



2 LOCATION MAP / WIND ZONES
N.T.S.



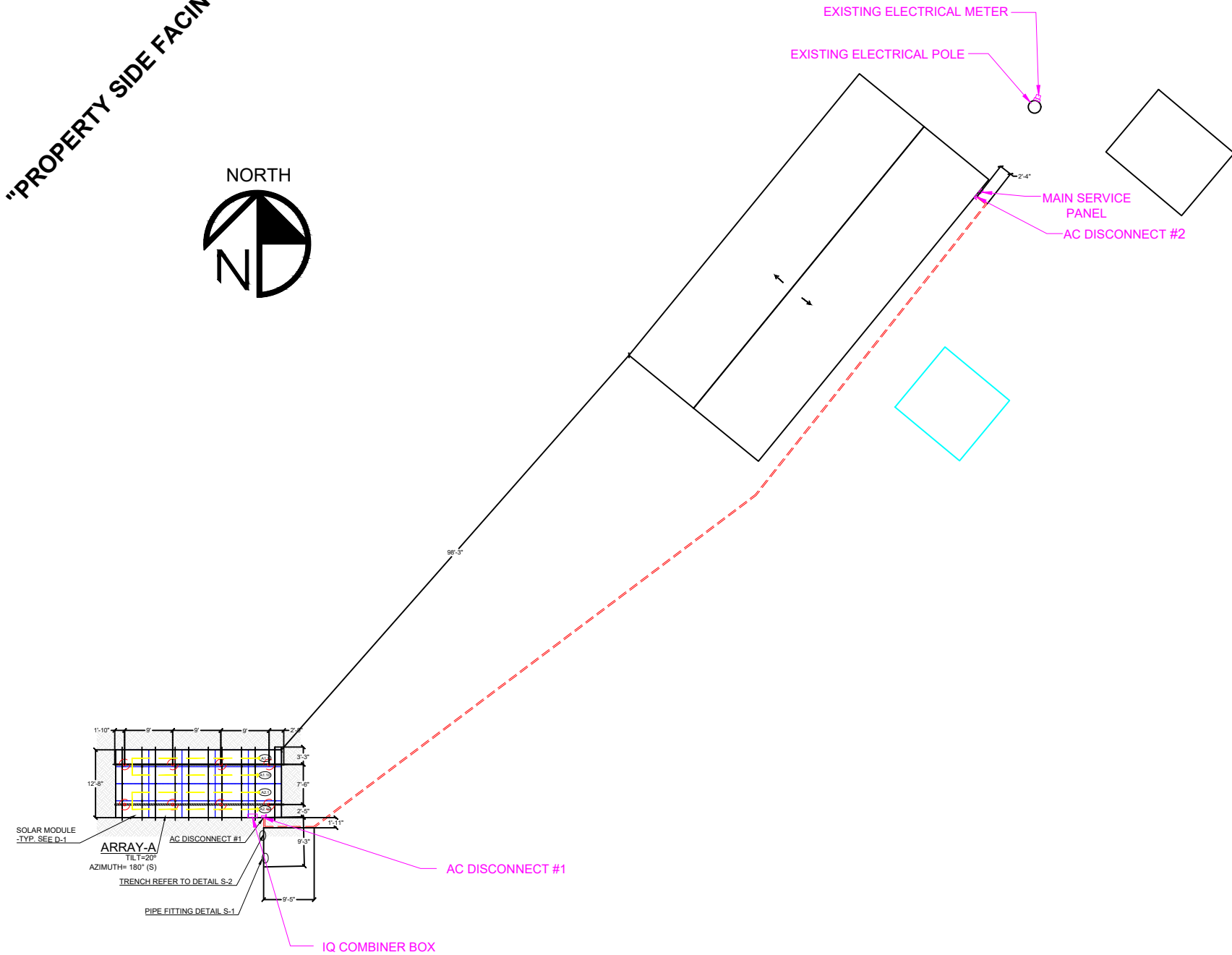
3 IRRADIANCE MAP
N.T.S.



4 3D RENDERING
N.T.S.



1 SITE/ROOF PLAN VIEW / BOS LOCATION
N.T.S.



PROJECT DESCRIPTION

SYSTEM CAPACITY: 7.9 KW DC / 5.9 KW AC
PV PANELS: (20) Q.PEAK DUO BLK ML-G10+ 395W
COMBINER BOX: (1) IQ COMBINER BOX 3 BY ENPHASE
INVERTER: (20) IQ7+ BY ENPHASE
RACKING SYSTEM: CROSS RAIL 80 BY K2 SYSTEMS

PROJECT INFORMATION

PROJECT LATITUDE	30.0787	MIN AMBIENT TEMP	-5 ° C
PROJECT LONGITUDE	-82.768989	MAX AMBIENT TEMP	35 ° C
AHJ	COLUMBIA COUNTY	WIND EXPOSURE	B
		DESIGN WIND SPEED	119 MPH

DRAWINGS INDEX

C-1	COVER SHEET
C-2	SAFETY PLANS
E-1	ONE LINE RISER DIAGRAM
E-2	SAFETY LABELS
S-1	STRUCTURAL PLAN
S-2	RACKING PLAN
D-1	PV MODULES DATA SHEET
D-2	SMART MONITORING DATA SHEET
D-3	INVERTER DATA SHEET

GENERAL NOTES

PER FL. STATUTE 377.705 (REVISED 7/1/2017), I RAFAEL A. GONZALEZ SOTO, P.E. 83104 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.

APPLICABLE CODES: 2020 FLORIDA BUILDING CODE 7TH EDITION, ASCE 7-16 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES, FFPC 7TH EDITION, NFPA 2018, NFPA 70 AND NEC 2017.

CONTRACTOR SHALL ENSURE ALL ROOF PENETRATIONS TO BE INSTALLED AND SEALED PER 2020 FLORIDA BUILDING CODE 7TH EDITION OR LOCAL GOVERNING CODE.

ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE (NEC) 2017, LOCAL STATE CODES, AND OTHER APPLICABLE LOCAL CODES. MEANS SHALL BE PROVIDED TO DISCONNECT ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS IN THE BUILDING. CONNECTORS TO BE TORQUED PER DEVICE LISTING, OR MANUFACTURERS RECOMMENDATIONS. NON-CURRENT CARRYING METAL PARTS SHALL BE CHECKED FOR PROPER GROUNDING.

REQUIRED SAFETY SIGNS AND LABELS SHALL BE PERMANENTLY ATTACHED BY ADHESIVE, OR OTHER MECHANICAL MEANS, LABELS SHALL COMPLY WITH ARTICLE 690 VI OF THE NEC 2017 OR OTHER APPLICABLE STATE AND LOCAL CODES. SEE LABELS AND MARKING PAGE FOR MORE INFORMATION.

RACKING ROOF MOUNT SYSTEM SHALL BE INSTALLED FOLLOWING MANUFACTURERS INSTRUCTION SPEC'S, INCLUDING ALL GROUNDING WEBB CLIPS, GROUND LUGS, AND RAIL SPLICE KITS FOR ELECTRICAL CONTINUITY.

MECAWIND TOOL IS BASED ON THE C&C WIND LOADS FOR ENCLOSED BUILDINGS. DESIGN WIND PRESSURES ARE CALCULATED USING ASCE 7-16 EQUATION 30.6-1. ALL NOTES IN FIGURES ASCE 7-16 30.4-1 AND 30.4-2(A,B AND /67C) HAVE BEEN INCORPORATED. MEAN ROOF HEIGHT MUST BE LESS THAN 60 FEET.

DOCUMENT CONTROL		DATE	CAD	QC
ISSUED FOR PERMIT		12-10-2021	BW	JC
REV	DESCRIPTION	DATE	CAD	QC

ENGINEER CONTACT INFORMATION	
ENGIPARTNERS LLC	
C.A. 32661	
255 GIRALDA AVE	
CORAL GABLES, FL 33134	
DESIGN@ENGIPARTNERS.COM	
833 - 888 - 3644	

ENGINEERING STAMP	
Digitally signed by Rafael A Gonzalez Soto	
Date: 2022.03.08	
08:15:55 -05'00'	

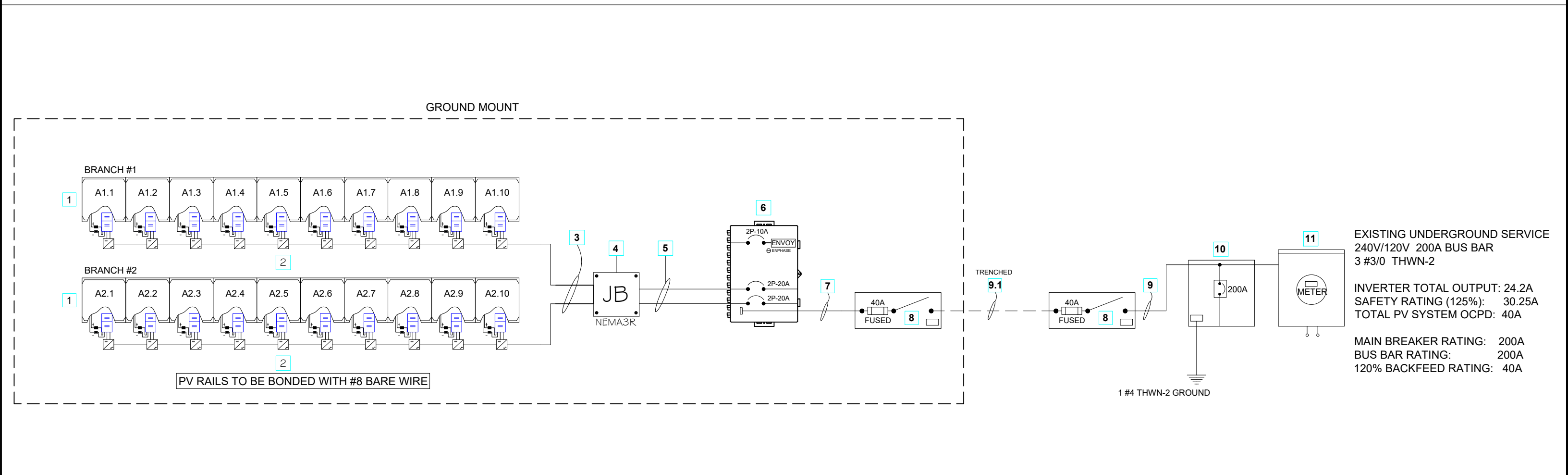
CONTRACTOR CONTACT INFORMATION	
TITAN SOLAR POWER FL	
12221 N US HIGHWAY 301	
THONOTASASSA, FL 33592	
(813) 982 -9001	
#EC13008093	

CONTRACTOR LOGO	

CUSTOMER:	HEATHER NEVILLE
PROJECT ADDRESS:	9291 FLORIDA 247 LAKE CITY FL 32024
PARCEL NUMBER:	015S1500423002

COVER SHEET		
SHEET NAME:		
PROJECT ID:	TSP100525	ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE:	12-14-2021	SHEET TITLE: C-1
		SHEETS: 1 OF 9

	WIRE SIZES, QUANTITY & TYPE			RACEWAY SIZE, TYPE, LOCATION & INFO.			WIRE AMPACITY CALCULATIONS					ADDITIONAL INFORMATION					
WIRE TAG	CONDUCTOR QTY. SIZE & TYPE	NEUTRAL QTY. SIZE & TYPE	GROUND QTY. SIZE & TYPE	RACEWAY SIZE & TYPE	RACEWAY LOCATION	RACEWAY HEIGHT ABOVE ROOF	OUTPUT CURRENT	125% OF OUTPUT CURRRENT	MIN OCPD	WIRE DE-RATED CALCULATION				DIST.	VOLTAGE	VOLTAGE DROP %	CONDUIT FILL %
										WIRE RATING	AMBIENT TEMP	# OF COND.	FINAL AMPACITY				
AC.1 (BEFORE JB)	(2) IQ CABLE BY ENPHASE	N/A	(1) #8 AWG BARE COPPER	NOT APPLICABLE	UNDER ARRAY	1/2" TO 3-1/2"	13A	16.25A	20A	30A X 0.76 X 1 = 22.8 A				10 FT.	240V	0.11%	6.4%
AC.2(FROM JB TO COMBINER BOX)	(4) #10 AWG THWN-2	N/A	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	ABOVE ROOF	1/2" TO 3-1/2"	13A	16.25A	20A	40A X 0.76 X 0.8 = 24.3 A				20 FT.	240V	0.21%	8.1%
AC.3(FROM COMBINER BOX TO SERVICE)	(2) #6 AWG THWN-2	(1) #6 AWG THWN-2	(1) #8 AWG THWN-2	1 1/2 PVC SCH80 CONDUIT	EXTERIOR WALL	"N/A"	24.2A	30.25A	40A	70A X 1 X 1 = 75 A				186.11 FT.	240V	0.1%	8.5%



1 ONE LINE RISER DIAGRAM

N.T.S.

LEGEND:

1	(20) Q.PEAK DUO BLK ML-G10+ 395W REFER TO D-1 SHEET	2	(20) IQ7+ MICROINVERTER BY ENPHASE REFER TO D-3 SHEET	3	2 IQ CABLE BY ENPHASE 1 #8 BARED WIRE GROUND
4	NEMA 3R JUNCTION BOX	5	4 #10 THWN-2 1 #8 THWN-2 GROUND 3/4" EMT CONDUIT	6	IQ COMBINER BOX BY ENPHASE REFER TO D-2 SHEET
7	2 #6 L1, L2 THWN-2 1 #6 THWN-2 NEUTRAL 1 #8 THWN-2 GROUND 1 1/2 PVC SCH80 CONDUIT	8	PV SYSTEM DISCONNECT RATED 60A WITH 40A FUSES	9	2 #6 THWN-2 1 #6 THWN-2 NEUTRAL 1 1/2 EMT CONDUIT
9.1	2 #6 THWN-2 1 #6 THWN-2 NEUTRAL 1 1/2 PVC SCH80 CONDUIT	10	PV INTERCONNECTION POINT- SUPPLY SIDE	11	UTILITY ELECTRICAL SERVICE

DOCUMENT CONTROL				ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:		
ISSUED FOR PERMIT				12-10-2021		BW/JC		TITAN SOLAR POWER FL		TITAN SOLAR POWER		HEATHER NEVILLE		ONE LINE RISER DIAGRAM		
REV DESCRIPTION				DATE		CAD QC		12221 N US HIGHWAY 301		9291 FLORIDA 247 LAKE CITY FL 32024		PROJECT ADDRESS:		PROJECT ID:		
								THONOTASASSA, FL 33592						ENGINEER OF RECORD:		
								(813) 982 -9001						ENG. RAFAEL A. GONZALEZ SOTO, PE		
								#EC13008093						DATE:		
														12-14-2021		
														SHEET TITLE:		
														E-1		
														SHEETS:		
														3 OF 9		

**WARNING**

ELECTRICAL SHOCK HAZARD

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

LABEL LOCATION:
AC DISCONNECT,
POINT OF INTERCONNECTION
PER CODE: NEC 690.13 (B)

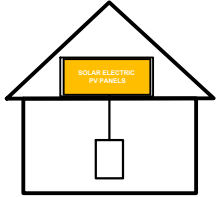
**WARNING**

TURN OFF PHOTOVOLTAIC
AC DISCONNECT PRIOR TO
WORKING INSIDE PANEL

LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 110.27 (C)
OSHA 1910.145(f)(7)

SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

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



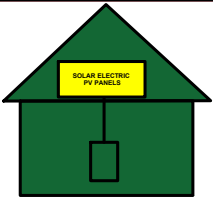
LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 690.56(C)(3)

PHOTOVOLTAIC
SYSTEM EQUIPPED
WITH RAPID SYSTEM
SHUTDOWN

LABEL LOCATION:
AC DISCONNECT
POINT OF INTERCONNECTION
PER CODE: NEC 690.56(C)

EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM IS
EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN
SWITCH TO THE "OFF"
POSITION TO SHUT DOWN
THE ENTIRE PV SYSTEM.



LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: FFPC 7TH EDITION: 11.12.2.1.1.1.1

INVERTER #1

NOMINAL OPERATING AC VOLTAGE

240 V

NOMINAL OPERATING AC FREQUENCY

60 HZ

MAXIMUM AC POWER

5.9 KW

MAXIMUM AC CURRENT

24.2 A

MAX OVERCURRENT DEVICE RATING
FOR AC MODULE PROTECTION

N/A

LABEL LOCATION:
INVERTER
PER CODE: NEC 690.52

MAXIMUM VOLTAGE

60 VDC

MAXIMUM CIRCUIT CURRENT

15.73 A

MAX RATED OUTPUT CURRENT OF
THE CHARGE CONTROLLER OR DC-TO-DC
CONVERTER
(IF INSTALLED)

N/A

LABEL LOCATION:
INVERTER
PER CODE: NEC 690.53

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:

24.2 A

NOMINAL OPERATING AC VOLTAGE:

240V

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.54

MAIN PHOTOVOLTAIC
SYSTEM DISCONNECT

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.13 (B)

WARNING: PHOTOVOLTAIC
POWER SOURCE

LABEL LOCATION:
MAIN SERVICES DISCONNECT, DC CONDUIT
PER CODE: NEC 690.31 (G) (3)

**WARNING**

DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:
POINT OF
INTERCONNECTION
PER CODE: NEC 705.12 (B)(3)

**WARNING**

POWER SOURCE OUTPUT CONNECTION. DO NOT
RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
POINT OF
INTERCONNECTION
PER CODE: NEC
705.12(B)(2)(3)(b)

**CAUTION**

PHOTOVOLTAIC SYSTEM CIRCUIT IS SUPPLY SIDE

LABEL LOCATION:
MAIN SERVICE PANEL
PER CODE: NEC 690.45(B)(5)

DO NOT DISCONNECT
UNDER LOAD

LABEL LOCATION:
POINT OF
INTERCONNECTION
PER CODE:
NEC 690.33(E)(2) & NEC
690.15 (C)

CAUTION: SOLAR ELECTRIC
SYSTEM CONNECTED

LABEL LOCATION: POINT OF INTERCONNECTION
PER CODE: NEC 690.15, NEC 690.13(B)

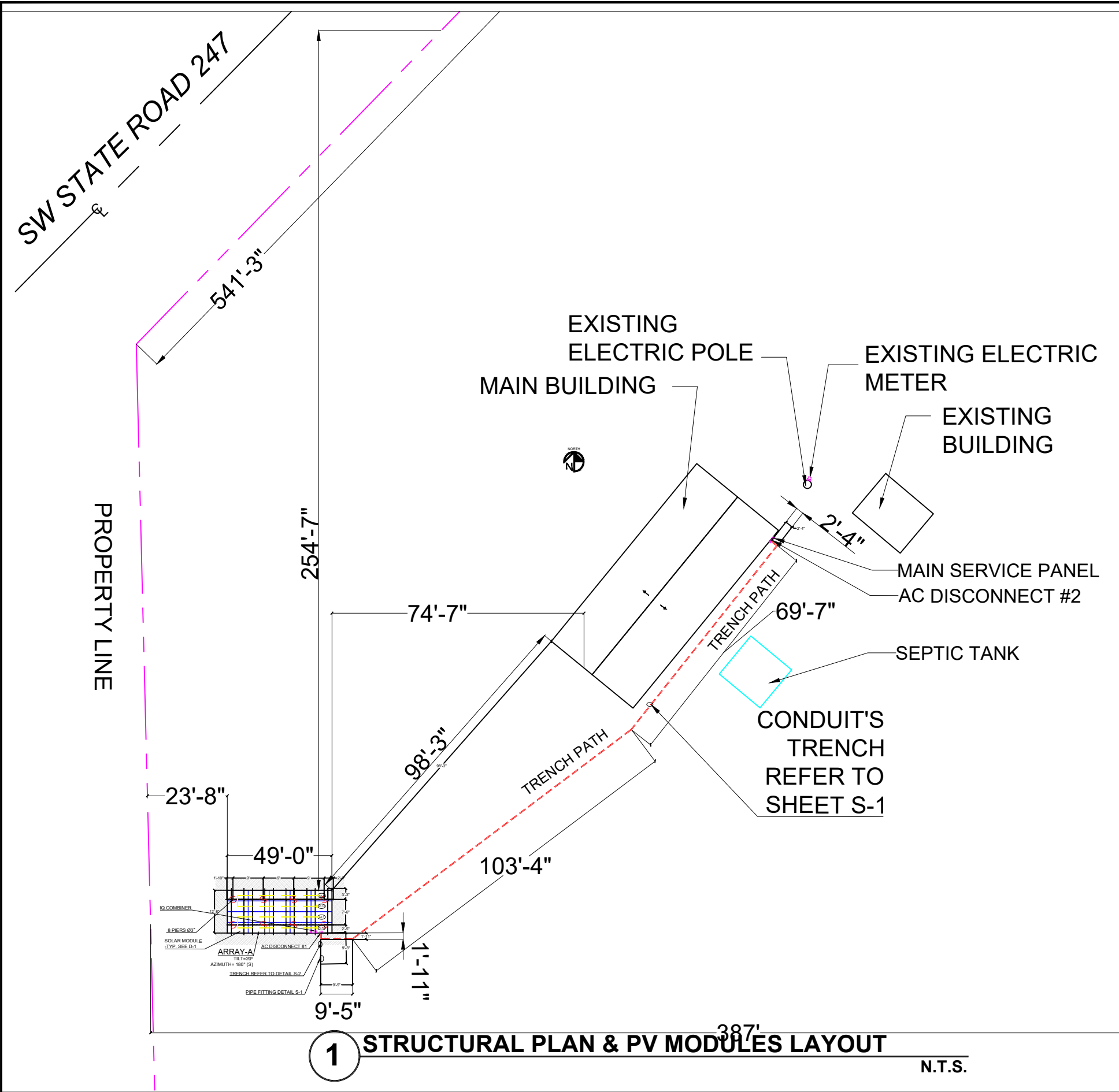
LABEL LOCATION: ADJACENT TO MAIN DISCONNECT

**TITAN**
SOLAR POWER
FLORIDA
901 ARMSTRONG BLVD, KISSIMMEE, FL 34741
1-855-SAY-SOLAR

1

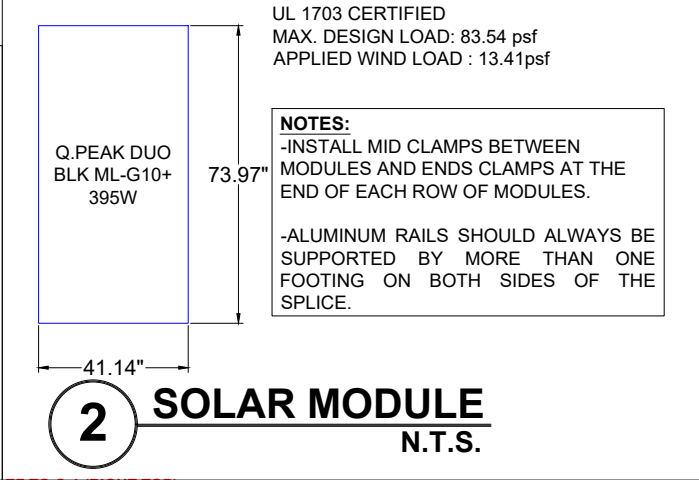
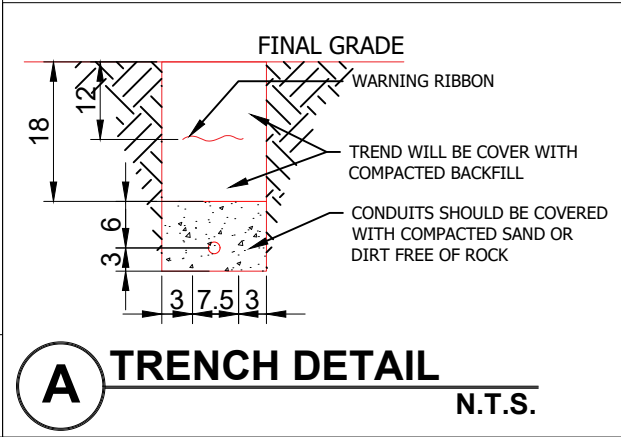
PV SAFETY LABELS DATA
N.T.S.

DOCUMENT CONTROL				DATE	CAD	QC	ENGINEER CONTACT INFORMATION				ENGINEERING STAMP				CONTRACTOR CONTACT INFORMATION				CONTRACTOR LOGO				CUSTOMER:				SHEET NAME: SAFETY LABELS												
ISSUED FOR PERMIT				12-10-2021	BW	JC	ENGIPARTNERS LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644				 Digitally signed by Rafael A Gonzalez Soto Date: 2022.03.08 08:16:20 -05'00'				TITAN SOLAR POWER FL 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093								HEATHER NEVILLE																
REV				DESCRIPTION																			DATE				CAD				QC				PROJECT ADDRESS:				
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																																			015S1500423002				
																								PROJECT ID:				ENGINEER OF RECORD:				SHEET TITLE:							
																								TSP100525				ENG. RAFAEL A. GONZALEZ SOTO, PE				E-2							
																												DATE:				SHEETS:							
																												12-14-2021				4 OF 9							



DESIGN WIND PRESSURE CALCULATIONS FOR SOLAR MODULES INSTALLED ON GROUND			
ARRAY DETAILS			
FBC VERSION	2020	RISK CATEGORY	I
CONFIG	4x5	EXPOSURE CATEGORY	C
MODS / PIERS	2.5	N-S SPACING	7'- 6"
PIERS	8	PIPE CANTILEVER	0'- 8"
SOUTH PIERS	4 (2'-6")	ULTIMATE WIND SPEED	110mph
NORTH PIERS	4 (4'-6")	TOTAL PIPE LENGTH	98'
DIAGONAL PIPES	YES	GROUND SNOW LOAD	0 psf
TOTAL RAILS	10		
RAIL CANTILEVER	3'-3"		
RAIL TYPE	CROSS RAIL 80		
SUBSTRUCTURE		FOUNDATION	
TILT ANGLE	25°	SOIL CLASS	4
PIPE SIZE	1.5"	HOLE DIAMETER	1'-8"
E-W PIER SPACING	9'- 0"	TYPE	CONCRETE
DIAGONAL BRACING	YES	MIN HOLE DEPTH	5'-0"
TOTAL FOUNDATIONS	8		
SOUTH CLEARANCE	1'- 11"		
NORTH CLEARANCE	5'- 1"		
REACTION FORCES			
SHEAR	1250 lbs	MOMENT	0 ft-lbs
		UPLIFT	-708.34 lbs

LEGEND & SYMBOLS	
OBS	OBSTRUCTIONS
XX.X	ARRAY # MODULE # STRING #
	PV MODULES
	ROOF MOUNTS & RAIL



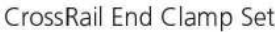
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ISSUED FOR PERMIT				DATE	CAD	QC		TITAN SOLAR POWER FL				HEATHER NEVILLE		STRUCTURAL PLAN				
REV				DATE	CAD	QC		12221 N US HIGHWAY 301										
								THONOTASASSA, FL 33592										
								(813) 982 -9001										
								#EC13008093										
							Digitally signed by Rafael A Gonzalez Soto							ENGINEER OF RECORD:				
							Date: 2022.03.08							ENG. RAFAEL A. GONZALEZ SOTO, PE				
							08:16:27 -05'00							DATE:				
														12-14-2021				
														SHEET TITLE:				
														S-1				
														SHEETS:				
														5 OF 9				



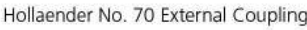
Material: aluminum
Finish: mill



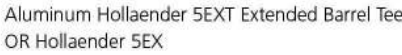
30-47 mm, 48-50 mm
Material: stainless steel
Finish: silver, dark



30-50mm
Material: stainless steel
Finnish: silver, dark



Material: aluminum



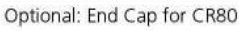
Material: aluminum



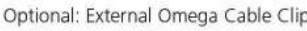
Material: aluminum



Material: stainless steel
Finish: silver, black
Hardware: stainless steel



Material: glass fiber reinforced polamide

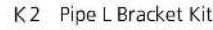


Material: polyamide, black

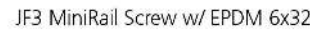


Material: stainless steel

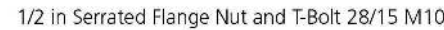
NON UL LISTED COMPONENTS



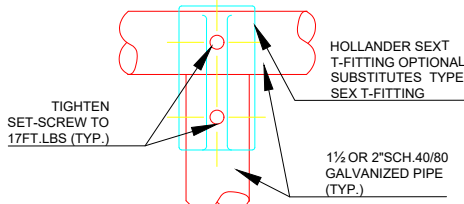
Material: stainless steel, galvanized steel



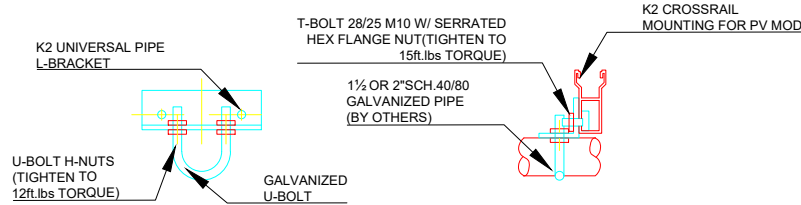
Material: stainless steel



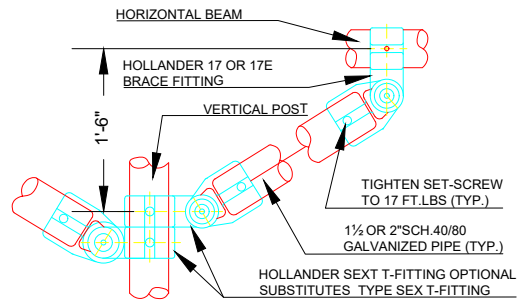
Material: stainless steel



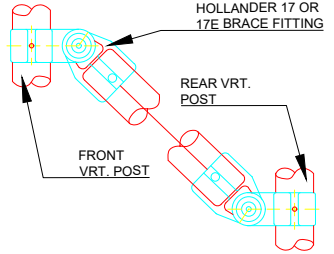
A GROUND MOUNT T-FITTING
SCALE: 3"=1'



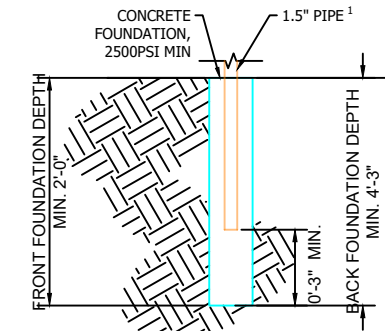
(B) K2 1.5" PIPE L-BRACKET
SCALE: 3"=1'



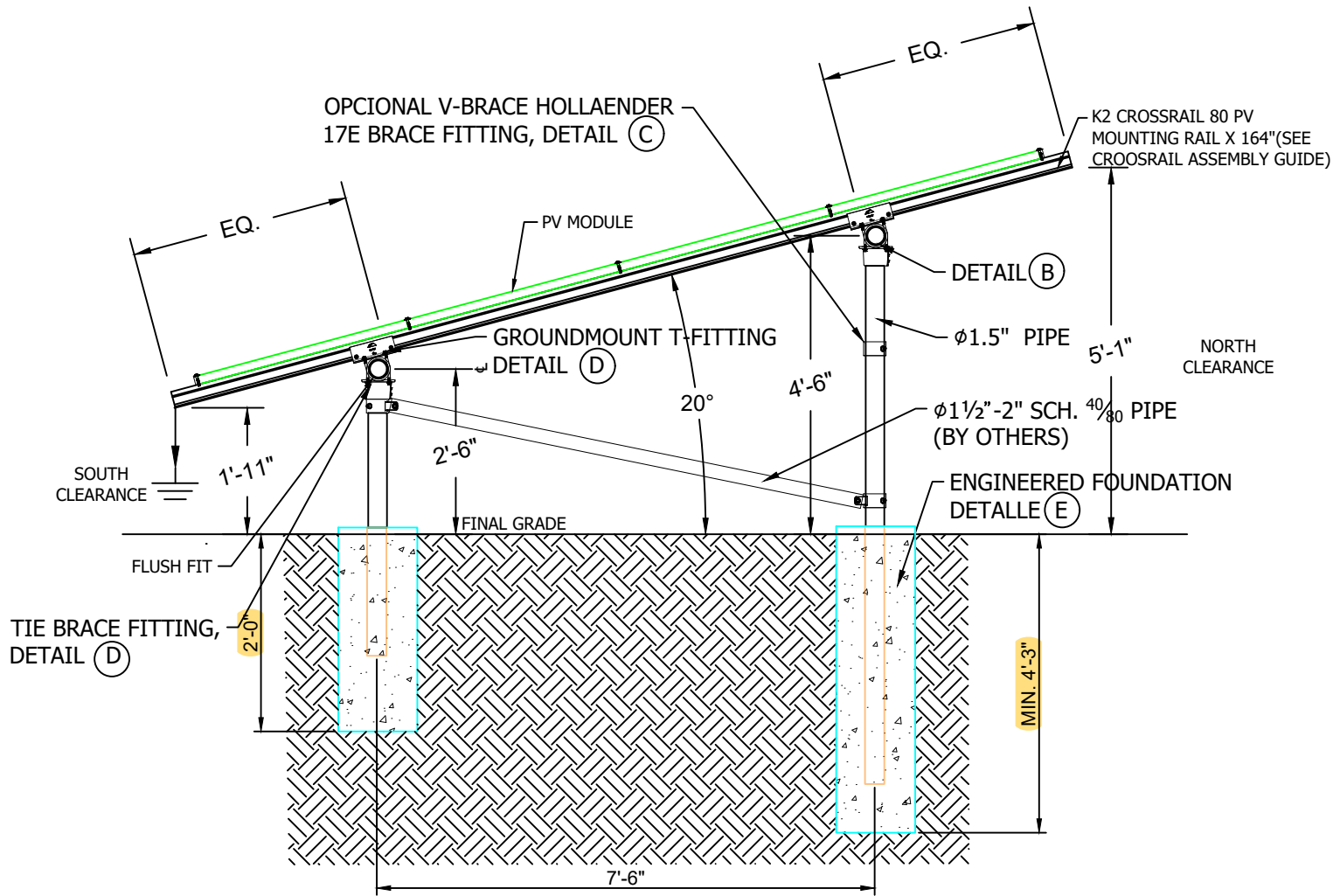
OPTIONAL V-BRACE (TYP. EACH POST)
SCALE: 3"=1'



TIE BRACE CONNECTIONS
SCALE: 3"=1'



(E) FOUNDATION DETAILS
SCALE: 1/2" = 1'



PV SYSTEM SIDE SECTION

SCALE: 3/4"=1'

DOCUMENT CONTROL		DATE	CAD	QC
ISSUED FOR PERMIT		12-10-2021	BW	JC
REV	DESCRIPTION	DATE	CAD	QC

ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO		CUSTOMER:		SHEET NAME:	
ENGIPARTNERS LLC C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134 DESIGN@ENGIPARTNERS.COM 833 - 888 - 3644		 Digitally signed by Rafael A Gonzalez Soto Date: 2022.03.08 08:16:35 -05'00'		TITAN SOLAR POWER FL 12221 N US HIGHWAY 301 THONOTASASSA, FL 33592 (813) 982 -9001 #EC13008093				HEATHER NEVILLE PROJECT ADDRESS: 9291 FLORIDA 247 LAKE CITY FL 32024 PARCEL NUMBER: 015S1500423002		RACKING PLAN PROJECT ID: TSP100525 ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE DATE: 12-14-2021 SHEET TITLE: S-2 SHEETS: 6 OF 9	

powered by

Q.ANTUM DUO Z

Q.PEAK DUO BLK ML-G10+

385-405

ENDURING HIGH PERFORMANCE

25^{YR} Warranty

EUPD RESEARCH
TOP BRAND PV
MODULES
EUROPE
2021

Q CELLS
Yield Security

BREAKING THE 20% EFFICIENCY BARRIER

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

THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS 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.

INNOVATIVE ALL-WEATHER TECHNOLOGY

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

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 aluminum alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).

A RELIABLE INVESTMENT

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

THE IDEAL SOLUTION FOR:

Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	74.0in × 41.1in × 1.26in (including frame) (1879mm × 1045mm × 32mm)
Weight	48.5lbs (22.0kg)
Front Cover	0.13in (3.2mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98in × 1.26-2.36in × 0.59-0.71in (53-101mm × 32-60mm × 15-18mm), IP67, with bypass diodes
Cable	4mm ² Solar cable; (+) ≥49.2in (1250mm), (-) ≥49.2in (1250mm)
Connector	Stäubli MC4; IP68

74.0" (1879 mm)
42.8" (1088 mm)
1.26" (32 mm)
4 × Grounding points ± 3.18" (81 mm)
1.26" (32 mm)
DETAIL A: 0.63" (16 mm)
0.60" (15.2 mm)
15.8" (399.5 mm)
39.2" (995 mm)
41.1" (1045 mm)
8 × Mounting slots (DETAIL A)
8 × Drainage holes

ELECTRICAL CHARACTERISTICS

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

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

Q CELLS PERFORMANCE WARRANTY

PERFORMANCE AT LOW IRRADIANCE

RELATIVE EFFICIENCY [%]

100
90
80
70
60
50
40
30
20
10
0

0 200 400 600 800 1000

IRRADIANCE [W/m²]

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.

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]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC) / 1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull ³	[lbs/ft ²]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ³	[lbs/ft ²]	113 (5400 Pa) / 84 (4000 Pa)		

See Installation Manual

QUALIFICATIONS AND CERTIFICATES

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

CSA
UL 61730

CE

TÜV Rheinland
CERTIFIED

www.tuv.com
ID: 111220277

PACKAGING INFORMATION

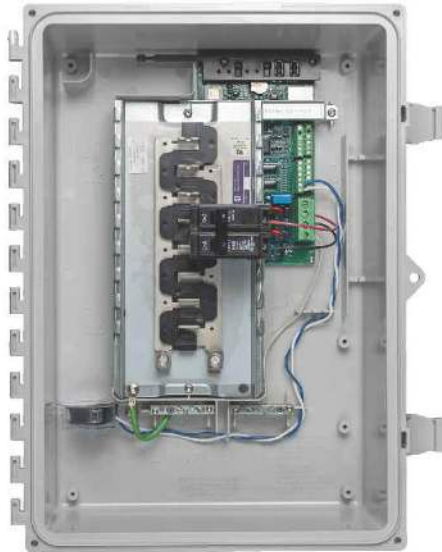
Horizontal packaging	76.4 in 1940mm	43.3 in 1100mm	48.0 in 1220mm	1656 lbs 751 kg	24 pellets	24 pellets	32 modules
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DOCUMENT CONTROL		DATE	CAD	QC	ENGINEER CONTACT INFORMATION		ENGINEERING STAMP		CONTRACTOR CONTACT INFORMATION		CONTRACTOR LOGO	CUSTOMER:	SHEET NAME:		
ISSUED FOR PERMIT		12-10-2021	BW	JC	ENGIPARTNERS LLC		Digitally signed by Rafael A Gonzalez Soto Date: 2022.03.08 08:16:42 -05'00'		TITAN SOLAR POWER FL		TITAN SOLAR POWER	HEATHER NEVILLE		PV MODULES DATA SHEET	
REV		DESCRIPTION	DATE	CAD	QC	2221 N US HIGHWAY 301			PROJECT ADDRESS:						
						THONOTASSA, FL 33592			9291 FLORIDA 247 LAKE CITY FL 32024						
						(813) 982 -9001			PARCEL NUMBER:						
						DESIGN@ENGIPARTNERS.COM		#EC13008093		015S1500423002		PROJECT ID:		ENGINEER OF RECORD:	SHEET TITLE:
						833 - 888 - 3644						TSP100525		ENG. RAFAEL A. GONZALEZ SOTO, PE	D-1
												DATE:		12-14-2021	SHEETS:
															7 OF 9

Specifications subject to technical changes © Q CELLS Q-PEAK DUO BLK ML-G10+ 385-405 2/2021 US_Prod_01_NA

Enphase
IQ Combiner 3
(X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV 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 Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- UL listed



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and REPLACEMENT PARTS (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G/12-year data plan) CELLMODEM-01 (3G/5-year data plan) CELLMODEM-M1 (4G based LTE-M/5-year data plan) Consumption Monitoring* CT CT-200-SPLIT	Plug and play industrial grade cellular modem with data plan 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.) Split core current transformers enable whole home consumption metering (+/- 2.5%).
* Consumption monitoring is required for Enphase Storage Systems	
Wireless USB adapter COMMS-KIT-01	Installed at the IQ Envoy. For communications with Enphase Encharge™ storage and Enphase Enpower™ smart switch. Includes USB cable for connection to IQ Envoy or Enphase IQ Combiner™ and allows redundant wireless communication with Encharge and Enpower.
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	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
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 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. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" 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
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
COMPLIANCE	
Compliance, 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)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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2019-11-04



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ISSUED FOR PERMIT				12-10-2021		BW	JC	ENGPARTNERS LLC				Digitally signed by Rafael A Gonzalez Soto		TITAN SOLAR POWER FL				HEATHER NEVILLE		SMART MONITORING DATA SHEET			
REV				DATE		CAD	QC	C.A. 32661 255 GIRALDA AVE CORAL GABLES, FL 33134				Date: 2022.03.08 08:16:48 -05'00'		12221 N US HIGHWAY 301 THONOTASASSA, FL 33592		9291 FLORIDA 247 LAKE CITY FL 32024		PROJECT ADDRESS:		PROJECT ID:			
								DESIGN@ENGPARTNERS.COM						(813) 982 -9001				PARCEL NUMBER:		TSP100525			
								833 - 888 - 3644						#EC13008093						ENGINEER OF RECORD:			
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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.



To learn more about Enphase offerings, visit enphase.com

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 and 72-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 grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

*The IQ 7+ Micro is required to support 72-cell modules.



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US / IQ7-60-B-US		IQ7PLUS-72-2-US / IQ7PLUS-72-B-US	
Commonly used module pairings ¹	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-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	1 x 1 ungrounded array; No additional AC side protection required; AC side protection requires max 20 A per branch circuit			
OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
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 ³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V		@240 V	@208 V
Peak CEC efficiency	97.6 %		97.5 %	97.3 %
CEC weighted efficiency	97.0 %		97.0 %	97.0 %

MECHANICAL DATA	
Ambient temperature range	-40°C to +65°C
Relative humidity range	4% to 100% (condensing)
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)
Connector type (IQ7-60-B-US & IQ7PLUS-72-B-US)	Friends PV2 (MC4 intermateable). Adaptors for modules with MC4 or UTX connectors: - PV2 to MC4: order ECA-S20-S22 - PV2 to UTX: order ECA-S20-S25
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)
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
Environmental category / UV exposure rating	NEMA Type 6 / outdoor

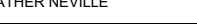
FEATURES	
Communication	Power Line Communication (PLC)
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.
Compliance	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 and NEC-2017 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>.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

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2018-05-24



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