Building Codes: 2017 NEC, 2018 IBC, 2018 IFC, 2018 IRC and AHJ Amendments

SPRAGUE, ANA PV SYSTEM 580 NEW CASTLE LANE. SPRING LAKE, NC, 28390 APN: 01050402 0177 52

JURISDICTION: HARNETT COUNTY (NC) GENERAL INFORMATION

SYSTEM SIZE: 10.400 kW-DC-STC

7.540 kW-AC **ROOF PITCHED:** 37 DEGREES

INVERTER: (26) ENPHASE IQ8PLUS-72-2-US (26) Q PEAK DUO BLK ML G10+ 400W MODULES: STRINGS: INV 1: (2) x 13 PARALLEL MODULE STRINGS

ELECTRICAL SERVICE RATING: 200A PV SYSTEM OVERCURRENT RATING: 40A

PV SYSTEM DISCONNECT SWITCH: EATON DG222URB (60A / 2P)

ROOF TYPE: COMP SHINGLE

ROOF FRAMING: MANUFACTURED/ENGINEERED TRUSS

RACKING:

ATTACHMENT METHOD: MIN. 5/16" x 3 1/2 LAG SCREWS EA. STANDOFF

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VICINITY MAP

SCALE: NTS







ENGINEER SEAL ARE FOR STRUCTURAL ITEMS ONLY



NOTES

EQUIPMENT LOCATION

- ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
- WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC690.31(A),(C) AND NEC TABLES 310.15(B)(2)(A) AND 310.15(B)(3)(C).
- 3. JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
- 4. ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT
- 5. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES
- 6. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

WIRING & CONDUIT NOTES

- ALL CONDUITS AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
- 2. CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
- 3. DC WIRING LIMITED TO MODULE FOOTPRINT. MICRO INVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY WITH SUITABLE WIRING CLIPS.
- 4. AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK, PHASE B OR L-2 RED, OR OTHER CONVENTION IF THREE PHASE, PHASE C OR L3-BLUE, YELLOW, ORANGE, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH THE HIGHER VOLTAGE TO BE MARKED ORANGE NEC 110.15.

GENERAL NOTES

- 1. MODULES ARE LISTED UNDER UL 1703 AND CONFORM TO THE STANDARDS.
- 2. INVERTERS ARE LISTED UNDER UL 1741 AND CONFORM TO THE
- 3. DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION
- 4. WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.
- 5. ALL GROUND WIRING CONNECTED TO THE MAIN SERVICE GROUNDING IN MAIN SERVICE PANEL/SERVICE COMPONENT.
- 6. ALL CONDUCTORS SHALL BE 600V, 75° C STANDARD COPPER UNLESS OTHERWISE NOTED.
- 7. WHEN REQUIRED, A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- 8. THE SYSTEM WILL NOT BE INTERCONNECTED BY THE CONTRACTOR UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND/OR THE UTILITY.
- 9. ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREES, WIRES OR SIGNS.
- 10. PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING.



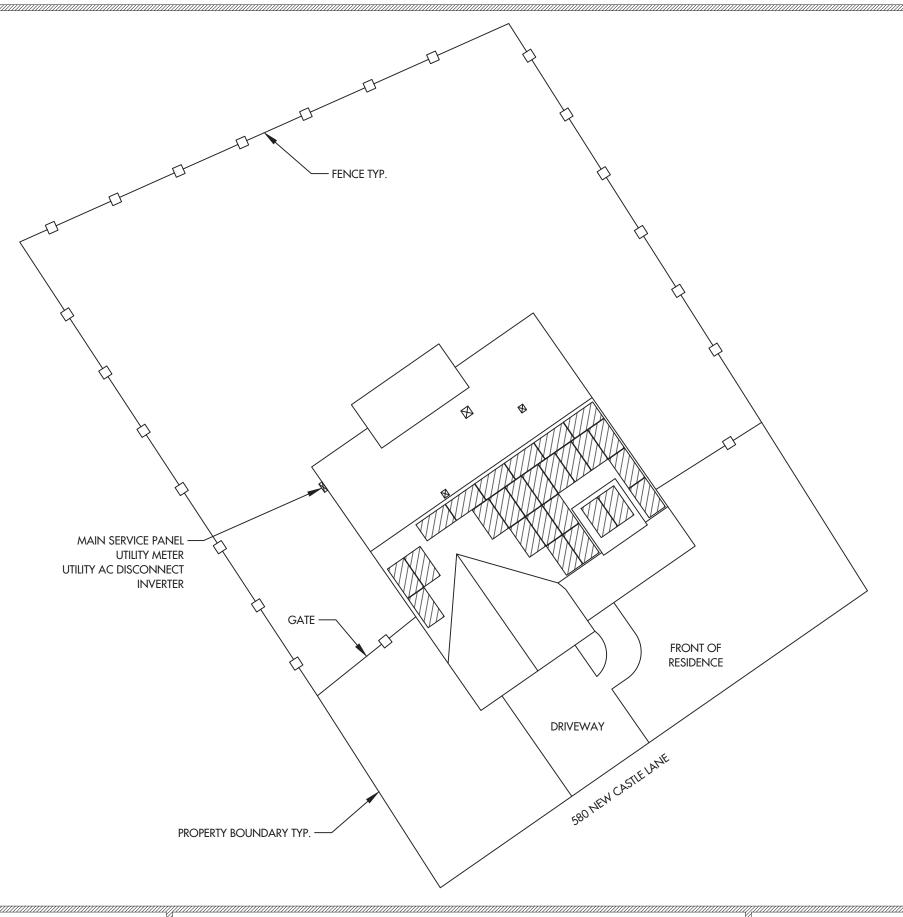
SPRAGUE, ANA RESIDENCE 580 NEW CASTLE LANE, SPRING LAKE, NC, 28390 LAT:35.234287, LON:-78.981030 TSP147051

(26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

DATE: 4/5/2023

REV:A DRAWN BY: JS **COVER PAGE**

PV 1





PROJECT NOTES

- 1. UTILITY SHALL HAVE 24HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC COMPONENTS LOCATED AT SES EQUIPMENT
- 2. NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO SES EQUIPMENT
- WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION AND NEC REQUIREMENTS.





SEAL:





SPRAGUE, ANA RESIDENCE 580 NEW CASTLE LANE , SPRING LAKE, NC, 28390 LAT:35.234287, LON:-78.981030 TSP147051 (26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

SCALE: 15/256" = 1'-0" DATE: 4/5/2023

REV: A

DRAWN BY: JS

SITE PLAN

PV 2

ARRAY INFORMATION

AR-01

QUANTITY: 24

MOUNTING TYPE: FLUSH

ARRAY TILT: 37° AZIMUTH: 145°

ATTACHMENT SPACING: 4' ROOF TYPE: COMP SHINGLE

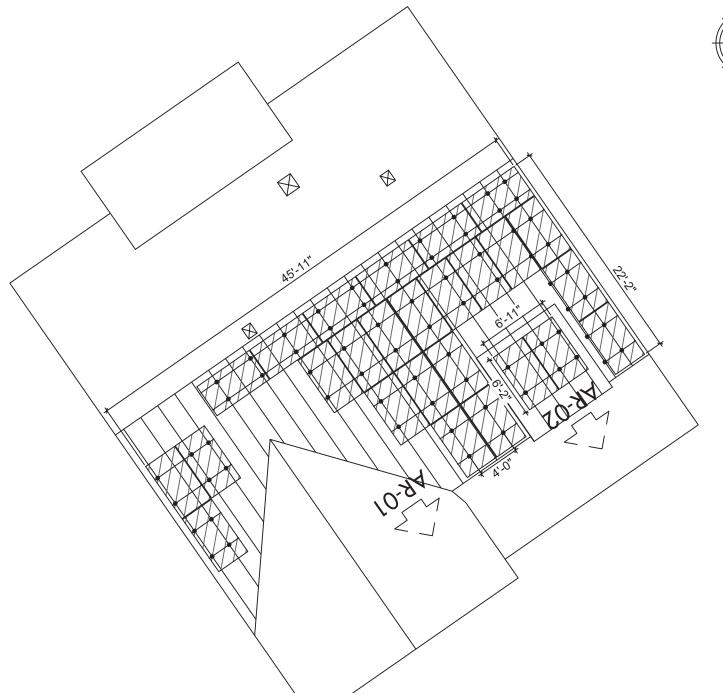
AR-02

QUANTITY: 2

MOUNTING TYPE: FLUSH

ARRAY TILT: 18° AZIMUTH: 145°

ATTACHMENT SPACING: 4' ROOF TYPE: COMP SHINGLE





NOTES

- ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
- TOTAL ROOF AREA = 3095 SQ-FT
- TOTAL ARRAY AREA = 549.14 SQ-FT
- ARRAY COVERAGE = 17.74%



ENGINEER SEAL ARE FOR STRUCTURAL ITEMS ONLY





SPRAGUE, ANA RESIDENCE 580 NEW CASTLE LANE, SPRING LAKE, NC, 28390 LAT:35.234287, LON:-78.981030 TSP147051 (26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

SCALE: 7/64" = 1'-0" DATE: 4/5/2023

REV:A

DRAWN BY: JS

PV LAYOUT
PV 3

MODULE & RACKING INFORMATION MODULE: Q PEAK DUO BLK ML G10+ 400W MODULE WEIGHT: 48.50 LBS

MODULE DIMENSIONS: 74"x 41.1" x 1.5" RACKING/RAIL: K2 SYSTEMS / K2 SYSTEMS

ROOF & FRAMING INFORMATION MATERIAL: COMP SHINGLE RAFTER/TRUSS SIZE: 2" x 4" RAFTER/TRUSS SPACING: 2'

ARRAY 01: 24 MODULES

UPLIFT = 15207.00 LBS.

POINT LOAD = 19.50 LBS. PER MOUNTING POINT

PULLOUT STRENGTH = 33600.00 LBS.

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 1248.00 LBS

ARRAY 02: 2 MODULES

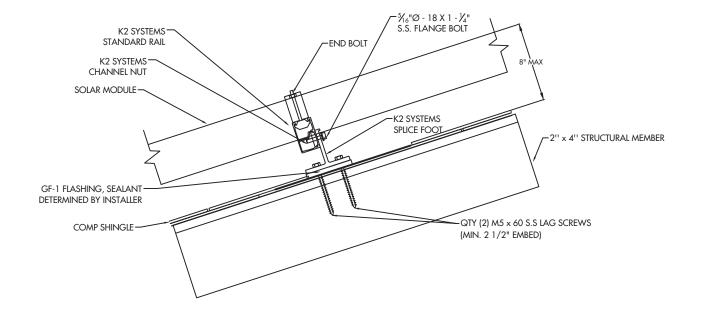
UPLIFT = 1267.25 LBS.

POINT LOAD = 17.33 LBS. PER MOUNTING POINT

PULLOUT STRENGTH = 3150.00 LBS.

DISTRIBUTED LOAD = 2.46 PSF

MODULE & RACKING WEIGHT = 104.00 LBS





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DATE: 4/5/2023

REV:A

DRAWN BY: JS

DETAILS

PV 4

PV MODULE

Q PEAK DUO BLK ML G10+ 400W

W = 400 WISC = 11.14 ADC VOC = 45.30 VDC

IMP = 10.77 ADC VMP = 37.13 VDC $TVOC = -0.270\% / ^{\circ}C$

WIRE SCHEDULE

- A (4) #12 AWG-CU ENPHASE Q-CABLE (HR)
 (1) #10 AWG-CU BARE COPPER WIRE (GND)
 IN FREE AIR
- B (4) #10 AWG-CU THWN-2 WIRE (HR) (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

C - (3) #8 AWG-CU THWN-2 WIRE (HR)
(1) #8 AWG-CU THWN-2 WIRE (GND)

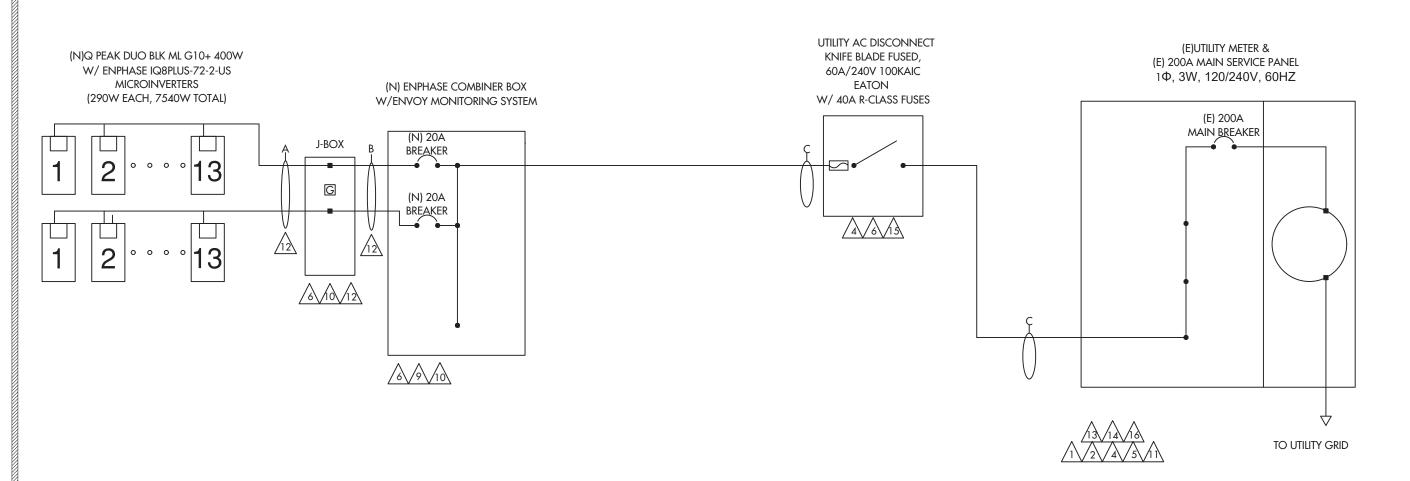
3/4" EMT

MAIN SERVICE PANEL

BUS RATING = 200A

MAX. CURRENT RATING = 240A (200A X 1.2)

SOLAR BACKFEED = 39A MAIN BREAKER = 200A TOTAL = 239A



WIRE SIZE CALCULATIONS

TEMP CORRECTION FACTOR: 0.87 (43° AMBIENT)
ROOFTOP TEMP CORRECTION FACTOR: 1.00 (43° ADJUSTED)
(2" ABOVE ROOFTOP / 0° TEMP ADDERS - AS OCCURS)
(TEMP DATA TAKEN FROM ASHRAE 2% AVG HIGH TEMP)

DC WIRING

CONDUIT FILL FACTOR = 0.80

OPTIMIZER MAX. CURRENT = 18.75A DC (15.00A X 1 X 1.25)

#10- AWG CU. AMPACITY = 47.85A (55A X 0.87)

FREE AIR

#10 - AWG CU. AMPACITY = 27.84A (40A X 0.87 X 0.80)

ROOFTOP CONDUIT

AC WIRING

CONDUIT FILL FACTOR = 1 (3) CONDUCTORS

MAX. INVERTER CURRENT = 31.46A (PER INVERTER SPECS)
MIN. INVERTER OCP = 39.325A (31.46A X 1.25)

INVERTER OCP = 40A

#8 - AWG CU AMPACITY = 47.85A (55A X 1 X 0.87)



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DATE: 4/5/2023

REV:A

DRAWN BY: JS

ONE LINE

PV 5

PV MODULE

Q PEAK DUO BLK ML G10+ 400W

400 W 11.14 ADC

VOC 45.30 VDC IMP 10.77 ADC VMP 37.13 VDC

TVOC = -0.270% / °C

WIRE SCHEDULE

- A (4) #12 AWG-CU ENPHASE Q-CABLE (HR) (1) #10 AWG-CU BARE COPPER WIRE (GND) IN FREE AIR
- B (4) #10 AWG-CU THWN-2 WIRE (HR) (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

C - (3) #8 AWG-CU THWN-2 WIRE (HR)

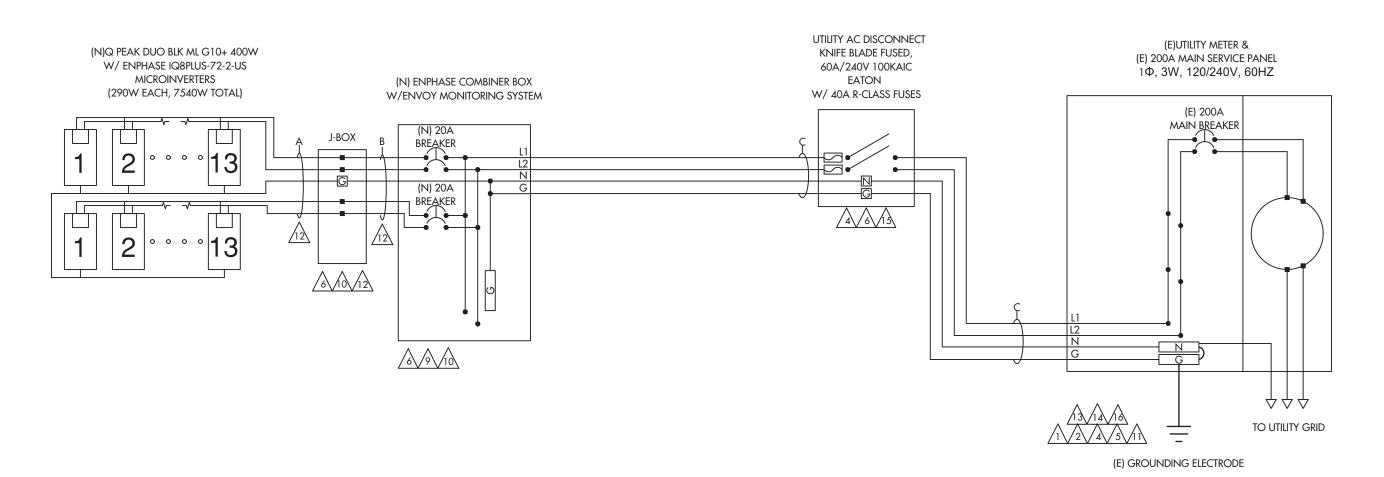
(1) #8 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

MAIN SERVICE PANEL

BUS RATING 200A

MAX. CURRENT RATING 240A (200A X 1.2)

SOLAR BACKFEED 39A MAIN BREAKER 200A 239A TOTAL



WIRE SIZE CALCULATIONS

TEMP CORRECTION FACTOR: 0.87 (43° AMBIENT) ROOFTOP TEMP CORRECTION FACTOR: 1.00 (43° ADJUSTED) (2" ABOVE ROOFTOP / 0° TEMP ADDERS - AS OCCURS) (TEMP DATA TAKEN FROM ASHRAE 2% AVG HIGH TEMP)

DC WIRING

CONDUIT FILL FACTOR 0.80

OPTIMIZER MAX. CURRENT = 18.75A DC (15.00A X 1 X 1.25)

#10- AWG CU. AMPACITY = 47.85A (55A X 0.87)

FREE AIR

#10 - AWG CU. AMPACITY = 27.84A (40A X 0.87 X 0.80)

ROOFTOP CONDUIT

AC WIRING

CONDUIT FILL FACTOR 1 (3) CONDUCTORS

MAX. INVERTER CURRENT = 31.46A (PER INVERTER SPECS) MIN. INVERTER OCP 39.325A (31.46A X 1.25)

INVERTER OCP

47.85A (55A X 1 X 0.87) #8 - AWG CU AMPACITY =



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(26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

DATE: 4/5/2023 REV:A

DRAWN BY: JS

THREE LINE

PV 6



A CAUTION PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

LOCATION: BACKFED BREAKER CODE REF: NEC 705.12(4)



DO NOT RELOCATE THIS OVERCURRENT DEVICE

LOCATION: BACKFED BREAKER

CODE REF: 2017 NEC 705.12(2)(3)(b)



<u>/2</u>\

WARNING

A GENERATION SCOURCE IS CONNECTED TO THE SUPPLY HE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH

LOCATION: (IF APPLICABLE) SUPPLY SIDE TAP

CODE REF: UTILITY



PHOTOVOLTAIC AC DISCONNECT

ATED AC OPERATING CURRENT

31.46A

NOMINAL OPERATING AC VOLTAGE:

240VAC

LOCATION: MAIN PANEL AC DISCONNECT(S)

CODE REF: NEC 690.54



∕6\

 \nearrow

RAPID SHUTDOWN **SWITCH FOR SOLAR PV SYSTEM**

LOCATION: MAIN PANEL (EXTERIOR)

CODE REF: NEC 690.56(C)(3)



WARNING

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

LOCATION: COMBINER PANEL AC DISCONNECT JUNCTION BOX

CODE REF: NEC 690.13(B)

PHOTOVOLTAIC

SYSTEM METER

LOCATION: DEDICATED KWH METER

CODE REF: NEC 690.4(B) UTILITY



▲ WARNING

PHOTOVOLTAIC SYSTEM **COMBINER PANEL**

LOCATION: AC COMBINER PANEL CODE REF: NEC 690.13(B)

DO NOT ADD LOADS



PHOTOVOLTAIC SYSTEM DC DISCONNECT

MAXIMUM VOLTAGE

MAXIMUM CIRCUIT CURRENT MAX. RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC- CONVERTER (IF INSTALLED)

LOCATION: DC DISCONNECT

CODE REF: UTILITY



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

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE

LOCATION: DC DISCONNECT, COMBINE BOX CODE REF: NEC 690.13(B)

EXPOSED TO SUNLIGHT



SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LOCATION: MAIN SERVICE (OUTSIDE COVER) CODE REF: NEC 690.12 NEC 690.56(C)(1)(a

YELLOW STICKER



WARNING PHOTOVOLTAIC POWER SOURCE

LOCATION: DC CONDUIT JUNCTION BOX NO MORE THAN 10FT CODE REF: NEC 690.31(G)(3) NEC 690 31/G)(4) REFLECTIVE AND WEATHER RESISTANT

LABEL REQUIRES CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8 INCH, WHITE LETTERS ON RED BACKGROUND LABELS SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES EVERY 10 FEET, WITHIN 1 FOOT OF TURNS OR BENDS AND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.



A CAUTION

DUAL POWER SOURCE SECOND SOURCE IS **PHOTOVOLTAIC**

LOCATION: SERVICE METER



WARNING

INVERTER OUTPUT CONNECTION

DO NOT RELOCATE THIS **OVERCURRENT DEVICE**

LOCATION: (IF APPLICABLE) SERVICE PANEL

CODE REF: NEC 705.12(7)

13

PHOTOVOLTAIC SYSTEM **UTILITY DISCONNECT SYSTEM**

LOCATION: AC DISCONNECT CODE REF: UTILITY



PV SOLAR BREAKER

DO NOT RELOCATE THIS **OVERCURRENT DEVICE**

LOCATION: MAIN PANEL: (EXTERIOR) PV BREAKER: (INTERIOR)

CODE REF: NEC 705.12(B)(2)(3)(B)

525 W BASELINE RD., MESA AZ, 85210 CONTRACTOR LIC# U.34445

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DATE: 4/5/2023 REV: A

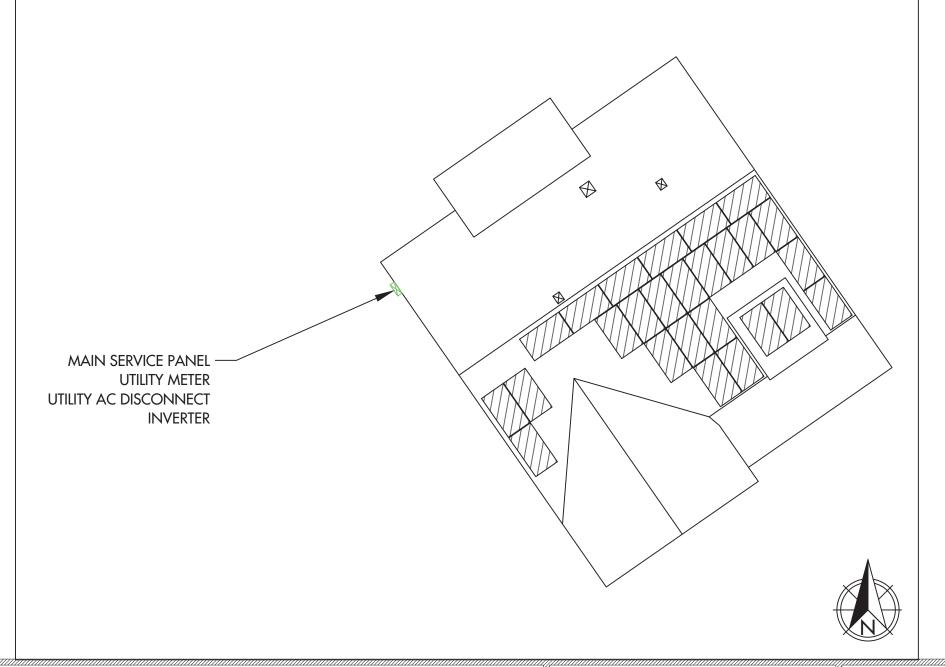
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LABELS

PV 7

CAUTION

POWER TO THIS BUILDING IS SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS AS SHOWN:



DIRECTORY PLAQUE IN ACCORDANCE WITH NEC690.56(A)(B), 705.10

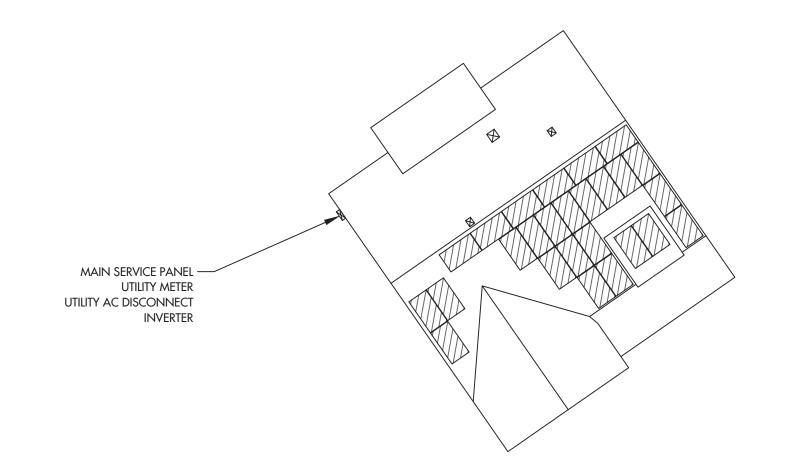


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DATE: 4/5/2023 REV: A DRAWN BY: JS PLACARD

PV 8

JOB SAFETY PLAN



LOCATION OF NEAREST URGENT CARE FACILITY

NAME:

ADDRESS:

PHONE NUMBER:

NOTES:

- INSTALLER SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME
- INSTALLER SHALL UPDATE NAME, ADDRESS, AND PHONE NUMBER OF NEAREST URGENT CARE FACILITY RELATIVE TO THE JOB SITE BEFORE STARTING WORK.

PRINT NAME	INITIAL	YES	NO





SPRAGUE, ANA RESIDENCE 580 NEW CASTLE LANE, SPRING LAKE, NC, 28390 LAT:35.234287, LON:-78.981030 TSP147051

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DATE: 4/5/2023 REV: A

DRAWN BY: JS

SAFETY PLAN

PV 9







IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, softwaredefined 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



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industryleading 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.

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IQ8SE-DS-0001-01-EN-US-2022-03-17

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 highpowered PV modules

Microgrid-forming

- · Complies with the latest advanced grid support**
- · Remote automatic updates for the latest grid requirements
- · Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements
- * Only when installed with IQ System Controller 2, meets UL 1741. IQ8H-208V operates only in grid-tied mode.
- ** IQ8 Series Microinverters supports split phase, 240V. IQ8H-208 supports split phase, 208V only.

IQ8 Series Microinverters

INPUT DATA (DC)		108-60-2-05	108PLUS-72-2-US	108M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US1		
Commonly used module pairings ²	W	235 - 350	235 - 440	260 - 460	295 - 500	320 - 540+	295 - 500+		
Module compatibility		60-cell/120 half-cell		60-cell/120 half-cell, 6	66-cell/132 half-cell a	and 72-cell/144 half-ce	AI.		
MPPT voltage range	٧	27 – 37	29 - 45	33 - 45	36 - 45	38 - 45	38 - 45		
Operating range	٧	25 - 48			25 - 58				
Min/max start voltage	٧	30 / 48			30 / 58				
Max input DC voltage	٧	50			60				
Max DC current ³ [module lsc]	A			1	5				
Overvoltage class DC port					II				
DC port backfeed current	mΑ				0				
PV array configuration		1x1 Ungrounded	array; No additional E	OC side protection requ	uired; AC side protecti	ion requires max 20A p	er branch circuit		
OUTPUT DATA [AC]		108-60-2-US	108PLUS-72-2-US	108M-72-2-US	108A-72-2-US	108H-240-72-2-US	IQ8H-208-72-2-US1		
Peak output power	VA	245	300	330	366	384	366		
Max continuous output power	VA	240	290	325	349	380	360		
Nominal (L-L) voltage/range4	٧			240 / 211 - 264			208 / 183 - 250		
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73		
Nominal frequency	Hz			ε	60				
Extended frequency range	Hz			50	- 68				
AC short circuit fault current over 3 cycles	Arms			2			4.4		
Max units per 20 A (L-L) branch circuit ⁵		16	13	11	11	10	9		
Total harmonic distortion				</td <td>5%</td> <td></td> <td></td>	5%				
Overvoltage class AC port				I	III				
AC port backfeed current	mΑ			3	50				
Power factor setting				1	.0				
Grid-tied power factor (adjustable)				0.85 leading	- 0.85 lagging				
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4		
CEC weighted efficiency	%	97	97	97	97.5	97	97		
Night-time power consumption	m W		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				М	C4				
Dimensions (HxWxD)				212 mm (8.3") x 175 mn	n (6.9") x 30.2 mm (1.2	·")			
Weight				1.08 kg ((2.38 lbs)				
Cooling			Natural convection - no fans						
Approved for wet locations		Yes							
Pollution degree		PD3							
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure							
Environ. category / UV exposure rating	NEMA Type 6 / outdoor								
COMPLIANCE									
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, 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							
	le ari								

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2022-03-17



SPRAGUE, ANA RESIDENCE 580 NEW CASTLE LANE, SPRING LAKE, NC, 28390 LAT:35.234287, LON:-78.981030 TSP147051

(26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

DATE: 4/5/2023

REV: A

DRAWN BY: JS

Data Sheet **Enphase Networking**

Enphase IQ Combiner 4/4C

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



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.

- · 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 (ANS C12.20+/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system an 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	occidinamento del micros del di micros del di micros del micros del companyone del companyone del companyone d
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
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	W 4744 O N V GO O O O O O O O O O O O O O O O O O
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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(26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

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Data Sheet Enphase Q Cable Accessories Region: INDIA

Enphase Q Cable and Accessories

The Enphase Q Cable™ and accessories are part of the sixth generation Enphase IQ System™. These products provide simplicity, reliability, and faster installation



Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- · Four-wire (three-phase) option also available
- · New cable numbering and plug and play connectors speed up installation and simplify wire management
- · Link connectors eliminate cable waste



Field-Wireable Connectors

SPRAGUE, ANA RESIDENCE

580 NEW CASTLE LANE, SPRING LAKE, NC, 28390

LAT:35.234287, LON:-78.981030

TSP147051

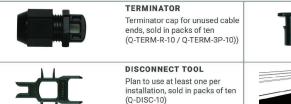
- · Easily connect Q cables on the roof without
- Make connections from any open connector and center feed any section of cable within
- · Available in male and female connector types

Enphase Q Cable Accessories

Q CABLE SPECIFICATIONS	
Voltage rating	600V (connector rating up to 250 V)
Cable temperature rating	90° C wet/dry
UV exposure rating	EN ISO 492-2
Environmental protection rating	IEC 60529 IP67
Compliance	RoHS, OIL RES I, CE, UV resistant
Cable insulator rating	H07BQ-F
Flame rating	IEC 60332-1-2

Q CABLE TYPES / ORDERING OPTIONS					
Model Number	Max Nominal Voltage	Ampacity Rating	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-25-10-240 (single-phase)	250 VAC	25 A	1.3 m	Portrait	240
Q-25-17-240 (single-phase)	250 VAC	25 A	2.0 m	Landscape (60-cell)	240
Q-25-20-200 (single-phase)	250 VAC	25 A	2.3 m	Landscape (72-cell)	200
Q-25-10-3P-200 (three-phase)	250 VAC	25 A	1.3 m	Portrait	200
Q-25-17-3P-160 (three-phase)	250 VAC	25 A	2.0 m	Landscape (60-cell)	160
Q-25-20-3P-160 (three-phase)	250 VAC	25 A	2.3 m	Landscape (72-cell)	160

ENPHASE Q CABLE ACCESSORIES					
Name	Model Number	Description			
Raw Q Cable (single-phase)	Q-25-RAW-300	300 meters cable with no connectors			
Raw Q Cable (three-phase)	Q-25-RAW-3P-300	300 meters cable with no connectors			
Field-wireable connector (male)	Q-CONN-R-10M	Make connections using single-phase cable			
Field-wireable connector (male)	Q-CONN-3P-10M	Make connections using three-phase cable			
Field-wireable connector (female)	Q-CONN-R-10F	Make connections from any Q Cable (single-phase) open connector			
Field-wireable connector (female)	Q-CONN-3P-10F	Make connections from any Q Cable (three-phase) open connector			
Cable Clip	ET-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling			
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount			
Disconnect tool	Q-DISC-3P-10	Disconnect tool for three-phase Field wireable connectors			
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling			
Terminator (single-phase)	Q-TERM-R-10	Terminator cap for unused single-phase cable ends			
Terminator (three-phase)	Q-TERM-3P-10	Terminator cap for unused three-phase cable ends			
Replacement DC Adaptor (MC4)	Q-DCC-2-INT	DC adaptor to MC4 (max voltage 100 VDC)			





SEALING CAPS Sealing caps for unused cable



connections, sold in packs of ten (Q-SEAL-10)

CABLE CLIP

Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (ET-CLIP-100)

To learn more about Enphase offerings, visit enphase.com/in



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Three-phase model (Q-DISC-





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BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9 %.



INDUSTRY'S MOST THOROUGH TESTING

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry:

The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology1, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty2.



INNOVATIVE ALL-WEATHER TECHNOLOGY

QCELLS

1 APT test conditions according to IEC / TS 62804-1:2015, method A (=1500 V, 96 h) 2 See data sheet on rear for further information.

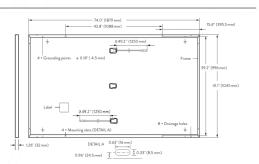
Q PEAK DUO BLK ML-G10+ 395-400

THE IDEAL SOLUTION FOR:

Rooftop arrays on residential buildings

MECHANICAL SPECIFICATION

FORMAT	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
WEIGHT	48.5 lbs (22.0 kg)
FRONT COVER	0.13 in (3.2 mm) 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 × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
CABLE	4 mm² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
CONNECTOR	Stäubli MC4: IP68



ELECTRICAL CHARACTERISTICS

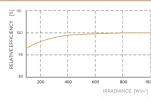
POV	VER CLASS			385	390	395	400	405
MIN	IMUM PERFORMANCE AT STANDARD	TEST CONDITIONS	s, STC 1 (PO)	WER TOLERANCE +5	W / -0 W)			
	POWER AT MPP	P _{MPP}	[W]	385	390	395	400	405
Σ	SHORT CIRCUIT CURRENT	I _{sc}	[A]	11.04	11.07	11.10	11.14	11.17
¥	OPEN CIRCUIT VOLTAGE	V _{oc}	[V]	45.19	45.23	45.27	45.30	45.34
Z	CURRENT AT MPP	I _{MPP}	[A]	10.59	10.65	10.71	10.77	10.83
~	VOLTAGE AT MPP	V_{MPP}	[V]	36.36	36.62	36.88	37.13	37.39
	EFFICIENCY	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MIN	IMUM PERFORMANCE AT NORMAL O	PERATING CONDI	TIONS, NMOT	2				
)	POWER AT MPP	P _{MPP}	[W]	288.8	292.6	296.3	300.1	303.8
3	SHORT CIRCUIT CURRENT	I _{sc}	[A]	8.90	8.92	8.95	8.97	9.00
₹	OPEN CIRCUIT VOLTAGE	Voc	[V]	42.62	42.65	42.69	42.72	42.76
Z	CURRENT AT MPP	I _{MPP}	[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

*Measurement tolerances Pupp ±3%; Ign; Vnn ±5% at STC; 1000 W/m², 25±2°C, AM 1.5 according to IEC 60904-3 • 2800 W/m², NMOT, spectrum AM 1.5

Q CELLS PERFORMANCE WARRANTY

first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86 % of nominal power up to

the warranty terms of the Q CELLS



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

TEMPERATURE COEFFICIENTS						
TEMPERATURE COEFFICIENT OF Isc	α	[%/K]	+0.04 TEMPERATURE COEFFICIENT OF Voc	β	[%/K]	-0.27
TEMPERATURE COEFFICIENT OF PMPP	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 (IEC)/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 ³	[lbs/ft ²]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature	-40°F up to +185°F
Max. Test Load, Push / Pull ³	[lbs/ft ²]	113 (5400 Pa) / 84 (4000 Pa)	on Continuous Duty	(-40°C up to +85°C)

QUALIFICATIONS AND CERTIFICATES









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ED	pack

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d	Horizo









PACKAGING INFORMATION







UL 61730, CE-compliant



525 W Baseline Rd., Mesa, AZ, 85210
TEL: 855.SAY.SOLAR





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EQUIPMENT SPECIFICATIONS



Item Number Description Part Number 1 Splice Foot X 4000113 | Splice Foot X Kit, Mill 2 K2 FlexFlash Butyl 3 M5 x 60 lag screws

Technical Data

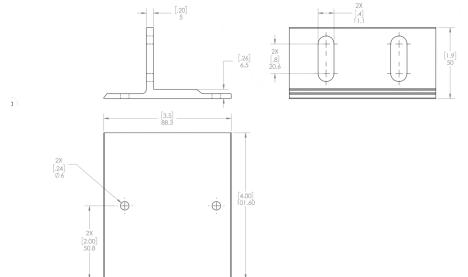
T-Bolt & Hex Nut Set

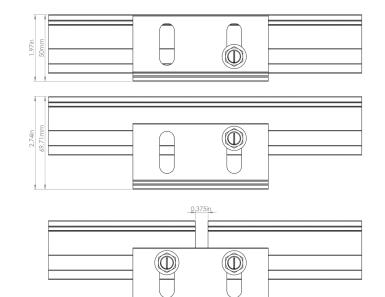
	Splice Foot X	
Roof Type	Composition shingle	
Material	Aluminum with stainless steel hardware	
Finish	Mill	
Roof Connection	M5 x 60 lag screws	
Code Compliance	UL 2703	
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80	

We support PV systems Formerly Everest Solar Systems









k2-systems.com



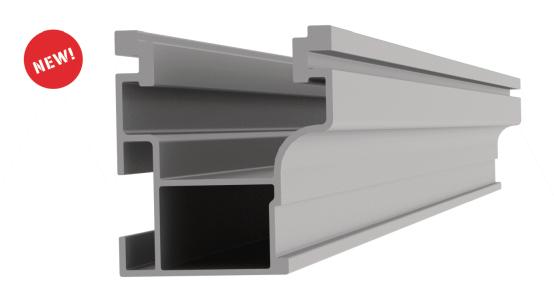
SPRAGUE, ANA RESIDENCE 580 NEW CASTLE LANE , SPRING LAKE, NC, 28390 LAT:35.234287, LON:-78.981030 TSP147051 (26) Q PEAK DUO BLK ML G10+ 400W (26) ENPHASE IQ8PLUS-72-2-US 10.400 kW DC SYSTEM SIZE 7.540 kW AC SYSTEM SIZE

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Mounting systems for solar technology





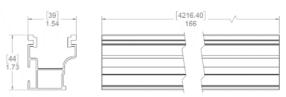
NEW PRODUCT

CrossRail 44-X

- Optimized rail profile
- ▶ One rail for all markets
- ▶ Built-in wire management
- ► Maintains same structural integrity as 48-X
- ▶ Tested up to 200 mph winds
- ▶ Tested up to 100 PSF snow loads



Description
CrossRail 44-X 166'', Mill
CrossRail 44-X 166'', Dark
CrossRail 44-X 180", Mill
CrossRail 44-X 180", Dark
RailConn Set, CR 44-X, Mill
RailConn Set, CR 44-X, Dark
End Cap, Black, CR 44-X



www.everest-solarsystems.com

CrossRail 44-X Product Sheet US01 | 0520 · Subject to change · Product illustrations are exemplary and may differ from the original.



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Recommended OCPD Size per Grid

Inverter	Maximum Output Current (A)	Minimum Fuse Rating (A)	Maximum Fuse Rating (A)
SE3000H-US	12.5	20	50
SE3800H-US	16	20	50
SE5000H-US	24 @ 208V	30	50
	21 @ 240V		
SE6000H-US	24 @ 208V	30 @ 208V	50
	25 @ 240V	35 @ 240V	
SE7600H-US	32	40	50
SE10000H-US	42	60	80
SE11400H-US	48.5 @ 208V	70 @ 208V	80
	47.5 @ 240V	60 @ 240V	

SolarEdge Single Phase Inverter with HD-Wave Technology Installation MAN-01-00541-1.1

SPRAGUE, ANA RESIDENCE

580 NEW CASTLE LANE, SPRING LAKE, NC, 28390

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REV: A DRAWN BY: JS equipment specifications PV 16