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

HOWARD JR, WILLIAM PV SYSTEM
698 HIGHGROVE DR.
SPRING LAKE, NC, 28390
JURISDICTION: HARNETT COUNTY
UTILITY:SOUTH RIVER ELECTRIC

GENERAL INFORMATION

SYSTEM SIZE:	23.400 kW-DC-STC 19.140 kW-AC
ROOF PITCHED:	40 DEGREES
INVERTER:	(65) ENPHASE IQ7PLUS-72-2-US MICROINVERTERS
MODULES:	(65) LG360N1K-E6
STRINGS:	INV 1: (3)x11 PARALLEL MODULE STRINGS INV 2: (2)x11, (1)x10 MODULE SERIES STRINGS
ELECTRICAL SERVICE RATING:	200A
PV SYSTEM OVERCURRENT RATING:	100A
PV SYSTEM DISCONNECT SWITCH:	EATON DG223NRB (100A / 2P)
ROOF TYPE:	COMP
ROOF FRAMING:	MANUFACTURED/ENGINEERED TRUSS
RACKING:	EVEREST
ATTACHMENT METHOD:	MIN. 5/16" x 3 ½ LAG SCREWS EA. STANDOFF

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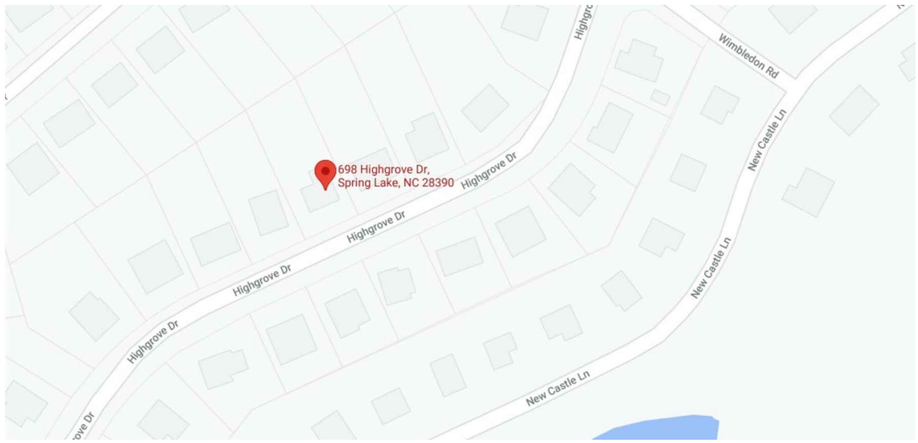
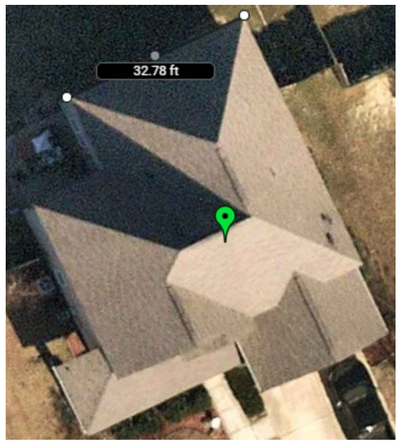
VICINITY MAP

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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LAT:35.236394, LON:-78.979042
TSP-88197

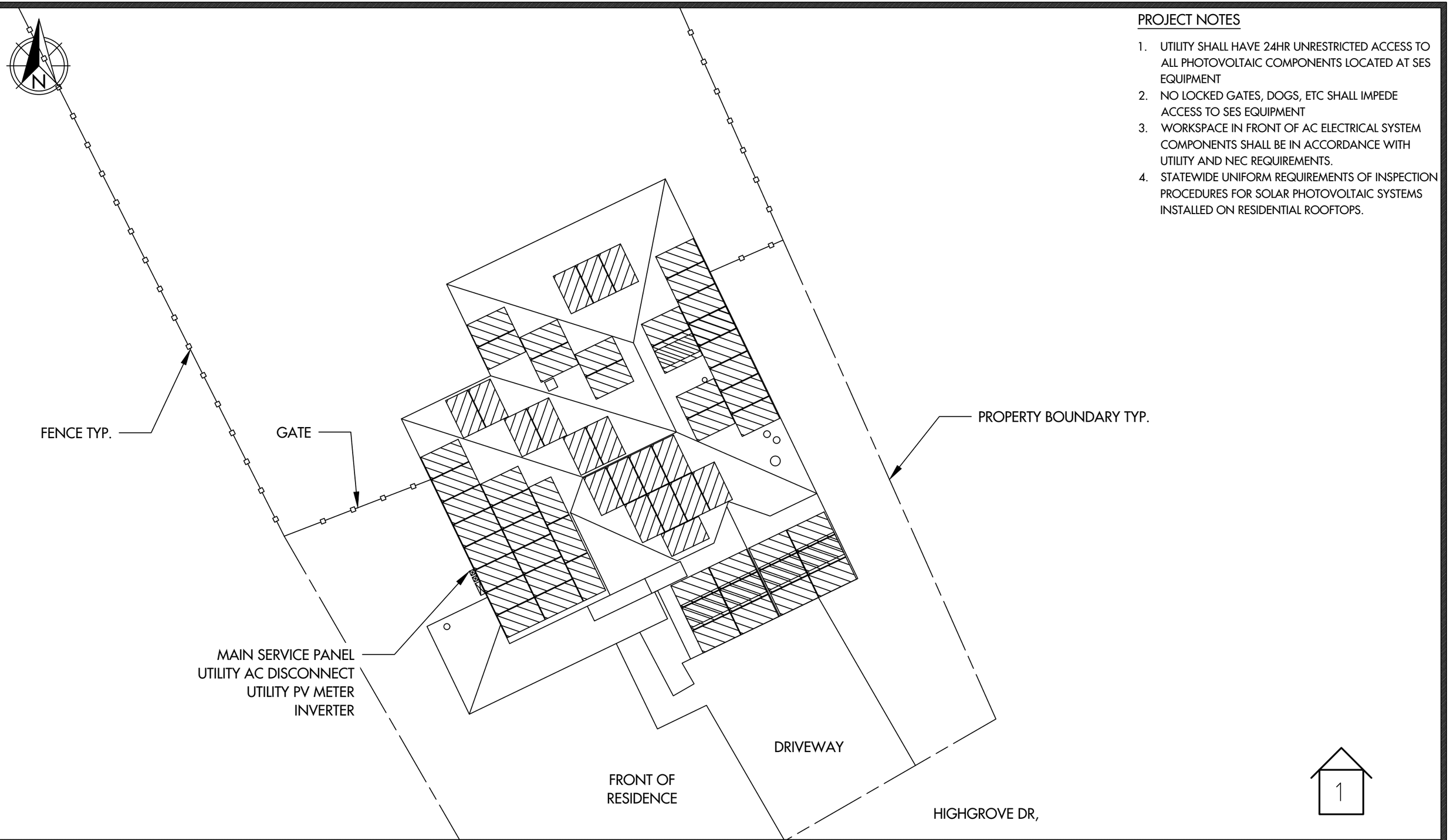
(65) LG360N1K-E6
(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

DATE: 6/29/2021
REV:A
DRAWN BY: JJ

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.



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(65) LG360N1K-E6
(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

SCALE:0.006993
DATE: 6/29/2021
REV:A
DRAWN BY: JJ

SITE PLAN
PV 2

ARRAY

AR-01

QUANTITY: 17
MOUNTING TYPE: FLUSH
ARRAY TILT: 40°
AZIMUTH: 244°
ATTACHMENT SPACING: 6'
ROOF TYPE: COMP

AR-02

QUANTITY: 6
MOUNTING TYPE: FLUSH
ARRAY TILT: 40°
AZIMUTH: 244°
ATTACHMENT SPACING: 6'
ROOF TYPE: COMP

AR-03

QUANTITY:18
MOUNTING TYPE: FLUSH
ARRAY TILT: 40°
AZIMUTH: 64°
ATTACHMENT SPACING: 6'
ROOF TYPE: COMP

AR-04

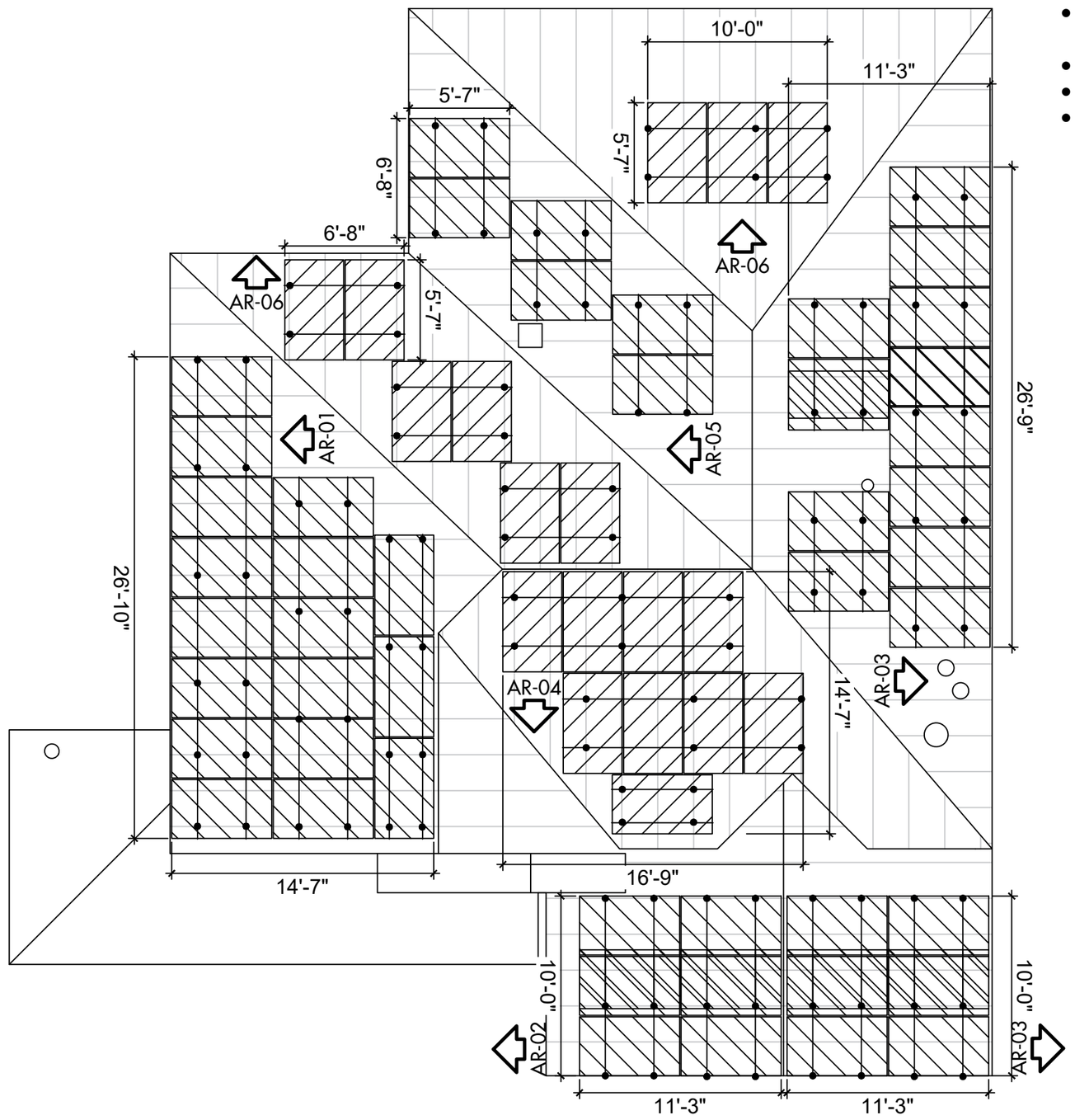
QUANTITY: 9
MOUNTING TYPE: FLUSH
ARRAY TILT: 40°
AZIMUTH: 154°
ATTACHMENT SPACING: 6'
ROOF TYPE: COMP

AR-05

QUANTITY: 6
MOUNTING TYPE: FLUSH
ARRAY TILT: 40°
AZIMUTH: 244°
ATTACHMENT SPACING: 6'
ROOF TYPE: COMP

AR-06

QUANTITY: 9
MOUNTING TYPE: FLUSH
ARRAY TILT: 40°
AZIMUTH: 274°
ATTACHMENT SPACING: 6'
ROOF TYPE: COMP



NOTES

- ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
- TOTAL ROOF AREA = 2529 SQ-FT
- TOTAL ARRAY AREA = 1288.08 SQ-FT
- ARRAY COVERAGE = 50.93%

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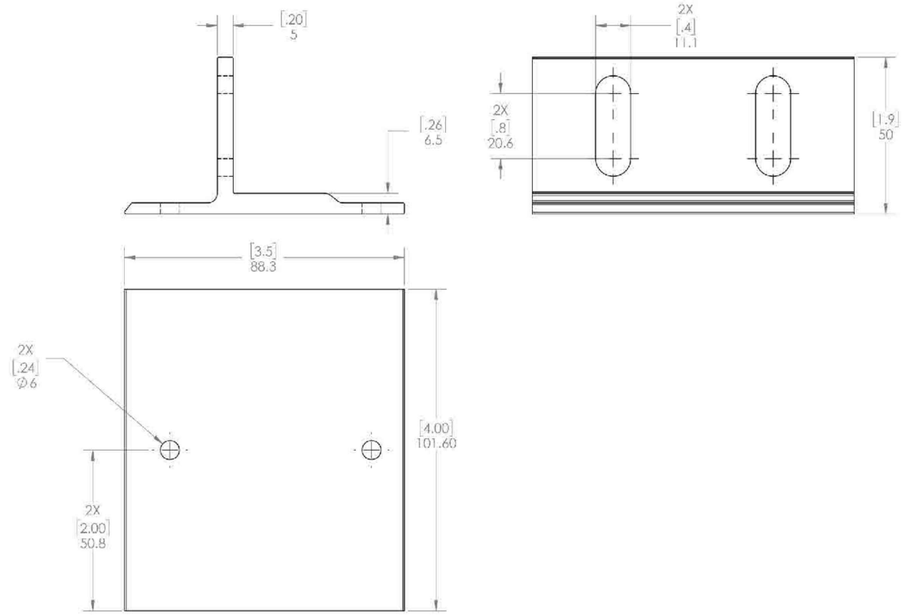
(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

SCALE: 0.011966
DATE: 6/29/2021
REV:A
DRAWN BY: JJ

PV LAYOUT
PV 3

MODULE & RACKING INFORMATION
MODULE: LG360N1K-E6
MODULE WEIGHT: 40.78 LBS
MODULE DIMENSIONS: 69.6" x 41" x1.5"
RACKING/RAIL: QUICKBOLT / EVEREST

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



ARRAY INFORMATION:

ARRAY 01: 17 MODULES
UPLIFT CALCULATION:
PANEL GROUP AREA: = MODULE AREA: 19.82 SQ.FT * MODULE QTY. 17 = 336.88 SQ.FT

TOTAL UPLIFT: = PANEL GROUP AREA:336.88 SQ. FT. * WIND LOAD 30 PSF = TOTAL LOAD 10106.50 LBS.

POINT LOAD CALCULATION:
ARRAY WEIGHT: MODULE WEIGHT (40.78 +3.5) * MODULE QTY.17 = 752.76 LBS / 28 MOUNTING POINTS = 26.88 LBS. PER MOUNTING POINT

PULLOUT STRENGTH CALCULATION:
CONNECTOR TYPE: 5/16" LAG SCREW (EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING POINTS: 28 * 2.5 (EMBED DEPTH) * 210 LBS = 14700.00 LBS.

DISTRIBUTED LOAD CALCULATION:
ARRAY WEIGHT: 752.76 LBS. / MODULE GROUP AREA: 336.88 SQ. FT. = 2.23 PSF

MODULE & RACKING WEIGHT:
(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(44.28 LBS)*17 = 752.76 LBS

ARRAY 02: 6 MODULES
UPLIFT CALCULATION:
PANEL GROUP AREA: = MODULE AREA: 19.82 SQ.FT * MODULE QTY. 6 = 118.90 SQ.FT
TOTAL UPLIFT: = PANEL GROUP AREA:118.90 SQ. FT. * WIND LOAD 30 PSF = TOTAL LOAD 3567.00 LBS.

POINT LOAD CALCULATION:
ARRAY WEIGHT: MODULE WEIGHT (40.78 +3.5) * MODULE QTY.6 = 265.68 LBS / 12 MOUNTING POINTS = 22.14 LBS. PER MOUNTING POINT

PULLOUT STRENGTH CALCULATION:
CONNECTOR TYPE: 5/16" LAG SCREW (EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING POINTS: 12 * 2.5 (EMBED DEPTH) * 210 LBS = 6300.00 LBS.

DISTRIBUTED LOAD CALCULATION:
ARRAY WEIGHT: 265.68 LBS. / MODULE GROUP AREA: 118.90 SQ. FT. = 2.23 PSF

MODULE & RACKING WEIGHT:
(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(44.28 LBS)*6 = 265.68 LBS

ARRAY 03: 18 MODULES
UPLIFT CALCULATION:
PANEL GROUP AREA: = MODULE AREA: 19.82 SQ.FT * MODULE QTY. 18 = 19.82 SQ.FT
TOTAL UPLIFT: = PANEL GROUP AREA:356.70 SQ. FT. * WIND LOAD 30 PSF = TOTAL LOAD 10701.00 LBS.

POINT LOAD CALCULATION:
ARRAY WEIGHT: MODULE WEIGHT (40.78 +3.5) * MODULE QTY.18 = 44.28 LBS / 30 MOUNTING POINTS = 26.57 LBS. PER MOUNTING POINT

PULLOUT STRENGTH CALCULATION:
CONNECTOR TYPE: 5/16" LAG SCREW (EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING POINTS: 30 * 2.5 (EMBED DEPTH) * 210 LBS = 15750.00 LBS.

DISTRIBUTED LOAD CALCULATION:
ARRAY WEIGHT: 797.04 LBS. / MODULE GROUP AREA: 356.70 SQ. FT. = 2.23 PSF

MODULE & RACKING WEIGHT:
(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(44.28 LBS)*18 = 797.04 LBS

ARRAY 04: 9 MODULES
UPLIFT CALCULATION:
PANEL GROUP AREA: = MODULE AREA: 19.82 SQ.FT * MODULE QTY. 9 = 178.35 SQ.FT
TOTAL UPLIFT: = PANEL GROUP AREA:178.35 SQ. FT. * WIND LOAD 30 PSF = TOTAL LOAD 5350.50 LBS.

POINT LOAD CALCULATION:
ARRAY WEIGHT: MODULE WEIGHT (40.78 +3.5) * MODULE QTY.9 = 398.52 LBS / 16 MOUNTING POINTS = 24.91 LBS. PER MOUNTING POINT

PULLOUT STRENGTH CALCULATION:
CONNECTOR TYPE: 5/16" LAG SCREW (EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING POINTS: 16 * 2.5 (EMBED DEPTH) * 210 LBS = 8400.00 LBS.

DISTRIBUTED LOAD CALCULATION:
ARRAY WEIGHT: 398.52 LBS. / MODULE GROUP AREA: 178.35 SQ. FT. = 2.23 PSF

MODULE & RACKING WEIGHT:
(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(44.28 LBS)*9 = 398.52 LBS

ARRAY 05: 6 MODULES
UPLIFT CALCULATION:
PANEL GROUP AREA: = MODULE AREA: 19.82 SQ.FT * MODULE QTY. 6 = 118.90 SQ.FT
TOTAL UPLIFT: = PANEL GROUP AREA:118.90 SQ. FT. * WIND LOAD 30 PSF = TOTAL LOAD 3567.00 LBS.

POINT LOAD CALCULATION:
ARRAY WEIGHT: MODULE WEIGHT (40.78 +3.5) * MODULE QTY.6 = 265.68 LBS / 12 MOUNTING POINTS = 22.14 LBS. PER MOUNTING POINT

PULLOUT STRENGTH CALCULATION:
CONNECTOR TYPE: 5/16" LAG SCREW (EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING POINTS: 12 * 2.5 (EMBED DEPTH) * 210 LBS = 6300.00 LBS.

DISTRIBUTED LOAD CALCULATION:
ARRAY WEIGHT: 265.68 LBS. / MODULE GROUP AREA: 118.90 SQ. FT. = 2.23 PSF

MODULE & RACKING WEIGHT:
(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(44.28 LBS)*6 = 265.68 LBS

ARRAY 06: 9 MODULES
UPLIFT CALCULATION:
PANEL GROUP AREA: = MODULE AREA: 19.82 SQ.FT * MODULE QTY. 9 = 178.35 SQ.FT
TOTAL UPLIFT: = PANEL GROUP AREA:178.35 SQ. FT. * WIND LOAD 30 PSF = TOTAL LOAD 5350.50 LBS.

POINT LOAD CALCULATION:
ARRAY WEIGHT: MODULE WEIGHT (40.78 +3.5) * MODULE QTY.9 = 398.52 LBS / 18 MOUNTING POINTS = 22.14 LBS. PER MOUNTING POINT

PULLOUT STRENGTH CALCULATION:
CONNECTOR TYPE: 5/16" LAG SCREW (EMBED MIN. 2.5")
PULLOUT STRENGTH: = OF MOUNTING POINTS: 18 * 2.5 (EMBED DEPTH) * 210 LBS = 9450.00 LBS.

DISTRIBUTED LOAD CALCULATION:
ARRAY WEIGHT: 398.52 LBS. / MODULE GROUP AREA: 178.35 SQ. FT. = 2.23 PSF

MODULE & RACKING WEIGHT:
(MODULE WEIGHT + 3.5LBS) * MODULE QTY.
(44.28 LBS)*9 = 398.52 LBS

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(65) LG360N1K-E6
(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

DATE: 6/29/2021
REV:A
DRAWN BY: JJ

DETAILS
PV 4

PV MODULE

LG360N1K-E6

W	=	360W
ISC	=	8.89 ADC
VOC	=	38.2 VDC
IMP	=	8.42 ADC
VMP	=	31.9 VDC
TVOC	=	-0.26% / °C

WIRE SCHEDULE

A - (6) #12 AWG ENPHASE Q CABLE (HR)
- (1) #10 AWG-CU BARE COPPER WIRE (GND) IN FREE AIR

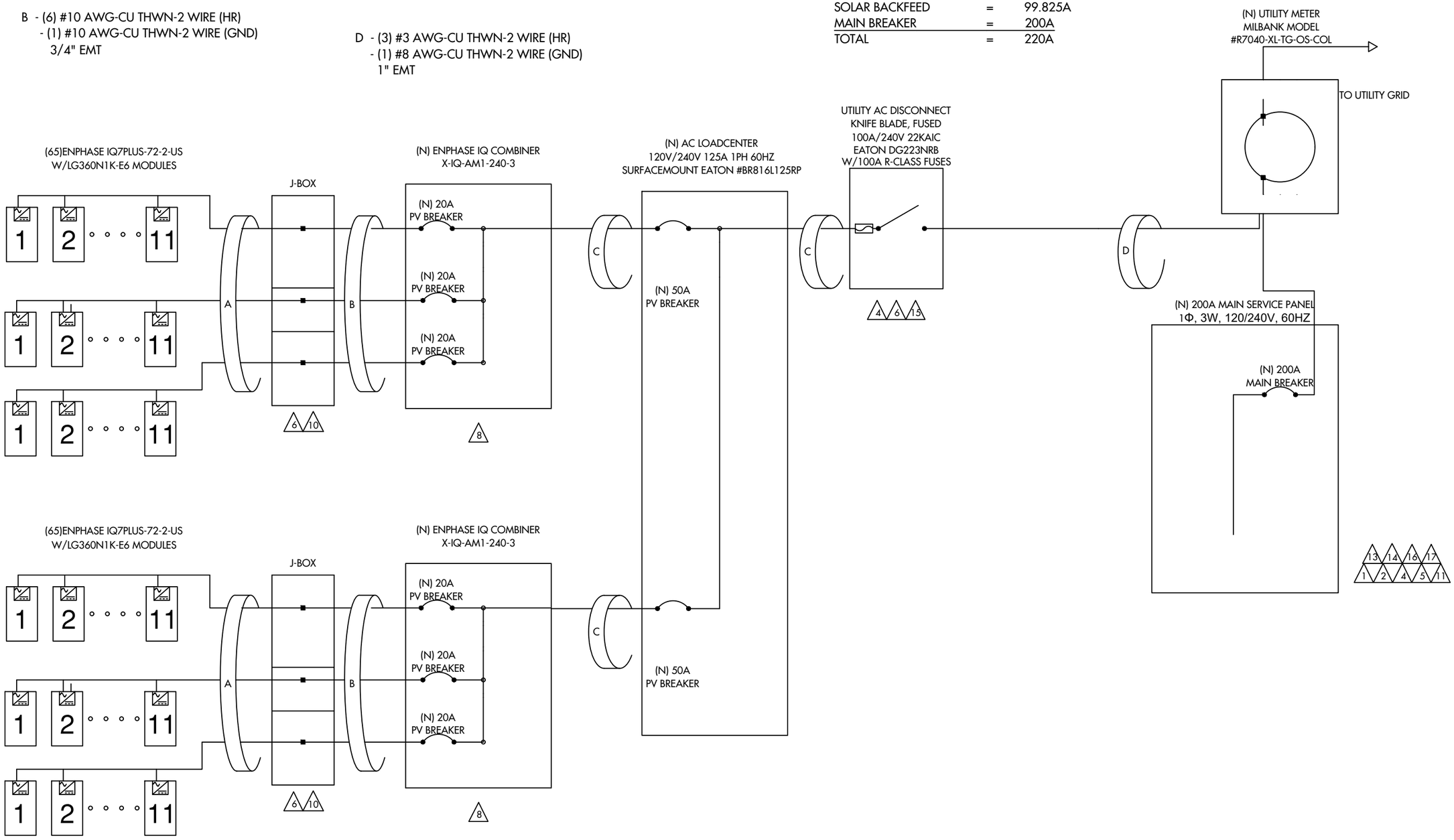
B - (6) #10 AWG-CU THWN-2 WIRE (HR)
- (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

C - (3) #6 AWG-CU THWN-2 WIRE (HR)
- (1) #8 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

D - (3) #3 AWG-CU THWN-2 WIRE (HR)
- (1) #8 AWG-CU THWN-2 WIRE (GND) 1" EMT

MAIN SERVICE PANEL

BUS RATING	=	200A
MAX. CURRENT RATING	=	240A (200A X 1.2)
SOLAR BACKFEED	=	99.825A
MAIN BREAKER	=	200A
TOTAL	=	220A



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(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

DATE: 6/29/2021
REV:A
DRAWN BY: JJ

ONE LINE

PV 5

PV MODULE

LG360N1K-E6

W	=	360W
ISC	=	8.89 ADC
VOC	=	38.2 VDC
IMP	=	8.42 ADC
VMP	=	31.9 VDC
TVOC	=	-0.26% / °C

WIRE SCHEDULE

A - (6) #12 AWG ENPHASE Q CABLE (HR)
- (1) #10 AWG-CU BARE COPPER WIRE (GND) IN FREE AIR

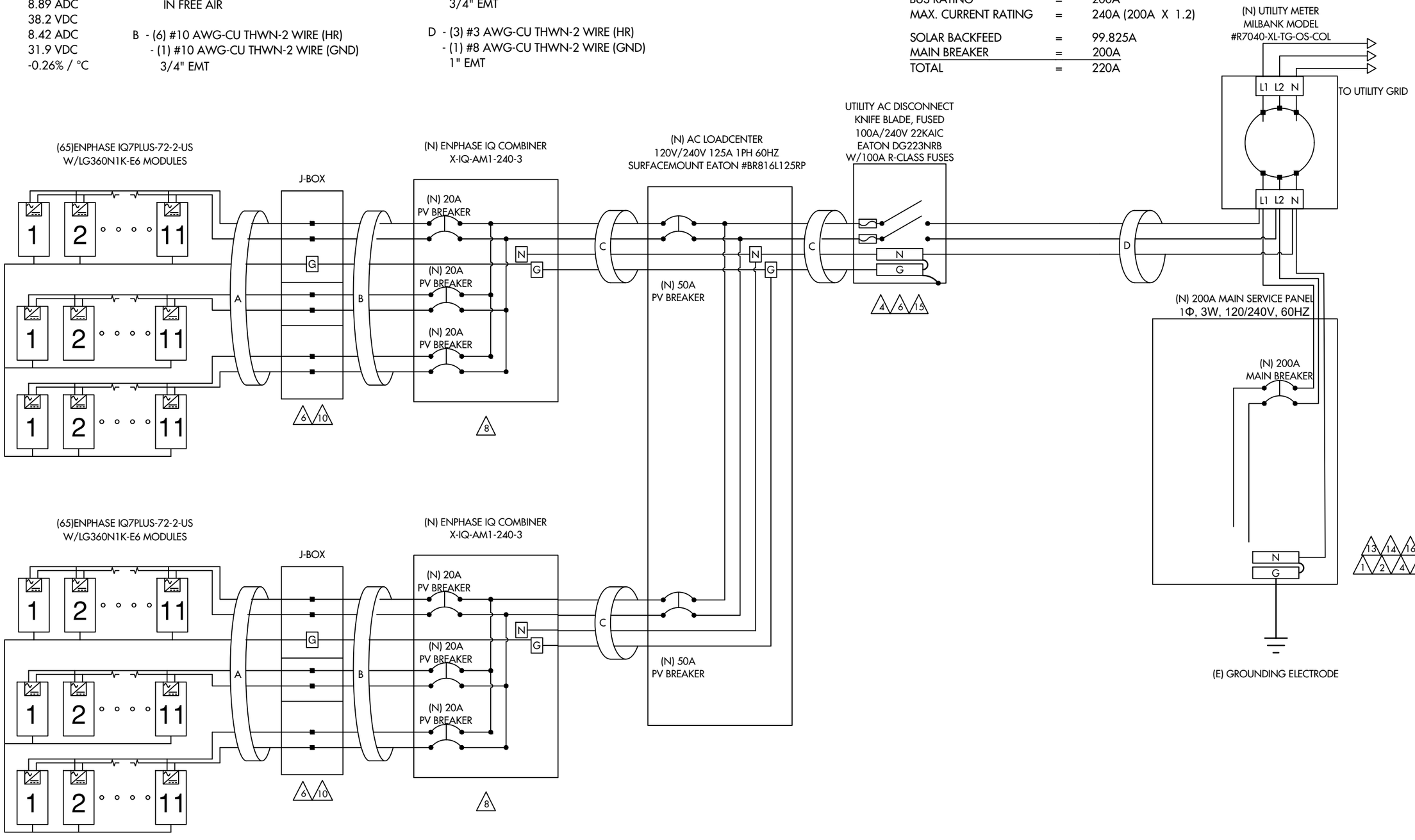
B - (6) #10 AWG-CU THWN-2 WIRE (HR)
- (1) #10 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

C - (3) #6 AWG-CU THWN-2 WIRE (HR)
- (1) #8 AWG-CU THWN-2 WIRE (GND) 3/4" EMT

D - (3) #3 AWG-CU THWN-2 WIRE (HR)
- (1) #8 AWG-CU THWN-2 WIRE (GND) 1" EMT

MAIN SERVICE PANEL

BUS RATING	=	200A
MAX. CURRENT RATING	=	240A (200A X 1.2)
SOLAR BACKFEED	=	99.825A
MAIN BREAKER	=	200A
TOTAL	=	220A



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DATE: 6/29/2021
REV:A
DRAWN BY: JJ

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: 79.86AAC
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

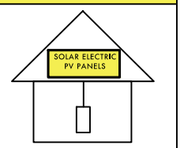
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

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

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LAT:35.236394, LON:-78.979042
TSP-88197

(65) LG360N1K-E6
(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

DATE: 6/29/2021
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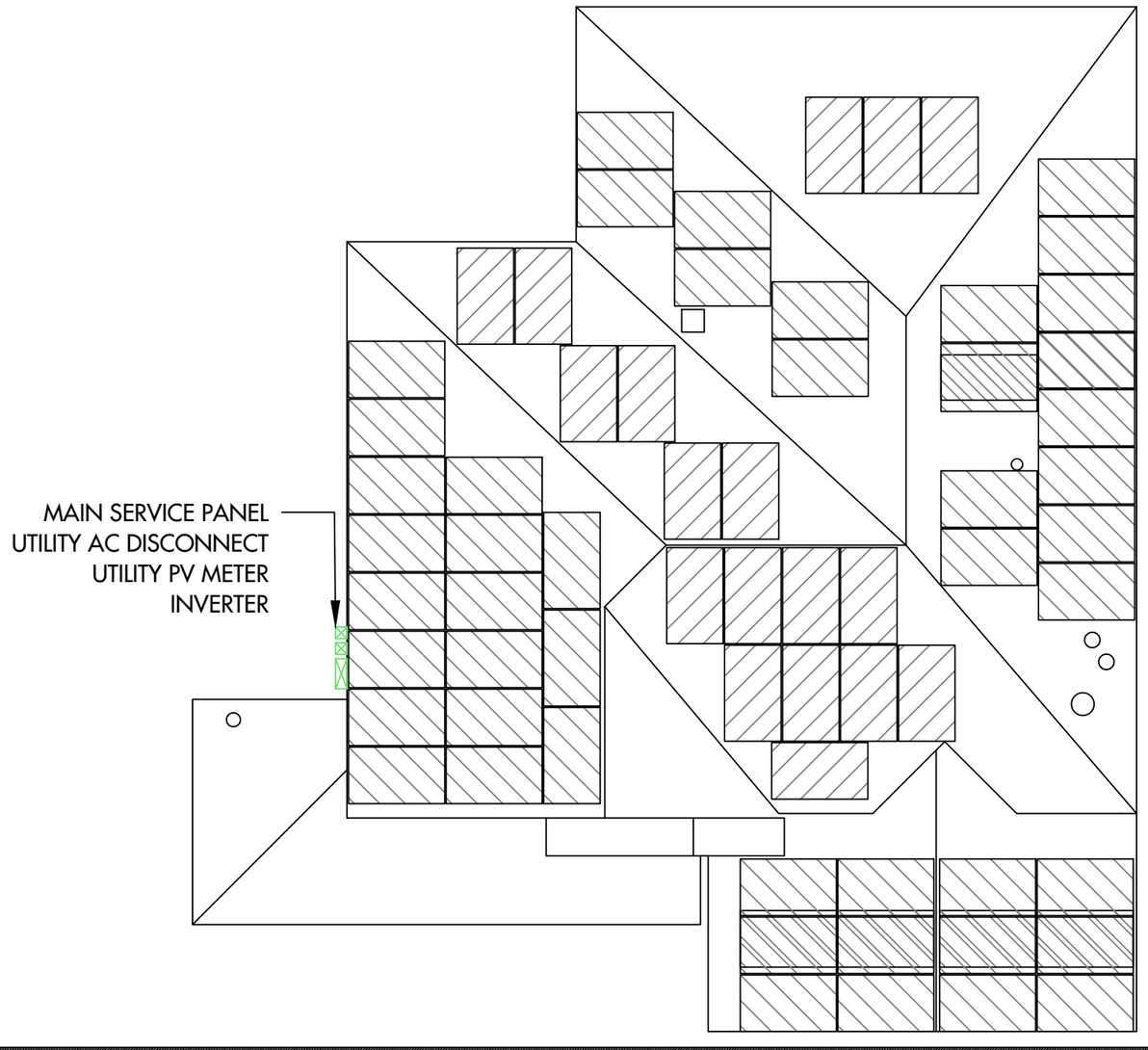
LABELS
PV 7

CAUTION

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



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

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PLACARD

PV 8

Data Sheet
Enphase Microinverters
Region: AMERICAS

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.

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 / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 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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EQUIPMENT SPECIFICATIONS
PV 9

Data Sheet
Enphase Networking

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

LISTED

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

ENPHASE.

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%).
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

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

2017-08-17

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EQUIPMENT SPECIFICATIONS
PV 10

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

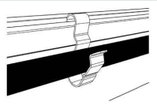
ENPHASE Q CABLE ACCESSORIES

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

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23.400 kW DC SYSTEM SIZE
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DRAWN BY: JJ

EQUIPMENT SPECIFICATIONS
PV 11

LG NeON®H Black

LG360N1K-E6

120

360W

The LG NeON® H is one of the most powerful and versatile modules on the market today. The cells are designed to appear all-black at a distance, and the performance warranty guarantees 87.2% of labeled power output at 25 years.

25 YEAR PRODUCT • PERFORMANCE • LABOR WARRANTY

c UL us

Features

Enhanced Performance Warranty

LG NeON® H Black has an enhanced performance warranty. After 25 years, LG NeON® H Black is guaranteed at least 87.2% of initial performance.

25-Year Limited Product Warranty

The NeON® H Black is covered by a 25-year limited product warranty.

Solid Performance on Hot Days

LG NeON® H Black performs well on hot days due to its low temperature coefficient.

Roof Aesthetics

LG NeON® H Black has been designed with aesthetics in mind using thinner wires that appear all black at a distance.

When you go solar, ask for the brand you can trust: LG Solar

About LG Electronics USA, Inc.

LG Electronics is a global leader in electronic products in the clean energy markets by offering solar PV panels and energy storage systems. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first MonoX® series to the market, which is now available in 32 countries. The NeON® (previous MonoX® NeON), NeON®2, NeON®2 BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG's leadership and innovation in the solar industry.

LG Life's Good

LG NeON®H Black

LG360N1K-E6

General Data

Cell Properties (Material/Type)	Monocrystalline/N-type
Cell Maker	LG
Cell Configuration	120 Cells (6 x 20)
Number of Busbars	9 EA
Module Dimensions (L x W x H)	1,768mm x 1,042mm x 40 mm
Weight	18.5 kg
Glass (Material)	Tempered Glass with AR coating
Backsheet (Color)	Black
Frame (Material)	Anodized Aluminium
Junction Box (Protection Degree)	IP 68 with 3 Bypass Diodes
Cables (Length)	1,200mm x 2EA
Connector (Type/Maker)	MC 4/MC

Certifications and Warranty

Certifications	IEC 61215-1/-1-1/2 : 2016, IEC 61730-1/2 : 2016, UL 61730-1 : 2017, UL 61730-2 : 2017
	ISO 9001, ISO 14001, ISO 50001
	OHSAS 18001
Salt Mist Corrosion Test	IEC 61701:2011 Severity 6
Ammonia Corrosion Test	IEC 62716:2013
Module Fire Performance	Type 2 (UL 61730)
Fire Rating	Class C (UL 790)
Solar Module Product Warranty	25 Year Limited
Solar Module Output Warranty	Linear Warranty*

*Improved: 1st year 98%, from 2-24th year: -0.45%/year down, 87.2% at year 25

Temperature Characteristics

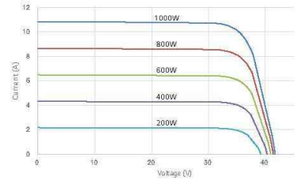
NMOT*	[°C]	42 ± 3
Pmax	[%/°C]	-0.33
Voc	[%/°C]	-0.26
Isc	[%/°C]	0.04

*NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m², Ambient temperature 20°C, Wind speed 1 m/s, Spectrum AM 1.5

Electrical Properties (NMOT)

Model		LG360N1K-E6
Maximum Power (Pmax)	[W]	269
MPP Voltage (Vmpp)	[V]	31.9
MPP Current (Impp)	[A]	8.42
Open Circuit Voltage (Voc)	[V]	38.2
Short Circuit Current (Isc)	[A]	8.89

I-V Curves



Electrical Properties (STC*)

Model		LG360N1K-E6
Maximum Power (Pmax)	[W]	360
MPP Voltage (Vmpp)	[V]	34.3
MPP Current (Impp)	[A]	10.51
Open Circuit Voltage (Voc ± 5%)	[V]	41.0
Short Circuit Current (Isc ± 5%)	[A]	11.03
Module Efficiency	[%]	19.5
Power Tolerance	[%]	0 ~ +3

*STC (Standard Test Condition): Irradiance 1000 W/m², cell temperature 25°C, AM 1.5
Measurement Tolerence of Pmax ± 3%

Operating Conditions

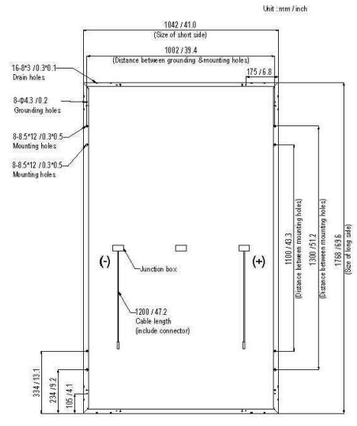
Operating Temperature	[°C]	-40 ~ +85
Maximum System Voltage	[V]	1,000 (UL/IEC)
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load* (Front)	[Pa/psf]	5,400
Mechanical Test Load* (Rear)	[Pa/psf]	4,000

*Based on IEC 61215-2 : 2016 (Test Load = Design Load x Safety Factor (1.5))
Mechanical Test Loads 6,000Pa/5,400Pa based on IEC 61215:2005

Packaging Configuration

Number of Modules per Pallet	[EA]	25
Number of Modules per 40' Container	[EA]	650
Number of Modules per 53' Container	[EA]	850
Packaging Box Dimensions (L x W x H)	[mm]	1,790 x 1,120 x 1,213
Packaging Box Dimensions (L x W x H)	[in]	70.5 x 44.1 x 47.8
Packaging Box Gross Weight	[kg]	510
Packaging Box Gross Weight	[lb]	1,124

Dimensions (mm/inch)



LG Life's Good

LG Electronics USA, Inc.
Solar Business Division
2000 Millbrook Drive
Lincolnshire, IL 60069
www.lg-solar.com

Product specifications are subject to change without notice.
LG360N1K-E6.pdf
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EQUIPMENT SPECIFICATIONS
PV 12

We support PV systems
Formerly Everest Solar Systems

Splice Foot X

TECHNICAL SHEET

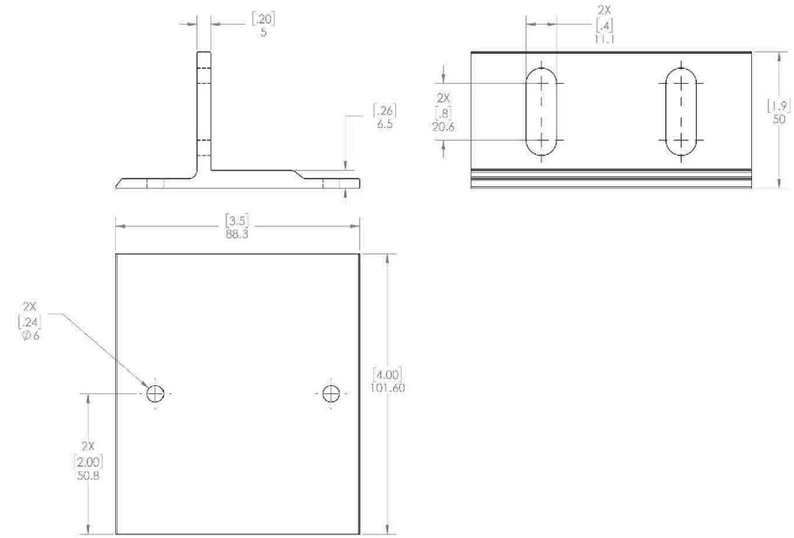
Item Number	Description	Part Number
1	Splice Foot X	4000113 | Splice Foot X Kit, Mill
2	K2 Solar Seal Butyl Pad	
3	M5 x 60 lag screws	
4	T-Bolt & Hex Nut Set	

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

We support PV systems
Formerly Everest Solar Systems

Units: [in] mm



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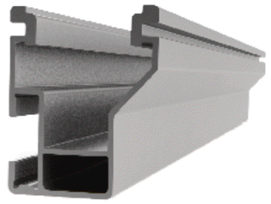
EQUIPMENT SPECIFICATIONS
PV 13

CrossRail 48-X

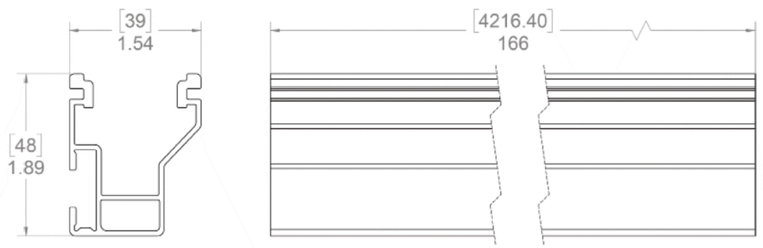


Mechanical Properties

	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
Sx	0.1980 in^3 (3.261 cm^3)
Sy	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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698 HIGHGROVE DR, SPRING LAKE, NC, 28390
LAT:35.236394, LON:-78.979042
TSP-88197

(65) LG360N1K-E6
(65) ENPHASE IQ7PLUS-72-2-US
23.400 kW DC SYSTEM SIZE
19.140 kW AC SYSTEM SIZE

DATE: 6/29/2021
REV:A
DRAWN BY: JJ

EQUIPMENT SPECIFICATIONS
PV 14