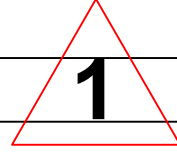


SCOPE of WORK

This set of plans details the installation of a new grid-interactive solar photovoltaic system

PV SYSTEM DETAILS	
-------------------	--

PV Module Type	QCELL_Q.TRON BLK M-G2+ 430W	
PV Module Quantity	16	
Solar PV DC System Rating (kWdc)	6.88	
Solar PV AC System Rating (kWac)	5.848	
Solar Gross Power Rating (kWac)	7.6	
Inverter Type	Tesla 7.6 KW	
Inverter Quantity	1	
Battery Type	N/A	
Battery Quantity	0	
Mounting Location (Roof/Ground/Pergola)	Roof	
Mounting Attachments Type	Sunmodo Nano-Mount	
Racking & Rails Type	Sunmodo SMR100	

SITE DETAILS

Property Owner Name	Michael Arcangelo
Site Coordinates	32.069332 , -81.096997
Property Address	603 Whitaker St, Apartment A, Savannah, GA 31401
Utility Company	SOCO

EXPOSURE NOTES	
----------------	--

Wind Exposure Category	B
Design Wind Speed (mph)	140
Risk Category/Structure Type	II/Enclosed
NAVD Flood Elevation	N/A (Not in a Flood Zone)

	GOVERNING CODES
--	-----------------

Structural Codes	2024 IBC/IEBC/IRC
Electrical Codes	2023 NEC
Fire Safety Codes	IFC 2024 (With Local AHJ Amendments, if applicable)

STRUCTURAL & ELECTRICAL AFFIDAVITS/CERTIFICATIONS

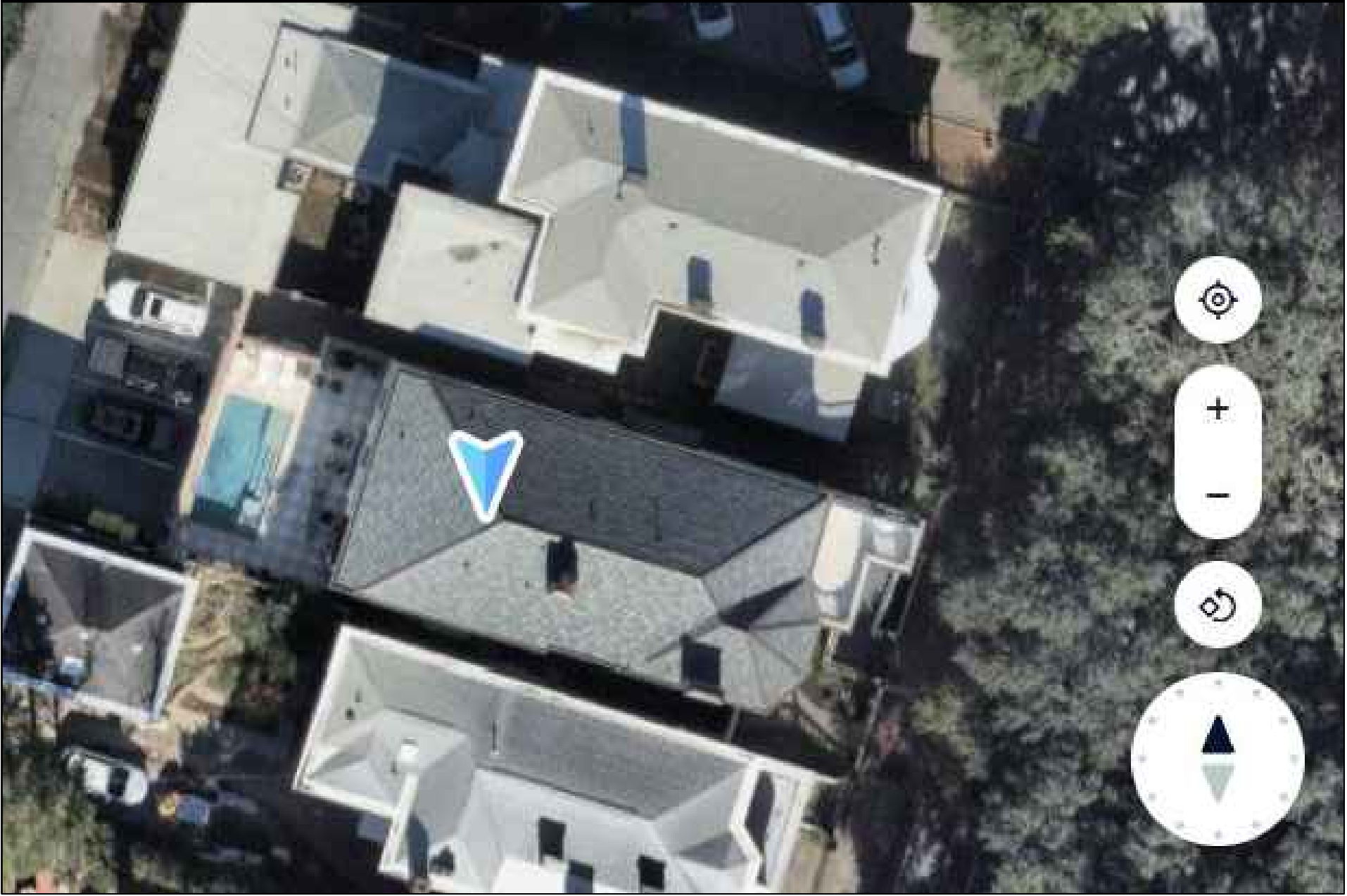
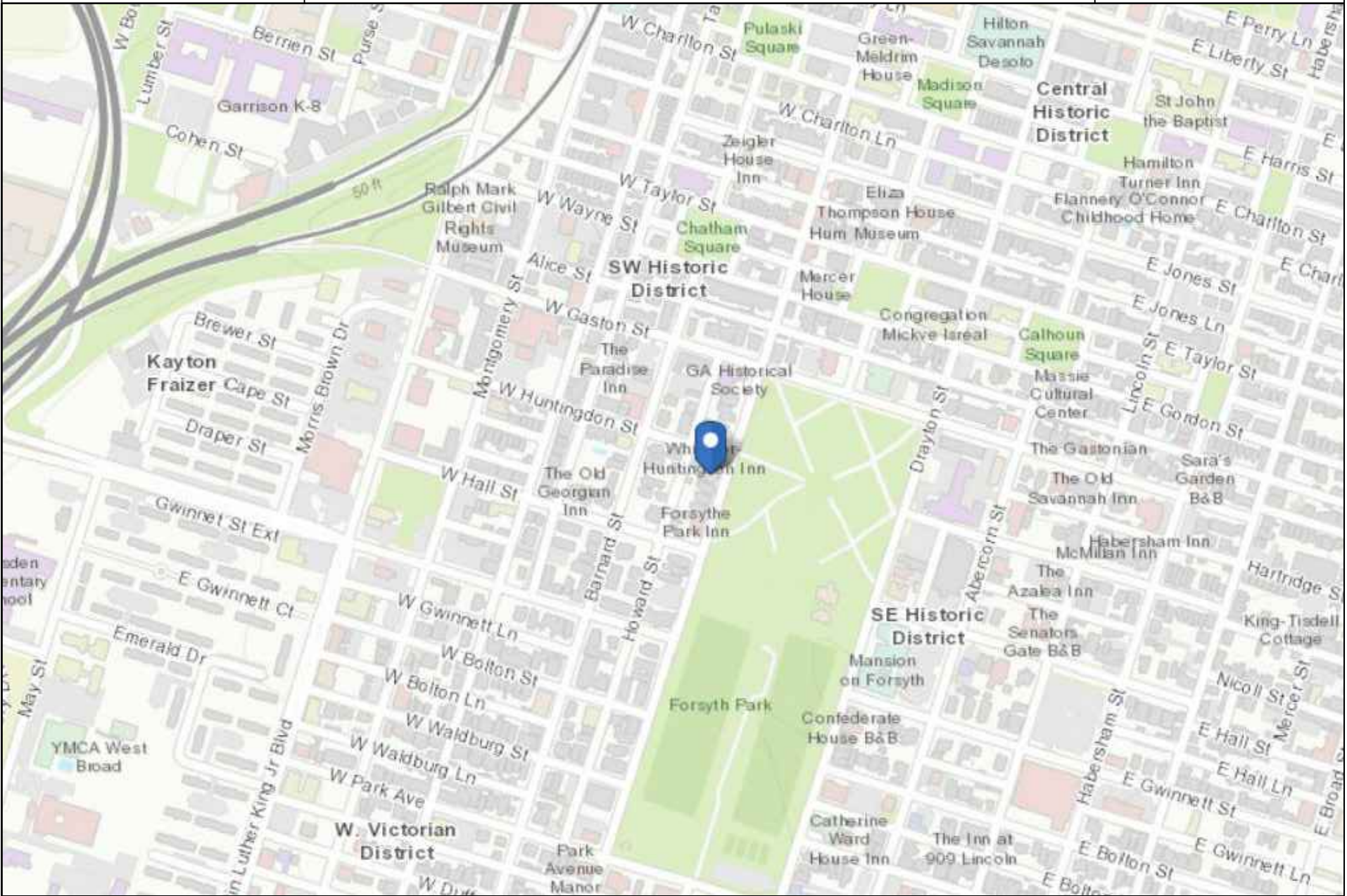
Structural Certification	I, AMJAD MARDI, PE (051450), AN ENGINEER LICENSED CERTIFY THAT THE INSTALLATION OF THE SOLAR MODULES IS IN COMPLIANCE WITH 2018 IBC. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.
Electrical Certification	I, AMJAD MARDI, PE (051450), AN ENGINEER LICENSED PURSUANT TO CERTIFY THAT THE SOLAR PHOTOVOLTAIC ELECTRICAL SYSTEM AND COMPONENTS ARE DESIGNED AND APPROVED USING THE CODE REQUIREMENTS AND STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE GEORGIA BUILDING CODE.

LEGEND

ACD	AC DISCONNECT		FIRE SETBACK		RAILS
INV	TESLA INVERTER		ROOF ZONE 1		TRUSS
PW	TESLA POWERWALL		ROOF ZONE 2		MCI-2
TEG	TESLA ENERGY GATEWAY		ROOF ZONE 3		ATTACHMENT
P	PANEL	#	# OF PLANE		EXPOSED MODULE
M-A	METER - A	3.717' 30.59 PSF 21.00 SF 5.650' MODULE 1			
M-B	METER - B				
MBE	MAIN BREAKER ENCLOSURE				

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Sheet	Description	REV.
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S2	WIND CALCULATIONS & ARRAY LAYOUT	0
S3	ATTACHMENT DETAIL & ARRAY LAYOUT	0
S4 & S5	MOUNTING & FLASHING DETAILS	0
E1	ELECTRICAL RISER DIAGRAM	0
E2	ELECTRICAL NOTES & EQUIPMENT SPECIFICATIONS	0
E3	SOLAR PV LABELS	0
APP.1-5	APPENDIX - DATA SHEETS, MODULE WIND RATINGS & WIND SIMULATION	0



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PROJECT NAME:

MICHAEL ARCANGELO
RESIDENCE

PROJECT ADDRESS:

603 Whitaker St, Apartment A
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE

DRAWING SCALE:

N.T.S.

SHEET NAME:

COVER PAGE

SHEET NUMBER:

	G1
--	----



- GENERAL NOTES:**
1. THE PROJECT IS DESIGNED IN GENERAL ACCORDANCE WITH THE GEORGIA 2018 IBC/ IEBC/IRC BUILDING CODE AND OTHER REFERENCED CODES.
 2. ABBREVIATIONS OTHER THAN AS PROVIDED ARE INDUSTRY STANDARD.
 3. CONDITION AND CONSTRUCTION OF ROOF ASSEMBLY SHALL BE VERIFIED BY PHYSICAL INSPECTION AND ACCEPTED BY CONTRACTOR PRIOR TO COMMENCEMENT.
 4. WORK TO BE COMPLETED SHALL BE VERIFIED BY INSTALLER AND ELECTRICIAN PRIOR TO COMMENCEMENT AND MATERIAL ORDER.
 5. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL BE LICENSED BY THE STATE OF GEORGIA AND AS REQUIRED BY PERMITTING AGENCY; NO UNLICENSED CONTRACTORS OR CONSTRUCTION AND TRADE WORKERS SHALL BE ALLOWED ON JOBSITE.
 6. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL INSPECT THE SITE AND ALL RESPECTIVE BUILDINGS IMMEDIATELY BEFORE PREPARING ANY BID AND BEFORE ORDERING ANY MATERIALS, AND SHALL PROVIDE CONTRACTOR WRITTEN NOTICE OF ANY DISCREPANCY BETWEEN FIELD CONDITIONS AND THE PLANS. AFTER VERIFICATION, MARDI ENGINEERING SHALL PREPARE ANY NECESSARY PLAN REVISION, GENERALLY WITHIN 72 HOURS OF SUCH NOTICE.
 7. REQUIRED PLAN DIMENSIONS NOT PROVIDED SHALL BE CONFIRMED WITH ENGINEER OF RECORD. DIMENSIONS IN PARENTHESES ARE FOR ENGINEERING REFERENCE ONLY.
 8. UNPLANNED ALTERATION OF STRUCTURAL ROOF OR WALL FRAMING SHALL REQUIRE WRITTEN APPROVAL BY THE EOR AND OWNER; PLANS SHALL BE SO REVISED.
 9. FIRE PROTECTION PROCEDURES SHALL BE FOLLOWED IN ACCORDANCE WITH NEC 2023, Art. 690. 9. WORK SHALL BE INSPECTED PRIOR TO COVER BY BUILDING INSPECTOR, AND EOR UPON REQUEST.
 - 10.BEST MANAGEMENT PRACTICES SHALL BE EXERCISED AT ALL TIMES TO MAINTAIN A SAFE AND CLEAN JOBSITE IN COORDINATION WITH PROPERTY OWNER AS APPLIES TO PARKING, TRASH REMOVAL, STORAGE, SOUND, UTILITIES AND TIMES OF WORK.
 - 11.NO WORK SHALL BE PERFORMED IN RIGHT-OF-WAY OR EASEMENTS WITHOUT WRITTEN PERMISSION FROM THE APPROPRIATE PERMITTING AGENCY AND OWNER.
 - 12.ALL MATERIALS NOT LISTED OR SPECIFIED HEREIN SHALL BE OBTAINED THROUGH CONTRACTOR-APPROVED VENDORS, GENERALLY NECESSARY TO COMPLETE TYPICAL SIMILAR CONSTRUCTION AND SHALL CONFORM TO CODE TABLE, INDUSTRY STANDARDS AND POLICIES OF THE PERMITTING AGENCY.
 - 13.DETAILS OR SPECIFICATIONS ARE CALLED OUT BY LOCATION, ARRAY, ELEMENT OR AS OTHERWISE APPLIES.
 - 14.IN THE EVENT OF WEATHER AND OTHER CIRCUMSTANCES THAT COULD MATERIALLY AFFECT BUILDING CONDITIONS OR INSTALLATION, CONTRACTOR SHALL PERFORM A RE-INSPECTION ALONG WITH OTHER CONTRACTORS AS REQUIRED THEN ADJUST PROJECT SCHEDULE TO INCLUDE RESPECTIVE PLAN REVISIONS.

- ROOF FIRE SAFETY NOTES:** (NFPA 11.12.2.2)
1. FIRE PROTECTION PROCEDURES SHALL BE FOLLOWED IN ACCORDANCE WITH NEC 2023, A. 690.9. WORK SHALL BE INSPECTED PRIOR TO COVER BY BUILDING INSPECTOR, OR EOR UPON REQUEST.
 2. ACCESS POINT ARE LOCATED FOR FIRE DEPT. LADDER(S) CLEAR OF OPENINGS/OBSTRUCTIONS.
 3. WORK SHALL BE PERFORMED IN ACCORDANCE WITH ROOF SAFETY RATING (CLASS A). (UL 790 / ASTM E108)

- NOTE TO INSTALLER:**
1. ALL PANELS SHALL BE ATTACHED TO EXISTING ROOF STRUCTURE USING THE REQUIRED NUMBER OF ATTACHMENTS IN THE PROPER CONFIGURATION AS DEFINED IN THIS PLAN SET.
 2. ALL PANELS SHALL BE FULLY OUTSIDE OF ANY ROOF AREAS DEFINED AS "FIRE SETBACK" IN THIS SITE PLAN. FIRE SETBACKS ARE DEFINED BY THE DIMENSIONS IN RED AND ARE CONSIDERED ABSOLUTE.
 3. ANY DIMENSIONS NOTED AS "MAX" SHALL BE BE UNDERSTOOD TO BE ABSOLUTE REQUIREMENTS WITH A TOLERANCE OF +0.0"
 3. ANY DIMENSIONS NOTED AS "MIN" SHALL BE BE UNDERSTOOD TO BE ABSOLUTE REQUIREMENTS WITH A TOLERANCE OF -0.0"
 4. STANDARD DIMENSIONS (NOT INCLUDING FIRE SETBACKS) SHALL BE UNDERSTOOD TO BE REQUIREMENTS WITH A TOLERANCE OF ±2.0"
 5. ANY DIMENSIONS NOTED AS "APPROX" SHALL BE UNDERSTOOD TO BE APPROXIMATE IN NATURE AND SHOULD BE USED AS A GUIDE. EXACT PLACEMENT OF THE PANELS RELATIVE TO THESE DIMENSIONS ARE LEFT TO THE INSTALLERS DISCRETION ASSUMING THAT ALL OTHER DEFINED REQUIREMENTS ARE MET.
 6. ANY DIMENSIONS IN PARENTHESES () ARE FOR ENGINEERING REFERENCE ONLY AND ARE NOT NEEDED FOR INSTALLATION.
 7. IT IS THE CONTRACTOR RESPONSIBILITY TO INSTALL THE SYSTEM AND ITS SUPPORTS AS INDICATED IN THESE PLANS. THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD IF SITE CONDITIONS DIFFER FROM WHAT IS DEPICTED ON PLANS.

ATTACHMENT SYSTEM:
ATTACHMENT SYSTEM AND FLASHING METHOD SHALL BE CONSTRUCTED ACCORDING MANUFACTURER'S INSTALLATION MANUAL AND AS SPECIFIED BY EOR.

NOTE:
ROOF LAYOUT SHOWN MAY BE ADJUSTED IN THE FIELD BY THE INSTALLER TO ACCOUNT FOR ISSUES CAUSED BY ROOF OBSTACLES, TRUSS ALIGNMENT, OR SHADING. SO LONG AS THE MODULES ARE MOUNTED AND SECURED TO THE ROOF. THE LAYOUT MAY BE ALTERED AND ALL ROOF ORIENTATION MAY BE UTILIZED.

SUGGESTED ELECTRICAL EQUIPMENT MOUNTING LOCATION
THE SUGGESTED EQUIPMENT MOUNTING LOCATION MAY BE ADJUSTED AT INSTALLER'S DISCRETION SO LONG AS LOCAL AHJ REQUIREMENTS ARE ADHERED TO



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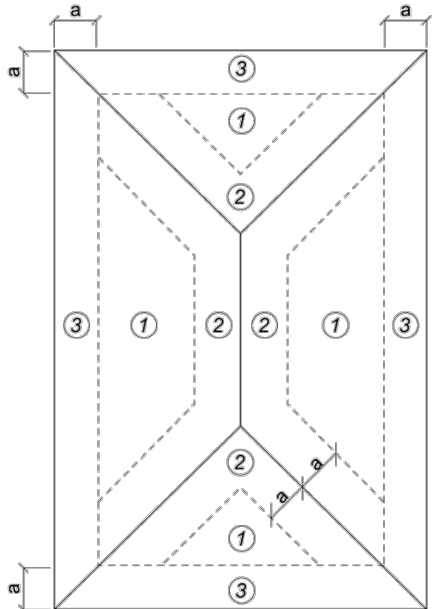
Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE

DRAWING SCALE:
N.T.S.

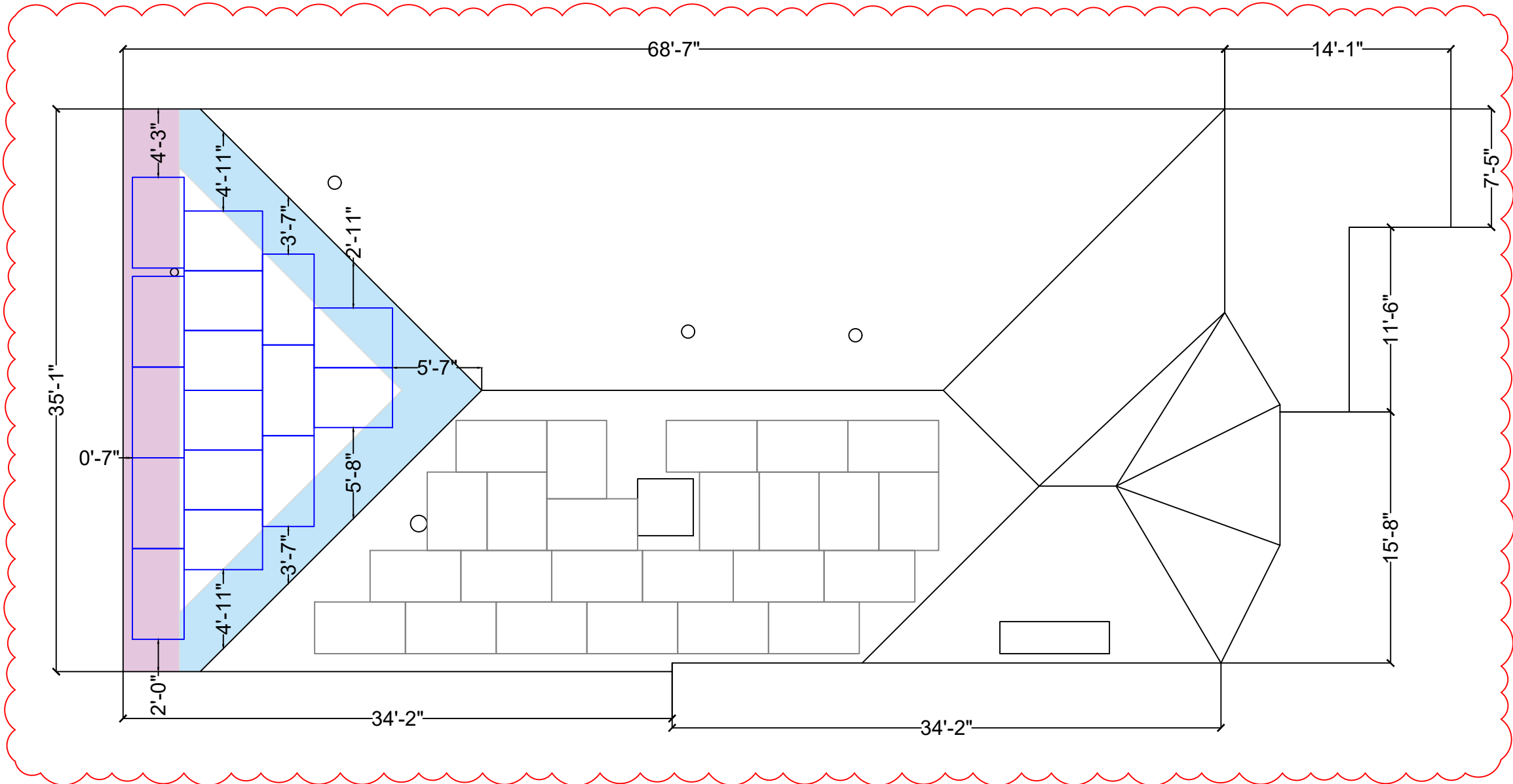
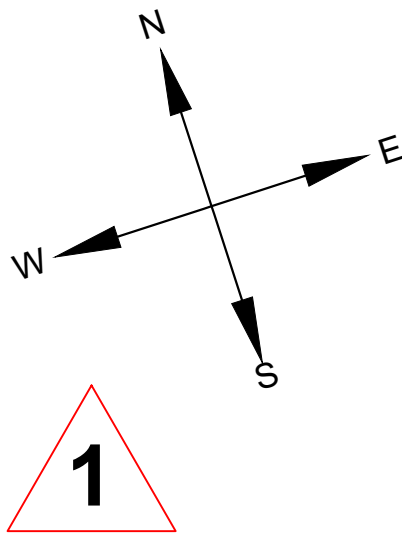
SHEET NAME:
SITE & ELECTRICAL PLAN

SHEET NUMBER:
S1

Wind Pressures (psf) where Solar Panels are to be installed per ASCE 7-22 Sec 29.4.4 (All wind pressures include a load factor of 0.6)		
	EXPOSED (DOWNWARD/ UPLIFT)	NOT EXPOSED (DOWNWARD/ UPLIFT)
1	NONE	5.99/-12.73
2	NONE	5.99/-17.22
3	NONE	5.99/-18.12
1_OH	NONE	NONE
2_OH	NONE	NONE
3_OH	NONE	0.00/-28.01
Existing Structure & Limiting Factors		
Roof Type	Hipped	
Roof Material	Shingle	
Sheathing	Plywood	
Framing	Wood Trusses, 24" O.C.	
Fire Rating	Class A	
Roof Slope	7:12	
Mean Roof Height (h) [ft]	±35.116	
Overhang (OH) [ft]	2	
Dead Load [psf]	19.9	
Live Load [psf]	20	
a = Width for Zone 2 and 3 determination (per C&C figure) [ft]	3.508	
h/2 = Width used to determine if exposed [ft]	17.56	
h1 = Distance from roof to lower panel edge: Min (hny,hnp) [ft]	0.29	
h2 = Distance from roof to upper panel edge: Max (hny,hnp) [ft]	0.29	
d1 = limit for adjacent panels [ft]	0.58	
Minimum height above roof edge [ft]	0.58	



PV Module Data		
Chord length [ft]	5.650	
Width [ft]	3.717	
Area [sqft]	21.00	
Thickness [ft]	0.098	
Weight [lbs]	46.70	
Module Dead Load	2.22	
Angle to Roof [degrees °]	0	
Environmental Data		
Design Wind Speed (V)	140	
Elevation Factor(Ke)	1.0	
Topographic factor (Kzt)	1.0	
pressure exposure (Kz)	0.9	
Velocity Pressure (qh)	42.65	
PV Module Loads		
	Downward	Uplift
Module Design Pressure [psf]	50.12	-30.59
Worst Case Pressure [psf]	5.99	-28.01
Worst Case Roof Zone	1 (Non-Exposed)	3_OH (Non-Exposed)
Net Load Pressure [psf]	8.21	-25.79
Margin [psf]	41.91	-4.80
Safety Factor (OK IF OVER 1.0)	6.10	1.19
Total Array Calculations		
Minimum Number of Attachments	43	
Number of Fasteners per Attachment	1	
Total Array Weight [lbs]	747.20	
Total Array Area [sqft]	335.99	
Total Roof Area [sqft]	2595.42	
Percentage of Total Occupied Roof Area [%]	12.95	
Total Array Uplift [lbs]	-8663.80	
Force per Attachment [lbs]	-201.48	
Force Per Fastener [lbs]	-201.48	
Max Allowed Force Per Fastener [lbs]	370	
Safety Factor (OK if over 1.50)	1.84	



LEGEND	
	ROOF ZONE 1
	ROOF ZONE 2
	ROOF ZONE 3
	EXPOSED MODULE
3.717' 30.59 PSF 21.00 SF 5.650'	MODULE
	MODULE UNDER SEPARATE PERMIT



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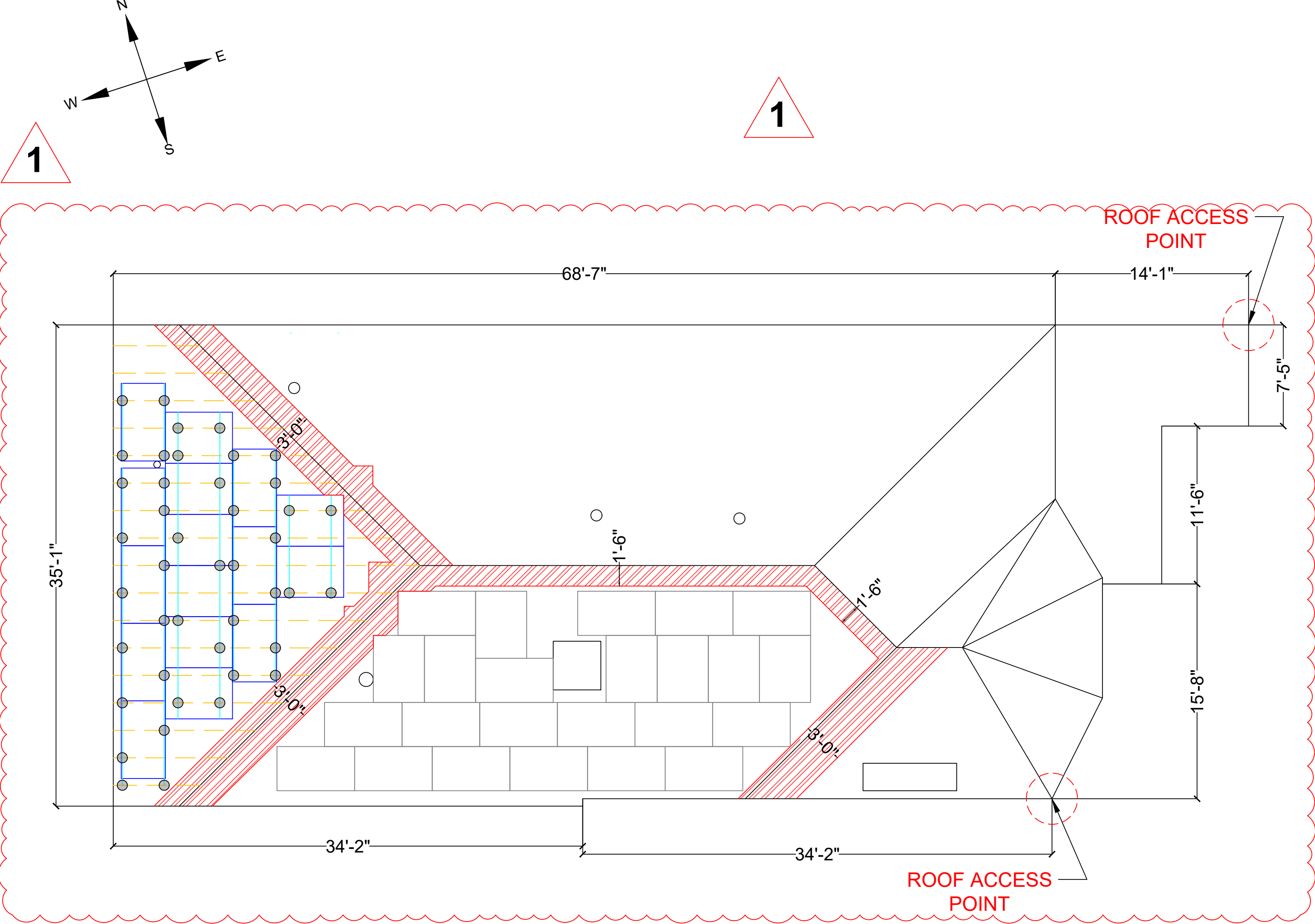
Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE, PV MODULE LOAD & CALCULATIONS

DRAWING SCALE:
N.T.S.

SHEET NAME:
WIND CALCULATIONS &
ARRAY LAYOUT

SHEET NUMBER:
S2

BILL OF MATERIALS	
Structural	
Product	Quantity
SUNMODO SMR100 Rail, 165"	11
SUNMODO SMR100 BONDING RAIL SPLICE	6
SUNMODO NANOMOUNT	43
SUNMODO L-FOOT ADAPTOR	43
SUNMODO END CLAMP	20
SUNMODO MID CLAMP	22
SUNMODO GROUND LUG	5
SUNMODO MLPE MOUNT	6
QCELL_Q.TRON BLK M-G2+ 430 430W MODULES	16
M-1 SEALANT	7
Electrical	
TESLA INVERTER 7.6KW	1
60A AC FUSED DISCONNECT	1
40A FUSES	2
FUSE REJECTION CLIPS	2
TESLA MCI-2	6



SYSTEM SUMMARY					
ROOF PLANE	NUMBER OF MODULES	ARRAY TILT (DEGREES)	AZIMUTH ANGLE (DEGREES)	ROOF SLOPE	ROOF SLOPE (DEGREES)
1	16	0	107	7:12	30.26

NOTE:

SINCE PHOTOVOLTAIC SYSTEM WILL NOT OCCUPY MORE THAN 33% OF THE ROOF (SEE SHEET S2 FOR CALCULATION), RIDGE SETBACKS SHALL BE PERMITTED TO BE 18" (R324.6.2).

NOTE:

MAX CANTILEVER: 40% OF ALLOWABLE SPAN

MAX ALLOWABLE SPAN FOR PORTRAIT MODULES: 72"

MAX ALLOWABLE SPAN FOR LANDSCAPE MODULES: 48"

LEGEND

- FIRE SETBACK
- RAILS
- TRUSS
- MCI-2
- ATTACHMENT
- ROOF PLANE #
- MODULE **1**
- MODULE UNDER SEPARATE PERMIT

30.59 PSF
21.00 SF
5.650'

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7/10/2026	REVISION HISTORY
	UPDATED MODULE & BOM

DRAWING SCALE:

N.T.S.

SHEET NAME:

ATTACHMENT DETAIL & ARRAY LAYOUT

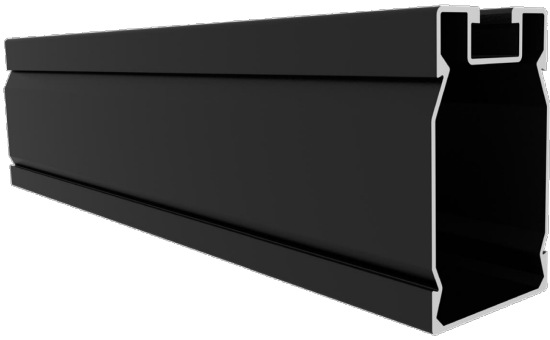
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S3

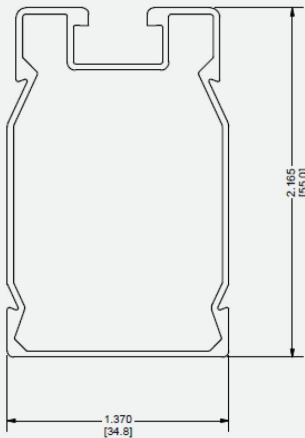
RACKING & MOUNTING SPECIFICATIONS



SMR100 Rail



Cut Sheet



SMR100 Rail

Mechanical Properties

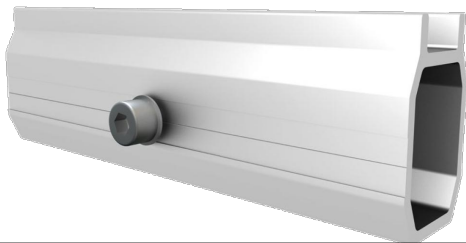
Material: 6005-T5 Aluminum
Weight: 0.4126 lbs/ft (0.614 kg/m)
Ultimate Tensile Strength: 37.7 ksi (260 MPa)
Yield Strength: 34.8 ksi (240 MPa)

Section Properties

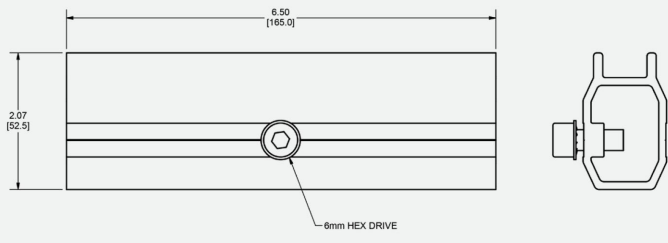
Sx: 0.196 in³ (3.21 cm³)
Sy: 0.146 in³ (2.39 cm³)
Area (X-section): 0.352 in² (2.27 cm²)



SMR Rail Splices



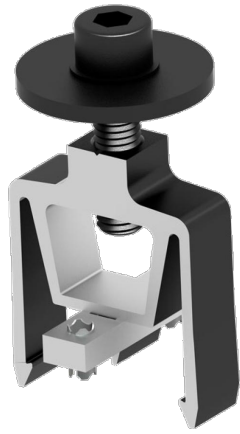
Cut Sheet



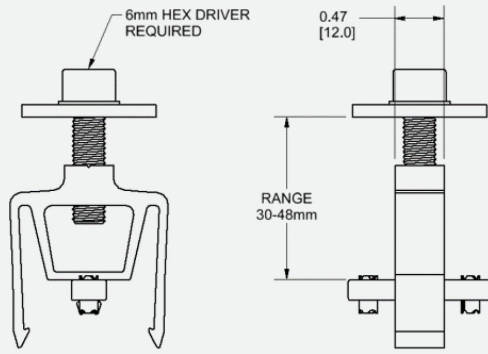
SMR100 Bonding Rail Splice



Mid Clamp



Cut Sheet



Pop-On Bonding Mid Clamp

6mm HEX DRIVER REQUIRED

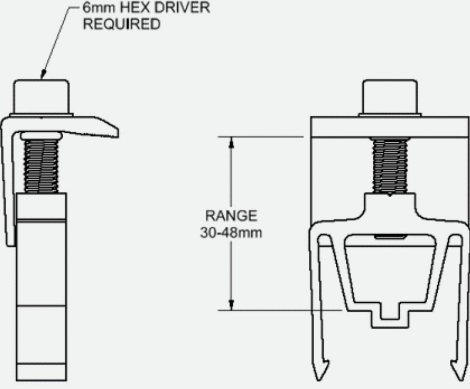
0.47 [12.0]

RANGE 30-48mm

End Clamp



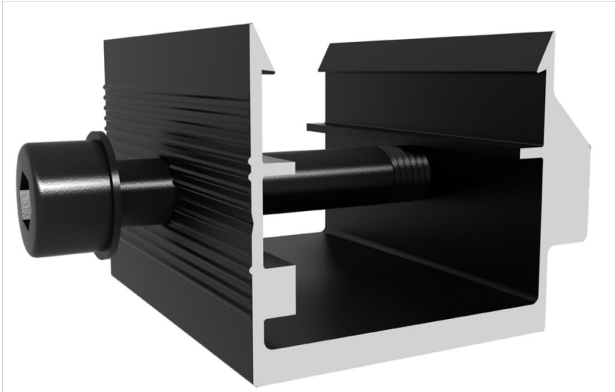
Pop-On End Clamp



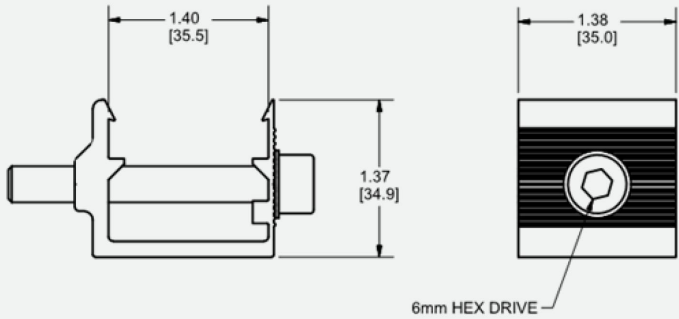
6mm HEX DRIVER REQUIRED

RANGE 30-48mm

L-Foot Adaptors



SMR100 L-Foot Adaptor



1.40 [35.5]

1.38 [35.0]

1.37 [34.9]

6mm HEX DRIVE

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GROUNDING DETAIL

SMR Pitched Roof System

Fault Current Path Diagram

Items are listed in the fault current path in order from the PV Panel to the Grounding Lug:

- 1. PV Panel
- 2. Mid Clamp Kit
- 3. SMR Rail Splice
- 4. SMR Rail
- 5. Ground Lug

Fault Current Path

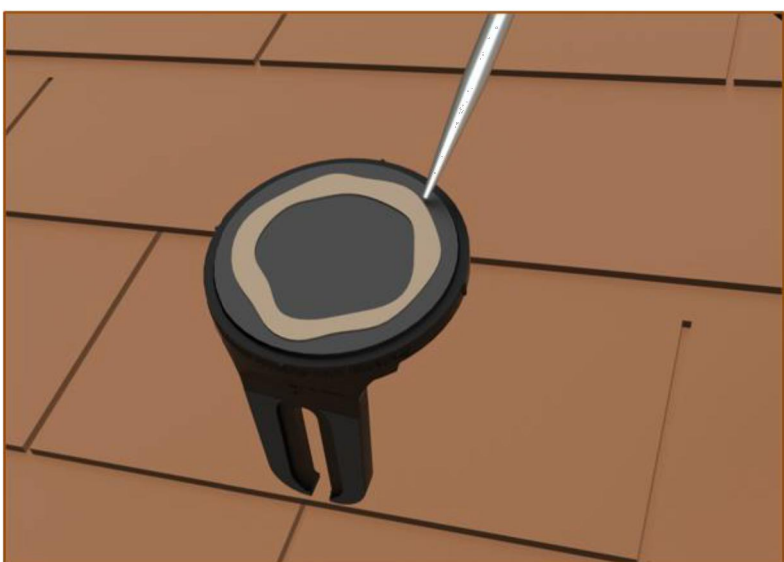
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Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
DRAWING SCALE:	
N.T.S.	
SHEET NAME:	
MOUNTING & FLASHING DETAIL	
SHEET NUMBER:	
S4	

RAFTER ATTACHED INSTALLATION DETAIL

Nano Rafter Mount Sealant Application

Apply a circular bead of composite roof sealant around the bottom of the NanoMount.

Apply additional sealant to the roof if needed to seal gaps between shingles or to smooth uneven surfaces.



Roof Attachment

Locate the center of the rafter in the desired roof location and drill a 7/32" [6mm] pilot hole. Clean sawdust, and fill hole with sealant, such as Chem-link M1 for wood and composite roofs.

Use a 13mm hex socket to install the 5/16" [M8] Lag Screw.

Do not over tighten.



Rail Attachment

Loosely install the L-Foot Adaptor to the L-Foot using the M8 Bolt provided.

Install the Rail onto the L-Foot and L-Foot Adaptor. Confirm that the hooks on the L-Foot Adaptor are fully engaged with the hooks on the side of the Rail.

Adjust the Rail to the desired height and then secure the Rail to the L-Foot Adaptor using the M8 Bolt; use a 13mm hex socket and torque to 13Nm (10 ft-lbs).



FASTENER NOTES:

FASTENER TYPE: (1) 5/16" S.S. LAG SCREW

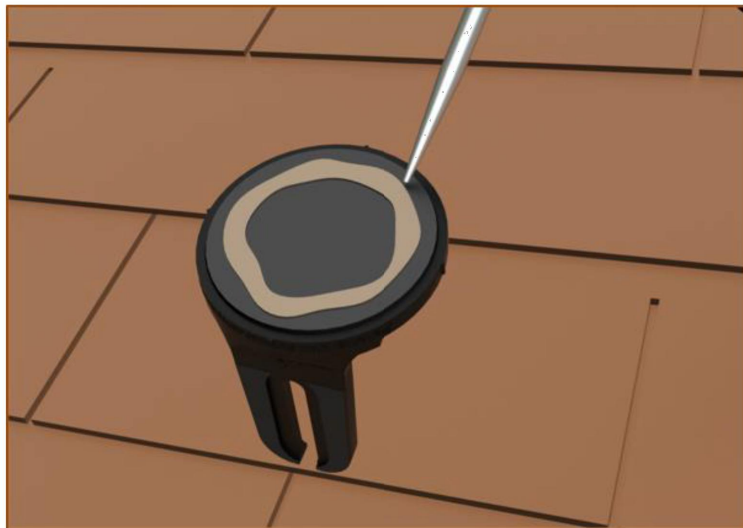
MINIMUM EMBEDMENT: 2.5"

DECK ATTACHED INSTALLATION DETAIL

Nano Deck Mount Sealant Application

Apply a circular bead of composite roof sealant around the bottom of the NanoMount.

Apply additional sealant to the roof if needed to seal gaps between shingles or to smooth uneven surfaces.



Roof Attachment

Locate the desired roof location and install the 4X Self-Tapping Screws with Sealing Washers.

Use a 13mm hex socket to install the Self-Tapping Wood Screws.

Do not over tighten.



Rail Attachment

Loosely install the L-Foot Adaptor to the L-Foot using the M8 Bolt provided.

Install the Rail onto the L-Foot and L-Foot Adaptor. Confirm that the hooks on the L-Foot Adaptor are fully engaged with the hooks on the side of the Rail.

Adjust the Rail to the desired height and then secure the Rail to the L-Foot Adaptor using the M8 Bolt; use a 13mm hex socket and torque to 13Nm (10 ft-lbs).



ATTACHMENT NOTES:

DECK ATTACHMENTS SHALL ONLY BE PLACED MAX. 24" APART



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Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

MOUNTING & FLASHING
DETAIL

SHEET NUMBER:

S5



NEC 690.13(B) label is required at each PV system disconnecting means. This will include combiner boxes, AC/DC switches & AC Disconnects.



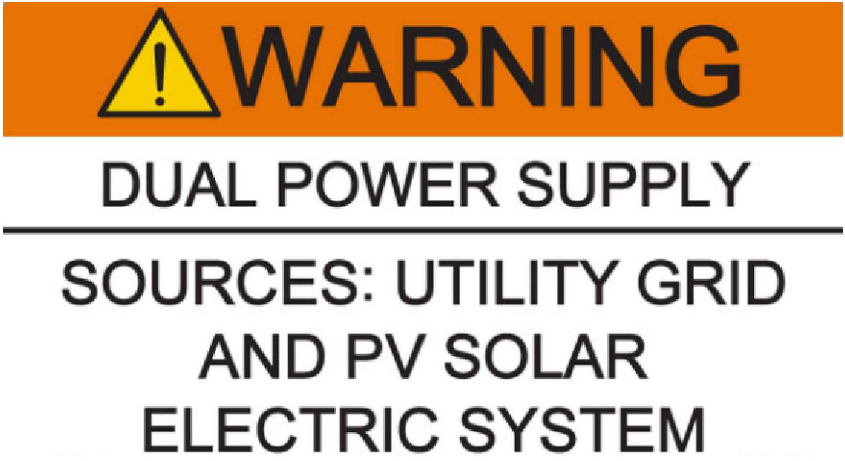
NEC 690.31(D)(2) label is required at all areas where PV system conductors are enclosed including junction boxes, raceways, conduit bodies, pull boxes, etc.



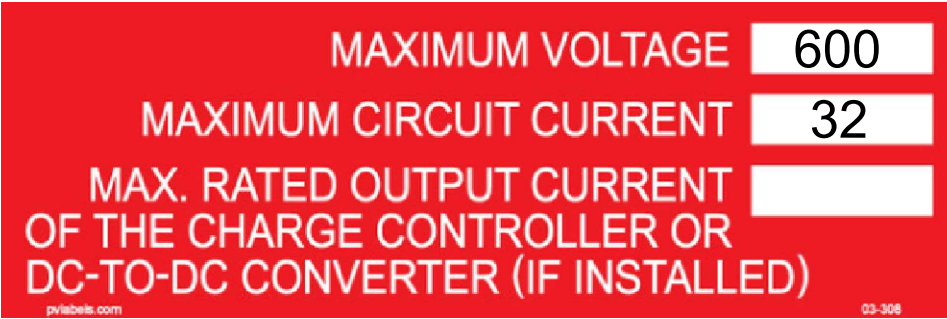
NEC 690.13(B) label is an optional addition to the previous label on systems where the line and load sides of the disconnect may be energized. This label is not required but “shall be permitted” by the NEC.



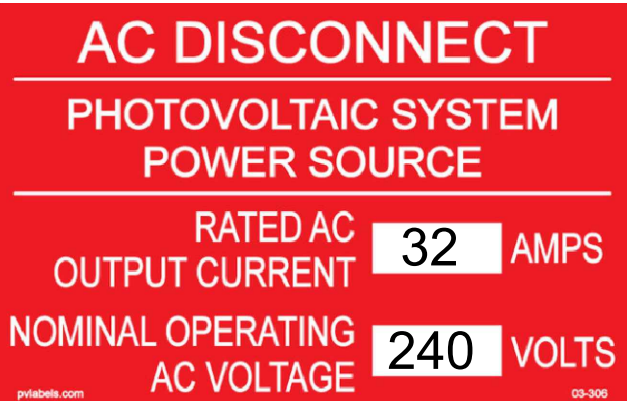
NEC 690.56(C)(2) label is required at the rapid shut down switch for the system. Typically, that is going to be the AC disconnect.



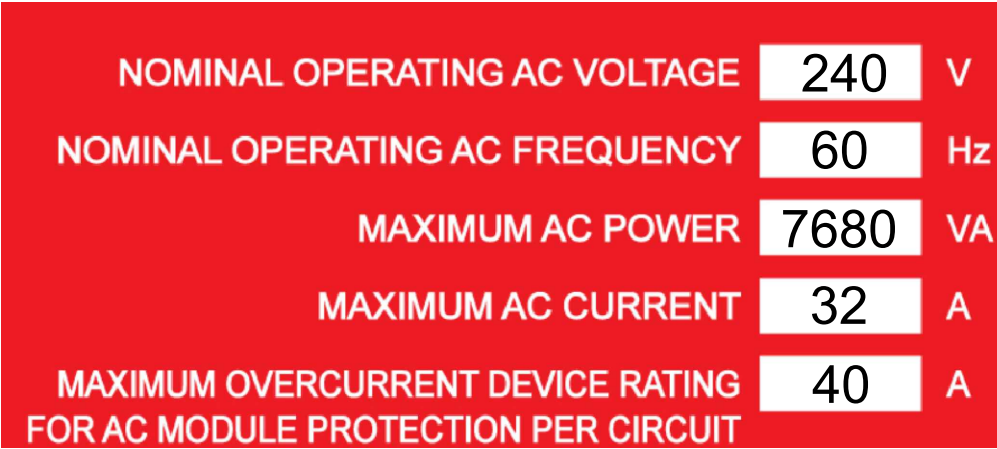
NEC 705.12(C) label is required at the main service equipment.



NEC 690.54 label is required at the point of interconnection disconnecting means, i.e. the AC disconnect.



NEC 690.54 label is required at the AC disconnecting means



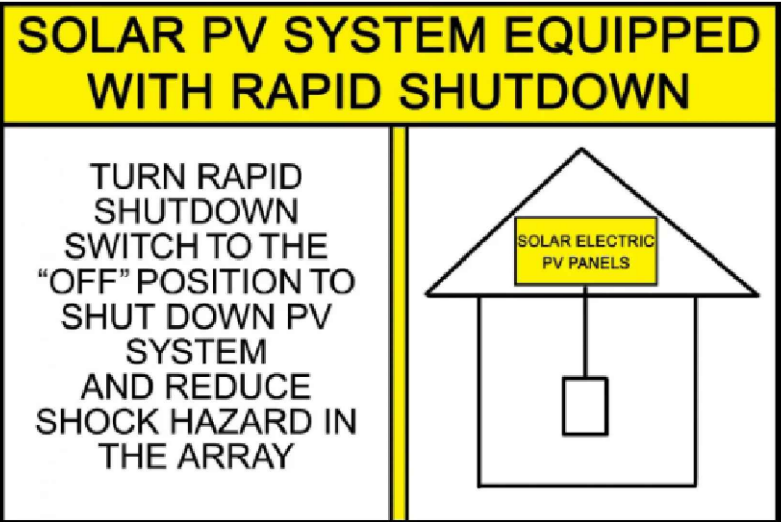
NEC 690.54 label is required at the AC disconnecting means



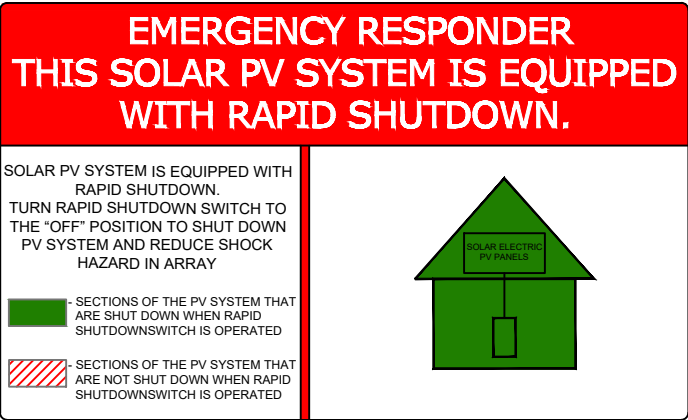
NEC 690.56(B) or NEC 705.10 label is required at every power source disconnecting means denoting location(s) of other power source(s) disconnecting means.



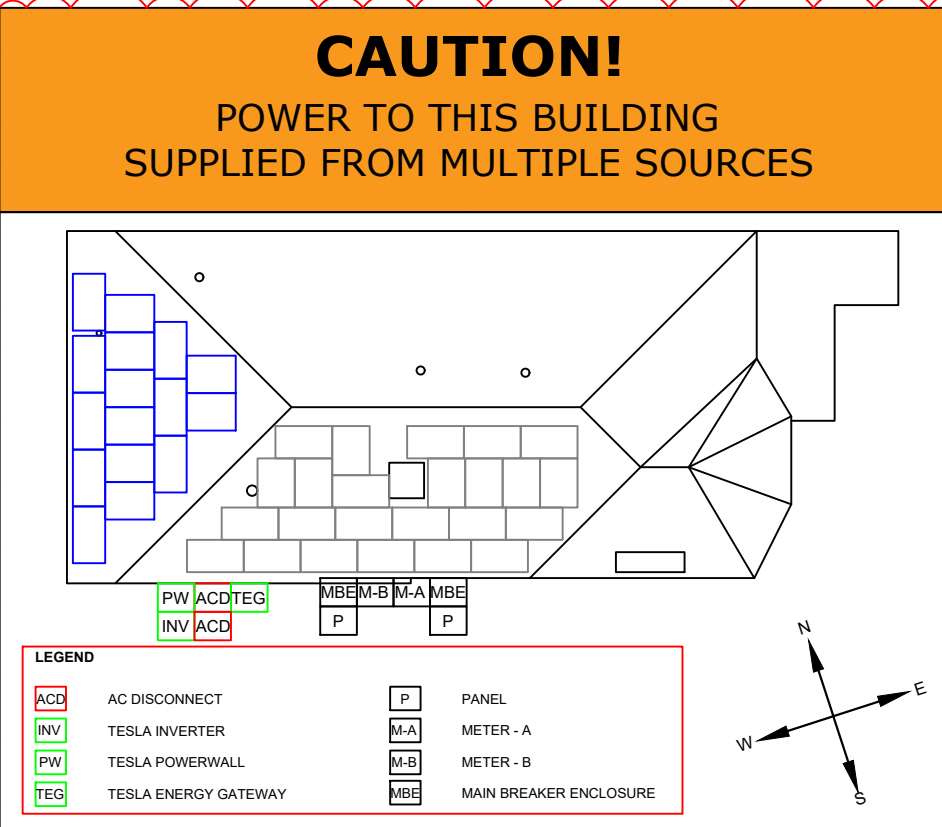
NEC 705.12(C) label is required at the main service equipment.



NEC 690.56(C) label is required at the service disconnecting means of the property.



NFPA 1.11.12.2.1.1 LABEL IS REQUIRED AT AC DISCONNECTING MEANS



705.10 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")



NFPA - 1, 11.12.2.1.5:
THIS LABEL IS REQUIRED AT MAIN DISCONNECT



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MICHAEL ARCANGELO RESIDENCE

PROJECT ADDRESS:

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Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
7/10/2026	REVISION HISTORY
	UPDATED MODULE

DRAWING SCALE:

N.T.S.

SHEET NAME:

SOLAR PV LABELS

SHEET NUMBER:

E3

Q.TRON BLK M-G2+ SERIES

420-440Wp | 108Cells
22.5% Maximum Module Efficiency
Domestic Content Option Available



MODEL Q.TRON BLK M-G2+
Q.TRON BLK M-G2.C+ Q.TRON BLK M-G2.D+
Q.TRON BLK M-G2.H+



Includes Domestic Content

Q.TRON BLK M-G2Y+ solar modules ("Y" can be "C, D, H") contain U.S. manufactured components which can contribute to qualifying for the 10% domestic content bonus to applicable tax credits.¹



High performance Qcells N-type solar cells

Q. ANTUM NEO Technology with optimized module layout boosts module efficiency up to 22.5%.



A reliable investment

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



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology³, Hot-Spot Protect.



Extreme weather rating

High-tech aluminum alloy frame, certified for high snow (8100 Pa) and wind loads (3600 Pa).



Innovative all-weather technology

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



Far beyond the standard

Qcells' comprehensive quality program ensures high long-term yields and the reliability of your solar system.

¹ This statement should not be relied on as tax advice and is subject to change based on changes made to applicable law and/or implementing rules, regulations or guidance. Please consult a qualified tax professional for specific advice.

² See data sheet on rear for further information.

³ APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96 h)

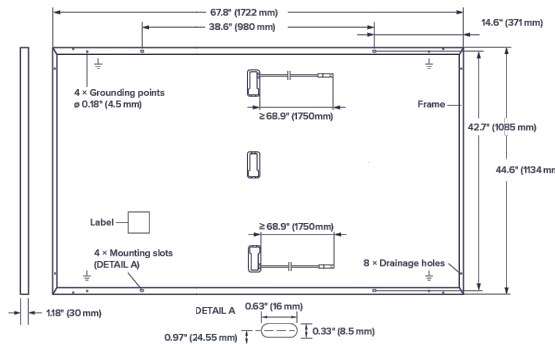
The ideal solution for:



Q.TRON BLK M-G2+ SERIES

Mechanical Specification

Format	67.8 in × 44.6 in × 1.8 in (including frame) (1722 mm × 1134 mm × 30 mm)
Weight	46.7 lbs (21.2 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 18 monocrystalline Q. ANTUM NEO solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), Protection class IP68, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 68.9 in (1750 mm), (-) ≥ 68.9 in (1750 mm)
Connector	Stäubli MC4; IP68



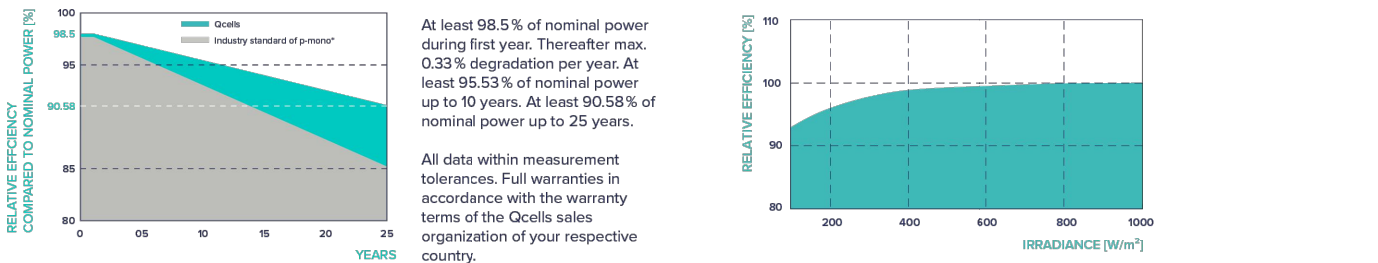
Electrical Characteristics

Power Class		420	425	430	435	440	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W/-0 W)							
Minimum	Power at MPP ¹	P _{MPP} [W]	420	425	430	435	440
	Short Circuit Current ¹	I _{SC} [A]	13.58	13.66	13.74	13.82	13.90
	Open Circuit Voltage ¹	V _{OC} [V]	38.75	39.03	39.32	39.60	39.88
	Current at MPP	I _{MPP} [A]	12.91	12.98	13.05	13.13	13.20
	Voltage at MPP	V _{MPP} [V]	32.54	32.74	32.94	33.14	33.33
	Efficiency ¹	η [%]	≥ 21.5	≥ 21.8	≥ 22.0	≥ 22.3	≥ 22.5

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²							
Minimum	Power at MPP	P _{MPP} [W]	318.2	322.0	325.8	329.5	333.3
	Short Circuit Current	I _{SC} [A]	10.94	11.00	11.07	11.14	11.20
	Open Circuit Voltage	V _{OC} [V]	36.77	37.04	37.31	37.58	37.84
	Current at MPP	I _{MPP} [A]	10.15	10.21	10.27	10.33	10.38
	Voltage at MPP	V _{MPP} [V]	31.33	31.53	31.72	31.92	32.11

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

Qcells Performance Warranty



Temperature Coefficients	α	β
Temperature Coefficient of I _{SC}	α [%/K]	+0.04
Temperature Coefficient of P _{MPP}	γ [%/K]	-0.29
Temperature Coefficient of V _{OC}	β [%/K]	-0.24
Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3 °C)

Properties for System Design

Maximum System Voltage	V _{sys} [V]	1000 (IEC)/1000 (UL)
Maximum Series Fuse Rating	[A DC]	25
Max. Design Load, Push/Pull ³	[lbs/ft ²]	113 (5400 Pa)/50 (2400 Pa)
Max. Test Load, Push/Pull ³	[lbs/ft ²]	169 (8100 Pa)/75 (3600 Pa)
PV module classification		Class II
Fire Rating based on ANSI/UL 61730		C/TYP 2
Permitted Module Temperature on Continuous Duty, (T _{50 max})		-40°F up to +158°F (-40°C up to +70°C)

Qualifications and Certificates

UL61730-1 & UL61730-2,
CE-compliant, IEC 61215:2021,
IEC 61730:2023,



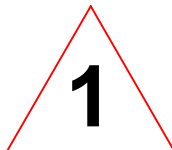
*Contact your Qcells Sales Representative for details regarding the module's eligibility to be Buy American Act (BAA) compliant.

Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product.
Hanwha Q CELLS America Inc. 300 Spectrum Center Drive, Suite 500, Irvine, CA 92618, USA | TEL +1 (949) 748-5996 | EMAIL: na.support@qcells.com | WEB: www.qcells.com/us



Specifications subject to technical changes © Qcells Q.TRON_BLK_M-G2+_series_DCA_420-440_2025-04_Rev02_NA



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Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE

DRAWING SCALE:

N.T.S.

SHEET NAME:

SOLAR MODULE
SPECIFICATIONS

SHEET NUMBER:

APP.1

SOLAR INVERTER

Tesla Solar Inverter provides DC to AC conversion and integrates with the Tesla ecosystem, including Solar Panels, Solar Roof, Powerwall, and vehicle charging, to provide a seamless sustainable energy experience.



KEY FEATURES

- Integrated rapid shutdown, arc fault, and ground fault protection
- 2x the standard number of MPPTs for high production on complex roofs
- No neutral wire simplifies installation

ELECTRICAL SPECIFICATIONS

MODEL NUMBER	1534000-xx-y	1538000-xx-y
OUTPUT (AC)	3.8 kW	7.6 kW
Nominal Power	3,800 W	7,600 W
Maximum Apparent Power	3,328 VA at 208 V 3,840 VA at 240 V	6,656 VA at 208 V 7,680 VA at 240 V
Maximum Continuous Current	16 A	32 A
Breaker (Overcurrent Protection)	20 A	40 A
Nominal Power Factor	1 - 0.9 (leading / lagging)	
THD (at Nominal Power)	<5%	
INPUT (DC)		
MPPT	2	4
Input Connectors per MPPT	1-2	1-2-1-2
Maximum Input Voltage	600 VDC	
DC Input Voltage Range	60 - 550 VDC	
DC MPPT Voltage Range	60 - 480 VDC ¹	
Maximum Current per MPPT (I _{mp})	13 A	
Maximum Short Circuit Current per MPPT (I _{sc})	15 A	

PERFORMANCE SPECIFICATIONS

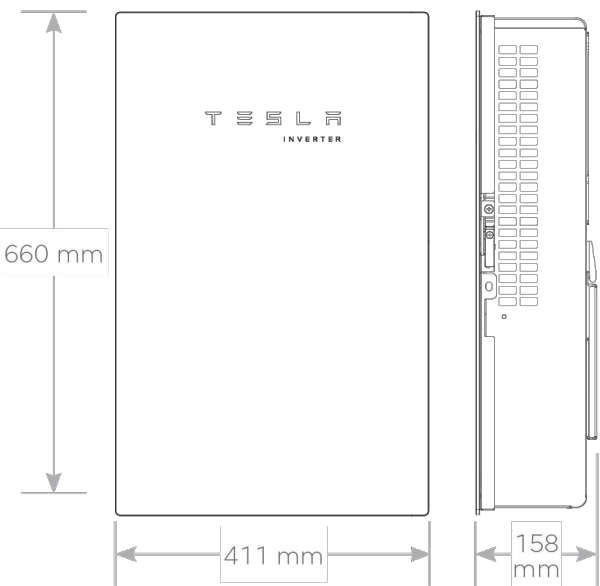
Peak Efficiency	98% at 208 V	98.4% at 208 V
	98.1% at 240 V	98.6% at 240 V
CEC Efficiency	97.5% at 208 V	97.5% at 208 V
	97.5% at 240 V	98.0% at 240 V
Allowable DC/AC Ratio	1.7	
Customer Interface	Tesla Mobile App	
Internet Connectivity	Wi-Fi (2.4 GHz, 802.11 b/g/n), Ethernet, Cellular (LTE/4G) ²	
AC Remote Metering Support	Wi-Fi (2.4 GHz, 802.11 b/g/n), RS-485	
Protections	Integrated arc fault circuit interrupter (AFCI), Rapid Shutdown	
Supported Grid Types	60 Hz, 240 V Split Phase 60 Hz, 208 V Wye	

¹ Maximum current.
² Cellular connectivity subject to network operator service coverage and signal strength.

MECHANICAL SPECIFICATIONS

Dimensions	660 mm x 411 mm x 158 mm (26 in x 16 in x 6 in)
Weight	52 lb ³
Mounting options	Wall mount (bracket)

³ Door and bracket can be removed for a mounting weight of 37 lb.



ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-30°C to 45°C (-22°F to 113°F) ⁴
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	-30°C to 70°C (-22°F to 158°F)
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	Type 3R
Ingress Rating	IP55 (Wiring compartment)
Pollution Rating	PD2 for power electronics and terminal wiring compartment, PD3 for all other components
Operating Noise @ 1 m	< 40 db(A) nominal, < 50 db(A) maximum

⁴For the 7.6 kW Solar Inverter, performance may be de-rated to 6.2 kW at 240 V or 5.37 kW at 208 V when operating at temperatures greater than 45°C.

COMPLIANCE INFORMATION

Grid Certifications	UL 1741, UL 1741 SA, IEEE 1547, IEEE 1547.1
Safety Certifications	UL 1741 PVRSS, UL 1699B, UL 1998 (US), UL 3741
Emissions	EN 61000-6-3 (Residential), FCC 47CFR15.109 (a)

Solar Shutdown Device Technical Specifications

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with Powerwall 3, solar array shutdown is initiated by any loss of AC power.

Electrical Specifications

Model	MCI-1	MCI-2
Nominal Input DC Current Rating (I _{mp})	12 A	13 A
Maximum Input Short Circuit Current (I _{sc})	19 A	17 A
Maximum System Voltage (PVHCS)	600 V DC	1000 V DC ⁷
⁷ Maximum System Voltage is limited by Powerwall to 600 V DC.		
Maximum Number of Devices per String	5	5
Control	Power Line Excitation	Power Line Excitation
Passive State	Normally Open	Normally Open
Maximum Power Consumption	7 W	7 W
Warranty	25 years	25 years

RSD Module Performance

Environmental Specifications

Operating Temperature	-40°C to 50°C (-40°F to 122°F)	-45°C to 70°C (-49°F to 158°F)
Storage Temperature	-30°C to 70°C (-22°F to 158°F)	-30°C to 70°C (-22°F to 158°F)
Enclosure Rating	NEMA 4X / IP65	NEMA 4X / IP65

Mechanical Specifications

Electrical Connections	MC4 Connector	MC4 Connector
Housing	Plastic	Plastic
Dimensions	125 x 150 x 22 mm (5 x 6 x 1 in)	173 x 45 x 22 mm (6.8 x 1.8 x 1 in)
Weight	350 g (0.77 lb)	120 g (0.26 lb)
Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip

Compliance Information

Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)
RSD Initiation Method	External System Shutdown Switch or Powerwall 3 Enable Switch

UL 3741 PV Hazard Control (and PVRSA) Compatibility

The following categories of solar module meet the UL 3741 PVHCS listing when installed with Powerwall 3 and Solar Shutdown Devices.

Tesla Solar Roof	PV Hazard Control System: BIPV compliance document
Tesla or Hanwha (Q.Peak Duo BLK or BLK-G6+) Modules certified for use with ZEP racking	PV Hazard Control System: ZS PVHCS compliance document
Other module and racking combinations	PV Hazard Control System: Generic PV Array compliance document



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amardi@mardiengineering.com

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MICHAEL ARCANGELO RESIDENCE

PROJECT ADDRESS:

603 Whitaker St, Apartment A Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

Sheet Name:

TESLA INVERTER SPECIFICATION

SHEET NUMBER:

APP.2

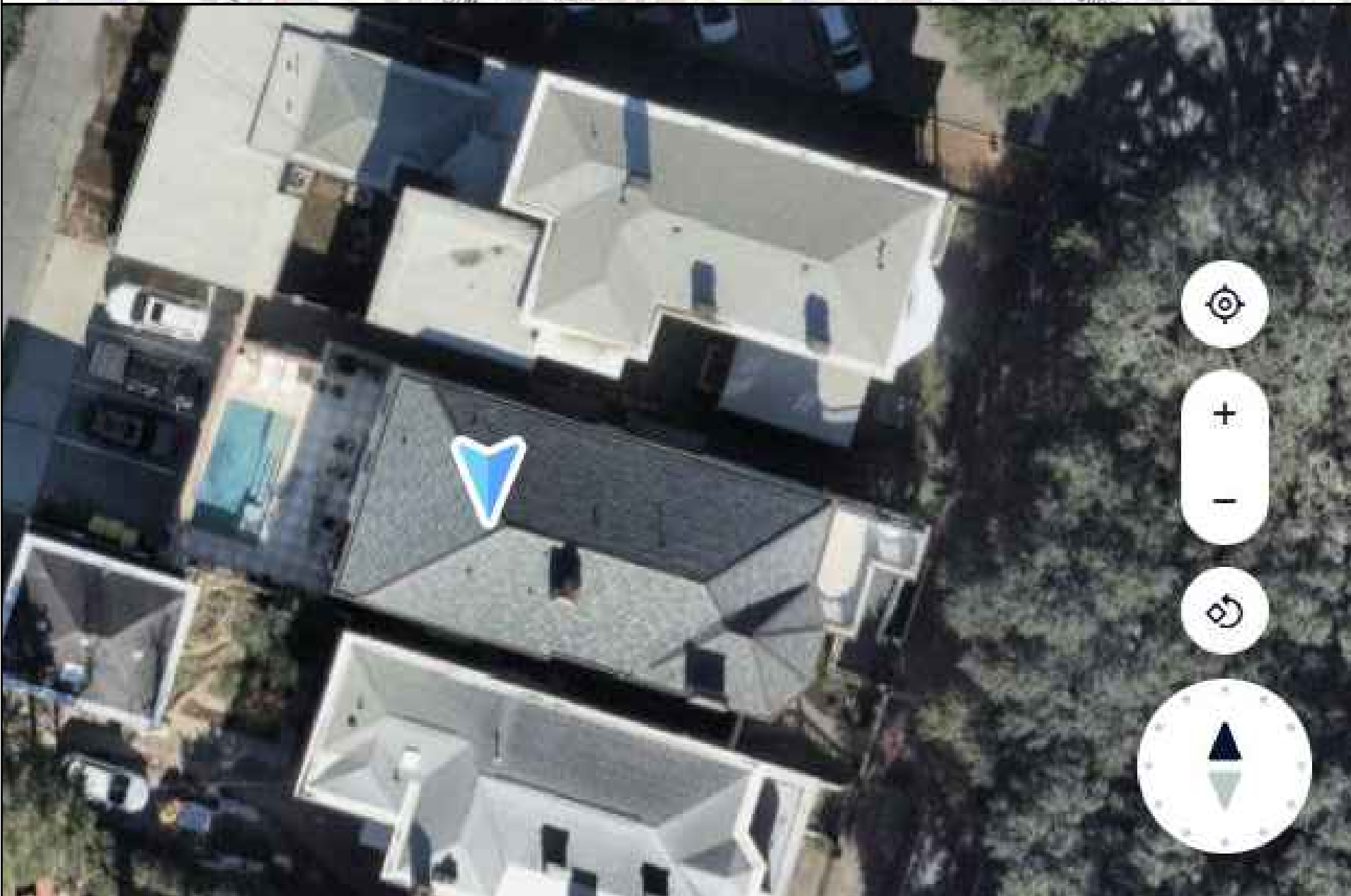
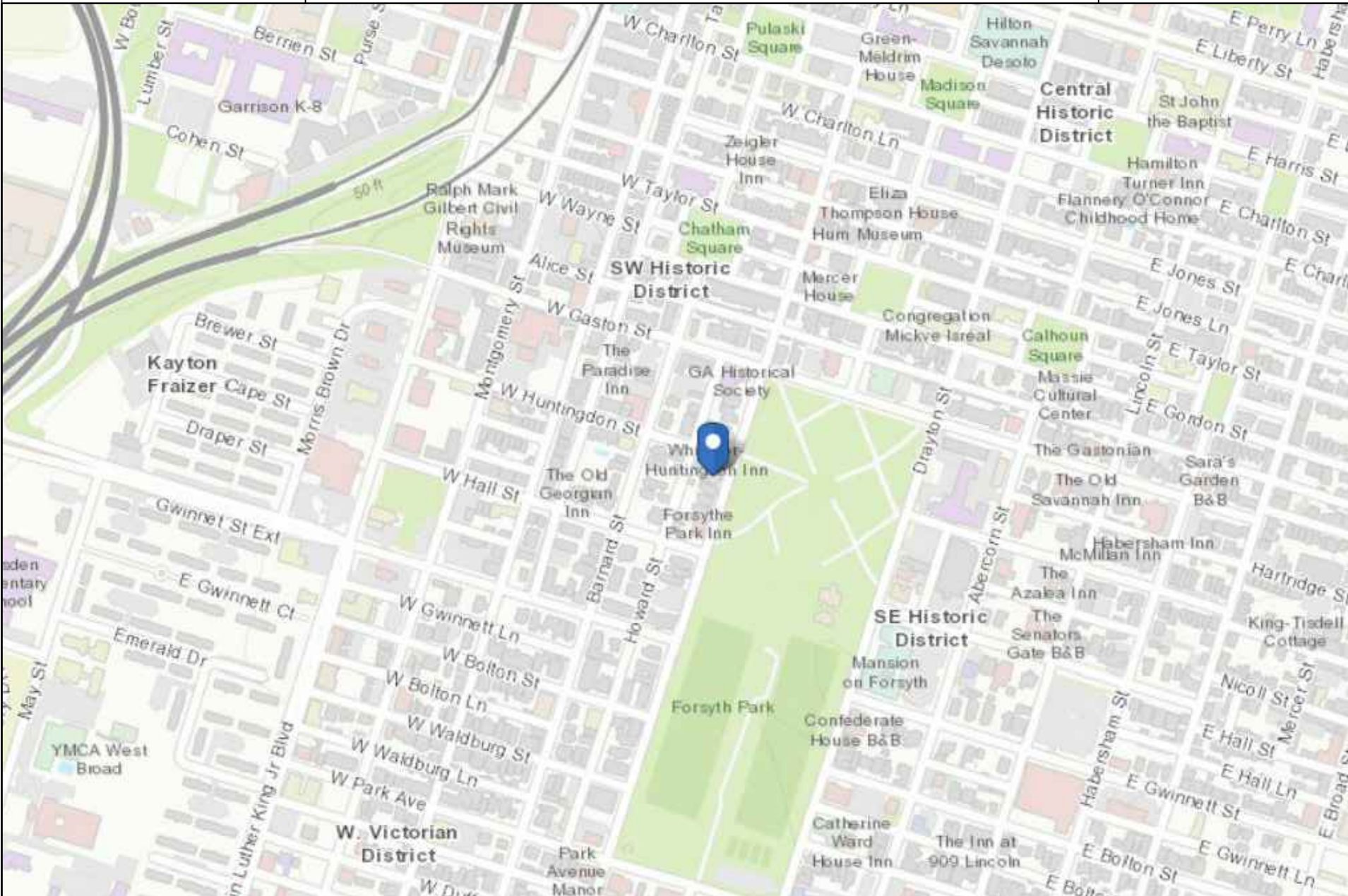
SCOPE of WORK	
This set of plans details the installation of a new grid-interactive solar photovoltaic system	
PV SYSTEM DETAILS	
PV Module Type	QCELL_Q.TRON BLK M-G2+ 430W
PV Module Quantity	24
Solar PV DC System Rating (kWdc)	10.32
Solar PV AC System Rating (kWac)	8.772
Solar Gross Power Rating (kWac)	11.5
Inverter Type	Tesla Powerwall 3 Integrated Inverter
Inverter Quantity	1
Battery Type	TESLA POWERWALL 3 & EXPANSION PACK
Battery Quantity	2
Mounting Location (Roof/Ground/Pergola)	Roof
Mounting Attachments Type	Sunmodo Nano-Mount
Racking & Rails Type	Sunmodo SMR100

SITE DETAILS	
Property Owner Name	Michael Arcangelo
Site Coordinates	32.069332 , -81.096997
Property Address	603 Whitaker St, Apartment B, Savannah, GA 31401
Utility Company	SOCO
EXPOSURE NOTES	
Wind Exposure Category	B
Design Wind Speed (mph)	140
Risk Category/Structure Type	II/Enclosed
NAVD Flood Elevation	N/A (Not in a Flood Zone)
GOVERNING CODES	
Structural Codes	2024 IBC/IEBC/IRC
Electrical Codes	2023 NEC
Fire Safety Codes	IFC 2024 (With Local AHJ Amendments, if applicable)

STRUCTURAL & ELECTRICAL AFFIDAVITS/CERTIFICATIONS	
Structural Certification	I, AMJAD MARDI, PE (051450), AN ENGINEER LICENSED CERTIFY THAT THE INSTALLATION OF THE SOLAR MODULES IS IN COMPLIANCE WITH 2018 IBC. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.
Electrical Certification	I, AMJAD MARDI, PE (051450), AN ENGINEER LICENSED PURSUANT TO CERTIFY THAT THE SOLAR PHOTOVOLTAIC ELECTRICAL SYSTEM AND COMPONENTS ARE DESIGNED AND APPROVED USING THE CODE REQUIREMENTS AND STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE GEORGIA BUILDING CODE.

LEGEND			
ACD	AC DISCONNECT		FIRE SETBACK
INV	TESLA INVERTER		ROOF ZONE 1
PW	TESLA POWERWALL		ROOF ZONE 2
TEG	TESLA ENERGY GATEWAY		ROOF ZONE 3
P	PANEL		# OF PLANE
M-A	METER - A		MODULE
M-B	METER - B		
MBE	MAIN BREAKER ENCLOSURE		
			RAILS
			TRUSS
			MCI-2
			ATTACHMENT
			EXPOSED MODULE
			MODULE UNDER SEPARATE PERMIT

Table Of Contents		
Sheet	Description	REV.
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S1	SITE & ELECTRICAL PLAN	0
S2	WIND CALCULATIONS & ARRAY LAYOUT	0
S3	ATTACHMENT DETAIL & ARRAY LAYOUT	0
S4 & S5	MOUNTING & FLASHING DETAILS	0
E1	ELECTRICAL RISER DIAGRAM	0
E2	ELECTRICAL NOTES & EQUIPMENT SPECIFICATIONS	0
E3	SOLAR PV LABELS	0
APP.1-6	APPENDIX - DATA SHEETS, MODULE WIND RATINGS & WIND SIMULATION	0



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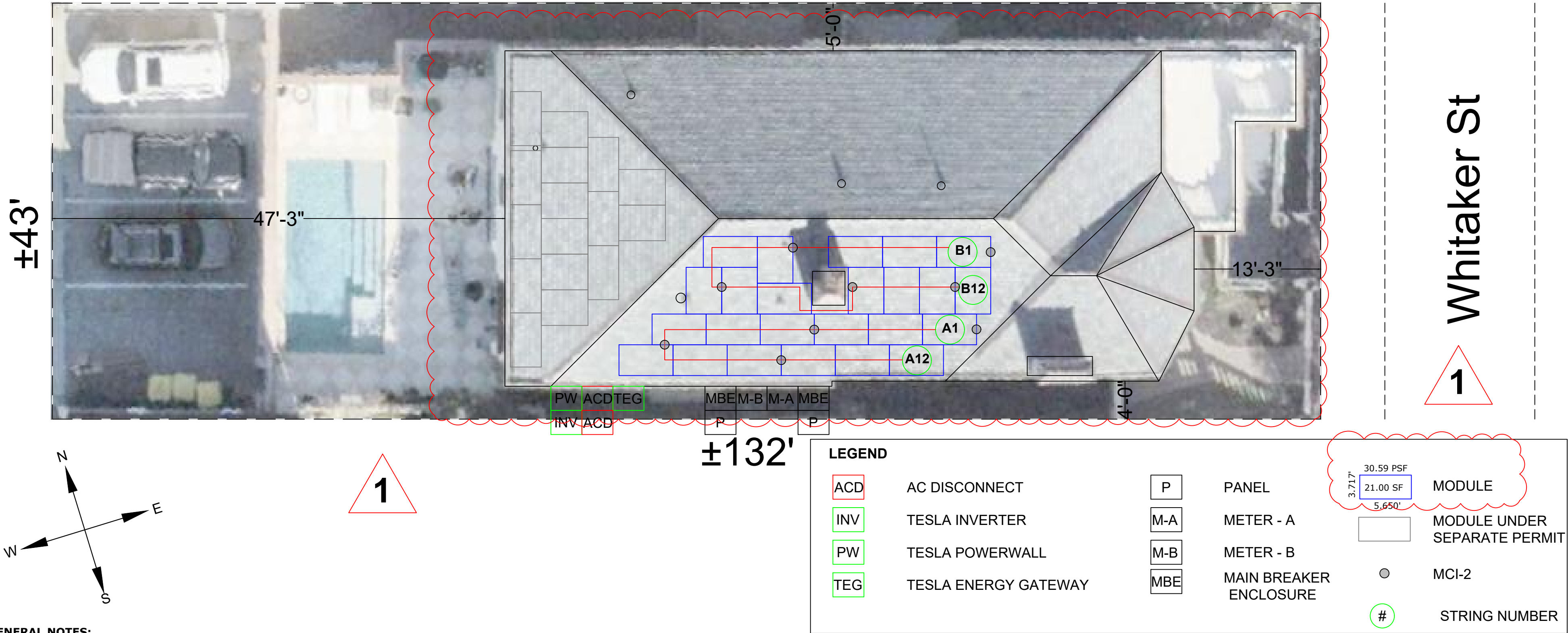
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SHEET NAME:

COVER PAGE

SHEET NUMBER:

G1



GENERAL NOTES:

1. THE PROJECT IS DESIGNED IN GENERAL ACCORDANCE WITH THE GEORGIA 2018 IBC/ IEBC/IRC BUILDING CODE AND OTHER REFERENCED CODES.
2. ABBREVIATIONS OTHER THAN AS PROVIDED ARE INDUSTRY STANDARD.
3. CONDITION AND CONSTRUCTION OF ROOF ASSEMBLY SHALL BE VERIFIED BY PHYSICAL INSPECTION AND ACCEPTED BY CONTRACTOR PRIOR TO COMMENCEMENT.
4. WORK TO BE COMPLETED SHALL BE VERIFIED BY INSTALLER AND ELECTRICIAN PRIOR TO COMMENCEMENT AND MATERIAL ORDER.
5. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL BE LICENSED BY THE STATE OF GEORGIA AND AS REQUIRED BY PERMITTING AGENCY; NO UNLICENSED CONTRACTORS OR CONSTRUCTION AND TRADE WORKERS SHALL BE ALLOWED ON JOBSITE.
6. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL INSPECT THE SITE AND ALL RESPECTIVE BUILDINGS IMMEDIATELY BEFORE PREPARING ANY BID AND BEFORE ORDERING ANY MATERIALS, AND SHALL PROVIDE CONTRACTOR WRITTEN NOTICE OF ANY DISCREPANCY BETWEEN FIELD CONDITIONS AND THE PLANS. AFTER VERIFICATION, MARDI ENGINEERING SHALL PREPARE ANY NECESSARY PLAN REVISION, GENERALLY WITHIN 72 HOURS OF SUCH NOTICE.
7. REQUIRED PLAN DIMENSIONS NOT PROVIDED SHALL BE CONFIRMED WITH ENGINEER OF RECORD. DIMENSIONS IN PARENTHESES ARE FOR ENGINEERING REFERENCE ONLY.
8. UNPLANNED ALTERATION OF STRUCTURAL ROOF OR WALL FRAMING SHALL REQUIRE WRITTEN APPROVAL BY THE EOR AND OWNER; PLANS SHALL BE SO REVISED.
9. FIRE PROTECTION PROCEDURES SHALL BE FOLLOWED IN ACCORDANCE WITH NEC 2023, Art. 690. 9. WORK SHALL BE INSPECTED PRIOR TO COVER BY BUILDING INSPECTOR, AND EOR UPON REQUEST.
- 10.BEST MANAGEMENT PRACTICES SHALL BE EXERCISED AT ALL TIMES TO MAINTAIN A SAFE AND CLEAN JOBSITE IN COORDINATION WITH PROPERTY OWNER AS APPLIES TO PARKING, TRASH REMOVAL, STORAGE, SOUND, UTILITIES AND TIMES OF WORK.
- 11.NO WORK SHALL BE PERFORMED IN RIGHT-OF-WAY OR EASEMENTS WITHOUT WRITTEN PERMISSION FROM THE APPROPRIATE PERMITTING AGENCY AND OWNER.
- 12.ALL MATERIALS NOT LISTED OR SPECIFIED HEREIN SHALL BE OBTAINED THROUGH CONTRACTOR-APPROVED VENDORS, GENERALLY NECESSARY TO COMPLETE TYPICAL SIMILAR CONSTRUCTION AND SHALL CONFORM TO CODE TABLE, INDUSTRY STANDARDS AND POLICIES OF THE PERMITTING AGENCY.
- 13.DETAILS OR SPECIFICATIONS ARE CALLED OUT BY LOCATION, ARRAY, ELEMENT OR AS OTHERWISE APPLIES.
- 14.IN THE EVENT OF WEATHER AND OTHER CIRCUMSTANCES THAT COULD MATERIALLY AFFECT BUILDING CONDITIONS OR INSTALLATION, CONTRACTOR SHALL PERFORM A RE-INSPECTION ALONG WITH OTHER CONTRACTORS AS REQUIRED THEN ADJUST PROJECT SCHEDULE TO INCLUDE RESPECTIVE PLAN REVISIONS.

ROOF FIRE SAFETY NOTES: (NFPA 11.12.2.2)

1. FIRE PROTECTION PROCEDURES SHALL BE FOLLOWED IN ACCORDANCE WITH NEC 2023, A. 690.9. WORK SHALL BE INSPECTED PRIOR TO COVER BY BUILDING INSPECTOR, OR EOR UPON REQUEST.
2. ACCESS POINT ARE LOCATED FOR FIRE DEPT. LADDER(S) CLEAR OF OPENINGS/OBSTRUCTIONS.
3. WORK SHALL BE PERFORMED IN ACCORDANCE WITH ROOF SAFETY RATING (CLASS A). (UL 790 / ASTM E108)

NOTE TO INSTALLER:

1. ALL PANELS SHALL BE ATTACHED TO EXISTING ROOF STRUCTURE USING THE REQUIRED NUMBER OF ATTACHMENTS IN THE PROPER CONFIGURATION AS DEFINED IN THIS PLAN SET.
2. ALL PANELS SHALL BE FULLY OUTSIDE OF ANY ROOF AREAS DEFINED AS "FIRE SETBACK" IN THIS SITE PLAN. FIRE SETBACKS ARE DEFINED BY THE DIMENSIONS IN RED AND ARE CONSIDERED ABSOLUTE.
3. ANY DIMENSIONS NOTED AS "MAX" SHALL BE BE UNDERSTOOD TO BE ABSOLUTE REQUIREMENTS WITH A TOLERANCE OF +0.0"
3. ANY DIMENSIONS NOTED AS "MIN" SHALL BE BE UNDERSTOOD TO BE ABSOLUTE REQUIREMENTS WITH A TOLERANCE OF -0.0"
4. STANDARD DIMENSIONS (NOT INCLUDING FIRE SETBACKS) SHALL BE UNDERSTOOD TO BE REQUIREMENTS WITH A TOLERANCE OF ±2.0"
5. ANY DIMENSIONS NOTED AS "APPROX" SHALL BE UNDERSTOOD TO BE APPROXIMATE IN NATURE AND SHOULD BE USED AS A GUIDE. EXACT PLACEMENT OF THE PANELS RELATIVE TO THESE DIMENSIONS ARE LEFT TO THE INSTALLERS DISCRETION ASSUMING THAT ALL OTHER DEFINED REQUIREMENTS ARE MET.
6. ANY DIMENSIONS IN PARENTHESES () ARE FOR ENGINEERING REFERENCE ONLY AND ARE NOT NEEDED FOR INSTALLATION.
7. IT IS THE CONTRACTOR RESPONSIBILITY TO INSTALL THE SYSTEM AND ITS SUPPORTS AS INDICATED IN THESE PLANS. THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD IF SITE CONDITIONS DIFFER FROM WHAT IS DEPICTED ON PLANS.

ATTACHMENT SYSTEM:

ATTACHMENT SYSTEM AND FLASHING METHOD SHALL BE CONSTRUCTED ACCORDING MANUFACTURER'S INSTALLATION MANUAL AND AS SPECIFIED BY EOR.

NOTE:

ROOF LAYOUT SHOWN MAY BE ADJUSTED IN THE FIELD BY THE INSTALLER TO ACCOUNT FOR ISSUES CAUSED BY ROOF OBSTACLES, TRUSS ALIGNMENT, OR SHADING. SO LONG AS THE MODULES ARE MOUNTED AND SECURED TO THE ROOF. THE LAYOUT MAY BE ALTERED AND ALL ROOF ORIENTATION MAY BE UTILIZED.

SUGGESTED ELECTRICAL EQUIPMENT MOUNTING LOCATION

THE SUGGESTED EQUIPMENT MOUNTING LOCATION MAY BE ADJUSTED AT INSTALLER'S DISCRETION SO LONG AS LOCAL AHJ REQUIREMENTS ARE ADHERED TO



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amardi@mardiengineering.com
(772) 643-3340



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PROJECT NAME:

MICHAEL ARCANGELO RESIDENCE

PROJECT ADDRESS:

603 Whitaker St, Apartment B
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE

DRAWING SCALE:

N.T.S.

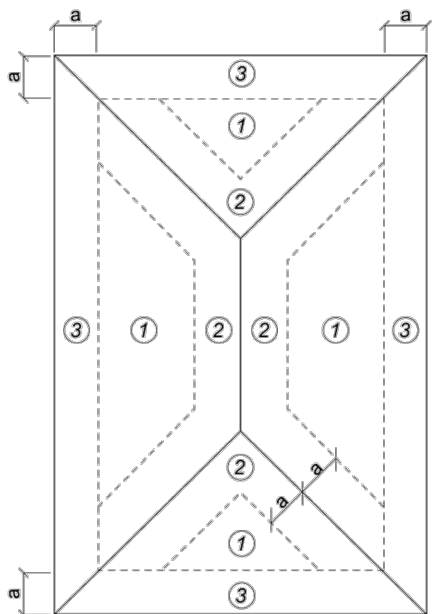
SHEET NAME:

SITE & ELECTRICAL PLAN

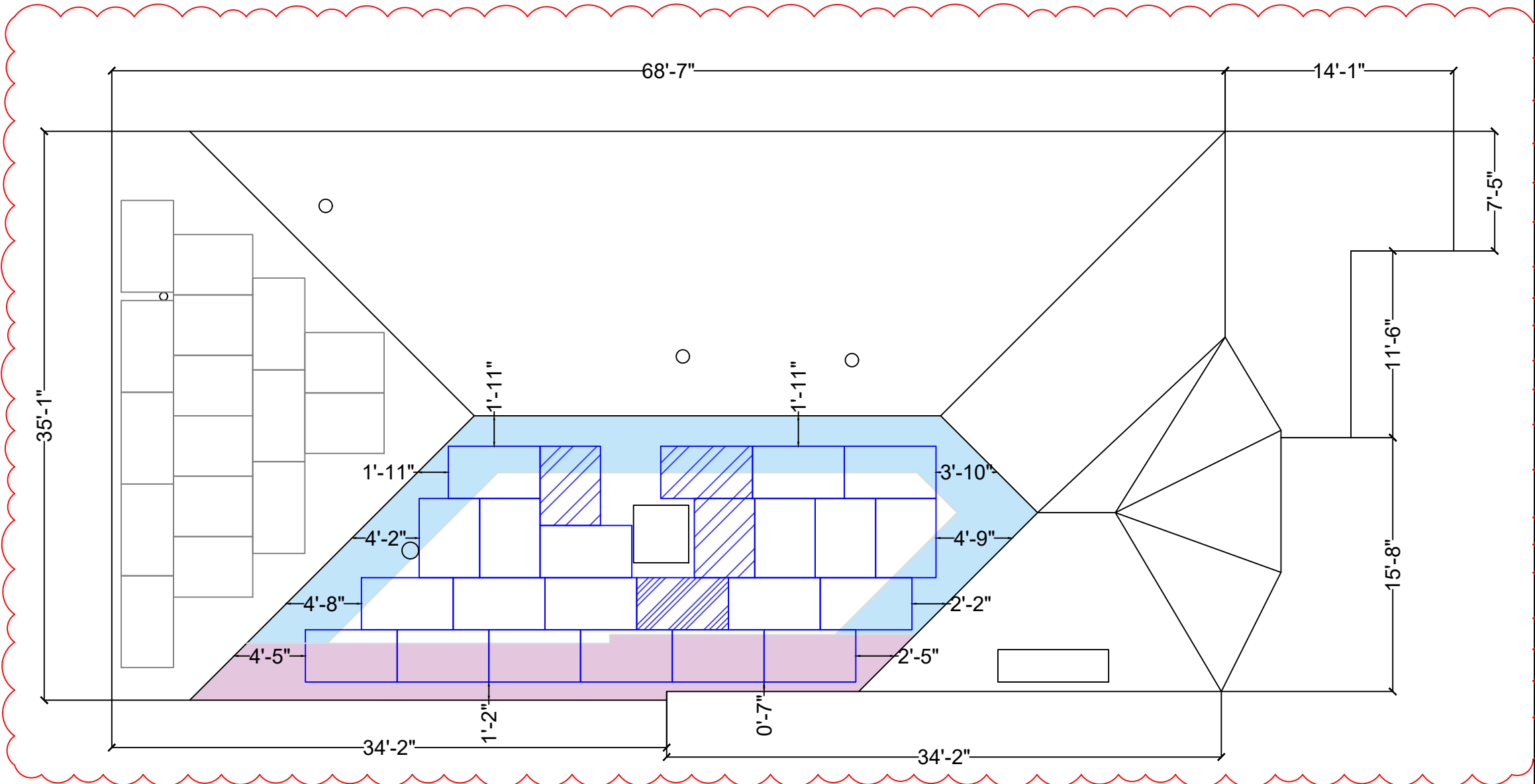
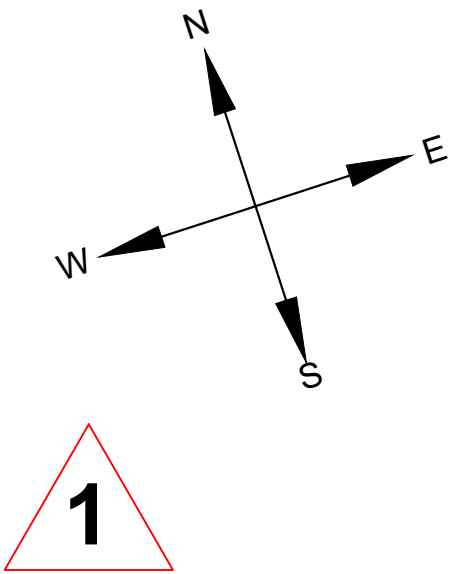
SHEET NUMBER:

S1

Wind Pressures (psf) where Solar Panels are to be installed per ASCE 7-22 Sec 29.4.4 (All wind pressures include a load factor of 0.6)		
	EXPOSED (DOWNWARD/ UPLIFT)	NOT EXPOSED (DOWNWARD/ UPLIFT)
1	5.99/-19.09	5.99/-12.73
2	5.99/-25.83	5.99/-17.22
3	NONE	5.99/-18.12
1_OH	NONE	NONE
2_OH	NONE	NONE
3_OH	NONE	0.00/-28.01
Existing Structure & Limiting Factors		
Roof Type	Hipped	
Roof Material	Shingle	
Sheathing	Plywood	
Framing	Wood Trusses, 24" O.C.	
Fire Rating	Class A	
Roof Slope	7:12	
Mean Roof Height (h) [ft]	±35.116	
Overhang (OH) [ft]	2	
Dead Load [psf]	19.9	
Live Load [psf]	20	
a = Width for Zone 2 and 3 determination (per C&C figure) [ft]	3.508	
h/2 = Width used to determine if exposed [ft]	17.56	
h1 = Distance from roof to lower panel edge: Min (hny,hnp) [ft]	0.29	
h2 = Distance from roof to upper panel edge: Max (hny,hnp) [ft]	0.29	
d1 = limit for adjacent panels [ft]	0.58	
Minimum height above roof edge [ft]	0.58	



PV Module Data		
Chord length [ft]	5.650	
Width [ft]	3.717	
Area [sqft]	21.00	
Thickness [ft]	0.098	
Weight [lbs]	46.70	
Module Dead Load	2.22	
Angle to Roof [degrees °]	0	
Environmental Data		
Design Wind Speed (V)	140	
Elevation Factor(Ke)	1.0	
Topographic factor (Kzt)	1.0	
pressure exposure (Kz)	0.9	
Velocity Pressure (qh)	42.65	
PV Module Loads		
	Downward	Uplift
Module Design Pressure [psf]	50.12	-30.59
Worst Case Pressure [psf]	5.99	-28.01
Worst Case Roof Zone	1 (Exposed)	3_OH (Non-Exposed)
Net Load Pressure [psf]	8.21	-25.79
Margin [psf]	41.91	-4.80
Safety Factor (OK IF OVER 1.0)	6.10	1.19
Total Array Calculations		
Minimum Number of Attachments	74	
Number of Fasteners per Attachment	1	
Total Array Weight [lbs]	1120.80	
Total Array Area [sqft]	503.98	
Total Roof Area [sqft]	2595.42	
Percentage of Total Occupied Roof Area [%]	19.42	
Total Array Uplift [lbs]	-12995.70	
Force per Attachment [lbs]	-175.62	
Force Per Fastener [lbs]	-175.62	
Max Allowed Force Per Fastener [lbs]	370	
Safety Factor (OK if over 1.50)	2.11	



LEGEND	
	ROOF ZONE 1
	ROOF ZONE 2
	ROOF ZONE 3
	EXPOSED MODULE
	MODULE
	MODULE UNDER SEPARATE PERMIT

3.717'	30.59 PSF
21.00 SF	
5.650'	



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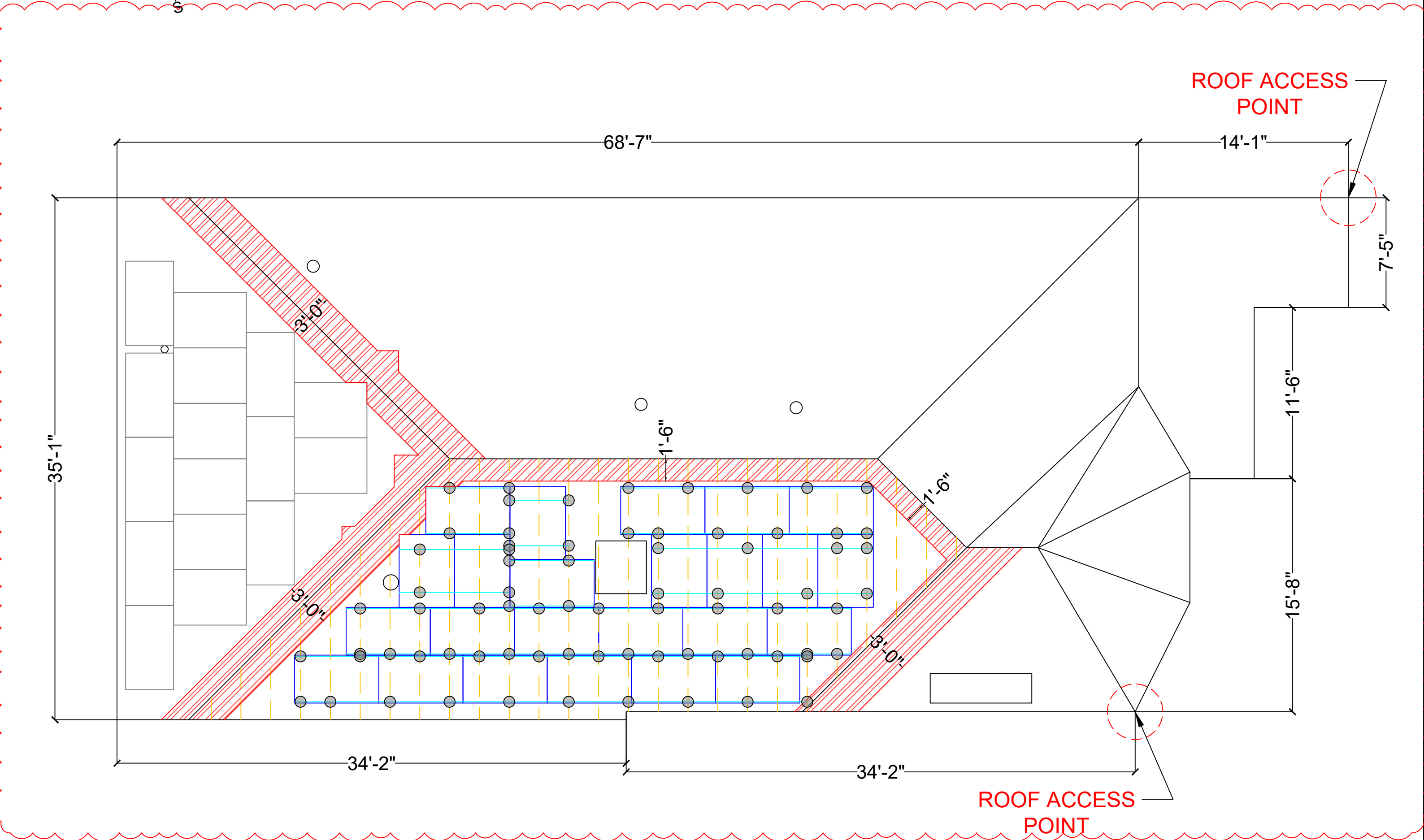
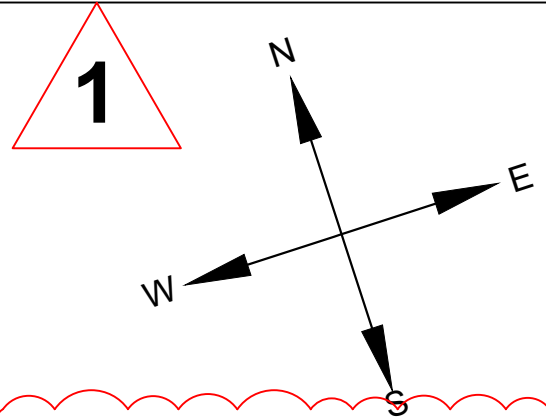
PROJECT NAME:
MICHAEL ARCANGELO
RESIDENCE
PROJECT ADDRESS:
603 Whitaker St, Apartment B
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE PV MODULE LOADS & CALCULATIONS

DRAWING SCALE:
N.T.S.
SHEET NAME:
WIND CALCULATIONS &
ARRAY LAYOUT
SHEET NUMBER:
S2

BILL OF MATERIALS	
Structural	
Product	Quantity
SUNMODO SMR100 Rail, 165"	17
SUNMODO SMR100 BONDING RAIL SPLICE	12
SUNMODO NANOMOUNT	74
SUNMODO L-FOOT ADAPTOR	74
SUNMODO END CLAMP	24
SUNMODO MID CLAMP	40
SUNMODO GROUND LUG	8
SUNMODO MLPE MOUNT	9
QCELL_Q.TRON BLK M-G2+ 430 430W MODULES	24
M-1 SEALANT	11

Electrical	
TESLA POWERWALL 3	1
TESLA ENERGY GATEWAY	1
TESLA POWERWALL III EXPANSION UNIT	1
TWO-POLE 60A BREAKER	1
60A NON FUSED AC FUSED DISCONNECT	1
TESLA MCI-2	9



SYSTEM SUMMARY					
ROOF PLANE	NUMBER OF MODULES	ARRAY TILT (DEGREES)	AZIMUTH ANGLE (DEGREES)	ROOF SLOPE	ROOF SLOPE (DEGREES)
1	24	0	197	7:12	30.26

NOTE:

SINCE PHOTOVOLTAIC SYSTEM WILL NOT OCCUPY MORE THAN 33% OF THE ROOF (SEE SHEET S2 FOR CALCULATION), RIDGE SETBACKS SHALL BE PERMITTED TO BE 18" (R324.6.2).

NOTE:

MAX CANTILEVER: 40% OF ALLOWABLE SPAN

MAX ALLOWABLE SPAN FOR PORTRAIT MODULES: 72"

MAX ALLOWABLE SPAN FOR LANDSCAPE MODULES: 48"

LEGEND

- FIRE SETBACK
- RAILS
- TRUSS
- MCI-2
- ATTACHMENT
- ROOF PLANE #
- MODULE
- MODULE UNDER SEPARATE PERMIT



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Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE, LAYOUT, BOM & SYSTEM SUMMARY TABLE

DRAWING SCALE:

N.T.S.

SHEET NAME:

ATTACHMENT DETAIL & ARRAY LAYOUT

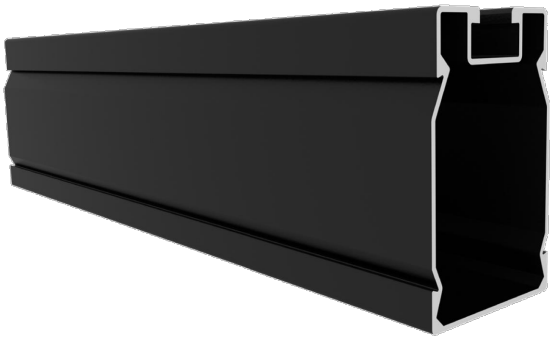
SHEET NUMBER:

S3

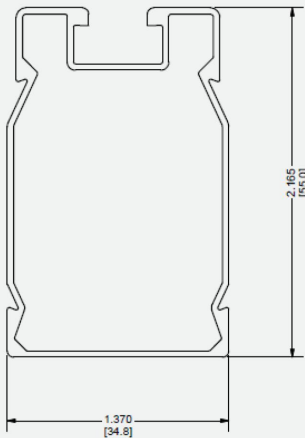
RACKING & MOUNTING SPECIFICATIONS



SMR100 Rail



Cut Sheet



SMR100 Rail

Mechanical Properties

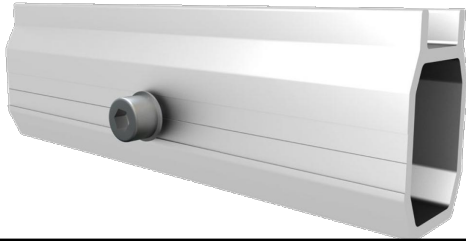
Material: 6005-T5 Aluminum
Weight: 0.4126 lbs/ft (0.614 kg/m)
Ultimate Tensile Strength: 37.7 ksi (260 MPa)
Yield Strength: 34.8 ksi (240 MPa)

Section Properties

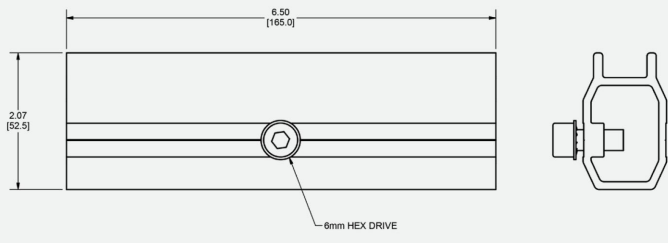
Sx: 0.196 in³ (3.21 cm³)
Sy: 0.146 in³ (2.39 cm³)
Area (X-section): 0.352 in² (2.27 cm²)



SMR Rail Splices



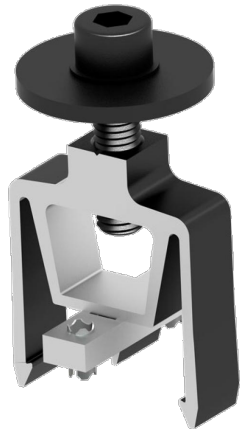
Cut Sheet



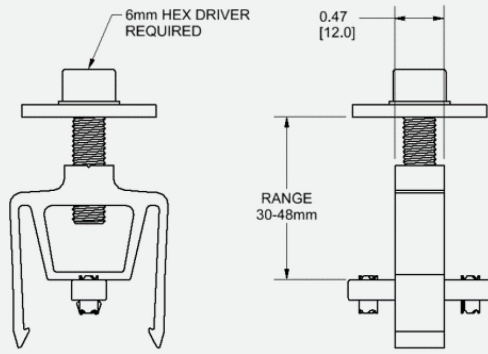
SMR100 Bonding Rail Splice



Mid Clamp



Cut Sheet



Pop-On Bonding Mid Clamp

6mm HEX DRIVER REQUIRED

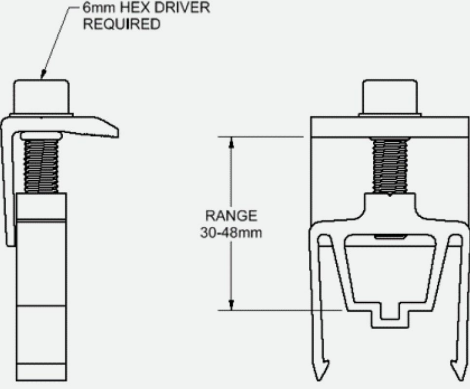
0.47 [12.0]

RANGE 30-48mm

End Clamp



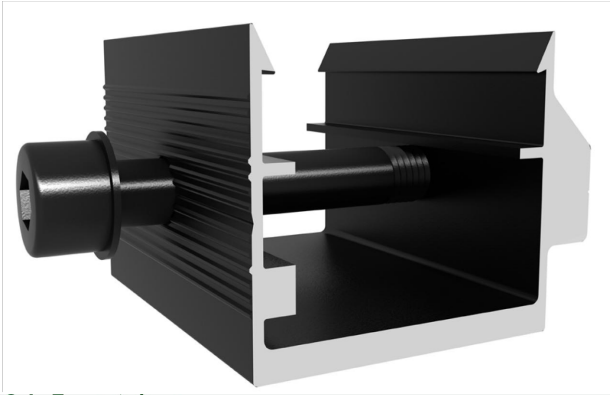
Pop-On End Clamp



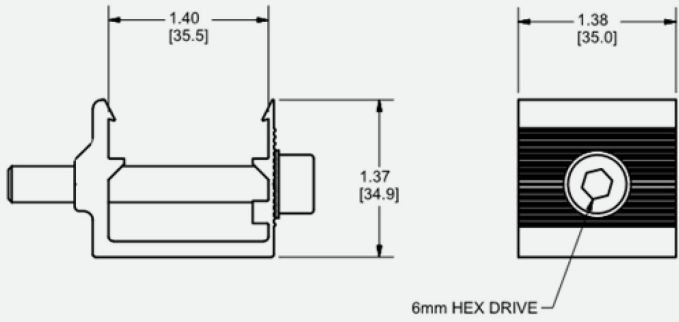
6mm HEX DRIVER REQUIRED

RANGE 30-48mm

L-Foot Adaptors



SMR100 L-Foot Adaptor



1.40 [35.5]

1.38 [35.0]

1.37 [34.9]

6mm HEX DRIVE



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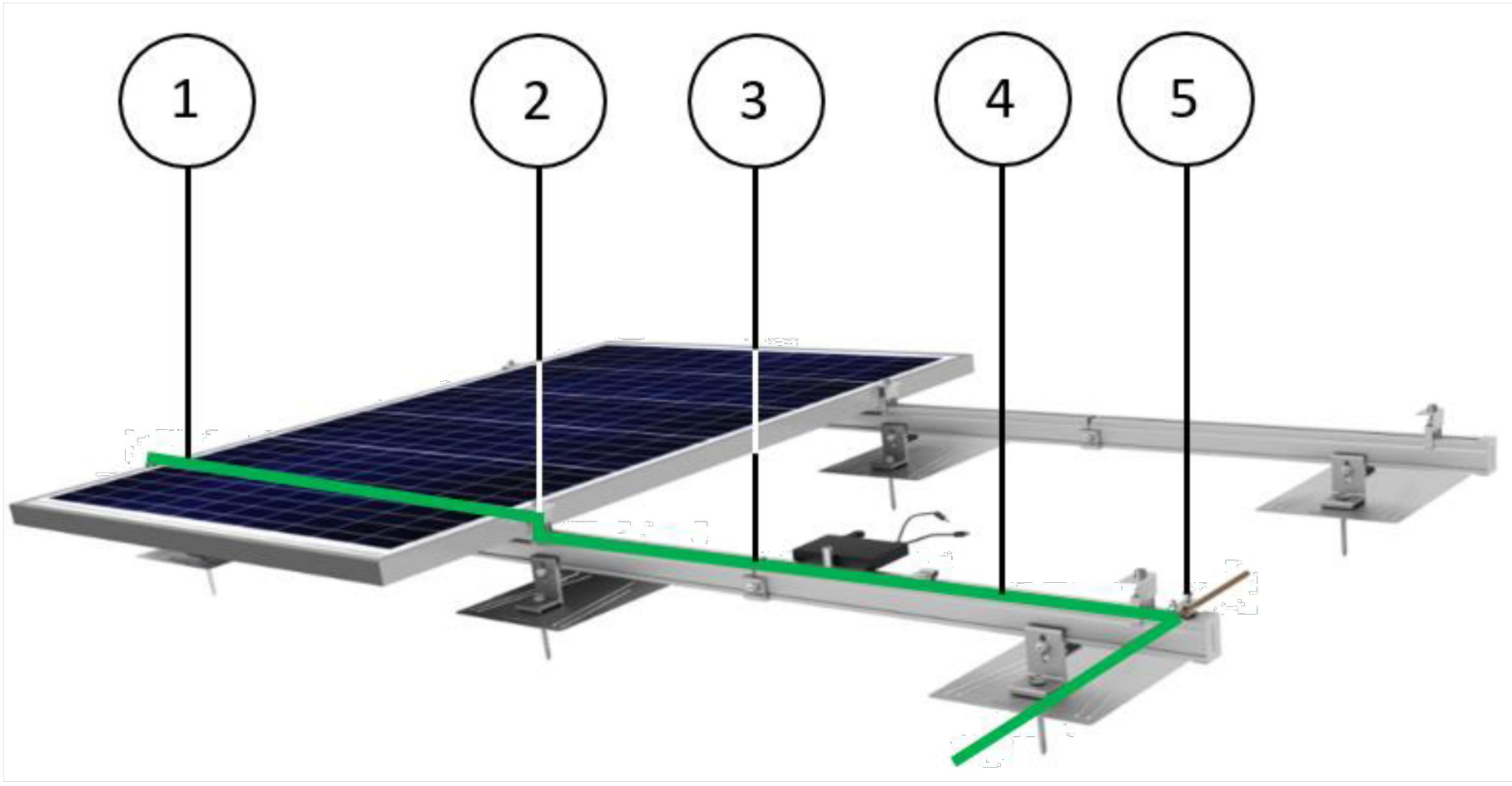
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GROUNDING DETAIL

SMR Pitched Roof System



Fault Current Path Diagram



Items are listed in the fault current path in order from the PV Panel to the Grounding Lug:

- 1. PV Panel
- 2. Mid Clamp Kit
- 3. SMR Rail Splice
- 4. SMR Rail
- 5. Ground Lug

Fault Current Path

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Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:
N.T.S.

SHEET NAME:
MOUNTING & FLASHING
DETAIL

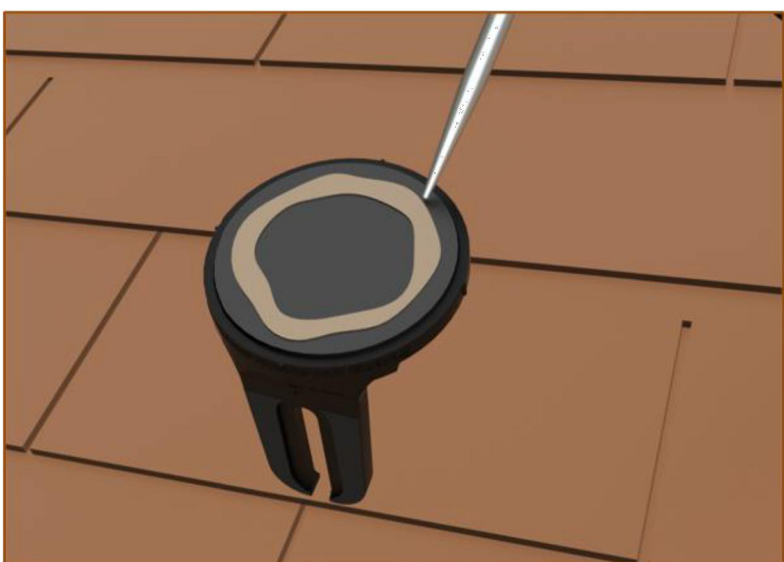
SHEET NUMBER:
S4

RAFTER ATTACHED INSTALLATION DETAIL

Nano Rafter Mount Sealant Application

Apply a circular bead of composite roof sealant around the bottom of the NanoMount.

Apply additional sealant to the roof if needed to seal gaps between shingles or to smooth uneven surfaces.



Roof Attachment

Locate the center of the rafter in the desired roof location and drill a 7/32" [6mm] pilot hole. Clean sawdust, and fill hole with sealant, such as Chem-link M1 for wood and composite roofs.

Use a 13mm hex socket to install the 5/16" [M8] Lag Screw.

Do not over tighten.



Rail Attachment

Loosely install the L-Foot Adaptor to the L-Foot using the M8 Bolt provided.

Install the Rail onto the L-Foot and L-Foot Adaptor. Confirm that the hooks on the L-Foot Adaptor are fully engaged with the hooks on the side of the Rail.

Adjust the Rail to the desired height and then secure the Rail to the L-Foot Adaptor using the M8 Bolt; use a 13mm hex socket and torque to 13Nm (10 ft-lbs).



FASTENER NOTES:

FASTENER TYPE: (1) 5/16" S.S. LAG SCREW

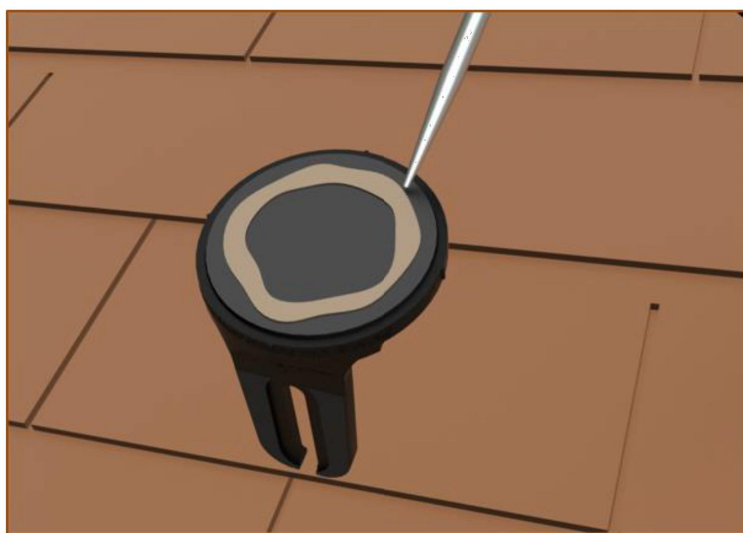
MINIMUM EMBEDMENT: 2.5"

DECK ATTACHED INSTALLATION DETAIL

Nano Deck Mount Sealant Application

Apply a circular bead of composite roof sealant around the bottom of the NanoMount.

Apply additional sealant to the roof if needed to seal gaps between shingles or to smooth uneven surfaces.



Roof Attachment

Locate the desired roof location and install the 4X Self-Tapping Screws with Sealing Washers.

Use a 13mm hex socket to install the Self-Tapping Wood Screws.

Do not over tighten.



Rail Attachment

Loosely install the L-Foot Adaptor to the L-Foot using the M8 Bolt provided.

Install the Rail onto the L-Foot and L-Foot Adaptor. Confirm that the hooks on the L-Foot Adaptor are fully engaged with the hooks on the side of the Rail.

Adjust the Rail to the desired height and then secure the Rail to the L-Foot Adaptor using the M8 Bolt; use a 13mm hex socket and torque to 13Nm (10 ft-lbs).



ATTACHMENT NOTES:

DECK ATTACHMENTS SHALL ONLY BE PLACED MAX. 24" APART



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Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

MOUNTING & FLASHING DETAIL

SHEET NUMBER:

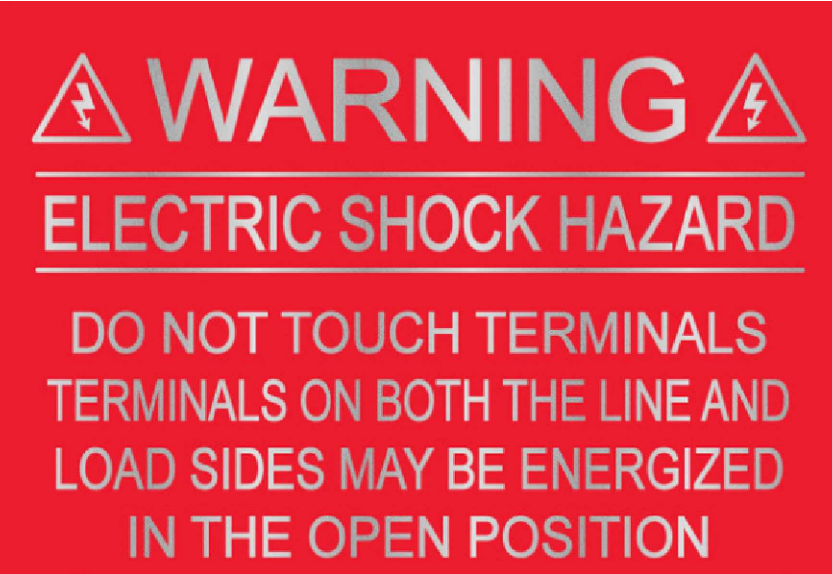
S5



NEC 690.13(B) label is required at each PV system disconnecting means. This will include combiner boxes, AC/DC switches & AC Disconnects.



NEC 690.31(D)(2) label is required at all areas where PV system conductors are enclosed including junction boxes, raceways, conduit bodies, pull boxes, etc.



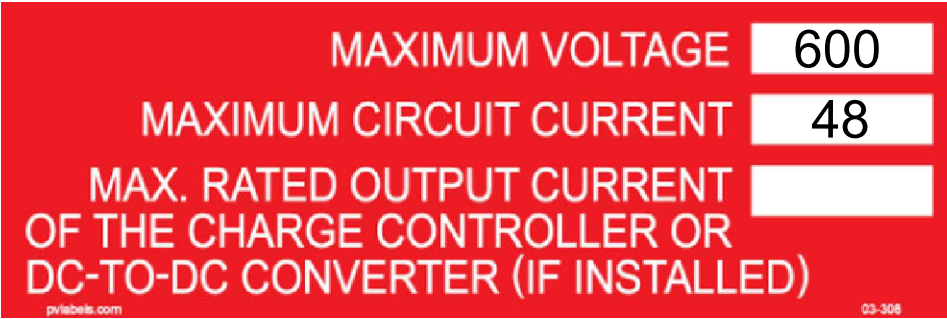
NEC 690.13(B) label is an optional addition to the previous label on systems where the line and load sides of the disconnect may be energized. This label is not required but “shall be permitted” by the NEC.



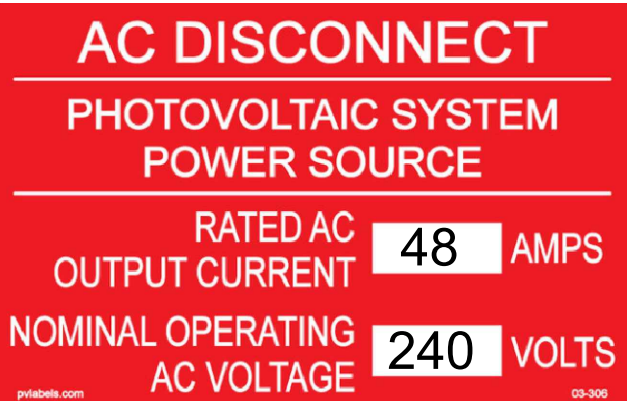
NEC 690.56(C)(2) label is required at the rapid shut down switch for the system. Typically, that is going to be the AC disconnect.



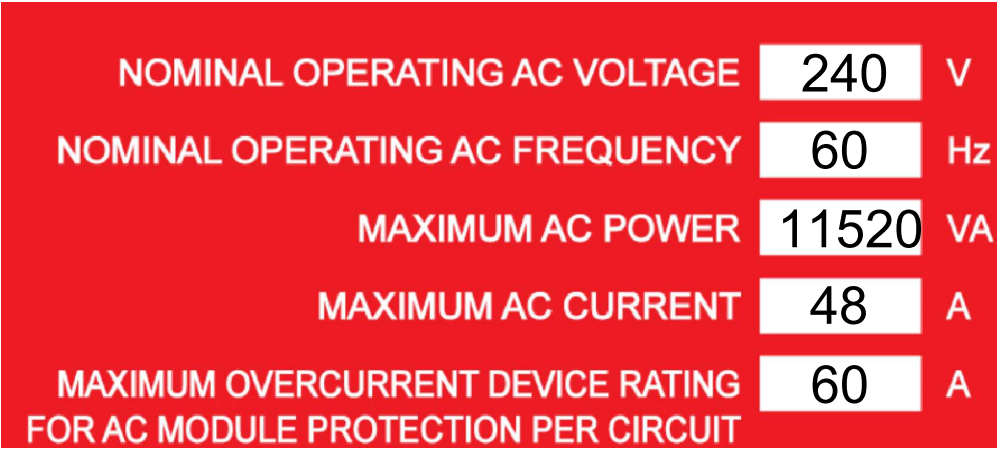
NEC 705.12(C) label is required at the main service equipment.



NEC 690.54 label is required at the point of interconnection disconnecting means, i.e. the AC disconnect.



NEC 690.54 label is required at the AC disconnecting means



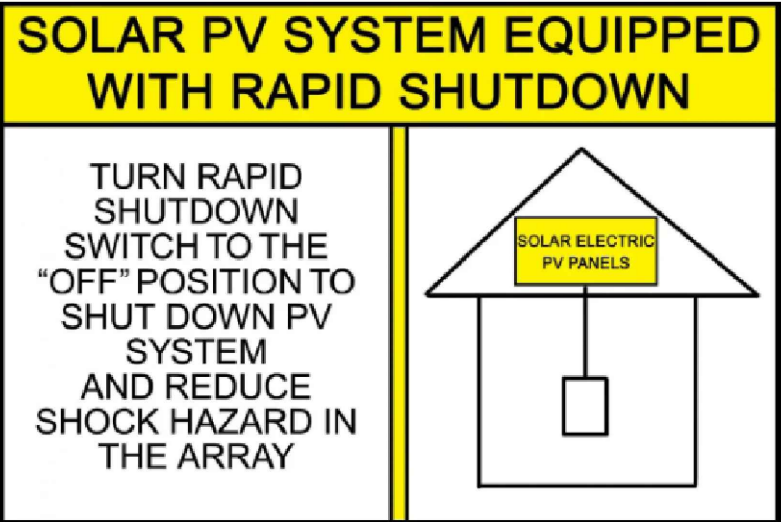
NEC 690.54 label is required at the AC disconnecting means



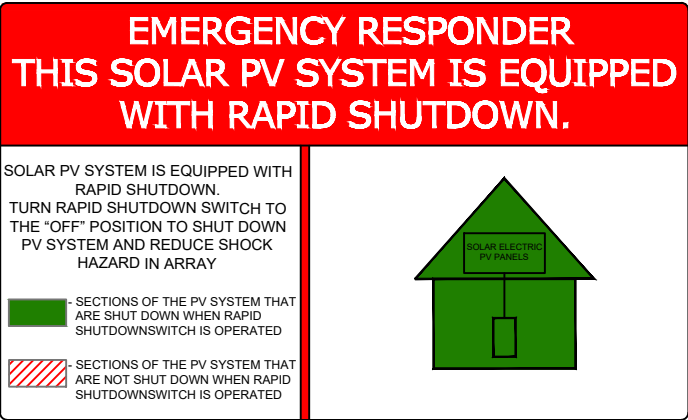
NEC 690.56(B) or NEC 705.10 label is required at every power source disconnecting means denoting location(s) of other power source(s) disconnecting means.



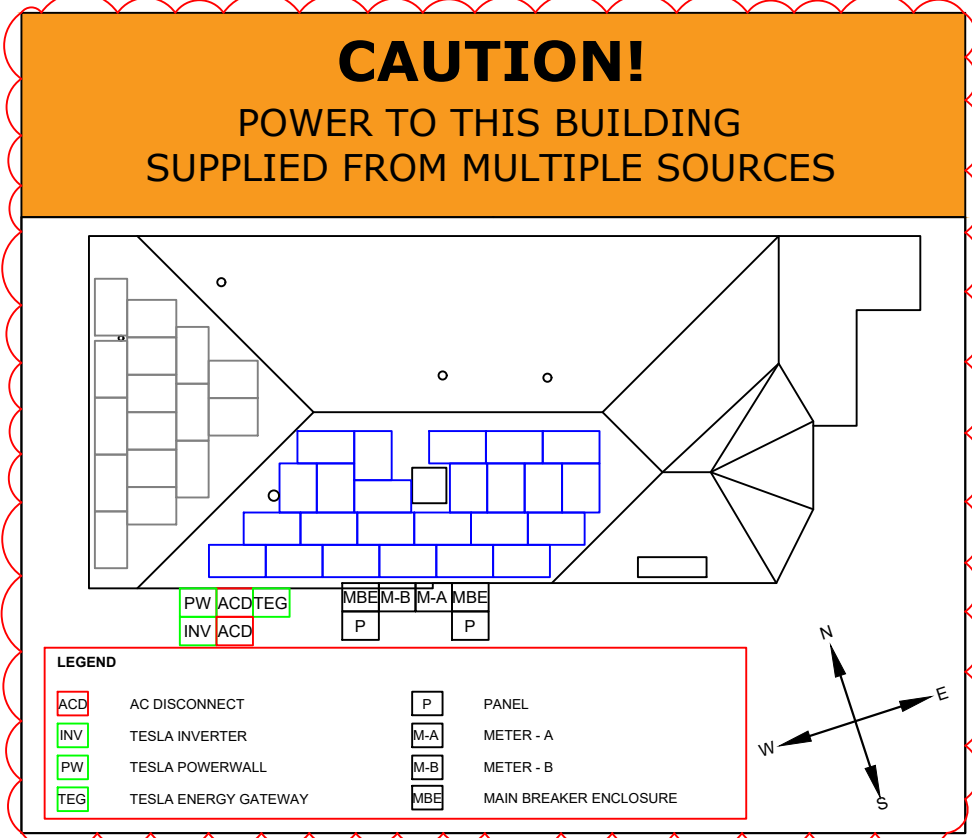
NEC 705.12(C) label is required at the main service equipment.



NEC 690.56(C) label is required at the service disconnecting means of the property.



NFPA 1.11.12.2.1.1 LABEL IS REQUIRED AT AC DISCONNECTING MEANS



705.10 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")



NFPA - 1, 11.12.2.1.5:
THIS LABEL IS REQUIRED AT MAIN DISCONNECT



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Reviewed by:	AKM
7/10/2026	REVISION HISTORY UPDATED MODULE & LAYOUT

DRAWING SCALE:

N.T.S.

SHEET NAME:

SOLAR PV LABELS

SHEET NUMBER:

E3

Q.TRON BLK M-G2+ SERIES

420-440Wp | 108Cells
22.5% Maximum Module Efficiency
Domestic Content Option Available

MODEL Q.TRON BLK M-G2+
Q.TRON BLK M-G2.C+ Q.TRON BLK M-G2.D+
Q.TRON BLK M-G2.H+



Includes Domestic Content

Q.TRON BLK M-G2Y+ solar modules ("Y" can be "C, D, H") contain U.S. manufactured components which can contribute to qualifying for the 10% domestic content bonus to applicable tax credits.¹



High performance Qcells N-type solar cells

QANTUM NEO Technology with optimized module layout boosts module efficiency up to 22.5%.



A reliable investment

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



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology³, Hot-Spot Protect.



Extreme weather rating

High-tech aluminum alloy frame, certified for high snow (8100 Pa) and wind loads (3600 Pa).



Innovative all-weather technology

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



Far beyond the standard

Qcells' comprehensive quality program ensures high long-term yields and the reliability of your solar system.

¹ This statement should not be relied on as tax advice and is subject to change based on changes made to applicable law and/or implementing rules, regulations or guidance. Please consult a qualified tax professional for specific advice.

² See data sheet on rear for further information.

³ APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96h)

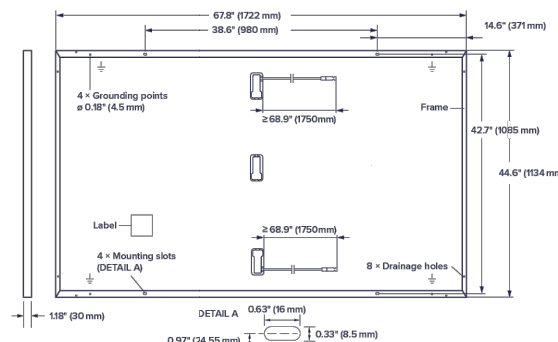
The ideal solution for:



Q.TRON BLK M-G2+ SERIES

Mechanical Specification

Format	67.8 in × 44.6 in × 1.8 in (including frame) (1722 mm × 1134 mm × 30 mm)
Weight	46.7 lbs (21.2 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 18 monocrystalline QANTUM NEO solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), Protection class IP68, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 68.9 in (1750 mm), (-) ≥ 68.9 in (1750 mm)
Connector	Stäubli MC4; IP68



Electrical Characteristics

Power Class		420	425	430	435	440	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W/-0 W)							
Minimum	Power at MPP ¹	P _{MPP} [W]	420	425	430	435	440
	Short Circuit Current ¹	I _{SC} [A]	13.58	13.66	13.74	13.82	13.90
	Open Circuit Voltage ¹	V _{OC} [V]	38.75	39.03	39.32	39.60	39.88
	Current at MPP	I _{MPP} [A]	12.91	12.98	13.05	13.13	13.20
	Voltage at MPP	V _{MPP} [V]	32.54	32.74	32.94	33.14	33.33
	Efficiency ¹	η [%]	≥ 21.5	≥ 21.8	≥ 22.0	≥ 22.3	≥ 22.5

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²							
Minimum	Power at MPP	P _{MPP} [W]	318.2	322.0	325.8	329.5	333.3
	Short Circuit Current	I _{SC} [A]	10.94	11.00	11.07	11.14	11.20
	Open Circuit Voltage	V _{OC} [V]	36.77	37.04	37.31	37.58	37.84
	Current at MPP	I _{MPP} [A]	10.15	10.21	10.27	10.33	10.38
	Voltage at MPP	V _{MPP} [V]	31.33	31.53	31.72	31.92	32.11

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

Qcells Performance Warranty



¹ Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2022)

Temperature Coefficients	α	β
Temperature Coefficient of I _{sc}	α [%/K]	+0.04
Temperature Coefficient of P _{MPP}	γ [%/K]	-0.29
Temperature Coefficient of V _{oc}	β [%/K]	-0.24
Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3 °C)

Properties for System Design

Maximum System Voltage	V _{sys} [V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	25	Fire Rating based on ANSI/UL 61730	C/TYP 2
Max. Design Load, Push/Pull ³	[lbs/ft ²]	113 (5400 Pa)/50 (2400 Pa)	Permitted Module Temperature on Continuous Duty, (T _{50 max})	-40°F up to +158°F (-40°C up to +70°C)
Max. Test Load, Push/Pull ³	[lbs/ft ²]	169 (8100 Pa)/75 (3600 Pa)		

³ See Installation Manual

Qualifications and Certificates

UL61730-1 & UL61730-2,
CE-compliant, IEC 61215:2021,
IEC 61730:2023,



¹ Contact your Qcells Sales Representative for details regarding the module's eligibility to be Buy American Act (BAA) compliant.

Qcells pursues minimizing paper output in consideration of the global environment.

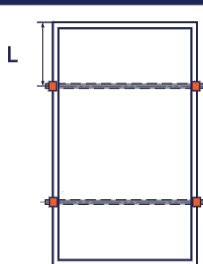
Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product.
Hanwha Q CELLS America Inc. 300 Spectrum Center Drive, Suite 500, Irvine, CA 92618, USA | TEL +1 (949) 748-5996 | EMAIL: na.support@qcells.com | WEB: www.qcells.com/us



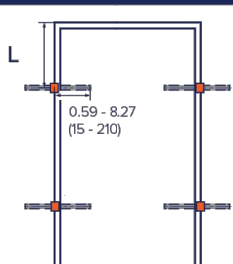
4 CLAMPS ON LONG SIDE &
2 CONTINUOUS RAILS PARALLEL TO SHORT SIDE

4 CLAMPS ON LONG SIDE (SHORT RAIL ALLOWED)

CL1a



CL1b



POSITION OF CLAMPS* [in]	TEST LOAD PUSH/PULL [Pa]	DESIGN LOAD PUSH/PULL [Pa]
0.79 - 11.8 (20 - 300 mm)	2400/2400	1600/1600
5.91 - 11.8 (150 - 300 mm)	5400/3600	3600/2400

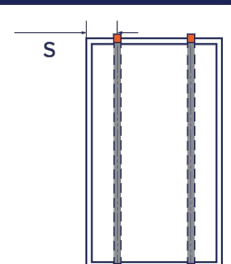
POSITION OF CLAMPS* [in]	TEST LOAD PUSH/PULL [Pa]	DESIGN LOAD PUSH/PULL [Pa]
7.87 - 11.8 (200 - 300 mm)	2600/3600	1730/2400
0.79 - 11.8 (20 - 300 mm)	1600/2400	1060/1600

- CL1a → Ensure that module frame is fixed directly on the rail of the substructure (no spacer allowed between the module and substructure).
- CL1b → Short mounting rails are permissible, if they overlap with the module less than 8.27 in (210 mm). Maintain a minimum distance (clearance) of ≥ 1.38 in (35 mm) between frame bottom edge and roof top or ballast.
→ Minimum support depth of 0.59 in (15 mm) is required on the back side of the module.

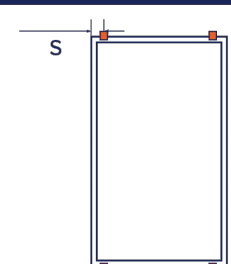
4 CLAMPS ON SHORT SIDE &
2 CONTINUOUS RAILS PARALLEL TO LONG SIDE

4 CLAMPS ON SHOR SIDE

CL2a



CL2b



POSITION OF CLAMPS* [in]	TEST LOAD PUSH/PULL [Pa]	DESIGN LOAD PUSH/PULL [Pa]
0.79 - 5.12** (20 - 130 mm)**	3600/2200	2400/1465
0.79 - 13.8** (20 - 350 mm)**	3600/1800	2400/1200

POSITION OF CLAMPS* [in]	TEST LOAD PUSH/PULL [Pa]	DESIGN LOAD PUSH/PULL [Pa]
0.79 - 7.87 (20 - 200 mm)	2200/2200	1465/1465

- CL2a → Ensure that module frame is fixed directly on the rail of the substructure (no spacer allowed between the module and substructure).
- CL2b → Minimum support depth of 0.59 in (15 mm) is required on the back side of the module.
→ Short mounting rails are permissible, if they overlap with the module less than 4.33 in (110 mm). Maintain a minimum distance (clearance) of ≥ 2.76 in (70 mm) between frame bottom edge and roof top or ballast



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MICHAEL ARCANGELO
RESIDENCE

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Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	MAA
Reviewed by:	AKM
REVISION HISTORY	
7/10/2026	UPDATED MODULE

DRAWING SCALE:

N.T.S.

SHEET NAME:

SOLAR MODULE
SPECIFICATIONS

SHEET NUMBER:

APP.1

Powerwall 3 Technical Specifications

System Technical Specifications

Model Number	1707000-xx-y			
Nominal Grid Voltage (Input & Output)	120/240 VAC			
Grid Type	Split phase			
Frequency	60 Hz			
Nominal Battery Energy	13.5 kWh AC ¹			
Nominal Output Power (AC)	5.8 kW	7.6 kW	10 kW	11.5 kW
Maximum Apparent Power	5,800 VA	7,600 VA	10,000 VA	11,500 VA
Maximum Continuous Current	24 A	31.7 A	41.7 A	48 A
Overcurrent Protection Device ²	30 A	40 A	60 A	60 A
Maximum Continuous Charge Current / Power (Powerwall 3 only)	20.8 A AC / 5 kW			
Maximum Continuous Charge Current / Power (Powerwall 3 with up to (3) Expansion units)	33.3 A AC / 8 kW			
Output Power Factor Rating	0 - 1 (Grid Code configurable)			
Maximum Output Fault Current (1 s)	160 A			
Maximum Short-Circuit Current Rating	10 kA			
Load Start Capability	185 LRA			
Solar to Battery to Home/Grid Efficiency	89% ^{1,3}			
Solar to Home/Grid Efficiency	97.5% ⁴			
Power Scalability	Up to 4 Powerwall 3 units supported			
Energy Scalability	Up to 3 Expansion units (for a maximum total of 7 units)			
Supported Islanding Devices	Gateway 3, Backup Switch, Backup Gateway 2			
Connectivity	Wi-Fi (2.4 and 5 GHz), Ethernet, Cellular (LTE/4G ⁵)			
Hardware Interface	Dry contact relay, Rapid Shutdown (RSD) certified switch and 2-pin connector, RS-485 for meters			
AC Metering	Revenue Grade (+/- 0.5%, ANSI C12.20)			
Protections	Integrated arc fault circuit interrupter (AFCI), Isolation Monitor Interrupter (IMI), PV Rapid Shutdown (RSD) using Tesla Mid-Circuit Interrupters			
Customer Interface	Tesla Mobile App			
Warranty	10 years			

¹ Values provided for 25°C (77°F), at beginning of life. 3.3 kW charge/discharge power.

² See [Powerwall 3 Installation Manual](#) for fuse requirements if using fuse for overcurrent protection.

³ Typical solar shifting use case.

⁴ Tested using CEC weighted efficiency methodology.

⁵ The customer is expected to provide internet connectivity for Powerwall 3; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

Powerwall 3 Technical Specifications

Solar Technical Specifications

Maximum Solar STC Input	20 kW
Withstand Voltage	600 V DC
PV DC Input Voltage Range	60 — 550 V DC
PV DC MPPT Voltage Range	60 — 480 V DC
MPPTs	6
Maximum Current per MPPT (I _{mp})	13 A ⁶
Maximum Short Circuit Current per MPPT (I _{sc})	15 A ⁶

⁶ Where the DC input current exceeds the MPPT rating, a jumper can be used to combine two MPPTs into a single input to intake DC current up to 26 A I_{mp} / 30 A I_{sc}.

Environmental Specifications

Operating Temperature	–20°C to 50°C (–4°F to 122°F) ⁷
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	–20°C to 30°C (–4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	NEMA 3R
Ingress Rating	IP67 (Battery & Power Electronics) IP55 (Wiring Compartment)
Pollution Rating	PD3
Operating Noise @ 1 m	< 50 db(A) typical < 62 db(A) maximum

⁷ Performance may be de-rated at operating temperatures above 40°C (104°F).

Compliance Information

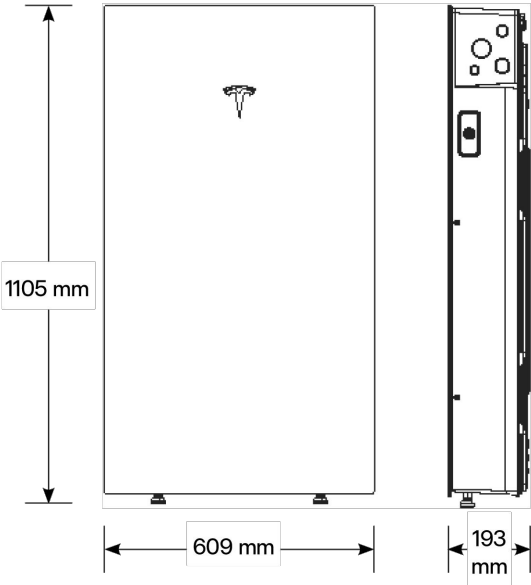
Certifications	UL 1741, UL 9540, UL 9540A, UL 3741, UL 1741 PCS, UL 1741 SA, UL 1741 SB, UL 1973, UL 1699B, UL 1998, CSA C22.2 No. 0.8, CSA C22.2 No. 107.1, CSA C22.2 No. 330, CSA 22.3 No. 9, IEEE 1547, IEEE 1547A, IEEE 1547.1, CA Rule No.21
Grid Connection	United States and Canada
Emissions	FCC Part 15 Class B, ICES 003
Environmental	RoHS Directive 2011/65/EU
Seismic	AC156, IEEE 693-2005 (high)
Fire Testing	Meets the unit level performance criteria of UL 9540A

Powerwall 3 Technical Specifications

Mechanical Specifications

Dimensions	1105 x 609 x 193 mm (43.5 x 24 x 7.6 in) ⁸
Total Weight of Installed Unit	132 kg (291.2 lb)
Weight of Powerwall 3	124 kg (272.5 lb)
Weight of Glass Front Cover	6.5 kg (14.5 lb)
Weight of Wall Bracket	1.9 kg (4.2 lb)
Mounting Options	Floor or wall mount

⁸ These dimensions include the glass front cover being installed on Powerwall 3.



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Reviewed by:	AKM
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N.T.S.

Sheet Name:

TESLA POWERWALL SPECIFICATION

SHEET NUMBER:

APP.2

Powerwall 3 Expansion Technical Specifications

Battery Technical Specifications	Model Number	1807000-xx-y
	Nominal Battery Energy	13.5 kWh
	Voltage Range	52 – 92 V DC ⁹

⁹ Powerwall 3 Expansion units are connected in parallel and are not field serviceable.

Environmental Specifications	Operating Temperature	–20°C to 50°C (–4°F to 122°F) ¹⁰
	Operating Humidity (RH)	Up to 100%, condensing
	Storage Temperature	–20°C to 30°C (–4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial
	Maximum Elevation	3000 m (9843 ft)
	Environment	Indoor and outdoor rated
	Enclosure Rating	NEMA 3R
	Ingress Rating	IP67
	Pollution Rating	PD3

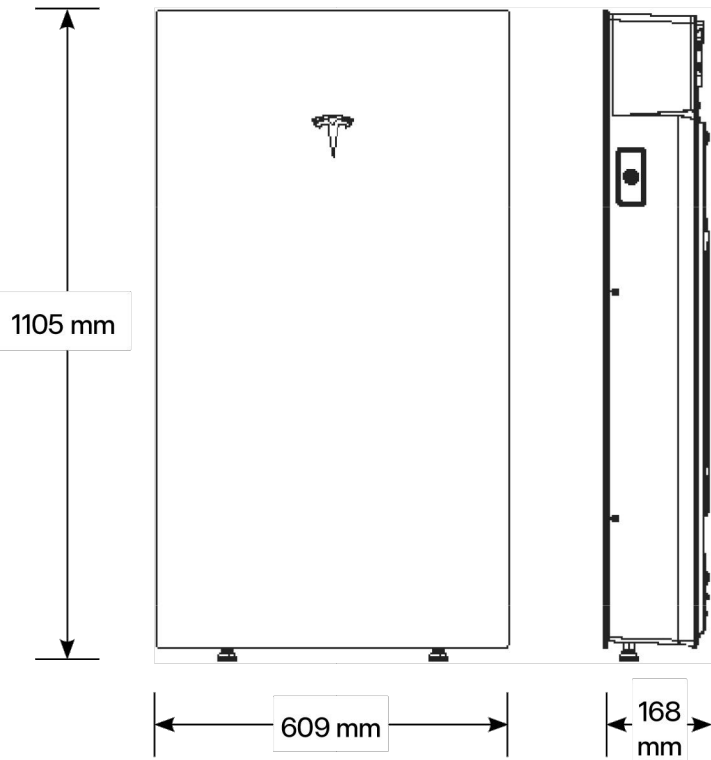
¹⁰ Performance may be de-rated at operating temperatures above 40°C (104°F).

Compliance Information	Certifications	UL 1973, UL 9540
------------------------	----------------	------------------

Mechanical Specifications	Dimensions	1105 x 609 x 168 mm (43.5 x 24 x 6.6 in) ¹¹
	Total Weight of Wall-Mounted Expansion Unit	118.5 kg (261.2 lb)
	Weight of Expansion Unit	110 kg (242.5 lb)
	Weight of Glass Front Cover	6.5 kg (14.5 lb)
	Weight of Wall Bracket	1.9 kg (4.2 lb)
	Weight of Expansion Accessories	0.7 kg (1.5 lb)
	Mounting Options	Floor or wall mount
	Stacking Capability (Floor Mount Only)	Up to (3) Expansion units behind a Powerwall 3
	Compatibility with Other Systems	Only compatible with Powerwall 3
	Connection to Powerwall 3 or Expansions	Powerwall 3 Expansion harness ¹²

¹¹ These dimensions include the glass front cover being installed on Powerwall 3 Expansion.

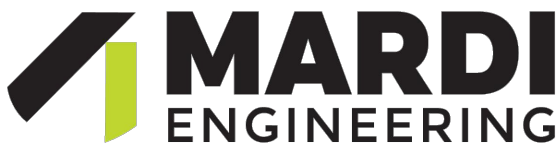
¹² The Powerwall 3 Expansion harness is a listed component of the UL 9540 certification.



Gateway 3

—
Tesla Gateway 3 controls connection to the grid in a Powerwall system, automatically detecting outages and providing seamless transition to backup power. It provides energy monitoring that is used by Powerwall for solar self-consumption, time-based control, and backup operation.

Performance Specifications	Model Number	1841000-x1-y	AC Meter	+/- 0.5%
	Nominal Grid Voltage	120/240 V AC	Communication	CAN
	Grid Configuration	Split phase	User Interface	Tesla App
	Grid Frequency	60 Hz	Backup Transition	Automatic disconnect for seamless backup
	Continuous Current Rating	200 A	Overcurrent Protection Device	100–200 A Service entrance rated Eaton CSR, BWH, or BW, or Square D QOM breakers
	Maximum Supply Short Circuit Current	22 kA with Square D or Eaton main breaker 25 kA with Eaton main breaker ¹⁵	Internal Panelboard	200 A 8-space/16 circuit breakers Eaton BR, Siemens QP, or Square D HOM breakers rated to 10–125A
	IEC Protective Class	Class I	Warranty	10 years
		¹⁵ Only Eaton CSR or BWH main breakers are 25 kA rated.		
Environmental Specifications	Operating Temperature	–20°C to 50°C (–4°F to 122°F)		
	Operating Humidity (RH)	Up to 100%, condensing		
	Maximum Elevation	3000 m (9843 ft)		
	Environment	Indoor and outdoor rated		
	Enclosure Type	NEMA 3R		
Compliance Information	Certifications	UL 67, UL 869A, UL 916, UL 1741 PCS, CSA 22.2 107.1, CSA 22.2 29		
	Emissions	FCC Part 15, Class B, ICES 003		
Mechanical Specifications	Dimensions	660 x 411 x 149 mm (26 x 16 x 6 in)		
	Weight	16.3 kg (36 lb)		
	Mounting options	Wall mount		



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Reviewed by:	AKM
REVISION HISTORY	

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N.T.S.

SHEET NAME:
TESLA GATEWAY & EXPANSION UNIT SPECIFICATION

SHEET NUMBER:
APP.3

Solar Shutdown Device Technical Specifications

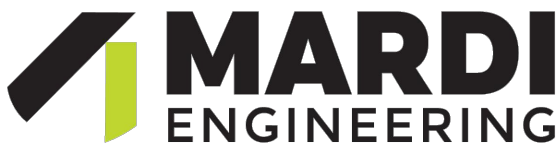
The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with Powerwall 3, solar array shutdown is initiated by any loss of AC power.

Electrical Specifications	Model	MCI-1	MCI-2
	Nominal Input DC Current Rating (I_{MP})	12 A	13 A
	Maximum Input Short Circuit Current (I_{SC})	19 A	17 A
	Maximum System Voltage (PVHCS)	600 V DC	1000 V DC ⁷
⁷ Maximum System Voltage is limited by Powerwall to 600 V DC.			
RSD Module Performance	Maximum Number of Devices per String	5	5
	Control	Power Line Excitation	Power Line Excitation
	Passive State	Normally Open	Normally Open
	Maximum Power Consumption	7 W	7 W
	Warranty	25 years	25 years
Environmental Specifications	Operating Temperature	-40°C to 50°C (-40°F to 122°F)	-45°C to 70°C (-49°F to 158°F)
	Storage Temperature	-30°C to 70°C (-22°F to 158°F)	-30°C to 70°C (-22°F to 158°F)
	Enclosure Rating	NEMA 4X / IP65	NEMA 4X / IP65
Mechanical Specifications	Electrical Connections	MC4 Connector	MC4 Connector
	Housing	Plastic	Plastic
	Dimensions	125 x 150 x 22 mm (5 x 6 x 1 in)	173 x 45 x 22 mm (6.8 x 1.8 x 1 in)
	Weight	350 g (0.77 lb)	120 g (0.26 lb)
	Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip
Compliance Information	Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)	
	RSD Initiation Method	External System Shutdown Switch or Powerwall 3 Enable Switch	

UL 3741 PV Hazard Control (and PVRSA) Compatibility

The following categories of solar module meet the UL 3741 PVHCS listing when installed with Powerwall 3 and Solar Shutdown Devices.

Tesla Solar Roof	PV Hazard Control System: BIPV compliance document
Tesla or Hanwha (Q.Peak Duo BLK or BLK-G6+) Modules certified for use with ZEP racking	PV Hazard Control System: ZS PVHCS compliance document
Other module and racking combinations	PV Hazard Control System: Generic PV Array compliance document



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TESLA SHUTDOWN DEVICE SPECIFICATION

SHEET NUMBER:
APP.4