



Historic Preservation Services
 Community Development & Neighborhood Services
 281 North College Avenue
 P.O. Box 580
 Fort Collins, CO 80522.0580
 970.224.6078
preservation@fcgov.com
fcgov.com/historicpreservation

CERTIFICATE OF APPROPRIATENESS

ISSUED: April 17, 2024

EXPIRATION: April 17, 2025

Sarah C. Fonte
 1605 Sheely Dr.
 Fort Collins, CO 80526

Dear Sarah Fonte:

As you are aware, last evening the Historic Preservation Commission gave Final Design Review approval for the work you are proposing for the Moyer House, at 1605 Sheely Dr. in the Sheely Drive Landmark District.

More specifically, the Commission approved:

1. Installation of flush-mount rooftop solar panels (see attached plans for details)

Applicable Code Standard	Summary of Code Requirement and Analysis (Rehabilitation)	Standard Met (Y/N)
SOI #1	<p><i>A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.</i></p> <p>This solar project will not change the residential use of the property.</p>	Y
SOI #2	<p><i>The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.</i></p> <p>No distinctive materials will be removed for this proposed solar panel project. Although the panels will be located toward the front of the house, the location conforms to the solar policy adopted by the Historic Preservation Commission 4/17/2024, exceeding the required 8” setback from the roof ridge and edge for flush-mounted solar panels on post-1950 buildings, and so this Standard is considered met.</p>	Y

SOI #3	<p><i>Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.</i></p> <p>The proposed solar panel system is clearly a modern feature, which avoids creating a false sense of historical development. This Standard is considered met.</p>	Y
SOI #4	<p><i>Changes to a property that have acquired historic significance in their own right will be retained and preserved.</i></p>	N/A
SOI #5	<p><i>Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.</i></p> <p>Because the proposed solar panels could easily be removed, and because their physical impact is limited to the roof, the distinctive materials, features, finishes, construction techniques, and examples of craftsmanship characteristic of this property will be preserved, and so this Standard is considered met.</p>	Y
SOI #6	<p><i>Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.</i></p>	N/A
SOI #7	<p><i>Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.</i></p>	N/A
SOI #8	<p><i>Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.</i></p>	N/A
SOI #9	<p><i>New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.</i></p> <p>The installation of roof-mounted solar panels will not destroy historic roof material and would clearly be a modern addition. For those reasons, this Standard is met.</p>	Y

SOI #10	<p><i>New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.</i></p> <p>The solar panels could be removed in the future without impacting the integrity of the historic home and its environment, and so this Standard is met.</p>	Y
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The Commission found that the proposed work meets the criteria and standards in Chapter 14, [Article IV](#) of the Fort Collins Municipal Code and the rooftop solar policy adopted by the Commission on April 17, 2024. Notice of the approved application has been forwarded to building and zoning staff to facilitate the processing of any permits that are needed for the work.

Please note that all ensuing work must conform to the approved plans. Any non-conforming alterations are subject to stop-work orders, denial of Certificate of Occupancy, and restoration requirements and penalties.

If the approved work is not completed prior to the expiration date noted above, you may apply for an extension by contacting staff at least 30 days prior to expiration. Extensions may be granted for up to 12 additional months, based on a satisfactory staff review of the extension request.

You may appeal this decision within two weeks by submitting a written notice of appeal to the City Clerk within fourteen (14) calendar days of this decision. Grounds and process for appeals are enumerated in Chapter 2, [Division 3](#) of the Fort Collins Municipal Code.

If you have any questions regarding this approval, or if I may be of any assistance, please do not hesitate to contact staff at preservation@fcgov.com or at (970) 224-6078.

Sincerely,

Jim Rose, Chair
Historic Preservation Commission

Design Review Application Historic Preservation Division

Fill this form out for all applications regarding designated historic buildings within the city limits of the City of Fort Collins. Review is required for these properties under Chapter 14, [Article IV](#) of the Fort Collins Municipal Code.

Applicant Information

Applicant's Name	Daytime Phone	Evening Phone
Mailing Address (for receiving application-related correspondence)	State	Zip Code
Email		

Property Information (put N/A if owner is applicant)

Owner's Name	Daytime Phone	Evening Phone
Mailing Address (for receiving application-related correspondence)	State	Zip Code
Email		

Project Description

Provide an overview of your project. Summarize work elements, schedule of completion, and other information as necessary to explain your project.

The following attachments are REQUIRED:

- Complete Application for Design Review
- Detailed Scope of Work (and project plans, if available)
- Color photos of existing conditions

Reminders:

Complete application would need all of checklist items as well as both pages of this document.

Detailed scope of work should include measurements of existing and proposed.

Please note: if the proposal includes partial or full demolition of an existing building or structure, a separate demolition application may need to be approved.

Additional documentation may be required to adequately depict the project, such as plans, elevations, window study, or mortar analysis. If there is insufficient documentation on the property, the applicant may be required to submit an intensive-level survey form (at the applicant's expense).

Required Additional information

The following items must be submitted with this completed application. Digital submittals preferred for photographs, and for other items where possible.

- At least one current photo for each side of the house. Photo files or prints shall be named/labeled with applicant name and elevation. For example, smitheast.jpg, smithwest.jpg, etc. If submitted as prints, photos shall be labeled
- Photos for each feature as described in the section "Detail of Proposed Rehabilitation Work." Photo files or prints shall be named or labeled with applicant name and feature letter. For example, smitha1.jpg, smitha2.jpg, smithb.jpg, smithc.jpg, etc.

Depending on the nature of the project, one or more of the following items shall be submitted. Your contractor should provide these items to you for attachment to this application.

- Drawing with dimensions.
- Product specification sheet(s).
- Description of materials included in the proposed work.
- Color sample(s) or chip(s) of all proposed paint colors.

Partial or full demolition is a part of this project.

Partial demolition could include scopes such as taking off existing rear porches to create space for a new addition or removing an existing wall or demolishing a roof. If you are taking away pieces of the existing residence, you are likely undergoing some partial demolition.

Signature of Owner

Date



PHOTOVOLTAIC ROOF MOUNT AND ENERGY SYSTEM

18 MODULES - SYSTEM SIZE STC (7.290 kW DC / 6.282 kW AC)
 1605 SHEELY DRIVE, FORT COLLINS, CO 80526, USA (40.5664710, -105.0922078)



SYSTEM SUMMARY STC (7.290 kW DC / 6.282 kW AC)

- STC DC: (18) 405W = 7.290 kW
- STC AC: (18) 349W = 6.282 kW
- STORAGE: (3) 3.84kW 5.0kWh = 11.52kW 15.0kWh
- (18) REC SOLAR REC405AA PURE (405W) MODULES
- (18) ENPHASE ENERGY INC. IQ8A-72-2-US 240V MICROINVERTERS
- (3) ENPHASE ENERGY INC. IQ BATTERY 5P
- 2x BRANCHES OF 9 CONNECTED IN PARALLEL

GOVERNING CODES

- 2021 INTERNATIONAL FIRE CODE
- 2021 INTERNATIONAL BUILDING CODE
- 2021 INTERNATIONAL RESIDENTIAL CODE
- 2023 NFPA 70 - NATIONAL ELECTRICAL CODE

GENERAL NOTES

- ALL PANELS, SWITCHES, ETC. SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS IN COMPLIANCE WITH UL REQUIREMENTS TO ACCOMMODATE CONDUCTORS SHOWN.
- THIS SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND UTILITY IS OBTAINED.
- ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT INCLUDING THOSE THAT ARE EXPOSED TO OUTSIDE ENVIRONMENT SHALL BE WEATHERPROOF AND SHALL BE LISTED BY 'UL' FOR THE TYPE OF APPLICATION AND 'UL' LABEL SHALL APPEAR ON ALL ELECTRICAL EQUIPMENT.
- WIRING METHOD SHALL BE EMT ABOVE GROUND MOUNTED IN CONCEALED SPACES (UNLESS APPROVED OTHERWISE) AND SCHEDULE-40 PVC FOR BELOW GROUND INSTALLATIONS UNLESS NOTED OTHERWISE.
- AN OSHA APPROVED LADDER PROVIDING ACCESS TO ALL PORTIONS OF THE ARRAY SHALL BE SECURED IN PRIOR TO REQUESTING INSPECTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE CONDUCTOR IF NECESSARY.
- IQ BATTERY UNITS SHOULD NOT BE INSTALLED IN DIRECT SUNLIGHT.

SHEET INDEX

- PV-1 COVER PAGE
- PV-2 ROOF PLAN WITH MODULES
- PV-3 ATTACHMENT DETAIL
- PV-3.1 EQUIPMENT ELEVATION
- PV-4 SINGLE LINE DIAGRAM
- PV-5 WIRING CALCULATION
- PV-6 PLACARDS
- PV-7+ EQUIPMENT SPECIFICATION

AHJ: FORT COLLINS (CITY OF), COLORADO
 UTILITY: FORT COLLINS UTILITIES

CONTRACTOR: WWW.REENERGIZECO.COM
 ADDRESS: 1805 E. 58TH AVE UNIT K DENVER CO 80216 USA
 PHONE: 9709885682
 EMAIL: mchener@reenergizeco.com
 LICENSE #: EC 0102500
 ELECTRICAL LICENSE #: ME-3001100, EC-0102500 - REenergizeCO

REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

SARAH & STEVEN FONTE
 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

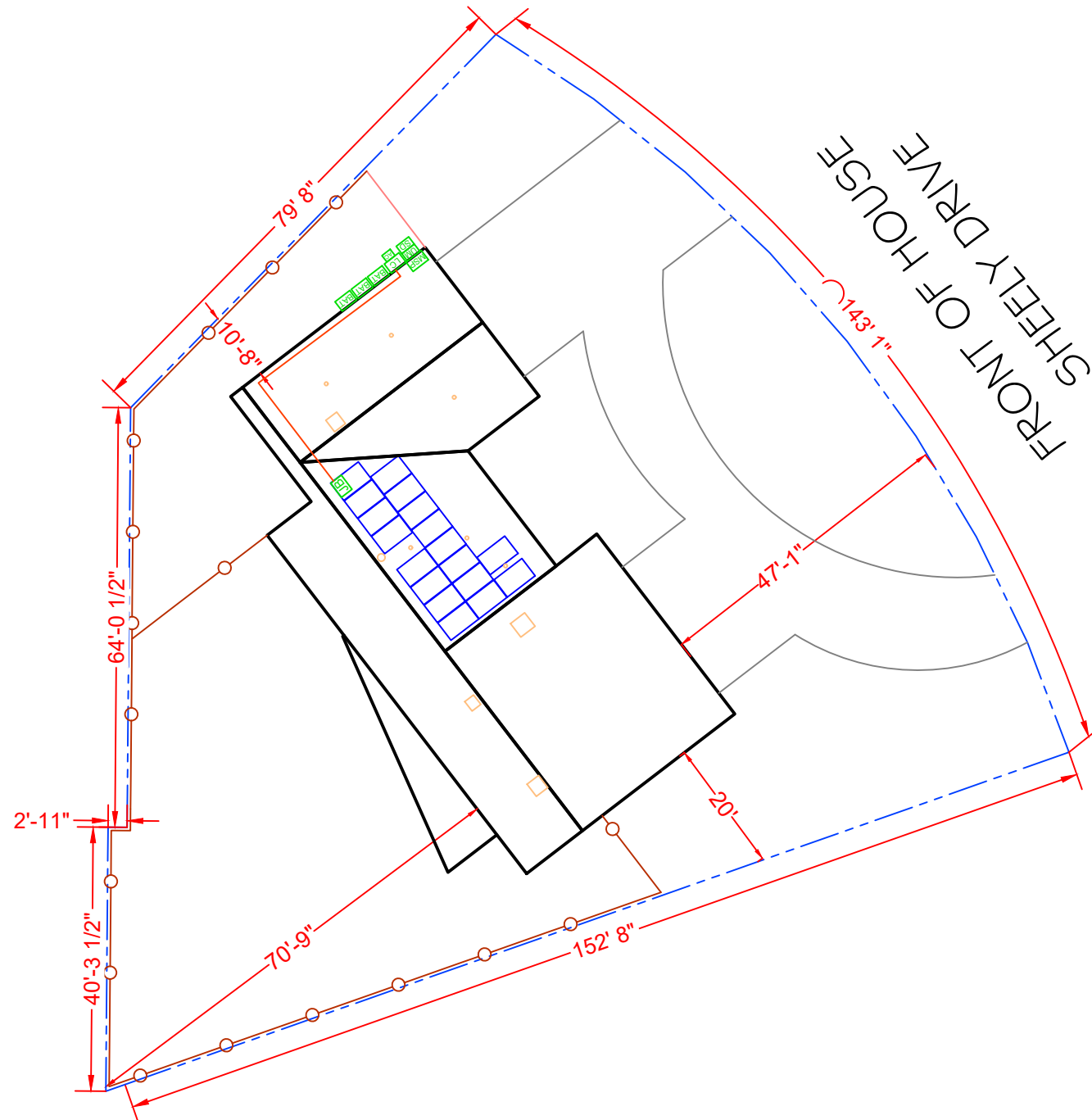
COVER PAGE

SHEET SIZE

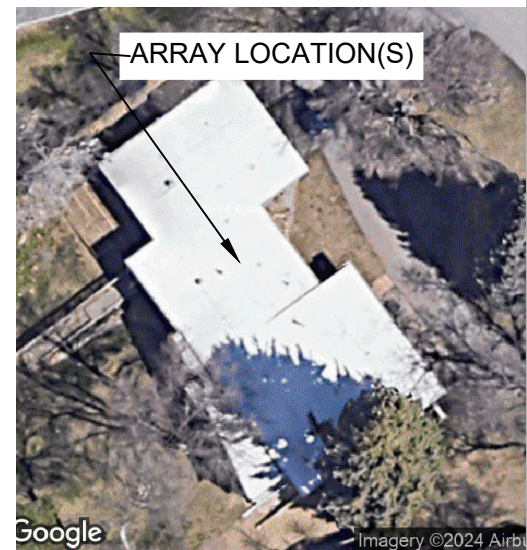
ANSI B
 11" X 17"

SHEET NUMBER

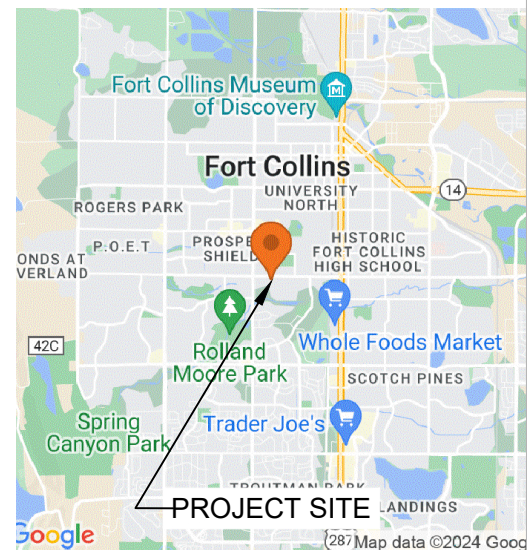
PV-1



SITE PLAN
 SCALE: 1/24" = 1'-0"



HOUSE PHOTO
 SCALE: NTS



VICINITY MAP
 SCALE: NTS



MODULE AREA & WEIGHT CALCULATIONS

- PANEL TYPES (COUNT, AREA, WEIGHT):
- (18x) REC SOLAR REC405AA PURE (405W) (71.7" x 40.0", 45.2 LB)
- MICRO-INVERTER TYPES (COUNT, WEIGHT):
- (18x) ENPHASE ENERGY INC. IQ8A-72-2-US 240V (2.38 LB)
- ATTACHMENT COUNT: 42
 MOUNTING SYSTEM WEIGHT/MODULE: 1.5 LB
 TOTAL ROOF AREA: 3615 SF
- NEW PANELS:
- TOTAL AREA: (18) 71.7" x 40.0" = 358 SF
 - TOTAL WEIGHT: (18) 45.2 + (18) 2.4 + (18) 1.5 = 883 LB
 - WEIGHT PER CONNECTION: 883 LB / 42 = 21.02 LB
 - DISTRIBUTED LOAD: 883 LB / 358 SF = 2.46 PSF
 - ROOF AREA COVERED: 358 SF / 3615 SF = 9.9%

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	18	REC SOLAR REC405AA PURE (405W)
MICRO INVERTERS	18	ENPHASE ENERGY INC. IQ8A-72-2-US 240V
BATTERY	1	ENPHASE ENERGY INC. IQ BATTERY 5P
JUNCTION BOX (AC)	1	JUNCTION BOX 600V, NEMA 3R UL LISTED
COMBINER PANEL (AC)	1	ENPHASE IQ COMBINER 5C
AC DISCONNECT	1	PV VISIBLE LOCKABLE LABELED DISCONNECT (60A UNFUSED 1PH 240VAC)
ATTACHMENTS	42	UNIRAC - FLASHLOC RM
RAIL	9	UNIRAC - SOLARMOUNT LIGHT
RAIL SPLICES	2	RAIL SPLICES
MID CLAMPS	26	MID CLAMPS
END CLAMPS	20	END CLAMPS
GROUNDING LUG	5	GROUNDING LUG

ROOF DESCRIPTION TABLE							
ROOF PLANE	ROOF PITCH	ROOF AZIMUTH	ROOF TYPE	TRUSS SIZE	TRUSS SPACING	ATTACHMENT SPACING	MODULES (PITCH)
#1	7°	53°	MEMBRANE	2" x 4"	24" O.C.	48" O.C.	18 (7°)

ROOF ACCESS POINT

- SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

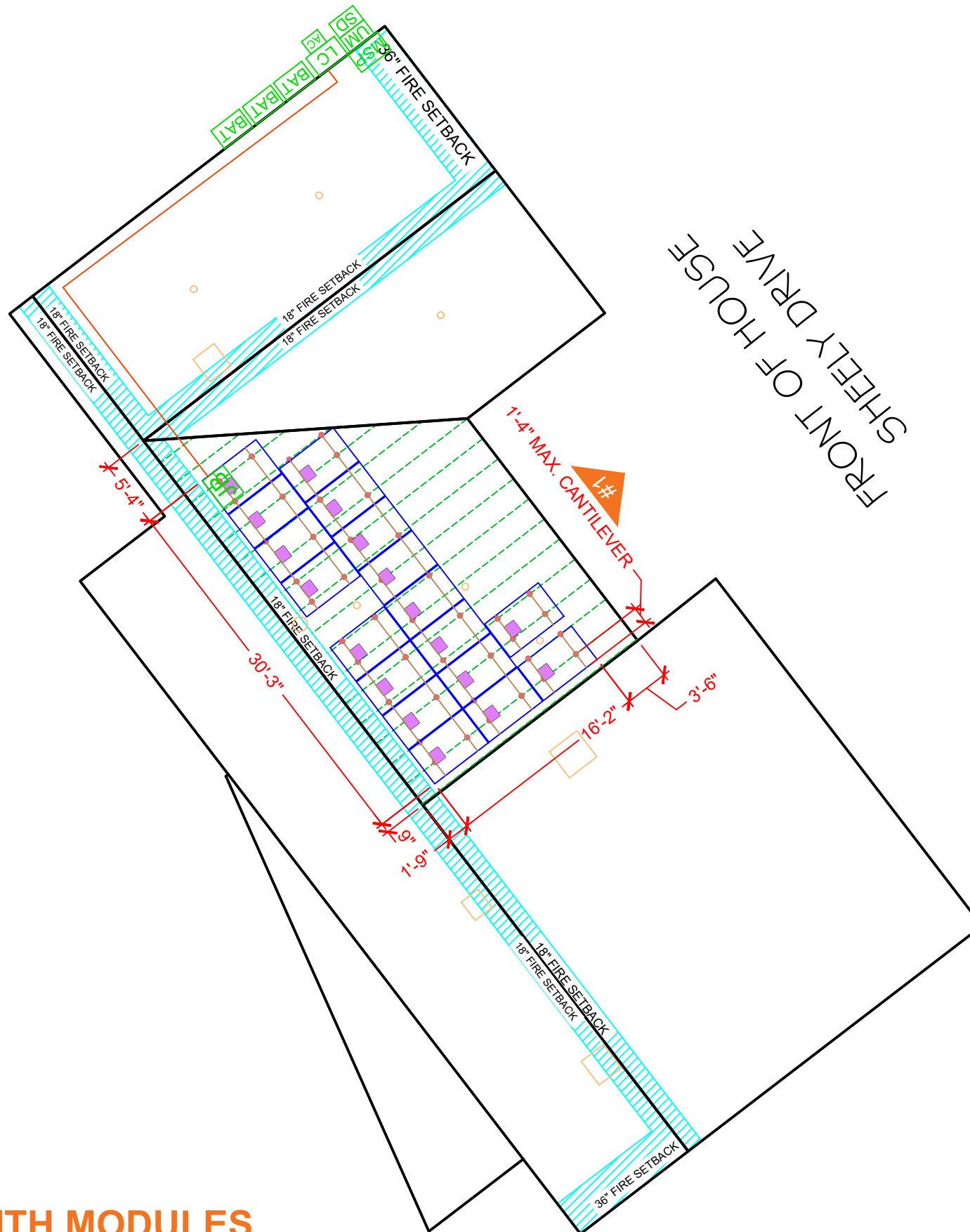
DESIGN CRITERIA

- EXPOSURE CATEGORY = B
- WIND SPEED = 140 MPH
- SNOW LOAD = 35 PSF

LEGEND

	NEW PV MODULE		DIMENSIONS
	FIRE SETBACK		PROPERTY LINE
	MICRO-INVERTER		CONDUIT
	ROOF ATTACHMENT		RAFTER/TRUSS
	ROOF ACCESS POINT		RAIL
			OBSTRUCTION
	BATTERY (NEW)		MAIN SERVICE PANEL (NEW, 200A)
	JUNCTION BOX (NEW)		UTILITY METER (EXISTING)
	AC COMBINER PANEL (NEW)		SERVICE DISCONNECT (EXISTING)
	AC DISCONNECT UNFUSED (NEW)		

ROOF PLAN WITH MODULES
 SCALE: 3/32" = 1'-0"



CONTRACTOR: WWW.REENERGIZECO.COM
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 PHONE: 970985682
 EMAIL: macherer@reenergizeco.com
 LICENSE #: EC 0102500
 ELECTRICAL LICENSE #: ME-3001100, EC-0102500 - REenergizeCO

REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

SARAH & STEVEN FONTE
 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

ROOF PLAN WITH MODULES

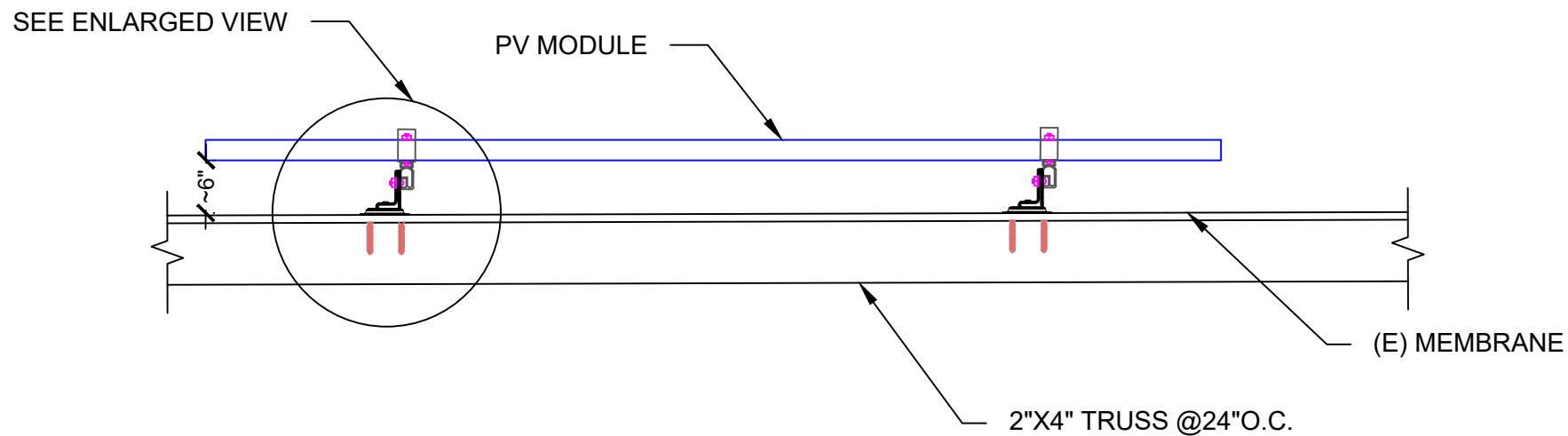
SHEET SIZE

**ANSI B
 11" X 17"**

SHEET NUMBER

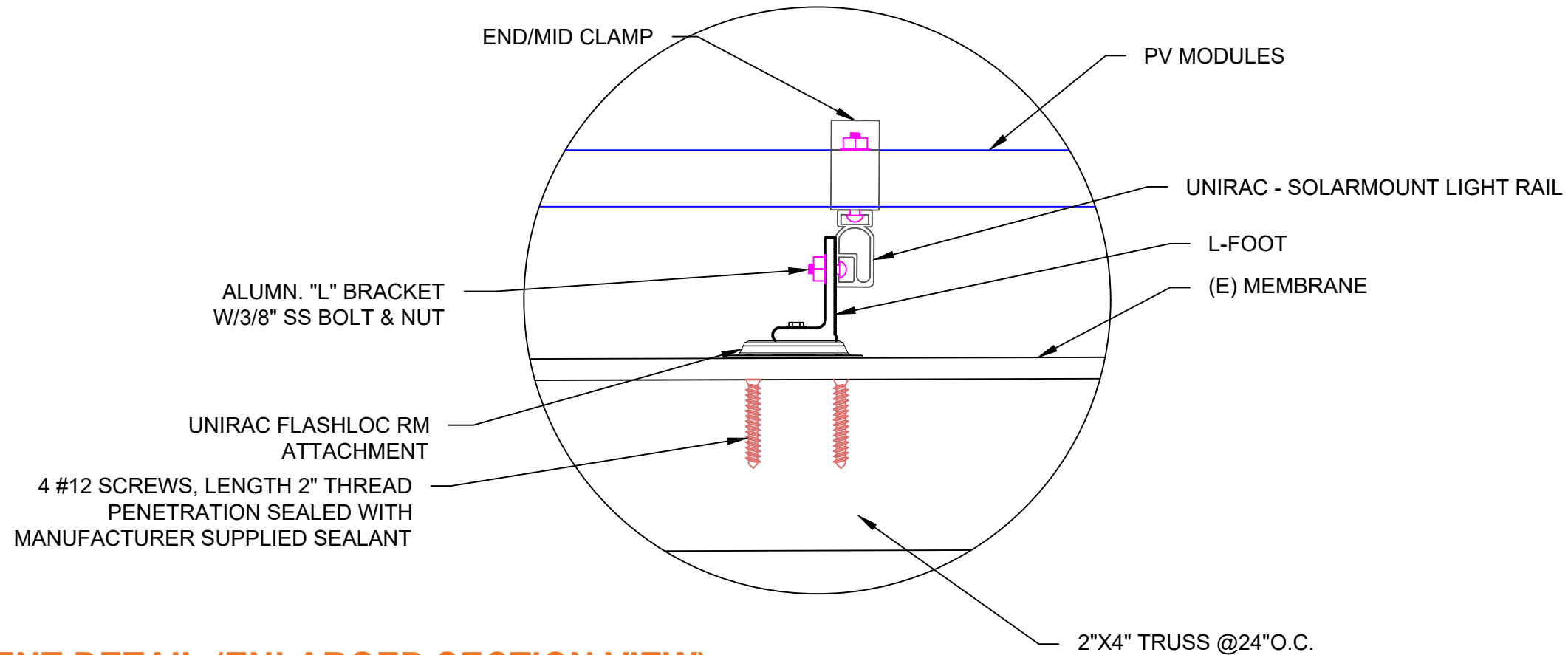
PV-2





ATTACHMENT DETAIL

SCALE: NTS



ATTACHMENT DETAIL (ENLARGED SECTION VIEW)

SCALE: NTS



CONTRACTOR: WWW.REENERGIZECO.COM
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 EMAIL: macher@reenergizeco.com
 LICENSE #: EC 0102500
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REVISIONS

DESCRIPTION	DATE	REV

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HOMEOWNER INFO

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 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

ATTACHMENT
 DETAIL

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-3



CONTRACTOR: WWW.REENERGIZECO.COM
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 ELECTRICAL LICENSE #: ME-3001100, EC-0102500 -
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REVISIONS

DESCRIPTION	DATE	REV

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HOMEOWNER INFO

SARAH & STEVEN
 FONTE
 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

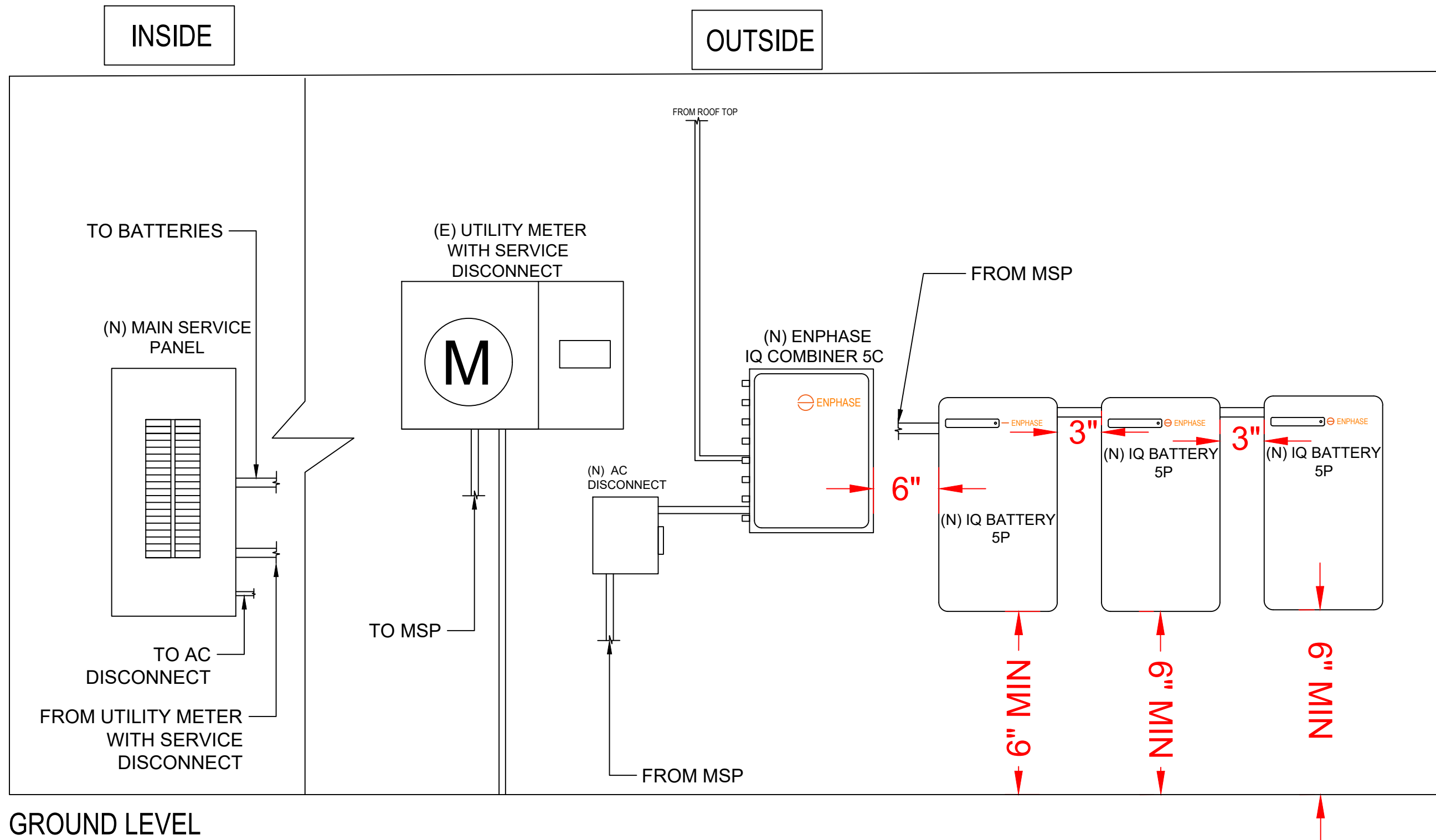
ATTACHMENT
 DETAIL

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-3.1



SYSTEM SUMMARY STC (7.290 kW DC / 6.282 kW AC)

STC DC: (18) 405W = 7.290 kW

STC AC: (18) 349W = 6.282 kW

STORAGE: (3) 3.84kW 5.0kWh = 11.52kW 15.0kWh

- (18) REC SOLAR REC405AA PURE (405W) MODULES
- (18) ENPHASE ENERGY INC. IQ8A-72-2-US 240V MICROINVERTERS
- (3) ENPHASE ENERGY INC. IQ BATTERY 5P
- 2x BRANCHES OF 9 CONNECTED IN PARALLEL

INTERCONNECTION 120% RULE (MAIN PANEL)

UTILITY FEED + TOTAL BACKFEED
100A + 100A = 200A

LESS OR EQUAL TO
BUS RATING x 120%
200A x 120% = 240A

CALCULATION ENSURES BUS IS
SAFE REGARDLESS OF LOADS

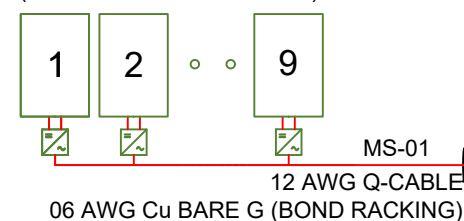
EXTREME CASE MODULE OUTPUT (REC SOLAR REC405AA PURE (405W))

$I_{sc}(25^{\circ}\text{C}) = 10.30\text{A}$, $T_{isc} = 0.040\%/^{\circ}\text{C}$
 $I_{sc}(T) = I_{sc}(25^{\circ}\text{C}) \times [1 + T_{isc} \times (T - 25^{\circ}\text{C})]$
 $I_{sc}(-23^{\circ}\text{C}) = 10.10\text{A}$, $I_{sc}(34^{\circ}\text{C}) = 10.34\text{A}$

$V_{oc}(25^{\circ}\text{C}) = 48.90\text{V}$, $T_{voc} = -0.240\%/^{\circ}\text{C}$
 $V_{oc}(T) = V_{oc}(25^{\circ}\text{C}) \times [1 + T_{voc} \times (T - 25^{\circ}\text{C})]$
 $V_{oc}(-23^{\circ}\text{C}) = 54.53\text{V}$, $V_{oc}(34^{\circ}\text{C}) = 47.84\text{V}$

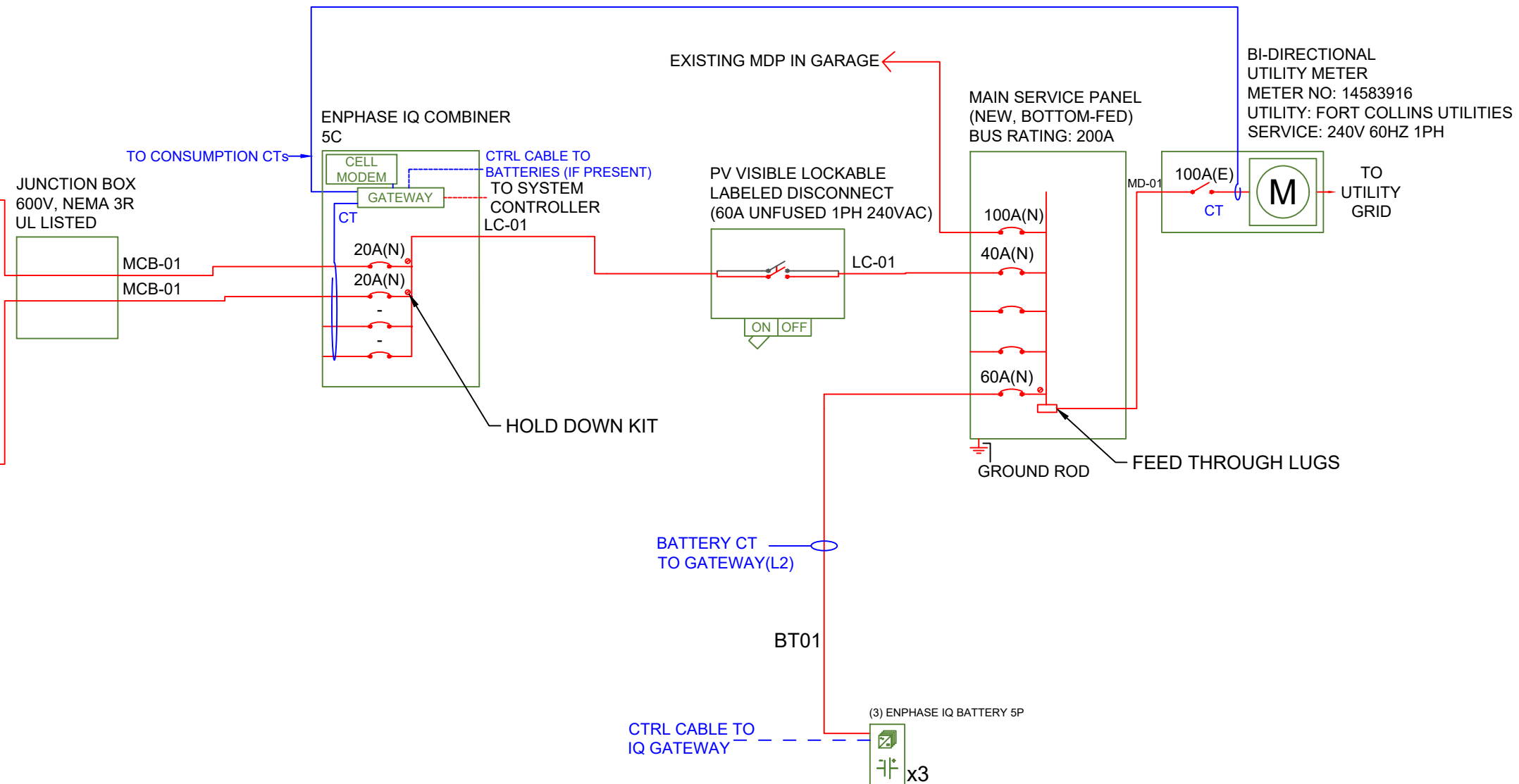
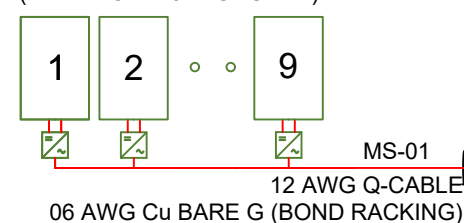
MOD: REC SOLAR REC405AA PURE
(405W)

INV: ENPHASE ENERGY INC.
IQ8A-72-2-US 240V
(1 BRANCH X 9 MICRO-INV)



MOD: REC SOLAR REC405AA PURE
(405W)

INV: ENPHASE ENERGY INC.
IQ8A-72-2-US 240V
(1 BRANCH X 9 MICRO-INV)



ELECTRICAL NOTES

- ALL GROUNDING TO COMPLY WITH NEC 690.47.
- ROOFTOP CONDUIT SHALL BE LOCATED MIN. 7/8" ABOVE ROOF SURFACE.
- ALL TERMINALS SHALL BE MIN. 75°C RATED.
- IQ GATEWAY BREAKER DETERMINED AT FACTORY BY MANUFACTURER (10A or 15A).
- FOR IQ GATEWAY: USE SINGLE CT FOR PV PRODUCTION (L1 FROM ALL PV BRANCH CIRCUITS). USE DOUBLE CTs FOR CONSUMPTION (L1 AND L2 FEEDING MSP MAIN BREAKER, SERVICE SIDE).
- IQ COMBINER 5/5C REQUIRES ENPHASE HOLD DOWN KIT X-IQ-NA-HD-125A.

ELECTRICAL SINGLE LINE DIAGRAM

SCALE: NTS

AC wire details							
Wire	Min Ampacity	Live	Neutral	Ground	Min EMT	Min PVC	Min RMC
MS-01	16.31A	12 AWG (Q-Cable)	-	06 AWG BARE (NOT IN CONDUIT)	-	-	-
MCB-01	16.31A	(2) 10 AWG THWN-2	-	10 AWG THWN-2	1/2 in	1/2 in	1/2 in
LC-01	32.63A	(2) 08 AWG THWN-2	08 AWG THWN-2	10 AWG THWN-2	3/4 in	3/4 in	3/4 in
MD-01	100A	(2) 03 AWG THWN-2	03 AWG THWN-2	08 AWG THWN-2	1 in	1 in	1 in
BT01	60A (OCPD)	(2) 06 AWG THWN-2	-	10 AWG THWN-2	3/4 in	3/4 in	3/4 in



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REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

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 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

**SINGLE LINE
DIAGRAM**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-4

SYSTEM SUMMARY STC (7.290 kW DC / 6.282 kW AC)

STC DC: (18) 405W = 7.290 kW

STC AC: (18) 349W = 6.282 kW

STORAGE: (3) 3.84kW 5.0kWh = 11.52kW 15.0kWh

- (18) REC SOLAR REC405AA PURE (405W) MODULES
- (18) ENPHASE ENERGY INC. IQ8A-72-2-US 240V MICROINVERTERS
- (3) ENPHASE ENERGY INC. IQ BATTERY 5P
- 2x BRANCHES OF 9 CONNECTED IN PARALLEL



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 LICENSE #: EC 0102500
 ELECTRICAL LICENSE #: ME-3001100, EC-0102500 -
 REenergizeCO

REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

AC wire details																	
WireID	#Modules	Nominal Voltage	Backfeed *1.25 /cond. set	Min OCPD	Total Power	Conductor sets	ccConductors /conduit	Expected max temp	Adjusted ampacity (ampacity x temp derate x conduit fill derate)	Conductor & neutral size	EGC size (Cu)	Conductor metal	Max length	V drop	Min EMT size	Min PVC size	Min RMC size
MS-01	9	240 V	16.31 A	20 A	3.1 kW	1	2	34	25 x 0.94 x - = 23.50 A	12 AWG (Q-Cable)	06 AWG BARE (NOT IN CONDUIT)	Cu	50 ft	0.94 %	-	-	-
MCB-01	9	240 V	16.31 A	20 A	3.1 kW	1	2	34	35 x 0.94 x 1.00 = 32.90 A	10 AWG THWN-2	10 AWG THWN-2	Cu	50 ft	0.57 %	1/2 in	1/2 in	1/2 in
LC-01	18	240 V	32.63 A	40 A	6.3 kW	1	2	34	50 x 0.94 x 1.00 = 47.00 A	08 AWG THWN-2	10 AWG THWN-2	Cu	10 ft	0.15 %	3/4 in	3/4 in	3/4 in

INTERCONNECTION 120% RULE (MAIN PANEL)

UTILITY FEED + TOTAL BACKFEED
 100A + 100A = 200A
 LESS OR EQUAL TO
 BUS RATING x 120%
 200A x 120% = 240A

CALCULATION ENSURES BUS IS SAFE REGARDLESS OF LOADS

EXTREME CASE MODULE OUTPUT (REC SOLAR REC405AA PURE (405W))

Isc(25°C) = 10.30A, Tisc = 0.040%/°C
 Isc(T) = Isc(25°C) x [1 + Tisc x (T-25°C)]
 Isc(-23°C) = 10.10A, Isc(34°C) = 10.34A
 Voc(25°C) = 48.90V, Tvoc = -0.240%/°C
 Voc(T) = Voc(25°C) x [1 + Tvoc x (T-25°C)]
 Voc(-23°C) = 54.53V, Voc(34°C) = 47.84V

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 600V AND 90°C WET ENVIRONMENT.
- 3) 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.
- 4) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- 5) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- 6) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- 7) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 8) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- 9) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C.VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- 10) PV EQUIPMENT SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NEC 690.
- 11) EXACT LOCATION OF AUXILIARY GROUNDING TO BE DETERMINED AT TIME OF INSTALL.
- 12) EXISTING WIRES MUST BE REPLACED IF SMALLER THAN LISTED MINIMUM SIZES PER NEC 310.15(B)(16).
- 13) IQ GATEWAY BREAKER DETERMINED AT FACTORY BY MANUFACTURER (10A or 15A).
- 14) FOR IQ GATEWAY: USE SINGLE CT FOR PV PRODUCTION (L1 FROM ALL PV BRANCH CIRCUITS). USE DOUBLE CTs FOR CONSUMPTION (L1 AND L2 FEEDING MSP MAIN BREAKER, SERVICE SIDE).
- 6) IQ COMBINER 5/5C REQUIRES ENPHASE HOLD DOWN KIT X-IQ-NA-HD-125A.

WIRING CALCULATIONS

SCALE: NTS

SARAH & STEVEN
 FONTE
 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

WIRING
 CALCULATIONS

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-5

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

LABEL LOCATION:
INVERTER(S), AC/DC DISCONNECT(S), AC COMBINER PANEL (IF APPLICABLE).
PER CODE(S): NEC 2023: 690.13(B), 705.20(7), 706.15(C)

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

LABEL LOCATION:
UTILITY SERVICE METER AND MAIN SERVICE PANEL.
PER CODE(S): NEC 2023: 705.30(C)

WARNING
POWER SOURCE OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
ADJACENT TO PV BREAKER AND ESS OCPD (IF APPLICABLE).
PER CODE(S): NEC 2023: 705.12(B)(2)

WARNING
THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE SHALL NOT EXCEED AMPACITY OF BUSBAR

LABEL LOCATION:
PV LOAD CENTER (IF APPLICABLE) AND ANY PANEL THAT UTILIZES "THE SUM OF BREAKERS RULE".
PER CODE(S): NEC 2023: 705.12 (B)(3)

PV SYSTEM DISCONNECT
MAXIMUM AC OPERATING CURRENT: 26.10 AMPS
NOMINAL OPERATING AC VOLTAGE: 240.0 VAC

LABEL LOCATION:
AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.
PER CODE(S): NEC 2023: 690.13(B)

WARNING: PHOTOVOLTAIC POWER SOURCE

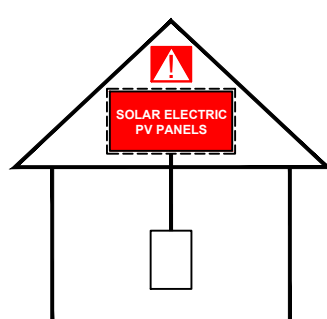
LABEL LOCATION:
INTERIOR AND EXTERIOR DC CONDUIT EVERY 10 FT, AT EACH TURN, ABOVE AND BELOW PENETRATIONS, ON EVERY JB/PULL BOX CONTAINING DC CIRCUITS.
PER CODE(S): NEC 2023: 690.31(D)(2)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL LOCATION:
INSTALLED WITHIN 3' OF RAPID SHUT DOWN SWITCH PER CODE(S): NEC 2023: 690.12(D)(2), IFC 2021: 1204.5.3

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.

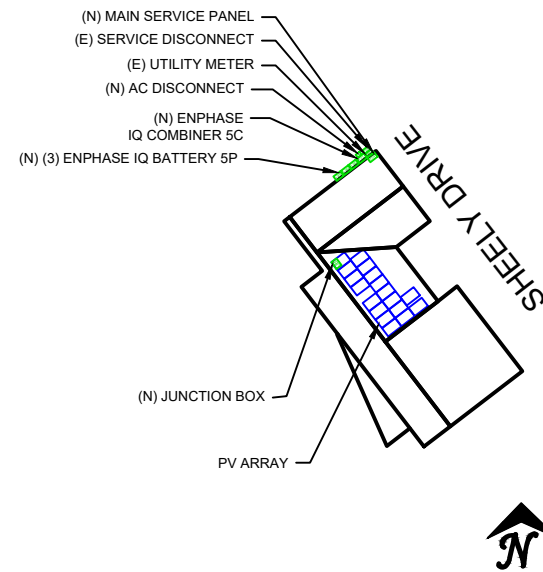


LABEL LOCATION: INTERCONNECTION POINT (MSP OR AC DISCONNECT IF LINE SIDE TAP)
CODE REF: NEC 2023: 690.13

BATTERY
1 OF 3
2 OF 3
3 OF 3

LABEL LOCATION: BATTERY

CAUTION:
MULTIPLE SOURCES OF POWER



LABEL LOCATION: MSP
PER CODE(S): NEC 2023 : 705.10(3)

NOTES AND SPECIFICATIONS:

- SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF THE NEC 2023 ARTICLE 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
- SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING EFFECTIVE WORDS, COLORS AND SYMBOLS.
- LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
- LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
- SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4-2011, PRODUCT SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
- DO NOT COVER EXISTING MANUFACTURER LABELS.



CONTRACTOR: WWW.REENERGIZECO.COM
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EMAIL: mcheneg@reenergizeco.com
LICENSE #: EC 0102500
ELECTRICAL LICENSE #: ME-3001100, EC-0102500 - REenergizeCO

REVISIONS		
DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO
SARAH & STEVEN FONTE
1605 SHEELY DRIVE,
FORT COLLINS, CO 80526, USA
APN: 0102601 PHONE: N/A
EMAIL: N/A

SHEET NAME
PLACARDS

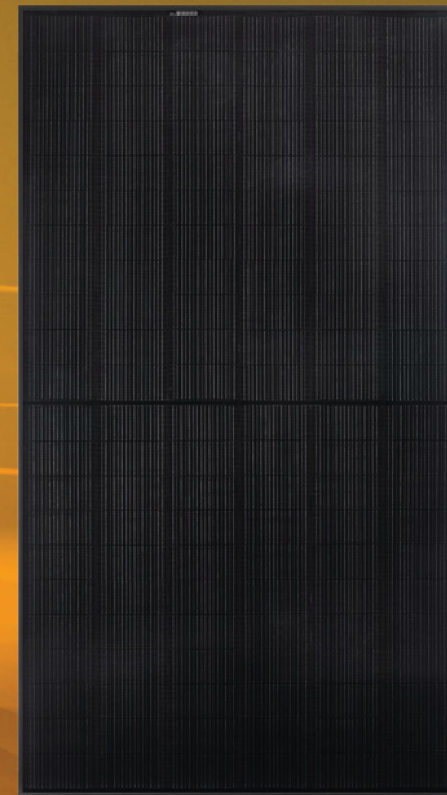
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

SOLAR'S MOST TRUSTED



REC ALPHA[®] PURE SERIES PRODUCT SPECIFICATIONS

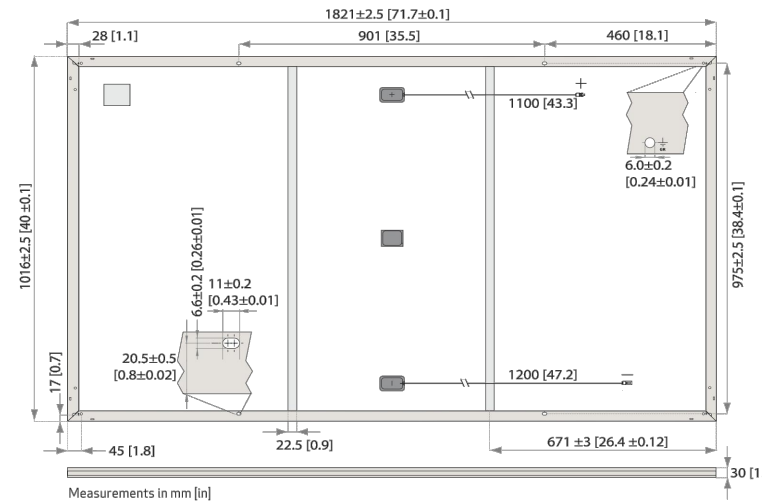


405 Wp
219 W/m²



REC ALPHA PURE SERIES > PRODUCT SPECIFICATIONS

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 (4 mm ²) in accordance with IEC 62852 IP68 only when connected
Glass:	3.2 mm solar glass with anti-reflective surface treatment	Cable:	4 mm ² solar cable, 1.1 m + 1.2 m in accordance with EN 50618
Backsheet:	Highly resistant polymer (black)	Dimensions:	1821 x 1016 x 30 mm
Frame:	Anodized aluminum (black)	Weight:	20.5 kg
Junction box:	3-part, 3 bypass diodes, lead-free IP68 rated, in accordance with IEC 62790	Origin:	Made in Singapore

ELECTRICAL DATA

	Product Code*: RECxxxAA Pure				
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/m ²)	208.1	210.8	213.5	216.2	219.0
Panel Efficiency (%)	20.8	21.1	21.3	21.6	21.9
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 1000 W/m², temperature 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 20°C, windspeed 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 ... +85°C
Maximum system voltage:	1000 V
Maximum test load (front):	+7000 Pa (713 kg/m ²)*
Maximum test load (rear):	-4000 Pa (407 kg/m ²)*
Max series fuse rating:	25 A
Max reverse current:	25 A

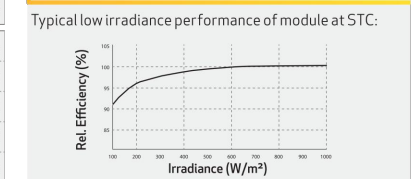
*See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

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



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REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

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APN: 0102601 PHONE: N/A
EMAIL: N/A

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

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.



www.recgroup.com



Ref: PW-DS-12-06-Rev-A 03.21 Specifications subject to change without notice.



IQ8M and IQ8A Microinverters

Our newest IQ8 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 modes. This chip is built in advanced 55nm technology with high speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



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 IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL listed as PV Rapid Shutdown Equipment and conform with various regulations, when installed according to manufacturer's instructions.

*Only when installed with IQ System Controller 2, meets UL 1741.
**IQ8M and IQ8A support split-phase, 240V installations only.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3rd Ed.)

Note:

IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc.) in the same system.

IQ8M and IQ8A Microinverters

INPUT DATA (DC)		IQ8M-72-2-US	IQ8A-72-2-US
Commonly used module pairings ¹	W	260 – 460	295 – 500
Module compatibility		54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half-cell and 72-cell / 144 half-cell	
MPPT voltage range	V	30 – 45	32 – 45
Operating range	V	16 – 58	
Min. / Max. start voltage	V	22 / 58	
Max. input DC voltage	V	60	
Max. continuous input DC current	A	12	
Max. input DC short-circuit current	A	25	
Max. module I _{sc}	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1 x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8M-72-2-US	IQ8A-72-2-US
Peak output power	VA	330	366
Max. continuous output power	VA	325	349
Nominal (L-L) voltage / range ²	V	240 / 211 – 264	
Max. continuous output current	A	1.35	1.45
Nominal frequency	Hz	60	
Extended frequency range	Hz	47 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max. units per 20 A (L-L) branch circuit ³		11	
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.8	97.7
CEC weighted efficiency	%	97.5	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (H x W x D)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. 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 3 rd Ed.), 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, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at <https://link.enphase.com/module-compatibility>. (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.

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LICENSE #: EC 0102500
ELECTRICAL LICENSE #: ME-3001100, EC-0102500 - REenergizeCO

REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

SARAH & STEVEN FONTE
1605 SHEELY DRIVE,
FORT COLLINS, CO 80526, USA
APN: 0102601 PHONE: N/A
EMAIL: N/A

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B 11" X 17"

SHEET NUMBER

PV-8



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, along with IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provides you with a complete grid-agnostic Enphase Energy System.



IQ Series Microinverters
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) dramatically 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



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IQC-5-5C-DSH-00007-2.0-EN-US-2023-09-27

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) ¹ . 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 IQ System
Busbar	125A busbar with support for 1 x IQ Gateway breaker and 4 x 20A breaker for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Prewired 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 CTRL 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 BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers Supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with 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 "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 Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B series circuit breakers (with screws)
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage	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 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 up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)

IQC-5-5C-DSH-00007-2.0-EN-US-2023-09-27



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REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

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APN: 0102601 PHONE: N/A
EMAIL: N/A

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
PV-9

MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to 46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"> 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors 60 A breaker branch input: 4 to 1/0 AWG copper conductors Main lug combined output: 10 to 2/0 AWG copper conductors Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing
Communication (In-premise connectivity)	Built-in CTRL board for wired communication with IQ Battery 5P and IQ System Controller 3/3G. Integrated Power Line Communication for IQ Series Microinverters
Altitude	Up to 2,600 meters (8,530 feet)
COMMUNICATION INTERFACES	
Integrated Wi-Fi	802.11b/g/n (dual band 2.4 GHz/5 GHz), for connecting the Enphase cloud via the internet
Wi-Fi range (recommended)	10 m
Bluetooth	BLE4.2, 10 m range to configure Wi-Fi SSID
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included), for connecting to the Enphase Cloud via the internet
Mobile Connect	CELLMODEM-M1-06-SP-05 or CELLMODEM-M1-06-AT-05 (included with IQ Combiner 5C)
Digital I/O	Digital input/output for grid operator control
USB 2.0	For Mobile Connect
Access point (AP) mode	For connection between the IQ Gateway and a mobile device running the Enphase Installer App
Metering ports	Up to two Consumption CTs, one IQ Battery CT, and one Production CT
Power line communication	90-110 kHz
Web API	Refer to https://developer-v4.enphase.com
Local API	Refer to guide for local API
COMPLIANCE	
IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003
IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1, IEEE 1547: 2018 (UL 1741-SB, 3 rd Ed.) IEEE 2030.5/CSIP Compliant Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
COMPATIBILITY	
IQ System Controller 3/3G	SC200D111C240US01, SC200G111C240US01
IQ Battery 5P	IQBATTERY-5P-1P-NA
Microinverter	IQ6, IQ7, and IQ8 Series Microinverters



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 EMAIL: mscherrer@reenergizeco.com
 LICENSE #: EC 0102500
 ELECTRICAL LICENSE #: ME-3001100, EC-0102500 - REenergizeCO

REVISIONS

DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

SARAH & STEVEN FONTE
 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

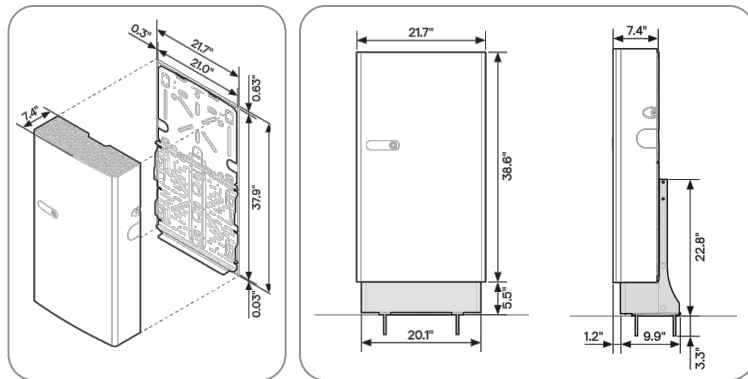
PV-9.1



IQ Battery 5P

The IQ Battery 5P all-in-one AC-coupled system is powerful, reliable, simple, and safe. It has a total usable energy capacity of 5.0 kWh and includes six embedded grid-forming microinverters with a 3.84 kVA continuous power rating. It provides backup capability, and installers can quickly design the right system size to meet the customer needs.

Dimensions in inches



Wall mounted

Floor mounted with pedestal
(sold separately)



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Powerful

- Provides 3.84 kVA continuous and 7.68 kVA peak power
- Doubles the available power per kWh of prior generations of IQ Battery
- Includes six embedded IQ8D-BAT Microinverters

Reliable

- 15 years limited warranty
- Cools passively with no moving parts or fans
- Uses wired communication for fast and consistent connection
- Updates software and firmware remotely

Simple

- Fully integrated AC battery system
- Installs and commissions easily
- Supports Backup, Self-Consumption, and time-of-use (TOU) modes
- Offers homeowners remote monitoring and control from the Enphase App
- Field replaceable components

Safe

- Evaluated to UL 9540A for large scale fire testing and reduced separation distance as required in 2021 IRC R328.3.1, 2021 IFC 1207.1.5, and 2023 NFPA 855 15.3.1 and 9.1.5.¹
- Uses lithium iron phosphate (LFP) chemistry for maximum safety and longevity

¹Follow all installation instructions and local codes and requirements of the Authority Having Jurisdiction (AHJ) when installing Enphase ESS.

IQB-5P-DSH-00010-4.0-EN-US-2023-11-07

IQ Battery 5P

MODEL NUMBER	
IQBATTERY-5P-1P-NA	The IQ Battery 5P system with integrated IQ Microinverters and battery management system (BMS) with battery controller
WHAT'S IN THE BOX	
IQ Battery 5P unit	IQ Battery 5P unit (B05-T02-US00-1-3)
ID cover and conduit cover	IQ Battery 5P cover with two conduit covers for the left and right sides of the unit
Bottom mounting bracket and top shield	Bottom mounting bracket for mounting the battery on the wall. One top shield is required for UL9540A
M5 seismic screws	Two M5 seismic screws for securing the battery unit on the bottom mounting bracket
M4 grounding screws	Two M4 grounding screws for securing the top shield on the bottom mounting bracket
M5 ID cover grounding screws	Two M5 ID cover grounding screws for the EMI/EMC requirement
Cable ties	Six cable ties for securing field cables to the unit
Control (CTRL) connector	Spare CTRL connector without resistor for CTRL wiring
Control (CTRL) connector with resistor	Spare CTRL connector with resistor for CTRL wiring
Quick Install Guide (QIG)	QIG for IQ Battery unit installation instructions
OPTIONAL ACCESSORIES AND REPLACEMENT PARTS	
IQ8D-BAT-RMA	IQ8D-BAT Microinverter for field replacement
B05-T02-US00-1-3-RMA	IQ Battery 5P Battery unit for field replacement
B05-CX-0550-O	IQ Battery 5P cover for field replacement
B05-PI-0550-O	IQ Battery 5P pedestal mount
B05-CP-096-O	IQ Battery 5P conduit plates for field replacement. Includes one left-side and one right-side conduit plate
B05-WB-0543-O	IQ Battery 5P wall bracket for field replacement. Includes one bottom mounting bracket and one top shield
IQBATTERY-HNDL-5	IQ Battery 5P lifting handles. Includes one left-side and one right-side lifting handle
B05-ACFB-080-O	IQ Battery 5P AC filter board for field replacement
B05-BMSNA-0490-O	IQ Battery 5P BMS board for field replacement
B05-CANB-063-O	IQ Battery 5P control communication board for field replacement
B05-NICS-0524-O, B05-NUCS-0524-O	IQ Battery 5P control switch is preinstalled on the wiring cover for field replacement
OUTPUT (AC)	
Rated (continuous) output power	@240 VAC ² 3.84 kVA
Peak output power	7.68 kVA (3 seconds), 6.14 kVA (10 seconds)
Nominal voltage/range	240/211-264 VAC
Nominal frequency/range	60/57-63 Hz
Rated output current (@240 VAC)	16 A
Peak output current (@240 VAC)	32 A (3 seconds), 25.6 A (10 seconds)
Power Start capability	Up to 48 A LRA ³
Power factor (adjustable)	0.85 leading...0.85 lagging
Maximum units per 20 A branch circuit	One unit (single-phase)
Maximum conductor size supported	3 AWG
Overcurrent protection device (OCPD) for 3 AWG cable	80 A
Interconnection	Single-phase
AC round-trip efficiency ⁴	90%

²Supported in both grid-connected and backup/off-grid operation.

³Power Start capability may vary.

⁴AC to the battery to AC at 50% power rating.

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IQB-5P-DSH-00010-4.0-EN-US-2023-11-07

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REVISIONS

DESCRIPTION	DATE	REV

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HOMEOWNER INFO

SARAH & STEVEN FONTE
1605 SHEELY DRIVE,
FORT COLLINS, CO 80526, USA
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EMAIL: N/A

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

IQ Battery 5P

BATTERY	
Total capacity	5.0 kWh
Usable capacity	5.0 kWh
DC round-trip efficiency	96%
Nominal DC voltage	76.8 V
Maximum DC voltage	86.4 V
Ambient operating temperature range (charging)	-20°C to 50°C (-4°F to 122°F) non-condensing
Ambient operating temperature range (discharging)	-20°C to 55°C (-4°F to 131°F) non-condensing
Optimum operating temperature range	0°C to 30°C (32°F to 86°F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (HxWxD)	980 mm x 550 mm x 188 mm (38.6 in x 21.7 in x 7.4 in)
Lifting weight	66.3 kg (146.1 lbs)
Total installed weight	78.9 kg (174 lbs)
Enclosure	Outdoor-NEMA 3R
IQ8D-BAT Microinverter enclosure	NEMA type 6
Cooling	Natural convection
Altitude	Up to 2,500 meters (8,202 feet)
Mounting	Wall-mount or pedestal-mount (sold separately)
FEATURES AND COMPLIANCE	
Compatibility	Compatible with IQ and M Series Microinverters, IQ System Controller 3/3G, IQ Combiner 5/5C, and IQ Gateway for grid-tied and backup operation
Communication	Wired control communication
Services	Backup, Self-Consumption, TOU, and NEM integrity
Monitoring	Enphase Installer Platform and Enphase App monitoring options; API integration
Compliance	CA Rule 21 (UL 1741-SA), IEEE 1547:2018 (UL 1741-SB, 3rd Ed.) CAN/CSA C22.2 No. 107.1-16 UL 9540 ⁵ , UL 9540A, UN 38.3, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2
LIMITED WARRANTY	
Limited warranty	>60% capacity, up to 15 years or 6,000 cycles ⁶

⁵ Following local standards, choose a well-ventilated, non-habitable, indoor location (like a 2-car garage) or in an outdoor location, which is out of direct sunlight and where the ambient temperature and humidity are within -4°F to 113°F (-20°C to 45°C) and 5% to 95% RH, non-condensing.
⁶ Whichever occurs first. Restrictions apply.

Revision history

REVISION	DATE	DESCRIPTION
DSH-00010-4.0	November 2023	Updated the "Output (AC)" table.
DSH-00010-3.0	September 2023	<ul style="list-style-type: none"> Updated product images. Editorial updates.
DSH-00010-2.0	July 2023	<ul style="list-style-type: none"> Added battery isometric view on the first page. Editorial updates.
DSH-00010-1.0	May 2023	Initial release.



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 ELECTRICAL LICENSE #: ME-3001100, EC-0102500 - REenergizeCO

REVISIONS		
DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

SARAH & STEVEN FONTE
 1605 SHEELY DRIVE,
 FORT COLLINS, CO 80526, USA
 APN: 0102601 PHONE: N/A
 EMAIL: N/A

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
PV-11



CONTRACTOR: WWW.REENERGIZECO.COM
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REVISIONS

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SHEET NAME

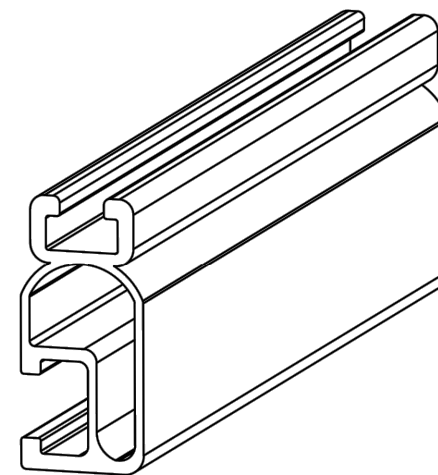
**EQUIPMENT
 SPECIFICATION**

SHEET SIZE

**ANSI B
 11" X 17"**

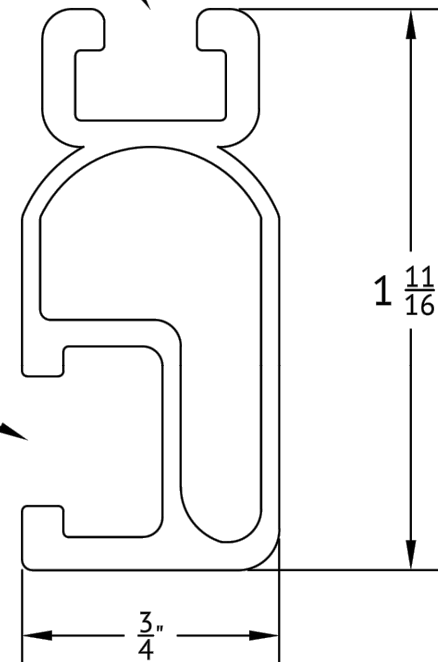
SHEET NUMBER

PV-12



1/4" BOLT LOCATION

3/8" BOLT LOCATION



UNIRAC
 1411 BROADWAY BLVD NE
 ALBUQUERQUE, NM 87102 USA
 WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	LIGHT RAIL
REVISION DATE:	APRIL 2016

DRAWING NOT TO SCALE
 ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE
 OR MORE US PATENTS

LEGAL NOTICE

SM-P02
 SHEET

FLASHLOC™ RM

THE STRONGEST ATTACHMENT FOR EVERY FLAT ROOF



Unirac's **FLASHLOC™ RM** is a lightweight, durable, powder-coated cast aluminum roof attachment solution that provides fast, easy installation and helps save labor cost. **FLASHLOC™ RM** is compatible with most roofing materials and is applicable for almost all solar racking form factors. Rigorous mechanical, sealing, and ease-of-install testing has been successfully completed for assurance of long-term reliability.

FEATURES

FLASHLOC™ Technology – no more membrane SKUs or heat welding

- Works for all roof types – see Chemlink M-1's compatibility for details
- Labor and attachment savings
- Industry-leading install time
- 6,600-lb. uplift offset (ultimate)
- Includes 8 fastener holes
- Attachment can accommodate roofing screw sizes #12 - #15
- 25-year warranty

PRODUCT SPECIFICATIONS

- 7.5" diameter X 0.94" height
- Included hardware: 1 preassembled bolt and washer
- Chemlink M-1 and 1-Part included in kit

PART NUMBER	DESCRIPTION	PACK SIZE
310999	FLASHLOC RM KIT	10

*Check with your local distributor for finalized pricing.



FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702



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 EMAIL: N/A

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-13

CERTIFICATE OF COMPLIANCE

Certificate Number 20220917-E341165
Report Reference E341165-20210317
Date 2022-09-17

Issued to: Enphase Energy Inc.
 1420 N. McDowell Blvd. Petaluma, CA 94954-6515

This is to certify that representative samples of Photovoltaic Grid Support Utility Interactive Inverter with Rapid Shutdown Functionality
 Models: IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: See Page 2

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

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CERTIFICATE OF COMPLIANCE

Certificate Number 20220917-E341165
Report Reference E341165-20210317
Date 2022-09-17

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.
 Standards for Safety:

UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, Edition 3, Issue Date 09/28/2021. Including the requirements in UL 1741 Supplements SA and SB.

IEEE 1547, Interconnection and Interoperability of Distributed Energy Resources (DERs) with Associated Electric Power Systems (EPSs) Interfaces, Issue Date 02/15/2018

IEEE 1547.1, IEEE Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources (DERs) with Electric Power Systems (EPSs) Associated Interfaces, Issue Date 03/05/2020.

UL 62109-1, Safety of Converters for Use in Photovoltaic Power Systems - Part 1: General Requirements; IEC 62109-2, Safety of Power Converters for use in Photovoltaic Power Systems - Part 2: Particular Requirements for Inverters.

CAN/CSA C22.2 No. 62109-1, Safety of Power Converters for use in photovoltaic power systems - Part 1: General Requirements, 2016/07

CAN/CSA C22.2 No. 62109-2, Safety of Power Converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters, 2016/07

R21: The evaluation to the Standards above provides evidence of compliance to the intent of the existing California Rule 21 Interconnection (references to the past publication of IEEE 1547 standards) and UL1741 Table SA1.1 option to use the IEEE 1547.1-2020 and UL1741SB test methods in conjunction with using IEEE 1547-2018 as the SRD under which SA11.2 Normal Ramp Rate is not addressed. Additional testing was conducted to confirmed compliance to Normal Ramp Rate SA11.2. See also Appendix A.

14H (SA): The evaluation to the Standards above provides evidence of compliance to HECO Rule 14H, SRD V1.0, Interconnection Application.

14H (SB): The evaluation to the Standards above provides evidence of compliance to HECO Rule 14H, SRD V2.0, Interconnection Application.



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HOMEOWNER INFO

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 EMAIL: N/A

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
 11" X 17"

SHEET NUMBER

PV-14

CERTIFICATE OF COMPLIANCE

Certificate Number 20220917-E341165
Report Reference E341165-20210317
Date 2022-09-17

Inverter Firmware Version:			
Model	UL 1998 (grid support)	Date	Version/Revision
IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72	Yes	2022-08-02	2.45.04
	Yes	2022-09-09	2.48.01



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Report Reference E341165-20210317
Date 2022-09-17

APPENDIX A

As permitted by UL1741, 3rd Edition, Table SA1.1, shown below, allows for the evaluation of products using either the UL 1741 SA tests or alternative testing methods using the requirements of IEEE 1547.1-2020 in accordance with IEEE 1547-2018 and IEEE 1547.1-2020.

UL1741 SA test name	SA test section	Comparable IEEE 1547.1-2020 test section	Subject Inverter complies with UL1741SA
Anti-Islanding Protection	SA8	5.10.2	✓
Low and High Voltage Ride-Through	SA9	5.4.4, 5.4.7	✓
Low and High Frequency Ride-Through	SA10	5.5.3, 5.5.4	✓
Normal Ramp Rates	SA11.2	NA ^a	✓
Soft-Start Ramp Rates	SA11.4	5.6	✓
Specified Power Factor	SA12	5.14.3	✓
Volt/Var Mode	SA13	5.14.4	✓ ^b
Frequency-Watt	SA14	5.15.2	✓
Volt-Watt	SA15	5.14.9	✓
Disable Permit Service	SA17	5.6	✓
Limit Active Power	SA18	5.13	✓

^a IEEE 1547-2018 and IEEE 1547.1-2020 do not have a requirement for, or test equivalent to, the UL 1741 SA Normal Ramp Rate which is presently a local requirement per California Rule 21 and/or Hawaii 14H. This inverter has been additionally tested and is compliance with the Normal Ramp Rate test of SA11.2.

^b - Functional in the following priority modes: [X] active power [X] reactive power



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SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

**ANSI B
 11" X 17"**

SHEET NUMBER

PV-15



