AERIAL VIEW:



GENERAL NOTES

- 1. INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM SHALL BE IN ACCORDANCE WITH NEC ARTICLE 690, AND ALL OTHER APPLICABLE NEC CODES WHERE NOTED OR EXISTING
- 2. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL COMPLY WITH NEC ARTICLE 110
- 3. ALL WIRES, INCLUDING THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE IN ACCORDANCE WITH NEC ARTICLE 250
- 4. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE; THIS SYSTEM IS UTILITY INTERACTIVE PER UL 1741 AND DOES NOT INCLUDE STORAGE BATTERIES OR OTHER ALTERNATIVE STORAGE SOURCES
- 5. ALL DC WIRES SHALL BE SIZED ACCORDING TO [NEC 690.8]
- 6. DC CONDUCTORS SHALL BE WITHIN PROTECTED RACEWAYS IN ACCORDANCE WITH [NEC 690.31]
- 7. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL JURISDICTIONAL BUILDING CODE

STREET VIEW:



SITE SPECIFICATIONS

OCCUPANCY: R-3

ZONING: RESIDENTIAL

PHOTOVOLTAIC (PV) SYSTEM SPECIFICATIONS

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s) Racking: Unirac - FLASHKIT PRO - 48" O.C.

APPLICABLE GOVERNING CODES

2017 NEC

2020 FBC 7TH EDITION, BUILDING

2020 FBC 7TH EDITION, RESIDENTIAL

2020 FBC 7TH EDITION, EXISTING BUILDING

2020 FFPC

CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

Lat, 30.1400587 Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative

SHEET INDEX:

PV01 COVER PAGE

PV02 SITE PLAN

PV03 ROOF ATTACHMENTS

PV04 MOUNTING DETAIL

PV05 LINE DIAGRAM

PV06 ELECTRICAL CALCS

PV07 LABELS

PV08 PLACARD

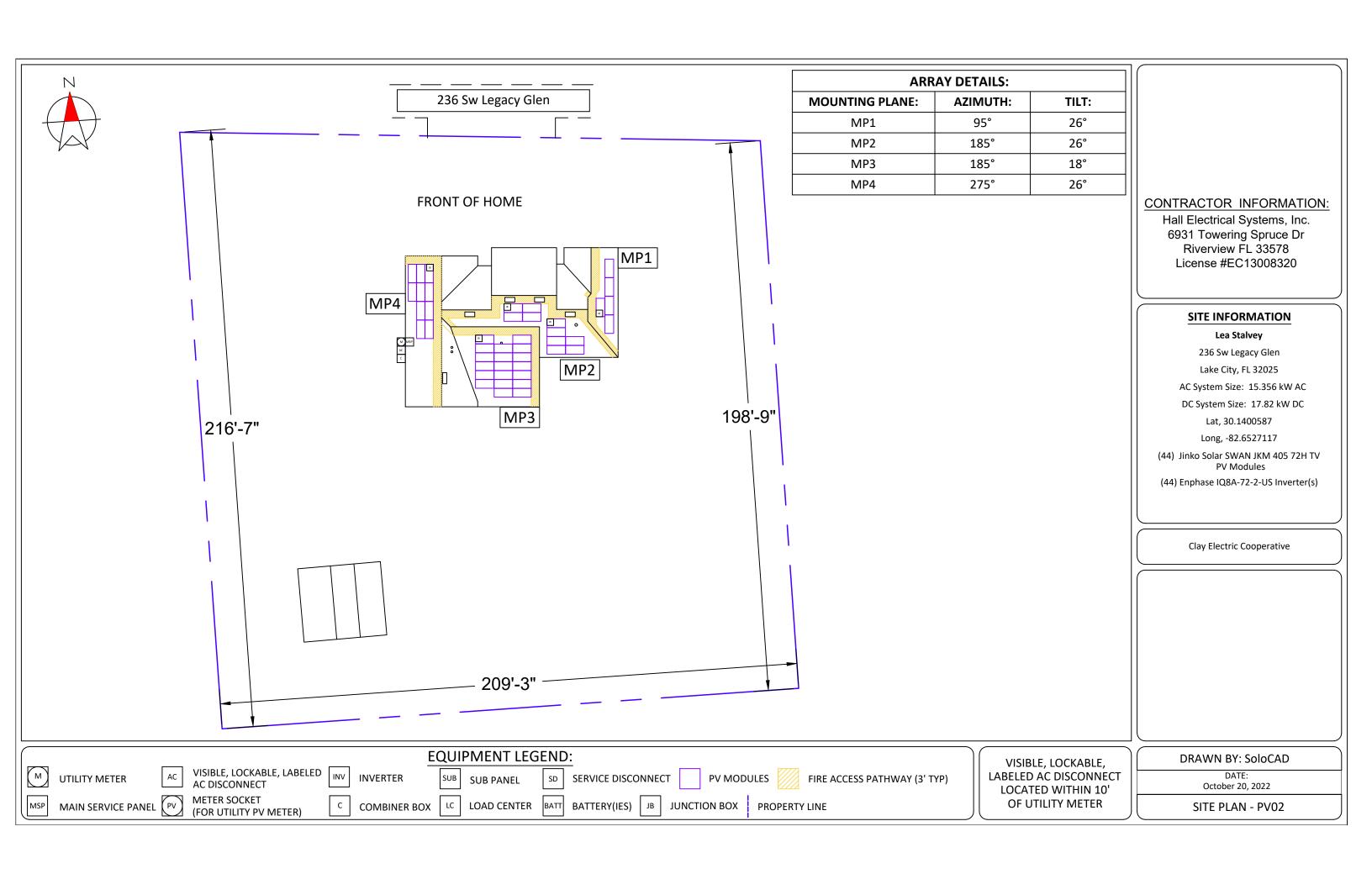
PV09 SITE PHOTOS

DRAWN BY: SoloCAD

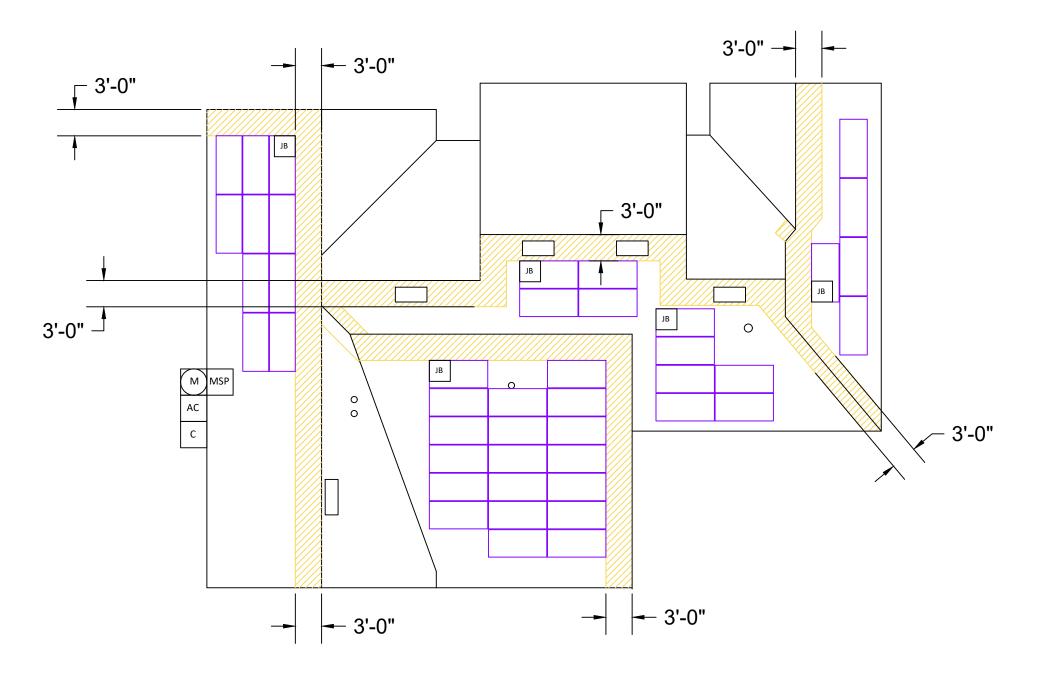
DATE:

October 20, 2022

COVER PAGE - PV01







CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

Lat, 30.1400587

Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)

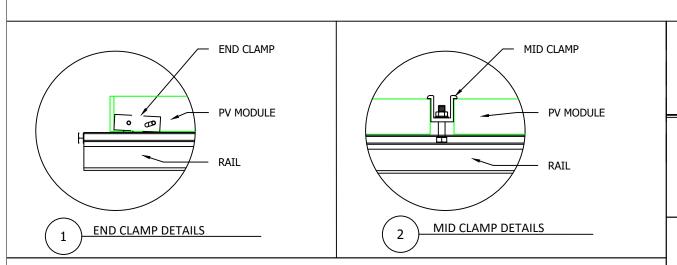
Clay Electric Cooperative

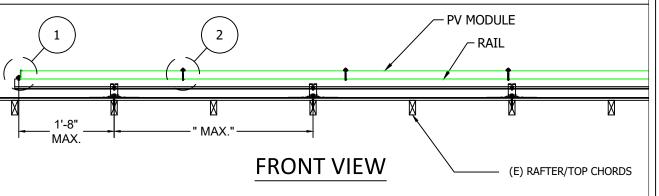
EQUIPMENT INFORMATION:		ROOF INFO:		PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:	
RAIL MANUFACTURER:	Unirac	ROOF TYPE:	Asphalt Shingle	PV MODULE COUNT:	44
RAIL PART NUMBER:	SM	ROOF FRAMING:	Manufactured Truss	ARRAY AREA:	MODULE COUNT * 22.04 ft ² = 969.76
ATTACHMENTS	Unirac - FLASHKIT PRO	RAFTER/TOP CHORD SIZE:	2x4	ROOF AREA:	3800.442 ft²
ATTACHMENT QTY:	170	RAFTER/TOP CHORD SPACING:	24"	PERCENT OF ROOF COVERED:	26%
SPLICE QTY:	16	ATTACHMENT SPACING:	48''	ARRAY WEIGHT:	MODULE COUNT * 49 lbs = 2156 lbs
MIDCLAMP QTY:	50		POINT LOAD: ARRAY LBS/ATTAG		ARRAY LBS/ATTACHMENTS = 12.68
ENDCLAMP QTY:	76			DISTRIBUTED LOAD: (lbs/ft²)	(ARRAY) WEIGHT/AREA = 2.22 lbs/ft ²

DRAWN BY: SoloCAD

DATE: October 20, 2022

ROOF ATTACHMENTS - PV03





Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

CONTRACTOR INFORMATION:

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC

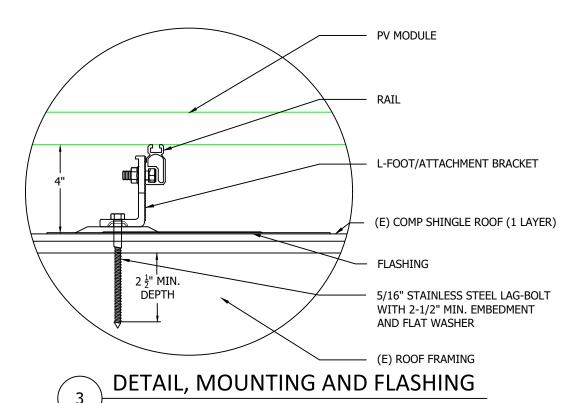
DC System Size: 17.82 kW DC

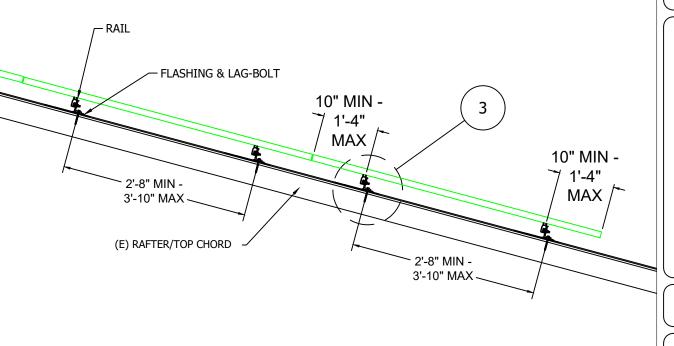
Lat, 30.1400587

Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)





SIDE VIEW

Clay Electric Cooperative

EQUIPMENT INFORMATION:		ROOF INFO:		PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:	
RAIL MANUFACTURER:	Unirac	ROOF TYPE:	Asphalt Shingle	PV MODULE COUNT:	44
RAIL PART NUMBER:	SM	ROOF FRAMING:	Manufactured Truss	ARRAY AREA:	MODULE COUNT * 22.04 ft ² = 969.76
ATTACHMENTS	Unirac - FLASHKIT PRO	RAFTER/TOP CHORD SIZE:	2x4	ROOF AREA:	3800.442 ft ²
ATTACHMENT QTY:	170	RAFTER/TOP CHORD SPACING:	24"	PERCENT OF ROOF COVERED:	26%
SPLICE QTY:	16	ATTACHMENT SPACING:	48"	ARRAY WEIGHT:	MODULE COUNT * 49 lbs = 2156 lbs
MIDCLAMP QTY:	50			POINT LOAD:	ARRAY LBS/ATTACHMENTS = 12.68
ENDCLAMP QTY:	76			DISTRIBUTED LOAD: (lbs/ft²)	(ARRAY) WEIGHT/AREA = 2.22 lbs/ft ²

DRAWN BY: SoloCAD

DATE: October 20, 2022

MOUNTING DETAIL - PV04

Jinko Solar SWAN JKM 405	72H TV Specs
POWER MAX (PMAX):	405 W
OPEN CIRCUIT VOLTAGE (VOC):	48.45 V
MAX POWER-POINT CURRENT (IMP):	10.08 A
MAX POWER-POINT VOLTAGE (VMP):	40.19 V
SHORT CIRCUIT CURRENT (ISC):	10.42 A
SERIES FUSE RATING:	25A

Enphase IQ8A-72-2-L	JS Specs		
MAX INPUT VOLTAGE:	60 V		
MAX DC SHORT CIRCUIT CURRENT:	15 A		
MAXIMUM OUTPUT POWER:	349 W		
MAXIMUM OUTPUT CURRENT:	1.45 A		
NOM. OUTPUT VOLTAGE:	240 V		
MAX UNITS PER 20A CIRCUIT:	11		
1-Phase, 60 HZ, UL 1741 Listed			

		Equipment Schedule	
TYPE:	QTY:	DESCRIPTION:	RATING:
MODULES:	(44)	Jinko Solar SWAN JKM 405 72H TV	405 W
INVERTERS:	(44)	Enphase IQ8A-72-2-US	349 W
AC DISCONNECT(S):	(1)	PV AC Disconnect, 240V, 2-Pole	100 A
AC COMBINER:	(1)	Enphase (X-IQ-AM 1-240-4)	125 A

	Conduit & Conductor Schedule						
	TAG	QTY	WIRE GAUGE	DESCRIPTION	CONDUIT SIZE		
	(2)		12-2	ENPHASE Q-CABLE ALUMINUM - (L1, L2)	N/A - FREE AIR		
	1	(1)	6 AWG	THWN-2 COPPER - (GROUND)	N/A - FREE AIR		
	2	(2)	10 AWG	THHN/THWN-2 COPPER - (L1, L2)	3/4" EMT		
1	2	(1)	10 AWG	THWN-2 COPPER - (GROUND)	3/4 EIVII		
1	3	(8)	10 AWG	THHN/THWN-2 (L1, L2)	3/4" EMT		
1	3	(1)	10 AWG	THWN-2 COPPER -(GROUND)	3/4 EIVII		
	_	(3)	3 AWG	THWN-2 COPPER - (L1, L2, NEUTRAL)	1" EMT		
	4	(1)	8 AWG	THWN-2 COPPER - (GROUND)	I EIVII		

CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

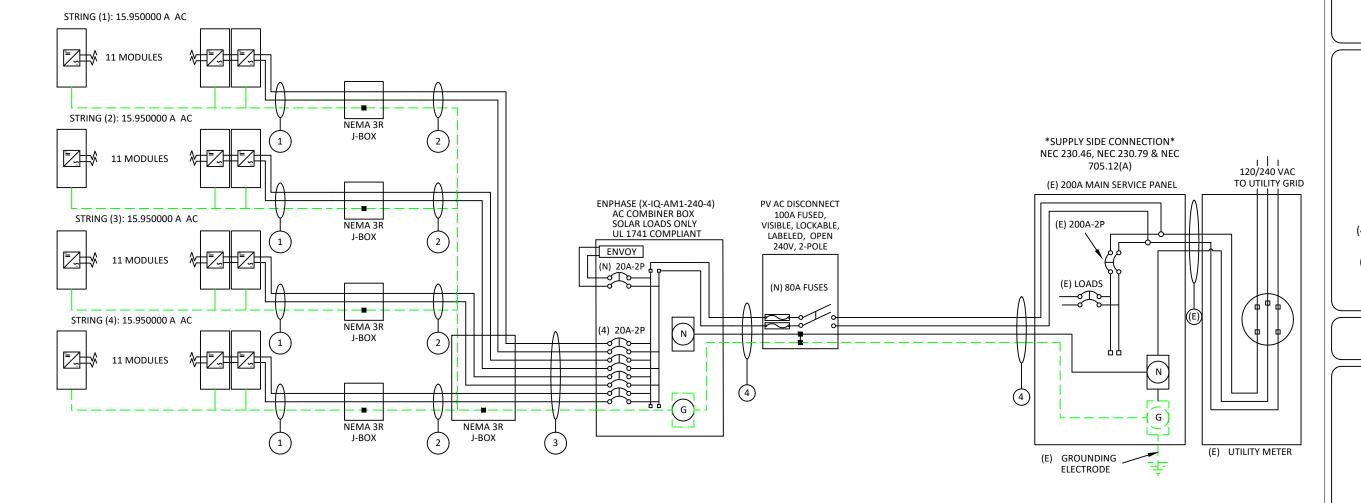
Lat, 30.1400587

Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative



VISIBLE, LOCKABLE, LABELED AC DISCONNECT LOCATED WITHIN 10' OF UTILITY METER DRAWN BY: SoloCAD

DATE: October 20, 2022

LINE DIAGRAM - PV05

STRING CALCULATIONS				
Enphase IQ8A-72-2-US	STRING #1	STRING #2	STRING #3	STRING #4
MAX AC CURRENT:	15.95A	15.95A	15.95A	15.95A
MICRO INVERTERS IN SERIES	11	11	11	11
NOMINAL STRING VOLTAGE:	240V	240V	240V	240V
MAX AC OUTPUT POWER	3839.00W	3839.00W	3839.00W	3839.00W
ARRAY DC POWER:		178	20W	
TOTAL MANY AC CLIDDENIT		63.80	00004	

SYSTEM OCPD CALCULATIONS			
INVERTER MODEL(S):	Enphase IQ8A-72-2-US		
# OF INVERTERS:	44		
MAX OUTPUT CURRENT:	1.45A		
(# OF INVERTERS) X (MAX OUTPUT CURRENT) X 125% <= OCPD RATING			
(44 X 1.45A X 1.25) = 79.75A <= 80A, OK			

				SUPPLY SIDE INTERCONNECTION
TOTAL MAX AC CURRENT:		63.800000A	MAIN BUSBAR RATING:	200A
NUMBER OF CURRENT CARRYING CONDUCTORS		PERCENT OF VALUES	MAIN DISCONNECT RATING:	200A
4-6		.80	PV OCPD RATING:	80A
7-9		.70		SERVICE RATING >= PV OCPD
10-20		.50		200A >= 80A, OK

SUPPLY SIDE INTERCONNECTION		
MAIN BUSBAR RATING:	200A	
MAIN DISCONNECT RATING:	200A	
PV OCPD RATING:	80A	
SERVICE RATING >= PV OCPD		
200A >= 80A, OK		

Conduit & Conductor Schedule CONDUCTOR RATING # OF CONDUCTORS CONDUCTOR TEMP. RATE TAG QTY WIRE GAUGE DESCRIPTION **CONDUIT SIZE** CONDUCTOR RATING AMBIENT TEMP TEMP. DERATE CONDUIT FILL DERATE W/DERATES ENPHASE Q-CABLE ALUMINUM - (L1, L2) (2) 12-2 1 N/A - FREE AIR 25A 90°C 34°C 0.96 N/A - FREE AIR 24A N/A - FREE AIR (1) THWN-2 COPPER - (GROUND) 6 AWG THHN/THWN-2 COPPER - (L1, L2) 10 AWG 3/4" EMT 40A 90°C 34°C 0.96 38.4A 11.9% (1) THWN-2 COPPER - (GROUND) 10 AWG (8) THHN/THWN-2 (L1, L2) 10 AWG 3/4" EMT 40A 90°C 34°C 0.7 26.88A 35.7% (1) 10 AWG THWN-2 COPPER -(GROUND) (3) 3 AWG THWN-2 COPPER - (L1, L2, NEUTRAL) 100A 34°C 8 AWG THWN-2 COPPER - (GROUND)

GROUNDING & GENERAL NOTES:

- 1. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
- 2. DC GEC AND AC EGC TO BE SPLICED TO EXISTING ELECTRODE
- 3. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
- 4. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD -JUNCTION BOXES DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
- 5. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.

INTERCONNECTION NOTES:

- 1. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9] & [NEC 230.95]
- 2. SUPPLY SIDE INTERCONNECTION ACCORDING TO [NEC 705.12] WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH [NEC 240.21]

DISCONNECT NOTES:

- 1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS) 2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.
- 3. FUSED AC DISCONNECT TO BE USED.

CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

> Lat, 30.1400587 Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative

DRAWN BY: SoloCAD

October 20, 2022

ELECTRICAL CALCS - PV06



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

FOR PV DISCONNECTING MEANS WHERE THE LINE AND LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN

[NEC 690.13(B)]

WARNING

THIS EQUIPMENT IS FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT **DEVICE, SHALL NOT EXCEED** AMPACITY OF BUSBAR.

EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUSBAR OR CONDUCTOR SUPPLIED FROM MULTIPLE SOURCES SHALL BE MARKED TO INDICATE THE PRESENCE OF ALL SOURCES.[NEC 705.12(B)(2)(3)(c)]

WARNING

INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT **DEVICE**

PLACED ADJACENT TO THE BACK-FED BREAKER FROM THE INVERTER IF TIE IN CONSISTS OF LOAD SIDE CONNECTION TO BUSBAR. [NEC 705.12(B)(2)(3)(b)]

WARNING

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

EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUSBAR OR CONDUCTOR SUPPLIED FROM MULTIPLE SOURCES SHALL BE MARKED TO INDICATE THE PRESENCE OF ALL SOURCES [NEC 705.12(B)(3)]

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT: NOMINAL OPERATING AC VOLTAGE: 240

AT POINT OF INTERCONNECTION, MARKED AT AC DISCONNECTING MEANS. [NEC 690.54]

- 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 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI
- 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(B)(3)]
- LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8", WHITE ON RED BACKGROUND; REFLECTIVE, AND PERMANENTLY AFFIXED [NEC 690.31(G)]

WARNING: PHOTOVOLTAIC **POWER SOURCE**

LABEL 6
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS. [NEC 690.31(G)(3&4)]

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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

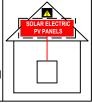


FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND CONDUCTORS LEAVING

SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION. [NEC 690.56(C)(1)(A)]

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



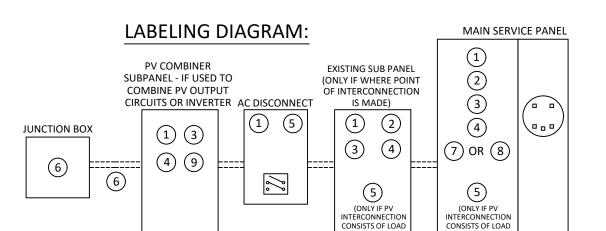
RAPID SHUTDOWN **SWITCH FOR**

SOLAR PV SYSTEM

FOR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY:

SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION. [NEC 690.56(C)(1)(b)]

SIGN LOCATED AT RAPID SHUT DOWN DISCONNECT SWITCH [NEC 690.56(C)(3)]



** ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VERY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ELECTRICAL DIAGRAM PAGE.

CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

Lat. 30.1400587

Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV **PV Modules**

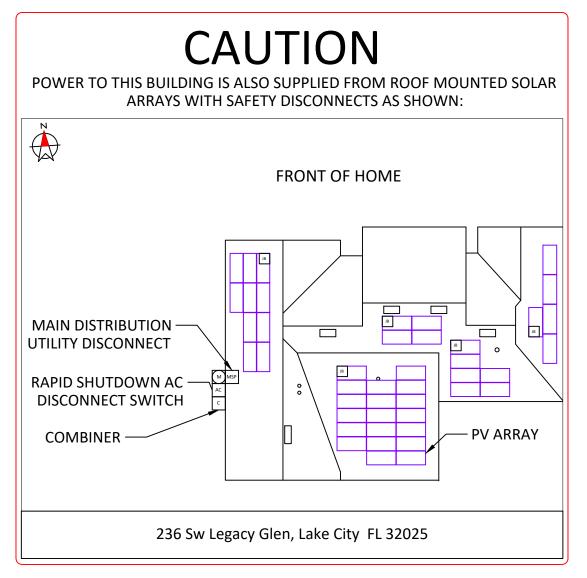
(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative

DRAWN BY: SoloCAD

DATE: October 20, 2022

LABELS - PV07



DIRECTORY

PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS OUTLINED WITHIN: NEC 690.56(B)&(C), [NEC 705.10])

CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

Lat, 30.1400587 Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative

DRAWN BY: SoloCAD

DATE: October 20, 2022

PLACARD - PV08

SITE PHOTOS:





CONTRACTOR INFORMATION:

Hall Electrical Systems, Inc. 6931 Towering Spruce Dr Riverview FL 33578 License #EC13008320

SITE INFORMATION

Lea Stalvey

236 Sw Legacy Glen Lake City, FL 32025

AC System Size: 15.356 kW AC DC System Size: 17.82 kW DC

> Lat, 30.1400587 Long, -82.6527117

(44) Jinko Solar SWAN JKM 405 72H TV PV Modules

(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative

DRAWN BY: SoloCAD

DATE: October 20, 2022

SITE PHOTOS - PV09

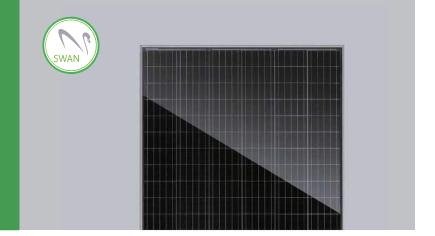
www.jinkosolar.com



Swan Bifacial HC 72M 385-405 Watt

MONOCRYSTALLINE MODULE

ISO9001:2015\ISO14001:2015\ISO45001:2018













KEY FEATURES



5 Busbar Solar Cell

5 busbar solar cell adopts new technology to improve the efficiency of modules , offers a better aesthetic appearance, making it perfect for rooftop



PID Resistance

Excellent Anti-PID performance guarantee limited power degradation for mass production.



Higher Lifetime Power Yield:

0.55% annual power degradation 30 year linear power warranty



Light-weight design:

Light-weight design using transparent backsheet for easy installation and low



Higher power output:

Module power increases 5-25% generally (per different reflective condition) lower LCOE and higher IRR

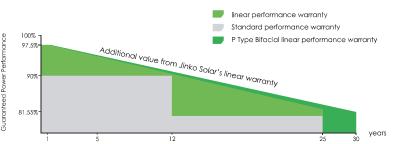


Better low-light performance:

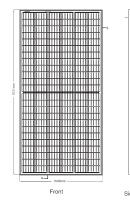
Excellent performance in low-light environments (e.g. early morning, dusk, and cloud, etc.)

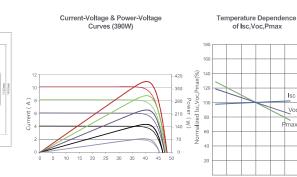
LINEAR PERFORMANCE WARRANTY

12 Year Product Warranty • 30 Year Linear Power Warranty 0.55% Annual Degradation Over 30 years



Engineering Drawings





Packaging Configuration	
(Two pallets = One stack)	
25ncs/pallots 70ncs/stack 770ncs/ 40'HO Container	

Mechanical (Characteristics
Cell Type	Mono PERC 158.75×158.75mm
No.of cells	144 (6×24)
Dimensions	2031×1008×30mm (79.96×39.69×1.18 inch)
Weight	22.3 kg (49.2 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TUV 1×4.0mm² (+): 250mm , (-): 150 mm or Customized Length

Electrical Performance & Temperature Dependence

Module Type	JKM385M-72H-TV		JKM390M-72H-TV		JKM395M-72H-TV		JKM400M-72H-TV		JKM405M-72H-TV	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	385Wp	286Wp	390Wp	290Wp	395Wp	293Wp	400Wp	297Wp	405Wp	301Wp
Maximum Power Voltage (Vmp)	39.50V	36.88V	39.62V	37.22V	39.83V	37.55V	40.01V	37.64V	40.19V	37.77V
Maximum Power Current (Imp)	9.76A	7.75A	9.84A	7.78A	9.92A	7.81A	10.00A	7.89A	10.08A	7.96A
Open-circuit Voltage (Voc)	48.10V	45.30V	48.14V	45.34V	48.26V	45.45V	48.35V	45.54V	48.45V	45.63V
Short-circuit Current (Isc)	10.08A	8.14A	10.17A	8.21A	10.23A	8.26A	10.32A	8.34A	10.42A	8.41A
Module Efficiency STC (%)	18.	81%	19.0)5%	19.2	9%	19.5	54%	19.7	78%
Operating Temperature(°C)					-40°C~-	+85°C				
Maximum system voltage					1500VD	C (IEC)				
Maximum series fuse rating				25A						
Power tolerance				0~+3%						
Temperature coefficients of Pmax					-0.35%/°C					
Temperature coefficients of Voc -0.29					%/°C					
Temperature coefficients of Isc 0.048%/°C										
Nominal operating cell temperature (NOCT) 45±2°C										
Refer. Bifacial Factor 70±5%										

BIFA	CIAL OUTPUT-F	REARSIDE	E POWER (GAIN		
5%	Maximum Power (Pmax)	404Wp	410Wp	415Wp	420Wp	425Wp
	Module Efficiency STC (%)	19.75%	20.00%	20.26%	20.52%	20.77%
15%	Maximum Power (Pmax)	443Wp	449Wp	454Wp	460Wp	466Wp
	Module Efficiency STC (%)	21.63%	21.91%	22.19%	22.47%	22.75%
25%	Maximum Power (Pmax)	481Wp	488Wp	494Wp	500Wp	506Wp
	Module Efficiency STC (%)	23.51%	23.81%	24.12%	24.42%	24.73%











The company reserves the final right for explanation on any of the information presented hereby. JKM385-405M-72H-TV-A3.1(2)-EN-F30







IQ8 Series Microinverters

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



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



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



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



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

© 2021 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IO8 microinverters, and other names are trademarks of Enphase Energy, Inc. Data subject to change.

IQ8SE-DS-0001-01-EN-US-2021-10-19

Easy to install

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

High productivity and reliability

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

Microgrid-forming

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

IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	108PLUS-72-2-US	IQ8M-72-2-US	108A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US	
Commonly used module pairings ²	W	235 - 350	235 - 440	260 - 460	295 – 500	320 - 540+	295 – 500+	
Module compatibility		60-cell/120 half-cell		60-cell/120	half-cell and 72-cell/	'144 half-cell		
MPPT voltage range	٧	27 – 37	29 – 45	33 – 45	36 - 45	38 – 45	38 - 45	
Operating range	٧	25 – 48			25 - 58			
Min/max start voltage	٧	30 / 48			30 / 58			
Max input DC voltage	٧	50			60			
Max DC current ³ [module lsc]	Α				15			
Overvoltage class DC port					II			
DC port backfeed current	mA				0			
PV array configuration		1x1 Ungrounded a	array; No additional D	C side protection requ	uired; AC side protecti	on requires max 20A p	er branch circuit	
OUTPUT DATA (AC)		108-60-2-08	108PLUS-72-2-US	IQ8M-72-2-US	108A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-U	
Peak output power	VA	245	300	330	366	384	366	
Max continuous output power	VA	240	290	325	349	380	360	
Nominal (L-L) voltage/range⁴	٧			240 / 211 – 264			208 / 183 – 250	
Max continuous output current	Α	1.0	1.21	1.35	1.45	1.58	1.73	
Nominal frequency	Hz				60			
Extended frequency range	Hz	50 – 68						
Max units per 20 A (L-L) branch circuit ⁵		16	13	11	11	10	9	
Total harmonic distortion				<	5%			
Overvoltage class AC port					III			
AC port backfeed current	mA			3	30			
Power factor setting				1	.0			
Grid-tied power factor (adjustable)				0.85 leading	- 0.85 lagging			
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4	
CEC weighted efficiency	%	97	97	97	97.5	97	97	
Night-time power consumption	mW			6	60			
MECHANICAL DATA								
Ambient temperature range				-40°C to +60°C	(-40°F to +140°F)			
Relative humidity range				4% to 100%	(condensing)			
DC Connector type				М	C4			
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")						
Weight		1.08 kg (2.38 lbs)						
Cooling				Natura l conve	ection – no fans			
Approved for wet locations				Υ	'es			
Acoustic noise at 1 m				<60) dBA			
Pollution degree		PD3						
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure						
Environ. category / UV exposure rating				NEMA Type	6 / outdoor			
COMPLIANCE								
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to						

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2021-10-19

Data Sheet **Enphase Networking**

Enphase IQ Combiner 4/4C

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



To learn more about Enphase offerings, visit enphase.com

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

Smart

- · Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ
- 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
- 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 (ANS 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					
Envoy breaker	10A or 15A rating GE/Siemens/Eaton 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)	$37.5 \times 49.5 \times 16.8 \text{ cm}$ (14.75" \times 19.5" \times 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	III 4744 OAN/OOA OOO ON - 4074 47 OED D-+45 OL D 1050 000					
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**



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.









Light Rail is Fully Compatible with all SM Components



Featuring Google Map Capabilities within U-Builder

FAST INSTALLATION, SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT

#UNIRAC

OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

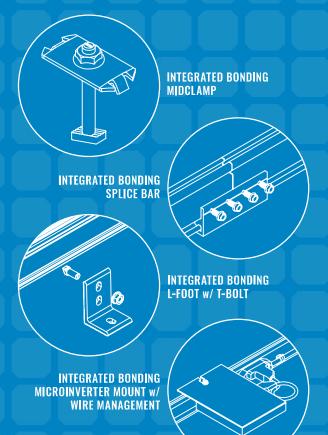
Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

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

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.





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 stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

CERTIFIED OUALITY 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.

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

FLASHKIT PRO



FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Featuring Unirac's patented **SHED & SEAL** technology, a weather proof system which provides the ultimate protection against roof leaks. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With **FLASH**KIT pro, you have everything you need for a quick, professional installation.









YOUR COMPLETE SOLUTION Flashings, lags, continuous slot L-Feet and hardware



CONVENIENT 10 PACKS Packaged for speed and ease of handling

THE COMPLETE ROOF ATTACHMENT SOLUTION

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

FLASHKIT PRO

INSTALLATION GUIDE



FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.









INSTALL L-FOOT

ATTACH L-FOOT TO RAIL

PRE-INSTALL

INSTALL **FLASH**KIT PRO FLASHING

- · Locate roof rafters and snap chalk lines to mark the installation point for each roof attachment.
- Drill a 7/32" pilot hole at each roof attachment. Fill each pilot hole with sealant.

STEP 1 INSTALL **FLASH**KIT PRO FLASH**I**NG

• Add a U-shaped bead of roof sealant to the underside of the flashing with the open side of the U pointing down the roof slope. Slide the aluminum flashing underneath the row of shingles directly up slope from the pilot hole as shown. Align the indicator marks on the lower end of the flashing with the chalk lines on the roof to center the raised hole in the flashing over the pilot hole in the roof. When installed correctly, the flashing will extend under the two courses of shingles above the pilot hole.

STEP 2 INSTALL L-FOOT

• Fasten L-foot and Flashing into place by passing the included lag bolt and pre-installed stainless steel-backed EPDM washer through the L-foot EPDM grommet, and the raised hole in the flashing, into the pilot hole in the roof rafter.

• Drive the lag bolt down until the L-foot is held firmly in place. It is normal for the EPDM on the underside of the stainless steel backed EPDM washer to compress and expand beyond the outside edge of the steel washer when the proper torque is applied.

- Use caution to avoid over-torqueing the lag bolt if using an impact driver.
- Repeat Steps 1 and 2 at each roof attachment point.

STEP 3 ATTACH I-FOOT TO RAII

- Insert the included 3/8"-16 T-bolts into the lower slot on the Rail (sold separately), spacing the bolts to match the spacing between the roof attachments.
- Position the Rail against the L-Foot and insert the threaded end of the T-Bolt through the continuous slot in the L-Foot. Apply anti-seize to bolt threads to prevent galling of the T-bolt and included 3/8" serrated flange nut. Place the 3/8" flange nut on the T-bolt and finger tighten, Repeat STEP 3 until all L-Feet are secured to the Rail with a T-bolt. Adjust the level and height of the Rail and torque each holt to 30ft-lbs.

FASTER INSTALLATION. 25-YEAR WARRANTY.

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