

MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION
STAFF REPORT

Address: 508 New York Avenue, Takoma Park **Meeting Date:** 2/22/2023
Resource: Non-Contributing Resource **Report Date:** 2/15/2023
 Takoma Park Historic District **Public Notice:** 2/8/2023
Applicant: Julie Finegan **Tax Credit:** N/A
 (Zayn Bradley, Agent)
Review: HAWP **Staff:** John Liebertz
Permit Number: 1019618
PROPOSAL: Solar panel installation.

STAFF RECOMMENDATION

Staff recommends that the Historic Preservation Commission (HPC) **approve** the HAWP application.

ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Non-Contributing Resource within the Takoma Park Historic District
STYLE: Modern
DATE: c. 1937

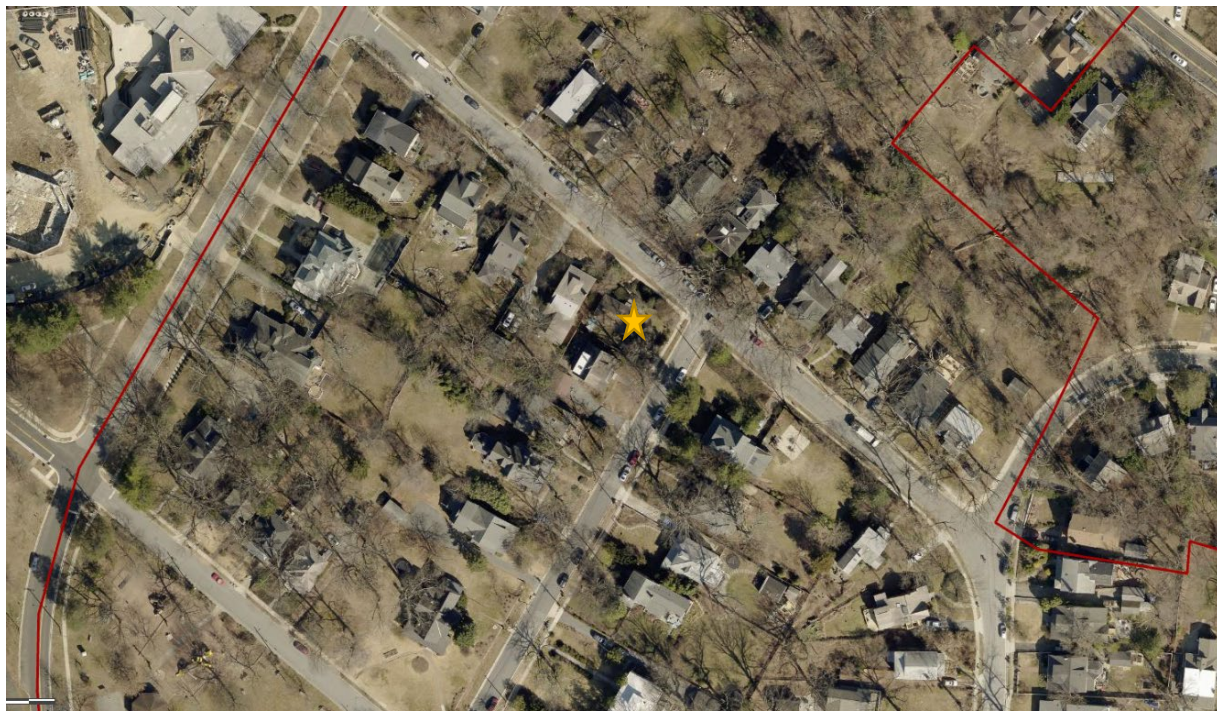


Figure 1: The subject property at 508 New York Avenue is located at the southwest corner of the intersection of New York Avenue and Buffalo Avenue. The yellow star is the location of the subject house and the red outline is the boundary of the Master Plan Historic District.

PROPOSAL

The applicant proposes to install fourteen (14) roof-mounted solar panels split into two equal arrays on the northern (front) and southern (rear) slopes of the hipped roof.

APPLICABLE GUIDELINES

The Historic Preservation Office and Historic Preservation Commission (HPC) consult several documents when reviewing alterations and new construction within the Takoma Park Historic District. These documents include the historic preservation review guidelines in the approved and adopted amendment for the *Takoma Park Historic District (Guidelines)*, *Montgomery County Code Chapter 24A (Chapter 24A)*, the *Secretary of the Interior's Standards for Rehabilitation (Standards)*, and *Historic Preservation Commission Policy No. 20-01 ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS*. The pertinent information in these four documents is outlined below.

Takoma Park Historic District Guidelines

There are two broad planning and design concepts which apply to all categories. These are:

- The design review emphasis will be restricted to changes that are all visible from the public right-of-way, irrespective of landscaping or vegetation (it is expected that the majority of new additions will be reviewed for their impact on the overall district), and
- The importance of assuring that additions and other changes to existing structures act to reinforce and continue existing streetscape, landscape, and building patterns rather than to impair the character of the historic district.

The Guidelines contain the following statements pertaining to Non-Contributing/Out-of-Period Resources:

- Non-Contributing/Out-of-Period Resources are either buildings that are of little or no architectural and historical significance to the historic district or are newer buildings that have been constructed outside of the district's primary periods of historical importance. These types of resources should receive the most lenient level of design review.
- Most alterations and additions to Non-Contributing/Out-of-Period Resources should be approved as a matter of course. The only exceptions would be major additions and alterations to the scale and massing of Non-Contributing/Out-of-Period Resources which affect the surrounding streetscape and/or landscape and could impair the character of the historic district as a whole.

Montgomery County Code, Chapter 24A-8

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

- (b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to ensure conformity with the purposes and requirements of this chapter, if it finds that:
 - (1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or

- (2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or

- (d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

Secretary of the Interior’s Standards for Rehabilitation

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

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

- 9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

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

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

Now, THEREFORE:

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

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

WHEREAS, the County Council has established a Climate Emergency;

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

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

WHEREAS, the widespread use of solar panels, both for hot water and for electricity production, will reduce greenhouse gases in the county, in accordance with the aims of the Emergency Climate

Mobilization resolution (Resolution No.: 18-974), it shall be the policy of the Historic Preservation Commission that:

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

STAFF DISCUSSION

The subject property constructed ca. 1937 is a Non-Contributing Resource to the Takoma Park Historic District. The dwelling has a prominent location and high visibility at the southwest corner of New York and Buffalo avenues. The one-story house has a parged concrete block structural system capped with an asphalt shingle hipped roof. The resource has undergone few alterations since its construction. In 2017, the Historic Preservation Commission approved HAWP 37/03-17VV that permitted the replacement of three existing skylights.¹



Figure 2: Original advertisement for 508 New York Avenue (formerly 117 New York Avenue), 1937 (left), and view of the north elevation, 2023.

Source: Washington Post, June 20, 1937 (left). Montgomery Planning (right).

The current proposal is to install fourteen (14) roof-mounted solar panels split into two equal arrays on the northern (front) and southern (rear) slopes of the hipped roof. The panels will be: 1) flush mounted; 2) follow the existing slope; and 3) be equal to or less than six inches from the roof to the face of the panel. All conduits will be in the attic and the utility disconnect will be placed on the northern corner of the west (side) elevation adjacent to the existing utility meter.

¹ For more information, <https://montgomeryplanning.org/wp-content/uploads/2017/02/I.F-508-New-York-Avenue-Takoma-Park.pdf>



Figure 3: Aerial view of the property, ca 2021. The red arrows point to the proposed locations for the solar panels on the front and rear roof slopes of the non-contributing building. The yellow outline is the approximate property boundary. The orange “x”s are Outstanding Resources in the historic district.
Source: ConnectExplorer.

Staff finds that the proposal is consistent with the applicable guidelines. The use of a freestanding solar array is not possible due to the constraints of the lot and existing tree canopy. The property contains no accessory buildings (outbuildings, garages, etc.) to install the panels on which necessitates their installation on the roof of the house. The *Guidelines* stipulate that alterations to Non-Contributing Resources should be approved as a matter of course unless the scale or massing of the alteration affects the surrounding streetscape and/or landscape or could impair the character of the overall district. While the placement of the panels on just the rear elevation is preferable, the array would be unable to support the energy usage of the household. In addition, the design of the western (side elevation) roof slope prohibits the installation of panels as well. Therefore, staff supports the installation of the panels on the northern (front) slope.

The proposed arrays will not affect the overall massing or scale of the dwelling or the surrounding district due to its flush-mounting and low-profile. While there are three Outstanding Resources (recognized for their architectural significance) within the primary viewshed of the subject property (*Fig. 3*), staff finds that the panels will not adversely affect the streetscape.

Staff finds that the proposed panels have an organized configuration, are mounted less than or equal to six inches above the surface of the roof (from the roof to the face of the panel) and follow the existing slope. In addition, the panels are setback appropriately from the edge and ridge of the roof. All conduits are located within the attic. While the inverter is placed within view of the public right-of-way on the northern extent of the west (side) elevation, it is adjacent to an existing utility meter and will not further diminish the integrity of the streetscape. All these alterations (panels, inverters, etc.) could be removed at a future date with no impairment to the historic district.

Therefore, based on the *Takoma Park Historic District Guidelines and Policy Guidance #20-01: Solar Technology (2021)* staff finds that the alterations are compatible with the historic district and supports the proposal.

After full and fair consideration of the applicant’s submission, staff finds the proposal, as modified by the condition, consistent with the Criteria for Issuance in Chapter 24A-8(b)(1), (2) and (d), having found the proposal is consistent with the *Secretary of the Interior’s Standards for Rehabilitation #2, #9, and #10,*

Takoma Park Historic District Guidelines, and Policy Guidance #20-01: Solar Technology (2021) outlined above.

STAFF RECOMMENDATION

Staff recommends that the Commission **approve** the HAWP application under the Criteria for Issuance in Chapter 24A-8(b), (1), (2) & (d), having found that the proposal, as modified by the condition, is consistent with the *Takoma Park Historic District Guidelines*, and therefore will not substantially alter the exterior features of the historic resource and is compatible in character with the district and the purposes of Chapter 24A;

and in conformance with HPC *Policy No.20-01*;

and with the *Secretary of the Interior's Standards for Rehabilitation #2, #9, and #10*.

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

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

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make any alterations to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-563-3400 or john.liebertz@montgomeryplanning.org to schedule a follow-up site visit.



APPLICATION FOR HISTORIC AREA WORK PERMIT
HISTORIC PRESERVATION COMMISSION
301.563.3400

FOR STAFF ONLY:
HAWP#
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:

- 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

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

Owner's mailing address	Owner's Agent's mailing address
Adjacent and confronting Property Owners mailing addresses	
7426 Buffalo venue, Takoma Park 20912 511 New York Avenue, Takoma Park MD 20912	7427 Buffalo Avenue, Takoma Park MD 20912 515 New York Avenue, Takoma Park MD 20912

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:

Work Item 1: _____	
Description of Current Condition:	Proposed Work:

Work Item 2: _____	
Description of Current Condition:	Proposed Work:

Work Item 3: _____	
Description of Current Condition:	Proposed Work:

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

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









Sustainable Energy Systems LLC

4509 Metropolitan Court Unit H

Frederick, MD 21704

(301) 788-4003



To whom it may concern:

The panels on the front elevation of 508 New York Ave must be placed there as it is the only other optimal location beyond the rear elevation.

The panels located on the rear of the home will not be able to support the energy usage of this household. The roof gable on the additional two roof planes does not allow enough room to install panels while following the proper building codes.

Additionally, this property does not have a detached structure to install panels nor does tree coverage allow for free standing panels.

Kind Regards,

Sustainable Energy Systems

Aurora Shade Report

Customer

Julie Finegan

Designer

Rollie Belles

Organization

Sustainable Energy
Systems

Address

508 New York Ave
Takoma Park, MD 20912,
USA

Coordinates

(38.983140, -77.019057)

Date

21 September 2022

Annual irradiance



Summary

Array	Panel Count	Azimuth (deg.)	Pitch (deg.)	Annual TOF (%)	Annual Solar Access (%)	Annual TSRF (%)
1	7	209	23	97	63	61
2	7	29	23	69	73	50
Weighted average by panel count	-	-	-	-	68	55.8

Monthly solar access (%) across arrays

Array	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	58	50	50	63	75	79	77	68	51	49	54	61
2	69	59	58	72	82	87	85	74	60	51	64	67

Customer

Julie Finegan

Designer

Rollie Belles

Organization

Sustainable Energy

Address

508 New York Ave
Takoma Park, MD 20912,
USA

Coordinates

(38.983140, -77.019057)

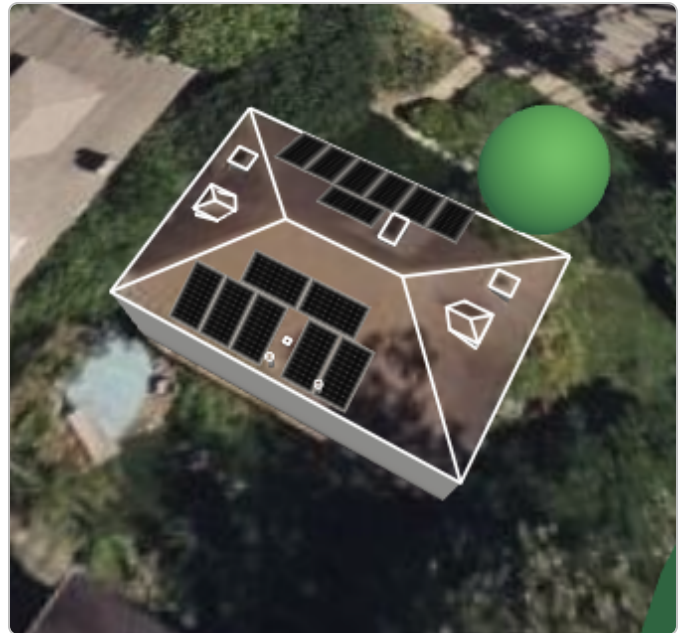
**Systems
Date**

21 September 2022

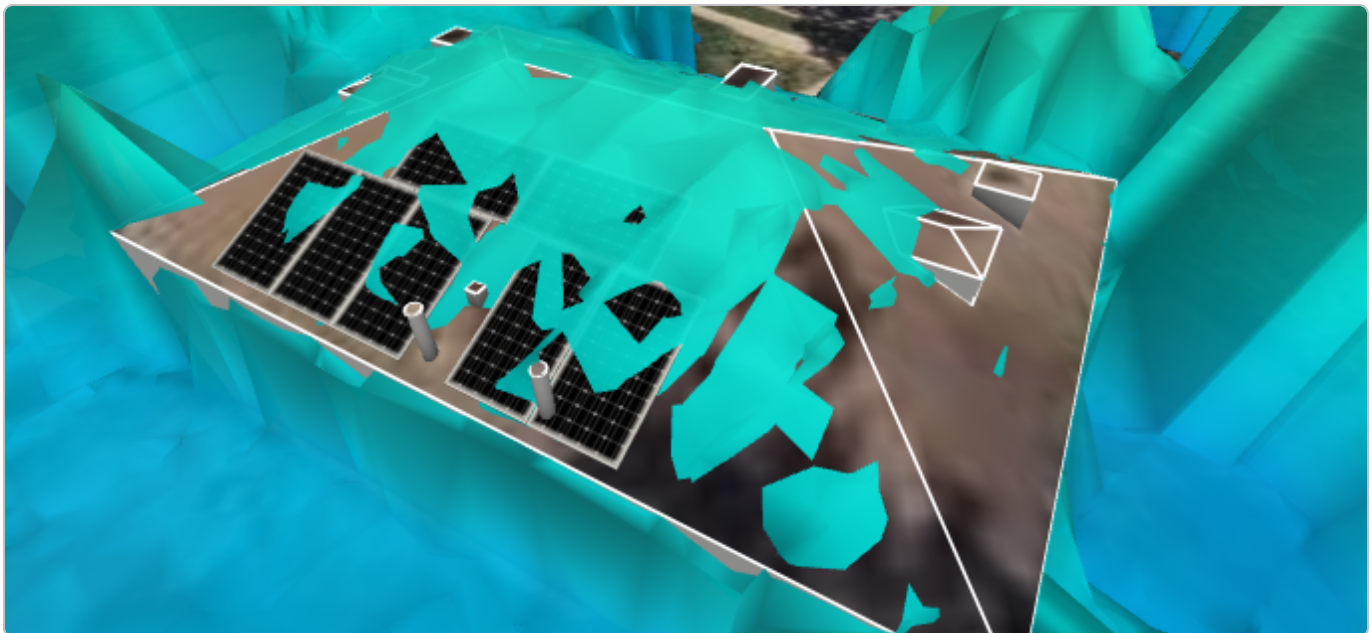
Zoomed out satellite view



3D model



3D model with LIDAR overlay  13 ft



Customer

Julie Finegan

Designer

Rollie Belles

Organization

Sustainable Energy
Systems
Date

Address

508 New York Ave
Takoma Park, MD 20912,
USA

Coordinates

(38.983140, -77.019057)

21 September 2022


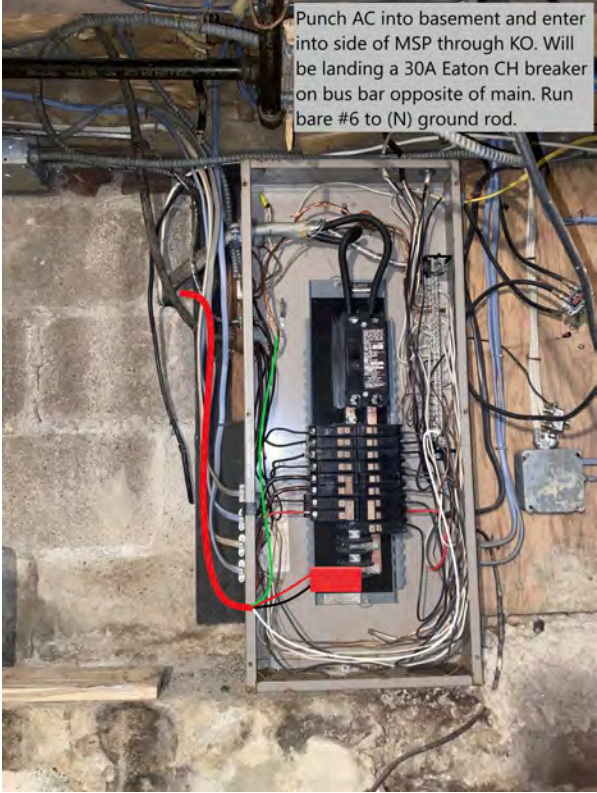
Street view and corresponding 3D model



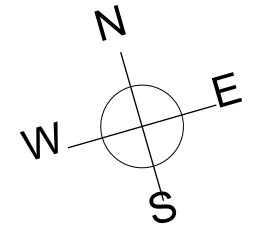
I, **Rollie Belles**, certify that I have generated this shading report to the best of my abilities, and I believe its contents to be accurate.

SOLAR PV PROJECT, FINEGAN, JULIE 5.670 kW

508 New York Ave, Takoma Park, MD 20912

DRAWING INDEX	BOS DRAWINGS	MSP DRAWINGS
<p>G000 COVER Z001 SITE PLAN S001 ARRAY LAYOUT S002 SECTION E001 ONE LINE CUTSHEETS</p> <p>◆SCOPE OF WORK: Installing 14 Asphalt Roof Mounted Solar Panels - 5.670 kW</p>	 <p>Punch out of soffit, bend conduit over (E) SEC cable, and run straight down to enter into bottom of INV w/ conduit body w/ weephole. Punch AC in near (E) SEC punch-in to enter into basement.</p> <p>All conduits will be located within the roof</p>	 <p>Punch AC into basement and enter into side of MSP through KO. Will be landing a 30A Eaton CH breaker on bus bar opposite of main. Run bare #6 to (N) ground rod.</p>
<p>FINANCING: Cash</p>		
<p>Sales Person Contact:</p>		
<p>SES TARA (240) 520-7058</p>		
<p>APPROVED BY:</p>		

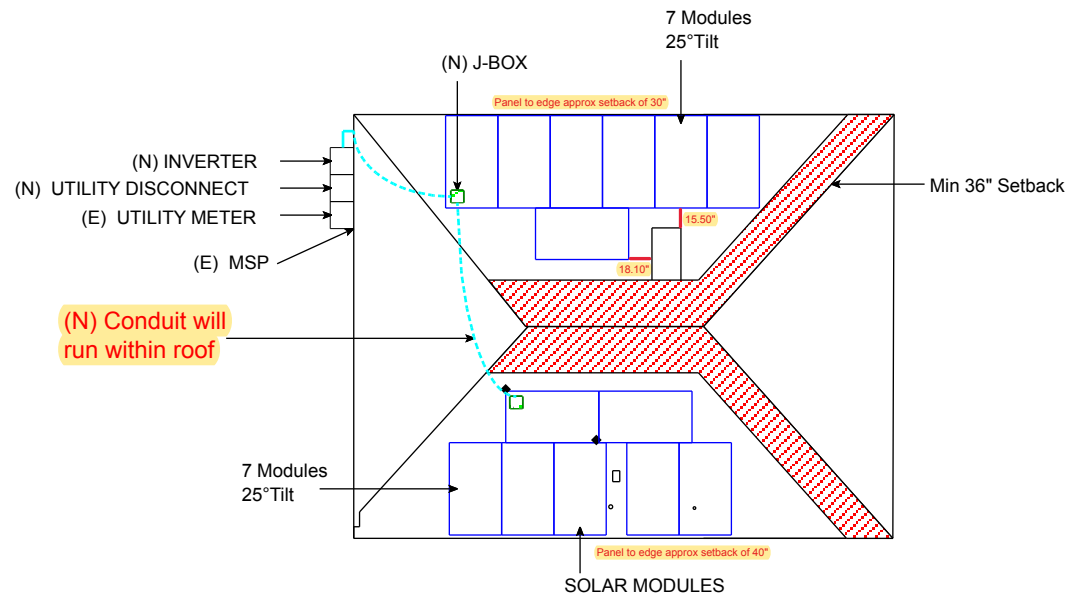
Julie Finegan 5.670 kW
508 New York Ave
Takoma Park, MD 20912
(504) 232-5085
jafinegan@live.com



Panels will be equal to or less than 6 inches from the roof to the face of the panel


New York Ave.

PANELS WILL BE FLUSHMOUNTED/
WILL FOLLOW SLOPE



Roof 1 Specs: Modules : 7 Pitch: 25° Azimuth: 209° Rafter Spacing: 16" O.C.	Roof 2 Specs: Modules : 7 Pitch: 25° Azimuth: 29° Rafter Spacing: 16" O.C.		
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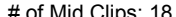
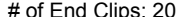






STRUCTURAL NOTES:
 1. MOUNTS ARE APPROXIMATE LOCATION BUT ACCURATELY SPACED
 2. MOUNTS SHOULD BE STAGGERED WHEN POSSIBLE TO EVENLY DISTRIBUTE LOAD
 3. DO NOT SPLICE RAILS IN MIDDLE 50% OF SPAN BETWEEN TWO MOUNTS
 4. ON TRUSS ROOF SYSTEMS, KEEP ATTACHMENTS 6" MIN. FROM NAIL PLATES

 PV MODULE SPECS:
 REC 405 Watt
 Module Weight: 45 lbs
 Module Length: 71.7"
 Module Width: 40"
 Frame: 1.2" (30mm)

Inverter: (1) SolarEdge SE5000H
 String 1- 14 modules

Racking: Everest

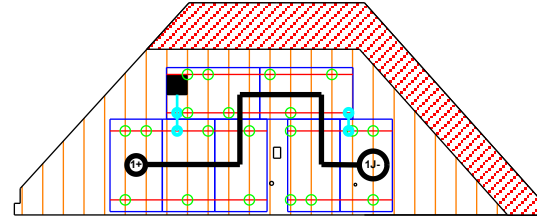
Optimizer: SolarEdge S440(1 per module)

-  Mount: 20+19=39
-  # of Rails: 9
-  # of Mid Clips: 18
-  # of End Clips: 20
-  # of Splices: 2
-  # of Grounding Lugs: 6
-  J-Box: 2
- 
-  String Homerun
-  String Jumper

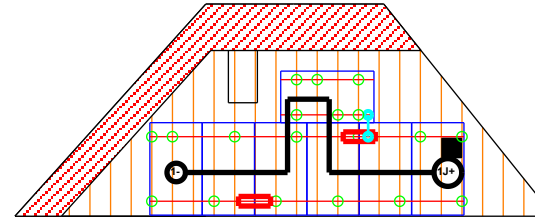
Julie Finegan 5.670 kW
 508 New York Ave
 Takoma Park, MD 20912
 (504) 232-5085
 jafinegan@live.com

ARRAY LAYOUT

ROOF 1:



ROOF 2:



SUSTAINABLE ENERGY SYSTEMS, LLC

301-569-2342

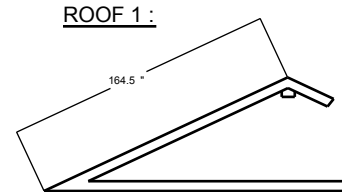
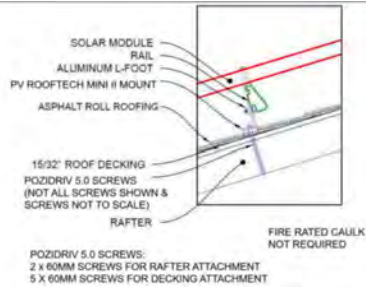
4509 METROPOLITAN CT, FREDERICK, MD, 21704

GP

S001

Julie Finegan 5.670 kW
 508 New York Ave
 Takoma Park, MD, 20912
 (504) 232-5085
 jafinegan@live.com

PV MODULE SPECS:
 REC 405 watt
 Module Weight: 45 lbs
 Module Length: 71.7"
 Module Width: 40"
 Frame: 1.2" (30mm)



ROOF 1 SPECS :
 2 x 6 Top Chord
 Rafter Spacing: 16"
 Roof Material: Asphalt

ROOF 2 SPECS :
 2 x 6 Top Chord
 Rafter Spacing: 16"
 Roof Material: Asphalt

ARRAY 1 SPECS :
 Pitch: 25°
 Azimuth: 209°
 # Of Modules: 7
 Total Module Weight: 315 lbs
 Racking Weight: 39.9 lbs
 Array Weight: 354.9 lbs
 Array Area: 139.3 sq.ft.
 Array Dead Load: 2.5 lbs/sq.ft.
 Number of Mounts: 20
 Load Per Mount: 17.75 lbs

ARRAY 2 SPECS :
 Pitch: 25°
 Azimuth: 29°
 # Of Modules: 7
 Total Module Weight: 315 lbs
 Racking Weight: 39.9 lbs
 Array Weight: 354.9 lbs
 Array Area: 139.3 sq.ft.
 Array Dead Load: 2.5 lbs/sq.ft.
 Number of Mounts: 19
 Load Per Mount: 18.68 lbs



Sustainable Energy Systems, LLC

301-569-2342

4509 METROPOLITAN CT, FREDERICK, MD, 21704

GP

S002 SECTION

PV MODULE SPECS

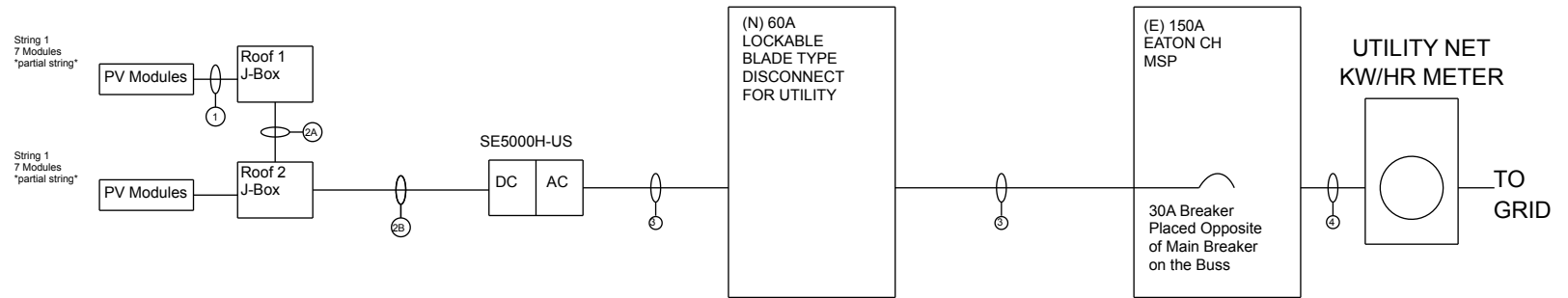
REC 405 watt
 Module Weight: 45 lbs
 Module Length: 71.7"
 Module Width: 40"
 Frame: 1.2" (30mm)

INVERTER 1 SPECS

SOLAREEDGE SE5000H-US
 OPERATING CURRENT (IMP): 13.5A
 OPERATING VOLTAGE (VMP): 380VDC
 MAX SHORT CIRCUIT CURRENT (ISC): 30A
 MAX SYSTEM VOLTAGE (VOC): 480VDC
 STRINGS: 1&2
 OCPD 30A

AC OUTPUT

SYSTEM VOLTAGE: 240 VAC
 SYSTEM AMPERAGE: 21A

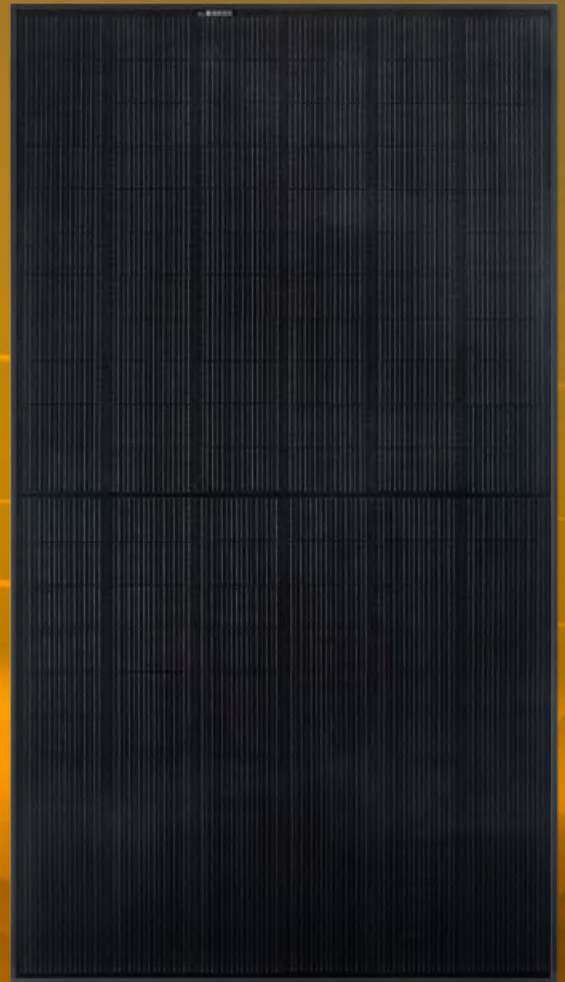


DC SOURCE CONDUCTORS - all conductors are Cu				AC SOURCE CONDUCTORS - all conductors are THHN/Cu *unless noted					
#	CONDUIT	CONDUCTOR	GROUND	#	CONDUIT	CONDUCTOR	NEUTRAL	GROUND	CT WIRE
1	NONE	(2) 10 AWG PV WIRE	(1) 8 AWG BARE	3	3/4" EMT	(2) 10 AWG (R,B)	(1) 10 AWG	(1) 8 AWG (G)	(4) 18 AWG (TP,BW)
2A	3/4"	(2) 10 AWG THHN (1Y, 1R)	(1) 8 AWG THHN						
2B	3/4"	(2) 10 AWG THHN (1B, 1R)	(1) 8 AWG THHN						
				4	(E) SEC	(2) 4/0 (R,B) Al	(1) 4/0 AWG Bare Al	NONE	NONE

Julie Finegan 5.670 kW
 508 New York Ave
 Takoma Park, MD 20912
 (504) 232-5085
 jafinegan@live.com

SUSTAINABLE ENERGY SYSTEMS, LLC	301-569-2342	4509 METROPOLITAN CT FREDERICK, MD 21704	E001 ONE LINE
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SOLAR'S MOST TRUSTED



REC ALPHA[®] PURE SERIES

PRODUCT SPECIFICATIONS

405WP
20.3 $\frac{W}{FT^2}$



ELIGIBLE

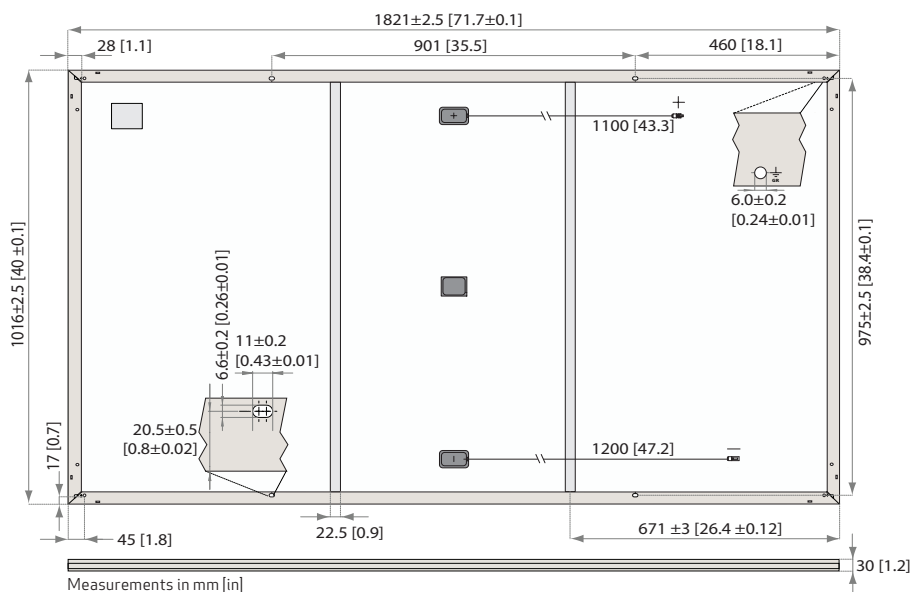


LEAD-FREE
ROHS COMPLIANT

EXPERIENCE



PERFORMANCE



GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology 6 strings of 22 cells in series	Connectors:	Stäubli MC4PV-KBT4/KST4, 12AWG (4mm ²) in accordance with IEC 62852 IP68 only when connected
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12AWG (4mm ²) PV wire, 43+47 in (1.1+1.2m) accordance with EN 50618
Backsheet:	Highly resistant polymer (black)	Dimensions:	71.7 x 40 x 1.2 in (1821 x 1016 x 30 mm)
Frame:	Anodized aluminum (black)	Weight:	45 lbs (20.5 kg)
Junction box:	3-part, 3 bypass diodes, IP68 rated in accordance with IEC 62790	Origin:	Made in Singapore

ELECTRICAL DATA

Product Code*: RECxxxAA Pure

	385	390	395	400	405
Power Output - P _{MAX} (Wp)	385	390	395	400	405
Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - V _{MPP} (V)	41.2	41.5	41.8	42.1	42.4
Nominal Power Current - I _{MPP} (A)	9.35	9.40	9.45	9.51	9.56
Open Circuit Voltage - V _{OC} (V)	48.5	48.6	48.7	48.8	48.9
Short Circuit Current - I _{SC} (A)	10.10	10.15	10.20	10.25	10.30
Power Density (W/sq ft)	19.3	19.6	19.8	20.1	20.3
Panel Efficiency (%)	20.8	21.1	21.3	21.6	21.9
Power Output - P _{MAX} (Wp)	293	297	301	305	309
Nominal Power Voltage - V _{MPP} (V)	38.8	39.1	39.4	39.7	40.0
Nominal Power Current - I _{MPP} (A)	7.55	7.59	7.63	7.68	7.72
Open Circuit Voltage - V _{OC} (V)	45.7	45.8	45.9	46.0	46.1
Short Circuit Current - I _{SC} (A)	8.16	8.20	8.24	8.28	8.32

Values at standard test conditions (STC: air mass AM1.5, irradiance 10.75 W/sq ft (1000 W/m²), temperature 77°F (25°C), based on a production spread with a tolerance of P_{MAX}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (N MOT: air mass AM1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s). *Where xxx indicates the nominal power class (P_{MAX}) at STC above.

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730 (Pending)
ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007, IEC 62941



WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	<25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply

MAXIMUM RATINGS

Operational temperature:	-40 ... +185°F (-40 ... +85°C)
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (146 lbs/sq ft)*
Maximum test load (rear):	-4000 Pa (83.5 lbs/sq ft)*
Max series fuse rating:	25 A
Max reverse current:	25 A

* See installation manual for mounting instructions.
Design load = Test load / 1.5 (safety factor)

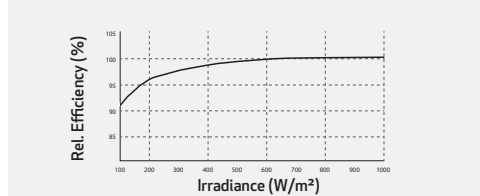
TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P _{MAX} :	-0.26 %/°C
Temperature coefficient of V _{OC} :	-0.24 %/°C
Temperature coefficient of I _{SC} :	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.



Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US



Optimized installation with HD-Wave technology

- / Specifically designed to work with power optimizers
- / Record-breaking efficiency
- / Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- / Fixed voltage inverter for longer strings
- / Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- / UL1741 SA certified, for CPUC Rule 21 grid compliance
- / Extremely small
- / Built-in module-level monitoring
- / Outdoor and indoor installation
- / Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

/ Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5 ⁽¹⁾							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, adjustable -0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600k Ω Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

⁽¹⁾ For other regional settings please contact SolarEdge support

⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated

/ Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

SE3000H-US SE3800H-US SE5000H-US SE6000H-US SE7600H-US SE10000H-US SE11400H-US

ADDITIONAL FEATURES

Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)
Revenue Grade Data, ANSI C12.20	Optional ⁽³⁾
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi station for local connection
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect

STANDARD COMPLIANCE

Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)
Emissions	FCC Part 15 Class B

INSTALLATION SPECIFICATIONS

AC Output Conduit Size / AWG Range	3/4" minimum / 14-6 AWG			3/4" minimum /14-4 AWG	
DC Input Conduit Size / # of Strings / AWG Range	3/4" minimum / 1-2 strings / 14-6 AWG			3/4" minimum / 1-3 strings / 14-6 AWG	
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174			21.3 x 14.6 x 7.3 / 540 x 370 x 185	in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6	lb / kg
Noise	< 25			<50	dBA
Cooling	Natural Convection				
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽⁴⁾				
Protection Rating	NEMA 4X (Inverter with Safety Switch)				

⁽³⁾ Revenue grade inverter P/N: SExxxxH-US000BNC4

⁽⁴⁾ Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

/ Power Optimizer

For North America

P370 / P400 / P401 / P485 / P505

Optimizer model (typical module compatibility)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96- cell modules)	P401 (for high power 60 and 72 cell modules)	P485 (for high-voltage modules)	P505 (for higher current modules)		
INPUT							
Rated Input DC Power ⁽¹⁾	370	400		485	505	W	
Absolute Maximum Input Voltage (Voc at lowest temperature)	60	80	60	125 ⁽²⁾	83 ⁽²⁾	Vdc	
MPPT Operating Range	8 - 60	8 - 80	8-60	12.5 - 105	12.5 - 83	Vdc	
Maximum Short Circuit Current (Isc)	11	10.1	11.75	11	14	Adc	
Maximum Efficiency						99.5	%
Weighted Efficiency						98.8	%
Overvoltage Category						II	
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)							
Maximum Output Current						15	Adc
Maximum Output Voltage	60			80		Vdc	
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)							
Safety Output Voltage per Power Optimizer						1 ± 0.1	Vdc
STANDARD COMPLIANCE							
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020			NEC 2014, 2017 & 2020	NEC 2014, 2017 & 2020		
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62109-1 (class II safety), UL1741						
Material	UL94 V-0, UV Resistant						
RoHS	Yes						
INSTALLATION SPECIFICATIONS							
Maximum Allowed System Voltage						1000	Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters						
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in	
Weight (including cables)	655 / 1.4	750 / 1.7	655 / 1.4	845 / 1.9	1064 / 2.3	gr / lb	
Input Connector	MC4 ⁽³⁾			Single or dual MC4 ⁽³⁾⁽⁴⁾	MC4 ⁽³⁾		
Input Wire Length	0.16 / 0.52, 0.9 / 2.95 ⁽⁴⁾	0.16 / 0.52	0.16 / 0.52, 0.9 / 2.95 ⁽⁴⁾	0.16 / 0.52	0.16 / 0.52	m / ft	
Output Wire Type / Connector	Double Insulated / MC4						
Output Wire Length	1.2 / 3.9					m / ft	
Operating Temperature Range ⁽⁵⁾	-40 to +85 / -40 to +185					°C / °F	
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100					%	

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed

(2) NEC 2017 requires max input voltage be not more than 80V

(3) For other connector types please contact SolarEdge

(4) For dual version for parallel connection of two modules use P485-4NMDMRM. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer connected to one PV module. When connecting a single module seal the unused input connectors with the supplied pair of seals

(5) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter ⁽⁶⁾⁽⁷⁾	Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P370, P400, P401 P485, P505	8	10	18	
Maximum String Length (Power Optimizers)		25	25	50	
Maximum Nominal Power per String	5700 ⁽⁸⁾ (6000 with SE7600-US - SE11400-US)	5250 ⁽⁸⁾	6000 ⁽⁹⁾	12750 ⁽¹⁰⁾	W
Parallel Strings of Different Lengths or Orientations	Yes				

(6) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf

(7) It is not allowed to mix P485/P505 with P370/P400/P401 in one string

(8) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to: <https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf>

(9) For 208V grid: it is allowed to install up to 7,200W per string when the maximum power difference between each string is 1,000W

(10) For 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W

Power Optimizer For Residential Installations

S440, S500, S500B



POWER OPTIMIZER

Enabling PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Faster installations with simplified cable management and easy assembly using a single bolt
- Module-level voltage shutdown for installer and firefighter safety
- Flexible system design for maximum space utilization
- Superior efficiency (99.5%)
- Compatible with bifacial PV modules

* Functionality subject to inverter model and firmware version

/ Power Optimizer

For Residential Installations

S440, S500, S500B

	S440	S500	S500B	UNIT
Rated Input DC Power ⁽¹⁾	440	500		W
Absolute Maximum Input Voltage (Voc)	60		125	Vdc
MPPT Operating Range	8 - 60		12.5 - 105	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15		Adc
Maximum Efficiency	99.5			%
Weighted Efficiency	98.6			%
Overvoltage Category	II			
OUTPUT DURING OPERATION				
Maximum Output Current	15			Adc
Maximum Output Voltage	60	80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)				
Safety Output Voltage per Power Optimizer	1 +/- 0.1			Vdc
STANDARD COMPLIANCE				
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011			
Safety	IEC62109-1 (class II safety), UL1741			
Material	UL94 V-0, UV Resistant			
RoHS	Yes			
Fire Safety	VDE-AR-E 2100-712:2013-05			
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage	1000			Vdc
Dimensions (W x L x H)	129 x 155 x 30		129 x 155 x 45	mm
Weight (including cables)	655			gr
Input Connector	MC4 ⁽²⁾			
Input Wire Length	0.1			m
Output Connector	MC4			
Output Wire Length	(+) 2.3, (-) 0.10			m
Operating Temperature Range ⁽³⁾	-40 to +85			°C
Protection Rating	IP68			
Relative Humidity	0 - 100			%

(1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.

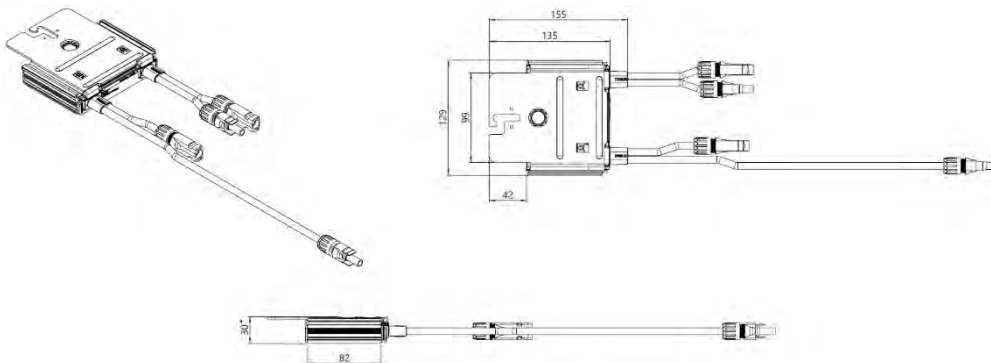
(2) For other connector types please contact SolarEdge.

(3) For ambient temperature above +70°C power de-rating is applied. Refer to [Power Optimizers Temperature De-Rating Technical Note](#) for details.

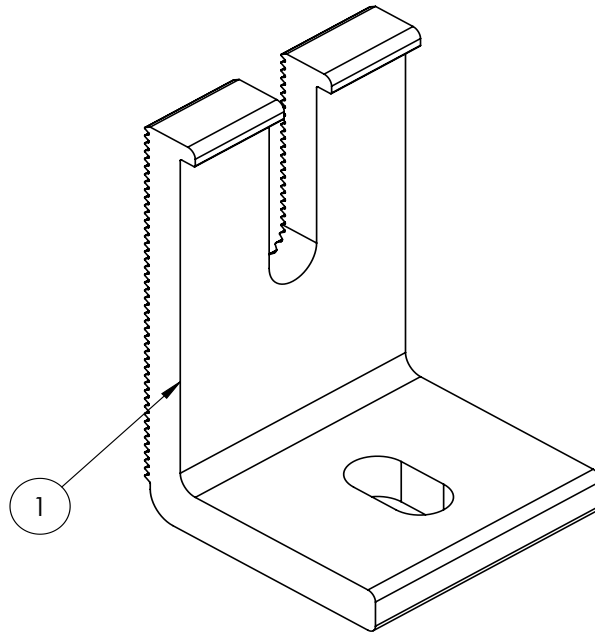
PV System Design Using a SolarEdge Inverter ⁽⁴⁾		Single Phase HD-Wave	Three Phase SExxK-RWB	Three Phase for 230/400V Grid	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	9	16	18	
	S500B	6	8		14	
Maximum String Length (Power Optimizers)		25	20		50	
Maximum Continuous Power per String		5700	5625	11250	12750	W
Maximum Allowed Connected Power per String (Permitted only when the power difference between strings is less than 2,000W)		See ⁽⁵⁾	See ⁽⁵⁾	13500	15000	W
Parallel Strings of Different Lengths or Orientations				Yes		

(4) It is not allowed to mix S-series and P-series Power Optimizers in new installations.

(5) If the inverter's rated AC power \leq maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to <https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf>.



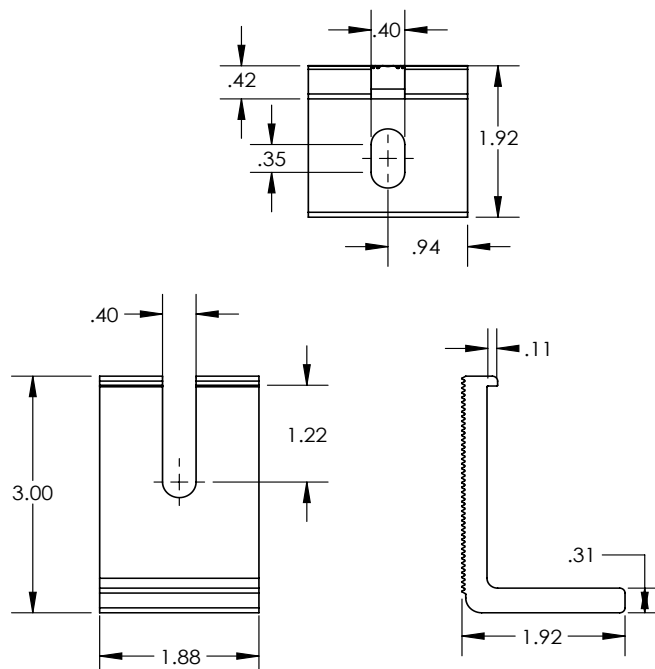
*45mm for S500B



ITEM NO	DESCRIPTION	QTY IN KIT
1	FOOT, EXTRUDED L - SLOTTED	4

PART NUMBER	DESCRIPTION
FM-LFT-003	Kit, 4Pcs, Slotted L-Foot, Mill
FM-LFT-003-B	Kit, 4Pcs, Slotted L-Foot, Black

1) Foot, Extruded L - Slotted



RT-MINI

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

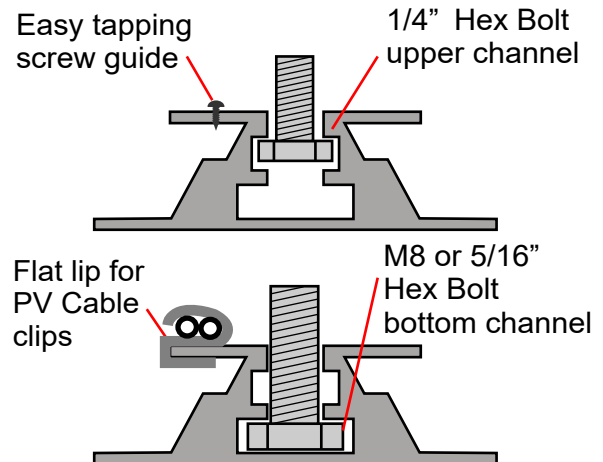
RT-MINI is suitable for mounting any rail system with a conventional L-Foot.



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



Installation Manual



RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

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

Components

RT2-00-MINIBK



MINI base : 20 ea.

Screw : 40 ea.

Extra RT-Butyl : 10 ea.

Optional item

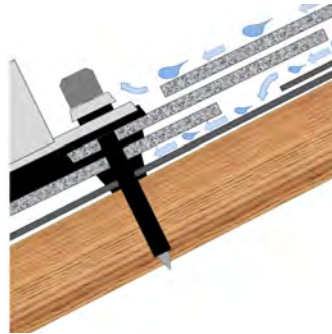
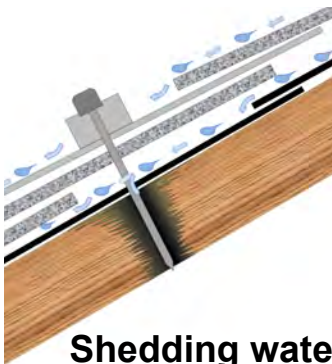
5 x 60mm Mounting screw (RT2-04-SD5-60) : 100 ea./Bag

5/16" Hex bolt, washer & nut set (RT-04-BN30SL-US) : 100 ea./Bag

RT-Butyl (RT2-04-BUTYLT) : 10 ea./Box

RT-Butyl is Roof Tech's flexible flashing used in one million residential PV systems for the last 26 years. It is the first PV mounting system with Flexible Flashing certified by the ICC. Engineered to withstand wind speeds up to 180 mph and ground snow up to 90 psf.

Metal Flashing Retrofit Flexible Flashing

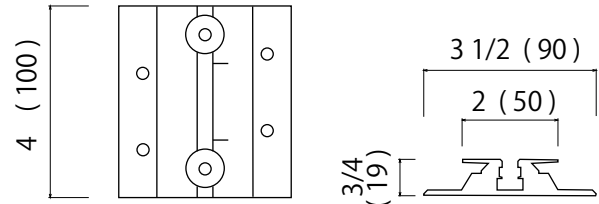


Shedding water? **100% Waterproof**

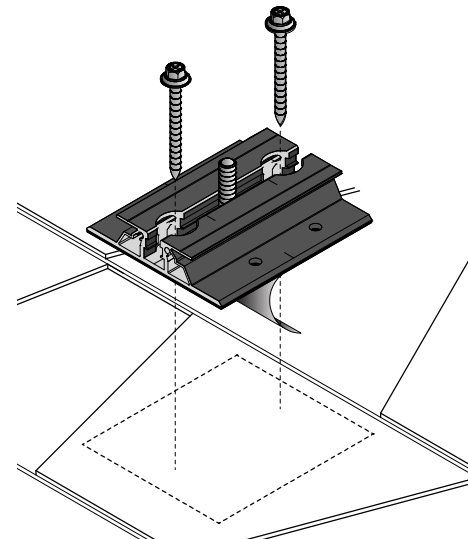
ICC ESR-3575 ASTM2140 testing UV testing (7500 hrs.)



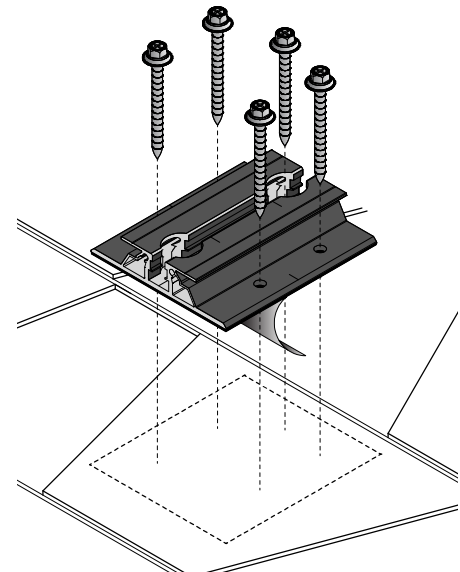
Dimensions in (mm)



Rafter installation



Deck installation



P.E. Stamped Letters available at www.roof-tech.us/support
TAS 100 A on metal and asphalt roof.

Roof Tech Inc.

www.roof-tech.us

info@roof-tech.us

10620 Trenea Street, Suite 230, San Diego, CA 92131

858.935.6064

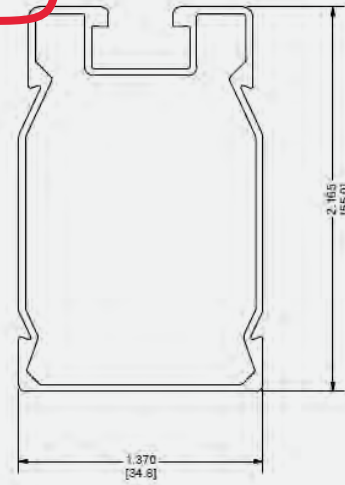
March 2020

SMR100 Rail



SMR100 Rail

Will be using SMR100



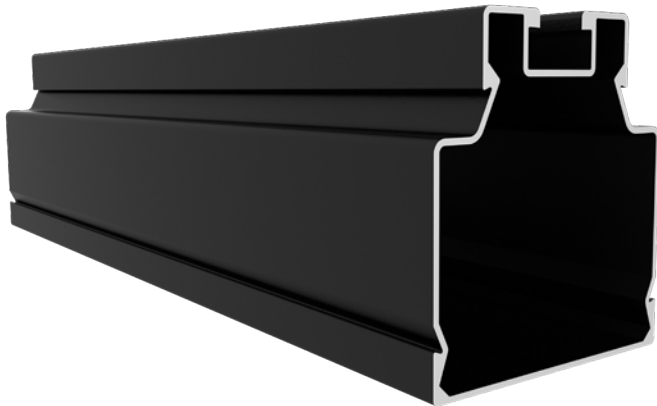
Mechanical Properties

Material: 6005-T5 Aluminum
 Weight: 0.4126 lbs/ft (0.614 kg/m)
 Ultimate Tensile Strength: 37.7 ksi (260 MPa)
 Yield Strength: 34.8 ksi (240 MPa)

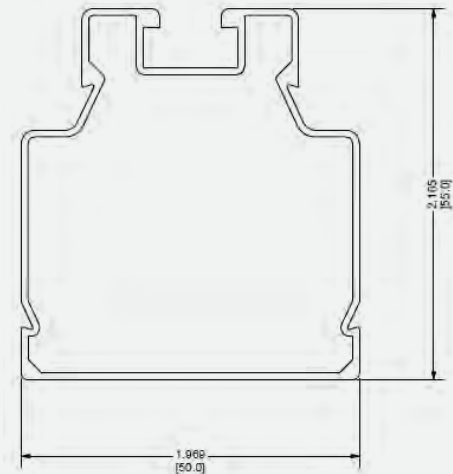
Section Properties

Sx: 0.196 in³ (3.21 cm³)
 Sy: 0.146 in³ (2.39 cm³)
 Area (X-section): 0.352 in² (2.27 cm²)

SMR200 Rail



SMR200 Rail



Mechanical Properties

Material: 6005-T5 Aluminum
 Weight: 0.645 lbs/ft (0.960 kg/m)
 Ultimate Tensile Strength: 37.7 ksi (260 MPa)
 Yield Strength: 34.8 ksi (240 MPa)

Section Properties

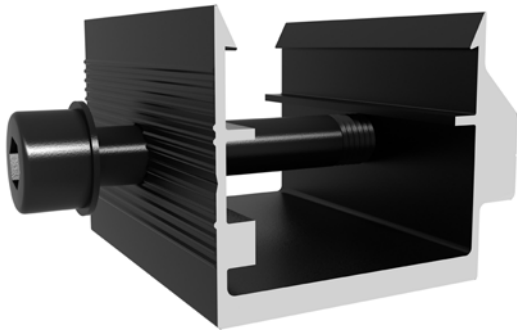
Sx: 0.321 in³ (5.26 cm³)
 Sy: 0.272 in³ (4.46 cm³)
 Area (X-section): 0.551 in² (3.55 cm²)

Part Number	Description
A20422-168-BK	SMR100 Rail, Black Anodized, 168"
A20453-168-BK	SMR200 Rail, Black Anodized, 168"
A20440-BK1	Rail End Cap, SMR100, Black
A20440-BK2	Rail End Cap, SMR200, Black

SMR Rail Splices



L-Foot Adaptors

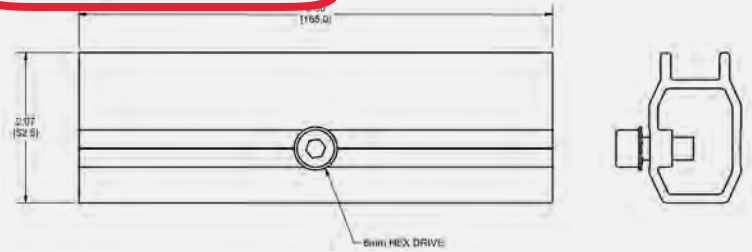


Part Number	Description
K10421-002	Structural Splice, SMR100
K10462-002	Structural Splice, SMR200
K10433-BK1	L Foot Adaptor, SMR100, Black
K10434-BK1	L Foot Adaptor, SMR200, Black

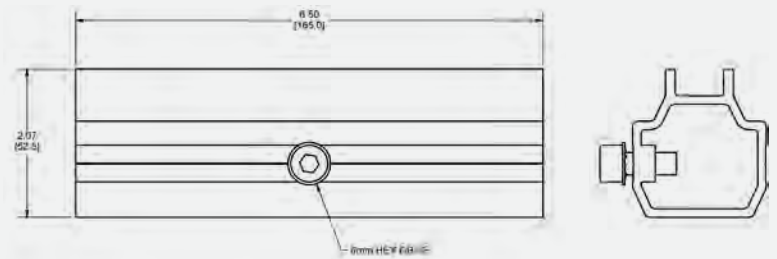
Cut Sheet

SMR100 Bonding Rail Splice

Will be using SMR100

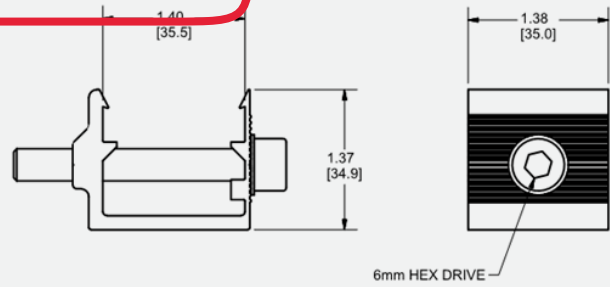


SMR200 Bonding Rail Splice

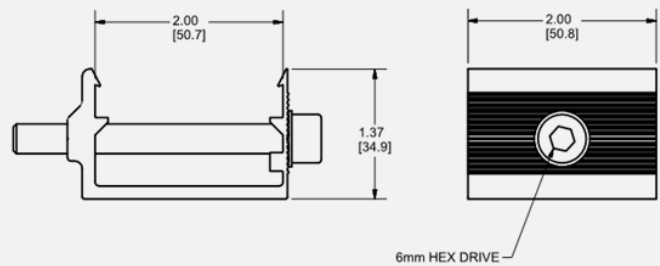


SMR100 L-Foot Adaptor

Will be using SMR100



SMR200 L-Foot Adaptor



Materials:

1. Extrusions 6005-T5 Aluminum
2. Hardware 304 Stainless Steel

Pop-On Mid Clamp



Pop-On End Clamp



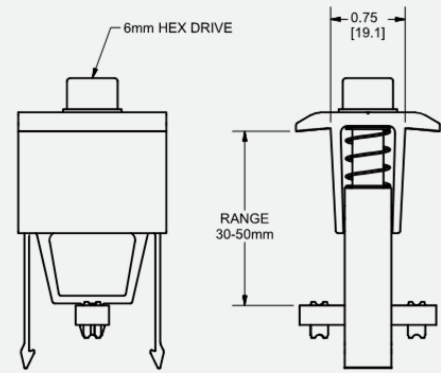
Shared Rail Mid/End Clamp



Part Number	Description
K10417-BK1	Mid Clamp, SMR Pop-On, Black
K10418-BK1	End Clamp, SMR Pop-On, Black
K10419-BK1	Shared Rail Mid Clamp, SMR Pop-On, Black
K10420-BK1	Shared Rail End Clamp, SMR Pop-On, Black

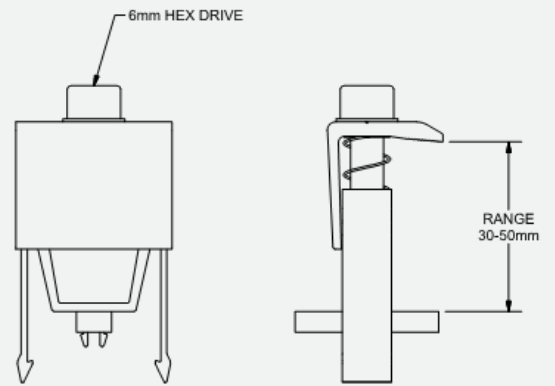
Pop-On Bonding Mid Clamp

Material: Aluminum



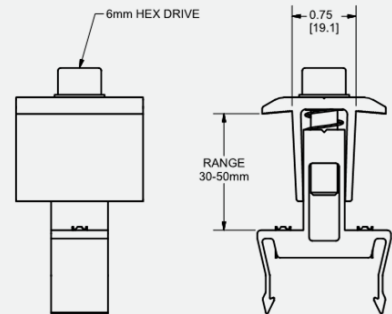
Pop-On End Clamp

Material: Aluminum



Shared Rail Bonding Mid Clamp

Material: Aluminum



Shared Rail End Clamp

Material: Aluminum

