

HISTORIC AND DESIGN REVIEW COMMISSION

June 15, 2016

Agenda Item No: 23

HDRC CASE NO: 2016-213
ADDRESS: 631 MISSION ST
LEGAL DESCRIPTION: NCB 2914 BLK 3 LOT 19
ZONING: RM4 H HS
CITY COUNCIL DIST.: 1
DISTRICT: King William Historic District
LANDMARK: House
APPLICANT: Tyron Johnson/IES Co
OWNER: Mary Escobedo
TYPE OF WORK: Solar installation on the primary structure
REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install a solar panel system onto the roof of the primary historic structure at 631 Mission Street. Within this request, the applicant has proposed the following:

1. Locate sixteen (16) panels in front of the side gable, visible from the public right of way on Mission Street.
2. Locate four (4) panels behind the side gable, hidden from the public right of way on Mission Street.

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 631 Mission in the King William Historic District. The applicant has proposed to mount the solar panel system on the side (southeast) roof slope of the primary historic structure both in front of the side roof gable and behind the side roof gable.
- b. According to the Guidelines for Additions 6.C.i, solar collectors should be located on the 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. Additionally, solar collectors may be located on garages or other accessory structures where access to the primary structure is limited. The applicant has proposed to locate 16 of the solar panels on the street side of the existing side gable where they would be visible from the public right of way. This is not consistent with the Guidelines.
- c. To the rear of the side roof gable, the applicant has proposed to locate 4 solar panels. This location is consistent with the Guidelines for Additions 6.C.i. Staff recommends the applicant propose to locate additional panels behind the roof gable.

RECOMMENDATION:

Staff does not recommend approval of item #1.

Staff recommends approval of item #2. Additionally, staff recommends the applicant study placing additional solar panels behind the side gable or on the rear accessory structure.

CASE MANAGER:

Edward Hall



Flex Viewer

Powered by ArcGIS Server

Printed: Jun 02, 2016

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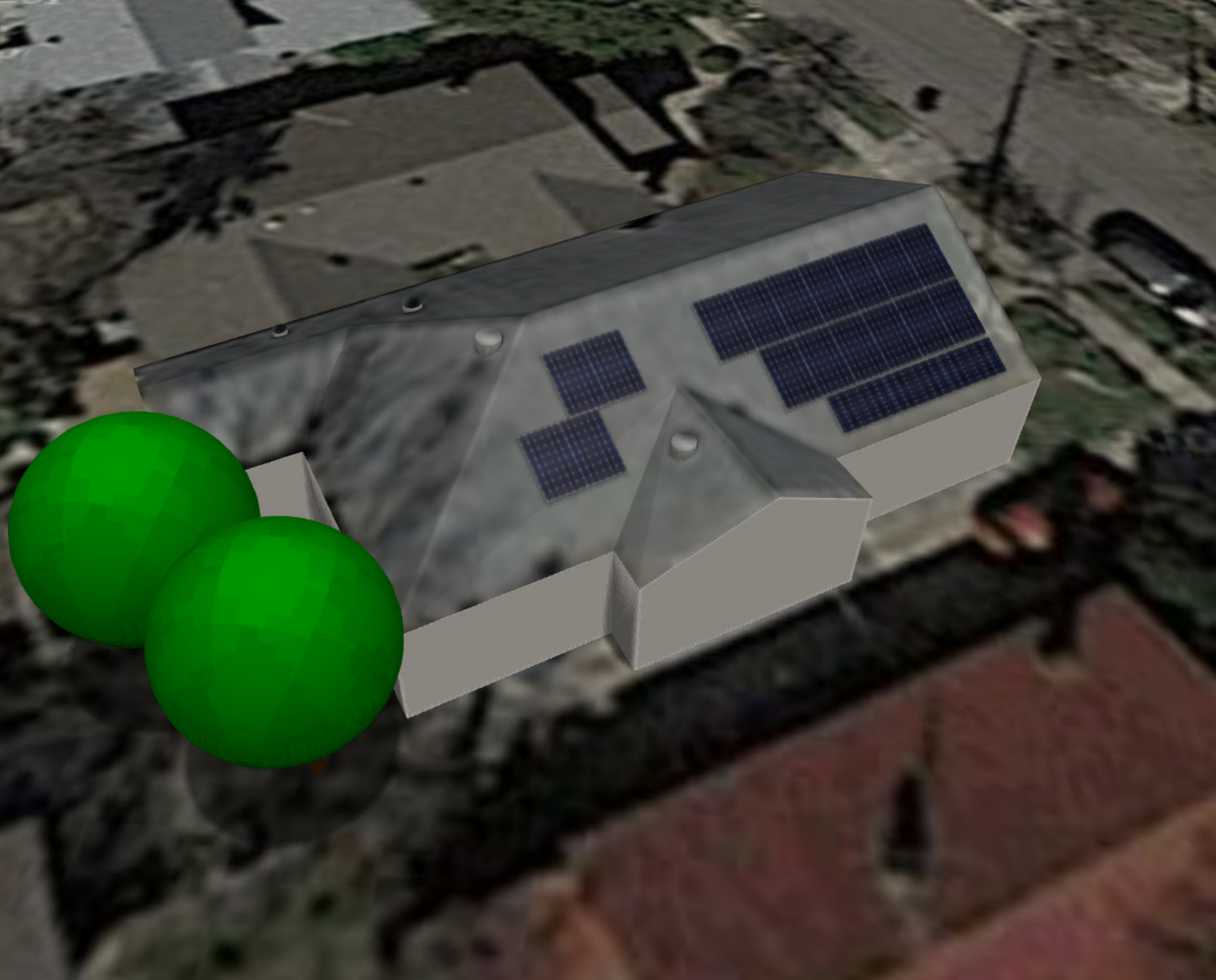
631 Mission St

Mission St

Mission St

Mission St





PHOTOVOLTAIC SIGNAGE

THIS SERVICE IS FED FROM MULTIPLE SOURCES:
GRID AND PV ARRAY

1. Install on main service

WARNING
PANEL CONTAINS D.C. SOLAR POWER SYSTEM
DISCONNECT MAY NOT DE-ENERGIZE
ALL POWER SOURCES

2. Install on DC disconnect

CAUTION:
PHOTOVOLTAIC SYSTEM
CIRCUIT BREAKER IS BACKFED

3. Install on back-fed breaker

CAUTION: PV SYSTEM DISCONNECT

4. Install on AC disconnect

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

5. Install on pull boxes with internal terminals

CAUTION: SOLAR CIRCUIT

6. Place every 10 feet on all interior and exterior DC conduits,
raveways, enclosures, and cable assemblies, at turns,
above and /or below penetrations, all DC combiners,
and junction boxes.

WARNING
TURN OFF PHOTOVOLTAIC AC DISCONNECTS
PRIOR TO WORKING INSIDE PANEL

7. Install on A/C service section and all A/C sub-panels

WARNING:
INVERTER OUTPUT CONNECTION. DO NOT
RELOCATE THIS OVERCURRENT DEVICE.

8. Install at Inverter output connection.

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

9. Install on inverter (ground Fault indicator)

PHOTOVOLTAIC SOLAR SYSTEM: 5,600 DC WATTS
OPERATING CURRENT: 9 Adc
OPERATING VOLTAGE: 350 Vdc
MAXIMUM SYSTEM VOLTAGE: 350 Vdc
SHORT CIRCUIT CURRENT: 15 Adc

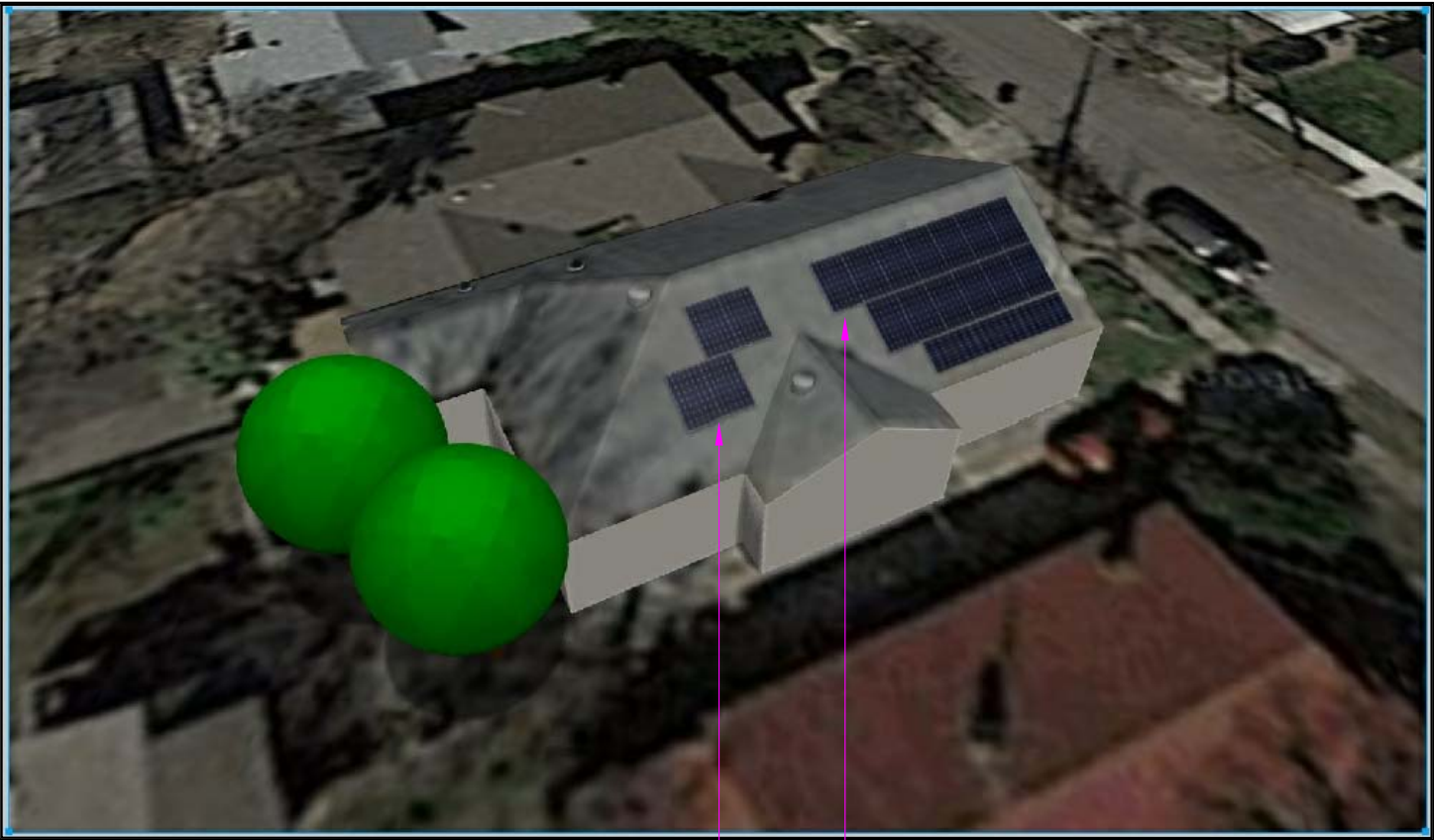
10. Install on Inverter

Typical Caution Signage per NEC Article 690 requirements

Sign and Markings Format:
(1) White lettering on red background
(2) Minimum 3/8 - inch letter height
(3) All letters to be capitalized
(4) Arial or similar font, non-bold
(5) Signage - permanent reflective weather resistant material
suitable for the environment

PV EQUIPMENT

	NEW Junction Box SolaDeck below Array
	NEW (1) SolarEdge 5,000 Watt Inverter with DC Disconnect Sign 2, 5, 9 & 10
	NEW AC Disconnect 60 A /240 V Square D # DU222NRB Or Equivalent. Sign 4
	NEW Performance Meter
	NEW 200 A Main Panel at Utility Electrical Service (200A buss) & (N) Solar Breaker Sign 1, 3, 7 & 8 (E) Revenue Meter



Note to Installer:
Provide & Install SolarEdge Wireless
Communication ZigBee Kit

(20) LG 280W PV Solar Modules
Model # LG280N1C-G3 (64.57" x 39.37")
or equivalent, Flush mount system
(20) SolarEdge 300W Optimizers, Model # P300
or equivalent
2 strings of 10 to Inverter

Layout for Roof
Mounted PV Solar Installation
for the Escodedo Residence

Photovoltaic System	
Roof Mount PV:	(20) LG Electronics PV Solar 280 Watt Modules, Model # LG280N1C-G3 Or Equivalent (20) SolarEdge 300 Watt Power Optimizers, Model # P300 (240V). Or Equivalent
Roofing:	Composition Shingle

IES Residential (Electrical)
1240 Railroad Street
Corona, CA 92882
#912189, C10



Signature
William B. Crist, Jr.

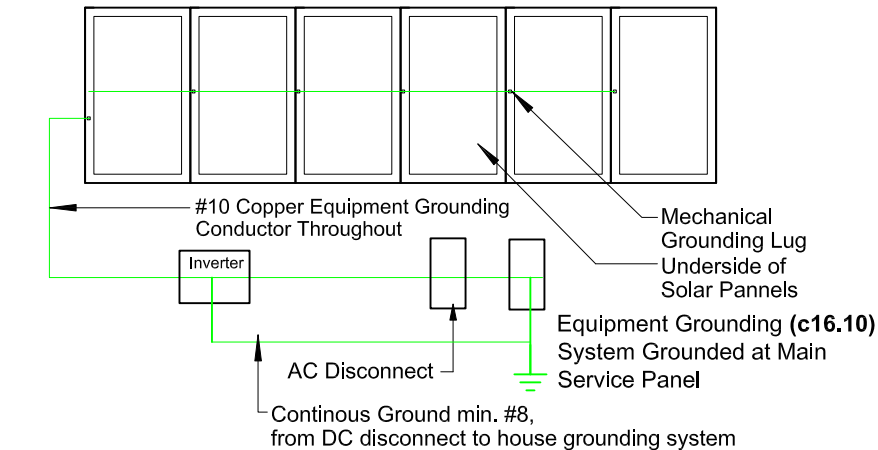
ESCODEDO RESIDENCE
631 Mission Street
San Antonio, TX 78210

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No.	Revision/ Issue	Date

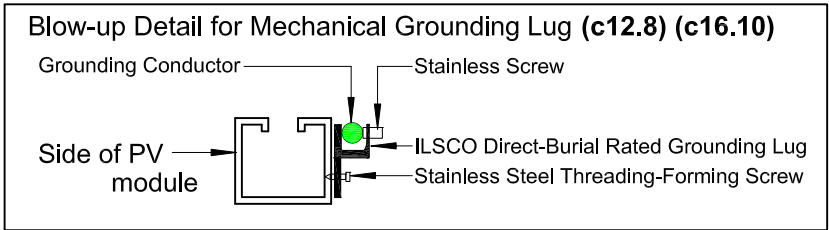
Project
5.60 kWdc Residential
Photovoltaic Array

Date	5/20/2016
Sheet	D1
Scale	None

Grounding Detail for Solar Array (Continuous)



Note:
Grounding Detail Diagrammatic See
Electrical Diagram for Actual # of Modules per String



Ampacity Calculations

1) Junction Box to DC Optimizers

Wire Ampacity 2014 NEC Table 310.15(B)(16) #10 USE-2, 90 degrees C	Thermal Derate Factor 2014 NEC Table 310.15(B)(2)(a) 48 degrees C	Number of Conductors 2014 NEC 310.15 (B)(3)(a) Free Air, not in a Raceway
(40 Amps)	* (0.82)	* (1.00)

(40 Amps) * (0.82) * (1.00) = 33 A > PV I_{design} (14.91 A); therefore OK

2) DC Optimizers to Inverter. Attic Run

Wire Ampacity 2014 NEC Table 310.15(B)(16) #10 THWN-2, 90 degrees C	Thermal Derate Factor 2014 NEC Table 310.15(B)(2)(a) 48 degrees C	Number of Conductors 2014 NEC 310.15 (B)(3)(a) (4-6) Max.
(40 Amps)	* (0.82)	* (0.80)

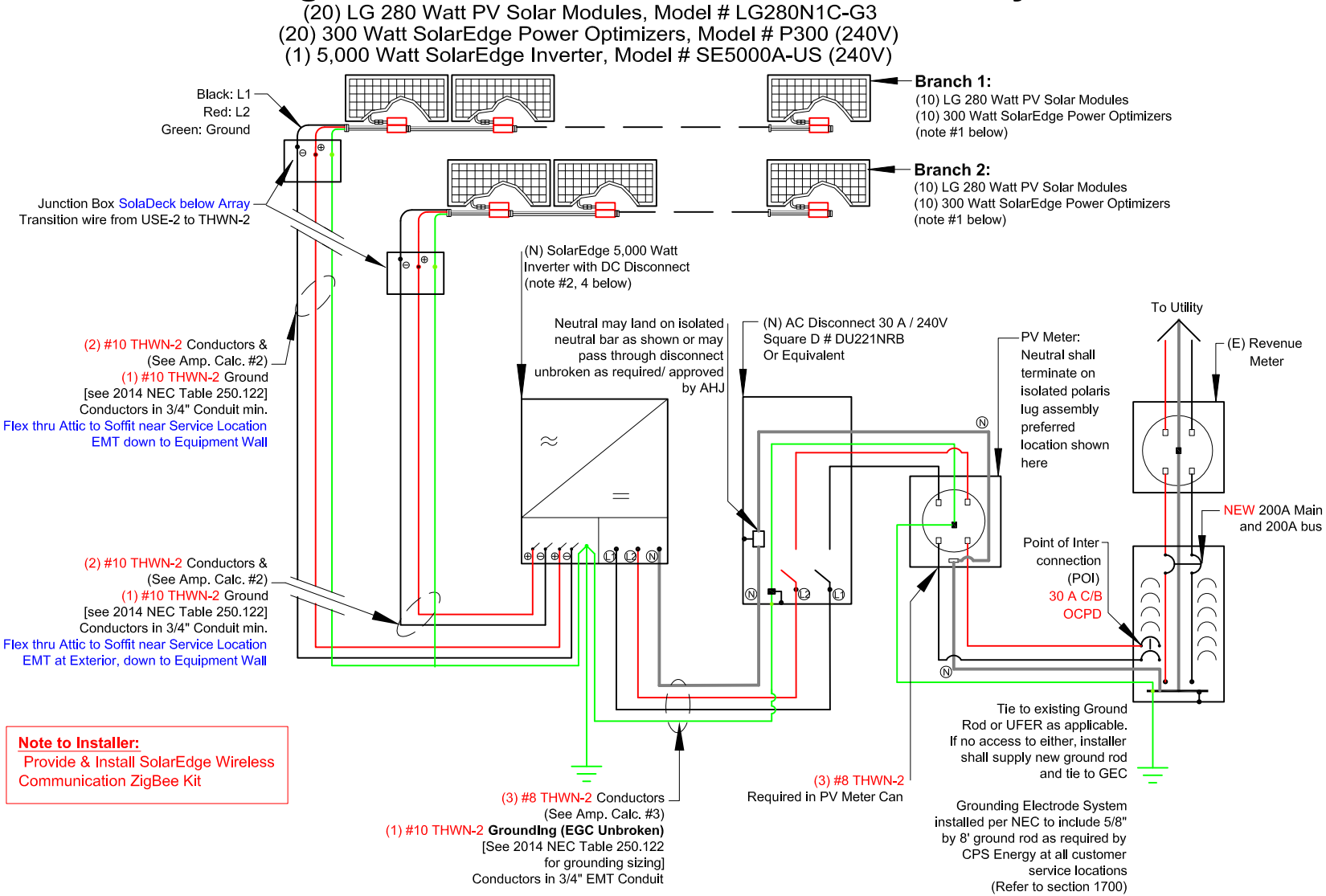
(40 Amps) * (0.82) * (0.80) = 26 A ≥ Inverter design current (I_{design} = 23.4 A);
therefore conductor size OK

3) Inverter to Main Panel

Wire Ampacity 2014 NEC Table 310.15(B)(16) #8 THWN-2, 90 degrees C	Thermal Derate Factor 2014 NEC Table 310.15(B)(2)(a) 48 degrees C	Number of Conductors 2014 NEC 310.15 (B)(3)(a) (1-3) Max.
(55 Amps)	* (0.82)	* (1.00)

(55 Amps) * (0.82) * (1.00) = 45 A ≥ Inverter design current (I_{design} = 26.25 A);
therefore conductor size OK

Electrical Diagram for 5.600 kWdc -- 5.049 kWac PV System:



DC Electrical Calcs.

System DC Wiring
V_{mpp} = (31.5 Vdc mpp)*(1 panel) = 31.5 Vdc
V_{oc} = (38.9 Vdc)*(1 panel) = 38.9Vdc
V_{max} = (38.9Vdc)*(118%) = 45.90 Vdc
Max Input voltage of DC Optimizers: 48 Vdc --> O.K.
Current from PV to DC Optimizers to Junction Box(es)
I_{pm} = (8.97 A)*(1 string) = 8.97 A
I_{sc} = (9.56 A)*(1 string) = 9.56 A
I_{design} = (9.56 A)*(1.56) = 14.91A --> #10 USE-2

Minimum string length (Power optimizers): 8
Maximum string length (Power optimizers): 25
Maximum Power per string: 5250 Watts
Maximum Output of DC Optimizers: 15A* 1.56 = 23.4 A

GENERAL NOTES:

- (20) LG 280 Watt PV Solar Modules, Model # LG280N1C-G3. Modules wired and listed to UL1703 standards.
- (20) 300 Watt SolarEdge Power Optimizers, Model # P300 (240V).
- (1) 5,000 Watt SolarEdge Inverter, Model # SE5000A-US (240V). Attached with system electrical specifications and ground fault protected & listed to UL 1741 standards.
- Photovoltaic system ground will be tied into existing ground at main service from DC Disconnect/ Inverter as per NEC Sec. 250.166 (B).
"The Grounding Electrode Conductor shall not be smaller then the largest conductor supplied by the system and not smaller than #8 AWG."
- Equipment operating 150 Volts or greater shall only be serviced or replaced by qualified personnel. Field protection may be in the form of conduit, closed cabinet or an enclosure which require use to tools to open.
- Solar Photovoltaic System equipment will be installed in accordance with the requirements of Art. 690 of the 2014 NEC.
- Inverter output circuit conductors shall be installed in continuous metal raceways. Conduit bodies or junction boxes that allow to un-metered inverter output circuit conductors are not permitted. Not applicable for micro-inverters.
- The PV DC grounding system shall not be bonded to the AC grounding by using the combined DC grounding electrode conductor and AC equipment grounding conductor. Contractor may use the option shown above or may install a grounding electrode conductor from the inverter directly to the service grounding electrode(s).
- The point of interconnection shall be made after the CPS Revenue Meter in a junction box suitable for the conditions and provided with locking provisions. Such installation must be pre-approved by CPS Energy. (refer to figure 2000.4 for typical meter loop drawing)
- Neutral wire shall remain unbroken.

AC Electrical Calcs.

System AC Wiring Run: SolarEdge 5,000 Watt Inverter
P_{max} = (257.6 Wptc rating)*(20 panels)*(97.5% inverter eff.) = 5,049 Wac
I_{mp} = (5,049 Wac) / (240 Vac) = 21 A
Max Inverter Current = 21 A
I_{design} = (21 A)*(1.25) = 26.25 A --> #8 THWN-2 --> 30 A C/B

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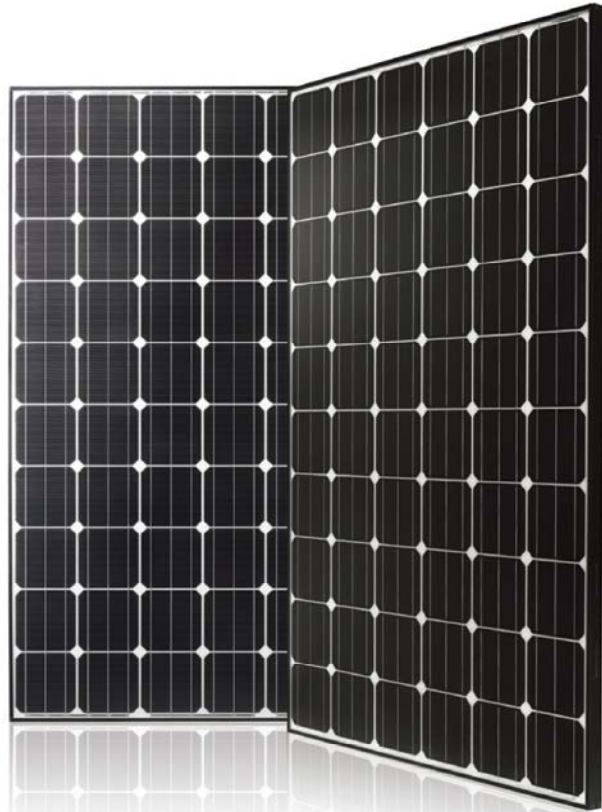
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Project 5.60 kWdc Residential Photovoltaic Array	
Date	5/20/2016
Sheet	E1
Scale	--



MonoX[®] NeON

LG280N1C-G3



LG Electronics, Inc. (Korea Exchange: 06657.KS) is one of the globally leading companies and technology innovator for electronics, information and communication products. The LG Electronics currently employs more than 91,000 people worldwide in 117 companies. In fiscal year 2011, 48.97 billion USD of revenue was achieved.

LG is one of the world's largest manufacturers of mobile phones, flat screen TVs, air conditioners, washing machines and refrigerators. As a future-oriented company, LG enables others to use technology consisting of renewable energies. LG's high quality solar products are being manufactured in LG's leading production facility in South Korea.



KM 564573 BS EN 61215 Photovoltaic Modules



LG's High Efficient Cell Technology

Driven by LG's own N-type technology, LG's high-efficiency modules will provide customers with high economic benefits.



Light and Robust

With a weight of just 16.8 kg, LG modules are proven to demonstrate outstanding durability against external pressure up to 5400 Pa.



Reliable Warranties

LG stands by its products with the strength of a global corporation and sterling warranty policies. LG offers a 10 year product limited warranty and a 25 year limited linear output warranty.



Convenient Installation

LG modules are carefully designed to benefit installers by allowing quick and easy installations throughout the carrying, grounding, and connecting stages of modules.



100% EL Test Completed

All LG modules pass Electroluminescence inspection. This EL inspection detects cracks and other imperfections unseen by the naked eye.



Positive Power Tolerance

LG provides rigorous quality testing to solar modules to assure customers of the stated power outputs of all modules, with a positive nominal tolerance starting at 0%.

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LG280N1C-G3

Mechanical Properties

Cells	6 x 10
Cell vendor	LG
Cell type	Monocrystalline
Cell dimensions	156 x 156 mm / 6 x 6 in
# of busbar	3
Dimensions (L x W x H)	1640 x 1000 x 35 mm 64.57 x 39.37 x 1.38 in
Static snow load	5400 Pa / 113 psf
Static wind load	2400 Pa / 50 psf
Weight	16.8 ± 0.5 kg / 36.96 ± 1.1 lb
Connector type	MC4 connector IP 67
Junction box	IP 67 with 3 bypass diodes
Length of cables	2 x 1000 mm / 2 x 39.37 in
Glass	High transmission tempered glass
Frame	Anodized aluminum

Certifications and Warranty

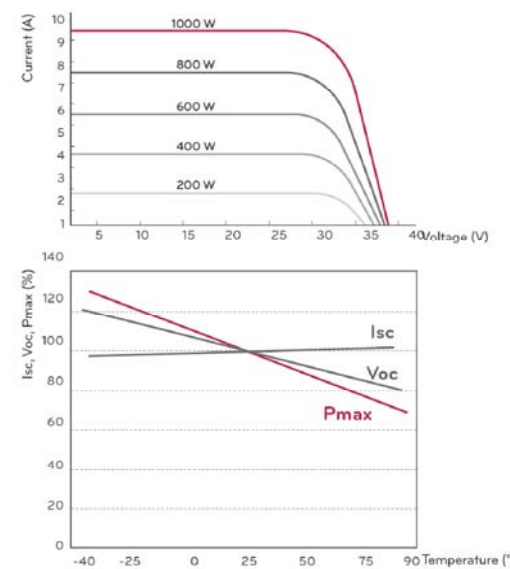
Certifications	IEC 61215, IEC 61730-1/-2, UL 1703, ISO 9001, IEC 61701
Product warranty	10 years
Output warranty of P _{max} (measurement Tolerance ± 3%)	Linear warranty*

* 1) 1st year: 97%, 2) After 2nd year: 0.7% annual degradation, 3) 80.2% for 25 years

Temperature Coefficients

NOCT	45 ± 2 °C
P _{mp}	-0.42 %/°C
V _{oc}	-0.31 %/°C
I _{sc}	0.03 %/°C

Characteristic Curves



Electrical Properties (STC*)

	280 W
MPP voltage (V _{mpp})	31.5
MPP current (I _{mp})	8.97
Open circuit voltage (V _{oc})	38.9
Short circuit current (I _{sc})	9.56
Module efficiency (%)	171
Operating temperature (°C)	-40 ~ +90
Maximum system voltage (V)	600(UL), 1000(IEC)
Maximum series fuse rating (A)	20
Power tolerance (%)	0 ~ +3

* STC (Standard Test Condition): Irradiance 1000 W/m², module temperature 25 °C, AM 1.5

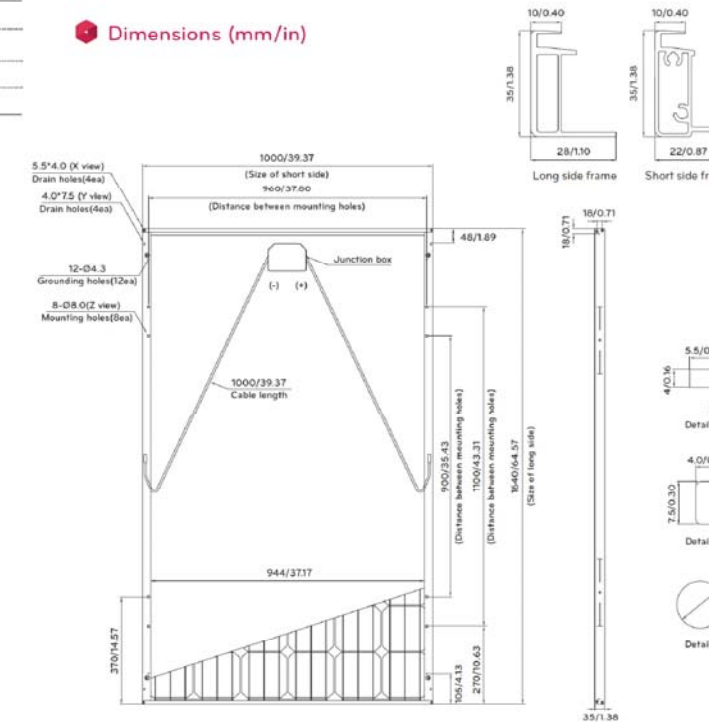
* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.

Electrical Properties (NOCT*)

	280 W
Maximum power (P _{mp})	206
MPP voltage (V _{mpp})	28.8
MPP current (I _{mp})	7.15
Open circuit voltage (V _{oc})	35.9
Short circuit current (I _{sc})	7.70
Efficiency reduction (from 1000 W/m ² to 200 W/m ²)	< 4.5 %

* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s

Dimensions (mm/in)



* The distance between the center of the mounting/grounding holes



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NJ 07632
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www.lgsolarusa.com

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SolarEdge Power Optimizer
Module Add-On For North America

P300 / P350 / P400 / P405



POWER OPTIMIZER

PV power optimization at the module-level

- Upto 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

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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 SOLAREEDGE 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.



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Project
5.60 kWdc Residential
Photovoltaic Array

Date	5/20/2016
Sheet	SP2
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SolarEdge Single Phase Inverters
For North America

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US /
SE7600A-US / SE10000A-US / SE11400A-US



The best choice for SolarEdge enabled systems

- Integrated arc fault protection (Type 1) for NEC 2011 690.11 compliance
- Superior efficiency (98%)
- Small, lightweight and easy to install on provided bracket
- Built-in module-level monitoring
- Internet connection through Ethernet or Wireless
- Outdoor and indoor installation
- Fixed voltage inverter, DC/AC conversion only
- Pre-assembled Safety Switch for faster installation
- Optional – revenue grade data, ANSI C12.1

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INVERTERS



Single Phase Inverters for North America

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US /
SE7600A-US / SE10000A-US / SE11400A-US

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	SE10000A-US	SE11400A-US	
OUTPUT								
Nominal AC Power Output	3000	3800	5000	6000	7600	9980 @ 208V 10000 @ 240V	11400	VA
Max. AC Power Output	3300	4150	5400 @ 208V 5450 @ 240V	6000	8350	10800 @ 208V 10950 @ 240V	12000	VA
AC Output Voltage Min.-Nom.-Max. ⁽¹⁾ 183 - 208 - 229 Vac	-	-	✓	-	-	✓	-	
AC Output Voltage Min.-Nom.-Max. ⁽¹⁾ 211 - 240 - 264 Vac	✓	✓	✓	✓	✓	✓	✓	
AC Frequency Min.-Nom.-Max. ⁽¹⁾	59.3 - 60 - 60.5 (with HI country setting 57 - 60 - 60.5)							Hz
Max. Continuous Output Current	12.5	16	24 @ 208V 21 @ 240V	25	32	48 @ 208V 42 @ 240V	47.5	A
GFDI					1			A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds				Yes				Yes
INPUT								
Recommended Max. DC Power ⁽²⁾ (STC)	3750	4750	6250	7500	9500	12400	14250	W
Transformer-less, Ungrounded					Yes			
Max. Input Voltage					500			
Nom. DC Input Voltage					325 @ 208V / 350 @ 240V			
Max. Input Current ⁽³⁾	9.5	13	16.5 @ 208V 15.5 @ 240V	18	23	33 @ 208V 30.5 @ 240V	34.5	Adc
Max. Input Short Circuit Current					45			
Reverse-Polarity Protection					Yes			
Ground-Fault Isolation Detection					600kΩ Sensitivity			
Maximum Inverter Efficiency	97.7	98.2	98.3	98.3	98	98	98	%
CEC Weighted Efficiency	97.5	98	97.5 @ 208V 98 @ 240V	97.5	97.5	97 @ 208V 97.5 @ 240V	97.5	%
Nighttime Power Consumption	< 2.5				< 4		W	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, RS232, Ethernet, ZigBee (optional)							
Revenue Grade Data, ANSI C12.1	Optional ⁽⁴⁾							
Rapid Shutdown – NEC 2014 690.12	Functionality enabled when SolarEdge rapid shutdown kit is installed ⁽⁵⁾							
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 / 16-6 AWG				3/4" minimum / 8-3 AWG			
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 16-6 AWG				3/4" minimum / 1-2 strings / 14-6 AWG			
Dimensions with Safety Switch (HxWxD)	30.5 x 12.5 x 7 / 775 x 315 x 172		30.5 x 12.5 x 7.5 / 775 x 315 x 191		30.5 x 12.5 x 10.5 / 775 x 315 x 260		in / mm	
Weight with Safety Switch	51.2 / 23.2		54.7 / 24.7		88.4 / 40.1		lb / kg	
Cooling	Natural Convection				Fans (user replaceable)			
Noise	< 25				< 50			
Min.-Max. Operating Temperature Range	-13 to +140 / -25 to +60 (-40 to +60 version available ⁽⁶⁾)							°F / °C
Protection Rating	NEMA 3R							

⁽¹⁾ For other regional settings please contact SolarEdge support.
⁽²⁾ Limited to 125% for locations where the yearly average high temperature is above 77°F/25°C and to 135% for locations where it is below 77°F/25°C.
For detailed information, refer to http://www.solaredge.us/files/pdfs/inverter_dc_oversizing_guide.pdf.
⁽³⁾ A higher current source may be used; the inverter will limit its input current to the values stated.
⁽⁴⁾ Revenue grade inverter P/N: SExxxxA-US000NNR2
⁽⁵⁾ Rapid shutdown kit P/N: SE1000-RSD-51
⁽⁶⁾ -40 version P/N: SExxxxA-US000NNU4



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Drawn By: TD		
Checked By: JCARR		
No.	Revision/ Issue	Date

Project	
5.60 kWdc Residential Photovoltaic Array	
Date	5/20/2016
Sheet	SP3
Scale	None



Serrated base grips the roof deck to prevent the base from moving while installing the lag bolt

FastJack®

Patent #6,360,491

Flashable Roof Stanchion

The patented design of the FastJack® can be easily expressed as the most innovative, efficient and cost-effective tool of it's kind!

Between the precision CNC machined base and stanchion along with strict engineering and material standards, the FastJack® has been laboratory tested to provide 2,359 pounds of strength using only a single lag bolt (included)!

Four Sizes Available!

3" High	Part# FJ-300-18
For low profile installations using Oatey® flashings (for composition shingle roof-tops)	
4-1/2" High	Part# FJ-450-18
For installations using standard flashings (for composition & flat rooftops)	
6" High	Part# FJ-600-18
For standard flashings (for flat tile rooftops)	
7-1/2" High	Part# FJ-750-18
For standard flashings (sized for S-curve tile roofs and/or double flashed installations)	

The FastJack® design is covered under Pat. #6,360,491
Using 1ea. 5/16" x 3-1/2" Lag Bolt

Laboratory Tested
2,359 lbs
Vertical Pullout!
808 lbs
Side Axial Pullout!

FastJack® FJ-300-18
For Oatey® style flashings



FastJack® FJ-450-18
For standard height flashings



Commercial FastJack® also available (rated at 4,250 lbs.)

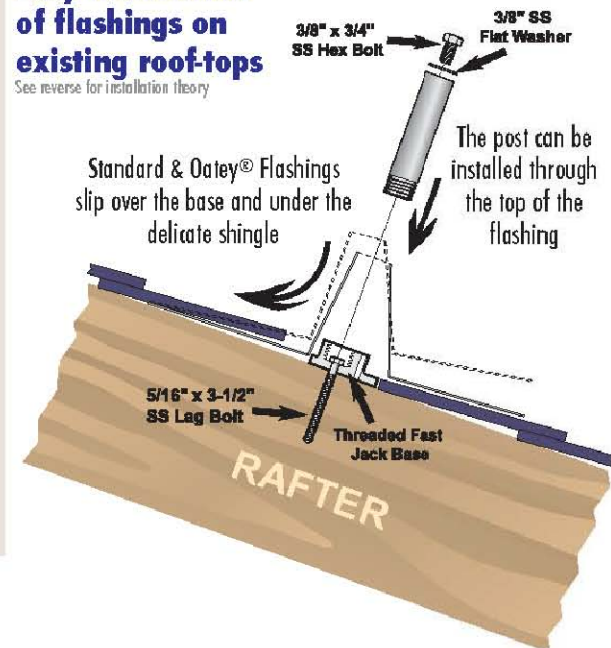
Benefits of the FastJack®

- Removable post makes installation on existing roofs/retrofit quick and easy (refer to the illustration to the right)
- Patented design locates the lag bolt directly under the stanchion providing superior strength values
- Fast & easy to install - saves time and labor costs
- Precision machined from extruded aluminum, there are no welds to corrode or break
- Significantly lighter than steel for installer convenience and reduced shipping costs.
- Integrated drill guide insures perfect pilot holes every time - minimizes the possibility of splitting roof rafters
- Base design allows virtually any roof flashing to install flat on the roof deck

Email us for more information
prosolar@prosolar.com

Easy installation of flashings on existing roof-tops

See reverse for installation theory



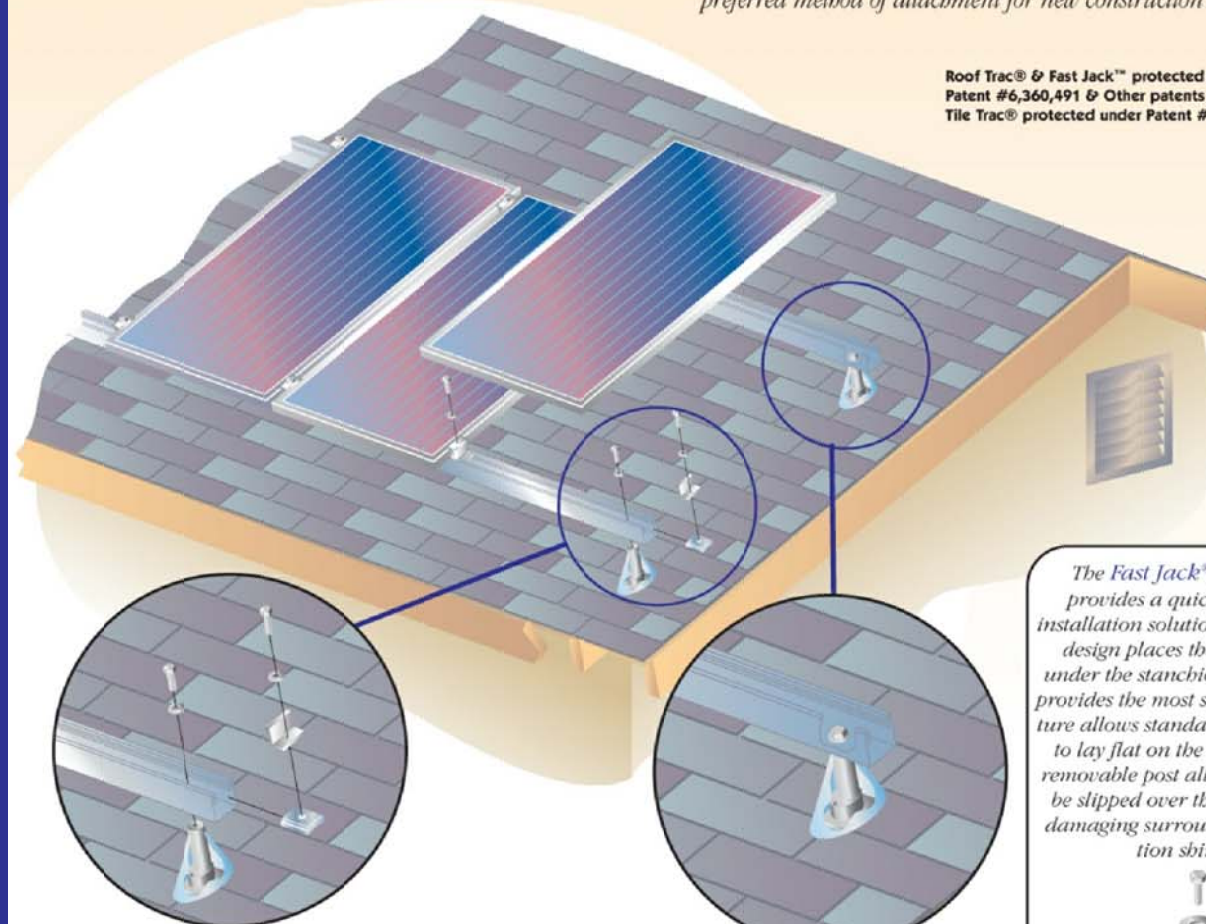
Roof Trac™

Patent #6,360,491

The Original "Top-Down" PV Mounting System.

Integrated with Fast Jack® attachments

The patented Roof Trac™ system installed with the Fast Jack® attachment method provides an ideal solution for installations where a flashing is desired. The Fast Jack® is also the solar industries preferred method of attachment for new construction roofs.

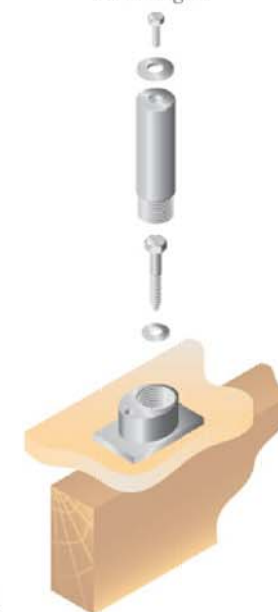


Roof Trac® & Fast Jack™ protected under Patent #6,360,491 & Other patents pending.
Tile Trac® protected under Patent #5,646,029.

Illustrated above is how the Fast Jack® attachment seamlessly integrates with the Roof Trac™ mounting system.

All attachment hardware is concealed within the support rail leaving an aesthetically pleasing solar array.

The Fast Jack® attachment provides a quick and strong installation solution. Our patented design places the bolt directly under the stanchion post where it provides the most support. This feature allows standard roof flashings to lay flat on the roof deck. The removable post allows flashings to be slipped over the base without damaging surrounding composition shingles.



Splice Kit

The splice kit provides a solution to rigidly lock multiple rail sets together. The splice kit has a feature that allows for thermal expansion/contraction of the rails without damaging the roof-top!

professional SOLAR products
(800) 84-SOLAR
(805) 383-0802-fax
4630 Calle Quetzal
Camarillo, CA 93012

For more information you can visit us on the web at
www.RoofTrac.com

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SolarEdge Wireless Communication
ZigBee Kit North America

SE1000-ZBGW-K-NA / SE1000-ZB03-SLV-NA / SE1000-ZBRPT-NA

COMMUNICATION



Simple Wireless Connectivity

- Connects SolarEdge inverters wirelessly to an Internet router
- ZigBee unit installed within the inverter enclosure for outdoor resilience
- Antenna external to inverter for wider range
- Communication to Internet via Ethernet
- The home gateway supports up to 15 SolarEdge devices (e.g. inverters) on the wireless network



USA - GERMANY - ITALY - FRANCE - JAPAN - CHINA - ISRAEL - AUSTRALIA

www.solaredge.us



SolarEdge Wireless Communication ZigBee Kit North America
SE1000-ZBGW-K-NA / SE1000-ZB03-SLV-NA / SE1000-ZBRPT-NA

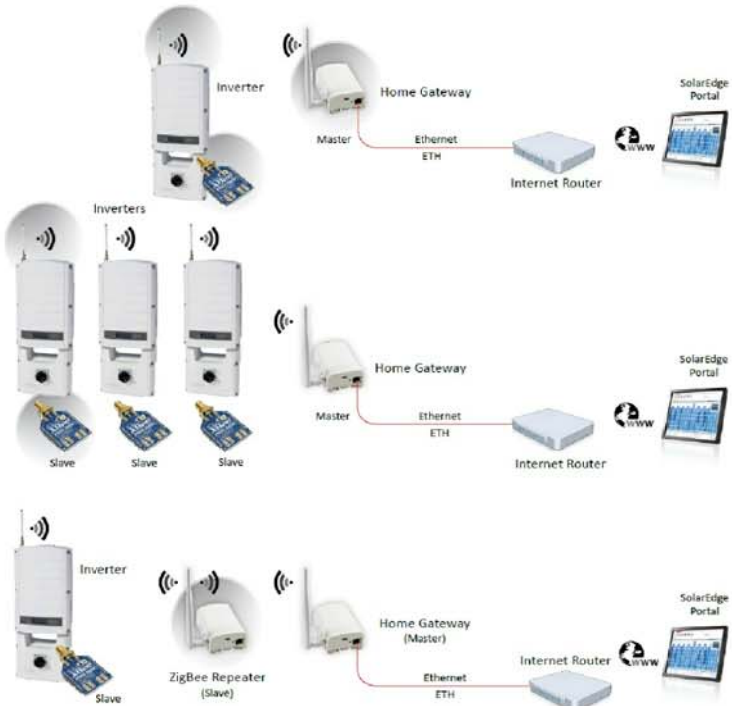
FUNCTIONAL		UNIT
Number of devices that can be monitored	1-15	
RF PERFORMANCE		
Transmit power	18	dBm
Receiver Sensitivity	-102	dBm
Antenna gain	4	dBi
Outdoor (LOS) range	400 / 1300	m / ft
Indoor range ¹	50 / 160	m / ft
HOME GATEWAY / REPEATER		
Antenna	Included	
Power supply	Included, 100-240VAC	
Operating temperature	-20 to +60 / -4 to +140	°C / °F
Relative humidity (non condensing)	0 - 80	%
Ingress protection	IP20 (Indoor)	
ZIGBEE SLAVE KIT		
Antenna, mounting bracket and RF cable	Included	
Dimensions (H x W x D)	22.0 x 32.9 x 4.1 / 0.9 x 1.3 x 0.2	mm / in
Ingress protection	IP65 (IP20 / indoor rated when installed inside Control and Communication Gateway or Firefighter Gateway)	
CERTIFICATION		
Safety	IEC60950, UL60950	
EMC Approvals	FCC(USA), IC(Canada)	

¹ Approximate values, may differ depending on specific installation conditions

Scenario A: Basic Kit
Part Number: SE1000-ZBGW-K-NA
- 1 x SolarEdge home gateway
- 1 x ZigBee slave kit
for single SolarEdge device

Scenario B: Adding additional slave units
Part Number: SE1000-ZB03-SLV-NA
- 1x ZigBee slave kit
for connecting multiple devices to the same home gateway

Scenario C: Extending range using a repeater
Part Number: SE1000-ZBRPT-NA
- 1 x SolarEdge ZigBee Repeater
for extending the ZigBee range



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