PROJECT DESCRIPTION

SYSTEM CAPACITY: 13.505 KW DC / 10.73 KW AC

PV PANELS: (37) DNA 120 MF26 365W BY APTOS

COMBINER: (1) IQ COMBINER BOX 3 BY ENPHASE

INVERTER: (37) IQ7+ MICROINVERTER BY ENPHASE

RACKING SYSTEM: ROCK-IT SYSTEM 3.0 BY ECOFASTEN

PROJECT INFORMATION

PROJECT LATITUDE	27.92484	MIN AMBIENT TEMP	-5 ° C
PROJECT LONGITUDE	-82.61121	MAX AMBIENT TEMP	35 ° C
AHJ	COLUMBIA COUNTY	WIND EXPOSURE	C
		DESIGN WIND SPEED	120 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.

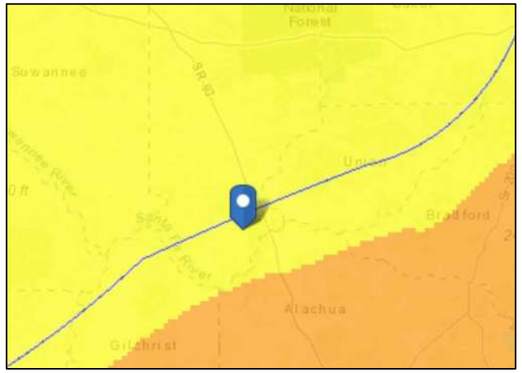
CONTRACTOR SHALL ENSURE ALL ROOF PENETRATIONS TO BE INSTALLED AND SEALED PER 2020 FLORIDA BUILDING CODE 7TH EDITION OR LOCAL GOVERNING CODE.

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.

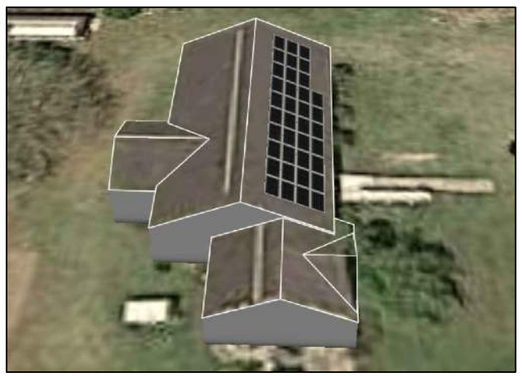


2 LOCATION MAP / WIND ZONES

N.T.S.

3 IRRADIANCE MAP

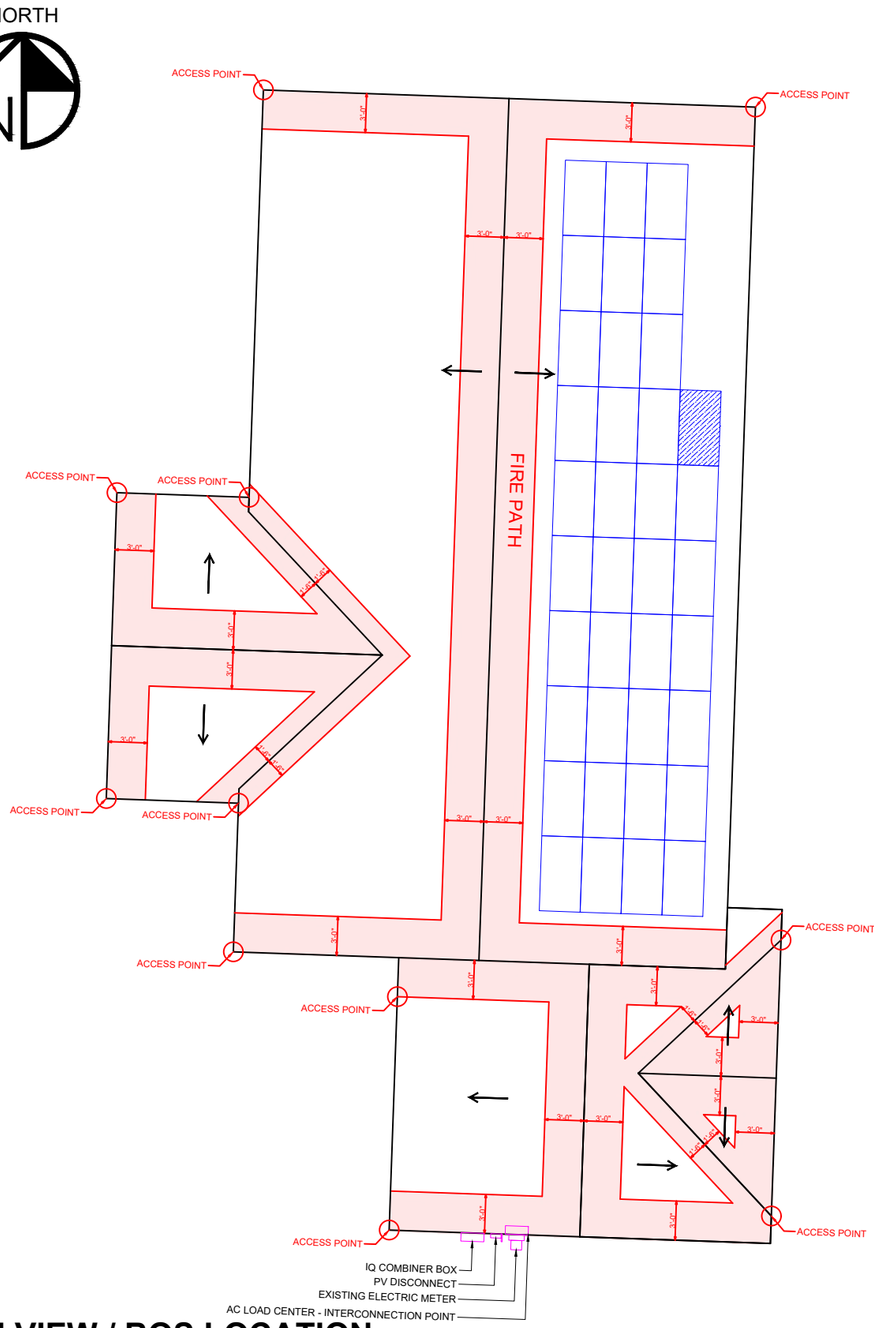
N.T.S.



4 3D RENDERING

N.T.S.

Columbia County Building Department — Plans Reviewed for Code Compliance — State of Florida



1 ROOF PLAN VIEW / BOS LOCATION

N.T.S.

"PROPERTY SIDE FACING STREET"

DOCUMENT CONTROL	DATE	CAD	QC
ISSUED FOR PERMIT	07-14-2022	JA	MM

REV	DESCRIPTION	DATE	CAD	QC

ENGINEER CONTACT INFORMATION

ENGIPARTNERS LLC
C.A. 32661
1825 PONCE DE LEON BLVD #114
CORAL GABLES, FL 33134

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833 - 888 - 3644

ENGINEERING STAMP

Rafael A. Gonzalez Soto, No. 83104, State of Florida, Professional Engineer
Rafael A Gonzalez Soto 2022.07.15 08:51:34 -04'00'

CONTRACTOR CONTACT INFORMATION

ENERGY SOLUTIONS DIRECT
6076 PARK BLVD N

PINELLAS PARK, FL 33781

(727) 744-0716 (800) 425-1175

#EC13008844

CONTRACTOR LOGO

ESD SOLAR

CUSTOMER: BARBARA FEDOR

PROJECT ADDRESS: 19156 S US HIGHWAY 441, HIGH SPRINGS, FL 32643

PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: COVER SHEET

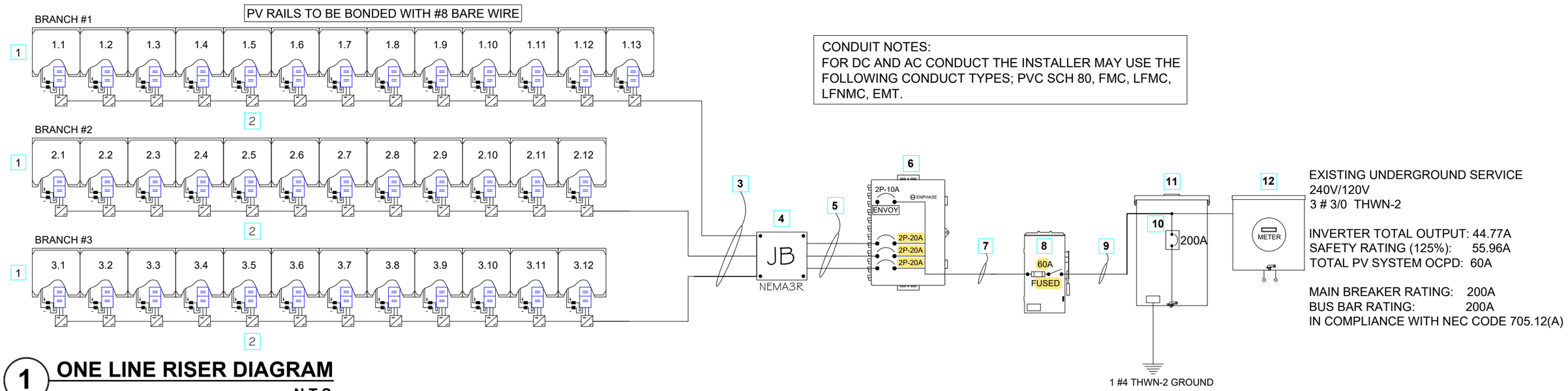
PROJECT ID: EP15179

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

DATE: 07-13-2022

SHEET TITLE: C-1

	WIRE SIZES, QUANTITY & TYPE			RACEWAY SIZE, TYPE & LOCATION			WIRE AMPACITY CALCULATIONS							ADDITIONAL INFORMATION			
										WIRE DE-RATED CALCULATION							
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 (AMP)	125% OF OUTPUT CURRRENT (AMP)	MIN OCPD (AMP)	WIRE RATING	AMBIENT TEMPERATURE COEFFICIENT	# OF CONDUCTORS COEFFICIENT	DE-RATES AMPACITY	DIST.	VOLTAGE	VOLTAGE DROP %	CONDUIT FILL %
AC.1 BRANCH 1 (BEFORE JB)	(1) IQ CABLE BY ENPHASE	N/A	(1) #8 AWG BARE COPPER	NOT APPLICABLE	UNDER ARRAY	1/2" TO 3-1/2"	15.73	19.66	20A	30A	0.76	1	22.8A	10 FT.	240V	0.11%	6.4%
AC.1 BRANCH 2 (BEFORE JB)	(1) IQ CABLE BY ENPHASE	N/A	(1) #8 AWG BARE COPPER	NOT APPLICABLE	UNDER ARRAY	1/2" TO 3-1/2"	14.52	18.15	20A	30A	0.76	1	22.8A	10 FT.	240V	0.11%	6.4%
AC.1 BRANCH 3 (BEFORE JB)	(1) IQ CABLE BY ENPHASE	N/A	(1) #8 AWG BARE COPPER	NOT APPLICABLE	UNDER ARRAY	1/2" TO 3-1/2"	14.52	18.15	20A	30A	0.76	1	22.8A	10 FT.	240V	0.11%	6.4%
AC.2 BRANCH 1 (FROM JB TO COMBINER BOX)	(2) #10 AWG THWN-2	N/A	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	ABOVE ROOF	1/2" TO 3-1/2"	15.73	19.66	20A	40A	0.76	0.8	24.3A	20 FT.	240V	0.21%	8.1%
AC.2 BRANCH 2 (FROM JB TO COMBINER BOX)	(2) #10 AWG THWN-2	N/A	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	ABOVE ROOF	1/2" TO 3-1/2"	14.52	18.15	20A	40A	0.76	0.8	24.3A	20 FT.	240V	0.21%	8.1%
AC.2 BRANCH 3 (FROM JB TO COMBINER BOX)	(2) #10 AWG THWN-2	N/A	(1) #8 AWG THWN-2	3/4" EMT CONDUIT	ABOVE ROOF	1/2" TO 3-1/2"	14.52	18.15	20A	40A	0.76	0.8	24.3A	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	3/4" EMT CONDUIT	EXTERIOR WALL	"N/A"	44.77A	55.96A	60A	75A	1	1	75A	5 FT.	240V	0.1%	7.7%



1 ONE LINE RISER DIAGRAM

N.T.S.

CONDUIT NOTES:
FOR DC AND AC CONDUCT THE INSTALLER MAY USE THE FOLLOWING CONDUCT TYPES; PVC SCH 80, FMC, LFMC, LFNMC, EMT.

EXISTING UNDERGROUND SERVICE
240V/120V
3 # 3/0 THWN-2

INVERTER TOTAL OUTPUT: 44.77A
SAFETY RATING (125%): 55.96A
TOTAL PV SYSTEM OCPD: 60A

MAIN BREAKER RATING: 200A
BUS BAR RATING: 200A
IN COMPLIANCE WITH NEC CODE 705.12(A)

LEGEND:

1	(37) DNA 120 MF26 365W BY APTOS REFER TO D-1 SHEET	2	IQ7+ MICROINVERTER BY ENPHASE REFER TO D-3 SHEET	3	3 IQ CABLE BY ENPHASE 1 #8 BARED WIRE GROUND
4	NEMA 3R JUNCTION BOX	5	6 #10 THWN-2 1 #8 THWN-2 GROUND 3/4" EMT CONDUIT	6	IQ COMBINER BOX BY ENPHASE - REFER TO D-2 SHEET WITH ENVOY BREAKER - OPTIONAL SIZE:10A, 15A OR 20 A
7	2 #6 L1,L2 THWN-2 1 #6 THWN-2 NEUTRAL 1 #8 THWN-2 GROUND 3/4" EMT CONDUIT	8	PV SYSTEM DISCONNECT - 60A RATED WITH 60A FUSES	9	2 #6 L1, L2 THWN-2 1 #6 THWN-2 NEUTRAL 3/4" EMT CONDUIT
10	PV INTERCONNECTION POINT-LINE SIDE	11	EXISTING INTERIOR PANEL RATED 200A	12	UTILITY ELECTRICAL SERVICE

DOCUMENT CONTROL	DATE	CAD	QC
ISSUED FOR PERMIT	07-14-2022	JA	MM

REV	DESCRIPTION	DATE	CAD	QC

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Rafael A Gonzalez Soto
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CONTRACTOR CONTACT INFORMATION
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(727) 744-0716 (800) 425-1175
#EC13008844

CONTRACTOR LOGO
ESD SOLAR

CUSTOMER: BARBARA FEDOR

PROJECT ADDRESS:
19156 S US HIGHWAY 441
HIGH SPRINGS, FL 32643

PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: ONE LINE RISER DIAGRAM

PROJECT ID: EP15179

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

DATE: 07-13-2022

SHEET TITLE: E-1

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)

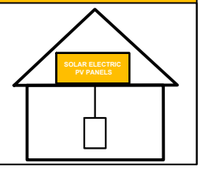
WARNING

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.



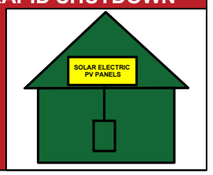
LABEL LOCATION:
AC DISCONNECT, MAIN PANEL
PER CODE: NEC 690.56(C)(1)(a)

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

1 PV SAFETY LABELS DATA
N.T.S.

MICRO-INVERTER

NOMINAL OPERATING AC VOLTAGE	240 V
NOMINAL OPERATING AC FREQUENCY	60 HZ
MAXIMUM AC POWER	10.73 KW
MAXIMUM AC CURRENT	44.77A
MAX OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION	20A

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:	44.77 A
NOMINAL OPERATING AC VOLTAGE:	240V

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.54

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

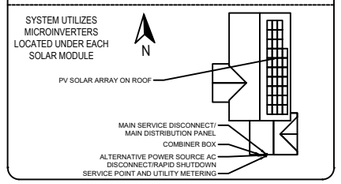
LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC 690.13 (B)

WARNING: PHOTOVOLTAIC POWER SOURCE

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

CAUTION

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:



PER CODE: NEC 690.56 (B) , NEC705.10

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

ENERGY SOLUTION DIRECT

PHONE NUMBER: (727) 744-0716
(800) 425-1175

ADDRESS: 6076 PARK BLVD N
PINELLAS PARK, FL 33781

GENERAL NOTE:

ADHESIVE FASTENED SIGNS:

· THE LABEL SHALL BE VISIBLE, REFLECTIVE AND SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED [NFPA 1, 11.12.2.1]
· WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
· ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT [IFC 605.11.1.3]

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CONTRACTOR LOGO
ESD SOLAR

CUSTOMER:
BARBARA FEDOR

PROJECT ADDRESS:
19156 S US HIGHWAY 441
HIGH SPRINGS, FL 32643

PARCEL NUMBER:
33-6S-17-09834-202 (36340)

SHEET NAME:
SAFETY LABELS

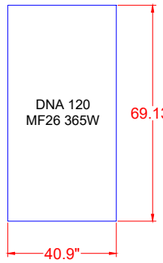
PROJECT ID:
EP15179

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

DATE:
07-13-2022

SHEET TITLE:
E-2

SOLAR MODULE



UL 1703 CERTIFIED
MAX. DESIGN LOAD: 112.78 psf
APPLIED WIND LOAD: -25.14 psf

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.

WORST CASE MODULE:
ZONE 1: 39%
ZONE 2e: 61%

-25.14(0.39) + -25.14(0.61) = -25.14psf

ULTIMATE WIND SPEED	120	mph
DESIGN WIND SPEED	120	mph
RISK CATEGORY	II	
EXPOSURE CATEGORY	C	
ROOF SLOPE (°)	23	
ROOF TYPE	GABLED	
MATERIAL ROOF TYPE	ASPHALT SHINGLES	
PRESSURE ZONE:	1&2	
MEAN ROOF HEIGHT:	13.816'	
0.5 MEAN ROOF HEIGHT	6.908000	
$2H_2$	10	"
PERIMETER WIDTH:	3.78	'
K_D	0.85	
K_{ZT}	1.0	
K_H	0.849	
VELOCITY PRESSURE (q) = $0.60*0.00256* K_H K_{ZT} K_D V^2$		
VELOCITY PRESSURE (ASD)	15.96	

NON EXPOSED	EXPOSED	ARRAY EQUALIZATION FACTOR:
EDGE FACTOR: γ_E = 1.0	EDGE FACTOR: γ_E = 1.5	γ_a = 0.7

EXTERNAL PRESSURE COEFFICIENT Z1	0.7	-1.5
EXTERNAL PRESSURE COEFFICIENT Z2e	0.7	-1.5
EXTERNAL PRESSURE COEFFICIENT Z2n	0.7	-2.5
EXTERNAL PRESSURE COEFFICIENT Z2r	0.7	-2.5
EXTERNAL PRESSURE COEFFICIENT Z3e	0.7	-2.5
EXTERNAL PRESSURE COEFFICIENT Z3r	0.7	-3.6
INTERNAL PRESSURE COEFFICIENT	0.18	

ZONES	PRESSURES (PSF)	NON EXPOSED PRESSURES (PSF)	EXPOSED PRESSURES (PSF)	MAX SPAN (FT)	MAX CANTI-LEVER (IN)
1	-26.81	-16.76	-25.14	6 '	24"
2e	-26.81	-16.76	-25.14	6 '	24"
2n	-42.77	-27.93	-41.90	4 '	16"
2r	-42.77	-27.93	-41.90	4 '	16"
3e	-42.77	-27.93	-41.90	4 '	16"
3r	-60.33	-40.22	-60.33	4 '	16"

TOTAL ROOF AREA	3669.97	sq.-ft
TOTAL MODULES:	37	
TOTAL PHOTOVOLTAIC AREA:	726.63	sq.-ft
TOTAL PERCENTAGE AREA OF PV SYSTEM:	19.80	%
WIND LOAD (PSF):	-25.14	
TOTAL WIND LOAD (LBS):	-18,267.48	
TOTAL ROOF MOUNTS:	52	
TENSION FORCE PER MOUNT (LBS):	-351.30	

LEGEND & SYMBOLS

OBS	ROOF OBSTRUCTIONS
	NON-EXPOSED MODULES
	EXPOSED MODULES
	EDGE MODULES
	TRUSSES OR RAFTERS
	ROOF MOUNTS
	ROOF SLOPE

ROOF'S GENERAL NOTES:

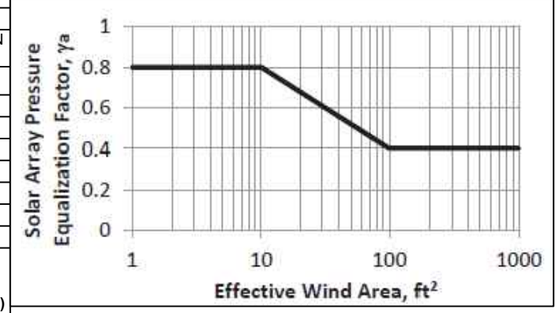
1- CONTRACTOR/INSTALLER TO VERIFY ROOF CONDITIONS FOR PROPER INSTALLATION OF THE PV SYSTEM.
2- CONTRACTOR/INSTALLER TO NOTIFY THE OWNER IMMEDIATELY OF ANY ROOF DEFICIENCIES AND/OR REPAIR REQUIRED TO INSTALL THE PV SYSTEM.
3- EOR DOES NOT ASSUME ANY RESPONSIBILITY FOR THE INSTALLATION OF ANY PV SYSTEM ON DEFICIENT ROOFS.
4-CONTRACTOR/INSTALLER ASSUMES ALL RESPONSIBILITY TO INSTALL AS PER MANUFACTURER STANDARDS.

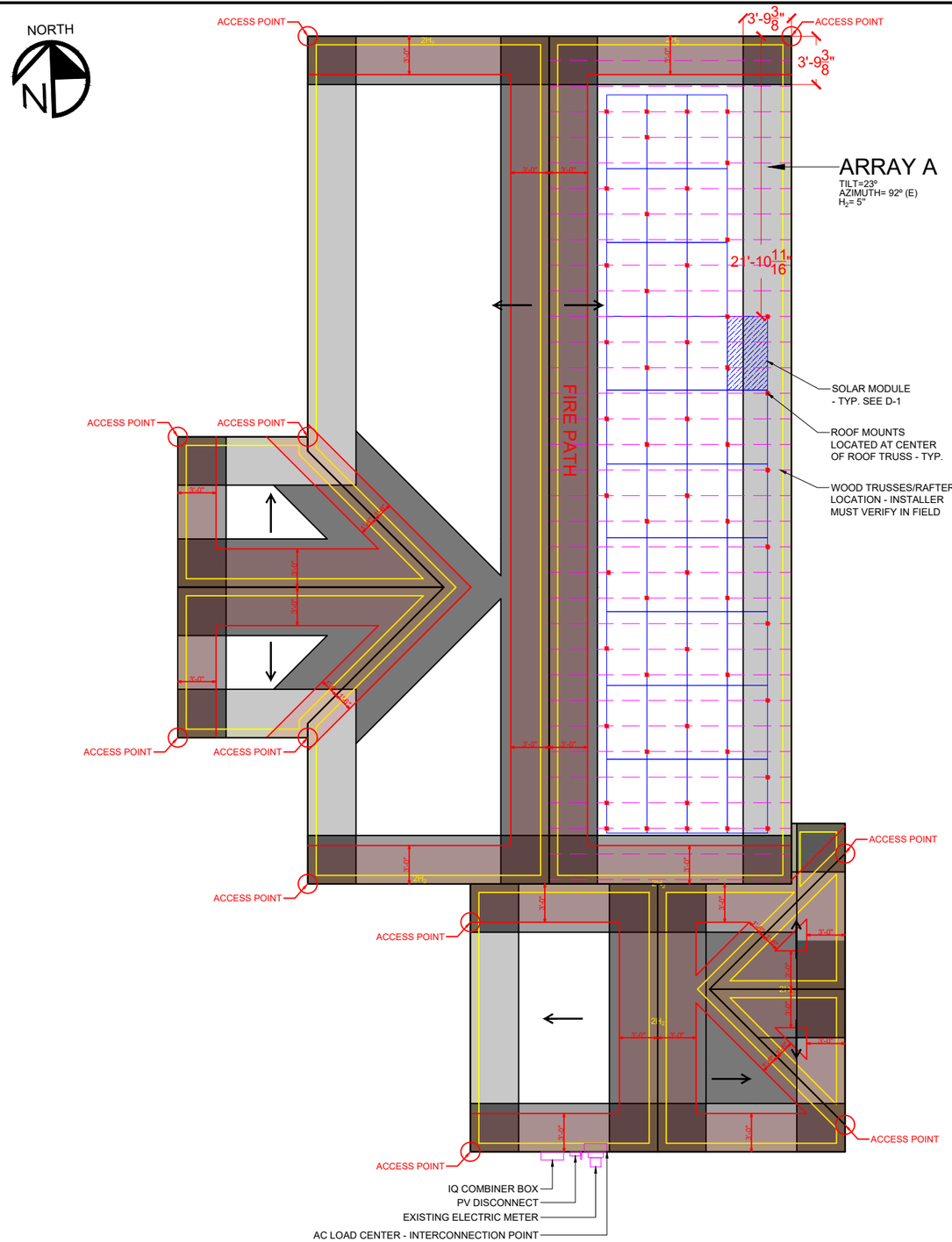
ROOF INSPECTION NOTE:

A PANEL IS DEFINED AS EXPOSED IF D1 TO THE ROOF EDGE >0.5H AND ONE OF THE FOLLOWING APPLIES:
1. D1 TO THE ADJACENT ARRAY > 4 FT (1.2 M) OR
2. D2 TO THE NEXT ADJACENT PANEL> 4 FT. (1.2 M)

ASCE 7.16 - 29.4-7
DESIGNED WIND PRESSURES:

$$p = q_h (GC_p)(\gamma_E)(\gamma_a)$$





1 STRUCTURAL ROOF PLAN & PV MODULES LAYOUT
N.T.S.

DOCUMENT CONTROL	DATE	CAD	QC
ISSUED FOR PERMIT	07-14-2022	JA	MM

REV	DESCRIPTION	DATE	CAD	QC

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ENGINEERING STAMP
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Rafael A Gonzalez Soto 2022.07.15 08:52:23 -04'00'

CONTRACTOR CONTACT INFORMATION
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CONTRACTOR LOGO
ESD SOLAR

CUSTOMER: BARBARA FEDOR

PROJECT ADDRESS:
19156 S US HIGHWAY 441
HIGH SPRINGS, FL 32643

PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: STRUCTURAL PLAN

PROJECT ID: EP15179

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

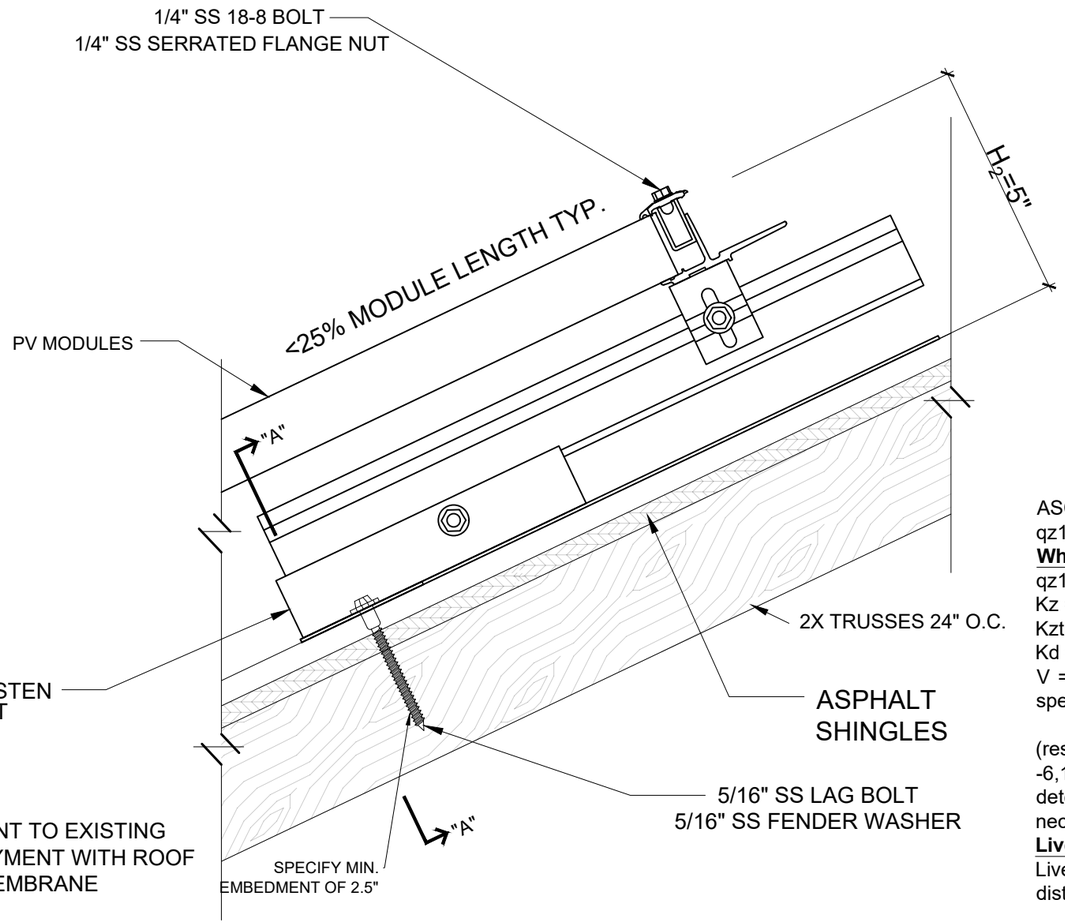
DATE: 07-13-2022

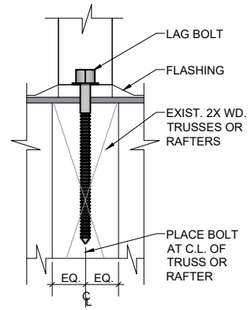
SHEET TITLE: S-1

MAXIMUM ATTACHMENT SPANS (INCHES)				ATTACHMENT SPAN FOR 72 CELL MODULE INSTALLED IN LANDSCAPE ORIENTATION						
GROUND SNOW LOAD	EXPOSURE CATERGORY	PANEL ANGLE	WIND SPEED	120 MPH						
			ROOF ZONE	1'	1	2e	2r	2n	3e	3r
0 PSF	C	20 TO 27	ARRAY INTERIOR	72	72	72	57	57	57	53
			ARRAY EDGE	64	64	64	38	38	38	35

LAG BOLT PULL OUT CALCULATIONS

Spruce, Pine,	Per inch Thread Depth	266lbs
SS Lag Bolt 5/16" x 4"	Min. Thread Depth	0'-3"
Wood Strength x Thread Depth = Pull Out Strength		
266 lbs. x 3 in = 798 lbs.		
Allowable Pull Out Strength per Lag Bolt		798 lbs.
Max. Pull Out Strength Required per Lag Bolt		351.30
Lag Bolt Pull Out Strength Safety Factor		2.27





SECTION "A-A"
N.T.S.

DISTRIBUTED LOAD CALCULATIONS

PV MODULES & RACKING WEIGHT = (INDIVIDUAL MODULE WEIGHT + 3.5 LBS) * (MODULE QTY) = (48.69 LBS) * (37) = 1,801.53 LBS

PER SQUARE FEET (PSF) ARRAY LOAD = PV MODULES & RACKING WEIGHT / TOTAL ARRAY AREA = 1,801.53 LBS / 726.63 SQFT = 2.48 PSF

HENCE, ROOF WILL CARRY THE ADDITIONAL SOLAR SYSTEM LOAD

ASCE 7-16 Velocity Pressure
qz10 = 0.00256Kz Kzt Kd V2

Where:

qz10 = ASCE 7-16 velocity pressure evaluated at mean roof height (psf)
Kz = velocity pressure exposure coefficient
Kzt = topographic factor
Kd = wind directionality factor
V = basic wind speed (mph) from ASCE 7-16 maps referred to as ultimate wind speed maps in 2020 FBC.

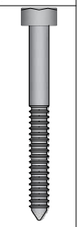
As an example, for an array having an area of 158.04 sq.-ft., the total uplifting (resultant) force acting on the array would be -39.1 psf x 158.04 sq. ft. = -6,179.364 lb. Knowing this resultant force, the design engineer can now determine the number of attachment points and the size of the mounting hardware necessary to safely carry this load.

Live Loads:

Live loads associated with photovoltaic systems are usually assumed to be distributed uniformly and are small, on the order of 4 psf or less.

Uni-Rac Specs. Lag pull-out (withdrawal) capacities (lbs) in typical roof lumber (ASD)

	STAINLESS STEEL Lag screw specifications	
	Specific gravity	*5/16" shaft, * per inch thread depth*
Douglas Fir, Larch	0.50	266
Douglas Fir, South	0.46	235
Engelman Spruce, Lodgepole Pine (MSR 1650 f & higher)	0.46	235
Hem, Fir, Redwood (close grain)	0.43	212
Hem, Fir (North)	0.46	235
Southern Pine	0.55	307
Spruce, Pine, Fir	0.42	205
Spruce, Pine, Fir (E of 2 million psi and higher grades of MSR and MEL)	0.50	266



Sources: American Wood Council, NDS 2005, Table 11.2A, 11.3A.

1 SHINGLE ROOF MOUNT DETAIL & DATA

N.T.S.

DOCUMENT CONTROL		DATE	CAD	QC
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REV	DESCRIPTION	DATE	CAD	QC

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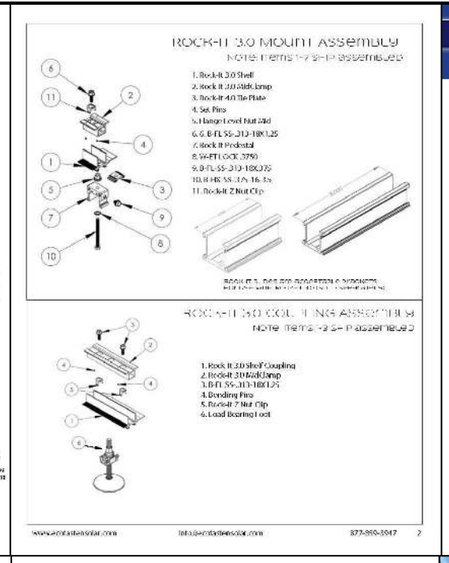
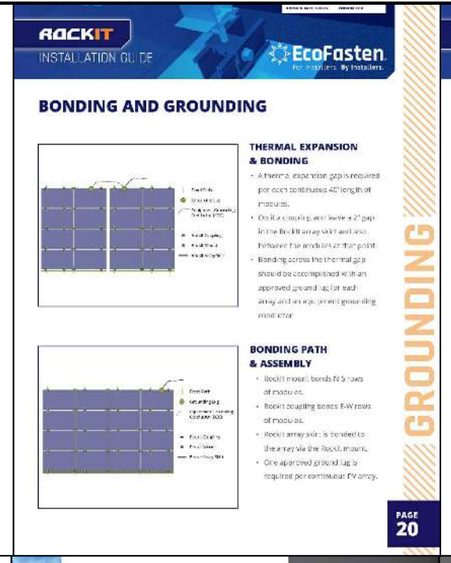
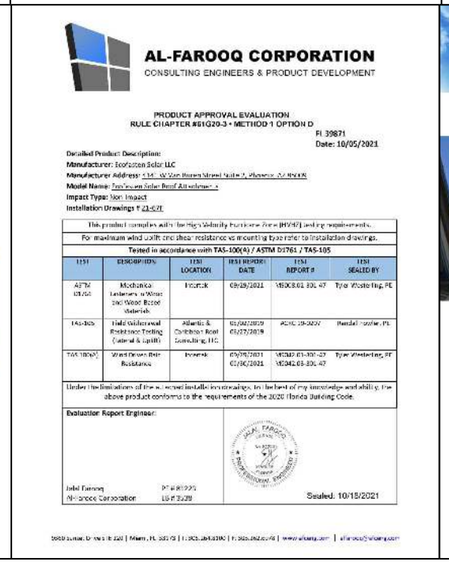
CONTRACTOR LOGO
ESD SOLAR

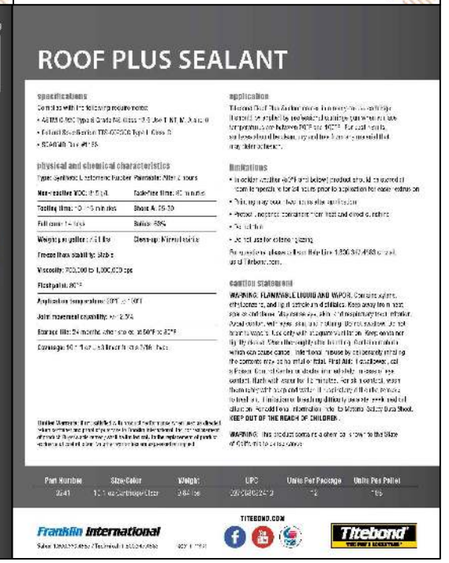
CUSTOMER: BARBARA FEDOR
PROJECT ADDRESS: 19156 S US HIGHWAY 441, HIGH SPRINGS, FL 32643
PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: RACKING PLAN
PROJECT ID: EP15179
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE: 07-13-2022
SHEET TITLE: S-2









Lag Screw Installation Guidelines

1. Determine location for the Mount on roof by drilling through the center of truss from bottom with 5/32" drill bit.
2. Mark mounting holes for Mount on underlayment. Mounting holes should be centered on the trusses.
3. Drill 15/64" pilot hole.
4. Apply sealant to bottom of Mount.
5. Place Mount over roof underlayment with holes in roof.
6. Apply sealant to bottom of Mount, apply sealant to lag screws and fasten Mount securely to trusses.
7. Apply additional sealant to top assembly to be sure all penetrations are sealed.

Notes: (1) Thread must be embedded in the side grain of a Trusses or other structural member integral with the building structure.
(2) Lag Bolts must be located in the middle third of the structural member.
(3) These values are not valid for wet services.
(4) This table does not include shear capacities. If necessary, contact a local engineer to specify lag bolt size with regard to shear forces.
(5) Install lag bolts with head ad washer flush to surface (no gap). Do nor over-torque.
(6) Withdrawal design values for lag screw connections shall be multiplied by applicable adjustment factors if necessary. See table 10.3.1 in the American Wood Council NDS for Wood Construction.

1 SHINGLE ROOF MOUNT DETAIL & DATA

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CUSTOMER: BARBARA FEDOR

PROJECT ADDRESS:
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HIGH SPRINGS, FL 32643

PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: RACKING PLAN

PROJECT ID: EP15179

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

DATE: 07-13-2022

SHEET TITLE: S-3

DNA™ 120

Solar for Innovators

Residential | Commercial

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-efficencies in extreme temperatures. Contact our sales team today to learn more about our line of high-efficienty solar panels.

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  No excessive silver bussing or ribbons
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30 Year Warranty | 3X IEC Standards | RETC Top Performer

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DNA™ 120

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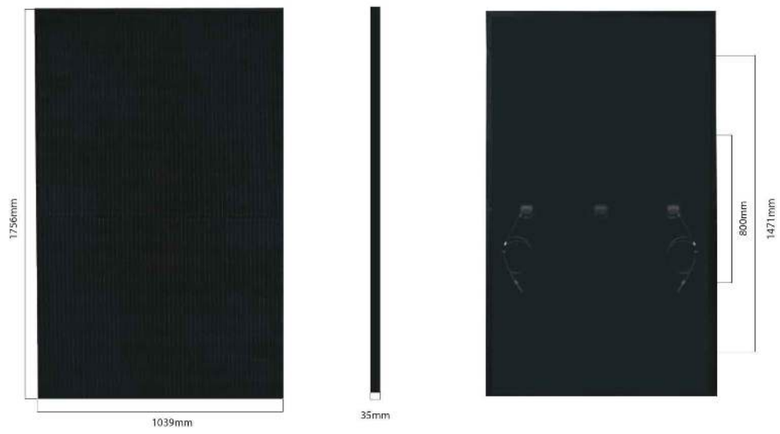


Electrical Specifiactions

	DNA-120-MF26-360W	DNA-120-MF26-365W	DNA-120-MF26-370W
STCrated Output P_{mpp} (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 Circiut Current I_{SC} (A)	11.24	11.36	11.51
Rated Voltage V_{mpp} (V)	33.8	33.96	34.06
Rated Voltage I_{mpp} (A)	10.66	10.75	10.87

Standard Test Conditions for front-face of panel: 1000 W/m², 25°C, measurement uncertainty ≤3%

Temperature Coefficients

Temperature Coefficients P_{mpp}	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	1,000 VDC (UL&IEC)
Maximum Load Capacity (Per UL 1703)	5400 PA Snow Load / 210mph Wind Rating
Fire Performance Class	Class C/Type 1

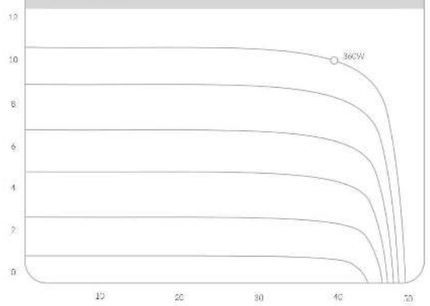
Packaging Configuration

Number of Modules per Pallet	30
Number of Pallets per 40ft. Container	26
Pallet Dimensions	1770 X 1090 X 2365
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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CUSTOMER: BARBARA FEDOR

PROJECT ADDRESS:
19156 S US HIGHWAY 441
HIGH SPRINGS, FL 32643

PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: PV MODULES DATA SHEET

PROJECT ID: EP15179

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

DATE: 07-13-2022

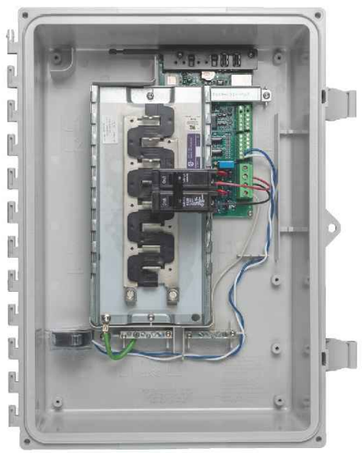
SHEET TITLE: D-1

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**

ENPHASE.

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

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

2019-11-04

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PROJECT ADDRESS: 19156 S US HIGHWAY 441 HIGH SPRINGS, FL 32643
PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: SMART MONITORING DATA SHEET
PROJECT ID: EP15179
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE: 07-13-2022
SHEET TITLE: D-2

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**

ENPHASE.

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.

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

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2018-05-24

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CUSTOMER: BARBARA FEDOR
PROJECT ADDRESS: 19156 S US HIGHWAY 441 HIGH SPRINGS, FL 32643
PARCEL NUMBER: 33-6S-17-09834-202 (36340)

SHEET NAME: INVERTER DATA SHEET
PROJECT ID: EP15179
ENGINEER OF RECORD: ENG. RAFAEL A. GONZALEZ SOTO, PE
DATE: 07-13-2022
SHEET TITLE: D-3