

BUILDING CODES: 2017 NEC, AND 2018 NORTH CAROLINA RESIDENTIAL CODE

AYALA, JUAN PV SYSTEM
 67 FOLLY CT.
 LINDEN, NC, 28356
 JURISDICTION: HARNETT COUNTY
 UTILITY:DUKE ENERGY NC

GENERAL INFORMATION

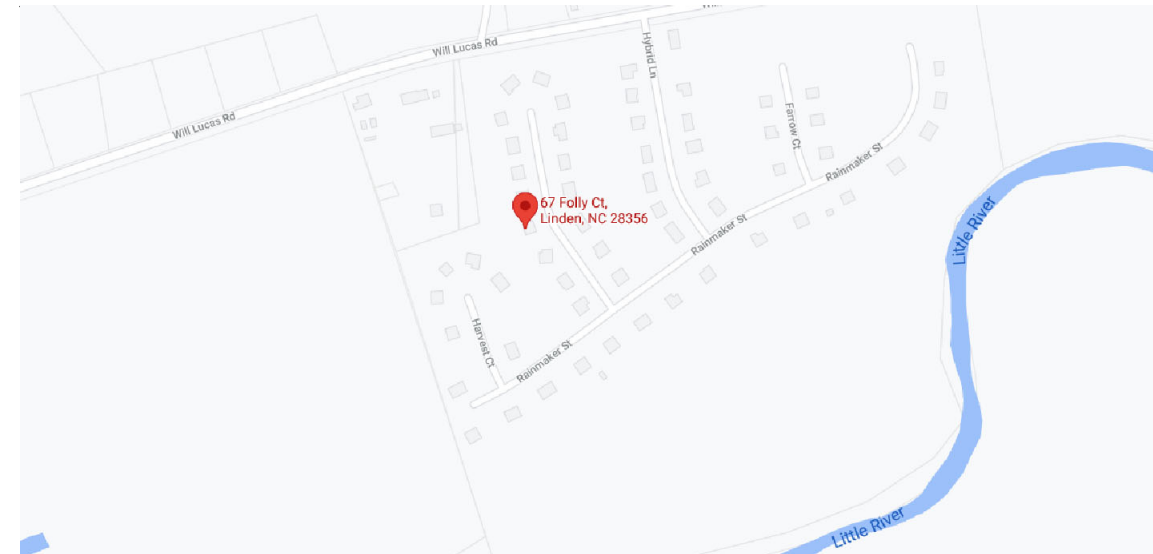
SYSTEM SIZE: 9.860 kW-DC-STC
 0.290 kW-AC
 ROOF PITCHED: 45 DEGREES
 INVERTER: (29) ENPHASE IQ7PLUS-72-2-US MICROINVERTERS
 MODULES: (29) SILFAB SIL-340 NL
 STRINGS: (1)x16, (1)x13 PARALLEL MODULE STRINGS
 ELECTRICAL SERVICE RATING: 200A
 PV SYSTEM OVERCURRENT RATING: 15A
 PV SYSTEM DISCONNECT SWITCH: EATON DG221URB (30A / 2P)
 ROOF TYPE: COMP
 ROOF FRAMING: MANUFACTURED/ENGINEERED TRUSS
 RACKING: EVEREST
 ATTACHMENT METHOD: MIN. 5/16" x 3 1/2 LAG SCREWS EA. STANDOFF

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VICINITY MAP

SCALE: NTS



AERIAL MAP

SCALE: NTS



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.



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 SEPERMITTING@TITANSOLARPOWER.COM
 (877) 997-7652

AYALA, JUAN RESIDENCE
 67 FOLLY CT, LINDEN, NC, 28356
 LAT:35.252418, LON:-78.852627
 TSP-77847

(29) SILFAB SIL-340 NL
 (29) ENPHASE IQ7PLUS-72-2-US
 9.860 kW DC SYSTEM SIZE
 0.290 kW AC SYSTEM SIZE

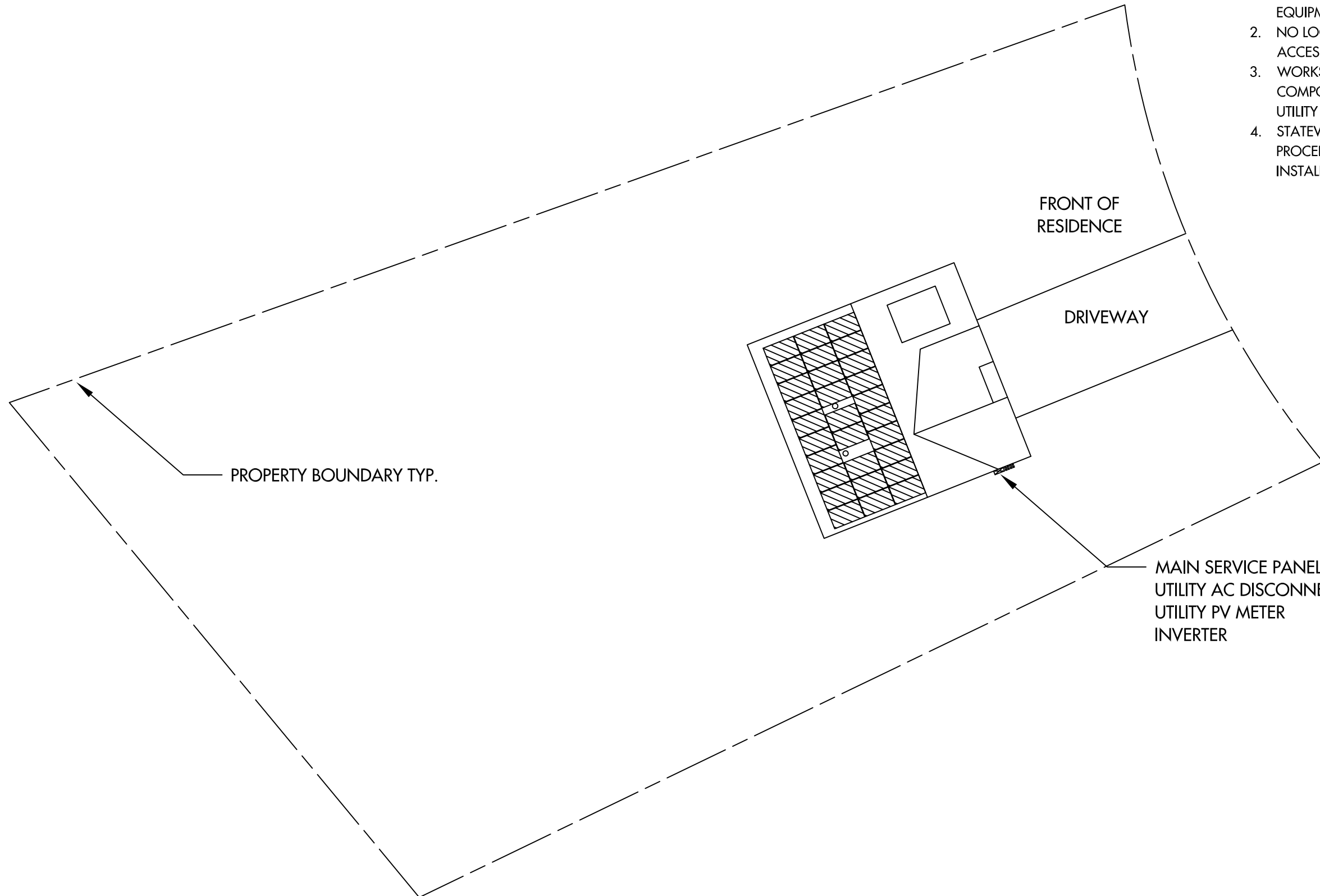
DATE: 5/12/2021
 REV:A
 DRAWN BY: DG

COVER PAGE
PV 1



PROJECT NOTES

1. UTILITY SHALL HAVE 24HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC COMPONENTS LOCATED AT SES EQUIPMENT
2. NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO SES EQUIPMENT
3. WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH UTILITY AND NEC REQUIREMENTS.
4. STATEWIDE UNIFORM REQUIREMENTS OF INSPECTION PROCEDURES FOR SOLAR PHOTOVOLTAIC SYSTEMS INSTALLED ON RESIDENTIAL ROOFTOPS.



NOTE: NO GATES - NO FENCES



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SCALE:0.004473
 DATE: 5/12/2021
 REV:A
 DRAWN BY: DG

SITE PLAN
PV 2

ARRAY

AR-01

QUANTITY: 29

MOUNTING TYPE: FLUSH

ARRAY TILT: 45°

AZIMUTH: 248°

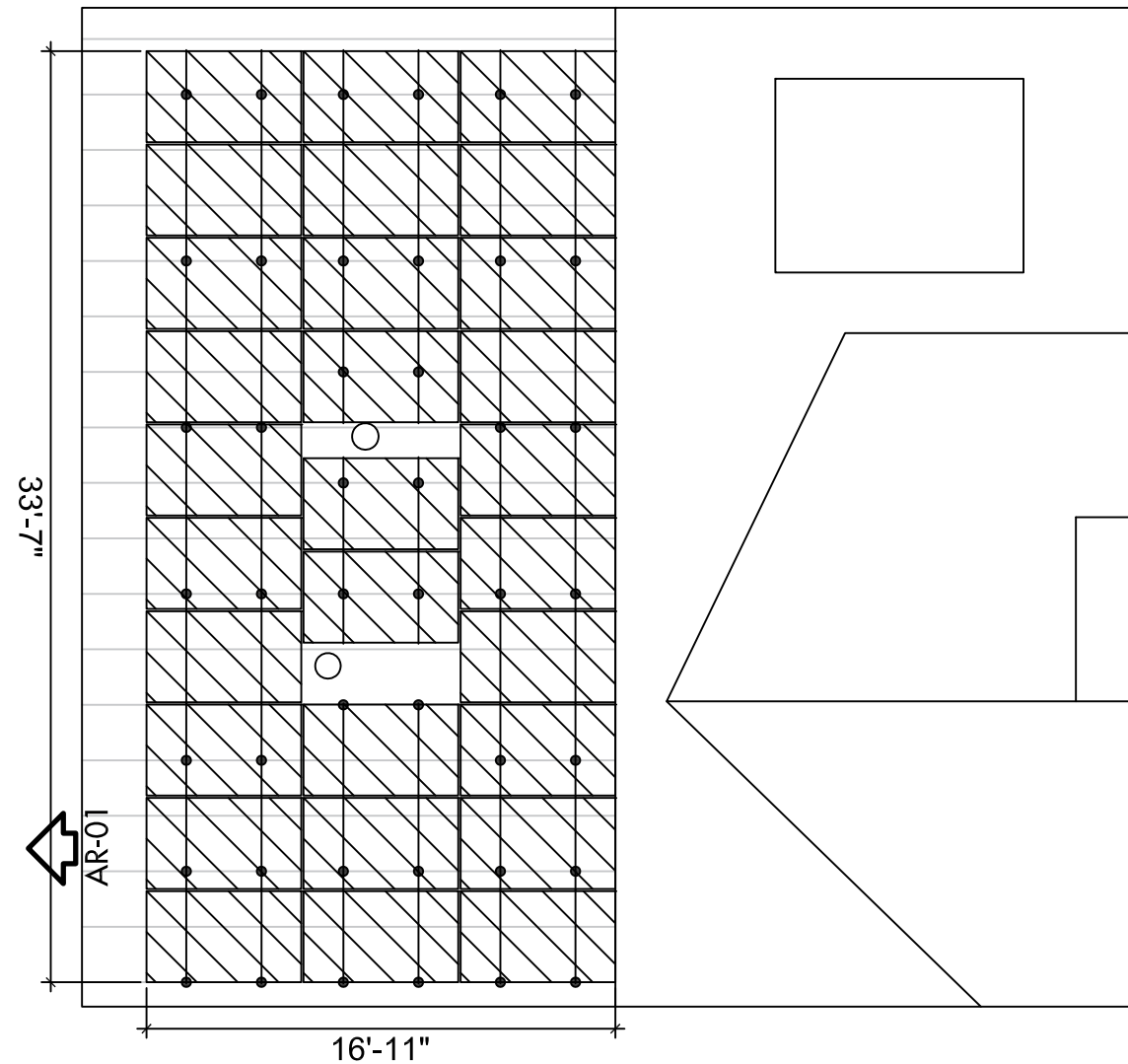
ATTACHMENT SPACING: 6'

ROOF TYPE: COMP



NOTES

- ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
- TOTAL ROOF AREA = 1385 SQ-FT
- TOTAL ARRAY AREA = 530.83 SQ-FT
- ARRAY COVERAGE = 38.33%



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SCALE: 0.012211
DATE: 5/12/2021
REV:A
DRAWN BY: DG

PV LAYOUT
PV 3

MODULE & RACKING INFORMATION

MODULE: SILFAB SIL-340 NL
MODULE WEIGHT: 42.99 LBS
MODULE DIMENSIONS: 66.9" x 39.4" x 1.5"
RACKING/RAIL: QUICKBOLT / EVEREST

ROOF & FRAMING INFORMATION

MATERIAL: COMP
RAFTER/TRUSS SIZE: 2" x 4"
RAFTER/TRUSS SPACING: 2'

ARRAY INFORMATION:

ARRAY 01: 29 MODULES

UPLIFT CALCULATION:

PANEL GROUP AREA: = MODULE AREA: 18.30
SQ.FT * MODULE QTY. 29 = 530.83 SQ.FT

TOTAL UPLIFT: = PANEL GROUP AREA: 530.83
SQ. FT. * WIND LOAD 30 PSF =
TOTAL LOAD 15924.99 LBS.

POINT LOAD CALCULATION:

ARRAY WEIGHT: MODULE WEIGHT (42.99
+3.5) * MODULE QTY. 29 = 1348.21 LBS / 44
MOUNTING POINTS = 30.64 LBS. PER
MOUNTING POINT

PULLOUT STRENGTH CALCULATION:

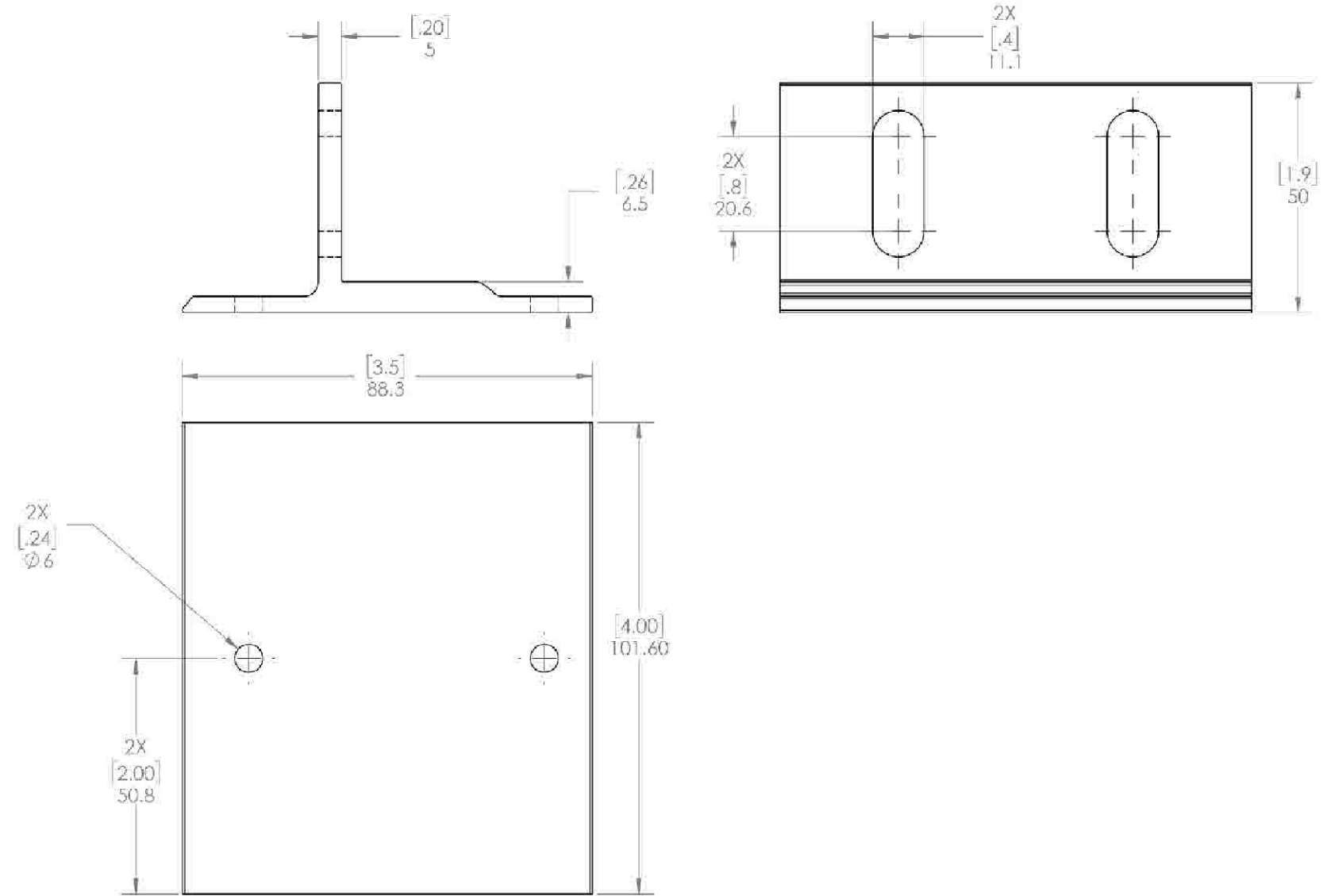
CONNECTOR TYPE: 5/16" LAG SCREW
(EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING
POINTS: 44 * 2.5 (EMBED DEPTH) * 210 LBS =
23100.00 LBS.

DISTRIBUTED LOAD CALCULATION:

ARRAY WEIGHT: 1348.21 LBS. / MODULE
GROUP AREA: 530.83 SQ. FT. = 2.54 PSF

MODULE & RACKING WEIGHT:

(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(46.49 LBS)*29 = 1348.21 LBS



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DETAILS
PV 4

PV MODULE

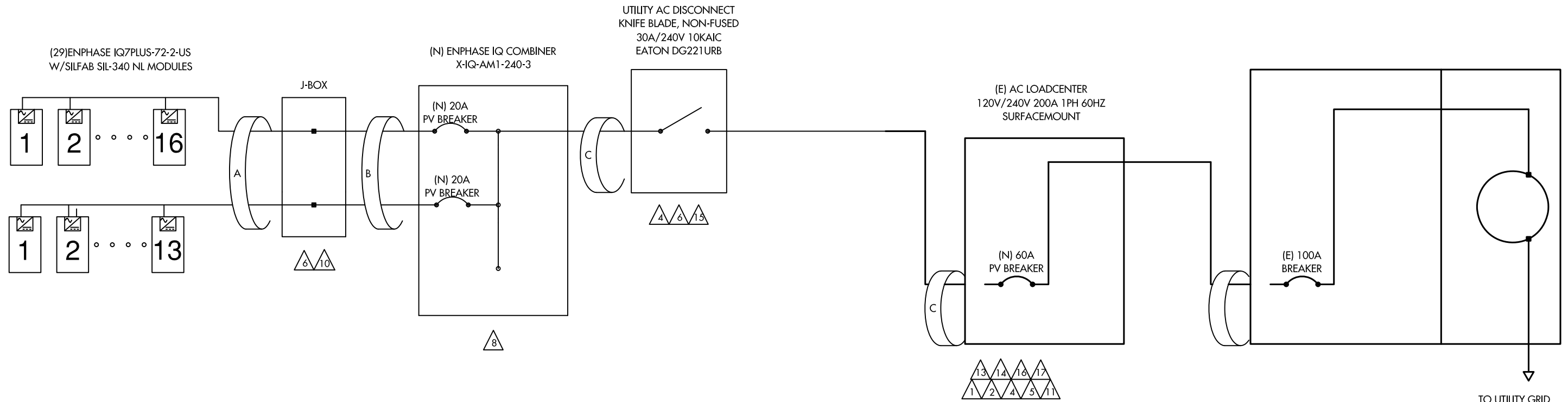
SILFAB SIL-340 NL
 W = 340W
 ISC = 10.5 ADC
 VOC = 40.9 VDC
 IMP = 10.1 ADC
 VMP = 33.7 VDC
 TVOC = -0.31% / °C

WIRE SCHEDULE

A - (4) #12 AWG 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



WIRE SIZE CALCULATIONS

TEMP CORRECTION FACTOR: 0.87 (109° AMBIENT)
 ROOF TOP TEMP CORRECTION FACTOR: 1 (109°)
 (2" ABOVE ROOFTOP / 0° TEMP ADDERS - AS OCCURS)
 (TEMP DATA TAKEN FROM ASHRAE 2% AVG HIGH TEMP)

DC WIRING
 CONDUIT FILL FACTOR = 0.8
 OPTIMIZER MAX. CURRENT = 18.75ADC (15A X 1.25)
 #10 - AWG CU. AMPACITY = 45.10A (55A X 1.0 X 0.87) FREE AIR
 #10 - AWG CU. AMPACITY = 32A (40A X 1 X 0.8) ROOFTOP CONDUIT

AC WIRING
 CONDUIT FILL FACTOR = 1 (3) CONDUCTORS
 MAX. INVERTER CURRENT = 1.21A (PER INVERTER SPECS)
 MIN. INVERTER OCP = 1.5125A (1.21A X 1.25)
 INVERTER OCP = 15A
 #8 - AWG CU AMPACITY = 47.85A (55A X 1.0 X 0.87)



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 DRAWN BY: DG

ONE LINE
PV 5

PV MODULE

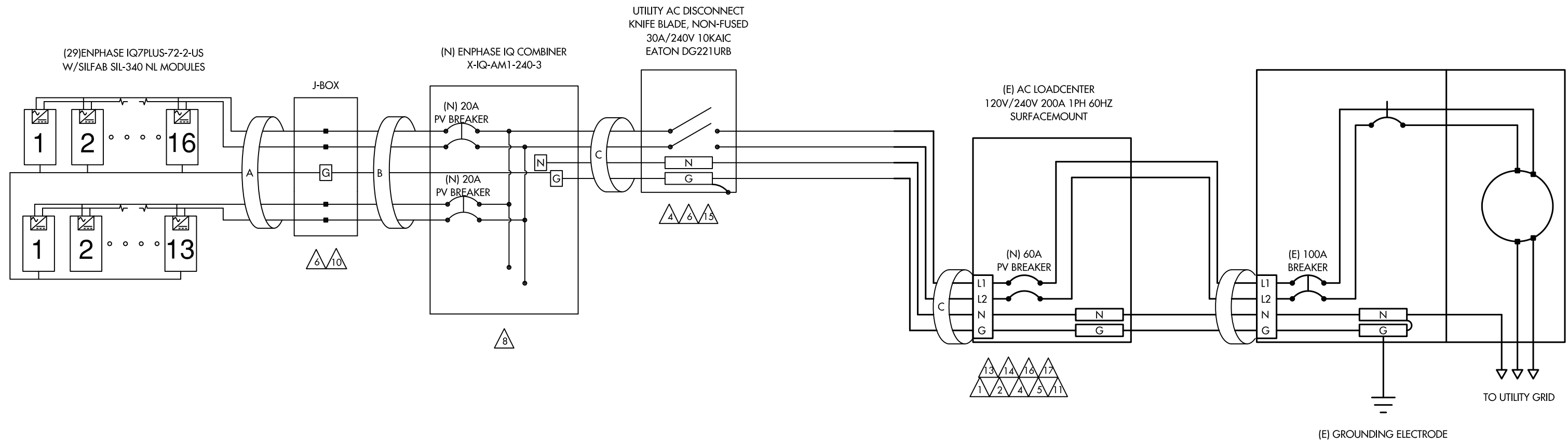
SILFAB SIL-340 NL
 W = 340W
 ISC = 10.5 ADC
 VOC = 40.9 VDC
 IMP = 10.1 ADC
 VMP = 33.7 VDC
 TVOC = -0.31% / °C

WIRE SCHEDULE

A - (4) #12 AWG 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



WIRE SIZE CALCULATIONS

TEMP CORRECTION FACTOR: 0.87 (109° AMBIENT)
 ROOF TOP TEMP CORRECTION FACTOR: 1 (109°)
 (2" ABOVE ROOFTOP / 0° TEMP ADDERS - AS OCCURS)
 (TEMP DATA TAKEN FROM ASHRAE 2% AVG HIGH TEMP)

AC WIRING
 CONDUIT FILL FACTOR = 1 (3) CONDUCTORS
 MAX. INVERTER CURRENT = 1.21A (PER INVERTER SPECS)
 MIN. INVERTER OCP = 1.5125A (1.21A X 1.25)
 INVERTER OCP = 15A
 #8 - AWG CU AMPACITY = 47.85A (55A X 1.0 X 0.87)

DC WIRING
 CONDUIT FILL FACTOR = 0.8
 OPTIMIZER MAX. CURRENT = 18.75ADC (15A X 1.25)
 #10 - AWG CU. AMPACITY = 45.10A (55A X 1.0 X 0.87) FREE AIR
 #10 - AWG CU. AMPACITY = 32A (40A X 1 X 0.8) ROOFTOP CONDUIT

TITAN SOLAR POWER
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 0.290 kW AC SYSTEM SIZE

DATE: 5/12/2021
 REV:A
 DRAWN BY: DG

THREE LINE
PV 6

1 **CAUTION**
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED
LOCATION: BACKFED BREAKER
CODE REF: NEC 705.12(4)

2 **WARNING**
ELECTRICAL SHOCK HAZARD
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION
INVERTER OUTPUT CURRENT
DEVICE. DO NOT RELOCATE THIS
OVERCURRENT DEVICE.
LOCATION: BACKFED BREAKER
CODE REF: 2017 NEC 705.12(2)(3)(b)

3 **WARNING**
ELECTRICAL SHOCK HAZARD
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION
A GENERATION SOURCE 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: 1.21AAC
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)

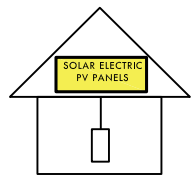
7 **PHOTOVOLTAIC
SYSTEM METER**
LOCATION: DEDICATED KWH METER
CODE REF: NEC 690.4(B) UTILITY

8 **WARNING**
ELECTRICAL SHOCK HAZARD
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION
PHOTOVOLTAIC COMBINER PANEL.
DO NOT ADD LOADS
LOCATION: AC COMBINER PANEL
CODE REF: NEC 690.13(B)

9 **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
CODE REF: UTILITY

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

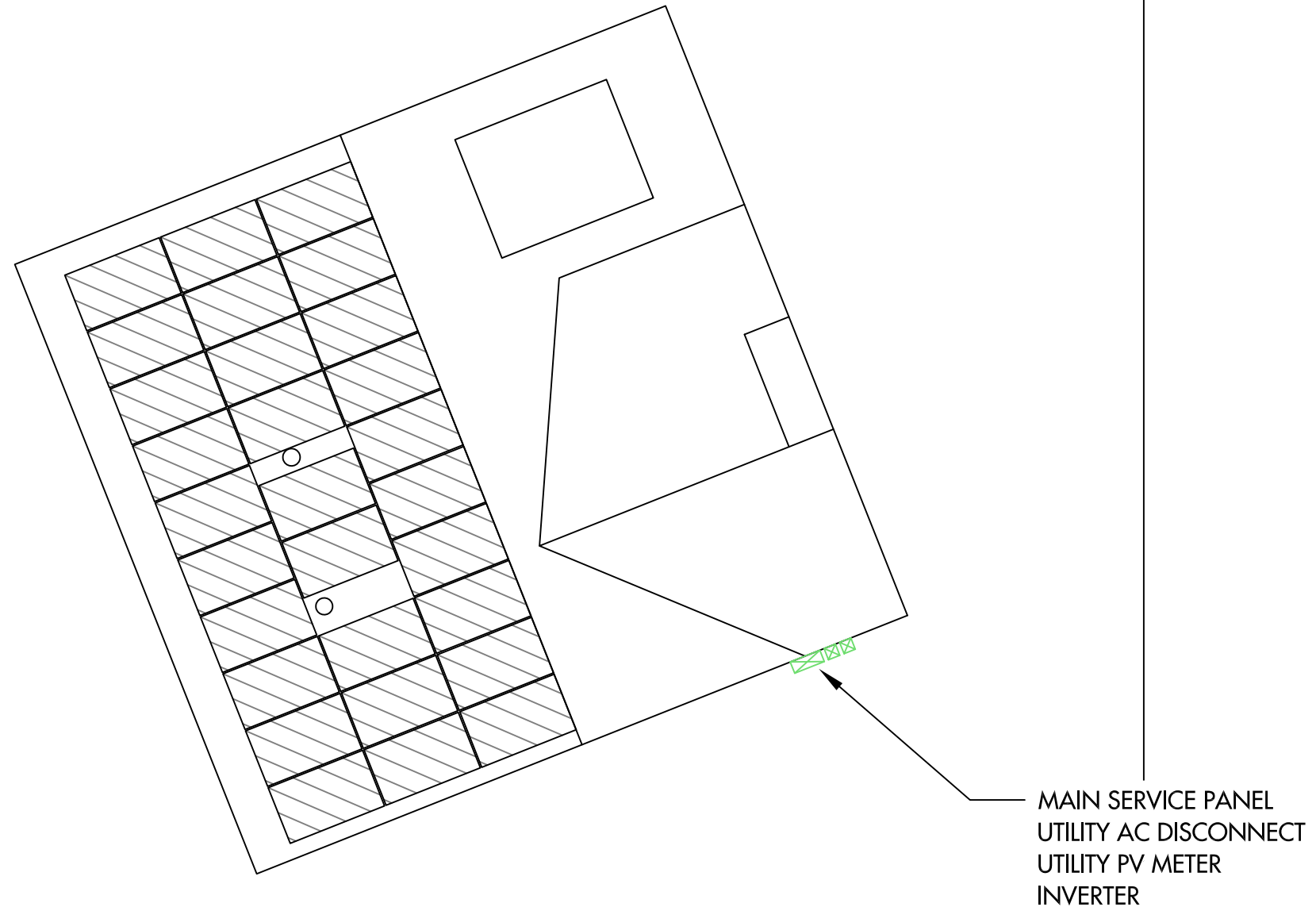
16 **PV SOLAR BREAKER**
DO NOT RELOCATE THIS
OVERCURRENT DEVICE
LOCATION: MAIN PANEL:(EXTERIOR)
PV BREAKER: (INTERIOR)
CODE REF: NEC 705.12(B)(2)(3)(B)

17 **WARNING**
TURN OFF PHOTOVOLTAIC AC
DISCONNECT PRIOR TO
WORKING INSIDE PANEL
LOCATION: MAIN PANEL:(EXTERIOR)
CODE REF: OSHA 1910.145



CAUTION

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



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



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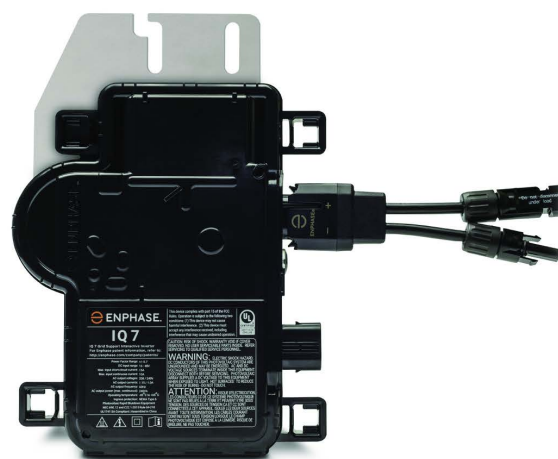
PLACARD
PV 8

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell/120 half-cell and 72-cell/144 half-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell/144 half-cell modules.



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings ¹	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell/120 half-cell PV modules only		60-cell/120 half-cell and 72-cell/144 half-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range ²	240 V /	208 V /	240 V /	208 V /
	211-264 V	183-229 V	211-264 V	183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit ³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
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			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.

2. Nominal voltage range can be extended beyond nominal if required by the utility.

3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com



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 TSP-77847

(29) SILFAB SIL-340 NL
 (29) ENPHASE IQ7PLUS-72-2-US
 9.860 kW DC SYSTEM SIZE
 0.290 kW AC SYSTEM SIZE

DATE: 5/12/2021
 REV:A
 DRAWN BY: DG

EQUIPMENT SPECIFICATIONS
PV 9

Enphase IQ Combiner (X-IQ-AM1-240-B)

The **Enphase IQ Combiner™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular

Simple

- Three pre-installed 20 A / 240 VAC circuit breakers
- Provides production metering and optional consumption monitoring.

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner

MODEL NUMBER

IQ Combiner X-IQ-AM1-240-B	IQ Combiner with Enphase IQ Envoy™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%).
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ACCESSORIES (order separately)

Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan)	Plug and play industrial grade cellular modem with data plan 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.)
Consumption Monitoring CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
Solar branch circuit breakers	Three 2-pole 20 A/240 VAC DIN rail-mounted breakers
Maximum system voltage	240 VAC
Rated output current	48 A
Rated input current, each input	16 A
Maximum fuse/circuit breaker rating (output)	60 A
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy

MECHANICAL DATA

Dimensions (WxHxD)	38.0 x 38.7 x 20.3 cm (15.0" x 15.3" x 8.0")
Weight	5.1 kg (11.2 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Vented, natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire size	14 to 6 AWG copper conductors for branch inputs. 14 to 4 AWG copper conductors for combined output. Follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable - not included
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) - not included

COMPLIANCE

Compliance, Combiner	UL 1741
Compliance, IQ Envoy	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 Metering: ANSI C12.20 accuracy class 0.5

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2017-08-17



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EQUIPMENT
SPECIFICATIONS
PV 10

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




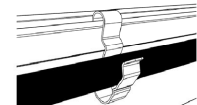


Enphase Q Cable Accessories

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)

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EQUIPMENT
 SPECIFICATIONS
PV 11



TITAN

SOLAR PANEL

60 Cell
Monocrystalline
PV Module



CHUBB
* Chubb provides error and omission insurance to Silfab Solar Inc.

SIL-340 NL
POWERED BY
SILFAB SOLAR



INDUSTRY LEADING WARRANTY

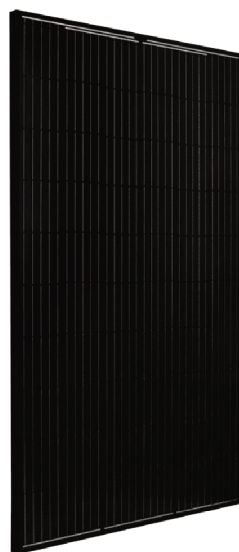
The Titan Solar Panel is manufactured by Silfab Solar and includes an industry leading 25-year product workmanship and 30-year performance warranty.

MAXIMUM ENERGY OUTPUT

Leveraging over 35+ years of worldwide experience in the solar industry, Silfab is dedicated to superior manufacturing processes and innovations such as Bifacial and Back Contact technologies, to ensure our partners, such as Titan Solar have the latest in solar innovation.

NORTH AMERICAN QUALITY

Silfab is the leading automated solar module manufacturer in North America. Utilizing premium quality materials and strict quality control management to deliver the highest efficiency, premium quality PV modules 100% made in North America.



BAA / ARRA COMPLIANT

Panels are designed and manufactured to meet Buy American Act Compliance. The US State Department, US Military and FAA have all utilized Silfab panels in their solar installations.

LIGHT AND DURABLE

Engineered to accommodate high wind load conditions for test loads validated up to 4000Pa uplift. The light-weight frame is exclusively designed for wide-ranging racking compatibility and durability.

QUALITY MATTERS

Total automation ensures strict quality controls during the entire manufacturing process at ISO certified facilities.

DOMESTIC PRODUCTION

Silfab Solar manufactures PV modules in two automated locations within North America. Our 500+ North American team is ready to help Titan Solar win the hearts and minds of customers, providing customer service and product delivery that is direct, efficient and local.

AESTHETICALLY PLEASING

All black sleek design, ideal for high-profile residential or commercial applications.

PID RESISTANT

PID Resistant due to advanced cell technology and material selection. In accordance to IEC 62804-1.

Electrical Specifications	SIL-340 NL mono PERC		
Test Conditions	STC	NOCT	
Module Power (Pmax)	Wp	340	241
Maximum power voltage (Vpmax)	V	33.7	30.4
Maximum power current (Ipmax)	A	10.1	7.9
Open circuit voltage (Voc)	V	40.9	37.1
Short circuit current (Isc)	A	10.5	8.3
Module efficiency	%	20.0	17.7
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	20	
Power Tolerance	Wp	+/- 3%	

Measurement conditions: STC 1000 W/m² • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
* Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by +/- 3%.

Temperature Ratings	SIL-340 NL mono PERC	
Temperature Coefficient Isc	0.064 %/°C	
Temperature Coefficient Voc	-0.28 %/°C	
Temperature Coefficient Pmax	-0.36 %/°C	
NOCT (± 2°C)	46 °C	
Operating temperature	-40/+85 °C	

Mechanical Properties and Components	SIL-340 NL mono PERC	
Module weight	41 ± 0.4 lbs	
Dimensions (H x L x D)	66.9 in x 39.4 in x 1.5 in	
Maximum surface load (wind/snow)*	83.5/112.8 lb/ft ²	
Hail impact resistance	ø 1 in at 51.6 mph	
Cells	60 - Si mono PERC - 5 busbar, 6.25 x 6.25 Inch	
Glass	0.126 in high transmittance, tempered, DSM anti-reflective coating	
Cables and connectors (refer to installation manual)	47.2 in, ø 0.22 in, MC4 from Staubli	
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV backsheet	
Frame	Anodized Aluminum (Black)	
Bypass diodes	3 diodes-30SQ045T (45V max DC blocking voltage, 30A max forward rectified current)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP67 rated	

Warranties	SIL-340 NL mono PERC			
Module product workmanship warranty	25 years**			
Linear power performance guarantee	30 years			
	≥ 97.1% end 1 st year	≥ 91.6% end 12 th year	≥ 85.1% end 25 th year	≥ 82.6% end 30 th year

Certifications	SIL-340 NL mono PERC	
Product	ULC ORD C1703, UL1703, CEC listed***, UL 61215-1/-1-1/-2, UL 61730-1/-2, IEC 61215-1/-1-1/-2***, IEC 61730-1/-2***, CSA C22.2#61730-1/-2***, IEC 62716 Ammonia Corrosion; IEC61701:2011 Salt Mist Corrosion Certified, UL Fire Rating: Type 2 ISO9001:2015	

Factory
 ■ Modules Per Pallet: 26
 ■ Pallets Per Truck: 36
 ■ Modules Per Truck: 936

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.

**12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at www.silfabsolar.com.

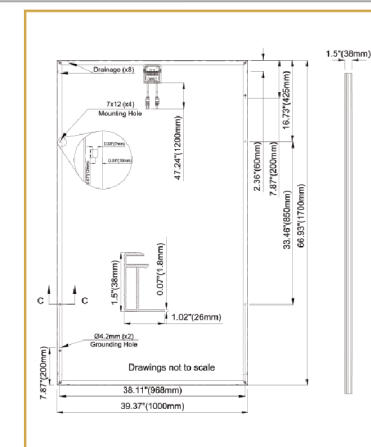
***September 2020 expected completion date.

PAN files generated from 3rd party performance data are available for download at: www.silfabsolar.com/downloads

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EQUIPMENT
SPECIFICATIONS
PV 12

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

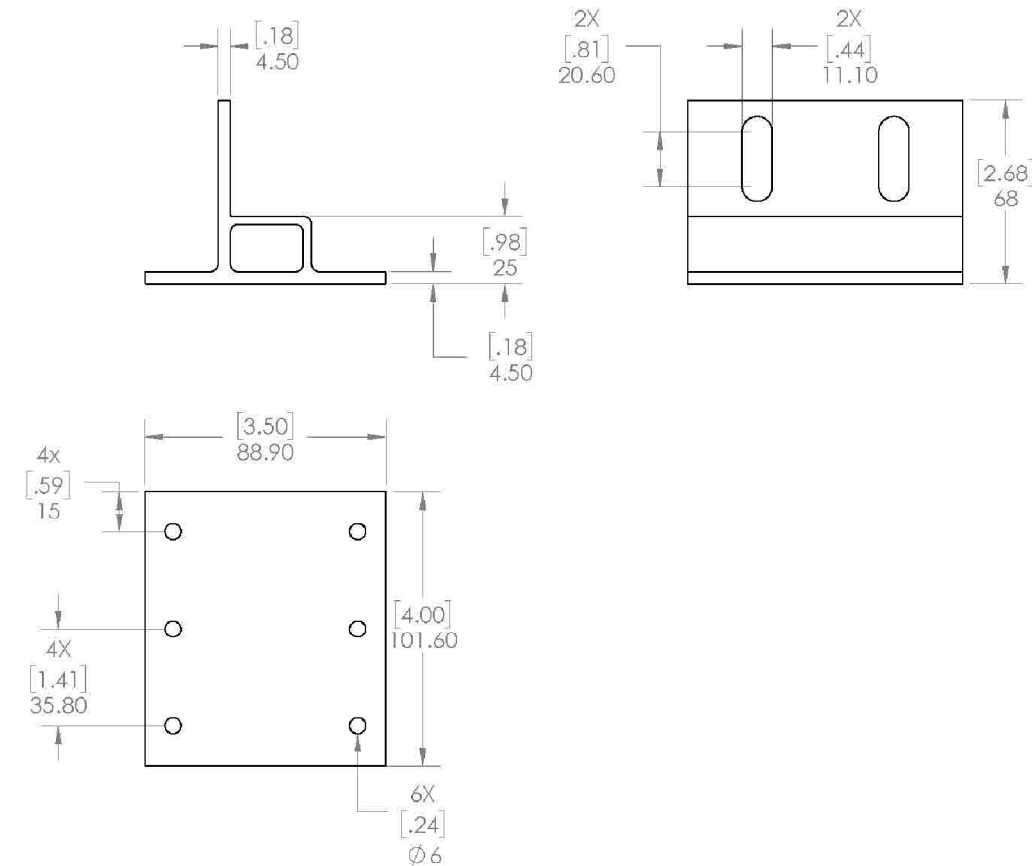
Splice Foot X	
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

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Units: [in] mm



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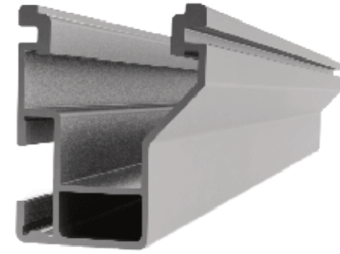
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EQUIPMENT
SPECIFICATIONS
PV 13

CrossRail 48-X

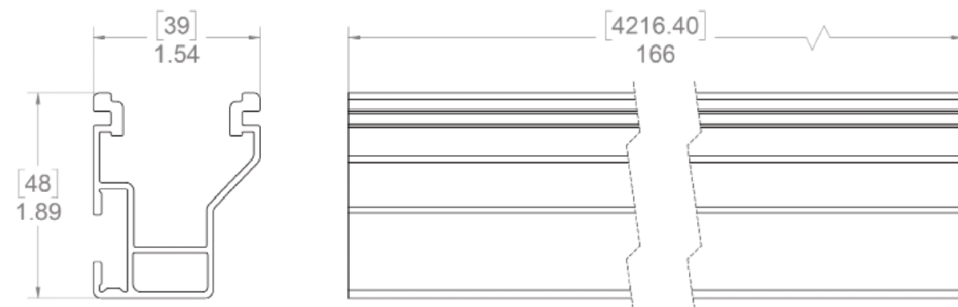


Mechanical Properties

CrossRail 48-X	
Material	6000 Series Aluminum
Ultimate Tensile Strength	37.7 ksi (260 MPa)
Yield Strength	34.8 ksi (240 MPa)
Weight	0.56 lbs/ft (0.833 kg/m)
Finish	Mill or Dark Anodized

Section Properties

CrossRail 48-X	
S _x	0.1980 in ³ (3.261 cm ³)
S _y	0.1510 in ³ (2.507 cm ³)
A (X-Section)	0.4650 in ² (3.013 cm ²)



Dimensions in [mm] Inches

Notes:

- ▶ Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-10
- ▶ UL2703 Listed System for Fire and Bonding

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PV 14