HISTORIC AND DESIGN REVIEW COMMISSION

April 06, 2016

Agenda Item No: 6

HDRC CASE NO:	**2016-122**
ADDRESS:	119 E CRAIG PLACE
LEGAL DESCRIPTION:	NCB 1706 BLK 2 LOT 28 KEYSTONE SCHOOL SUBD
ZONING:	MF33 H IDZ
CITY COUNCIL DIST.:	1
DISTRICT:	Monte Vista Historic District
APPLICANT:	James Flores/Advanced Solar & Electric, LLC
OWNER:	Jim Lindsey
TYPE OF WORK:	Installation of solar panels

REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install a solar panel system onto the roof of 119 E Craig Place, commonly known as Keystone School.

APPLICABLE CITATIONS:

Historic Design Guidelines, Chapter 3, Guidelines for Additions

C. SOLAR COLLECTORS
i. Location—Locate solar collectors on side or rear roof pitch of the primary historic structure to the maximum extent feasible to minimize visibility from the public right-of-way while maximizing solar access. Alternatively, locate solar collectors on a garage or outbuilding or consider a ground-mount system where solar access to the primary structure is limited.
ii. Mounting (sloped roof surfaces)—Mount solar collectors flush with the surface of a sloped roof. Select collectors that are similar in color to the roof surface to reduce visibility.
iii. Mounting (flat roof surfaces)—Mount solar collectors flush with the surface of a flat roof to the maximum extent feasible. Where solar access limitations preclude a flush mount, locate panels towards the rear of the roof where visibility from the public right-of-way will be minimized.

FINDINGS:

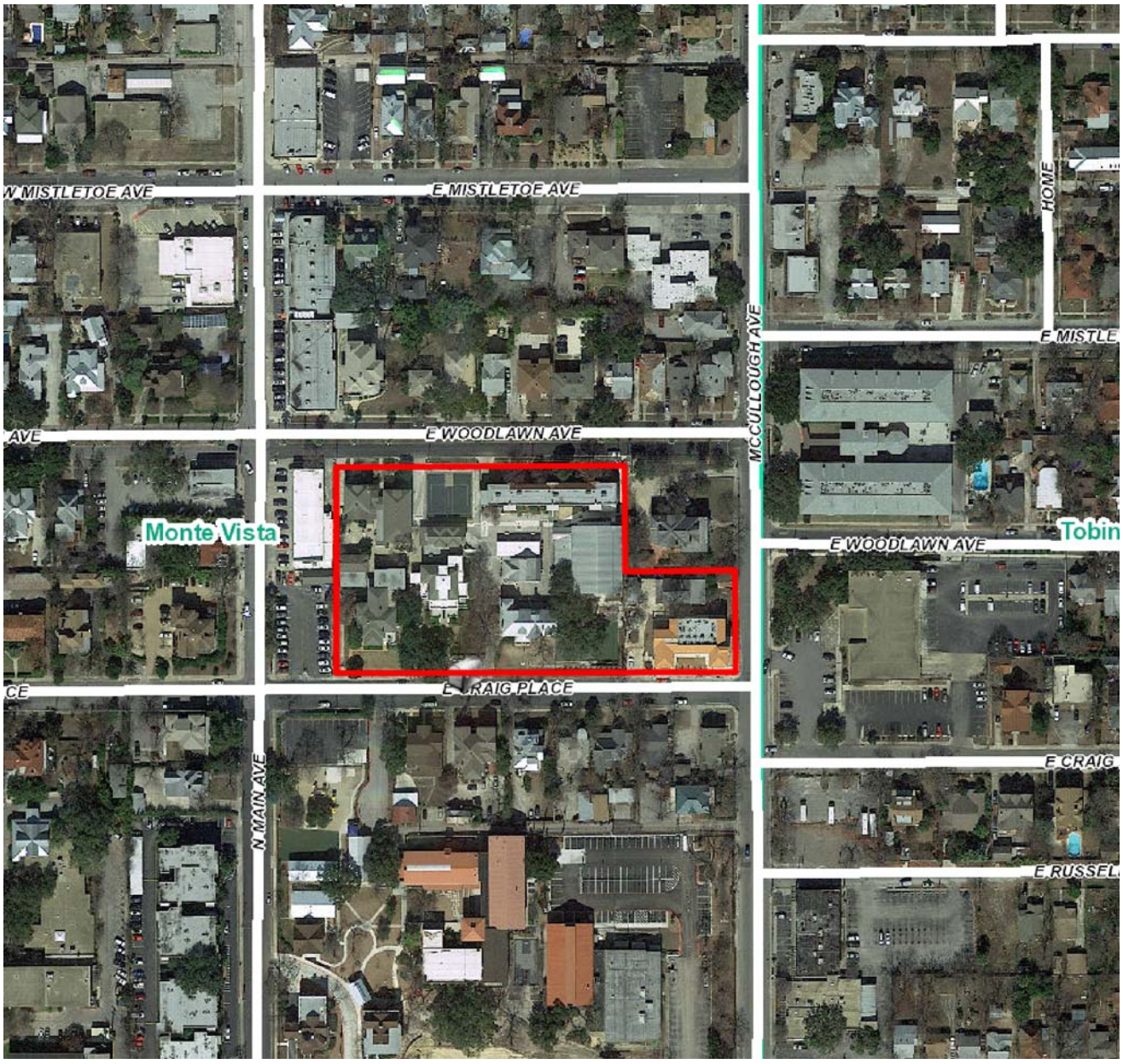
a. The applicant has proposed to mount a solar panel system at 119 E Craig place, commonly known as Keystone School located at the corner of E Craig and McCollough Avenue in the Monte Vista Historic District.
b. The applicant has proposed to mount the solar panel system on a portion of the roof that houses other existing mechanical equipment and is screened from the public right of way by parapet walls. The applicant's proposed mounting location is consistent with the Guidelines for Additions 6.C.i.
c. In regards to mounting, solar collectors that are mounted to flat roofs should be mounted as flush with the surface as possible. The applicant has noted a low slope which staff finds is appropriate.

RECOMMENDATION:

Staff recommends approval as submitted based on findings a through c.

CASE MANAGER:

Edward Hall



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Flex Viewer

Powered by ArcGIS Server

Printed:Mar 30, 2016

Advanced Solar and Electric L.L.C.

105 W. Loop 539, Cibolo, Texas 78108 (210) 556-1399 www.advancedsolar.com sales@advancedsolar.com

TECL# 27328

Site Survey Worksheet

CUSTOMER:	Keystone School	DATE:	January 27, 2016
JOB SITE:	119 East Craig Place	w Phone:	210 735-4022 x307
CITY / ST / ZIP	San Antonio TX 78212	c Phone:	210 771-5744
EMAIL	jlindsey@keystoneschool.org	1 or 2 Story:	Other
Proposed System	8.70 (D/C KW capacity)	AHJ:	COSA
Panel Configuration	QTY 30 290 SunPreme SNPM-GxB-SL-290		
Inverter Configuration	QTY 1 Solar Edge SE10K-480v		
Other Info			
Other Info		Drawn By:	Rep: Mark Est

All Arrays		Array #1	Array #2	Array #3	Array #4
Tilt:		10.0			
Azimuth:		180			
Qty:	30	30			
KW	8.70	8.70	0.00	0.00	0.00
NREL Default kwH	12006	12006	0	0	0
NREL Actual kWh:	11441	11441			
% Default	95.29%	95.29%			

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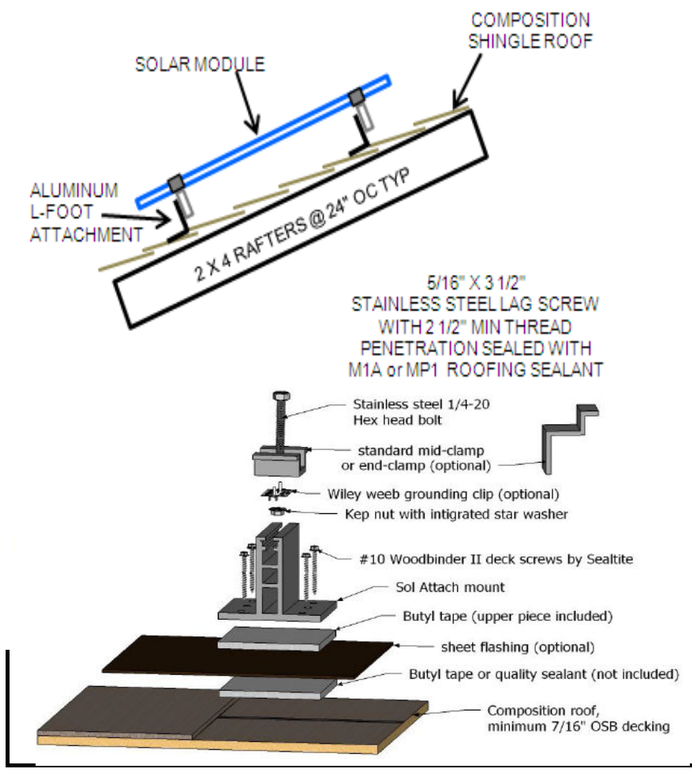
Site Survey Worksheet

CUSTOMER:	**Keystone School**	**DATE:**	**#VALUE!**
JOB SITE:	**119 East Craig Place**	**PHONE #1:**	**210 735-4022 x307**
CITY / ST / ZIP	**San Antonio TX**	**PHONE #2:**	**210 771-5744**
EMAIL	**jlindsey@keystoneschool.org**	**TYPE:**	**School**

All safe working distances will be met

1 PV SITE LAYOUT



CONSTRUCTION NOTES:

1. ALL EQUIPMENT TO BE LISTED OR LABLED FOR ITS APPLIATION.
2. INSTALLATION TO BE COMPLIANT WITH THE NEC.
3. MODULE GROUNDNG METHOD SHALL BE WEEB UGC AND WEEB LUGS.
4. ALL CONDUCTORS ARE COPPER, UNLESS OTHERWISE SPECIIFIED.
5. 3.0 PSF MAX DEAD LOAD CONTRIBUTED FROM SOLAR ARRAY

SIGNAGES PER NEC 690.17 & 705.10:

LABELS FOR JUNCTION BOXES, COMBINER BOXES, SOLAR LOAD CENTERS, AND DISCONNECTS:
"WARNING: ELECTRICAL SHOCK HAZARD. DO NOT TOUCH THE TERMINALS. TERMINALS ON BOTH THE LINE & LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION"

LABEL FOR SOLAR A/C DISCONNECT:
"SOLAR AC DISCONNECT"

LABEL FOR SOLAR BACK-FEED BREAKER:
"SOLAR INPUT BREAKER. DO NOT MOVE"

LABEL FOR LOAD BOX "SECOND SOURCES IS A PHOTOVOLTAIC SYSTEM"

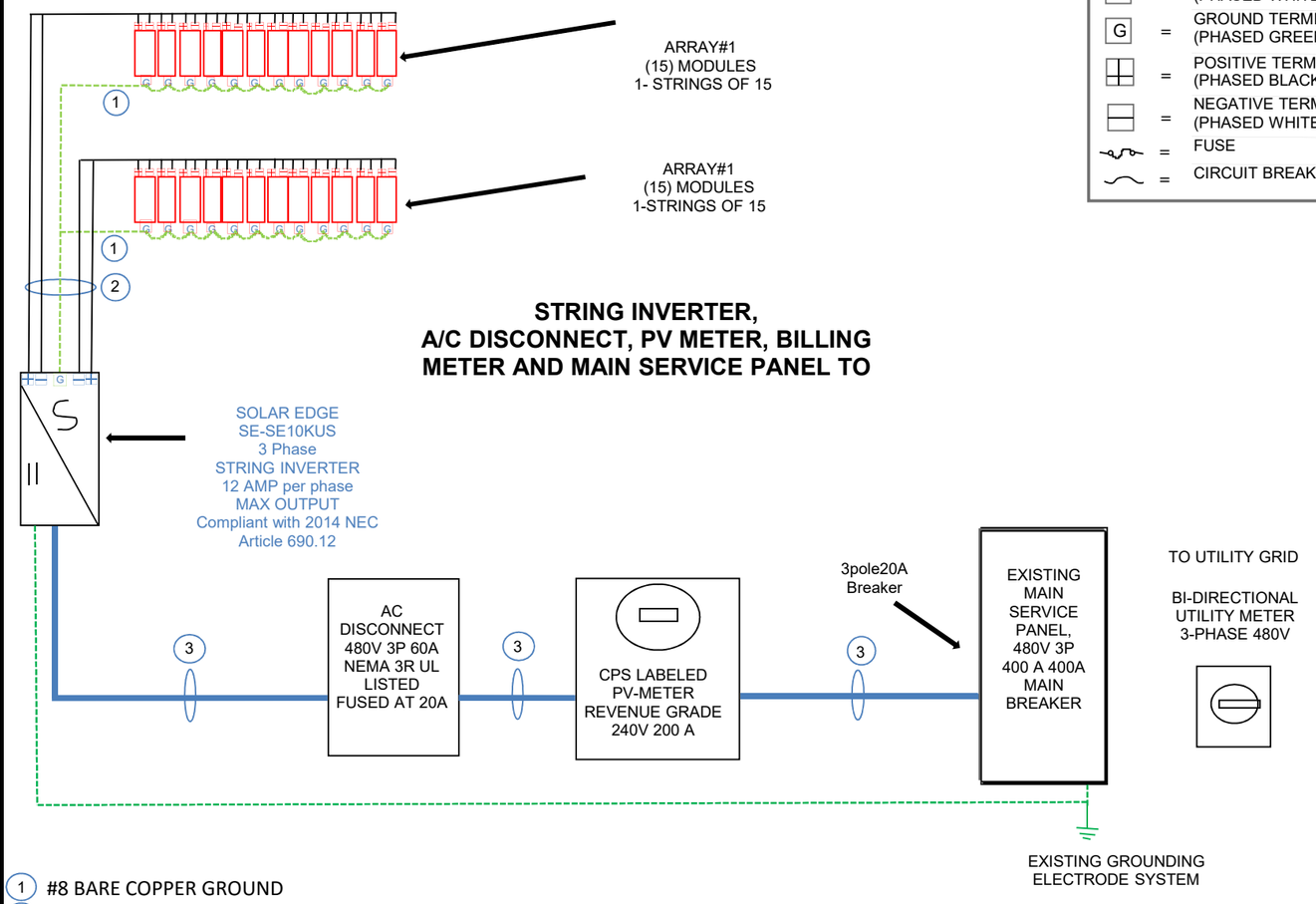
LABEL FOR LOAD BOX:
"OPERATING VOLTAGE:
MAXIMUM SYSTEM VOLTAGE:
MAXIMUM SYSTEM CURRENT:
MAXIMUM INVERTER OUTPUT:

DESCRIPTION	DATE	REV
ORIGINAL	1/31/2016	A
REVISED		B
REVISED		C
Mstr Elect#	96107	

DESIGN & DRAFTING BY:
Advanced Solar and Electric llc
Master Electrician:
James D. Flores, Sr

School SOLAR ARRAY 8.70 KW D/C
Qty 30 SunPreme SNPM-GxB-SL-290 Modules

3 WIRING DIAGRAM



1. #8 BARE COPPER GROUND
2. #10 USE-2 MC4-W/CONNECTORS TO MODULES IN 3/4" EMT
3. 1-#8 THHN-N, 2-#8THHN 1-#8 GRND, IN 1" EMT

LEGEND

---	=	EQUIPMENT GROUNDING CONDUCTORS
——	=	CIRCUIT CONDUCTORS
L1	=	LINE 1 TERMINAL (PHASED BLACK)
L2	=	LINE 2 TERMINAL (PHASED RED)
N	=	NEUTRAL TERMINAL (PHASED WHITE)
G	=	GROUND TERMINAL (PHASED GREEN)
	=	POSITIVE TERMINAL (PHASED BLACK)
	=	NEGATIVE TERMINAL (PHASED WHITE)
	=	FUSE
	=	CIRCUIT BREAKER

Keystone School
119 East Craig Place
San Antonio TX 78212
School Application
TECL #27328

SHEET TITLE: PHOTOVOLTAIC INSTALLATION

PAGE NUMBER: PV-1

MAXIMA GxB 290W Bifacial Module

A Trusted Quality Brand in Solar

High Performance

Bifacial technology generates power from both the front and back faces of the module, resulting in up to 20% higher energy harvest (kWh). N-type cells packaged in frameless double glass modules yield higher power and do not suffer from light-induced degradation (LID) or potential induced degradation (PID)..

Quality & Reliability

Double glass modules designed for durability. Certified to international certification body standards: IEC, UL, and CEC listed. Manufactured according to the International Quality Management System ISO9001.

Extreme Climate Performance

As temperatures rise, our patented SmartSilicon hybrid cell technology produces more power [kW] than conventional crystalline silicon solar panels at the same elevated temperature.

Guaranteed Performance

All modules have a 10 year product warranty and 25 year power output warranty.

Superior Aesthetics

Thin profile double-glass construction provides superior aesthetics that are a perfect complement to roofs, carports, and canopies.

About Sunpreme

Sunpreme is an innovative solar PV module manufacturer headquartered in Sunnyvale, California with manufacturing facilities in the United States and China. We provide high quality, reliable and aesthetically superior modules to residential, commercial, and utility customers globally. Sunpreme solar systems are delivering clean energy in 9 different countries.

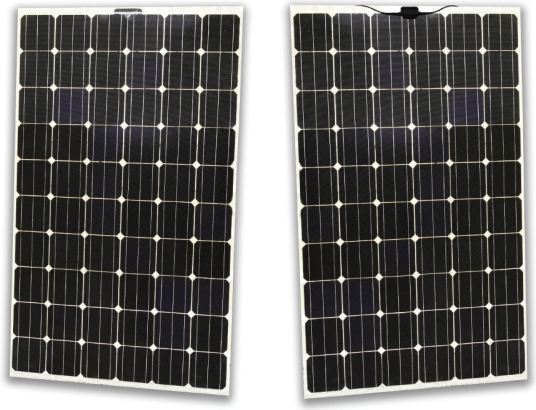
Sunpreme solar panels are designed and engineered in Silicon Valley, CA, USA.

SmartSilicon Technology

Sunpreme modules use our patented SmartSilicon technology that combines a crystalline silicon substrate with innovative thin-film materials to achieve high-efficiency power output and reliable energy production for increased project returns.

Unlike conventional silicon or thin-film technologies, Sunpreme uses highly scalable process to deliver high efficiency solar power at very competitive Levelized Cost of Energy (LCOE).

www.sunpreme.com | info@sunpreme.com
Sunpreme: +1.408.245.1112



Front view **Back view**

High Efficiency

18% Module Efficiency (Mono-facial),
20% Efficiency with 10% Backside Power Boost, and over 21% with 20% Backside Power Boost

Bifacial Energy Boost

Harvests sun from the backside to increase power output up to 20%

Double-Glass Frameless Design

Sunpreme Design is more robust, and does not require module grounding

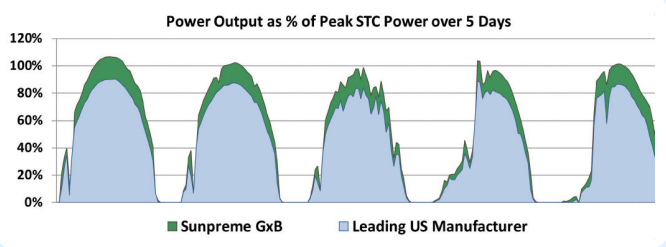
10 YEAR

PRODUCT WARRANTY

25 YEAR

POWER WARRANTY

In head-to-head testing with a leading US manufacturer, Sunpreme's Maxima GxB panel outperforms the competition with over 20% higher power output, exceeding the STC Power rating under real world conditions



Maxima GxB 290W Bifacial Solar Module

High Performance 60-cell N-type Solar Module

ELECTRICAL SPECIFICATIONS[1]	280	290	300
STC rated output P_{MPP} (W)	280	290	300
Cell Efficiency	19.8%	20.3%	20.8%
Standard sorted output	-0/+3%	-0/+3%	-0/+3%
Open Circuit Voltage V_{OC} (V)	42.9	43.9	44.5
Short circuit current I_{SC} (A)	9.1	9.2	9.2
Rated Voltage V_{MPP} (V)	32.9	33.7	34.5
Rated Current I_{MPP} (A)	8.5	8.6	8.7

1: Standard Test Conditions for front-face of panel: 1000 W/m², 25°C.

BI-FACIAL OUTPUT	280	290	300
With 10% Backside Power Boost			
Power Output (W)	308	319	330
Module Efficiency	18.8%	19.5%	20.2%
With 20% Backside Power Boost			
Power Output (W)	336	348	360
Module Efficiency	20.5%	21.3%	22.0%

MECHANICAL SPECIFICATIONS

Dimensions	1,652 x 988.5 x 6 mm (5.42 x 3.24 x 0.02 ft)
Weight	25 kg
Area	1.63 m² (17.55 ft²)
Cell type	Bifacial Mono N-type with proprietary SmartSilicon Hybrid Cell Technology (HCT)
Module type	60 Cells, Frameless double glass design with tempered glass, no grounding required
Glass	Tempered 2.9mm anti-reflective coating, low-iron
Junction Box	Tyco IP-67 rated; 1,000V UL/IEC, 3 diodes
Cables	4mm² x 0.9 m cable: MC4 or MC4 compatible Tyco connectors

TEST OPERATING CONDITIONS

Operating Temperature	- 40 to + 85°C
Storage Temperature	- 40 to + 85°C
Maximum Series Fuse	15 A
Maximum System Voltage	1,000VDC (UL & IEC)
Power/Sq.Ft. w/ 20% backside power boost	20.1 W / Sq. Foot
Maximum load capacity	5,400 Pa (snow load) 185 mph wind rating
Fire Class	Class C

WARRANTY AND STANDARDS

10 year extended product warranty

25 year limited power warranty

90% power warranty at 10 years

80% power warranty at 25 years

Certified to UL 1703, IEC 61646, IEC 61730-01, IEC 61730-02, IEC 61701 standards, CEC & FSEC listed, and CE mark.

TEMPERATURE COEFFICIENTS

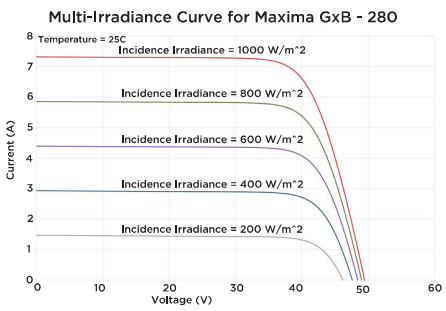
Temperature coefficient P_{MPP}	-0.31%/C
Temperature coefficient I_{SC}	+0.06%/C
Temperature coefficient V_{OC}	-0.27%/C
Normal operating cell temperature (NOCT)°C	46C +/- 2

PACKAGING

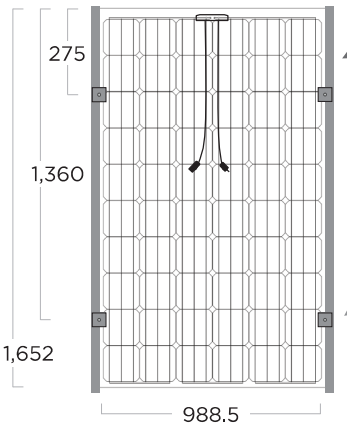
Modules per pallet	26 modules
Pallets per shipping container	28 crates

CERTIFICATIONS

Current - Voltage (IV) Curve



Rear View (mm)

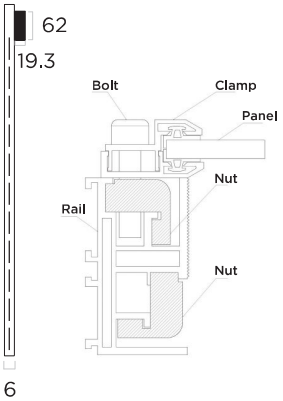


Mounting method

- Rail structure runs parallel to long-side of module
- Compatible with bifacial module (minimizes back-side shading)
- Uniform mounting method for ground, roof, or carport installations

Retaining clip

Side View (mm)



Covered by one or more of the following U.S. patents: 7,951,640; 7,956,283; 7,960,644

solaredge

INVERTERS

SolarEdge Three Phase Inverters for the 277/480V Grid for North America

SE10KUS / SE20KUS / SE33.3KUS

The best choice for SolarEdge enabled systems

- Integrated arc fault protection for NEC 2011 690.11
- Rapid shutdown for NEC 2014 690.12
- Superior efficiency (98.5%)
- Outdoor and indoor installation
- Built-in module-level monitoring
- Internet connection through Ethernet or Wireless
- Small, lightweight and easy to install on provided bracket
- Fixed voltage inverter, DC/AC conversion only
- Integrated Safety Switch and DC fuses (plus & minus)

Three Phase Inverters for the 277/480V Grid for North America

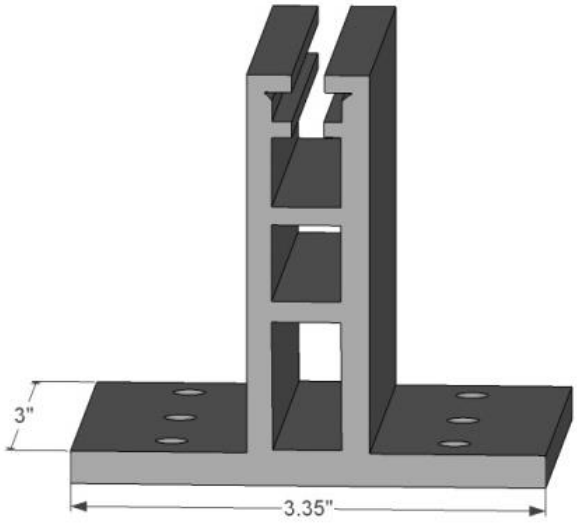
SE10KUS / SE20KUS / SE33.3KUS[1]

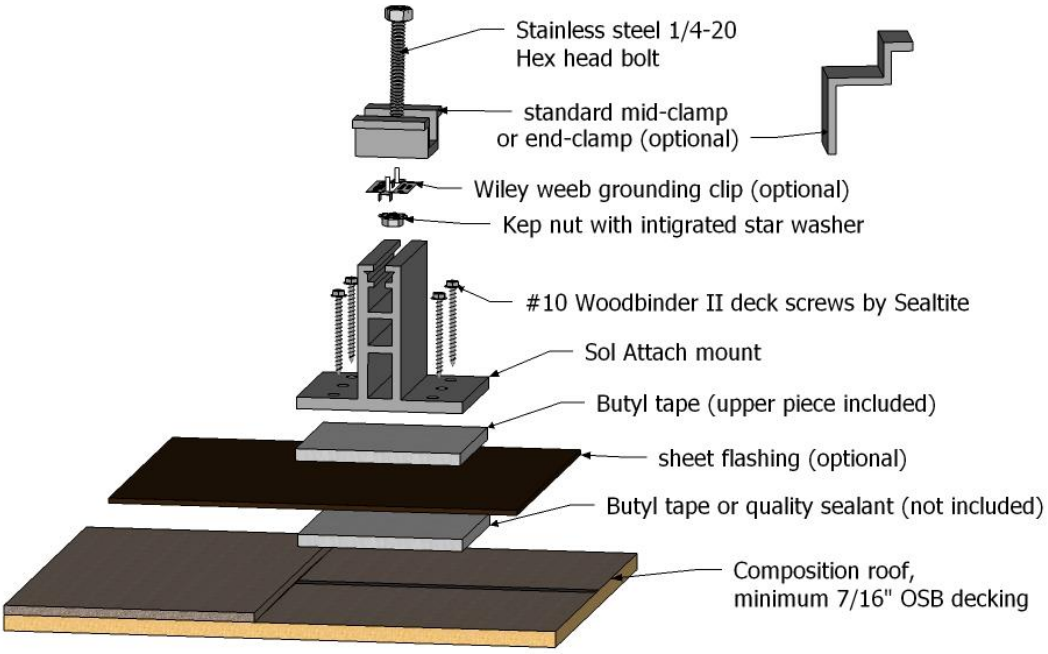
	SE10KUS	SE20KUS	SE33.3KUS	
OUTPUT				
Rated AC Power Output	10000	20000	33300	VA
Maximum AC Power Output	10000	20000	33300	VA
AC Output Line Connections	4-wire WYE (L1-L2-L3-N) plus PE			
AC Output Voltage Minimum-Nominal-Maximum[2] (L-N)	244-277-305			Vac
AC Output Voltage Minimum-Nominal-Maximum[2] (L-L)	422.5-480-529			Vac
AC Frequency Min-Nom-Max[2]	59.3 - 60 - 60.5			Hz
Max. Continuous Output Current (per Phase)	12	24	40	A
GFDI Threshold	1			A
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes			
INPUT				
Maximum DC Power (Module STC)	13500	27000	45000	W
Transformer-less, Ungrounded	Yes			
Maximum Input Voltage DC to Gnd	490			Vdc
Maximum Input Voltage DC+ to DC-	980			Vdc
Nominal Input Voltage DC to Gnd	420			Vdc
Nominal Input Voltage DC+ to DC-	840			Vdc
Maximum Input Current	13.5	26.5	40	Adc
Max. Input Short Circuit Current	45			Adc
Reverse-Polarity Protection	Yes			
Ground-Fault Isolation Detection	1MΩ Sensitivity			
CEC Weighted Effciency	98		98.5	%
Night-time Power Consumption	< 3		< 4	W
ADDITIONAL FEATURES				
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional)			
Rapid Shutdown – NEC 2014 690.12	With installation of rapid shutdown kit[3]			
STANDARD COMPLIANCE				
Safety	UL1741, UL1699B, UL1998, CSA 22.2			
Grid Connection Standards	IEEE1547			
Emissions	FCC part15 class B			
INSTALLATION SPECIFICATIONS				
AC output conduit size / AWG range	3/4" minimum / 12-6 AWG			
DC input conduit size / AWG range	3/4" minimum / 12-6 AWG			
Number of DC inputs	2 pairs		3 pairs (with fuses on plus & minus)[4]	
Dimensions (HxWxD)	21 x 12.5 x 10.5 / 540 x 315 x 260			in/mm
Dimensions with Safety Switch (HxWxD)	30.5 x 12.5 x 10.5 / 775 x 315 x 260			in/mm
Weight	73.2 / 33.2		99.5 / 45	lb/kg
Weight with Safety Switch	79.7 / 36.2		106 / 48	lb/kg
Cooling	Fans (user replaceable)			
Noise	< 50		< 55	dBA
Operating Temperature Range	-40 to +140 / -40 to +60			˚F/˚C
Protection Rating	NEMA 3R			

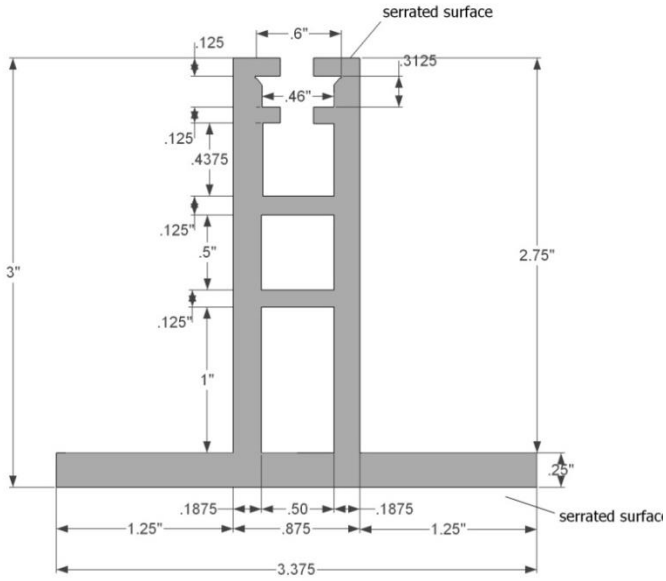
[1] For 208V inverters refer to: http://www.solaredge.com/files/pdfs/products/inverters/se-three-phase-us-inverter-208V-datasheet.pdf
[2] For other regional settings please contact SolarEdge support.
[3] Rapid shutdown kit P/N: contact SolarEdge.
[4] Field replacement kit for 1 pair of inputs P/N: DCD-3PH-1TBK.

RoHS

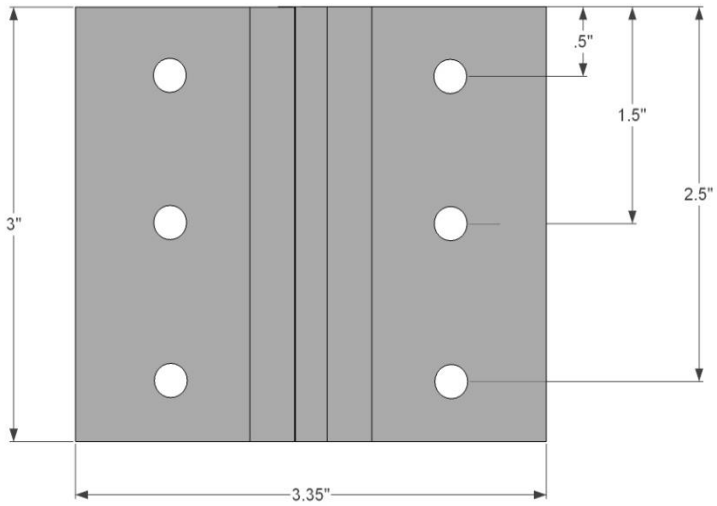
Sol Attach, LLC
Composition roof mounting foot
Extrusions made of 6061-T6 alloy
Patent Pending







Front View

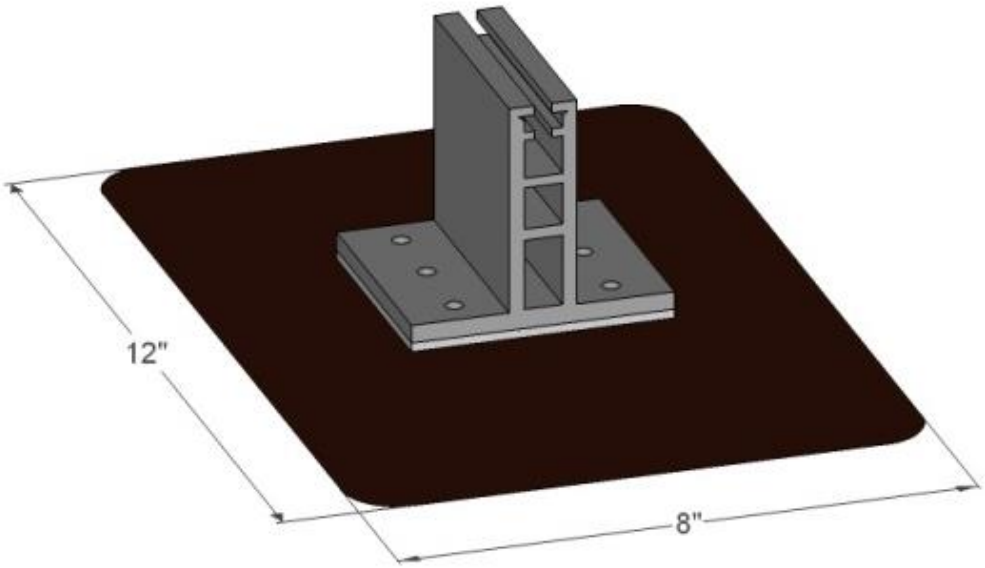


Top View

Weights:

Each single mount	6.6 oz
One mount with 4 deck screws and butyl tape	8.6 oz
One mount with screws, butyl, and mid-clamp	10.1 oz
One mount with screws, butyl, mid-clamp, and flashing	12.6 oz

Flat flashing



solaredge

SolarEdge Power Optimizer

Module Add-On For North America

P300 / P350 / 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

SolarEdge Power Optimizer

Module Add-On for North America

P300 / P350 / P400 / P405

	P300 (for 60-cell modules)	P350 (for 72-cell modules)	P400 (for 96-cell modules)	P405 (for thin film modules)	
INPUT					
Rated Input DC Power[1]	300	350	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				Adc
Maximum DC Input Current	12.5				Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.8				%
Overvoltage Category	II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING INVERTER)					
Maximum Output Current	15				Adc
Maximum Output Voltage	60			85	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR 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
Dimensions (W x L x H)	141 x 212 x 40.5 / 5.55 x 8.34 x 1.59				mm / in
Weight (including cables)	950 / 2.1				gr / lb
Input Connector	MC4 / Amphenol / Tyco			MC4	
Output Wire Type / Connector	Double Insulated; Amphenol				
Output Wire Length	0.95 / 3.0	1.2 / 3.9			m / ft
Operating Temperature Range	-40 - +85 / -40 - +185				˚C / ˚F
Protection Rating	IP65 / NEMA4				
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]	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	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes			

[2] It is not allowed to mix P405 with P300/P350/P400/P600/P700 in one string.


KEYSTONE


NO TRESPASSING