Design Packet For:

Michael Diaz & Ajitha Antony

10921 Sheridans Trail.,
Orland Park, IL, 60467-5421.

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System Design Summary

GRNE SOLAR

Annual Production Report produced by Travis Kepler

Design 1 Michael Diaz & Ajitha Antony, 10921 Sheridans Trail, Orland Park, IL 60467-5421

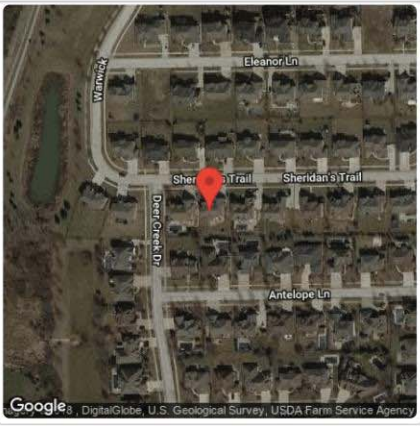
Report

Project Name	Michael Diaz & Ajitha Antony
Project Address	10921 Sheridans Trail, Orland Park, IL 60467-5421
Prepared By	Travis Kepler travis@grnesolar.com

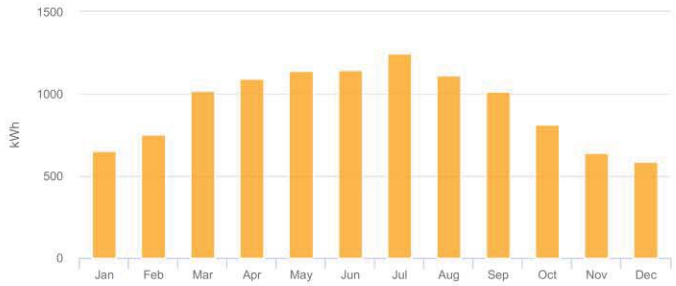
System Metrics

Design	Design 1
Module DC Nameplate	7.80 kW
Inverter AC Nameplate	7.60 kW Load Ratio: 1.03
Annual Production	11.22 MWh
Performance Ratio	87.1%
kWh/kWp	1,438.1
Weather Dataset	TMY, 10km Grid (41.55,-87.85), NREL (prospector)
Simulator Version	02438dc84d-15065d270a-ca63df14a5-d5d7833a30

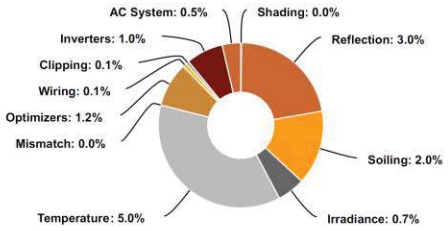
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,420.0	
	POA Irradiance	1,651.2	16.3%
	Shaded Irradiance	1,650.9	0.0%
	Irradiance after Reflection	1,600.8	-3.0%
	Irradiance after Soiling	1,568.7	-2.0%
	Total Collector Irradiance	**1,568.7**	**0.0%**
Energy (kWh)	Nameplate	12,251.3	
	Output at Irradiance Levels	12,159.7	-0.7%
	Output at Cell Temperature Derate	11,547.6	-5.0%
	Output After Mismatch	11,547.6	0.0%
	Optimizer Output	11,409.0	-1.2%
	Optimal DC Output	11,396.6	-0.1%
	Constrained DC Output	11,387.4	-0.1%
	Inverter Output	11,273.5	-1.0%
	Energy to Grid	**11,217.1**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		29.1 °C
Simulation Metrics			
	Operating Hours		4684
	Solved Hours		4684

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km Grid (41.55,-87.85), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Characterization										
	N325 (VBHN325SA16) (Panasonic)	Spec Sheet Characterization, PAN										
Component Characterizations	Device	Characterization										
	P400 NA (SolarEdge)	Mfg Spec Sheet										
	SE7600H-US (SolarEdge)	Spec Sheet										

Components

Component	Name	Count
Inverters	SE7600H-US (SolarEdge)	1 (7.60 kW)
Strings	10 AWG (Copper)	2 (123.0 ft)
Optimizers	P400 NA (SolarEdge)	24 (9.60 kW)
Module	Panasonic, N325 (VBHN325SA16) (325W)	24 (7.80 kW)

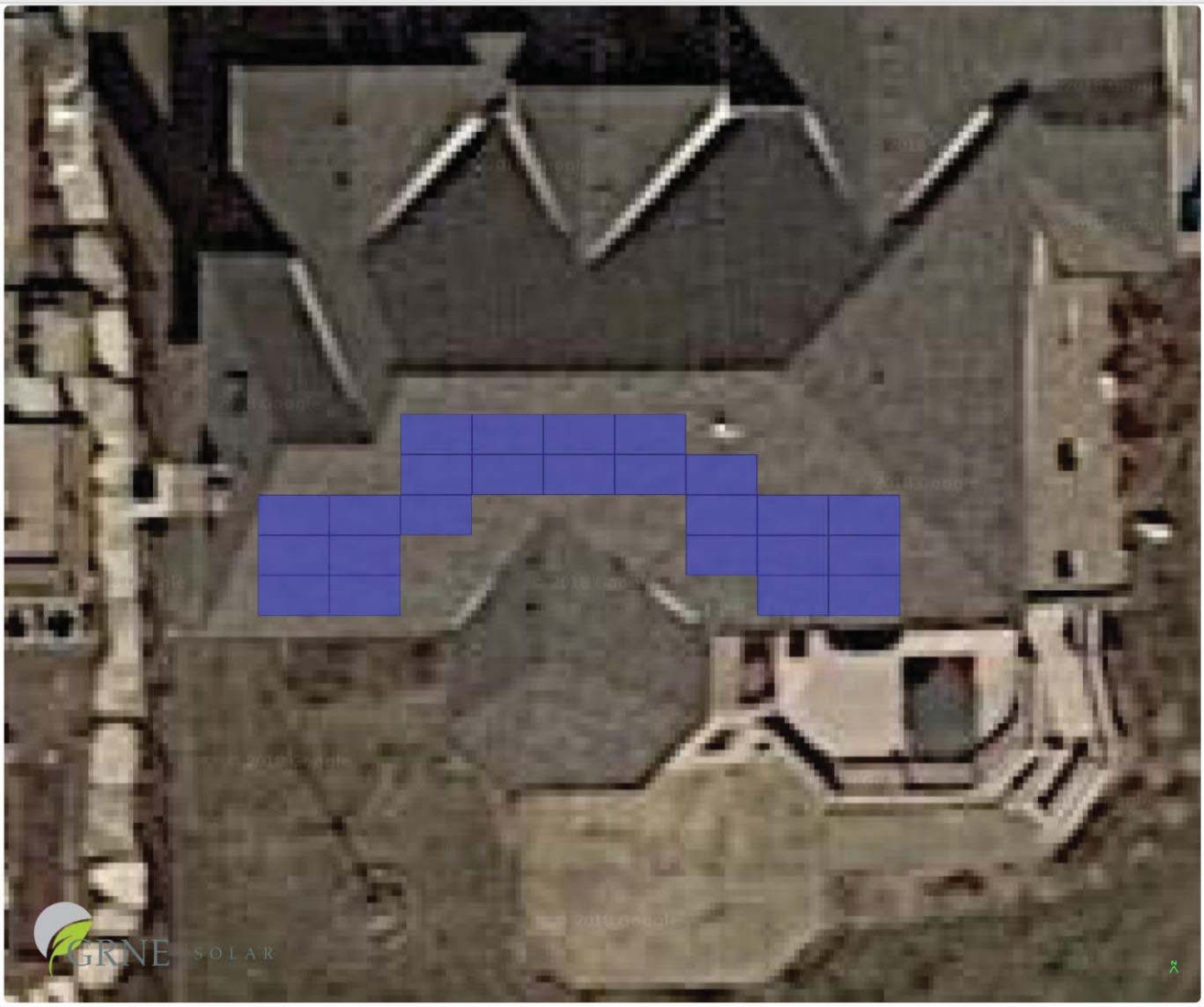
Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	8-16	Along Racking

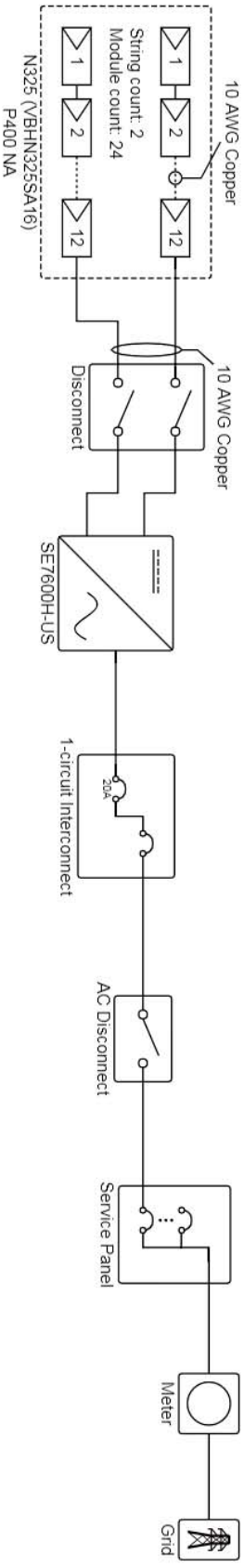
Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	32°	180°	0.0 ft	1x1	37	24	7.80 kW

Detailed Layout



Electrical Single Line Diagram

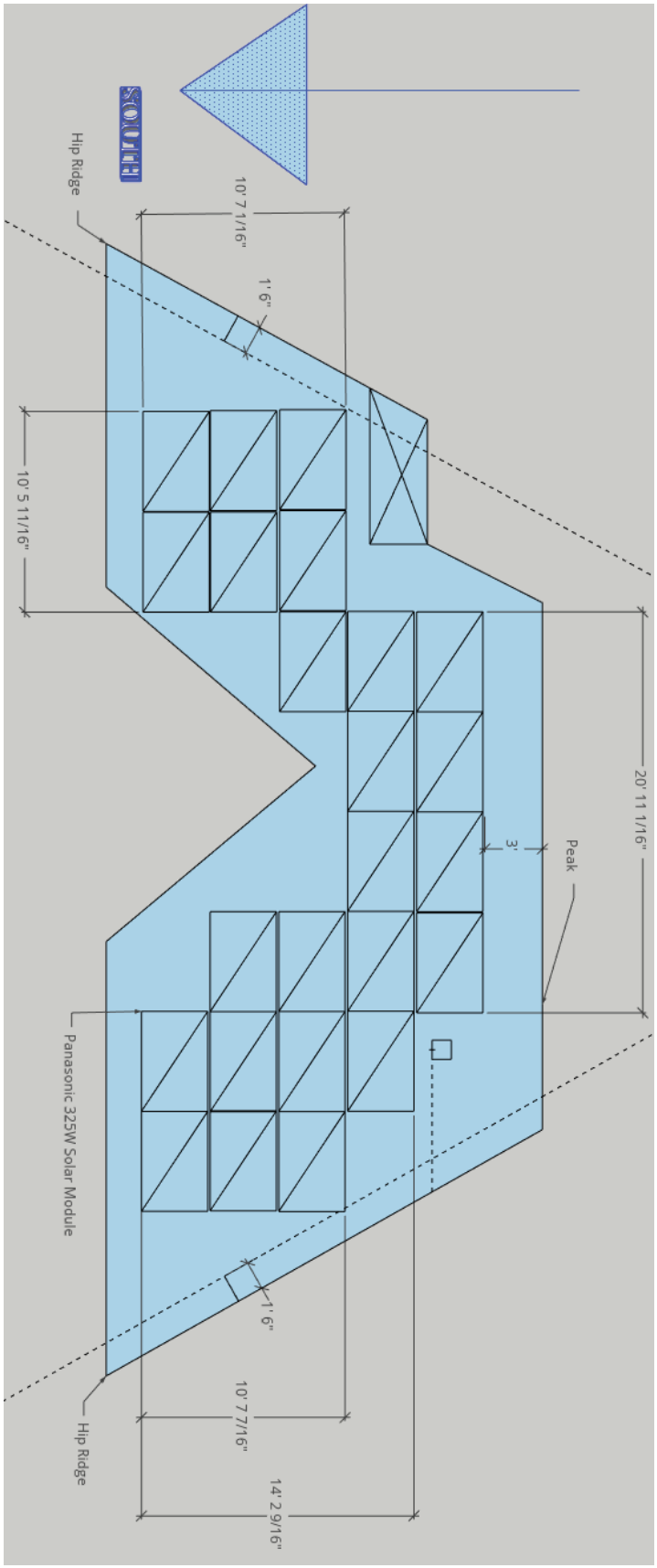


Module Specifications	
24x Panasonic N325 (VBHN325SA16)	
STC Rating	325 W
Vmp	57.6 V
Imp	5.65 A
Voc	69.6 V
Isc	6.03 A

Inverter Specifications	
1x SolarEdge SE7600H-US	
Max AC Power Rating	7.6 kW
Max Input Voltage	480 V
Min AC Power Rating	0 W
Min Input Voltage	360 V

Wire Schedule		
Tier	Wire	Length
String	2x 10 AWG	123ft

Detailed Roof Layout



Michael Diaz

PITCHED ROOF

IRONRIDGE
1495 ZEPHYR AVE, HAYWARD, CA 94544

Project Details

NAME	Michael Diaz	DATE	2018-08-14
LOCATION	Orland Park, IL, 60467	TOTAL MODULES	24
MODULE	Panasonic:VBHN325SA16 (35mm)	TOTAL WATTS	7,800
DIMENSIONS	62.60" x 41.46" x 1.38" (1,590 x 1,053 x 35mm)	ATTACHMENT PTS	48

Load Assumptions

WIND EXPOSURE	B
WIND SPEED	100 mph
GROUND SNOW LOAD	30 psf
ATTACHMENT SPACING	6.0 ft

Building Details

ROOF SLOPE	32 deg
BUILDING HEIGHT	35 ft
RISK CATEGORY	I

Engineering

XR100 SPAN DETAILS (Landscape)

Roof Zone	Max Span	Max Cantilever
1	6' 6"	2' 7"
2	6' 6"	2' 7"
3	6' 6"	2' 7"

MAXIMUM REACTION FORCES (Landscape)

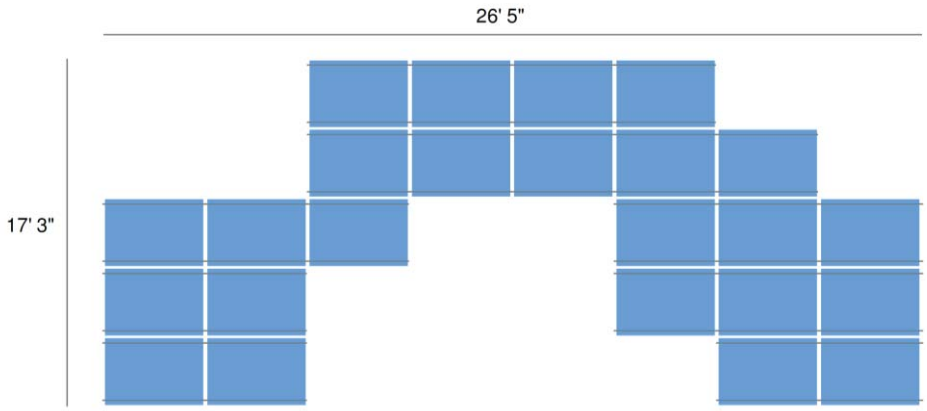
Roof Zone	Down	Uplift	Lateral
1	284.00	-138.00	124.00
2	284.00	-170.00	124.00
3	284.00	-170.00	124.00

System Weight

TOTAL WEIGHT	1271 lbs
WEIGHT/ATTACHMENT	26.5 lbs
DISTRIBUTED WEIGHT	2.9 psf
RACKING WEIGHT	293.0 lbs

Array Details

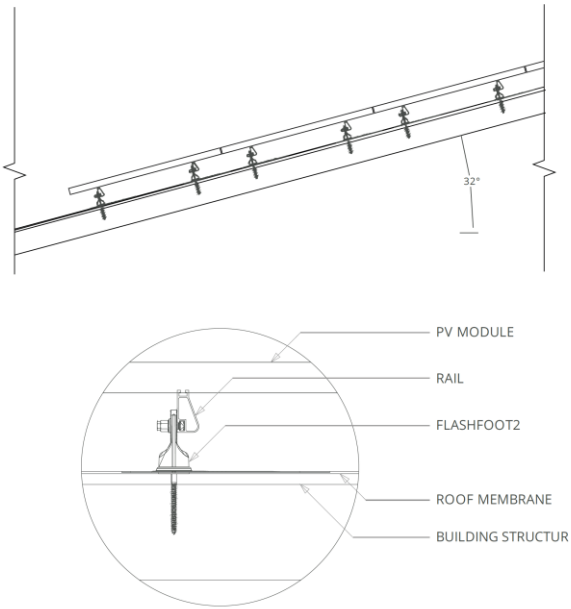
Array	Cols	Rows	Orientation	Row Length	Cantilever	Violations	Provided Rails	Attachments	Clamps	Splices
A	4	1	LANDSCAPE	21' 1.5"	1' 7"	None	56'[4 x 14']	8	10	2
A	5	1	LANDSCAPE	26' 4.5"	1' 2"	None	56'[4 x 14']	10	12	2
A	3	2	LANDSCAPE	15' 10.6"	1' 11"	None	68'[4 x 17']	12	16	0
A	2	1	LANDSCAPE	10' 7.6"	2' 4"	None	28'[2 x 14']	4	6	0
A	3	1	LANDSCAPE	15' 10.6"	1' 11"	None	34'[2 x 17']	6	8	0
A	2	2	LANDSCAPE	10' 7.6"	2' 4"	None	56'[4 x 14']	8	12	0



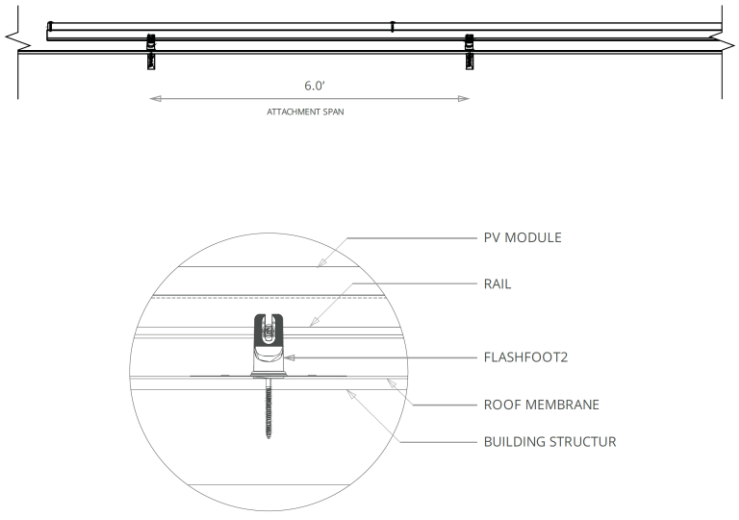
Michael Diaz

PITCHED ROOF

Side View (Landscape)



Front View (Landscape)



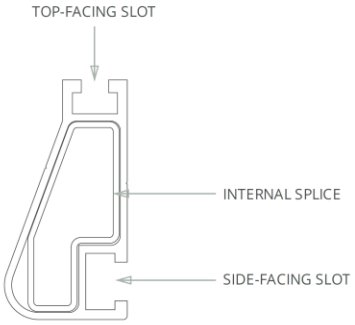
Note: The images displayed in this report are meant to represent one portion of the array. The use of a break line indicates that the array may continue on beyond that point.

Michael Diaz

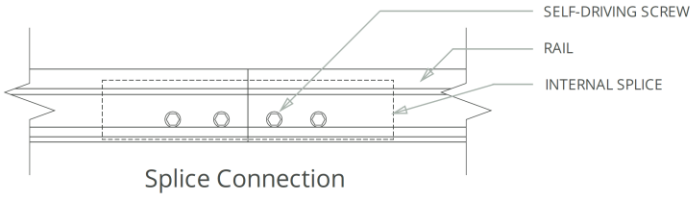
PITCHED ROOF

IRONRIDGE
1495 ZEPHYR AVE, HAYWARD, CA 94544

Splice Detail

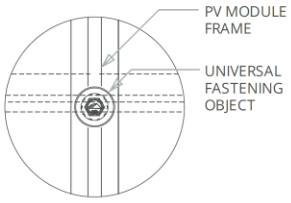


XR100

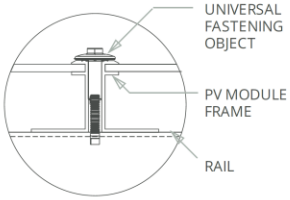


Splice Connection

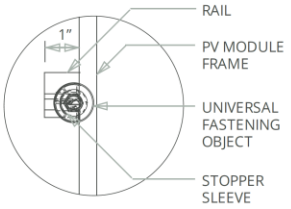
Clamp Detail



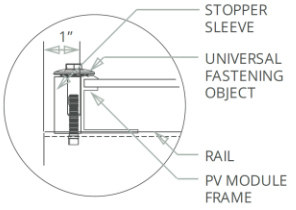
Mid Clamp, Plan



Mid Clamp, Front

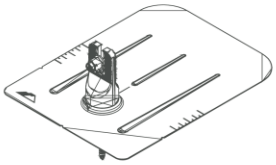


End Clamp, Plan

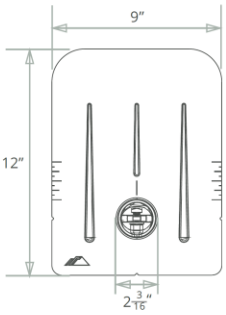


End Clamp, Front

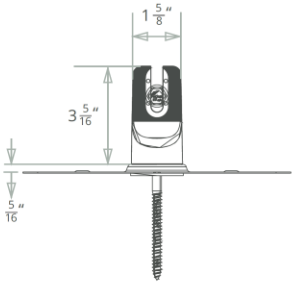
FlashFoot2 Detail



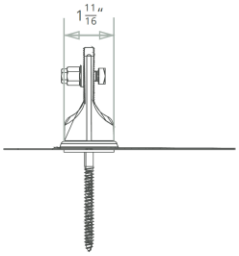
Perspective View



Plan View

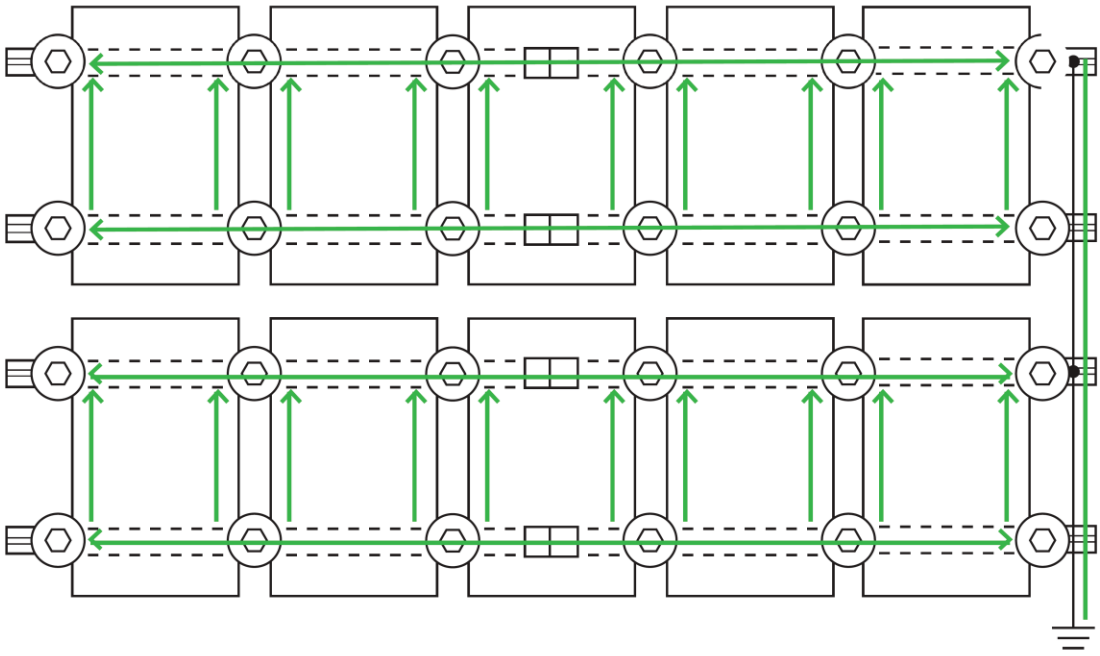


Front View



Side View

Grounding Diagram



UFO Clamp

Fault Current Ground Path

Grounding Lug *

Min 10 AWG Copper Wire *

Bonded Splice (Rail Connection)

* Grounding Lugs and Wire are not required in systems using Enphase microinverters.

Panasonic

HIT Photovoltaic Module

Photovoltaic Module HIT® N330, N325 | VBHN330SA16, VBHN325SA16

Panasonic solar technology

Panasonic photovoltaic modules HIT® feature an innovative hetero-junction cell structure made of mono-crystalline and amorphous silicon layers. Ultra-thin amorphous silicon layers prevent recombinations of electrons, keeping carrier loss to an absolute minimum. As a result, HIT® conversion efficiency ratings are among the highest available today.

19.7% module efficiency

Employing 96 cells in the same size footprint, N330 and N325 HIT® produce up to 36% more free electricity compared to conventional 60-cell panels.

- More solar power output per square foot
- Fewer panels to install, faster installations
- Ideal for small roof areas
- Greater cost savings for homeowners over a 25-year lifecycle

HIT®: 9,167kWh/year (15pcs x 330W = 4.95kW) **VS** Standard*: 6,716kWh/year (15pcs x 260W = 3.90kW)

NOTE: Panasonic's simulation in CA, USA

*Conventional crystalline module

Quality you can trust

100% Panasonic HIT®

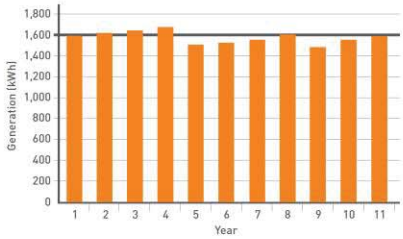
Starting over 40 years ago with the research and development of photovoltaic cells in 1975, Panasonic has been a solar pioneer since the beginning of the green revolution. In 1997, the HIT® set the industry standard for high conversion efficiency. Satisfied customers worldwide have come to trust and rely on Panasonic quality ever since.

Panasonic manufactured and guaranteed

- 25-year power output warranty and 15-year workmanship warranty
- Vertically integrated in-house manufacturing of wafer, cell, and module
- State-of-the-art production facilities and manufacturing processes
- Industry's most stringent independent testing and quality control standards
- IEC and 20+ internal tests

Minimal field degradation

Actual recorded data proves reliable, stable performance over 11 years.

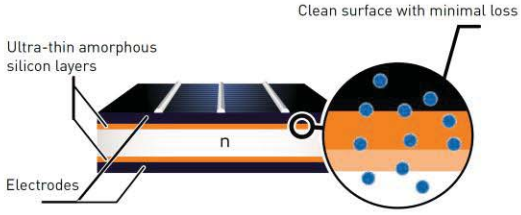


Simply powerful

Panel size (1.6m²) Panel size (1.6m²)

With the same dimension, HIT® N330 produces more power than conventional crystalline modules

Cell structure of HIT®



Electrical and Mechanical Characteristics | N330, N325

Electrical Specifications (TENTATIVE)

Model	VBHN330SA16	VBHN325SA16
Rated Power (Pmax)[1]	330W	325W
Maximum Power Voltage (Vpm)	58.0V	57.6V
Maximum Power Current (Ipm)	5.70A	5.65A
Open Circuit Voltage (Voc)	69.7V	69.6V
Short Circuit Current (Isc)	6.07A	6.03A
Temperature Coefficient (Pmax)	-0. 30%/°C	-0. 30%/°C
Temperature Coefficient (Voc)	-0. 174V/°C	-0. 174V/°C
Temperature Coefficient (Isc)	1.82mA/°C	1.82mA/°C
NOCT	44.0°C	44.0°C
CEC PTS Rating	305.9W	301.2W
Cell Efficiency	22.09%	21.76%
Module Efficiency	19.7%	19.4%
Watts per Ft.²	18.3W	18.0W
Maximum System Voltage	600V	600V
Series Fuse Rating	15A	15A
Warranted Tolerance (-/+)	+10%/-0%*	+10%/-0%*

Mechanical Specifications (TENTATIVE)

Model	VBHN330SA16, VBHN325SA16
Internal Bypass Diodes	4 Bypass Diodes
Module Area	18.02 Ft.² (1.67m²)
Weight	40.81 Lbs. (18.5kg)
Dimensions LxWxH	62.6x41.5x1.4 in. (1590x1053x35 mm)
Cable Length +Male/-Female	40.2/40.2 in. (1020/1020 mm)
Cable Size / Type	No. 12 AWG / PV Cable
Connector Type[2]	Multi-Contact® Type IV (MC4™)
Static Wind / Snow Load	50 PSF (2400 Pa)
Pallet Dimensions LxWxH	63.7x42.2x5.5 in. (1618x1071x140 mm)
Quantity per Pallet / Pallet Weight	40 pcs. /1719 Lbs. (780 kg)
Quantity per 40' Container	560 pcs.
Quantity per 20' Container	240 pcs.

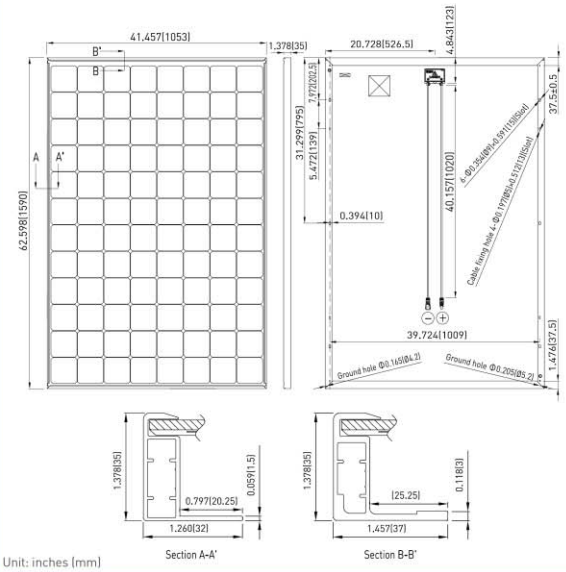
Operating Conditions & Safety Ratings (TENTATIVE)

Model	VBHN330SA16, VBHN325SA16
Operating Temperature	-40°F to 185°F (-40°C to 85°C)
Hail Safety Impact Velocity	1" hailstone (25mm) at 52 mph (23m/s)
Safety & Rating Certifications	UL 1703, cUL, CEC
UL 1703 Fire Classification	Type 2
Limited Warranty	15 Years Workmanship, 25 Years Power Output

Note: Standard Test Conditions: Air mass 1.5; irradiance = 1000W/m²; cell temp. 25°C
*Maximum power at delivery. For guarantee conditions, please check our guarantee document.

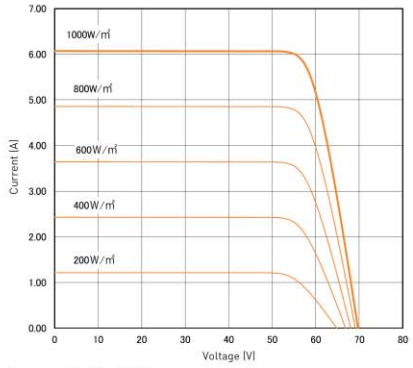
[1]STC: Cell temp. 25°C, AM1.5, 1000W/m²
[2]Safety locking clip (PV-SSH4) is not supplied with the module.
Note: Specifications and information above may change without notice.

Dimensions



Unit: inches (mm)

Dependence on Irradiance



Reference data for model: VBHN330SA16
(Cell temperature: 25°C)

⚠CAUTION! Please read the installation manual carefully before using the products.

Used electrical and electronic products must not be mixed with general household waste. For proper treatment, recovery and recycling of old products, please take them to applicable collection points in accordance with your national legislation.

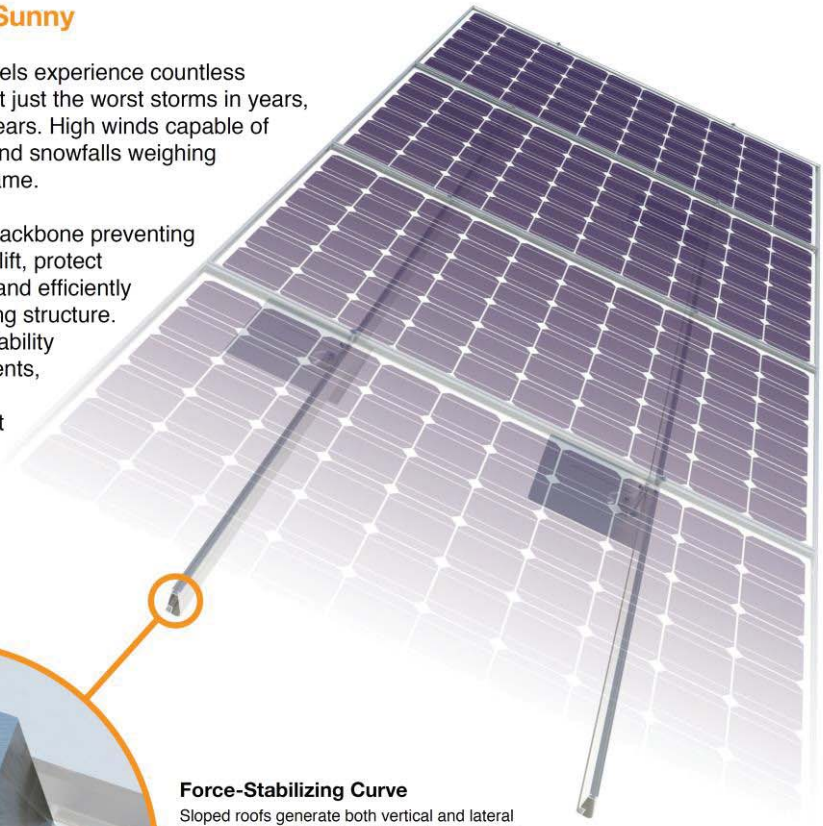
Panasonic
Panasonic Eco Solutions of North America
Two Riverfront Plaza, 5th Floor, Newark, NJ 07102
panasonicHIT@us.panasonic.com
business.panasonic.com/solarpanels

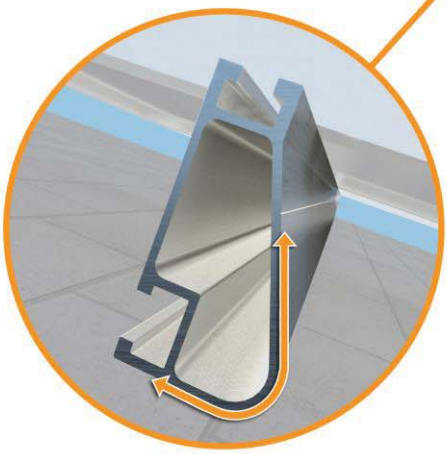
RS151248SS

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.





Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

INVERTERS

Single Phase Inverter
with HD-Wave Technology for North America

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

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- 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
- High reliability without any electrolytic capacitors
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

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Single Phase Inverter
with HD-Wave Technology for North America

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

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	
OUTPUT							
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	VA
Max. AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	VA
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	Vac
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]						Hz
Maximum Continuous Output Current 208V	-	16	-	24	-	-	A
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	A
GFDI Threshold	1						A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes						
INPUT							
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	W
Maximum DC Power @208V	-	5100	-	7750	-	-	
Transformer-less, Ungrounded	Yes						
Maximum Input Voltage	480						Vdc
Nominal DC Input Voltage	380				4[illegible]0		Vdc
Maximum Input Current 208V	-	9	-	13.5	-	-	
Maximum Input Current @240V	8.5	10.5	13.5	16.5	20	27	Adc
Max. Input Short Circuit Current	45						Adc
Reverse-Polarity Protection	Yes						
Ground-Fault Isolation Detection	600kΩ Sensitivity						
Maximum Inverter Efficiency	99	99.2					%
CEC Weighted Efficiency	99						%
Nighttime Power Consumption	< 2.5						W
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Data, ANSI C12.20	Optional[2]						
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 / 20-4 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				Natural convection		
Operating Temperature Range	-13 to +140 / -25 to +60[3] (-40˚F / -40˚C option)[4]						˚F / ˚C
Protection Rating	NEMA 3R (Inverter with Safety Switch)						

[1] For other regional settings please contact SolarEdge support
[2] Revenue grade inverter P/N: SExxxxH-US000NNC2
[3] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[4] -40 version P/N: SExxxxH-US000NNU4

RoHS

solaredge

SolarEdge Power Optimizer

Module Add-On For North America

P300 / P320 / P370 / P400 / P405

POWER OPTIMIZER

PV power optimization at the module-level

- 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
- Module-level voltage shutdown for installer and firefighter safety

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SolarEdge Power Optimizer

Module Add-On for North America

P300 / P320 / P370 / P400 / P405

	P300 (for 60-cell modules)	P320 (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)	
INPUT						
Rated Input DC Power[1]	300	320	370	400	405	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	Vdc
Maximum Short Circuit Current (Isc)	10	11		10.1		Adc
Maximum DC Input Current	12.5	13.75		12.63		Adc
Maximum Efficiency	99.5					%
Weighted Efficiency	98.8					%
Overvoltage Category	II					
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)						
Maximum Output Current	15					Adc
Maximum Output Voltage	60				85	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)						
Safety Output Voltage per Power Optimizer	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)	128 x 152 x 27.5 / 5 x 5.97 x 1.08			128 x 152 x 35 / 5 x 5.97 x 1.37	128 x 152 x 50 / 5 x 5.97 x 1.96	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	gr / lb
Input Connector	MC4 Compatible		MC4 / Amphenol AH4	MC4 Compatible		
Output Wire Type / Connector	Double Insulated; MC4 Compatible		Double Insulated; MC4 / Amphenol AH4	Double Insulated; MC4 Compatible		
Output Wire Length	0.95 / 3.0			1.2 / 3.9		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.

PV SYSTEM DESIGN USING A SOLAREDGE INVERTER[2][3]	SINGLE PHASE HD-WAVE	SINGLE PHASE	THREE PHASE 208V	THREE PHASE 480V	
Minimum String Length (Power Optimizers)	8		10	18	
Maximum String Length (Power Optimizers)	25		25	50	
Maximum Power per String	5700 (6000 with SE7600H-US)	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes				

[2] For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf.
[3] It is not allowed to mix P405 with P300/P370/P400/P600/P700 in one string.


Solar to be installed on the backside of this roof surface.
Peak Height 33’
Eve Height 27’
10921
SOLAR PANELS

Image of Back of Home

----- Square Feet ----
Solar: 5.21' x 3.45' x 24 = 431.38
Surface A: 965.9
Surface B: 408.6
Surface C: 592.3
Surface D: 489.7

Surface E: 187.4
Surface F: 71.3
Surface G: 45.7
Surface H: 76.9
Surface I: 170.7
Surface J: 80.8
Surface K: 94.7

Solar Square Feet 431.38 / Total Surface Square Feet: 3,184 x 100

= 13.55 % of roof occupied by solar