

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK ML-G10+ 400
INVERTER	ENPHASE IQ8PLUS-72-2-US
RACKING	SUNMODO EZ GRIP W/ UNIRAC NXT HORIZON 2-RAIL RACKING SYSTEM
SYSTEM SIZE (DC)	3.2 KW
LOCATION	30.1561099,-82.6678166

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-1.1(2)	ATTACHMENT DETAIL
PV-1.2	INVERTER SPECS
PV-1.3	COMBINER SPECS
PV-1.4	PANEL SPECS
PV-2	PANEL LAYOUT
PV-3	ELETRICAL
PV-3.1	ELECTRICAL CONT.
PV-3.2	EQUIPMENT LABELS

FBC, RESIDENTIAL 2023											
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 ML-G10+ 400 400 WATT MODULE 74" X 41.1" X 1.26" (SEE DATASHEET)</div>
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BILL OF MATERIALS	
MODULES	8
INVERTERS	8
L-FOOT ATTACHMENT W/ SUNMODO EZ GRIP	18
171" RAILS	4
ENPHASE COMBINER BOX	1
EATON 60A FUSIBLE AC DISCONNECT	2
35A FUSES	2
125A LINE TAPS	2

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-22, 8TH EDITION 2023 FLORIDA RESIDENTIAL CODE, 8TH EDITION 2023 FLORIDA BUILDING CODE, 8TH EDITION 2023 FLORIDA FIRE PREVENTION CODE, NEC 2020 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 MICHAEL S. REZK, P.E. PROFESSIONAL ENGINEER, WITH LICENCE No. 95844.

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 8TH EDITION 2023 FLORIDA RESIDENTIAL CODE

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

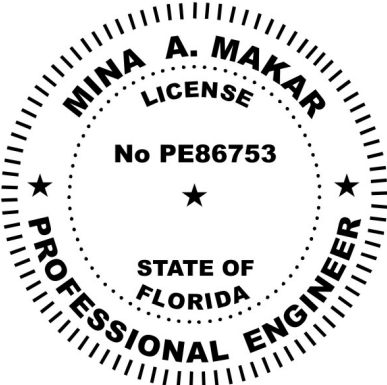
FSEC CERTIFICATION STATEMENT:

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 2023



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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Date: 2024.01.25 07:01:42 -05:00

SOLAR CONTRACTOR

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

CUSTOMER INFORMATION

GLEN MAXWELL - MS145318
1967 SOUTHWEST SISTERS WELCOME ROAD
LAKE CITY, FL 32025
(386) 406-7578

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 3.2 KW
8 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 400
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

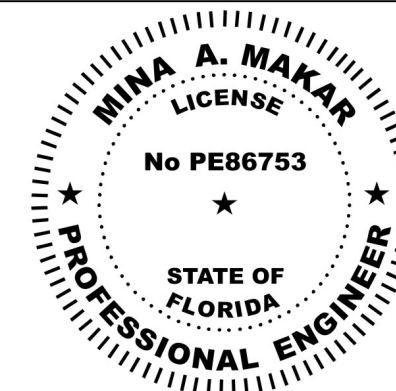
PROJECT INFORMATION

INITIAL	DATE: 1/25/2024	DESIGNER: AKL
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

COVER PAGE

PV-1

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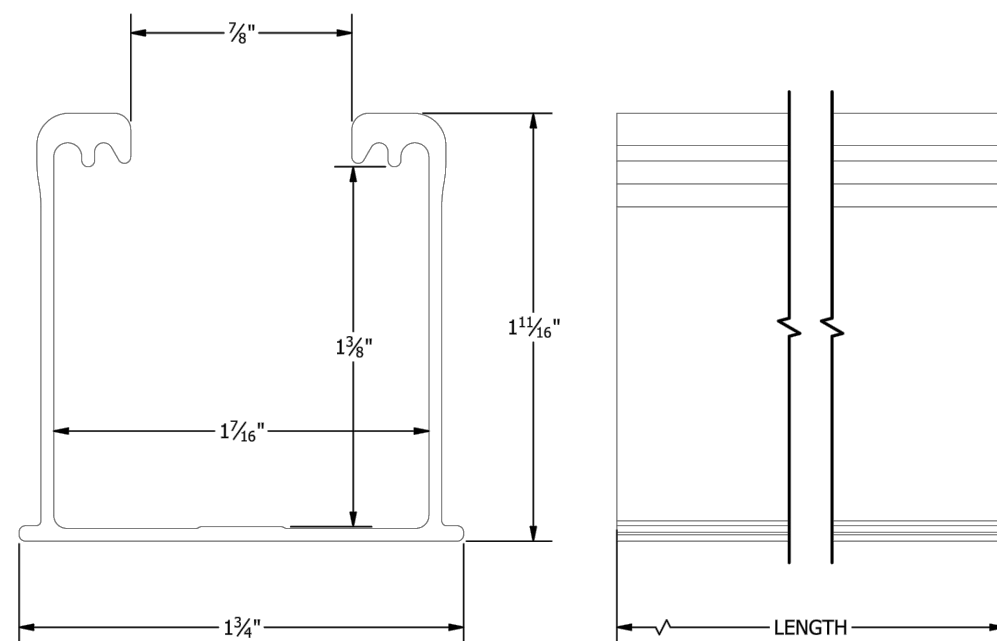
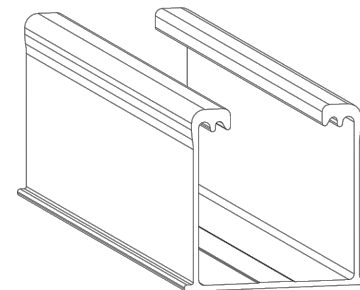
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REV:	DATE:	DESIGNER:

ATTACHMENT DETAIL

PV-1.1

PART # TABLE		
P/N	DESCRIPTION	LENGTH
084RLM1	NXT HORIZON RAIL 84" MILL	84"
084RLD1	NXT HORIZON RAIL 84" DARK	84"
168RLM1	NXT HORIZON RAIL 168" MILL	168"
168RLD1	NXT HORIZON RAIL 168" DARK	168"
208RLM1	NXT HORIZON RAIL 208" MILL	208"
208RLD1	NXT HORIZON RAIL 208" DARK	208"
246RLM1	NXT HORIZON RAIL 246" MILL	246"
246RLD1	NXT HORIZON RAIL 246" DARK	246"



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE: NXT HORIZON

DRAWING TYPE: PART DETAIL

DESCRIPTION: RAIL

REVISION DATE: 9/13/2021

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

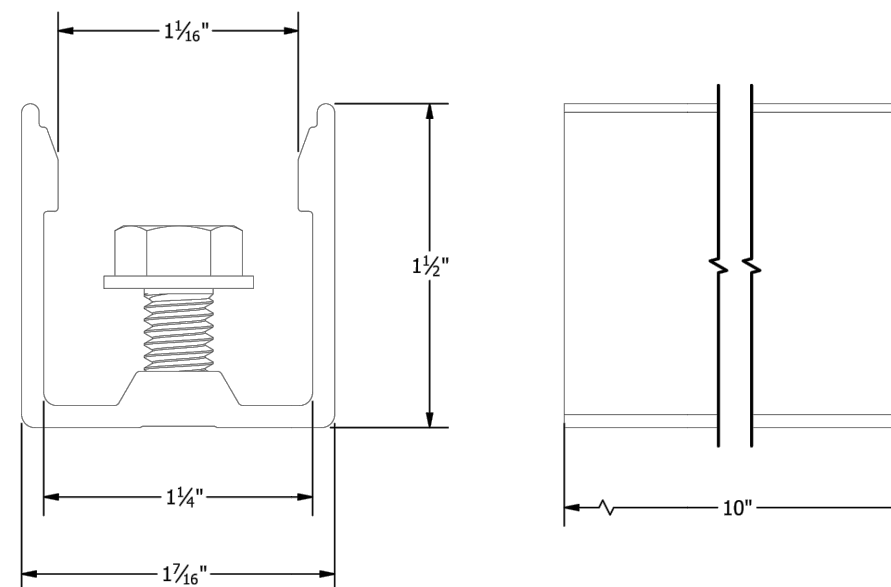
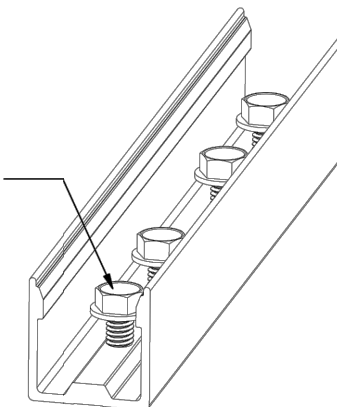
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

NH-P01

SHEET

PART # TABLE		
P/N	DESCRIPTION	LENGTH
RLSPLCM1	NXT HORIZON RAIL SPLICE	10"

4X - 5/16"-18 x 5/8"
HEX FLANGE SCREW - TYPE F



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE: NXT HORIZON

DRAWING TYPE: PART DETAIL

DESCRIPTION: RAIL SPLICE

REVISION DATE: 9/22/2021

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

NH-P02

SHEET



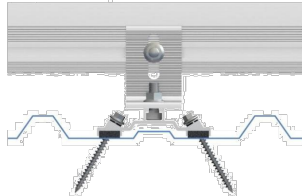
EZ GRIP METAL DECK MOUNT

Make your next metal roof attachment without the daunting task of locating the truss.

SunModo's EZ Grip Metal Deck Mount installs into 26 gauge sheet metal, 1/2 plywood or 7/16 OSB roof decking material.

SunModo's EZ Grip Metal Deck Mount installs in just minutes into sheet metal, plywood or OSB roof decking. The four included 1/4 x 3" Hex Washer Head Self-tapping Screws have the length to penetrate though 1-1/2 inches of insulation while still piercing completely through the roof decking. And since the four screws are guided by the aluminum extruded base to penetrate at a 30-degree angle, the Metal Roof Deck Mount Kit offers superior attachment performance. 1/4-20 Self-drilling screws can be used for attachments into 26 gauge minimum thickness metal roofs.

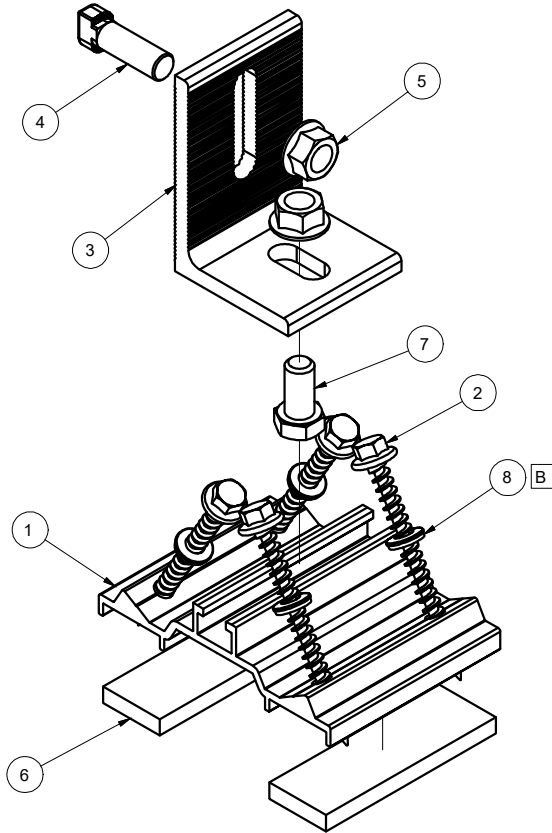
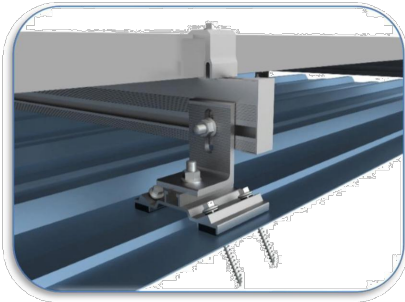
The EZ Grip Metal Deck Mount is designed to fit on the most popular R-Panel and U-Panel trapezoidal types of metal roofs. The aluminum extruded base easily clears roof profiles 7/16" tall by 1-1/2" wide. The EPDM gaskets on the washers and on the aluminum extruded base combine to provide a water tight seal at the roof penetration site.



Features and Benefits

- Attaches into 1/2 plywood or 7/16 OSB roof decking material using four 1/4 x 3" Hex Washer Head Self-tapping Screws
- Attaches into 26 gauge minimum thickness sheet metal using four 1/4 x 2" Hex Washer Head Self-drilling Screws
- Angled penetrations provide superior attachment performance
- A wide variety of L-feet and attachment options are available
- Passed the High-Velocity Hurricane Zone (HVHZ) –TAS 100(a) Wind-Driven Rain Test

SunModo Corp | Vancouver, WA | 360-844-0048
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REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	10/16/2018
B	ADD B15019-001	LWF	10/24/2018

IN 1/2" PLYWOOD		
LOAD DIRECTION	FOS=2	FOS=3
UPLIFT	345	230
LATERAL.PERP. TO SLOT	140	95
LATERAL.PARALLEL TO SLOT	265	175

IN 7/16" OSB		
LOAD DIRECTION	FOS=2	FOS=3
UPLIFT	190	125
LATERAL.PERP. TO SLOT	125	85
LATERAL.PARALLEL TO SLOT	135	90

NOTES

- * Factor of Safety as shown
- * Torque at 3/8" T-Bolt = 15ft.lbs (20 N.m)
- * All loads in pounds force
- * Values valid only for conditons equal or better than test conditions
- * Values valid only when product is used in accordance with SunModo installation instruction and other technical documentation
- * The kit as shown in the BOM. For alternative configurations, contact SunModo
- 4 1/4" Deck Screws in Min 7/16" OSB

B	8	B15019-001	SEALING WASHER .26 ID X .50 X .125	4
	7	B15018-001	HEX CAP SCREW 3/8-16 X 3/4	1
	6	C50001-001	GASKET, EPDM, WITH ADHESIVE	2
	5	B15003-001	FLANGE NUT 3/8-16	2
	4	B20007-002	T-BOLT 3/8-16X1.0", 304 SS	1
	3	A20062-001	L FOOT	1
	2	B15039-001	HEX WASHER HEAD LAG BOLT 1/4X3	4
	1	A50224-001	METAL ROOF DECK MOUNT	1
ITEM		PART NUMBER	DESCRIPTION	QTY
MATERIAL			<div>SunModo Corp.</div> <div>14800 NE 65TH STREET, VANCOUVER WA 98682</div>	
SEE NOTES				
Third Angle Projection: 				
GENERAL SPECIFICATIONS All Dimensions in inches (millimeters) Tolerances X.XX ±0.01 (0.25mm) X.XX ±0.02 (0.50mm) X.X ±0.039 (1.0mm) Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.				
DRAWN BY			TITLE	
LWF			METAL ROOF DECK MOUNT KIT	
CHECKED BY			B	DRAWING NUMBER
			K50532-001 STRUCTURE	
APPROVALS			SCALE: NONE SHEET 1 of 1	

SunModo Corp.

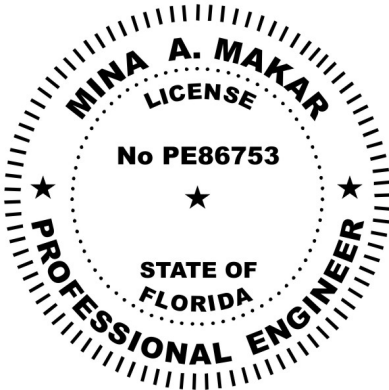
14800 NE 65TH STREET, VANCOUVER WA 98682

ATTACHMENT DETAIL FOR CORRUGATED METAL ROOF



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PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 3.2 KW
8 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 400
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

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REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

ATTACHMENT DETAIL

PV-1.1 (2)



DATA SHEET



IQ8 and IQ8+ Microinverters

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



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



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



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



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

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

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 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 ² [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)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit ⁴		16	13
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
CEC weighted efficiency	%	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	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>

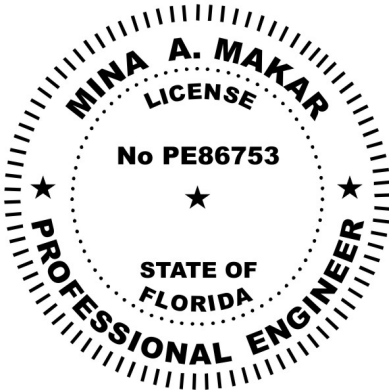
(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17



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INVERTER DETAIL

PV-1.2

IQ Combiner 4/4C



To learn more about Enphase offerings, visit enphase.com
IQ-C-4-4C-DS-0103-EN-US-12-29-2022



The **IQ Combiner 4/4C** with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It 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 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
- Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC 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
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with 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 and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes 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)	
Supported microinverters	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
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 - 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
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)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
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
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to +46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A 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	Up to 3,000 meters (9,842 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3 rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 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

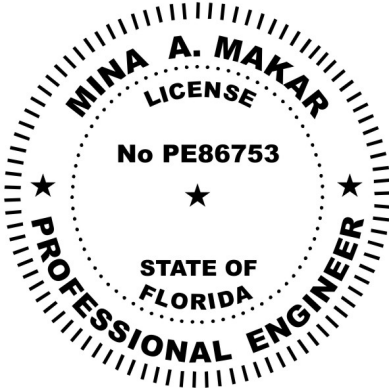
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IQ-C-4-4C-DS-0103-EN-US-12-29-2022



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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

GLEN MAXWELL - MS145318
1967 SOUTHWEST SISTERS WELCOME ROAD
LAKE CITY, FL 32025
(386) 406-7579

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 3.2 KW
8 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 400
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 1/25/2024	DESIGNER: AKL
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

COMBINER DETAIL

PV-1.3

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



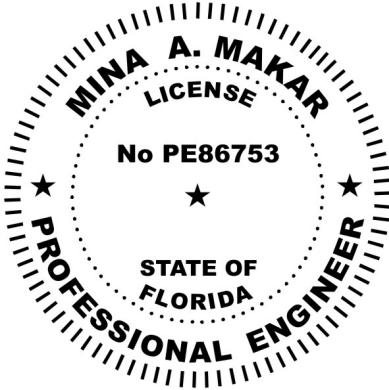
- NOTE:**
1. ROOF COVERING MATERIAL IS COMPOSED OF CORRUGATED METAL.
 2. EXACT ATTACHMENT LOCATION AND QUANTITY OF ATTACHMENTS ARE BASED ON EXISTING RAFTER LOCATIONS OBTAINED FROM FIELD MEASUREMENTS. THE LOCATION AND QUANTITY OF ATTACHMENTS MAY VARY BASED ON RAFTER LAYOUT START POINT, SPACING VARIATIONS AND ROOFING TYPE. VERIFY IN THE FIELD ALL RAFTER LOCATIONS AND ADJUST LAYOUT AS REQUIRED. A TILE ROOF WILL PRODUCE A STAGGERED ATTACHMENT LAYOUT BECAUSE OF EXISTING STAGGERED TILE JOINT LOCATIONS.

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	8	15°	96°	91%	48 /48 /48	48 /48 /48	16 /10 /10	16 /10 /10



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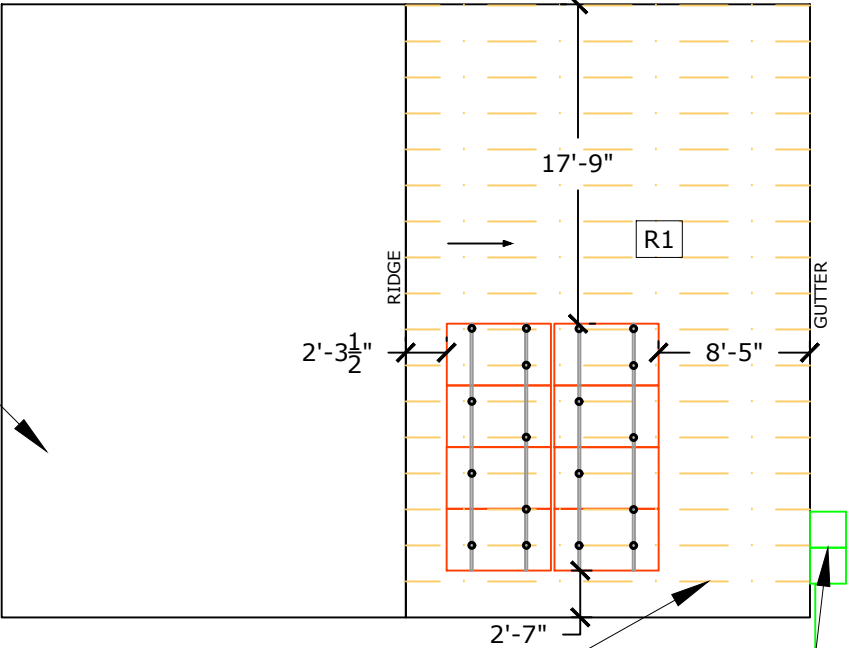
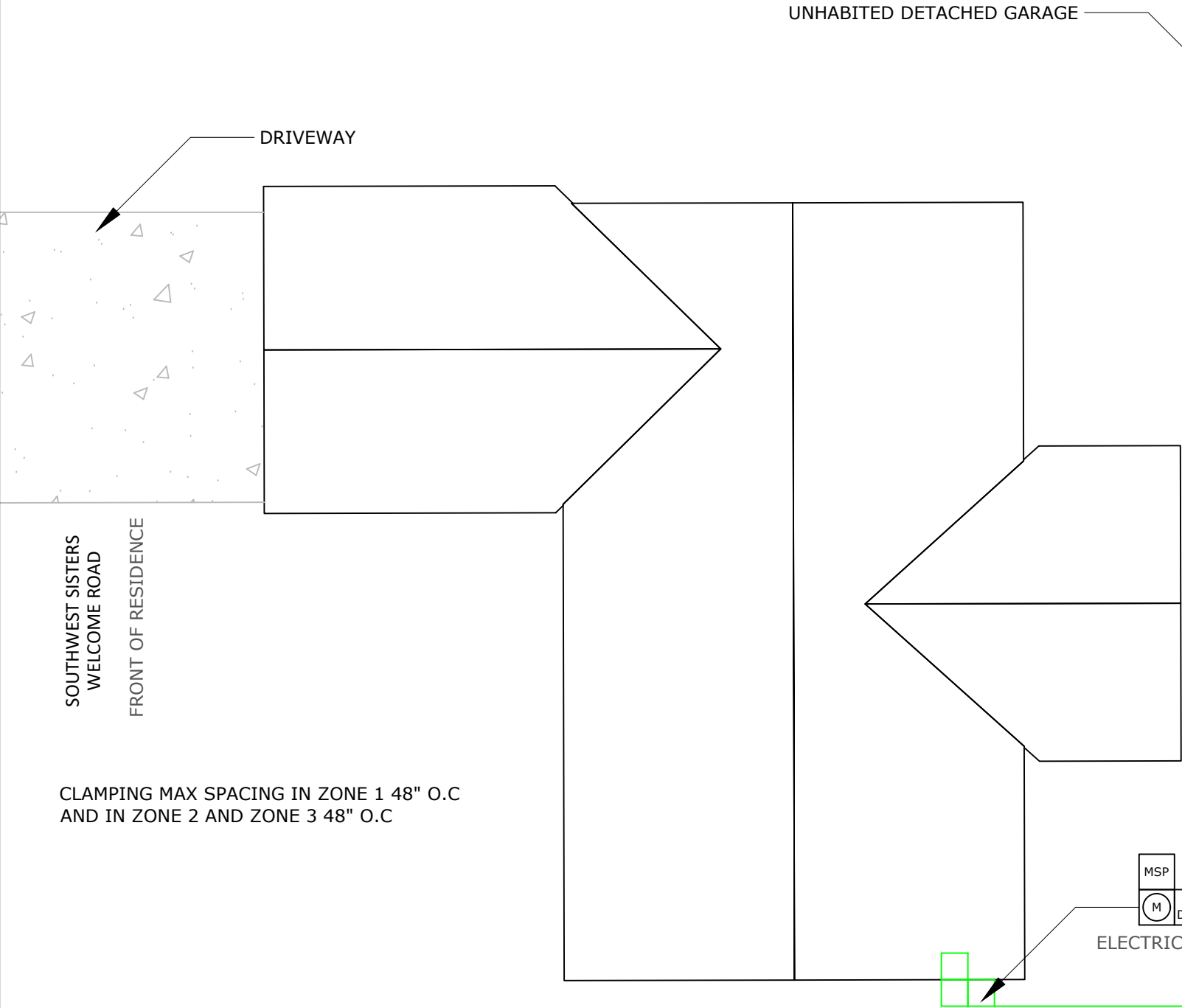
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ROOF LAYOUT

PV-2



RAFTER SPACING
24" O.C. (TYP)

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	

~80' TRENCH (DISTANCE BETWEEN
HOUSE AND GARAGE IS NOT TO SCALE)

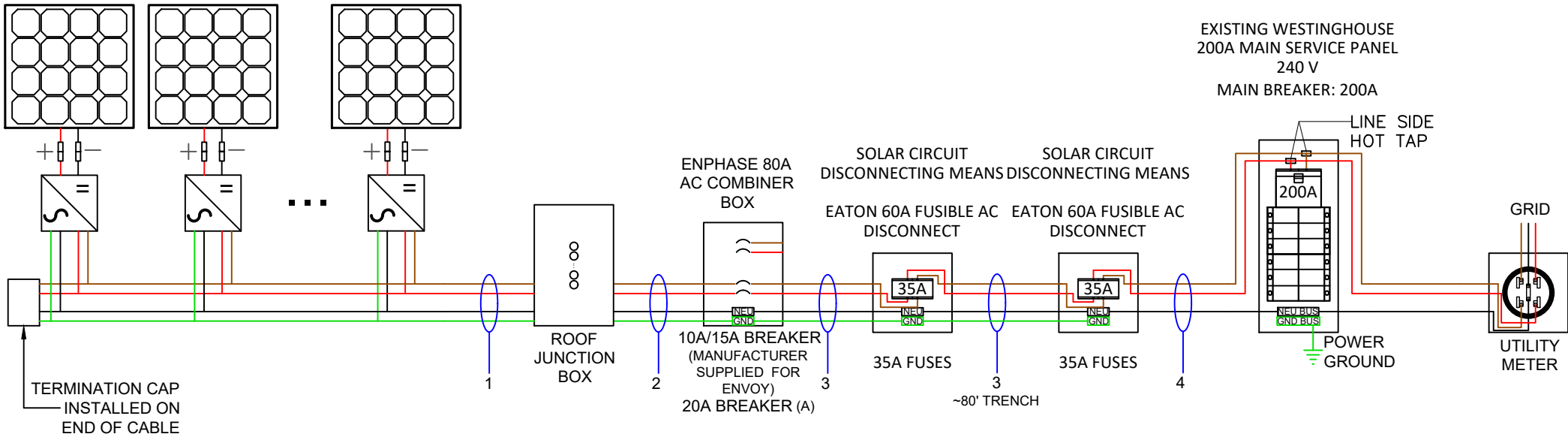
ELECTRICAL EQUIPMENT

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 ML-G10+ 400	MODEL	IQ8PLUS-72-2-US	WIRE RUN	V _{mp}	I _{mp}	R	L (FT)	V _o	% V _o	WIRE SIZE
MAX POWER	400W	MAX OUTPUT POWER	290W	BRANCH TO J-BOX	240.00	9.68	1.98	52.67	2.019	0.84%	12 AWG
OPEN CIRCUIT VOLTAGE	45.3V	OPEN DC VOLTAGE	60V	J-BOX TO LOAD CENTER	240.00	9.68	1.24	50.00	1.200	0.50%	10 AWG
MPP VOLTAGE	37.13V	NOMINAL AC VOLTAGE	240V	LOAD CENTER TO AC DISCONNECT	240.00	12.1	0.778	3.00	0.056	0.02%	08 AWG
SHORT CIRCUIT CURRENT	11.14A	MAX AC CURRENT	1.21A	AC DISCONNECT TO INTERCONNECTION	240.00	12.1	0.491	10.00	0.119	0.05%	06 AWG
MPP CURRENT	10.77A	CEC INVERTER EFFICIENCY	97%								
NUMBER OF MODULES	8	NUMBER OF INVERTERS	8								
UL1703 COMPLIANT	YES	UL1703 COMPLIANT	YES								

SUB PANEL BREAKER SIZE	# OF MODULES	PV BREAKER PER BRANCH	THIS SOLAR PHOTOVOLTAIC SYSTEM COMPLIES WITH THE 2023 FLORIDA BUILDING CODE AND THE 2020 NATIONAL ELECTRICAL CODE
	UP TO 16	20A	

8 HANWHA Q.PEAK DUO BLK ML-G10+ 400 400W MODULES PAIRED WITH
8 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS

BRANCH CIRCUIT A
8 MICRO-INVERTERS

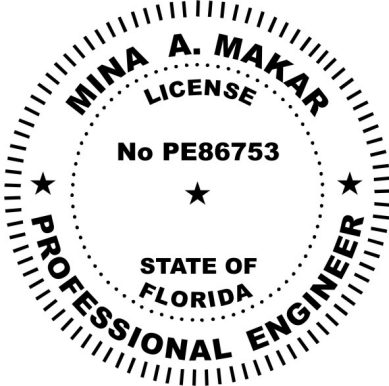


FSEC CERTIFICATION STATEMENT:
PER FL. STATUE 377.705 , I, MINA A. MAKAR PE# 86753, CERTIFICATE OF AUTHORIZATION #33404, AN ENGINEER LICENSED PURSUANT TO CHAPTER 471,CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 2023



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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	1	12 AWG	Trunk Cable	90°C	30	0.96	1	28.80	8	1.21	1.25	12.10	12 AWG	Trunk Cable
2	3/4" PVC	2	10 AWG	THWN-2	75°C	35	0.96	1	33.60	8	1.21	1.25	12.10	08 AWG	THWN-2
3	3/4" PVC	3 + G	08 AWG	THWN-2	75°C	50	0.96	1	48.00	8	1.21	1.25	12.10	08 AWG	THWN-2
4	3/4" PVC	3	06 AWG	THWN-2	75°C	65	0.96	1	62.40	8	1.21	1.25	12.10		THWN-2

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

THREE LINE DIAGRAM

PV-3

ELECTRICAL NOTES:

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 2020
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 2020 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.

22. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
23. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C)(1) AND ARTICLE 310.8 (D).
24. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
25. TOTAL AREA OF ALL CONDUCTORS, SPLICES, AND TAPS INSTALLED AT ANY CROSS SECTION OF THE WIRING DOES NOT EXCEED 75% OF THE CROSS SECTIONAL AREA OF THE SPACE. NEC 312.8(A)(2).
26. SYSTEM IS CONSIDERED AN AC MODULE SYSTEM. NO DC CONDUCTORS ARE PRESENT IN CONDUIT, COMBINER, JUNCTION BOX, DISCONNECT. AND COMPLIES WITH 690.6 - NO DC DISCONNECT AND ASSOCIATED DC LABELING ARE REQUIRED.
27. SYSTEM COMPLIES WITH 690.12 RAPID SHUTDOWN AND ASSOCIATED LABELING AS PER 690.56(C). AC VOLTAGE AND SYSTEM OPERATING CURRENT SHALL BE PROVIDED 690.52.
28. CONDUCTORS IN CONDUIT ARE AC CONDUCTORS BRANCH CIRCUITS AND NOT PV SOURCE CIRCUITS. 690.6.
29. ALL GROUNDING SHALL COMPLY WITH 690.47(A) IN THAT THE AC MODULES WILL COMPLY WITH 250.64.
30. NO TERMINALS SHALL BE ENERGIZED IN THE OPEN POSITION IN THIS AC MODULE SYSTEM 690.13, 690.15, 690.6.
31. WHERE APPLICABLE: INTERCONNECTION SHALL COMPLY WITH 705.12(A) OR 705.12(B)
32. ALL WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH 2020 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.
33. PV POWER CIRCUIT LABELS SHALL APPEAR ON EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

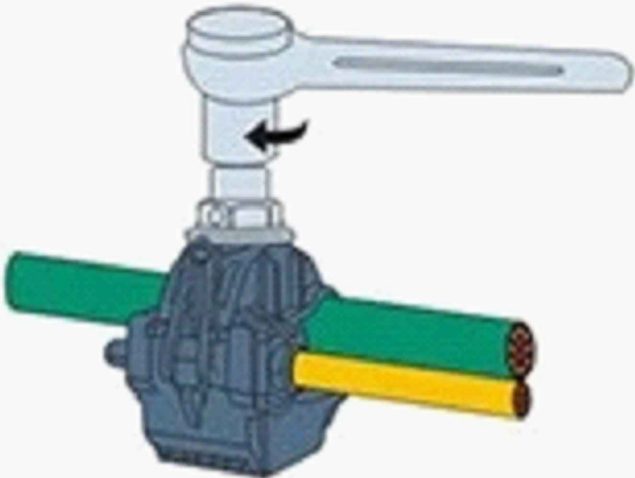
TABLE 1:

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

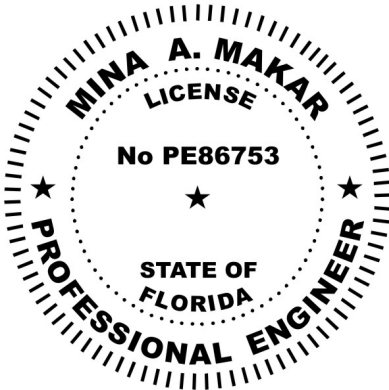
FIGURE 1:

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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PV SYSTEM INFORMATION





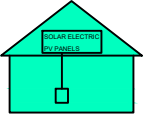


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8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

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ELECTRICAL CONT.

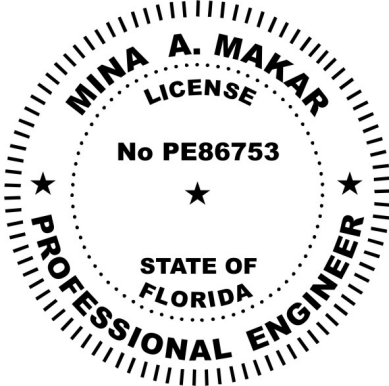
PV-3.1

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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 12.1 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>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><div>⚠WARNING</div><div>DUAL POWER SUPPLY SECOND SOURCE IS PHOTOVOLTAIC SYSTEM</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		



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EQUIPMENT LABELS

PV-3.2