PHOTOVOLTAIC ROOF MOUNT SYSTEM

CODE AND STANDARDS

THE INSTALLATION OF SOLAR ARRAYS AND PHOTOVOLTAIC POWER SYSTEMS SHALL COMPLY WITH THE FOLLOWING CODES:

- 2020 NATIONAL ELECTRICAL CODE
- 2018 NORTH CAROLINA RESIDENTIAL CODE
- 2018 NORTH CAROLINA BUILDING CODE
- ALL OTHER ORDINANCE ADOPTED BY THE LOCAL GOVERNING AGENCIES

SITE NOTES / OSHA REGULATION

1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2. THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED AND IDENTIFIED BY RECOGNIZED ELECTRICAL TESTING LABORATORY.
4. MODULES AND SUPPORT STRUCTURES SHALL BE GROUNDED
5. SOLAR INVERTER SHALL BE LISTED TO UL1741
6. ALL CONDUCTORS SHALL BE COPPER AND SHOULD BE 75 AND 90 DEG RATED
7. REMOVAL OF AN INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR, THE PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUIT GROUNDED CONDUCTORS.
8. LIVE PARTS OF PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS OVER 150V TO GROUND SHALL NOT BE ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS WHILE ENERGIZED.
9. ALL PV MODULES AND ASSOCIATED EQUIPMENT AND WIRING SHALL BE PROTECTED FROM PHYSICAL DAMAGE.

SOLAR CONTRACTOR

1. MODULE CERTIFICATIONS INCLUDE UL1703, IEC61646, IEC61370.
2. IF APPLICABLE, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE MARKED GROUNDING LUG HOLES PER THE MANUFACTURERS INSTALLATION REQUIREMENTS.
3. AS INDICATED BY DESIGN, OTHER NRTL LISTED MODULE GROUNDING DEVICES MAY BE USED IN PLACE OF STANDARD GROUNDING LUGS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ.
4. ALL MICROINVERTERS, PHOTOVOLTAIC MODULES, AC COMBINERS, DC-AC CONVERTERS AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER NEC690.4(B).
5. ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH LOCAL BUILDING CODE.
6. TERMINALS AND LUGS WILL BE TIGHTENED TO MANUFACTURER TORQUE SPECIFICATIONS (WHEN PROVIDED) IN ACCORDANCE WITH NEC CODE 110.14(D) ON ALL ELECTRICAL CONNECTIONS.
7. MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC UNLESS NOT AVAILABLE.

SR.#	PROJECT INFORMATION	
1	PV MODULES	06 x CANADIAN SOLAR CS6.1-54TM-460H
2	INVERTERS	01 x SE11400H – US (RGM)
3	OPTIMIZERS	30 x SOLAREDGE S500B
4	ROOF TYPE	ASPHALT SHINGLES
5	RACKING	PSR-B84 RAILS (BLACK)
6	MOUNTING TYPE	INSTAFLASH2 (BLACK)
7	DC SIZE	2.76 KW
8	AC SIZE	11.4 KVA

SR.#	PROJECT INFORMATION	
1	PV1	DRAWING INDEX
2	PV2	SITE LAYOUT
3	PV3	STRING MAPPING
4	PV4	ELECTRICAL ONE LINE DIAGRAM
5	PV5	DETAILED ELECTRICAL WIRING SCHEMATIC
6	PV6	PV LABELS
7	PV7	BILL OF MATERIALS
8	PV8	ATTACHMENT DETAILS

VICINITY MAP

TOP VIEW OF THE BUILDING

DESIGN CRITERIA
WIND SPEED: 120 MPH
GROUND SNOW LOAD: 10 PSF
WIND EXPOSURE FACTOR: B

UTILITY COMPANY:
DUKE ENERGY

PERMIT ISSUER (AHJ):
HARNETT COUNTY

SCOPE OF WORK
INSTALLATION OF UTILITY INTERACTIVE PHOTOVOLTAIC SOLAR SYSTEM.

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Sheet Name:

Drawing Index

JOB NUMBER:

25-584-KG

Date:	Revision:
08/19/2025	A

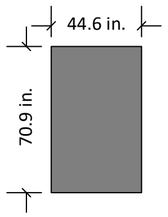
Sheet Size:	Sheet Number:
ANSI C 17" X 22"	PV1

NABCEP CERTIFIED PV Installation Professional
Ali Buttar
PVIP #031310-32

NORTH CAROLINA PROFESSIONAL SEAL 039529 ENGINEER USMAN NOOR
08-26-2025

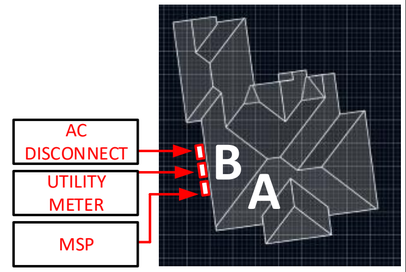
ROOF DESCRIPTION			
ROOF	PITCH	AZIMUTH	NO. OF MODULES
A	45°	174°	28
B	45°	262°	11

MODULE DIMENSIONS

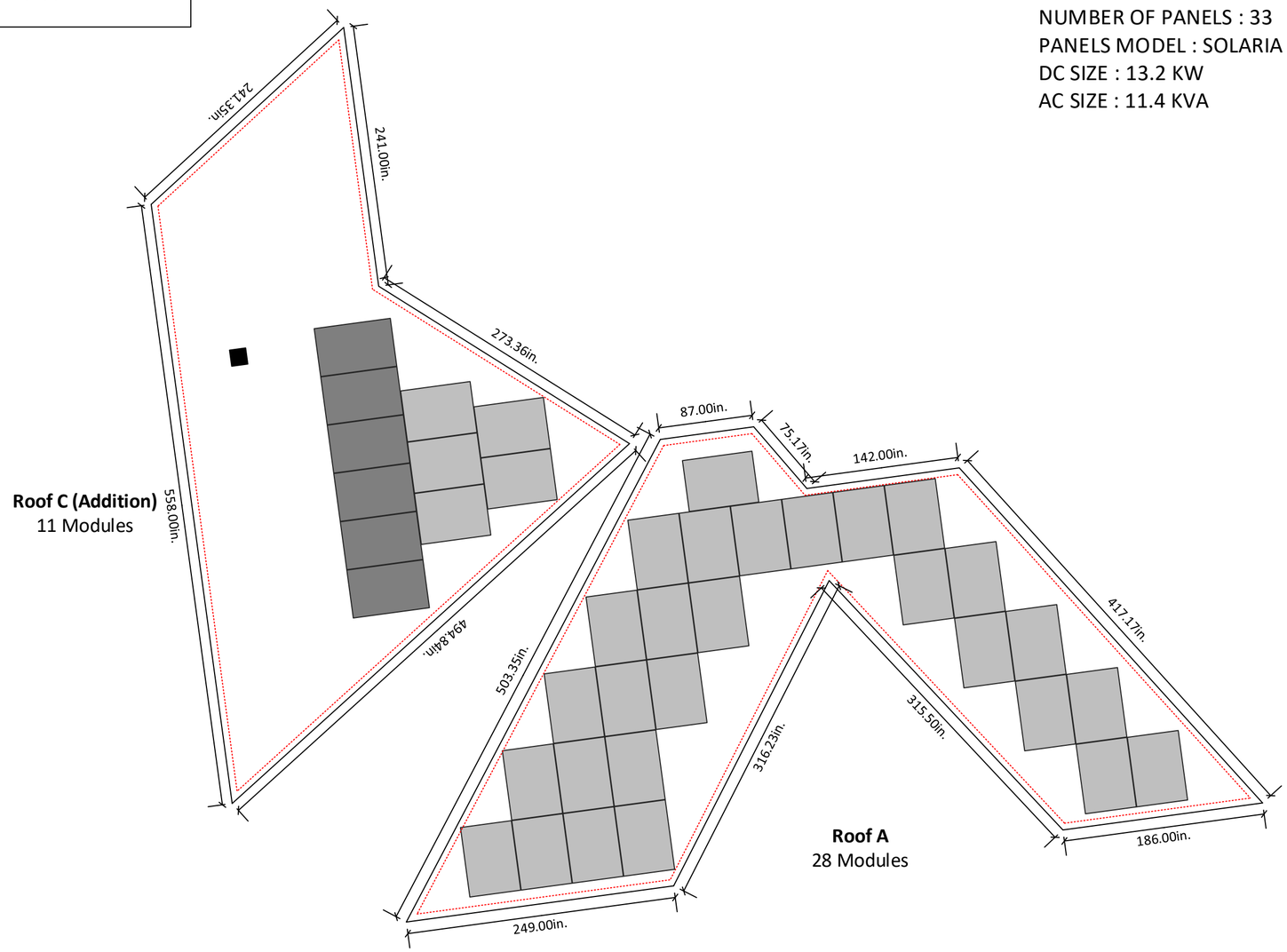


PV System Dead Load
(Panel + Racking weight) / PV System Area
(No. of panels x Weight of panel(lbs.) +Length of racking(ft.) x 1.15 lb.ft) /
(No. of panels x Height x Width) = Total psf

ROOF	A	B		
DEAD LOAD (PSF)	2.59	2.63		



Vent	• There is no vent on roof A. • No vent will be covered by PV modules during the installation.
	Pre – Installed PV Panels
	New PV Panels

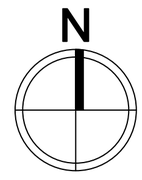


NEW ADDITION SYSTEM DETAILS
NUMBER OF PANELS : 06
PANELS MODEL : CANADIAN SOLAR CS6.1-54TM-460H
DC SIZE : 2.76 KW
AC SIZE : 11.4 KVA

PRE-INSTALLED SYSTEM DETAILS
NUMBER OF PANELS : 33
PANELS MODEL : SOLARIA POWERXT 400R-PM
DC SIZE : 13.2 KW
AC SIZE : 11.4 KVA

6in setback from sides of the roof

SITE LAYOUT
SCALE: 1/8" - 1'



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Site Layout

JOB NUMBER:
25-584-KG

Date:	Revision:
08/19/2025	A

Sheet Size:	Sheet Number:
ANSI C 17" X 22"	PV2

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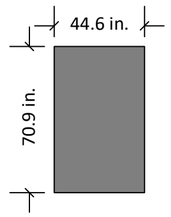
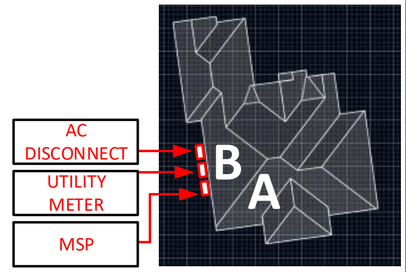
08-26-2025

ROOF DESCRIPTION			
ROOF	PITCH	AZIMUTH	NO. OF MODULES
A	45°	174°	28
B	45°	262°	11

MODULE DIMENSIONS



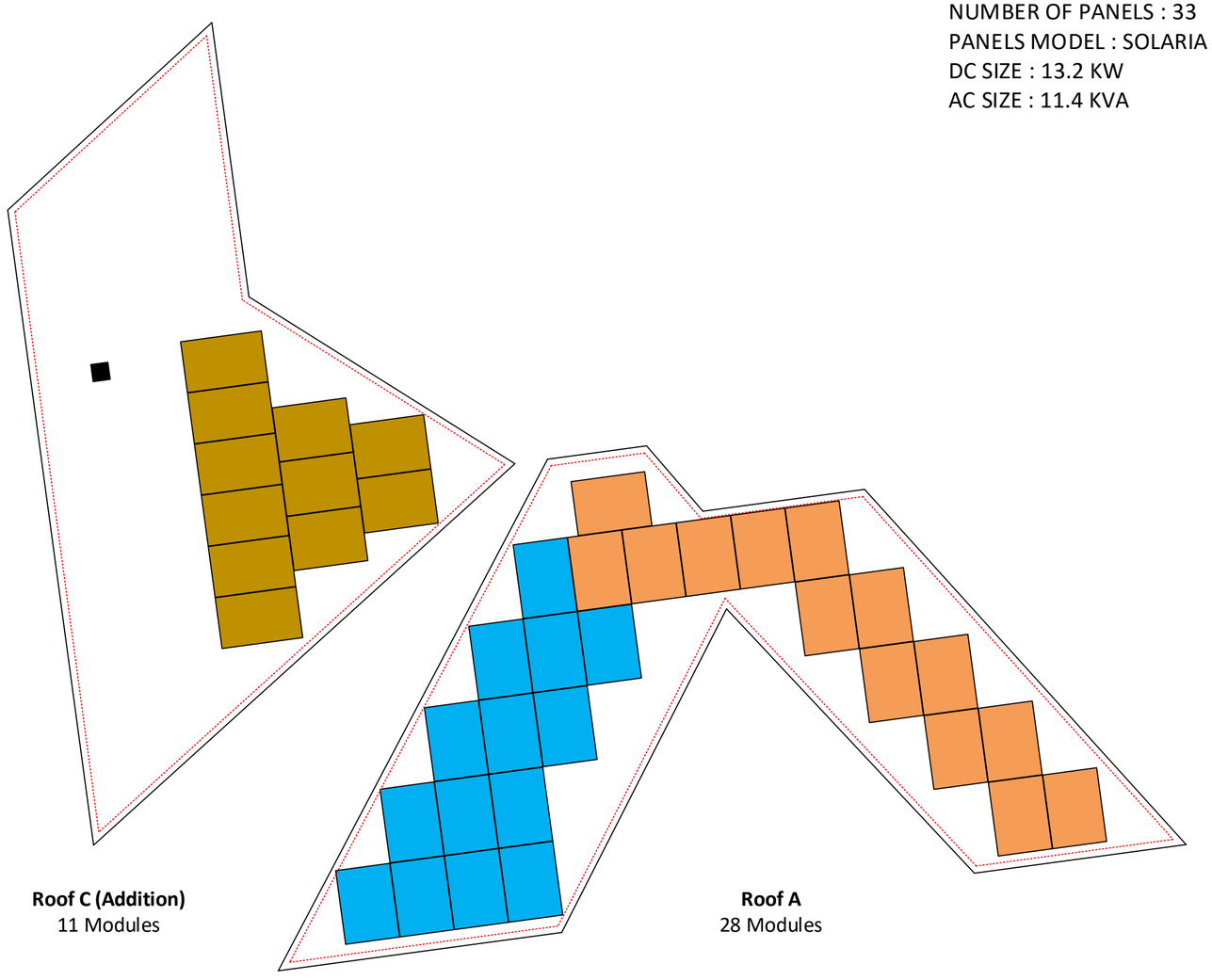
STRING LAYOUT					
Inverter-A SE7600H-US(RGM) Existing			Q. HOME COMBINER New Addition		
Strings #	No. of Modules	Color	Strings #	No. of Modules	Color
String 1	14				
String 2	14				
String 3	11				



Note: We are doing re-stringing here

NEW ADDITION SYSTEM DETAILS
NUMBER OF PANELS : 06
PANELS MODEL : CANADIAN SOLAR CS6.1-54TM-460H
DC SIZE : 2.76 KW
AC SIZE : 11.4 KVA

PRE-INSTALLED SYSTEM DETAILS
NUMBER OF PANELS : 33
PANELS MODEL : SOLARIA POWERXT 400R-PM
DC SIZE : 13.2 KW
AC SIZE : 11.4 KVA

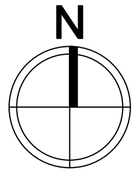


Roof C (Addition)
11 Modules

Roof A
28 Modules

6in setback from sides of the roof

STRING MAPPING
SCALE: 1/8" - 1'



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String Mapping

JOB NUMBER:
25-584-KG

Date:	Revision:
08/19/2025	A

Sheet Size:	Sheet Number:
ANSI C 17" X 22"	PV3

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Ali Buttar
PVIP #031310-32

08-26-2025

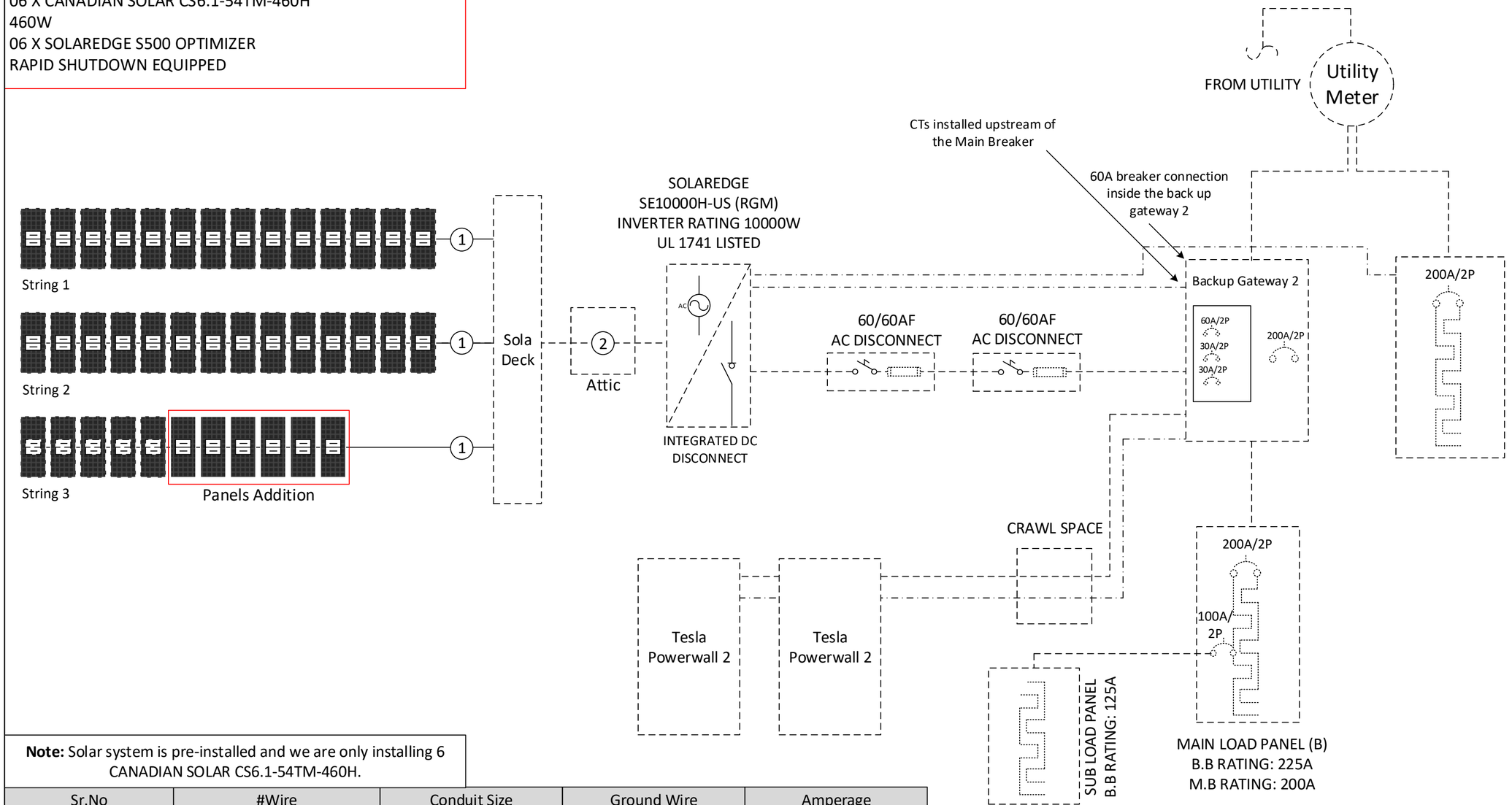
STRING CALCULATION

String #	No of Modules	Estimated Power	Imax	Impp	Voc	Vmpp
1,2	14	5,600W	23.4 Adc	15 Adc	14 Vdc	400 Vdc
3	11	4,760W	23.4 Adc	15 Adc	11 Vdc	400 Vdc

NEC Code (2020) and UL Standard Refrences

Rapid Shut Down	NEC 690.12 (A-D), UL1741	Grounding	NEC Article 250.30(A)
Disconnecting Means	NEC 690.13	Conduit Fill	NEC Table C.9, 310.15(B)(3)(a)
Feeder Sizing	NEC Table 310, 15(B)(16, 17)	Interconnection	NEC 705.12
Over current Protection	NEC 690.9		

New Addition System Details
06 X CANADIAN SOLAR CS6.1-54TM-460H
460W
06 X SOLAREDGE S500 OPTIMIZER
RAPID SHUTDOWN EQUIPPED



Note: Solar system is pre-installed and we are only installing 6 CANADIAN SOLAR CS6.1-54TM-460H.

Sr.No	#Wire	Conduit Size	Ground Wire	Amperage
1	2 x #10 PV		#10 Bare Cu	23.4
2	6 x #10 THHN Cu	3/4" LFMC	#10 Green	23.4

Existing System Details
- System Size: 13,200W DC
- (33) SOLARIA POWERXT 400R-PM
- (33) SOLAREDGE P401 OPTIMIZERS
- (01) SOLAREDGE SE11400H-US (RGM)
- Output: 47.5A max @ 240 VAC
- 11.4 kVA AC output max

- Grounding will be done via Pegasus grounding lugs and mid-clamps to ensure the rail and panels are continuously grounded.
- Rapid Shutdown is included in the micro inverter , refer to Mid Circuit Interrupter and Inverter attached datasheets.
- The load center/disconnect will be visible, lockable, accessible to utility linesmen, and properly labeled per NEC requirements. It will be located on the exterior wall next to the utility meter.
- Prepare cable in usual manner.
- Stretch tape and apply half-lapped to form void-free joint. Degree of stretch is not critical and may vary in different sections of joint to accomplish void-free application.
- Protect the joint with two half-lapped layers of any scotch vinyl plastic electrical tape.

New System Details
- System Size: 15,960W DC
- (06) Canadian Solar CS6.1-54TM-460H New Panels Addition
- (06) SOLAREDGE S500 OPTIMIZER New Optimizers Addition
- (33) SOLARIA POWERXT 400R-PM
- (33) SOLAREDGE P401 OPTIMIZERS
- (01) SOLAREDGE SE11400H-US (RGM)
- Output: 47.5A max @ 240 VAC
- 11.4 kVA AC output max

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Electrical One Line Diagram

JOB NUMBER:

25-584-KG

Date:	Revision:
08/19/2025	A

Sheet Size:	Sheet Number:
ANSI C 17" X 22"	PV4

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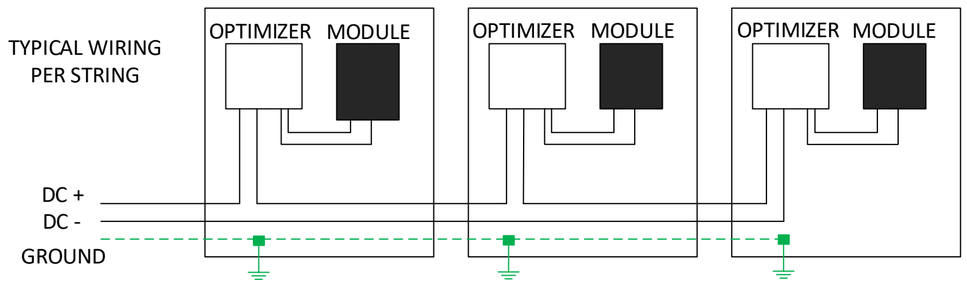
08-26-2025



Line 1	
Line 2	
Neutral	
Ground	

Note: The arrow on the 225A CTs should face the grid.
Note: Dip switch settings are factory set to address 1
Note: Accepted Breakers for Gateway: Eaton CSR or BW (100-200A)
Note: Loads more than 176A LRA will be non-backed up by Tesla and will be managed manually.

Note: The arrow on the Backup Gateway 2 CTs should face the grid.
Note: Backup Gateway 2 CT-1 should be installed on Line 1.

Note: Fault current is smaller than 10kAIC
Note: There will be partial consumption.
Note: Solar system is pre-installed and we are only installing 6 new solar panels.

DIP SWITCH CONFIGURATION

■	0	OFF
□	1	ON

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Sheet Name:

Detailed Electrical Diagram

JOB NUMBER:

25-584-KG

Date:	**Revision:**
08/19/2025	A
Sheet Size: ANSI C 17" X 22"	**Sheet Number:** PV5

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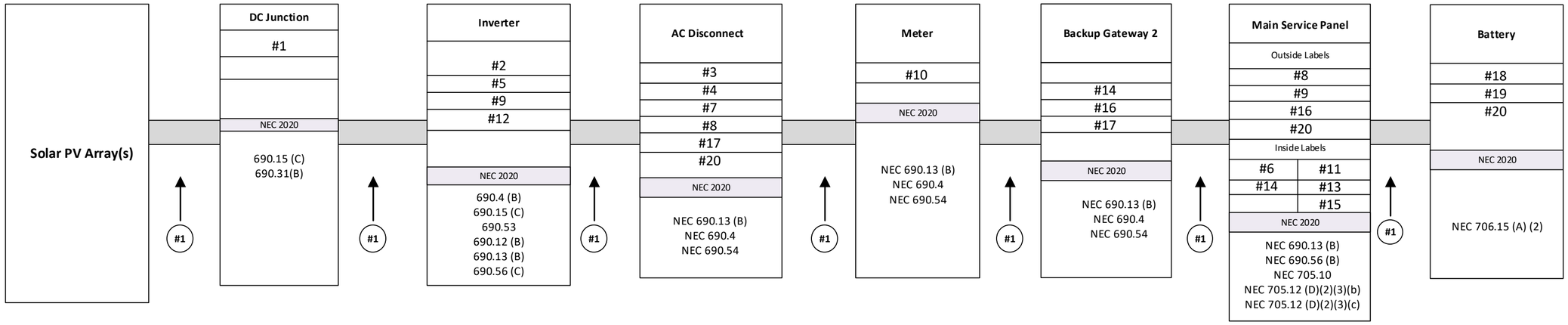
08-26-2025



LABELING AND WARNING SIGNS: NEC 2020

A. PURPOSE
PROVIDE EMERGENCY RESPONDERS WITH APPROPRIATE WARNING AND GUIDANCE WITH RESPECT TO ISOLATING THE SOLAR ELECTRIC SYSTEM. THIS CAN FACILITATE IDENTIFYING ENERGIZED ELECTRICAL LINES THAT CONNECT THE SOLAR PANELS TO THE INVERTER, AS SHOULD NOT BE CUT WHEN VENTING FOR SMOKE REMOVAL.

B. MAIN SERVICE DISCONNECT:

1. RESIDENTIAL BUILDINGS- THE MARKING MAY BE PLACED WITHIN THE MAIN SERVICE DISCONNECT. THE MARKING SHALL BE PLACED ON THE OUTSIDE COVER IF THE MAIN SERVICE DISCONNECT IS OPERABLE WITH THE SERVICE PANEL CLOSED.

2. COMMERCIAL BUILDINGS- THE MARKINGS SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECTCLEARLY VISIBLE FROM THE LOCATION WHERE THE LEVER IS OPERATED

3. MARKINGS, VERBIAGE, FORMAT AND TYPE OF MATERIAL

a. VERBIAGE: CAUTION; SOLAR ELECTRIC SYSTEM CONNECTED
b. FORMAT:

(1) WHITE LETTERING ON A RED BACKGROUND
(2) MINIMUM 3/8 INCH LETTER HEIGHT
(3) ALL LETTERS SHALL BE CAPITALIZED
(4) ARIAL OR SIMILAR FONT, NON-BOLD

c. MATERIAL:

(1) REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (USE UL-969) AS STANDARD FOR WEATHER RATING): DURABLE ADHESIVE MATERIALS MEET THIS REQUIREMENT.

C. MARKING REQUIREMENTS ON DC CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, DC COMBINERS AND JUNCTION BOXES;

1. MARKING: PLACEMENT, VERBIAGE, FORMAT AND TYPE OF MATERIAL.

a. PLACEMENT: MARKINGS SHALL BE PLACED EVERY 10 (TEN) FEET ON ALL INTERIOR AND EXTERIOR DC CONDUITS, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES, AT TURNS ABOVE AND/OR BELOW PENETRATIONS, ALL DC COMBINERS AND JUNCTION BOXES.
b. VERBIAGE: CAUTION SOLAR CIRCUIT
c. THE FORMAT AND TYPE OF MATERIAL SHALL ADHERE TO SECTION B-3.B & C ABOVE

D. INVERTERS ARE NOT REQUIRED TO HAVE CAUTION MARKINGS

#1
WARNING:PHOTOVOLATIC POWER SOURCE

#2
PHOTOVOLATIC
DC DISCONNECT

#3
PHOTOVOLATIC
AC DISCONNECT

#4
RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

#5
MAXIMUM VOLTAGE 400Vdc
MAX. RATED CIRCUIT CURRENT 23.4Adc
OF THE CHARGE CONTOLLER OR DC-TO-DC CONVERTER (IF INSTALLED)

#6
PHOTOVOLTIVC POWER SOURCE
OPERATING AC VOLTAGE 240 V
MAXIMUN OPERATING AC OUTPUT CURRENT 47.5 A

#7
AC DISCONNECT
PHOTOVOLTAIC SYSTEM POWER SOURCE
RATED AC OUTPUT CURRENT 47.5 AMPS
NOMINAL OPERATING AC VOLTAGE 240 VOLTS

#8
WARNING
ELECTRIC SHOCK HAZARD
TERMINAL ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

#9
WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

#10
WARNING
THREE POWER SOURCES
SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRIC SYSTEM

#11
WARNING
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

#12
WARNING
BIPOLAR PHOTOVOLTAIC ARRAY
DISCONNECT OF NEUTRAL GROUNDED CONDUCTORS MAY RESULT IN OVERVOLTAGE ON ARRAY OR INVERTER

#13
WARNING
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

#14
WARNING
SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFEED

#15
SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

#16
SOLAR AC DISCONNECT LOCATED AT WEST SIDE WALL OF THE HOUSE BESIDE THE UTILITY METER

#17
SERIVCE DISCONNECT LOCATED IN THE BACKUP GATEWAY2 PANEL

#18
BATTERY

#19
MAIN BATTERY SYSTEM DISCONNECT

#20
BATTERY DISCONNECT LOCATED IN THE BACKUP GATEWAY 2 PANEL

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Sheet Name:

PV Labels

JOB NUMBER:

25-584-KG

Date:	**Revision:**
08/19/2025	A
Sheet Size: ANSI C 17" X 22"	**Sheet Number:** PV6

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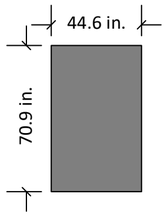
PVIP #031310-32

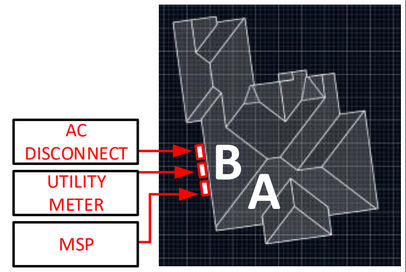
NORTH CAROLINA PROFESSIONAL SEAL 043529 ENGINEER USMAN NOOR
08-26-2025

ROOF DESCRIPTION			
ROOF	PITCH	AZIMUTH	NO. OF MODULES
A	45°	174°	28
B	45°	262°	11

MODULE DIMENSIONS

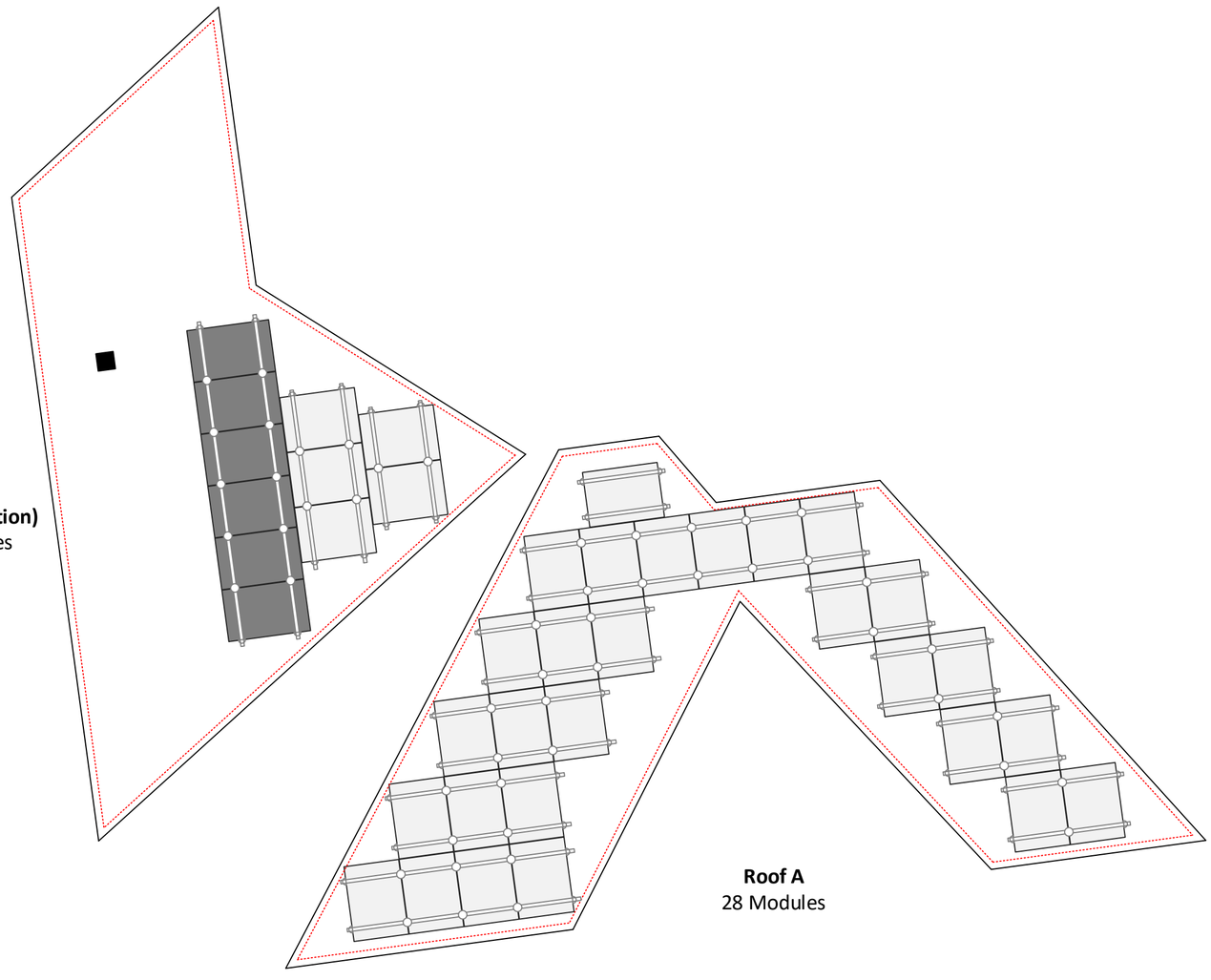


Rails and Splices : PSR-B84 (BLACK)	Roof Attachment: InstaFlash 2
Rafter Spacing : 16 in.	There is one layer of shingles Roofing material is asphalt shingles
Attachment Span: 5 ft. 4 in.	The roof is located in 120mph wind zone



	Pre – Installed PV Panels
	New PV Panels

PV LABELS		
Sr No	Code	Qty
01	02-314	12



6in setback from sides of the roof

RAILS AND MOUNTING SYSTEM

- 08 x PSR-B84: Pegasus Rail, Black, 84" (7 Feet)
- 06 x PSR-SPLS: Pegasus - Bonded, Structural Splice
- 10 x PSR-MCB: Pegasus - Multiclamp, Mid/End, 30 to 40 mm, Black
- 04 x PSR-HEC: Pegasus - Hidden End Clamp
- 06 x PSR-MLP: Pegasus - MLPE Mount
- 03 x PSR-LUG: Pegasus - Grounding Lug
- 15 x PSR-WMC: Pegasus - Wire Management Clip
- 01 x PSR-CBG: Pegasus - Cable Grip
- 04 x PSR-CAP: Pegasus - End Cap
- 15 x PIF2-BDT: InstaFlash2- Deck or Rafter Attach – With Dovetail T-Bolt
- 50 x PF-DRW85: Pegasus Fastener – Deck-Rafter 85mm
- 12 x Heyco Wire Clips
- 01 x GEOC GC66100: SEALANT 2300 10.3OZ CLEAR (20) GEOCEL 230 TRIPOLY CLEAR
- 05 x MULTI 32.0017P0001-UR: PV MC4 MALE (10) [1000]
- 05 x MULTI 32.0016P0001-UR: PV MC4 FEMALE (10) [1000]

SOLAR MODULES

- 06 x Canadian Solar CS6.1-54TM-460H (460W)

INVERTER & SUPPORTING ITEMS

- 06 x SOLED S500: SolarEdge Power Optimizer S500

BILL OF MATERIAL
SCALE: 1/8" - 1'

N

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Bill of Material

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Sheet Size:	Sheet Number:
ANSI C 17" X 22"	PV7

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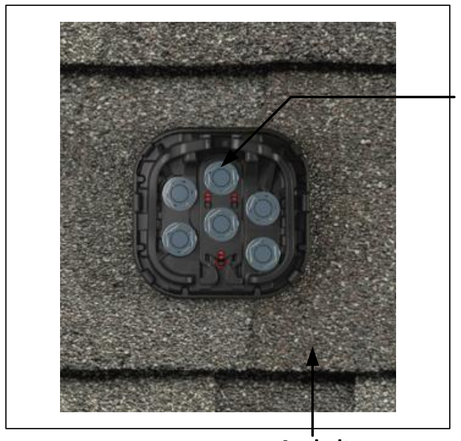
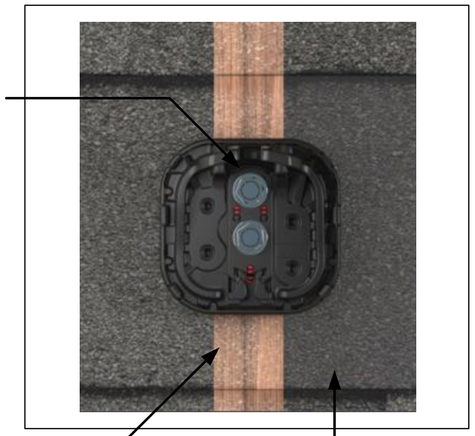
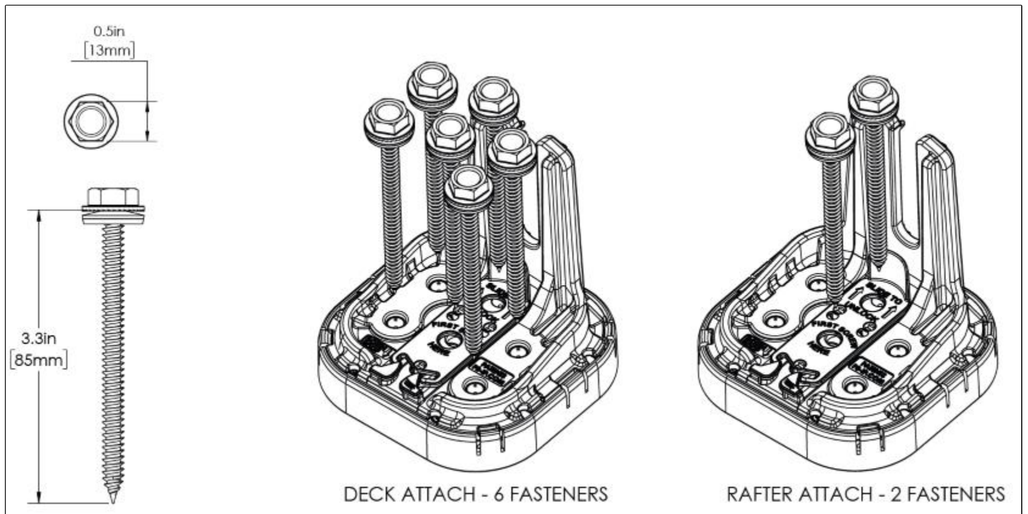
08-26-2025

Deck Attach – 6 Fasteners

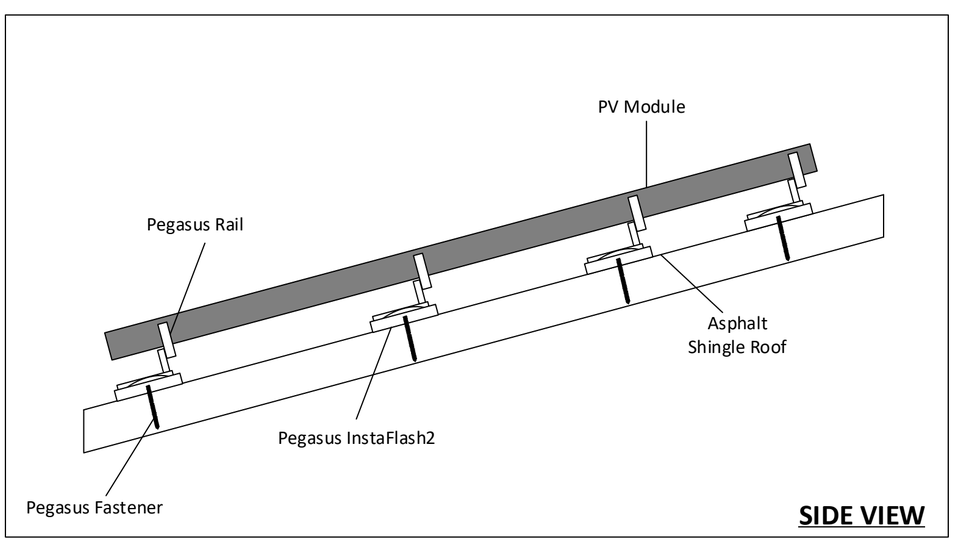


Rafter Attach – 2 Fasteners





					
Multi-Clamp	Hidden End Clamp	MLPE Mount	Dovetail T-Bolt	Ground Lug	Cable Grip
Torque Value 100 in-lbs.	Torque Value 135 in-lbs.	Torque Value 135 in-lbs.	Torque Value 300 in-lbs.	Torque Value 135 in-lbs.	Torque Value 135 in-lbs.



SIDE VIEW

PV Dead Load	
Roof A	**PV System Dead Load** **(Panel + Racking weight) / PV System Area** (28 panels x 48 lbs./panel + 223 ft. of racking x 1.17 lb.ft) / (28 panels x 5.393' x 3.95') = 2.59 psf
Roof B	**PV System Dead Load** **(Panel + Racking weight) / PV System Area** (11 panels x 48 lbs./panel + 40 ft. of racking x 1.17 lb.ft) / (11 panels x 5.393' x 3.95') = 2.63 psf

8MSOLAR
ADVANCING ENERGY INDEPENDENCE

5112 Departure Drive,
Raleigh NC 27616
O: 919.948.6474
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Customer Information:

Keith L Gallaher

3297 Raynor McLamb Rd.
Linden, NC 28356

Customer Signature:

Sheet Name:

Attachment Details

JOB NUMBER:

25-584-KG

Date:	**Revision:**
08/19/2025	A
Sheet Size:	**Sheet Number:**
ANSI C 17" X 22"	PV8

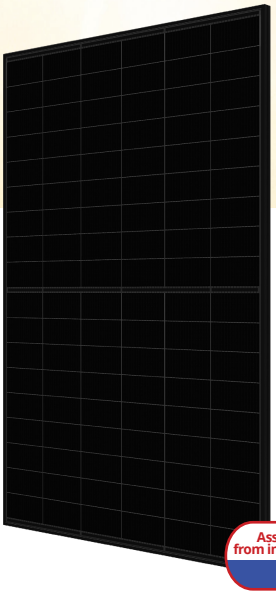
NABCEP CERTIFIED
PV Installation Professional
Ali Buttar
PVIP #031310-32

NORTH CAROLINA PROFESSIONAL SEAL 037529 ENGINEER USMAN NOOR

08-26-2025

NEW

CanadianSolar



Assembled in the US from imported components
USA

TOPHiKu6 (All-Black)

N-type TOPCon Technology

435 W ~ 465 W

CS6.1-54TM-435|440|445|450|455|460|465H

MORE POWER

465 W

Module power up to 465 W
Module efficiency up to 22.8 %

Excellent anti-LeTID & anti-PID performance.
Low power degradation, high energy yield

Lower temperature coefficient (Pmax): -0.29%/°C, increases energy yield in hot climate

Lower LCOE & system cost

MORE RELIABLE

Minimizes micro-crack impacts

Heavy snow load up to 8100 Pa, wind load up to 6000 Pa*

* For detailed information, please refer to the Installation Manual.

25 Years **Industry Leading Product Warranty on Materials and Workmanship***

30 Years **Linear Power Performance Warranty***

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety
IEC62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE / CGC
CEC listed (US California) / FSEC (US Florida)
UL 61730 / IEC 61701 / IEC 62716 / IEC 60068-2-68
UNI 9177 Reaction to Fire: Class 1

* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 23 years, it has successfully delivered over 150 GW of premium-quality solar modules across the world.

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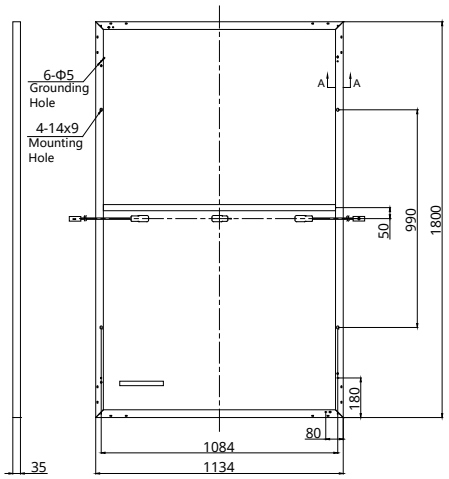
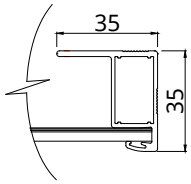
ENGINEERING DRAWING (mm)

Rear View

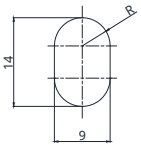


Frame Cross Section

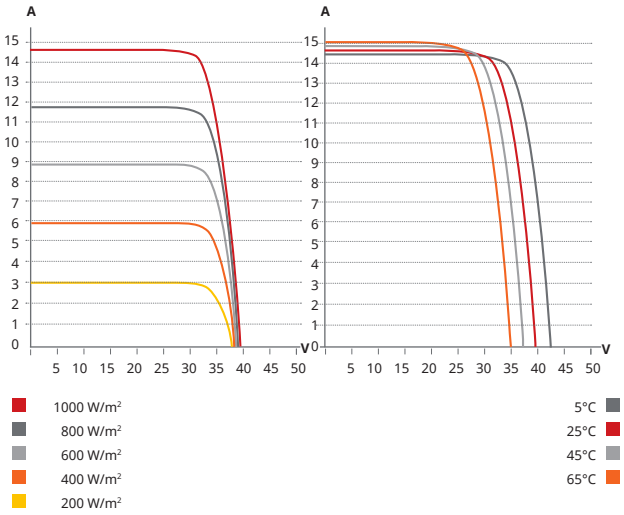
A - A



Mounting Hole



CS6.1-54TM-455H / I-V CURVES



ELECTRICAL DATA | STC*

CS6.1-54TM	435H	440H	445H	450H	455H	460H	465H
Nominal Max. Power (Pmax)	435 W	440 W	445 W	450 W	455 W	460 W	465 W
Opt. Operating Voltage (Vmp)	32.4 V	32.6 V	32.8 V	33.0 V	33.2 V	33.4 V	33.6 V
Opt. Operating Current (Imp)	13.45 A	13.52 A	13.59 A	13.66 A	13.72 A	13.78 A	13.85 A
Open Circuit Voltage (Voc)	38.3 V	38.5 V	38.7 V	38.9 V	39.1 V	39.3 V	39.5 V
Short Circuit Current (Isc)	14.33 A	14.41 A	14.48 A	14.55 A	14.61 A	14.69 A	14.77 A
Module Efficiency	21.3%	21.6%	21.8%	22.0%	22.3%	22.5%	22.8%
Operating Temperature	-40°C ~ +85°C						
Max. System Voltage	1000V (IEC/UL)						
Module Fire Performance	TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)						
Max. Series Fuse Rating	25 A						
Protection Class	Class II						
Power Tolerance	0 ~ + 10 W						

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m2, spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	TOPCon cells
Cell Arrangement	108 [2 X (9 X 6)]
Dimensions	1800 × 1134 × 35 mm (70.9 × 44.6 × 1.38 in)
Weight	23 kg (50.7 lbs)
Front Cover	3.2 mm tempered glass with anti-reflective coating
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC), 12 AWG (UL)
Connector	T6 or MC4 or MC4-EVO2 or MC4-EVO2A
Cable Length (Including Connector)	1500 mm (61.0 in) (+) / 1100 mm (43.3 in) (-)
Per Pallet	30 pieces
Per Container (40' HQ)	720 pieces

ELECTRICAL DATA | NMOT*

CS6.1-54TM	435H	440H	445H	450H	455H	460H	465H
Nominal Max. Power (Pmax)	328 W	332 W	335 W	339 W	343 W	347 W	351 W
Opt. Operating Voltage (Vmp)	30.5 V	30.7 V	30.9 V	31.1 V	31.3 V	31.5 V	31.7 V
Opt. Operating Current (Imp)	10.74 A	10.80 A	10.85 A	10.91 A	10.96 A	11.02 A	11.07 A
Open Circuit Voltage (Voc)	36.2 V	36.4 V	36.5 V	36.7 V	36.9 V	37.1 V	37.3 V
Short Circuit Current (Isc)	11.56 A	11.63 A	11.68 A	11.74 A	11.79 A	11.85 A	11.92 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.29 % / °C
Temperature Coefficient (Voc)	-0.25 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

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Power Optimizer

For North America

P370 / P400 / P401 / P485 / P505

POWER OPTIMIZER

PV power optimization at the module-level

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

solaredge

/ Power Optimizer

For North America

P370 / P400 / P401 / P485 / P505

Optimizer model (typical module compatibility)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P401 (for high power 60 and 72 cell modules)	P485 (for high-voltage modules)	P505 (for higher current modules)	
INPUT						
Rated Input DC Power[1]	370	400	430	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	60	80	60	125[2]	83[2]	Vdc
MPPT Operating Range	8 - 60	8 - 80	8-60	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11	10.1	12.5	11	14	Adc
Maximum DC Input Current	13.75	12.5	14.65	12.5	17.5	
Maximum Efficiency	99.5					%
Weighted Efficiency	98.8					%
Overvoltage Category	II					
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)						
Maximum Output Current	15					Adc
Maximum Output Voltage	60			80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)						
Safety Output Voltage per Power Optimizer	1 ± 0.1					Vdc
STANDARD COMPLIANCE						
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3					
Safety	IEC62109-1 (class II safety), UL1741, NEC/PVRSS					
Material	UL94 V-0 , UV Resistant					
RoHS	Yes					
INSTALLATION SPECIFICATIONS						
Maximum Allowed System Voltage	1000					Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters					
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4[3]			MC4[3]	MC4[3]	
Input Wire Length	0.16 / 0.5					m / ft
Output Wire Type / Connector	Double Insulated / MC4					
Output Wire Length	1.2 / 3.9					m / ft
Operating Temperature Range[4]	-40 to +85 / -40 to +185					˚C / ˚F
Protection Rating	IP68 / Type6B					
Relative Humidity	0 - 100					%

(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) NEC 2017 requires max input voltage be not more than 80V
(3) For other connector types please contact SolarEdge
(4) Longer inputs wire lengths are available for use. For 0.9m input wire length order P401-xxxLxxx
(5) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

PV System Design Using a SolarEdge Inverter[6][7]		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P370, P400, P401	8		10	18	
	P485, P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50	
Maximum Power per String		5700[8] (6000 with SE7600-US - SE11400-US)	5250[8]	6000[9]	12750[10]	W
Parallel Strings of Different Lengths 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 P485/P505 with P370/P400/P401 in one string
(8) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(9) For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W
(10) For 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W

Intertek RoHS