MAI RESIDENCE

10.585 kW DC STC, 8.410 kW AC PV SYSTEM

236 SW CANNON CREEK DR
LAKE CITY, FL 32024

PROJECT DESCRIPTION:

29x365 HANWHA: Q.PEAK DUO BLK-G10+365 (365W) MODULES
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
SYSTEM SIZE: 10.585 kW DC STC, 8.410 kW AC
ARRAY AREA #1: 231.76 SQ. FT.
ARRAY AREA #2: 231.76 SQ. FT.
ARRAY AREA #3: 96.56 SQ. FT.

NEW EQUIPMENT SUMMARY
29 HANWHA: Q.PEAK DUO BLK-G10+365 (365W) MODULES
29 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS

RACKING: UNIRAC LIGHT RAIL
ATTACHMENT: S-5 PROTEA

DESIGN CRITERIA:

WIND SPEED (ULT):	130 MPH
WIND SPEED (ASD):	101 MPH
RISK CATEGORY:	II
EXPOSURE:	B

CODES AND STANDARDS

GOVERNING CODES:
FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 (FRC)
FLORIDA PLUMBING CODE, 7TH EDITION 2020 (FPC)
FLORIDA BUILDING CODE, 7TH EDITION 2020 (FBC)
FLORIDA MECHANICAL CODE, 7TH EDITION 2020 (FMC)
NATIONAL ELECTRICAL CODE 2017 (NEC)
ASCE 7-16

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

REV	DESIGNER	DATE	COMMENT	REV.

STRUCTURAL CERTIFICATION:

I ERMOCRATES CASTILLO PE# 52590 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC: RESIDENTIAL 2020 7th ED., CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.

ELECTRICAL CERTIFICATION:

I ERMOCRATES CASTILLO PE# 52590 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 107, THE NEC 2017, AND THOSE SET FORTH BY THE FLORIDA SOLAR ENERGY CENTER CERTIFICATION

OWNER

MAI

INSTALLER

ADT SOLAR
4492 Eagle Falls Place,
Tampa, FL 33619
PH: (866) 450-1012

ENGINEER

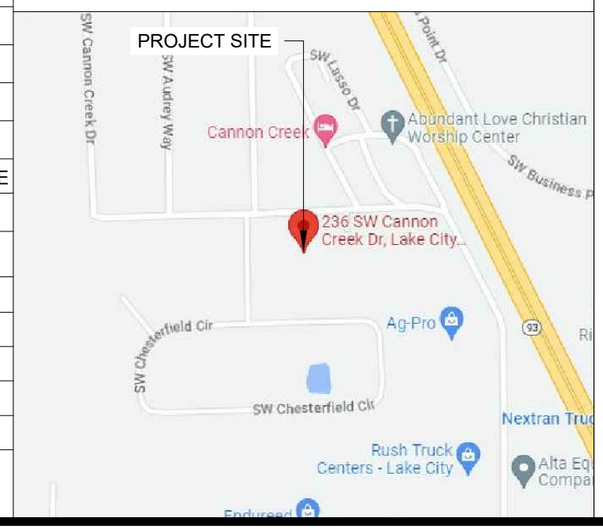
Castillo Engineering Services LLC
620 N. Wymore Road, Suite 250,Maitland, FL 32751
TEL: (407) 289-2575
Ermocrates E. Castillo
License#: FL PE 52590

SHEET INDEX

SHEET #	SHEET DESCRIPTION
G-01	COVER SHEET
A-00	NOTES AND DESCRIPTION
A-01	ROOF PLAN
S-01	MODULE LAYOUT
S-01.1	PARTIAL PRESSURE AND MODULES EXPOSURE
S-02	ATTACHMENT DETAIL
S-02.1,02.2 S-02.3	STRUCTURE CALCULATION
E-01	ELECTRICAL LINE DIAGRAM
E-02	WIRING CALCULATIONS
E-03	SYSTEM LABELING
DS-01-06	DATA SHEETS
BOM	BILL OF MATERIAL

HOUSE PHOTO

VICINITY MAP



Castillo Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:07

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
G-01

Symbols:

Section..... X / X-XX — Sheet where section is located

Elevation ..... X / X-XX — Detail ID Letter; Sheet where section is located

Detail ..... X / X-XX — Detail ID Letter; Sheet where section is located

Detail ..... (Enlarged Plan) X / X-XX — Detail ID Letter; Area to be enlarged; Sheet where section is located

Keyed Notes ..... 1 — Keyed note designation on applicable sheet

Ground Terminal .....

Grounding Point/rod....

Solar Panel ..... or 00 — Module with Source Circuit number

Combiner Box ..... CB

AC Disconnect ..... ACD

Main Distribution Panel ..... MDP

Fuse .....

Overcurrent Breaker ..

Inverter .....

Transformer .....

Automatic ..... Transfer Switch ATS

Vent, Attic fan (Roof obstruction)

PV Roof Attachment

Trusses

Conduit

Fire Access

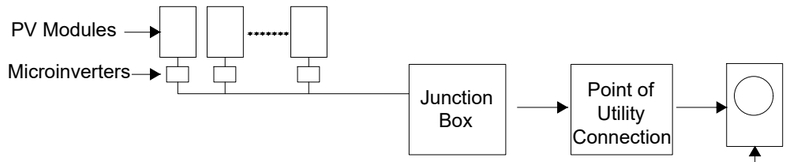
Abbreviations:

ACD	AC Disconnect
AC	Alternating Current
APPROX	Approximate
AWG	American Wire Gauge
BAT	Battery
CB	Combiner Box
DC	Direct Current
DISC	Disconnect
(E)	Existing
EL	Elevation
EQ	Equal
GP	Generation Panel
JB	Junction Box
MCB	Main Combiner Box
MFR	Manufacturer
MID	Microgrid Interconnect Device
MIN	Minimum
MISC	Miscellaneous
MDP	Main Distribution Panel
(N)	New
NAVD	North American Vertical datum
OCPD	Over Current Protection Device
POCC	Point Of Common Coupling
PV	Photovoltaic
SF	Squarefoot/feet
STC	Standard Test Conditions
SD	Soladeck
TBD	To Be Determined
TYP	Typical
UNO	Unless Noted Otherwise
UM	Utility meter
VIF	Verify In Field
WP	Weather Proof

System Description

This system is a grid-tied, PV system, with PV generation consisting of 29 HANWHA: Q.PEAK DUO BLK-G10+365 (365W) MODULES with a combined STC rated dc output power of 10585 W. The modules are connected into 29 ENPHASE IQ8PLUS-72-2-US MICROINVERTERS with a rated AC output power of 8410 W. The inverter has electronic maximum power point tracking to maximize energy captured by the PV modules. The inverter also has an internal ground fault detection and interruption device that is set to disconnect the array in the event that a ground fault that exceeds one ampere should occur. The inverter has DC and AC disconnect integrated system and labels are provided as required by the *National Electrical Code*

When the sun is shining, power from the PV array is fed into the inverter, where it is converted from DC to AC. The inverter output is then used to contribute to the power requirements of the occupancy. If PV power meets the requirements of the loads of the occupancy, any remaining PV power is sold back to the utility. When utility power is available, but PV power is not available, building loads are supplied by the utility.



The inverter meets the requirements of IEEE 1547 and UL 1741.

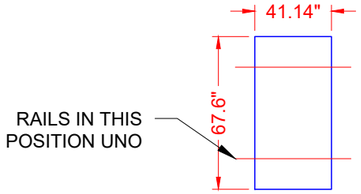
Figure 1: PV System Block Diagram

FALL PROTECTION:
ANCHORAGES USED FOR ATTACHMENT OF PERSONAL FALL ARREST EQUIPMENT MUST BE INDEPENDENT OF ANY ANCHORAGE BEING USED TO SUPPORT OR SUSPEND PLATFORMS, AND CAPABLE OF SUPPORTING AT LEAST 5,000 POUNDS PER EMPLOYEE ATTACHED, OR MUST BE DESIGNED AND USED AS FOLLOWS:

- AS PART OF A COMPLETE PERSONAL FALL ARREST SYSTEM WHICH MAINTAINS A SAFETY FACTOR OF AT LEAST TWO.
- UNDER THE SUPERVISION OF A QUALIFIED PERSON

ADDITIONAL INFORMATION

- 29 CFR 1926 SUBPART M, FALL PROTECTION. OSHA STANDARD.
- 1926.502, FALL PROTECTION SYSTEMS CRITERIA AND PRACTICES
- 1926.502(D)(15)



HANWHA: Q.PEAK DUO BLK-G10+365 (365W) MODULES

ALLOWABLE DESIGN PRESSURE	PSF
DOWN PRESSURE, 2 RAILS	75.0
UPLIFT PRESSURE, 2 RAILS	55.6

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with seal — Digitally signed by: Ermocrates E Castillo Date: 2023.02.07 09:16:07

PROJECT NAME

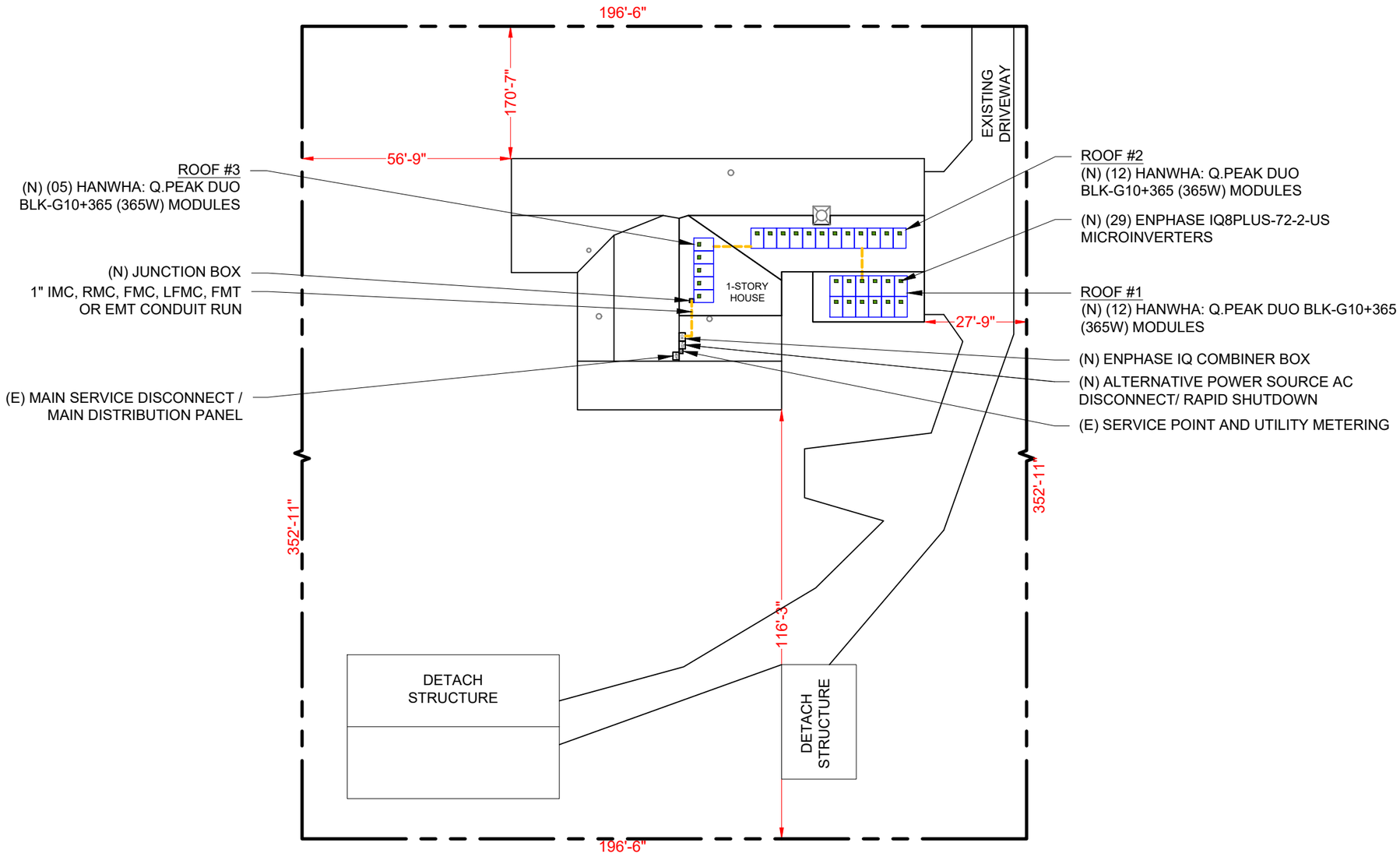
MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
NOTES AND DESCRIPTION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
A-00

SW CANNON CREEK DR



1 ROOF PLAN WITH PROPERTY LINES

A-01

SCALE: 1/32" = 1'-0"

Castillo Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal

Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:08

PROJECT NAME

MAI RESIDENCE

236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

ROOF PLAN

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

A-01

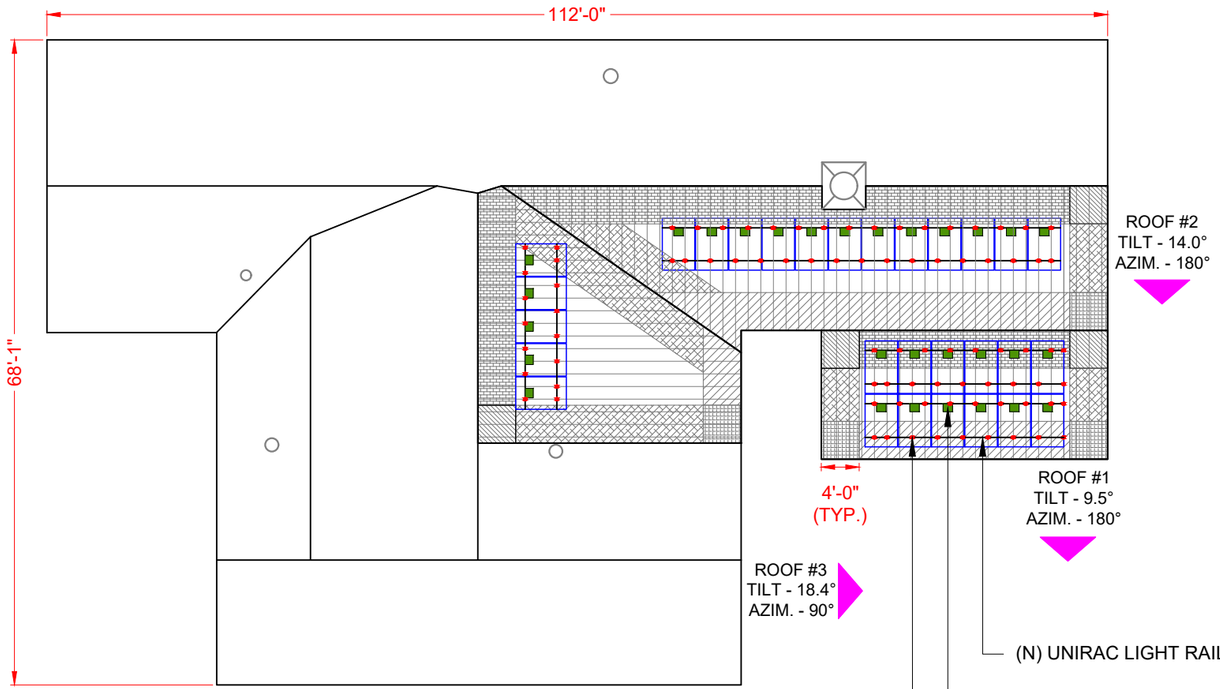
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 29 MODULES
MODULE TYPE = HANWHA: Q.PEAK DUO BLK-G10+365 (365W) MODULES
WEIGHT = 43.87 LBS / 19.9 KG.
MODULE DIMENSIONS = 67.6" x 41.14" = 19.31 SF
UNIT WEIGHT OF ARRAY = 2.27 PSF

ARRAY AREA & ROOF AREA CALC'S

ROOF	ROOF TYPE	NO. OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)	TILT	AZIMUTH	SEAM SPACING
#1	METAL ROOF	12	231.76	531.22	43.63	9.5°	90°	16" O.C.
#2	METAL ROOF	12	231.76	411.10	56.37	14°	180°	16" O.C.
#3	METAL ROOF	05	96.56	801.23	12.05	18.4°	180°	16" O.C.
TOTAL PLAN VIEW		29	560.08	5923.06	9.46			

(E) FRONT YARD



(E) BACK YARD

1 MODULE LAYOUT
S-01 SCALE: 1/16" = 1'-0"

GENERAL INSTALLATION PLAN NOTES:

1) STRUCTURE PROPERTIES
- ROOF FINISH: METAL ROOF
- MEAN ROOF HEIGHT: 15 FT.
- ROOF SLOPES: 18.4°, 14°& 9.5°
- STANDING SEAM
- WOOD SPECIES: SYP.
- SEAM SPACING: 16" O.C.
- ROOF SHEATHING: 7/16" OSB

2) ROOF ATTACHMENTS TO STANDING SEAMS SHALL BE INSTALLED AS SHOWN IN SHEET S-02 AND AS FOLLOWS FOR EACH WIND ZONE::

FOR SLOPES: 18.4° & 14°& 9.5°

WIND ZONES	NON - EXPOSED MODULES		EDGE / EXPOSED MODULES	
	SPAN	CANTILEVER	SPAN	CANTILEVER
ZONE 1	2'-8"	0-10"	2'-8"	0-10"
ZONE 1'	X	X	X	X
ZONE 2e	2'-8"	0-10"	2'-8"	0-10"
ZONE 2n	2'-8"	0-10"	2'-8"	0-10"
ZONE 2r	2'-8"	0-10"	2'-8"	0-10"
ZONE 3e	2'-8"	0-10"	2'-8"	0-10"
ZONE 3r	2'-8"	0-10"	2'-8"	0-10"

SEE SHEET S-02.1 & S-02.2 & S-02.3 FOR SUPPORTING CALCULATIONS.

3) THE EXISTING ROOF AND STRUCTURE IS IN GOOD CONDITION AND WILL NOT BE ADVERSELY AFFECTED BY THE ADDITIONAL LOADS IMPOSED BY THE PV INSTALLATION. THE INSTALLER OR CONTRACTOR IS TO FIELD VERIFY AND REPORT TO THE ENGINEER IF THERE ARE ANY DISCREPANCIES BETWEEN THE PLANS AND IN FIELD CONDITIONS.

* I CERTIFY THAT THE INSTALLATION OF THE MODULES IS IN COMPLIANCE WITH FBC: RESIDENTIAL 2020 7th ED. CHAPTER 3. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES AND EQUIPMENT DEAD LOADS. *

LEGEND
- WIND ZONE 1 (TYP)
- WIND ZONE 2e (TYP)
- WIND ZONE 2n (TYP)
- WIND ZONE 2r (TYP)
- WIND ZONE 3r (TYP)
- WIND ZONE 3e (TYP)

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:08

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
MODULE LAYOUT

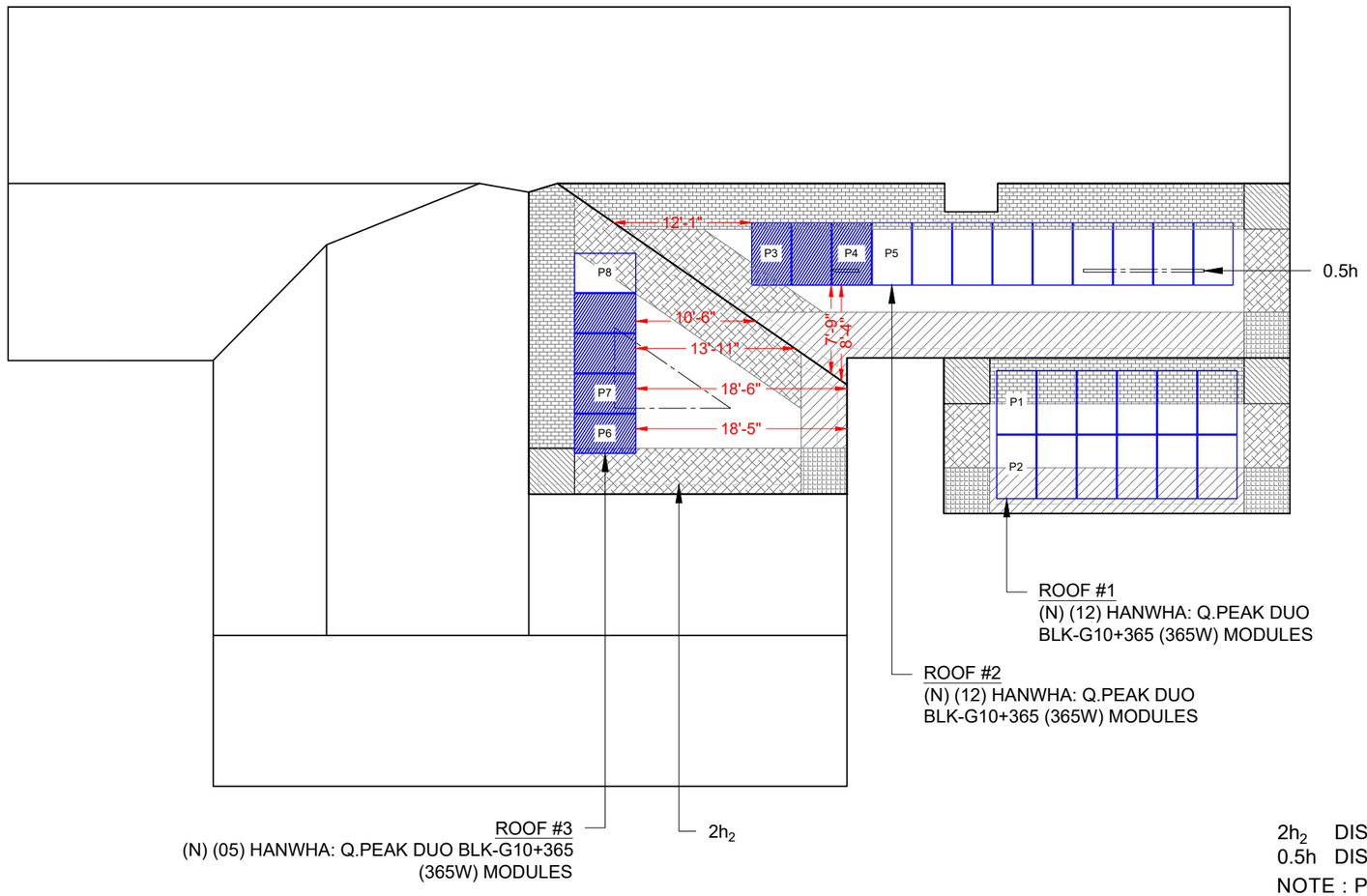
SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-01

LEGEND

- EXPOSED MODULE
- EDGE MODULE
- NON- EXPOSED MODULE
- MISSING MODULE
- MIN. MODULE EDGE DISTANCE LINE
- MODULE EXPOSURE LINE
- WIND ZONE 1 (TYP)
- WIND ZONE 2e (TYP)
- WIND ZONE 2n (TYP)
- WIND ZONE 2r (TYP)
- WIND ZONE 3r (TYP)
- WIND ZONE 3e (TYP)

(E) FRONT YARD



(E) BACK YARD

FOR SLOPES: 9.5°

NON-EXPOSED MODULES

	1	1'	2e	2n	2r	3e	3r
	17.60	0.00	17.60	22.40	22.40	22.40	26.70

Module Size 19.31 Sqft.

Non-Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P1	9.22	0.00	0.00	0.00	10.09	0.00	0.00	20.11
P2	9.94	0.00	9.37	0.00	0.00	0.00	0.00	17.60

ALLOWABLE MODULE UPLIFT PRESSURE 2 RAILS: 55.6 PSF

FOR SLOPES: 14°

EXPOSED MODULES

	1	1'	2e	2n	2r	3e	3r
	26.40	0.00	26.40	33.70	33.70	33.70	40.10

Module Size 19.31 Sqft.

Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P3	14.42	0.00	0.00	2.84	2.05	0.00	0.00	28.25
P4	17.26	0.00	0.00	0.00	2.05	0.00	0.00	27.18

ALLOWABLE MODULE UPLIFT PRESSURE 2 RAILS: 55.6 PSF

NON-EXPOSED MODULES

	1	1'	2e	2n	2r	3e	3r
	17.60	0.00	17.60	22.40	22.40	22.40	26.70

Module Size 19.31 Sqft.

Non-Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P5	17.26	0.00	0.00	0.00	2.05	0.00	0.00	18.11

ALLOWABLE MODULE UPLIFT PRESSURE 2 RAILS: 55.6 PSF

FOR SLOPES: 18.4°

EXPOSED MODULES

	1	1'	2e	2n	2r	3e	3r
	26.40	0.00	26.40	33.70	33.70	33.70	40.10

Module Size 19.31 Sqft.

Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P6	16.91	0.00	0.00	0.00	2.40	0.00	0.00	27.31
P7	19.31	0.00	0.00	0.00	0.00	0.00	0.00	26.40

ALLOWABLE MODULE UPLIFT PRESSURE 2 RAILS: 55.6 PSF

NON-EXPOSED MODULES

	1	1'	2e	2n	2r	3e	3r
	17.60	0.00	17.60	22.40	22.40	22.40	26.70

Module Size 19.31 Sqft.

Non-Exposed modules								Partial
	1	1'	2e	2n	2r	3e	3r	Pressure
P8	9.89	0.00	0.00	9.42	0.00	0.00	0.00	19.94

ALLOWABLE MODULE UPLIFT PRESSURE 2 RAILS: 55.6 PSF

$2h_2$ DISTANCE : 10"
0.5h DISTANCE : 7'-6"

NOTE : PARTIAL PRESSURES OF THE WIND ZONES ON ALL MODULES HAVE BEEN VERIFIED AND ARE WITHIN THE ALLOWABLE PER THE MANUFACTURER SPECIFICATION, INSTALLER SHOULD FOLLOW THE LAYOUT TO AVOID HIGHER ZONAL PARTIAL PRESSURES. ANY CHANGES IN LAYOUT SHOULD BE REPORTED BACK TO THE ENGINEER OF RECORD.

1 PARTIAL PRESSURE AND MODULES EXPOSURE

S-01.1 SCALE: 5/64" = 1'-0"

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:08

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

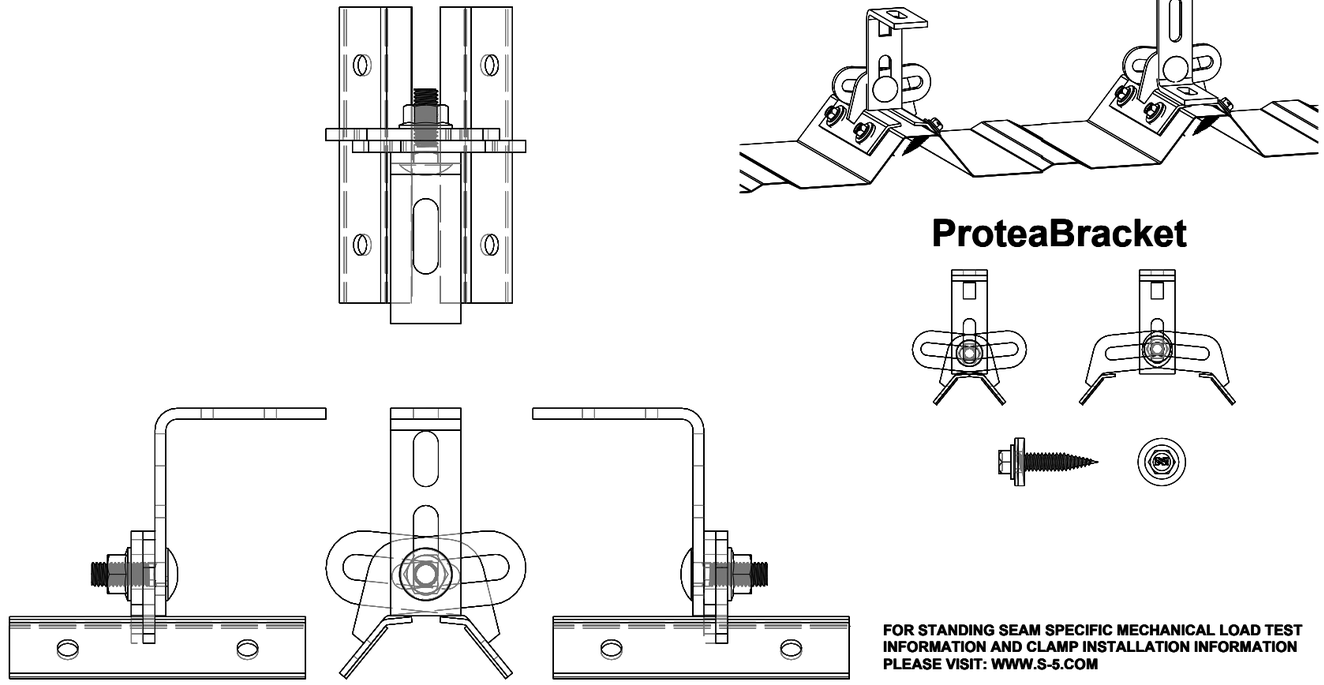
PARTIAL PRESSURE AND MODULES EXPOSURE

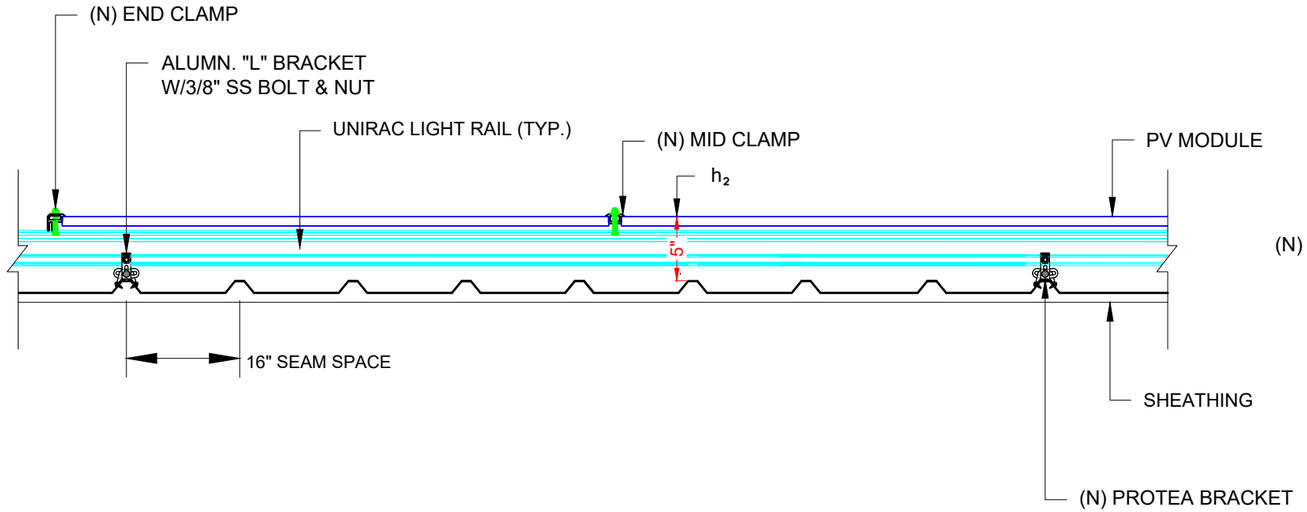
SHEET SIZE

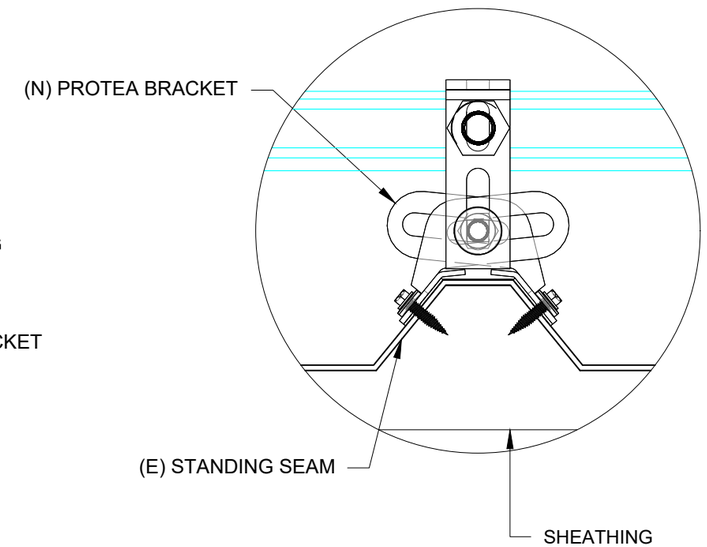
ANSI B
11" X 17"

SHEET NUMBER

S-01.1







2 ATTACHMENT DETAIL (ENLARGED VIEW)

S-02 SCALE: 1" = 4"

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Digitally signed by: Ermocrates E Castillo Date: 2023.02.07 09:16:09

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

ATTACHMENT DETAIL

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

S-02

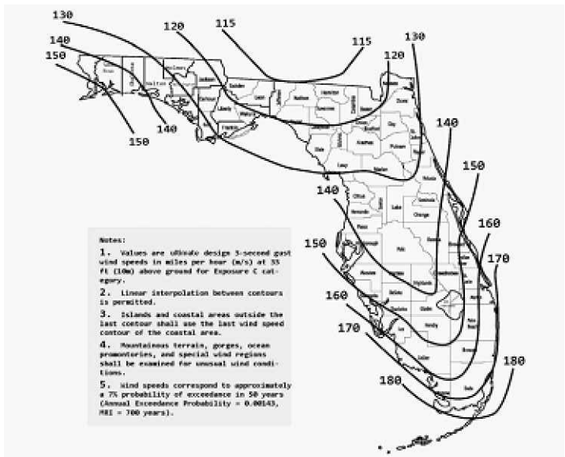


FIGURE 1609.3(1)
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES

FOR SLOPES: 18.4°

WIND LOAD CALCULATIONS FOR MODULES INSTALLED ON ROOFS WITH A HEIGHT LESS THAN 60'

SITE INFORMATION

FBC VERSION	2020	RISK CATEGORY	II
MEAN ROOF HEIGHT (ft)	15.0	EXPOSURE CATEGORY	B
ROOF LENGTH (ft)	112.0	ROOF SLOPE	4 /12
ROOF WIDTH (ft)	68.1	ROOF SLOPE (°)	18.4
PARAPET HEIGHT (ft)	0.0	ROOF TYPE	GABLE
MODULE LENGTH (in)	67.6	ULTIMATE WIND SPEED	130 mph
MODULE WIDTH (in)	41.14	NOMINAL WIND SPEED	101 mph
MODULE ORIENTATION	PORTRAIT	EXPOSURE FACTOR (C_e)	1.000
MODULE AREA (sq. ft.)	19.31	TEMPERATURE FACTOR (C_t)	1.000
GROUND SNOW LOAD (psf)	0.0	IMPORTANCE FACTOR (I_s)	1.000
DEAD LOAD (psf)	3.0	SLOPE FACTOR (C_s)	0.910
SLOPED ROOF SNOW LOAD (psf)	0.0	K_D	0.850
EFFECTIVE WIND AREA (ft^2)	19.3	K_{ZT}	1.000
GROUND ELEVATION (ft)	105.0	K_e	0.996
HVHZ	NO	K_z	0.575

DESIGN CALCULATIONS

VELOCITY PRESSURE (q) = $.00256*K_e K_z K_{ZT} K_D V^2$

VELOCITY PRESSURE(ASD) 12.6 psf

WIDTH OF PRESSURE COEFFICIENT	68.08' * 10%	=	6.808'	ZONE WIDTH A	4 FT
	15' * 40%	=	6'	ZONE 2 WIDTH	N/A (FOR (°) < 7°)
				ZONE 3 WIDTH	N/A (FOR (°) < 7°)

EXTERNAL PRESSURE COEFFICIENT	ZONE 1	0.468	-2.033
	ZONE 1'	X	X
	ZONE 2e	0.468	-2.033
	ZONE 2n	0.468	-2.591
	ZONE 2r	0.468	-2.591
	ZONE 3e	0.468	-2.591
	ZONE 3r	0.468	-3.085

INTERNAL PRESSURE COEFFICIENT (+/-) 0

DESIGN PRESSURES

ROOF ZONE	DOWN	UP				
1	16.0	-25.7	psf			
1'	X	X	psf			
2e	16.0	-25.7	psf	Module allowable uplift pressure	55.6	psf
2n	16.0	-32.7	psf	Module allowable down pressure	75	psf
2r	16.0	-32.7	psf			
3e	16.0	-32.7	psf			
3r	16.0	-39.0	psf			

ARRAY FACTORS

ARRAY EDGE FACTOR (EXPOSED)	1.5	SOLAR PANEL PRESSURE EQUALIZATION FACTOR	0.6857
ARRAY EDGE FACTOR (NON-EXPOSED)	1		

ADJUSTED DESIGN PRESSURES

ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)	
1	16.0	-26.4	-17.6	psf
1'	X	X	X	psf
2e	16.0	-26.4	-17.6	psf
2n	16.0	-33.7	-22.4	psf
2r	16.0	-33.7	-22.4	psf
3e	16.0	-33.7	-22.4	psf
3r	16.0	-40.1	-26.7	psf

ATTACHMENTS USED

ATTACHMENT MODEL	S-5 protea	
ATTACHMENT STRENGTH	422	lbs

MAX DESIGN LOADS ALLOWABLE

LIMIT MAX SPAN TO		48	in					
RAFTER/SEAM SPACING		16	in	NO. OF RAILS	Exposed:	2	Non. Exp:	2
ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)		SPANS (E)		SPANS (N.E)	
1	120.2	198.4	132.2	lbs	32	in	32	in
1'	X	X	X	lbs	X	in	X	in
2e	120.2	198.4	132.2	lbs	32	in	32	in
2n	120.2	252.9	168.6	lbs	32	in	32	in
2r	120.2	252.9	168.6	lbs	32	in	32	in
3e	120.2	252.9	168.6	lbs	32	in	32	in
3r	120.2	301.1	200.7	lbs	32	in	32	in

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:09

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
STRUCTURE CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-02.1

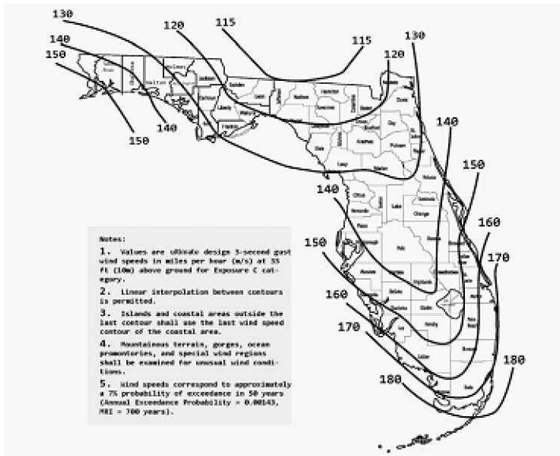


FIGURE 1609.3(1)
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES

FOR SLOPES: 14°

WIND LOAD CALCULATIONS FOR MODULES INSTALLED ON ROOFS WITH A HEIGHT LESS THAN 60'

SITE INFORMATION

FBC VERSION	2020	RISK CATEGORY	II
MEAN ROOF HEIGHT (ft)	15.0	EXPOSURE CATEGORY	B
ROOF LENGTH (ft)	112.0	ROOF SLOPE	3 /12
ROOF WIDTH (ft)	68.1	ROOF SLOPE (°)	14.0
PARAPET HEIGHT (ft)	0.0	ROOF TYPE	GABLE
MODULE LENGTH (in)	67.6	ULTIMATE WIND SPEED	130 mph
MODULE WIDTH (in)	41.14	NOMINAL WIND SPEED	101 mph
MODULE ORIENTATION	PORTRAIT	EXPOSURE FACTOR (C_e)	1.000
MODULE AREA (sq. ft.)	19.31	TEMPERATURE FACTOR (C_t)	1.000
GROUND SNOW LOAD (psf)	0.0	IMPORTANCE FACTOR (I_s)	1.000
DEAD LOAD (psf)	3.0	SLOPE FACTOR (C_s)	0.910
SLOPED ROOF SNOW LOAD (psf)	0.0	K_D	0.850
EFFECTIVE WIND AREA (ft^2)	19.3	K_{ZT}	1.000
GROUND ELEVATION (ft)	105.0	K_e	0.996
HVHZ	NO	K_z	0.575

DESIGN CALCULATIONS

VELOCITY PRESSURE (q) = $.00256*K_e K_z K_{ZT} K_D V^2$

VELOCITY PRESSURE(ASD) 12.6 psf

WIDTH OF PRESSURE COEFFICIENT	68.08' * 10%	=	6.808'	ZONE WIDTH A	4 FT
	15' * 40%	=	6'	ZONE 2 WIDTH	N/A (FOR (°) < 7°)
				ZONE 3 WIDTH	N/A (FOR (°) < 7°)

EXTERNAL PRESSURE COEFFICIENT	ZONE 1	0.468	-2.033
	ZONE 1'	X	X
	ZONE 2e	0.468	-2.033
	ZONE 2n	0.468	-2.591
	ZONE 2r	0.468	-2.591
	ZONE 3e	0.468	-2.591
	ZONE 3r	0.468	-3.085
INTERNAL PRESSURE COEFFICIENT (+/-)		0	

DESIGN PRESSURES

ROOF ZONE	DOWN	UP			
1	16.0	-25.7	psf		
1'	X	X	psf		
2e	16.0	-25.7	psf	Module allowable uplift pressure	55.6 psf
2n	16.0	-32.7	psf	Module allowable down pressure	75 psf
2r	16.0	-32.7	psf		
3e	16.0	-32.7	psf		
3r	16.0	-39.0	psf		

ARRAY FACTORS

ARRAY EDGE FACTOR (EXPOSED)	1.5	SOLAR PANEL PRESSURE EQUALIZATION FACTOR	0.6857
ARRAY EDGE FACTOR (NON-EXPOSED)	1		

ADJUSTED DESIGN PRESSURES

ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)	
1	16.0	-26.4	-17.6	psf
1'	X	X	X	psf
2e	16.0	-26.4	-17.6	psf
2n	16.0	-33.7	-22.4	psf
2r	16.0	-33.7	-22.4	psf
3e	16.0	-33.7	-22.4	psf
3r	16.0	-40.1	-26.7	psf

ATTACHMENTS USED

ATTACHMENT MODEL	S-5 protea	
ATTACHMENT STRENGTH	422	lbs

MAX DESIGN LOADS ALLOWABLE

LIMIT MAX SPAN TO		48	in				
RAFTER/SEAM SPACING		16	in	NO. OF RAILS	Exposed: 2	Non. Exp: 2	
ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)		SPANS (E)	SPANS (N.E)	
1	120.2	198.4	132.2	lbs	32 in	32 in	
1'	X	X	X	lbs	X in	X in	
2e	120.2	198.4	132.2	lbs	32 in	32 in	
2n	120.2	252.9	168.6	lbs	32 in	32 in	
2r	120.2	252.9	168.6	lbs	32 in	32 in	
3e	120.2	252.9	168.6	lbs	32 in	32 in	
3r	120.2	301.1	200.7	lbs	32 in	32 in	

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:09

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
STRUCTURE CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-02.2

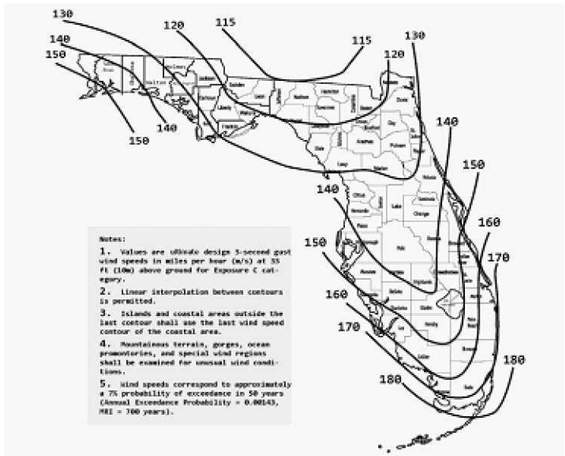


FIGURE 1609.3(1)
ULTIMATE DESIGN WIND SPEEDS, V_{ULT}, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES

FOR SLOPES: 9.5°

WIND LOAD CALCULATIONS FOR MODULES INSTALLED ON ROOFS WITH A HEIGHT LESS THAN 60'

SITE INFORMATION

FBC VERSION	2020	RISK CATEGORY	II
MEAN ROOF HEIGHT (ft)	15.0	EXPOSURE CATEGORY	B
ROOF LENGTH (ft)	112.0	ROOF SLOPE	2 /12
ROOF WIDTH (ft)	68.1	ROOF SLOPE (°)	9.5
PARAPET HEIGHT (ft)	0.0	ROOF TYPE	GABLE
MODULE LENGTH (in)	67.6	ULTIMATE WIND SPEED	130 mph
MODULE WIDTH (in)	41.14	NOMINAL WIND SPEED	101 mph
MODULE ORIENTATION	PORTRAIT	EXPOSURE FACTOR (C_e)	1.000
MODULE AREA (sq. ft.)	19.31	TEMPERATURE FACTOR (C_t)	1.000
GROUND SNOW LOAD (psf)	0.0	IMPORTANCE FACTOR (I_s)	1.000
DEAD LOAD (psf)	3.0	SLOPE FACTOR (C_s)	0.910
SLOPED ROOF SNOW LOAD (psf)	0.0	K_D	0.850
EFFECTIVE WIND AREA (ft^2)	19.3	K_{ZT}	1.000
GROUND ELEVATION (ft)	105.0	K_e	0.996
HVHZ	NO	K_z	0.575

DESIGN CALCULATIONS

VELOCITY PRESSURE (q) = $.00256*K_e K_z K_{ZT} K_D V^2$

VELOCITY PRESSURE(ASD) 12.6 psf

WIDTH OF PRESSURE COEFFICIENT	68.08' * 10%	=	6.808'	ZONE WIDTH A	4 FT
	15' * 40%	=	6'	ZONE 2 WIDTH	N/A (FOR (°) < 7°)
				ZONE 3 WIDTH	N/A (FOR (°) < 7°)

EXTERNAL PRESSURE COEFFICIENT	ZONE 1	0.468	-2.033
	ZONE 1'	X	X
	ZONE 2e	0.468	-2.033
	ZONE 2n	0.468	-2.591
	ZONE 2r	0.468	-2.591
	ZONE 3e	0.468	-2.591
	ZONE 3r	0.468	-3.085

INTERNAL PRESSURE COEFFICIENT (+/-) 0

DESIGN PRESSURES

ROOF ZONE	DOWN	UP	
1	16.0	-25.7	psf
1'	X	X	psf
2e	16.0	-25.7	psf
2n	16.0	-32.7	psf
2r	16.0	-32.7	psf
3e	16.0	-32.7	psf
3r	16.0	-39.0	psf

Module allowable uplift pressure 55.6 psf
Module allowable down pressure 75 psf

ARRAY FACTORS

ARRAY EDGE FACTOR (EXPOSED)	1.5	SOLAR PANEL PRESSURE EQUALIZATION FACTOR	0.6857
ARRAY EDGE FACTOR (NON-EXPOSED)	1		

ADJUSTED DESIGN PRESSURES

ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)	
1	16.0	-26.4	-17.6	psf
1'	X	X	X	psf
2e	16.0	-26.4	-17.6	psf
2n	16.0	-33.7	-22.4	psf
2r	16.0	-33.7	-22.4	psf
3e	16.0	-33.7	-22.4	psf
3r	16.0	-40.1	-26.7	psf

ATTACHMENTS USED

ATTACHMENT MODEL	S-5 protea	
ATTACHMENT STRENGTH	422	lbs

MAX DESIGN LOADS ALLOWABLE

LIMIT MAX SPAN TO 48 in

RAFTER/SEAM SPACING 16 in NO. OF RAILS Exposed: 2 Non. Exp: 2

ROOF ZONE	DOWN	UP (Exposed)	UP (N. Exposed)		SPANS (E)	SPANS (N.E)
1	120.2	198.4	132.2	lbs	32 in	32 in
1'	X	X	X	lbs	X in	X in
2e	120.2	198.4	132.2	lbs	32 in	32 in
2n	120.2	252.9	168.6	lbs	32 in	32 in
2r	120.2	252.9	168.6	lbs	32 in	32 in
3e	120.2	252.9	168.6	lbs	32 in	32 in
3r	120.2	301.1	200.7	lbs	32 in	32 in

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:10

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

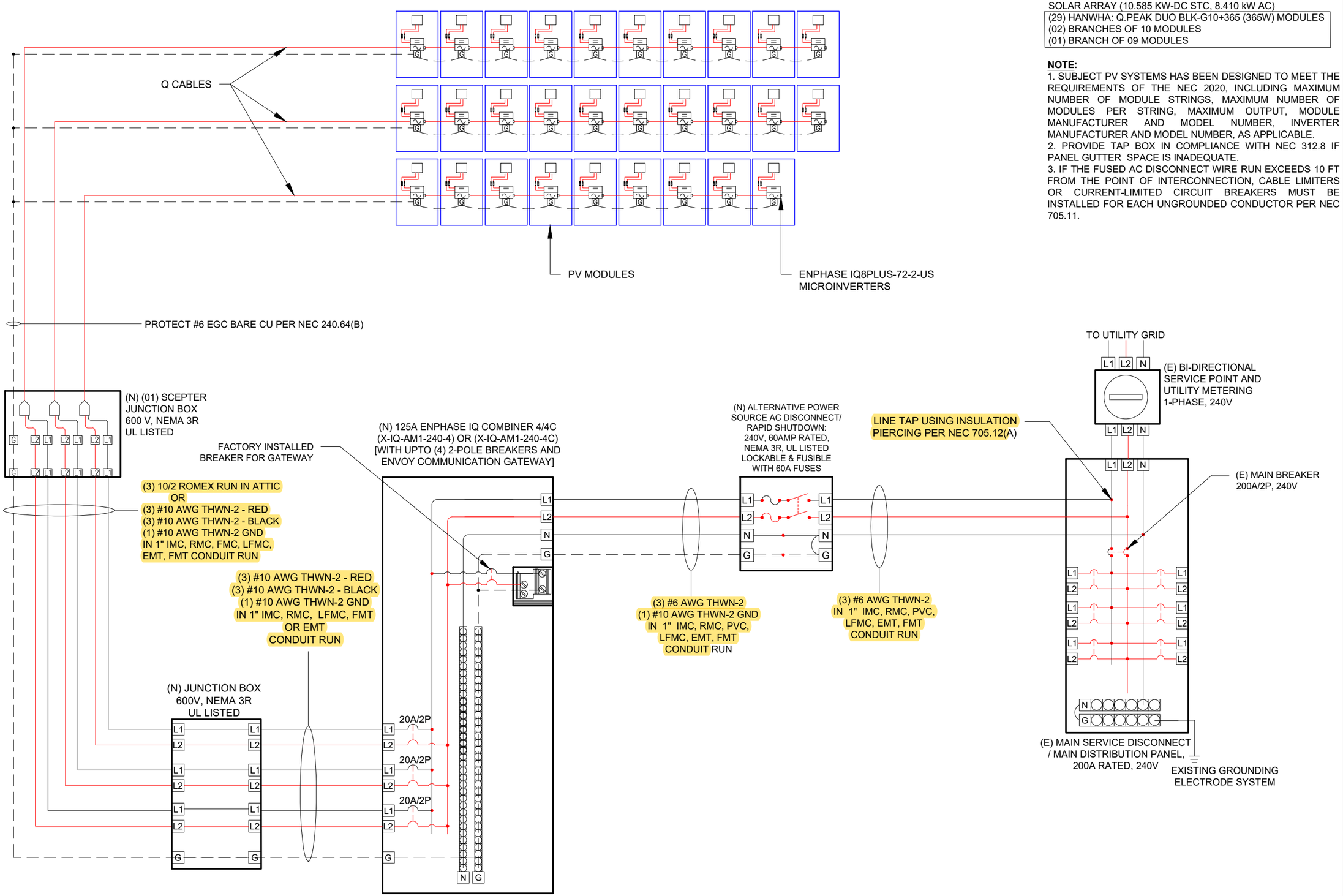
SHEET NAME
STRUCTURE CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
S-02.3

SOLAR ARRAY (10.585 KW-DC STC, 8.410 kW AC)
(29) HANWHA: Q.PEAK DUO BLK-G10+365 (365W) MODULES
(02) BRANCHES OF 10 MODULES
(01) BRANCH OF 09 MODULES

NOTE:
1. SUBJECT PV SYSTEMS HAS BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE NEC 2020, INCLUDING MAXIMUM NUMBER OF MODULE STRINGS, MAXIMUM NUMBER OF MODULES PER STRING, MAXIMUM OUTPUT, MODULE MANUFACTURER AND MODEL NUMBER, INVERTER MANUFACTURER AND MODEL NUMBER, AS APPLICABLE.
2. PROVIDE TAP BOX IN COMPLIANCE WITH NEC 312.8 IF PANEL GUTTER SPACE IS INADEQUATE.
3. IF THE FUSED AC DISCONNECT WIRE RUN EXCEEDS 10 FT FROM THE POINT OF INTERCONNECTION, CABLE LIMITERS OR CURRENT-LIMITED CIRCUIT BREAKERS MUST BE INSTALLED FOR EACH UNGROUNDED CONDUCTOR PER NEC 705.11.



1 | ELECTRICAL LINE DIAGRAM

E-01 SCALE: NTS

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD, SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Digital

Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:10

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-01

ELECTRICAL CALCULATION:

Module Manufacturer	Hanwha
Module Model	Q.Peak DUO8LK-G10+365
Inverter Manufacturer	Enphase
Inverter Model	Enphase IQ 8 Plus
Modules/Branch Circuit 1	10
Modules/Branch Circuit 2	10
Modules/Branch Circuit 3	9
Total Array Power (kW)	10.585
System ac Voltage	240V 1-Phase

Module Properties			
Voc	41.21	Isc	11.07
Vmpp	34.58	Imp	10.56
TC Voc	-0.27%/°K	TC Vmp	-0.34%/°K
Pmp	365.0	NOCT	45 °C

Design Temperature	
Min. Ambient Temp. °F	32
Max. Ambient Temp. °F	117
Calculated Max. Voc	45
Calculated Min Vmp	27
Conduit Fill	
Number of conduits	1

Inverter Properties	
Output Voltage	240 L-L 1-PH
Max Input dc Voltage	60 Vdc
Operating Range	25 - 58 Vdc
MPPT Voltage Range	29 - 45 Vdc
Start Voltage	30 Vdc
Max Input Power	440 Wdc
Continuous AC Power	290 VA

Ampacity Calcultions

Circuit	Max Amps	1.25 x Max Amps	AWG	90 °C Ampacity	Ambient Temp °F	Temp Derate	Conduit Fill	Fill Derate	Derated Ampacity	Maximum Circuit Breaker
Circuit 1	12.1	15.1	#10	40	130	0.76	6	0.8	24.32	20 A
Circuit 2	12.1	15.1	#10	40	130	0.76	6	0.8	24.32	20 A
Circuit 3	10.9	13.6	#10	40	130	0.76	6	0.8	24.32	20 A
AC Combiner Panel Output	35.06	43.8	#6	75	95	0.96	3	1	72	60 A

Maximum Circuit Voltage Drop	2%

Voltage Drop Calculations

Circuit	AWG	Circular Mills	I	V	Max Length
Circuit 1	#10	10380	12.1	240	160 Feet
Circuit 2	#10	10380	12.1	240	160 Feet
Circuit 3	#10	10380	10.9	240	177 Feet
AC Combiner Panel Output	#6	26240	35.1	240	139 Feet

Notes

Temp derate based on NEC Table 310.15(B)(2)(A)
Conduit fill derate based on NEC Table 310.15(B)(3)(A)
Maximum Voc calculated using module manufacture temperature coefficients per NEC 690.7(A)
Unless otherwise specified, all wiring must be THHN or THWN-2 Copper
All wire sizes listed are the minimum allowable
In any cell indicates that the system is safe and complies with NEC requirements
In any cell indicates a potentially unsafe condition
Information input by system designer
Informaton obtained from manufacturer datasheets

ELECTRICAL NOTES

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT. THE TERMINALS ARE RATED FOR 75 DEGREE C.
3. THE WIRES ARE SIZED ACCORDING TO NEC 110.14.
4. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
5. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
6. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
7. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
8. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
9. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
10. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
11. THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE .
12. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
13. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
14. RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
15. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
16. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
17. THIS SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN OF PV CONDUCTORS IN COMPLIANCE WITH NEC 690.12.
18. LABELING IN COMPLIANCE WITH NEC 690.12 AND 690.56(C) IS SHOWN ON SHEET E-03.
19. ALL CONDUITS TO BE INSTALLED A MINIMUM OF 7/8" ABOVE THE ROOF SURFACE.

I ERMOCRATES CASTILLO PE# 52590 AN ENGINEER LICENSED PURSUANT TO CHAPTER 471, CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 107, THE NEC 2017, AND THOSE SET FORTH BY THE FLORIDA SOLAR ENERGY CENTER CERTIFICATION

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
STATE OF FLORIDA
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:11

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

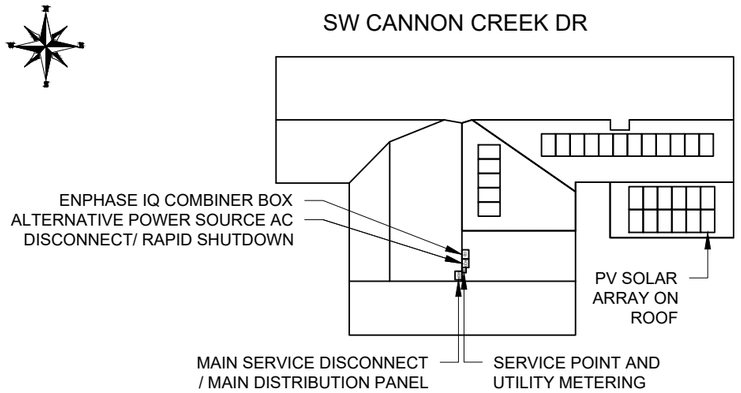
SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-02

CAUTION!

POWER TO THIS BUILDING
SUPPLIED FROM MULTIPLE SOURCES

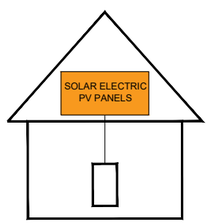


236 SW CANNON CREEK DR,LAKE CITY, FL 32024

LABEL LOCATION:
MAIN SERVICE DISCONNECT / MAIN DISTRIBUTION PANEL, PV DISCONNECT
LOCATED NO MORE THAN 3FT (1M) FROM THE SERVICE DISCONNECT
(TEXT HEIGHT SHOULD BE A MINIMUM OF 3/8")
PER CODE NEC 705.10

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, POINT OF INTERCONNECTION
(PER CODE: NEC 690.56(C)(1)(a), IFC 1204.5.1

⚠ WARNING

ELECTRIC 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 DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

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

PHOTOVOLTAIC SYSTEM AC DISCONNECT

RATED AC OPERATING CURRENT 35.06 AMPS
AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.54)

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))

DATA PER PANEL

NOMINAL OPERATING AC VOLTAGE -	240	**V**
NOMINAL OPERATING AC FREQUENCY-	60	**Hz**
MAXIMUM AC POWER-	290	**VA**
MAXIMUM AC CURRENT-	1.21	**A**
MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION PER CIRCUIT-	20	**A**

LABEL LOCATION:
COMBINER BOX
(PER CODE: NEC 690.52)

PHOTOVOLTAIC SYSTEM MICROINVERTERS LOCATED UNDER EACH PV MODULE IN ROOF TOP ARRAY

LABEL LOCATION:
INVERTER
(PER CODE: NEC 690.52)

AC COMBINER BOX

LABEL LOCATION:
COMBINER BOX
(PER CODE: NEC 690.52)

AC DISCONNECT

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.54)

SOLAR CONNECTION
LINE SIDE TAP

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

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

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

10.585 KW SOLAR
DISCONNECT LOCATED

LABEL LOCATION:
AC DISCONNECT, POINT OF INTERCONNECTION
(PER CODE: NEC 690.54)

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]

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Digital ID
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:11

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
SYSTEM LABELING

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
E-03

powered by Q.ANTUM DUO Z

PRELIMINARY

Q.PEAK DUO BLK-G10+

350-370

ENDURING HIGH PERFORMANCE

TÜVRheinland CERTIFIED — Quality Controlled PV — www.tuv.com ID 1111232615

n-tv GERMANY'S MOST POPULAR PROVIDER Life & Living Award 2021 1st Place Solar Technology

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 behaviour.

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 aluminium 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:

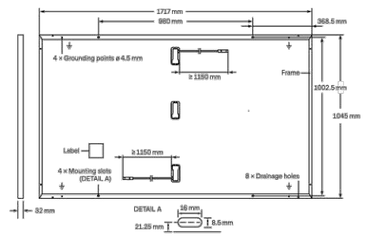
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	1717 mm × 1045 mm × 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥1150 mm, (−) ≥1150 mm
Connector	Stäubli MC4; IP68

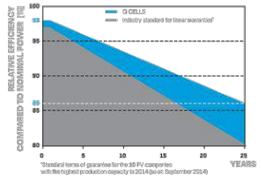


ELECTRICAL CHARACTERISTICS

POWER CLASS			350	355	360	365	370
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)							
Minimum	Power at MPP[1]	P_{MPP} [W]	350	355	360	365	370
	Short Circuit Current[1]	I_{SC} [A]	10.97	11.00	11.04	11.07	11.10
	Open Circuit Voltage[1]	V_{OC} [V]	41.11	41.14	41.18	41.21	41.24
	Current at MPP	I_{MPP} [A]	10.37	10.43	10.49	10.56	10.62
	Voltage at MPP	V_{MPP} [V]	33.76	34.03	34.31	34.58	34.84
	Efficiency[1]	η [%]	≥19.5	≥19.8	≥20.1	≥20.3	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]							
Minimum	Power at MPP	P_{MPP} [W]	262.6	266.3	270.1	273.8	277.6
	Short Circuit Current	I_{SC} [A]	8.84	8.87	8.89	8.92	8.95
	Open Circuit Voltage	V_{OC} [V]	38.77	38.80	38.83	38.86	38.90
	Current at MPP	I_{MPP} [A]	8.14	8.20	8.26	8.31	8.37
	Voltage at MPP	V_{MPP} [V]	32.24	32.48	32.71	32.94	33.17

[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

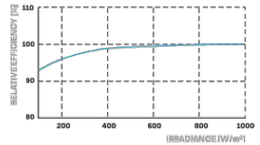
Q CELLS PERFORMANCE WARRANTY



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	[°C]	43±3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1000	PV module classification		Class II
Maximum Reverse Current	I_R	[A]	20	Fire Rating based on ANSI / UL 61730		C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2660	Permitted Module Temperature on Continuous Duty		−40 °C - +85 °C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000			

QUALIFICATIONS AND CERTIFICATES

Quality Controlled PV - TÜV Rheinland; IEC 61215:2016; IEC 61730:2016. This data sheet complies with DIN EN 50380. QCPV Certification ongoing.

TÜVRheinland CERTIFIED www.tuv.com ID 1111232077

CE

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.

Hanwha Q CELLS GmbH
Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | TEL +49 (0)3494 66 99-23444 | FAX +49 (0)3494 66 99-23000 | EMAIL sales@q-cells.com | WEB www.q-cells.com

Engineered in Germany

Q CELLS

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD, SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:12

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-01

ENPHASE

DATA SHEET

IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

IQ8SP-DS-0002-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741.
** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings[1]	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current[2] [module Isc]	A	15	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		**IQ8-60-2-US**	**IQ8PLUS-72-2-US**
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range[3]	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit[4]		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
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	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility
(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Logo
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:12

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-02

Data Sheet
Enphase Networking

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C

X-IQ-AM1-240-4C

X-IQ-AM1-240-4

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

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

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

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

ENPHASE

Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 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. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" 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
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ 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) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

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

ENPHASE

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal
Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:12

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME
DATA SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
DS-03

SOLARMOUNT

UNIRAC

SOLARMOUNT defined the standard in solar racking. Features are designed to get installers off the roof faster. Our grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Systems can be configured with standard or light rail to meet your design requirements at the lowest cost possible. The superior aesthetics package provides a streamlined clean edge for enhanced curb appeal, with no special brackets required for installation.

Now Featuring:

THE NEW FACE OF SOLAR RACKING

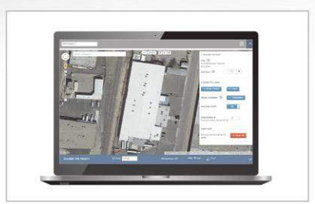
Superior Aesthetics Package

LOSE ALL OF THE COPPER & LUGS

System grounding through Enphase microinverters and trunk cables

SMALL IS THE NEXT NEW BIG THING

Light Rail is Fully Compatible with all SM Components



ENHANCED DESIGN & LAYOUT TOOLS

Featuring Google Map Capabilities within U-Builder

FAST INSTALLATION. SUPERIOR AESTHETICS

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT

UNIRAC

OPTIMIZED COMPONENTS

INTEGRATED BONDING & PRE-ASSEMBLED PARTS

Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

VERSATILITY

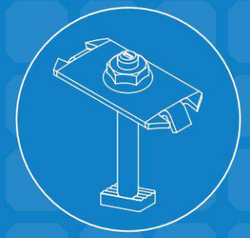
ONE PRODUCT - MANY APPLICATIONS

Quickly set modules flush to the roof or at a desired tilt angle. Change module orientation to portrait or landscape while securing a large variety of framed modules on flat, low slope or steep pitched roofs. Available in mill, clear and dark anodized finishes to outperform your projects financial and aesthetic aspirations.

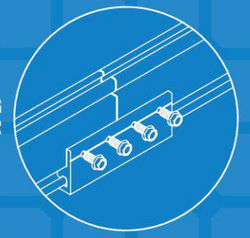
AUTOMATED DESIGN TOOL

DESIGN PLATFORM AT YOUR SERVICE

Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers: there's no need to print results and send to a distributor, just click and share.

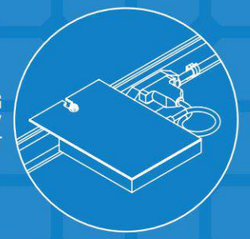


INTEGRATED BONDING MIDCLAMP



INTEGRATED BONDING SPLICE BAR

INTEGRATED BONDING L-FOOT w/ T-BOLT



INTEGRATED BONDING MICROINVERTER MOUNT w/ WIRE MANAGEMENT

LISTED **UL2703**

BONDING & GROUNDING
MECHANICAL LOADING
SYSTEM FIRE CLASSIFICATION

UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT

UNMATCHED EXPERIENCE | CERTIFIED QUALITY | ENGINEERING EXCELLENCE | BANKABLE WARRANTY | DESIGN TOOLS | PERMIT DOCUMENTATION

TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2015, 14001:2015 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

BANKABLE WARRANTY

Don't leave your project to chance, Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a twenty five (25) year limited product warranty and a five (5) year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

PUB2017FEB28 · PRINTED

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal

Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:13

PROJECT NAME

MAI RESIDENCE
236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-04

S-5!®

The Right Way!™

ProteaBracket™

A versatile bracket for mounting solar PV to trapezoidal roof profiles

ProteaBracket™ is now made in aluminum. Still the most versatile trapezoidal metal roof attachment solution on the market, the S-5! ProteaBracket just got better!

The bracket features an adjustable attachment base and module attachment options to accommodate different roof profile dimensions and mounting options.

Our pre-applied EPDM gasket with peel and stick adhesive makes installation a snap, ensuring accurate and secure placement the first time.

With no messy sealants, faster installation, and a weather-proof fit, ProteaBracket offers you the most versatile solar attachment solution available.

ProteaBracket* can be used for rail mounting or "direct-attach" with S-5! PVKIT™

*When ProteaBracket is used in conjunction with the S-5! PVKIT, an additional nut is required during installation.

NEW

NOW AVAILABLE IN ALUMINUM

ProteaBracket™

Features and Benefits

- 34% lighter - saves on shipping
- Stronger L-Foot™
- Load-tested for engineered application
- Corrosion-resistant materials
- Adjustable - Fits rib profiles up to 3"
- Peel-and-Stick prevents accidental shifting during installation
- Fully pre-assembled
- 25-year warranty*

*See www.S-5.com for details.

MADE IN THE USA

888-825-3432 | www.S-5.com |

The right way to attach solar PV to trapezoidal roof profiles!

S-5!®

The Right Way!™

ProteaBracket™ is the perfect solar attachment solution for most trapezoidal rib, exposed-fastened metal roof profiles!

ProteaBracket™ is compatible with common metal roofing materials and comes with a pre-applied EPDM gasket on the base.

Note: All four pre-punched holes must be used to achieve tested strength. Fasteners are provided.

For design assistance, ask your distributor, or visit **www.S-5.com** for the independent lab test data that can be used for load-critical designs and applications. Also, please visit our website for more information including metallurgical compatibilities and specifications.

S-5!® holding strength is unmatched in the industry.

Multiple Attachment Options:

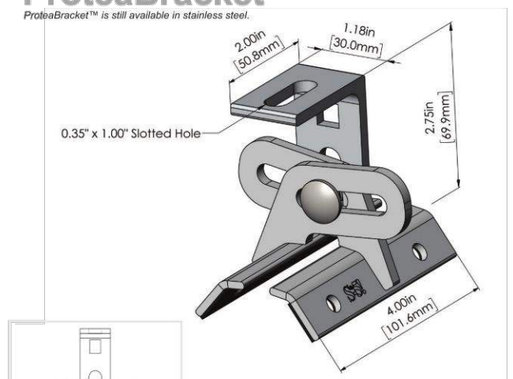
Side Mount Rail

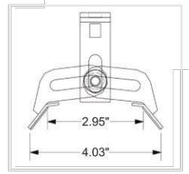
Bottom Mount Rail

w/ S-5! PVKIT™ (rail-less)

ProteaBracket™

ProteaBracket™ is still available in stainless steel.

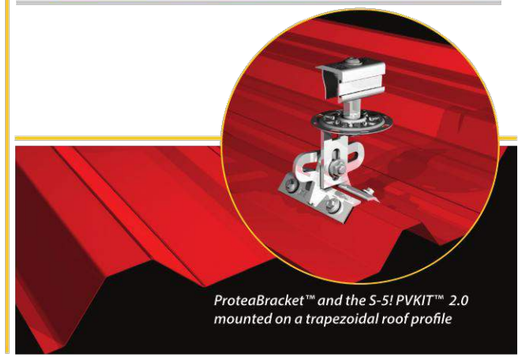




ProteaBracket fits profiles up to 3 inches

INSTALLATION:

No surface preparation needed. (1) Wipe away excess oil and debris. **(2)** Peel off adhesive release paper. **(3)** Align and mount bracket directly onto crown of panel. **(4)** Secure ProteaBracket through pre-punched holes, using piercing-point S-5! screws.



ProteaBracket™ and the S-5! PVKIT™ 2.0 mounted on a trapezoidal roof profile

S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, bolt torque, patents, and trademarks, visit the S-5! website at www.S-5.com.

Distributed by

Castillo Engineering
SOLAR DONE RIGHT®

CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Digital ID

Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:13

PROJECT NAME

MAI RESIDENCE

236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

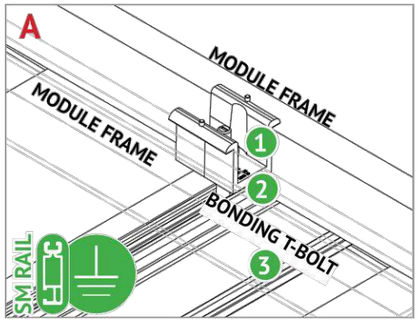
DS-05

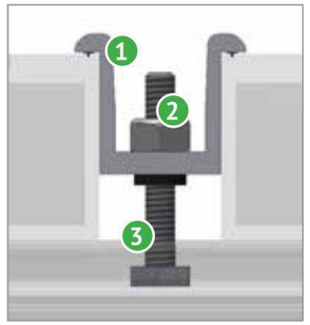
SM SOLAR MOUNT

BONDING CONNECTION GROUND PATHS

INSTALLATION GUIDE

0 PAGE

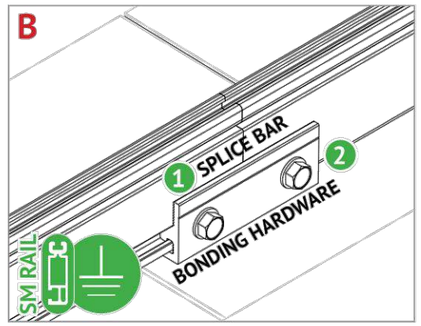




BONDING MIDCLAMP ASSEMBLY

BONDING MIDCLAMP ASSEMBLY

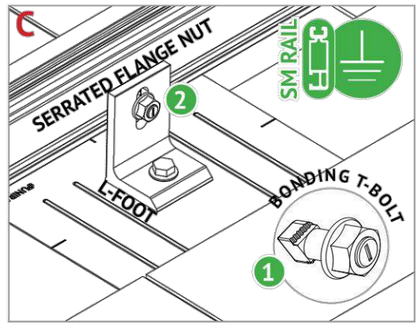
1. Aluminum mid clamp with stainless steel bonding pins that pierce module frame anodization to bond module to module through clamp
2. Stainless steel nut bonds aluminum clamp to stainless steel T-bolt
3. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, clamp, and modules to SM rail



BONDING RAIL SPLICE BAR

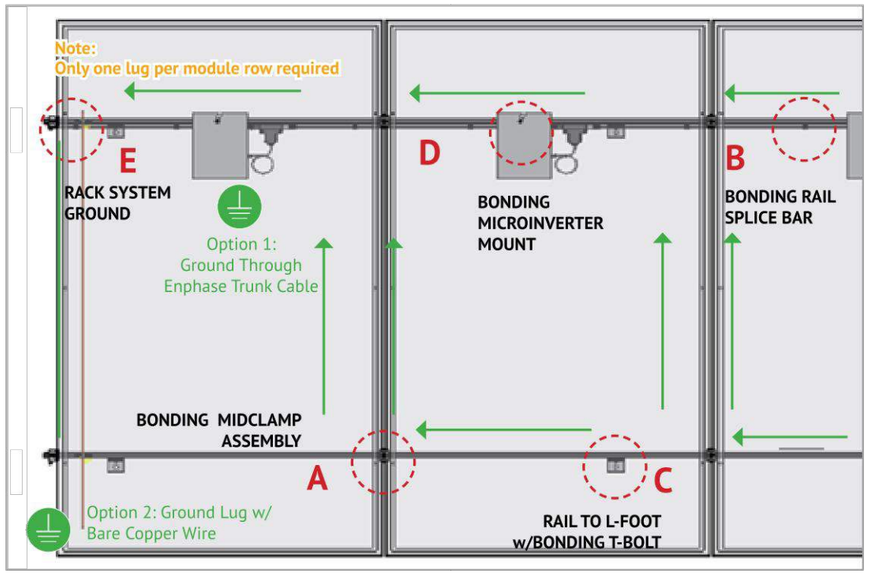
1. Bonding Hardware creates bond between splice bar and each rail section
2. Aluminum splice bar spans across rail gap to create rail to rail bond. Rail on at least one side of splice will be grounded.

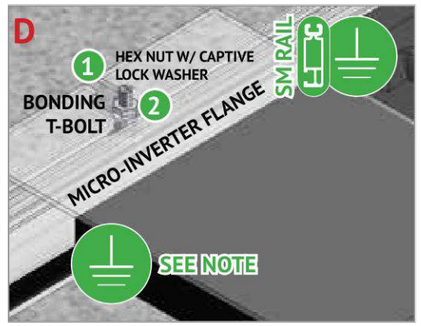
Note: Splice bar and bolted connection are non-structural. The splice bar function is rail alignment and bonding.



RAIL TO L-FOOT w/BONDING T-BOLT

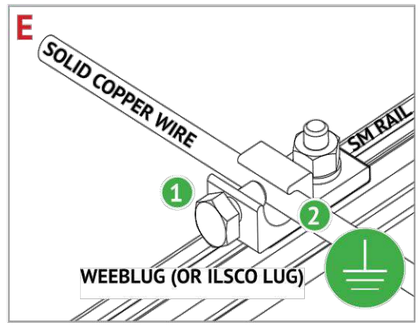
1. Serrated flange nut removes L-foot anodization to bond L-Foot to stainless steel T-bolt
2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail





BONDING MICROINVERTER MOUNT

1. Hex nut with captive lock washer bonds metal microinverter flange to stainless steel T-bolt
2. Serrated T-bolt head penetrates rail anodization to bond T-bolt, nut, and L-foot to grounded SM rail **System ground including racking and modules may be achieved through the trunk cable of approved microinverter systems. See page J for details**



RACK SYSTEM GROUND

1. WEEB washer dimples pierce anodized rail to create bond between rail and lug
2. Solid copper wire connected to lug is routed to provide final system ground connection.
   NOTE: Ilsco lug can also be used when secured to the side of the rail. See page K for details

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Digital ID

Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:14

PROJECT NAME

MAI RESIDENCE

236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

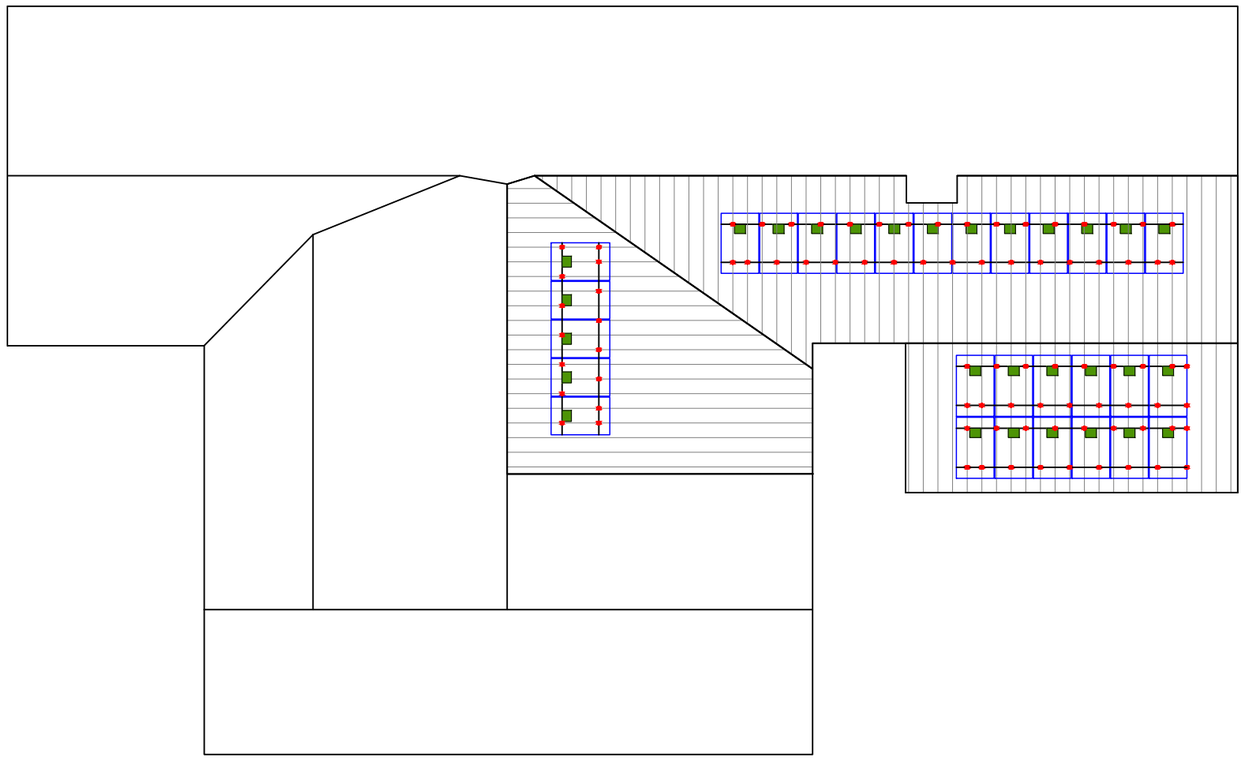
DATA SHEET

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

DS-06



ITEM	COUNT	DESCRIPTION
PV MODULES	29	Hanwha Q.Peak DUOBLK-G10+365
MICRO-INVERTER	29	IQ8PLUS-72-2-US
MICROINVERTER T-BOLT	29	MICROINVERTER T-BOLT
Q-CABLE CLIP	58	EN-Q-CLIP-100
Q-CABLE	10FT	Q-12-RAW-300
TRUNK CABLE	35	EN-Q-12-10-240
TRUNK BRANCH TERMINATOR	3	EN-Q-TERM-01
TRUNK WATER TIGHT COVER	20	EN-Q-SEAL-01
AC COMBINER BOX	1	EN-X-IQ-AM1-240-4
SCEPTER JB 444	3	JUNCTION BOX
RAIL	17	Unirac Light Rail
SPLICE BAR	17	UNI-303019M
ROOF ATTACHMENT	84	S-5 PROTEA
RAIL T BOLT	84	UNI-009020S
END CLAMP	16	UNI-302026D
MID CLAMP	50	UNI-302029D
WEEB LUGS	7	WEEBLUGS-6.7
TERMINAL BLOCKS	15	IMO ER10BEIGE
TERM BLOCK N CAPS	6	SP2.5-10BEIGE
NPT GLANDS	6	NPT CABLE GLAND
CONDUIT LOCKNUT	6	LOCKNUT FOR CABLE GLAND
ROOFING BOOT	3	OATEY 8" x 8"
ROOF REPAIR FABRIC	1	ROOF REPAIR FABRIC
ROOF CEMENT	2	ROOF CEMENT
SPLIT CORE TRANSFORMER	2	EN-CT-200-SPLIT
TP LINK	1	TP AV600

Castillo Engineering
SOLAR DONE RIGHT®
CASTILLO ENGINEERING SERVICES, LLC
COA # 28345
620 N. WYMORE ROAD,
SUITE 250,
MAITLAND, FL 32751
TEL: (407) 289-2575
ERMOCRATES E. CASTILLO - FL PE 52590

REVISIONS

DESCRIPTION	DATE	REV

PROJECT INSTALLER

ADT Solar

Signature with Seal

Digitally signed by: Ermocrates E Castillo
Date: 2023.02.07 09:16:14

PROJECT NAME

MAI RESIDENCE

236 SW CANNON CREEK DR
LAKE CITY, FL 32024

SHEET NAME

BILL OF MATERIAL

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

BOM