

Sustainable Energy Systems, LLC

4509 Metropolitan Court

Frederick, MD 21704

Attn: Mr. Rollie Belles III

March 28, 2021

Re: 1678 32nd Street NW – Washington, DC 20007
Structural Certification.

Mr. Belles:

In accordance with your request I, Juan Utrera P.E. acting as an independent structural engineer for the project, located on 1678 32nd Street NW – Washington, DC 20007, have reviewed the information provided by Sustainable Energy Systems, LLC for the installation of solar panels on the existing roof system.

The proposed solar panels will add an additional 3 PSF of dead load to the roof framing system; the solar panels are to be supported using the Everest Cross Rail System and the L-Mount fastened to the existing roof framing at 72" O.C. maximum.

Conclusions & Recommendations:

Roof 1:

The existing roof rafters spaced @ 16" O.C. are structurally sound to support the additional 3 PSF imposed by the solar panels. Please 5.5 SF per mount location the rafters can support the 165 pounds of snow load imposed by the design ground snow load of 30 PSF. The installation of the panels has also been designed for 115 MPH wind speed required by code in the area.

Roof 2:

The existing roof trusses spaced @ 16" O.C. are structurally sound to support the additional 3 PSF imposed by the solar panels. Please 5.3 SF per mount location the rafters can support the 161 pounds of snow load imposed by the design ground snow load of 30 PSF. The installation of the panels has also been designed for 115 MPH wind speed required by code in the area.

Roof 3:

The existing roof rafters spaced @ 16" O.C. are structurally sound to support the additional 3 PSF imposed by the solar panels. Please 6.5 SF per mount location the rafters can support the 195 pounds of snow load imposed by the design ground snow load of 30 PSF. The installation of the panels has also been designed for 115 MPH wind speed required by code in the area.

The proposed solar panel collectors and the Everest Cross Rail System to support the collectors comply with the 2015 International Building Code (IBC) and the Uniform Solar Energy Code. The mounting hardware will work well with the existing roof framing.

Should you have any questions regarding the information submitted, or if I can be of further assistance please call me at (301) 748-2769.

Sincerely,

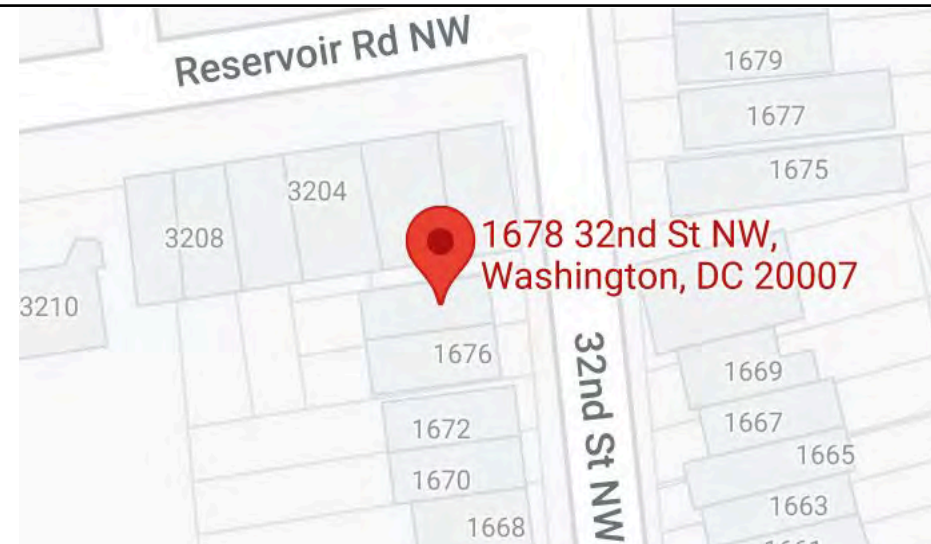
Juan M. Utrera, P.E.

Structural Engineering Unlimited, LLC

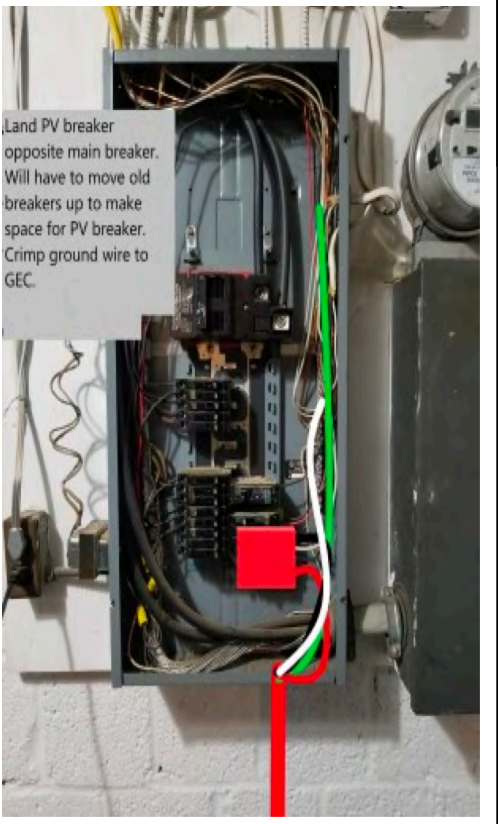
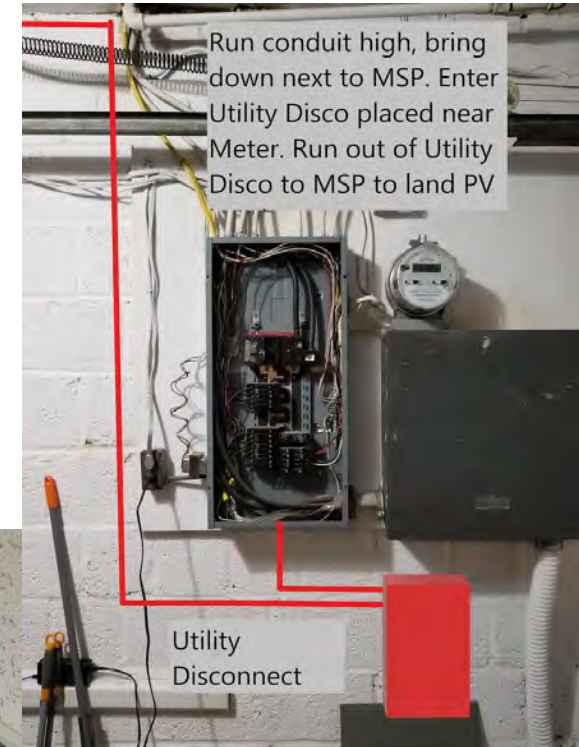


1678 32nd St NW, Washington, DC 20007

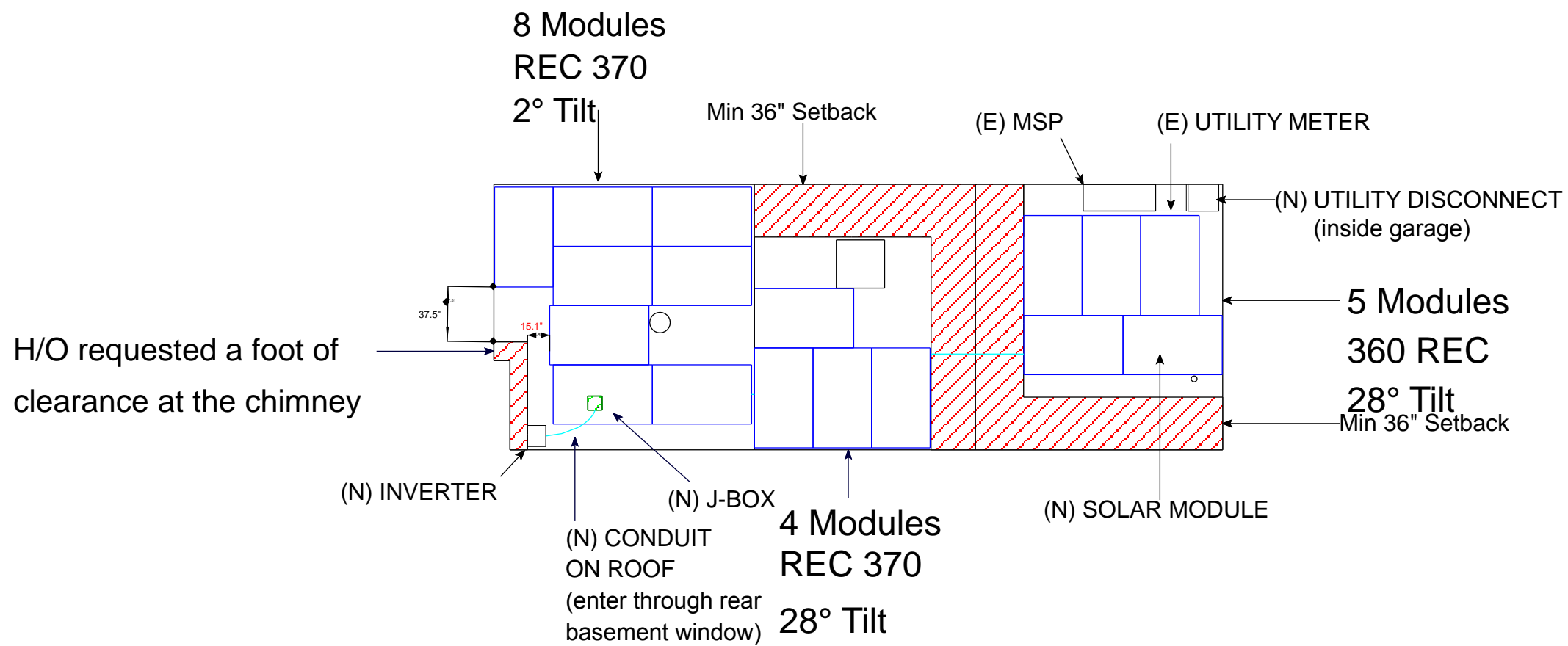
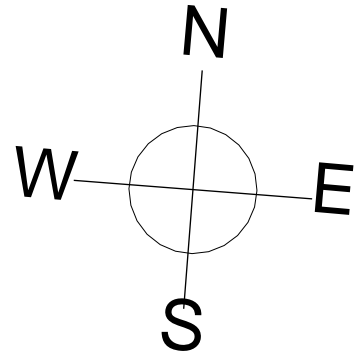
SOLAR PV PROJECT, KAPAN, TUMER 6.24 KW



DRAWING INDEX	CONDUIT / BOS / MSP DRAWINGS	
<p>G000 COVER Z001 SITE PLAN S001 ARRAY LAYOUT S002 SECTION A100 ELEVATION E001 ONE LINE E002 ELECTRICAL CALCS E003 LABELS CUTSHEETS</p>		
<p>SCOPE OF WORK: Installing 17 Roof Mounted Solar Panels - 6.24 kW</p> <p>Applicable Codes: ICC 2015 IRC 2015 IFC 2015 NEC 2014</p>		



Tumer Kapan 6.24 kW
 1678 32nd St NW
 Washington, DC 20007
 (202)674-0626
 tumerkapan@gmail.com



32nd St.

Roof 1 Specs: Modules : 5 Pitch: 28° Azimuth: 84° Rafter Spacing: 16" O.C.	Roof 2 Specs: Modules : 4 Pitch: 28° Azimuth: 264° Rafter Spacing: 16" O.C.	Roof 3 Specs: Modules : 8 Pitch: 2° Azimuth: 264° Rafter Spacing: 16" O.C.
---	--	---

ARRAY LAYOUT

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 360 watt
 REC 370 watt
 Module Weight: 43 lbs
 Module Length: 67.8"
 Module Width: 40"
 Frame: 1.2" (30mm)

REC 360 watt
 Module Weight: 41.7 lbs
 Module Length: 66.3"
 Module Width: 39.3"
 Frame: 1.5" (38 mm)

Inverter: (1) SolarEdge SE5000H-US
 String 1- 9 modules
 String 2- 8 modules

Racking: Everest / Chemlink

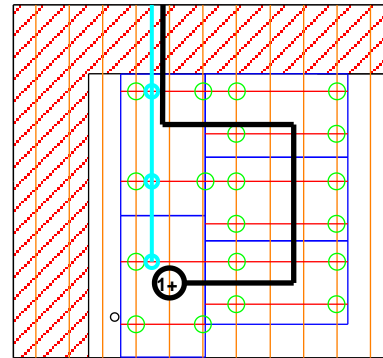
Optimizer: SolarEdge P370 (1 per module)

-  Mount: 19+14+23=56
-  # of Rails: 12
-  # of Mid Clips: 17
-  # of End Clips: 38
-  # of Splices: 0
- # of Grounding Lugs: 11
- J-Box: 1
-  String Homerun

Tumer Kapan 6.24
 1678 32nd St NW
 Washington, DC 20007
 (202) 674-0626
 tumerkapan@gmail.com

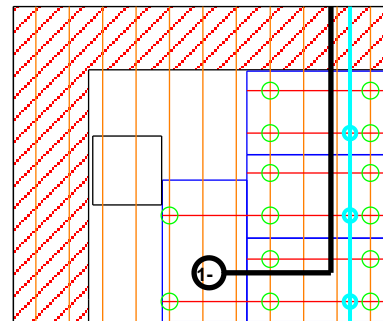
ROOF 1:

Height off roof: 4"

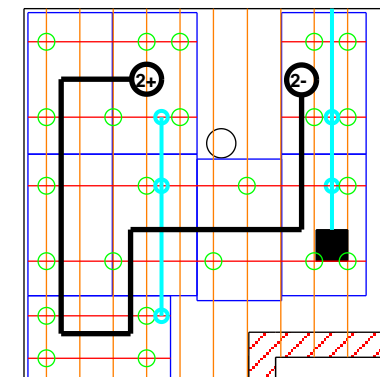


REC 360'S x5 ON
FRONT ROOF

ROOF 2:

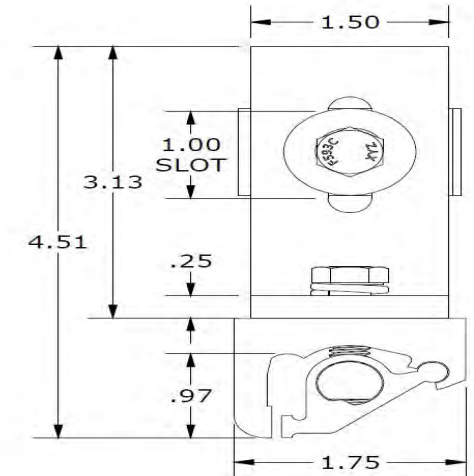
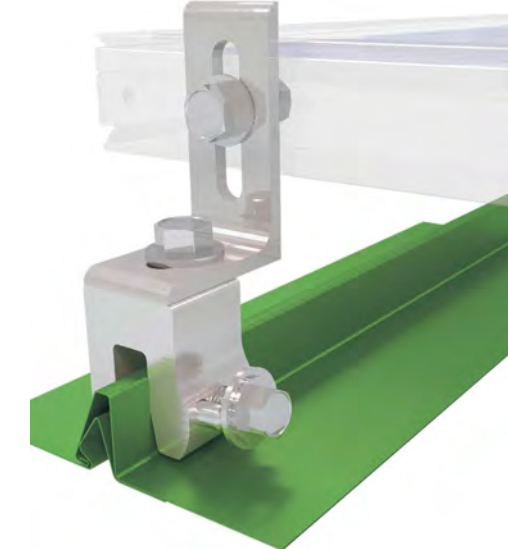
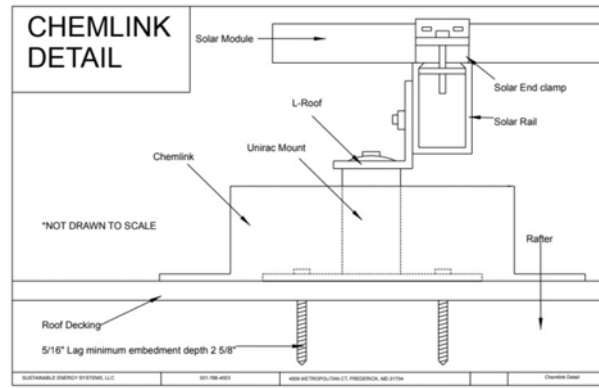


ROOF 3:



05/08/2021

Tumer Kapan 6.24
 1678 32nd St NW
 Washington, DC 20007
 (202)674-0626
 tumerkapan@gmail.com



PV MODULE SPECS:

REC 370 watt

Module Weight: 43 lbs
 Module Length: 67.8"
 Module Width: 40"
 Frame: 1.2" (30mm)

REC 360 watt

Module Weight: 41.7 lbs
 Module Length: 66.3"
 Module Width: 39.3"
 Frame: 1.5" (38mm)

ROOF 1 SPECS :
 2 x 8 Top Chord
 Rafter Spacing: 16"
 Roof Material: Metal

ROOF 2 SPECS :
 2 x 8 Top Chord
 Rafter Spacing: 16"
 Roof Material: Metal

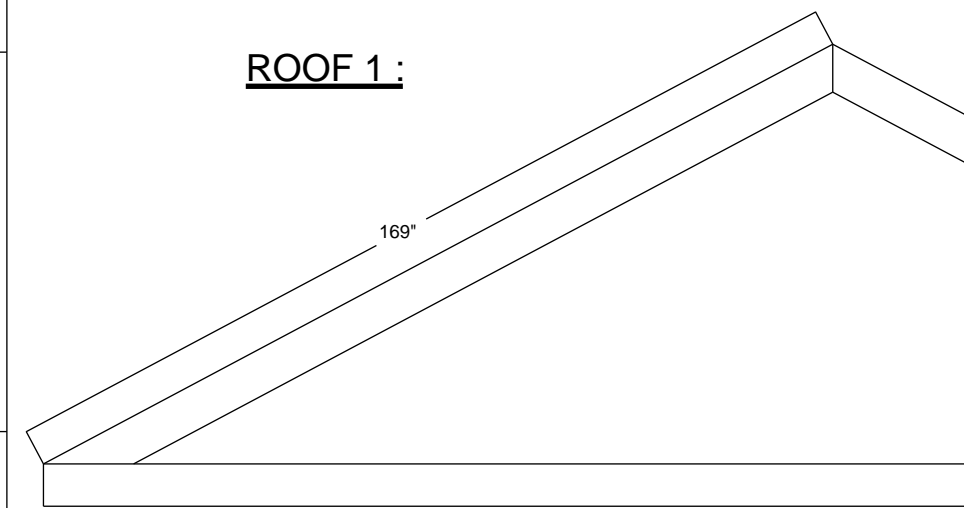
ROOF 3 SPECS :
 2 x 8 Top Chord
 Rafter Spacing: 16"
 Roof Material: TPO

ARRAY 1 SPECS :
 Pitch: 28°
 Azimuth: 84°
 # Of Modules: 5
 Total Module Weight: 215 lbs
 Racking Weight: 28.5 lbs
 Array Weight: 243.5 lbs
 Array Area: 94 sq.ft.
 Array Dead Load: 2.6 lbs/sq.ft.
 Number of Mounts: 17
 Load Per Mount: 14.3 lbs

ARRAY 2 SPECS :
 Pitch: 28°
 Azimuth: 264°
 # Of Modules: 4
 Total Module Weight: 172 lbs
 Racking Weight: 22.8 lbs
 Array Weight: 194.8 lbs
 Array Area: 75.2 sq.ft.
 Array Dead Load: 2.6 lbs/sq.ft.
 Number of Mounts: 14
 Load Per Mount: 13.9 lbs

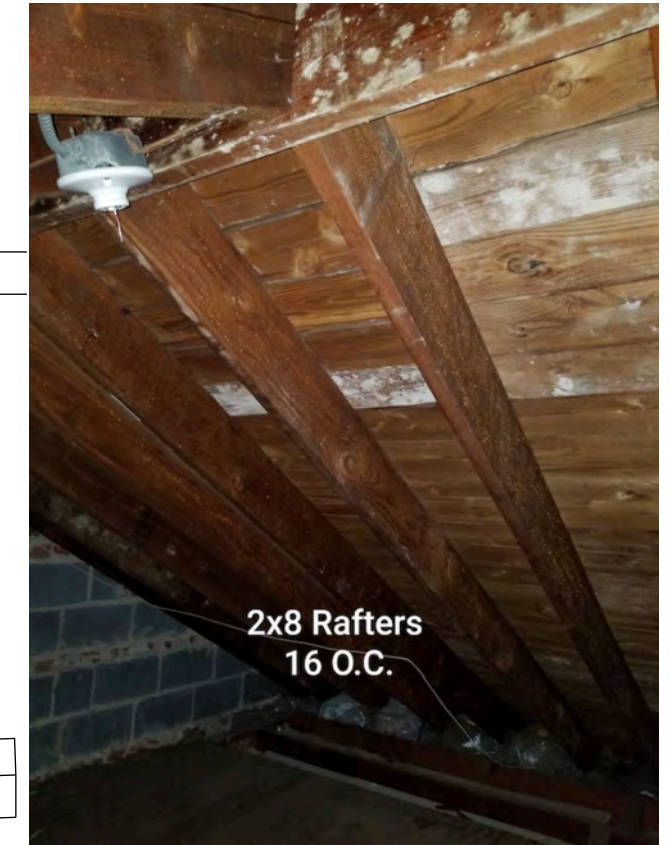
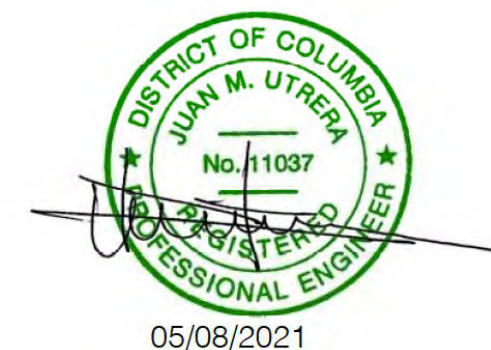
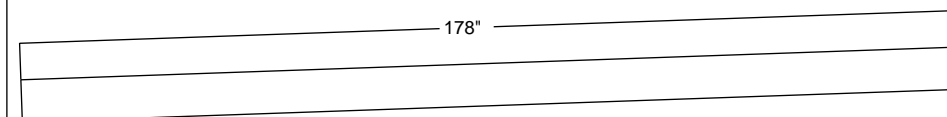
ARRAY 3 SPECS :
 Pitch: 2°
 Azimuth: 264°
 # Of Modules: 8
 Total Module Weight: 344 lbs
 Racking Weight: 45.6 lbs
 Array Weight: 389.6 lbs
 Array Area: 150.4 sq.ft.
 Array Dead Load: 2.6 lbs/sq.ft.
 Number of Mounts: 23
 Load Per Mount: 16.9 lbs

ROOF 1 :

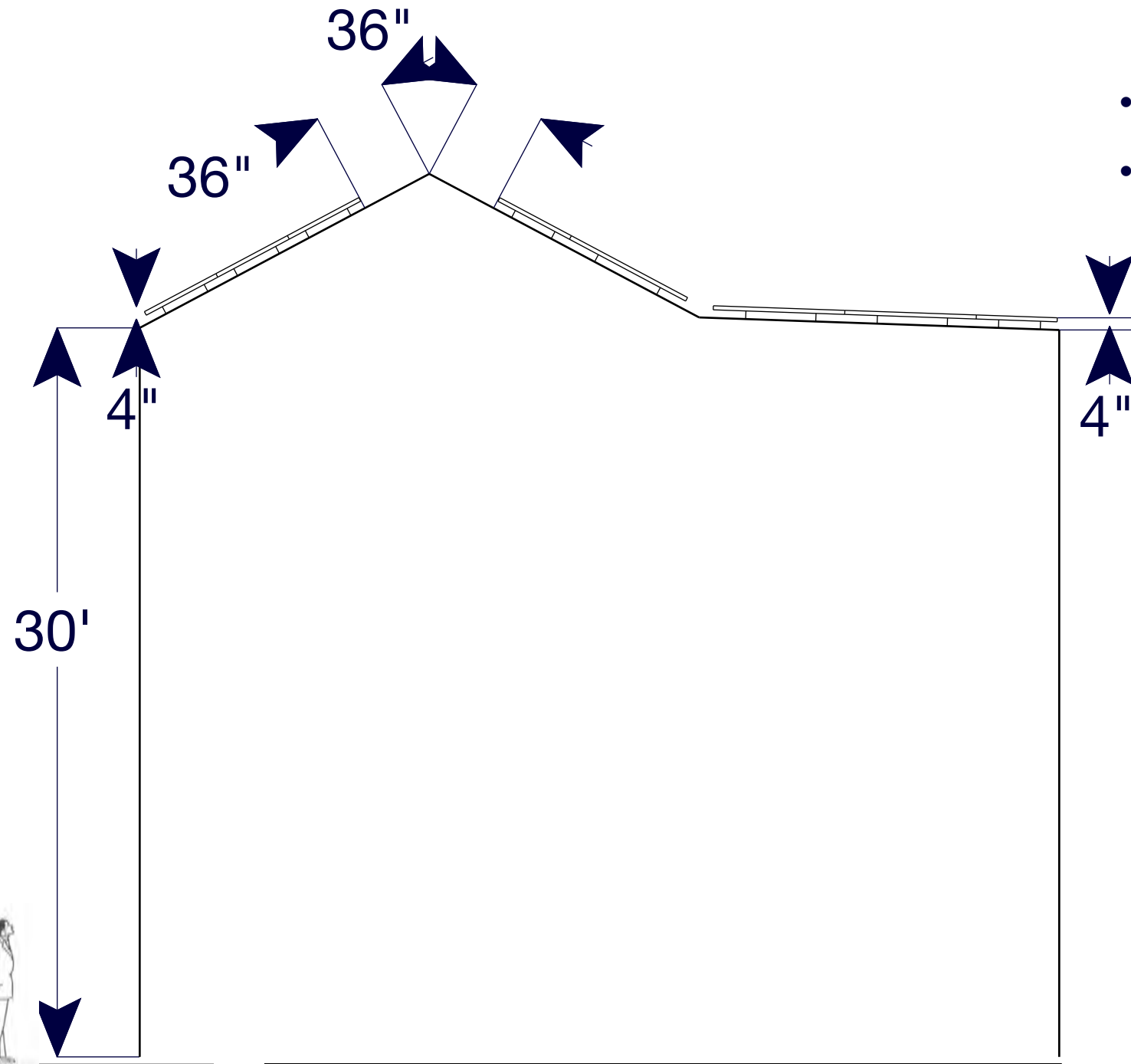


ROOF 2 :

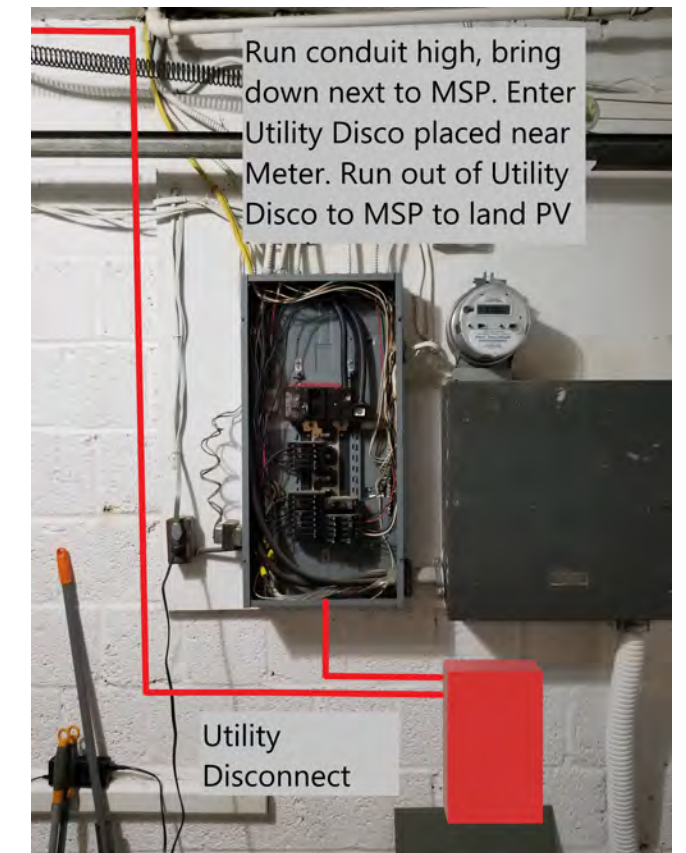
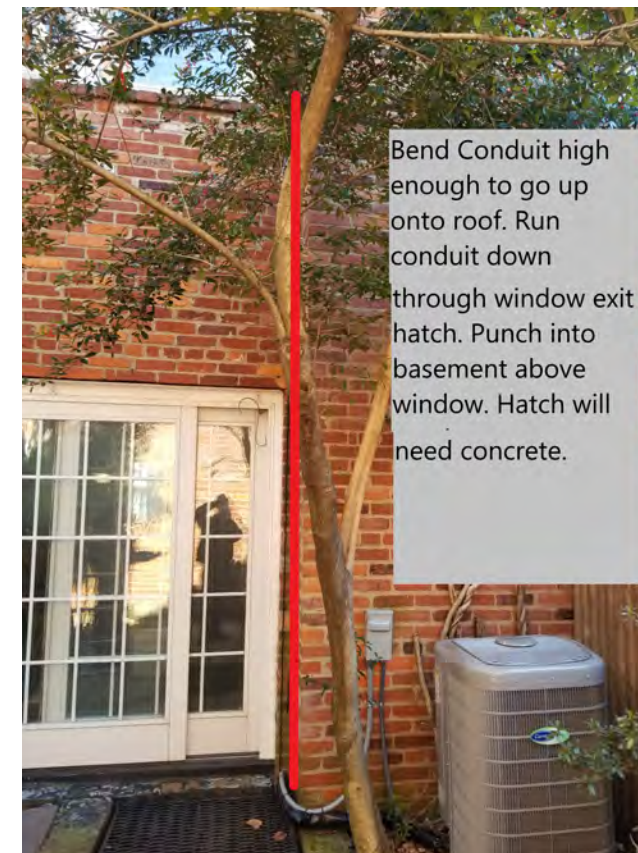
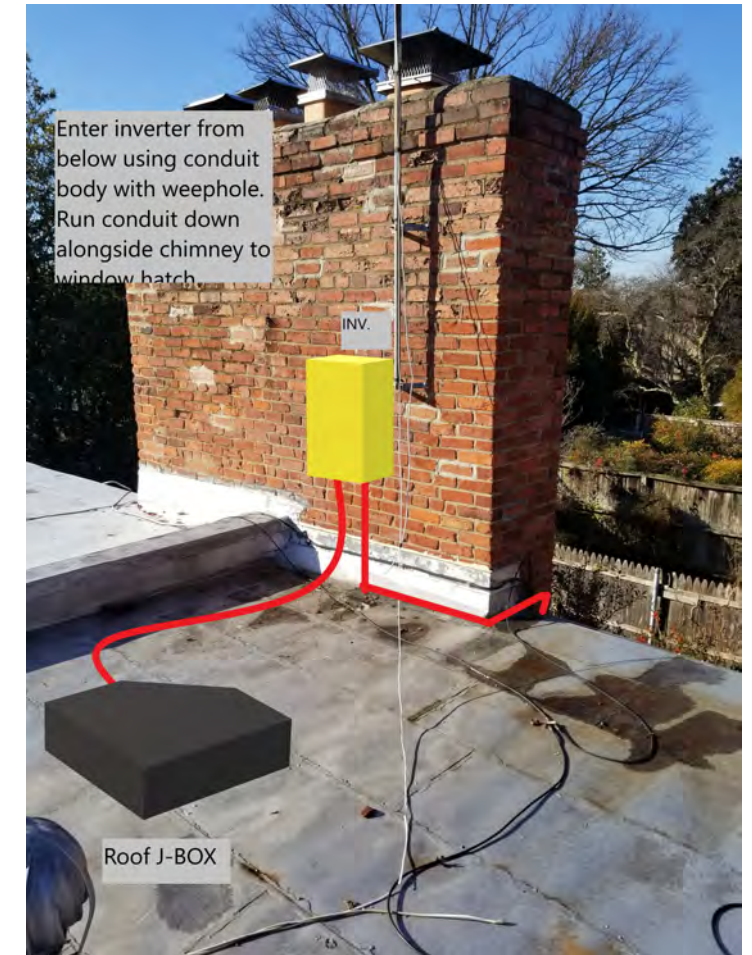
ROOF 3 :



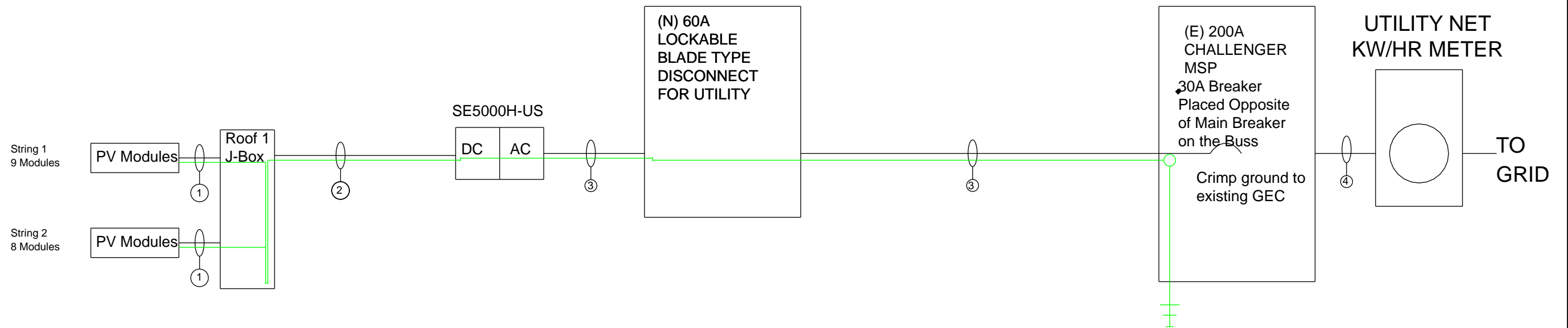
Tumer Kapan 6.24
 1678 32nd St NW
 Washington, DC 20007
 (202)674-0626
 tumerkapan@gmail.com



- Conduit will be contained to the rear of the building. Nothing will be installed on the front.
- Modules lay 4" from roof paneling.
- Roof J Box is a new installation



<u>PV MODULE SPECS</u> REC 360 watt Module Weight: 41.7 lbs Module Length: 66.3" Module Width: 39.3" Frame: 1.5" (38mm)	<u>PV MODULE SPECS</u> REC 370 watt Module Weight: 43 lbs Module Length: 67.8" Module Width: 40" Frame: 1.2" (30mm)	<u>INVERTER 1 SPECS</u> SOLAREEDGE SE5000H-US OPERATING CURRENT (IMP): 13.5A OPERATINGVOLTAGE (VMP): 380VDC MAX SHORT CIRCUIT CURRENT (ISC): 30A MAX SYSTEM VOLTAGE (VOC): 480VDC STRINGS: 1&2 OCPD 30A	<u>AC OUTPUT</u> 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) 6 AWG BARE	3	3/4" EMT	(2) 10 AWG (R,B)	(1) 10 AWG	(1) 8 AWG (G)	(4) 18 AWG (TP,BW)
2	3/4"	(4) 10 AWG THHN (2B,2R)	(1) 6 AWG THHN						
				4	(E) SEC	(2) 4/0 (R,B) Al	(1) 4/0 AWG Bare Al	NONE	NONE

Tumer Kapan 6.24 kW
1678 32nd St NW
Washington, DC 20007
(202)674-0626
tumerkapan@gmail.com

MODULE TO OPTIMIZER (FREE AIR)

#12 AWG PV WIRE PROVIDED BY MODULE
MC4 CONNECTION - 90°C max 30A
WIRE MANUFACTURER - RATED 90° C
CAPACITY OF WIRE DERATE USING 90° C = 30 AMPS
ROOF TOP TEMPERATURE CORRECTION = 0° - Wires under array
AMBIENT TEMP 36° C + 0° = .91 Correction Factor (CF)
CONDUCTOR IN RACEWAY - FREE AIR = 1 Correction Factor

CAPACITY OF WIRE = 30 * 0.91 * 1 = 27.3 A

OF MODULES IN PARALLEL PER CIRCUIT = 1
ISC OF REC 370 = 10.3A
CONTINUOUS LOAD = 1.25

MAX ISC = 1 * 10.3 * 1.25 = 12.9A

CONCLUSION: #12 is sufficient 27.3A > 12.9A

PV HOME RUNS (FREE AIR)

#10 AWG PV WIRE Field Installed
MC4 CONNECTION - 90°C max 30A
TERMINALS MAINTAIN 75° C RATING - 35 A
CAPACITY OF WIRE DERATE USING 90° C = 40 AMPS
ROOF TOP TEMPERATURE CORRECTION = 0 - Wires Under Array
AMBIENT TEMP 36° C + 0° = .91 Correction Factor (CF)
CONDUCTOR IN RACEWAY - FREE AIR = 1 Correction Factor

CAPACITY OF WIRE = 40 * 0.91 * 1 = 36.4 A > 35A

OF MODULES IN PARALLEL PER CIRCUIT = 1
ISC OF OPTIMIZER = 15 A
CONTINUOUS LOAD = 1.25

MAX ISC = 1 * 15 * 1.25 = 18.75A

CONCLUSION: #10 is sufficient 35A > 18.75 A

INVERTER TO POINT OF CONNECTION (POC)

#10 AWG THHN Field Installed
TERMINALS MAINTAIN 75° C RATING - 35 A
CAPACITY OF WIRE DERATE USING 90° C = 40 AMPS
ROOF TOP TEMPERATURE CORRECTION = 0
AMBIENT TEMP 36 - 40° C + 0° = .91 Correction Factor (CF)
CONDUCTOR IN RACEWAY - 3 = 1 Correction Factor

CAPACITY OF WIRE = 40 * .91 * 1 = 36.4 A > 35A

INVERTER SE5000
OUTPUT = 21A
CONTINUOUS LOAD = 1.25

MAX ISC = 21 * 1.25 = 26.25A

NEXT AVAILABLE OCPD = 30A

CONCLUSION: #10 is sufficient 35A > 26.25 A

Table 250.122 Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment

Rating or Setting of Automatic Overcurrent Device in Circuit Ahead of Equipment, Conduit, etc., Not Exceeding (Amperes)	Size (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum*
15	14	12
20	12	10
30	10	8
40	10	8
60	10	8
100	8	6
200	6	4
300	4	2
400	3	1
500	2	1/0
600	1	2/0
800	1/0	3/0
1000	2/0	4/0
1200	3/0	250
1600	4/0	350
2000	250	400
2500	350	600
3000	400	600
4000	500	800
5000	700	1200
6000	800	1200

Note: Where necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than given in this table.
*See installation restrictions in 250.120.

Table 310.15(B)(16) (formerly Table 310.15) Allowable Ampacities of Insulated Conductors Rated Up to and Including 2000 Volts, 60°C Through 90°C (140°F Through 194°F), Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C (86°F)

Size AWG or kcmil	Temperature Rating of Conductor (See Table 310.15(B)(1))					
	60°C (140°F)	75°C (167°F)	90°C (194°F)	90°C (194°F)	75°C (167°F)	60°C (140°F)
Type TW, UF	Type THHN, THWN, THWN-2, XHHW-2, XLP, XLP-2	Type THHN, THWN, THWN-2, XHHW-2, XLP, XLP-2	Type THHN, THWN, THWN-2, XHHW-2, XLP, XLP-2	Type THHN, THWN, THWN-2, XHHW-2, XLP, XLP-2	Type THHN, THWN, THWN-2, XHHW-2, XLP, XLP-2	Type THHN, THWN, THWN-2, XHHW-2, XLP, XLP-2

Table 310.15(B)(3)(a) Adjustment Factors for More Than Three Current-Carrying Conductors in a Raceway or Cable

Number of Conductors ¹	Percent of Values in Table 310.15(B)(16) through Table 310.15(B)(19) as Adjusted for Ambient Temperature if Necessary	
	Number of Conductors ¹	Percent
4-6	80	
7-9	70	
10-20	50	
21-30	45	
31-40	40	
41 and above	35	

¹Number of conductors is the total number of conductors in the raceway or cable or cable adjusted in accordance with 310.15(B)(5) and (6).

NEC Table 310.15(B)(2)(A)
Ambient Temperature Correction Factors Based on 30°C (86°F)

For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities specified in the ampacity tables by the appropriate correction factor shown below.

Ambient Temperature (°C)	Temperature Rating of Conductor			Ambient Temperature (°F)
	60°C	75°C	90°C	
10 or less	1.29	1.20	1.15	50 or less
11-15	1.22	1.15	1.12	51-59
16-20	1.15	1.11	1.08	60-68
21-25	1.08	1.05	1.04	69-77
26-30	1.00	1.00	1.00	78-86
31-35	0.91	0.94	0.96	87-95
36-40	0.82	0.88	0.91	96-104
41-45	0.71	0.82	0.87	105-113
46-50	0.58	0.75	0.82	114-122
51-55	0.41	0.67	0.76	123-131
56-60	—	0.58	0.71	132-140
61-65	—	0.47	0.65	141-149

OPTIMIZER TO OPTIMIZER (FREE AIR)

#12 AWG PV WIRE PROVIDED BY MODULE
MC4 CONNECTION - 90°C max 30A
WIRE MANUFACTURER - RATED 90° C
CAPACITY OF WIRE DERATE USING 90° C = 30 AMPS
ROOF TOP TEMPERATURE CORRECTION = 0 - Wires under array
AMBIENT TEMP 36° C + 0° = .91 Correction Factor (CF)
CONDUCTOR IN RACEWAY - FREE AIR = 1 Correction Factor

CAPACITY OF WIRE = 30 * 0.91 * 1 = 27.3 A

OF MODULES IN PARALLEL PER CIRCUIT = 1
ISC OF OPTIMIZER = 15 A
CONTINUOUS LOAD = 1.25

MAX ISC = 1 * 15 * 1.25 = 18.75A

CONCLUSION: #12 is sufficient 27.3A > 18.75A

PASS THROUGH BOX TO INVERTER (EMT)/ROOF TOP CONDUIT

#10 AWG THHN Field Installed
TERMINALS MAINTAIN 75° C RATING - 35A
CAPACITY OF WIRE DERATE USING 90° C = 40 AMPS
ROOF TOP TEMPERATURE CORRECTION = 22°
AMBIENT TEMP 36° C + 22° = .71 Correction Factor (CF)
CONDUCTOR IN RACEWAY = 4 = .8 Correction Factor

CAPACITY OF WIRE = 40 * 0.71 * .8 = 22.72 A

OF MODULES IN PARALLEL PER CIRCUIT = 1
ISC OF OPTIMIZER = 15A
CONTINUOUS LOAD = 1.25

MAX ISC = 1 * 15 * 1.25 = 18.75A

CONCLUSION: #10 is sufficient 22.72 A > 18.75 A

BUSS BAR CALCULATION NEC 705.12(B)(2)(3)(b) (NEC 2011 690.8)

MAIN SERVICE BUSS RATING = 200A
MAIN BREAKER SIZE = 200A
200 * 1.2 = 240
240-200 (MCB) = 40A
MAX ALLOWABLE PV BREAKER = 40A

CONCLUSION: 30A breaker is allowed, 40A > 30A.

INVERTER (1) TO AC COMBINER

N/A

Table 310.15(B)(3)(c) Ambient Temperature Adjustment for Raceways or Cables Exposed to Sunlight on or Above Rooftops

Distance Above Roof to Bottom of Raceway or Cable	Temperature adder	
	°C	°F
On roof 0 - 13 mm (0 - 1/2 in.)	33	60
Above roof 13 mm (1/2 in.)	22	40
Above 90 mm - 300 mm (3 1/2 in. - 12 in.)	17	30
Above 300 mm - 900 mm (12 in. - 36 in.)	14	25

Tumer Kapan 6.24
1678 32nd St NW
Washington, DC 20007
(202) 674-0626
tumerkapan@gmail.com

WARNING
 ELECTRICAL SHOCK HAZARD
 DO NOT TOUCH TERMINALS
 IF GROUND FAULT IS INDICATED
 NORMALLY GROUNDED CONDUCTORS
 MAY BE UNGROUNDED AND ENERGIZED

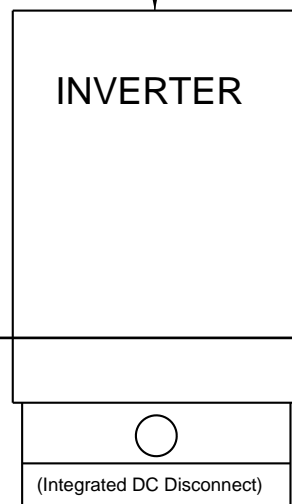
Located at Electrical Panel.
 Required sign, suggested language,
 as per NEC 690.5(C)

Marked on conduit, raceway,
 enclosures & cable assemblies
 every 10'. IFC 605.11.1.4

WARNING:
 PHOTOVOLTAIC POWER SOURCE

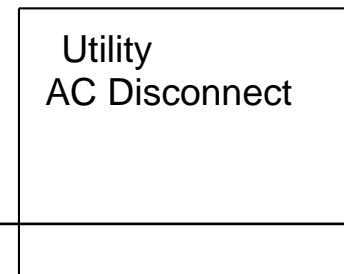
Common PV Signage/Marking: specific
 system requirements will vary. As per
 IFC 605.11.1, signs shall be reflective &
 weather resistant, with white letters at
 least 3/8" high on red background.

SOLAR PANELS



Located at DC Disconnect
 Required sign, suggested language,
 as per NEC 690.53

PV SYSTEM DC DISCONNECT
 RATED MAX POWER-POINT CURRENT: 13.5 ADC
 RATED MAX POWER-POINT VOLTAGE: 380 VDC
 SHORT CIRCUIT CURRENT: 30 ADC
 MAXIMUM SYSTEM VOLTAGE: 480 VDC

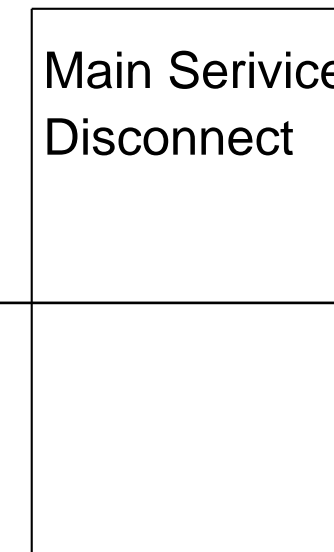


Located at AC Disconnect
 Required sign, suggested language,
 as per NEC 690.54

PV SYSTEM DISCONNECT
 RATED AC OUTPUT: 21 AMPS
 NORMAL OPERATING VOLTAGE: 240 VOLTS

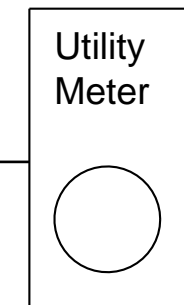
WARNING
 ELECTRICAL SHOCK HAZARD
 DO NOT TOUCH TERMINALS
 TERMINALS ON BOTH LINE AND LOAD
 SIDES MAY BE ENERGIZED IN THE
 OPEN POSITION

Located at Electrical Panel.
 Required sign, suggested language,
 as per NEC 690.17



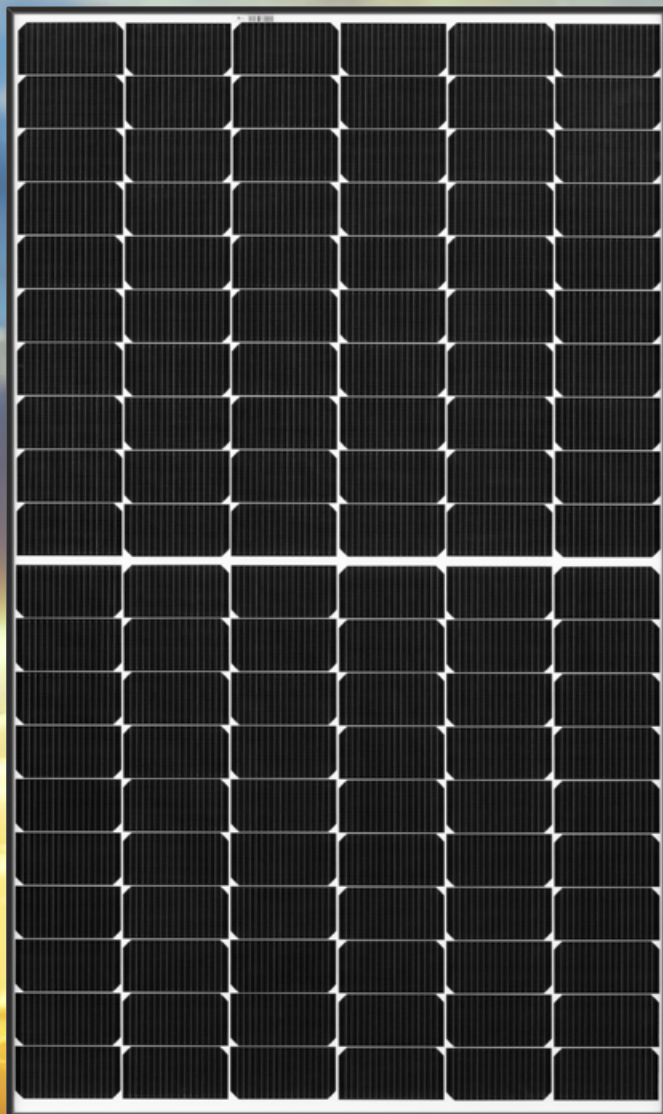
Located on point of interconnection.
 Required sign, suggested language,
 as per NEC 690.54

WARNING
 DUAL POWER SOURCES
 SECOND SOURCE IS PHOTOVOLTAIC SYSTEM
 RATED AC OUTPUT: 21 AMPS
 NORMAL OPERATING VOLTAGE: 240 VOLTS



Tumer Kapan 6.24
 1678 32nd St NW
 Washington, DC 20007
 (202)674-0626
 tumerkapan@gmail.com

SOLAR'S MOST TRUSTED



REC ALPHA SERIES

380 W_P POWER

20 YEAR PRODUCT WARRANTY

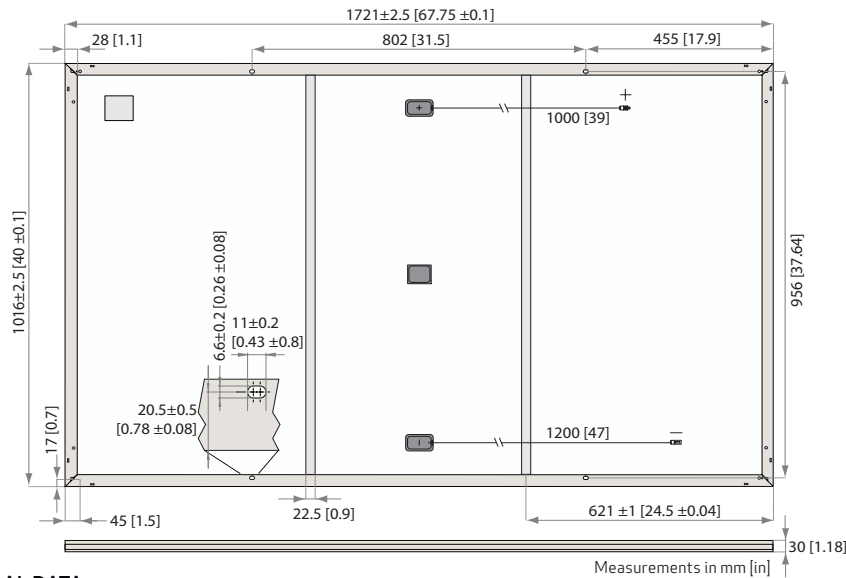
25 YEAR POWER OUTPUT WARRANTY



recgroup.com/alpha

REC ALPHA SERIES

PRODUCT DATASHEET



GENERAL DATA

Cell type:	120 half-cut cells with REC heterojunction cell technology 6 strings of 20 cells in series	Junction box:	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12 AWG (4 mm ²) PV wire, 39 + 47 in (1 + 1.2 m) in accordance with EN 50618
Backsheet:	Highly resistant polymeric construction	Connectors:	Stäubli MC4PV-KBT4/KST4, 12 AWG (4 mm ²) in accordance with IEC 62852 IP68 only when connected
Frame:	Anodized aluminum (black)	Origin:	Made in Singapore

ELECTRICAL DATA @ STC

Product Code*: RECxxxAA

	360	365	370	375	380
Nominal Power - P _{MPP} (Wp)	360	365	370	375	380
Watt Class Sorting - (W)	-0/+5	-0/+5	-0/+5	-0/+5	-0/+5
Nominal Power Voltage - V _{MPP} (V)	37.7	38.0	38.3	38.7	39.0
Nominal Power Current - I _{MPP} (A)	9.55	9.60	9.66	9.72	9.76
Open Circuit Voltage - V _{OC} (V)	44.1	44.3	44.5	44.6	44.7
Short Circuit Current - I _{SC} (A)	10.23	10.26	10.30	10.40	10.46
Panel Efficiency (%)	20.6	20.9	21.2	21.4	21.7

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 V_{OC} & I_{SC} ±3% within one watt class. * Where xxx indicates the nominal power class (P_{MPP}) at STC above.

ELECTRICAL DATA @ NMOT

Product Code*: RECxxxAA

	274	278	282	286	290
Nominal Power - P _{MPP} (Wp)	274	278	282	286	290
Nominal Power Voltage - V _{MPP} (V)	35.5	35.8	36.1	36.4	36.7
Nominal Power Current - I _{MPP} (A)	7.71	7.76	7.80	7.85	7.88
Open Circuit Voltage - V _{OC} (V)	41.6	41.7	41.9	42.0	42.1
Short Circuit Current - I _{SC} (A)	8.26	8.29	8.32	8.40	8.45

Nominal module operating temperature (NMOT: 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_{MPP}) at STC above.

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 1703, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 1703	Fire Type Class 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
AS4040.2 NCC 2016	Cyclic Wind Load
ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007	



WARRANTY

20 year product warranty
25 year linear power output warranty
Maximum annual power degradation of 0.25% p.a.
Guarantees 92% of power after 25 years
See warranty conditions for further details.

MECHANICAL DATA

Dimensions:	678 x 40 x 1.2 in (1721 x 1016 x 30 mm)
Area:	18.8 sq ft (1.75 m ²)
Weight:	43 lbs (19.5 kg)

MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
Maximum system voltage:	1000 V
Design load (+): snow	4666 Pa (97.5 lbs/sq ft)*
Maximum test load (+):	7000 Pa (146 lbs/sq ft)*
Design load (-): wind	2666 Pa (55.6 lbs/sq ft)*
Maximum test load (-):	4000 Pa (83.5 lbs/sq ft)*
Max series fuse rating:	25 A
Max reverse current:	25 A

* Calculated using a safety factor of 1.5
* See installation manual for mounting instructions

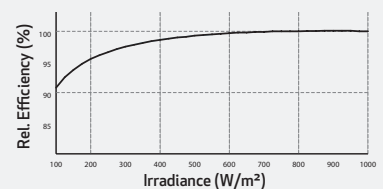
TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P _{MPP} :	-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 Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs around 2,000 people worldwide, producing 1.5 GW of solar panels annually.



Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505

POWER OPTIMIZER



PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

/ Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT							
Rated Input DC Power ⁽¹⁾	320	340	370	400	405	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125 ⁽²⁾	83 ⁽²⁾	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1		14	Adc
Maximum DC Input Current	13.75			12.63		17.5	Adc
Maximum Efficiency	99.5						%
Weighted Efficiency	98.8					98.6	%
Oversoltage Category	II						
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)							
Maximum Output Current	15						Adc
Maximum Output Voltage	60			85			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							
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62109-1 (class II safety), UL1741						
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 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4 ⁽³⁾						
Output Wire Type / Connector	Double Insulated; MC4						
Output Wire Length	0.95 / 3.0		1.2 / 3.9				m / ft
Input Wire Length	0.16 / 0.52						m / ft
Operating Temperature Range	-40 - +85 / -40 - +185						°C / °F
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100						%

⁽¹⁾ Rated STC power of the module. Module of up to +5% power tolerance allowed

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

⁽³⁾ For other connector types please contact SolarEdge

PV System Design Using a SolarEdge Inverter ⁽⁴⁾⁽⁵⁾	Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400 P405 / P505	8	10	18	
Maximum String Length (Power Optimizers)		6	8	14	
Maximum String Length (Power Optimizers)		25	25	50 ⁽⁶⁾	
Maximum Power per String	5700 (6000 with SE7600-US - SE11400-US)	5250	6000 ⁽⁷⁾	12750 ⁽⁸⁾	W
Parallel Strings of Different Lengths or Orientations	Yes				

⁽⁴⁾ For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf

⁽⁵⁾ It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string

⁽⁶⁾ A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

⁽⁷⁾ For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W

⁽⁸⁾ For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W

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>

DESCRIPTION:
SNAPRACK, ULTRA RAIL STANDARD BASE SEAM CLAMP WITH L FOOT AND LOCK

DRAWN BY:

mwatkins

SnapRack™
 Solar Mounting Solutions

PART NUMBER(S):

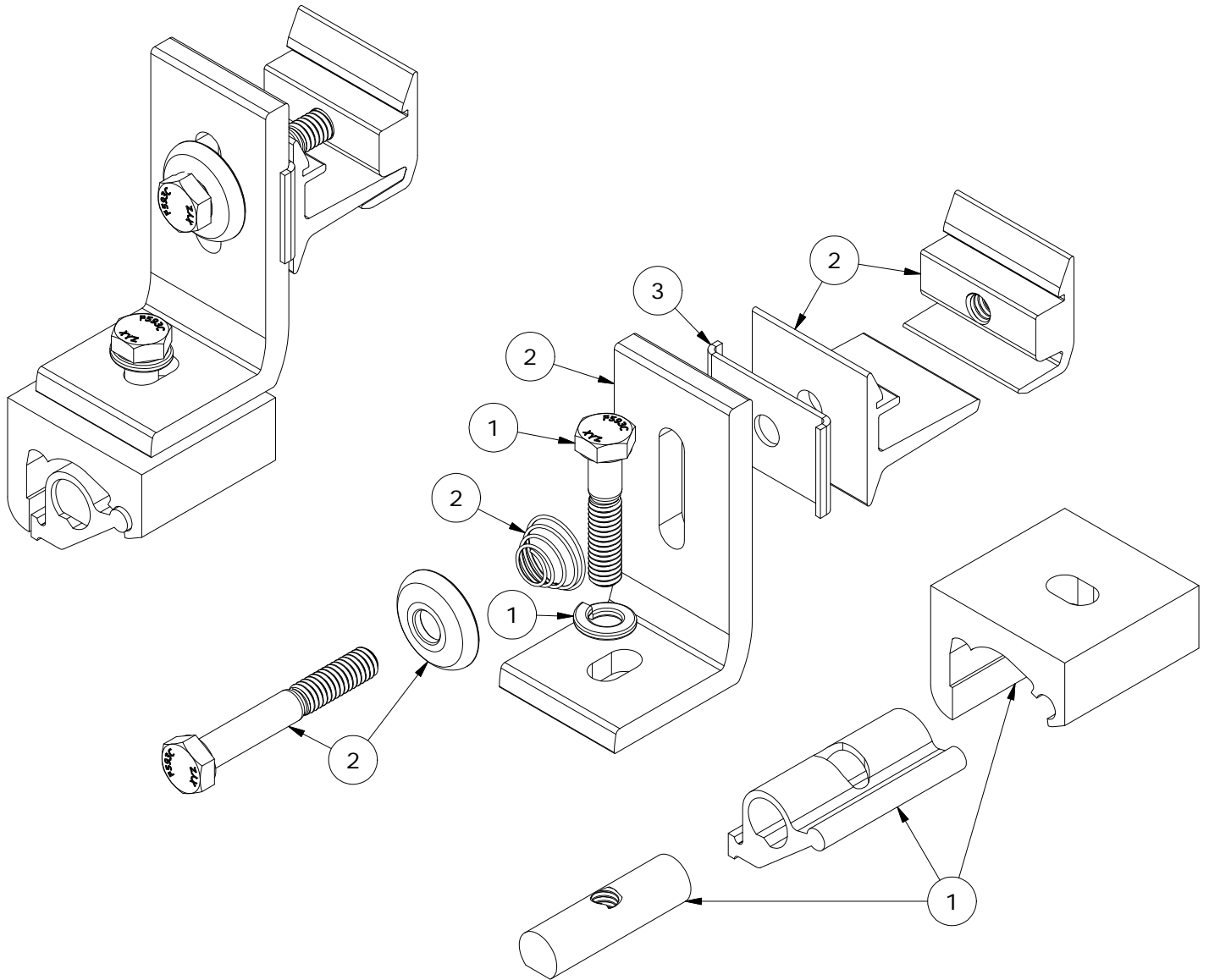
242-05158

REVISION:

A

595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA
 PHONE (415) 580-6900 • FAX (415) 580-6902

THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF SUNRUN SOUTH LLC.



PARTS LIST

ITEM	QTY	DESCRIPTION
1	1	SNAPRACK, STANDARD BASE SEAM CLAMP
2	1	SNAPRACK, ULTRA FOOT FOR 5/16IN, SILVER
3	1	SNAPRACK, SEAM CLAMP ROTATION LOCK

MATERIALS:

6000 SERIES ALUMINUM, STAINLESS STEEL

OPTIONS:

DESIGN LOAD (LBS):

598 UP, 461 DOWN, 275 SIDE

ULTIMATE LOAD (LBS):

1463 UP, 652 DOWN, 602 SIDE

TORQUE SPECIFICATION:

16.7 LB-FT

CERTIFICATION:

UL 2703, FILE E359313

WEIGHT (LBS):

0.70

DESCRIPTION:
SNAPRACK, ULTRA RAIL STANDARD BASE SEAM
CLAMP WITH L FOOT AND LOCK

DRAWN BY:

mwatkins

REVISION:

A

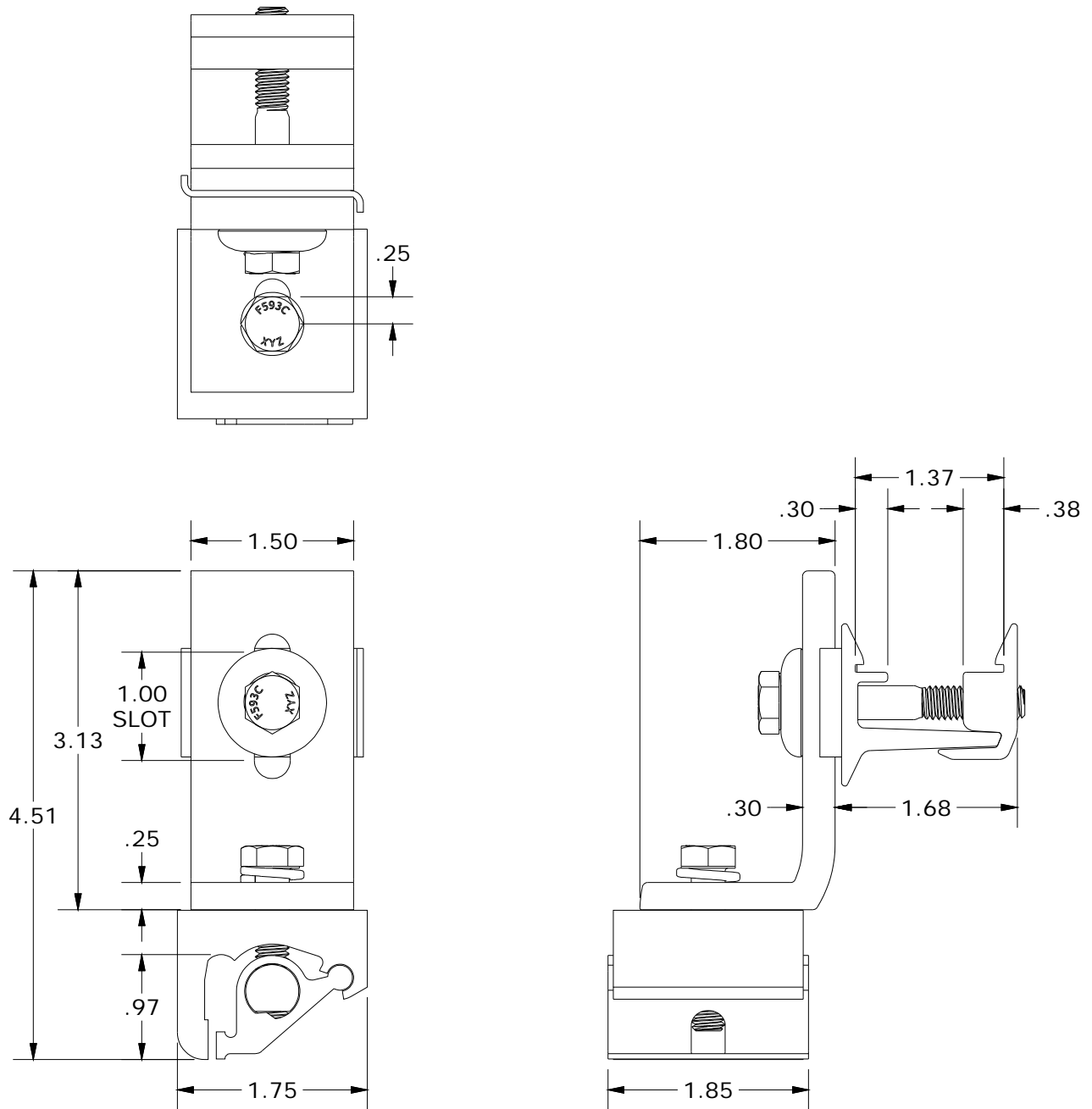
SnapNrack™
Solar Mounting Solutions

PART NUMBER(S):

242-05158

595 MARKET STREET, 29TH FLOOR • SAN FRANCISCO, CA 94105 USA
PHONE (415) 580-6900 • FAX (415) 580-6902

THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY
REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE
WRITTEN CONSENT OF SUNRUN SOUTH LLC.



ALL DIMENSIONS IN INCHES

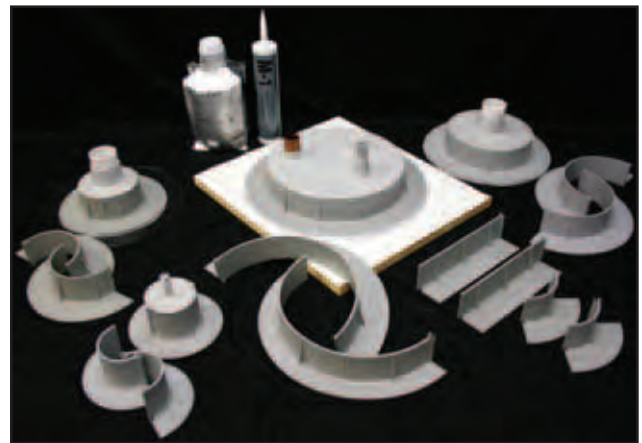
Penetration Seals

CHEM LINK's patented **ChemCurb Penetration Seal System** has been keeping roof penetrations watertight since 1990. The **ChemCurb System** replaces old-style metal pitch pans with versatile, polyester components, pourable sealants, and **M-1 Structural Adhesive** that can usually be installed in under 10 minutes—and never require flashing or mechanical attachment. **ChemCurbs** are designed for use on granulated modified bitumen, asphalt and coat tar B.U.R. They are also specified for PVC, EPDM, PIB and TPO single ply roofing (must use **CHEM LINK TPO Primer** with TPO). When installed properly, this system forms a durable, waterproof rubber seal around penetrations of any size.

ChemCurbs / E-Curbs

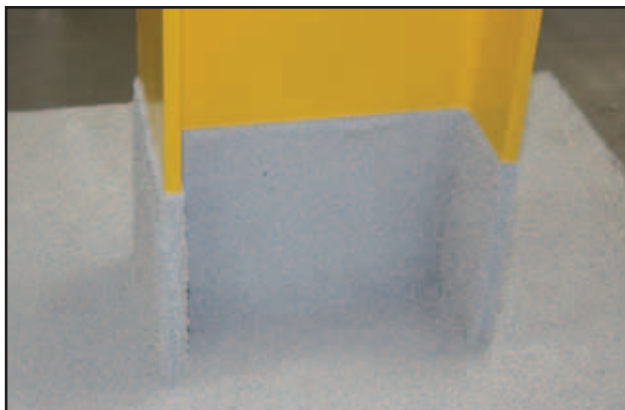


The **ChemCurb System** is sold as a kit or as separate components for larger jobs and unique shapes. Our inside sales staff will work with you on any specific project ensuring that the customer receives the best penetration seal in the industry.



With our traditional **ChemCurb System**, we have expanded our line of **E-Curb**. Both economical and efficient, **E-Curbs** “interlocking slip-fit technology” allows for quick assembly and easy installation.

FlashPack



The **FlashPack** system is a liquid flashing kit designed to waterproof odd-shaped roof penetrations in difficult flashing conditions.

2-Piece Standoff Technical Datasheet

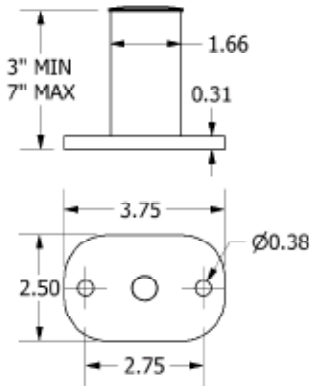
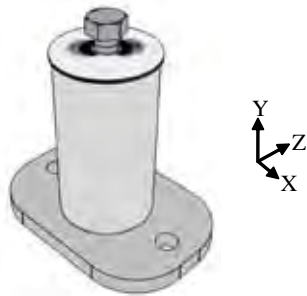
Pub 101026-1td V1.0 October 2010

2-Piece Aluminum Standoffs	1
2-Piece Aluminum Standoff with SolarMount-I 1-flange connection	2
2-Piece Aluminum Standoff with L-foot connection	2

Standoffs

2-Piece Aluminum Standoffs

Part No. 310503, 310504, 310506, 310507, 310553, 310554, 310556, 310557, 310603, 310604, 310606, 310607, 310653, 310654, 310656, 310657



Dimensions specified in inches unless noted

Standoff and Base Material:

- One of the following extruded aluminum alloys: 6005-T5, 6105-T5, 6061-T6
- Ultimate tensile: 38 ksi; Yeild: 35 ksi
- Clear or Dark anodized

Weight:

- 3" Standoff (as shown): 0.522 pounds (237 g)
- Add 0.086 pounds per inch (39 g/ inch)

Allowable and design loads are valid for a Unirac 2-piece aluminum standoff

Attach with zinc plated carbon steel or stainless steel fasteners

Resistance and safety factors are determined according to Part 1A section 9 of the 2005 Aluminum Design Manual

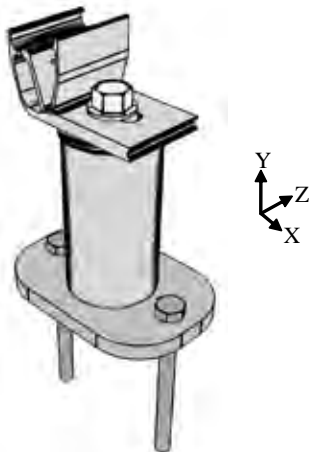
NOTE: Loads are given for the standoff only. Check load limits for lag screw or other attachment method.

Applied Load Direction	Average Ultimate Load lbs (N)	Allowable Load lbs (N)	Safety Factor, W	Design Load lbs (N)	Resistance Factor, F
Tension/Compression, Y±	3266 (14528)	1089 (4844)	3.00	1633 (7264)	0.500
∪Z Bending, Applied Moment*	559 ft lbs (758 Nm)	250 ft lbs (339 Nm)	2.24	378 ft lbs (512 Nm)	0.676

*Example: If the module is mounted 6" (0.5 ft) from the base of the standoff, the allowable side load is 250 ft*lbs/ 0.5 ft = 500 lbs

2-Piece Aluminum Standoff with SolarMount-I 1-flange connection

Part No. 05013C, 05014C, 05016C, 05017C



Reference the SolarMount-I series datasheet for 1-flange connection specifications.

For the 1-flange connection to standoff:

- Use included 1 3/4" EPDM washer between the 1-flange connection and standoff
- Assemble with included 300 series stainless steel 3/8"-16 flanged hex head screw
- Use anti-seize and tighten to 30 ft-lbs of torque

Allowable and design loads are valid when components are assembled according to authorized Unirac documents.

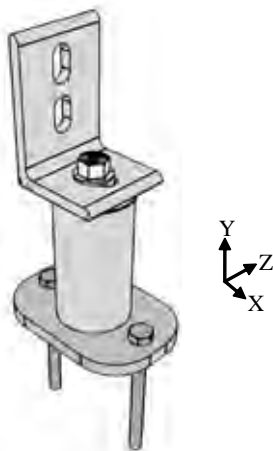
1-Flange connections are compatible with SolarMount-I series beams.

Resistance factors and allowable loads are determined according to part 1A section 9 of the 2005 Aluminum Design Manual.

NOTE: Loads are for the connection and standoff only. Check load limits for the lag screw or other attachment method.

Applied Load Direction	Average Ultimate lbs (N)	Allowable Load lbs (N)	Safety Factor, FS	Design Loads lbs (N)	Resistance Factor, Φ
Tension, Y+	1415 (6294)	635 (2825)	2.23	960 (4270)	0.679
Compression, Y-	1949 (8670)	873 (3883)	2.23	1320 (5872)	0.677
Transverse, X-, downhill	635 (2825)	313 (1392)	2.03	473 (2104)	0.745
Transverse, X+, uphill	42 (187)	20 (89)	2.15	30 (133)	0.705
\cup Z Bending, Applied Moment	559 ft lbs (758 Nm)	250 ft lbs (339 Nm)	2.24	378 ft lbs (512 Nm)	0.676

2-Piece Aluminum Standoff with L-foot connection



Reference the SolarMount datasheet for L-foot specifications.

For the L- foot to standoff connection:

- Use included 1 3/4" EPDM washer between the L-foot and standoff
- Assemble with included 300 series stainless steel 3/8"-16 flanged hex head screw
- Use anti-seize and tighten to 30 ft-lbs of torque

Allowable and design loads are valid when components are assembled according to authorized Unirac documents.

L-feet are compatible with SolarMount, SolarMount Heavy Duty, and SunFrame rails.

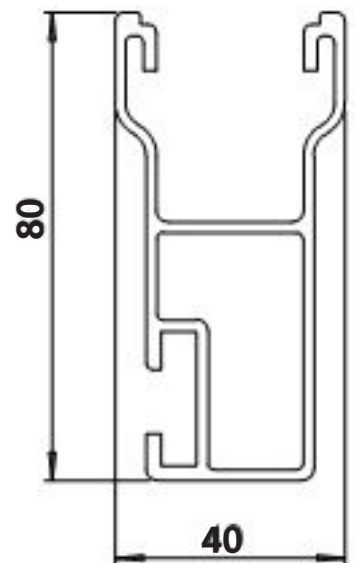
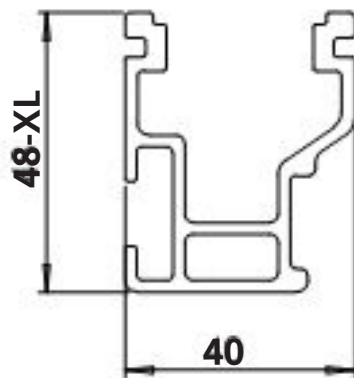
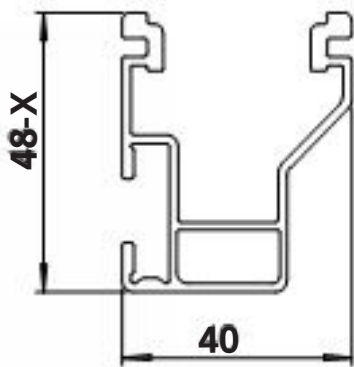
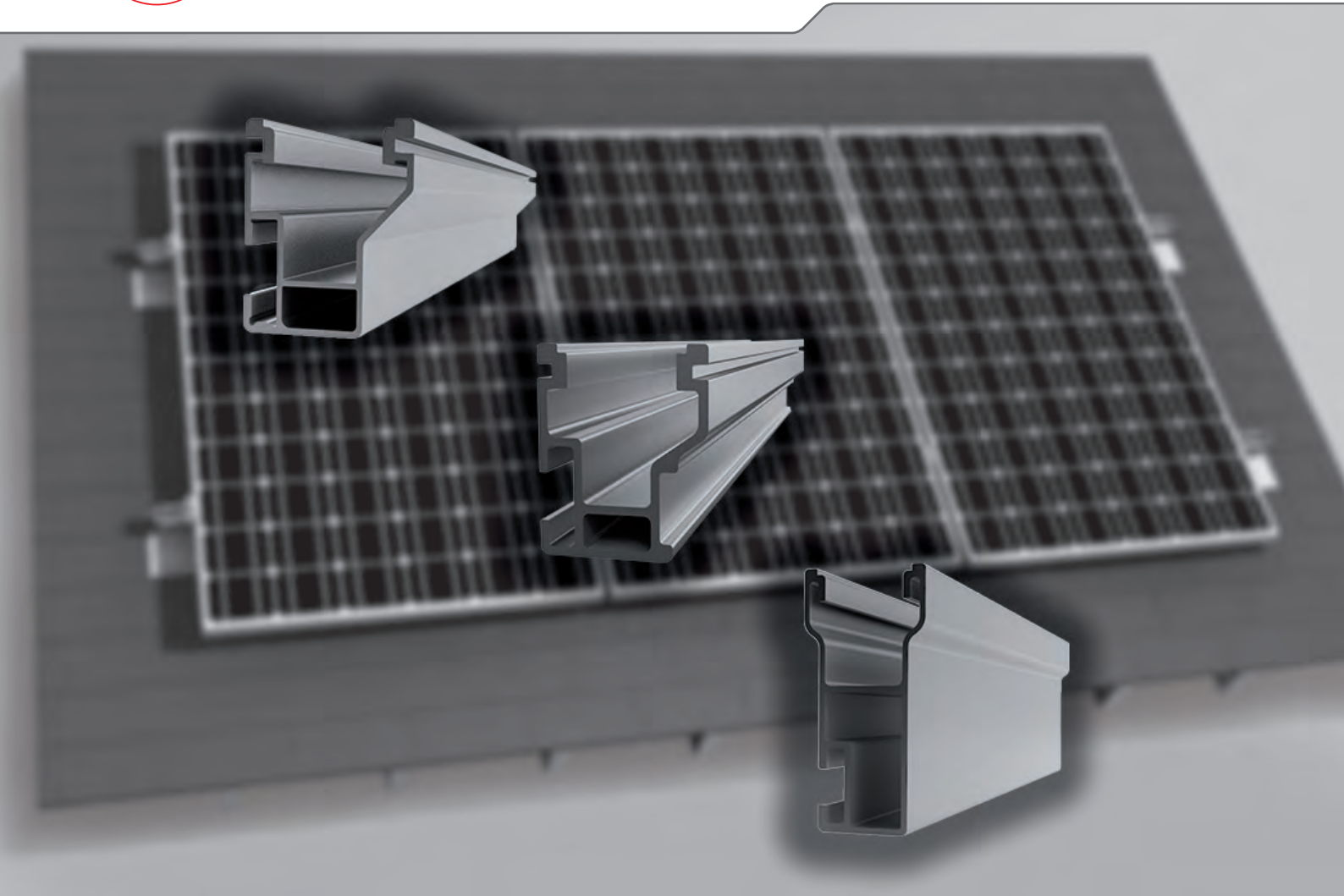
Resistance factors and allowable loads are determined according to part 1A section 9 of the 2005 Aluminum Design Manual.

NOTE: Loads are for the connection and standoff only. Check load limits for the lag screw or other attachment method.

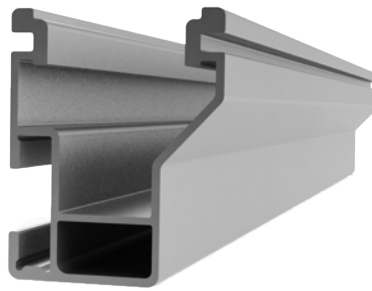
Applied Load Direction	Average Ultimate lbs (N)	Allowable Load lbs (N)	Safety Factor, FS	Design Loads lbs (N)	Resistance Factor, Φ
Tension, Y+	1859 (8269)	707 (3144)	2.63	1069 (4755)	0.575
Compression, Y-	3258 (14492)	1325 (5893)	2.46	2004 (8913)	0.615
Sliding, Z \pm	1766 (7856)	755 (3356)	2.34	1141 (5077)	0.646
Transverse, X \pm	486 (2162)	213 (949)	2.28	323 (1436)	0.664
\cup Z Bending, Applied Moment	559 ft lbs (758 Nm)	250 ft lbs (339 Nm)	2.24	378 ft lbs (512 Nm)	0.676



CrossRail Rails



CrossRail 48-X

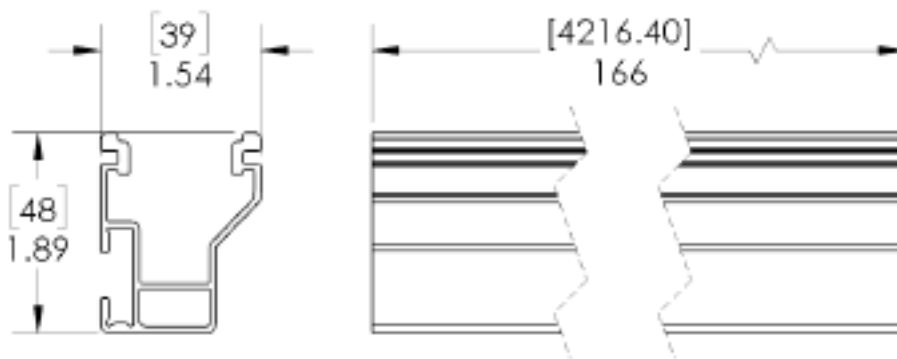


Mechanical Properties

CrossRail 48-X	
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi (260 MPa)
Yield Strength	34.8 ksi (240 MPa)
Weight	0.56 lbs/ft (0.833 kg/m)
Finish	Mill or Dark Anodized

Section Properties

CrossRail 48-X	
S _x	0.199 in ³ (3.261 cm ³)
S _y	0.153 in ³ (2.507 cm ³)
A (X-Section)	0.467 in ² (3.013 cm ²)



Dimensions in [mm] Inches

Notes:

- ▶ Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-10
- ▶ UL2703 Listed System for Fire and Bonding

CrossRail 80

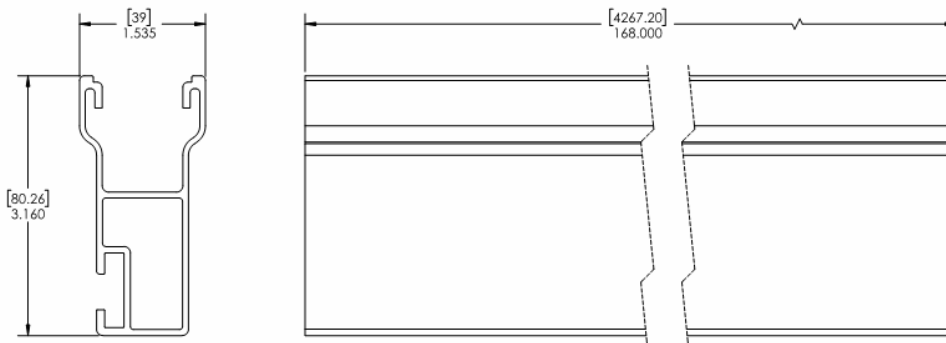


Mechanical Properties

	CrossRail 80
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi (260 MPa)
Yield Strength	34.8 ksi (240 MPa)
Weight	0.91 lbs/ft (1.355 kg/m)
Finish	Mill or Dark Anodized

Section Properties

	CrossRail 80
S _x	0.5290 in ³ (8.669 cm ³)
S _y	0.2514 in ³ (4.120 cm ³)
A (X-Section)	0.7770 in ² (5.013 cm ²)

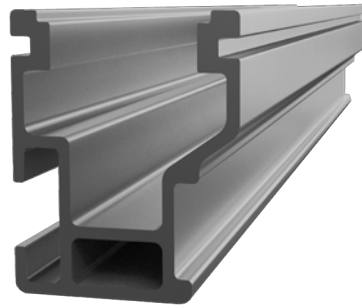


Dimensions in [mm] Inches

Notes:

- ▶ Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-10
- ▶ UL2703 Listed System for Fire and Bonding

CrossRail 48-XL

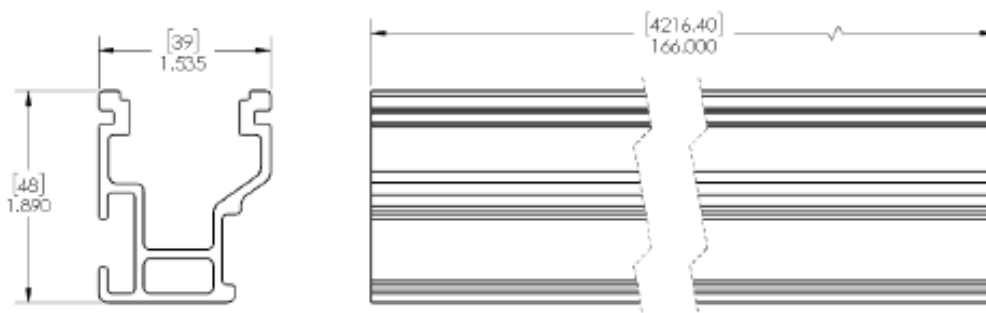


Mechanical Properties

	CrossRail 48-XL
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi (260 MPa)
Yield Strength	34.8 ksi (240 MPa)
Weight	0.76 lbs/ft (1.13 kg/m)
Finish	Mill or Dark Anodized

Section Properties

	CrossRail 48-XL
Sx	0.279 in ³ (4.571 cm ³)
Sy	0.257 in ³ (4.213 cm ³)
A (X-Section)	0.652 in ² (4.207 cm ²)



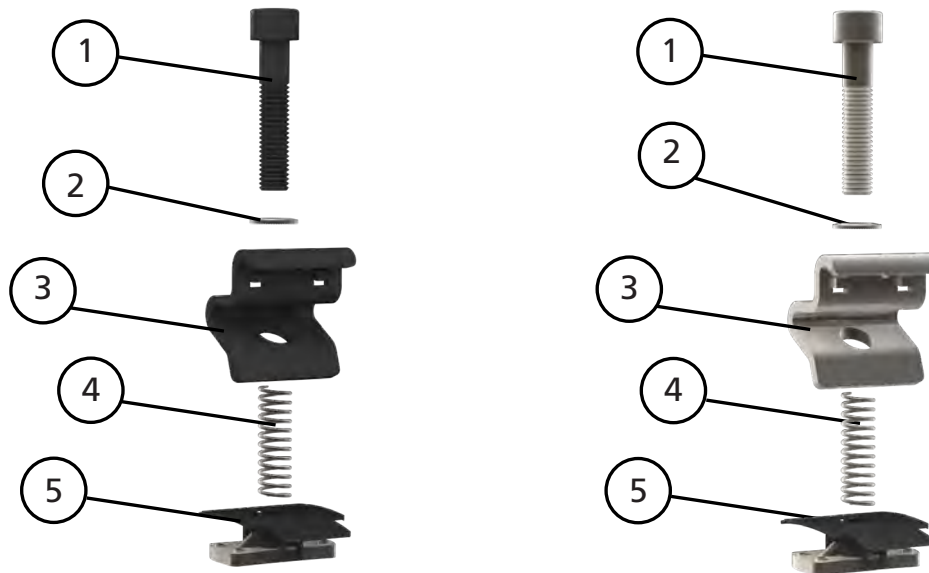
Dimensions in [mm] Inches

Notes:

- ▶ Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-10
- ▶ UL2703 Listed System for Fire and Bonding



CrossRail End Clamp



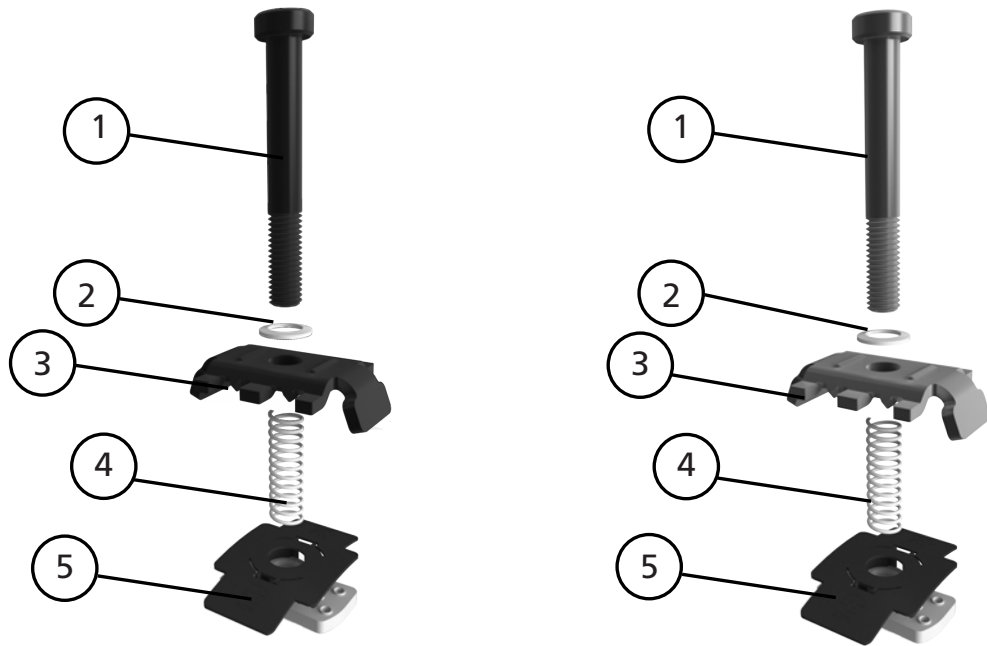
Item No.	Description	Part No.
1	Allen Bolt	4000429 CR EC Silver, 30-50mm, Shared RL 30-45mm
2	Lock Washer	4000430 CR EC Dark, 30-50mm, Shared RL 30-45mm
3	End Clamp	
4	Clamp Spring	
5	MK3 Slot Nut	

Technical data

	Mid Clamp
Scope of application	Used with all of our CrossRail based systems
Fastening type / roof fixture	Clamp
Module orientation	Vertical or horizontal
Material	Stainless steel
Compatible module frame size	30-50mm
Warranty	25 years



CrossRail Mid Clamp



Item No.	Description	Part No.
1	Allen Bolt	4000601CR MC Silver, 30-47mm, Shared RL 30-42mm
2	Lock Washer	4000602 CR MC Dark, 30-47mm, Shared RL 30-42mm
3	Mid Clamp	
4	Clamp Spring	
5	MK3 Slot Nut	

Technical data

	Mid Clamp
Scope of application	Used with all of our CrossRail based systems
Fastening type / roof fixture	Clamp
Module orientation	Vertical or horizontal
Material	Stainless steel
Compatible module frame size	30-47mm
Warranty	25 years



Highlights

In the Georgetown Historic District
In the Commission of Fine Arts jurisdiction area

Basic Information

1678 32ND STREET NW	
SSL (Square, Suffix & Lot)	1280 0943
Lot type	tax lot
Ward	Ward 2
ANC	ANC 2E
SMD	SMD 2E02
Neighborhood Cluster	Cluster 4
Police District	Second Police District
Police Service Area	PSA 206
Voting Precinct	Precinct 5
Zoning	R-20
2010 census tract	01
2010 census block group	1
2010 census block	1007

Ownership and Taxes

Tax lot	1280 0943
Premises	1678 32ND ST NW WASHINGTON DC 20007
Owner	KAPAN, TUMER

Interactive Map

