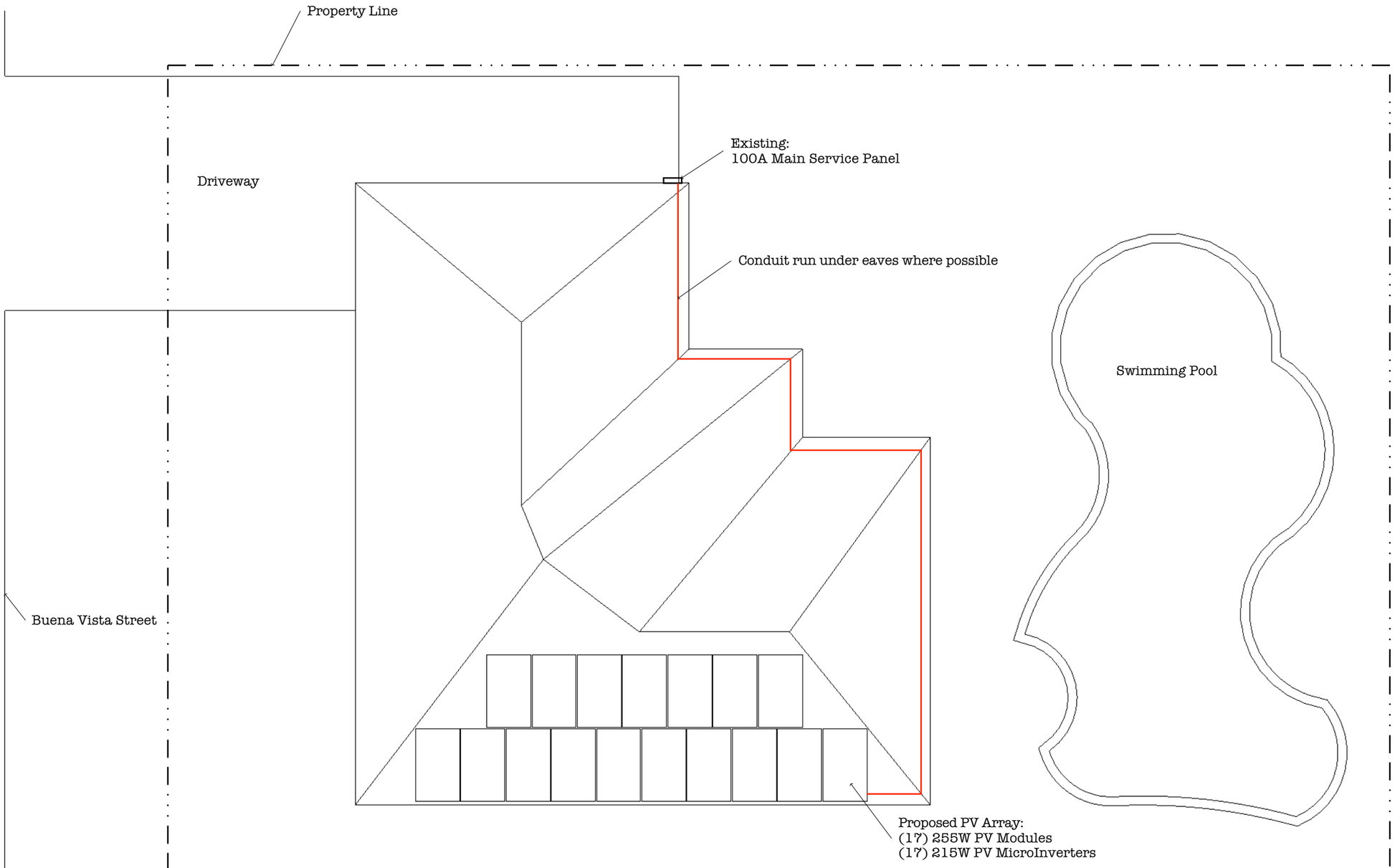
Scale: 1/8" = 1'



General Notes:

Solar Photovoltaic System to be installed on Residential Structure.

Design complying with the latest edition of California Electrical Code, NEC, the San Diego Area Electrical News, Letters, and all local ordinances and policies.

This Project has been designed in compliance with the CBC Section 1609 to withstand a minimum 85 MPH wind load.

The house is one story tall.

The rafters are 2 x 4 at 16" on center.

This system will not be interconnected until approval from the local jurisdiction and the utility is obtained.

This system is a utility interactive system with no storage batteries.

The Solar Photovoltaic installation shall not obstruct any plumbing, mechanical, or building roof vents.

If the existing main service panel does not have a verifiable grounding electrode, it is the contractor's responsibility to install a supplemental grounding electrode.

Each module will be grounded using the supplied connection points identified on the module and the manufacturer's installation instructions.

A ladder shall be in place for inspection in compliance with CAL-OSHA regulations.

Proper access and working clearance will be provided as per section 110.26 CEC.

Tenco Solar Inc.

18713 Glass Mountain Drive
Riverside, CA 92504

Contractor's Signature:

Lic#C46#820684

4,335W DC

Hetherington Residence
3529 Buena Vista Street
San Diego, CA 92109
Parcel Number:
423-492-07-00

Revision	Date

Drawn By: Sunny

Date: 05/10/2012

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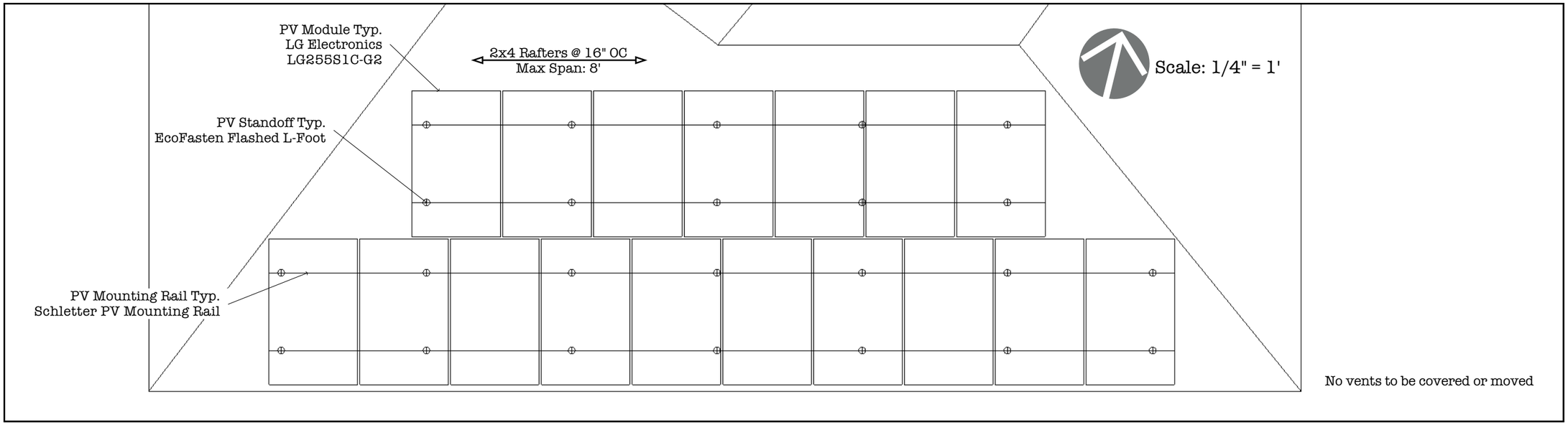
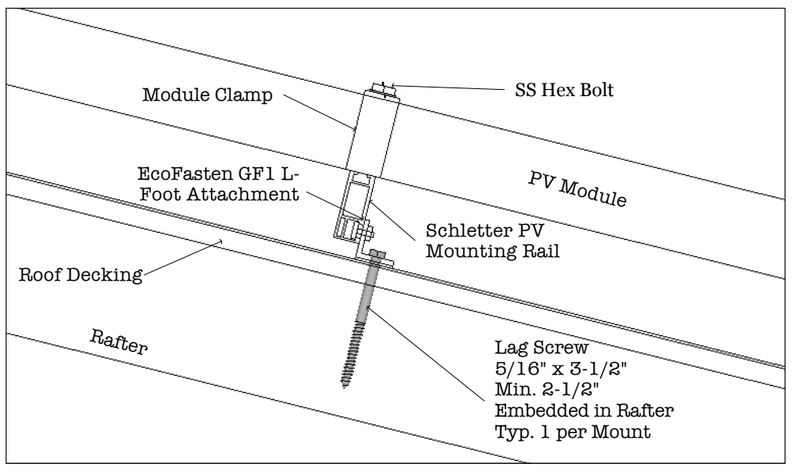
ROOF PLAN / SITE PLAN





Modules are mounted flush to the roof face using EcoFasten GF1 Standoffs attached to Schuco mounting rails.

Standoffs are to be placed "as built" at no more than 6' centers along rails, with no more than 20" cantilever over the end standoff.

All equipment to be installed according to manufacturer's specifications.

Qty of Modules: 17
Module Weight: 41.9 lbs
Racking Weight: 5 lb / module
Module Area: 17.4 sqft
Attachment Density: 1.4 posts / module

46.9 lbs / 1.4 posts = 33.5 lbs / roof attachment
Total Weight: 797 lbs
Total Area: 296 sqft
Dead Load: 2.7 lbs / sqft

Tenco Solar Inc.

18713 Glass
Mountain Drive
Riverside, CA 92504

Contractor's Signature:

Lic#C-46#820684

4,335W DC

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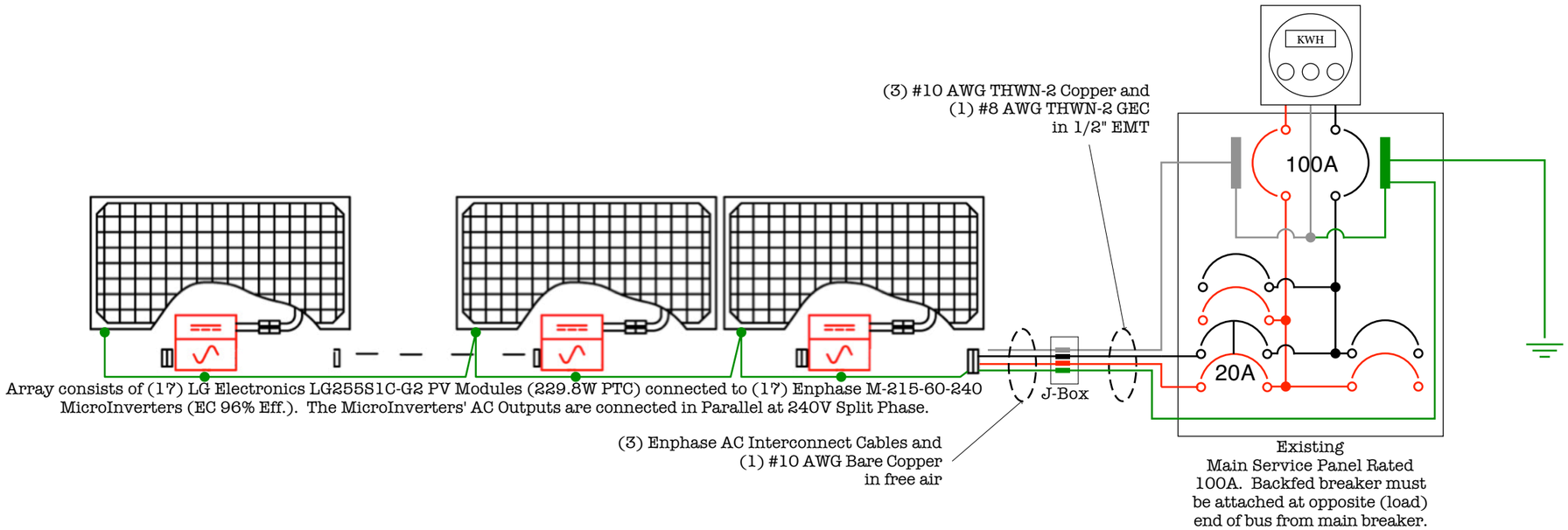
PV MODULE MOUNTING DETAIL



Notes:
All plaques and signage required by the latest edition of California Electrical Code and the San Diego Area Electrical Newsletter will be installed as required.

Alternate Power source Placard shall be metallic or plastic, engraved or machine printed letters in contrasting color to to the plaque. This plaque will be attached by pop rivets or screws or other approved method. If exposed to sunlight, it shall be UV resistant.

PV DC conductors entering the building shall be installed in metal conduit and the conduit shall be labeled "CAUTION DC CIRCUIT" or equivalent every 5 feet.

Exposed non-current carrying metal parts of module frames, equipments, and conductor enclosures shall be grounded in accordance with 250.134 or 250.136(A) regardless of voltage.

Each module shall be grounded using the supplied connection point identified on the module and the manufacturer's instructions.

If the existing grounding electrode system can not be verified or is only metallic water piping, it is the contractor's responsibility to install a supplemental grounding electode.

Wire Sizing Calculations:

Array Junction Box to SubPanel: 15.23 A Max Current x 1.25 (690.8(B)(1)) / 0.76 ambient temp corr.(125°F) =25.05 A

Equipment Schedule	
Description	**Part Number**
PV Module	(17) LG Electronics LG255S1C-G2
Inverters	(17) Enphase M215-60-240-S2x

Module and Array Ratings: (17 Modules)			
PV Module Ratings: (STC)		**Inverter Ratings:**	
Make:	LG Electronics	**Make:**	Enphase
Model:	LG255S1C-G2	**Model:**	M215-60-240-S2x
Imp:	8.50 A		
Vmp:	30.00 V	**Max DC Voltage:**	45 V
Isc:	8.85 A	**Max / Nom. Power (AC):**	215 W
Voc:	37.20 V	**Nom. AC Voltage:**	240 V
Pmax:	255 W	**Max AC Current:**	0.90 A
%Voc / °C	0.34%	**Max Short-Circuit Current:**	15 A
PTC Watts	229.8 W	**Max Input Current:**	10.50 A
		CEC Efficiency	96.0%

Array Rating: (STC)	
Series:	1
Parallel:	17
Voltage:	240 V AC
Array Current:	15.23 A
Array Max Power:	3655 W

Definitions	
EGC	Equipment Grounding Conductor
GEC	Grounding Electrode Conductor
Voc	Open Circuit Voltage
Isc	Short Circuit Current
Vmp	Maximum Power Voltage
Imp	Maximum Power Current
Pmax	Maximum Power
%Voc / °C	Temperature Coefficient

Tenco Solar Inc.

18713 Glass
Mountain Drive
Riverside, CA 92504

Contractor's Signature:

LicC-46#820684

4,335W DC

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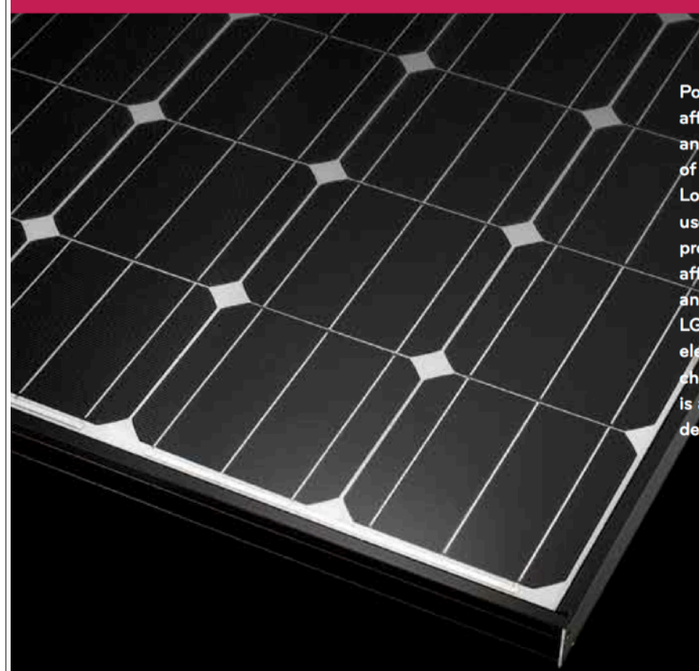
SINGLE LINE DIAGRAM

LG
Life's Good

Mono X™

LG260S1C / LG255S1C / LG250S1C



Power from the sun: clean, renewable, affordable. This is the dream of solar energy, and LG is making it real with the introduction of the Mono X™ solar module.
Loaded with features for easy installation, use and maintenance, the Mono X™ modules provide decades of clean, renewable and affordable energy for residential, commercial and utility applications.
LG's long and successful record in the electronics industry provides assurance that choosing LG's state-of-the-art solar modules is an investment in superior standards of design, manufacture and support.

World's 1st
Carbonfund.org

c UL us CE

The LG Mark of Excellence
Customers rest assured of cutting-edge technology and dependability when they see the LG logo on every cell. The LG logo reflects the high standards that have guided LG for more than 50 years.

Accredited Testing Lab
LG's laboratory has earned the stamp of approval from both TÜV Rheinland and Underwriters Laboratories as an official testing laboratory, another sign of LG's commitment to excellence.

Long-lasting Warranty and Support
LG always stands by its products with sterling warranty policies. The Mono X™ support policy includes a 10-year product warranty, a 12-year 90% power warranty, and a 25-year 80% power warranty.

Designed for Durability
LG solar modules are designed with slim and durable glass to be light in weight while also being able to withstand heavy loads up to 5400 Pa.

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%.

Commitment to a Clean Environment
The Mono X™ module is the first in the world authorized to display the Carbonfree Certified® Label. To be certified, the Mono X™ passed a rigorous Life Cycle Assessment from raw materials to end of use.

Mono X™

LG260S1C / LG255S1C / LG250S1C

Mechanical Properties

Cells	6 x 10
Cell vendor	LG
Cell type	Monocrystalline
Cell dimensions	156 x 156 mm² / 6 x 6 in²
# of busbar	3
Dimensions (L x W x H)	1632 x 986 x 42 mm
	64.25 x 38.82 x 1.65 in
Maximum load (Pa)*	5400 (113 psf)
Weight	19 kg / 41.89 lb
Connector type*	Tyco connector IP 67
Junction box	IP 65 with 3 bypass diodes
Length of cables	2 x 1000 mm / 2 x 39.37 in

* Under the IEC standards
* NEC 2008 compliant

Certifications and Warranty

Certifications	IEC 61215 Ed.2, IEC 61730, UL 1703
Product warranty	10 years
Output warranty of Pmax	12 years – 90%
	25 years – 80%

Temperature Coefficients

NOCT	43.7 ± 2 °C
Pmpp	-0.469 %/K
Voc	-0.128 V/K, -0.338 %/K
Isc	3.78 mA/K, 0.043 %/K

Electrical Properties (STC*)

	LG260S1C	LG255S1C	LG250S1C
Maximum power at STC (Pmax)	260	255	250
MPP voltage (Vmpp)	30.1	30.0	29.9
MPP current (Impp)	8.64	8.50	8.37
Open circuit voltage (Voc)	37.3	37.2	37.1
Short circuit current (Isc)	8.94	8.85	8.76
Module efficiency (%)	16.2	15.8	15.5
Operating temperature (°C)		-40 ~ +90	
Maximum system voltage (V)		600	
Maximum series fuse rating (A)		20	
Power tolerance (%)		0 ~ +3	

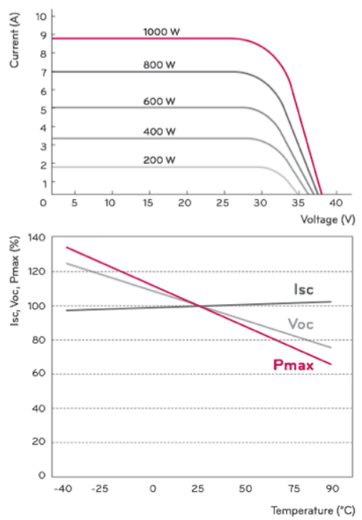
* STC (Standard Test Condition): Irradiance 1000 W/m², module temperature 25 °C, AM 1.5
* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.

Electrical Properties (NOCT*)

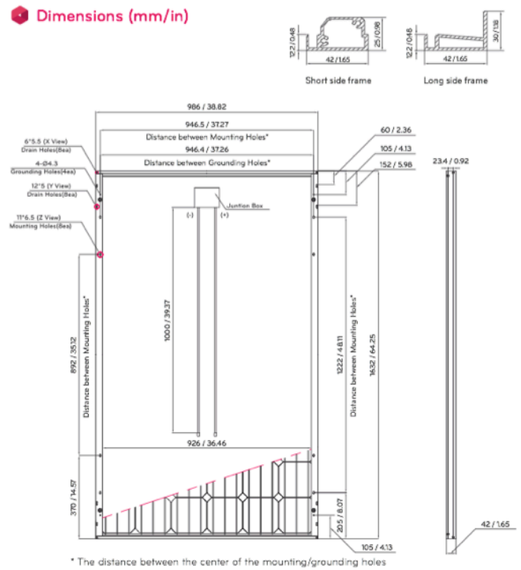
	LG260S1C	LG255S1C	LG250S1C
Maximum power (W)	189	186	182
Maximum power voltage (V)	27.11	27.01	26.91
Maximum power current (A)	6.98	6.87	6.77
Open circuit voltage (Voc)	34.61	34.51	34.41
Short circuit current (Isc)	7.22	7.15	7.08
Efficiency reduction (from 1000 W/m² to 200 W/m²)		< 4.5 %	

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

Characteristic Curves



Dimensions (mm/in)



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

LG
Life's Good

North America Solar Business Team
LG Electronics U.S.A. Inc
1000 Sylvan Ave, Englewood Cliffs,
NJ 07632
Contact: lg.solar@lge.com
www.lgsolarusa.com

Product specifications are subject to change without notice.

Tenco Solar Inc.

18713 Glass
Mountain Drive
Riverside, CA 92504

Contractor's Signature:

Lic#C46#820684

4,335W DC

Hetherington Residence
3529 Buena Vista Street
San Diego, CA 92109
Parcel Number:
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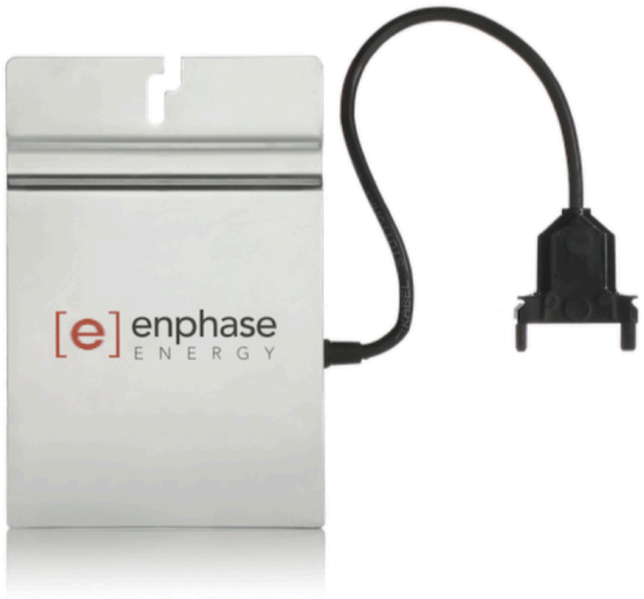
MODULE DATASHEET

[e] ENPHASE MICROINVERTER M215



The Enphase Energy Microinverter System improves energy harvest, increases reliability, and dramatically simplifies design, installation and management of solar power systems. The Enphase System includes the microinverter, the Envoy Communications Gateway, and Enlighten, Enphase's monitoring and analysis software.

PRODUCTIVE
- Maximum energy production
- Resilient to dust, debris and shading
- Performance monitoring per module

RELIABLE
- System availability greater than 99.8%
- No single point of system failure

SMART
- Quick & simple design, installation and management
- 24/7 monitoring and analysis

SAFE
- Low voltage DC
- Reduced fire risk

C US

MICROINVERTER TECHNICAL DATA

Input Data (DC)	M215-60-2LL-S22/S23 M215-60-2LL-S22-NA/S23-NA (Ontario)	
Recommended maximum input power (STC)	260W	
Maximum input DC voltage	45V	
Peak power tracking range	22V – 36V	
Operating range	16V – 36V	
Min./Max. start voltage	26.4V/45V	
Max. DC short circuit current	15A	
Max. input current	10.5A	
Output Data (AC)	**@208 Vac**	**@240 Vac**
Maximum output power	215W	215W
Nominal output current	1.0 A*	0.9 A*
Nominal voltage/range	208V/183V-229V	240V/211V-264V
Extended voltage/range	208V/179V-232V	240V/206V-269V
Nominal frequency/range	60.0/59.3-60.5	60.0/59.3-60.5
Extended frequency/range	60.0/59.2-60.6	60.0/59.2-60.6
Power factor	>0.95	>0.95
Maximum units per 20A branch circuit	25 (three phase)	17 (single phase)
Maximum output fault current	1.05 Arms, over 3 cycles; 25.2 Apeak, 1.74ms duration	

*Arms at nominal voltage

Efficiency	
CEC weighted efficiency	96.0%
Peak inverter efficiency	96.3%
Static MPPT efficiency (weighted, reference EN 50530)	99.8%
Dynamic MPPT efficiency (fast irradiation changes, reference EN 50530)	99.9%
Night time power consumption	46mW

Mechanical Data	
Ambient temperature range	-40ºC to +65ºC
Operating temperature range (internal)	-40ºC to +85ºC
Dimensions (WxHxD)	17.3 cm x 16.4 cm x 2.5 cm (6.8" x 6.45" x 1.0")*
Weight	1.6 kg (3.5 lbs)
Cooling	Natural convection – no fans
Enclosure environmental rating	Outdoor – NEMA 6

*without mounting bracket

Features	
Compatibility	Pairs with most 60-cell PV modules
Communication	Power line
Warranty	25-year limited warranty
Compliance	UL1741/IEEE1547, FCC Part 15 Class B CAN/CSA-C22.2 NO. 0-M91, 0.4-04, and 107.1-01

Enphase Energy, Inc.
201 1st Street, Petaluma, CA 94952
877 797 4743 www.enphase.com

05/17/2011

Tenco Solar Inc.
18713 Glass Mountain Drive
Riverside, CA 92504

Contractor's Signature:

Lic#C46#820684

4,335W DC

Hetherington Residence
3529 Buena Vista Street
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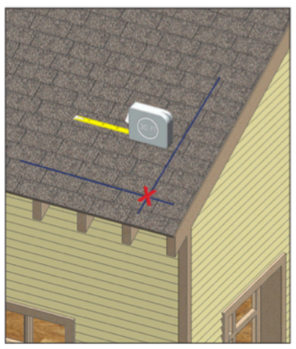
INVERTER DATASHEET

EcoFasten Solar



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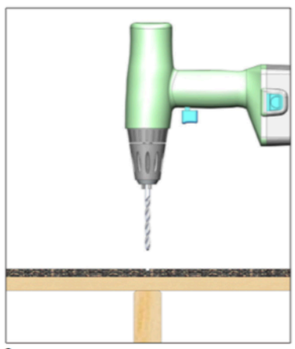

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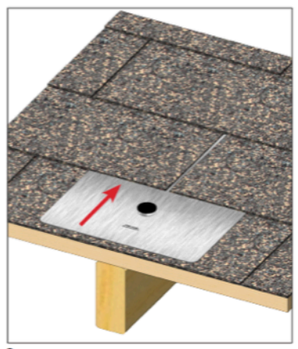

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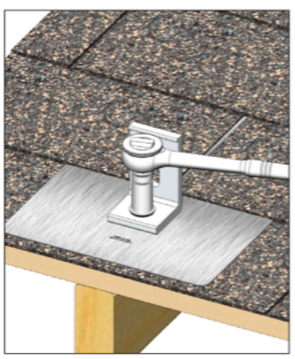
4

5



6

1. Locate the rafters and snap horizontal and vertical lines to mark the installation position for each GreenFasten flashing.
2. Drill a pilot hole (1/4" diameter) for the lag bolt. Backfill with sealant.*
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.
4. Line up pilot hole with GreenFasten hole.
5. Insert the lag bolt through the EPDM washer, the top compression component (L-Bracket pictured) and the gasketed hole in the flashing and into the rafter.
6. Torque to 140 inch-pounds

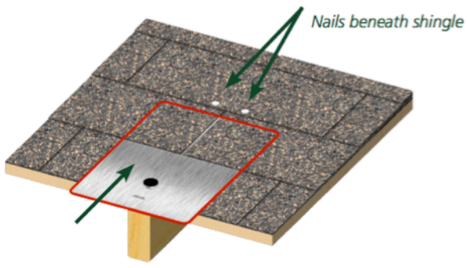
Consult an engineer or go to www.ecofastensolar.com for engineering data.

*EcoFasten recommends an EPDM mastic.

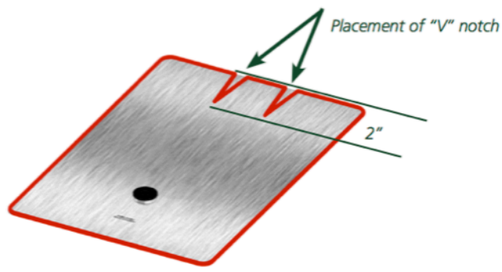
EcoFasten Solar

* Use for vertical adjustment when leading edge of flashing hits nails in upper shingle courses

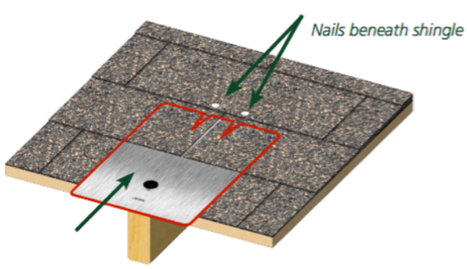
1. Slide flashing up under shingles until leading edge engages nails. Measure remaining distance to adjust upslope.



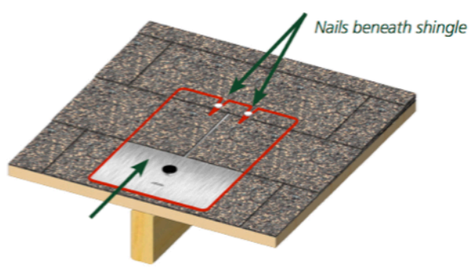
2. Remove flashing and cut "V" notch at marks where nail shafts engaged leading edge of flashing the distance desired in Step 1. Notch depth not to exceed 2" length by 1/2" width.



3. Reinstall flashing with notched area upslope.



4. Position notched leading edge underneath nail heads as shown.



MOUNTING DATASHEET

Sheet: PV-6

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