

# NOTICE OF DECISION

PLANNING DIVISION  
555 LIBERTY ST. SE, RM 305  
SALEM, OREGON 97301  
PHONE: 503-588-6173  
FAX: 503-588-6005



*Si necesita ayuda para comprender esta información, por favor llame  
503-588-6173*

## DECISION OF THE HISTORIC LANDMARKS COMMISSION

**CLASS 3 MAJOR HISTORIC DESIGN REVIEW CASE NO.: HIS25-05**

**APPLICATION NO.: 25-106502-PLN**

**NOTICE OF DECISION DATE:** April 18, 2025

**SUMMARY:** A proposal to install a rooftop solar array to the roof of 506 21st St NE.

**REQUEST:** Class 3 Major Historic Design Review of a proposal to install a solar array to the roof of the Baxter House, a historic landmark on property zoned RS (Single Family Residential) and located at 506 21st Street NE (Marion County Assessors Map and Tax Lot number: 073W26AA09900).

**APPLICANT:** Earthlight Technologies LLC (Catherine Wolfe, Robert Ignato)

**LOCATION:** 506 21st St NE, Salem OR 97301

**CRITERIA:** Salem Revised Code (SRC) Chapters 230.065 – General Guidelines for Historic Contributing Resources

**FINDINGS:** The findings are in the attached Decision dated April 17, 2025.

**DECISION:** The **Historic Landmarks Commission APPROVED** Class 3 Major Historic Design Review Case No. HIS25-05 based on the application deemed complete on March 26, 2025

### VOTE:

**Yes 6      No 0      Absent 2 (Kaser, Weathers)**

Kirsten Straus, Chair  
Historic Landmarks Commission

The rights granted by the attached decision must be exercised, or an extension granted, by May 6, 2027, or this approval shall be null and void.

Application Deemed Complete:	<u>March 26, 2025</u>
Public Hearing Date:	<u>April 17, 2025</u>
Notice of Decision Mailing Date:	<u>April 18, 2025</u>
Decision Effective Date:	<u>May 6, 2025</u>
State Mandate Date:	<u>July 24, 2025</u>

**Case Manager:** Jacob Morris, [jjmorris@cityofsalem.net](mailto:jjmorris@cityofsalem.net), 503-540-2417

This decision is final unless written appeal and associated fee (if applicable) from an aggrieved party is filed with the City of Salem Planning Division, Room 320, 555 Liberty Street SE, Salem OR 97301, or by email at [planning@cityofsalem.net](mailto:planning@cityofsalem.net), no later than 5:00 p.m. Monday, May 5, 2025. The notice of appeal must contain the information required by SRC 300.1020 and must state where the decision failed to conform to the provisions of the applicable code section, SRC Chapter(s) 230. The appeal fee must be paid at the time of filing. If the appeal is untimely and/or lacks the proper fee, the appeal will be rejected. The Hearings Officer will review the appeal at a public hearing. After the hearing, the Hearings Officer may amend, rescind, or affirm the action, or refer the matter to staff for additional information.

The complete case file, including findings, conclusions and conditions of approval, if any, is available for review by contacting the case manager, or at the Planning Desk in the Permit Application Center, Room 305, City Hall, 555 Liberty Street SE, during regular business hours.

<http://www.cityofsalem.net/planning>

## DECISION OF THE SALEM HISTORIC LANDMARKS COMMISSION

**CASE NO.:** Historic Design Review Case No. HIS25-05

**FINDINGS:** Based upon the application materials, the facts and findings in the Staff Report incorporated herein by reference, and testimony provided at the Public Hearing of the April 17, 2025, the Historic Landmarks Commission (HLC) finds that the applicant adequately demonstrated that their proposal complies with the applicable provisions of the Salem Revised Code (SRC) 230.065 as follows:

### **FINDINGS**

#### **Criteria:**

#### **230.065. General Guidelines for Historic Contributing Resources.**

*(a) Except as otherwise provided in this chapter, the property shall be used for its historic purpose, or for a similar purpose that will not alter street access, landscape design, entrance(s), height, footprint, fenestration, or massing.*

**Finding:** There will be no changes to the purpose, street access, landscape, entrances, height, footprint, fenestration or massing. The HLC finds that SRC 230.065 (a) has been met.

*(b) Historic materials, finishes, and distinctive features shall, when possible, be preserved and repaired according to historic preservation methods.*

**Finding:** The shape of the roof will not be impacted. The solar arrays, where proposed to be installed, will be “flush mounted” parallel to the existing roof planes. The HLC finds that SRC 230.065 (b) has been met.

*(c) Distinctive stylistic features or examples of skilled craftsmanship significance shall be treated with sensitivity.*

**Finding:** The solar system project is limited to the roof. The siding, trim, paint, leaded windows and other historical features will not be impacted by the proposed solar project. The visual impact of the solar panels is mitigated somewhat because the house features a main level that is elevated approximately 5 feet above grade. This characteristic makes the panels less visually prominent when viewed from the sidewalk adjacent to the subject property. From the 21st St frontage, one roof that has visual prominence is proposed to be excluded from the energy improvement project to strike a balance between the homeowner’s project goals and the historical integrity and aesthetics of the prominent façade. The HLC finds that SRC 230.065 (c) has been met.

*(d) Historic or original features shall be restored or reconstructed only when supported by physical or photographic evidence.*

**Finding:** No restoration or reconstruction is proposed. The HLC finds that SRC 230.065 (d) has been met.

*(e) Changes that have taken place to a historic resource over the course of time are evidence of the history and development of a historic resource and its environment, and should be*

*recognized and respected. These changes may have acquired historic significance in their own right, and this significance should be recognized and respected.*

**Finding:** No significant changes are impacted by the proposal. The HLC finds that SRC 230.065 (e) is met.

*(f) Additions and alterations to a historic resource shall be designed and constructed to minimize changes to the historic resource.*

**Finding:** The 18 proposed solar panels will be approximately 48 by 68 inches in size, black with anti-reflective coating glass. Their installation will comprise a majority (approximately 80%) of the of the south roof of the resource, which currently is comprised of black composition shingling on the surface. The most architecturally detailed elevation faces west, and the busiest street also is to the west of the resource. For these reasons, the primary elevation is the west elevation. To minimize the visual impact, the solar modules are proposed to not be installed on the western end of the south roof face that is plainly visible from the sidewalk at 21st & Breyman streets. The proposed design is the least visible arrangement that would qualify for solar incentives provided by Energy Trust of Oregon. While the solar panel installation will have a minimal adverse visual impact to the resource, the panel installation and associated equipment have been designed to minimize changes to the resource and the installation itself is reversible. The HLC finds that SRC 230.065 (f) has been met.

*(g) Additions and alterations shall be constructed with the least possible loss of historic materials and so that significant features are not obscured, damaged, or destroyed.*

**Finding:** The solar modules will be attached in a “flush mount” orientation where the top of the modules will be approximately 4” above the existing roof plane. The attachment hardware attaches to the rafters via two lag bolts, and most are substantially out of view on account of being set back from the array edges by approximately 1 foot. There will be a minimal loss of historic materials and none of the features below the roof line will be affected. The utility meter is on the back of the house and some electrical equipment will be mounted on the adjacent exterior. The HLC finds that SRC 230.065 (g) is met.

*(h) Structural deficiencies in a historic resource shall be corrected without visually changing the composition, design, texture or other visual qualities.*

**Finding:** No structural repairs are proposed as part of this project. The HLC finds that SRC 230.065 (h) is not applicable to the evaluation of this proposal.

*(i) Excavation or re-grading shall not be allowed adjacent to or within the site of a historic resource which could cause the foundation to settle, shift, or fail, or have a similar effect on adjacent historic resources.*

**Finding:** No excavation or re-grading is proposed. The HLC finds that SRC 230.065 (i) is not applicable to the evaluation of this proposal.



## **DECISION**

The Historic Landmarks Commission **APPROVES** HIS25-05.

**VOTE: Yes 6    No 0    Abstain 2 (Kaser, Weathers)**

Attachments: A. Vicinity Map  
                  B. Excerpt from Applicant's Submittal Materials

Prepared by Jacob Morris, Historic Preservation Planner

\\allcity\CDGroup\CD\PLANNING\HISTORIC\CASE APPLICATION Files - Processing Documents & Staff  
Reports\Major Type III\2025\Decisions\HIS25-05 506 21<sup>st</sup> St NE. Decision Findings.doc

# Vicinity Map

## 506 21st St NE



### Legend

- Taxlots
- Urban Growth Boundary
- City Limits
- Outside Salem City Limits
- Historic District
- Schools
- Parks

0 100 200 400 Feet



**CITY OF Salem**  
AT YOUR SERVICE  
Community Planning and Development

This product is provided as is, without warranty. In no event is the City of Salem liable for damages from the use of this product. This product is subject to license and copyright limitations and further distribution or resale is prohibited.

**Sec. 230.065. - General guidelines for historic contributing resources.**

(a) Except as otherwise provided in this chapter, the property shall be used for its historic purpose, or for a similar purpose that will not alter street access, landscape design, entrance(s), height, footprint, fenestration, or massing.

**Response:**

There will be no changes to the purpose, street access, landscape, entrances, height, footprint, fenestration or massing.

(b) Historic materials, finishes, and distinctive features shall, when possible, be preserved and repaired according to historic preservation methods.

**Response:**

The roof structure was recently updated with new asphalt composition shingles, and the flat prominence of structure has a new membrane roof and surround flashing.

The shape of the roof will not be impacted. The solar arrays, where proposed to be installed, will be “flush mounted” parallel to the existing roof planes.

(c) Distinctive stylistic features or examples of skilled craftsmanship significance shall be treated with sensitivity.

**Response:**

The solar system project is limited to the roof. The siding, trim, paint, leaded windows and other historical features will not be impacted by the proposed energy improvement.

The house features a main level that is elevated approximately 5 feet above grade, which makes the many of the roof surfaces not visible when standing on the sidewalk adjacent to the subject property. From the 21<sup>st</sup> St frontage, one roof that has visual prominence is proposed to be excluded from the energy improvement project to strike a balance between the homeowner’s project goals and the historical integrity and aesthetics of the prominent façade.

(d) Historic or original features shall be restored or reconstructed only when supported by physical or photographic evidence.

**Response:**

No restoration or reconstruction is proposed.

(e) Changes that have taken place to a historic resource over the course of time are evidence of the history and development of a historic resource and its environment, and should be recognized and

respected. These changes may have acquired historic significance in their own right, and this significance should be recognized and respected.

**Response:**

No notable changes have been identified, nor proposed for modification.

(f) Additions and alterations to a historic resource shall be designed and constructed to minimize changes to the historic resource.

**Response:**

The homeowner seeks to modernize the energy efficiency of the property for financially and environmentally beneficial reasons.

The proper frontage of the residence faces to the west, on 21<sup>st</sup> St NE. The roof presents a gable with a window in the unfinished and uninhabitable attic.

The secondary frontage of the residence faces to Breyman St NE, and includes access to off-street parking.

Because the home is constructed on the north side of the cross street, the secondary façade is also the south-facing roof.

To minimize the visual impact, the solar modules are proposed to not be installed on the roof face that is plainly visible from the sidewalk at 21<sup>st</sup> & Breyman. The remainder of the roof surfaces are substantially not visible from the immediate property when alighting to the 21<sup>st</sup> St frontage.

The somewhat common approach, for properties subject to City of Salem Chapter 230, of restricting the energy improvements to the rear roofs is not feasible on this property. Due to the solar productivity thresholds that are required to qualify for solar incentives provided by Energy Trust of Oregon, solar modules must be placed on southerly-facing roofs with minimal shading. Furthermore, the homeowner will realize far greater financial and environmental benefits by having good sun exposure for the solar modules.

(g) Additions and alterations shall be constructed with the least possible loss of historic materials and so that significant features are not obscured, damaged, or destroyed.

**Response:**

The solar modules will be attached in a “flush mount” orientation where the top of the modules will be approximately 4” above the existing roof plane. The attachment hardware attaches to the rafters via two lag bolts, and most are substantially out of view on account of being set back from the array edges by approximately 1 foot.

There will be no loss of historic materials and none of the features below the roof line will be affected. The utility meter is on the back of the house and some electrical equipment will be mounted on the adjacent exterior.

(h) Structural deficiencies in a historic resource shall be corrected without visually changing the composition, design, texture or other visual qualities.

**Response:**

No structural repairs are planned. Some sheathing in the roof substructure has already been replaced where deficient.

(i) Excavation or re-grading shall not be allowed adjacent to or within the site of a historic resource which could cause the foundation to settle, shift, or fail, or have a similar effect on adjacent historic resources.

**Response:**

No re-grading is planned.



South





west

GENERAL NOTES

- 1

1.1.1

PROJECT NOTES:
- 1.1.2

THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
- 1.1.3

THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION .
- 1.1.4

ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4 & NEC 690.60: **PV MODULES:** UL1703, IEC61730, AND IEC61215, AND TYPE 1 FIRE RATING **INVERTERS:** UL 1741 CERTIFIED, IEEE 1547, 929, 519 **COMBINER BOX(ES):** UL 1703 OR UL 1741 ACCESSORY. PV MOUNTING SYSTEM: UL2703, AND CLASS A FIRE RATED PER UL 2703.
- 1.1.5

NEC 690.35 REFERS SPECIFICALLY TO "UNGROUNDED" PV POWER SYSTEMS. ALSO DESIGNATED AS "TRANSFORMERLESS" BY INVERTER MANUFACTURERS AND "NON-ISOLATED" BY UNDERWRITERS LABORATORY.
- 1.1.6

INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE LISTED FOR THIS USE [NEC 690.35 (G)].
- 1.1.7

AS SPECIFIED BY THE AHJ, EQUIPMENT USED IN UNGROUNDED SYSTEMS LABELED ACCORDING TO NEC 690.35 (F).
- 1.1.8

MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
- 1.1.9

ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, PHOTOVOLTAIC MOUNTING SYSTEMS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D), SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].
- 1.1.10

ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
- 1.2.1

SCOPE OF WORK:
- 1.2.2

PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.
- 1.3.1

WORK INCLUDES:
- 1.3.2

PHOTOVOLTAIC MOUNTING SYSTEMS - IRONRIDGE HUG
- 1.3.3

PV RACKING SYSTEM INSTALLATION - IRONRIDGE AIRE RAIL A1
- 1.3.4

PV MODULE AND INVERTER INSTALLATION - REC SOLAR REC460AA PURE-RX SOLAR MODULES / ENPHASE IQ8X-80-M-US MICROINVERTERS
- 1.3.5

PV EQUIPMENT GROUNDING
- 1.3.6

PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX
- 1.3.7

PV LOAD CENTERS (IF INCLUDED)
- 1.3.8

PV METERING/MONITORING (IF INCLUDED)
- 1.3.9

PV DISCONNECTS
- 1.3.10

PV FINAL COMMISSIONING
- 1.3.11

(E) ELECTRICAL EQUIPMENT RETROFIT FOR PV
- 1.3.12

SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

SCOPE OF WORK

SYSTEM SIZE:

STC: 22 X 460W = 10.120KW

PTC: 22 X 438.8W = 9.654KW

(22) REC SOLAR REC460AA PURE-RX MODULES

(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

ATTACHMENT TYPE: IRONRIDGE HUG

MSP UPGRADE: NO

CONTRACTOR

EARTHLIGHT TECHNOLOGIES

812 McCLAIN ST

SILVERTON, OR 97381

PHONE: 503-874-4142

CONTRACTOR LICENSE: 201408



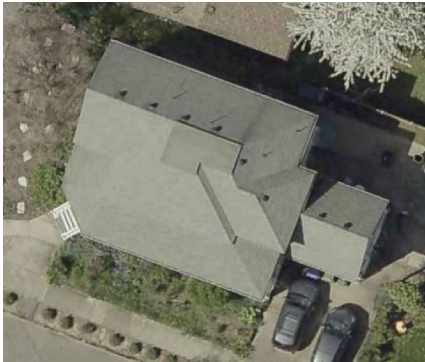
NEW PV SYSTEM: 10.120 kWp

CARMEL BENDER RESIDENCE

506 21ST ST NE,

SALEM, OR 97301

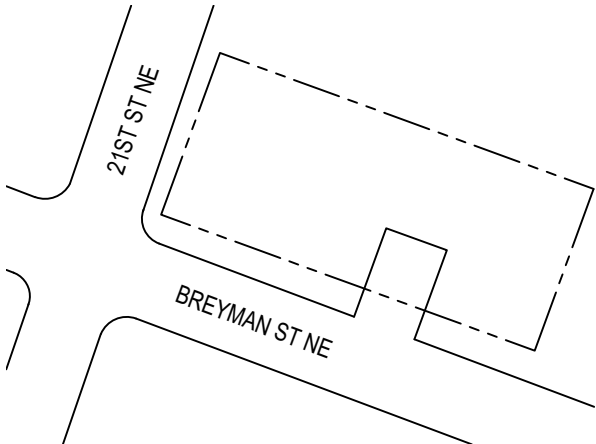
ASSESSOR'S #: 073W26AA09900



01

AERIAL PHOTO

NOT TO SCALE



02

PLOT MAP

NOT TO SCALE



SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
G-1	COVER PAGE
G-2	NOTES
PV-1	SITE PLAN
PV-2	SOLAR RACKING PLAN
PV-3	ASSEMBLY DETAILS
PV-4	ELECTRICAL PLAN
PV-5	LINE DIAGRAM
PV-6	DESIGN TABLES
PV-7	PLACARDS & LABELS
PV-8	RESOURCE DOCUMENT
PV-9	RESOURCE DOCUMENT
PV-10	RESOURCE DOCUMENT
PV-11	RESOURCE DOCUMENT
PV-12	RESOURCE DOCUMENT

PROJECT INFORMATION

OWNER

NAME: CARMEL BENDER

PHONE: 503-544-9909

E-MAIL: CARMEL.E.BENDER@GMAIL.COM

PROJECT MANAGER

NAME: CHARLES BONVILLE

PHONE: 503-874-4142

CONTRACTOR

NAME: EARTHLIGHT TECHNOLOGIES

PHONE: 503-874-4142

AUTHORITIES HAVING JURISDICTION

ELECTRICAL: SALEM CITY

BUILDING: SALEM CITY

ZONING: SALEM CITY

UTILITY: PGE

DESIGN SPECIFICATIONS

OCCUPANCY: R-3

CONSTRUCTION: SINGLE-FAMILY

ZONING: RESIDENTIAL

RISK CATEGORY: II

GROUND SNOW LOAD: 25 PSF

WIND EXPOSURE: B

WIND SPEED: 98 MPH

APPLICABLE CODES & STANDARDS

2023 NEC, 2023 ORSC, 2022 OSSC & 2023 OESC

FOR OFFICIAL USE

COVER PAGE

SYSTEM AC SIZE @ STC: 8.360 kW	SYSTEM DC SIZE @ STC: 10.120 kW	PAGE:
(22) REC SOLAR REC460AA PURE-RX MODULES	(22) ENPHASE IQ8X-80-M-US MICROINVERTERS	G-1
DRAWN: V.D.	REV: PERMIT SET	DATE: 12/31/2024
CHECKED: D.A.		

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION

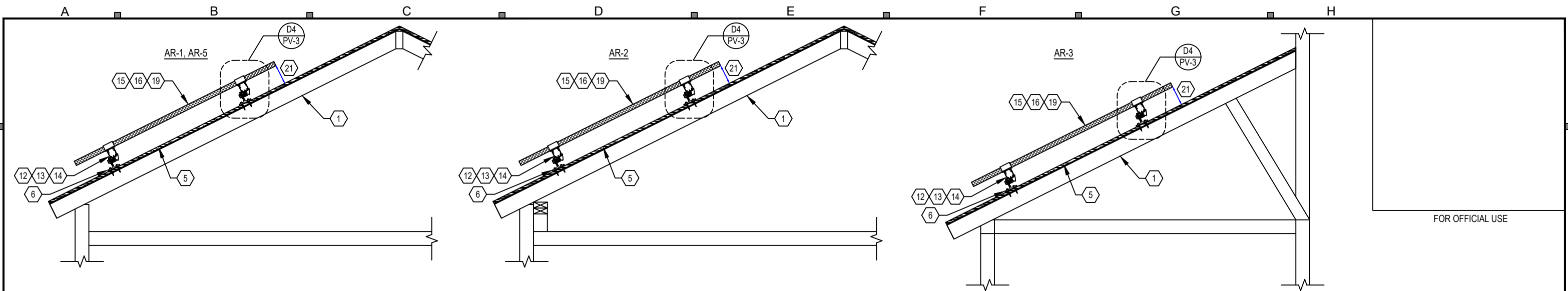
506 21ST ST NE, SALEM, OR 97301

ASSESSOR'S #: 073W26AA09900

PHONE: 503-544-9909



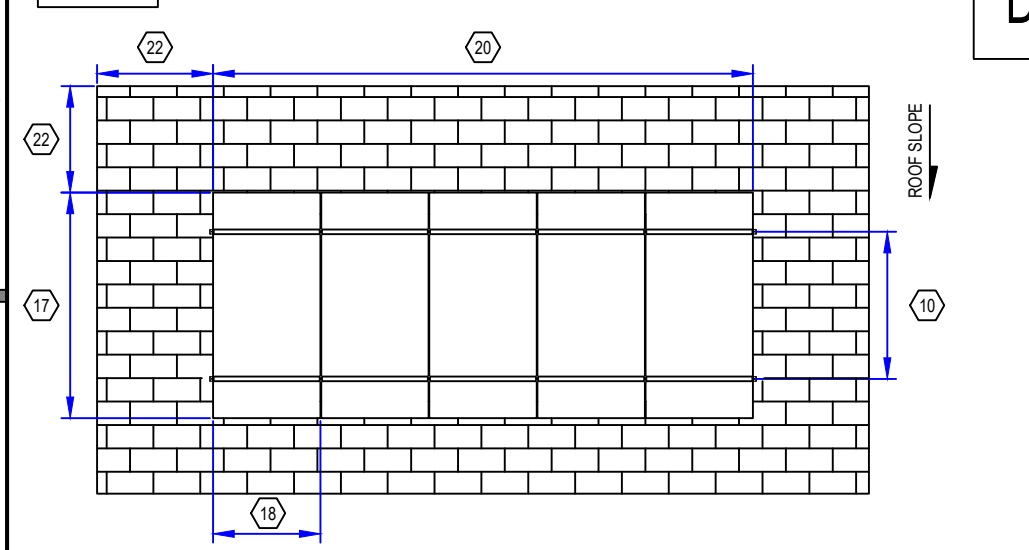
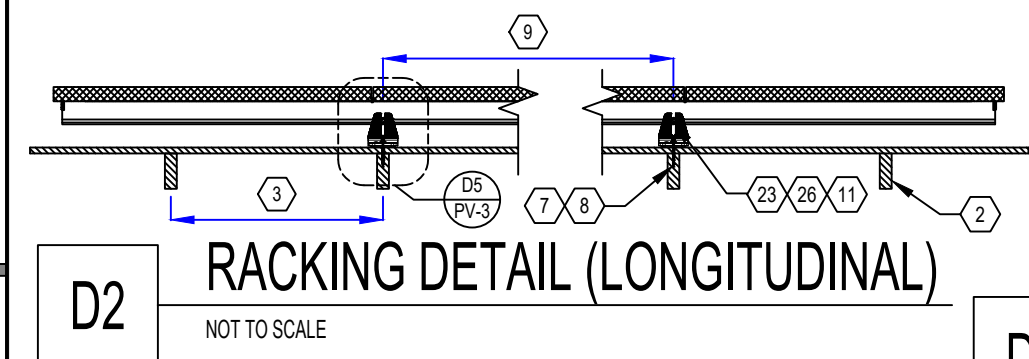
[illegible]



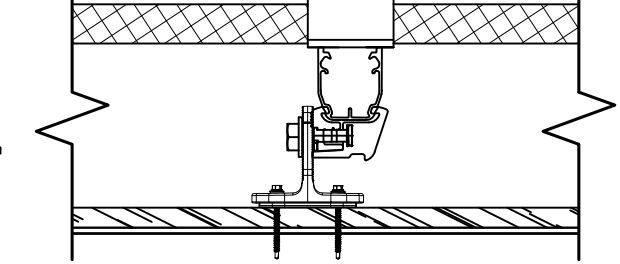
**D1.1** RACKING DETAIL (TRANSVERSE)  
NOT TO SCALE

**D1.2** RACKING DETAIL (TRANSVERSE)  
NOT TO SCALE

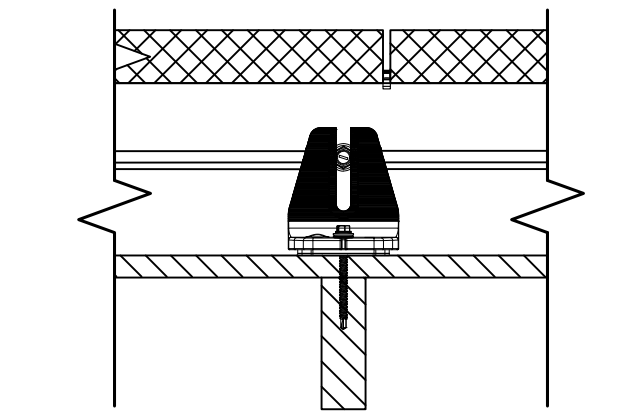
**D1.3** RACKING DETAIL (TRANSVERSE)  
NOT TO SCALE



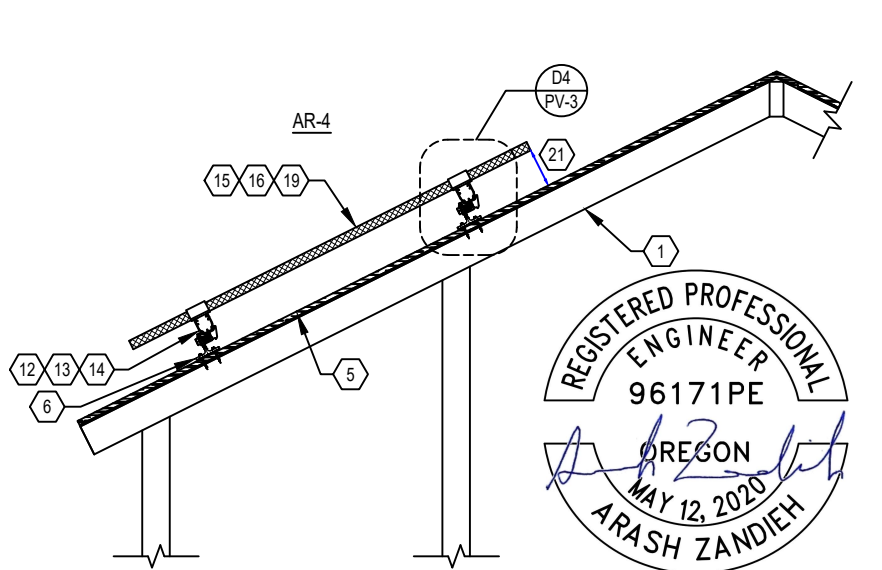
**D3** RACKING DETAIL (TOP)  
NOT TO SCALE



**D4** DETAIL (TRANSVERSE)  
NOT TO SCALE



**D5** DETAIL (LONGITUDINAL)  
NOT TO SCALE



**D1.4** RACKING DETAIL (TRANSVERSE)  
NOT TO SCALE

NOTES:  
FOR ARRAY 1 ROOF, ATTACH SISTER RAFTERS ON 4 RAFTERS.  
THE PE-CALCULATED MAX ALLOWABLE SPAN WITHOUT SISTERING IS 8' 9".  
FOR ARRAY 3 ROOF, CORRECT THE STRUCTURE WITH KNEE BRACES TO  
THE BEARING WALL. AFTER CORRECTION, THE MAX SPAN WILL BE NO  
GREATER THAN THE PE-CALCULATED MAXIMUM OF 7'.

**SHEET KEYNOTES**

1. ROOF STRUCTURE: AR1 - AR3, AR5: SINGLE SPAN RAFTER; AR4: RAFTERS SUPPORTED BY LBW
2. RAFTER SIZE: 2X4 IN. NOMINAL
3. RAFTER SPACING: AR1, AR2, AR4, AR5: 24"; AR3: 32 IN. O.C.
4. MAX. RAFTER SPAN: AR1: 7 FT. - 3 IN., AR2: 8 FT. - 9 IN., AR3: 7 FT., AR4: 4 FT. - 6 IN., AR5: 7 FT. - 3 IN.
5. ROOF MATERIAL: COMP. SHINGLE
6. ROOF ATTACHMENT TYPE: IRONRIDGE HUG
7. LAG BOLT DIAMETER: 5/16 IN.
8. LAG BOLT EMBEDMENT: 2 1/2 IN.
9. MAX. HORIZONTAL STANDOFF: AR1, AR2, AR4, AR5: 48"; AR3: 64 IN.
10. MAX. VERTICAL STANDOFF: LANDSCAPE: 26 IN., PORTRAIT: 33 IN.
11. STANDOFF STAGGERING: YES
12. RAIL MANUFACTURER (OR EQUIV.): IRONRIDGE
13. RAIL MODEL (OR EQUIVALENT): AIRE RAIL A1
14. RAIL WEIGHT: 0.45 PLF
15. MODULE MANUFACTURER: REC SOLAR
16. MODULE MODEL: REC460AA PURE-RX
17. MODULE LENGTH: 68"
18. MODULE WIDTH: 47.4"
19. MODULE WEIGHT: 50 LBS.
20. SEE PV-2 FOR DIMENSION(S)
21. MODULE CLEARANCE: 0'-4"
22. MODULE MIN. FIRE OFFSET: 12" FROM RIDGE, 0" FROM HIPS, 6" FROM VALLEYS (IF ANY)
23. TOTAL # OF ATTACHMENTS: 68.
24. TOTAL AREA: 492.43 SQ. FT.
25. TOTAL WEIGHT: 1234.76 LBS.
26. WEIGHT PER ATTACHMENT: 18.16 LBS.
27. DISTRIBUTED LOAD: 2.51 PSF

CONTRACTOR  
EARTHLIGHT TECHNOLOGIES  
812 McCLAIN ST  
SILVERTON, OR 97381  
PHONE: 503-874-4142  
CONTRACTOR LICENSE: 201408



CARMEL BENDER RESIDENCE  
RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION  
506 21ST ST NE, SALEM, OR 97301  
ASSESSOR'S #: 073W26AA09900  
PHONE: 503-544-9909

ASSEMBLY DETAILS			PAGE: <b>PV-3</b>
SYSTEM AC SIZE @ STC: 8.360 kW	SYSTEM DC SIZE @ STC: 10.120 kW		
(22) REC SOLAR REC460AA PURE-RX MODULES (22) ENPHASE IQ8X-80-M-US MICROINVERTERS			
DRAWN: V.D. CHECKED: D.A.	REV: PERMIT SET	DATE: 12/31/2024	



SOLAR'S MOST TRUSTED



# REC ALPHA<sup>®</sup> PURE-RX SERIES

## DATASHEET

470 W<sub>P</sub>

22.6% EFFICIENCY

21 W/FT<sup>2</sup>

9 A MODULE CURRENT  
COMPATIBLE WITH MLPE

PRODUCT  
REC  
25 YEAR  
PROTRUST  
WARRANTY  
PERFORMANCE

ELIGIBLE

EXPERIENCE



PERFORMANCE



REC ALPHA<sup>®</sup> PURE-RX SERIES

DATASHEET



GENERAL DATA

Cell Type	88 half-cut bifacial REC heterojunction cells, with gapless technology
Glass	0.13 in. solar glass with anti-reflective surface treatment in accordance with EN12150
Backsheet	Highly resistant polymer (Black)
Frame	Anodized aluminum (Black)
Junction Box	4-part, 4 bypass diodes, IP68 rated, in accordance with IEC 62790
Connectors	Stäubli MC4 PV-KBT4/KST4 (12AWG) in accordance with IEC 62852 IP68 only when connected
Cable	12 AWG solar cable, 66.9 in. + 66.9 in. in accordance with EN50618
Dimensions	68 x 47.4 x 1.2 in. (22.4 ft <sup>2</sup> )
Weight	50 lbs
Origin	Made in Singapore

Measurements in inches



ELECTRICAL DATA

PRODUCT CODE<sup>1</sup>: RECxxxAA Pure-RX

Power Output - P <sub>MAX</sub> (W <sub>p</sub> )	450	460	470
Watt Class Sorting - (W)	0/+10	0/+10	0/+10
Nominal Power Voltage - V <sub>MPP</sub> (V)	54.3	54.9	55.4
Nominal Power Current - I <sub>MPP</sub> (A)	8.29	8.38	8.49
Open Circuit Voltage - V <sub>OC</sub> (V)	65.1	65.3	65.6
Short Circuit Current - I <sub>SC</sub> (A)	8.81	8.88	8.95
Power Density (W/ft <sup>2</sup> )	20.1	20.5	21.0
Panel Efficiency (%)	21.6	22.1	22.6

STC

Values at standard test conditions (STC: air mass AM1.5, irradiance 1000 W/m<sup>2</sup>, temperature 77°F (25°C), based on a production spread with a tolerance of P<sub>MAX</sub> V<sub>OC</sub> & I<sub>SC</sub> ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM1.5, irradiance 800 W/m<sup>2</sup>, temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s)). <sup>1</sup>Where xxx indicates the nominal power class (P<sub>MAX</sub>) at STC above.

NMOT

Power Output - P <sub>MAX</sub> (W <sub>p</sub> )	343	350	358
Nominal Power Voltage - V <sub>MPP</sub> (V)	51.2	51.7	52.2
Nominal Power Current - I <sub>MPP</sub> (A)	6.70	6.77	6.86
Open Circuit Voltage - V <sub>OC</sub> (V)	61.3	61.6	61.8
Short Circuit Current - I <sub>SC</sub> (A)	7.11	7.17	7.23

Values at standard test conditions (STC: air mass AM1.5, irradiance 1000 W/m<sup>2</sup>, temperature 77°F (25°C), based on a production spread with a tolerance of P<sub>MAX</sub> V<sub>OC</sub> & I<sub>SC</sub> ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM1.5, irradiance 800 W/m<sup>2</sup>, temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s)). <sup>1</sup>Where xxx indicates the nominal power class (P<sub>MAX</sub>) at STC above.

MAXIMUM RATINGS\*

Operational Temperature	-40 °F - 185 °F
System Voltage	1000 V
Maximum Test Load (front)	+7000 Pa (146 lb/ft <sup>2</sup> )
Maximum Test Load (rear)	-4000 Pa (83.4 lb/ft <sup>2</sup> )
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 <sub>MAX</sub>	-0.24% /K
Temperature coefficient of V <sub>OC</sub>	-0.24% /K
Temperature coefficient of I <sub>SC</sub>	0.04% /K

\* The temperature coefficients stated are linear values

DELIVERY INFORMATION

Panels per Pallet	33
Panels per 40 ft GP/high cube container	594 (18 Pallets)
Panels per 53 ft truck	792 (24 Pallets)

Available from:

LOW LIGHT BEHAVIOR

Typical low irradiance performance of module at STC:



REC Solar PTE. LTD.

20 Tuas South Ave. 14  
Singapore 637312  
post@recgroup.com  
www.recgroup.com



FOR OFFICIAL USE

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW

SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES

(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.

CHECKED: D.A.

REV: PERMIT SET

DATE: 12/31/2024

PAGE:  
PV-8

CONTRACTOR

EARTHLIGHT TECHNOLOGIES  
812 McCLAIN ST  
SILVERTON, OR 97381  
PHONE: 503-874-4142  
CONTRACTOR LICENSE: 201408



CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION  
506 21ST ST NE, SALEM, OR 97301  
ASSESSOR'S #: 073W26AA09900  
PHONE: 503-544-9909





PRELIMINARY DATASHEET



# IQ8X Microinverter

Our newest IQ8 Series Microinverters are the industry’s first microgrid-forming\*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid mode. This chip is built using advanced 55-nm technology with high-speed digital logic and superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

IQ8X Microinverter is the latest addition to this family, designed to support PV modules with high input DC voltage and cell counts, such as 80-half-cut cells, 88-half-cut cells and 96-cells.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to the IQ8 Series Microinverters with integrated MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conform with regulations when installed according to the manufacturer’s instructions.

\*Meets UL 1741 only when installed with IQ System Controller 2 and 3.

© 2023 Enphase Energy. All rights reserved. Enphase, the e and CC logos, IQ, and certain other marks listed at <https://enphase.com/trademark-usage-guidelines> are trademarks of Enphase Energy, Inc. in the US and other countries. Data subject to change.

IQ8X-MC4-DSH-00185-2.0-EN-US-2023-11-16

## IQ8X Microinverter

INPUT DATA (DC)	UNIT	IQ8X-80-M-US
Commonly used module pairings <sup>1</sup>	W	320–540
Module compatibility	—	To meet compatibility, PV modules must be within the following maximum input DC voltage and maximum module I <sub>sc</sub> . Module compatibility can be checked at <a href="https://enphase.com/installers/microinverters/calculator">https://enphase.com/installers/microinverters/calculator</a>
MPPT voltage range	V	43–60
Operating range	V	25–79.5
Minimum and maximum start voltage	V	30–79.5
Maximum input DC voltage	V	79.5
Maximum continuous operating DC current	A	10
Maximum input DC short-circuit current	A	16
Maximum module I <sub>sc</sub>	A	13
Overvoltage class DC port	—	II
DC port backfeed current	mA	0
PV array configuration	—	Ungrounded array; no additional DC side protection required; AC side protection requires maximum 20 A per branch circuit

OUTPUT DATA (AC)	UNIT	IQ8X-80-M-US @240 VAC	IQ8X-80-M-US @208 VAC
Peak output power	VA	384	366
Maximum continuous output power	VA	380	360
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120° <sup>4</sup>
Minimum and maximum grid voltage <sup>2</sup>	V	211–264	183–229
Max. continuous output current	A	1.58	1.73
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short circuit fault current over three cycles	A <sub>rms</sub>	2.70	
Maximum units per 20 A (L-L) branch circuit <sup>3</sup>	—	10	9
Total harmonic distortion	%	<5	
Overvoltage class AC port	—	III	
AC port backfeed current	mA	18	
Power factor setting	—	1.0	
Grid-tied power factor (adjustable)	—	0.85 leading ... 0.85 lagging	
Peak efficiency	%	97.3	97.0
CEC weighted efficiency	%	96.5	96.5
Nighttime power consumption	mW	26	12

MECHANICAL DATA	
Ambient temperature range	–40°C to 65°C (–40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type	Stäubli MC4
Dimensions (H × W × D); Weight	212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Approved for wet locations; Pollution degree	Yes; PD3
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environmental category; UV exposure rating	NEMA Type 6; outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer’s instructions.

(1) No enforced DC/AC ratio.  
(2) Nominal voltage range can be extended beyond nominal if required by the utility.  
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.  
(4) IQ8X is not certified for use with Enphase Three Phase Network Protection Relay (NPR-3P-208-NA) and therefore designed for single-phase operation only. Check with the local utility requirements if you wish to install single phase inverter across three phases.

IQ8X-MC4-DSH-00185-2.0-EN-US-2023-11-16

FOR OFFICIAL USE

### CONTRACTOR

EARTHLIGHT TECHNOLOGIES  
812 McCLAIN ST  
SILVERTON, OR 97381  
PHONE: 503-874-4142  
CONTRACTOR LICENSE: 201408



### CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION  
506 21ST ST NE, SALEM, OR 97301  
ASSESSOR'S #: 073W26AA09900  
PHONE: 503-544-9909

### RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW      SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES  
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.  
CHECKED: D.A.

REV: PERMIT SET

DATE:  
12/31/2024

PAGE:

PV-9



DATA SHEET



X-IQ-AM1-240-5  
X-IQ-AM1-240-5C

## IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provide a complete grid-agnostic Enphase Energy System.



**IQ Series Microinverters**  
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) simplify the installation process.



**IQ System Controller 3/3G**  
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.



**IQ Battery 5P**  
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.



**IQ Load Controller**  
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.



5-year limited warranty

\*For country-specific warranty information, see the <https://enphase.com/installers/resources/warranty> page.

© 2024 Enphase Energy. All rights reserved. Enphase, the e and CC logos, IQ, and certain other marks listed at <https://enphase.com/trademark-usage-guidelines> are trademarks of Enphase Energy, Inc. in the U.S. and other countries. Data subject to change.

IQC-5-5C-DSH-00007-3.0-EN-US-2024-03-01

## IQ Combiner 5/5C

MODEL NUMBER	
IQ Combiner 5 (X-IQ-AM1-240-5)	IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (± 2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat.
IQ Combiner 5C (X-IQ-AM1-240-5C)	IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%) and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05) <sup>1</sup> . Includes a silver solar shield to deflect heat.
WHAT'S IN THE BOX	
IQ Gateway printed circuit board	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System
Busbar	80 A busbar with support for 1 × IQ Gateway breaker and 4 × 20 A breaker for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%
Consumption CT	Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5%
IQ Battery CT	One battery metering clamp CT, shipped with the box, accurate up to ±2.5%
CTRL board	Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P
Enphase Mobile Connect (only with IQ Combiner 5C)	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan
Accessories kit	Spare control headers for the COMMS-KIT-02 board
ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY)	
CELLMODEM-M1-06-SP-05	4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan
CELLMODEM-M1-06-AT-05	4G-based LTE-M1 cellular modem with a 5-year AT&T data plan
Circuit breakers (off-the-shelf)	Supports Eaton BR2XX, Siemens Q2XX and GE/ABB THQL21XX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with the hold-down kit.
Circuit breakers (provided by Enphase)	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the "Accessories" section)
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 5/5C
XA-ENV2-PCBA-5	IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws)
XA-COMMS2-PCBA-5	Replacement COMMS-KIT-02 printed circuit board (PCB) for IQ Combiner 5/5C
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage and frequency	120/240 VAC, 60 Hz
Busbar rating	125 A
Fault current rating	10 kAIC
Maximum continuous current rating (input from PV/storage)	64 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	80 A of distributed generation/95 A with IQ Gateway breaker included
IQ Gateway breaker	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-CLAMP)	A pair of 200 A clamp-style current transformers is included with the box
IQ Battery metering CT	200 A clamp-style current transformer for IQ Battery metering, included with the box

1. A plug-and-play industrial-grade cell modem for systems of up to 60 microinverters. Available in the United States, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.

IQC-5-5C-DSH-00007-3.0-EN-US-2024-03-01

### CONTRACTOR

EARTHLIGHT TECHNOLOGIES  
812 McCLAIN ST  
SILVERTON, OR 97381  
PHONE: 503-874-4142  
CONTRACTOR LICENSE: 201408



### CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION  
506 21ST ST NE, SALEM, OR 97301  
ASSESSOR'S #: 073W26AA09900  
PHONE: 503-544-9909

### RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW      SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES  
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.  
CHECKED: D.A.

REV: PERMIT SET

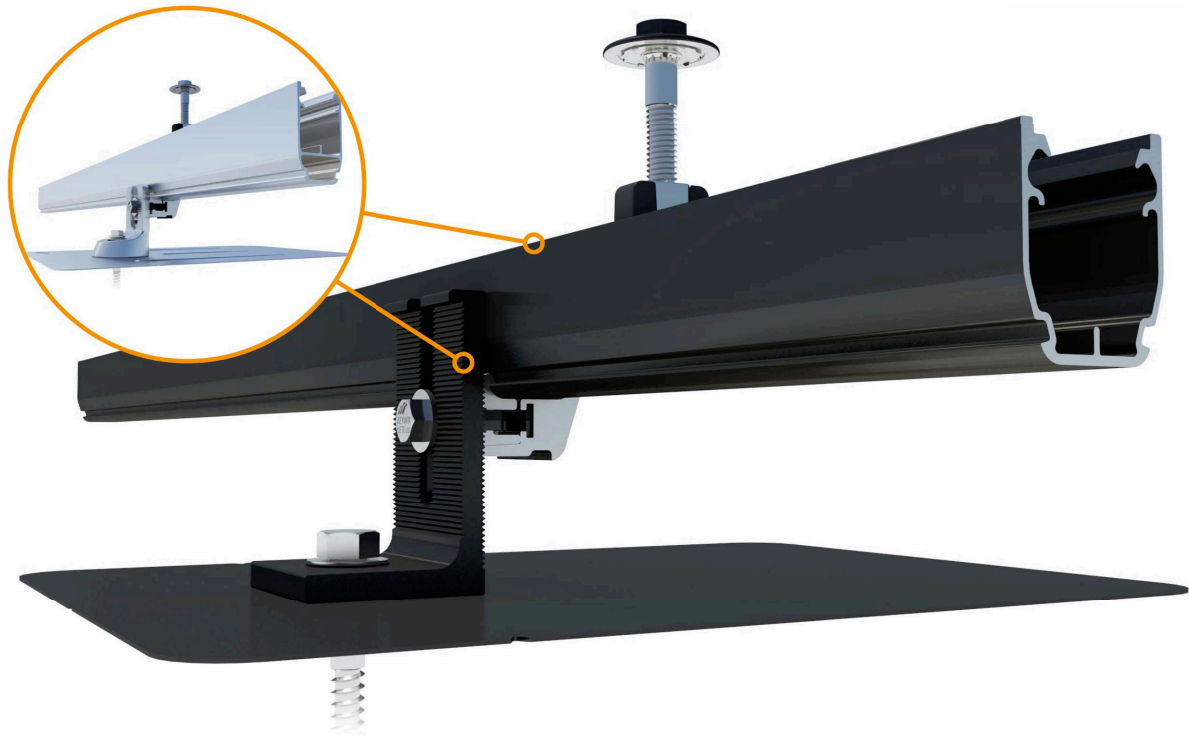
DATE:  
12/31/2024

PV-10





# Aire™ Racking System



## Breathe easy with accelerated installations.

The Aire™ racking system has been carefully crafted to streamline every part of the installation process, taking out all of the tiresome hassles—so that you get off the roof and on to your next project faster than ever.

Aire™ retains the strength and reliability that IronRidge installers have come to depend on. Whether you're a seasoned installer with years under your belt or just getting started in solar, breathe easy with open Aire™.



### Strength Tested

All components have been evaluated for superior structural performance.



### Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof structure.



### UL 2703 Listed System

Entire system and components meet the latest effective UL 2703 standards.



### PE Certified

Pre-stamped engineering letters are available online for most states.



### Design Assistant

Free online software makes it simple to create, share, and price projects.



### 25-Year Warranty

Products are guaranteed to arrive without any impairing defects.

Datasheet

One-Tool System - 1/2" Hex-Head Components

Datasheet

## Rails

### Aire™ A1 Rail



The lighter, open Aire™ rail for standard conditions.

- 6' spanning capability
- Wire management tray
- Mill or anodized black

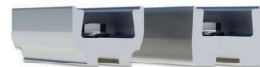
### Aire™ A2 Rail



The tougher, open Aire™ rail for higher load capacity.

- 8' spanning capability
- Wire management tray
- Mill or anodized black

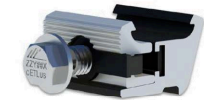
### Aire™ Rail Ties



Structurally connect and bond Aire™ Rails together.

- Reinstallable, up to 5x
- Internal splice design
- No more splice rules

### Aire™ Dock



Connects Aire™ Rails to attachments with ease.

- Clicks on, slides easily
- Drops into open slots
- Anodized assembly

## Clamps & Grounding

### Aire™ Lock Mids



Securely bond between modules to Aire™ Rails.

- Fits 30-40mm modules
- Utilizes UFO® design
- Minimal 1/2" gap

### Aire™ Lock Ends



Securely bond modules to Aire™ Rails along ends.

- Fits 30-40mm modules
- Easy rail engagement
- Clean aesthetics

### Aire™ Lock Stealth



Securely bonds modules to rail ends, entirely hidden.

- Angled for easy install
- Robust tether leash
- Fits most modules

### Aire™ Lug



Bonds Aire™ Rails to grounding conductors.

- Simplified with single bolt
- Low-profile form factor
- Works with 10-6 AWG

## Accessories

### Aire™ Caps



Block entry and provide a finished look to Aire™ Rails.

- Stay secure on rail ends
- Symmetrical, with drain
- Cover rough-cut ends

### Aire™ Clip



Keeps wiring contained in open Aire™ Rail channels.

- No module interference
- Simple press-in design
- Slot for easy removal

### Aire™ MLPE Mount



Securely bonds MLPE and accessories to Aire™ Rails.

- Glove-friendly installation
- Lays flush in rail channel
- Low profile form factor

### Aire™ All Tile Hook



Attaches rails to tile roofs, with Aire™ Dock included.

- Works on flat, S, & W tiles
- Single-socket installation
- Optional deck flashing

## Resources



### Design Assistant

Quickly go from rough layout to fully engineered system.

Go to [IronRidge.com/design](https://IronRidge.com/design)



### Approved for FL Hurricane Zones

Aire™ has Florida Product Approval. Additional details can be found on the Florida Building Code website.

Learn More at [bit.ly/florida-aire](https://bit.ly/florida-aire)

© 2023 IronRidge, Inc. All rights reserved. U.S. Patents Pending. Version 1.01

## CONTRACTOR

EARTHLIGHT TECHNOLOGIES  
812 McCLAIN ST  
SILVERTON, OR 97381  
PHONE: 503-874-4142  
CONTRACTOR LICENSE: 201408



## CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION  
506 21ST ST NE, SALEM, OR 97301  
ASSESSOR'S #: 073W26AA09900  
PHONE: 503-544-9909

## RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES  
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.  
CHECKED: D.A.

REV: PERMIT SET

DATE:  
12/31/2024

PV-11