Building Codes: 2017 NEC, 2018 IBC, 2018 IFC, 2018 IRC and AHJ Amendments

ROARK, KYLE PV SYSTEM 147 RIVER BIRCH RUN . COATS, NC, 27521 APN:

JURISDICTION: HARNETT COUNTY (NC)
GENERAL INFORMATION

SYSTEM SIZE:

4.800 kW-DC-STC 3.800 kW-AC

ROOF PITCHED:

34 DEGREES

INVERTER:

(1) SOLAREDGE SE3800H-US W/ P340 OPTIMIZERS

MODULES:

(12) Q PEAK DUO BLK ML G10+ 400W (1) x 12 MODULE SERIES STRING

STRINGS: ELECTRICAL SERVICE RATING:

200A

PV SYSTEM OVERCURRENT RATING: PV SYSTEM DISCONNECT SWITCH:

20A EATON DG221URB (30A / 2P)

ROOF TYPE:

**COMP SHINGLE** 

ROOF FRAMING:

MANUFACTURED/ENGINEERED TRUSS

RACKING:

**K2 SYSTEMS** 

ATTACHMENT METHOD:

MIN. 5/16" x 3 ½ LAG SCREWS EA. STANDOFF

12/29/2022

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REQUIRED INFORMATION	SHEET NAME	SHEET NUMBER
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ROOF ATTACHMENT DETAILS	DETAILS	PV 4
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ELECTRICAL 3 LINE DIAGRAM	THREE LINE	PV 6
OCP & WIRE SIZING CALCULATIONS	1 & 3 LINE	PV 5 & 6
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# VICINITY MAP

SCALE: NTS

# AERIAL MAP SCALE: NTS



#### **NOTES**

#### **EQUIPMENT LOCATION**

- 1. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
- 2. WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC690.31(A),(C) AND NEC TABLES 310.15(B)(2)(A) AND 310.15(B)(3)(C).
- 3. JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
- 4. ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
- 5. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
- ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

#### WIRING & CONDUIT NOTES

- ALL CONDUITS AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE.
   CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
- 2. CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
- DC WIRING LIMITED TO MODULE FOOTPRINT. MICRO INVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY WITH SUITABLE WIRING CLIPS.
- 4. AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK, PHASE B OR L-2 RED, OR OTHER CONVENTION IF THREE PHASE, PHASE C OR L3-BLUE, YELLOW, ORANGE, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH THE HIGHER VOLTAGE TO BE MARKED ORANGE NEC 110.15.

#### **GENERAL NOTES**

- 1. MODULES ARE LISTED UNDER UL 1703 AND CONFORM TO THE STANDARDS.
- 2. INVERTERS ARE LISTED UNDER UL 1741 AND CONFORM TO THE STANDARDS.
- DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL
   ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION
   MIGHT VARY.
- WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.
- ALL GROUND WIRING CONNECTED TO THE MAIN SERVICE GROUNDING IN MAIN SERVICE PANEL/SERVICE COMPONENT.
- 6. ALL CONDUCTORS SHALL BE 600V, 75° C STANDARD COPPER UNLESS OTHERWISE NOTED.
- WHEN REQUIRED, A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- 8. THE SYSTEM WILL NOT BE INTERCONNECTED BY THE CONTRACTOR UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND/OR THE UTILITY.
- ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREES, WIRES OR SIGNS.
- 10. PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING.



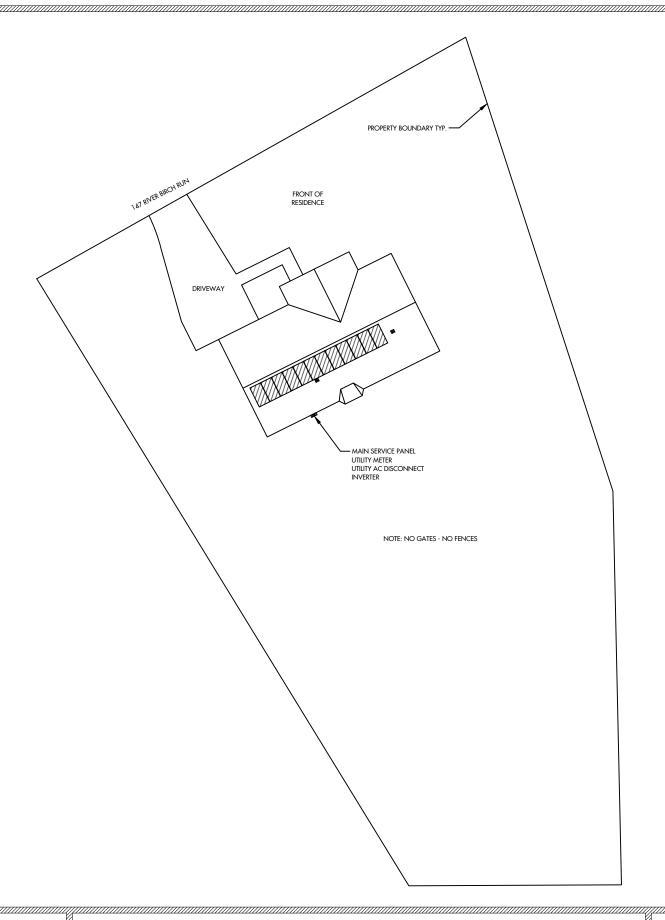
ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885 (12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE 3.800 kW AC SYSTEM SIZE

DATE: 12/29/2022 REV:A

DRAWN BY: JS

COVER PAGE

PV 1





#### **PROJECT NOTES**

- 1. UTILITY SHALL HAVE 24HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC COMPONENTS LOCATED AT SES EQUIPMENT
- 2. NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO SES EQUIPMENT
- 3. WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH DUKE ENERGY (NC) AND NEC REQUIREMENTS.





ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885 (12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE 3.800 kW AC SYSTEM SIZE

SCALE: 9/256" = 1'-0" DATE: 12/29/2022

DATE: 12/29/202 REV: A

DRAWN BY: JS

SITE PLAN

PV 2

#### ARRAY INFORMATION

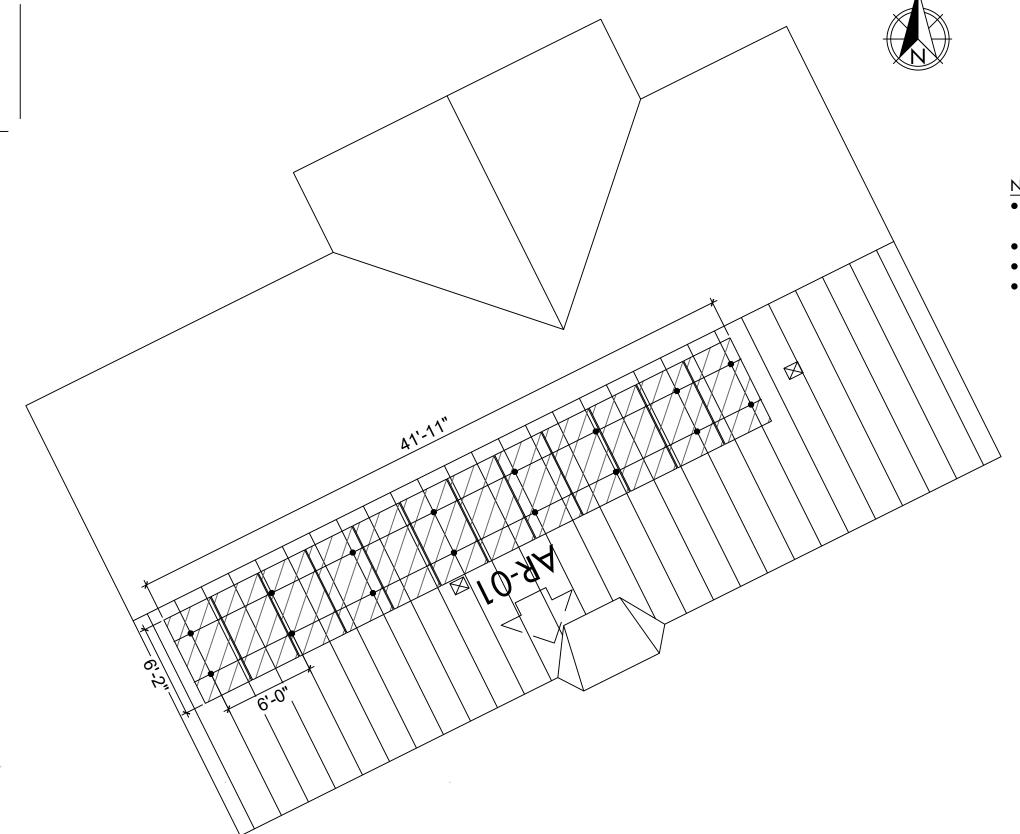
AR-01

QUANTITY: 12

MOUNTING TYPE: FLUSH

ARRAY TILT: 34° AZIMUTH: 153°

ATTACHMENT SPACING: 6' ROOF TYPE: COMP SHINGLE



## NOTES

- ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
- TOTAL ROOF AREA = 2328.9 SQ-FT
- TOTAL ARRAY AREA = 253.45 SQ-FT
- ARRAY COVERAGE = 10.88%



ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885 (12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE 3.800 kW AC SYSTEM SIZE

SCALE: 5/32" = 1'-0" DATE: 12/29/2022

REV:A

DRAWN BY: JS

PV LAYOUT PV 3

MODULE & RACKING INFORMATION
MODULE: Q PEAK DUO BLK ML G10+ 400W
MODULE WEIGHT: 48.50 LBS
MODULE DIMENSIONS: 74"x 41.1" x 1.5"

RACKING/RAIL: K2 SYSTEMS / K2 SYSTEMS

ROOF & FRAMING INFORMATION
MATERIAL: COMP SHINGLE
RAFTER/TRUSS SIZE: 2" x 4"
RAFTER/TRUSS SPACING: 2"

ARRAY 01: 12 MODULES

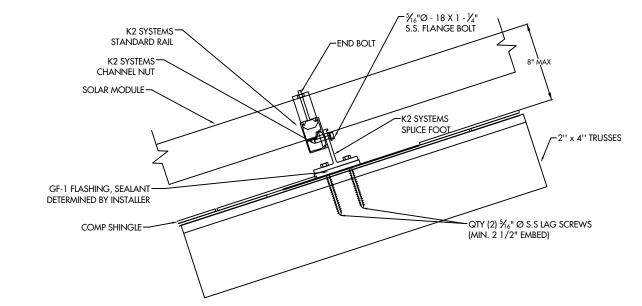
 $\underline{\mathsf{UPLIFT}} = \underline{\mathsf{7603.50}} \; \mathsf{LBS}.$ 

POINT LOAD = 39.00 LBS. PER MOUNTING POINT

 $\underline{\text{PULLOUT STRENGTH}} = \underline{8400.00 \text{ LBS}}.$ 

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 624.00 LBS



REV:A DRAWN BY: JS

#### **PV MODULE**

Q PEAK DUO BLK ML G10+ 400W

400 W 11.14 ADC VOC 45.30 VDC

IMP 10.77 ADC VMP 37.13 VDC TVOC = -0.270% / °C

#### **WIRE SCHEDULE**

A - (2) #10 AWG-CU PV WIRE (HR) (1) #10 AWG-CU BARE COPPER WIRE (GND) IN FREE AIR

B - (2) #10 AWG-CU THWN-2 WIRE (HR) (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

## C - (3) #8 AWG-CU THWN-2 WIRE (HR)

(1) #8 AWG-CU THWN-2 WIRE (GND)

3/4" EMT

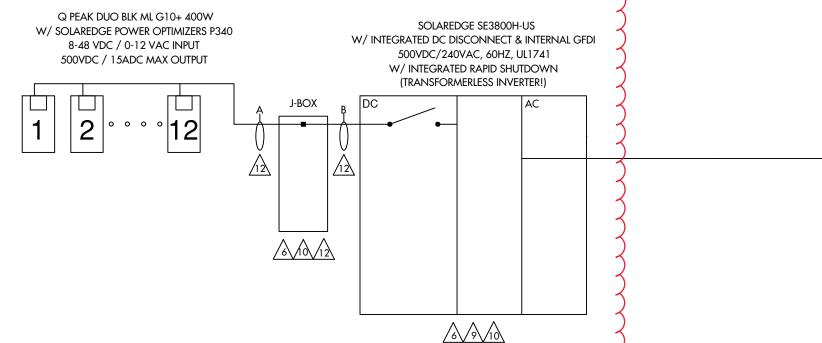
#### MAIN SERVICE PANEL

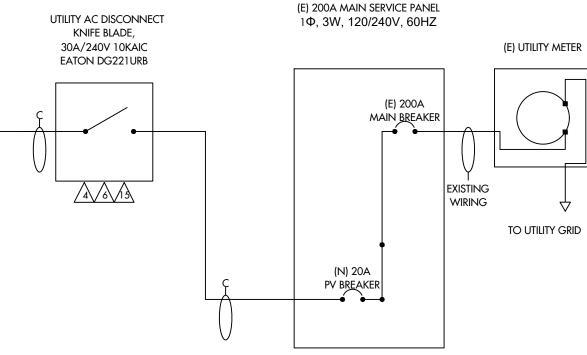
**BUS RATING** 200A

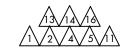
MAX. CURRENT RATING 240A (200A X 1.2)

SOLAR BACKFEED 20A MAIN BREAKER 200A TOTAL 220A

#### 12/29/2022







#### WIRE SIZE CALCULATIONS

TEMP CORRECTION FACTOR: 0.87 (43° AMBIENT) ROOFTOP TEMP CORRECTION FACTOR: 1.00 (43° ADJUSTED) (2" ABOVE ROOFTOP / 0° TEMP ADDERS - AS OCCURS) (TEMP DATA TAKEN FROM ASHRAE 2% AVG HIGH TEMP)

DC WIRING

CONDUIT FILL FACTOR 1.00

OPTIMIZER MAX. CURRENT = 18.75A DC (15.00A X 1 X 1.25) #10- AWG CU. AMPACITY = 47.85A (55A X 0.87)

FREE AIR

#10 - AWG CU. AMPACITY = 34.80A (40A X 0.87 X 1.00)

**ROOFTOP CONDUIT** 

**AC WIRING** 

CONDUIT FILL FACTOR 1 (3) CONDUCTORS MAX. INVERTER CURRENT = 16A (PER INVERTER SPECS)

MIN. INVERTER OCP 20A (16A X 1.25)

**INVERTER OCP** 20A

#8 - AWG CU AMPACITY 47.85A (55A X 1 X 0.87)



ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885

(12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE

3.800 kW AC SYSTEM SIZE

DATE: 12/29/2022 REV:A

DRAWN BY: JS

ONE LINE PV 5

#### **PV MODULE**

Q PEAK DUO BLK ML G10+ 400W

400 W 11.14 ADC VOC 45.30 VDC

IMP 10.77 ADC VMP 37.13 VDC TVOC = -0.270% / °C

# **WIRE SCHEDULE**

A - (2) #10 AWG-CU PV WIRE (HR) (1) #10 AWG-CU BARE COPPER WIRE (GND) IN FREE AIR

B - (2) #10 AWG-CU THWN-2 WIRE (HR) (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

# C - (3) #8 AWG-CU THWN-2 WIRE (HR)

(1) #8 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

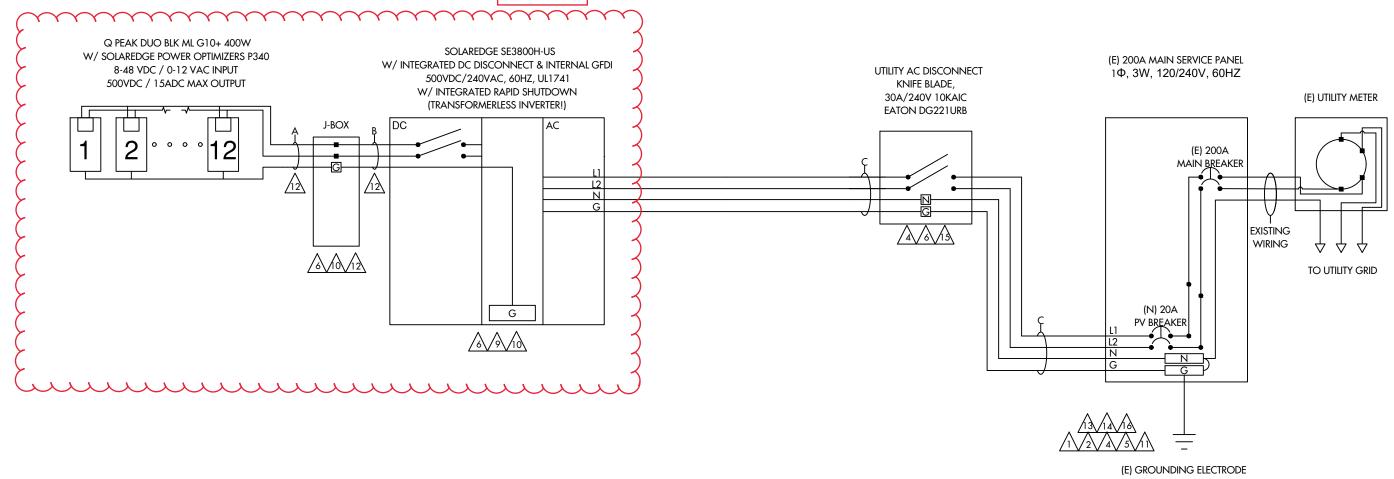
MAIN SERVICE PANEL

**BUS RATING** 200A

MAX. CURRENT RATING 240A (200A X 1.2)

SOLAR BACKFEED 20A MAIN BREAKER 200A TOTAL 220A

12/29/2022



#### WIRE SIZE CALCULATIONS

TEMP CORRECTION FACTOR: 0.87 (43° AMBIENT) ROOFTOP TEMP CORRECTION FACTOR: 1.00 (43° ADJUSTED) (2" ABOVE ROOFTOP / 0° TEMP ADDERS - AS OCCURS) (TEMP DATA TAKEN FROM ASHRAE 2% AVG HIGH TEMP)

DC WIRING

CONDUIT FILL FACTOR 1.00

OPTIMIZER MAX. CURRENT = 18.75A DC (15.00A X 1 X 1.25) #10- AWG CU. AMPACITY = 47.85A (55A X 0.87)

FREE AIR

#10 - AWG CU. AMPACITY = 34.80A (40A X 0.87 X 1.00)

**ROOFTOP CONDUIT** 

**AC WIRING** 

CONDUIT FILL FACTOR 1 (3) CONDUCTORS MAX. INVERTER CURRENT = 16A (PER INVERTER SPECS)

MIN. INVERTER OCP 20A (16A X 1.25)

**INVERTER OCP** 20A

#8 - AWG CU AMPACITY 47.85A (55A X 1 X 0.87)



ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885

(12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE

3.800 kW AC SYSTEM SIZE

DATE: 12/29/2022

REV:A

DRAWN BY: JS

THREE LINE

PV 6





LOCATION: BACKFED BREAKER CODE REF: NEC 705.12(4)



**M** WARNING

DO NOT RELOCATE THIS

OVERCURRENT DEVICE

LOCATION: BACKFED BREAKER

CODE REF: 2017 NEC 705.12(2)(3)(b)



WARNING

A GENERATION SCOURCE IS CONNECTED TO THE SUPPLY HE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH LOCATION: (IF APPLICABLE) SUPPLY SIDE TAP

CODE REF: UTILITY



PHOTOVOLTAIC AC DISCONNECT

ATED AC OPERATING CURRENT

NOMINAL OPERATING AC VOLTAGE:

240VAC

LOCATION: MAIN PANEL AC DISCONNECT(S)

CODE REF: NEC 690.54



RAPID SHUTDOWN **SWITCH FOR SOLAR PV SYSTEM** 

LOCATION: MAIN PANEL (EXTERIOR)

CODE REF: NEC 690.56(C)(3)



**WARNING** 

ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LOCATION: COMBINER PANEL

AC DISCONNECT JUNCTION BOX CODE REF: NEC 690.13(B)



**PHOTOVOLTAIC** 

SYSTEM METER

LOCATION: DEDICATED KWH METER

CODE REF: NEC 690.4(B) UTILITY



# **MARNING**

PHOTOVOLTAIC SYSTEM **COMBINER PANEL** 



LOCATION: AC COMBINER PANEL CODE REF: NEC 690.13(B)

DO NOT ADD LOADS



PHOTOVOLTAIC SYSTEM DC DISCONNECT **MAXIMUM VOLTAGE** 

MAXIMUM CIRCUIT CURRENT

MAX. RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC- CONVERTER (IF INSTALLED)

LOCATION: DC DISCONNECT

CODE REF: UTILITY



# M WARNING

ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT

LOCATION: DC DISCONNECT, COMBINE BOX CODE REF: NEC 690.13(B)

WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT



#### SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LOCATION: MAIN SERVICE (OUTSIDE COVER) CODE REF: NEC 690.12 NEC 690.56(C)(1)(a

YELLOW STICKER



WARNING PHOTOVOLTAIC POWER SOURCE

LOCATION: DC CONDUIT JUNCTION BOX NO MORE THAN 10FT CODE REF: NEC 690.31(G)(3) NEC 690 31/G)(4) REFLECTIVE AND WEATHER RESISTANT

LABEL REQUIRES CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8 INCH, WHITE LETTERS ON RED BACKGROUND LABELS SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES EVERY 10 FEET, WITHIN 1 FOOT OF TURNS OR BENDS AND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.



#### **A** CAUTION

**DUAL POWER SOURCE** SECOND SOURCE IS **PHOTOVOLTAIC** 

LOCATION: SERVICE METER



#### **WARNING**

INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS **OVERCURRENT DEVICE** 

LOCATION: (IF APPLICABLE) SERVICE PANEL

CODE REF: NEC 705.12(7)

13

PHOTOVOLTAIC SYSTEM **UTILITY DISCONNECT SYSTEM**  LOCATION: AC DISCONNECT

CODE REF: UTILITY



PV SOLAR BREAKER

DO NOT RELOCATE THIS **OVERCURRENT DEVICE** 

LOCATION: MAIN PANEL: (EXTERIOR) PV BREAKER: (INTERIOR)

CODE REF: NEC 705.12(B)(2)(3)(B)

525 W BASELINE RD., MESA AZ, 85210 **CONTRACTOR LIC# U.34445** 

ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885

(12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE 3.800 kW AC SYSTEM SIZE

DATE: 12/29/2022 REV: A

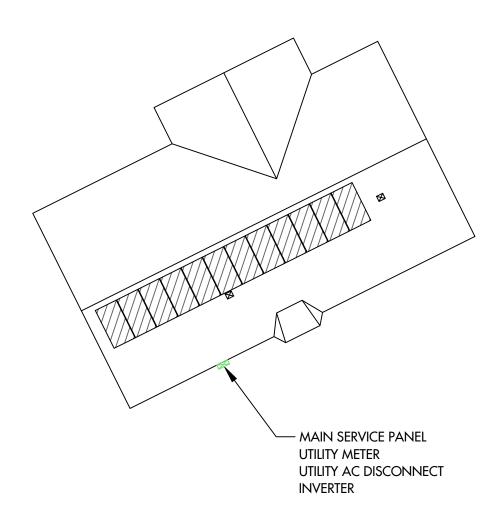
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**PV** 7

LABELS

# CAUTION

POWER TO THIS BUILDING IS SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS AS SHOWN:



DIRECTORY PLAQUE IN ACCORDANCE WITH NEC690.56(A)(B), 705.10



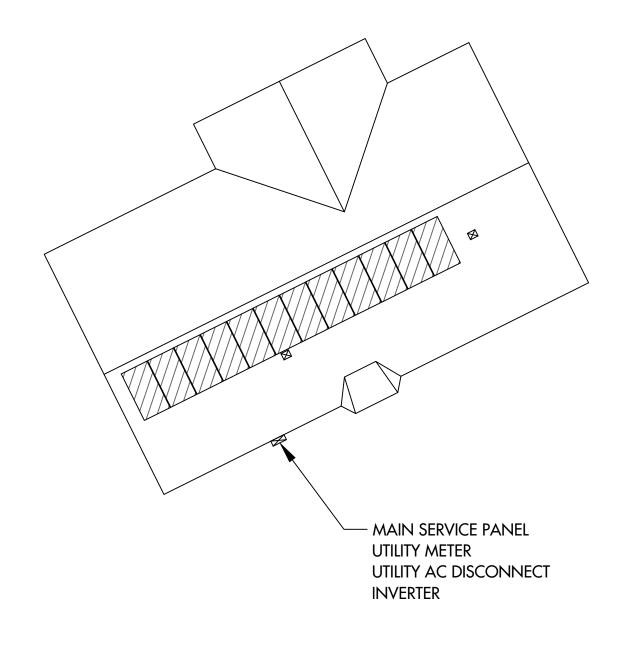


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DATE: 12/29/2022 REV: A DRAWN BY: JS PLACARD

PV 8

# JOB SAFETY PLAN





NAME:

ADDRESS:

PHONE NUMBER:

#### **NOTES:**

- INSTALLER SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME
- INSTALLER SHALL UPDATE NAME, ADDRESS, AND PHONE NUMBER OF NEAREST URGENT CARE FACILITY RELATIVE TO THE JOB SITE BEFORE STARTING WORK.

PRINT NAME	INITIAL	YES	NO





ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885

(12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE 3.800 kW AC SYSTEM SIZE

DATE: 12/29/2022 REV: A

DRAWN BY: JS

SAFETY PLAN

PV 9

# **Single Phase Inverter** with HD-Wave Technology

#### for North America

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



#### Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
  UL1741 SA certified, for CPUC Rule 21 grid compliance
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings

solaredge.com

- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12

INVERTERS

- / Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- / Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

/ 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								
OUTPUT								
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 MinNomMax. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Va
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	<b>✓</b>	-	<b>✓</b>	-	-	<b>✓</b>	Va
AC Frequency (Nominal)	1			59.3 - 60 - 60.5 <sup>(1)</sup>				Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	А
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	А
Power Factor			1,	Adjustable - 0.85 to	0.85			
GFDI Threshold				1				A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds				Yes				
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V		5100	-	7750	-	-	15500	V
Transformer-less, Ungrounded	1			Yes				
Maximum Input Voltage				480				Vd
Nominal DC Input Voltage		3	80			400		Vd
Maximum Input Current @240V <sup>(2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Ac
Maximum Input Current @208V <sup>(2)</sup>	5 <u>-</u>	9	-	13.5	-	-	27	Ac
Max. Input Short Circuit Current				45				Ac
Reverse-Polarity Protection	N S			Yes				
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99			9	9.2			9
CEC Weighted Efficiency		99 98.5 © 208V						
Nighttime Power Consumption				< 2.5				W

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

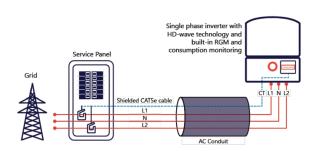
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces			RS485, Etherne	t, ZigBee (optional),	Cellular (optional)			
Revenue Grade Metering, ANSI C12.20				Optional <sup>(3)</sup>				
Consumption metering				(				
Inverter Commissioning		With the Set	App mobile applicati	on using Built-in Wi-	Fi Access Point for Lo	ocal Connection		
Rapid Shutdown - NEC 2014 and 2017 690.12			Automatic Rap	id Shutdown upon A	C Grid Disconnect			
STANDARD COMPLIANCE								
Safety		UL1741,	UL1741 SA, UL1699B	, CSA C22.2, Canadia	an AFCI according to	T.I.L. M-07		
Grid Connection Standards			IEE	E1547, Rule 21, Rule 1	14 (HI)			
Emissions				FCC Part 15 Class E	3			1
INSTALLATION SPECIFICA	TIONS							
AC Output Conduit Size / AWG Range		1"	Maximum / 14-6 AV	VG		1" Maximum	/14-4 AWG	
DC Input Conduit Size / # of Strings / AWG Range		1" Maxir	num / 1-2 strings / 1-	4-6 AWG		1" Maximum / 1-3	strings / 14-6 AWG	
Dimensions with Safety Switch (HxWxD)		17.7 x	14.6 x 6.8 / 450 x 37	'0 x 174		21.3 x 14.6 x 7.3 ,	7 540 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	n			
Operating Temperature Range			-4	40 to +140 / -40 to +	·60 <sup>(4)</sup>			°F / °C
Protection Rating		NEMA 4X (Inverter with Safety Switch)						

erter with Revenue Grade Meter P/N. 56:000A1-050U0BNL-9; inverter with Revenue Grade Produld be ordered separately. SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box power up to at least 50°C / 122°F; for power de-rating information refer to: https://www.solare.

#### **How to Enable Consumption Monitoring**

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, home household energy usage helping them to avoid high electricity bills





solaredge

ROARK, KYLE RESIDENCE 147 RIVER BIRCH RUN, COATS, NC, 27521 LAT:35.423875, LON:-78.701803 TSP136885

(12) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE3800H-US 4.800 kW DC SYSTEM SIZE 3.800 kW AC SYSTEM SIZE

DATE: 12/29/2022 REV: A

DRAWN BY: JS

**EQUIPMENT SPECIFICATIONS PV 10** 



Intertek 3933 US Route 11 Cortland, NY 13045 Telephone: 607-753-7311 www.intertek.com

Subject: ETL Evaluation of SolarEdge Products to Rapid Shutdown Requirements

To, whom it may concern

This letter represents the testing results of the below listed products to the requirements contained in the following standards:

The evaluation was done on the PV Rapid Shutdown System (PVRSS), and covers installations consisting of optimizers and inverters with part numbers listed below.

The testing done has verified that controlled conductors are limited to:

- Not more than 30 volts and 240 voltamperes within 30 seconds of rapid shutdown initiation outside the array.
- Not more than 80 volts and 240 voltamperes within 30 seconds of rapid shutdown initiation inside the array.

The rapid shutdown initiation is performed by either disconnecting the AC feed to the inverter, or – if the inverter DC Safety switch is readily accessible – by turning off the DC Safety switch.

#### Applicable products:

(1) Power optimizers:

PB followed by 001 to 350; followed by -AOB or -TFI.
OP followed by 001 to 500; followed by -LV, -MV, -IV or -EV.
P followed by 001 to 1100.
SP followed by 001 to 350.

When optimizers are connected to 2 or more modules in series, the max input voltage may exceed 80V. Following the implementation of the NEC 2017 rapid shutdown value of 80V max inside of the array at the beginning of 2019, modules exceeding this combined input max voltage will be required to use optimizers with parallel inputs. Also meeting NEC 2020 rapid shutdown requirement.

(2) 1 -PH Inverters

 $SE3000A-US\ /\ SE3800A-US\ /\ SE5000A-US\ /\ SE6000A-US\ /\ SE7600A-US\ /\ SE10000A-US\ /\ SE11400A-US\ /\ SE3000H-US\ /\ SE$ 

Inverter part number may be followed by a suffix.

(3) 3 -PH Inverters



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SE9KUS / SE10KUS / SE14.4KUS/ SE16.7kUS / SE17.3kUS / SE20KUS/ SE24KUS / SE30KUS / SE33.3KUS / SE40KUS / SE40KUS / SE50KUS / SE66.6KUS / SE80KUS / SE85KUS / SE100KUS / SE120KUS; when the following label is labeled on the side of the inverter:

Please note, this Letter Report does not represent authorization for the use of any Intertek certification marks.

Brand Name(s) SolarEdge

**Relevant Standard(s)** UL 1741, UL 1741 CRD for rapid shutdown

National Electric Code, 2020, Section 690.12 requirement for

rapid shutdown

**Verification Issuing Office** 3933 US Route 11, Cortland, NY 13045

NRTL Disclaimer, Different for each NRTL – Example: "This Verification is for the exclusive use of NRTL's Client and is provided pursuant to the agreement between NRTL and its Client. NRTL's responsibility and liability are limited to the terms and conditions of the agreement. NRTL assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Verification. Only the Client is authorized to copy or distribute this Verification. Any use of the NRTL name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by NRTL. The observations and test results referenced from this Verification are relevant only to the sample tested. This Verification by itself does not imply that the material, product, or service is or has ever been under an NRTL certification program."

Signature:

Name: Mukund Rana Position: Staff Engineer Date:5/17/2021



Intertek 3933 US Route 11 Cortland, NY 13045 Telephone: 607-753-7311 www.intertek.com

Date	Engineer / Reviewer	Description
5/17/2021 G104683664CRT	Dishant Patel	Added New 3-PH Inverter model SE50KUS, SE80KUS, SE85KUS and SE120KUS.
	Mukund Rana	Updated Power optimizers from "P followed by 001 to 960" to "P followed by 001 to 1100"
		Updated NEC standard from "National Electric Code, 2017, Section 690.12 requirement for rapid shutdown" To "National Electric Code, 2020, Section 690.12 requirement for rapid shutdown"



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EQUIPMENT SPECIFICATIONS PV 11

# **POWER Power Optimizer** For North America P320 / P340 / P370 / P400 / P401 / P405 / P485 / P505 25 YEAR **OPTIMIZE**

#### PV power optimization at the module-level

- Specifically designed to work with SolarEdge
- / Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial
- Flexible system design for maximum space

- Fast installation with a single bolt
- / Next generation maintenance with modulelevel 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 / P401 / P405 / P485 / 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)	P401 (for high power 60 and 72 cell modules)	P405 (for high- voltage modules)	P485 (for high- voltage modules)	P505 (for higher current modules)	
INPUT									
Rated input DC Power <sup>(i)</sup>	320	340	370	4	00	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	4	18	60	80	60	12	5(2)	83@	Vdc
MPPT Operating Range	8 -	48	8 - 60	8 - 80	8-60	12.5	- 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)		11		10.1	11.75	*	1	14	Add
Maximum Efficiency				99.	.5				95
Weighted Efficiency				98.8				98.6	%
Overvoltage Category				1					
OUTPUT DURING OPER	ATION (POV	VER OPTIMI	ZER CONNEC	TED TO OPE	RATING SOI	LAREDGE IN	VERTER)		
Maximum Output Current		15							Add
Maximum Output Voltage			60				85		Vdc
OUTPUT DURING STAND	DBY (POWER	<b>OPTIMIZER</b>	DISCONNECT	ED FROM SO	DLAREDGE IN	VERTER OR	SOLAREDGI	E INVERTER C	OFF)
Safety Output Voltage per Power Optimizer		1±0.1							Vdc
STANDARD COMPLIAN	CE								
EMC			FCC Pa	rt15 Class 3, IEC6	1000-6-2, IEC6100	0-6-3			
Safety				IEC62109-1 (class	safety), U_1741				
Material				UL94 V-0 , L	JV Resistant				
RoHS				Ye	S				
INSTALLATION SPECIFIC	CATIONS								
Maximum Allowed System Voltage				100	00				Vdc
Compatible inverters			All SolarE	dge Single Phase	and Three Phase i	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 153 x 29.5 /5.1 x 6 x 1.16	129 x 159 x 49.5	5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mn /in
Weight (including cables)		630 / 1.4		750 / 1.7	655 / 1.5	845	/ 1.9	1064 / 2.3	gr/
Input Connector		MC4 <sup>(3)</sup> Single or dua MC4 <sup>(3)</sup>							
Input Wire Length				0.16 /	0.52				m/
Output Wire Type / Connector				Double Irsul					
Output Wire Length	0.9 /	2.95			1.2 /	3.9			m/
Operating Temperature Range <sup>(5)</sup>				-40 - +85 /	-40 - +185				°C /
THE RESIDENCE OF THE PARTY OF T		IP68 / NEMA6P							
Protection Rating				1P68 / N	EMAGP				

(1) 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 (2) INCC 2017 requires maximput voltage be not more than 80V (3) For other connector Types place contact Standardige (4) For dual version for parallel connection of two modules use P485-4NMDMRM. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer connected to one PV module. When connecting a single module seal the unused input connectors with the supplied pair of seals.

(5) For ambient temperature above +85°C / +83°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>(6)(7)</sup>		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length	P320, P340, P370, P400, P401	8	1	10	18	
(Power Optimizers)	P405, P485, P505	6		8	14	
Maximum String Length (Power	Optimizers)	25		25	50 <sup>(8)</sup>	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400- US)	5250	6000%	12750(10)	W
Parallel Strings of Different Leng	ths or Orientations		,	/es		

(6) For detailed string sizing information refer to: http://www.solaredge.com/sites/detault/iles/string\_sizing\_na.pdf
(7) It is not allowed to mix P405;P485;P505 with P320;P342(P9370;P400;P401 in one string
(a)) A string with more than 30 opt mizers does not meet IRC rapid shutdown requirements; safety voltage will be above the 30V requirement
(9) For 208V gold, it is allowed to install up to 7,200W per string when the maximum power difference between each string is 1,000W
(10) For 27/748UV grid. It is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W

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**EQUIPMENT SPECIFICATIONS** 





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



**ENDURING HIGH PERFORMANCE** 

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



**EXTREME WEATHER RATING** 

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



A RELIABLE INVESTMENT

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

<sup>1</sup> APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96 h)

#### THE IDEAL SOLUTION FOR:

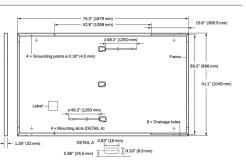


Engineered in Germany



#### MECHANICAL SPECIFICATION

Format	74.0 in $\times$ 41.1 in $\times$ 1.26 in (including frame) (1879 mm $\times$ 1045 mm $\times$ 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	$2.09$ - $3.98$ in $\times$ $1.26$ - $2.36$ in $\times$ $0.59$ - $0.71$ in (53- $101$ mm $\times$ $32$ - $60$ mm $\times$ $15$ - $18$ mm), IP67, with bypass diodes
Cable	$4 \text{ mm}^2 \text{ Solar cable; (+)} \ge 49.2 \text{ in (1250 mm), (-)} \ge 49.2 \text{ in (1250 mm)}$
Connector	Stäubli MC4; IP68

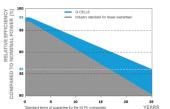


#### **ELECTRICAL CHARACTERISTICS**

POV	VER CLASS			385	390	395	400	405
MIN	IMUM PERFORMANCE AT STANDA	RD TEST CONDITIO	NS, STC1 (PO	WER TOLERANCE +	5W/-0W)			
	Power at MPP <sup>1</sup>	P <sub>MPP</sub>	[W]	385	390	395	400	405
	Short Circuit Current <sup>1</sup>	I <sub>sc</sub>	[A]	11.04	11.07	11.10	11.14	11.17
mnu.	Open Circuit Voltage <sup>1</sup>	V <sub>oc</sub>	[V]	45.19	45.23	45.27	45.30	45.34
Minim	Current at MPP	I <sub>MPP</sub>	[A]	10.59	10.65	10.71	10.77	10.83
2	Voltage at MPP	V <sub>MPP</sub>	[V]	36.36	36.62	36.88	37.13	37.39
	Efficiency <sup>1</sup>	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MIN	IMUM PERFORMANCE AT NORMA	OPERATING CONI	DITIONS, NM	OT <sup>2</sup>				
	Power at MPP	P <sub>MPP</sub>	[W]	288.8	292.6	296.3	300.1	303.8
E .	Short Circuit Current	I <sub>sc</sub>	[A]	8.90	8.92	8.95	8.97	9.00
Minim	Open Circuit Voltage	V <sub>oc</sub>	[V]	42.62	42.65	42.69	42.72	42.76
ž.	Current at MPP	I <sub>MPP</sub>	[A]	8.35	8.41	8.46	8.51	8.57
	Voltage at MPP	V <sub>MPP</sub>	[V]	34.59	34.81	35.03	35.25	35.46

\*Measurement tolerances P<sub>MPP</sub> ±3%; I<sub>SC</sub>; V<sub>OC</sub> ±5% at STC: 1000W/m², 25±2°C, AM 1.5 according to IEC 60904-3 • 2800W/m², NMOT, spectrum AM 1.5

#### Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to

es. Full warranties in accordance wit the warranty terms of the Q CELLS

PERFORMANCE AT LOW IRRADIANCE

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I <sub>sc</sub>	α	[%/K]	+0.04	Temperature Coefficient of Voc	β	[%/K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

#### PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V <sub>SYS</sub>	[V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push/Pull <sup>3</sup>	[lbs/ft <sup>2</sup> ]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature	-40°F up to +185°F
Max. Test Load, Push / Pull <sup>3</sup>	[lbs/ft <sup>2</sup> ]	113 (5400 Pa) / 84 (4000 Pa)	on Continuous Duty	(-40°C up to +85°C)

#### **QUALIFICATIONS AND CERTIFICATES**





Horizontal	76.4 in	43.3
packaging	1940 mm	1100 m

			*
Horizontal 76.4in 43.3 packaging 1940mm 1100m		24 pallets	32 modules

PACKAGING INFORMATION

#### Hanwha Q CELLS America Inc.

UL 61730, CE-compliant IEC 61215:2016, IEC 61730:2016,

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.g-cells.com | WEB www.g-cells.us

525 W BASELINE RD., MESA AZ, 85210 **CONTRACTOR LIC# U.34445** 

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**EQUIPMENT SPECIFICATIONS** 



# TECHNICAL SHEET

1	tem Number	Description	Part Number
1	L	Splice Foot X	4000113   Splice Foot X Kit, Mill
6	2	K2 FlexFlash Butyl	
3	3	M5 x 60 lag screws	
_	4	T-Bolt & Hex Nut Set	

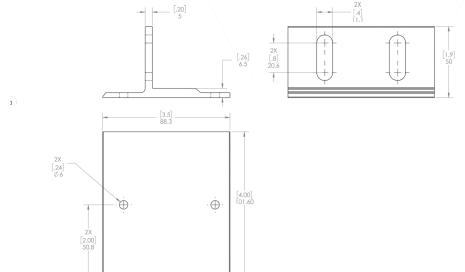
#### Technical Data

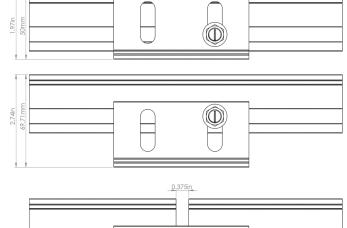
	Splice Foot X
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

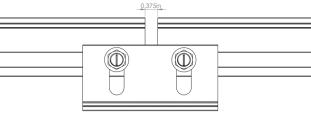
We support PV systems
Formerly Everest Solar Systems











k2-systems.com



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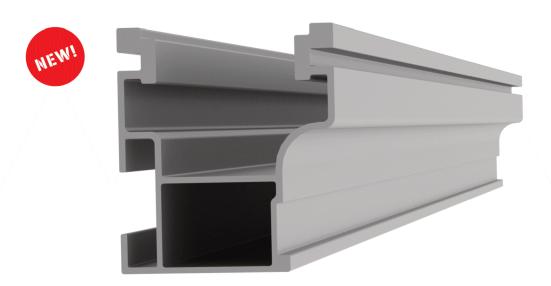
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EQUIPMENT SPECIFICATIONS PV 14

#### Mounting systems for solar technology





#### **NEW PRODUCT**

# CrossRail 44-X

- Optimized rail profile
- ▶ One rail for all markets
- ▶ Built-in wire management
- ► Maintains same structural integrity as 48-X
- ▶ Tested up to 200 mph winds
- ▶ Tested up to 100 PSF snow loads



Part Number	Description
4000019	CrossRail 44-X 166'', Mill
4000020	CrossRail 44-X 166'', Dark
4000021	CrossRail 44-X 180", Mill
4000022	CrossRail 44-X 180", Dark
4000051	RailConn Set, CR 44-X, Mill
4000052	RailConn Set, CR 44-X, Dark
4000067	End Cap, Black, CR 44-X



www.everest-solarsystems.com

CrossRail 44-X Product Sheet US01 | 0520 · Subject to change · Product illustrations are exemplary and may differ from the original.



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