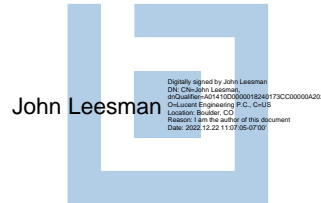


December 22, 2022

Hall Electrical Systems Inc  
6931 Towering Spruce Dr  
Riverview, FL 33578

RE: Engineering Services  
Stalvey Residence  
236 Sw Legacy Glen, Lake City, FL  
15.356 kW System  
Solo Job #2898609



To Whom It May Concern,

We have reviewed the following information regarding the solar panel installation for this project. Alterations to these documents or plans shall not be made without direct written consent of the Engineer of Record.

#### A. Assumptions from Field Observation provided by Hall Electrical Systems Inc

The following structural design regarding the proposed alterations have been prepared from these assumptions. The verification of the field observations is the responsibility of the contractor. **Prior to commencement of work, the contractor shall verify the framing sizes, spacings, and spans noted in the sealed plans, calculations, and/or certification letter and notify the Engineer of Record of any discrepancies.**

	<u>Roof A</u>	<u>Roof B</u>
Roof Finish :	Asphalt Shingle	Asphalt Shingle
Roof Underlayment :	OSB	OSB
Roof Profile :	Gable	Monoslope
Roof Structural System :	Metal Plate Trusses	Metal Plate Trusses
Truss Top Chord/Setup :	2 x 4 / Double Fink	2 x 4 / Half Fink
Chord/Rafter Wood Grade :	Southern Pine #2 or better	Southern Pine #2 or better
Truss/Rafter Spacing :	24" o.c.	24" o.c.
Roof Slope :	26 deg	18 deg
Max Top Chord/Rafter Span :	6.66 ft	8.44 ft
Bearing Wall Type :	Convl Lt-Frame Constr	CLFC
Foundation :	Permanent Concrete	Permanent Concrete
Stories :	Single	Single

#### B. Building Design Criteria

Code :	2020 FBC, 7th Ed (ASCE 7-16)	Risk Category :	II
Roof Live Load :	20 psf (0 psf at panels)	Occupancy Class :	R-3
Ground Snow Load :	0 psf	Roof Dead Load :	6.5 psf
Ult Wind Speed :	120 mph	PV Dead Load :	<u>3 psf</u>
Exposure Category :	C	Total Dead Load :	9.5 psf

#### C. Summary of Existing Structure Results

##### Roof A & B

After review of the field observations and based on our calculations and in accordance with the applicable building codes and current industry standards, the existing roof structure supporting the proposed alterations consisting of the solar array has been determined to be:

- Adequate to support the additional imposed loads. **No structural upgrades are required.**

#### **D. Solar Panel Support Bracket Anchorage**

1. Solar panels shall be designed, mounted, and installed in accordance with the most recent "UniRac Manual", which can be found on the UniRac website (<http://unirac.com/>).
2. Manufacturer's Panel Bracket Connection to Roof Chord/Rafter Member:

Fastener : (1) 5/16" Lag Screw per Bracket  
NDS Withdrawal Value : 307 lbs/inch  
Min. Thread Length and Penetration Depth : 2.5"

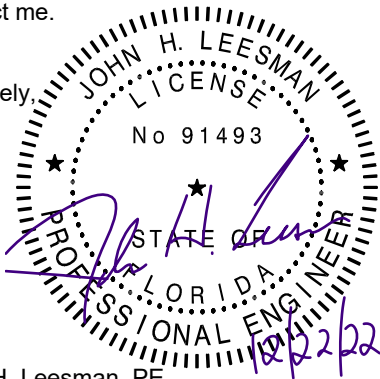
3. Considering the existing roof's slope, size, spacing, condition, and calculated loads, the panel bracket supports shall be placed no greater than 48 in. o/c.
4. Panel supports connections shall be staggered to distribute load to adjacent trusses.

#### **E. Overall Summary**

Based on the information supplied to us at the time of this report, on the evaluation of the existing structure, and solar array panel bracket connection, it is our opinion that the roof system will adequately support the additional loads imposed by the solar array. This evaluation conforms to 2020 FBC, 7th Ed and current industry standards.

Should you have any questions regarding this letter or if you require further information, do not hesitate to contact me.

Sincerely,



John H. Leesman, PE  
License No. 91493

John H Leesman, Professional Engineer, State of Florida,  
License No. 91493

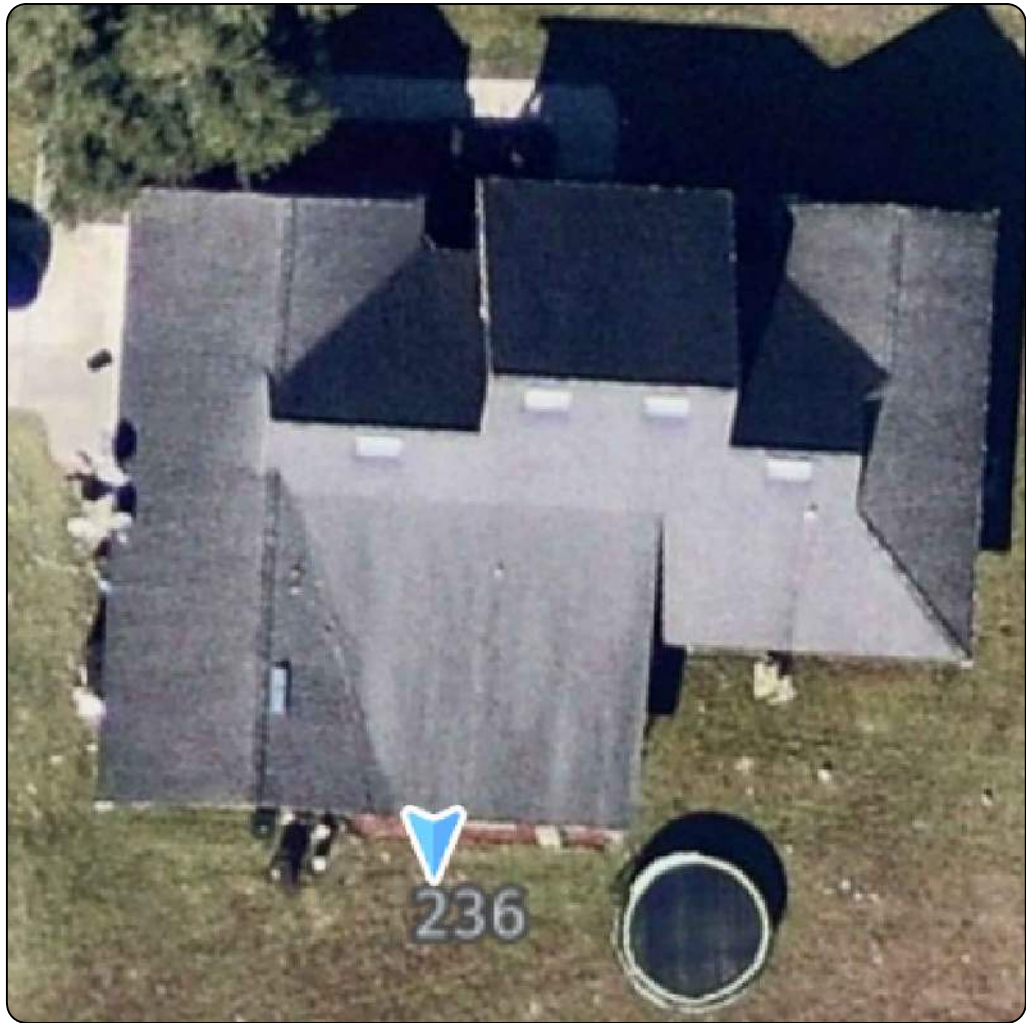
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Leesman, PE on 12-22-2022.

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copies.

#### **Limits of Scope of Work and Liability**

The existing structure is assumed to have been designed and constructed following appropriate codes at the time of erection and assumed to have appropriated permits. The calculations performed are only for the roof framing supporting the solar array installation referenced in the stamped plans and were completed according to generally recognized structural analysis standards and procedures, professional engineering, and design experience opinions and judgements. Existing deficiencies which are unknown or were not observed during the time the site observation are not included in this scope of work. All solar panel modules, racking, and mounting equipment shall be designed and installed per the manufacturer's approved installation specifications. The Engineer of Record and the engineering consulting firm assume no responsibility for misuse or improper installation. This analysis is not stamped for water leakage. Framing was determined on information in provided plans and/or photos, along with engineering judgement. Prior to commencement of work, the contractor shall verify the framing sizes, spacings, and spans noted in the stamped plans, calculations, and/or certification letter and notify the Engineer of Record of any discrepancies prior to starting construction. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation. The contractor shall also verify that there are no damage/deficiencies (i.e., dry rot, water damage, termite damage, framing member/connection damage, etc.) to framing that was not addressed in the stamped plans, calculations, and/or certification letter and notify the Engineer of Record of any concerns prior to starting construction.

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:



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

SITE SPECIFICATIONS

OCCUPANCY: R-3  
ZONING: RESIDENTIAL

John H Leesman, Professional Engineer, State of Florida,  
License No. 91493

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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

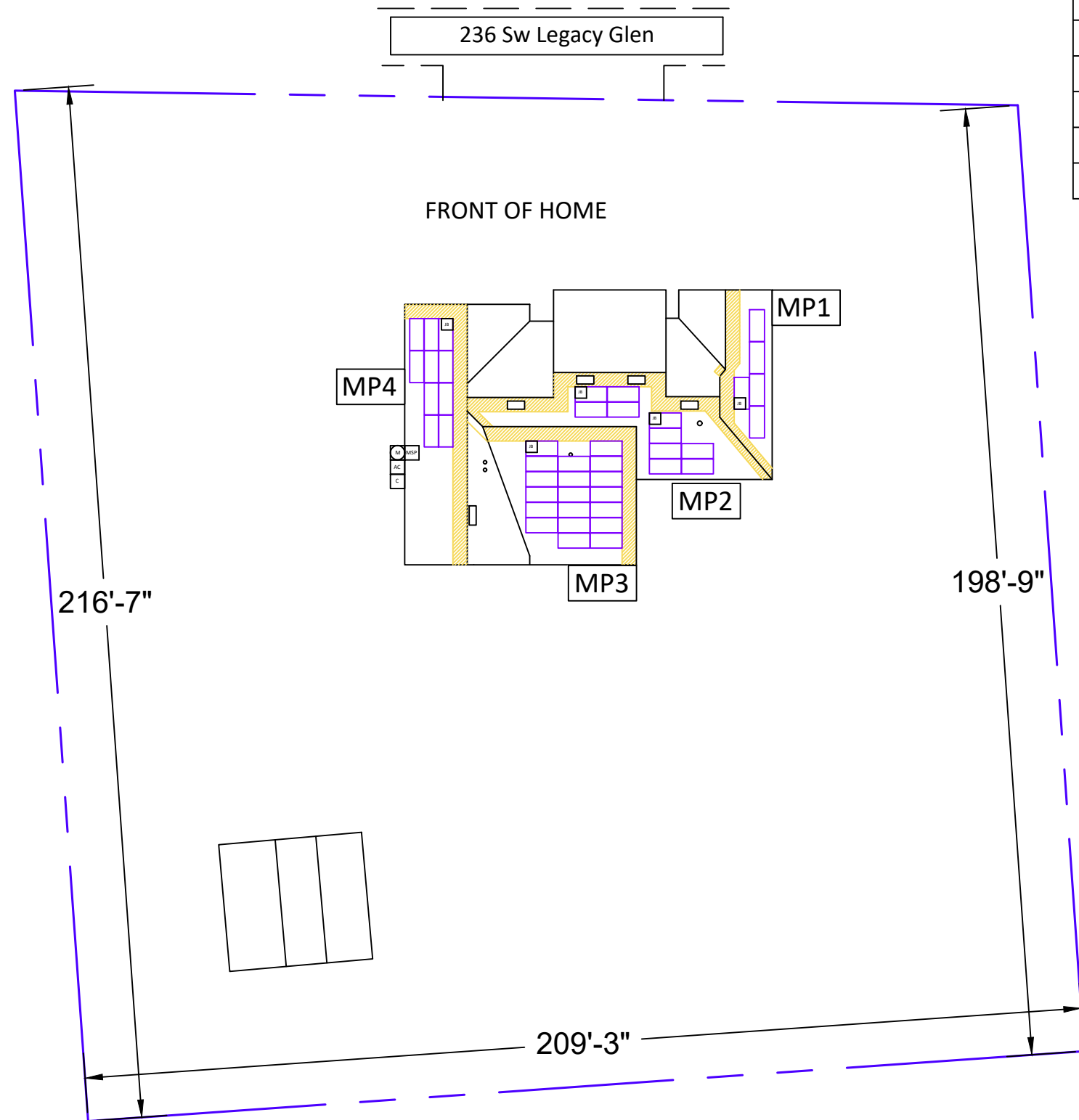
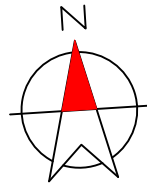
SHEET INDEX:

- 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:  
December 21, 2022

COVER PAGE - PV01



ARRAY DETAILS:		
MOUNTING PLANE:	AZIMUTH:	TILT:
MP1	95°	26°
MP2	185°	26°
MP3	185°	18°
MP4	275°	26°

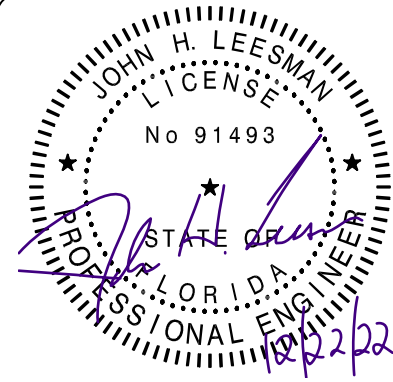


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**EQUIPMENT LEGEND:**

- M

UTILITY METER

AC

VISIBLE, LOCKABLE, LABELED  
AC DISCONNECT

INV

INVERTER

SUB

SUB PANEL

SD

SERVICE DISCONNECT

PV

PV MODULES

FIRE ACCESS PATHWAY (3' TYP)
- MSP

MAIN SERVICE PANEL
- PV

METER SOCKET  
(FOR UTILITY PV METER)
- C

COMBINER BOX
- LC

LOAD CENTER
- BATT

BATTERY(IES)
- JB

JUNCTION BOX
- PROPERTY LINE

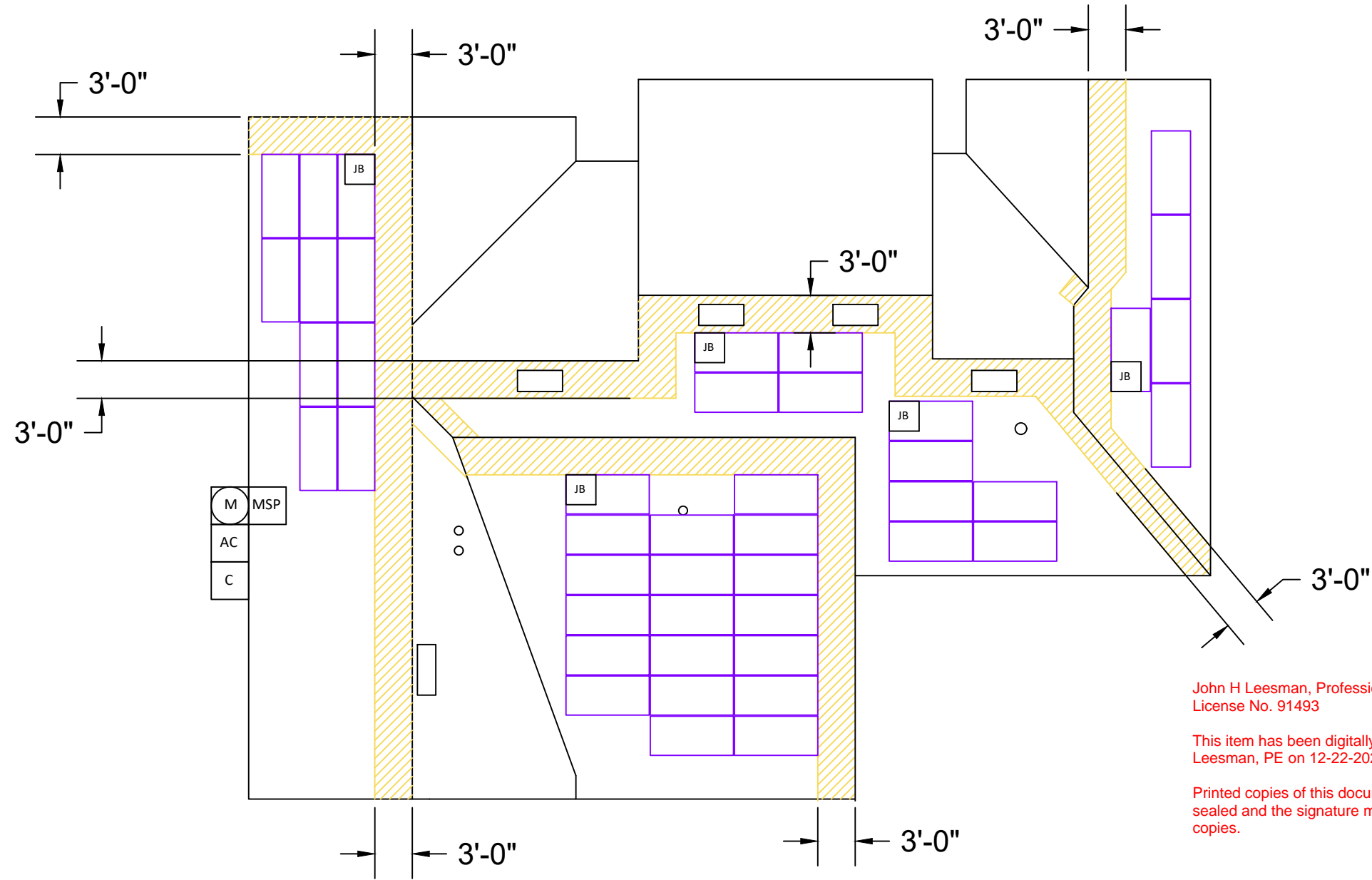
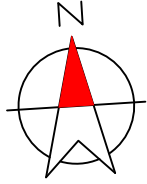
VISIBLE, LOCKABLE,  
LABELED AC DISCONNECT  
LOCATED WITHIN 10'  
OF UTILITY METER

DRAWN BY: SoloCAD

DATE:  
December 21, 2022

SITE PLAN - PV02





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Lake City, FL 32025

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DC System Size: 17.82 kW DC

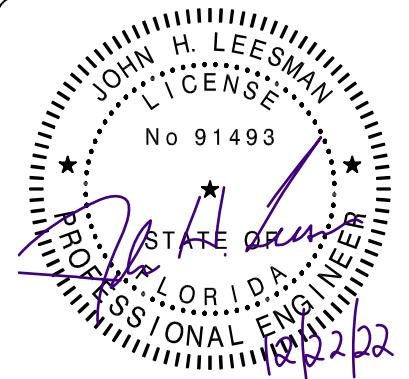
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Long, -82.6527117

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

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

Clay Electric Cooperative



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DATE:  
December 21, 2022

ROOF ATTACHMENTS - PV03

#### EQUIPMENT INFORMATION:

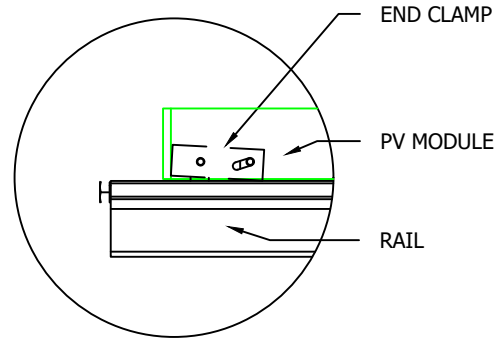
RAIL MANUFACTURER:	Unirac
RAIL PART NUMBER:	SM
ATTACHMENTS	Unirac - FLASHKIT PRO
ATTACHMENT QTY:	170
SPLICE QTY:	16
MIDCLAMP QTY:	50
ENDCLAMP QTY:	76

#### ROOF INFO:

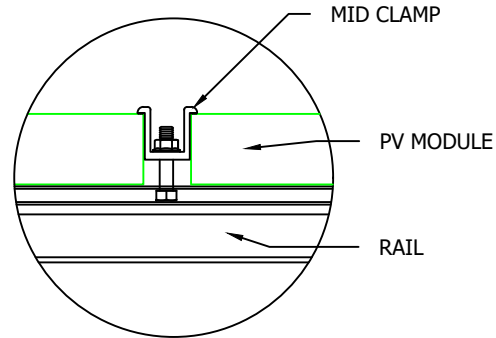
ROOF TYPE:	Asphalt Shingle
ROOF FRAMING:	Manufactured Truss
RAFTER/TOP CHORD SIZE:	2x4
RAFTER/TOP CHORD SPACING:	24"
ATTACHMENT SPACING:	48"

#### PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:

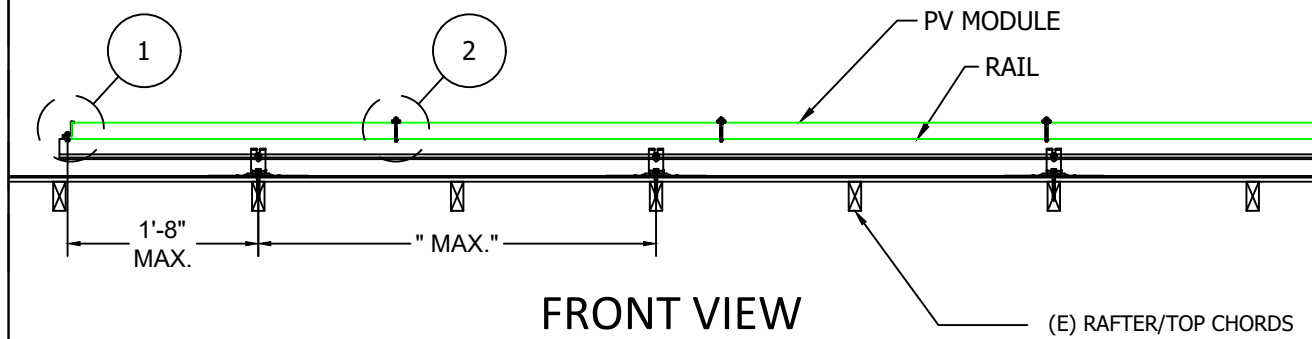
PV MODULE COUNT:	44
ARRAY AREA:	MODULE COUNT * 22.04 ft <sup>2</sup> = 969.76
ROOF AREA:	3800.442 ft <sup>2</sup>
PERCENT OF ROOF COVERED:	26%
ARRAY WEIGHT:	MODULE COUNT * 49 lbs = 2156 lbs
POINT LOAD:	ARRAY LBS/ATTACHMENTS = 12.68
DISTRIBUTED LOAD: (lbs/ft <sup>2</sup> )	(ARRAY) WEIGHT/AREA = 2.22 lbs/ft <sup>2</sup>



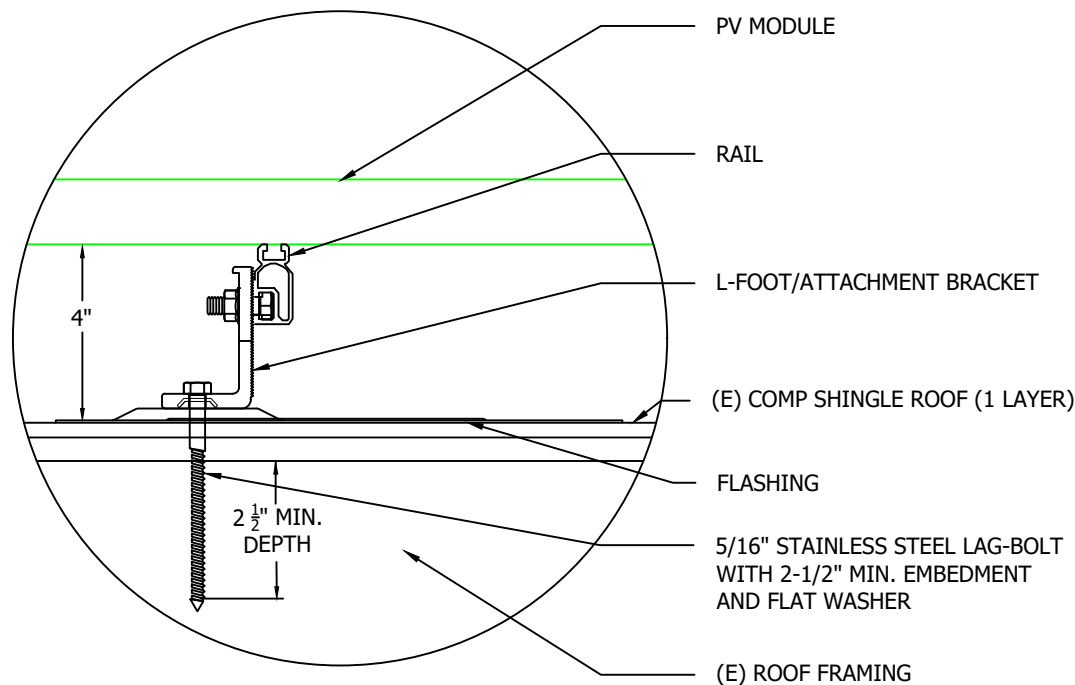
1 END CLAMP DETAILS



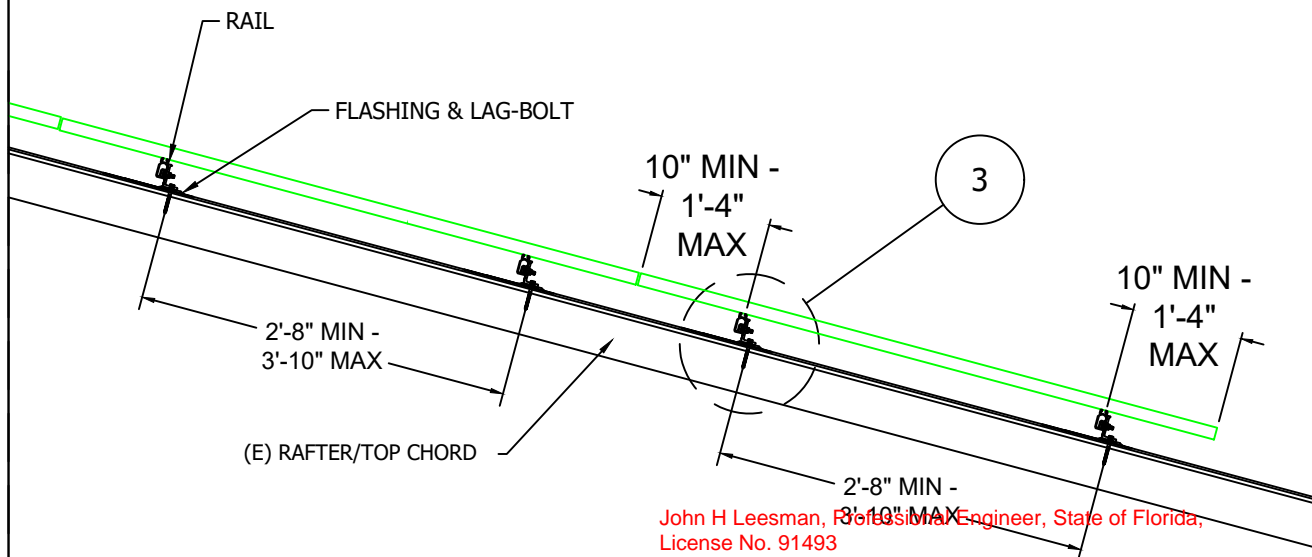
2 MID CLAMP DETAILS



FRONT VIEW



3 DETAIL, MOUNTING AND FLASHING



SIDE VIEW

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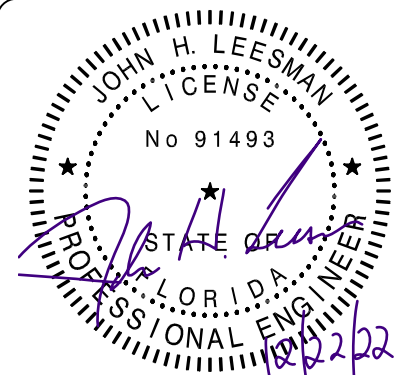
Lat, 30.1400587

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:  
December 21, 2022

MOUNTING DETAIL - PV04

EQUIPMENT INFORMATION:

RAIL MANUFACTURER:	Unirac
RAIL PART NUMBER:	SM
ATTACHMENTS	Unirac - FLASHKIT PRO
ATTACHMENT QTY:	170
SPLICE QTY:	16
MIDCLAMP QTY:	50
ENDCLAMP QTY:	76

ROOF INFO:

ROOF TYPE:	Asphalt Shingle
ROOF FRAMING:	Manufactured Truss
RAFTER/TOP CHORD SIZE:	2x4
RAFTER/TOP CHORD SPACING:	24"
ATTACHMENT SPACING:	48"

PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:

PV MODULE COUNT:	44
ARRAY AREA:	MODULE COUNT * 22.04 ft <sup>2</sup> = 969.76
ROOF AREA:	3800.442 ft <sup>2</sup>
PERCENT OF ROOF COVERED:	26%
ARRAY WEIGHT:	MODULE COUNT * 49 lbs = 2156 lbs
POINT LOAD:	ARRAY LBS/ATTACHMENTS = 12.68
DISTRIBUTED LOAD: (lbs/ft <sup>2</sup> )	(ARRAY) WEIGHT/AREA = 2.22 lbs/ft <sup>2</sup>

Jinko Solar SWAN JKM 405 72H TV Specs	
POWER MAX (P <sub>MAX</sub> ):	405 W
OPEN CIRCUIT VOLTAGE (V <sub>OC</sub> ):	48.45 V
MAX POWER-POINT CURRENT (I <sub>MP</sub> ):	10.08 A
MAX POWER-POINT VOLTAGE (V <sub>MP</sub> ):	40.19 V
SHORT CIRCUIT CURRENT (I <sub>SC</sub> ):	10.42 A
SERIES FUSE RATING:	25A

Enphase IQ8A-72-2-US 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
1	(2)	12-2	ENPHASE Q-CABLE ALUMINUM - (L1, L2)	N/A - FREE AIR
	(1)	6 AWG	THWN-2 COPPER - (GROUND)	
2	(2)	10 AWG	THHN/THWN-2 COPPER - (L1, L2)	3/4" EMT
	(1)	10 AWG	THWN-2 COPPER - (GROUND)	
3	(8)	10 AWG	THHN/THWN-2 (L1, L2)	3/4" EMT
	(1)	10 AWG	THWN-2 COPPER -(GROUND)	
4	(3)	3 AWG	THWN-2 COPPER - (L1, L2, NEUTRAL)	1" EMT
	(1)	8 AWG	THWN-2 COPPER - (GROUND)	



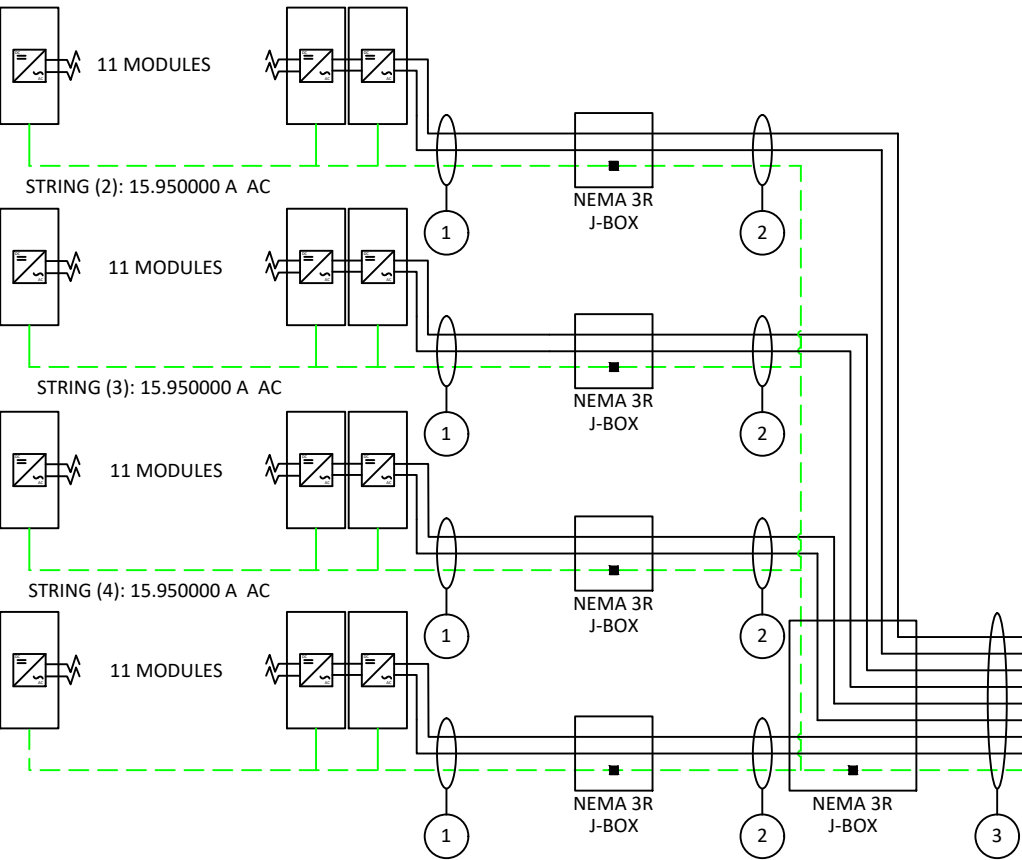
**CONTRACTOR INFORMATION:**  
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STRING (1): 15.950000 A AC



\*SUPPLY SIDE CONNECTION\*  
NEC 230.46, NEC 230.79 & NEC  
705.12(A)

(E) 200A MAIN SERVICE PANEL

(E) 200A-2P

(E) LOADS

(E) GROUNDING  
ELECTRODE

120/240 VAC  
TO UTILITY GRID

(E) UTILITY METER

VISIBLE, LOCKABLE,  
LABELED AC DISCONNECT  
LOCATED WITHIN 10'  
OF UTILITY METER

**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

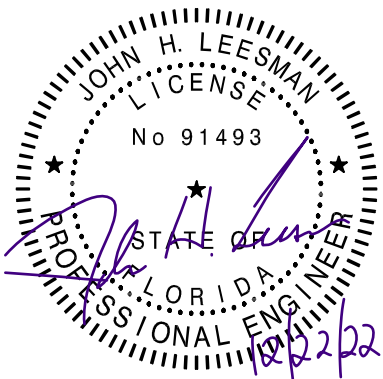
Lat, 30.1400587

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:  
December 21, 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:	17820W			
TOTAL MAX AC CURRENT:	63.800000A			

NUMBER OF CURRENT CARRYING CONDUCTORS	PERCENT OF VALUES
4-6	.80
7-9	.70
10-20	.50

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

Conduit & Conductor Schedule											
TAG	QTY	WIRE GAUGE	DESCRIPTION	CONDUIT SIZE	CONDUCTOR RATING	CONDUCTOR TEMP. RATE	AMBIENT TEMP	TEMP. DERATE	# OF CONDUCTORS DERATE	CONDUCTOR RATING W/DERATES	CONDUIT FILL
1	(2)	12-2	ENPHASE Q-CABLE ALUMINUM - (L1, L2)	N/A - FREE AIR	25A	90°C	34°C	0.96	N/A - FREE AIR	24A	N/A - FREE AIR
	(1)	6 AWG	THWN-2 COPPER - (GROUND)								
2	(2)	10 AWG	THHN/THWN-2 COPPER - (L1, L2)	3/4" EMT	40A	90°C	34°C	0.96	1	38.4A	11.9%
	(1)	10 AWG	THWN-2 COPPER - (GROUND)								
3	(8)	10 AWG	THHN/THWN-2 (L1, L2)	3/4" EMT	40A	90°C	34°C	0.96	0.7	26.88A	35.7%
	(1)	10 AWG	THWN-2 COPPER -(GROUND)								
4	(3)	3 AWG	THWN-2 COPPER - (L1, L2, NEUTRAL)	1" EMT	100A	75°C	34°C	0.94	1	94A	38.1%
	(1)	8 AWG	THWN-2 COPPER - (GROUND)								

GROUNDING & GENERAL NOTES:

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

INTERCONNECTION NOTES:

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

DISCONNECT NOTES:

- 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)
- AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.
- FUSED AC DISCONNECT TO BE USED.

John H Leesman, Professional Engineer, State of Florida,  
License No. 91493

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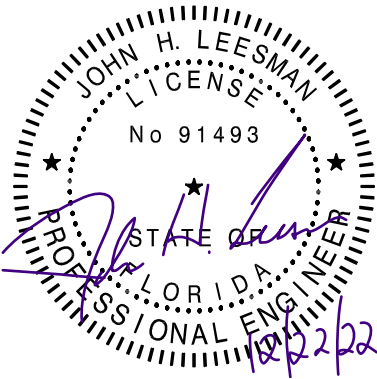
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(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative




DRAWN BY: SoloCAD

DATE:  
December 21, 2022

ELECTRICAL CALCS - PV06






**WARNING**

**ELECTRIC SHOCK HAZARD**

**TERMINALS ON THE LINE AND  
LOAD SIDES MAY BE ENERGIZED  
IN THE OPEN POSITION**

LABEL 1  
FOR PV DISCONNECTING MEANS WHERE THE LINE AND  
LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN  
POSITION.  
[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.**

LABEL 2  
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**

LABEL 3  
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**

LABEL 4  
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:**

64

**NOMINAL OPERATING AC VOLTAGE:**

240

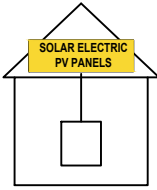
LABEL 5  
AT POINT OF INTERCONNECTION, MARKED AT  
AC DISCONNECTING MEANS.  
[NEC 690.54]

- 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 2017 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(B)(3)]
  5. 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**

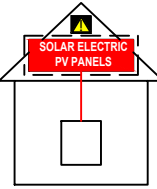
**SOLAR PV SYSTEM EQUIPPED  
WITH RAPID SHUTDOWN**

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



**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**

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)]

LABEL 7  
FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND 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)(A)]

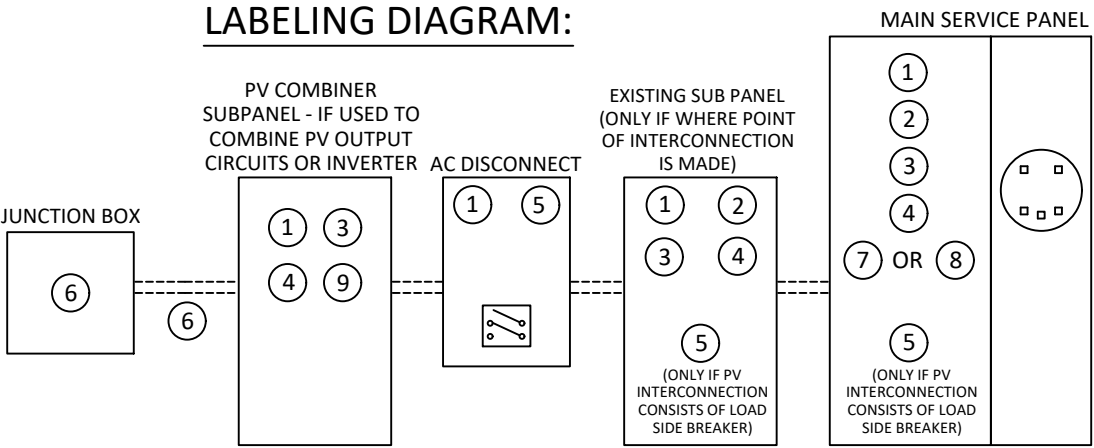
LABEL 8  
FOR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS  
LEAVING THE ARRAY:  
SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY  
FROM SERVICE DISCONNECTING MEANS TO WHICH THE  
PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE  
LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN  
SWITCHES IF NOT AT THE SAME LOCATION.  
[NEC 690.56(C)(1)(b)]

LABEL 9  
SIGN LOCATED AT RAPID SHUT DOWN  
DISCONNECT SWITCH [NEC 690.56(C)(3)].

John H Leesman, Professional Engineer, State of Florida,  
License No. 91493

This item has been digitally signed and sealed by John H.  
Leesman, PE on 12-22-2022.

Printed copies of this document are not considered signed and  
sealed and the signature must be verified on any electronic  
copies.



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

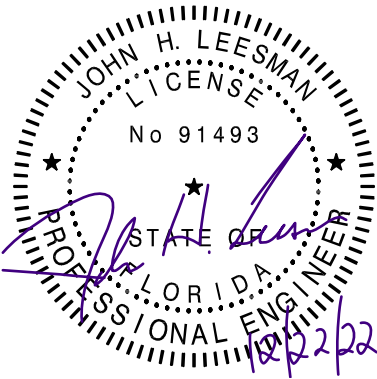


**CONTRACTOR INFORMATION:**  
Hall Electrical Systems, Inc.  
6931 Towering Spruce Dr  
Riverview FL 33578  
License #EC13008320

**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



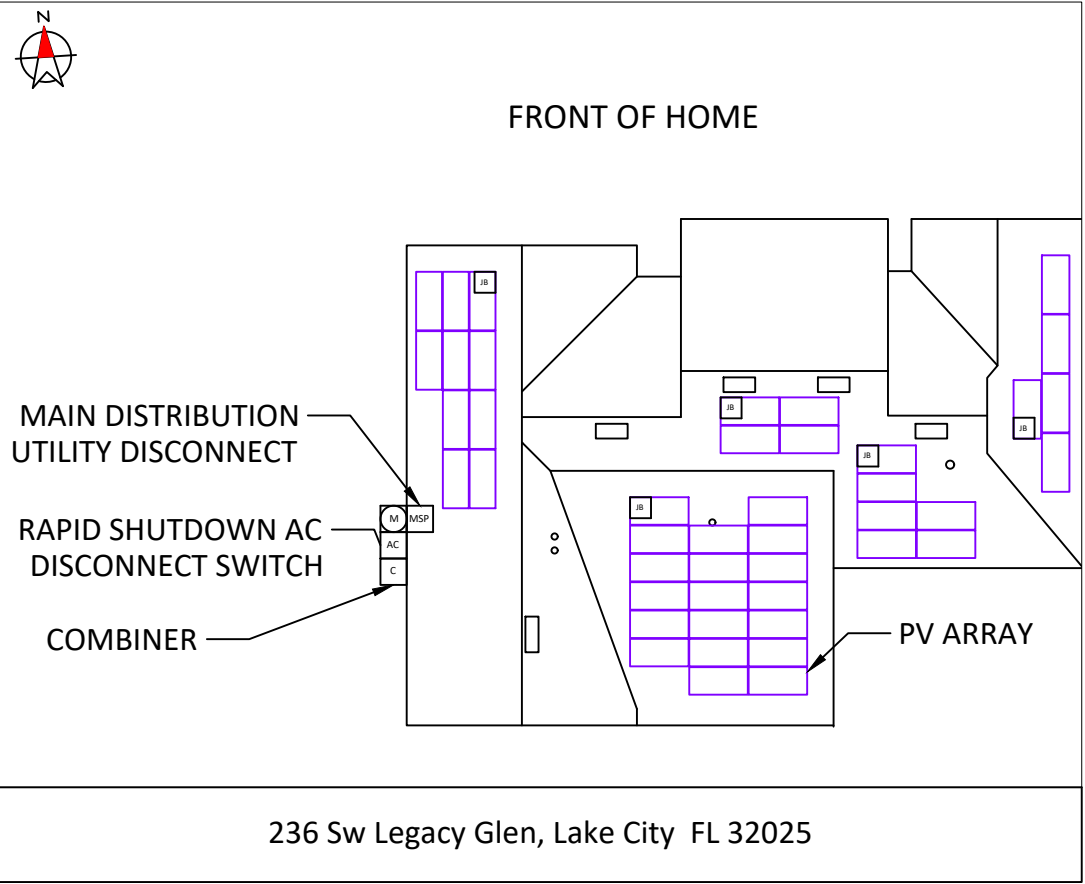
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DATE:  
December 21, 2022

**LABELS - PV07**

# CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM ROOF MOUNTED SOLAR  
ARRAYS WITH SAFETY DISCONNECTS AS SHOWN:



**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])

John H Leesman, Professional Engineer, State of Florida,  
License No. 91493

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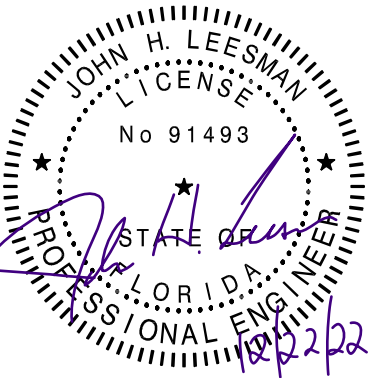


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PV Modules  
(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative



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DATE:  
December 21, 2022

PLACARD - PV08



SITE PHOTOS:



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License No. 91493

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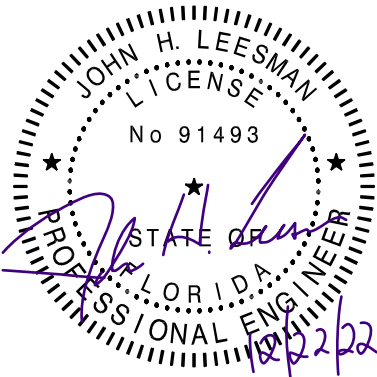
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PV Modules  
(44) Enphase IQ8A-72-2-US Inverter(s)

Clay Electric Cooperative



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**DATE:**  
December 21, 2022  
**SITE PHOTOS - PV09**

# Swan Bifacial HC

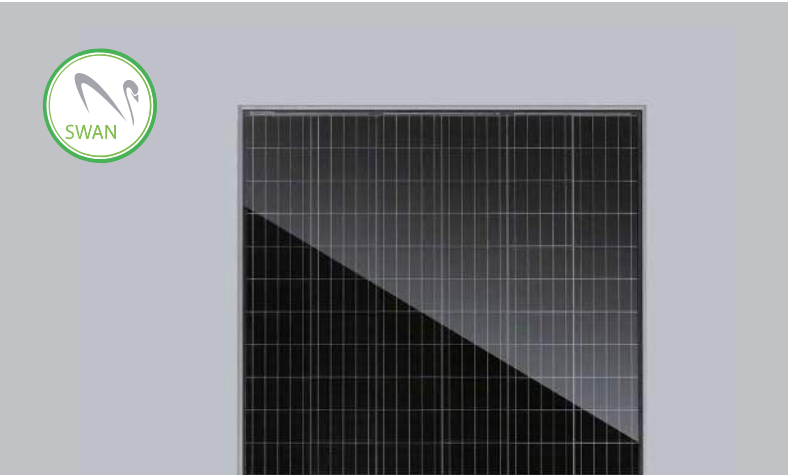
## 72M 385-405 Watt

### MONOCRYSTALLINE MODULE


Positive power tolerance of 0~+3%


ISO9001:2015·ISO14001:2015·ISO45001:2018 certified factory.


IEC61215, IEC61730, certified products.





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 installation.
- 

**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
- 

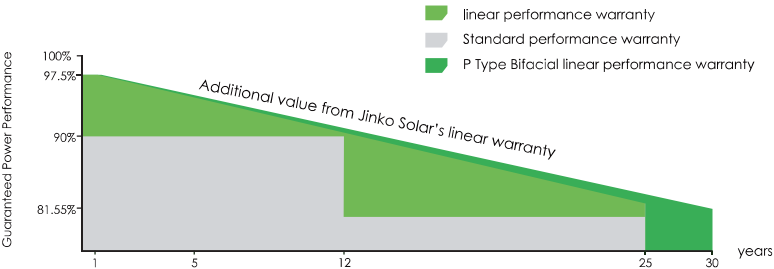
**Light-weight design:**  
Light-weight design using transparent backsheet for easy installation and low BOS cost.
- 

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

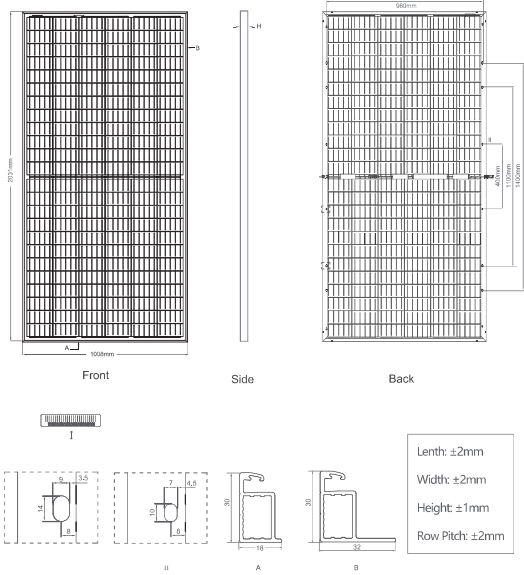
**Better low-light performance:**  
Excellent performance in low-light environments (e.g. early morning, dusk, and cloud, etc.)

LINEAR PERFORMANCE WARRANTY

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



Engineering Drawings

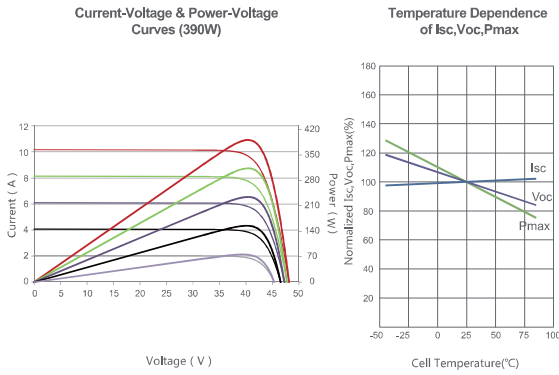


Packaging Configuration

( Two pallets = One stack )

35pcs/pallets, 70pcs/stack, 770pcs/ 40'HQ Container

Electrical Performance & Temperature Dependence



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

SPECIFICATIONS

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%		19.05%		19.29%		19.54%		19.78%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1500VDC (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%									

BIFACIAL OUTPUT-REAR SIDE 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%

\*STC: ☀ Irradiance 1000W/m² 🏠 Cell Temperature 25°C ☁ AM=1.5  
NOCT: ☀ Irradiance 800W/m² 🏠 Ambient Temperature 20°C ☁ AM=1.5 🌀 Wind Speed 1m/s

\* Power measurement tolerance: ± 3%

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.



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



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



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

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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 high-powered PV modules

### Microgrid-forming

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

## IQ8 Series Microinverters

INPUT DATA (DC)		I08-60-2-US	I08PLUS-72-2-US	I08M-72-2-US	I08A-72-2-US	I08H-240-72-2-US	I08H-208-72-2-US <sup>1</sup>	
Commonly used module pairings <sup>2</sup>	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	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45	
Operating range	V	25 – 48	25 – 58					
Min/max start voltage	V	30 / 48	30 / 58					
Max input DC voltage	V	50	60					
Max DC current <sup>3</sup> [module Isc]	A	15						
Overvoltage class DC port		II						
DC port backfeed current	mA	0						
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit						
OUTPUT DATA (AC)		I08-60-2-US	I08PLUS-72-2-US	I08M-72-2-US	I08A-72-2-US	I08H-240-72-2-US	I08H-208-72-2-US	
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/range <sup>4</sup>	V	240 / 211 – 264						208 / 183 – 250
Max continuous output current	A	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 <sup>5</sup>		16	13	11	11	10	9	
Total harmonic distortion		<5%						
Overvoltage class AC port		III						
AC port backfeed current	mA	30						
Power factor setting		1.0						
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging						
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4	
CEC weighted efficiency	%	97	97	97	97.5	97	97	
Night-time power consumption	mW	60						
MECHANICAL DATA								
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)						
Relative humidity range		4% to 100% (condensing)						
DC Connector type		MC4						
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")						
Weight		1.08 kg (2.38 lbs)						
Cooling		Natural convection – no fans						
Approved for wet locations		Yes						
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-I, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01  This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.						

(1) 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.

# Enphase IQ Combiner 4/4C

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



To learn more about Enphase offerings, visit [enphase.com](https://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
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 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](https://enphase.com)

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# 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

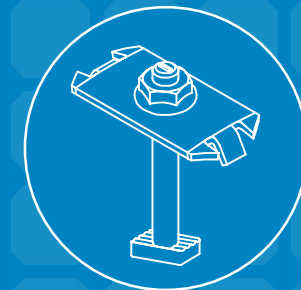
### ONE PRODUCT - MANY APPLICATIONS

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.

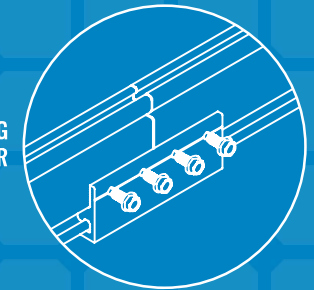
## AUTOMATED DESIGN TOOL

### 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.



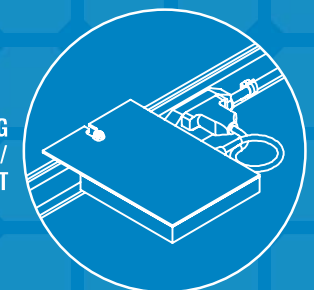
INTEGRATED BONDING  
MIDCLAMP



INTEGRATED BONDING  
SPLICE BAR



INTEGRATED BONDING  
L-FOOT w/ T-BOLT



INTEGRATED BONDING  
MICROINVERTER MOUNT w/  
WIRE MANAGEMENT

 LISTED **UL2703** BONDING & GROUNDING  
MECHANICAL LOADING  
SYSTEM FIRE CLASSIFICATION

## UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



UNMATCHED  
EXPERIENCE



CERTIFIED  
QUALITY



ENGINEERING  
EXCELLENCE



BANKABLE  
WARRANTY



DESIGN  
TOOLS



PERMIT  
DOCUMENTATION

### 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

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# 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 **FLASHKIT pro**, you have everything you need for a quick, professional installation.



**TRUSTED WATER SEAL FLASHINGS**  
FEATURING **SHED & SEAL** TECHNOLOGY



**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](http://UNIRAC.COM) OR CALL (505) 248-2702

# FLASHKIT PRO

## INSTALLATION GUIDE



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



**STEP 1**  
INSTALL **FLASHKIT PRO** FLASHING



**STEP 2**  
INSTALL L-FOOT



**STEP 3**  
ATTACH L-FOOT TO RAIL

### PRE-INSTALL

- 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 FLASHKIT PRO FLASHING

- 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.

#### TIP:

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

### STEP 3 ATTACH L-FOOT TO RAIL

- 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 bolt to 30ft-lbs.

## FASTER INSTALLATION. 25-YEAR WARRANTY.

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