HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Karen Burditt
Chair

Date: February 28, 2025

MEMORANDUM

TO: Rabbiah Sabbakhan
Department of Permitting Services
FROM: Devon Murtha
Historic Preservation Section
Maryland-National Capital Park & Planning Commission
SUBJECT: Historic Area Work Permit #1103977 – Solar panel installation

---

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **Approved** at the February 26, 2025 HPC meeting.

The HPC staff has reviewed and stamped the attached submission materials.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Inan Phillips and Tina Crouse (Agent)
Address: 35 Columbia Avenue, Takoma Park, MD 20912

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once work is complete, the applicant will contact Devon Murtha at 301-495-1328 or devon.murtha@montgomeryplanning.org to schedule a follow-up site visit.

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

Property Built in 1928

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

-Install (18) roof mounted solar panels, 7.20 kW

-Micro Inverters to be placed under each panel

-Utility disconnect to be installed next to utility meter along with electrical combiner box for micro inverters

Galvanized steel conduit to run from equipment to run along side

APPROVED

Montgomery County

Historic Preservation Commission

Karen Burdette

REVIEWED

By Devon.Murtha at 9:05 am, Feb 28, 2025

Work Item 1: _____

Description of Current Condition:	Proposed Work:

Work Item 2: _____

Description of Current Condition:	Proposed Work:

Work Item 3: _____

Description of Current Condition:	Proposed Work:

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

APPROVED
Montgomery County
Historic Preservation Commission

HISTORIC AREA WORK PERMIT
CHECKLIST OF
APPLICATION REQUIREMENTS

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

APPROVED

Montgomery County

Historic Preservation Commission

Karen Burdette

REVIEWED

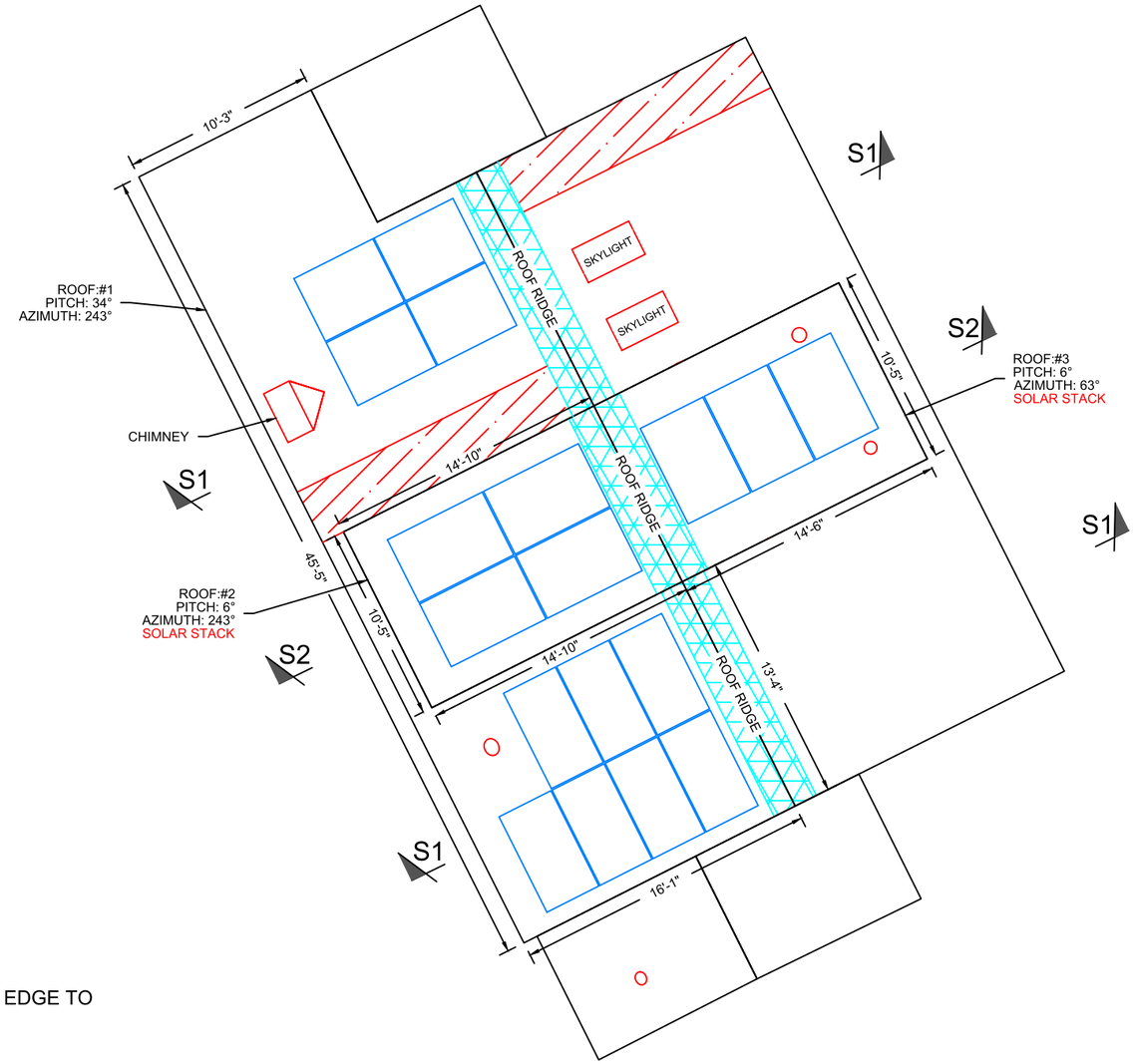
By Devon.Murtha at 9:05 am, Feb 28, 2025

SolarStack on R2 & R3

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

David C. Hernande
Digitally signed by David C. Hernande
Date: 2025.01.31 11:48:56 -05:00

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 49993, EXP. 10/06/2026.



N
S

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: 1782 SQFT

SOLAR ARRAY AREA: 378.36 SQFT

THE SOLAR ARRAY IS 21.2% OF THE PLAN VIEW TOTAL ROOF AREA

NOTES:

1. THE SYSTEM SHALL INCLUDE (18) LONGI LR5-54HABB-400M.
2. SNAPNRACK TOPSPEED WILL BE INSTALLED IN ACCORDANCE WITH SNAPNRACK INSTALLATION MANUAL.
3. SOLAR STACK MOUNT KIT WILL BE INSTALLED IN ACCORDANCE WITH SOLAR STACK INSTALLATION MANUAL.
4. REFER TO STRUCTURAL DRAWING FOR SECTIONS MARKED AND ADDITIONAL NOTES.

SOLAR PANEL LAYOUT

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

APPROVED
Montgomery County
Historic Preservation Commission

Solar Energy World
Because Tomorrow Matters

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

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Building Code	International Residential Code (IRC) 2018
Electrical Code	National Electrical Code (NEC) 2017
Wind Speed	115 MPH
Snow Load	30 PSF
Modules	(18) LONGi LR5-54HABB-400M
Inverter(s)	(18) IQ8+-72-M-US
DC System Size	7.200 kW
AC System Size	5.220 kW
Customer Information	Inan Phillips 35 Columbia Ave Takoma Park, MD 20912
Partner/Lender	None
AHJ	Montgomery
Utility	BGE
Sheet Name	Solar Panel Layout
Drawn By	CB
Date	January 31, 2025
Scale	AS NOTED
Job Number	MD22958
Sheet	A-1

David C. Hernande
Digitally signed by David C. Hernande
Date: 2025.01.31 11:48:56 -05:00

STATE OF MARYLAND
DAVID C. HERNANDEZ
49993
PROFESSIONAL ENGINEER

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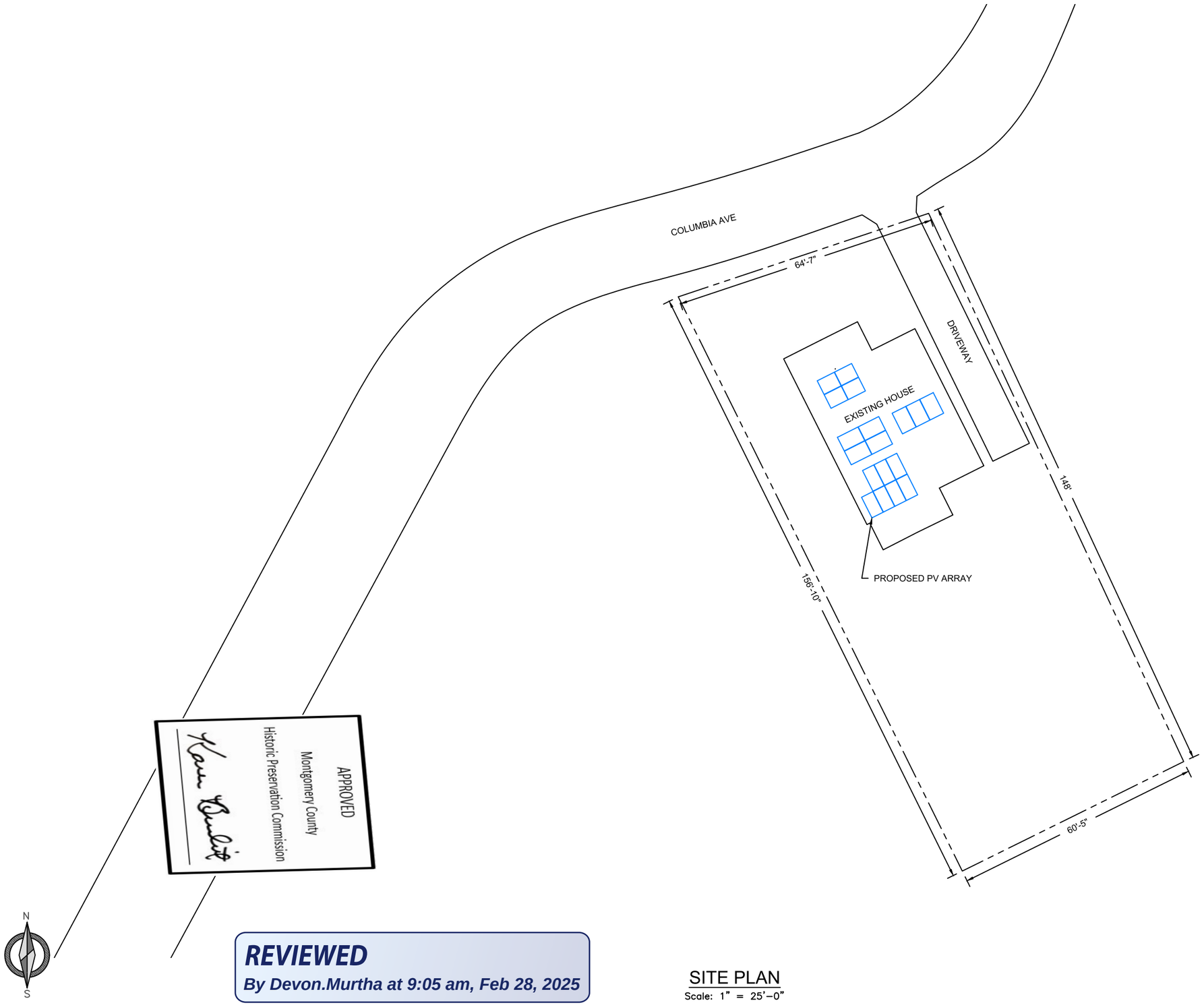

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

SITE PLAN
Scale: 1" = 25'–0"

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Customer Information	Inan Phillips 35 Columbia Ave Takoma Park, MD 20912
Partner/Lender	None
AHJ: Montgomery	Utility: BGE
Sheet Name	Site Plan
Drawn By: CB	Date: January 31, 2025
Scale: AS NOTED	Job Number: MD22958
Sheet: A-2	

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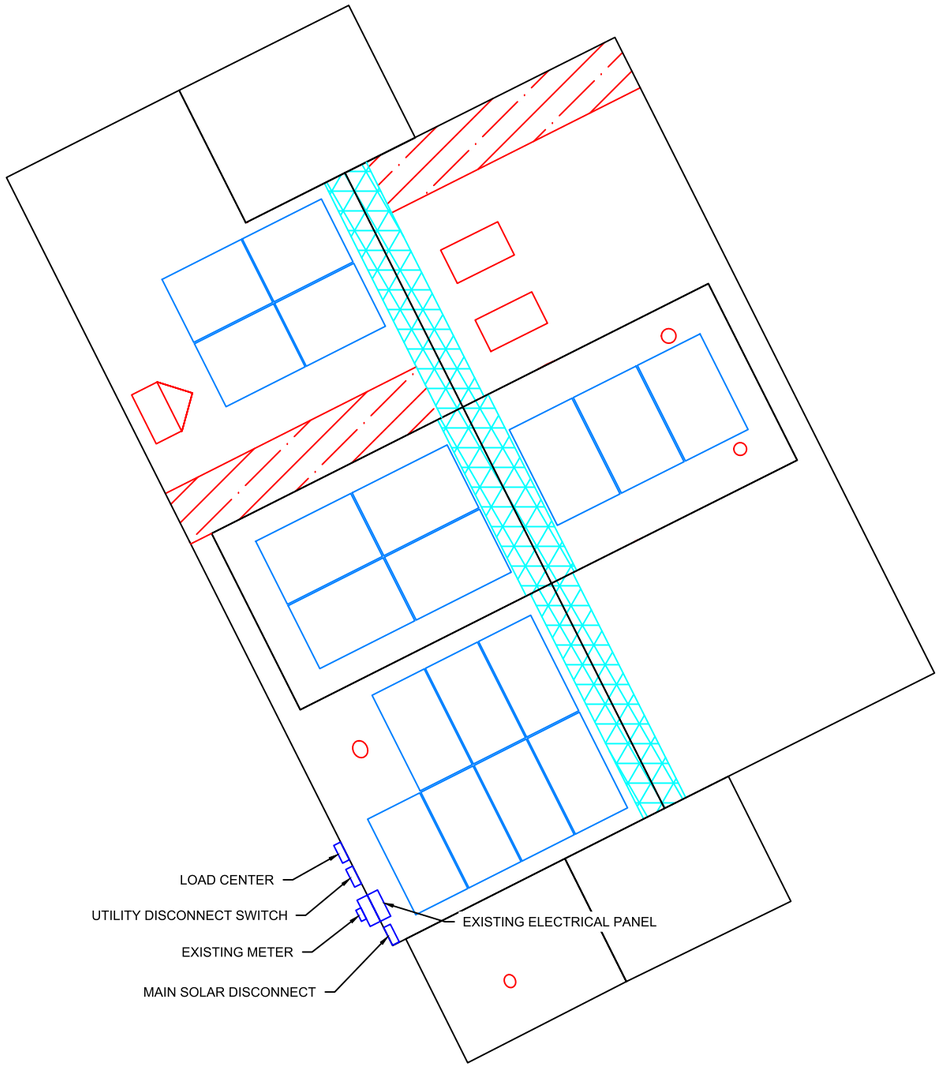

EQUIPMENT LOCATION PLAN
Scale: NTS

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

NOTE:

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

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Partner/Lender	None
AHJ	Montgomery
Utility	BGE
Sheet Name	Equipment Location Plan
Drawn By	CB
Date	January 31, 2025
Scale	AS NOTED
Job Number	MD22958
Sheet	E-1

David C. Hernande
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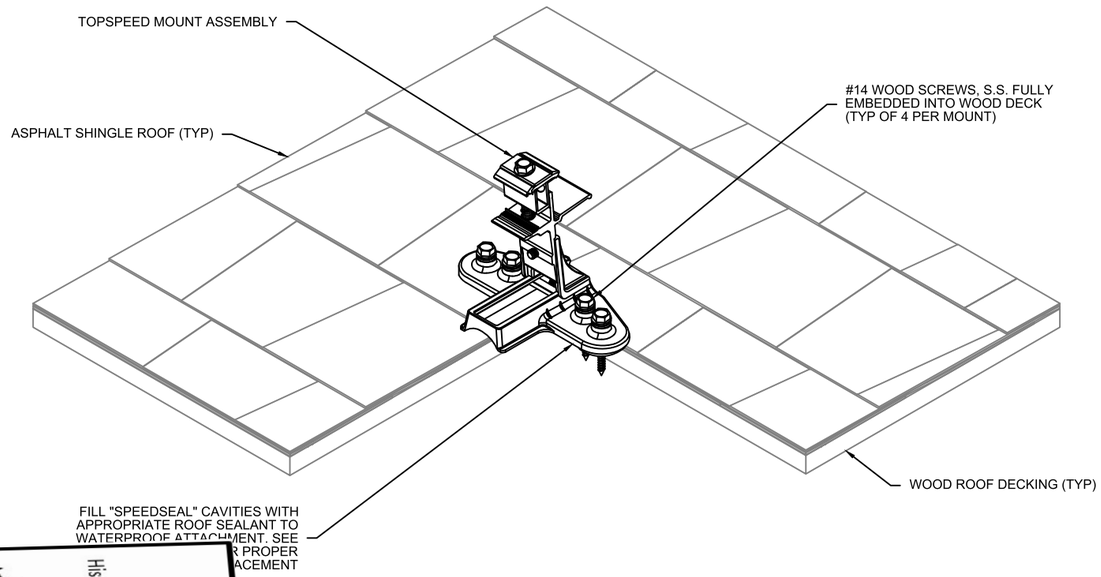

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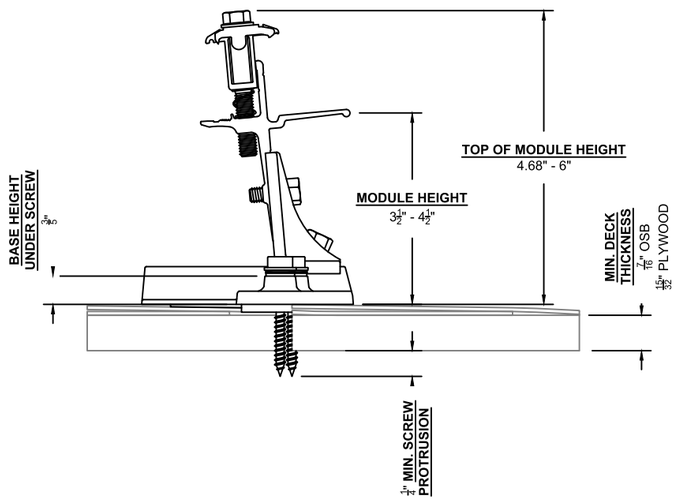
Montgomery County
Historic Preservation Commission

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

Structural Details		
S1	Truss	2x6 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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Modules: (18) LONGi LR5-54HABB-400M
Inverter(s): (18) IQ8+-72-M-US
DC System Size: 7.200 kW | AC System Size: 5.220 kW
Customer Information: Inan Phillips, 35 Columbia Ave, Takoma Park, MD 20912
Partner/Lender: None
AHJ: Montgomery | Utility: BGE
Sheet Name: Structural Attachment Details
Drawn By: CB | Date: January 31, 2025
Scale: AS NOTED | Job Number: MD22958 | Sheet: S-1

David C. Hernande
Digitally signed by David C. Hernande
Date: 2025.01.31 11:48:56 -05:00

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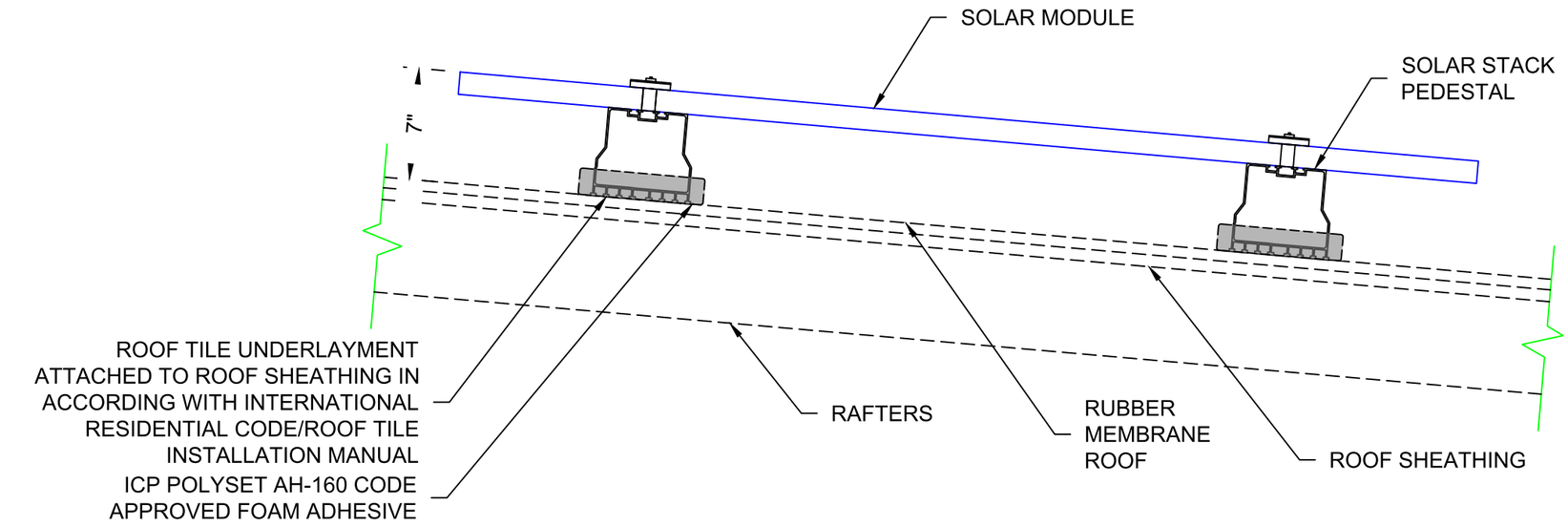

Structural Details		
S2	Truss	2x6 O.C. 24"

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.
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Wind Speed	Snow Load
115 MPH	30 PSF

Modules: (18) LONGi LR5-54HABB-400M

Inverter(s): (18) IQ8+-72-M-US

DC System Size	AC System Size
7.200 kW	5.220 kW

Customer Information:
Inan Phillips
35 Columbia Ave
Takoma Park, MD 20912

Partner/Lender: None

AHJ	Utility
Montgomery	BGE

Sheet Name: Structural Attachment Details

Drawn By	Date
CB	January 31, 2025

Scale	Job Number	Sheet
AS NOTED	MD22958	S-2

Bill Of Materials	
Product	Count
Mounts Without Spacers	22
Mounts With Spacers	8
Clamps Without Spacers	0
Clamps With Spacers	2

David C. Hernande
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Date: 2025.01.31 11:48:56 -05:00

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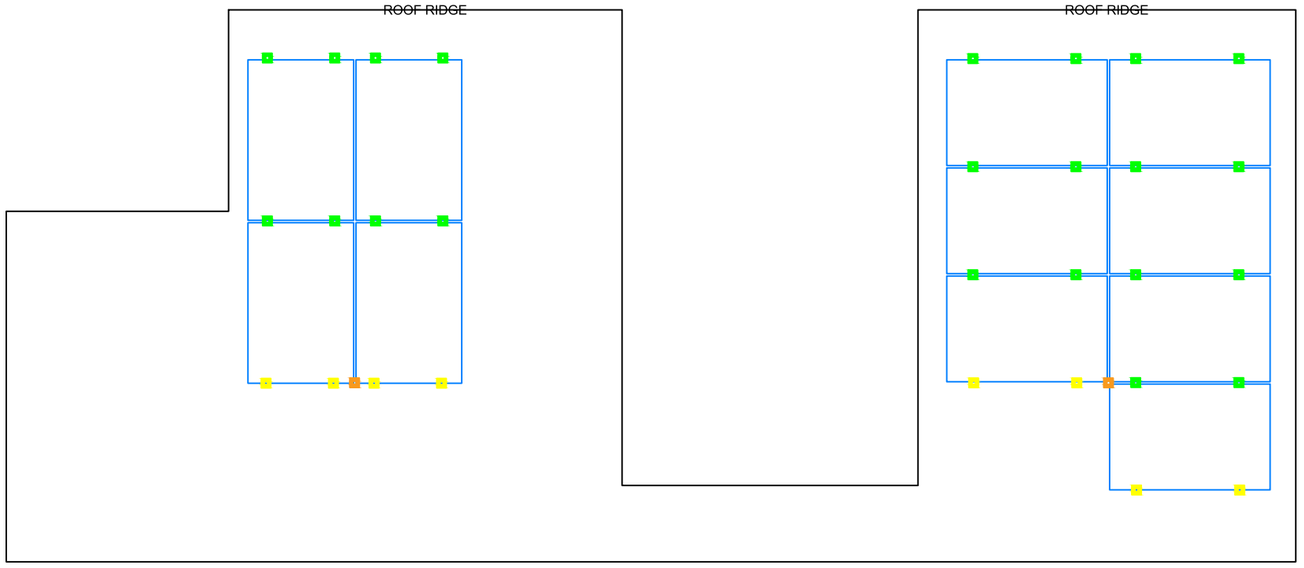

SOLAR PANEL FOOTING PLAN R1
Scale: 3/16" = 1'-0"

KEY

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

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

APPROVED
Montgomery County
Historic Preservation Commission

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

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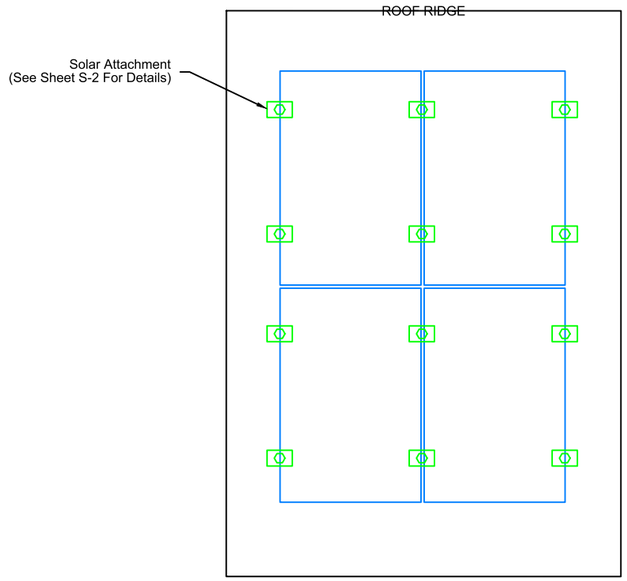
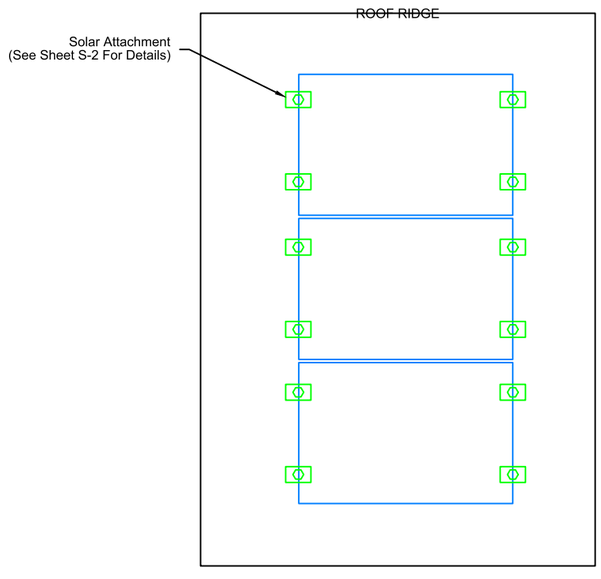
Inverter(s): (18) IQ8+-72-M-US
DC System Size: 7.200 kW | AC System Size: 5.220 kW
Customer Information: Inan Phillips, 35 Columbia Ave, Takoma Park, MD 20912
Partner/Lender: None
AHJ: Montgomery | Utility: BGE
Sheet Name: Solar Panel Footing Plan
Drawn By: CB | Date: January 31, 2025
Scale: AS NOTED | Job Number: MD22958 | Sheet: S-3

Bill Of Materials	
Product	Count
Solar Stack	24



SOLAR PANEL FOOTING PLAN R2

Scale: 1/4" = 1'-0"



SOLAR PANEL FOOTING PLAN R3

Scale: 1/4" = 1'-0"

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

NOTES:

1. SOLAR STACK SHALL BE INSTALLED IN ACCORDANCE WITH SOLAR STACK INSTALLATION MANUAL.

David C. Hernande
Digitally signed by David C. Hernande
Date: 2025.01.31 11:48:56 -05:00

STATE OF MARYLAND
DAVID C. HERNANDEZ
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PROFESSIONAL ENGINEER

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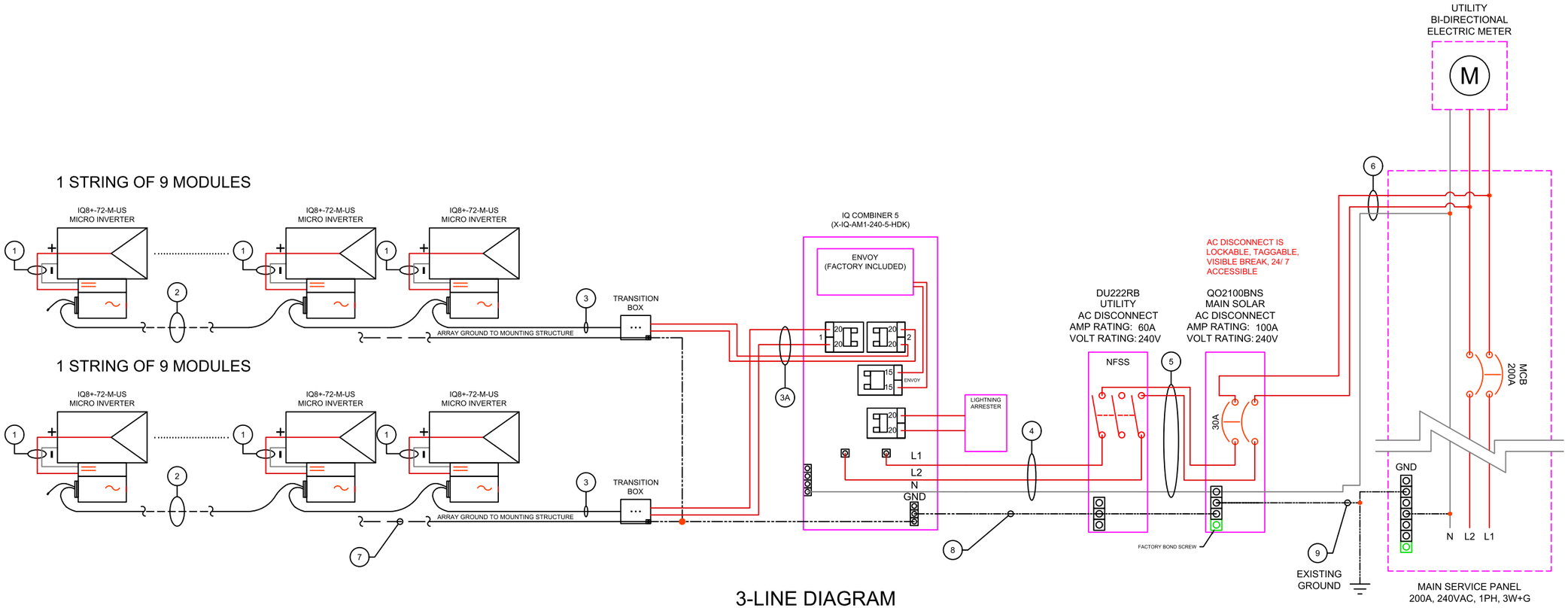
Customer Information	Inan Phillips 35 Columbia Ave Takoma Park, MD 20912
Partner/Lender	None
AHJ: Montgomery	Utility: BGE
Sheet Name	Solar Panel Footing Plan
Drawn By: CB	Date: January 31, 2025
Scale: AS NOTED	Job Number: MD22958
Sheet: S-4	



3-LINE DIAGRAM

MODULE SPECIFICATIONS	
MODEL NUMBER	LR5-54HABB-400M
PEAK POWER	400 W
RATED VOLTAGE (Vmpp)	30.94 V
RATED CURRENT (Imp)	12.93 A
OPEN CIRCUIT VOLTAGE (Voc)	37.05 V
SHORT CIRCUIT CURRENT (Isc)	13.72 A
MAXIMUM SYSTEM VOLTAGE	1000VDC

INVERTER SPECIFICATIONS	
MODEL NUMBER	IQ8PLUS-72-M-US
MAXIMUM DC VOLTAGE	60 V
MAXIMUM POWER OUTPUT	290 W
NOMINAL AC VOLTAGE	240 VAC
MAXIMUM AC CURRENT	1.21 A
CEC EFFICIENCY	97.0%

ARRAY DETAILS		
NO. OF MODULES PER STRING	9	9
NO. OF STRINGS	1	1
ARRAY WATTS AT STC	3600	3600

REVIEWED
By Devon.Murtha at 9:05 am, Feb 28, 2025

APPROVED
Montgomery County
Historic Preservation Commission

TAG		E	NOTES
1	Panel to Micro	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	#10 Cu THHN/THWN-2	
5	AC Disconnect to AC Disconnect	#10 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

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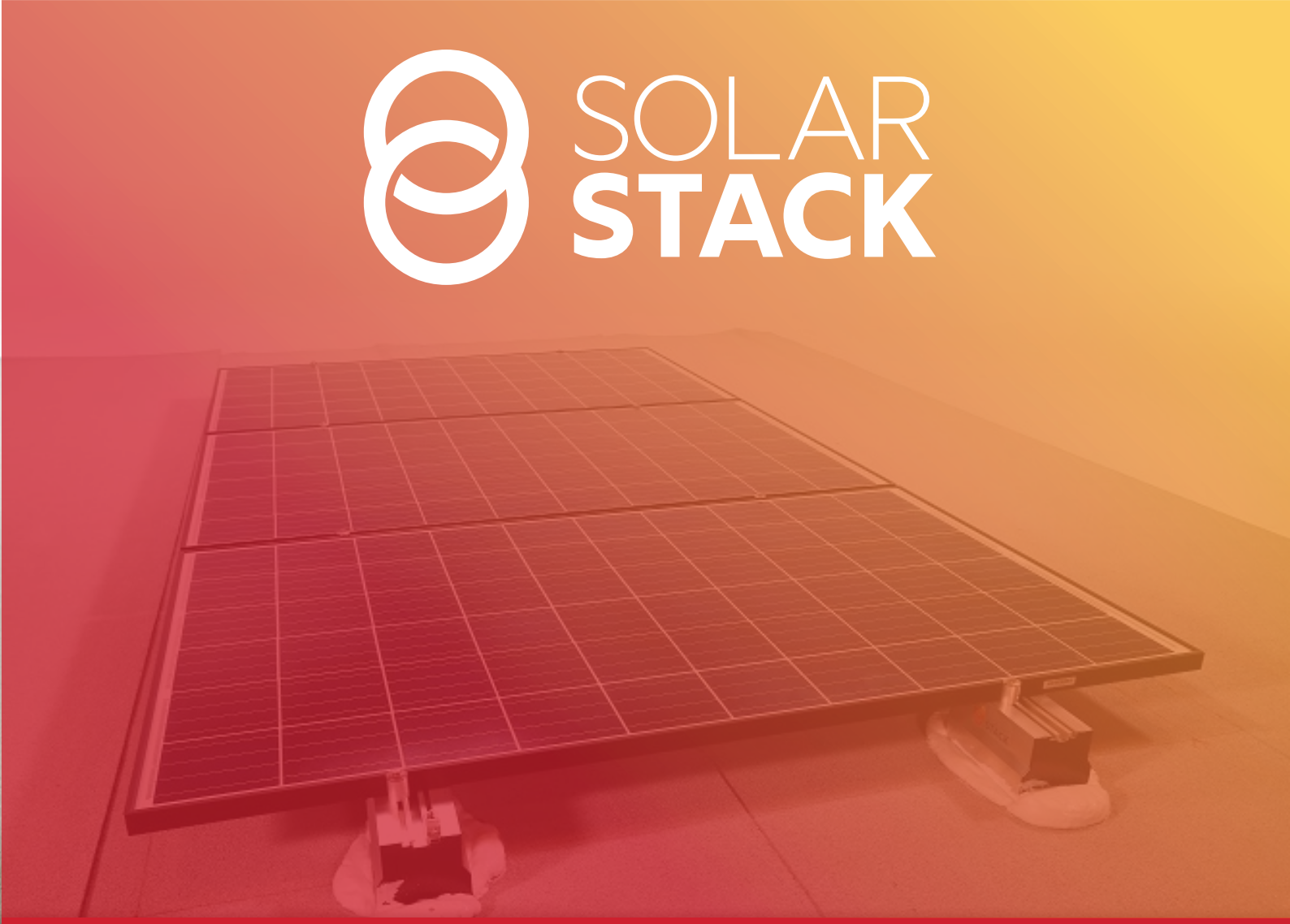
Inverter(s): (18) IQ8+-72-M-US
DC System Size: 7.200 kW | AC System Size: 5.220 kW

Customer Information:
Inan Phillips
35 Columbia Ave
Takoma Park, MD 20912

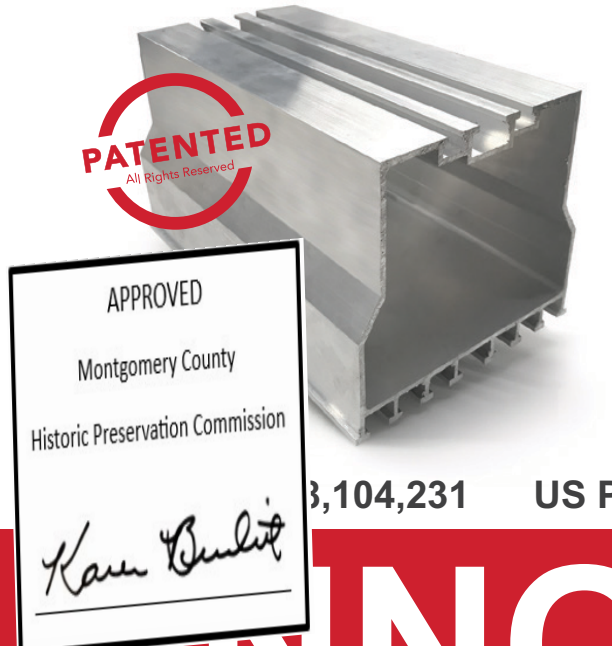
Partner/Lender: None
AHJ: Montgomery | Utility: BGE
Sheet Name: Electrical 3-Line Diagram
Drawn By: CB | Date: January 31, 2025
Scale: AS NOTED | Job Number: MD22958 | Sheet: E-2

SOLAR STACK



INSTALLATION MANUAL v.1

SOLAR STACK MOUNTING SYSTEM FOR FLAT ROOFS



ZERO PENETRATION SOLAR MOUNTING PEDESTAL

,104,231 US PATENT No 8,615,954 US PATENT No 9,315,999

INNOVATIVE PRODUCTS FOR ROOFING & SOLAR

REVIEWED
By Devon.Murtha at 9:06 am, Feb 28, 2025

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INSTALLATION INSTRUCTIONS

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REVIEWED

By Devon.Murtha at 9:06 am, Feb 28, 2025

BEFORE YOU START

Please carefully read through this installation manual before you begin installation, operation or maintenance work. Failure to follow these installation instructions may result in damage and injury. Please keep this manual safe for future reference.

This installation manual describes proper installation procedures and provides necessary standards required for product reliability. Warranty details are available on www.solarstack.com . All installers must thoroughly read this installation manual and have a clear understanding of the installation procedures prior to installation. Failure to follow these guidelines may result in property damage, bodily injury or even death.

IT IS THE INSTALLER'S RESPONSIBILITY TO:

Ensure safe installation of all electrical aspects of the array. All electrical installation and procedures should be conducted by a licensed electrician or solar contractor. Routine maintenance of a module or panel shall not involve breaking or disturbing the bonding path of the system. All work must comply with national, state and local installation procedures, product and safety standards.

Comply with all applicable local or national building and fire codes, including any that may supersede this manual.

Ensure all products are appropriate for the installation, environment, and array under the site's loading conditions.

Use only Solar Stack parts or parts recommended by Solar Stack. Substituting parts may void any applicable warranty.

Ensure provided information is accurate. Issues resulting from inaccurate information are the installer's responsibility.

Ensure bare copper grounding wire does not contact aluminum and zinc-plated steel components, to prevent risk of galvanic corrosion.

If loose components or loose fasteners are found during periodic inspection, re-tighten immediately. If corrosion is found, replace affected components immediately.

Provide an appropriate method of direct-to-earth grounding according to the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems.

Disconnect AC power before servicing or removing modules, AC modules, micro inverters and power optimizers.

Review module manufacturer's documentation for compatibility and compliance with warranty

REVIEWED
By Devon.Murtha at 9:06 am, Feb 28, 2025

IMPORTANT NOTES

- Solar Stack Roof mounting systems are UL 2703 listed. Standard for safety UL/ANSI 2703, Mounting Systems, Mounting devices, Clamping/Retention Devices and Ground lugs for use with PV modules.

- Solar Stack systems have been evaluated for module-to-system bonding and mechanical load to the requirements of UL/ANSI 2703.

- This racking system may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

- Solar Stack mounting systems were evaluated assuming a 20 Amp maximum series fuse size.

- The system is a non-separately derived system. The following components have been evaluated for ... und path: PV module, Mid Clamp, End Clamp, Pedestal and ... alled on BUR (Build Up Roofing), Mineral surface (Modified ... on and Concrete roofs.

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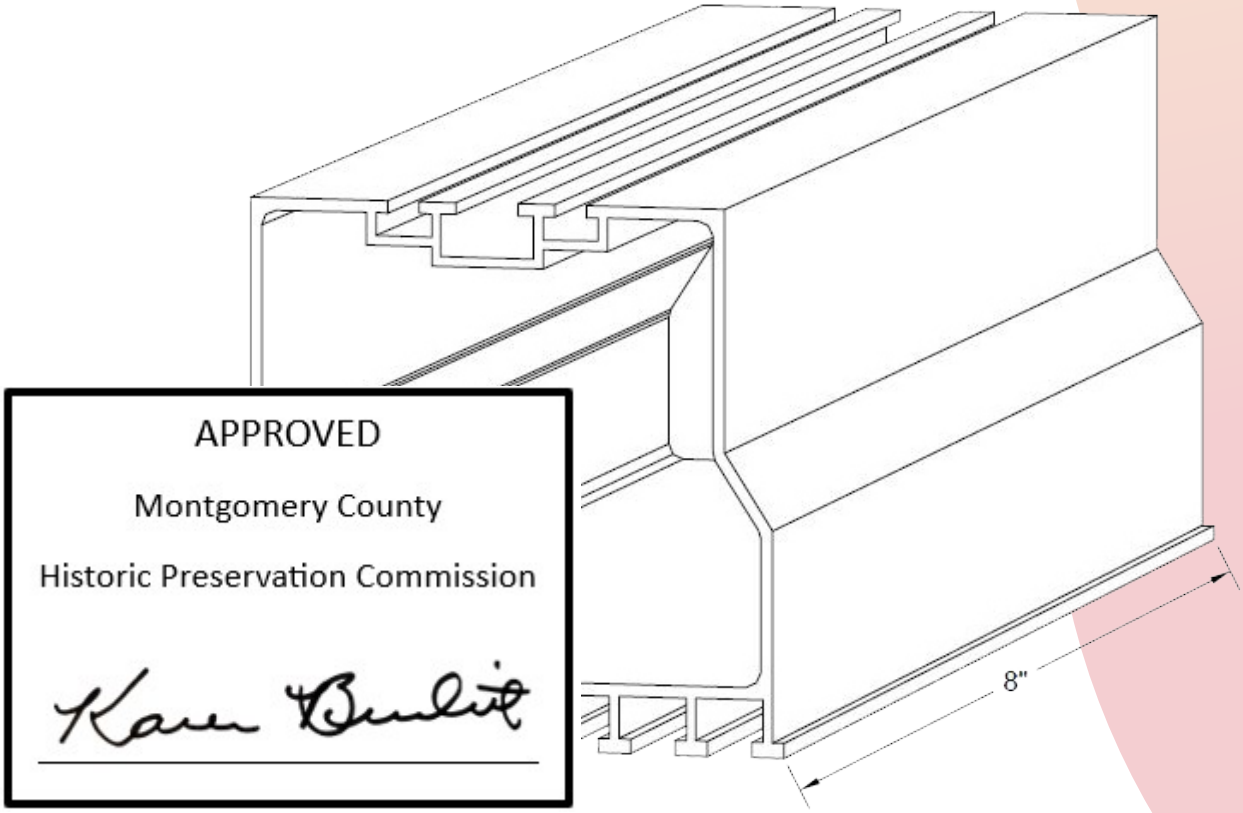
SOLAR STACK'S COMPONENTS

Solar Stack's innovative design incorporates a patented pedestal used in conjunction with a code-approved adhesive.

Solar Stack eliminates potentially disastrous roof penetrations and allows roof warranties (and the roof itself) to remain intact. Since there's no need for anchor penetrations or locating structural connection points, installation is significantly simplified. Solar Stack's streamlined design cuts labor and installation time in half, avoiding costly, damaging complications associated with accessing attic spaces and modifying structural connection points.

Additionally, Solar Stack eliminates crawling into hot or cold attic spaces to install solar panels. And because there's no drilling, you have total peace of mind that roof leaks won't result from installation. Solar Stack has undergone rigorous testing by accredited facilities and earned the most stringent certifications from the state of Florida for use in High-Velocity Hurricane Zones, ensuring its durability.



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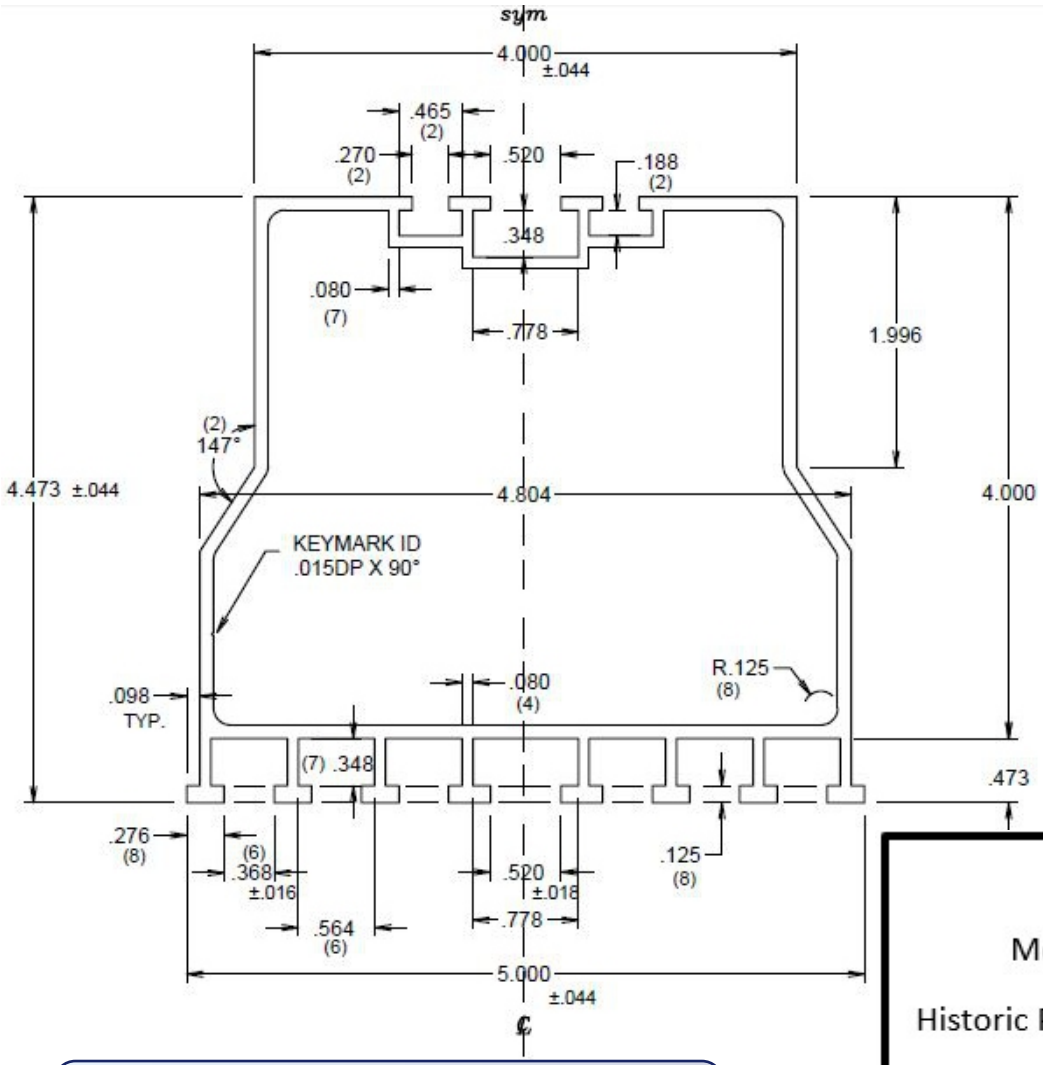
SOLAR STACK'S COMPONENTS

System/Components "SOLAR STACK " or "DOUBLE DOWN " Solar Pedestal Models

8 in. "SOLAR STACK " or "DOUBLE DOWN " Solar Pedestal
Overall Product Dimensions:
Length: 8.00 in.
Width: 5.00 in.
Height: 4.75 in.



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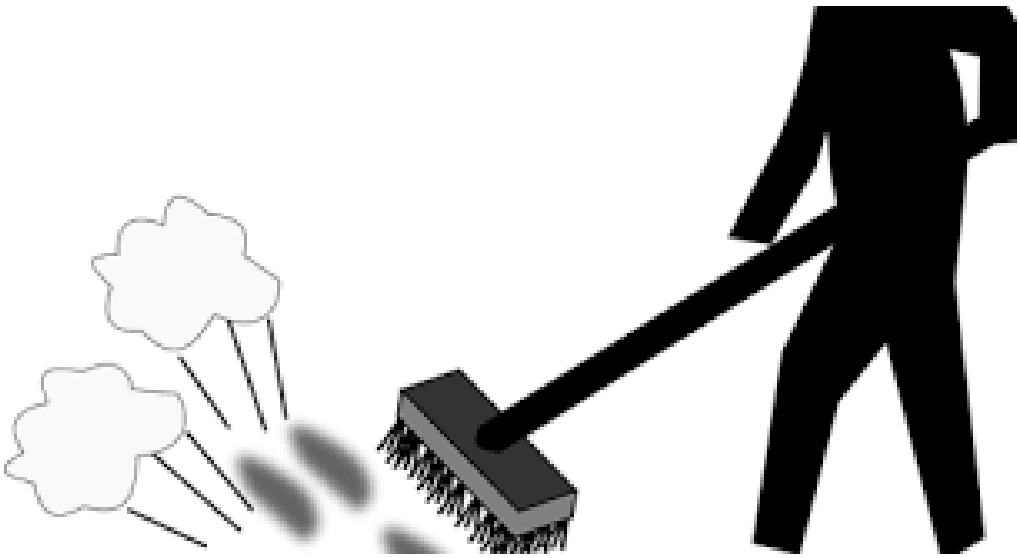
PREPARATION OF THE ROOF

Solar Stack pedestals can be installed on the Asphalt, Concrete and TPO roof. Clean the roof with a brush. Make sure that the place where the Solar Stack pedestals and solar panels are to be placed on the roof is clean, dry and flat. The presence of gravel, sand, stones, algae, dust, etc. can lead to instability of the system and/or can cause damage to the roof.

Surface Preparation. All roof surfaces must be free of any debris, dirt, grease, oil, and standing water before adhesive is applied. Clean the hole of any sawdust with appropriate tools and materials. Follow adhesive manufacturers application instructions.



In determining the location of the solar panels on the flat roof, it is very important to pay attention to the incoming sunlight. Throughout the day and throughout the year.

Place the solar panels on a roof that has no shadow. The shadow of a chimney, trees and nearby buildings have a detrimental effect on the yield of the solar panels.

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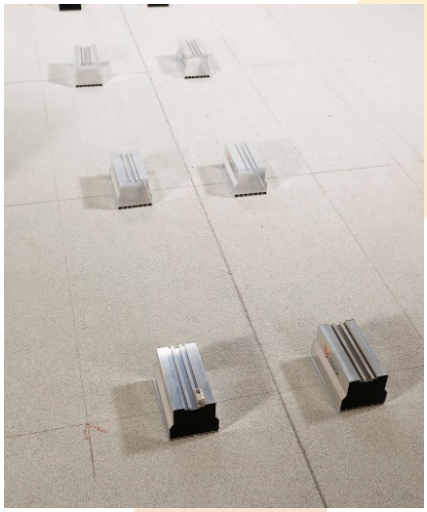
ARRAY LAYOUT

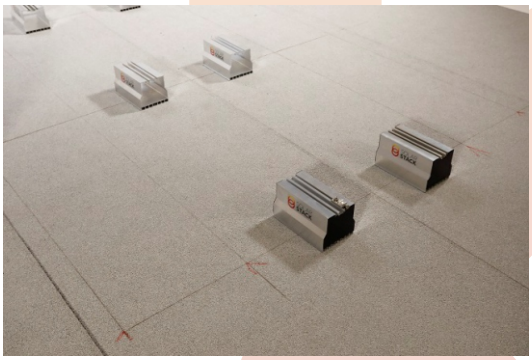
Using your engineered design, locate the array layout on the roof, and determine mount locations.

Measure and determine the spacing between the Solar Stack pedestals according to the solar array design.

Snap and mark the lines across the roof for all the mounts.

Prepare the Solar Stack pedestals and place them next to the marked lines where they will be installed.





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INSTALLING SOLAR STACK PEDESTALS

Determine the spacing of Solar Stack pedestals for your solar array design.

Surface Preparation. All roof surfaces must be free of any debris, dirt, grease, oil, and standing water before adhesive is applied. Clean the surface of roof of any sawdust with appropriate tools and materials. Follow adhesive manufacturers application instructions.

Approved adhesive types that can be used for installation of Solar Stack pedestals can be find in the following table.

Table 7.1
Uplift Resistance Loads/Pressure[2]

Uplift Load applied to the Top of "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Assembly (90° To Roof Surface)

Adhesive Type:	GEN 3 Pedestal Size:	Paddy Dimensions:	Paddy Weight:	Ultimate Load[1]:
ICP Polyset® AH-160	12"	16-5/8" x 8-7/8"	79.9 grams	-833 LBF
ICP Polyset® AH-160	8"	12-3/8" x 8"	62.6 grams	-658 LBF
DOW Tile Bond	8"	10-1/2" x 7"	55 grams	-383 LBF
DOW Insta-Stik	8"	10-1/2" x 7"	59.8 grams	-400 LBF
DAP Stormbond	8"	10-1/2" x 7"	52.1 grams	-500 LBF

Notes:
1. Ultimate Loads with 0 margin of safety applied to the test loads.
2. Assembly was tested for vertical up.

Table 7-1 (Evaluation report for Florida product approval #FL 21074.6 R4)

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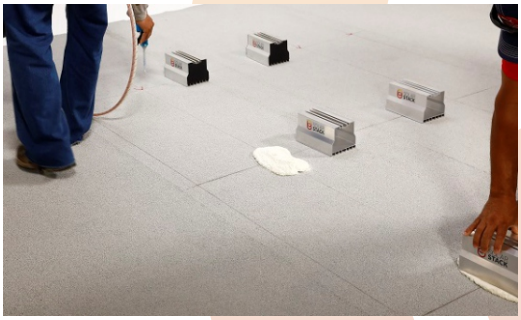
INSTALLING SOLAR STACK PEDESTALS

Dispense adhesive into location of mount, making room for expansion of adhesive.

(Note: All Polyurethane Foam Adhesives will expand up to 3 time's original sprayed size. Take care to allow for expansion and required contact area to Solar Stack Pedestal to ensure performance as designed.)



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INSTALLING SOLAR STACK PEDESTALS

Install Solar Stack pedestal into fresh adhesive and allow to cure in accordance with adhesive manufacturer recommendations.

Adhesive is expanding and Ready for Solar Stack pedestal Installation.

All exposed polyurethane adhesive must be This can be exterior grade vering the foam

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INSTALLING THE MODULES

The next step is to lay down the solar modules and install them to the Solar Stack pedestals. Modules can be installed in portrait or landscape orientation, according to the engineering plans. As well as taking measurements, we'll check that the modules look straight – not just from where we're sitting on the roof, but from down on the ground too.

Modules will be connected with each other, according to the provided engineering plans in regards to the proper stringing.

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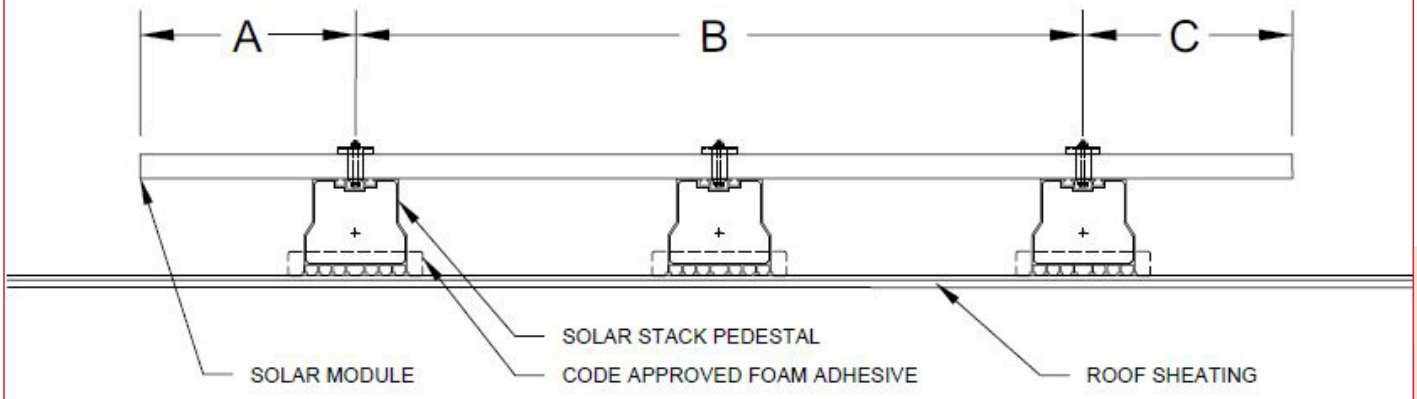
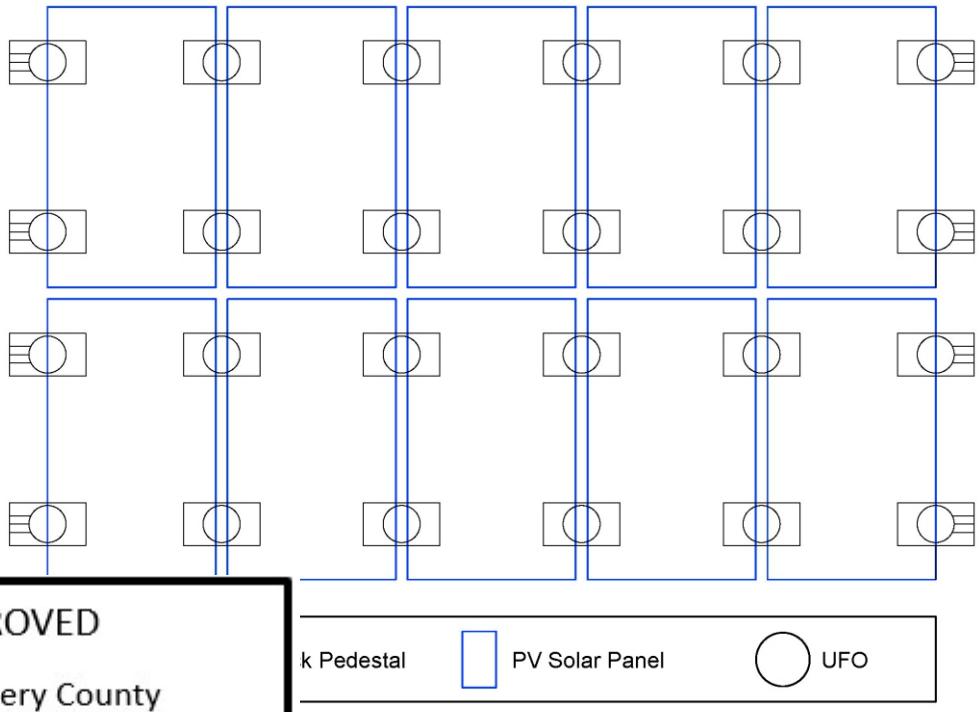
INSTALLING THE MODULES

This is a typical module, installed on the Solar Stack pedestals. Number of the required pedestals per module/raw, will be determined according to the provided engineering plans, in regards to the typical geographical region and existing wind loads. вf the modules are installed in HVHZ, than Roof underlayment must be approved and installed according to the local (AHJ) regulations and codes. йlacement of the pedestals and distance between them (A,B i C) must be determined according to the module manufacturer instructions.



Typical module layout with Solar Stacks mounts.



k Pedestal PV Solar Panel UFO

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pection of the installation for loose components, loose , such that if found, the affected components are to be

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INSTALLING THE MODULE CLAMPS

Clamps hold the modules onto the frame. There are two types: end-clamps and mid-clamps. End-clamps are used at the end of a row of modules fixing the last one in place, while mid-clamps sit between two panels and ensure they're spaced equally.

Attach the modules using the clamps as noted on the drawing:

- Insert the middle clamps and tighten them.
- Insert the end clamps laterally in the pedestal. The end clamps are attached and then tightened at the height of the module frame.

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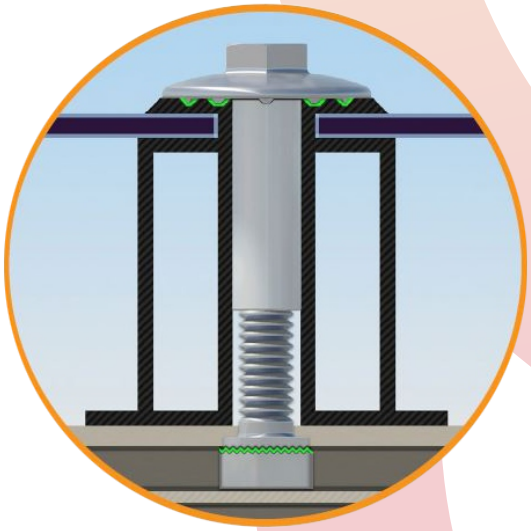
INSTALLING THE MODULE CLAMPS

Modules should be installed to the Solar Stack pedestals with the manufacturer approved middle/end clamps. There are different types of clamps available that can be used for the module installation. Solar Stack recommends Ironridge UFO clamps.

The Universal Fastening Object (UFO) - Ironridge racking, securely bonds solar modules to the Solar Stack pedestals. It comes assembled and lubricated and can fit wide range of module heights. Stopper Sleeve, snaps onto the UFO, and converts it into bonded end clamp.

The recommended torque to be applied to the following components and connections for proper assembly and bonding for both systems:

End Clamp	80 in-lbs.	Mid Clamp	80 in-lbs.



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GROUNDING

Grounding lug will be mounted at every row. Grounding lugs connects the PV modules to the grounding conductors. Attach the grounding lug to the Solar Stack Pedestal with hardware. Secure the grounding wire to the lug by tightening the set screw and torque Grounding Lug 120 in-lbs. at Pedestal terminal and 5 ft-lbs. at wire terminal.

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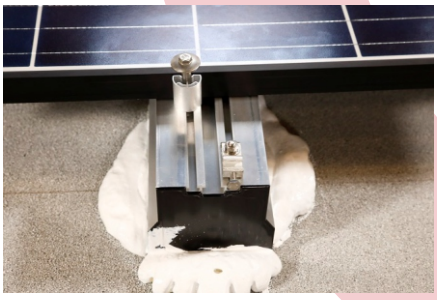
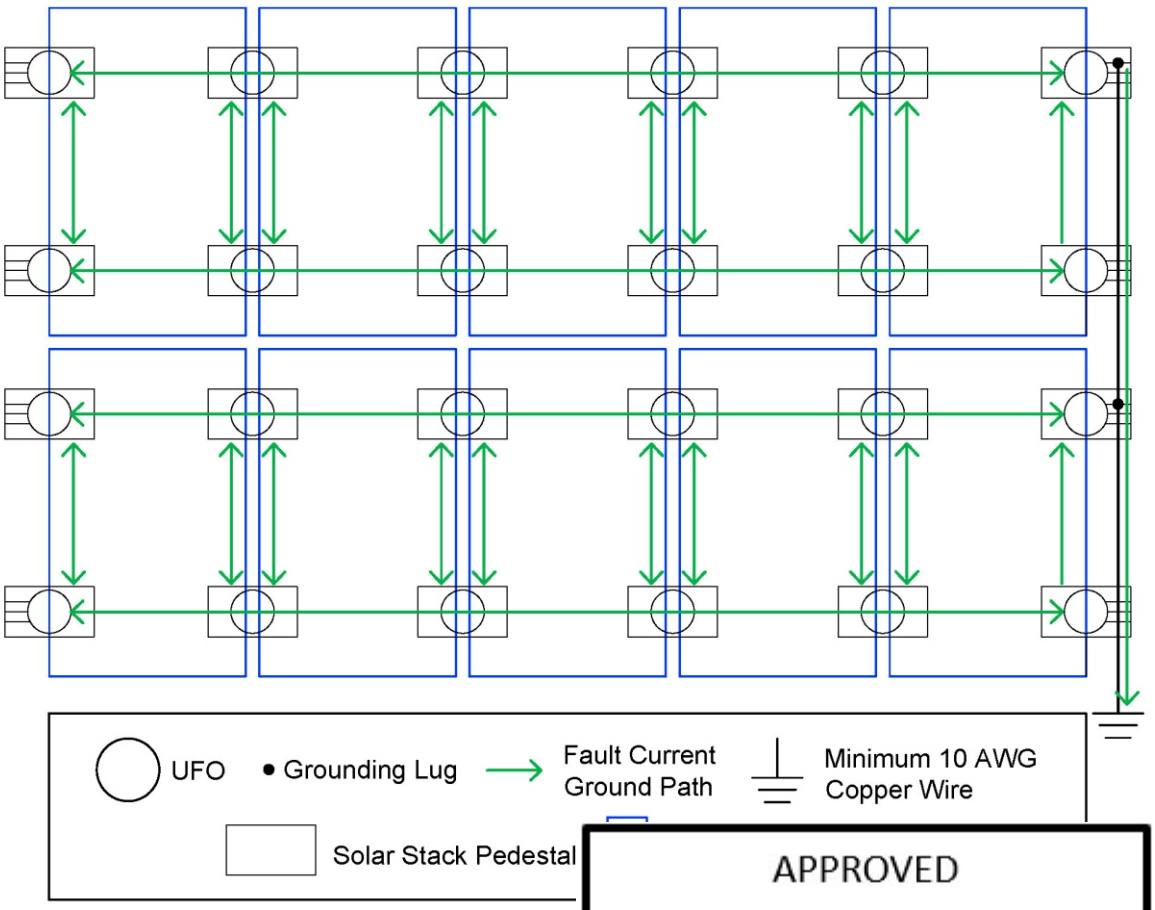


GROUNDING

Entire solar array must me grounded. Modules should be bonded to the Solar Stack pedestals with the manufacturer approved middle/end clamps. Solar Stack recommends Ironridge UFO clamps. The UFO family of components eliminates the need for separate grounding hardware by bonding PV modules directly to the Solar Stack pedestals. UFO hardware forms secure electrical bonds with both the module and the pedestal, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.

Grounding wire should be installed, in a way that will electrically bond the module rows between each other. Grounding lug will be installed on the Solar Stack pedestal (one per each row) and bond the grounding wire. Grounding wire should be min #10 AWG (Bare Copper wire) size. If other than specified, then must be determined by a Professional Engineer, in accordance to the National Electric Code.

Grounding conductors, from each row of the array, must be bonded together, in order to form a solid electrical connection/system, which will continue to the closest Junction or Combiner box. From that point, according to the Professional Engineer ampacity calculations, based on the NEC, proper grounding wire will continue to run all the way down to the determined system grounding point.



The system is a non-separately derived
e been
evaluated for bonding as the fault current gro
Clamp,
Pedestal and Ground Lugs.

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MODULE COMPATIBILITY

Solar Stack racking system may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

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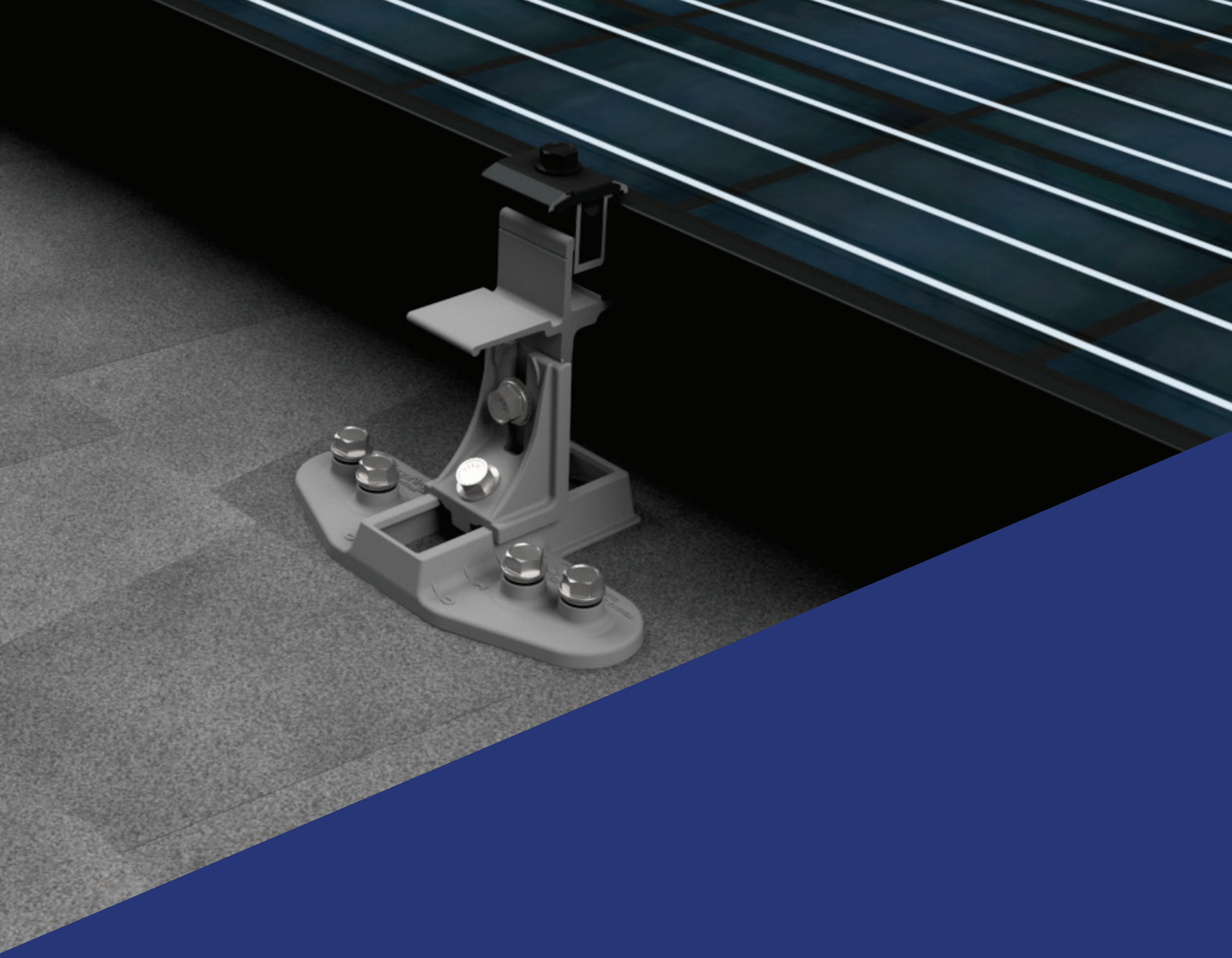

SnapNrack™

Solar Mounting Solutions

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nting System

snapnrack.com

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An Intro to SnapNrack TopSpeed™ with SpeedSeal™ Technology

snapnrack.com

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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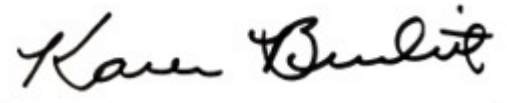

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Project Plans

Installation Steps

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By Devon.Murtha at 9:07 am, Feb 28, 2025

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
| to the module frame flange through the specified hardware and
ed, the grounding terminal is identified by the green colored set

hase R/C (QIKH2)(QIMS2) model M250, M215 & C250 is bonded
nphase R/C (QIMS2) Model EFM-XXMM anodization piercing
nounted PV system is bonded (modules and microinverters)
ground through the Enphase R/C (QIMS2) Engage Cables;
77, when properly grounded at the service entrance.
ovoltaic bonding device cat. no. Dynobond is an optional
system. The Dynobond device has been evaluated to provide
ond device attach range of adjacent modules
Attachment Kit model 242-02151 has been investigated to bond
approved MLPE device back plates to frames of modules.

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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.

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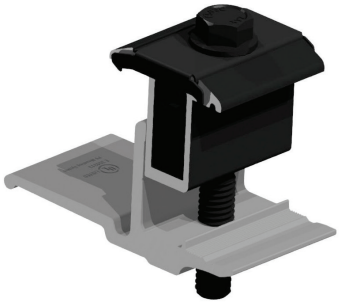
Component Details

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.



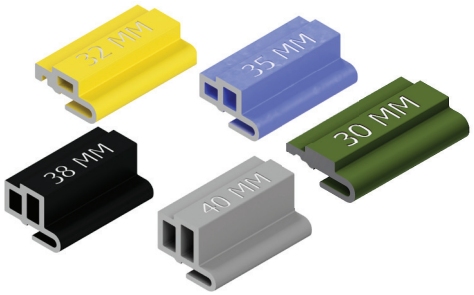
TopSpeed™ Clamp

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

Universal Skirt

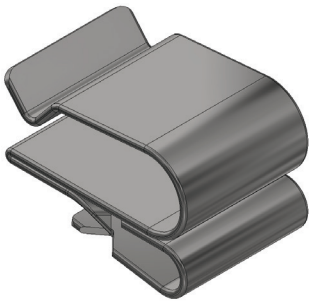
SnapNrack Universal Skirt in double portrait or single landscape lengths.

Wire Managements Components



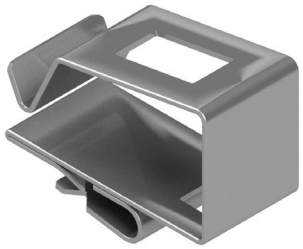
Skirt Spacers

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



Smart Clip

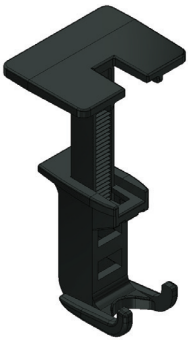
Module frame cable clip, holds two PV wires or Enphase IQ-Cables.



Smart Clip XL

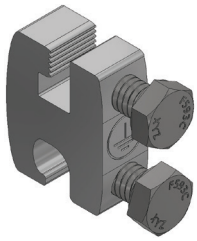
Module frame cable clip, holds six PV wires or four Enphase IQ-Cable.

Grounding/MLPE Com



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.

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

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By Devon.Murtha at 9:07 am, Feb 28, 2025

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

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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.

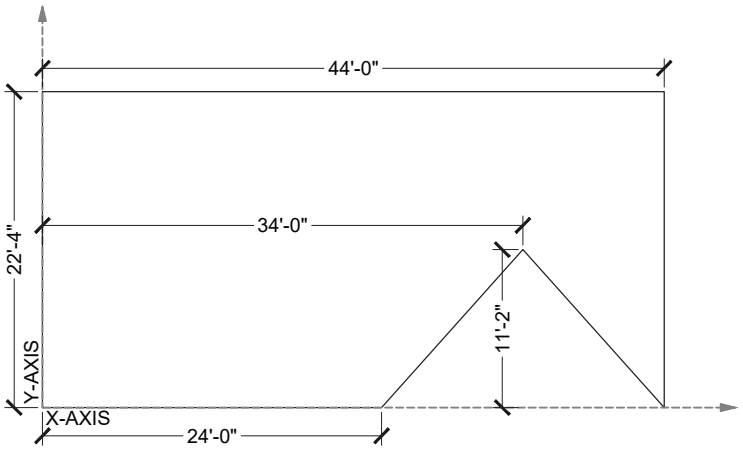
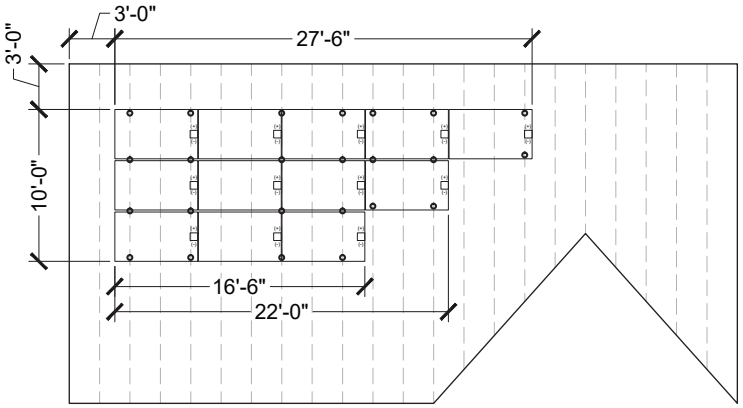


Image note: X-Axis described in this manual is cross-slope on the roof, Y-Axis is in line with the roof slope.

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.

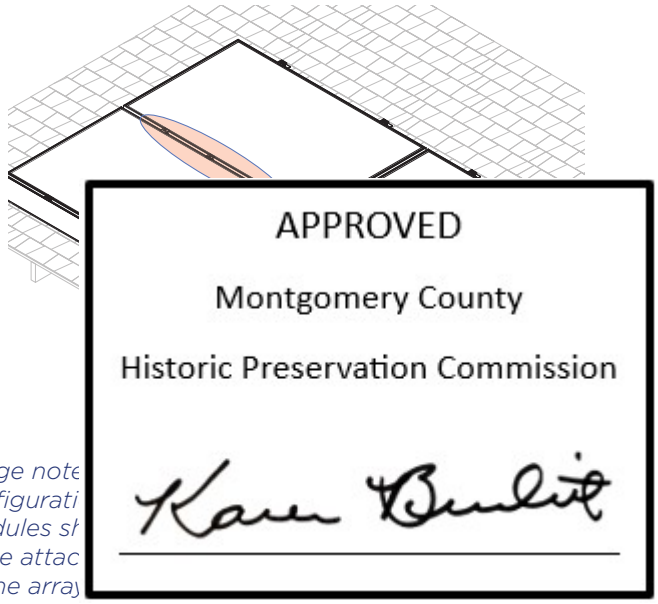


Image note configurati modules sh three attac of the array

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.**

Safe ntinued

- **Safety e and quality issues**
- **Always wear proper eye protection when required.**

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TopSpeed™ Mount to Module Frame Installation

Required Tools

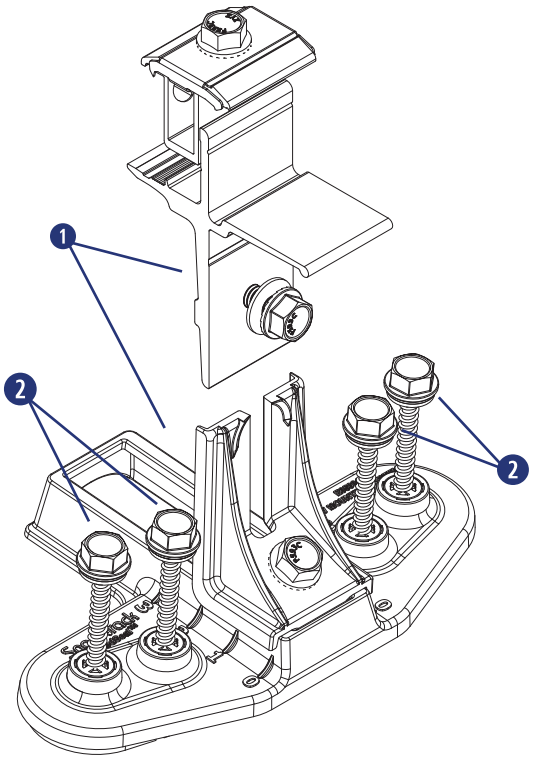
- Socket Wrench/Impact Driver
- Torque Wrench
- 1/2" Socket

Materials Included - TopSpeed™ System with SpeedSeal™ Technology

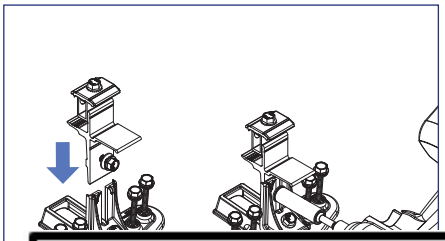
1. (1) SnapNrack TopSpeed™ Mount
2. (4) SnapNrack #14 Wood Screw with 1/2" Hex Head & sealing washer

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



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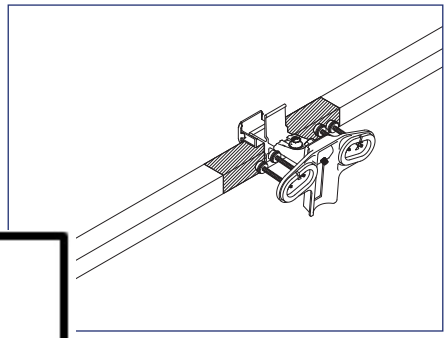
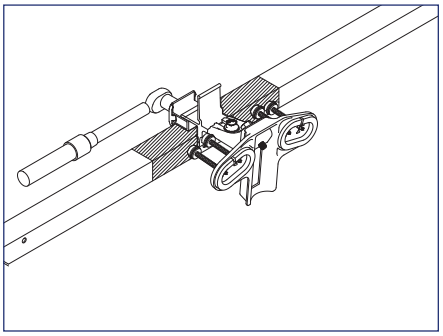


sition TopSpeed™ Mount clamp
e module frame within the
ule manufacturers required
oing zone.



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.

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TopSpeed™ Universal Skirt Layout

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Required Tools

- Roof Marking Crayon or Chalk
- Tape Measure

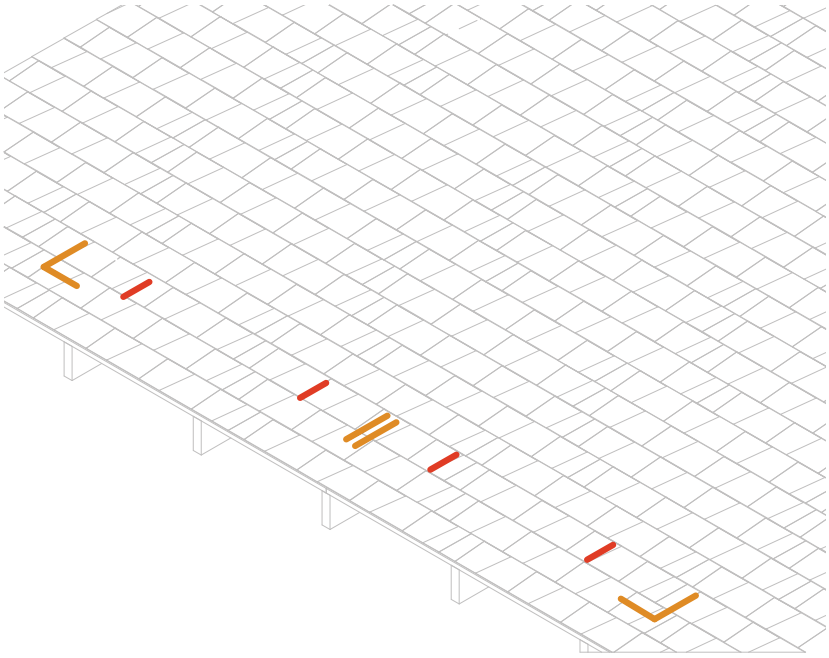
LAYOUT INSTRUCTIONS

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.



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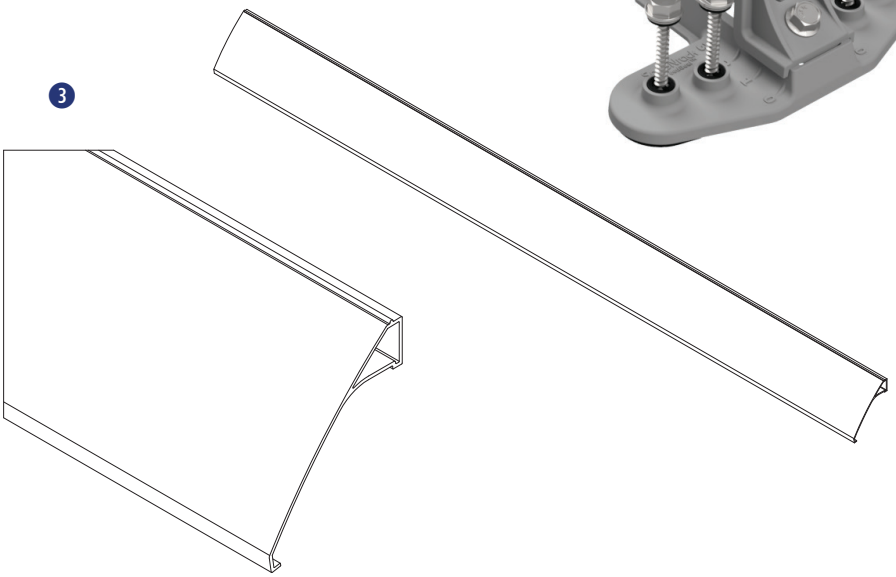
TopSpeed™ Mount: Skirt Installation

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



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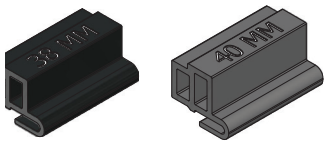

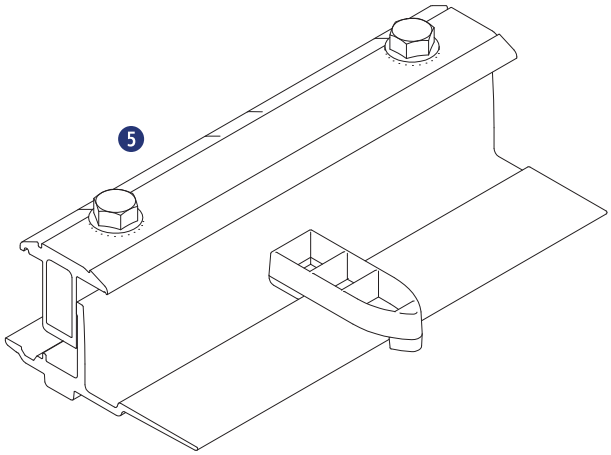

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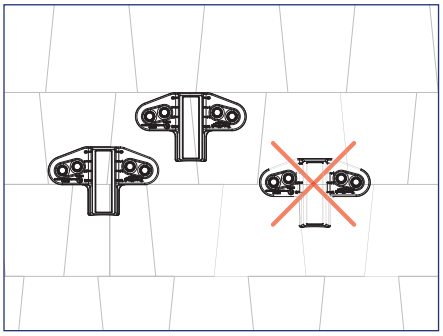
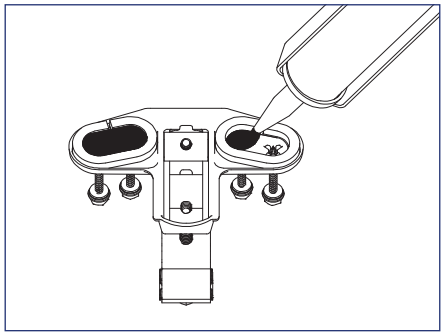
TopSpeed™ Mount Skirt Installation

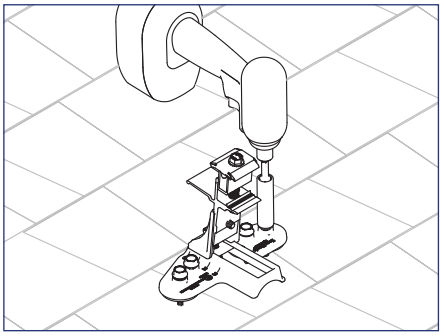
INSTALLATION INSTRUCTIONS



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



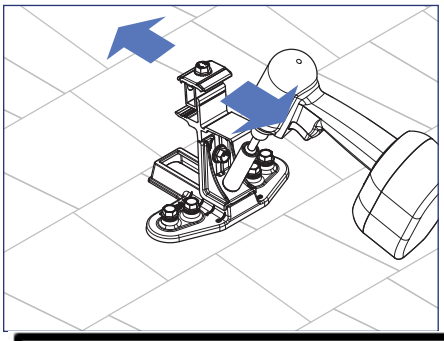
2) Fill both cavities on bottom of TopSpeed™ Mount created by SpeedSeal™ gasket with roof sealant to ensure a watertight seal.

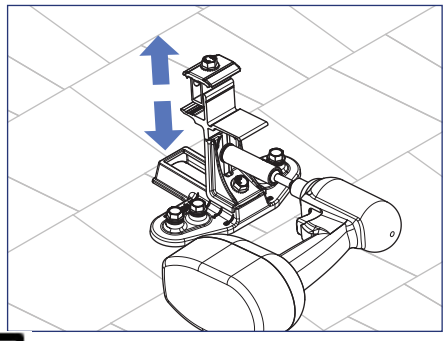


3) Attach TopSpeed™ Mount to roof using the (4) SnapNrack #14 Wood Screws with 1/2" hex head that are captured in the Mount.

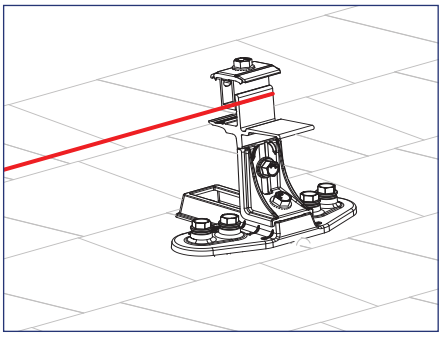
Install Note:

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.





To set the TopSpeed™ Mount
vel loosen the Leveling bolt and
ove the clamp up or down, then
ghten the Leveling bolt and torque
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.

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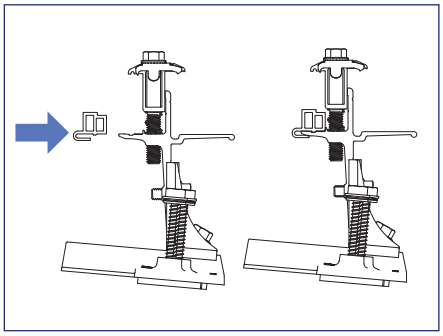
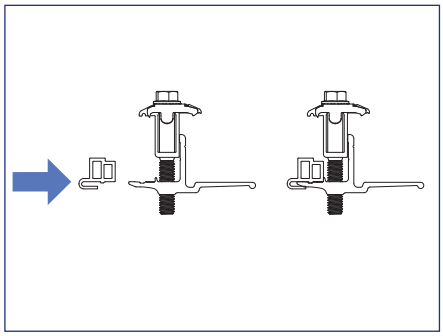
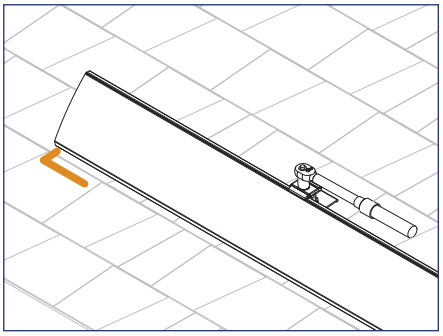
INSTALLATION INSTRUCTIONS

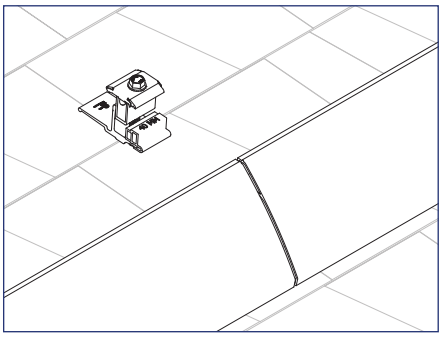


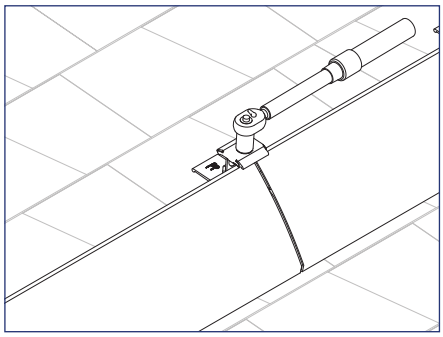


7) Universal Spacers will need to be added to Mounts and Clamps where Skirt will be installed.



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.

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Wire Management

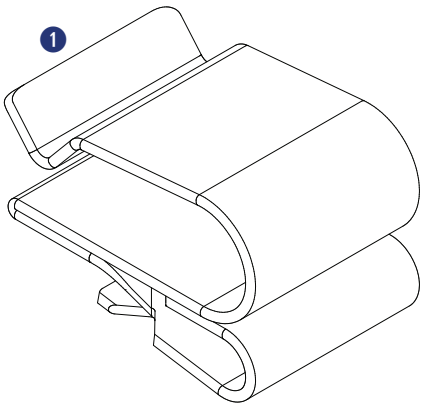
Required Tools

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

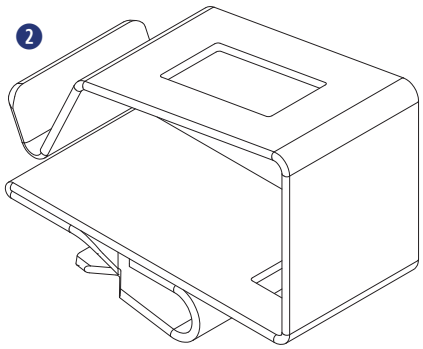
Materials Included

Smart Clips

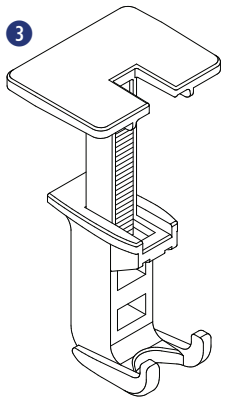
1. (1) Smart Clip [(2) PV Wire, (1) Enphase IQ Cable]
2. (1) Smart Clip XL [(6) PV Wire, (4) Enphase IQ]
3. (1) Wire Saver [(1) PV Wire]



Smart Clip



Smart Clip XL



Wire Saver

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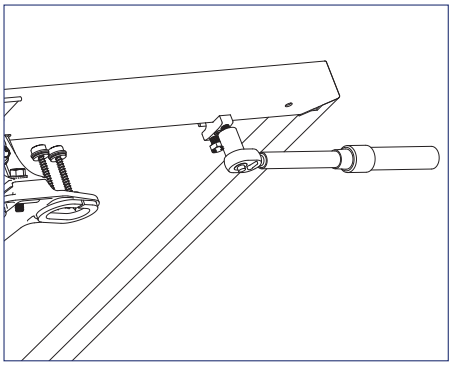
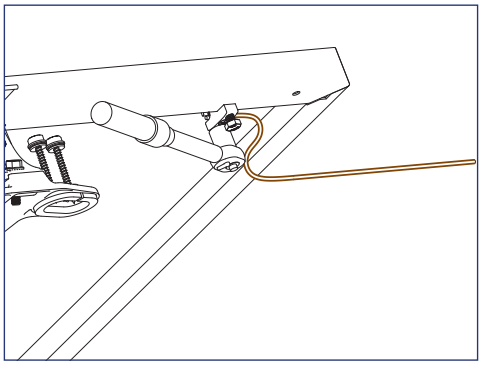
INSTALLATION INSTRUCTIONS - GROUND LUG

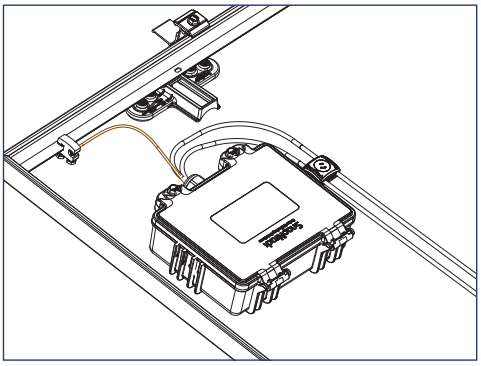
The SnapNrack Ground Lug to be used in accordance with the National Electric Code, ANSI/NFPA 70.



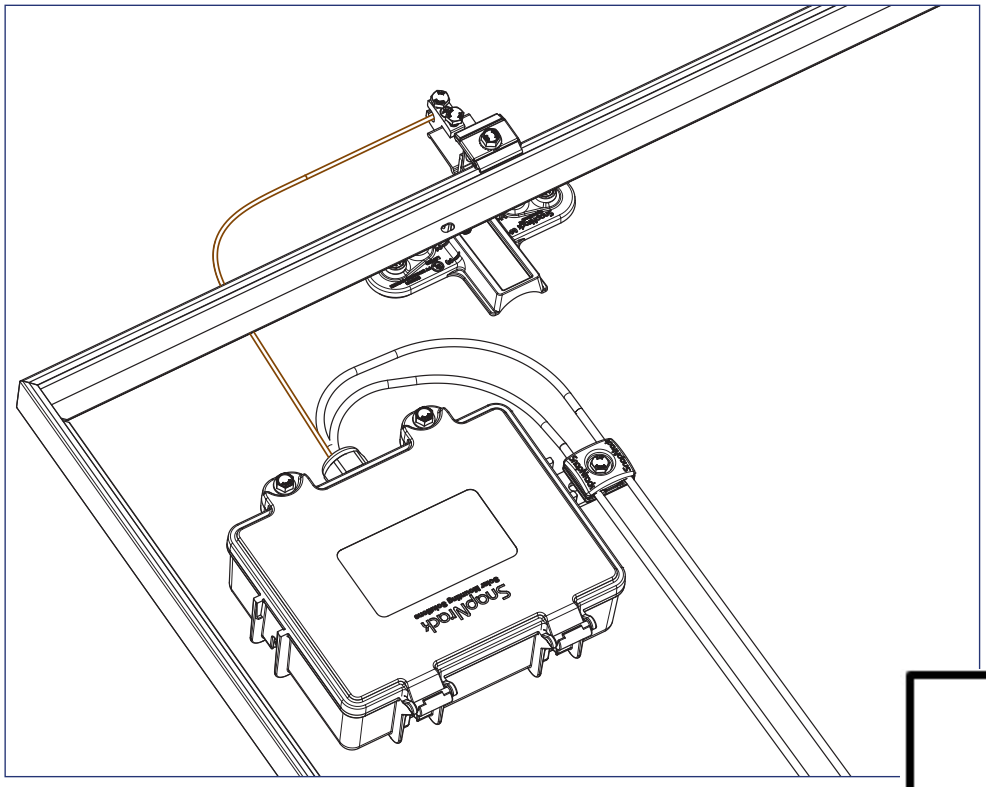
1) Ground Lug (242-92202) can be attached anywhere along the module frame or any TopSpeed™ Mount near the Junction Box. Torque module clamping bolt to 8 ft-lb.



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 th array. Run bare copper between ground lug and Junction Box.

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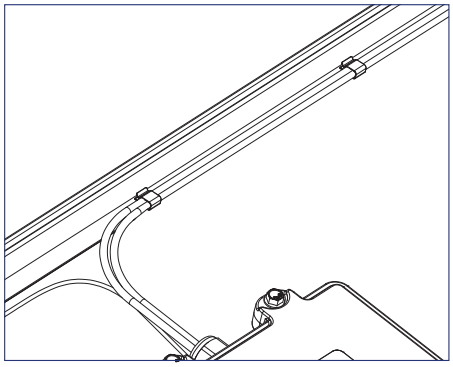
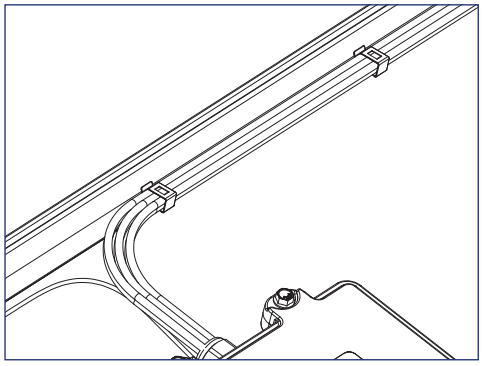
INSTALLATION INSTRUCTIONS - SMART CLIPS

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

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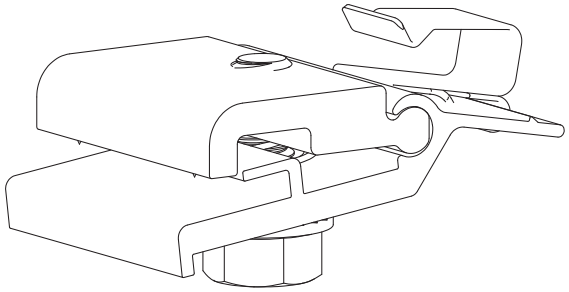
MLPE & RSD Installation

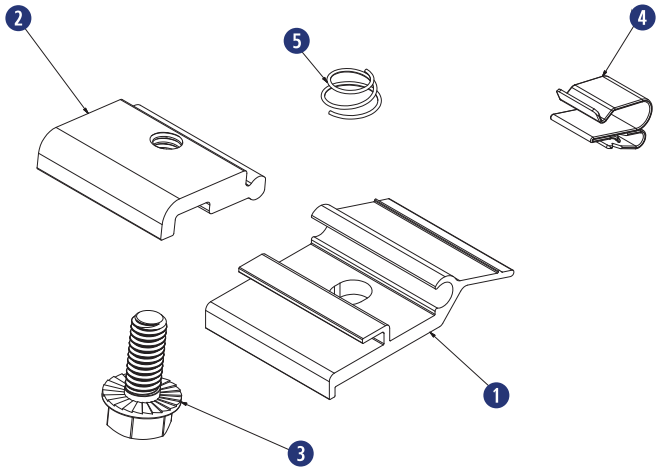
Required Tools

- 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

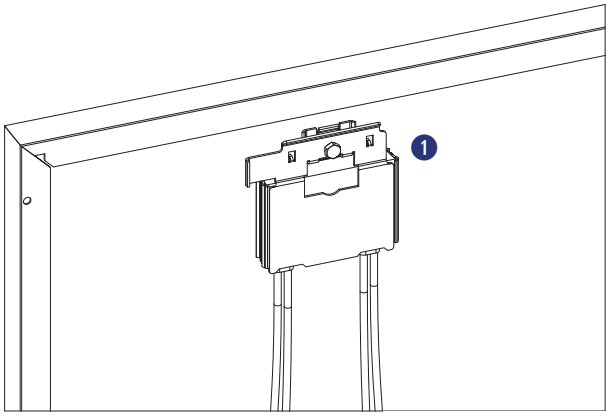




Materials Included

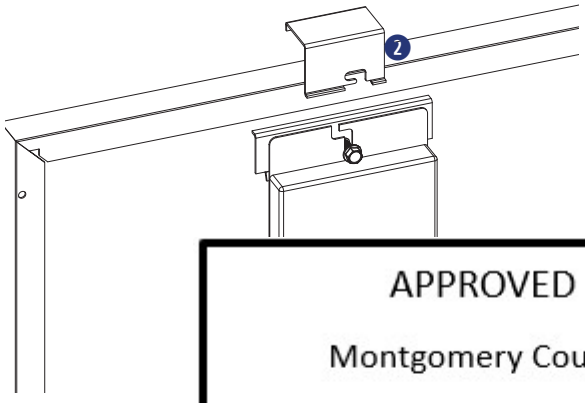
SolarEdge Frame Mount

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



Enphase Frame Mount

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



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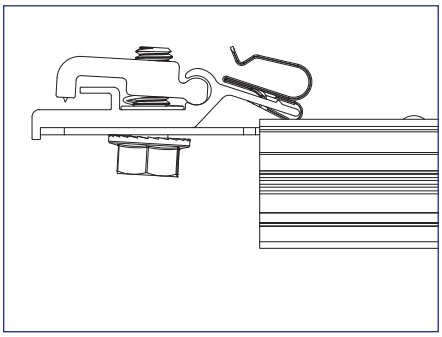
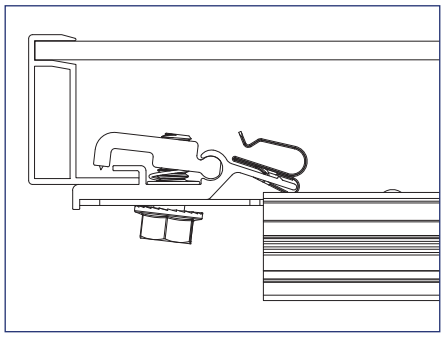
INSTALLATION INSTRUCTIONS - SNAPNRACK MLPE FRAME ATTACHMENT KIT

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).

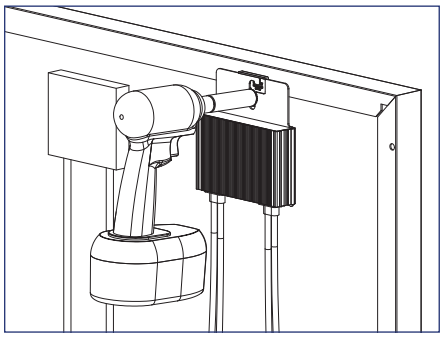


1) Slide the backplate channel of the MLPE device under the MLPE Frame Attachment Kit bolt. The MLPE mounting plate should rest against the MLPE mounting plate backstop on the MLPE Frame Attachment Kit.



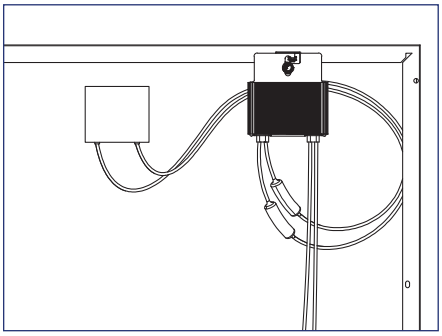
2) Position the MLPE Frame Attachment Kit on the module frame flange in a location that will not interfere with mounting system components. The module frame flange should rest against the module flange backstop on the MLPE Frame Attachment Kit.

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.

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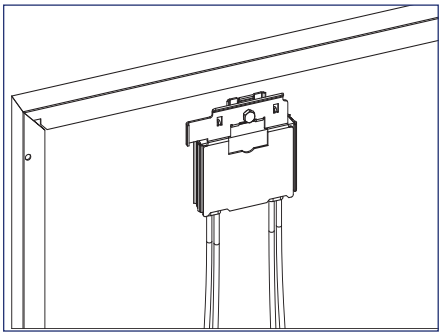
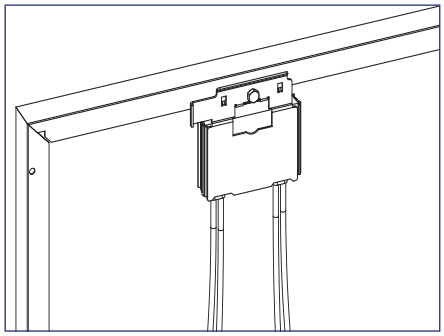
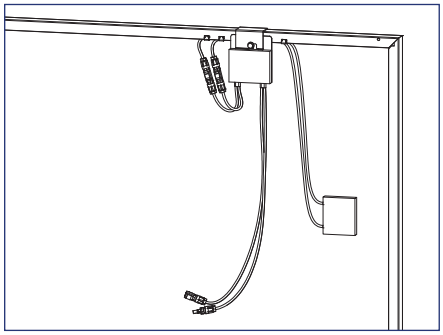
INSTALLATION INSTRUCTIONS - SOLAREDGE FRAME MOUNT



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.

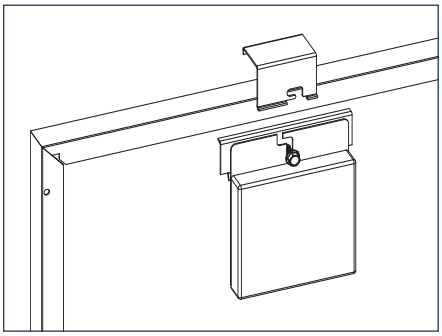


3) Connect the module leads to the input connectors on the optimizer and manage conductors with SnapNrack Smart Clips.

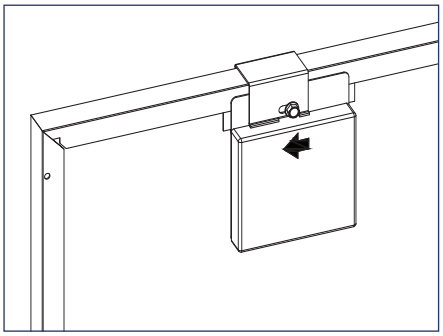
Install Note:

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

INSTALLATION INSTRUCTIONS - ENPHASE FRAME MOUNT



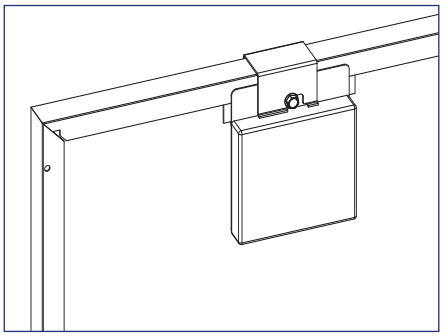
1) Locate the Enphase Frame Mount bracket clamp at a location on the module frame that will not interfere with the TopSpeed™ Mounts.



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.

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Module Installation

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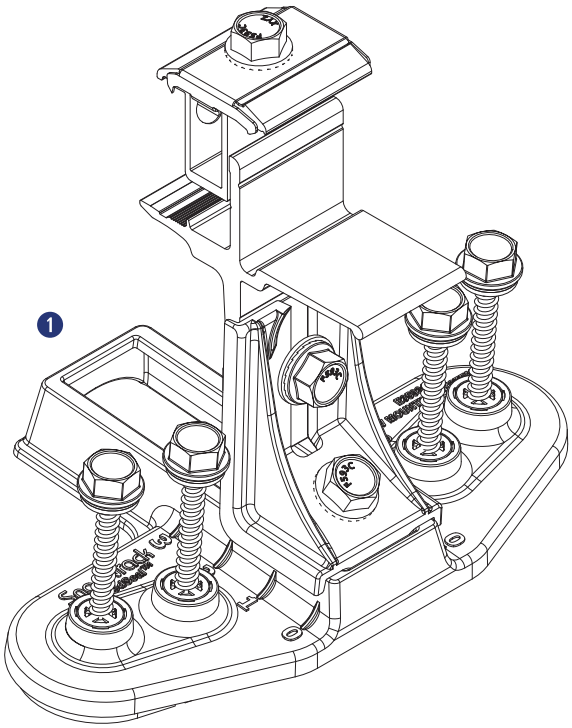
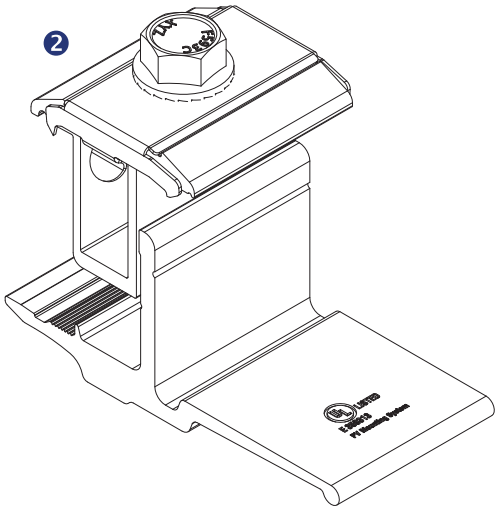
Required Tools

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

Materials Included

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

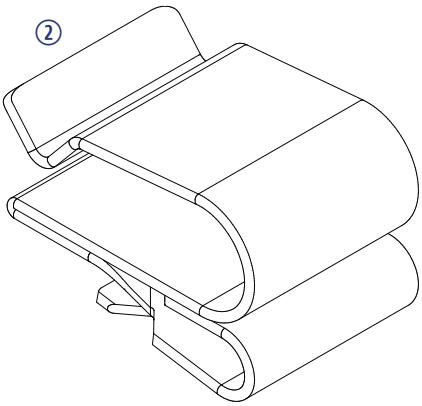


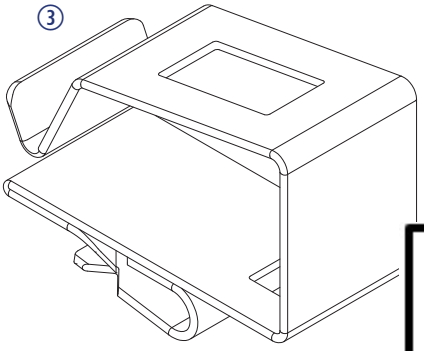


Other Materials Required

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





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Module Installation

INSTALLATION INSTRUCTIONS - BOTTOM ROW

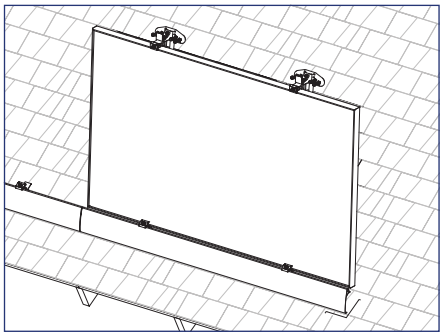
Recommended Best Practice:

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

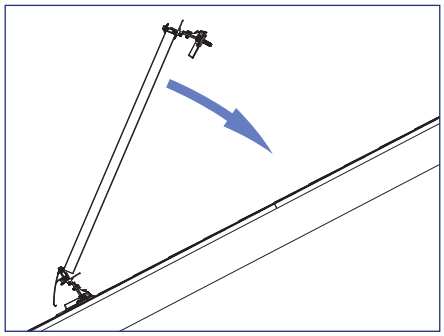
Install Note:

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.

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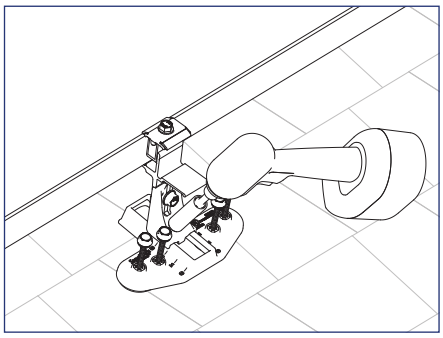
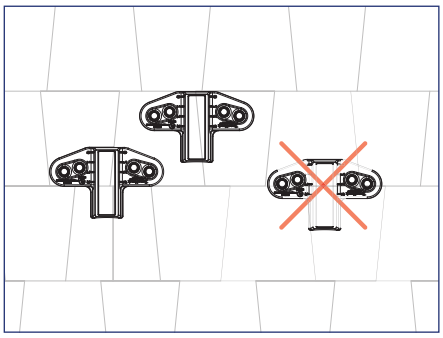
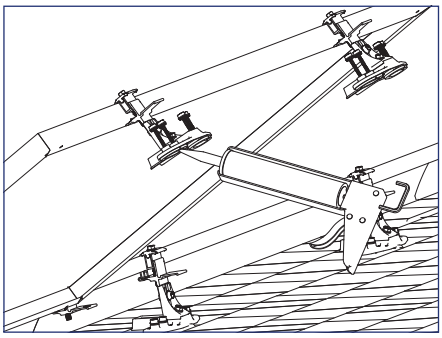




3) When module is level with roof verify the Speedseal™ portion of the TopSpeed™ Mounts are positioned entirely on one course of composition. If required listen the 1/2" nut and adjust the base as needed then tighten the bolt.



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.

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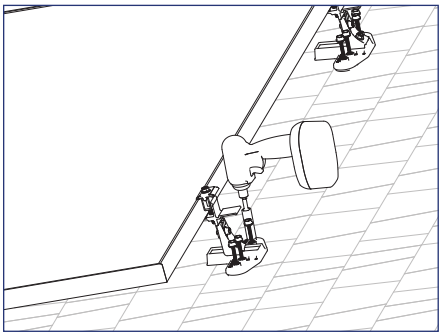
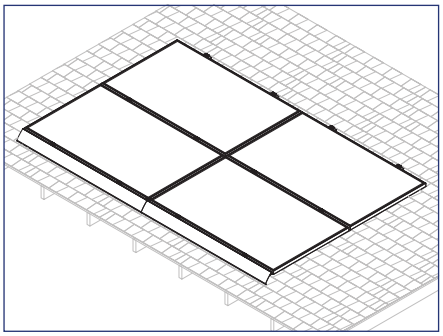
INSTALLATION INSTRUCTIONS - BOTTOM ROW



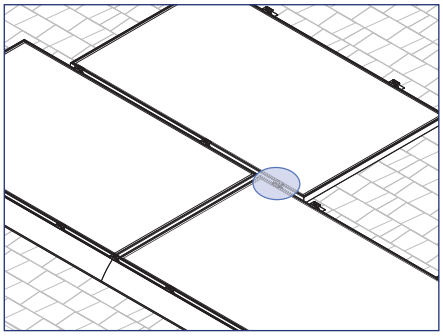
5) Lower the module to the roof and drive the (4) pre installed Snapnrack #14 Wood Screws with 1/2" hex head into the roof sheathing.

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.

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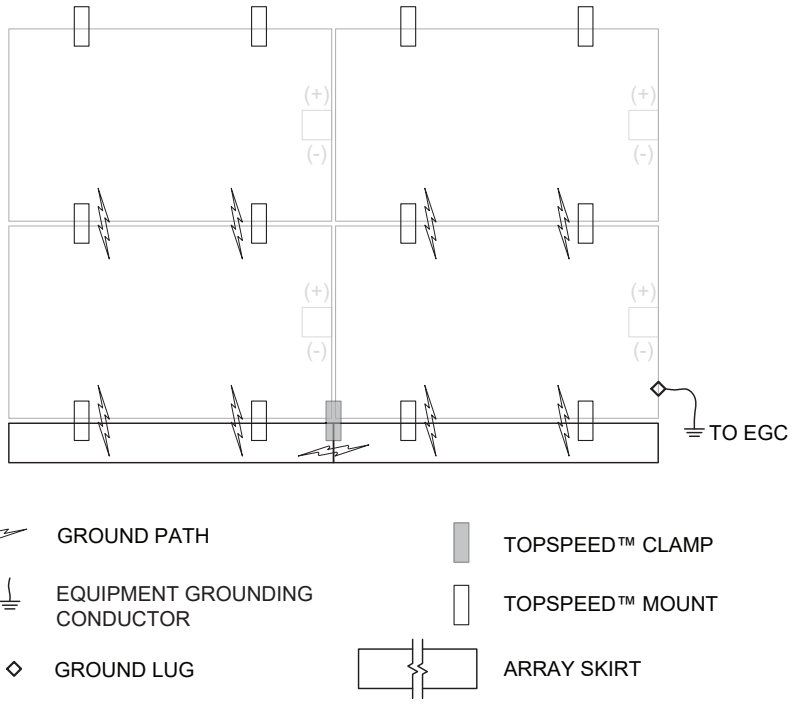
Grounding Specifications

GROUND PATH DETAILS

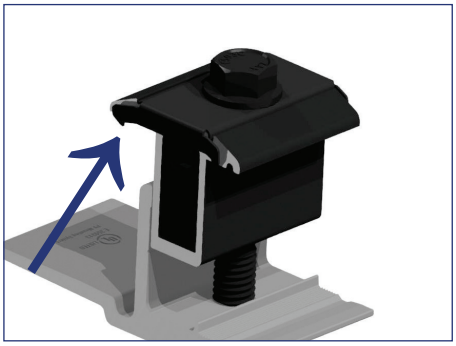
All TopSpeed™ components in the fault current ground path have been Certified to be used multiple times for grounding/bonding. The UL 2703 Listing does not specify a maximum number of uses for the Mount, Link, or Ground Lug. Review the requirements of the National Electrical Code (NEC) Article 250 to 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:

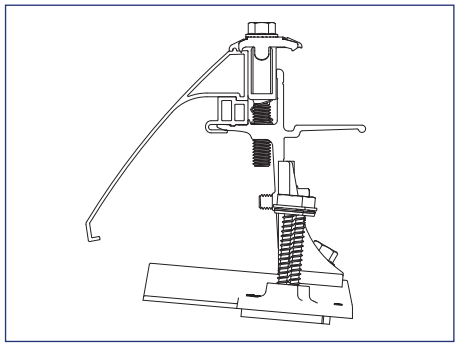
- SnapNrack, TopSpeed™ Mount
- SnapNrack, TopSpeed™ Clamp



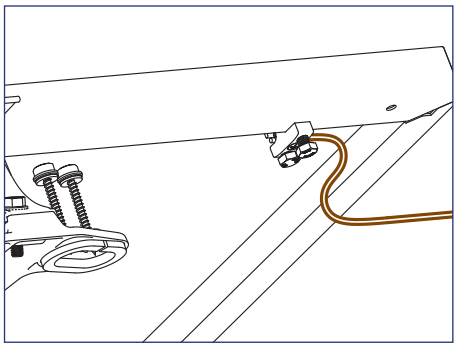
GROUNDING METHOD DETAILS

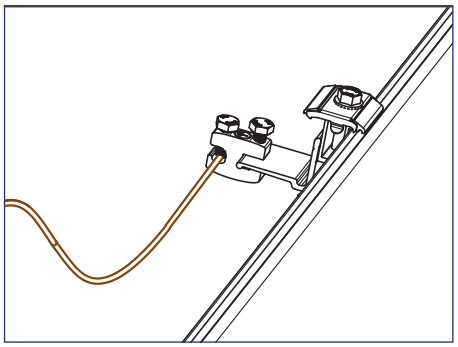


1) Row to row module bonding provided by bonding clips in Mount assembly and Clamp assembly.



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
ding with Link Bonding Clamps:
m, 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.

G MARKING DETAILS

g is

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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.

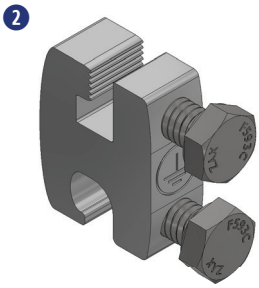
Scenarios that could result in a disruption of the bonding path are described, for example irregularly-shaped arrays, arrays consisting of individual rows, and any other scenario where module removal could disrupt the bonding path. In most cases, the removal of a module for servicing will not disturb 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.

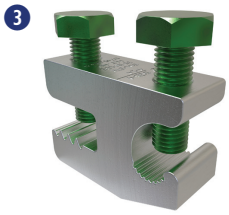
Required Tools

- 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™





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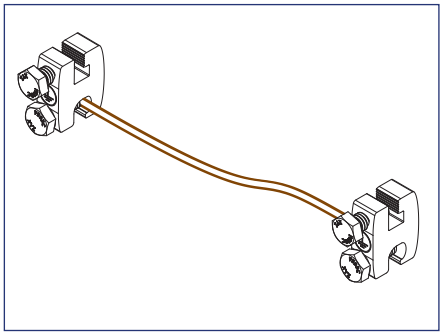
Maintaining the Grounding Bonding When Removing a Module

JUMPER ASSEMBLY INSTRUCTION & INSTALLATION

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

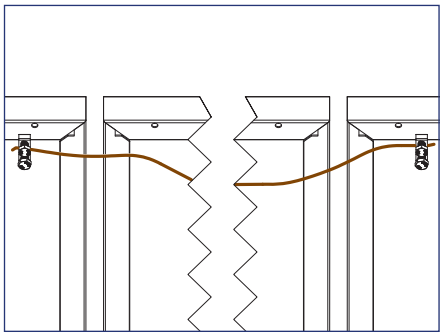
1) Identify the existing ground path at the location of module removal and choose an appropriate length of #10 bare copper to bridge the soon to be broken ground path.



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.

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Appendix A

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	
	FF-MP-BBB-xxx	
	Q.PEAK DUO-G5-XXX	Q.PEAK DUO XL-G10.3/BFG-XXX
	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
	PEAK DUO-BLK-G7-XXX	Q.PEAK DUO BLK G10+-XXX
	.PEAK DUO-G7.2-XXX	Q.PEAK DUO XL-G10.3-XXX
	.PEAK DUO-G6+-XXX	Q.PEAK DUO XL-G10.c-XXX
	EAK 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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Appendix A

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
	JKMXXXM-60	JKMXXXP-72-V
	JKMXXXM-60L	JKMXXXPP-72
	JKMXXXM-60HL	JKMXXXPP-72-V
	JKMXXXM-60HBL	JKMSXXXP-72
	JKMXXXP-60	JKMXXXM-72HL-V
	1XXXP-60-J4	JKMXXXM-72HL-TV
	MXXXP-60-V	JKMXXXM-72HBL
	XXXP-60B-J4	JKMXXXM-6TL3-B
	MXXXPP-60	JKMXXXM-6RL3-B
	1XXXPP-60-V	JKMXXXM-7RL3-V
	(MXXXM-72	JKMXXXM-7RL3-TV
	1XXXM-72L-V	JKMXXXM-72HL4-V
	(MXXXP-72	JKMXXXM-72HL4-TV
LG	GXXXN1C-A5	LGXXXA1C-V5
	GXXXN1K-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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Appendix A

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
[illegible]	SNEA-XXXM3-60	USNEA-XXXM3-72
	NEA-XXXM3B-60	USNEA-XXXM3B-72
[illegible]	VBHNXXXKA03	VBHXXXRA18N
	VBHNXXXKA04	VBHXXXRA03K
	VBHNXXXSA17	EVPVXXX(K)
	VBHNXXXSA18	EVPVXXXH
	VBHN325SA17E	EVPVXXXPK
Enphase	PSXXXM-20/U	PSxxxM8GF-18/VH
	PSXXXM8GH-20/U	PSxxxM8GFH-18/VH
	PSxxxM8GF-24/TH	PSxxxM6-24/TH
	PSxxxM8GFH-24/TH	

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By Devon.Murtha at 9:08 am, Feb 28, 2025

Appendix A

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
[illegible]	SST-XXXM3-60	SST-XXXM3-72
	[illegible]-XXXM3B-60	SST-XXXM3B-72
[illegible]	P660M-XXX	TP672M-XXX
	P660P-XXX	TP672P-XXX
[illegible]	I-XXXDD05(II)	TSMXXXDD05H.05(II)
	XXDD05A.05(II)	TSM-XXXDD06M.05(II)
	XXDD05A.08(II)	TSM-XXXDE15H(II)
	XXDD05A.082(II)	TSM-XXXDE15M(II)
	M-XXXPA05	TSMXXXDE06X.05(II)
	I-XXXPA05.05	TSMXXXDE09.05
	I-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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Appendix A

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

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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		
Tigo	TS4-R-F	
	TS4-R-O	
	TS4-R-M-DUO	
	TS4-R-S-DUO	
	TS4-A-2F	

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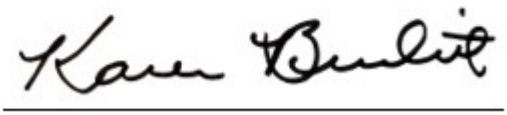

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Hi-MO 5

LR5-54HABB

390~415M

- Suitable for distributed projects
- Advanced module technology delivers superior module efficiency
  - M10 Gallium-doped Wafer
  - Integrated Segmented Ribbons
  - 9-busbar Half-cut Cell
- Globally validated bifacial energy yield
- High module quality ensures long-term reliability

25 25-year Warranty for Materials and Processing

30 30-year Warranty for Extra Linear Power Output

Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730

ISO9001:2015: ISO Quality Management System

ISO14001: 2015: ISO Environment Management System

ISO45001: 2018: Occupational Health and Safety

IEC62941: Guideline for module design qualification and type approval

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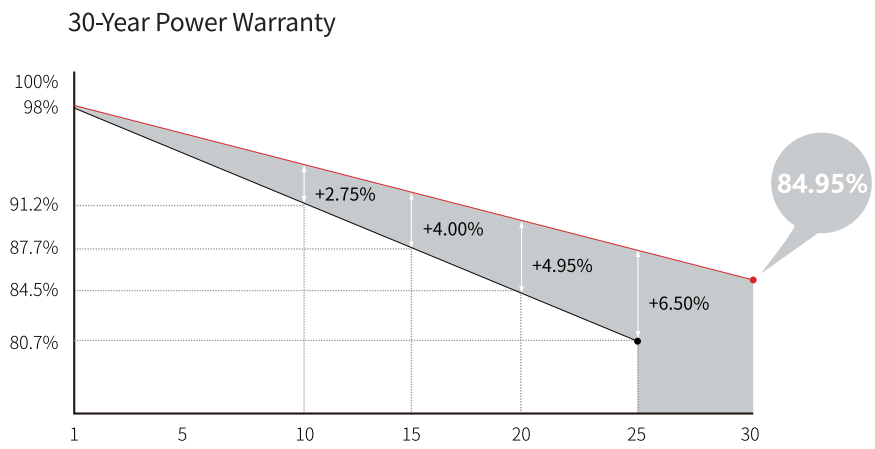
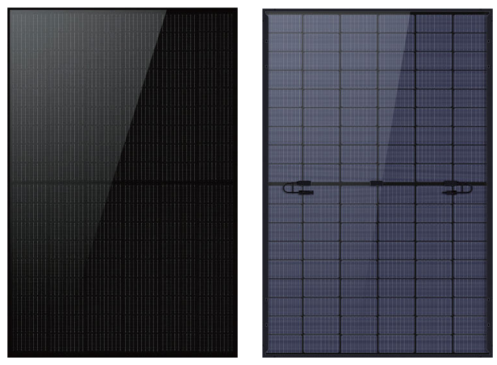
Hi-MO 5

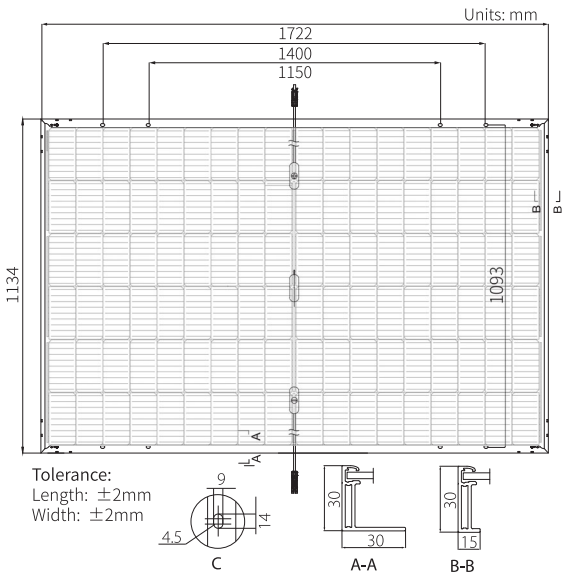
LR5-54HABB 390~415M

21.3%	0~3%	<2%	0.45%	HALF-CELL
MAX MODULE EFFICIENCY	POWER TOLERANCE	FIRST YEAR POWER DEGRADATION	YEAR 2-30 POWER DEGRADATION	Lower operating temperature

Additional Value







Mechanical Parameters

Cell Orientation	108 (6×18)
Junction Box	IP68, three diodes
Output Cable	4mm², ±1200mm length can be customized
Glass	Dual glass, 2.0+1.6mm heat strengthened glass
Frame	Anodized aluminum alloy frame
Weight	22.5kg
Dimension	1722×1134×30mm
Packaging	36pcs per pallet / 216pcs per 20' GP / 936pcs or 792pcs(Only for USA) per 40' HC

Electrical Characteristics

STC : AM1.5 1000W/m² 25°C NOCT : AM1.5 800W/m² 20°C 1m/s Test uncertainty for Pmax: ±3%

Module Type	LR5-54HABB-390M		LR5-54HABB-395M		LR5-54HABB-400M		LR5-54HABB-405M		LR5-54HABB-410M		LR5-54HABB-415M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	390	291.5	395	295.2	400	299.0	405	302.7	410	306.5	415	310.2
Open Circuit Voltage (Voc/V)	36.58	34.39	36.81	34.61	37.05	34.84	37.29	35.06	37.53	35.29	37.77	35.51
Short Circuit Current (Isc/A)	13.57	10.95	13.65	11.01	13.72	11.07	13.79	11.13	13.87	11.19	13.94	11.25
Voltage at Maximum Power (Vmp/V)	30.47	28.43	30.70	28.64	30.94	28.86	31.18	29.09	31.42	29.31	31.66	29.54
Current at Maximum Power (Imp/A)	12.80	10.26	12.87	10.31	12.93	10.36	12.99	10.41	13.05	10.45	13.11	10.50
Module Efficiency(%)	20.0		20.2		20.5		20.7		21.0		21.3	

Electrical characteristics with different rear side power gain (reference to 400W front)

Pmax /W	Voc/V	Isc /A	Vmp/V	Imp /A	Pmax gain
420	37.05	14.41	30.94	13.58	5%
440	37.05	15.09	30.94	14.22	10%
460	37.15	15.78	31.04	14.87	15%
480	37.15	16.46	31.04	15.52	20%
500	37.15	17.15	31.04	16.16	25%

Operating Parameters

Operational Temperature	-40°C ~ +85°C
Power Output Tolerance	0 ~ 3%
Voc and Isc Tolerance	±3%
Maximum System Voltage	DC1500V (IEC/UL)
Maximum Series Fuse Rating	30A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Bifaciality	70±5%
Fire Rating	UL Similar type 38 * IEC Class C

*Reference Standard：UL61730 Second Edition, Dated October 28, 2022

Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

Temperature Ratings (STC)

Temperature Coefficient of Isc	+0.050%/°C
Temperature Coefficient of Voc	-0.265%/°C
Temperature Coefficient of Pmax	-0.340%/°C

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Specifications included in this datasheet are subject to change without notice. LONGi reserves the right of final interpretation. (20230115V17) Only for North America

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REVIEWED
By Devon.Murtha at 9:09 am, Feb 28, 2025

DATA SHEET

IQ8 and IQ8+ 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 using advanced 55-nm technology with high-speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

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

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-and-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conform with various regulations, when installed according to the manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-and-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

- Compliant with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB)

NOTE:

- IQ8 Microinverters cannot be mixed with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, and so on) in the same system.
- IQ Microinverters ship with default settings that meet North America's IEEE 1547 interconnection standard requirements. Region-specific adjustments may be requested by an Authority Having Jurisdiction (AHJ) or utility representative according to the IEEE 1547 interconnection standard. An IQ Gateway is required to make these changes during installation.

*Meets UL 1741 only when installed with IQ System Controller 2 or 3.
**IQ8 and IQ8+ support split-phase, 240 V installations only.

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By Devon.Murtha at 9:09 am, Feb 28, 2025

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)	UNITS	IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings[1]	W	235–350	235–440
Module compatibility	—	To meet compatibility, PV modules must be within maximum input DC voltage and maximum module I_{sc} listed below. Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator.	
MPPT voltage range	V	27–37	27–45
Operating range	V	16–48	16–58
Minimum/Maximum start voltage	V	22/48	22/58
Maximum input DC voltage	V	50	60
Maximum continuous input DC current	A	10	12
Maximum input DC short-circuit current	A	25	
Maximum module (I_{sc})	A	20	
Overvoltage class DC port	—	II	
DC port backfeed current	mA	0	
PV array configuration	—	Ungrounded array; no additional DC side protection required; AC side protection requires maximum 20 A per branch circuit.	

OUTPUT DATA (AC)	UNITS	IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Maximum continuous output power	VA	240	290
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	
Minimum and Maximum grid voltage[2]	V	211-264	
Maximum continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short-circuit fault current over three cycles	Arms	2	
Maximum units per 20 A (L-L) branch circuit[3]	—	16	13
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	%	97.7	
CEC weighted efficiency	%	97	
Nighttime power consumption	mW	23	25

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 (H × W × D)	212 mm (8.3 in) × 175 mm (6.9 in) × 30.2 mm (1.2 in)
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection–no fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environmental category/UV exposure rating	NEMA Type 6/Outdoor

(1) No enforced DC/AC ratio.
(2) Nominal voltage range can be extended beyond nominal if required by
(3) Limits may vary. Refer to local requirements to define the number of m

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COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01. This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV Systems, for AC and DC conductors, when installed according to the manufacturer's instructions.

REVIEWED
By Devon.Murtha at 9:09 am, Feb 28, 2025

Revision history

REVISION	DATE	DESCRIPTION
DSH-00207-3.0	February 2024	Updated the information about IEEE 1547 interconnection standard requirements.
DSH-00207-2.0	October 2023	Included NEC 2023 specification in the “Compliance” section.
DSH-00207-1.0	September 2023	Updated module compatibility specification.

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IQ8SP-12A-DSH-00207-3.0-EN-US-2024-02-12

REVIEWED

By Devon.Murtha at 9:09 am, Feb 28, 2025

COVER LETTER
SOLAR STACK – Roof solar mounting pedestal

Date: January 9, 2025
Re: Solar Stack pedestal – Cover Letter
Subj: State of Maryland, USA

SOLAR STACK Florida Product Approval (FL#21074) is in compliance with:

- ASCE 7-16 IRC – 2018 IBC - 2018

Performance evaluation is summarized in Table 7.1 below:

7.0 One Structural Connection Performance:

7.1 Uplift Resistance:

Table 7.1
SOLAR STACK attached to Adhesive
Ultimate Uplift Resistance Loads (LBF)[1,2]

#	Uplift Load applied to the Top of "SOLAR STACK" Assembly (90° To Roof Surface)				
	Adhesive Type:	Pedestal Size: (Length)	Paddy Dimensions: (minimum)	Paddy Weight: Per pedestal (nominal)	Ultimate Load **Tension** (LBF)[1,2]
1	ICP AH-160 Blue	12"	4" dia. x 12" long x 1" high	83.6 grams	**-1025**
2	ICP AH-160 Blue	8"	4" dia. x 8" long x 1" high	51.7 grams	**-758**
3	ICP AH-160	6"	5"- 6" dia. x 6" long x 1-1/2" high	57.3 grams	**-600**
4	ICP AH-160	4"	4" dia. x 4" long x 1" high	49.9 grams	**-325**
5	DAP Stormbond 2 (fka Touch 'N Seal Storm Bond 2)	8"	6" dia. x 8" long x 1-1/2" high	44.2 grams	**-750**
6	DAP SmartBond	8"	6" dia. x 8" long x 1-1/2" high	49.5 grams	**-575**
7	DUPONT Tile Bond	12"	4" dia. x 12" long x 1" high	50.1 grams	**-1233**
8	DUPONT Tile Bond	8"	6" dia. x 8" long x 1-1/2" high	35.5 grams	**-875**
9	ICP APOC Polyset RTA-1	8"	5" dia. x 8" long x 1-1/2" high	47.3 grams	**-882**
10	ICP APOC Polyset RTA-1	6"	5" dia. x 6" long x 1-1/2" high	40.4 grams	**-432**
11	ICP APOC Polyset RTA-1	4"	5" dia. x 4" long x 1-1/2" high	27.1 grams	**-320**

Notes:
1. Ultimate Loads (LBF) with 0 margin of safety applied to the test loads.
2. Assembly was tested for vertical up.

The installation of solar rack system shall be as follows:

The unified panel assembly shall be supported on Solar Stack adhered solar mounting feet (pedestal) providing an average of 2.5 mounting feet per module. The brackets, clamps, bolts, screws, nuts, etc that attach the PV modules to the top side of the Solar Stack pedestals (8 inches long and 5 inches wide). Foot attachment to the roof shall be provided with a minimum of 2 per module long side and shared between modules. Mounting feet shall be adhered to the roof deck per the manufacturer's standard installation details to attach the Solar Stack to the roof membrane.

Solar panel mounting systems installed parallel to the plane of a roof shall be no more than 12" above the roof when measured perpendicular to the roof surface. When installed as per the above specifications the system shall meet required 115 MPH wind load, 10 PSF Dead Load, 20 PSF Live Load and 35 PSF Ground Snow load requirements

This review is for structural review only and does not express or imply any review of the roofing materials for weather tightness, condition, or lifespan. Review of the roofing materials should be performed by the installation contractor or a certified roofing professional. Should you have any further questions or comments please feel free to contact our office.

Respectfully,

David C Hernandez
Digitally signed by David C Hernandez
Date: 2025.01.15 05:32:36 -05'00'

aree Green Building Engineer #832

STATE OF MARYLAND
DAVID C. HERNANDEZ
49993
PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 49993, EXP 10/06/2026.

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By Devon.Murtha at 9:09 am, Feb 28, 2025

TECHNICAL DATA SHEET

POLYSET® AH-160

LOW PRESSURE POLYURETHANE FOAM INFORMATION

Description	Low pressure, two-component spray polyurethane foam adhesive
SPF	Spray Polyurethane Foam
Applications	Designed to adhere to concrete and clay roof tile onto compatible roofing underlayment surfaces.
Preparation for use	Substrate must be clean, dry, firm, free of loose particles, and free of dust, grease and mold release agents. Protect surfaces not to be foamed. Read SDS, Operating Instructions, and Product Stewardship Guidelines. For additional information go to www.icpadhesives.com.
Use	Warm/Cool chemical to 70-90°F (21-32°C). Follow instructions for set-up found in the operating instructions.
PPE	 Wear protective glasses with side shields or goggles, nitrile gloves, and clothing that protects against dermal exposure. Recommend dispensing product in a well-ventilated area with certified respiratory protection; however, well ventilated exterior applications may not need respiratory protection. It is the responsibility of the employer to complete a PPE evaluation and/or exposure assessment to determine if respiratory protection is required. Read all instructions, ICP Product Stewardship Guidelines, and SDS (Section 8) prior to use of any product.
Note	FOR PROFESSIONAL USE ONLY. Always check the local building code before use. Cured low pressure polyurethane foam is non-toxic and inert.
Temperature	Please see chart located on page 2
Product Storage	Store in a dry area. Optimum chemical storage temperature is 50-100°F (10-38°C). Excessive heat can cause premature aging of components resulting in a shorter shelf-life. Do not allow material to freeze.
Disposal	Refer to SDS (Section 13) for instructions. Always dispose of empty cylinders in according to applicable federal, state, provincial and local regulations.
Shelf-life	12 months
Compatibility	Cured low pressure polyurethane foam is chemically inert and non-reactive in approved applications. Compatible with structural concrete, asphalt primed concrete, and insulating concrete, various BUR, base sheets, steel-22 gauge or lower, vapor retarders, gypsum, polystyrene, wood fiber, and polyisocyanurate.
Limitations	Do not use when ambient substrate temperatures are below 40°F (4C°). Do not use during inclement weather, on wet surfaces or on any roof deck showing signs of deterioration or loss of structural integrity. Do not use after the expiration date.
Additional Attachment Requirement	Additional fastening may be necessary on steep pitches. Reference installation instructions on www.icpadhesives.com.
Tile Profile	See chart located on Page 3.

TECHNICAL DATA	STANDARD	RESULTS
Density	ASTM D1622	1.6 lbs/ft³ (25.6 kg/m³)
Compressive Strength	ASTM D1623	18 lbf/in² (124 kPa) Parallel 12 lbf/in² (82 kPa) Perpendicular
Tensile Strength	ASTM D412	28 psi
Water Absorption	ASTM D2842	3.73%
Moisture Vapor Transmission	ASTM E96	3.1 Perm-in
Dimensional Stability	ASTM D2126	At -40°F (4°C) +0.07% At 158°F (70°C) +6.0%
Closed Cell Content	ASTM 2856	86%

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By Devon.Murtha at 9:09 am, Feb 28, 2025

APPROVALS/STANDARDS/CLASSIFICATIONS

Class A Rated, ASTM E108	
Florida Product Approval	FBC Approved FL6332-R8
Miami Dade NOA	17-0322.03

TEMPERATURE GUIDELINES

Chemical Storage Temperature	50-100°F (10-38°C)
Outside Application Temperature	40-100°F (4-38°C)
Process Core Chemical Temperature	70-90°F (21-32°C)
Surface Temperature (Substrate)	40-100°F (4-38°C)

PROPERTIES AND YIELD[1]

	Weight (Including packaging)	Coverage (30-gram medium paddy)	Open Time	Work Life in Mixing Nozzle	Set-up Time	Time to Full Cure
62496580302	45.3 lbs / A component 40 lbs / B component	1295	1 – 2 minutes[1]	1 minute[1]	10 – 20 minutes[1]	24 - 48 hours
62481389104	14 lbs / A component 12.5 lbs / B component	400	1 – 2 minutes[1]	1 minute[1]	10 – 20 minutes[1]	24 - 48 hours

[1]Times may be affected by temperature and weather conditions.

ADHESIVE PLACEMENT FOR TILE PROFILE*

Tile Profile	Minimum Paddy Contact Area	Minimum Paddy Gram Weight
Flat Low High	17-23 sq inches	45-65
Flat	10-12 sq inches	30
Low	12-14 sq inches	30
High	17-19 sq inches	30
Flat Low High	Two Paddys: 8-9 sq inches at head of tile 9-11 sq inches at overlap	12 grams per paddy
Two-Piece Barrel (Cap Tile)	2 beads (1 each longitudinal edge) 20-25 sq inches each bead	17 grams per paddy
Two Piece Barrel (Pan Tile)	65-70 sq inches	34 grams under pan

*See NOA No.: 17-0322.03 for tile placement illustrations.

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By Devon.Murtha at 9:09 am, Feb 28, 2025

Always read all operating, application and safety instructions before using any products. Use in conformance with all local, state and federal regulations and safety requirements. Failure to strictly adhere to any recommended procedures and reasonable safety precautions shall release ICP Adhesives & Sealants, Inc. of all liability with respect to the materials or the use thereof. For additional information and location of your nearest distributor, call ICP Adhesives & Sealants Inc. 1 330.753.4585 or 1 800.321.5585.

NOTE: Physical properties shown are typical and are to serve only as a guide for engineering design. Results are obtained from specimens under ideal laboratory conditions and may vary upon use, temperature and ambient conditions. Right to change physical properties as a result of technical progress is reserved. This information supersedes all previously published data. The Customer is responsible for deciding whether products and associated TDS information are appropriate for customer's use.

ICP low pressure one-component polyurethane foam sealants and adhesives (OCF), low pressure spray polyurethane foams (SPF), and low pressure pour-in-place polyurethane foams (PIP) are composed of a diisocyanate, hydrofluorocarbon or hydrocarbon blowing agent, and polyol. For polyurethane foam sealants/adhesives: wear protective glasses with side shields or goggles, nitrile gloves, and clothing that protects against dermal exposure. Recommend using in a well-ventilated area. Avoid breathing vapors. Read the SDS and instructions carefully before use (www.icpadhesives.com). For spray polyurethane foams and pour-in-place polyurethane foams: wear protective glasses with side shields or goggles, nitrile gloves, and clothing that protects against dermal exposure. Use only in a well-ventilated area and with certified respiratory protection or a powered air purifying respirator (PAPR). Additional information on ventilation can be found in the Product Stewardship Guide (www.icpadhesives.com). Read the SDS (www.icpadhesives.com) and instructions carefully before use. The urethane foam produced from these ingredients will support combustion and may present a fire hazard if exposed to a fire or excessive heat about 240°F (116°C). Refer to each product's TDS for specifications, testing results, and other attributes. The customer is ultimately responsible for deciding whether products and associated TDS information are appropriate for customer's use. Refer to the products' SDS, ICP Adhesives & Sealants' Product Stewardship Guidelines, and operating instructions for guidance on the safe and proper application of the product (www.icpadhesives.com). For professional use only. Building practices unrelated to materials can lead to potential mold issues. Material suppliers cannot provide assurance that mold will not develop in any specific system.

WARNINGS: Follow safety precautions and wear protective equipment as recommended. Prolonged inhalation exposure may cause respiratory irritation/sensitization and/or reduce pulmonary function in susceptible individuals. Onset may be delayed. Pre-existing respiratory conditions may be aggravated. We recommend that the product is used in a well-ventilated area and with certified respiratory protection. NIOSH approved positive pressure supplied air respirator is recommended if exposure guidelines may be exceeded. Contents may be very sticky and irritating to skin and eyes, therefore wear safety glasses with side shields or goggles, nitrile gloves, and clothing that protects against dermal exposure when operating. If liquid chemical comes in contact with skin, first wipe thoroughly with dry cloth, then rinse affected area with water. Wash with soap and water afterwards, and apply hand lotion if desired. If liquid comes in contact with eyes, immediately flush with large volume of clean water for at least 15 minutes and get medical help at once. If liquid is swallowed, get immediate medical attention. Do not induce vomiting. If breathing is difficult, give oxygen. If breathing has stopped give artificial respiration. Products manufactured or produced from these chemicals are organic and, therefore, combustible. Each user of any product should carefully determine whether there is a potential fire hazard associated with such product in a specific usage. **KEEP OUT OF REACH OF CHILDREN.**

LIMITED WARRANTY and LIMITATION OF DAMAGES: ICP Adhesives & Sealants, Inc. warrants only that the product shall meet ICP Adhesives & Sealants, Inc. specifications for the product when shipped by ICP Adhesives & Sealants, Inc. NO OTHER EXPRESSED OR IMPLIED WARRANTIES APPLY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT OUTSIDE THE U.S. AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. Buyer and users assume all risks of use, handling and storage of the product. Failure to strictly adhere to any recommended procedures shall release ICP Adhesives & Sealants, Inc. from all liability. The user of the product is responsible to determine suitability of the product for the particular use. The exclusive remedy as to any breach of warranty, negligence or other claim is limited to the replacement of the product. Liability for any indirect, incidental or consequential damage or loss is specifically excluded.

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By Devon.Murtha at 9:09 am, Feb 28, 2025

CBUCK Engineering

Specialty Structural Engineering

CBUCK, Inc. Certificate of Authorization #8064

Evaluation Report

"SOLAR STACK"

Roof Solar Pedestal

Manufacturer:

SOLAR STACK INC.

1071 SW 30th Avenue

Deerfield Beach, Florida 33442

for

Florida Product Approval

 # FL 21074.2 R8

Florida Building Code 8th Edition (2023)

Method: **2 - B**

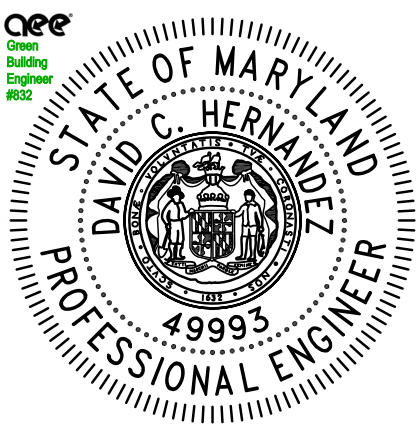
Category: **Roofing**

Sub - Category: **Roofing Accessories that are an Integral Part of the Roofing System**

Product Name: "SOLAR STACK"

Product Description: Roof Solar Pedestal

Product Material: Aluminum



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 49993, EXP 10/06/2026.

David C Hernandez

Digitally signed by David C Hernandez
Date: 2025.01.06 05:37:56 -05'00'

This item has been digitally signed and sealed by James L. Buckner, P.E., on this date below. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

Prepared by:

James L. Buckner, P.E., SECB
Florida Professional Engineer # 31242
Florida Evaluation ANE ID: 1916
Project Manager: Diana Galloway
Report No. 22-525-SS-G4-hz-ER.2
(Revises 20-230-SS-G4-HVHZ-ER, FL21074.4 R6, R7)
Date: 2/14/2024

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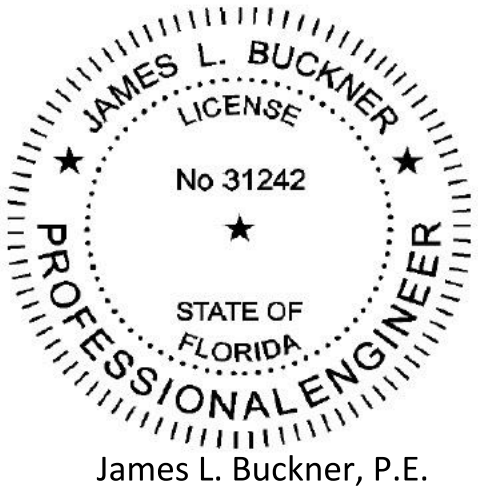

James L. Buckner, P.E.
FL31242

2024.02.14 11:02:58 -05'00'

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CBUCK, Inc. dba CBUCK Engineering
491-9927 · Email: cbuck@cbuckinc.net · Website: www.cbuckinc.net
Business: 1374 Community Dr., Jupiter, FL 33458

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By Devon.Murtha at 9:09 am, Feb 28, 2025

1.0 Manufacturer: **SOLAR STACK INC.**
1071 SW 30th Avenue
Deerfield Beach, Florida 33442
(561) 276-9745
https://solarstack.com/

2.0 Product:

2.1 Product Name: "SOLAR STACK"

2.2 Product Description: Roof Solar Mounting Pedestal

3.0 Evaluation Scope:

3.1 Compliance with the following

Florida Building Code 8th Edition (2023), High Velocity Hurricane Zone (HVHZ)
Florida Building Code 8th Edition (2023), Outside High Velocity Hurricane Zone (Non-HVHZ)

3.2 Evaluation Method:

Florida Product Approval Rule: Method 2
Per Florida Administrative Code 61G20-3.005 (2) (b)

3.3 Evaluation Classification:

Category: Roofing
Subcategory: Roofing Accessories that are an Integral part of the Roofing System

3.4 Properties Evaluated

Structural (Wind Resistance) Properties: for one load path connection

3.5 Limits of Evaluation:

This product assembly evaluation is limited to compliance with section 3.1 to section 3.4 of this report.

4.0 Evaluated Uses:

SOLAR STACK INC. "SOLAR STACK" is used as a roof solar mounting pedestal,
Adhered to the Top of approved adhesives listed in this report.

5.0 Product Assembly Description:

5.1 General:

The SOLAR STACK INC. "SOLAR STACK" roof solar mounting pedestals are aluminum roof solar mounting pedestals that are adhered to the Top of foam adhesives list in this report.

6.0 Connection Assembly as Evaluated:

"SOLAR STACK" pedestal
Adhered to Top of Foam Adhesive

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7.0 One Structural Connection Performance:

7.1 Uplift Resistance:

Table 7.1
SOLAR STACK attached to Adhesive
Ultimate Uplift Resistance Loads (LBF)[1,2]

#	Uplift Load applied to the Top of "SOLAR STACK" Assembly (90° To Roof Surface)				
	Adhesive Type:	Pedestal Size: (Length)	Paddy Dimensions: (minimum)	Paddy Weight: Per pedestal (nominal)	Ultimate Load **Tension** (LBF)[1,2]
1	ICP AH-160 Blue	12"	4" dia. x 12" long x 1" high	83.6 grams	**-1025**
2	ICP AH-160 Blue	8"	4" dia. x 8" long x 1" high	51.7 grams	**-758**
3	ICP AH-160	6"	5"- 6" dia. x 6" long x 1-1/2" high	57.3 grams	**-600**
4	ICP AH-160	4"	4" dia. x 4" long x 1" high	49.9 grams	**-325**
5	DAP Stormbond 2 (fka Touch 'N Seal Storm Bond 2)	8"	6" dia. x 8" long x 1-1/2" high	44.2 grams	**-750**
6	DAP SmartBond	8"	6" dia. x 8" long x 1-1/2" high	49.5 grams	**-575**
7	DUPONT Tile Bond	12"	4" dia. x 12" long x 1" high	50.1 grams	**-1233**
8	DUPONT Tile Bond	8"	6" dia. x 8" long x 1-1/2" high	35.5 grams	**-875**
9	ICP APOC Polyset RTA-1	8"	5" dia. x 8" long x 1-1/2" high	47.3 grams	**-882**
10	ICP APOC Polyset RTA-1	6"	5" dia. x 6" long x 1-1/2" high	40.4 grams	**-432**
11	ICP APOC Polyset RTA-1	4"	5" dia. x 4" long x 1-1/2" high	27.1 grams	**-320**

Notes:
1. Ultimate Loads (LBF) with 0 margin of safety applied to the test loads.
2. Assembly was tested for vertical up.

8.0 Performance Standard:

The following Modified Test Standard was used to demonstrate compliance with the intent of the code per Method 2 of the Florida Administrative Code FAC 61G20-3005 (2) (b).

Modified-TAS 114-11 – *Test Procedure for Simulated Uplift Pressure Resistance of Adhered Roof System Assemblies. Testing Application Standard, (TAS) 114-95, Appendix D,*

Primary modifications;

The product tested was not a roof assembly.

The product was tested for one structural connection: Pedestal base to top of adhesive.

The intent of the test was to provide design load path resistance of a structural connection.

9.0 Code Compliance:

The product assembly described herein has demonstrated compliance with the intent of the Florida Building Code 8th Edition (2023), Section 1708.2.

10.0 Limitations and Conditions of Use:

10.1 This report evaluates the solar pedestal adhered to top of foam adhesive. This report is intended to be part of a complete load path design. Structural capacities of the bottom side of adhesive patty, other components and systems need to be combined for code wind design. Attachment to the top plate of the "SOLAR STACK" [illegible] report.

10.2 Design of the roof adhesive [illegible] e scope of this report.

10.3 Assembly was not evaluate[illegible]

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By Devon.Murtha at 9:09 am, Feb 28, 2025

10.4 Scope of "Limitations and Conditions of Use" for this evaluation:
This evaluation report for "State Approval" contains technical documentation, specifications and installation method(s) which include "Limitations and Conditions of Use" throughout the report in accordance with Rule 61G20-3.005. Per Rule 61G20-3.004, the Florida Building Commission is the authority to approve products under "State Approval".

10.5 This report is a building code product evaluation per FLPE rule (FAC) 61G15-36 to comply with Florida product approval rule (FAC) 61G20-3. This evaluation report is part of the Florida Building Commission approval for the listed code related criteria. This report by James Buckner, P.E. and CBUCK Engineering is not a design certification of code compliance construction submittal documentation, per FBC section 107, for any individual structure, site specific or permit design.

10.6 All metal components and fasteners shall be corrosion resistant in accordance with applicable sections of FBC, including but not limited to Sections 1504.3.2, 1506.6 and 1507.4.4. For HVHZ areas, all roofing accessories shall comply with FBC Sections 1517.5 and 1517.6.

10.7 Fire Classification is outside the scope of Rule 61G20-3 and is therefore not included in this evaluation.

10.8 All pedestals shall be permanently labeled with the manufacturer's name and/or logo, and/or model.

10.9 This evaluation report approves the product assembly as described in this report for use in the High Velocity Hurricane Zone (HVHZ) code section. (Dade & Broward Counties)

10.10 Option for application outside "Limitations and Conditions of Use"
Rule 61G20-3.005(1)(e) allows engineering analysis for "project specific approval by the local authorities having jurisdiction in accordance with the alternate methods and materials authorized in the Code". Any modification of the product as evaluated in this report and approved by the Florida Building Commission is outside the scope of this evaluation and will be the responsibility of others.

11.0 Quality Assurance:

The manufacturer has demonstrated compliance of products in accordance with the Florida Building Code and Rule 61G20-3.005 (3) for manufacturing under a quality assurance program audited by an approved quality assurance entity through Keystone Certifications, Inc., (FBC Organization #QUA ID:1824).

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By Devon.Murtha at 9:09 am, Feb 28, 2025

12.0 System/Components

12.1 "SOLAR STACK" Solar Pedestal

Attachment of solar panels to SOLAR STACK solar pedestals is outside the scope of this evaluation and shall be designed by others.

12.1.1 "SOLAR STACK" Solar Pedestal

Material Specifications:

Type:	Aluminum
Thickness:	0.095" (min.)
Alloy Type:	6005A T5

12.1.2 "SOLAR STACK" Solar Pedestal Sizes:

12.1.2.1 4" SOLAR STACK" Solar Pedestal

Overall Product Dimensions:

Length:	4.00 in.
Width:	5.00 in.
Height:	4.50 in.

12.1.2.2 6" SOLAR STACK" Solar Pedestal

Overall Product Dimensions:

Length:	6.00 in.
Width:	5.00 in.
Height:	4.50 in.

12.1.2.3 8" SOLAR STACK" Solar Pedestal

Overall Product Dimensions:

Length:	8.00 in.
Width:	5.00 in.
Height:	4.50 in.

12.1.2.4 12" SOLAR STACK" Solar Pedestal

Overall Product Dimensions:

Length:	12.00 in.
Width:	5.00 in.
Height:	4.50 in.

12.2 Roof Foam Adhesive:

Adhesion of "SOLAR STACK" system to top of foam adhesive shall have the following minimum characteristics and be in compliance with this report, FBC Chapter 15, applicable code sections, product approvals, and in accordance with roof adhesive manufacturer's limitations and recommendations.

12.2.1 Adhesive Option 1:

Product Name:	Polyset AH-160
Manufactured by:	ICP Adhesives and Sealants, Inc.
Type:	Two-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#6332.1 R10
	Miami-Dade County: NOA# 22-0614.10

12.2.2 Adhesive Option 2:

Product Name:	Polyset AH-160 Blue
Manufactured by:	ICP Adhesives and Sealants, Inc.
Type:	Two-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#6332.1 R10
	Miami-Dade County: NOA# 22-0614.10

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12.2.3 Adhesive Option 3:

Product Name:	Storm Bond 2K
Manufactured by:	DAP Products, Inc.
Type:	Two-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Miami-Dade County: NOA# 21-0928.02

12.2.4 Adhesive Option 4:

Product Name:	Storm Bond
Manufactured by:	DAP Products, Inc.
Type:	Single-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#14506.1
	Miami-Dade County: NOA# 21-0928.04

12.2.5 Adhesive Option 5:

Product Name:	Tile Bond
Manufactured by:	DuPont de Nemours, Inc.
Type:	Single-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#22525.1 R7
	Miami-Dade County: NOA# 22-0614.05

12.2.6 Adhesive Option 6:

Product Name:	APOC Polyset RTA-1
Manufactured by:	ICP Adhesives and Sealants, Inc.
Type:	Single-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#6276.1
	Miami-Dade County: NOA# 22-0618.08

13.0 Installation Method:

"SOLAR STACK" Pedestal to Top of Roof Adhesive:

Install the "SOLAR STACK" Solar Pedestal into the paddy of roof foam adhesive per above Table 7.1. SOLAR STACK Pedestals shall be firmly pressed into adhesive so that pedestal base and base perimeter is encapsulated in adhesive. (Refer to Table 7.1 and drawings at the end of this evaluation report.)

1. **Apply Roof adhesive:**
   Adhesive Type: **Refer to Table 7.1**
   Paddy weight: **Refer to Table 7.1**
   Adhesive Size: **Refer to Table 7.1**
   Paddy placement of roof tile adhesive shall be applied on clean, dry approved surface.
2. **"SOLAR STACK" Solar Pedestal**
   Install the "SOLAR STACK" Solar Pedestal into the paddy of Adhesive.
   Pedestal Size: **Refer to Table 7.1**

The SOLAR STACK INC. "SOLAR STACK" solar roof pedestal shall be installed in compliance with the installation method listed in this report and applicable code sections of FBC 8th Edition (2023). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation instructions as a supplemental guid

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14.0 Evaluation Reference Data:

14.1 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 1215.01.21, Dated: 12/22/21 (Syst 1,2)

14.2 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 0222.02-19, Dated: 2/26/19 (Syst 5)

14.3 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 0309.01-23, Dated: 3/15/23 (Syst 9)

14.4 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 1105.01-21, Dated: 11/13/21 (Syst 7,8)

14.5 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 0712.01-23, Dated: 7/17/23 (Sys 10,11)

14.6 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 1003.01-22, Dated: 10/7/22 (Syst 3,4 12)

14.7 Quality Assurance
By Keystone Certifications, Inc., (FBC Organization #QUA ID:1824)
SOLAR STACK INC, Licensee #: 448
(FBC Organization #QUA ID:1824)

14.8 Engineering Analysis
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

14.9 Test Standard Equivalency
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

14.10 Letter Re: Product Name Change
By Tim Graboski with Ridged Systems LLC, dated 11/20/2018

14.11 Letter Re: Manufacture Name Change
By Tim Graboski with Ridged Systems LLC, dated 06/23/2023

14.12 Certification of Independence
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

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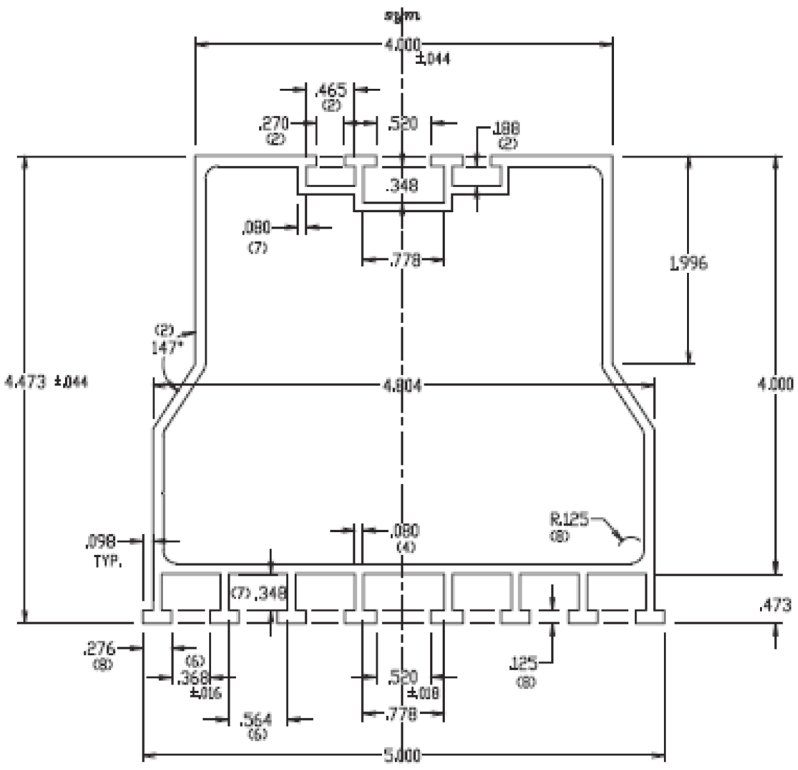
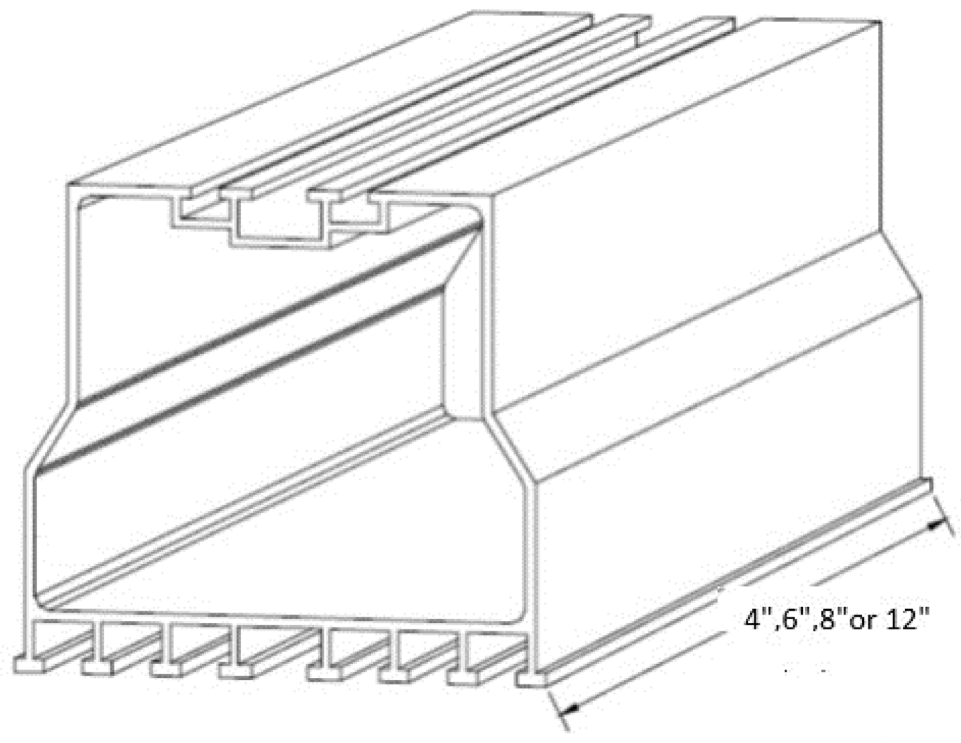
By Devon.Murtha at 9:09 am, Feb 28, 2025

CBUCK, Inc. Certificate of Authorization #8064

Installation Method
SOLAR STACK INC.
"SOLAR STACK" Roof Pedestal



"SOLAR STACK "
Typical Profile View



"SOLAR STACK "
Isometric Profile View

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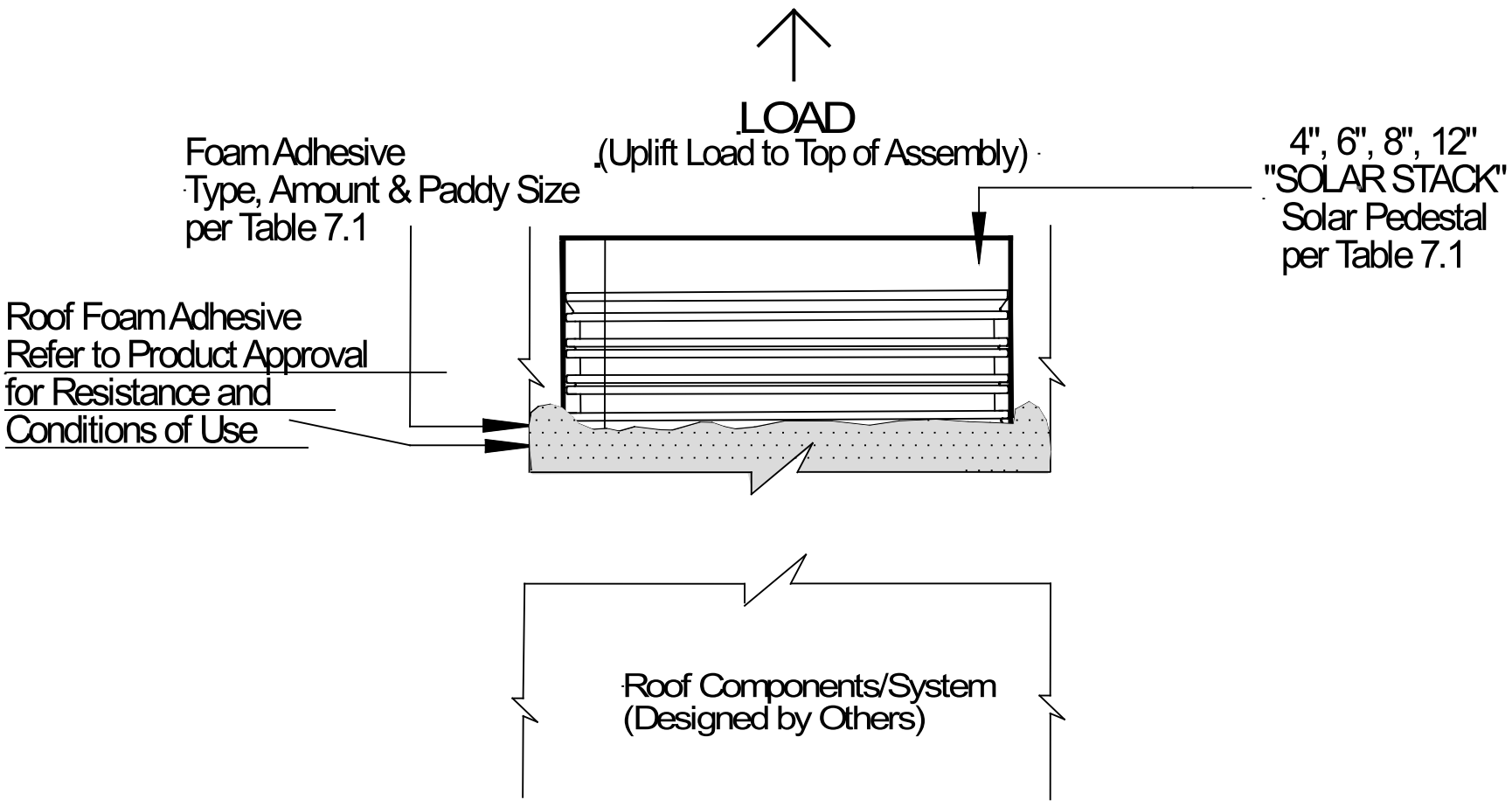
Installation Method
SOLAR STACK INC.
"SOLAR STACK" Roof Pedestal



Typical Assembly
Section View

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By Devon.Murtha at 9:09 am, Feb 28, 2025

DAVID C. HERNANDEZ, PE

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

DATE: February 3, 2025

RE: 35 Columbia Ave, Takoma Park, MD 20912, 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 for roofs 2 & 3 are attached to the roof with 8" Solar Stack Pedestal mounting system adhered with ICP POLYSET AH-160 foam adhesive. The panels on roof 1 are attached to the roof with TopSpeed railless 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 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	= 9 psf
Solar Stack System dead Load (Total)	= 9.3 psf
Solar system dead load	= 3 psf

Overall, the roof area is structurally adequate to support the PV alteration with no modifications or reinforcements.

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 sign
Date: 2025.0

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 49993, EXP 10/06/2026.
02/03/25

APPROVED

Montgomery County

Historic Preservation Commission

REVIEWED

By Devon.Murtha at 9:10 am, Feb 28, 2025

	COMPANY	PROJECT
WoodWorks® SOFTWARE FOR WOOD DESIGN	Jan. 31, 2025 13:32	Roof 1.wwb

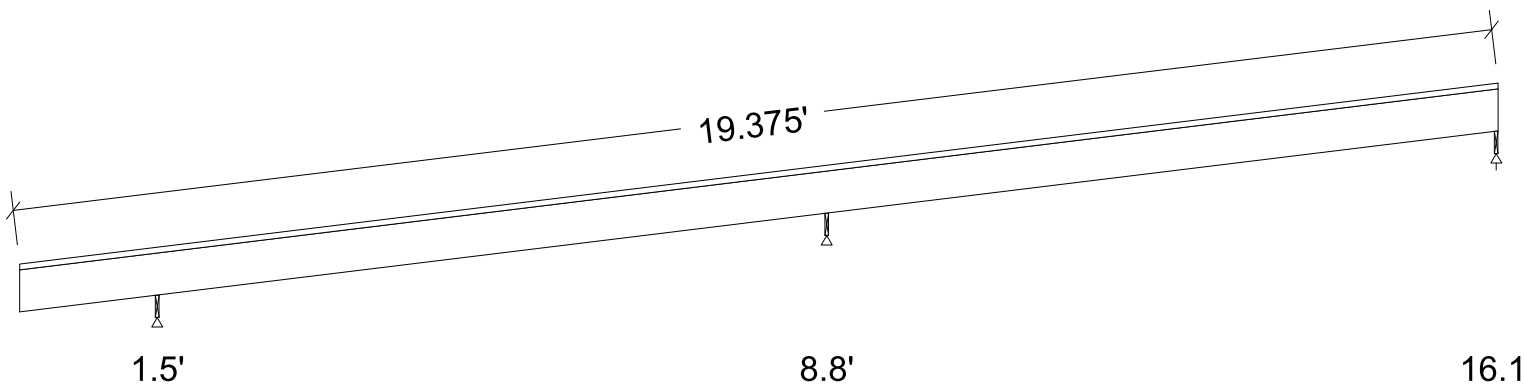
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
D-ROOF	Dead	Full Area	No			12.00(24.0")		psf
S2	Snow	Partial Area	No	14.30	16.10	23.10(24.0")		psf
L2	Roof live	Partial Area	No	14.30	16.10	16.00(24.0")		psf
D-PV	Dead	Partial Area	No	4.90	14.30	3.00(24.0")		psf
L1	Roof live	Partial Area	No	0.00	4.90	16.00(24.0")		psf
S1	Snow	Partial Area	No	0.00	4.90	23.10(24.0")		psf
SPV	Snow	Partial Area	No	4.90	14.30	13.86(24.0")		psf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:						
Dead		138		295		100
Snow		204		255		111
Roof Live		131		38		46
Factored:						
Total		343		549		211
Bearing:						
F'theta		543		543		543
Capacity						
Joist		713		713		407
Support		586		586		586
Des ratio						
Joist		0.48		0.77		0.52
Support		0.58		0.94		0.36
Load comb		#3		#3		#3
Length		0.50*		0.50*		0.50*
Min req'd		0.50*		0.47**		0.50*
Cb		1.75		1.75		1.00
Cb min		1.75		1.75		1.00
Cb support		1.25		1.25		1.25
Fcp sup		625		625		625

*Minimum bearing length setting used: 1/2" for end supports and 1/2" for interior supports

**Minimum bearing length governed by the required width of the supporting member.

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By Devon.Murtha at 9:10 am, Feb 28, 2025

Lumber-soft, S-P-F, No.1/No.2, 2x6 (1-1/2"x5-1/2")
Supports: All - Timber-soft Beam, D.Fir-L No.2
Roof joist spaced at 24.0" c/c; Total length: 19.69'; Clear span(horz): 1.5', 7.25', 7.25'; Volume = 1.1 cu.ft.; Pitch: 8/12
Lateral support: top = continuous, bottom = at end supports; Repetitive factor: applied where permitted (refer to online help);
This section PASSES the design code check.

WARNING: Member length exceeds typical stock length of 18.0 ft

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 40	Fv' = 155	psi	fv/Fv' = 0.26
Bending(+)	fb = 399	Fb' = 1504	psi	fb/Fb' = 0.26
Bending(-)	fb = 671	Fb' = 746	psi	fb/Fb' = 0.90
Deflection:				
Interior Live	0.04 = < L/999	0.44 = L/240	in	0.09
Total	0.11 = L/918	0.58 = L/180	in	0.20
Cantil. Live	-0.03 = L/802	0.18 = L/120	in	0.15
Total	-0.06 = L/366	0.24 = L/90	in	0.25

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	135	1.15	1.00	1.00	-	-	-	-	1.00	1.00	3
Fb'+	875	1.15	1.00	1.00	1.000	1.300	-	1.15	1.00	1.00	3
Fb'-	875	1.15	1.00	1.00	0.496	1.300	-	1.15	1.00	1.00	3
Fcp'	425	-	1.00	1.00	-	-	-	-	1.00	1.00	-
E'	1.4 million		1.00	1.00	-	-	-	-	1.00	1.00	3
Emin'	0.51 million		1.00	1.00	-	-	-	-	1.00	1.00	3

CRITICAL LOAD COMBINATIONS:
Shear : LC #3 = D + S
Bending(+): LC #3 = D + S
Bending(-): LC #3 = D + S
Deflection: LC #3 = D + S (live)
LC #3 = D + S (total)
Bearing : Support 1 - LC #3 = D + S
Support 2 - LC #3 = D + S
Support 3 - LC #3 = D + S
D=dead S=snow Lr=roof live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1

CALCULATIONS:
V max = 244, V design = 223 lbs; M(+) = 251 lbs-ft; M(-) = 423 lbs-ft
EIy = 29.12 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow…)
Total deflection = 1.5 dead + "live"
Bearing: Allowable bearing at an angle F'theta calculated for each support as per NDS 3.10.3
Lateral stability(-): Lu = 17.56' Le = 26.63' RB = 28.0; Lu based on full span

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
4. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
5. SLOPED BEAMS: level bearing is required for all sloped beams.

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Historic Preservation Commission

REVIEWED
By Devon.Murtha at 9:10 am, Feb 28, 2025

	COMPANY	PROJECT
WoodWorks® SOFTWARE FOR WOOD DESIGN	Jan. 31, 2025 12:36	Roof 2 & 3 - Solar Stack.wwb

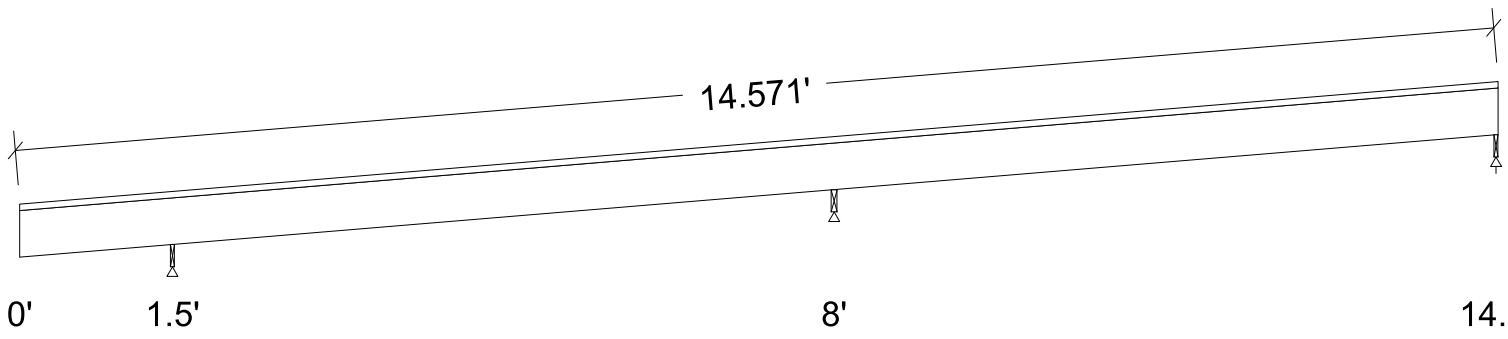
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
D-ROOF	Dead	Full Area	No			12.00(24.0")		psf
S1	Snow	Full Area	No			23.10(24.0")		psf
L2	Roof live	Partial Area	No	12.80	14.50	16.21(24.0")		psf
D-PV	Dead	Partial Area	No	1.60	12.80	9.30(24.0")		psf
L1	Roof live	Partial Area	No	0.00	1.60	20.00(24.0")		psf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:						
Dead		145		334		79
Snow		192		363		116
Roof Live		71		0		48
Factored:						
Total		337		697		195
Bearing:						
F'theta		427		427		427
Capacity						
Joist		561		697		320
Support		586		836		586
Des ratio						
Joist		0.60		1.00		0.61
Support		0.58		0.83		0.33
Load comb		#3		#3		#3
Length		0.50*		0.71		0.50*
Min req'd		0.30		0.71		0.50*
Cb		1.75		1.53		1.00
Cb min		1.75		1.53		1.00
Cb support		1.25		1.25		1.25
Fcp sup		625		625		625

*Minimum bearing length setting used: 1/2" for end supports and 1/2" for interior supports

Lumber-soft, S-P-F, No.1/No.2, 2x6 (1-1/2"x5-1/2")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Roof joist spaced at 24.0" c/c; Total length: 14.63'; Clear span(horz): 1.5', 6.438', 6.438'; Volume = 0.8 cu.ft.; Pitch: 1/12

Lateral support: top = continuous, bottom = at end supports; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

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By Devon.Murtha at 9:10 am, Feb 28, 2025

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 56	Fv' = 155	psi	fv/Fv' = 0.36
Bending(+)	fb = 409	Fb' = 1504	psi	fb/Fb' = 0.27
Bending(-)	fb = 704	Fb' = 953	psi	fb/Fb' = 0.74
Deflection:				
Interior Live	0.03 = < L/999	0.33 = L/240	in	0.09
Total	0.06 = < L/999	0.43 = L/180	in	0.14
Cantil. Live	-0.01 = < L/999	0.15 = L/120	in	0.09
Total	-0.04 = L/467	0.20 = L/90	in	0.19

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	135	1.15	1.00	1.00	-	-	-	-	1.00	1.00	3
Fb'+	875	1.15	1.00	1.00	1.000	1.300	-	1.15	1.00	1.00	3
Fb'-	875	1.15	1.00	1.00	0.633	1.300	-	1.15	1.00	1.00	3
Fcp'	425	-	1.00	1.00	-	-	-	-	1.00	1.00	-
E'	1.4 million		1.00	1.00	-	-	-	-	1.00	1.00	3
Emin'	0.51 million		1.00	1.00	-	-	-	-	1.00	1.00	3

CRITICAL LOAD COMBINATIONS:

```
Shear     : LC #3  = D + S
Bending(+): LC #3  = D + S
Bending(-): LC #3  = D + S
Deflection: LC #3  = D + S  (live)
            LC #3  = D + S  (total)
Bearing   : Support 1 - LC #3 = D + S
            Support 2 - LC #3 = D + S
            Support 3 - LC #3 = D + S
D=dead S=snow Lr=roof live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 352, V design = 309 lbs; M(+) = 258 lbs-ft; M(-) = 443 lbs-ft
  EIy = 29.12 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow…)
Total deflection = 1.5 dead + "live"
Bearing: Allowable bearing at an angle F'theta  calculated for each support
as per NDS 3.10.3
Lateral stability(-):  Lu = 13.06'  Le = 20.19'  RB = 24.3; Lu based on full span
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
4. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
5. SLOPED BEAMS: level bearing is required for all sloped beams.

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REVIEWED

By Devon.Murtha at 9:10 am, Feb 28, 2025

ASCE 7 - 16 WIND CALCULATION FOR: Roof 1

Project Address: 35 Columbia Ave
Takoma Park, MD 20912

DESIGN CRITERIA

Ultimate Wind Speed: 115 mph

Exposure Category: B

a: 3.2 ft

Velocity Pressure Exposure Coefficient, *Kz*: 0.61

Topographic Factor, *Kzt*: 1

Wind Directionality Factor, *Kd*: 0.85

Ground Elevation Factor, *Ke*: 1

Solar Array Pressure Equalization Factor, *ya*: 0.7 / 0.7

Array Edge Factor, γE: 1

Solar Array Dead Load: 3 psf

Mean Roof Height: 18 ft

Roof Pitch: 34°

Roof Type: Gable

Module Name, Dimensions, Area: LONGi LR5-54HABB-400M, 44.6in X 67.8in, 3023.88 sqin

CALCULATION

Velocity Pressure Due to Wind: $q_h = 0.00256(Kz)(Kzt)(Kd)(I)(V^2)$ $(Ch\ 26. Eq\ 26.10-1)$

Actual Uplift Pressure: $\mathrm{p} = 0.6D + 0.6W$ $(Ch\ 2.4.1\ LC\ \#7/a)$

Wind Uplift Pressure: $p = qh\ (GCp)(yE)(ya)$ $(Ch\ 29. Eq\ 29.4-7)$

Landscape Panels

Roof Zone	1	2e	2n	2r	3e	3r
Mount Spacing	44”	44”	44”	44”	44”	44”
External Pressure Coefficient (GCp)	-1.8	-1.8	-2	-1.8	-2.66	-2
Actual Uplift Pressure (p)	-11.68 psf	-11.68 psf	-13.14 psf	-11.68 psf	-17.99 psf	-13.14 psf
Tributary Area (AT)	6.81 sqft	6.81 sqft	6.81 sqft	6.81 sqft	6.81 sqft	6.81 sqft
Uplift Force (P)	-79.59 lbs	-79.59 lbs	-89.56 lbs	-79.59 lbs	-122.56 lbs	-89.56 lbs

Portrait Panels

Roof Zone	1	2e	2n	2r	3e	3r
Mount Spacing	44”	44”	44”	44”	44”	44”
External Pressure Coefficient (GCp)	-1.78	-1.78	-1.99	-1.78	-2.48	-1.99
Actual Uplift Pressure (p)	-11.48 psf	-11.48 psf	-12.96 psf	-11.48 psf	-16.52 psf	-12.96 psf
Tributary Area (AT)	10.36 sqft	10.36 sqft	10.36 sqft	10.36 sqft	10.36 sqft	10.36 sqft
Uplift Force (P)	-118.94 lbs	-118.94 lbs	-134.27 lbs	-118.94 lbs	-171.14 lbs	-134.27 lbs

Uplift Capacity

Attachment Type = 4 1/4" Lag Screw Deck Mount

Hardware Pullout Capacity = 260 lbs

Embedment Depth = 0.75 in

Safety Factor = 1.5

Duration Factor = 1.6

Maximum Uplift Force = 122.556 lbs / 171.138 lbs

Allowable Pullout Capacity = 260 lbs

Allowable Pullout Capacity = 260 lbs > Uplift Force per Bolt = 122.56 lbs, Therefore OK. (Landscape)

Allowable Pullout Capacity = 260 lbs > Uplift Force per Bolt = 171.14 lbs, Therefore OK. (Portrait)

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Historic Preservation Commission

EXACTUS ENERGY
NEW AGE ENGINEERING

REVIEWED
By Devon.Murtha at 9:10 am, Feb 28, 2025

ASCE 7 - 16 WIND CALCULATION FOR: Roof 2 & 3

Project Address: 35 Columbia Ave
Takoma Park, MD 20912

DESIGN CRITERIA

Ultimate Wind Speed: 115 mph

Exposure Category: B

a: 3.2 ft

Velocity Pressure Exposure Coefficient, *Kz*: 0.61

Topographic Factor, *Kzt*: 1

Wind Directionality Factor, *Kd*: 0.85

Ground Elevation Factor, *Ke*: 1

Solar Array Pressure Equalization Factor, *ya*: 0.63 / 0.59

Array Edge Factor, γE: 1

Solar Array Dead Load: 3 psf

Mean Roof Height: 18 ft

Roof Pitch: 6°

Roof Type: Flat / Low-Sloped

Module Name, Dimensions, Area: LONGi LR5-54HABB-400M, 44.6in X 67.8in, 3023.88 sqin

CALCULATION

Velocity Pressure Due to Wind: $q_h = 0.00256(Kz)(Kzt)(Kd)(I)(V^2)$ $(Ch\ 26. Eq\ 26.10 - 1)$

Actual Uplift Pressure: $\mathrm{p} = 0.6D + 0.6W$ $(Ch\ 2.4.1\ LC\ \#7/a)$

Wind Uplift Pressure: $p = qh\ (GCp)(yE\ )(ya\ )$ $(Ch\ 29. Eq\ 29.4 - 7)$

Portrait & Landscape Panels

Roof Zone	1	1'	2	3
External Pressure Coefficient (GCp)	-1.69	-0.9	-2.29	-3.18
Actual Uplift Pressure (p)	-9.44 psf	-4.18 psf	-13.4 psf	-19.3 psf
Tributary Area (AT)	10.5 sqft	10.5 sqft	10.5 sqft	10.5 sqft
Uplift Force (P)	-99.07 lbs	-43.93 lbs	-140.71 lbs	-202.65 lbs

Uplift Capacity

Attachment Type = Solar Stack Pedestal with ICP ADHESIVES POLYSET® AH-160

Hardware Pullout Capacity = 720.8 lbs (as per manufacturer's test Reports)

Safety Factor = 3

Maximum Uplift Force = 202.652 lbs

Allowable Pullout Capacity = Hardware Pullout Capacity / Safety Factor = 240.27 lbs

Allowable Pullout Capacity = 240.27 lbs > Uplift Force per Bolt = 202.65 lbs, Therefore OK.

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Historic Preservation Commission

EXACTUS ENERGY
NEW AGE ENGINEERING

REVIEWED
By Devon.Murtha at 9:10 am, Feb 28, 2025

232838), last calibrated 10/13/23. Attached to the load cell was a turnbuckle connected to an eye connector threaded onto a 1/2"-14 steel bolt with a 0.743" hex head x 0.310" thick. The head of the bolt was inserted into the top center channel of each unit, at mid-length. The test deck was parallel to the floor and load was applied vertically and perpendicular to the floor.

Uplift Test Procedure:
The loading and load measurement device was rigidly connected to the load transfer device and the uplift load was gradually applied. The loads were applied in 15 lbf increments, until failure. Each load increment was maintained for one (1) minute.

Failure:
Failure was defined as the inability to achieve or maintain the next load increment for one (1) minute due to delamination of the test specimen from the membrane. The last load maintained for 1 minute and observed mode of failure is reported as the Ultimate load and the mode of failure was recorded.

Uplift Test Results:

Unit #	Weight (lbf.)	Ultimate Load (lbf.)
1	1.667	925
2	1.784	270
3	1.780	730
4	1.775	460
5	1.777	925
6	1.623	1015
average	1.734	720.8

Average Ultimate Load – Average Tile Weight with 2:1 Margin of Safety= 720.8-1.734/2 = 359.5
359.5 lbf/ 0.28 ft^2 = 1,284 psf
Specimen #1: Max. load 926.8 lbf.- The head of the bolt pulled out of the channel of the test unit.
Specimen #2: Max. load 285.4 lbf.- The membrane delaminated from the plywood substrate.
Specimen #3: Max. load 742.5 lbf.- There was cohesive failure in the membrane and foam adhesive.
Specimen #4: Max. load 465.1 lbf.- The membrane delaminated from the plywood substrate.
Specimen #5: Max. load 935.1 lbf.- There was cohesive failure in the foam adhesive.
Specimen #6: Max. load 1121.4 lbf.- The head of the bolt pulled out of the channel of the test unit.

Disclaimer: This test report was prepared by American Test Lab of South Florida, (ATLSF), for the exclusive use of the above named client and does not constitute certification of this product. The results relate to the particular specimens tested and does not imply that the quality of similar or identical products manufactured or installed from specifications or shop drawings identical to the product tested. ATLSF is an independent testing laboratory and assumes that all information provided by the client is accurate and does not guarantee or warrant any product tested or installed.

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Historic Preservation Commission

REVIEWED
By Devon.Murtha at 9:10 am, Feb 28, 2025

SEISMIC CHECK

Breakdown of Loads		
Asphalt Shingles:	7	psf
Insulation:	1.5	psf
Plywood Sheathing:	1.5	psf
Rafters:	1	psf
Misc:	1	psf
Live load:	20	psf

Existing Roof Seismic Weight			
Element	Unit Weight (psf)	Area (Sq.ft)	Weight (lbs)
Roof DL	12	1782.00	21384
Exterior Walls	6	3049.20	18295.2
Interior Walls	6	3049.20	18295.2
Existing Seismic Weight @Roof Level, We =			57974.4

New PV System Seismic Weight			
Element	Unit Weight (psf)	Area (Sq.ft)	Weight (lbs)
Pv System	3	378.36	1135.08
Seismic Weight of New PV System, Wpv =			1135.08

% Increase in Lateral (Seismic) Weight @Roof Level Due to PV System Addition, %-increase = Wpv / We	1.96%	< 10% - Pass

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Montgomery County

Historic Preservation Commission

REVIEWED

By Devon.Murtha at 9:10 am, Feb 28, 2025

Solar Energy World
Because Tomorrow Matters

Project Roof Mounted Solar PV Installation Property Owner Inan Phillips

Address 35 Columbia Ave, Takoma Park, MD 20912

☑ I reviewed the design of the photovoltaic (PV) system, as designed by the manufacturer, and the design criteria utilized for the mounting equipment and panel mounting assembly (rack system) for the installation of (18) panels supported by the rack system, as shown on the drawings prepared for the above referenced address. I certify that the configurations and design criteria meet the standards and requirements of the International Residential Code (IRC) in COMCOR 08.00.02.

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

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

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

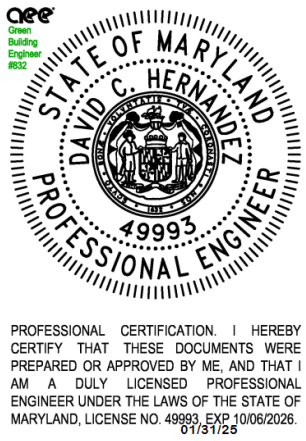
☑ I prepared or approved the construction documents for the mounting equipment, rack system, roof structure for this project.

Re-installations:
□ I certify that the reinstallation of the photovoltaic system (PV) as shown on the approved drawings for permit _____ (show original permit #) does not alter the approval under the permit or make the PV system, attachment to the building, and roof framing unsafe.

49993
Maryland PE License Number

Date 01/31/25

Seal



Signature David C. Hernandez, PE Digitally signed by David C. Hernandez, Date: 2025.01.31 11:48:56 -05:00

APPROVED
Montgomery County
Historic Preservation Commission

Updated 11/14/2024

REVIEWED
By Devon.Murtha at 9:10 am, Feb 28, 2025

SolarEnergyWorld
Because Tomorrow Matters

Property Owners Name: Property Built in 1928

Property Owners Address: -Install (18) roof mounted solar panels, 7.20 kW

Address of installation if different than owner's address:

I certify that:

- ☐ I prepared or approved the electrical drawings and related documents for the photovoltaic {PV) system at the above location.
- ☐ The design of the PV system, and all electrical Installations and equipment, meets the standards and requirements of the National Electrical Code as adopted by Montgomery County *in* COMCOR 17.02.01.
- ☐ I reviewed and completed the Worksheet for PV System, which was attached to the permit application for the PV system at the **above** location.

15732

State Master Electrician License Number

Date: 02/03/2025

Signature: Matt Kuss

APPROVED

Montgomery County

Historic Preservation Commission

Karen Burditt

REVIEWED

By Devon.Murtha at 9:10 am, Feb 28, 2025

City of Takoma Park

Housing and Community Development Department

Main Office 301-891-7119
Fax 301-270-4568
www.takomaparkmd.gov

7500 Maple Avenue
Takoma Park, MD 20912

MUNICIPALITY LETTER

February 03, 2025

To: Inan Phillips
35 Columbia Avenue, Takoma Park, MD 20912
inanph@aol.com 301-270-5504

To: Department of Permitting Services
2425 Reedie Drive, 7th floor
Wheaton, Maryland 20902

From: Planning and Development Services Division

THIS IS NOT A PERMIT – For Informational Purposes Only

VALID FOR ONE YEAR FROM DATE OF ISSUE

The property owner is responsible for obtaining all required permits from Montgomery County and the City of Takoma Park. If this property is in the **Takoma Park Historic District,** it is subject to Montgomery County Historic Preservation requirements.

Representative Name: Tina Crouse tcrouse@solarenergyworld.com 410-570-4157
Location of Project: 35 Columbia Avenue, Takoma Park, MD 20912
Proposed Scope of Work: Install (18) roof mounted solar panels, 7.20 kW

The purpose of this municipality letter is to inform you that the City of Takoma Park has regulations and city permit requirements that may apply to your project. This municipality letter serves as notification that, in addition to all Montgomery County requirements, you are required to comply with all City permitting requirements, including:

- Tre
- Sto
- City

Failure to c ı the issuance of a Stop Work Order and other administrat)etails of Takoma Park's permit requirements are attached on

The issuanc he proje rize the property owner to proceed wi iew and comment on project plans during the Montgome

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By Devon.Murtha at 9:10 am, Feb 28, 2025

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Karen Burditt

City Of Takoma P

The City of Takoma Park permits for the following issu

Tree Impact Assessment/Tree Protection Plan/Tree Removal Ap

Construction activities that occur within 50 feet of any urban forest t located on the project property or on an adjacent property, may requ Tree Protection Plan Permit. Make sure to submit a request for a Tree Impact Assessment and schedule a site visit with the City's Urban Forest Manager if any urban forest tree is in the vicinity of proposed construction activities. See the Tree Permits section of the City website for the specific conditions in which a Tree Impact Assessment is required. Depending on the Urban Forest Manager's conclusion following the Tree Impact Assessment, you may need to prepare a full Tree Protection Plan and apply for a Tree Protection Plan Permit as well. Separately, the removal of any urban forest tree will require a Tree Removal Permit application. The tree ordinance is detailed in the City Code, section 12.12. For permit information check: https://takomaparkmd.gov/services/permits/tree-permits. The City's Urban Forest Manager can be reached at 301-891-7612 or urbanforestmanager@takomaparkmd.gov.

Stormwater Management:

If you plan to develop or redevelop property, you may be required to provide appropriate stormwater management measures to control or manage runoff, as detailed in City Code section 16.04. All commercial or institutional development in the city must apply for a Stormwater Management Permit regardless of the size of the land disturbance. Additions or modifications to existing detached single-family residential properties do not require a Stormwater Management permit if the project does not disturb more than 5,000 square feet of land area. For more information visit: https://takomaparkmd.gov/government/public-works/stormwater-management-program/. The City Engineer should be contacted to determine if a City permit is required. The City Engineer can be reached at 301-891-7620.

City Right of Way:

- To place a **construction dumpster or storage container** temporarily on a City right of way (usually an adjacent road), you will need to obtain a permit. A permit is not required if the dumpster is placed in a privately-owned driveway or parking lot.
- If you plan to install a new **driveway apron**, or enlarge or replace an existing driveway apron, you need a Driveway Apron Permit.
- If you plan to construct a **fence** in the City right of way, you need to request a Fence Agreement. If approved, the Agreement will be recorded in the Land Records of Montgomery County.

For more information and applications for City permits, see: https://takomaparkmd.gov/services/permits/ or contact the Department of Public Works at 301-891-7633.

Failure to comply with the City's permitting requirements could result in the issuance of a Stop Work Order and other administrative actions within the provisions of the law.

eSigned via SeamlessDocs.com
Tina Crouse
Key: 38bf2056622713c0bf979ea7ee94776a

Tina Crouse 02-03-2025

eSigned via SeamlessDocs.com
Takoma Park Planning Division
Key: 19fe84f123e68a3ff457621905 9d5fbe

02-03-2025

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By Devon.Murtha at 9:10 am, Feb 28, 2025

DEPARTMENT OF PERMITTING SERVICES

Marc Elrich
County Executive

Rabbiah Sabbakhan
Director

HISTORIC AREA WORK PERMIT APPLICATION

Application Date: 2/3/2025

Application No: 1103977
AP Type: HISTORIC
Customer No: 1408761

Affidavit Acknowledgement

The Contractor is the Primary applicant authorized by the property owner
This application does not violate any covenants and deed restrictions

Primary Applicant Information

Address	35 COLUMBIA AVE TAKOMA PARK, MD 20912
Othercontact	Solar Energy World (Primary)

Historic Area Work Permit Details

Work Type	ALTER
Scope of Work	Install (18) roof mounted solar panels, 7.20 kW

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Karen Burditt

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By Devon.Murtha at 9:10 am, Feb 28, 2025

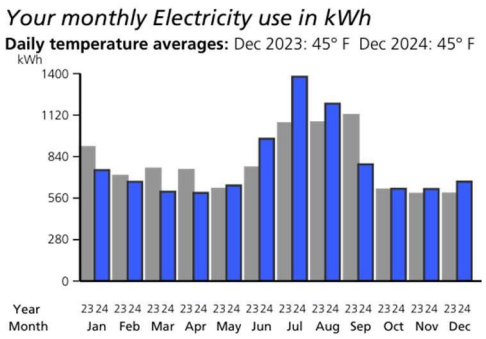
SolarEnergyWorld
Because Tomorrow Matters

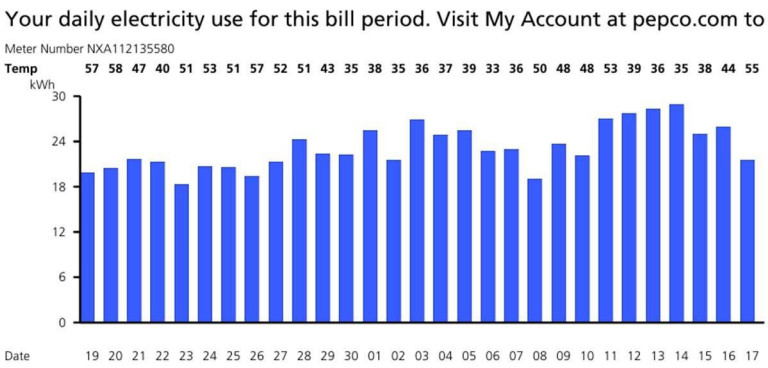
02/11/2025

To whom it may concern,

- Justification of panels on the front of the house and heat map.

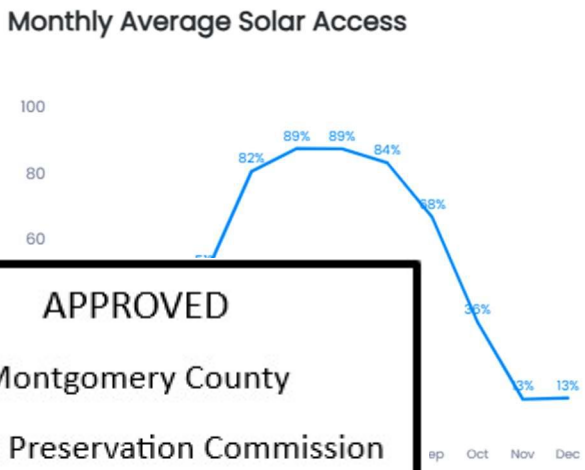
Monthly energy consumption for Address vs the proposed system monthly production

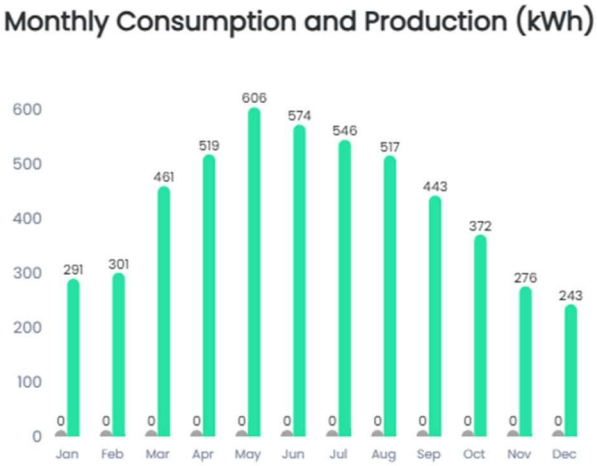




Segment	Modules	Size	Production	Per module	ASA	TSRF	Consumption	PV Offset	Area	Coverage	Perimeter
All total	18	7.2 kW	5,149 kWh	286 kWh	57.14%	49.32%	0 kWh	0%	1782 ft²	22.02%	162.6 (ft)

Nearest weather station: 724050, WASHINGTON DC REAGAN AP, VA (7.67 mi)





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- The home had an annual usage of roughly 671 kWh in 2024. Our proposed system is estimated to have 5,149 kWh in annual production.

  The panels will vary in production based on their location on the structure, but this estimated production for an **18**-panel system breaks down to roughly 286 kWh per panel annually.

  The panels on the front of the home have an average of 280 kWh per panel annually for a 15-panel array estimated to have 4,198 kWh in annual production. The panels on the back of the home have an average of 317 kWh per panel annually for a 3-panel array estimated to have 951 kWh in annual production.

Justification for the Placement of the panels.

- All usable space on the south-facing roof plane is being utilized in this design. The panels on the rear plane produce less than the panels on the front the system would only produce around 2,417 kWh annually. The front roof planes with panels will have lower visibility from the road as the view is significantly blocked by large trees in the front yard and the neighboring house

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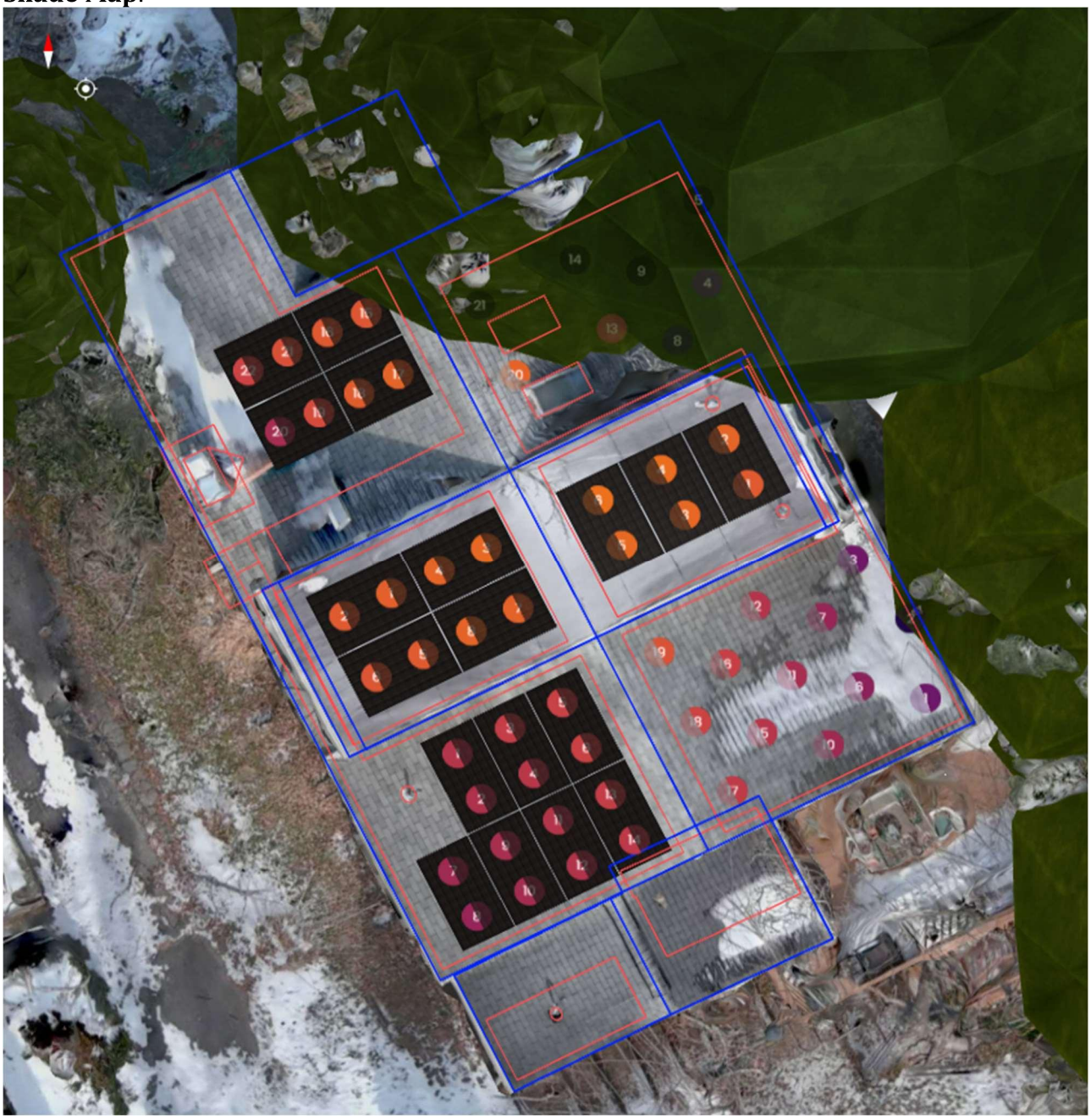
Shade Map.



Thank you,
Andrew Tam
Design Engineer.

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By Devon.Murtha at 9:10 am, Feb 28, 2025

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