

ROOF MOUNT INSTALLATION OF 4.40 KW DC PHOTOVOLTAIC SYSTEM

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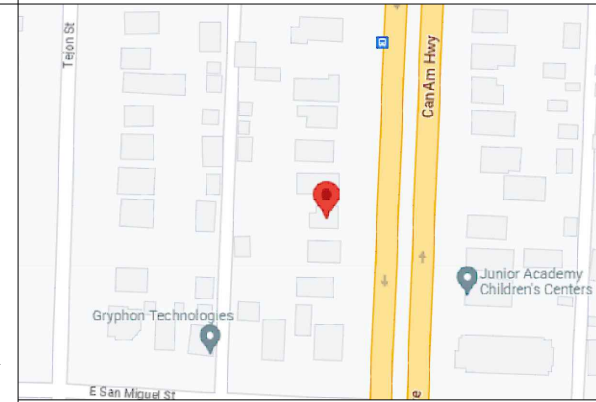
PROJECT DATA

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



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		

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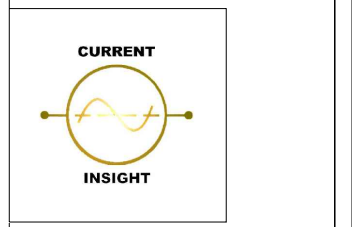
CONTRACTOR

SOLARISE

Address:
 2936 Janitell Rd
 Colorado Springs, CO 80906

Phone Number:
 (719)315-3034

Drafted By:



Current Insight, LLC

2852 W. Amini Way
 South Jordan, UT 84095

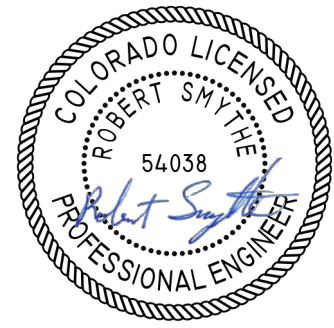
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PHOTOVOLTAIC SYSTEM 4.40 KW DC	
11	VSUN 400W MODULES (VSUN400-108BMH)
11	Enphase Energy Microinverters (IQ7PLUS-72-2-US)

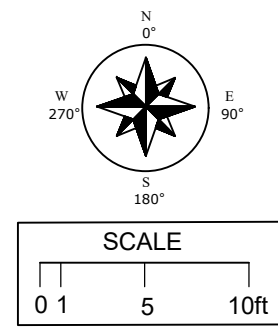
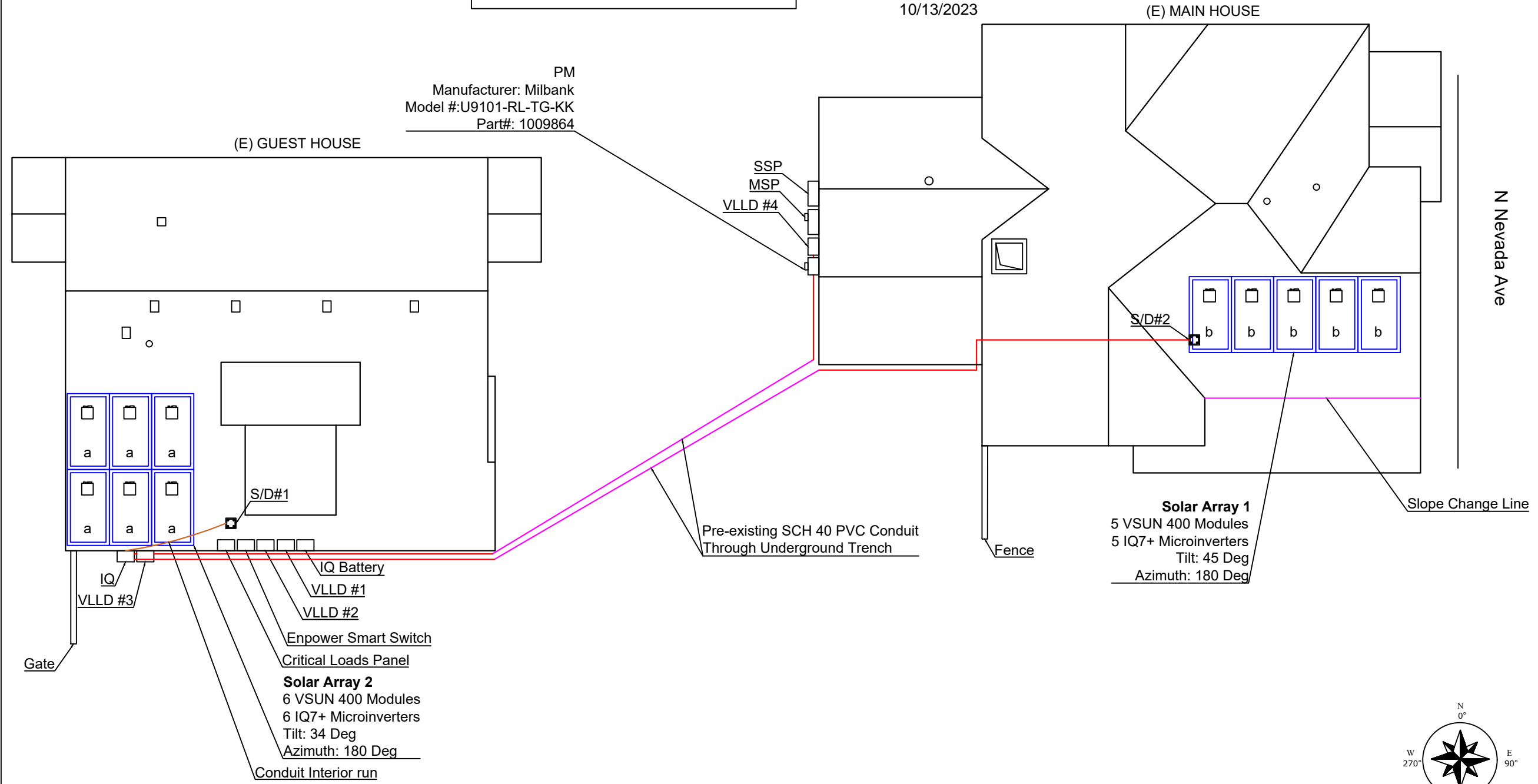
GUEST HOUSE ROOF AREA CALCULATIONS
 FIRE SPRINKLERS - NO
 TOTAL ROOF AREA (SQ.FT.) - 1,140
 SOLAR AREA (SQ.FT.) - 126
 % OF COVERED AREA - 11.1%

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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SOLARISE

Address:
 2936 Janitell Rd
 Colorado Springs, CO 80906

Phone Number:
 (719)315-3034

Drafted By:

Current Insight, LLC

2852 W. Amini Way
 South Jordan, UT 84095

TIMOTHY & MARCIE MURPHY
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OCTOBER 11, 2023	1
AS INDICATED	
PV SYSTEM	

SITE PLAN

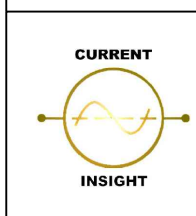


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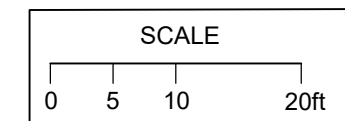
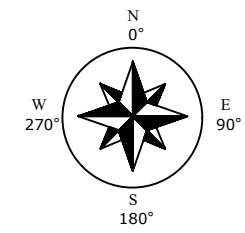
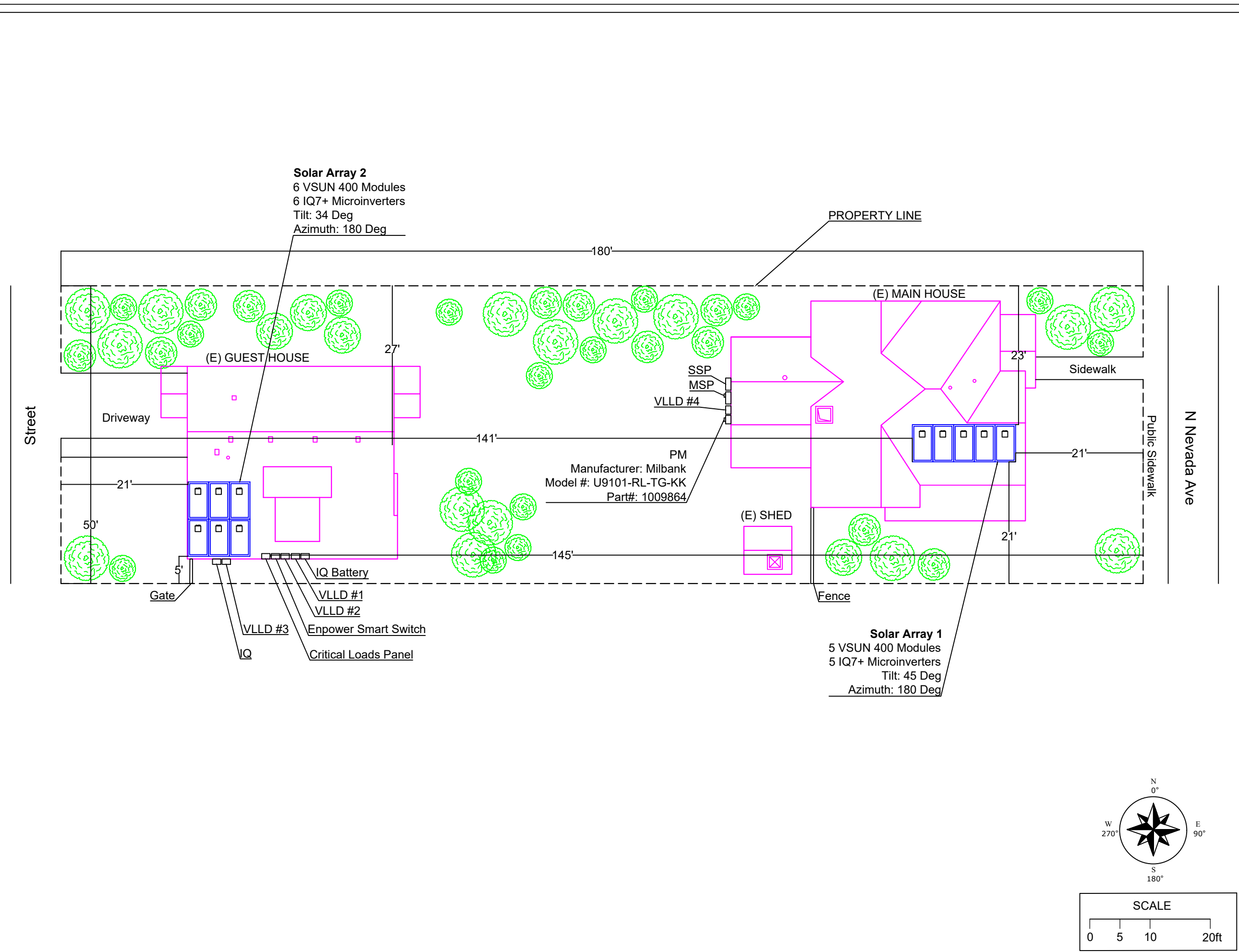
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PV SYSTEM

1.1



GARAGE FLOOR PLAN

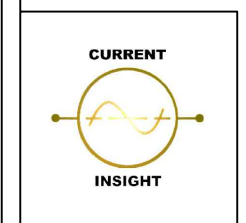


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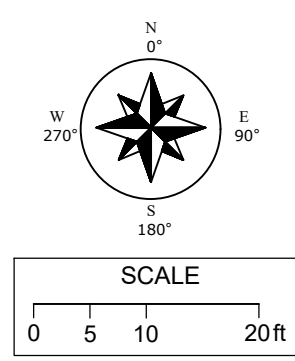
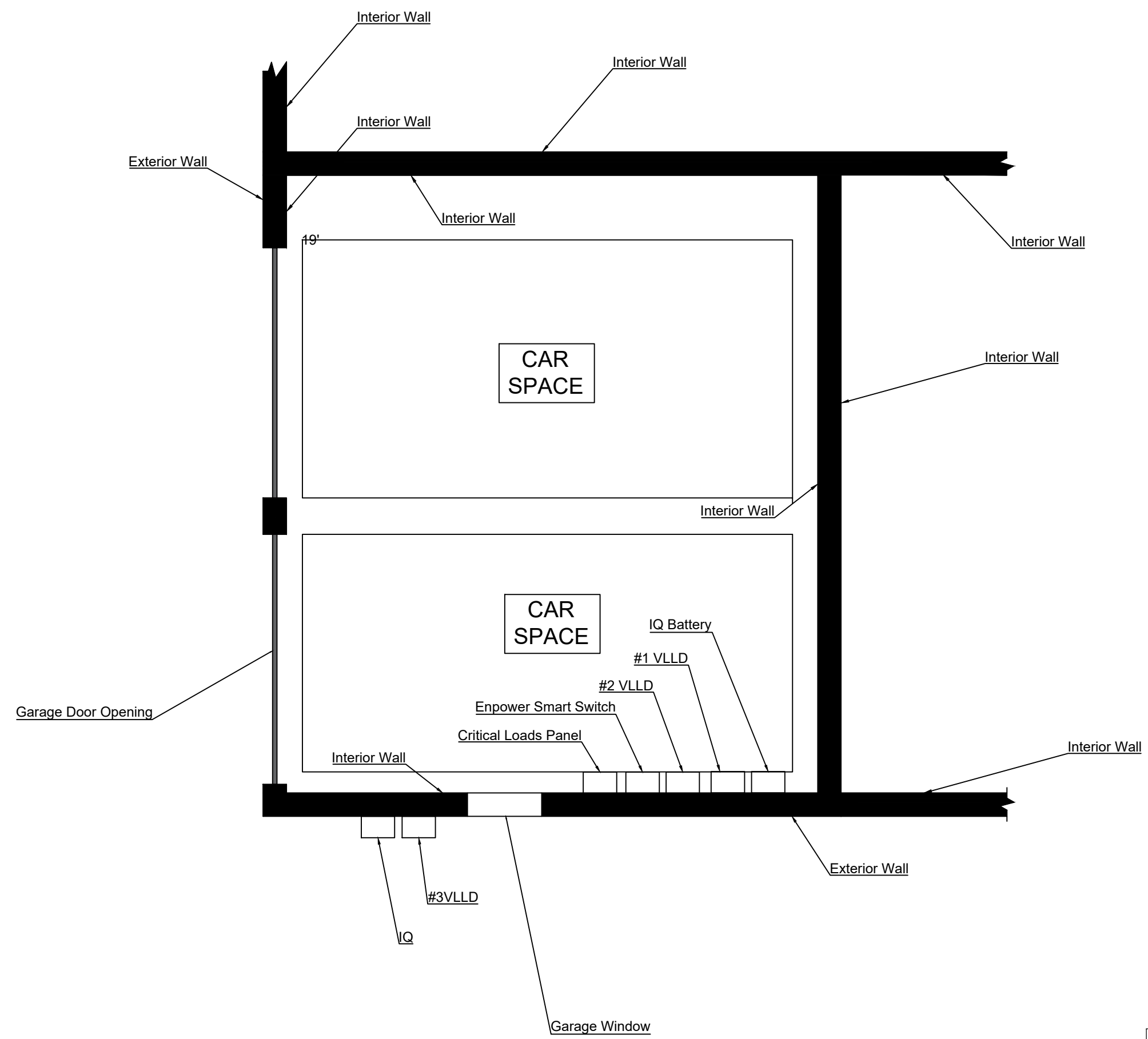
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PV SYSTEM

1.2

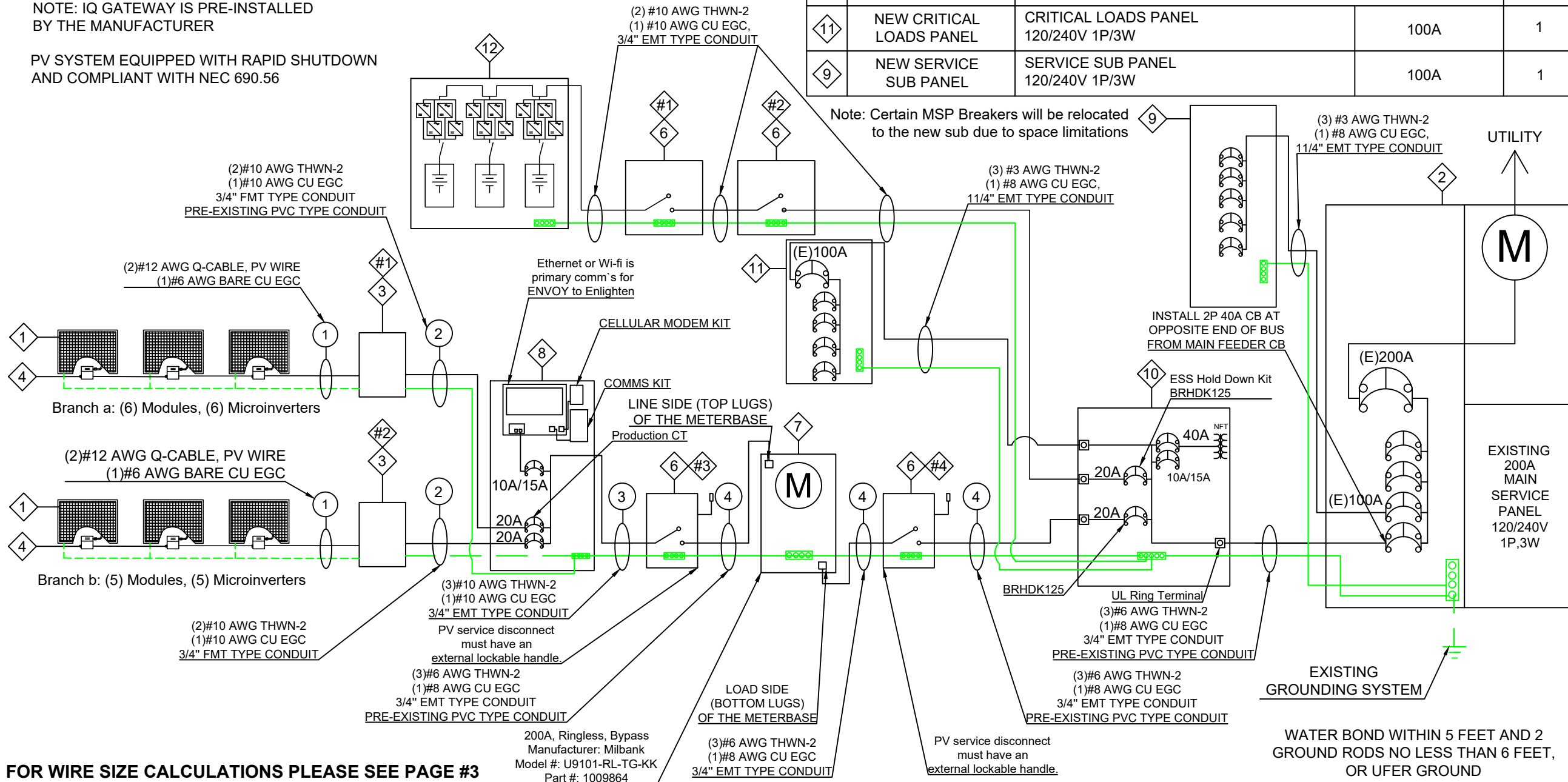


#	ITEM	DESCRIPTION		QTY
1	PV MODULE	VSUN 400W	Isc = 13.68A Voc = 37.20V	11
		VSUN400-108BMH	Imp = 12.84A Vmp = 31.17V	
2	EXISTING MAIN SERVICE PANEL	MAIN SERVICE PANEL & UTILITY METER	BUSBAR RATING	200A
			BREAKER RATING	200A
3	SOLADECK JUNCTION BOX	8"Wx9"Wx2.5"D UL50 LISTED WATER TIGHT NEMA TYPE 3		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 INPUT POWER	235-440 W	
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

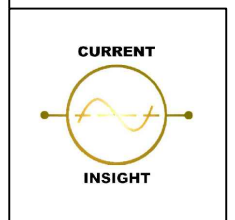


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South Jordan, UT 84095

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COLORADO SPRINGS, CO 80903

OCTOBER 11, 2023

AS INDICATED

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 IQ COMBINER BOX TO AC DISCONNECT	
	(3) #10 AWG THWN-2
	(1) #10 AWG CU EGC, 3/4" EMT TYPE CONDUIT
	NUMBER OF MICROINVERTERS 11
③	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	
	(3) #6 AWG THWN-2
	(1) #8 AWG CU EGC, 3/4" EMT TYPE CONDUIT, PRE-EXISTING PVC TYPE CONDUIT

WIRE CHART	
FROM #1S/D BOX, #2S/D BOX TO IQ COMBINER BOX	
	(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"
②	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

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
$200A "MB" + 40A "PV \& BATTERY" = 240A \leq 240A \text{ MAX}$	

WIRE SIZE CALCULATIONS

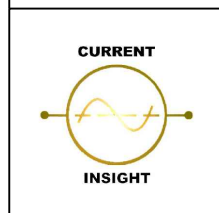


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SOLARISE

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

Drafted By:



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2852 W. Amini Way
South Jordan, UT 84095

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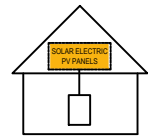
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PV SYSTEM

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

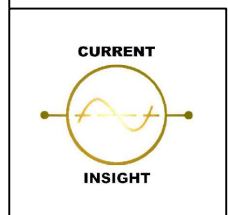


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PV SYSTEM

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

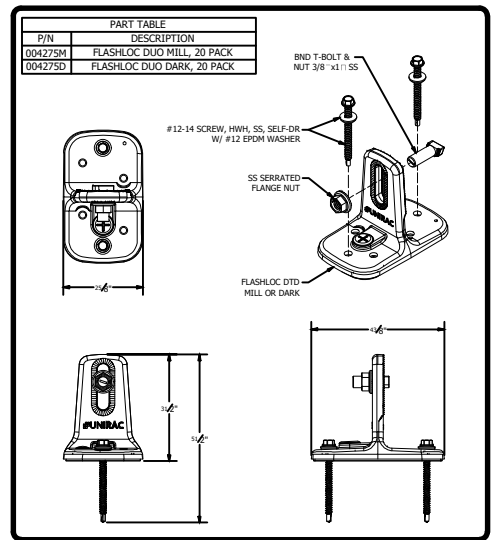
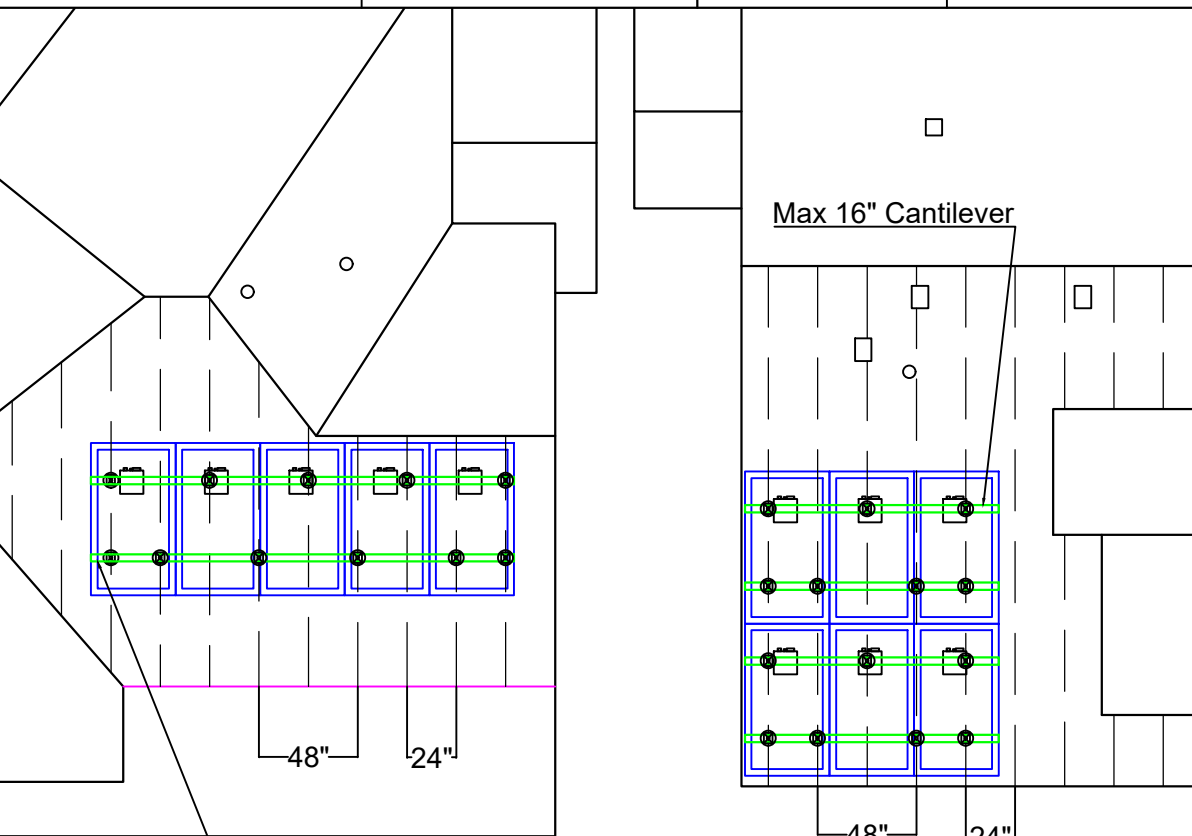
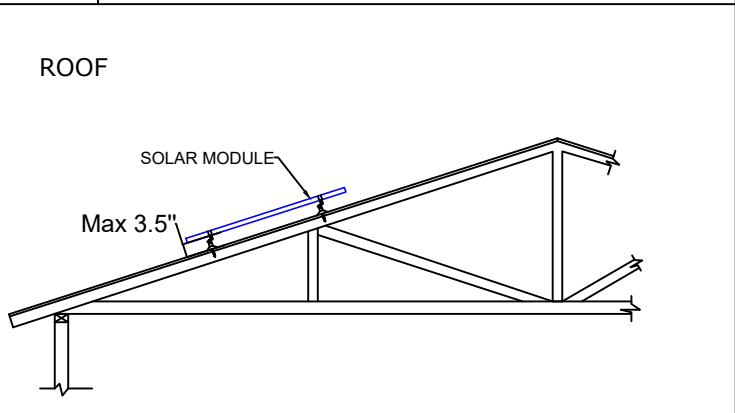
10/13/2023

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	

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RACKING RAIL	
ATTACHMENT	
ROOF FRAMING	

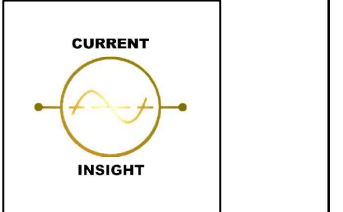


PRODUCT LINE: SOLARMOUNT	DRAWING NOT TO SCALE ALL DIMENSIONS ARE NOMINAL	FL-404
DRAWING TYPE: ASSEMBLY DETAIL	PRODUCT PROTECTED BY ONE OR MORE US PATENTS	SHEET
DESCRIPTION: FLASHLOC DUO KIT	LEGAL NOTICE	
REVISION DATE: 4/29/2021		

CONTRACTOR

SOLARISE
 Address:
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 Phone Number:
 (719)315-3034

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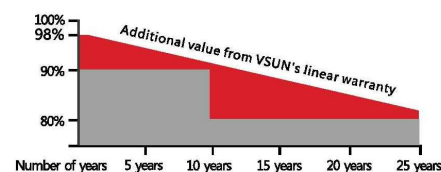
VSUN405-108BMH

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

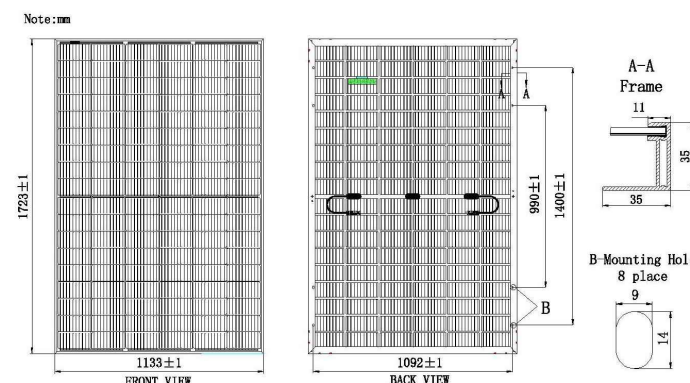
Packaging

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

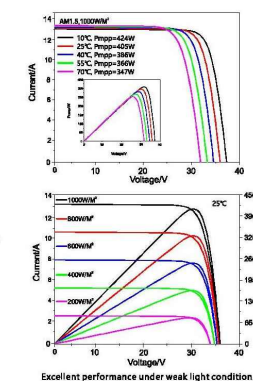
System Design

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

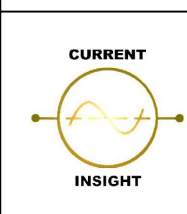


CONTRACTOR

SOLARISE

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

Drafted By:



Current Insight, LLC

2852 W. Amini Way
South Jordan, UT 84095

TIMOTHY & MARCIE MURPHY
1320 N NEVADA AVE
COLORADO SPRINGS, CO 80903

OCTOBER 11, 2023

AS INDICATED

PV SYSTEM

D1

INVERTER DATA SHEET

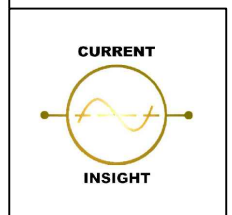


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PV SYSTEM

D2

Data Sheet
Enphase Microinverters
Region: AMERICAS

Enphase IQ 7 and IQ 7+ Microinverters

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

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

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

Easy to Install

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

Productive and Reliable

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

Smart Grid Ready

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

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

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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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

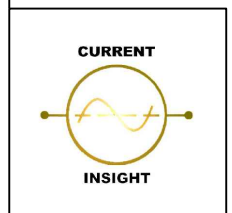


CONTRACTOR

SOLARISE

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

Drafted By:



Current Insight, LLC

2852 W. Amini Way
South Jordan, UT 84095

TIMOTHY & MARCIE MURPHY
1320 N NEVADA AVE
COLORADO SPRINGS, CO 80903

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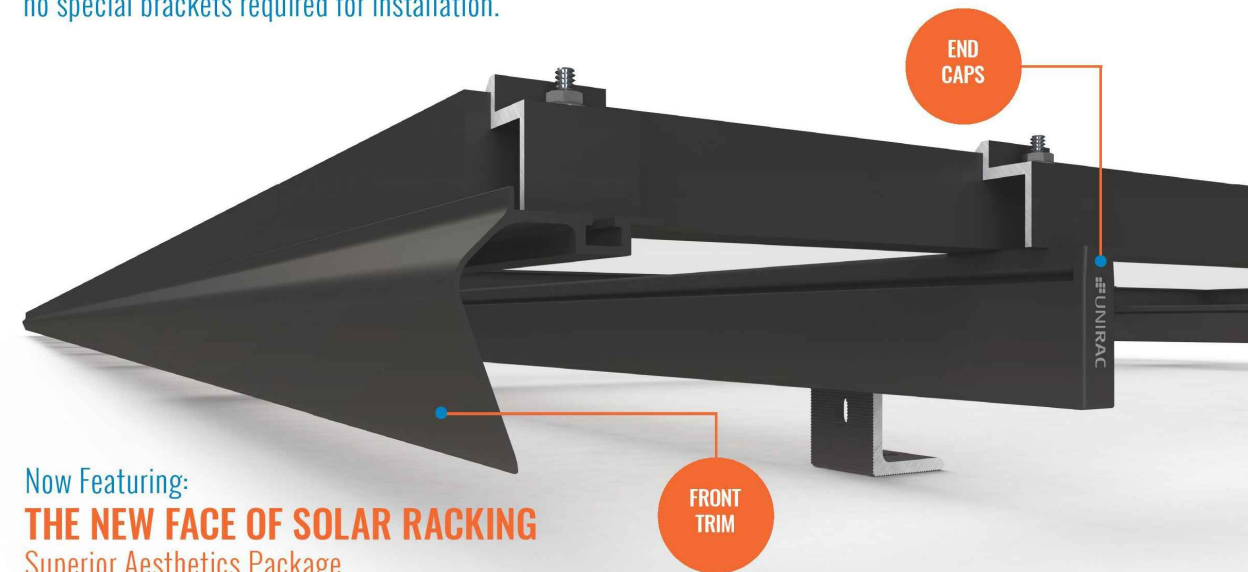
PV SYSTEM

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

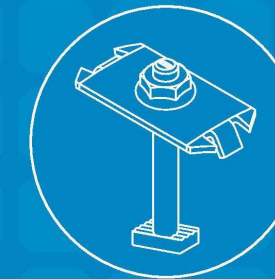
ONE PRODUCT - MANY APPLICATIONS

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.

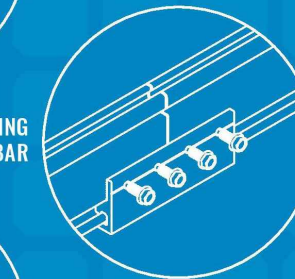
AUTOMATED DESIGN TOOL

DESIGN PLATFORM AT YOUR SERVICE

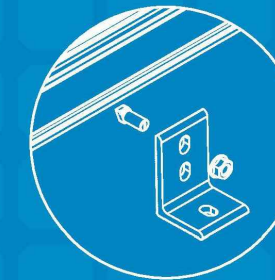
Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability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



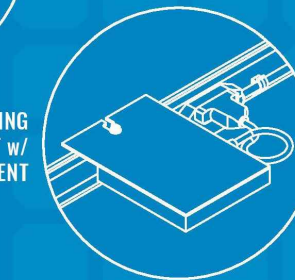
INTEGRATED BONDING MIDCLAMP



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

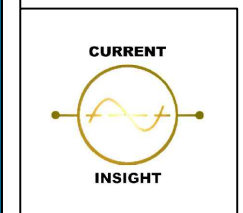


CONTRACTOR

SOLARISE

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

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2852 W. Amini Way
South Jordan, UT 84095

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PV SYSTEM

D4

FLASHLOC™ DUO

THE MOST VERSATILE DIRECT TO DECK ATTACHMENT



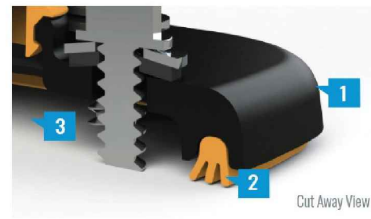
FLASHLOC™ DUO is the most versatile direct to deck and rafter attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the required number of screws to secure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

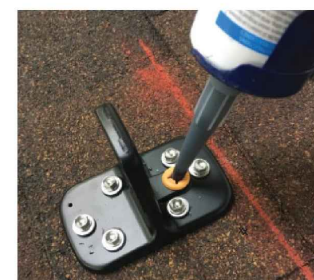
Snap chalk lines for attachment rows. On shingle roofs, snap lines 1/4" below upslope edge of shingle course. This line will be used to align the upper edge of the mount.

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

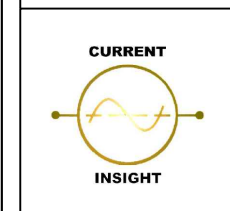


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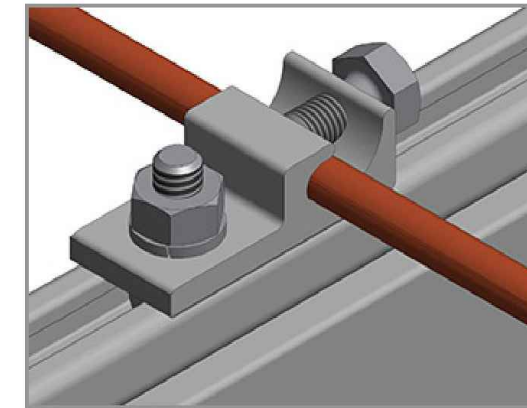
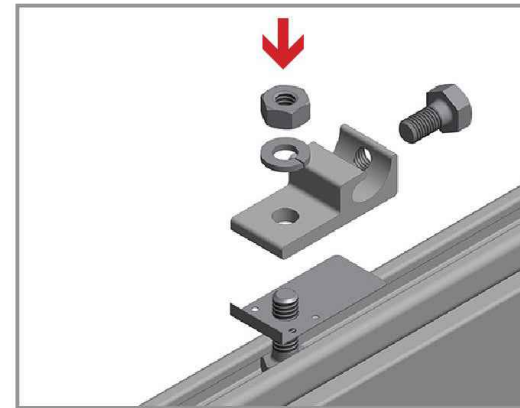
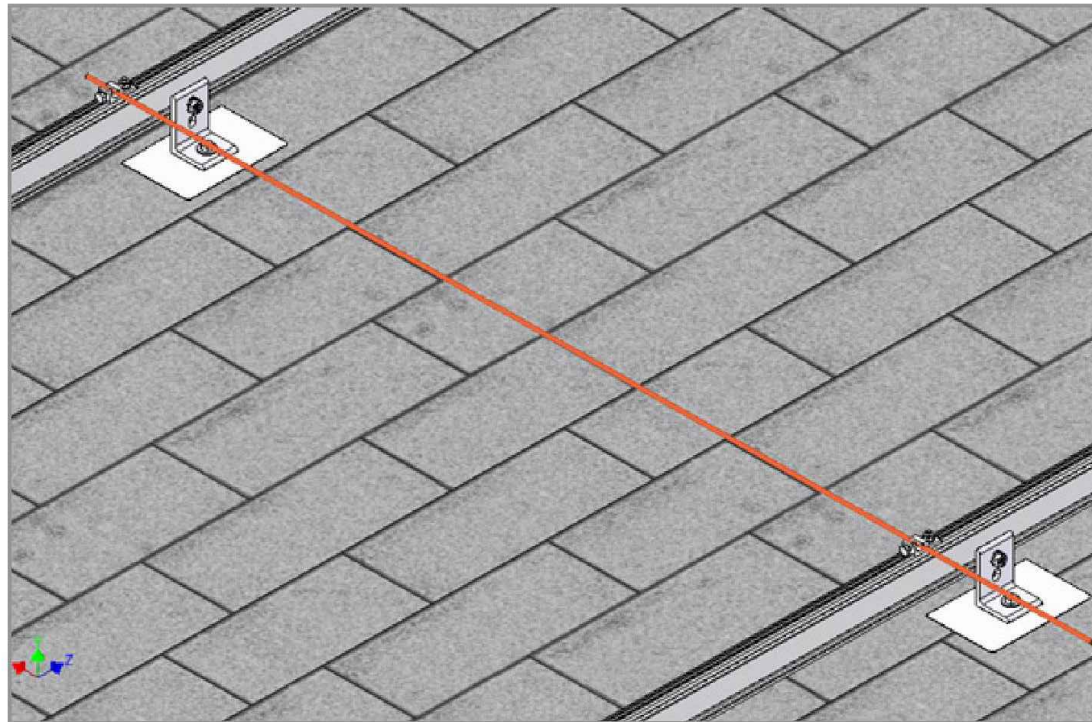
D5

FASTER INSTALLATION. 25-YEAR WARRANTY.

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

FASTER INSTALLATION. 25-YEAR WARRANTY.

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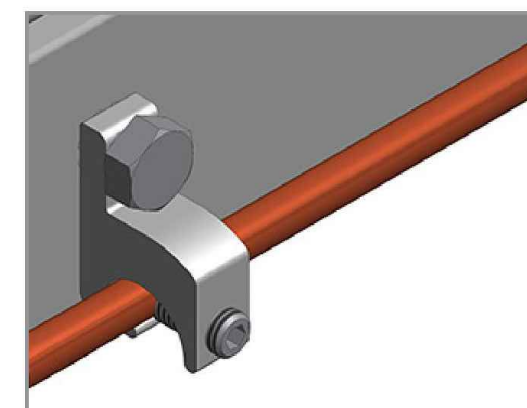
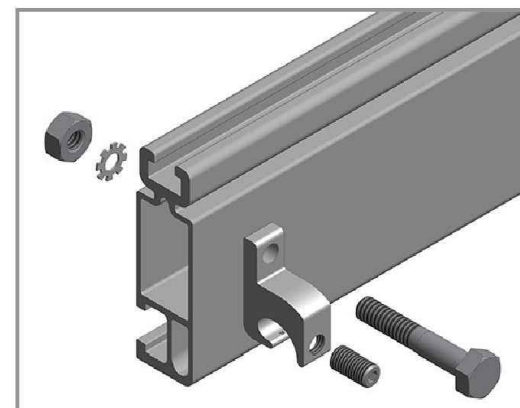
WEEBLUG CONDUCTOR - UNIRAC P/N 008002S:

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"

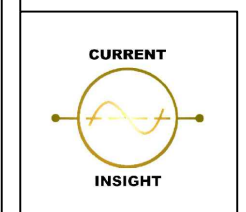
- Torque value depends on conductor size.
- See product data sheet for torque value.

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SOLARISE

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

Drafted By:



Current Insight, LLC

2852 W. Amini Way
South Jordan, UT 84095

TIMOTHY & MARCIE MURPHY
1320 N NEVADA AVE
COLORADO SPRINGS, CO 80903

OCTOBER 11, 2023

AS INDICATED

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

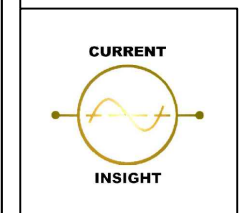


CONTRACTOR

SOLARISE

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

Drafted By:



Current Insight, LLC

2852 W. Amini Way
South Jordan, UT 84095

TIMOTHY & MARCIE MURPHY
1320 N NEVADA AVE
COLORADO SPRINGS, CO 80903

OCTOBER 11, 2023

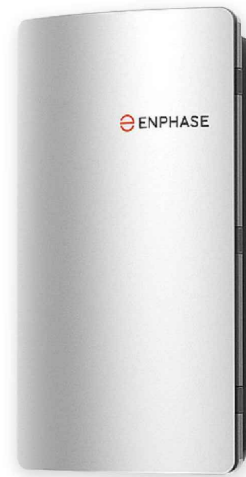
AS INDICATED

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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**ENPHASE
 ENPOWER**

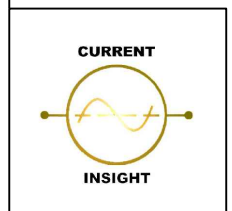


CONTRACTOR

SOLARISE

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

Drafted By:



Current Insight, LLC

2852 W. Amini Way
 South Jordan, UT 84095

TIMOTHY & MARCIE MURPHY
 1320 N NEVADA AVE
 COLORADO SPRINGS, CO 80903

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PV SYSTEM

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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

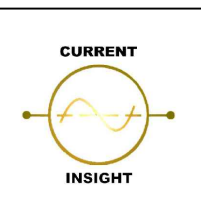


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PV SYSTEM

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

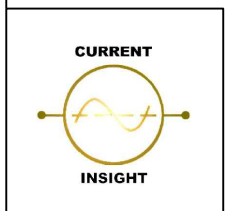


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