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

## DINH, QUOC PV SYSTEM 4735 HILLMON GROVE ROAD. CAMERON, NC, 28326 APN:

## JURISDICTION: HARNETT COUNTY (NC) GENERAL INFORMATION

SYSTEM SIZE: 14.000 kW-DC-STC 10.000 kW-AC 30 DEGREES

**INVERTER:** (1) SOLAREDGE SE10000H-US W/ P340 OPTIMIZERS

(35) Q PEAK DUO BLK ML G10+ 400W MODULES:

 $(1) \times 15$ ,  $(1) \times 10$ ,  $(1) \times 10$  MODULE SERIES STRINGS STRINGS:

**ELECTRICAL SERVICE RATING:** 200A PV SYSTEM OVERCURRENT RATING: 60A

**ROOF PITCHED:** 

PV SYSTEM DISCONNECT SWITCH: EATON DG222URB (60A / 2P)

**ROOF TYPE: COMP SHINGLE** 

MANUFACTURED/ENGINEERED TRUSS **ROOF FRAMING:** 

**RACKING: K2 SYSTEMS** 

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

## TABLE OF CONTENTS

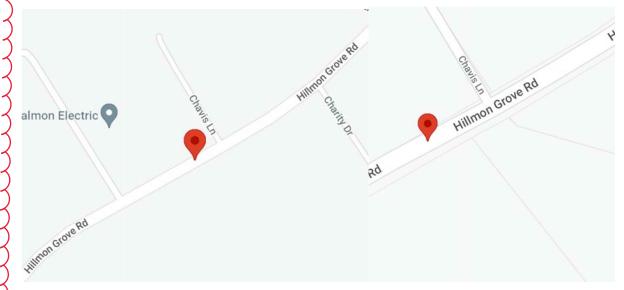
REQUIRED INFORMATION	SHEET NAME	SHEET NUMBER
SITE INFORMATION	COVER PAGE	PV 1
MODULE AND EQUIPMENT LAYOUT	SITE PLAN	PV 2
LOCATION & QUANTITY OF PACKING & STANDOFFS	PV LAYOUT	PV 3
RACKING LOAD & UPLIFT CALCULATIONS	PV LAYOUT	PV 3
ROOF ATTACHMENT DETAILS	DETAILS	PV 4
ELECTRICAL 1 LINE DIAGRAM	ONE LINE	PV 5
ELECTRICAL 3 LINE DIAGRAM	THREE LINE	PV 6
OCP & WIRE SIZING CALCULATIONS	1 & 3 LINE	PV 5 & 6
ARRAY & INVERTER ELECTRICAL SPECIFICATIONS	1 & 3 LINE	PV 5 & 6
EQUIPMENT SPECIFICATIONS	1 & 3 LINE	PV 5 & 6
LABEL NOTES	LABELS	PV 7
PV EQUIPMENT LABELING DETAIL	LABELS	PV 7
DIRECTORY LABEL	PLACARD	PV 8
JOB SAFETY PLAN	SAFETY PLAN	PV 9
PV EQUIPMENT SPECIFICATIONS	EQUIPMENT SPEC.	PV 10 - 16
DATA SHEETS & ADDITIONAL INFORMATION	SUPPLEMENTAL MATERIAL	

## VICINITY MAP

**SCALE: NTS** 

## **AERIAL MAP**

**SCALE: NTS** 



## **NOTES**

### **EQUIPMENT LOCATION**

- 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
- 6. 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.
- 3. 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
- 3. DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION
- 4. WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.
- 5. 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.
- 7. 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.
- 9. 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.



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

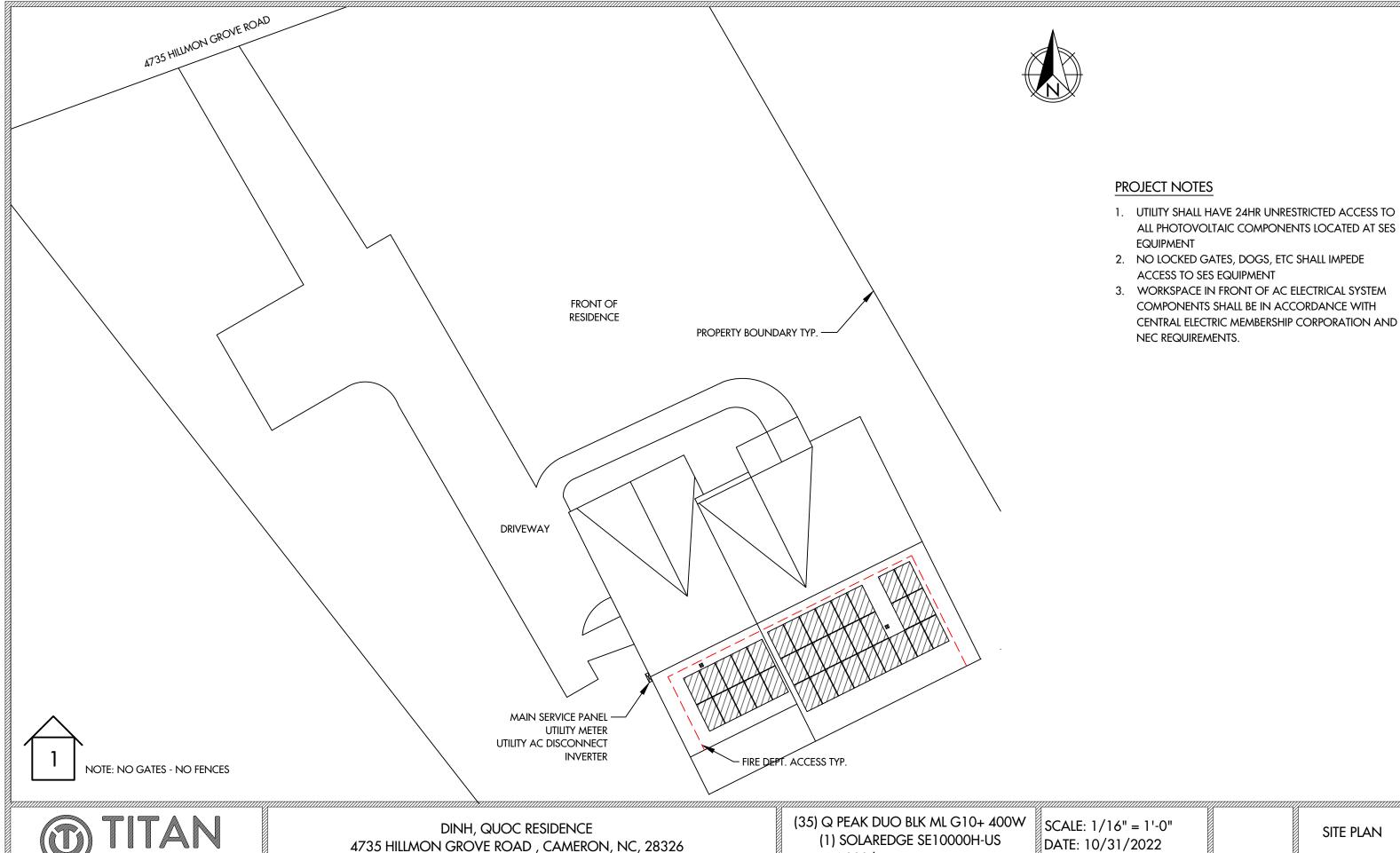
DATE: 10/31/2022

**REV:A** 

DRAWN BY: AW

**COVER PAGE** 

PV 1





4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

REV: A

DRAWN BY: AW

PV 2

## ARRAY INFORMATION

AR-01

QUANTITY: 25

MOUNTING TYPE: FLUSH

ARRAY TILT: 30° AZIMUTH: 154°

ATTACHMENT SPACING: 6' ROOF TYPE: COMP SHINGLE

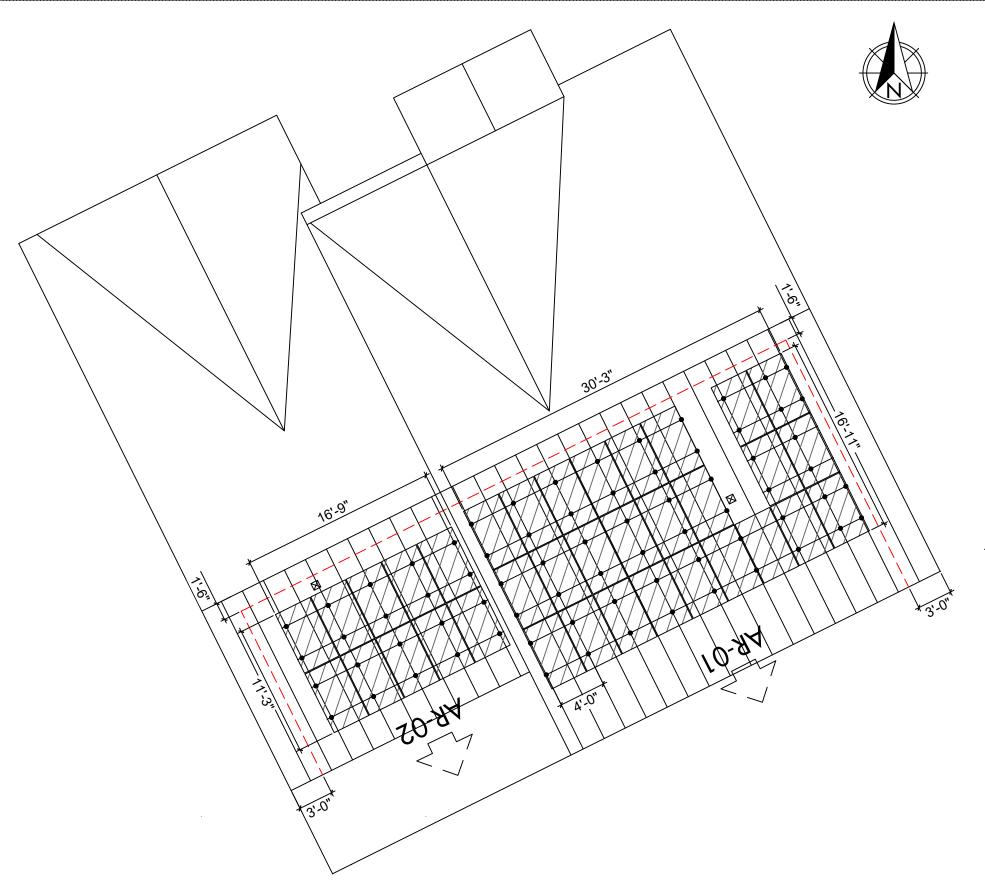
AR-02

QUANTITY: 10

MOUNTING TYPE: FLUSH

ARRAY TILT: 30° AZIMUTH: 154°

ATTACHMENT SPACING: 6' ROOF TYPE: COMP SHINGLE



## NOTES

- ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
- TOTAL ROOF AREA = 3234.183 SQ-FT
- TOTAL ARRAY AREA = 739.23 SQ-FT
- ARRAY COVERAGE = 22.86%



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190 (35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

SCALE: 31/256" = 1'-0" DATE: 10/31/2022

REV:A

DRAWN BY: AW

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: 25 MODULES

UPLIFT = 15840.63 LBS.

POINT LOAD = 24.07 LBS. PER MOUNTING POINT

PULLOUT STRENGTH = 28350.00 LBS.

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 1300.00 LBS

ARRAY 02: 10 MODULES

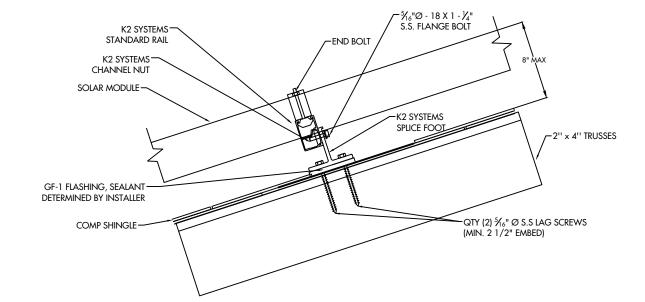
UPLIFT = 6336.25 LBS.

POINT LOAD = 26.00 LBS. PER MOUNTING POINT

PULLOUT STRENGTH = 10500.00 LBS.

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 520.00 LBS



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190 (35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

REV:A DRAWN BY: AW DETAILS

PV 4

## **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

2

2

2

Q PEAK DUO BLK ML G10+ 400W

W/ SOLAREDGE POWER OPTIMIZERS P340

8-48 VDC / 0-12 VAC INPUT

500VDC / 15ADC MAX OUTPUT

15

10

10

## **WIRE SCHEDULE**

- C (3) #6 AWG-CU THWN-2 WIRE (HR) (1) #8 AWG-CU THWN-2 WIRE (GND)
- A (6) #10 AWG-CU PV WIRE (HR) (1) #10 AWG-CU BARE COPPER WIRE (GND) IN FREE AIR
- B (6) #10 AWG-CU THWN-2 WIRE (HR) (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

J-BOX

SOLAREDGE SE10000H-US W/ INTEGRATED DC DISCONNECT & INTERNAL GFDI (E) 200A MAIN SERVICE PANEL UTILITY AC DISCONNECT 500VDC/240VAC, 60HZ, UL1741 1Ф, 3W, 120/240V, 60HZ KNIFE BLADE, W/ INTEGRATED RAPID SHUTDOWN (N)125 A SUB PANEL 60A/240V 10KAIC (TRANSFORMERLESS INVERTER!) 1Ф, 3W, 120/240V, 60HZ EATON DG222URB

## 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

6/9/10

CONDUIT FILL FACTOR OPTIMIZER MAX. CURRENT =

0.80

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 = 27.84A (40A X 0.87 X 0.80) **ROOFTOP CONDUIT** 

**AC WIRING** 

CONDUIT FILL FACTOR 1 (3) CONDUCTORS

42A (PER INVERTER SPECS) MAX. INVERTER CURRENT MIN. INVERTER OCP 52.5A (42A X 1.25)

**INVERTER OCP** 

#6 - AWG CU AMPACITY 65.25A (75A X 1 X 0.87)



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

PV BREAKER

DATE: 10/31/2022

REV:A

DRAWN BY: AW

ONE LINE

TO UTILITY GRID

PV 5

SEAL:

BREAKER

## PV MODULE

Q PEAK DUO BLK ML G10+ 400W

W = 400 WISC = 11.14 ADC VOC = 45.30 VDC

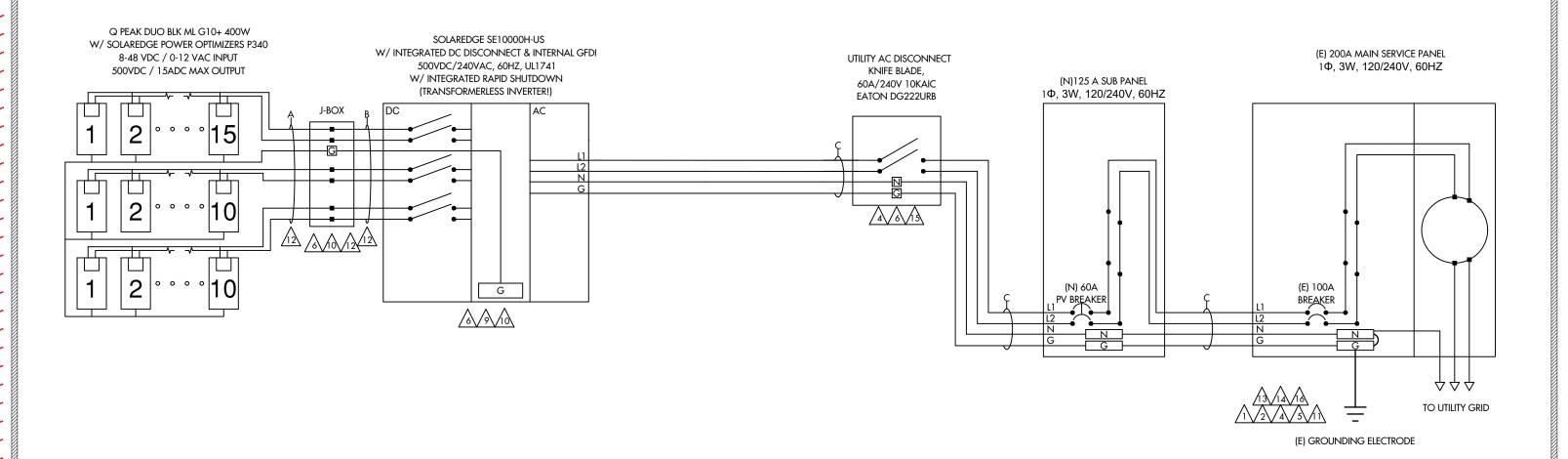
 $\begin{array}{rcl} IMP & = & 10.77 \text{ ADC} \\ VMP & = & 37.13 \text{ VDC} \end{array}$ 

VMP = 37.13 VDCTVOC = -0.270% / °C

## WIRE SCHEDULE

- A (6) #10 AWG-CU PV WIRE (HR)
  (1) #10 AWG-CU BARE COPPER WIRE (GND)
  IN FREE AIR
- B (6) #10 AWG-CU THWN-2 WIRE (HR) (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

C - (3) #6 AWG-CU THWN-2 WIRE (HR) (1) #8 AWG-CU THWN-2 WIRE (GND) 3/4" EMT



## 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 = 0.80

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 = 27.84A (40A X 0.87 X 0.80)

ROOFTOP CONDUIT

AC WIRING

CONDUIT FILL FACTOR = 1 (3) CONDUCTORS

MAX. INVERTER CURRENT = 42A (PER INVERTER SPECS)

MIN. INVERTER OCP = 52.5A (42A X 1.25)

INVERTER OCP = 60A

#6 - AWG CU AMPACITY = 65.25A (75A X 1 X 0.87)



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190 (35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

REV:A

DRAWN BY: AW

THREE LINE

PV 6





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



DO NOT RELOCATE THIS OVERCURRENT DEVICE

LOCATION: BACKFED BREAKER

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



WARNING

HE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH

LOCATION: (IF APPLICABLE) SUPPLY SIDE TAP LOAD PANEL

AC DISCONNECT(S)

CODE REF: UTILITY



PHOTOVOLTAIC AC DISCONNECT

RAPID SHUTDOWN

**SWITCH FOR** 

**SOLAR PV SYSTEM** 

ATED AC OPERATING CURRENT

NOMINAL OPERATING AC VOLTAGE:

42A AC 240VAC

CODE REF: NEC 690.54

LOCATION: MAIN PANEL (EXTERIOR)

LOCATION: DEDICATED KWH METER

CODE REF: NEC 690.4(B) UTILITY

LOCATION: MAIN PANEL

CODE REF: NEC 690.56(C)(3)



 $\triangle$ 

## **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

8

## **▲** WARNING

PHOTOVOLTAIC SYSTEM **COMBINER PANEL** 

DO NOT ADD LOADS



CODE REF: NEC 690.13(B)



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

LOCATION: DC DISCONNECT, COMBINE BOX

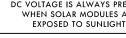
CODE REF: NEC 690.13(B)



## M WARNING

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

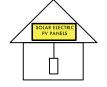
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE





## 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



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)



/18

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)



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022 REV: A

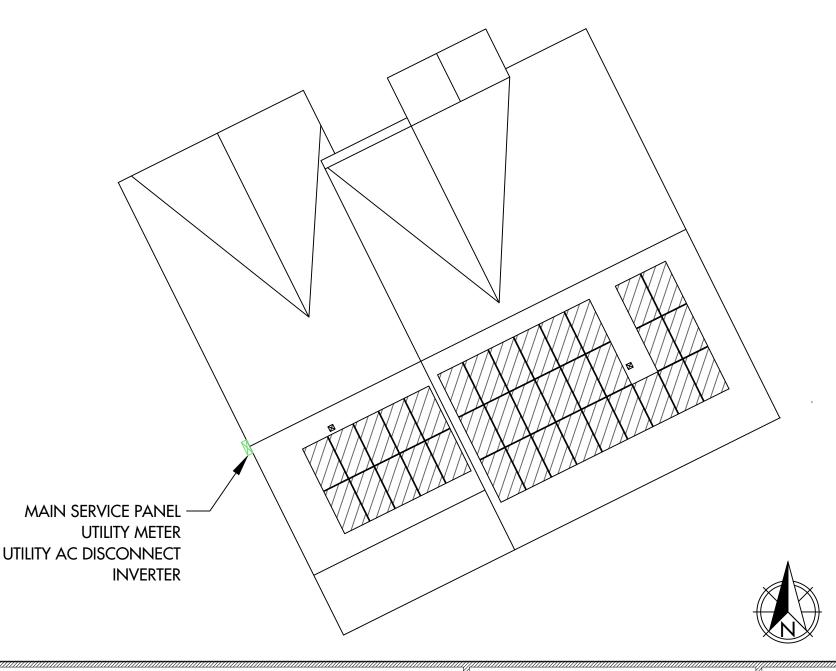
DRAWN BY: AW

LABELS

**PV** 7

## 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

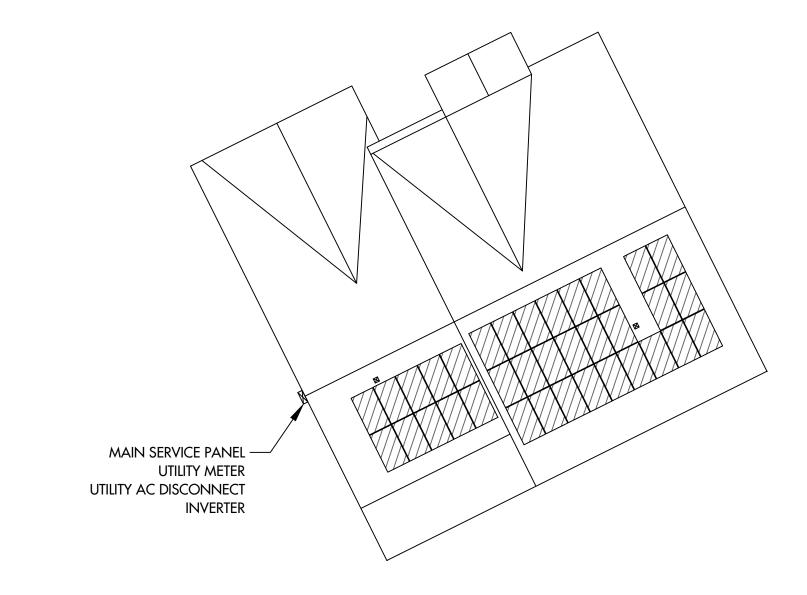


DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190 (35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022 REV: A DRAWN BY: AW PLACARD

PV 8

## JOB SAFETY PLAN



LOCATION OF NEAREST URGENT CARE FACILITY

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



CONTRACTOR LIC# U.33714

DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

REV: A

DRAWN BY: AW

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

525 W BASELINE RD., MESA AZ, 85210

CONTRACTOR LIC# U.33714

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 SEXXXXH-XXXXXBXX4								
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)	·	✓	✓	✓	<b>√</b>	✓	✓	Vac
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	<b>✓</b>	-	✓	-	-	<b>✓</b>	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	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	W
Transformer-less, Ungrounded	(			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	Ad
Maximum Input Current @208V <sup>(2)</sup>	-	9	-	13.5	-	-	27	Ad
Max. Input Short Circuit Current				45				Ad
Reverse-Polarity Protection	1			Yes				
Ground-Fault Isolation Detection				600kΩ Sensitivity				
Maximum Inverter Efficiency	99			g	9.2			%
CEC Weighted Efficiency				99			99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption				< 2.5				W

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

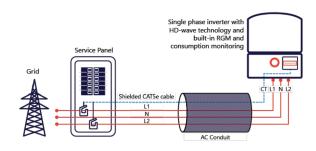
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

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 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								
STANDARD COMPLIANCE										
Safety		UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07								
Grid Connection Standards			IEE	E1547, Rule 21, Rule 1	4 (HI)					
Emissions				FCC Part 15 Class E	3					
INSTALLATION SPECIFICAT	TIONS									
AC Output Conduit Size / AWG Range		1"	Maximum / 14-6 AV	/G		1" Maximum	/14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range		1" Maxir	num / 1-2 strings / 14	I-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 ,	/ 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			-4	10 to +140 / -40 to +	60(4)			°F/°C		
Protection Rating			NEMA -	X (Inverter with Safe	ety 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

DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022 REV: A

DRAWN BY: AW

**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
- Not more than 80 volts and 240 voltamperes within 30 seconds of rapid shutdown initiation

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

(2) 1 -PH Inverters

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US / SE7600A-US / SE10000A-US / SE11400A-US / SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US when the following label is labeled on the side of the inverter:

Inverter part number may be followed by a suffix.

(3) 3 -PH Inverters



Intertek 3933 US Route 11 Cortland, NY 13045 Telephone: 607-753-7311

SE9KUS / SE10KUS / SE14.4KUS / SE16.7kUS / SE17.3kUS / SE20KUS / SE24KUS / SE30KUS / SE33.3KUS / SE40KUS / SE43.2KUS / 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

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

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 is 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. 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 Incitation 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"					



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022 REV: A

DRAWN BY: AW

**EQUIPMENT SPECIFICATIONS** 

# 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>(1)</sup>	320	340	370	4	00	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	4	8	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	11	14	Add
Maximum Efficiency				99	.5				95
Weighted Efficiency				98.8				98.6	%
Overvoltage Category				1					
OUTPUT DURING OPER	RATION (POV	VER OPTIMI	ZER CONNEC	TED TO OPE	RATING SOI	AREDGE IN	VERTER)		
Maximum Output Current		15						Ad	
Maximum Output Voltage			60	0 85					Vd
OUTPUT DURING STANI	DBY (POWER	<b>OPTIMIZER</b>	DISCONNECT	ED FROM SO	DLAREDGE IN	IVERTER OR	SOLAREDGI	E INVERTER O	OFF)
Safety Output Voltage per Power Optimizer				1 ±	0.1				Vd
STANDARD COMPLIAN	CE								
EMC			FCC Pa	art15 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				Vde
Compatible inverters			All SolarE	dge Single Phase	and Three Phase i	nverters			
Dimensions (W x L x H)	129 :	× 153 x 27.5 / 5.1>	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 / îr
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> MC4 <sup>(3)</sup>						MC4 <sup>B)</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 /					°C /
Protection Rating				IP68 / N	EMA6P				
Relative Hurnidity				C - 1	100				95

(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		10	18	
(Power Optimizers)	P405, P485, P505	6 8 14				
Maximum String Length (Powe	er Optimizers)	25 25 50/8		50 <sup>(8)</sup>		
Maximum Power per String		5700 (6000 with SE7600-US - SE11400- US)	5250	6000%	12750(10)	W
Parallel Strings of Different Lengths or Orientations			,	vies .		

(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





DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

REV: A

DRAWN BY: AW

**EQUIPMENT SPECIFICATIONS** 



sive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



#### **INNOVATIVE ALL-WEATHER TECHNOLOGY**

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:

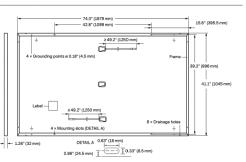


Engineered in Germany



#### 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

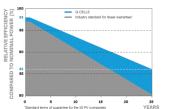


#### **ELECTRICAL CHARACTERISTICS**

UM PERFORMANCE AT STANDAR ower at MPP <sup>1</sup> hort Circuit Current <sup>1</sup>	D TEST CONDITIO			5W/-0W)			
	P <sub>MPP</sub>	DA/1					
hort Circuit Current <sup>1</sup>		[W]	385	390	395	400	405
	I <sub>sc</sub>	[A]	11.04	11.07	11.10	11.14	11.17
pen Circuit Voltage <sup>1</sup>	V <sub>oc</sub>	[V]	45.19	45.23	45.27	45.30	45.34
urrent at MPP	I <sub>MPP</sub>	[A]	10.59	10.65	10.71	10.77	10.83
oltage at MPP	V <sub>MPP</sub>	[V]	36.36	36.62	36.88	37.13	37.39
fficiency <sup>1</sup>	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
UM PERFORMANCE AT NORMAL	OPERATING CONI	DITIONS, NMC	)T²				
ower at MPP	P <sub>MPP</sub>	[W]	288.8	292.6	296.3	300.1	303.8
hort Circuit Current	I <sub>sc</sub>	[A]	8.90	8.92	8.95	8.97	9.00
pen Circuit Voltage	Voc	[V]	42.62	42.65	42.69	42.72	42.76
urrent at MPP	I <sub>MPP</sub>	[A]	8.35	8.41	8.46	8.51	8.57
oltage at MPP	V <sub>MPP</sub>	[V]	34.59	34.81	35.03	35.25	35.46
of the transfer of the transfe	urrent at MPP  bitage at MPP  ficiency <sup>1</sup> JM PERFORMANCE AT NORMAL ( bwer at MPP  nort Circuit Current pen Circuit Voltage  urrent at MPP	Map   Map	Impe	Mapp   Mapp	1	V	Mapp   Mapp

\*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

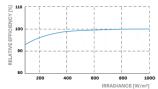
#### Q CELLS PERFORMANCE WARRANTY



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.	V	[% / K]	-0.34	Nominal Module Operating Temperature	TOMIA	[°F]	109+54(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**





			[lb]	1 <mark>O-O</mark>	40'HC	
Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	1656 lbs 751 kg	24 pallets	24 pallets	3 module

PACKAGING INFORMATION

#### Hanwha Q CELLS America Inc.

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.33714

DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190

(35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

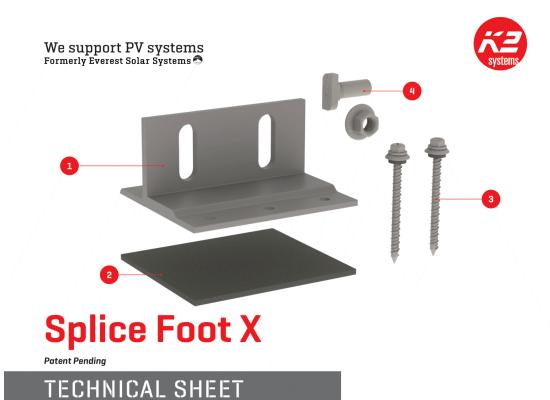
REV: A

DRAWN BY: AW

**EQUIPMENT SPECIFICATIONS** 

SEAL:

32



# Item Number Description Part Number 1 Splice Foot X 4000113 | Splice Foot X Kit, Mill 2 K2 FlexFlash Butyl 3 M5 x 60 lag screws

#### Technical Data

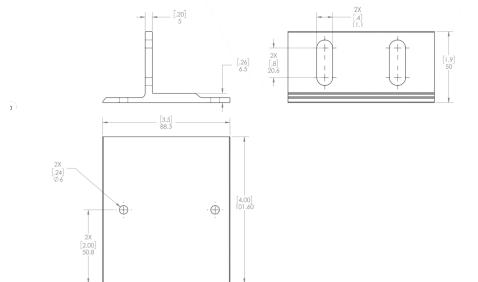
T-Bolt & Hex Nut Set

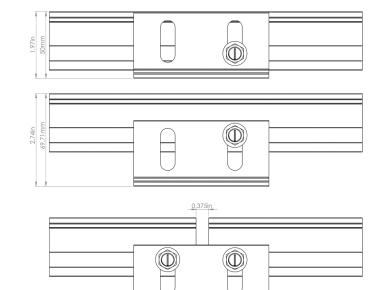
	Splice Foot X
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

## We support PV systems Formerly Everest Solar Systems









k2-systems.com



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190 (35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

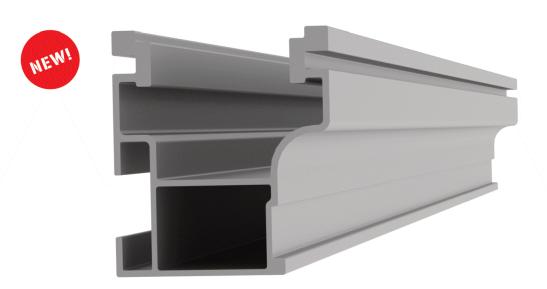
REV: A

DRAWN BY: AW

EQUIPMENT SPECIFICATIONS PV 14

## Mounting systems for solar technology





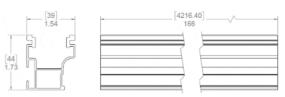
## **NEW PRODUCT**

## 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

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



DINH, QUOC RESIDENCE 4735 HILLMON GROVE ROAD, CAMERON, NC, 28326 LAT:35.224377, LON:-79.149889 TSP125190 (35) Q PEAK DUO BLK ML G10+ 400W (1) SOLAREDGE SE10000H-US 14.000 kW DC SYSTEM SIZE 10.000 kW AC SYSTEM SIZE

DATE: 10/31/2022

REV: A

DRAWN BY: AW

EQUIPMENT SPECIFICATIONS PV 15