

SCOPE OF WORK:

TO INSTALL A ROOF MOUNTED SOLAR PHOTOVOLTAIC SYSTEM AT THE OWNER RESIDENCE LOCATED AT 244 SW LOBLOLLY PL, LAKE CITY, FL 32024.

SYSTEM DC RATING: 14.00 KWDC SYSTEM AC RATING: 10.16 KWAC

GENERAL NOTES:

- THESE CONSTRUCTION DOCUMENTS HAVE BEEN BASED ON FIELD INSPECTIONS AND OTHER INFORMATION AVAILABLE AT THE TIME. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS IN CONSTRUCTION DETAILS.
- ARCHITECT HAS NOT BEEN RETAINED TO SUPERVISE ANY CONSTRUCTION OR INSTALLATION OF ANY EQUIPMENT AT SITE.
 CONTRACTOR HAS THE FULL RESPONSIBILITY TO CHECK AND VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. ANY WORK STARTED BEFORE CONSULTATION AND ACCEPTANCE BY THE ENGINEER SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE SUBJECT TO CORRECTION BY THEM WITHOUT ADDITIONAL COMPENSATION.
- THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROPER INSTALLATION AND COMPLETION OF THE WORK WITH APPROVED MATERIALS.
- THE CONTRACTOR SHALL PERFORM THE WORK IN STRICT CONFORMANCE WITH THE LOCAL LAWS, REGULATIONS AND THE NATIONAL ELECTRIC CODE.

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. (NEC 690.4(C), NEC 2017).
- 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 CONDUCTORS AND WIRE TIES EXPOSED TO SUNLIGHT ARE LISTED AS UV RESISTANT.
- ALL CONDUIT SIZES AND TYPES, SHALL BE LISTED FOR ITS PURPOSE AND APPROVED FOR THE SITE APPLICATIONS.



SHEET INDEX						
CS-0	COVER SHEET & BOM					
E-1	STRING LAYOUT & SIGNAGE					
E-2	ELECTRICAL DIAGRAM & CALCS.					
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GOVERNING CODES

2018 NFPA 1 (FIRE CODE)
2017 NATIONAL ELECTRICAL CODE
2020 FLORIDA BUILDING CODE (7TH EDITION)

AUTHORITY HAVING JURISDICTION (AHJ): COLUMBIA COUNTY

	BILL OF MATERIALS								
EQUIPMENT	QTY	DESCRIPTION							
SOLAR PV MODULE	35	Q.PEAK DUO BLK ML-G10+ 400W							
MICROINVERTER	35	ENPHASE IQ8PLUS-72-2-US							
JUNCTION BOX	1	JUNCTION BOX, NEMA 3R, UL LISTED							
COMBINER BOX	1	ENPHASE IQ COMBINER 4/4C W/ IQ ENVOY (X-IQ-AM1-240-4)							
AC DISCONNECT	1	FUSED AC DISCONNECT, 240V, NEMA 3R, UL LISTED							
POWER PERFECT BOX	1	(ES1PN), 120V/240V, NEMA 3X							



7006 STAPOINT CT STE B WINTER PARK, FL 32792 +1 (407) 988-0273

PROJECT NAME & ADDRESS

PAUL ZUBERER RESIDENCE 244 SW LOBLOLLY PL LAKE CITY, FL 32024

ENGINEER CONTACT INFORMATION

OMAR TIRADO LICENSE# 89380 12600 CHALLENGER PKWY, STE 200 ORLANDO, FL 32826

SIGNATURE WITH SEAL

2022.06.28 12:36:19 04'00'

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY OMAR TIRADO ON THE DATE ADJACENT TO THE SEAL. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEAL, AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

REVISIONS							
DESCRIPTION	DATE	REV					
Orawn by:		N.R.					
Checked by:		O.T.					

SHEET NAME
COVER SHEET &

BOM
SHEET NUMBER

CS-0



EMERGENCY RESPONDER SOLAR PV SYSTEM EQUIPPED

RMINALS ON BOTH THE LINE AND

OAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

OWN THE ENTIRE PV SYSTEM

RNING: PHOTOVOLTAI POWER SOURCE

42.4 240

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

1 WARNING 🕸 DUAL POWER SOURCE

LABEL LOCATION: POINT OF INTERCONNECTION

ENCLOSURES/ AC DISCONNECT/ MAIN SERVICE PANEL PER CODE: NEC 2017, 690.13(B)

LABEL LOCATION: RAPID SHUTDOWN (AC DISCONNECT) PER CODE: NEC 690.56 (C)(1) & NFPA1 11.12.2.1.1.1.1, 11.12.2.1.4

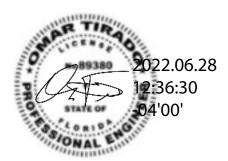
ABEL LOCATION: CONDUIT/ RACEWAY/ ENCLOSURES/ COMBINER BOX/ AC DISCONNECT PER CODE: NEC2017, 690.31(G)(3)(4)

LABEL LOCATION: AC DISCONNECT/ BREAKER/ POINTS OF CONNECTION PER CODE: NEC2017, 690.13(B)

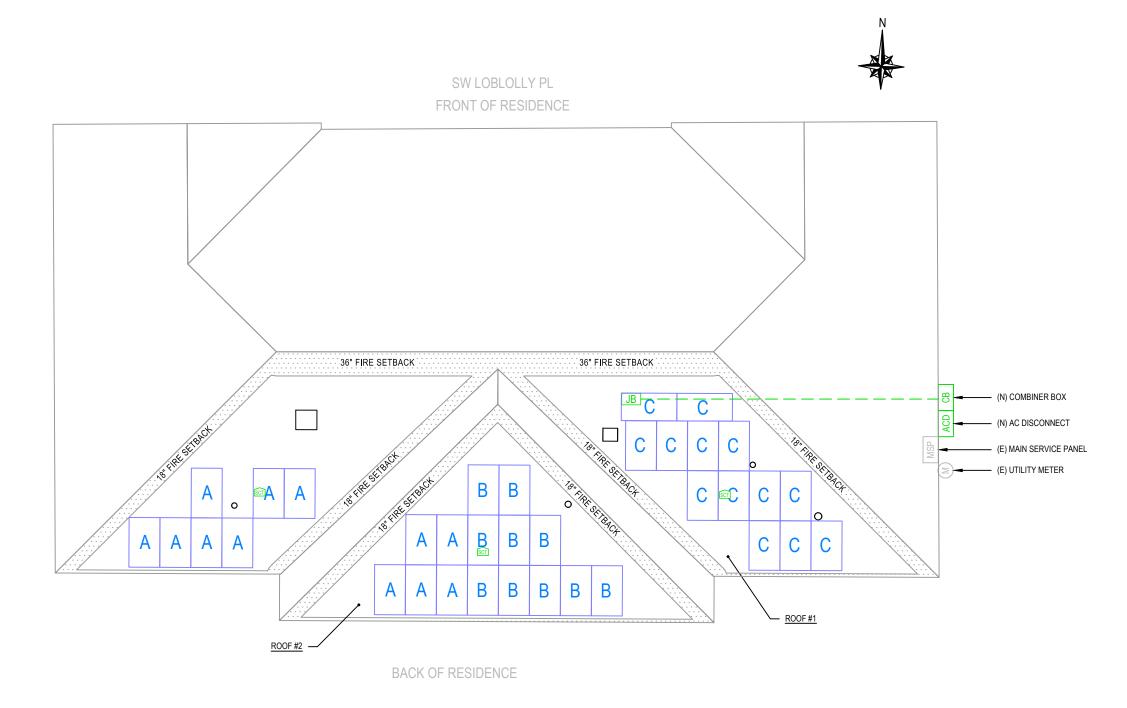
AC DISCONNECT
PER CODE: NEC2017, 690.53

(AC DISCONNECT) PER CODE: NEC 690.58 (C)(3)

PER CODE: NEC 2017, 705.12(B)



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ROOF PLAN WITH STRING LAYOUT E-1

SOLAR ATLANTIC KEY ENERGY LLC 7006 STAPOINT CT STE B WINTER PARK, FL 32792 +1 (407) 988-0273 PROJECT NAME & ADDRESS RESIDENCE 244 SW LOBLOLLY PL LAKE CITY, FL 32024 PAUL ZUBERER ENGINEER CONTACT INFORMATION OMAR TIRADO LICENSE# 89380 12600 CHALLENGER PKWY, STE 200 ORLANDO, FL 32826 SIGNATURE WITH SEAL REVISIONS DESCRIPTION DATE REV O.T. Checked by: 6/27/22

> SHEET NAME STRING LAYOUT & **SIGNAGE**

> > SHEET NUMBER

E-1

ID	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	MIN	N. CONDUCTOR SIZE (AWG)	MIN. DIA CONDUIT SIZE (IN.)	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD (A)		MIN. EGC SIZE (AWG)	TEMP. COR	RR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT (A)	MAX. CURRENT (A)	BASE AMP. (A)	DERATED AMP. (A)	TERM. AMP. RATING (A)	LENGTH (FT)	VOLTAGE DROP (%)
1	STRING A	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.76	55°C	N/A	14.52	18.15	30	N/A	N/A	85.00	0.83
2	STRING B	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.76	55°C	N/A	12.1	15.13	30	N/A	N/A	55.00	0.45
3	STRING C	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.76	55°C	N/A	15.73	19.66	30	N/A	N/A	60.00	0.63
4	JUNCTION BOX	IQ COMBINER	10	THWN-2 COPPER	0.75 LTNM	3	6	20	10	THWN-2 COPPER	0.76	55°C	0.8	15.73	19.66	40	24.3	35	45.00	0.73
5	IQ COMBINER	AC DISCONNECT	6	THWN-2 COPPER	0.75 LTNM	1	3	60	10	THWN-2 COPPER	0.96	34°C	1	42.35	52.94	75	72.0	65	5.00	0.09
6	AC DISCONNECT	MSP	6	THWN-2 COPPER	0.75 LTNM	1	3	N/A	-	-	0.96	34°C	1	42.35	52.94	75	72.0	65	5.00	0.09

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REVISIONS DESCRIPTION DATE REV

LEGEND

(E) - EXISTING

1°C

34°C

1.0"

55°C

(N) - NEW

DESIGN TEMPERATURE SPECIFICATIONS

RECORD LOW TEMP

CONDUIT HEIGHT

AMBIENT TEMP (HIGH TEMP 2%)

CONDUCTOR TEMPERATURE RATE (ROOF)

SHEET NAME **ELECTRICAL LINE** DIAGRAM & CALCS.

6/27/22

SHEET NUMBER

E-2

(N) STRING A - 12 Q.PEAK DUO BLK ML-G10+ 400W MODULES TO UTILITY GRID — 12 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS (N) STRING B - 10 Q.PEAK DUO BLK ML-G10+ 400W MODULES 112N (E) BI-DIRECTIONAL UTILITY METER (N) LINE SIDE TAP ENVOY 10A/2P OR 15A/2P (E) MAIN BREAKER - 10 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS TO HOUSE, 200A (N) STRING C - 13 Q.PEAK DUO BLK ML-G10+ 400W MODULES 20A/2P (2) 60 A FUSES 15A/2P — 13 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS N C (N) JUNCTION (N) FUSED AC BOX (NUCCOOC) DISCONNECT (N) IQ COMBINER BOX TO MOUNTING STRUCTURE 6AWG BARE COPPER (E) MAIN SERVICE (N) POWER PERFECT PANEL, 200A (E) GROUND ELECTRODE CONDUCTOR BOX - 6AWG BARE

COPPER

22.06.28

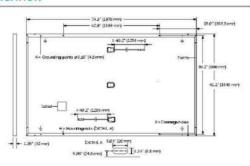
NOTE: LTNM OR EQUIVALENT TYPE CONDUIT

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ELECTRICAL LINE DIAGRAM SCALE: NTS E-2

MECHANICAL SPECIFICATION

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5lbs (22.0kg)
Front Cover	0.13 in (3.2mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6×22 monocrystalline Q.ANTUM solar half cells
Junction Box	$2.09-3.98$ in \times $1.26-2.36$ in \times $0.59-0.71$ in (53-101 mm \times $32-60$ mm \times $15-18$ mm), IP67, with bypass clodes
Cable	4 mm² Solar cable; (+) ≥49.2 in (1250 mm), (-) ≥49.2 in (1250 mm)
Connector	Staubli MC4; IP68

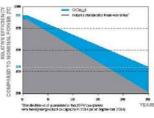


ELECTRICAL CHARACTERISTICS

PO	WER CLASS			385	390	395	400	405
MH	NIMUM PERFORMANCE AT STANDA	RD TEST CONDITIC	NS, STC+ (PO	WERTOLERANCE +	5W/-0W)			
	Power at MPPI	P _{MPP}	[W]	385	390	395	400	405
	Short Circuit Current ¹	lsc	[A]	11.04	11.07	11.10	11.14	11.17
un n	Open Circuit Voltage ^a	Voc	[V]	45.19	45.23	45.27	45.30	45.34
Minim	Current at MPP	lupp	[A]	10.59	10.65	10.71	10,77	10.83
2	Voltage at MPP	V _{MPP}	[V]	36,36	36.62	36.88	37.13	37,39
	Efficiency ^a	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MIR	NIMUM PERFORMANCE AT NORMA	LOPERATING CON	OTTIONS, NMC	OT ^a				
	Power at MPP	PMPP	[W]	288,8	292.6	296.3	300.1	303.8
Ē	Short Circuit Current	lec	[A]	8.90	8.92	8.95	8.97	9.00
E	Open Circuit Voltage	Voc	[V]	42.62	42.65	42.69	42.72	42.76
ž	Current at MPP	lupp	[A]	8.35	8.41	8,46	8.51	8.57
	Voltage at MPP	V _{MPP}	[V]	34.59	34.81	35.03	35.25	35.46

4Measurement tolerances P_{MPP} ± 3%; I_{sc}; V_{oc} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 6090 4-3 + 2800 W/m², NMOT, spectrum AM 1.5

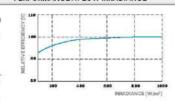
PERFORMANCE AT LOW IRRADIANCE



Q CELLS PERFORMANCE WARRANTY

At least 98% of nominal power during first year. Thereafter max, 0.5% degradation per year. At least 98.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of lac	a	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of Pure	v	1%/K1	-0.34	Nominal Module Operating Temperature	NMOT	I°F1	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V ₉₇₃	[V]	1000 (EC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push / Pull*	[lbs/ft²]	75 (3600 Pa) /55 (2660 Pa)	Permitted Module Temperature	-40°F up to +185°F
Max. Test Load, Push/PulP	[lbs/ft²]	113 (5400Pa) /84 (4000Pa)	en Continuous Duty	(-40 °C up to +85 °C)
² See Installation Manual				

QUALIFICATIONS AND CERTIFICATES

PACKAGING INFORMATION

UL 61730, CE-compilant; Guality Controlled PV - TOV Rheinland, IEC 612152018, IEC 61730-2016, U.S. Patamino. 9,893,215 (solar cells), QCPV Certification ampoing.







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			P	10-0	49.HQ	
Horizontal packaging		48.0 in 1220 mm		24 pallets	24 pallets	32 modules

Note: installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.g-cells.com | WEB www.q-cells.us

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		108-60-2-US	108PLUS-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 and 72-cell/144 half-cell				
MPPT voltage range	٧	27 – 37	29 - 45				
Operating range	٧	25 - 48	25 - 58				
Min/max start voltage	٧	30 / 48	30/58				
Max input DC voltage	v	50	60				
Max DC current² [module Isc]	A		15				
Overvoltage class DC port			1				
DC port backfeed current	mA		0				
PV array configuration		txl Ungrounded array; No additional DC side protection	n required; AC side protection requires max 20A per branch circuit				
DUTPUT BATA (ACI		108-60-2-US	108PLUS-72-2-US				
Peak output power	VA	245	300				
Max continuous output power	VA	240	290				
Nominal (L-L) voltage/range ³	v	2	40 / 211 - 264				
Max continuous output current	A	1.0	1.21				
Nominal frequency	Hz		60				
Extended frequency range	Hz		50 - 68				
Max units per 20 A (L-L) branch circu	it 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 lea	ading - 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 +6	60°C (-40°F to +140°F)				
Relative humidity range		4% to 1	100% (condensing)				
DC Connector type			MC4				
Dimensions (HxWxD)		212 mm (8.3") x 1	75 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					
Acoustic noise at 1 m		<60 dBA					
Pollution degree		PD3					
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure					
Environ. category / UV exposure ratin	g	NEMA	Type 6 / outdoor				
COMPLIANCE		- 4					
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC	Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01				
Certifications			nt and conforms with NEC 2014, NEC 2017, and NEC 2020 section Systems, for AC and DC conductors, when installed according to				

(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.

manufacturer's instructions.

IQ8SP-DS-0002-01-EN-US-2021-10-19



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O.T.

6/27/22

EQUIPMENT SPECIFICATIONS

SHEET NUMBER

E-3

Enphase IQ Combiner 4/4C

MODEL NUMBER	
Q Combiner 4 (X- Q-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 modern (CELL MODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modern 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 modern with 5-year Sprint data plan 4G based LTE-M1 cellular modern 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 BR215 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	65A
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
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 Emphase 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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