

SCOPE OF WORK:

TO INSTALL A ROOF MOUNTED SOLAR PHOTOVOLTAIC SYSTEM AT THE OWNER RESIDENCE LOCATED AT 169 SW FRIENDSHIP WAY, LAKE CITY, FL 32024.

SYSTEM DC RATING: 12.40 KWDC SYSTEM AC RATING: 9.00 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
- THE CONTRACTOR SHALL PERFORM THE WORK IN STRICT CONFORMANCE WITH THE LOCAL LAWS, REGULATIONS AND THE NATIONAL ELECTRIC CODE.

ELECTRICAL NOTES:

MATERIALS.

- 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.

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E-1	STRING LAYOUT & SIGNAGE						
E-2	ELECTRICAL DIAGRAM & CALCS.						
E-3+	EQUIPMENT SPECIFICATIONS						

GOVERNING CODES

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

AUTHORITY HAVING JURISDICTION (AHJ): COLOMBIA COUNTY

BILL OF MATERIALS							
EQUIPMENT	QTY	DESCRIPTION					
SOLAR PV MODULE	31	Q.PEAK DUO BLK ML-G10+ 400W					
MICROINVERTER	31	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					



ATLANTIC KEY ENERGY LLC 7006 STAPOINT CT STE B WINTER PARK, FL 32792

+1 (407) 988-0273
PROJECT NAME & ADDRESS

CHRISTINE WILSON RESIDENCE 169 SW FRIENDSHIP WAY LAKE CITY, FL 32024

ENGINEER CONTACT INFORMATION

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

SIGNATURE WITH SEAL

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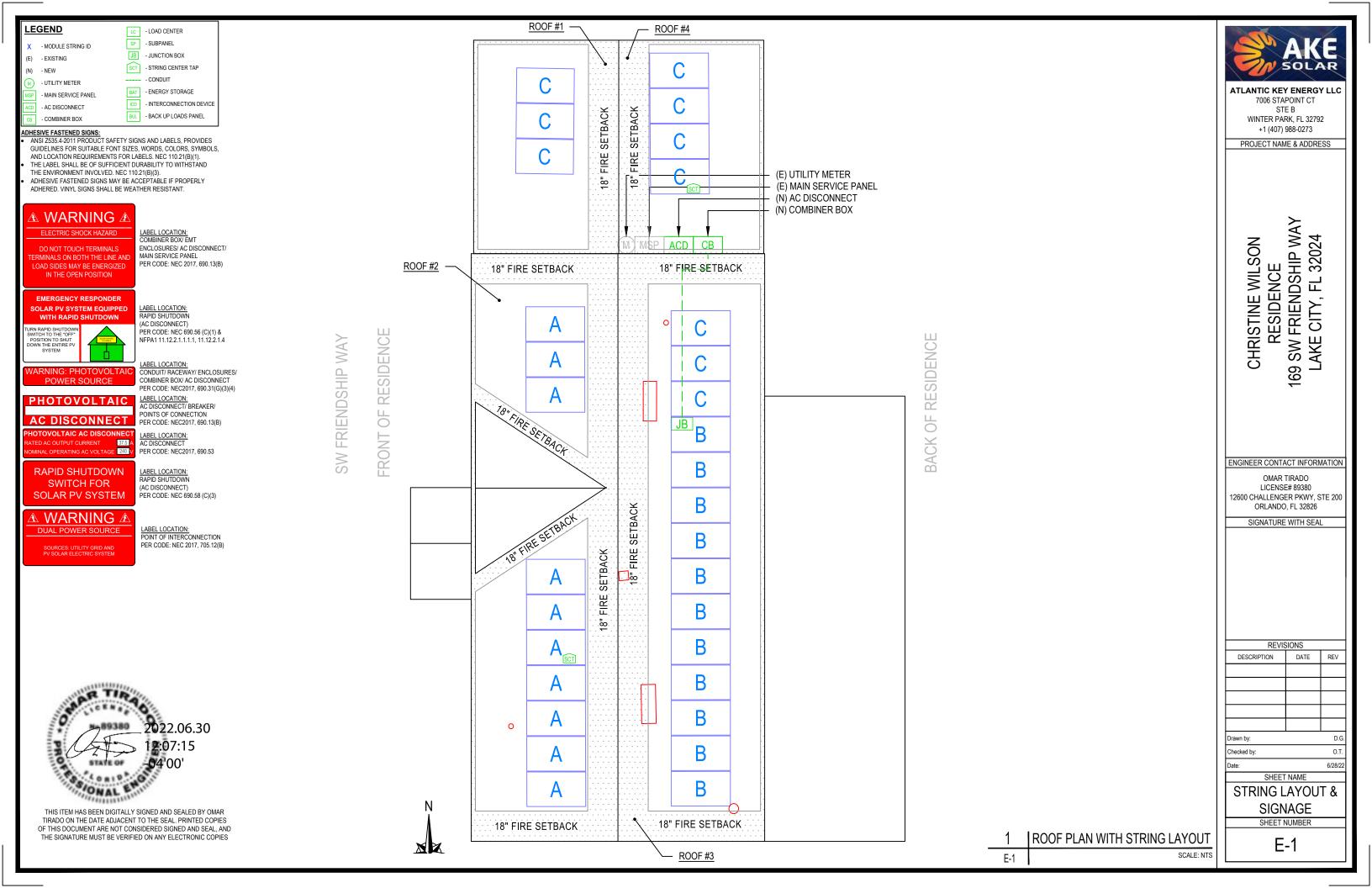
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REVISIONS								
DESCRIPTION	DATE	REV						
Drawn by:	•	D.G.						
Checked by:		O.T.						
Date:		6/28/22						

COVER SHEET & BOM

SHEET NAME

SHEET NUMBER



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	R. 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	0.71	56°C	N/A	12.1	15.13	30	N/A	N/A	64.00	0.52
2	STRING B	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.71	56°C	N/A	13.31	16.64	30	N/A	N/A	38.00	0.83
3	STRING C	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.71	56°C	N/A	12.1	15.13	30	N/A	N/A	58.00	0.47
4	JUNCTION BOX	IQ COMBINER	10	THWN-2 COPPER	0.75 LTNM	3	6	20	10	THWN-2 COPPER	0.71	56°C	0.8	13.31	16.64	40	22.7	35	30.00	0.41
5	IQ COMBINER	AC DISCONNECT	8	THWN-2 COPPER	0.75 LTNM	1	3	50	10	THWN-2 COPPER	0.96	35°C	1	37.51	46.89	55	52.8	50	5.00	0.12
6	AC DISCONNECT	MSP	6	THWN-2 COPPER	0.75 LTNM	1	3	N/A	-	-	0.96	35°C	1	37.51	46.89	75	72.0	65	5.00	0.08

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LEGEND

(E) - EXISTING

-6°C

35°C

1.0"

56°C

(N) - NEW

DESIGN TEMPERATURE SPECIFICATIONS

RECORD LOW TEMP

CONDUIT HEIGHT

AMBIENT TEMP (HIGH TEMP 2%)

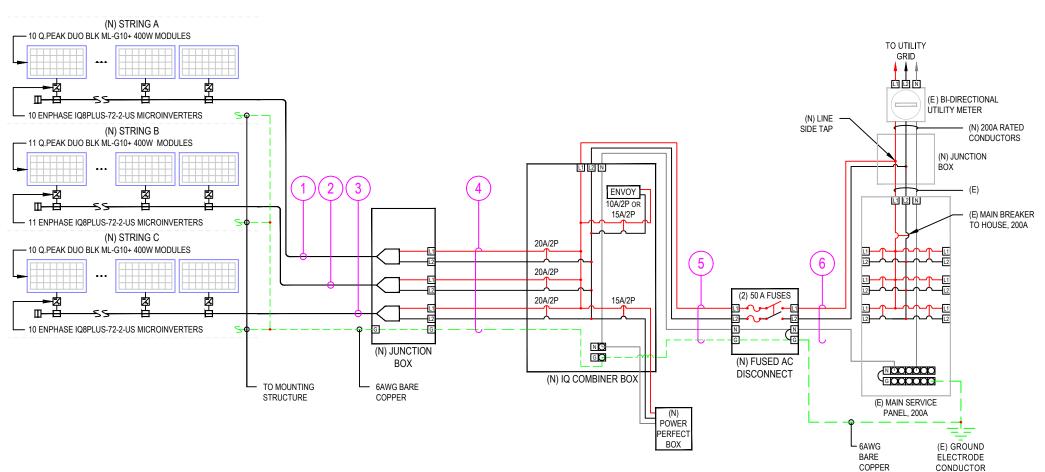
CONDUCTOR TEMPERATURE RATE (ROOF)

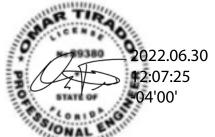
SHEET NAME **ELECTRICAL LINE** DIAGRAM & CALCS.

SHEET NUMBER

E-2

NOTE: LTNM OR EQUIVALENT TYPE CONDUIT



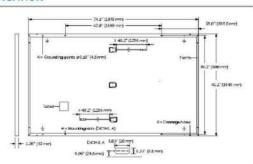


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| ELECTRICAL LINE DIAGRAM SCALE: NTS E-2

MECHANICAL SPECIFICATION

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5lbs (22.0 kg)
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

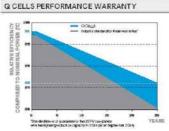


ELECTRICAL CHARACTERISTICS

POV	WER CLASS			385	390	395	400	405
MIN	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
nu.	Open Circuit Voltage ¹	Voc	[V]	45.19	45.23	45.27	45.30	45.34
Minir	Current at MPP	lupp	[A]	10.59	10.65	10.71	10,77	10.83
2	Voltage at MPP	VMPP	[V]	36,36	36.62	36.88	37.13	37,39
	Efficiency ^a	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MIN	NIMUM PERFORMANCE AT NORMA	LOPERATING CON	OTTIONS, NMC	OT ^a				
	Power at MPP	PMEP	[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
Ī	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

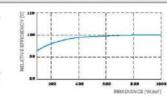
 $^4 \text{Measurement tolerances P}_{\text{MWP}} \pm 3\%; l_{\text{pc}}; V_{\text{QC}} \pm 5\% \text{ at STC}: 1000 \text{ W/m²}, 25 \pm 2\,^{\circ}\text{C}, \text{AM 1.5 according to IEC 6090 4-3} + ^2 800 \text{ W/m²}, \text{NMOT, spectrum AM 1.5}$

PERFORMANCE AT LOW IRRADIANCE



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 P _{MP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)	

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[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 (3600Pa) /55 (2660Pa) 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.







			•	10-0	49.HG	
Horizontal	76,4 in	43.3 in	1656lbs	24	24	32
packaging 1	.940 mm	1100mm	751kg	pallets	pallets	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	v	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 current ² [module lsc]	А		15
Overvoltage class DC port			1
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection	on required; AC side protection requires max 20A per branch circuit
OUTPUT 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	٧	2	240 / 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*	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 le	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 +	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 1	175 mm (6.9") × 30.2 mm (1.2")
Weight		1.0	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	A Type 6 / outdoor

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

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

(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.

Certifications

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



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DESCRIPTION DATE REV

Drawn by: D.G.

Checked by:

Date:

SHEET NAME

O.T.

6/28/22

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 (ANS 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 (CELLMODEM-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 46 based LTE-M1 cellular modem with 5-year Sprint data plan 46 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	65A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circult 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° C10 +46° C (-40° 10 115° 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 8, 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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