Building Codes: 2017 NEC W/NC AMENDMENTS, 2018 NORTH CAROLINA

RESIDENTIAL CODE, AND 2018 NORTH CAROLINA FIRE CODE 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

ROOF PITCHED: 30 DEGREES

INVERTER: (1) SOLAREDGE SE10000H-US W/ P401 OPTIMIZERS

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

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

ELECTRICAL SERVICE RATING: 225A PV SYSTEM OVERCURRENT RATING: 60A

PV SYSTEM DISCONNECT SWITCH: EATON DG222URB (60A / 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

## **TABLE OF CONTENTS**

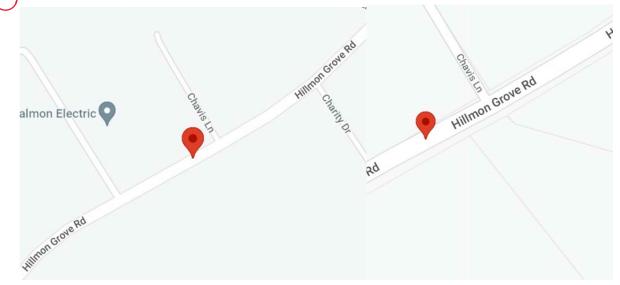
REQUIRED INFORMATION	SHEET NAME	SHEET NUMBER
SITE INFORMATION	COVER PAGE	PV 1
MODULE AND EQUIPMENT LAYOUT	SITE PLAN	PV 2
LOCATION & QUANTITY OF PACKING & STANDOFFS	PV LAYOUT	PV 3
RACKING LOAD & UPLIFT CALCULATIONS	PV LAYOUT	PV 3
ROOF ATTACHMENT DETAILS	DETAILS	PV 4
ELECTRICAL 1 LINE DIAGRAM	ONE LINE	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.
- 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.
- 4. 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,  $75^{\circ}$  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.



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

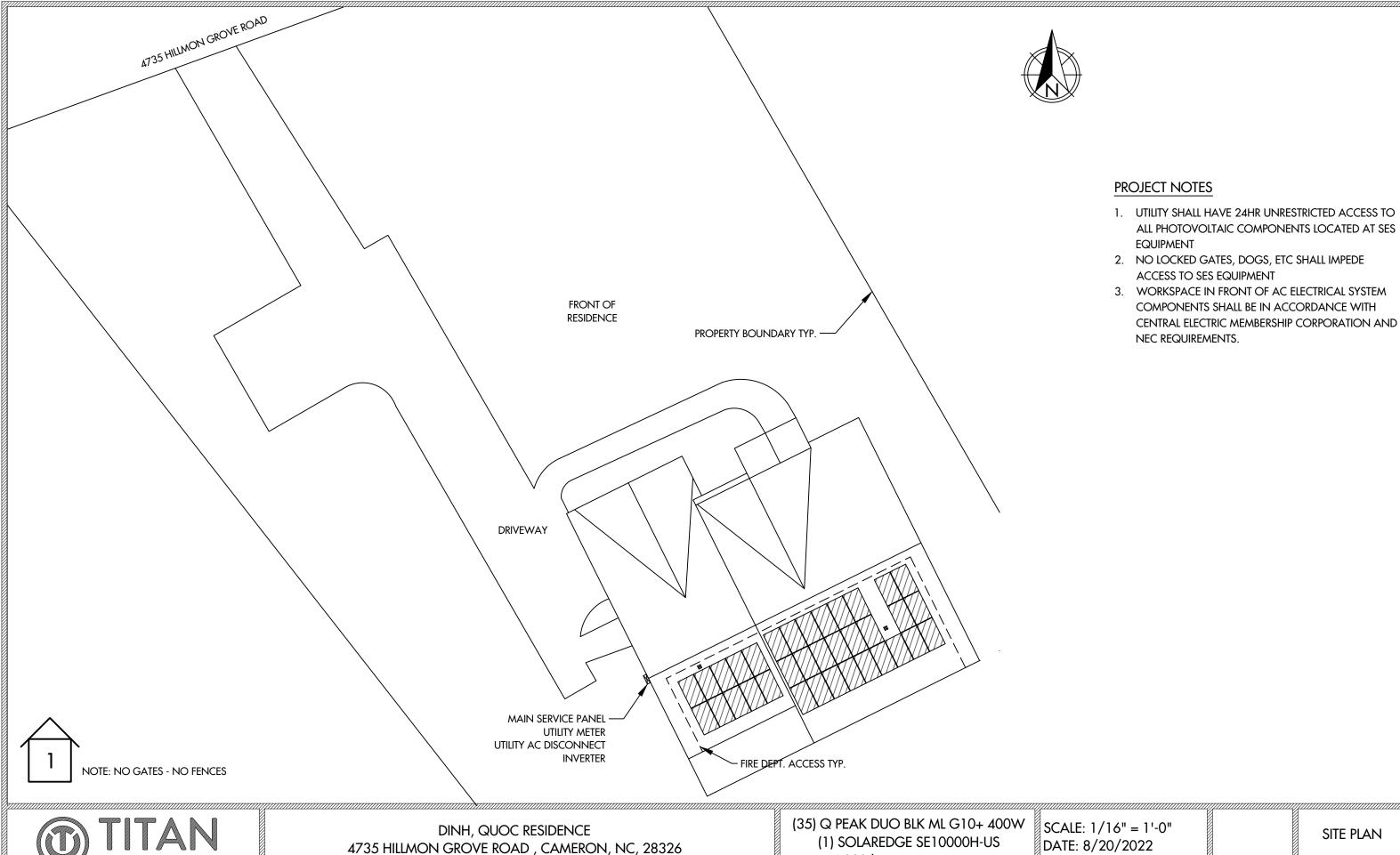
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COVER PAGE

PV 1



SOLAR POWER 525 W BASELINE RD., MESA AZ, 85210 CONTRACTOR LIC# U.33714

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

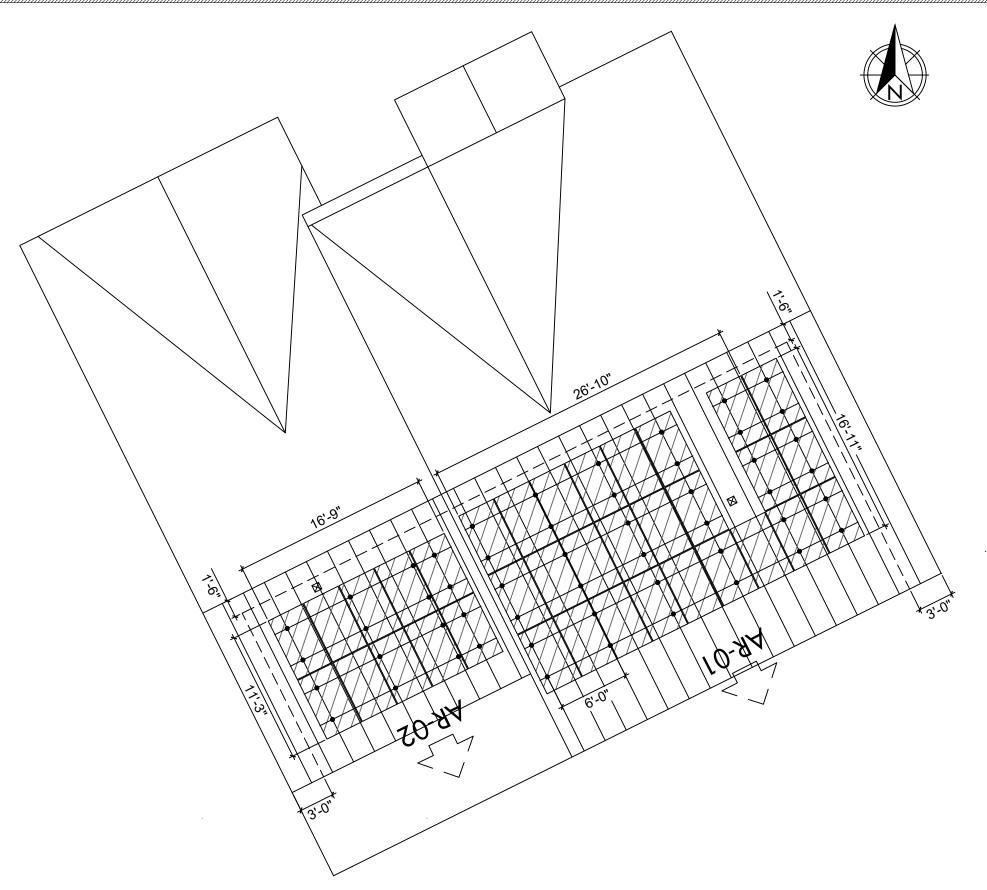
AR-02

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%



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SCALE: 31/256" = 1'-0" DATE: 8/20/2022

REV:A

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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 = 36.11 LBS. PER MOUNTING POINT

PULLOUT STRENGTH = 18900.00 LBS.

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 1300.00 LBS

ARRAY 02: 10 MODULES

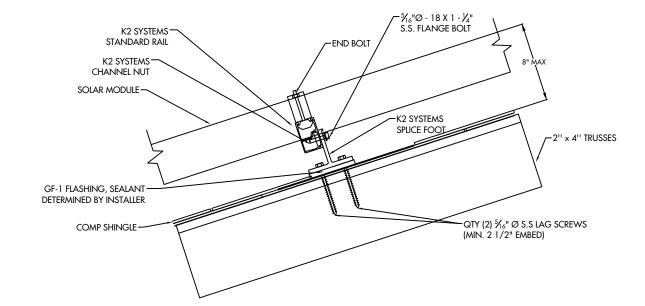
UPLIFT = 6336.25 LBS.

POINT LOAD = 32.50 LBS. PER MOUNTING POINT

PULLOUT STRENGTH = 8400.00 LBS.

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 520.00 LBS



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(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: 8/20/2022

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**DETAILS** 

PV 4

#### **PV MODULE**

TVOC =

Q PEAK DUO BLK ML G10+ 400W

-0.270% / °C

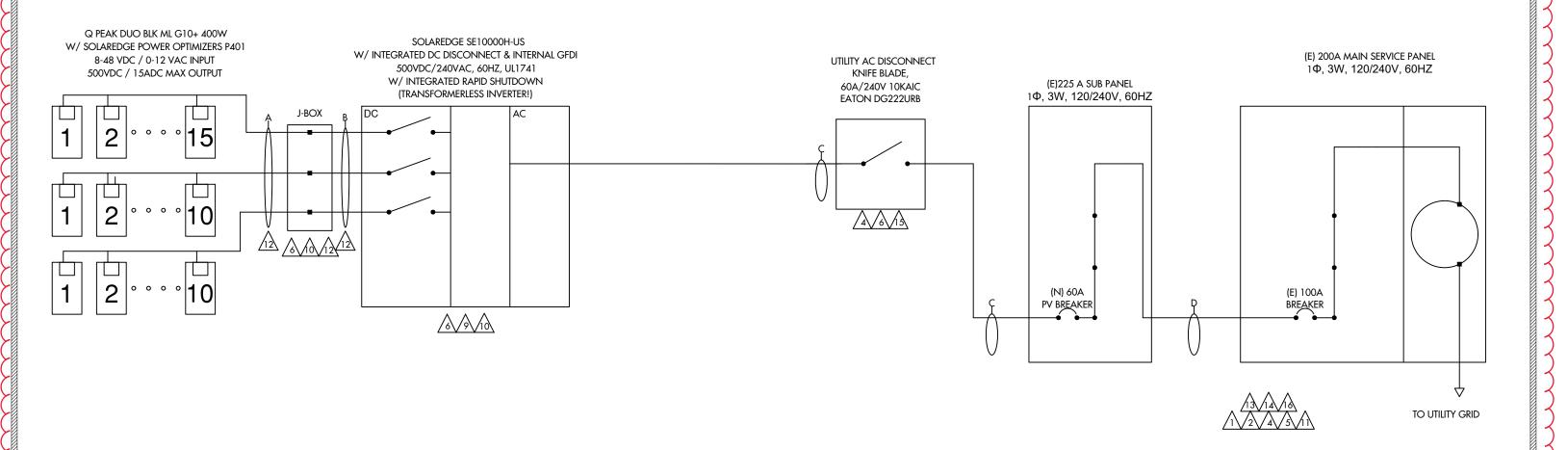
400 W

11.14 ADC VOC 45.30 VDC

IMP 10.77 ADC VMP 37.13 VDC

#### **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)
- D (3) #3 AWG-CU THWN-2 WIRE (HR) (1) #8 AWG-CU THWN-2 WIRE (GND)



#### 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** 

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



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(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: 8/20/2022

REV:A

DRAWN BY: AW

ONE LINE

PV 5

#### **PV MODULE**

Q PEAK DUO BLK ML G10+ 400W

W = 400 W

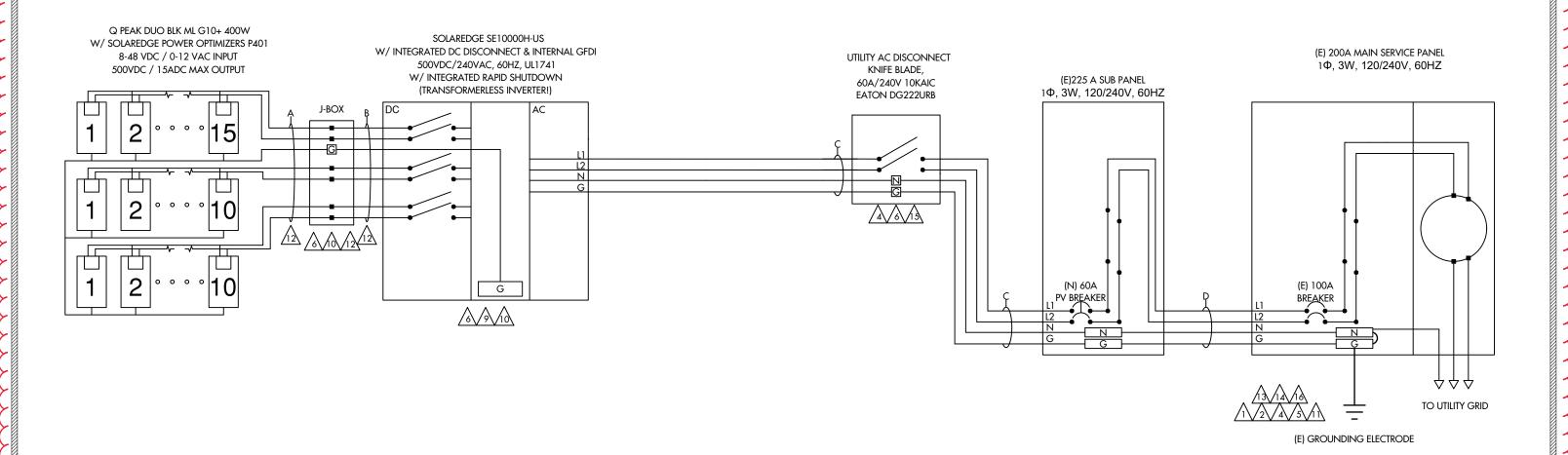
ISC = 11.14 ADC VOC = 45.30 VDC

IMP = 10.77 ADCVMP = 37.13 VDC

VMP = 37.13 VDC $TVOC = -0.270\% / ^{\circ}C$ 

#### **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
- D (3) #3 AWG-CU THWN-2 WIRE (HR)
  (1) #8 AWG-CU THWN-2 WIRE (GND)
  1" 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)



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DATE: 8/20/2022

REV:A

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THREE LINE

PV 6

.





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



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 $\triangle$ 

LOCATION: BACKFED BREAKER DO NOT RELOCATE THIS CODE REF: 2017 NEC 705.12(2)(3)(b) OVERCURRENT DEVICE



 $\sqrt{3}$ HE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH

LOCATION: (IF APPLICABLE) SUPPLY SIDE TAP LOAD PANEL

AC DISCONNECT(S)

CODE REF: UTILITY

LOCATION: MAIN PANEL

CODE REF: NEC 690.54



ATED AC OPERATING CURRENT

42A AC

NOMINAL OPERATING AC VOLTAGE: 240VAC

RAPID SHUTDOWN **SWITCH FOR SOLAR PV SYSTEM** 

LOCATION: MAIN PANEL (EXTERIOR)

CODE REF: NEC 690.56(C)(3)



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

8

## **▲** WARNING

PHOTOVOLTAIC SYSTEM **COMBINER PANEL** 

DO NOT ADD LOADS

MAXIMUM VOLTAGE

MAXIMUM CIRCUIT CURRENT

MAX. RATED OUTPUT CURRENT OF

THE CHARGE CONTROLLER OR DC-

TO-DC- CONVERTER (IF INSTALLED)

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

EXPOSED TO SUNLIGHT

PHOTOVOLTAIC SYSTEM DC DISCONNECT

LOCATION: AC COMBINER PANEL

LOCATION: DC DISCONNECT

CODE REF: UTILITY

LOCATION: DC DISCONNECT, COMBINE BOX

CODE REF: NEC 690.13(B)

CODE REF: NEC 690.13(B)

13

#### **A** CAUTION

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

LOCATION: SERVICE METER

<u>/14\</u>

### **WARNING**

INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS **OVERCURRENT DEVICE** 

LOCATION: (IF APPLICABLE) SERVICE PANEL

CODE REF: NEC 705.12(7)

15

/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)



/10\

#### 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.



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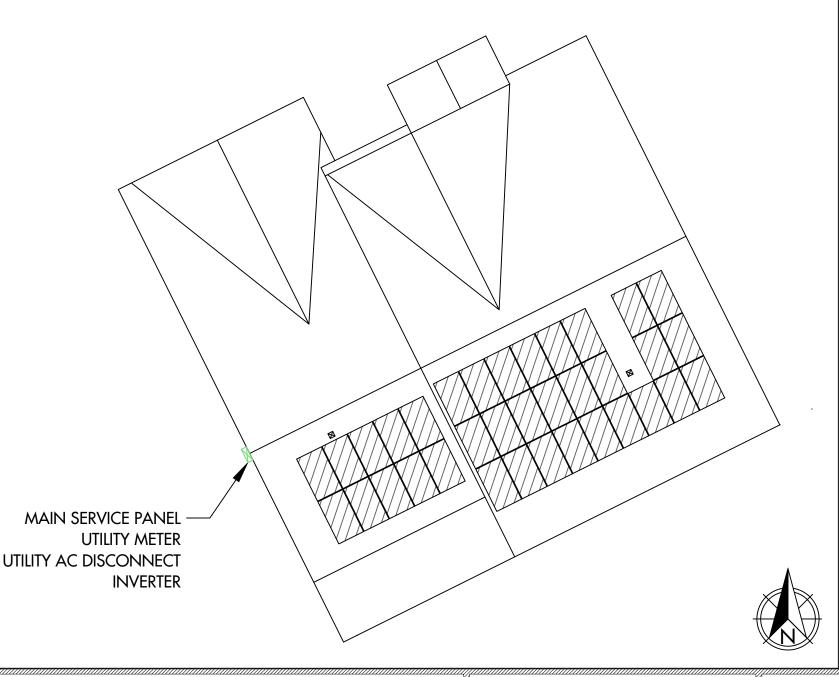
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LABELS

**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



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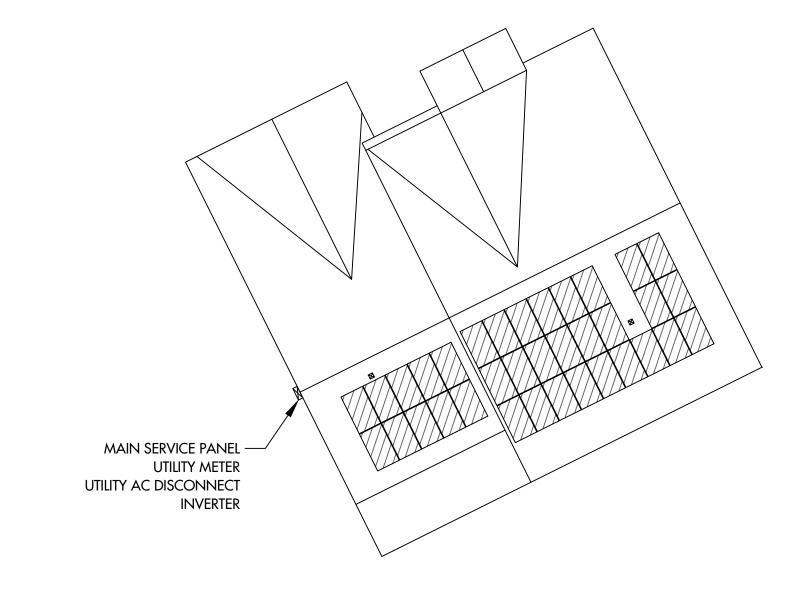
DATE: 8/20/2022 REV:A

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**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



TITAN

SOLAR POWER

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: 8/20/2022 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

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>	✓	<b>✓</b>	✓	✓	Vac	
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	<b>✓</b>	-	<b>✓</b>	-	-	✓	Vac	
AC Frequency (Nominal)	1			59.3 - 60 - 60.5(1)				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				Vdc	
Nominal DC Input Voltage		3	380			400		Vdc	
Maximum Input Current @240V <sup>(2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Add	
Maximum Input Current @208V <sup>(2)</sup>	-	9	-	13.5	-	-	27	Add	
Max. Input Short Circuit Current				45				Add	
Reverse-Polarity Protection	3			Yes					
Ground-Fault Isolation Detection				600kΩ Sensitivity					
Maximum Inverter Efficiency	99			9	9.2			%	
CEC Weighted Efficiency				99			99 @ 240V 98.5 @ 208V	%	
Nighttime Power Consumption	1			< 2.5				W	

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

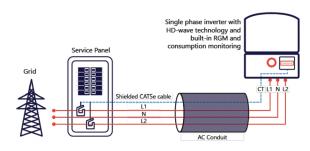
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces			RS485, Etherne	et, 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	IONS							
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	70 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	)			
Operating Temperature Range			-4	40 to +140 / -40 to +	60(4)			°F / °C
Protection Rating			NEMA	4X (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: 8/20/2022 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 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



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 / SE40KUS / SE50KUS / 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"



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

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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>(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	*	11	14	Add
Maximum Efficiency				99	5				%
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 STAN	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	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				Vdc
Compatible inverters			All SolarE	dge Single Phase	and Three Phase i	inverters			
Dimensions (W x L x H)	129 :	× 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			MC	4 <sup>(3)</sup>			Single or dua MC4 <sup>(3)(4)</sup>	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/
Protection Rating		IP68 / NEMA6P							
rrotection nating				11 00 / 11	LIVIPIOI				

(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 De a SolarEdge I	sign Using nverter <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 (Power	Optimizers)	2.	5	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	gths or Orientations			Yes		

(6) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string\_sizing\_na.pdf
(7) It is not allowed to mix P405/P485/P505 with P320/P340/P370/P400/P401 in one string
(8) A string with more than 30 optimizers does not meet IRC rapid shutdown requirements; safety voltage will be above the 30V requirement
(9) For 208V grid. It is allowed to install up to 7,200W per string when the maximum power difference between each string is 1,000W
(10) For 21/1/480V 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** 



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:

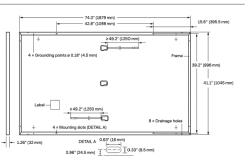


Engineered in Germany



#### 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 × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥49.2 in (1250 mm), (-) ≥49.2 in (1250 mm)
Connector	Stäubli MC4; IP68

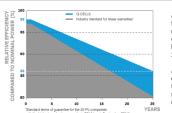


#### **ELECTRICAL CHARACTERISTICS**

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 MPP¹	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



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 $V_{\scriptsize SYS}$	[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]	53' N	40'HC	
	Horizontal packaging	76.4 in 1940 mm	48.0 in 1220 mm		24 pallets	24 pallets	3 module
_							

PACKAGING INFORMATION

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

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**EQUIPMENT SPECIFICATIONS** 



# TECHNICAL SHEET

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	
4	T-Bolt & Hex Nut Set	

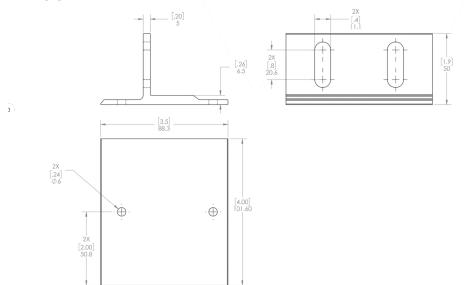
#### Technical Data

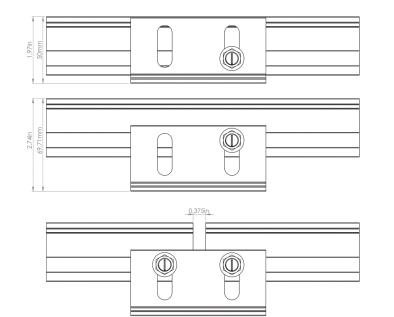
	Splice Foot X
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

We support PV systems
Formerly Everest Solar Systems



Units: [in] mm





k2-systems.com



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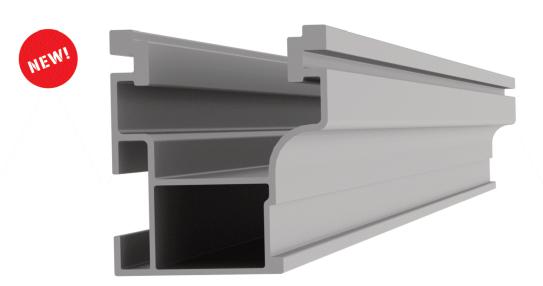
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EQUIPMENT SPECIFICATIONS PV 14

#### Mounting systems for solar technology





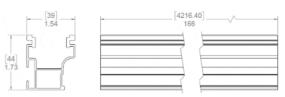
#### **NEW PRODUCT**

# 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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**EQUIPMENT SPECIFICATIONS PV 15**