Scott E. Wyssling, PE
Coleman D. Larsen, SE, PE
Gregory T. Elvestad, PE

76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

November 15, 2022
Revised March 13, 2023

Titan Solar Power
210 North Sunway Drive
Gilbert, AZ 85233

Scott Wyssling, PE

Digitally signed by Scott Wyssling, PE
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, OU=Engineering, CN="Scott Wyssling, PE", E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2023.03.13 09:05:29-06'00'
Foxit PDF Editor Version: 11.1.0

Re: Engineering Services
Cupec Residence
135 Southern Place, Lillington, NC
10.400 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

### *A. Site Assessment Information*

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.

### *B. Description of Structure:*

| | |
|---|---|
| ***Roof Framing:*** | Prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber. |
| ***Roof Material:*** | Composite Asphalt Shingles |
| ***Roof Slope:*** | 26 degrees |
| ***Attic Access:*** | Accessible |
| ***Foundation:*** | Permanent |

### *C. Loading Criteria Used*

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 15 psf
- **Wind Load** based on ASCE 7-10
  - Ultimate Wind Speed = 117 mph (based on Risk Category II)
  - Exposure Category C

*Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2018 NCRC, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.*

***D. Solar Panel Anchorage***

1. The solar panels shall be mounted in accordance with the most recent K2 Systems installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a M5 x 60mm lag screw is 213 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 1-5/8", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using two (2) M5 x 60mm lag screw with a minimum of 1-5/8" embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 2018 NCRC, current industry standards, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
North Carolina License #

THIS PLAN HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY SCOTT WYSSLING, PE USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308

Signed 3/13/2023

Building Codes: 2017 NEC W/NC AMENDMENTS NEC, 2018 NORTH CAROLINA RESIDENTIAL CODE, AND 2018 NORTH CAROLINA FIRE CODE and AHJ Amendments

# CUPEC, CLAY PV SYSTEM
# 135 SOUTHERN PLACE .
# LILLINGTON, NC, 27546
# APN: 130527 0012 34
# JURISDICTION: HARNETT COUNTY (NC)

## GENERAL INFORMATION

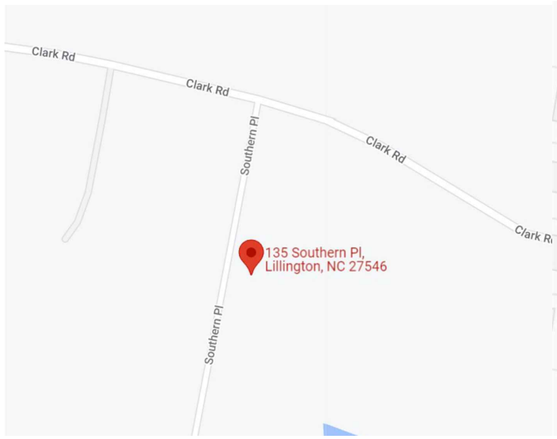
| | |
|---|---|
| SYSTEM SIZE: | 10.400 kW-DC-STC<br>7.540 kW-AC |
| ROOF PITCHED: | 26 DEGREES |
| INVERTER: | (26) ENPHASE IQ8PLUS-72-2-US |
| MODULES: | (26) Q PEAK DUO BLK ML G10+ 400W |
| STRINGS: | INV 1: (2) x 13 PARALLEL MODULE STRINGS |
| ELECTRICAL SERVICE RATING: | 200A |
| PV SYSTEM OVERCURRENT RATING: | 40A |
| PV SYSTEM DISCONNECT SWITCH: | EATON DG222URB (60A / 2P) |
| ROOF TYPE: | COMP SHINGLE |
| ROOF FRAMING: | MANUFACTURED/ENGINEERED TRUSS |
| RACKING: | K2 SYSTEMS |
| ATTACHMENT METHOD: | MIN. M5x60mm LAG SCREWS EA. STANDOFF |

## TABLE OF CONTENTS



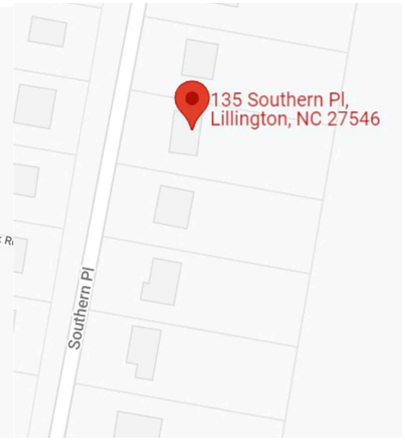
## VICINITY MAP

SCALE: NTS




## AERIAL MAP

SCALE: NTS

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## NOTES

### EQUIPMENT LOCATION

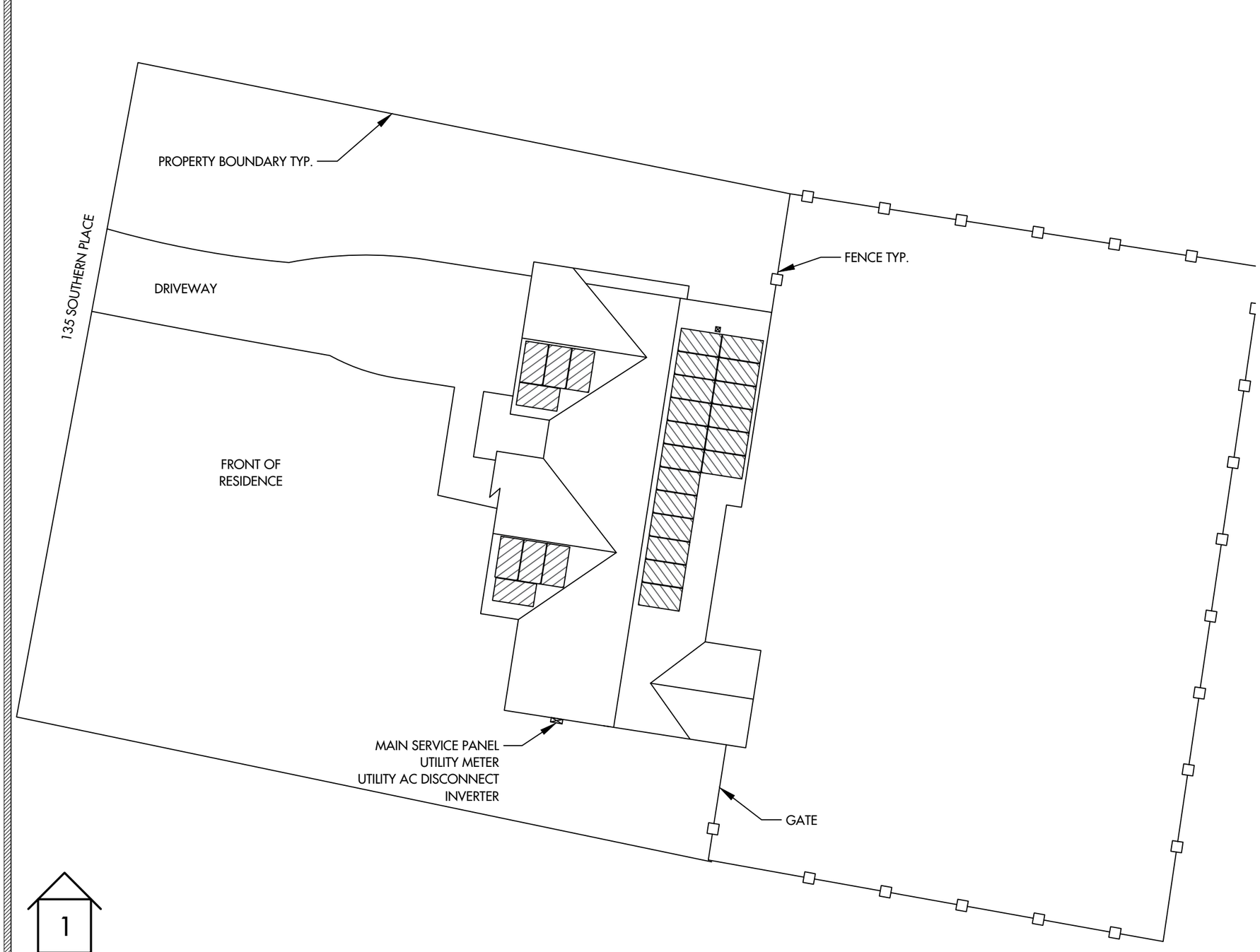
1. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
2. WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC690.31(A),(C) AND NEC TABLES 310.15(B)(2)(A) AND 310.15(B)(3)(C).
3. JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER 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

1. 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 STANDARDS.
3. DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION MIGHT VARY.
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.




## 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
3. WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION AND NEC REQUIREMENTS.


Wyssling Consulting, PLLC
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1

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

CUPEC, CLAY RESIDENCE
135 SOUTHERN PLACE , LILLINGTON, NC, 27546
LAT:35.338055, LON:-78.915807
TSP146972

(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: 1/16" = 1'-0"
DATE: 3/13/2023
REV: A
DRAWN BY: CA

SEAL:

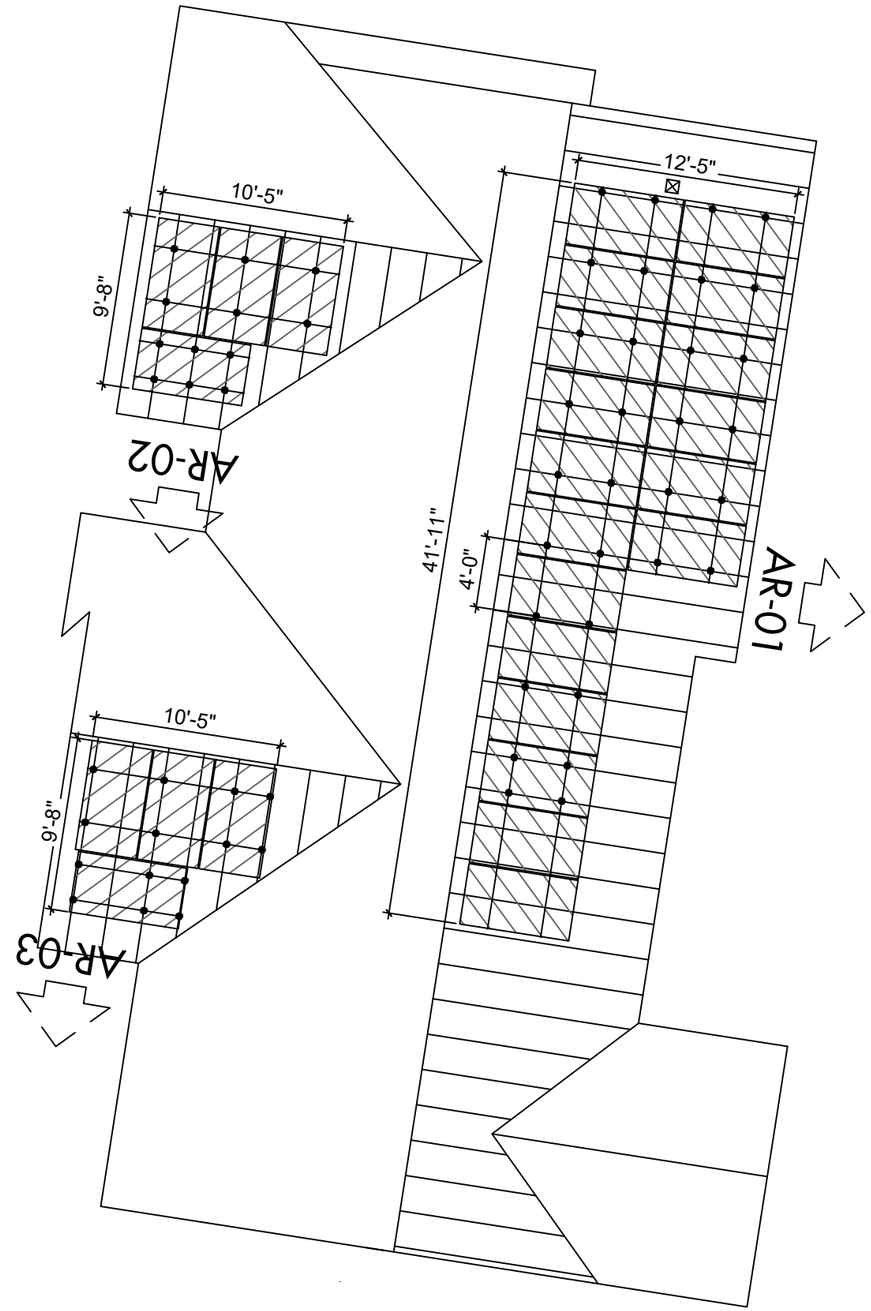
SITE PLAN
PV 2

ARRAY INFORMATION

AR-01
QUANTITY: 18
MOUNTING TYPE: FLUSH
ARRAY TILT: 26°
AZIMUTH: 103°
ATTACHMENT SPACING: 4'
ROOF TYPE: COMP SHINGLE

AR-02
QUANTITY: 4
MOUNTING TYPE: FLUSH
ARRAY TILT: 26°
AZIMUTH: 188°
ATTACHMENT SPACING: 4'
ROOF TYPE: COMP SHINGLE

AR-03
QUANTITY: 4
MOUNTING TYPE: FLUSH
ARRAY TILT: 26°
AZIMUTH: 188°
ATTACHMENT SPACING: 4'
ROOF TYPE: COMP SHINGLE




N

3/13/2023

NOTES
- ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
- TOTAL ROOF AREA = 2341.73 SQ-FT
- TOTAL ARRAY AREA = 549.14 SQ-FT
- ARRAY COVERAGE = 23.45%

NORTH CAROLINA PROFESSIONAL SEAL 040546 ENGINEER SCOTT E. WYSSLING

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CUPEC, CLAY RESIDENCE
135 SOUTHERN PLACE , LILLINGTON, NC, 27546
LAT:35.338055, LON:-78.915807
TSP146972

(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

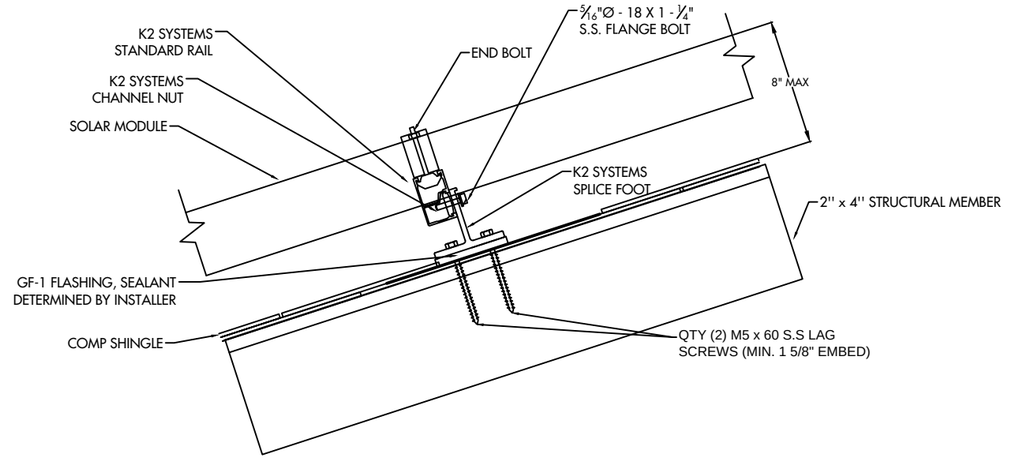
SCALE: 15/128" = 1'-0"
DATE: 3/13/2023
REV:A
DRAWN BY: CA

SEAL:

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: 18 MODULES
UPLIFT = 11405.25 LBS.
POINT LOAD = 29.25 LBS. PER MOUNTING POINT
PULLOUT STRENGTH = 16800.00 LBS.
DISTRIBUTED LOAD = 2.46 PSF
MODULE & RACKING WEIGHT = 936.00 LBS

ARRAY 02: 4 MODULES
UPLIFT = 2534.50 LBS.
POINT LOAD = 17.33 LBS. PER MOUNTING POINT
PULLOUT STRENGTH = 6300.00 LBS.
DISTRIBUTED LOAD = 2.46 PSF
MODULE & RACKING WEIGHT = 208.00 LBS

ARRAY 03: 4 MODULES
UPLIFT = 2534.50 LBS.
POINT LOAD = 14.86 LBS. PER MOUNTING POINT
PULLOUT STRENGTH = 7350.00 LBS.
DISTRIBUTED LOAD = 2.46 PSF
MODULE & RACKING WEIGHT = 208.00 LBS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TITAN SOLAR POWER
525 W BASELINE RD., MESA AZ, 85210
CONTRACTOR LIC# U.34445

CUPEC, CLAY RESIDENCE
135 SOUTHERN PLACE , LILLINGTON, NC, 27546
LAT:35.338055, LON:-78.915807
TSP146972

(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: 3/13/2023
REV:A
DRAWN BY: CA

SEAL:

DETAILS
PV 4

## PV MODULE

Q PEAK DUO BLK ML G10+ 400W

| | | |
|---|---|---|
| W | = | 400 W |
| ISC | = | 11.14 ADC |
| VOC | = | 45.30 VDC |
| IMP | = | 10.77 ADC |
| VMP | = | 37.13 VDC |
| TVOC | = | -0.270% / °C |

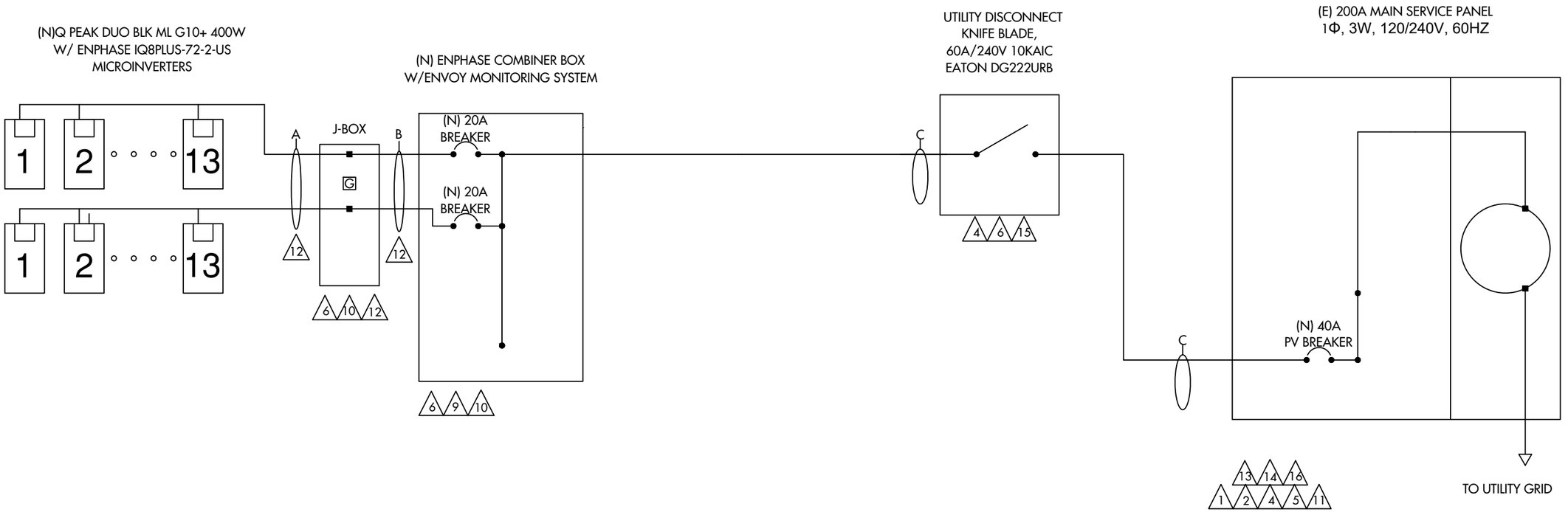
## WIRE SCHEDULE

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

NOTE:
SUPPLY/LINE SIDE CONNECTION
NO MAIN BREAKER
NO 120% RULE
6 HANDLE RULE




## 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 FREE AIR | = | 47.85A (55A X 0.87) |
| #10 - AWG CU. AMPACITY ROOFTOP CONDUIT | = | 27.84A (40A X 0.87 X 0.80) |

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) |


TITAN SOLAR POWER
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LAT:35.338055, LON:-78.915807
TSP146972

(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: 3/13/2023
REV:A
DRAWN BY: CA

SEAL:

ONE LINE
PV 5

## PV MODULE

Q PEAK DUO BLK ML G10+ 400W

| | | |
|---|---|---|
| W | = | 400 W |
| ISC | = | 11.14 ADC |
| VOC | = | 45.30 VDC |
| IMP | = | 10.77 ADC |
| VMP | = | 37.13 VDC |
| TVOC | = | -0.270% / °C |

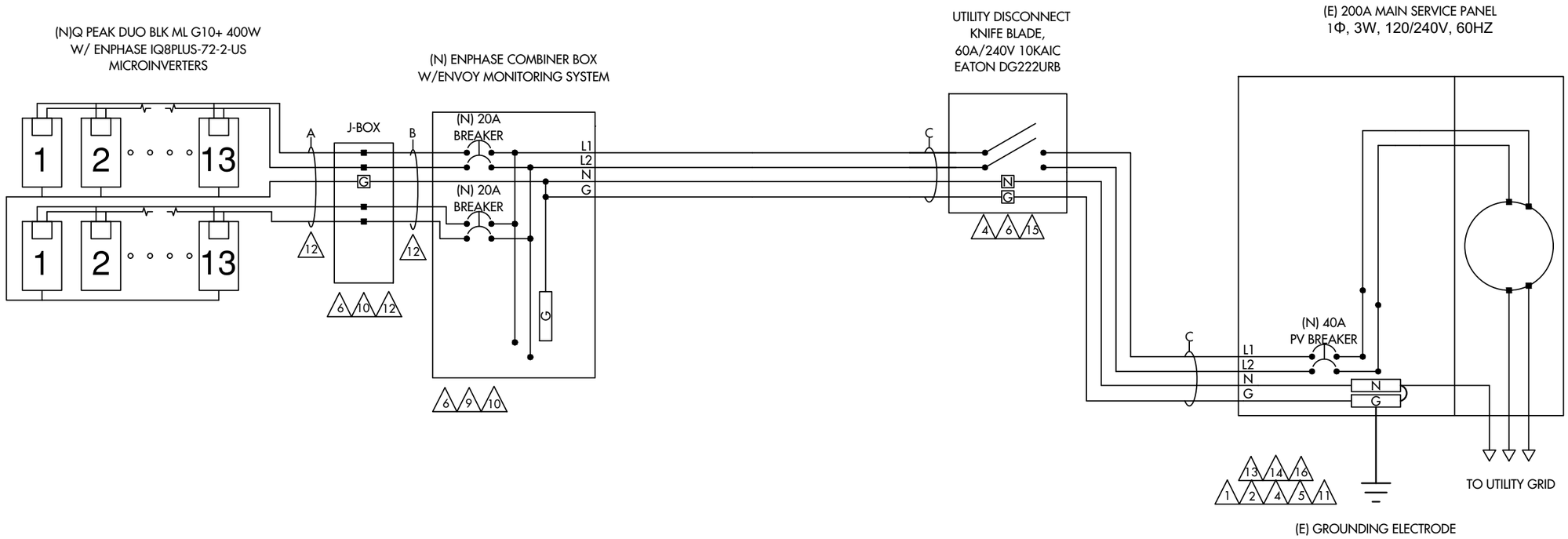
## WIRE SCHEDULE

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

NOTE:
SUPPLY/LINE SIDE CONNECTION
NO MAIN BREAKER
NO 120% RULE
6 HANDLE RULE




## WIRE SIZE CALCULATIONS

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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 FREE AIR | = | 47.85A (55A X 0.87) |
| #10 - AWG CU. AMPACITY ROOFTOP CONDUIT | = | 27.84A (40A X 0.87 X 0.80) |

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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TSP146972

(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: 3/13/2023
REV:A
DRAWN BY: CA

SEAL:

THREE LINE
PV 6

1

**⚠ CAUTION**
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

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

2

**⚠ WARNING**
INVERTER OUTPUT CONNECTION:
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LOCATION: BACKFED BREAKER
CODE REF: 2017 NEC 705.12(2)(3)(b)

3

**WARNING**
A GENERATION SCOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE MAIN SERVICE DISCONNECT. FOLLOW THE PROPER LOCK-OUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE

LOCATION: (IF APPLICABLE)
SUPPLY SIDE TAP
LOAD PANEL
CODE REF: UTILITY

4

**PHOTOVOLTAIC AC DISCONNECT**
RATED AC OPERATING CURRENT: 31.46A
NOMINAL OPERATING AC VOLTAGE: 240VAC

LOCATION: MAIN PANEL
AC DISCONNECT(S)
CODE REF: NEC 690.54

5

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

LOCATION: MAIN PANEL (EXTERIOR)
PV BREAKER (INTERIOR)
CODE REF: NEC 690.56(C)(3)

6

**⚠ 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
INVERTER(S)
CODE REF: NEC 690.13(B)

7

**PHOTOVOLTAIC**
**SYSTEM METER**

LOCATION: DEDICATED KWH METER
CODE REF: NEC 690.4(B) UTILITY

8

**⚠ WARNING**
PHOTOVOLTAIC SYSTEM
COMBINER PANEL
DO NOT ADD LOADS

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

9

**PHOTOVOLTAIC SYSTEM DC DISCONNECT**
MAXIMUM VOLTAGE: 480VDC
MAXIMUM CIRCUIT CURRENT: 15.0ADC
MAX. RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC- CONVERTER (IF INSTALLED) 15.0ADC

LOCATION: DC DISCONNECT
INVERTER
CODE REF: UTILITY

10

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

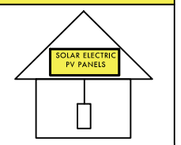
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

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

11

**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.




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

12

**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.

13

**⚠ CAUTION**
DUAL POWER SOURCE
SECOND SOURCE IS
PHOTOVOLTAIC

LOCATION: SERVICE METER
MAIN PANEL

14

**⚠ WARNING**
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LOCATION: (IF APPLICABLE)
SERVICE PANEL
CODE REF: NEC 705.12(7)

15

**PHOTOVOLTAIC SYSTEM**
**UTILITY DISCONNECT SYSTEM**

LOCATION: AC DISCONNECT
CODE REF: UTILITY

16

**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)

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

CUPEC, CLAY RESIDENCE
135 SOUTHERN PLACE , LILLINGTON, NC, 27546
LAT:35.338055, LON:-78.915807
TSP146972

(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

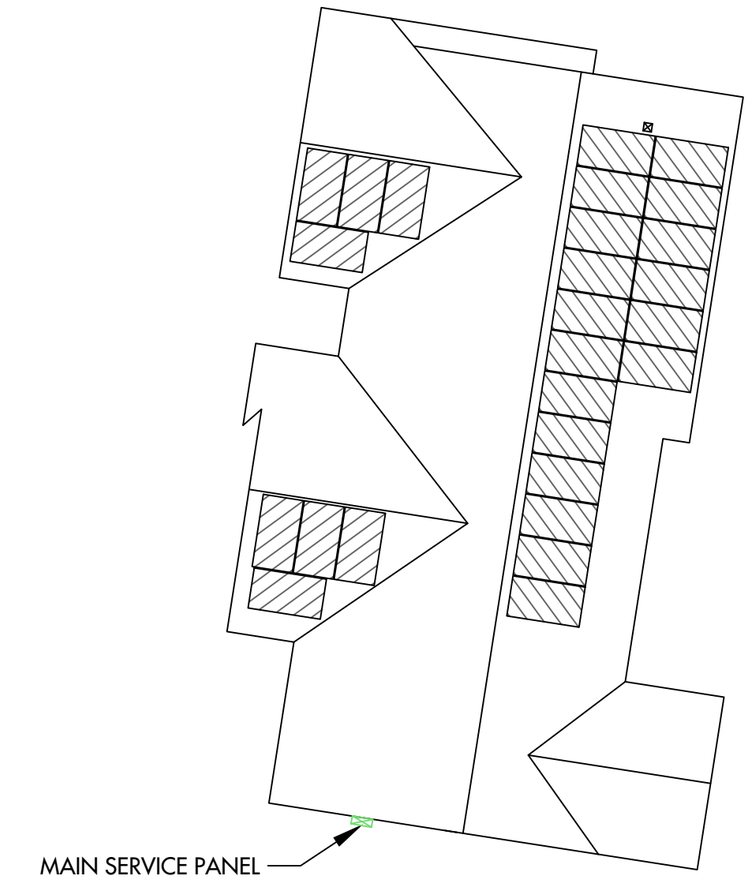
DATE: 3/13/2023
REV: A
DRAWN BY: CA

SEAL:

LABELS
PV 7

# CAUTION

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



MAIN SERVICE PANEL
UTILITY METER
UTILITY AC DISCONNECT
INVERTER

N

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

TITAN SOLAR POWER
525 W BASELINE RD., MESA AZ, 85210
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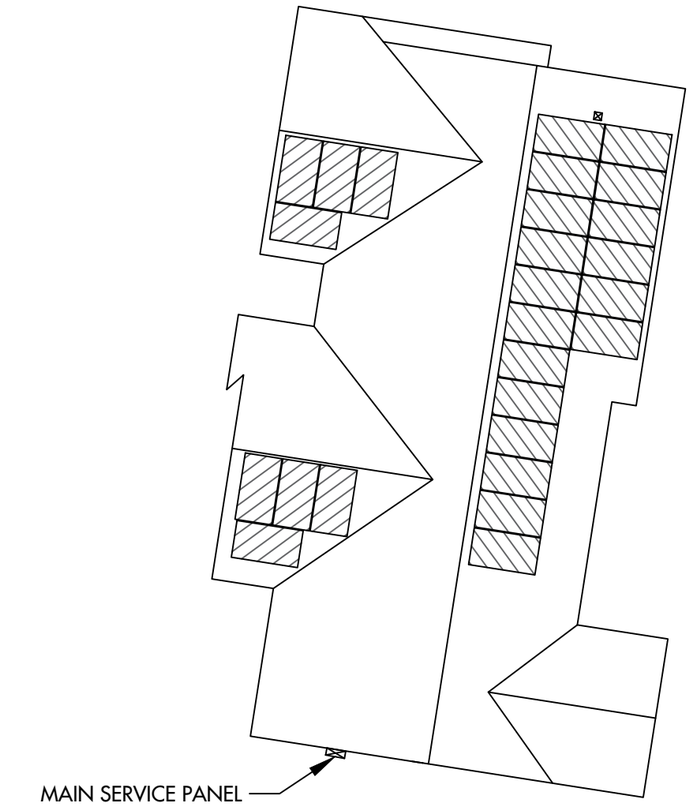
DATE: 3/13/2023
REV: A
DRAWN BY: CA

SEAL:

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 |
|---|---|---|---|
| | | | |
| | | | |
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| | | | |
| | | | |
| | | | |

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SAFETY PLAN
PV 9

ENPHASE.

DATA SHEET

# IQ8 Series 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.

Enphase 25 year limited warranty

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.

UL CERTIFIED SAFETY

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-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) | | IQ8-60-2-US | IQ8PLUS-72-2-US | IQ8M-72-2-US | IQ8A-72-2-US | IQ8H-240-72-2-US | IQ8H-208-72-2-US[1] |
|---|---|---|---|---|---|---|---|
| Commonly used module pairings[3] | 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, 66-cell/132 half-cell and 72-cell/144 half-cell | | | | |
| MPPT voltage range | V | 27 – 37 | 29 – 45 | 33 – 45 | 36 – 45 | 38 – 45 | 38 – 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 | | | | | |
| Overvoltage class DC port | | II | | | | | |
| DC port backfeed current | mA | 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** | **IQ8M-72-2-US** | **IQ8A-72-2-US** | **IQ8H-240-72-2-US** | **IQ8H-208-72-2-US[1]** |
| 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/range[4] | V | 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 | 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 | | <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 | 97.6 | 97.6 | 97.6 | 97.4 |
| CEC weighted efficiency | % | 97 | 97 | 97 | 97.5 | 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-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01<br><br>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) 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.



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(26) Q PEAK DUO BLK ML G10+ 400W
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10.400 kW DC SYSTEM SIZE
7.540 kW AC SYSTEM SIZE

DATE: 3/13/2023
REV: A
DRAWN BY: CA

SEAL:

EQUIPMENT SPECIFICATIONS
PV 10

Data Sheet
Enphase Networking

# 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

UL LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

## 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<br>COMMS-CELLMODEM-M1-06<br>CELLMODEM-M1-06-SP-05<br>CELLMODEM-M1-06-AT-05 | - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites<br>- 4G based LTE-M1 cellular modem with 5-year Sprint data plan<br>- 4G based LTE-M1 cellular modem with 5-year AT&T data plan |
| Circuit Breakers<br>BRK-10A-2-240V<br>BRK-15A-2-240V<br>BRK-20A-2P-240V<br>BRK-15A-2P-240V-B<br>BRK-20A-2P-240V-B | Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers.<br>Circuit breaker, 2 pole, 10A, Eaton BR210<br>Circuit breaker, 2 pole, 15A, Eaton BR215<br>Circuit breaker, 2 pole, 20A, Eaton BR220<br>Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support<br>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 |
| 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<br>• 60 A breaker branch input: 4 to 1/0 AWG copper conductors<br>• Main lug combined output: 10 to 2/0 AWG copper conductors<br>• Neutral and ground: 14 to 1/0 copper conductors<br>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<br>Production metering: ANSI C12.20 accuracy class 0.5 (PV production)<br>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**

ENPHASE



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7.540 kW AC SYSTEM SIZE

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DRAWN BY: CA

SEAL:

EQUIPMENT SPECIFICATIONS
PV 11

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 times.

## 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

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

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

ENPHASE.

## 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 |

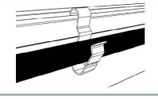
| Q CABLE TYPES / ORDERING OPTIONS | | | | | |
|---|---|---|---|---|---|
| **Model Number** | **Max Nominal Voltage** | **Ampacity Rating** | **Connector Spacing** | **PV Module Orientation** | **Connector Count per Box** |
| Q-25-10-240 (single-phase) | 250 VAC | 25 A | 1.3 m | Portrait | 240 |
| Q-25-17-240 (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) |

**TERMINATOR**
Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-R-10 / Q-TERM-3P-10))

**SEALING CAPS**
Sealing caps for unused cable connections, sold in packs of ten (Q-SEAL-10)

**DISCONNECT TOOL**
Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)
Three-phase model (Q-DISC-3P-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**


2018-11-26

ENPHASE.

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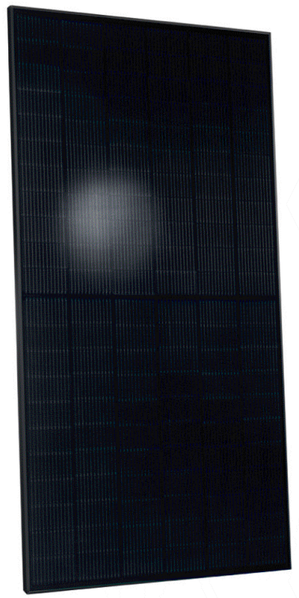
EQUIPMENT SPECIFICATIONS
PV 12

# TITAN SOLAR PANEL

25 YR Warranty Product & Performance

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2021

Q CELLS Yield Security



## 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

**Optimal yields, whatever the weather with excellent low-light and temperature behavior.**

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 CELLS

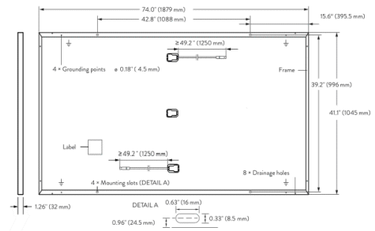
# Q PEAK DUO BLK ML-G10+

395-400 *ENDURING HIGH PERFORMANCE*

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 |

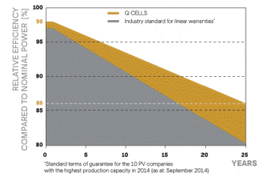



## ELECTRICAL CHARACTERISTICS

| POWER CLASS | | | | 385 | 390 | 395 | 400 | 405 |
|---|---|---|---|---|---|---|---|---|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC [1] (POWER TOLERANCE +5 W / −0 W) | | | | | | | | |
| MINIMUM | POWER AT MPP | $P_{MPP}$ | [W] | 385 | 390 | 395 | 400 | 405 |
| MINIMUM | SHORT CIRCUIT CURRENT | $I_{SC}$ | [A] | 11.04 | 11.07 | 11.10 | 11.14 | 11.17 |
| MINIMUM | OPEN CIRCUIT VOLTAGE | $V_{OC}$ | [V] | 45.19 | 45.23 | 45.27 | 45.30 | 45.34 |
| MINIMUM | CURRENT AT MPP | $I_{MPP}$ | [A] | 10.59 | 10.65 | 10.71 | 10.77 | 10.83 |
| MINIMUM | 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 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT [2] | | | | | | | | |
| MINIMUM | POWER AT MPP | $P_{MPP}$ | [W] | 288.8 | 292.6 | 296.3 | 300.1 | 303.8 |
| MINIMUM | SHORT CIRCUIT CURRENT | $I_{SC}$ | [A] | 8.90 | 8.92 | 8.95 | 8.97 | 9.00 |
| MINIMUM | OPEN CIRCUIT VOLTAGE | $V_{OC}$ | [V] | 42.62 | 42.65 | 42.69 | 42.72 | 42.76 |
| MINIMUM | CURRENT AT MPP | $I_{MPP}$ | [A] | 8.35 | 8.41 | 8.46 | 8.51 | 8.57 |
| MINIMUM | VOLTAGE AT MPP | $V_{MPP}$ | [V] | 34.59 | 34.81 | 35.03 | 35.25 | 35.46 |

[1] Measurement tolerances $P_{MPP}$ ±3%; $I_{SC}$; $V_{OC}$ ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

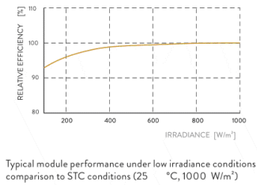
### Q CELLS PERFORMANCE WARRANTY




At least 98 % of nominal power during 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 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.

### PERFORMANCE AT LOW IRRADIANCE




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

### TEMPERATURE COEFFICIENTS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TEMPERATURE COEFFICIENT OF $I_{SC}$ | α | [%/K] | +0.04 | TEMPERATURE COEFFICIENT OF $V_{OC}$ | β | [%/K] | −0.27 |
| TEMPERATURE COEFFICIENT OF $P_{MPP}$ | 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/ft²] | 75 (3600 Pa) / 55 (2660 Pa) | | Permitted Module Temperature on Continuous Duty | −40 °F up to +185 °F (−40 °C up to +85 °C) |
| Max. Test Load, Push / Pull [3] | [lbs/ft²] | 113 (5400 Pa) / 84 (4000 Pa) | | | |

[3] See Installation Manual

## QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,893,215 (solar cells),
QCPV Certification ongoing.

C SP US Certified UL 61730 · CE · TÜVRheinland CERTIFIED www.tuv.com ID 1111220277

## PACKAGING INFORMATION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Horizontal packaging | 76.4 in 1940 mm | 43.3 in 1100 mm | 48.0 in 1220 mm | 1656 lbs 751 kg | 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.


Q CELLS
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA
**TEL**: +1 949 748 5996
**EMAIL**: sales@q-cells.com.

TITAN SOLAR PANEL
525 W Baseline Rd., Mesa, AZ, 85210
**TEL**: 855.SAY.SOLAR
**EMAIL**: info@titansolarpower.com




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

CUPEC, CLAY RESIDENCE
135 SOUTHERN PLACE , LILLINGTON, NC, 27546
LAT:35.338055, LON:-78.915807
TSP146972

(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: 3/13/2023
REV: A
DRAWN BY: CA

SEAL:

EQUIPMENT SPECIFICATIONS
PV 13

We support PV systems
Formerly Everest Solar Systems


# Splice Foot X

*Patent Pending*

## TECHNICAL SHEET

| 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 | |
| 4 | T-Bolt & Hex Nut Set | |

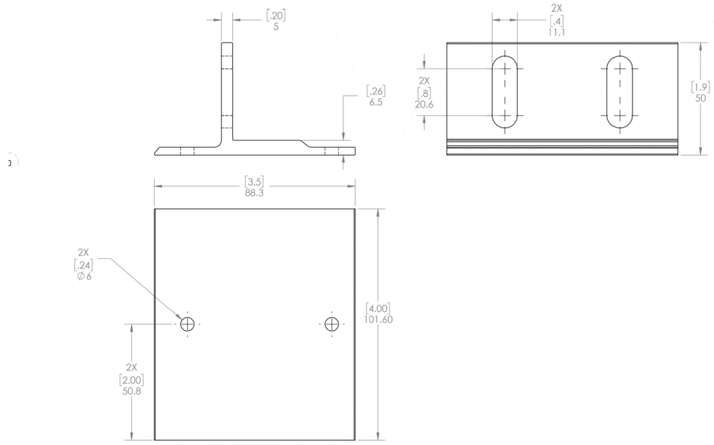
### Technical Data

| | 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

Units: [in] mm




k2-systems.com

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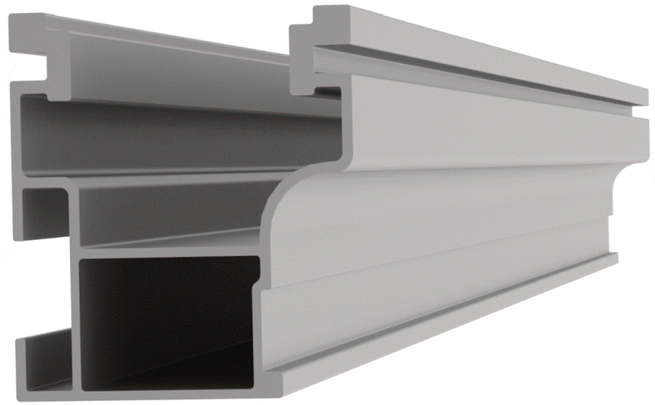
SEAL:

EQUIPMENT SPECIFICATIONS
PV 14

Mounting systems for solar technology

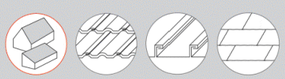
NEW!



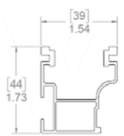
NEW PRODUCT

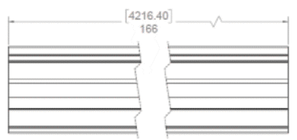
# CrossRail 44-X

- 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



| Part Number | Description |
|---|---|
| 4000019 | CrossRail 44-X 166'', Mill |
| 4000020 | CrossRail 44-X 166'', Dark |
| 4000021 | CrossRail 44-X 180", Mill |
| 4000022 | CrossRail 44-X 180", Dark |
| 4000051 | RailConn Set, CR 44-X, Mill |
| 4000052 | RailConn Set, CR 44-X, Dark |
| 4000067 | End Cap, Black, CR 44-X |



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10.400 kW DC SYSTEM SIZE
7.540 kW AC SYSTEM SIZE

DATE: 3/13/2023
REV: A
DRAWN BY: CA

SEAL:

EQUIPMENT SPECIFICATIONS
PV 15

# 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<br>21 @ 240V | 30 | 50 |
| SE6000H-US | 24 @ 208V<br>25 @ 240V | 30 @ 208V<br>35 @ 240V | 50 |
| SE7600H-US | 32 | 40 | 50 |
| SE10000H-US | 42 | 60 | 80 |
| SE11400H-US | 48.5 @ 208V<br>47.5 @ 240V | 70 @ 208V<br>60 @ 240V | 80 |



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EQUIPMENT SPECIFICATIONS
PV 16