SYSTEM INFORMATION		
SYSTEM SIZE (kW):		18.9
NO. OF MODULES:	42	LG450N2W-E6-450
INVERTERS:	42	Enphase Inverter IQ7+

GENERAL NOTES:

1.1.1 PROJECT NOTES:

1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.

1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.

1.1.4 GROUND FAULT DETECTION AND INTERRUPTION (GFDI) DEVICE IS INTEGRATED WITH THE MICROINVERTER IN ACCORDANCE WITH NEC 690.5(A).

1.1.5 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4 & NEC 690.60:

PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE.

INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519.

COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY.

1.1.6 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.

1.1.7 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].

1.1.8 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

1.2.1 SCOPE OF WORK:

1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.

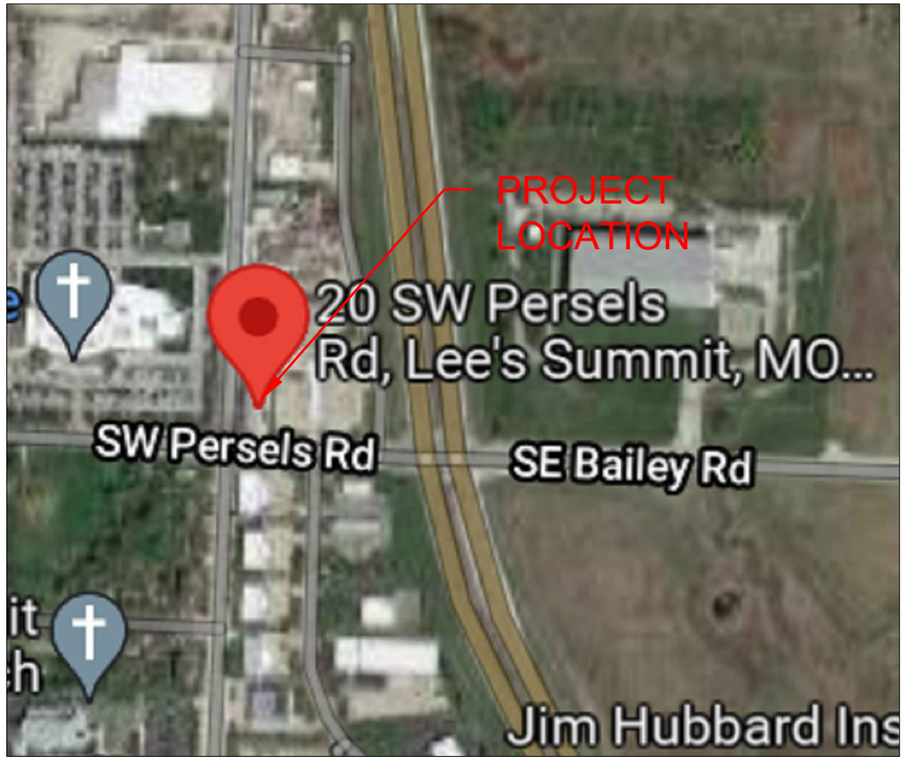
ABBREVIATIONS

(E)	EXISTING
(N)	NEW
GND	GROUND
PNL	PANEL BOARD OR PANEL
J-BOX	JUNCTION BOX
MON	MONITORING
MSP	MAIN SERVICE PANEL
MON	MONITORING
PVC	POLYVINYL CHLORIDE
EMT	ELECTRIC METAL TUBING
FMC	FLEXIBLE METAL CONDUIT
USE	UNDERGROUND SERVICE ENTRANCE
NEMA	NATIONAL ELECTRIC MANUFACTURES ASSOCIATION
W	WATTS
KW	1,000 WATTS
M	METER

GPS COORDINATES: LAT.:38.8964506° N / LONG.:-94.3773102° W

AERIAL VIEW

VICINITY VIEW



ROOF TOP :
ARRAY #1
TILT: 23
AZIMUTH: 275°

WIND SPEED:
EXPOSURE CATEGORY: B
SNOW LOAD: 20 PSF
OCCUPANCY: II

CODES

2020 NATIONAL ELECTRIC CODE (NEC)

- 2018 INTERNATIONAL BUILDING CODE (IBC) 2018 EDITION
- 2018 INTERNATIONAL RESIDENTIAL CODE (IRC) 2000 EDITION.
- 2018 INTERNATIONAL FIRE CODE (IFC)
- 2015 INTERNATIONAL MECHANICAL CODE (IMC)
- 2015 INTERNATIONAL PLUMBING CODE (IPC)
- 2018 INTERNATIONAL EXISTING BUILDING CODE (IEBC)
- 2015 INTERNATIONAL FUEL GAS CODE (IFGC)

MAIN PANEL RATING: 200 A
MAIN BREAKER SIZE : 200 A
INTERCONNECTION TYPE: LINE SIDE TAP
OCPD SIZE: 70A
MOUNTING TYPE: ROOFTOP

	RANDY FIELDS
PROJECT ADDRESS:	20 SW PERSELS RD, LEE'S SUMMIT, MO 64081

INDEX / INDICATORS

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PV- 01	GOVERNING CODES & NOTES
PV- 02	PLOT PLAN WITH ROOF PLAN
PV- 03	MODULE MOUNTING STRUCTURE
PV- 04	ELECTRICAL LINE DIAGRAM
PV- 05	LABELS
PV- 06	MODULE DATASHEET
PV- 07	INVERTER DATASHEET
PV- 08	IQ COMBINER DATASHEET
PV- 09	PLACARD
PV- 10-12	RACKING DATASHEET
PV- 13	ELECTRICAL EQUIPMENT PICTURES

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Lee's Summit, Missouri
12/15/2021

Digitally signed by Joe Frogge
DN: CN=Joe Frogge, OU=Development, OU=LS Users, DC=CVLS, DC=CVDC
Reason: I release for construction
Date: 2021.12.15 08:23:25-06'00'

PROJECT OWNER
RANDY FIELDS

CONTRACTOR:

THE SOLAR GUYS
Installation • Service • Repair
Commercial • Residential
Energy Storage

UTILITY COMPANY
EVERGY - LEGACY

AHJ

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PROJECT ADDRESS
20 SW PERSELS RD, LEE'S SUMMIT, MO 64081

REVISION HISTORY

REV	DESCRIPTION	DRW	CHK	DATE
0	DRAFT REVIEW	SR	MA	10/12/21

JOB NUMBER: B

SITE NUMBER:

SCALE: N.T.S.

DRAWING NUMBER

DRAWING TITLE

STATE OF MISSOURI
JAMES A. CLANCY
NUMBER PE-2008006307
PROFESSIONAL ENGINEER

GENERAL

1. UTILITY SHALL BE NOTIFIED BEFORE ACTIVATION OF PV SYSTEM.
2. 110.2 APPROVAL: ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.
3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
4. CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
5. ALL EQUIPMENT AND ASSOCIATED CONNECTIONS OF INVERTERS, MODULES, PV SOURCE CIRCUITS, BATTER CONNECTIONS, ETC. AND ALL ASSOCIATED WIRING AND INTERCONNECTIONS SHALL BE INSTALLED ONLY BY QUALIFIED PERSONNEL (CEC 690.4(E)).
6. THE CONTRACTOR OR OWNER MUST PROVIDE ROOF ACCESS (LADDER TO ROOF) FOR THE ALL REQUIRED INSPECTIONS. LADDERS MUST BE OSHA APPROVED, MINIMUM TYPE I WITH A 250 LB RATING, IN GOOD CONDITION AND DESIGNED FOR ITS INTENDED USE
7. SMOKE ALARMS AND CARBON MONOXIDE ALARMS ARE REQUIRED TO BE RETROFITTED ONTO THE EXISTING DWELLING AS PER THE 2013 CRC. THESE SMOKE ALARMS ARE REQUIRED TO BE IN ALL BEDROOMS, OUTSIDE EACH BEDROOM, AND AT LEAST ONE ON EACH FLOOR OF THE HOUSE. CARBON MONOXIDE ALARMS ARE REQUIRED TO BE RETROFITTED OUTSIDE EACH BEDROOM AND AT LEAST ONE ON EACH FLOOR OF THE HOUSE. THESE ALARMS MAY BE SOLELY BATTERY OPERATED IF THE PHOTOVOLTAIC PROJECT DOES NOT INVOLVE THE REMOVAL OF INTERIOR WALL AND CEILING FINISHES INSIDE THE HOME; OTHERWISE, THE ALARMS MUST BE HARD WIRED AND INTERCONNECTED. (CRC R314, R315)
8. SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER CRC SECTIONS R314 AND 315 TO BE VERIFIED AND INSPECTED BY THE INSPECTOR IN THE FIELD.
9. CONTRACTOR SHALL VERIFY THAT THE ROOF STRUCTURE WILL WITHSTAND THE ADDITIONAL LOADS.
10. LAG SCREWS SHALL PENETRATE A MINIMUM 2" INTO SOLID SAWN STRUCTURAL MEMBERS AND SHALL NOT EXCEED MANUFACTURER RECOMMENDATIONS FOR FASTENERS INTO ENGINEERED STRUCTURAL MEMBERS.
11. AN ACCESS POINT SHALL BE PROVIDED THAT DOES NOT PLACE THE GROUND LADDER OVER OPENINGS SUCH AS WINDOWS OR DOORS ARE LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION AND IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES, OR SIGNS. (CRC R331.4.2)
12. WHERE DC CONDUCTORS ARE RUN INSIDE BUILDING, THEY SHALL BE CONTAINTED IN A METAL RACEWAY; THEY SHALL NOT BE INSTALLED WITHIN 10" OF THE ROOF DECKING OR SHEATHING EXCEPT WHERE COVERED BY THE PV MODULES AND EQUIPMENT. (CEC 690.31(E)(1))
13. PLUMBING AND MECHANICAL VENTS THROUGH THE ROOF SHALL NOT BE COVERED BY SOLAR MODULES - NO BUILDING, PLUMBING, OR MECHANICAL VENTS TO BE COVERED, OBSTRUCTED OR ROUTED AROUND SOLAR MODULES.
14. ALL FIELD-INSTALLED JUNCTION, PULL, AND OUTLET BOXES LOCATED BEHIND MODULES SHALL BE ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE SECURED BY REMOVABLE FASTENERS.

ELECTRICAL

1. WIRING MATERIALS SHALL COMPLY WITH MAXIMUM CONTINUOUS CURRENT OUTPUT AT 25°C AND MAXIMUM VOLTAGE AT 600V; WIRE SHALL BE WET RATED AT 90°C.
2. EXPOSED PHOTOVOLTAIC SYSTEM CONDUCTORS ON THE ROOF WILL BE USE-2 OR PV TYPE WIRE.
3. PHOTOVOLTAIC SYSTEM CONDUCTORS SHALL BE IDENTIFIED AND GROUPED. THE MEANS OF IDENTIFICATION SHALL BE PERMITTED BY SEPARATE COLOR-CODING, MARKING TAPE, TAGGING OR OTHER APPROVED MEANS
4. ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS. (CEC314.15)
5. WHERE CONDUCTORS ARE INSTALLED UNDERGROUND, SECTION 300.5 OF THE CEC MUST BE FOLLOWED TO ENSURE PROPER PROTECTION.
6. ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS. (CEC 250.90, 250.96)
7. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
8. REMOVAL OF A UTILITY-INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BUILDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PV SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR.
9. FOR GROUNDED SYSTEMS, THE PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUITS SHALL BE PROVIDED WITH A GROUND-FAULT PROTECTION DEVICE OR SYSTEM THAT DETECTS A GROUND FAULT, INDICATES THAT FAULT HAS OCCURED, AND AUTOMATICALLY DISCONNECTS ALL CONDUCTORS OR CAUSES THE INVERTER TO AUTOMATICALLY CEASE SUPPLYING POWER TO OUTPUT CIRCUITS. (CEC 690.35(C))
10. FOR UNGROUNDED SYSTEMS, THE INVERTER IS EQUIPPED WITH GROUND FAULT PROTECTION AND A GFI FUSE PORT FOR GROUND FAULT INDICATION.
PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR

GOVERNING CODES

ALL MATERIALS, EQUIPMENT, INSTALLATION AND WORK SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES:

- 2019 CBC / 2018 IBC
- 2019 CRC / 2018 IRC
- 2019 CEC / 2020 NEC
- 2019 CMC / 2018 UMC
- 2019 CPC / 2018 UPC
- 2019 CFC / 2018 IFC
- 2019 BUILDING ENERGY EFFICIENCY STANDARDS
- CEC ARTICLE 690
- CFC ARTICLE 605.11
- IEEE STANDARD 929
- UL STANDARD 1741
- OSHA 29 CFR 1910.269
- WHERE APPLICABLE, RULES OF THE PUBLIC UTILITIES COMMISSION REGARDING SAFETY AND RELIABILITY
- THE AUTHORITY HAVING JURISDICTION
- MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS
- 2017 LAEC, 2017 LABC, 2017 LAMC, 2013 NATIONAL FIRE ALARM TO RACKING RAIL OR

STATE OF MISSOURI
JAMES A. CLANCY
NUMBER PE-2008006307
PROFESSIONAL ENGINEER

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Development Services Department
Lee's Summit, Missouri
12/15/2021

PROJECT OWNER
RANDY FIELDS

CONTRACTOR:
THE SOLAR GUYS
Installation · Service · Repair
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Energy Storage

UTILITY COMPANY
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AHJ
LEE'S SUMMIT

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PROJECT ADDRESS
20 SW PERSELS RD, LEE'S SUMMIT, MO 64081

REVISION HISTORY

REV	DESCRIPTION	DRW	CHK	DATE
0	DRAFT REVIEW	SR	MA	10/12/21

JOB NUMBER
PAGE SIZE B
SITE NUMBER
SCALE N.T.S.
DRAWING NUMBER
PV-01
DRAWING TITLE
GOVERNING CODES & NOTES

MODULE ALLOCATION					
ROOF PLANE	A	B	C	D	E
AZIMUTH	275				
TILT	23				
# OF MODULES	42				

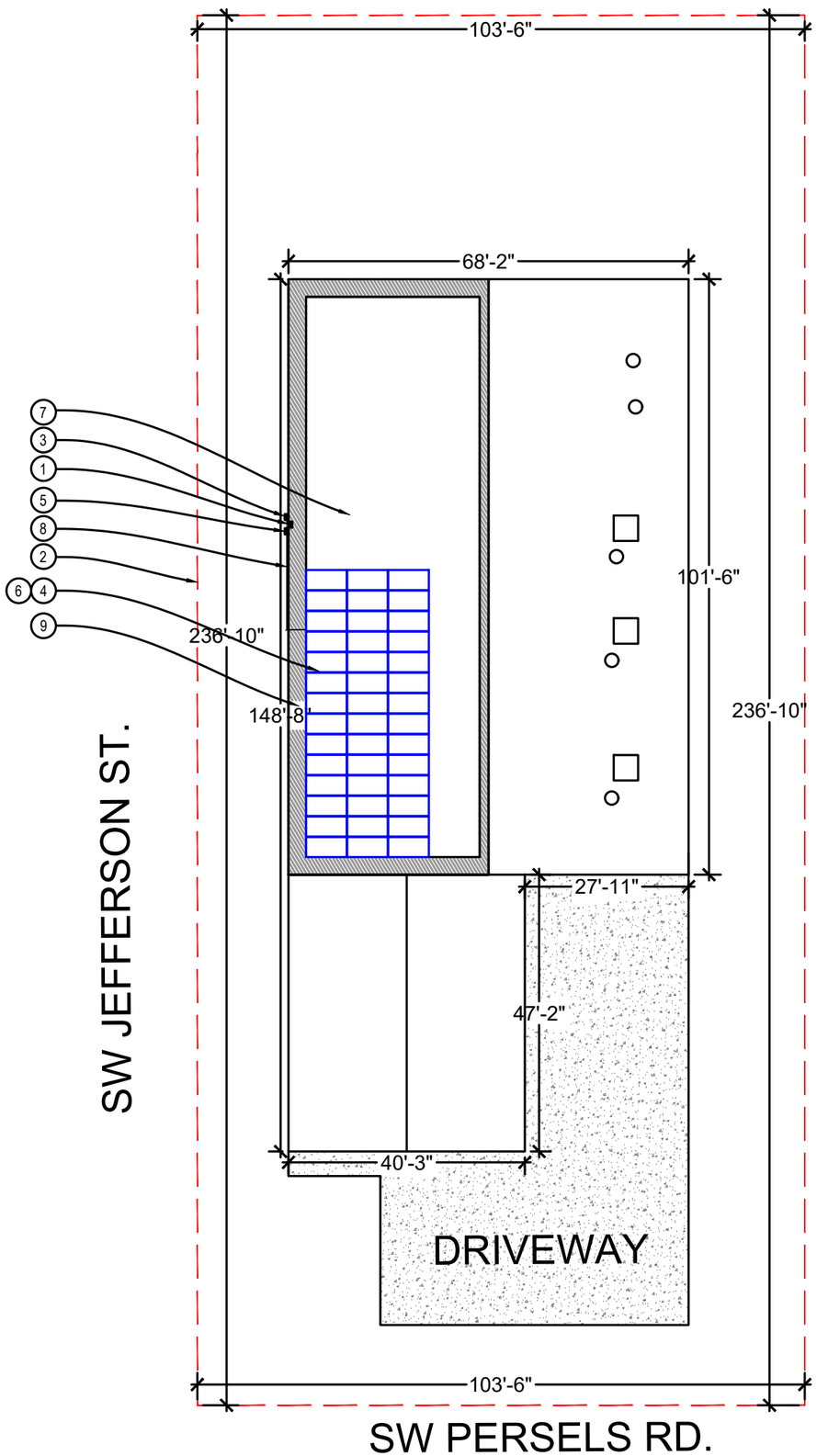
SYSTEM AC OUTPUT: 12.39 kW

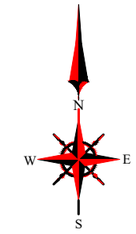
SYSTEM DC INPUT: 18.90 kW

1. MAIN SERVICE PANEL (E / INSIDE)
2. PROPERTY LINE
3. UTILITY METER (E / OUTSIDE)
4. PV MODULES (N)
5. PHOTOVOLTAIC SYSTEM AC DISCONNECT(N / OUTSIDE)
6. MICROINVERTER
7. BUILDING (E)
8. EMT CONDUIT ON ROOF
9. FIRE SETBACK OF 36"

NOTE:

- FIELD VERIFY ALL MEASUREMENTS.
- DISCONNECTS WITHIN 10 FEETS OF METER.





ARRAY AZIMUTH
275 DEGREES

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PAGE SIZE
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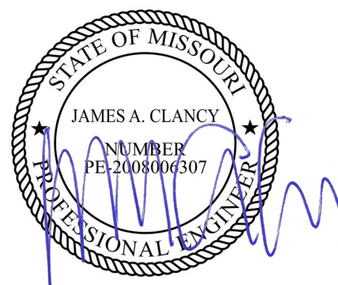
SITE NUMBER

SCALE
1"=18'

DRAWING NUMBER
PV-02

DRAWING TITLE
PLOT PLAN WITH ROOF PLAN



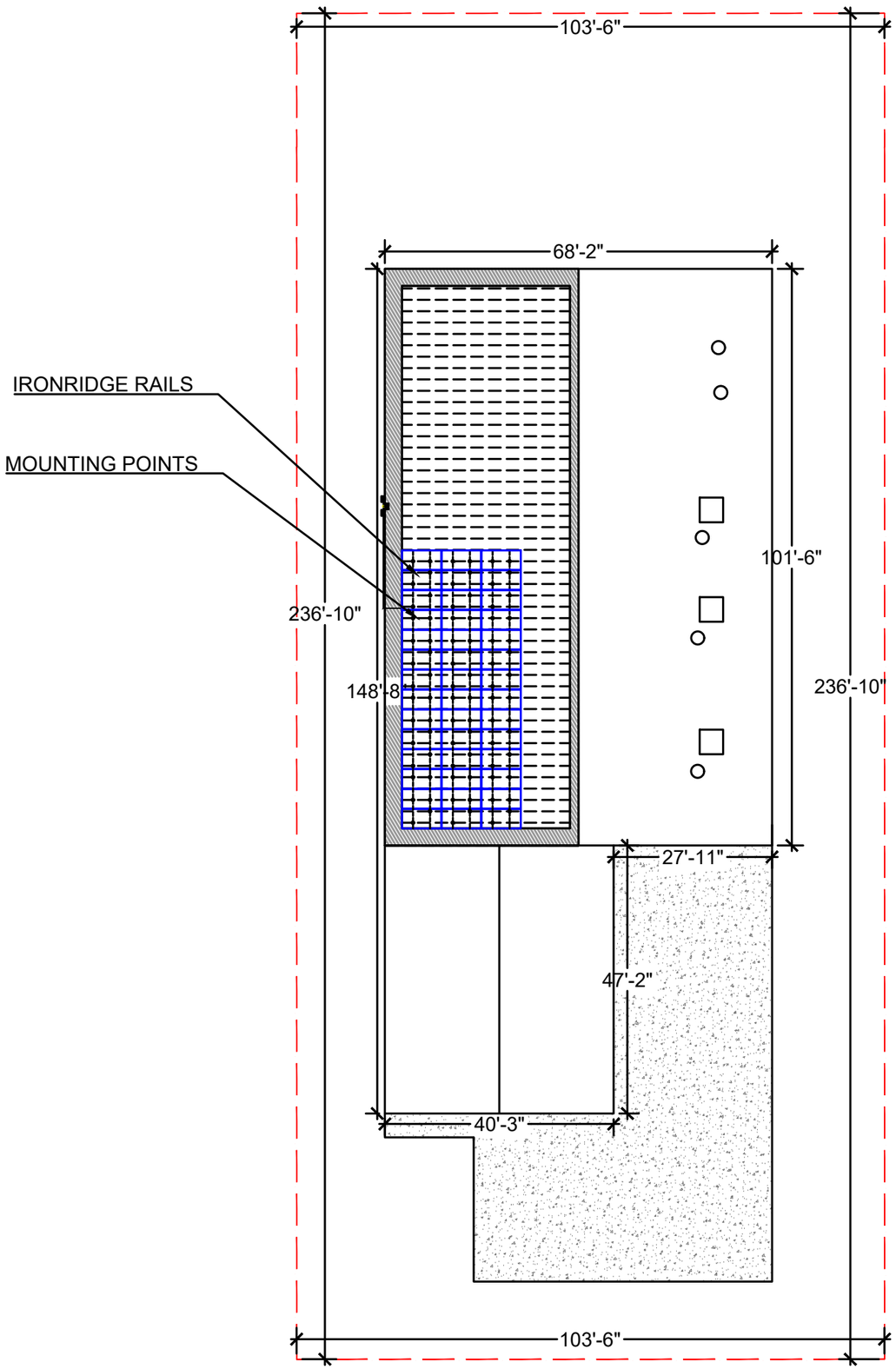
0 9' 18' 36'

Scale: 1"-18'
(For 11x17 Print)

MODULE ALLOCATION					
ROOF PLANE	A	B	C	D	E
AZIMUTH	275				
TILT	23				
# OF MODULES	42				

SYSTEM AC OUTPUT: 12.39 kW

SYSTEM DC INPUT: 18.90 kW



BILL OF MATERIAL		
EQUIPMENT	MAKE	QUANTITY
MODULE	LG450N2W-E6-450	42
INVERTER	ENPHASE INVERTER IQ7+	42
AC DISCONNECT	AC DISCONNECT (70A FUSED) 100A, 3P, 208VAC, NEMA 3R UL LISTED	1
MOUNTING RAILS	XR-100-168A XR100, Rail 168" (14 Feet) Clear	28
MOUNTING SPLICE	XR100-BOSS-01-M1 Bonded Splice, XR100	16

NOTE:

- FIELD VERIFY ALL MEASUREMENTS.
- DISCONNECTS WITHIN 10 FEETS OF METER.

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DRAWING NUMBER

PV-03

DRAWING TITLE

ROOF TOP & MODULES

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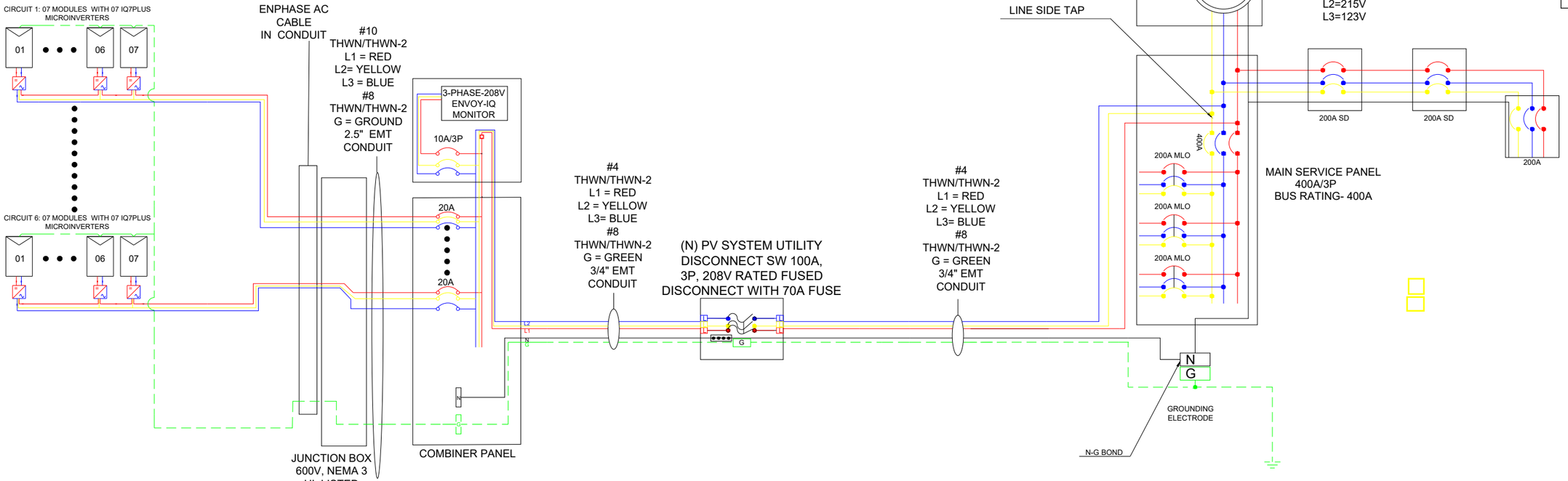
JAMES A. CLANCY
NUMBER PE-2008006307
PROFESSIONAL ENGINEER



	CONDUCTOR SIZE	APPROXIMATE AREA OF CONDUCTOR (NEC CHAPTER-9 TABLE-5)	# OF CONDUCTORS PER CONDUIT	CONDUIT SIZE	NOMINAL INTERNAL AREA OF CONDUIT IN SQ.INCH (NEC CHAPTER-9 TABLE-4)	CONDUIT/WIRE FILL PERCENT	FILL FACTOR (NEC 2019 TABLE 310.15(B)(3)(a))	AMBIENT TEMP. IN DEGREE CELCIUS	TEMP.ADDER (NEC 2019 Table 310.15(B)(3)(c))	TOTAL TEMP IN DEGREE CELCIUS	TEMP CORR. FACTOR (NEC-2019 TABLE-310.15(B)(2)(a))	CONDUCTOR RATING IN AMPERE (NEC-2019 TABLE-310.15(B)(16))	DERATED CURRENT RATING IN AMPERE	OCPD (NEC-2019 ARTICLE-690.8)
JUNCTION BOX TO SUB PANEL	10 AWG	0.0211	10	2.5"EMT	4.695	10.91%	0.5	32	22	54	0.76	40	20.9	20A
SUB PANEL TO INTERCONNECTION	4 AWG	0.0824	3	3/4"EMT	0.533	31.32%	1	32	0	32	0.96	95	75	70A

EQUIPMENT		
KEY	TYPE	DESCRIPTION
1	PV MODULE	LG450N2W-E6-450
2	INVERTER	ENPHASE INVERTER IQ7+
3	DC DISCONNECT	NA
4	AC DISCONNECT	DISCONNECT SW (VISIBLE OPEN, 70A FUSED) 100A, 2P, 208VAC NEMA 3R
5	MAIN SERVICE PANEL (E)	MAIN SERVICE PANEL 200A RATED WITH 200A MAIN BREAKER
6	OPTIMIZERS	NA
7	SUB PANEL (E)	

INVERTER SPECIFICATION	
MAKE	ENPHASE INVERTER IQ7+
AC CAPACITY (KW)	12.39
OUTPUT POWER (KW)	12.39
PHASE	1
MAXIMUM CONTINOUS OUTPUT CURRENT @ 208VOLT (A)	51.62

MAXIMUM DC CURRENT (A)	
	14.33
OPERATING DC CURRENT (A)	MODULE IMP
	10.96
AC OUTPUT (A) (INVERTER)	INVERTER IAC X 1.25
TOTAL AC OUTPUT (A)	63.52
MAXIMUM DC VOLTAGE (V)	(MOD./STRING)X MOD. VOC X TEMP. Δ X TEMP. COEFF.
	392
DC OPERATING VOLTAGE (V)	(MOD./STRING)X MOD. VMP
	328.8

PV MODULE SPECIFICATIONS	
MAKE	LG450N2W-E6-450
NOMINAL OUTPUT POWER (W)	450

MAIN SERVICE PANEL INFO		
VOLTAGE	208	V
PHASES	3	
BOX/BUS RATING	400	A
MAIN BREAKER RATING	400	A

SYSTEM INFORMATION		
# OF MODULES	42	
# OF STRINGS	6	
# OF MODULES PER STRING	7	7
TOTAL POWER (kW)	18.90	

NOTE: THE MAIN SERVICE PANEL IS CONFIGURED TO PASS NEC 705.12 (D)(2)(3)(b)

NOTE: AC DISCONNECT TO BE INSTALLED WITHIN 10 FEET OF UTILITY METER.

NOTE: BI-DIRECTIONAL METER LABELS SHALL BE WEATHERPROOF, DURABLE AND PERMANENTLY MOUNTED AND LABELS SHALL COMPLY WITH NEC 609

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JAMES A. CLANCY
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PROFESSIONAL ENGINEER

LABEL-1: PV DC DISCONNECT

MAXIMUM VOLTAGE:	363.2VOLT
MAXIMUM CIRCUIT CURRENT:	10.20 AMPS
MAXIMUM RATED OUTPUT CURRENT:	9.70AMPS

LABEL-2: PV AC DISCONNECT

PV SYSTEM AC DISCONNECT

RATED AC OUTPUT CURRENT:	50.85 AMPS
NOMINAL OPERATING AC VOLTAGE:	208 VOLT
MAXIMUM RATED OUTPUT CURRENT:	50.85 AMPS

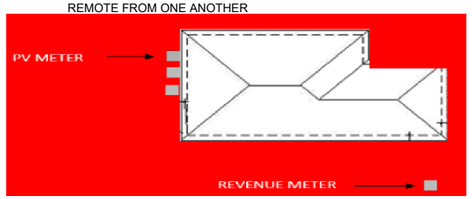
LABEL-3: PV METER SOCKET

PV METER

LABEL-4: CPS ENERGY REVENUE METER SOCKET

PV METER

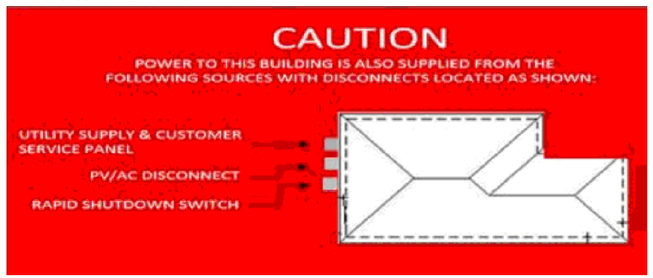
LABEL-5: PLACARD BELOW REQUIRED ON BOTH REVENUE AND PV METER SOCKETS WHERE METERS HAVE BEEN APPROVED TO BE REMOTE FROM ONE ANOTHER



WARNING!

WARNING!

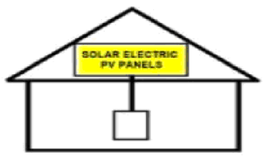
LABEL-8: CUSTOMER SERVICE PANEL



LABEL-9: RAPID SHUTDOWN PLACARD

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

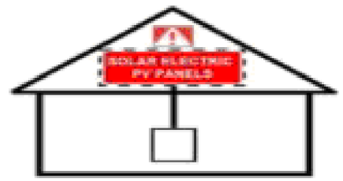
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY



LABEL-10: RAPID SHUTDOWN

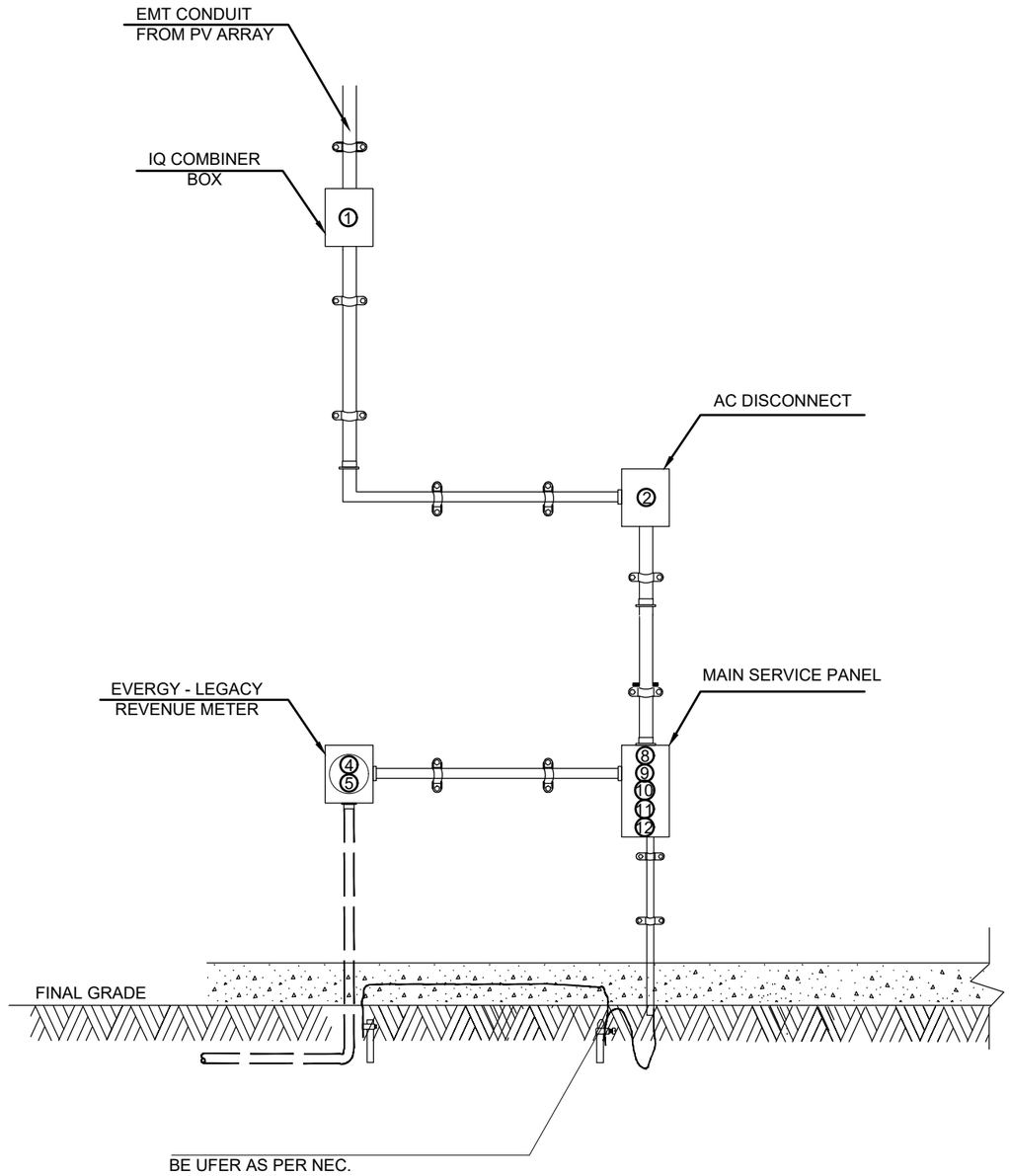
SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION, TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT



RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

DO NOT REMOVE, ADD



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STATE OF MISSOURI
JAMES A. CLANCY
NUMBER PE-2008006307
PROFESSIONAL ENGINEER

LG NeON®H

LG450N2W-E6

144

450W

For those who demand super-high efficiency, strong warranties and time-tested technology from a trusted brand, the NeON H Monofacial module is good value and offers improved temperature coefficient and near-zero Light Induced Degradation (LID).

25 YEAR PRODUCT • PERFORMANCE WARRANTY

c UL us

Features

Enhanced Performance Warranty

LG NeON® H has an enhanced performance warranty. After 25 years, LG NeON® H is guaranteed at least 90.6% of initial performance.

25-Year Limited Product Warranty

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

BOS (Balance Of System) Saving

LG NeON® H can reduce the total number of strings due to its high module efficiency resulting in a more cost effective and efficient solar power system.

Solid Performance on Hot Days

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

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

LG450N2W-E6

General Data

Cell Properties (Material/Type)	Monocrystalline / N-type
Cell Maker	LG
Cell Configuration	144 Cells (6 x 24)
Number of Busbars	9EA
Module Dimensions (L x W x H)	2,110mm x 1,042mm x 40mm
Weight	22kg
Glass (Material)	Tempered Glass with AR Coating
Backsheet (Color)	White
Frame (Material)	Anodized Aluminium
Junction Box (Protection Degree)	IP 68 with 3 Bypass Diodes
Cables (Length)*	1,400mm x 2EA
Connector (Type/Maker)	MC 4 / MC

*Including connector

Certifications and Warranty

Certifications	IEC 61215-1/-1-1/2 : 2016, IEC 61730-1/2:2016, UL 61730
	ISO 9001, ISO 14001, ISO 50001
	OHSAS 18001
Salt Mist Corrosion Test	IEC 61701 : 2012 Severity 6
Ammonia Corrosion Test	IEC 62716 : 2013
Module Fire Performance	Type 1 (UL 61730)
Fire Rating	Class C (UL 790, ULC / ORD C 1703)
Solar Module Product Warranty	25 Year Limited
Solar Module Output Warranty	Linear Warranty*

*Improved: 1st year 98.5%, from 2-24th year: -0.33%/year down, 90.6% at year 25

Temperature Characteristics

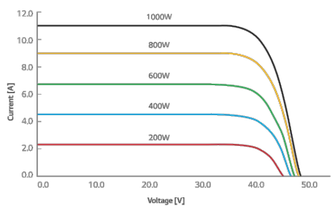
NMOT*	[°C]	44 ± 3
Pmax	[%/°C]	-0.33
Voc	[%/°C]	-0.26
Isc	[%/°C]	0.04

*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		LG450N2W-E6
Maximum Power (Pmax)	[W]	338
MPP Voltage (Vmpp)	[V]	38.6
MPP Current (Impp)	[A]	8.77
Open Circuit Voltage (Voc)	[V]	46.2
Short Circuit Current (Isc)	[A]	9.24

I-V Curves



Electrical Properties (STC*)

Model		LG450N2W-E6
Maximum Power (Pmax)	[W]	450
MPP Voltage (Vmpp)	[V]	41.1
MPP Current (Impp)	[A]	10.96
Open Circuit Voltage (Voc,±5%)	[V]	49.0
Short Circuit Current (Isc,±5%)	[A]	11.47
Module Efficiency	[%]	20.5
Power Tolerance	[%]	0 ~ +3

*STC (Standard Test Condition): Irradiance 1000 W/m², Cell temperature 25°C, AM 1.5
Measure Tolerance: ± 3%

Operating Conditions

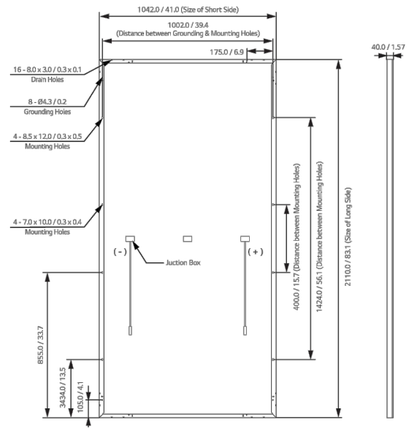
Operating Temperature	[°C]	-40 ~+85
Maximum System Voltage	[V]	1,000 (IEC)
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load* (Front)	[Pa/psf]	5,400/113
Mechanical Test Load* (Rear)	[Pa/psf]	3,000/63

*Based on IEC 61215-2 : 2016 (Test Load = Design Load x Safety Factor (1.5))

Packaging Configuration

Number of Modules per Pallet	[EA]	25
Number of Modules per 40' HQ Container	[EA]	550
Number of Modules per 53' HQ Container	[EA]	750
Packaging Box Dimensions (L x W x H)	[mm]	2,160 x 1,120 x 1,213
Packaging Box Dimensions (L x W x H)	[in]	85 x 44.1 x 47.8
Packaging Box Gross Weight	[kg]	610
Packaging Box Gross Weight	[lb]	1,345

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.
LG450N2W-E6.pdf
031921

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PV-06
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MODULE DATASHEET

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 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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INVERTER DATASHEET

Data Sheet
Enphase Networking

Enphase IQ Combiner 3-ES/3C-ES

X-IQ-AM1-240-3-ES
X-IQ-AM1-240-3C-ES

X-IQ-AM1-240-3C-ES

X-IQ-AM1-240-3-ES

The **Enphase IQ Combiner 3-ES/3C-ES**™ with Enphase IQ Envoy™ and integrated LTE-M1 cell modem (included only with IQ Combiner 3C-ES) consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Envoy for communication and control
- Includes LTE-M1 cell modem (included only with IQ Combiner 3C-ES)
- Includes solar shield to match Ensemble esthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Reduced size from IQ Combiner+ (X-IQ-AM1-240-2)
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included
- UL listed

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

ENPHASE.

Enphase IQ Combiner 3-ES / 3C-ES

MODEL NUMBER	
IQ Combiner 3-ES (X-IQ-AM1-240-3-ES)	IQ Combiner 3-ES with Enphase IQ Envoy printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the Encharge storage system and Enpower smart switch and to deflect heat.
IQ Combiner 3C-ES (X-IQ-AM1-240-3C-ES)	IQ Combiner 3C-ES with Enphase IQ Envoy printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect LTE-M1 (CELLMODEM-M1), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the Encharge storage system and Enpower smart switch and to deflect heat.
ACCESSORIES and **REPLACEMENT PARTS**	(not included, order separately)
Ensemble Communications Kit (COMMS-CELLMODEM-M1)	Includes COMMS-KIT-01 and CELLMODEM-M1 with 5-year data plan for Ensemble sites
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for Combiner 3-ES / 3C-ES
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3-ES / 3C-ES (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3-ES / 3C-ES
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Envoy
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1 4G based LTE-M1 cellular modem (included only with IQ Combiner 3C-ES). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

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

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PV-08
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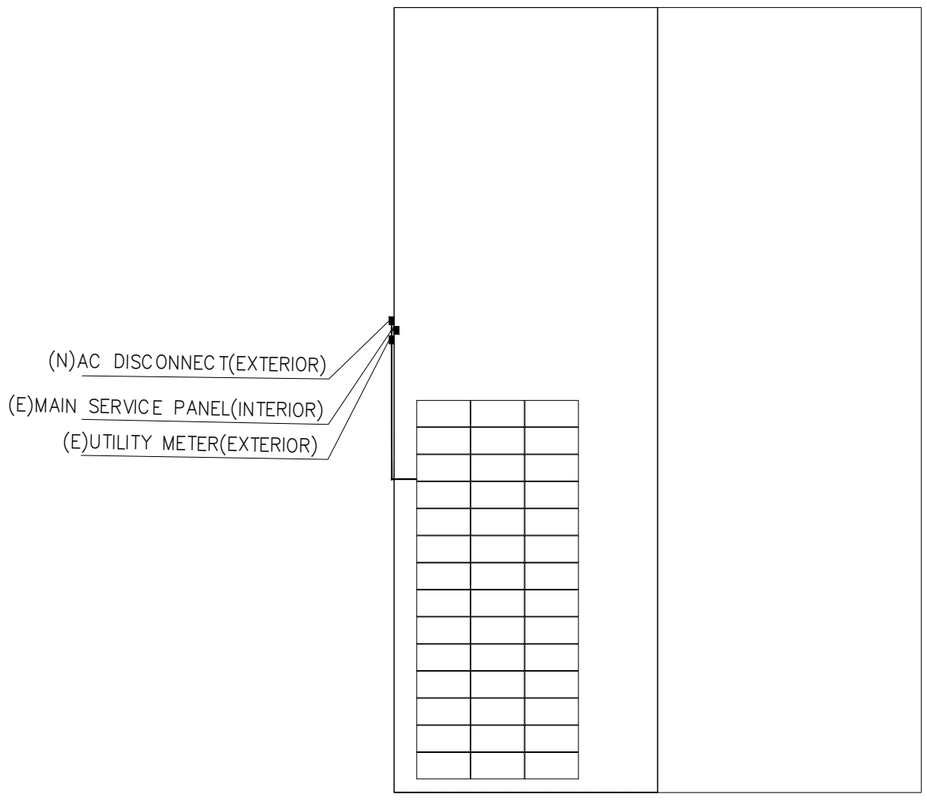
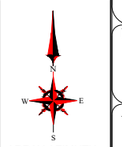
IQ COMBINER DATASHEET

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECT LOCATED AS SHOWN





ARRAY AZIMUTH
275 DEGREES

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PV-09

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PLACARD

S-5!®

The Right Way!®

S-5-U Clamp

The S-5-U clamp is by far our most popular and most versatile clamp. It fits about 85% of the standing seam profiles manufactured in North America—including most structural and architectural profiles. It can be used on vertically oriented seams and, by rotating the clamp 90 degrees, it can also be used on most horizontal 2" seam profiles.

Its simple design, generous dimensioning, and multiple hole orientations are what make the S-5-U clamp so versatile for use with the S-5!® snow retention products, such as ColorGard®, as well as with other heavy-duty applications.

Installation is as simple as setting the specially patented round-point setscrews into the clamp, placing the clamp on the seam, and tightening them to the specified tension. Then, affix ancillary items using the bolt provided with the product. Go to www.S-5.com/tools for information and tools available for properly attaching and tensioning S-5! clamps.

S-5-U Mini Clamp

The S-5-U Mini is a bit shorter than the S-5-U and has one setscrew rather than two. The mini is the choice for attaching all kinds of rooftop accessories: signs, walkways, satellite dishes, antennas, rooftop lighting, lightning protection systems, solar arrays, exhaust stack bracing, conduit, condensate lines, mechanical equipment—just about anything!*

*S-5! mini clamps are not compatible with, and should not be used with S-5! SnoRail™/SnoFence™ or ColorGard® snow retention systems.

The S-5-U clamp is our most popular and versatile clamp, fitting about 85% of the standing seam profiles in North America.

The right way to attach almost anything to metal roofs!

S-5-U and S-5-U Mini

888-825-3432 | www.S-5.com

MADE IN THE USA

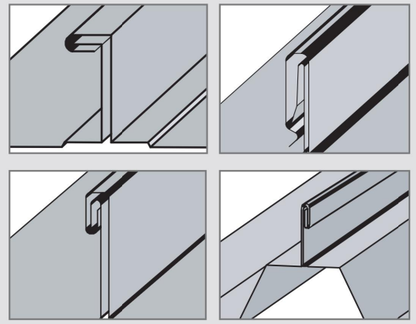
S-5!® The Right Way!®

The strength of the S-5-U clamp is in its simple design. The patented setscrews will slightly dimple the metal seam material but not pierce it—leaving the roof manufacturer's warranty intact.

The **S-5-U and S-5-U Mini clamps** are each furnished with the hardware shown to the right. Each box also includes a bit tip for tightening setscrews using an electric screw gun. A structural aluminum attachment clamp, the S-5-U is compatible with most common metal roofing materials excluding copper. All included hardware is stainless steel. Please visit **www.S-5.com** for more information including CAD details, metallurgical compatibilities and specifications.

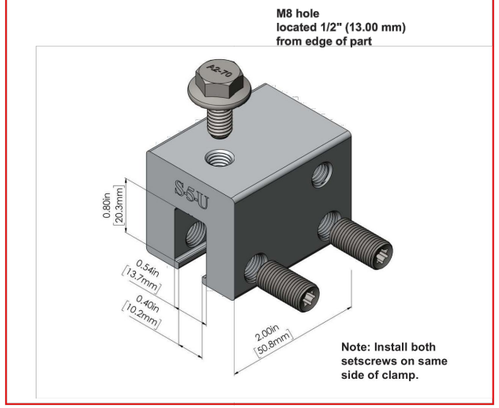
The S-5-U clamp has been tested for load-to-failure results on most major brands and profiles of standing seam roofing. The independent lab test data found at www.S-5.com can be used for load-critical designs and applications. S-5!® holding strength is unmatched in the industry.

Example Profiles

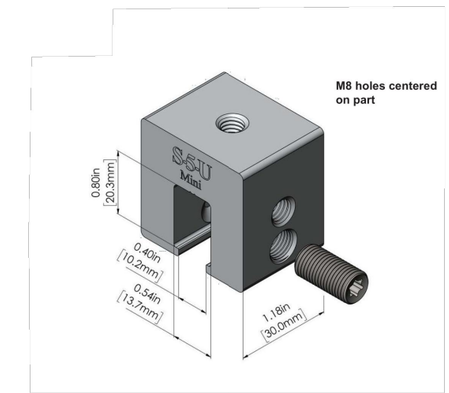


For horizontal seams under 0.65", do not use this clamp. Visit www.S-5.com for more detailed information and proper clamp usage.

S-5-U Clamp



S-5-U Mini Clamp



Please note: All measurements are rounded to the second decimal place.

S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. Visit the website at www.S-5.com for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel, and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consultthe S-5! website at www.S-5.com for published data regarding holding strength.

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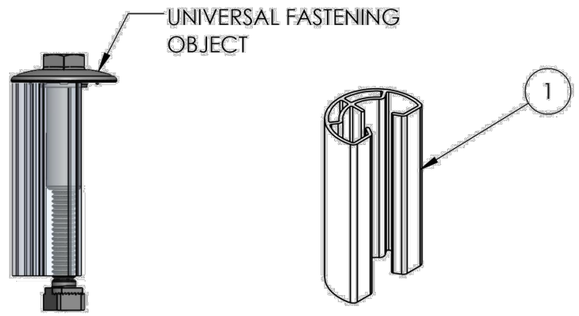
RACKING DATASHEET

Cut Sheet

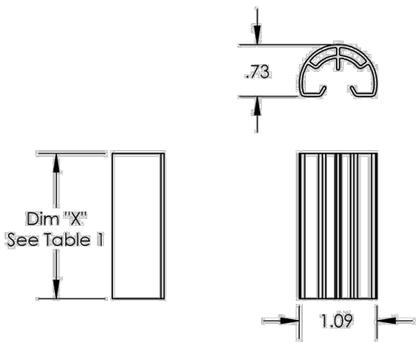
IRONRIDGE

Stopper Sleeve



ITEM NO.	COMPONENT
1	STOPPER SLEEVE

TABLE 1: STOPPER SLEEVE PART NUMBES AND HEIGHT		
MILL PART NUMBER	BLACK PART NUMBER	HEIGHT "X" (mm)
UFO-STP-30MM-M1	UFO-STP-30MM-B1	30
UFO-STP-32MM-M1	UFO-STP-32MM-B1	32
UFO-STP-33MM-M1	UFO-STP-33MM-B1	33
UFO-STP-35MM-M1	UFO-STP-35MM-B1	35
UFO-STP-38MM-M1	UFO-STP-38MM-B1	38
UFO-STP-40MM-M1	UFO-STP-40MM-B1	40
UFO-STP-42MM-M1	UFO-STP-42MM-B1	42
UFO-STP-46MM-M1	UFO-STP-46MM-B1	46



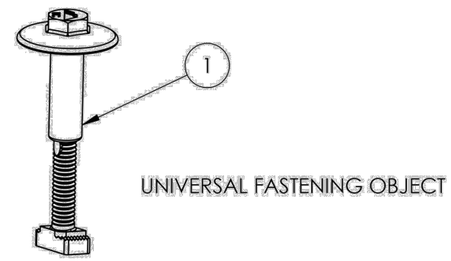
Property	Value
Material	6000 Series Aluminum
Finish	Mill or Black

v1.30

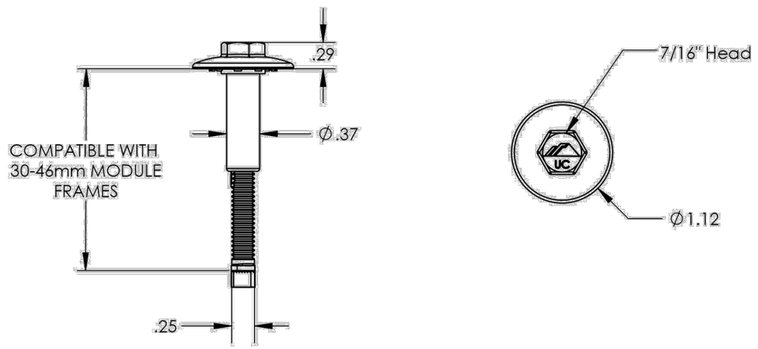
Cut Sheet

IRONRIDGE

Universal Fastening Object



ITEM NO.	DESCRIPTION
UFO-CL-01-A1	UNIVERSAL MODULE CLAMP, CLEAR
UFO-CL-01-B1	UNIVERSAL MODULE CLAMP, BLACK



Property	Value
Material	300 Series Stainless Steel
Finish	Clear and Black

v1.30

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Development Services Department
Lee's Summit, Missouri
12/15/2021

RANDY FIELDS

PROJECT OWNER

CONTRACTOR:

THE SOLAR GUYS
Installation · Service · Repair
Commercial · Residential
Energy Storage

UTILITY COMPANY
EVERGY - LEGACY

AHJ
LEE'S SUMMIT

APN.

PROJECT ADDRESS
20 SW PERSELS RD, LEE'S SUMMIT, MO 64081

REVISION HISTORY

REV	DESCRIPTION	DRW	CHK	DATE
0	DRAFT REVIEW	SR	MR	10/12/21

JOB NUMBER
PAGE SIZE B

SITE NUMBER
SCALE N.T.S.

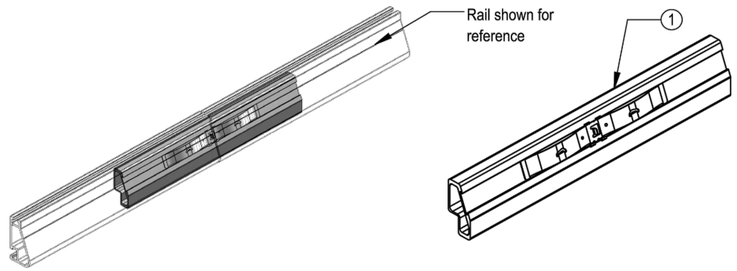
DRAWING NUMBER
PV-11

DRAWING TITLE
RACKING DATASHEET

Cut Sheet

IRONRIDGE

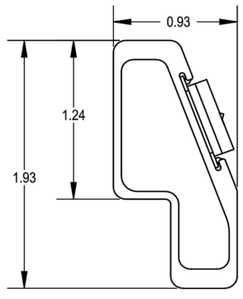
BOSS XR100

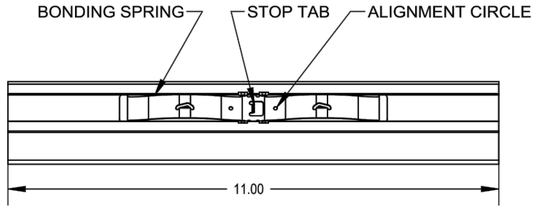


ITEM NO	DESCRIPTION	QTY IN KIT
1	SPLICE, XR100, MILL	1

Part Number	Description
XR100-BOSS-01-M1	Bonded Splice, XR100

1) Bonded Splice, XR100





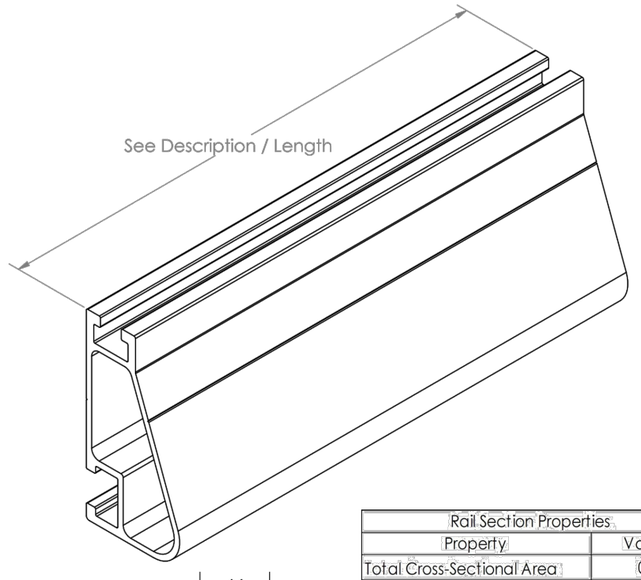
Propery	Value
Material	6000 Series Aluminum
Finish	Mill

v1.0

Cut Sheet

IRONRIDGE

XR100 Rail



Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.582 in^2
Section Modulus (X-axis)	0.297 in^3
Moment of Inertia (X-axis)	0.390 in^4
Moment of Inertia (Y-axis)	0.085 in^4
Torsional Constant	0.214 in^3
Polar Moment of Inertia	0.126 in^4

APPROVED MATERIALS:
6005-T6, 6005A-T61, 6105-T5, 6N01-T6
(34,000 PSI YIELD STRENGTH MINIMUM)

Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-100-132A	XR-100-132B	XR100, Rail 132" (11 Feet)	6000-Series Aluminum	7.50 lbs.
XR-100-168A	XR-100-168B	XR100, Rail 168" (14 Feet)		9.55 lbs.
XR-100-204A	XR-100-204B	XR100, Rail 204" (17 Feet)		11.60 lbs.

v1.1

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PV-12

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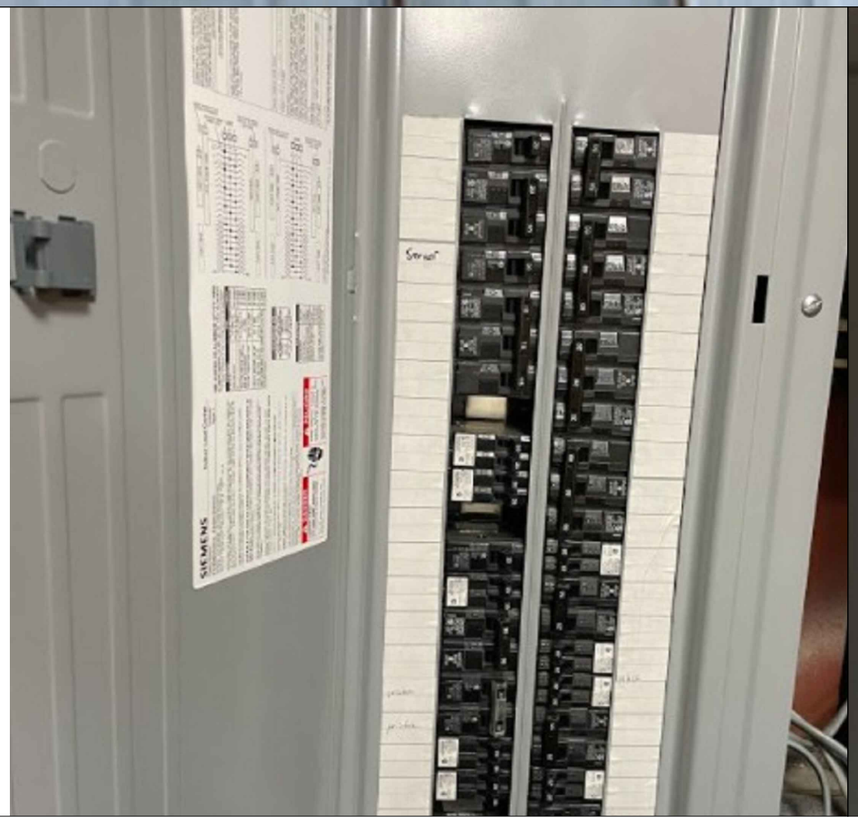

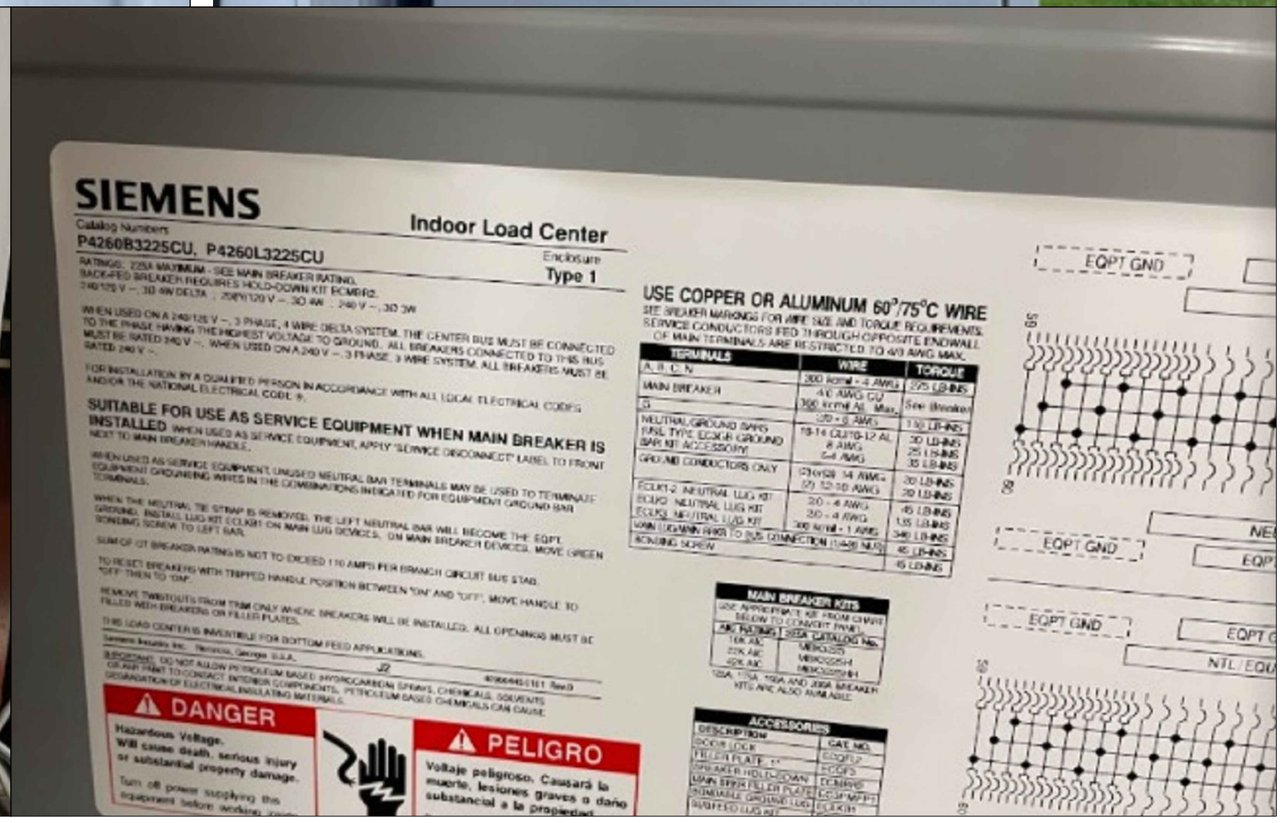

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PV-13

DRAWING TITLE

ELECTRICAL EQUIPMENT PICTURES