HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Sandra I. Heiler
Chairman

Date: February 21, 2020

MEMORANDUM

TO: Hadi Mansouri
Department of Permitting Services
FROM: Dan Bruechert
Historic Preservation Section
Maryland-National Capital Park & Planning Commission
SUBJECT: Historic Area Work Permit #902829: Solar Panels

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **approved** at the February 12, 2020 HPC meeting.

The HPC staff has reviewed and stamped the attached construction drawings**.**

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Larue Kouyoudjian
Address: 10007 Leafy Avenue, Silver Spring

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once work is complete the applicant will contact Dan Bruechert at 301.563.3400 or dan.bruechert@montgomeryplanning.org to schedule a follow-up site visit.

ABBREVIATIONS

A AMPERE AC ALTERNATING CURRENT BLDG BUILDING CONC CONCRETE DC DIRECT CURRENT EGC EQUIPMENT GROUNDING CONDUCTOR (E) EXISTING EMT ELECTRICAL METALLIC TUBING FSB FIRE SET-BACK GALV GALVANIZED GEC GROUNDING ELECTRODE CONDUCTOR GND GROUND HDG HOT DIPPED GALVANIZED I CURRENT Imp CURRENT AT MAX POWER Isc SHORT CIRCUIT CURRENT kVA KILOVOLT AMPERE kW KILOWATT LBW LOAD BEARING WALL MIN MINIMUM (N) NEW NEUT NEUTRAL NTS NOT TO SCALE OC ON CENTER PL PROPERTY LINE POI POINT OF INTERCONNECTION PV PHOTOVOLTAIC SCH SCHEDULE S STAINLESS STEEL STC STANDARD TESTING CONDITIONS TYP TYPICAL UPS UNINTERRUPTIBLE POWER SUPPLY V VOLT Vmp VOLTAGE AT MAX POWER Voc VOLTAGE AT OPEN CIRCUIT W WATT 3R NEMA 3R, RAINTIGHT

ELECTRICAL NOTES

1. THIS SYSTEM IS GRID-INTERTIED VIA A UL-LISTED POWER-CONDITIONING INVERTER.
2. THIS SYSTEM HAS NO BATTERIES, NO UPS.
3. A NATIONALLY-RECOGNIZED TESTING LABORATORY SHALL LIST ALL EQUIPMENT IN COMPLIANCE WITH ART. 110.3.
4. WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A SIGN WILL BE PROVIDED WARNING OF THE HAZARDS PER ART. 690.17.
5. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART. 210.5.
6. CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH ART. 250.97, 250.92(B).
7. DC CONDUCTORS EITHER DO NOT ENTER BUILDING OR ARE RUN IN METALLIC RACEWAYS OR ENCLOSURES TO THE FIRST ACCESSIBLE DC DISCONNECTING MEANS PER ART. 690.31(E).
8. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY UL LISTING.
9. MODULE FRAMES SHALL BE GROUNDED AT THE UL-LISTED LOCATION PROVIDED BY THE MANUFACTURER USING UL LISTED GROUNDING HARDWARE.
10. MODULE FRAMES, RAIL, AND POSTS SHALL BE BONDED WITH EQUIPMENT GROUND CONDUCTORS.

JURISDICTION NOTES

STRUCTURAL DESIGN FOR THE SUPPORTING STRUCTURE OF THE HOUSE WAS PERFORMED IN ACCORDANCE WITH IRC/IBC 2015 - STRUCTURAL DESIGN FOR THE RACK SYSTEM AND MOUNTING HARDWARE WAS PERFORMED IN ACCORDANCE WITH IRC/IBC 2015.

APPROVED
Montgomery County
Historic Preservation Commission

Sandra L. Heiler

REVIEWED
By Dan.Bruechert at 9:52 am, Feb 21, 2020

LICENSE

#11805 MASTER ELECTRICIAN
Nicholaus Meyers

MODULE GROUNDING METHOD: ZEP SOLAR

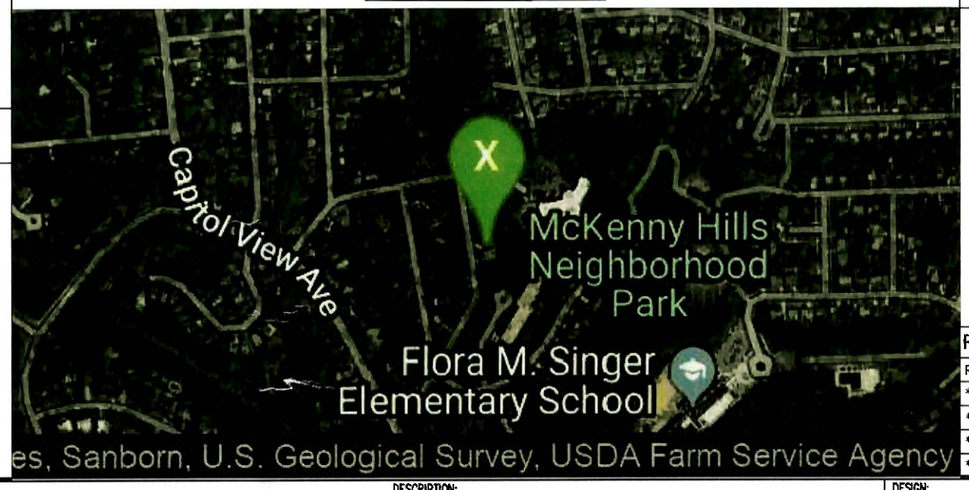
AHJ: Montgomery County

UTILITY: PEPCO (MD)

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE 2015 IBC AND 2015 IRC. 2. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2014 NATIONAL ELECTRIC CODE.

VICINITY MAP



INDEX

Sheet 1 COVER SHEET
Sheet 2 SITE PLAN
Sheet 3 STRUCTURAL VIEWS
Sheet 4 STRUCTURAL VIEWS 2
Sheet 5 UPLIFT CALCULATIONS
Sheet 6 THREE LINE DIAGRAM
Cutsheets Attached

REV BY DATE COMMENTS

REV A	NAME	DATE	COMMENTS
*	*	*	*
*	*	*	*
*	*	*	*
*	*	*	*

JOB NUMBER: JB-2094562 00
MOUNTING SYSTEM: ZS Comp V4 w Flashing-Insert
MODULES: (24) Hanwha Q CELLS # Q.PEAK DUO BLK-G5/SC315
INVERTER: SolarEdge Technologies Ltd. # SE7600H-US [240V]

CUSTOMER:
Laure kouyoudjian
10007 Leafy Ave
Silver Spring, MD 20910

3018303813

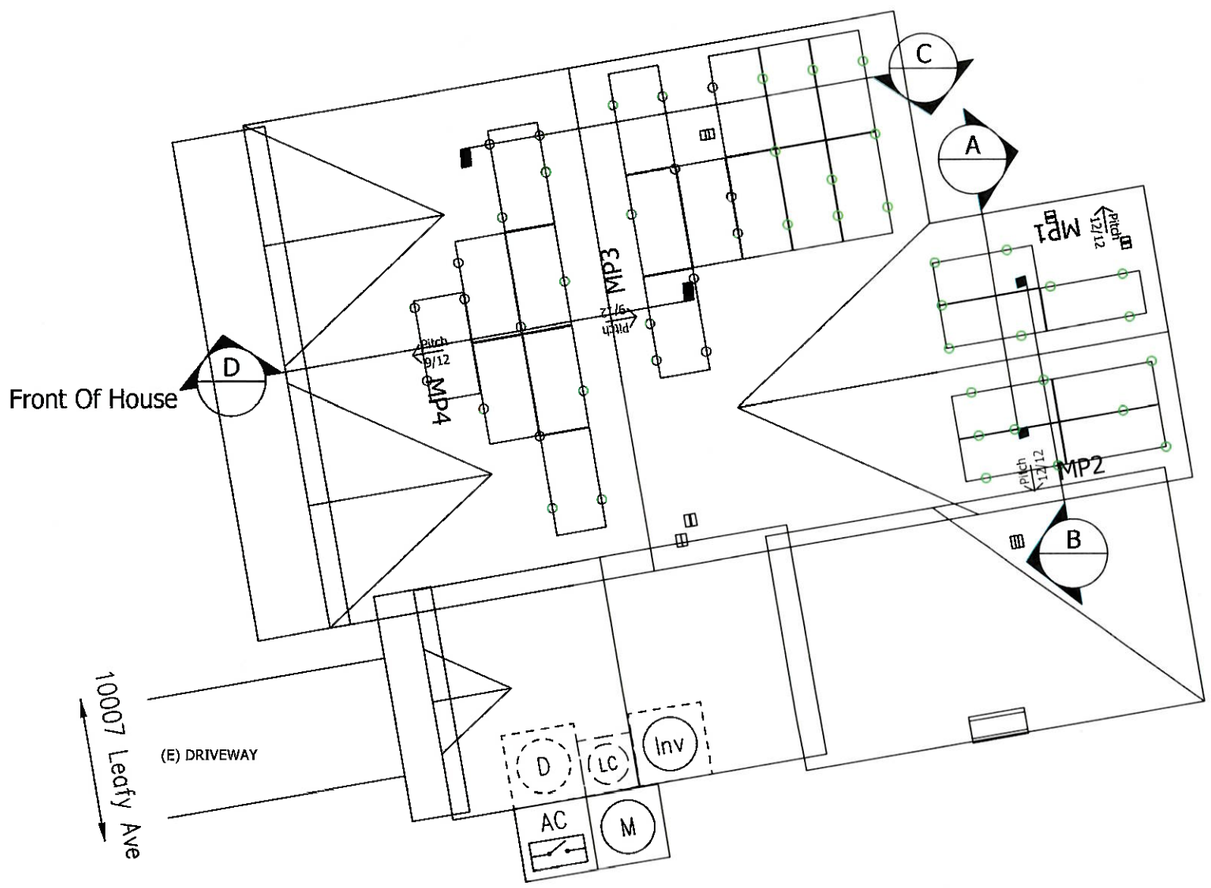
DESCRIPTION:
7.56 KW PV ARRAY

PAGE NAME:
COVER SHEET

DESIGN:
Carlos Gonzalez Bravo

SHEET: 1 REV: DATE: 12/20/2019

TESLA



01/09/2020

STATE OF MARYLAND
JASON WILLIAM TOMAN
No. 48728
PROFESSIONAL ENGINEER

STRUCTURAL ONLY
Digitally signed by Jason Toman
Date: 2020.01.09 08:29:28 -07'00'

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 48728. EXPIRATION DATE: 2-16-2020

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Dan.Bruechert at 9:52 am, Feb 21, 2020

MP1	PITCH: 45 AZIMUTH: 350 MATERIAL: Comp Shingle	ARRAY PITCH: 45 ARRAY AZIMUTH: 350 STORY: 2 Stories
MP2	PITCH: 45 AZIMUTH: 170 MATERIAL: Comp Shingle	ARRAY PITCH: 45 ARRAY AZIMUTH: 170 STORY: 2 Stories
MP3	PITCH: 34 AZIMUTH: 80 MATERIAL: Comp Shingle	ARRAY PITCH: 34 ARRAY AZIMUTH: 80 STORY: 2 Stories
MP4	PITCH: 34 AZIMUTH: 260 MATERIAL: Comp Shingle	ARRAY PITCH: 34 ARRAY AZIMUTH: 260 STORY: 2 Stories

LEGEND

- (M) (E) UTILITY METER & WARNING LABEL
- (Inv) INVERTER W/ INTEGRATED DC DISCO & WARNING LABELS
- (DC) DC DISCONNECT & WARNING LABELS
- (AC) AC DISCONNECT & WARNING LABELS
- (B) DC JUNCTION/COMBINER BOX & LABELS
- (D) DISTRIBUTION PANEL & LABELS
- (LC) LOAD CENTER & WARNING LABELS
- (M) DEDICATED PV SYSTEM METER
- (RSD) RAPID SHUTDOWN
- STANDOFF LOCATIONS
- CONDUIT RUN ON EXTERIOR
- CONDUIT RUN ON INTERIOR
- GATE/FENCE
- HEAT PRODUCING VENTS ARE RED
- INTERIOR EQUIPMENT IS DASHED

SITE PLAN

Scale: 1/8" = 1'

0 1' 8' 16'

N W E S

JOB NUMBER: JB-2094562 00
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7.56 KW PV ARRAY

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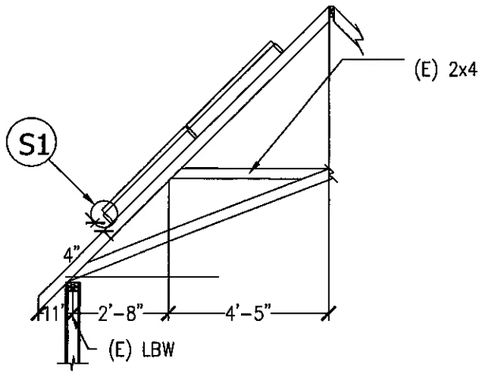
SITE PLAN

DESIGN:
Carlos Gonzalez Bravo

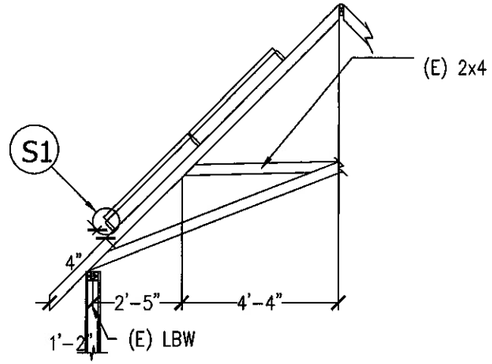
SHEET: 2
REV:
DATE: 12/20/2019

TESLA



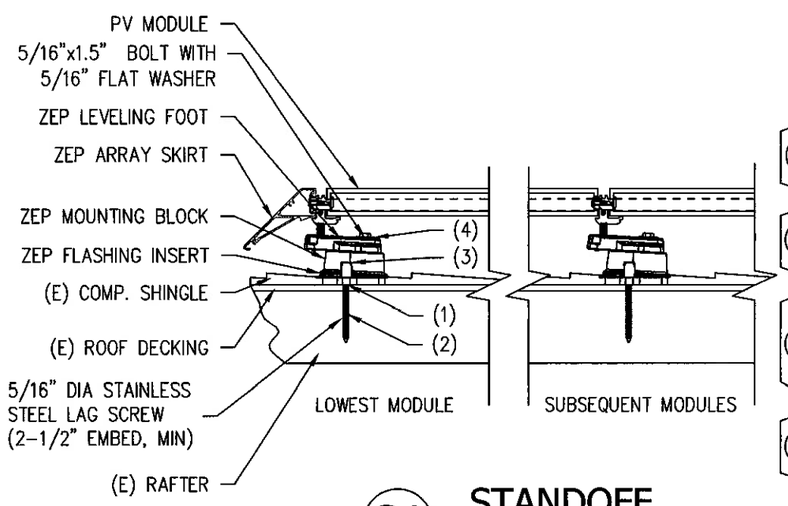
A SIDE VIEW OF MP1 NTS

MP1	X-SPACING	X-CANTILEVER	Y-SPACING	Y-CANTILEVER	NOTES
LANDSCAPE	72"	24"	39"	0"	STAGGERED
PORTRAIT	48"	19"	66"	0"	
TOP CHORD 2x4 @ 24" OC BOT CHORD 2x4 @24" OC			ROOF AZI 350 PITCH 45 ARRAY AZI 350 PITCH 45 Comp Shingle		STORIES: 2
X AND Y ARE ALWAYS RELATIVE TO THE STRUCTURE FRAMING THAT SUPPORTS THE PV. X IS ACROSS RAFTERS AND Y IS ALONG RAFTERS.					



B SIDE VIEW OF MP2 NTS

MP2	X-SPACING	X-CANTILEVER	Y-SPACING	Y-CANTILEVER	NOTES
LANDSCAPE	72"	24"	39"	0"	STAGGERED
PORTRAIT	48"	19"	66"	0"	
TOP CHORD 2x4 @ 24" OC BOT CHORD 2x4 @24" OC			ROOF AZI 170 PITCH 45 ARRAY AZI 170 PITCH 45 Comp Shingle		STORIES: 2
X AND Y ARE ALWAYS RELATIVE TO THE STRUCTURE FRAMING THAT SUPPORTS THE PV. X IS ACROSS RAFTERS AND Y IS ALONG RAFTERS.					



INSTALLATION ORDER	
(1)	LOCATE RAFTER, MARK HOLE LOCATION, AND DRILL PILOT HOLE.
(2)	ATTACH FLASHING INSERT TO MOUNTING BLOCK AND ATTACH TO RAFTER USING LAG SCREW.
(3)	INJECT SEALANT INTO FLASHING INSERT PORT, WHICH SPREADS SEALANT EVENLY OVER THE ROOF PENETRATION.
(4)	INSTALL LEVELING FOOT ON TOP OF MOUNTING BLOCK & SECURELY FASTEN WITH BOLT.

S1 STANDOFF

Scale: 1 1/2" = 1'

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Dan.Bruechert at 9:52 am, Feb 21, 2020

Digitally signed by Jason Toman
Date: 2020.01.06 16:51:14 -07'00'

01/06/2020

STATE OF MARYLAND · JASON WILLIAM TOMAN · No. 48728 · PROFESSIONAL ENGINEER

STRUCTURAL ONLY

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INVERTER: SolarEdge Technologies Ltd. # SE7600H-US [240V]

CUSTOMER:
Laure kouyoudjian
10007 Leafy Ave
Silver Spring, MD 20910

3018303813

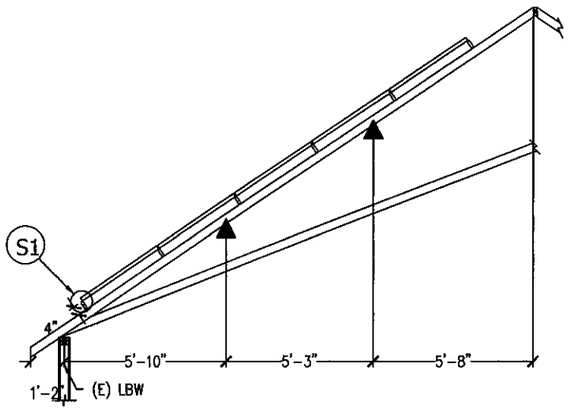
DESCRIPTION: 7.56 KW PV ARRAY

PAGE NAME: STRUCTURAL VIEWS

DESIGN: Carlos Gonzalez Bravo

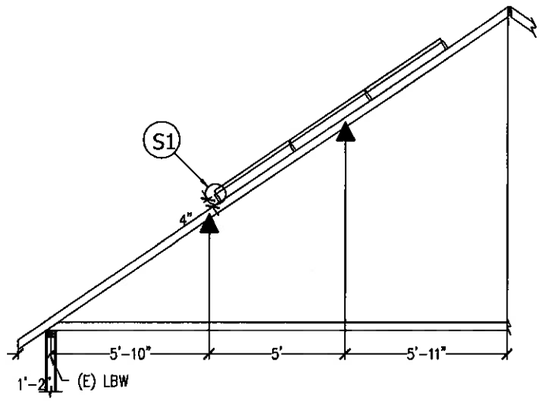
SHEET: 3 REV: DATE: 12/20/2019

TESLA



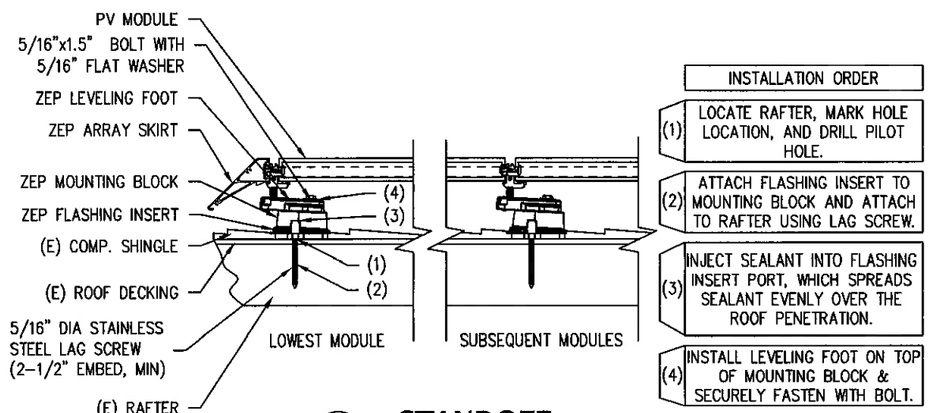
C SIDE VIEW OF MP3 NTS

MP3	X-SPACING	X-CANTILEVER	Y-SPACING	Y-CANTILEVER	NOTES
LANDSCAPE	72"	24"	39"	0"	STAGGERED
PORTRAIT	48"	19"	66"	0"	
TOP CHORD 2x4 @ 24" OC BOT CHORD 2x4 @24" OC			ROOF AZI 80 PITCH 34 ARRAY AZI 80 PITCH 34 Comp Shingle		STORIES: 2
X AND Y ARE ALWAYS RELATIVE TO THE STRUCTURE FRAMING THAT SUPPORTS THE PV. X IS ACROSS RAFTERS AND Y IS ALONG RAFTERS.					



D SIDE VIEW OF MP4 NTS

MP4	X-SPACING	X-CANTILEVER	Y-SPACING	Y-CANTILEVER	NOTES
LANDSCAPE	72"	24"	39"	0"	STAGGERED
PORTRAIT	48"	19"	66"	0"	
TOP CHORD 2x4 @ 24" OC BOT CHORD 2x4 @24" OC			ROOF AZI 260 PITCH 34 ARRAY AZI 260 PITCH 34 Comp Shingle		STORIES: 2
X AND Y ARE ALWAYS RELATIVE TO THE STRUCTURE FRAMING THAT SUPPORTS THE PV. X IS ACROSS RAFTERS AND Y IS ALONG RAFTERS.					



S1 STANDOFF

Scale: 1 1/2" = 1'

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INVERTER: SolarEdge Technologies Ltd. # SE7600H-US [240V]

CUSTOMER:
Laure kouyoudjian
10007 Leafy Ave
Silver Spring, MD 20910

3018303813

DESCRIPTION: 7.56 KW PV ARRAY

PAGE NAME: STRUCTURAL VIEWS 2

DESIGN: Carlos Gonzalez Bravo

SHEET: 4 REV: DATE: 12/20/2019

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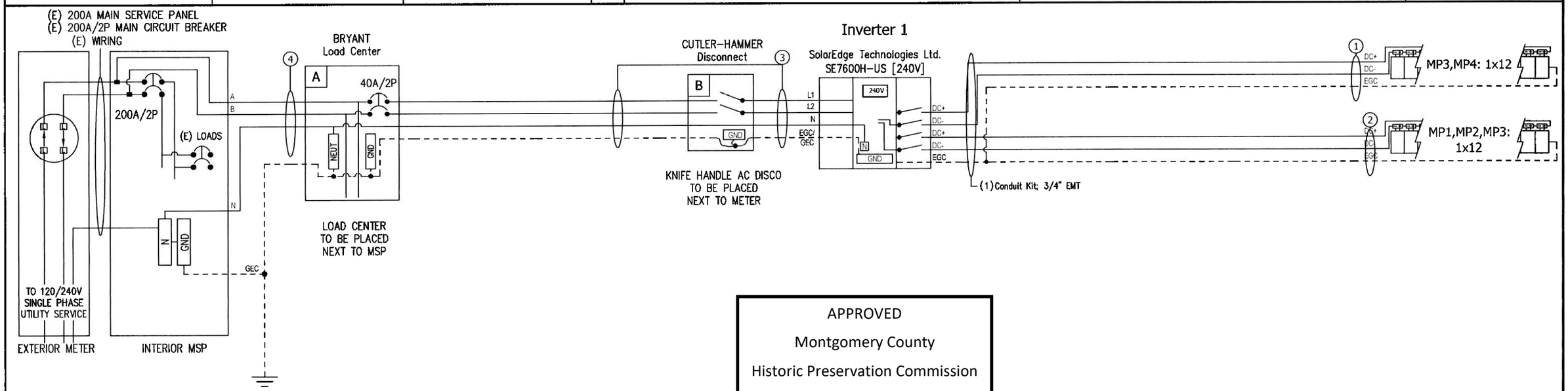
GROUND SPECS	MAIN PANEL SPECS	GENERAL NOTES	INVERTER SPECS	MODULE SPECS	LICENSE
BOND (N) #8 GEC TO (N) GROUND ROD AT PANEL WITH IRREVERSIBLE CRIMP	Panel Number: SB20(30-40)CT Meter Number: NXA113571969 Underground Service Entrance	Inv 1: DC Ungrounded Tie-In: Supply Side Connection	INV 1 – (1) SolarEdge Technologies Ltd. # SE7600H-US [240V] Inverter; 7600W,240V/208V,99%,HD Wave w/Unifed Disco and ZB,AFCI INV 2 INV 3	– (24) Hanwha Q CELLS # Q.PEAK DUO BLK-G5/SC315 PV Module; 315W, 292.2 PTC, 40MM, Black Frame, MC4, ZEP, 1000V Voc: 40.29 Vpmax: 33.46 Isc AND Imp ARE SHOWN IN THE DC STRINGS IDENTIFIER	#11805 MASTER ELECTRICIAN Nicholaus Meyers



CONDUIT RUNS MAY BE CONDENSED DUE TO SITE CONDITIONS AND/OR INSTALLATION EASE. ALL CONDUIT FILL DERATES AND PROPER CALCULATIONS HAVE BEEN COMPLETED PER NEC CHAPTER 9, TABLE 4

Voc* = MAX VOC AT MIN TEMP

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POI – (1)Ground Rod 5/8" x 8', Copper
– (2)ILSCO # IPC 4/0-#6 Insulation Piercing Connector; Main 4/0-4, Tap 6-14

SSC – SUPPLY SIDE CONNECTION. DISCONNECTING MEANS SHALL BE SUITABLE AS SERVICE EQUIPMENT AND SHALL BE RATED PER NEC.

A – (1)CUTLER-HAMMER # BR240 Breaker; 40A/2P, 2 Spaces
– (1)EATON # BR24L125FP Load Center; 125A, 120/240V, NEMA 1, Main Lug, 1 ø, 2 Spaces, 4 Circuits, FlshMt

B – (1)CUTLER-HAMMER # DG322UGB Disconnect; 60A, 240Vac, Non-Fusible, NEMA 1
– (1)CUTLER-HAMMER # DG100NB Ground/Neutral Kit; 60-100A, General Duty (DG)

AC

④ 15FT – (1)AWG #6, THWN-2, Black; (1)AWG #6, THWN-2, Red; (1)AWG #6, THWN-2, White NEUTRAL Vmp =240 VAC Imp=32 AAC; – (1)AWG #6, Solid Bare Copper GEC – (1)Conduit Kit; 3/4" EMT

③ 10FT – (1)AWG #8, THWN-2, Black; (1)AWG #8, THWN-2, Red; (1)AWG #10, THWN-2, White NEUTRAL Vmp =240 VAC Imp=32 AAC; – (1)AWG #8, THWN-2, Green EGC/GEC – (1)Conduit Kit; 3/4" EMT

PV – (24)SOLAREDGE # P400-5NM4MZM PowerBox Optimizer; 400W, ZEP

DC

① 80FT – (2)AWG #10, PV Wire, 600V, Black Voc* =500 VDC Isc =15 ADC; (1)AWG #10, THHN/THWN-2, Green EGC Vmp =350 VDC Imp=10.66 ADC; (1)Conduit Kit; 3/4" EMT

② 80FT – (2)AWG #10, PV Wire, 600V, Black Voc* =500 VDC Isc =15 ADC; (1)AWG #10, THHN/THWN-2, Green EGC Vmp =350 VDC Imp=10.66 ADC; (1)Conduit Kit; 3/4" EMT

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CUSTOMER:
Laure kouyoudjian
10007 Leafy Ave
Silver Spring, MD 20910
3018303813

DESCRIPTION:
7.56 KW PV ARRAY

PAGE NAME:
THREE LINE DIAGRAM

DESIGN:
Carlos Gonzalez Bravo

SHEET: 6 REV: DATE: 12/20/2019

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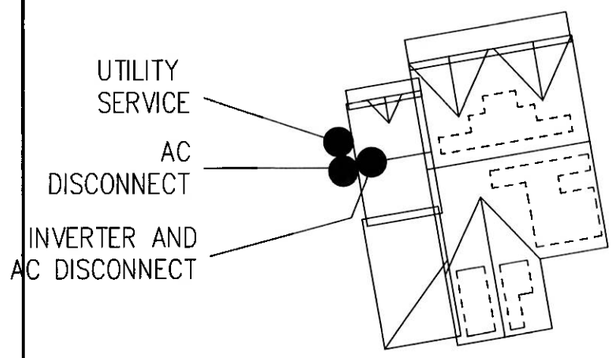
CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:

- Address: 10007 Leafy Ave



SOLAR PHOTOVOLTAIC ARRAY(S)

PHOTOVOLTAIC BACK-FED CIRCUIT BREAKER IN MAIN ELECTRICAL PANEL IS AN A/C DISCONNECT PER NEC 690.17

OPERATING VOLTAGE = 240V

JB-2094562-00

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3018303813

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PAGE NAME:
SITE PLAN PLACARD

DESIGN:
Carlos Gonzalez Bravo

SHEET: 7 REV: DATE: 12/20/2019

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WARNING: PHOTOVOLTAIC POWER SOURCE

Label Location:
(C)(CB)(JB)
Per Code:
NEC 690.31.G.3

PHOTOVOLTAIC DC DISCONNECT

Label Location:
(DC) (INV)
Per Code:
NEC 690.14.C.2

MAXIMUM POWER-POINT CURRENT (Imp) ____ A
MAXIMUM POWER-POINT VOLTAGE (Vmp) ____ V
MAXIMUM SYSTEM VOLTAGE (Voc) ____ V
SHORT-CIRCUIT CURRENT (Isc) ____ A

Label Location:
(DC) (INV)
Per Code:
NEC 690.53

WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED
NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUNDED AND ENERGIZED

Label Location:
(DC) (INV)
Per Code:
NEC 690.5(C)

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION
DC VOLTAGE IS
ALWAYS PRESENT WHEN
SOLAR MODULES ARE
EXPOSED TO SUNLIGHT

Label Location:
(DC) (CB)
Per Code:
NEC 690.17(4)

PHOTOVOLTAIC AC DISCONNECT

Label Location:
(AC) (POI)
Per Code:
NEC 690.14.C.2

MAXIMUM AC OPERATING CURRENT ____ A
MAXIMUM AC OPERATING VOLTAGE ____ V

Label Location:
(AC) (POI)
Per Code:
NEC 690.54

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

Label Location:
(AC)(POI)
Per Code:
NEC 690.17.E

PHOTOVOLTAIC SYSTEM
EQUIPPED WITH RAPID
SHUTDOWN

Label Location:
(INV)
Per Code:
CEC 690.56(C)

WARNING
INVERTER OUTPUT
CONNECTION
DO NOT RELOCATE
THIS OVERCURRENT
DEVICE

Label Location:
(POI)
Per Code:
NEC 690.64.B.7

CAUTION
PHOTOVOLTAIC SYSTEM
CIRCUIT IS BACKFED

Label Location:
(D) (POI)
Per Code:
NEC 690.64.B.4

CAUTION
DUAL POWER SOURCE
SECOND SOURCE IS
PHOTOVOLTAIC SYSTEM

Label Location:
(POI)
Per Code:
NEC 690.64.B.4

PHOTOVOLTAIC POINT OF INTERCONNECTION
WARNING: ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION. FOR SERVICE DE-ENERGIZE BOTH SOURCE AND MAIN BREAKER.
PV POWER SOURCE
MAXIMUM AC OPERATING CURRENT ____ A
MAXIMUM AC OPERATING VOLTAGE ____ V

Label Location:
(POI)
Per Code:
NEC 690.17.4; NEC 690.54

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS
PHOTOVOLTAIC SYSTEM ARE
UNGROUNDED AND
MAY BE ENERGIZED

Label Location:
(DC) (INV)
Per Code:
NEC 690.35(F)
TO BE USED WHEN
INVERTER IS
UNGROUNDED

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Montgomery County
Historic Preservation Commission

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REVIEWED
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(AC): AC Disconnect
(C): Conduit
(CB): Combiner Box
(D): Distribution Panel
(DC): DC Disconnect
(IC): Interior Run Conduit
(INV): Inverter With Integrated DC Disconnect
(LC): Load Center
(M): Utility Meter
(POI): Point of Interconnection

	Label Set		

APPROVED
Montgomery County
Historic Preservation Commission

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REVIEWED
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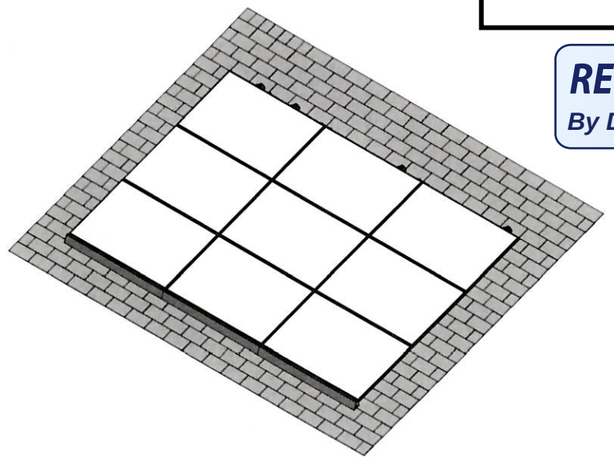
SolarCity | ZepSolar

Ne

ZS Comp
for composition shingle roofs



Description

- PV mounting solution for composition shingle roofs
- Works with all Zep Compatible Modules
- Auto bonding UL-listed hardware creates structural and electrical bond
- ZS Comp has a UL 1703 Class "A" Fire Rating when installed using modules from any manufacturer certified as "Type 1" or "Type 2"

Specifications

- Designed for pitched roofs
- Installs in portrait and landscape orientations
- ZS Comp supports module wind uplift and snow load pressures to 50 psf per UL 2703
- Wind tunnel report to ASCE 7-05 and 7-10 standards
- ZS Comp grounding products are UL listed to UL 2703 and UL 467
- ZS Comp bonding products are UL listed to UL 2703
- Engineered for spans up to 72" and cantilevers up to 24"
- Zep wire management products listed to UL 1565 for wire positioning devices

ZEP COMPATIBLE

UL LISTED

zepsolar.com

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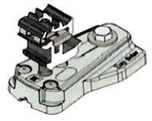
Next-Level PV Mounting Technology

Components

Mounting Block
Part No. 850-1633
Listed to UL 2703

Flashing Insert
Part No. 850-1628
Listed to UL 2703

Captured Washer Lag
Part No. 850-1631-001
850-1631-002
850-1631-003
850-1631-004



Leveling Foot
Part No. 850-1397
Listed to UL 2703

Array Skirt
Part No. 850-1608 or 500-0113
Listed to UL 2703

Grip
Part No. 850-1606 or 850-1421
Listed to UL 2703

End Cap
Part No.
(L) 850-1586 or 850-1460
(R) 850-1588 or 850-1467

Interlock
Part No. 850-1388 or 850-1613
Listed to UL 2703

Ground Zep V2
Part No. 850-1511
Listed to UL 467 and UL 2703

DC Wire Clip
Part No. 850-1509
Listed to UL 1565

zepsolar.com

This document does not create any express warranty by Zep Solar or about its products or services. Zep Solar's sole warranty is contained in the written product warranty for each product. The end-user documentation shipped with Zep Solar's products constitutes the sole specifications referred to in the product warranty. The customer is solely responsible for verifying the suitability of ZepSolar's products for each use. Specifications are subject to change without notice. Patents and Apps zspats.com.

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Date last exported: April 29, 2016 11:22 AM

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SolarEdge Power Optimizer - Zep Compatible™ Module Add-On

For North America P300-ZEP, P400-ZEP

POWER OPTIMIZER

Zep Groove framed modules

- ...ble™ bracket
- ...me without screws - reduces on-roof ...sts
- ...ment grounded through the bracket
- 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
- Next generation maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety

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www.solaredge.us

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Dan.Bruechert at 9:53 am, Feb 21, 2020

solaredge

SolarEdge Power Optimizer - Zep Compatible™

Module Add-On For North America P400-ZEP

	P300-ZEP (for 60-cell PV modules)	P400-ZEP (for 72 & 96-cell modules)	
INPUT			
Rated Input DC power[1]	300	400	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48	80	Vdc
MPPT Operating Range	8 - 48	8-80	Vdc
Maximum Short Circuit Current (Isc)	10	10.1	Adc
Maximum DC Input Current	12.5	12.63	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		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 including mounting bracket (WxLxH)	128 x 196 x 27.5 / 5 x 7.71 x 1.08	128 x 196 x 35 / 5 x 7.71 x 1.37	mm / in
Dimensions excluding mounting bracket (WxLxH)	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	mm / in
Weight (including cables and mounting bracket)	720 / 1.6	840 / 1.9	kg / lb
Input Connector	MC4 Compatible		
Output Connector	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 / NEMA 6P		
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 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

CE ETL

solaredge

SolarEdge Single Phase Inverters

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS

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Sandra J. Heiler

REVIEWED

By Dan.Bruechert at 9:53 am, Feb 21, 2020

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)
- Simple configuration and commissioning with smartphone app and built in Wi-Fi (SE10000H-US, SE11400H-US)

HD wave

solaredge

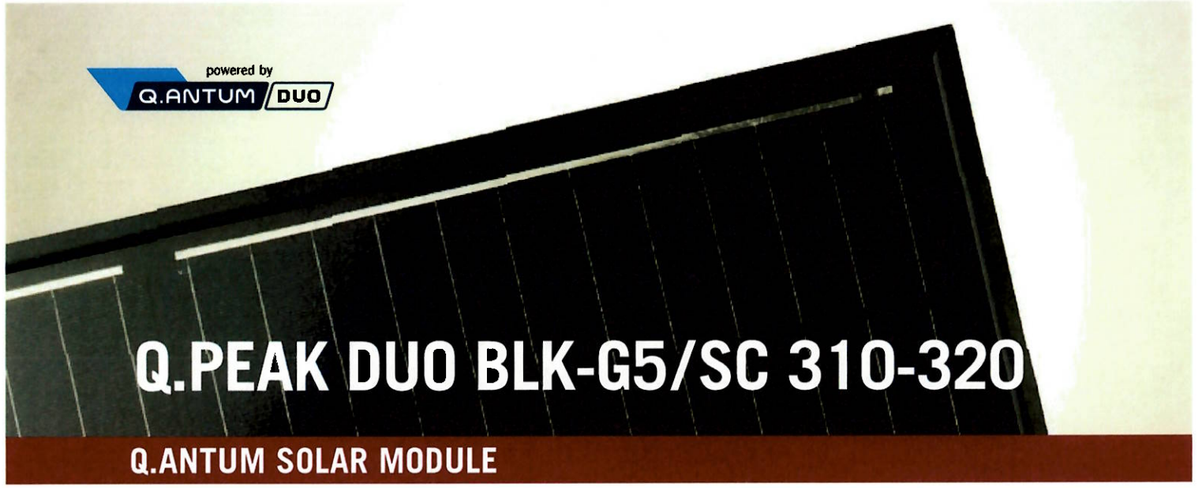
Single Phase Inverters for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT								
Rated AC Power Output	3000	3800 @240V 3300 @208V	5000	6000	7600	10000	11400	VA
Max. AC Power Output	3000	3800 @240V 3300 @208V	5000	6000	7600	10000	11400	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	47.5	A
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power	4650	5900	7750	9300	11800	15500	17670	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380					400		Vdc
Maximum Input Current 208V	-	9	13.5	-	-	-	-	Adc
Maximum Input Current 240V	8.5	10.5	13.5	16.5	20	27	30.5	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 7.7 / 540 x 370 x 195	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	40.1 / 18.2	lb / kg
Noise	< 25				<50			dBA
Cooling	Natural Convection				Natural convection and internal fan (user replaceable)			
Operating Temperature Range	-13 to +140 / -25 to +60[4] (-40°F / -40°C option)[5]							°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
[4] For power de-rating information refer to https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[5] -40 version P/N: SExxxxH-US000NNU4

RoHS



Q.PEAK DUO BLK-G5/SC 310-320

Q.ANTUM SOLAR MODULE

The new Q.PEAK DUO BLK-G5/SC solar module from Q CELLS impresses thanks to innovative Q.ANTUM DUO Technology, which enables particularly high performance on a small surface, and a black Zep CompatibleTM frame design for improved aesthetics, easy installation and increased safety. Q.ANTUM's world-record-holding cell concept has now been combined with state-of-the-art circuitry half cells and a six-busbar design, thus achieving outstanding performance under real conditions - both with low-intensity solar radiation as well as on hot, clear summer days.

Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.3 %.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behavior.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID and Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa) regarding IEC.

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance guarantee[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

THE IDEAL SOLUTION FOR:

Rooftop arrays on commercial/industrial buildings

Engineered in **Germany**

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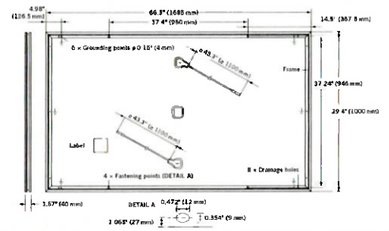
REVIEWED
By Dan.Bruechert at 9:53 am, Feb 21, 2020

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (−1500 V, 168 h)
[2] See data sheet on rear for further information.

Q CELLS

MECHANICAL SPECIFICATION

Format	66.3 in × 39.4 in × 1.57 in (including frame) (1685 mm × 1000 mm × 40 mm)
Weight	44.5 lbs (20.2 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 20 monocrystalline Q.ANTUM solar half-cells
Junction box	2.76-3.35 in × 1.97-2.76 in × 0.51-0.83 in (70-85 mm × 50-70 mm × 13-21 mm), decentralized, IP67
Cable	4 mm² Solar cable; (+) ≥43.3 in (1100 mm), (−) ≥43.3 in (1100 mm)
Connector	Multi-Contact MC4, IP68

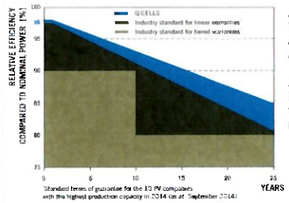


ELECTRICAL CHARACTERISTICS

POWER CLASS				310	315	320
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)						
Minimum	Power at MPP[2]	P_{MPP}	[W]	310	315	320
	Short Circuit Current*	I_{SC}	[A]	9.83	9.89	9.94
	Open Circuit Voltage*	V_{OC}	[V]	40.02	40.29	40.56
	Current at MPP*	I_{MPP}	[A]	9.36	9.41	9.47
	Voltage at MPP*	V_{MPP}	[V]	33.12	33.46	33.80
	Efficiency[2]	η	[%]	≥18.4	≥18.7	≥19.0
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NOC[3]						
Minimum	Power at MPP[2]	P_{MPP}	[W]	229.7	233.5	237.2
	Short Circuit Current*	I_{SC}	[A]	7.93	7.97	8.02
	Open Circuit Voltage*	V_{OC}	[V]	37.43	37.69	37.94
	Current at MPP*	I_{MPP}	[A]	7.36	7.41	7.45
	Voltage at MPP*	V_{MPP}	[V]	31.20	31.52	31.84

[1] 1000 W/m², 25 °C, spectrum AM 1.5G [2] Measurement tolerances STC ±3 %; NOC ±5 % [3] 800 W/m², NOCT, spectrum AM 1.5G * typical values, actual values may differ

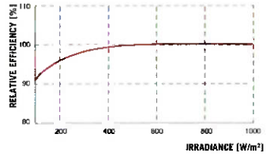
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.54 % degradation per year. At least 93.1 % of nominal power up to 10 years. At least 85 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organization of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.28
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.37	Normal Operating Cell Temperature	NOCT	[°F]	113 ±5.4 (45 ±3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1000 (IEC) / 1000 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating	C (IEC) / TYPE 1 (UL)
Design load, push (UL)[2]	[lbs/ft²]	50 (2400 Pa)	Permitted module temperature on continuous duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Design load, pull (UL)[2]	[lbs/ft²]	50 (2400 Pa)	[2] see installation manual	

QUALIFICATIONS AND CERTIFICATES

UL 1703, CE-compliant,
IEC 61215 (Ed. 2); IEC 61730 (Ed. 1), application class A

PACKAGING INFORMATION

Number of Modules per Pallet	26
Number of Pallets per 53' Trailer	32
Number of Pallets per 40' High Cube Container	26
Pallet Dimensions (L × W × H)	69.3 in × 45.3 in × 46.9 in (1760 mm × 1150 mm × 1190 mm)
Pallet Weight	1268 lbs (575 kg)

NOTE: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
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