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Lehi, UT 84043
m: (309) 645-0999
admin@lucenteng.co

July 13, 2022

Encōr Solar, LLC
3049 Executive Pkwy, Ste 300
Lehi, UT 84043

RE: Engineering Services
Talbird Residence
259 SW Silverpalm Dr, Lake City, FL
7.67 kW System
Solo Job #2465758

John Leesman

Digitally signed by John Leesman
DN: CN=John Leesman,
dnQualifier=A01410D0000017B12F005B900010DA0,
O=Lucent Engineering P.C., C=US
Location: Boulder, CO
Reason: I am the author of this document
Date: 2022.07.13 12:32:08-06'00'

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 Encōr Solar, LLC

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</u>
Roof Finish :	Asphalt Shingle
Roof Underlayment :	OSB
Roof Profile :	Hip Gable
Roof Structural System :	Metal Plate Trusses
Truss Top Chord/Setup :	2 x 4 / Attic
Chord/Rafter Wood Grade :	Southern Pine #2 or better
Truss/Rafter Spacing :	24" o.c.
Roof Slope :	28 deg
Max Top Chord/Rafter Span :	6.26 ft
Bearing Wall Type :	Convl Lt-Frame Constr
Foundation :	Permanent Concrete
Stories :	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

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.**

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 Withdrawl Value : 307 lbs/inch
Min. Thread Length and Penetration Depth : 2.5"

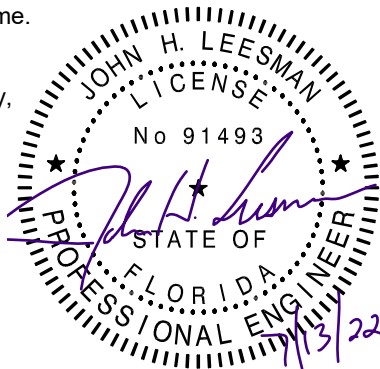
3. Considering the existing roof's slope, size, spacing, condition, and calculated loads, the panel bracket supports shall be placed no greater than 48 in. o/c.
4. Panel supports connections shall be staggered to distribute load to adjacent trusses.

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, Professional Engineer, State of Florida,
License No. 91493

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Leesman, PE on 07-13-2022.

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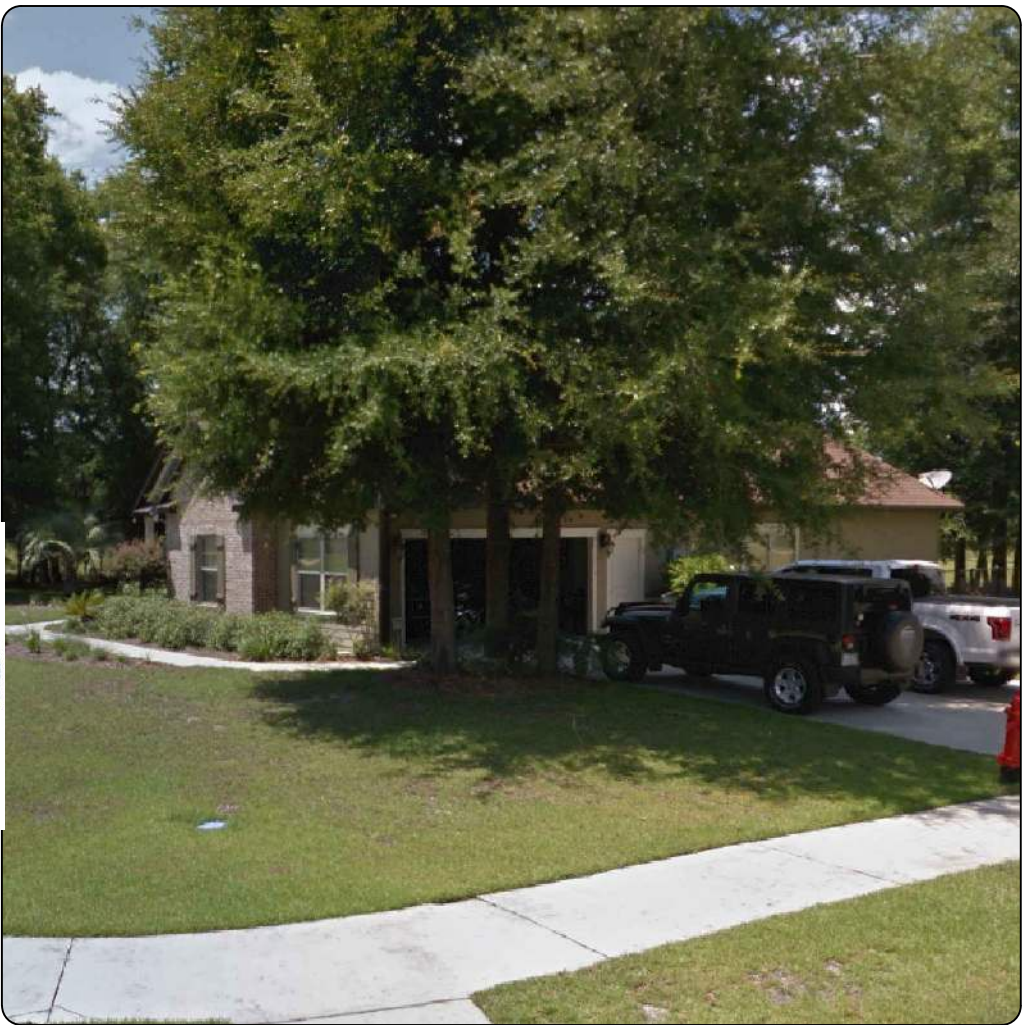
Limits of Scope of Work and Liability

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:



STREET VIEW:



CONTRACTOR INFORMATION:
SOUTHERN COAST SERVICES
1804 NW MADRID WAY,
BOCA RATON FL 33432
License #CVC57153

SITE INFORMATION

Charlotte Talbird
259 Sw Silverpalm Dr
Lake City, FL 32024
AC System Size: 7.678 kW AC
DC System Size: 8.8 kW DC
Lat, 30.1668247551375
Long, -82.7074967944774
(22) Hanwha Q.PEAK DUO BLK ML-G10 400
PV Modules
(22) Enphase IQ8A-72-2-US
Inverter(s)

Florida Power & Light

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

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DATE:
July 11, 2022

COVER PAGE - PV01

GENERAL NOTES

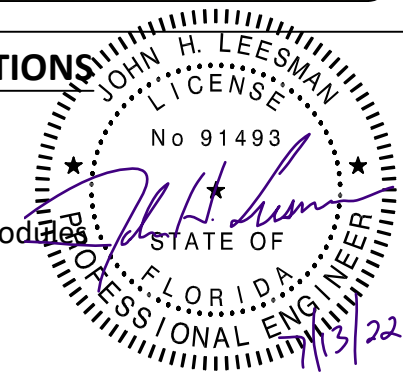
1. INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM SHALL BE IN ACCORDANCE WITH NEC ARTICLE 690, AND ALL OTHER APPLICABLE NEC CODES WHERE NOTED OR EXISTING
2. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL COMPLY WITH NEC ARTICLE 110
3. ALL WIRES, INCLUDING THE GROUNDING 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

PHOTOVOLTAIC (PV) SYSTEM SPECIFICATIONS

EQUIPMENT:
AC System Size: 7.678 kW AC
DC SYSTEM SIZE: 8.8 kW DC
(22) Hanwha Q.PEAK DUO BLK ML-G10 400 PV Modules
(22) 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



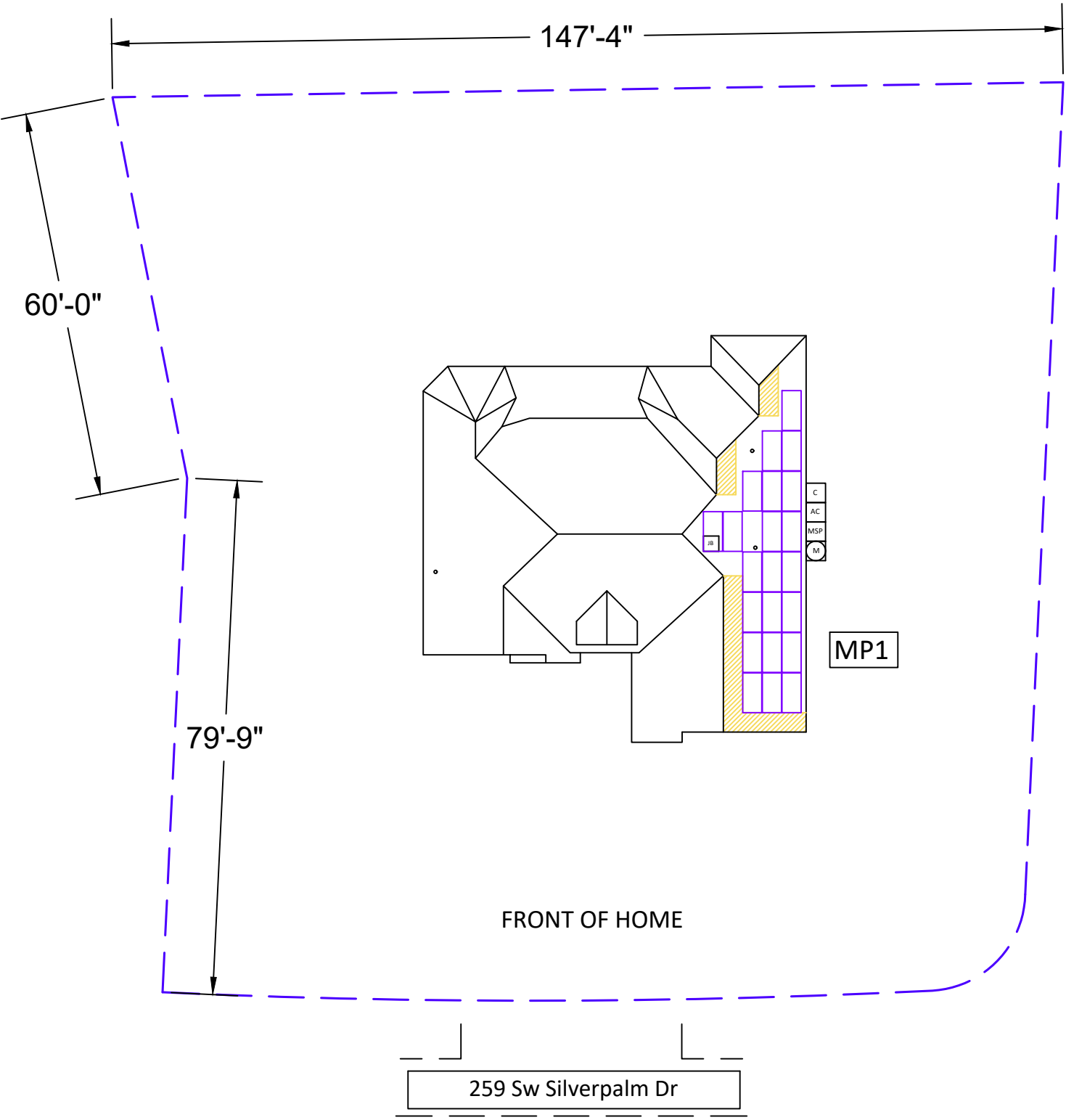
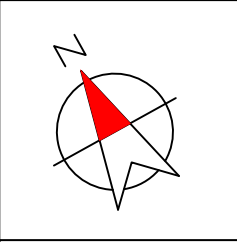
SITE SPECIFICATIONS

OCCUPANCY: R-3
ZONING: RESIDENTIAL

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

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ARRAY DETAILS:		
MOUNTING PLANE:	AZIMUTH:	TILT:
MP1	119°	28°

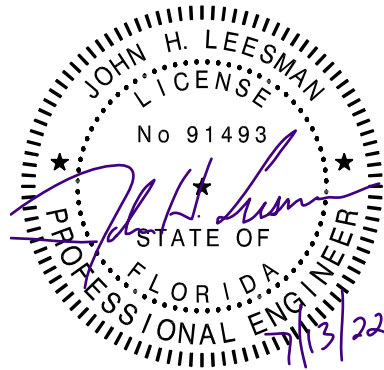


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EQUIPMENT LEGEND:

- 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

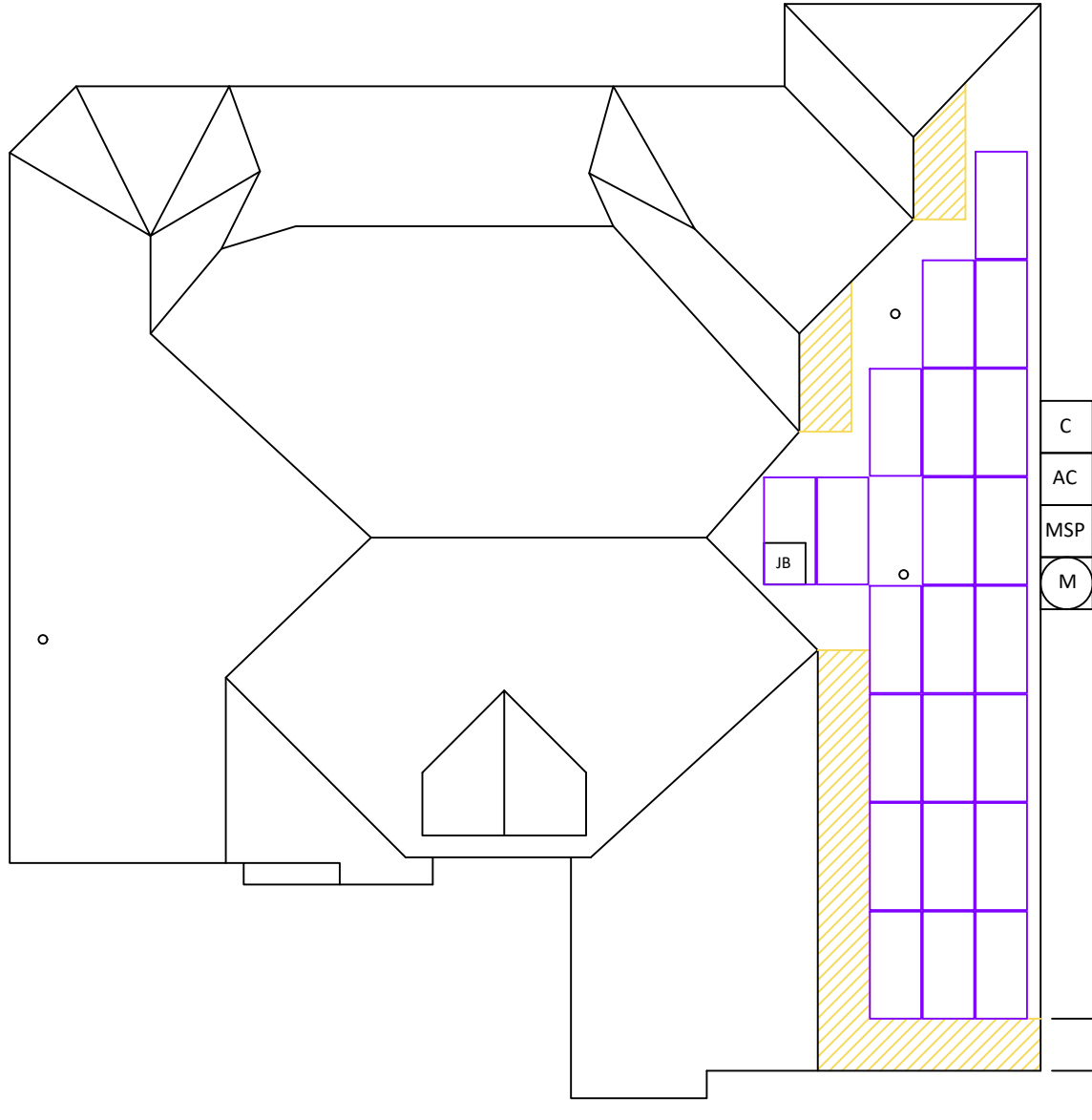
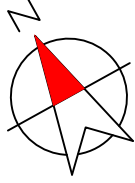
PROPERTY LINE

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

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SITE PLAN - PV02



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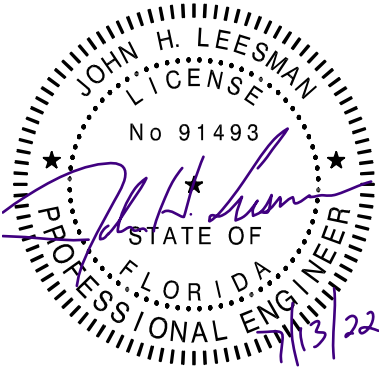


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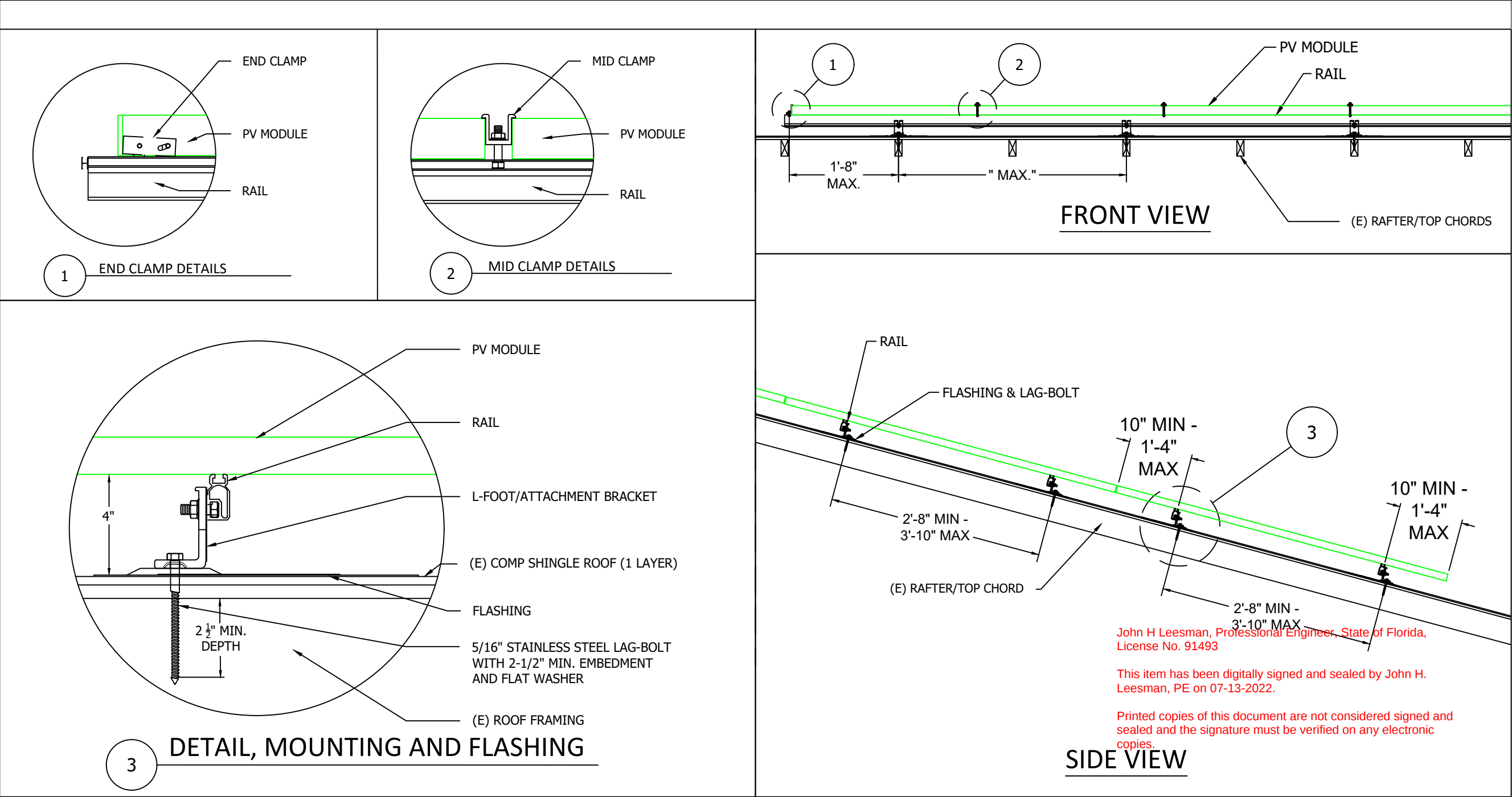


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ROOF ATTACHMENTS - PV03

EQUIPMENT INFORMATION:		ROOF INFO:		PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:	
RAIL MANUFACTURER:	Unirac	ROOF TYPE:	Asphalt Shingle	PV MODULE COUNT:	22
RAIL PART NUMBER:	SM	ROOF FRAMING:	Manufactured Truss	ARRAY AREA:	MODULE COUNT * 21.14 ft² = 465.08
ATTACHMENTS	Unirac - FLASHKIT PRO	RAFTER/TOP CHORD SIZE:	2x4	ROOF AREA:	3063 ft²
ATTACHMENT QTY:	86	RAFTER/TOP CHORD SPACING:	24"	PERCENT OF ROOF COVERED:	15%
SPLICE QTY:	14	ATTACHMENT SPACING:	48"	ARRAY WEIGHT:	MODULE COUNT * 49 lbs = 1078 lbs
MIDCLAMP QTY:	28			POINT LOAD:	ARRAY LBS/ATTACHMENTS = 12.53
ENDCLAMP QTY:	32			DISTRIBUTED LOAD: (lbs/ft²)	(ARRAY) WEIGHT/AREA = 2.32 lbs/ft²

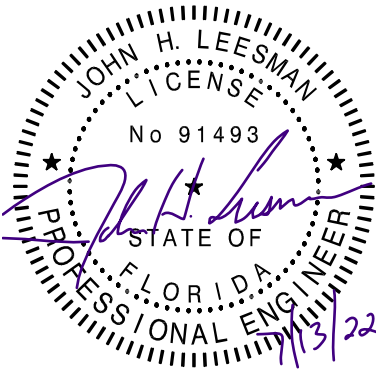


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MOUNTING DETAIL - PV04

EQUIPMENT INFORMATION:		ROOF INFO:		PHOTOVOLTAIC ARRAY STRUCTURAL CRITERIA:	
RAIL MANUFACTURER:	Unirac	ROOF TYPE:	Asphalt Shingle	PV MODULE COUNT:	22
RAIL PART NUMBER:	SM	ROOF FRAMING:	Manufactured Truss	ARRAY AREA:	MODULE COUNT * 21.14 ft ² = 465.08
ATTACHMENTS	Unirac - FLASHKIT PRO	RAFTER/TOP CHORD SIZE:	2x4	ROOF AREA:	3063 ft ²
ATTACHMENT QTY:	86	RAFTER/TOP CHORD SPACING:	24"	PERCENT OF ROOF COVERED:	15%
SPLICE QTY:	14	ATTACHMENT SPACING:	48"	ARRAY WEIGHT:	MODULE COUNT * 49 lbs = 1078 lbs
MIDCLAMP QTY:	28			POINT LOAD:	ARRAY LBS/ATTACHMENTS = 12.53
ENDCLAMP QTY:	32			DISTRIBUTED LOAD: (lbs/ft ²)	(ARRAY) WEIGHT/AREA = 2.32 lbs/ft ²

Hanwha Q.PEAK DUO BLK ML-G10 400 Specs	
POWER MAX (P _{MAX}):	400W
OPEN CIRCUIT VOLTAGE (V _{OC}):	45.3V
MAX POWER-POINT CURRENT (I _{MP}):	10.77A
MAX POWER-POINT VOLTAGE (V _{MP}):	37.13V
SHORT CIRCUIT CURRENT (I _{SC}):	11.14A
SERIES FUSE RATING:	20 A

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:	(22)	Hanwha Q.PEAK DUO BLK ML-G10 400	400 W
INVERTERS:	(22)	Enphase IQ8A-72-2-US	349 W
AC DISCONNECTS:	(1)	PV AC Disconnect, 240V, 2-Pole	60 A

Conduit & Conductor Schedule				
TAG	QTY	WIRE GAUGE	DESCRIPTION	CONDUIT SIZE
1	(2)	12-2	PV-WIRE, USE-2 COPPER - (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	(4)	10 AWG	THHN/THWN-2 (L1, L2)	3/4" EMT
	(1)	10 AWG	THWN-2 COPPER -(GROUND)	
4	(3)	8 AWG	THWN-2 COPPER -(L1, L2, NEUTRAL)	3/4" EMT
	(1)	10 AWG	THWN-2 COPPER -(GROUND)	



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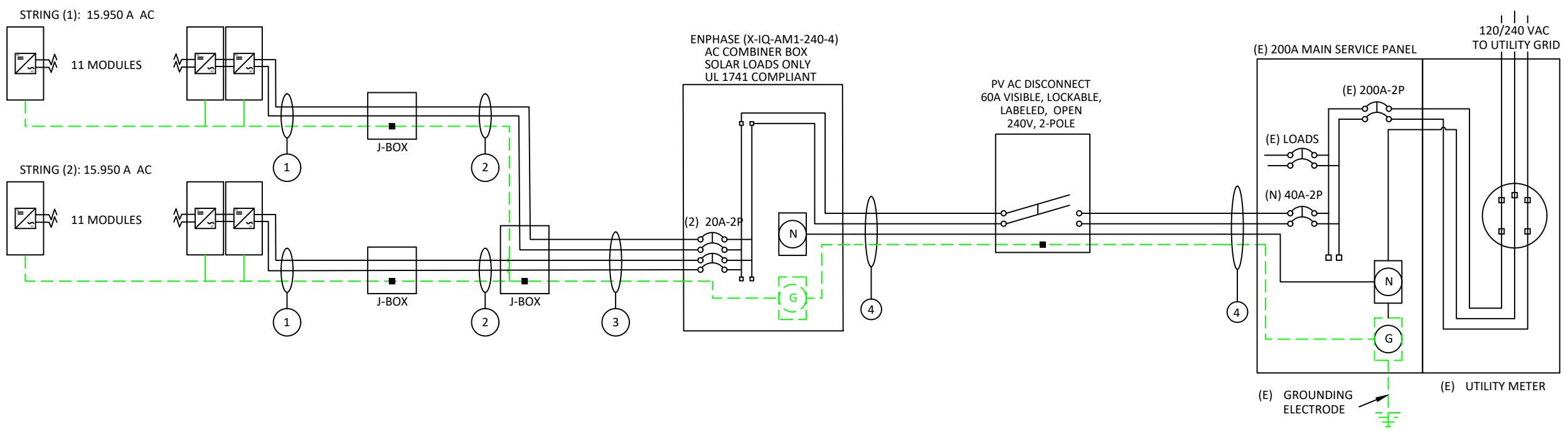
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LINE DIAGRAM - PV05



STRING CALCULATIONS		
Enphase IQ8A-72-2-US	STRING #1	STRING #2
MAX AC CURRENT:	15.95A	15.95A
MICRO INVERTERS IN SERIES	11	11
NOMINAL STRING VOLTAGE:	240V	240V
MAX AC OUTPUT POWER	3839.000000W	3839.000000W
ARRAY DC POWER:	8800W	
TOTAL MAX AC CURRENT:	31.90A	

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:	22
MAX OUTPUT CURRENT:	1.45A
(# OF INVERTERS) X (MAX OUTPUT CURRENT) X 125% <= OCPD RATING	
(22 X 1.45A X 1.25) = 39.875A <= 40A, OK	

BUSBAR CALCULATIONS - 120% RULE	
MAIN BUSBAR RATING:	200A
MAIN DISCONNECT RATING:	200A
PV OCPD RATING:	40A
(MAIN BUS RATING X 120%) - MAIN DISCONNECT RATING >= OCPD RATING	
(200A X 1.2) - 200A = 40A, >= 40A, 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	PV-WIRE, USE-2 COPPER - (L1, L2)	N/A - FREE AIR	30A	90°C	34°C	0.96	N/A - FREE AIR	28.8A	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	(4)	10 AWG	THHN/THWN-2 (L1, L2)	3/4" EMT	40A	90°C	34°C	0.96	0.8	30.72A	19.8%
	(1)	10 AWG	THWN-2 COPPER -(GROUND)								
4	(3)	8 AWG	THWN-2 COPPER -(L1, L2, NEUTRAL)	3/4" EMT	50A	75°C	34°C	0.94	1	47A	24.6%
	(1)	10 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. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].

2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]

3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.

4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

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



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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
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

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)(c)]

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:

32

NOMINAL OPERATING AC VOLTAGE:

240

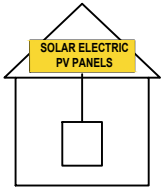
LABEL 5
AT POINT OF INTERCONNECTION, MARKED AT
AC DISCONNECTING MEANS.
[NEC 690.54, NEC 690.13 (B)]

- LABELING NOTES:**
- 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.
 - LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRIC CODE, OSHA STANDARD 19010.145, ANSI Z535.
 - MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
 - 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 [IFC 605.11.1.1]

WARNING: PHOTOVOLTAIC POWER SOURCE

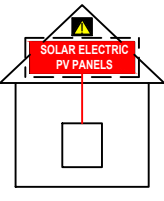
SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



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



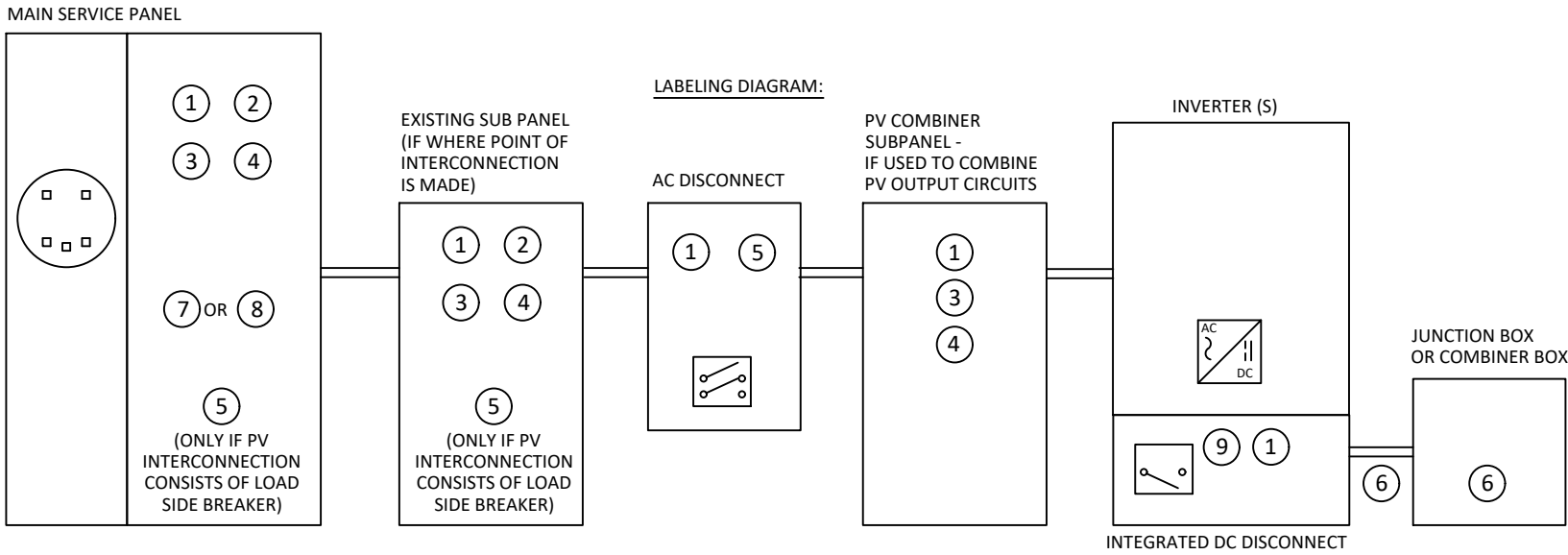
LABEL 6
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND
ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED
AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS,
PARTITIONS, CEILINGS, OR FLOORS.
[NEC 690.31(G)(3&4)]

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)].

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM



*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 ON THE ELECTRICAL DIAGRAM PAGE.



CONTRACTOR INFORMATION:
SOUTHERN COAST SERVICES
1804 NW MADRID WAY,
BOCA RATON FL 33432
License #CVC57153

SITE INFORMATION

Charlotte Talbird

259 Sw Silverpalm Dr

Lake City, FL 32024

AC System Size: 7.678 kW AC

DC System Size: 8.8 kW DC

Lat, 30.1668247551375

Long, -82.7074967944774

(22) Hanwha Q.PEAK DUO BLK ML-G10 400
PV Modules

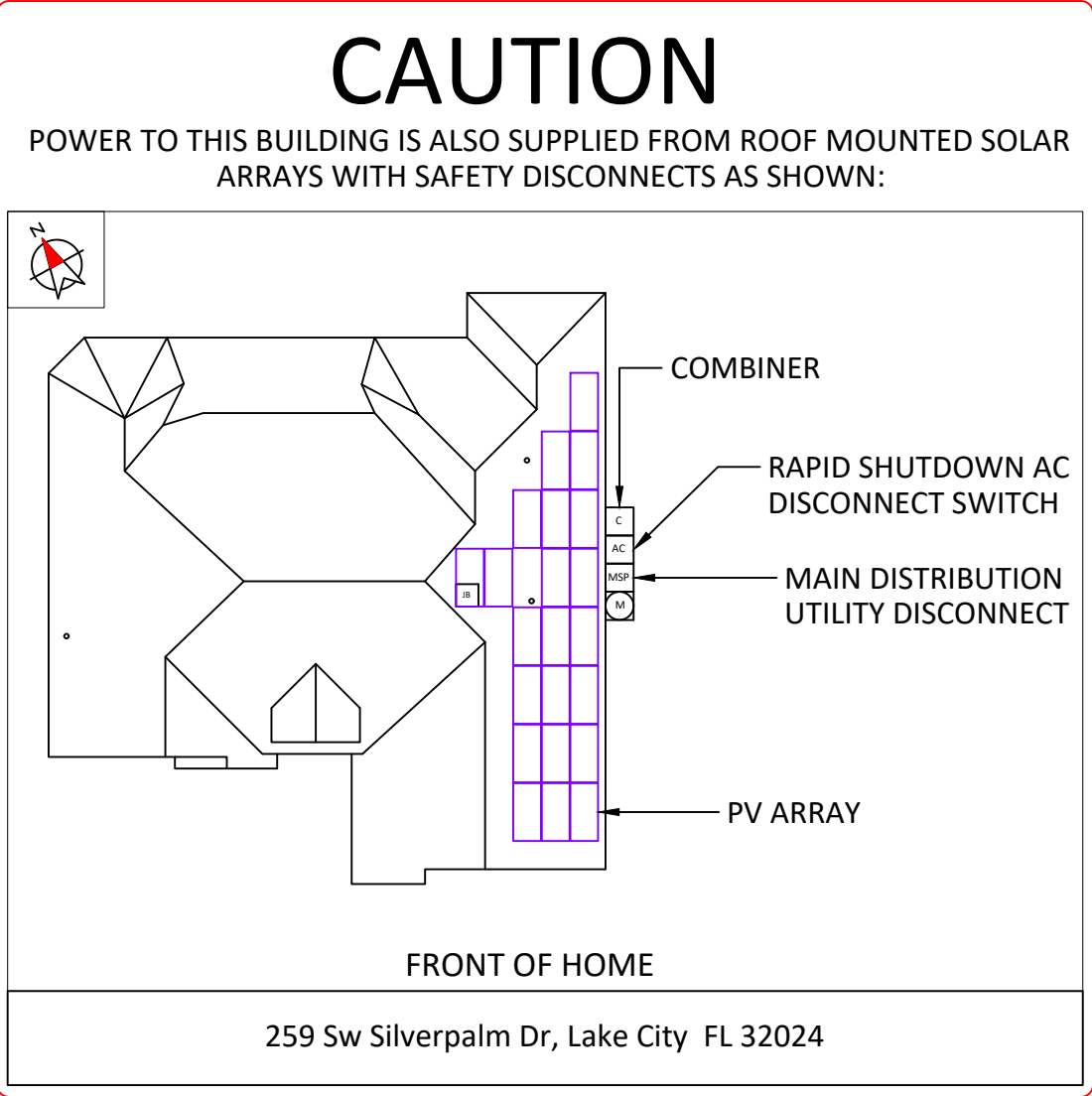
(22) Enphase IQ8A-72-2-US
Inverter(s)

Florida Power & Light

DRAWN BY: SoloCAD

DATE:
July 11, 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:
SOUTHERN COAST SERVICES
1804 NW MADRID WAY,
BOCA RATON FL 33432
License #CVC57153

SITE INFORMATION

Charlotte Talbird
259 Sw Silverpalm Dr
Lake City, FL 32024
AC System Size: 7.678 kW AC
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Lat, 30.1668247551375
Long, -82.7074967944774
(22) Hanwha Q.PEAK DUO BLK ML-G10 400
PV Modules
(22) Enphase IQ8A-72-2-US
Inverter(s)

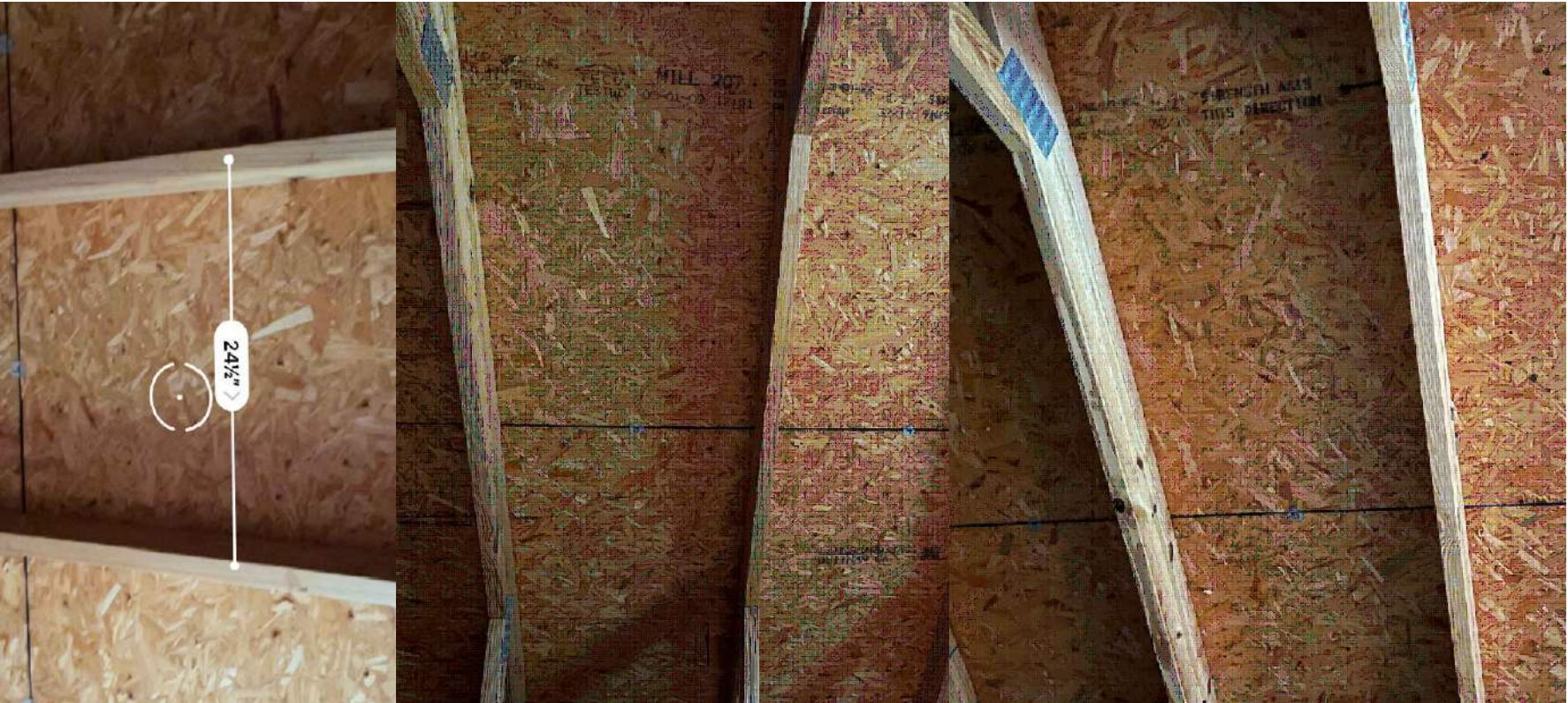
Florida Power & Light

DRAWN BY: SoloCAD

DATE:
July 11, 2022

PLACARD - PV08

SITE PHOTOS:



CONTRACTOR INFORMATION:
SOUTHERN COAST SERVICES
1804 NW MADRID WAY,
BOCA RATON FL 33432
License #CVC57153

SITE INFORMATION

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Long, -82.7074967944774
(22) Hanwha Q.PEAK DUO BLK ML-G10 400
PV Modules
(22) Enphase IQ8A-72-2-US
Inverter(s)

Florida Power & Light

DRAWN BY: SoloCAD

DATE:
July 11, 2022

SITE PHOTOS - PV09

powered by
Q.ANTUM DUO Z

PRELIMINARY

Q.PEAK DUO BLK ML-G10

385-405

ENDURING HIGH
PERFORMANCE



BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).



A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty².



STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

¹ APT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 168h)

² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

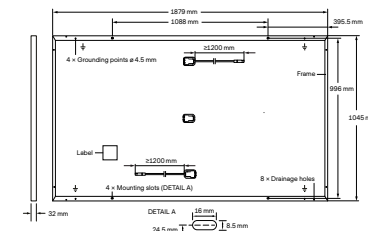


Rooftop arrays on
residential buildings

Engineered in Germany

Q CELLS

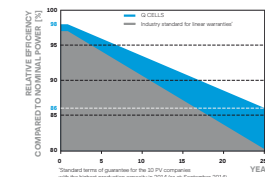
MECHANICAL SPECIFICATION	
Format	1879 mm × 1045 mm × 32 mm (including frame)
Weight	22.0 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 1200 mm, (-) ≥ 1200 mm
Connector	Stäubli MC4, Hanwha Q CELLS HQC4; IP68



ELECTRICAL CHARACTERISTICS							
POWER CLASS			385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)							
Minimum	Power at MPP ¹	P _{MPP} [W]	385	390	395	400	405
	Short Circuit Current ¹	I _{SC} [A]	11.04	11.07	11.10	11.14	11.17
	Open Circuit Voltage ¹	V _{OC} [V]	45.19	45.23	45.27	45.30	45.34
	Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.77	10.83
	Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.13	37.39
	Efficiency ¹	η [%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²							
Minimum	Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	300.1	303.8
	Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	8.97	9.00
	Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.72	42.76
	Current at MPP	I _{MPP} [A]	8.35	8.41	8.46	8.51	8.57
	Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25	35.46

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC} ± 3%; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 800 W/m², NMOT, spectrum AM 1.5

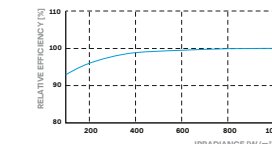
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I _{sc}	α	[%/K]	+0.04	Temperature Coefficient of V _{oc}	β	[%/K]	-0.21
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°C]	43±3

PROPERTIES FOR SYSTEM DESIGN					
Maximum System Voltage	V _{sys}	[V]	1000	PV module classification	Class II
Maximum Reverse Current	I _a	[A]	20	Fire Rating based on ANSI / UL 61730	C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2660	Permitted Module Temperature on Continuous Duty	-40 °C - +85 °C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES

IEC 61215:2016;
IEC 61730:2016.
This data sheet complies
with DIN EN 50380.



Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH

Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0)3494 66 99-23444 | **FAX** +49 (0)3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

Specifications subject to technical changes © Q CELLS Q.PEAK DUO BLK ML-G10_385-405_2021-02_Rev01.EN

Q CELLS



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 ¹
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	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 ³ [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 ⁴	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 ⁵		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

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

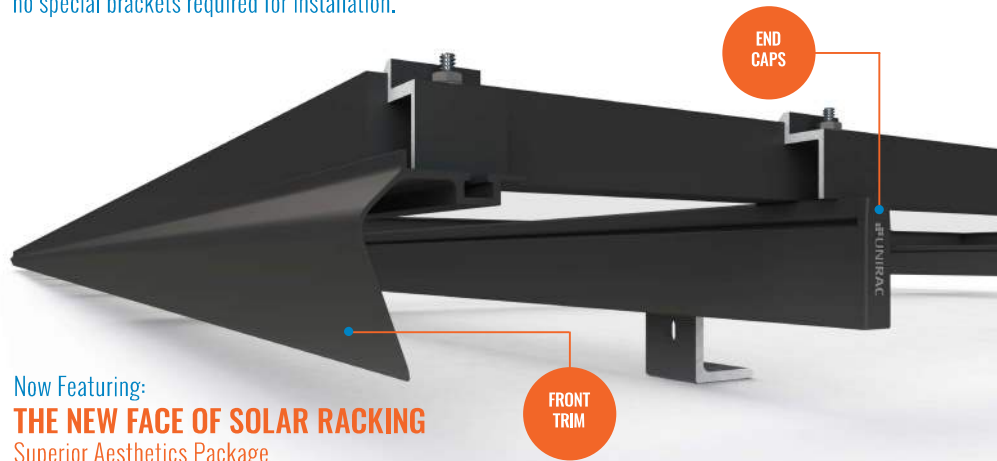
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SOLARMOUNT



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 & 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

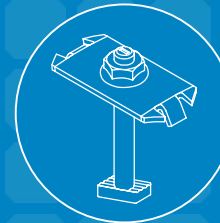
ONE PRODUCT - MANY APPLICATIONS

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.

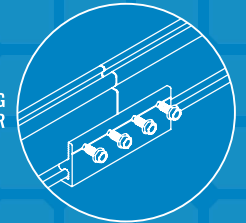
AUTOMATED DESIGN TOOL

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.



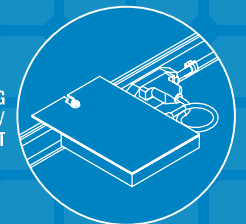
INTEGRATED BONDING
MIDCLAMP



INTEGRATED BONDING
SPICE 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



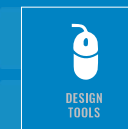
CERTIFIED
QUALITY



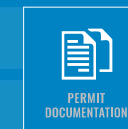
ENGINEERING
EXCELLENCE



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

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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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