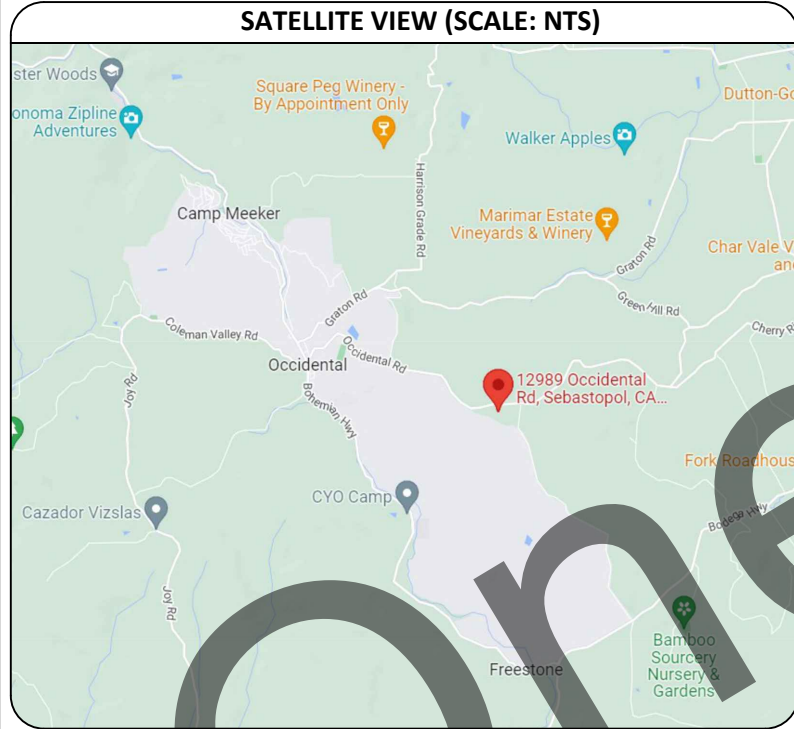


PROJECT: PV SYSTEM DETAILS	
[DC] SYSTEM SIZE	[AC] SYSTEM SIZE
36 MODULES x 345W	(36) ENPHASE IQ8PLUS-72-2-US (240V) MICRO-INVERTER x 290W
12.42 kW	10.44 kW



- ### SCOPE OF WORK
- PROPOSED PROJECT TO INSTALL GRID- TIED PV ONLY SYSTEM ON AN EXISTING ROOFTOP STRUCTURE AT A RESIDENTIAL LOCATION :
 - THE PV MODULES WILL BE SECURED ON ROOF USING PRE-ENGINEERED ROOF RACKING SYSTEM.
 - INSTALLED PV SYSTEM WILL BE THEN CONNECTED TO HOMEOWNER'S SERVICE EQUIPMENT USING APPLICABLE INTERCONNECTION METHOD (AS PER AHJ).
 - THE ENERGY PRODUCED BY PV SYSTEM WILL BE USED TO POWER THE HOME APPLIANCES. EXCESS POWER IS SENT BACK TO THE UTILITY GRID.

- ### APPLICABLE GOVERNING CODES & NOTES
- THIS PROJECT SHALL COMPLY WITH THE FOLLOWING CODES:
- 2019 CALIFORNIA BUILDING CODE
 - 2019 CALIFORNIA RESIDENTIAL CODE
 - 2019 CALIFORNIA MECHANICAL CODE
 - 2019 CALIFORNIA PLUMBING CODE
 - 2019 CALIFORNIA ENERGY CODE
 - 2019 CALIFORNIA FIRECODE
 - 2019 CALIFORNIA ELECTRICAL CODE
- ALL OTHER RELATED STATE & AHJ BY-LAWS & ORDINANCES

- ### DESIGN CRITERIA
- OCCUPANCY GROUP: R1/SINGLE FAMILY DWELLING (SFD)
 - NO. OF STORIES: SINGLE STORY
 - EXPOSURE CATEGORY : B, RISK CATEGORY : II
 - WIND SPEED (ASCE 7-16) : 91 MPH
 - GROUND SNOW LOAD (ASCE 7-16) : 0 PSF
 - ASHRAE EXTREME LOW: -3°C
 - ASHRAE HIGH TEMP (2% AVG.) : 34°C
 - ASHRAE DISTANCE ABOVE ROOF (7/8") : 56°C

SHEET INDEX

PV-0	PROJECT SUMMARY
PV-1	SITE PLAN
PV-2	ROOF ATTACHMENT DETAILS
PV-3	BOM & STRING LAYOUT
S-1	STRUCTURAL DETAILED DIAGRAM
E-1	ELECTRICAL DIAGRAM
E-2	ELECTRICAL CALCULATIONS
E-3	PLACARDS
E.S	EQUIPMENT SPECIFICATIONS

EQUIPMENT DETAILS

(#) PV MODULES	(36) SOLARIA POWERXT-345R-BD 345W
(#) MICRO- INVERTER	(36) ENPHASE IQ8PLUS-72-2-US (240V)
(#) COMBINER BOX	(01) ENPHASE IQ COMBINER 4C (X-IQ-AM1-240-4C)
SMART SWITCH DEVICE	IQ SYSTEM CONTROLLER 2 (EP200G101-M240US01)
ENERGY STORAGE SYSTEM	(2) X ENPAHSE ENCHARGE 10T (ENCHARGE-10T-1P-INT)
ROOF RACKING SYSTEM	UNIRAC FLASHLOC COMP W/ UNIRAC SOLARMOUNT LIGHT RAIL
STRING / BRANCH CIRCUIT	2 STRINGS OF 10, 2 STRINGS OF 8
POINT OF INTERCONNECTION	100A LOAD BREAKER IN THE MAIN SERVICE PANEL W/ 150A MAIN BREAKER, 225A BUSBAR,120/240V, 3W, 1φ
UTILITY	PG&E
AHJ	SONOMA COUNTY

- ### GENERAL NOTES
- ALL COMPONENTS ARE UL LISTED & CEC CERTIFIED, WHERE WARRANTED
 - A DISCONNECTING MEANS SHALL BE INSTALLED AT A READILY ACCESSIBLE LOCATION EITHER OUTSIDE OF THE BUILDING OR STRUCTURE OR INSIDE NEAREST POINT OF ENTRANCE OF THE SYSTEM CONDUCTORS.
 - HEIGHT OF THE INTEGRATED AC/DC DISCONNECT SHALL NOT EXCEED 6'-7" PER CEC CODE 240.24.
 - A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH CEC 690.47 AND 250.50 THROUGH 60 AND 250-166 SHALL BE PROVIDED. PER CEC
 - GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT. GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO LARGER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
 - PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
 - PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
 - WATER PROOF CONNECTORS AND HUBS SHALL BE USED WHERE APPLICABLE PER CEC 312.2 AND 314.15.
 - GROUNDING/BONDING BUSHINGS SHALL BE INSTALLED WHERE APPLICABLE PER CEC 250.92.
 - ALL EXTERIOR RACEWAYS ON WALLS SHOULD BE EMT UNLESS NOTED OTHERWISE.
 - CONTRACTOR SHALL INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS & NOTHING IN THIS DOCUMENT SHALL BE INTERPRETED IN A WAY THAT OVERRIDES THEM.
 - CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ALL CONDITIONS, DIMENSIONS & DETAILS IN THIS DOCUMENT. ALL DIMENSIONS SHALL BE VERIFIED BY SUBCONTRACTOR BEFORE INSTALLATION.
- PHOTOVOLTAIC SYSTEM FIRE CLASSIFICATION LISTING IN ACCORDANCE WITH UL1703 STANDARD.

- ### ELECTRICAL NOTES
- THE EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE INSTALLED ONLY BY QUALIFIED PEOPLE. A QUALIFIED PERSON IS ONE WHO HAS SKILLS AND KNOWLEDGE RELATED TO THE CONSTRUCTION AND OPERATION OF THE ELECTRICAL EQUIPMENT AND INSTALLATIONS AND HAS RECEIVED SAFETY TRAINING TO RECOGNIZE AND AVOID THE HAZARDS INVOLVED. (CEC690.4(E) AND 705.6)
 - LOCAL UTILITY PROVIDER SHALL BE NOTIFIED PRIOR TO USE AND ACTIVATION OF ANY SOLAR PHOTOVOLTAIC INSTALLATION. FOR A LINE SIDE TAP CONNECTION, UTILITY NEEDS TO BE NOTIFIED WELL IN ADVANCE TO COORDINATE BUILDING ELECTRICAL SHUT OFF.
 - NEW CONDUIT ROUTING SHOWN IS ESSENTIALLY SCHEMATIC. SUBCONTRACTOR SHALL LAY OUT RUNS TO SUIT FIELD CONDITIONS AND THE COORDINATION REQUIREMENTS OF OTHER TRADES.
 - ARRAY WIRING SHOULD NOT BE READILY ACCESSIBLE EXCEPT TO QUALIFIED PERSONNEL.
 - ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE WATERTIGHT AND APPROVED FOR USE IN WET LOCATIONS .
 - WIRING METHODS FOR PV SYSTEM CONDUCTORS AREN'T PERMITTED WITHIN 10 IN. OF THE ROOF DECKING OR SHEATHING EXCEPT WHERE LOCATED DIRECTLY BELOW THE ROOF SURFACE THAT'S COVERED BY PV MODULES AND ASSOCIATED EQUIPMENT WIRING
 - BACK-FED BREAKER MUST BE AT THE OPPOSITE END OF BUS BAR FROM THE MAIN BREAKER OR MAIN LUG SUPPLYING CURRENT FROM THE UTILITIES.
 - ALL CONDUCTORS AND WIRE TIES EXPOSED TO SUNLIGHT ARE LISTED AS UV RESISTANT.
 - CONTRACTOR SHALL FOLLOW ALL ELECTRICAL EQUIPMENT LABELING REQUIREMENTS ACCORDING TO CEC.
 - MEASURE THE LINE-TO-LINE AND LINE-TO-NEUTRAL VOLTAGE OF ALL SERVICE ENTRANCE CONDUCTORS PRIOR TO INSTALLING ANY SOLAR EQUIPMENT. THE VOLTAGES FOR THE 240VAC RATED.

DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	NTS
SHEET SIZE	11"X 17"
	ANSI B

HOMEOWNER INFO	APN NUMBER: #080060018000
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KIRKLAND RESIDENCE

#	REVISION/UPDATE	DATE

SIGNED & STAMP BY

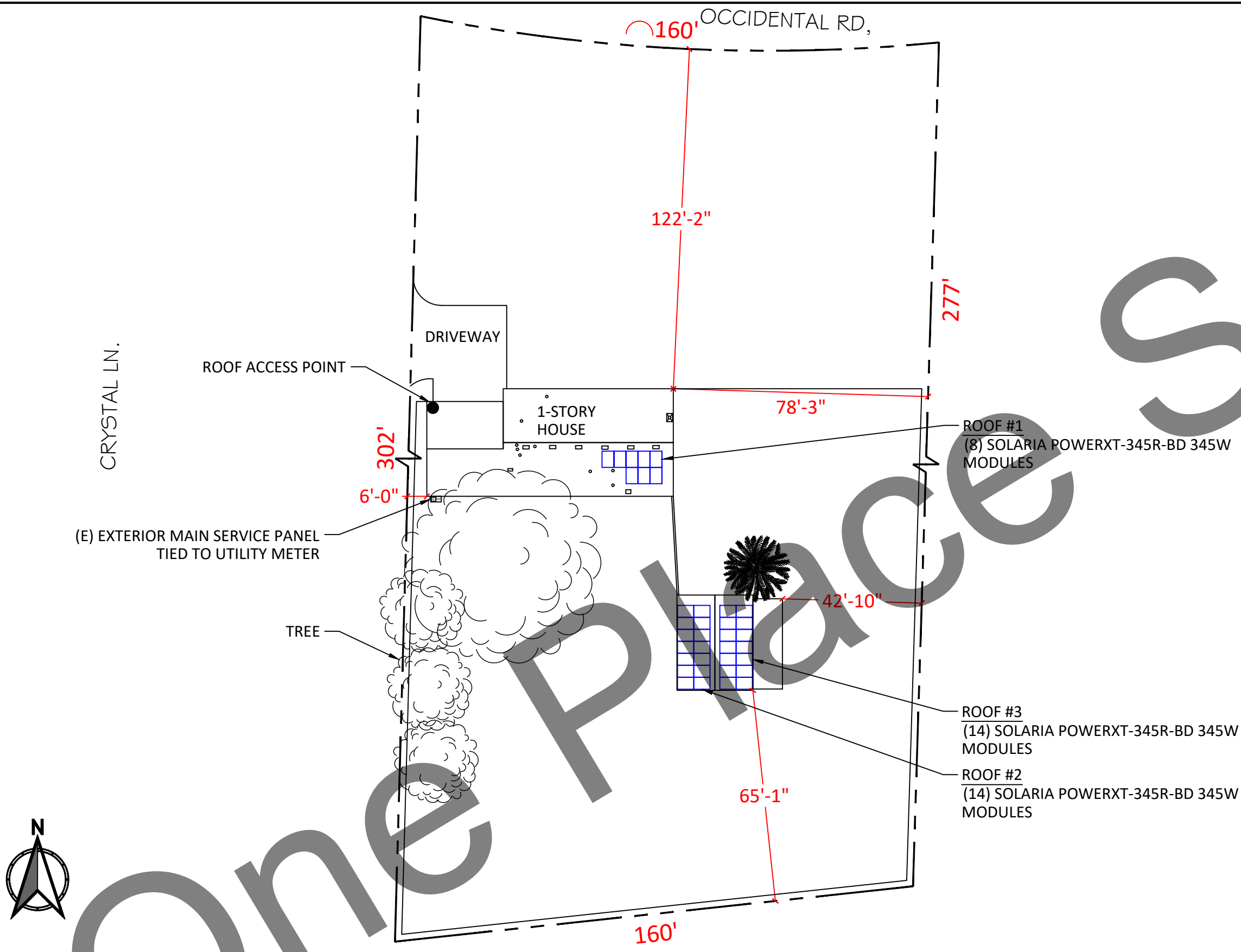
PV-0
SHEET NO.
PROJECT SUMMARY
SHEET INFORMATION

LEGEND	
	UTILITY METER
	ENPHASE IQ COMBINER 4C
	AC DISCONNECT
	MAIN SERVICE PANEL
	CRITICAL LOADS BACKUP PANEL
	ENPHASE IQ SYSTEM CONTROLLER 2
	ENPHASE ENCHARGE 10T BATTERY
	DC JUNCTION BOX
	RAPID SHUTDOWN SWITCH
	CONDUIT
	VENT, ATTIC FAN (ROOF OBSTRUCTIONS)
	CHIMNEY
	UNIRAC SOLAR MOUNT LIGHT RAIL
	TRENCH
	TOP CAP
	PIPE

PROPOSED SITE DIAGRAM SHOWING THE RELATIVE LOCATION OF MAJOR COMPONENTS.

PROTECTION OF EMERGENCY RESPONDERS
 ALL SHARP EDGES AND FASTENER TIPS SHALL BE COVERED OR CRIMPED OVER TO ELIMINATE SHARP EDGES, TO MINIMIZE RISK OF INJURY TO EMERGENCY RESPONDERS.
 ALL ROOF MOUNTED CONDUITS, BOXES, AND EQUIPMENT CROSSING PATHWAYS ARE TO BE CLEARLY IDENTIFIED BY A RED/WHITE REFLECTIVE TAPE OR OTHER APPROVED MATERIAL.

- ROOF ACCESS POINT:**
- 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.
 - NO ENCROACHMENT INTO EASEMENTS BY NEW SCOPE OF WORK (SOLAR PANELS, RACK/RAIL SYSTEM & EQUIPMENT)



DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	1/32" = 1'-0"
SHEET SIZE	11"X 17"
	ANSI B

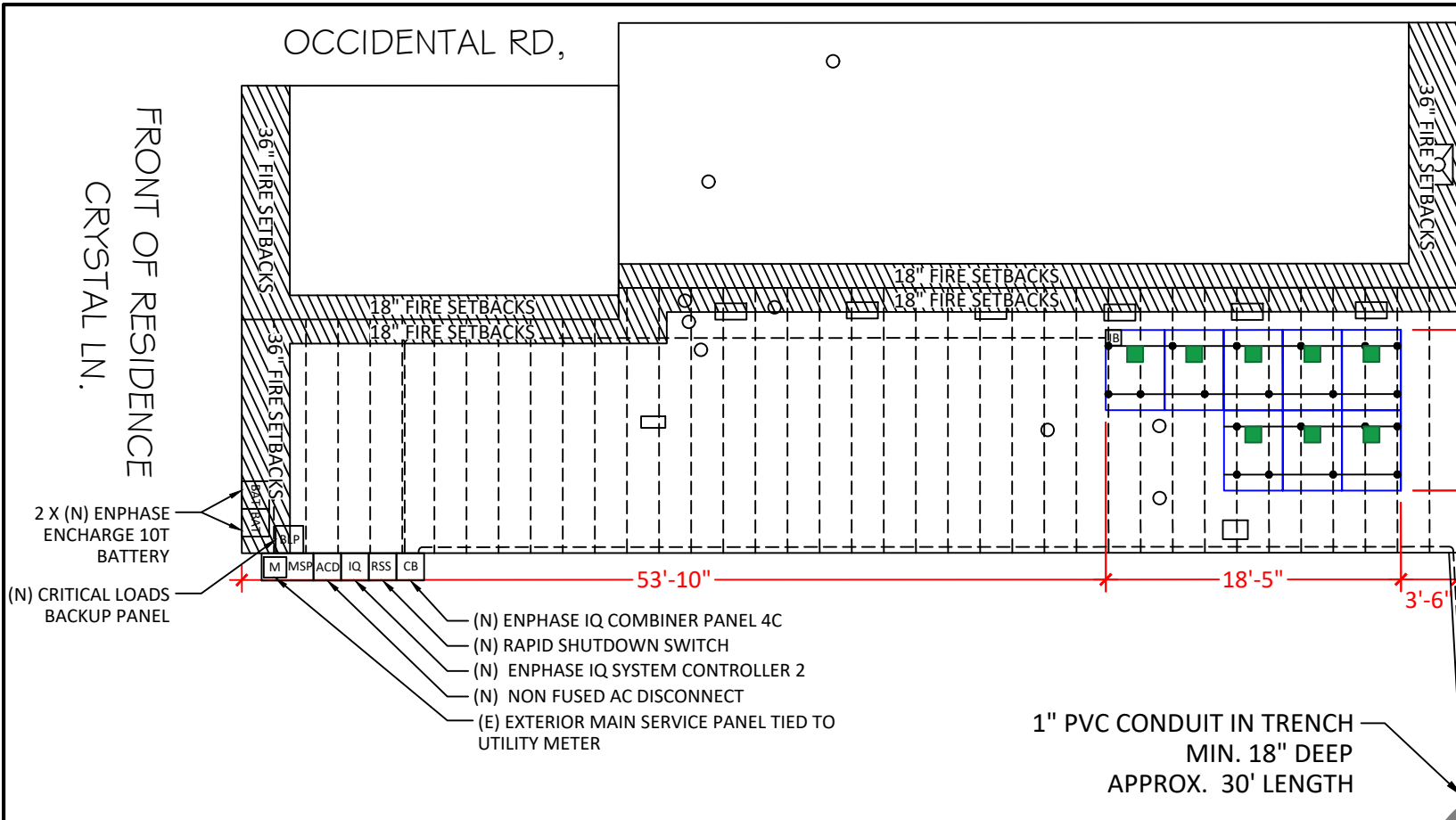
KIRKLAND RESIDENCE

HOMEOWNER INFO APN NUMBER: #080060018000

#	REVISION/UPDATE	DATE

SIGNED & STAMP BY

PV-1
 SHEET NO.
SITE PLAN
 SHEET INFORMATION



ROOF DETAILS			
MOUNTING PLANE	ROOF #1	ROOF #2	ROOF #3
NO. OF MODULES	8	14	14
AZIMUTH	180°	269°	89°
ROOF TILT	20°	20°	20°
ROOF TYPE	COMP SHINGLE	COMP SHINGLE	COMP SHINGLE
RAFTER SIZE	2"X6"	2"X6"	2"X6"
RAFTER SPACING	24"	24"	24"
ARRAY AREA	155.73	272.53	272.53
(TOTAL ARRAY AREA/ TOTAL ROOF AREA) X 100% = (700.79/3343.83) X 100% = 20.96%			

LEGEND	
	UTILITY METER
	ENPHASE IQ COMBINER 4C
	AC DISCONNECT
	MAIN SERVICE PANEL
	CRITICAL LOADS BACKUP PANEL
	ENPHASE IQ SYSTEM CONTROLLER 2
	ENPHASE ENCHARGE 10T BATTERY
	DC JUNCTION BOX
	RAPID SHUTDOWN SWITCH
	CONDUIT
	VENT, ATTIC FAN (ROOF OBSTRUCTIONS)
	CHIMNEY
	UNIRAC SOLARMOUNT LIGHT RAIL
	- TRENCH
	- TOP CAP
	- PIPE

NOTE: ALL EXTERIOR CONDUIT TO BE PAINT MATCHED TO THE HOMES COLORS

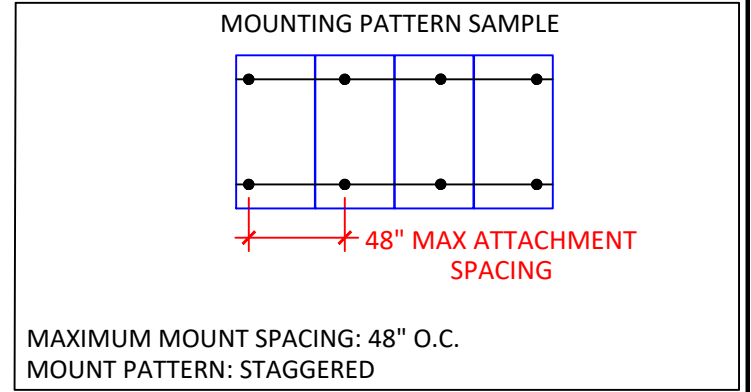
NOTES:
 CALIFORNIA FIRE CODE SECTION 605.11.1.2 FOR RESIDENTIAL R-1 OCCUPANCIES AT LEAST THREE (3) FEET OF CLEARANCE ALONG THE EDGE OF THE ROOF TO A PANEL AND AT LEAST THREE (3) FEET FROM THE RIDGE SHALL BE AT LEAST ONE AND ONE-HALF (1-1/2) FEET FROM A VALLEY OR HIP. NO CLEARANCE IS REQUIRED AT THE EAVE.
 INTERNATIONAL FIRE CODE SECTION 605.11.1.2.4 ROOF WITH HIPS AND VALLEYS - WHERE PANELS ARE TO BE LOCATED ON ONLY ONE SIDE OF EQUAL LENGTH, THE PANEL SHALL BE PERMITTED TO BE PLACED DIRECTLY ADJACENT TO THE HIP OR VALLEY.

NOTES: NEW ELECTRIC EQUIPMENTS ARE 3 FEET AWAY FROM THE GAS METER

NOTES: ATTACHMENT POINTS ARE NOT EXACT. CONTRACTOR MAY NEED TO ADJUST MOUNT LOCATION. EXISTING ROOF CONDITION & RAFTER LOCATIONS ARE SUBJECT TO FIELD VERIFICATION. ACTUAL LOCATION MAY DIFFER. INSTALL PER MANUFACTURER SPECIFICATIONS. SEE SUPPLEMENTAL DOCUMENTS FOR ATTACHMENT & STRUCTURAL DOCUMENTATION.

1" PVC CONDUIT IN TRENCH
 MIN. 18" DEEP
 APPROX. 30' LENGTH

PLUMBING VENTS, SKYLIGHTS AND MECHANICAL VENTS SHALL NOT BE COVERED, MOVED, RE-ROUTED OR RE-LOCATED.
 THE WORKING CLEARANCES AROUND THE EXISTING ELECTRICAL EQUIPMENT AS WELL BE MAINTAINED IN ACCORDANCE WITH CEC 110.26



DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	3/32" = 1'-0"
SHEET SIZE	11"X 17"
	ANSI B

KIRKLAND RESIDENCE

APN NUMBER: #080060018000

HOMEOWNER INFO

#	REVISION/UPDATE	DATE

SIGNED & STAMP BY

PV-2

SHEET NO.

ROOF ATTACHMENT DETAILS

SHEET INFORMATION

BILL OF MATERIALS

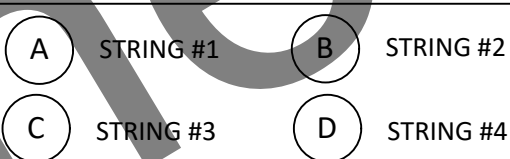
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	36	SOLARIA POWERXT-345R-BD 345W
MICRO-INVERTER	36	ENPHASE IQ8PLUS-72-2-US (240V)
JUNCTION BOX	2	JUNCTION BOX, 600V, NEMA 3R, UL LISTED
COMBINER BOX	1	ENPHASE IQ COMBINER 4C W/ IQ GATEWAY (X-IQ-AM1-240-4C)
BACKUP PANEL	1	NEW CRITICAL LOADS BACKUP PANEL 240V/125A BUS BAR RATING, SINGLE PHASE, WITH A 100A DISCONNECT
RAPID SHUTDOWN SWITCH	1	RAPID SHUTDOWN SWITCH
TRANSFER SWITCH	1	ENPHASE IQ SYSTEM CONTROLLER 2 (EP200G101-M240US01)
IQ LOAD CONTROLLER	2	IQ LOAD CONTROLLER
BATTERY	2	ENPAHSE ENCHARGE 10T(ENCHARGE-10T-1P-INT)
AC DISCONNECT	1	100A NON FUSED AC DISCONNECT, 2P, NEMA 3R, 240V
ENPHASE Q CABLE	40	ENPHASE Q CABLE 240V, (PER CONNECTOR)
BRANCH TERMINATOR	4	BRANCH TERMINATOR
WATER TIGHT CAPS	4	WATER TIGHT CAPS
ATTACHMENT	80	5/16"x4" SS LAG BOLT W/SS EPDM BONDED WASHER
ATTACHMENT	80	SS SERRATED T-BOLT W/ SS SERRATED FLANGE NUT
ATTACHMENT	80	FLASHLOC BASE
RAIL	21	UNIRAC SOLARMOUNT LIGHT RAIL
BONDED SPLICE	10	UNIRAC SPLICE PRO SERIES MILL
CLAMPS	60	UNIRAC UNIVERSAL AF MID CLAMP
CLAMPS	24	UNIRAC UNIVERSAL AF END CLAMP
GROUNDING LUG	6	GROUNDING LUG

ARRAY WEIGHT (LOAD CALC'S)

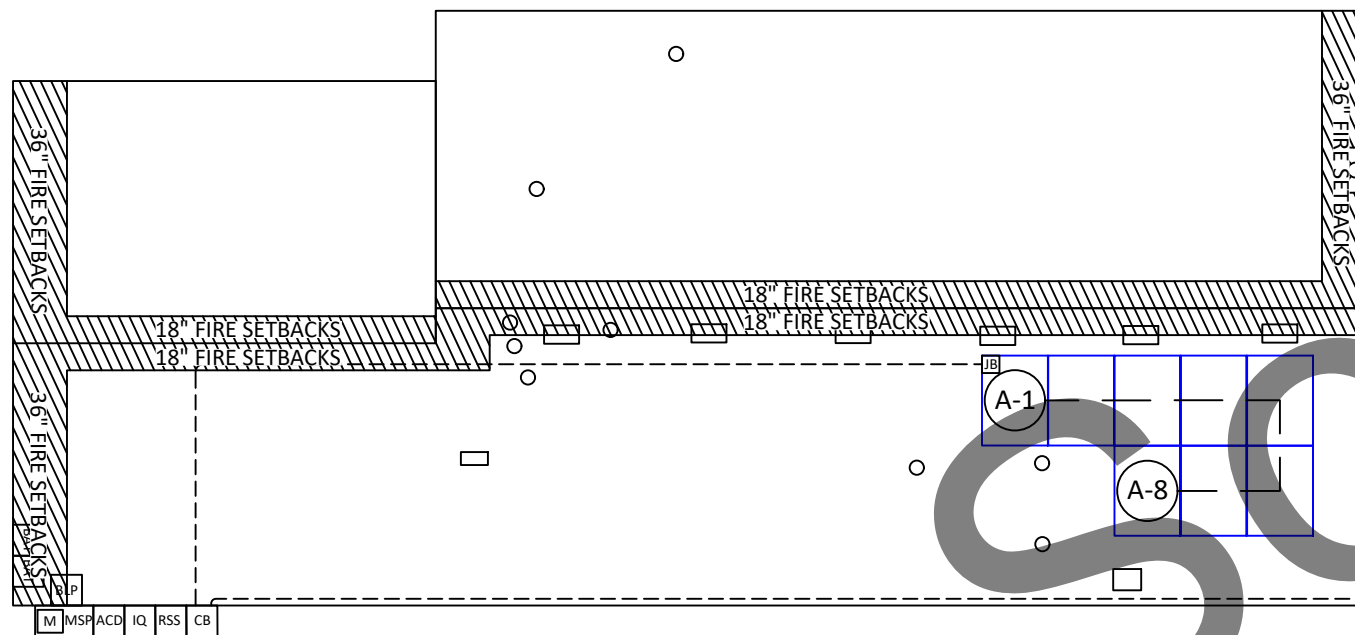
Number of Modules	36	
Module Weight	46	LBS
Total Module (Array) Weight	1656.00	LBS
Number of Attachment point	80	
Mounting System Weight <small>(Per Module)</small>	0.55	LBS
Mounting System Weight	44.00	LBS
Total System Weight <small>(Module Weight + Mounting System Weight)</small>	1700.00	LBS
Weight at Each Attachment Point <small>(Array Weight / Number of Attachment Point)</small>	20.70	LBS
Module Area <small>(63.81" x 43.93")</small>	19.47	SqFt
Total Array Area	700.79	SqFt
Distributed Load <small>(Total System Weight / Total Array Area)</small>	2.36	Per SqFt
Total Roof Area	3343.83	SqFt
Total Percentage of Roof Covered <small>(Total Array Area / Total Roof Area) * 100</small>	20.96%	



STRING LEGEND



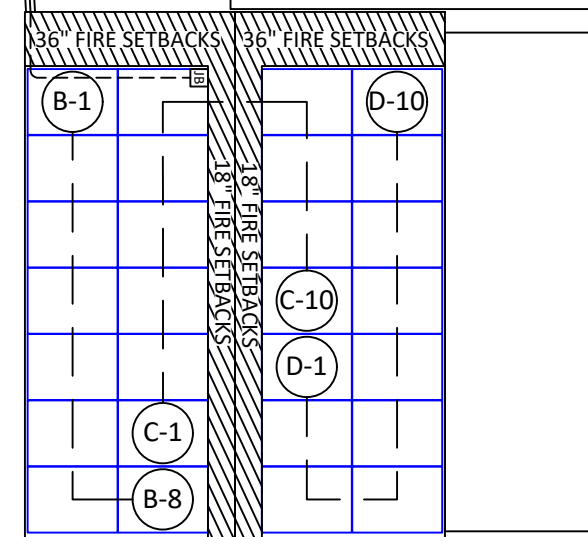
OCCIDENTAL RD,



LEGEND

- UTILITY METER
- ENPHASE IQ COMBINER 4C
- AC DISCONNECT
- MAIN SERVICE PANEL
- CRITICAL LOADS BACKUP PANEL
- ENPHASE IQ SYSTEM CONTROLLER 2
- ENPHASE ENCHARGE 10T BATTERY
- DC JUNCTION BOX
- RAPID SHUTDOWN SWITCH
- CONDUIT
- VENT, ATTIC FAN (ROOF OBSTRUCTIONS)
- CHIMNEY
- UNIRAC SOLARMOUNT LIGHT RAIL
- TRENCH
- TOP CAP
- PIPE

FRONT OF RESIDENCE
CRYSTAL LN.



KIRKLAND RESIDENCE

DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	3/32" = 1'-0"
SHEET SIZE	11" X 17"
	ANSI B

HOMEOWNER INFO

APN NUMBER: #080060018000

#	REVISION/UPDATE	DATE

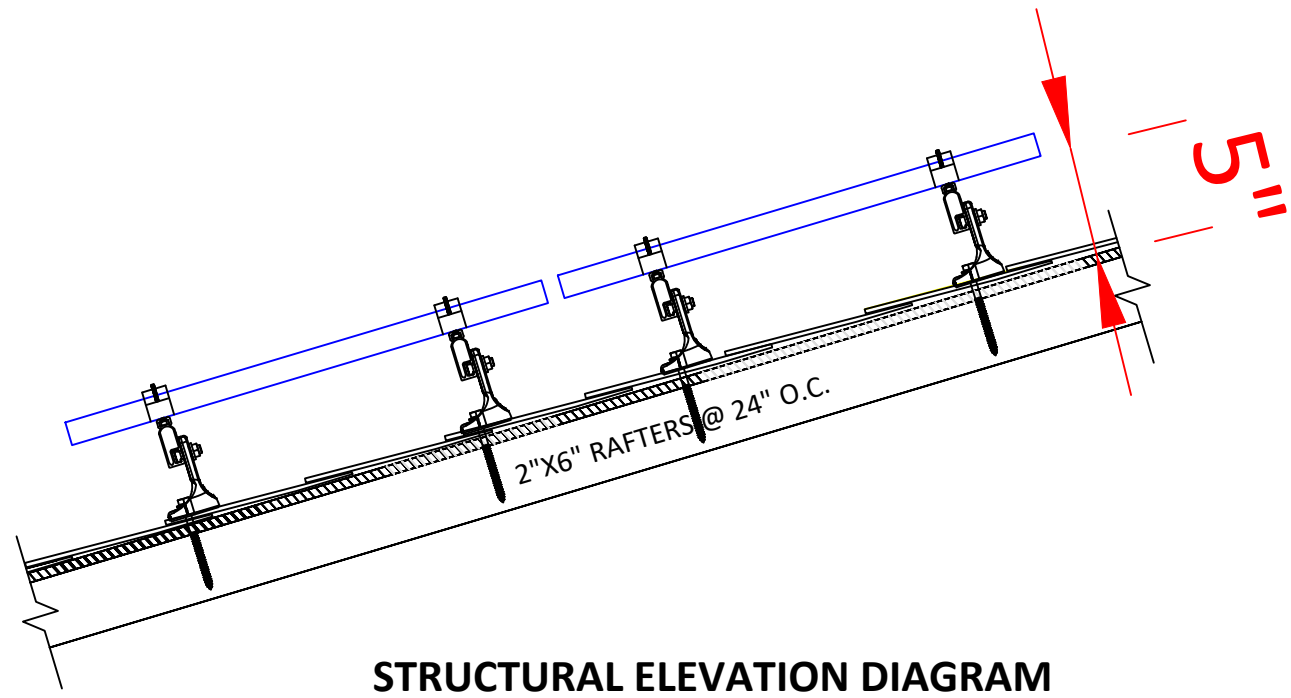
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PV-3

SHEET NO.

BOM &
STRING
LAYOUT

SHEET INFORMATION



STRUCTURAL ELEVATION DIAGRAM

UNIRAC UNIVERSAL AF MID/END CLAMPS

PV MODULE

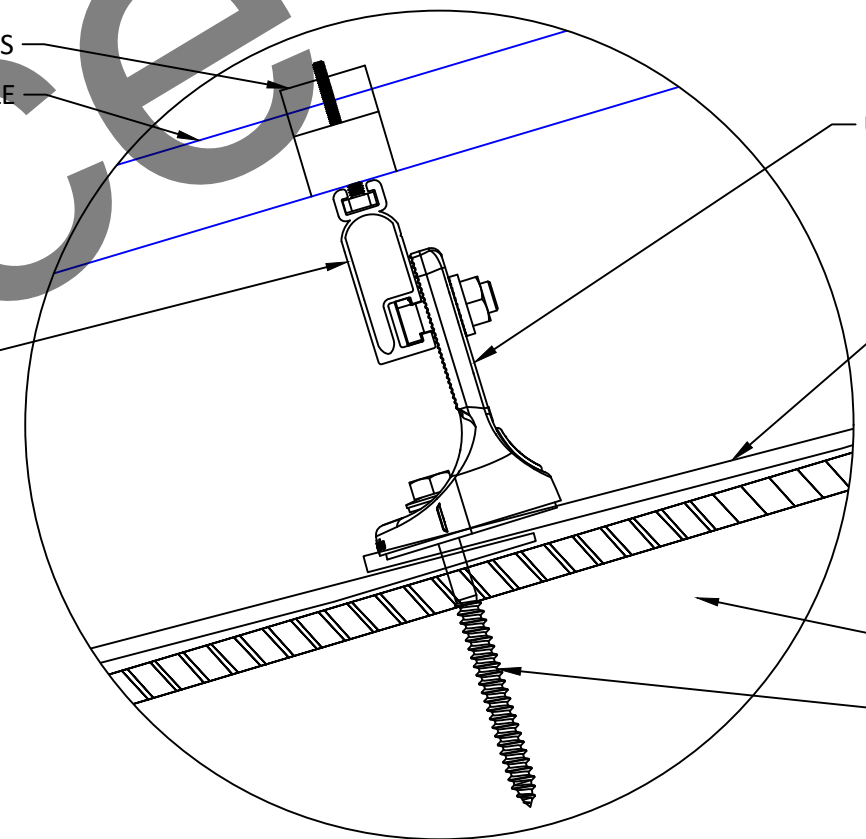
UNIRAC SOLARMOUNT
LIGHT RAIL

UNIRAC FLASHLOC COMP

COMP SHINGLE

2"X6" RAFTERS @ 24" O.C.

5/16" x 4" SS LAG BOLT W/ SS
EPDM BONDED WASHER



ATTACHMENT DETAILED DIAGRAM

NOTES: FLASHING SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS PRINTED INSTRUCTIONS. IF THERE IS ANY CONFLICT BETWEEN WHAT IS DEPICTED & INSTRUCTION AS PER MANUFACTURER, MANUFACTURERS INSTRUCTIONS SHALL SUPERSEDE.

DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	NTS
SHEET SIZE	11"X 17"
	ANSI B

KIRKLAND RESIDENCE

APN NUMBER: #080060018000

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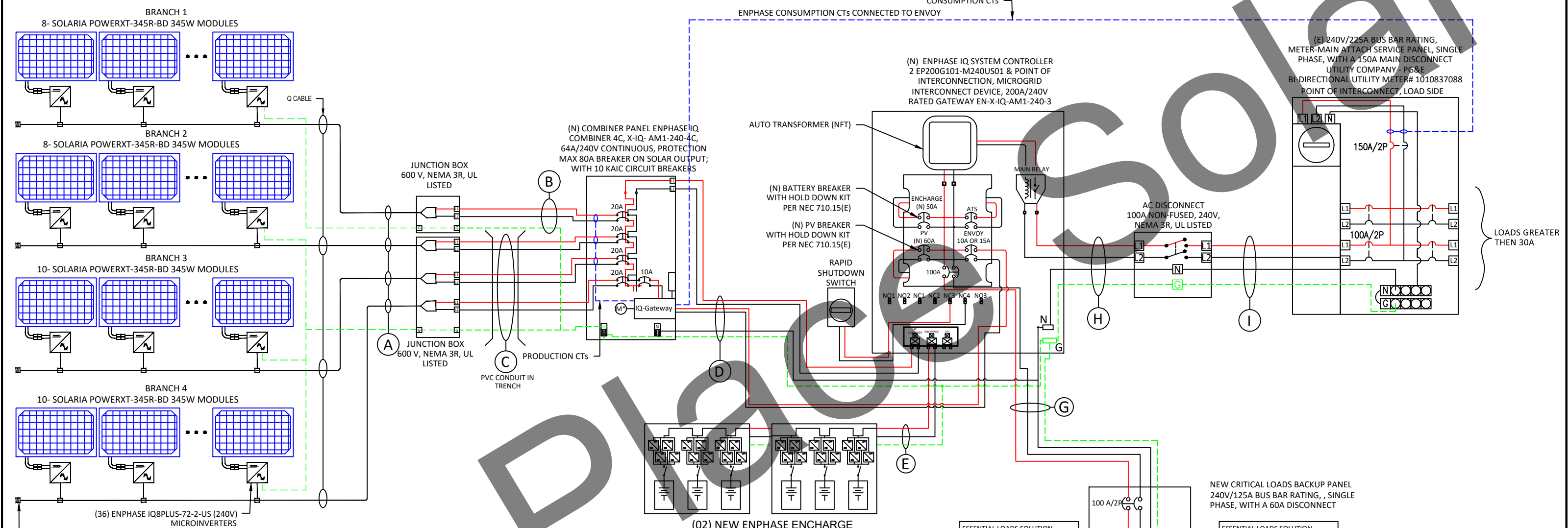
S-1

SHEET NO.

STRUCTURAL
DETAILED
DIAGRAM

SHEET INFORMATION

[DC] SYSTEM SIZE	[AC] SYSTEM SIZE
36 MODULES x 345W	(36) ENPHASE IQ8PLUS-72-2-US (240V) MICRO-INVERTER x 290W
12.42 kW	10.44 kW



EQUIPMENT DETAILS	
(#) PV MODULES	(36) SOLARIA POWERXT-345R-BD 345W
(#) MICROINVERTERS	(36) ENPHASE IQ8PLUS-72-2-US (240V)
OUTPUT CURRENT	43.56A
BRANCH CIRCUIT	2 STRINGS OF 10, 2 STRINGS OF 8
POINT OF INTERCONNECTION	100A LOAD BREAKER IN THE MAIN SERVICE PANEL 225A BUSBAR, 150A MAIN BREAKER, 120/240V, 3W, 1φ
UTILITY	PG&E
AHJ	SONOMA COUNTY

DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	NTS
SHEET SIZE	11"X 17"
	ANSI B

KIRKLAND RESIDENCE

HOMEOWNER INFO APN NUMBER: #080060018000

#	REVISION/UPDATE	DATE

SIGNED & STAMP BY

E-1
SHEET NO.
ELECTRICAL DIAGRAM & CALCULATIONS
SHEET INFORMATION

ID	CONDUCTOR			CONDUIT	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CONDUIT	CONDUIT FILL PERCENT	OCPD	EGC		TEMP. CORR. FACTOR		CONDUIT FILL FACTOR	CONT. CURRENT x 125%				MAX CURRENT	BASE AMP.	DERATED AMP.	LENGTH	VOLTAGE DROP
	AWG	TYPE	MATERIAL						AWG	MATERIAL	TEMP.	FACTOR		CONT. CURRENT	MULTIPLIER	FACTOR	RESULT					
A	10 AWG	Q CABLE	-	-	1	2	N/A	N/A	6 AWG	BARE COPPER	0.71	(56°C)	N/A	12.1A	x	1.25	=	15.1A	N/A	N/A	50FT	0.46%
B	10 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	2	11.45%	20A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	9.7A	x	1.25	=	12.1A	40A	40A x 1 x 0.96 = 38.4A	60FT	1.35%
C	10 AWG	THWN-2	COPPER	MIN 1" Dia PVC	3	6	26.72%	20A	8 AWG	THWN-2, COPPER	0.96	(34°C)	0.8	12.1A	x	1.25	=	15.1A	40A	40A x 0.8 x 0.96 = 30.72A	130FT	1.68%
D	6 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	3	36.53%	60A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	43.5A	x	1.25	=	54.5A	75A	75A x 1 x 0.96 = 72A	5FT	0.10%
E	8 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	2	26.73%	50A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	33.4A	x	1.25	=	41.8A	55A	55A x 1 x 0.96 = 52.8A	5FT	0.08%
F	10 AWG	THWN-2	COPPER	MIN 0.75" Dia EMT	1	2	11.45%	N/A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	24A	x	1.25	=	30A	40A	40A x 1 x 0.96 = 38.4A	5FT	0.13%
G	3 AWG	THWN-2	COPPER	MIN 1.25" Dia EMT	1	3	25.15%	100A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	80A	x	1.25	=	100A	115A	115A x 1 x 0.96 = 110.4A	5FT	0.06%
H	3 AWG	THWN-2	COPPER	MIN 1.25" Dia EMT	1	3	25.15%	N/A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	80A	x	1.25	=	100A	115A	115A x 1 x 0.96 = 110.4A	5FT	0.06%
I	3 AWG	THWN-2	COPPER	MIN 1.25" Dia EMT	1	3	25.15%	100A	8 AWG	THWN-2, COPPER	0.96	(34°C)	1	80A	x	1.25	=	100A	115A	115A x 1 x 0.96 = 110.4A	5FT	0.06%

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL	SOLARIA POWERXT-345R-BD 345W
VMP	38.9V
IMP	8.88A
VOC	47.1V
ISC	9.40A
TEMP. COEFF. VOC	-0.29 %/°C
MODULE DIMENSION	63.81" (L) x 43.93" (W)
PANEL WATTAGE	345W

MICROINVERTER SPECIFICATIONS	
MANUFACTURER / MODEL	ENPHASE IQ8PLUS-72-2-US (240V)
NOMINAL OUTPUT VOLTAGE	240VAC
CONTINUOUS OUTPUT CURRENT	1.21A

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-3°C
AMBIENT TEMP (HIGH TEMP 2%)	34°C
CONDUIT HEIGHT	7/8"
ROOF TOP TEMP	90°C
CONDUCTOR TEMPERATURE RATE	56°C
MODULE TEMPERATURE COEFFICIENT OF VOC	-0.29 %/K

BATTERY SPECIFICATION	
MODEL	ENCHARGE-10T-1P-INT
AMBIENT TEMPERATURE RANGE	-15°C TO 55°C
RATED OUTPUT CURRENT	16.7 A
NOMINAL VOLTAGE	230/184-253 VAC
USABLE CAPACITY	10.5 KWH
INTERCONNECTION	SINGLE-PHASE

ENPHASE ENPOWER SPECIFICATION	
MAX. DISCONNECT CURRENT	200A
MAX. OVERCURRENT PROTECTION BREAKER	200A

DATE		09/23/2022
PROJECT ID		
CREATED BY		RSS
CHECKED BY		KB
SCALE		NTS
SHEET SIZE		11"X 17"
		ANSI B

DATE		09/23/2022
PROJECT ID		
CREATED BY		RSS
CHECKED BY		KB
SCALE		NTS
SHEET SIZE		11"X 17"
		ANSI B

KIRKLAND RESIDENCE	
APN NUMBER: #080060018000	
HOMEOWNER INFO	

#	REVISION/UPDATE	DATE

SIGNED & STAMP BY	
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E-1
SHEET NO.
ELECTRICAL DIAGRAM & CALCULATIONS
SHEET INFORMATION

1

! WARNING

ELECTRIC SHOCK HAZARD

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

LABEL LOCATION:
MAIN SERVICE PANEL/AC DISCONNECT/INVERTER/
AC COMBINER
2019 CEC 690.13(B)

2

! WARNING

ELECTRIC SHOCK HAZARD

IF GROUND FAULT IS INDICATED
ALL NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUND AND ENERGIZED

LABEL LOCATION:
INVERTER(S), ENPHASE ENVOY ENCLOSURE (IF
APPLICABLE).
PER CODE(S): CEC 2019: 690.5(C)

3

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT 43.56 A
NOMINAL OPERATING AC VOLTAGE 240 VAC

LABEL LOCATION:
AC DISCONNECT 2019 CEC 690. 13(B)

4

**RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM**

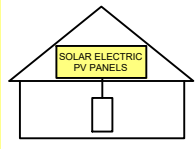
LABEL LOCATION:
INVERTER
AT OR WITHIN 3' OF THE DC COMBINER
SWITCH
2019 CEC 690.56(C)(3)

ADHESIVE FASTENED SIGNS:
• THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
• WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [CEC 110.21(B) FIELD MARKING].
• ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [CFC 605.11.1.3]

5

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LABEL PER NEC 690.56(C)- PROVIDE AT AC DISCONNECT FOR RAPID SHUTDOWN COMPLIANT SYSTEM

6

! WARNING

PHOTOVOLTAIC SYSTEM COMBINER PANEL

DO NOT ADD LOADS

LABEL LOCATION:
PHOTOVOLTAIC AC COMBINER (IF APPLICABLE).
PER CODE(S): CEC 2019: 705.12(B)(2)(3)(c)

7

! WARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

LABEL LOCATION:
UTILITY SERVICE METER AND MAIN SERVICE PANEL.
PER CODE(S): CEC 2019: 705.12(D)(3)

8

CAUTION-TRI POWER SOURCE

FIRST SOURCE IS UTILITY ELECTRICAL GRID
SECOND SOURCE IS AC BATTERY
THIRD SOURCE IS PV INVERTER

REQ'D BY: CEC 705.10
LABEL LOCATION:
SUB PANEL OR BACKUP LOADS PANEL,
MAIN SERVICE, METER/MAIN

9

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL LOCATION:
UTILITY SERVICE ENTRANCE/METER, INVERTER/DC DISCONNECT IF REQUIRED BY LOCAL AHJ. OR OTHER LOCATIONS AS REQUIRED BY LOCAL AHJ
PER CODE(S): CEC 2019: ARTICLE 690.56(C)

10

BATTERY DISCONNECT

DO NOT RELOCATE THIS OVERCURRENT DEVICE

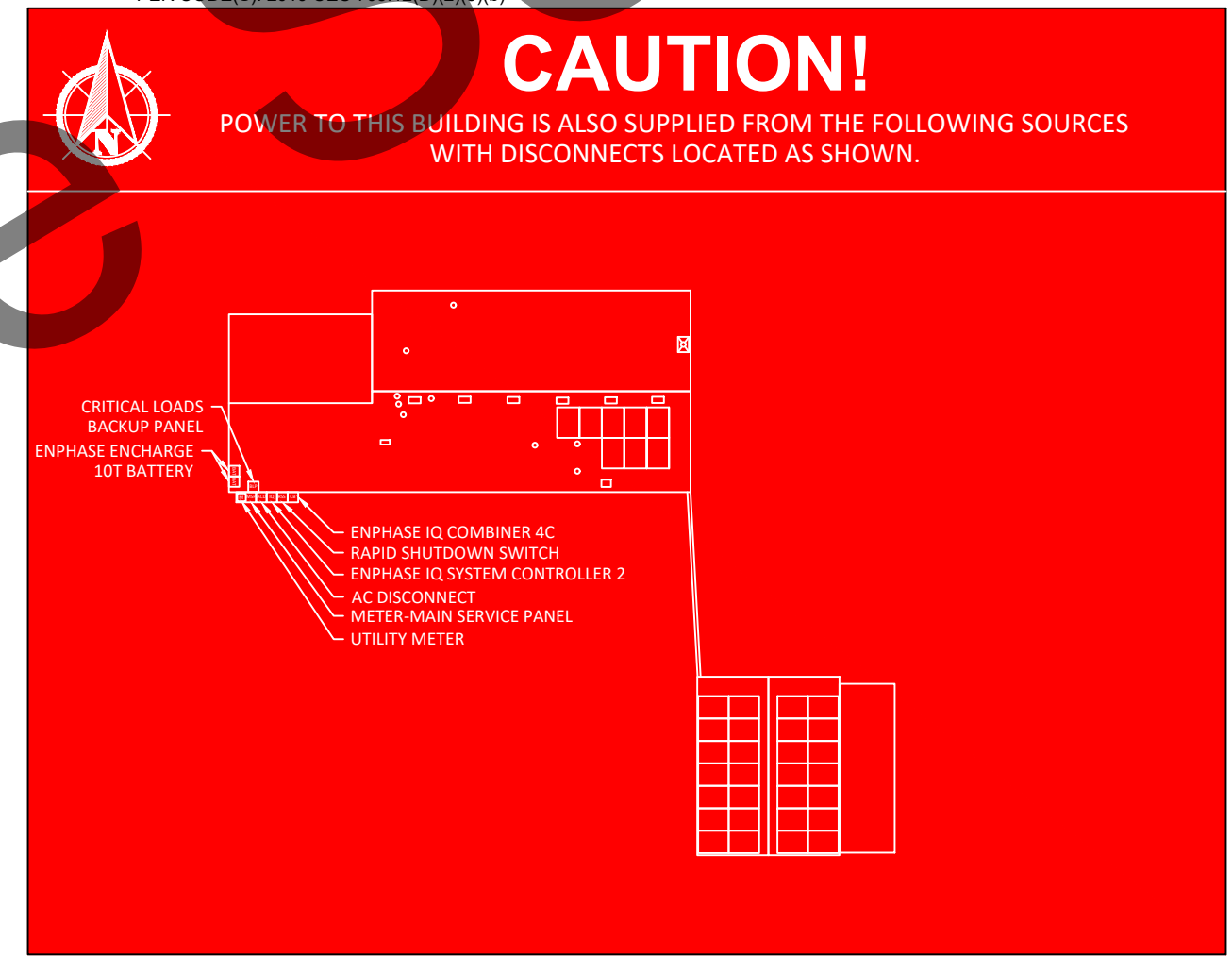
REQ'D BY: NEC 705.12(B)(2)(3)(b)
LABEL LOCATION:
BATTERY BREAKERS

11

PV SOLAR BREAKER

DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
ADJACENT TO PV BREAKER (IF APPLICABLE)
PER CODE(S): 2019 CEC 705.12(D)(2)(3)(b)



LABEL LOCATION:
EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED

DATE	09/23/2022
PROJECT ID	
CREATED BY	RSS
CHECKED BY	KB
SCALE	NTS
SHEET SIZE	11"X 17"
	ANSI B

KIRKLAND RESIDENCE

HOMEOWNER INFO APN NUMBER: #080060018000

#	REVISION/UPDATE	DATE

SIGNED & STAMP BY

E-2
SHEET NO.
PLACARDS
SHEET INFORMATION



Solaria PowerXT® | Residential



Solaria PowerXT®-350R-PD | Solaria PowerXT®-345R-BD

Achieving up to 19.4% efficiency, Solaria PowerXT solar modules are one of the highest power modules in the residential solar market. Compared to conventional modules, Solaria PowerXT modules have fewer gaps between the solar cells; this leads to higher power and superior aesthetics. Solaria PowerXT residential modules are manufactured with black backsheet and frames, giving them a striking appearance.

Developed in California, Solaria's patented cell cutting and module assembly takes processed solar wafers and turns them into PowerXT solar modules. The process starts by creating a highly reliable PowerXT cell where busbars and ribbon interconnections are eliminated. Solaria then packages the cells into the PowerXT solar module, reducing inactive space between the cells. All of the above leads to an exceptionally efficient solar module produced in a cost effective manner.

Higher Efficiency, Higher Power

Solaria PowerXT modules achieve up to 19.4% efficiency; conventional modules achieve 15% – 17% efficiency. Solaria PowerXT modules are one of the highest power modules available.

Lower System Costs

Solaria PowerXT modules produce more power per square meter area. This reduces installation costs due to fewer balance of system components.

Improved Shading Tolerance

Sub-strings are interconnected in parallel, within each of the four module quadrants, which dramatically lowers the shading losses and boosts energy yield.

Improved Aesthetics

Compared to conventional modules, Solaria PowerXT modules have a more uniform appearance and superior aesthetics.

Durability and Reliability

Solder-less cell interconnections are highly reliable and designed to far exceed the industry leading 25 year warranty.

About Solaria

Established in 2000, The Solaria Corporation has created one of the industry's most respected IP portfolios, with over 100 patents encompassing materials, processes, applications, products, manufacturing automation and equipment. Headquartered in Fremont, California, Solaria has developed a technology platform that unlocks the potential of solar energy allowing it to be ubiquitous and universally accessed.



Solaria PowerXT®-350R-PD Solaria PowerXT®-345R-BD

Performance at STC (1000W/m², 25° C, AM 1.5)

Solaria PowerXT-		340R-BD	345R-BD	345R-PD	350R-PD
Max Power (P _{max})	[W]	340	345	345	350
Efficiency	[%]	18.8	19.1	19.1	19.4
Open Circuit Voltage (V _{oc})	[V]	46.9	47.1	46.9	47.1
Short Circuit Current (I _{sc})	[A]	9.36	9.40	9.46	9.49
Max Power Voltage (V _{mp})	[V]	38.6	38.9	38.5	38.8
Max Power Current (I _{mp})	[A]	8.79	8.88	8.93	9.02
Power Tolerance	[%]	-0/+3	-0/+3	-0/+3	-0/+3

Performance at NOCT (800W/m², 20°C Amb, Wind 1 m/s, AM 1.5)

Max Power (P _{max})	[W]	252	255	255	259
Open Circuit Voltage (V _{oc})	[V]	44.1	44.3	44.1	44.3
Short Circuit Current (I _{sc})	[A]	7.58	7.61	7.66	7.69
Max Power Voltage (V _{mp})	[V]	35.5	35.8	35.4	35.7
Max Power Current (I _{mp})	[A]	7.03	7.10	7.15	7.22

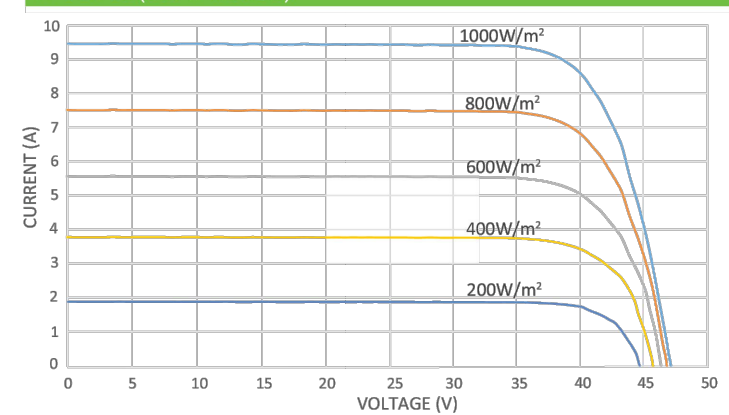
Temperature Characteristics

NOCT	[°C]	45 +/-2
Temp. Coeff. of P _{max}	[% / °C]	-0.39
Temp. Coeff. of V _{oc}	[% / °C]	-0.29
Temp. Coeff. of I _{sc}	[% / °C]	0.04

Design Parameters

Operating temperature	[°C]	-40 to +85
Max System Voltage	[V]	1000
Max Fuse Rating	[A]	15
Bypass Diodes	[#]	4

IV Curves (350W Module)



Authorized Dealer



Mechanical Characteristics

Cell Type	Monocrystalline Silicon
Dimensions (L x W x H)	1621mm x 1116mm x 40mm
Weight	21 kg / 46 lbs
Glass Type / Thickness	AR Coated, Tempered / 3.2mm
Frame Type	Anodized Aluminum
Cable Type / Length	12 AWG PV Wire (UL) / 1000mm
Connector Type	Amphenol H4 (MC4 compatible)
Junction Box	IP67 / 4 diodes
Front Load (UL 1703)	5400 Pa / 113 psf
Rear Load (UL 1703)	3600 Pa / 75 psf

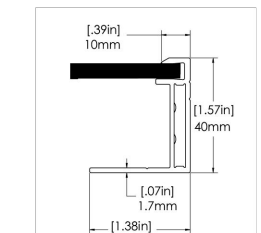
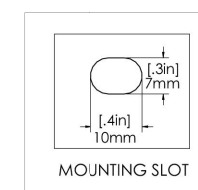
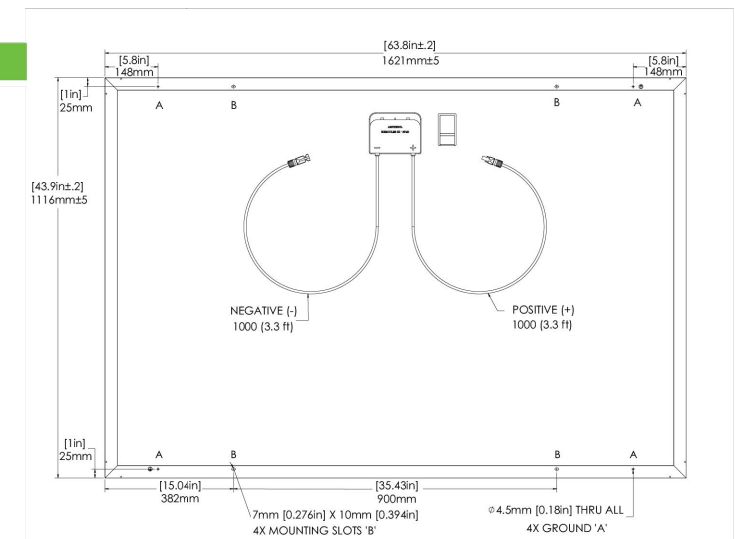
Certifications / Warranty

Certifications	UL 1703/IEC 61215/IEC 61730/CEC
Fire Type (UL 1703)	1
Power & Product Warranty	25 years*

* Warranty details at www.solaria.com

Packaging

Stacking Method	Horizontal / Palletized
Pcs / Pallet	25
Pallet Dims (L x W x H)	1685 x 1150 x 1230 mm
Pallet Weight	590 kg / 1300 lbs
Pallets / 40-ft Container	28
Pcs / 40-ft Container	700





IQ8 and IQ8+ Microinverters

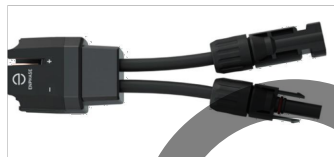
Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (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 super-fast 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 Enphase IQ Battery, Enphase 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 Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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-SB) requirements

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current ² [module Isc]	A	15	15
Overvoltage class DC port		II	II
DC port backfeed current	mA	0	0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	A _{rms}	2	
Max units per 20 A (L-L) branch circuit ⁴		16	13
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	%	97.5	97.6
CEC weighted efficiency	%	97	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 (HxWxD)		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-SB), UL 62109-1, UL1741/IEE1547, 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 Shut Down 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) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>

(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C



X-IQ-AM1-240-4C

X-IQ-AM1-240-4

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

Enphase IQ Combiner 4/4C

MODEL NUMBER

IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), 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.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.

ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)

Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 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° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 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.
Altitude	To 2000 meters (6,560 feet)

INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

COMPLIANCE

Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1



To learn more about Enphase offerings, visit enphase.com



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Enphase Encharge 10T

The **Enphase Encharge 10T™** all-in-one AC-coupled storage system is **reliable, smart, simple, and safe**. It is comprised of three base Encharge 3T™ storage units, has a total usable energy capacity of 10.5 kWh and twelve embedded microinverters with 3.84 kW power rating. Installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



Reliable

- Proven high reliability IQ Series Microinverters
- Ten-year limited warranty
- Three independent Encharge storage base units
- Twelve embedded IQ8X-BAT Microinverters
- Passive cooling (no moving parts/fans)

Smart

- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

Safe

- Cells safety tested
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

To learn more about Enphase offerings, visit enphase.com



Enphase Encharge 10T

MODEL NUMBER	
ENCHARGE-10T-1P-INT	Encharge 10T™ battery storage system with integrated Enphase IQ Series microinverters and battery management unit (BMU). Includes: - Three Encharge 3T™ base units (B03-T01-INT00-1-2) - One Encharge 10T™ cover kit with cover, wall mounting bracket, and interconnect cable for wiring between batteries (B10T-C-1290-0)
OUTPUT (AC)	
Rated (continuous) output power	3.84 kVA ¹
Nominal voltage / range	230/184-253 VAC
Nominal frequency / range	50/47–52 Hz
Rated output current	16.7 A ¹
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Interconnection	Single phase
Maximum AC short circuit fault current over 3 cycles	8.4 Arms
Round trip efficiency ²	89%
BATTERY	
Total capacity	10.5 kWh
Usable capacity	10.5 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	75.6 V
Ambient operating temperature range	-15° C to 55° C (5° 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 (WxHxD)	1283 x 775 x 188 mm (50.5 x 30.5 x 7.4 in)
Weight	Three individual 40.5 kg (89.3 lbs) base units plus 22.1 kg (48.7 lbs) cover and mounting bracket; total 143.6 kg (316.5 lbs)
Enclosure	Outdoor – IP55
Cooling	Natural convection – No fans
Altitude	Up to 2000 meters (6561 feet)
Mounting	Wall mount
FEATURES AND COMPLIANCE	
Compatibiliteit	Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros and Enphase Envoy-S.
Communicatie	Wireless 2.4 GHz
Services	Self-consumption, TOU, Net Energy Metering Integrity
Controleren	Enlighten Manager and MyEnlighten monitoring options; API integration
Certificatie	UN 38.3, EN 62040.1, VDE AR-N 4105:2018 EMI: CE, EFT, ESD, Surge, dips and interruptions, CRF Cell Module: IEC 62619:2017, UN 38.3, UL1973, UL9540A Inverters: EN 62109-1, EN 62109-2, EN 62909-1:2017, EN 50549-1:2019
LIMITED WARRANTY	
Limited Warranty ³	EMI: CE, EFT, ESD, Surge, dips and interruptions, CRF 80% capacity, up to 10 years or 3600 cycles ⁴

1. During Commissioning, Encharge can be limited to 3.68 kVA / 16 A to meet local grid code requirements.
 2. AC to Battery to AC at 50% power rating.
 3. Whichever occurs first. Restrictions apply.
 4. Cycles refer to complete charge and discharge cycles.

To learn more about Enphase offerings, visit enphase.com



Enphase IQ System Controller 2

The **Enphase IQ System Controller 2** connects the home to grid power, the IQ Battery system, and solar PV. It provides microgrid interconnection device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.

Reliable

- Durable NEMA type 3R enclosure
- Ten-year limited warranty

Smart

- Controls safe connectivity to the grid
- Automatically detects grid outages
- Provides seamless transition to backup

Simple

- Connects to the load or service equipment¹ side of the main load panel
- Centered mounting brackets support single stud mounting
- Supports conduit entry from the bottom, bottom left side, and bottom right side
- Supports whole home and partial home backup and subpanel backup
- Up to 200A main breaker support
- Includes neutral-forming transformer for split phase 120/240V backup operation
- IQ System Controller supports backward compatibility with older generation of PV microinverters (M215, M250 and S series), making it simple for home owners to upgrade their systems
- Easy integration with generator from major manufacturers

1. IQ System Controller 2 is not suitable for use as service equipment in Canada.



To learn more about Enphase offerings, visit enphase.com

Enphase IQ System Controller 2

MODEL NUMBER	
EP200G101-M240US01	Enphase IQ System Controller 2 with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and battery installations.
ACCESSORIES and REPLACEMENT PARTS	
EP200G-NA-XA-E3	Replacement IQ System Controller 2 printed circuit board
EP200G-NA-HD-200A	Eaton type BR circuit breaker hold-down screw kit, BRHDK125
CT-200-SPLIT	200 A split core current transformers for Generator metering (+/- 2.5%)
Circuit breakers (as needed) ^{2,3}	Not included, must order separately:
• BRK-100A-2P-240V: Main breaker, 2 pole, 100A, 25kAIC, CSR2100	• BRK-20A-2P-240V-B: Circuit breaker, 2 pole, 20A, 10kAIC, BR220B
• BRK-125A-2P-240V: Main breaker, 2 pole, 125A, 25kAIC, CSR2125N	• BRK-30A-2P-240V: Circuit breaker, 2 pole, 30A, 10kAIC, BR230B
• BRK-150A-2P-240V: Main breaker, 2 pole, 150A, 25kAIC, CSR2150N	• BRK-40A-2P-240V: Circuit breaker, 2 pole, 40A, 10kAIC, BR240B
• BRK-175A-2P-240V: Main breaker, 2 pole, 175A, 25kAIC, CSR2175N	• BRK-60A-2P-240V: Circuit breaker, 2 pole, 60A, 10kAIC, BR260
• BRK-200A-2P-240V: Main breaker, 2 pole, 200A, 25kAIC, CSR2200N	• BRK-80A-2P-240V: Circuit breaker, 2 pole, 80A, 10kAIC, BR280
EP200G-HNDL-R1	IQ System Controller 2 installation handle kit (order separately)
EP200G-LITKIT	IQ System Controller 2 literature kit, including labels, feed-through headers, screws, filler plates, and QIG
BRK-20A40A-2P-240V	2 pole, 20A/40A, 10kAIC, BQC220240
ELECTRICAL SPECIFICATIONS	
Assembly rating	Continuous operation at 100% of its rating
Nominal voltage / range (L-L)	240 VAC / 100 - 310 VAC
Voltage measurement accuracy	±1% V nominal (±1.2V L-N and ±2.4V L-L)
Auxiliary contact for load control, excess PV control, and generator two-wire control	24V, 1A
Nominal frequency / range	60 Hz / 56 - 63 Hz
Frequency measurement accuracy	±0.1 Hz
Maximum continuous current rating	160A
Maximum input overcurrent protection device	200A
Maximum output overcurrent protection device	200A
Maximum overcurrent protection device rating for Generator circuit ⁴	80A
Maximum overcurrent protection device rating for storage branch circuit ⁴ (the storage branch circuit can be replaced with PV)	80A
Maximum overcurrent protection device rating for IQ8 PV combiner branch circuit ⁴	80A
Neutral Forming Transformer (NFT)	<ul style="list-style-type: none"> • Breaker rating (pre-installed): 40A between L1 and Neutral; 40A between L2 and Neutral • Continuous rated power: 3600VA • Maximum continuous unbalance current: 30A @ 120V • Peak rated power: 8800VA for 30 seconds • Peak unbalanced current: 80A @ 120V for 30 seconds
MECHANICAL DATA	
Dimensions (WxHxD)	50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in)
Weight	39.4 kg (87 lbs)
Ambient temperature range	-40° C to +50° C (-40° F to 122° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NEMA type 3R, polycarbonate construction
Altitude	To 2500 meters (8200 feet)
WIRE SIZES	
Connections (All lugs are rated to 90C)	<ul style="list-style-type: none"> • Main lugs and backup load lugs: Cu/Al: 1 AWG – 300 KCMIL • CSR breaker bottom wiring lugs: Cu/Al: 2 AWG – 300 KCMIL • BR breakers (wire provided): 6 AWG • AC combiner lugs, Encharge lugs, and generator lugs: 14 AWG – 2 AWG • Neutral (large lugs): Cu/Al: 6 AWG - 300 KCMIL
Neutral and ground bars	<ul style="list-style-type: none"> Large holes (5/16-24 UNF): 14 AWG – 1/0 AWG Small holes (10-32 UNF): 14 AWG – 6 AWG
COMPLIANCE	
Compliance	UL 1741, UL 1741 SA, UL 1741 PCS, UL1998, UL869A ⁵ , UL67 ⁵ , UL508 ⁵ , UL50E ⁵ CSA 22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, AC156. IQ System Controller 2 is approved for Use as Service Equipment in the United States ⁵ IFETEL homologation number: RCPENEP22-2078

2. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.

3. The IQ System Controller 2 is rated 22 kAIC

4. Not included. Installer must provide properly rated breaker per circuit breaker list above.

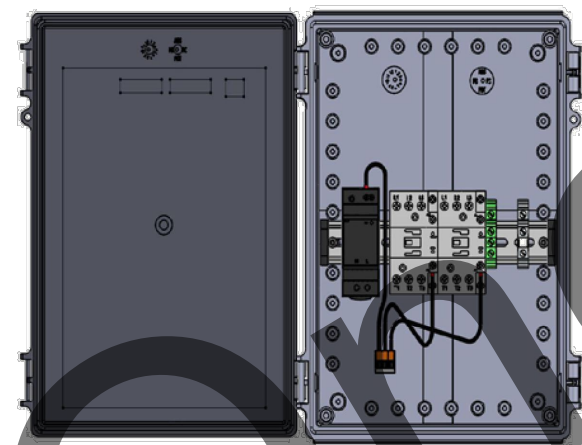
5. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

To learn more about Enphase offerings, visit enphase.com

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Enphase IQ Load Controller



The **Enphase IQ Load Controller**, when used in conjunction with the IQ System Controller, enables control of up to 2 loads running 240VAC L-L or shedding of up to 2 solar circuits when operating in an off-grid mode with the Enphase energy management system.

The IQ Load Controller can also be used for controlling 4 loads running 120VAC L-L.

Up to 2 IQ Load Controllers can be integrated with each IQ System Controller on a site.

Powerful

- Control up to 2, 36A resistive loads or 3HP/25A inductive loads running at 240VAC or 4 loads running at 120VAC
- Shed up to 2 excess IQ6, IQ7, M215 or M250 solar branch circuits (up to 32A each) to maintain Solar-To-Storage ratio when off-grid
- Prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life
- Choose from three load control modes for flexibility or manually control loads from the Enphase App

Simple

- A complete solution for use with the IQ System Controller's load control feature
- DIN rail mounted components enable easy installation and servicing
- Easy configuration via Enphase Installer App

Reliable

- Designed for indoor or outdoor installations
- 5 years warranty
- Durable NEMA 4X Enclosure

Enphase IQ Load Controller

EP-NA-LK02-040	IQ Load Controller for use with IQ System Controller's auxiliary contacts to shed non-essential loads or M-series, IQ series microinverters	
INPUT DATA		
DC Power Supply input voltage	120Vac	
DC Power Supply input Current rating	12A	
CAPACITY		
Total loads controlled	2 loads running at 240Vac or 4 loads at 120Vac	
Max load controlled	36A resistive, 25A inductive for dedicated loads, 32A resistive for branch circuits with 2 or more loads	
MECHANICAL DATA		
Ambient temperature range	-25 to 40 °C	
Dimensions (WxHxD)	12.58 x 14.58 x 5.96 (in)	
Weight	6.61 (lbs)	
Cooling	Natural Convection	
Enclosure	Outdoor, NEMA type 4X, polycarbonate construction	
WIRE SIZES		
Contactor	• Line/Load power terminals • Contactor A1/A2 control terminals	14-8AWG 18-16AWG
Power Supply	• 120V L-N input terminals • 120V V+/V- output terminals	14-12AWG 18-16AWG
Ground terminal block		24-6AWG
Neutral terminal block		24-6AWG
COMPLIANCE		
Compliance	UL1741	
WARRANTY		
Limited Warranty	5 years	

FLASH LOC



FLASHLOC is the ultimate attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the lag bolt and inject sealant into the base. **FLASHLOC's** patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with lag bolts, sealant, and hardware for maximum convenience. Don't just divert water, **LOC it out!**

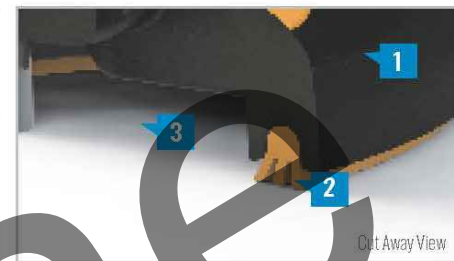


TESTED TO TAS-100
WIND DRIVEN RAIN TEST
AND UL441 RAIN TEST



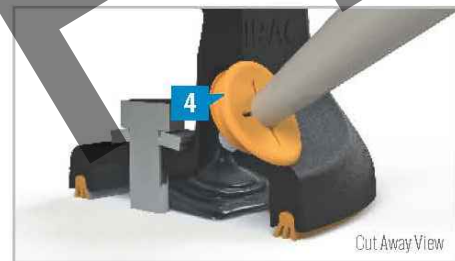
PROTECT THE ROOF

Install a high-strength waterproof attachment without lifting, prying or damaging shingles.



LOC OUT WATER

With an outer shield **1**, contour-conforming gasket **2** and pressurized sealant chamber **3**, the Triple Seal technology delivers a 100% waterproof connection.



HIGH-SPEED INSTALL

Simply drive lag bolt and inject sealant into the port **4** to create a permanent pressure seal.

FLASH LOC

INSTALLATION GUIDE



PRE-INSTALL

Snap chalk lines for attachment rows. On shingle roofs, snap lines 1-3/4" below upslope edge of shingle course. Locate rafters and mark attachment locations.

At each location, drill a 7/32" pilot hole. Clean roof surface of dirt, debris, snow, and ice. Next, BACKFILL ALL PILOT HOLES WITH SEALANT.

NOTE: Space mounts per racking system install specifications.



STEP 1: SECURE

Place **FLASHLOC** over pilot hole with lag on down-slope side. Align indicator marks on sides of mount with chalk line. Pass included lag bolt and sealing washer through **FLASHLOC** into pilot hole. Drive lag bolt until mount is held firmly in place.

NOTE: The EPDM in the sealing washer will expand beyond the edge of the metal washer when proper torque is applied.



STEP 2: SEAL

Insert tip of UNIRAC provided sealant into port. Inject until sealant exits both vents.

Continue array installation, attaching rails to mounts with provided T-bolts.



NOTE: When **FLASHLOC** is installed over gap between shingle tabs or vertical joints, fill gap/joint with sealant between mount and upslope edge of shingle course.

USE ONLY UNIRAC APPROVED SEALANTS: Chemlink Duralink 50, Chemlink M-1, Geocel 4500, or Geocel S-4

FASTER INSTALLATION. 25-YEAR WARRANTY.

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

FASTER INSTALLATION. 25-YEAR WARRANTY.

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

SOLARMOUNT



SOLARMOUNT defined the standard in solar racking. Features are designed to get installers off the roof faster. Our grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Systems can be configured with standard or light rail to meet your design requirements at the lowest cost possible. The superior aesthetics package provides a streamlined clean edge for enhanced curb appeal, with no special brackets required for installation.



Now Featuring:
THE NEW FACE OF SOLAR RACKING
Superior Aesthetics Package



LOSE ALL OF THE COPPER & LUGS
System grounding through Enphase microinverters and trunk cables



SMALL IS THE NEXT NEW BIG THING
Light Rail is Fully Compatible with all SM Components



ENHANCED DESIGN & LAYOUT TOOLS
Featuring Google Map Capabilities within U-Builder

FAST INSTALLATION. SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT



OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

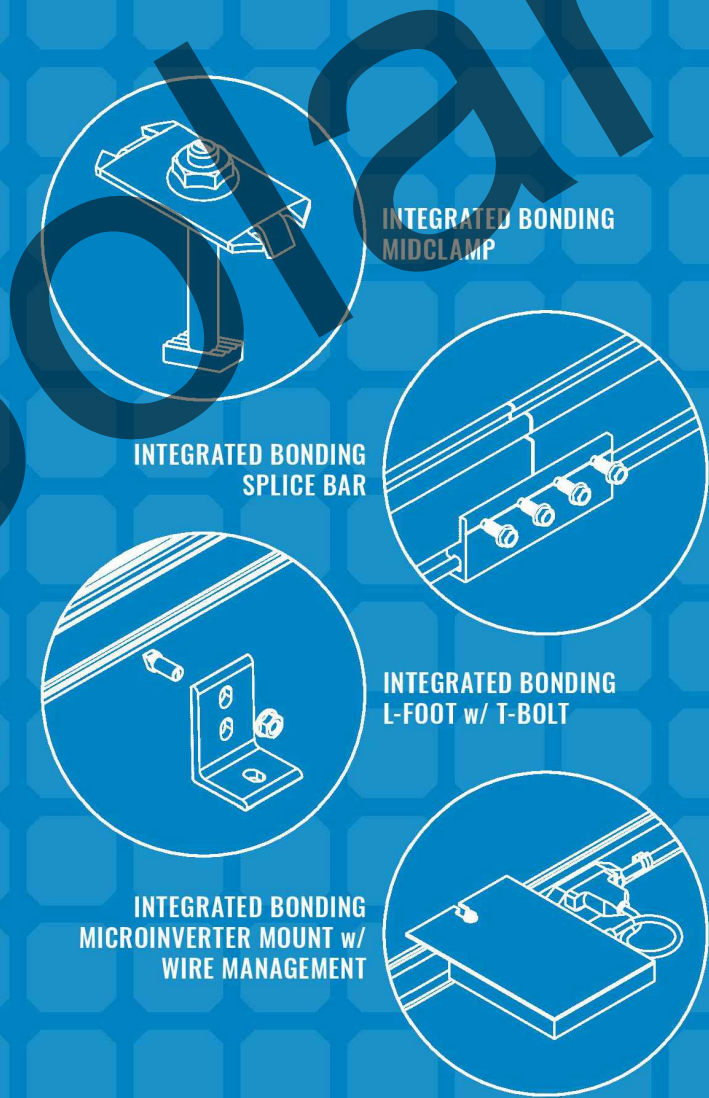
VERSATILITY

ONE PRODUCT - MANY APPLICATIONS

Quickly set modules flush to the roof or at a desired tilt angle. Change module orientation to portrait or landscape while securing a large variety of framed modules on flat, low slope or steep pitched roofs. Available in mill, clear and dark anodized finishes to outperform your projects financial and aesthetic aspirations.

AUTOMATED DESIGN TOOL DESIGN PLATFORM AT YOUR SERVICE

Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers; there's no need to print results and send to a distributor, just click and share.



UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2015, 14001:2015 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

BANKABLE WARRANTY

Don't leave your project to chance. Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a twenty five (25) year limited product warranty and a five (5) year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN



Certificate of Compliance

Certificate: 70131735

Master Contract: 266909

Project: 80096297

Date Issued: 2021-10-22

Issued To: **Unirac**
1411 Broadway NE
Albuquerque, New Mexico, 87102
United States

Attention: Klaus Nicolaedis

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Issued by: *Michael Hoffnagle*
Michael Hoffnagle

PRODUCTS

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems
CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -
Certified to US Standards



Certificate: 70131735
Project: 80096297

Master Contract: 266909
Date Issued: 2021-10-22

Models:	SM	-	SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.
	ULA	-	Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules.

Solarmount

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless-steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs. Fire ratings of Class A with Type 1, 2, 3, 10, 19, 22 or 25 for steep slope. Tested at 5" interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.

UL 2703 Mechanical Load ratings:

Downward Design Load (lb/ft ²)	113.5
Upward Design Load (lb/ft ²)	50.7
Down-Slope Load (lb/ft ²)	16.13

Test Loads:

Downward Load (lb/ft ²)	170.20
Upward Load (lb/ft ²)	76.07
Down-Slope Load (lb/ft ²)	24.2