

# PROJECT DESCRIPTION:

40 X MISSION SOLAR MSE305SQ5T MODULES  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 SYSTEM SIZE: 12.20 kW DC STC

ARRAY AREA: ROOF #1- 715.6 SQ. FT.

## EQUIPMENT SUMMARY

40 MISSION SOLAR MSE305SQ5T MODULES  
 40 SOLAREEDGE POWER OPTIMIZER P320  
 01 SOLAREEDGE SE11400H-US INVERTER

## APPLICABLE CODES & STANDARDS

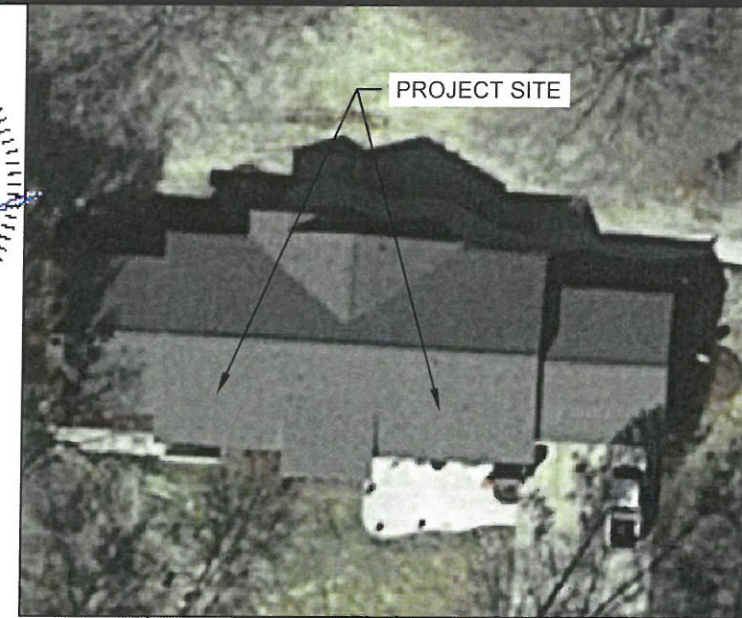
BUILDING: IBC 2012 IRC 2012  
 ELECTRICAL: NEC 2017

## DESIGN SPECIFICATION

OCCUPANCY: II  
 CONSTRUCTION: SINGLE-FAMILY  
 ZONING: RESIDENTIAL  
 GROUND SNOW LOAD: 20 PSF  
 WIND EXPOSURE: B  
 WIND SPEED: 120 MPH

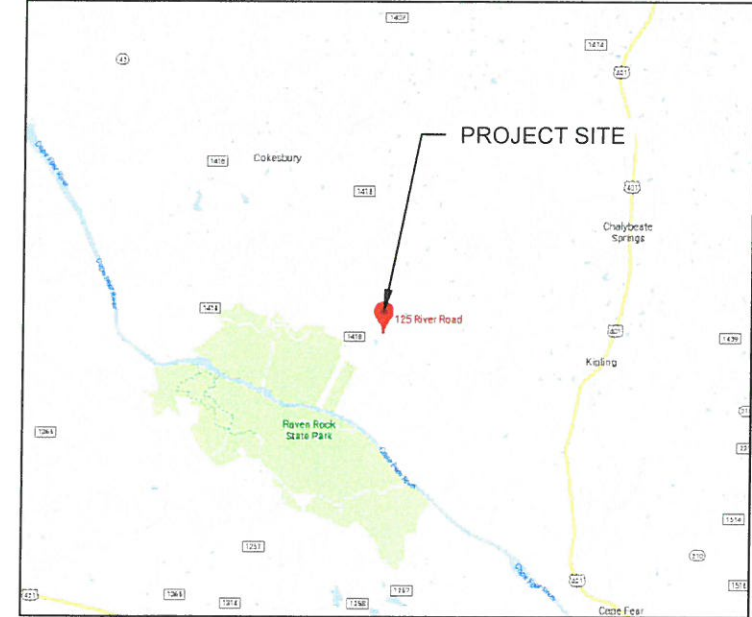
## AUTHORITIES HAVING JURISDICTION

BUILDING: WAKE COUNTY  
 ZONING: WAKE COUNTY  
 UTILITY: DUKE ENERGY PROGRESS



2 HOUSE PHOTO

PV-1 SCALE: NTS

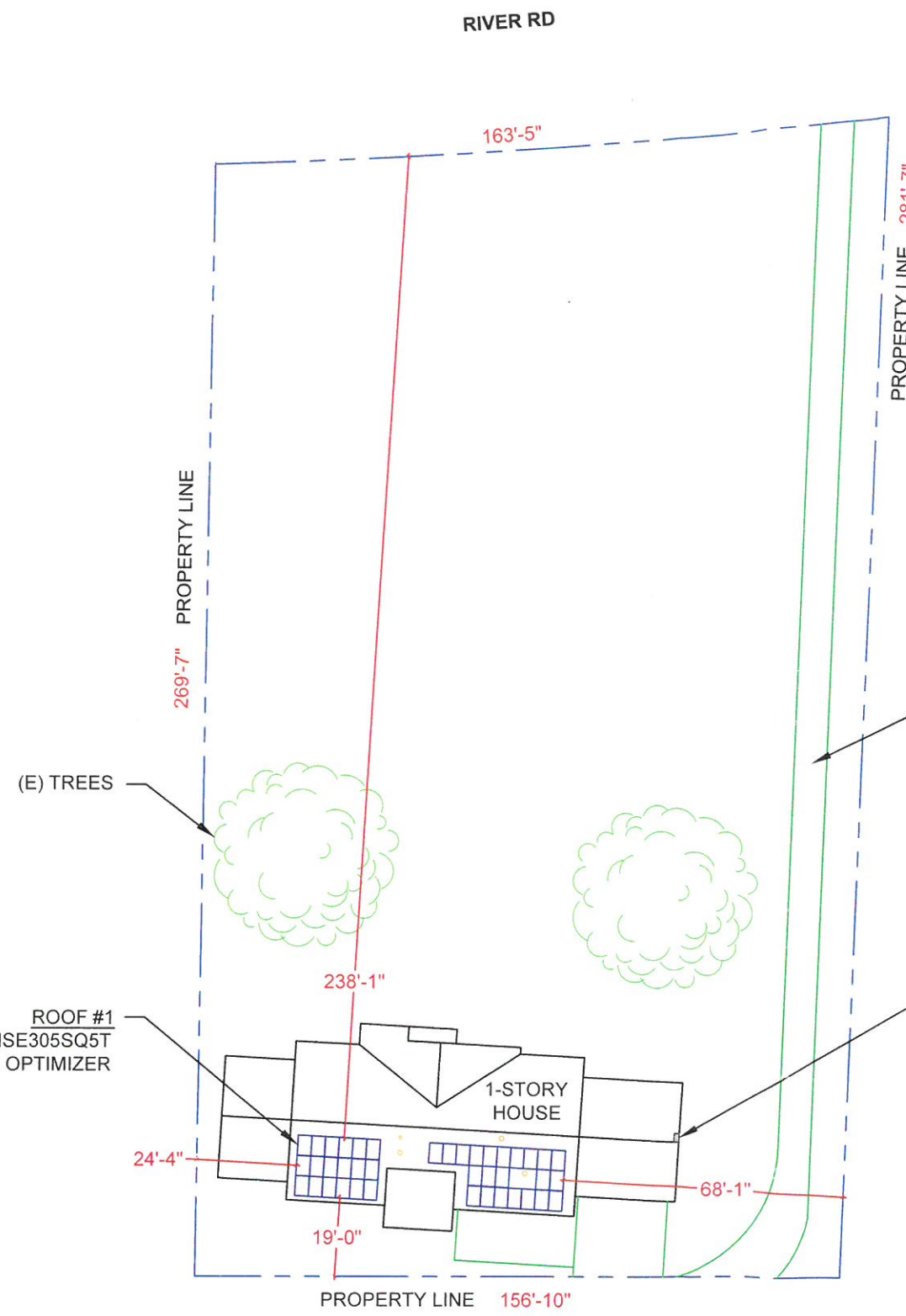


3 VICINITY MAP

PV-1 SCALE: NTS

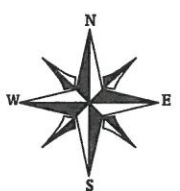
**SHEET INDEX**

PV-1	PLOT PLAN & VICINITY MAP
PV-2	ROOF PLAN & MODULES
PV-2A	STRING LAYOUT
PV-3	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM
PV-5	WIRING CALCULATIONS
PV-6	SOLAREEDGE OPTIMIZER CHART
PV-7 to 12	EQUIPMENT SPECIFICATIONS



**NOTICE TO CONTRACTOR**  
 All construction must comply with current NC Building Codes and is subject to field inspection and verification.

APPROVED BY: *[Signature]*  
 DATE PLANS RECEIVED: 11/10/18  
 DATE PLANS APPROVED: 11/14/18  
 HARNETT COUNTY CENTRAL PERMITTING  
 APPLICATION # ERES18110027  
 JOB NAME: Power Home Solar LLC  
 APPROVED BY: *[Signature]*



1 PLOT PLAN WITH ROOF PLAN

PV-1 SCALE: 0.002193

**POWERHOME SOLAR & ROOFING**  
 POWER HOME SOLAR, LLC  
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 919 N. MAIN ST.  
 MOORESVILLE, NC 28115  
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 Email: info@powerhome.com  
 Web: www.powerhome.com

Penn Fusion Engineering, LLC  
 Firm License No. P-1848  
 152 S. Broad St, Lansdale PA 19446

Signature with Seal

DATE: 11/08/2018

PROJECT NAME & ADDRESS

**SHIRA ROSE RESIDENCE**  
 125 RIVER RD.,  
 FUQUAY VARINA, NC 27526

DESIGNED BY  
**PHS**

SHEET NAME  
**PLOT PLAN & VICINITY MAP**

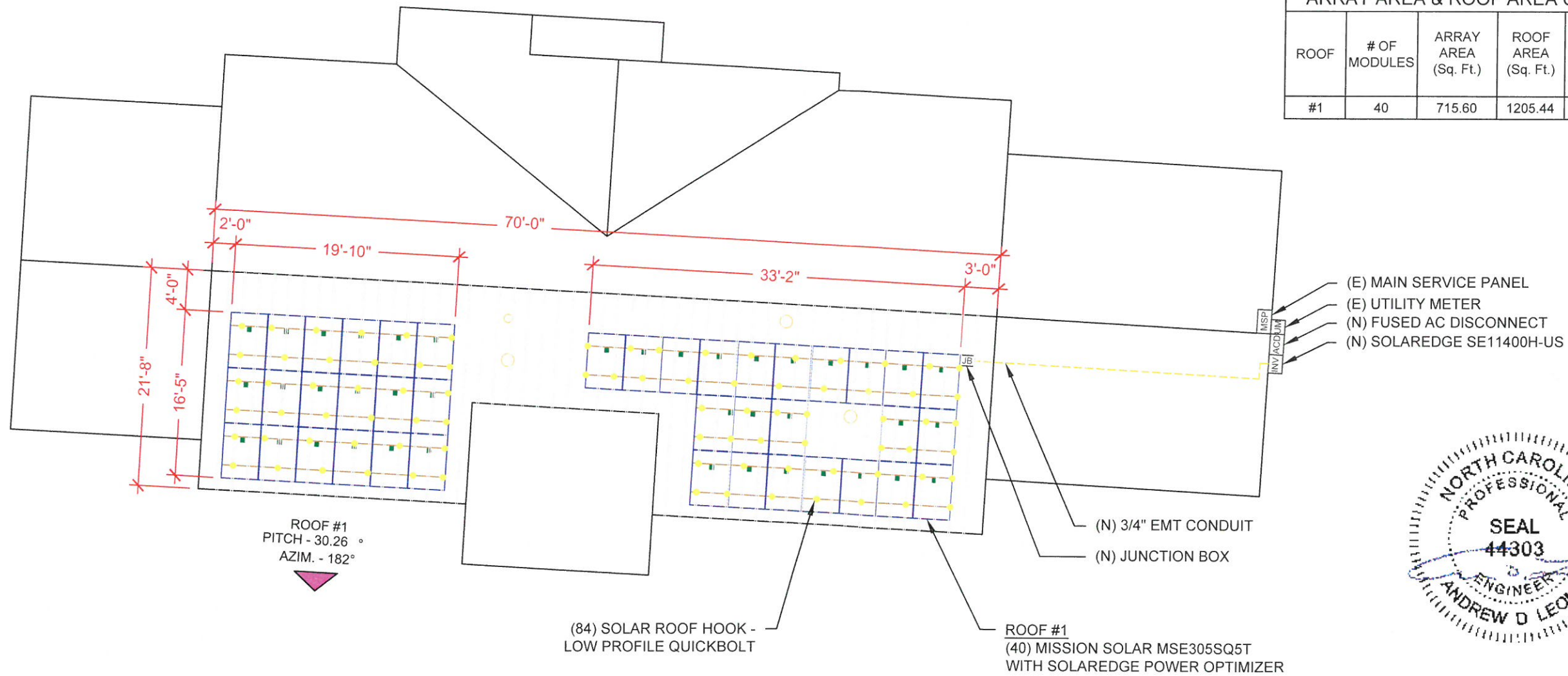
SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-1**

**MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 40 MODULES  
 MODULE TYPE = MISSION SOLAR MSE305SQ5T MODULES  
 MODULE WEIGHT = 40.1 LBS / 18.2 KG.  
 MODULE DIMENSIONS = 65.51" x 39.33" = 17.89 SF

**(E) FRONT OF RESIDENCE**



ROOF DESCRIPTION				
ROOF TYPE		COMPOSITE SHINGLE		
ROOF LAYER		1 LAYERS		
ROOF	ROOF PITCH	AZIMUTH	RAFTER SIZE	RAFTER SPACING
#1	30.26°	182°	2X6	16"

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	40	715.60	1205.44	59

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SHEET NAME  
**ROOF PLAN & MODULES**

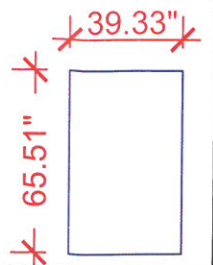
SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-2**



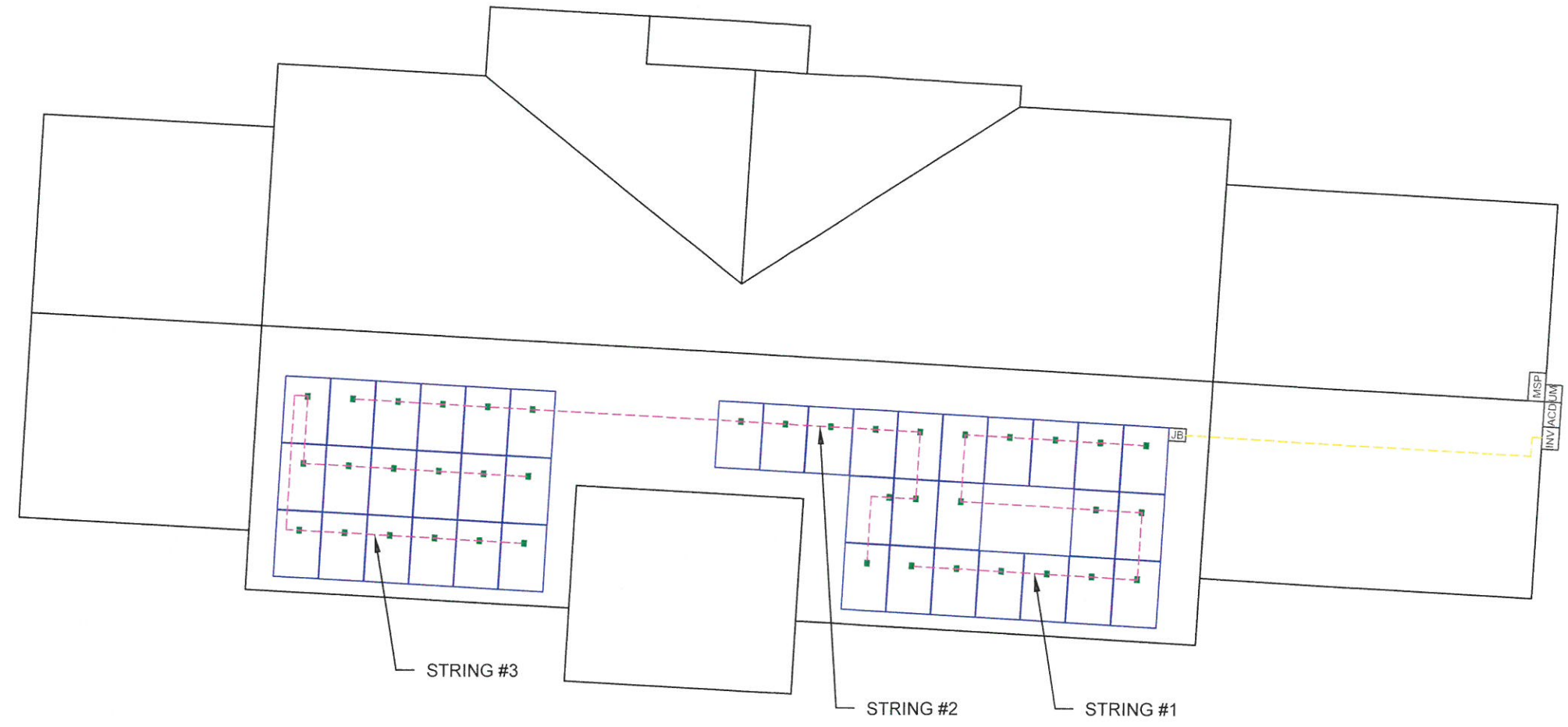
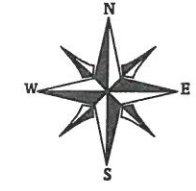
**(E) BACK OF RESIDENCE**

LEGEND	
[JB]	- JUNCTION BOX
[INV]	- INVERTER
[DC]	- INTEGRATED DC DISCONNECT
[SLD]	- SOLAR LOAD CENTER
[PM]	- PRODUCTION METER
[MSP]	- MAIN SERVICE PANEL
[CB]	- COMBINER BOX
○ □	- VENT, ATTIC FAN (ROOF OBSTRUCTION)
■	- ROOF ATTACHMENT
—	- RAFTERS
---	- CONDUIT



MISSION SOLAR ENERGY  
 PERC 60 MSE305SQ5T  
 MONO BLKMODULES





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RESIDENCE**  
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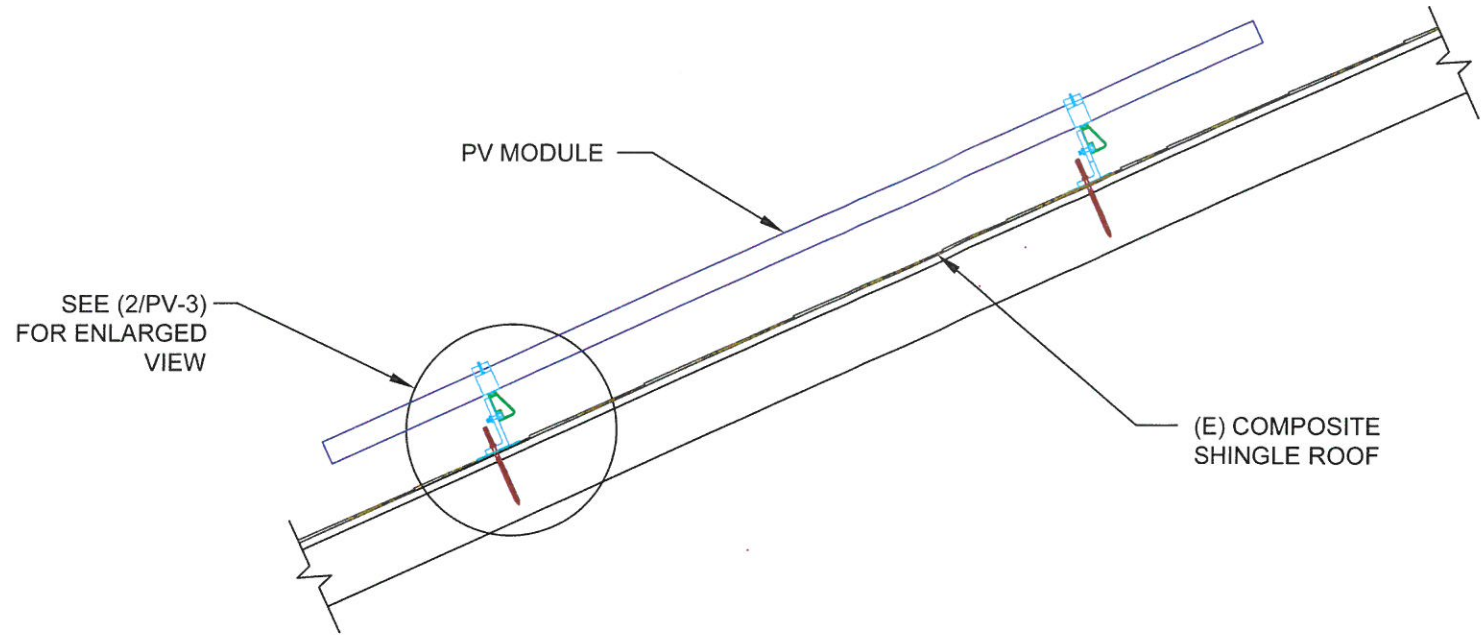
DESIGNED BY  
**PHS**

SHEET NAME  
**STRING  
LAYOUT**

SHEET SIZE  
**ANSI B  
11" X 17"**

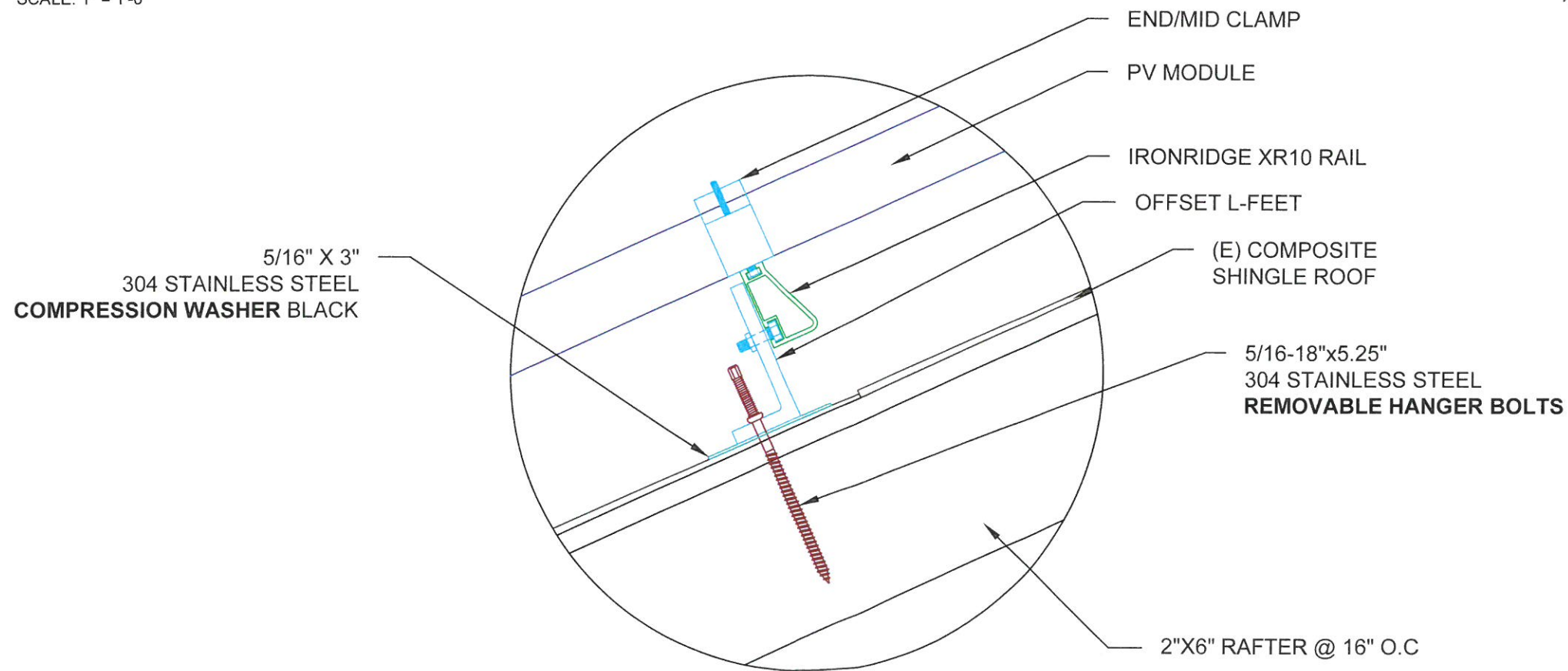
SHEET NUMBER  
**PV-2A**

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	40	MISSION SOLAR MSE305SQ5T
OPTIMIZER	40	SOLAREGE POWER OPTIMIZER P320
INVERTER	01	SOLAREGE SE11400H-US INVERTER
AC DISCONNECT	1	60A FUSED, (2) 60A FUSES, 240V, NEMA 3R, UL LISTED
SOLAR DECK	1	SOLAR DECKS
RAILS	26	IRONRIDGE XR10 RAIL 168" (14 FEET) BLACK
BONDED SPLICE	12	SPLICE KIT
MODULE CLAMPS	94	UNIVERSAL MODULE CLAMPS
GROUNDING LUG	7	IRONRIDGE GROUNDING LUG
END CLAMPS	28	END CLAMPS / STOPPER SLEEVE
ATTACHMENT	84	SRH LOW PROFILE QUICKBOLT
SQUARE-BOLT	84	SQUARE-BOLT BONDING ATTACHMENT HARDWARE

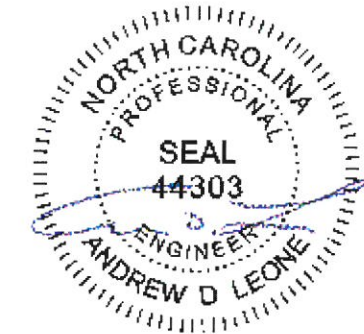


**1 | ATTACHMENT DETAIL**

SCALE: 1" = 1'-0"



**2 | ATTACHMENT DETAIL (enlarged view)**



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PHS

SHEET NAME

ATTACHMENT  
 DETAIL

SHEET SIZE

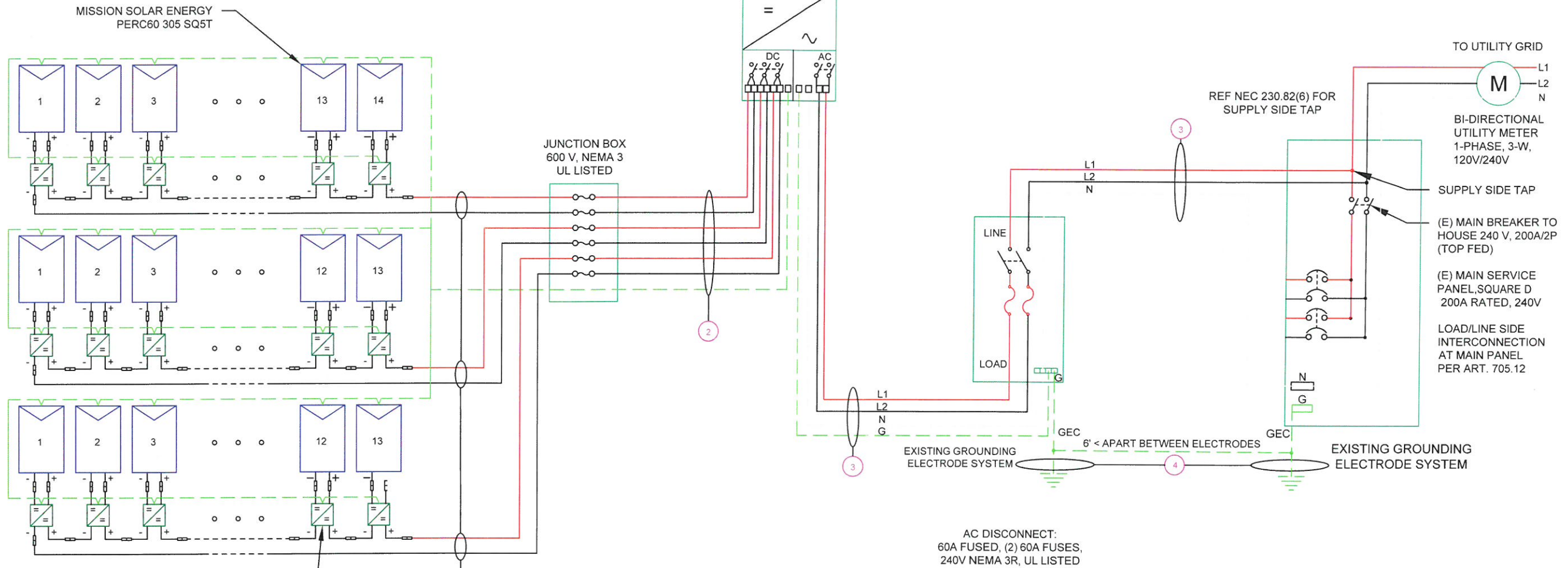
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SHEET NUMBER

PV-3

(40) MISSION SOLAR MSE305SQ5T  
MODULES  
(1) STRING OF 14 MODULES  
(2) STRING OF 13 MODULES  
CONNECTED IN SERIES

SOLAREGE SE11400H-US (240V)  
OUTPUT: 240 VAC, 47.5A  
99% CEC WEIGHTED EFFICIENCY  
NEMA 3R, UL LISTED, INTERNAL GFDI  
WITH INTEGRATED DC DISCONNECT



SolarEdge Power Optimizer P320 Rated  
DC Input Power - 320 watts  
Maximum Input Voltage - 48 Vdc  
MPPT Range - 8 to 48 Vdc  
Maximum Input Current - 13.75 Adc  
Maximum Output Current - 15 Adc String  
Limitations - 8 to 25 Optimizers,  
5700 watts STC per string maximum

**! WARNING !**  
PHOTOVOLTAIC  
POWER SOURCE

LABEL 1  
ON ALL CONDUITS SPACED AT MAX 10FT

**! CAUTION !**  
SOLAR ELECTRIC  
SYSTEM CONNECTED  
AND ENERGIZED

LABEL 2  
AT INVERTER

**! CAUTION !**  
PHOTOVOLTAIC SYSTEM  
EQUIPPED WITH RAPID  
SHUTDOWN

LABEL 3  
AT INVERTER

PHOTOVOLTAIC  
DC DISCONNECT

LABEL 4  
AT EACH DC DISCONNECT

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

LABEL 5  
AT EACH AC DISCONNECT

PHOTOVOLTAIC  
AC  
DISCONNECT

LABEL 6  
AT EACH AC DISCONNECT

**! WARNING !**  
DUAL POWER SOURCES  
SECOND SOURCE IS PV SYSTEM

LABEL 8  
AT MEP

**! WARNING !**  
SOLAR SYSTEM  
CONNECTED  
AND ENERGIZED

LABEL 9  
AT MEP

**! CAUTION !**  
SOLAR POINT OF  
INTERCONNECTION

LABEL 10  
AT UTILITY METER

**! WARNING !**  
THE SERVICE METER IS ALSO SERVED  
BY A PHOTOVOLTAIC SYSTEM

LABEL 11  
AT UTILITY METER

QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
(6)	#10AWG - PV WIRE/USE-2	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR	N/A	N/A
(6)	#10AWG - THWN-2	EMT OR LFMC IN ATTIC	3/4"
(1)	#6AWG - THWN-2 GND		
(3)	#6AWG - THWN-2	PVC/LFNC	3/4"
(1)	#6AWG - THWN-2 GND		
(1)	EXISTING GROUNDING SYSTEM		

SERVICE INFO	
UTILITY PROVIDER:	DUKE ENERGY PROGRESS
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	SQUARE D
MAIN SERVICE PANEL:	200A
MAIN CIRCUIT BREAKER RATING:	200A
MAIN SERVICE LOCATION:	EAST
SERVICE FEED SOURCE:	OVERHEAD

# 1 ELECTRICAL LINE DIAGRAM

PV-4

SCALE: NTS

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SHEET NAME  
**ELECTRICAL LINE DIAGRAM**

SHEET SIZE

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SHEET NUMBER

PV-4

# MSE PERC 60

High Power PERC Rooftop Module

MISSION SOLAR ENERGY



Class Leading Output:  
305W power



Advanced Technology:  
PERC and 4 busbars drive  
>18% module efficiency



Superior Aesthetics:  
All-black design coupled with  
outstanding power output



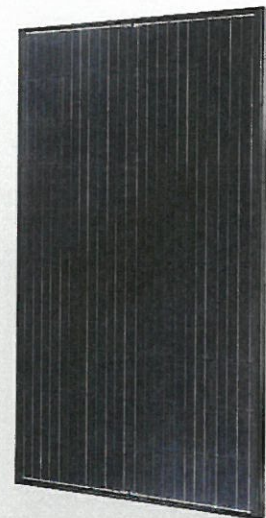
Certified Reliability:  
3X IEC, salt mist, ammonia



5600 Pa snow load **New!**  
175 mph wind rating



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.



## 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.

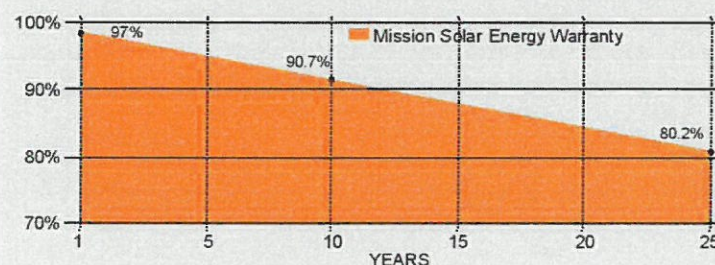
## Outstanding performance with PERC

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	MSE305SQ5T		
Power Output	P <sub>max</sub>	Wp	305
Module Efficiency		%	18.35
Tolerance			0 <sup>+</sup> +3%
Short-Circuit Current	I <sub>sc</sub>	A	9.69
Open Circuit Voltage	V <sub>oc</sub>	V	40.25
Rated Current	I <sub>mp</sub>	A	9.27
Rated Voltage	V <sub>mp</sub>	V	32.9

STC: Irradiance 1000 W/m<sup>2</sup>, Cell temperature of 25°C, AM 1.5

## TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44°C (±2°C)
Temperature Coefficient of P <sub>max</sub>	-0.427%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.318%/°C
Temperature Coefficient of I <sub>sc</sub>	0.042%/°C

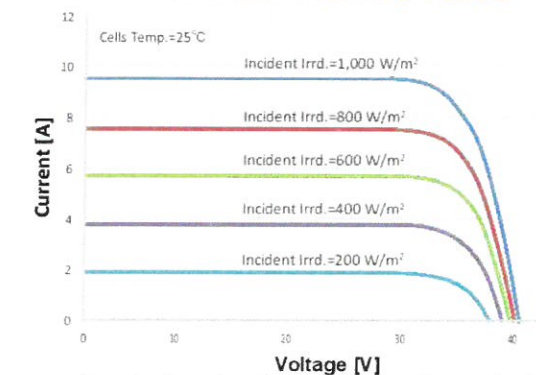
## OPERATING CONDITIONS

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
Front & Back Load (UL standard)	5600 Pa (117 psf) <b>New!</b>
Hail Safety Impact Velocity	25mm at 23 m/s

## MECHANICAL DATA

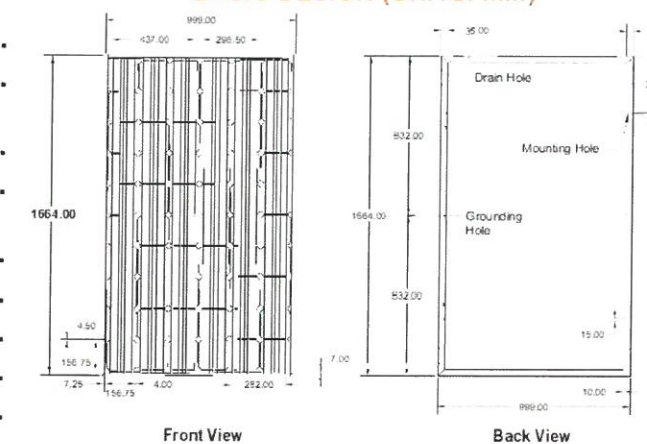
Solar Cells	P-type Mono-crystalline Silicon (156.75mm)
Cell orientation	60 cells (6x10), 4 busbar
Module dimension	1664mm x 999mm x 40mm (65.51 in. x 39.33 in. x 1.57 in.)
Weight	18.2 kg (40.1 lb)
Front Glass	3.2mm (0.126 in.) tempered, Low-iron, Anti-reflective coating
Frame	Anodized aluminum alloy
Encapsulant	Ethylene vinyl acetate (EVA)
J-Box	Protection class IP67 with 3 bypass-diodes
Cables	PV wire, 1m (39.37 in.), 4mm <sup>2</sup> / 12 AWG
Connector	MC4 or compatible

## MSE305SQ5T: 305WP, 60CELL SOLAR MODULE CURRENT-VOLTAGE CURVE



Current-voltage characteristics with dependence on irradiance and module temperature

## BASIC DESIGN (UNITS: mm)



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

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SPECIFICATION

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11" X 17"

SHEET NUMBER

PV-7



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

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



## 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)



www.solaredge.us

INVERTERS



# 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		
<b>OUTPUT</b>									
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400	VA	
Max. AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 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 <sup>1)</sup>							Hz	
Maximum Continuous Output Current @240V	-	16	-	24	-	-	-	A	
Maximum Continuous Output Current @208V	12.5	16	21	25	32	42	47.5	A	
GFI Threshold	1							A	
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes								
<b>INPUT</b>									
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							Vdc	
Maximum Input Current 208V	9							A	
Maximum Input Current @240V	8.5	10.5	13.5	16.5	20	27	30.5	A	
Max. Input Short Circuit Current	45							A	
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	
<b>ADDITIONAL FEATURES</b>									
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)								
Revenue Grade Data, ANSI C12.20	Optional <sup>2)</sup>								
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect								
<b>STANDARD COMPLIANCE</b>									
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07								
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)								
Emissions	FCC Part 15 Class B								
<b>INSTALLATION SPECIFICATIONS</b>									
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					lb / kg	
Noise	< 25							dBA	
Cooling	Natural Convection				Natural convection				
Operating Temperature Range	-13 to +140 / -25 to +60 <sup>3)</sup> (-40°F / -40°C option) <sup>4)</sup>							°F / °C	
Protection Rating	NEMA 3R (Inverter with Safety Switch)								

<sup>1)</sup> For other regional settings please contact SolarEdge support.  
<sup>2)</sup> Revenue grade inverter P/N: SExxxxH US000NNC2  
<sup>3)</sup> For power derating information refer to: https://www.solaredge.com/sites/default/files/ie-temperature\_derating\_note\_na.pdf  
<sup>4)</sup> 40 version P/N: SExxxxH US000NNU4



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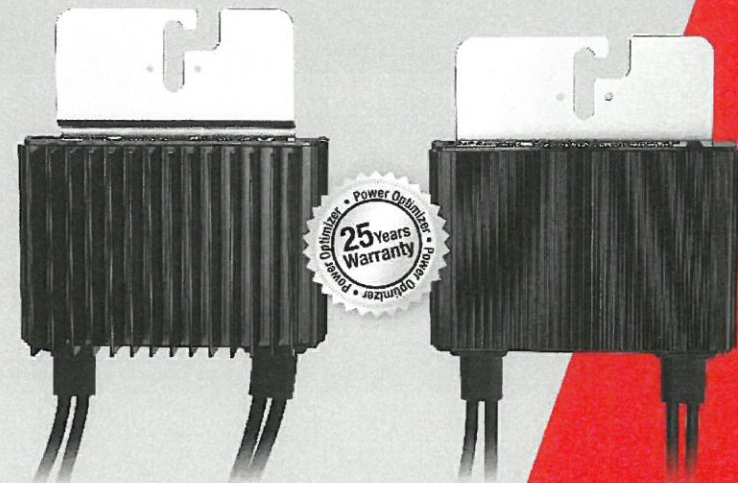
SHEET NUMBER

PV-8



# 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

www.solaredge.us



# 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)	
<b>INPUT</b>						
Rated Input DC Power <sup>(1)</sup>	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		%
Oversoltage Category	II					
<b>OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREGE INVERTER)</b>						
Maximum Output Current	15					Adc
Maximum Output Voltage	60		85			Vdc
<b>OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREGE INVERTER OR SOLAREGE INVERTER OFF)</b>						
Safety Output Voltage per Power Optimizer	1 ± 0.1					Vdc
<b>STANDARD COMPLIANCE</b>						
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3					
Safety	IEC62109-1 (class II safety), UL1741					
RoHS	Yes					
<b>INSTALLATION SPECIFICATIONS</b>						
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 36 / 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 <sup>(2)</sup>					
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					
Protection Rating	IP68 / NEMA6P					
Relative Humidity	0 - 100					

<sup>(1)</sup> Rated STC power of the module. Module of up to -5% power tolerance allowed.

<sup>(2)</sup> For other connector types please contact SolarEdge.

PV SYSTEM DESIGN USING A SOLAREGE INVERTER <sup>(3)(4)</sup>	SINGLE PHASE HD-WAVE	SINGLE PHASE	THREE PHASE 208V	THREE PHASE 480V	
Minimum String Length (Power Optimizers)	6	8	8	14	
Maximum String Length (Power Optimizers)	25	25	25	50 <sup>(5)</sup>	
Maximum Power per String	5700 (6000 with SE7600-US - SE11400- US)	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes				

<sup>(3)</sup> For detailed string sizing information refer to: [http://www.solaredge.com/sites/default/files/string\\_sizing\\_na.pdf](http://www.solaredge.com/sites/default/files/string_sizing_na.pdf).

<sup>(4)</sup> It is not allowed to mix P405/P505 with P320/P370/P400/P500/P700/P800 in one string.

<sup>(5)</sup> A string with more than 30 optimizers does not meet NEC rapid shutdown requirements, safety voltage will be above the 30V requirement.



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Signature with Seal

DATE: 11/08/2018

PROJECT NAME & ADDRESS

SHIRA ROSE  
RESIDENCE  
125 RIVER RD.,  
FUQUAY VARINA, NC 27526

DESIGNED BY

PHS

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-9





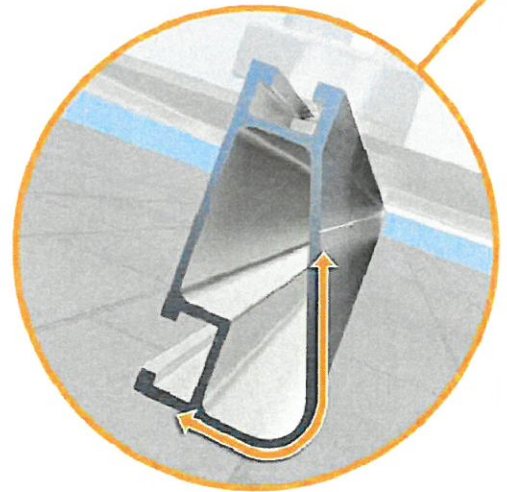
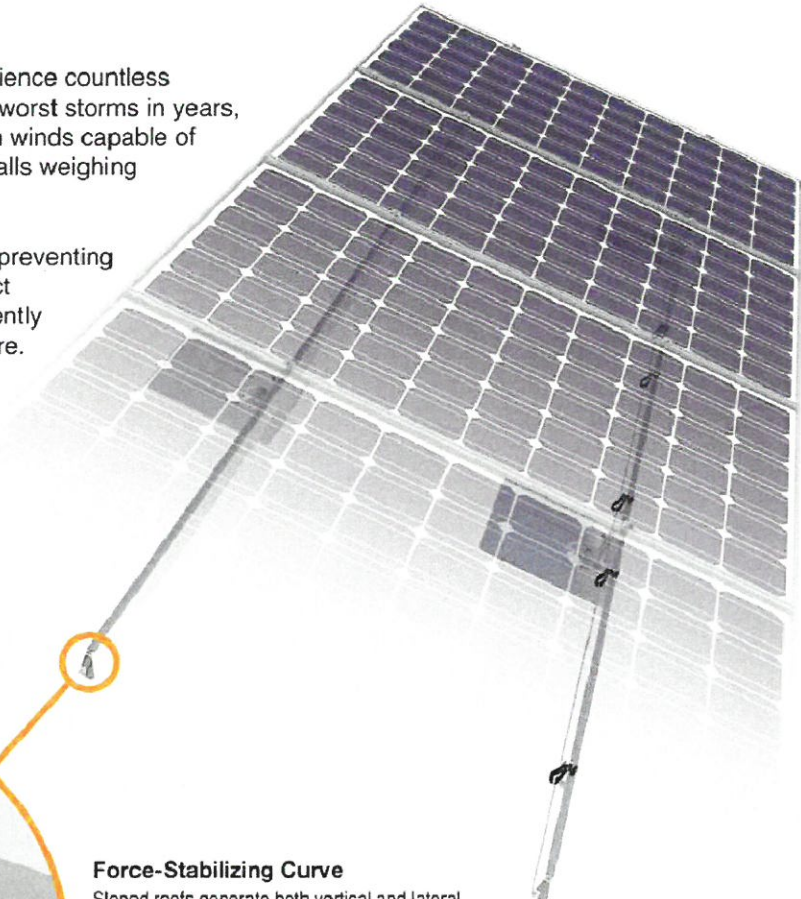
Tech Brief

## XR Rail Family

### Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



#### Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

#### Compatible with Flat & Pitched Roofs



XR Rails are compatible with FlashFoot and other pitched roof attachments.



IronRidge offers a range of tilt leg options for flat roof mounting applications.

#### Corrosion-Resistant Materials

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.



## XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

Tech Brief



#### XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

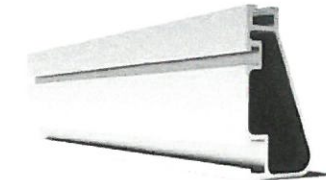
- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available



#### XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



#### XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

## Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100						
	120						
	140	XR10		XR100		XR1000	
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

**POWERHOME SOLAR & ROOFING**  
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 919 N. MAIN ST.  
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 Phone: 704-800-6591 (OFFICE)  
 Email: info@powerhome.com  
 Web: www.powerhome.com

Signature with Seal

DATE: 11/08/2018

PROJECT NAME & ADDRESS

SHIRA ROSE RESIDENCE  
 125 RIVER RD.,  
 FUQUAY VARINA, NC 27526

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PHS

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SHEET SIZE

ANSI B  
 11" X 17"

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PV-10



## UFO Family of Components

Tech Brief

### Simplified Grounding for Every Application

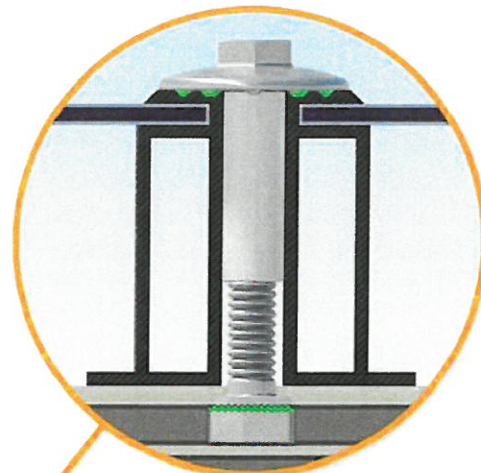
The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



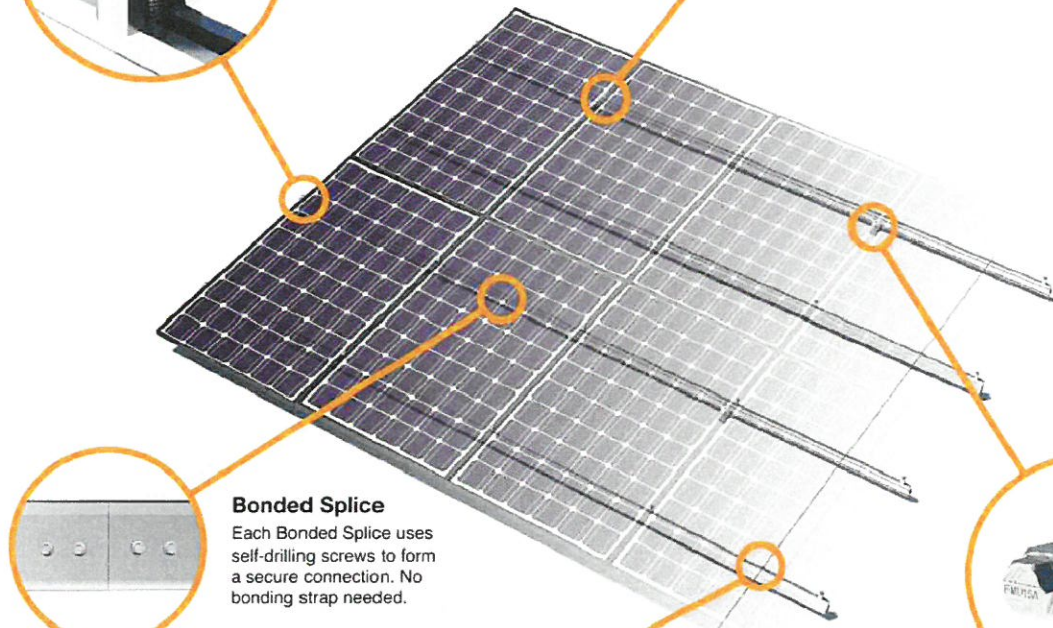
#### Stopper Sleeve

The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.



#### Universal Fastening Object (UFO)

The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.



#### Bonded Splice

Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.



#### Grounding Lug

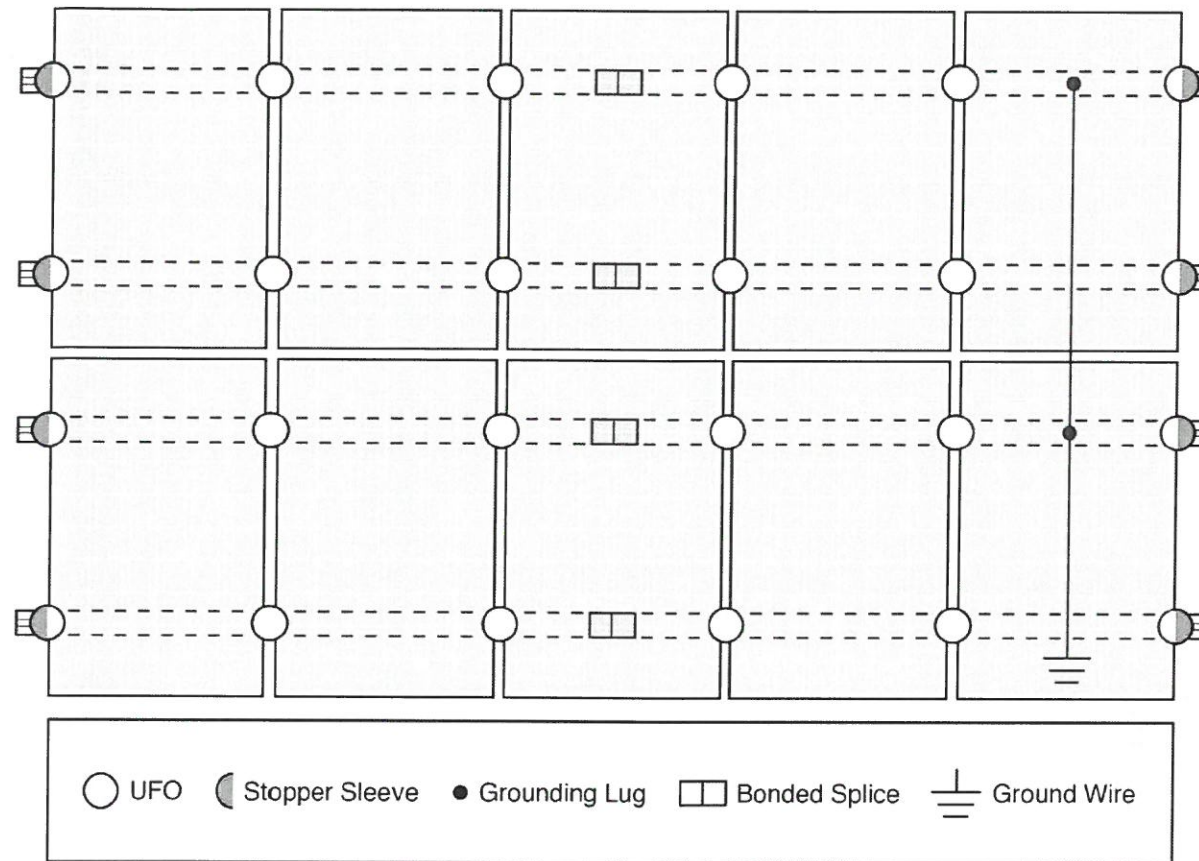
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



#### Bonded Attachments

The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

### System Diagram



⚠ Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

### UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

🔗 [Go to IronRidge.com/UFO](http://Go to IronRidge.com/UFO)

### Cross-System Compatibility

Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✓	✓	XR1000 Only
UFO/Stopper	✓	✓	✓
Bonded Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		

Tech Brief



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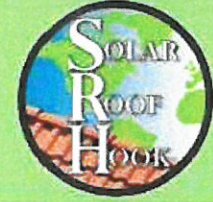
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PV-11

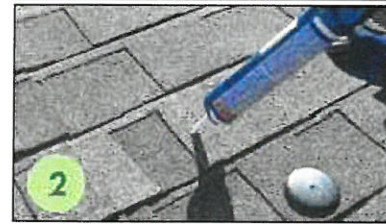
# Low Profile QuickBOLT™



Part #	Box Quantity	Size
17667	10 Washers; 10 Bolts; 10 Offset L-Foot; 10 Serrated Hex Flange Nuts	5/16" x 3"; 5/16" x 5.25"; NA; 5/16"



## LOW PROFILE QUICKBOLT™ INSTALLATION INSTRUCTIONS



### RECOMMENDED MATERIALS

- Rafter locator
- Chalk or crayon
- 3/16" Drill Bit
- Roofing Manufacturer's approved sealant

### INSTALLATION INSTRUCTIONS

1. Locate and mark the rafters.
2. Pre-drill the hole with the 3/16" Drill Bit.
3. Fill the pre-drilled hole with sealant.  
\*We also recommend creating a circle of sealant on the back of the washer.
4. Place the EPDM Washer & drive the Bolt until the Washer compresses to the roof.
5. Place the L-Foot & Nut.
6. Tighten the Nut until the L-Foot is secure.

### WHERE IS MY FLASHING?

The Stainless Steel backed EPDM Washer is fully Code-Compliant and does not require additional Sheet Metal Flashing. The collar on the QuickBOLT™ compresses the washer down onto the roof, forming a 100% leak-proof seal.

5830 Las Positas Road, Livermore, California 94551 | 3948 Airway Drive, Rock Hill, South Carolina 29732  
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125 RIVER RD.,  
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DESIGNED BY  
**PHS**

SHEET NAME  
**EQUIPMENT  
SPECIFICATION**

SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-12**