

HISTORIC AND DESIGN REVIEW COMMISSION

October 19, 2016

Agenda Item No: 16

HDRC CASE NO: 2016-403
ADDRESS: 631 MISSION ST
LEGAL DESCRIPTION: NCB 2914 BLK 3 LOT 19
ZONING: RM-4 H
CITY COUNCIL DIST.: 1
DISTRICT: King William Historic District
APPLICANT: Tyron Johnson/IES Texas Solar
OWNER: Mary Escobar
TYPE OF WORK: Installation of solar panels

REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install a solar panel system on the roof of the historic structure at 631 Mission. The proposed system is to include fourteen panels.

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 request to install solar panels on the roof of the historic structure at 631 Mission was originally heard by the HDRC on June 15, 2016. At that time, the applicant had proposed to locate solar panels in front of the existing side gable where they would be visible from the public right of way. Staff's recommendation was for the applicant to relocate the panels to the rear of the structure, behind the side gable. The applicant withdrew the request at the hearing in order to revise the request. The applicant has made progress toward a less visible solution.
- b. At this time, the applicant has proposed to install fourteen solar panels on three separate roof slopes to the rear of the side gable. Two panels will be at the extreme rear of the structure located on an addition, six panels will be located on the west facing rear roof slope and six panels will be located on the south facing roof slope of the front gable to the rear of the existing side gable.
- c. 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. Staff finds that the majority of the proposed panels will not be seen from the public right of way and their placement is consistent with the Guidelines for Additions. Additionally, staff finds that the upper two panels to the immediate rear of the side gable will be seen from the public right of way and recommends that the applicant reposition both panels to minimize any visibility.

RECOMMENDATION:

Staff recommends approval based on findings a through c with the stipulation that the applicant present additional information regarding a revised placement of the two panels that will be visible from Mission Street to staff prior to permitting.

CASE MANAGER:

Edward Hall



Flex Viewer

Powered by ArcGIS Server

Printed: Jun 02, 2016

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CITY OF SAN ANTONIO
OFFICE OF HEARING
PLANNING & DESIGN
REVIEW COMMISSION
ADDRESS: [REDACTED]
REQUEST: [REDACTED]
HEARING DATE: [REDACTED]
TIME: 5:00 PM
FOR MORE INFORMATION CONTACT
CITY PLANNING
ALL HEARING MEETING TAKE PLACE AT 1010 S. ALAMO

WILSON
COP
RELOCATION



631 Mission St

Mission St

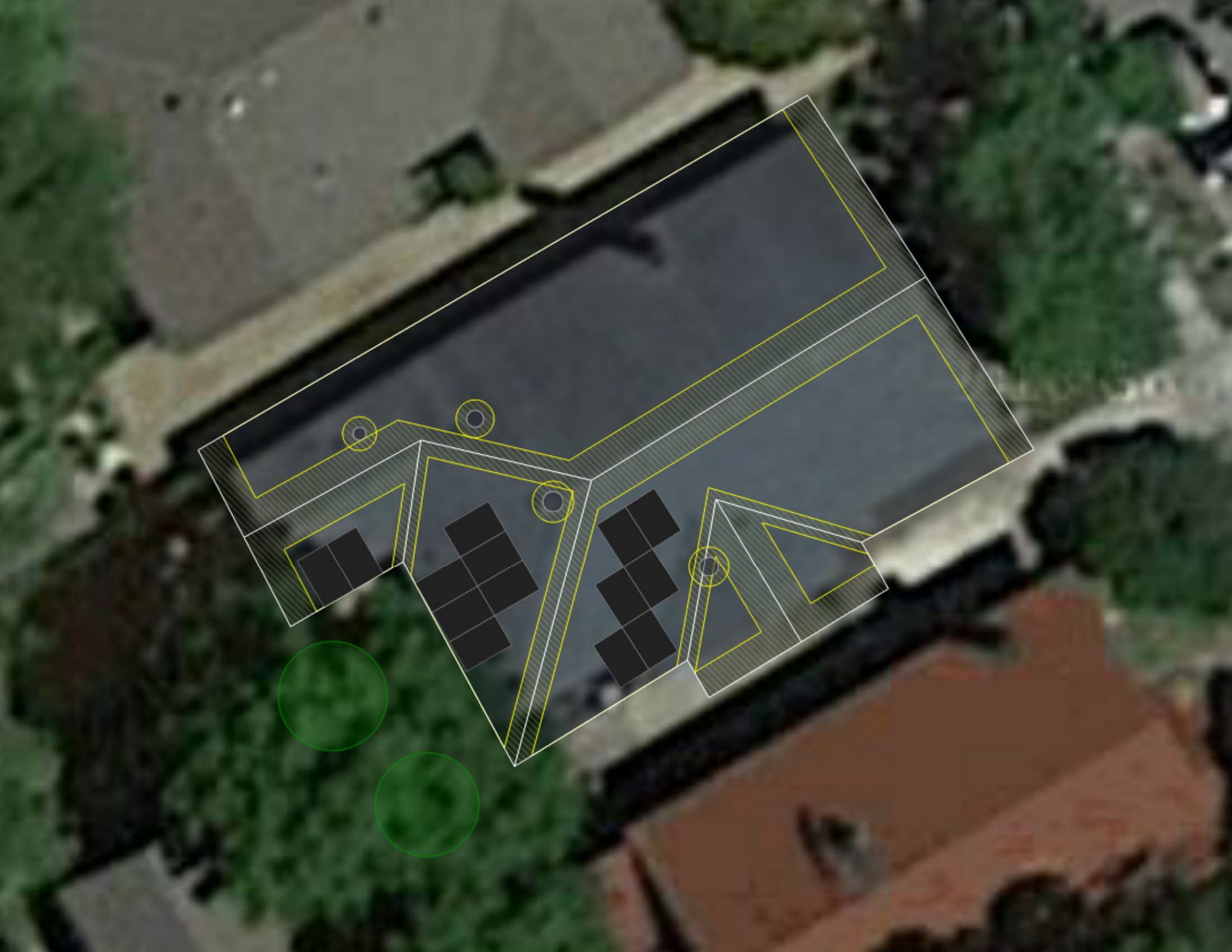
Mission St

Mission St

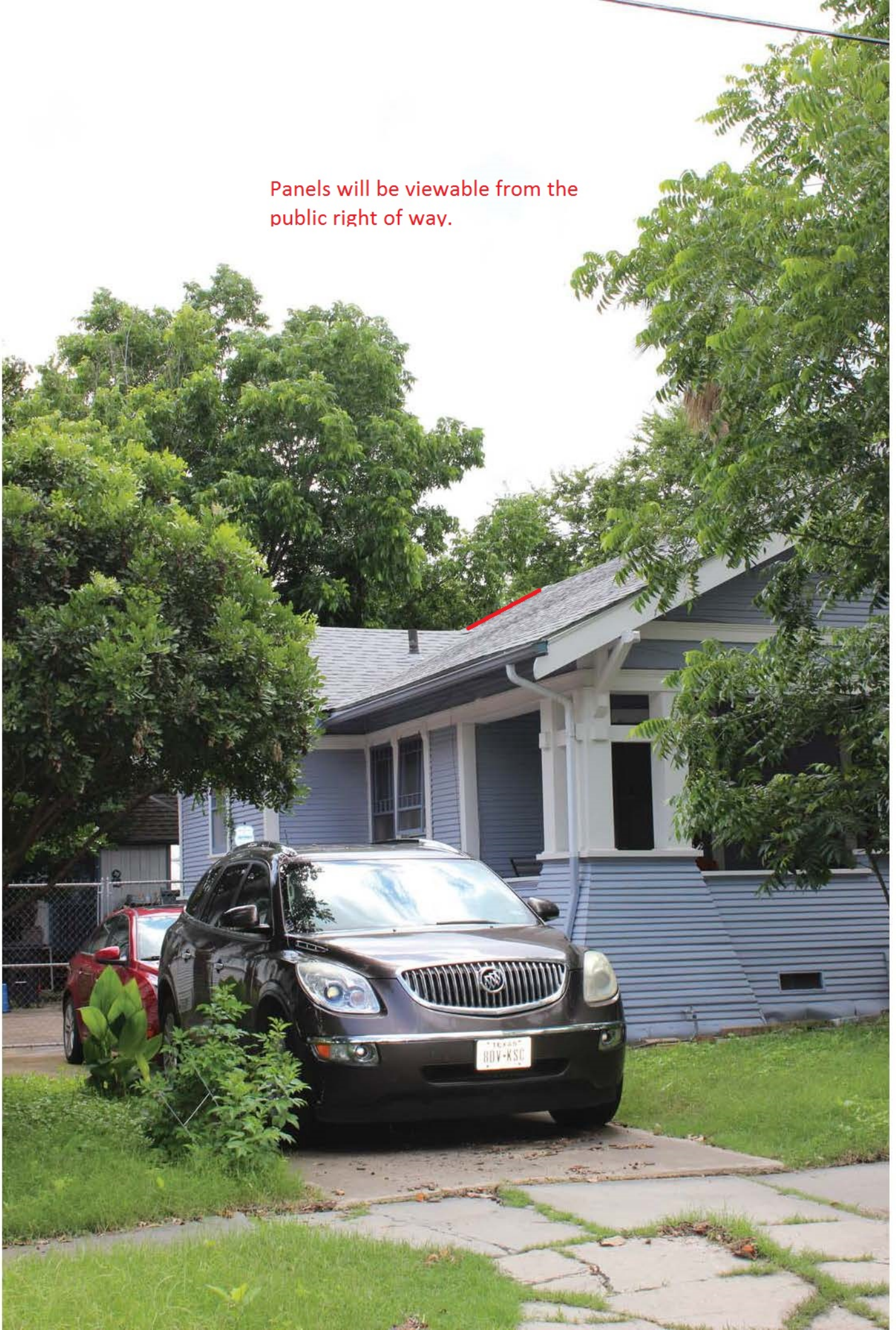








Panels will be viewable from the
public right of way.





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,
rawayes, 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
UNGROUNDDED AND ENERGIZED






9. Install on inverter (ground Fault indicator)

PHOTOVOLTAIC SOLAR SYSTEM: 4,410 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 3,800 Watt Inverter with DC Disconnect Sign 2, 5, 9 & 10
	NEW AC Disconnect 30 A / 240 V Square D # DU221RB Or Equivalent. Sign 4
	NEW Performance Meter
	NEW 200 A Main Panel at Utility Electrical Service (200A bus) & (N) Solar Breaker Sign 1, 3, 7 & 8 (E) Revenue Meter




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


(14) LG 315W PV Solar Modules
Model # LG315N1C-G4 (64.57" x 39.37")
or equivalent, Flush mount system
(14) SolarEdge 320W Optimizers, Model # P320
or equivalent
1 string of 14 to Inverter

Layout for Roof
Mounted PV Solar Installation
for the Escobedo Residence

Photovoltaic System
Roof Mount PV: (14) LG Electronics PV Solar 315 Watt Modules, Model # LG315N1C-G4
Or Equivalent
(14) SolarEdge 320 Watt Power Optimizers, Model # P320 (240V). Or Equivalent
Roofing: Composition Shingle

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

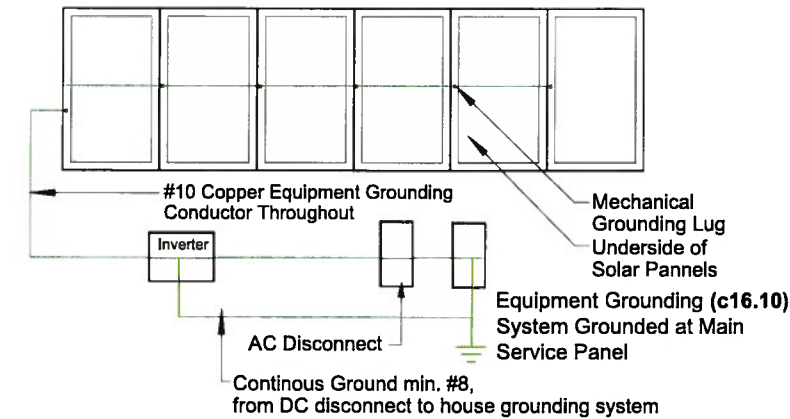



Signature
William B. Crist, Jr.

ESCOBEDO RESIDENCE
631 Mission Street
San Antonio, TX 78210

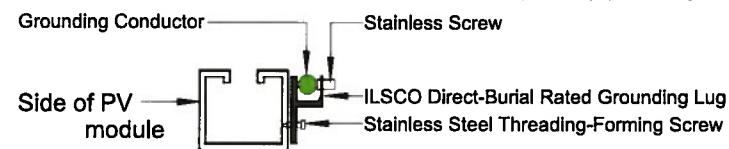
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Checked By:	JCARR	
No.	Revision/ Issue	Date
Project		
4.41 kWdc Residential Photovoltaic Array		
Date	6/21/2016	
Sheet	D1	
Scale	None	

Grounding Detail for Solar Array (Continuous)



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

Blow-up Detail for Mechanical Grounding Lug (c12.8) (c16.10)



Ampacity Calculations

1) PV / DC Optimizers to Junction Box

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)

$(40 \text{ Amps}) * (0.82) * (1.00) = 33 \text{ A} > \text{PV } I_{\text{design}} (15.63 \text{ A}); \text{ therefore OK}$

2) Junction Box to Inverter

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) 2014 NEC 310.15 (B)(3)(c) 60 degrees C + 22 degrees C	Number of Conductors 2014 NEC 310.15 (B)(3)(a) (4-6) Max.
(55 Amps)	* (0.58)	* (0.80)

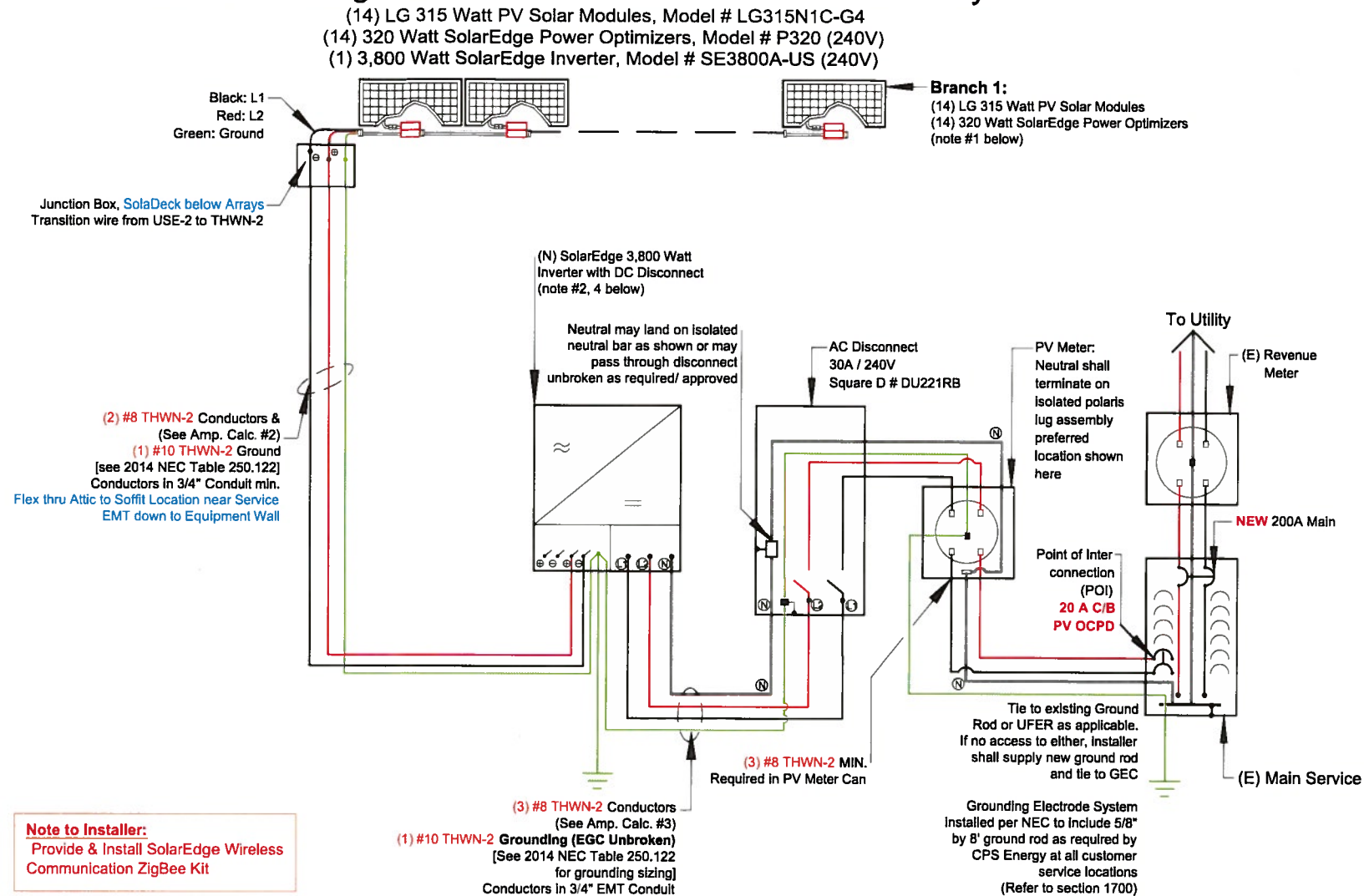
$(55 \text{ Amps}) * (0.58) * (0.80) = 26 \text{ A} \geq \text{Inverter design current } (I_{\text{design}} = 23.4 \text{ A});$
therefore conductor size OK

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)

$(55 \text{ Amps}) * (0.82) * (1.00) = 45 \text{ A} \geq \text{Inverter design current } (I_{\text{design}} = 20 \text{ A});$
therefore conductor size OK

Electrical Diagram for 4.410 kWdc -- 3.943 kWac PV System:



DC Electrical Calcs.

System DC Wiring
 $V_{\text{mpp}} = (33.2 \text{ Vdc mpp}) * (1 \text{ panel}) = 33.2 \text{ Vdc}$
 $V_{\text{oc}} = (40.6 \text{ Voc}) * (1 \text{ panel}) = 40.6 \text{ Vdc}$
 $V_{\text{max}} = (40.6 \text{ Vdc}) * (118\%) = 47.91 \text{ Vdc}$
Max Input voltage of DC Optimizers: 48 Vdc → O.K.

$I_{\text{pm}} = (9.50 \text{ A}) * (1 \text{ string}) = 9.50 \text{ A}$
 $I_{\text{sc}} = (10.02 \text{ A}) * (1 \text{ string}) = 10.02 \text{ A}$
 $I_{\text{design}} = (10.02 \text{ Vdc}) * (1.56) = 15.63 \text{ A} \rightarrow \#10 \text{ USE-2}$

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

GENERAL NOTES:

- (14) LG 315 Watt PV Solar Modules, Model # LG315N1C-G4. Modules wired and listed to UL1703 standards.
- (14) 320 Watt SolarEdge Power Optimizers, Model # P320 (240V).
- 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 than 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.

Current from PV to DC Optimizers to Junction Box(es)
 $I_{\text{pm}} = (9.50 \text{ A}) * (1 \text{ string}) = 9.50 \text{ A}$
 $I_{\text{sc}} = (10.02 \text{ A}) * (1 \text{ string}) = 10.02 \text{ A}$
 $I_{\text{design}} = (10.02 \text{ A}) * (1.56) = 15.63 \text{ A}$

Current from Junction Box to Inverter(s)
Max Output Current = 15A
 $I_{\text{design}} = (15 \text{ A}) * (1.56) = 23.4 \text{ A}$

Nominal DC Input Voltage: 350V @ 240V

AC Electrical Calcs.

System AC Wiring Run:
 $P_{\text{max}} = (287.4 \text{ Wptc rating}) * (14 \text{ panels}) * (98\% \text{ inverter eff.}) = 3,943 \text{ Wac}$
 $I_{\text{mp}} = (3,943 \text{ Wac}) / (240 \text{ Vac}) = 16.43 \text{ A}$
Max Inverter Current = 16 A
 $I_{\text{design}} = (16 \text{ A}) * (1.25) = 20 \text{ A} \rightarrow 20 \text{ A C/B}$

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Signature
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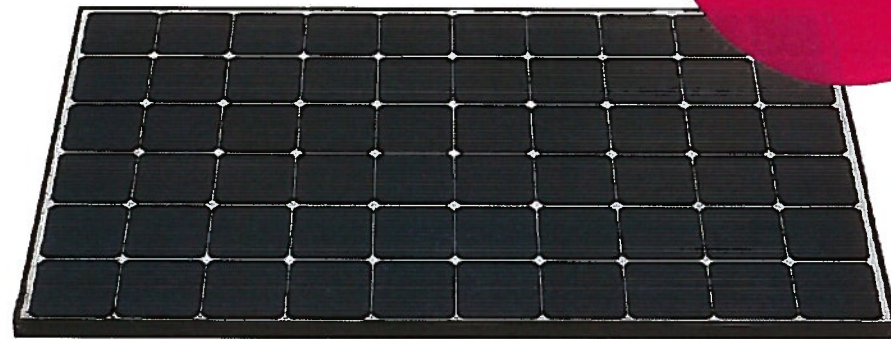
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4.41 kWdc Residential
Photovoltaic Array

Date	6/21/2016
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Scale	--



Innovation for
a Better Life



LG NeON™ 2 LG315N1C-G4

60 cell

LG's new module, LG NeON™ 2, adopts Cello technology. Cello technology replaces 3 busbars with 12 thin wires to enhance power output and reliability. LG NeON™ 2 demonstrates LG's efforts to increase customer's values beyond efficiency. It features enhanced warranty, durability, performance under real environment, and aesthetic design suitable for roofs.



Enhanced Performance Warranty

LG NeON™ 2 has an enhanced performance warranty. The annual degradation has fallen from -0.7%/yr to -0.6%/yr. Even after 25 years, the cell guarantees 2.4% more output than the previous LG NeON™ modules.



Aesthetic Roof

LG NeON™ 2 has been designed with aesthetics in mind; thinner wires that appear all black at a distance. The product may help increase the value of a property with its modern design.



Better Performance on a Sunny Day

LG NeON™ 2 now performs better on sunny days thanks to its improved temperature coefficient.



High Power Output

Compared with previous models, the LG NeON™ 2 has been designed to significantly enhance its output efficiency, thereby making it efficient even in limited space.



Outstanding Durability

With its newly reinforced frame design, LG has extended the warranty of the LG NeON™ 2 for an additional 2 years. Additionally, LG NeON™ 2 can endure a front load up to 6000 Pa, and a rear load up to 5400 Pa.



Double-Sided Cell Structure

The rear of the cell used in LG NeON™ 2 will contribute to generation, just like the front; the light beam reflected from the rear of the module is reabsorbed to generate a great amount of additional power.

LG NeON™ 2 LG315N1C-G4

Mechanical Properties

Cells	6 x 10
Cell Vendor	LG
Cell Type	Monocrystalline / N-type
Cell Dimensions	156.75 x 156.75 mm / 6 inches
# of Busbar	12 (Multi Wire Busbar)
Dimensions (L x W x H)	1640 x 1000 x 40 mm 64.57 x 39.37 x 1.57 inch
Front Load	6000 Pa / 125 psf
Rear Load	5400 Pa / 113 psf
Weight	17.0 ± 0.5 kg / 37.48 ± 1.1 lbs
Connector Type	MC4, MC4 Compatible, IP67
Junction Box	IP67 with 3 Bypass Diodes
Length of Cables	2 x 1000 mm / 2 x 39.37 inch
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminum

Certifications and Warranty

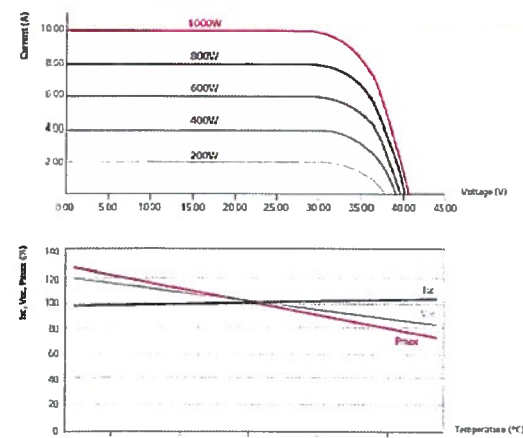
Certifications	IEC 61215, IEC 61730 1/2 IEC 62716 (Ammonia Test) IEC 61701 (Salt Mist Corrosion Test) ISO 9001 UL 1703
Module Fire Performance (USA)	Type 2 (UL 1703)
Fire Rating (for CANADA)	Class C (ULC/ORD C1703)
Product Warranty	12 years
Output Warranty of Pmax	Linear warranty*

* 1) 1st year 98%, 2) After 2nd year 0.6% annual degradation, 3) 83.6% for 25 years

Temperature Characteristics

NOCT	46 ± 3 °C
Pmpp	-0.38 %/°C
Voc	-0.28 %/°C
Isc	0.03 %/°C

Characteristic Curves



Electrical Properties (STC *)

Module Type	315 W
MPP Voltage (Vmpp)	33.2
MPP Current (Impp)	9.50
Open Circuit Voltage (Voc)	40.6
Short Circuit Current (Isc)	10.02
Module Efficiency (%)	19.2
Operating Temperature (°C)	-40 ~ +90
Maximum System Voltage (V)	1000
Maximum Series Fuse Rating (A)	20
Power Tolerance (%)	0 ~ +3

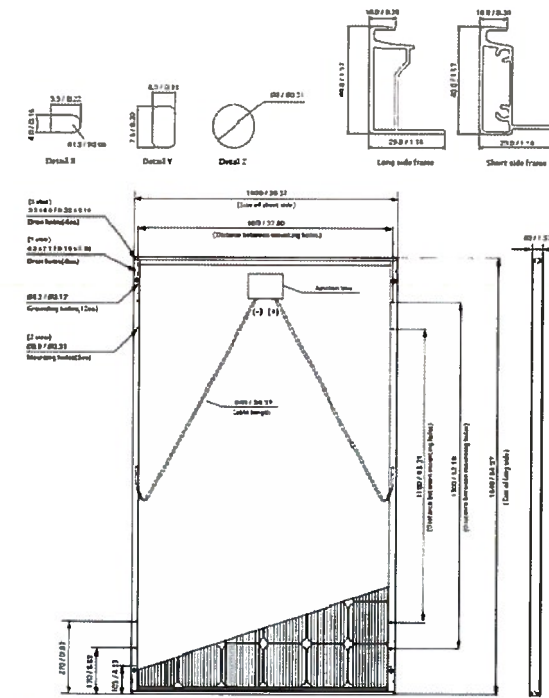
* STC (Standard Test Condition) Irradiance 1000 W/m², Module Temperature 25 °C, AM 1.5
* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.
* The typical change in module efficiency at 250 W/m² in relation to 1000 W/m² is -2.0%.

Electrical Properties (NOCT*)

Module Type	315 W
Maximum Power (Pmax)	230
MPP Voltage (Vmpp)	30.4
MPP Current (Impp)	7.58
Open Circuit Voltage (Voc)	37.6
Short Circuit Current (Isc)	8.08

* 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.

About LG Electronics

LG Electronics is a global player who has been committed to expanding its capacity, based on solar energy business as its future growth engine. We embarked on a solar energy source research program in 1985, supported by LG Group's rich experience in semi-conductor, LCD, chemistry, and materials industry. We successfully released the first Mono X[®] series to the market in 2010, which were exported to 32 countries in the following 2 years, thereafter in 2013, LG NeON™ (previously known as Mono X[®] NeON) won "Intersolar Award" which proved LG is the leader of innovation in the industry.



North America Solar Business Team
LG Electronics USA, Inc.
1000 Sylvan Ave, Englewood Cliffs, NJ 07632

Contact: lg.solar@lge.com
www.lgsolarusa.com

Product specifications are subject to change without notice.
DS-N2-60-C-G-F-EN-50427

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01/04/2015

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Project
4.41 kWdc Residential
Photovoltaic Array

Date	6/21/2016
Sheet	SP1
Scale	None

Signature
William B. Crist, Jr.

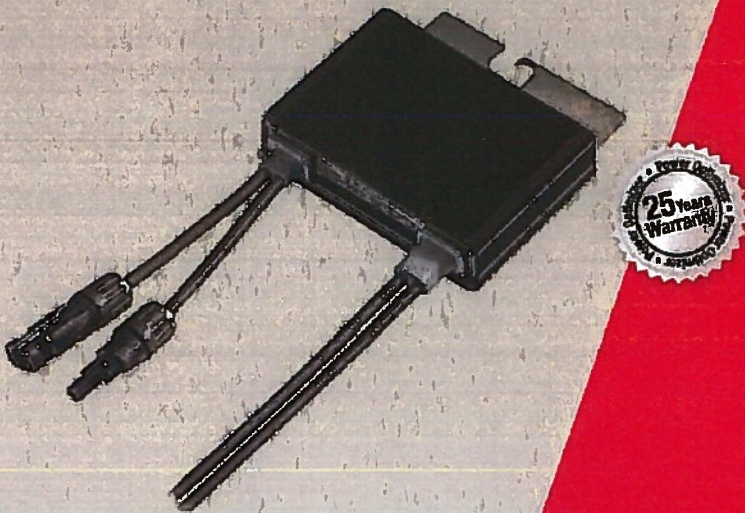


SolarEdge Power Optimizer

Module Add-On For North America

P300 / P320 / P400 / P405

POWER OPTIMIZER



PV power optimization at the module-level

- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety

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SolarEdge Power Optimizer

Module Add-On for North America

P300 / P320 / P400 / P405

	P300 (for 60-cell modules)	P320 (for high-power 60-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	
INPUT					
Rated Input DC Power ⁽¹⁾	300	320	400	405	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		80	125	Vdc
MPPT Operating Range	8 - 48		8 - 80	12.5 - 105	Vdc
Maximum Short Circuit Current (Isc)	10	11		10	Adc
Maximum DC Input Current	12.5	13.75		12.5	Adc
Maximum Efficiency			99.5		%
Weighted Efficiency			98.8		%
Overvoltage Category			II		
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)					
Maximum Output Current			15		Adc
Maximum Output Voltage		60		85	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE 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
Compatible inverters		All SolarEdge Single Phase and Three Phase Inverters			
Dimensions (W x L x H)	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	128 x 152 x 48 / 5 x 5.97 x 1.89	mm / in
Weight (including cables)	770 / 1.7		930 / 2.05	930 / 2.05	gr / lb
Input Connector		MC4 Compatible			
Output Wire Type / 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			
Protection Rating		IP68 / NEMA6P			
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 ⁽¹⁾	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
Parallel Strings of Different Lengths or Orientations		Yes	

⁽¹⁾ It is not allowed to mix P405 with P300/P400/P600/P700 in one string.



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X *Wm. B. Crist, Jr.*

Signature
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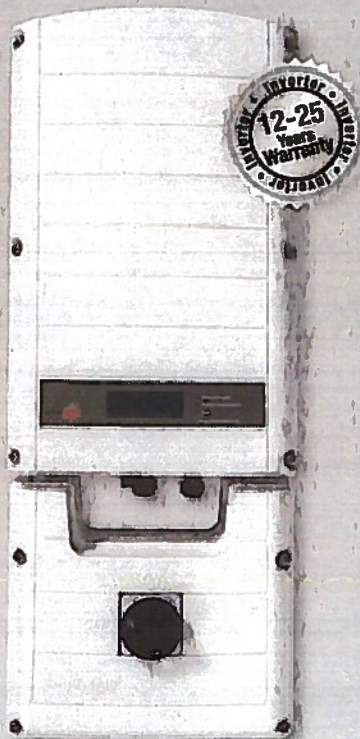
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4.41 kWdc Residential Photovoltaic Array	
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SolarEdge Single Phase Inverters
For North America

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



INVERTERS

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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www.solaredge.us



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 ⁽¹⁾ (STC)	3750	4750	6250	7500	9500	12400	14250	W
Transformer-less, Ungrounded	Yes							
Max. Input Voltage	500							Vdc
Nom. DC Input Voltage	325 @ 208V / 350 @ 240V							Vdc
Max. Input Current ⁽¹⁾	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							Adc
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			dBA
Min.-Max. Operating Temperature	-13 to +140 / -25 to +60 (-40 to +60 version available ⁽⁶⁾)							°F / °C
Range								
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/pdf/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-S1
⁽⁶⁾ -40 version P/N: SExxxxA-US000NNU4



RoHS

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



ESCOBEDO RESIDENCE
631 Mission Street
San Antonio, TX 78210

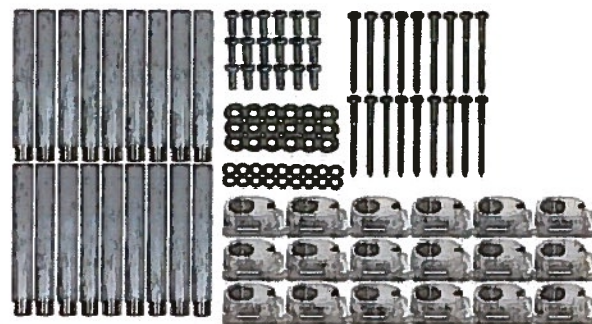
Drawn By: TD	
Checked By: JCARR	
No.	Revision/ Issue
	Date

Project	
4.41 kWdc Residential Photovoltaic Array	
Date	6/21/2016
Sheet	SP3
Scale	None

Signature
William B. Crist, Jr.

Fast Jack®

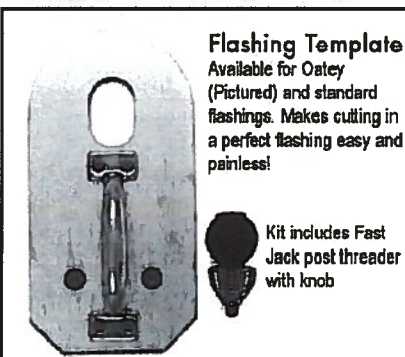
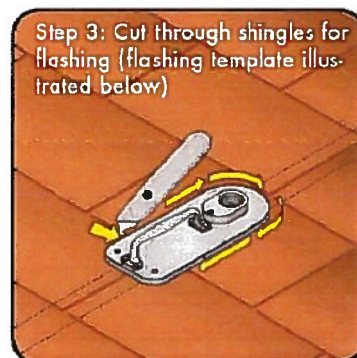
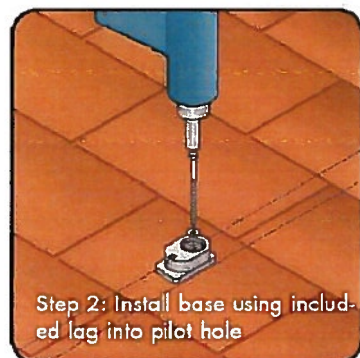
Bulk packaging means easier stocking abilities, less packaging waste and quicker, more convenient installation. Everything in the photo below is shipped in a resealable box for storage of extra parts.



The Fast Jack® is available in four convenient sizes. All sizes are packaged in quantities of 18 per box:

- 18 - 1" Round Posts (3", 4-1/2", 6" or 7-1/2" tall)
- 18 - Threaded bases
- 18 - 3/8" x 3/4" SS Hex Bolts
- 18 - 3/8" SS Flat washers
- 18 - 5/16" x 3" SS Lag bolts
- 18 - 5/16" SS Flat Washers

Easy Installation:



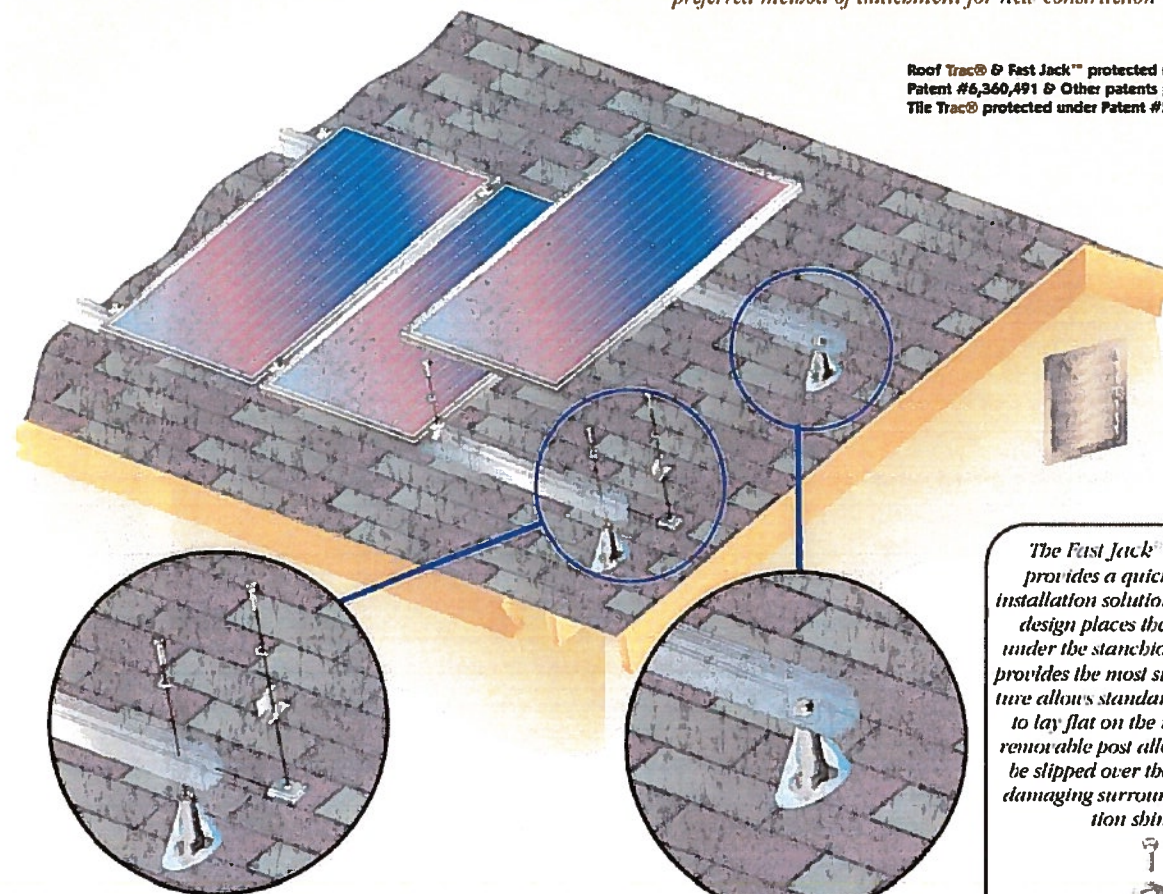
© Professional Solar Products, Inc. March 2006

Roof Trac™

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.

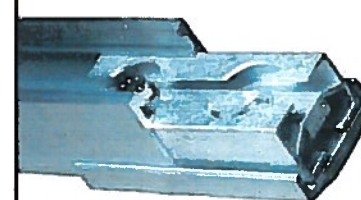


Roof Trac® & Fast Jack™ protected under Patent #6,360,491 & Other patents pending.
Tile Trac® protected under Patent #5,646,029.

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

IES Residential (Electrical)
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Drawn By:	TD	
Checked By:	JCARR	
No.	Revision/ Issue	Date

Project
4.41 kWdc Residential Photovoltaic Array

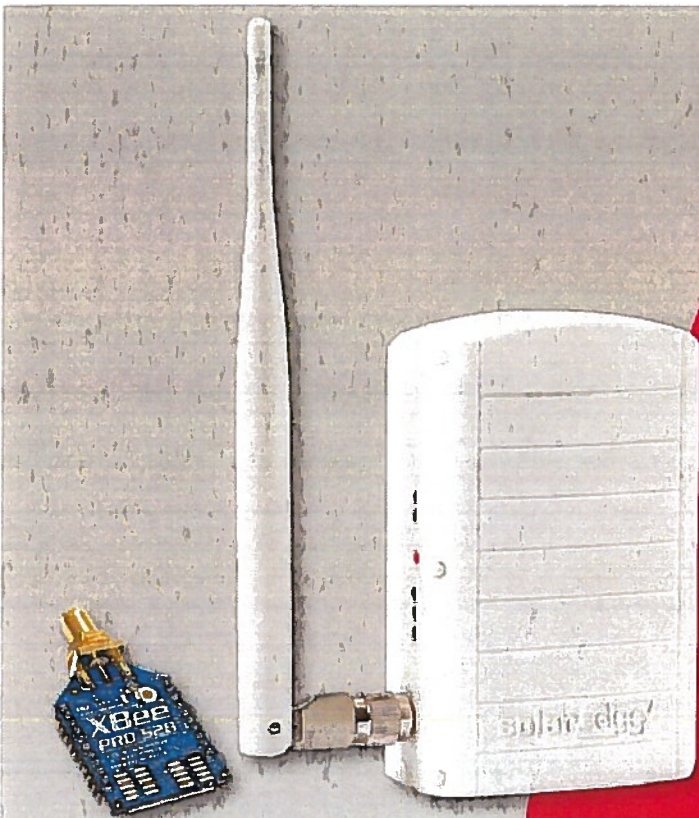
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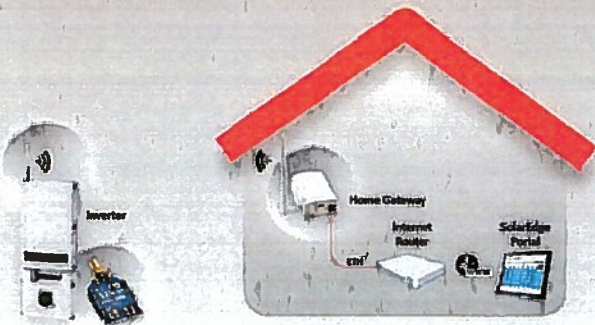
SolarEdge Wireless Communication
ZigBee Kit North America

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



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



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COMMUNICATION



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

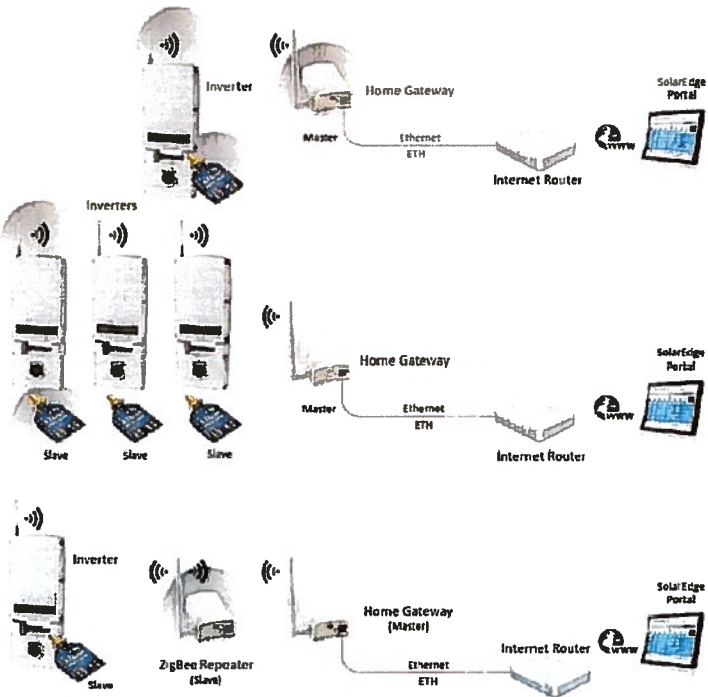
FUNCTIONAL		UNIT
Number of devices that can be monitored	1-15	
RF PERFORMANCE		
Transmit power	18	dBm
Receiver Sensitivity	-102	dBm
Antenna gain	4	dBi
Outdoor (LOS) range	400 / 1300	m / ft
Indoor range ¹	50 / 160	m / ft
HOME GATEWAY / REPEATER		
Antenna	Included	
Power supply	Included, 100-240VAC	
Operating 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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