HISTORIC LANDMARK COMMISSION STAFF REPORT

700 North Solar Panels
PLNHLC2014-00557
232 W 700 North
October 2, 2014

Planning Division
Department of Community and Economic Development

Applicant:
Travis Welton, contractor

Staff:
Anna Anglin (801) 535-6050 or Anna.anglin@slcgov.com

Tax ID: 08-25-456-023

Current Zone: SR-1A Special Development Pattern Residential

Master Plan Designation:
Low Density Residential (5-15 dwelling units per acre)

Council District:
District 3, represented by Stan Penfold

Lot Size:
Approximately 4,791 square feet

Current Use: Single Family

Applicable Land Use Regulations:
- 21A.34.020
- 21A.40.190

Notification
- Notice mailed on 09/18/14
- Agenda posted on the Planning Division and Utah Public Meeting Notice websites 09/18/14
- Posted Property on 9/18/2014

Attachments
A. Proposed Plans
B. Photos

Request
The applicant Travis Welton, representing the property owner, is requesting approval from the City for an installed small solar energy collection system on a single family residence. The solar panels are placed on the east side of the roof of the house and are visible from the street. This property is located in the Capitol Hill Historic District.

This type of project must be reviewed as a Minor Alteration by the Historic Landmark Commission as it is for a photovoltaic system which is visible from a public right of way.

Staff Recommendation
Staff recommends that the Historic Landmark Commission review the application, and approve the installed small solar energy collection system pursuant to the findings, analysis and conditions of approval in this staff report with the following condition:

- The Panels are installed no greater than six inches off the roof to appear flush mounted.

Potential Motions
Consistent with Staff Recommendation: Based on the analysis and findings of fact in the staff report, testimony and plans presented, I move that the Commission approve the request for a minor alteration for the installed small solar energy collection system on the east side of the roof which is visible from the public right-of-way for the residence at 232 W 700 North Street.

Not Consistent with Staff Recommendation: Based on the testimony, plans presented and the following findings, I move that the Commission deny the request for a minor alteration for the installed small solar energy collection system on the east side of the roof which is visible from the public right-of-way for the residence at 232 W 700 North Street based on the following findings (Commissioner then states findings based on the Standards to support the motion):

1. A property shall be used for its historic purpose or be used for a purpose that requires minimal change to the defining characteristics of the building and its site and environment;

	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; 3. All sites, structures and objects shall be recognized as products of their own time. Alterations that have no historical basis and which seek to create a false sense of history or architecture are not allowed; 4. Alterations or additions that have acquired historic significance in their own right shall be retained and preserved; 5. Distinctive features, finishes and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved; 6. Deteriorated architectural features shall be repaired rather than replaced wherever feasible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, texture and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features, substantiated by historic, physical or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other structures or objects; 7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible; 8. Contemporary design for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant cultural, historical, architectural or archaeological material, and such design is compatible with the size, scale, color, material and character of the property, neighborhood or environment; 9. Additions or alterations to structures and objects shall be done in such a manner that if such additions or alterations were to be removed in the future, the essential form and integrity of the structure would be unimpaired. The new work shall be differentiated from the old and shall be compatible in massing, size, scale and architectural features to protect the historic integrity of the property and its environment; 10. Certain building materials are prohibited including the following: a. Aluminum, asbestos, or vinyl cladding when applied directly to an original or historic material. 11. Any new sign and any change in the appearance of any existing sign located on a landmark site or within the H historic preservation overlay district, which is visible from any public way or open space shall be consistent with the historic character of the landmark site or H historic preservation overlay district and shall comply with the standards outlined in chapter 21A.46 of this title.

Vicinity Map & Photo of House

Background & Project Description

The subject property is located at 232 West 700 North Street and is considered a contributing historic structure in the Capitol Hill Historic District. The house is a Greek Revival style home built approximately in 1887 and is rated as a significant structure in the 2006 reconnaissance survey. The house has a pitched roof and asphalt shingles. The total area of the roof is approximately 990 square feet. The applicant is requesting to approve the installed solar panels on the east side of the roof. The size of the small solar energy collection system is approximately 190.6 square feet and consists of 11 panels. There are no panels on the front or the back of the house. The panels are approximately 3.25 by 5.5 feet each. The panels are mounted on an aluminum racking system approximately three to six inches above the roof surface. The racking penetrates the roof at 32 points and the total array system will weigh approximately 671 pounds. The applicant has already had approval from building code to install the system. The panels have a black frame, black backing paper, and black cells and the color of the roof is gray.

The applicant had a permit issued to them in error due to a Certificate of Appropriateness being issued to them under the misunderstanding that the solar panels were not readily visible from the street. The original Certificate of Appropriateness was approved on August 9, 2014 and was rescinded on August 21, 2014, due to a site visit to the property confirming the high visibility placement of the solar panels. A hold was placed on the permit and the applicant was notified that the Certificate of Appropriateness was nullified and a new Certificate of Appropriateness would need to be issued only by the Historic Landmark Commission for approval. The solar panels were not yet installed on August 21, 2014 when the Planning staff went to the property. When Planning staff revisited the site on September 23, 2014, the solar panels had been installed.

Public Comments

One comment was received by email from John Webster owner of the property located at 705 N 200 West in support of the solar panels being installed. Any other comments received after the publication of this staff report will be forwarded to the members of the Historic Landmark Commission.

Zoning Ordinance and Design Guidelines

21A.40.190.A – Small Solar Energy Collection Systems Standards

1. Setbacks, Location, and Height:
   a. A small solar energy collection system shall be located a minimum of six feet from all property lines and other structures, except the structure on which it is mounted.

      Analysis: The six foot setback from the property line is for solar panels standing on their own structure. Solar panels mounted on the roof of an existing structure do not require the six foot setback. The location of the installed system is completely attached to the roof and will not encroach any farther than the house into a required yard.

      Finding: This standard does not apply to this project because the proposed small solar energy collection system is located entirely on the roof of an existing structure.

   b. A small solar energy collection system may be located on an accessory structure, including legal accessory structures located less than six feet from a property line.

Analysis: The solar panels are located on the principal structure. The applicant considered the possibility of placing the panels on the roof of the accessory structure; but the accessory structure is shaded by mature trees and would not allow enough sunlight to power the solar array system. In addition, the solar array system is too large to be placed in the rear yard.

Finding: The location on the accessory structure or rear yard area was considered, but found that it was not feasible.

c. A small solar energy collection system shall not exceed by more than three feet the maximum building height (based on the type of building – principal or accessory - the system is located on) permitted in the zoning district in which it is located or shall not extend more than 12 feet above the roofline of the structure upon which it is mounted, whichever is less.

Analysis: The small solar energy collection system is parallel to the roof and is no more than six inches off the roof surface.

Finding: This standard is met.

d. A development proposed to have a small solar energy collection system located on the roof or attached to a structure, or an application to establish a system on an existing structure, shall provide a structural certification as part of the building permit application.

Finding: The applicant has already submitted all necessary documentation to the Building Permits division for the installation and structural details for the solar panels.

2. Coverage: A small solar energy collection system mounted to the roof of a building shall not exceed 90% of the total roof area of the building upon which it is installed. A system constructed as a separate accessory structure on the ground shall count toward the total building and yard coverage limits for the lot on which it is located.

Analysis: The small solar energy collection system is mounted on the roof of the main residence. The solar energy collection system is approximately 190.6 square feet. The total area of the roof of the principal structure is approximately 990 square feet. This means that the proposed small solar energy collection system will cover about 19% of the roof area.

Finding: This standard has been met.

3. Code Compliance: Small solar energy collection systems shall comply with all applicable building and electrical codes contained in the international building code adopted by Salt Lake City.

Finding: The small solar energy collection system has been approved by the Building Permits division and will be inspected to ensure that it meets all applicable codes adopted by Salt Lake City.

4. Solar Easements: A property owner who has installed or intends to install a small solar energy collection system shall be responsible for negotiating with other property owners in the vicinity for any desired solar easement to protect solar access for the system and shall record the easement with the Salt Lake County Recorder.

Finding: The applicant is responsible for negotiating with other property owners for any desired solar easements.

5. Off Street Parking and Loading Requirements: Small solar energy collection systems shall not remove or encroach upon required parking or loading areas for other uses on the site or access to such parking or loading areas.

Analysis: The small solar energy collection system is located on the main residence and is not located upon any required parking area.

Finding: This standard has been met.

21A.40.190.B.3 – Small Solar Collection Systems and Historic Preservation Overlay Districts or Landmark Sites: Small Solar Collection System Location Priorities

3. Small Solar Collection System Location Priorities: In approving appropriate locations and manner of installation, consideration shall include the following locations in the priority order they are set forth below. The method of installation approved shall be the least visible from a public right of way, not including alleys, and most compatible with the character defining features of the historic building, structure, or site. Systems proposed for locations in subsections B.3.a through B.3.d of this section, which are not readily visible from a public right of way may be reviewed administratively as set forth in subsection 21A.34.020.F,1, "Administrative Decision", of this title. Systems proposed for locations in subsections B.3.e and B.3.f of this section, which may be visible from a public right of way shall be reviewed by the Historic Landmark Commission in accordance with the procedures set forth in subsection 21A.34.020.F.2, "Historic Landmark Commission", of this title.

a. Rear yard in a location not readily visible from a public right of way.

b. On accessory buildings or structures in a location not readily visible from a public right of way.

c. In a side yard in a location not readily visible from a public right of way.

d. On the principal building in a location not readily visible from a public right of way.

e. On the principal building in a location that may be visible from a public right of way, but not on the structure's front facade.

f. On the front facade of the principal building in a location most compatible with the character defining features of the structure.

Analysis:

a. The rear yard is not an option for installation as the yard area is shaded by mature trees on a portion of it and the solar array system is too large to fit into the portion of the yard which is not shaded.
b. The existing accessory structure is located in the rear yard and is shaded by mature trees.
c. The property has narrow side yards that would not accommodate the small solar energy collection system.
d. There is no portion of the roof of the principal structure which is not visible from the street.
e. The small solar collection system is placed on the east side of the roof and covers almost the entire length of the east facing roof side.

f. The solar array system is not located on the front façade of the structure.

Finding: Based on the priority order of location, criteria a through d are not feasible. However, in this case the proposal meets criteria e and criteria f is not applicable.

21A.40.190.B.2 - Small Solar Collection Systems and Historic Preservation Overlay Districts Or Landmark Sites

1. General: In addition to meeting the standards set forth in this section, all applications to install a small solar collection system within the historic preservation overlay district shall obtain a certificate of appropriateness prior to installation. Small solar collection systems shall be allowed in accordance with the location priorities detailed in subsection B3 of this section. If there is any conflict between the provisions of this subsection B, and any other requirements of this section, the provisions of this subsection B shall take precedence.

Analysis: As noted previously in the analysis of the location priorities, there are some preferred locations for installation of the small solar energy collection system that will not work on this particular property. Staff has noted why each of the priority locations will not work due to sun exposure and the rear yard not being large enough to accommodate the small solar energy collection system.

Finding: The current location, while it is not one of the priority locations, is the best possible location for the small solar energy collection system on the site. Should the application be approved by the Historic Landmark Commission, the applicant will need to obtain a Certificate of Appropriateness and this standard will be met.

2. Installation Standards: The small solar energy collection system shall be installed in a location and manner on the building or lot that is least visible and obtrusive and in such a way that causes the least impact to the historic integrity and character of the historic building, structure, site or district while maintaining efficient operation of the solar device. The system must be installed in such a manner that it can be removed and not damage the historic building, structure, or site it is associated with.

Analysis: Although the solar array system is installed on the east side of the building and is visible from 700 North Street, staff finds that the visual impact of the small solar energy collection system is minimized by being flushed as close as possible to the roof to make them less visible while still making them function effectively. The solar panels start approximately eight inches from the front roof line and ends five feet away from the rear roof line. In this case, the placement of the solar panels closer to the street facing façade of the house makes them less visible from 700 North Street due to the location of trees in the front yard.

In addition, the system placed on the roof will not damage the main components of the historic structure. The solar array system could be removed in the future with some damage to the roof material, but the existing asphalt shingles on the roof are not original to the residence.

Finding: The location of the small solar energy collection system is the least obtrusive to the historic nature of the residence and property and can be easily removed in the future with minimal impact to the roof and not the roof structure. This location has also been chosen as it is the most efficient location for the system to operate.

21A.34.020 H Historic Preservation Overlay District

G. Standards for Certificate of Appropriateness for Altering of a Landmark Site or Contributing Structure: In considering an application for a Certificate of Appropriateness for alteration of a landmark site or contributing structure, the Historic Landmark Commission shall find that the project substantially complies with all of the general standards that pertain to the application and that the decision is in the best interest of the City.

Standard 1: A property shall be used for its historic purpose or be used for a purpose that requires minimal change to the defining characteristics of the building and its site and environment;

Analysis: The building was constructed in 1887 as a single family home. No change of use is proposed and very little impact is made to the characteristics of the home. The installation does not impact character defining features of the building, site or environment.

Finding: This standard is met.

Standard 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;

Applicable Design Guidelines from *A Preservation Handbook for Historic Residential Properties & Districts in Salt Lake City.*

7.6 The visual impact of skylights and other rooftop devices should be minimized.

- Skylights or solar panels should be installed to reflect the plane of the historic roof.
- They should be lower than the ridgeline, when possible.
- Flat skylights and solar panels that are parallel with the roof plane may be appropriate on the rear and sides of the roof.
- Avoid locating a skylight or solar panel on a front roof plane wherever possible.

Analysis: The small solar energy collection system is placed:

- Parallel to the roof up to six inches off the roof surface.
- Is placed a minimum of 36 inches from the roof ridgeline to comply with fire code.
- Is not placed on the front façade. Although it will be visible from the street on the east side, the options for where to place the panels are limited in order to efficiently produce energy.

1. **Finding:** Although the small solar energy collection system is visible from the street on the east side, staff finds that the visual impact will be minimized by the system being installed as flush as possible to the roof making them less visible while still making them function effectively. The small solar energy collection system is placed parallel to the roof and not above the ridgeline, and no portion of the roof form will be altered. No historic materials or features have been altered. Options for other locations are limited due to size or location relative to the sun. This standard is met.

Standard 3: All sites, structure and objects shall be recognized as products of their own time. Alterations that have no historical basis and which seek to create a false sense of history or architecture are not allowed.

Analysis: The panels are a utility and are not installed in a manner to create a false sense of history or architecture.

Finding: This standard is met.

Standard 4: Alterations or additions that have acquired historic significance in their own right shall be retained and preserved.

Analysis: No significant historic features are lost.

Finding: This standard is met.

Standard 5: Distinctive features, finishes and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

Analysis: No significant historic features have been lost as the small solar energy collection system is located on the roof and will have very little impact to the roof or the character of the property. The property and the structure continue to remain a historic property that can have the solar panels removed with little to no impact to the property or structure. The panels are mounted flush to the roof. The applicant is required to ensure that the structure can handle the weight load of the solar panels on the roof.

Finding: This standard is met.

Standard 6: Deteriorated architectural features shall be repaired rather than replaced wherever feasible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, texture and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features, substantiated by historic, physical or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other structures or objects.

Analysis: The subject proposal does not include repair or replacement of deteriorated architectural features.

Finding: This standard is not applicable.

Standard 7: Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

Analysis: The completed work does not include any treatments of historic materials.

Finding: This standard is not applicable.

Standard 8: Contemporary designs for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant cultural, historical, architectural or archaeological material, and such design is compatible with the size, scale, color, material and character of the property, neighborhood or environment.

Analysis: Although a minor feature has been added to the roof of the residence, the roof form itself has not been modified or altered. The small solar energy collection system is designed to be flush mounted and to have the least amount of visual and structural impact.

In addition, the color of the roof is gray and the panels of the proposed small solar collection system are black making the two materials blend well together. This helps minimize their visibility from the public right of way.

Finding: This standard is met.

Standard 9: Additions or alterations to structures and objects shall be done in such a manner that if such additions or alteration were to be removed in the future, the essential form and integrity of the structure would be unimpaired. The new work shall be differentiate from the old and shall be compatible in massing, size, scale and architectural features to protect the historic integrity of the property and its environment.

Analysis: The small solar energy collection system can be removed without impairing any form and integrity of the structure other than possible damage to the asphalt shingle roof, which is not original to the structure.

Finding: This standard is met.

Standard 10: Certain building materials are prohibited including the following: Vinyl, asbestos, or aluminum cladding when applied directly to an original or historic material.

Analysis: This application does not include vinyl, asbestos or aluminum cladding.

Finding: This standard is not applicable.

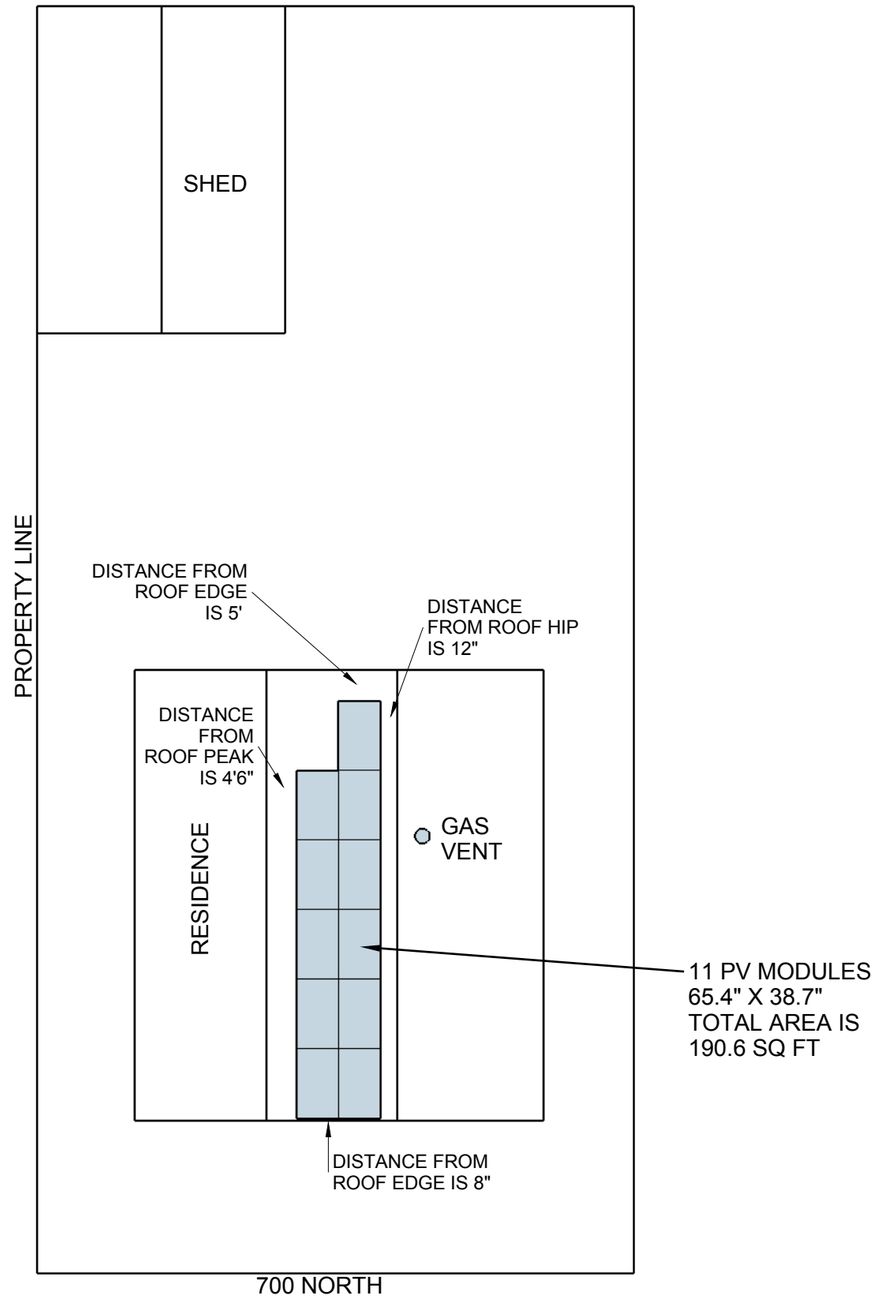
Standard 11: Any new sign and any change in the appearance of any existing sign located on a landmark site or within the H historic preservation overlay district, which is visible from any public way or open space shall be consistent with the historic character of the landmark site or H historic preservation overlay district and shall comply with the standards outlined in part IV, Chapter 21A.46 of this title;

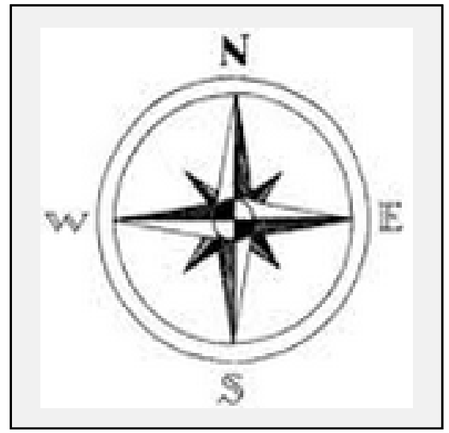
Analysis: No signs are proposed.

Finding: This standard is not applicable.

Attachment A

Proposed Plans





ROOF NOTES:

- ENGINEERED ROOF TRUSSES - UPPER CHORD AT 24" O.C.
- ROOFING MAT COMPOSITE ROOF TILE
- SINGLE LAYER

PHOTOVOLTAIC SYSTEM NOTES:

- RESIDENTIAL
- ROOF MOUNTED
- GRID TIED

APPLICABLE CODES

- 2012 IRC
- 2012 IBC
- 2012 IFC
- 2012 IECC
- 2011 NEC

GO Solar

customer
232 W 700N
Salt Lake City, UT
84103

ISSUE
September 24, 2014

DRAWN BY
SC, GJ

PROJECT
Solar Photovoltaic

SYSTEM SIZE
2.75 KW

Go Solar Group
4425 S. 500 W. Suite D
Murray, UT 84123
License# 8543016-5501

01
Site Info

SMA INVERTER SPECIFICATIONS

Technical data	Sunny Boy 3000TL-US		Sunny Boy 3800TL-US	
	208 V AC	240 V AC	208 V AC	240 V AC
Input (DC)				
Max. usable DC power (@ cos φ = 1)	3200 W		4200 W	
Max. DC voltage	600 V		600 V	
Rated MPPT voltage range	175 - 480 V		175 - 480 V	
MPPT operating voltage range	125 V - 500 V		125 V - 500 V	
Min. DC voltage / start voltage	125 V / 150 V		125 V / 150 V	
Max. input current / per MPP tracker	18 A / 15 A		24 A / 15 A	
Number of MPP trackers / strings per MPP tracker	2 / 2			
Output (AC)				
AC nominal power	3000 W		3330 W	3840 W
Max. AC apparent power	3000 VA		3330 VA	3840 VA
Nominal AC voltage / adjustable	208 V / ●	240 V / ●	208 V / ●	240 V / ●
AC voltage range	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V
AC grid frequency; range	60 Hz / 59.3 - 60.5 Hz		60 Hz / 59.3 - 60.5 Hz	
Max. output current	15 A		16 A	
Power factor (cos φ)	1		1	
Output phases / line connections	1 / 2		1 / 2	
Harmonics	< 4%		< 4%	
Efficiency				
Max. efficiency	96.8%	97.1%	96.8%	97.2%
CEC efficiency	96%	96.5%	96%	96.5%
Protection devices				
DC disconnection device	●			
DC reverse-polarity protection	●			
Ground fault monitoring / Grid monitoring	● / ●			
AC short circuit protection	●			
All-pole sensitive residual current monitoring unit	●			
Arc fault circuit interrupter (AFCI) compliant to UL 1699B	●			
Protection class / overvoltage category	I / IV			
General data				
Dimensions (W / H / D) in mm (in)	490 / 519 / 185 (19.3 / 20.5 / 7.3)			
DC Disconnect dimensions (W / H / D) in mm (in)	187 / 297 / 190 (7.4 / 11.7 / 7.5)			
Packing dimensions (W / H / D) in mm (in)	617 / 597 / 266 (24.3 / 23.5 / 10.5)			
DC Disconnect packing dimensions (W / H / D) in mm (in)	370 / 240 / 280 (14.6 / 9.4 / 11.0)			
Weight / DC Disconnect weight	24 kg (53 lb) / 3.5 kg (8 lb)			
Packing weight / DC Disconnect packing weight	27 kg (60 lb) / 3.5 kg (8 lb)			
Operating temperature range	-40 °C ... +60 °C (-40 °F ... +140 °F)			
Noise emission (typical)	≤ 25 dB(A)		< 25 dB(A)	
Internal consumption at night	< 1 W		< 1 W	
Topology	Transformerless		Transformerless	
Cooling concept	Convection		Convection	
Electronics protection rating	NEMA 3R		NEMA 3R	
Features				
Secure Power Supply	●		●	
Display: graphic	●		●	
Interfaces: RS485 / Speedwire/Webconnect	o/o		o/o	
Warranty: 10 / 15 / 20 years	●/o/o		●/o/o	
Certificates and permits (more available on request)	UL 1741, UL 1998, UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA-C22.2 107.1-1			
NOTE: US inverters ship with gray lids				
Type designation	SB 3000TL-US-22		SB 3800TL-US-22	

Certified

- UL 1741 and 1699B compliant
- Integrated AFCI meets the requirements of NEC 2011 690.11

MSI ALPHA+ FLUSH MOUNTING SYSTEM SPECIFICATIONS (USED AS EQUIPMENT GROUNDING CONDUCTORS)

Application	*Pitched roof*
Roof types	*Suitable for most types of roof cladding*
Roof slope	*Up to 60° [1]*
Building height	*Up to 66 ft • 20 m [1]*
PV modules	*Framed, unframed*
Module orientation	*Landscape, portrait*
Size of module array	*not limited [2]*
Height allowance	*Up to 1.5 in • 38 mm*
Rail span	*Up to 6.6 ft • 2 m [1]*
Standards	*International Building Code IBC 2009* *California Building Code CBC 2010* *ASCE/SEI 7-10* *Aluminum Design Manual 2010* *ANSI/AISC 360-05* *ACI 318-08*
Supporting profiles	*Extruded Aluminum (EN AW 6063 T66)*
Hooks, small parts	*Stainless steel (V2A)*
Color	*Mill finish or black anodized*
Warranty	*10 years*

Splice options

Clickstone mid-clamp

Telescoping end piece

Roof hook with QuickAttach rail connection

GO Solar

Kathy Pope
232 West 700 North
Salt Lake City, UT
84103

ISSUE
August 6, 2014

DRAWN BY
SC, GJ

PROJECT
Solar Photovoltaic

SYSTEM SIZE
2.75 KW

Go Solar Group
4425 S. 500 W. Suite D
Murray, UT 84123
License# 8543016-5501

04
Specs

MSI RACKING INSTALLATION

2. Technical Description

2.1. System Overview

In the following, the most important system parts are described.

The design of the individual system components can vary, or additional components (e.g. cross rail connectors) may be required, depending on:

- Type of roof (substructure and roof cladding)
- Type of module
- Number of modules and configuration
- Local conditions

Image 2.1. – 1

a Roof hook
b Base rail
c Connector
d Telescoping end piece (optional)
e Module clamp
f Module end clamp

2.2. Components

In the following all mounting system parts of the Alpha+ are shown, which can be included in the scope of the delivery. The exact scope of the delivery and the number of individual components depends on your order.

a Alpha+ base rail (BR), options:
- BR 4/35 in various lengths
- BR 6/40 in various lengths
- BR 10/48 in various lengths
- 0.6 m pieces, either mill finished or black

b Alpha+ connector, options:
- Internal connectors (respectively for BR 4/35, BR 6/40 and BR 10/48)
- External connectors (respectively for BR 4/35, BR 6/40 and BR 10/48)

c Telescoping end-piece (optional), options:
- For BR 4/35, BR 6/40 and BR 10/48
- Either with mill finished or black end piece

d Module end clamp, options:
- For different module frame heights
- Mill finished or black

e Module clamp, options:
- For different spans of module frame heights
- Mill finished or black

f Roof fastener, options:
- Roof hooks in various designs (example shown here: standard roof hook)
- Hanger bolts in various designs (example shown here: hanger bolt with rubber seal)
- Sheet-metal clamps in various designs (example shown here: Kalzip clamp)

g Fastening materials for roof hooks in various designs depending on type of roof hook

h Small parts for connecting the roof fastener to the base rail, options:
- L-bracket + small parts (required for some roof hooks, hanger bolts and sheet-metal clamps)
- T-head bolt and serrated lock nut (supplied loose)
- Rail support with position lock (pre-mounted to the respective roof hook)

i Cross rail connector, options:
- Simple design, pre-assembled
- Design with position lock of the T-head bolt, pre-assembled

j End caps, options:
- For BR 4/35, BR 6/40 and BR 10/48
- Grey or black

PV MODULE RATING @ STC			
MODULE MANUFACTURER		Canadian Solar	
MODULE MODEL #		CS6P -255M	
MAX POWER-POINT CURRENT (Imp)	=	8.35	A
MAX POWER-POINT VOLTAGE (Vmp)	=	30.5	V
OPEN-CIRCUIT VOLTAGE (Voc)	=	37.7	V
SHORT-CIRCUIT CURRENT (Isc)	=	8.87	A
MAX POWER (Pmax)	=	255	W
MAX SYSTEM VOLTAGE	=	600	VDC
Voc TEMPERATURE COEFF.	=	-0.35%	C

INVERTER RATING			
INVERTER MAN.		SMA	
INVERTER MODEL #		SB3000TL	
MAX DC INPUT VOLTAGE	=	600	V
MAX AC OUTPUT POWER	=	3000	W
OPERATING DC VOLTAGE	=	500	V
NOMINAL AC VOLTAGE	=	240	A
NOMINAL OUTPUT CURR	=	15	A
CEC WEIGHTED EFICENCY	=	96.50%	
MAX OCPD RATING	=	20	A

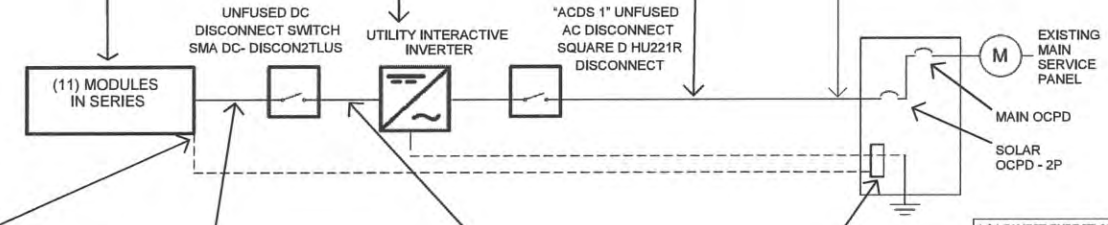
SOLAR PV SYSTEM AC POINT OF CONNECTION			
AC OUTPUT CURRENT	=	240	V
NOMINAL AC VOLTAGE	=	264	V

THIS PANEL IS FED BY MULTIPLE SOURCES
PV AND UTILITY

SERVICE PANEL RATING		
BUS AMP RATING	=	200 A
SERVICE VOLTAGE	=	240 V
MAIN SERVICE OCPD RATING	=	200 A
SOLAR OCPD RATING	=	20 A
20% BUS BAR BACKFEED ALLOWED	=	40 A
120% of BUS BAR RATING	=	240 A
MAIN SERVICE OCPD + SOLAR OCPD	=	220 A

FOR EACH INVERTER, SUPPLY BREAKERS SHALL COMPLY WITH 120% BUSBAR EXCEPTION IN 690.64(B)(2)(a)

CIRCUIT CONDUCTOR	
CONDUIT SIZE & TYPE:	3/4" EMT CONDUIT
CONDUCTOR SIZE:	#10 AWG MIN.
CONDUCTOR TYPE:	THWN-2 OR RHW-2
NUMBER OF CONDUCTORS:	
1 RED 1 WHITE 1 GREEN	
GROUNDING ELECTRODE SIZE:	#8 AWG MIN



INTEGRATED EQUIPMENT GROUNDING WITH MID CLAMP FROM MODULE TO RACKING

WEEBL LUG ASSEMBLY CONNECTION ON RACKING TO GROUDING CONDUCTOR

SYSTEM VOLTAGE AND CURRENT			
Rated MPP Current	=	8.35	A
Rated MPP Voltage	=	335.50	V
Max System Voltage	=	467.0	V
Max Circuit Current	=	11.1	A

SOURCE CIRCUIT CONDUCTOR	
CONDUCTOR SIZE:	#10 AWG MIN
CONDUCTOR TYPE:	PV WIRE

DC GROUNDING ELECTRODE CONDUCTOR: SIZE #8 AWG MIN

INSTALLED PER ART. 250.64

1.) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP -16 oC

2.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE 36 oC

2.) 2009 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47oC IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1oC). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47oC OR LESS (ALL OF UNITED STATES),

a) 12 AWG, 90oC CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH Isc OF 7.68 AMPS OR LESS WHEN PROTECTED BY A 12-AMP OR SMALLER FUSE.

b) 10 AWG, 90oC CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH Isc OF 9.6 AMPS OR LESS WHEN PROTECTED BY A 15-AMP OR SMALLER FUSE.

SYSTEM IMPP, VMPP, VOC AND ISC SIGN PROVIDED AT INVERTER PER NEC 690.53

INVERTER AC OUTPUT VOLTAGE/CURRENT SIGN PROVIDED AT INVERTER PER NEC 690.54

SYSTEM LABELS AND WARNING FOR DC DISCONNECT, AC DISCONNECT AND INVERTER. LABELS TO BE AFFIXED PRIOR TO FINAL INSPECTION.

DC CONDUCTORS RUN EXTERNALLY ON HOUSE IN METAL CONDUIT PER NEC 690.31(E).

SIGN FOR DC DISCONNECT LOCATION PROVIDED AT SERVICE PANEL PER NEC 690.4(H) AND NEC 705.10.

GO Solar

Kathy Pope
232 West 700 North
Salt Lake City, UT
84103

ISSUE
August 6, 2014

DRAWN BY
SC, GJ

PROJECT
Solar Photovoltaic

SYSTEM SIZE
2.75 KW

Go Solar Group
4425 S. 500 W. Suite D
Murray, UT 84123
License# 8543016-5501

02
Electrical

CS6P-255 I 260M

*Electrical wire production can be provided upon request.

PRODUCT | KEY FEATURES

- Excellent module efficiency up to 16.16%
- High performance at low irradiance above 96.5%
- Positive power tolerance up to 5w
- High PTC rating up to 91.31%
- Anti-glare module surface available
- IP67 junction box long-term weather endurance
- Heavy snow load up to 5400pa
- Salt mist, ammonia and blown sand resistance, for seaside, farm and desert environment

THE BEST IN CLASS

Canadian Solar's modules are the best in class in terms of power output and long term reliability. Our meticulous product design and stringent quality control ensure our modules deliver an exceptionally high PV energy yield in live PV system as well as in PVsyst's system simulation. Our accredited in-house PV testing facilities guarantee all module component materials meet the highest quality standards possible.

PRODUCT | WARRANTY & INSURANCE

25 Year Industry leading linear power output warranty
10 Year Product warranty on materials and workmanship

25 YEARS Warranty Insurance

Canadian Solar provides 100% non-cancellable, immediate warranty insurance

PRODUCT & MANAGEMENT SYSTEM | CERTIFICATES*

IEC61215 / IEC61730: VDE / MCS / CE / CEC AU / CQC
UL1703 / IEC61215 performance: CEC listed (US) / FSEC (US Florida)
UL1703: CSA | IEC 61701 ED2: VDE | IEC62716: TUV | IEC60068-2-68: SGS
PV CYCLE (EU) | UNI9177 Reaction to Fire: Class 1

ISO9001: 2008 I Quality management system
ISOTS16949:2009 I The automotive industry quality management system
ISO14001:2004 I Standards for environmental management system
QC080000:2012 I The certificate for hazardous substances process management
OHSAS 18001:2007 I International standards for occupational health and safety

*Please contact your sales representative for the entire list of certificates applicable to your products

CANADIAN SOLAR INC.

Founded in 2001 in Canada, Canadian Solar Inc., (NASDAQ: CSIQ) is the world's TOP 3 solar power company. As a leading manufacturer of solar modules and PV project developer with about 6 GW of premium quality modules deployed around the world in the past 13 years, Canadian Solar is one of the most bankable solar companies in Europe, USA, Japan and China. Canadian Solar operates in six continents with customers in over 90 countries and regions. Canadian Solar is committed to providing high quality solar products, solar system solutions and services to customers around the world.

ELECTRICAL DATA | STC

Electrical Data	CS6P-255M	CS6P-260M
Nominal Maximum Power (Pmax)	255 W	260 W
Optimum Operating Voltage (Vmp)	30.5 V	30.7 V
Optimum Operating Current (Imp)	8.35 A	8.48 A
Open Circuit Voltage (Voc)	37.7 V	37.8 V
Short Circuit Current (Isc)	8.87 A	8.99 A
Module Efficiency	15.85%	16.16%
Operating Temperature	-40°C~+85°C	
Maximum System Voltage	1000V (IEC) / 1000V (UL) / 600V (UL)	
Maximum Series Fuse Rating	15 A	
Application Classification	Class A	
Power Tolerance	0~+5 W	

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

ELECTRICAL DATA | NOCT

Electrical Data	CS6P-255M	CS6P-260M
Nominal Maximum Power (Pmax)	184 W	188 W
Optimum Operating Voltage (Vmp)	27.8 V	28.0 V
Optimum Operating Current (Imp)	6.62 A	6.70 A
Open Circuit Voltage (Voc)	34.6 V	34.7 V
Short Circuit Current (Isc)	7.18 A	7.28 A

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

MODULE | MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline, 6 inch
Cell Arrangement	60 (6 x 10)
Dimensions	1638 x 982 x 40mm (64.5 x 38.7 x 1.57in)
Weight	18.5kg (40.8 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
Junction Box	IP67, 3 diodes
Cable	4mm² (IEC)/4mm² & 12AWG 1000V (UL1000V)/ 12AWG (UL 600V), 1000mm
Connectors	MC4 or MC4 compatible
Standard Packaging	24pcs, 504kg (quantity and weight per pallet)
Module Pieces per Container	672pcs (40'HQ)

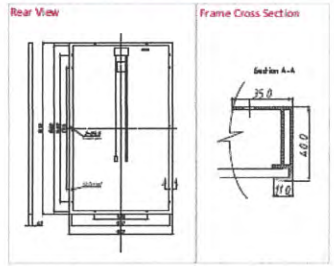
TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.45%/°C
Temperature Coefficient (Voc)	-0.35%/°C
Temperature Coefficient (Isc)	0.060%/°C
Nominal Operating Cell Temperature	45±2°C

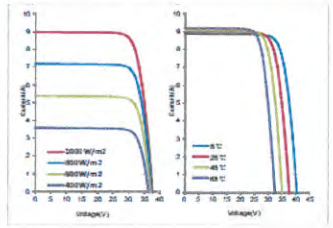
PERFORMANCE AT LOW IRRADIANCE

Industry leading performance at low irradiation, +96.5% module efficiency from an irradiance of 1000W/m² to 200W/m² (AM 1.5, 25 °C)

MODULE | ENGINEERING DRAWING



CS6P-260M | I-V CURVES



Partner Section

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PROJECT
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SYSTEM SIZE
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4425 S. 500 W. Suite D
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License# 8543016-5501

03
Panels

Attachment B

Photos

Front of Subject Property

East Side of Subject Property

Rear Yard of Subject Property

Detached Garage on Subject Property