

# PROJECT DESCRIPTION:

16 X MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLK  
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES  
 SYSTEM SIZE: 4.72 kW DC STC  
 ARRAY AREA: ROOF #1- 286.24 SQ. FT.

## EQUIPMENT SUMMARY

- 16 MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLK
- 16 SOLAREEDGE POWER OPTIMIZER P300
- 01 SOLAREEDGE SE5000H-US INVERTER

**APPLICABLE CODES & STANDARDS**  
 BUILDING: IBC 2012 IRC 2012  
 ELECTRICAL: NEC 2014

## DESIGN SPECIFICATION

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

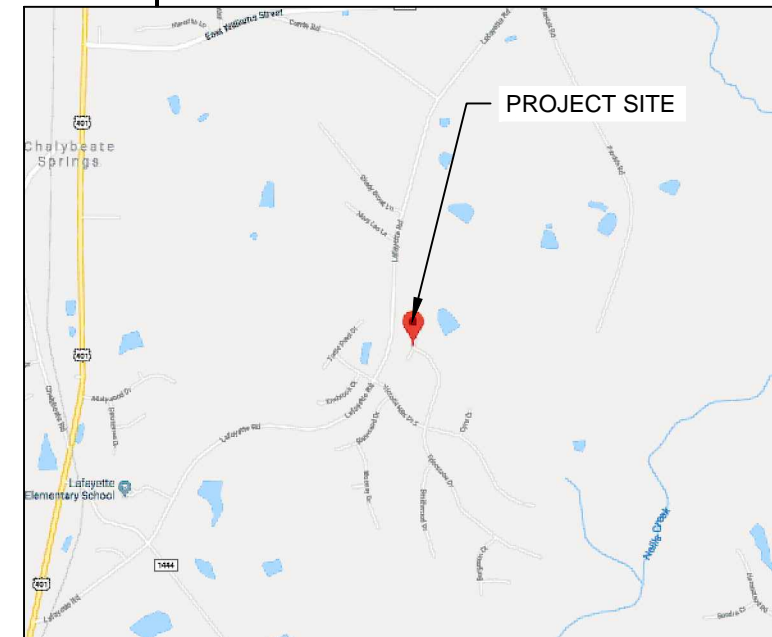
## AUTHORITIES HAVING JURISDICTION

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



**2 HOUSE PHOTO**

PV-1 SCALE: NTS

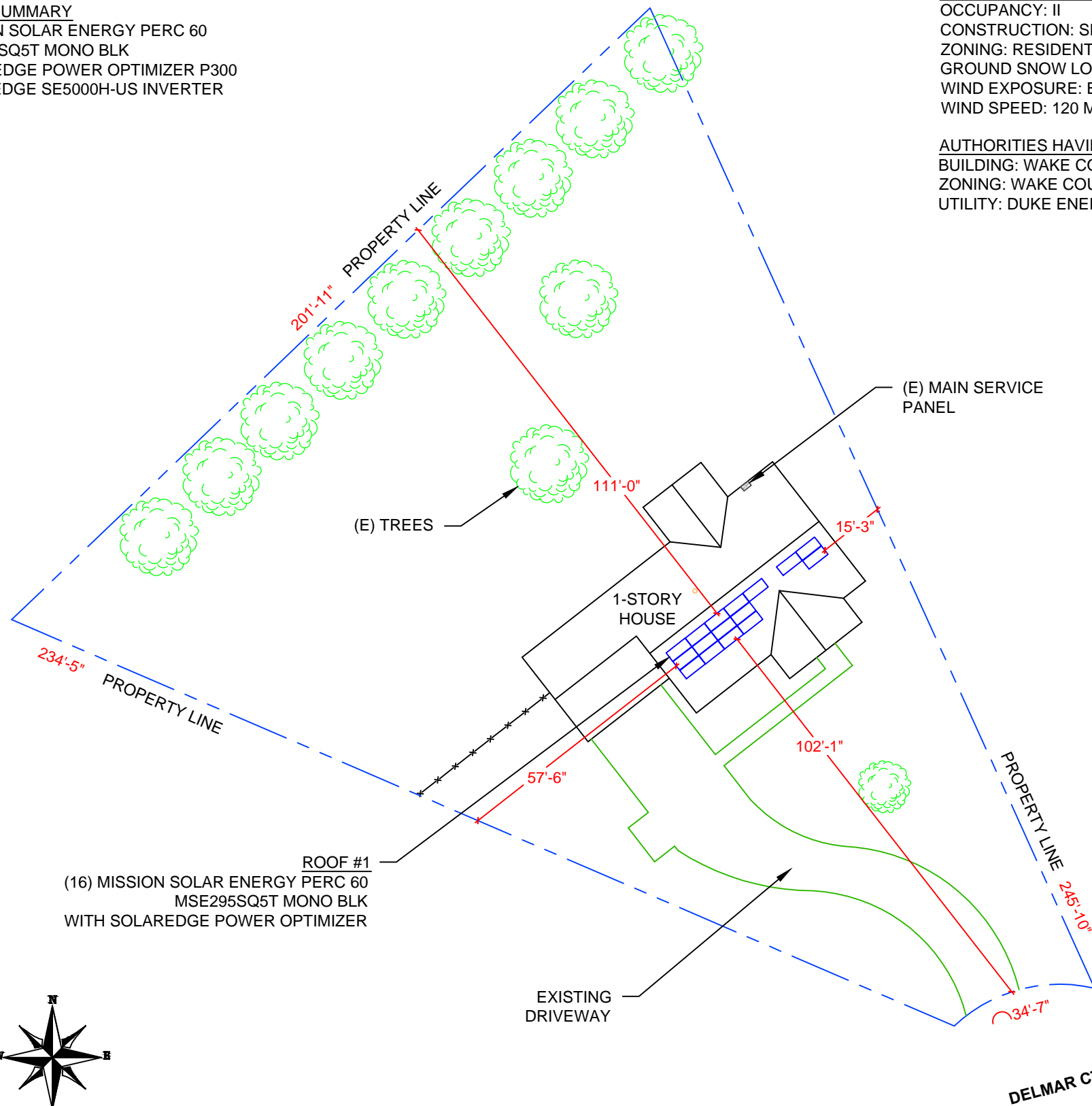


**3 VICINITY MAP**

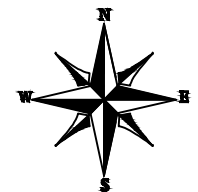
PV-1 SCALE: NTS

## 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



**ROOF #1**  
 (16) MISSION SOLAR ENERGY PERC 60  
 MSE295SQ5T MONO BLK  
 WITH SOLAREEDGE POWER OPTIMIZER



**1 PLOT PLAN WITH ROOF PLAN**

PV-1 SCALE: 0.002794

**POWERHOME SOLAR & ROOFING**  
 POWER HOME SOLAR, LLC  
 "POWER YOUR FUTURE"  
 919 N. MAIN ST.  
 MOORESVILLE, NC 28115  
 Phone: 704-800-6591 (OFFICE)  
 Email: info@powerhome.com  
 Web: www.powerhome.com

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal  
 DATE: 07/16/2018

**PROJECT NAME & ADDRESS**  
**DENNIS NORTHGRAVE RESIDENCE**  
 2424 DELMAR CT.,  
 FUQUAY VARINA, NC 27526

DESIGNED BY  
**PHS**

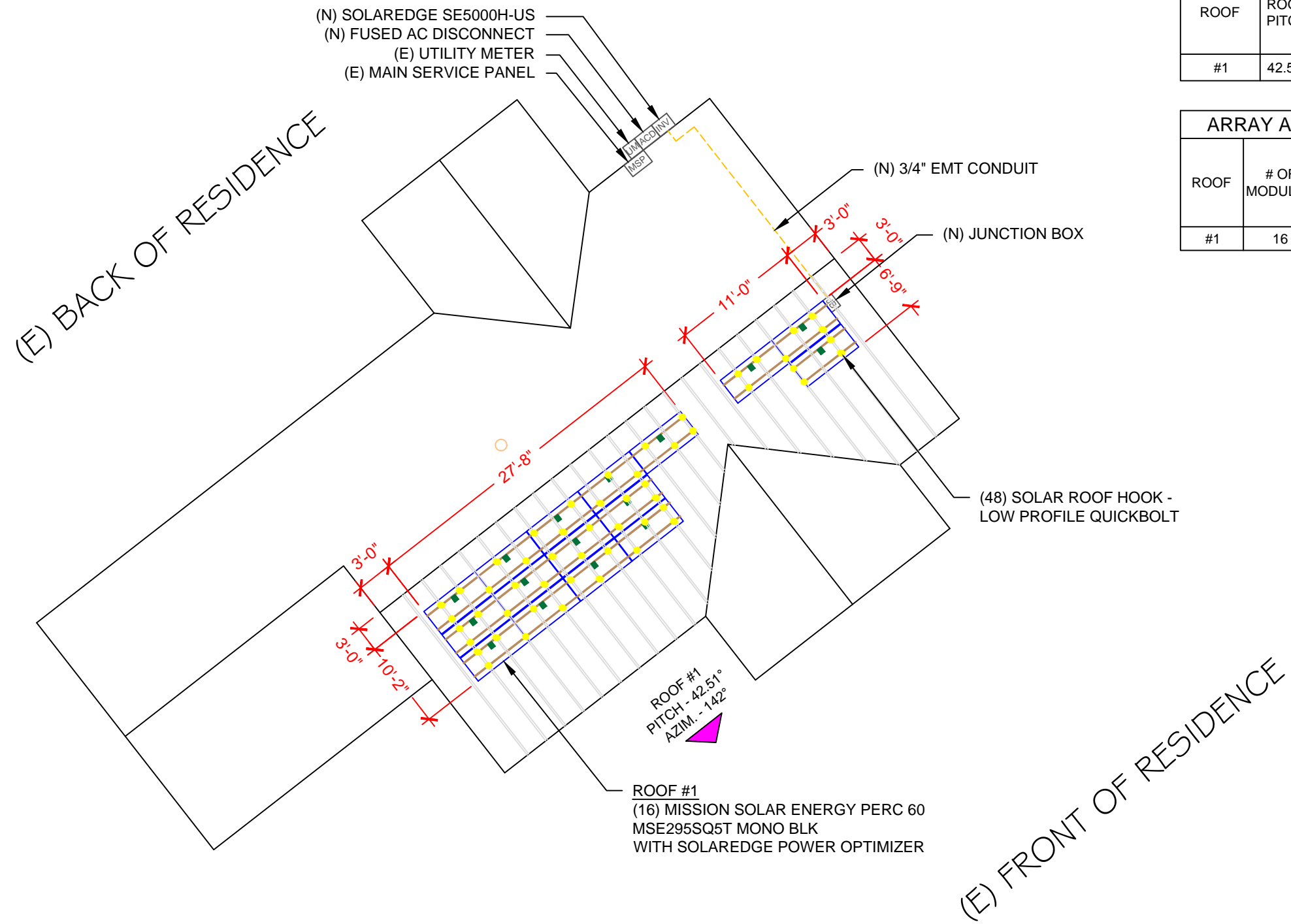
SHEET NAME  
**PLOT PLAN & VICINITY MAP**

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

SHEET NUMBER  
**PV-1**

# MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 16 MODULES  
 MODULE TYPE = MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLK  
 MODULE WEIGHT = 40.1 LBS / 18.2 KG.  
 MODULE DIMENSIONS = 65.51"x 39.33" = 17.89 SF



ROOF DESCRIPTION				
ROOF TYPE		COMPOSITE SHINGLE		
ROOF LAYER		1 LAYERS		
ROOF	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	42.51°	142°	2X4	24"

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	16	286.24	737.32	39

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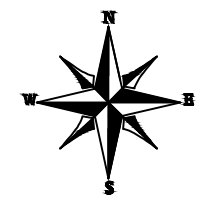
PROJECT NAME & ADDRESS  
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SHEET NAME  
**ROOF PLAN & MODULES**

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

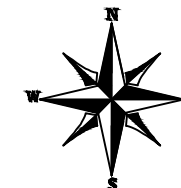
SHEET NUMBER  
**PV-2**



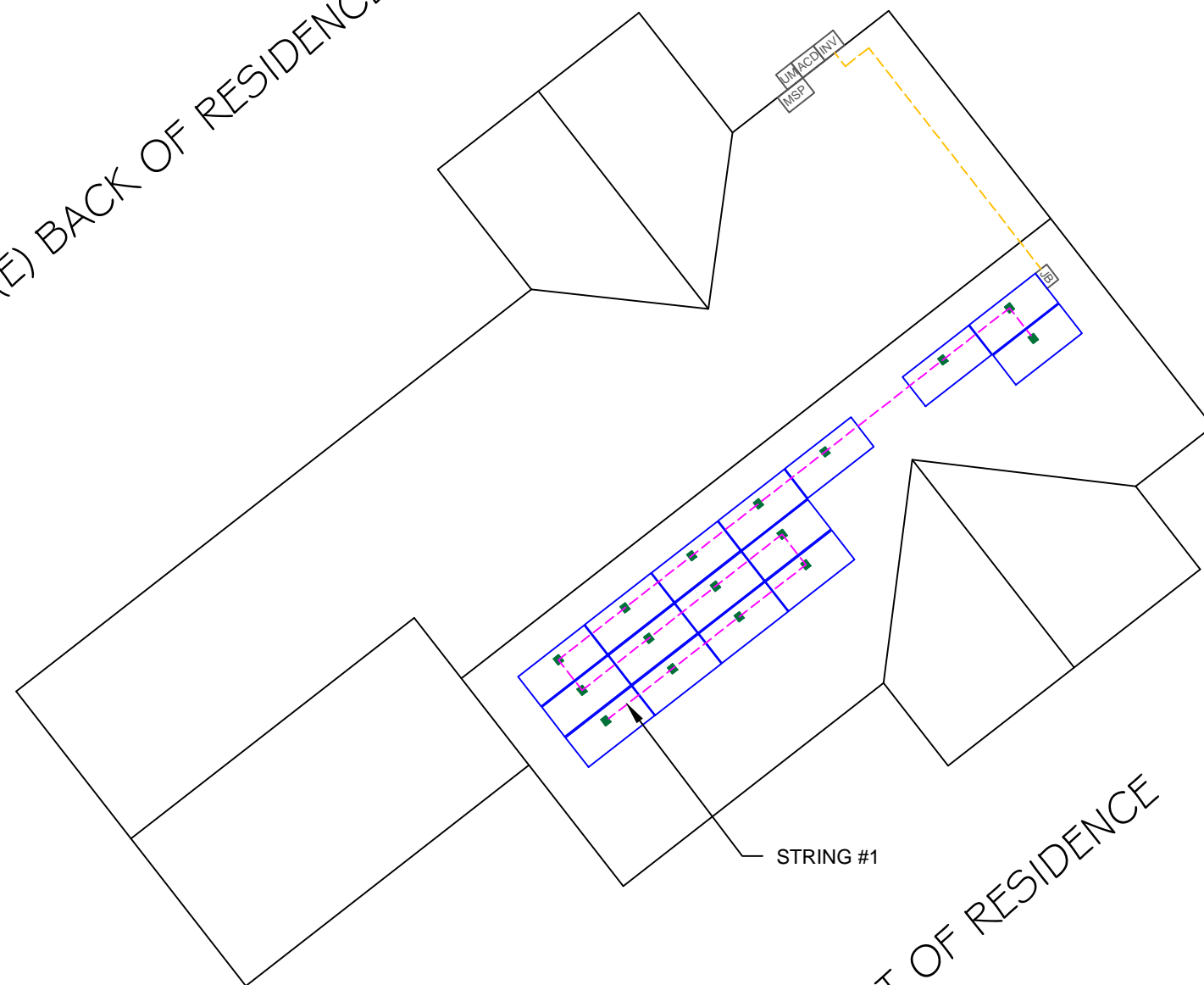
**MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLKMODULES**

65.51" x 39.33"

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



(E) BACK OF RESIDENCE



(E) FRONT OF RESIDENCE

STRING #1

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	16	MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLK
OPTIMIZER	16	SOLAREGE POWER OPTIMIZER P300
INVERTER	01	SOLAREGE SE5000H-US INVERTER
AC DISCONNECT	1	30A FUSED, (2) 30A FUSES, 240V, NEMA 3R, UL LISTED
SOLAR DECK	1	SOLAR DECKS
RAILS	16	IRONRIDGE XR10 RAIL 168" (14 FEET) BLACK
BONDED SPLICE	6	SPLICE KIT
MODULE CLAMPS	42	UNIVERSAL MODULE CLAMPS
GROUNDING LUG	5	IRONRIDGE GROUNDING LUG
END CLAMPS	20	END CLAMPS / STOPPER SLEEVE
ATTACHMENT	48	SRH LOW PROFILE QUICKBOLT
SQUARE-BOLT	48	SQUARE-BOLT BONDING ATTACHMENT HARDWARE

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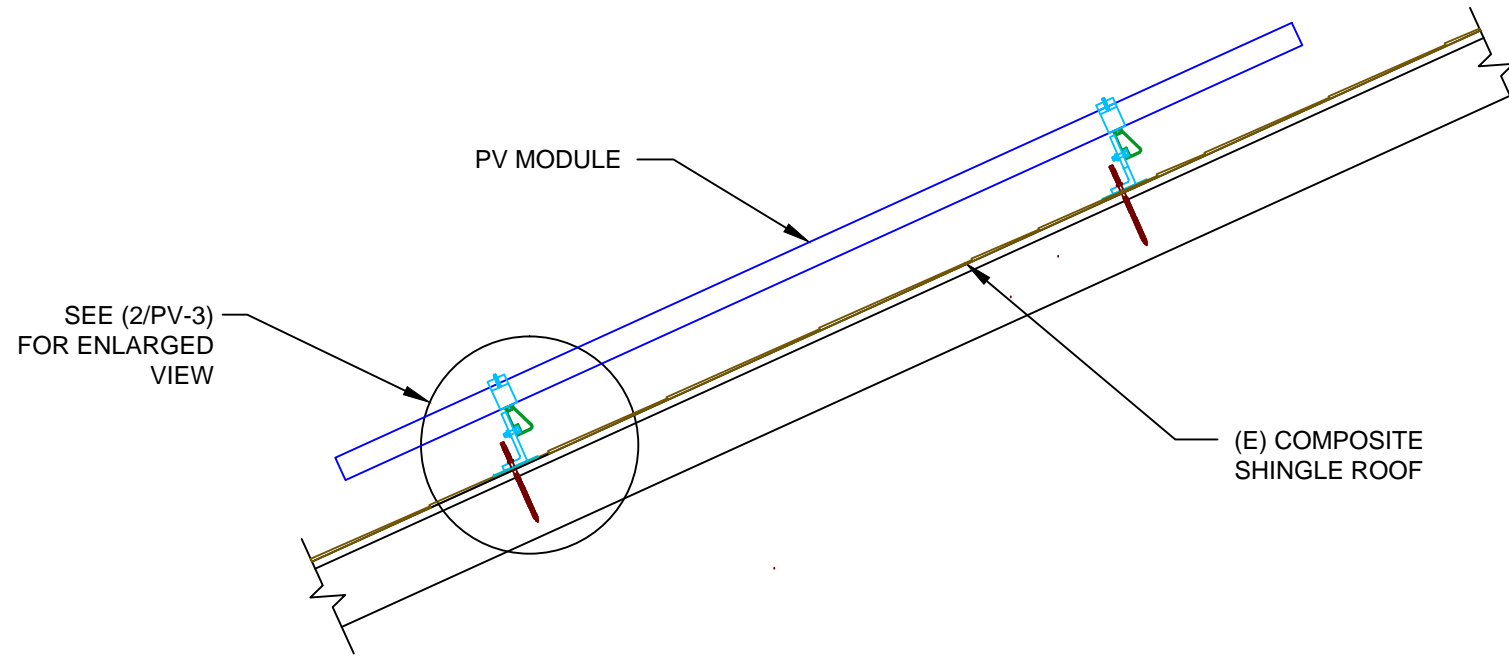
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 2424 DELMAR CT.,  
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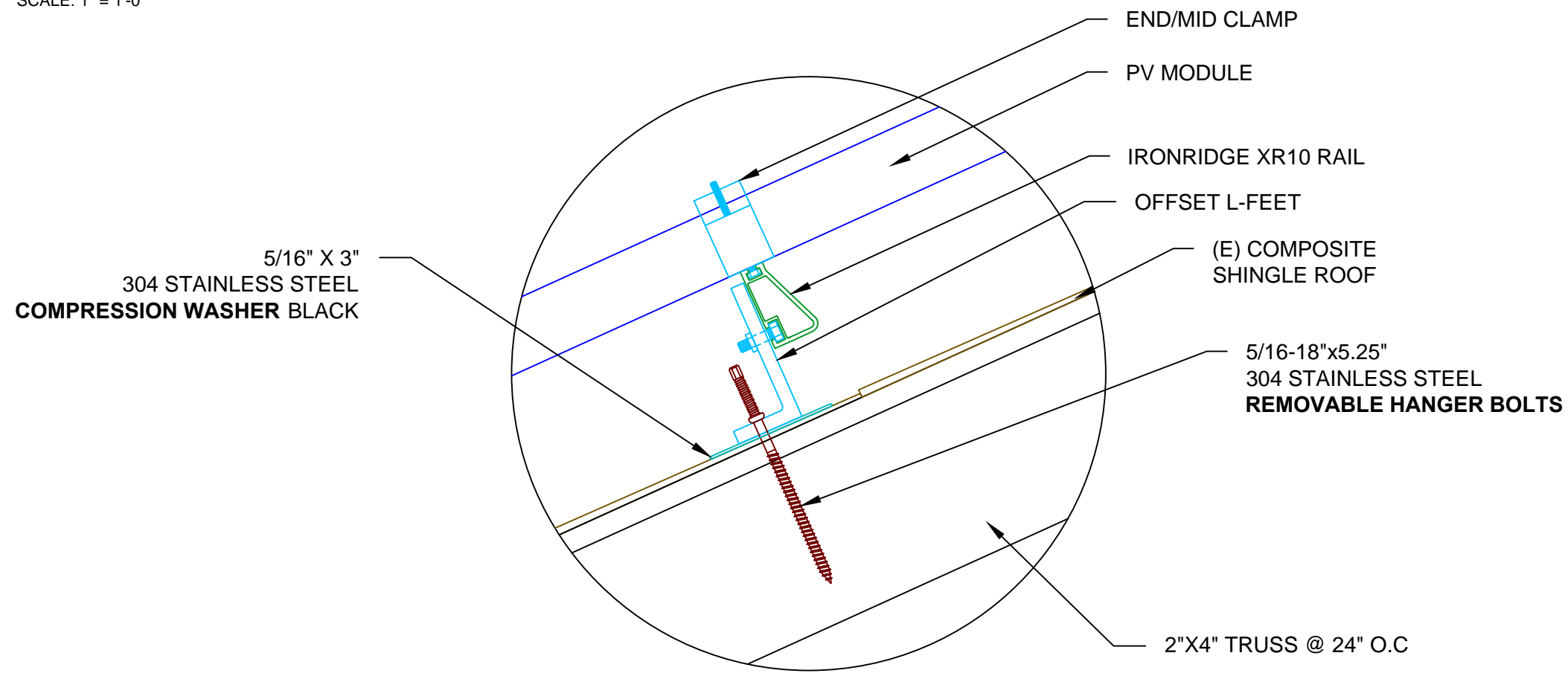
SHEET NAME  
**STRING LAYOUT**

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

SHEET NUMBER  
**PV-2A**



**1 | ATTACHMENT DETAIL**  
SCALE: 1" = 1'-0"



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

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SHEET NAME  
**ATTACHMENT DETAIL**

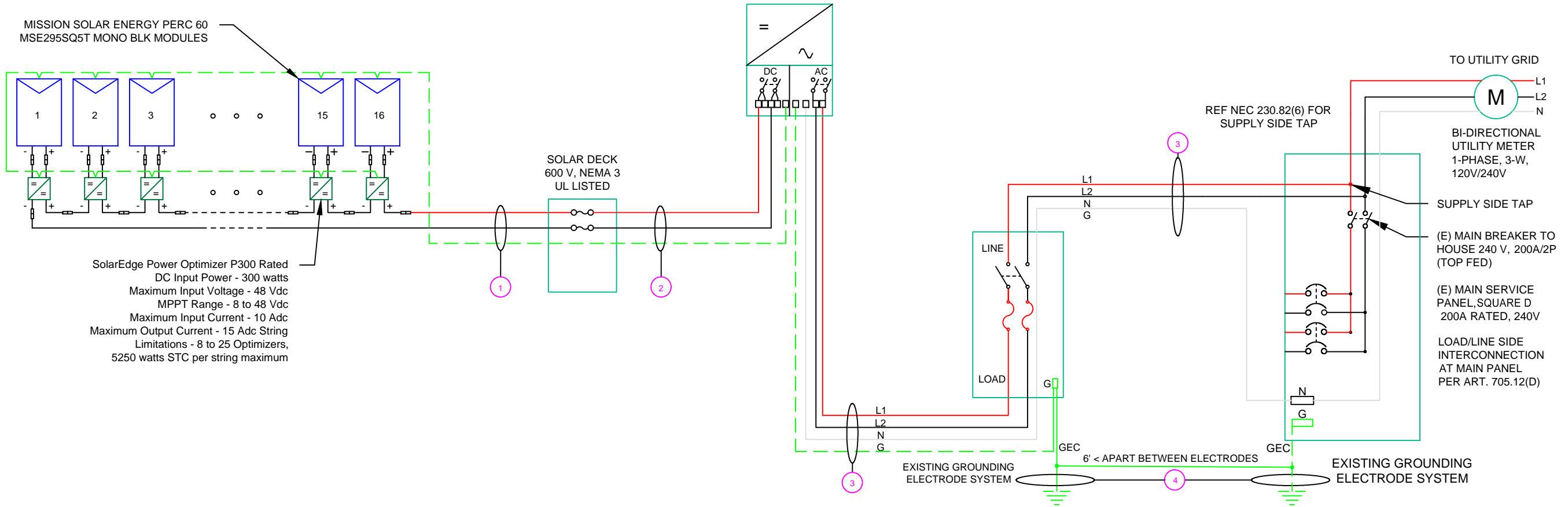
SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-3**

(16) MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MODULES  
 (1) STRING OF 16 MODULES CONNECTED IN SERIES

SOLAREGE SE5000H-US (240V)  
 OUTPUT: 240 VAC, 21A  
 99% CEC WEIGHTED EFFICIENCY  
 NEMA 3R, UL LISTED, INTERNAL GFDI  
 WITH INTEGRATED DC DISCONNECT

MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLK MODULES



SolarEdge Power Optimizer P300 Rated  
 DC Input Power - 300 watts  
 Maximum Input Voltage - 48 Vdc  
 MPPT Range - 8 to 48 Vdc  
 Maximum Input Current - 10 Adc  
 Maximum Output Current - 15 Adc String  
 Limitations - 8 to 25 Optimizers,  
 5250 watts STC per string maximum

AC DISCONNECT:  
 30A FUSED, (2) 30A FUSES,  
 240V NEMA 3R, UL LISTED

**! 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
(2)	#10AWG - PV WIRE/USE-2	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR	N/A	N/A
(2)	#10AWG - THWN-2	PVC, EMT OR FLEX IN ATTIC	3/4"
(1)	#6AWG - THWN-2 GND		
(3)	#6AWG - THWN-2	EMT OR PVC	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:	NORTHWEST
SERVICE FEED SOURCE:	OVERHEAD

# 1 ELECTRICAL LINE DIAGRAM

PV-4

SCALE: NTS

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**DENNIS NORTHGRAVE  
 RESIDENCE**  
 2424 DELMAR CT.,  
 FUQUAY VARINA, NC 27526

DESIGNED BY  
**PHS**

SHEET NAME  
**ELECTRICAL LINE  
 DIAGRAM**

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

SHEET NUMBER  
**PV-4**

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	MISSION SOLAR ENERGY PERC 60 MSE295SQ5T MONO BLK
VMP	32.72V
IMP	9.03A
VOC	40.11V
ISC	9.52A
TEMP. COEFF. VOC	-0.318%/°K
MODULE DIMENSION	65.51"L x 39.33"W x 1.57"D (In Inch)

INVERTER #1 SPECIFICATIONS	
MANUFACTURER / MODEL #	SOLAREEDGE SE5000H-US
NOMINAL AC POWER	5.0 KW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	21A

POWER OPTIMIZER (OPTIMIZER P300-2NM4ARS)	
MAXIMUM INPUT POWER	300W
MINIMUM INPUT VOLTAGE	8 VDC
MAXIMUM INPUT VOLTAGE	48VDC
MAXIMUM MODULE ISC	10 ADC
MAXIMUM OUTPUT CURRENT	15 ADC

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
.80	4-6
.70	7-9
.50	10-20

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-12°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	56°
CONDUCTOR TEMPERATURE RATE	90°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.318%/°K

### DC CONDUCTOR AMPACITY CALCULATIONS: ARRAY TO JUNCTION BOX:

EXPECTED WIRE TEMP (In Celsius)	56°
TEMP. CORRECTION PER TABLE (310.16)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	1.0
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	14.88A
1.25 X 1.25 X Isc	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC TABLE 310.16	
TEMP. CORRECTION PER TABLE (310.16) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	28.4A
Result should be greater than (14.88A) otherwise less the entry for circuit conductor size and ampacity	

### DC CONDUCTOR AMPACITY CALCULATIONS: FROM JUNCTION BOX TO INVERTER:

AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c)	+22°
EXPECTED WIRE TEMP (In Celsius)	34°+22° = 56°
TEMP. CORRECTION PER TABLE (310.16)	0.71
NO. OF CURRENT CARRYING CONDUCTORS	2
CONDUIT FILL CORRECTION PER NEC 310.15(B)(2)(a)	1.0
CIRCUIT CONDUCTOR SIZE	10AWG
CIRCUIT CONDUCTOR AMPACITY	40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	14.88A
1.25 X 1.25 X Isc	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC TABLE 310.16	
TEMP. CORRECTION PER TABLE (310.16) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(2)(a) X CIRCUIT CONDUCTOR AMPACITY	28.4A
Result should be greater than (14.88A) otherwise less the entry for circuit conductor size and ampacity	

### AC CONDUCTOR AMPACITY CALCULATIONS:

No. OF INVERTER	1
EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER TABLE (310.16)	0.96
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC 310.15(B)(2)(a)	1
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY	75A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B)	26.25A
1.25 X MAX INVERTER OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC TABLE 310.16	
TEMP. CORRECTION PER TABLE (310.16) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(2)(a) X CIRCUIT CONDUCTOR AMPACITY	72A
Result should be greater than (26.25A) otherwise less the entry for circuit conductor size and ampacity	



REVISIONS		
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Signature with Seal

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**DENNIS NORTHGRAVE  
RESIDENCE**

2424 DELMAR CT.,  
FUQUAY VARINA, NC 27526

DESIGNED BY

**PHS**

SHEET NAME

**WIRING  
CALCULATIONS**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-5**

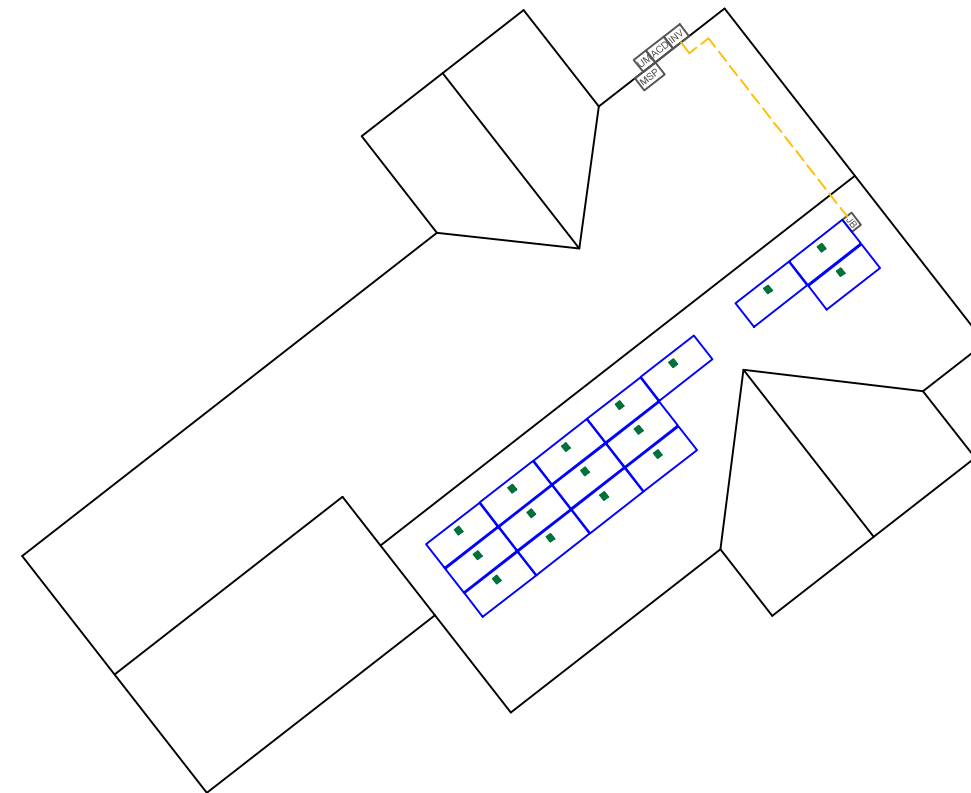
### ELECTRICAL NOTES

- 1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- 3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- 4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- 5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- 6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- 7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- 9.) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- 10.) THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE

1-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80 81-90 91-100 101-110 111-120 121-130

1														
2														
3														
4														
5														

# SOLAREEDGE OPTIMIZER CHART



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SHEET NAME

**SOLAREEDGE OPTIMIZER CHART**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-6**

# MSE PERC 60

High Power PERC Rooftop Module



Class Leading Output:  
300W power



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



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



Certified Reliability:  
3X IEC, salt mist, ammonia



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.



Assembled  
in the USA

## 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.

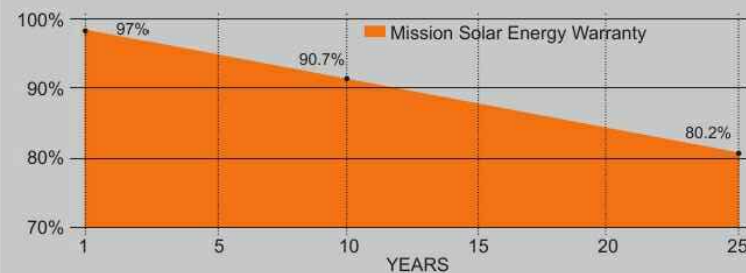
## Outstanding performance with PERC

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



## CERTIFICATIONS

IEC 61215/ IEC 61730/ IEC 61701 UL 1703



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

## ELECTRICAL SPECIFICATIONS

Electrical parameters at Standard Test Condition (STC)

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

STC: Irradiance 1000 W/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 Pmax	-0.427%/°C
Temperature Coefficient of Voc	-0.318%/°C
Temperature Coefficient of Isc	0.042%/°C

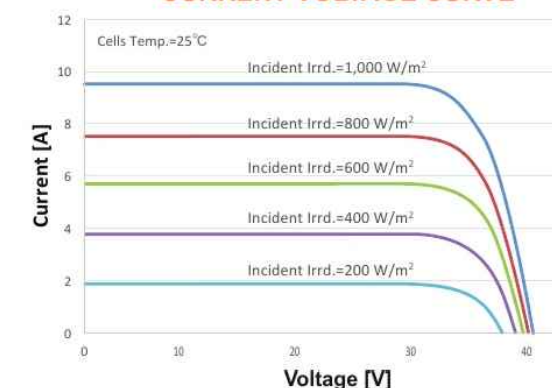
## OPERATING CONDITIONS

Maximum System Voltage	1,000VDC
Operating Temperature Range	-40°C (-40°F) to +90°C (194°F)
Maximum Series Fuse Rating	15A
Fire Safety Classification	Type 1, Class C
Front & Back Load (UL standard)	5600 Pa (117 psf) <b>New!</b>
Hail Safety Impact Velocity	25mm at 23 m/s

## MECHANICAL DATA

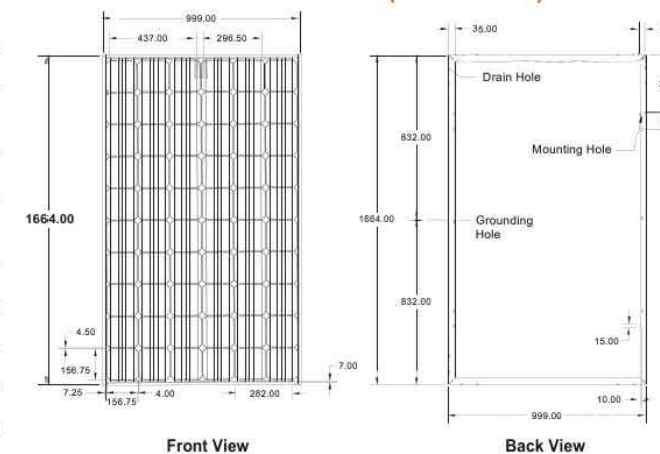
Solar Cells	P-type Mono-crystalline Silicon (156.75mm)
Cell orientation	60 cells (6x10), 4 busbar
Module dimension	1664mm x 999mm x 40mm (65.51 in. x 39.33 in. x 1.57 in.)
Weight	18.2 kg (40.1 lb)
Front Glass	3.2mm (0.126 in.) tempered, Low-iron, Anti-reflective coating
Frame	Anodized aluminum alloy
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

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



Current-voltage characteristics with dependence on irradiance and module temperature

## BASIC DESIGN (UNITS: mm)



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

Rev. 7.03

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



## REVISIONS

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DESIGNED BY

PHS

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-7





# SolarEdge Single Phase Inverters for North America

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



INVERTERS

### Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Integrated arc fault protection for NEC 2011 690.11 and integrated rapid shutdown for NEC 2014 690.12
- 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)



USA-CANADA-GERMANY-ITALY-FRANCE-JAPAN-CHINA-AUSTRALIA-THE NETHERLANDS-UK-ISRAEL-TURKEY-SOUTH AFRICA-BULGARIA [www.solaredge.us](http://www.solaredge.us)



## Single Phase Inverters for North America

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

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	
<b>OUTPUT</b>						
Rated AC Power Output	3000	3800	5000	6000	7600	VA
Max. AC Power Output	3000	3800	5000	6000	7600	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 208V	-	-	24	-	-	A
Maximum Continuous Output Current 240V	12.5	16	21	25	32	A
GFDI Threshold	-	-	1	-	-	A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	-	-	Yes	-	-	
<b>INPUT</b>						
Maximum DC Power	4650	5900	7750	9300	11800	W
Transformer-less, Ungrounded	-	-	Yes	-	-	
Maximum Input Voltage	-	-	480	-	-	Vdc
Nominal DC Input Voltage	-	-	380	-	400	Vdc
Maximum Input Current 208V	-	-	15.5	-	-	Adc
Maximum Input Current 240V	8.5	10.5	13.5	16.5	20	Adc
Max. Input Short Circuit Current	-	-	45	-	-	Adc
Reverse-Polarity Protection	-	-	Yes	-	-	
Ground-Fault Isolation Detection	-	-	600k <sub>Ω</sub> Sensitivity	-	-	
Maximum Inverter Efficiency	99	-	99.2	-	-	%
CEC Weighted Efficiency	-	-	99	-	-	%
Nighttime Power Consumption	-	-	< 2.5	-	-	W
<b>SELF-SUSTAINING POWER OUTLET (OPTIONAL)</b>						
Nominal Output Voltage	-	-	120	-	-	V
Maximum Output Power	-	-	1500 <sup>(2)</sup>	-	-	W
External Outlet with GFDI	-	-	Yes	-	-	
<b>ADDITIONAL FEATURES</b>						
Supported Communication Interfaces	-	-	RS485, Ethernet, ZigBee (optional), Cellular (optional)	-	-	
Revenue Grade Data, ANSI C12.20	-	-	Optional <sup>(3)</sup>	-	-	
Rapid Shutdown - NEC 2014 690.12	-	-	Automatic Rapid Shutdown upon AC Grid Disconnect	-	-	
<b>STANDARD COMPLIANCE</b>						
Safety	-	-	UL1741, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07	-	-	
Grid Connection Standards	-	-	IEEE1547, Rule 21, Rule14 (HI)	-	-	
Emissions	-	-	FCC Part 15 Class B	-	-	
<b>INSTALLATION SPECIFICATIONS</b>						
AC Output Conduit Size / AWG Range	-	-	0.75-1" Conduit / 14-6 AWG	-	-	
DC Input Conduit Size / # of Strings / AWG Range	-	-	0.75-1" Conduit / 1-2 strings / 14-6 AWG	-	-	
Dimensions with Safety Switch (HxWxD)	-	-	17.7 x 14.6 x 6.8 / 450 x 370 x 174	-	-	in / mm
Weight with Safety Switch	-	-	25.3 / 11.5	-	-	lb / kg
Noise	-	-	< 25	-	-	dB(A)
Cooling	-	-	Natural Convection	-	-	
Operating Temperature Range	-	-	-13 to +140 / -25 to +60 <sup>(4)</sup> (-40°F / -40°C option) <sup>(5)</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> Depends on PV availability.  
<sup>(3)</sup> Revenue grade inverter P/N: SExxxxH-US000NNC2.  
<sup>(4)</sup> Power de-rating from 50°C.  
<sup>(5)</sup> -40 version P/N: SExxxxH-US000NNU4.



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### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 07/16/2018

### PROJECT NAME & ADDRESS

DENNIS NORTHGRAVE  
 RESIDENCE  
 2424 DELMAR CT.,  
 FUQUAY VARINA, NC 27526

DESIGNED BY

PHS

SHEET NAME  
 EQUIPMENT  
 SPECIFICATION

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-8



# 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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www.solaredge.us



# 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)	
<b>INPUT</b>					
Rated Input DC Power <sup>(1)</sup>	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	10.1		Adc
Maximum DC Input Current	12.5	13.75	12.63		Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.8				%
Overvoltage Category	II				
<b>OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)</b>					
Maximum Output Current	15				Adc
Maximum Output Voltage	60		85		Vdc
<b>OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)</b>					
Safety Output Voltage per Power Optimizer	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 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 50 / 5 x 5.97 x 1.96		mm / in
Weight (including cables)	760 / 1.7	830 / 1.8	1064 / 2.3		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				°C / °F
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.

PV SYSTEM DESIGN USING A SOLAREEDGE INVERTER <sup>(2)</sup>	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			

<sup>(2)</sup> It is not allowed to mix P405 with P300/P400/P600/P700 in one string.



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REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 07/16/2018

PROJECT NAME & ADDRESS

DENNIS NORTHGRAVE  
RESIDENCE  
2424 DELMAR CT.,  
FUQUAY VARINA, NC 27526

DESIGNED BY

PHS

SHEET NAME

EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

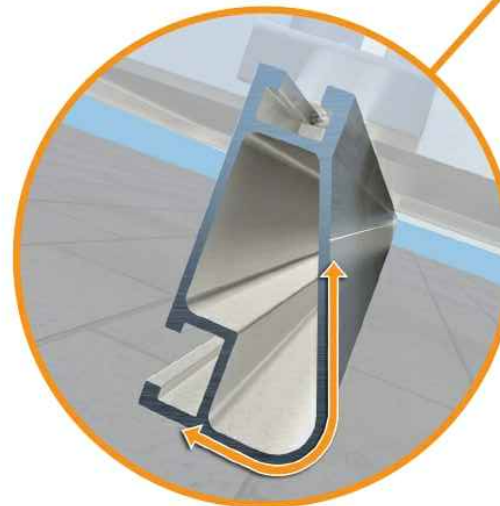
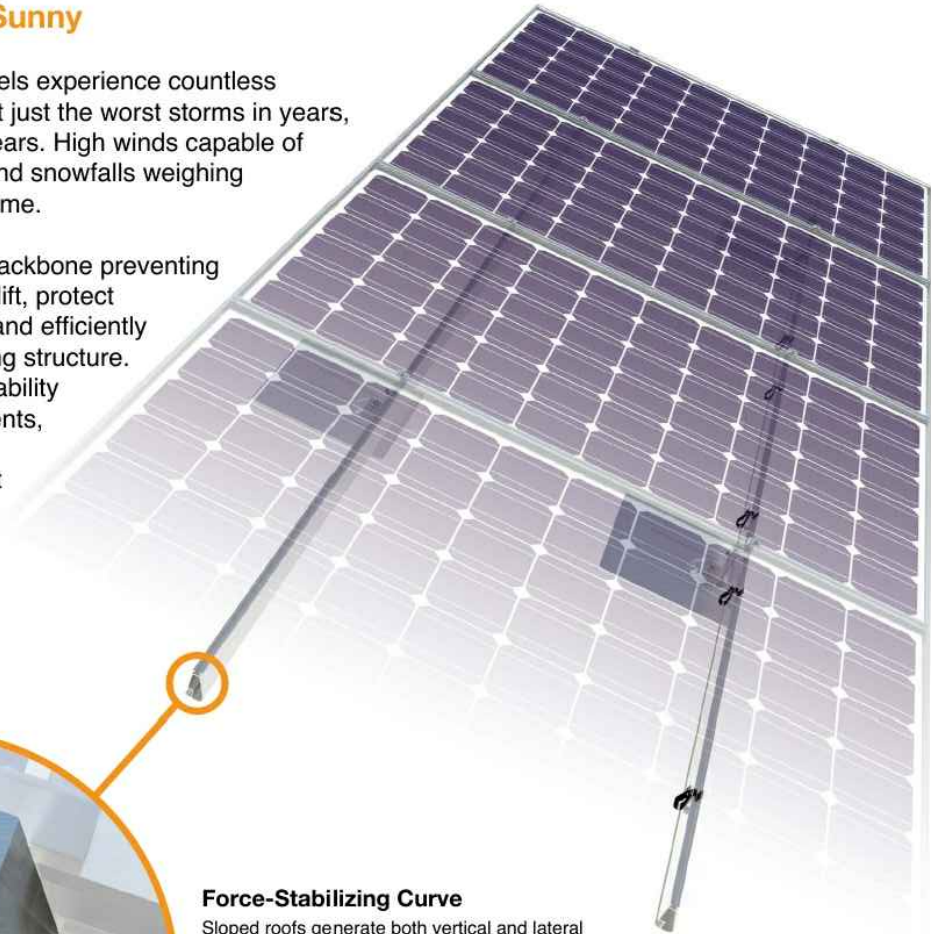
PV-9

# 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.



### 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	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

REVISIONS		
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**DENNIS NORTHGRAVE RESIDENCE**

2424 DELMAR CT.,  
 FUQUAY VARINA, NC 27526

DESIGNED BY

**PHS**

SHEET NAME

**EQUIPMENT SPECIFICATION**

SHEET SIZE

**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-10**

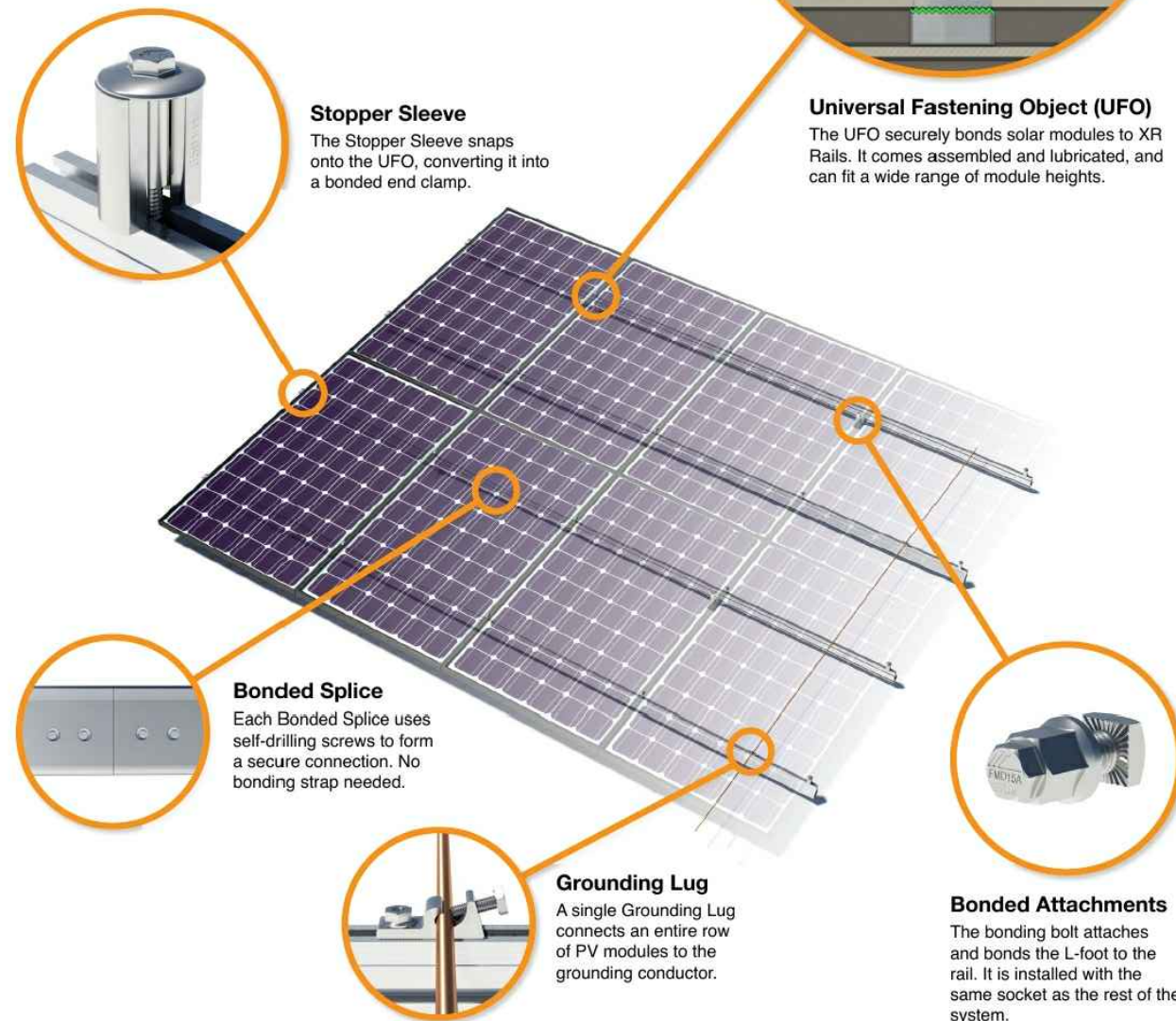


## UFO Family of Components

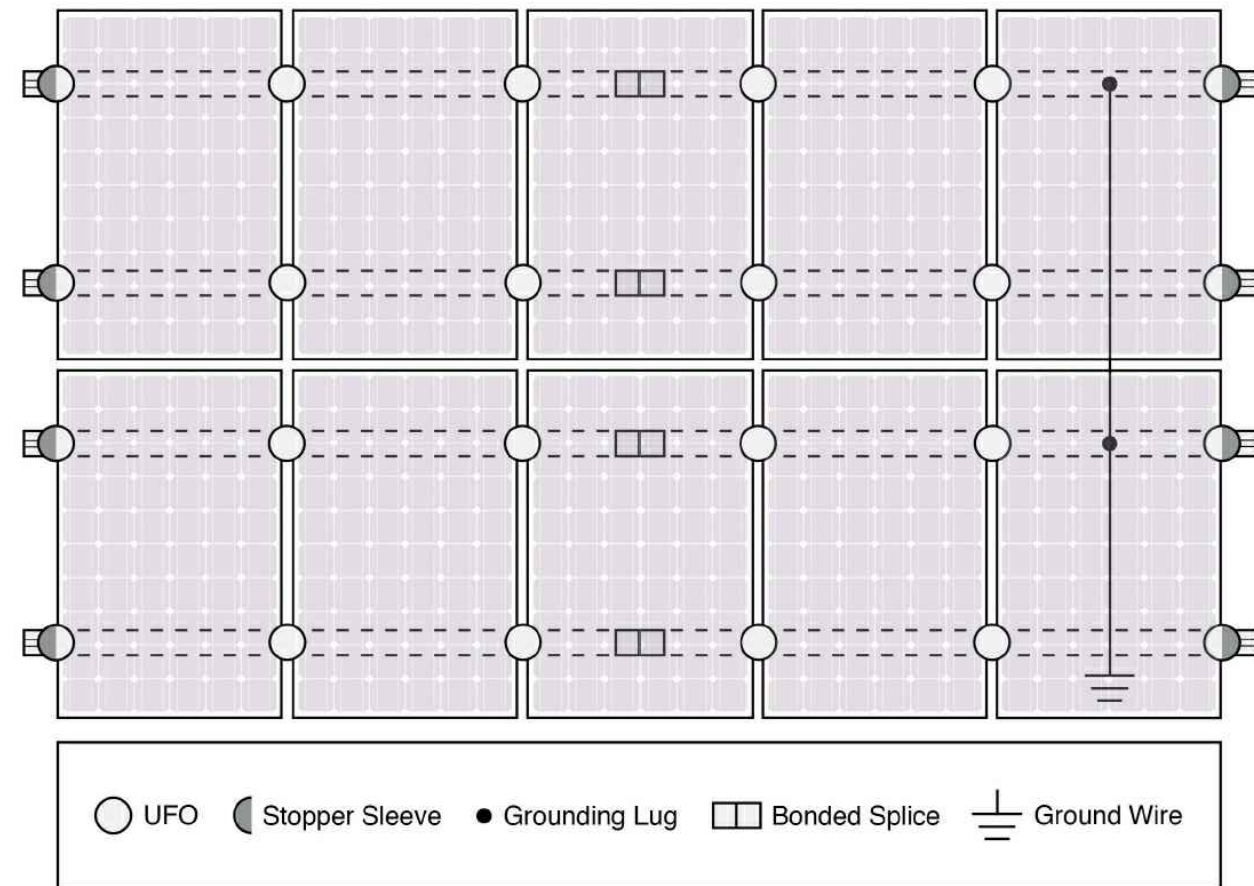
### Simplified Grounding for Every Application

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.



### 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://IronRidge.com/UFO)

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



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**EQUIPMENT SPECIFICATION**

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

SHEET NUMBER  
**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

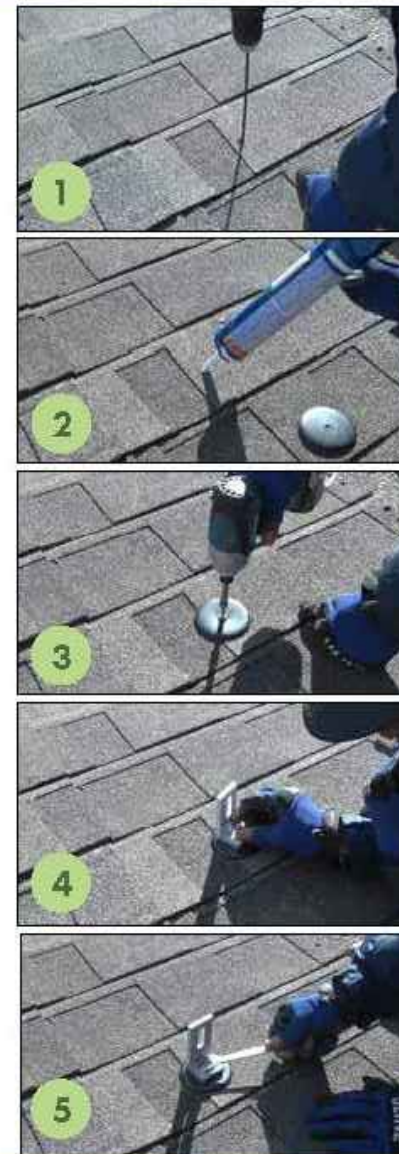
- Rafter locator
- Chalk or crayon
- 3/16" Drill Bit
- Roofing Manufacturer's approved sealant

### 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.



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SolarRoofHook is a division of Quickscrews International Corp.

INSTALLATION VIDEOS, SPEC SHEETS, & TEST RESULTS AVAILABLE ON  
[WWW.SOLARROOFHOOK.COM](http://WWW.SOLARROOFHOOK.COM)



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EQUIPMENT  
SPECIFICATION

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ANSI B  
11" X 17"

SHEET NUMBER

PV-12