

December 1, 2022

LGCY Solar
3333 Digital Drive #600
Lehi, UT 84043

Scott
Wyssling, PE

Digitally signed by Scott Wyssling, PE
DN: C=US, S=Utah, L=Alpine,
O=Wyssling Consulting, OU=Owner,
CN="Scott Wyssling, PE",
E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2022.12.01 11:13:40-07'00'
Foxit PDF Editor Version: 11.1.0

Re: Engineering Services
Holcombe Residence
254 Leon Sauls Loop, Lake City FL
11.880 kW System

To Whom It May Concern:

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

A. Site Assessment Information

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

B. Description of Structure:

Roof Framing: Prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber.

Roof Material: Metal Roofing

Roof Slope: 12 degrees

Attic Access: Accessible

Foundation: Permanent

C. Loading Criteria Used

- **Dead Load**
 - Existing Roofing and framing = 7 psf
 - New Solar Panels and Racking = 3 psf
 - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 0 psf
- **Wind Load** based on ASCE 7-16
 - Ultimate Wind Speed = 120 mph (based on Risk Category II)
 - Exposure Category B



Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the FBC 2020, 7th Edition, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.

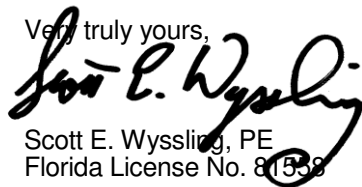
D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent "S5 Installation Manual". If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. System will be attached to the metal roofing material utilizing the patented S5 connection. Installation of the connections shall be in accordance with the manufacturer's recommendations.
3. Considering the roof slopes, the size, spacing, condition of roof, the panel supports shall be placed no greater than 45" o/c.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the FBC 2020, 7th Edition, current industry standards, and is based on information supplied to us at the time of this report.

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

Very truly yours,


Scott E. Wyssling, PE
Florida License No. 81558



Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
Florida License # RY34912

12/1/2022

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

PROJECT DESCRIPTION:

PHOTOVOLTAIC ROOF MOUNT & ENERGY STORAGE SYSTEM
27x440 APTOS SOLAR DNA-120-MF10 (440W) MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
SYSTEM SIZE: 11.88 kW DC STC
SYSTEM SIZE: 7.83 kW AC

EQUIPMENT SUMMARY

- 27 APTOS SOLAR DNA-120-MF10 (440W) MODULES
- 27 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
- 01 ENPHASE ENCHARGE 3-1P-NA BATTERY
- 01 ENPHASE ENPOWER SMART SWITCH R2

DESIGN CRITERIA	
WIND SPEED	120
EXPOSURE CATEGORY	B
RISK CATEGORY	II
MOUNTING METHOD	ROOF MOUNT
GROUND SNOW LOAD	0

CODE COMPLIANCE

ALL WORK SHALL COMPLY WITH ALL STATE AND LOCAL CODES, ORDINANCES AND ANY OTHER REGULATING AUTHORITIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK.

AHJ NOTES:
ALL WORK SHALL COMPLY WITH THE
2020 FLORIDA RESIDENTIAL CODE
2020 FLORIDA BUILDING CODE
2020 FLORIDA ENERGY CONSERVATION CODE
2020 FLORIDA PLUMBING CODE
2020 FLORIDA FUEL GAS CODE

ELECTRICAL CODE:
ALL ELECTRICAL WORK SHALL COMPLY WITH THE
2017 NATIONAL ELECTRIC CODE.

GPS COORDINATES: 30.065328, -82.610599

GENERAL INSTALLATION NOTES

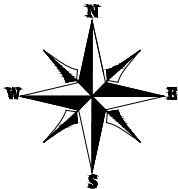
- INSTALLER SHALL ASSUME FULL RESPONSIBILITY AND LIABILITY FOR COMPLIANCE WITH REGULATIONS PER FEDERAL OSHA AND LOCAL REGULATIONS PERTAINING TO WORK PRACTICES, PROTECTION OF WORKERS AND VISITORS TO THE SITE.
- INSTALLER SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AT SITE BEFORE COMMENCING WORK.
- CONTRACTOR SHALL FURNISH ALL MATERIAL EXCEPT AS SPECIFIED IN THE CONTRACT AND/OR THESE DRAWINGS.
- ALL MATERIALS SHALL BE IN NEW AND UNUSED CONDITION.
- MANUFACTURER'S MATERIAL EQUIPMENT, ETC. SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
- THE INSTALLER SHALL BECOME FAMILIAR WITH ALL UTILITY AS-BUILT PLANS AND THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES, PAVEMENT OR IMPROVEMENTS.
- CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY THE OWNER OF DISCREPANCIES REQUIRING FURTHER CLARIFICATION BEFORE PROCEEDING WITH THE WORKS.
- INSTALL ALL ASPECTS OF THIS PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS AND AS NOTED ON DRAWINGS ISSUED FOR CONSTRUCTION.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER 310.0(D)
- WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26
- EXACT CONDUIT RUN LOCATIONS SUBJECT TO CHANGE
- ROOF PENETRATIONS ARE SEALED.
- INVERTER IS LISTED TO UL-1741 "UTILITY INTERACTIVE"
- VISIBLE, LABELED, LOCKABLE DISCONNECT LOCATED LESS THAN 10' FROM UTILITY METER

SHEET INDEX

- PV-0 COVER SHEET
- PV-1 PLOT PLAN WITH ROOF PLAN
- PV-2 ROOF PLAN WITH MODULES
- PV-3 ATTACHMENT DETAIL
- PV-4 ELECTRICAL LINE DIAGRAM
- PV-4A ELECTRICAL LINE CALCULATION
- PV-5 ELECTRICAL PHOTOS
- PV-6 PLACARDS
- PV-7 ADDITIONAL NOTES
- PV-8 JOB HAZARD ANALYSIS
- PV-9+ EQUIPMENT SPECIFICATIONS



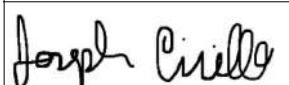
1 HOUSE PHOTO
PV-0 SCALE: NTS



2 VICINITY MAP
PV-0 SCALE: NTS



LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899



LICENSE NUMBER: EC13006601



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12/1/2022

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APN# 095S1709174002

SHEET NAME
COVER SHEET

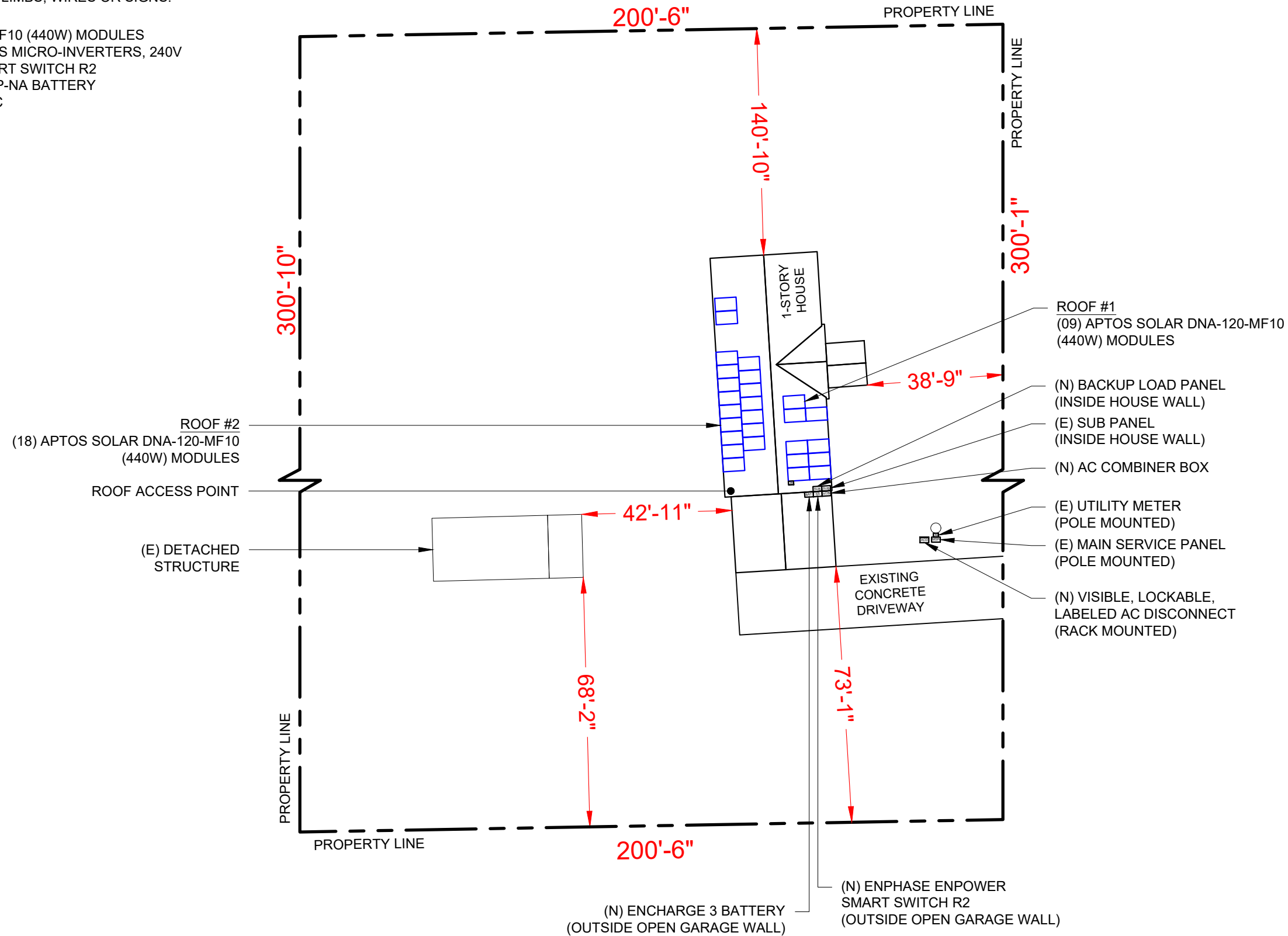
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-0

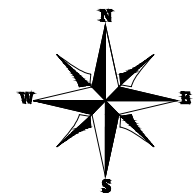
● ROOF ACCESS POINT

ROOF ACCESS POINT SHALL NOT BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

SYSTEM SUMMARY
27 APTOS SOLAR DNA-120-MF10 (440W) MODULES
27 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
01 ENPHASE ENPOWER SMART SWITCH R2
03 ENPHASE ENCHARGE 3-1P-NA BATTERY
SYSTEM SIZE: 11.88 KW DC STC



LEON SAULS LOOP

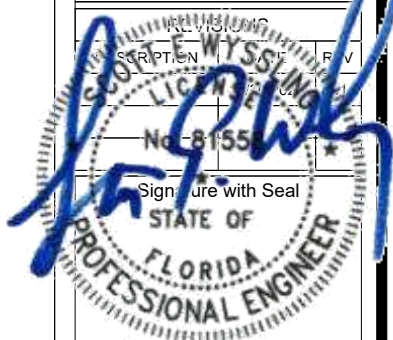


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Joseph Cirillo

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SHEET NAME
PLOT PLAN WITH
ROOF PLAN

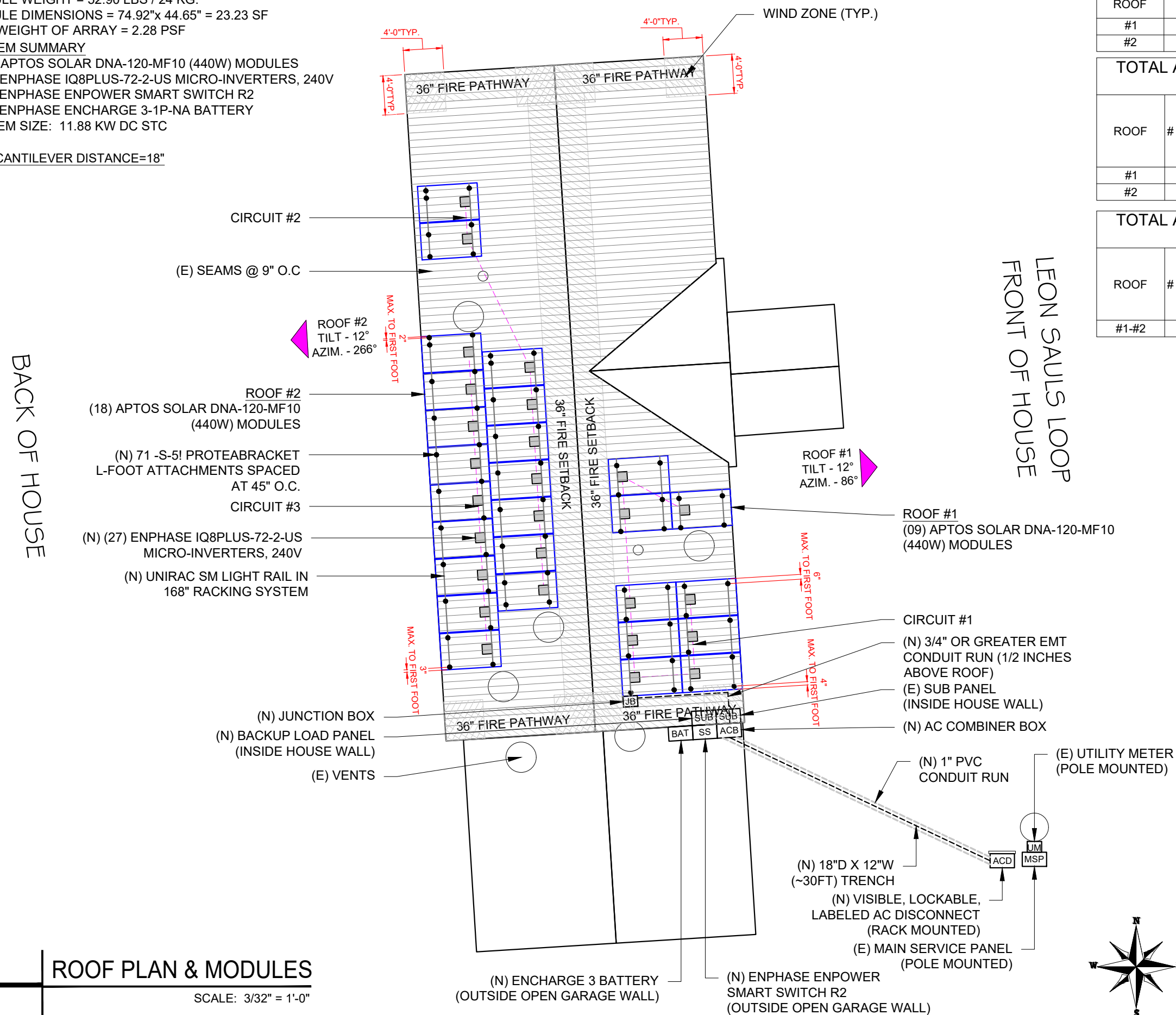
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

NUMBER OF MODULES = 27 MODULES
MODULE TYPE = APTOS SOLAR DNA-120-MF10 (440W) MODULES
MODULE WEIGHT = 52.90 LBS / 24 KG.
MODULE DIMENSIONS = 74.92"x 44.65" = 23.23 SF
UNIT WEIGHT OF ARRAY = 2.28 PSF

27 APTOS SOLAR DNA-120-MF10 (440W) MODULES
27 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
01 ENPHASE ENPOWER SMART SWITCH R2
01 ENPHASE ENCHARGE 3-1P-NA BATTERY
SYSTEM SIZE: 11.88 KW DC STC

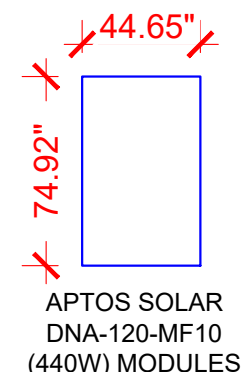
MAX.CANTILEVER DISTANCE=18"



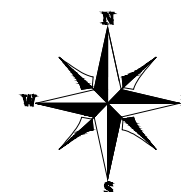
ROOF DESCRIPTION				
ROOF TYPE			CORRUGATED METAL ROOF	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	12°	86°	2"x4"	24" O.C.
#2	12°	266°	2"x4"	24" O.C.

TOTAL ARRAY AREA WITH MOUNTING ROOF AREA				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	MOUNTING ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	09	209.07	904	23.13
#2	18	418.15	1043	40.09

TOTAL ARRAY AREA WITH MOUNTING ROOF AREA				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	MOUNTING ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1-#2	27	627.22	1947	32.21



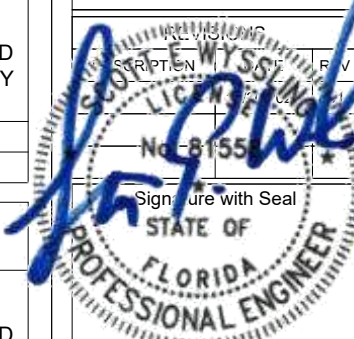
- - MICRO-INVERTERS
- - UTILITY METER
- - JUNCTION BOX
- AC COMBINER BOX
- - AC DISCONNECT
- - SUB PANEL
- - BACKUP LOAD PANEL
- - MAIN SERVICE PANEL
- - ENPHASE ENCHARGE 3 BATTERY
- - ENPHASE ENPOWER SMART SWITCH R2
- -VENTS
(ROOF OBSTRUCTION)
- - CONDUIT RUN
- - SEAMS
- - ROOF ATTACHMENT
- - RAIL
- - CIRCUIT



LGCY POWER
3333 DIGITAL DR #600, LEHI,
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Joseph Cirillo

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APN# 095S1709174002

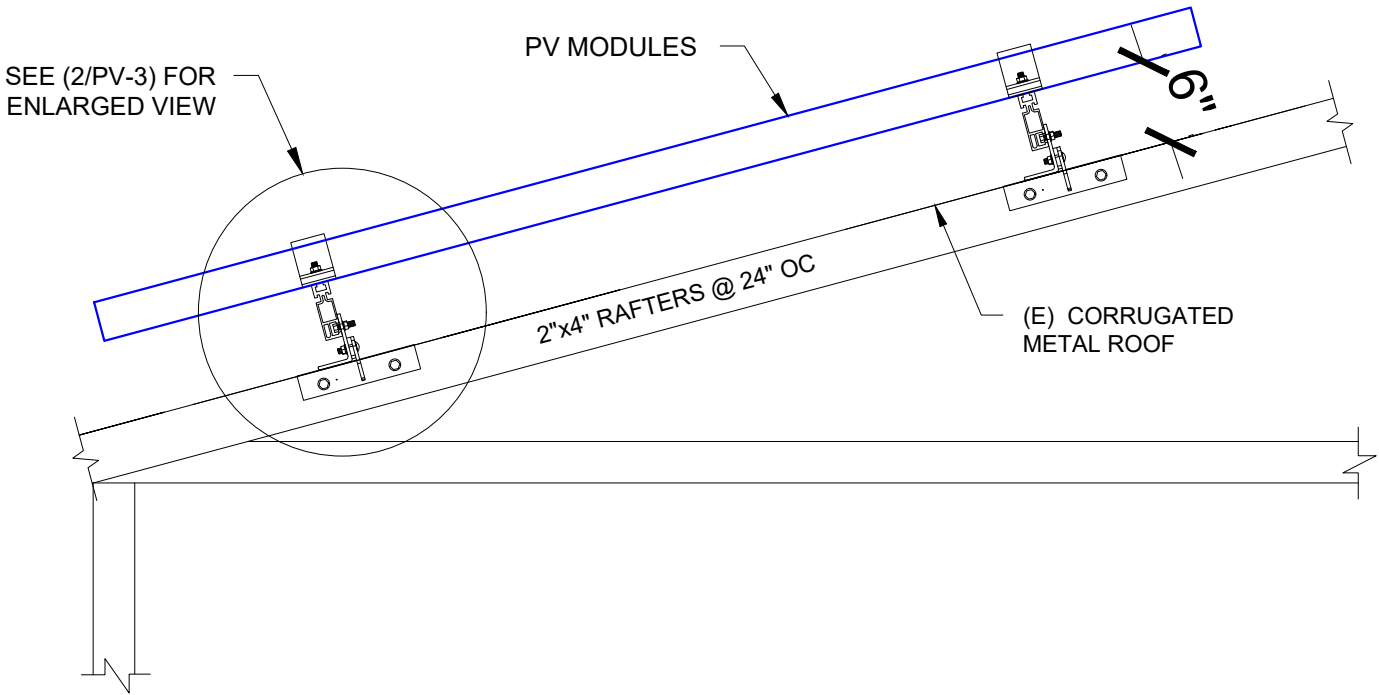
SHEET NAME
ROOF PLAN
WITH MODULES

SHEET SIZE
ANSI B
11" X 17"

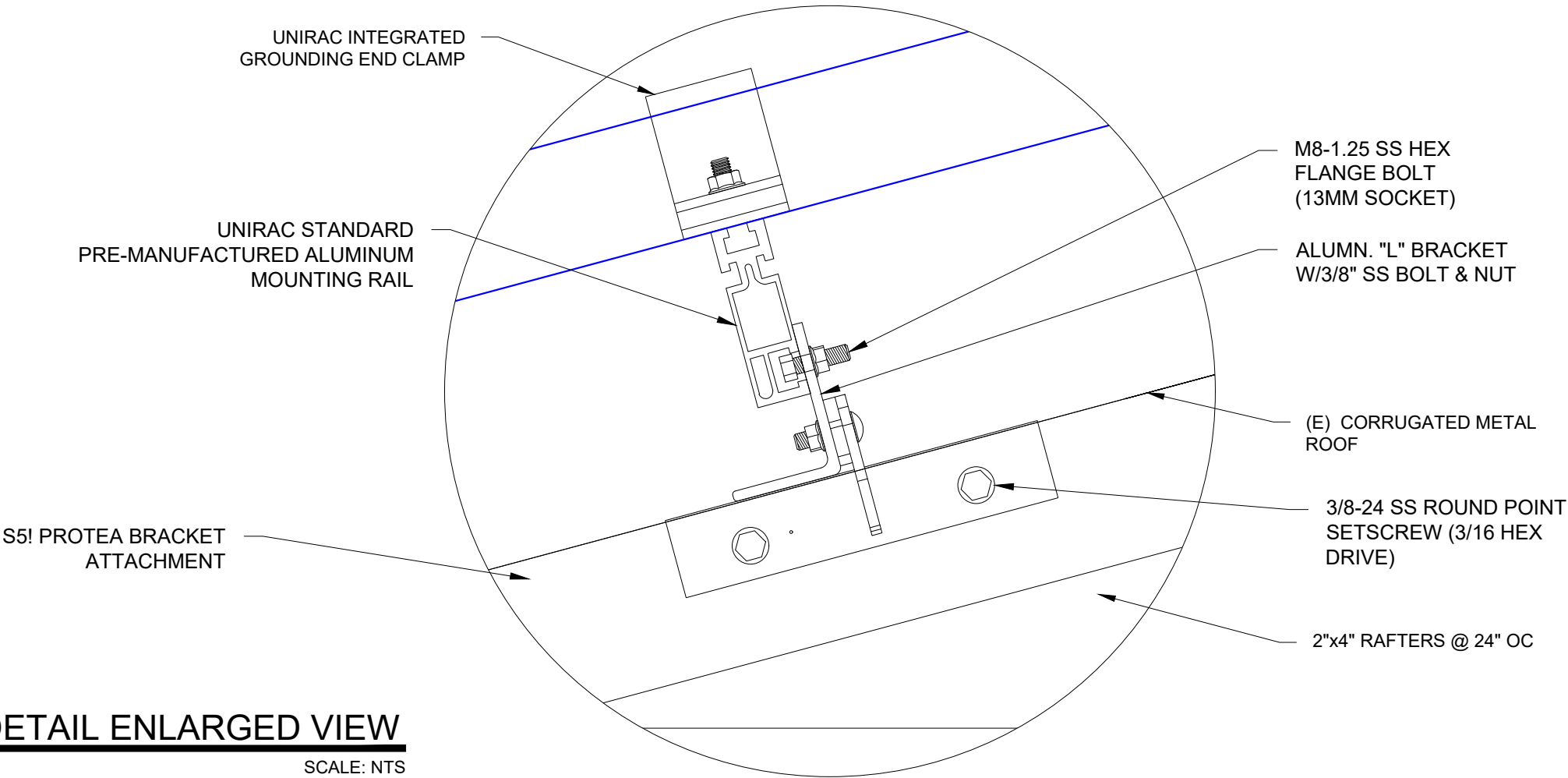
SHEET NUMBER

PV-2

SYSTEM SUMMARY
27 APTOS SOLAR DNA-120-MF10 (440W) MODULES
27 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
01 ENPHASE ENPOWER SMART SWITCH R2
01 ENPHASE ENCHARGE 3-1P-NA BATTERY
SYSTEM SIZE: 11.88 KW DC STC



1 ATTACHMENT DETAIL (SIDE VIEW)
PV-3 SCALE: NTS

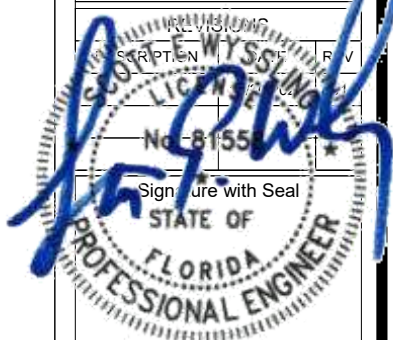


2 ATTACHMENT DETAIL ENLARGED VIEW
PV-3 SCALE: NTS



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SHEET NAME
ATTACHMENT
DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

INVERTER SPECIFICATIONS	
MANUFACTURER	ENPHASE IQ8PLUS-72-2-US
MAX. DC VOLT RATING	60 VOLTS
MAX. POWER AT 40 C	290 WATTS
NOMINAL AC VOLTAGE	240 VOLTS
MAX. AC CURRENT	1.21 AMPS
MAX. OCPD RATING	20 AMPS
MAX. PANELS/CIRCUIT	13
SHORT CIRCUIT CURRENT	15 AMPS

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	APTOS SOLAR DNA-120-MF10 (440W)
VMP	34.16V
IMP	13.17A
VOC	41.34V
ISC	13.80A
MODULE DIMENSION	74.92"L x 44.65"W x 1.38"D (In Inch)
THIS PANEL IS FED BY MULTIPLE SOURCES (UTILITY, BATTERY AND SOLAR)	
AC OUTPUT CURRENT	38.00A
NOMINAL AC VOLTAGE	240V

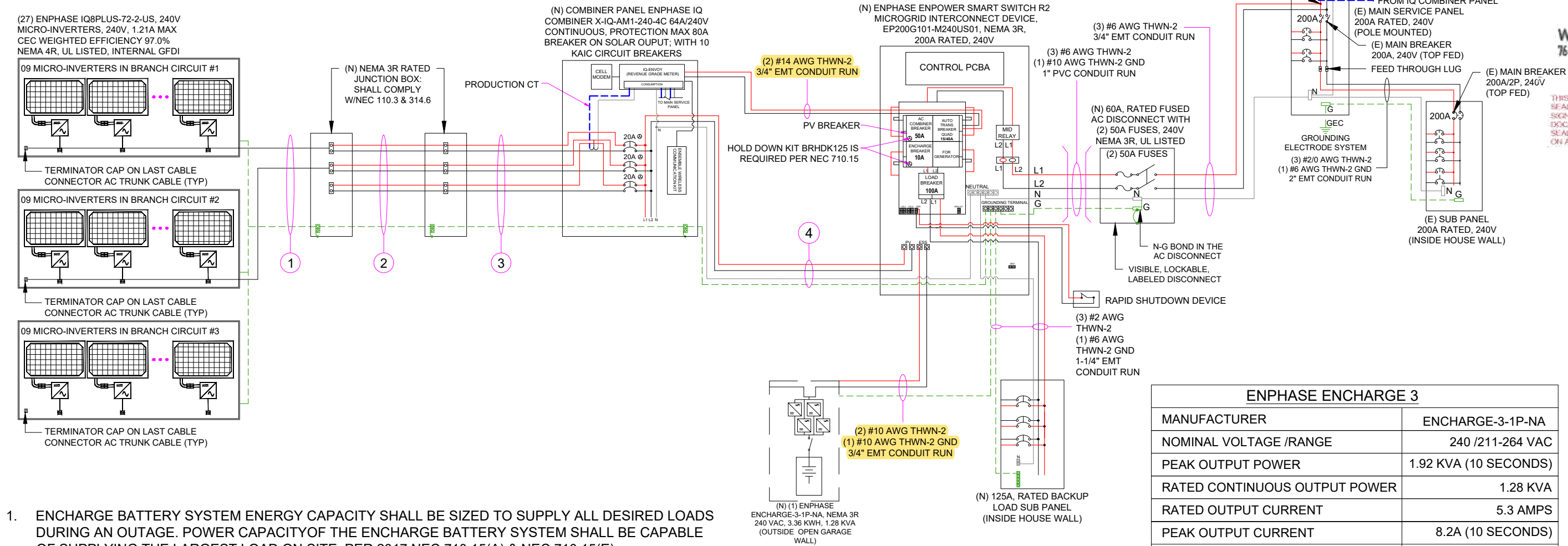
ENPHASE Q CABLE TO BE ATTACHED TO
RAIL MIN. 3-1/2" ABOVE ROOF SURFACE

(27) APTOS SOLAR DNA-120-MF10 (440W) MODULES
(27) ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
(01) ENPHASE ENCHARGE 3-1P-NA BATTERY
(01) ENPHASE ENPOWER SMART SWITCH R2
(03) CIRCUITS OF 09 MODULES WITH MICRO INVERTERS
CONNECTED IN SERIES PER CIRCUIT
SYSTEM SIZE: 11.88 KW DC STC

NOTE:
1. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE
BASED ON MINIMUM CODE REQUIREMENTS AND ARE
NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD
CONDITIONS.

Rooftop conductor ampacities designed in compliance
with art. 690.8, Tables 310.15(B)(2)(a),
310.15(B)(3)(a), 310.15(B)(3)(c), 310.15(B)(16),
Chapter 9 Table 4, 5, & 9. Location specific
temperature obtained from ASHRAE 2017 data tables

RECORD LOW TEMP	-10°
AMBIENT TEMP (HIGH TEMP 2%)	37°
CONDUIT HEIGHT	0.5"
ROOF TOP TEMP	59°
CONDUCTOR TEMPERATURE RATE	90°



ENPHASE ENCHARGE 3	
MANUFACTURER	ENCHARGE-3-1P-NA
NOMINAL VOLTAGE / RANGE	240 /211-264 VAC
PEAK OUTPUT POWER	1.92 KVA (10 SECONDS)
RATED CONTINUOUS OUTPUT POWER	1.28 KVA
RATED OUTPUT CURRENT	5.3 AMPS
PEAK OUTPUT CURRENT	8.2A (10 SECONDS)
NOMINAL DC VOLTAGE	67.2 V
MAX. DC VOLTAGE	73.5 V

ENPHASE IQ SYSTEM CONTROLLER 2	
MANUFACTURER	EP200G101-M240US01
NOMINAL VOLTAGE / RANGE	240 VAC / 100 - 310 VAC
MAX. CONT. CURRENT	160 AMPS
MAX. OUTPUT OCPD	200 AMPS
MAX. OCPD FOR STORAGE BRANCH	80 AMPS
MAX. OCPD FOR PV COMBINER BRANCH	80 AMPS

LGCY POWER

LGCY POWER
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855-353-4899

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LICENSE NUMBER: EC1300660



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12/1/2022

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APN# 095S1709174002

SHEET NAME
**ELECTRICAL LINE
DIAGRAM**

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

SHEET NUMBER
PV-4

WIRE TAG #	WIRE FROM - -	CONDUIT	WIRE QTY	WIRE GAUGE:	WIRE TYPE ENPHASE Q-CABLE INCLUDES #12 GROUND	TEMP RATING:	WIRE AMP	TEMP DE-RATE:	CONDUIT FILL:	WIRE OCP:	TERMINAL 75°C RATING:	INVERTER QTY:	NOC:	NEC:	STRING AMPS	GRND SIZE	GRND WIRE TYPE
①	ARRAY TO JUNCTION BOX	-	3	#12	Q-CABLE	90°	30A x	0.91 x	1.00 =	27.30A	25A	09 x	1.21 x	1.25 =	13.61A	#6	BARE CU
②	JUNCTION BOX TO JUNCTION BOX	FREE AIR	6	#12	12/2 UF-B	75°	25A x	0.88 x	0.80 =	17.60A	25A	09 x	1.21 x	1.25 =	13.61A	#10	BARE CU
③	JUNCTION BOX TO COMBINER PANEL	3/4" EMT	6	#10	THWN-2	75°	35A x	0.88 x	0.80 =	24.64A	35A	09 x	1.21 x	1.25 =	13.61A	#10	THWN-2
④	COMBINER PANEL TO ENPOWER	3/4" EMT	3	#6	THWN-2	75°	65A x	0.88 x	1.00 =	57.20A	65A	27 x	1.21 x	1.25 =	40.84A	#10	THWN-2



LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899



LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

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SHEET NAME

ELECTRICAL LINE
CALCULATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-4A



I-T-E[®] Manufactured House

Catalog Number

M1632MB1200F
M1632MB1200S

RATINGS:

200 Amps. Max.

See Main Breaker Rating

120/240 Volts AC 1 Phase 3 Wire

208Y/120 Volts AC 1 Phase 3 Wire

Suitable for use as service equipment when used as permitted by Article 384 of the National Electrical Code.

Sum of QT breaker rating not to exceed 110 amps. per branch circuit bus stab.

TERMINALS:

USE COPPER OR ALUMINUM WIRE

for all panel terminals and on circuit breaker terminals when breakers are so marked.

Ground Bar Wire Size

Copper

One #14-#4 AWG and Two or Three #14-#10 AWG

Aluminum

One #12-#4 AWG and Two or Three #12-#10 AWG

Neutral Bar Wire Size

Tightening

Line Terminals A, I

Suitable for 60°/75°

Wire Size

Copper and Aluminum

#1 – 300 MCM AWG

Torque Terminals to

Branch Breaker Ter

for 60°C Copper or

Conductors.

75°C Copper Condu

(40 Amp. Thru 125 A

Only.)

LK-4 Lug Kit

Suitable for 60°/75°C

Wire Size

Copper or Aluminum

#1-300 MCM AWG

Torque Terminals to 3

#4-2/0 AWG

Torque Terminals to 1

LK-3 Lug Kit

Suitable for 60°/75°C

Wire Size

Copper and Aluminum

#1-300 MCM AWG

Torque Terminals to 34

LK-2 Lug Kit

Suitable for 60°/75°C C

Wire Size

Copper and Aluminum

#4-2/0 AWG

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

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APN# 095S1709174002

SHEET NAME
ELECTRICAL
PHOTOS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

1) COMBINER PANEL
NEC 705.12(B)(3)(4)
LOCATED AT AC COMBINER PANEL

WARNING

PHOTOVOLTAIC SYSTEM
COMBINER PANEL
DO NOT ADD LOADS

2) AC DISCONNECT
NEC 690.54
LOCATED ON AC DISCONNECT

PHOTOVOLTAIC SYSTEM
AC DISCONNECT

OPERATING VOLTAGE 240 VOLTS
OPERATING CURRENT 38.00 AMPS

3) PV SOLAR BREAKER
NEC 705.12(B)(3)(2)
LOCATED NEXT TO THE PV BREAKER

PV SOLAR BREAKER

DO NOT RELOCATE THIS
OVERCURRENT DEVICE

4) PV CONDUCTORS
NEC 690.31(D)(2)
LOCATED ON CABLE TRAYS, JUNCTION BOXES AND CONDUIT

WARNING: PHOTOVOLTAIC
POWER SOURCE

LABELS MUST BE VISIBLE AFTER INSTALLATION.
LABELS MUST BE LOCATED ON EVERY SECTION OF
THE WIRING SYSTEM SEPARATED BY WALLS,
FLOORS OR OTHER PARTITIONS AND MUST NOT BE
SEPARATED BY MORE THAN 10'

BATTERY

1 OF 1

LABEL LOCATION:
BATTERY

ALL LABELS MUST BE PERMANENTLY ATTACHED, MUST BE WEATHER AND SUNLIGHT RESISTANT AND MAY NOT BE HAND-WRITTEN

5) RAPID SHUTDOWN
NEC 690.56(C)(2)
LOCATED ON AC DISCONNECT

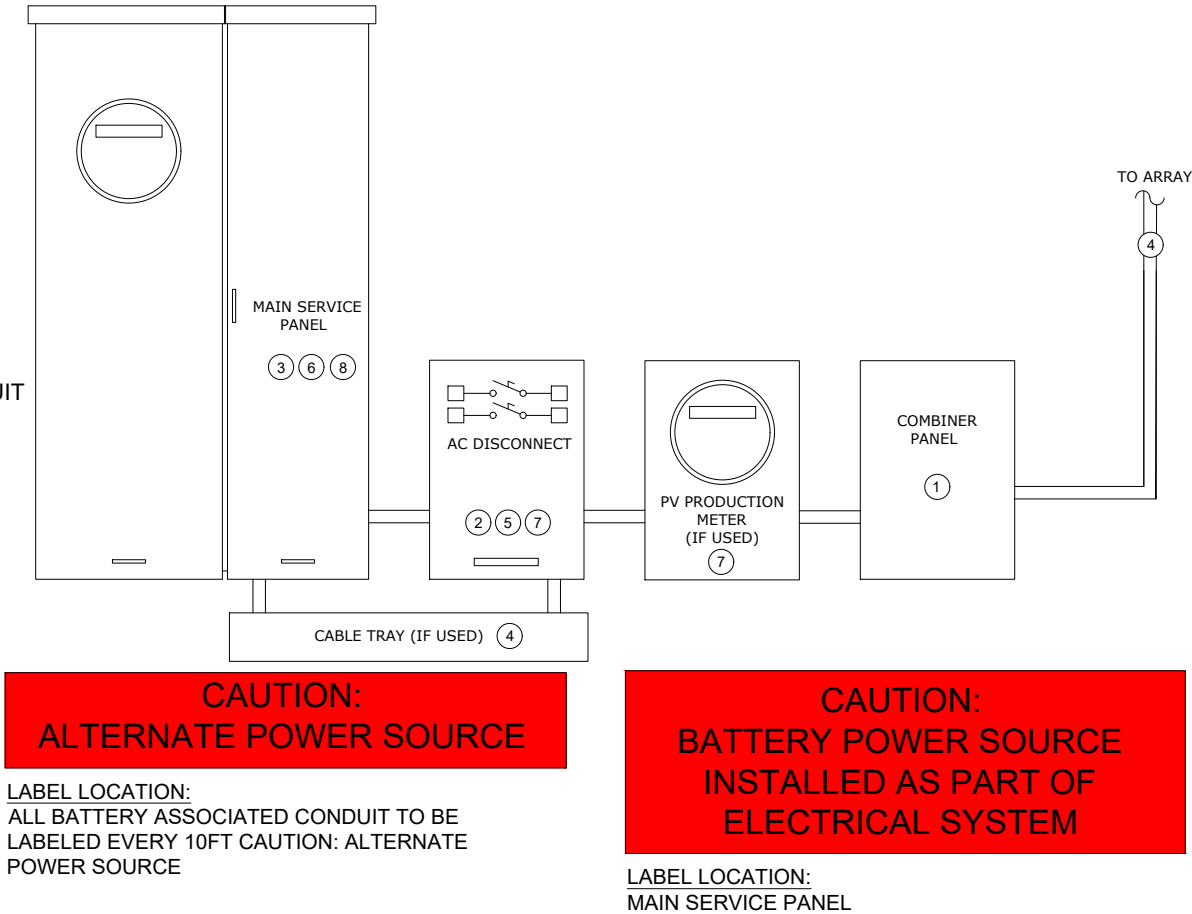
RAPID SHUTDOWN
SWITCH FOR
SOLAR PV SYSTEM

6) DUEL POWER SOURCES
NEC 690.56(C)
MUST BE LOCATED ON THE MAIN SERVICE PANEL

SOLAR 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

SOLAR ELECTRIC
PV PANELS



CAUTION:
BATTERY POWER SOURCE
INSTALLED AS PART OF
ELECTRICAL SYSTEM

LABEL LOCATION:
MAIN SERVICE PANEL

7) ELECTRIC SHOCK HAZARD
NEC 690.13(B)
LOCATED ON AC DISCONNECT & PRODUCTION METER

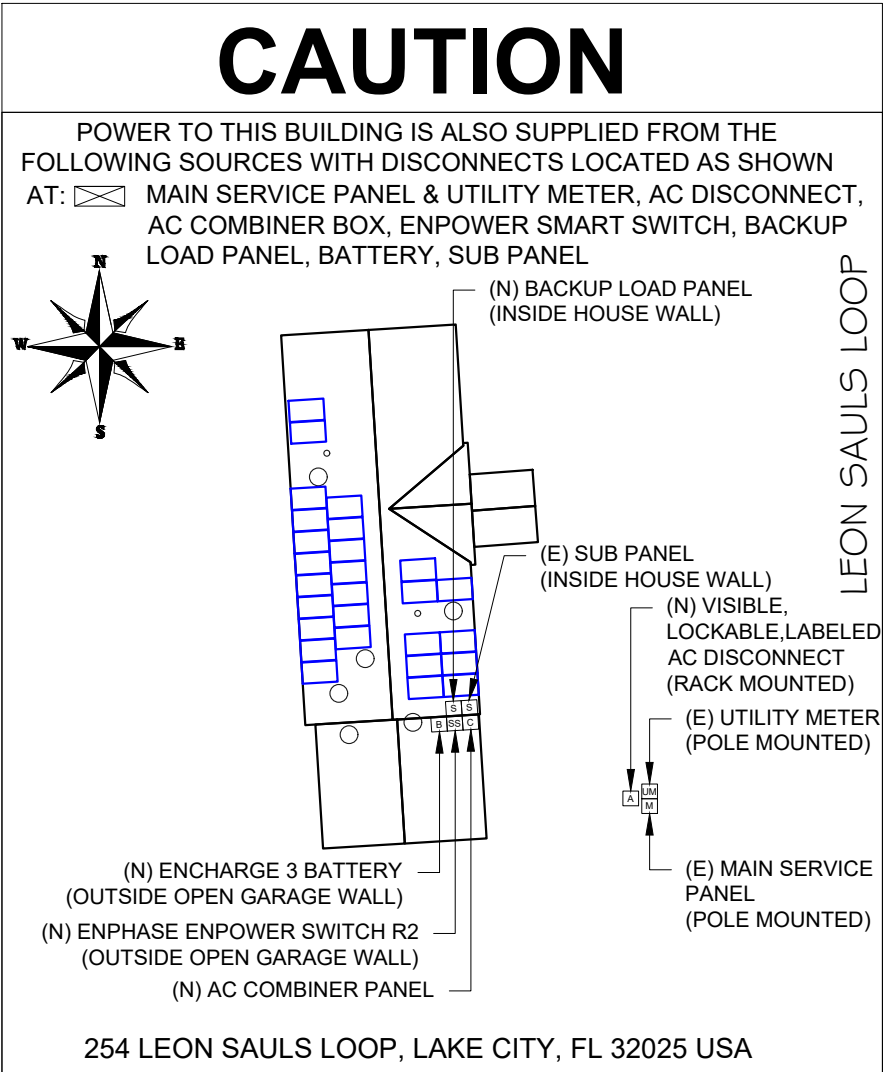
WARNING

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

8) DUAL POWER SUPPLY
NEC 705.12(B)(3)
MUST BE LOCATED ON THE MAIN SERVICE PANEL

WARNING

DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM



- LABELING NOTES:**
1. LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.
 2. LABELING REQUIREMENTS BASED ON THE NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
 3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
 4. LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED [NEC 110.21] THEY SHALL BE PERMANENTLY ATTACHED, WEATHER/SUNLIGHT RESISTANT, AND SHALL NOT BE HAND WRITTEN NEC 11.21(B)
 5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

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254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
PLACARDS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

ELECTRICAL NOTES:

- 1. EACH MODULE TO BE GROUNDED USING THE SUPPLIED CONNECTION POINT PER MANUFACTURER'S REQUIREMENTS. ALL SOLAR MODULES, EQUIPMENT, AND METALLIC COMPONENTS ARE TO BE BONDED. IF THE EXISTING GROUNDING ELECTRODE SYSTEM CAN NOT BE VERIFIED OR IS ONLY METALLIC WATER PIPING.
- 2. ALL PLAQUES AND SIGNAGE REQUIRED BY THE LATEST EDITION OF NATIONAL ELECTRICAL CODE. LABEL SHALL BE METALLIC OR PLASTIC, ENGRAVED OR MACHINE PRINTED IN ACCORDANCE WITH NEC REQUIREMENTS. PLAQUE SHALL BE UV RESISTANT IF EXPOSED TO SUNLIGHT.
- 3. EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.138(A).
- 4. CONFIRM LINE SIDE VOLTAGE AT ELECTRIC UTILITY SERVICE PRIOR TO CONNECTING INVERTER. VERIFY SERVICE VOLTAGE IS WITHIN INVERTER VOLTAGE OPERATIONAL RANGE.
- 5. OUTDOOR EQUIPMENT SHALL BE NEMA-3R RATED OR BETTER.
- 6. ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
- 7. ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE, AND FOR ROOF-MOUNTED SYSTEMS, WIRING MUST BE PERMANENTLY AND COMPLETELY HELP OFF OF THE ROOF SURFACE. NEC 110.2 - 110.4 / 300.4



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Joseph Ciriello

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APN# 095S1709174002

SHEET NAME

ADDITIONAL NOTES

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-7



FIELD DESIGN REQUEST FORM

JOB INFORMATION

JOB NAME:

DATE:

ADDRESS:

CHANGE REQUEST

WHO AUTHORIZED THE CHANGE:

DESCRIBE THE NEEDED CHANGE & WHY:

NEW DESIGN LAYOUT

DRAW THE MOUNTING PLANE SHOWING THE NEW MODULE LAYOUT:

INSTALLER NAME(PRINT):

I UNDERSTAND AND AGREE TO THE CHANGES MADE ABOVE:

CUSTOMER NAME

CUSTOMER SIGNATURE

DATE



JOB HAZARD ANALYSIS

CUSTOMER NAME/JOB ID: CUSTOMER ADDRESS

INSTALL DATE - - Time : am/pm

HAZARD CATEGORY	HAZARD TYPE	HAZARD CONTROL MEASURES
LADDER SAFETY	- LOCATION - CONDITION - WORKING CLEARANCE	
FALL PROTECTION	WORKING 6’ OR HIGHER	
ELECTRICAL SAFETY	- ARCH FLASH - ELECTRIC SHOCK/ELECTROCUTION	
WEATHER CONDITIONS	- HEAT/COLD TEMP - RAINY/ICY/WINDY	
PUBLIC SAFETY	- WORK/OBJECTS OVERHEAD - SLIPS/TRIPS/FALLS - ACCESS TO LIVE ELECTRICAL	

NEAREST EMERGENCY FACILITY

CONTACT IMMEDIATLY IN EMERGENCY (911 AND/OR)

GENERAL SITE DISCRIPTION/NOTES

CREW MEMBERS ON SITE FOR INSTALL	
NAME	SIGNATURE
FMU/LMD-	

ELECTRICAL COMPLETION
PHOTOS QR CODE

ROOFTOP INSTALLATION
PHOTOS QR CODE

MPU COMPLETION
PHOTOS QR CODE



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EMAIL ID# - sholcombe@newgeneration.org

PHONE NO.# (386) 867-0713

APN# 095S1709174002

SHEET NAME
JOB HAZARD ANALYSIS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

DNA™ 120

Solar for Innovators

Residential | Commercial

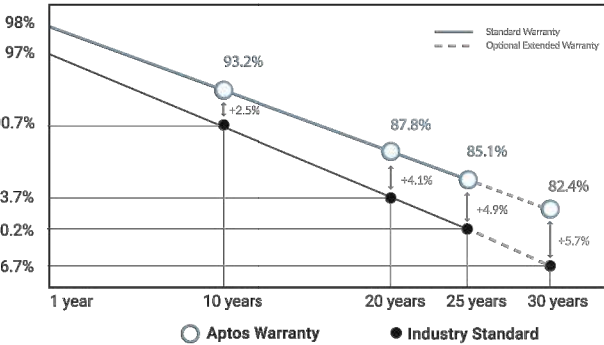


Designed & Engineered in Silicon Valley

440W | 435W | 430W

Our DNA Split Cell Series uses advanced selective emitter PERC technology with thin film layers to improve heat tolerance, increase photon capture, minimize resistive loss, and use 5% more of the available active area for optimal power performance. Our panels exceed IEC standards and come with an industry leading, 30-year warranty.

Linear Performance Warranty



Features



Advanced Technology

Patented DNA™ technology boosts power performance & module efficiency



Maximum Panel Density

Advanced split cell technology with 10 ultra-thin busbars allows for less resistance and more photon capture



Durable Design

Robust product design is resilient in extreme weather. Up to 5400 Pa snow load and 5400 Pa wind load

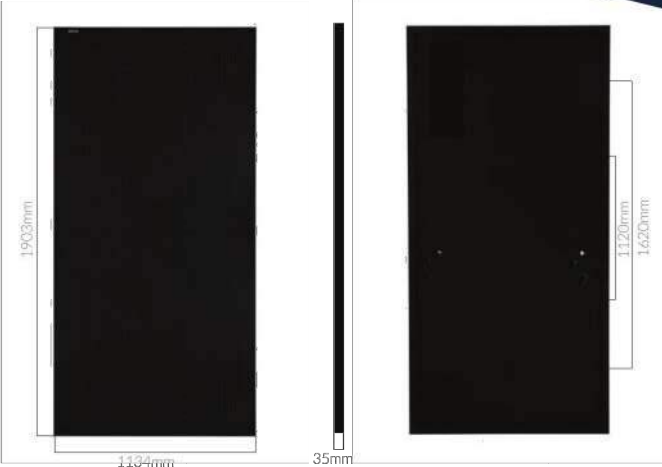


A Safe Investment

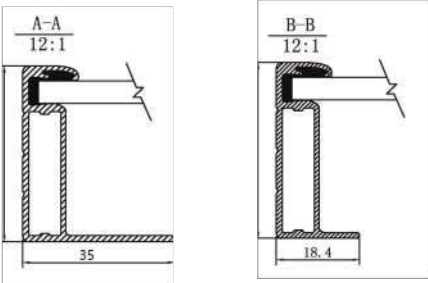
Industry leading 30 year warranty



3140 De La Cruz Blvd., Ste 200
Santa Clara, CA 95054
www.aptosolar.com | info@aptosolar.com



v A™ 120



Electrical Specifications

	DNA-120-MF10-430W	DNA-120-MF10-435W	DNA-120-MF10-440W
STCrated Output P _{mp} (W)	430W	435W	440W
Module Efficiency	20.39%	20.62%	20.85%
Open Circuit Voltage V _{oc} (V)	40.80	41.10	41.34
Short Circuit Current I _{sc} (A)	13.61	13.70	13.80
Rated Voltage V _{mp} (V)	33.82	34.02	34.16
Rated Voltage I _{mp} (A)	13.01	13.09	13.17

Standard Test Conditions for front-face of panel: 1000 W/m², 25°C, measurement uncertainty <3%

Temperature Coefficients

Temperature Coefficients P _{mp}	-0.35%/°C
Temperature Coefficients I _{sc}	+0.06%/°C
Temperature Coefficients V _{oc}	-0.29%/°C
Nominal Operating Cell Temperature (NOCT)	45°C

Test Operating Conditions

Maximum Series Fuse	25A
Maximum System Voltage	1,500 VDC (UL&IEC)
Maximum Load Capacity (Per UL 1703)	5400 PA Snow Load / 5400 Pa Wind Load
Fire Performance Class	Class C/Type 1

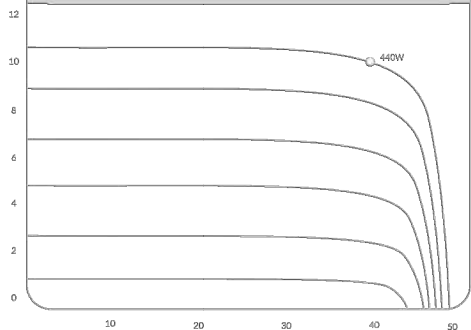
Packaging Configuration

Number of Modules per Pallet	31
Number of Pallets per 40ft. Container	24
Pallet Dimensions	2030 X 1220 X 1200
Pallet Weight (kg)	766
Container Weight (kg)	18,384

Mechanical Properties

Cell Type	Monocrystalline
Glass	3.2mm, anti-reflection coating, high transmission, low iron, tempered glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68
Dimensions	1903 X 1134 X 35 mm
Output Cable	4mm2 (EU)12AWG,39.37in.(1200mm)
Weight	52.9lbs.(24kg)
Cable Length	1200mm
Encapsulant	POE

I-V Curve



Certifications



Aptos Solar Technology reserves the right to make specification changes without notice



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Joseph Cirillo

LICENSE NUMBER: EC13006601

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APN# 095S1709174002

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-9



DATA SHEET



IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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IQ8SP-DS-0002-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA [DC]		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current ² [module Isc]	A		15
Overvoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA [AC]		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V		240 / 211 – 264
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz		60
Extended frequency range	Hz		50 – 68
AC short circuit fault current over 3 cycles	A _{rms}		2
Max units per 20 A (L-L) branch circuit ⁴		16	13
Total harmonic distortion			<5%
Overvoltage class AC port			III
AC port backfeed current	mA		30
Power factor setting			1.0
Grid-tied power factor (adjustable)			0.85 leading – 0.85 lagging
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW		60
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree ⁵		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01	
		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 C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>

(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17



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Joseph Cirillo
LICENSE NUMBER: EC13006601

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Signature with Seal

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APN# 095S1709174002

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C



To learn more about Enphase offerings, visit enphase.com



The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)	
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	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 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 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-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER

PV-11

Enphase IQ Envoy

The **Enphase IQ Envoy™** communications gateway delivers solar production and energy consumption data to Enphase Enlighten™ monitoring and analysis software for comprehensive, remote maintenance and management of the Enphase IQ System.

With integrated revenue grade production metering and optional consumption monitoring, Envoy IQ is the platform for total energy management and integrates with the Enphase Ensemble™ and the Enphase IQ Battery™.



Smart

- Enables web-based monitoring and control
- Bidirectional communications for remote upgrades
- Supports power export limiting and zeroexport applications

Simple

- Easy system configuration using Enphase Installer Toolkit™ mobile app
- Flexible networking with Wi-Fi, Ethernet, or cellular

Reliable

- Designed for installation indoors or outdoors
- Five-year warranty

Enphase IQ Envoy

MODEL NUMBERS	
Enphase IQ Envoy™ ENV-IQ-AM1-240	Enphase IQ Envoy communications gateway with integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%). Includes one 200A continuous rated production CT (current transformer).
ACCESSORIES (Order Separately)	
Enphase Mobile Connect™ CELLMODEM-M1 (4G based LTE-M/5-year data plan) CELLMODEM-M1-B (4G-based LTE-M1/5-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 consumption CTs enable whole home metering.
Ensemble Communications Kit COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows wireless communication with Encharge and Enpower.
POWER REQUIREMENTS	
Power requirements	120/240 VAC split-phase. Max 20 A overcurrent protection required.
Typical Power Consumption	5W
CAPACITY	
Number of microinverters polled	Up to 600
MECHANICAL DATA	
Dimensions (WxHxD)	21.3 x 12.6 x 4.5 cm (8.4" x 5" x 1.8")
Weight	17.6 oz (498 g)
Ambient temperature range	-40° to 65° C (-40° to 149° F) -40° to 46° C (-40° to 115° F) if installed in an enclosure
Environmental rating	IP30. For installation indoors or in an NRTL-certified, NEMA type 3R enclosure.
Altitude	To 2000 meters (6,560 feet)
Production CT	- Limited to 200A of continuous current / 250A OCPD – 72kW AC - Internal aperture measures 19.36mm to support 250MCM THWN conductors (max) - UL2808 certified for revenue grade metering
Consumption CT	- For electrical services to 250A with parallel runs up to 500A - Internal aperture measures 0.84" x 0.96" (21.33mm x 24.38mm) to support 3/0 THWN conductor - UL2808 certified, for use at service entrance for services up to 250Vac
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Mobile	CELLMODEM-M1 (4G) or CELLMODEM-M1-B (4G). Not included. Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
COMPLIANCE	
Compliance	UL 61010-1 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 (PV production only)



To learn more about Enphase offerings, visit enphase.com



To learn more about Enphase offerings, visit enphase.com

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LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo
LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

HANNAH HOLCOMBE
254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-12

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

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))



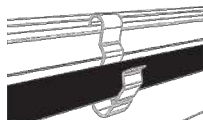
SEALING CAPS

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

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2018-11-26



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Joseph Ciriello

LICENSE NUMBER: EC13006601

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APN# 095S1709174002

SHEET NAME
EQUIPMENT
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SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-13

S-5!® The Right Way!™

**NOW AVAILABLE
IN ALUMINUM**

NEW

ProteaBracket™

ProteaBracket™

A versatile bracket for
mounting solar PV to
trapezoidal roof profiles

ProteaBracket™ is now made in aluminum. Still the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteaBracket just got better!

The bracket features an adjustable attachment base and module attachment options to accommodate different roof profile dimensions and mounting options.

Our pre-applied EPDM gasket with peel and stick adhesive makes installation a snap, ensuring accurate and secure placement the first time.

With no messy sealants, faster installation, and a weather-proof fit, ProteaBracket offers you the most versatile solar attachment solution available.

**ProteaBracket* can be used for
rail mounting or "direct-attach"
with S-5! PVKIT™**

Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*

*When ProteaBracket is used in conjunction with the S-5! PVKIT, an additional nut is required during installation.

*See www.S-5.com for details.



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

S-5!®
The Right Way!™

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal rib, exposed-fastened metal roof profiles!

ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

Note: All four pre-punched holes must be used to achieve tested strength. Fasteners are provided.

For design assistance, ask your distributor, or visit www.S-5.com for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:



**Side
Mount Rail**



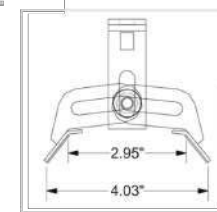
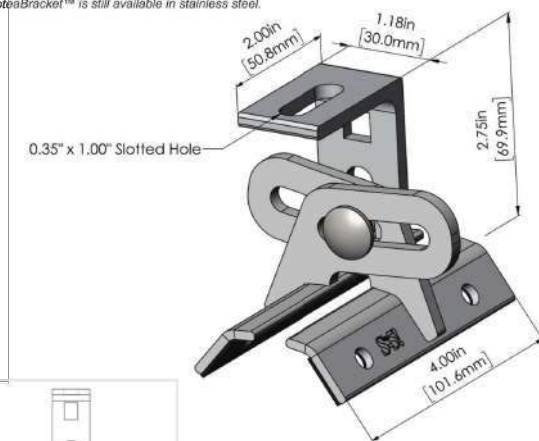
**Bottom
Mount Rail**



**w/ S-5!
PVKIT™
(rail-less)**

ProteaBracket™

ProteaBracket™ is still available in stainless steel.



**ProteaBracket fits profiles
up to 3 inches**

INSTALLATION:

No surface preparation needed. (1) Wipe away excess oil and debris. (2) Peel off adhesive release paper. (3) Align and mount bracket directly onto crown of panel. (4) Secure ProteaBracket through pre-punched holes, using piercing-point S-5! screws.



*ProteaBracket™ and the S-5! PVKIT™ 2.0
mounted on a trapezoidal roof profile*

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

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

Copyright 2019, Metal Roof Innovations, Ltd. S-5! products are patent protected. S-5! aggressively protects its patents, trademarks, and copyrights. Version 07089.

Distributed by

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LGCY POWER
3333 DIGITAL DR #600, LEHI,
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855-353-4899

Joseph Cirillo

LICENSE NUMBER: EC13006601

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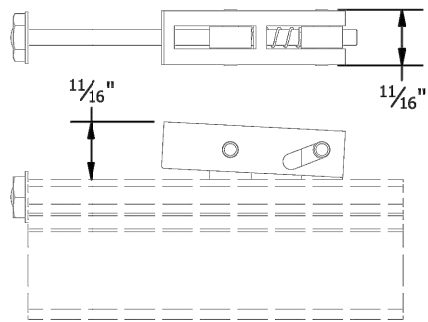
SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

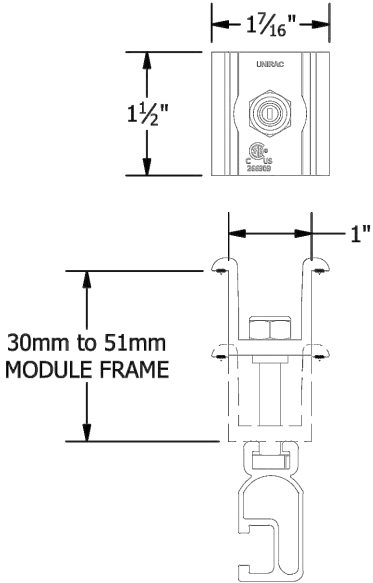
SHEET NUMBER

PV-14

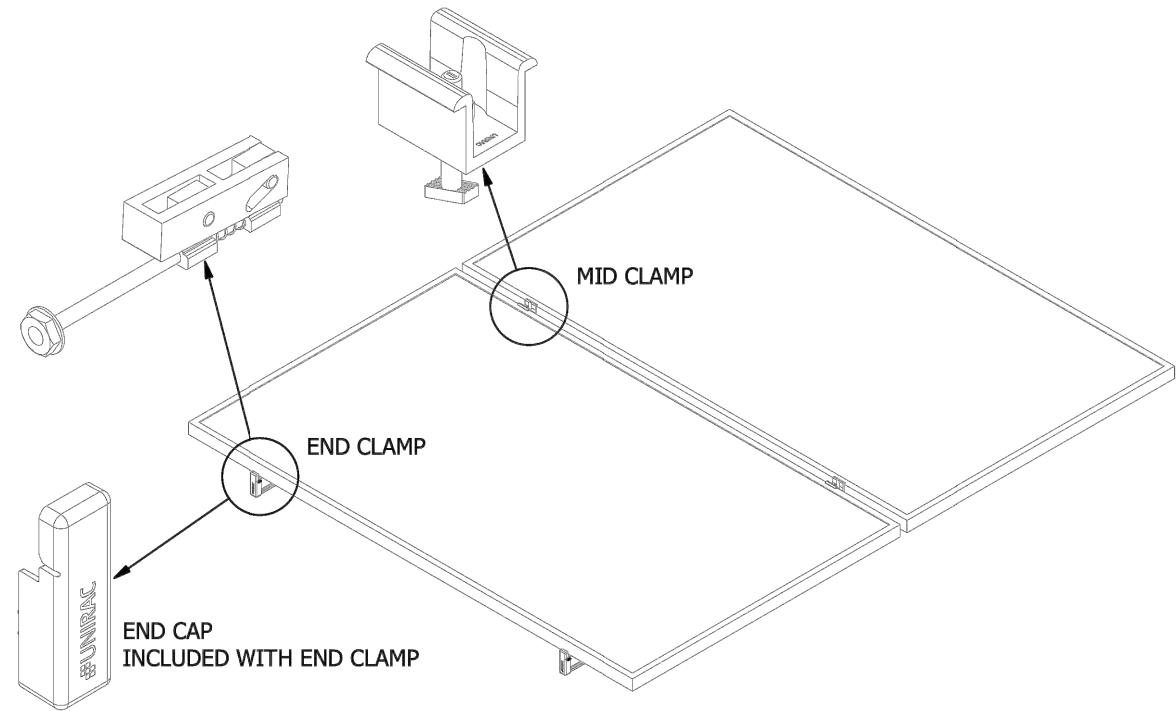
PRO SERIES END CLAMP



PRO SERIES MID CLAMP



PART # TABLE	
P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK





1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

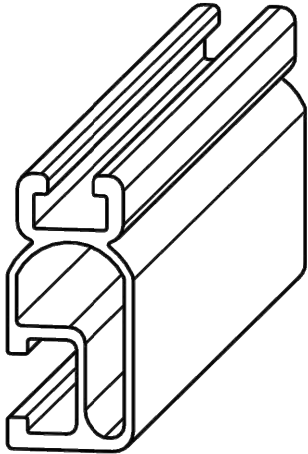
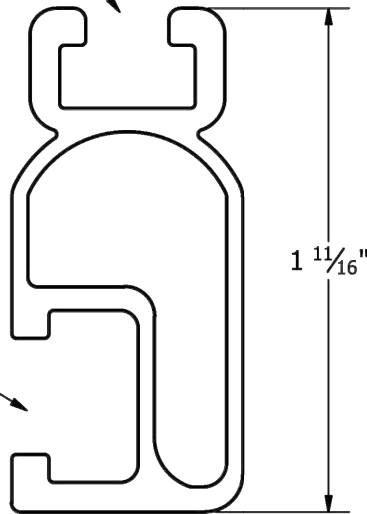
DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL
PRODUCT PROTECTED BY ONE OR MORE US PATENTS LEGAL NOTICE

SM-A01

SHEET

1/4" BOLT LOCATION

3/8" BOLT LOCATION



PART # TABLE		
P/N	DESCRIPTION	LENGTH
315168M	SM LIGHT RAIL 168" MILL	168"
315168D	SM LIGHT RAIL 168" DRK	168"
315240M	SM LIGHT RAIL 240" MILL	240"
315240D	SM LIGHT RAIL 240" DRK	240"



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	LIGHT RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL
PRODUCT PROTECTED BY ONE OR MORE US PATENTS LEGAL NOTICE

SM-P02

SHEET



LGCY POWER
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UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo
LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

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APN# 095S1709174002

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15



CODE COMPLIANCE NOTES

INSTALLATION GUIDE

C PAGE

SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved system level performance for steep sloped roofs. System level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes ≥ 2 inches per foot, or 9.5 degrees). The system is to be mounted over fire resistant roof covering rated for the application. There is no required minimum or maximum height limitation above the roof deck to maintain the system fire rating for SOLARMOUNT. Module Types & System Level Fire Ratings are listed below:

Rail Type	Module Type	System Level Fire Rating	Rail Direction	Module Orientation	Mitigation Required
Standard Rail	Type 1, Type 2, Type 3 & Type 10	Class A, Class B & Class C	East-West	Landscape OR Portrait	None Required
			North-South	Landscape OR Portrait	None Required
Light Rail	Type 1 & Type 2	Class A, Class B & Class C	East-West	Landscape OR Portrait	None Required
			North-South	Landscape OR Portrait	None Required

This racking system may be used to ground and/or mount a PV module complying with UL1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

UL2703 CERTIFICATION MARKING LABEL

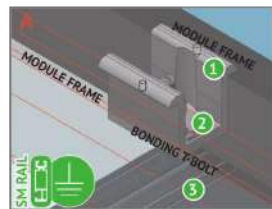
Unirac SOLARMOUNT is listed to UL 2703. Certification marking is embossed on all mid clamps as shown. Labels with additional information will be provided. After the racking system is fully assembled, a single label should be applied to the SOLARMOUNT rail at the edge of the array. Note: The sticker label should be placed such that it is visible, but not outward facing.



BONDING CONNECTION GROUND PATHS

INSTALLATION GUIDE

0 PAGE

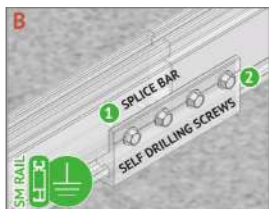


BONDING MIDCLAMP ASSEMBLY

- 1 Aluminum mid clamp with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
- 2 Stainless steel nut bonds aluminum clamp to stainless steel T-bolt
- 3 Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to SM rail

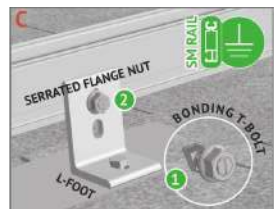


BONDING MIDCLAMP ASSEMBLY



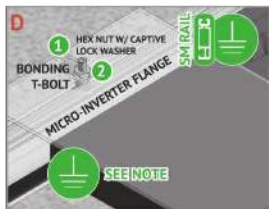
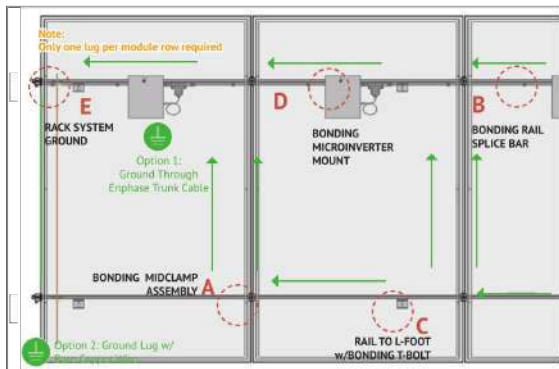
BONDING RAIL SPLICE BAR

- 1 Stainless steel self drilling screws drill and tap into splice bar and rail, creating bond between splice bar and each rail section
 - 2 Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.
- Note: Splice bar and belted connection are non-structural. The splice bar function is rail alignment and bonding.



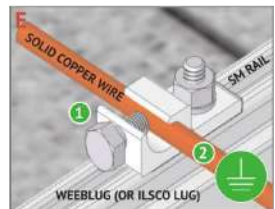
RAIL TO L-FOOT w/BONDING T-BOLT

- 1 Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-bolt
- 2 Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail



BONDING MICROINVERTER MOUNT

- 1 Hex nut with captive lock washer bonds metal microinverter flange to stainless steel T-bolt
- 2 Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail. System ground including racking and modules may be achieved through the trunk cable of approved microinverter systems. See page 1 for details



RACK SYSTEM GROUND

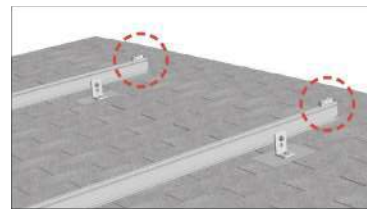
- 1 WEEB washer dimples pierce anodized rail to create bond between rail and lug
- 2 Solid copper wire connected to lug is routed to provide final system ground connection. NOTE: Heco lug can also be used when secured to the side of the rail. See page 1-3 for details



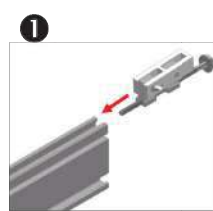
ENDCLAMP, FIRST MODULE & TRIM

INSTALLATION GUIDE

K PAGE



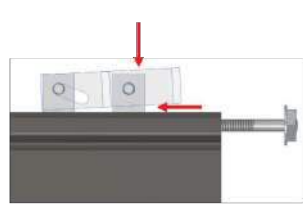
INSTALL MODULE END CLAMPS: The End clamp is supplied as an assembly with a 1/2" hex head bolt that is accessible at the ends of rails. The clamp should be installed on the rails prior to installing end modules.



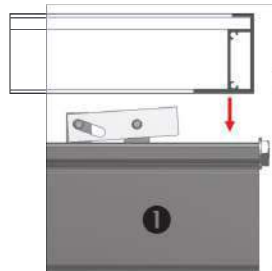
INSTALL END CLAMPS ON RAIL: Slide end clamp on to rail by engaging the two t-guide brackets with the top slot of the rails. **Ensure bolt is extended as far as possible so that clamp is positioned at max. distance from end of rail.**



POSITION END CLAMPS: Slide end clamp assembly on to rail until bolt head engages with end of rail. End clamps are positioned on rails prior to the first end module and prior to the last end module.



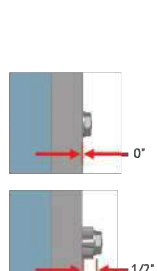
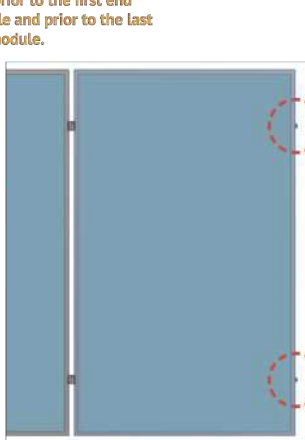
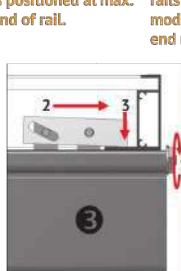
NOTE: To assist insertion of clamp into rail slot, Pressure may be applied to top or side of bracket as shown. Do not force clamp into rail by pushing on bolt with excessive force.



INSTALL FIRST MODULE: Install the first end module onto rails with the flange of the module frame positioned between end clamps at an ends of rails.



ENGAGE CLAMP: While holding module in position and with flange in full contact with rail, rotate end clamp bolt until clamp engages with flange to provide clamp force. **To ensure bolt is not over-torqued, use low torque setting on drill or if using an impact driver, stop rotation as soon as impact action of driver begins. TORQUE VALUE (See table and notes on PG. 1) End clamp bolt to 3 ft-lbs, No anti-seize**



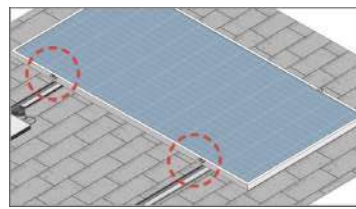
For best appearance, position module flush with ends of rails. Rails should not extend more than 1/2" beyond module. Module must be fully supported by rails and cannot overhang ends of rails.



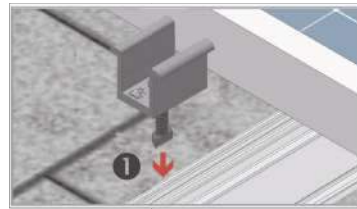
BONDING MIDCLAMP & TRIM

INSTALLATION GUIDE

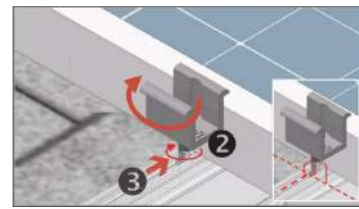
L PAGE



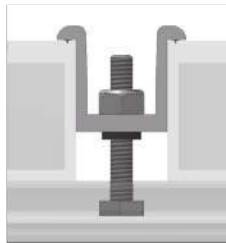
INSTALL MIDCLAMPS: Midclamp is supplied as an assembly with a T-bolt for module installation. Clamp assemblies may be positioned in rail near point of use prior to module placement.



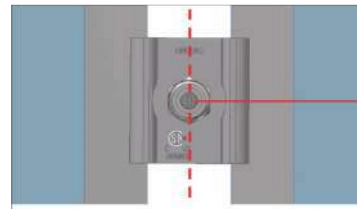
INSERT MIDCLAMP ASSEMBLY: Insert 1/4" T-Bolt into top slot of rail



MIDCLAMP: Rotate midclamp assembly and slide until clamp is against module frame. Do not tighten nut until next module is in position. Ensure bolt is perpendicular to rail.



PLACE ADJACENT MODULE AGAINST CLAMPS: Modules must be tight against clamps with no gaps. Tighten nut to required torque.



POSITION INDICATOR - SERRATED T-BOLT: Verify the T-bolt position indicator is perpendicular to the rail.

TORQUE VALUE (See table and notes on PG. A)
11 ft-lbs. No anti-seize.



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LICENSE NUMBER: EC13006601

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SHEET NAME
EQUIPMENT
SPECIFICATION

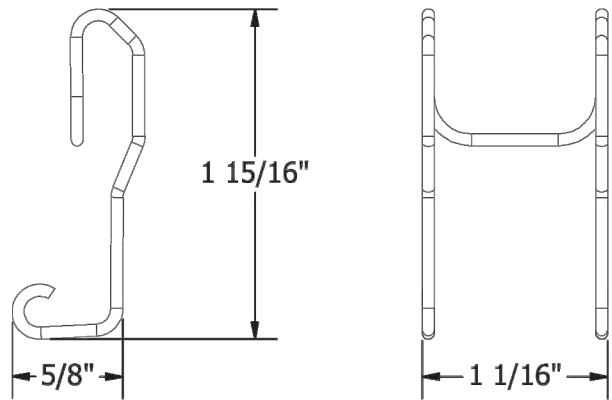
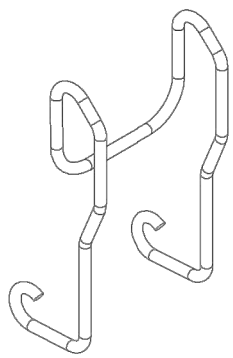
SHEET SIZE

ANSI B
11" X 17"

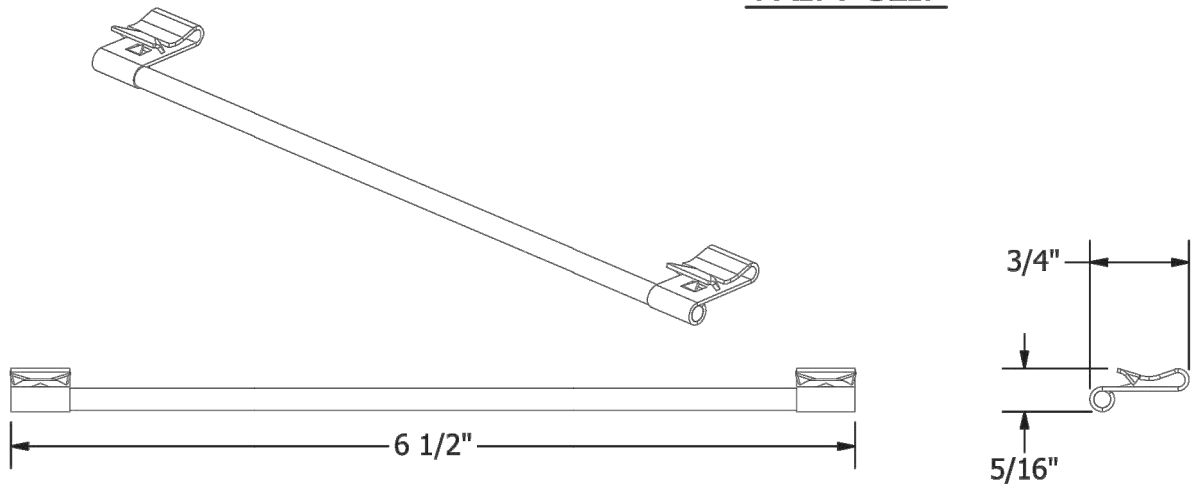
SHEET NUMBER

PV-16

PART # TABLE	
P/N	DESCRIPTION
240905C	SFM TRIM CLIP
008015S	SFM WIRE BONDING CLIP



TRIM CLIP



WIRE BONDING CLIP



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SFMCR
DRAWING TYPE:	PART
DESCRIPTION:	TRIM CLIP / WIRE BONDING CLIP
REVISION DATE:	6/27/2018

DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL
PRODUCT PROTECTED BY ONE OR MORE US PATENTS LEGAL NOTICE

SFMCR-P04
SHEET



LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo

LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

HANNAH HOLCOMBE
254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

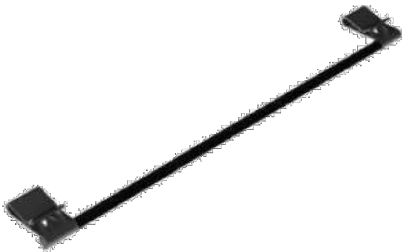
SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

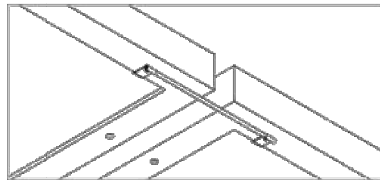


UNIRAC #008015S Wire Bonding Clip

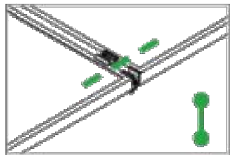


Compliant With:

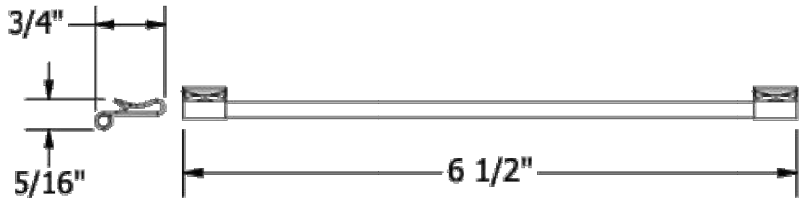
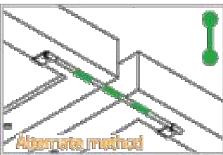
NEC 690.43(A) Photovoltaic Module Mounting Systems and Devices. Devices and systems used for mounting PV modules that are also used for bonding module frames shall be listed, labeled, and identified for bonding PV modules. Devices that mount adjacent PV modules shall be permitted to bond adjacent PV modules.



N/S Bonding Alternate Method:
Fully seat bonding clip on each module flange to provide bond across N/S module gap.



N-S BONDING PATH:
N-S module to module bonding is accomplished with bonding clamp with 2 integral bonding pins. (refer also to alternate method)



ILSCO SGB-4. *Optional method for bonding module to EGC in the junction box using bare #6, completing the array bonding.*



Weeb Grounding Lug. *Optional method for bonding a single rail to the EGC in the junction box using bare #6, completing the array bonding.*



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LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-18



Address
3333 N Digital Drive,
STE 600, Lehi, UT 84043

Phone
855.353.4899

Website
lgcypower.com



Address
3333 N Digital Drive,
STE 600, Lehi, UT 84043

Phone
855.353.4899

Website
lgcypower.com

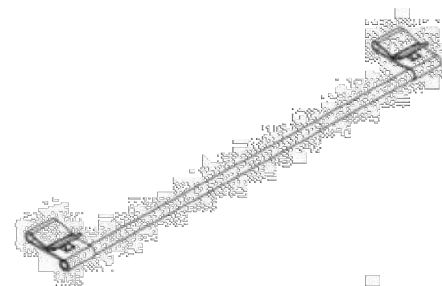




August 23, 2022

Dear customer,

Thank you for your inquiry regarding the Wire Bond Clip (Part Number 008015S, pictured below) and the electrical bonding capabilities.



This letter is to report that when properly installed along the outside edge of an array, connecting two rows of panels, the connection accomplishes the bonding required by UL2703. The part has been tested and meets the requirements stated in UL2703. The part is a UL2703-recognized part, meeting NEC 690.43(A) requirements.

For further information, please contact Unirac, Inc. We're looking forward to seeing you making solar happen with us!

Best regards,

Keegan Sutanto

Keegan Sutanto
Product Manager, Residential
Unirac, Inc.

Unirac, Inc. • www.unirac.com

1411 Broadway Blvd. NE • Albuquerque, NM • 87102-1545 • Ph: (505) 242-6411 • Fax: (505) 242-6412



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UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo

LICENSE NUMBER: EC13006601

REVISIONS		
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HANNAH HOLCOMBE
254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-19



Descriptive Report
and Test Results

MASTER CONTRACT: 266909
REPORT: 70131735
PROJECT: 80050628

- Edition 1:** September 20, 2017; Project 70131735– Albuquerque
Issued by Michael Hoffnagle
- Edition 2:** December 6, 2017; Project 70161436– Albuquerque
Issued by Michael Hoffnagle
- Edition 3:** October 8, 2018; Project 70185553 - Irvine
Issued by Michael Hoffnagle
- Edition 4:** May 15, 2019; Project 70218415 - Irvine
Issued by Uday Singh
- Edition 5:** November 18, 2019; Project 80007667 - Irvine
Issued by Michael Hoffnagle
- Edition 6:** January 28, 2020; Project 80030869 - Irvine
Issued by Michael Hoffnagle
- Edition 7:** April 11, 2020; Project 80038806 - Irvine
Prepared By: Michael Hoffnagle
Authorized By: Sean Jiang
- Edition 8:** September 29, 2020; Project 80050628 - Irvine
Prepared By: Michael Hoffnagle
Authorized By: Michael Hoffnagle

Report pages reissued

Contents: Certificate of Compliance - Pages 1 to 3
Supplement to Certificate of Compliance - Pages 1 to 2
Description and Tests - Pages 1 to 20
Att1 Installation Manual SM– Pages 1 to 31
Att2 Schematics SM– Pages 1 to 55
Att3 Installation Manual ULA– Pages 1 to 20

PRODUCTS

- CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems
- CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -
Certified to US Standards

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34 Bunsen, Irvine, CA, U.S.A. 92618
Telephone: 949.733.4300 1.800.463.6727 Fax: 949.733.4320 www.csagroup.org

MASTER CONTRACT: 266909
REPORT: 70131735
PROJECT: 80050628

Page No: 11
Date Issued: September 29, 2020

Table 2

Module Manufacturer	Model/Series	
	Below models can be used together with racking system in this report to be a Class A fire system, only when they are rated for Fire Type 1, 2, 3, or 10 for steep slope applications.	
AU Optronics (BenQ Solar)	PM Series	
Aleo	P18, P19, S18, S19, S59, S79	
Aptos Solar	DNA-144 & DNA 120 Series	
Astronergy	CHSM6612 M, M/HV CHSM72M-HC, CHSM6612P Series CHSM6612P/HV Series	
Auxin	AXN6M610Txxx, AXN6P610Txxx, AXN6M612Txxx, AXN6P612Txxx	
Axitec	AC-XXXM/60S, AC-XXXP/60S, AC-XXXM/72S, AC-XXXP/156-60S, AC-XXXP/72S	
Boviet	BVM6610P-XXX, BVM6610M-XXX, BVM6612M-XXX, BVM6612P-XXX	
BYD	P6K Series MHK-36	
Canadian Solar	CS6P-M, CS6P-P, CSX-P, CS6X-P CS5A-M, CS6U-P, CS6U-M, CS6K-MS, CS6K-M, CS6K-P, ELPS CS6A-MM, ELPS CS6P-MM CS3U-P CS3U-MS, CS3K-P, CS3K-MS, CS1K-MS CS3K-MB, CS3K-PB, CS3U-MB, CS3W-P, CS3L-P, CS3U-PB, CS1H-MS, CS3U-MS	CS3U-xxxPB-AG, CS3U-xxxMB-AG, CS3KxxxPB-AG, CS3KxxxMB-AG, CS3WxxxP-PB-AG, CS1HxxxMS, CS1UxxxMS, CS3UxxxP HighEfficiency, CS3KxxxP HighEfficiency, CS6UxxxP High Efficiency, CS6KxxxP HighEfficiency, CS6KxxxMS AllBlack, ELPS CS6P-MM, ELPS CS6A-MM



LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo

LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

HANNAH HOLCOMBE
254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-20



November 17, 2020

Unirac
1411 Broadway Blvd. NE
Albuquerque, NM 87102

Attn.: Unirac - Engineering Department

Re: Engineering Certification for the Unirac U-Builder 2.0 SOLARMOUNT Flush Rail

PZSE, Inc. - Structural Engineers has reviewed the Unirac SOLARMOUNT rails, proprietary mounting system constructed from modular parts which is intended for rooftop installation of solar photovoltaic (PV) panels; and has reviewed the U-builder Online tool. This U-Builder software includes analysis for the SOLARMOUNT LIGHT rail, SOLARMOUNT STANDARD rail, and SOLARMOUNT HEAVY DUTY rail with Standard and Pro Series hardware. All information, data and analysis contained within are based on, and comply with the following codes and typical specifications:

- Minimum Design Loads for Buildings and other Structures, ASCE/SEI 7-05, ASCE/SEI 7-10, ASCE/SEI 7-16
- 2006-2018 International Building Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
- 2006-2018 International Residential Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
- AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES.
- 2015 Aluminum Design Manual, by The Aluminum Association, 2015

Following are typical specifications to meet the above code requirements:

Design Criteria:	Ground Snow Load = 0 - 100 (psf) Basic Wind Speed ASD Minimum 110 mph to 147 mph Basic Wind Speed LRFD Minimum 142 mph to 190 mph Roof Mean Height = 0 - 60 (ft) Roof Pitch = 0 - 45 (degrees) Exposure Category = B, C & D
Attachment Spacing:	Per U-builder Engineering report.
Cantilever:	Maximum cantilever length is L/3, where "L" is the span noted in the U-Builder online tool.
Clearance:	2" to 10" clear from top of roof to top of PV panel.
Tolerance(s):	1.0" tolerance for any specified dimension in this report is allowed for installation.
Installation Orientation:	See SOLARMOUNT Rail Flush Installation Guide. Landscape - PV Panel long dimension is parallel to ridge/eave line of roof and the PV panel is mounted on the long side. Portrait - PV Panel short dimension is parallel to ridge/eave line of roof and the PV panel is mounted on the short side.

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
T 916.961.3960 F 916.961.3965 W www.pzse.com
Experience | Integrity | Empowerment



Components and Cladding Roof Zones:

The Components and Cladding Roof Zones shall be determined based on ASCE 7-05, ASCE 7-10 & 7-16 Component and Cladding design.

- Notes:
- U-builder Online tool analysis is only for Unirac SM SOLARMOUNT Rail Flush systems only and do not include roof capacity check.
 - Risk Category II per ASCE 7-16.
 - Topographic factor, kzt is 1.0.
 - Array Edge Factor $Y_E = 1.5$
 - Average parapet height is 0.0 ft.
 - Wind speeds are LRFD values.
 - Attachment spacing(s) apply to a seismic design category E or less.

Design Responsibility:

The U-Builder design software is intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. In all cases, this U-builder software should be used under the direction of a design professional with sufficient structural engineering knowledge and experience to be able to:

- Evaluate whether the U-Builder Software is applicable to the project, and
- Understand and determine the appropriate values for all input parameters of the U-Builder software.

This letter certifies that the Unirac SM SOLARMOUNT Rails Flush, when installed according to the U-Builder engineering report and the manufacture specifications, is in compliance with the above codes and loading criteria.

This certification excludes evaluation of the following components:

- The structure to support the loads imposed on the building by the array; including, but not limited to: strength and deflection of structural framing members, fastening and/or strength of roofing materials, and/or the effects of snow accumulation on the structure.
- The attachment of the SM SOLARMOUNT Rails to the existing structure.
- The capacity of the solar module frame to resist the loads.

This requires additional knowledge of the building and is outside the scope of the certification of this racking system.

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA

DIGITAL SIGNATURE



F-15844

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LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo

LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

HANNAH HOLCOMBE
254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-21



Certificate of Compliance

Certificate: 70131735 **Master Contract:** 266909

Project: 80060420 **Date Issued:** 2021-02-23

Issued To: Unirac
1411 Broadway NE
Albuquerque, New Mexico, 87102
United States

Attention: Klaus Nicolaedis

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Issued by: Michael Hoffnagle
Michael Hoffnagle

PRODUCTS

CLASS - C531302 - POWER SUPPLIES- PHOTOVOLTAICS- PV Racking
CLASS - C531382 - POWER SUPPLIES- PHOTOVOLTAICS PV Racking and clamping systems-Certified to US Standards

Models: SM SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.

ULA Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules.



Certificate: 70131735
Project: 80060420

Master Contract: 266909
Date Issued: 2021-02-23

Solarmount

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs. Fire ratings of Class A with Type 1, 2, 3, or 10 for steep slope. Tested at 5" interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.

UL 2703 Mechanical Load ratings:

Downward Design Load (lb/ft²)	113.5
Upward Design Load (lb/ft²)	50.7
Down-Slope Load (lb/ft²)	16.1

Test Loads:

Downward Load (lb/ft²)	112.8
Upward Load (lb/ft²)	50.13
Down-Slope Load (lb/ft²)	7.5

Unirac Large Array

ULA is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules. ULA aluminum components merge with SM rails and installer-supplied steel pipe. The SM rail system is secured to the horizontal Pipe using the Rail Bracket components. The Rear and Front cap secures the horizontal Pipe to the vertical Pipe. The Front cap is also used to secure the Cross brace. A Slider is attached to the vertical Pipe to secure the Cross brace. The SM rails, caps, slider, rail brackets, and cross braces materials are 6105-T5 aluminum extrusion. Fasteners materials are 304 stainless steel. Horizontal and vertical pipe materials meet the minimum requirements of ASTM A53 for galvanized steel pipe in 2" and 3" diameter.

The mechanical load ratings from the SM test data will be applied to the ULA model.

Fire Testing is not applicable due to being a ground mount system.



LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

Joseph Ciriello

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

HANNAH HOLCOMBE
254 LEON SAULS LOOP,
LAKE CITY, FL 32025 USA
EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-22

CERTIFICATE OF COMPLIANCE

Certificate Number 20220223-E341165
Report Reference E341165-20210317
Issue Date 2022-02-23
Issued to: Enphase Energy Inc.
1420 N. McDowell Blvd. Petaluma, CA 94954-6515

This is to certify that representative samples of Grid Support, Utility Interactive Supporting Energy Storage, Multimode, Bi-directional Microinverters Models IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E, or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters. Has been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: See Page 2
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

This Certificate of Compliance is provided as a courtesy to help our customers communicate product compliance information, as documented in our UL Follow-Up Services procedure. This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark shall be considered as being UL Certified and covered under UL's Follow-Up Services. Look for the UL Certification Mark on the product.

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Bruce Mahrenholz, Director, North American Certification Program
UL LLC

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CERTIFICATE OF COMPLIANCE

Certificate Number 20220223-E341165
Report Reference E341165-20210317
Issue Date 2022-02-23

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Standards for Safety:

UL 62109-1, STANDARD FOR SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS - PART 1: GENERAL REQUIREMENTS, Edition 1, Revision Date 04/30/2019

IEC 62109-2, SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS - PART 2: PARTICULAR REQUIREMENTS FOR INVERTERS, Edition 1, Issue Date 06/2011

UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, Edition 2, Revision Date 06/10/2021, including the requirements in UL 1741 Supplement SA, sections as noted in the Technical considerations.

IEEE 1547, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems.

IEEE 1547.1, IEEE Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems.

CSA C22.2 No. 62109-1, Safety of Power Converters for Use in Photovoltaic Power Systems - Part 1: General Requirements, Edition 1, Issue Date 07/2016

CSA C22.2 No. 62109-2, Safety of Power Converters for Use in Photovoltaic Power Systems - Part 2: Particular Requirements for Inverters, Edition 1, Issue Date 07/2016


Bruce Mahrenholz, Director, North American Certification Program
UL LLC

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LAKE CITY, FL 32025 USA
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SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-23

Enphase Encharge 3

The **Enphase Encharge 3™** all-in-one AC-coupled storage system is **reliable, smart, simple**, and **safe**. It has a total usable energy capacity of 3.36 kWh and includes four embedded grid-forming microinverters with 1.28 kW power rating. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



Reliable

- Proven high-reliability IQ Series Microinverters
- Ten-year limited warranty
- Four embedded IQ 8X-BAT Microinverters
- Passive cooling (no moving parts/fans)

Smart

- Grid-forming capability for backup operation
- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

Safe

- Battery safety tested
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

Enphase Encharge 3

MODEL NUMBER	
ENCHARGE-3-1P-NA	Encharge 3 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - One Encharge 3.36 kWh base unit (B03-A01-US00-1-3) - One Encharge 3 cover kit with cover and wall mounting bracket (B03-C-0350-0)
ACCESSORIES	
ENCHARGE-HNDL-R1	One set of Encharge base unit installation handles
OUTPUT (AC)	
Rated (continuous) output power	1.28 kVA
Peak output power	1.92 kVA (10 seconds)
Nominal voltage / range	240/211–264 VAC
Nominal frequency / range	60/57–63 Hz
Rated output current	5.3 A
Peak output current	8.2A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20 A branch circuit	Three units (single phase)
Interconnection	Single phase
Maximum AC short circuit fault current over 3 cycles	23.2 Arms
Round trip efficiency ²	89%
BATTERY	
Total capacity	3.5 kWh
Usable capacity	3.36 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2 V
Maximum DC voltage	73.5 V
Ambient operating temperature range	-15° C to 55° C (5° F to 131° F) non-condensing
Optimum operating temperature range	0° C to 30° C (32° F to 86° F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (WxHxD)	367 mm x 664 mm x 319mm (14.45 in x 26.14 in x 12.56 in)
Weight	One individual 44.2 kg (97.4 lbs) base unit plus 7.8 kg (17.2 lbs) cover and mounting bracket; total 52 kg (114.6 lbs)
Enclosure	Outdoor – NEMA 3R
IQ 8X-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2500 meters (8200 feet)
Mounting	Wall mount
FEATURES AND COMPLIANCE	
Compatibility	Compatible with grid-tied PV systems. Compatible with Enphase M215/M250 and IQ Series Micros, Enphase Enpower, and Enphase IQ Envoy for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enlighten Manager and MyEnlighten monitoring options; API integration
Compliance	UL 9540, UN 38.3, UL 9540A, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2, UL 1741SA, CAN/CSA C22.2 No. 107.1-16, and IEEE 1547
LIMITED WARRANTY	
Limited Warranty ³	>70% capacity, up to 10 years or 4000 cycles
1. Supported in backup/off-grid operation. 2. AC to battery to AC at 50% power rating. 3. Whichever occurs first. Restrictions apply.	

To learn more about Enphase offerings, visit enphase.com

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LGCY POWER
3333 DIGITAL DR #600, LEHI,
UT 84043, UNITED STATES
855-353-4899

Joseph Cirillo
LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV
	11/30/2022	01

Signature with Seal

CUSTOMER INFORMATION

HANNAH HOLCOMBE
254 LEON SAULS LOOP,
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EMAIL ID# - sholcombe@newgeneration.org
PHONE NO.# (386) 867-0713
APN# 095S1709174002

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-24

Enphase IQ System Controller 2



The **Enphase IQ System Controller 2** connects the home to grid power, the IQ Battery system, and solar PV. It provides microgrid interconnection device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.

Reliable

- Durable NEMA type 3R enclosure
- Ten-year limited warranty

Smart

- Controls safe connectivity to the grid
- Automatically detects grid outages
- Provides seamless transition to backup

Simple

- Connects to the load or service equipment¹ side of the main load panel
- Centered mounting brackets support single stud mounting
- Supports conduit entry from the bottom, bottom left side, and bottom right side
- Supports whole home and partial home backup and subpanel backup
- Up to 200A main breaker support
- Includes neutral-forming transformer for split phase 120/240V backup operation
- IQ System Controller supports backward compatibility with older generation of PV microinverters (M215, M250 and S series), making it simple for home owners to upgrade their systems
- Easy integration with generator from major manufacturers

1. IQ System Controller 2 is not suitable for use as service equipment in Canada.

To learn more about Enphase offerings, visit enphase.com



Enphase IQ System Controller 2

MODEL NUMBER		
EP200G101-M240USD1	Enphase IQ System Controller 2 with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and battery installations.	
ACCESSORIES and REPLACEMENT PARTS		
EP200G-NA-XA-E3	Replacement IQ System Controller 2 printed circuit board	
EP200G-NA-HD-200A	Eaton type BR circuit breaker hold-down screw kit, BRHDK125	
CT-200-SPLIT	200 A split core current transformers for Generator metering (+/- 2.5%)	
Circuit breakers (as needed) ^{2,3}	Not included, must order separately:	
• BRK-100A-2P-240V : Main breaker, 2 pole, 100A, 25kAIC, CSR2100	• BRK-20A-2P-240V-B: Circuit breaker, 2 pole, 20A, 10kAIC, BR220B	
• BRK-125A-2P-240V: Main breaker, 2 pole, 125A, 25kAIC, CSR2125N	• BRK-30A-2P-240V: Circuit breaker, 2 pole, 30A, 10kAIC, BR230B	
• BRK-150A-2P-240V: Main breaker, 2 pole, 150A, 25kAIC, CSR2150N	• BRK-40A-2P-240V: Circuit breaker, 2 pole, 40A, 10kAIC, BR240B	
• BRK-175A-2P-240V: Main breaker, 2 pole, 175A, 25kAIC, CSR2175N	• BRK-60A-2P-240V: Circuit breaker, 2 pole, 60A, 10kAIC, BR260	
• BRK-200A-2P-240V: Main breaker, 2 pole, 200A, 25kAIC, CSR2200N	• BRK-80A-2P-240V: Circuit breaker, 2 pole, 80A, 10kAIC, BR280	
EP200G-HNDL-R1	IQ System Controller 2 installation handle kit (order separately)	
EP200G-LITKIT	IQ System Controller 2 literature kit, including labels, feed-through headers, screws, filler plates, and QIG	
BRK-20A40A-2P-240V	2 pole, 20A/40A, 10kAIC, BQC220240	
ELECTRICAL SPECIFICATIONS		
Assembly rating	Continuous operation at 100% of its rating	
Nominal voltage / range (L-L)	240 VAC / 100 - 310 VAC	
Voltage measurement accuracy	±1% V nominal (±1.2V L-N and ±2.4V L-L)	
Auxiliary contact for load control, excess PV control, and generator two-wire control	24V, 1A	
Nominal frequency / range	60 Hz / 56 - 63 Hz	
Frequency measurement accuracy	±0.1 Hz	
Maximum continuous current rating	160A	
Maximum input overcurrent protection device	200A	
Maximum output overcurrent protection device	200A	
Maximum overcurrent protection device rating for Generator circuit ⁴	80A	
Maximum overcurrent protection device rating for storage branch circuit ⁴ (the storage branch circuit can be replaced with PV)	80A	
Maximum overcurrent protection device rating for IQ8 PV combiner branch circuit ⁴	80A	
Neutral Forming Transformer (NFT)	• Breaker rating (pre-installed): 40A between L1 and Neutral, 40A between L2 and Neutral • Continuous rated power: 3600VA • Maximum continuous unbalance current: 30A @ 120V • Peak rated power: 8800VA for 30 seconds • Peak unbalanced current: 80A @ 120V for 30 seconds	
MECHANICAL DATA		
Dimensions (WxHxD)	50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in)	
Weight	39.4 kg (87 lbs)	
Ambient temperature range	-40° C to +50° C (-40° F to 122° F)	
Cooling	Natural convection, plus heat shield	
Enclosure environmental rating	Outdoor, NEMA type 3R, polycarbonate construction	
Altitude	To 2500 meters (8200 feet)	
WIRE SIZES		
Connections (All lugs are rated to 90C)	• Main lugs and backup load lugs • CSR breaker bottom wiring lugs • BR breakers (wire provided) • AC combiner lugs, Encharge lugs, and generator lugs • Neutral (large lugs)	Cu/Al: 1 AWG ~ 300 KCMIL Cu/Al: 2 AWG ~ 300 KCMIL 6 AWG 14 AWG ~ 2 AWG Cu/Al: 6 AWG - 300 KCMIL
Neutral and ground bars	Large holes (5/16-24 UNF) Small holes (10-32 UNF)	14 AWG ~ 1/0 AWG 14 AWG ~ 6 AWG
COMPLIANCE		
Compliance	UL 1741, UL 1741 SA, UL 1741 PCS, UL1998, UL869A ⁵ , UL67 ⁵ , UL508 ⁵ , UL50E ⁵ CSA 22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003, AC156. IQ System Controller 2 is approved for Use as Service Equipment in the United States ⁵ .	

2. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.
3. The IQ System Controller 2 is rated 22 kAIC
4. Not included. Installer must provide properly rated breaker per circuit breaker list above.
5. Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

To learn more about Enphase offerings, visit enphase.com

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SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-25

Listed to UL 1973?	No
Listed by UL to 1973?	Yes, File number E499298- unlisted component
UL 9540A Report	UL Project 4788656362, August 2019
Deviations from 9540A Report	The cell is identical.
	
Figure 3 – Photo of cell	

Unit Level Test Description

Overall Test Configuration

The overall layout of test equipment and measurement locations is illustrated in Figure 5. The layout includes 1 initiating cabinet, 3 target cabinets, and instrumented wall.

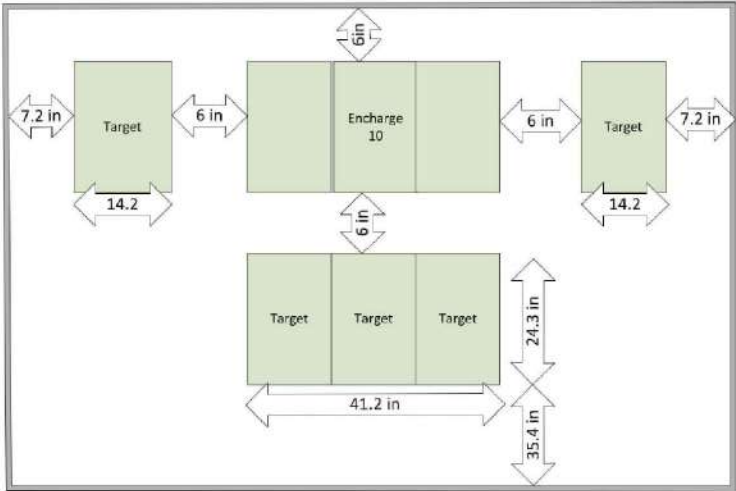


Figure 4 – Test configuration and unit spacing

Table 2 – Test configuration

Test Configuration	
Clearance between Initiating Unit and Target Unit 1	6 in.
Clearance between Initiating Unit and Target Unit 2	6 in.
Clearance between Initiating Unit and Target Unit 3	6 in.
Clearance between Initiating Unit and Wall	Units were mounted on the 8ft. x 8ft wall opposite from the test room door. The units were installed on the surface of this wall.
Clearance between Initiating Unit and Ceiling	6 in.
Doors	No doors on the unit
Physical barriers between units	None



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**EQUIPMENT
SPECIFICATION**

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

SHEET NUMBER
PV-26

UL 9540A Test Report
for
Enphase Energy Inc

All testing was conducted according to UL 9540A, Fourth Edition, dated November 12, 2019.

Battery Energy Storage Description

Battery Energy Storage System Configuration

Table 1 – Product details

Unit	
Manufacturer	Enphase Energy Inc
Model Number	Encharge 10
Electrical Ratings	240 Vac and 3.84kVA
Electrical Configuration	3 separate Encharge 3 modules. Each module is connected to integrated Enphase microinverters and BMU. Each module has a 21S1P cell configuration.
Dimensions	1070 mm wide x 317 mm deep x 664 mm high
Number of Modules per Encharge 10	3
Listed to UL 9540?	No
Listed by UL to 9540?	No
Construction Description	Plastic cover with slotted openings on the top. The cover is installed over the top and sides of the three Encharge 3 modules.
Fire Protection Features	None



Figure 1 – Photo of Encharge 10 unit

Module	
Manufacturer	Enphase Energy Inc
Model Number	WX12I3250 (21S1P)
Electrical Ratings	67.2 Vdc and 50 Ah
Electrical Configuration	21 series x 1 parallel
Dimensions	279 mm wide x 236 mm deep x 298 mm high
Construction Description	Plastic enclosure on the top, bottom, and ends. Metal heat sink strip on the long sides.
Fire Protection Features	None
Listed to UL 1973?	No
Listed by UL to 1973?	No



Figure 2 – Photo of WX12I3250 (21S1P) module utilized in unit test

UL 9540A Report	UL Project 4788656362 September 2019
Deviations from 9540A Report	The unit's module is identical to UL 9540A tested module.

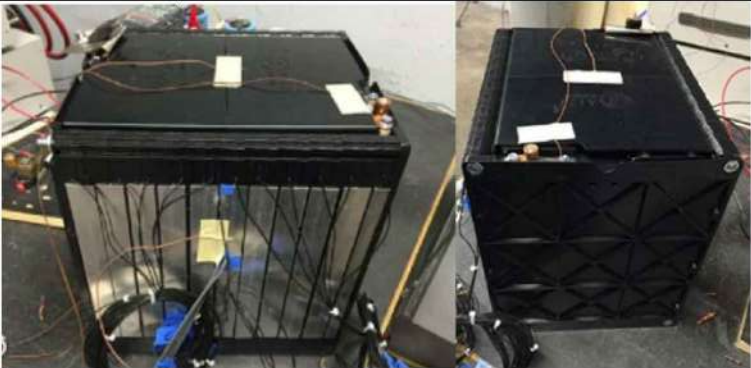


Figure 2 – Module tested in UL Project Number 4788656362

Cell	
Manufacturer	Enphase Energy Inc
Model Number	#WX12I3250
Chemistry	Lithium iron phosphate
Electrical Ratings	3.2 Vdc and 50 Ah
Dimensions	206 mm x 226.0 mm x 0.162mm
Construction Description	Prismatic pouch

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PV-27

CERTIFICATE OF COMPLIANCE

Certificate Number E488100
Report Reference E488100-20200514
Issue Date 2020-MAY-18

Issued to: ENPHASE ENERGY INC
1420 N McDowell Blvd
Petaluma CA 94954-6515

This certificate confirms that representative samples of ENERGY STORAGE SYSTEMS AND EQUIPMENT
Utility Interactive Energy Storage System.
Model: ENCHARGE-3-1P-NA and ENCHARGE-10-1P-NA

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/CAN/UL 9540, Energy Storage Systems and Equipment.
UL 991, Tests for Safety-Related Controls Employing Solid-State Devices

Additional Information: See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information.

This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.


Bruce Mahrenholz, Director North American Certification Program
UL LLC

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