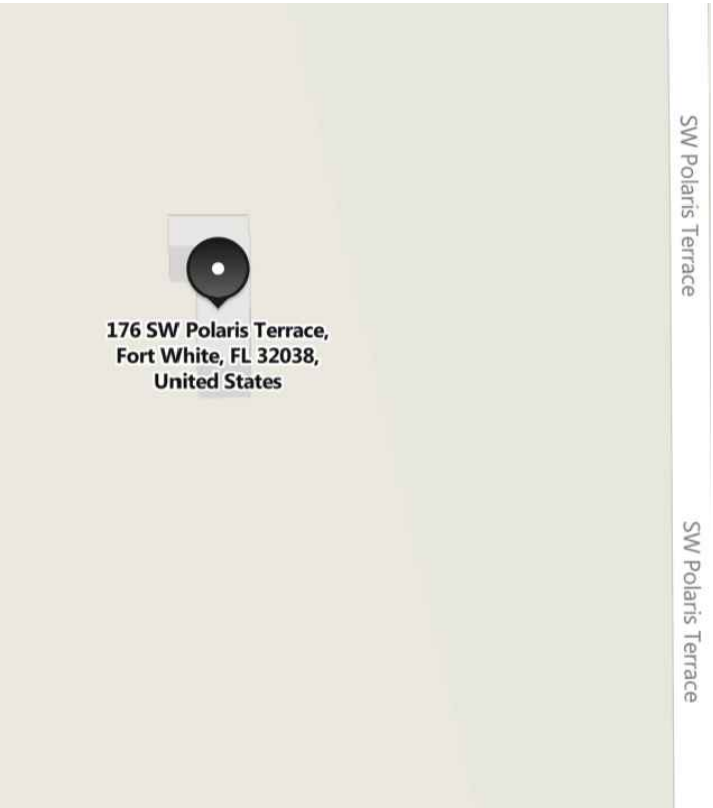


PV PROJECT - 10.95kWdc



1 PROPERTY ASSESSOR MAP - PROJECT LOCATION NTS



2 AERIAL MAP - PROJECT LOCATION NTS

SCOPE OF WORK

THESE PLANS ARE FOR THE INSTALLATION OF A ROOF MOUNTED PHOTOVOLTAIC (PV) SYSTEM. THE PV SYSTEM WILL BE INTERCONNECTED WITH THE CLAY UTILITY GRID THROUGH EXISTING ELECTRICAL EQUIPMENT AND WILL OPERATE IN PARALLEL VIA LOAD SIDE CONNECTION WITH NET ENERGY METER.

GOVERNING BUILDING CODES

- 2020 FLORIDA BUILDING CODE, 7TH EDITION
- 2020 FLORIDA RESIDENTIAL CODE, 7TH EDITION
- 2017 NATIONAL ELECTRICAL CODE, NEC
- 2020 FLORIDA FIRE PREVENTION CODE 7TH EDITION.
- UL STANDARDS
 - RACKING - UL 2703
 - PV MODULE - UL 1703
 - INVERTER - UL 1741

DESIGN SPECIFICATIONS

- AHJ - Columbia County
- UTILITY - CLAY
- BUILDING RISK CATEGORY II
- DESIGN WIND SPEED (ULT) - 130MPH
- DESIGN SNOW LOAD - 0PSF
- EXPOSURE CATEGORY - C
- MEAN ROOF HEIGHT - 15FT
- ROOF SLOPE - 22.26°

PV SYSTEM SPECIFICATIONS

- PV MODULE: 30 x Aptos DNA-120-MF26-365W; 10.95kWdc
- INVERTER: IQ7+-72-2-US
- RACKING: Ecofasten Rock-it
- ROOF TYPE:METAL PANEL
- AZIMUTH:88°

PV INSTALLATION OVERVIEW

ELECTRICAL

- POINT OF CONNECTION: LOAD
- MAX INV OUTPUT CURRENT: 1.21A Ea.
- PV AC DEDICATED OCP DEVICE RATING: $(30 * 1.21A) * 125\% = 45.375A$, 50A OCP
- UTILITY AC DISCONNECT REQ'D: YES

STRUCTURAL

- MAX ALLOWABLE SPACING BETWEEN ATTACH POINTS: 45 Inches
- MIN. NUMBER OF ATTACHMENT POINTS: 78
- WEIGHT PER ATTACHMENT POINT: 18.9LBS/ATTACH
- PV DEAD LOAD: 2.50PSF

Sheet List Table

Sheet Number	Sheet Title
PV01	COVER
PV02	NOTES
PV03	E_PV SITE PLAN
PV04	ELEVATION
PV05	LINE DIAGRAM
PV06	S_PV SITE LAYOUT
PV07	PV ATTACH PLAN
R01	MODULE DATASHEET
R02	INVERTER DATASHEET
R03	IQ COMBINER DATASHEET
R04	RACKING DATASHEET



Project Type - Photovoltaic

Project Location:
176 SW Polaris Terrace,
Fort White, FL 32038

Parcel Number: 13-7S-16-04203-013
Assessor Phone # (386) 758-1083

- PV SYSTEM SPECIFICATIONS
- PV MODULE: 30 x Aptos DNA-120-MF26-365W; 10.95kWdc
 - INVERTER: IQ7+-72-2-US
 - RACKING: Ecofasten Rock-it
 - ROOF TYPE:METAL PANEL
 - AZIMUTH:88°
 - ROOF SLOPE:22.26°

File Name:
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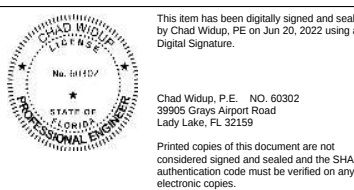
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PV01 - COVER

Sheet Size:
ANSI full bleed B (17.00 x 11.00 Inches)

Drawing history			
no.	drawn by	revision	date
01	DCG	----	6/17/22

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Date:
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PV01

	1	2	3	4	5	6	7	8	9	10	11
A	INSTALLATION NOTES			ELECTRICAL NOTES			STRUCTURAL NOTES				
	1. THE EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURES INSTALLATION INSTRUCTIONS. 2. THE ACTUAL LOCATION OF THE ARRAY AND PLACEMENT OF THE MECHANICAL ANCHORS ARE SUBJECT TO VARIANCES DEPENDING ON SITE CONDITIONS AND/OR ROOF OBSTRUCTIONS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SPECIFICATIONS BEFORE COMMENCING. 3. ALL OUTDOOR EQUIPMENT SHALL BE RAIN TIGHT WITH MINIMUM NEMA3-R RATING. 4. ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION. 5. ALL WORK SHALL COMPLY WITH THE BUILDING CODES SET FORTH BY THE GOVERNING JURISDICTION. 6. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY THE NATIONAL FIRE CODE, NFC AND THE NATIONAL ELECTRICAL CODE, NEC.			1. INSTALLATION TO BE COMPLIANT WITH NFPA 1 & NFPA70 (NATIONAL ELECTRICAL CODE) 2. THE PV SYSTEM IS AN UNGROUNDED PV ARRAY AND HAS A GROUND-FAULT PROTECTION DEVICE THAT MEETS THE REQUIREMENTS OF 690.41(B)(1) AND (2) 3. THE EXACT LOCATION OF NEW ELECTRICAL EQUIPMENT AND CONDUIT RUN RELATING TO THIS PROJECT IS SUBJECT TO CHANGE AND WILL BE DETERMINED ON SITE BY THE CONTRACTOR. 4. ALL CLEARANCES AND WORK SPACE AS REQUIRED PER NEC 110.26 SHALL BE FOLLOWED 5. THE INVERTER(S) SHALL MEET ALL CURRENT CODE REQUIREMENTS FOR RAPID SHUTDOWN AS DEFINED IN NEC 690.12. 6. ALL EQUIPMENT TO BE LISTED OR LABELED FOR ITS APPLICATION(UL OR OTHER APPROVED LISTINGS) 6.1. PV MODULE - UL1703 6.2. INVERTER - UL1741 6.3. RACKING SYSTEM - UL2703 7. GROUNDING 7.1. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690 7.2. MODULE BONDING METHOD SHALL BE INTEGRATED GROUNDING MID CLAPS. REFER TO MANUFACTURES SPECIFIC INSTRUCTIONS FOR PROPER BONDING TECHNIQUES. 7.3. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES SHALL BE RATED FOR DIRECT BURIAL 7.4. EGC SHALL BE SIZED IN ACCORDACE WITH 250.122 AND ARRAY EGC'S SMALLER THAN 6AWG SHALL COMPLY WITH 250.120(C) 8. ALL CONDUCTORS ARE COPPER, UNLESS SPECIFIED OTHERWISE 9. ALL CONDUIT, RACEWAYS, AND JUNCTION BOXES SHALL BE SIZED ACCORDING TO THE APPLICABLE CODE IF THE SIZE IS NOT SPECIFIED. 10. SIGNAGE SHALL BE APPLIED ACCORDING TO GOVERNING BUILDING CODES AND LOCAL JURISDICTIONS SPECIFIC REQUIREMENTS. 11. EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC. 12. CALCULATION OF MAXIMUM CIRCUIT CURRENT FOR THE SPECIFIC CIRCUIT SHALL BE CALCULATED IN ACCORDANCE WITH 690.8(A)(1) THROUGH (A)(6). CONDUCTOR AMPACITY SHALL BE SIZED TO NOT CARRY LESS THAN THE LARGER OF 690.8(B)(1) OR (2) 13. DC PV SOURCE AND DC OUTPUT CURRENT CIRCUITS ON OR INSIDE A BUILDING SHALL BE CONTAINED IN METAL RACEWAYS, TYPE MC METAL-CLAD CABLE THAT COMPLIES WITH 250.118(10), OR METAL ENCLOSURES FROM THE POINT OF PENETRATION OF THE SURFACE OF THE BUILDING OR STRUCTURE TO THE FIRST READILY ACCESSIBLE DISCONNECTING MEANS.(690.31(G)) 14. ACCESS TO BOXES; JUNCTION, PULL, AND OUTLET BOXES LOCATED BEHIND MODULES OR PANELS SHALL BE SO INSTALLED THAT THE WIRING CONTAINED IN THEM CAN BE RENDERED ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE(S) SECURED BY REMOVABLE FASTENERS AND CONNECTED BY FLEXIBLE WIRING SYSTEM.(690.34) 15. PV POINT OF CONNECTION. THE OUTPUT OF AN INTERCONNECTED ELECTRIC POWER SOURCE SHALL BE CONNECTED AS SPECIFIED IN 705.12(A) or (B).			1. PV SYSTEM CONSIST OF THE PV MODULES, RACKING AND CONNECTION HARDWARE 2. RACKING SYSTEM & PV ARRAY SHALL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL 3. MAXIMUM SPACING BETWEEN CONNECTION POINTS 45 Inches 8. THE ATTACHMENTS SHOULD BE STAGGERED, WHERE POSSIBLE, TO ALLOW DISTRIBUTION OF THE DESIGN LOADS EVENLY TO THE STRUCTURE. 9. ALL ROOF PENETRATIONS SHALL BE FLASHED AND SEALED BY APPROVED METHOD PER ROOF TYPE MANUFACTURE. 10. TYP. ROOF SUPPORT STRUCTURE; 2" X 4", 24"O.C. 11. REFER TO TABLE 1.1 FOR MAX OVERHANG FROM LAST ATTACHMENT. 12. PV ARRAY SHALL BE A MINIMUM 3" ABOVE THE ROOFING MATERIAL.				
	B	GENERAL PV SITE NOTES									
	1. PV ARRAY NOT TO DIRUPT ATTIC VENTS OR PLUMBING VENTS. ARRAY TO SPAN OR EXTEND TERMINATION PLUMBING VENTS WITHOUT ANY IMPACT ON THEIR FUNCTIONALITY. 2. PANELS WILL NOT EXCEED THE OVERALL HEIGHT OR ROOF PITCH OF THE EXISTING STRUCTURE.										
C	ABBREVIATIONS										
	(E) - EXISTING (N) - NEW TYP - TYPICAL NTS - NOT TO SCALE MIN - MINIMUM MAX - MAXIMUM AC - ALTERNATING CURRENT DC - DIRECT CURRENT PV - PHOTOVOLTAIC MOD - PV MODULE INV - DC/AC PV INVERTER POC - POINT OF CONNECTION(PV) RSB - RAPID SHUTDOWN BOX CB - CIRCUIT BREAKER (EX. 20A/2P CB - 20AMP 2-POLE CIRCUIT BREAKER) C - CONDUIT OCP - OVERCURRENT PROTECTION OCPD- OVERCURRENT PROTECTION DEVICE MSD - MAIN SERVICE DISCONNECT DISC - DISCONNECT MSP - MAIN SERVICE PANEL SP - SUB PANEL PLP - PROTECTED LOADS PANEL MLO - MAIN LUG ONLY MB - MAIN BREAKER EGC - EQUIPMENT GROUNDING CONDUCTOR GEC - GROUNDING ELECTRODE CODUCTOR GES - GROUNDING ELECTRODE SYSTEM										
D	SYMBOLS										
	UTILITY METER PV MODULE DC/AC UTILITY INTERACTIVE INVERTER DISCONNECT CB DOUBLE POLE CB SINGLE POLE FUSE FUSED DISCONNECT										
F											
G											



BAPS

Engineering & Permitting

Project Type - Photovoltaic

Project Location:

176 SW Polaris Terrace,
Fort White, FL 32038

Parcel Number: 13-7S-16-04203-013

Assessor Phone # (386) 758-1083

PV SYSTEM SPECIFICATIONS

1. PV MODULE: 30 x Aptos

DNA-120-MF26-365W; 10.95kWdc
2. INVERTER: IQ7+-72-2-US
3. RACKING: Ecofasten Rock-it
4. ROOF TYPE:METAL PANEL
5. AZIMUTH:88°
6. ROOF SLOPE:22.26°

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02_JANKOWSKI MARY_NOTES.DWG

Sheet Number and Title:

PV02 - NOTES

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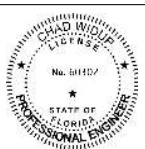
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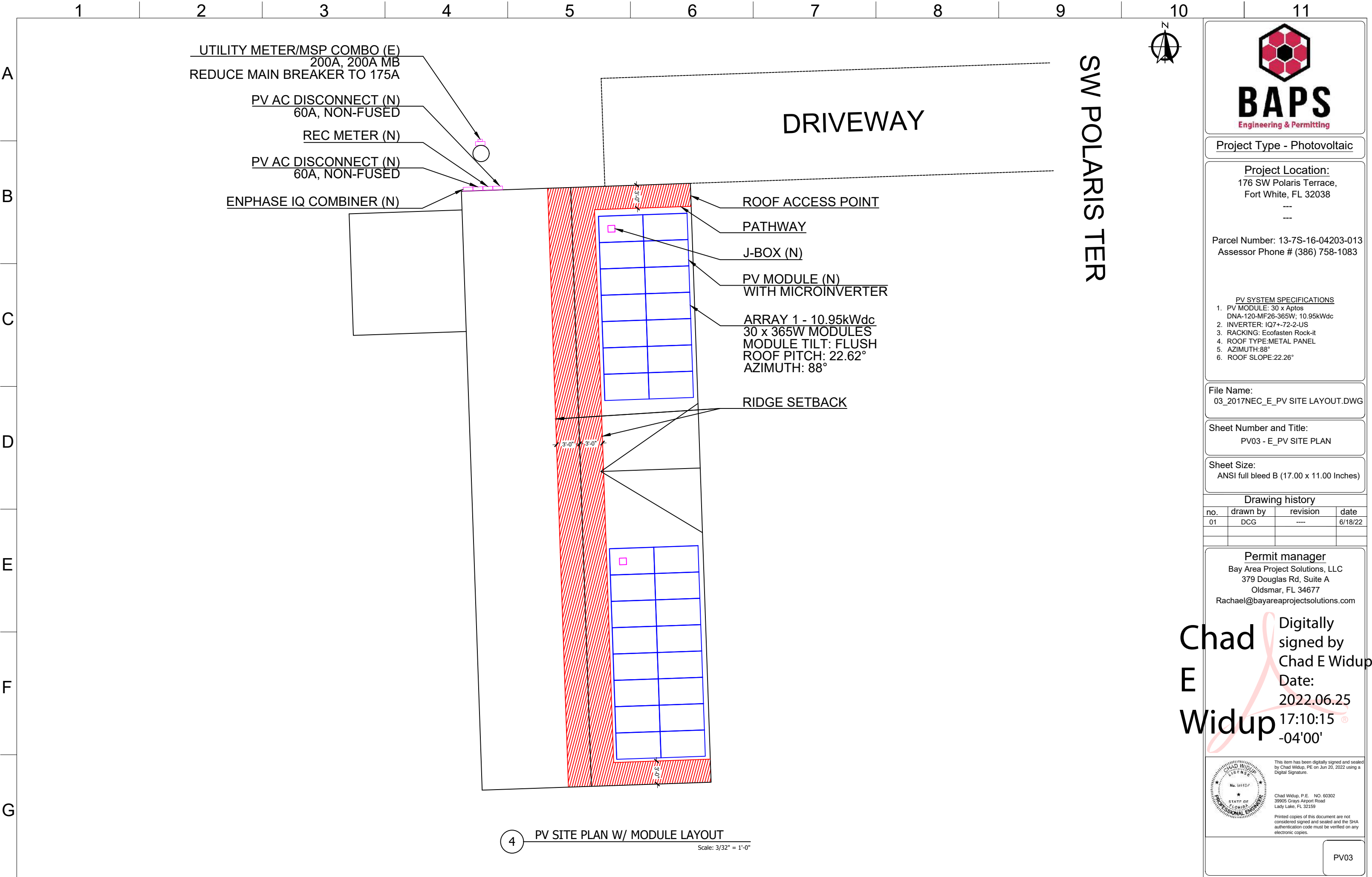


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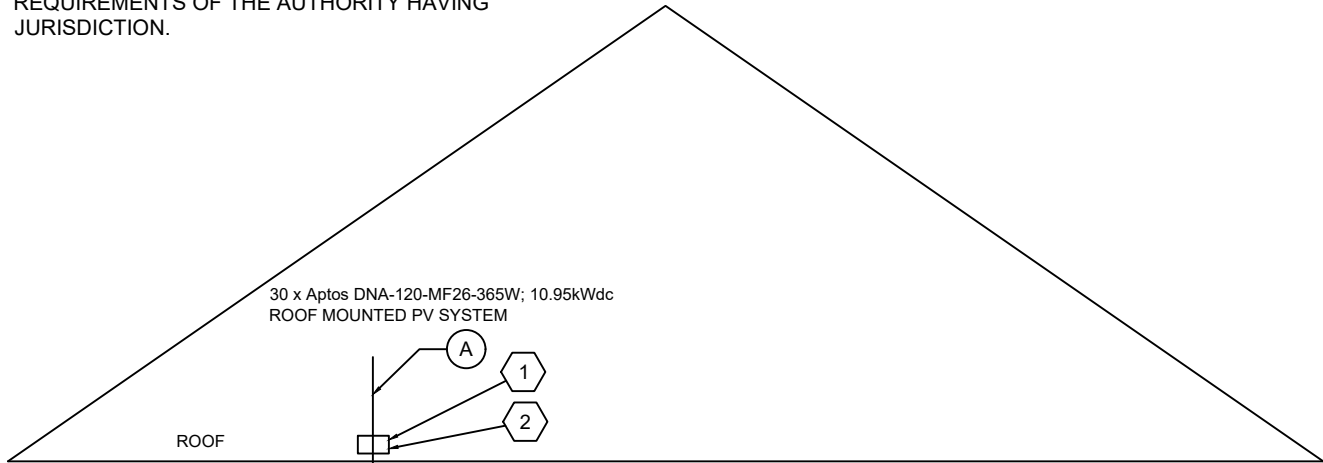
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PV02

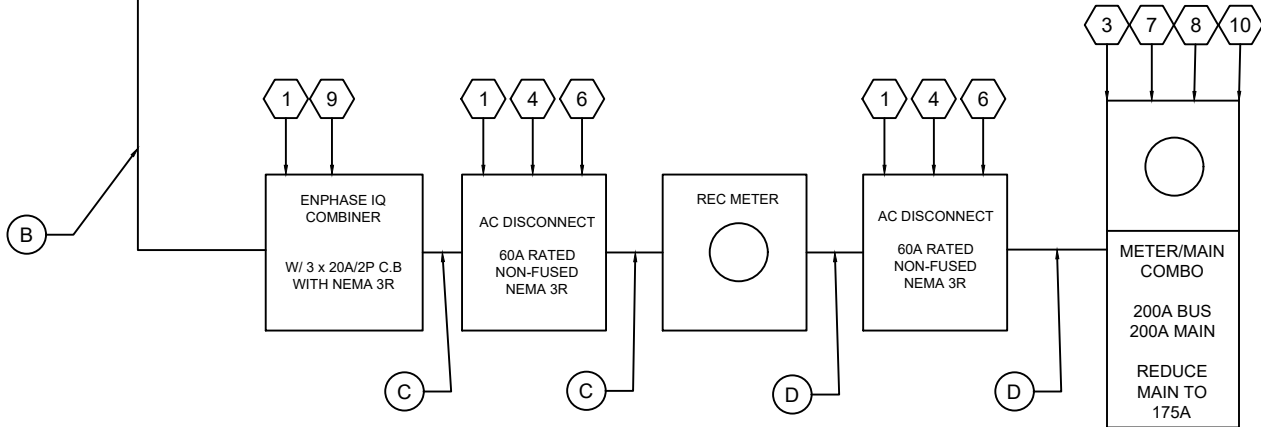


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- NEC LABEL NOTES:
1. THE WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH NEC 110.21(B)
 2. LABELS SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE THEY ARE INSTALLED.
 3. LABELS TO BE A MIN LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
 4. LABELS SHALL ALSO COMPLY WITH THE SPECIFIC REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.



- NOTES:
1. DESCRIPTION OF COMBINER BOX.
 2. DESCRIPTION OF NON-FUSED DISCONNECT (AUXILLARY GENERATION DISCONNECT)
 3. DESCRIPTION OF CONDUIT BEING USED, INCLUDING DIAMETER OF CONDUIT TYPE. REFER TO CONDUIT AND CONDUCTOR SCHEDULE ON LINE DIAGRAM



4 RISER DIAGRAM Scale: NTS

LABEL 1 - NEC 690.13(B)
APPLY TO DISCONNECTING MEANS WHERE THE LINE AND LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 2 - NEC 690.31(G)(4)
APPLY TO EXPOSED RACEWAYS, CABLE TRAYS, OTHER WIRING METHODS, COVERS, ENCLOSURES OF PULL BOXES, AND J-BOXES. SPACING BETWEEN LABELS OR MARKINGS SHALL NOT BE MORE THAN 10FT APART.

LABEL 3 - NEC 690.56(C)(1)(a)
APPLY TO LABEL ON OR NO MORE THAN 3FT FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION

LABEL 4 - NEC 690.56(B) & NFPA 11.12.2.1.1.6
APPLY TO RAPID SHUTDOWN SWITCH
PV SYSTEM COMMENCES RAPID SHUTDOWN SEQUENCE UPON DISCONNECT FROM AC SOURCE - COMPLIES WITH NEC 690.12
INITIATION DEVICE SHALL BE LOCATED AT A READILY ACCESSIBLE LOCATION OUTSIDE THE BUILDING(LABEL SHALL BE WITHIN 3FT OF SWITCH)

LABEL 5 - 690.53(IF APPLICABLE)
APPLY TO DC DISCONNECT/INVERTER

LABEL 6 - NEC 690.54
APPLY TO MAIN PV AC DISCONNECT

LABEL 7 - NEC 705.12(B)(3)
APPLY TO MSP

LABEL 8 - NEC 705.12(B)(2)(3)(b)
APPLY TO BACK-FED BREAKER, IF APPLICABLE

LABEL 9 - NEC 705.12(B)(2)(3)(c)
PROVIDE AT PV COMBINER OR MSP IF APPLICABLE

LABEL 10 - NFPA 1, 11.12.2.1.5
INSTALLER INFORMATION LOCATED ADJACENT TO THE MAIN DISCONNECT, INDICATING THE NAME AND EMERGENCY TELEPHONE NUMBER OF THE COMPANY

! WARNING !

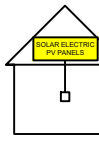
ELECTRIC SHOCK HAZARD

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

WARNING: PHOTOVOLTAIC POWER SOURCE

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.



RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

PHOTOVOLTAIC SYSTEM ! DC DISCONNECT !

MAX SYSTEM VOLTAGE: 480VDC
MAX CIRCUIT CURRENT: 12A
MAX OUT CURRENT(DC TO DC CONV.): 15A

PHOTOVOLTAIC SYSTEM ! AC DISCONNECT !

RATED AC OUTPUT CURRENT: 30 x 1.21A = 36.3A
NOMINAL OPERATING VOLTAGE: 240VAC

! WARNING !

DUAL POWER SOURCES
SOURCES: UTILITY GRID, PV
SOLAR ELECTRIC SYSTEM

! WARNING !

POWER SOURCE OUTPUT CONNECTION:
DO NOT RELOCATE THIS OVERCURRENT DEVICE

! WARNING !

DEDICATED SOLAR PANEL DO NOT CONNECT ANY OTHER LOADS

IN CASE OF EMERGENCY CALL INSTALLATION COMPANY



BAPS
Engineering & Permitting

Project Type - Photovoltaic

Project Location:

176 SW Polaris Terrace,
Fort White, FL 32038

Parcel Number: 13-7S-16-04203-013
Assessor Phone # (386) 758-1083

PV SYSTEM SPECIFICATIONS

1. PV MODULE: 30 x Aptos DNA-120-MF26-365W; 10.95kWdc
2. INVERTER: IQ7+-72-2-US
3. RACKING: Ecofasten Rock-it
4. ROOF TYPE:METAL PANEL
5. AZIMUTH:88°
6. ROOF SLOPE:22.26°

File Name:

03_JANKOWSKI MARY
E_ELEVATIONS.DWG

Sheet Number and Title:

PV04 - ELEVATION

Sheet Size:

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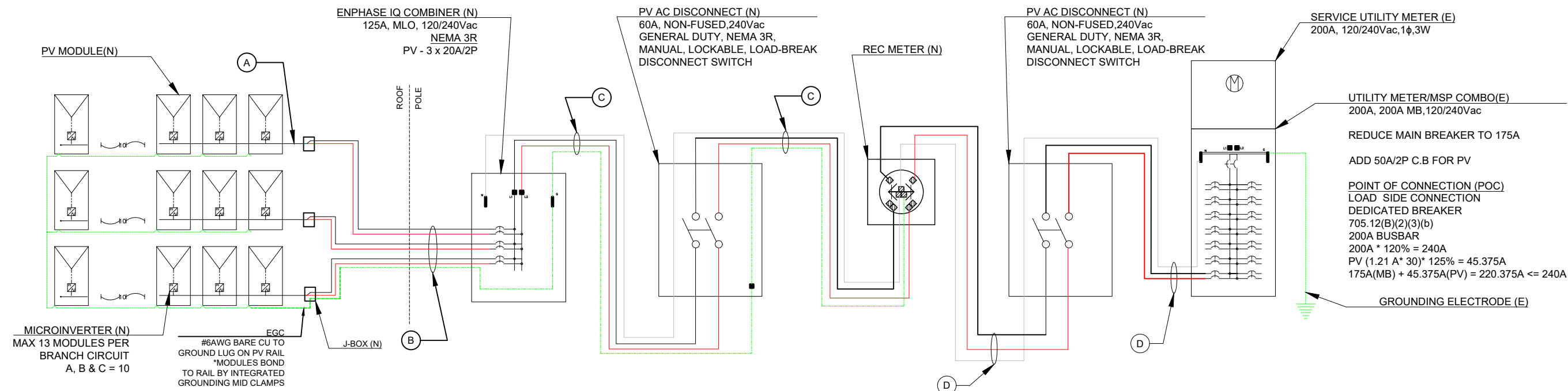
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PV04

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Electrical Calculations - Photovoltaic System											
Project Details				Microinverter			PV Module			Branch Circuit Summary	
Project Name		PV PROJECT		Model Number		IQ7PLUS-72-2-US		Model Number		DNA-120-MF26 365	
Project Location		FORT WHITE, FL		Max input PV Power		440		Nominal Output @ STC, Pmp		365	
Module - 30		Aptos DNA-120-MF26 365		DC Max Voltage		60		Open Circuit Voltage, Voc		40.7	
Inverter - 30		Enphase IQ7PLUS-72-2-US		Nominal Output Current		1.21		Max Power Point, Vmp		33.96	
Utility - 240		Vac		Nominal Voltage		240		Short Circuit Current, Isc		11.24	
DC Rating 10.95		kW		AC Max Output Power		295		Max Power Point Current, Imp		10.66	
AC Rating 8.85		kW		Max Continuous output Power		290		VOC Temp Coeff		-0.29	
Min. Ambient Temp, °C		0		CEC Weighted Efficiency		97		Dimensions, LxWxH (in)		69.13 x 40.9 x 1.37	
Max. Ambient Temp, °C		35		Max Units per 20A Branch Circuit		13		Weight		45.19	
										Wdc	
										Vdc	
										Vdc	
										A	
										A	
										% / °C	
										240A >= 220.375A; 705.12(B)(2)(3)(b) Satisfied	
										240	
										220	

Branch Circuit Sizing						
Inputs	Branch Circuit Combiner A					
# of Branch Circuits	3					
Individual Branch Circuits	A	B	C			
Microinverters per Branch Circuit	10	10	10			
Output current per string (A)	12.10	12.10	12.10			
125% of Output for min. OCP (A)	15.13	15.13	15.13			
Min. Breaker Size (A)	20	20	20			



Conduit and Conductor Schedule						
Tag	Description and Conductor Type	Min. Conductor Gauge	Number of Conductors	Typical Conduit Type	Min. Conduit Size	Max one way length (ft)
A	Enphase Q Cable	12AWG	{L1, L2} {G}	FREE AIR	MFG CABLE	20
B	J-box to Comb., THWN-2	12AWG	3 x {L1, L2}, G	*MC CABLE	MC	40
C	Comb to REC, THWN 2	6AWG	L1, L2, N, {#10G}	PVC, EMT, or FMC	3/4"	5
D	REC to POC, THWN-2	6AWG	L1, L2, N	PVC, EMT, or FMC	3/4"	5
Note: LFMC or LFNC can be used as necessary, if "uses permitted" of the current version of the NEC are met. (G) can be #8AWG THWN-2						
For Conduit sizing refer to Chapter 9 Tables, NEC						

Conductor Sizing					
Inverter output CKT			Combiner output ckts		
Distance above roof			PV Combiner A		
Amb. Temp. Adder for Rooftops (°F)	40	310.15(8)(2)(i)	Design temperature (°F)	94	
Design temperature (°F)	135		Max Ambient Temp. Range (°F)	87-95	310.15(8)(2)(i)
Adjusted Temp. Range for Roof	132-140	310.15(8)(2)(i)	Temp. Rating of Conductor	75°C	
Temp. Rating of Conductor	75°C		No. of Current Carrying Cond.	<4	310.15(8)(3)(a)
No. of Current Carrying Cond.	<4	310.15(8)(3)(a)	Max Continuous Load (A)	45	
Overcurrent Protection (A)	20	690.8(A)	Overcurrent Protection (A)	50	
125% of Output for Min. OCP(A)	15.1	690.8(A)	Amb. Temp Correction Factor	0.94	310.15(8)(2)(i)
Amb. Temp Correction Factor	0.58	310.15(8)(2)(i)	Raceway Fill Adjustment Factor	100%	310.15(8)(3)(a)
Raceway Fill Adjustment Factor	100%	310.15(8)(3)(a)	Wire Size (AWG or MCM)	6	310.15(8)(16)
Wire Size (AWG or MCM)	12	310.15(8)(16)	Allowable Ampacity (Amps)	65	
Allowable Ampacity (Amps)	25		Adjusted Ampacity (Amps)	61	65*0.94*1=61.1
Adjusted Ampacity (Amps)	15	25*0.58*1=14.5			

Project Type - Photovoltaic

Project Location:
176 SW Polaris Terrace,
Fort White, FL 32038

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5. AZIMUTH:88°
6. ROOF SLOPE:22.26°

File Name:
04_JANKOWSKI MARY_LINE
DIAGRAM.DWG

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PV05 - LINE DIAGRAM

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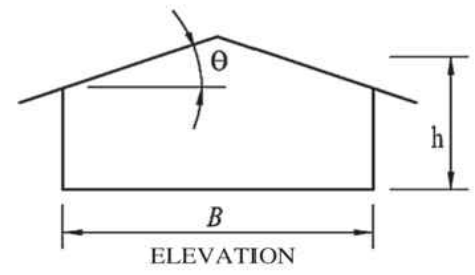
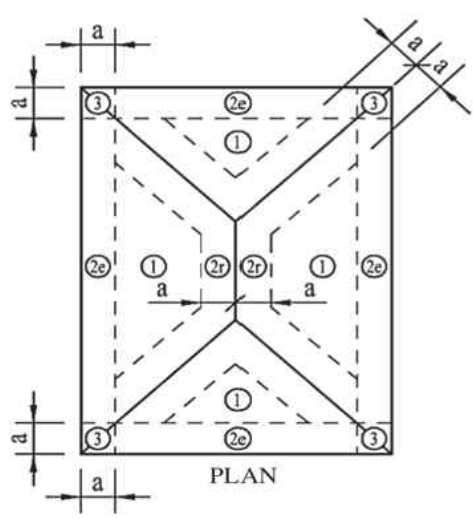
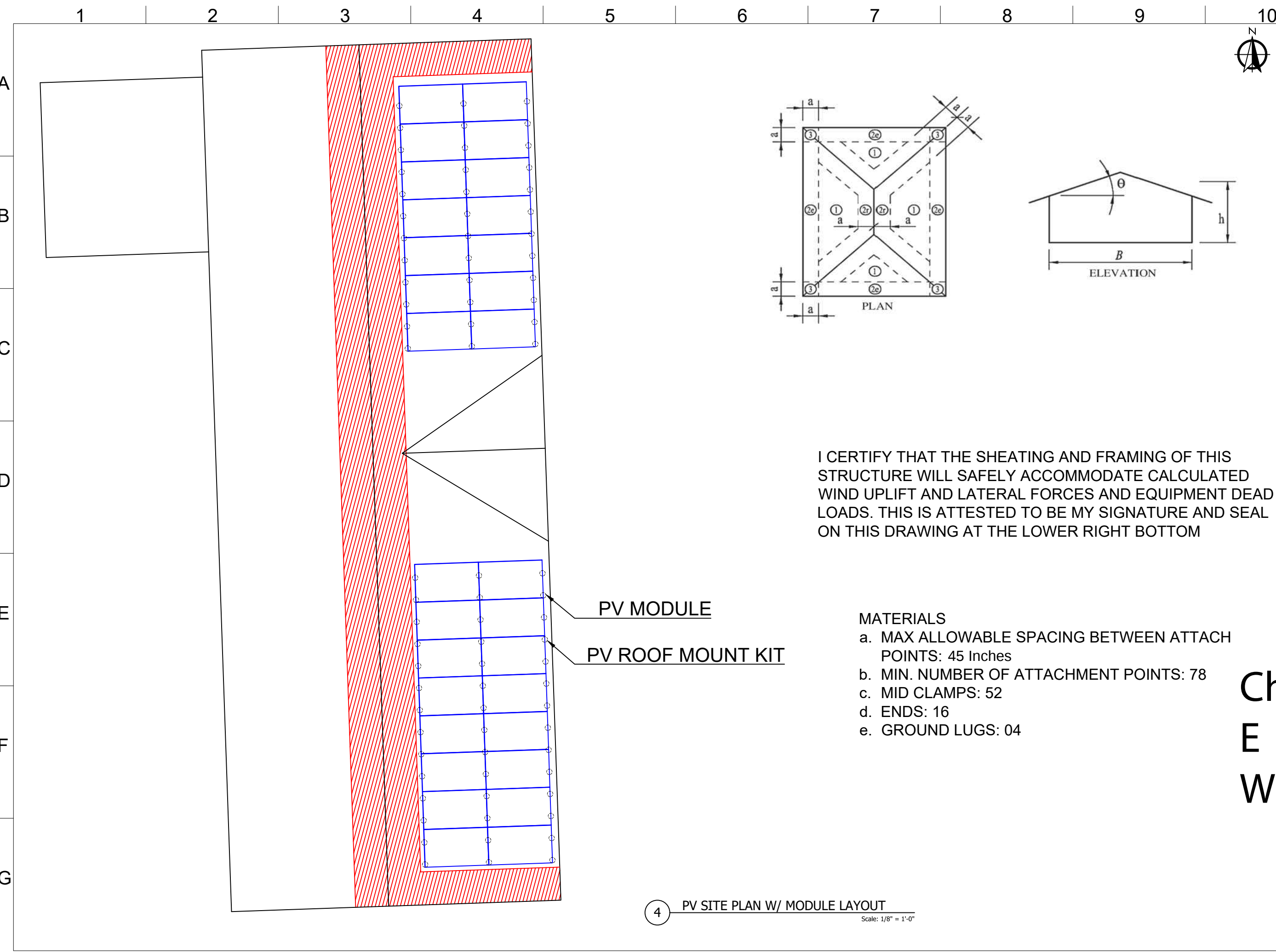
no.	drawn by	revision	date
01	DCG	---	6/18/22

Design
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379 Douglas Rd, Suite A
Oldsmar, FL 34677
Rachael@bayareaprojectsolutions.com

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by Chad E
Widup
Date:
2022.06.25
17:15:44 -04'00'

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39905 Grays Airport Road
Lady Lake, FL 32159
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PV05



I CERTIFY THAT THE SHEETING AND FRAMING OF THIS STRUCTURE WILL SAFELY ACCOMMODATE CALCULATED WIND UPLIFT AND LATERAL FORCES AND EQUIPMENT DEAD LOADS. THIS IS ATTESTED TO BE MY SIGNATURE AND SEAL ON THIS DRAWING AT THE LOWER RIGHT BOTTOM

- MATERIALS**
- a. MAX ALLOWABLE SPACING BETWEEN ATTACH POINTS: 45 Inches
 - b. MIN. NUMBER OF ATTACHMENT POINTS: 78
 - c. MID CLAMPS: 52
 - d. ENDS: 16
 - e. GROUND LUGS: 04

4 PV SITE PLAN W/ MODULE LAYOUT
Scale: 1/8" = 1'-0"





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6. ROOF SLOPE:22.26°

File Name:
05_JANKOWSKI MARY_S_PV SITE LAYOUT.DWG

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PV06 - S_PV SITE LAYOUT

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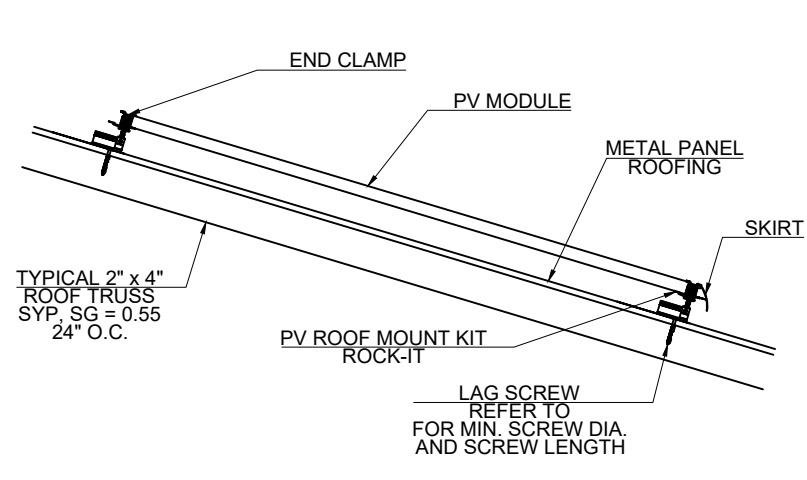
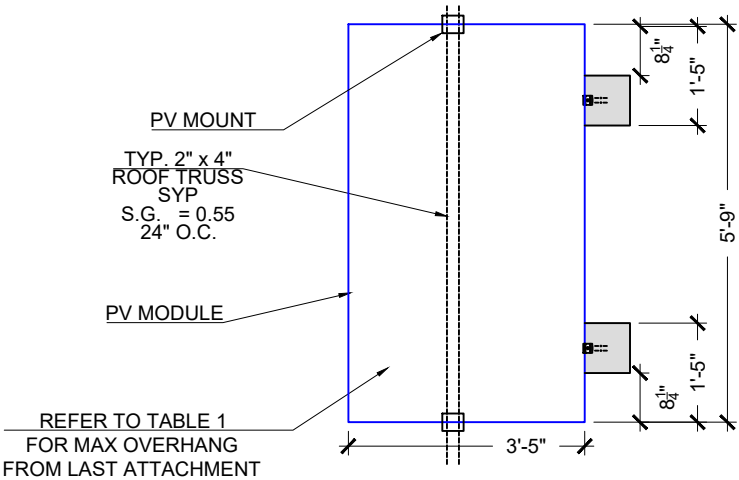
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PV06

TABLE 1

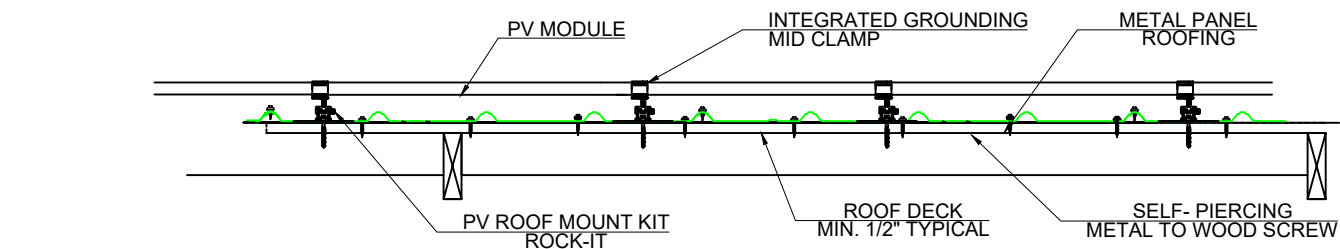
ASCE 7-16 CHAPTER 29 WIND LOADS - Rooftop Solar Panels Minimum Design Loads - Part 1: Enclosed(Gable,Hip,Flat h<60ft, 0°<0<45°)									
Wind Load Parameters - Inputs									
Risk Category		II		Table 1.5-1					
Basic Wind Speed (Ult)		130 mph		Figure 26.5-1B					
Roof Angle		21° to 27°							
Roof Type		Gable							
Exposure Cat.		B,C, or D		C		Section 26.7			
Mean Roof Height		h		15.00 ft					
Roof attachment		5/16" x 4.75" Lag Screw							
Rafter/Truss Spacing		24		in O.C.					
No. of Rails		2							
No. of Modules - Portrait		30							
No. of Modules - Landscape		0							
Module Model Number		DNA-120-MF26 365							
bldg. least horizontal dim (typ.)		360		in					
Elevation		<1000		ft					
Est. # of attachment points		78							
PV Dead Load				Module and Racking Specs					
# of Modules		30		Dimensions, LxWxH (in)		69.13 x 40.9 x 1.37			
Module	W _{mod}	45	lbs	Width		3.41	ft		
Array	W _{mods}	1356	lbs	Length		5.76	ft		
Micro/optimizer	W _{mic}	120	lbs	Module Area		19.66	ft²		
PV Rail	W _{PV rail}	0	lbs	Dead Load - Rail, Clamps, Mounts		1	lb/ft		
Total Weight	W _{total}	1476	lbs	Total Rail Length		0	ft		
Total Area	A _T	589.91	ft²	Module load ratings		Ultimate	Allowable		
Dead Load	D _{PV}	2.50	psf	Load Rating - Snow(psf)		113.4	75.6		
Weight/attachment		18.9	lbs	Load Rating - Wind(psf)		-113.4	-75.6		
PV Attachment - Results									
Roof Zones - Gable 21° to 27°									
	1	2**	2r**	2n**	3e**	3r**			
GC _p - Uplift	-1.5	-1.5	-2.1	-2.1	-2.1	-2.3			
GC _p - Down	0.5	0.5	0.5	0.5	0.5	0.5			
p = q _h (GC _p)(γ _e)(γ _s)	-26.3	-26.3	-37.8	-37.8	-37.8	-41.7	psf	29.4-7	
p = q _h (GC _p)(γ _e)(γ _s)	9.6	9.6	9.6	9.6	9.6	9.6	psf	29.4-7	
Max Allowable Span	6	6	6	6	6	4	ft	*notes	
Max Cantilever (in)	24	24	24	24	24	16	Max span * 33% (in)		
Notes									
Eq.1 Point Load = Roof Zone psf * TA									
Eq.2 TA = (Module Length / 2) * Max Span									
Eq.3 *Max span Equation, SF = Allowable pullout / Point Load									
Eq.4 Max Span = Allowable Pullout / (SF * Roof Zone psf * L/2)									
a) The Max span between attachment points must not exceed the rail spans provided by racking manufacture.									
b) Allowable Module load ratings are determined by SF = 1.5									
Wind Load Parameters									
Wind Speed (asf)	101	mph	FRC R301.2.1.3						
Effective Wind Area	19.66	ft²	26.20						
Wind Directionality	K _d	0.85	Table 26.6-1						
Topographic factor	K _{z1}	1.00	26.8 or 26.8.2						
Ground Elevation Factor	K _e	1.00	Table 26.9-1						
Velocity Exposure Coefficient	K _z	0.85	Table 26.10-1						
Array Edge Factor	γ _e	1.50	29.4.4 *Modules are considered Exposed						
Solar Panel Equalization Factor	γ _a	0.68	Fig. 29.4-8						
Velocity Pressure	q _h	18.75	psf	q _h =0.00256 K _d K _{z1} K _e V²					
Added Safety Factor	1.2								
Allowable Pullout per mount	859.2	lbs							
10% of least horizontal dim	0.4h or 0.6h	6.00	ft	Flat - 0.6h, Gable, Hip - 0.4h					
		3.00	ft	10% of least hor. Dim. Or 0.4h, whichever is smaller, but not less than either 4% of Least hor. Or 3 ft. (Flat roof - 0.6h)					
Roof Zone Set Back	a	3.00	ft						
	h ₂	5	in	Not > 10 in (panel height above roof)					
	2h ₂	10	in	*min distance array shall be from the roof edge, Gable Ridge, or hip ridge					
		0.25	in	min gap between all panels but not > 6.7 ft					
	d1	1.00	ft	Horizontal distance orthogonal to panel edge					
	d2	0.25	ft	Horizontal distance from edge of one panel to the nearest edge in the next row					
	0.5h	7.50	ft	*modules are considered exposed that are within 1.51p from roof edge					

** No Exposed or Edge Conditions Allowed
MAX ALLOWABLE SPACING BETWEEN ATTACH POINTS: 1/2e - 45 Inches
2n/2r/3e - 26 Inches
3r - 18 Inches

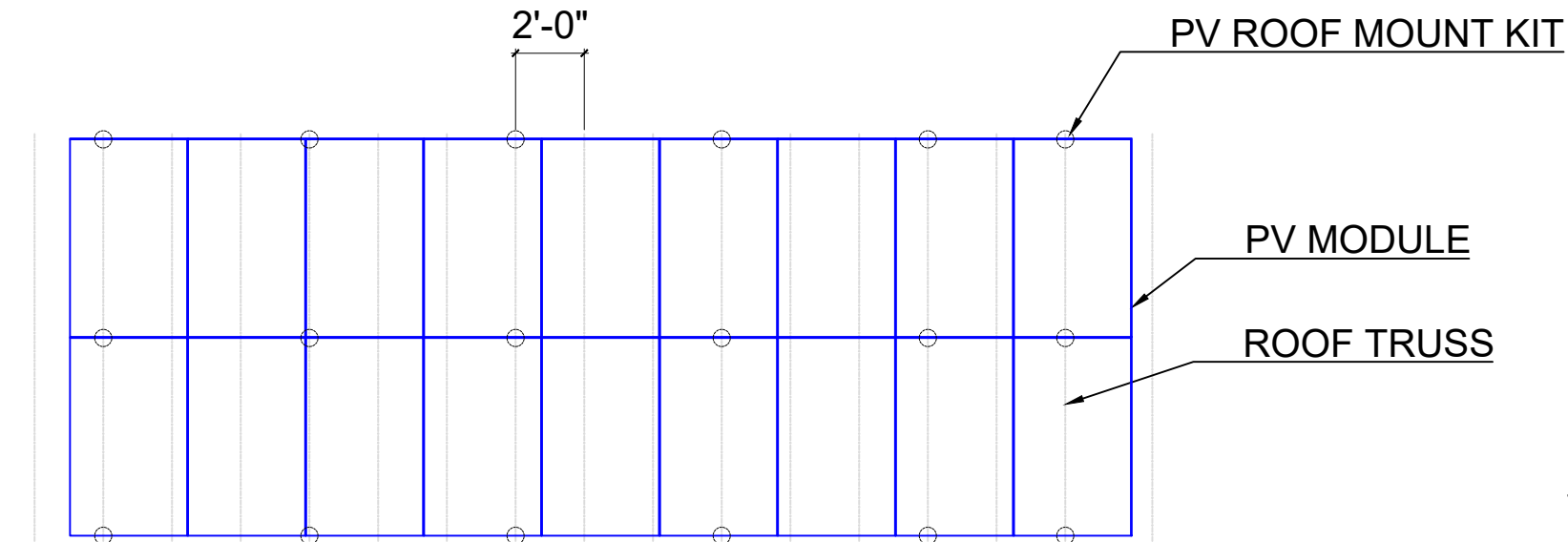


A ALLOW. CLAMPING AREA - TOP DOWN
Scale: 3/8" = 1'-0"

B CONNECTION DETAIL - SIDE VIEW
Scale: 1:16



C CONNECTION DETAIL - FRONT VIEW
Scale: 3/4" = 1'



D MODULE ATTACHMENT PLAN
Scale: 3/16" = 1'-0"



BAPS
Engineering & Permitting

Project Type - Photovoltaic

Project Location:

176 SW Polaris Terrace,
Fort White, FL 32038

Parcel Number: 13-7S-16-04203-013
Assessor Phone # (386) 758-1083

PV SYSTEM SPECIFICATIONS

1. PV MODULE: 30 x Aptos
DNA-120-MF26-365W; 10.95kWdc
2. INVERTER: IQ7+72-2-US
3. RACKING: Ecofasten Rock-it
4. ROOF TYPE: METAL PANEL
5. AZIMUTH: 88°
6. ROOF SLOPE: 22.26°

File Name:
06_JANKOWSKI MARY_SHINGLE_H.DWG

Sheet Number and Title:
PV07 - PV ATTACH PLAN

Sheet Size:
ANSI full bleed B (17.00 x 11.00 Inches)

Drawing history

no.	drawn by	revision	date
01	DCG	---	6/17/22

Permit manager

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PV07

DNA™ 120

Residential | Commercial

Solar for Innovators

Designed & Engineered in Silicon Valley
370W | 365W | 360W

Our DNA™ Split Cell Series impressively combines advanced solar technologies to maximize performance. Our patented Dual Nano Absorber (DNA™) Technology allows the panel to operate at high-efficiencies in extreme temperatures. Contact our sales team today to learn more about our line of high-efficiency solar panels.

⚡ Patented DNA™ technology boosts power performance & module efficiency

🔌 Advanced split cell technology with 9 ultra-thin busbars allows for less resistance and more photon capture

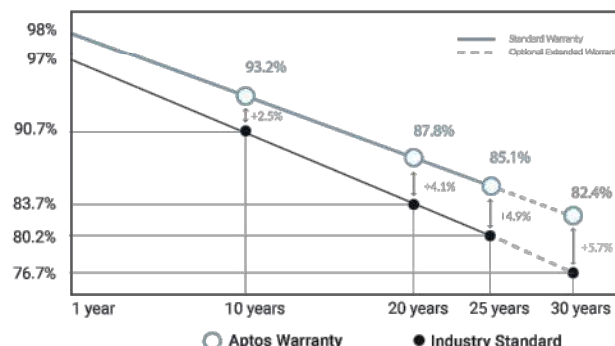
🌳 Ideal solution for applications affected by shading

✨ All-black design for pristine aesthetics
No excessive silver bussing or ribbons

☁️ Robust product design is resilient in extreme weather. Up to 5400 Pa snow load and 210 mph wind speeds



Linear Performance Warranty



30 Year Warranty

3X IEC Standards

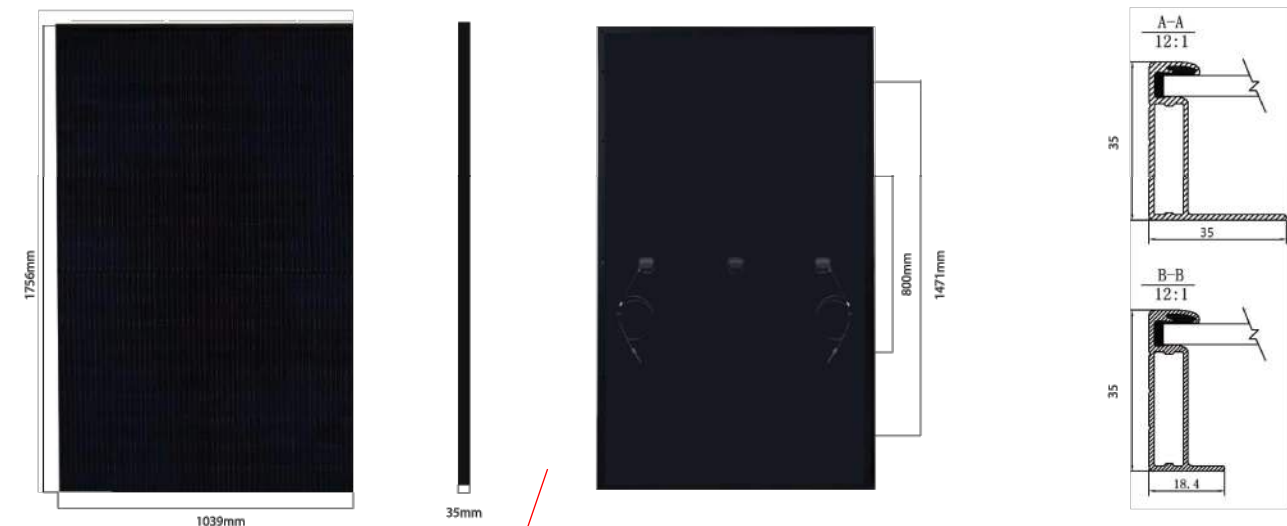
RETc Top Performer



3140 De La Cruz Blvd., Ste 200
Santa Clara, CA 95054
www.aptosolar.com
info@aptossolar.com

DNA™ 120

Solar for Innovators



Electrical Specifications

	DNA-120-MF26-360W	DNA-120-MF26-365W	DNA-120-MF26-370W
STCrated Output P_{mp} (W)	360W	365W	370W
Module Efficiency	19.73%	20.01%	20.29%
Open Circuit Voltage V_{oc} (V)	40.6	40.7	40.8
Short Circuit Current I_{sc} (A)	11.24	11.36	11.51
Rated Voltage V_{mp} (V)	33.8	33.96	34.06
Rated Voltage I_{mp} (A)	10.66	10.75	10.87

Temperature Coefficients

Temperature Coefficients P_{mp}	-0.36%
Temperature Coefficients I_{sc}	+0.05%/°C
Temperature Coefficients V_{oc}	-0.29%/°C
Normal Operating Cell Temperature (NOCT)	44°C

Test Operating Conditions

Maximum Series Fuse	20A
Maximum System Voltage	1,500 VDC (UL&IEC)
Maximum Load Capacity (Per UL 1703)	5400 PA Snow Load / 210mph Wind Rating
Fire Performance Class	Class C/Type 1

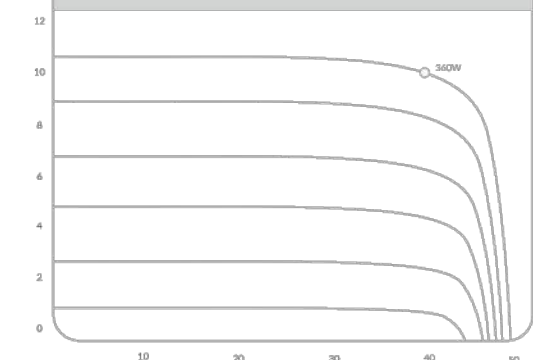
Packaging Configuration

Number of Modules per Pallet	30
Number of Pallets per 40ft. Container	26
Pallet Dimensions	1740 X 1140 X 1165
Pallet Weight (kg)	640
Container Weight (kg)	16640

Mechanical Properties

Cell Type	Monocrystalline
Glass	3.2mm, anti-reflection coating, high transmission, low iron, tempered glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68
Dimensions	1756 X 1039 X 35mm
Output Cable	4mm2 (EU)12AWG,39.37in.(1200mm)
Weight	45.19lbs.(20.5kg)
Cable Length	1200mm
Encapsulant	POE

I-V Curve



Certifications



UL61730-1, UL61730-2

Aptos Solar Technology reserves the right to make specification changes without notice



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Widup

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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.



To learn more about Enphase offerings, visit enphase.com



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 pairings¹	235 W - 360 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/range²	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 circuit³	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.

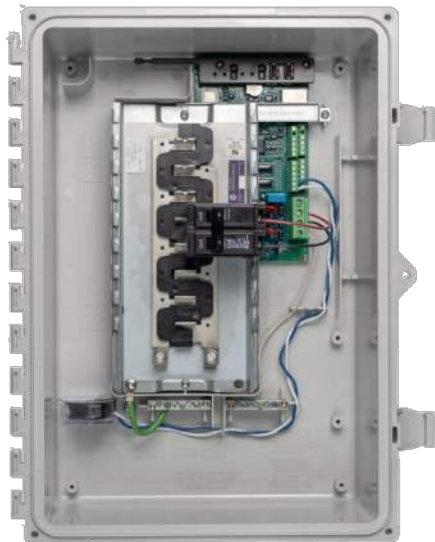
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2018-05-24



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 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	Split core current transformers enable whole home consumption metering (+/- 2.5%).
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 2
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
* Consumption monitoring is required for Enphase Storage Systems.	

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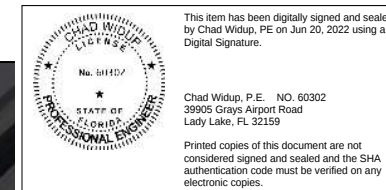
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2018-09-13





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ROCKIT

COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a top-down leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS



Composition Shingle,
Tile, Metal



Rail-Less



Structural-Attach
Direct-Attach



ROCKIT

COUPLING

The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.

SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aesthetically-pleasing finishing touch.

ROCKIT MOUNT

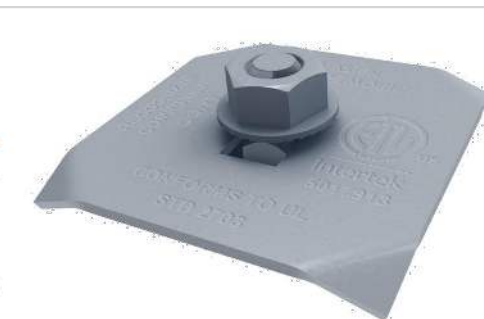
Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

ROCKIT SLIDE

Available in three variations, the RockIt Slide allows installation on composition shingle, tile, and metal roofs.

FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.



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