



HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Robert Sutton
Chairman

Date: November 20, 2024

MEMORANDUM

TO: Rabbiah Sabbakhan
Department of Permitting Services

FROM: Laura DiPasquale
Historic Preservation Section
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit #1092096 – 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** by HPC staff:

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: Scott Greenberger; Tina Crouse (Agent)
Address: 7128 Willow Avenue, Takoma Park

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 Laura DiPasquale at 301-495-2167 or laura.dipasquale@montgomeryplanning.org to schedule a follow-up site visit.





HISTORIC PRESERVATION COMMISSION

HAWP #: _____ at: _____
submitted on: _____
has been reviewed and determined that the proposal fits into the following category/categories:

- Repair or replacement of a masonry foundation with new masonry materials that closely match the original in appearance;
Installation of vents or venting pipes in locations not visible from the public right-of-way;
New gutters and downspouts;
Removal of vinyl, aluminum, asbestos, or other artificial siding when the original siding is to be repaired and/or replaced in kind;
Removal of accessory buildings that are not original to the site or non-historic construction;
Repair or replacement of missing or deteriorated architectural details such as trim or other millwork, stairs or stoops, porch decking or ceilings, columns, railings, balusters, brackets shutters, etc., with new materials that match the old in design, texture, visual characteristics, and, where possible materials, so long as the applicant is able to provide one extant example, photographic evidence, or physical evidence that serves as the basis for the work proposed;
Construction of wooden decks that are at the rear of a structure and are not visible from a public right-of-way;
Roof replacement with -compatible roofing materials, or with architectural shingles replacing 3-Tab asphalt shingles;
Installation of storm windows or doors that are compatible with the historic resource or district;
Repair, replacement or installation of foundation-level doors, windows, window wells, and areaways, or foundation vents, venting pipes, or exterior grills that do not alter the character-defining features and/or the historic character of the resource;
Construction of fences that are compatible with the historic site or district in material, height, location, and design;
Fence is lower than 48" in front of rear wall plane;

- Construction of walkways, parking pads, patios, driveways, or other paved areas that are not visible from a public right-of-way and measure no more than 150 square feet in size;
Replacement of existing walkways, parking pads, patios, driveways, or other paved areas with materials that are compatible with the visual character of the historic site and district and that are no greater than the dimensions of the existing hardscape;
Construction of small accessory buildings no larger than 250 square feet in size that are not visible from the public right-of-way;
Installations of skylights on the rear of a structure that will not be visible from the public right-of-way, and would not remove or alter character-defining roof materials;
Installation of solar panels and arrays in locations that are not readily visible from the public right-of-way or that are designed so as to have a minimal impact on the historic resource or the historic district (e.g., systems that are ground-mounted in areas other than the front or side yard of a corner lot, located on accessory or outbuildings, on non-historic additions, or on rear facing roof planes);
Installation of car charging stations in any location on a property or in the right-of-way;
Installation of satellite dishes;
Removal of trees greater than 6" in diameter (d.b.h.) that are dead, dying, or present an immediate hazard.
Removal of trees greater than 6" in diameter (d.b.h.) in the rear of the property that will not impact the overall tree canopy of the surrounding district or historic site;
Replacement tree required as a condition; and,
Other minor alterations that may be required by the Department of Permitting Services post-Commission approval that would have no material effect on the historic character of the property.

Staff finds the proposal complies with Chapter 24A, the Secretary of the Interior's Standards for Rehabilitation, and any additional requisite guidance. Under the authority of COMCOR No. 24A.04.01, this HAWP is approved by Laura DiPaquale on _____. The approval memo and stamped drawings follow.



APPLICATION FOR HISTORIC AREA WORK PERMIT
HISTORIC PRESERVATION COMMISSION
301.563.3400

FOR STAFF ONLY:
HAWP#
DATE ASSIGNED

APPLICANT:

Name:
Address:
Daytime Phone:
E-mail:
City:
Zip:
Tax Account No.:

AGENT/CONTACT (if applicable):

Name:
Address:
Daytime Phone:
E-mail:
City:
Zip:
Contractor Registration No.:

LOCATION OF BUILDING/PREMISE: MIHP # of Historic Property

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

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

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

Building Number: Street:

Town/City: Nearest Cross Street:

Lot: Block: Subdivision: Parcel:

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

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

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

Signature of owner or authorized agent

Date

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

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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED

Montgomery County

Historic Preservation Commission



Robert H. Potter



Utility Meter after Install

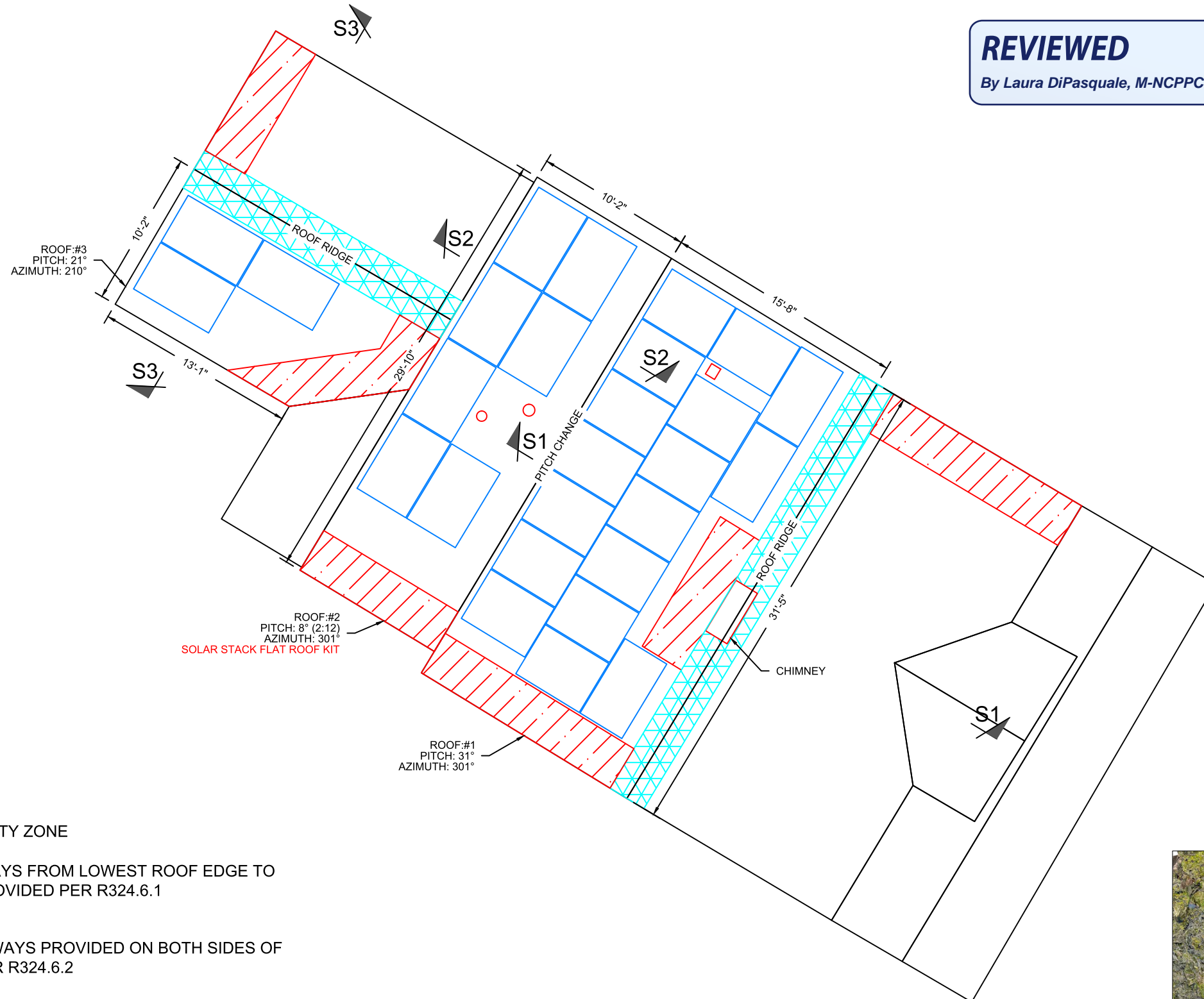
REVIEWED
By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission
Ronald G. Adams



REVIEWED
By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission
[Signature]



- 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: 2233 SQFT
SOLAR ARRAY AREA: 567.00 SQFT
THE SOLAR ARRAY IS 25.4% OF THE PLAN VIEW TOTAL ROOF AREA

- NOTES:**
- THE SYSTEM SHALL INCLUDE (27) HANWHA Q.TRON BLK M-G2+ 425W.
 - SNAPNRACK TOPSPEED WILL BE INSTALLED IN ACCORDANCE WITH SNAPNRACK INSTALLATION MANUAL ON R1 & R3.
 - SOLAR STACK MOUNT KIT WILL BE INSTALLED IN ACCORDANCE WITH SOLAR STACK INSTALLATION MANUAL ON R2.
 - REFER TO STRUCTURAL DRAWING FOR SECTIONS MARKED AND ADDITIONAL NOTES.

SOLAR PANEL LAYOUT
Scale: 1/8" = 1'-0"

Solar Energy World
Because Tomorrow Matters

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

Disclaimer:
This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

Building Code	
International Residential Code (IRC) 2018	
Electrical Code	
National Electrical Code (NEC) 2017	
Wind Speed	Snow Load
115 MPH	30 PSF
Modules	
(27) HANWHA Q.TRON BLK M-G2+ 425W	
Inverter(s)	
(27) IQ8MC-72-M-US	
DC System Size	AC System Size
11.475 kW	8.640 kW
Customer Information	
Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912	
Payment Order	
Dividend	
Utility	Utility
Montgomery County	Peppo
Sheet Name	
Solar Panel Layout	
Drawn By	Date
AMP	October 30, 2024
Scale	Job Number
AS NOTED	MD21991
Sheet	
A-1	

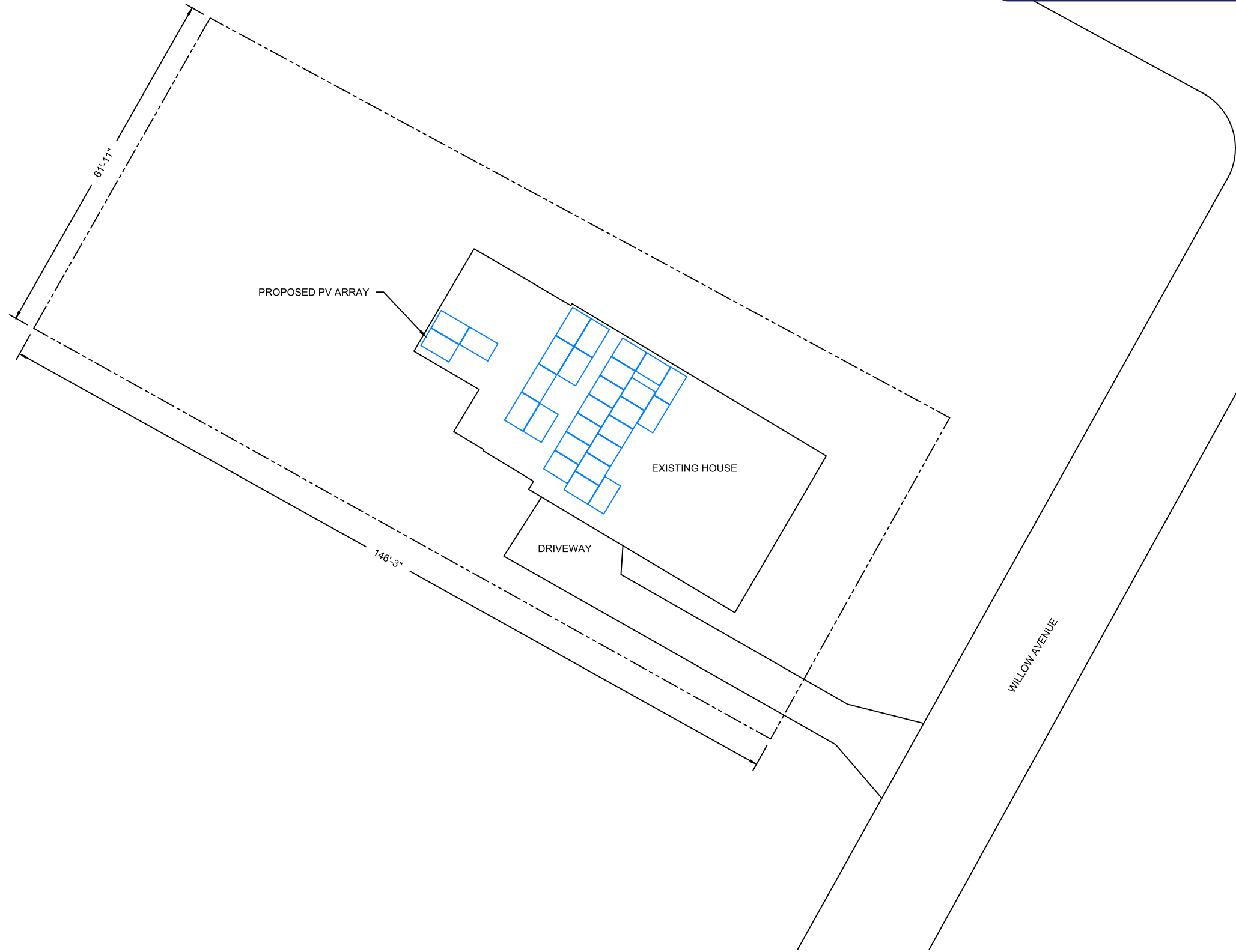


David C. Hernandez
 Digitally signed by David C. Hernandez
 Date: 2024.10.31 18:26:09 -04:00




REVIEWED
 By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission

SITE PLAN
 Scale: 1" = 20'-0"



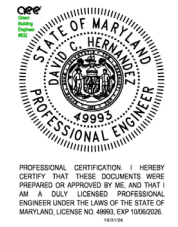
Solar Energy World
 Because Tomorrow Matters

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

Disclaimer:
 This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

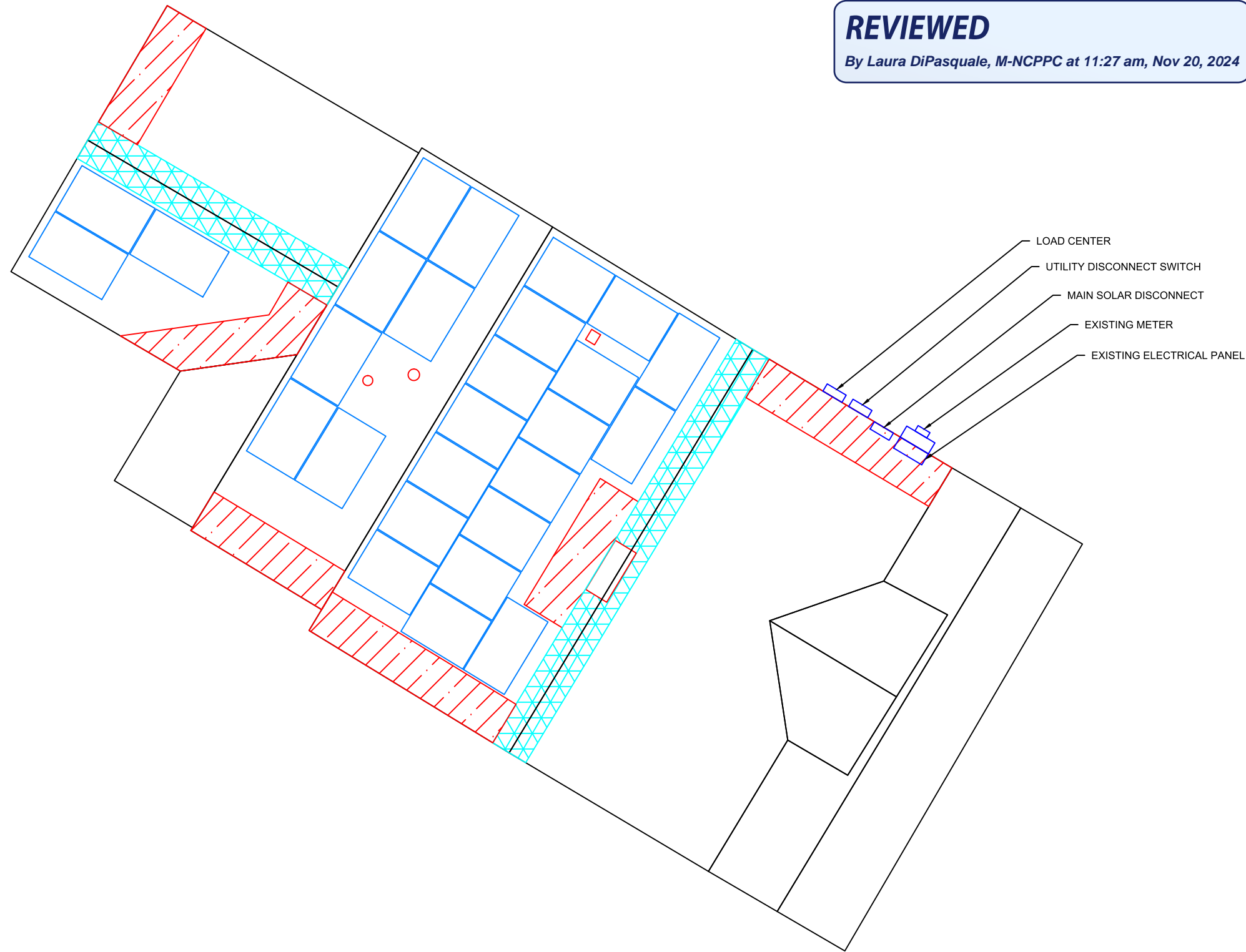
Building Code	
International Residential Code (IRC) 2018	
Electrical Code	
National Electrical Code (NEC) 2017	
Wind Speed	Snow Load
115 MPH	30 PSF
Modules	
(27) HANWHA Q.TRON BLK M-G2+ 425W	
Inverter(s)	
(27) IQ8MC-72-M-US	
DC System Size	AC System Size
11.475 kW	8.640 kW
Customer Information	
Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912	
Payment Order	
Dividend	
City	Utility
Montgomery County	Pepco
Sheet Name	
Site Plan	
Drawn By	Date
AMP	October 30, 2024
Scale	Job Number
AS NOTED	MD21991
Sheet	
A-2	

David C. Hernande
 Digitally signed by David C. Hernande
 Date: 2024.10.31 18:26:09 -04:00




REVIEWED
 By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



EQUIPMENT LOCATION PLAN
 Scale: NTS

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



Solar Energy World
 Because Tomorrow Matters

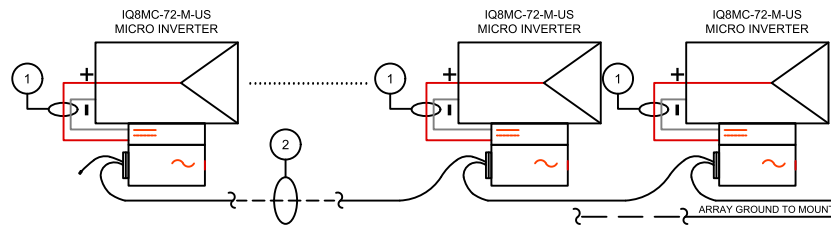
Solar Energy World LLC.
 14880 Sweitzer Lane
 Laurel, MD 20707
 (888) 497-3233

Disclaimer:
 This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

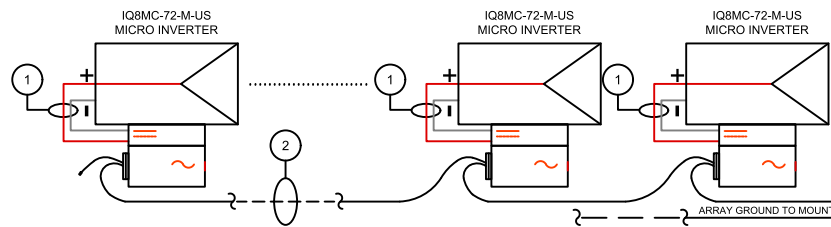
Building Code	
International Residential Code (IRC) 2018	
Electrical Code	
National Electrical Code (NEC) 2017	
Wind Speed	Snow Load
115 MPH	30 PSF
Modules	
(27) HANWHA Q.TRON BLK M-G2+ 425W	
Inverter(s)	
(27) IQ8MC-72-M-US	
DC System Size	AC System Size
11.475 kW	8.640 kW
Customer Information	
Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912	
Payment Order	
Dividend	
City	Utility
Montgomery County	Pepco
Sheet Name	
Equipment Location Plan	
Drawn By	Date
AMP	October 30, 2024
Scale	Job Number
AS NOTED	MD21991
Sheet	
E-1	

SMART INVERTERS

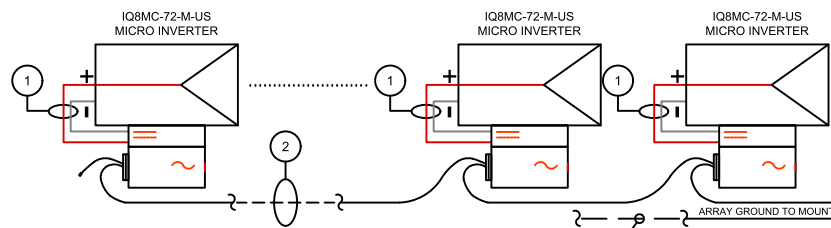
1 STRING OF 9 MODULES



1 STRING OF 9 MODULES

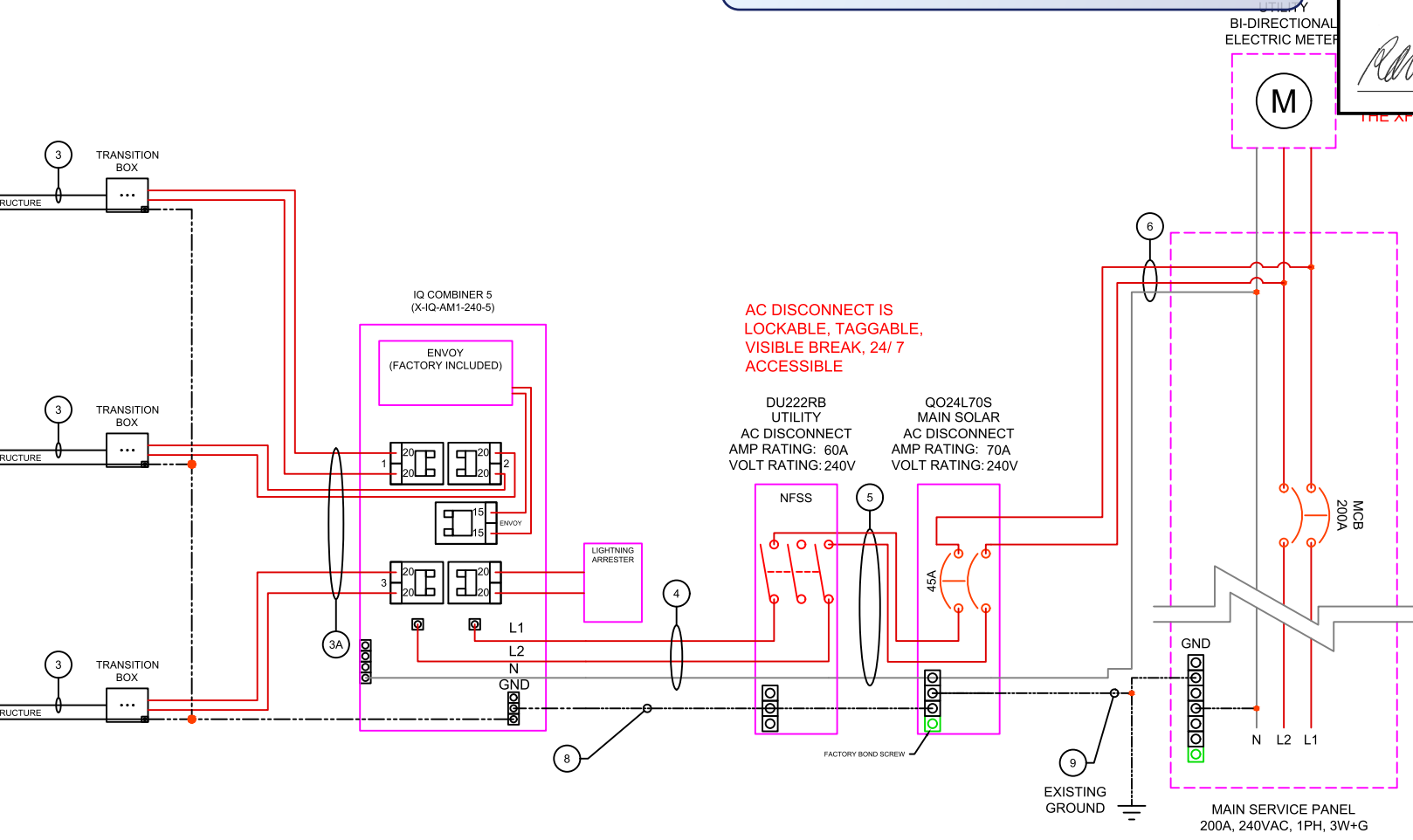


1 STRING OF 9 MODULES



REVIEWED
By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission
[Signature]



AC DISCONNECT IS LOCKABLE, TAGGABLE, VISIBLE BREAK, 24/7 ACCESSIBLE

DU222RB UTILITY AC DISCONNECT AMP RATING: 60A VOLT RATING: 240V
QO24L70S MAIN SOLAR AC DISCONNECT AMP RATING: 70A VOLT RATING: 240V

BI-DIRECTIONAL ELECTRIC METER

M

THE X MARK FEEDING IT

MAIN SERVICE PANEL 200A, 240VAC, 1PH, 3W+G

MODULE SPECIFICATIONS	
MODEL NUMBER	QTRON BLK M-G2+ 425W
PEAK POWER	425 W
RATED VOLTAGE (V _{mpp})	32.74 V
RATED CURRENT (I _{mp})	12.98 A
OPEN CIRCUIT VOLTAGE (V _{oc})	39.03 V
SHORT CIRCUIT CURRENT (I _{sc})	13.66 A
MAXIMUM SYSTEM VOLTAGE	1000VDC
INVERTER SPECIFICATIONS	
MODEL NUMBER	IQ8MC-72-M-US
MAXIMUM DC VOLTAGE	60 V
MAXIMUM POWER OUTPUT	320 W
NOMINAL AC VOLTAGE	240 VAC
MAXIMUM AC CURRENT	1.33 A
CEC EFFICIENCY	97.0%
ARRAY DETAILS	
NO. OF MODULES PER STRING	9
NO. OF STRINGS	1
ARRAY WATTS AT STC	3825

3-LINE DIAGRAM

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

GENERAL ELECTRIC NOTES: NEC2017

- EQUIPMENT USED SHALL BE NEW, UNLESS OTHERWISE NOTED.
 - EQUIPMENT USED SHALL BE UL LISTED, UNLESS OTHERWISE NOTED.
 - EQUIPMENT SHALL BE INSTALLED PROVIDING ADEQUATE PHYSICAL WORKING SPACE AROUND THE EQUIPMENT AND SHALL COMPLY WITH NEC.
 - COPPER CONDUCTORS SHALL BE USED AND SHALL HAVE AN INSULATION RATING OF 600V, 90°C, UNLESS OTHERWISE NOTED.
 - CONDUCTORS SHALL BE SIZED IN ACCORDANCE TO THE NEC. CONDUCTORS AMPACITY SHALL BE DE-RATED FOR TEMPERATURE INCREASE, CONDUIT FILL AND VOLTAGE DROP.
 - ALL CONDUCTORS, EXCEPT PV WIRE SHALL BE INSTALLED IN APPROVED CONDUITS OR RACEWAY. CONDUITS SHALL BE ADEQUATELY SUPPORTED AS PER NEC.
 - AC DISCONNECT SHOWN IS REQUIRED IF THE UTILITY REQUIRES VISIBLE-BLADE SWITCH.
 - EXPOSED NON-CURRENT CARRYING METAL PARTS SHALL BE GROUNDED AS PER NEC.
 - LINE SIDE INTER-CONNECTION SHALL COMPLY WITH NEC.
 - SMS MONITORING SYSTEM AND IT'S CONNECTION SHOWN IS OPTIONAL. IF USED, REFER TO SMS INSTALLATION MANUAL FOR WIRING METHODS AND OPERATION PROCEDURE.
 - ASHRAE FUNDAMENTAL OUTDOOR DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE U.S. (PHOENIX, AZ OR PALM SPRINGS, CA)
 - FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF MOUNTED SUNLIGHT CONDUIT USING THE OUTDOOR TEMPERATURE OF 47°C
 - 10AWG CONDUCTOR ARE GENERALLY ACCEPTABLE FOR MODULES WITH AN I_{sc} OF 9.6 AMPS WITH A 15 AMP FUSE.
- WIRE SIZING FOR OCPD
EX (I_{sc} * (1.25)(1.25)) / (# OF STRINGS IN PARALLEL) = WIRE AMPACITY OR USING NEC TABLE 690.8

Solar Energy World
Because Tomorrow Matters

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

Disclaimer:
This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

Building Code: International Residential Code (IRC) 2018
Electrical Code: National Electrical Code (NEC) 2017

Wind Speed: 115 MPH	Snow Load: 30 PSF
---------------------	-------------------

Modules: (27) HANWHA Q.TRON BLK M-G2+ 425W
Inverter(s): (27) IQ8MC-72-M-US

DC System Size: 11.475 kW	AC System Size: 8.640 kW
---------------------------	--------------------------

Customer Information:
Scott Greenberger
7128 Willow Ave
Takoma Park, MD 20912

Permit/Order: Dividend

City: Montgomery County	Utility: Pepco
-------------------------	----------------

Sheet Name: Electrical 3-Line Diagram

Drawn By: AMP	Date: October 30, 2024
---------------	------------------------

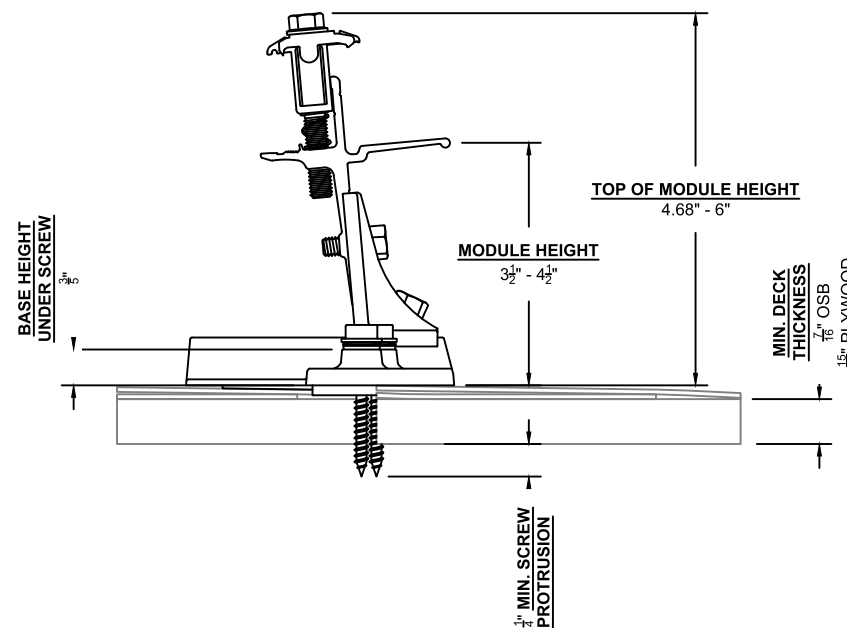
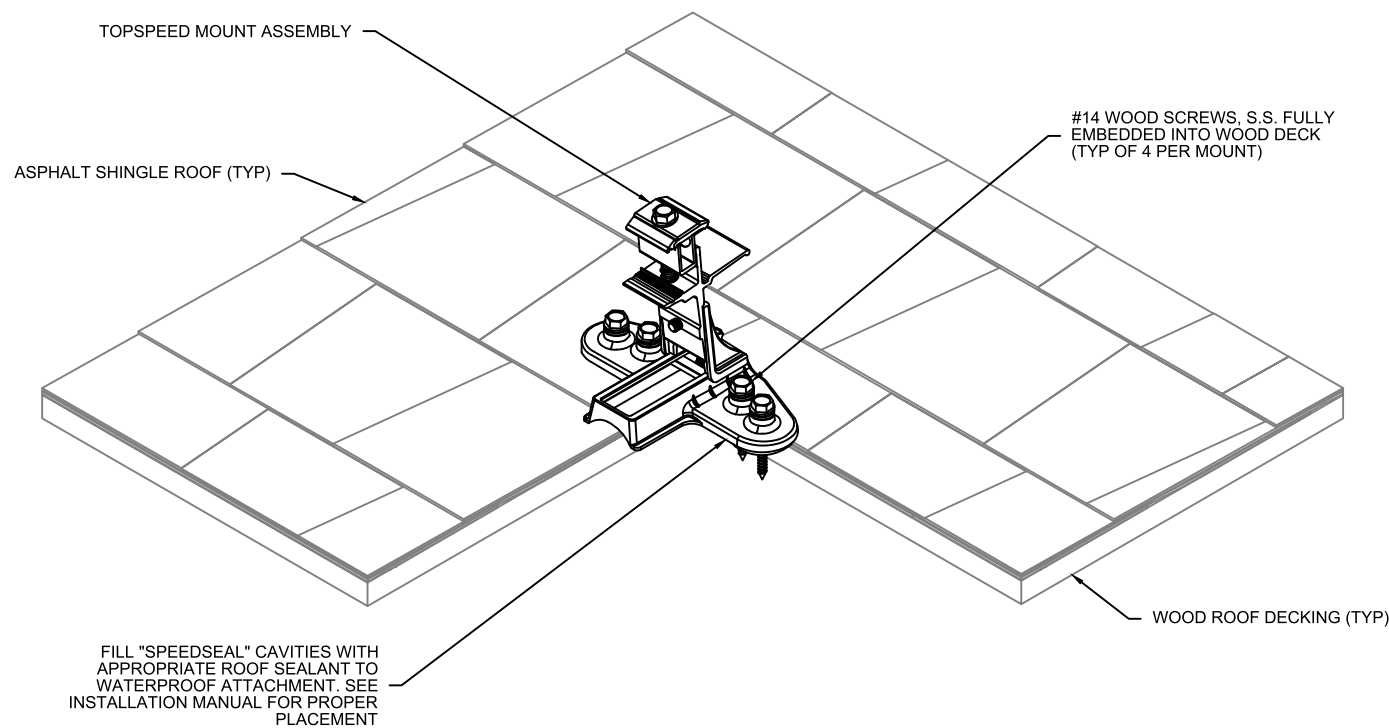
Scale: AS NOTED	Job Number: MD21991	Sheet: E-2
-----------------	---------------------	------------

David C. Hernande
 Digitally signed by David C. Hernande
 Date: 2024.10.31 18:26:09 -04:00



REVIEWED
 By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission





Structural Details		
S1	Rafter	2x6 O.C. 24"
S3	Rafter	2x8 O.C. 16"

NOTES:

- 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.
- LOAD CRITERIA PER :
 - EXPOSURE CATEGORY "B"
 - GROUND SNOW LOAD, $P_g = 30$ PSF
 - LATERAL LOAD RISK CATEGORY "II"
 - ULTIMATE DESIGN WIND SPEED = 115 MPH
- SOLAR PANELS AND RACKING SYSTEMS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
- FOLLOW ALL LOCAL AND FEDERAL SAFETY REQUIREMENTS.

STRUCTURAL ATTACHMENT DETAIL



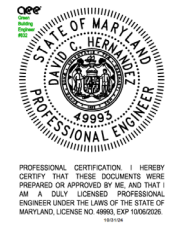
Solar Energy World
 Because Tomorrow Matters

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

Disclaimer:
 This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

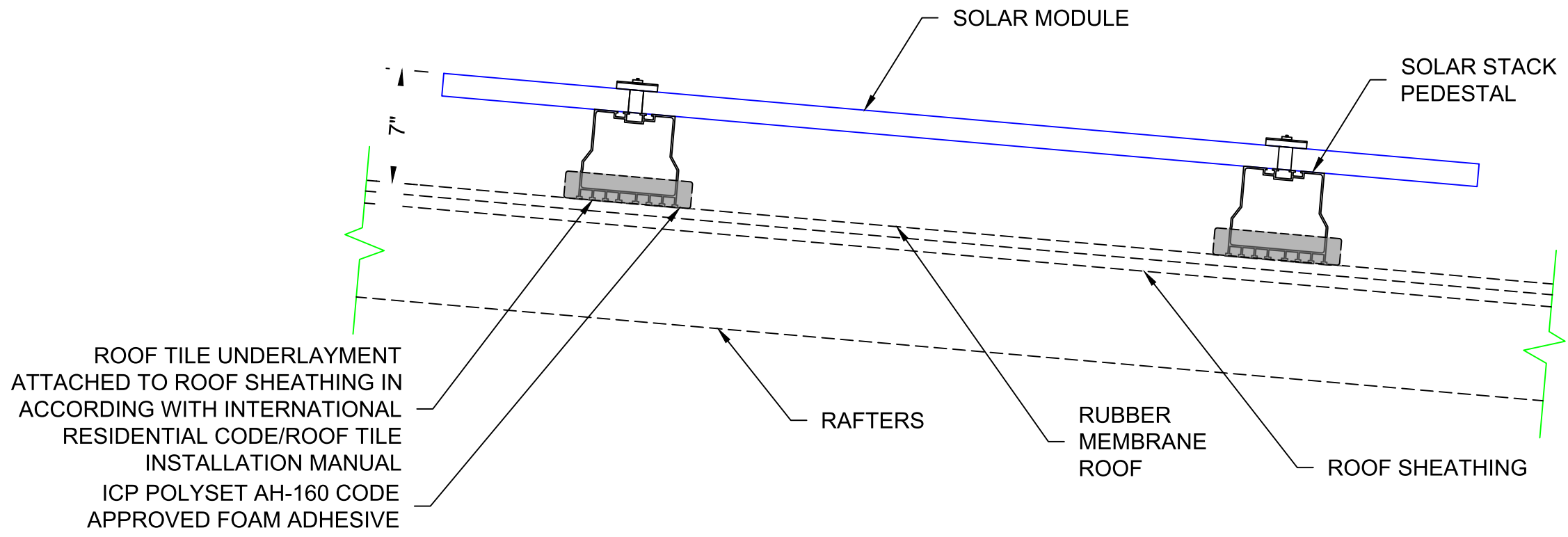
Building Code International Residential Code (IRC) 2018	
Electrical Code National Electrical Code (NEC) 2017	
Wind Speed 115 MPH	Snow Load 30 PSF
Modules (27) HANWHA Q.TRON BLK M-G2+ 425W	
Inverter(s) (27) IQ8MC-72-M-US	
DC System Size 11.475 kW	AC System Size 8.640 kW
Customer Information Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912	
Payment under Dividend	
Utility Montgomery County	Utility Peppo
Sheet Name Structural Attachment Details	
Drawn By AMP	Date October 30, 2024
Scale AS NOTED	Job Number MD21991
Sheet S-1	

David C. Hernande
 Digitally signed by David C. Hernande
 Date: 2024.10.31 23:59:06 -04:00



REVIEWED
 By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



Structural Details		
S2	Rafter	2x4 O.C. 24"
with 2x8 sister rafters		

- NOTES:**
- 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.
 - LOAD CRITERIA PER :
 - EXPOSURE CATEGORY "B"
 - GROUND SNOW LOAD, $P_g = 30$ PSF
 - LATERAL LOAD RISK CATEGORY "II"
 - ULTIMATE DESIGN WIND SPEED = 115 MPH
 - SOLAR PANELS AND RACKING SYSTEMS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.
 - FOLLOW ALL LOCAL AND FEDERAL SAFETY REQUIREMENTS.

STRUCTURAL ATTACHMENT DETAIL

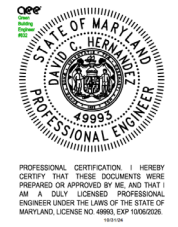
Solar Energy World
 Because Tomorrow Matters

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

Disclaimer:
 This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

Building Code		International Residential Code (IRC) 2018
Electrical Code		National Electrical Code (NEC) 2017
Wind Speed	Snow Load	
115 MPH	30 PSF	
Modules		(27) HANWHA Q.TRON BLK M-G2+ 425W
Inverter(s)		(27) IQ8MC-72-M-US
DC System Size	AC System Size	
11.475 kW	8.640 kW	
Customer Information		
Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912		
Payment/Order		
Dividend		
City	Utility	
Montgomery County	Peppo	
Sheet Name		
Structural Attachment Details		
Drawn By	Date	
AMP	October 30, 2024	
Scale	Job Number	Sheet
AS NOTED	MD21991	S-2

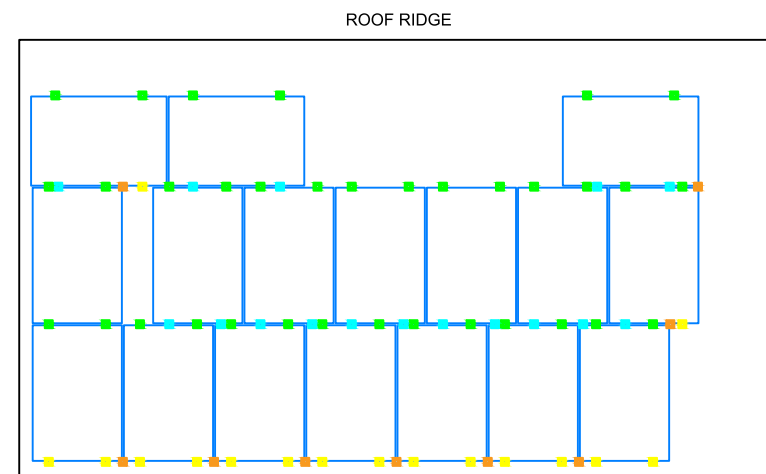
David C. Hernandez
 Digitally signed by David C. Hernandez
 Date: 2024.10.31 18:26:09 -04:00



REVIEWED

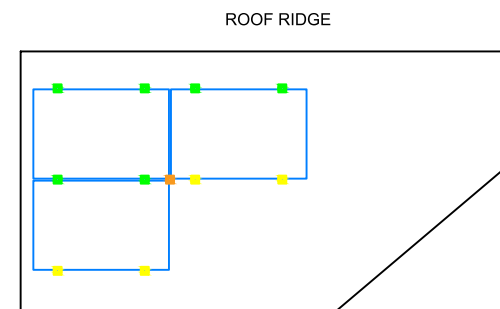
By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



SOLAR PANEL FOOTING PLAN R1

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



SOLAR PANEL FOOTING PLAN R3


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

KEY

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

NOTES:

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



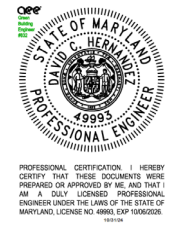
Solar Energy World
 Because Tomorrow Matters

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

Disclaimer:
 This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

Building Code	
International Residential Code (IRC) 2018	
Electrical Code	
National Electrical Code (NEC) 2017	
Wind Speed	Snow Load
115 MPH	30 PSF
Modules	
(27) HANWHA Q.TRON BLK M-G2+ 425W	
Inverter(s)	
(27) IQ8MC-72-M-US	
DC System Size	AC System Size
11.475 kW	8.640 kW
Customer Information	
Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912	
Payment Under	
Dividend	
Utility	Utility
Montgomery County	Pepco
Sheet Name	
Solar Panel Footing Plan	
Drawn By	Date
AMP	October 30, 2024
Scale	Job Number
AS NOTED	MD21991
Sheet	
S-3	

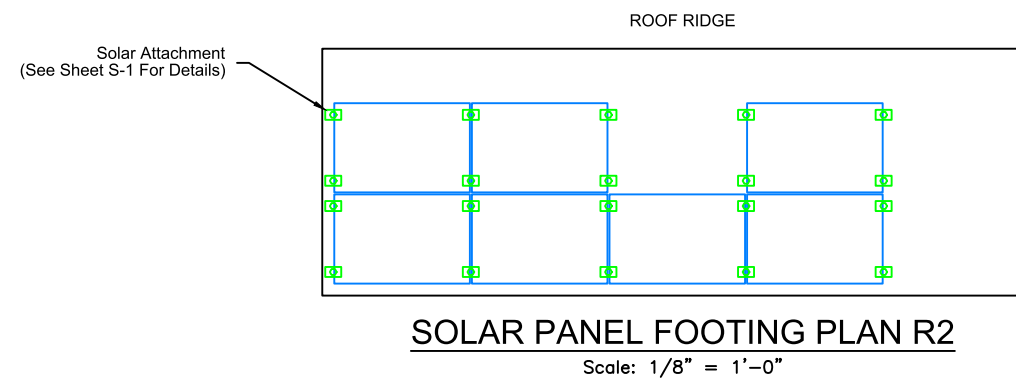
David C. Hernandez
 Digitally signed by David C. Hernandez
 Date: 2024.10.31 18:26:09 -04:00



REVIEWED


By Laura DiPasquale, M-NCPPC at 11:27 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



NOTES:

1. SOLAR STACK SHALL BE INSTALLED IN ACCORDANCE WITH SOLAR STACK INSTALLATION MANUAL.
2. SOLAR STACK SHALL BE SPACED AT A MAXIMUM OF 4' O/C.
3. MAX OVERHANG (CANTILEVER) OF MODULES SHALL NOT EXCEED 12".



Solar Energy World
 Because Tomorrow Matters

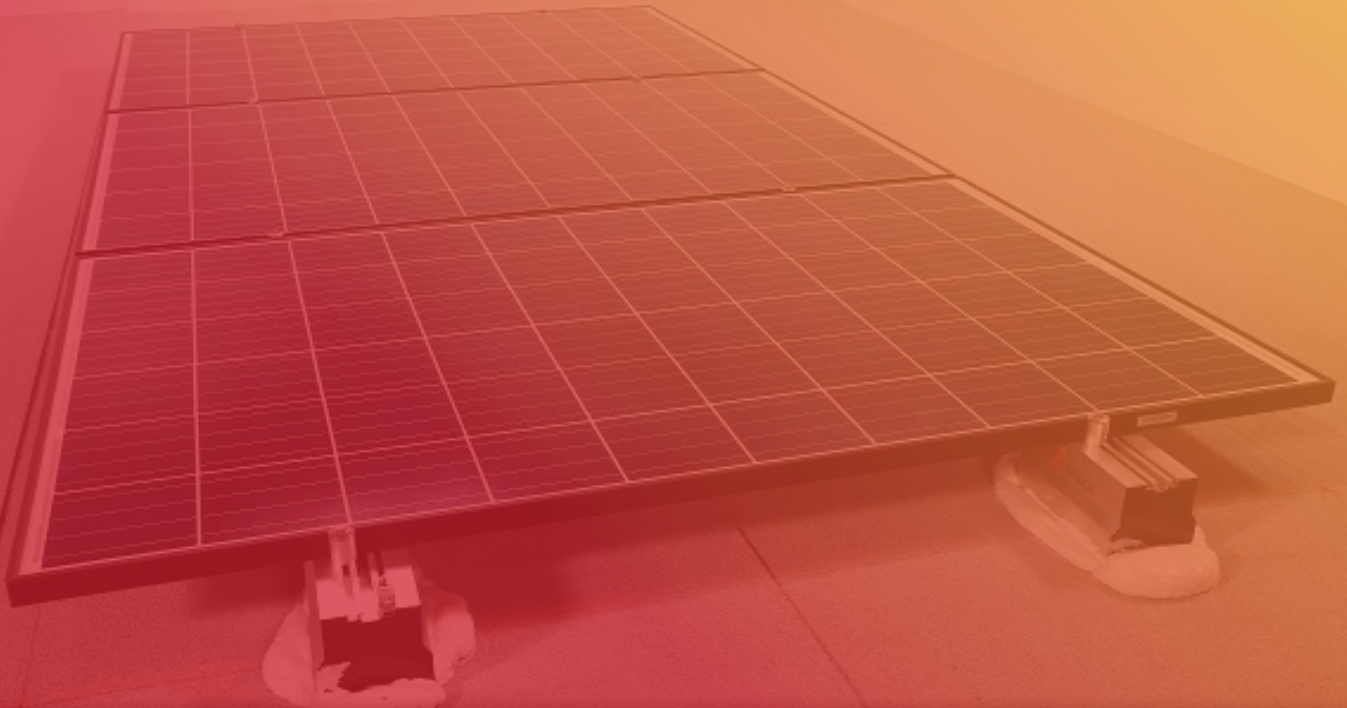
Solar Energy World LLC.
 14880 Sweitzer Lane
 Laurel, MD 20707
 (888) 497-3233

Disclaimer:
 This drawing is the property of Solar Energy World Inc. The information herein contained shall be used for the sole benefit of Solar Energy World. It shall not be disclosed to others outside the recipient's organization, in whole or in part, without the written permission of Solar Energy World, except in connection with the sale and use of the respective Solar Energy equipment.

Building Code International Residential Code (IRC) 2018	
Electrical Code National Electrical Code (NEC) 2017	
Wind Speed 115 MPH	Snow Load 30 PSF
Modules (27) HANWHA Q.TRON BLK M-G2+ 425W	
Inverter(s) (27) IQ8MC-72-M-US	
DC System Size 11.475 kW	AC System Size 8.640 kW
Customer Information Scott Greenberger 7128 Willow Ave Takoma Park, MD 20912	
Payment Under Dividend	
AHJ Montgomery County	Utility Pepco
Sheet Name Solar Panel Footing Plan	
Drawn By AMP	Date October 30, 2024
Scale AS NOTED	Job Number MD21991
Sheet S-4	



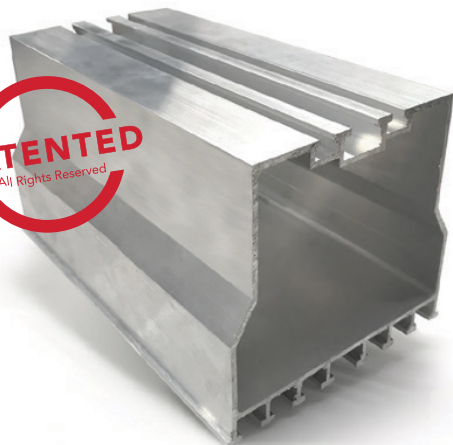
SOLAR STACK



INSTALLATION MANUAL v.1

SOLAR STACK MOUNTING SYSTEM FOR FLAT ROOFS

PATENTED
All Rights Reserved



ZERO PENETRATION

SOLAR MOUNTING PEDESTAL

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

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

INNOVATIVE

PRODUCTS FOR BUILDING & SOLAR



TABLE OF CONTENTS

INSTALLATION INSTRUCTIONS

1. BEFORE YOU START	3
2. IMPORTANT NOTES	4
3. SOLAR STACK'S COMPONENTS	5
4. PREPARATION OF THE ROOF	7
5. ARRAY LAYOUT	8
6. INSTALLING SOLAR STACK PEDESTALS	9
7. INSTALLING THE MODULES	12
8. INSTALLING THE MODULE CLAMPS	14
9. GROUNDING	16
10. MODULE COMPATIBILITY	18

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission



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 terms and conditions.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



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 bonding as the fault current ground path: PV module, Mid Clamp, End Clamp, Pedestal and Ground Lugs.
- Solar Stack pedestals can be installed on BUR (Build Up Roofing), Mineral surface (Modified Bitumen), EPDM, PVC, TPO, Hypalon and Concrete roofs.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission

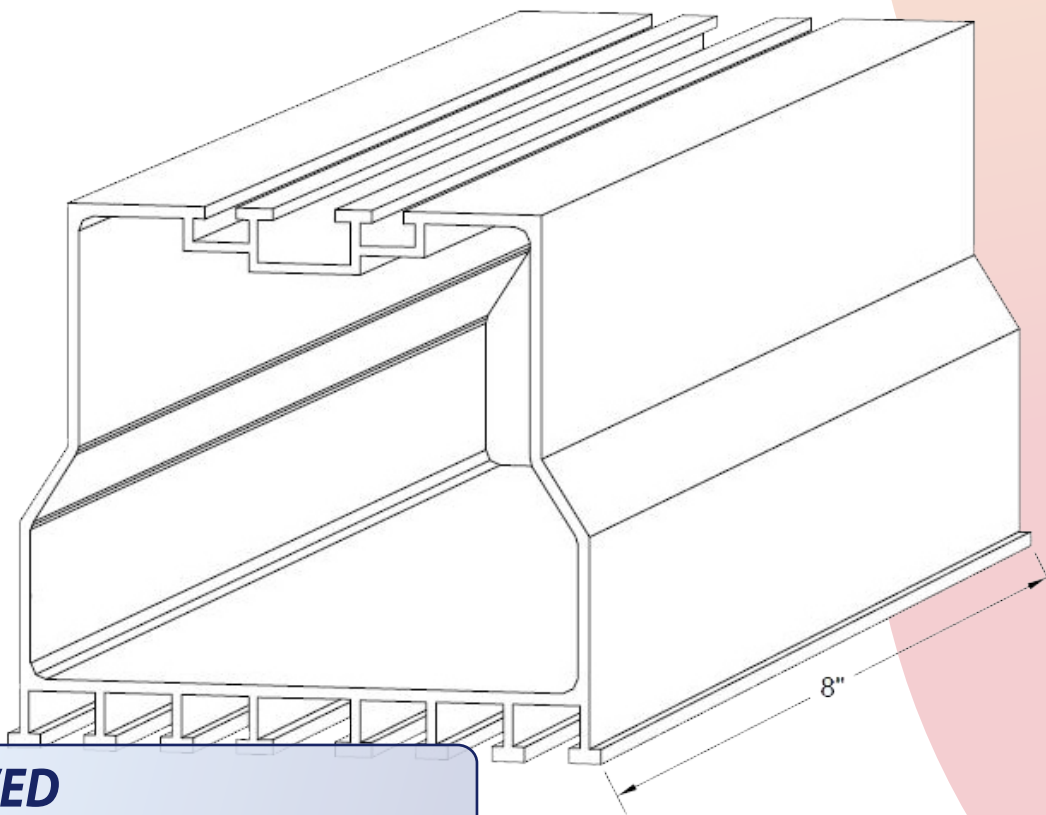


SOLAR STACK'S COMPONENTS

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.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024



SOLAR STACK'S COMPONENTS

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

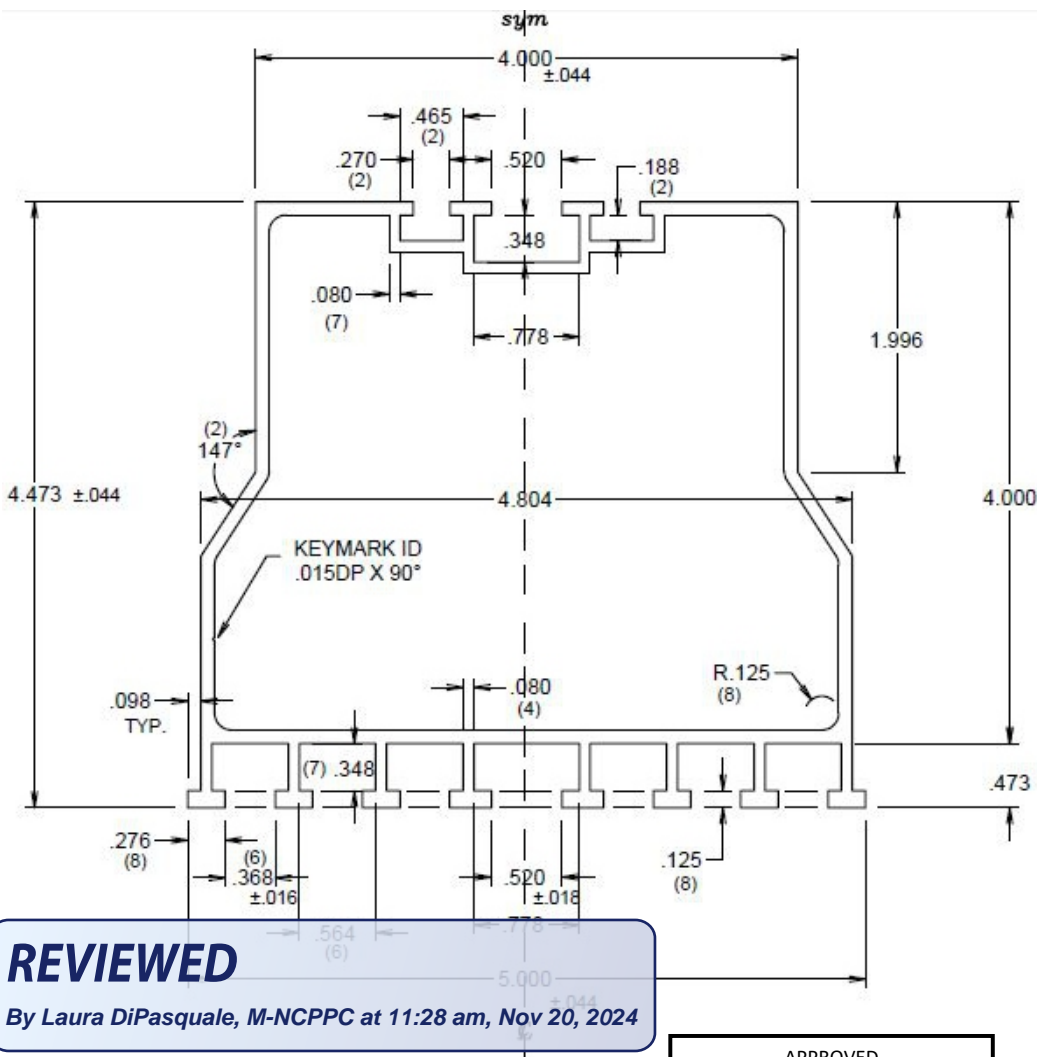
8 in. "SOLAR STACK " or "DOUBLE DOWN " Solar Pedestal

Overall Product Dimensions:

Length: 8.00 in.

Width: 5.00 in.

Height: 4.75 in.



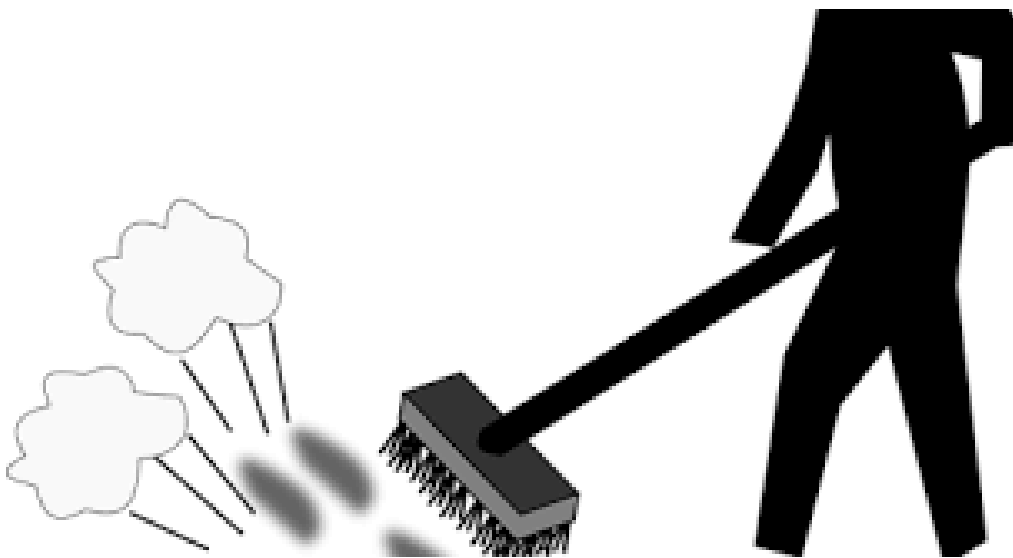
REVIEWED
 By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission

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.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



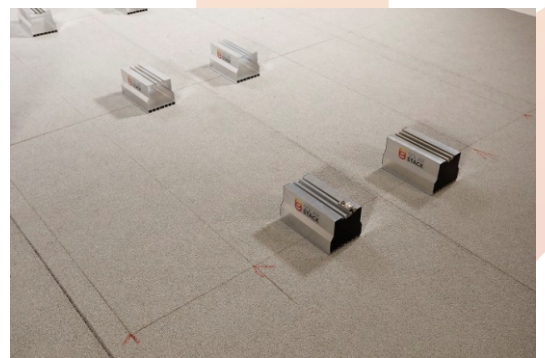
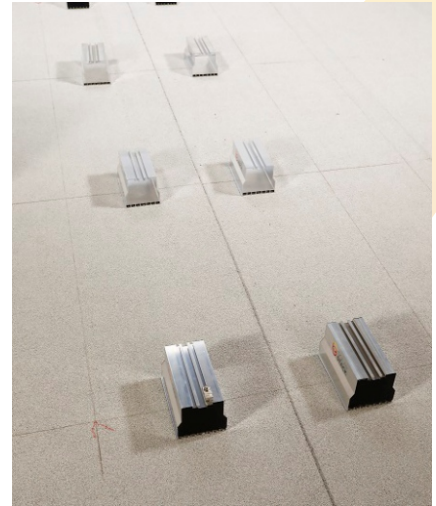
ARRAY LAYOUT

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.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



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 found 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)

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

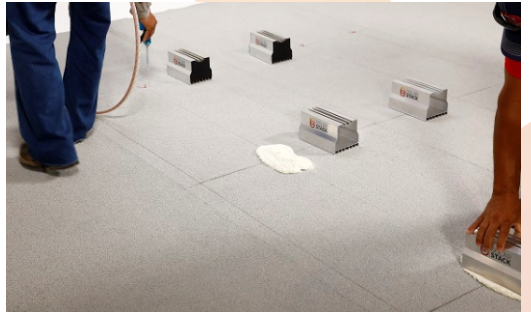
APPROVED
 Montgomery County
 Historic Preservation Commission



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.)



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



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 protected from UV exposure. This can be accomplished by coating with an exterior grade outdoor acrylic paint/coating or covering the foam adhesive with another method.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission

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.



REVIEWED

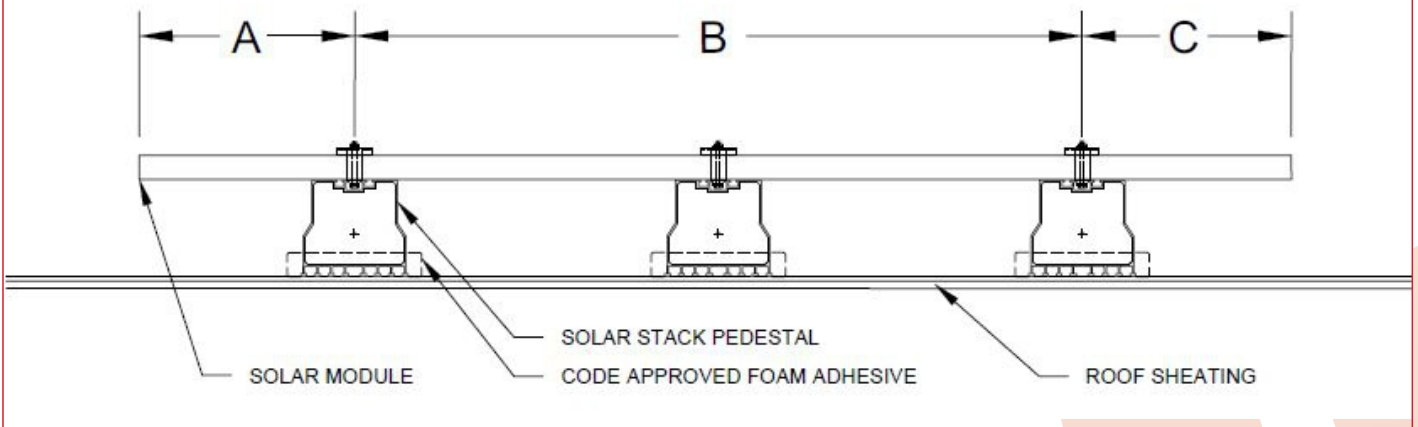
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission

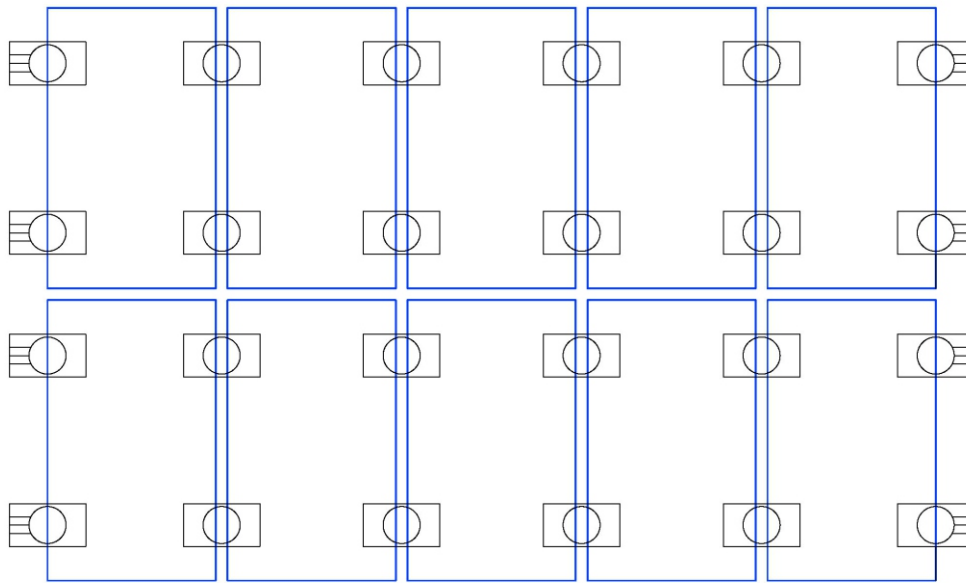


INSTALLING THE MODULES

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. If the modules are installed in HVHZ, than Roof underlayment must be approved and installed according to the local (AHJ) regulations and codes. Placement 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.



REVIEWED



Solar Stack Pedestal

PV Solar Panel



UFO

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

IMPORTANT: Periodic re-inspection of fasteners and any corrosion, such that immediately replaced.

APPROVED
Montgomery County
Historic Preservation Commission

loose components, loose and components are to be

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.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission

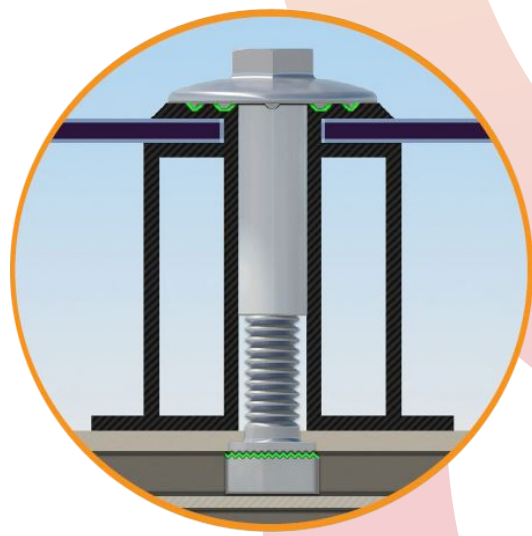
INSTALLING THE MODULE CLAMPS

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.
-----------	------------	-----------	------------



REVIEWED

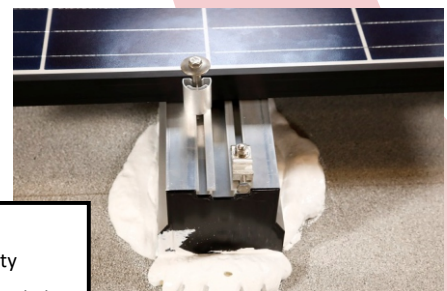
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



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.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission

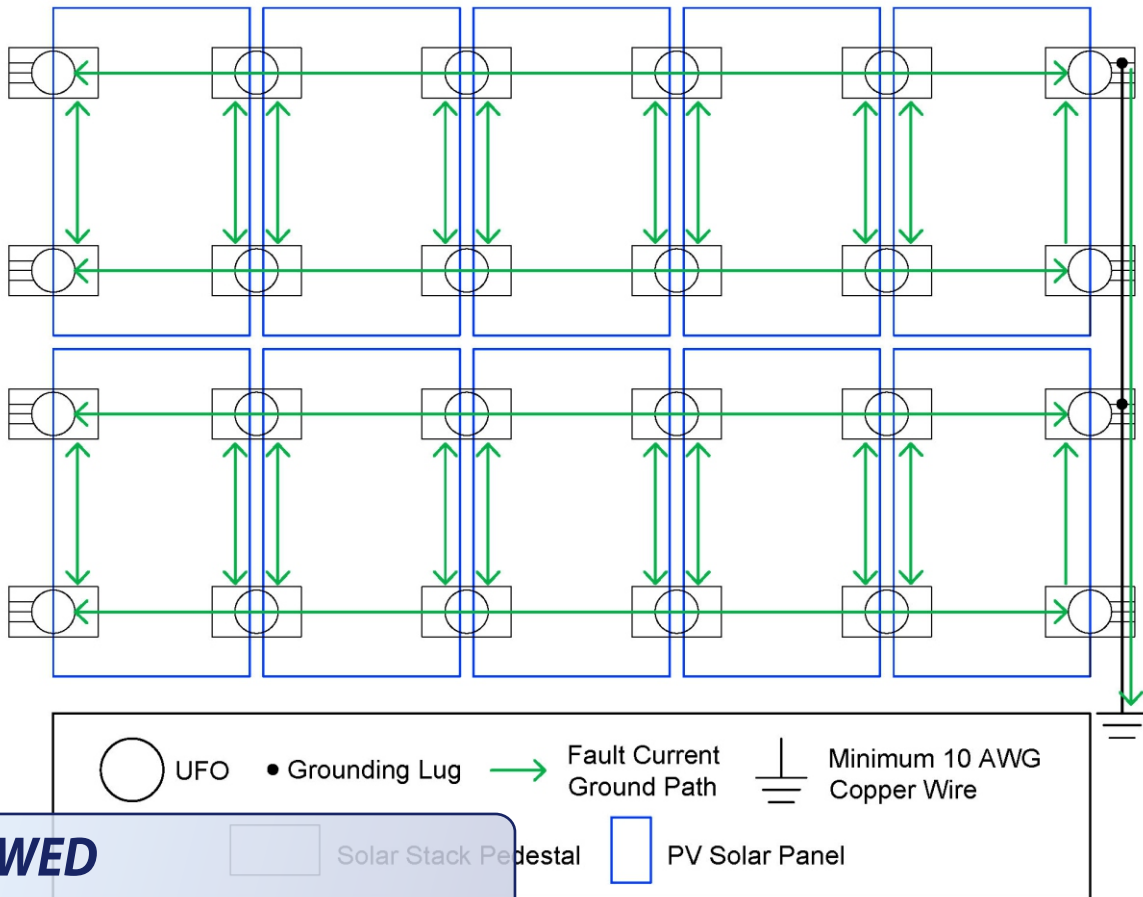


GROUNDING

Entire solar array must be 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.



REVIEWED
 By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

The system is a non-separately derived system. The system has been evaluated for bonding as the fault current path through the Solar Stack Pedestal and Ground Lugs.

APPROVED
 Montgomery County
 Historic Preservation Commission

...ing components have been evaluated, Mid Clamp, End Clamp,

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.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission





SnapNrack™

Solar Mounting Solutions

TopSpeed™ Mounting System

Installation Manual

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission



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.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

Montgomery County

Historic Preservation Commission



Project Plans

Certification Details 4

Component Details 5

Pre-Installation Requirements 7

Installation Steps

TopSpeed™ Skirt Layout 8

TopSpeed™ Mount to Module Installation 9

TopSpeed™ Mount Skirt Installation 10

Wire Management 13

MLPE Attachment 16

Module Installation 19

Grounding Specifications 22

Maintaining the Grounding Bonding When Removing a Module 23

Appendix A: List of approved Modules and MLPEs 25

REVIEWED
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission


Certification Details

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

Grounding/Bonding

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

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

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

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

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

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

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

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

An alternate method of grounding, Enphase R/C (QIKH2)(QIMS2) model M250, M215 & C250 is bonded to the module frame by the Enphase R/C (QIMS2) Model EFM-XXMM anodization piercing mounting kit. The total roof-mounted PV system is bonded (modules and microinverters) through the Enphase R/C (QIMS2) Engage Cables; the service entrance. Dynobond is an optional component that may be used with this system. Dynobond has been evaluated to provide module to module bonding. The Dynobond device back plates to frames of approved MLPE device back plates to frames of

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

Montgomery County

Historic Preservation Commission



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.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

Montgomery County
Historic Preservation Commission

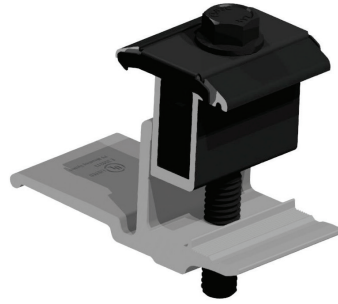


TopSpeed™ Structural Components



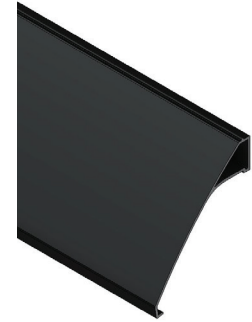
TopSpeed™ Mount

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



TopSpeed™ Clamp

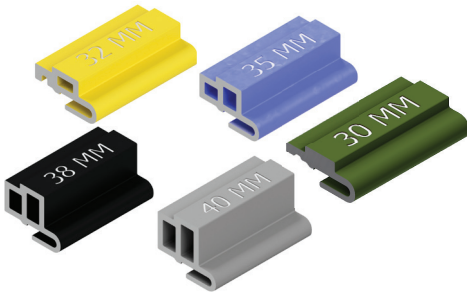
SnapNrack TopSpeed™ Clamp assembly including including Link bottom, Link top, and springs.



Universal Skirt

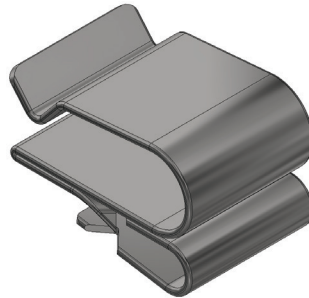
SnapNrack Universal Skirt in double portrait or single landscape lengths.

Wire Managements Components



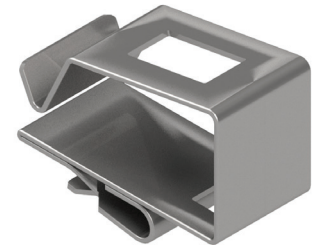
Skirt Spacers

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



Smart Clip

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



Smart Clip XL

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

Grounding/MLPE Components

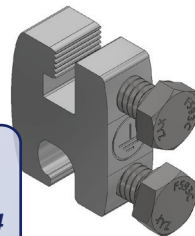


REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

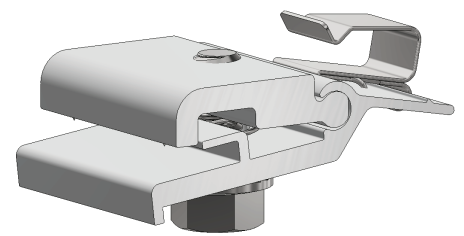
Wire Saver

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



APPROVED
Montgomery County
Historic Preservation Commission

SnapNrack Grounding Component used for attaching Grounding Components to module or array per array.



MLPE Frame Attachment Kit

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

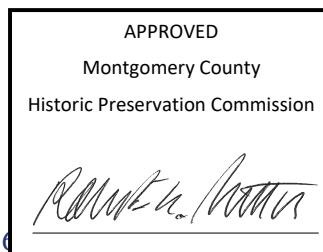
Hardware Torque Specifications

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

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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024



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.

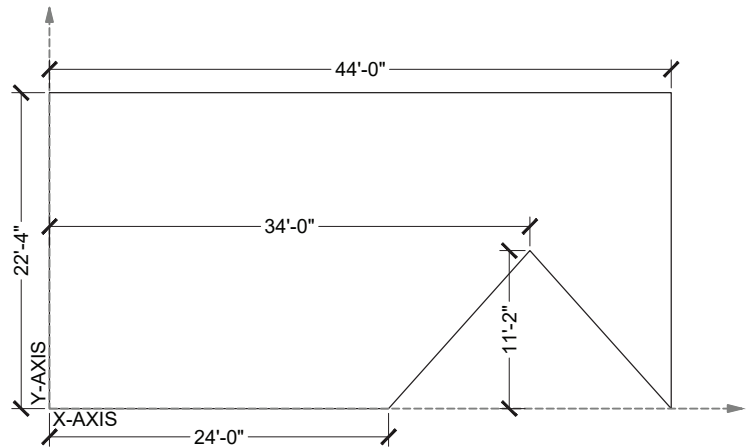


Image note: X-Axis described in this manual is cross-slope on the roof, Y-Axis is in line with the roof slope.

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.

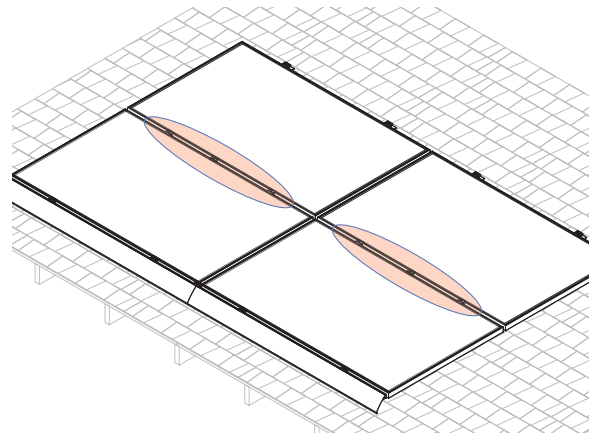
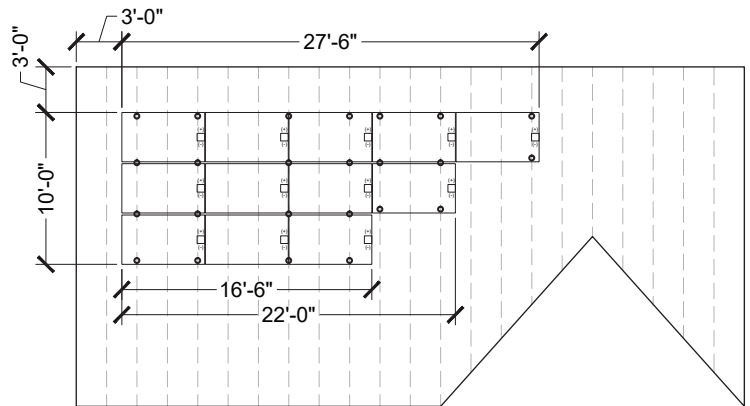


Image note: This four module array is installed in a high load configuration with three attachments per side where two modules share attachments. See highlighted area. As shown, three attachments are never required at the skirt or the top

Best Practice:

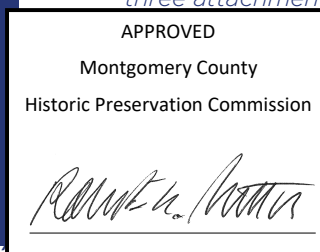
If environmental load conditions require three TopSpeed™ attachments per module side this is only required when modules share attachments.

- 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.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

- 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.



...ance Continued
...ould be checked periodically for wear
...eye protection when required.

Required Tools

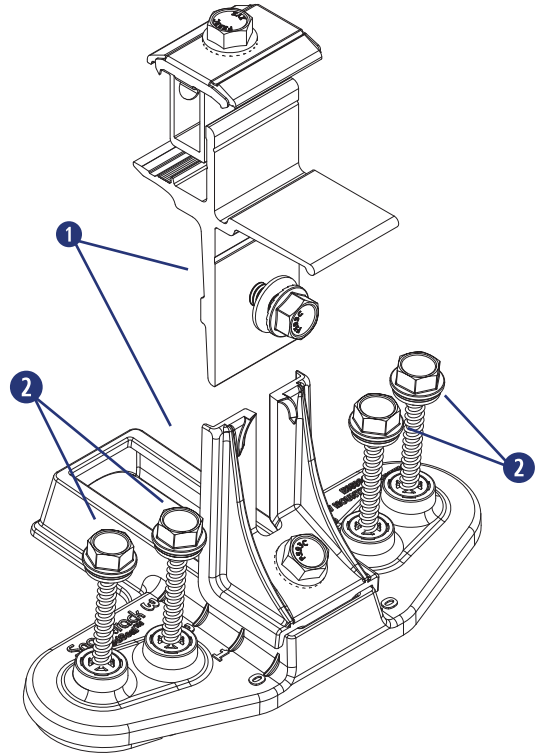
- Socket Wrench/Impact Driver
- Torque Wrench
- 1/2" Socket

Materials Included - TopSpeed™ System with SpeedSeal™ Technology

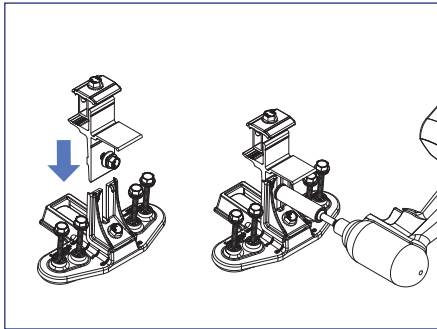
- 1 (1) SnapNrack TopSpeed™ Mount
- 2 (4) SnapNrack #14 Wood Screw with 1/2" Hex Head & sealing washer

Best Practice:

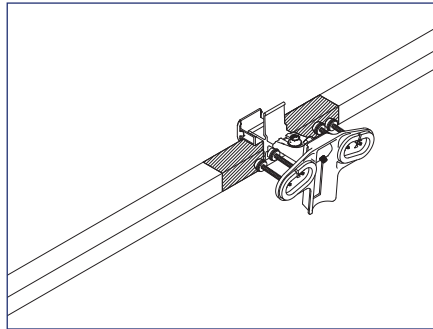
Attach all TopSpeed™ mounts as the modules are being prepped with MLPEs on the ground. Attach Mounts before attaching MLPEs to simplify wire management.



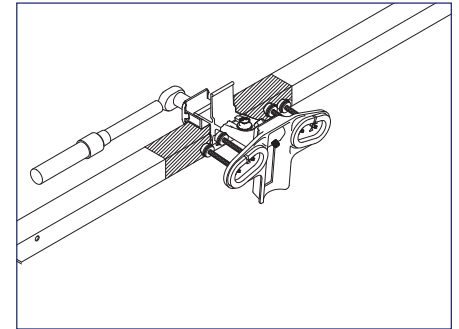
INSTALLATION INSTRUCTIONS



1) Assemble all TopSpeed™ Mounts required for the installation. Slide the clamp tower assembly into the base and tighten the screws.



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



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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission


Install Note:

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

Required Tools

- Roof Marking Crayon or Chalk
- Tape Measure

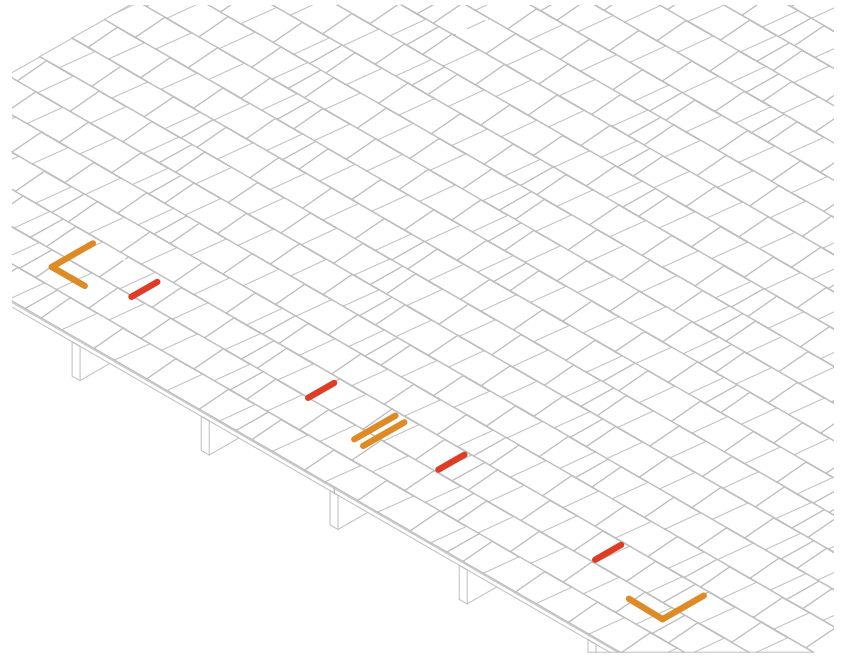
LAYOUT INSTRUCTIONS

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.



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024



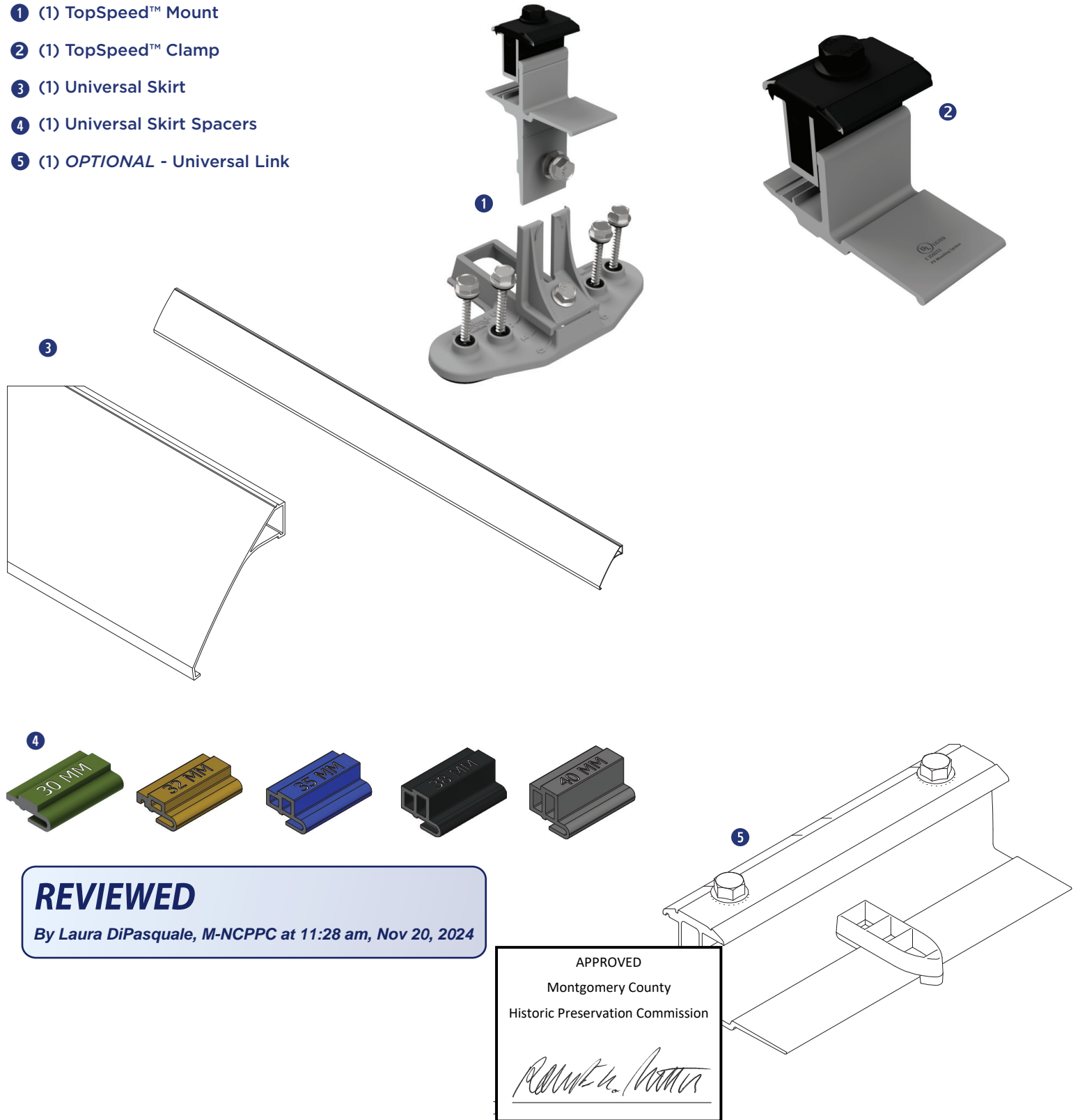
TopSpeed™ Mount: Skirt Installation

Required Tools

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

Materials Included - TopSpeed™ Mount with SpeedSeal™ Technology

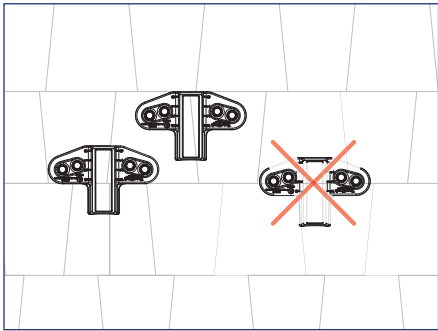
- ① (1) TopSpeed™ Mount
- ② (1) TopSpeed™ Clamp
- ③ (1) Universal Skirt
- ④ (1) Universal Skirt Spacers
- ⑤ (1) *OPTIONAL* - Universal Link



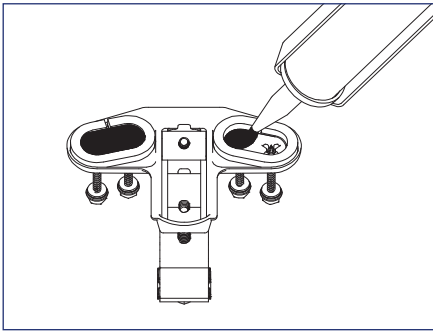
REVIEWED
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission
Robert H. [Signature]

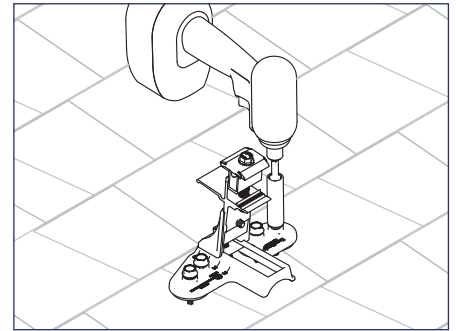
INSTALLATION INSTRUCTIONS



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



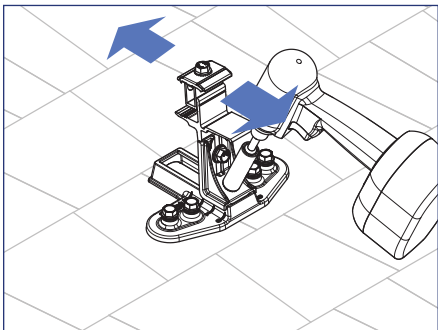
2) Fill both cavities on bottom of TopSpeed™ Mount created by SpeedSeal™ gasket with roof sealant to ensure a watertight seal.



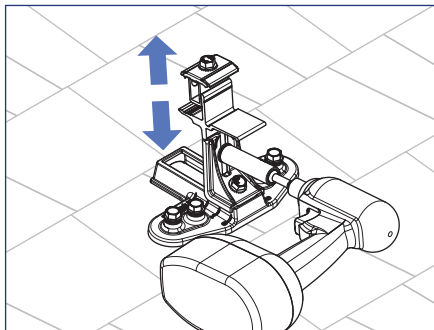
3) Attach TopSpeed™ Mount to roof using the (4) SnapNrack #14 Wood Screws with 1/2" hex head that are captured in the Mount.

Install Note:

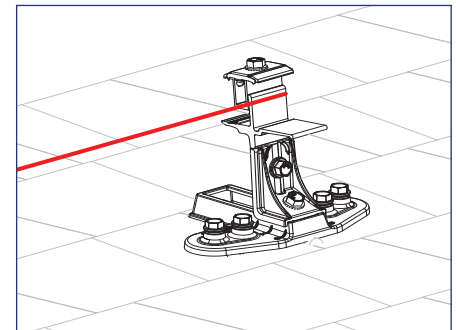
Roof sealant should be expelled from both vents of the TopSpeed™ Mount as it is installed to assure the proper amount of roof sealant has been applied. If sealant is not expelled from all four vents, remove TopSpeed™ Mount, add more sealant to the cavity, then reinstall.



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



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



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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

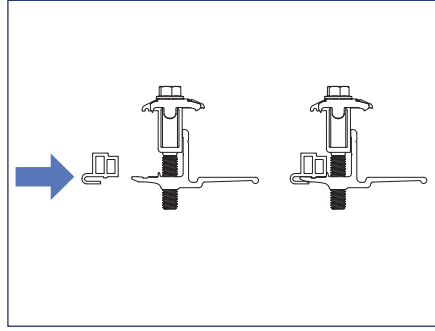
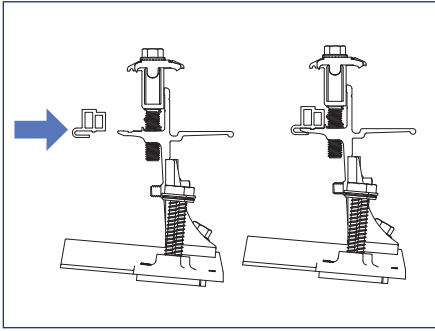
Montgomery County

Historic Preservation Commission

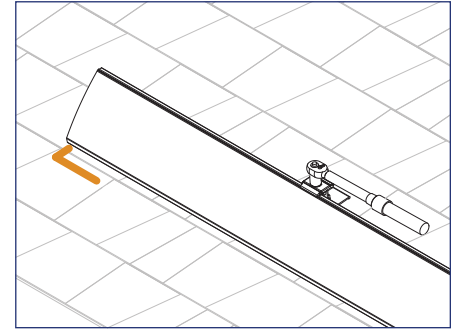
Install Note:

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

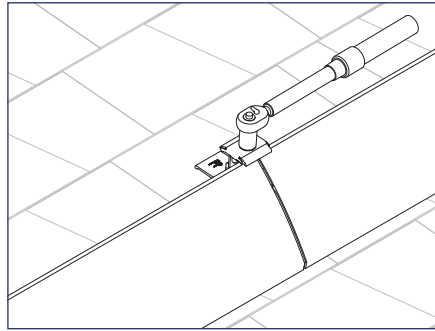
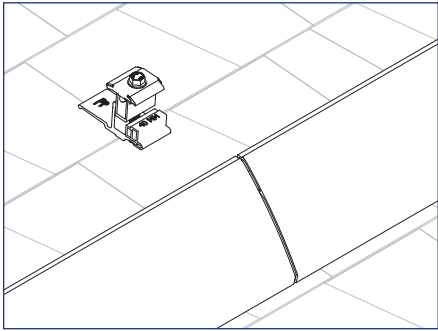
INSTALLATION INSTRUCTIONS



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



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



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



Install Note:

Optionally use Universal Links to connect lengths of Array Skirt.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

Montgomery County
Historic Preservation Commission

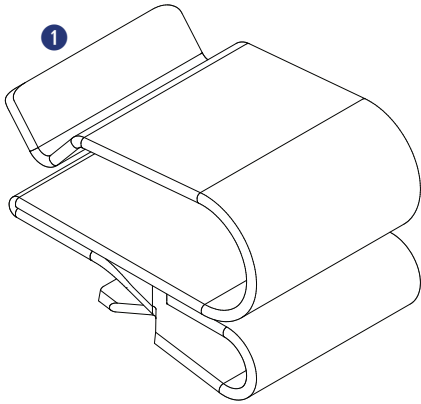
Required Tools

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

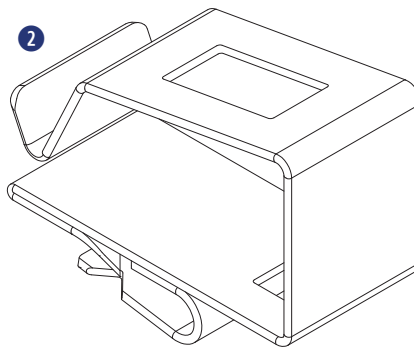
Materials Included

Smart Clips

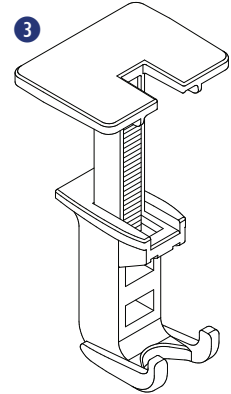
- 1 (1) Smart Clip [(2) PV Wire, (1) Enphase IQ Cable]
- 2 (1) Smart Clip XL [(6) PV Wire, (4) Enphase IQ]
- 3 (1) Wire Saver [(1) PV Wire]



Smart Clip



Smart Clip XL



Wire Saver

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

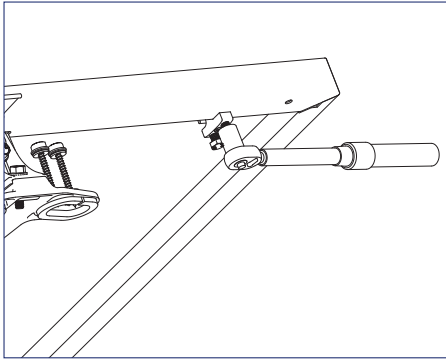
APPROVED

Montgomery County
Historic Preservation Commission

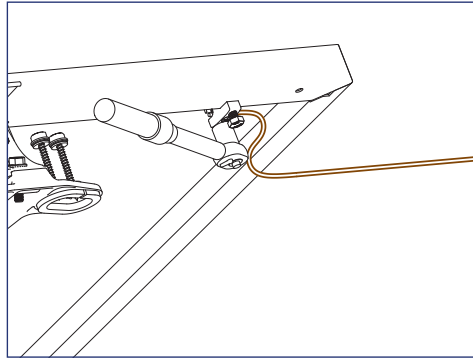
A handwritten signature in black ink, appearing to read "Robert H. Porter", is written over a horizontal line.

INSTALLATION INSTRUCTIONS - GROUND LUG

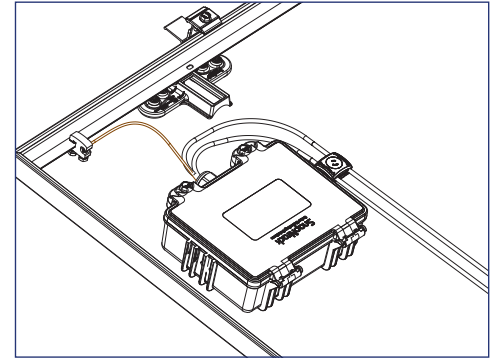
The SnapNrack Ground Lug to be used in accordance with the National Electric Code, ANSI/NFPA 70.



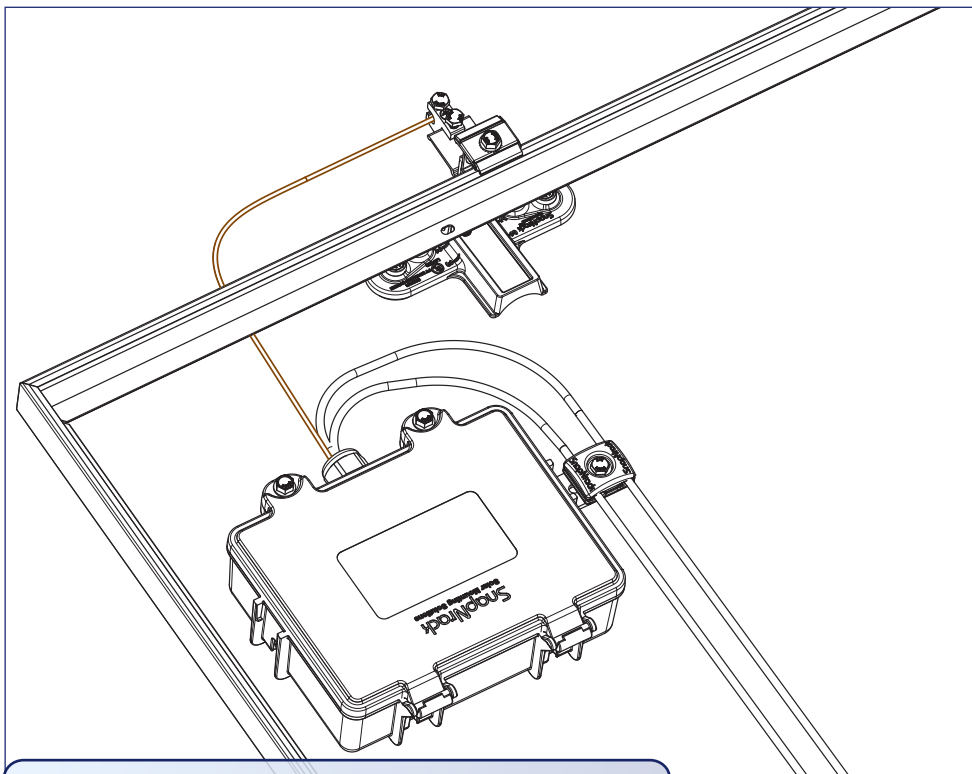
1) Ground Lug (242-92202) can be attached anywhere along the module frame or any TopSpeed™ Mount near the Junction Box. Torque module clamping bolt to 8 ft-lb.



2) Run 10 - 6 AWG, solid, bare copper wire 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**.

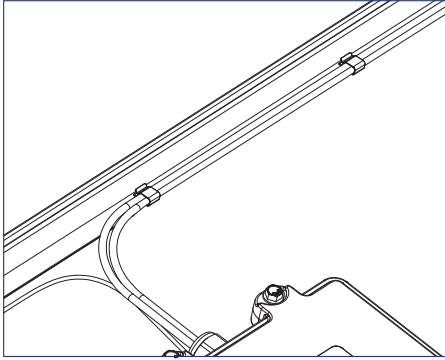


REVIEWED Ground Lug on the Mount Landing Pad at the top of the
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

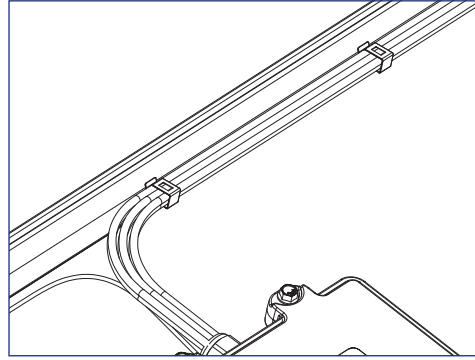
APPROVED
Montgomery County
Historic Preservation Commission


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 to 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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

Montgomery County
Historic Preservation Commission

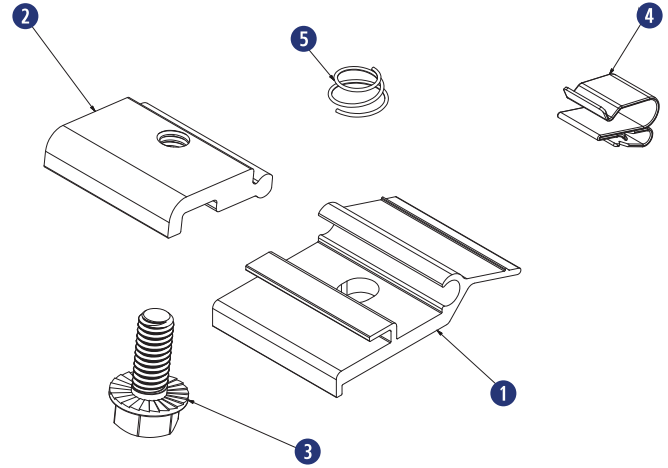
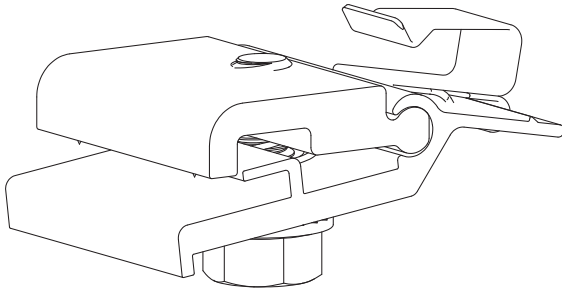
A handwritten signature in black ink, appearing to read "Robert H. Porter", written over a horizontal line.

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



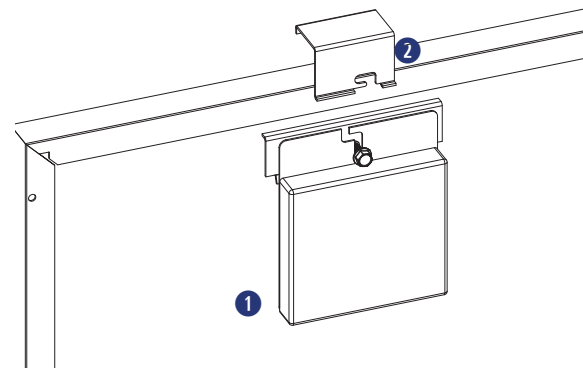
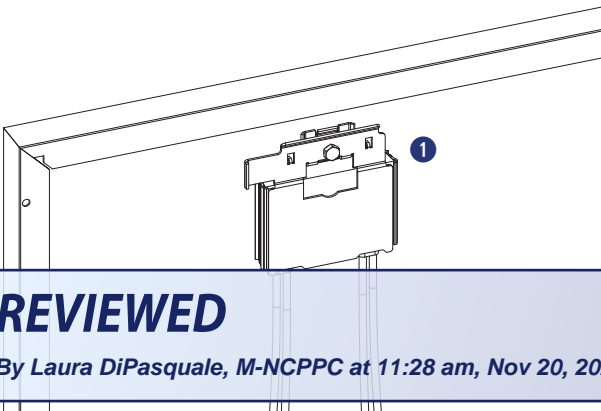
Materials Included

SolarEdge Frame Mount

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

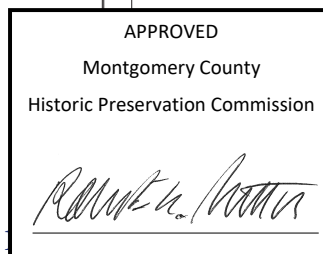
Enphase Frame Mount

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



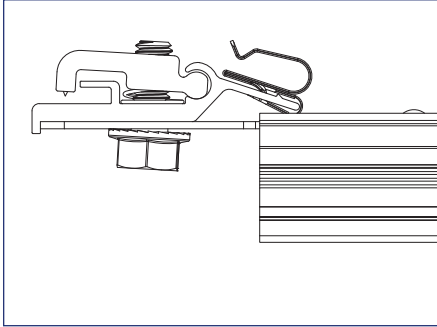
REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

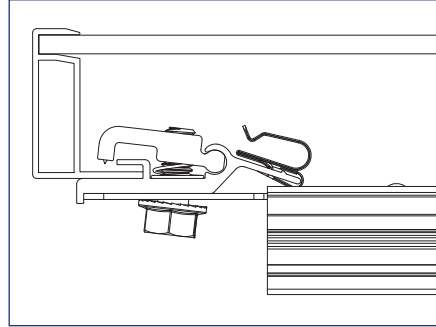


INSTALLATION INSTRUCTIONS - SNAPRACK MLPE FRAME ATTACHMENT KIT

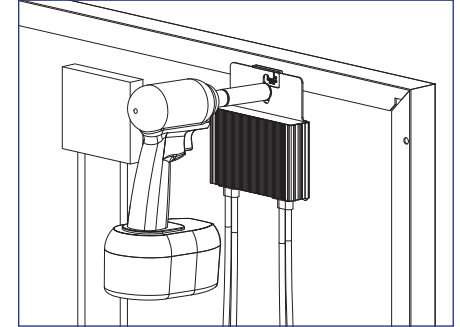
SnapNrack MLPE Frame Attachment kit are used to attach module level performance enhancing devices, and other devices such as an SRD (rapid shutdown device), directly to module frames, and provide integrated grounding/bonding for Devices grounded through metal back plate. (Refer to the list of tested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



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



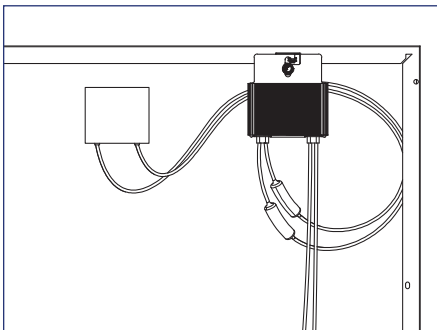
Install Note:

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



Install Note:

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



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

REVIEWED

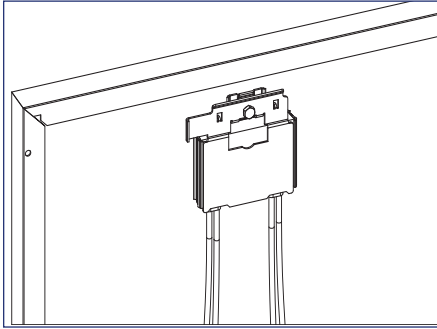
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED

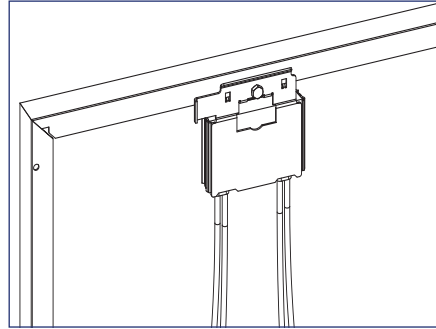
Montgomery County
Historic Preservation Commission



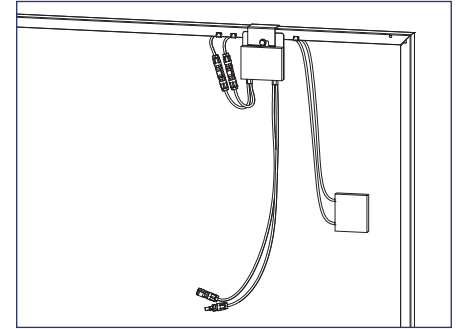
INSTALLATION INSTRUCTIONS - SOLAREEDGE FRAME MOUNT



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.



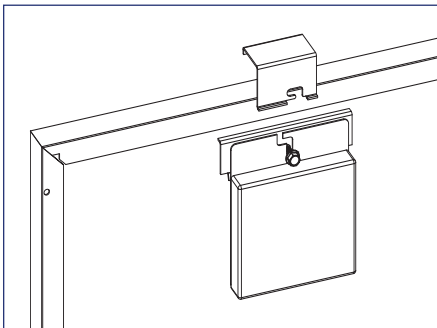
3) Connect the module leads to the input connectors on the optimizer and manage conductors with SnapNrack Smart Clips.



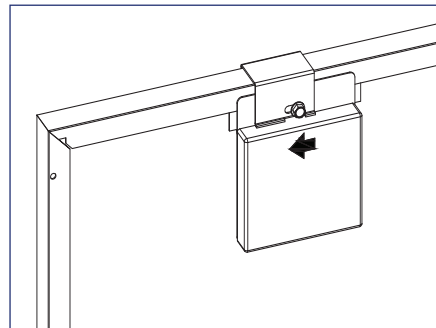
Install Note:

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.

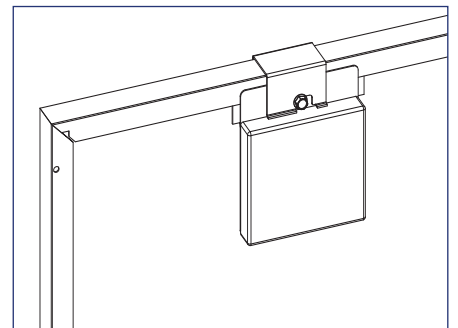


2) Slide the microinverter unit onto the bracket clamp, then move it slightly to the left.



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.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

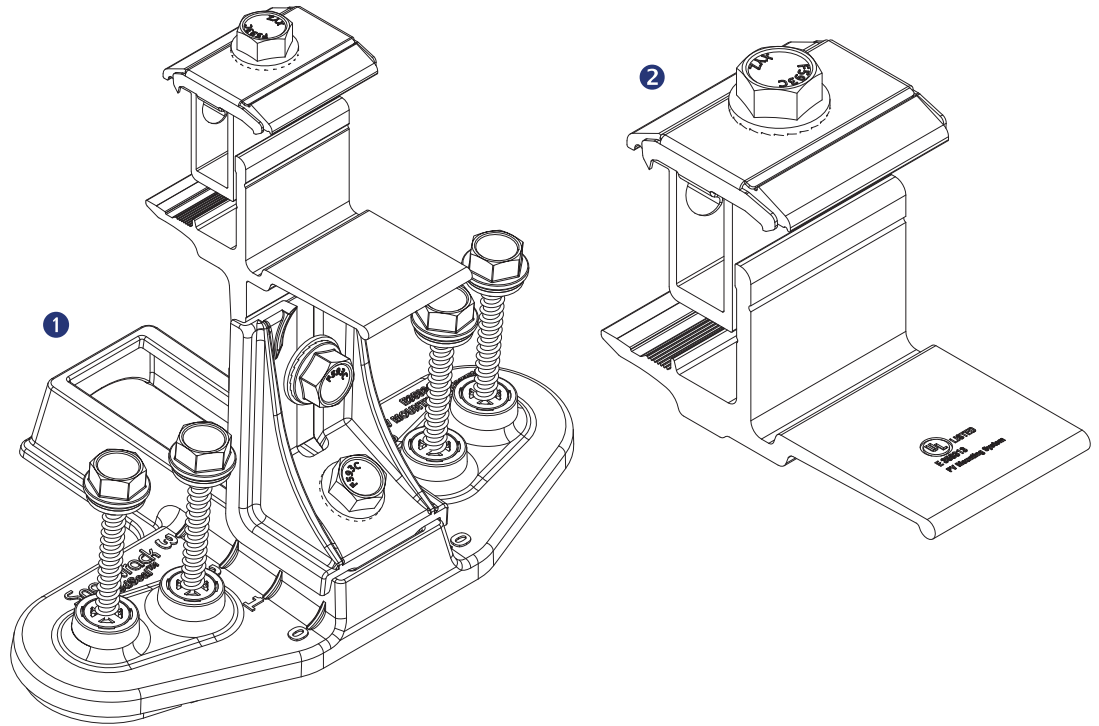


Required Tools

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

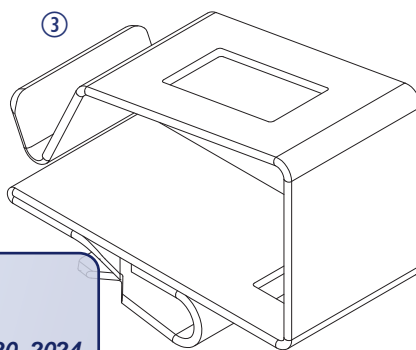
Materials Included

- 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



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission



INSTALLATION INSTRUCTIONS - BOTTOM ROW

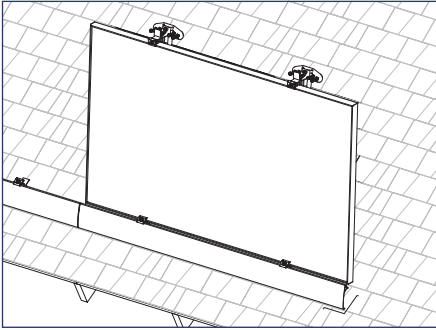
Recommended Best Practice:

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

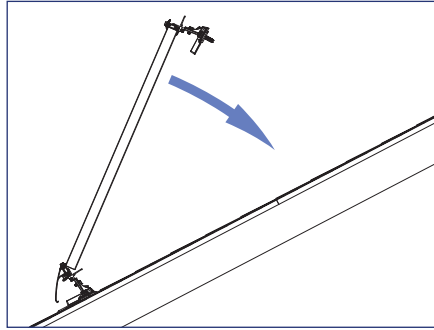
Install Note:

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

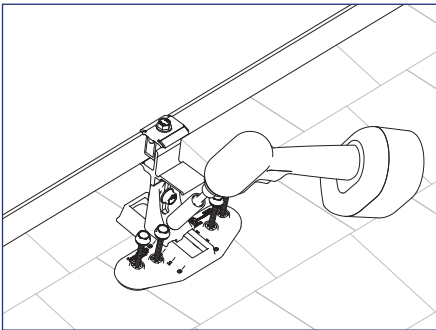
- With no MLPE, secure module leads to module frame to allow access to connectors while modules are installed
- Secure MLPE device to module frame with SnapNrack MLPE Frame Attachment Kit and connect module leads to MLPE, and manage leads by positioning connectors to allow access during installation



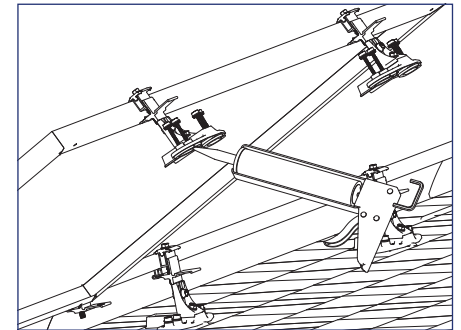
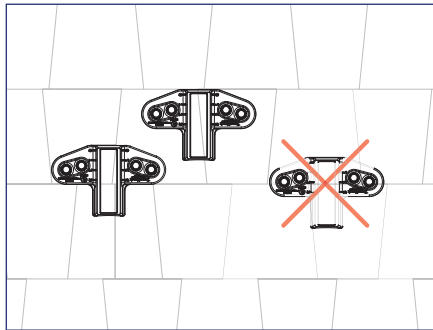
1) Rest downslope edge of module on the Mounts and/or Clamps position module so side edge is flush with marked edge of array layout or Skirt.



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



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



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

REVIEWED

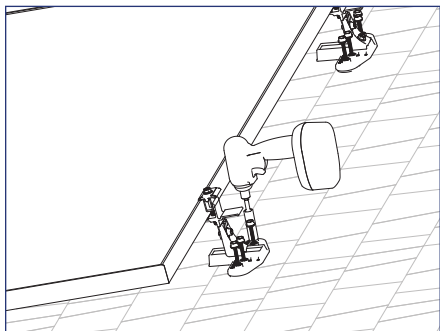
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024



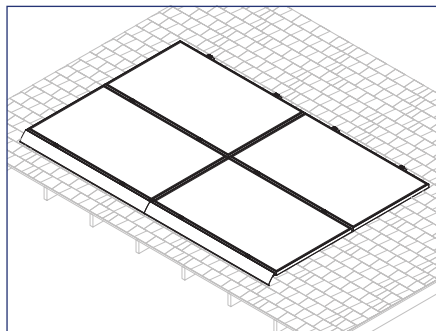
Install Note:

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

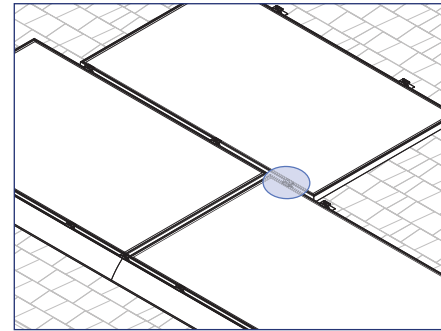
INSTALLATION INSTRUCTIONS - BOTTOM ROW



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



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.

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.

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.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

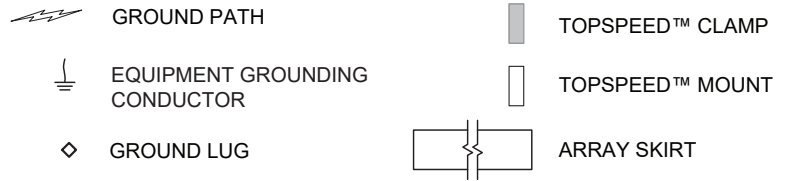
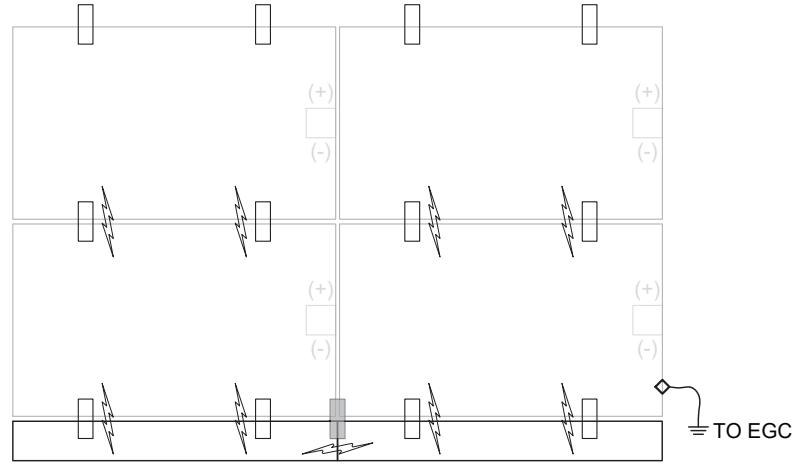


GROUND PATH DETAILS

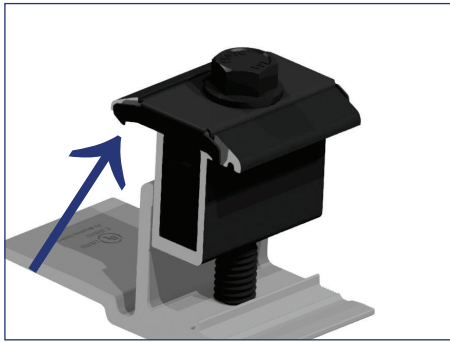
All TopSpeed™ components in the fault current ground path have been Certified to be used multiple times for grounding/bonding. The UL 2703 Listing does not specify a maximum number of uses for the Mount, Link, or Ground Lug. Review the requirements of the National Electrical Code (NEC) Article 250 to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

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

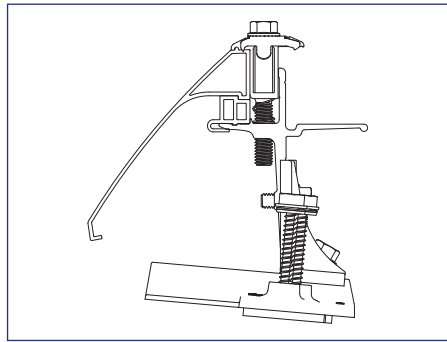
- SnapNrack, TopSpeed™ Mount
- SnapNrack, TopSpeed™ Clamp



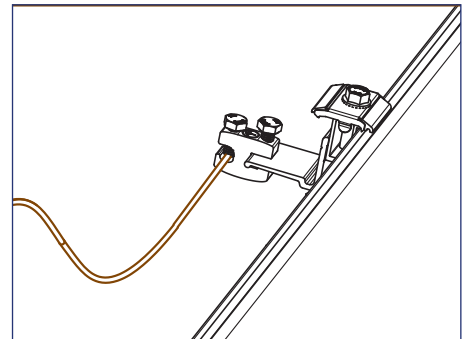
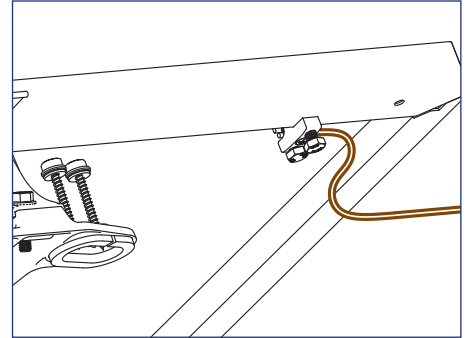
GROUNDING METHOD DETAILS



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



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



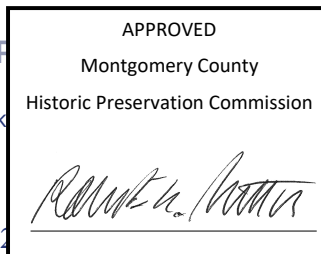
3) Each continuous array is connected to Equipment Grounding Conductor through Ground Lug (242-92202) installed on one module per array.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

GROUNDING MAP

The Ground Lug is marked with the ground symbol.



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

Maintaining the Grounding Bonding When Removing a Module

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.

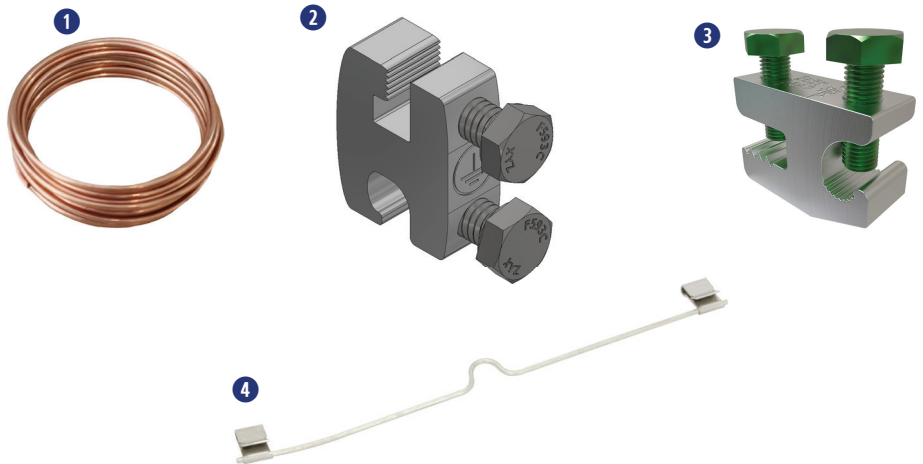
Scenarios that could result in a disruption of the bonding path are described, for example irregularly-shaped arrays, arrays consisting of individual rows, and any other scenario where module removal could disrupt the bonding path. In most cases, the removal of a module for servicing will not disturb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



REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

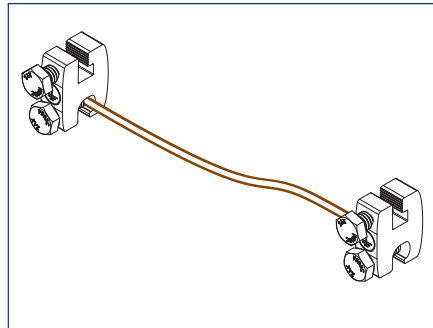
APPROVED
Montgomery County
Historic Preservation Commission


Maintaining the Grounding Bonding When Removing a Module

JUMPER ASSEMBLY INSTRUCTION & INSTALLATION

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

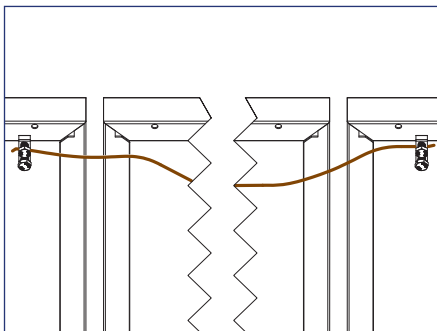
1) Identify the existing ground path at the location of module removal and choose an appropriate length of #10 bare copper to bridge the soon to be broken ground path.



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
REVIEWED

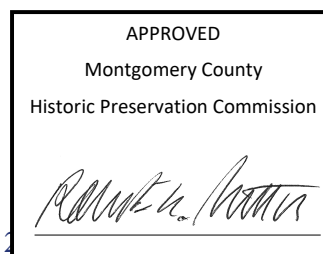
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

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.



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.snaprack.com.

Manufacturer	Model	
Aptos Solar	DNA-120-MF23-XXX	DNA-120-BF26-XXXW
	DNA-120-BF23-XXX	DNA-144-BF26-XXXW
	DNA-144-MF23-XXX	DNA-108-BF10-xxxW
	DNA-144-BF23-XXX	DNA-120-BF10-xxxW
	DNA-120-MF26-XXXW	DNA-108-MF10-xxxW
	DNA-144-MF26-XXXW	
Canadian Solar	CS6K-XXX-M	CS1H-XXX-MS
	CS6K-XXX-M-SD	CS1H-XXX-MS-AB
	CS6K-XXX-P	CS3W-XXX-P
	CS6K-XXX-P-SD	CS3N-XXX-MS
	CS6K-XXX-MS	CS1Y-XXX-MS
	CS3K-XXX-P	CS3W-MB-AG
	CS3K-XXX-MS	CS3Y-MB-AG
	CS3U-XXX-MS	CS6W-XXXMB-AG
	CS3U-XXX-P	CS6R-XXXMS-HL
	CS1K-XXX-MS	CS3W-XXX-MS
CertainTeed	CTXXXHC11-06	
Chint Solar	CHSM6612M-XXX	CHSM72M-HC-XXX* (Astro 4)
	CHSM6612M(BL)-XXX	CHSM72M-HC-XXX* (Astro 5)
	CHSM6612M/HV-XXX	
Dehui Solar	DH-M760B-XXXW	DH-M760F-XXXW
	DH-M760W-XXXW	DH-M772F-XXXW
	DH-M772W-XXXW	
Freedom Forever	FF-MP-BBB-xxx	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> REVIEWED By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024 </div>	Q.PEAK DUO-G5-XXX	Q.PEAK DUO XL-G10.3/BFG-XXX
	Q.PEAK DUO-BLK-G5-XXX	Q.PEAK DUO G10-XXX
	Q.PLUS DUO-G5-XXX	Q.PEAK DUO BLK G10-XXX
	Q.PEAK DUO-G7-XXX	Q.PEAK DUO G10+-XXX
	Q.PEAK DUO-BLK-G7-XXX	Q.PEAK DUO BLK G10+-XXX
	Q.PEAK DUO-G7.2-XXX	Q.PEAK DUO XL-G10.3-XXX
	Q.PEAK DUO-G6+-XXX	Q.PEAK DUO XL-G10.c-XXX
	Q.PEAK DUO-	Q.PEAK DUO XL-G10.d-XXX
	Q.PEAK DUO-	Q.PEAK DUO L-G8.3/BFG-XXX
	Q.PEAK DUO-	Q.PEAK DUO L-G8.3/BGT-XXX
	Q.PEAK DUO-	Q.PEAK DUO ML-G10-XXX
	Q.PEAK DUO-	Q.PEAK DUO BLK ML-G10+-XXX

APPROVED

Montgomery County

Historic Preservation Commission




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

REVIEWED
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission

Manufacturer	Model	
LG	LGXXN1C-G4	LGXXN1W-A6
	LGXXN1K-G4	LGXXQ1C-A6
	LGXXS1C-G4	LGXXQ1K-A6
	LGXXN2C-G4	LGXXM1K-A6
	LGXXN2K-G4	LGXXM1C-A6
	LGXXN2W-G4	LGXXA1C-A6
	LGXXS2C-G4	LGXXQAC-A6
	LGXXS2W-G4	LGXXQAK-A6
	LGXXN1C-V5	LGXXN1K-B6
	LGXXN1W-V5	LGXXN2W-E6
	LGXXN2T-V5	LGXXN2T-E6
	LGXXN2T-J5	LGXXN1K-E6
	LGXXN1T-V5	LGXXN3K-V6
	Longi	LR6-60-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	MSEXXS05T	MSEXXSQ4S
	MSEXXS05K	MSEXXS8K
	MSEXXSQ5T	MSEXXS8T
	MSEXXSQ5K	MSEXXS9S
	MSEXXM4J	MSE60AXXX
	MSEXXM6J	MSEXXS5K
	MSEXXS06W	MSEXXS5T
	MSEXXS04J	MSEXXS6S
	MSEXXS06J	MSEXXS6W
	MSEXXSQ6S	MSEXXS5R
Next Energy Alliance	USNEA-XXXM3-60	USNEA-XXXM3-72
	USNEA-XXXM3B-60	USNEA-XXXM3B-72
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> REVIEWED <small>By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024</small> </div>	VBHNXXXKA03	VBHXXXRA18N
	VBHNXXXKA04	VBHXXXRA03K
	VBHNXXXSA17	EVPVXXX(K)
	VBHNXXXSA18	EVPVXXXH
	VBHN32	EVPVXXXPK
Phono Solar	PSXXXM8G	PSxxxM8GF-18/VH
	PSXXXM8F	PSxxxM8GFH-18/VH
	PSxxxM8G	PSxxxM6-24/TH
	PSxxxM8G	

APPROVED
 Montgomery County
 Historic Preservation Commission




Manufacturer	Model	
REC (All may be followed by "BLK" or "BLACK")	RECXXTP2	RECXXTP2SM 72 BLK2
	RECXXTP2-BLK	RECXXXAA
	RECXXNP	RECXXTP3M
	RECXXTP2M	RECXXTP4
	RECXXTP2M 72	RECXXXAA Pure
	RECXXTP2M 72 BLK	RECXXXAA Pure-R
	RECXXTP2M 72 BLK2	RECXXNP2
	RECXXTP2SM 72	RECXXNP3
	RECXXTP2SM 72 BLK	
SEG Solar	SEG-400-BMB-HV	SEG-xxx-BMD-HV
	SEG-400-BMB-TB	SEG-xxx-BMD-TB
Silfab	SLAXXX-M	SILXXXNT
	SLAXXX-P	SILXXXHL
	SSAXXX-M	SILXXXBK
	SSAXXX-P	SILXXXNX
	SILXXXBL	SILXXXNU
	SILXXXML	SILXXXHC
	SILXXXNL	SILXXXHN
	SLGXXX-M	SILXXXBG
	SLGXXX-P	SIL-xxxHC+
	SSGXXX-M	SIL-xxxHM
	SSGXXX-P	
Solaria	Solaria PowerXT-XXXR-PX	Solaria PowerXT-XXXR-PM
	Solaria PowerXT-XXXR-BX	Solaria PowerXT-XXXR-PM-AC
	Solaria PowerXT-XXXR-AC	
Sunpower	SPR-AXXX-G-AC	SPR-MXXX-H-AC
	SPR-AXXX	SPR-MXXX
	SPR-AXXX-BLK-G-AC	SPR-MXXX-BLK-H-AC
	SPR-AXXX-BLK	SPR-MXXX-BLK
SunSpark	SST-XXXM3-60	SST-XXXM3-72
	SST-XXXM3B-60	SST-XXXM3B-72
Talesun	TP660M-XXX	TP672M-XXX
	TP660P-XXX	TP672P-XXX
Tina	TSM-XXXDD05(II)	TSMXXXDD05H.05(II)
	TSM-XXXDD05A.05(II)	TSM-XXXDD06M.05(II)
	TSM-XXXDD05A.08(II)	TSM-XXXDE15H(II)
	TSM-XXXDD05A.082(II)	TSM-XXXDE15M(II)
	TSM-XXXPA05	TSMXXXDE06X.05(II)
	TSM-XXXPA05.05	TSMXXXDE09.05
	TSM-XXX	TSM-XXXDE15V(II)
	TSM-XX	TSM-XXXDEG15VC.20(II)
	TSM-XXXR	TSM-XXXDEG18MC.20(II)
	TSM-XXX	TSM-XXXDEG19C.20

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission




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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



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


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

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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission

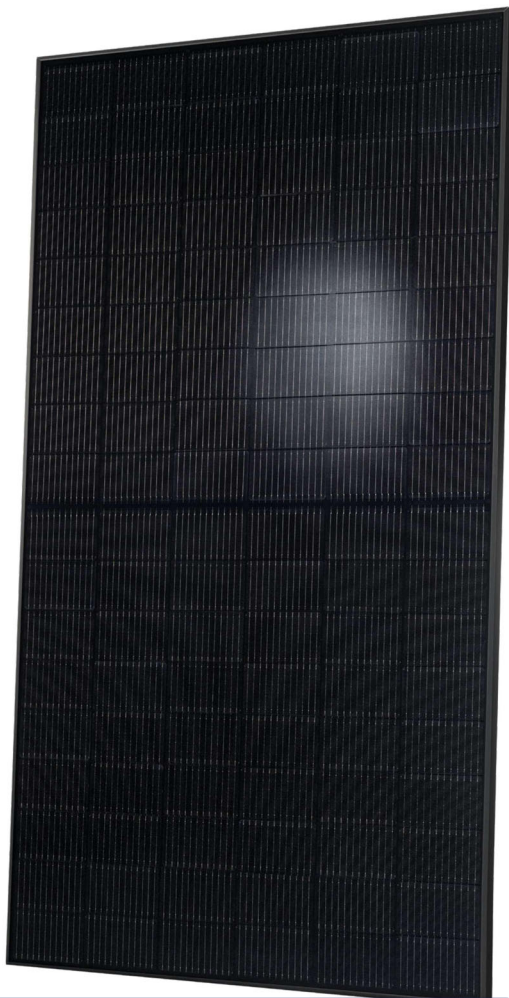


Q.TRON BLK M-G2+ SERIES



405-430 Wp | 108 Cells
22.0% Maximum Module Efficiency

MODEL Q.TRON BLK M-G2+



High performance Qcells N-type solar cells

Q.ANTUM NEO Technology with optimized module layout boosts module efficiency up to 22.0%.



A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty¹.



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology², Hot-Spot Protect.



Extreme weather rating

High-tech aluminium alloy frame, certified for high snow (8100 Pa) and wind loads (3600 Pa).



Innovative all-weather technology

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



The most thorough testing programme in the industry

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

¹ See data sheet on rear for further information.

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

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

The ideal solution for:



Rooftop arrays on residential buildings

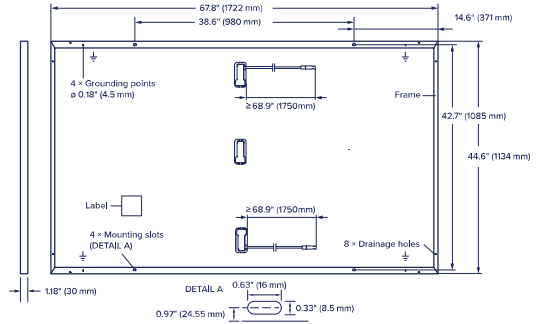
APPROVED
Montgomery County
Historic Preservation Commission



Q.TRON BLK M-G2+ SERIES

Mechanical Specification

Format	67.8 in × 44.6 in × 1.18 in (including frame) (1722 mm × 1134 mm × 30 mm)
Weight	46.7 lbs (21.2 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 18 monocrystalline Q.ANTUM NEO solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 68.9 in (1750 mm), (-) ≥ 68.9 in (1750 mm)
Connector	Stäubli MC4; IP68



Electrical Characteristics

POWER CLASS	405	410	415	420	425	430
-------------	-----	-----	-----	-----	-----	-----

MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC¹ (POWER TOLERANCE +5 W/-0 W)

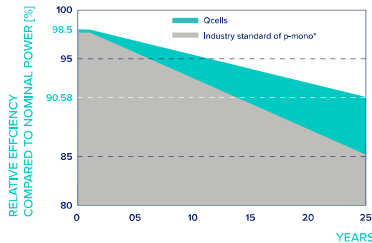
Minimum	Power at MPP ¹	P _{MPP} [W]	405	410	415	420	425	430
	Short Circuit Current ¹	I _{SC} [A]	13.33	13.41	13.49	13.58	13.66	13.74
	Open Circuit Voltage ¹	V _{OC} [V]	37.91	38.19	38.47	38.75	39.03	39.32
	Current at MPP	I _{MPP} [A]	12.69	12.76	12.83	12.91	12.98	13.05
	Voltage at MPP	V _{MPP} [V]	31.93	32.13	32.34	32.54	32.74	32.94
	Efficiency ¹	η [%]	≥20.7	≥21.0	≥21.3	≥21.5	≥21.8	≥22.0

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT²

Minimum	Power at MPP	P _{MPP} [W]	306.1	309.9	313.7	317.5	321.2	325.0
	Short Circuit Current	I _{SC} [A]	10.74	10.81	10.87	10.94	11.00	11.07
	Open Circuit Voltage	V _{OC} [V]	35.96	36.23	36.50	36.77	37.04	37.31
	Current at MPP	I _{MPP} [A]	9.98	10.04	10.10	10.15	10.21	10.27
	Voltage at MPP	V _{MPP} [V]	30.66	30.87	31.07	31.26	31.46	31.65

¹Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC; 1000 W/m², 25 ±2°C, AM 1.5 according to IEC 60904-3 • ²800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

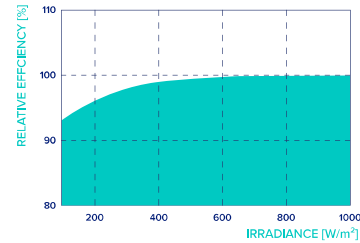


At least 98.5% of nominal power during first year. Thereafter max. 0.33% degradation per year. At least 95.53% of nominal power up to 10 years. At least 90.58% of nominal power up to 25 years.

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

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

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α [%/K]	+0.04	Temperature Coefficient of V _{OC}	β [%/K]	-0.24
Temperature Coefficient of P _{MPP}	γ [%/K]	-0.30	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3°C)

Properties for System Design

Maximum System Voltage	V _{sys} [V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	25	Fire Rating based on ANSI/UL 61730	C / TYPE 2
Max. Design Load Push/Pull ³	[lbs./ft ²] / [kg./m ²]	113 (5400 Pa) / 50 (2400 Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Design Load Pull ³	[lbs./ft ²] / [kg./m ²]	169 (8100 Pa) / 75 (3600 Pa)		

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

Qualifications and Certificates

UL61730-1 & UL61730-2, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells).



^{*}Contact your Qcells Sales Representative for details regarding the module's eligibility to

Qcells pursues minimizing paper output in consideration of the

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

qcells



IQ8MC Microinverter

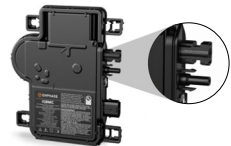
Our newest IQ8 Series Microinverters are the industry's first microgrid-forming*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 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.



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



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



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

REVIEWED
By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

*Meets UL 1741 only when installed with IQ System Controller 2 or 3.

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

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

Microgrid-forming

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

NOTE:

- IQ8 Microinverters cannot be mixed together 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. An IQ Gateway is required to make these changes during installation.

APPROVED
Montgomery County
Historic Preservation Commission

IQ8MC Microinverter

INPUT DATA (DC)	UNITS	IQ8MC-72-M-US
Commonly used module pairings ¹	W	260-460
Module compatibility	—	To meet compatibility, PV modules must be within the following max. input DC voltage and max. module I _{sc} . Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator .
MPPT voltage range	V	25-45
Operating range	V	18-58
Min./Max. start voltage	V	22/58
Max. input DC voltage	V	60
Max. continuous operating DC current	A	14
Max. input DC short-circuit current	A	25
Max. module I _{sc}	A	20
Overtoltage 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 max 20 A per branch circuit

OUTPUT DATA (AC)	UNITS	IQ8MC-72-M-US @240 VAC	IQ8MC-72-M-US @208 VAC
Peak output power	VA	330	315
Max. continuous output power	VA	320	310
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120°
Min./Max. grid voltage ²	V	211-264	183-229
Max. continuous output current	A	1.33	1.49
Nominal frequency	Hz	60	
Extended frequency range	Hz	47-68	
AC short circuit fault current over three cycles	Arms	2.70	
Max. units per 20 A (L-L) branch circuit ³	—	12	10
Total harmonic distortion	%	<5	
Overtoltage class AC port	—	III	
AC port backfeed current	mA	18	
Power factor setting	—	1.0	
Grid-tied power factor (adjustable)	—	0.85 leading ... 0.85 lagging	
Peak efficiency	%	97.4	97.2
CEC weighted efficiency	%	97.0	96.5
Nighttime power consumption	mW	33	25

MECHANICAL DATA	UNITS
Ambient temperature range	-40°C to 65°C (-40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type	Stäubli MC4
Dimensions (H × W × D); Weight	212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Enclosure	Yes; PD3
Environment	Class II double-insulated, corrosion-resistant polymeric enclosure
Indoor/Outdoor	Indoor

REVIEWED Pollution degree
 Enclosure
 By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024
 Environ. category: UV exposure rating

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 This product is UL Listed as PV rapid shutdown ed C22.1-2018 Rule 64-218 rapid shutdown of PV syst ES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and installed according to the manufacturer's instructions.

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

APPROVED
 Montgomery County
 Historic Preservation Commission


Revision history

REVISION	DATE	DESCRIPTION
DSH-00049-4.0	February 2024	Added information about IEEE 1547 interconnection standard requirements.
DSH-00049-3.0	October 2023	Included NEC 2023 specification in the "Compliance" section.
DSH-00049-2.0	September 2023	Updated module compatibility information.
DSH-00049-1.0	May 2023	Preliminary release.


REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024





DAVID C. HERNANDEZ, PE

513-418-8812 

4912 Prospect Ave., Blue Ash OH 45242 

davehernandezpe@gmail.com 

DATE: October 31, 2024

RE: 7128 Willow 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 roof 2 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 & 3 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	= 25 psf
Roof dead load	= 9 psf
Solar system dead load (Total)	= 9.3 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: 2024.1



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. 10/31/24

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024





DAVID C. HERNANDEZ, PE

513-418-8812

4912 Prospect Ave., Blue Ash OH 45242

davehernandezpe@gmail.com

SEISMIC CHECK

Breakdown of Loads		
Asphalt Shingles:	4	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	9	2233.00	20097
Exterior Walls	6	3684.60	22107.6
Interior Walls	6	3684.60	22107.6
Existing Seismic Weight @Roof Level, We =			64312.2

New PV System Seismic Weight			
Element	Unit Weight (psf)	Area (Sq.ft)	Weight (lbs)
Pv System (TopSpeed)	3	420.00	1260.00
Pv System (Solar Stack)	9.3	147.00	1367.10
Seismic Weight of New PV System, Wpv =			2627.10

% Increase in Lateral (Seismic) Weight @Roof Level Due to PV System Addition, %-increase = Wpv / We	4.08%	< 10% - Pass
---	-------	--------------


REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission



DAVID C. HERNANDEZ, PE

513-418-8812 

4912 Prospect Ave., Blue Ash OH 45242 

davehernandezpe@gmail.com 

IEBC IMPACT CHECK			
Inputs	Roof 1	Roof 3	Unit
Existing Gravity Loads			
Roof Dead Load (DL _r)	12	12	psf
Roof Live Load (LL _r)	20	20	psf
Roof Snow Load (SL _r)	23.1	23.1	psf
(DL _r +LL _r)/Cd =	25.6	25.6	psf
(DL _r +SL _r)/Cd=	30.52	30.52	psf
Max. Existing Gravity Load	30.52	30.52	psf
Proposed Gravity Loads			
Roof Dead Load with PV Panel Load (DL)	15	15	psf
Roof Live Load (LL)	0	0	psf
Roof Snow Load (SL)	15.02	18.94	psf
(DL+LL)/Cd =	16.67	16.67	psf
(DL+SL)/Cd=	26.1	29.51	psf
Max. Proposed Gravity Load	26.1	29.51	psf
% Change =	-14.48	-3.31	%
<i>The change in gravity loads for Roofs 1, 2, and 3 after the proposed solar installation is less than 5%, therefore passes the Impact Check.</i>			

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission

Calculation of rafter size used in analysis of Roof 2

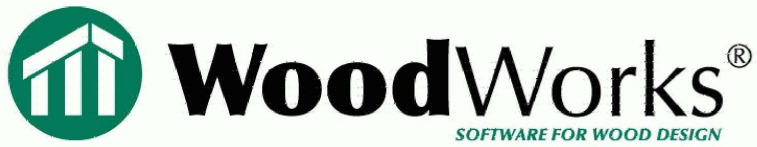
Actual Rafter Thickness	1.5	in (TRUE)
Actual Rafter Depth	3.5	in (TRUE)
Section modulus of original rafter	3.06	in ³
Sister member thickness	1.5	in (TRUE)
Sister member depth	7.25	in (TRUE)
Section modulus of sister member	13.14	in ³
Total Section Modulus	16.2	in³
Rafter Thickness in Analysis	3	in
Rafter Depth in Analysis	5.69	in

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
Montgomery County
Historic Preservation Commission





COMPANY

PROJECT

Oct. 31, 2024 23:37

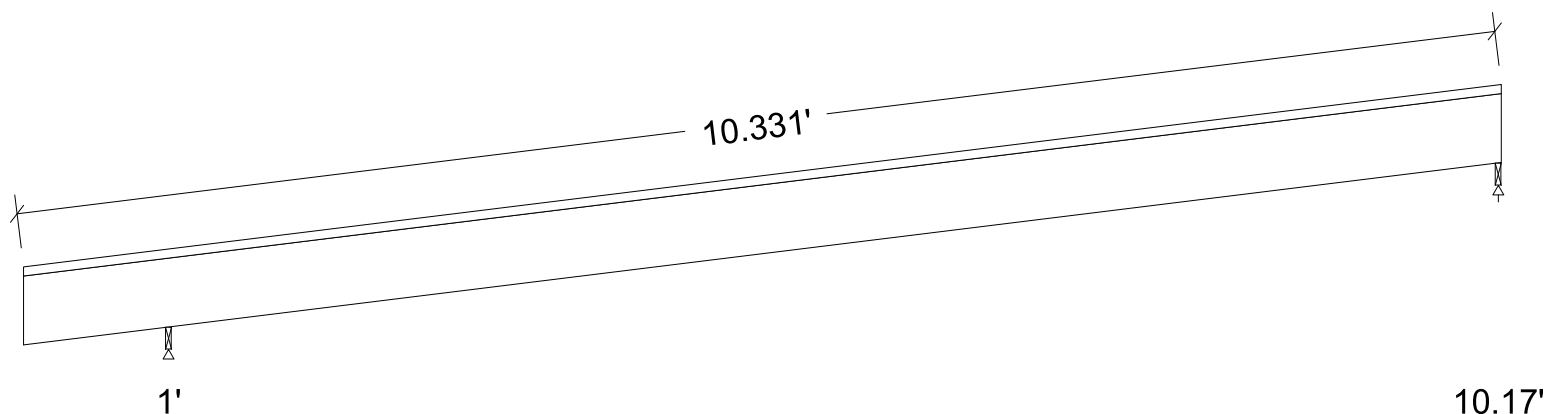
Solar stack - Roof 2_final.wwb

Design Check Calculation Sheet
WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
D-ROOF	Dead	Full Area	No			12.00	(24.0")	psf
S1	Snow	Full Area	No			23.10	(24.0")	psf
D-PV	Dead	Partial Area	No	0.40	4.10	9.30	(24.0")	psf
L1	Roof live	Partial Area	No	4.10	10.10	20.00	(24.0")	psf

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



Unfactored:			
Dead		197	120
Snow		260	210
Roof Live		80	160
Factored:			
Total		458	331
Bearing:			
F' _{theta}		433	433
Capacity			
Joist		1137	650
Support		1055	1055
Des ratio			
Joist		0.40	0.51
Support		0.43	0.31
Load comb		#3	#3
Length		0.50*	0.50*
Min req'd		0.50*	0.50*
Cb		1.75	1.00
Cb min		1.75	1.00
Cb support		1.13	1.13
F _{cp sup}		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, 3"x5-11/16"

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

Roof joist spaced at 24" c/c; Total length: 10.44'; Clear span(horz): 1', 9.125'; Volume = 1.2 cu.ft.; Pitch: 2/12

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

This section PASSES the design code check.

WARNING: This CUSTOM SIZE is not in the database. Refer to online help.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024



Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 29	Fv' = 155	psi	fv/Fv' = 0.19
Bending(+)	fb = 569	Fb' = 1504	psi	fb/Fb' = 0.38
Bending(-)	fb = 29	Fb' = 1504	psi	fb/Fb' = 0.02
Deflection:				
Interior Live	0.11 = L/980	0.62 = L/180	in	0.18
Total	0.22 = L/504	0.93 = L/120	in	0.24
Cantil. Live	-0.04 = L/313	0.14 = L/90	in	0.29
Total	-0.08 = L/158	0.20 = L/60	in	0.38

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	1.000	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	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

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 = 371, V design = 328 lbs; M(+) = 768 lbs-ft; M(-) = 39 lbs-ft

EIy = 64.47 lb-in²

"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

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.
6. The critical deflection value has been determined using maximum back-span deflection. Cantilever deflections do not govern design.

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024

APPROVED
 Montgomery County
 Historic Preservation Commission



Project Property Owner Scott Greenberger

Address 7128 Willow Ave, Takoma Park, MD 20912, USA

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 (27) panels supported by the rack system, as shown on the drawings prepared for the above referenced address. I certify that the configurations and design criteria meet the standards and requirements of the International Residential Code (IRC) and International Existing Building Code (IEBC) adopted by Montgomery County in COMCOR08.00.02.

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

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

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

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

49993
Maryland PE License Number

Date November 4, 2024

Signature David C. Hernandez, PE
Digitally signed by David C. Hernandez,
Date: 2024.11.03 18:52:23 -05:00

Seal



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.
11/03/24

Must be submitted with plans

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:28 am, Nov 20, 2024





Property Owners Name: Scott Greenberger

Property Owners Address: 7128 Willow Avenue, Takoma Park, MD 20912

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: 11/01/2024

Signature: *Matt Heun*

REVIEWED

By Laura DiPasquale, M-NCPPC at 11:30 am, Nov 20, 2024