Bypass diodes	3 diodes-30SQ045T (45V max DC blocking voltage, 30A max forward rectified current)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP67 rated	

TEMPERATURE RATINGS	
Temperature Coefficient Isc	+0.046 %/°C
Temperature Coefficient Voc	-0.279 %/°C
Temperature Coefficient Pmax	-0.377 %/°C
NOCT (± 2°C)	43.5 °C
Operating temperature	-40/+85 °C

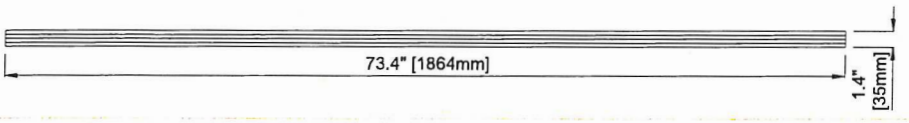
WARRANTIES	
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years
	≥ 97.1% end 1st yr ≥ 91.6% end 12th yr ≥ 85.1% end 25th yr ≥ 82.6% end 30th yr

CERTIFICATIONS	
Product	UL 61215-1:2017 Ed.1, UL 61215-2:2017 Ed.1, UL 61730-1:2017 Ed.1, UL 61730-2:2017 Ed.1, CSA C22.2#61730-1:2019 Ed.2, CSA C22.2#61730-2:2019 Ed.2, IEC 61215-1:2016 Ed.1, IEC 61215-2:2016 Ed.1, IEC 61730-1:2016 Ed.2, IEC 61730-2:2016 Ed.2, IEC 61701:2020 (Salt Mist Corrosion), IEC 62716:2013 (Ammonia Corrosion), CEC Listing, UL Fire Rating: Type 1
Factory	ISO9001:2015

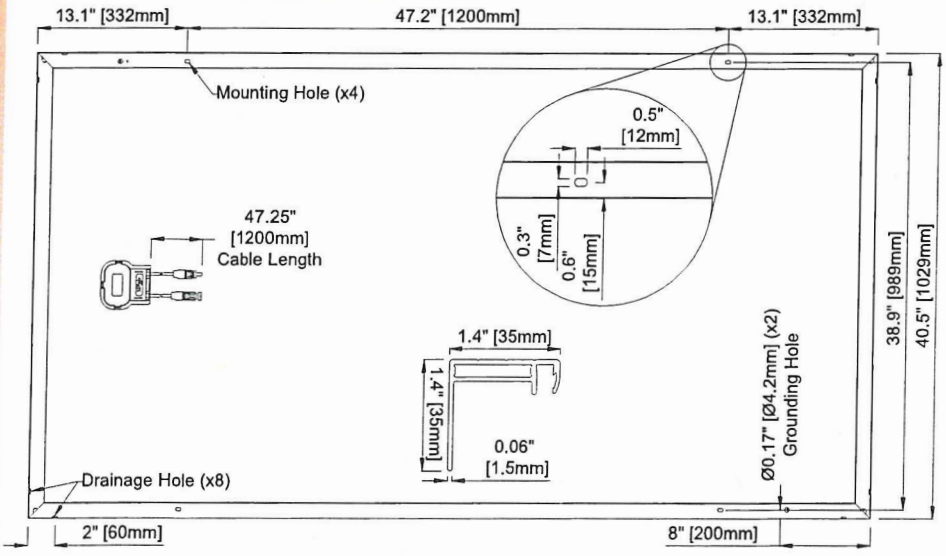
SHIPPING SPECS	
Modules Per Pallet:	27 or 27 (California)
Pallets Per Truck	31 or 30 (California)
Modules Per Truck	837 or 810 (California)

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.
** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads

SIDE



BACK VIEW



SILFAB SOLAR INC.

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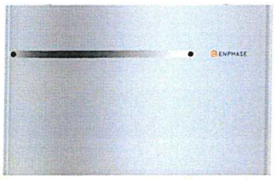
240 Courtneypark Drive East
Mississauga ON L5T 2Y3 Canada
T +1 905.255.2501
F +1 905.696.0267

ENPHASE

DATA SHEET

IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



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

Enphase 25 year limited warranty

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

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

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

Easy to install

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

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

IQ8SE-DS-0001-01-EN-US-2022-03-17

* Only when installed with IQ System Controller 2, meets UL 1741. IQ8H-208V operates only in grid-tied mode.

** IQ8 Series Microinverters supports split phase, 240V. IQ8H-208 supports split phase, 208V only.

IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US[1]
Commonly used module pairings[2]	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48	25 – 58				
Min/max start voltage	V	30 / 48	30 / 58				
Max input DC voltage	V	50	60				
Max DC current[3] [module Isc]	A	15					
Overvoltage class DC port		II					
DC port backfeed current	mA	0					
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					

OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US[1]
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range[4]	V	240 / 211 – 264					208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
AC short circuit fault current over 3 cycles	Arms	2					4.4
Max units per 20 A (L-L) branch circuit[5]		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					

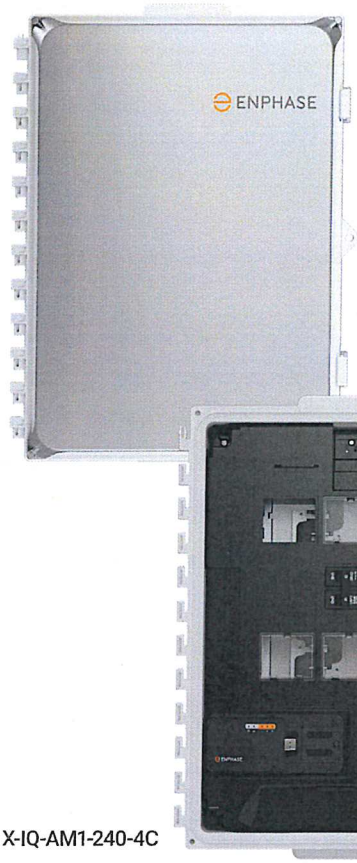
MECHANICAL DATA	
Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (condensing)
DC Connector type	MC4
Dimensions (HxWxD)	212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection – no fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environ. category / UV exposure rating	NEMA Type 6 / outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

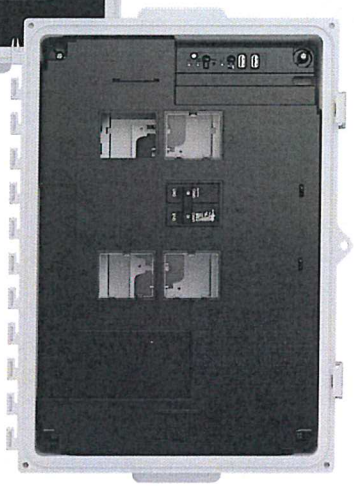
IQ Combiner 4/4C

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



X-IQ-AM1-240-4C

X2-IQ-AM1-240-4C (IEEE 1547:2018)



X-IQ-AM1-240-4

X2-IQ-AM1-240-4 (IEEE 1547:2018)

Smart

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

Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

UL LISTED

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

ENPHASE.

IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.

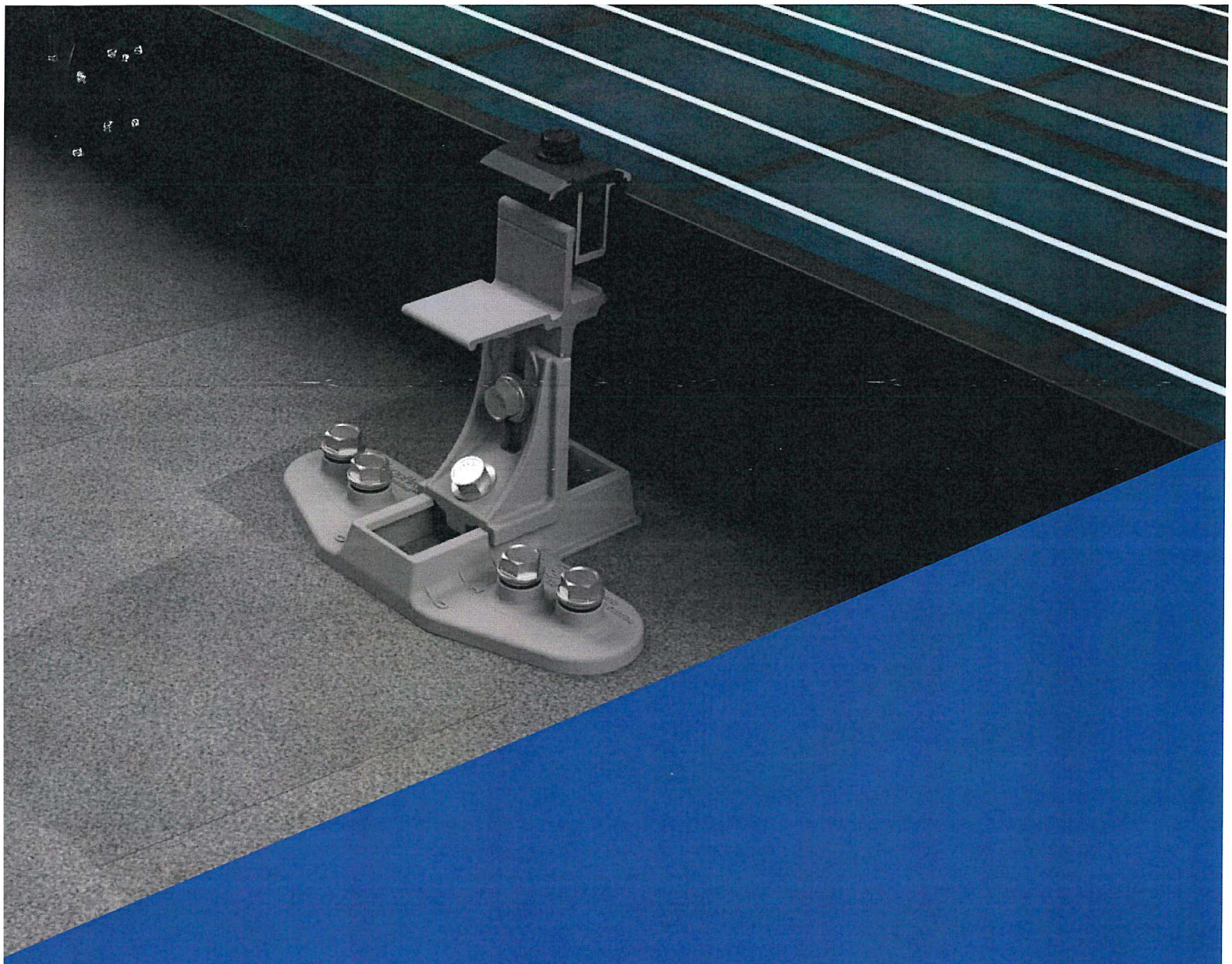
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Supported microinverters	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	 - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers

ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation/95A with IQ Gateway breaker included
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway

MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) 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	• 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors • Always follow local code requirements for conductor sizing.
Altitude	Up to 3,000 meters (9,842 feet)

INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)

COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1



SnapNrack™

Solar Mounting Solutions

TopSpeed™ Mounting System

Installation Manual

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An Intro to SnapNrack TopSpeed™ with SpeedSeal™ Technology

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SnapNrack's primary goal is to provide our customers with the lowest possible installed cost for mounting residential solar modules, without compromising the values the industry has come to expect: ease of use, quality, aesthetics, and safety. Designing with this goal in mind, we are proud to present the SnapNrack TopSpeed™ mounting system with SpeedSeal™ Technology.

SnapNrack has created a ground breaking system combining great features and benefits we are known for, with our TopSpeed™ System and the most up to date technical innovation in the industry, thus reducing parts while driving down labor, material, and total installation costs. Designed to work with standard module frames, achieving UL 2703 Listing for Grounding/ Bonding and Fire Classification, providing integrated wire management, aesthetics and our industry leading "Snap-In" features, SnapNrack is providing the simplest and most cost effective solar mounting solution on the market with TopSpeed™ including integrated fasteners and SpeedSeal™ Technology.

Advantages of Installing the SnapNrack TopSpeed™ System

Modules are installed with a minimum number of parts

This elimination of parts leads to a lower estimated system cost for both the installer and home owner.

Built in Wire Management and Aesthetics

Extensive wire management solutions have been designed specifically for the system that adapts to multiple possible mounting positions.

The system is designed to be aesthetically pleasing and sturdy with a skirt that provides considerable strength at the leading edge and an elegant look for those seeking high end looking systems.

SnapNrack TopSpeed™ includes SpeedSeal™ Technology

SpeedSeal™ Technology features integrated flashing. This eliminates loosening layers of composition and removing nails with a pry bar, leading to less damage to the roof, minimized potential roof leaks, and much faster installs.

TopSpeed™ Mounts attach Directly to the Decking

As well as all of the benefits associated with the standard SpeedSeal™ Technology, TopSpeed™ attaches to the roof sheathing and does not require rafter attachment. Simply attaching to the roof sheathing removes the requirement for finding rafters and drilling pilot holes, creating potential rafter misses that can cause leaks.

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Certification Details

SnapNrack TopSpeed™ mounting system has been evaluated by Underwriters Laboratories (UL) and Listed to UL Standard 2703 for Grounding/Bonding, and Fire Classification.

Grounding/Bonding

Only specific components have been evaluated for bonding, and are identified as being in the ground path. The TopSpeed™ components that have been evaluated for bonding are the Mount Assembly (Mount Clamp Top, Module Clamp Tower, Angle Bracket), Clamp Assembly, Universal Skirt, Universal Skirt Clamp, Ground Lugs, and Smart Clips.

Universal Skirt Spacers, Mount Channel Nut, and Mount Base are not required to be bonded to the system based on the exceptions in clause 9.1 of UL 2703 1st Ed. Wire management clips are utilized to route conductors away from these components and must be assembled according to the instructions.

This mounting system may be used to ground and/or mount a PV module complying with UL 1703 or UL 61703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. See Appendix A for the list of modules tested for use with the TopSpeed™ System for integrated grounding.

Ground Lugs have been evaluated to both UL 467 and UL 2703 Listing requirements. The following ground lugs have been approved for use: SnapNrack model 242-92202, and Ilsco models GBL-4DBT and SGB-4.

The following components have been evaluated for bonding as the fault current ground path: TopSpeed™ Mount Assembly, (Mount Clamp Top, Module Clamp Tower, Angle Bracket), Clamp Assembly, Wire Management Clips, and Ground Lugs. In order to maintain the Listing for bonding, wire management clips must be assembled to route conductors away from parts that have not been evaluated for bonding.

A Listed (QIMS) and Unlisted Component (KDER3) grounding lug, SnapNrack part no. 242-92202, is attached to the module frame flange for the normal attachment of a Grounding Electrode Conductor, which provides bonding within the system and eventual connection to a Grounding Electrode, as required by the U.S. NEC. Details of part no. 242-92202 can be found in Volume 1, Section 4, and Volume 2, Section 2. When this method is used, the grounding symbol is stamped onto the body of the ground lug to identify the grounding terminal.

An alternate method of grounding, a UL Listed (KDER and QIMS) grounding lug, Ilsco (E34440 and E354420) model SGB-4 is attached to the module frame flange. When this method is used, the grounding terminal is identified by the green colored screws of the lug.

An alternate method of grounding, a UL Listed (KDER and QIMS) grounding lug, Ilsco (E34440 and E354420) model GBL-4BDT is attached to the module frame flange through the specified hardware and torque values. When this method is used, the grounding terminal is identified by the green colored set screw of the lug.

An alternate method of grounding, Enphase R/C (QIKH2)(QIMS2) model M250, M215 & C250 is bonded to the Listed PV module frame by the Enphase R/C (QIMS2) Model EFM-XXMM anodization piercing mounting/clamping kit. The total roof-mounted PV system is bonded (modules and microinverters) together and the assembly is bonded to ground through the Enphase R/C (QIMS2) Engage Cables; Model ETXX-240, ETXX-208 or ETXX-277, when properly grounded at the service entrance.
R/C (QIMS2), Dynoraxx (E357716) photovoltaic bonding device cat. no. Dynobond is an optional component that may be used with this system. The Dynobond device has been evaluated to provide module to module bonding. The Dynobond device attaches to the frame flange of adjacent modules Listed (QIMS), SnapNrack MLPE Frame Attachment Kit model 242-02151 has been investigated to bond approved MLPE device back plates to frames of modules.

Fire

SnapNrack TopSpeed™ has been investigated for a Class A System Fire Classification for Steep-Sloped and low sloped roofs with Type 1 and Type 2 modules. Because the system was tested at 5 inches above the test roof fixture, TopSpeed™ can be installed without any height restrictions due to System Fire Classification. See Appendix A for potential module-specific height restrictions due to module temperature. The Skirt is considered an optional component with respect to Fire Classification, as SnapNrack TopSpeed™ maintains the same Fire Classification Rating both with and without the skirt.

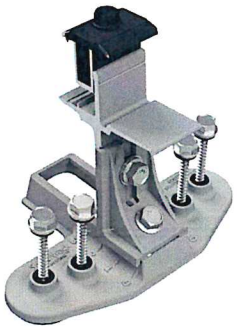
NOTE: Modules with an asterisk* have a fire rating that is different from Type 1, Type 2 or Type 29. SNR systems have only been evaluated for use with Type 1, Type 2, or Type 29 modules. Modules with a different fire type rating should be considered to not have been evaluated for use with SNR systems with respect to a system fire rating.

Inspection Practices

SnapNrack recommends a periodic re-inspection of the completed installation for loose components, loose fasteners, and any corrosion, such that if found, the affected components are to be immediately replaced.

Component Details

TopSpeed™ Structural Components



TopSpeed™ Mount

SnapNrack TopSpeed™ Mount assembly including SpeedSeal™ base, clamp top, and (4) SnapNrack #14 SS Wood Screws with 1/2" Hex Head.

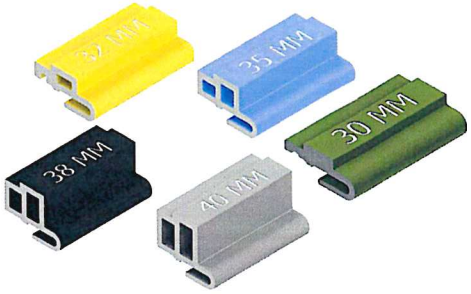
TopSpeed™ Clamp

SnapNrack TopSpeed™ Clamp assembly including including Link bottom, Link top, and springs.

Universal Skirt

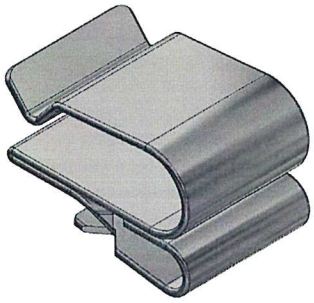
SnapNrack Universal Skirt in double portrait or single landscape lengths.

Wire Managements Components



Skirt Spacers

SnapNrack Universal Skirt Spacer for 40mm, 38mm, 35mm, 32mm, and 30mm modules.



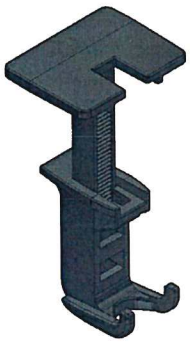
Smart Clip

Module frame cable clip, holds two PV wires or Enphase IQ-Cables.

Smart Clip XL

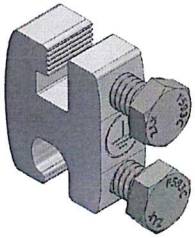
Module frame cable clip, holds six PV wires or four Enphase IQ-Cable.

Grounding/MLPE Components



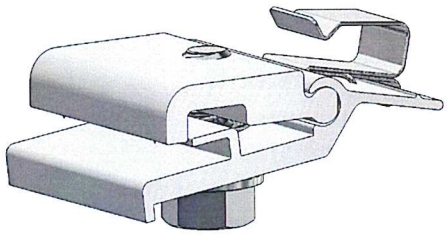
Wire Saver

Designed to secure conductors that become loose and hang below the array, holds one conductor.



Ground Lug

SnapNrack Ground Lug assembly used for attaching the Equipment Grounding Conductor on to one module or any TopSpeed™ Mount per array.



MLPE Frame Attachment Kit

Attaches MLPEs (Module Level Performance Enhancers) and other related equipment to the module frame.

Hardware Torque Specifications

The recommended torque to be applied to components for proper assembly and bonding are as follows:

Hardware Description	Torque Specification
All TopSpeed™ ½" bolts; System Leveling Bolt, TopSpeed™ Mount Clamping Bolt, Clamp Bolt	16 ft-lb
Ground Lug model 242-92202 to Module Frame or anywhere on the TopSpeed™ Mount, and Ground Lug model 242-92202 to Grounding Electrode Conductor (6-12 SOL)	8 ft-lb
MLPE Frame Attachment Kit, MLPE Rail Attachment Kit	10 ft-lb
SolarEdge Frame Mounted Microinverter Bracket to Module Frame	11 ft-lb
Enphase Frame Mounted Microinverter Bracket to Module Frame	13 ft-lb
Ground Lug model SGB-4 to module	75 in-lb
Ground Lug model SGB-4 to Grounding Electrode Conductor (4-14 SOL or STR)	35 in-lb
Ground Lug model GBL-4DBT to module	35 in-lb
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (10-14 SOL or STR)	20 in-lb
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (8 SOL or STR)	25 in-lb
Ground Lug model GBL-4DBT to Grounding Electrode Conductor (4-6 SOL or STR)	35 in-lb

Pre-Installation Requirements

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Site Survey

- Measure the roof surfaces and develop an accurate drawing, including any obstacles such as chimneys and roof vents.
- If plans for the roof structure are available, verify that the plans match the final structure.
- Identify any roof access or setback areas as required by the local AHJ.
- Identify any construction issues that may complicate the process of locating rafters from the roof surface.
- If you find structural problems such as termite damage or cracked rafters that may compromise the structure's integrity consult a structural engineer.

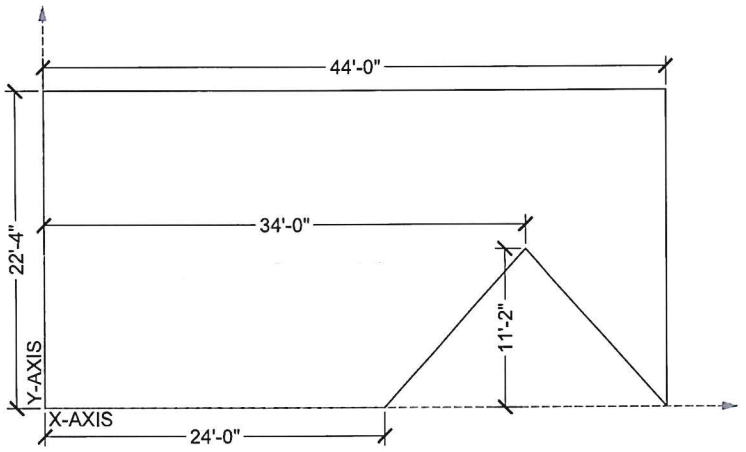
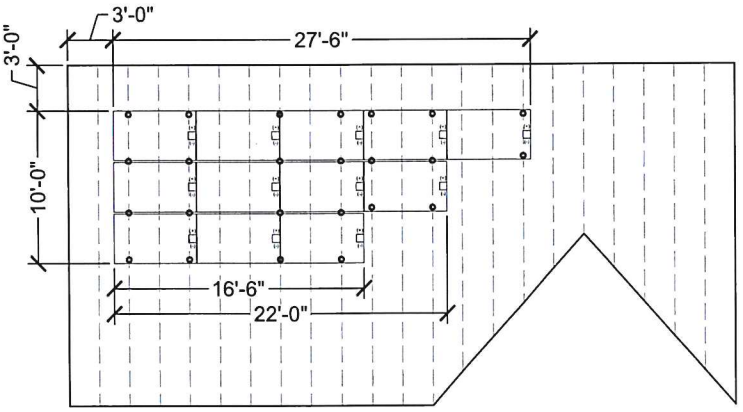


Image note: X-Axis described in this manual is cross-slope on the roof, Y-Axis is in line with the roof slope.

Design Guidance

- PV Designers should account for the 0.75 inch spacing between rows and columns of modules when creating the layout.
- Determine site conditions for calculating the engineering values, confirm site conditions and code versions comply with local AHJ requirements.
- Reference site conditions and system specifications in TopSpeed™ Structural Engineering Report to determine the number of attachments per module side.
- Insert SnapNrack installation details into design plan set specific to the project requirements.
- Draw roof attachment locations on plan set layout based on TopSpeed™ Structural Engineering.



Best Practice:

If environmental load conditions require three TopSpeed™ attachments per module side this is only required when modules share attachments.

- Identify homerun and Junction Box locations based on rooftop wiring requirements.
- Mark distance from array edge to identifiable roof feature in x and y axes.

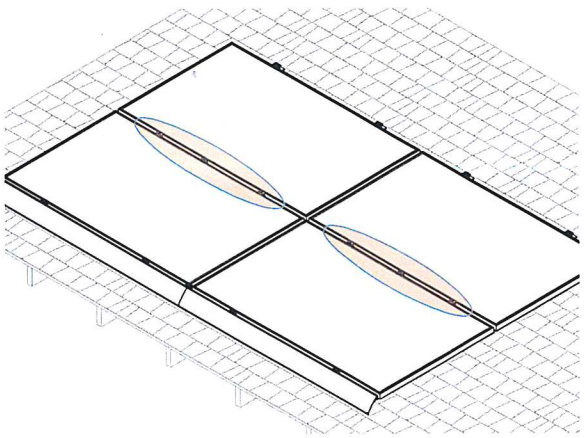


Image note: This four module array is installed in a high load configuration with three attachments per side where two modules share attachments. See highlighted area. As shown, three attachments are never required at the skirt or the top of the array.

Safety Guidance

- **Always wear appropriate OSHA approved safety equipment when at active construction site.**
- **Appropriate fall protection or prevention gear should be used. Always use extreme caution when near the edge of a roof.**
- **Use appropriate ladder safety equipment when accessing the roof from ground level.**

Safety Guidance Continued

- **Safety equipment should be checked periodically for wear and quality issues.**
- **Always wear proper eye protection when required.**

TopSpeed™ Mount to Module Frame Installation

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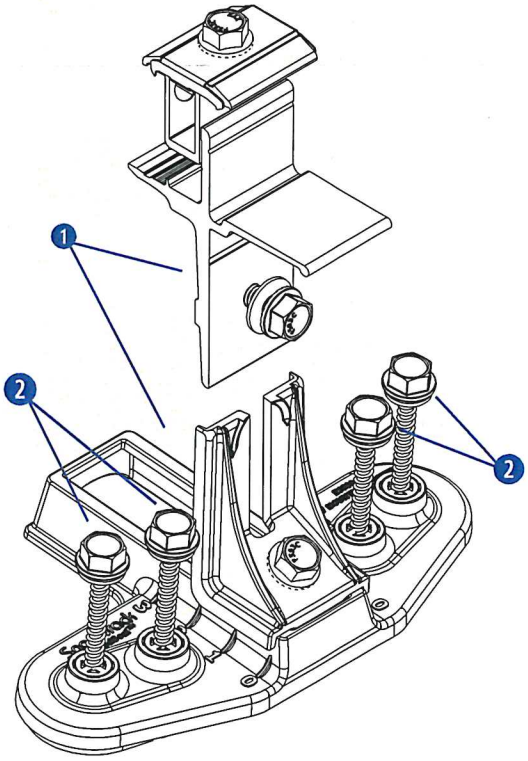
Required Tools

- Socket Wrench/Impact Driver
- Torque Wrench
- 1/2" Socket

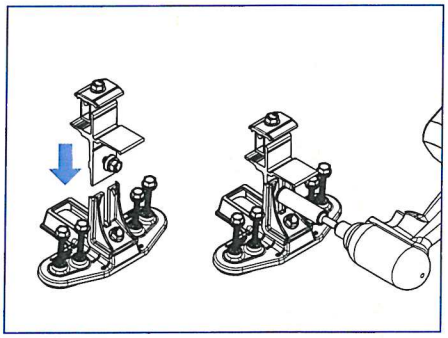
Materials Included - TopSpeed™ System with SpeedSeal™ Technology

1. (1) SnapNrack TopSpeed™ Mount
2. (4) SnapNrack #14 Wood Screw with 1/2" Hex Head & sealing washer

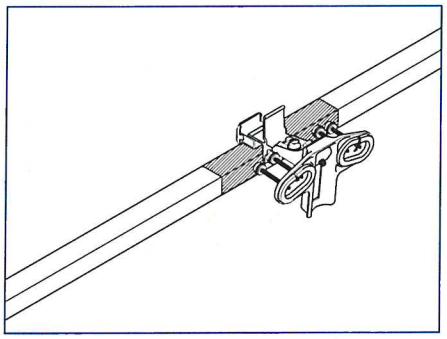


Best Practice:
Attach all TopSpeed™ mounts as the modules are being prepped with MLPEs on the ground. Attach Mounts before attaching MLPEs to simplify wire management.

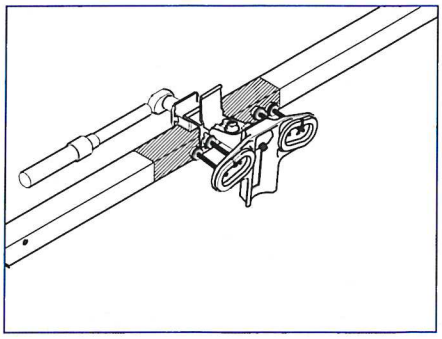
INSTALLATION INSTRUCTIONS



1) Assemble all TopSpeed™ Mounts required for the installation. Slide the clamp tower assembly into the angle bracket riser and tighten the leveling bolt to 16 ft-lbs.



2) Position TopSpeed™ Mount clamp on the module frame within the module manufacturers required clamping zone.



3) Tighten 1/2" clamping bolt to 16 ft-lb. Only two Mounts are required per module on one side.

Install Note:
For high load conditions add a third attachment in the middle of the module frame.

TopSpeed™ Universal Skirt Layout

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Required Tools

- Roof Marking Crayon or Chalk
- Tape Measure

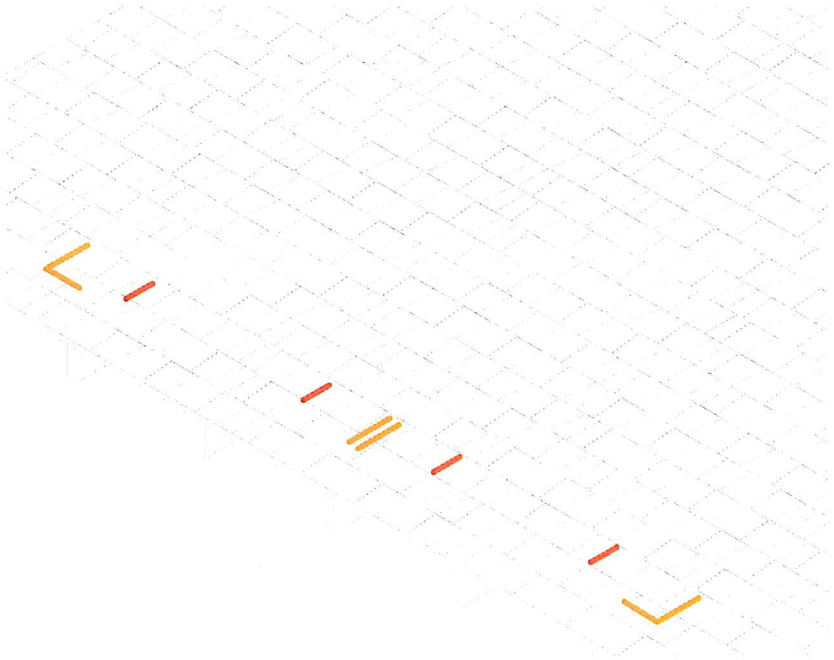
LAYOUT INSTRUCTIONS

1) Use a tape measure to verify that all modules will fit properly on the roof surface.

2) On the roof draw the layout for the skirt installation including module gaps (recommended 0.75 inch gap), bottom corners, and locations of the two TopSpeed™ attachments per module that clamp to the skirt. Three attachments per module is never required at the skirt.

Install Note:

If environmental load conditions require three TopSpeed™ attachments per module side this is only required when modules share attachments.



TopSpeed™ Mount: Skirt Installation

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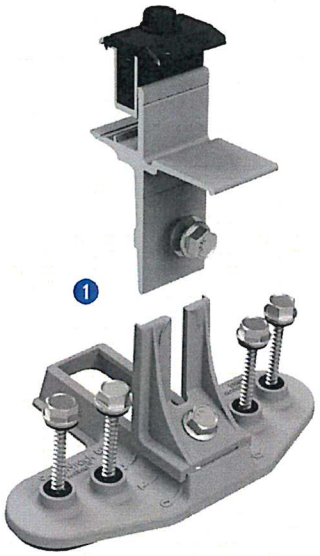
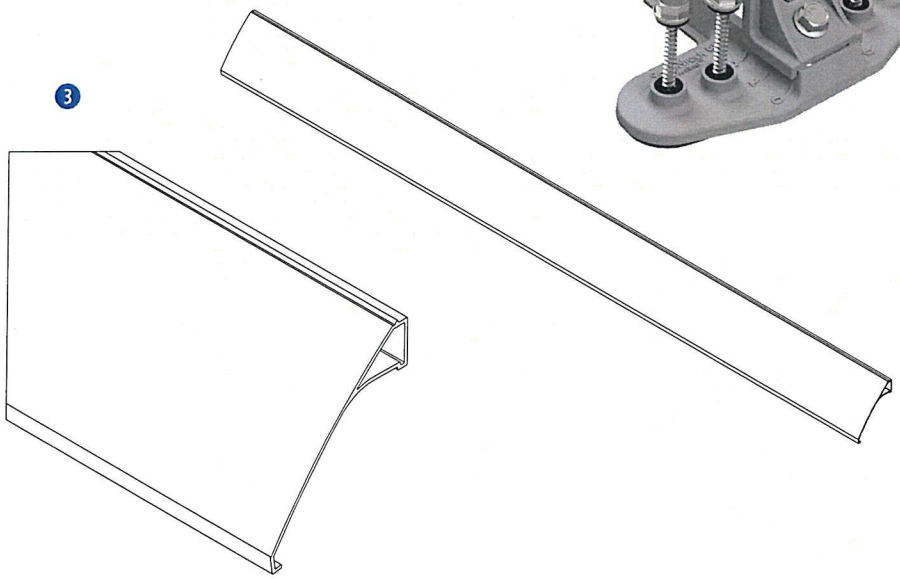
Required Tools

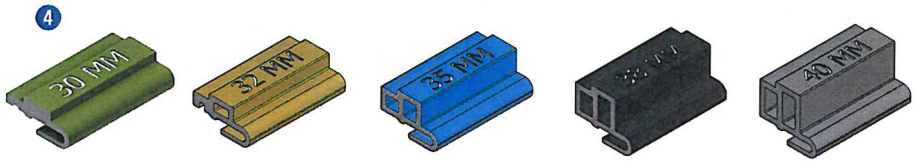
- Socket Wrench/Impact Driver
- Torque Wrench
- 1/2" Socket
- Roofing sealant

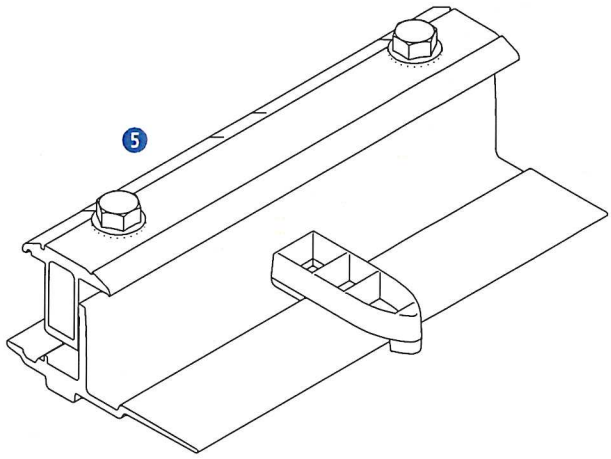
Materials Included - TopSpeed™ Mount with SpeedSeal™ Technology

1. (1) TopSpeed™ Mount
2. (1) TopSpeed™ Clamp
3. (1) Universal Skirt
4. (1) Universal Skirt Spacers
5. (1) *OPTIONAL* - Universal Link









TopSpeed™ Mount Skirt Installation

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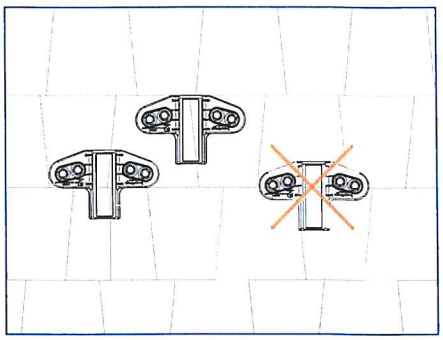
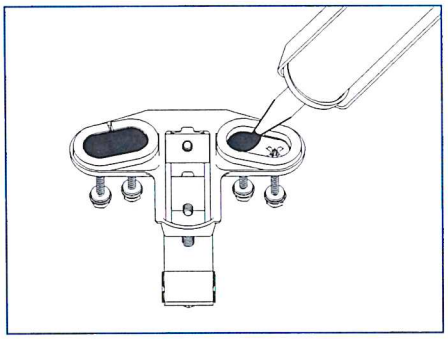
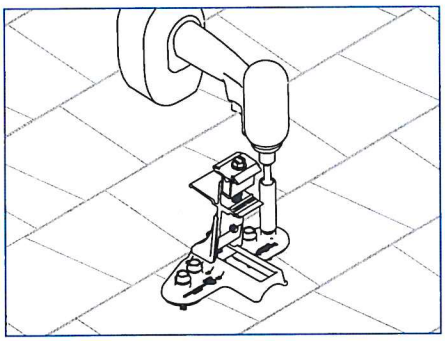
INSTALLATION INSTRUCTIONS



1) Install TopSpeed™ Mounts at locations drawn during the skirt layout. Mounts must be installed entirely on one course of composition.

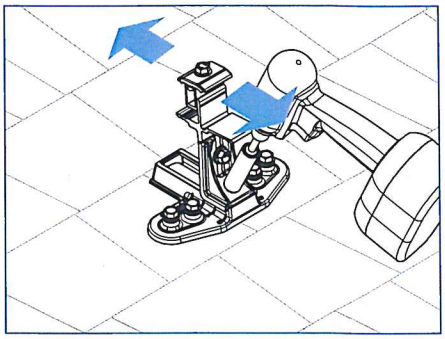


2) Fill both cavities on bottom of TopSpeed™ Mount created by SpeedSeal™ gasket with roof sealant to ensure a watertight seal.

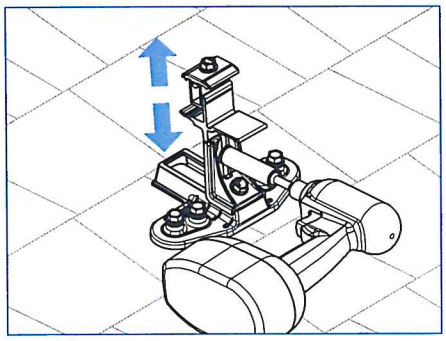


3) Attach TopSpeed™ Mount to roof using the (4) SnapNrack #14 Wood Screws with 1/2" hex head that are captured in the Mount.

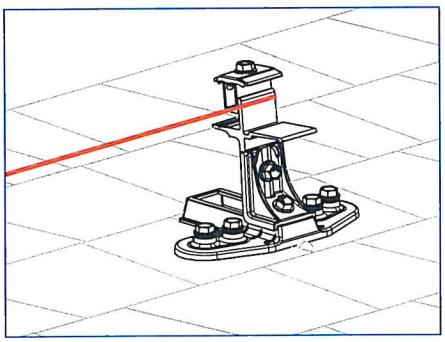
Install Note:
Roof sealant should be expelled from both vents of the TopSpeed™ Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from all four vents, remove TopSpeed™ Mount, add more sealant to the cavity, then reinstall.



4) Loosen Course Adjustment bolt and adjust end Mounts up or down until aligned with bottom edge of array as marked on the roof, then tighten the Course Adjustment bolt.



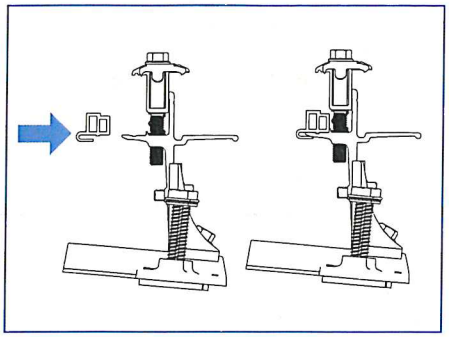
5) To set the TopSpeed™ Mount level loosen the Leveling bolt and move the clamp up or down, then tighten the Leveling bolt and torque to 16 ft-lb.

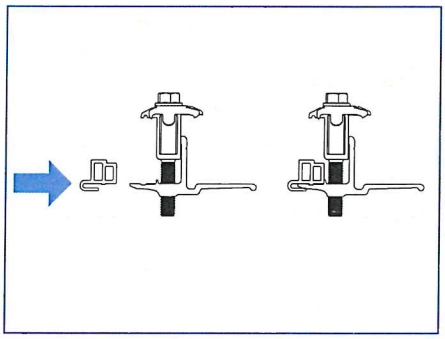


6) Pull string line tight from one corner mount to opposite corner mount to align and level all TopSpeed™ Mounts between the end mounts.

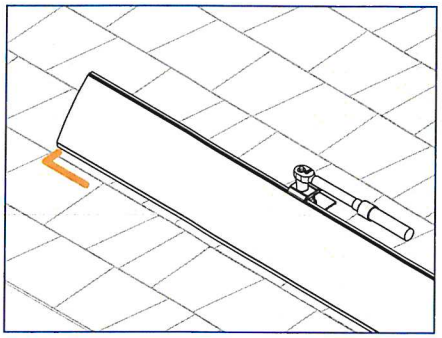
Install Note:
Use the string line alignment feature on Mounts to level and align the Mounts.

INSTALLATION INSTRUCTIONS

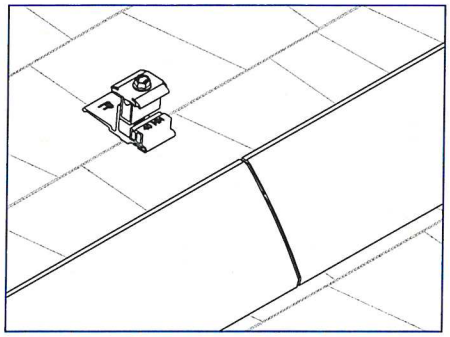


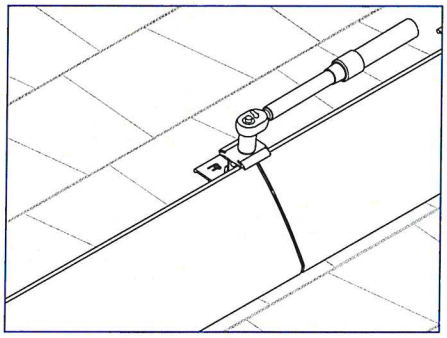


7) Universal Spacers will need to be added to Mounts and Clamps where Skirt will be installed.



8) Install Universal Skirt by holding the skirt in Mount, sliding Skirt to align with array layout marks, and clamping skirt into mount.





9) Use TopSpeed™ Clamps to connect multiple lengths of Array Skirt.

Install Note:
Optionally use Universal Links to connect lengths of Array Skirt.

Wire Management

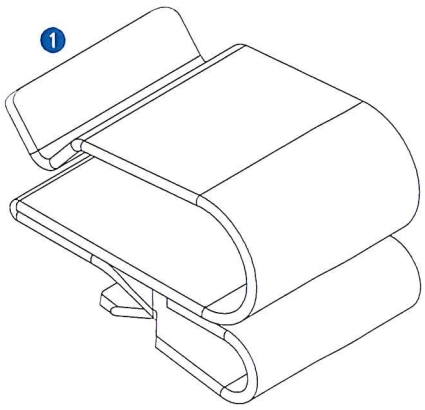
Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket
- Electrician Tools

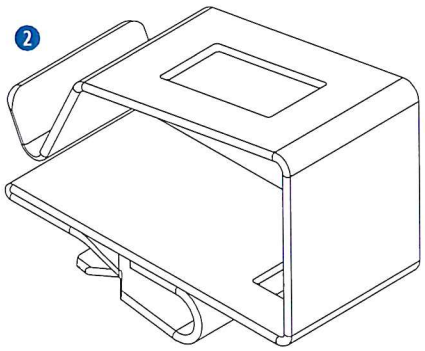
Materials Included

Smart Clips

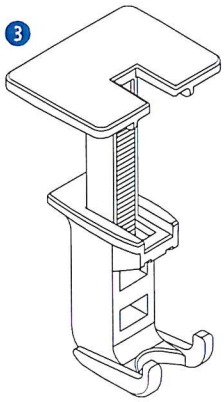
1. (1) Smart Clip [(2) PV Wire, (1) Enphase IQ Cable]
2. (1) Smart Clip XL [(6) PV Wire, (4) Enphase IQ]
3. (1) Wire Saver [(1) PV Wire]



Smart Clip



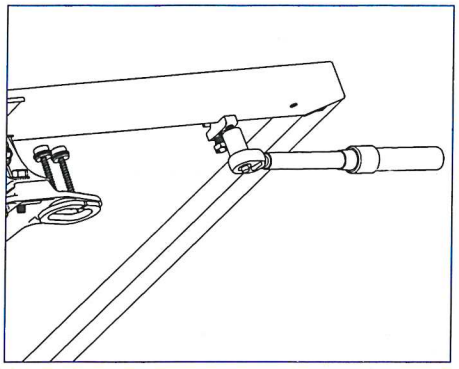
Smart Clip XL



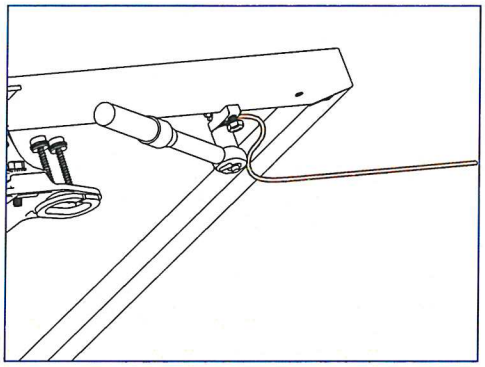
Wire Saver

INSTALLATION INSTRUCTIONS - GROUND LUG

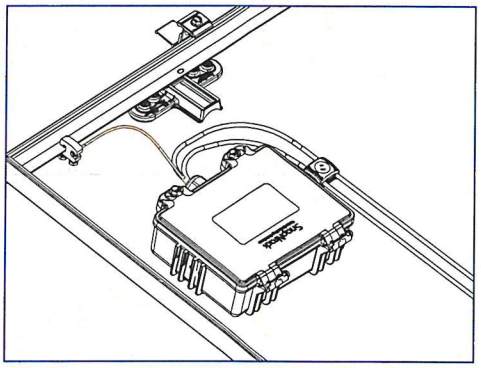
The SnapNrack Ground Lug to be used in accordance with the National Electric Code, ANSI/NFPA 70.



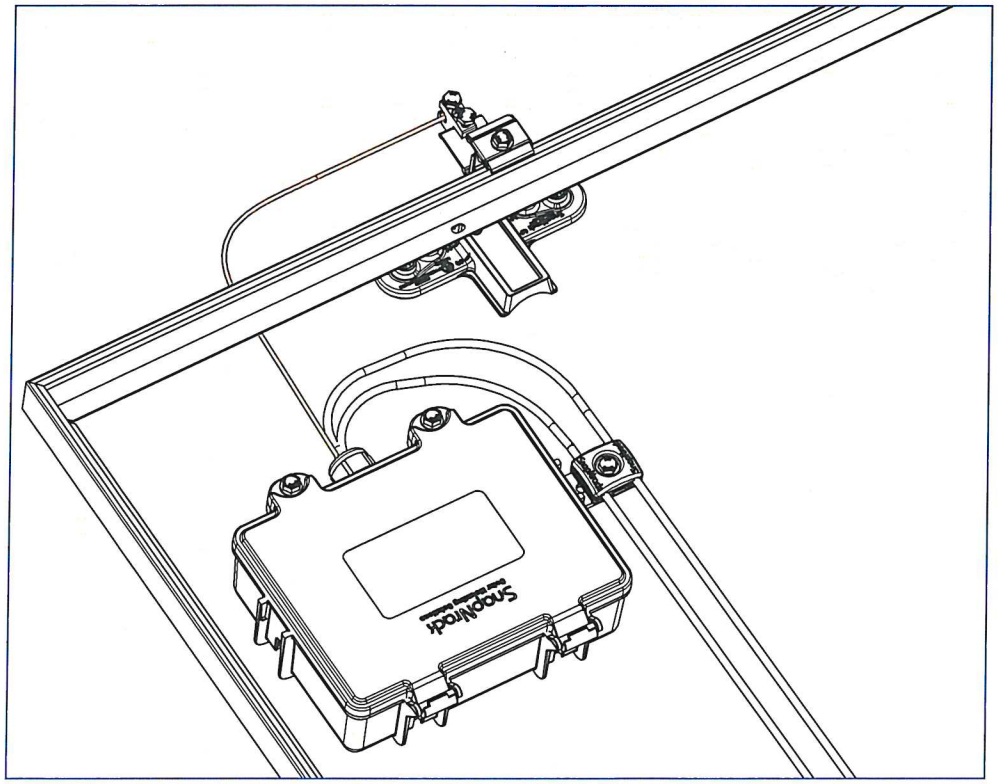
1) Ground Lug (242-92202) can be attached anywhere along the module frame or any TopSpeed™ Mount near the Junction Box. Torque module clamping bolt to 8 ft-lb.



2) Run 10 – 6 AWG, solid, bare copper GEC into Ground Lug channel, torque wire clamping bolt to 8 ft-lb.



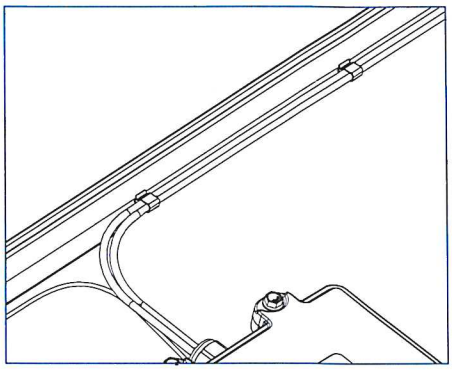
3) Run bare, solid EGC from Ground Lug R to Junction Box, bond bare EGC to stranded EGC in Junction Box. For details on installing the Junction Box reference the **Junction Box Installation Manual.**



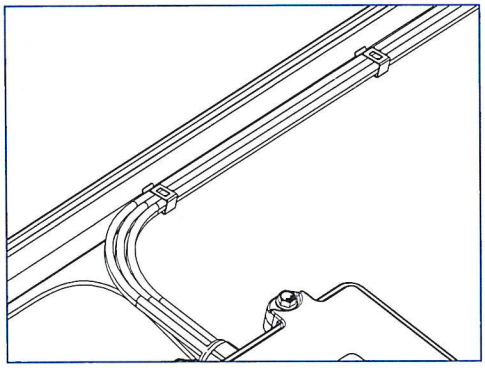
4) Optionally; Install Ground Lug on the Mount Landing Pad at the top of the array. Run bare copper between ground lug and Junction Box.

INSTALLATION INSTRUCTIONS - SMART CLIPS

SmartClip and SmartClip XL should be used to route conductors in a neat and workmanlike manner away from all non-bonded components and support the conductors adequately to eliminate potential damage.



1) Use SnapNrack Smart Clip II to manage up two PV wires inside the module frame while prepping out the modules on the ground or installing modules on the roof.



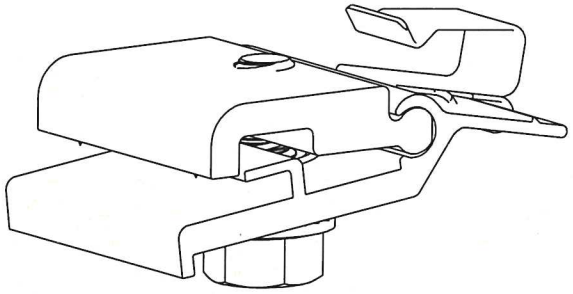
2) Use SnapNrack Smart Clip XL to manage larger bundles of PV wire; up to 6 PV wires per clip

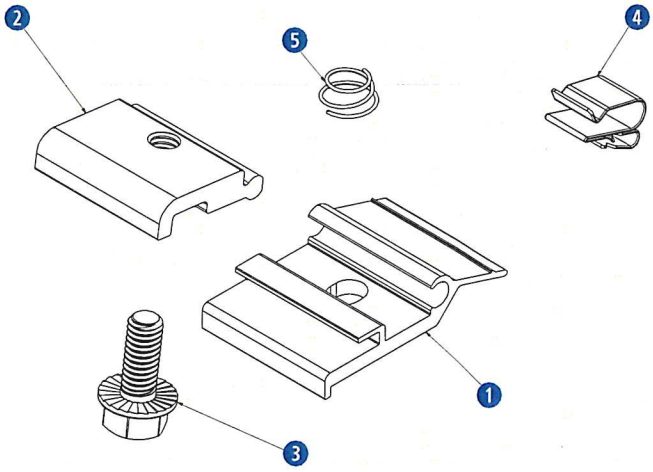
Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket

Materials Included - MLPE Rail Attachment Kit

1. (1) SnapNrack MLPE Frame Attachment Top
2. (1) SnapNrack MLPE Frame Attachment Bottom
3. (1) 5/16"-18 X 3/4" Serrated Flange Bolt SS
4. (1) SnapNrack Smart Clip
5. (1) SnapNrack MLPE Frame Attachment Coil Spring SS

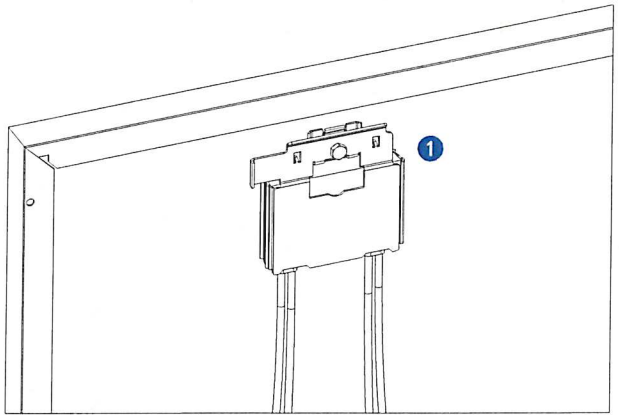




Materials Included

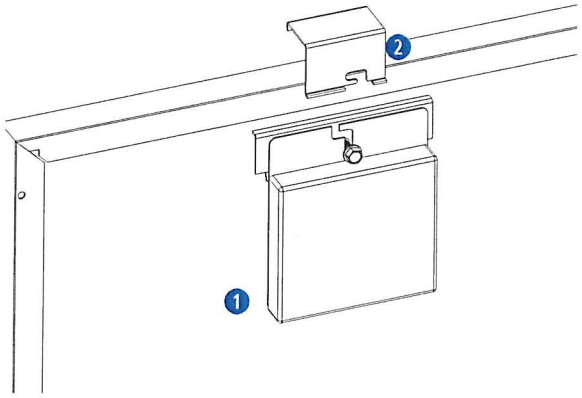
SolarEdge Frame Mount

1. (1) SolarEdge Optimizer w/ Frame-Mounted Module Add-On



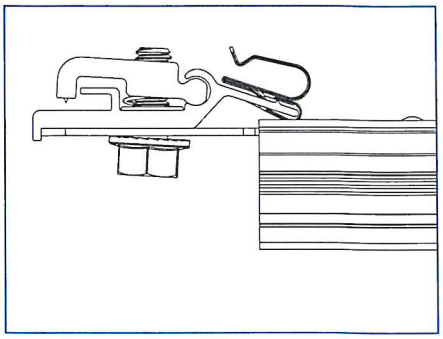
Enphase Frame Mount

1. (1) Enphase Microinverter
2. (1) Enphase Frame Mount

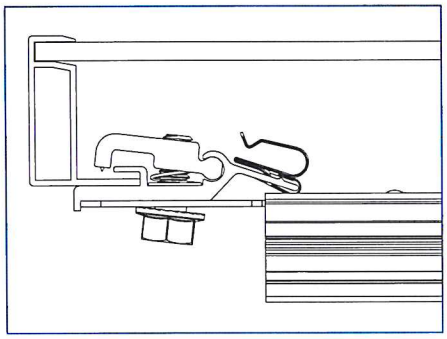


INSTALLATION INSTRUCTIONS - SNAPNRACK MLPE FRAME ATTACHMENT KIT

SnapNrack MLPE Frame Attachment kit are used to attach module level performance enhancing devices, and other devices such an SRD (rapid shutdown device), directly to module frames, and provide integrated grounding/bonding for Devices grounded through metal back plate. (Refer to the list of tested MLPE devices on page XX of this manual).

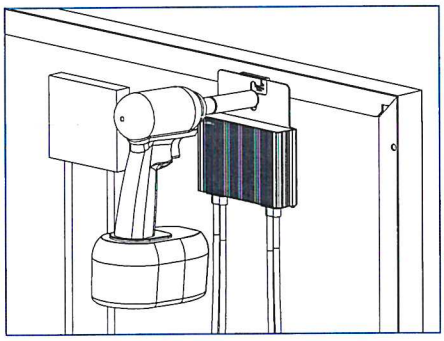


1) Slide the backplate channel of the MLPE device under the MLPE Frame Attachment Kit bolt. The MLPE mounting plate should rest against the MLPE mounting plate backstop on the MLPE Frame Attachment Kit.



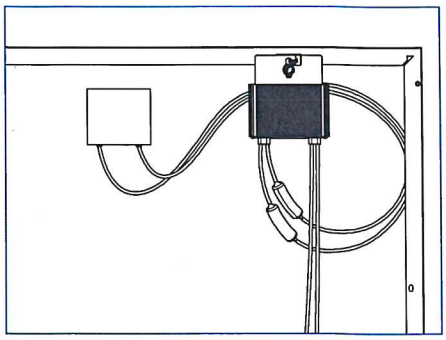
2) Position the MLPE Frame Attachment Kit on the module frame flange in a location that will not interfere with mounting system components. The module frame flange should rest against the module flange backstop on the MLPE Frame Attachment Kit.

Install Note:
Avoid blocking module frame drainage holes when installing the MLPE Frame Attachment Kit.



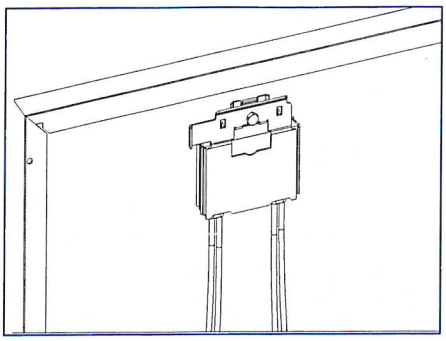
3) Tighten the mounting bolt on the MLPE Frame Attachment Kit to 12 lb-ft (144 lb-in).

Install Note:
The MLPE Frame Attachment Kit bonds the following components: Module Frame, MLPE backplate and Smart Clip.

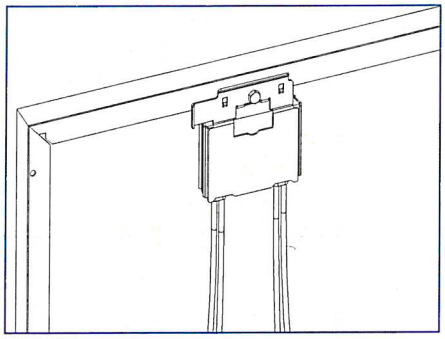


4) Connect the module leads to the input connectors on the MLPE device and manage conductors with the integrated Smart Clip.

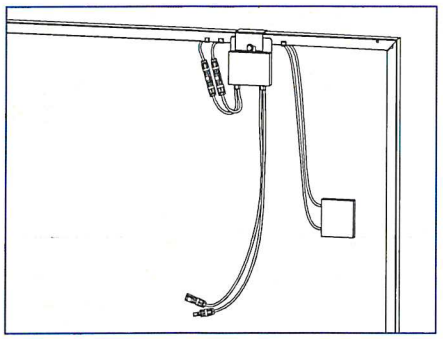
INSTALLATION INSTRUCTIONS - SOLAREDGE FRAME MOUNT



1) Locate the SolarEdge optimizer with Frame-Mounted Module Add-On at a location on the module frame that will not interfere with the TopSpeed™ Mounts.



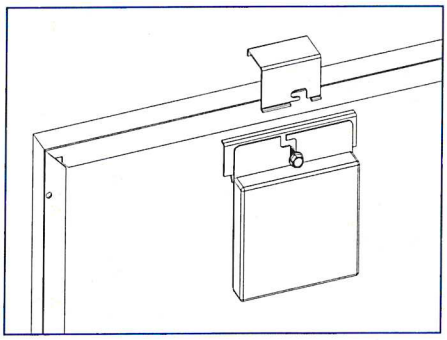
2) Install the optimizer mounting plate onto the module frame and tighten hardware to 11 ft-lbs.



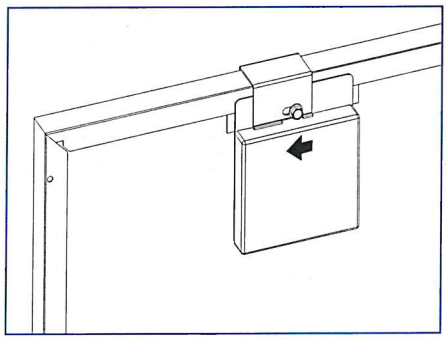
3) Connect the module leads to the input connectors on the optimizer and manage conductors with SnapNrack Smart Clips.

Install Note:
If module is mounted in portrait, install MLPE on long side, short side for landscape.

INSTALLATION INSTRUCTIONS - ENPHASE FRAME MOUNT

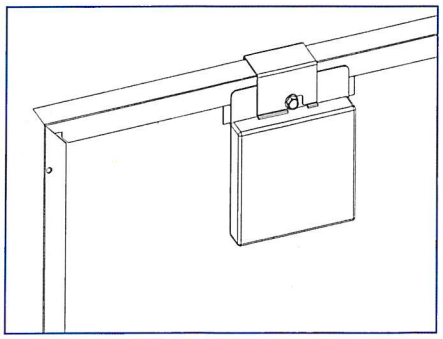


1) Locate the Enphase Frame Mount bracket clamp at a location on the module frame that will not interfere with the TopSpeed™ Mounts.



2) Slide the microinverter unit onto the bracket clamp, then move it slightly to the left.

Install Note:
The microinverter mounting flange should be on the outside of the module frame.



3) Tighten the hardware to 13 ft-lbs.

4) Connect module leads to microinverter DC connectors.

Install Note:
Refer to the Enphase Frame Mount installation guide for additional instructions.

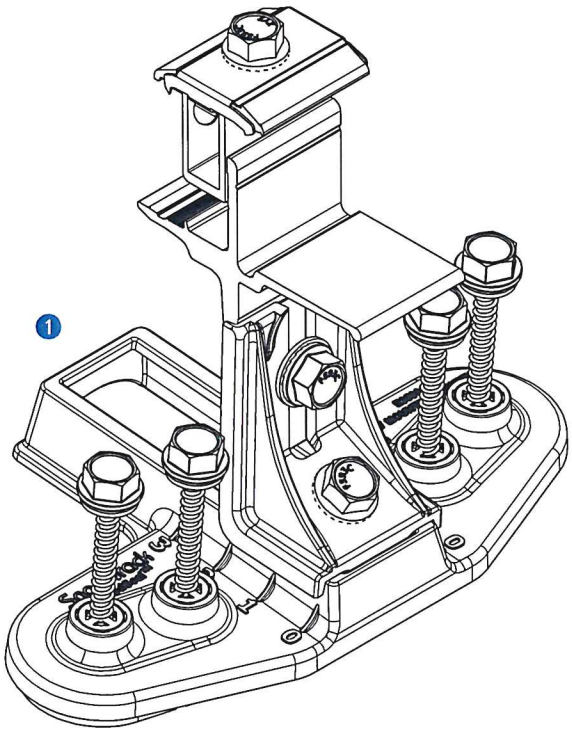
Module Installation

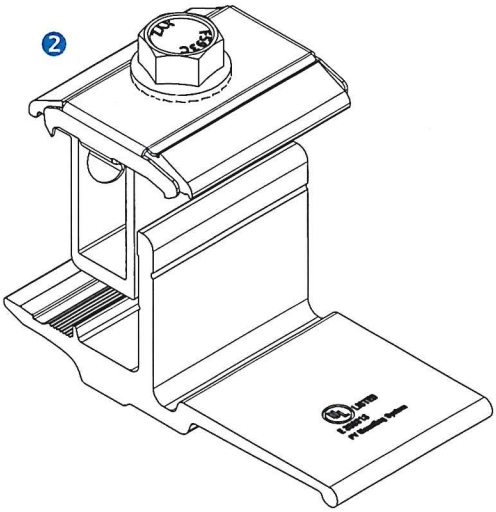
Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket
- Roofing Sealant

Materials Included

1. SnapNrack TopSpeed™ Mount
2. SnapNrack TopSpeed™ Clamp

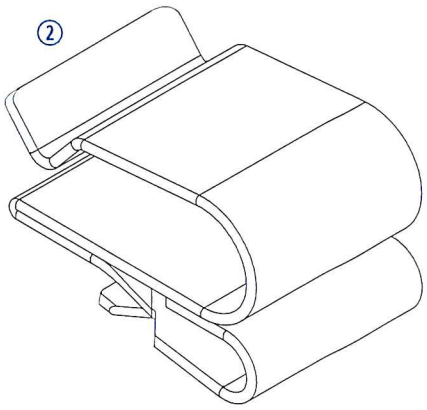


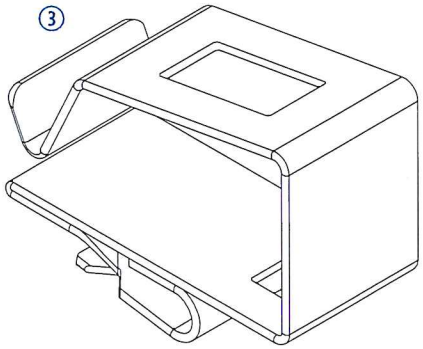


Other Materials Required

② SnapNrack Smart Clip (2-5 per module)
See Wire Management section for details

③ SnapNrack Smart Clip XL (10-20 per array)
See Wire Management section for details





INSTALLATION INSTRUCTIONS - BOTTOM ROW

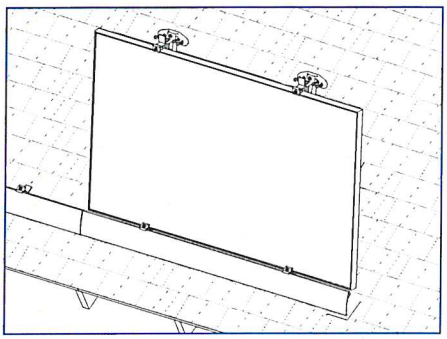
Recommended Best Practice:

Attach all TopSpeed™ mounts as the modules are being prepped with MLPEs on the ground. Attach Mounts before attaching MLPEs to simplify wire management.

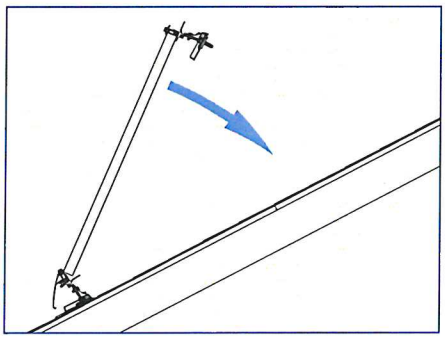
Install Note:

It is recommended that module leads and connectors are prepared for installation using SnapNrack Smart Clips before being brought to the rooftop.

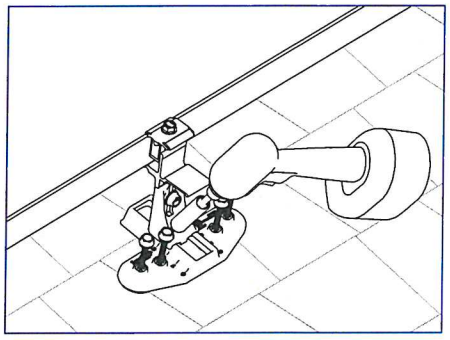
- With no MLPE, secure module leads to module frame to allow access to connectors while modules are installed
- Secure MLPE device to module frame with SnapNrack MLPE Frame Attachment Kit and connect module leads to MLPE, and manage leads by positioning connectors to allow access during installation

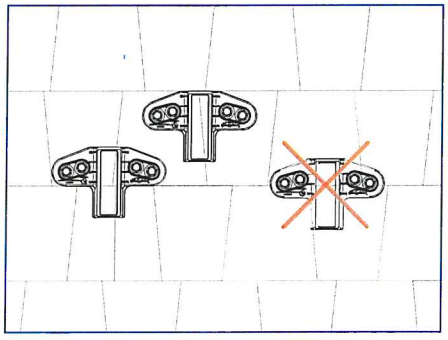


1) Rest downslope edge of module on the Mounts and/or Clamps position module so side edge is flush with marked edge of array layout or Skirt.

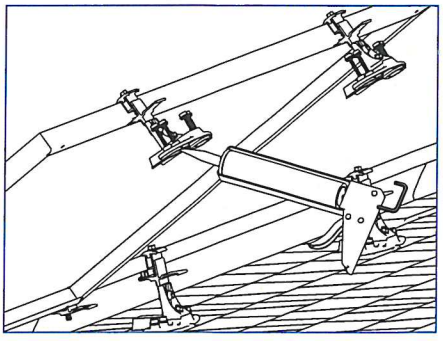


2) Lower upslope edge of module while simultaneously applying slight pressure to seat module into Mounts and/or Clamps.





3) When module is level with roof verify the Speedseal™ portion of the TopSpeed™ Mounts are positioned entirely on one course of composition. If required listen the 1/2" nut and adjust the base as needed then tighten the bolt.

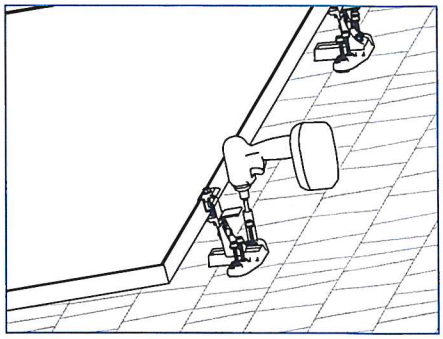


4) Lift the upslope edge of the module and fill the SpeedSeal™ reservoir with roofing sealant.

Install Note:

Roof sealant should be expelled from both vents of the TopSpeed™ Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from all four vents, remove TopSpeed™ Mount, add more sealant to the cavity, then reinstall.

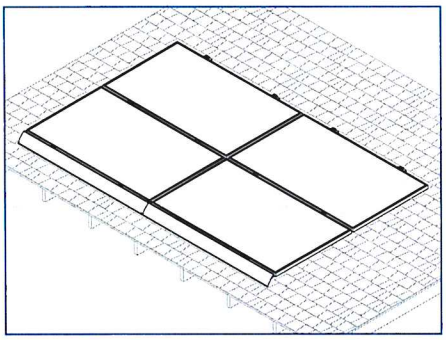
INSTALLATION INSTRUCTIONS - BOTTOM ROW



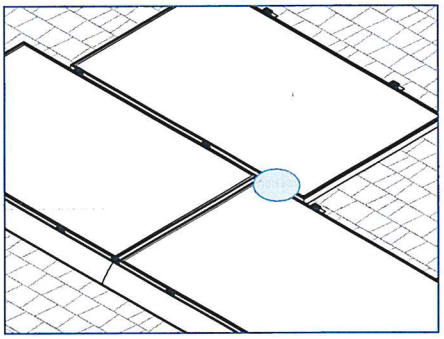
5) Lower the module to the roof and drive the (4) pre installed Snapnrack #14 Wood Screws with 1/2" hex head into the roof sheathing.

Install Note:

Roof sealant should be expelled from both vents of the TopSpeed™ Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from both vents, remove TopSpeed™ Mount, add more sealant to the cavity, then reinstall.



6) Repeat steps 1 through 5 for additional modules in the array.



7) For staggered arrays and arrays with mixed orientation, use the TopSpeed™ Clamp as needed to support the modules.

When installing a TopSpeed™ Clamp for support of an over cantilevered module, the clamp shall be installed 2-6" from the edge of the upslope (cantilevered) module.

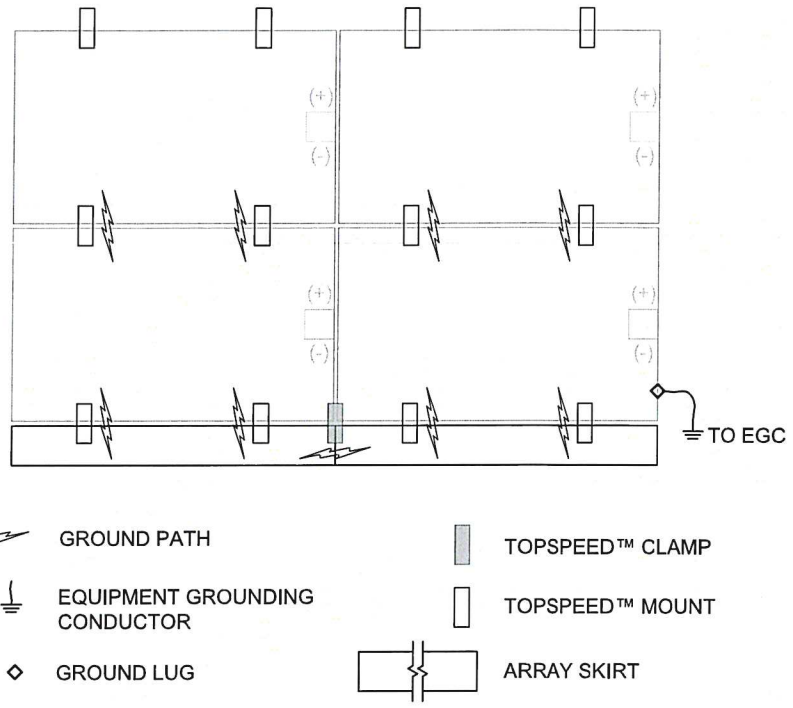
Grounding Specifications

GROUND PATH DETAILS

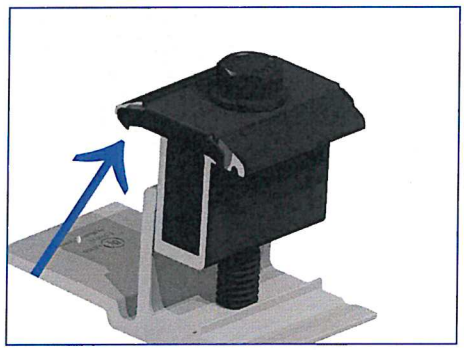
All TopSpeed™ components in the fault current ground path have been Certified to be used multiple times for grounding/bonding. The UL 2703 Listing does not specify a maximum number of uses for the Mount, Link, or Ground Lug. Review the requirements of the National Electrical Code (NEC) Article 250 to select the appropriate Equipment Grounding Conductor size based on the short-circuit current of the PV system.

When using Ground Lug R the following components are part of the fault current ground path:

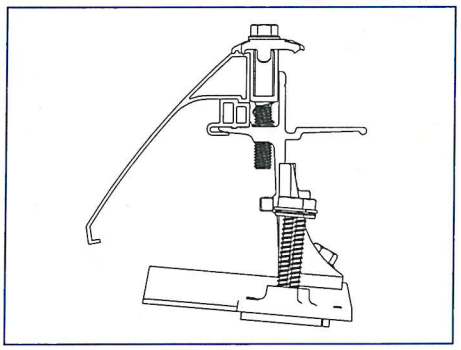
- SnapNrack, TopSpeed™ Mount
- SnapNrack, TopSpeed™ Clamp



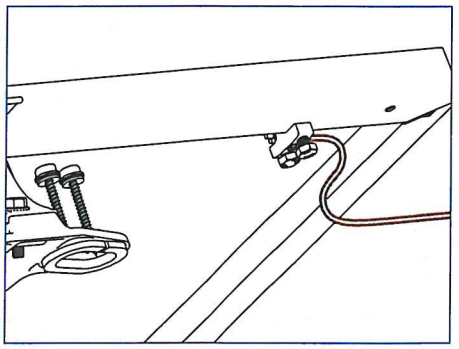
GROUNDING METHOD DETAILS

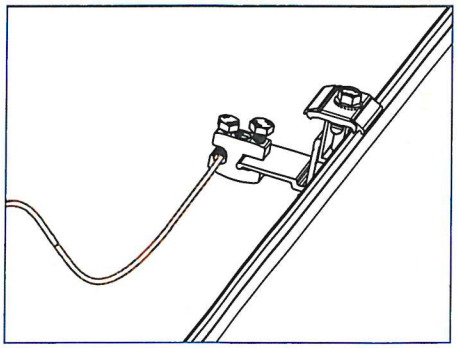


1) Row to row module bonding provided by bonding clips in Mount assembly and Clamp assembly.



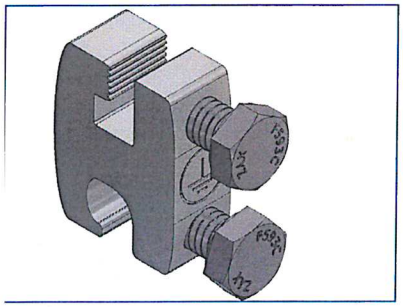
2) Column to column bonding provided by Universal Skirt and bonding clips in the Clamp assembly and/or the RL Universal Link assembly.
Module heights evaluated for bonding with Link Bonding Clamps: 40mm, 38mm, 35mm, 32mm, 30mm





3) Each continuous array is connected to Equipment Grounding Conductor through Ground Lug (242-92202) installed on one module per array.

Optionally; Install Ground Lug on the Mount Landing Pad at the top of the array.



GROUNDING MARKING DETAILS

The Ground Lug is marked with the ground symbol.

INSTRUCTION FOR MAINTAINING THE GROUNDING BONDING WHEN REMOVING A MODULE FOR SERVICING

CAUTION: Module removal may disrupt the bonding path and could introduce the risk of electric shock. Additional steps may be required to maintain the bonding path. Modules should only be removed by qualified persons in compliance with the instructions in this manual.

Module removal is not presented as a frequently expected occurrence and will not be required as part of routine maintenance.

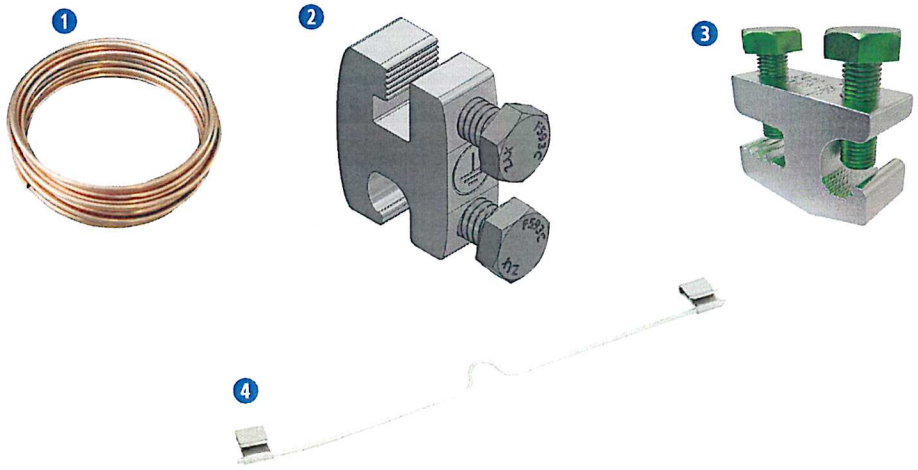
Scenarios that could result in a disruption of the bonding path are described, for example irregularly-shaped arrays, arrays consisting of individual rows, and any other scenario where module removal could disrupt the bonding path. In most cases, the removal of a module for servicing will not disturb or break grounding continuity. If a module is to be removed that will break continuity, these are the steps that must be taken to maintain a continuously bonded SnapNrack TopSpeed™ System.

Required Tools

- Socket Wrench
- Torque Wrench
- 1/2" Socket
- 7/16" Socket

Required Materials

1. #10 Or Larger Bare Copper Conductor
2. SnapNrack Ground Lug part no. 242-92202
3. Ilsco Part No. SGB-4
4. DnoRaxx Dynobond™

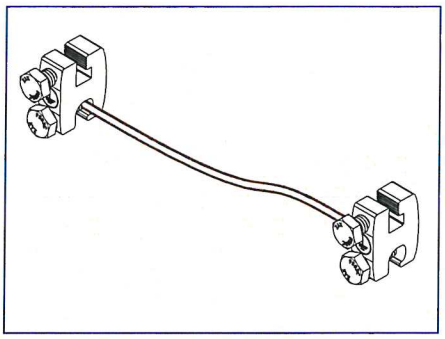


Maintaining the Grounding Bonding When Removing a Module

JUMPER ASSEMBLY INSTRUCTION & INSTALLATION

CAUTION: Do Not Remove the Module until the Jumper is installed

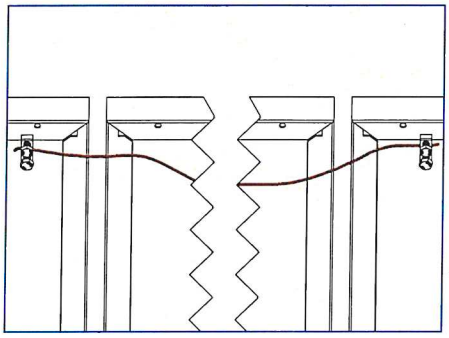
1) Identify the existing ground path at the location of module removal and choose an appropriate length of #10 bare copper to bridge the soon to be broken ground path.



Example of assembled bonding jumper using (2) SnapNrack Ground Lugs

2) Attach one ground lug to each end of #10 bare copper wire. See recommended options below:

1. (2) SnapNrack Ground Lug part no. 242-922022
2. (2) Ilsco part no. SGB-4
3. (1) DroRaxx DynoBond™



3) Before the module is removed, attach the assembled bonding jumper. Depending on where the module will be removed and choice of ground lug, jumper attachment locations will vary.

- SnapNrack Ground Lug part no. 242-92202 or Ilsco SGB-4 lugs can be attached to module frames or anywhere on the TopSpeed™ Mount.
- DynoRaxx DynoBond™ is approved and appropriate when a short bonding jumper is needed from module to module.

4) Service the array. With the bonding jumper installed, it is now safe to remove the module for service or maintenance.

5) After Servicing the array reinstall the module and original ground path. Only then Remove the bonding jumper.

Caution: Do not remove the bonding jumper until original ground path is established.

Appendix A

snapnrack.co

APPROVED MODULE & MLPE INFORMATION

SnapNrack TopSpeed™ System has been tested with the following UL Listed module series: The SnapNrack TopSpeed™ System employs top-down clamps and links which have been evaluated for frame-to-system bonding, at specific mounting torques and with the specific module series listed below. All wattage values are covered.

Module manufacturer approval letters can be found at www.snapnrack.com.

Manufacturer	Model	
Aptos Solar	DNA-120-MF23-XXX	DNA-120-BF26-XXXW
	DNA-120-BF23-XXX	DNA-144-BF26-XXXW
	DNA-144-MF23-XXX	DNA-108-BF10-xxxW
	DNA-144-BF23-XXX	DNA-120-BF10-xxxW
	DNA-120-MF26-XXXW	DNA-108-MF10-xxxW
	DNA-144-MF26-XXXW	
Canadian Solar	CS6K-XXX-M	CS1H-XXX-MS
	CS6K-XXX-M-SD	CS1H-XXX-MS-AB
	CS6K-XXX-P	CS3W-XXX-P
	CS6K-XXX-P-SD	CS3N-XXX-MS
	CS6K-XXX-MS	CS1Y-XXX-MS
	CS3K-XXX-P	CS3W-MB-AG
	CS3K-XXX-MS	CS3Y-MB-AG
	CS3U-XXX-MS	CS6W-XXXMB-AG
	CS3U-XXX-P	CS6R-XXXMS-HL
	CS1K-XXX-MS	CS3W-XXX-MS
CertainTeed	CTXXXHC11-06	
Chint Solar	CHSM6612M-XXX	CHSM72M-HC-XXX* (Astro 4)
	CHSM6612M(BL)-XXX	CHSM72M-HC-XXX* (Astro 5)
	CHSM6612M/HV-XXX	
Dehui Solar	DH-M760B-XXXW	DH-M760F-XXXW
	DH-M760W-XXXW	DH-M772F-XXXW
	DH-M772W-XXXW	
Freedom Forever	FF-MP-BBB-xxx	
Hanwha Q Cells	Q.PEAK DUO-G5-XXX	Q.PEAK DUO XL-G10.3/BFG-XXX
	Q.PEAK DUO-BLK-G5-XXX	Q.PEAK DUO G10-XXX
	Q.PLUS DUO-G5-XXX	Q.PEAK DUO BLK G10-XXX
	Q.PEAK DUO-G7-XXX	Q.PEAK DUO G10+-XXX
	Q.PEAK DUO-BLK-G7-XXX	Q.PEAK DUO BLK G10+-XXX
	Q.PEAK DUO-G7.2-XXX	Q.PEAK DUO XL-G10.3-XXX
	Q.PEAK DUO-G6+-XXX	Q.PEAK DUO XL-G10.c-XXX
	Q.PEAK DUO-BLK-G6+-XXX	Q.PEAK DUO XL-G10.d-XXX
	Q.PEAK DUO-G6-XXX	Q.PEAK DUO L-G8.3/BFG-XXX
	Q.PEAK DUO-BLK-G6-XXX	Q.PEAK DUO L-G8.3/BGT-XXX
	Q.PEAK DUO-G8+-XXX	Q.PEAK DUO ML-G10-XXX
	Q.PEAK DUO-BLK-G8+-XXX	Q.PEAK DUO BLK ML-G10+-XXX

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Manufacturer	Model	
Hanwha Q Cells	Q.PEAK DUO-G8-XXX	Q.PEAK DUO ML-G10+-XXX
	Q.PEAK DUO-BLK-G8-XXX	Q.PEAK DUO BLK ML-G10-XXX
	Q.PEAK DUO BLK-G6+/AC-XXX	Q.PEAK DUO ML-G10.a+-XXX
	Q.PEAK DUO-ML-G9-XXX	Q.PEAK DUO BLK ML-G10.a+-XXX
	Q.PEAK DUO-BLK-ML-G9-XXX	Q.PEAK DUO ML-G10.a-XXX
	Q.PEAK DUO-BLK-G9-XXX	Q.PEAK DUO BLK ML-G10.a-XXX
	Q.PEAK DUO-BLK-ML-G9+-XXX	Q.PEAK DUO BLK G10+/AC XXX
	Q.PEAK DUO-ML-G9+-XXX	Q.PEAK DUO BLK G10+/HL XXX
	Q.PEAK DUO-BLK-ML-G9+-XXX	Q.PEAK DUO XL-G11.3 XXX
	Q.PEAK DUO XL-G9.2-XXX	Q.PEAK DUO XL-G11.3 BFG XXX
	Q.PEAK DUO XL-G9.3-XXX	Q.TRON-G1+ XXX
	Q.PEAK DUO XL-G9.3/BFG-XXX	Q.TRON BLK-G1+ XXX
	Q.PEAK DUO XL-G10.2-XXX	
HT-SAAE	HT60-166M-XXX	HT60-182M-XXX
Heliene	60M-XXX	72M-XXX
	60P-XXX	72P-XXX
"Hyundai (All may be followed by "BK")"	HiA-SXXXMS	HiS-SXXXYI
	HiS-SXXXXY	HiS-SXXXYH(BK)
Hyperion/Runergy	HY-DH108P8-XXX(Y)	
JA Solar	JAM60S09-XXX/PR	JAM72S10-XXX/PR
	JAM60S10-XXX/MR	JAM72S12-XXX/PR
	JAM60S10-XXX/PR	JAM60S17-XXX/MR
	JAM60S12-XXX/PR	JAM54S30-XXX/MR
	JAM72S09-XXX/PR	JAM54S31-XXX/MR
	JAM72S10-XXX/MR	JAM72D30-XXX/MB
Jinko Solar	JKMXXXM-60	JKMXXXP-72-V
	JKMXXXM-60L	JKMXXXPP-72
	JKMXXXM-60HL	JKMXXXPP-72-V
	JKMXXXM-60HBL	JKMSXXXP-72
	JKMXXXP-60	JKMXXXM-72HL-V
	JKMXXXP-60-J4	JKMXXXM-72HL-TV
	JKMXXXP-60-V	JKMXXXM-72HBL
	JKMXXXP-60B-J4	JKMXXXM-6TL3-B
	JKMXXXPP-60	JKMXXXM-6RL3-B
	JKMXXXPP-60-V	JKMXXXM-7RL3-V
	JKMXXXM-72	JKMXXXM-7RL3-TV
	JKMXXXM-72L-V	JKMXXXM-72HL4-V
	JKMXXXP-72	JKMXXXM-72HL4-TV
LG	LGXXXN1C-A5	LGXXXA1C-V5
	LGXXXN1K-A5	LGXXXM1C-L5
	LGXXXQ1C-A5	LGXXXM1K-L5
	LGXXXQ1K-A5	LGXXXN1C-N5
	LGXXXS1C-A5	LGXXXN1K-L5
	LGXXXN2C-B3	LGXXXN1K-A6
	LGXXXN2W-B3	LGXXXN1C-A6

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Manufacturer	Model	
LG	LGXXXN1C-G4	LGXXXN1W-A6
	LGXXXN1K-G4	LGXXXQ1C-A6
	LGXXXS1C-G4	LGXXXQ1K-A6
	LGXXXN2C-G4	LGXXXM1K-A6
	LGXXXN2K-G4	LGXXXM1C-A6
	LGXXXN2W-G4	LGXXXA1C-A6
	LGXXXS2C-G4	LGXXXQAC-A6
	LGXXXS2W-G4	LGXXXQAK-A6
	LGXXXN1C-V5	LGXXXN1K-B6
	LGXXXN1W-V5	LGXXXN2W-E6
	LGXXXN2T-V5	LGXXXN2T-E6
	LGXXXN2T-J5	LGXXXN1K-E6
	LGXXXN1T-V5	LGXXXN3K-V6
Longi	LR6-60-XXXM	LR4-60HPB-XXXM
	LR6-60BK-XXXM	LR4-60HIB-XXXM
	LR6-60HV-XXXM	LR4-60HPH-XXXM
	LR6-60PB-XXXM	LR4-60HIH-XXXM
	LR6-60PE-XXXM	LR6-60HIH-XXXM
	LR6-60PH-XXXM	LR6-60HIB-XXXM
	LR6-60HPB-XXXM	LR4-72HPH-XXXM
	LR6-60HPH-XXXM	
Meyer Burger	Meyer Burger Black*	Meyer Burger White*
mSolar	TXI6-XXX120BB	
Mission Solar	MSEXXXSO5T	MSEXXXSQ4S
	MSEXXXSO5K	MSEXXXSR8K
	MSEXXXSQ5T	MSEXXXSR8T
	MSEXXXSQ5K	MSEXXXSR9S
	MSEXXXMM4J	MSE60AXXX
	MSEXXXMM6J	MSEXXXSX5K
	MSEXXXSO6W	MSEXXXSX5T
	MSEXXXSO4J	MSEXXXSX6S
	MSEXXXSO6J	MSEXXXSX6W
	MSEXXXSQ6S	MSEXXXSX5R
Next Energy Alliance	USNEA-XXXM3-60	USNEA-XXXM3-72
	USNEA-XXXM3B-60	USNEA-XXXM3B-72
Panasonic	VBHNXXXKA03	VBHXXXRA18N
	VBHNXXXKA04	VBHXXXRA03K
	VBHNXXXSA17	EVPVXXX(K)
	VBHNXXXSA18	EVPVXXXH
	VBHN325SA17E	EVPVXXXPK
Phono Solar	PSXXXM-20/U	PSxxxM8GF-18/VH
	PSXXXMH-20/U	PSxxxM8GFH-18/VH
	PSxxxM8GF-24/TH	PSxxxM6-24/TH
	PSxxxM8GFH-24/TH	

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Manufacturer	Model	
REC (All may be followed by "BLK" or "BLACK")	RECXXXTP2	RECXXXTP2SM 72 BLK2
	RECXXXTP2-BLK	RECXXXAA
	RECXXXNP	RECXXXTP3M
	RECXXXTP2M	RECXXXTP4
	RECXXXTP2M 72	RECXXXAA Pure
	RECXXXTP2M 72 BLK	RECXXXAA Pure-R
	RECXXXTP2M 72 BLK2	RECXXXNP2
	RECXXXTP2SM 72	RECXXXNP3
	RECXXXTP2SM 72 BLK	
SEG Solar	SEG-400-BMB-HV	SEG-xxx-BMD-HV
	SEG-400-BMB-TB	SEG-xxx-BMD-TB
Silfab	SLAXXX-M	SILXXXNT
	SLAXXX-P	SILXXXHL
	SSAXXX-M	SILXXXBK
	SSAXXX-P	SILXXXNX
	SILXXXBL	SILXXXNU
	SILXXXML	SILXXXHC
	SILXXXNL	SILXXXHN
	SLGXXX-M	SILXXXBG
	SLGXXX-P	SIL-xxxHC+
	SSGXXX-M	SIL-xxxHM
	SSGXXX-P	
Solaria	Solaria PowerXT-XXXR-PX	Solaria PowerXT-XXXR-PM
	Solaria PowerXT-XXXR-BX	Solaria PowerXT-XXXR-PM-AC
	Solaria PowerXT-XXXR-AC	
Sunpower	SPR-AXXX-G-AC	SPR-MXXX-H-AC
	SPR-AXXX	SPR-MXXX
	SPR-AXXX-BLK-G-AC	SPR-MXXX-BLK-H-AC
	SPR-AXXX-BLK	SPR-MXXX-BLK
SunSpark	SST-XXXM3-60	SST-XXXM3-72
	SST-XXXM3B-60	SST-XXXM3B-72
Talesun	TP660M-XXX	TP672M-XXX
	TP660P-XXX	TP672P-XXX
Trina	TSM-XXXDD05(II)	TSMXXXDD05H.05(II)
	TSM-XXXDD05A.05(II)	TSM-XXXDD06M.05(II)
	TSM-XXXDD05A.08(II)	TSM-XXXDE15H(II)
	TSM-XXXDD05A.082(II)	TSM-XXXDE15M(II)
	TSM-XXXPA05	TSMXXXDE06X.05(II)
	TSM-XXXPA05.05	TSMXXXDE09.05
	TSM-XXXPA05.08	TSM-XXXDE15V(II)
	TSM-XXXPD05	TSM-XXXDEG15VC.20(II)
	TSM-XXXPD05.002	TSM-XXXDEG18MC.20(II)
	TSM-XXXPD05.05	TSM-XXXDEG19C.20

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Manufacturer	Model	
Trina	TSM-XXXPD05.05S	TSM-XXXDEG21C.20
	TSM-XXXPD05.08	TSM-XXXDE09C.05
	TSM-XXXPD05.082	TSM-XXXDE09C.07
	TSM-XXXPD05.08D	TSM-xxxNE09RC.05
	TSM-XXXPD05.08S	
Vikram Solar	SOMERA VSMHBB.60.XXX.05	PREXOS VSMDHT.60.XXX.05
	SOMERA VSMH.72.XXX.05	PREXOS VSMDHT.72.XXX.05
VSUN	VSUNXXX-144BMH-DG	VSUNXXX-108BMH
	VSUNXXX-120BMH	
ZNShine	ZXM6-60-XXX/M	ZXM6-NH144-XXXM
	ZXM6-NH120-XXXM	ZXM7-SH108-XXXM

Appendix A

SnapNrack TopSpeed™ has been tested with the following Module Level Power Electronic (MLPE) devices:

SnapNrack TopSpeed™ mounting systems has been tested with the following UL/NRTL Listed Module Level Power Electronic (MLPE) Devices. The back plates of the MLPEs have been evaluated for bonding to TopSpeed™ through the SnapNrack MLPE Frame Attachment Kit, model 242-02151.

MLPE Manufacturer	Model	
AP Smart	RSD-S-PLC	
Celestica International	DG-006-F001201x	DG-006-F001401x
Delta Electronics	GPI00010105	
Enphase	C250	IQ7PLUS-72-2-US
	M215	IQ7PLUS-72-B-US
	M250	IQ8-60
	IQ6-60-2-US	IQ8PLUS-72
	IQ6PLUS-72-2-US	IQ8A-72
	IQ7-60-2-US	IQ8H-208-72
	IQ7-60-B-US	IQ8H-240-72
Generec	S2502	
Ginlong Technologies	Solis-RSD-1G	
	Solis-MLRSD-R1-1G	Solis-MLRSD-R2-1G
SolarEdge	P300-5NC4ARS	P320-5NC4ARS
	P370-5NC4AFS	P400-5NC4AFS
	P320	P340
	P370	P400
	P401	P405
	P485	P505
	P730	P800p
	P850	P860
	P950	P1100
	P1101	S440
	S500	
SMA	RSB-2S-US-10	
Tigo	TS4-R-F	TS4-R-M
	TS4-R-O	TS4-R-S
	TS4-R-M-DUO	TS4-R-O-DUO
	TS4-R-S-DUO	TS4-A-F
	TS4-A-2F	TS4-A-O
	TS4-A-S	

Historic Preservation Trust of Lancaster County

April 30, 2024

Borough of Columbia
308 Locust St
Columbia, PA 17512

HARB Review for 401 Walnut Street, Columbia – permit #240037

401 Walnut Street, Columbia was built as a single-family residence in 1890 (permit application and Lancaster County Historic Resource Survey) in the Italianate style. Most of the exterior historic fabric is intact.

The proposed Scope of Work includes:

Install of a 7.79 KW roof mount solar array. 19 panels. Total roof area 392 sq. ft.

Preservation Review

Install of roof mount solar array.
Appropriate with conditions. Based on the drawings showing the position of the solar array on the rear ell and set back from the edge of the roof on the street is sympathetic to the historic district. If the solar array were visible from the streetscape that would be inappropriate. Verify the placement of the solar array.

Based on National Trust for Historic Preservation: Solar Panels on Historic Properties Guidance and the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Sustainability.

Reference Secretary of the Interior's Standards for Rehabilitation 1, 2

Sehner-Ellicott-von Hess House
PO Box 2667 | Lancaster, Pennsylvania 17603
717-291-5861 | manager@hptrust.org

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.