


ABBREVIATIONS	ELECTRICAL NOTES	JURISDICTION NOTES																																				
<p>A AMPERE AC ALTERNATING CURRENT BLDG BUILDING CONC CONCRETE DC DIRECT CURRENT EGC EQUIPMENT GROUNDING CONDUCTOR (E) EXISTING EMT ELECTRICAL METALLIC TUBING FSB FIRE SET-BACK GALV GALVANIZED GEC GROUNDING ELECTRODE CONDUCTOR GND GROUND HDG HOT DIPPED GALVANIZED I CURRENT Imp CURRENT AT MAX POWER Isc SHORT CIRCUIT CURRENT kVA KILOVOLT AMPERE kW KILOWATT LBW LOAD BEARING WALL MIN MINIMUM (N) NEW NEUT NEUTRAL NTS NOT TO SCALE OC ON CENTER PL PROPERTY LINE POI POINT OF INTERCONNECTION PV PHOTOVOLTAIC SCH SCHEDULE S STAINLESS STEEL STC STANDARD TESTING CONDITIONS TYP TYPICAL UPS UNINTERRUPTIBLE POWER SUPPLY V VOLT Vmp VOLTAGE AT MAX POWER Voc VOLTAGE AT OPEN CIRCUIT W WATT 3R NEMA 3R, RAIN TIGHT</p>	<ol style="list-style-type: none"> <li>THIS SYSTEM IS GRID-INTERTIED VIA A UL-LISTED POWER-CONDITIONING INVERTER.</li> <li>A NATIONALLY – RECOGNIZED TESTING LABORATORY SHALL LIST ALL EQUIPMENT IN COMPLIANCE WITH ART. 110.3.</li> <li>WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A SIGN WILL BE PROVIDED WARNING OF THE HAZARDS PER ART. 690.17.</li> <li>EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART. 210.5.</li> <li>CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH ART. 250.97, 250.92(B).</li> <li>DC CONDUCTORS EITHER DO NOT ENTER BUILDING OR ARE RUN IN METALLIC RACEWAYS OR ENCLOSURES TO THE FIRST ACCESSIBLE DC DISCONNECTING MEANS PER ART. 690.31(E).</li> <li>ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY UL LISTING.</li> <li>MODULE FRAMES SHALL BE GROUNDED AT THE UL – LISTED LOCATION PROVIDED BY THE MANUFACTURER USING UL LISTED GROUNDING HARDWARE.</li> <li>MODULE FRAMES, RAIL, AND POSTS SHALL BE BONDED WITH EQUIPMENT GROUND CONDUCTORS.</li> </ol>	<p style="text-align: center;"><b>VICINITY MAP</b></p>  <p style="text-align: center;">Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies</p>																																				
<p style="text-align: center;"><b>LICENSE</b></p>	<p style="text-align: center;"><b>GENERAL NOTES</b></p> <ol style="list-style-type: none"> <li>ALL WORK SHALL COMPLY WITH THE 2018 NORTH CAROLINA RESIDENTIAL CODE.</li> <li>ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.</li> </ol>	<p style="text-align: center;"><b>INDEX</b></p> <table border="1"> <tr><td>Sheet 1</td><td>COVER SHEET</td></tr> <tr><td>Sheet 2</td><td>SITE PLAN</td></tr> <tr><td>Sheet 3</td><td>STRUCTURAL VIEWS</td></tr> <tr><td>Sheet 4</td><td>UPLIFT CALCULATIONS</td></tr> <tr><td>Sheet 5</td><td>THREE LINE DIAGRAM</td></tr> <tr><td colspan="2">Cutsheets Attached</td></tr> </table> <table border="1"> <thead> <tr><th>REV</th><th>BY</th><th>DATE</th><th>COMMENTS</th></tr> </thead> <tbody> <tr><td>REV A</td><td>NAME</td><td>DATE</td><td>COMMENTS</td></tr> <tr><td>*</td><td>*</td><td>*</td><td>*</td></tr> <tr><td>*</td><td>*</td><td>*</td><td>*</td></tr> <tr><td>*</td><td>*</td><td>*</td><td>*</td></tr> <tr><td>*</td><td>*</td><td>*</td><td>*</td></tr> </tbody> </table>	Sheet 1	COVER SHEET	Sheet 2	SITE PLAN	Sheet 3	STRUCTURAL VIEWS	Sheet 4	UPLIFT CALCULATIONS	Sheet 5	THREE LINE DIAGRAM	Cutsheets Attached		REV	BY	DATE	COMMENTS	REV A	NAME	DATE	COMMENTS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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JOB NUMBER: JB-2752560 00

MOUNTING SYSTEM:  
ZS Comp V4 w Flashing-Insert

MODULES:  
(22) Hanwha Q Cells Q.PEAK DUO BLK ML-G10.a+/TS 410

INVERTER:  
Tesla Powerwall 3 [240V] # 1707000-XX-Y 11.5 kW / 13.5 kWh

CUSTOMER:  
William Alsobrook  
12583 McDougald Rd  
Broadway, NC 27505

9192593118

DESCRIPTION:  
9.02 KW PV ARRAY  
11.5 KW (AC NAMEPLATE) PV ARRAY  
27 KWH ENERGY STORAGE SYSTEM

PAGE NAME:  
COVER SHEET

DESIGN:  
Safania Romas

SHEET: 1      REV:      DATE: 11/25/2024



PV ARRAY DEAD LOAD = 3 LBS/SF

HATCHING INDICATES WIND PRESSURE ZONES. SEE THE STANDOFF SPACING AND LAYOUT TABLE FOR MORE INFORMATION.



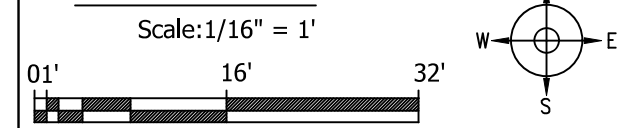
Structural Only  
 NC Firm D-0427  
 Digitally signed by  
 Henry Zhu  
 Date: 2024-12-18  
 11:37:43 -08:00

MP1	PITCH: 44° (12:12) ARRAY PITCH: 44° (12:12) AZIMUTH: 219 ARRAY AZIMUTH: 219 MATERIAL: Comp Shingle STORY: 2 Stories
MP2	PITCH: 21° (5:12) ARRAY PITCH: 21° (5:12) AZIMUTH: 219 ARRAY AZIMUTH: 219 MATERIAL: Comp Shingle STORY: 2 Stories

### LEGEND

- (E) UTILITY METER & WARNING LABEL
- INVERTER W/ INTEGRATED DC DISCO & WARNING LABELS
- AUTOMATIC RELAY
- DC DISCONNECT & WARNING LABELS
- AC DISCONNECT & WARNING LABELS
- DC JUNCTION/COMBINER BOX & LABELS
- ENERGY STORAGE SYSTEM FOR STAND ALONE OPERATION
- DISTRIBUTION PANEL & LABELS
- LOAD CENTER & WARNING LABELS
- DEDICATED PV SYSTEM METER
- RAPID SHUTDOWN
- STANDOFF LOCATIONS
- CONDUIT RUN ON EXTERIOR
- CONDUIT RUN ON INTERIOR
- GATE/FENCE
- HEAT PRODUCING VENTS ARE RED
- INTERIOR EQUIPMENT IS DASHED

### SITE PLAN



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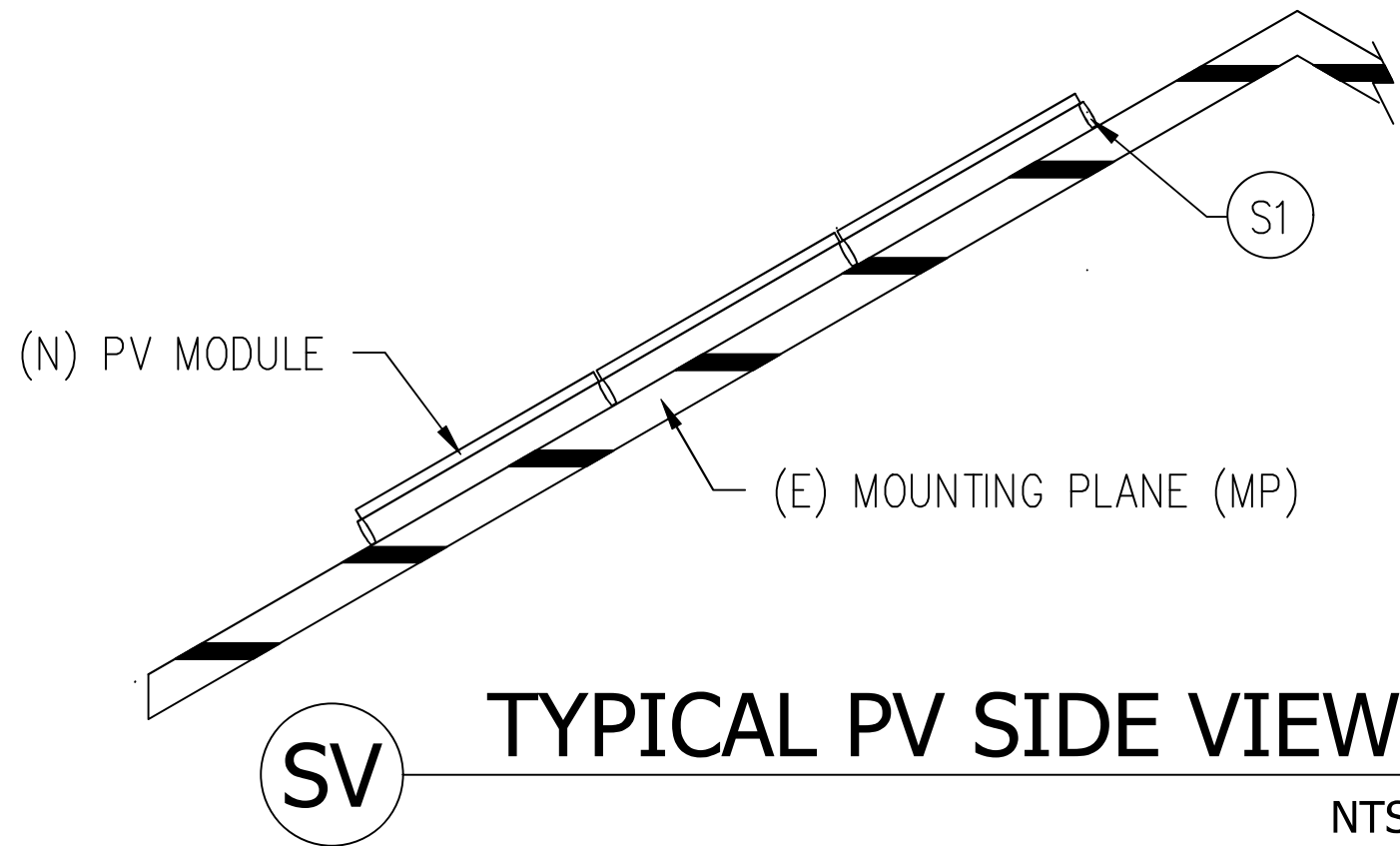
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 MODULES: (22) Hanwha Q Cells Q.PEAK DUO BLK ML-G10.a+/TS 410  
 INVERTER: Tesla Powerwall 3 [240V] # 1707000-XX-Y 11.5 kW / 13.5 kWh

CUSTOMER: William Alsobrook  
 12583 McDougald Rd  
 Broadway, NC 27505  
 9192593118

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 PAGE NAME: SITE PLAN

DESIGN: Safania Romas  
 SHEET: 2 REV: DATE: 11/25/2024

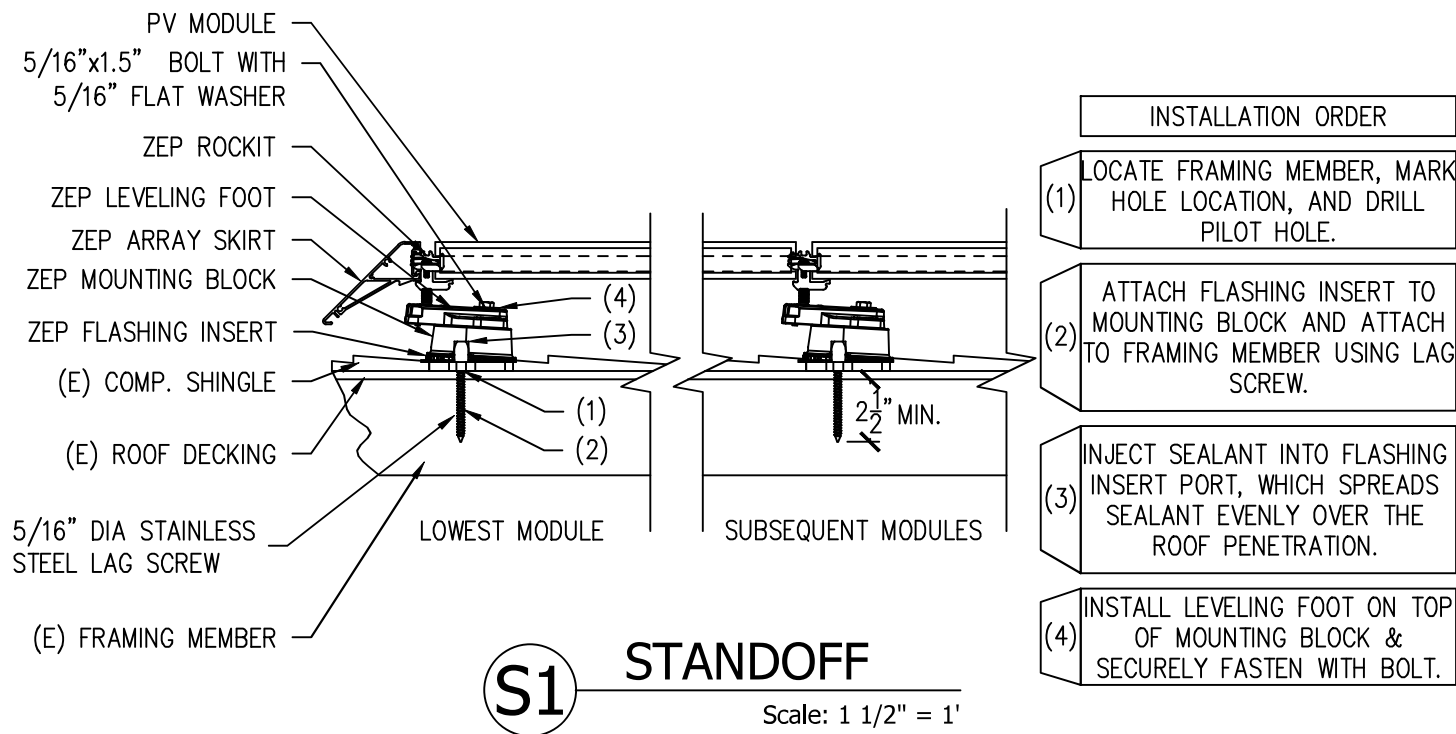




*Yong Heng Zhu*

NORTH CAROLINA  
PROFESSIONAL  
SEAL  
051417  
ENGINEER  
YONG HENG ZHU

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NC Firm D-0427  
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PAGE NAME:  
STRUCTURAL VIEWS

DESIGN:  
Safania Romas

SHEET: 3 REV: DATE: 11/25/2024

TESLA



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 Henry Zhu  
 Date: 2024-12-18  
 11:37:43 -08:00

Jobsite Specific Design Criteria			
Design Code		ASCE 7-10	
Risk Category		II	Table 1.5-1
Ultimate Wind Speed	V-Ult	120	Fig. 1609A
Exposure Category		C	Section 26.7
Ground Snow Load	pg	15	Table 7-1

MP Specific Design Information	
MP Name	MP1
Roofing	Comp Shingle
Standoff	ZS Comp V4 w Flashing-Insert
Pitch	44
SL/RLL: PV	4.5
SL/RLL: Non-PV	12.5
Edge Zone Width	5.9 ft
Azimuth	219
Stories	2
Rafter Size/Spacing	2x6 @24" OC
CJ Size/Spacing	2x6 @24" OC
Standoff Spacing and Layout	
MP Name	MP1
Applied Wind Zones <sub>2</sub>	All <input type="checkbox"/>
Wind Pressure	-19.65
Landscape X-Spacing	72
Landscape X-Cantilever	24
Landscape Y-Spacing	41
Landscape Y-Cantilever	-
Portrait X-Spacing	48
Portrait X-Cantilever	16
Portrait Y-Spacing	74
Portrait Y-Cantilever	-
Layout	Staggered

Notes:  
 1. X and Y are maximums that are always relative to the structure framing that supports the PV. X is across rafters and Y is along rafters.  
 2. Hatching in Applied Wind Zone rows corresponds to hatching on Site Plan.  
 3. Table lists consistent conservative standoff specifications and layout requirements across all wind zones to comply with the maximum wind pressure of any zone.

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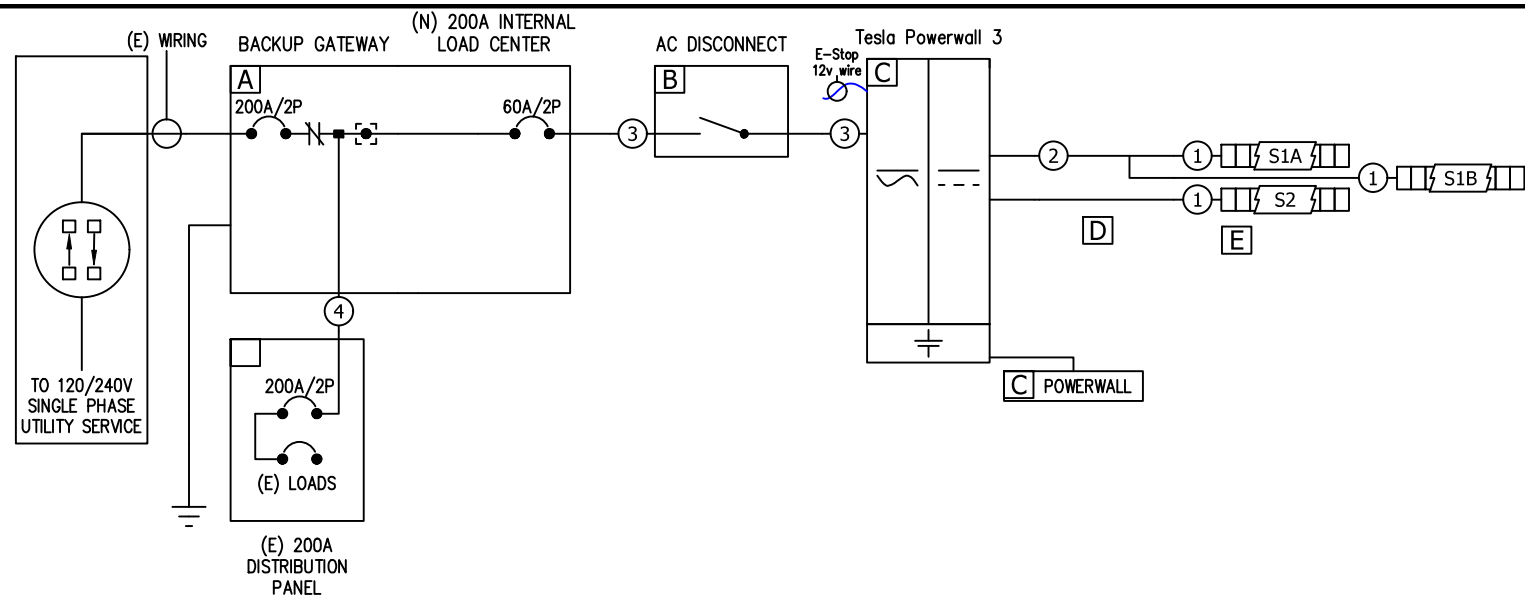
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 UPLIFT CALCULATIONS

DESIGN:  
 Safania Romas  
 SHEET: 4 REV: DATE:  
 11/25/2024





CONDUIT MATERIAL TYPE AND SIZE TO BE DETERMINED IN THE FIELD TO NEC 2017 STANDARDS.



PCS Controlled Current Setting:  
 (Panel Rating \* 0.8) = 160A  
 (200A Busbar)

**F** Emergency Stop Button (E-Stop)

- Rapid Shutdown Initiation Device per Article 690.12(C) of the NEC
- Disconnecting Means as defined in Article 100 of the NEC
- Connection to generation sources with 12V, 1A communication wire

1. GROUND NEUTRAL BOND TO BE COMPLETED IN SERVICE EQUIPMENT (A)
2. CONDUIT RUNS MAY BE CONDENSED DUE TO SITE CONDITIONS AND/OR INSTALLATION EASE. ALL CONDUIT FILL DERATES AND PROPER CALCULATIONS HAVE BEEN COMPLETED PER NEC CHAPTER 9, TABLE 4.
3. SOLAR SHUTDOWN DEVICE TO BE INSTALLED FOR SYSTEM RAPID SHUTDOWN (RSD) IN ACCORDANCE WITH ARTICLE 690 OF THE APPLICABLE NEC.
4. CONDUIT TYPE CAN CHANGE DUE TO SITE CONDITIONS AND WILL FOLLOW THE NEC REQUIREMENTS FOR THAT CONDUIT TYPE.

PARTS			DC CONDUCTOR TABLE						STRING TABLE										
Ref	Qty	Description	Ref	Type	Qty	Size (AWG, Cu)	EGC (AWG, Cu)	Conduit	Isc (ADC)	Imp (ADC)	Product Ref	String Ref	Module per String	MCI per String	Voc* (VDC)	Vmp (VDC)	Mounting Plane		
A	1	Breaker; 60A/2P, 2 Spaces	1	PV Wire	2	#10	#10	3/4" EMT	11.10	10.65	C	S1A	6	2	297.55	225.84	MP1		
A	1	200A Main Circuit Breaker; 2-Pole, 240V, 10kAIC	2	PV Wire	2	#10	#10	3/4" EMT	22.20	21.30		S1B	6	2	297.55	225.84	MP1		
A	1	Tesla # 1841000-XX-Y: Back-up Gateway 3.0 NA for PW	AC CONDUCTOR TABLE						S2	10		4	495.91	376.40	MP1				
B	1	Disconnect; 60A, 240Vac, Non-Fusible, NEMA 3R: 2P, 2W, Lockable	Ref	Type	Qty	Size (AWG) (Cu) (Al)	Min EGC (AWG, Cu)	Conduit (Cu) (Al)	Length (ft)	Imp (AAC)	Vmp (VAC)								
B	1	Ground/Neutral Kit; 60-100A, General Duty (DG)	3	THWN-2	3	#06 #04	#10	PVC Jacketed MC 1" EMT	5ft	48	240								
C	1	Powerwall 3 Expansion Tesla Inc [240V] # 1807000-XX-Y 13.5 kWh	4	THWN-2	3	#2/0 #4/0	#06	2" PVC 2" PVC	2ft	-	240								
C	1	Tesla Powerwall 3 [240V] # 1707000-XX-Y 11.5 kW / 13.5 kWh																	
D	1	MC4-EVO 2 Y CONNECTOR, PLUG (MALE)																	
D	1	MC4-EVO2 Y CONNECTOR, SOCKET (FEMALE)																	
E	8	Tesla MCI, 650V, 12A																	
F	1	UL 508 Emergency Stop Device - NEMA 4X																	

SITE SPECIFICATIONS		MODULE SPECIFICATIONS	
Main Panel Rating	(E) 200A	Hanwha Q Cells Q.PEAK DUO BLK ML-G10.a+/TS 410: PV Mod, 410W, 381.0PTC, ZEP, Blk Frm, Blk Backsht, MC4, 1kV	
Main Breaker Rating	(E) 200A	Qty	22
General Notes	DC Ungrounded Inverters	Voc	45.31
Panel Number	SN3048B1200	Vmp	37.64
Meter Number	ZZZ 3G2119 H67	Isc and Imp are in the DC Conductor Table	
Service Entrance	Underground		

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	MOUNTING SYSTEM: ZS Comp V4 w Flashing-Insert	9192593118	PAGE NAME: THREE LINE DIAGRAM	SHEET: 5	
	MODULES: (22) Hanwha Q Cells Q.PEAK DUO BLK ML-G10.a+/TS 410			REV: 11/25/2024	
	INVERTER: Tesla Powerwall 3 [240V] # 1707000-XX-Y 11.5 kW / 13.5 kWh			DATE:	

WARNING: PHOTOVOLTAIC POWER SOURCE

Label Location:  
(C)(CB)(JB)  
Per Code:  
NEC 690.31.G.3

**⚠ WARNING**

THIS EQUIPMENT FED BY  
MULTIPLE SOURCES. TOTAL  
RATING OF ALL OVER CURRENT  
DEVICES, EXCLUDING MAIN  
SUPPLY OVERCURRENT DEVICE,  
SHALL NOT EXCEED AMPACITY  
OF BUSBAR.

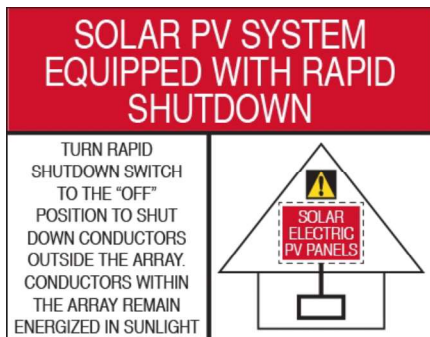
Label Location:  
(MSP)  
Per Code:  
NEC 705.12.B.2.3.C

**DC PHOTOVOLTAIC  
DISCONNECT**

Label Location:  
(DC)(INV)  
Per Code:  
NEC 690.13.B

MAXIMUM POWER-  
POINT CURRENT (I<sub>mp</sub>)  A  
MAXIMUM POWER-  
POINT VOLTAGE (V<sub>mp</sub>)  V  
MAXIMUM SYSTEM  
VOLTAGE (V<sub>oc</sub>)  V  
SHORT-CIRCUIT  
CURRENT (I<sub>sc</sub>)  A

Label Location:  
(DC) (INV)  
Per Code:  
NEC 690.53



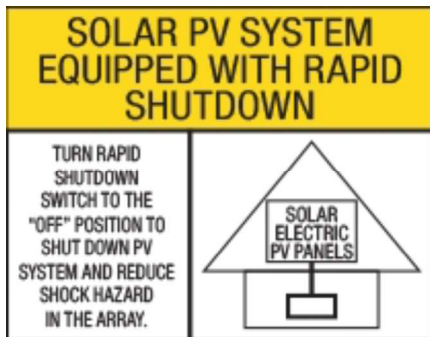
Label Location:  
ABB/Delta Solivia Inverter  
Per Code:  
690.56(C)(1)(b)

**AC PHOTOVOLTAIC  
DISCONNECT**

Label Location:  
(AC)(POI)  
Per Code:  
NEC 690.13.B

MAXIMUM AC  
OPERATING CURRENT  A  
MAXIMUM AC  
OPERATING VOLTAGE  V

Label Location:  
(AC) (POI)  
Per Code:  
NEC 690.54



Label Location:  
SolarEdge and, Delta M-Series and, Telsa Inverter  
Per Code:  
690.56(C)(1)(a)

**⚠ WARNING**

ELECTRIC SHOCK HAZARD  
DO NOT TOUCH TERMINALS  
TERMINALS ON BOTH LINE  
AND LOAD SIDES MAY BE  
ENERGIZED IN THE OFF POSITION

Label Location:  
(AC)(POI)  
Per Code:  
690.13.B

**⚠ WARNING**

INVERTER OUTPUT  
CONNECTION  
DO NOT RELOCATE  
THIS OVERCURRENT  
DEVICE

Label Location:  
(POI)  
Per Code:  
NEC 705.12.B.2.3.B

(AC): AC Disconnect  
(C): Conduit  
(CB): Combiner Box  
(D): Distribution Panel  
(DC): DC Disconnect  
(IC): Interior Run Conduit  
(INV): Inverter With Integrated DC Disconnect  
(LC): Load Center  
(M): Utility Meter  
(POI): Point of Interconnection

BACKUP LOAD CENTER

Label Location:  
(BLC)  
Per Code:  
NEC 408.4

**CAUTION**  
TRI POWER SOURCE  
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM  
THIRD SOURCE IS ENERGY STORAGE SYSTEM

Label Location:  
(MSP)  
Per Code:  
NEC 705.12(B)(3)

**CAUTION**  
DO NOT ADD NEW LOADS

Label Location:  
(BLC)  
Per Code:  
NEC 220

**WARNING**

THIS EQUIPMENT FED BY  
MULTIPLE SOURCES. TOTAL  
RATING OF ALL OVER CURRENT  
DEVICES, EXCLUDING MAIN  
SUPPLY OVERCURRENT DEVICE,  
SHALL NOT EXCEED AMPACITY  
OF BUSBAR.

Label Location:  
(MSP)  
Per Code:  
NEC 705.12.B.2.3.c

**CAUTION**  
THIS PANEL HAS SPLICED FEED-  
THROUGH CONDUCTORS.  
LOCATION OF DISCONNECT AT ENERGY  
STORAGE BACKUP LOAD PANEL

Label Location:  
(MSP)  
Per Code:  
NEC 312.8.A(3)

**NOMINAL ESS VOLTAGE:** 120/240V  
**MAX AVAILABLE SHORT-  
CIRCUIT FROM ESS:** 32A  
**ARC FAULT CLEARING  
TIME FROM ESS:** 67ms  
**DATE OF  
CALCULATION:**

Label Location:  
(MSP)  
Per Code:  
Per 706.7(D) label to be marked in field

**CAUTION**  
DUAL POWER SOURCE  
SECOND SOURCE IS  
ENERGY STORAGE SYSTEM

Label Location:  
(MSP)  
Per Code:  
NEC 705.12(B)(3)

ENERGY STORAGE SYSTEM ON SITE  
LOCATED WITHIN LINE OF SIGHT

Label Location:  
(MSP)  
Per Code:

ENERGY STORAGE SYSTEM ON SITE  
LOCATED ON ADJACENT WALL

Label Location:  
(MSP)  
Per Code:

ENERGY STORAGE SYSTEM ON SITE  
LOCATED ON OPPOSITE WALL

Label Location:  
(MSP)  
Per Code:

ENERGY STORAGE SYSTEM ON SITE  
LOCATED INSIDE

Label Location:  
(MSP)  
Per Code:

(AC): AC Disconnect  
(BLC): Backup Load Center  
(MSP): Main Service Panel

# Powerwall 3

## Power Everything

Powerwall 3 is a fully integrated solar and battery system, designed to accelerate the transition to sustainable energy. Customers can receive whole home backup, cost savings, and energy independence by producing and consuming their own energy while participating in grid services. Once installed, customers can manage their system using the Tesla App to customize system behavior to meet their energy goals.

Powerwall 3 achieves this by supporting up to 20 kW DC of solar and providing up to 11.5 kW AC of continuous power per unit. It has the ability to start heavy loads rated up to 185 LRA, meaning a single unit can support the power needs of most homes. Powerwall 3 Expansions make it easier and more affordable to scale up customers' systems to meet their current or future needs. Powerwall 3 is designed for fast and efficient installations, modular system expansion, and simple connection to any electrical service.



# 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 <sub>1</sub>			
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 <sub>2</sub>	30 A	40 A	60 A	60 A
Configurable Maximum Continuous Discharge Power Off-Grid (PV Only, -20°C to 25°C)	15.4 kW <sub>3</sub>			
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% <sup>14</sup>			
Solar to Home/Grid Efficiency	97.5% <sup>5</sup>			
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 <sub>e</sub> )			
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			

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

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

<sup>3</sup> If enabling the 15.4 kW off-grid maximum continuous discharge power, Powerwall 3 must be installed with an 80 A breaker and appropriately sized conductors.

<sup>4</sup> Typical solar shifting use case.

<sup>5</sup> Tested using CEC weighted efficiency methodology.

<sup>6</sup> 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 <sup>7</sup>
Maximum Short Circuit Current per MPPT ( $I_{sc}$ )	15 A <sup>7</sup>

<sup>7</sup>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) <sup>8</sup>
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

<sup>8</sup>Performance may be de-rated at operating temperatures above 40°C (104°F).

## Compliance Information

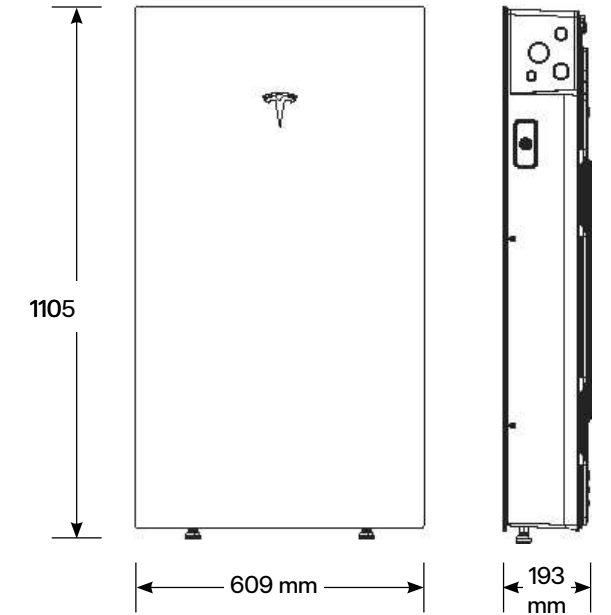
Certifications	UL 1741, UL 9540, UL 9540A, UL 3741, UL 1741 PCS, UL 1741 SA, UL 1741 SB, UL 1973, UL 1699B, UL 1998, CSA C22.2 No. 0.8, CSA C22.2 No. 107.1, CSA C22.2 No. 330, CSA 22.3 No. 9, IEEE 1547, IEEE 1547A, IEEE 1547.1, CA Rule No.21
Grid Connection	United States and Canada
Emissions	FCC Part 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) <sup>9</sup>
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

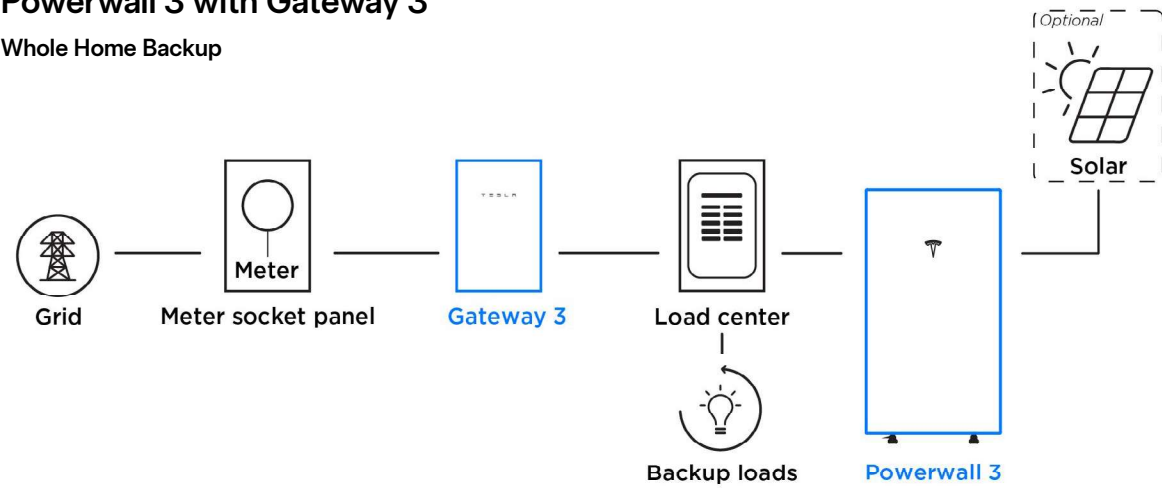
<sup>9</sup>These dimensions include the glass front cover being installed on Powerwall 3.



# Powerwall 3 Example System Configurations

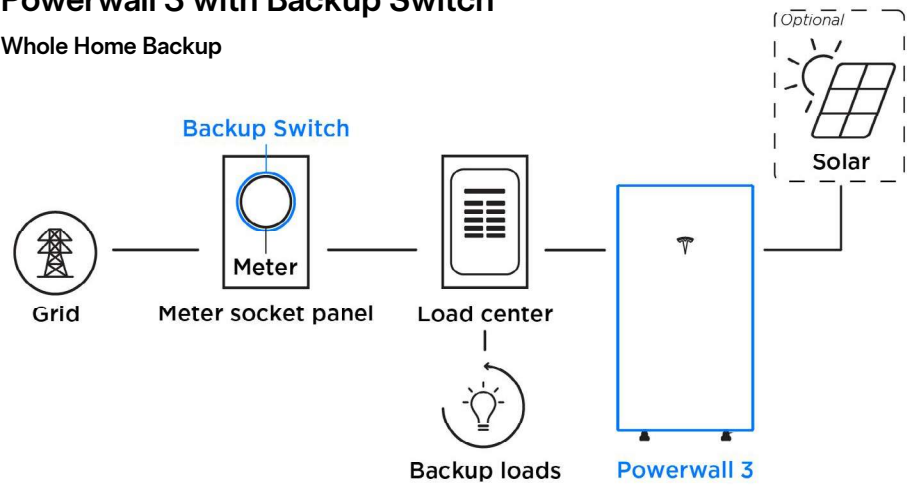
## Powerwall 3 with Gateway 3

Whole Home Backup



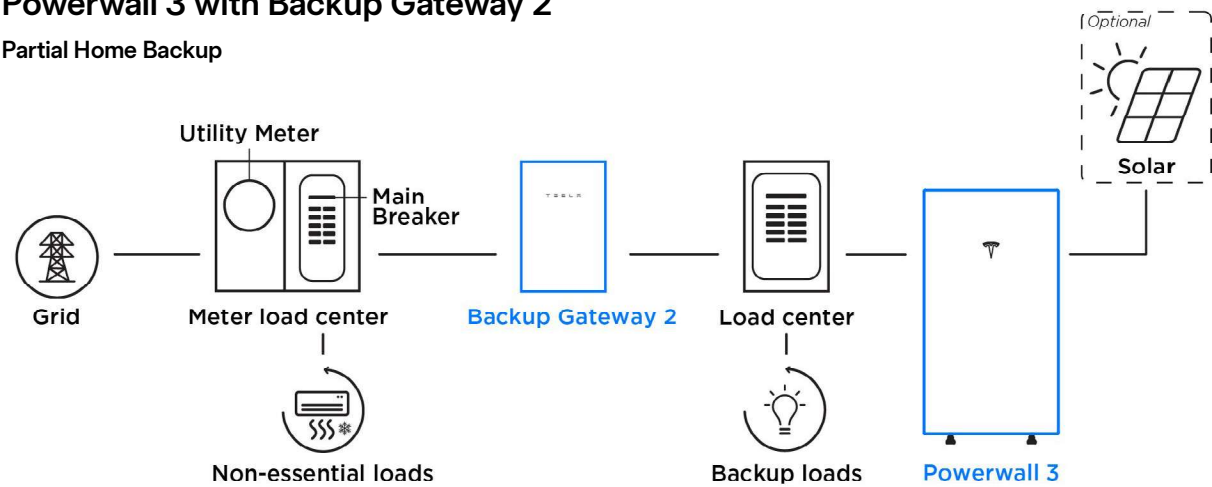
## Powerwall 3 with Backup Switch

Whole Home Backup



## Powerwall 3 with Backup Gateway 2

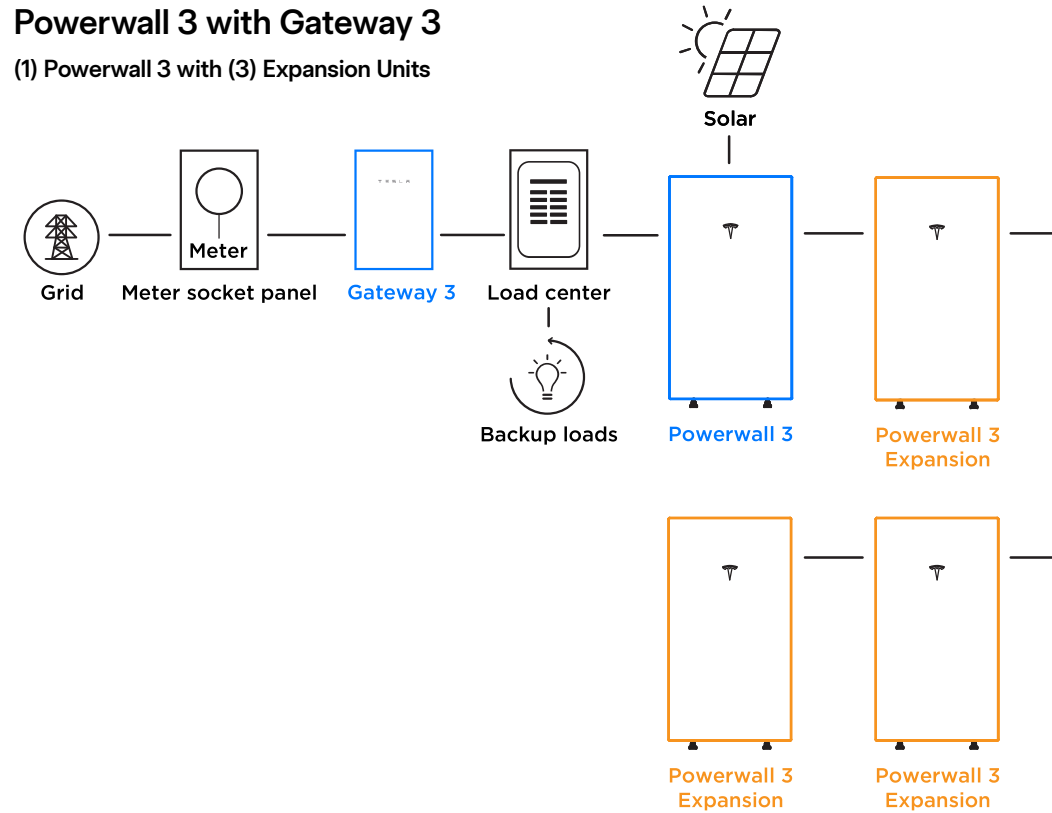
Partial Home Backup



# Powerwall 3 Example System Configurations

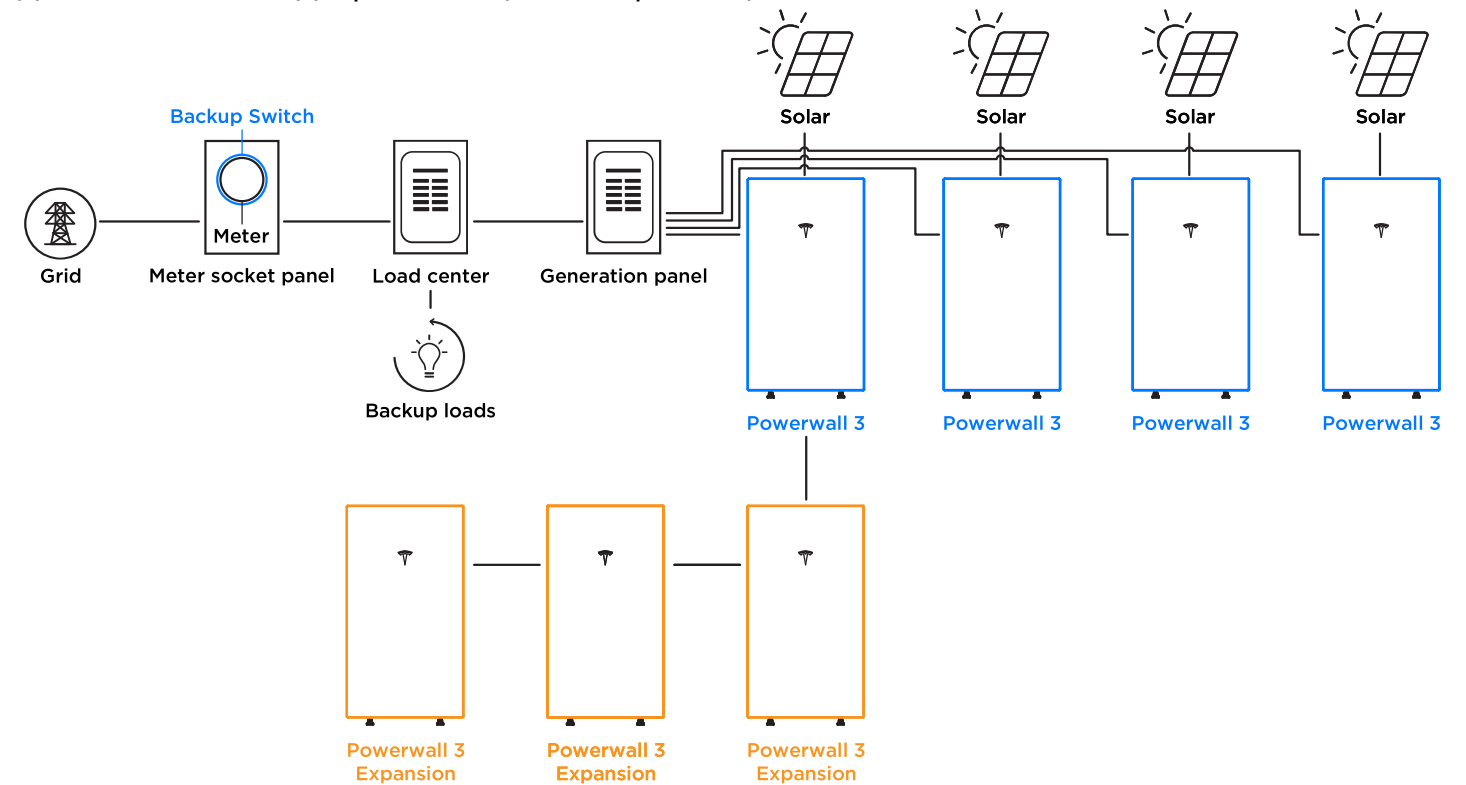
## Powerwall 3 with Gateway 3

(1) Powerwall 3 with (3) Expansion Units



## Powerwall 3 with Backup Switch

(4) Powerwall 3 Units with (3) Expansion Units (Maximum System Size)



# 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

<b>Model Number</b>	1841000-01-y	<b>AC Meter</b>	Revenue accurate (+/- 0.5%)
<b>Nominal Grid Voltage</b>	120/240 V AC	<b>Communication</b>	CAN
<b>Grid Configuration</b>	Split phase	<b>User Interface</b>	Tesla App
<b>Grid Frequency</b>	60 Hz	<b>Backup Transition</b>	Automatic disconnect for seamless backup
<b>Continuous Current Rating</b>	200 A	<b>Overcurrent Protection Device</b>	100-200 A Service entrance rated Eaton CSR, BWH, or BW, or Square D QOM breakers
<b>Maximum Supply Short Circuit Current</b>	22 kA with Square D or Eaton main breaker 25 kA with Eaton main breaker <sup>1</sup>	<b>Internal Panelboard</b>	200 A 8-space/16 circuit breakers Eaton BR, Siemens QP, or Square D HOM breakers rated to 10-125A
<b>IEC Protective Class</b>	Class I	<b>Warranty</b>	10 years
<b>Overvoltage Category</b>	Category IV		

<sup>1</sup>Only Eaton CSR or BWH main breakers are 25 kA rated

## Environmental Specifications

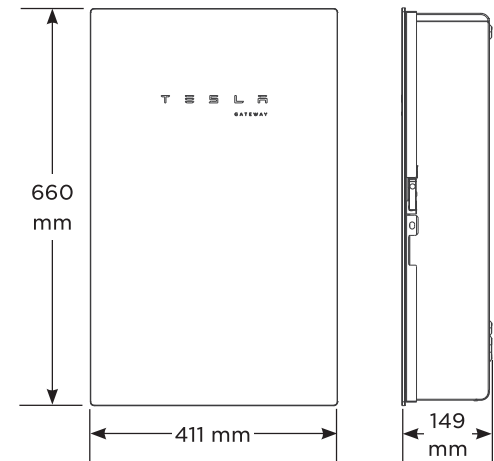
<b>Operating Temperature</b>	-20°C to 50°C (-4°F to 122°F)
<b>Operating Humidity (RH)</b>	Up to 100%, condensing
<b>Maximum Elevation</b>	3000 m (9843 ft)
<b>Environment</b>	Indoor and outdoor rated
<b>Enclosure Type</b>	NEMA 3R

## Compliance Information

<b>Certifications</b>	UL 67, UL 869A, UL 916, UL 1741 PCS, CSA 22.2 107.1, CSA 22.2 29
<b>Emmissions</b>	FCC Part 15, ICES 003

## Mechanical Specifications

<b>Dimensions</b>	660 x 411 x 149 mm (26 x 16 x 6 in)
<b>Weight</b>	16.4 kg (36 lb)
<b>Mounting options</b>	Wall mount



# Q.PEAK DUO BLK ML-G10+ SERIES



385-415 Wp | 132 Cells  
21.0% Maximum Module Efficiency

MODEL Q.PEAK DUO BLK ML-G10+/TS



## Breaking the 21 % efficiency barrier

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 21.0%.



## A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty<sup>1</sup>.



## Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology<sup>2</sup> and Hot-Spot Protect.



## Innovative all-weather technology

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



## Zep compatible™ frame design

High-tech black Zep Compatible™ frame, for improved aesthetics, easy installation and increased safety.



## The most thorough testing programme in the industry

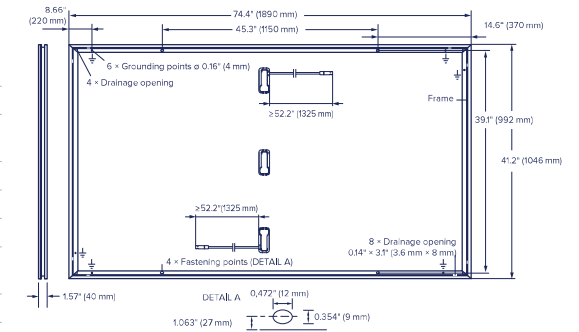
Qcells is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

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

# Q.PEAK DUO BLK ML-G10+ SERIES

## Mechanical Specification

Format	74.4 in × 41.2 in × 1.57 in (including frame) (1890 mm × 1046 mm × 40 mm)
Weight	51.8 lbs (23.5 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm <sup>2</sup> Solar cable; (+) ≥ 52.2 in (1325 mm), (-) ≥ 52.2 in (1325 mm)
Connector	Stäubli MCA; IP68



## Electrical Characteristics

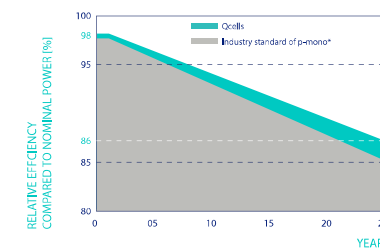
POWER CLASS		385	390	395	400	405	410	415	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC <sup>1</sup> (POWER TOLERANCE +5W / -0W)									
Minimum	Power at MPP <sup>1</sup>	P <sub>MPP</sub> [W]	385	390	395	400	405	410	415
	Short Circuit Current <sup>1</sup>	I <sub>SC</sub> [A]	11.04	11.07	11.10	11.14	11.17	11.20	11.23
	Open Circuit Voltage <sup>1</sup>	V <sub>OC</sub> [V]	45.19	45.23	45.27	45.3	45.34	45.37	45.41
	Current at MPP	I <sub>MPP</sub> [A]	10.59	10.65	10.71	10.77	10.83	10.89	10.95
	Voltage at MPP	V <sub>MPP</sub> [V]	36.36	36.62	36.88	37.13	37.39	37.64	37.89
	Efficiency <sup>1</sup>	η [%]	≥ 19.5	≥ 19.7	≥ 20.0	≥ 20.2	≥ 20.5	≥ 20.7	≥ 21.0

## MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT<sup>2</sup>

Minimum	Power at MPP	P <sub>MPP</sub> [W]	288.8	292.6	296.3	300.1	303.8	307.6	311.3
	Short Circuit Current	I <sub>SC</sub> [A]	8.90	8.92	8.95	8.97	9.00	9.03	9.05
	Open Circuit Voltage	V <sub>OC</sub> [V]	42.62	42.65	42.69	42.72	42.76	42.79	42.83
	Current at MPP	I <sub>MPP</sub> [A]	8.35	8.41	8.46	8.51	8.57	8.62	8.68
	Voltage at MPP	V <sub>MPP</sub> [V]	34.59	34.81	35.03	35.25	35.46	35.68	35.89

<sup>1</sup> Measurement tolerances P<sub>MPP</sub> ± 3%; I<sub>SC</sub>, V<sub>OC</sub> ± 5% at STC: 1000 W/m<sup>2</sup>, 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 2800 W/m<sup>2</sup>, NMOT, spectrum AM 1.5

## Qcells PERFORMANCE WARRANTY

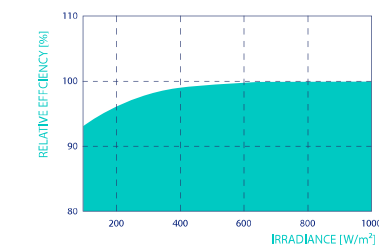


At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

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

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

## PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m<sup>2</sup>).

## TEMPERATURE COEFFICIENTS

Temperature Coefficient of I <sub>SC</sub>	α [% / K]	+0.04	Temperature Coefficient of V <sub>OC</sub>	β [% / K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ [% / K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3 °C)

## Properties for System Design

Maximum System Voltage	V <sub>sys</sub> [V]	1000 (IEC) / 1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push/Pull <sup>1</sup>	[lbs / ft <sup>2</sup> ]	85 (4080 Pa) / 85 (4080 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push/Pull <sup>1</sup>	[lbs / ft <sup>2</sup> ]	128 (6120 Pa) / 128 (6120 Pa)		

<sup>1</sup> See Installation Manual

## Qualifications and Certificates

UL61730-1 & UL61730-2, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells),



The ideal solution for:



\*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. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL hqcc-inquiry@qcells.com | WEB www.qcells.com



qcells



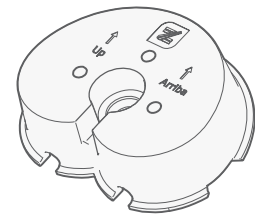
# ROOFING SYSTEM SPECIFICATIONS



<b>DESCRIPTION</b>	PV mounting solution for composition shingle roofs.
	Works with all Zep Compatible Modules.
	Auto bonding UL-listed hardware creates structural and electrical bond.
<b>SPECIFICATIONS</b>	Designed for pitched roofs.
	Installs in portrait and landscape orientations.
	Engineered for spans up to 72" and cantilevers up to 24".
	ZS Comp has a UL 1703 Class "A" Fire Rating when installed using modules from any manufacturer certified as "Type 1" or "Type 2".
	Attachment method UL listed to UL 2582 for Wind Driven Rain.
	ZS Comp supports 50 psf (2400 Pa) front and up to 72 psf (3450 Pa) rear side design load rating for Portrait module orientation per UL 2703.
	ZS Comp supports 50 psf (2400 Pa) front side and up to 72 psf (3450 Pa) rear side design load rating for Landscape module orientation.
	Engineered for compliance with ASCE 7-05, 7-10, and 7-16 wind load requirements.
	Zep wire management products listed to UL 1565 for wire positioning devices.
ZS Comp grounding products are listed to UL 2703 and UL 467.	
ZS Comp bonding products are listed to UL 2703.	

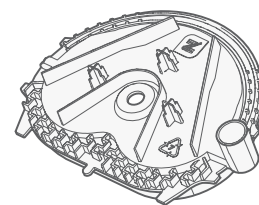
## MOUNTING BLOCK

Listed to UL 2703  
Part #850-1633



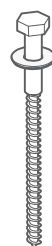
## FLASHING INSERT

Listed to UL 2703 and UL 2582 for Wind Driven Rain  
Part #850-1628



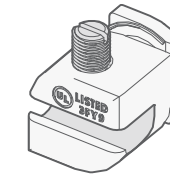
## CAPTURED WASHER LAG

Part #850-1631-002 and #850-1631-004



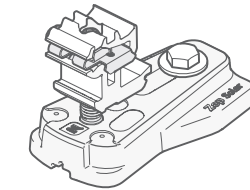
## GROUND ZEP

Listed to UL 2703  
Part #850-1511



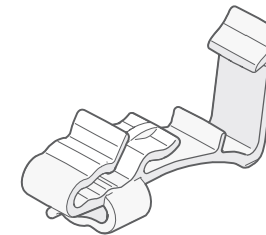
## LEVELING FOOT

Listed to UL 2703  
Part #850-1397



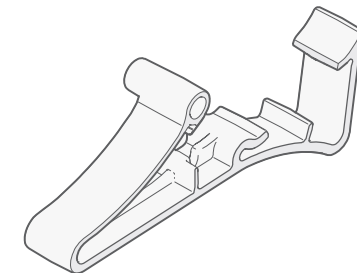
## DC WIRE CLIP

Listed to UL 1565  
Part #850-1509



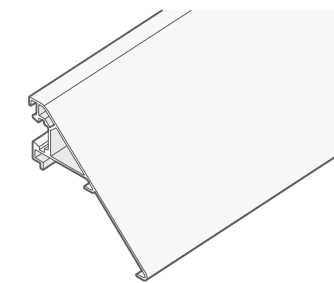
## HOME RUN CLIP

Listed to UL 1565  
Part #850-1510



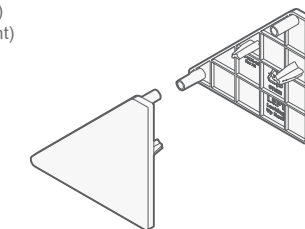
## ARRAY SKIRT

Listed to UL 2703  
Part #850-1608



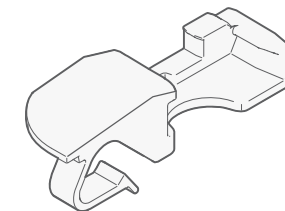
## END CAP

Listed to UL 2703  
Part #850-1586 (Left)  
Part #850-1588 (Right)



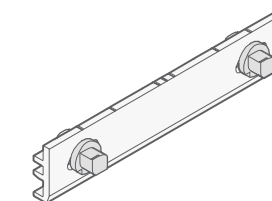
## SKIRT GRIP

Listed to UL 2703  
Part #850-1606



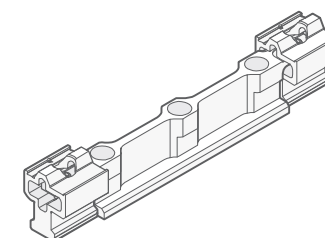
## INTERLOCK

Listed to UL 2703  
Part #850-1613



## HYBRID INTERLOCK

Listed to UL 2703  
Part #850-1281



# MCI WIRING DETAIL

## GENERAL NOTES

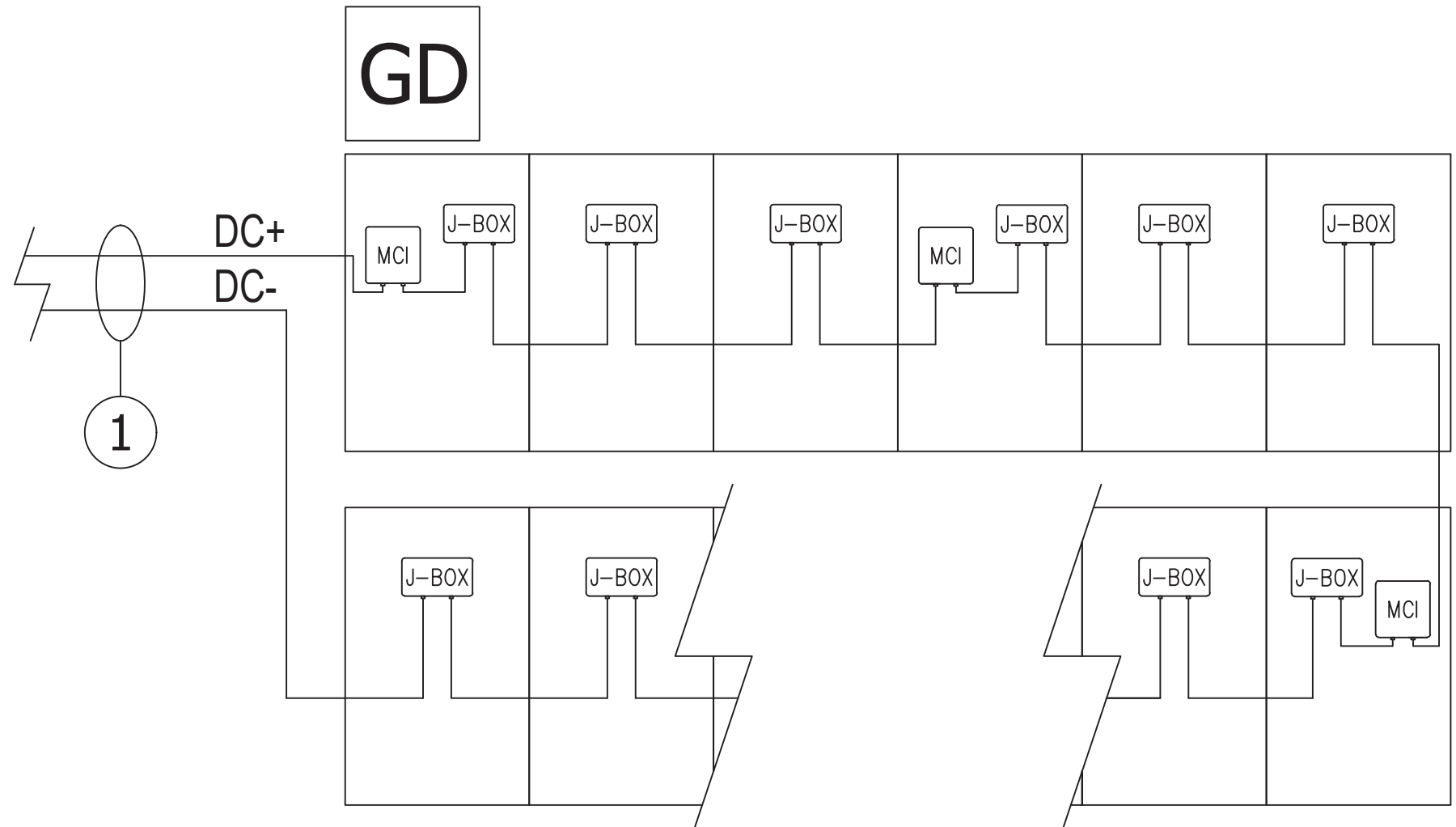
- DRAWING OF STANDARD MCI WIRING DETAIL FOR ANY GIVEN STRING LENGTH
- IF INITIATED, RAPID SHUTDOWN OCCURS WITHIN 30 SECONDS OF ACTIVATION AND LIMITS VOLTAGE ON THE ROOF TO NO GREATER THAN 165V (690.12.B.2.1)
- MID CIRCUIT INTERRUPTER (MCI) IS A UL 1741 PVRSE CERTIFIED RAPID SHUTDOWN DEVICE (RSD)

## RETROFIT PV MODULES

- MCIS ARE LOCATED AT ROOF LEVEL, JUST UNDER THE PV MODULES IN ACCORDANCE WITH 690.12 REQUIREMENTS
- THE QUANTITY OF MCIS PER STRING IS DETERMINED BY STRING LENGTH
  - NUMBER OF MODULES BETWEEN MCI UNITS = 0-3
  - MAXIMUM NUMBER OF MODULES PER MCI UNIT = 3
  - MINIMUM NUMBER MCI UNITS = MODULE COUNT/3

\*Exception: Tesla (Longi) modules installed in locations where the max Voc for 3 modules at low design temperature exceeds 165V shall be limited to 2 modules between MCIs.

PLEASE REFER TO MCI CUTSHEET AND PVRSA INSERT FOR MORE INFORMATION



① (2)AWG, PV Wire, 600V, Black

DC

# Solar Shutdown Device 2 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+ or Tesla Solar Inverter, solar array shutdown is initiated by any loss of AC power.

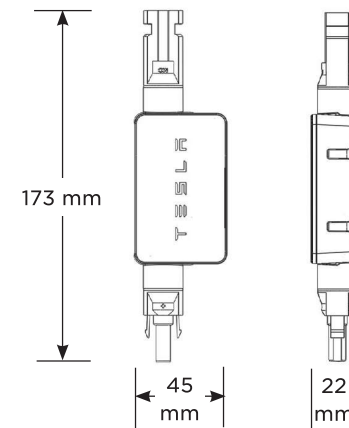
Electrical Specifications	Nominal Input DC Current Rating ( $I_{MP}$ )	13 A
	Maximum Input Short Circuit Current ( $I_{SC}$ )	17 A
	Maximum System Voltage (PVHCS)	1000 V DC

RSD Module Performance	Maximum Number of Devices per String	5
	Control	Power Line Excitation
	Passive State	Normally Open
	Maximum Power Consumption	7 W
	Warranty	25 years

Environmental Specifications	Ambient Temperature	-45°C to 70°C (-49°F to 158°F)
	Enclosure Rating	NEMA 4X / IP65

Compliance Information	Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)
	RSD Initiation Method	PV System AC Breaker or Switch
	Compatible Equipment	See Compatibility Table below

Mechanical Specifications	Model Number	MCI-2
	Electrical Connections	MC4 Connector
	Housing	Plastic
	Dimensions	173 x 45 x 22 mm (6.8 x 1.8 x 0.9 in)
	Weight	120 g (0.26 lb)



## UL 3741 PV Hazard Control (and PVRSA) Compatibility

Tesla Solar Roof and Tesla/Zep ZS Arrays using the following modules are certified to UL 3741 and UL 1741 PVRSA when installed with Powerwall+ or Tesla Solar Inverter and Solar Shutdown Devices. See [Powerwall+ / Tesla Solar Inverter Rapid Shutdown: Module Selection Based on PV Hazard Control System Listing](#) for guidance on installing other modules.

Brand	Model	Required Solar Shutdown Devices
Tesla	Solar Roof V3	1 Solar Shutdown Device per 10 modules
Tesla	Tesla TxxxS (where xxx = 405 to 450 W, increments of 5) Tesla TxxxH (where xxx = 395 to 415 W, increments of 5)	1 Solar Shutdown Device per 3 modules <sup>1</sup>
Hanwha	Q.PEAK DUO BLK-G5 or Q.PEAK DUO BLK-G6+	1 Solar Shutdown Device per 3 modules

<sup>1</sup>Exception: Tesla solar modules installed in locations where the max Voc for three modules at low design temperatures exceeds 165 V shall be limited to two modules between Solar Shutdown Devices.