WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE
Scott E. Wyssling, PE
Coleman D. Larsen, SE, PE
Gregory T. Elvestad, PE

76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

August 5, 2022

Legacy 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: 2022.08.05 12:45:21-06'00'
Foxit PDF Editor Version: 11.1.0

Re: Engineering Services
Epstein Residence
521 Old Mill Drive, NW Lake City FL
27.280 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" o.c. with 2 x 6 dimensional lumber top chord and all other members 2 x 4 dimensional lumber.
Roof Material: Composite Asphalt Shingles
Roof Slope: 27 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 Unirac 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. Connection on the roof is utilizing (4) ½" or #14 screws into the existing decking to resist uplift forces. Contractor to verify installation to be performed in accordance with the Unirac recommendations. Pull out values per screw are based on National Design Specification values for CDX plywood and are identified as 208 lbs/inch. Based on ½" sheathing the value per screw would be 104 lbs providing 416 lbs uplift resistance per attachment.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.
4. Panel supports connections shall be staggered to distribute load to adjacent framing members.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 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

SCOTT E WYSSLING
LICENSE
No. 81558
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

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

Signed 8/5/2022

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:

62x440 APTOS SOLAR DNA-144-MF26 (440W) MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
SYSTEM SIZE: 27.28 kW DC STC
SYSTEM SIZE: 17.98 kW AC

EQUIPMENT SUMMARY

62	APTOS SOLAR DNA-144-MF26 (440W) MODULES
62	ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V

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

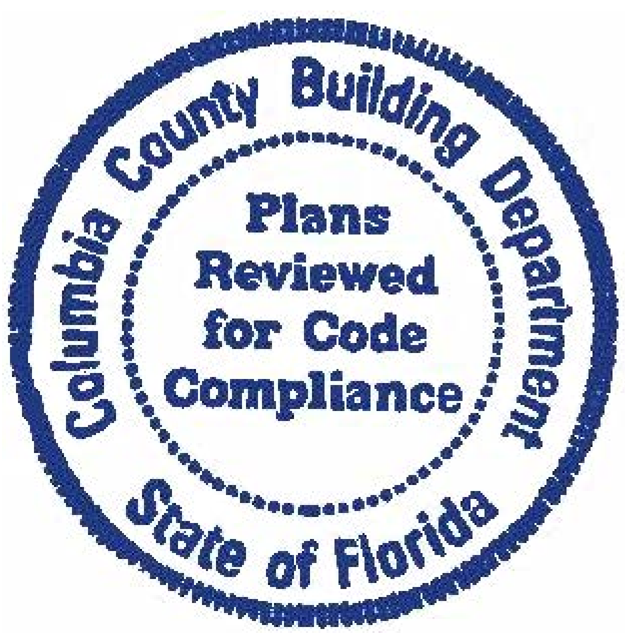
CODE COMPLIANCE

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 FIRE CODE
2020 FLORIDA FUEL GAS CODE

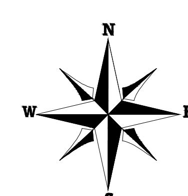
ELECTRICAL CODE:
ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.

GPS COORDINATES: 30.203998, -82.679852



GENERAL INSTALLATION NOTES

1. 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.
2. INSTALLER SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AT SITE BEFORE COMMENCING WORK.
3. CONTRACTOR SHALL FURNISH ALL MATERIAL EXCEPT AS SPECIFIED IN THE CONTRACT AND/OR THESE DRAWINGS.
4. ALL MATERIALS SHALL BE IN NEW AND UNUSED CONDITION.
5. MANUFACTURER'S MATERIAL EQUIPMENT, ETC. SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
6. THE INSTALLER SHALL BECOME FAMILIAR WITH ALL UTILITY AS-BUILT PLANS AND THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES, PAVEMENT OR IMPROVEMENTS.
7. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY THE OWNER OF DISCREPANCIES REQUIRING FURTHER CLARIFICATION BEFORE PROCEEDING WITH THE WORKS.
8. INSTALL ALL ASPECTS OF THIS PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS AND AS NOTED ON DRAWINGS ISSUED FOR CONSTRUCTION.
9. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER 310.0(D)
10. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26
11. EXACT CONDUIT RUN LOCATIONS SUBJECT TO CHANGE
12. ROOF PENETRATIONS ARE SEALED.
13. INVERTER IS LISTED TO UL-1741 "UTILITY INTERACTIVE"
14. 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 CALCULATION
PV-5	ATTIC PHOTO
PV-6	ELECTRICAL PHOTOS
PV-7	PLACARDS
PV-8	ADDITIONAL NOTES
PV-9	JOB HAZARD ANALYSIS
PV-10+	EQUIPMENT SPECIFICATIONS

1 HOUSE PHOTO
PV-0 SCALE: NTS

2 VICINITY MAP
PV-0 SCALE: NTS

LGCY POWER

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

LICENSE NUMBER: EC13001601

REVISIONS

DESCRIPTION	DATE	REV

SCOTT E WYSSLING LICENSE No 8155 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signature with Seal

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

Signed 8/5/2022

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.

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

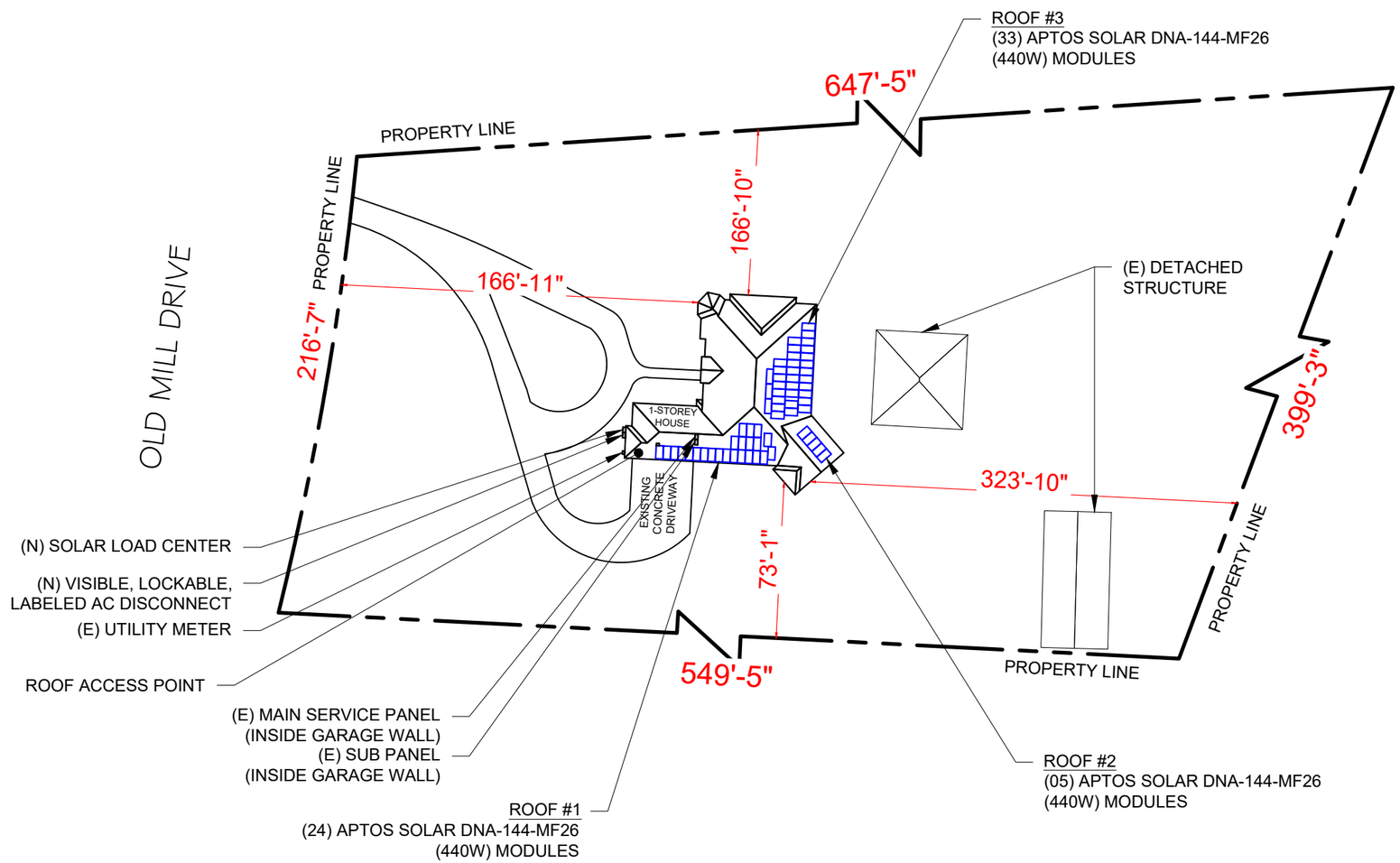
SHEET NUMBER
PV-0

● 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

62 APTOS SOLAR DNA-144-MF26 (440W) MODULES
62 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
SYSTEM SIZE: 27.28 KW DC STC



1 PLOT PLAN WITH ROOF PLAN
PV-1 SCALE: 1/64" = 1'-0"

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

LICENSE NUMBER: EC13009601

REVISION

DESCRIPTION	REV
No. 81554	
Status with Seal	

STATE OF FLORIDA PROFESSIONAL ENGINEER

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

Signed 8/5/2022

THIS PLAN HAS BEEN DIGITALLY 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.

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
PLOT PLAN WITH ROOF PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

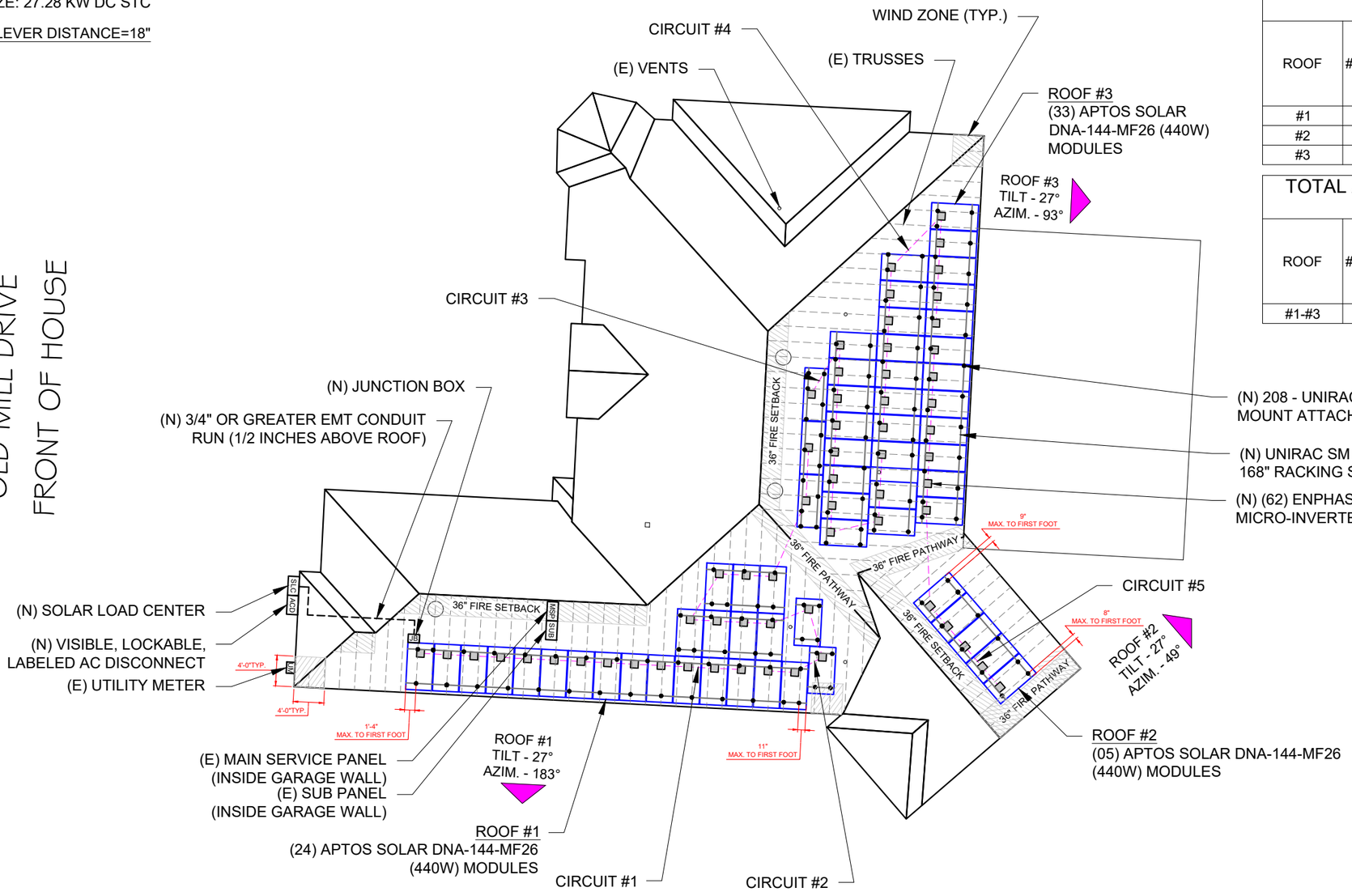
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 62 MODULES
MODULE TYPE = APTOS SOLAR DNA-144-MF26 (440W) MODULES
MODULE WEIGHT = 53.13 LBS / 24.1 KG.
MODULE DIMENSIONS = 82.48"x 40.90" = 23.43 SF
UNIT WEIGHT OF ARRAY = 2.27 PSF

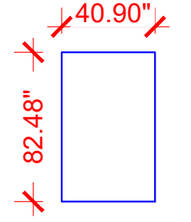
SYSTEM SUMMARY
62 APTOS SOLAR DNA-144-MF26 (440W) MODULES
62 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
SYSTEM SIZE: 27.28 KW DC STC

MAX.CANTILEVER DISTANCE=18"

OLD MILL DRIVE
FRONT OF HOUSE



BACK OF HOUSE



APTOS SOLAR
DNA-144-MF26
(440W) MODULES

ROOF DESCRIPTION

ROOF TYPE			COMPOSITE SHINGLE	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	27°	183°	2"x6"	24" O.C.
#2	27°	49°	2"x6"	24" O.C.
#3	27°	93°	2"x6"	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	24	562.24	1053	53.39
#2	05	117.13	356	32.90
#3	33	773.08	1140	67.81

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-#3	62	1452.45	2549	56.98

LEGEND

- MICRO-INVERTERS
- UM - UTILITY METER
- JB - JUNCTION BOX
- SLC - SOLAR LOAD CENTER
- ACD - AC DISCONNECT
- SUB - SUB PANEL
- MSP - MAIN SERVICE PANEL
- -VENTS (ROOF OBSTRUCTION)
- - CONDUIT RUN
- - RAFTERS
- - ROOF ATTACHMENT
- - RAIL
- - CIRCUIT

1 ROOF PLAN & MODULES
PV-2 SCALE: 1/16" = 1'-0"

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

Joseph Ciriello
LICENSE NUMBER: EC13008601

REVISIONS	
DESCRIPTION	REV

SCOTT E. WYSSLING LICENSE No. 81554 STATE OF FLORIDA PROFESSIONAL ENGINEER
Sealed with Seal

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

Signed 8/5/2022

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.

CUSTOMER INFORMATION

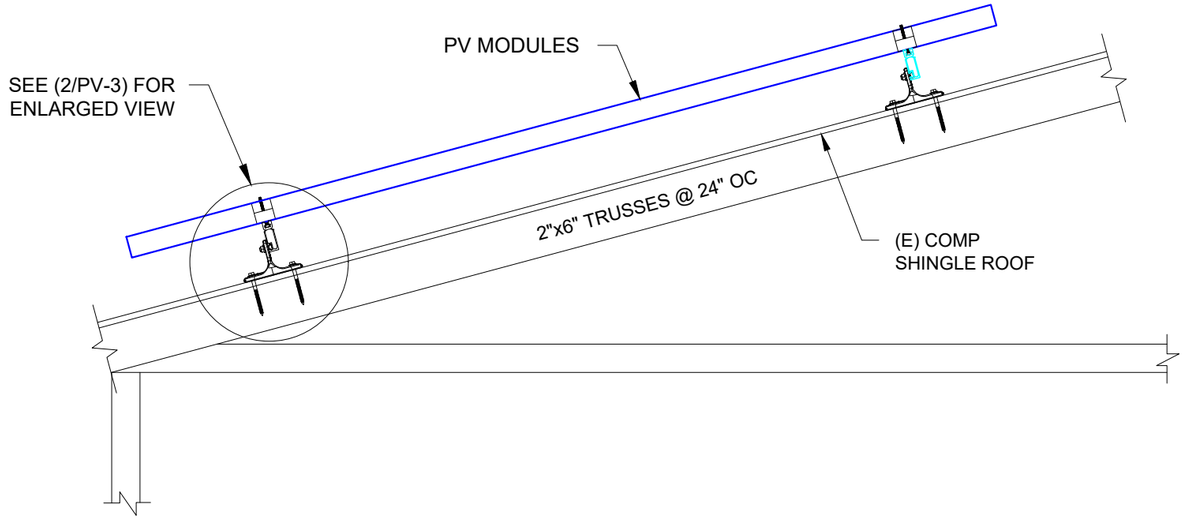
ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
ROOF PLAN WITH MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

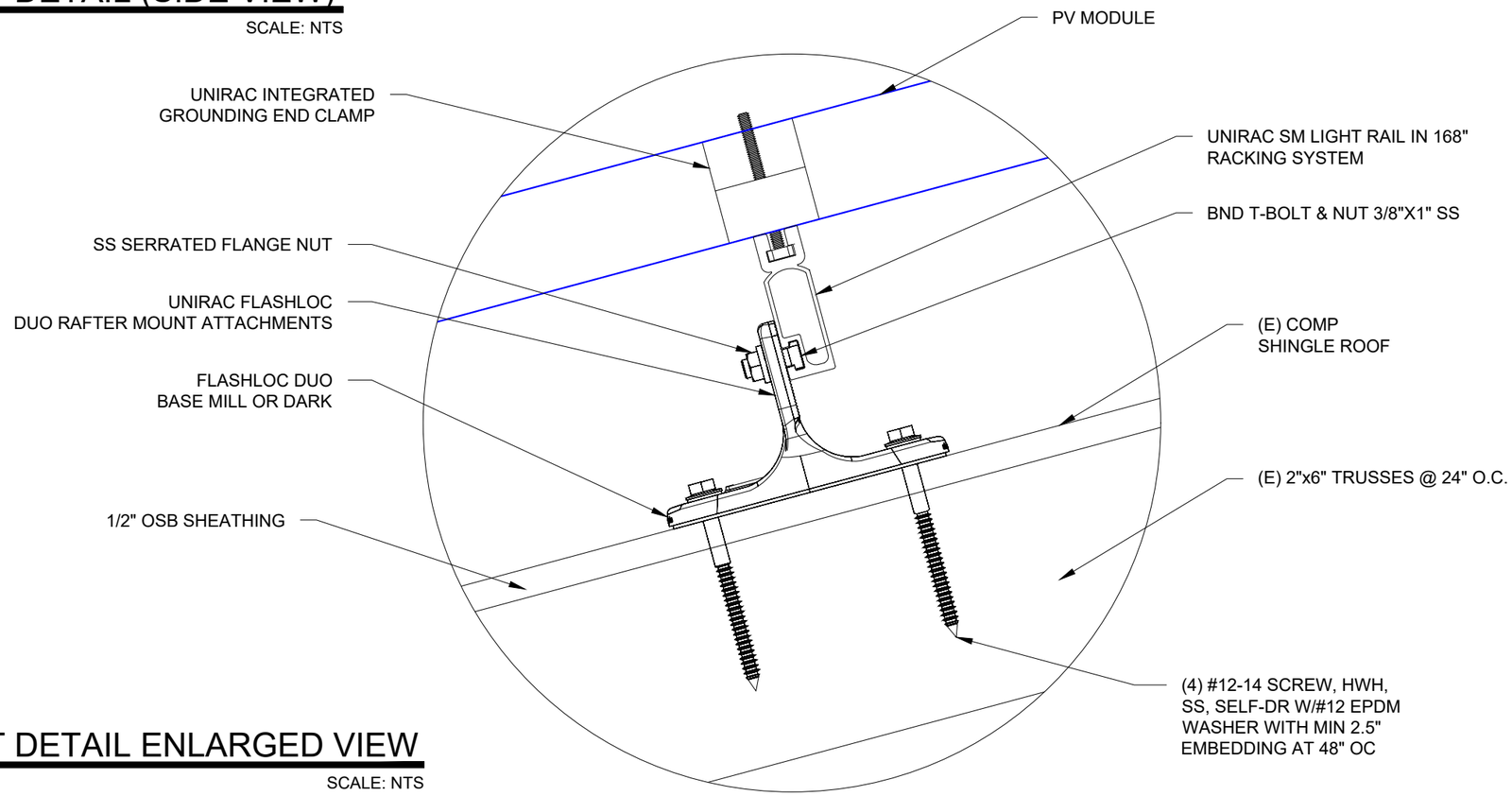
SYSTEM SUMMARY
62 APTOS SOLAR DNA-144-MF26 (440W) MODULES
62 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
SYSTEM SIZE: 27.28 KW DC STC



1 ATTACHMENT DETAIL (SIDE VIEW)

PV-3

SCALE: NTS



2 ATTACHMENT DETAIL ENLARGED VIEW

PV-3

SCALE: NTS

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

LICENSE NUMBER: EC13008601

REVISIONS	
DESCRIPTION	REV

Status with Seal

SCOTT E. WYSSLING LICENSE No. 81554 STATE OF FLORIDA PROFESSIONAL ENGINEER

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

Signed 8/5/2022

THIS PLAN HAS BEEN DIGITALLY 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.

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

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

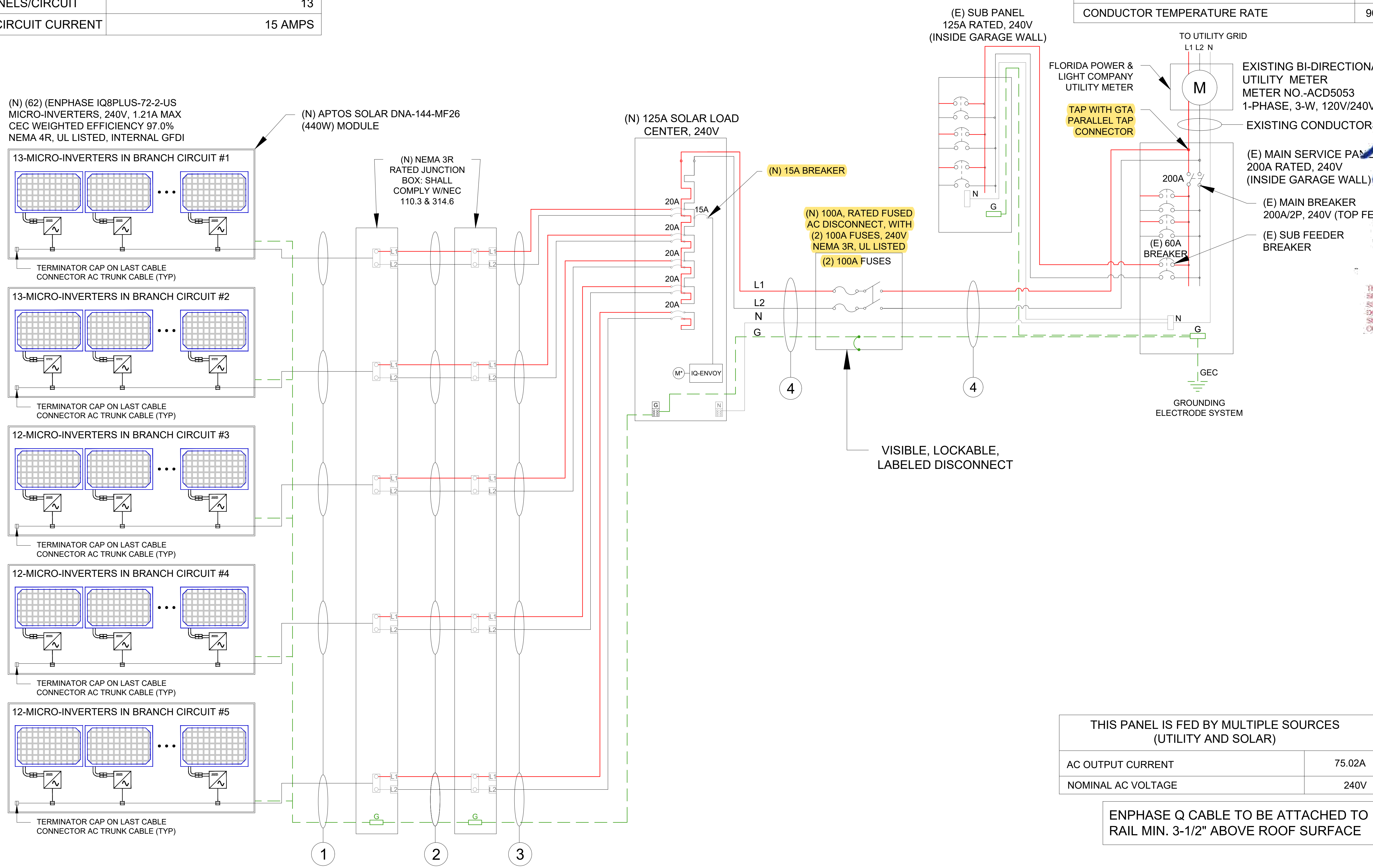
SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	APTOS SOLAR DNA-144-MF26 (440W)
VMP	41.0V
IMP	10.74A
VOC	49.9V
ISC	11.33A
MODULE DIMENSION	82.48"L x 40.90"W x 1.57"D (In Inch)

(62) APTOS SOLAR DNA-144-MF26 (440W) MODULES
(62) ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS, 240V
(02) CIRCUITS OF 13 MODULES WITH MICRO INVERTERS
(03) CIRCUITS OF 12 MODULES WITH MICRO INVERTERS
CONNECTED IN SERIES PER CIRCUIT
SYSTEM SIZE: 27.28 KW DC STC

NOTE:
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°



THIS PANEL IS FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	
AC OUTPUT CURRENT	75.02A
NOMINAL AC VOLTAGE	240V

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

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

LICENSE NUMBER: EC1300...
SCOTT E. WYSSLING
No 81558
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
Florida License # RY34912
Signed 8/5/2022

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.

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

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	-	5	#12	Q-CABLE	90°	30A x	0.91 x	1.00	= 27.30A	25A	13	x 1.21	x 1.25	= 19.66A	#6	BARE CU
2	JUNCTION BOX TO JUNCTION BOX	FREE AIR	10	#12	12/2 UF-B	75°	25A x	0.88 x	0.50	= 11.00A	25A	13	x 1.21	x 1.25	= 19.66A	#6	BARE CU
3	JUNCTION BOX TO COMBINER PANEL	3/4" EMT	10	#10	THWN-2	75°	35A x	0.88 x	0.50	= 15.40A	35A	13	x 1.21	x 1.25	= 19.66A	#6	THWN-2
4	COMBINER PANEL TO MAIN SERVICE PANEL	1-1/4" EMT	3	#2	THWN-2	75°	115A x	0.88 x	1.00	= 101.2A	115A	62	x 1.21	x 1.25	= 93.78A	#6	THWN-2

LGCY POWER

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
ELECTRICAL CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4A

LGCY POWER

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

Joseph Ciriello

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME

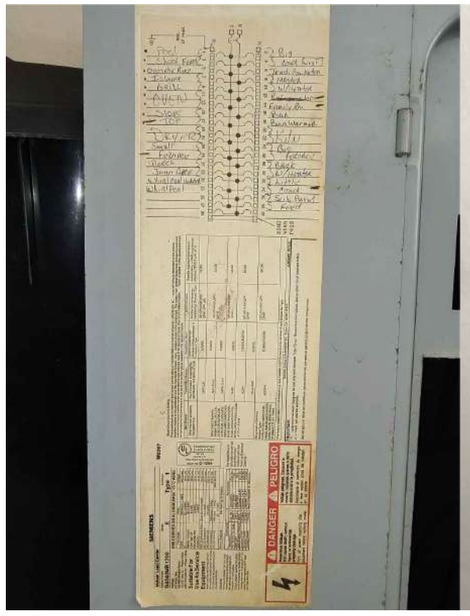
ATTIC
PHOTO

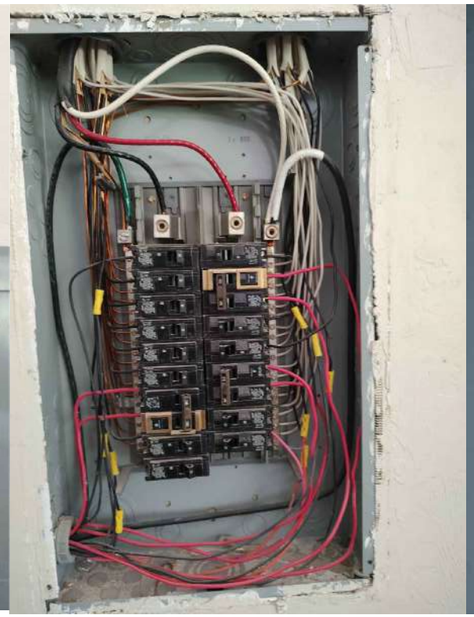
SHEET SIZE

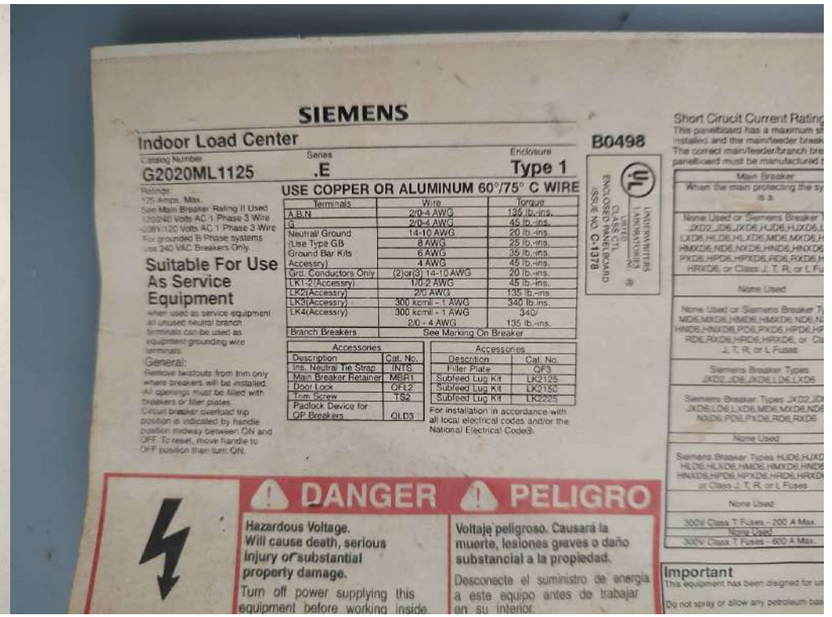
ANSI B
11" X 17"

SHEET NUMBER

PV-5







LGCY POWER

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
ELECTRICAL PHOTOS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

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 75.0 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'

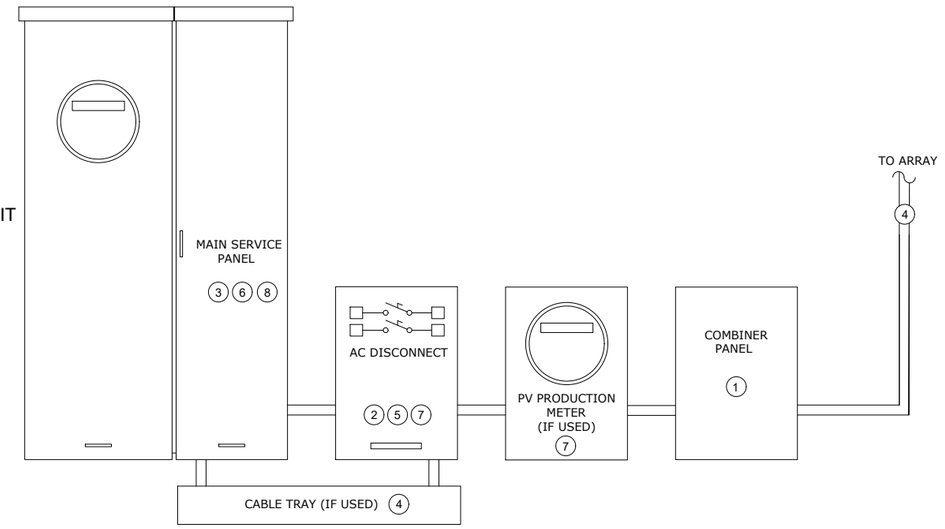
5) RAPID SHUTDOWN
NEC 690.56(C)(2)
LOCATED ON AC DISCONNECT

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



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.

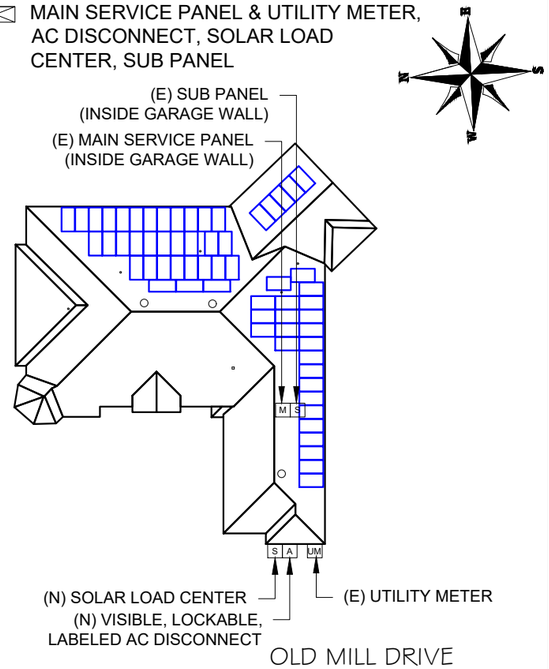
3. MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

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]

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN AT: ✉ MAIN SERVICE PANEL & UTILITY METER, AC DISCONNECT, SOLAR LOAD CENTER, SUB PANEL



521 OLD MILL DRIVE, NW LAKE CITY, FL 32055 USA

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

LGCY POWER

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

Joseph Ciriello

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 26S1602305121

SHEET NAME
PLACARDS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

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

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

Joseph Ciriello

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME

ADDITIONAL NOTES

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-8

LGCY POWER

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

LGCY POWER

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

LGCY POWER

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
JOB HAZARD ANALYSIS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

DNA™ 144

Solar for Innovators

Residential I Commercial

Designed & Engineered in Silicon Valley

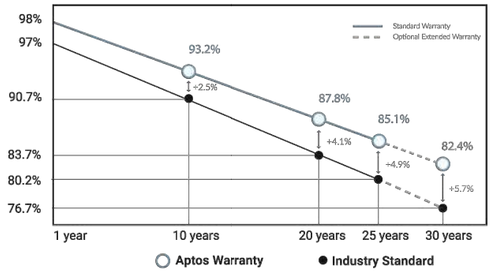
440W I 435W I 430W

Our DNA™ Split Cell Series impressively combines advanced solar technologies to maximize performance. Our patented Dual Nano Absorber (DNA™) Technology allows the panel to operate at high-efficencies in extreme temperatures. Contact our sales team today to learn more about our line of high-efficienty solar panels.

- Patented DNA™ technology boosts power performance & module efficiency
- Advanced split cell technology with 9 ultra-thin busbars allows for less resistance and more photon capture
- Ideal solution for applications affected by shading
- All-black design for pristine aesthetics
  No excessive silver bussing or ribbons
- Robust product design is reslient in extreme weather. Up to 5400 Pa snow load and 210 mph wind speeds

30 Year Warranty | 3X IEC Standards | RETC Top Performer

Linear Performance Warranty

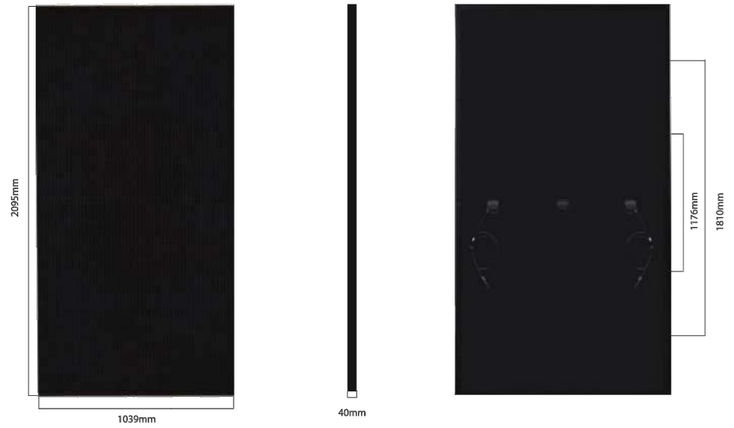


aptos™ solar technology

3140 De La Cruz Blvd., Ste 200
Santa Clara, CA 95054
wwww.aptossolar.com
info@aptossolar.com

DNA™ 144

Solar for Innovators



Electrical Specifiactions	DNA-144-MF26-440W	DNA-144-MF26-435W	DNA-144-MF26-430W
STCrated Output P_{mpp} (W)	440W	435W	430W
Module Efficiency	20.21%	19.98%	19.76%
Open Circuit Voltage V_{voc} (V)	49.9	49.7	49.5
Short Circiut Current I_{sc} (A)	11.33	11.26	11.19
Rated Voltage V_{mmp} (V)	41.0	40.8	40.6
Rated Voltage I_{mmp} (A)	10.74	10.67	10.60

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

Temperature Coefficients	
Temperature Coefficients P_{mmp}	-0.36%
Temperature Coefficients I_{sc}	+0.05%/°C
Temperature Coefficients V_{oc}	-0.29%/°C
Normal Operating Cell Temperature (NOCT)	44°C

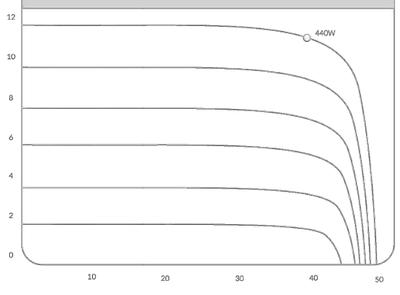
Test Operating Conditions	
Maximum Series Fuse	20A
Maximum System Voltage	1,000 VDC (UL&IEC)
Maximum Load Capacity (Per UL 1703)	5400 PA Snow Load / 210mph Wind Rating
Fire Performance Class	Class C/Type 1

Packaging Configuration	
Number of Modules per Pallet	27
Number of Pallets per 40ft. Container	22
Pallet Dimensions	2110 X 1120 X 2365
Pallet Weight (kg)	680
Container Weight (kg)	14960

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

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	2095 X 1039 X 40mm
Output Cable	4mm2 (EU)12AWG,39.37in.(1200mm)
Weight	53.13lbs.(24.1kg)
Cable Length	1200mm
Encapsulant	POE

I-V Curve



Certifications

UL61730-1, UL61730-2

LGCY POWER

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-10

ENPHASE

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.

Enphase 25 year limited warranty

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.

UL CERTIFIED SAFETY

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

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

© 2022 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ8 Microinverters, and other names are trademarks of Enphase Energy, Inc. Data subject to change.

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

* 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	Arms	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		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. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 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

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

Data Sheet
Enphase Networking

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

CERTIFIED

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

ENPHASE

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).
ACCESORIES (Order Seperately)	
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 12.5 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**

ENPHASE

© 2021 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ Envoy, and other trademarks or service names are the trademarks of Enphase Energy, Inc. Data subject to change. 06-30-2021

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

Data Sheet
Enphase Q Cable Accessories
Region: INDIA

Enphase Q Cable and Accessories

The **Enphase Q Cable™** and accessories are part of the sixth generation Enphase IQ System™. These products provide simplicity, reliability, and faster installation times.

Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- Four-wire (three-phase) option also available
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste

Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

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

ENPHASE

Enphase Q Cable Accessories

Q CABLE SPECIFICATIONS	
Voltage rating	600V (connector rating up to 250 V)
Cable temperature rating	90° C wet/dry
UV exposure rating	EN ISO 492-2
Environmental protection rating	IEC 60529 IP67
Compliance	RoHS, OIL RES I, CE, UV resistant
Cable insulator rating	H07BQ-F
Flame rating	IEC 60332-1-2

Q CABLE TYPES / ORDERING OPTIONS

Model Number	Max Nominal Voltage	Ampacity Rating	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-25-10-240 (single-phase)	250 VAC	25 A	1.3 m	Portrait	240
Q-25-17-240 (single-phase)	250 VAC	25 A	2.0 m	Landscape (60-cell)	240
Q-25-20-200 (single-phase)	250 VAC	25 A	2.3 m	Landscape (72-cell)	200
Q-25-10-3P-200 (three-phase)	250 VAC	25 A	1.3 m	Portrait	200
Q-25-17-3P-160 (three-phase)	250 VAC	25 A	2.0 m	Landscape (60-cell)	160
Q-25-20-3P-160 (three-phase)	250 VAC	25 A	2.3 m	Landscape (72-cell)	160

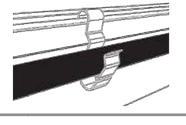
ENPHASE Q CABLE ACCESSORIES

Name	Model Number	Description
Raw Q Cable (single-phase)	Q-25-RAW-300	300 meters cable with no connectors
Raw Q Cable (three-phase)	Q-25-RAW-3P-300	300 meters cable with no connectors
Field-wireable connector (male)	Q-CONN-R-10M	Make connections using single-phase cable
Field-wireable connector (male)	Q-CONN-3P-10M	Make connections using three-phase cable
Field-wireable connector (female)	Q-CONN-R-10F	Make connections from any Q Cable (single-phase) open connector
Field-wireable connector (female)	Q-CONN-3P-10F	Make connections from any Q Cable (three-phase) open connector
Cable Clip	ET-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount
Disconnect tool	Q-DISC-3P-10	Disconnect tool for three-phase Field wireable connectors
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling
Terminator (single-phase)	Q-TERM-R-10	Terminator cap for unused single-phase cable ends
Terminator (three-phase)	Q-TERM-3P-10	Terminator cap for unused three-phase cable ends
Replacement DC Adaptor (MC4)	Q-DCC-2-INT	DC adaptor to MC4 (max voltage 100 VDC)

TERMINATOR
Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-R-10 / Q-TERM-3P-10))

SEALING CAPS
Sealing caps for unused cable connections, sold in packs of ten (Q-SEAL-10)

DISCONNECT TOOL
Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)
Three-phase model (Q-DISC-3P-10)



CABLE CLIP
Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (ET-CLIP-100)

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

© 2018 Enphase Energy. All rights reserved. All trademarks or brands used are the property of Enphase Energy, Inc.
2018-11-26

ENPHASE

LGCY POWER

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-13

FLASHLOC™ DUO

THE MOST VERSATILE DIRECT TO DECK ATTACHMENT

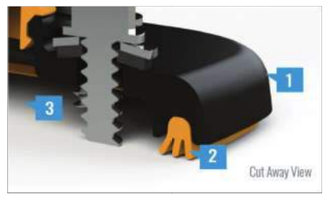
UNIRAC

BETTER SOLAR STARTS HERE

FLASHLOC™ **DUO** is the most versatile direct to deck and rafter attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the required number of screws to secure the mount and inject sealant into the base. **FLASH**LOC's patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with two rafter screws, sealant and hardware for maximum convenience (deck screws sold separately). Don't just divert water, **LOC it out!**

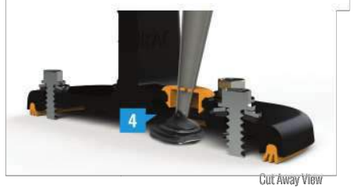
PROTECT THE ROOF

Install a high-strength waterproof attachment without lifting, prying or damaging shingles.



LOC OUT WATER

With an outer shield 1 contour-conforming gasket 2 and pressurized sealant chamber 3 the Triple Seal technology delivers a 100% waterproof connection.



HIGH-SPEED INSTALL

Simply drive the required number of screws and inject sealant into the port 4 to create a permanent pressure seal.

APRIL2021_FLASHLOCDUO_V1

FASTER INSTALLATION. 25-YEAR WARRANTY.

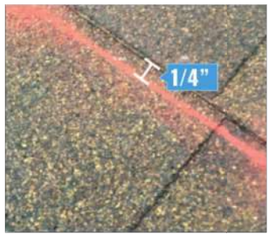
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FLASHLOC™ DUO

INSTALLATION GUIDE

UNIRAC

BETTER SOLAR STARTS HERE



PRE-INSTALL: CLEAN SURFACE AND MARK LOCATION

Ensure existing roof structure is capable of supporting loads prescribed in Flashloc Duo D&E Guide. Clean roof surface of dirt, debris, snow and ice.

Snap chalk lines for attachment rows. On shingle roofs, snap lines 1/4" below upslope edge of shingle coarse. This line will be used to align the upper edge of the mount.

NOTE: Space mounts per span charts found in Flashloc Duo D&E Guide.

STEP ONE: SECURE

ATTACHING TO A RAFTER: Place FLASHLOC DUO over rafter location and align upper edge of mount with horizontal chalk line. Secure mount with the two (2) provided rafter screws. BACKFILL ALL PILOT HOLES WITH SEALANT.

ATTACHING TO SHEATHING: Place FLASHLOC DUO over desired location and align upper edge of mount with horizontal chalk line. Secure mount with the two (2) provided rafter screws. Next, secure mount with four (4) deck screws by drilling through the FLASHLOC DUO deck mount hole locations. Unirac recommends using a drill as opposed to an impact gun to prevent over-tightening or stripping roof sheathing.

IMPORTANT: SECURELY ATTACH MOUNT BUT DO NOT OVERTIGHTEN SCREWS.

STEP TWO: SEAL

Insert tip of UNIRAC approved sealant into port and inject until sealant exits vent. Continue array installation, attaching rails to mounts with provided T-bolts.

NOTE: When FLASHLOC DUO is installed over gap between shingle tabs or vertical joints, fill gap/joint with sealant between mount and upslope edge of shingle course.

CUT SHINGLES AS REQUIRED: DO NOT INSTALL THE FLASHLOC SLIDER ACCROSS THICKNESS VARIATIONS GREATER THAN 1/8" SUCH AS THOSE FOUND IN HIGH DEFINITION SHINGLES.

NOTE: When installing included rail attachment hardware, torque T-bolt nut to 30 ft-lbs.
NOTE: If an exploratory hole falls outside of the area covered by the sealant, flash hole accordingly.

USE ONLY UNIRAC APPROVED SEALANTS. PLEASE CONTACT UNIRAC FOR FULL LIST OF COMPATIBLE SEALANTS.

FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

LGCY POWER

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

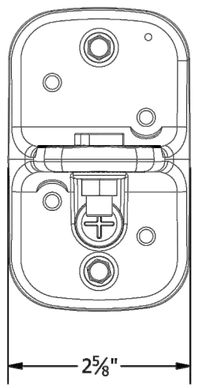
ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

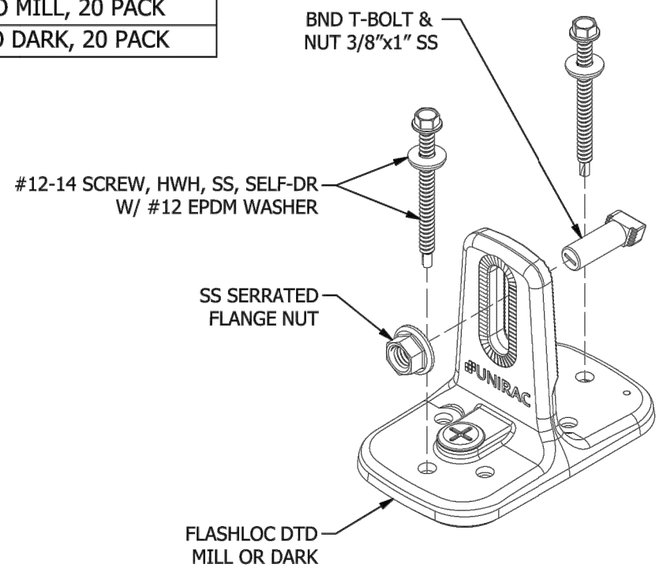
SHEET NAME
EQUIPMENT SPECIFICATION

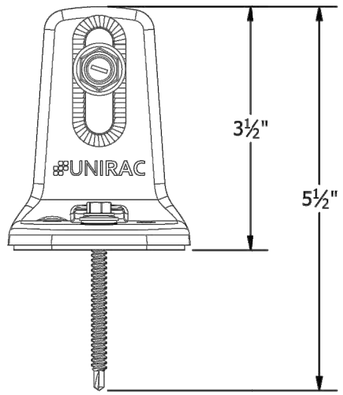
SHEET SIZE
ANSI B
11" X 17"

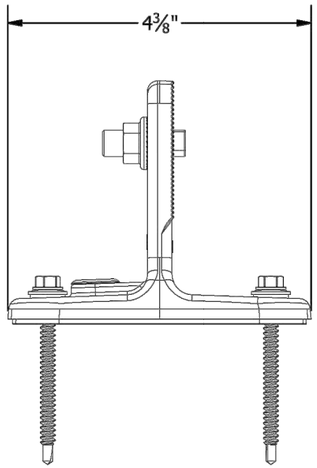
SHEET NUMBER
PV-14

PART TABLE	
P/N	DESCRIPTION
004275M	FLASHLOC DUO MILL, 20 PACK
004275D	FLASHLOC DUO DARK, 20 PACK









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

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	ASSEMBLY DETAIL
DESCRIPTION:	FLASHLOC DUO KIT
REVISION DATE:	4/29/2021

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

FL-A04
SHEET

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

Joseph Ciriello
LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

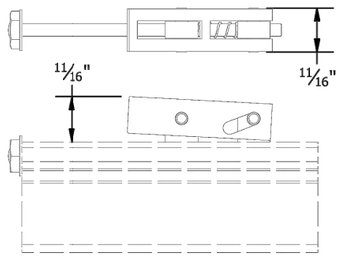
ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

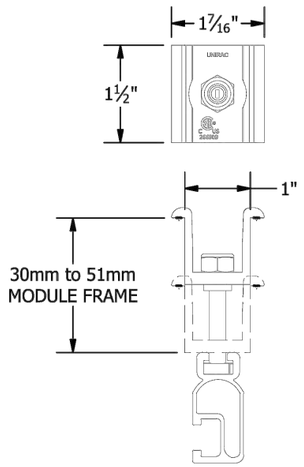
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

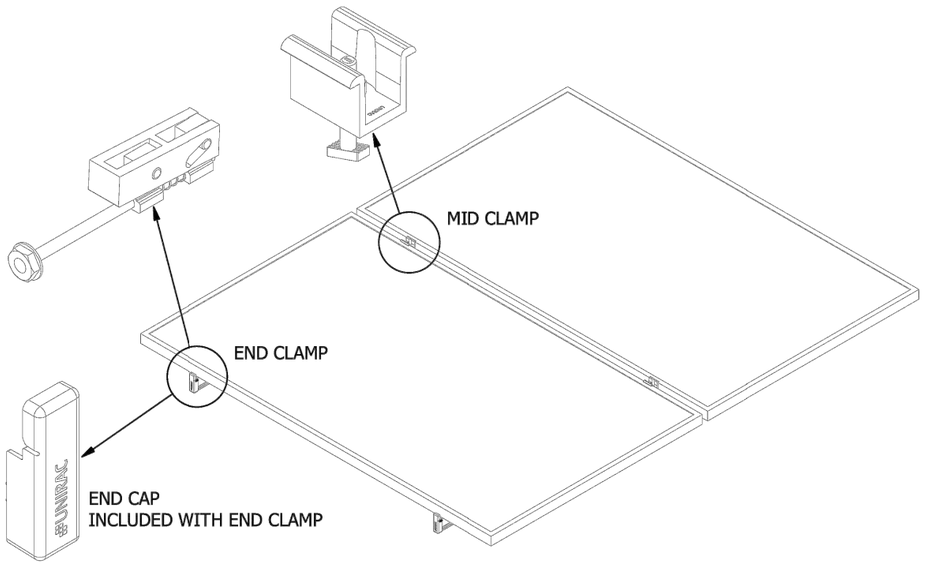
PRO SERIES END CLAMP



PRO SERIES MID CLAMP



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



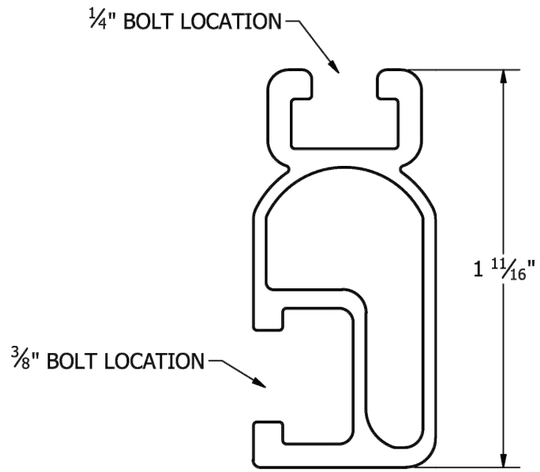
UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

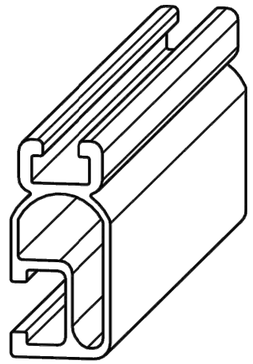
PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	PRO SERIES BONDING CLAMPS
REVISION DATE:	10/26/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01
SHEET





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"

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-16

SM SOLAR MOUNT — 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:

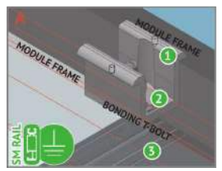
Rail Type	Module Type	System Level Fire Rating	Rail Direction	Module Orientation	Mitigation Required
Standard Rail	Type 1, Type 2, Type 3 & Type 10	Class A, Class B & Class C	East-West	Landscape OR Portrait	None Required
			North-South	Landscape OR Portrait	None Required
Light Rail	Type 1 & Type 2	Class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

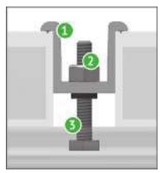
Unirac SOLARMOUNT is listed to UL 2703. Certification marking is embossed on all mid clamps as shown. Labels with additional information will be provided . After the racking system is fully assembled, a single label should be applied to the SOLARMOUNT rail at the edge of the array. Note: The sticker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

SM SOLAR MOUNT — BONDING CONNECTION GROUND PATHS — INSTALLATION GUIDE — 0 PAGE

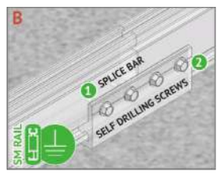


BONDING MIDCLAMP ASSEMBLY

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



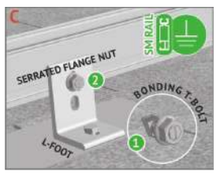
BONDING MIDCLAMP ASSEMBLY



BONDING RAIL SPLICE BAR

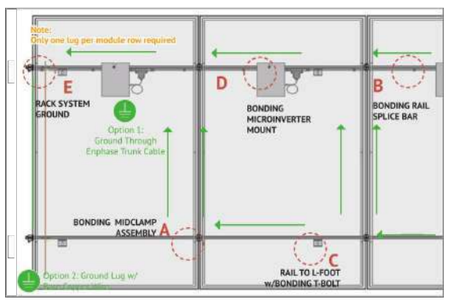
1. Stainless steel self drilling screws drill and tap into splice bar and rail creating bond between splice bar and each rail section
2. Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

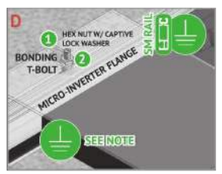
Note: Splice bar and bolted connection are non-structural. The splice bar function is rail alignment and bonding.



RAIL TO L-FOOT w/BONDING T-BOLT

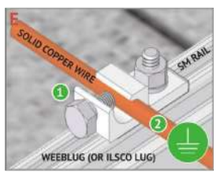
1. Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-bolt
2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail





BONDING MICROINVERTER MOUNT

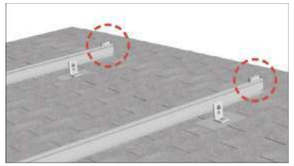
1. Hex nut with captive lock washer bonds metal microinverter flange to stainless steel T-bolt
2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail System ground including racking and modules may be achieved through the trunk cable of approved microinverter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



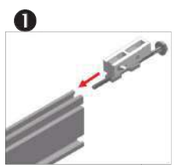
RACK SYSTEM GROUND

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: Ilsco lug can also be used when secured to the side of the rail. See page I-3 for details

SM SOLAR MOUNT — ENDCLAMP, FIRST MODULE &TRIM — INSTALLATION GUIDE — K PAGE

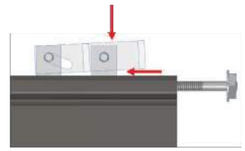


INSTALL MODULE END CLAMPS: The End clamp is supplied as an assembly with a 1/2" hex head bolt that is accessible at the ends of rails. The clamp should be installed on the rails prior to installing end modules.

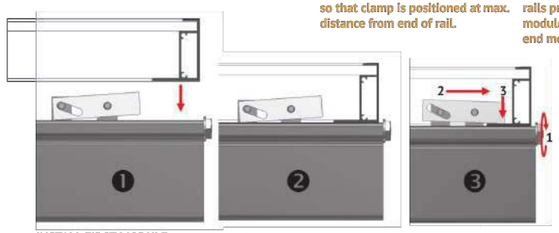


INSTALL END CLAMPS ON RAIL: Slide end clamp on to rail by engaging the two t-guide brackets with the top slot of the rails. **Ensure bolt is extended as far as possible so that clamp is positioned at max. distance from end of rail.**

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.**



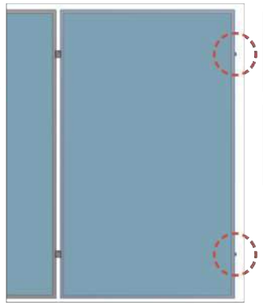
NOTE: To assist insertion of clamp into rail slot, Pressure may be applied to top or side of bracket as shown. Do not force clamp into rail by pushing on bolt with excessive force.

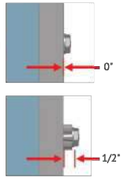


INSTALL FIRST MODULE: Install the first end module onto rails with the flange of the module frame positioned between end clamps an ends of rails.

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.**

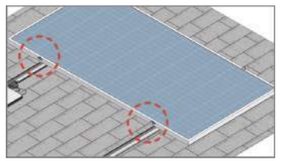
TORQUE VALUE (See table and notes on PG. 1)
End clamp bolt to 3 ft-lbs, No anti-seize



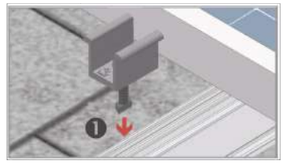


For best appearance, position module flush with ends of rails. Rails should not extend more than 1/2" beyond module. Module must be fully supported by rails and cannot overhang ends of rails.

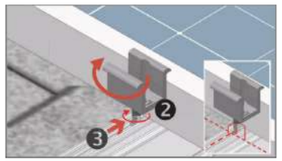
SM SOLAR MOUNT — BONDING MIDCLAMP & TRIM — INSTALLATION GUIDE — L PAGE



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.



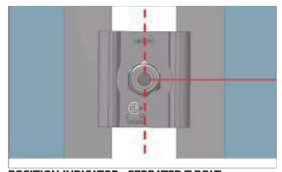
INSERT MIDCLAMP ASSEMBLY: Insert 1/4" T-Bolt into top slot of rail



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.

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



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

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

Joseph Ciriello
LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

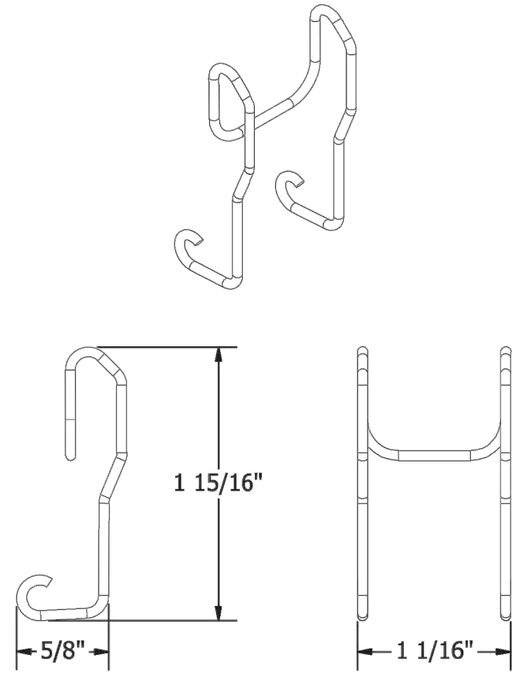
ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

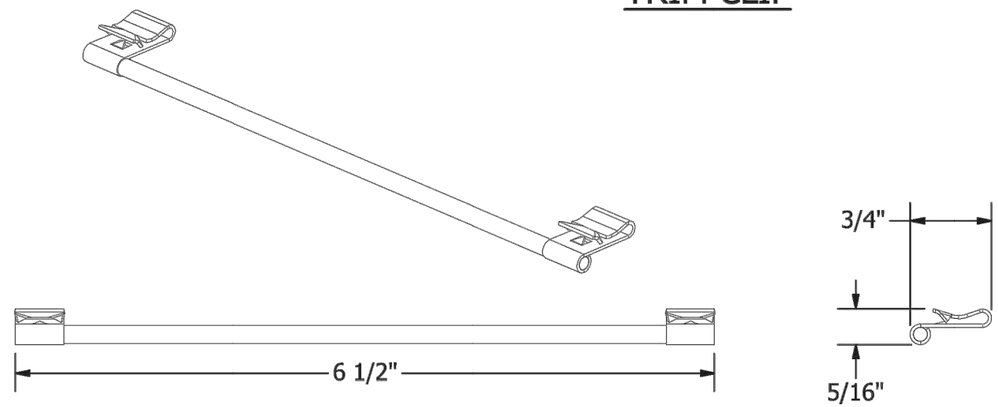
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

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



TRIM CLIP



WIRE BONDING CLIP

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

Joseph Ciriello
LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-18

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

This report shall not be reproduced, except in full, without the approval of CSA Group.

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

 © 2020 CSA Group. All rights reserved.

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

 © 2020 CSA Group. All rights reserved.

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-19

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:

1. Minimum Design Loads for Buildings and other Structures, ASCE/SEI 7-05, ASCE/SEI 7-10, ASCE/SEI 7-16
2. 2006-2018 International Building Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
3. 2006-2018 International Residential Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES.
5. 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:
1) U-builder Online tool analysis is only for Unirac SM SOLARMOUNT Rail Flush systems only and do not include roof capacity check.
2) Risk Category II per ASCE 7-16.
3) Topographic factor, kzt is 1.0.
4) Array Edge Factor $Y_E = 1.5$
5) Average parapet height is 0.0 ft.
6) Wind speeds are LRFD values.
7) 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:
1) 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.
2) The attachment of the SM SOLARMOUNT Rails to the existing structure.
3) 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
STATE OF TEXAS
PAUL K. ZACHER
112248
EXP. 06/30/2021
LICENSED PROFESSIONAL ENGINEER
F-15844

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

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

Joseph Ciriello
LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-20

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

C US

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.

© 2018 CSA Group. All rights reserved.

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.

© 2018 CSA Group. All rights reserved.

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

LICENSE NUMBER: EC13006601

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-21

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.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

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

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

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

Joseph Ciriello
LICENSE NUMBER: EC13006601

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ABBY EPSTEIN
521 OLD MILL DRIVE,
NW LAKE CITY, FL 32055 USA
EMAIL ID# - abbylepstein@gmail.com
PHONE NO.# (954) 895-8058
APN# 263S1602305121

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-22