



Scott E. Wyssling, PE  
Jon P. Ward, SE, PE  
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June 29, 2022  
Revised August 24, 2022

Titan Solar Power  
210 North Sunway Drive  
Gilbert, AZ 85233

Re: Engineering Services  
Fillippis Residence  
840 Micahs Way North, Spring Lake NC  
12.400 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:** 34 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** = 10 psf
- **Wind Load** based on ASCE 7-10
  - Ultimate Wind Speed = 119 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 NCRS (2015 IRC), 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.*

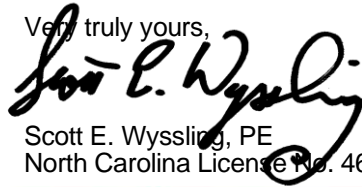
**D. Solar Panel Anchorage**

1. The solar panels shall be mounted in accordance with the most recent K2 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  $\frac{5}{16}$ " lag screw is 235 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of  $2\frac{1}{2}$ ", 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 one  $\frac{5}{16}$ " diameter lag screw with a minimum of  $2\frac{1}{2}$ " 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 centers.
4. Panel supports connections shall be staggered to distribute load to adjacent framing members.

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 (2015 IRC), 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 No. 46546

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76 N Meadowbrook Drive Alpine UT 84004  
North Carolina COA # P-2308

Signed 08-24-22

**SCOPE OF WORK**

TO INSTALL A ROOF MOUNTED SOLAR PHOTOVOLTAIC SYSTEM AT THE OWNER RESIDENCE LOCATED AT 840 MICAHS WAY N, SPRING LAKE, NC 28390, USA. THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT. THE PV SYSTEM DOES NOT INCLUDE STORAGE BATTERIES.

**EQUIPMENT SUMMARY**

31 Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN) MODULES
1 SOLAREEDGE SE10000H-US [240V] INVERTER
31 SOLAREEDGE POWER OPTIMIZER P401

**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 SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, OBTAINS ALL PERMITS, LICENSES AND PAY ALL REQUIRED FEES AND COMPLETE INSTALLATION.
- 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.
- DAMAGE CAUSED TO THE EXISTING STRUCTURE, PIPES, DUCTS, WINDOWS, WALL, FLOORS, ETC. SHALL BE REPAIRED TO THE ORIGINAL CONDITION OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROPER INSTALLATION AND COMPLETION OF THE WORK WITH APPROVED MATERIALS.
- NO CHANGES ARE TO BE MADE WITHOUT THE CONSULTATION AND APPROVAL OF THE ARCHITECT.
- CONTRACTOR SHALL OBTAIN BULDING PERMIT. NO WORK TO START UNLESS BUILDING PERMIT IS PROPERLY DISPLAYED.
- ALL WORKMANSHIP AND MATERIALS SHALL BE OF FIRST QUALITY AND IN COMPLIANCE WITH THE REQUIREMENTS OF THE FLORIDA BUILDING CODE, THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ALL PERTINENT AGENCIES.
- IT IS ESSENTIAL THAT ALL WORK PROCEED WITH THE MAXIMUM COOPERATION OF ALL PARTIES AND WITH MINIMUM INTERFERENCE TO THE OCCUPANTS WITHIN THE BUILDING. THE OWNER'S DIRECTIONS IN THIS REGARD SHALL BE FULLY COMPLIED WITH.
- ALL EXPOSED PLUMBING, HVAC, ELECTRICAL DUCTWORK, PIPING AND CONDUITS ARE TO BE PAINTED BY GENERAL CONTRACTOR.
- THE CONTRACTOR SHALL PERFORM THE WORK IN STRICT CONFORMANCE WITH THE LOCAL LAWS, REGULATIONS AND THE NATIONAL ELECTRIC CODE.
- THE CONTRACTOR SHALL OBTAIN ALL PERMITS, APPROVALS, AFFIDAVITS, CERTIFICATIONS, ETC. AND PAY ALL FEES AS REQUIRED BY THE LOCAL AUTHORITIES.
- CONTRACTORS SHALL OBTAIN FIRE CERTIF. UPON COMPLETION OF WORK.

**ELECTRICAL NOTES**

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURERS INSTRUCTION.
- MODULE SUPPORT RAIL SHALL BE BONDED TO THE MODULE

**GOVERNING CODES**

2018 NORTH CAROLINA FIRE CODE  
 2018 NORTH CAROLINA BUILDING CODE  
 2018 NORTH CAROLINA RESIDENTIAL CODE  
 2018 NORTH CAROLINA ENERGY CONSERVATION CODE  
 2018 NORTH CAROLINA EXISTING BUILDING CODE  
 2018 NORTH CAROLINA SWIMMING POOL AND SPA CODE  
 2018 UNIFORM MECHANICAL CODE  
 2018 UNIFORM PLUMBING CODE  
 2017 NATIONAL ELECTRICAL CODE

AHJ NAME : HARNETT COUNTY

**WIRING AND CONDUIT NOTES**

- ALL CONDUIT SIZES AND TYPES SHALL BE LISTED FOR ITS PURPOSE AND APPROVAL FOR THE SITE APPLICATIONS
- ALL PV CABLES AND HOMERUN WIRES BE #10AWG \*USE-2, PV WIRE, OR PROPRIETARY SOLAR CABLING SPECIFIED BY MFR, OR EQUIVALENT; ROUTED TO SOURCE CIRCUIT COMBINER BOXES AS REQUIRED
- ALL PV DC CONDUCTORS IN CONDUIT EXPOSED TO SUNLIGHT SHALL BE DERATED ACCORDING TO AS PER LATEST NEC CODE.
- EXPOSED ROOF PV DC CONDUCTORS SHALL BE USE-2, 90°C RATED, WET AND UV RESISTANT, AND UL LISTED RATED FOR 600V, UV RATED SPIRAL WRAP SHALL BE USED TO PROTECT WIRE FROM SHARP EDGES
- PHASE AND NEUTRAL CONDUCTORS SHALL BE DUAL RATED THHN/THWN-2 INSULATED, 90°C RATED, WET AND UV RESISTANT, RATED FOR 1000V PER NEC 2017
- 4-WIRE DELTA CONNECTED SYSTEMS HAVE THE PHASE WITH THE HIGHER VOLTAGE TO GROUND MARKED ORANGE OR IDENTIFIED BY OTHER EFFECTIVE MEANS
- ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION
- VOLTAGE DROP LIMITED TO 2%
- AC CONDUCTORS >4AWG COLOR CODED OR MARKED: PHASE A OR L1- BLACK, PHASE B OR L2- RED, PHASE C OR L3- BLUE, NEUTRAL- WHITE/GRAY



Rev 1



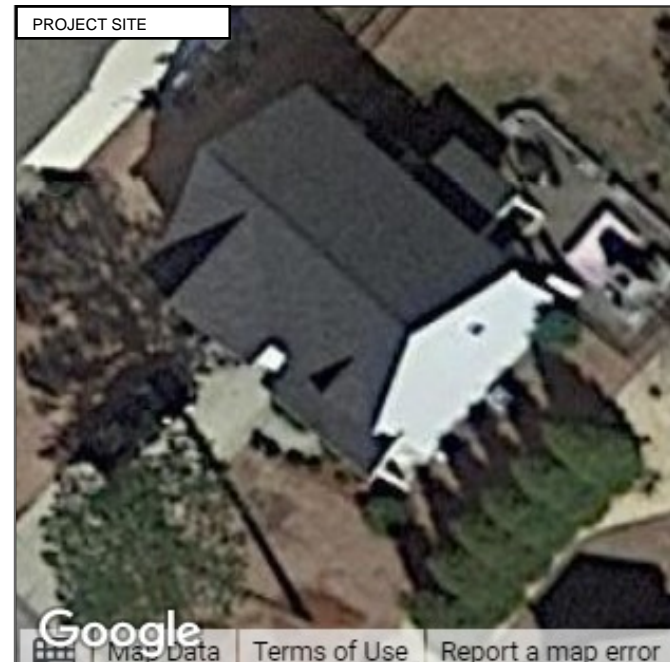
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<b>SYSTEM RATING</b>
12.400 kWDC
10.000 kWAC

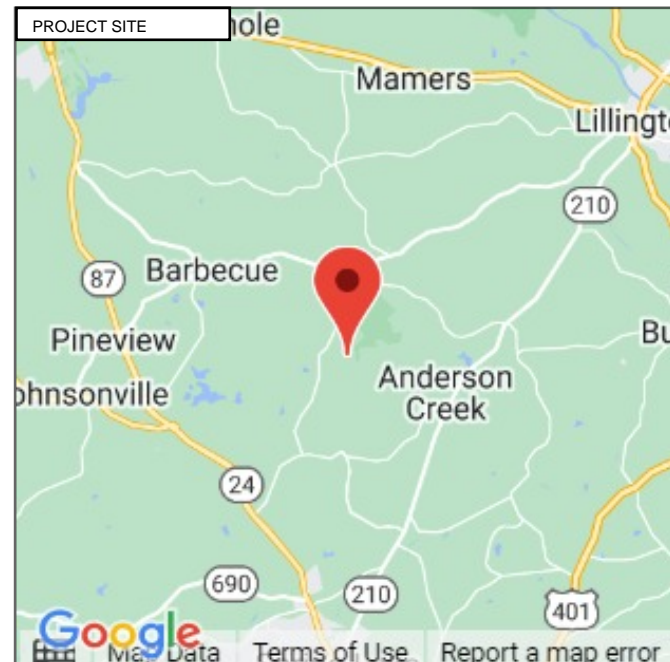
PHOTOVOLTAIC SYSTEM FIRE CLASSIFICATION LISTING IN ACCORDANCE WITH UL 1703 STANDARD.

SHEET INDEX	
PV1	COVER PAGE
PV2	SITE PLAN
PV3	ROOF PLAN
PV4	STRING LAYOUT & BOM
PV5-PV6	ATTACHMENT DETAILS
PV7-PV8	ELECTRICAL LINE & CALCS.
PV9	SPECIFICATIONS & NOTES
PV10-PV11	SIGNAGE
PV12	JOB SAFETY PLAN
PV13-PV18	EQUIPMENT SPECIFICATIONS



HOUSE PHOTO

SCALE: NTS



VICINITY MAP

SCALE: NTS



TITAN SOLAR POWER  
 160 N MCQUEEN RD,  
 GILBERT, AZ 85233, USA  
 PH# : (808) 371-5338  
 Electrical LIC# : U.33714

SYSTEM INFO	
(31) Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)	
(1) SOLAREEDGE SE10000H-US [240V]	
DC SYSTEM SIZE: 12.400 kWDC	
AC SYSTEM SIZE: 10.000 kWAC	
METER: 97 856 077	

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	08/24/2022	A

PROJECT NAME & ADDRESS

NICK FILLIPPIS  
 RESIDENCE  
 840 MICAHS WAY N, SPRING LAKE, NC 28390, USA  
 EMAIL ID: NF654716@GMAIL.COM  
 PHONE NO. (740) 705-0109

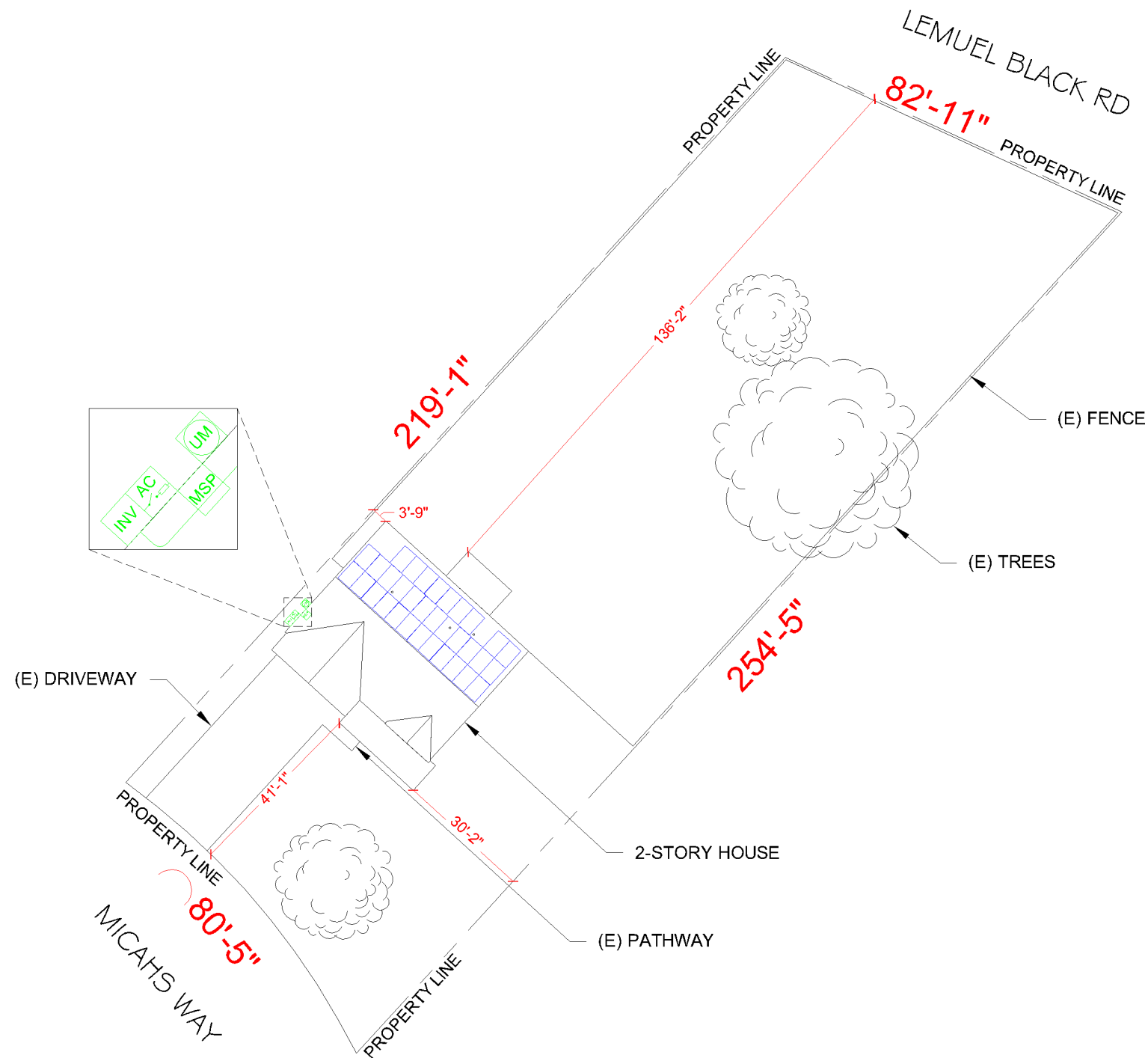
DATE: 8/24/2022
SHEET NAME <b>COVER PAGE</b>
SHEET SIZE <b>ANSI B 11" X 17"</b>
SHEET NUMBER <b>PV-1</b>

**SITE NOTES**

- A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS AN UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
- THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26]

**LEGEND**

- JB (N) JUNCTION BOX
- UM (E) UTILITY METER
- MSP (E) MAIN SERVICE PANEL
- AC (N) FUSED AC DISCONNECT
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- CONDUIT
- P401 OPTIMIZER
- INV SOLAREEDGE SE10000H-US [240V] INVERTER
- Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN) MODULES
- K2 CROSSRAIL 44-X
- TRENCH



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DATE: 8/24/2022

SHEET NAME  
**SITE PLAN**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-2**



SCALE: 1/32" = 1'-0

METER NO#: 97 856 077

DESIGN SPECIFICATION	
RISK CATEGORY:	II
CONSTRUCTION:	SFD
ZONING:	RESIDENTIAL
SNOW LOAD (ASCE7-10):	10 PSF
EXPOSURE CATEGORY:	C
WIND SPEED (ASCE7-10):	119 MPH

MODULE TYPE, DIMENSIONS & WEIGHT	
NUMBER OF MODULES:	31 MODULES
MODULE TYPE:	Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)
MODULE WEIGHT:	48.5 LBS
MODULE DIMENSIONS:	74" X 41.1" = 21.12 SF
UNIT WEIGHT OF AREA:	2.3 PSF

ROOF DESCRIPTION					
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING	ROOF MATERIAL
#1	34°	42°	2" x 4"	24" o.c.	COMP SHINGLE

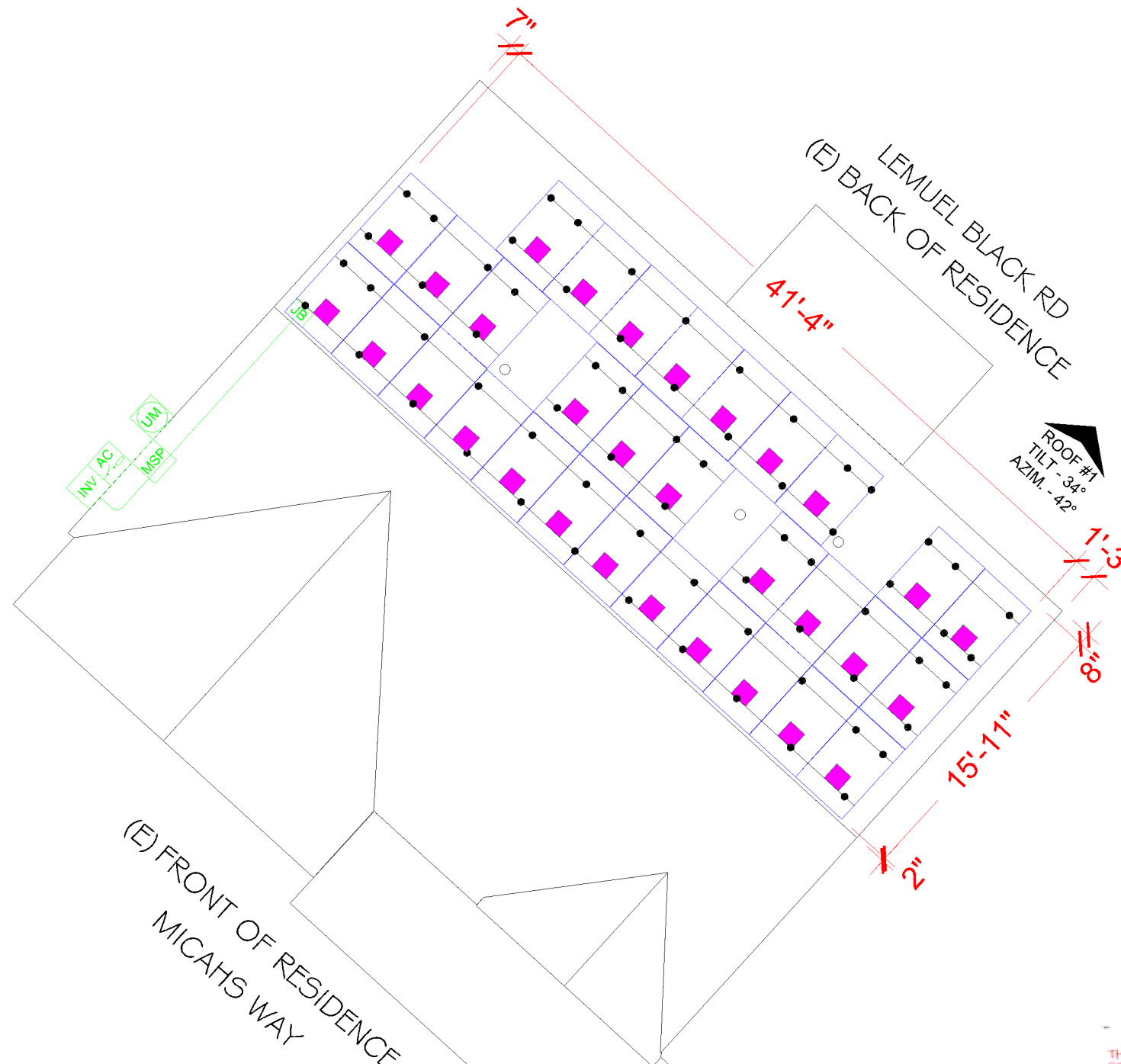
ARRAY AREA & ROOF AREA CALC'S		
ROOF #1	# OF MODULES	ARRAY AREA (Sq. Ft.)
#1	31	654.75
(TOTAL ARRAY AREA/TOTAL ROOF AREA) X 100%		
= (654.75/1809.82) X 100% = 36.18%		

**LEGEND**

- (N) JUNCTION BOX
- (E) UTILITY METER
- (E) MAIN SERVICE PANEL
- (N) FUSED AC DISCONNECT
- VENT. ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- CONDUIT
- P401 OPTIMIZER
- SOLAREEDGE SE10000H-US [240V] INVERTER
- Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN) MODULES
- K2 CROSSRAIL 44-X
- TRENCH

PANEL HEIGHT OFF ROOF 4"

DEAD LOAD CALCULATION			
EQUIPMENT'S DESCRIPTIONS	QTY	LBS/UNIT	TOTAL WEIGHT
MODULES	31	48.5	1503.5
MID CLAMP	50	0.3	15
END CLAMP	24	0.31	7.44
K2 CROSSRAIL 44-X	17	10	170.00
SPLICE BAR	6	0.65	3.91
SPLICE FOOT X	67	0.9	60.30
K2 SOLAR SEAL BUTYL PAD	67	0.42	28.14
M5 X 60 LAG SCREWS	134	0.08	10.72
T BOLT AND HEX NUT SET	67	0.05	3.35
TOTAL WEIGHT OF THE SYSTEM (LBS)			1802.36
TOTAL ARRAY AREA ON THE ROOF (SQ. FT.)			654.75
WEIGHT PER SQ. FT. (LBS)			2.76
WEIGHT PER PENETRATION (LBS)			5.39



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SCALE: 1/8" = 1'-0"

TITAN SOLAR POWER  
 160 N MCQUEEN RD,  
 GILBERT, AZ 85233, USA  
 PH# : (808) 371-5338  
 Electrical LIC# : U.33714

SYSTEM INFO	
(31) Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)	
(1) SOLAREEDGE SE10000H-US [240V]	
DC SYSTEM SIZE: 12.400 kWDC	
AC SYSTEM SIZE: 10.000 kWAC	
METER: 97 856 077	

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	08/24/2022	A

PROJECT NAME & ADDRESS

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 EMAIL ID: NF654716@GMAIL.COM  
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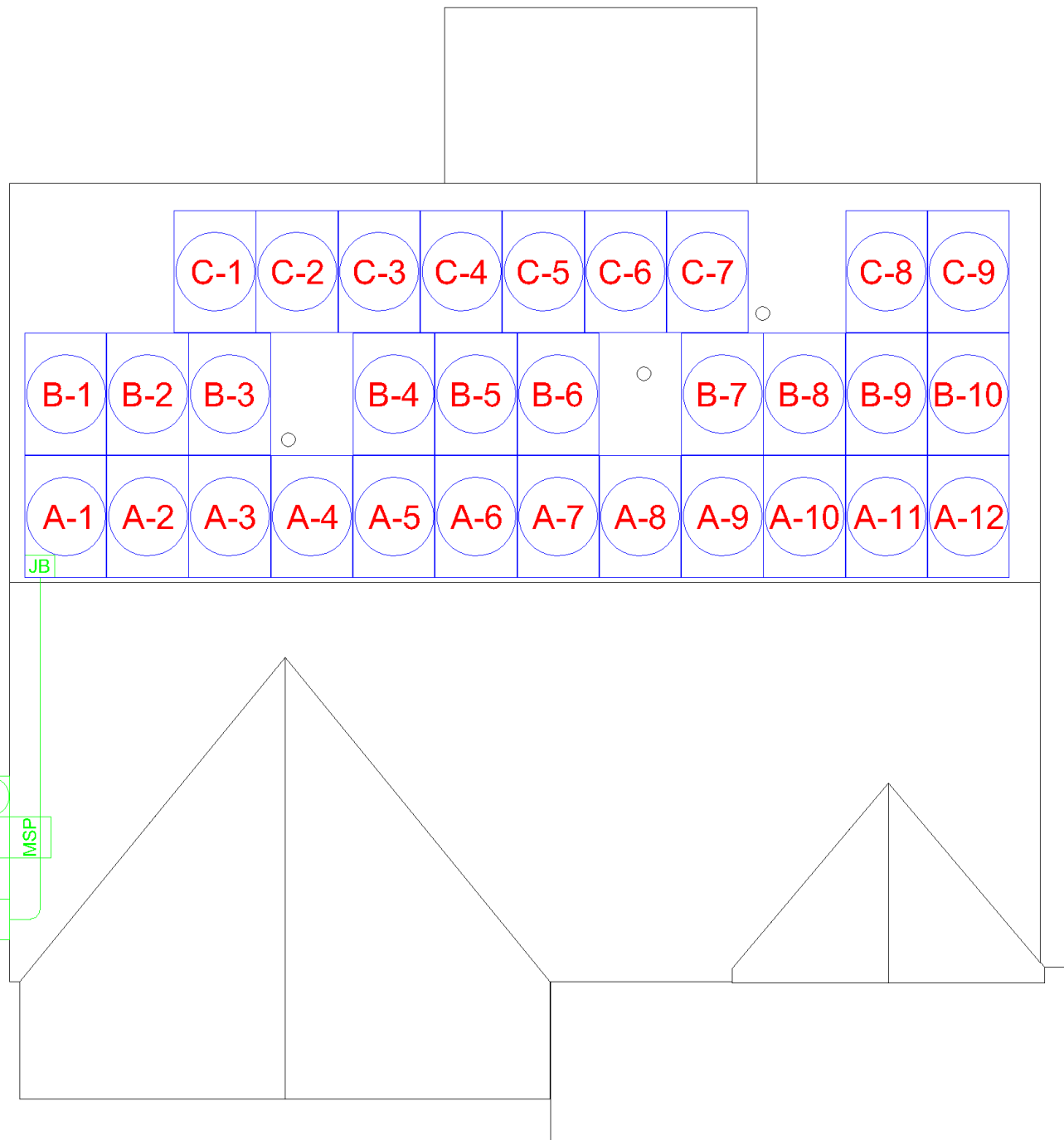
DATE: 8/24/2022
SHEET NAME ROOF PLAN
SHEET SIZE ANSI B 11" X 17"
SHEET NUMBER PV-3

METER NO#: 97 856 077

**BILL OF MATERIALS**

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	31	Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)
INVERTER	1	SOLAREEDGE SE10000H-US [240V]
OPTIMIZER	31	SOLAREEDGE POWER OPTIMIZER P401
JUNCTION BOX	1	JB-1.XL, JUNCTION BOX, NEMA 3R, UL LISTED
FUSED AC DISCONNECT	1	EATON DG222NRB PV SYSTEM AC DISCONNECT SWITCH FUSED, 60A W/X FUSES, 120/240V 2P NEMA 3R
ATTACHMENT	67	SPLICE FOOT X
ATTACHMENT	67	K2 SOLAR SEAL BUTYL PAD
ATTACHMENT	134	M5 X 60 LAG SCREWS
ATTACHMENT	67	T BOLT AND HEX NUT SET
RAILS	17	K2 CROSSRAIL 44-X
BONDED SPLICE	6	SPLICE KIT
MID CLAMP	50	MODULES MID CLAMPS
END CLAMP	24	MODULES END CLAMPS
GROUNDING LUG	6	GROUNDING LUG

LEMUEL BLACK RD  
(E) BACK OF RESIDENCE



(E) FRONT OF RESIDENCE  
MICAHS WAY



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(TITAN)

(1) SOLAREEDGE  
SE10000H-US [240V]

DC SYSTEM SIZE: 12.400 kWDC

AC SYSTEM SIZE: 10.000 kWAC

METER: 97 856 077

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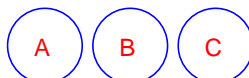
SHEET NAME  
STRING LAYOUT  
& BOM

SHEET SIZE  
ANSI B  
11" X 17"

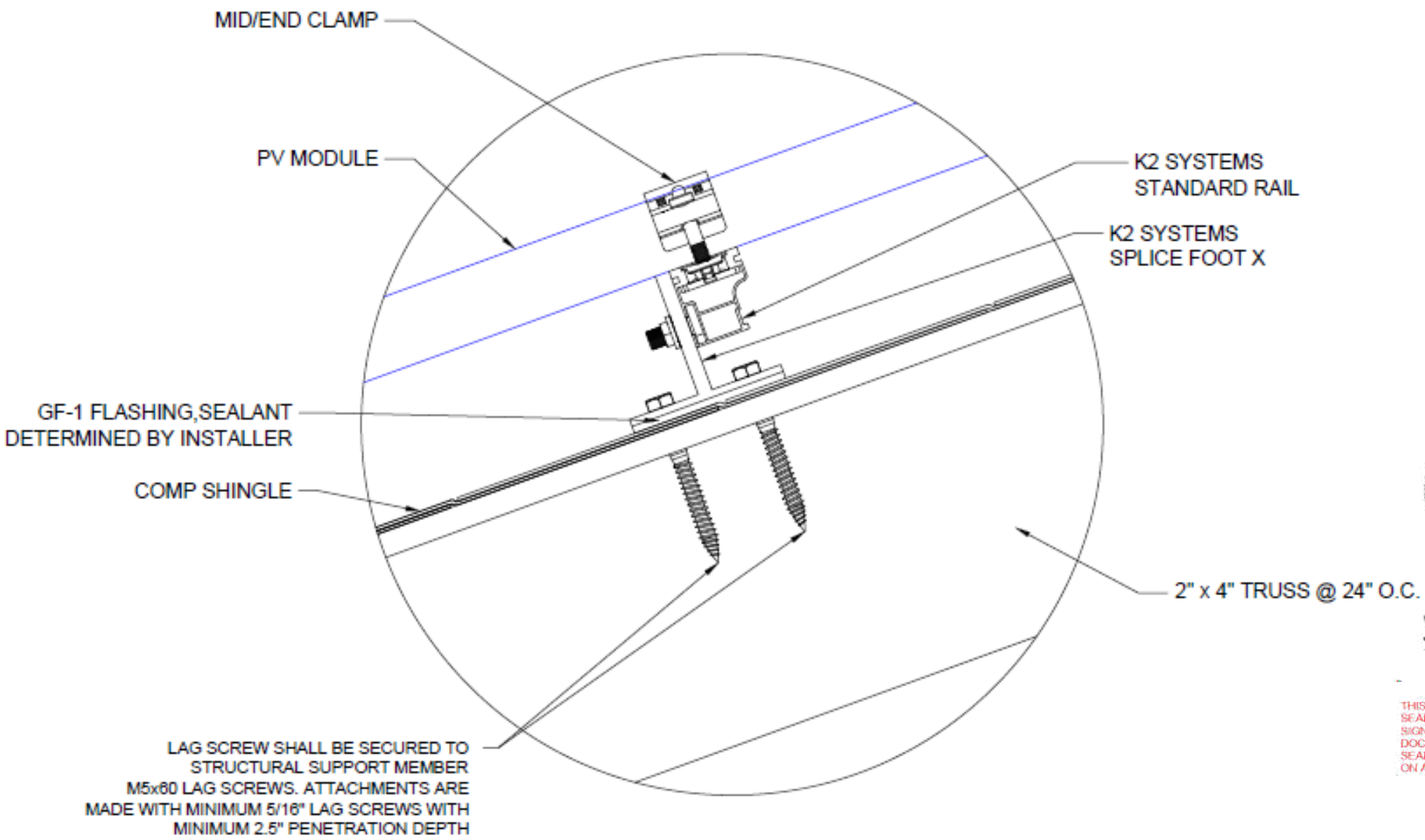
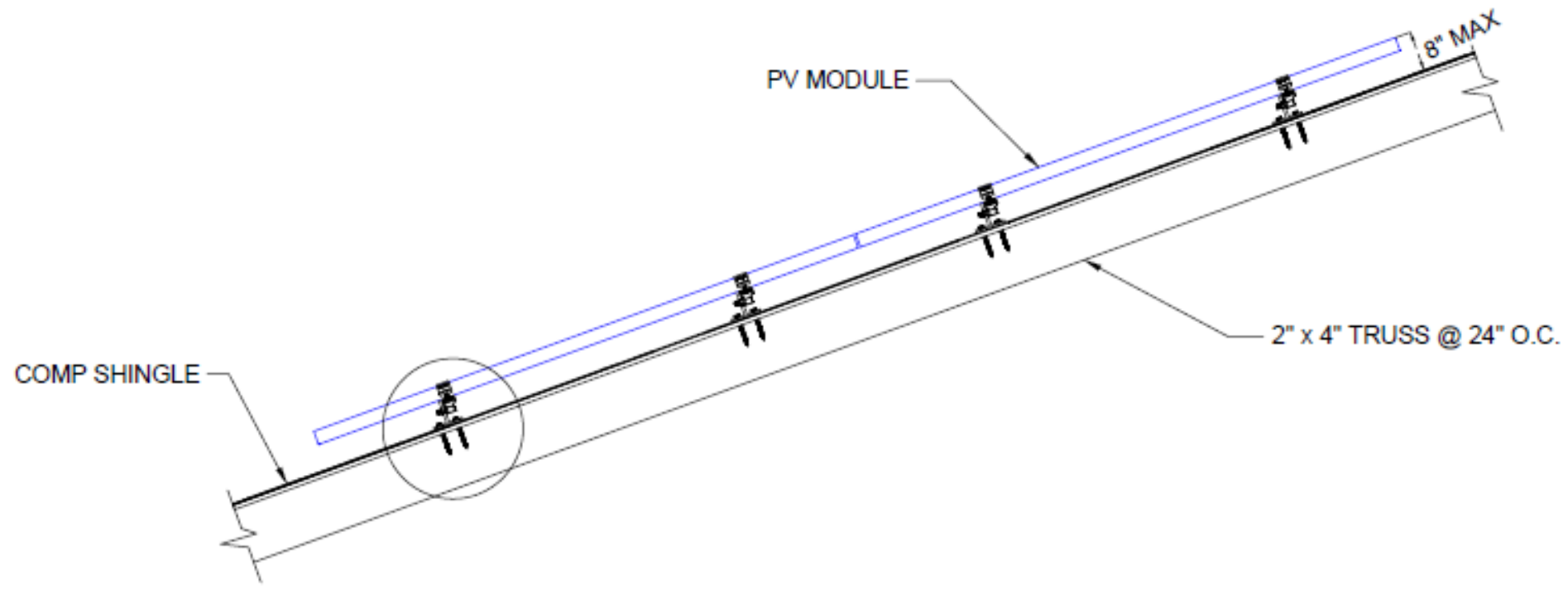
SHEET NUMBER  
PV-4



SCALE: 1/8" = 1'-0"



- MODULE STRINGING



LAG SCREW SHALL BE SECURED TO STRUCTURAL SUPPORT MEMBER M5x60 LAG SCREWS. ATTACHMENTS ARE MADE WITH MINIMUM 5/16\"



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PHONE NO. (740) 705-0109

DATE: 8/24/2022

SHEET NAME  
**ATTACHMENT  
DETAILS**

SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-5**



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SYSTEM INFO

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Q.PEAK DUO BLK ML-G10+ 400  
(TITAN)

(1) SOLAREEDGE  
SE10000H-US [240V]

DC SYSTEM SIZE: 12.400 kWDC

AC SYSTEM SIZE: 10.000 kWAC

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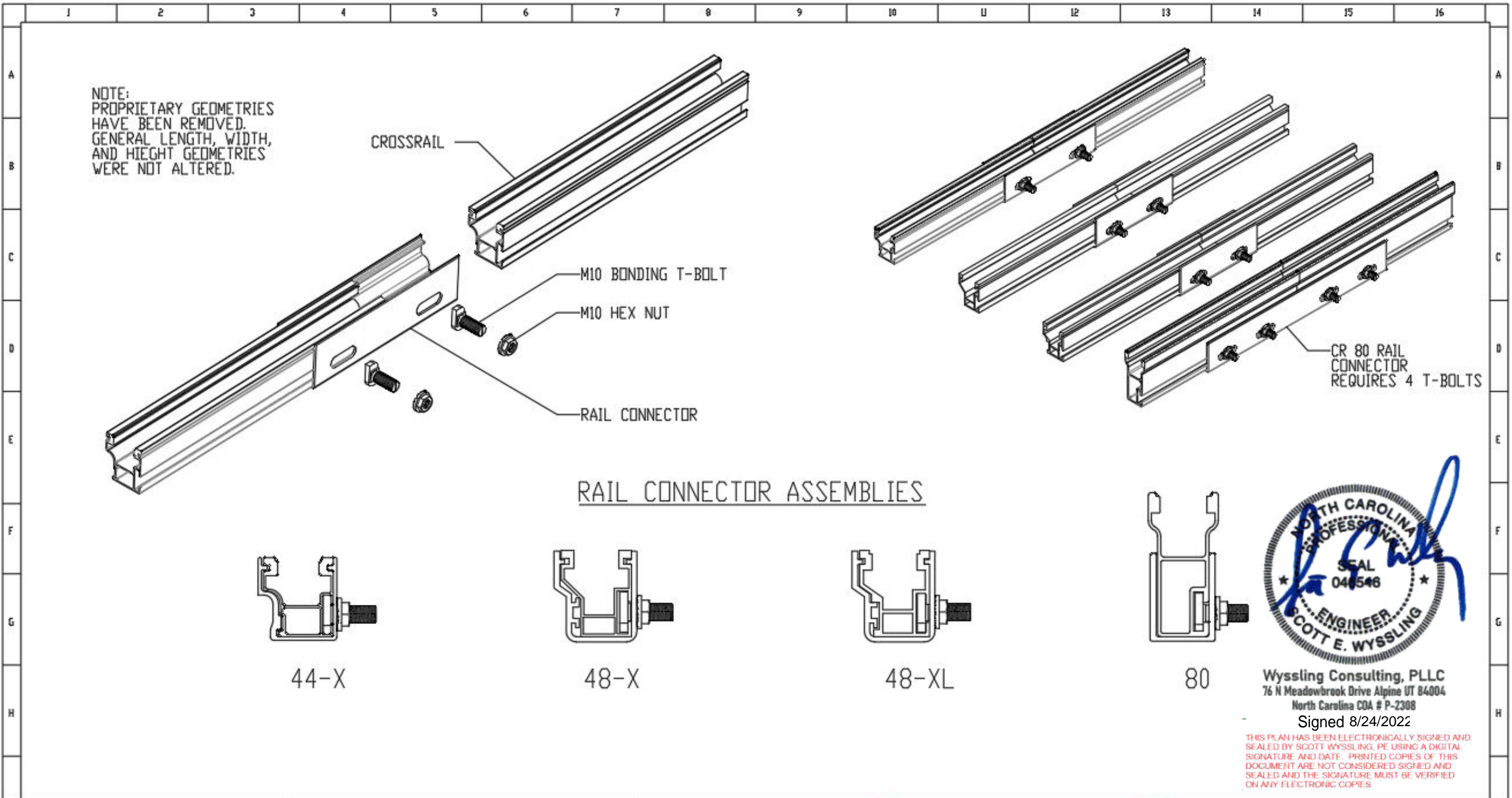
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DETAILS

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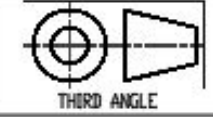
SHEET NUMBER  
PV-6



REVISION HISTORY

Revision	Date	Description
01		
02		
03		
04		
05		

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phone 760.301.5300



Name	Date
Drawn I. VIGGINS	07/29/2020
Checked R. HAGEN	08/07/2020
Approved I. VIGGINS	08/07/2020
Last Revision	

1016

CROSSRAIL RAIL  
CONNECTOR ASSEMBLIES

1017

Scale: 1:1

Revision: 01

#1 Dimensions are mm

Sheet 2 of 2

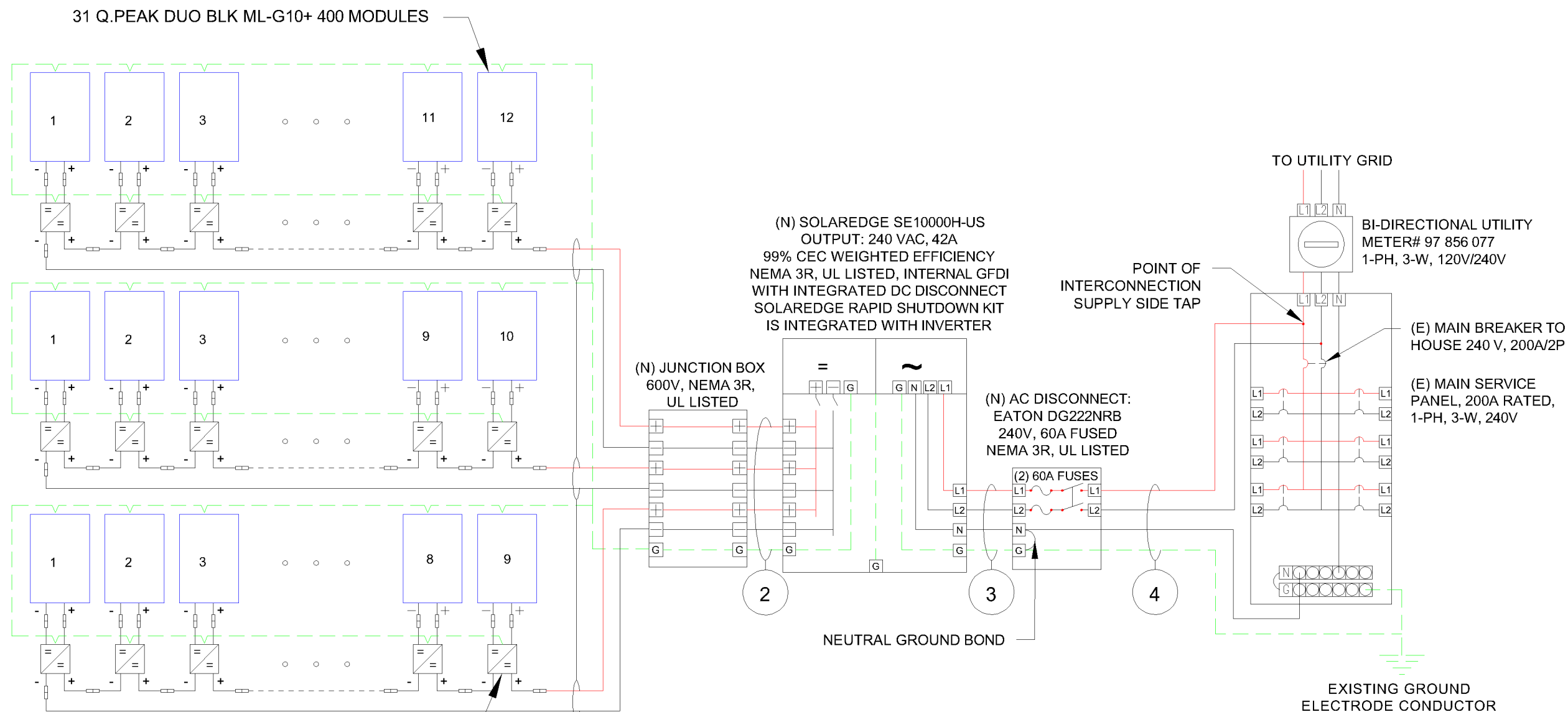
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TITAN SOLAR POWER  
160 N MCQUEEN RD,  
GILBERT, AZ 85233, USA  
PH#: (808) 371-5338  
Electrical LIC#: U.33714

ID	TYPICAL	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	CONDUCTOR			CONDUIT	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CIRCUIT	CONDUIT FILL PERCENT	OCPD	EGC		TEMP. CORR. FACTOR		CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	LENGTH	VOTAGE DROP
				8 AWG	BARE COPPER																		
1	3	ARRAY	JUNCTION BOX	10 AWG	PV WIRE	COPPER	NULL NULL	1	2	N/A	N/A	8 AWG	BARE COPPER	0.71	(58°C)	N/A	15.00A	18.75A	40A	28.40A	90°C	75FT	0.58%
2	1	JUNCTION BOX	INVERTER	10 AWG	THWN 2	COPPER	MIN 0.75" DIA EMT	3	6	29.27%	N/A	8 AWG	THWN-2 COPPER	0.91	(36°C)	0.8	15.00A	18.75A	40A	29.12A	90°C	35FT	0.27%
3	1	INVERTER	FUSED AC DISCONNECT	6 AWG	THWN 2	COPPER	MIN 0.75" DIA EMT	1	3	34.33%	60A	8 AWG	THWN-2 COPPER	0.91	(36°C)	1	42.00A	52.5A	75A	68.25A	90°C	5FT	0.09%
4	1	FUSED AC DISCONNECT	MSP	6 AWG	THWN 2	COPPER	MIN 0.75" DIA EMT	1	3	34.33%	N/A	8 AWG	THWN-2 COPPER	0.91	(36°C)	1	42.00A	52.5A	75A	68.25A	90°C	5FT	0.09%



SolarEdge Power Optimizer P401 Rated  
DC Input Power - 400 watts  
Maximum Input Voltage - 60 Vdc  
MPPT Range - 8 to 60 Vdc  
Maximum Input Current - 11.75 Adc  
Maximum Output Current - 15 Adc String  
Limitations - 8 to 25 Optimizers,  
6000 watts STC per string maximum

SYSTEM RATING	
12.400 kWDC	
10.000 kWAC	

SERVICE INFO	
UTILITY PROVIDER:	DOMINION ENERGY
AHJ NAME:	HARNETT COUNTY
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	SQUARE D
MAIN SERVICE PANEL:	200 A
MAIN BREAKER RATING:	200 A
MAIN SERVICE LOCATION:	WEST
SERVICE FEED SOURCE:	UNDERGROUND

SYSTEM INFO		
(31) Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)		
(1) SOLAREEDGE SE10000H-US [240V]		
DC SYSTEM SIZE: 12.400 kWDC		
AC SYSTEM SIZE: 10.000 kWAC		
METER: 97 856 077		

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	08/24/2022	A

PROJECT NAME & ADDRESS

NICK FILLIPPIS  
RESIDENCE  
840 MICAHS WAY N, SPRING LAKE, NC 28390, USA  
EMAIL ID: NF654716@GMAIL.COM  
PHONE NO. (740) 705-0109

DATE: 8/24/2022

SHEET NAME  
**ELECTRICAL  
LINE & CALCS.**

SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-7**

SCALE: NTS

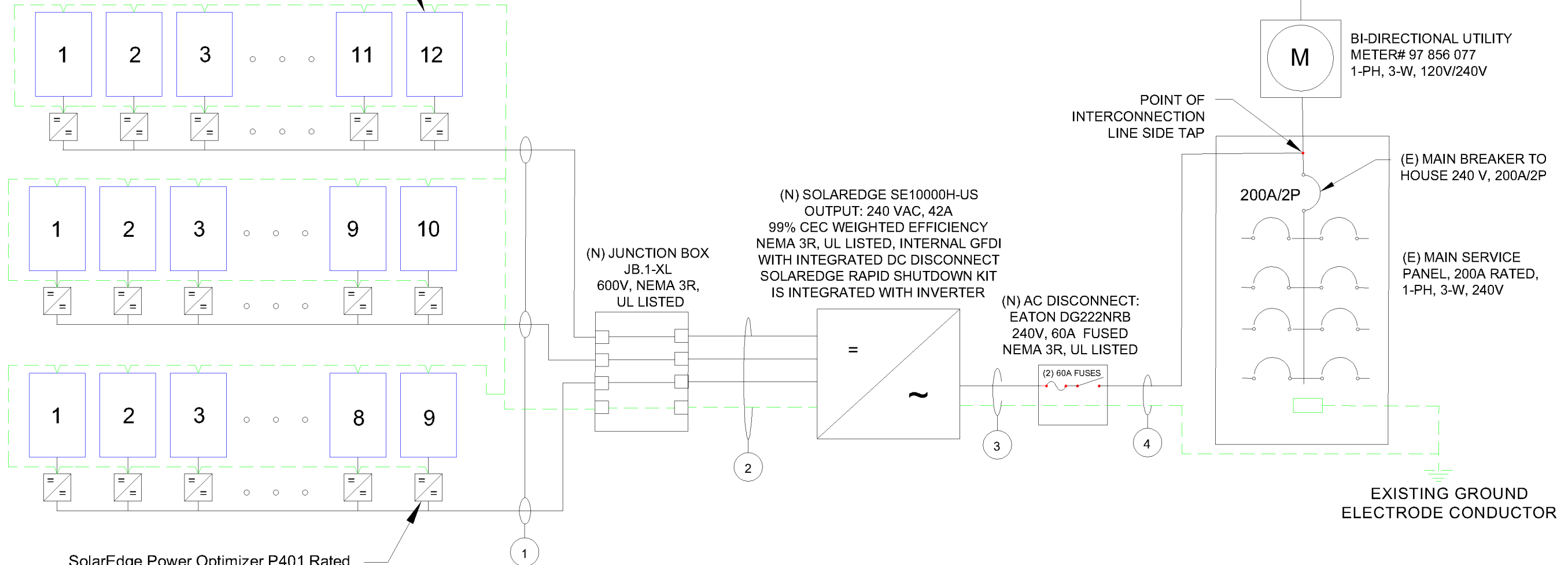
METER NO#: 97 856 077



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 PH#: (808) 371-5338  
 Electrical LIC#: U.33714

ID	TYPICAL	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	CONDUCTOR			CONDUIT	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CIRCUIT	CONDUIT FILL PERCENT	OCPD	EGC		TEMP. CORR. FACTOR		CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	LENGTH	VOTAGE DROP
				8 AWG	BARE COPPER							(58°C)											
1	3	ARRAY	JUNCTION BOX	10 AWG	PV WIRE	COPPER	NULL NULL	1	2	N/A	N/A	8 AWG	BARE COPPER	0.71	(58°C)	N/A	15.00A	18.75A	40A	28.40A	90°C	75FT	0.58%
2	1	JUNCTION BOX	INVERTER	10 AWG	THWN 2	COPPER	MIN 0.75" DIA EMT	3	6	29.27%	N/A	8 AWG	THWN-2 COPPER	0.91	(36°C)	0.8	15.00A	18.75A	40A	29.12A	90°C	35FT	0.27%
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31 Q.PEAK DUO BLK ML-G10+ 400 MODULES



SolarEdge Power Optimizer P401 Rated  
 DC Input Power - 400 watts  
 Maximum Input Voltage - 60 Vdc  
 MPPT Range - 8 to 60 Vdc  
 Maximum Input Current - 11.75 Adc String  
 Maximum Output Current - 15 Adc String  
 Limitations - 8 to 25 Optimizers,  
 6000 watts STC per string maximum

SYSTEM RATING	
12.400 kWDC	
10.000 kWAC	

SERVICE INFO	
UTILITY PROVIDER:	DOMINION ENERGY
AHJ NAME:	HARNETT COUNTY
MAIN SERVICE VOLTAGE:	240V
MAIN PANEL BRAND:	SQUARE D
MAIN SERVICE PANEL:	200 A
MAIN BREAKER RATING:	200 A
MAIN SERVICE LOCATION:	WEST
SERVICE FEED SOURCE:	UNDERGROUND

SYSTEM INFO		
(31) Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)		
(1) SOLAREGE SE10000H-US [240V]		
DC SYSTEM SIZE: 12.400 kWDC		
AC SYSTEM SIZE: 10.000 kWAC		
METER: 97 856 077		

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SHEET NAME  
**ELECTRICAL LINE & CALCS.**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-8**

SCALE: NTS

METER NO#: 97 856 077

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL	Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)
VMP	37.13 V
IMP	10.77 A
VOC	45.3 V
ISC	11.14 A
TEMP. COEFF. VOC	-0.27%/K
PTC RATING	376.55 W
MODULE DIMENSION	74"(L) x 41.1"(W)
PANEL WATTAGE	400 W

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL	SOLAREEDGE SE10000H-US [240V]
NOMINAL AC POWER	10000 W
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	42 A

POWER OPTIMIZER (SOLAREEDGE P401)	
MAXIMUM INPUT POWER	400 W
MAXIMUM INPUT VOLTAGE	60 VDC
MAXIMUM INPUT ISC	11.75 ADC
MAXIMUM OUTPUT CURRENT	15 ADC
WEIGHTED EFFICIENCY	98.8%

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-10°C
AMBIENT TEMP (HIGH TEMP 2%)	36°C
CONDUIT HEIGHT	7/8"
ROOF TOP TEMP	90°C
CONDUCTOR TEMPERATURE RATE	58°C
MODULE TEMPERATURE COEFFICIENT OF VOC	-0.27%/K

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
0.80	4-6
0.70	7-9
0.50	10-20



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SYSTEM INFO
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(1) SOLAREEDGE SE10000H-US [240V]
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AC SYSTEM SIZE: 10.000 kWAC
METER: 97 856 077

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DESCRIPTION	DATE	REV
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EMAIL ID: NF654716@GMAIL.COM  
PHONE NO. (740) 705-0109

DATE: 8/24/2022

SHEET NAME  
**SPECIFICATIONS  
& NOTES**

SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-9**

**1** **PHOTOVOLTAIC AC DISCONNECT**  
**RATED AC OUTPUT CURRENT 42 AMPS**  
**NOMINAL OPERATING AC VOLTAGE 240 VOLTS**

LABEL LOCATION:  
 MAIN SERVICE PANEL/MAIN SERVICE DISCONNECT/AC DISCONNECT  
 PER CODE: NEC 690.13(B)

**2** **RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

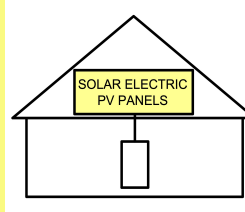
LABEL LOCATION:  
 INVERTER AT OR WITHIN 3' OF THE DC COMBINER SWITCH  
 PER CODE: NEC 690.56(C)(3)

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

LABEL LOCATION:  
 POINT OF INTERCONNECTION, MAIN SERVICE DISCONNECT, AC DISCONNECT, AC COMBINER, INVERTER  
 PER CODE: NEC 690.13(B)

**4** **SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

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



LABEL LOCATION:  
 MAIN SERVICE DISCONNECT IF MSD IS OUTSIDE PLACE IT THERE / IF MSD IS INSIDE PLACE ON THE AC DISCONNECT  
 PER CODE: NEC 690.56(C)(1)(a)

**5** **CAUTION : SOLAR CIRCUIT**

LABEL LOCATION:  
 MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR CONDUIT, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES AT LEAST EVERY 10 FT, AT TURNS AND ABOVE/BELOW PENETRATIONS AND ALL COMBINER/JUNCTION BOXES  
 PER CODE: IFC 606.11.1.4

**6** **MAXIMUM VOLTAGE 480 VDC**  
**MAXIMUM CIRCUIT CURRENT 27 ADC**  
**MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC-CONVERTER(IF INSTALLED) 45 ADC**

LABEL LOCATION:  
 DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE  
 PER CODE: 2017 NFPA 70, NEC 690.53

**7** **WARNING**  
**ELECTRIC SHOCK HAZARD**  
**THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED**

LABEL LOCATION:  
 PLACE THIS LABEL AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT AND DEVICE WHERE ENERGIZED, UNGROUNDED BE EXPOSED DURING SERVICE:  
 PER CODE: NEC 690.35 (F)

**8** **CAUTION : SOLAR ELECTRIC SYSTEM CONNECTED**

LABEL LOCATION:  
 POINT OF INTERCONNECTION & INVERTER  
 PER CODE: NEC 690.15 & 690.13(B)

**9** **WARNING: PHOTOVOLTAIC POWER SOURCE**

LABEL LOCATION:  
 CONDUIT  
 PER CODE: 2017 NEC 690.31(G)(3)

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

LABEL LOCATION:  
 MAIN SERVICE DISCONNECT/ AC DISCONNECT/ MAIN SERVICE PANEL/ REVENUE METER/ AC COMBINER  
 PER CODE: NEC 705.12(B)(3)

**11** **PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH**

LABEL LOCATION:  
 AC DISCONNECT  
 PER CODE: NEC 690.56(C)(3)

**12** **SERVICE EQUIPMENTS**

**EQUIPMENT DE SERVICE**

**EQUIPO DE SERVICIO**

LABEL LOCATION:  
 AC DISCONNECT  
 PER CODE: NEC 230.66

- ADHESIVE FASTENED SIGNS**
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
  - WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNING AND MARKINGS SHOULD COMPLY WITH ANSI 2535.4 [NEC 110.21(B) FIELD MARKING].
  - ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]



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 160 N MCQUEEN RD,  
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 PH# : (808) 371-5338  
 Electrical LIC# : U.33714

SYSTEM INFO	
(31) Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)	
(1) SOLAREEDGE SE10000H-US [240V]	
DC SYSTEM SIZE: 12.400 kWDC	
AC SYSTEM SIZE: 10.000 kWAC	
METER: 97 856 077	

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	08/24/2022	A

PROJECT NAME & ADDRESS

NICK FILLIPPIS  
 RESIDENCE  
 840 MICAHS WAY N, SPRING LAKE, NC 28390, USA  
 EMAIL ID: NF654716@GMAIL.COM  
 PHONE NO. (740) 705-0109

DATE: 8/24/2022
SHEET NAME <b>SIGNAGE</b>
SHEET SIZE <b>ANSI B 11" X 17"</b>
SHEET NUMBER <b>PV-10</b>

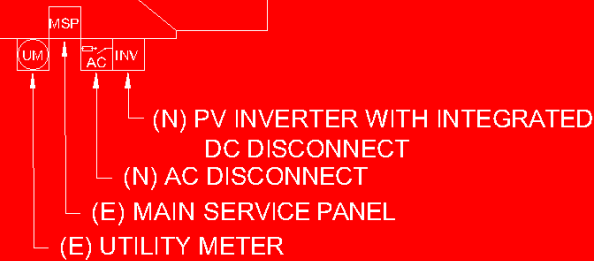


**POWER TO THIS BUILDING IS SUPPLIED FROM  
THE FOLLOWING SOURCES WITH DISCONNECTS  
LOCATED AS SHOWN**

LEMUEL BLACK RD

MICAH'S WAY

ARRAY



**LABEL LOCATION:**  
EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S)  
FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED  
(PER CODE: NEC 705.10)



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Q.PEAK DUO BLK ML-G10+ 400  
(TITAN)

(1) SOLAREEDGE  
SE10000H-US [240V]

DC SYSTEM SIZE: 12.400 kWDC

AC SYSTEM SIZE: 10.000 kWAC

METER: 97 856 077

REVISIONS

DESCRIPTION	DATE	REV
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PROJECT NAME & ADDRESS

NICK FILLIPPIS  
RESIDENCE  
840 MICAH'S WAY N, SPRING LAKE, NC 28390, USA  
EMAIL ID: NF654716@GMAIL.COM  
PHONE NO. (740) 705-0109

DATE: 8/24/2022

SHEET NAME  
**SIGNAGE**

SHEET SIZE  
**ANSI B  
11" X 17"**

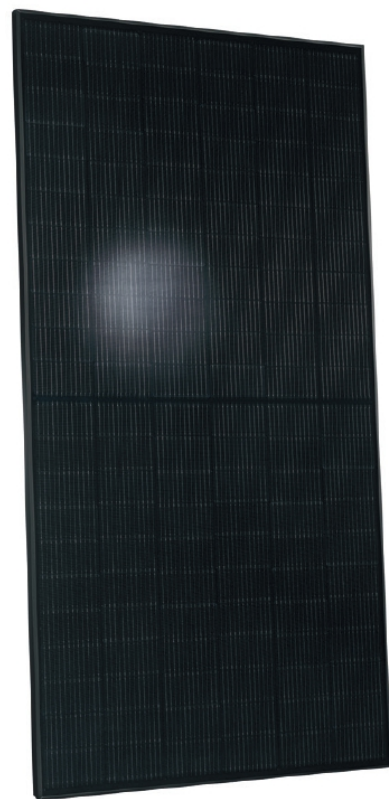
SHEET NUMBER  
**PV-11**





# TITAN

## SOLAR PANEL



**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 Technology, 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 warranty<sup>2</sup>.

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

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



## Q PEAK DUO BLK ML-G10+

### 395-400

ENDURING HIGH PERFORMANCE

THE IDEAL SOLUTION FOR:  
Rooftop arrays on residential buildings



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

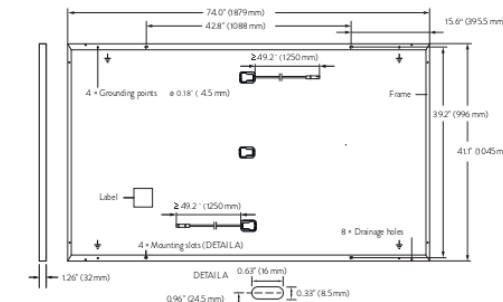


525 W Baseline Rd., Mesa, AZ, 85210  
TEL: 855.SAY.SOLAR  
EMAIL: info@titansolarpower.com

Specifications subject to technical changes © Q CELLS Q PEAK DUO BLK ML-G10+-395-400-2021-05\_Rev01\_NA

### 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 mm <sup>2</sup> Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
CONNECTOR	Stäubli MC4; IP68

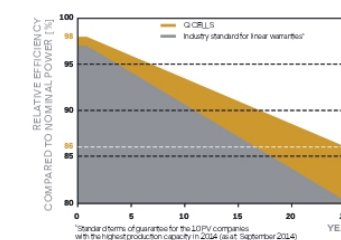


### ELECTRICAL CHARACTERISTICS

POWER CLASS		385	390	395	400	405	
<b>MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC</b> <sup>1</sup> (POWER TOLERANCE ±5 W / -0 W)							
MINIMUM	POWER AT MPP	P <sub>MPP</sub> [W]	385	390	395	400	405
	SHORT CIRCUIT CURRENT	I <sub>SC</sub> [A]	11.04	11.07	11.10	11.14	11.17
	OPEN CIRCUIT VOLTAGE	V <sub>OC</sub> [V]	45.19	45.23	45.27	45.30	45.34
	CURRENT AT MPP	I <sub>MPP</sub> [A]	10.59	10.65	10.71	10.77	10.83
	VOLTAGE AT MPP	V <sub>MPP</sub> [V]	36.36	36.62	36.88	37.13	37.39
<b>EFFICIENCY</b>		η [%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
<b>MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT</b> <sup>2</sup>							
MINIMUM	POWER AT MPP	P <sub>MPP</sub> [W]	288.8	292.6	296.3	300.1	303.8
	SHORT CIRCUIT CURRENT	I <sub>SC</sub> [A]	8.90	8.92	8.95	8.97	9.00
	OPEN CIRCUIT VOLTAGE	V <sub>OC</sub> [V]	42.62	42.65	42.69	42.72	42.76
	CURRENT AT MPP	I <sub>MPP</sub> [A]	8.35	8.41	8.46	8.51	8.57
	VOLTAGE AT MPP	V <sub>MPP</sub> [V]	34.59	34.81	35.03	35.25	35.46

<sup>1</sup>Measurement tolerances P<sub>MPP</sub> ±3%; I<sub>SC</sub>; V<sub>OC</sub> ±5% at STC: 1000 W/m<sup>2</sup>, 25 ± 2°C, AM 1.5 according to IEC 60904-3 • • 800 W/m<sup>2</sup>, NMOT, spectrum AM 1.5

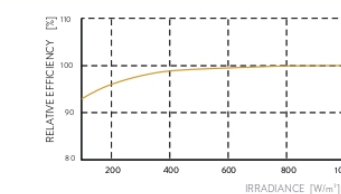
### Q CELLS PERFORMANCE WARRANTY



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/m<sup>2</sup>)

### TEMPERATURE COEFFICIENTS

TEMPERATURE COEFFICIENT OF I <sub>SC</sub>	α [%/K]	+0.04	TEMPERATURE COEFFICIENT OF V <sub>OC</sub>	β [%/K]	-0.27
TEMPERATURE COEFFICIENT OF P <sub>MPP</sub>	γ [%/K]	-0.34	NOMINAL MODULE OPERATING TEMPERATURE	NMOT [°F]	109 ± 5.4 (43 ± 3°C)

### PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V <sub>sys</sub> [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 <sup>1</sup> [lbs/ft <sup>2</sup> ]	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 <sup>1</sup> [lbs/ft <sup>2</sup> ]	113 (5400 Pa)/84 (4000 Pa)		

<sup>1</sup> 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.



### 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
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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.



TITAN SOLAR POWER  
160 N MCQUEEN RD,  
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Q.PEAK DUO BLK ML-G10+ 400  
(TITAN)

(1) SOLAREGE  
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AC SYSTEM SIZE: 10.000 kWAC

METER: 97 856 077

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RESIDENCE  
840 MICAHS WAY N, SPRING LAKE, NC 28390, USA  
EMAIL ID: NF654716@GMAIL.COM  
PHONE NO. (740) 705-0109

DATE: 8/24/2022

SHEET NAME  
EQUIPMENT  
SPECIFICATIONS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-13



# / Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / **SE10000H-US** / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	<b>SE10000H-US</b>	SE11400H-US
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4						
<b>OUTPUT</b>							
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓
AC Frequency (Nominal)	59.3 - 60 - 60.5 <sup>(1)</sup>						
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5
Power Factor	1, Adjustable - 0.85 to 0.85						
GFDI Threshold	1						
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes						
<b>INPUT</b>							
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650
Maximum DC Power @208V	-	5100	-	7750	-	-	15500
Transformer-less, Ungrounded	Yes						
Maximum Input Voltage	480						
Nominal DC Input Voltage	380						
Maximum Input Current @240V <sup>(2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5
Maximum Input Current @208V <sup>(2)</sup>	-	9	-	13.5	-	-	27
Max. Input Short Circuit Current	45						
Reverse-Polarity Protection	Yes						
Ground-Fault Isolation Detection	600k $\Omega$ Sensitivity						
Maximum Inverter Efficiency	99						99.2
CEC Weighted Efficiency	99						
Nighttime Power Consumption	< 2.5						

(1) For other regional settings please contact SolarEdge support  
 (2) A higher current source may be used; the inverter will limit its input current to the values stated

# / Single Phase Inverter with HD-Wave Technology for North America

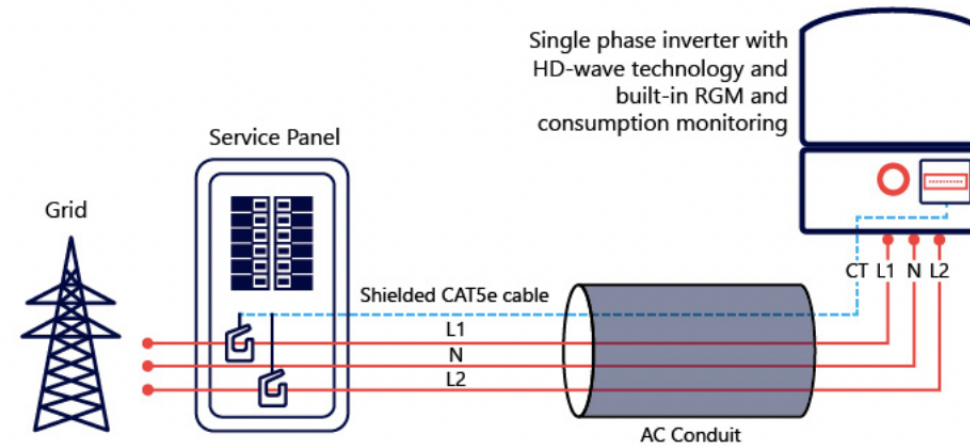
SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / **SE10000H-US** / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	<b>SE10000H-US</b>	SE11400H-US	
<b>ADDITIONAL FEATURES</b>								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Metering, ANSI C12.20	Optional <sup>(3)</sup>							
Consumption metering	Optional <sup>(3)</sup>							
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection							
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
<b>STANDARD COMPLIANCE</b>								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (H)							
Emissions	FCC Part 15 Class B							
<b>INSTALLATION SPECIFICATIONS</b>								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG				1" Maximum /14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG				1" Maximum / 1-3 strings / 14-6 AWG			
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.3 x 14.6 x 7.3 / 540 x 370 x 185			
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6			lb / kg	
Noise	< 25				<50			dB(A)
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60 <sup>(4)</sup>							
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

(3) Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BN14. For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box  
 (4) Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

## How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills



TITAN SOLAR POWER  
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 PH# : (808) 371-5338  
 Electrical LIC# : U.33714

SYSTEM INFO
(31) Q CELLS Q.PEAK DUO BLK ML-G10+ 400 (TITAN)
(1) SOLAREGE SE10000H-US [240V]
DC SYSTEM SIZE: 12.400 kWDC
AC SYSTEM SIZE: 10.000 kWAC
METER: 97 856 077

REVISIONS		
DESCRIPTION	DATE	REV
REVISION	08/24/2022	A

### PROJECT NAME & ADDRESS

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**EQUIPMENT SPECIFICATIONS**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-14**



# Power Optimizer

For North America

P370 / P400 / P401 / P485 / P505



POWER OPTIMIZER

## PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

## Power Optimizer

For North America

P370 / P400 / P401 / P485 / P505

Optimizer model (typical module compatibility)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96- cell modules)	P401 (for high power 60 and 72 cell modules)	P485 (for high-voltage modules)	P505 (for higher current modules)	
<b>INPUT</b>						
Rated Input DC Power <sup>(1)</sup>	370	400		485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	60	80	60	125 <sup>(2)</sup>	83 <sup>(2)</sup>	Vdc
MPPT Operating Range	8 - 60	8 - 80	8-60	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11	10.1	11.75	11	14	Adc
Maximum DC Input Current	13.75	12.5	14.65	12.5	17.5	
Maximum Efficiency				99.5		%
Weighted Efficiency				98.8		%
Overvoltage Category				II		
<b>OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)</b>						
Maximum Output Current				15		Adc
Maximum Output Voltage				60	80	Vdc
<b>OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)</b>						
Safety Output Voltage per Power Optimizer				1 ± 0.1		Vdc
<b>STANDARD COMPLIANCE</b>						
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3					
Safety	IEC62109-1 (class II safety), UL1741, NEC/PVRSS					
Material	UL94 V-0, UV Resistant					
RoHS	Yes					
<b>INSTALLATION SPECIFICATIONS</b>						
Maximum Allowed System Voltage	1000					Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters					
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4 <sup>(3)</sup>			MC4 <sup>(3)</sup>	MC4 <sup>(3)</sup>	
Input Wire Length				0.16 / 0.5		m / ft
Output Wire Type / Connector	Double Insulated / MC4					
Output Wire Length	1.2 / 3.9					m / ft
Operating Temperature Range <sup>(4)</sup>	-40 to +85 / -40 to +185					°C / °F
Protection Rating	IP68 / Type6B					
Relative Humidity	0 - 100					%

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed.  
 (2) NEC 2017 requires max input voltage be not more than 80V  
 (3) For other connector types please contact SolarEdge  
 (4) Longer inputs wire lengths are available for use. For 0.9m input wire length order P401-xxxLxxx  
 (5) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

PV System Design Using a SolarEdge Inverter <sup>(6)(7)</sup>	Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P370, P400, P401 P485, P505	8 6	10 8	18 14	
Maximum String Length (Power Optimizers)	25		25	50	
Maximum Power per String	5700 <sup>(8)</sup> (6000 with SE7600-US - SE11400-US)	5250 <sup>(8)</sup>	6000 <sup>(9)</sup>	12750 <sup>(10)</sup>	W
Parallel Strings of Different Lengths or Orientations	Yes				

(6) For detailed string sizing information refer to: [http://www.solaredge.com/sites/default/files/string\\_sizing\\_na.pdf](http://www.solaredge.com/sites/default/files/string_sizing_na.pdf)  
 (7) It is not allowed to mix P485/P505 with P370/P400/P401 in one string  
 (8) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement  
 (9) For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W  
 (10) For 277/480V grid: it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W



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(1) SOLAREEDGE SE10000H-US [240V]		
DC SYSTEM SIZE: 12.400 kWDC		
AC SYSTEM SIZE: 10.000 kWAC		
METER: 97 856 077		

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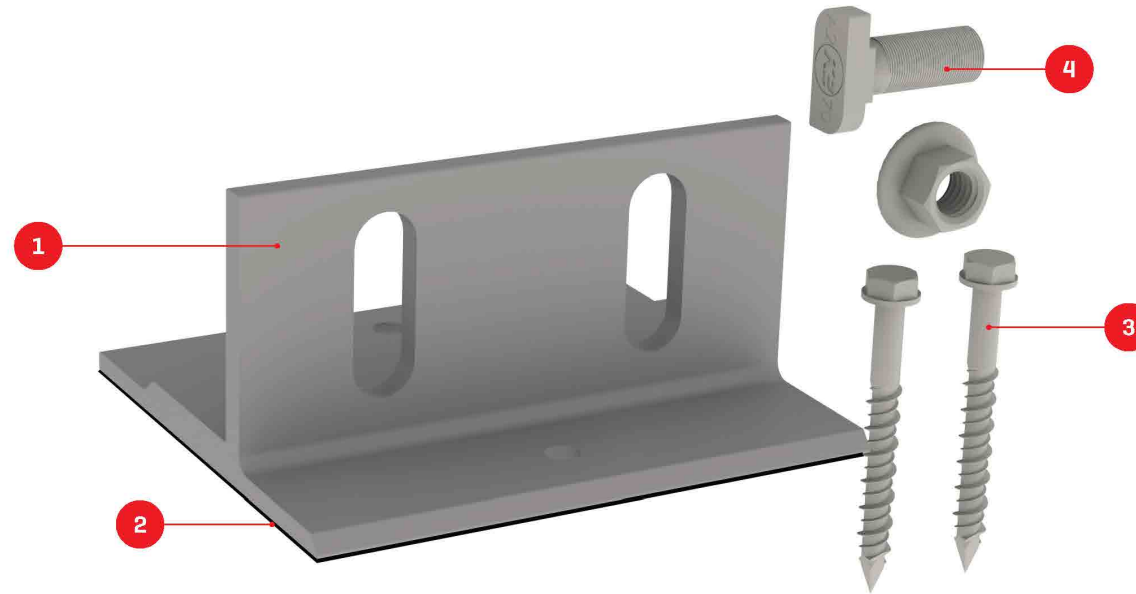
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SHEET NAME  
**EQUIPMENT SPECIFICATIONS**

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
**PV-15**

We support PV systems  
Formerly Everest Solar Systems



# Splice Foot X

## TECHNICAL SHEET

Item Number	Description	Part Number
1	Splice Foot X	4000113   Splice Foot X Kit, Mill
2	K2 Solar Seal Butyl Pad	
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



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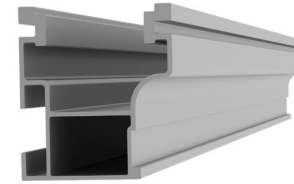
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# CROSSRAIL 44-X



## Mechanical Properties

CrossRail 44-X	
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi [260 MPa]
Yield Strength	34.8 ksi [240 MPa]
Weight	0.47 lbs/ft [0.699 kg/m]
Finish	Mill or Dark Anodized

## Sectional Properties

CrossRail 44-X	
S <sub>x</sub>	0.1490 in <sup>3</sup> [0.3785 cm <sup>3</sup> ]
S <sub>y</sub>	0.1450 in <sup>3</sup> [0.3683 cm <sup>3</sup> ]
A [X-Section]	0.4050 in <sup>2</sup> [1.0287 cm <sup>2</sup> ]

Units: [mm] in



Notes:

- ▶ Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-16
- ▶ UL2703 Listed System for Fire and Bonding



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SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-17**

## A. System Specifications and Ratings

- Maximum Voltage: 1,000 Volts
- Maximum Current: 120 Amps
- Allowable Wire: 14 AWG – 6 AWG
- Spacing: Please maintain a spacing of at least ½” between uninsulated live parts and fittings for conduit, armored cable, and uninsulated live parts of opposite polarity.
- Enclosure Rating: Type 3R
- Roof Slope Range: 2.5 – 12:12
- Max Side Wall Fitting Size: 1”
- Max Floor Pass-Through Fitting Size: 1”
- Ambient Operating Conditions: (-35°C) - (+75°C)
- Compliance:
  - JB-1.XL: UL1741
  - Approved wire connectors: must conform to UL1741
- System Marking: **Interek Symbol and File #5019942**
- Periodic Re-inspections: If re-inspections yield loose components, loose fasteners, or any corrosion between components, components that are found to be affected are to be replaced immediately.

**Table 1: Typical Wire Size, Torque Loads and Ratings**

	1 Conductor	2 Conductor	Torque				
			Type	NM	Inch Lbs	Voltage	Current
ABB ZS6 terminal block	10-24 awg	16-24 awg	Sol/Str	0.5-0.7	6.2-8.85	600V	30 amp
ABB ZS10 terminal block	6-24 awg	12-20 awg	Sol/Str	1.0-1.6	8.85-14.16	600V	40 amp
ABB ZS16 terminal block	4-24 awg	10-20 awg	Sol/Str	1.6-2.4	14.6-21.24	600V	60 amp
ABB M6/8 terminal block	8-22 awg		Sol/Str	.08-1	8.85	600V	50 amp
Ideal 452 Red WING-NUT Wire Connector	8-18 awg		Sol/Str			600V	
Ideal 451 Yellow WING-NUT Wire Connector	10-18 awg		Sol/Str			600V	
Ideal, In-Sure Push-In Connector Part #39	10-14 awg		Sol/Str			600V	
WAGO, 221-612	10-14 awg		Sol/Str			600V	
International Hydraulics 2S2/0	10-14 awg		Sol/Str	4	35		
	8 awg		Sol/Str	4.5	40		
Brumall 4-5,3	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		
Blackburn LL414	4-14 awg		Sol/Str				

**Table 2: Minimum wire-bending space for conductors through a wall opposite terminals in mm (inches)**

Wire size, AWG or	Wires per terminal (pole)			
	1	2	3	4 or More
kcmil (mm2)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
14-10 (2.1-5.3)	Not specified	-	-	-
8 (8.4)	38.1 (1-1/2)	-	-	-
6 (13.3)	50.8 (2)	-	-	-



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EQUIPMENT  
SPECIFICATIONS

SHEET SIZE

ANSI B  
11" X 17"

SHEET NUMBER

PV-18