Planning & Building Department
6280 W 800N
McCordsville, IN 46055
Phone: 317.335.3604
Email: building@mccordsville.org

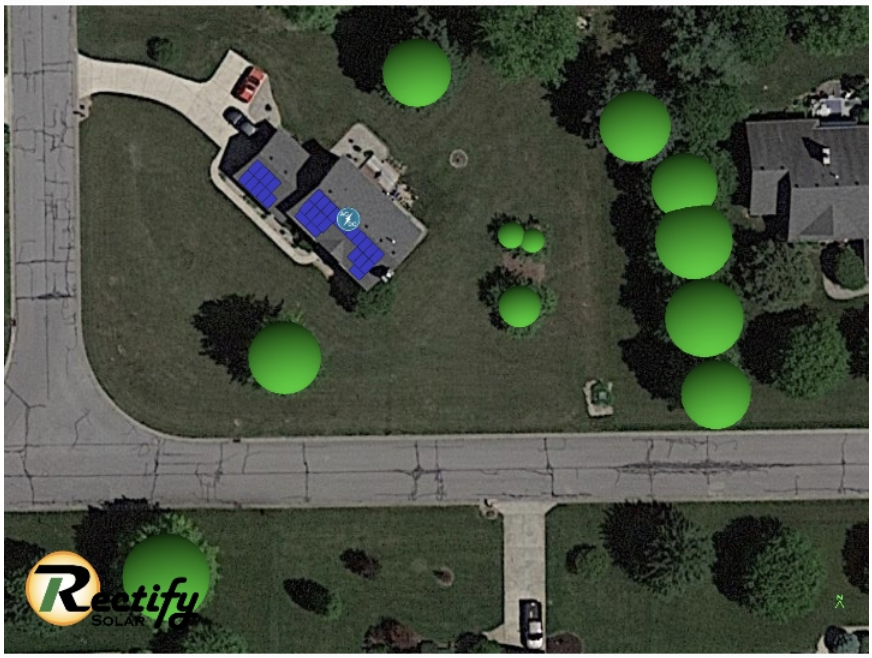
PUBLIC HEARING INFORMATION

Case #: BZA-22-001

Title: Rectify Solar, LLC's request for Development Standard Variance for roof-top solar panels

Meeting Date: this zoning petition is currently scheduled to be heard at the March 3rd Board of Zoning Appeals meeting.

*Meeting agenda and staff report will be available on the website by end of business day on the Friday preceding the applicable meeting. Go to www.mccordsville.org and click on "Agendas & Minutes".



CORY HARKINS
NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM
DC SYSTEM SIZE (12 KW)

SYSTEM DETAILS

DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	SYSTEM SIZE :12 KW DC STC
AC RATING OF SYSTEM	10 KW
AC OUTPUT CURRENT	42 A
NO. OF MODULES	(30) REC ALPHA PURE BLACK REC400AA(4000W) SOLAR MODULE
NO. OF INVERTERS	(1) SE10000H-US SOLAREDGE INVERTER
NO. OF OPTIMIZERS	(30) P401 SOLAREDGE OPTIMIZERS
POINT OF CONNECTION	LINE SIDE TAP IN THE MSP
ARRAY STRINGING	(2) BRANCH OF 15 MODULES

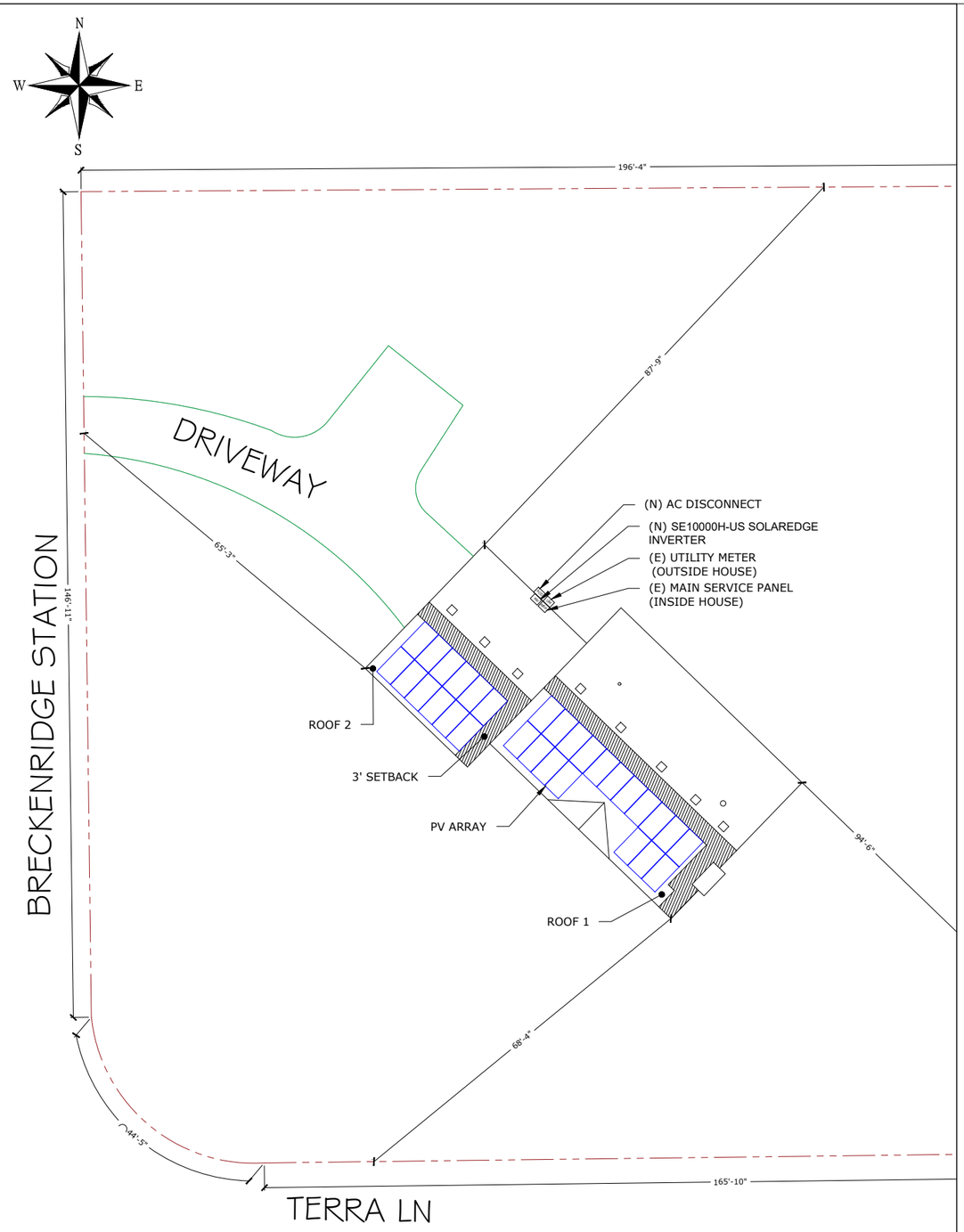
SITE DETAILS

ASHRAE EXTREME LOW	-22°C
ASHRAE 2% HIGH	32°C
GROUND SNOW LOAD	20 PSF
WIND SPEED	115MPH
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	C

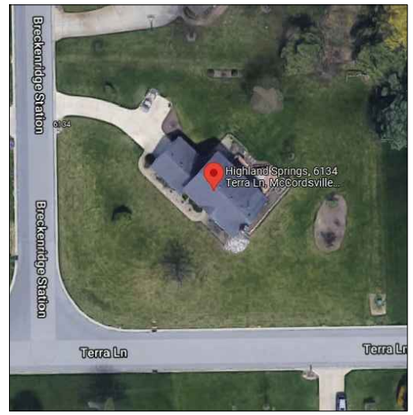
GOVERNING CODES

INDIANA RESIDENTIAL CODE (IRC) 2020
INDIANA BUILDING CODE (IBC) 2014
INDIANA FIRE CODE (IFC) 2014
NATIONAL ELECTRIC CODE, NEC 2008 CODE BOOK, NFPA 70

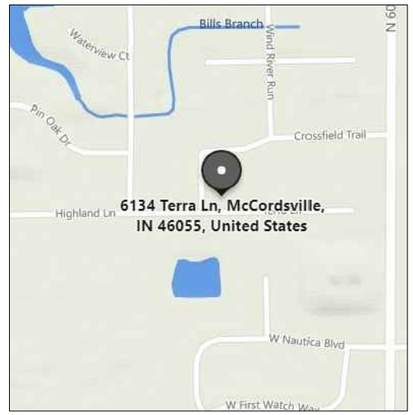
SHEET INDEX



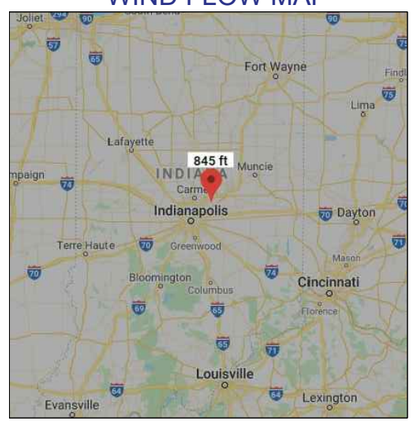
SITE MAP (N.T.S)



VICINITY MAP



WIND FLOW MAP



Rectify SOLAR
ADD : 1821 S. BASCOM AVE, UNIT 191. CAMPBELL, CA 95008, USA
LICENSE #1014694
CONTACT: 855-573-2843

Signature with Seal

CORY HARKINS

6134 TERRA LN, MCCORDSVILLE, IN 46055, USA

REVISIONS	DATE	DESCRIPTION	ENGG.	REV

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

SHEET NAME

SITE MAP & VICINITY MAP

SHEET NUMBER

A-00

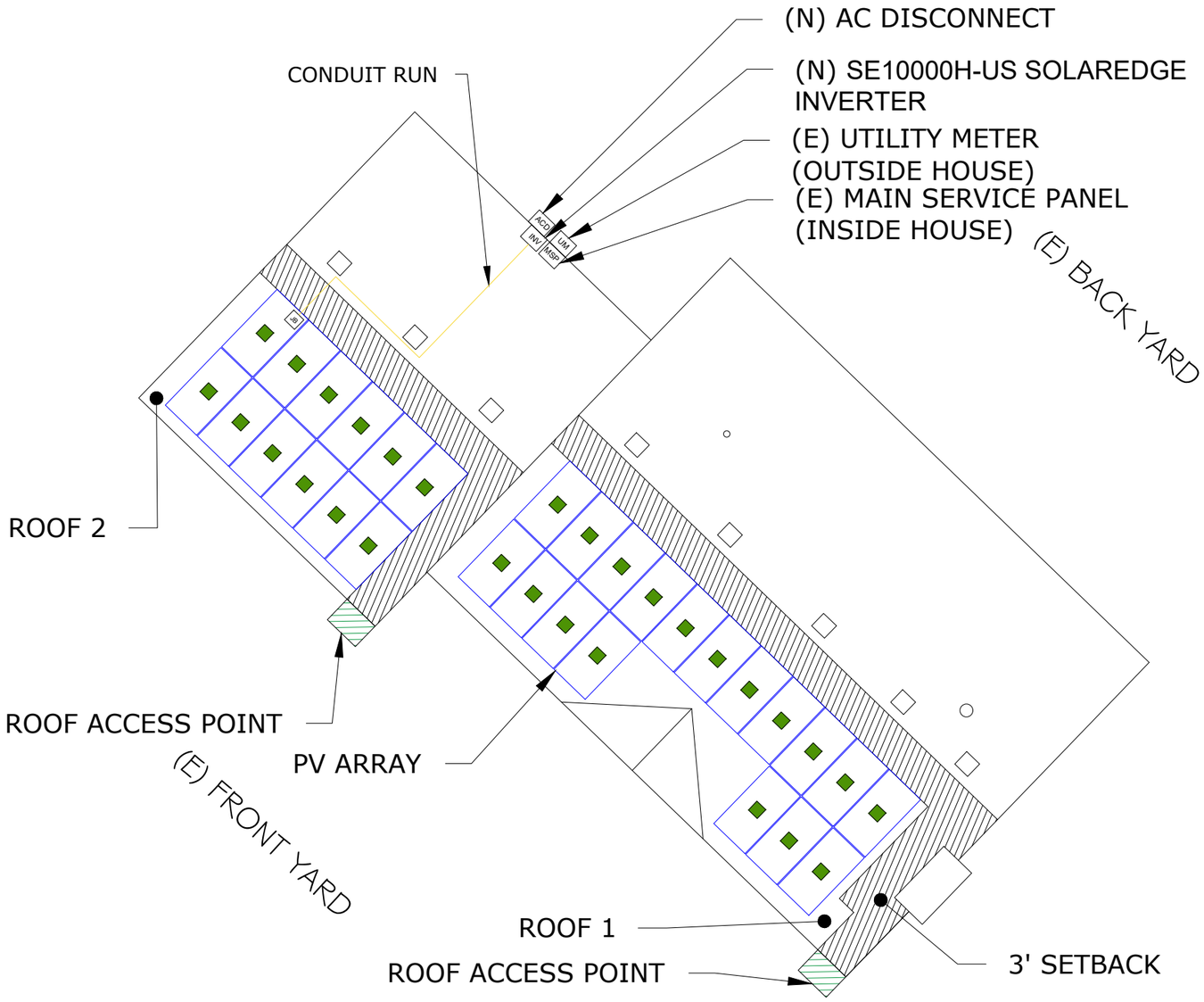
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 30 MODULES
MODULE TYPE = REC ALPHA PURE BLACK REC400AA(4000W) SOLAR MODULE
WEIGHT = 45.2 LBS / 20.5 KG.
MODULE DIMENSIONS = 71.7" X 40" = 19.92 SF

NUMBER OF OPTIMIZER = 30
OPTIMIZER TYPE = P401 SOLAREDGE OPTIMIZERS

NUMBER OF INVERTER = 1
INVERTER TYPE = SE10000H-US SOLAREDGE INVERTER

DC SYSTEM SIZE: 12 KW
AC SYSTEM SIZE: 10 KW



GENERAL INSTALLATION PLAN NOTES:

1) ROOF ATTACHMENTS TO TRUSSES SHALL BE INSTALLED AS SHOWN IN SHEET S-01 AND AS FOLLOWS FOR EACH WIND ZONE:.

WIND ZONE 1: MAX SPAN 6'-0" O.C.
WIND ZONE 2: MAX SPAN 4'-0" O.C.
WIND ZONE 3: MAX SPAN 2'-0" O.C.

2) EXISTING RESIDENTIAL BUILDING IS AN ASPHALT SHINGLE ROOF WITH MEAN ROOF HEIGHT 15 FT AND 2"x4" WOOD ROOF RAFTER SPACED 24" O.C.
CONTRACTOR TO FIELD VERIFY AND SHALL REPORT TO THE ENGINEER IF ANY DISCREPANCIES EXIST BETWEEN PLANS AND IN FIELD CONDITIONS.

I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH IBC: RESIDENTIAL CHAPTER 3.BUILDING STRUCTURE WILL SAFELY ACCOMMODATE LATERAL AND UPLIFT WIND LOADS, AND EQUIPMENT DEAD LOADS.

LEGENDS

- UM - UTILITY METER
- M - METER MAIN COMBO
- MSP - MAIN SERVICE PANEL
- JB - JUNCTION BOX
- INV - INVERTER
- ACD - AC DISCONNECT
- PM - PRODUCTION METER
- CP - COMBINER PANEL
- - FIRE SETBACK
- - ROOF ACCESS POINT
- - OPTIMIZER
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- - CONDUIT

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Signature with Seal

CORY HARKINS

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REVISIONS	DESCRIPTION	DATE
REV	ENGG.	

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

SHEET NAME
ROOF PLAN & MODULES

SHEET NUMBER
S-01

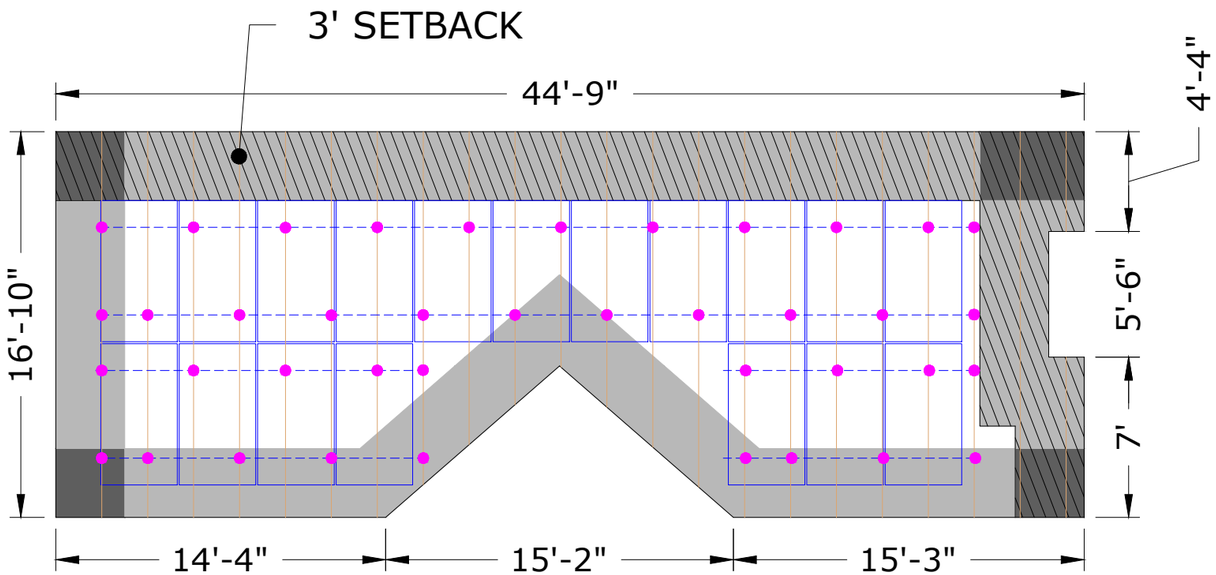
ROOF DESCRIPTION:

(ROOF #1)

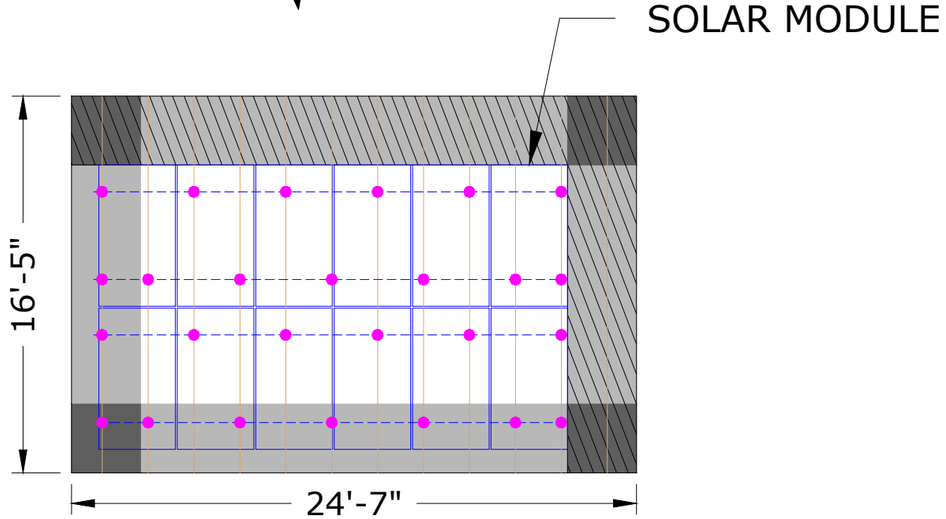
MODULES - 18
ROOF TILT - 30°
ROOF AZIMUTH - 224°
TRUSSES SIZE - 2"X4" @ 24" O.C.

(ROOF #2)

MODULES -12
ROOF TILT - 30°
ROOF AZIMUTH - 224°
TRUSSES SIZE - 2"X4" @ 24" O.C.



ROOF #1



ROOF #2

LEGENDS

- FIRE SETBACK
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- PV ROOF ATTACHMENT
- COUPLING
- RAFTERS / TRUSSES
- WIND ZONE I
- WIND ZONE II
- WIND ZONE III

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LICENSE #1014694
CONTACT: 855-573-2843

Signature with Seal

CORY HARKINS

6134 TERRA LN, MCCORDSVILLE, IN 46055, USA

REVISIONS	DATE	DESCRIPTION	ENGG.	REV

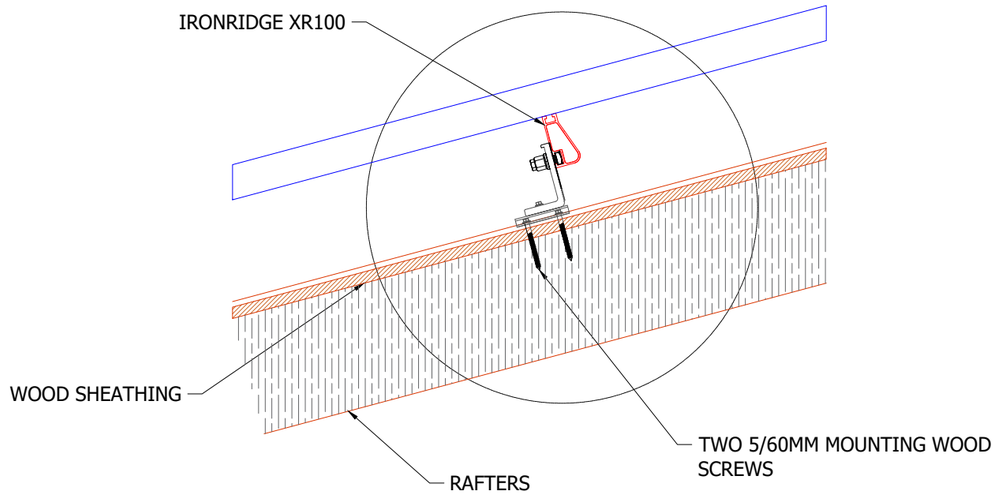
PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

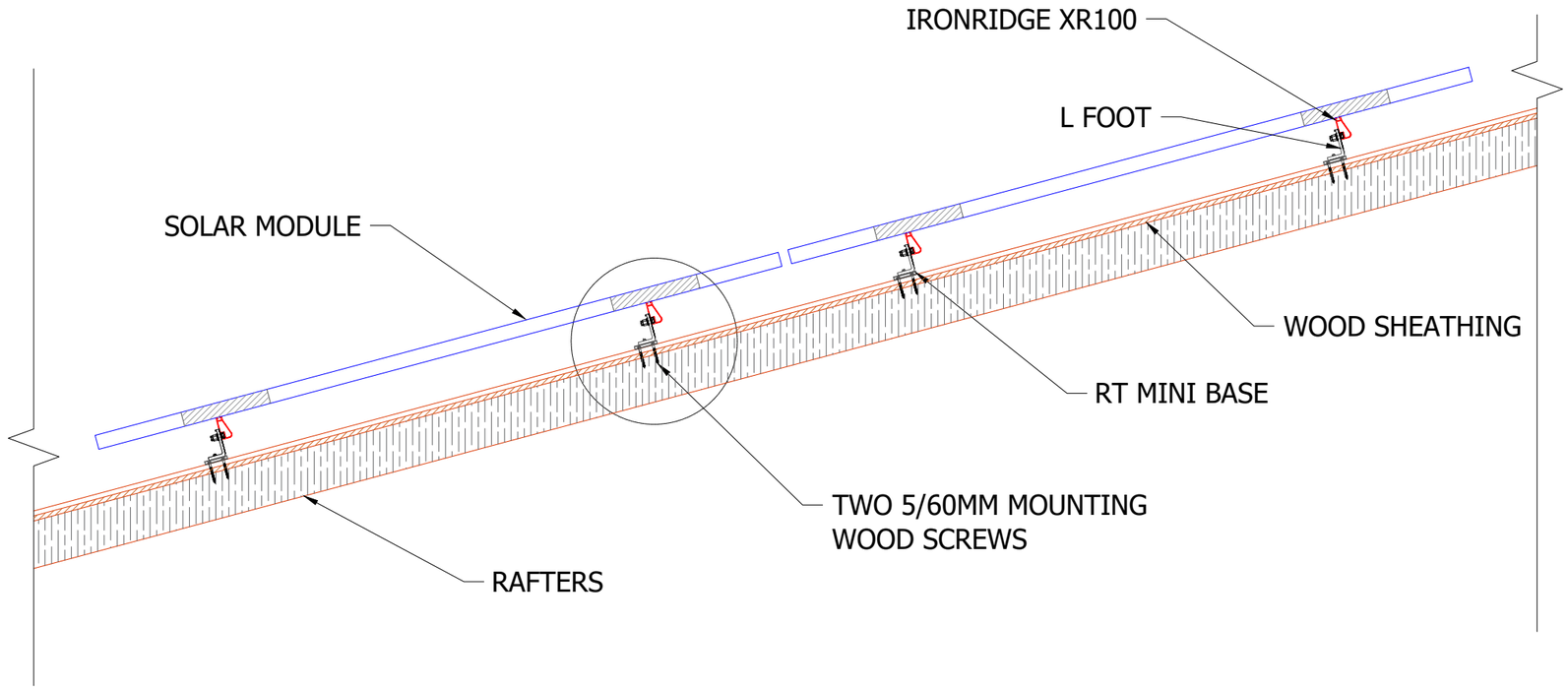
SHEET NAME
ARRAY LAYOUT

SHEET NUMBER
S-02

PHOTOVOLTAIC MODULE GENERAL NOTES:

1. APPLICABLE CODE: 2020 INDIANO BUILDING CODE 7th ED. & ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES
2. BOLT DIAMETER AND EMBEDMENT LENGTHS ARE DESIGNED PER NDS(2012) REQUIREMENTS. ALL BOLT CAPACITIES ARE BASED ON A WOOD ROOF TRUSS AS EMBEDMENT MATERIAL.
3. ALL WIND DESIGN CRITERIA AND PARAMETERS ARE FOR HIP AND GABLE RESIDENTIAL ROOFS, CONSIDERING FROM A 7° TO A MAXIMUM 27° (2/12 TO A MAXIMUM 6/12 PITCH) ROOF IN SCHEDULE. ALL RESIDENTIAL ROOFS SHALL NOT EXCEED 30'-0" MEAN ROOF HEIGHT.
4. ROOF SEALANTS SHALL CONFORM TO ASTM C920 AND ASTM 6511.
5. THIS SHEET REFLECTS STRUCTURAL CONNECTIONS ONLY. REFER TO MANUFACTURERS' MANUAL FOR ALL ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND SOLAR SPECS.
6. ALL ALUMINUM COMPONENTS SHALL BE ANODIZED ALUMINUM 6105-T5 UNLESS OTHERWISE NOTED.
7. LAG BOLTS SHALL BE ASTM A276 STAINLESS STEEL UNLESS OTHERWISE NOTED.
8. ALL RAILING AND MODULES SHALL BE INSTALLED PER MANUFACTURERS' INSTRUCTIONS.
9. I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH IBC:BUILDING CHAPTER 16 AND IRC:RESIDENTIAL CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE CALCULATED WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.





STRUCTURAL ATTACHMENT DETAILS

Rectify SOLAR
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LICENSE #1014694
CONTACT: 855-573-2843

Signature with Seal

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6134 TERRA LN, MCCORDSVILLE, IN 46055, USA

REVISIONS	DATE	DESCRIPTION	ENGG.	REV

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

SHEET NAME: STRUCTURAL ATTACHMENT DETAILS

SHEET NUMBER: S-03

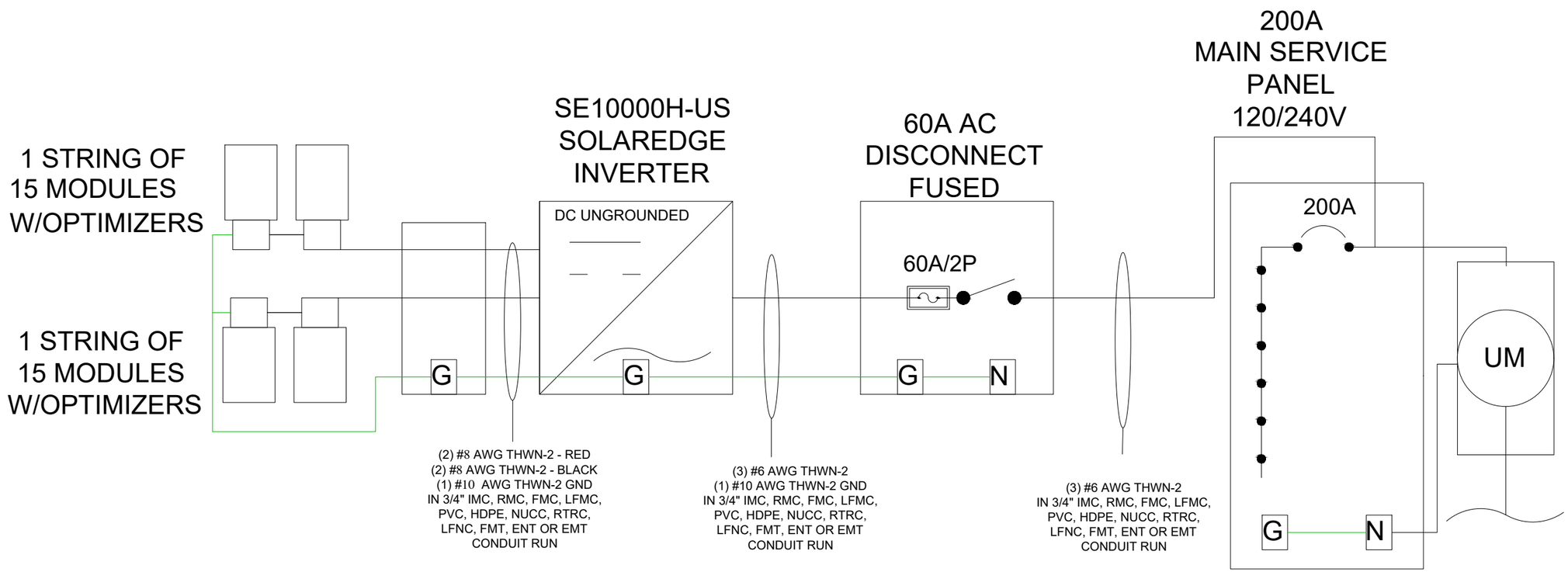
MODULE SPECIFICATION	
MANUFACTURER	REC PURE BLACK
MODEL NO.	REC 400AA Alpha
OPEN CIRCUIT VOLTAGE (Voc)	48.8
SHORT CIRCUIT CURRENT(Isc)	10.10
RATED VOLTAGE (Vmpp)	42.1
RATED CURRENT (Impp)	9.51

OPTIMIZER SPECIFICATION	
MANUFACTURER	SOLAREDGE OPTIMIZER
MODEL NO.	P401
OPEN CIRCUIT VOLTAGE (Voc)	60V
SHORT CIRCUIT CURRENT(Isc)	11.75 A
MAX. AC OUTPUT CURRENT	15 A

INVERTER SPECIFICATION	
MANUFACTURER	SOLAREDGE INVERTER
MODEL NO.	SE10000H-US
MAX. OUTPUT POWER	10000 W
MAX. AC OUTPUT VOLTAGE	240V
MAX. AC OUTPUT CURRENT	42 A

ARRAY DETAILS	
DC SYSTEM SIZE	12 KW
AC SYSTEM SIZE	10 KW
TOTAL NO. OF MODULES	30
NO. OF MODULE PER STRING	2@15
NO. OF STRING	2

NOTE:
1. SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE NEC 2008, NFPA 70 AND INCLUDING MAXIMUM NUMBER OF MODULE STRINGS, MAXIMUM NUMBER OF MODULES PER STRING, MAXIMUM OUTPUT, MODULE MANUFACTURER AND MODEL NUMBER, INVERTER MANUFACTURER AND MODEL NUMBER, AS APPLICABLE.
2. PROVIDE TAP BOX IN COMPLIANCE WITH 312.8 IF PANEL GUTTER SPACE IS INADEQUATE.



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REVISIONS	DATE	DESCRIPTION	ENGG.	REV

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

SHEET NAME
ELECTRICAL
LINE DIAGRAM

SHEET NUMBER
E-01

ELECTRICAL CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE INVERTER

AMBIENT TEMPERATURE = 32°C+22°C = 54°C
CONDUIT INSTALLED AT MINIMUM DISTANCE OF 7/8 INCHES ABOVE ROOF .....NEC 310.15(B)(3)(c)
TEMPERATURE DERATE FACTOR - 0.76 ...NEC 310.15(B)(2)(a)
GROUPING FACTOR - 0.8...NEC 310.15(B)(3)(a)

CONDUCTOR AMPACITY
= (OPTIMIZER O/P CURRENT) x 1.56 / A.T.F / G.F ...NEC 690.8(B)
= [(15 x 1.56] / 0.76 / 0.8
= 38.49 A
SELECTED CONDUCTOR - #8 THWN-2 ...NEC 310.15(B)(16)

(B) AFTER INVERTER

TEMPERATURE DERATE FACTOR - 0.96
GROUPING FACTOR - 1

CONDUCTOR AMPACITY
=(TOTAL INV O/P CURRENT) x 1.25 / 0.96 / 1 ...NEC 690.8(B)
=[(42) x 1.25] /0.96 / 1
=54.69 A
SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION ..NEC 690.9(B)

=TOTAL INVERTER O/P CURRENT x 1.25
=(42) x 1.25 = 52.5 A
SELECTED OCPD = 60A

SELECTED EQUIPMENT GROUND CONDUCTOR (EGC) = #10 THWN-2 ... NEC 250.122(A)

ELECTRICAL NOTES

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.THE TERMINALS ARE RATED FOR 75 DEGREE C.
3. CONDUCTOR TERMINATION AND SPLICING AS PER NEC 110.14
4. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
5. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
6. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
7. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
8. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
9. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
10. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
11. THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
12. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
13. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
14. RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
15. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
16. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).

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6134 TERRA LN, MCCORDSVILLE, IN 46055, USA

REVISIONS	DESCRIPTION	DATE
REV.		
ENGG.		

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

SHEET NAME: WIRING CALCULATIONS

SHEET NUMBER: E-02

⚠ WARNING

ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
PER CODE: NEC 690.17(E), CB

WARNING PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION:
CONDUIT, COMBINER BOX
(PER CODE: NEC690.31(G)(3)(4) & NEC 690.13(G)(4)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(D)(3) & NEC 690.64)

ADHESIVE FASTENED SIGNS:

· THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED. NEC110.21(B)(3)
· WHERE REQUIRED ELSEWHERE IN THIS CODE AND FIELD APPLIED LABELS, WARNING(S) AND MARKING SHALL COMPLY WITH ANSI Z535.4. NEC 110.21(B) FIELD MARKING
· ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT. IFC 605.11.1.3

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED OPERATING AC CURRENT 42 AMPS
NOMINAL AC OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.54)

WARNING
INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(D)(7))
[Not required if panelboard is rated not less than sum of ampere ratings of all overcurrent devices supplying it]

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL LOCATION:
AC DISCONNECT, DC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC690.56(C))

⚠ WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

EMERGENCY CONTACT
855-573-2843

⚠ WARNING
DEDICATED SOLAR PANELS DO
NOT CONNECT ANY OTHER LOADS

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY

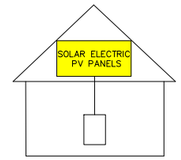

Figure 690.56(C)(1)(a) Label for PV Systems that Shut down the array and the conductors leaving the array

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REVISIONS	REV	ENGG.	DESCRIPTION	DATE

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

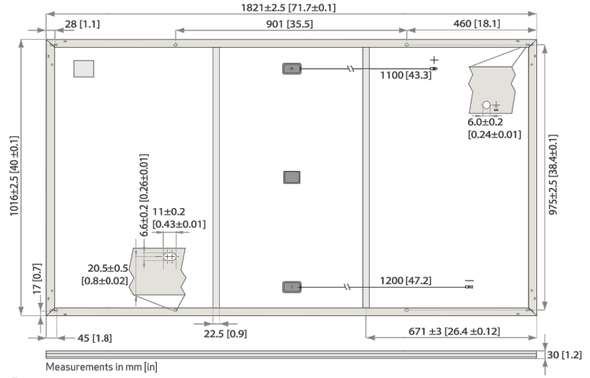
SHEET NAME
SYSTEM LABELING

SHEET NUMBER
E-03

REC
SOLAR'S MOST TRUSTED

PRODUCT SPECIFICATIONS

REC ALPHA PURE BLACK SERIES > PRODUCT SPECIFICATIONS



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, IP67 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)	9.99	10.03	10.07	10.10	10.14
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)	8.07	8.10	8.13	8.16	8.19

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)

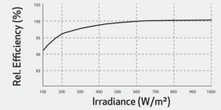
TEMPERATURE RATINGS*

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:



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

Specifications subject to change without notice.

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

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REVISIONS	REV	ENGG	DESCRIPTION	DATE

PERMIT DEVELOPER	
DATE	02/18/2022
DESIGNER	OVR
REVIEWER	

SHEET NAME: MODULE DATASHEET

SHEET NUMBER: DS-01

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P401 / P405 / 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.com

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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(1)	320	340	370	400		405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	60	125(2)		83(2)	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	Adc
Maximum Efficiency	99.5								%
Weighted Efficiency	98.8							98.6	%
Overvoltage Category	II								
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)									
Maximum Output Current	15								Adc
Maximum Output Voltage	60					85			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 Part15 Class B, IEC61000-6-2, IEC61000-6-3								
Safety	IEC62109-1 (class II safety), UL1741								
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)						Single or dual MC4(3)(4)	MC4(3)	
Input Wire Length	0.16 / 0.52								m / ft
Output Wire Type / Connector	Double Insulated / MC4								
Output Wire Length	0.9 / 2.95		1.2 / 3.9						m / ft
Operating Temperature Range(5)	-40 - +85 / -40 - +185								°C / °F
Protection Rating	IP68 / NEMA6P								
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) 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 / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details.

PV System Design Using a SolarEdge Inverter(6)(7)		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400, P401	8		10	18	
	P405, P485, P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50(8)	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	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 P405/P485/P505 with P320/P340/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 7,200W 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

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SHEET NUMBER
DS-02

INVERTERS

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
- Record-breaking efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

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

	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 Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
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	380				400			Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

[1] For other regional settings please contact SolarEdge support.
[2] A higher current source may be used; the inverter will limit its input current to the values stated

Single Phase Inverter with HD-Wave Technology for North America

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

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Data, ANSI C12.20	Optional[3]							
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi station 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	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	3/4" minimum / 14-6 AWG						3/4" minimum /14-4 AWG	
DC Input Conduit Size / # of Strings / AWG Range	3/4" minimum / 1-2 strings / 14-6 AWG						3/4" minimum / 1-3 strings / 14-6 AWG	
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174						21.3 x 14.6 x 7.3 / 540 x 370 x 185	in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9		38.8 / 17.6	lb / kg
Noise	< 25					< 50		dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

[3] Revenue grade inverter P/N: SExxxxH-US000BNC4
[4] Full power up to at least 50°C / 122°F; for power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

RoHS

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INVERTER DATASHEET

SHEET NUMBER
DS-03

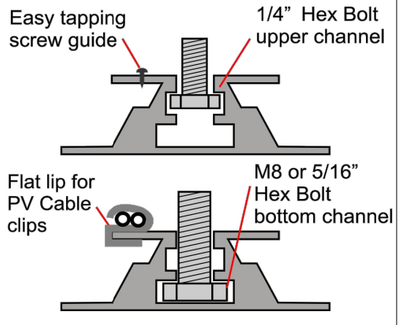
RT-MINI

Self-flashing base for asphalt & metal roof-top PV mounting systems

RT-MINI is suitable for mounting any rail system with a conventional L-Foot.

Dual bolt design:
M8 or 5/16” for L-Foot
& 1/4” for EMC

Call Now for more detail
619-551-7029



RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

Engineered to ASTM D 1761 (Standard Test Methods for Mechanical Fasteners in Wood)

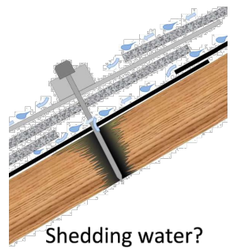
Components

RT2-00-MINIBK
PAT : PENDING

MINI base : 20 ea.
Screw : 40 ea.
Extra RT-Butyl : 10 ea.

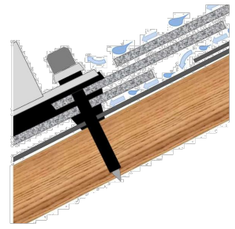
RT-Butyl is Roof Tech’s flexible flashing used in 550,000 residential PV systems for the last 20 years. It is the first PV mounting system with Flexible Flashing certified by the ICC.

Metal Flashing Retrofit



Shedding water?

Flexible Flashing



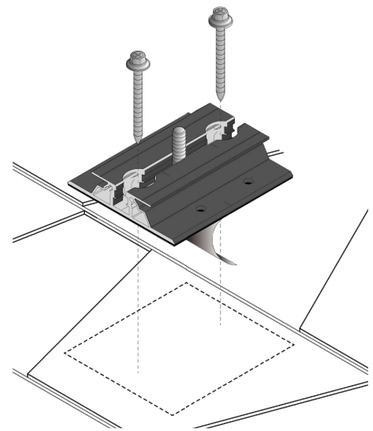
100% Waterproof

ICC ESR-3575

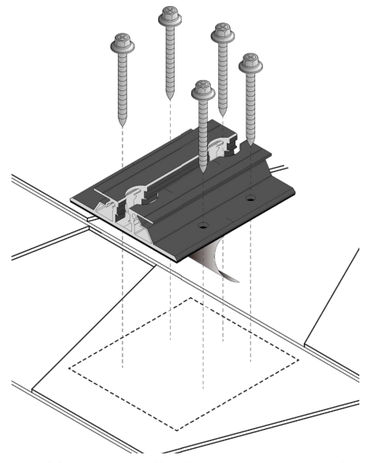
ASTM2140 testing

UV testing (7500 hrs.)

Rafter installation



Deck installation



P.E. Stamped Letters available at www.roof-tech.us/support

Roof Tech Inc.
www.roof-tech.us info@roof-tech.us
333 H Street, Suite 5000, Chula Vista, CA 91910
619.551.7029

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ATTACHMENT DATASHEET

SHEET NUMBER
DS-04

Tech Brief

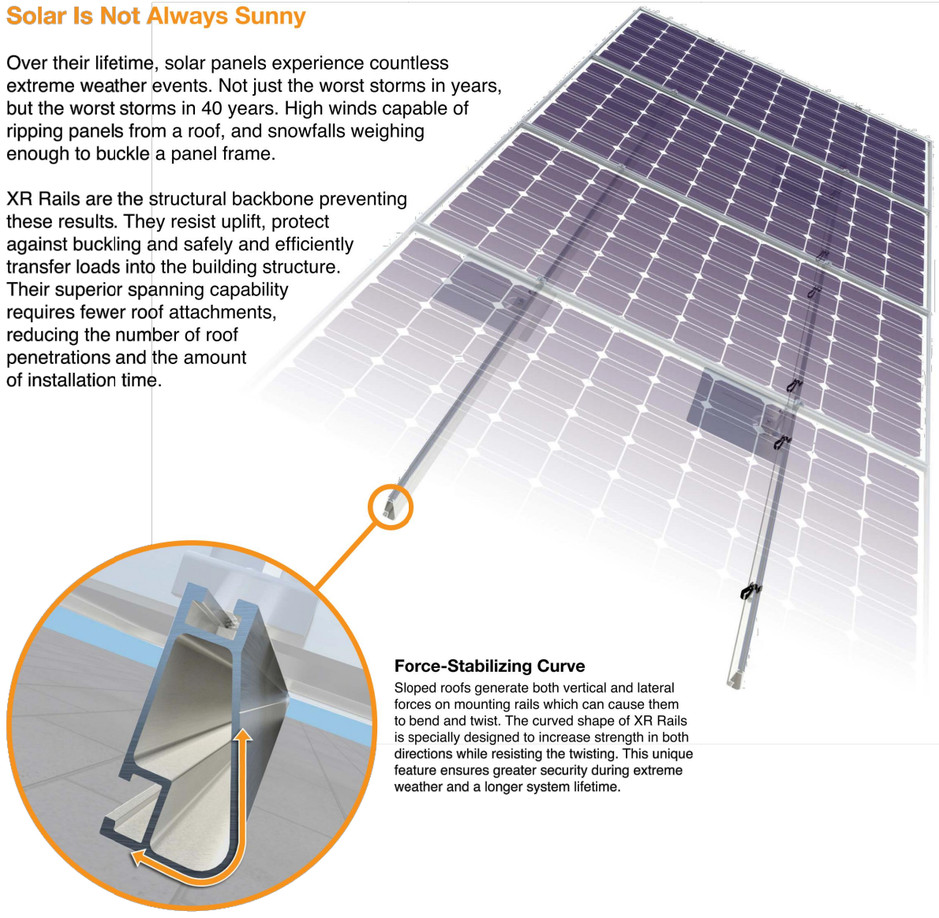
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

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