

STAFF REPORT: 7-10-2019 MEETING
APPLICATION NUMBER: 2019-6313
ADDRESS: 4444 SECOND
HISTORIC DISTRICT: WARREN PRENTIS
APPLICANT: JOE GALLAGHER
DATE OF STAFF VISIT: 7/6/2019

PREPARED BY: J. ROSS

PROPOSAL

The building located at 4444 Second was erected in 1920 to serve as an automobile show room and service station. The rear wing or “annex” was erected in 1966 IS SET BACK back approximately 50’-0” from the building’s original/main mass. The building is one story in height and features brick exterior walls with cast stone accents. The roof at the western-most bay of the building and at the rear 1966 addition is flat. An arched roof which is constructed of timber bow trusses is located at the eastern portion of the original building. A white PVC membrane covers the roof. The existing windows, added ca. 2009, are aluminum. The 2010 building rehabilitation also included the installation of solar panels at the roof of the 1966 rear annex and the establishment of an open brick paver patio at the site. A 6’-0”-high metal fence with brick columns encloses the parcel. A 4-story apartment building sits directly to the south of the building, while a 3-story apartment building is to the north. Non-historic, one-story commercial buildings with large paved/concrete parking lots are located to the west of the building/across 2nd Avenue. Commercial and multi-family uses predominate within THE BUILDING'S immediate vicinity.

With the current proposal, the applicant is seeking the Commission’s approval to install new solar panels at the arched/brow truss roof at the original portion of the building. Specifically, the current application proposes the following:

- Mount 32 solar panels on the south face of the bow-truss roof. The panels will be mounted 8" above the roof, and parallel to the angle of the roof, with no additional slope on the panel. The panels will be mounted to aluminum racking adhered to roof using U-Anchor heat weld attachments. As per the submitted renderings, the panels will be arranged in two rows which will run east/west along the roof surface. The array measures 6’-8”x 90’-0” overall and will be pushed back approximately 7 feet back/east from the roof edge/parapet.

STAFF OBSERVATIONS

As noted above, solar panels (approved by the Commission in 2009) currently exist at the building’s rooftop. Please see the attached drawing, which indicates the existing array’s location. Though visible from the right-of-way, it is staff’s opinion that the current are compatible with the the building's historic character. The applicant has submitted a rendering which indicates that the proposed new panels will be minimally visible from the public right-of-way. The new array will be pushed back 7’-0” from the roof edge and will be located at the south face of the roof. Note that the parapet at the roof/wall junction is approximately 3’-0” high. It is staff’s opinion that the positioning of the proposed new array will mitigate/minimize any potential negative visual impacts. Also, in staff’s opinion, the proposed new panels will not detract from the district's and/or building's historic features or spatial relationships because the prevailing character of the immediate environment is commercial in nature and the panels are compatible with the “...diverse physical appearance...” of the adjacent architectural resources.

ELEMENTS OF DESIGN

(7) *Relationship of materials.* The majority of residential buildings are faced with brick, often combined with masonry and/or wooden trim, architectural elements and details. The house at 110 West Forest Avenue is the only wood frame building in the district. Many storefronts of brick commercial buildings have large plate glass windows. The majority of roofs visible from the street are covered in asphalt, but slate exists; the roof of Detroit Central High School (now “Old Main”) is metal, while its balconies are bronze. Wrought iron balconets and railings

ornament several apartment buildings. Tile is used on the Goodrich Building at 4809 Woodward Avenue.

- (8) *Relationship of textures.* The major textural relationship is that of brick laid in mortar, often juxtaposed with wood and/or smooth, carved or molded cast stone elements and trim. Textured brick and brick laid in patterns creates considerable interest where it exists. Slate roofs have particular textural values where they exist, as does the metal roof of Detroit Central High School (now “Old Main”). Asphalt shingles generally have little textural interest, even in those types which purport to imitate some other variety.
- (9) *Relationship of colors.* Natural brick colors (such as red, yellow, brown, buff) predominate in wall surfaces. Natural stone colors also exist, including gray, beige, brown and red. Roofs, the majority of which are asphalt shingle, are in natural colors (tile and slate colors, natural and stained wood colors). Paint colors often relate to style. The buildings derived from classical precedents, particularly those of colonial revival, neo-colonial and renaissance revival styles, generally have woodwork painted white, cream, or in the range of those colors. Colors known to have been in use on similar buildings of this style in the eighteenth or early twentieth centuries may be considered for appropriateness. Buildings of vernacular English revival styles generally have painted woodwork and window frames of a dark brown or cream color. Victorian buildings display a broad color palette. Tile and stained glass, where it exists as decoration visible on the front facade, contributes to the artistic interest of the building. The original colors of any building, as determined by professional analysis, are always acceptable for that building, and may provide guidance for similar buildings.

RECOMMENDATION

As noted above, the proposed new solar panel array will be minimally visible from the public right-of-way. However, it is staff’s opinion that the proposed installation will not result in the removal of historic materials or the alteration of features and spaces that characterize the building or district. Staff therefore recommends that the Commission issue a Certificate of Appropriateness for the work a proposed because it meets the Secretary of the Interior’s Standards for Rehabilitation, standard number (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* number (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* and number (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.*









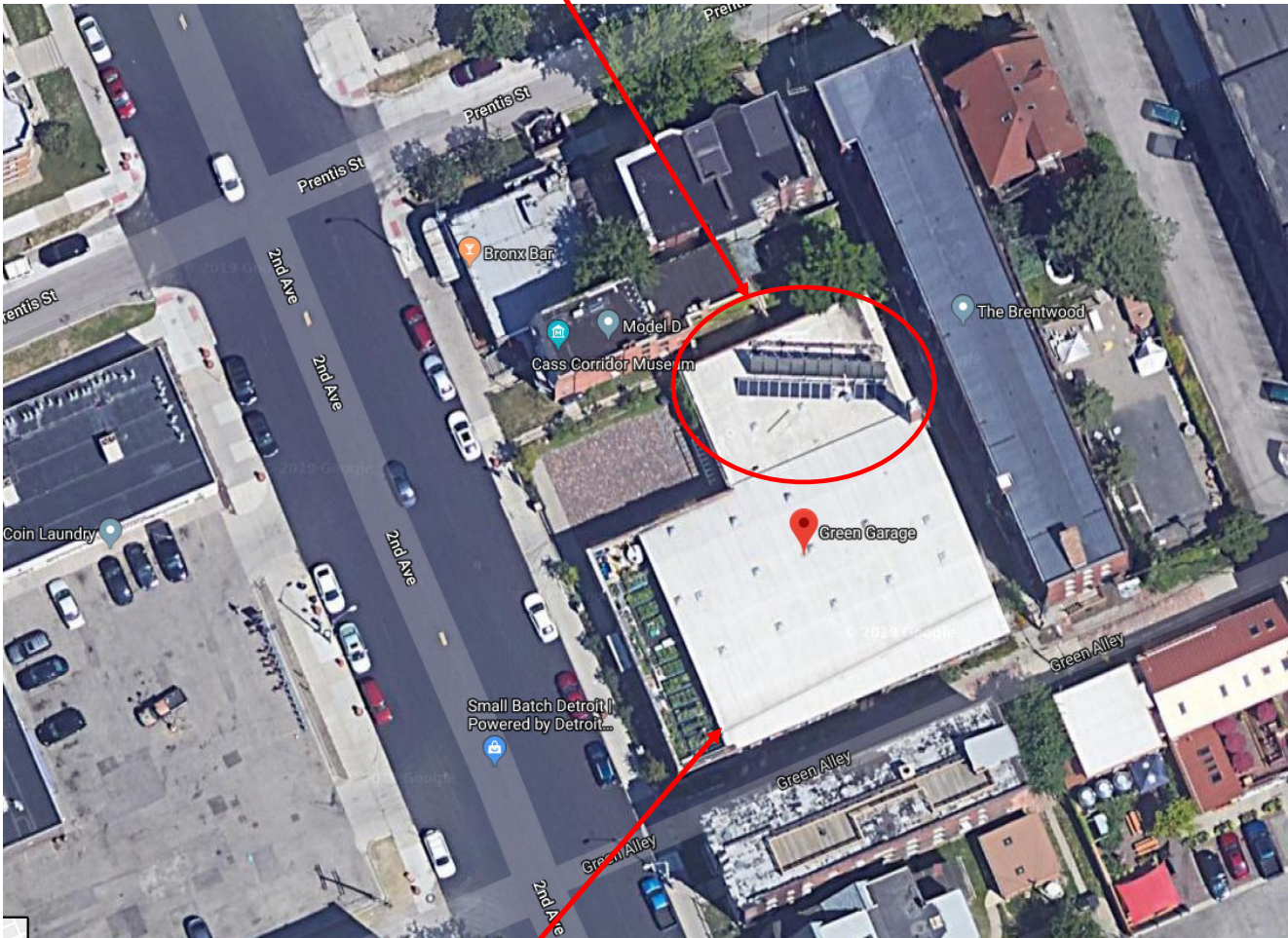








Existing array, approved by the Commission in 2009



Proposed location for new panels

This request is regarding installation of additional solar panels at the Green Garage, 4444 2nd Ave, Detroit 48201.

The building underwent a restoration and renovation, completed in November of 2011. As part of the energy upgrades undertaken at that time, solar panels were approved by the Historic Commission and installed on the flat roof of the north annex to the building..

This application is for installation of 32 additional panels on the south face of the bow-truss roof. The roof is a white Duralast pvc membrane.

Scope of Work

- Obtain building and electric permits from City of Detroit Building Dept
- Mount panels to aluminum racking adhered to roof using U-Anchor heat weld attachments
- Run electric wiring in conduit to existing panel location, and from there to electric service room
- Obtain final inspections from city of detroit
- Provide required documentation to DTE to obtain approved interconnection agreement

The panels will be mounted 8" above the roof, and parallel to the angle of the roof, with no additional slope on the panel. Sketchup modeling of the building shows the panels will be barely visible from any street level viewing. Additional equipment will be located inside the building electrical service room.

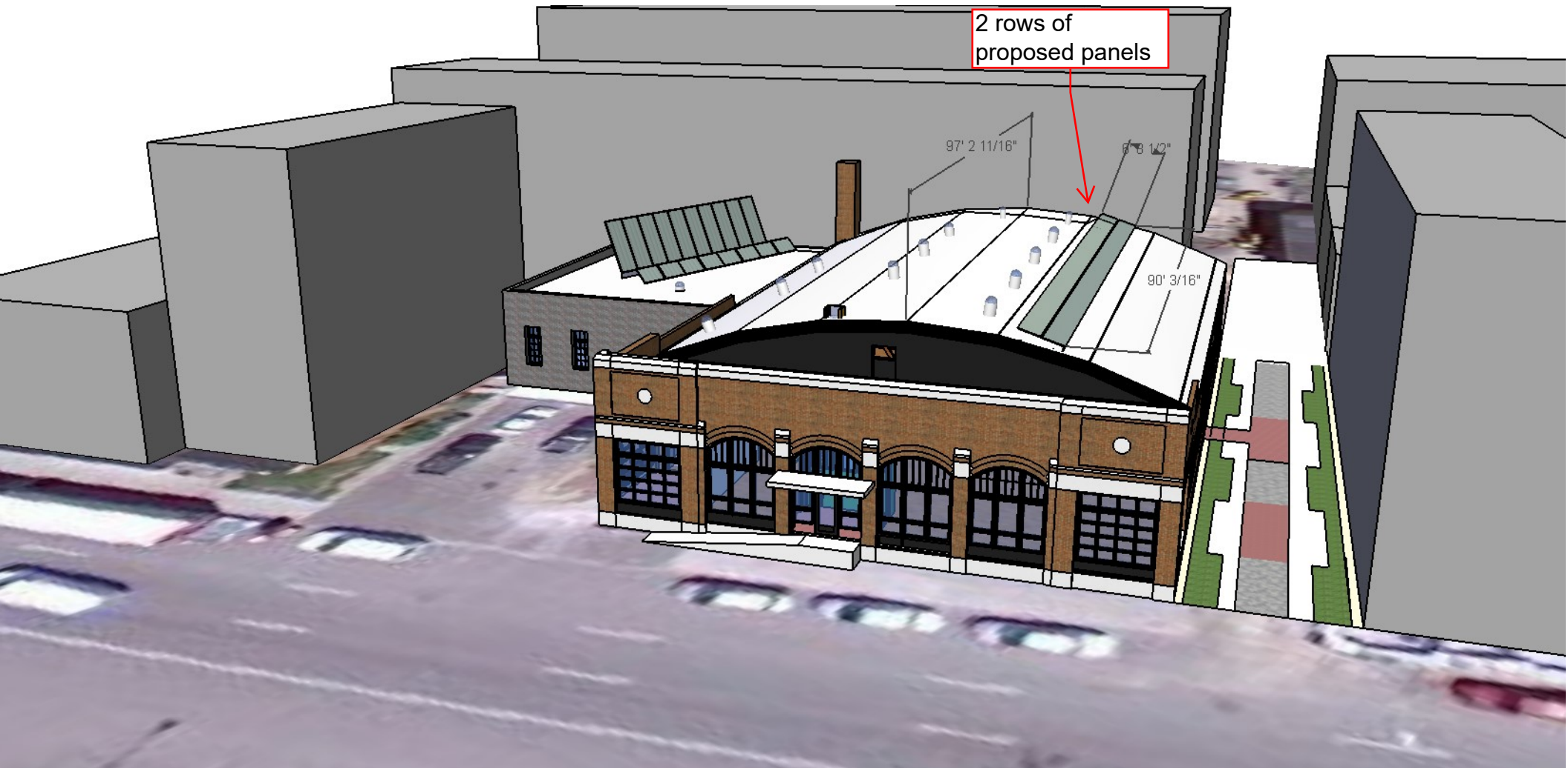
Enclosed are photos of the building, and screen shots from the Sketchup model representing the building and views of the roof after addition of the panels.

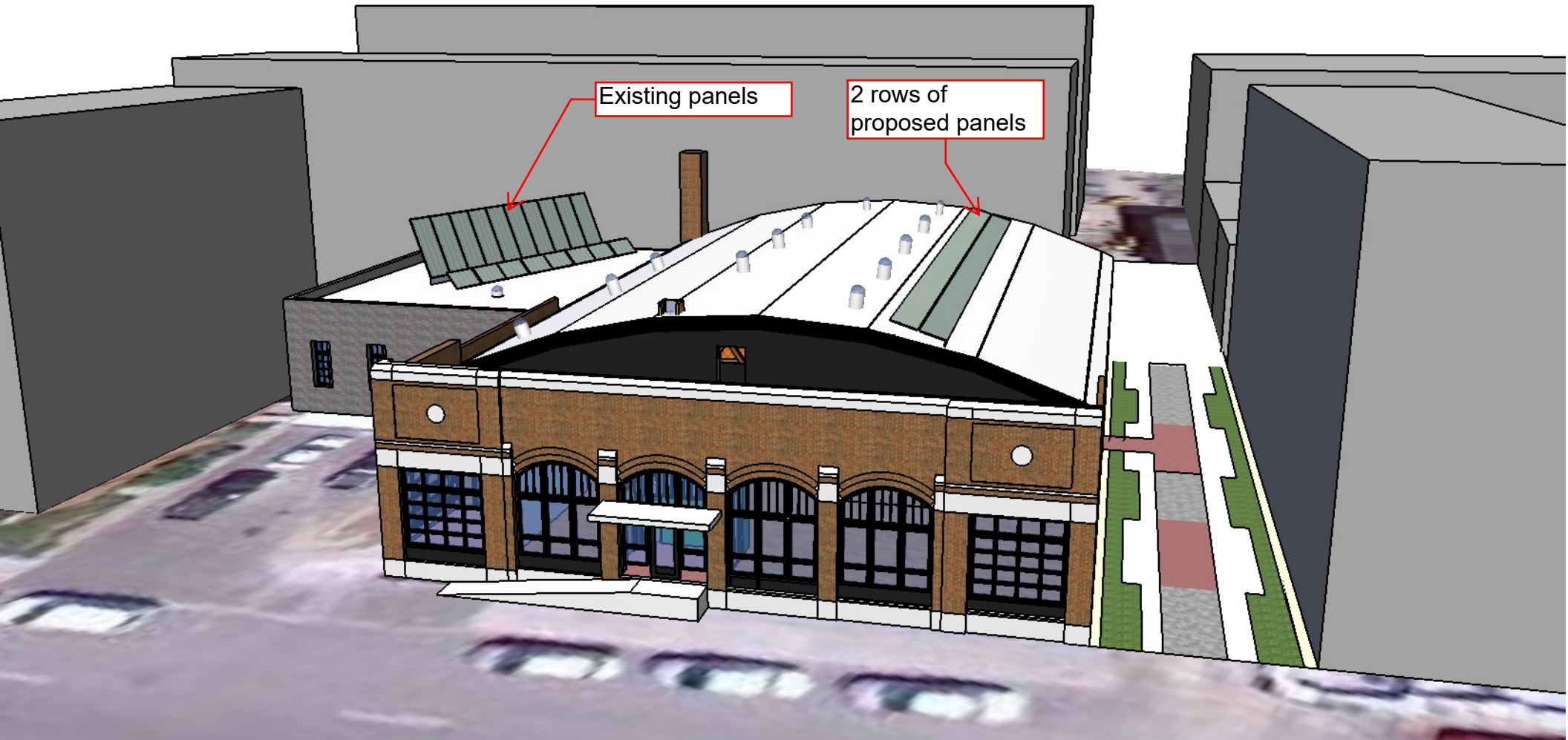
I am hopeful this can be administratively approved, due to the low visibility and impact on the surrounding neighborhood.

Respectfully,

Joe Gallagher
Green Garage
248.345.8306

Overall dimensions of array 6'8" x 90'



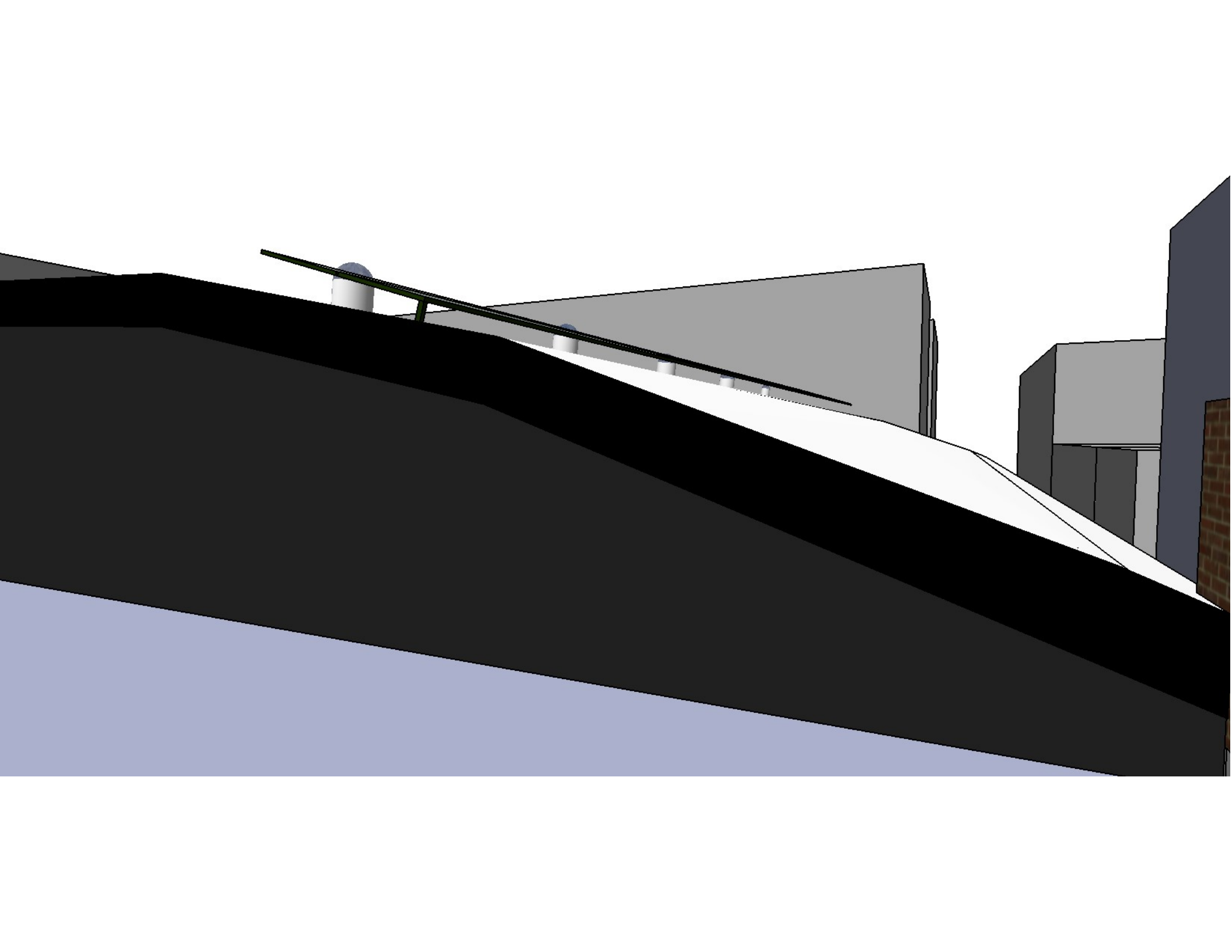


Existing panels

2 rows of proposed panels











Front

Back



Product Specs

Bolt

- 3/8"-16 x 1.5" Bolt*
- Material Type: 304 Stainless Steel

Plate

- Outer Diameter: 5-1/2"
- Fastener Hole Diameter: 17/64" (8 holes)
- Fastener Hole Pattern: 4-1/8" Diameter
- Material Thickness: 0.047" (1.194mm)
- Material Type: Galvalume® AZ55
- Target Membrane
- Manufacturer: Brand Specific OR Generic
- Color: Default White*
- Length: 15.75"
- Width: 15.75"
- Thickness: Default 60 mil*

Patents

- Visit www.anchorcorp.com/patents

Packaging Specs

- Sold Individually OR Full Box Quantity
- Individual Weight: Approx. 1.1875 lbs
- Full Box Quantity: 10 units
- Box Weight: Approx. 17 lbs
- Box Dimensions: 17" x 11" x 17"
- Full Pallet Quantity: 30 boxes
- Pallet Dimensions: 48" x 40" x 67"

Description

The U-Anchor 2000-PVC is a lightweight rooftop attachment system consisting of a thermoplastic target membrane and a U-Anchor 2000 series plate. The plate is factory welded to the target membrane and a matching thermoplastic cover membrane is applied over the plate and onto the target membrane, encapsulating the plate. The U2000-PVC provides a positive, watertight, manufacturer accepted attachment for mechanically attached and fully adhered PVC roofing systems.

Additionally, the U2000-PVC acts as an effective expansion joint at each rooftop attachment point and minimizes stress to roof components.

Advantages

- Extremely strong and lightweight
- Fast installation, approximate rate of 12 per man hour
- Installs on any flat surface

U-Anchor Attachment

The U2000-PVC is attached to a fully adhered roofing system by hot air welding around the perimeter edge consistent with the specified roofing manufacturer's hot air welding specifications.

Equipment Attachment

To securely mount your rooftop equipment to the U-Anchor, after its installed, the connection nut must be fastened to approximately 20-25 torque pounds.

Use a calibrated torque wrench during install to ensure appropriate results are achieved.

Testing / Approvals

- Accepted - All Major Roofing Manufacturers

Individual deck assembly reports available upon request.

Ratings

Results are base on plate performance only.

- Ultimate Load - Shear: 1800 lbs
- Ultimate Load - Tension: 1800 lbs

*Test was performed in accordance with:
ASCE 7-10 ASTM E330-02 (2010) TAS 1178*

Warranty

- Standard 20 Year Material Only Warranty

* Specified option is standard. Custom options may be available for additional charge. Lead times may apply depending on roofing manufacturer and product availability.



*Black frame product can be provided upon request.

CS6K- 285 | 290 | 295 | 300 | 305 P HIGH EFFICIENCY POLY MODULE

Canadian Solar's modules use the latest innovative poly cell technology, increasing module power output and system reliability, ensured by 17 years of experience in module manufacturing, well-engineered module design, stringent BOM quality testing, an automated manufacturing process and 100% EL testing.

KEY FEATURES



Excellent module efficiency of up to: 18.63 %



IP68 junction box for long-term weather endurance



Heavy snow load up to 6000 Pa, wind load up to 4000 Pa *



High PTC rating of up to: 92.90 %



linear power output warranty



product warranty on materials and workmanship

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system

ISO 14001:2015 / Standards for environmental management system

OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / MCS / CEC AU / INMETRO

UL 1703 / IEC 61215 performance: CEC listed (US)

UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE

IEC60068-2-68:SGS

Take-e-way



* We can provide this product with special BOM specifically certified with salt mist, ammonia and sand blowing tests. Please talk to our local technical sales representatives to get your customized solutions.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. No. 1 module supplier for quality and performance/price ratio in IHS Module Customer Insight Survey. As a leading PV project developer and manufacturer of solar modules with over 30 GW deployed around the world since 2001.

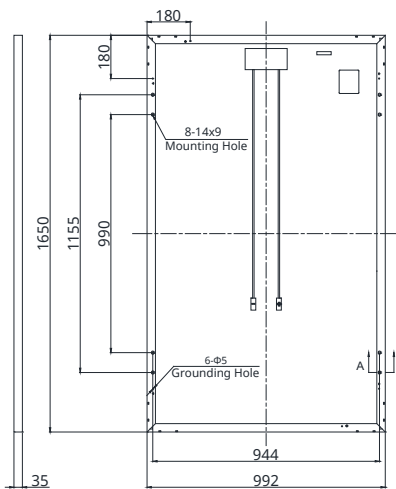
*For detailed information, please refer to the Installation Manual.

CANADIAN SOLAR INC.

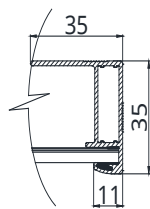
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

ENGINEERING DRAWING (mm)

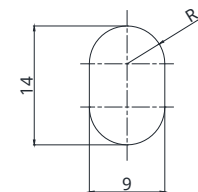
Rear View



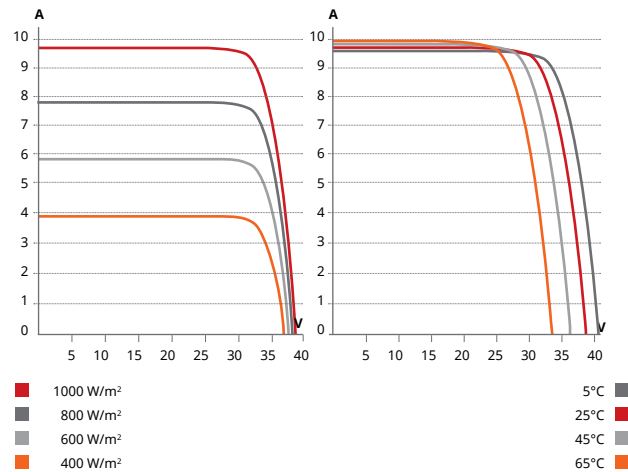
Frame Cross Section A-A



Mounting Hole



CS6K-295P / I-V CURVES



ELECTRICAL DATA | STC*

CS6K	285P	290P	295P	300P	305P
Nominal Max. Power (P _{max})	285 W	290 W	295 W	300 W	305 W
Opt. Operating Voltage (V _{mp})	31.4 V	31.6 V	31.8 V	32.0 V	32.1 V
Opt. Operating Current (I _{mp})	9.06 A	9.18 A	9.28 A	9.38 A	9.50 A
Open Circuit Voltage (V _{oc})	38.3 V	38.5 V	38.6 V	38.8 V	38.9 V
Short Circuit Current (I _{sc})	9.64 A	9.72 A	9.81 A	9.92 A	10.03 A
Module Efficiency	17.41%	17.72%	18.02%	18.33%	18.63%
Operating Temperature	-40°C ~ +85°C				
Max. System Voltage	1000 V (IEC/UL) or 1500 V (IEC/UL)				
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)				
Max. Series Fuse Rating	15 A				
Application Classification	Class A				
Power Tolerance	0 ~ + 5 W				

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

CS6K	285P	290P	295P	300P	305P
Nominal Max. Power (P _{max})	210 W	214 W	218 W	221 W	225 W
Opt. Operating Voltage (V _{mp})	28.9 V	29.1 V	29.3 V	29.4 V	29.5 V
Opt. Operating Current (I _{mp})	7.28 A	7.36 A	7.44 A	7.52 A	7.62 A
Open Circuit Voltage (V _{oc})	35.8 V	36.0 V	36.1 V	36.3 V	36.4 V
Short Circuit Current (I _{sc})	7.78 A	7.85 A	7.92 A	8.01 A	8.10 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

PERFORMANCE AT LOW IRRADIANCE

Outstanding performance at low irradiance, with an average relative efficiency of 96.5 % for irradiances between 200 W/m² and 1000 W/m² (AM 1.5, 25°C).

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

MECHANICAL DATA

Specification	Data
Cell Type	Poly-crystalline, 6 inch
Cell Arrangement	60 (6 × 10)
Dimensions	1650×992×35 mm (65.0×39.1×1.38 in)
Weight	18.2 kg (40.1 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4.0 mm ² (IEC), 12 AWG (UL), 1000 mm (39.4 in)
Connector	T4 series
Per Pallet	30 pieces
Per Container (40' HQ)	840 pieces

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (P _{max})	-0.39 % / °C
Temperature Coefficient (V _{oc})	-0.29 % / °C
Temperature Coefficient (I _{sc})	0.05 % / °C
Nominal Module Operating Temperature (NMOT)	43 ± 3 °C

PARTNER SECTION



CANADIAN SOLAR INC.

545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

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	%
Overvoltage 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