

ROOF MOUNT INSTALLATION OF 4.40 KW DC PHOTOVOLTAIC SYSTEM

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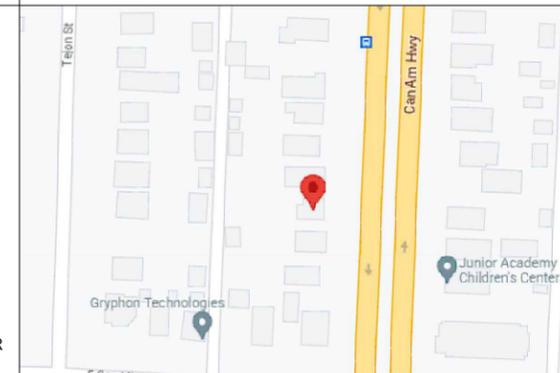
PROJECT DATA

| | | |
|------------------------|---|-------------------------------|
| PROJECT ADDRESS | 1320 N NEVADA AVE COLORADO SPRINGS, CO 80903 | |
| OWNER | TIMOTHY & MARCIE MURPHY | |
| SCOPE | 4.40 KW DC | 3.19 KW AC |
| | 11 | VSUN 400W VSUN400-108BMH |
| | 11 | ENPHASE IQ7PLUS-72-2-US |
| | 1 | ENPHASE ENCHARGE 10 10.08 kWh |
| ELECTRICAL INFORMATION | EXISTING | 1 ϕ , 3W, 120/240V |
| | MAIN SERVICE PANEL BUSBAR RATING | 200A |
| | MAIN SERVICE BREAKER RATING | 200A |
| BUILDING INFORMATION | ONE STORY BUILDING | |
| | CONSTRUCTION TYPE: V-B | |
| | OCCUPANCY: R | |
| | ROOF TYPE | COMPOSITION SHINGLE |
| FRAMING | 2"X4" @ 24" O.C | |
| RACKING INFORMATION | UNIRAC SOLAR MOUNT | |
| AHJ | CITY OF COLORADO SPRINGS | |
| APN | 6407106014 | |
| LOT AREA | 9,500 SQFT | |
| LIVING AREA | 3,044 SQFT | |

GENERAL NOTES

1. ALL ELECTRICAL MATERIALS SHALL BE NEW AND LISTED BY RECOGNIZED ELECTRICAL TESTING LABORATORY CUSTOM MADE EQUIPMENT SHALL HAVE COMPLETE TEST DATA SUBMITTED BY THE MANUFACTURER ATTESTING TO ITS SAFETY
2. OUTDOOR EQUIPMENT SHALL BE AT LEAST NEMA 3R RATED
3. ALL METALLIC EQUIPMENT SHALL BE GROUNDED
4. ALL SPECIFIC WIRING IS BASED ON THE USE OF COPPER.
5. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO INSTALLATION AND SHALL COORDINATE ALL INSPECTIONS, TESTING COMMISSIONING AND ACCEPTANCE WITH THE CLIENT, UTILITY CO. AND CITY INSPECTORS AS NEEDED.
6. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS OF SERVICE POINTS AND SERVICE SIZES WITH THE SERVING UTILITY COMPANY AND COMPLY WITH ALL UTILITY COMPANIES REQUIREMENTS. IF THE SOLAR BACK FED BREAKER IS OVER THE BUSS SIZE 20% LIMIT, CONTRACTOR SHALL INCLUDE THE COST TO REPLACE MAIN BREAKER OR ENLARGE MAIN CAPACITY.
7. DRAWINGS ARE DIAGRAMMATIC ONLY, ROUTING OF RACEWAYS SHALL BE OPTION OF THE CONTRACTOR UNLESS OTHERWISE NOTED AND SHALL BE COORDINATED WITH OTHER TRADES.
8. IF THE ROOF MATERIAL OR ROOF STRUCTURE NOT ADEQUATE FOR PV INSTALLATION, CALL ENGINEER PRIOR TO INSTALL. THE CONTRACTOR IS RESPONSIBLE TO VERIFY THAT THE ROOF IS CAPABLE OF WITHSTANDING THE EXTRA WEIGHT.
9. IF THE DISTANCES FOR CABLE RUNS ARE DIFFERENT THAN SHOWN, THE CONTRACTOR SHALL NOTIFY THE ELECTRICAL ENGINEER TO VALIDATE THE WIRE SIZE. FINAL DRAWINGS WILL BE RED-LINED AND UPDATED AS APPROPRIATE.
10. WHENEVER A DISCREPANCY IN QUALITY OF EQUIPMENT ARISES ON THE DRAWING OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL AND SERVICES REQUIRED BY THE STRICTEST CONDITIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS TO ENSURE COMPLETE COMPLIANCE AND LONGEVITY OF THE OPERABLE SYSTEM REQUIRED BY THE ARCHITECT/ENGINEERS.

VICINITY MAP



PHOTOVOLTAIC NOTES

1. ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED AND IDENTIFIED UL 1703.
2. SOLAR SYSTEM SHALL NOT COVER ANY PLUMBING OR MECHANICAL VENTS
3. MODULES AND SUPPORT STRUCTURES SHALL BE GROUNDED.
4. SOLAR INVERTER MUST HAVE A MANUFACTURE INSTALLED DISCONNECTING MEANS THAT PREVENTS PARALLEL FEEDING UTILITY LINES DURING POWER OUTAGE.
5. REMOVAL OF AN INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTORS.
6. ALL PV MODULES AND ASSOCIATED EQUIPMENT AND WIRING SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE.
7. LIVE PARTS OF PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS OVER 150V TO GROUND SHALL NOT BE ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS WHILE ENERGIZED.
8. INVERTER IS EQUIPPED W/ INTEGRATED GFCI, THUS PROVIDING GROUND FAULT PROTECTION
9. ALL CONDUCTORS SHALL BE COPPER AND 90 DEG RATED
10. ALL ELECTRICAL EQUIPMENT SHALL BE LISTED BY A RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED BY THE DEPARTMENT.
11. THE OUTPUT OF A UTILITY INTERACTIVE-INVERTER SHALL BE PERMITTED TO BE CONNECTED TO THE SUPPLY SIDE OF THE SERVICE DISCONNECTING MEANS AS PER 230.82(6)
12. A SINGLE CONDUCTOR SHALL BE PERMITTED TO BE USED TO PERFORM THE MULTIPLE FUNCTIONS OF DC GROUNDING, AC GROUNDING AND BONDING BETWEEN AC AND DC SYSTEMS SIZED AS PER SEC 250.122
13. EQUIPMENT GROUND CONDUCTOR REQUIRED IN RACEWAYS SIZED PER CEC 250-122.
14. PER ART 250.92. NON-CURRENT CARRYING METAL PARTS OF EQUIPMENT SHALL BE EFFECTIVELY BONDED TOGETHER. BOND BOTH ENDS OF RACEWAYS

SATELLITE VIEW



CONTRACTOR

SOLARISE

 Address:
 2936 Janitell Rd
 Colorado Springs, CO 80906
 Phone Number:
 (719)315-3034

CODE REFERENCES

THE INSTALLATION OF SOLAR ARRAYS AND PHOTOVOLTAIC POWER SYSTEMS SHALL COMPLY WITH THE FOLLOWING CODES:

2023 (PPRBC) PIKES PEAK REGIONAL BUILDING CODE
 2021 (IBC) INTERNATIONAL BUILDING CODE
 2021 (IMC) INTERNATIONAL MECHANICAL CODE
 2021 (IPC) INTERNATIONAL PLUMBING CODE
 2021 (IFC) INTERNATIONAL FIRE CODE
 2021 (IRC) INTERNATIONAL RESIDENTIAL CODE
 2023 (NEC) NATIONAL ELECTRIC CODE

ALL OTHER ORDINANCE ADOPTED BY THE LOCAL GOVERNING AGENCIES

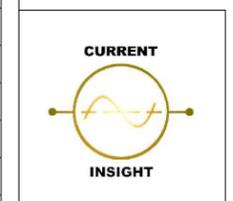
UNIT INDEX

| | | | | | |
|------|-------------------------------------|------|----------------------------|--|--|
| MSP | Main Service Panel | SSP | Service Sub Panel | | |
| UM | Utility Meter | PV | PV Load Center | | Micro Inverter / Optimizer |
| PM | Production Meter | PVS6 | Sunpower PV Supervisor | | Solar Module |
| IM | Itron Meter | IQ | IQ Combiner Box | | 36" Setback |
| INV | Inverter | J/B | Junction Box | | 18" Setback |
| VLLD | Visible Lockable Labeled Disconnect | EV | EV Outlet | | |
| RSC | Rapid Shutdown Controller | BB | Battery Backup | | |
| RSB | Rapid Shutdown Box | AT | Auto Transformer | | |
| | | SEM | Solar Edge Meter Enclosure | | EMT / FMT / PVC / RMC type conduit/ Romex NM Cable/ FNMT (Fluid non-metallic tube) |
| | | DP | Distribution Panel | | |

SHEET INDEX

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OCTOBER 11, 2023
 AS INDICATED
 PV SYSTEM

0

| PHOTOVOLTAIC SYSTEM 4.40 KW DC | |
|--------------------------------|---|
| 11 | VSUN 400W MODULES (VSUN400-108BMH) |
| 11 | Enphase Energy Microinverters (IQ7PLUS-72-2-US) |

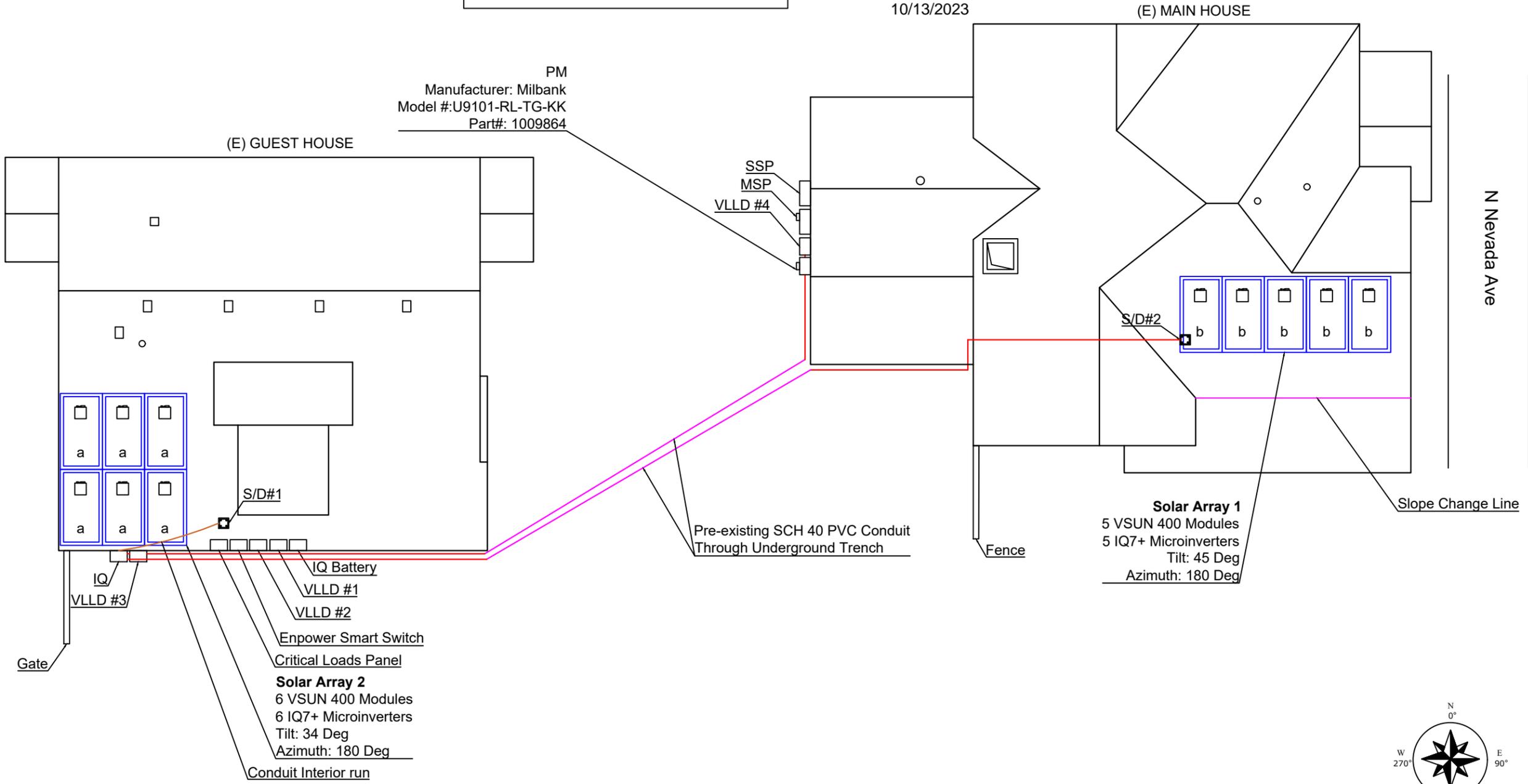
GUEST HOUSE ROOF AREA CALCULATIONS
 FIRE SPRINKLERS - NO
 TOTAL ROOF AREA (SQ.FT.) - 1,140
 SOLAR AREA (SQ.FT.) - 126
 % OF COVERED AREA - 11.1%

MAIN HOUSE ROOF AREA CALCULATIONS
 FIRE SPRINKLERS - NO
 TOTAL ROOF AREA (SQ.FT.) - 1,570
 SOLAR AREA (SQ.FT.) - 105
 % OF COVERED AREA - 6.7%

BETWEEN ARRAYS AND FROM JUNCTION BOX TO PV EQUIPMENT FMT TYPE CONDUIT WILL RUN THROUGH ATTIC AT MIN 18" FROM ROOF DECKING



10/13/2023



ROOF PLAN

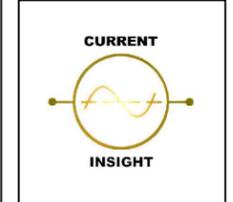


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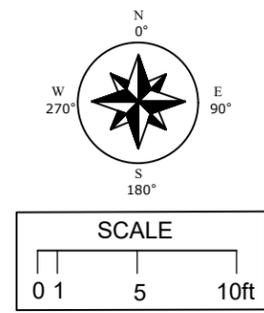
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SITE PLAN

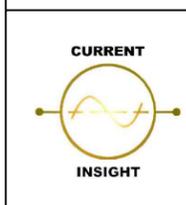


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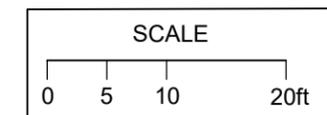
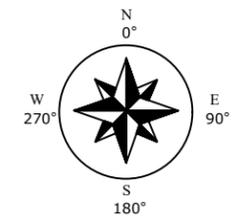
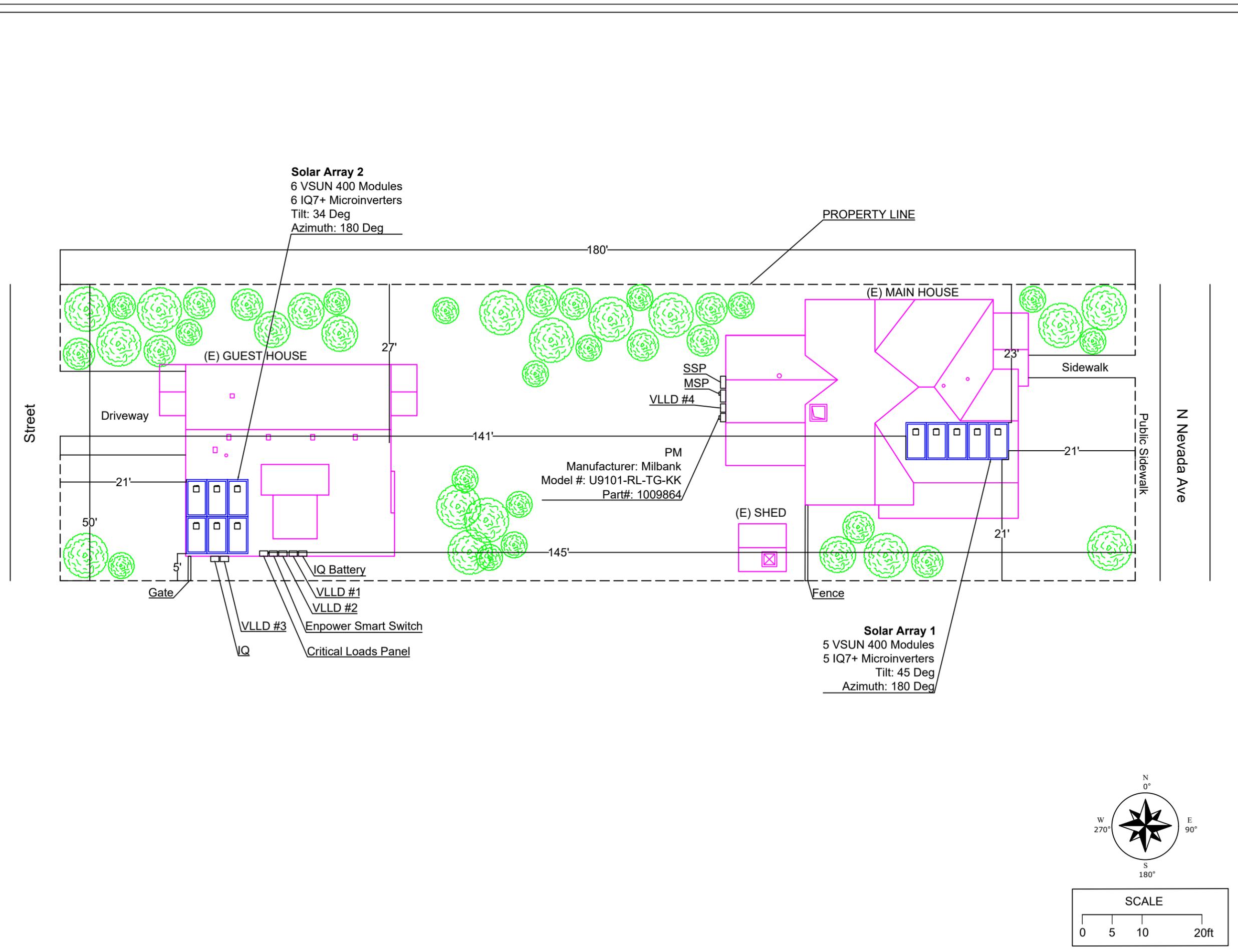
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PV SYSTEM

1.1



GARAGE FLOOR PLAN

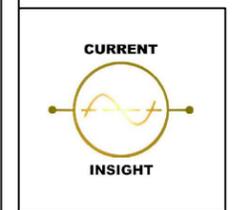


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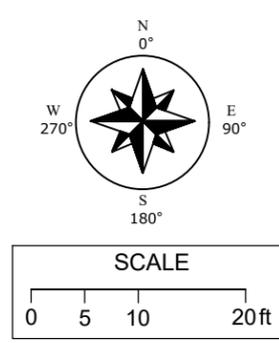
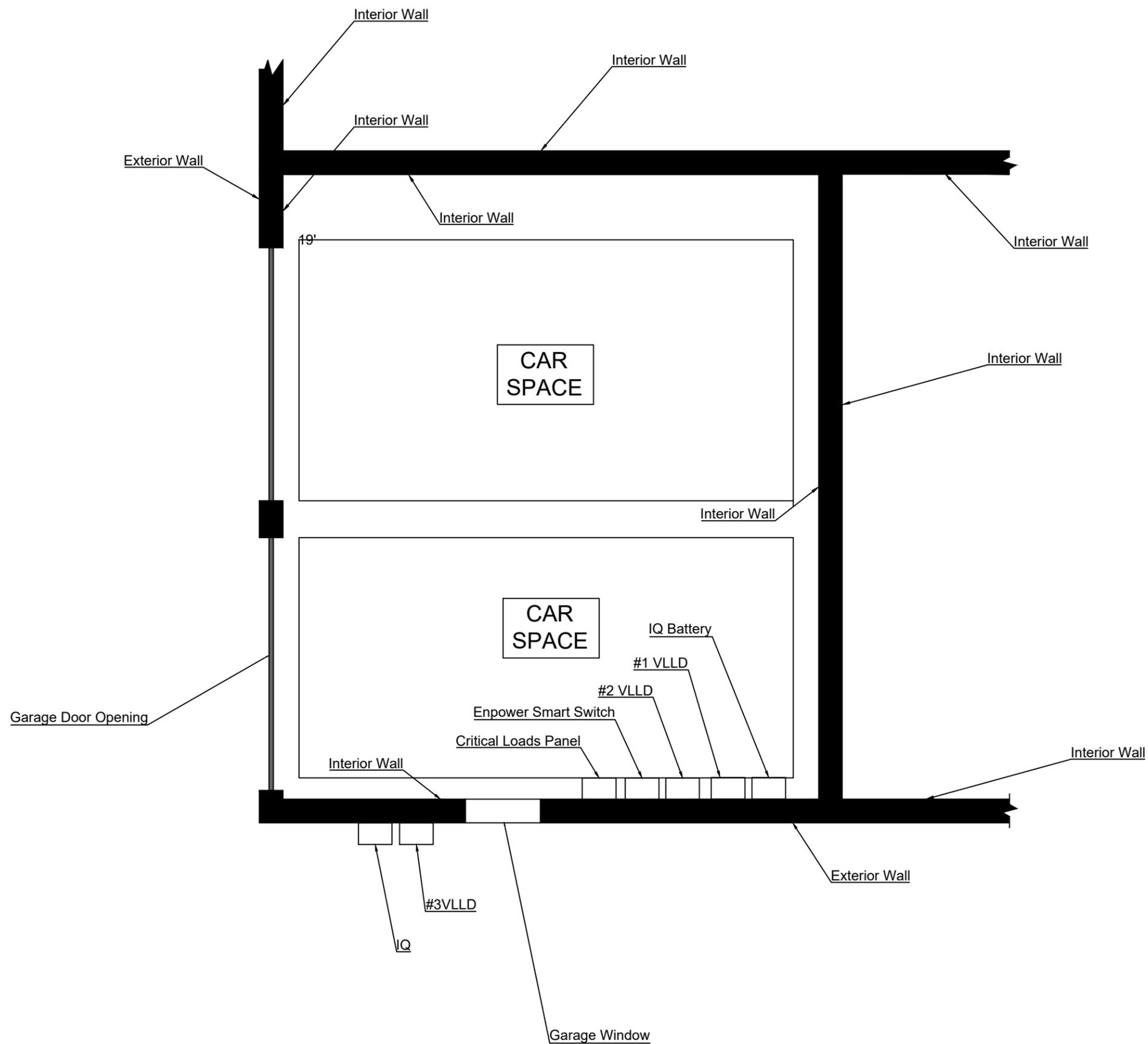
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PV SYSTEM

1.2

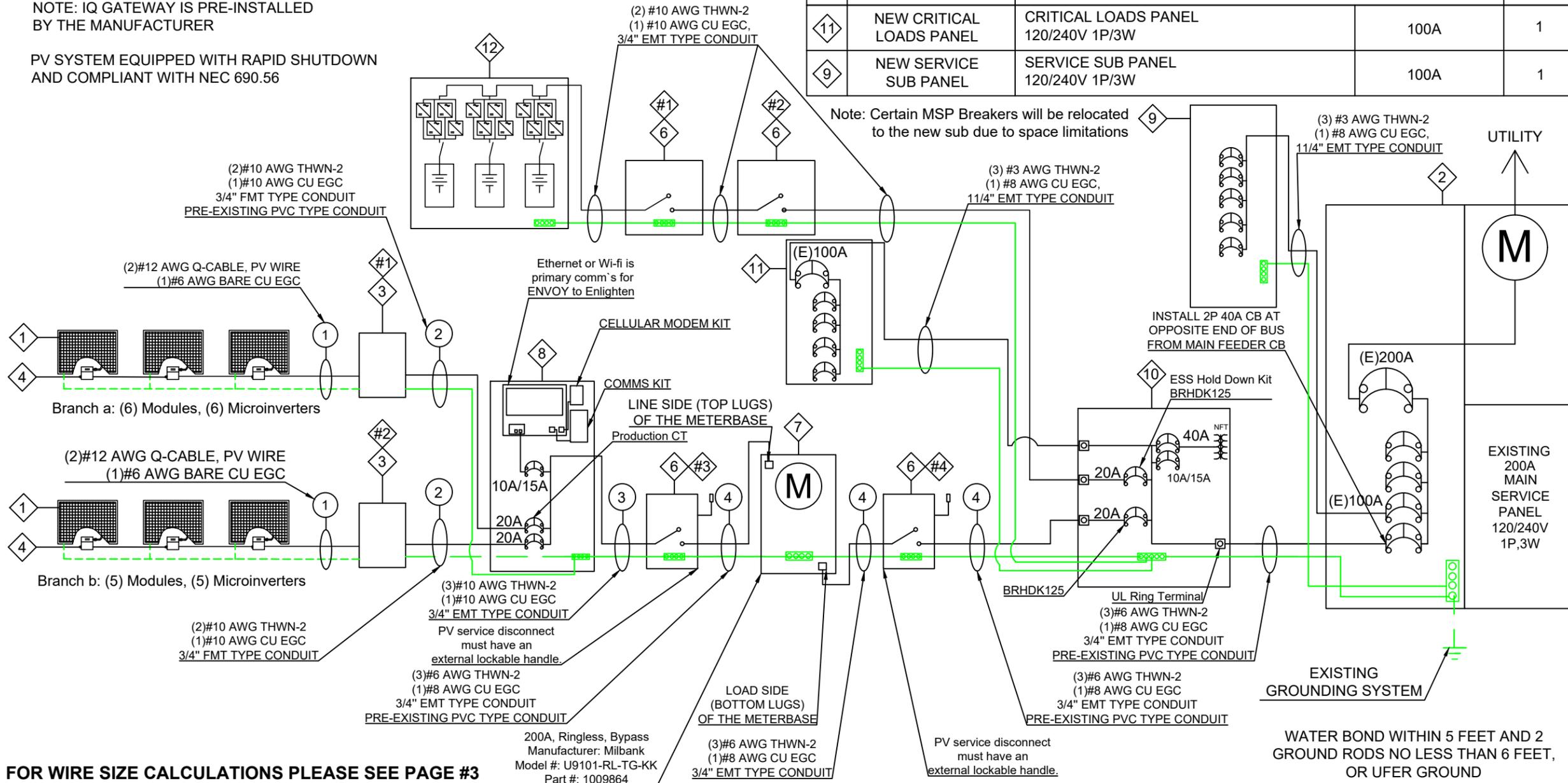


| # | ITEM | DESCRIPTION | | QTY |
|---|-----------------------------|---|------------------------------|-----|
| 1 | PV MODULE | VSUN 400W | Isc = 13.68A Voc = 37.20V | 11 |
| | | VSUN400-108BMH | Imp = 12.84A Vmp = 31.17V | |
| 2 | EXISTING MAIN SERVICE PANEL | MAIN SERVICE PANEL & UTILITY METER | BUSBAR RATING 200A | 1 |
| | | | BREAKER RATING 200A | 1 |
| 3 | SOLADECK JUNCTION BOX | 8"Wx9"Wx2.5"D UL50 LISTED WATER TIGHT NEMA TYPE 3 | | 2 |
| 4 | INVERTER | Enphase Energy Microinverters (IQ7PLUS-72-2-US) | | 11 |
| | | PEAK PWR TRACKING VOLTAGE | 27-45 V | |
| | | CEC EFFICIENCY | 97.0 % | |
| | | PROTECTION RATING: | NEMA 6 | |
| | | MAXIMUM INPUT CURRENT | 15.0 A | |
| | | MAXIMUM OUTPUT CURRENT | 1.21 A | |
| | | MAXIMUM CONTINUOUS OUTPUT POWER | 290 W | |

| # | ITEM | DESCRIPTION | QTY | |
|----|--------------------------|--|-----------|--|
| 8 | IQ COMBINER | ENPHASE IQ COMBINER BOX WITH ENPHASE IQ GATEWAY 120/240V, NEMA 3R MODEL# X-IQ-AM1-240-(4/4C) | 1 | |
| | | IQ GATEWAY INFORMATION | | EITHER 10A OR 15A PV 2-POLE C/B (2)#14 AWG THWN-2 (L1+L2) (1)#14 AWG-NEUTRAL |
| | | INSTALL 15A PV 2-POLE C/B | | - |
| | | INSTALL 20A PV 2-POLE C/B | 2 | |
| 6 | VLLD DISCONNECT | VISIBLE LOCKABLE LABELED DISCONNECT BLADE TYPE, NEMA 3R, 120/240V | 30A 4 | |
| 7 | PRODUCTION METER | PV PRODUCTION METER FM2S, 240V, 3W | 1 | |
| 10 | ENPHASE ENPOWER | ENPOWER SMART SWITCH | 1 | |
| 12 | BATTERY BACKUP | BATTERY BACKUP SYSTEMS ENCHARGE-10-1P-NA 10.08 kWh | 1 | |
| 11 | NEW CRITICAL LOADS PANEL | CRITICAL LOADS PANEL 120/240V 1P/3W | 100A 1 | |
| 9 | NEW SERVICE SUB PANEL | SERVICE SUB PANEL 120/240V 1P/3W | 100A 1 | |

NOTE: IQ GATEWAY IS PRE-INSTALLED BY THE MANUFACTURER

PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN AND COMPLIANT WITH NEC 690.56



FOR WIRE SIZE CALCULATIONS PLEASE SEE PAGE #3

SINGLE LINE DIAGRAM

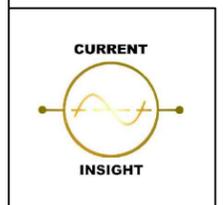


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PV SYSTEM

| WIRE CHART | |
|---|------------------------------|
| FROM PV MODULES TO #1S/D BOX, #2S/D BOX | |
| ① | (2) #12 AWG Q-CABLE, PV WIRE |
| | (1) #6 AWG BARE CU EGC |

| WIRE CHART | |
|--|--|
| FROM #1S/D BOX, #2S/D BOX TO IQ COMBINER BOX | |
| ② | (2) #10 AWG THWN-2 (Romex will run through the attic when allowed) |
| | (1) #10 AWG CU EGC, 3/4" FMT TYPE CONDUIT, PRE-EXISTING PVC TYPE CONDUIT |
| | INVERTER OUTPUT MAX CURRENT 1.21 |
| | COEFFICIENT 1.25 |
| | ADJST. FACTOR (1 thru 3 WIRES) 1.0 |
| | RACEWAY HEIGHT FROM THE ROOF DECKING 18" |
| | TEMP. DERATE FACTOR (TEMP - 39 + 17 = 56C) 0.71 |
| | BRANCH CIRCUITS 2 |
| | a b |
| | 6 5 |
| | BRANCH CIRCUIT CURRENT a: 6 BREAKER SIZE PER BRANCH CRCT |
| | 6 * 1.21*1.25 9.1A 20A |
| | BRANCH CIRCUIT CURRENT b: 5 BREAKER SIZE PER BRANCH CRCT |
| | 5 * 1.21*1.25 7.6A 20A |
| | ADJUSTED CONDUCTOR AMPACITY |
| | 9.1 / 0.71 / 1.0 12.8A |

| WIRE CHART | |
|--|---|
| FROM IQ COMBINER BOX TO AC DISCONNECT | |
| ③ | (3) #10 AWG THWN-2 |
| | (1) #10 AWG CU EGC, 3/4" EMT TYPE CONDUIT |
| | NUMBER OF MICROINVERTERS 11 |
| | MAXIMUM INVERTER OUTPUT CURRENT 1.21 |
| | CONSIDER CONTINUOUS COEFFICIENT 1.25 |
| | CONSIDER CONTINUOUS (A) 11 * 1.21 * 1.25 16.6 |
| | WALL TEMPERATURE FACTOR 0.91 |
| | TEMPERATURE ADJUSTMENT (A) 11 * 1.21 * 1.25 / 0.91 18.3 |
| FROM AC DISCONNECT TO ENPOWER SMART SWITCH | |
| ④ | (3) #6 AWG THWN-2 |
| | (1) #8 AWG CU EGC, 3/4" EMT TYPE CONDUIT, PRE-EXISTING PVC TYPE CONDUIT |

| QTY | OUTPUT CALCULATIONS | |
|-----|----------------------------------|--------|
| 11 | IQ7PLUS-72-2-US (CEC) | 97% |
| 11 | VSUN400-108BMH | 400W |
| | Pmax (PTC Rating) | 372.9W |
| | PV SYSTEM MAX DC OUTPUT 11 * 400 | 4.40KW |
| | PV SYSTEM MAX AC OUTPUT 11 * 290 | 3.19KW |

| MAIN SERVICE PANEL RATING | |
|---|------|
| BUSBAR RATING | 200A |
| MAIN BREAKER | 200A |
| PV & BATTERY BREAKER SIZE | 40A |
| 120% RULE: | |
| MAX ALLOWED FEED | 240A |
| 200A"MB" + 40A "PV & BATTERY" = 240A ≤ 240A MAX | |

WIRE SIZE CALCULATIONS

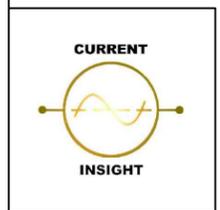


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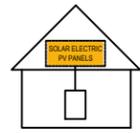
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PV SYSTEM

3

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



NEC 690.56(C)

PLACED ON THE MAIN SERVICE. CODE REQUIRES IT TO BE INSTALLED NO MORE THAN 5 FEET FROM THE MAIN SERVICE

PHOTOVOLTAIC SYSTEM AC DISCONNECT

OPERATING VOLTAGE 240 VOLTS

OPERATING CURRENT 13.31 AMPS

NEC 690.54, NEC 690.13(B)

PLACED ON THE RAPID SHUTDOWN/AC DISCONNECT.

CAUTION: DO NOT INSTALL ADDITIONAL LOADS IN THIS PANEL

PLACED ON THE INTERIOR OF THE COMBINER PANEL AND ON THE SOLA DECK.

WARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

PLACED ON THE ALL ELECTRICAL PANELS, ALL SOLAR J/BOXES TO INCLUDE SOLA DECK

PV SOLAR BREAKER

DO NOT RELOCATE THIS OVERCURRENT DEVICE

PLACED ON THE PANEL SCHEDULE OR RIGHT NEXT TO THE BACKFEED SOLAR BREAKER.

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

PLACED ON THE RAPID SHUTDOWN/AC DISCONNECT.

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 2023 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]
5. LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8" , WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [IFC 605.11.1.1]

CODE REQUIRED SIGNAGE

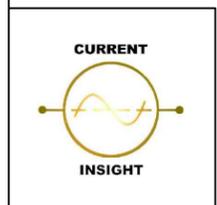


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PV SYSTEM

4

| | ROOF PITCH | ROOFING LAYERS | ROOFING TYPE | RACKING TYPE | ATTACHMENT TYPE | FRAMING TYPE | FRAMING SIZE | PENETRATION PATTERN | MAX PENETRATION SPACING |
|-------------|------------|----------------|--------------|--------------|---------------------|--------------|-----------------|---------------------|-------------------------|
| MAIN HOUSE | 45° | 1 Layer | Comp Shingle | Unirac | Unirac Flashloc Duo | Truss | 2"X4" @ 24" O.C | Staggered | 48" |
| GUEST HOUSE | 34° | 1 Layer | Comp Shingle | Unirac | Unirac Flashloc Duo | Truss | 2"X4" @ 24" O.C | Staggered | 48" |
| | | | | | | | | | |
| | | | | | | | | | |

| | | | | | |
|------------|---------|-----------|--------------|--------------------|---|
| WIND SPEED | 130 MPH | EXPOSURE | C | ASCE 7-16 | ROOF SHEATHED WITH 1/2" PLYWOOD AND UPPER SURFACE IS FACED WITH FELT PAPER |
| SNOW LOAD | 30 PSF | LAG BOLTS | #12-14 SCREW | MIN 2.5" EMBEDMENT | MOUNTS AND MOUNTING HARDWARE WILL BE SEALED WITH CHEM LINK SEALANT OR EQUIVALENT. |

STRUCTURAL STAMP

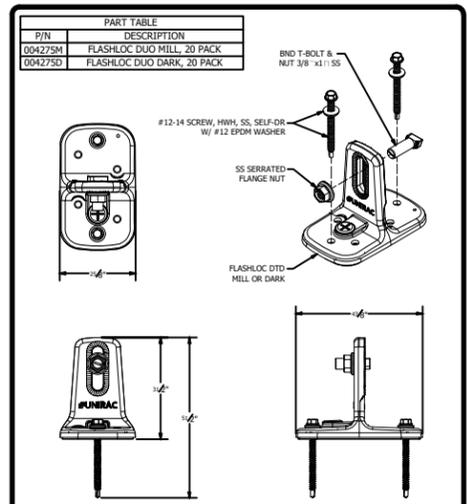
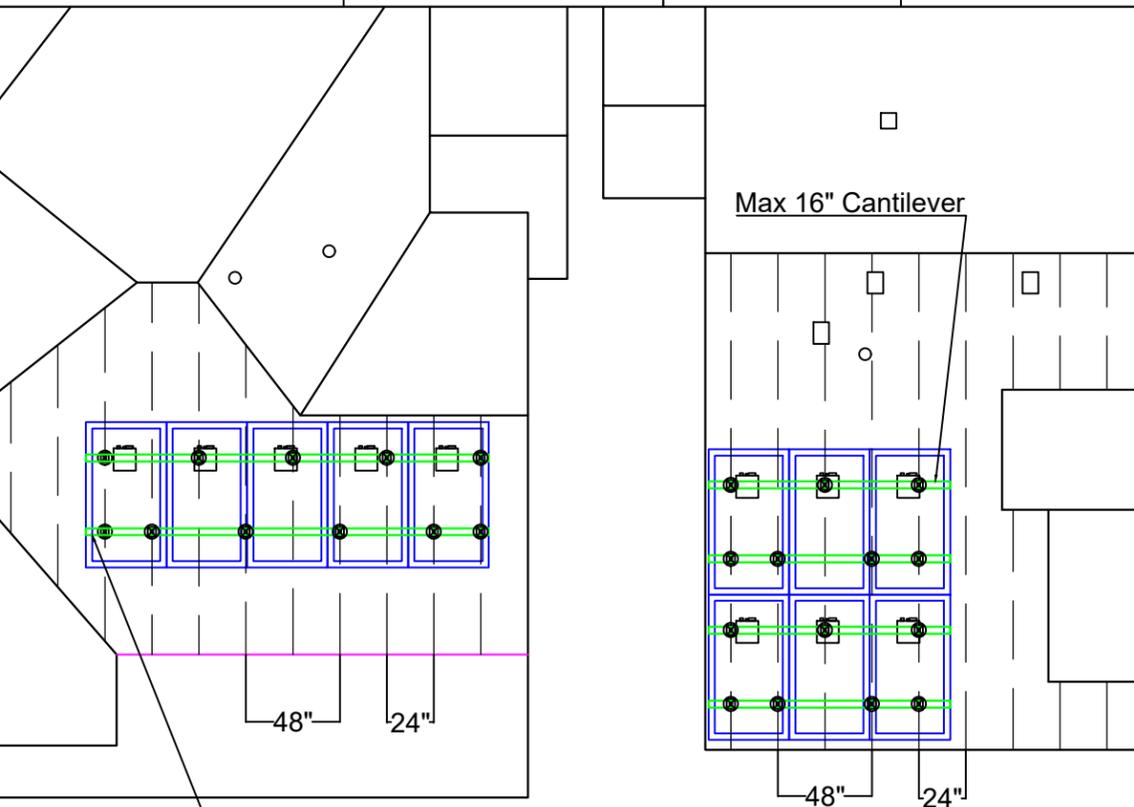
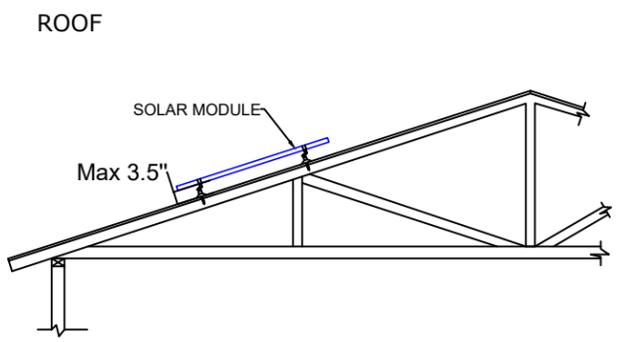
10/13/2023

ATTACHMENT LAYOUT



| WEIGHT LOAD CALCULATION | MAIN HOUSE | GUEST HOUSE |
|----------------------------|----------------|-------------|
| MODULE WEIGHT (LBS) | | 48.1 |
| # OF MODULES | 5 | 6 |
| TOTAL MODULE WEIGHT (LBS) | 241 | 289 |
| RACK WEIGHT (LBS) | 48 | 58 |
| MICROINVERTER WEIGHT (LBS) | 12 | 14 |
| TOTAL SYSTEM WEIGHT (LBS) | 301 | 361 |
| # OF STANDOFFS | 11 | 14 |
| LOADING PER STANDOFF (LBS) | 27.3 | 25.8 |
| TOTAL MODULE AREA (SQ.FT.) | 105 | 126 |
| LOADING (PSF) | 2.86 | 2.86 |
| TOTAL ROOF AREA (Sq. FT) | 1570 | 1140 |
| % OF COVERED AREA | 6.7 | 11.1 |
| PV MODULE MODEL # | VSUN400-108BMH | |

| INDEX | |
|--------------|--|
| RACKING RAIL | |
| ATTACHMENT | |
| ROOF FRAMING | |



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
 ONE OR MORE US PATENTS
 LEGAL NOTICE

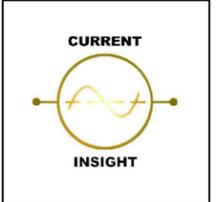
FL-404
 SHEET

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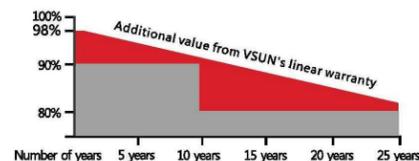
VSUN405-108BMH

405W
Highest power output

20.75%
Module efficiency

12 years
Material & Workmanship warranty

25 years
Linear power output warranty



■ VSUN ■ Standard Warranty
Munich RE

PERC MBB technology with Circular Ribbon

Higher output power

Half-cell Technology

Positive tolerance offer

VSUN405-108BMH
VSUN395-108BMH

VSUN400-108BMH
VSUN390-108BMH

Micro Gap

Up to 30% extra power generation yield from the back side

Certified for salt/ammonia corrosion resistance

Load certificates: wind to 2400Pa and snow to 5400Pa

Lower LCOE

VSUN, a BNEF Tier-1 PV module manufacturer invested by Fuji Solar, has been committed to providing greener, cleaner and more intelligent renewable energy solutions. VSUN is dedicated to bringing reliable, customized and high-efficient products into various markets and customers worldwide



Engineered in Japan
www.vsun-solar.com

最も信頼出来る再エネパートナー

Electrical Characteristics at Standard Test Conditions(STC)

| Module Type | VSUN405-108BMH | VSUN400-108BMH | VSUN395-108BMH | VSUN390-108BMH |
|----------------------------------|----------------|----------------|----------------|----------------|
| Maximum Power - Pmax (W) | 405 | 400 | 395 | 390 |
| Open Circuit Voltage - Voc (V) | 37.36 | 37.2 | 37.03 | 36.84 |
| Short Circuit Current - Isc (A) | 13.78 | 13.68 | 13.59 | 13.5 |
| Maximum Power Voltage - Vmpp (V) | 31.36 | 31.17 | 31 | 30.82 |
| Maximum Power Current - Imp (A) | 12.92 | 12.84 | 12.75 | 12.66 |
| Module Efficiency | 20.75% | 20.49% | 20.23% | 19.98% |

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1.5; module temperature 25°C. Pmax Sorting : 0~5W. Measuring Tolerance: ±3%.

Remark: Electrical data do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

Electrical Characteristics with different rear side power gain(reference to 400 front)

| Pmax (W) | Voc (V) | Isc (A) | Vmpp (V) | Imp (A) | Pmax gain |
|----------|---------|---------|----------|---------|-----------|
| 420 | 37.1 | 14.36 | 31.17 | 13.48 | 5% |
| 440 | 37.1 | 15.05 | 31.17 | 14.12 | 10% |
| 479 | 37.2 | 16.42 | 31.12 | 15.41 | 20% |
| 499 | 37.2 | 17.10 | 31.12 | 16.05 | 25% |

Temperature Characteristics

| | |
|---------------------------------|------------|
| NOCT | 45°C(±2°C) |
| Voltage Temperature Coefficient | -0.27%/°C |
| Current Temperature Coefficient | +0.048%/°C |
| Power Temperature Coefficient | -0.32%/°C |

Maximum Ratings

| | |
|----------------------------|---------|
| Maximum System Voltage [V] | 1500 |
| Series Fuse Rating [A] | 30 |
| Bifaciality | 70%±10% |

Material Characteristics

| | |
|--------------------|--|
| Dimensions | 1723×1133×30mm (L×W×H) |
| Weight | 21.8kg |
| Frame | Anodized aluminum profile |
| Front Glass | White toughened safety glass, 3.2 mm |
| Cell Encapsulation | EVA (Ethylene-Vinyl-Acetate) or POE |
| Back Sheet | Transparent backsheets |
| Cells | 12×9 pieces monocrystalline solar cells series strings |
| Junction Box | IP68, 3 diodes |
| Cable&Connector | Potrait: 500 mm (cable length can be customized) , 1×4 mm ² , compatible with MC4 |

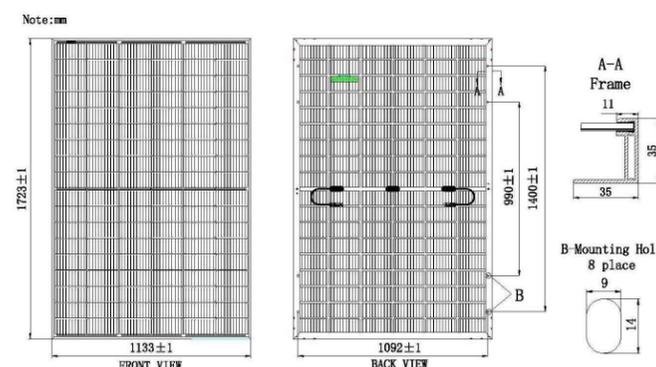
Packaging

| | |
|-------------------|------------------|
| Dimensions(L×W×H) | 1760×1125×1253mm |
| Container 20' | 186 |
| Container 40' | 403 |
| Container 40'HC | 806 |

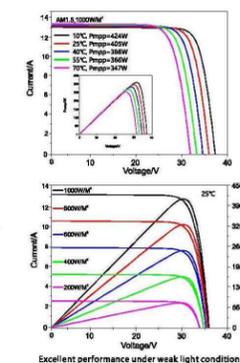
System Design

| | |
|----------------------|---|
| Temperature Range | -40 °C to + 85 °C |
| Withstanding Hail | Maximum diameter of 25 mm with impact speed of 23 m/s |
| Maximum Surface Load | 5,400 Pa |
| Application class | class A |

Dimensions



IV-Curves



MODULE DATA SHEET



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OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

D1

Enphase IQ 7 and IQ 7+ Microinverters

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

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

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



Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

| INPUT DATA (DC) | IQ7-60-2-US | | IQ7PLUS-72-2-US | |
|--|--|-------------------|--|-------------------|
| Commonly used module pairings ¹ | 235 W - 350 W + | | 235 W - 440 W + | |
| Module compatibility | 60-cell/120 half-cell PV modules only | | 60-cell/120 half-cell and 72-cell/144 half-cell PV modules | |
| Maximum input DC voltage | 48 V | | 60 V | |
| Peak power tracking voltage | 27 V - 37 V | | 27 V - 45 V | |
| Operating range | 16 V - 48 V | | 16 V - 60 V | |
| Min/Max start voltage | 22 V / 48 V | | 22 V / 60 V | |
| Max DC short circuit current (module I _{sc}) | 15 A | | 15 A | |
| Overvoltage class DC port | II | | II | |
| DC port backfeed current | 0 A | | 0 A | |
| PV array configuration | 1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit | | | |
| OUTPUT DATA (AC) | IQ 7 Microinverter | | IQ 7+ Microinverter | |
| Peak output power | 250 VA | | 295 VA | |
| Maximum continuous output power | 240 VA | | 290 VA | |
| Nominal (L-L) voltage/range ² | 240 V / 211-264 V | 208 V / 183-229 V | 240 V / 211-264 V | 208 V / 183-229 V |
| Maximum continuous output current | 1.0 A (240 V) | 1.15 A (208 V) | 1.21 A (240 V) | 1.39 A (208 V) |
| Nominal frequency | 60 Hz | | 60 Hz | |
| Extended frequency range | 47 - 68 Hz | | 47 - 68 Hz | |
| AC short circuit fault current over 3 cycles | 5.8 Arms | | 5.8 Arms | |
| Maximum units per 20 A (L-L) branch circuit ³ | 16 (240 VAC) | 13 (208 VAC) | 13 (240 VAC) | 11 (208 VAC) |
| Overvoltage class AC port | III | | III | |
| AC port backfeed current | 18 mA | | 18 mA | |
| Power factor setting | 1.0 | | 1.0 | |
| Power factor (adjustable) | 0.85 leading ... 0.85 lagging | | 0.85 leading ... 0.85 lagging | |
| EFFICIENCY | @240 V | @208 V | @240 V | @208 V |
| Peak efficiency | 97.6 % | 97.6 % | 97.5 % | 97.3 % |
| CEC weighted efficiency | 97.0 % | 97.0 % | 97.0 % | 97.0 % |
| MECHANICAL DATA | | | | |
| Ambient temperature range | -40°C to +65°C | | | |
| Relative humidity range | 4% to 100% (condensing) | | | |
| Connector type | MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter) | | | |
| Dimensions (HxWxD) | 212 mm x 175 mm x 30.2 mm (without bracket) | | | |
| Weight | 1.08 kg (2.38 lbs) | | | |
| Cooling | Natural convection - No fans | | | |
| Approved for wet locations | Yes | | | |
| Pollution degree | PD3 | | | |
| Enclosure | Class II double-insulated, corrosion resistant polymeric enclosure | | | |
| Environmental category / UV exposure rating | NEMA Type 6 / outdoor | | | |
| FEATURES | | | | |
| Communication | Power Line Communication (PLC) | | | |
| Monitoring | Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy. | | | |
| Disconnecting means | The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690. | | | |
| Compliance | CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions. | | | |

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.
 2. Nominal voltage range can be extended beyond nominal if required by the utility.
 3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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INVERTER DATA SHEET

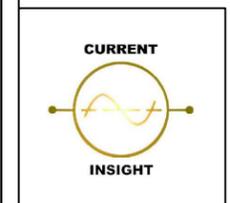


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OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

D2

Enphase IQ Combiner 4/4C

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



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



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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IQ COMBINER BOX DATA SHEET

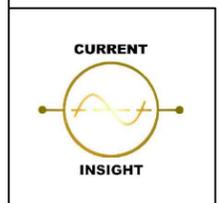


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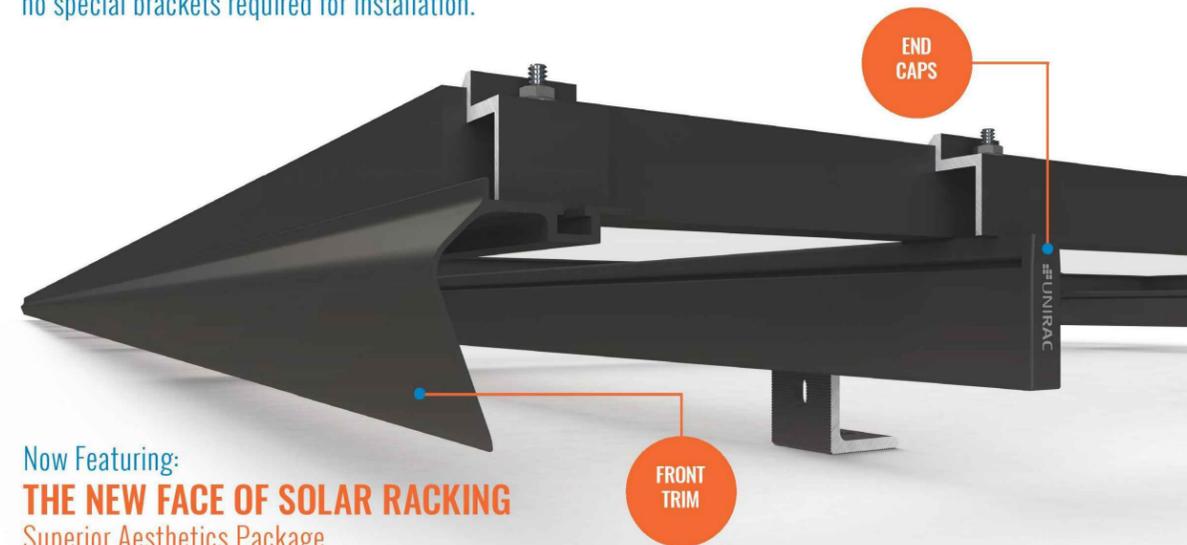
PV SYSTEM

D3

SOLARMOUNT



SOLARMOUNT defined the standard in solar racking. Features are designed to get installers off the roof faster. Our grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Systems can be configured with standard or light rail to meet your design requirements at the lowest cost possible. The superior aesthetics package provides a streamlined clean edge for enhanced curb appeal, with no special brackets required for installation.



Now Featuring:
THE NEW FACE OF SOLAR RACKING
Superior Aesthetics Package



LOSE ALL OF THE COPPER & LUGS
System grounding through Enphase microinverters and trunk cables



SMALL IS THE NEXT NEW BIG THING
Light Rail is Fully Compatible with all SM Components



ENHANCED DESIGN & LAYOUT TOOLS
Featuring Google Map Capabilities within U-Builder

FAST INSTALLATION. SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT



OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

VERSATILITY

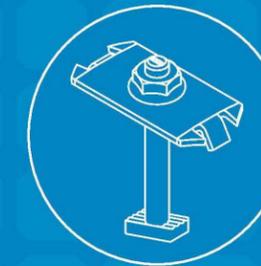
ONE PRODUCT - MANY APPLICATIONS

Quickly set modules flush to the roof or at a desired tilt angle. Change module orientation to portrait or landscape while securing a large variety of framed modules on flat, low slope or steep pitched roofs. Available in mill, clear and dark anodized finishes to outperform your projects financial and aesthetic aspirations.

AUTOMATED DESIGN TOOL

DESIGN PLATFORM AT YOUR SERVICE

Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers; there's no need to print results and send to a distributor, just click and share.



INTEGRATED BONDING
MIDCLAMP



INTEGRATED BONDING
SPLICE BAR



INTEGRATED BONDING
L-FOOT w/ T-BOLT



INTEGRATED BONDING
MICROINVERTER MOUNT w/
WIRE MANAGEMENT



UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.



CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2015, 14001:2015 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.



BANKABLE WARRANTY

Don't leave your project to chance, Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a twenty five (25) year limited product warranty and a five (5) year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

PUB2017E28 - PRINTED

RACKING DATA SHEET

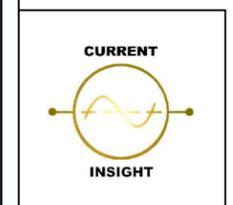


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OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

D4

FLASHLOC™ DUO

THE MOST VERSATILE DIRECT TO DECK ATTACHMENT



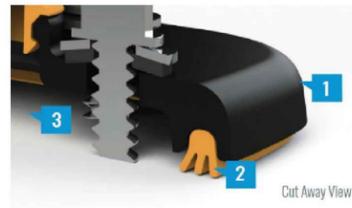
FLASHLOC™ DUO is the most versatile direct to deck and rafter attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the required number of screws to secure the mount and inject sealant into the base. FLASHLOC'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.

APRIL2021_FLASHLOC2DUO_V1



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.

FLASHLOC™ DUO

INSTALLATION GUIDE



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 course. 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.

ATTACHMENT DATA SHEET

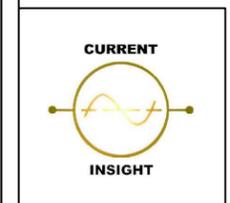


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OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

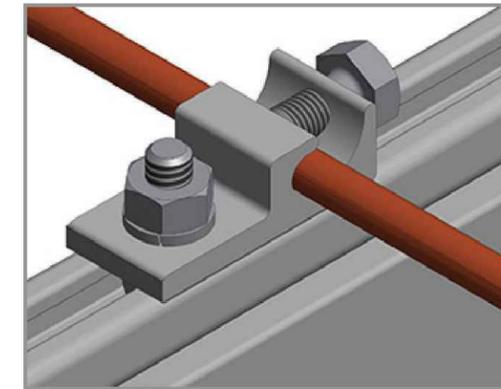
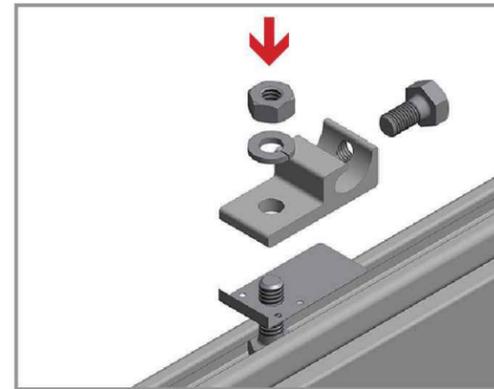
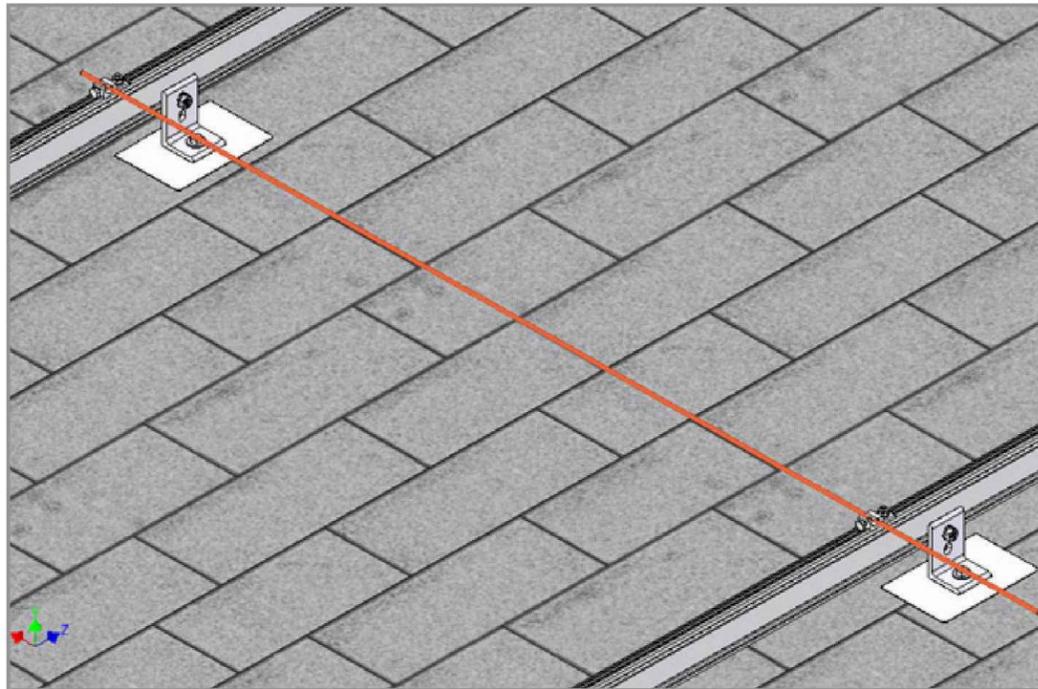
D5

FASTER INSTALLATION. 25-YEAR WARRANTY.

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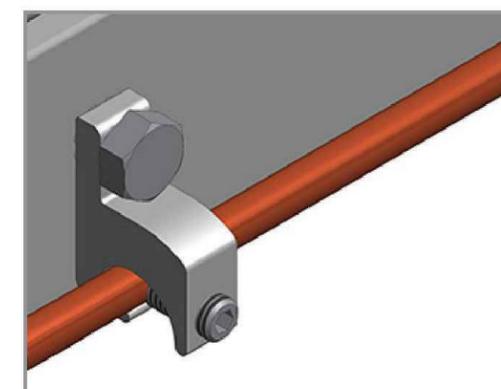
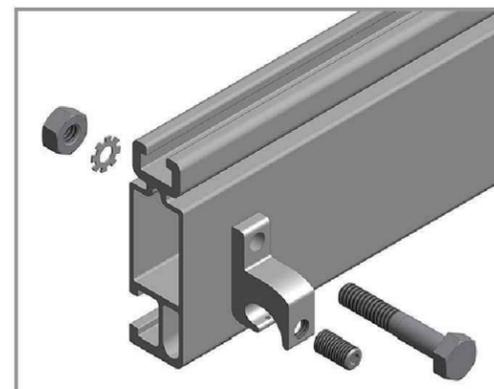
WEEB LUG CONDUCTOR - UNIRAC P/N 008002S:

Apply Anti Seize and insert a bolt in the aluminum rail and through the clearance hole in the stainless steel flat washer. Place the stainless steel flat washer on the bolt, oriented so the dimples will contact the aluminum rail. Place the lug portion on the bolt and stainless steel flat washer. Install stainless steel flat washer, lock washer and nut. Tighten the nut until the dimples are completely embedded into the rail and lug.

See product data sheet for more details, Model No. WEEB-LUG-6.7.

GROUNDING LUG MOUNTING DETAILS:

Details are provided for both the WEEB and IlSCO products. The WEEBLug has a grounding symbol located on the lug assembly. The IlSCO lug has a green colored set screw for grounding indication purposes. Installation must be in accordance with NFPA NEC 70, however the electrical designer of record should refer to the latest revision of NEC for actual grounding conductor cable size



ILSCO LAY-IN LUG CONDUCTOR - UNIRAC P/N 008009P: Alternate Grounding Lug
- Drill and bolt thru both rail walls per table.

See product data sheet for more details, Model No. GBL-4DBT.

| GROUNDING LUG - BOLT SIZE & DRILL SIZE | | |
|--|-----------|--------------------------------|
| GROUND LIG | BOLT SIZE | DRILL SIZE |
| WEEBLug | 7/16" | N/A- Place in Top SM Rail Slot |
| ILSCO Lug | #10-32 | 7/32" |

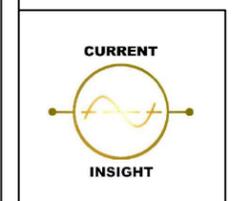
- Torque value depends on conductor size.
- See product data sheet for torque value.

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PV SYSTEM

D7

Enphase Encharge 10

The **Enphase Encharge 10™** all-in-one AC-coupled storage system is **reliable, smart, simple, and safe**. It is comprised of three base Encharge 3™ storage units, has a total usable energy capacity of 10.08 kWh and twelve embedded grid-forming microinverters with 3.84 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
- Three independent Encharge storage base units
- Twelve 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

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

To learn more about Enphase offerings, visit enphase.com



Enphase Encharge 10

| MODEL NUMBER | |
|--|---|
| ENCHARGE-10-1P-NA | Encharge 10 battery storage system with integrated Enphase Microinverters and battery management unit (BMU). Includes: - Three Encharge 3.36 kWh base units (B3-A01-US001-1-3) - One Encharge 10 cover kit with cover, wall mounting bracket, watertight conduit hubs, and interconnect kit for wiring between batteries (B10-C-1050-0) |
| ACCESSORIES | |
| ENCHARGE-HNDL-R1 | One set of Encharge base unit installation handles |
| OUTPUT (AC) | |
| @ 240 VAC¹ | |
| Rated (continuous) output power ² | 3.84 kVA |
| Peak output power | 5.7 kVA (10 seconds) |
| Nominal voltage / range | 240 / 211 – 264 VAC |
| Nominal frequency / range | 60 / 57 – 61 Hz |
| Rated output current | 16 A |
| Peak output current | 24.6A (10 seconds) |
| Power factor (adjustable) | 0.85 leading ... 0.85 lagging |
| Maximum units per 20 A branch circuit | 1 unit (single phase) |
| Interconnection | Single-phase |
| Maximum AC short circuit fault current over 3 cycles | 69.6 Arms |
| Round trip efficiency ² | 89% |
| BATTERY | |
| Total capacity | 10.5 kWh |
| Usable capacity | 10.08 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) | 1070 mm x 664 mm x 319 mm (42.13 in x 26.14 in x 12.56 in) |
| Weight | Three individual 44.2 kg (97.4 lbs) base units plus 21.1 kg (48.7 lbs) cover and mounting bracket; total 154.7 kg (341 lbs) |
| Enclosure | Outdoor – NEMA type 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 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 |
| LIMITED WARRANTY | |
| Limited Warranty ³ | >70% capacity, up to 10 years or 4000 cycles |

1. Supported in backup/off grid operations
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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BATTERY DATA SHEET

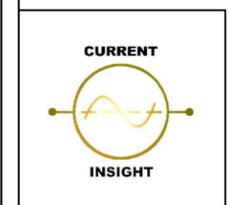


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OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

D8

Enphase Enpower

The **Enphase Enpower™** smart switch, part of the Enphase Ensemble™ energy management technology, 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. Along with storage and generator input circuits, it offers Microgrid Interconnect Device (MID) functionality and a Eaton BR series busbar assembly.



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 entrance 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 120/240 V backup operation

Enphase Enpower

MODEL NUMBER

| | |
|--------------------|--|
| EP200G101-M240US00 | Enphase Enpower smart switch with neutral-forming transformer (NFT), Microgrid Interconnect Device (MID), breakers, and screws. Streamlines grid-independent capabilities of PV and storage installations. |
|--------------------|--|

ACCESSORIES and REPLACEMENT PARTS

| | |
|---|--|
| XA-E3-PCBA-ENS | Replacement Enpower controller printed circuit board |
| Circuit Breakers (as needed) ¹ | Not included, must be ordered separately: |
| BRK-100A-2P-240V | • Main breaker, 2 pole, 100A, 25kAIC, CSR2100N |
| BRK-125A-2P-240V | • Main breaker, 2 pole, 125A, 25kAIC, CSR2125N |
| BRK-150A-2P-240V | • Main breaker, 2 pole, 150A, 25kAIC, CSR2150N |
| BRK-175A-2P-240V | • Main breaker, 2 pole, 175A, 25kAIC, CSR2175N |
| BRK-200A-2P-240V | • Main breaker, 2 pole, 200A, 25kAIC, CSR2200N |
| BRK-20A-2P-240V | • Circuit breaker, 2 pole, 20A, 10kAIC, BR220B |
| BRK-30A-2P-240V | • Circuit breaker, 2 pole, 30A, 10kAIC, BR230B |
| BRK-40A-2P-240V | • Circuit breaker, 2 pole, 40A, 10kAIC, BR240B |
| BRK-60A-2P-240V | • Circuit breaker, 2 pole, 60A, 10kAIC, BR260 |
| BRK-80A-2P-240V | • Circuit breaker, 2 pole, 80A, 10kAIC, BR280 |

ELECTRICAL SPECIFICATIONS

| | |
|--|--|
| Assembly rating | Continuous operation at 100% of its rating |
| System voltage | 120/240 VAC, 60 Hz |
| Maximum continuous current rating | 160 A |
| Maximum output overcurrent protection device | 200 A |
| Maximum input overcurrent protection device | 200A |
| Maximum overcurrent protection device rating for storage branch circuit ² | 80A |
| Maximum overcurrent protection device rating for PV combiner branch circuit ² | 80A |
| NFT Breaker rating (pre-installed) | 40A between L1 and Neutral; 40A between L2 and Neutral |

MECHANICAL DATA

| | |
|--------------------------------|--|
| Dimensions (WxHxD) | 50cm x 91.6cm x 24.6cm (19.7 in x 36 in x 9.7 in) |
| Weight | 37.2 kg (82 lbs) |
| Ambient temperature range | -40° C to +50° C (-40° to 122° F) |
| Cooling | Natural convection, plus heat shield |
| Enclosure environmental rating | Outdoor, NEMA type 3R, polycarbonate construction |
| Wire sizes | <ul style="list-style-type: none"> • Grid input : Up to AWG 4/0 Cu/Al conductors • Load panel : Up to AWG 4/0 Cu/Al conductors • Main load panel output : Up to AWG 4/0 Cu/Al conductors • Generator input : Up to AWG 14 to AWG 6 Cu conductors • Encharge input : Up to AWG 14 to AWG 6 Cu conductors • PV Combiner input: Up to AWG 14 to AWG 6 Cu conductors • Ground : Up to AWG 14 to AWG 1/0 Cu conductors • Neutral : Up to AWG 14 to AWG 4/0 Cu conductors Always follow local electrical code requirements for conductor sizing. |
| Altitude | To 2500 meters (8200 feet) |

COMPLIANCE

| | |
|------------|---|
| Compliance | This product will comply with all the required regulatory certifications in the North American markets before launch. Details will be provided in the final data sheet. |
|------------|---|

1. Compatible with BRHDK125 Hold-Down Kit to comply with 2017 NEC 710.15E for back-fed circuit breakers.
2. Not included. Installer must provide properly rated breaker per circuit breaker list above.

To learn more about Enphase offerings, visit enphase.com

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 2019-12-11

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**ENPHASE
 ENPOWER**

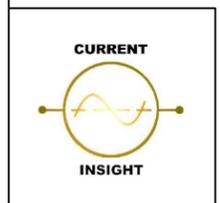


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OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

D9



U9101-RL-TG-KK

| | | | |
|-------------------------------|---|---------------------------|--|
| Catalog Number | U9101-RL-TG-KK | Enclosure | G90 Galvanized Steel with Powder Coat Finish |
| Marketing Product Description | 5 Terminal Ringless Small Hub Open Triplex Ground Horn Bypass | Jaw Quantity | 5 Terminal |
| UPC | 784572290426 | Bypass Type | Horn Bypass |
| Length (IN) | 4.125 | Number of Meter Positions | 1 Position |
| Width (IN) | 11 | Equipment Ground | Triplex Ground |
| Height (IN) | 14.563 | Hub Opening | Small Hub Opening |
| Brand Name | Milbank | Line Side Wire Range | 6 AWG - 350 kcmil |
| Type | Ringless Meter Socket | Load Side Wire Range | 6 AWG - 350 kcmil |
| Application | Meter Socket | Number Of Receptacles | 0 |
| Standard | UL Listed;Type 3R | | |
| Voltage Rating | 600 Volts Alternating Current | | |
| Amperage Rating | 200 Continuous Ampere | | |
| Phase | 1 Phase | | |
| Frequency Rating | 60 Hertz | | |
| Size | 4.125L x 11W x 14.563H | | |
| Number Of Cutouts | 0 | | |
| Cutout Size | No Main Breaker | | |
| Cable Entry | Overhead | | |
| Terminal | Lay in | | |
| Insulation | Glass Polyester | | |
| Mounting | Surface Mount | | |

Please consult serving utility for their requirements prior to ordering or installing, as specifications and approvals vary by utility and may require local electrical inspector approval. All installations must be installed by a licensed electrician and must comply with all national and local codes, laws and regulations. Milbank reserves the right to make changes in specifications and features shown without notice or obligation.

PRODUCTION METER SPEC SHEET

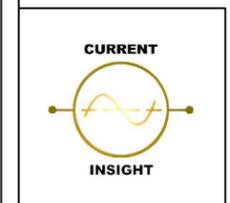


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D10



COMPATIBLE MODULES

SYSTEM CERTIFICATION

33

PAGE

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the SOLARMOUNT system.

| Manufacture | Module Model / Series |
|---------------|--|
| REC | RECxxxAA (BLK/Pure/Pure-R) RECxxxNP (N-PEAK) RECxxxNP2 (Black) RECxxxNP3 Black RECxxxPE, RECxxxPE72 RECxxxTP, RECxxxTP72 RECxxxTP2(M/BLK2) RECxxxTP2S(M)72 RECxxxTP3M (Black) RECxxxTP4 (Black) |
| Renesola | All 60-cell modules |
| Risen | RSM Series, RSM110-8-xxxBMDG |
| SEG Solar | SEG-xxx-BMD-HV SEG-xxx-BMD-TB |
| S-Energy | SN72 & SN60 Series |
| Seraphim | SEG-(6PA/6PB/6MA/6MA-HV/6MB/E01/E11) SRP-(6QA/6QB) SRP-xxx-6MB-HV, SRP-320-375-BMB-HV, SRP-xxx-BMC-HV, SRP-390-450-BMA-HV, SRP-xxx-BMZ-HV, SRP-390-405-BMD-HV |
| Sharp | NU-SA & NU-SC Series |
| Silfab | SLA-M, SLA-P, SLG-M, SLG-P & BC Series SIL-xxx(BG/BK/BL/HC/HC+/HL/HM/HN/ML/ NL/NT/NX/NU) |
| Solar4America | S4Axxx-108MH10BB, S4Axxx-72MH5BB |

| Manufacture | Module Model / Series |
|---------------|--|
| SolarEver USA | SE-166*83-xxxM-120N SE-182*91-xxxM-108N |
| Solaria | PowerXT-xxxR-(AC/PD/BD) PowerXT-xxxC-PD PowerXT-xxxR-PM (AC) PowerX-400R |
| Solartech | STU HJT, STU PERC & Quantum PERC |
| SolarWorld | Sunmodule Protect, Sunmodule Plus/Pro |
| Sonali | SS-M-360 to 390 Series SS-M-390 to 400 Series SS-M-440 to 460 Series SS-M-430 to 460 BiFacial Series |
| Sun Edison | F-Series, R-Series |
| Suniva | MV Series & Optimus Series (35mm) |
| Sunmac Solar | M754SH-BB Series |
| SunPower | AC, X-Series, E-Series & P-Series SPR E20 435 COM (G4 Frame) Axxx-BLK-G-AC, SPR-Mxxx-H-AC SPR-Mxxx-H-AC |
| SunTech | STP, STPXXXS - B60/Wnhb |
| Talesun | TP572, TP596, TP654, TP660 TP672, Hipor M, Smart, TD6I72M |
| Tesla | SC, SC B, SC B1, SC B2, TxxxS, TxxxH |
| Trina | PA05, PD05, DD05, DD06, DE06, DE09.05 PD14, PE14, DD14, DE14, DE15, DE15V(II) DEG15HC.20(II), DEG15MC.20(II) DEG15VC.20(II), DE18M(II), DEG18MC.20(II) DE19, DEG19C.20 |

| Manufacture | Module Model / Series |
|-----------------|--|
| TSMC | TS-150C2 CIGSw |
| Universal Solar | UNI4xx-144BMH-DG UNI5xx-144BMH-DG UNIxxx-108M-BB UNIxxx-120M-BB UNIxxx-120MH |
| Upsolar | UP-MxxxP, UP-MxxxM(-B) |
| URECO | D7Kxxx(H7A/H8A), D7Mxxx(H7A/H8A) FAKxxx(C8G/E8G), FAMxxxE7G-BB FAMxxxE8G(-BB), FBKxxxM8G F6MxxxE7G-BB FBMxxxMFG-BB |
| Vikram | Eldora, Somera, Ultima PREXOS VSMDDHT.60.AAA.05 PREXOS VSMDDHT.72.AAA.05 |
| Vina | VNS-72M1-5-xxxW-1.5, VNS-72M3-5-xxxW-1.5, VNS-144M1-5-xxxW-1.5, VNS-144M3-5-xxxW-1.5, VNS-120M3-5-xxxW-1.0 |
| VSUN | VSUNxxx-60M-BB, VSUNxxx-72MH VSUN4xx-144BMH VSUN4xx-144BMH-DG VSUN5xx-144BMH-DG VSUNxxx-108M-BB VSUNxxx-120M-BB VSUNxxx-120BMH VSUNxxx-132BMH VSUNxxx-108BMH |
| Waaree | Ahnay Series Bi-33 Arka Series WSMDi |

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- **Listed models can be used to achieve a Class A fire system rating for steep slope applications. See page 30**

MODULE COMPATIBILITY

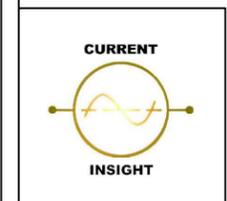


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