PV MATERIAL SUMMARY: DISTRIBUTOR

REC365NP2 BLACK	5
S440	5
XR-10-168B	2
XR-10-204B	2
XR10-BOSS-01-M1	2
UFO-CL-01-B1	14
UFO-STP-30MM-B1	8
XR-LUG-03-A1	2
QB DECK MOUNT 16317	24
GC66803 Geocel Sealant	2
SOLADECK 0799-5B	1

NOTICE TO CONTRACTOR
All construction must comply with current NC Building Codes and is subject to field inspection and verification.
APPROVED
Limited building only review.
Permit holder responsible for full compliance with the code
07/21/2023
Harnett COUNTY NORTH CAROLINA

NC SOLAR NOW

CLIENT INFO

FREDI O WATKINS
70 ASPEN LANE
LILLINGTON, NC 27546-9385

PROJECT INFO

DC INPUT:	10.225 kW
AC EXPORT:	7.600 kW
DOI INSPT. METHOD:	OPTION 2

Model Energy
300 Fayetteville St.
#1430
Raleigh, NC 27602
919-274-9905
ModelEnergy.com
P-1194

NORTH CAROLINA PROFESSIONAL SEAL 035699 ENGINEER ANDREW W. KING 7/12/23

CODE REFERENCES

NATION ELECTRICAL CODE v. 2017
NC FIRE PROTECTION CODE v. 2018
NC BUILDING CODE v. 2018
NC RESIDENTIAL CODE v. 2018
ACSE v. 7-10

SITE CONDITIONS

WIND SPEED:	117 MPH
RISK CATEGORY:	II
EXPOSURE:	B
SNOW:	15 PSF

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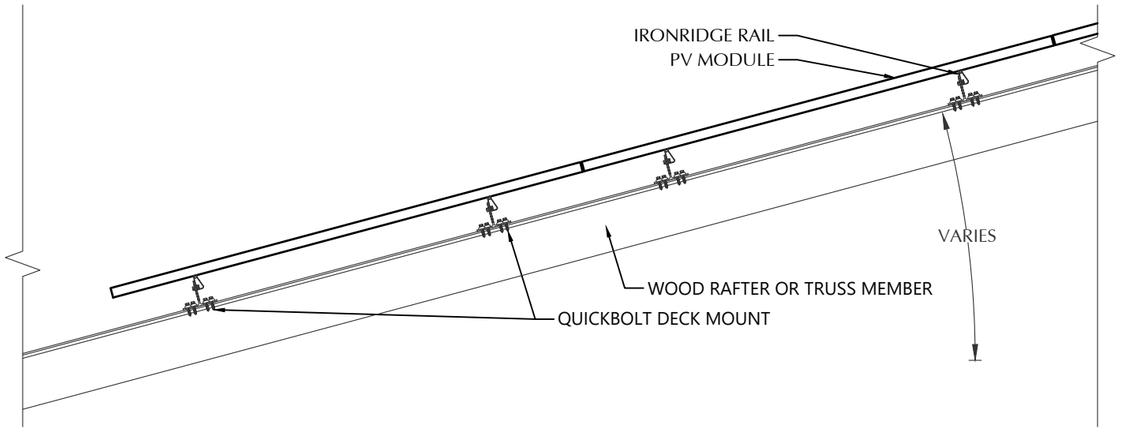
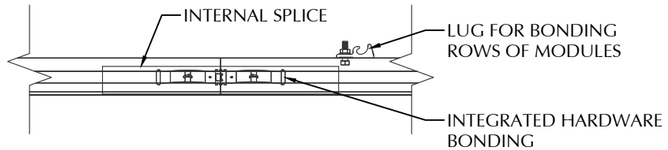
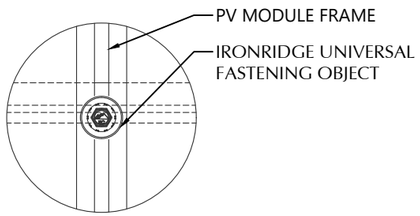
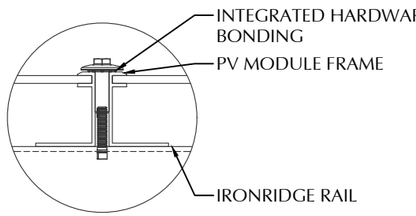
PV SYSTEM COVER PAGE

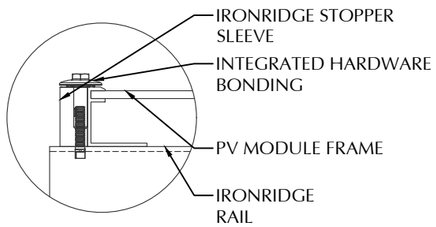
PV-1.1

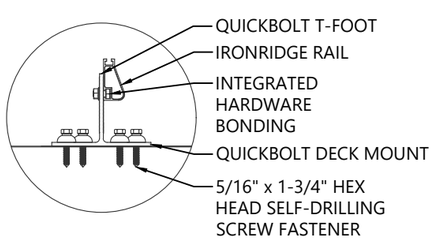




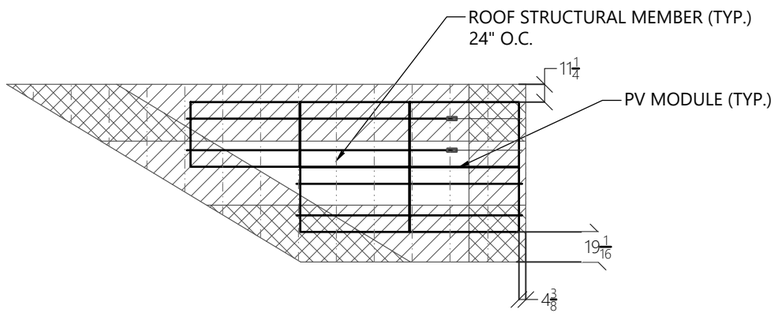








1 ROOF FASTENER DETAIL
NOT TO SCALE



2 ROOF A ARRAY LAYOUT
1/8" = 1'-0"

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

NAME: ANDREW W. KING, PE

SIGNED:

PV MODULES

MAKE	REC
MODEL	REC365NP2 BLACK
WIDTH	40.94 IN
LENGTH	69.10 IN
THICKNESS	30 MM
WEIGHT	44.00 LBS.
ARRAY AREA	98 SQFT.
ARRAY WEIGHT	246 LBS.

ROOF SUMMARY

STRUCTURE:	
TYPE	TRUSSES
MATERIAL	SOUTHERN PINE #2
SIZE	2 X 4
SPACING	24 IN O.C.
ALLOWABLE SPAN	88 IN
PITCH	4/12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	COMPOSITE
THICKNESS	7/16 IN
WEIGHT	1.60 LBS/SQFT
ROOFING:	
TYPE	ASPHALT SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.30 LBS./SQFT.

ROOF MOUNT SUMMARY

MAXIMUM (IN)	MOUNT SPACING	RAIL OVERHANG
WIND ZONE 1	72 IN	19 IN
WIND ZONE 2	39 IN	16 IN
WIND ZONE 3	24 IN	10 IN

ROOF LOADING

GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD	20 LBS./SQFT.
DEAD LOAD	
ROOFING	3.9 LBS/SQFT.
PV ARRAY	2.5 LBS./SQFT.
TOTAL	6.4 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-23.0 LBS./SQFT.
UPLIFT ZONE 2	-38.0 LBS./SQFT.
UPLIFT ZONE 3	-57.1 LBS./SQFT.
DOWNWARD	13.6 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-235 LBS.
UPLIFT ZONE 2	-210 LBS.
UPLIFT ZONE 3	-194 LBS.
DOWNWARD	139 LBS.

ROOF MOUNT & FASTENER

ROOF MOUNT:	
MAKE	QUICKBOLT
MODEL	QB DECK MOUNT 16317
MATERIAL	STAINLESS / EPDM
FASTENER:	
MAKE	QUICK SCREWS
MODEL	HEX LAG PN# 16318
MATERIAL	304 SS
SIZE	5/16" X 1-3/4"
GENERAL:	
WEIGHT	0.88 LBS.
FASTENERS PER MOUNT	4
MAX. PULL-OUT FORCE	705.0 LBS.
SAFETY FACTOR	3
DESIGN PULL-OUT FORCE	235.0 LBS.

MOUNTING RAILS

MAKE	IRONRIDGE
MODEL	XR10
MATERIAL	ALUMINUM
WEIGHT	0.425 LBS/IN
SPACING	20 IN

NC SOLAR NOW

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PV SYSTEM STRUCTURAL

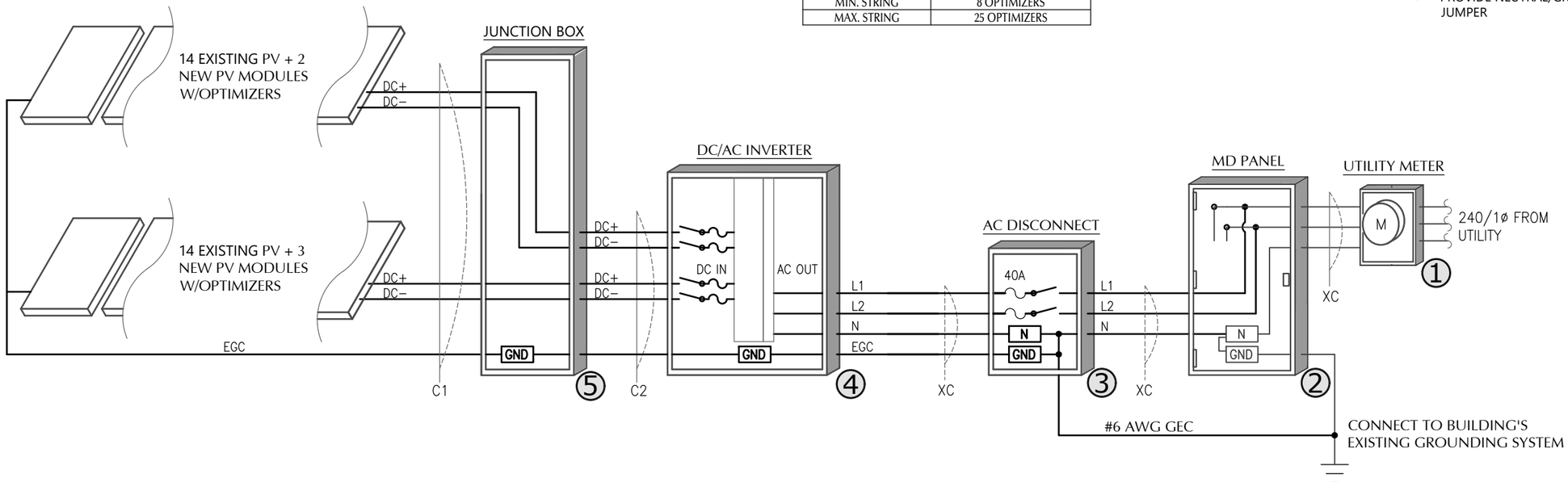
PV-2.1

CONDUCTOR SCHEDULE

TAG	CURRENT CARRYING CONDUCTORS			GROUNDING CONDUCTORS			CONDUIT/RACEWAY			NOTES
	QTY.	SIZE	INSULATION	QTY.	SIZE	INSULATION	QTY.	SIZE	LOCATION	
C1	4	10 AWG	PV WIRE	1	6 AWG	BARE	-	-	FREE AIR	1
C2	4	10 AWG	THWN	1	10 AWG	THWN	1	3/4"	EXT/INT	2,4
XC	-	-	-	-	-	-	-	-	-	3

NOTES:

1. MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
2. CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
3. EXISTING CONDUCTORS, FIELD VERIFY
4. EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR



1 ELECTRICAL SCHEMATIC
NTS

PV MODULE (NEW)

MAKE	REC
MODEL	REC365NP2 BLACK
NOM. POWER (PNOM)	365 WATTS
NOM. VOLT. (VMPP)	34.3 VOLTS
O.C. VOLT (VOC)	40.9 VOLTS
MAX. SYS. VOLT.	1000 VOLTS
NOM. CURR. (IMPP)	10.7 AMPS
S.C. CURR. (ISC)	11.4 AMPS
TEMP. COEF. (PMPP)	-0.34 %/C
TEMP. COEF. (Voc)	-0.26 %/C
MAX SERIES FUSE	25 AMPS
UL COMPLIANT (Y/N)	YES

PV MODULES (EXISTING)

MAKE	HELIENE
MODEL	60M-HBLK 300
TECHNOLOGY	MONO-CRYST.
NOM. POWER (PNOM)	300 WATTS
NOM. VOLT. (VMP)	33.139 VOLTS
O.C. VOLT. (VOC)	39.83 VOLTS
MAX. SYS. VOLT.	1500 V (UL)
TEMP. COEF. (VOC)	-0.31 %/°C
NOM. CURR. (IMP)	9.127 AMPS
S.C. CURR. (ISC)	9.59 AMPS
MAX. SERIES FUSE	15 AMPS

MODULE OPTIMIZER (EXISTING)

MAKE	SOLAREDGE
MODEL	P300
DC INPUT:	
NOM. POWER	300 WATTS
VOLT. RANGE	8-48
MAX. CURR.	10 AMPS
DC OUTPUT:	
NOM. POWER	300 WATTS
MAX. VOLT.	60 VOLTS
MAX. CURR.	15 AMPS
MIN. STRING	8 OPTIMIZERS
MAX. STRING	25 OPTIMIZERS

MODULE OPTIMIZER (NEW)

MAKE	SOLAREDGE
MODEL	S440
DC INPUT:	
NOM. POWER	440 WATTS
VOLT. RANGE	8 to 60
MAX. CURR.	14.5 AMPS
DC OUTPUT:	
NOM. POWER	440 WATTS
MAX. VOLT.	60 VOLTS
MAX. CURR.	15 AMPS
MIN-MAX STRING	8-25 OPTIMIZERS
UL LIST. (Y/N)	YES

JUNCTION BOX (EXISTING+NEW)

MAKE	SOLADECK
PROTECT. RATING	NEMA TYPE 3R
UL LIST. (Y/N)	YES

MD PANEL (EXISTING)

MAKE	GENERIC
MODEL	NA
ENCL. RATING	NEMA 3R
VOLT. RATING	240
BUS RATING	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	NO
MAIN BREAKER RATING	N/A

- EACH BREAKER SERVES AS SERVICE DISCONNECT

DC / AC INVERTER (EXISTING)

MAKE	SOLAREDGE
MODEL	SE7600A-USS
DC INPUT:	
MAX POWER	10250 WATTS
VOLT. RANGE	350-500
NOM. VOLT.	350 VOLTS
MAX. CURRENT	23 AMPS
STRING INPUTS	2 STRINGS
AC OUTPUT:	
MAX. POWER	8350 WATTS
NOM. POWER	7600 WATTS
NOM. VOLT.	240 VOLTS
MAX. CURR.	32 AMPS
DC DISC. (Y/N)	YES
RAPID SHUTDOWN (Y/N)	YES
PROTECT. RATING	NEMA TYPE 3R
UL LIST. (Y/N)	YES
CONSUMPTION MONITOR	No

AC DISCONNECT (EXISTING)

MAKE	GENERIC
MODEL	NA
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
AMP RATING	60 AMPS
UL LIST. (Y/N)	YES
FUSED (Y/N)	YES
FUSE RATING	40 A

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION
- INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILY ACCESSIBLE TO UTILITY COMPANY PERSONNEL AT ALL TIMES
- SERVICE RATED
- PROVIDE NEUTRAL/GROUND BONDING JUMPER

NC SOLAR NOW

CLIENT INFO

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70 ASPEN LANE
LILLINGTON, NC 27546-9385

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SITE CONDITIONS

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PV SYSTEM ELECTRICAL

PV-3.1

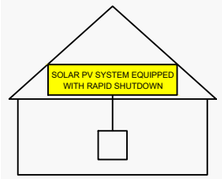
WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

①
②

NEC 705.12 (B)(3)
PLACE ON ALL EQUIPMENT THAT IS SUPPLIED BY BOTH POWER SOURCES

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



②

NEC 690.56 (C)(1)(a)
PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

③

NEC 690.56 (C)(3)
PLACE ON RAPID SHUTDOWN SWITCH OR EQUIPMENT WITH INTEGRATED RAPID SHUTDOWN *REFLECTIVE*

DIRECT CURRENT
PHOTOVOLTAIC POWER SOURCE
MAXIMUM VOLTAGE 600 VDC
MAX CIRCUIT CURRENT 30.0 AMPS

④

NEC 690.53
PLACE ON ALL DC DISCONNECTING MEANS

PV SYSTEM DISCONNECT

③

NEC 690.13 (B)
PLACE ON PV SYSTEM DISCONNECTING MEANS.

SERVICE DISCONNECT LOCATED:
EXTERIOR NW SIDE OF RESIDENCE

PV DISCONNECT LOCATED:
EXTERIOR NW SIDE OF RESIDENCE

②③④

NEC 705.10
PLACE AT SERVICE EQUIPMENT AND PV SYSTEM DISCONNECTING MEANS. FIELD VERIFY EQUIPMENT LOCATIONS AND LABEL ACCORDINGLY.

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

④

NEC 690.13 (B)
PLACE ON PV SYSTEM DISCONNECTING MEANS.

PHOTOVOLTAIC POWER SOURCE
OPERATING AC VOLTAGE 240 V
MAXIMUM OPERATING AC OUTPUT CURRENT 32.00 A

③

NEC 690.54
PLACE ON INTERCONNECTION DISCONNECTING MEANS

WARNING: PHOTOVOLTAIC POWER SOURCE

⑤

NEC 690.31 (G)(3)&(4)
PLACE ON ALL JUNCTION BOXES, EXPOSED RACEWAYS, AND OTHER WIRING METHODS EVERY 10' AND ON EVERY SECTION SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

DC DISCONNECT

④

NEC 690.13 (B)
PLACE ON INVERTER

LABEL NOTES

1. LABELS SHOWN ARE HALF THEIR ACTUAL REQUIRED SIZE.
2. LABEL MATERIAL SHALL BE SUITABLE FOR THE EQUIPMENT ENVIRONMENT.
3. DC CONDUIT SHALL BE MARKED WITH REQUIRED LABEL EVERY 10 FEET.
4. LABELS WILL BE APPLIED IN ACCORDANCE WITH THE NEC. SOME LABELS MAY NOT BE NECESSARY.

DC WIRING NOTES

1. CONDUCTORS SHALL BE COPPER, RATED AT NOT LESS THAN 600 VOLTS FOR RESIDENTIAL CONSTRUCTION AND NOT LESS THAN 1000 VOLTS FOR COMMERCIAL CONSTRUCTION.
2. MINIMUM SIZE SHALL BE #10 AWG UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. EXPOSED WIRING CONDUCTOR INSULATION SHALL BE TYPE PV WIRE, USE-2, OR RHW-2 WHERE THE OUTER LAYER OF THE INSULATION IS UV, SUNLIGHT, AND MOISTURE RESISTANT.
6. EXTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THWN-2 AND INSTALLED IN ELECTRICAL METALLIC TUBING(EMT) OR RIGID POLYVINYL CHLORIDE CONDUIT(PVC). ALTERNATIVELY, METAL CLAD CABLE(MC) CAN BE USED AS WELL WHEN RATED FOR USE IN WET LOCATIONS.
7. INTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THHN-2 AND INSTALLED IN ELECTRICAL METALLIC TUBING(EMT), FLEXIBLE METAL CONDUIT(FMC), OR METAL CLAD CABLE(MC).
6. USE SCHEDULE 40 PVC OUTDOORS WHERE NOT SUBJECT TO PHYSICAL DAMAGE OR BELOW FLOOR SLAB. USE SCHEDULE 80 PVC OUTDOORS WHERE SUBJECT TO PHYSICAL DAMMAGE
7. MINIMUM CONDUIT SIZE TO BE 1/2".
8. WIRING METHODS TO CONFORM TO ARTICLES 330, 334, 348, 350, 352, 356, AND 358 OF THE 2017 NEC.

AC WIRING NOTES

1. CONDUCTORS SHALL BE COPPER RATED AT NOT LESS THAN 600 VOLTS.
2. MINIMUM SIZE SHALL BE #14 AWG UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. EXTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THWN AND INSTALLED IN ELECTRICAL METALLIC TUBING(EMT), RIGID POLYVINYL CHLORIDE CONDUIT(PVC), LIQUID-TIGHT FLEXIBLE METAL CONDUIT(LFMC), OR LIQUID-TIGHT FLEXIBLE NON-METALLIC CONDUIT(LFNC) . ALTERNATIVELY, METAL CLAD CABLE(MC) CAN BE USED AS WELL WHEN RATED FOR USE IN WET LOCATIONS.
4. INTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THHN AND INSTALLED IN ELECTRICAL METALLIC TUBING(EMT), FLEXIBLE METAL CONDUIT(FMC), METAL CLAD CABLE(MC), OR ROMEX.
5. USE SCHEDULE 40 PVC OUTDOORS WHERE NOT SUBJECT TO PHYSICAL DAMAGE OR BELOW FLOOR SLAB. USE SCHEDULE 80 PVC OUTDOORS WHERE SUBJECT TO PHYSICAL DAMMAGE
6. MINIMUM CONDUIT SIZE TO BE 1/2".
7. WIRING METHODS TO CONFORM TO ARTICLES 330, 334, 348, 350, 352, 356, AND 358 OF THE 2017 NEC.

CONSTRUCTION NOTES

1. ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH THE NEC, STATE, AND LOCAL APPLICABLE CODES.
2. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS.
3. ENSURE REQUIRED MAINTENANCE ACCESS AND CLEARANCES ARE MAINTAINED.
4. WIRES SHALL BE RATED AND LABELED "SUNLIGHT RESISTANT" WHERE EXPOSED TO AMBIENT CONDITIONS.
5. FUSES 0 - 600 AMPS SHALL BE UL CLASS "RK-1" LOW PEAK DUAL ELEMENT TIME DELAY WITH 200,000 AMPERE INTERRUPTING RATING AS MANUFACTURED BY BUSSMANN, UNLESS NOTED OTHERWISE.
6. ALL TERMINALS/LUGS SHALL BE 75° RATED. ALL TERMINALS, SPLICING CONNECTORS, LUGS, ETC SHALL BE IDENTIFIED FOR USE WITH THE MATERIAL (CU/AL) OF THE CONDUCTOR AND SHALL BE PROPERLY INSTALLED.
7. PROVIDE A PULLWIRE IN ALL EMPTY CONDUITS.
8. ALL PENETRATIONS THROUGH EXTERIOR ROOFS SHALL BE FLASHED IN A WATERPROOF MANNER.
9. ALL PENETRATIONS THROUGH ATTIC FIRE BARRIERS SHALL BE SEALED WITH FIRE-BARRIER SEALANT CAULK.
10. SUPPORT ALL CONDUIT AND EQUIPMENT IN ACCORDANCE W/ NEC. ANY SUSPENDED MATERIALS SHALL BE DIRECTLY SUPPORTED BY THE BUILDING STRUCTURE.
11. METAL CONDUIT COUPLINGS CAN BE COMPRESSION TYPE, THREADED, OR BE SET-SCREW TYPE. PLASTIC CONDUIT COUPLINGS TO BE SOCKET GLUED TYPE.
12. A COMPLETE GROUNDING SYSTEM SHALL BE PRESENT OR PROVIDED AND INSTALLED IN ACCORDANCE WITH ARTICLE 250 OF THE NEC, AND AS SHOWN ON THE DRAWINGS.
13. EACH ELECTRICAL APPLIANCE SHALL BE PROVIDED WITH A NAMEPLATE GIVING THE IDENTIFYING NAME AND THE RATING IN VOLTS AND AMPERES, OR VOLTS AND WATTS. IF THE APPLIANCE IS TO BE USED ON A SPECIFIC FREQUENCY OR FREQUENCIES, IT SHALL BE SO MARKED. WHERE MOTOR OVERLOAD PROTECTION EXTERNAL TO THE APPLIANCES IS REQUIRED, THE APPLIANCE SHALL BE SO MARKED.
14. WHERE APPLICABLE, GROUNDING ELECTRODE CONDUCTOR TO BE CONTINUOUS. GROUNDING CRIMPS TO BE IRREVERSIBLE.
15. PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED AND THAT VARIOUS DANGERS ARE PRESENT.
16. EACH PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT.
17. WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT.
18. A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED AT THE DC DISCONNECT MEANS.
19. A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
20. ALL MODULE GROUND CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC SECTION 690.4 (C)
21. A NORTH CAROLINA REGISTERED DESIGN PROFESSIONAL WILL BE REQUIRED TO SEAL THE STRUCTURAL DESIGN AT THE TIME OF PERMIT APPLICATION IF ANY OF THE FOLLOWING EXIST AND ARE ATTESTED TO BY THE APPLICANT:
    - I. THE WEIGHT OF THE PV SYSTEM EXCEEDS THREE (3) POUNDS PER SQUARE FOOT(PSF)
    - II. THE ROOF POSSESSES MORE THAN ONE (1) LAYER OF ASPHALT SHINGLES
    - III. THE ROOFING MATERIAL CONSISTS OF A TYPE OTHER THAN ASPHALT SHINGLES OR METAL
    - IV. THE ROOF IS LOCATED IN A 140 MPH OR GREATER WIND ZONE

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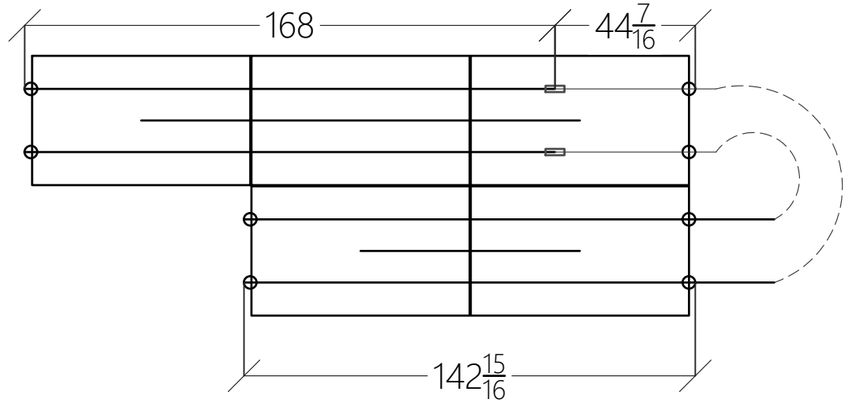
PV SYSTEM EQUIPMENT LABELS

PV-4.1



NOTE: ADD ONE ROW TO EACH EXISTING STRING OF PV MODULES

1 ARRAY LAYOUT DETAIL
NOT TO SCALE

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NC FIRE PROTECTION CODE v. 2018
NC BUILDING CODE v. 2018
NC RESIDENTIAL CODE v. 2018
ACSE v. 7-10

SITE CONDITIONS

WIND SPEED:	117 MPH
RISK CATEGORY:	II
EXPOSURE:	B
SNOW:	15 PSF

SHEET INDEX

VERSIONS

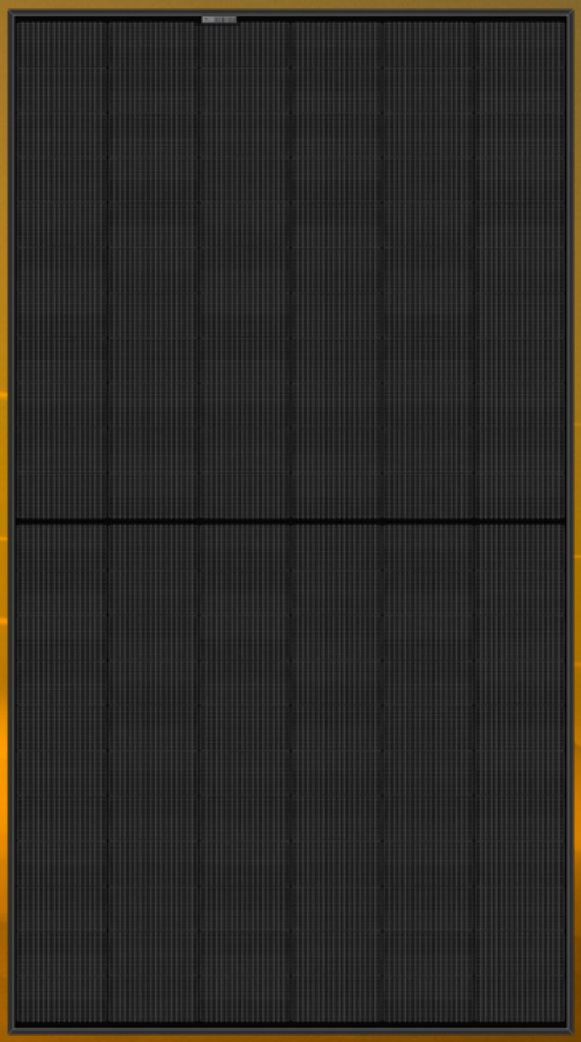
FOR:	DESIGNER	DATE
CONSTRUCTION	CRM	7/12/2023

PV SYSTEM INSTALL GUIDE

PV-5.1

SOLAR'S MOST TRUSTED

REC



REC ALPHα® PURE BLACK SERIES

PRODUCT SPECIFICATIONS

405 WP

20.3 W/FT²

PRODUCT REC 25 YEAR ProTrust WARRANTY PERFORMANCE LABOR

ELIGIBLE

LEAD-FREE

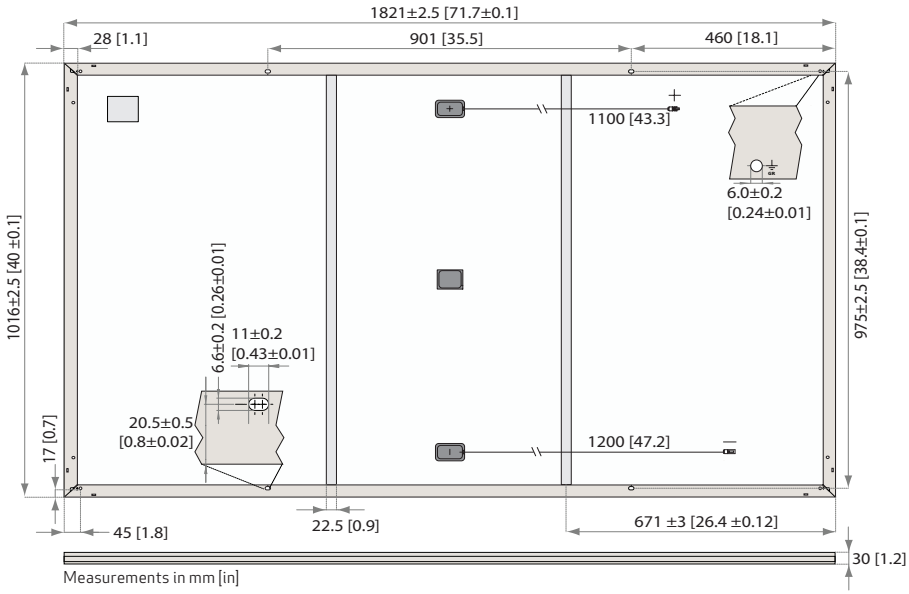
ROHS COMPLIANT

EXPERIENCE α PERFORMANCE

REC
SOLAR'S MOST TRUSTED

PRODUCT SPECIFICATIONS

REC ALPHA PURE BLACK SERIES > PRODUCT SPECIFICATIONS



Measurements in mm [in]

GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology 6 strings of 22 cells in series	Connectors:	Stäubli MC4 PV-KBT4/KST4, 12 AWG (4 mm²) in accordance with IEC 62852 IP68 only when connected
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12 AWG (4 mm²) PV wire, 43+47 in (1.1+1.2 m) accordance with EN 50618
Backsheet:	Highly resistant polymer (black)	Dimensions:	71.7 x 40 x 1.2 in (1821 x 1016 x 30 mm)
Frame:	Anodized aluminum (black)	Weight:	45 lbs (20.5 kg)
Junction box:	3-part, 3 bypass diodes, IP68 rated in accordance with IEC 62790	Origin:	Made in Singapore

ELECTRICAL DATA

	Product Code*: RECxxxAA Pure Black				
STC					
Power Output - P_{MAX} (Wp)	385	390	395	400	405
Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - V_{MPP} (V)	41.2	41.5	41.8	42.1	42.4
Nominal Power Current - I_{MPP} (A)	9.35	9.40	9.45	9.51	9.56
Open Circuit Voltage - V_{OC} (V)	48.5	48.6	48.7	48.8	48.9
Short Circuit Current - I_{SC} (A)	10.10	10.15	10.20	10.25	10.30
Power Density (W/sq ft)	19.3	19.6	19.8	20.1	20.3
Panel Efficiency (%)	20.8	21.1	21.3	21.6	21.9
NMOT					
Power Output - P_{MAX} (Wp)	293	297	301	305	309
Nominal Power Voltage - V_{MPP} (V)	38.8	39.1	39.4	39.7	40.0
Nominal Power Current - I_{MPP} (A)	7.55	7.59	7.63	7.68	7.72
Open Circuit Voltage - V_{OC} (V)	45.7	45.8	45.9	46.0	46.1
Short Circuit Current - I_{SC} (A)	8.16	8.20	8.24	8.28	8.32

Values at standard test conditions (STC: air mass AM 1.5, irradiance 10.75 W/sq ft (1000 W/m²), temperature 77°F (25°C), based on a production spread with a tolerance of P_{MAX}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM 1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s). * Where xxx indicates the nominal power class (P_{MAX}) at STC above.

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 61730 (Pending)

ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007, IEC 62941

WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Solar Professional	No	Yes	Yes
System Size	All	≤25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply

MAXIMUM RATINGS

Operational temperature:	-40 ... +185°F (-40 ... +85°C)
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (146 lbs/sq ft)*
Maximum test load (rear):	-4000 Pa (83.5 lbs/sq ft)*
Max series fuse rating:	25 A
Max reverse current:	25 A

* See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

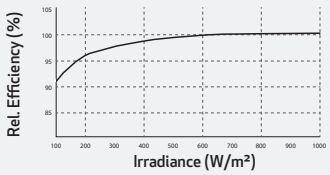
TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P_{MAX}:	-0.26 %/°C
Temperature coefficient of V_{OC}:	-0.24 %/°C
Temperature coefficient of I_{SC}:	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:



Specifications subject to change without notice.

Ref: PM-DS-12-01-Rev- A 03.21

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.

REC
www.recgroup.com

Power Optimizer

For North America

S440 / S500 / S500B

POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

/ Power Optimizer

For North America

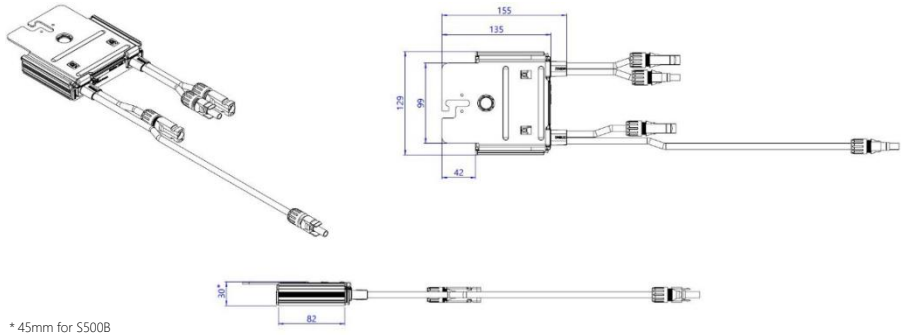
S440 / S500 / S500B

	S440	S500	S500B	
INPUT				
Rated Input DC Power(1)	440	500		W
Absolute Maximum Input Voltage (Voc)	60		125	Vdc
MPPT Operating Range	8 – 60		12.5 – 105	Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15		Adc
Maximum Efficiency	99.5			%
Weighted Efficiency	98.6			%
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 INVERTER OFF)				
Safety Output Voltage per Power Optimizer	1 ± 0.1			Vdc
STANDARD COMPLIANCE				
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020			
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3			
Safety	IEC62109-1 (class II safety), UL1741			
Material	UL94 V-0, UV Resistant			
RoHS	Yes			
Fire Safety	VDE-AR-E 2100-712:2013-05			
INSTALLATION SPECIFICATIONS				
Maximum Allowed System Voltage	1000			Vdc
Dimensions (W x L x H)	129 x 155 x 30 / 5.07 x 6.02 x 1.18		129 x 155 x 45 / 5.07 x 6.10 x 1.77	mm / in
Weight	720 / 1.6		790 / 1.74	gr / lb
Input Connector	MC4(2)			
Input Wire Length	0.1 / 0.32			m / ft
Output Connector	MC4			
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32			m / ft
Operating Temperature Range(3)	-40 to +85			˚C
Protection Rating	IP68 / NEMA6P			
Relative Humidity	0 – 100			%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
(2) For other connector types please contact SolarEdge.
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to the Power Optimizers Temperature De-Rating Technical Note for more details.

PV System Design Using a SolarEdge Inverter		SolarEdge Home Wave - Single Phase	Three Phase for 208V Grid	Three Phase for277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	10	18	
	S500B	6	8	14	
Maximum String Length (Power Optimizers)		25		50(4)	
Maximum Nominal Power per String		5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connected Power per String(5) (Permitted only when the difference in connected power between strings is 1,000W or less)		Refer to footnote 5	One string 7200	15000	W
			Two strings or more 7800		
Parallel Strings of Different Lengths or Orientations		Yes			

(4) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.
(5) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to the Single String Design Guidelines Application Note for more details.
(6) It is not allowed to mix S-series and P-series Power Optimizers in new installations.



* 45mm for S500B

Intertek RoHS

Representative Image

Catalog No. TG3222R

Description: 60A 2P GD N3R 240V FUSIBLE SW

UPC No 783164008500

Products > Switches & Disconnects > Disconnect & Safety Switches > Safety Switches > General Duty

- Designed for residential and light commercial applications where duty is not severe.
- Listed to UL standard 98 enclosed and dead front switches.
- Suitable for use as service equipment when installed in accordance with the National Electrical Code.
- Certified to CSA standard 22.2 no. 4-04 enclosed and dead front switches.
- Meets or exceeds NEMA KS1 standard for enclosed switches - type GD.
- Fusible and non-fusible switches available (consult BuyLog for interrupt ratings).
- Quick-make, quick-break mechanism (30-200 amp).
- 60/75°C conductor rating.

Descriptors

Category	General Duty

Specifications

Amperage	60 A
Poles	2
Wires	3
Fusing	Fusible
Enclosure	NEMA 3R (Outdoor)
Wire Range (Cu/Al)	12-2
240 Vac, NEC Std, 1-ph	3.0 hp
240 Vac, Time Delay, 1-ph	10.0 hp
250 Vdc	10.0 hp
GSA Compliance	Yes

Classifications

CSA Certified	Yes

Dimensions

Height	13.7 in
Depth	3.9 in
Width	8.4 in
Weight	11.0 lb

Publications

Title	Publication No.	Publication Type
General Duty Safety Switches: 30-600 Amp, 240 Vac 1 page. For residential and light commercial applications.	DEE-576	Brochures
60A - Safety Switches 1 page outline drawing in .pdf format.	10103091-SH103	Drawings-Outline and Dimensional

Additional Documentation: Visit our Publication Library to find technical documentation, time current curves, CSI Specifications and promotional literature.

SOLADECK
FLASHED PV ROOF-MOUNT
COMBINER/ENCLOSURES

Installation manual for models 0799 Series and 0766-41AD

Table of Contents

2nd Edition – October 2017

RSTC Enterprises, Inc.
2214 Heimstead Road
Eau Claire, WI 54703
866-367-7782

www.soladeck.com

Read the entire installation manual before installing a SolaDeck

WARNING! *STOP*

DO NOT WORK ON ROOF IF SURFACE IS WET, FROSTED, ICE OR SNOW COVERED.
USE LADDERS SAFELY
USE HAND & EYE PROTECTION WHEN WORKING WITH POWER TOOLS
USE EXTREME CAUTION TO AVOID CONTACT WITH POWER LINES. CONTACT WITH POWER LINES, ELECTRIC LIGHTS OR POWER CIRCUITS MAY BE FATAL

Installation of this product should be attempted only by individuals skilled in the use of the tools and equipment necessary for installation. Protect you and all persons and property during installation. If you have any doubt concerning your competence or expertise, consult a qualified expert to perform the installation.
R.S.T.C. Enterprises Incorporated assumes no responsibility for the failure of an architect, contractor, installer, or building owner to comply with all applicable laws, building codes and requirements, and adequate safety precautions.

ATTENTION! *STOP*

NE FONCTIONNE PAS SUR LE TOIT Si la surface est mouillée, dépolie, la glace ou couvert de neige.
Utiliser les échelles TOUTE SÉCURITÉ
UTILISATION DES MAINS ET DES LUNETTES DE PROTECTION LORS DE TRAVAILLER AVEC LES OUTILS DE PUISSANCE. UTILISATION EXTRÊME PRUDENCE POUR ÉVITER LE CONTACT AVEC DES LIGNES DE PUISSANCE. CONTACT AVEC DES LIGNES DE PUISSANCE, lumières électriques circuits électriques ou PEUT ÊTRE MORTEL

L'installation de ce produit devrait être tentée que par des personnes formées à l'utilisation des outils et équipements nécessaires pour l 'installation. Protégez vous et les personnes et les biens pendant l'installation. Si vous avez un doute concernant votre compétence ou l'expertise, consulter un expert qualifié pour effectuer l'installation.
RSTC Enterprises Incorporated décline toute responsabilité de l'échec d'un architecte, entrepreneur, installateur ou propriétaire d'immeuble pour se conformer à toutes les lois, les codes du bâtiment et des exigences, et les précautions de sécurité adéquates.

Tools and Hardware List

Utility knife - 1/4" nut driver - #2 Phillips head drive bit - Pry bar – Roof sealant – Drill

0799 Series: (5) # 10 – 1" Phillips screws; (5) # 10 bonded seal washers; (5) 8x32-1/4" self thread hex screws

0766-41AD: (7) # 10 – 1" Phillips screws; (5) # 10 bonded seal washers; (5) 8x32-1/4" self thread hex screws

IMPORTANT SAFETY INSTRUCTIONS

Save this manual - It contains important instructions for models 0799 Series and 0766-41 AD that should be followed during the installation of this product.

SolaDeck products are listed by ETL to the UL standards: UL 1741; CSA C22.2 No. 290

These enclosures are rated for up to 1000 VDC 180 amp, 480 VAC 60 amp max

Grounding Instructions- The system should be connected to a grounded, permanent wiring system.

System wiring and grounding must comply with NEC Code, ANSI/NFPA 70-1996, or other appropriate codes and is the responsibility of the installer.

The equipment ground on SolaDeck is marked with the: 

Note: Solar panels produce electrical current when light is present and during overcast weather. Do not wire from the array to the SolaDeck combiner. Complete all connections inside the SolaDeck combiner first and then connect the array.

General Wiring Installation Instructions

Acceptable UL recognized components are found in UL Report # 3171411PRT-002

Remove any necessary knockouts before securing the SolaDeck to the roof or other surface.

Follow the mounting instructions page 4

Install components onto the din rail and lock in place.

When combining, secure the bus bar to the fuse holders or breakers.

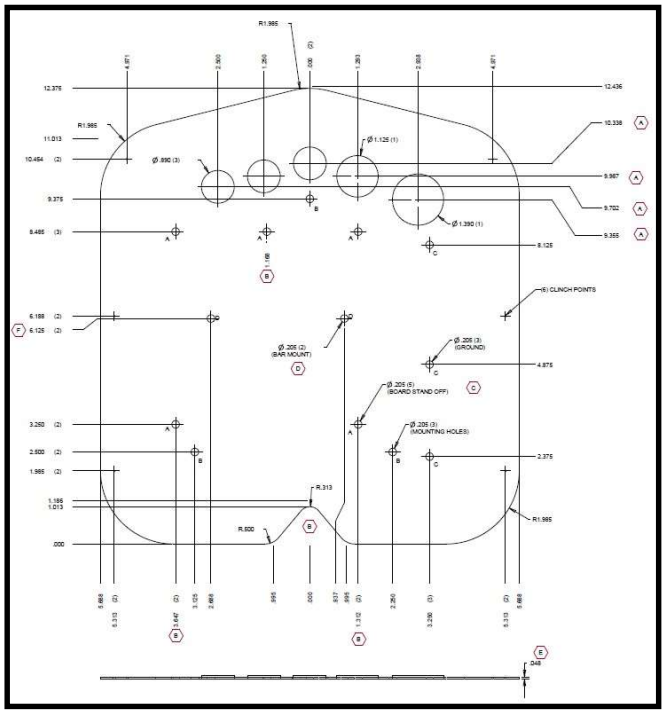
Install neutral mounted power block on din rail where designated PV neutral or negative and lock in place.

Torque values are listed in the table on page 5.

SolaDeck Base showing dimple locations

The 2 corner dimples support .5”, .75” or 1" fittings or conduit

The 3 center dimples support .5” fittings or conduit



Base plate drawing for knockout sizes and locations

SolaDeck Installation Instructions

DO NOT PROCEED WITH INSTALLATION UNTIL YOU HAVE READ ENTIRE INSTRUCTIONS INCLUDING WARNINGS

Figure 1

- Determine the location for the SolaDeck on the roof surface.
- Use the template from the bottom of the SolaDeck carton to trace the SolaDeck on the shingles.

Figure 1

Figure 2

- Use a pry bar to loosen the shingles, then remove any nails that would interfere with the SolaDeck flashing. *The flashing will slide beneath the shingles.
- Cut the roofing material to the shape of the template.
- Remove the knockouts needed to penetrate the roof deck.

Figure 2

Figure 3

- Slide the SolaDeck into place beneath the shingles and mark the knockout locations.
- Remove the SolaDeck and drill a hole through the roof deck 1/3 larger than the knockout holes.
- Determine the size and number of fittings or conduit needed to bring the circuit or string wiring into the SolaDeck. The corner dimples allow up to 1" fittings, the center dimples allow .5" fittings. Use a knockout tool or drill to cut the fitting holes where the base dimples are located.
- Install the fittings, reposition the SolaDeck and using the 1" truss head screws provided fasten the Soladeck to the roof deck from inside the enclosure (locations shown).
- Use roof cement to seal the shingles to the flashing & replace roof nails.

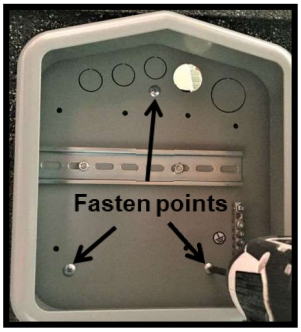


Figure 3

Figure 4

Figure 4

- Install components needed to connect the solar panel circuits.

Figure 5

- When connections are complete, finish by installing the cover using the 8/32 x 3/8" hex head screws provided.

Figure 5

Requirements: 75 C copper wire

Use only code approved, appropriately UL listed or recognized components

Ratings for 0799 model series and 0766-41AD

1000VDC / 180amps 10Ka short circuit; 480 VAC / 60 amps 10Ka Short circuit

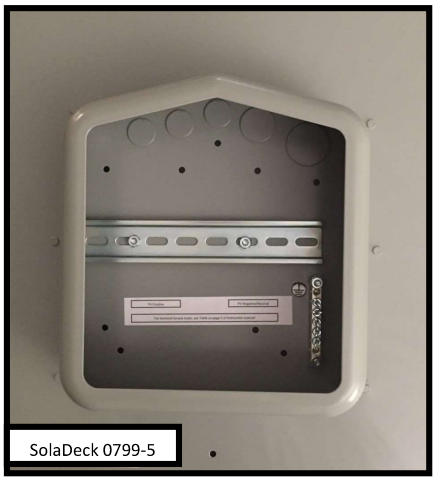
Typical wire size, torque loads and ratings

	1 Conductor	2 Conductors	Torque				
			Type	NM	Inch Lbs	Voltage	Current
ABB ZS6 terminal block	24-10 awg	24-16 awg	Sol/Str	0.5-0.7	6.2-8.85	600V	30 amp
ABB ZS10 terminal block	24-6 awg	20-12 awg	Sol/Str	1.0-1.6	8.85-14.16	600V	40 amp
ABB ZS16 terminal block	24-4 awg	20-10 awg	Sol/Str	1.6-2.4	14.6-21.24	600V	60 amp
ABB ZS50 terminal block	18-0 awg	18-4 awg	Sol/Str	3	26.55	1000V	140 amp
ABB M6/8 terminal block	22-8 awg		Sol/Str	.08-1	8.85	600V	50 amp
ABB M10 terminal block	35-16 awg		Sol/Str	1.2-1.4	10.62-12.39	600V	65 amp
ABB DBL 80 primary	4 awg		Sol/Str	1.5-2	13.5-18	1000V	80 amp
ABB DBL80 secondary	14-10 awg		Sol/Str	.08-1.2	7.2-10.8	1000V	80 Amp
ABB BDL 125 primary	8-2 awg		Sol/Str	2-3	18 - 26.5	1000 VAC	125 amp
ABB BDL 125 primary	8-2 awg		Sol/Str	2-3	18 - 26.5	1500VDC	125 amp
Abb DBL 125 secondary	14-6 awg		Sol/Str	2 - 3	18 - 26.5	1000VAC	125 amp
Abb DBL 125 secondary	14-6 awg		Sol/Str	2 - 3	18 - 26.5	1500VDC	125 amp
Little fuse LPHV series	8 - 14 awg		STR	2	17.7	1000VDC	30 amp
Little fuse LPHV series	10-14 awg		Sol	2	17.7	1000VDC	30 amp
Little fuse LPSM CH series	10 - 14 awg		Sol	2	17.7	600V	30 amp
Little fuse LPSM CH series	8 - 14 awg		Str	2	17.7	600V	30 amp
Bussmann CHPV series	14 - 10 awg		Sol/Str	2.3	20	1000VDC	30 amp
Bussmann CHPV series	14 - 10 awg		Sol/Str	2.3	20	600VDC	30 amp
ABB Breaker SU200 m series	18 - 4 awg		Sol/Str	2.8	13.3 - 39.8	480VAC	15 & 20 amp
International Hydraulics 2S2/0	14-10 awg		Sol/Str	4	35		
	8 awg		Sol/Str	4.5	40		
	4 awg		Sol/Str	5.1	45		
	2 awg		Sol/Str	5.7	50		
Brumall 4-9,1,2,89-RS	4-6 awg		Sol/Str		45	2000V	
	8 awg		Sol/Str		40		
	10 - 14 awg		Sol/Str		35		
Blackburn LL414	4 14 awg		Sol/Str				

Typical SolaDeck Combiner Features

- Typical SolaDeck Combiner Features
- Stamped seamless galvanized steel or Stainless
- Powder coated surfaces (1,100 salt spray hours)
- Models available grey, black or stainless steel
- Flashes into the roof deck
- Two, five or single position ground lug
- 8” din rail installed
- 5 Roof deck knockouts (3) @.5”, (1) @ .75”, (1) @ 1”
- 5 dimples for gland fitting or conduit entry
- Mounting hardware included

0799 Series SolaDecks


SolaDeck 0799-5


SolaDeck 0799-D


SolaDeck 0799-2

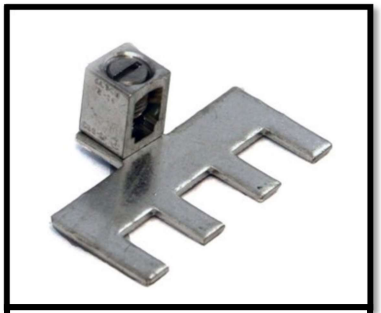
Common Component & Kit Examples

1 Pole Fuse Holder

2 Pole AC Breaker

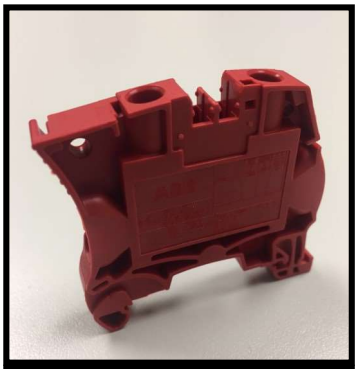
Power Distribution Block

3/4" Fitting



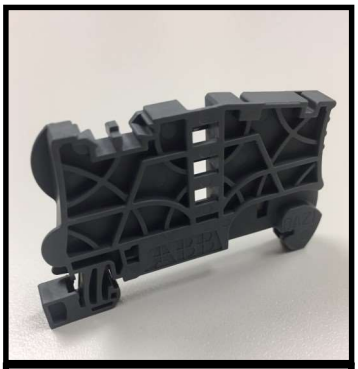
Positive Bus Bar

Midget Fuse



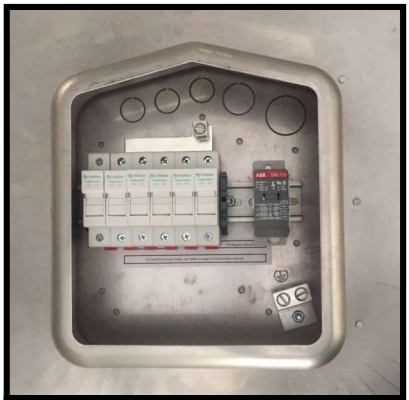
Terminal blocks, available in red, grey or black;

4mm, 8mm, 10mm

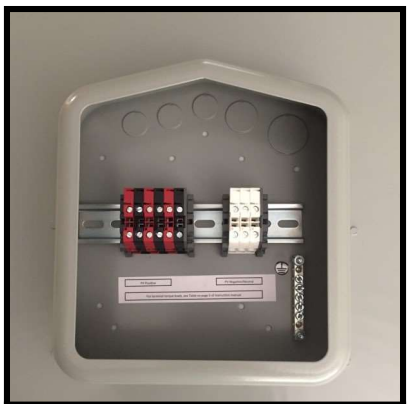


Rail Stop

End Plate



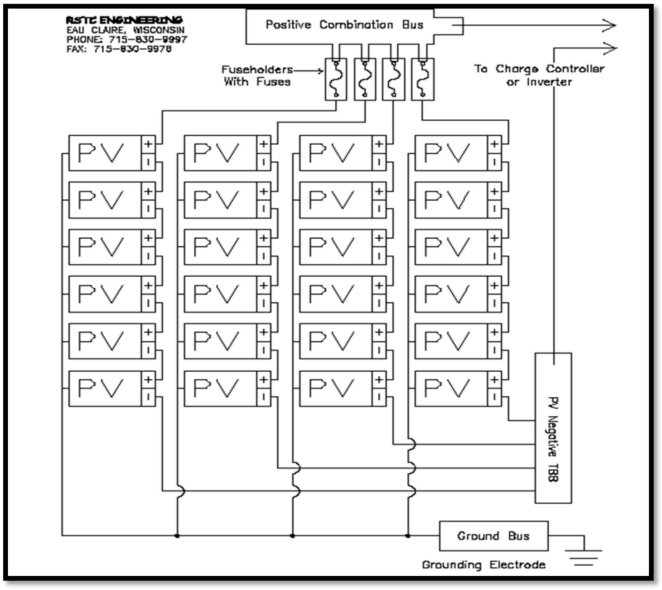
SolaDeck 0799-2 with DC Combiner Kit



SolaDeck 0799-5 with DC Passthrough Kit

*SolaDeck enclosures include din rail and ground blocks. All other internal parts are sold separately.

Typical DC Wiring Schematic



Warranty Information

Warranty repairs must conform to warranty terms.

As with all manufactured devices, replacement may be needed due to damage, unauthorized use, or defect.

Equipment must be installed according to the instructions and manuals provided.

Products returned must be packaged, properly addressed and shipped prepaid.

There is no additional allowance or reimbursement for installer or user for labor or travel time required to disconnect, service or reinstall the damaged component (s).

RSTC will ship a replacement product prepaid to addresses in the continental United States.

In the event of a product malfunction, RSTC will not bear any responsibility for resulting losses, expenses or damage to other components.

One Year Limited Warranty

Important: Evidence of original purchase is required for warranty service.
WARRANTOR: RSTC Enterprises Incorporated
ELEMENTS OF WARRANTY: RSTC warrants for one year to the original retail owner, this product is free from defects in materials and craftsmanship with only the limitations or exclusions set out below.
WHAT IS NOT COVERED: This warranty covers only defects in materials and workmanship provided by RSTC Enterprises, and does not cover equipment damage or malfunction from misuse, abuse, accident, and act of God. Installation must be in accordance with our written instructions. RSTC Enterprises will not be liable for any installation charges associated with replacement incidental or consequential damages resulting from your use of or inability to use the product.
REMEDY: Your only remedy under this warranty is the exchange or replacement in the event that the product does not conform to this warranty. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.
CLAIMS PROCESS: To make a claim under this warranty, the product should be shipped postage paid, with original purchase receipt to:

RSTC ENTERPRISES
2214 HEIMSTEAD ROAD
EAU CLAIRE, WI 54703
1-866-367-7782 or www.soladeck.com