

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK-G6+ 340
INVERTER	ENPHASE IQ7-60-2-US
RACKING	ROOFTECH MINI & ECOFASTEN CLICKFIT SYSTEM 2-RAIL
SYSTEM SIZE (DC)	10.88 KW
LOCATION	30.1270120,-82.6753255

CLIMATIC & GEOGRAPHIC DESIGN CRITERIA TABLE R301.2(1)	
SPEED (MPH)	120
TOPOGRAPHIC EFFECTS	B
SPECIAL WIND REGION	NO
WIND BORNE DEBRIS ZONE	2
SEISMIC DESIGN CATEGORY	C
CLIMATE ZONE	2A
WIND EXPOSURE CATETORY	B

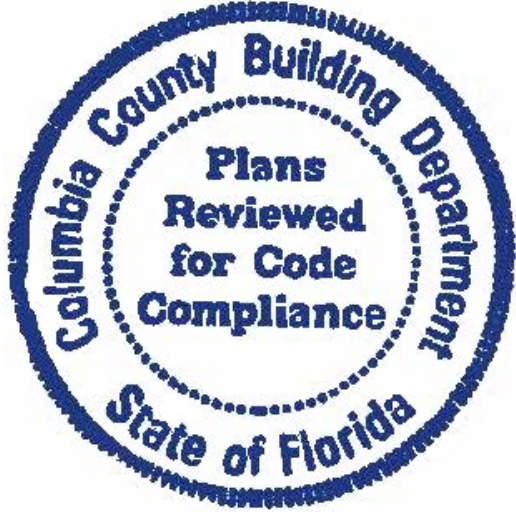
PLAN KEY	
PV-1	COVER PAGE
PV-1.1	ATTACHMENT DETAIL
PV-2	ROOF LAYOUT
PV-3	ELECTRICAL
PV-3.1	ELECTRICAL CONT.
PV-3.2	EQUIPMENT LABELS

FBC, RESIDENTIAL 2020											
TABLE R301.2.1.3											
WIND SPEED CONVERSIONS ^a											
V _{ult}	110	115	120	130	140	150	160	170	180	190	200
V _{asd}	85	89	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.447 m/s.

- a. Linear interpolation is permitted.

<div><div></div><div></div></div> <div>HANWHA Q.PEAK DUO BLK-G6+ 340 340 WATT MODULE 68.5" X 40.5" X 1.26" (SEE DATASHEET)</div>
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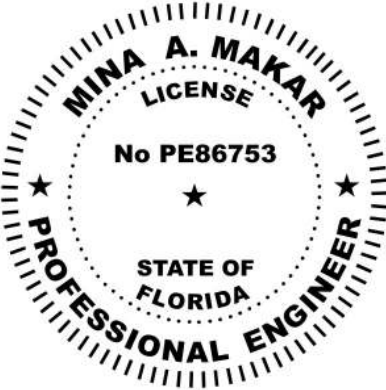


BILL OF MATERIALS	
MODULES	32
INVERTERS	32
L-FOOT ATTACHMENT	58
168" RAILS	14
ENPHASE COMBINER BOX	1
EATON 60A FUSIBLE AC DISCONNECT	1
40A FUSES	2
40A BACKFEED BREAKER	1



PRO CUSTOM SOLAR LLC D.B.A. MOMENTUM SOLAR
325 HIGH STREET, METUCHEN, NJ 08840
(732) 902-6224
MOMENTUMSOLAR.COM

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SOLAR CONTRACTOR

CAMERON CHRISTENSEN
CERTIFIED SOLAR CONTRACTOR LICENSE NUMBER: CVC57036
MOMENTUM SOLAR
5728 MAJOR BLVD. SUITE 307, ORLANDO FL. 32819

CUSTOMER INFORMATION

SUSAN PITTMAN - MS92418
280 SOUTHWEST GERALD CONNER DRIVE
LAKE CITY, FL 32024
9047965788

PV SYSTEM INFORMATION

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INITIAL	DATE: 12/27/2021	DESIGNER: HK
REV:	DATE:	DESIGNER:
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COVER PAGE

PV-1

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-16, 7TH EDITION 2020 FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 FLORIDA BUILDING CODE, 7TH EDITION 2020 FLORIDA FIRE PREVENTION CODE, NEC 2017 AND ALL LOCAL CODES & ORDINANCES.

ROOF SHALL HAVE NO MORE THAN TWO LAYERS OF COVERING IN ADDITION TO THE SOLAR EQUIPMENT.

INSTALLATION OF SOLAR EQUIPMENT SHALL BE FLUSH MOUNTED, PARALLEL TO AND NO MORE THAN 6-INCHES ABOVE THE SURFACE OF THE ROOF.

ANY PLUMBING VENTS ARE NOT TO BE CUT OR COVERED FOR SOLAR EQUIPMENT INSTALLATION. ANY RELOCATION OR MODIFICATION OF THE VENT REQUIRES A PLUMBING PERMIT AND INSPECTION.

ALL DESIGN, CALCULATIONS ARE PERFORMED BY DANIEL DUNZIK REGISTERED ARCHITECT. FLORIDA STATE STATUTE 471.003(3) PROVIDES THAT LICENSED ARCHITECTS ARE EXEMPTED FROM THE PROVISIONS OF CHAPTER 471 ENGINEERING AND NOT PRECLUDED FROM PERFORMING ENGINEERING SERVICES FOR INTEGRATED SYSTEMS AND SERVICES THAT ARE INCIDENTAL TO BUILDINGS AND STRUCTURES.

INVERTER PLACEMENT:

SYSTEM UTILIZES "ENPHASE" MICRO-INVERTERS WITH RAPID SHUTDOWN CONTROL LOCATED ON THE BACK SIDE OF EACH MODULE.

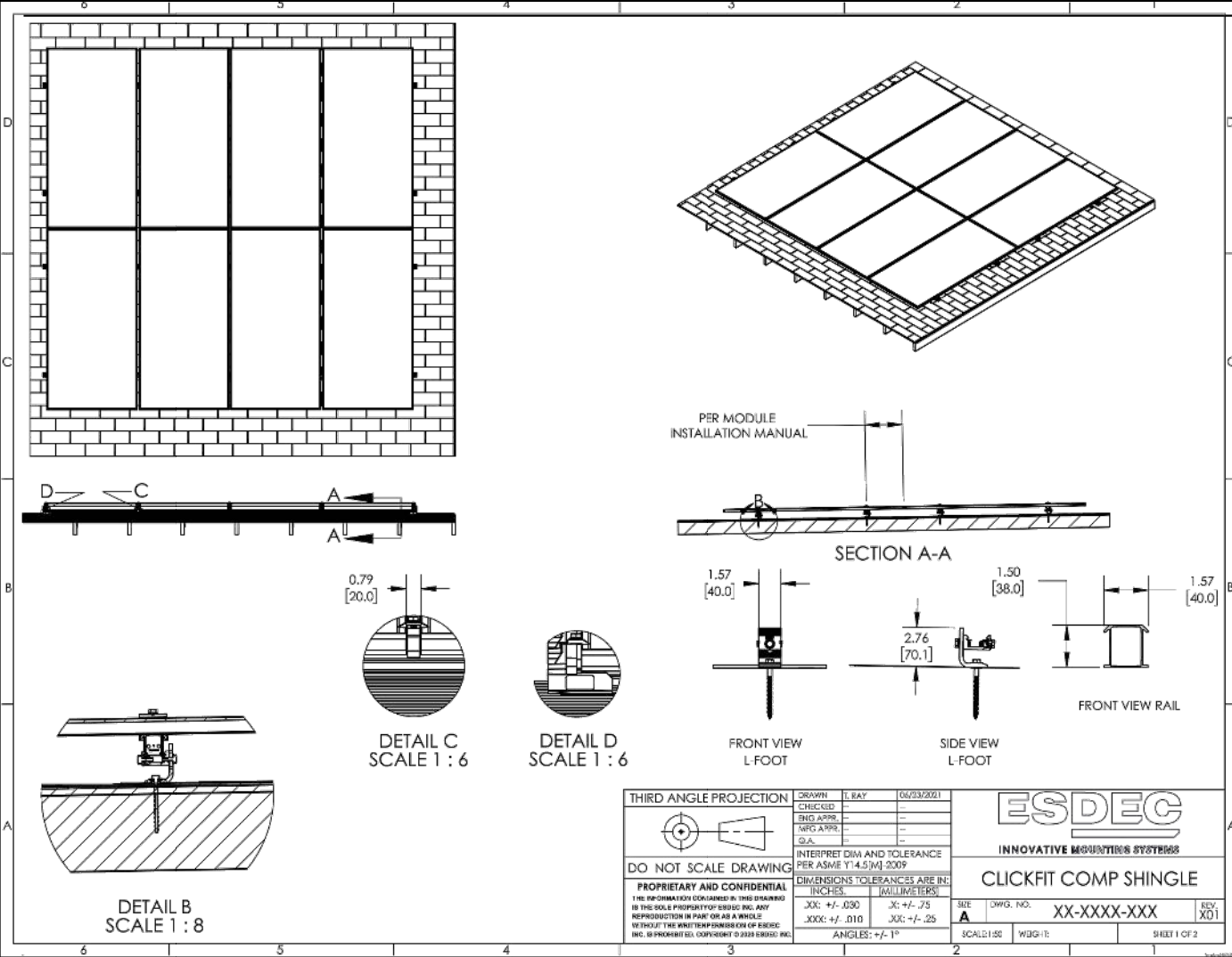
STRUCTURAL STATEMENT:

THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE NEW LOADS IMPOSED BY THE PHOTOVOLTAIC MODULE SYSTEM INCLUDING UPLIFT & SHEAR.EXISTING RAFTER SIZES & DIMENSIONS CONFORM TO 7TH EDITION 2020 FLORIDA RESIDENTIAL CODE

MOUNTING BRACKETS AND HARDWARE MEET OR EXCEED FLORIDA CODE REQUIREMENTS FOR THE DESIGN CRITERIA OF THE TOWN.

FSEC CERTIFICATION STATEMENT:

PER FL. STATUE 377.705 , I, MINA A. MAKAR PE# 86753, CERTIFICATE OF AUTHORIZATION #33404, AN ENGINEER LICENSED PURSUANT TO CHAPTER 471,CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 2020



RT-MINI

Self-flashing base for asphalt & metal roof-top PV mounting systems

RT-MINI is suitable for mounting any rail system with a conventional L-Foot.

Dual bolt design: M8 or 5/16" for L-Foot & 1/4" for EMC

ICC ESR 3575

Call Now for more details 858-935-6064

Roof Tech

Smarter PV mounting solutions from top of roof to bottom line

www.roof-tech.us info@roof-tech.us

RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

Engineered to ASTM D 1761 (Standard Test Methods for Mechanical Fasteners in Wood)

Components

RT2-00-MINIBK PAT. PENDING

MINI base : 20 ea.
Screw : 40 ea.
Extra RT-Butyl : 10 ea.

Optional item
5 x 60mm Mounting screw (RT2-04-SDS-60) : 100 ea./Bag
5/16" Hex bolt, washer & nut set (RT-04-BNWSL-US) : 100 ea./Bag
RT-Butyl (RT2-04-BUTYL) : 10 ea./Box

RT-Butyl is Roof Tech's flexible flashing used in 700,000 residential PV systems for the last 24 years. It is the first PV mounting system with Flexible Flashing certified by the ICC.

Metal Flashing Retrofit

Flexible Flashing

Shedding water?

100% Waterproof

ICC ESR-3575 ASTM2140 testing UV testing (7500 hrs.)

Rafter installation

Deck installation

P.E. Stamped Letters available at www.roof-tech.us/support

Roof Tech Inc.
www.roof-tech.us info@roof-tech.us
10620 Treena Street, Suite 230, San Diego, CA 92131
858.935.6064

Rev. 03-2020

ATTACHMENT DETAIL FOR SHINGLE ROOF

momentum SOLAR

PRO CUSTOM SOLAR LLC D.B.A. MOMENTUM SOLAR
325 HIGH STREET, METUCHEN, NJ 08840
(732) 902-6224
MOMENTUMSOLAR.COM

PROFESSIONAL ENGINEERING

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LICENSE
No PE86753
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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ATTACHMENT DETAIL

PV-1.1

SCALE: 3/32" = 1'-0"

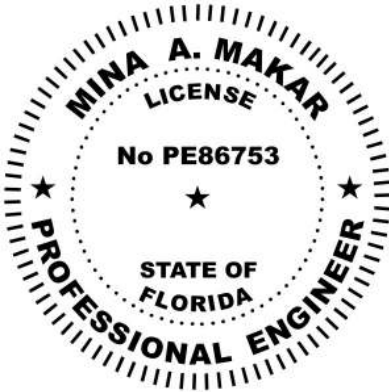


ROOF	PANEL COUNT	TILT	AZIMUTH	SHADING	LANDSCAPE MAX SPAN (ROOF AREA 1/2/3)	PORTRAIT MAX SPAN (ROOF AREA 1/2/3)	LANDSCAPE MAX CANTILEVER	PORTRAIT MAX CANTILEVER
R1	9	26°	179°	96%	72 /48 /48	72 /48 /48	16 /10 /10	16 /10 /10
R2	19	23°	269°	87%	72 /48 /48	72 /48 /48	16 /10 /10	16 /10 /10
R3	4	24°	89°	99%	72 /48 /48	72 /48 /48	16 /10 /10	16 /10 /10



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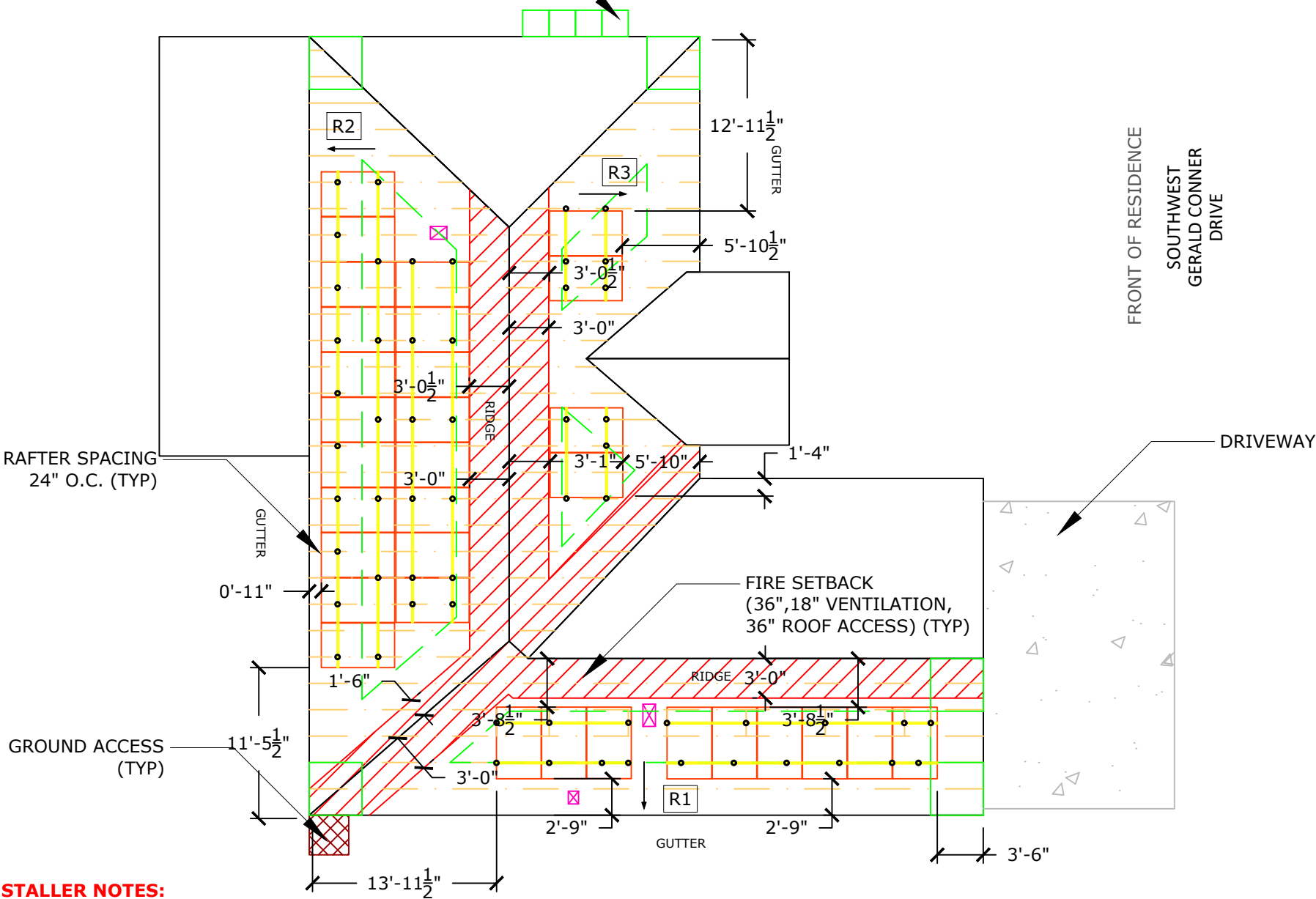
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ROOF LAYOUT

PV-2

CB AC DISC MSP M
ELECTRICAL EQUIPMENT



SOLAR INSTALLER NOTES:
R1 HAS HORIZONTAL RAFTERS

CLAMPING MAX SPACING IN ZONE 1 72" O.C
AND IN ZONE 2 AND ZONE 3 48" O.C

NOTE:
1. ROOF COVERING MATERIAL IS COMPOSED OF SINGLE LAYER ASPHALT COMPOSITE SHINGLE.
2. REFER TO LAYOUT DETAIL DRAWING PV-3 FOR ALL ROOFTOP DIMENSIONS.

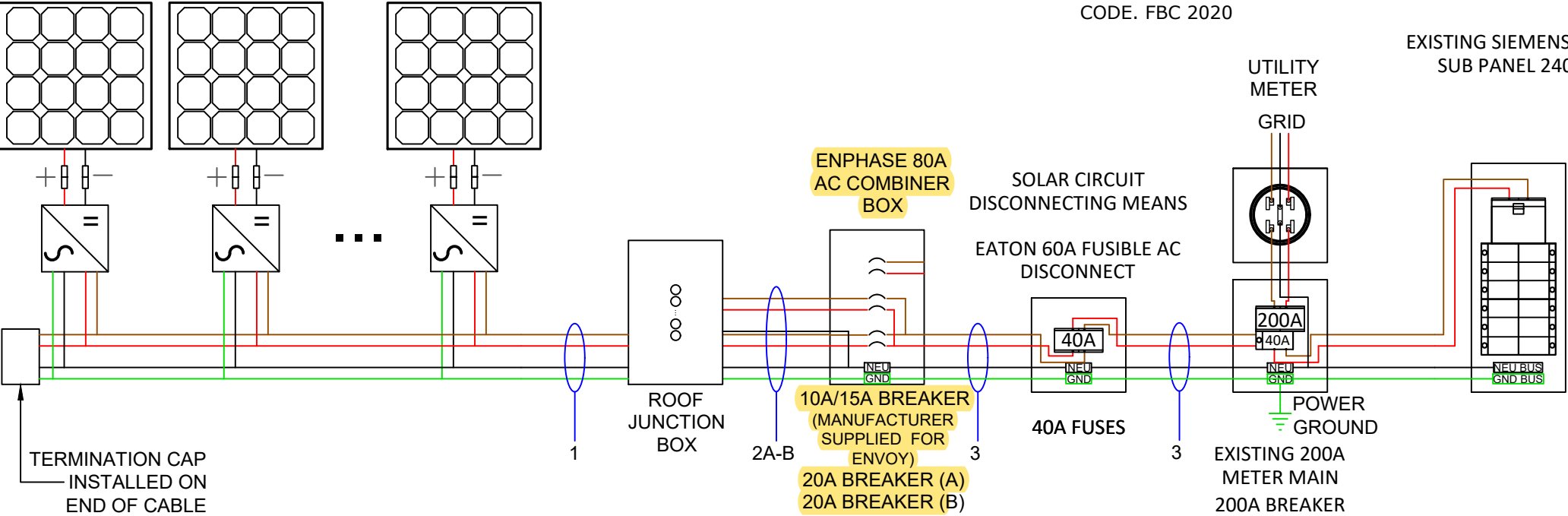
TOTAL SQUARE FOOTAGE OF ROOF: 2468 SQFT
SQUARE FOOTAGE OF SOLAR ARRAY:1024 SQFT
PERCENTAGE OF SOLAR ROOF COVERAGE: 24.98%
18" RIDGE SETBACK SHALL BE REQUIRED

SYMBOL LEGEND			
MSP	MAIN SERVICE PANEL		CHIMNEY
SP	SUB-PANEL		SKYLIGHT
M	UTILITY METER		VENT
AC DISC	AC DISCONNECT		PIPE VENT
UDC	UTILITY DISCONNECT		FAN
LC	LOAD CENTER		SATELLITE DISH
N3R	NEMA 3R BOX W/ ENVOY-S		FIRE SETBACKS
CB	COMBINER BOX		MIN 3'x3' GROUND ACCESS POINT
	MODULE		PITCH DIRECTION
		WIND PRESSURE ZONE LINES. REFER TO PV-2.2 FOR ADDITIONAL INFO	

PV MODULE RATINGS				INVERTER RATINGS		VOLTAGE DROP CALCULATIONS									
MODULE MAKE		HANWHA		INVERTER MAKE		ENPHASE		FORMULA USED PER NEC HANDBOOK 215.2(A)(4) WHERE APPLICABLE							
MODEL		Q.PEAK DUO BLK-G6+ 340		MODEL		IQ7-60-2-US		WIRE RUN	V _{mp}	I _{mp}	R	L (FT)	V _o	% V _o	WIRE SIZE
MAX POWER		340W		MAX OUTPUT POWER		240W		BRANCH TO J-BOX	240.00	16	1.98	105.33	6.674	2.78%	12 AWG
OPEN CIRCUIT VOLTAGE		40.66V		OPEN DC VOLTAGE		48V		J-BOX TO LOAD CENTER	240.00	32	1.24	50.00	3.968	1.65%	10 AWG
MPP VOLTAGE		33.94V		NOMINAL AC VOLTAGE		240V		LOAD CENTER TO AC DISCONNECT	240.00	40	0.778	3.00	0.187	0.08%	08 AWG
SHORT CIRCUIT CURRENT		10.52A		MAX AC CURRENT		1A		AC DISCONNECT TO INTERCONNECTION	240.00	40	0.778	10.00	0.622	0.26%	08 AWG
MPP CURRENT		10.02A		CEC INVERTER EFFICIENCY		97%									
NUMBER OF MODULES		32		NUMBER OF INVERTERS		32									
UL1703 COMPLIANT		YES		UL1703 COMPLIANT		YES									
SUB PANEL BREAKER SIZE		# OF MODULES	PV BREAKER PER BRANCH	THIS SOLAR PHOTOVOLTAIC SYSTEM COMPLIES WITH THE 2020 FLORIDA BUILDING CODE AND THE 2017 NATIONAL ELECTRICAL CODE											
		UP TO 16	20A												
NEC 705.12(B)(2)(3)(b) 120% RULE (1.25 x INVERTER OUTPUT) + MAIN OCPD ≤ BUS RATING x 1.20 (1.25 x 32) + 200 ≤ 200 x 1.20															
EFCG CERTIFICATION STATEMENT:															

32 HANWHA Q.PEAK DUO BLK-G6+ 340 340W MODULES PAIRED WITH
32 ENPHASE IQ7-60-2-US MICRO-INVERTERS

BRANCH CIRCUIT A
16 MICRO-INVERTERS
BRANCH CIRCUIT B
16 MICRO-INVERTERS



NEC 705.12(B)(2)(3)(b) 120% RULE
 $(1.25 \times \text{INVERTER OUTPUT}) + \text{MAIN OCPD} \leq \text{BUS RATING} \times 1.20$
 $(1.25 \times 32) + 200 \leq 200 \times 1.20$

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THREE LINE DIAGRAM

PV-3

Wire Tag	Conduit	Wire Qty	Wire Gauge	Wire Type	Temp. Rating	Wire Ampacity (A)	Temp. Derate	Conduit Fill Derate	Derated Ampacity (A)	Inverter Qty	NOC (A)	NEC Correction	Design Current (A)	Ground Size	Ground Wire Type
1	OPEN AIR	2	12 AWG	Trunk Cable	90°C	30	0.96	1	28.80	16	1	1.25	20.00	12 AWG	Trunk Cable
2A	1" PVC	2	10 AWG	THWN-2	75°C	35	0.96	0.8	26.88	16	1	1.25	20.00	08 AWG	THWN-2
2B	1" PVC	2	10 AWG	THWN-2	75°C	35	0.96	0.8	26.88	16	1	1.25	20.00	08 AWG	THWN-2
3	1" PVC	3 + G	08 AWG	THWN-2	75°C	50	0.96	1	48.00	32	1	1.25	40.00	08 AWG	THWN-2

NOTE: LETTER "G" IN WIRE QTY TAB STANDS FOR GROUNDING CONDUCTOR.

1. ALL CALCULATIONS FOR VOC, VMAX, IMP AND ISC HAVE BEEN CALCULATED USING THE MANUFACTURED STRING CALCULATOR BASED ON ASHRAE 2% HIGH AND EXTREME MINIMUM TEMPERATURE COEFFICIENTS.
2. THE ENTIRE ARRAY IS BONDED ACCORDING TO (NEC 690.46 - 250.120 PARAGRAPH C). THE GROUND IS CARRIED AWAY FROM THE GROUNDING LUG USING #6 BARE COPPER WIRE OR #8 THWN-2 COPPER WIRE.
3. THIS SYSTEM COMPLIES WITH NEC 2017
4. BRANCH CIRCUIT CALCULATION FOR WIRE TAG 1 DISPLAYS THE LARGEST BRANCH CIRCUIT IN SYSTEM. OTHER BRANCH CIRCUITS SHALL HAVE LOWER DESIGN CURRENT THAN THE ONE SHOWN. IN ADDITION, VOLTAGE DROP CALCULATIONS FROM PANELS TO THE COMBINER BOX SHALL BE SHOWN IN A SIMILAR FASHION
5. ALL CONDUCTORS ARE SIZED BASED ON NEC 2017 ARTICLE 310
6. ALL EQUIPMENT INSTALLED IS RATED AT 75°C
7. INVERTER NOC (NOMINAL OPEN CURRENT) OBTAINED FROM EQUIPMENT DATASHEET
8. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL LOCAL AND NATIONAL CODE REQUIREMENTS.
9. EACH MODULE MUST BE GROUNDED ACCORDING TO USER INSTRUCTIONS
10. ALL EQUIPMENT SHALL BE LISTED PER NEC 690.4(B)
11. PER NEC 690.13, 690.15, PROVIDE A WARNING SIGN AT ALL LOCATIONS WHERE TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION> SIGN SHALL READ *WARNING - ELECTRIC SHOCK HAZARD - DO NOT TOUCH TERMINALS - OR EQUIVALENT.
12. PER NEC 705.10, PROVIDE A PERMANENT PLAQUE OR DIRECTORY SHOWING ALL ELECTRIC POWER SOURCES ON THE PREMISES AT SERVICE ENTRANCE.
13. INTERCONNECTION METHOD SHALL COMPLY WITH NEC 705.12
14. AND OPTION FOR A SINGLE CIRCUIT BRANCH TO BE SPLIT INTO TWO SUB-CIRCUIT BRANCHES IS ACCEPTABLE.
15. ALL CONDUCTORS MUST BE COPPER.
16. NEUTRAL AND EQUIPMENT GROUNDING CONDUCTOR BONDED AS PER NEC 250.24(C).
17. EQUIPMENT GROUNDING CONDUCTOR IS CONNECTED TO A GROUNDING ELECTRODE SYSTEM PER 250.54(D).
18. FUSES FOR PV DISCONNECT HAVE AIC RATINGS OF 200KA AC AND 20KA DC.
19. SUPPLY SIDE CONNECTION SHALL BE MADE USING ILSKO INSULATION PIERCING CONNECTORS (IPC). MAKE, MODEL, AND RATING OF INTERCONNECTION CAN BE SEEN ON TABLE 1 BELOW.
20. METHOD OF INTERCONNECTION CAN BE SEEN IN FIGURE 1.
21. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.

- TABLE 1:**

MAKE	MODEL	VOLTAGE RATING	CONDUCTOR RANGE MAIN	CONDUCTOR RANGE TAP
ILSCO	IPC 4006	600 V	4/0-4 AWG	6-14 AWG
ILSCO	IPC 4020	600 V	4/0-2 AWG	2/0-6 AWG

INSTRUCTIONS FOR LINE TAPS

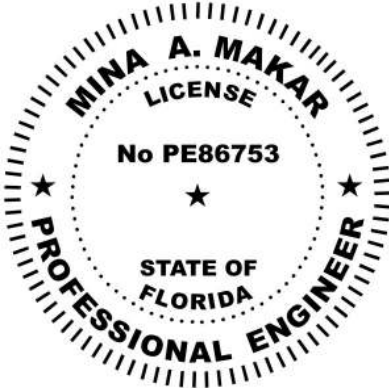
FIGURE 1:

1. ADJUST THE CONNECTOR NUT TO SUITABLE LOCATION
2. PUT THE BRANCH WIRE INTO THE CAP SHEATH FULLY
3. INSERT THE MAIN WIRE, IF THERE ARE TWO LAYS OF INSULATED LAY IN THE MAIN CABLE, SHOULD STRIP A CERTAIN LENGTH OF THE FIRST INSULATED LAY FROM INSERTED END
4. TURN THE NUT BY HAND, AND FIX THE CONNECTOR IN SUITABLE LOCATION.
5. SCREW THE NUT WITH THE SLEEVE SPANNER.
6. SCREW THE NUT CONTINUALLY UNTIL THE TOP PART IS CRACKED AND DROPPED DOWN



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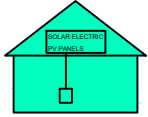


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ELECTRICAL CONT.

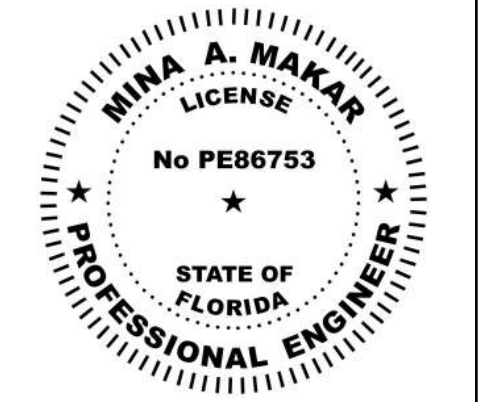
PV-3.1

ALL WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH NEC ARTICLE 110.21(B). LABEL WARNINGS SHALL ADEQUATELY WARN OF THE HAZARD. LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT, AND LABELS REQUIRED SHALL BE SUITABLE FOR THE ENVIRONMENT.					
TAG	LABEL	QUANTITY	LOCATION	NOTE	EXAMPLES
Ⓐ	<div><div>⚠CAUTION</div><div>AC SOLAR VOLTAGE</div></div>	12	AC CONDUITS	1 AT EVERY SEPARATION BY ENCLOSURES / WALLS / PARTITIONS / CEILINGS / FLOORS <u>OR</u> NO MORE THAN 10'	<div></div> <div></div> <div></div> <div></div>
Ⓑ	<div><div>WARNING: PHOTOVOLTAIC POWER SOURCE</div><div>PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN</div></div>	1	COMBINER BOX	1 AT ANY COMBINER BOX	
Ⓒ	<div><div>⚠WARNING</div><div>ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION</div></div>	1	JUNCTION BOX	1 AT ANY JUNCTION BOX	
Ⓓ	<div><div>PHOTOVOLTAIC SYSTEM ⚠AC DISCONNECT ⚠ RATED AC OUTPUT CURRENT A NOMINAL OPERATING AC VOLTAGE 240 V</div><div><div>⚠WARNING</div><div>ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION</div></div></div> <div><div>⚠CAUTION</div><div>POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR GENERATION AC SYSTEM DISCONNECT</div><div>RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM PHOTOVOLTAIC SYSTEM INSTALLED BY MOMENTUM SOLAR 3096 B HAMILTON BLVD S. PLAINFIELD, NJ 07080 PHONE NUMBER: 732-902-6224</div></div>	1	AC DISCONNECT (RSD SWITCH)	1 OF EACH AT FUSED AC DISCONNECT COMPLETE VOLTAGE AND CURRENT VALUES ON DISCONNECT LABEL	
Ⓔ	<div><div>⚠WARNING</div><div>DUAL POWER SUPPLY SECOND SOURCE IS PHOTOVOLTAIC SYSTEM</div></div>	1	UTILITY METER	1 AT UTILITY METER AND ONE DIRECTORY PLACARD	<div></div> <div></div>
Ⓕ	<div><div>EMERGENCY RESPONDER THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN</div><div>TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN ENTIRE PV SYSTEM SECTIONS OF THE PV SYSTEM THAT ARE SHUT DOWN WHEN THE RAPID SHUTDOWN SWITCH IS OPERATED SECTIONS OF THE PV SYSTEM THAT ARE NOT SHUT DOWN WHEN THE RAPID SHUTDOWN SWITCH IS OPERATED</div><div></div><div><div>⚠WARNING</div><div>DUAL POWER SUPPLY SECOND SOURCE IS PHOTOVOLTAIC SYSTEM</div></div></div>	1	INTERCONNECTION POINT	1 OF EACH AT BUILDING INTERCONNECTION POINT AND ONE DIRECTORY PLACARD	<div></div> <div></div>
	<div><div>⚠WARNING</div><div>POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE</div></div>	1	BACKFEED PANEL		
Ⓖ	<div><div>NOMINAL OPERATING AC VOLTAGE : 240V NOMINAL OPERATING AC FREQUENCY : 60HZ MAXIMUM AC POWER : VA MAXIMUM AC CURRENT : A MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION : 20A</div></div>	1	AC CURRENT PV MODULES		



PRO CUSTOM SOLAR LLC D.B.A. MOMENTUM SOLAR
325 HIGH STREET, METUCHEN, NJ 08840
(732) 902-6224
MOMENTUMSOLAR.COM

PROFESSIONAL ENGINEERING



Digitally signed by Mina A Makar.
Reason : This item has been electronically signed and sealed by [Mina A. Makar, PE 86753, COA # 33404] on the Date and Time Stamp shown using a digital signature.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies
Date: 2021.12.28 11:12:07 -05:00

SOLAR CONTRACTOR
CAMERON CHRISTENSEN
CERTIFIED SOLAR CONTRACTOR LICENSE NUMBER: CVC57036
MOMENTUM SOLAR
5728 MAJOR BLVD., SUITE 307, ORLANDO FL. 32819

CUSTOMER INFORMATION
SUSAN PITTMAN - MS92418
280 SOUTHWEST GERALD CONNER DRIVE
LAKE CITY, FL 32024
9047965788

PV SYSTEM INFORMATION
SYSTEM SIZE (DC): 10.88 KW
32 MODULES: HANWHA Q.PEAK DUO BLK-G6+ 340
32 INVERTERS: ENPHASE IQ7-60-2-US

PROJECT INFORMATION		
INITIAL	DATE: 12/27/2021	DESIGNER: HK
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

EQUIPMENT LABELS
PV-3.2