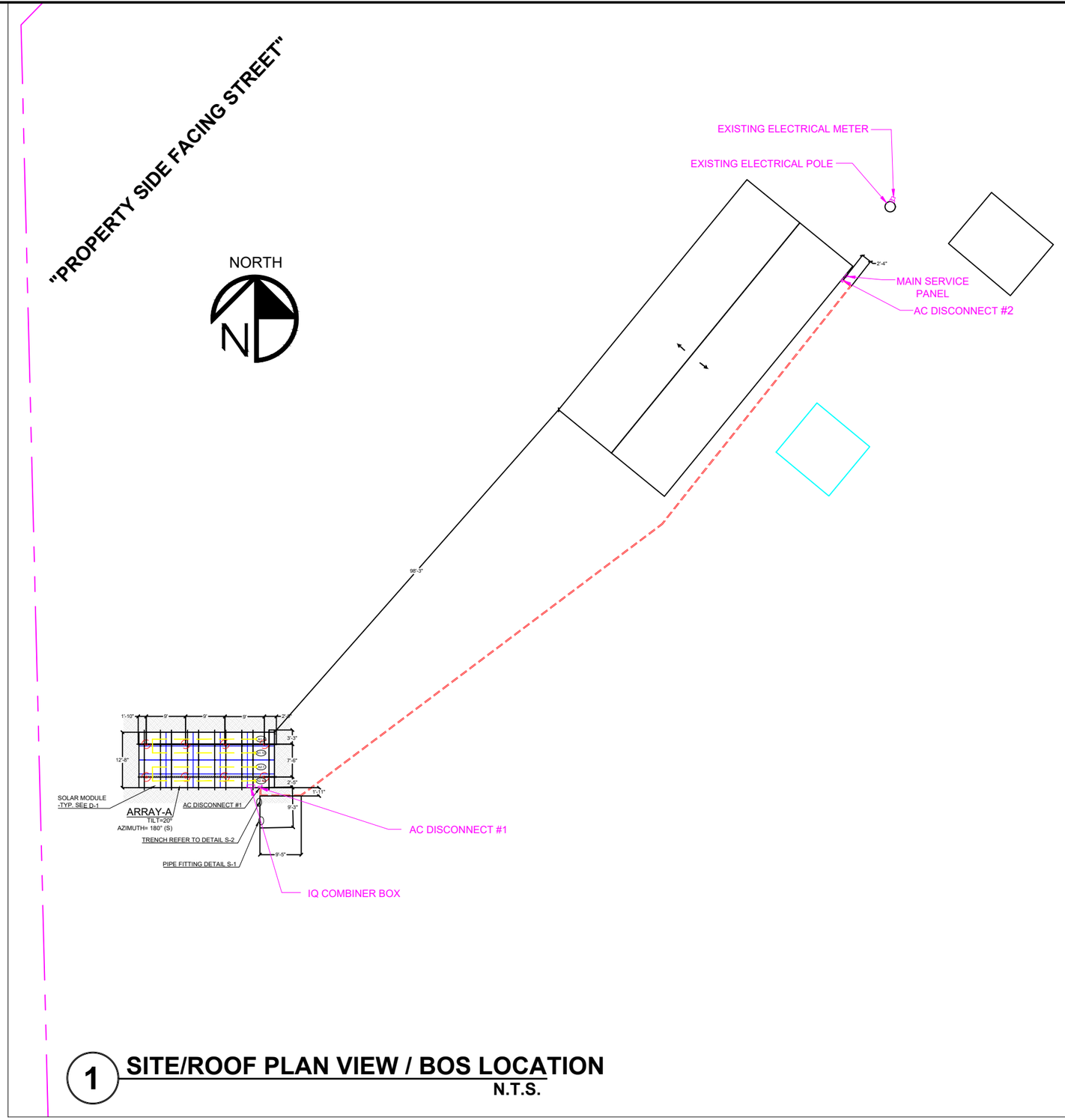
2 LOCATION MAP / WIND ZONES
N.T.S.

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

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 WEEB 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

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255 GIRALDA AVE
CORAL GABLES, FL 33134
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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

TITAN SOLAR POWER

CUSTOMER: HEATHER NEVILLE

PROJECT ADDRESS: 9291 FLORIDA 247, LAKE CITY FL 32024

PARCEL NUMBER: 015S1500423002

SHEET NAME: COVER SHEET

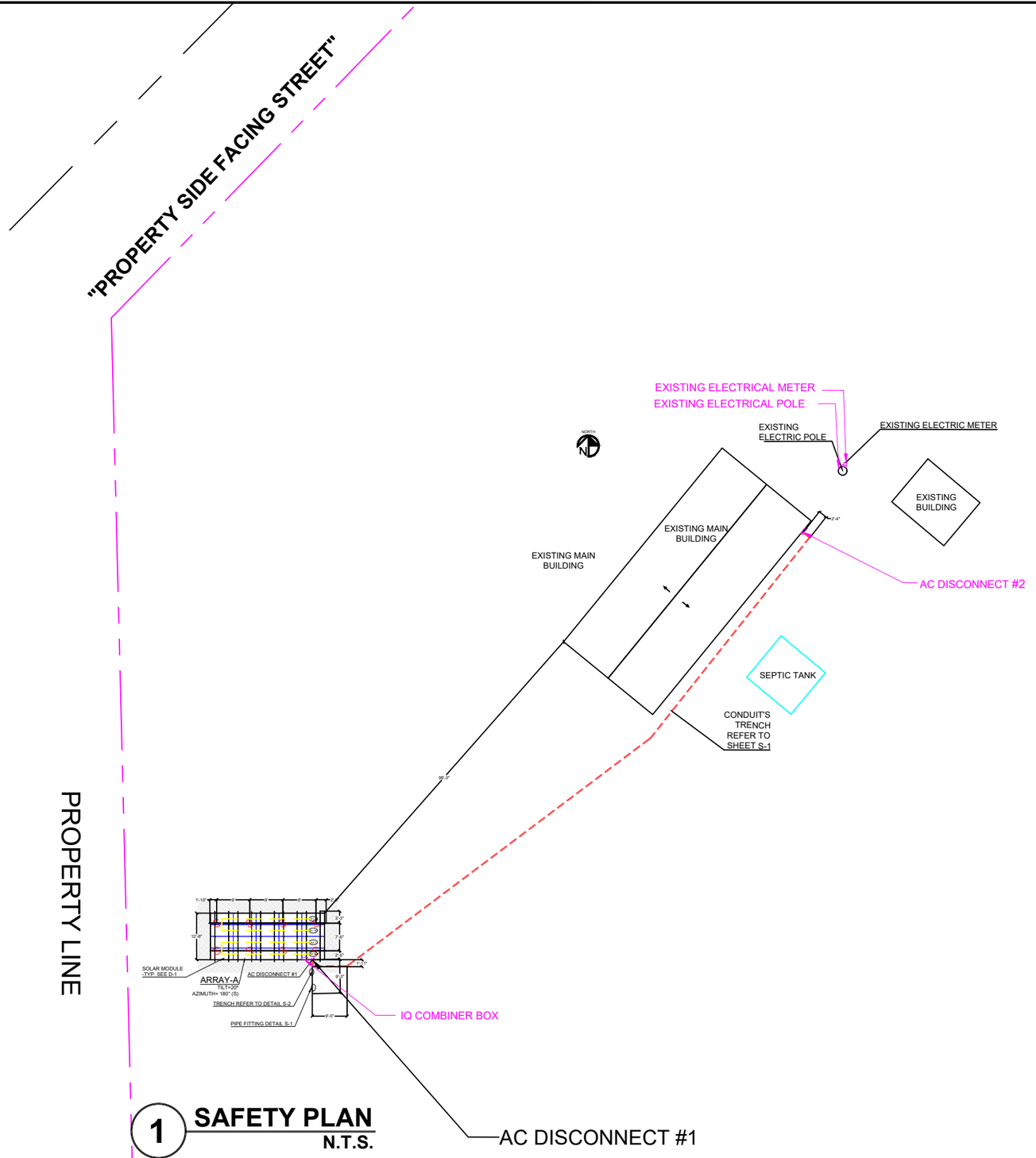
PROJECT ID: TSP100525

ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE

DATE: 12-14-2021

SHEET TITLE: C-1

SHEETS: 1 OF 9



1 **SAFETY PLAN**
N.T.S.

LOCATION OF NEAREST URGENT CARE FACILITY

NAME:

ADDRESS:

PHONE NUMBER:

NOTES:

1. INSTALLERS SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME
2. INSTALLERS SHALL UPDATE NAME ADDRESS AND PHONE NUMBER OF NEAREST URGENT CAR FACILITY RELATIVE TO THE SITE BEFORE STARTING WORK

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

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ENGINEERING STAMP

RAFAEL A. GONZALEZ SOTO LICENSED No. 83164 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by Rafael A Gonzalez Soto
Date: 2022.03.08 08:16:06 -05'00'

CONTRACTOR CONTACT INFORMATION

TITAN SOLAR POWER FL
12221 N US HIGHWAY 301

THONOTASASSA, FL 33592

(813) 982 -9001

#EC13008093

CONTRACTOR LOGO

TITAN SOLAR POWER

CUSTOMER: HEATHER NEVILLE

PROJECT ADDRESS: 9291 FLORIDA 247
LAKE CITY FL 32024

PARCEL NUMBER: 015S1500423002

SHEET NAME: SAFETY PLAN

PROJECT ID: TSP100525

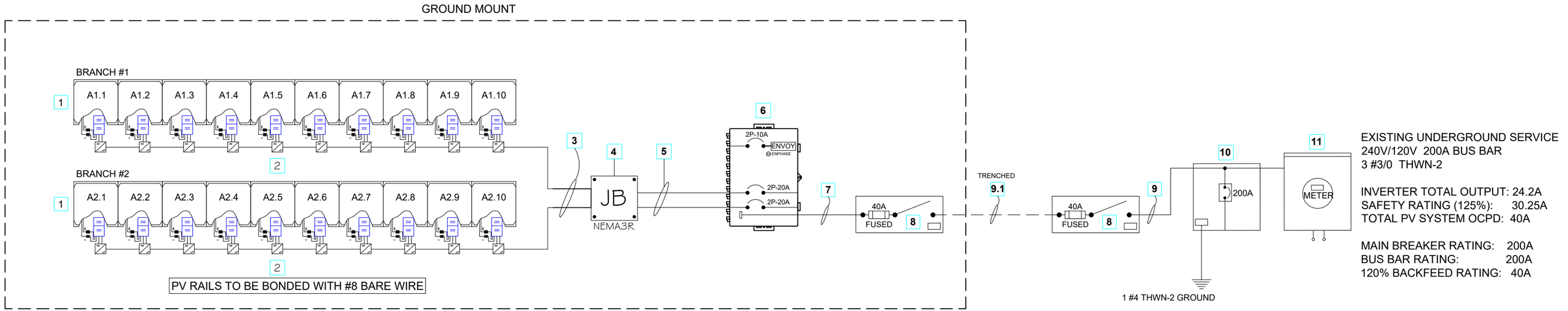
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE

DATE: 12-14-2021

SHEET TITLE: C-2

SHEETS: 2 OF 9

WIRE TAG	WIRE SIZES, QUANTITY & TYPE			RACEWAY SIZE, TYPE, LOCATION & INFO.			WIRE AMPACITY CALCULATIONS							ADDITIONAL INFORMATION			
	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%



EXISTING UNDERGROUND SERVICE
240V/120V 200A BUS BAR
3 #3/0 THWN-2

INVERTER TOTAL OUTPUT: 24.2A
SAFETY RATING (125%): 30.25A
TOTAL PV SYSTEM OCPD: 40A

MAIN BREAKER RATING: 200A
BUS BAR RATING: 200A
120% BACKFEED RATING: 40A

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

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REV	DESCRIPTION	DATE	CAD	QC

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833 - 888 - 3644

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Digitally signed by Rafael A Gonzalez Soto
Date: 2022.03.08 08:16:13 -05'00'

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

CONTRACTOR LOGO
TITAN SOLAR POWER

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

SHEET NAME: ONE LINE RISER DIAGRAM

PROJECT ID: TSP100525
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
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)

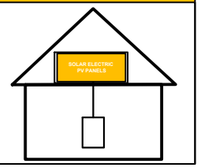
WARNING

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.



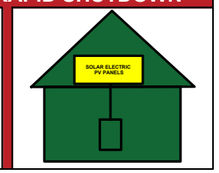
LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 690.56(C)(3)

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.



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)

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

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
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ENGINEERING STAMP
Digitally signed by Rafael A Gonzalez Soto
Date: 2022.03.08 08:16:20 -05'00'

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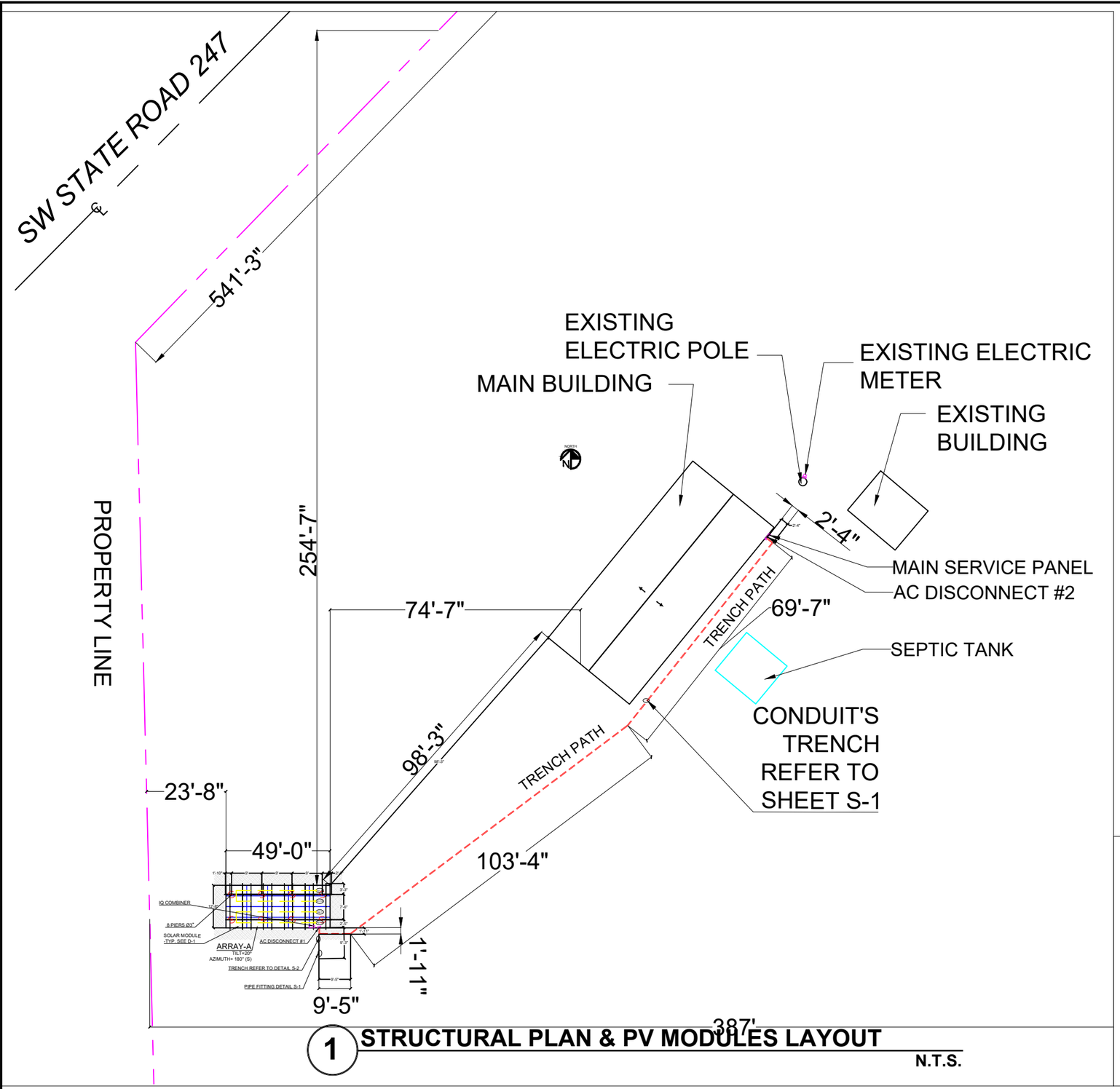
12221 N US HIGHWAY 301
THONOTASASSA, FL 33592
(813) 982 -9001
#EC13008093

CONTRACTOR LOGO
TITAN SOLAR POWER

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

SHEET NAME: SAFETY LABELS

PROJECT ID: TSP100525
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE: 12-14-2021
SHEET TITLE: E-2
SHEETS: 4 OF 9



1 STRUCTURAL PLAN & PV MODULES LAYOUT

N.T.S.

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

TILT ANGLE	25°
PIPE SIZE	1.5"
E-W PIER SPACING	9'- 0"
DIAGONAL BRACING	YES
TOTAL FOUNDATIONS	8
SOUTH CLEARANCE	1'- 11"
NORTH CLEARANCE	5'- 1"

FOUNDATION

SOIL CLASS	4
HOLE DIAMETER	1'-8"
TYPE	CONCRETE
MIN HOLE DEPTH	5'-0"

REACTION FORCES

SHEAR	MOMENT	UPLIFT
1250 lbs	0 ft-lbs	-708.34 lbs

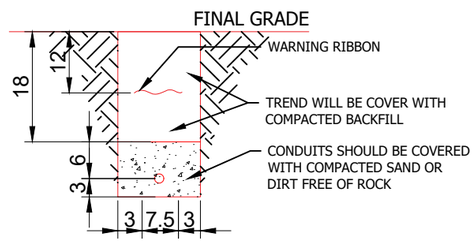
LEGEND & SYMBOLS

OBS — OBSTRUCTIONS

XX.X — ARRAY # / MODULE # / STRING #

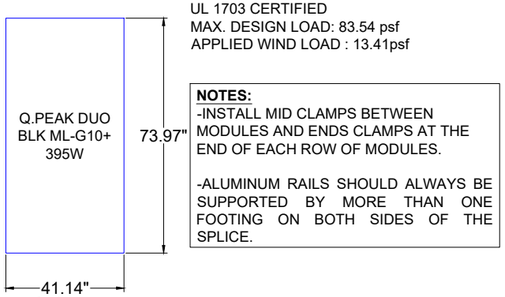
PV MODULES

ROOF MOUNTS & RAIL



A TRENCH DETAIL

N.T.S.



UL 1703 CERTIFIED
MAX. DESIGN LOAD: 83.54 psf
APPLIED WIND LOAD : 13.41psf

NOTES:
-INSTALL MID CLAMPS BETWEEN MODULES AND ENDS CLAMPS AT THE END OF EACH ROW OF MODULES.

-ALUMINUM RAILS SHOULD ALWAYS BE SUPPORTED BY MORE THAN ONE FOOTING ON BOTH SIDES OF THE SPLICE.

2 SOLAR MODULE

N.T.S.

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RAFAEL A. GONZALEZ SOTO — LICENSE — No. 83111 — STATE OF FLORIDA — PROFESSIONAL ENGINEER
Digitally signed by Rafael A Gonzalez Soto
Date: 2022.03.08 08:16:27 -05'00'

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12221 N US HIGHWAY 301
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(813) 982 -9001
#EC13008093

CONTRACTOR LOGO
TITAN SOLAR POWER

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

SHEET NAME: STRUCTURAL PLAN

PROJECT ID:	ENGINEER OF RECORD:	SHEET TITLE:
TSP100525	ENG. RAFAEL A. GONZALEZ SOTO, PE	S-1
	DATE: 12-14-2021	SHEETS: 5 OF 9

CrossRail 80

Material: aluminum
Finish: mill

CrossRail Mid Clamp UL2703+ Set

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

CrossRail End Clamp Set

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

Hollaender No. 70 External Coupling

Material: aluminum

Aluminum Hollaender 5EXT Extended Barrel Tee OR Hollaender 5EX

Material: aluminum

Aluminum Hollaender 17 Adj. Elbow

Material: aluminum

Aluminum End Clamp Set

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

Optional: End Cap for CR80

Material: glass fiber reinforced polamide

Optional: External Omega Cable Clip

Material: polyamide, black

Optional: HEY Clip SunRunner Cable Clip SS, S6404

Material: stainless steel

NON UL LISTED COMPONENTS

K 2 Pipe L Bracket Kit

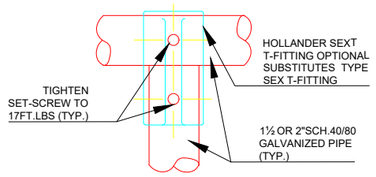
Material: stainless steel, galvanized steel

JF3 MiniRail Screw w/ EPDM 6x32

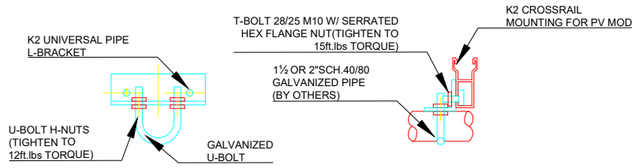
Material: stainless steel

1/2 in Serrated Flange Nut and T-Bolt 28/15 M10

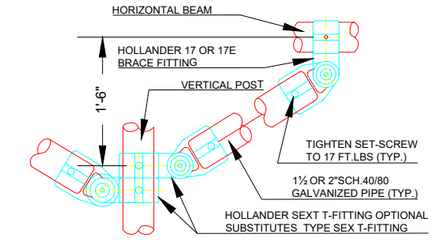
Material: stainless steel



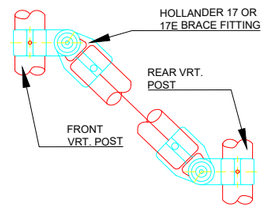
A GROUND MOUNT T-FITTING
SCALE: 3"=1'



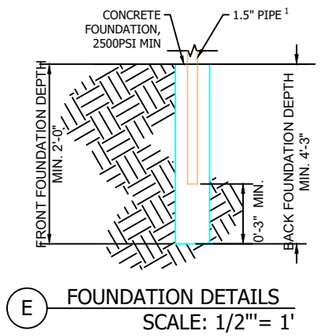
B K2 1.5" PIPE L-BRACKET
SCALE: 3"=1'



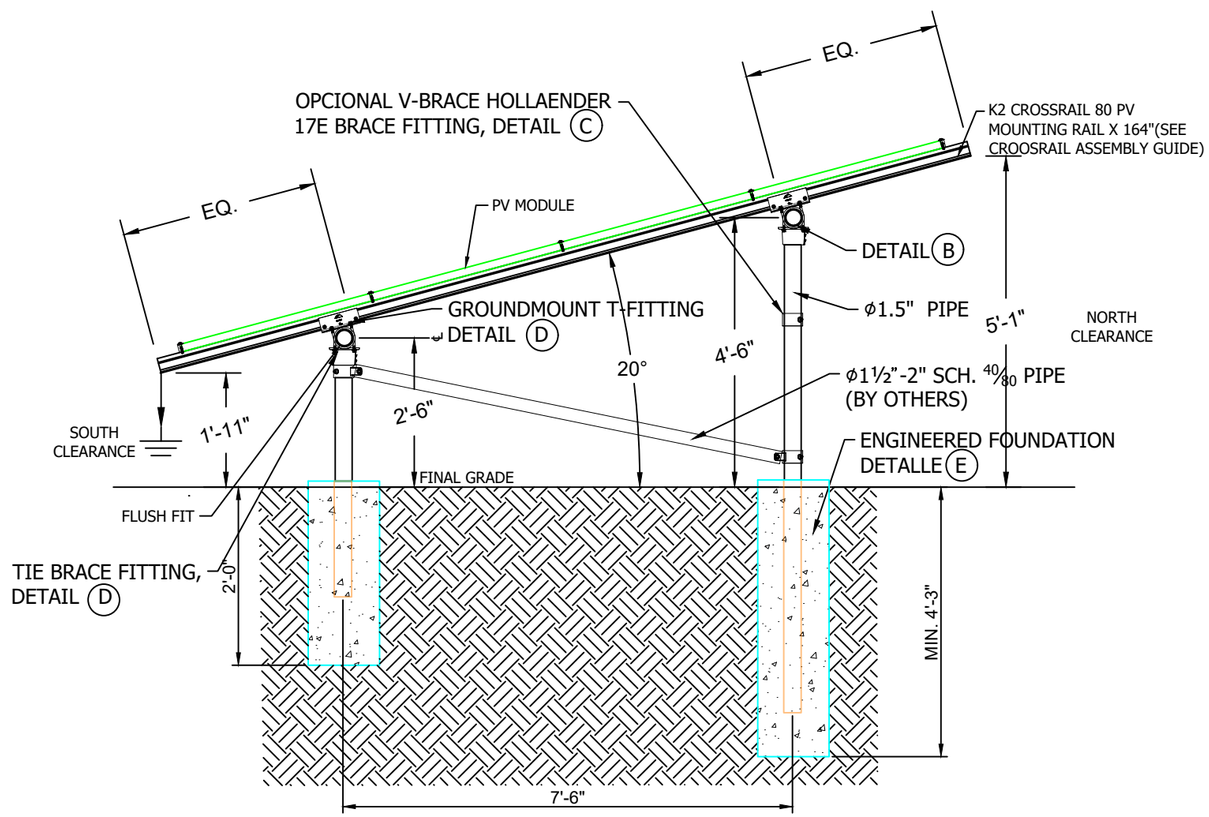
C OPTIONAL V-BRACE (TYP. EACH POST)
SCALE: 3"=1'



D TIE BRACE CONNECTIONS
SCALE: 3"=1'



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



PV SYSTEM SIDE SECTION

SCALE: 3/4"=1'

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TITAN SOLAR POWER

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PROJECT ADDRESS: 9291 FLORIDA 247, LAKE CITY FL 32024

PARCEL NUMBER: 015S1500423002

SHEET NAME: 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

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Q.PEAK DUO BLK ML-G10+

385-405

ENDURING HIGH PERFORMANCE

25 YR Warranty Product & Performance

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 Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING

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

A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty[2].

[1] APT test conditions according to IEC / TS 62804-1:2015, method A (−1500 V, 96 h)
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

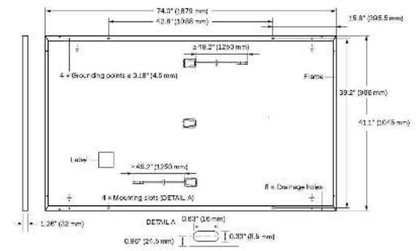
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	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 anodized aluminum
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 mm² Solar cable; (+) ≥49.2 in (1250 mm), (−) ≥49.2 in (1250 mm)
Connector	Stäubli MC4; IP68

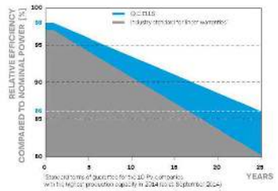


ELECTRICAL CHARACTERISTICS

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

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

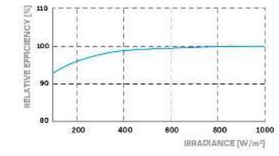
Q CELLS PERFORMANCE WARRANTY



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

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

PERFORMANCE AT LOW IRRADIANCE



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

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
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/ft²]	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/ft²]	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).
QCPV Certification ongoing.

PACKAGING INFORMATION

Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1656 lbs 751 kg	24 pallets	24 pallets	32 modules

Specifications subject to technical changes © Q CELLS Q.PEAK DUO BLK ML-G10+_385-405_2021-09_Rev01_NA

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

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DOCUMENT CONTROL		DATE	CAD	QC
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PARCEL NUMBER: 015S1500423002

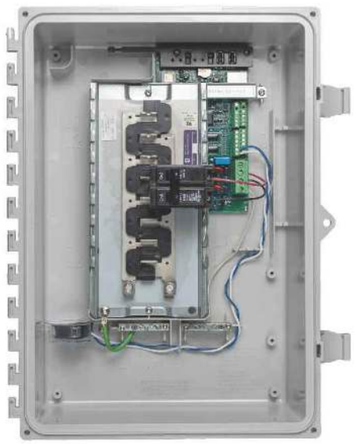
SHEET NAME: PV MODULES DATA SHEET
PROJECT ID: TSP100525
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE: 12-14-2021
SHEET TITLE: D-1
SHEETS: 7 OF 9

Data Sheet
Enphase Networking

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

LISTED

To learn more about Enphase offerings, visit **enphase.com**

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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)	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.)
Consumption Monitoring* CT CT-200-SPLIT * Consumption monitoring is required for Enphase Storage Systems	Split core current transformers enable whole home **consumption** metering (+/- 2.5%).
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

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2019-11-04

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PARCEL NUMBER: 015S1500423002

SHEET NAME: SMART MONITORING DATA SHEET

PROJECT ID:	ENGINEER OF RECORD:	SHEET TITLE:
TSP100525	ENG. RAFAEL A. GONZALEZ SOTO, PE	D-2
	DATE: 12-14-2021	SHEETS: 8 OF 9

Data Sheet
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 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.

UL CERTIFIED SAFETY US-CA E341165

To learn more about Enphase offerings, visit **enphase.com**

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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 DC side protection required; AC side protection requires max 20A 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**	**@208 V**	**@240 V**	**@208 V**
Peak CEC 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 +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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SHEET NAME: INVERTER DATA SHEET
PROJECT ID: TSP100525
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE: 12-14-2021
SHEET TITLE: D-3
SHEETS: 9 OF 9