



Scott E. Wyssling, PE, PP, CME

**Scott E. Wyssling, PE**  
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Alpine, UT 84004  
office (201) 874-3483  
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August 24, 2021

Re: Engineering Services  
Aguilar Residence  
135 Park Lane, Coats NC  
12.250 kW System

To Whom it May Concern,

Pursuant to your request, we have reviewed the following information regarding solar panel installation on the roof of the above referenced home:

1. Photographs of the interior and exterior of the roof system identifying existing structural members and their conditions.

Based on the above information we have evaluated the structural capacity of the existing roof system to support the additional loads imposed by the solar panels and have the following comments related to our review and evaluation:

**Description of Residence:**

The existing residence is typical wood framing construction with the roof system consisting of 2 x 6 dimensional lumber at 24" on center. The attic space is unfinished and photos indicate that there was free access to visually inspect the size and condition of the roof rafters. All wood material utilized for the roof system is assumed to be Doug-Fir #2 or better with standard construction components. The existing roofing material consists of composite asphalt shingles. Photos of the dwelling also indicate that there is a permanent foundation.

**A. Loading Criteria Used**

- 119 MPH wind loading based on ASCE 7-16 Exposure Category "B" at a slope of 30 degrees
- 7 PSF = Dead Load roofing/framing                      Live Load = 20 PSF                      Snow Load = 15 PSF
- 3 PSF = Dead Load solar panels/mounting hardware

*Total Dead Load = 10 PSF*

*The above values are within acceptable limits of recognized industry standards for similar structures in accordance with the North Carolina Residential Code (2018 IRC). Analysis performed of the existing roof structure utilizing the above loading criteria indicates that the existing rafters will support the additional panel loading without damage, if installed correctly.*

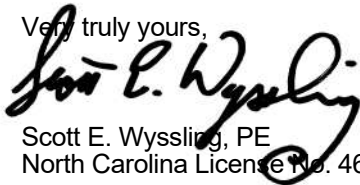
**B. Solar Panel Anchorage**

1. The solar panels shall be mounted in accordance with the most recent "IronRidge Install Manual", which can be found on the IronRidge website (<http://ironridge.com/>). If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. Maximum allowable pullout per lag screw is 235 lbs/inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications for Doug-Fir (North Lumber) *assumed*. Based on our evaluation, the pullout value, utilizing a penetration depth of 2 1/2", is less than what is allowable per connection and therefore is adequate. Based on the variable factors for the existing roof framing and installation tolerances, using a thread depth of 2 1/2" with a minimum size of 5/16" lag screw per attachment point for panel anchor mounts should be adequate with a sufficient factor of safety.
3. Considering the roof slopes, the size, spacing, condition of roof, the panel supports shall be placed no greater than 48" o/c.
4. Panel supports connections shall be staggered to distribute load to adjacent rafters.

Based on the above evaluation, it is the opinion of this office that with appropriate panel anchors being utilized the roof system will adequately support the additional loading imposed by the solar panels. This evaluation is in conformance with the North Carolina Residential Code and the 2018 IRC, current industry and standards, and based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,



Scott E. Wyssling, PE  
North Carolina License No. 46546



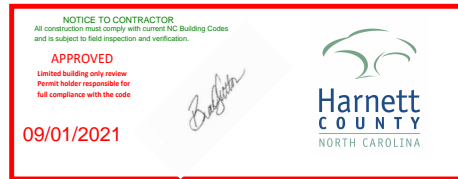
North Carolina Firm License No. 46546

**SCOPE OF WORK:**

TO INSTALL A ROOF MOUNTED SOLAR PHOTOVOLTAIC SYSTEM AT THE OWNER RESIDENCE LOCATED AT 135 PARK LN. COATS, NC 27521 THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT. THE PV SYSTEM DOES NOT INCLUDE STORAGE BATTERIES

**EQUIPMENT SUMMARY**

35 QCELL Q.PEAK DUO BLK-G8 350W MODULES
1 SOLAREEDGE SE10000H-US INVERTER
35 SOLAREEDGE POWER OPTIMIZER P370



**GOVERNING CODES**

- 2017 NATIONAL ELECTRICAL CODE
- 2018 INTERNATIONAL FIRE CODE
- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL RESIDENTIAL CODE
- 2018 INTERNATIONAL ENERGY CONSERVATION CODE
- 2018 INTERNATIONAL EXISTING BUILDING CODE
- 2018 INTERNATIONAL SWIMMING POOL AND SPA CODE
- 2018 UNIFORM MECHANICAL CODE
- 2018 UNIFORM PLUMBING CODE

**SYSTEM RATING**

12.25 KWDC  
10.00 KWAC

**SHEET INDEX**

PV-0	COVER PAGE
PV-1	SITE PLAN
PV-2	ROOF PLAN & MODULES
PV-2A	STRING LAYOUT & BOM
PV-3	ATTACHMENT DETAIL
PV-3A	ATTACHMENT DETAIL
PV-4	ELECTRICAL LINE DIAGRAM & CALCS.
PV-4A	SPECIFICATIONS & NOTES
PV-5	SIGNAGE
PV-6+	EQUIPMENT SPECIFICATIONS

**GENERAL NOTES:**

- THESE CONSTRUCTION DOCUMENTS HAVE BEEN BASED ON FIELD INSPECTIONS AND OTHER INFORMATION AVAILABLE AT THE TIME. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS IN CONSTRUCTION DETAILS.
- ARCHITECT HAS NOT BEEN RETAINED TO SUPERVISE ANY CONSTRUCTION OR INSTALLATION OF ANY EQUIPMENT AT SITE.
- CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, OBTAINS ALL PERMITS, LICENSES AND PAY ALL REQUIRED FEES AND COMPLETE INSTALLATION.
- CONTRACTOR HAS THE FULL RESPONSIBILITY TO CHECK AND VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. ANY WORK STARTED BEFORE CONSULTATION AND ACCEPTANCE BY THE ENGINEER SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE SUBJECT TO CORRECTION BY THEM WITHOUT ADDITIONAL COMPENSATION.
- DAMAGE CAUSED TO THE EXISTING STRUCTURE, PIPES, DUCTS, WINDOWS, WALL, FLOORS, ETC. SHALL BE REPAIRED TO THE ORIGINAL CONDITION OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROPER INSTALLATION AND COMPLETION OF THE WORK WITH APPROVED MATERIALS.
- NO CHANGES ARE TO BE MADE WITHOUT THE CONSULTATION AND APPROVAL OF THE ARCHITECT.
- CONTRACTOR SHALL OBTAIN BULDING PERMIT. NO WORK TO START UNLESS BUILDING PERMIT IS PROPERLY DISPLAYED.
- ALL WORKMANSHIP AND MATERIALS SHALL BE OF FIRST QUALITY AND IN COMPLIANCE WITH THE REQUIREMENTS OF THE NC BUILDING CODE, THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ALL PERTINENT AGENCIES.
- IT IS ESSENTIAL THAT ALL WORK PROCEED WITH THE MAXIMUM COOPERATION OF ALL PARTIES AND WITH MINIMUM INTERFERENCE TO THE OCCUPANTS WITHIN THE BUILDING. THE OWNER'S DIRECTIONS IN THIS REGARD SHALL BE FULLY COMPLIED WITH.
- ALL EXPOSED PLUMBING, HVAC, ELECTRICAL DUCTWORK, PIPING AND CONDUITS ARE TO BE PAINTED BY GENERAL CONTRACTOR.
- THE CONTRACTOR SHALL PERFORM THE WORK IN STRICT CONFORMANCE WITH THE LOCAL LAWS, REGULATIONS AND THE NATIONAL ELECTRIC CODE.
- THE CONTRACTOR SHALL OBTAIN ALL PERMITS, APPROVALS, AFFIDAVITS, CERTIFICATIONS, ETC. AND PAY ALL FEES AS REQUIRED BY THE LOCAL AUTHORITIES.
- CONTRACTORS SHALL OBTAIN FIRE CERTIF. UPON COMPLETION OF WORK.

**WIRING AND CONDUIT NOTES:**

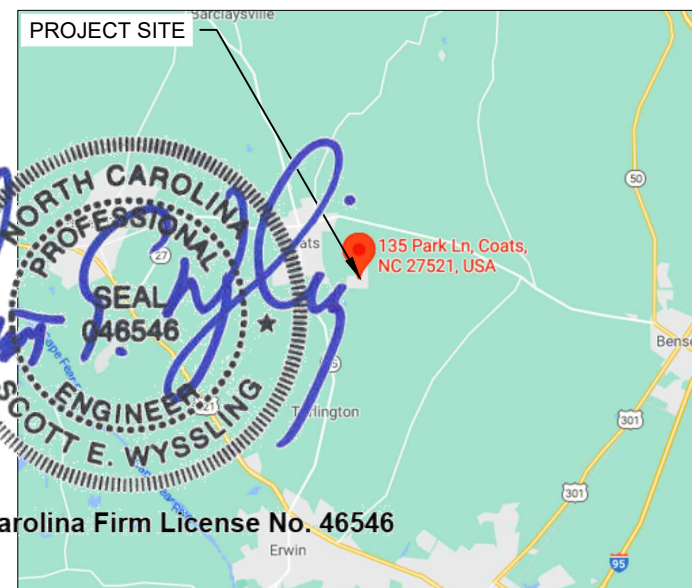
- ALL CONDUIT SIZES AND TYPES, SHALL BE LISTED FOR ITS PURPOSE AND APPROVED FOR THE SITE APPLICATIONS
- ALL PV CABLES AND HOMERUN WIRES BE #10AWG \*USE-2, PV WIRE, OR PROPRIETARY SOLAR CABLING SPECIFIED BY MFR, OR EQUIVALENT; ROUTED TO SOURCE CIRCUIT COMBINER BOXES AS REQUIRED
- ALL CONDUCTORS AND OCPD SIZES AND TYPES SPECIFIED ACCORDING TO [NEC 690.8 (A)(1) & (B)(1)], [NEC 240] [NEC 690.7] FOR MULTIPLE CONDUCTORS
- ALL PV DC CONDUCTORS IN CONDUIT EXPOSED TO SUNLIGHT SHALL BE DERATED ACCORDING TO [NEC TABLE 310.15 (B)(2)(C)] BLACK ONLY\*\*
- EXPOSED ROOF PV DC CONDUCTORS SHALL BE USE-2, 90°C RATED, WET AND UV RESISTANT, AND UL LISTED RATED FOR 600V, UV RATED SPIRAL WRAP SHALL BE USED TO PROTECT WIRE FROM SHARP EDGES
- PHASE AND NEUTRAL CONDUCTORS SHALL BE DUAL RATED THHN/THWN-2 INSULATED, 90°C RATED, WET AND UV RESISTANT, RATED FOR 600V PER NEC 2008 OR 1000V PER NEC 2011
- 4-WIRE DELTA CONNECTED SYSTEMS HAVE THE PHASE WITH THE HIGHER VOLTAGE TO GROUND MARKED ORANGE OR IDENTIFIED BY OTHER EFFECTIVE MEANS
- ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION
- VOLTAGE DROP LIMITED TO 2% FOR DC CIRCUITS AND 1% FOR AC CIRCUITS
- NEGATIVE GROUNDED SYSTEMS DC CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS: DC POSITIVE - RED (OR MARKED RED), DC NEGATIVE - GREY (OR MARKED GREY)
- POSITIVE GROUNDED SYSTEMS DC CONDUCTORS COLOR CODED: DC POSITIVE - GREY (OR MARKED GREY), DC NEGATIVE - BLACK (OR MARKED BLACK)
- AC CONDUCTORS >4AWG COLOR CODED OR MARKED: PHASE A OR L1- BLACK, PHASE B OR L2- RED, PHASE C OR L3- BLUE, NEUTRAL- WHITE/GRAY

**ELECTRICAL NOTES:**

- THE EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE INSTALLED ONLY BY QUALIFIED PEOPLE. A QUALIFIED PERSON IS ONE WHO HAS SKILLS AND KNOWLEDGE RELATED TO THE CONSTRUCTION AND OPERATION OF THE ELECTRICAL EQUIPMENT AND INSTALLATIONS AND HAS RECEIVED SAFETY TRAINING TO RECOGNIZE AND AVOID THE HAZARDS INVOLVED. (NEC 690.4(E) AND 705.6)
- LOCAL UTILITY PROVIDER SHALL BE NOTIFIED PRIOR TO USE AND ACTIVATION OF ANY SOLAR PHOTOVOLTAIC INSTALLATION. FOR A LINE SIDE TAP CONNECTION, UTILITY NEEDS TO BE NOTIFIED WELL IN ADVANCE TO COORDINATE BUILDING ELECTRICAL SHUT OFF.
- NEW CONDUIT ROUTING SHOWN IS ESSENTIALLY SCHEMATIC. SUBCONTRACTOR SHALL LAY OUT RUNS TO SUIT FIELD CONDITIONS AND THE COORDINATION REQUIREMENTS OF OTHER TRADES.
- ARRAY WIRING SHOULD NOT BE READILY ACCESSIBLE EXCEPT TO QUALIFIED PERSONNEL.
- ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE WATERTIGHT AND APPROVED FOR USE IN WET LOCATIONS. (NEC 314.15A).
- WIRING METHODS FOR PV SYSTEM CONDUCTORS AREN'T PERMITTED WITHIN 10 IN. OF THE ROOF DECKING OR SHEATHING EXCEPT WHERE LOCATED DIRECTLY BELOW THE ROOF SURFACE THAT'S COVERED BY PV MODULES AND ASSOCIATED EQUIPMENT WIRING
- BACK-FED BREAKER MUST BE AT THE OPPOSITE END OF BUS BAR FROM THE MAIN BREAKER OR MAIN LUG SUPPLYING CURRENT FROM THE UTILITIES.
- ALL CONDUCTORS AND WIRE TIES EXPOSED TO SUNLIGHT ARE LISTED AS UV RESISTANT.
- CONTRACTOR SHALL FOLLOW ALL ELECTRICAL EQUIPMENT LABELING REQUIREMENTS IN NEC 690 AND IFC 2015
- MEASURE THE LINE-TO-LINE AND LINE-TO-NEUTRAL VOLTAGE OF ALL SERVICE ENTRANCE CONDUCTORS PROIR TO INSTALLING ANY SOLAR EQUIPMENT. THE VOLTAGES FOR THE 240VAC RATED.



1 PV-0 HOUSE PHOTO SCALE: NTS



2 PV-0 VICINITY MAP SCALE: NTS

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal  
  
DATE: 08/12/2021

**PROJECT NAME & ADDRESS**

ARMANDO CRUZ AGUILAR  
RESIDENCE  
135 PARK LN.  
COATS, NC 27521  
PH NO. (801) 830-8155  
EMAIL ID: monson.travis@gmail.com

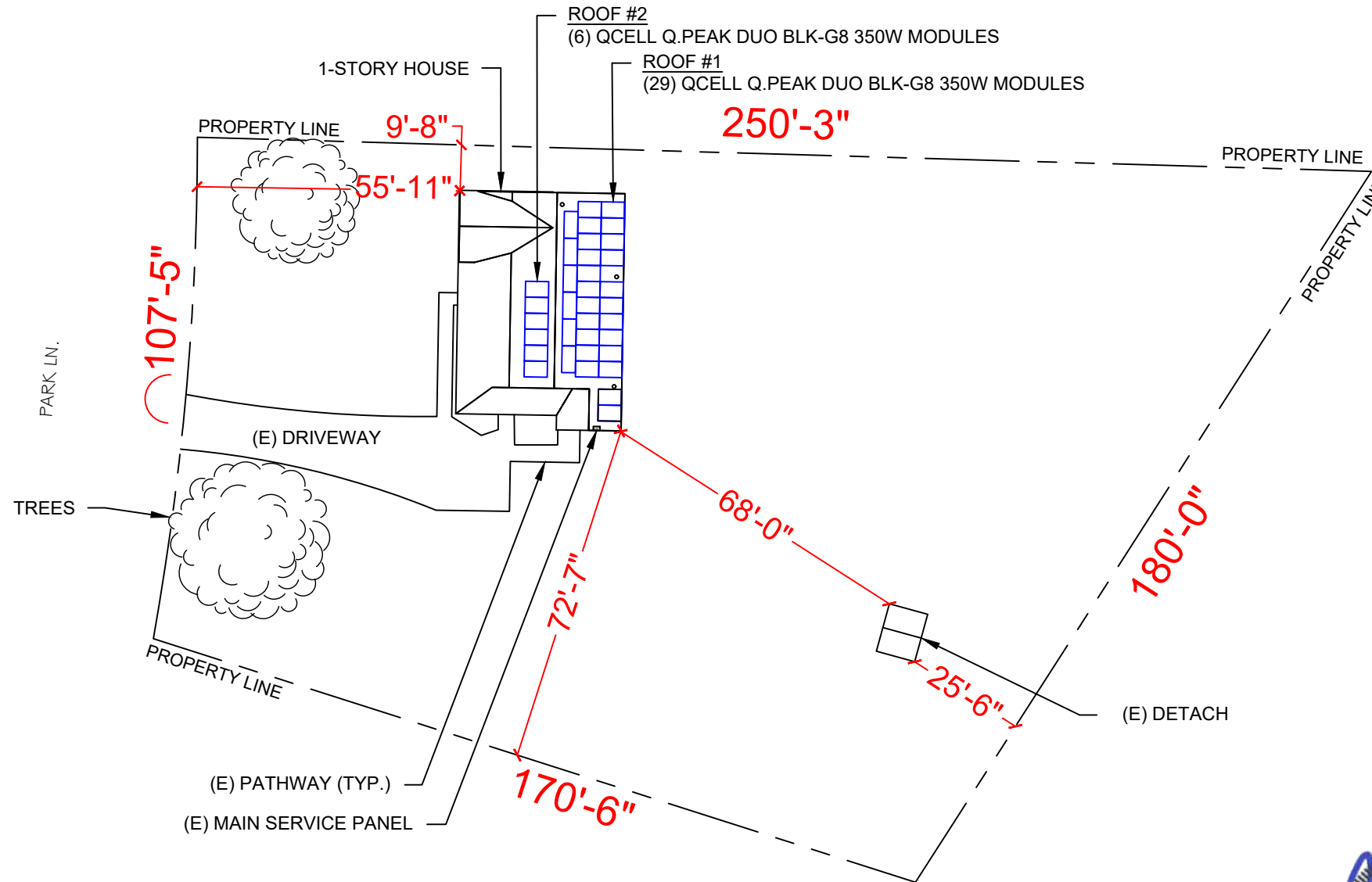
SHEET NAME  
**COVER PAGE**

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

SHEET NUMBER  
**PV-0**

**SITE NOTES**

- A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS AN UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
- THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26]



REVISIONS		
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SHEET NAME

SITE PLAN

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-1



1

PLOT PLAN WITH ROOF PLAN

PV-1

SCALE: 1/32" = 1'-0"



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DESIGN SPECIFICATION	
RISK CATEGORY:	II
CONSTRUCTION:	SFD
ZONING:	RESIDENTIAL
SNOW LOAD (ASCE 7-10):	15 PSF
EXPOSURE CATEGORY:	B
WIND SPEED (ASCE 7-10):	118 MPH

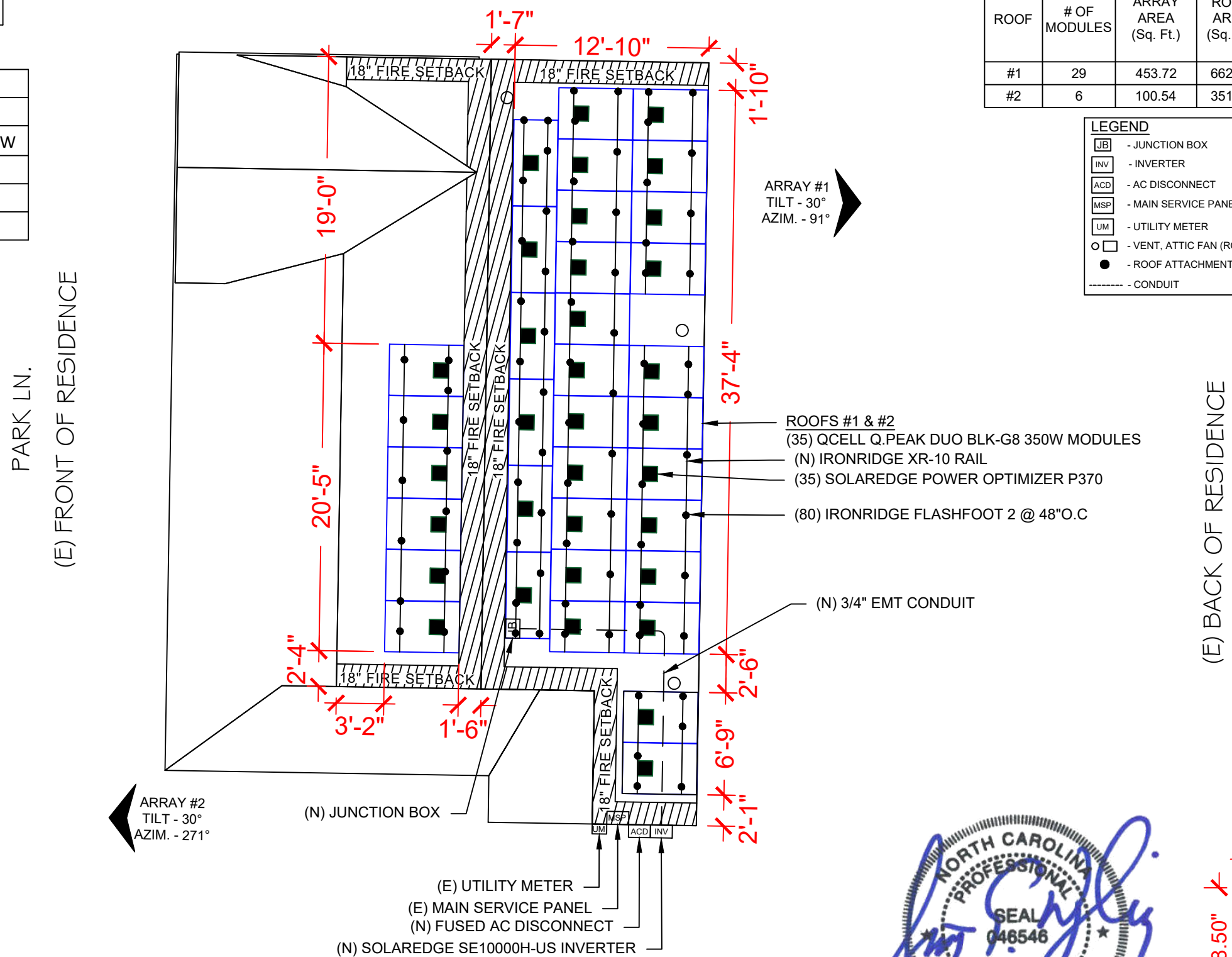
PANEL HEIGHT OFF ROOF	4"
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MODULE TYPE, DIMENSIONS & WEIGHT	
NUMBER OF MODULES:	35 MODULES
MODULE TYPE:	QCELL Q.PEAK DUO BLK-G8 350W
MODULE WEIGHT:	43.87 LBS
MODULE DIMENSIONS:	68.50" X 40.55" = 19.29 SF
UNIT WEIGHT OF AREA:	2.27 PSF

ROOF DESCRIPTION					
ROOF	ROOF TILT	AZIMUTH	RAFTER SIZE	RAFTER SPACING	ROOF MATERIAL
#1	30°	91°	2"X6"	24" o.c	COMP. SHINGLE
#2	30°	271°	2"X6"	24" o.c	COMP. SHINGLE

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	29	453.72	662.59	68
#2	6	100.54	351.90	29

REVISIONS		
DESCRIPTION	DATE	REV



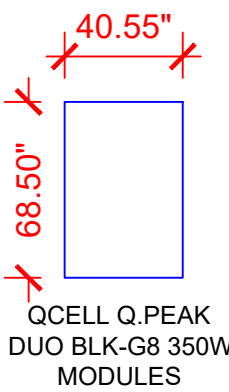
- ROOFS #1 & #2
- (35) QCELL Q.PEAK DUO BLK-G8 350W MODULES
- (N) IRONRIDGE XR-10 RAIL
- (35) SOLAREEDGE POWER OPTIMIZER P370
- (80) IRONRIDGE FLASHFOOT 2 @ 48"O.C

(N) 3/4" EMT CONDUIT

- (N) JUNCTION BOX
- (E) UTILITY METER
- (E) MAIN SERVICE PANEL
- (N) FUSED AC DISCONNECT
- (N) SOLAREEDGE SE10000H-US INVERTER



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1 ROOF PLAN & MODULES

PV-2 SCALE: 1/8" = 1'-0"

Signature with Seal

DATE: 08/12/2021

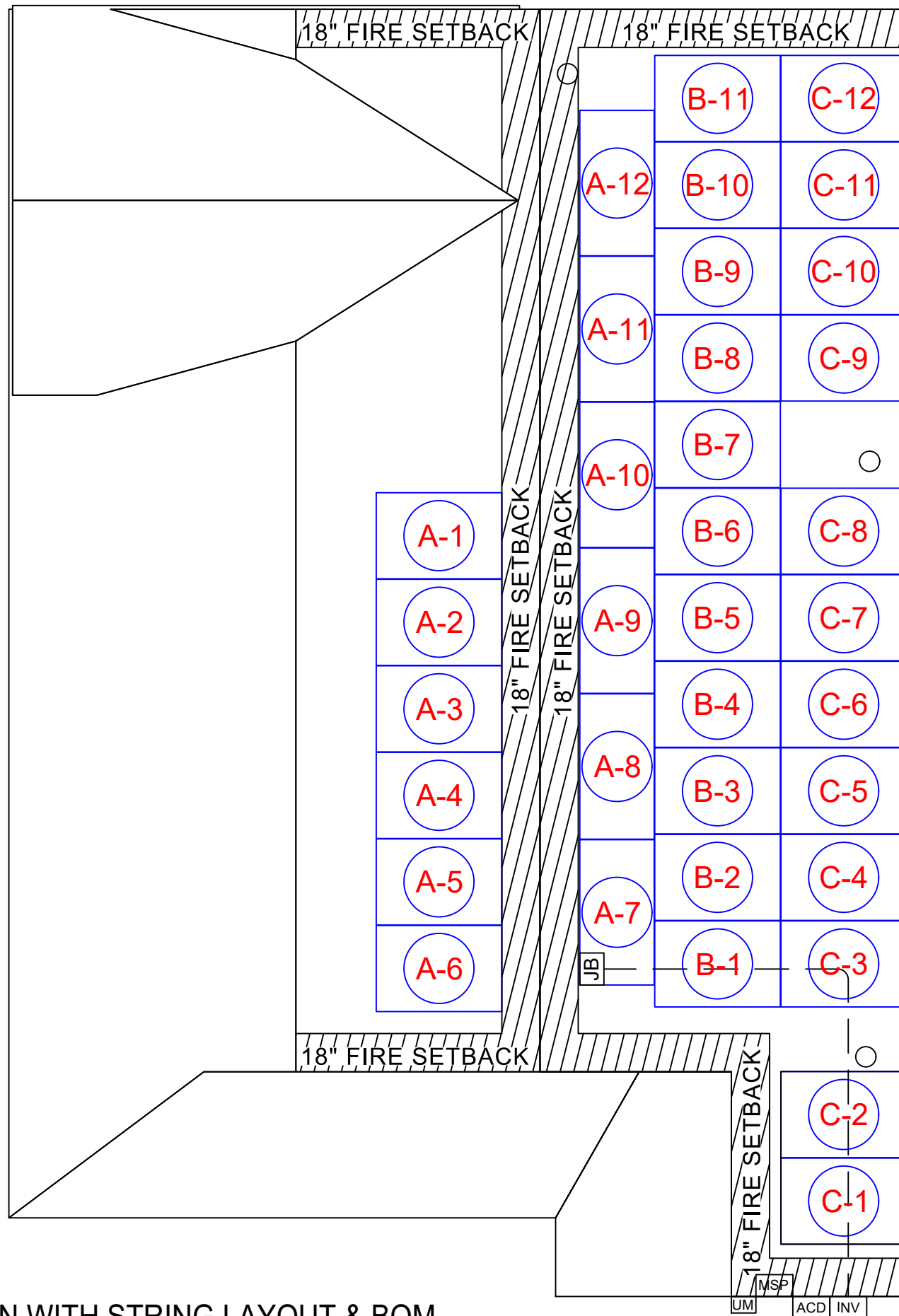
PROJECT NAME & ADDRESS

ARMANDO CRUZ AGUILAR  
 RESIDENCE  
 135 PARK LN.  
 COATS, NC 27521  
 PH NO. (801) 830-8155  
 EMAIL ID: monson.travis@gmail.com

SHEET NAME  
 ROOF PLAN & MODULES

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-2



BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	35	QCELL Q.PEAK DUO BLK-G8 350W
OPTIMIZER	35	SOLAREGE POWER OPTIMIZER P370
INVERTER	1	SOLAREGE SE10000H-US
AC DISCONNECT	1	60A FUSED AC DISCONNECT, (2) 60A FUSES, 240V, NEMA 3R, UL LISTED
JUNCTION BOX	1	JUNCTION BOX, NEMA 3R, UL LISTED
ATTACHMENT	80	IRONRIDGE FLASHFOOT 2
ATTACHMENT	80	FLASHING, ROUNDED CORNER, 9"X12"
ATTACHMENT	80	LAG SCREW, HEX HEAD, 5/16"X4"
ATTACHMENT	80	WASHER, SEALING, 5/16"ID X 3/4"OD
RAILS	20	IRONRIDGE XR-10 14 FEET (168")
BONDED SPLICE	12	XR-10 BONDED SPLICE
CLAMPS	82	MODULES CLAMPS (MID CLAMPS & END CLAMPS)
GROUNDING LUG	6	GROUNDING LUG

**A B C** - MODULE STRINGING

(E) BACK OF RESIDENCE

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

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1

ROOF PLAN WITH STRING LAYOUT & BOM

PV-2A

SCALE: 3/16" = 1'-0"

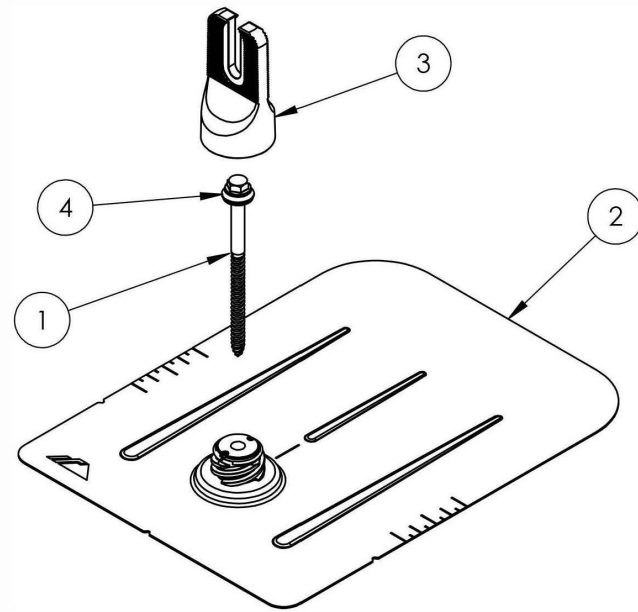
SHEET NAME  
 STRING LAYOUT & BOM

SHEET SIZE

ANSI B  
 11" X 17"

SHEET NUMBER

PV-2A

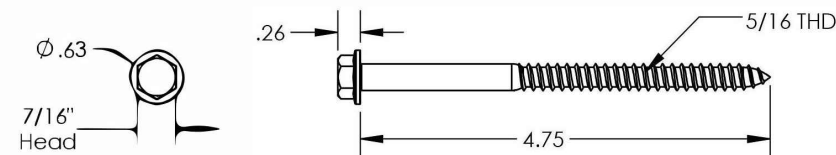


ITEM NO.	DESCRIPTION
1	BOLT LAG 5/16 X 4.75"
2	ASSY, FLASHING
3	ASSY, CAP
4	WASHER, EPDM BACKED

**FLASHFOOT 2**

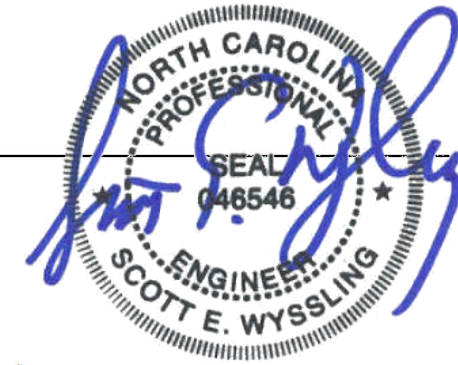
Part Number	Description
FF2-01-M1	FLASHFOOT2, MILL
FF2-01-B1	FLASHFOOT2, BLACK

**1) Bolt, Lag 5/16 x 4.75**



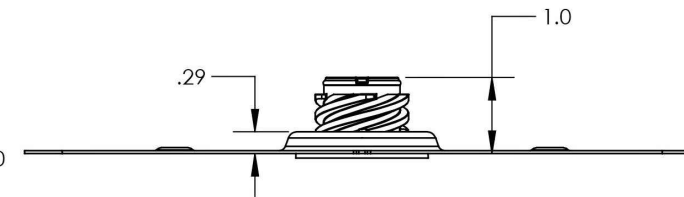
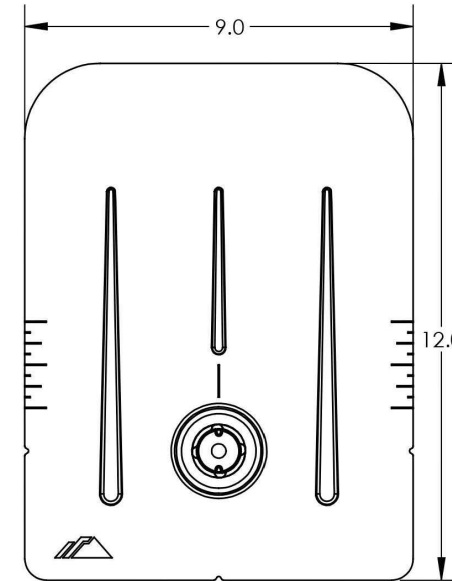
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.21



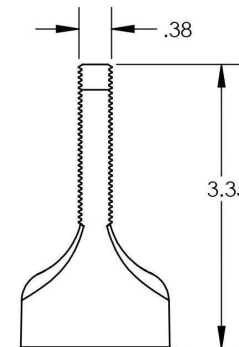
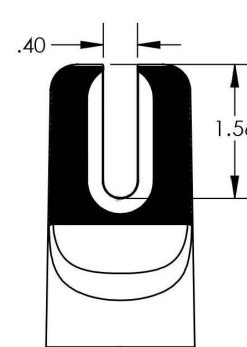
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**2) Assy, Flashing**



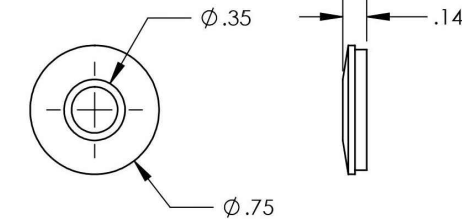
Property	Value
Material	Aluminum
Finish	Mill/Black

**3) Assy, Cap**



Property	Value
Material	Aluminum
Finish	Mill/Black

**4) Washer, EPDM Backed**



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.21

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 08/12/2021

PROJECT NAME & ADDRESS

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**RESIDENCE**  
 135 PARK LN.  
 COATS, NC 27521  
 PH NO. (801) 830-8155  
 EMAIL ID: monson.travis@gmail.com

SHEET NAME  
**ATTACHMENT  
 DETAILS**

SHEET SIZE

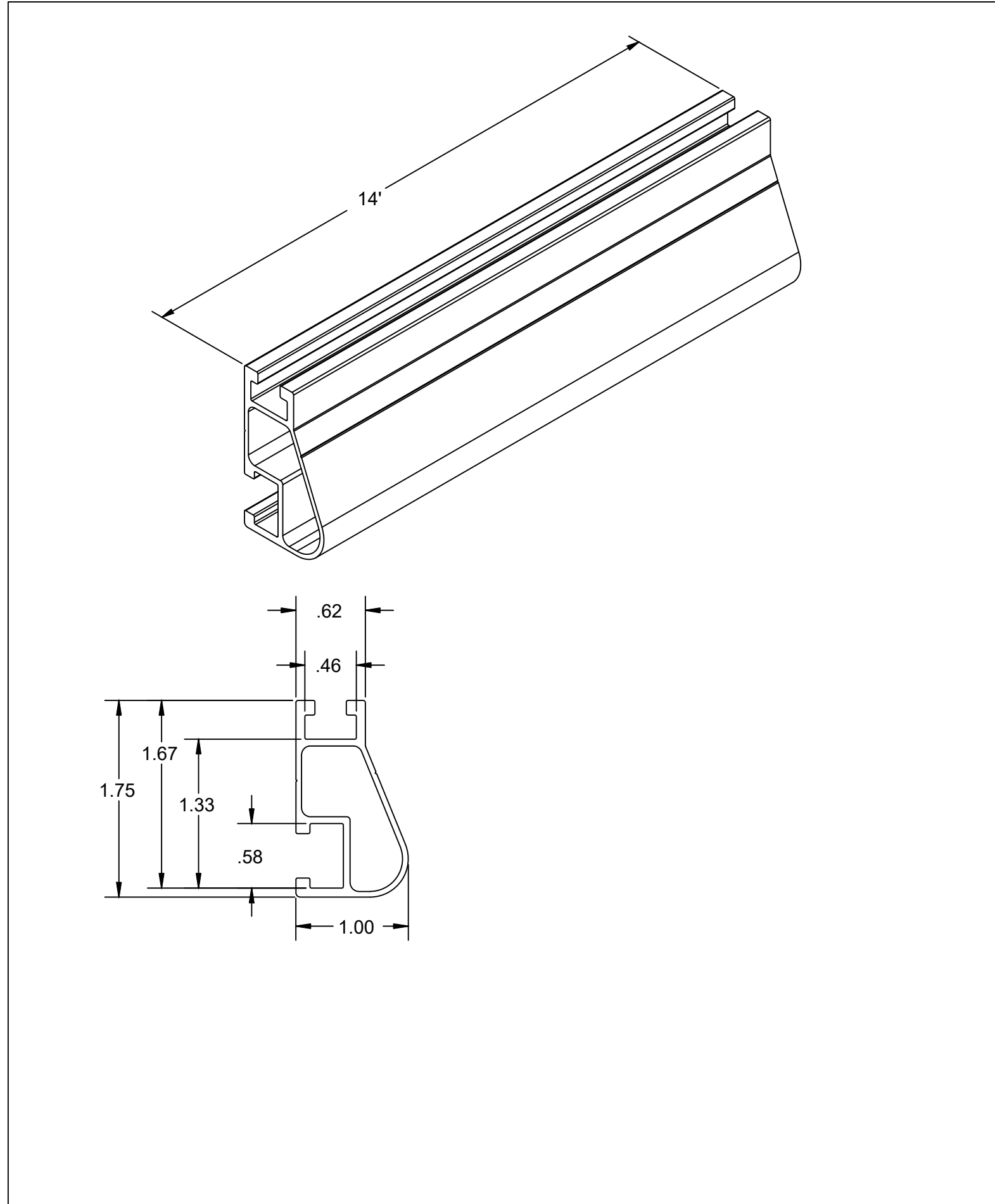
**ANSI B  
 11" X 17"**

SHEET NUMBER

**PV-3**

# IRONRIDGE

# XR10 Rail



REVISIONS		
DESCRIPTION	DATE	REV

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DATE: 08/12/2021

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SHEET NAME  
 ATTACHMENT  
 DETAILS

SHEET SIZE  
 ANSI B  
 11" X 17"

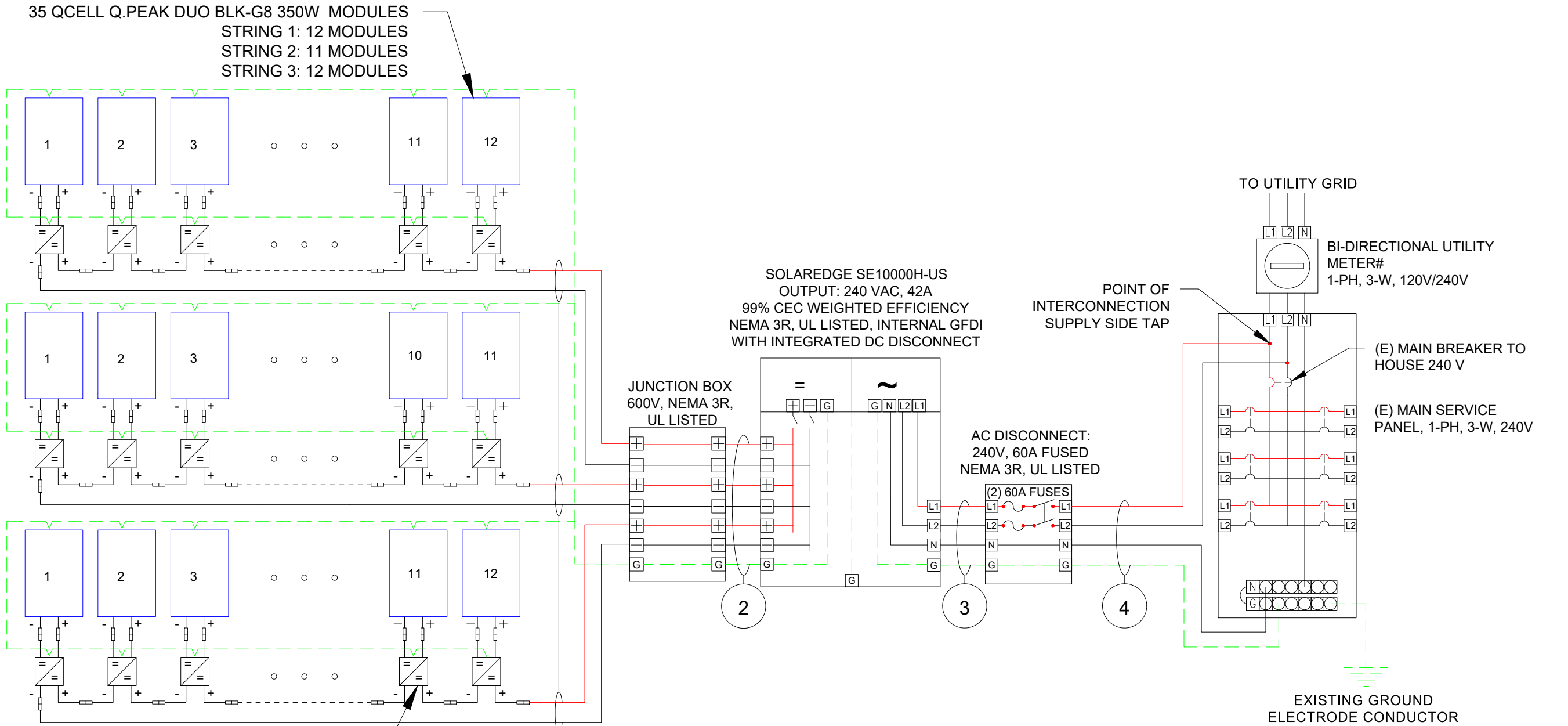
SHEET NUMBER  
 PV-3A



North Carolina Firm License No. 46546



ID	TYPICAL	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	CONDUCTOR			CONDUIT	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CONDUIT	CONDUIT FILL PERCENT	OCPD	EGC		TEMP. CORR. FACTOR		CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	LENGTH	VOLTAGE DROP
1	3	STRING	JUNCTION BOX	10 AWG	PV WIRE	COPPER	Open Air	1	2	N/A	N/A	6 AWG	BARE COPPER	0.71	(57°C)	N/A	15.0A	18.8A	40A	28.4A	90°C	71FT	0.02%
3	1	JUNCTION BOX	INVERTER	10 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	3	6	26.72%	N/A	8 AWG	THWN-2, COPPER	0.96	(35°C)	0.8	15.0A	18.8A	40A	30.7A	90°C	33FT	0.11%
5	1	INVERTER	FUSED AC DISCONNECT	6 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	3	36.53%	60A	8 AWG	THWN-2, COPPER	0.96	(35°C)	1	42.0A	52.5A	75A	72.0A	90°C	5FT	0.13%
8	1	FUSED AC DISCONNECT	MSP	6 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	3	36.53%	N/A	8 AWG	THWN-2, COPPER	0.96	(35°C)	1	42.0A	52.5A	75A	72.0A	90°C	5FT	0.13%



SolarEdge Power Optimizer P370 Rated  
 DC Input Power - 370 watts  
 Maximum Input Voltage - 60 Vdc  
 MPPT Range - 8 to 60 Vdc  
 Maximum Input Current - 11 Adc  
 Maximum Output Current - 15 Adc String  
 Limitations - 8 to 25 Optimizers,  
 6000 watts STC per string maximum



North Carolina Firm License No. 46546

SERVICE INFO
MAIN SERVICE VOLTAGE: 240V
MAIN SERVICE LOCATION: EAST
SERVICE FEED SOURCE: UNDERGROUND

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 08/12/2021

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SHEET NAME  
**ELECTRICAL LINE & CALCS.**

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

SHEET NUMBER  
**PV-4**

**SOLAR MODULE SPECIFICATIONS**

MANUFACTURER / MODEL	QCELL Q.PEAK DUO BLK-G8 350W
VMP	34.97 V
IMP	10.01 A
VOC	41.21 V
ISC	10.51 A
TEMP. COEFF. VOC	-0.27%/K
PTC RATING	328.55 W
MODULE DIMENSION	68.50"(L) x 40.55""(W)
PANEL WATTAGE	350W

**INVERTER SPECIFICATION**

MANUFACTURER / MODEL	SOLAREEDGE SE10000H-US
NOMINAL AC POWER	10000 W
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	42A

**POWER OPTIMIZER (SOLAREEDGE P370)**

MAXIMUM INPUT POWER	370 W
MAXIMUM INPUT VOLTAGE	60 VDC
MAXIMUM INPUT ISC	11 ADC
MAXIMUM OUTPUT CURRENT	15 ADC
WEIGHTED EFFICIENCY	98.80%

**AMBIENT TEMPERATURE SPECS**

RECORD LOW TEMP	-10°C
AMBIENT TEMP (HIGH TEMP 2%)	35°C
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	90°C
CONDUCTOR TEMPERATURE RATE	57°C
MODULE TEMPERATURE COEFFICIENT OF VOC	-0.27%/K

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
0.80	4-6
0.70	7-9
0.50	10-20

**REVISIONS**

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 08/12/2021

**PROJECT NAME & ADDRESS**

**ARMANDO CRUZ AGUILAR**  
**RESIDENCE**  
 135 PARK LN.  
 COATS, NC 27521  
 PH NO. (801) 830-8155  
 EMAIL ID: monson.travis@gmail.com

SHEET NAME  
**SPECIFICATIONS & NOTES**

SHEET SIZE

**ANSI B**  
**11" X 17"**

SHEET NUMBER

**PV-4A**

1

**⚠ WARNING**  
**ELECTRIC SHOCK HAZARD**  
 TERMINALS ON BOTH LINE AND  
 LOAD SIDES MAY BE ENERGIZED  
 IN THE OPEN POSITION

LABEL LOCATION:  
 COMBINER BOX/ EMT ENCLOSURES/  
 AC DISCONNECT/ MAIN SERVICE PANEL  
 (PER CODE: NEC 2017, 690.13(B))

2

**WARNING**  
**PHOTOVOLTAIC POWER SOURCE**

LABEL LOCATION:  
 CONDUIT, RACEWAY, ENCLOSURES,  
 COMBINER BOX & AC DISCONNECT  
 (PER CODE: NEC2017, 690.31(G)(3)(4))

3

**PHOTOVOLTAIC**  
 \_\_\_\_\_  
**AC DISCONNECT**

LABEL LOCATION:  
 AC DISCONNECT/ BREAKER/  
 POINTS OF CONNECTION  
 (PER CODE: NEC2017, 690.13(B))

4

**PHOTOVOLTAIC AC DISCONNECT**  
 RATED AC OUTPUT CURRENT   
 NOMINAL OPERATING AC VOLTAGE

LABEL LOCATION:  
 AC DISCONNECT  
 (PER CODE: NEC2017, 690.53)

5

**RAPID SHUTDOWN SWITCH  
 FOR SOLAR PV SYSTEM**

LABEL LOCATION:  
 RAPID SHUTDOWN (AC DISCONNECT)  
 PER CODE: NEC 690.58 (C)(3)

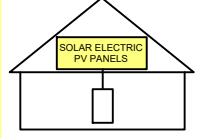
6

**WARNING: DUAL POWER SOURCE**  
**SECOND SOURCE IS PHOTOVOLTAIC SYSTEM**

LABEL LOCATION:  
 POINT OF INTERCONNECTION  
 (PER CODE: NEC 2017, 705.12(B))

7

**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:  
 RAPID SHUTDOWN (AC DISCONNECT)  
 PER CODE: NEC 690.56 (C)(1)

8

**RATED MAXIMUM POWER-  
 POINT CURRENT (Imp)  A**  
**RATED MAXIMUM POWER-  
 POINT VOLTAGE (Vmp)  V**  
**MAXIMUM SYSTEM  
 VOLTAGE (VOC)  V**  
**MAXIMUM CIRCUIT  
 CURRENT (Isc)  A**

LABEL LOCATION:  
 INVERTER: #1  
 (PER CODE: NEC 690.53)

ADHESIVE FASTENED SIGNS:  
 • ANSI Z535.4-2011 PRODUCT SAFETY SIGNS AND LABELS, PROVIDES GUIDELINES FOR SUITABLE FONT SIZES, WORDS, COLORS, SYMBOLS, AND LOCATION REQUIREMENTS FOR LABELS. NEC 110.21(B)(1)  
 • THE LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED. NEC 110.21(B)(3)  
 • ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT.

REVISIONS		
DESCRIPTION	DATE	REV

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 \_\_\_\_\_  
 DATE: 08/12/2021

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 RESIDENCE  
 135 PARK LN.  
 COATS, NC 27521  
 PH NO. (801) 830-8155  
 EMAIL ID: monson.travis@gmail.com

SHEET NAME  
**SIGNAGE**

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

SHEET NUMBER  
**PV-5**



powered by  
**Q.ANTUM DUO**

# Q.PEAK DUO BLK-G8 335-350

ENDURING HIGH  
PERFORMANCE



### Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.8%.



### INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



### ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology<sup>1</sup>, Hot-Spot Protect and Traceable Quality Tra.Q™.



### EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



### A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty<sup>2</sup>.



### STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

<sup>1</sup> APT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 168h)

<sup>2</sup> See data sheet on rear for further information.

### THE IDEAL SOLUTION FOR:



Rooftop arrays on residential buildings

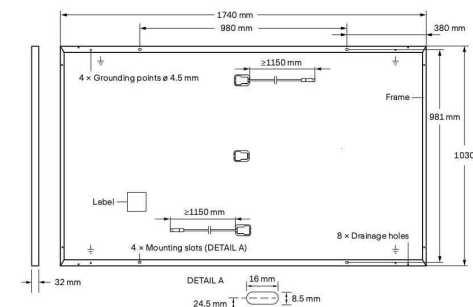
Engineered in Germany

**Q CELLS**

Engineered in Germany

### MECHANICAL SPECIFICATION

Format	1740 mm x 1030 mm x 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 x 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm x 32-60 mm x 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm <sup>2</sup> Solar cable; (+) ≥ 1150 mm, (-) ≥ 1150 mm
Connector	Stäubli MC4; IP68

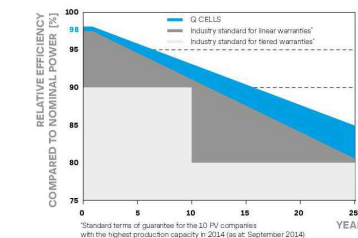


### ELECTRICAL CHARACTERISTICS

POWER CLASS	335	340	345	350	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC <sup>1</sup> (POWER TOLERANCE +5 W / -0 W)					
Power at MPP <sup>1</sup>	P <sub>MPP</sub> [W]	335	340	345	350
Short Circuit Current <sup>1</sup>	I <sub>SC</sub> [A]	10.34	10.40	10.45	10.51
Open Circuit Voltage <sup>1</sup>	V <sub>OC</sub> [V]	40.44	40.70	40.95	41.21
Current at MPP	I <sub>MPP</sub> [A]	9.85	9.90	9.96	10.01
Voltage at MPP	V <sub>MPP</sub> [V]	34.01	34.34	34.65	34.97
Efficiency <sup>1</sup>	η [%]	≥ 18.7	≥ 19.0	≥ 19.3	≥ 19.5
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT <sup>2</sup>					
Power at MPP	P <sub>MPP</sub> [W]	250.9	254.6	258.4	262.1
Short Circuit Current	I <sub>SC</sub> [A]	8.33	8.38	8.42	8.47
Open Circuit Voltage	V <sub>OC</sub> [V]	38.13	38.38	38.62	38.86
Current at MPP	I <sub>MPP</sub> [A]	7.75	7.79	7.84	7.88
Voltage at MPP	V <sub>MPP</sub> [V]	32.36	32.67	32.97	33.27

<sup>1</sup> Measurement tolerances P<sub>MPP</sub> ± 3%; I<sub>SC</sub>, V<sub>OC</sub> ± 5% at STC: 1000 W/m<sup>2</sup>, 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 2800 W/m<sup>2</sup>, NMOT, spectrum AM 1.5

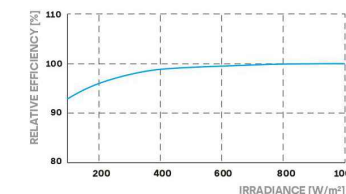
### Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

### PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m<sup>2</sup>).

### TEMPERATURE COEFFICIENTS

Temperature Coefficient of I <sub>SC</sub>	α [%/K]	+0.04	Temperature Coefficient of V <sub>OC</sub>	β [%/K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ [%/K]	-0.35	Normal Module Operating Temperature	NMOT [°C]	43 ± 3

### PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V <sub>SYS</sub> [V]	1000	Protection Class	II
Maximum Reverse Current	I <sub>R</sub> [A]	20	Fire Rating based on ANSI / UL 1703	C / TYPE 2
Max. Design Load, Push / Pull	[Pa]	3600 / 2667	Permitted Module Temperature on Continuous Duty	-40 °C - +85 °C
Max. Test Load, Push / Pull	[Pa]	5400 / 4000		

### QUALIFICATIONS AND CERTIFICATES

VDE Quality Tested, IEC 61215:2016; IEC 61730:2016, Application Class II; This data sheet complies with DIN EN 50380.



### PACKAGING INFORMATION

Number of Modules per Pallet	32
Number of Pallets per Trailer (24t)	28
Number of Pallets per 40' HC-Container (26t)	24
Pallet Dimensions (L x W x H)	1815 x 1150 x 1220 mm
Pallet Weight	683 kg

**Note:** Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH

Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | TEL +49 (0)3494 66 99-23444 | FAX +49 (0)3494 66 99-23000 | EMAIL sales@q-cells.com | WEB www.q-cells.com

Specifications subject to technical changes © Q CELLS Q.PEAK DUO BLK-G8\_335-350\_2019-11\_Rev01\_EN

### REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 08/12/2021

### PROJECT NAME & ADDRESS

ARMANDO CRUZ AGUILAR  
RESIDENCE  
135 PARK LN.  
COATS, NC 27521  
PH NO. (801) 830-8155  
EMAIL ID: monson.travis@gmail.com

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-6

**Q CELLS**



# Single Phase Inverter with HD-Wave Technology

for North America

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

12-25  
YEAR  
WARRANTY



INVERTERS

## Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

[solaredge.com](http://solaredge.com)



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

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

Model Number	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXBXX4							
<b>OUTPUT</b>								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5 <sup>1)</sup>							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, adjustable -0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
<b>INPUT</b>								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V <sup>2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V <sup>2)</sup>	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600k $\Omega$ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99					99 @ 240V 98.5 @ 208V		%
Nighttime Power Consumption	< 2.5							W

<sup>1)</sup> For other regional settings please contact SolarEdge support  
<sup>2)</sup> A higher current source may be used; the inverter will limit its input current to the values stated

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 135 PARK LN.  
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 EMAIL ID: monson.travis@gmail.com

SHEET NAME  
 EQUIPMENT  
 SPECIFICATION

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-7

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

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

Model Number	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
<b>ADDITIONAL FEATURES</b>							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Data, ANSI C12.20	Optional <sup>1)</sup>						
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi Access Point for local connection.						
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect						
<b>STANDARD COMPLIANCE</b>							
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07						
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (H)						
Emissions	FCC Part 15 Class B						
<b>INSTALLATION SPECIFICATIONS</b>							
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG			1" Maximum / 14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG			1" Maximum / 1-3 strings / 14-6 AWG			
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174			21.3 x 14.6 x 7.3 / 540 x 370 x 185			in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6			lb / kg
Noise	< 25			< 50			dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60 <sup>2)</sup>						
Protection Rating	NEMA 4X (Inverter with Safety Switch)						

<sup>1)</sup> Revenue grade inverter P/N: SExxxxH-US000BNC4

<sup>2)</sup> 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-note-na.pdf>

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COATS, NC 27521  
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EMAIL ID: monson.travis@gmail.com

SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-7A



# Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505



POWER OPTIMIZER

## PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com



## Power Optimizer For North America

P320 / P340 / P370 / P400 / P405 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)		
<b>INPUT</b>								
Rated Input DC Power <sup>(1)</sup>	320	340	370	400	405	505	W	
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125 <sup>(2)</sup>	87 <sup>(2)</sup>	Vdc	
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 87	Vdc	
Maximum Short Circuit Current (Isc)	11			10.1		14	Adc	
Maximum DC Input Current	13.75			12.5		17.5	Adc	
Maximum Efficiency	99.5						%	
Weighted Efficiency	98.8					98.6	%	
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 ± 0.1						Vdc	
<b>STANDARD COMPLIANCE</b>								
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3							
Safety	IEC62109-1 (class II safety), UL1741							
Material	UL94 V-0, UV Resistant							
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)	129 x 153 x 27.5 / 5.1 x 6 x 1.1		129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3		mm / in	
Weight (including cables)	630 / 1.4		750 / 1.7	845 / 1.9	1064 / 2.3		gr / lb	
Input Connector	Single or dual MC4 <sup>(3)</sup>							
Input Wire Length	0.16 / 0.52							m / ft
Output Wire Type / Connector	Double Insulated / MC4							
Output Wire Length	0.9 / 2.95		1.2 / 3.9				m / ft	
Operating Temperature Range <sup>(4)</sup>	-40 - +85 / -40 - +185							°C / °F
Protection Rating	IP68 / NEMA6P							
Relative Humidity	0 - 100							%

<sup>(1)</sup> Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed.  
<sup>(2)</sup> NEC 2017 requires max input voltage be not more than 80V.  
<sup>(3)</sup> For other connector types please contact SolarEdge.  
<sup>(4)</sup> For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details.

PV System Design Using a SolarEdge Inverter <sup>(5)(6)</sup>	Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400 P405 / P505	8	10	18	
Maximum String Length (Power Optimizers)		6	8	14	
Maximum String Length (Power Optimizers)		25	25	50 <sup>(7)</sup>	
Maximum Power per String	5700 (6000 with SE7600-US - SE11400-US)	5250	6000 <sup>(8)</sup>	12750 <sup>(8)</sup>	W
Parallel Strings of Different Lengths or Orientations	Yes				

<sup>(5)</sup> For detailed string sizing information refer to: [http://www.solaredge.com/sites/default/files/string\\_sizing\\_na.pdf](http://www.solaredge.com/sites/default/files/string_sizing_na.pdf)  
<sup>(6)</sup> It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string.  
<sup>(7)</sup> A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.  
<sup>(8)</sup> For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W.  
<sup>(9)</sup> For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W.

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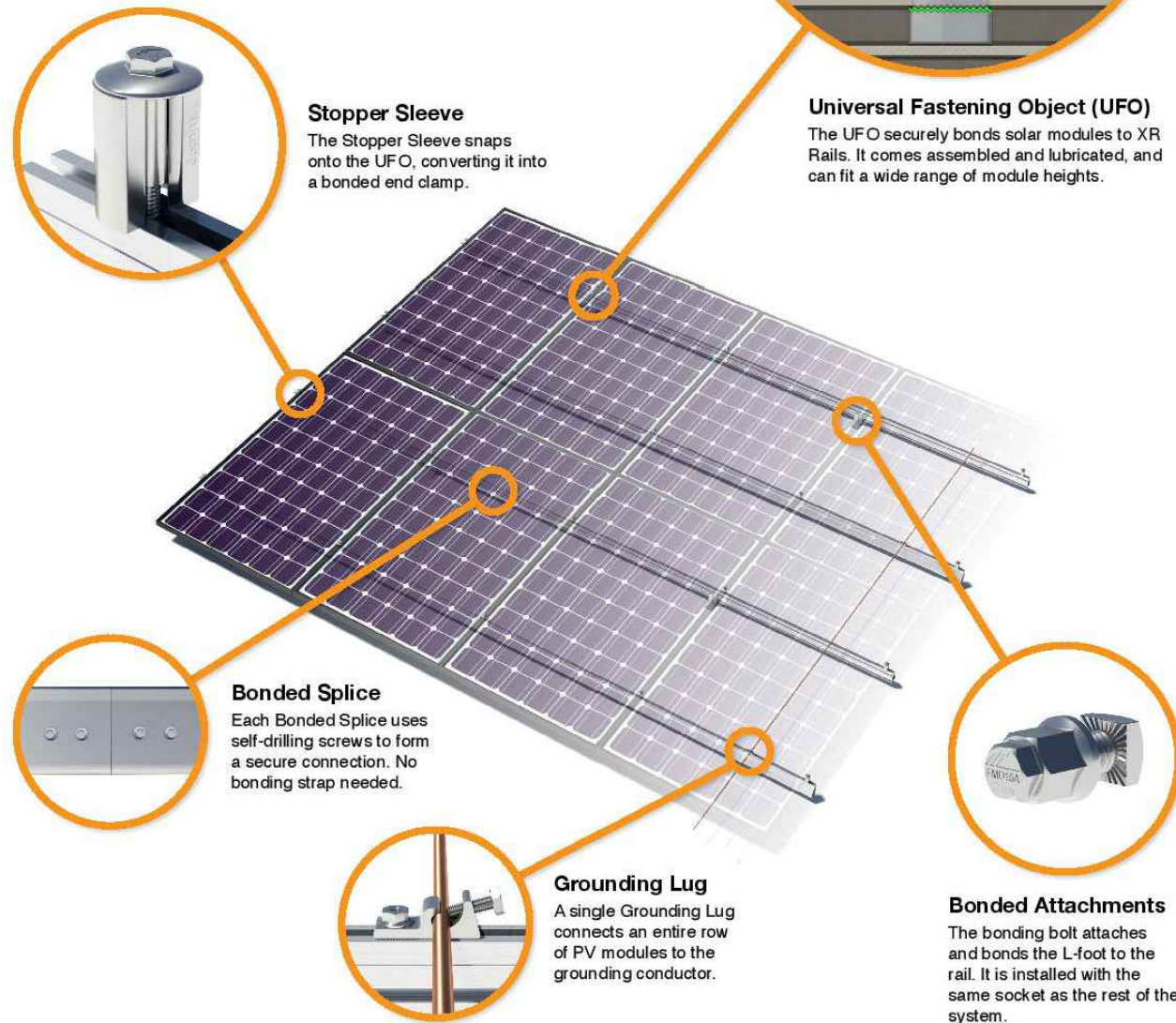
PV-8



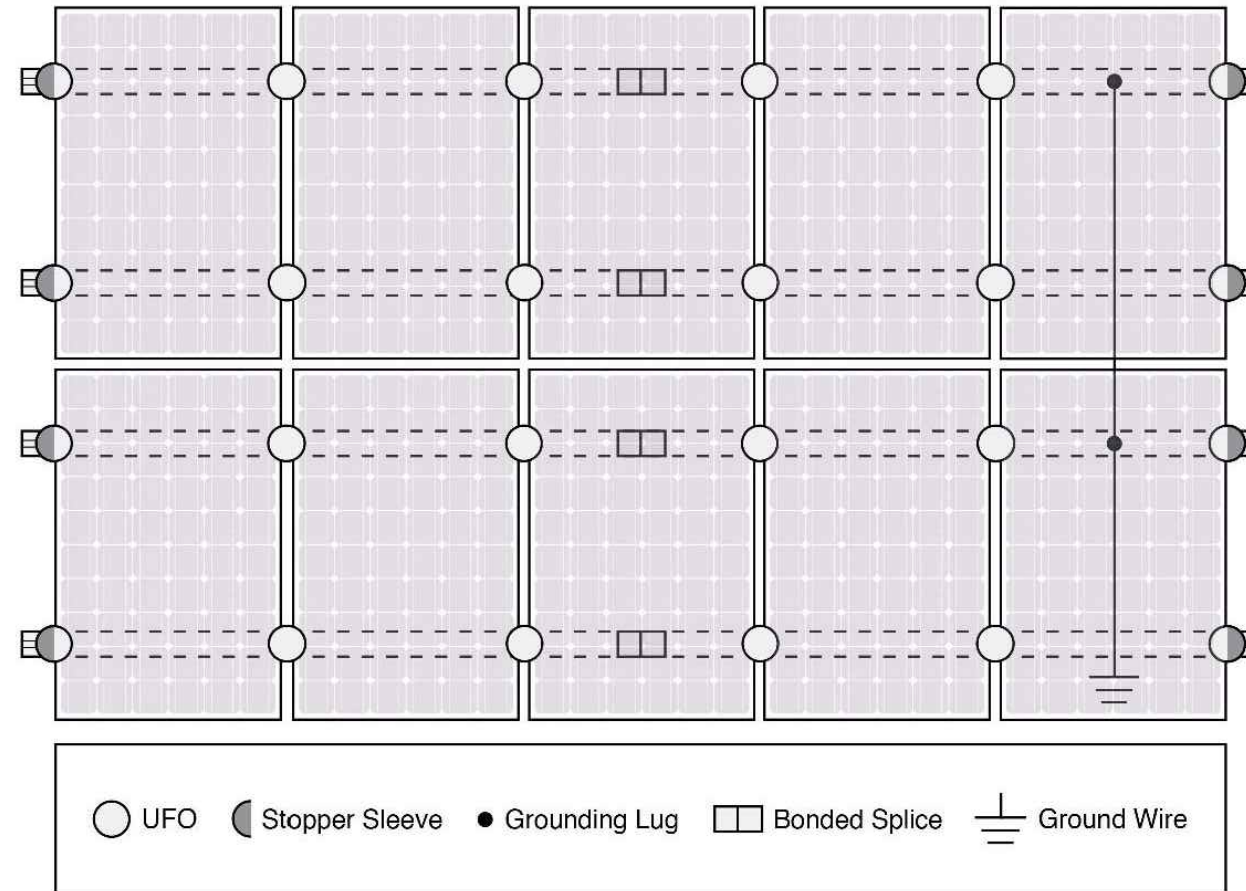
## Simplified Grounding for Every Application

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://Go to IronRidge.com/UFO)

Feature	Cross-System Compatibility		
	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.		

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

DATE: 08/12/2021

PROJECT NAME & ADDRESS

ARMANDO CRUZ AGUILAR  
RESIDENCE  
135 PARK LN.  
COATS, NC 27521  
PH NO. (801) 830-8155  
EMAIL ID: monson.travis@gmail.com

SHEET NAME  
EQUIPMENT SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-9





Tech Brief

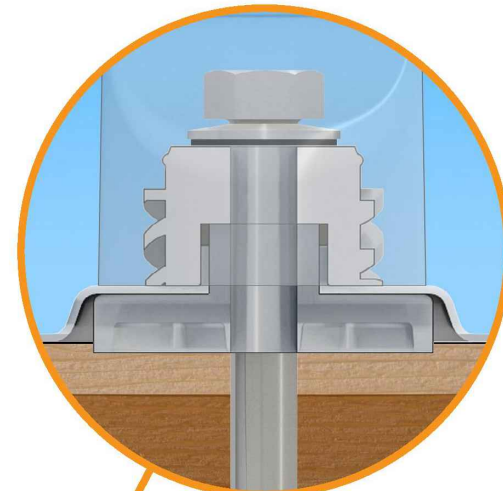
## FlashFoot2

### The Strongest Attachment in Solar

IronRidge FlashFoot2 raises the bar in solar roof protection. The unique water seal design is both elevated and encapsulated, delivering redundant layers of protection against water intrusion. In addition, the twist-on Cap perfectly aligns the rail attachment with the lag bolt to maximize mechanical strength.

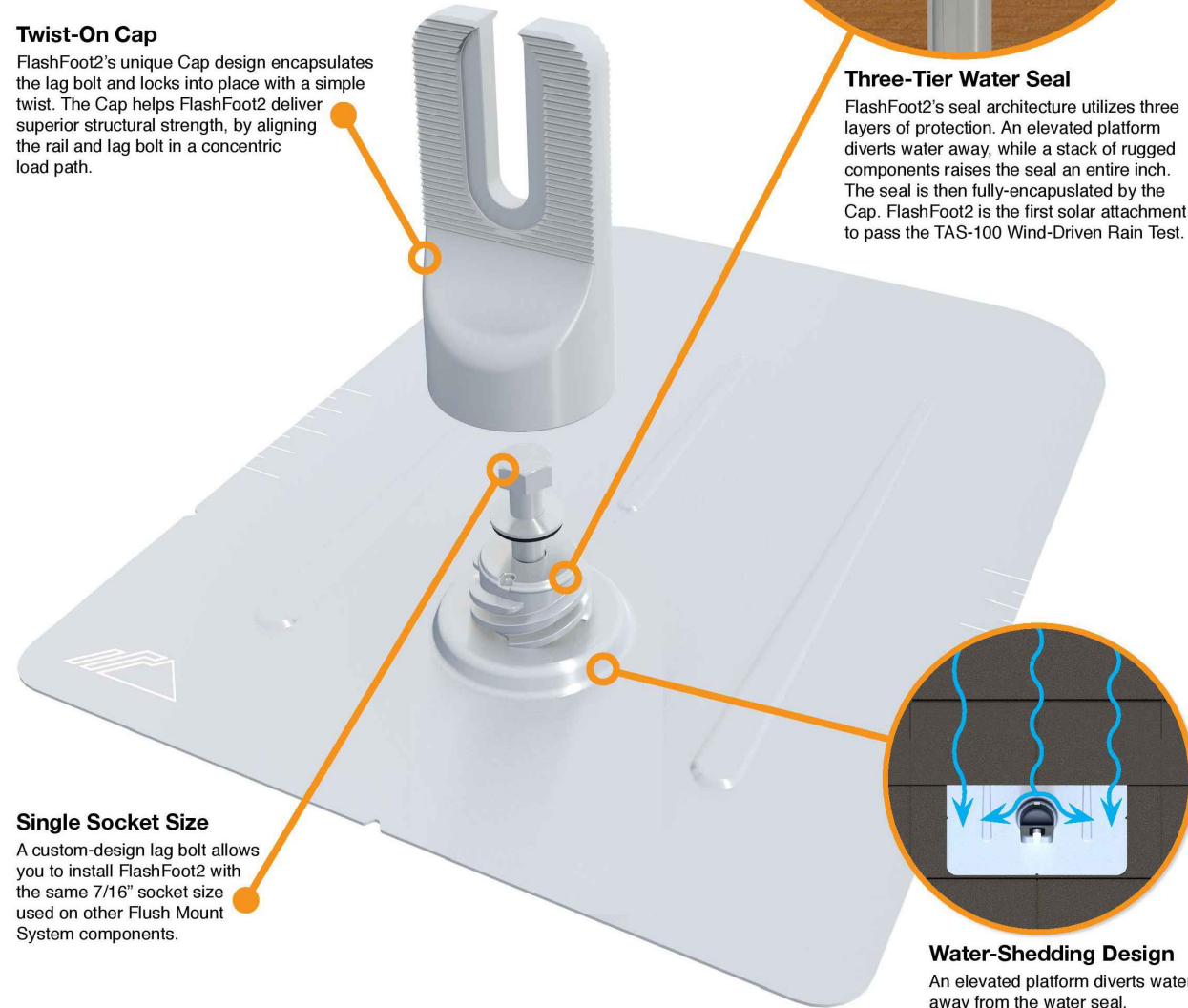
#### Twist-On Cap

FlashFoot2's unique Cap design encapsulates the lag bolt and locks into place with a simple twist. The Cap helps FlashFoot2 deliver superior structural strength, by aligning the rail and lag bolt in a concentric load path.



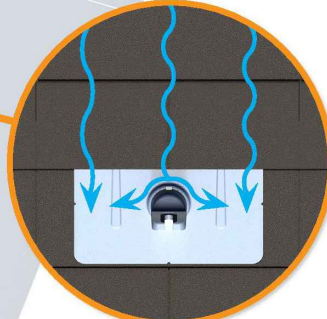
#### Three-Tier Water Seal

FlashFoot2's seal architecture utilizes three layers of protection. An elevated platform diverts water away, while a stack of rugged components raises the seal an entire inch. The seal is then fully-encapsulated by the Cap. FlashFoot2 is the first solar attachment to pass the TAS-100 Wind-Driven Rain Test.



#### Single Socket Size

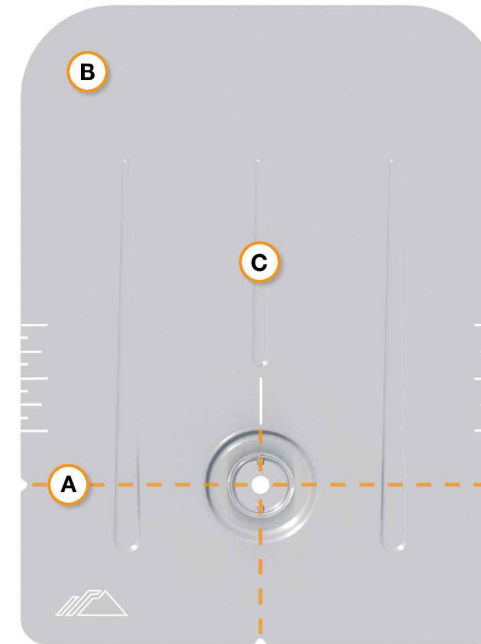
A custom-design lag bolt allows you to install FlashFoot2 with the same 7/16" socket size used on other Flush Mount System components.



#### Water-Shedding Design

An elevated platform diverts water away from the water seal.

### Installation Features



#### A Alignment Markers

Quickly align the flashing with chalk lines to find pilot holes.

#### B Rounded Corners

Makes it easier to handle and insert under the roof shingles.

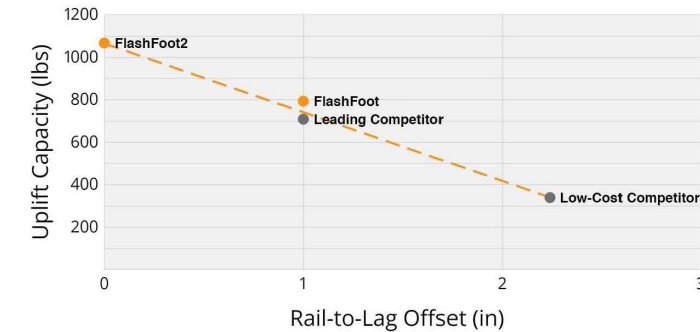
#### C Reinforcement Ribs

Help to stiffen the flashing and prevent any bending or crinkling during installation.

### Benefits of Concentric Loading

Traditional solar attachments have a horizontal offset between the rail and lag bolt, which introduces leverage on the lag bolt and decreases uplift capacity.

FlashFoot2 is the only product to align the rail and lag bolt. This concentric loading design results in a stronger attachment for the system.



### Testing & Certification

#### Structural Certification

Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7.

#### Water Seal Ratings

Water Sealing Tested to UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind Driven Rain Test" by Intertek. Ratings applicable for composition shingle roofs having slopes between 2:12 and 12:12.

#### UL 2703

Conforms to UL 2703 Mechanical and Bonding Requirements. See Flush Mount Install Manual for full ratings.

Tech Brief

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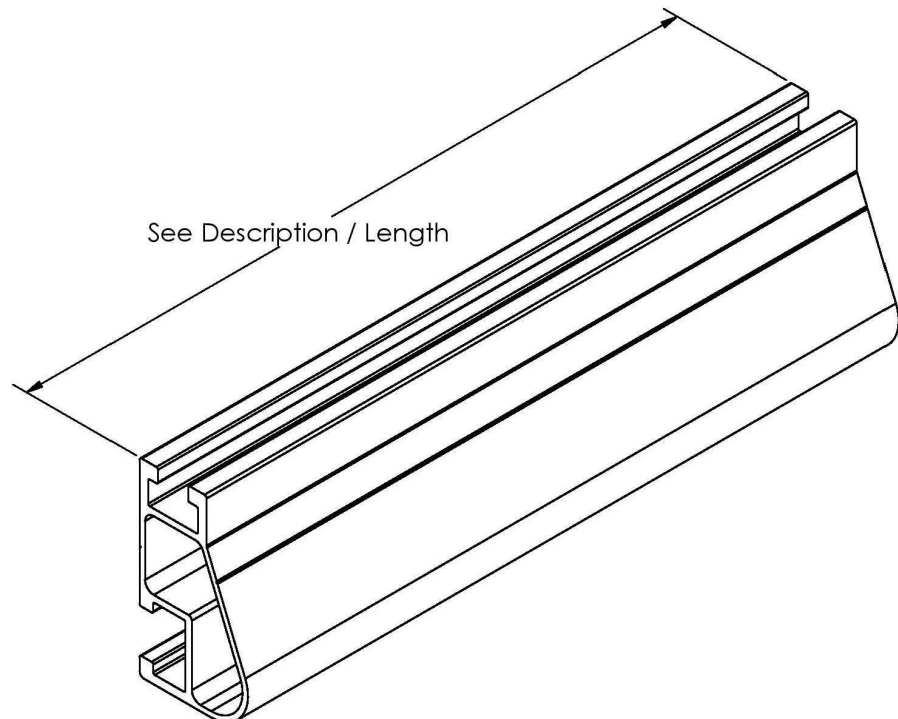
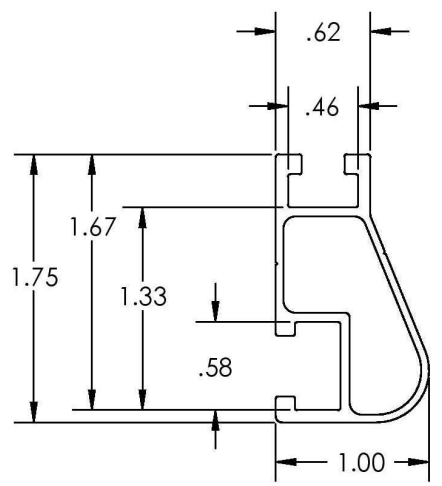
SHEET NAME  
EQUIPMENT  
SPECIFICATION

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-10



# XR10 Rail

Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.363 in <sup>2</sup>
Section Modulus (X-axis)	0.136 in <sup>3</sup>
Moment of Inertia (X-axis)	0.124 in <sup>4</sup>
Moment of Inertia (Y-axis)	0.032 in <sup>4</sup>
Torsional Constant	0.076 in <sup>3</sup>
Polar Moment of Inertia	0.033 in <sup>4</sup>

Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-10-132A	XR-10-132B	XR10, Rail 132" (11 Feet)	6000-Series Aluminum	4.67 lbs.
XR-10-168A	XR-10-168B	XR10, Rail 168" (14 Feet)		5.95 lbs.
XR-10-204A	XR-10-204B	XR10, Rail 204" (17 Feet)		7.22 lbs.

v1.0

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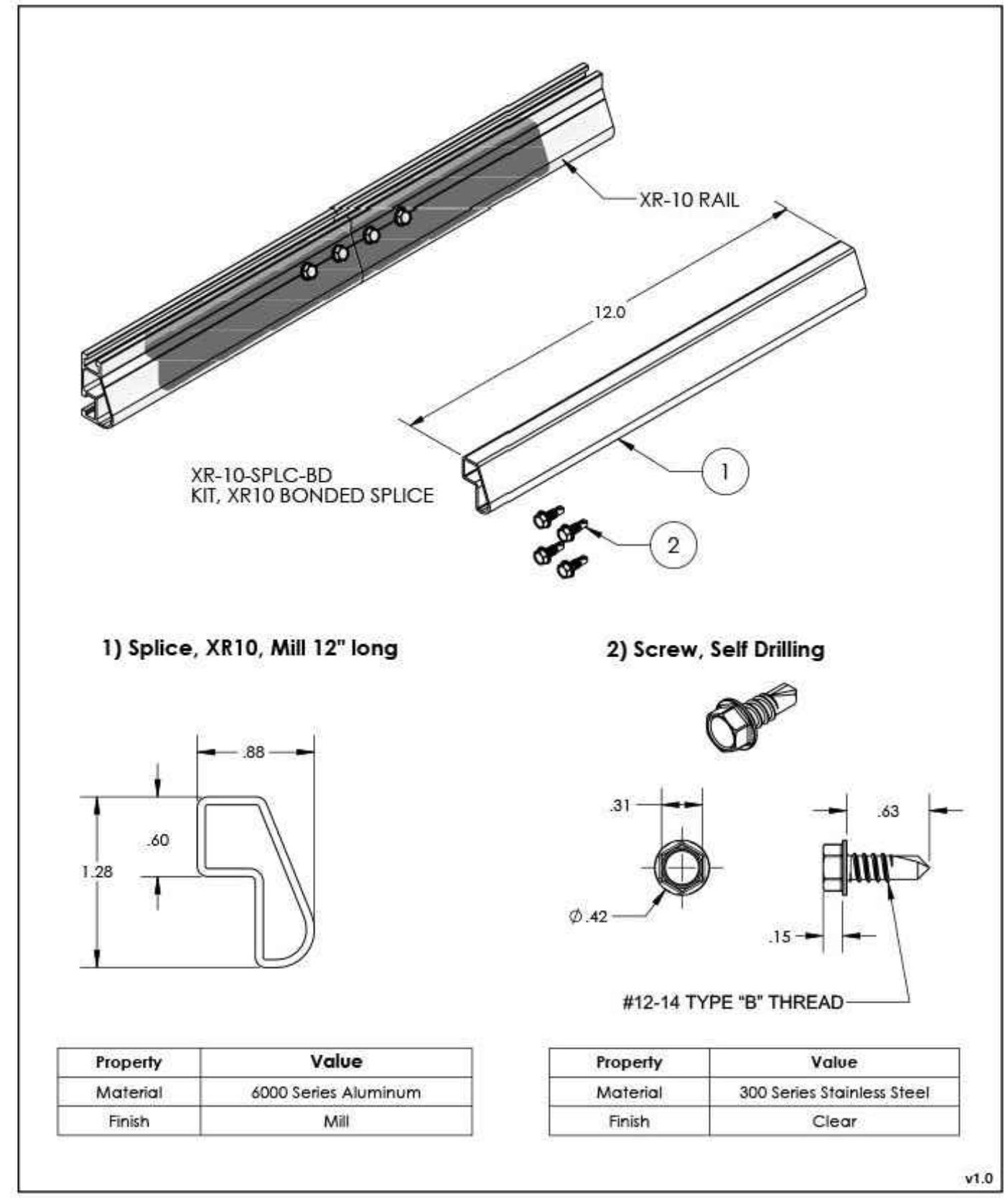
SHEET NAME  
**EQUIPMENT SPECIFICATION**

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

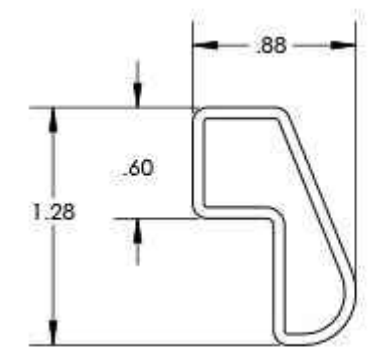
SHEET NUMBER  
**PV-11**



# XR10 Bonded Splice

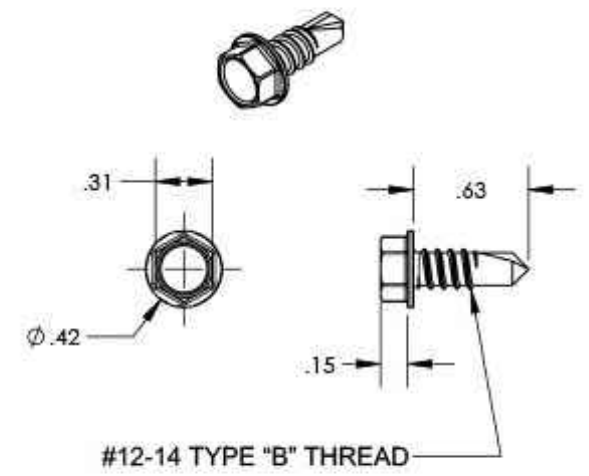


1) Splice, XR10, Mill 12" long



Property	Value
Material	6000 Series Aluminum
Finish	Mill

2) Screw, Self Drilling



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.0

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SHEET NAME  
**EQUIPMENT SPECIFICATION**

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

SHEET NUMBER  
**PV-12**