# CITY OF WASHINGTON

**PLANNING & DEVELOPMENT DEPARTMENT**
**301 Walnut St. · Washington, IL 61571**
**Ph. 309-444-1135 · Fax 309-444-9779**
http://www.washington-illinois.org
joliphant@ci.washington.il.us

## MEMORANDUM

TO: Chairman Burdette and Planning & Zoning Commission
FROM: Jon R. Oliphant, AICP, Planning & Development Director
SUBJECT: Public Hearing – Lei Wernsman Special Use Request, 203 Hilldale Avenue
DATE: January 28, 2019

**Summary**: Lei Wernsman has submitted a special use application for the installation of a solar energy system on the detached garage at 203 Hilldale Avenue. The zoning code requires a special use be issued in order to install a roof-mount solar energy system on an accessory structure. It would be located on the detached garage on the northern portion of the property. Staff recommends approval of this request.

**Background**: The property is approximately 0.22 acres and is zoned R-1 (Single- and Two-Family Residential). A detached garage was constructed on the north side of the property concurrently with the house in 1940. A 13.2 KW solar photovoltaic array is proposed to be located on the west and east-facing garage roofs. The site plan submitted would be comprised of 44 300-watt panels and cover approximately 76.5% of the roof, which is more than the maximum allowable 50% coverage. Please note the applicant has indicated interest in seeking a variance for the increased coverage. Consideration of the special use would only allow for 50% coverage.

An attached letter submitted by the contractor (Green Solar Technologies) indicates the reason for placing the panels on the garage is due to the location of three large trees that cause considerable shade on the principal structure's south-facing roof. Two of these trees are on the owner's property and could likely be removed. But a third tree is on the eastern neighbor's property and the neighbor has indicated an unwillingness to have it trimmed or removed. The north-facing roof of the principal structure is not an option because there would not be enough energy production to justify the cost.

Green Solar Technologies has attested that the roof is capable of supporting the proposed array. The City's electrical inspector has reviewed the attachments and has consented to this construction if the special use is approved. While a building permit would need to be issued if the special use is approved, the submitted attachments are thus far in conformance with the solar energy regulations. It would be installed in accordance with the adopted 2012 International Building Code.

The proposed use would not appear to be detrimental to the public's health, safety, or general welfare nor would it diminish property values or the use and enjoyment of properties in the vicinity. Placing the array on the south-facing roof on the house does not appear to be worthwhile because of the limited sun that would produce the energy. Their placement on the east- and west-facing garage roofs would be a solid alternative that would allow the owner to take advantage of the cost savings from the solar generation. Based on all of these factors, staff would recommend that the special use request be approved up to 50% roof coverage.

A public hearing has been scheduled on this topic at the February 6 Planning and Zoning Commission meeting.

Enclosures

# CITY OF WASHINGTON, ILLINOIS

## APPLICATION FOR SPECIAL USE

To have a complete application for a special use, you must submit the following:

- Signed and completed application
- Plat showing subject property and all adjacent properties – See below for plat requirements
- Ownership documentation (lease, deed, mortgage, etc.)
- Accurate legal description obtained from the Warranty Deed
- Application fee of $100 payable to the City of Washington

Address or location of property: 203 Hilldale Ave. Washington, IL 61571

Property Tax ID (PIN) number: 02-02-13-304-013

Current zoning classification of the property: R1

Current use of the property: Residential

What is the Special Use for? Solar install on stand alone garage

How will you meet other requirements of the zoning code (such as parking or landscaping, if applicable)? _____

Name of Applicant: Lei Weinsman Phone Number of Applicant: _____

Address of Applicant: 203 Hilldale Ave. Washington, IL 61571

Owner of Property: Lei Weinsman

Address of Owner: Same

I would like to receive correspondence by: ____ Mail ✓ Email Email address: ~~[illegible]~~ tbarth@zellei-electric.com

**PLAT REQUIREMENTS:** Your special use plat must show:

- Building or site plan layout and locations of proposed special uses, including square footage
- Adjacent properties, rights-of-way, streets, roads, railroads, waterways, and other physical features

**PUBLIC HEARING:** Your case will be referred with staff's recommendation to the next regularly scheduled Planning and Zoning Commission meeting for a public hearing. The Planning and Zoning Commission meets the first Wednesday of every month at 6:30 p.m at the Washington District Library meeting room at 380 N. Wilmor Road. At the Planning and Zoning Commission meeting, you will present your request. A special use cannot be recommended by the Planning and Zoning Commission unless the Commission finds, based upon the application and evidence presented at the public hearing, that all of the following conditions have been met:

1) The special use will not be detrimental to or endanger the public health, safety, morals, comfort, or general welfare; 2) The special use will not be injurious to the use and enjoyment of other property in the immediate vicinity, or substantially diminish or impair property values; 3) The special use will not impede development of surrounding property; 4) Adequate utilities, access roads, drainage, or necessary facilities will be provided; 5) Adequate ingress and egress provided to minimize traffic congestion in public streets; 6) The special use will conform to all other application regulations of the zoning district; and 7) If the special use would not otherwise be acceptable, the Planning Commission may recommend certain conditions be met to make the use acceptable, such as, but not limited to: landscape screening or fencing, specific hours of operation, night lighting or lighting restrictions, parking area requirements, signage restraints, outdoor storage limitations.

***Certification:*** *To the best of my knowledge, the information contained herein, and on the attachments, is true, accurate, and correct, and substantially represents the existing features and proposed features. Any error, misstatement, or misrepresentation of material fact or expression of material fact, with or without intention, shall constitute sufficient grounds for the revocation or denial of the proposed Special Use.*

Signature of Applicant — Date: 1/9/19

Signature of Owner — Date

After receiving a completed application, the City Clerk will file notice of your request with the local newspaper and with the adjoining property owners. If you have any questions, please contact Jon Oliphant, Planning & Development Director at (309) 444-1135.

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FOR OFFICE USE ONLY Case No.: _____

Plat Submitted? Y / N Date: _____

Documentation of Authority Submitted: _____

Commission Action: _____

Fee Paid? Y / N / N/A Amount: _____ Date: _____

Landscaping Plan Submitted? Y / N / N/A Date: _____

Date to go before the Planning and Zoning Commission: _____

Ordinance Review: (first reading) _____ (second reading) _____

GreenSolar TECH.

Green Solar Technologies
6400 Laurel Canyon Blvd #400
North Hollywood, CA 91606

January 11, 2019

City of Washington
301 Walnut St.
Washington, IL 61571

To Whom It May Concern,

We are writing in reference to a roof mount solar installation being installed for our client, Lei Wernsman, at the address 203 Hilldale Ave. Washington, IL 61571.

We are applying for a Special Use permit to be approved to install her solar system on the roof of her garage. The reasons why her garage roof is the preferred location for her solar system is due to the obstructions caused by multiple trees along the south edge of her and her neighbor's property. These 3 large trees cause considerable shade to the roof of her home that would dramatically affect the production of her solar system. While she may be able to have the 2 trees on her property removed, the largest of the trees is on her neighbor's property and they are unwilling to have it trimmed or cut down.

The other reason her garage roof is the ideal location for her solar system is that we are unable to fit all the panels we plan to install on the south facing roof of her home. We are unable to install on north facing roofs due to the lack of production the panels will contribute.

I hope this explanation is sufficient for your review and please feel free to reach out myself for further clarification on this matter.

Best Regards,

Dennis Boyce
Senior Project Manager
Green Solar Technologies
pm15@greensoltech.com
Fax: 424.239.6400
Cell: 818.392.0668
Office: 424.253.9438


# CITY OF WASHINGTON

TAZEWELL COUNTY, ILLINOIS

## LOCATION MAP

N
W E
S

**Legend**

- AG-1 (Agriculture)
- CE (Country Estates)
- R-1A (Single Family Residential)
- R-1 (1-2 Family Residential)
- R-2 (Multifamily Residential)
- C-1 (Local Retail)
- C-2 (General Retail)
- C-3 (Service Retail)
- I-1 (Light Industrial)
- I-2 (Heavy Industrial)

*Prepared by the City of Washington Department of Planning and Development*

*Printed: January 29, 2019*


# CITY OF WASHINGTON

TAZEWELL COUNTY, ILLINOIS

## LOCATION MAP

N
W E
S

*Prepared by the City of Washington Department of Planning and Development*

*Printed: January 29, 2019*

## GENERAL NOTES

1. ALL ELECTRICAL MATERIALS SHALL BE NEW AND LISTED BY RECOGNIZED ELECTRICAL TESTING LABORATORY

CUSTOM MADE EQUIPMENT SHALL HAVE COMPLETE TEST DATA SUBMITTED BY THE MANUFACTURER ATTESTING TO ITS SAFETY

2. OUTDOOR EQUIPMENT SHALL BE AT LEAST NEMA 3R RATED

3. ALL METALLIC EQUIPMENT SHALL BE GROUNDED

4. ALL SPECIFIC WIRING IS BASED ON THE USE OF COPPER.

5. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO INSTALLATION AND SHALL COORDINATE ALL INSPECTIONS, TESTING COMMISSIONING AND ACCEPTANCE WITH THE CLIENT, UTILITY CO. AND CITY INSPECTORS AS NEEDED.

6. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS OF SERVICE POINTS AND SERVICE SIZES WITH THE SERVING UTILITY COMPANY AND COMPLY WITH ALL UTILITY COMPANIES REQUIREMENTS. IF THE SOLAR BACK FED BREAKER IS OVER THE BUSS SIZE 20% LIMIT, CONTRACTOR SHALL INCLUDE THE COST TO REPLACE MAIN BREAKER OR ENLARGE MAIN CAPACITY.

7. DRAWINGS ARE DIAGRAMMATIC ONLY, ROUTING OF RACEWAYS SHALL BE OPTION OF THE CONTRACTOR UNLESS OTHERWISE NOTED AND SHALL BE COORDINATED WITH OTHER TRADES.

8. IF THE ROOF MATERIAL OR ROOF STRUCTURE NOT ADEQUATE FOR PV INSTALLATION, CALL ENGINEER PRIOR TO INSTALL. THE CONTRACTOR IS RESPONSIBLE TO VERIFY THAT THE ROOF IS CAPABLE OF WITHSTANDING THE EXTRA WEIGHT.

9. IF THE DISTANCES FOR CABLE RUNS ARE DIFFERENT THAN SHOWN, THE CONTRACTOR SHALL NOTIFY THE ELECTRICAL ENGINEER TO VALIDATE THE SIRE SIZE. FINAL DRAWINGS WILL BE RED-LINED AND UPDATED AS APPROPRIATE.

10. WHENEVER A DISCREPANCY IN QUALITY OF EQUIPMENT ARISES ON THE DRAWING OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL AND SERVICES REQUIRED BY THE STRICTEST CONDITIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS TO ENSURE COMPLETE COMPLIANCE AND LONGEVITY OF THE OPERABLE SYSTEM REQUIRED BY THE ARCHITECT/ENGINEERS.

11. ALL BROCHURES, OPERATION MANUALS, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE HANDED OVER TO OWNER'S REPRESENTATIVE AT THE COMPLETION OF WORK

## PHOTOVOLTAIC NOTES:

1. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED AND IDENTIFIED UL 1703.

2. SOLAR SYSTEM SHALL NOT COVER ANY PLUMBING OR MECHANICAL VENTS

3. MODULES AND SUPPORT STRUCTURES SHALL BE GROUNDED.

4. SOLAR INVERTER MUST HAVE A MANUFACTURE INSTALLED DISCONNECTING MEANS THAT PREVENTS PARALLEL FEEDING UTILITY LINES DURING POWER OUTAGE.

5. REMOVAL OF AN INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTORS.

6. ALL PV MODULES AND ASSOCIATED EQUIPMENT AND WIRING SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE.

7. LIVE PARTS OF PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS OVER 150V TO GROUND SHALL NOT BE ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS WHILE ENERGIZED.

8. INVERTER IS EQUIPPED W/ INTEGRATED GFDI, THUS PROVIDING GROUND FAULT PROTECTION

9. ALL CONDUCTORS SHALL BE COPPER AND 90 DEG RATED

10. ALL ELECTRICAL EQUIPMENT SHALL BE LISTED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED BY THE DEPARTMENT.

11. CONDUITS SHOULD BE PAINTED TO MATCH EXISTING ROOF AND WALL COLORS

12. THE OUTPUT OF A UTILITY INTERACTIVE-INVERTER SHALL BE PERMITTED TO BE CONNECTED TO THE SUPPLY SIDE OF THE SERVICE DISCONNECTING MEANS AS PER 230.82(6)

13. A SINGLE CONDUCTOR SHALL BE PERMITTED TO BE USED TO PERFORM THE MULTIPLE FUNCTIONS OF DC GROUNDING, AC GROUNDING AND BONDING BETWEEN AC AND DC SYSTEMS AS PER NEC 690.47(C) AND SIZED AS PER SEC 250.166

14. EQUIPMENT GROUND CONDUCTOR REQUIRED IN RACEWAYS SIZED PER NEC 250.166.

15. PER ART 250.92. NON-CURRENT CARRYING METAL PARTS OF EQUIPMENT SHALL BE EFFECTIVELY BONDED TOGETHER. BOND BOTH ENDS OF RACEWAYS

## SHEET INDEX



## INSTALLER

**Green Solar Tech**

GreenSolar

X

***DESIGNER NAME:***
***NAREK A.***

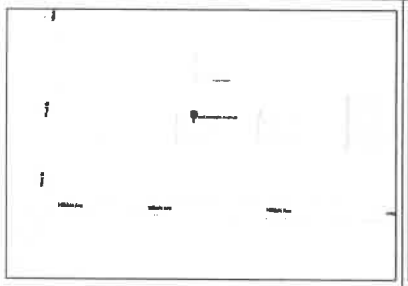
***DATE: JANUARY 25, 2019***

THE INSTALLATION OF SOLAR ARRAYS AND PHOTOVOLTAIC POWER SYSTEMS SHALL COMPLY WITH THE FOLLOWING CODES:

2009 (IBC) INTERNATIONAL BUILDING CODE
2009 (IMC) INTERNATIONAL MECHANICAL CODE
2009 (IPC) INTERNATIONAL PLUMBING CODE
2009 (IFC) INTERNATIONAL FIRE CODE
2009 (IRC) INTERNATIONAL RESIDENTIAL CODE
2008 (NEC) NATIONAL ELECTRIC CODE

ALL OTHER ORDINANCE ADOPTED BY THE LOCAL GOVERNING AGENCIES

***PROJECT NAME:*** *Lei Wernsman*
***ADDRESS:*** *203 Hilldale Ave Washington, IL 61571*



VICINITY MAP
SCALE: NTS

SATELLITE VIEW
SCALE: NTS

## PHOTOVOLTAIC SYSTEM SUMMARY

SYSTEM SIZE: DC STC: 13.20 KW
SYSTEM SIZE: AC CEC: 12.06 KW
SOLAR MODULES: (44) MISSION SOLAR MSE300SQ5T
OPTIMIZERS: (44) P320 POWER OPTIMIZERS
INVERTER:(1) SOLAR EDGE SE10000H-US
MOUNTING SYSTEM: EVEREST SOLAR SYSTEMS

**ELECTRICAL INFORMATION:**
**EXISTING**
MAIN SERVICE PANEL BUS SIZE: 100A
MAIN SERVICE BREAKER SIZE: 100A

**BUILDING INFORMATION:**
ONE STORY GARAGE
CONSTRUCTION TYPE: V-B
OCCUPANCY: R
ROOF: COMPOSITION SHINGLE
RAFTERS: 2"X6" @ 24" O.C.

## PHOTOVOLTAIC ARRAY

(44) Mission Solar Energy 300W Solar Modules (MSE300SQ5T)
(1) Solar Edge 10.0KW Inverter (SE10000H-US)
(44) Solar Edge P320 Power Optimizers

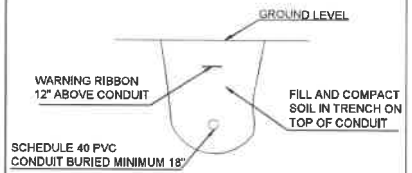
### UNIT INDEX

| | |
|---|---|
| MSP | (E) 100A Main Service Panel |
| UM | (E) Utility Meter |
| INV | (N) SE 10.0 Kw Inverter |
| ACD1 | (N) 60A Non-Fused Disconnect |
| ACD2 | (N) 60A Fused Disconnect |
| J/B | (N) Nema 3R Junction Box |
| | Solar Module |
| | Power Optimizer |
| | EMT Type Conduit |

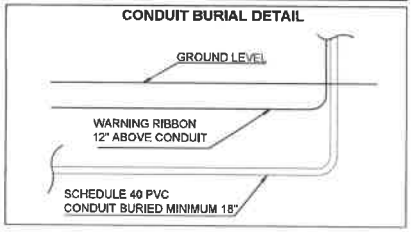
ROOF AREA CALCULATIONS
FIRE SPRINKLERS - NO
TOTAL ROOF AREA (SQ.FT.) - 1,035
SOLAR AREA (SQ.FT.) - 792
% OF COVERED AREA - 76.5%

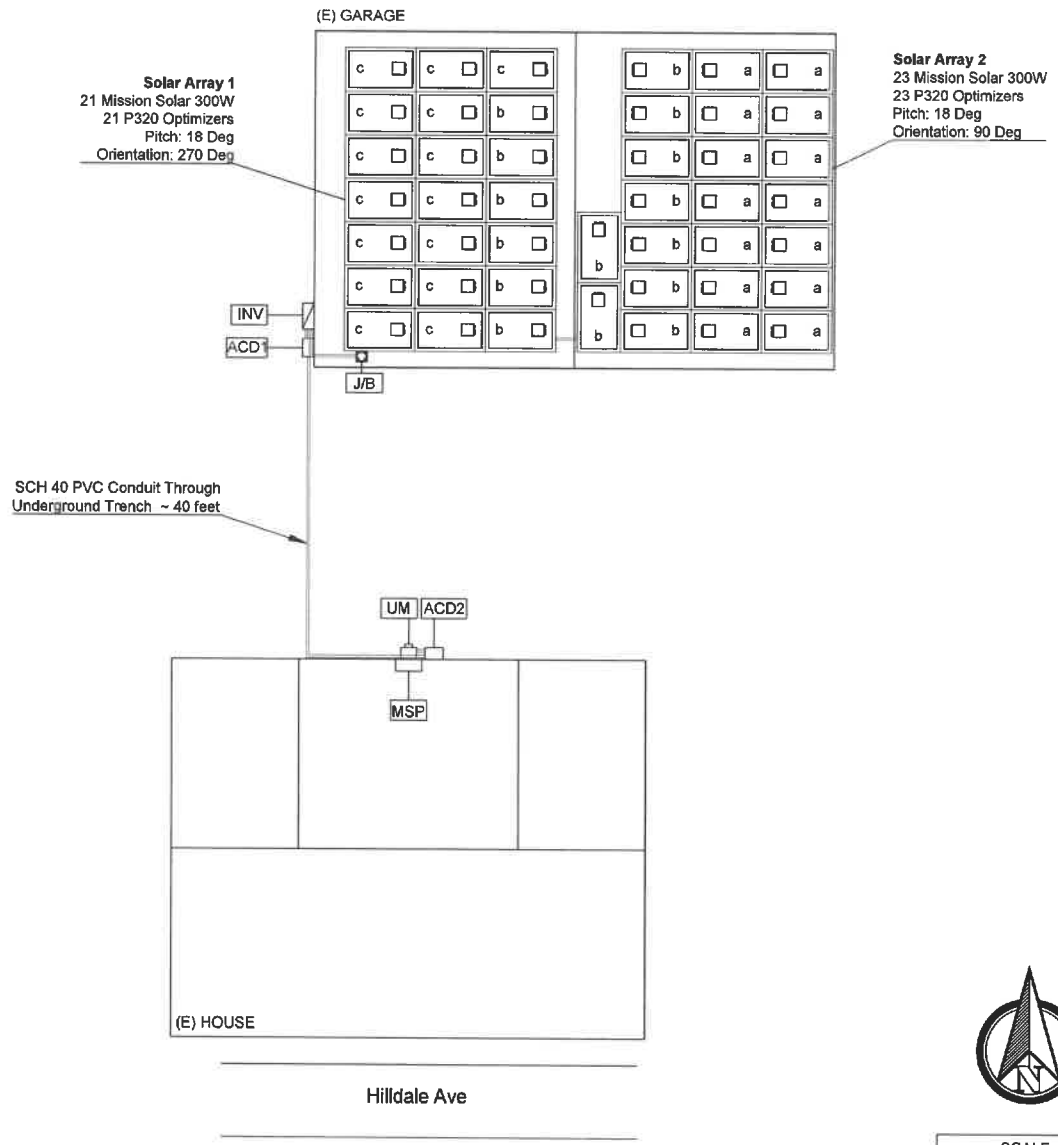
NOTE: PVC conduit and fittings directly buried in earth at a depth not less than 18"

**CONDUIT BURIAL DETAIL**




**CONDUIT BURIAL DETAIL**




FROM JUNCTION BOX TO ROOF EAVE EMT TYPE CONDUIT WILL RUN OVER THE ROOF AT 1 1/2" HEIGHT, THEN UNDER THE EAVE TO PV EQUIPMENT

SCALE
0 1 5 10 ft

General Notes

# ROOF PLAN

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

Firm Name & Address
Green Solar Tech

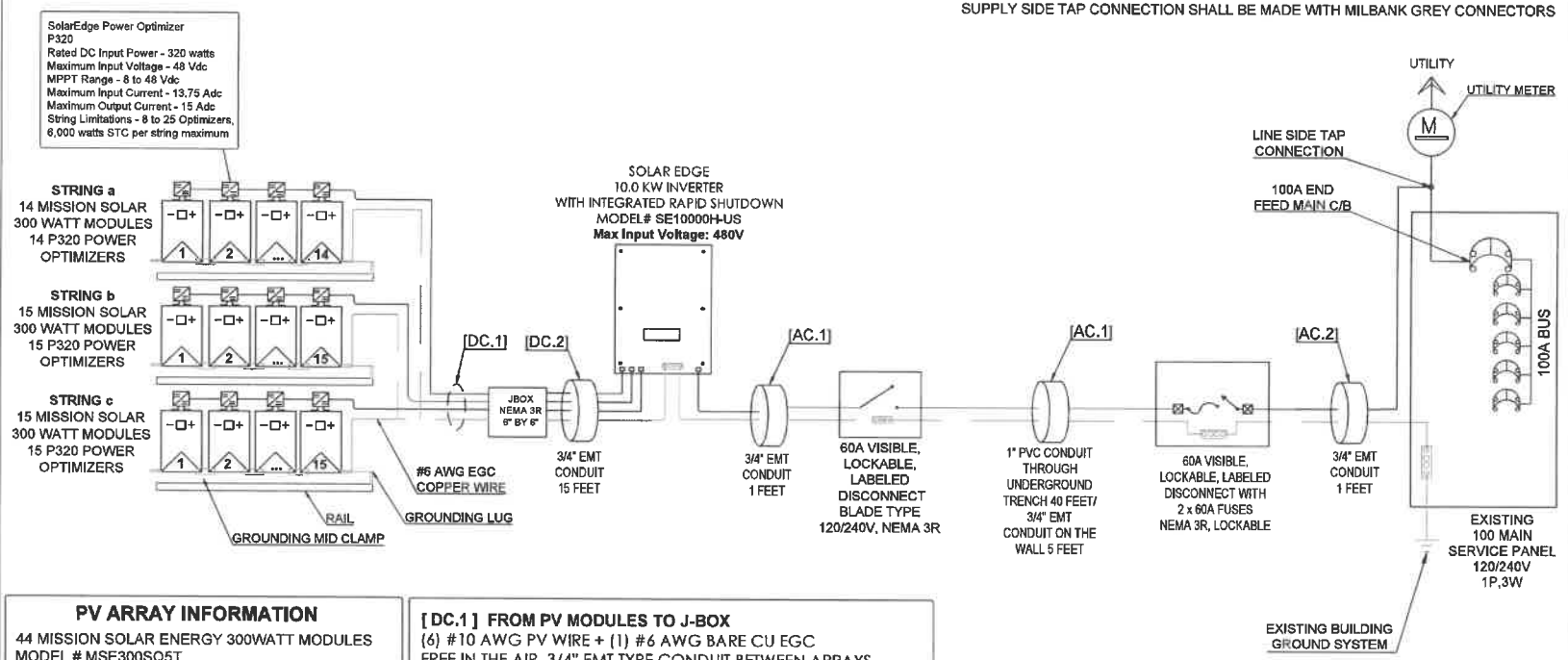
GreenSolar

X

Project Name & Address
*Lei Wernsman*
*203 Hilldale Ave*
*Washington, IL 61571*

Date JANUARY 25, 2019
Scale AS INDICATED
Project PV SYSTEM
Sheet 1

SUPPLY SIDE TAP CONNECTION METHOD SHALL MEET 2014 NEC 240.21 ART
SUPPLY SIDE TAP CONNECTION SHALL BE MADE WITH MILBANK GREY CONNECTORS




## PV ARRAY INFORMATION

44 MISSION SOLAR ENERGY 300WATT MODULES
MODEL # MSE300SQ5T
1 SOLAR EDGE 10.0 KW INVERTER
MODEL # SE10000H-US

NUMBER OF STRINGS PER INVERTER: 3
NUMBER OF SERIES IN STRING a: 14
NUMBER OF SERIES IN STRINGS b,c: 15

MAX DC WATTAGE: 15 * 300W = 4,500W <= 6,000W
MAX DC VOLTAGE: 480V

### PV MODULE RATINGS # STC

| | |
|---|---|
| SHORT CIRCUIT CURRENT I-SC | = 9.61A |
| MAXIMUM POWER CURRENT I-MP | = 9.17A |
| OPEN CIRCUIT VOLTAGE V-OC | = 40.18V |
| MAXIMUM POWER VOLTAGE V-MP | = 32.80V |

### INVERTER RATING

| | |
|---|---|
| PEAK PWR TRACKING VOLTAGE | = 400 V |
| CEC EFFICIENCY | = 99 % |
| ENCLOSURE : | NEMA 3R |
| MAXIMUM INPUT CURRENT | = 27.0 A |
| MAXIMUM OUTPUT CURRENT | = 42.0 A |
| MAXIMUM INPUT POWER | = 15,500 W |
| MAXIMUM OUTPUT POWER | = 10,000 W |

**[ DC.1 ] FROM PV MODULES TO J-BOX**
(6) #10 AWG PV WIRE + (1) #6 AWG BARE CU EGC
FREE IN THE AIR, 3/4" EMT TYPE CONDUIT BETWEEN ARRAYS

**[ DC.2 ] FROM J-BOX TO INVERTER**
(6) #10 AWG THWN-2 + (1) #8 AWG CU EGC
3/4" EMT TYPE CONDUIT

MAXIMUM CURRENT : 15 * 300W / 400V = 11.3 A
CONSIDERS CONTINUOUS: 11.3 A * 1.25 = 14.1 A
SHORT CIRCUIT CURRENT: 14.1 A * 1.25 = 17.6 A
RACEWAY HEIGHT FROM THE ROOF 1 ½" (TEMP - 39 + 22 = 61C)
TEMP. DERATE FACTOR -17.6 A / 0.58 = 30.3 A
MORE THAN 3 CCC ADJST. FACTOR (6 WIRES) - 0.8
ADJUSTED CONDUCTOR AMPACITY - 30.3 A / 0.8 = 37.9 A
WIRE SIZE FROM NEC TABLE 310.15(b)16 - **10 AWG**
AMBIENT TEM FACTOR 0.58 PER NEC 310.15(b)(2)(a)

**[ AC.1 ] FROM INVERTER TO FUSED DISCONNECT**
(3) #6 AWG THWN-2 + (1) #8 AWG CU EGC
3/4" EMT CONDUIT / 1" PVC CONDUIT

MAXIMUM INVERTER OUTPUT CURRENT: 42.0 A
**CONSIDERS CONTINUOUS: 42.0 A * 1.25 = 52.5 A**
TEMPERATURE ADJUSTMENT - 52.5 A / 0.91 = 57.7A
CONDUCTOR SIZE FROM NEC TABLE 310.15(b)(2)(a) - **6 AWG**

*Grounding specs:*
*Everest has a UL2703 Listed integrated grounding.*
*No additional ground lugs and copper wire are needed*
*(See integrated grounding spec sheet on page #12)*

*All the photovoltaic systems wires that on the roof and side of the building shall be protected against physical damage*

**[ AC.2 ] FROM FUSED DISCONNECT TO MAIN SERVICE PANEL**
(3) #6 AWG THWN-2 + (1) #6 AWG CU EGC
3/4" EMT CONDUIT

### OUTPUT CALCULATIONS

PV SYSTEM MAX DC OUTPUT:
44 * 300W = 13,200W
PV SYSTEM MAX AC OUTPUT:
(44) MISSION SOLAR MSE300SQ5T
(1) SOLAR EDGE SE10000H-US
Pmax (PTC Rating) PER MODULE: 276.9W
276.9W * 44 = 12.18 KW
12.18 KW * 99.0% CEC INVERTER = 12.06 KW

General Notes

# SINGLE LINE DIAGRAM

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

Firm Name & Address
Green Solar Tech

GreenSolar

X

Project Name & Address
*Lei Wernsman*
*203 Hilldale Ave*
*Washington, IL 61571*

Date JANUARY 25, 2019
Scale AS INDICATED
Project PV SYSTEM
Sheet 2

1. CAUTION
AUTHORIZED SOLAR PERSONNAL ONLY!

2. CAUTION
SOLAR DC CURRENT PRESENT DURING DAYLIGHT HOURS

**(STICKER TO BE LOCATED ON CONDUIT WITH DC CURRENT EVERY 4' HORIZONTALLY OR 10' VERTICALLY AND 1' FROM EACH SIDE OF A BEND)**

3. WARNING!
ELECTRIC SHOCK HAZARD.
IF GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

4. DC DISCONNECT
DC PHOTOVOLTAIC POWER SOURCE
RATED MAX POWER POINT CURRENT- 9.17 AMPS
RATED MAX POWER POINT VOLTAGE- 400 VOLTS
MAXIMUM SYSTEM VOLTAGE- 480 VOLTS
SHORT CIRCUIT CURRENT- 17.6 AMPS

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

11. PV LOAD CENTER SIZED FOR PV BREAKERS ONLY OR RENDERED UNABLE TO ACCEPT ANY ADDITIONAL LOADS.

**(STICKER LOCATED ON THE PV SUB PANEL)**

6. PV SUB-PANEL ONLY

**(TO BE LOCATED ON SUB-PANEL ONLY WHEN SUB-PANEL IS DEDICATED FOR PV ONLY)**

7. AC DISCONNECT
AC PHOTOVOLTAIC POWER SOURCE
RATED AC OUTPUT CURRENT: 42.0A MAX
NOMINAL AC OPERATING VOLTAGE: 240 Vac

8. THIS PANEL FED BY MULTIPLE SOURCES (UTILITY & SOLAR)

9. SOLAR

**(STICKER LOCATED INSIDE PANEL NEXT TO SOLAR BREAKER)**

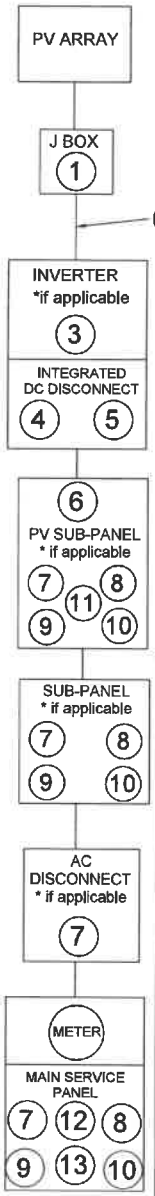
10. WARNING!
INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

**(STICKER LOCATED INSIDE PANEL BELOW PV BREAKER)**

12. PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUT DOWN

**(STICKER LOCATED ON THE MAIN SERVICE PANEL)**

**Permanent directory or plaque providing location of service disconnecting means and photovoltaic system disconnecting means, if not located at the same location.** (Plaques shall be metal or plastic, with engraved or machine printed letters, or electro-photo plating, in a contrasting color to the plaque. Plaques shall be permanently attached to the equipmenq or in the required location using an approved method that is suitable to withstand the environment to which it is exposed. Plaques and signage shall meet legibility, defacemet, exposure and adhesion requirements of Underwriters Laboratories marking and labeling system 969(UL969).
**Plaques will have red background & white lettering.**



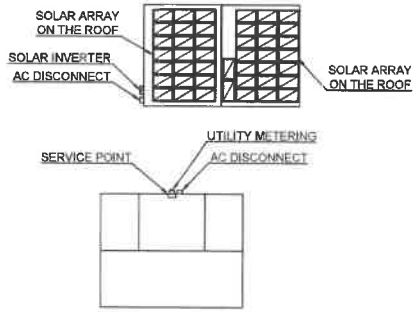

## MARKINGS, LABELS AND WIRING SIGNS

A. Purpose: Provide emergency responders with appropriate warning and guidance with respect to isolating solar electric system.
This can facilitate identifying energized electrical lines that connect solar panels to the inverter, as these should not be cut when venting for smoke removal
B. Main Service Disconnect.
1. Residential buildings - The marking main be placed within the main service disconnect. The marking shall be placed
outside cover if the main service disconnect is operable with the service panel closed.
2. Commercial buildings - The marking shall be placed adjacent to the main service disconnect clearly visible from the location where the level is operated
3. Markings: Verbiage, Format and Type of Material.
a. Verbiage: CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED
b. Format: White lettering on a red background. Minimum 3/8 inches letter height. All letters shall be capitalized. Arial or similar font, non bold.
c. Material: Reflective, weather resistant material suitable for the environment (use UL - 969 as standard for weather rating). Durable adhesive materials meet this requirement.
C.Marking Requirements on DC conduit, raceways, enclosures, cable assemblies, DC combiners and junction boxes:
1. Markings: Verbiage, Format and Type of Material.
a. Placement : Markings shall be placed every 10 feet on all interior and exterior DC conduits, raceways, enclosures, and cable assemblies,
at turns, above and for below penetrations, all DC combiners and junction boxes
b. Verbiage: CAUTION: SOLAR CIRCUIT Note: The format and type of material shall adhere to "V. V-3b, c" of this requirement.
c. Inverters are not required to have caution markings
1.Marking is required on all interior and exterior DC conduit raceways,enclosures,cable assemblies,and junction boxes,combiner boxes and disconnects.IFC 605.11.1
2.The materials used for marking shall be reflective,weather resistant material suitable for the environment.
Minimum 3/8 "letter height; all upper case letters Arial or similar font; Red background with white lettering. IFC 605.11.1.1
3.Marking shall contain the words: **WARNING : PHOTOVOLTAIC POWER SOURCE.** IFC 605.11.1.2
4.Marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated IFC 605.11.1.3

Only present if required by either the AHJ and/or utility company

# CAUTION

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




Hilldale Ave

General Notes

**CODE REQUIRED SIGNAGE**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

Green Solar Tech

GreenSolar

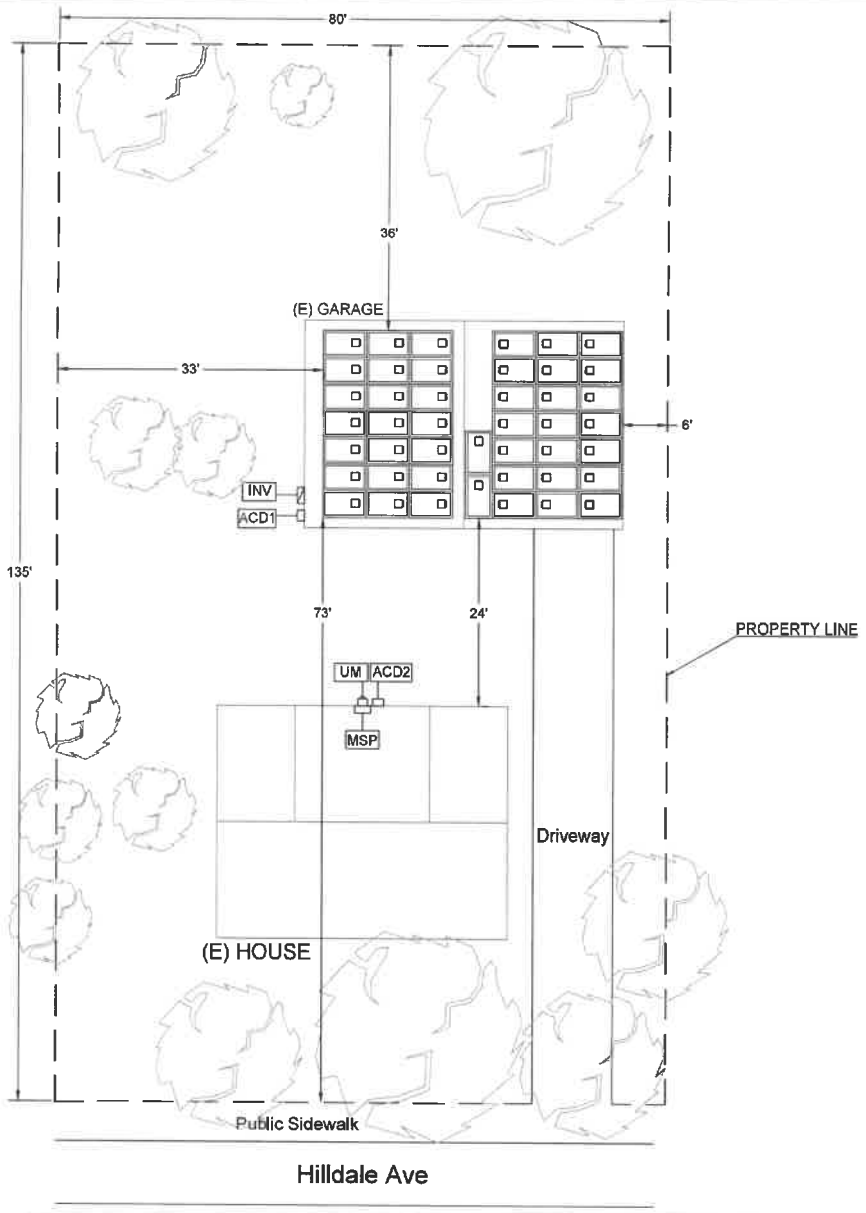
X

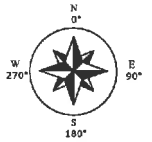

*Lei Wernsman*
*203 Hilldale Ave*
*Washington, IL 61571*


Date JANUARY 25, 2019
Scale AS INDICATED
Project PV SYSTEM
Sheet 3

## UNIT INDEX

| | |
|---|---|
| MSP | (E) Main Service Panel |
| UM | (E) Utility Meter |
| INV | (N) Inverter |
| ACD1 | (N) Non-Fused Disconnect |
| ACD2 | (N) Fused Disconnect |
| | Solar Module |
| | Power Optimizer |




SCALE

0 5 10 15ft

General Notes

# SITE PLAN

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|
| | | |

CONTRACTOR

Firm Name & Address

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Washington, IL 61571

| | |
|---|---|
| Date: JANUARY 25, 2019 | Sheet: 4 |
| Scale: AS INDICATED | |
| Project: PV SYSTEM | |

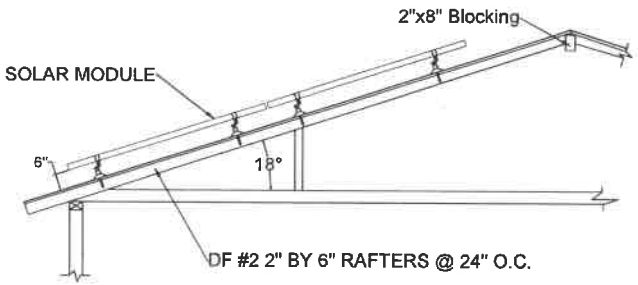
## WEIGHT LOAD CALCULATION

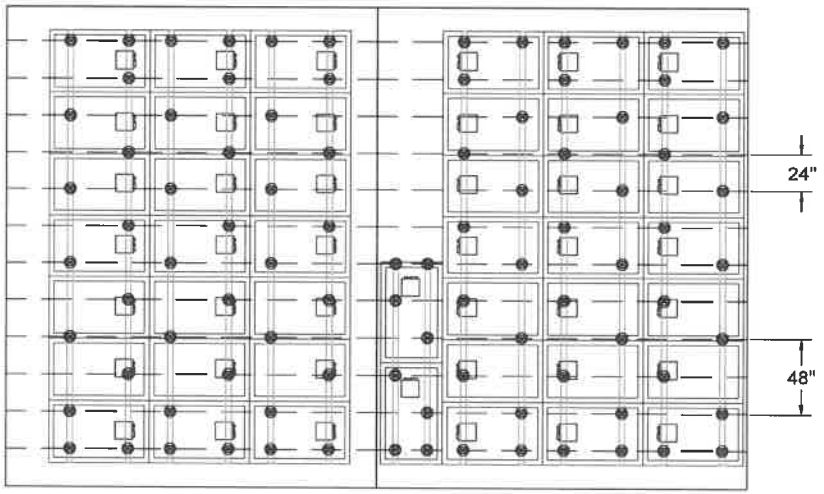
| | |
|---|---|
| MODULE WEIGHT (lbs) | 40.1 |
| # OF MODULES | 44 |
| TOTAL MODULE WEIGHT (lbs) | 1764 |
| RACK WEIGHT (lbs) | 353 |
| OPTIMIZERS WEIGHT (lbs) | 62 |
| TOTAL SYSTEM WEIGHT (lbs) | 2179 |
| # OF STANDOFFS | 92 |
| MAX SPAN BETWEEN STANDOFFS (in) | 48 |
| LOADING PER STANDOFF (lbs) | 23.7 |
| TOTAL AREA (sq.ft.) | 792 |
| LOADING (PSF) | 2.75 |

1. Everest Racking System
2. EverFlash Attachment
3. Racking loading calculations were performed for ASCE 7-10 wind speeds @ 115 mph for B and C exposure categories and ASCE 7-10 Seismic Design Category E, 0 psf Snow Load
4. Roof attachment hardware to be mounted to existing structure (2"x6" @ 24" O.C. Rafters) at 48" O.C. rail spans or less.
5. Hanger bolts are 5/16" X 3.5" stainless steel with 2.5" minimum embedment into the framing member.
6. Roof sheathed with 1/2" plywood and upper surface is faced with felt paper. Finished roof surface is **One Layer of Composition Shingle. / Rolled Composition.**
7. Mounts or/and mounting hardware will be sealed with Tremco Vulkem 116 Polyurethane Sealant or equivalent.

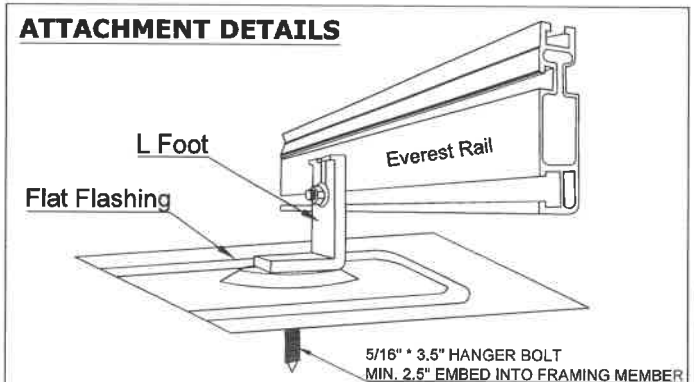
**STRUCTURAL ENGINEERING STAMP**
IF APPLICABLE*

**MOUNTS ARE STAGGERED**




## ATTACHMENT DETAILS




ATTACHMENT
RACKING RAIL
EXISTING 2" BY 6" @ 24" O.C. ROOF RAFTERS

General Notes

**ATTACHMENT LAYOUT**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

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GreenSolar

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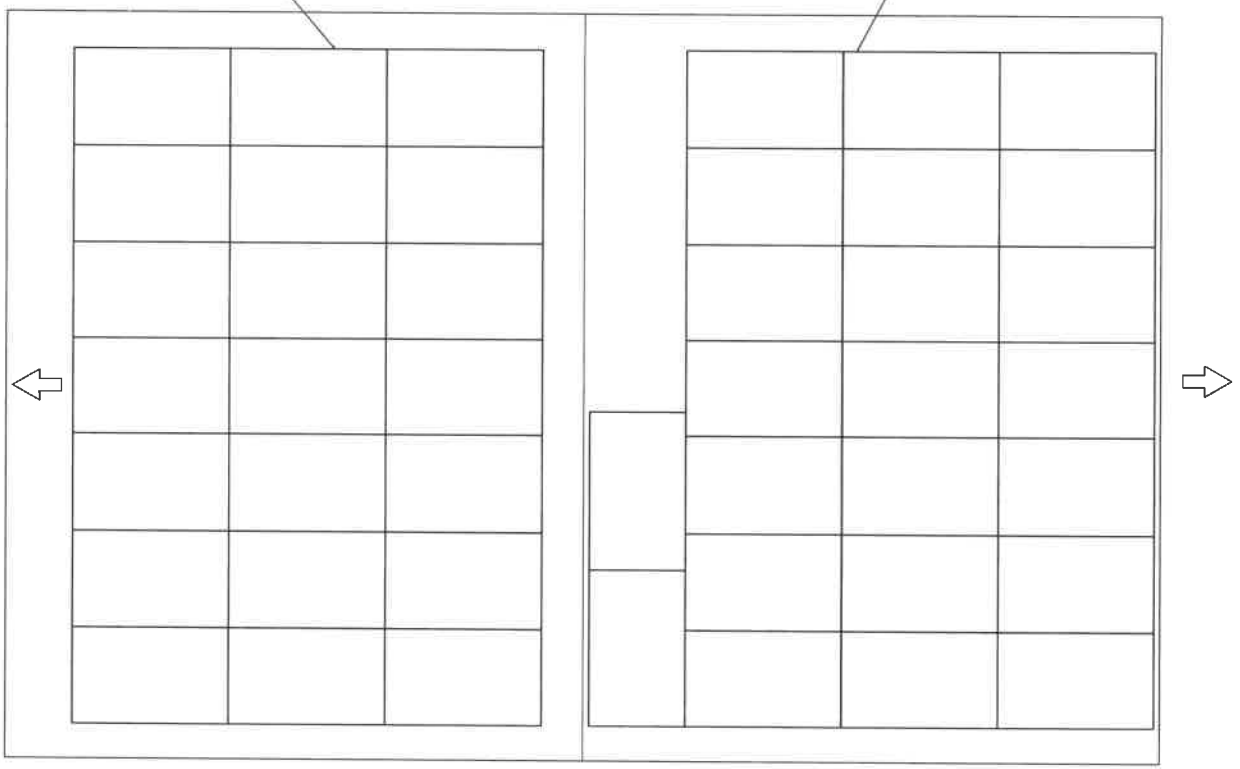
*Lei Wemsman*
*203 Hilldale Ave*
*Washington, IL 61571*

Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 5

**13.20 KW DC (STC)**
44 MISSION SOLAR
ENERGY 300W MSE300SQ5T
MODULES &
44 P320 OPTIMIZERS
1 SE10000H-US
INVERTER

**Solar Array 1**
21 Mission Solar 300W
21 P320 Optimizers
Pitch: 18 Deg
Orientation: 270 Deg

**Solar Array 2**
23 Mission Solar 300W
23 P320 Optimizers
Pitch: 18 Deg
Orientation: 90 Deg



[FOR INSTALLER USE ONLY]

General Notes

# MODULE MAP

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

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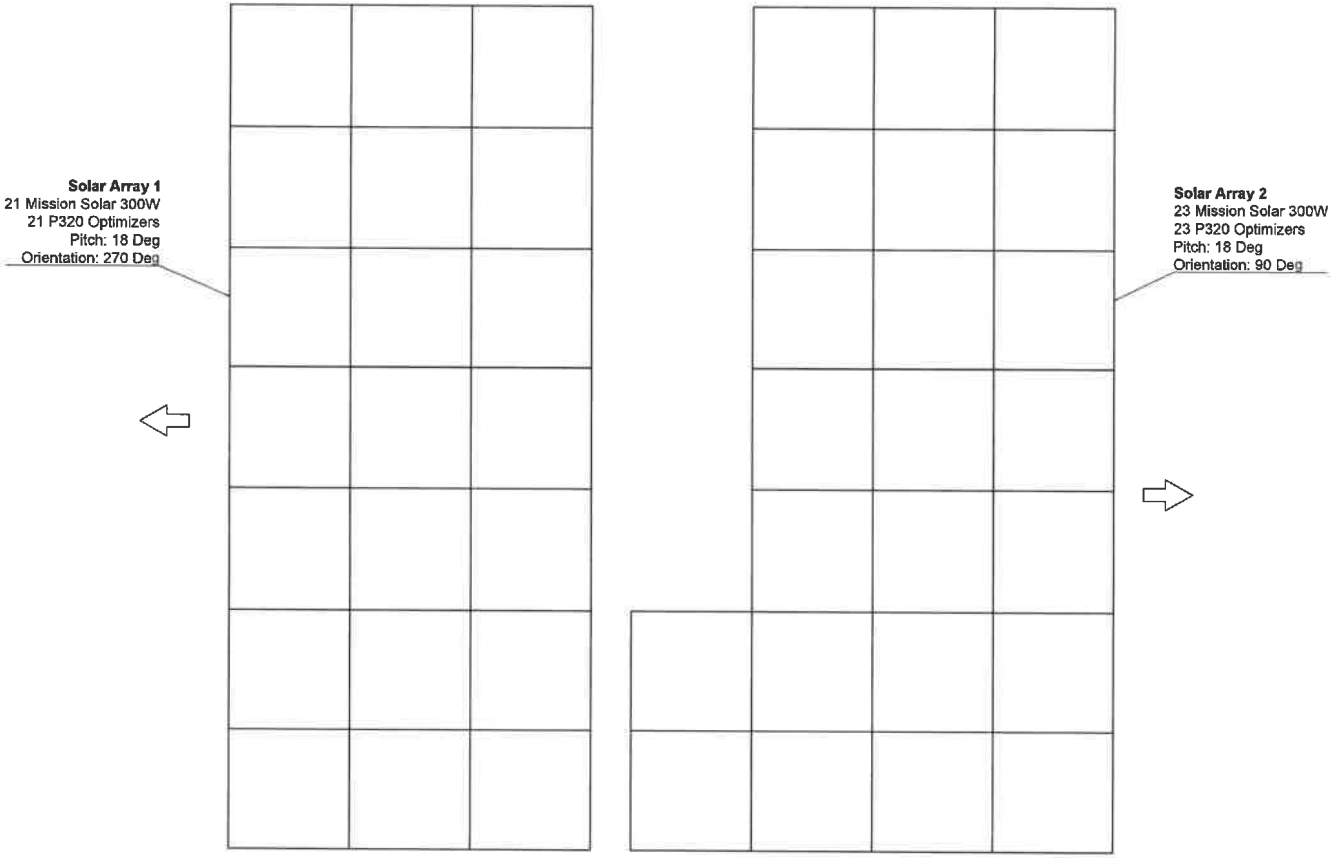
Date JANUARY 25, 2019
Scale AS INDICATED
Project PV SYSTEM
Sheet 6

**13.20 KW DC (STC)**
44 MISSION SOLAR
ENERGY 300W MSE300SQ5T
MODULES &
44 P320 OPTIMIZERS
1 SE10000H-US
INVERTER

INVERTER




[FOR INSTALLER USE ONLY]

General Notes

**INVERTER MAP**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

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Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 7

solaredge

# Single Phase Inverter
with HD-Wave Technology
for North America

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

INVERTERS

**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)

HD wave

www.solaredge.us

solaredge

## Single Phase Inverter
with HD-Wave Technology 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<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 | VA |
| Max. AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 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 @240V | 4650 | 5900 | 7750 | 9300 | 11800 | 15500 | 17650 | W |
| Maximum DC Power @208V | - | 5100 | - | 7750 | - | - | - | 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, UL16998, 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 / 14-6 AWG | | 3/4" minimum /14-4 AWG | | |
| DC Input Conduit Size / # of Strings / AWG Range | | | | 3/4" minimum / 1-2 strings / 14-6 AWG | | 3/4" minimum / 1-3 strings / 14-6 AWG | | |
| Dimensions with Safety Switch (HxWxD) | | | | 17.7 x 14.6 x 6.8 / 450 x 370 x 174 | | 21.3 x 14.6 x 7.3 / 540 x 370 x 185 | | in / mm |
| Weight with Safety Switch | | 22 / 10 | 25.1 / 11.4 | | 26.2 / 11.9 | 38.8 / 17.6 | | lb / kg |
| Noise | | | | < 25 | | <50 | | dBA |
| Cooling | | | | Natural Convection | | Natural convection | | |
| Operating Temperature Range | | | | -13 to +140 / -25 to +60[3] /-40°F / -40°C option[4] | | | | °F / °C |
| Protection Rating | | | | NEMA 3R (Inverter with Safety Switch) | | | | |

[1] For other regional settings please contact SolarEdge support
[2] Revenue grade inverter P/N: SExxxxH-US000NNC2
[3] For power derating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[4] 480 version P/N: SExxxxH-US000NNU4

RoHS



General Notes

**INVERTER DATA SHEET**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

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GreenSolar

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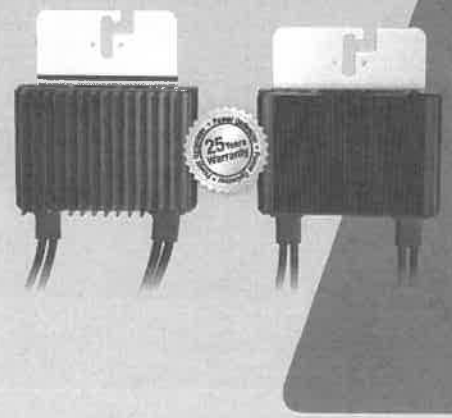
Date: JANUARY 25, 2019
Sheet: 8
Scale: AS INDICATED
Project: PV SYSTEM

solaredge

# Power Optimizer

P320 / P370 / P400 / P405 / P505

POWER OPTIMIZER



## PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Compliant with arc fault protection and rapid shutdown NEC requirements (when installed as part of the SolarEdge system)
- Module-level voltage shutdown for installer and firefighter safety

solaredge

## Power Optimizer

P320 / P370 / P400 / P405 / P505

| OPTIMIZER MODEL (typical module compatibility) | P320 (for high-power 60-cell modules) | P370 (for higher-power 60 and 72-cell modules) | P400 (for 72 & 96-cell modules) | P405 (for thin film modules) | P505 (for higher current modules) | |
|---|---|---|---|---|---|---|
| **INPUT** | | | | | | |
| Rated Input DC Power[1] | 320 | 370 | 400 | 405 | 505 | W |
| Absolute Maximum Input Voltage (Voc at lowest temperature) | 48 | 60 | 80 | 125 | 83 | Vdc |
| MPPT Operating Range | 8 - 48 | 8 - 60 | 8 - 80 | 12.5 - 105 | 12.5 - 83 | Vdc |
| Maximum Short Circuit Current (Isc) | 11 | | 10.1 | | 14 | Adc |
| Maximum DC Input Current | 13.75 | | 12.63 | | 17.5 | Adc |
| Maximum Efficiency | 99.5 | | | | | % |
| Weighted Efficiency | 98.8 | | | | 98.6 | % |
| Overvoltage Category | II | | | | | |
| **OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)** | | | | | | |
| Maximum Output Current | 15 | | | | | Adc |
| Maximum Output Voltage | 60 | | | 85 | | Vdc |
| **OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)** | | | | | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | | | | | Vdc |
| **STANDARD COMPLIANCE** | | | | | | |
| EMC | FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3 | | | | | |
| Safety | IEC62109-1 (class II safety), UL1741 | | | | | |
| RoHS | Yes | | | | | |
| **INSTALLATION SPECIFICATIONS** | | | | | | |
| Maximum Allowed System Voltage | 1000 | | | | | Vdc |
| Compatible Inverters | All SolarEdge Single Phase and Three Phase Inverters | | | | | |
| Dimensions (W x L x H) | 128 x 152 x 28 / 5 x 5.97 x 1.1 | | 128 x 152 x 35 / 5 x 5.97 x 1.42 | 128 x 152 x 50 / 5 x 5.97 x 1.96 | 128 x 152 x 59 / 5 x 5.97 x 2.32 | mm / in |
| Weight (including cables) | 630 / 1.4 | | 750 / 1.7 | 845 / 1.9 | 1064 / 2.3 | gr / lb |
| Input Connector | MC4[2] | | | | | |
| Output Wire Type / Connector | Double Insulated; MC4 | | | | | |
| Output Wire Length | 0.95 / 3.0 | 1.2 / 3.9 | | | | m / ft |
| Operating Temperature Range | -40 - +85 / -40 - +185 | | | | | °C / °F |
| Protection Rating | IP68 / NEMA6P | | | | | |
| Relative Humidity | 0 - 100 | | | | | % |

[1] Rated STC power of the module. Module of up to +5% power tolerance allowed
[2] For other connector types please contact SolarEdge

| PV SYSTEM DESIGN USING A SOLAREDGE INVERTER[3][4] | | SINGLE PHASE HD-WAVE | SINGLE PHASE | THREE PHASE 208V | THREE PHASE 480V | |
|---|---|---|---|---|---|---|
| Minimum String Length (Power Optimizers) | P320, P370, P400 | 8 | | 10 | 18 | |
| | P405 / P505 | 6 | | 8 | 14 | |
| Maximum String Length (Power Optimizers) | | 25 | | 25 | 50[5] | |
| Maximum Power per String | | 5700 (6000 with SE7600-US - SE11400-US) | 5250 | 6000 | 12750 | W |
| Parallel Strings of Different Lengths or Orientations | | Yes | | | | |

[3] For detailed string sizing information refer to: http://www.solaredge.com/files/pdfs/dedfault/files/string_sizing_na.pdf.
[4] It is not allowed to mix P405/P505 with P320/P370/P400/P600/P700/P800 in one string.
[5] A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

CE ETL

General Notes

**OPTIMIZER DATA SHEET**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|
| | | |

CONTRACTOR

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203 Hilldale Ave
Washington, IL 61571

Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 9

# MSE PERC 60

High Power PERC Rooftop Module

MISSION SOLAR ENERGY

- **Class Leading Output:** 300W power
- **Advanced Technology:** PERC and 4 busbars drive >18% module efficiency
- **Superior Aesthetics:** All-black design coupled with outstanding power output
- **Certified Reliability:** 3X IEC, salt mist, ammonia
- **Buy American Act**

**Proudly assembled in the USA**
Mission Solar Energy is headquartered in San Antonio, TX with module facilities onsite. Our hardworking team calls Texas home and is devoted to producing high quality solar products and services. Our supply chain includes local and domestic vendors increasing our impact to the U.S. economy.

**Assembled in the USA**

## CERTIFICATIONS

IEC 61215/ IEC 61730/ IEC 61701
UL 1703: CSA

Independently Audited by SOLARBUYER

PowerGuard

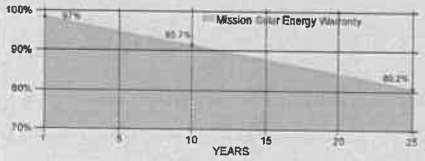
*As there are different certification requirements in different markets, please contact your local Mission Solar Energy sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

**Superior Aesthetics**
MSE PERC 60's slick all-black design coupled with outstanding power output makes it ideal for DG installations including commercial and rooftop systems.

**Outstanding performance with PERC**
Passivated Emitter Rear Contact (PERC) technology provides excellent power output through advanced cell structure.

**Best in class quality**
Mission Solar Energy production lines are fully automated and include multiple quality checks throughout the production process.

## 25-YEAR LINEAR WARRANTY




## ELECTRICAL SPECIFICATIONS

Electrical parameters at Standard Test Condition (STC)

| Module Type | | | MSE290SQ5T | MSE295SQ5T | MSE300SQ5T |
|---|---|---|---|---|---|
| Power Output | Pmax | Wp | 290 | 295 | 300 |
| Module Efficiency | | % | 17.45 | 17.75 | 18.05 |
| Tolerance | | | | 0~+3% | |
| Short-Circuit Current | Isc | A | 9.44 | 9.52 | 9.61 |
| Open Circuit Voltage | Voc | V | 39.81 | 40.11 | 40.18 |
| Rated Current | Imp | A | 8.95 | 9.03 | 9.17 |
| Rated Voltage | Vmp | V | 32.54 | 32.72 | 32.80 |

STC: Irradiance 1000 W/m2, Cell temperature of 25°C, AM 1.5

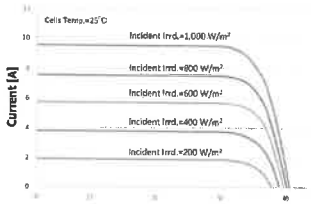
## TEMPERATURE COEFFICIENTS

| | |
|---|---|
| Normal Operating Cell Temperature (NOCT) | 44°C (±2°C) |
| Temperature Coefficient of Pmax | -0.427%/°C |
| Temperature Coefficient of Voc | -0.318%/°C |
| Temperature Coefficient of Isc | 0.042%/°C |

## OPERATING CONDITIONS

| | |
|---|---|
| Maximum System Voltage | 1,000VDC |
| Operating Temperature Range | -40°C (-40°F) to +90°C (194°F) |
| Maximum Series Fuse Rating | 15A |
| Fire Safety Classification | Type 1, Class C |
| Static Load Wind/Snow | 2400Pa/5400Pa |
| Hail Safety Impact Velocity | 25mm at 23 m/s |

## MSE295SQ5T: 295WP, 60CELL SOLAR MODULE CURRENT-VOLTAGE CURVE

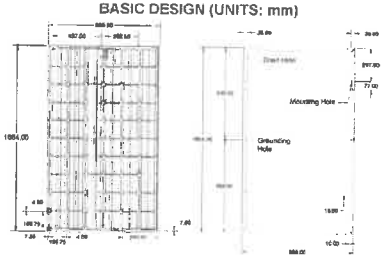



Current-voltage characteristics with dependence on irradiance and module temperature

## MECHANICAL DATA

| | |
|---|---|
| Solar Cells | P-type Mono-crystalline Silicon (156.75mm) |
| Cell orientation | 60 cells (6x10), 4 busbar |
| Module dimension | 1664mm x 999mm x 40mm (65.51 in. x 39.33 in. x 1.57 in.) |
| Weight | 18.2 kg (40.1 lb) |
| Front Glass | 3.2mm (0.126 in.) tempered, Low-iron, Anti-reflective coating |
| Frame | Anodized aluminum alloy |
| Encapsulant | Ethylene vinyl acetate (EVA) |
| J-Box | Protection class IP67 with 3 bypass-diodes |
| Cables | PV wire, 1m (39.37 in.), 4mm² / 12 AWG |
| Connector | MC4 or compatible |

## BASIC DESIGN (UNITS: mm)




Front View Back View

MISSION SOLAR ENERGY

Mission Solar Energy reserves the right to make specification changes without notice.

8303 South New Braunfels Ave. | San Antonio | TX | 78235 | missionsolar.com | info@missionsolar.com | (210) 531-8600

General Notes

**MODULE DATA SHEET**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

**CONTRACTOR**

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Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 10

Mounting systems for solar technology

# Everest Solar Systems
## Mounting Systems Solutions

**NEW**

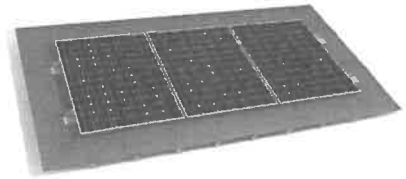
- **New Tilt Kit for CrossRail [Page 3]**
- **Enhanced D Dome System [Page 6]**

TABLE OF CONTENTS





Mounting systems for solar technology



**CrossRail for Pitched Roof :**

- German engineering - optimized for the US
- UL 2703 / ETL approved integrated bonding
- Super fast, simple installation
  - No drilling, no scribing, system
  - Pre-assembled clamps
  - Robust bonding set screws
  - Low part count

CrossRail 48 & CrossRail 80
Material: aluminum
Standard length: 164" or custom

L-Foot w/ T-Bolt and Flange Nut
Material: aluminum
Hardware: stainless steel

Rail Connector Set CrossRail 48 & 80
Material: aluminum splice
Hardware: stainless steel

Module End Clamp Set
Material: aluminum, mil, dark
Hardware: stainless steel

Module Middle Clamp Set
Material: aluminum, mil, dark
Hardware: stainless steel

Burndy WEEB Lug 8.0 + Hardware
Weeb Lug 8.0 Material: tin plated copper
Hardware: stainless steel

Micro Inverter Mounting Kit
Material: stainless steel

End Cap for CrossRail 48 & 80
Material: high strength nylon (PA66)

Omega Wire Management Clip
Material: high density plastic (PP)

Burndy KMC WEEB Clip
Material: stainless steel
Pre-assembled with Mid Clamp

HEYClip SunRunner Cable Clip SS, S6404
Material: stainless steel



General Notes

**RACKING DATA SHEET**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

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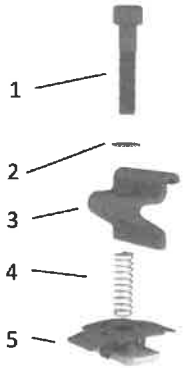
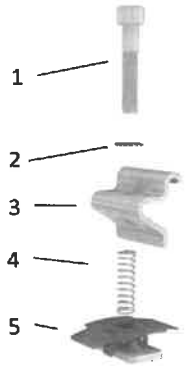
| | |
|---|---|
| Date | JANUARY 25, 2019 |
| Scale | AS INDICATED |
| Project | PV SYSTEM |

Sheet 11

# Everest Solar Systems
## Bonding End Clamp Spec Sheet

- Integrated bonding
- UL 2703 component
- Fast, simple installation
- Rugged design complies with a wide variety of module manufacturer's requirements
- Secured in place with MK2 for single-hand installation
- High strength, corrosion resistant stainless steel construction




**Dark End Clamp Sets**

**US00_4000353 End Clamp UL 2703 Set, Black, 30-40mm**
1. Allen Bolt, Black
2. Lock Washer
3. Universal End Clamp, Black
4. Clamp Spring
5. MK2 Slot Nut

**US00_4000354 End Clamp UL 2703,SS,Black,Set 41-50mm**
1. Allen Bolt, Black
2. Lock Washer
3. Universal End Clamp, Black
4. Clamp Spring
5. MK2 Slot Nut

**Plain End Clamp Sets**

**US00_4000351 End Clamp UL 2703,SS Set 30-40mm**
1. Allen Bolt
2. Lock Washer
3. Universal End Clamp
4. Clamp Spring
5. MK2 Slot Nut

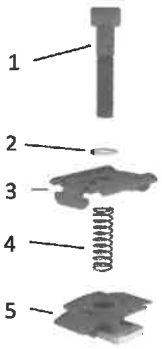
**US00_4000352 End Clamp UL 2703,SS Set 41-50mm**
1. Allen Bolt
2. Lock Washer
3. Universal End Clamp
4. Clamp Spring
5. MK2 Slot Nut

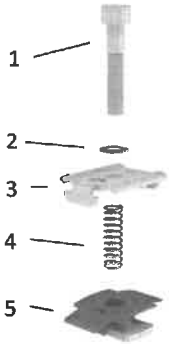
VDE Declaration of Conformity · CSTB (fr) · CSTB Pass'Innovation 2011-128 (fr) · TUV Rheinland - ISO 9001:2008 · VDE Certificate (de)

20150428-02

# Everest Solar Systems
## Bonding Mid Clamp Spec Sheet

- Integrated bonding
- UL 2703 component
- Fast, simple installation
- Rugged design complies with a wide variety of module manufacturer's requirements
- Secured in place with MK2 for single-hand installation
- High strength, corrosion resistant stainless steel construction




**Dark Mid Clamp Sets**

**US00_4000349 Mid Clamp UL 2703 Set, Black, 30-40mm**
1. Allen Bolt, Black
2. Lock Washer
3. Universal Mid Clamp, Black
4. Clamp Spring
5. MK2 Slot Nut

**US00_4000350 Mid Clamp UL 2703,SS,Black,Set 41-50mm**
1. Allen Bolt, Black
2. Lock Washer
3. Universal Mid Clamp, Black
4. Clamp Spring
5. MK2 Slot Nut

**Plain Mid Clamp Sets**

**US00_4000347 Mid Clamp UL 2703,SS Set 30-40mm**
1. Allen Bolt
2. Lock Washer
3. Universal Mid Clamp
4. Clamp Spring
5. MK2 Slot Nut

**US00_4000348 Mid Clamp UL 2703,SS Set 41-50mm**
1. Allen Bolt
2. Lock Washer
3. Universal Mid Clamp
4. Clamp Spring
5. MK2 Slot Nut

VDE Declaration of Conformity · CSTB (fr) · CSTB Pass'Innovation 2011-128 (fr) · TUV Rheinland - ISO 9001:2008 · VDE Certificate (de)

20150428-03

General Notes

**RACKING SPECS**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

Firm Name & Address
Green Solar Tech

GreenSolar

X

Project Name & Address
**Lei Wernsman**
203 Hilldale Ave
Washington, IL 61571

Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 12

# Certificate of Compliance

Certificate Number: 20150311-E467724
Report Reference: E467724-2015-01-08
Issue Date: 2015 March 11



Underwriters Laboratories

*Issued to:* EVEREST SOLAR SYSTEMS

3809 Ocean Ranch Blvd Suite 111
Oceanside, CA 92056

*This is to certify that representative samples of* Mounting Systems for Use with Flat-Plate Photovoltaic Modules and Panels
Everest CrossRail System utilizing CrossRail 48 rail

*Have been investigated by UL LLC in accordance with the Standard(s) indicated on this Certificate.*

*Standard(s) for Safety:* UL 2703, Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels.

*Additional Information:* See UL On-line Certification Directory at WWW.UL.COM for additional information.
The Everest CrossRail System achieved a system fire classification 'A' when tested in combination with UL1703 Listed PV modules with Type 1 and Type 2 module fire performance ratings. The system fire test method was in accordance with the Standard for Safety for Flat-Plate Photovoltaic Modules and Panels, UL 1703, 3rd Edition, dated November 28, 2014.

**Look for the UL Listing Mark on the product**

Only those products bearing the UL Listing Mark should be considered as being covered by UL's Listing and Follow-Up Service.

The UL Listing Mark generally includes the following elements: the symbol UL in a circle: (UL) with the word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category name (product identifier) as indicated in the appropriate UL Directory.

**William R. Carney**
**Director, North American Certification Programs**
UL LLC



General Notes

**RACKING CERTIFICATION**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|
| | | |

CONTRACTOR

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Green Solar Tech

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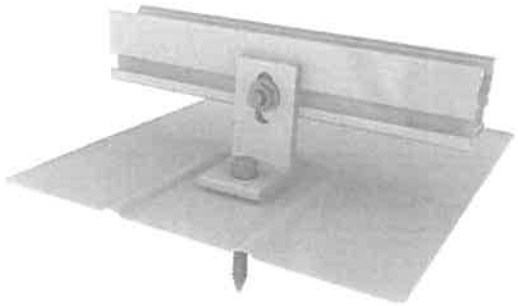
*Lei Wernsman*
*203 Hilldale Ave*
*Washington, IL 61571*

Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 13

Mounting systems for solar technology



EVEREST SOLAR SYSTEMS

## EverFlash

**COMP SHINGLE ROOF ATTACHMENT**

4000367 | EverFlash Comp Kit, 10X12" Mil
4000366 | EverFlash Comp Kit, 10X12" Black

EverFlash Flashing, 10" x 12"
Material: aluminum
Finish: mill, dark

EverFlash L-Foot and Hardware
Material: aluminum
Finish:: mill, dark

5/16" Sealing Washer
Material: stainless steel, EPDM insert

5/16" Lag Bolt
Material: stainless steel

### GENERAL GUIDELINES

- ¬ Always refer to roofing manufacturer's instructions prior to starting work.
- ¬ Refer to the American Wood Council's guidelines for Lag pull-out capacities (NDS 2005, Table 11.2A).
- ¬ Everest Solar recommends consulting a professional roofer prior to beginning work.
- ¬ Installer is responsible for verifying the structural integrity of the roof prior to installation.

### ASSEMBLY: STEP BY STEP

1. Locate the rafters and snap horizontal and vertical lines to mark the installation position for each EverFlash flashing.

   Materials required: Tape measure, string line

2. Drill a pilot hole (1/4" diameter) for the lag bolt. Remove any saw dust and fill the hole with the roofing manufacturer's recommended sealant.

   Materials required: Drill

3. Insert the flashing so the top part is under the next row of shingles and pushed far enough up slope to prevent water infiltration through vertical joint in shingles. The leading edge of flashing must butt against upper row of nails to prevent turning when torqued.

   Materials required: EverFlash flashing

4. Line up pilot hole with EverFlash flashing hole. Insert the lag bolt through the EPDM bonded washer, the L-Foot, the gasketed hole in the flashing and into the rafter.

5. Torque: The range is between 8.3 - 11.6 lb-ft depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners be careful not to over torque the fastener. You may need to stop and use a ratchet to finish the install.

Install Everest Mounting System (refer to CrossRail 48/80 installation manual)

**The EverFlash is simple and fast to install. Please contact us for further assistance:**

**SERVICE-HOTLINE + 1 760.301.5300**

Everest Solar Systems, LLC
3809 Ocean Ranch Blvd., Suite 111
Oceanside, CA 92056
Service-Hotline +1.760.301.5300
info@everest-solarsystems.com
www.everest-solarsystems.com

General Notes

**ATTACHMENT DATA SHEET**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

Green Solar Tech

GreenSolar

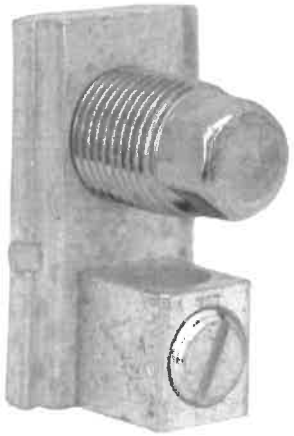
X

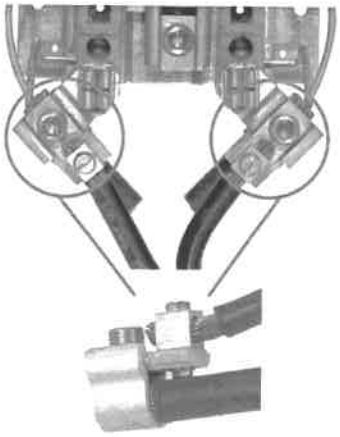
Lei Wernsman
203 Hilldale Ave
Washington, IL 61571

| | |
|---|---|
| Date | JANUARY 25, 2019 |
| Scale | AS INDICATED |
| Project | PV SYSTEM |
| Sheet | 14 |

# Milbank Accessories

*Tap Connectors*





**K4977-EXT**

## Specifications & Features

- #6-350 kcmil connectors with 100 amp #12-1/0 tap.
- Replaces the existing slide-in nut assembly on Milbank 200 amp sockets and allows for up to 100 amp tap connection in addition to the #6-350 kcmil connectors.
- Connectors designed for either line-side or load-side installation.
- Available with both internal and external hex set screws.
- Ideal for line-side connection when incorporating renewable energy net metering that utilizes two meters.
- Also perfect for load-side 100 amp feeds to outdoor lighting, water well pumps, hot tubs, outbuildings, whole house surge suppressors and swimming pools.
- Contact Milbank for additional applications and details.

### Tap Connectors

| Catalog Number | Description | VAC |
|---|---|---|
| **K4977-INT** | Set of 3 tap connectors with internal hex set screw | Under 300 |
| **K4977-EXT** | Set of 3 tap connectors with external hex set screw | Under 300 |
| **K5022** | Set of 3 tap connectors with internal hex set screw | Over 300 |

Utility requirements for this equipment may vary. Always consult the serving utility for their requirements before ordering or installing equipment.

MILBANK
ENERGY AT WORK



General Notes

**LINE SIDE TAP CONNECTOR**

Designer Name: Narek A.

| No. | Revision/Issue | Date |
|---|---|---|

CONTRACTOR

Firm Name & Address
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*Lei Wernsman*
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*Washington, IL 61571*

Date: JANUARY 25, 2019
Scale: AS INDICATED
Project: PV SYSTEM
Sheet: 15