

PROJECT DESCRIPTION:

29 x 400 URECO SOLAR FBM400MFG-BB (400W) MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

SYSTEM SIZE: 11.6 kW DC STC

EQUIPMENT SUMMARY

29 URECO SOLAR FBM400MFG-BB MODULES
29 DURACELL D350-M1 MICRO-INVERTERS

GOVERNING CODES :
FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)
FLORIDA PLUMBING CODE, 7TH EDITION 2020 (FPC)
FLORIDA BUILDING CODE, 7TH EDITION 2020 EDITION (FBC)
FLORIDA MECHANICAL CODE, 7TH EDITION 2020 (FMC)
2017 NATIONAL ELECTRICAL CODE
FLORIDA FIRE PREVENTION CODE, 7TH EDITION (FFPC)

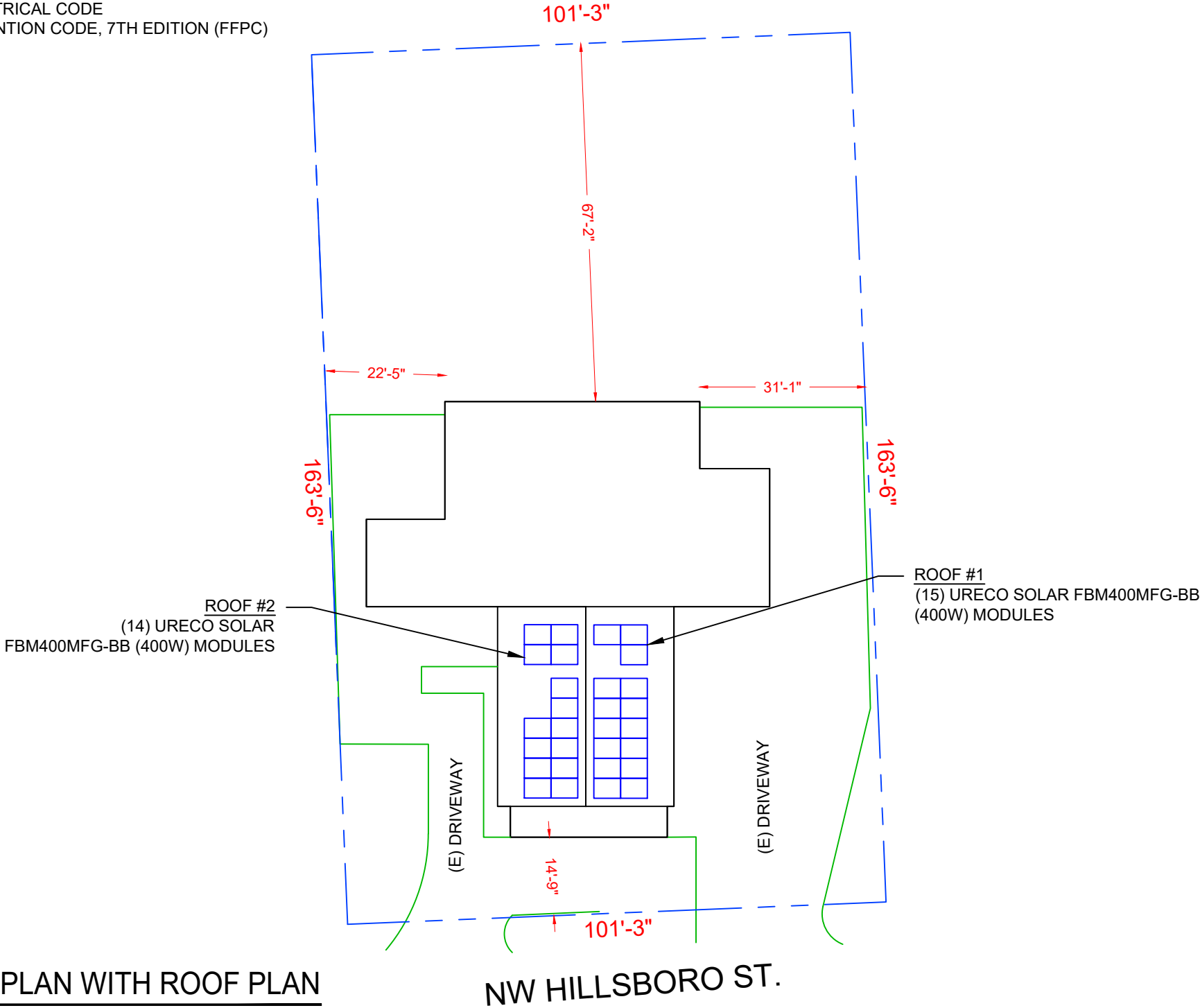
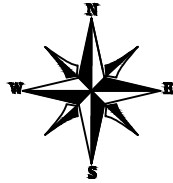
SHEET INDEX		
A-00	PLOT PLAN & VICINITY MAP	
S-01	ROOF PLAN & MODULES	
S-02	ATTACHMENT DETAILS	
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DS-05	ATTACHMENT DATA SHEET	



DISCLAIMER :
THE SET OF PLANS FOR THIS PROJECT IS FOR DESIGNING THE PROJECT FOR BUILDING CODE COMPLIANCE. THIS DOES NOT EXPRESS OR IMPLY A PERFORMANCE GUARANTEE OF ANY KIND. CONTRACTOR RESPONSIBLE TO REVIEW AND APPROVE THE LAYOUT WITH THE END USER PRIOR TO INSTALLATION.

ALL DIMENSION AND CONDITION SHOWN ON THE SET OF PLANS IS BASED ON THE BEST POSSIBLE INFORMATION GIVEN. CONTRACTOR RESPONSIBLE TO FILED VERIFY ALL CONDITION IN THE FILED PRIOR TO INSTALLATION OR ACCEPTS FULL RESPONSIBILITY.

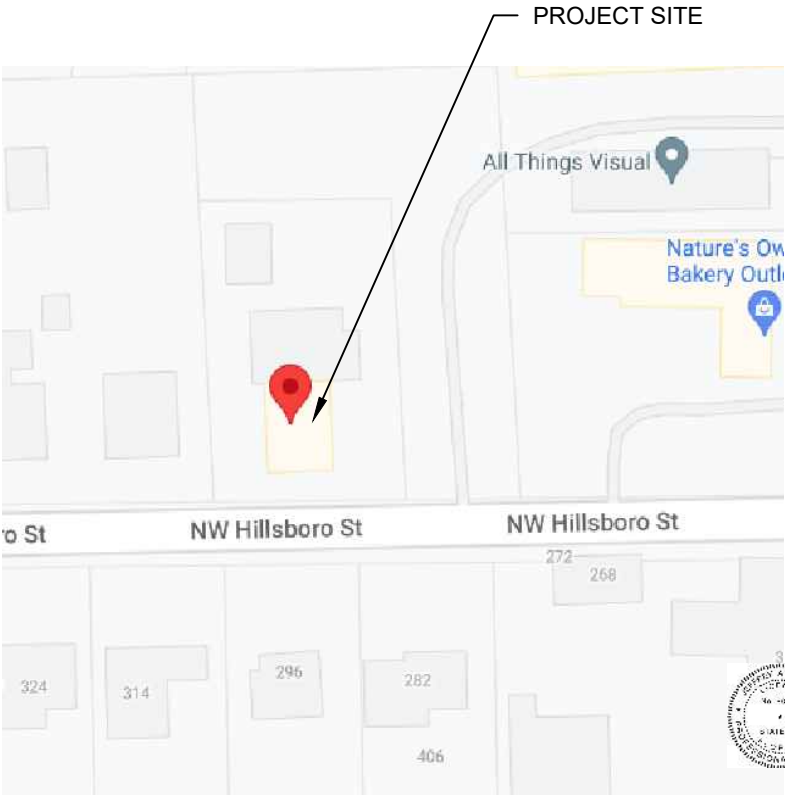
ASCE 7-16 WIND DESIGN CRITERIA
ULTIMATE WIND SPEED: 120 MPH
NOMINAL WIND SPEED: 93 MPH
WIND EXPOSURE: B
RISK CATEGORY: II



1 | PLOT PLAN WITH ROOF PLAN
A-00 | SCALE: 1" = 25'-0"



2 | HOUSE PHOTO
A-00 | SCALE: NTS



3 | VICINITY MAP
A-00 | SCALE: NTS

SOLAR ENERGY SPECIALISTS
6418 HOFFNER AVE #100
ORLANDO, FL 32822

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL	04-25-2023	01

PROJECT NAME
JAMES AND CHRISTINA MCNEIL
297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME
PLOT PLAN & VICINITY MAP

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

SHEET NUMBER
A-00

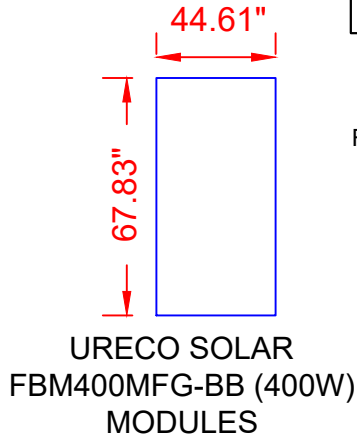
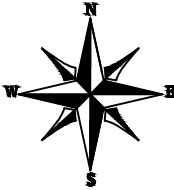
Signature with Seal
Digitally signed by Jeffrey A Torres
Date: 2023.04.26 14:39:55 -04'00'

JEFFREY A. TORRES, P.E.
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MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 29 MODULES
MODULE TYPE = URECO SOLAR FBM400MFG-BB (400W) MODULES
WEIGHT = 47.84 LBS / 21.7 KG.
MODULE DIMENSIONS = 67.83" x 44.61" = 21.01 SF

(E) BACK YARD

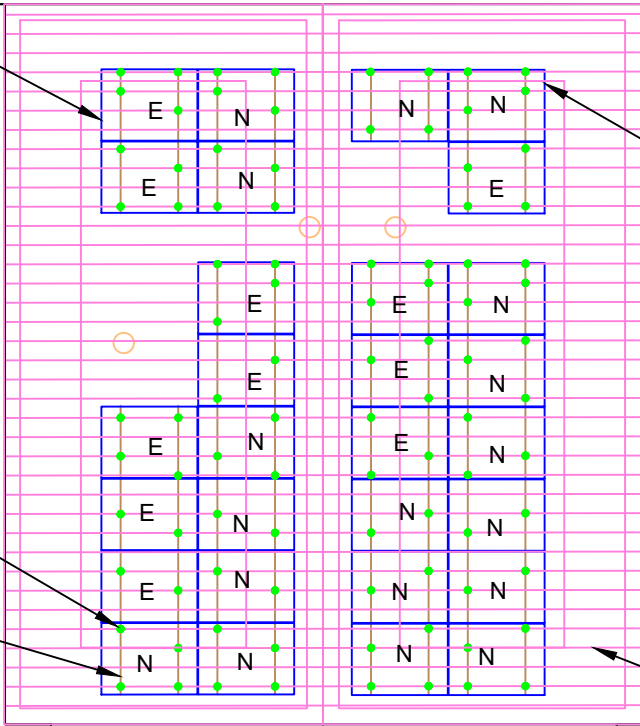


ROOF #2
(14) URECO SOLAR
FBM400MFG-BB (400W) MODULES

(N) S-5 PROTEA BRACKETS
PV ROOF ATTACHMENT @ 36" O.C.

(N) IRONRIDGE XR-10 RAIL (TYP.)

ROOF #2
TILT - 27°
AZIM. - 270°



ROOF #1
(15) URECO SOLAR FBM400MFG-BB
(400W) MODULES

ROOF #1
TILT - 27°
AZIM. - 90°

(E) TYP RAFTERS @ 12" O.C.

(E) FRONT YARD
NW HILLSBORO ST.

GENERAL STRUCTURAL NOTES:

1. APPLICABLE CODE: 2020 FLORIDA RESIDENTIAL CODE (7TH EDITION) & ASCE 7-16 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.
2. ATTACHMENT STRENGTH OF S-5 PROTEA BRACKETS ARE BASED OFF S-5'S PULL TEST DATA AND IRONRIDGE MANUFACTURERS SPECIFICATIONS AND IT IS ASSUMED THAT THE ROOF IS IN GOOD CONDITION FREE OF RUST AND CORROSION.
3. SPACING OF THE S-5 PROTEA BRACKET ATTACHMENTS SHALL BE AS FOLLOWS:
*WIND ZONE 1 = 3'-0" ON CENTER, 1'-0" CANTILEVER
*WIND ZONE 2e, 2r, 2n = 3'-0" ON CENTER, 1'-0" CANTILEVER
*WIND ZONE 3e, 3r = 3'-0" ON CENTER, 1'-0" CANTILEVER
4. S-5 PROTEA BRACKETS SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDATIONS TO WEATHER PROOF AND SEAL ALL ROOF PENETRATIONS.
5. EXISTING ROOF IS A TYPICAL GABLE ROOF FROM 20 DEGREES TO 27 DEGREES WITH A ROOF COVERING OF TYPE R METAL PANELS. MEAN ROOF HEIGHT = 15 FT OR LESS ABOVE GRADE.
6. DESIGN PARAMETERS SHOWN ARE BASED ON ALLOWABLE STRESS DESIGN (ASD) NOMINAL WIND SPEED PRESSURES PER SECTION 29.4.4 FOR ROOFTOP SOLAR PANELS PARALLEL TO THE ROOF SURFACE WITH EXPOSURE "B", RISK CATEGORY II, ENCLOSED BUILDING AND $h < 60'-0"$ PER ASCE 7-16 "MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES" AND 2020 F.B.C. (7TH EDITION). EXPOSED AND NON-EXPOSED MODULES ARE LABELED AS SHOWN.
7. ROOF SURFACE TO UNDERSIDE OF PANEL HEIGHT IS APPROXIMATELY 5 INCHES AND INCREASED UPLIFT ON THE PORTION OF MODULES WITHIN A 10 INCH CLEARANCE OF THE ROOF EDGES HAS BEEN CONSIDERED.
8. "a" DIMENSION AS DEFINED PER ASCE 7-16 SHALL BE 4 FT REGARDLESS PER THE 2020 FLORIDA RESIDENTIAL CODE (7TH EDITION).
10. SOLAR PANELS AND MOUNTING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

I CERTIFY THAT THE
INSTALLATION OF THE
MODULES IS IN COMPLIANCE
WITH FBC: RESIDENTIAL
CHAPTER 3. THE ADDITION
OF THE SOLAR MODULES
AND ALL ACCESSORIES TO
THE EXISTING BUILDING WILL
NOT ADVERSELY AFFECT
THE STRUCTURAL INTEGRITY
OF THE BUILDING AND CAN
SAFELY ACCOMMODATE THE
NEW IMPOSED LOADS OF
THE SOLAR SYSTEM.

LEGEND

- ED - EDGE MODULE
- E - EXPOSED MODULE
- N - NON-EXPOSED MODULE
- □ - ROOF OBSTRUCTION
- - PV ROOF ATTACHMENT
- - METAL ROOF SEAMS



**SOLAR ENERGY
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JAMES AND CHRISTINA MCNEIL

297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME

**ROOF PLAN &
MODULES**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

S-01

Signature with Seal

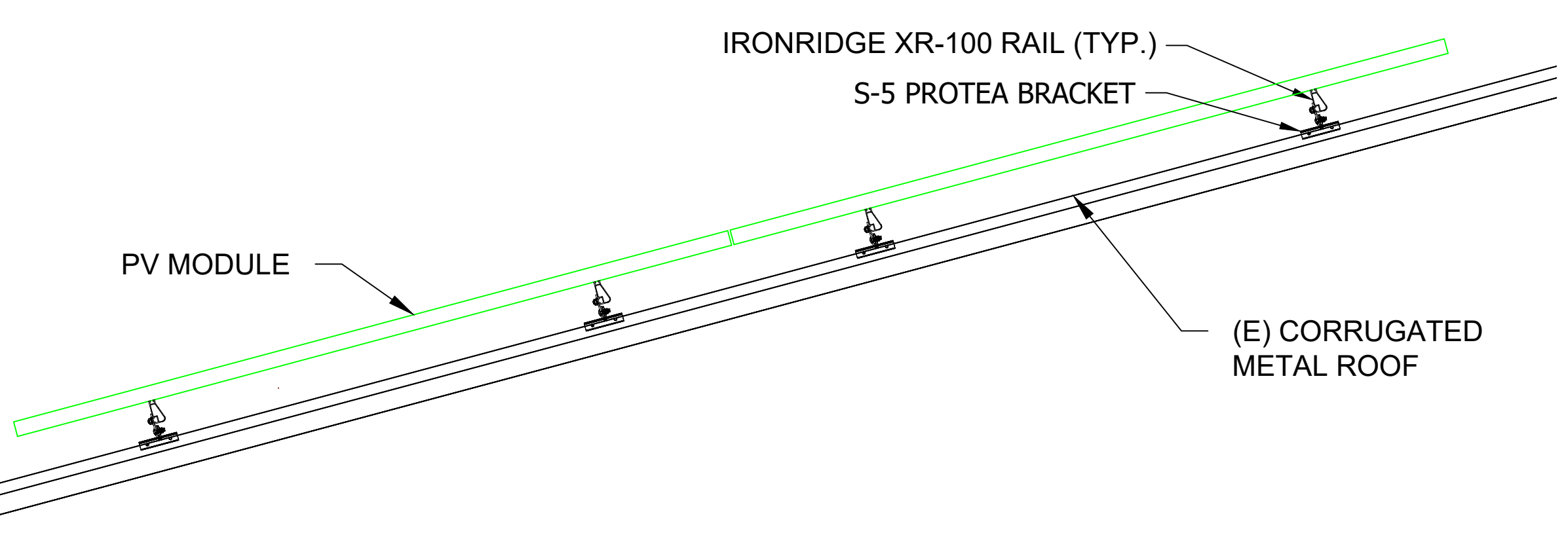
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Jeffrey A Torres
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2023.04.26
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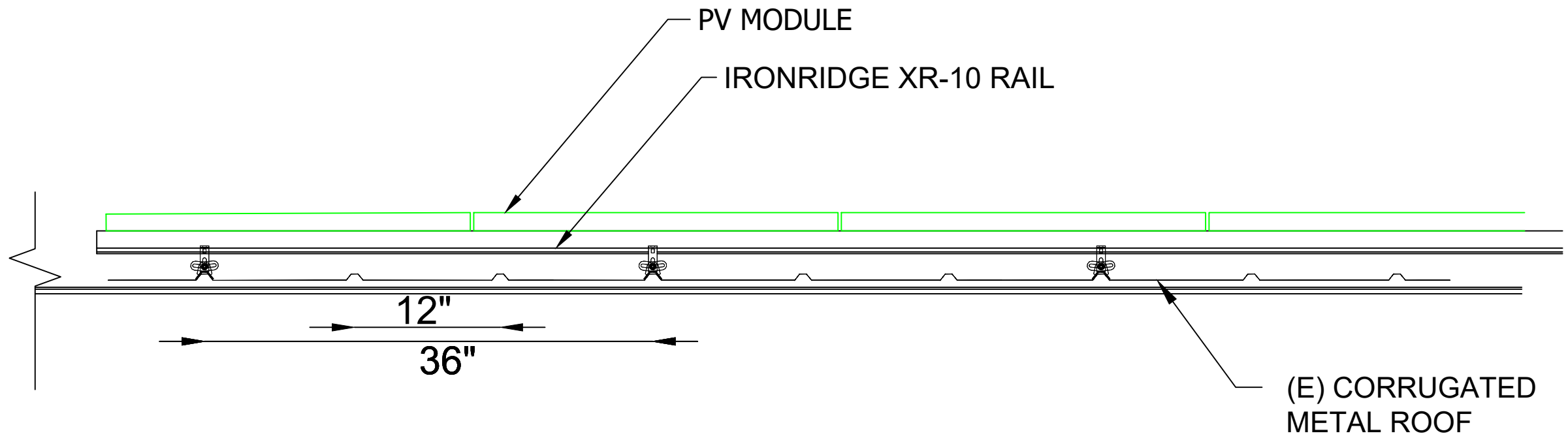
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BEEN REVIEWED AND
APPROVED FOR THE
PROJECT AND DATE
SHOWN HEREIN. Printed
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with Soy-Based Ink.

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NOTE: 2X4 RAFTES ASSUMED TO BE NO. 2 SYP
AND SHALL BE VERIFIED IN THE FIELD.



1 ATTACHMENT DETAIL
S-02 SCALE: 1"=1'-0"



2 ATTACHMENT DETAIL (enlarged view)
SCALE: NTS



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SHEET NAME
ATTACHMENT DETAILS

SHEET SIZE
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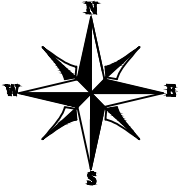
SHEET NUMBER
S-02



Signature with Seal
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SOLAR ARRAY 11.6 kW-DC STC
(29) URECO SOLAR FBM400MFG-BB (400W) MODULES
(01) BRANCH OF 15 MODULE
(01) BRANCH OF 14 MODULE



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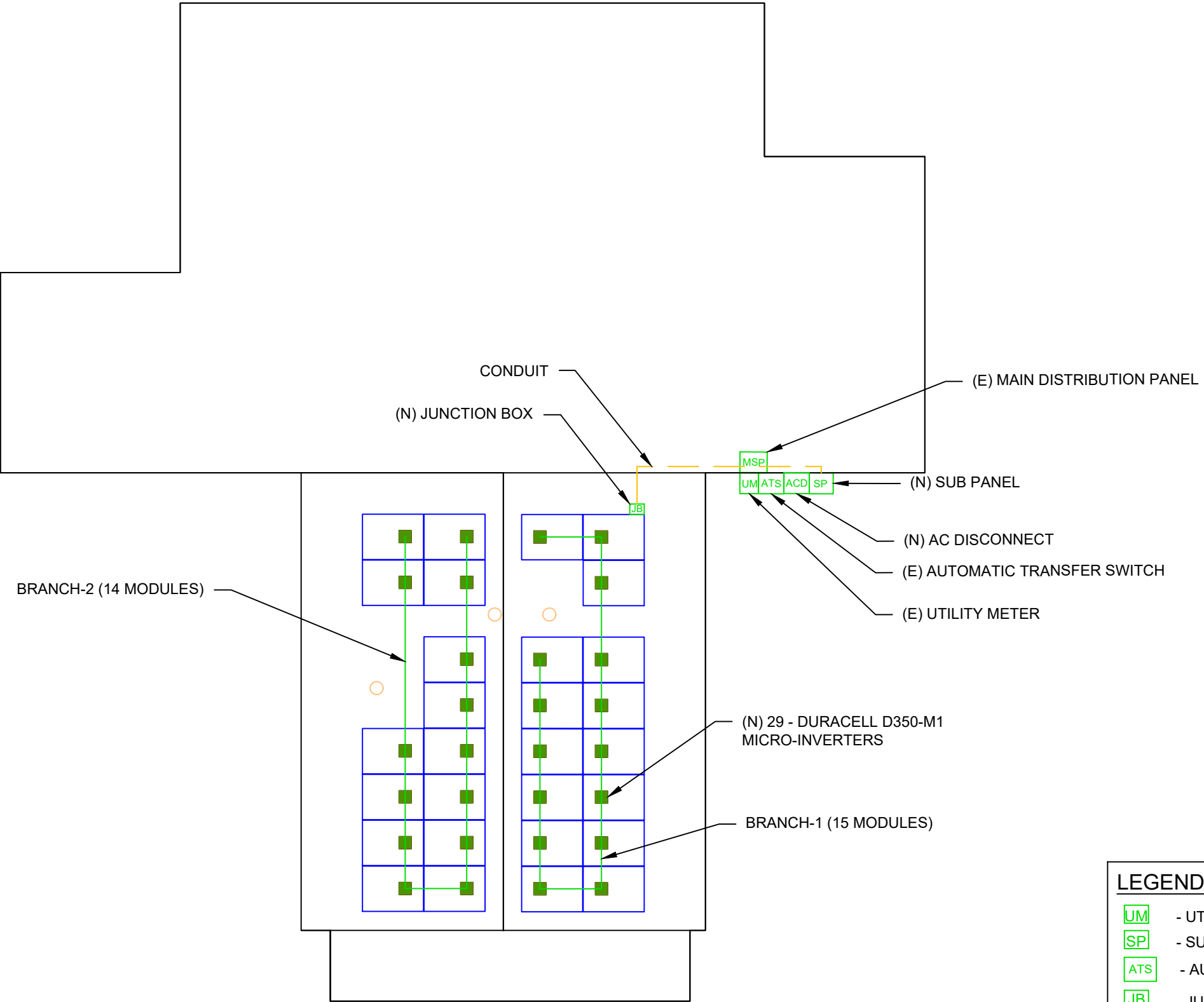
SHEET NAME
ELECTRICAL SITE PLAN

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

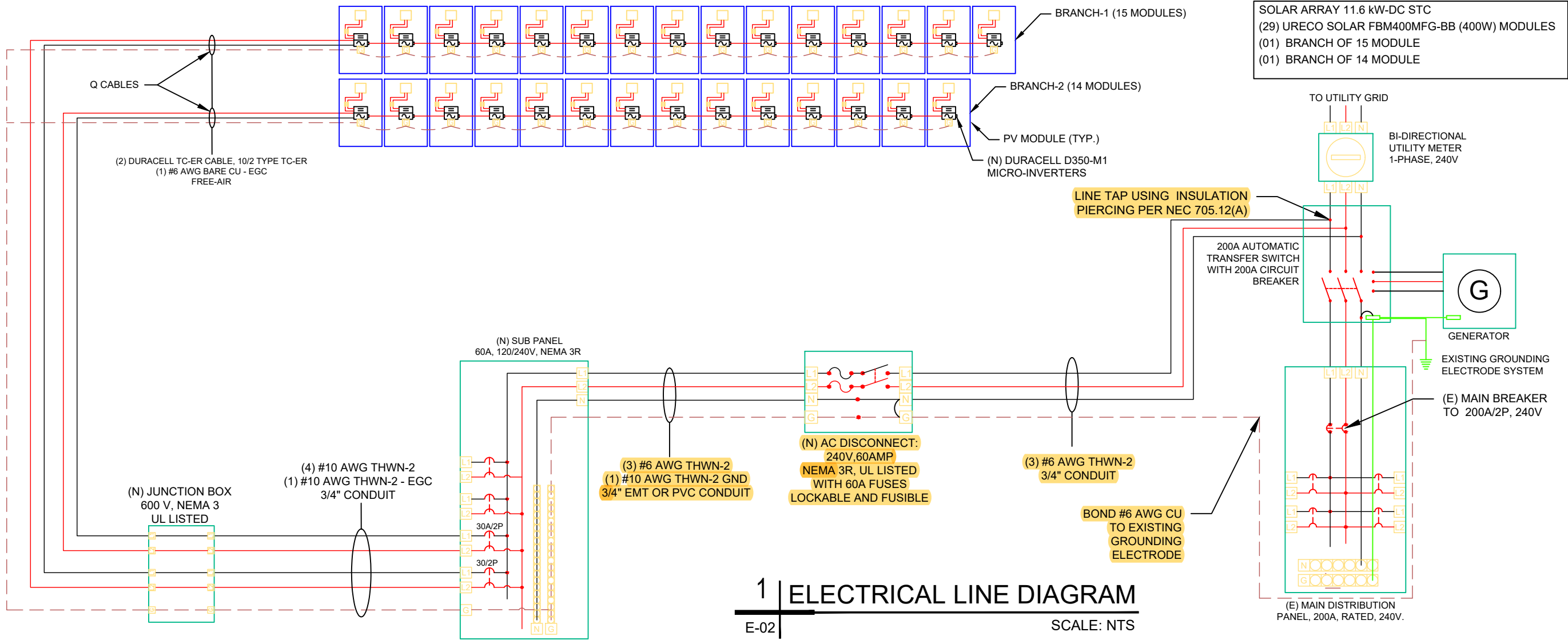
SHEET NUMBER
E-01

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(E) BACK YARD



- LEGEND**
- UM - UTILITY METER
 - SP - SUB PANEL
 - ATS - AUTOMATIC TRANSFER SWITCH
 - JB - JUNCTION BOX
 - ACD - AC DISCONNECT
 - MSP - MAIN DISTRIBUTION PANEL
 - □ - ROOF OBSTRUCTION
 - - CONDUIT



1 | ELECTRICAL LINE DIAGRAM
E-02 | SCALE: NTS

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	URECO SOLAR FBM400MFG-BB (400W) MODULES
VMP	31.17V
IMP	12.84A
VOC	37.20V
ISC	13.68A
MODULE DIMENSION	67.83"L x 44.61"W x 1.38"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	DURACELL D350-M1 MICRO-INVERTERS
MPPT VOLTAGE RANGE	16-60V
MAXIMUM INPUT VOLTAGE	60V
MAXIMUM UNIT PER BRANCH	16
MAXIMUM OUTPUT CURRENT	1.45A
CEC WEIGHTED EFFICIENCY	97%

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-5°
AMBIENT TEMP (HIGH TEMP 2%)	34°
CONDUIT MINIMUM HEIGHT FROM ROOF	0.5'
CONDUCTOR TEMPERATURE RATING	90°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.28%/°C

AC CONDUCTOR AMPACITY CALCULATIONS:
ARRAY TO JUNCTION BOX

EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
# OF CURRENT CARRYING CONDUCTORS	N/A
# OF C.C. CONDUCTORS CORRECTION PER NEC 310.15(B)(3)(a)	1.00
CIRCUIT CONDUCTOR SIZE	12 AWG
CIRCUIT CONDUCTOR AMPACITY	30A
REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A) & (B)	
1.25 x MAX AC OUTPUT x MAX # OF MICROINVERTERS/CIRCUIT	27.19A
DERATED CIRCUIT CONDUCTOR AMPACITY	28.80A
Result should be greater than (27.19A)	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM JUNCTION BOX TO PV COMBINER PANEL

EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
# OF CURRENT CARRYING CONDUCTORS	4
# OF C.C. CONDUCTORS CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A
REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A) & (B)	
1.25 x MAX AC OUTPUT x MAX # OF MICROINVERTERS/CIRCUIT	27.19A
DERATED CIRCUIT CONDUCTOR AMPACITY	30.72A
Result should be greater than (27.19A)	

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM PV COMBINER PANEL TO ACDS

EXPECTED WIRE TEMP (In Celsius)	34°
TEMP. CORRECTION PER TABLE (310.15)(B)(2)(a)	0.96
# OF CURRENT CARRYING CONDUCTORS	3
# OF C.C. CONDUCTORS CORRECTION PER NEC 310.15(B)(3)(a)	1.00
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY	75A
REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A) & (B)	
1.25 x MAX AC OUTPUT x TOTAL # OF MICROINVERTERS	52.56A
DERATED CIRCUIT CONDUCTOR AMPACITY	72.00A
Result should be greater than (52.56A)	

ELECTRICAL NOTES

- ALL EQUIPMENT SHALL BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90°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 SYSTEM. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS, AND ACCESSORIES TO MEET APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND ACCESSIBLE.
- INSTALL MODULE AND RACKING GROUNDING HARDWARE PER MANUFACTURER'S INSTRUCTION.

2 | WIRING CALCULATIONS
E-02 | SCALE: NTS



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JAMES AND CHRISTINA MCNEIL
297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME
ELECTRICAL
LINE DIAGRAM &
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-02

Signature with Seal

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Jeffrey A Torres
Date: 2023.04.26
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PHOTOVOLTAIC SYSTEM AC DISCONNECT
MAXIMUM AC OPERATING CURRENT 42.05 AMPS
MAXIMUM AC OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT(S)
PER NEC 690.54

**RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM**

LABEL LOCATION:
RAPID SHUTDOWN INITIATION DEVICE
PER NEC 690.56(C)(3)

**WARNING**

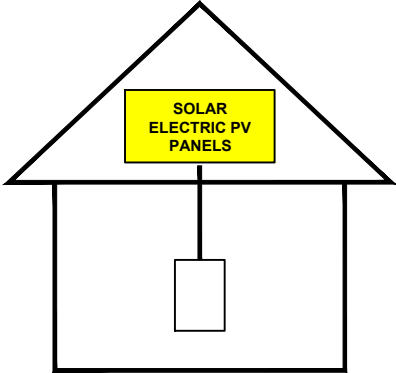
POWER SOURCE OUTPUT CONNECTION

**DO NOT RELOCATE THIS
OVERCURRENT DEVICE**

LABEL LOCATION:
POINT OF INTERCONNECTION (WHEN APPLICABLE)
PER NEC 705.12(B)(2)(3)(b)

**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 LOCATION:
AT SERVICE DISCONNECTING MEANS
PER NEC 690.56(C)(1)(a)

**SOLAR ENERGY
SPECIALIST**

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297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME
SYSTEM
LABELING

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-03



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2023.04.26
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



FBM_MFG-BB / 108 cells
390W - 405 W
Mono-Crystalline PV Module

URE Peach module uses URE state-of-the-art cell cutting technology, and advanced module manufacturing experiences.



Key Features

-  Positive power tolerance
+0 ~ +5 watt
-  100% EL inline inspection
Better module reliability
-  Withstand heavy loading
front load 5400 Pa & rear load 2400 Pa
-  Design for 1000 VDC
Reduce the system BOS effectively
-  Excellent low light performance
3.5% relative eff. Reduction at low
(200W/m²)

Electrical Data

Model - STC		FBM390MFG-BB	FBM395MFG-BB	FBM400MFG-BB	FBM405MFG-BB
Maximum Rating Power (Pmax)	[W]	390	395	400	405
Module Efficiency	[%]	19.98	20.23	20.49	20.75
Open Circuit Voltage (Voc)	[V]	36.84	37.03	37.20	37.36
Maximum Power Voltage	[V]	30.82	31.00	31.17	31.36
Short Circuit Current (Isc)	[A]	13.50	13.59	13.68	13.78
Maximum Power Current	[A]	12.66	12.75	12.84	12.92

*Standard Test Condition (STC): Cell Temperature 25 °C, Irradiance 1000 W/m², AM 1.5
*Values without tolerance are typical numbers. Measurement tolerance: ± 3%

Mechanical Data

Item	Specification
Dimensions	1723 mm (L) ¹ x 1133 mm (W) ¹ x 35 mm (D) ² / 67.83" (L) ¹ x 44.61" (W) ¹ x 1.38" (D) ²
Weight	21.7 kg / 47.84 lbs
Solar Cell	12x9 pieces monocrystalline solar cells series strings
Front Glass	White toughened safety glass, 3.2mm thickness
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate)
Frame	Black anodized aluminum profile
Junction Box	IP≥ 68, 3 diodes
Cable & Connector	Potrait : 500 mm (cable length can be customized), 1 x 4 mm ² compatible with MC4
Package Configuration	31 pcs Per Pallet, 806 pcs per 40' HQ container

¹ : With assembly tolerance of ± 2 mm [± 0.08"]
² : With assembly tolerance of ± 0.8 mm [± 0.03"]

Operating Conditions

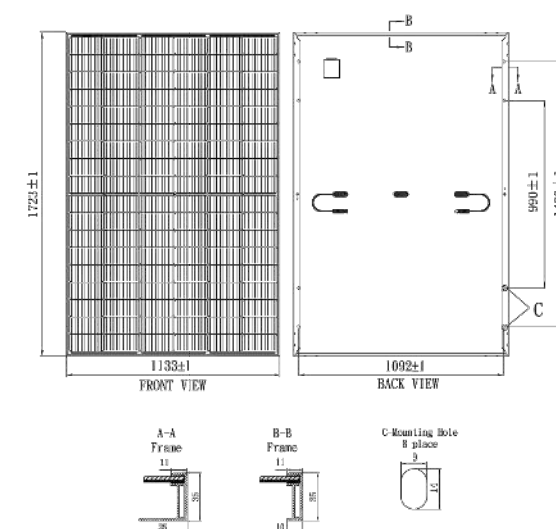
Item	Specification
Mechanical Load	5400 Pa
Maximum System Voltage	1000V
Series Fuse Rating	30 A
Operating Temperature	-40 to 85 °C

Temperature Characteristics

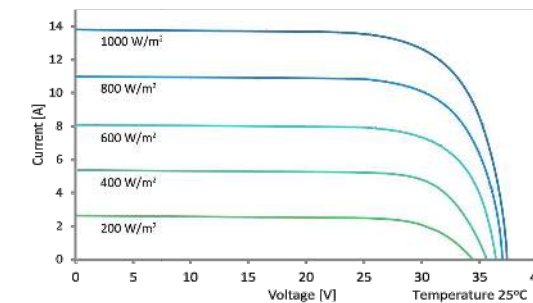
Item	Specification
Nominal Module Operating Temperature	45°C ± 2°C
Temperature Coefficient of Isc	0.048 % / °C
Temperature Coefficient of Voc	-0.27 % / °C
Temperature Coefficient of Pmax	-0.32 % / °C

*Nominal module operating temperature (NMOT): Air mass AM 1.5,
irradiance 800W/m², temperature 20°C, windspeed 1 m/s.
*Reduction in efficiency from 1000W/m² to 200W/m² at 25°C: 3.5 ± 2%.

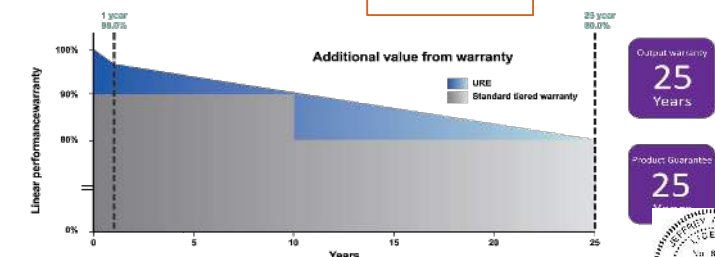
Engineering Drawing (mm)



Dependence on Irradiance



Reliability with Warranty



For more information, please visit us at www.urecorp.com



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MODULE DATA SHEET

SHEET SIZE
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11" X 17"**

SHEET NUMBER
DS-01

Signature with Seal

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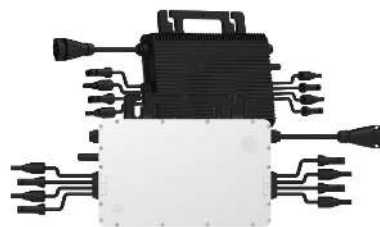
Single



Dual



Quad



Fast, Easy & Flexible Installation

Duracell Power Center's family of single, dual, and quad microinverters delivers the lowest cost, highest yield per panel PV installation.

The AC trunk cable format permits any combination of the three models to optimize even the most complex rooftop installations.

Reactive Power Control
CA Rule 21 compliant

Compliant with U.S.
NEC-2017 & NEC-2020
690.12 rapid shutdown

High reliability: NEMA 6
(IP67) enclosure, 6000V
surge protection

Become a Duracell Partner Today

sales@duracellpowercenter.com

Technical Data

Model	D350-M1		D700-M2		D1500-M4	
Input Data (DC)						
Number of PV inputs	1		2		4	
Module power range, typical (W)	280 to 470+		280 to 470+		300 to 505+	
Maximum input voltage (V)			60			
MPPT voltage range (V)			16-60			
Start-up voltage (V)			22			
Maximum input current (A)			11.5			
Output Data (AC)						
Peak output power (VA)	350		700		1500	
Maximum continuous output power (VA)	349		696		1438	
Maximum continuous output current (A)	1.45	1.68	2.9	3.35	5.99	5.99
Nominal output voltage(V)	240	208	240	208	240	208
Nominal output voltage range1 (V)	211-264	183-228	211-264	183-228	211-264	183-228
Nominal frequency/range1 (Hz)	60/55-65					
Power factor (adjustable)	>0.99 default (0.8 lead to 0.8 lag)					
Total harmonic distortion	<3%					
Maximum units per branch2 (10 AWG)	16	14	8	7	4	4
Efficiency						
CEC peak efficiency (%)			96.7			
CEC weighted efficiency (%)			96.5			
Nominal MPPT efficiency (%)			99.8			
Nighttime power consumption (mW)			<50			
Mechanical Data						
Ambient temperature range (°C)			-40 to +65			
Dimensions (W x H x D) mm	182 x 164 x 29.5		250 x 170 x 28		280 x 176 x 33	
Weight (kg)	1.75		2.6		3.35	
Enclosure rating	Outdoor NEMA 6					
Cooling	Natural convection - no fans					
Features						
Communication	2.4 GHz proprietary RF (Nordic)					
Monitoring	Yes					
Warranty	Up to 25 years					
Compliance	UL 1741, IEEE 1547, UL 1741 SA (240 Vac), CA Rule 21 (240 Vac), CSA C22.2 No. 107.1-16, FCC Part 15B, FCC Part 15C					
PV Rapid Shutdown	Conforms with NEC-2017 and NEC-2020 Article 690.12 and CEC-2021 Sec 64-218 Rapid Shutdown of PV Systems					

*1. Nominal voltage/frequency range can vary depending on local requirements.

*2. Refer to local requirements for exact number of microinverters per branch.

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SOLAR ENERGY SPECIALISTS
6418 HOFFNER AVE #100
ORLANDO, FL 32822

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	04-25-2023	01

PROJECT NAME

JAMES AND CHRISTINA MCNEIL

297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME

MICROINVERTER
DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-02

Signature with Seal



Digitally signed
by Jeffrey A
Torres
Date:
2023.04.26
14:41:57 -04'00'

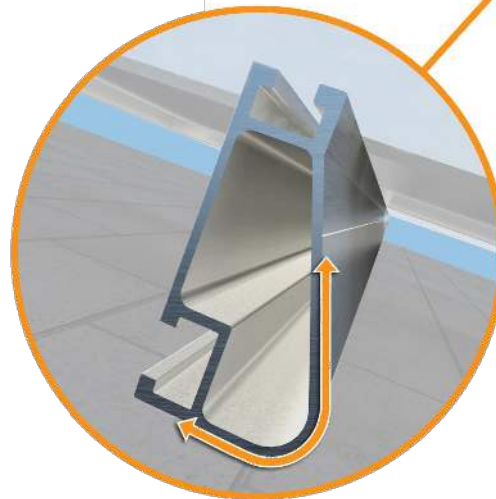
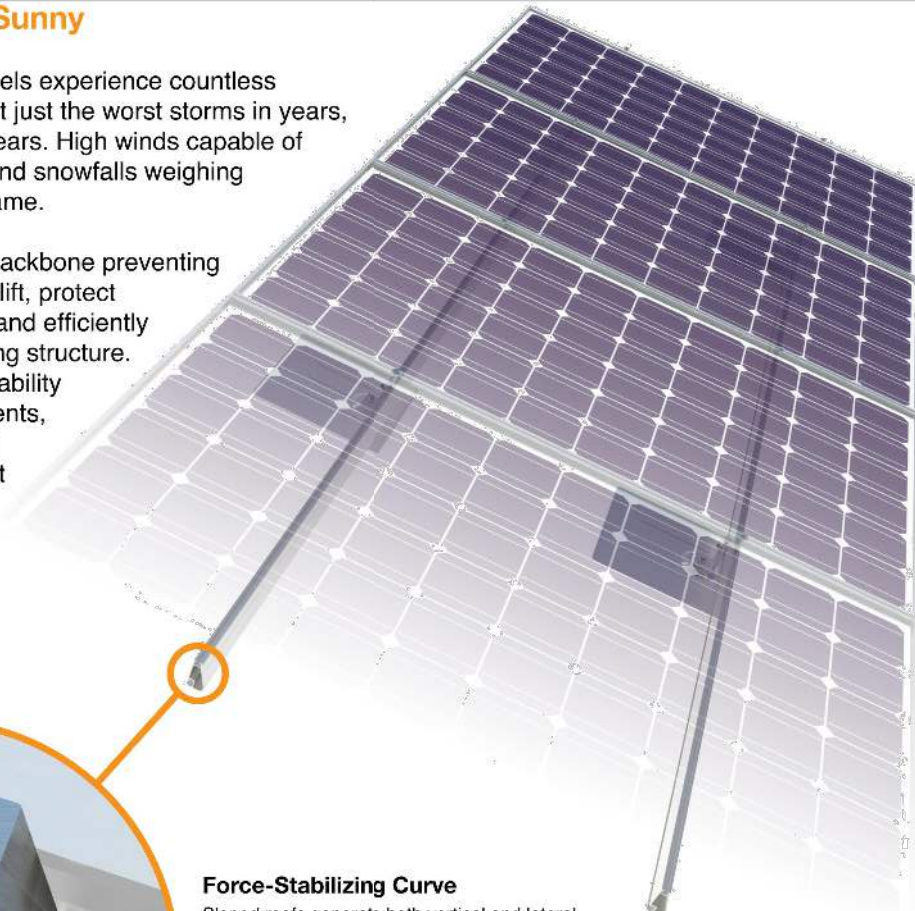
JEFFREY A. TORRES, P.E.
FL PE #80379
SUNSMART ENGINEERING, LLC
FL COA #35170
925 SUNSHINE LANE
ALTAMONTE SPRINGS, FL 32714
JEFF.TORRES@SUNSMARTENGINEERING.COM

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 6000-series 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 spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black 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 10 feet.

- 10' 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 up to 12 feet for commercial applications.

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

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

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

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

REVISIONS

DESCRIPTION	DATE	REV
INITIAL	04-25-2023	01

PROJECT NAME

JAMES AND CHRISTINA MCNEIL

297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME

RAIL
DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-03

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signed by
Jeffrey A

Torres

Date:

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The right way to attach solar PV to trapezoidal roof profiles!

S-5!®

The Right Way!™

NEW

NOW AVAILABLE
IN ALUMINUM

ProteaBracket™

ProteaBracket™

A versatile bracket for
mounting solar PV to
trapezoidal roof profiles

ProteaBracket™ is now made in aluminum. Still the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteaBracket just got better!

The bracket features an adjustable attachment base and module attachment options to accommodate different roof profile dimensions and mounting options.

Our pre-applied EPDM gasket with peel and stick adhesive makes installation a snap, ensuring accurate and secure placement the first time.

With no messy sealants, faster installation, and a weather-proof fit, ProteaBracket offers you the most versatile solar attachment solution available.

ProteaBracket* can be used for
rail mounting or "direct-attach"
with S-5! PVKIT™

Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*

*When ProteaBracket is used in conjunction with the S-5! PVKIT, an additional nut is required during installation.

*See www.S-5.com for details.



888-825-3432 | www.S-5.com

S-5!®

The Right Way!™

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal rib, exposed-fastened metal roof profiles!

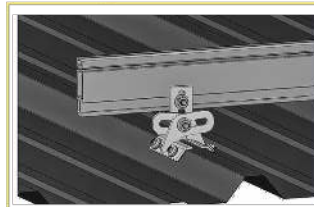
ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

Note: All four pre-punched holes must be used to achieve tested strength. Fasteners are provided.

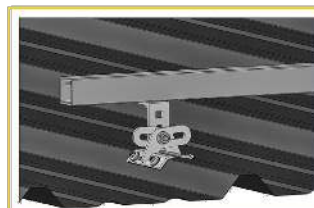
For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:



Side
Mount Rail



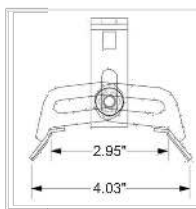
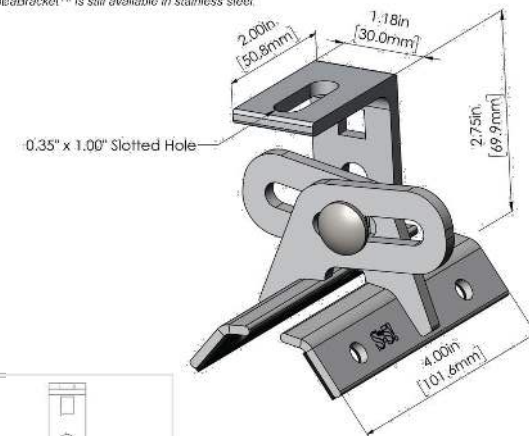
Bottom
Mount Rail



w/ S-5!
PVKIT™
(rail-less)

ProteaBracket™

ProteaBracket™ is still available in stainless steel.



ProteaBracket fits profiles
up to 3 inches

INSTALLATION:

No surface preparation needed. (1) Wipe away excess oil and debris. (2) Peel off adhesive release paper. (3) Align and mount bracket directly onto crown of panel. (4) Secure ProteaBracket through pre-punched holes, using piercing-point S-5! screws.



ProteaBracket™ and the S-5! PVKIT™ 2.0
mounted on a trapezoidal roof profile

S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

Copyright 2019, Metal Roof Innovations, Ltd. S-5! products are patent protected. S-5! aggressively protects its patents, trademarks, and copyrights. Version 07089.

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This form has been electronically signed and sealed by Jeffrey A. Torres, P.E. using a Digital Signature and data shown in the bottom right. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

JAMES AND CHRISTINA MCNEIL

297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME
ATTACHMENT
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-04

Signature with Seal

Digitally
signed by
Jeffrey A Torres
Date:
2023.04.26
14:42:38 -04'00'

JEFFREY A. TORRES, P.E.
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FL COA #35170
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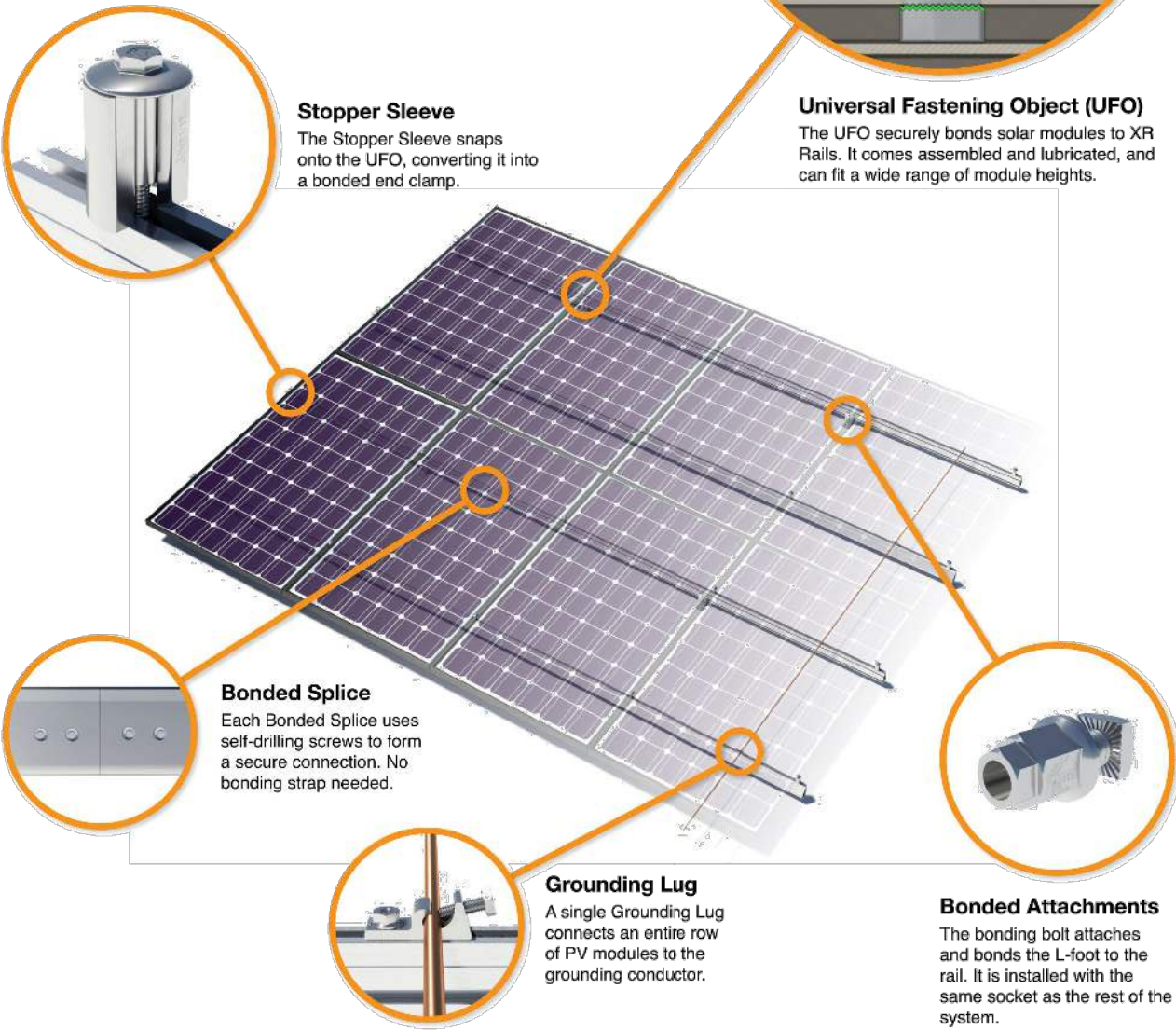
UFO Family of Components

Tech Brief

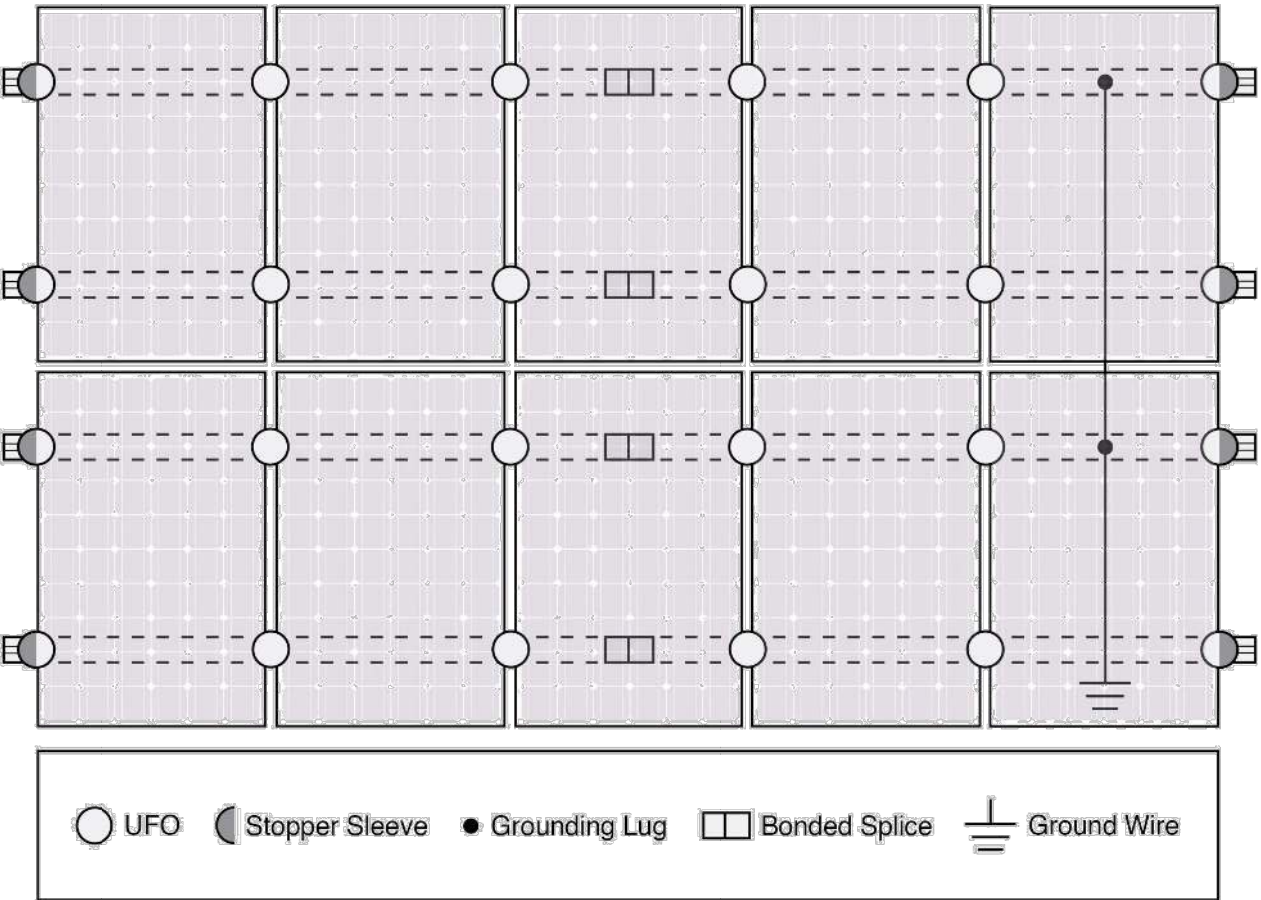
Simplified Grounding for Every Application

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.



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](https://www.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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INITIAL	04-25-2023	01

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297 NW HILLSBORO ST
LAKE CITY, FL 32055

SHEET NAME
ATTACHMENT DATA SHEET

SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
DS-05

Signature with Seal
Digitally signed by Jeffrey A Torres
Date: **2023.04.26 14:42:54 -04'00'**
JEFFREY A. TORRES, P.E.
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