SYSTEM INFORMATION				
MODULE HANWHA Q.PEAK DUO BLK ML-G10+ 410				
INVERTER	ENPHASE IQ7PLUS-72-2-US			
RACKING	UNIRAC HORIZON 2-RAIL RACKING SYSTEM W/ SUNMODO EZ GRIP			
SYSTEM SIZE (DC)	6.56 KW			
LOCATION	30.2234941,-82.6308080			

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

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

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.

HANWHA Q.PEAK DUO BLK ML-G10+ 410 410 WATT MODULE

	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				



BILL OF MATERIALS					
MODULES	16				
INVERTERS	16				
L-FOOT ATTACHMENT W/ SUNMODO EZ GRIP	36				
171" RAILS	7				
ENPHASE COMBINER BOX	1				
EATON 60A FUSIBLE AC DISCONNECT	1				
35A FUSES	2				
125A LINE TAPS	2				



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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

LINDA MCCOMBS - MS148424 502 NE REBECCA TERRACE LAKE CITY, FL 32055 3863442764

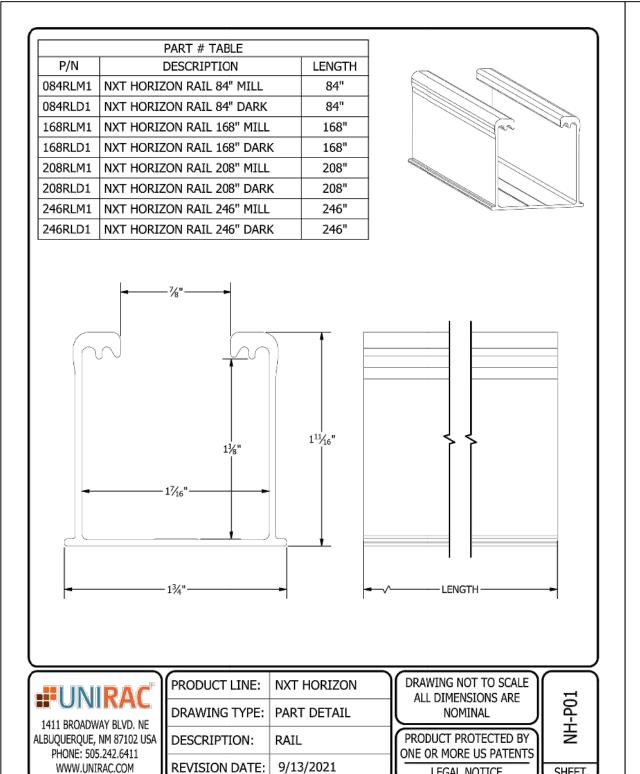
PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 6.56 KW 16 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 410 16 INVERTERS: ENPHASE IQ7PLUS-72-2-US

PROJECT INFORMATION						
NITIAL	DATE: 3/21/2024	DESIGNER: AKL				
EV:	DATE:	DESIGNER:				
EV:	DATE:	DESIGNER:				

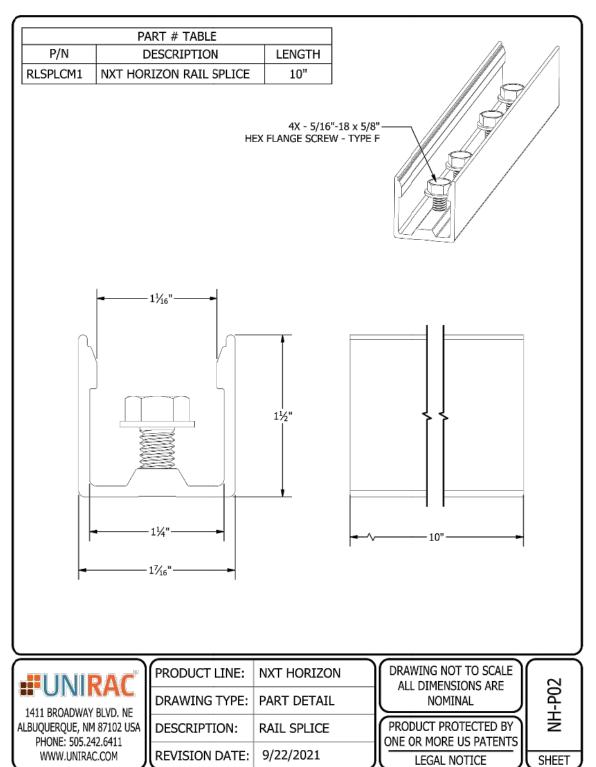
COVER PAGE

PV-1



SHEET

LEGAL NOTICE





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PROJECT INFORMATION DESIGNER: AKL DESIGNER:

ATTACHMENT DETAIL

PV-1.1



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.

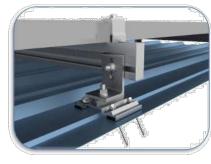
The EZ Grip Metal Deck Mount is designed to fit on the most popular R-Panel and U-Panel trapezoidal types of metal roofs. The aluminum extruded base easily clears roof profiles 7/16" tall by 1-1/2" wide. The EPDM gaskets on the washers and on the aluminum extruded base combine to provide a water tight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

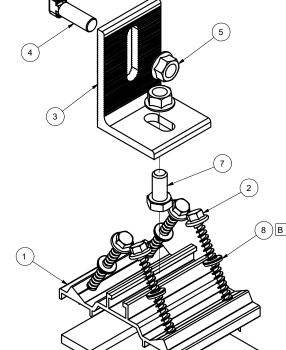


Features and Benefits

- 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

SunMode Corp | Vancouver, WA | 360-844-0048 Document Number D10153-V003 | @2019 - SunModo Corp.





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		nModo /4" Deck Scre	ews in I	Min 7/1	6" OSB					
В	8	B15019-001			IG WASHER .26 ID X .50	X .125			4	
	7	B15018-001			AP SCREW 3/8-16 X 3/4				1	
	6	C50001-001			T, EPDM, WITH ADHES	VE			2	
	5	B15003-001		FLANG	E 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 NUM	1BER	DESCRIPTION					QTY	
	MATERIAL SEE NOTES Third Angle Projection:			→ 🖅 SunModo Corp.						
	X.X ±0.039 [1.0mm] .010020 unless				14800 NE 65TH STREET, VANCOUVER WA 98 TITLE METAL ROOF DECK MOUNT KIT				382	
	Unless other DRAWN BY	DATE								
	CHECKED B		16/2018	B DRAWING NUMBER K50532-001 STRUCTURE						
IAY P.	APPROVAL	S		SCALE	: NONE	SHEET	1	of	1	

FOS=2 FOS=3

FOS=2 FOS=3

140

135

* Values valid only for conditons equal or better than test conditions

installation instruction and other technical documentation

* Values valid only when product is used in accordance with SunModo

* The kit as shown in the BOM. For alternative configurations, contact

ATTACHMENT DETAIL FOR CORRUGATED METAL ROOF

LOAD DIRECTION

LOAD DIRECTION

NOTES

ATERAL.PERP. TO SLOT

LATERAL.PERP. TO SLOT

LATERAL.PARALLEL TO SLOT

* Factor of Safety as shown

* All loads in pounds force

* Torque at 3/8" T-Bolt = 15ft.lbs (20 N.m)

LATERAL.PARALLEL TO SLO

momentum SOLAR

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PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 6.56 KW 16 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 410 16 INVERTERS: ENPHASE IQ7PLUS-72-2-US

PROJECT INFORMATION							
INITIAL	DATE: 3/21/2024	DESIGNER: AKL					
REV:	DATE:	DESIGNER:					
REV:	DATE:	DESIGNER:					

ATTACHMENT DETAIL

PV-1.1 (2)

Enphase Microinverters Region: AMERICAS

Enphase IQ 7 and IQ 7+ **Microinverters**

The high-powered smart grid-ready Enphase IQ 7 Micro™ and Enphase IQ 7+ Micro™ dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell/120 half-cell and 72cell/144 half-cell* modules
- · More than a million hours of testing
- · Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- · Complies with advanced grid support, voltage and frequency ride-through requirements
- · Remotely updates to respond to changing
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)
- * The IQ 7+ Micro is required to support 72-cell/144 half-cell modules.



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2	-US	
Commonly used module pairings ¹	235 W - 350 W +		235 W - 440 W +		
Module compatibility		f-cell PV modules	60-cell/120 half-cell and 72-		
	only		cell/144 half-cell PV modules		
Maximum input DC voltage	48 V		60 V		
Peak power tracking voltage	27 V - 37 V		27 V - 45 V		
Operating range	16 V - 48 V		16 V - 60 V		
Min/Max start voltage	22 V / 48 V		22 V / 60 V		
Max DC short circuit current (module Isc)	15 A		15 A		
Overvoltage class DC port	II		II		
DC port backfeed current	0 A		0 A		
PV array configuration	AC side protect	ed array; No addition ion requires max 20	A per branch circu	ıit	
OUTPUT DATA (AC)	IQ 7 Microinve	erter	IQ 7+ Microin	verter	
Peak output power	250 VA		295 VA		
Maximum continuous output power	240 VA		290 VA		
Nominal (L-L) voltage/range ²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V	
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)	
Nominal frequency	60 Hz		60 Hz		
Extended frequency range	47 - 68 Hz		47 - 68 Hz		
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms		
Maximum units per 20 A (L-L) branch circuit ^a	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)	
Overvoltage class AC port	III		111		
AC port backfeed current	18 mA		18 mA		
Power factor setting	1.0		1.0		
Power factor (adjustable)	0.85 leading (0.85 lagging	0.85 leading (0.85 lagging	
EFFICIENCY	@240 V	@208 V	@240 V	@208 V	
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3%	
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %	
MECHANICAL DATA					
Ambient temperature range	-40°C to +55°C				
Relative humidity range	4% to 100% (cor	ndensing)			
Connectortype	MC4 (or Amphe	nol H4 UTX with ad	ditional Q-DCC-5 a	adapte)	
Dimensions (HxWxD)	212 mm x 175 n	nm x 30.2 mm (with	out bracket)		
Weight	1.08 kg (2.38 lb	s)			
Cooling	Natural convect	ion - No fans			
Approved for wet locations	Yes				
Pollution degree	PD3				
Enclosure	Class II double-	insulated, corrosior	resistant polyme	ric endosure	
Environmental category / UV exposure rating	NEMA Type 6 /		polymo		
FEATURES					
Communication	Power Line Con	nmunication (PLC)			
Monitoring	Enlighten Mana	ger and MyEnlighte quire installation of			
Disconnecting means	The AC and DC	connectors have be		approved by UL for use as the load-break	
Compliance	disconnect required by NEC 690. 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 C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.				

- 1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
- Nominal voltage range can be extended beyond nominal if required by the utility.
 Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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PV SYSTEM INFORMATION

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PROJECT INFORMATION						
INITIAL	DATE: 3/21/2024	DESIGNER: AKL				
REV:	DATE:	DESIGNER:				
REV:	DATE:	DESIGNER:				

🕀 ENPHASE.

INVERTER DETAIL

PV-1.2



To learn more about Enphase offerings, visit enphase.com

Data Sheet Enphase Networking

IQ Combiner 4/4C



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 IO Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect hea:
- 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.)



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



IQ Combiner 4/4C

Enphase Energy, Inc. Data subject to chance

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 \pm 0.5%) and consumption monitoring (\pm 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	
Supported microinverters	IQ6, IQ7, and IQE. (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 (sclar and/or storage)	Up to four 2-poleEaton 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 (WxHzD)	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-cartified, 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 862.3, CatSE (or Cat6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3° Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2No. 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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LINDA MCCOMBS - MS148424 502 NE REBECCA TERRACE LAKE CITY, FL 32055 3863442764

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 6.56 KW
16 MODULES: HANWHA Q.PEAK DUO BLK
ML-G10+ 410
16 INVERTERS: ENPHASE
IQ7PLUS-72-2-US

PROJECT INFORMATION								
INITIAL	DATE: 3/21/2024	DESIGNER: AKL						
REV:	DATE:	DESIGNER:						
REV:	DATE:	DESIGNER:						

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

COMBINER DETAIL

PV-1.3

Q.PEAK DUO BLK ML-G10+ SERIES



385-410 Wp | 132 Cells 20.9 % Maximum Module Efficiency

MODEL Q.PEAK DUO BLK ML-G10+





Breaking the 20% efficiency barrier

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



A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty¹



Enduring high performance

Long-term yield security with Anti LeTID Technology, Antl PID Technology² and Hot-Spot Protect.



Extreme weather rating

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



Innovative all-weather technology

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



The most thorough testing programme in the industry

Qcells is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

The ideal solution for:







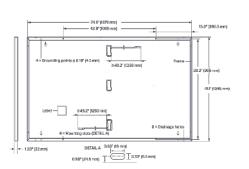




Q.PEAK DUO BLK ML-G10+ SERIES

■ Mechanical Specification

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (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	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥49.2 in (1250 mm), (-) ≥49.2 in (1250 mm)
Connector	Stäubli MC4; IP68



■ Electrical Characteristics

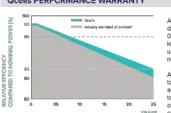
		385	390	395	400	405	410
ST CONDITIONS, ST	C1 (POWER 1	OLERANCE +51	v/-ow)				
Pmpp	[W]	385	390	395	400	405	410
l _{sc}	[A]	11.04	11.07	11.10	11.14	11,17	11.20
V _{oc}	[V]	45.19	45.23	45.27	45.30	45.34	45.37
I _{MPP}	[A]	10.59	10.65	10.71	10.77	10.83	10.89
V _{NPP}	[V]	36.36	36.62	36.88	37.13	37.39	37.64
η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6	≥20.9
	P _{MPP} I _{SC} V _{OC} I _{MPP}	P _{MPP} [W] _{SC} [A] _{VOC} [V] _{MPP} [A] _{MPP} [V]	ST CONDITIONS, STC' (POWER TOLERANCE +5 V P_MPP	ST CONDITIONS, STC' (POWER TOLERANCE +5W/-0W) P_{Netty}	ST CONDITIONS, STC' (POWER TOLERANCE +5W/-0W) P_MPP	ST CONDITIONS, STC' (POWER TOLERANCE +5W/-0W) STC POWER TOLERANCE +5W/-0W POWER TOLERANCE +5W/-0W STC POWER TOLERANCE +5W/-0W POWER TOLERANCE +5W/-0W STC POWER TOLERANCE +5W/-0W POWER TOLERANCE +5W	ST CONDITIONS, STC' (POWER TOLERANCE +5W/-0W) P_Nerr

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT

IVIII	MINION FERFORMANCE AT NORMAL OF EXALING CO	DIAIDILIOIA:	3, 14191011-						
	Power at MPP	P_{MPP}	[W]	288.8	292.6	296.3	300.1	303.8	307.6
Ę	Short Circuit Current	l _{sc}	[A]	8.90	8.92	8.95	8.97	9.00	9.03
į.	Open Circuit Voltage	Vac	[V]	42.62	42.65	42.69	42.72	42.76	42.79
Ž	Current at MPP	I _{MPP}	[A]	8.35	8.41	8.46	8.51	8.57	8.62
	Voltage at MPP	V _{MPP}	[V]	34.59	34.81	35.03	35.25	35.46	35.68

*Measurement tolerances P_{MPP} ±3%; I_{sc}; V_{OC} ±5% at STC: 1000 W/m², 25±2°C, AM 1.5 according to IEC 60904-3 • ²800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY



tandard terms of guarantee for the 5 PV companies with the ghest production capacity in 2021 (February 2021)

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 Ocells sales organisation of your respective country.

90 400 600 800 5000 IRRADIANCE (W/m²)

PERFORMANCE AT LOW IRRADIANCE

Typical module performance under low irradiance of

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I _{sc}	a	[%/K]	+0.04	Temperature Coefficient of V _{oc}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	у	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4

■ Properties for System Design

Maximum System Voltage	V _{sys}	[V]	1000 (IEC)/1000 (UL)
Maximum Series Fuse Rating		[A DC]	20
Max. Design Load, Push/Pull ^a		[lbs/ft ²]	75 (3600 Pa) / 55 (2660 Pa)
Max. Test Load, Push/Pull ³		[lbs/ft°]	113 (5400 Pa)/84 (4000 Pa)
3 See Installation Manual			

■ Qualifications and Certificates

UL 61730, CE-compliant, Quality Controlled PV - TÜV Rheinland IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells),









Quells pursues minimizing paper output in consideration of the global environment.

ocells

momentum

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

PROFESSIONAL ENGINEERING

No PE86753

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and the signature must be verified on any electronic copies

Printed copies of this document are

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Date: 2024.03.21 06:03:21 -05:00

SOLAR CONTRACTOR

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

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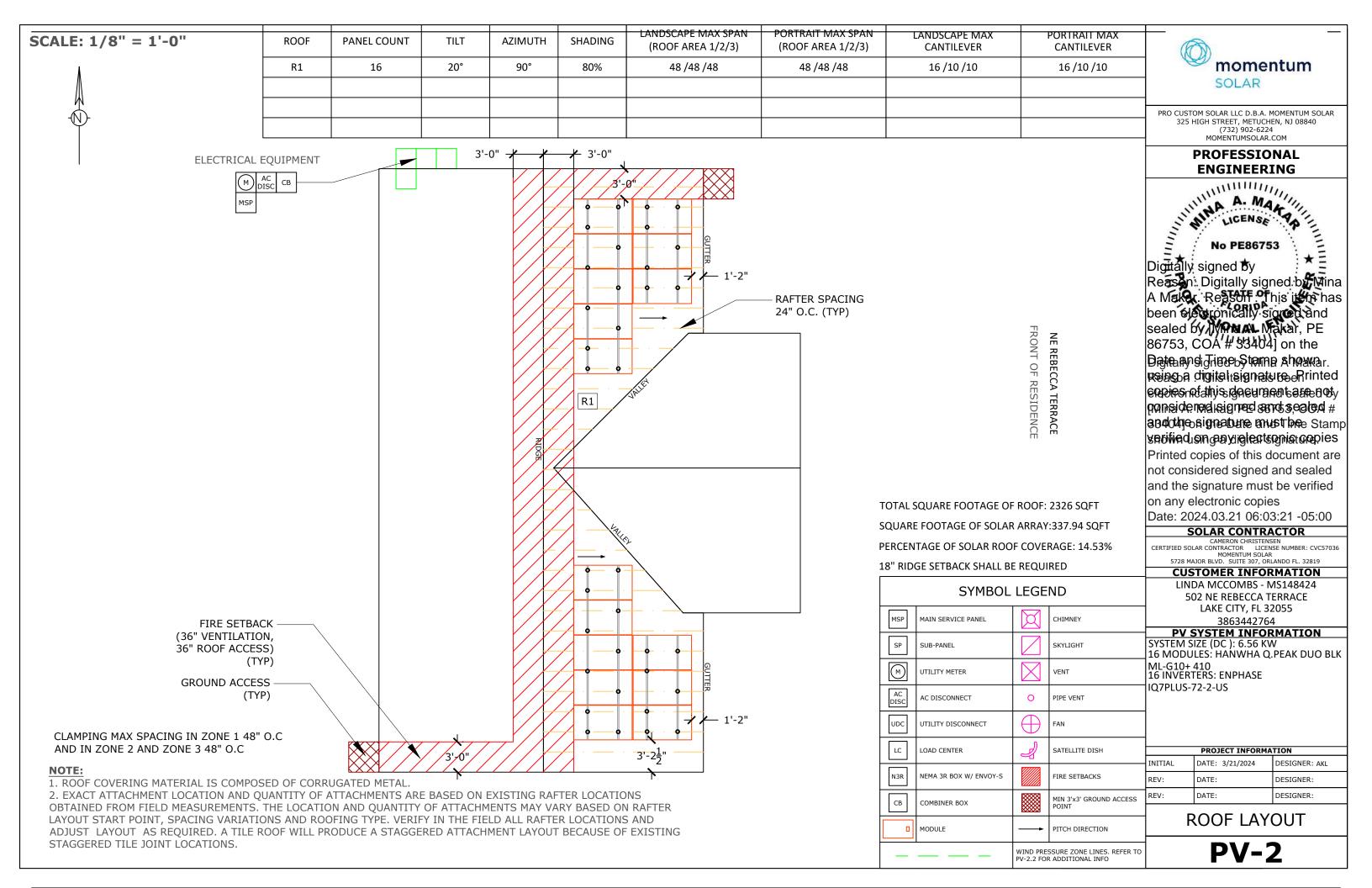
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PANEL DETAIL

PV-1.4

¹ See data sheet on rear for further information.

² APT test conditions according to IEC/TS 628044:2015, method A (-1500 V, 96h)



ſ													
	PV MODULE RA	TINGS	INVERTER RATINGS				VOLTAG	GE DROP CALC	ULATIONS				
	MODULE MAKE	HANWHA	INVERTER MAKE	ENPHASE		FORMULA USI	ED PER NEC H	ANDBOOK 215	5.2(A)(4) WHE	RE APPLICABL	_E		
	MODEL	HANWHA	MODEL	IQ7PLUS-72-2-	WIRE RUN	V_{mp}	I_{mp}	R	L (FT)	Vo	% V _o	WIRE SIZE	
	MODEL	Q.PEAK DUO BLK ML-G10+ 410		US	BRANCH TO J-BOX	240.00	9.68	1.98	52.67	2.019	0.84%	12 AWG	
	MAX POWER	410W	MAX OUTPUT POWER	290W							 	<u> </u>	PR
	OPEN CIRCUIT VOLTAGE	45.37V	OPEN DC VOLTAGE	60V	J-BOX TO LOAD CENTER	240.00	19.36	1.24	50.00	2.401	1.00%	10 AWG	
	MPP VOLTAGE	37.64V	NOMINAL AC VOLTAGE	240V	LOAD CENTER TO AC	240.00	24.2	0.778	3.00	0.113	0.05%	08 AWG	
•	SHORT CIRCUIT CURRENT	11.2A	MAX AC CURRENT	1.21A	DISCONNECT	240.00	24.2	0.778	3.00	0.115	0.05%	Uo AVVG	
	MPP CURRENT	10.89A	CEC INVERTER EFFICIENCY	97%	AC DISCONNECT TO INTERCONNECTION	240.00	24.2	0.491	10.00	0.238	0.10%	06 AWG	
	NUMBER OF MODULES	16	NUMBER OF INVERTERS	16				ı		1	1	1	

SUB PANEL **BREAKER SIZE**

UL1703 COMPLIANT

PV BREAKER # OF MODULES PER BRANCH **UP TO 16**

YES

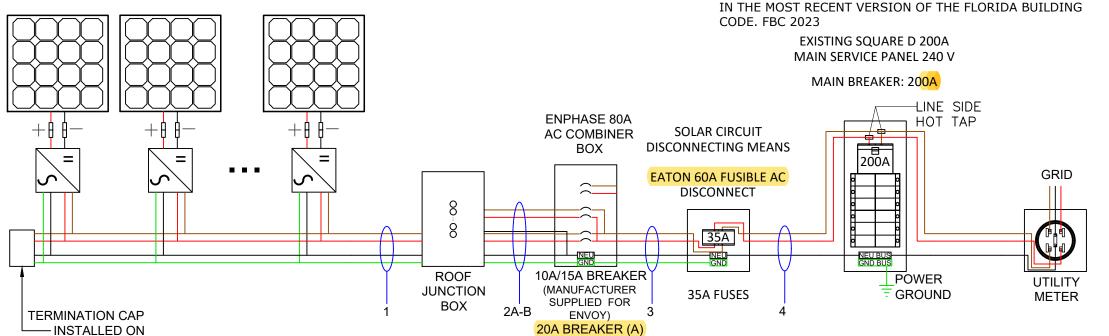
THIS SOLAR PHOTOVOLTAIC SYSTEM COMPLIES WITH THE 2023 FLORIDA BUILDING CODE AND THE 2020 NATIONAL ELECTRICAL CODE

YES

16 HANWHA Q.PEAK DUO BLK ML-G10+ 410 410W MODULES PAIRED WITH 16 ENPHASE IQ7PLUS-72-2-US MICRO-INVERTERS

UL1703 COMPLIANT

BRANCH CIRCUIT A 8 MICRO-INVERTERS BRANCH CIRCUIT B 8 MICRO-INVERTERS



20A BREAKER (B)

Wire Derated **Ground Wire** Wire Inverter Design Temp. Conduit NEC Temp. Ground Wire Tag Wire Qty Wire Type NOC (A) Conduit Gauge Rating Ampacity (A) Ampacity (A) Qty Current (A) Type Derate Fill Derate Correction Size OPEN AIR 2 12 AWG Trunk Cable 90°C 30 0.96 28.80 8 1.21 1.25 12.10 12 AWG Trunk Cable 1 2A 10 AWG THWN-2 75°C 35 0.96 26.88 8 1.21 1.25 12.10 3/4" PVC 4 0.8 08 AWG THWN-2 2B 75°C 8 10 AWG THWN-2 35 0.96 26.88 1.21 1.25 12.10 3 3/4" PVC 3 + G08 AWG THWN-2 75°C 50 0.96 1 48.00 16 1.21 1.25 24.20 08 AWG THWN-2 3/4" PVC 06 AWG THWN-2 75°C 65 0.96 1 62.40 16 1.21 1.25 24.20 THWN-2

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

END OF CABLE



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PROFESSIONAL ENGINEERING



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

Reason: Digitally signed by Mina A Maker Reason This it is has been electronically signed and sealed by MANAL Makar, PE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED 86753, COA # \$3404] on the Date and Jine Stame shawar. ksiaspa digitaltsignatureeRrinted |eadesnatathis:daeuraeatseaeuroty pansidenad signed sandseated # | **3040th| 606 igneature anust he** Stamp sephadian any iglect coniat copies

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SOLAR CONTRACTOR

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REV:	DATE:	DESIGNER:									
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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 690.43(A) THROUGH (D) WITH 250.134 OR 250.136.
- 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**
- 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 ILSCO 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

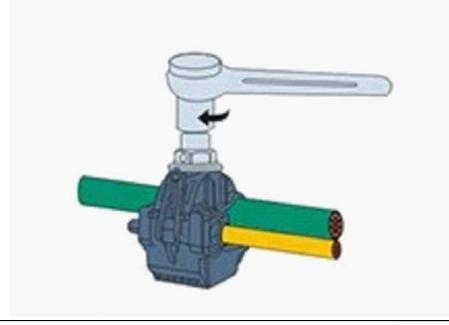
- 22. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C)(1) AND ARTICLE 310.8 (D).
- 24. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL 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 690.51
- 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(B), 690.6.
- 31. WHERE APPLICABLE: INTERCONNECTION SHALL COMPLY WITH 705.11(A) THROUGH (E) OR 705.12(B) THROUGH (E)
- 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

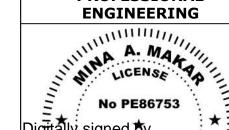
- 1. ADJUST THE CONNECTOR NUT TO SUITABLE LOCATION
- PUT THE BRANCH WIRE INTO THE CAP SHEATH FULLY
- INSERT THE MAIN WIRE, IF THERE ARE TWO LAYS OF INSULATED LAY IN THE MAIN CABLE, SHOULD STRIP A CERTAIN LENGTH OF THE FIRST INSULATED LAY FROM INSERTED END
- TURN THE NUT BY HAND, AND FIX THE CONNECTOR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





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

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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 SHAL	L ADEQUATELY W	ARN OF THE HAZARD. LABE	LS SHALL BE PERMANENTLY AFFIXED TO THE I	EQUIPMENT, AND LABELS REQUIRED SHALL BE SUITABLE FOR THE ENVIRONMEN
TAG	LABEL	QUANTITY	LOCATION	NOTE 1 AT EVERY SEPARATION BY	EXAMPLES
0	AC SOLAR VOLTAGE	12	AC CONDUITS	ENCLOSURES / WALLS / PARTITIONS / CEILINGS / FLOORS OR NO MORE THAN 10'	
0	WARNING: PHOTOVOLTAIC POWER SOURCE POWER SOURCE PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN	1	COMBINER BOX	1 AT ANY COMBINER BOX	
0	ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION	1	JUNCTION BOX	1 AT ANY JUNCTION BOX	
0	PHOTOVOLTAIC SYSTEM AC DISCONNECT A RATED AC OUTPUT CURRENT 19.36 A NOMINAL OPERATING AC VOLTAGE 240 V POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR GENERATION AC SYSTEM DISCONNECT AC SYSTEM DISCONNECT AC WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION PHOTOVOLTAIC SYSTEM INSTALLED BY MOMENTUM SOLAR 3096 B HAMILTON BLVD S. PLAINFIELD, NJ 07080 PHONE NUMBER:732-902-6224	1	AC DISCONNECT (RSD SWITCH)	1 OF EACH AT FUSED AC DISCONNECT COMPLETE VOLTAGE AND CURRENT VALUES ON DISCONNECT LABEL	CANCEL OF DECISION AND ADDRESS OF THE PARTY
0	DUAL POWER SUPPLY SECOND SOURCE IS PHOTOVOLTAIC SYSTEM	1	UTILITY METER	1 AT UTILITY METER	ELECTRIC SHOCK HAZARO DO NOT TUDICH TEMBANAS TERRIHAS OR ROOTH RE USE AND LOND SIRES WAY BE SHREQUED IN THE OPEN POSITION
0	EMERGENCY RESPONDER THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN ENTIRE PV SYSTEM BECTIONS SHITCH ON HEAD THE RAPID SHUTDOWN SHITCH OFFERD	1	INTERCONNECTION POINT	4 OF FACH AT BUILDING	CALVESTS WITH THE PARTY OF THE
	POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE	1	BACKFEED PANEL	1 OF EACH AT BUILDING INTERCONNECTION POINT	1.210×ce 2.31
0	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	1	AC CURRENT PV MODULES		A. WARNING A. DUAL FOWER SUPPLY SOURCE ULLIV SUPPLY SOURCE ULLIV SUPPLY AVIOLATION OF THE PROPERTY OF THE PROP

















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PROFESSIONAL ENGINEERING

No PE86753

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EQUIPMENT LABELS

PV-3.2