

PHOTOVOLTAIC ROOF MOUNT SYSTEM

16 MODULES-ROOF MOUNTED - 6.320 kW DC, 6.000 kW AC

667 ANGEL OAK DR, BUNNLEVEL, NC 28323



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	



STRUCTURAL ONLY
08/22/2023

PROJECT NAME & ADDRESS

MATTHEW WELLS
TAYLOR
RESIDENCE
667 ANGEL OAK DR,
BUNNLEVEL, NC 28323

DRAWN BY

ESR

SHEET NAME

COVER SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-1

PROJECT DATA

PROJECT ADDRESS: 667 ANGEL OAK DR, BUNNLEVEL, NC 28323
OWNER: MATTHEW WELLS TAYLOR
DESIGNER: ESR

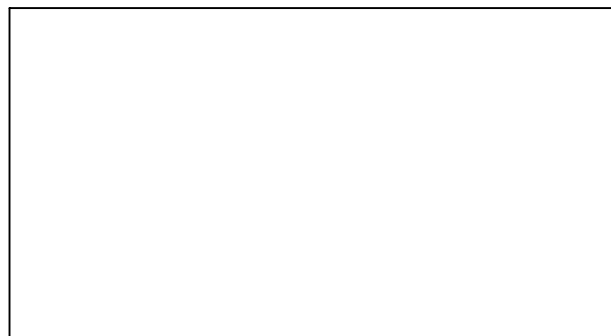
SCOPE: 6.320 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH 16 MISSION SOLAR: MSE395SX9R 395W PV MODULES WITH 16 SOLAREEDGE: S440 POWER OPTIMIZERS AND 01 SOLAREEDGE: SE6000H-US (240V/6000W) INVERTER

AUTHORITIES HAVING JURISDICTION:
BUILDING: HARNETT COUNTY
ZONING: HARNETT COUNTY
UTILITY: SOUTH RIVER EMC

SHEET INDEX

PV-1 COVER SHEET
PV-2 SITE PLAN
PV-3 ROOF PLAN & MODULES
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PV-5 STRUCTURAL DETAIL
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PV-7 WIRING CALCULATIONS
PV-8 LABELS
PV-9+ EQUIPMENT SPECIFICATIONS

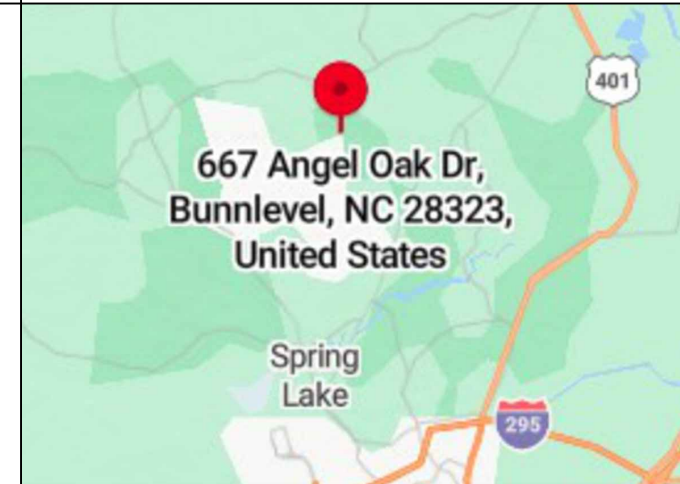
SIGNATURE



GENERAL NOTES

- ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
- THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2017.
- THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
- ALL CONDUCTORS OF A CIRCUIT, INCLUDING THE EGC, MUST BE INSTALLED IN THE SAME RACEWAY, OR CABLE, OR OTHERWISE RUN WITH THE PV ARRAY CIRCUIT CONDUCTORS WHEN THEY LEAVE THE VICINITY OF THE PV ARRAY.
- WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
- HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH CEC 690.47 AND 250.50 THROUGH 60 AND 250-166 SHALL BE PROVIDED. PER NEC GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT. GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO LARGER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
- PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
- PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE. WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF THE ROOF SURFACE.
- ALL SINAGE TO BE PLACED IN ACCORDANCE WITH THE LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SINAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
- INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE UL 1741 LISTED.
- THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
- SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
- PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
- DISCONNECTING MEANS SHALL BE LOCATED IN A VISIBLE, READILY ACCESSIBLE LOCATION WITHIN THE PV SYSTEM EQUIPMENT OR A MAXIMUM OF 10 FEET AWAY FROM THE SYSTEM [NEC 690.13(A)]
- ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
- WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
- ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
- ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.

VICINITY MAP



HOUSE PHOTO



CODE REFERENCES

2018 NORTH CAROLINA BUILDING CODE
2018 NORTH CAROLINA RESIDENTIAL CODE
2018 NORTH CAROLINA FIRE CODE
2017 NATIONAL ELECTRICAL CODE



PROJECT DESCRIPTION:

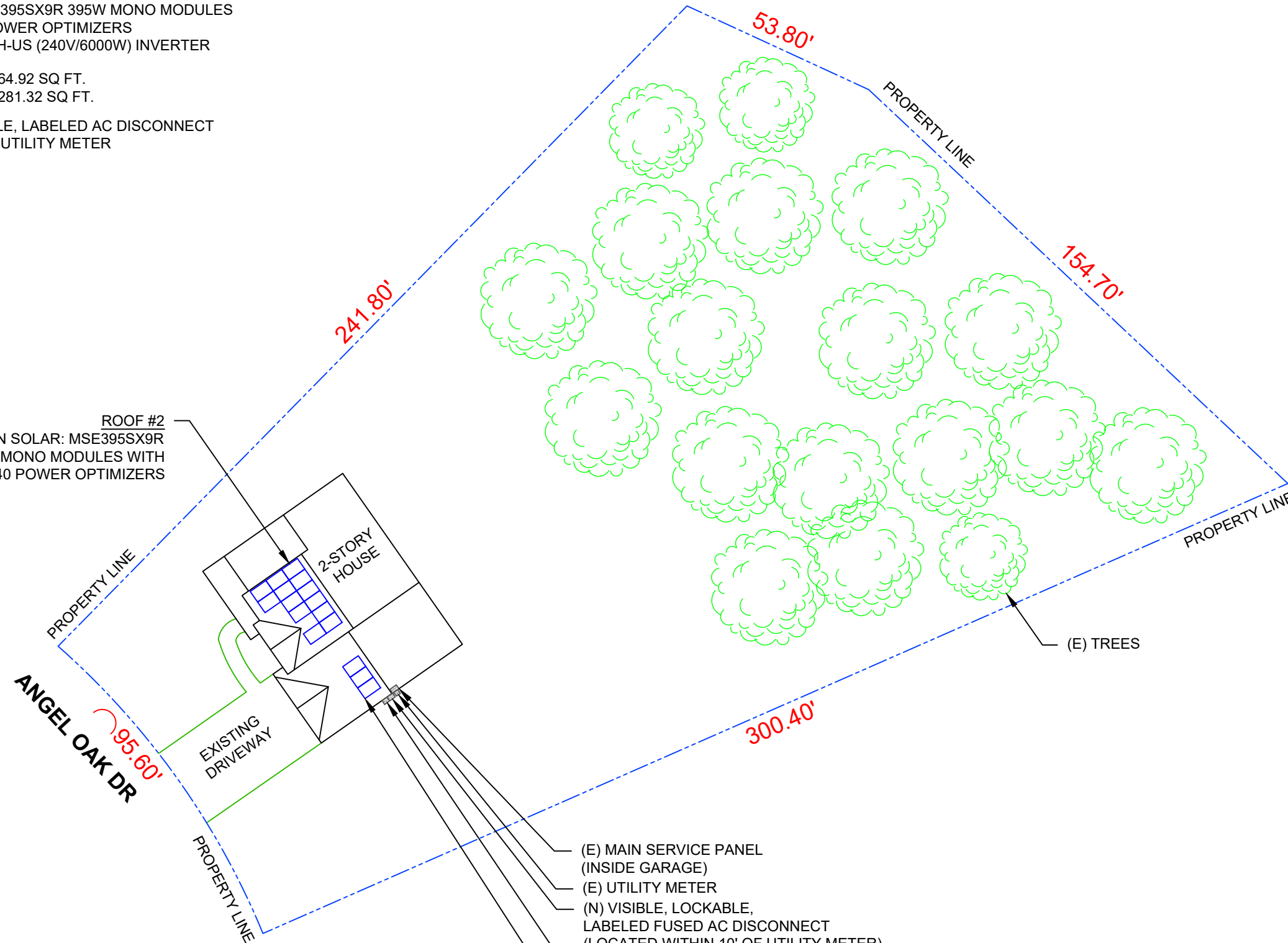
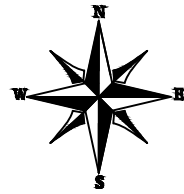
16 X MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
 DC SYSTEM SIZE: 6.320 kW DC
 AC SYSTEM SIZE: 6.000 kW AC

EQUIPMENT SUMMARY

16 MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 16 SOLAREEDGE: S440 POWER OPTIMIZERS
 01 SOLAREEDGE: SE6000H-US (240V/6000W) INVERTER

ROOF ARRAY AREA #1:- 64.92 SQ FT.
 ROOF ARRAY AREA #2:- 281.32 SQ FT.

NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT
 LOCATED WITHIN 10' OF UTILITY METER



ROOF #2
 (13) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH
 SOLAREEDGE: S440 POWER OPTIMIZERS

- (E) MAIN SERVICE PANEL (INSIDE GARAGE)
- (E) UTILITY METER
- (N) VISIBLE, LOCKABLE, LABELED FUSED AC DISCONNECT (LOCATED WITHIN 10' OF UTILITY METER)
- (N) SOLAREEDGE: SE6000H-US (240V/6000W) INVERTER

ROOF #1
 (3) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH
 SOLAREEDGE: S440 POWER OPTIMIZERS

DESIGN SPECIFICATION
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER
 WIND EXPOSURE: REFER STRUCTURAL LETTER
 WIND SPEED: REFER STRUCTURAL LETTER



TOP TIER SOLAR SOLUTIONS
 1530 CENTER PARK DR #2911,
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ESR

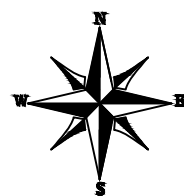
SHEET NAME
SITE PLAN

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

SHEET NUMBER
PV-2

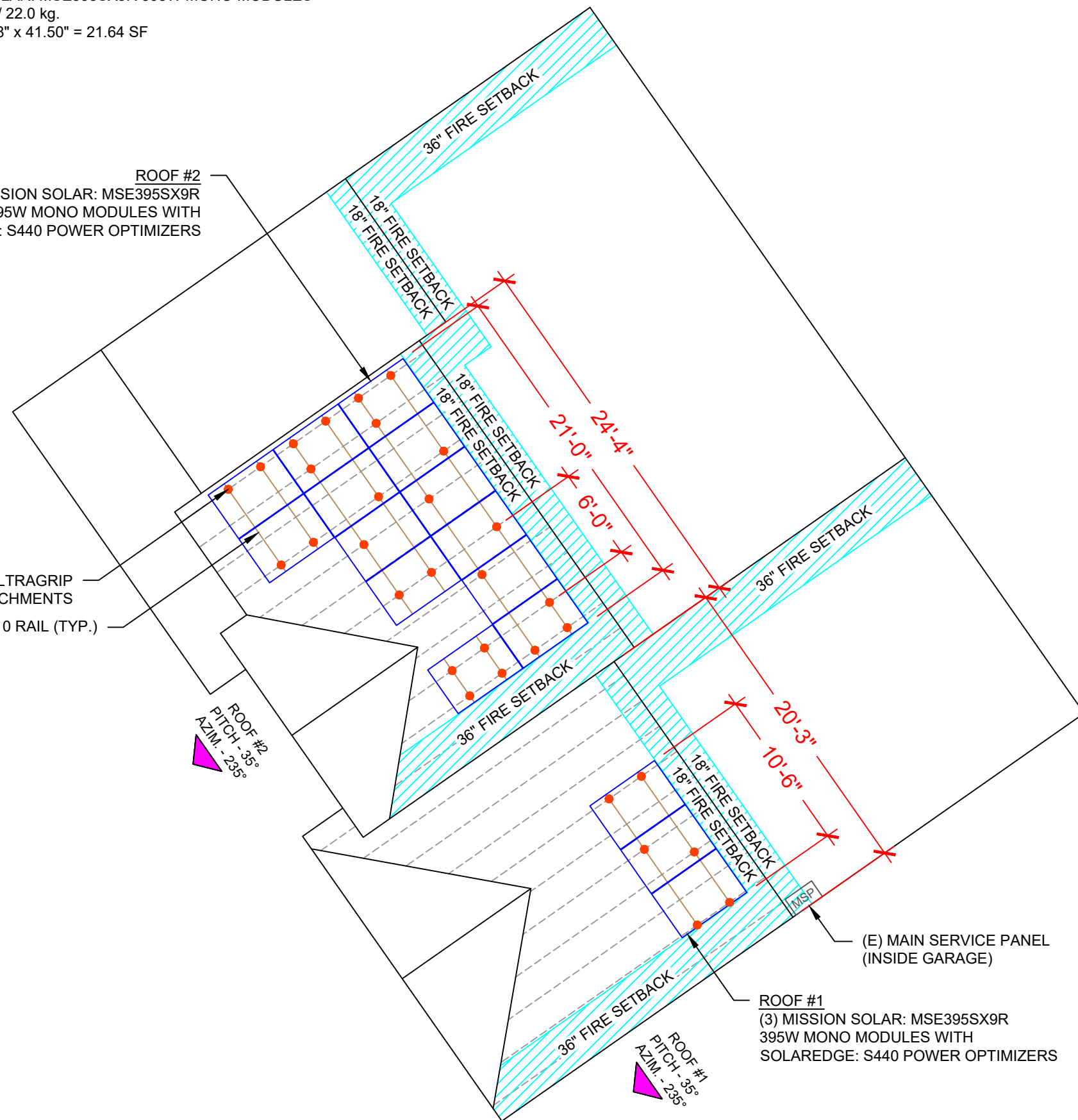
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 16 MODULES
 MODULE TYPE = MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 MODULE WEIGHT = 48.5 LBS / 22.0 kg.
 MODULE DIMENSIONS = 75.08" x 41.50" = 21.64 SF



ROOF #2
 (13) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH
 SOLAREEDGE: S440 POWER OPTIMIZERS

IRONRIDGE HALO ULTRAGRIP
 ATTACHMENTS
 (N) IRONRIDGE XR-10 RAIL (TYP.)

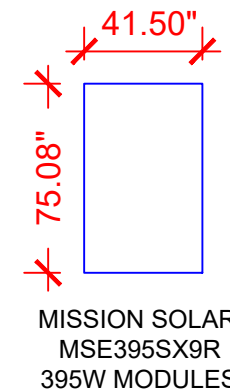


ROOF #2
 PITCH - 35°
 AZIM. - 235°

ROOF #1
 PITCH - 35°
 AZIM. - 235°

ROOF #1
 (3) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH
 SOLAREEDGE: S440 POWER OPTIMIZERS

(E) MAIN SERVICE PANEL
 (INSIDE GARAGE)



ROOF DESCRIPTION					
ROOF TYPE			ASPHALT SHINGLE		
ROOF LAYER			1 LAYER		
ROOF	# OF MODULES	ROOF PITCH	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	3	35°	235°	2"X4"	24"
#2	13	35°	235°	2"X4"	24"

ARRAY AREA & ROOF AREA CALC'S		
TOTAL PV ARRAY AREA (SQ. FT.)	TOTAL ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
346.24	2543.87	14

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NORTH CAROLINA PROFESSIONAL ENGINEER
 STA. 056324
TREVOR JONES
 ENGINEER
 STRUCTURAL ONLY
 08/22/2023

PROJECT NAME & ADDRESS

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ESR

SHEET NAME
ROOF PLAN & MODULES

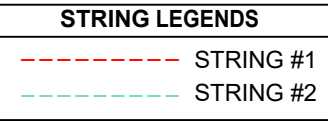
SHEET SIZE
**ANSI B
 11" X 17"**

SHEET NUMBER
PV-3

LEGEND

- [JB] - JUNCTION BOX
- [INV] - INVERTER
- [ACD] - AC DISCONNECT
- [UM] - UTILITY METER
- [MSP] - MAIN SERVICE PANEL
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- — — - TRUSS
- - - - - CONDUIT

DC SYSTEM SIZE: 6.320 kW DC
 AC SYSTEM SIZE: 6.000 kW AC
 (16) MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 WITH (16) SOLAREEDGE: S440 POWER OPTIMIZERS
 LOCATED UNDER EACH PANEL AND
 01 SOLAREEDGE: SE6000H-US (240V/6000W) INVERTER



BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
SOLAR PV MODULES: MISSION SOLAR: MSE395SX9R 395W MODULE	16
OPTIMIZERS: SOLAREEDGE: S440 POWER OPTIMIZERS	16
INVERTER: SOLAREEDGE: SE6000H-US (240V/6000W) INVERTER	01
JUNCTION BOXES: JUNCTION BOX UL 1741, NEMA 3R CSA C22.2 NO.290	2
AC DISCONNECT: FUSED AC DISCONNECT, 60A FUSED, (2) 35A FUSES 240V NEMA 3R, UL LISTED	1
IRONRIDGE XR10 RAIL (RAIL 168" (14 FEET) CLEAR) (XR-10-168A)	14
BONDED SPLICE, XR10 (XR10-BOSS-01-M1)	4
UNIVERSAL MODULE CLAMP, CLEAR (UFO-CL-01-A1)	42
STOPPER SLEEVE, 40MM, MILL (UFO-STP-40MM-M1)	20
GROUNDING LUG (XR-LUG-03-A1)	5
IRONRIDGE HALO ULTRAGRIP ATTACHMENTS (QM-HUG-01-M1)	31
RD STRUCTURAL SCREW,3.0L (HW-RD1430-01-M1)	62
SQUARE-BOLT BONDING HARDWARE (BHW-SQ-02-A1)	31

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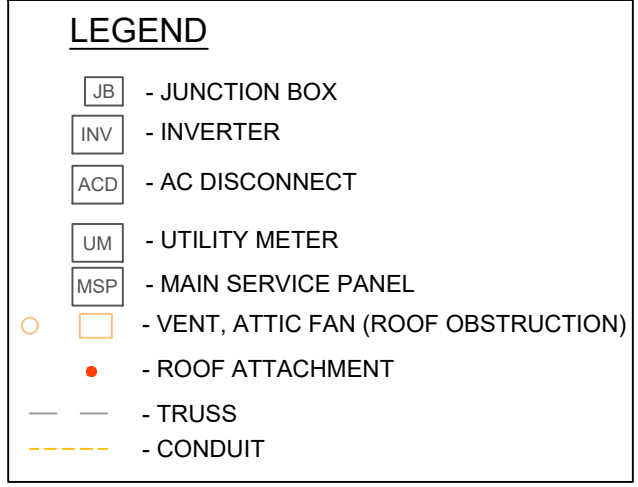
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DRAWN BY
ESR

SHEET NAME
ELECTRICAL PLAN

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

SHEET NUMBER
PV-4



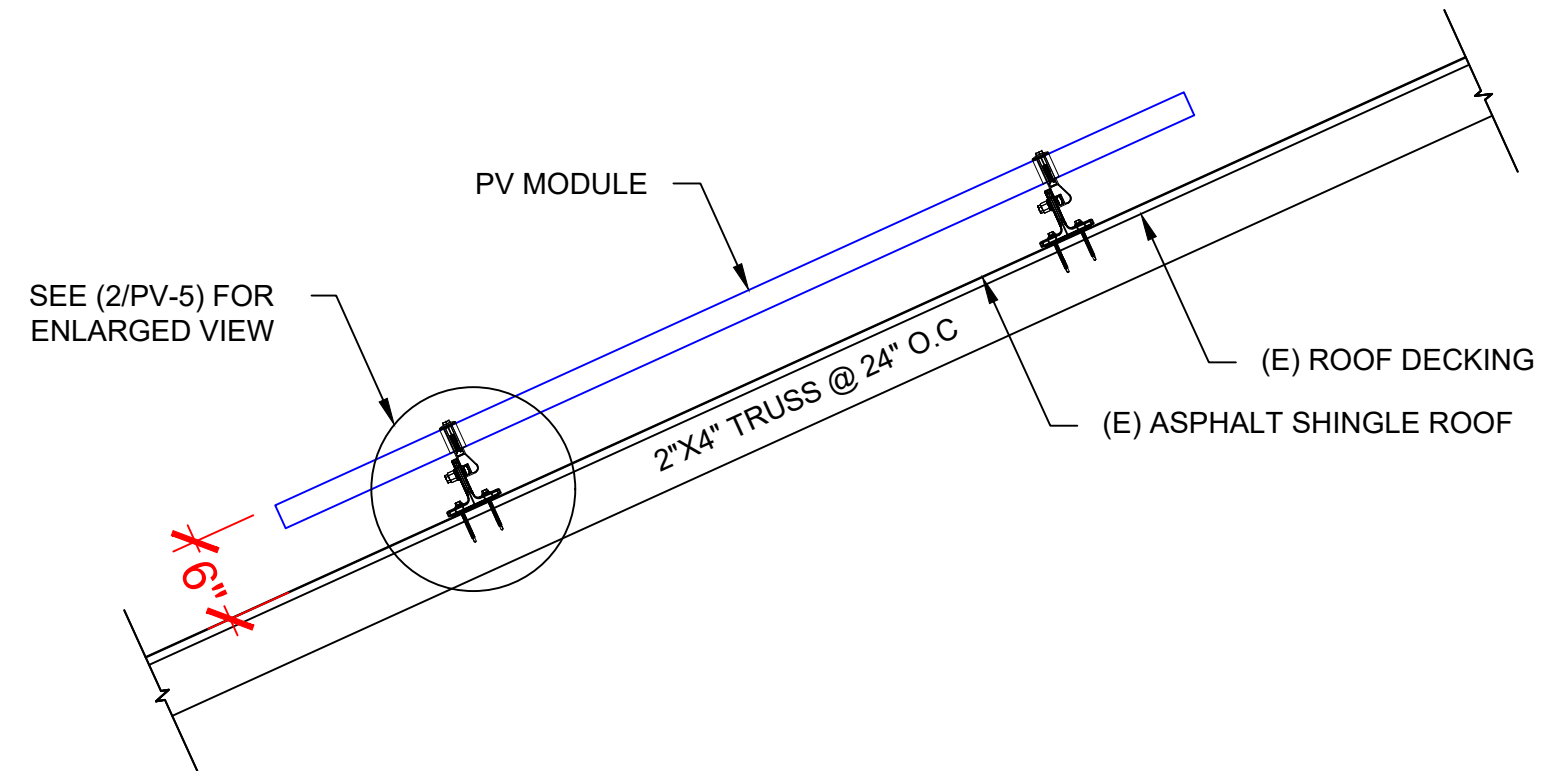


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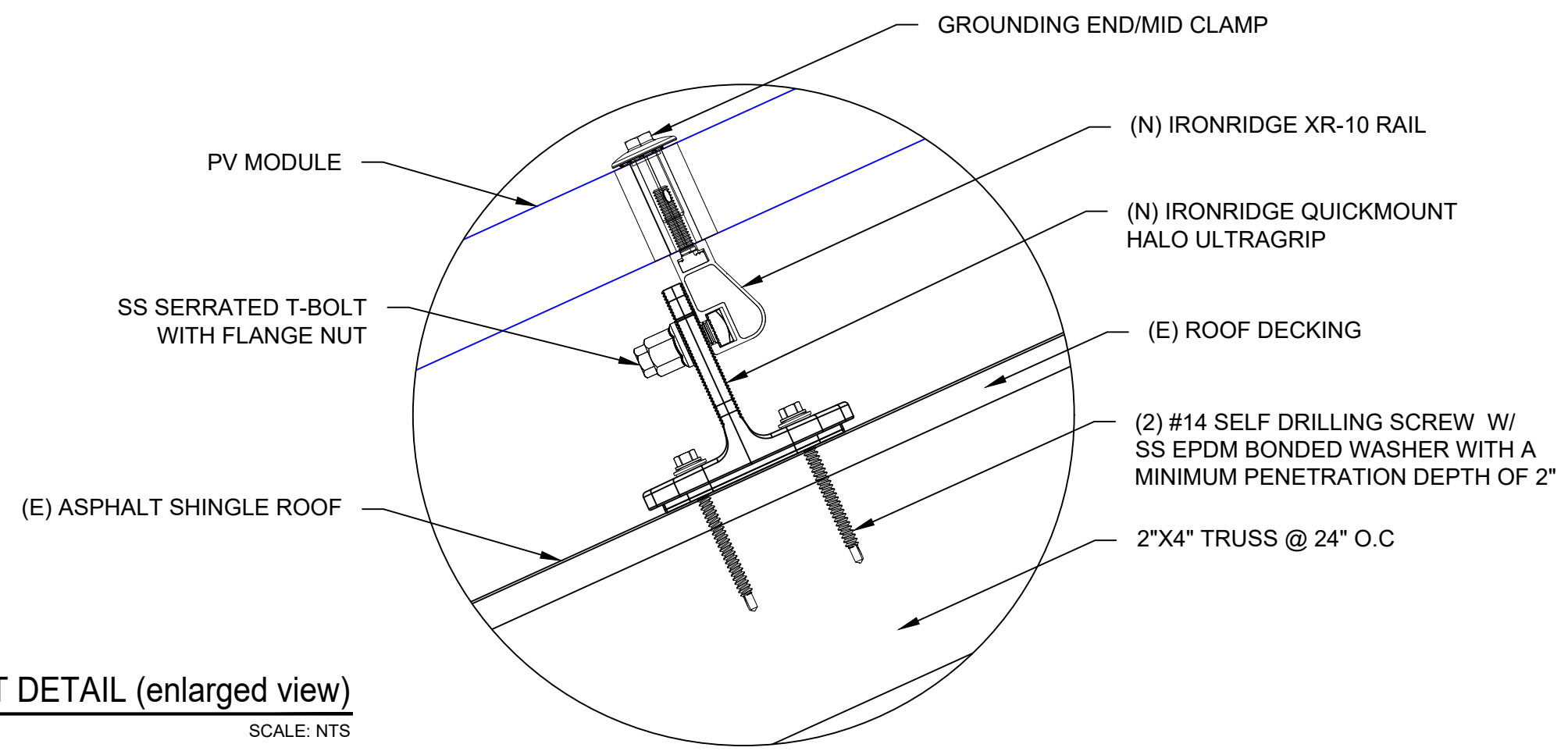
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1 | **STRUCTURAL ATTACHMENT (Side view)**
 PV-5 | SCALE: N.T.S



2 | **ATTACHMENT DETAIL (enlarged view)**
 PV-5 | SCALE: NTS

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SHEET NAME
STRUCTURAL DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

DC SYSTEM SIZE: 6.320 kW DC
AC SYSTEM SIZE: 6.000 kW AC

(16) MISSION SOLAR: MSE395SX9R 395W MONO MODULES WITH (16) SOLAREEDGE: S440 POWER OPTIMIZERS LOCATED UNDER EACH PANEL (240V) AND (01) SOLAREEDGE: SE6000H-US (240V/6000W) INVERTER (2) STRINGS OF 8 MODULES ARE CONNECTED IN SERIES

BACKFEED BREAKER CALCULATION (120% RULE):
(MAIN BUS X 1.2 - MAIN BREAKER) >= (PV BREAKER)
(200A X 1.2 - 200A) >= (35A)
(40A) >= (35A) HENCE OK

INTERCONNECTION NOTES:

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES:

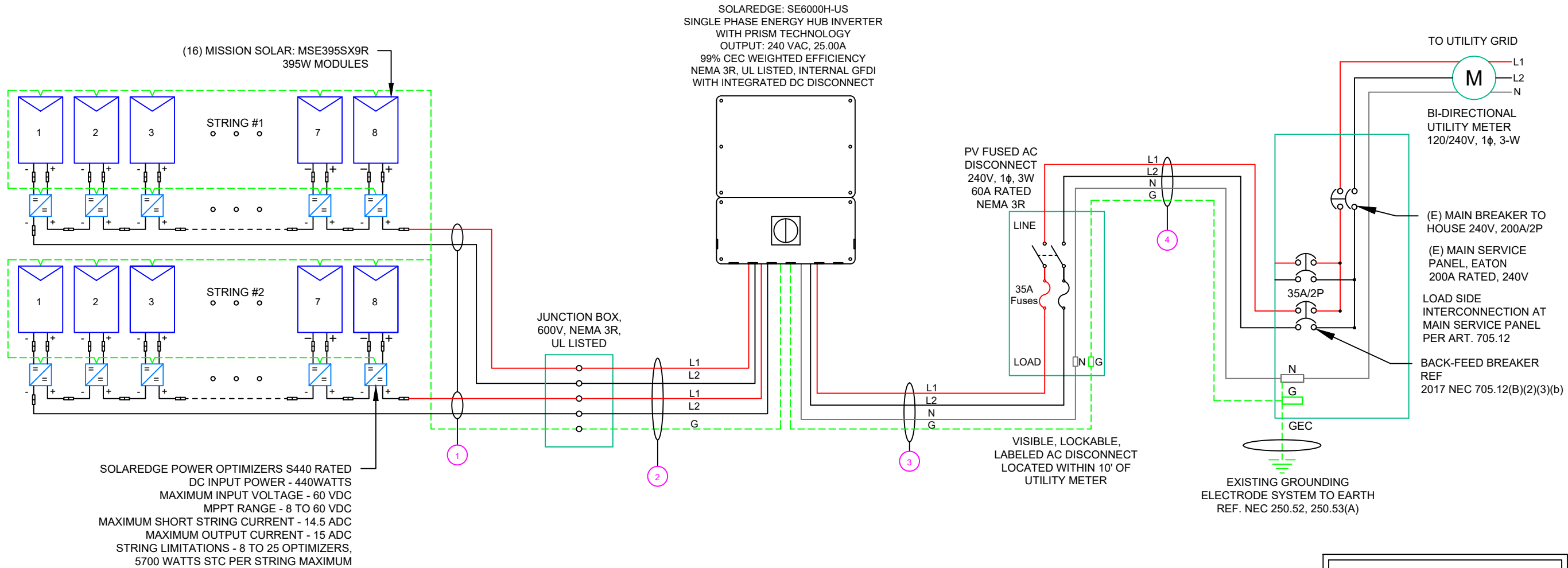
1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
3. DISCONNECT MEANS AND THEIR LOCATION SHALL BE IN ACCORDANCE WITH [NEC 225.31] AND [NEC 225.32].

GROUNDING & GENERAL NOTES:

1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.

RACKING NOTE:

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER



NOTE: CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED

QTY	CONDUCTOR INFORMATION		CONDUIT TYPE	CONDUIT SIZE
① (4)	#10AWG -	PV WIRE/USE-2	N/A	N/A
(1)	#6AWG -	BARE COPPER IN FREE AIR		
② (4)	#10AWG -	CU, THWN-2	EMT OR LFMC IN ATTIC	3/4"
(1)	#10AWG -	CU, THWN-2 GND		
③ (2)	#8AWG -	CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#8AWG -	CU, THWN-2 N		
④ (1)	#10AWG -	CU, THWN-2 GND	EMT, LFMC OR PVC	3/4"
(2)	#8AWG -	CU, THWN-2		
(1)	#8AWG -	CU, THWN-2 N		
(1)	#10AWG -	CU, THWN-2 GND		

TOP TIER
SOLAR SOLUTIONS

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ESR

SHEET NAME
ELECTRICAL LINE DIAGRAM

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

SHEET NUMBER
PV-6

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	MISSION SOLAR: MSE395SX9R 395W MODULE
VMP	36.99V
IMP	10.68A
VOC	45.18V
ISC	11.24A
TEMP. COEFF. VOC	-0.259%/°C
MODULE DIMENSION	75.08"L x 41.50"W x 1.57"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	SOLAREGE: SE6000H-US (240V/6000W) INVERTER
NOMINAL AC POWER	6.000 kW
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	25.00A

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

AMBIENT TEMPERATURE SPECS	
AMBIENT TEMP (HIGH TEMP 2%)	38°
RECORD LOW TEMPERATURE	-11°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.259%/°C



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AC FEEDER CALCULATIONS																						
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
INVERTER	AC DISCONNECT	240	25	31.25	35	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	5	0.778	0.081	3/4" EMT	24.5591
AC DISCONNECT	POI	240	25	31.25	35	CU #8 AWG	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	5	0.778	0.081	3/4" EMT	24.5591

CUMULATIVE VOLTAGE DROP 0.162

DC FEEDER CALCULATIONS																					
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
STRING 1	JUNCTION BOX	380	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.049	N/A	#N/A
STRING 2	JUNCTION BOX	380	15.00	18.75	20	BARE COPPER #6 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.049	N/A	#N/A
JUNCTION BOX	INVERTER	380	15.00	18.75	20	CU #10 AWG	CU #10 AWG	35	PASS	38	4	40	0.91	0.8	29.12	PASS	35	1.24	0.343	3/4" EMT	19.79362

String 1 Voltage Drop 0.392
String 2 Voltage Drop 0.392

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- 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.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOX, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSKO GBL-4DBT LAY-IN LUG.
- TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.

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SHEET NAME
WIRING CALCULATIONS

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

SHEET NUMBER
PV-7

PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT & ENCLOSURES

LABEL- 1:
LABEL LOCATION:
EMT/CONDUIT RACEWAY
SOLADECK / JUNCTION BOX
CODE REF: NEC 690.31 (D)(2)

WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY
BE ENERGIZED IN THE OPEN POSITION

LABEL- 2:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.13(B)

WARNING

DUAL POWER SUPPLY

SOURCE: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

LABEL- 3:
LABEL LOCATION:
MAIN SERVICE PANEL
CODE REF: NEC 705.12(C) & NEC 690.59

SOLAR PV BREAKER:

**BREAKER IS BACKFED
DO NOT RELOCATE**

LABEL-4:
LABEL LOCATION:
MAIN SERVICE PANEL
CODE REF: NEC 705.12(C) & NEC 690.59

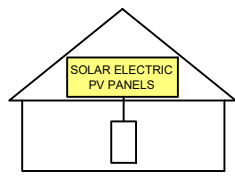
WARNING

**POWER SOURCE OUTPUT
CONNECTION. DO NOT
RELOCATE THIS
OVERCURRENT DEVICE**

LABEL- 5:
LABEL LOCATION:
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
SUBPANEL (ONLY IF SOLAR IS BACK-FED)
CODE REF: NEC 705.12(B)(3)(2)

**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN
SWITCH TO THE
"OFF" POSITION TO
SHUT DOWN PV SYSTEM
AND REDUCE
SHOCK HAZARD
IN THE ARRAY



LABEL- 6:
LABEL LOCATION:
AC DISCONNECT
CODE REF: [NEC 690.56(C)(1)(A)]

**RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM**

LABEL- 7:
LABEL LOCATION:
AC DISCONNECT
MAIN SERVICE PANEL (ONLY IF SOLAR IS BACK-FED)
CODE REF: NEC 690.56(C)(2)

DC DISCONNECT

LABEL- 8:
LABEL LOCATION:
INVERTER
CODE REF: NEC 690.13(B)

**AC DISCONNECT
PHOTOVOLTAIC SYSTEM
POWER SOURCE**

NOMINAL OPERATING AC VOLATGE **240 V**
RATED AC OUTPUT CURRENT **25.00 A**

LABEL- 9:
LABEL LOCATION:
AC DISCONNECT
CODE REF: NEC 690.54

MAXIMUM VOLTAGE **480 V**
MAXIMUM CIRCUIT CURRENT **16.50 A**
MAXIMUM RATED OUTPUT
CURRENT OF THE CHARGE
CONTROLLER OR DC-TO-DC
CONVERTER (IF INSTALLED)

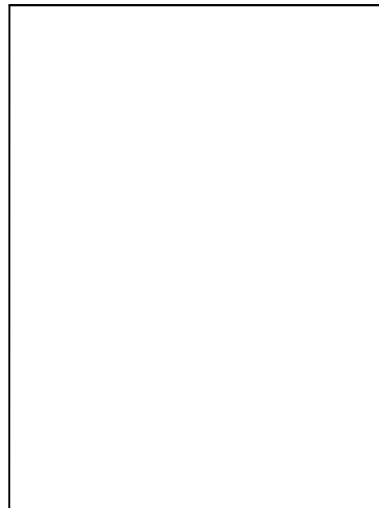
LABEL- 10:
LABEL LOCATION:
ON THE RIGHT SIDE OF THE INVERTER (PRE-EXISTING ON THE INVERTER)
CODE REF: NEC 690.53



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	



PROJECT NAME & ADDRESS

**MATTHEW WELLS
TAYLOR
RESIDENCE**
667 ANGEL OAK DR,
BUNLEVEL, NC 28323

DRAWN BY
ESR

SHEET NAME
LABELS

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

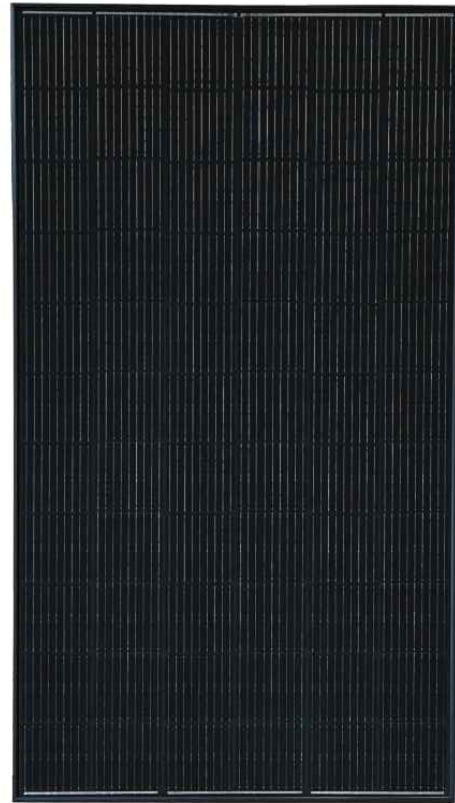
SHEET NUMBER
PV-8

MSE PERC 66

MISSION SOLAR ENERGY



395W Positive Power Tolerance
Class leading power output -0 to +3%



True American Quality True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas where we manufacture our modules. We produce American, high-quality solar modules ensuring the highest-in-class power output and best-in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long term.

Demand the best. Demand Mission Solar Energy.



Certified Reliability

- Tested to UL 61730 & IEC Standards
- PID resistant
- Resistance to salt mist corrosion



Advanced Technology

- 9 Busbar
- Passivated Emitter Rear Contact
- Ideal for all applications



Extreme Weather Resilience

- Up to 5,400 Pa front load & 3,600 Pa back load
- Tested load to UL 61730
- 40 mm frame



BAA Compliant for Government Projects

- Buy American Act
- American Recovery & Reinvestment Act

CERTIFICATIONS

CEC

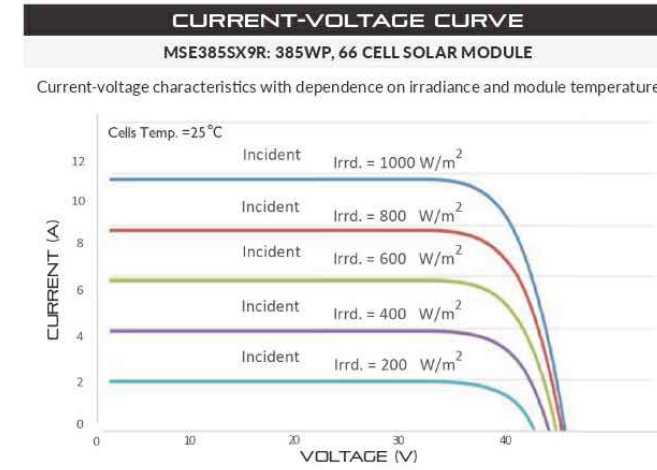
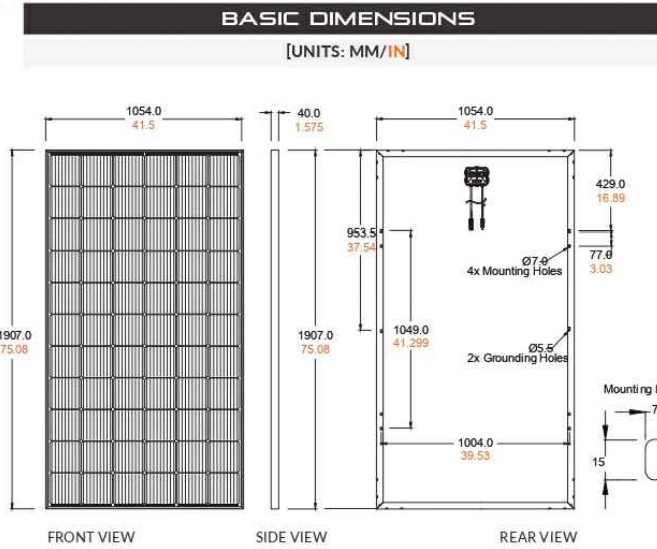


UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

If you have questions or concerns about certification of our products in your area, please contact Mission Solar Energy.



Class Leading
390-400W



CERTIFICATIONS AND TESTS

IEC	61215, 61730, 61701
UL	61730



CEC



Mission Solar Energy

8303 S. New Braunfels Ave., San Antonio, Texas 78235
www.missionsolar.com | info@missionsolar.com

Mission Solar Energy reserves the right to make specification changes without notice.
C-SA2-MKTG-0027 REV 4 03/18/2022

MSE PERC 66

ELECTRICAL SPECIFICATION

PRODUCT TYPE	MSE _{XXX} SX9R (XXX = P _{max})				
	P _{max}	W _p	390	395	400
Power Output			390	395	400
Module Efficiency	%		19.4	19.7	19.9
Tolerance	%		0/+3	0/+3	0/+3
Short Circuit Current	I _{sc}	A	11.19	11.24	11.31
Open Circuit Voltage	V _{oc}	V	45.04	45.18	45.33
Rated Current	I _{mp}	A	10.63	10.68	10.79
Rated Voltage	V _{mp}	V	36.68	36.99	37.07
Fuse Rating	A		20	20	20
System Voltage	V		1,000	1,000	1,000

TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	43.75°C (±3.7%)
Temperature Coefficient of P _{max}	-0.367%/°C
Temperature Coefficient of V _{oc}	-0.259%/°C
Temperature Coefficient of I _{sc}	0.033%/°C

OPERATING CONDITIONS

Maximum System Voltage	1,000Vdc
Operating Temperature Range	-40°F to 185°F (-40°C to +85°C)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1*
Front & Back Load (UL Standard)	Up to 5,400 Pa front and 3,600 Pa back load, Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

*Mission Solar Energy uses quality sourced materials that result in a Type 1 fire rating. Please note, the Fire Class Rating is designated for the fully-installed PV system, which includes, but is not limited to, the module, the type of mounting used, pitch and roof composition.

MECHANICAL DATA

Solar Cells	P-type mono-crystalline silicon
Cell Orientation	66 cells (6x11)
Module Dimension	1,907mm x 1,054mm x 40mm
Weight	48.5 lbs. (22 kg)
Front Glass	3.2mm tempered, low-iron, anti-reflective
Frame	40mm Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.2m, Wire 4mm ² (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-8

SHIPPING INFORMATION

Container Feet	Ship To	Pallet	Panels	390W Bin
53'	Most States	30	780	304.20 kW
Double Stack	CA	26	676	263.64 kW

PALLET [26 PANELS]

Weight	Height	Width	Length
1,300 lbs. (572 kg)	47.56 in (120.80 cm)	46 in (116.84 cm)	77 in (195.58 cm)

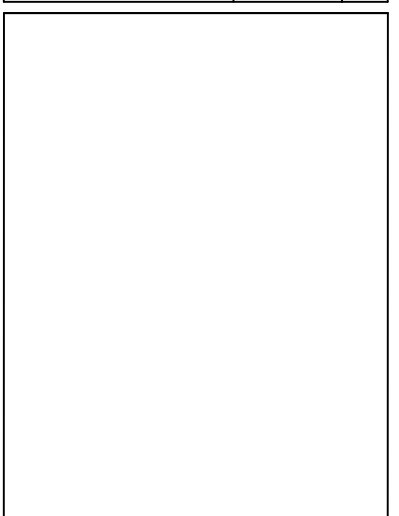
TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

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BUNNLEVEL, NC 28323

DRAWN BY
ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

Power Optimizer For Residential Installations

S440 / S500 / S500B / S650B



POWER OPTIMIZER

Enabling PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Faster installations with simplified cable management and easy assembly using a single bolt
- Module-level voltage shutdown for installer and firefighter safety
- Flexible system design for maximum space utilization
- Superior efficiency (99.5%)
- Compatible with bifacial PV modules

*Functionality subject to inverter model and firmware version

solaredge.com

solaredge

Power Optimizer For Residential Installations

S440 / S500 / S500B / S650B

	S440	S500	S500B	S650B	UNIT
INPUT					
Rated Input DC Power ⁽¹⁾	440	500		650	W
Absolute Maximum Input Voltage (Voc)	60		125	85	Vdc
MPPT Operating Range	8 – 60		12.5 – 105	12.5 – 85	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15			Adc
Maximum Efficiency			99.5		%
Weighted Efficiency			98.6		%
Overvoltage Category			II		
OUTPUT DURING OPERATION					
Maximum Output Current			15		Adc
Maximum Output Voltage	60			80	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)					
Safety Output Voltage per Power Optimizer			1 ± 0.1		Vdc
STANDARD COMPLIANCE⁽²⁾					
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011				
Safety	IEC62109-1 (class II safety), UL1741				
Material	UL94 V-0, UV Resistant				
RoHS	Yes				
Fire Safety	VDE-AR-E 2100-712:2018-12				
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage			1000		Vdc
Dimensions (W x L x H)	129 x 155 x 30			129 x 165 x 45	mm
Weight	720			790	gr
Input Connector			MC4 ⁽³⁾		
Input Wire Length			0.1		m
Output Connector			MC4		
Output Wire Length			(+) 2.3, (-) 0.10		m
Operating Temperature Range ⁽⁴⁾			-40 to +85		°C
Protection Rating			IP68		
Relative Humidity			0 – 100		%

(1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.

(2) For details about CE compliance, see [Declaration of Conformity - CE](#).

(3) For other connector types please contact SolarEdge.

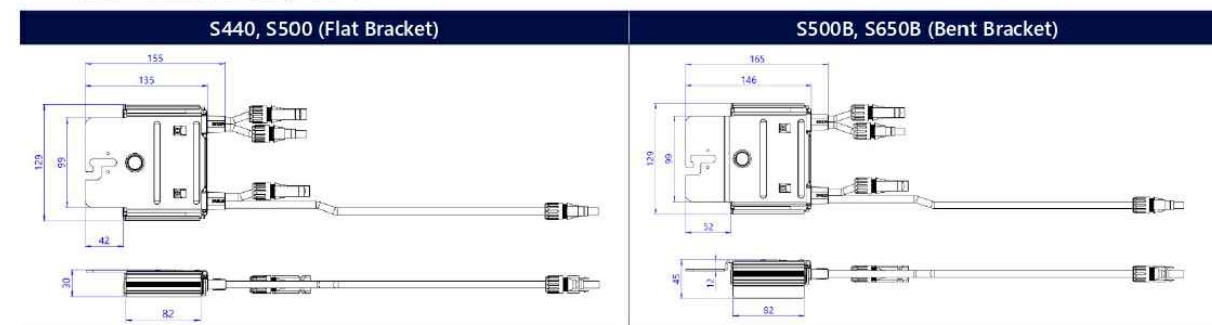
(4) Power de-rating is applied for ambient temperatures above +85°C for S440 and S500, and for ambient temperatures above +75°C for S500B. Refer to the [Power Optimizers Temperature De-Rating Technical Note](#) for details.

PV System Design Using a SolarEdge Inverter ⁽⁵⁾	SolarEdge Home Wave Inverter Single Phase	SolarEdge Home Short String Inverter Three Phase	Three Phase for 230/400V Grid	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500: 8 S500B, S650B: 6	9	16	18	
Maximum String Length (Power Optimizers)	25	20	50	50	
Maximum Continuous Power per String	5700	5625	11250	12750	W
Maximum Allowed Connected Power per String (In multiple string designs, the maximum is permitted only when the difference in connected power between strings is 2,000W or less)	See ⁽⁶⁾	See ⁽⁶⁾	13500	15000	W
Parallel Strings of Different Lengths or Orientations	Yes				

(5) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.

(6) If the inverter's rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverter's maximum input DC power.

Refer to [Application Note: Single String Design Guidelines](#).



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CE RoHS

TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	

PROJECT NAME & ADDRESS

MATTHEW WELLS
TAYLOR
RESIDENCE
667 ANGEL OAK DR,
BUNNLEVEL, NC 28323

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

Single Phase Energy Hub Inverter with Prism Technology

For North America

SE3000H-US / SE3800H-US / **SE6000H-US** / SE7600H-US / SE10000H-US / SE11400H-US⁽¹⁾



HOME BACKUP

Optimized battery storage with HD-Wave technology

- Record-breaking 99% weighted efficiency with 200% DC oversizing
- Multi-inverter, scalable storage solution
 - With enhanced battery power up to 10kW
- Small, lightweight, and easy to install
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020, per article 690.11 and 690.12
- Modular design, future ready with optional upgrades to:
 - DC-coupled storage for full or partial home backup
 - Built-in consumption monitoring
 - Direct connection to the SolarEdge smart EV charger
 - Embedded revenue grade production data, ANSI C12.20 Class 0.5

solaredge.com



Single Phase Energy Hub Inverter with Prism Technology

For North America

SE3000H-US / SE3800H-US / **SE6000H-US** / SE7600H-US / SE10000H-US / SE11400H-US⁽¹⁾

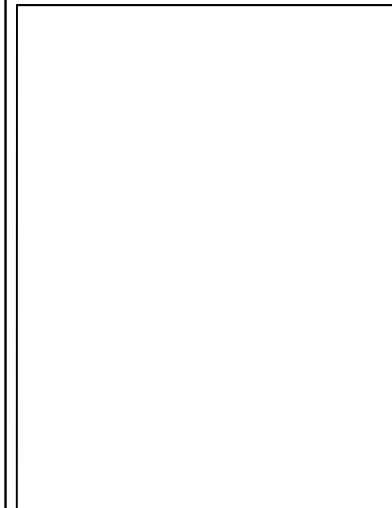
	SE3000H-US	SE3800H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	UNITS	
OUTPUT - AC ON GRID								
Rated AC Power	3000	3800 @ 240V 3300 @ 208V	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	W	
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	W	
AC Frequency Range (min - nom - max)	59.3 - 60 - 60.5 ⁽²⁾						Hz	
Maximum Continuous Output Current @ 240V	12.5	16	25	32	42	47.5	A	
Maximum Continuous Output Current @ 208V	-	16	24	-	-	48.5	A	
GFDI Threshold	1						A	
Total Harmonic Distortion (THD)	<3						%	
Power Factor	1, adjustable -0.85 to 0.85							
Utility Monitoring/Islanding Protection/Country Configurable Thresholds	Yes							
Charge Battery from AC (if allowed)	Yes							
Typical Nighttime Power Consumption	<2.5						W	
OUTPUT - AC BACKUP⁽³⁾								
Rated AC Power in Backup Operation ⁽⁴⁾	3000	3800 7600*	6000	7600 10300*	10000	10300	W	
AC L-L Output Voltage Range in Backup	211 - 264						Vac	
AC L-N Output Voltage Range in Backup	105 - 132						Vac	
AC Frequency Range in Backup (min - nom - max)	55 - 60 - 65						Hz	
Maximum Continuous Output Current in Backup Operation	12.5	16 32*	25	32 43*	42	43	A	
GFDI	1						A	
THD	<5						%	
OUTPUT - SMART EV CHARGER AC								
Rated AC Power	9600						W	
AC Output Voltage Range	211 - 264						Vac	
On-Grid AC Frequency Range (min - nom - max)	59.3 - 60 - 60.5						Hz	
Maximum Continuous Output Current @ 240V (grid, PV and battery)	40						Aac	
INPUT - DC (PV AND BATTERY)								
Transformer-less, Ungrounded	Yes							
Max Input Voltage	480						Vdc	
Nom DC Input Voltage	380						Vdc	
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
INPUT - DC (PV)								
Maximum DC Power @ 240V	6000	7600 15200*	12000	15200 22800*	22000	22800	W	
Maximum DC Power @ 208V	-	6600	10000	-	-	20000	W	
Maximum Input Current ⁽⁵⁾ @ 240V	8.5	10.5 20*	16.5	20 31*	27	31	Adc	
Maximum Input Current ⁽⁵⁾ @ 208V	-	9	13.5	-	-	27	Adc	
Max. Input Short Circuit Current	45						Adc	
Maximum Inverter Efficiency	99						99.2	%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
2-pole Disconnection	Yes							

* Supported with PN SExxxxH-USMxxxxxx or SExxxxH-USMxxxxxx
 (1) These specifications apply to inverters with part numbers SExxxxH-USMxxxxxx or SExxxxH-USMxxxxxx and connection unit model number DCD-1PH-US-PKH-F-x
 (2) For other regional settings please contact SolarEdge support
 (3) Not designed for standalone applications and requires AC for commissioning. Backup functionality is only supported for 240V grid
 (4) Rated AC power in Backup Operation are valid for installations with multiple inverters. For a single backup inverter operation, rated AC power in Backup is 90% of the value stated
 (5) A higher current source may be used; the inverter will limit its input current to the values stated



TOP TIER SOLAR SOLUTIONS
 1530 CENTER PARK DR #2911,
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PROJECT NAME & ADDRESS
**MATTHEW WELLS
 TAYLOR
 RESIDENCE**
 667 ANGEL OAK DR,
 BUNNLEVEL, NC 28323

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
 SPECIFICATION**

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

SHEET NUMBER
PV-11

/ Single Phase Energy Hub Inverter with Prism Technology

For North America

SE3000H-US / SE3800H-US / **SE6000H-US** / SE7600H-US / SE10000H-US / SE11400H-US⁽¹⁾

	SE3000H-US	SE3800H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	UNITS
INPUT - DC (BATTERY)							
Supported Battery Types	SolarEdge Energy Bank, LG RESU Prime ⁽⁶⁾						
Number of Batteries per Inverter	Up to 3 SolarEdge Energy Bank; up to 2 LG RESU Prime						
Continuous Power ⁽⁷⁾	6000	7600		10000			W
Peak Power ⁽⁷⁾	6000	7600		10000			W
Max Input Current	16	20		26.5			Adc
2-pole Disconnection	Yes						
SMART ENERGY CAPABILITIES							
Consumption Metering	Built-in ⁽⁹⁾						
Backup & Battery Storage	With Backup Interface (purchased separately) for service up to 200A; Up to 3 inverters						
EV Charging	Direct connection to Smart EV charger						
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, Cellular ⁽⁸⁾ , Wi-Fi (optional), SolarEdge Energy Net (optional)						
Revenue Grade Metering, ANSI C12.20	Built-in ⁽⁹⁾						
Integrated AC, DC and Communication Connection Unit	Yes						
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi Access Point for local connection						
DC Voltage Rapid Shutdown (PV and Battery)	Yes, according to NEC 2014, NEC 2017 and NEC 2020 690.12						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1741 PCS, UL1699B, UL1998, UL9540, CSA 22.2						
Grid Connection Standards	IEEE1547, Rule 21, Rule 14H						
Emissions	FCC part 15 class B						
INSTALLATION SPECIFICATIONS							
AC Output and EV AC Output Conduit Size / AWG Range	1" maximum / 14-4 AWG						
DC Input (PV and Battery) Conduit Size / AWG Range	1" maximum / 14-6 AWG						
Dimensions with Connection Unit (H x W x D)	17.7 x 14.6 x 6.8 / 450 x 370 x 174		17.7 x 14.6 x 6.8 / 450 x 370 x 174 17.7 x 14.6 x 6.8 / 450 x 370 x 174*	17.7 x 14.6 x 6.8 / 450 x 370 x 174			in / mm
Weight with Connection Unit	26 / 11.8		26 / 11.8 41.7 / 18.9*	41.7 / 18.9			lb / kg
Noise	< 25	< 25 < 50*	< 25	< 50			dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽¹⁰⁾						
Protection Rating	NEMA 4						

(6) The part numbers SExxxxH-USxMxxxx only support the SolarEdge Energy Bank. The part numbers SExxxxH-USxNxxxx support both SolarEdge Energy Bank and LG RESU Prime batteries. Requires supporting inverter firmware.

(7) Discharge power is limited up to the inverter rated AC power for on-grid and backup applications.

(8) For consumption metering current transformers should be ordered separately: SECT-SPL-22SA-T-20 or SEACT0750-400NA-20 units per box. Revenue grade metering is only for production metering.

(9) Information concerning the Data Plan's terms & conditions is available in the following link:

<https://www.solaredge.com/sites/default/files/se-communication-plan-terms-and-conditions-eng.pdf>

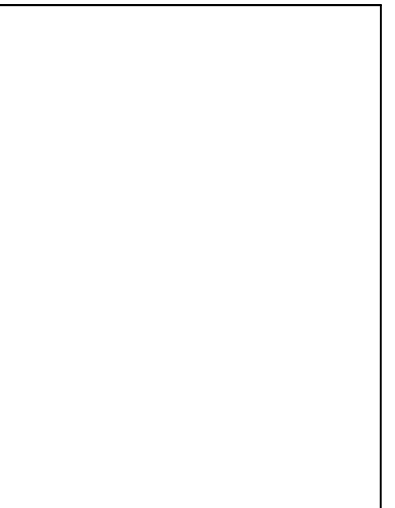
(10) Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-ncte-na.pdf>



TOP TIER SOLAR SOLUTIONS

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PROJECT NAME & ADDRESS
MATTHEW WELLS TAYLOR RESIDENCE 667 ANGEL OAK DR, BUNNLEVEL, NC 28323

DRAWN BY ESR

SHEET NAME EQUIPMENT SPECIFICATION
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SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-12

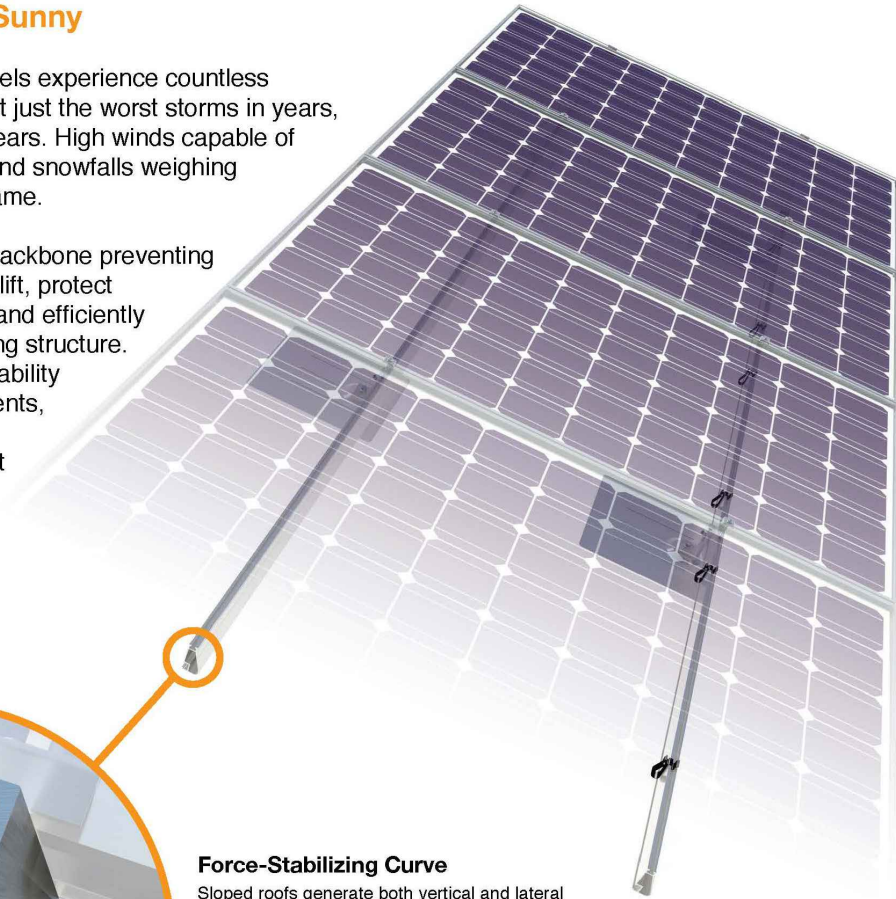


XR Rail Family

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						



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	

PROJECT NAME & ADDRESS		
MATTHEW WELLS TAYLOR RESIDENCE 667 ANGEL OAK DR, BUNNLEVEL, NC 28323		

DRAWN BY		
ESR		
SHEET NAME		
EQUIPMENT SPECIFICATION		
SHEET SIZE		
ANSI B 11" X 17"		
SHEET NUMBER		
PV-13		



UFO Family of Components

Tech Brief

Simplified Grounding for Every Application

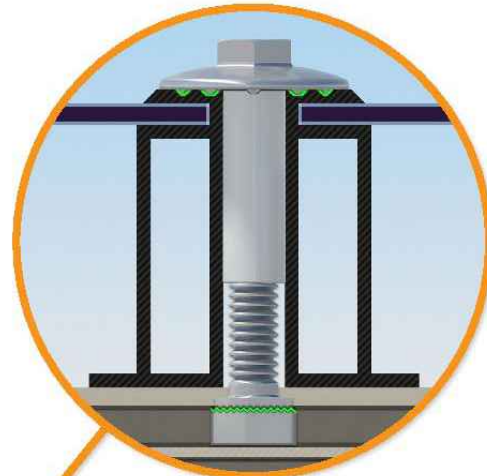
The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

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

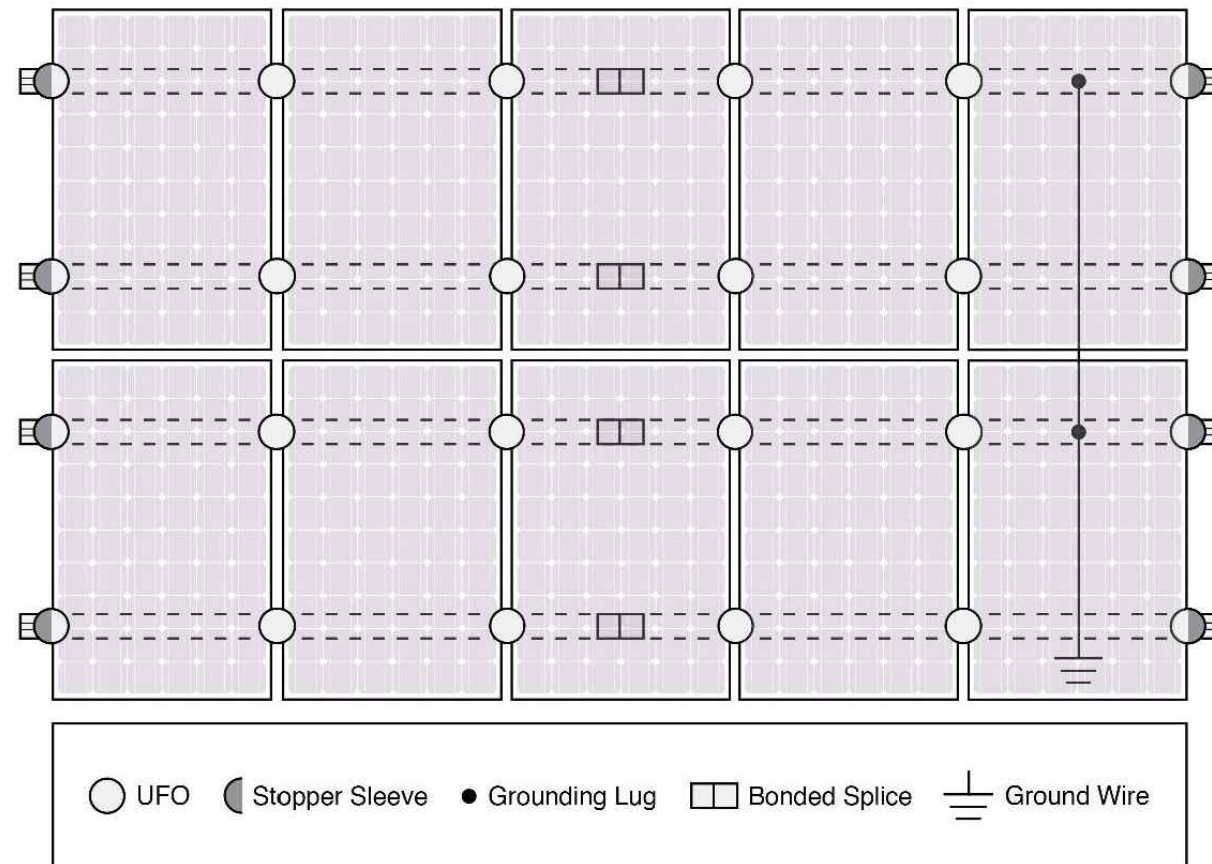
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



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

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.		

TOP TIER
SOLAR SOLUTIONS

TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS

DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	

PROJECT NAME & ADDRESS

MATTHEW WELLS
TAYLOR
RESIDENCE
667 ANGEL OAK DR,
BUNNLEVEL, NC 28323

DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-14



QuickMount® Halo UltraGrip

Cut Sheet

Cut Sheet

ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

PART NUMBER	DESCRIPTION
QM-HUG-01-M1	Halo UltraGrip - Mill
QM-HUG-01-B1	Halo UltraGrip - Black

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QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0

1. Halo UltraGrip

Property	Value
Material	3000 Series Aluminium
Finish	Mill or Black

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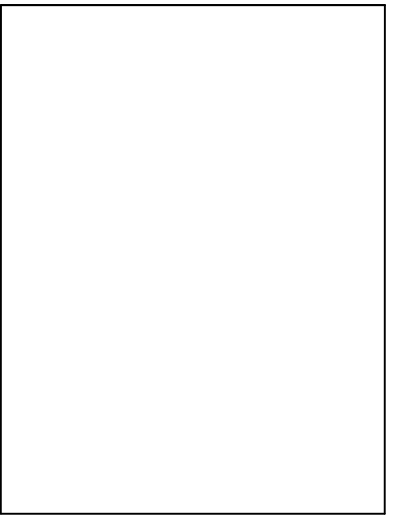
QM-HUG-01-B1 or QM-HUG-01-M1 Cut Sheet Rev 1.0



TOP TIER SOLAR SOLUTIONS

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667 ANGEL OAK DR,
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DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-15



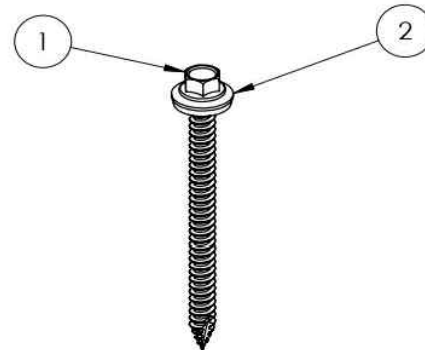
QuickMount® RD Structural Screw



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

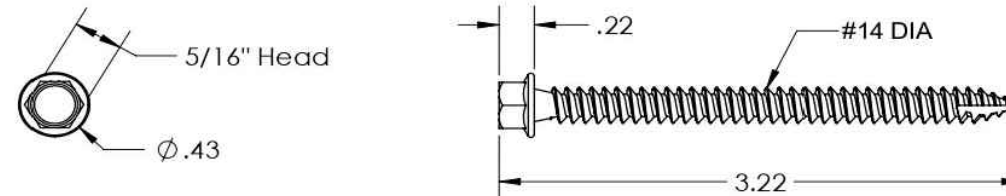
REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	



ITEM NO	DESCRIPTION	QTY IN KIT
1	Self Drilling Screw, #14, Wood Tip	1
2	Washer, EPDM Backed	1

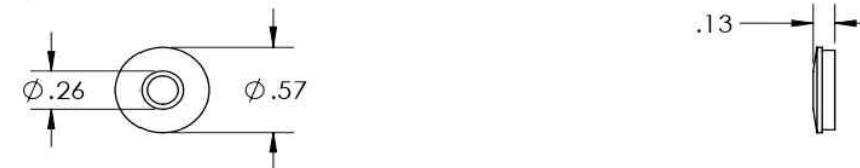
PART NUMBER	DESCRIPTION
RD-1430-01-M1	RD Structural Screw

1. Self Drilling Screw, #14, Wood Tip



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

2. Washer, EPDM Backed



Property	Value
Material	300 Series Stainless Steel
Finish	Clear



PROJECT NAME & ADDRESS

**MATTHEW WELLS
TAYLOR
RESIDENCE**
667 ANGEL OAK DR,
BUNNLEVEL, NC 28323

DRAWN BY
ESR

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

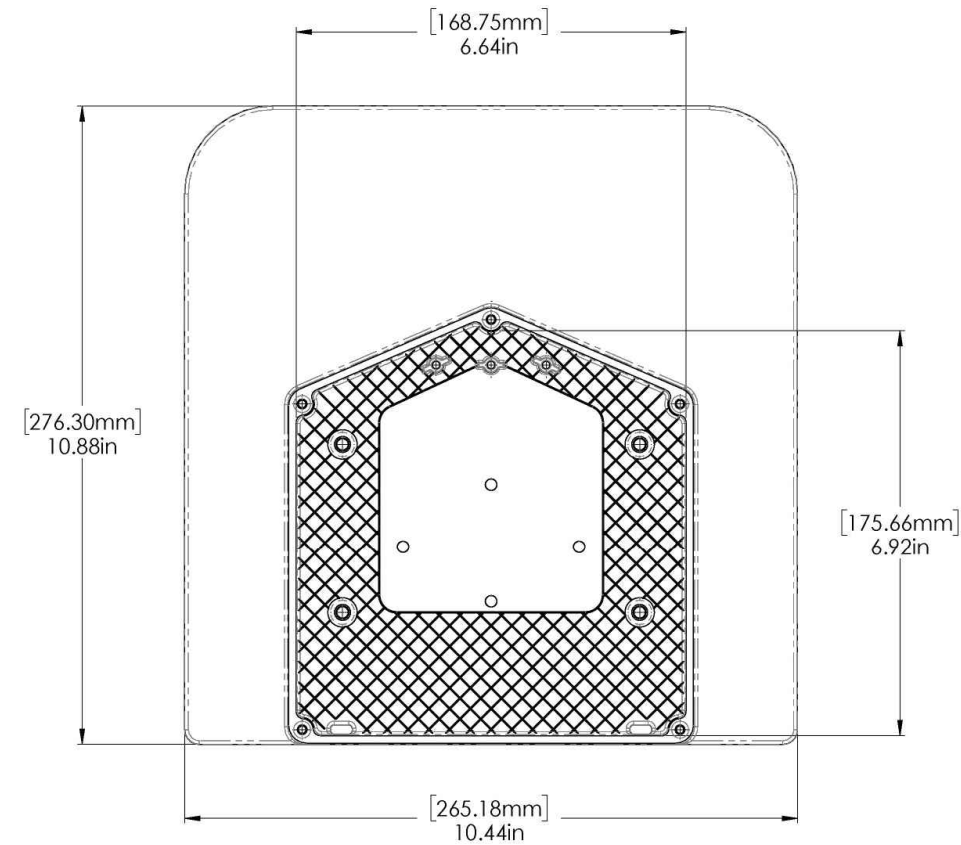
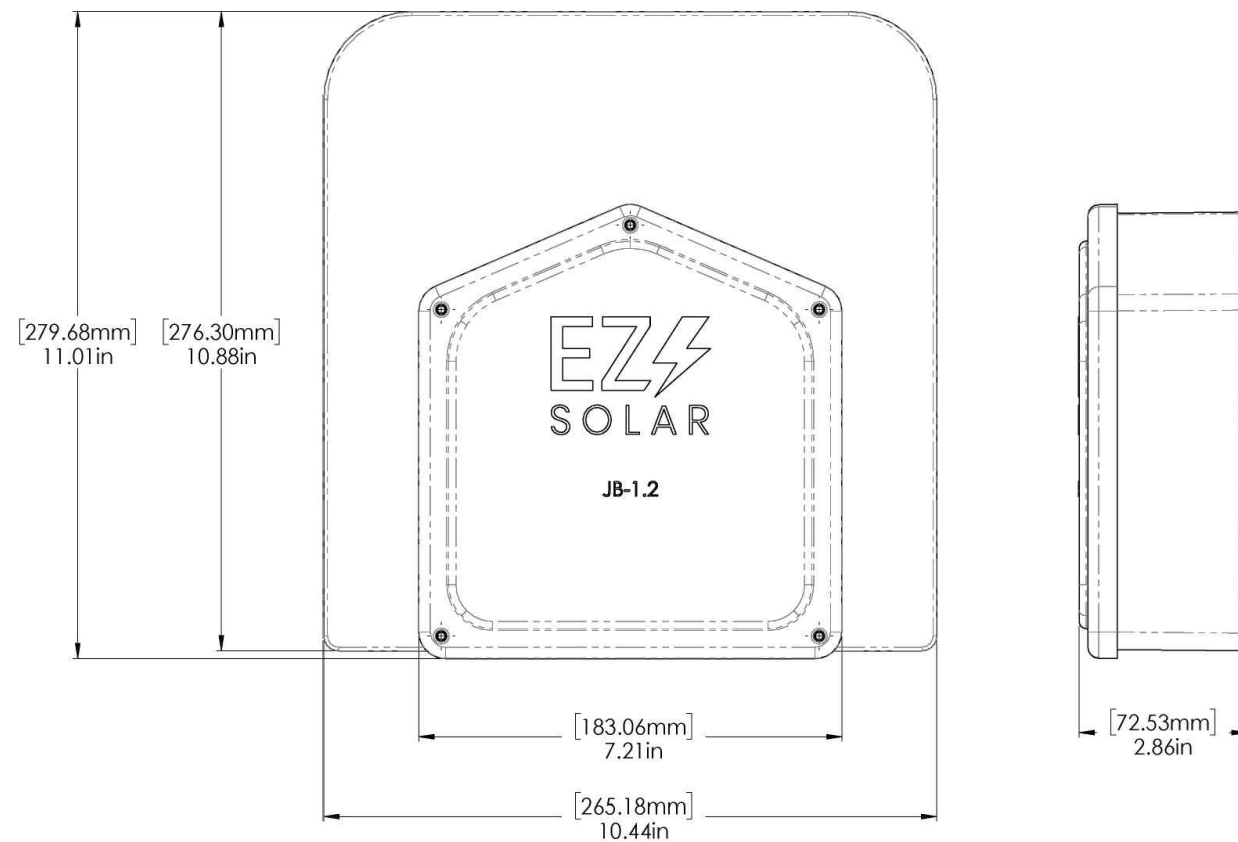
SHEET NUMBER
PV-16

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	JB-1.2 BODY	POLYCARBONATE WITH UV INHIBITORS	1
2	JB-1.2 LID	POLYCARBONATE WITH UV INHIBITORS	1
3	#10 X 1-1/4" PHILLIPS PAN HEAD SCREW		6
4	#8 X 3/4" PHILLIPS PAN HEAD SCREW		6

SIZE B	DWG. NO. JB-1.2	REV
SCALE: 1:2	WEIGHT: 1.45 LBS	SHEET 1 OF 3

TORQUE SPECIFICATION:	15-20 LBS
CERTIFICATION:	UL 1741, NEMA 3R CSA C22.2 NO. 290
WEIGHT:	1.45 LBS

SIZE B	DWG. NO. JB-1.2	REV
SCALE: 1:2	WEIGHT: 1.45 LBS	SHEET 2 OF 3



REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	08/22/2023	

PROJECT NAME & ADDRESS		
MATTHEW WELLS TAYLOR RESIDENCE 667 ANGEL OAK DR, BUNNLEVEL, NC 28323		

DRAWN BY ESR

SHEET NAME EQUIPMENT SPECIFICATION
--

SHEET SIZE ANSI B 11" X 17"

SHEET NUMBER PV-17
