ABBREVIATIONS

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, RAINTIGHT

ELECTRICAL NOTES

1. THIS SYSTEM IS GRID-INTERTIED VIA A UL-LISTED POWER-CONDITIONING INVERTER.
2. A NATIONALLY - RECOGNIZED TESTING LABORATORY SHALL LIST ALL EQUIPMENT IN COMPLIANCE WITH ART. 110.3.
3. 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.
4. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART. 210.5.
5. CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH ART. 250.97, 250.92(B).
6. 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).
7. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY UL LISTING.
8. MODULE FRAMES SHALL BE GROUNDED AT THE UL - LISTED LOCATION PROVIDED BY THE MANUFACTURER USING UL LISTED GROUNDING HARDWARE.
9. MODULE FRAMES, RAIL, AND POSTS SHALL BE BONDED WITH EQUIPMENT GROUND CONDUCTORS.

JURISDICTION NOTES

NOTICE TO CONTRACTOR
All construction must comply with current NC Building Codes and is subject to field inspection and verification.

APPROVED
Limited building only review
Permit holder responsible for full compliance with the code

06/11/2025

Harnett COUNTY NORTH CAROLINA

LICENSE

MODULE GROUNDING METHOD: ZEP SOLAR

AHJ: Harnett County

UTILITY: Duke Energy Progress (NC)

D

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE 2018 NORTH CAROLINA RESIDENTIAL CODE.
2. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.

VICINITY MAP

INDEX

REV	BY	DATE	COMMENTS
REV A	RZL	4/3/2025	Increased PV. Re-arranged BOS.
REV B	RZL	4/17/2025	Removed one PW per customer request.
REV C	RZL	4/25/2025	Added one PW back per customer request.
REV D	RZL	5/7/2025	Plans updated with Harnett County requirements.
*	*	*	*

JOB NUMBER: JB-2752635 00

MOUNTING SYSTEM: ZS Comp V4 w Flashing-Insert

MODULES: (39) Hanwha Q Cells Q.PEAK DUO BLK ML-G10+/TS 410

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

CUSTOMER:
Charles Stizza
222 Blue Monarch Ln
Fuquay-Varina, NC 27526

9199468284

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

PAGE NAME:
COVER SHEET

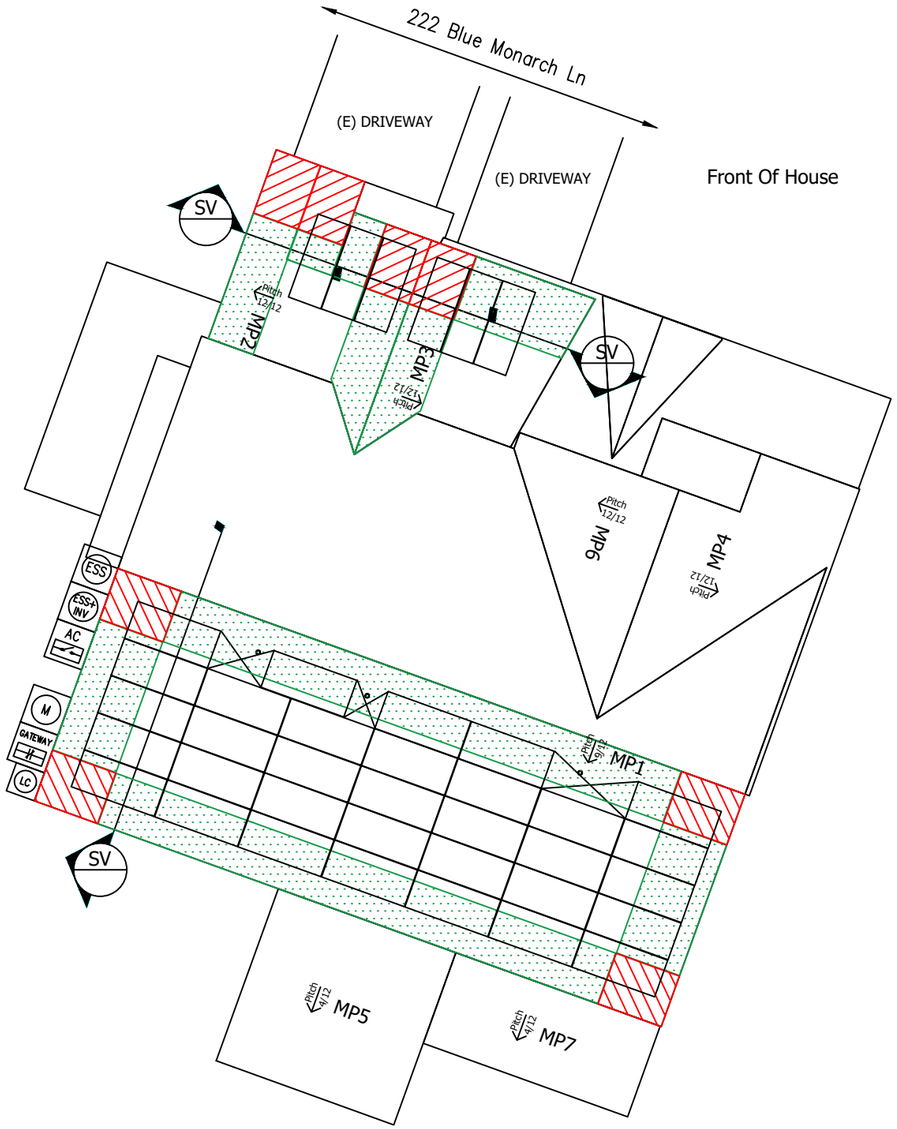
DESIGN:
Raul Zepeda Lastra

SHEET: 1 REV: D DATE: 5/7/2025

TESLA

PV ARRAY DEAD LOAD = 3 LBS/SF

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



MP1	PITCH: 37° (9:12) ARRAY PITCH: 37° (9:12) AZIMUTH: 200 ARRAY AZIMUTH: 200 MATERIAL: COMP SHINGLE STORY: 2 STORIES
MP2	PITCH: 45° (12:12) ARRAY PITCH: 45° (12:12) AZIMUTH: 290 ARRAY AZIMUTH: 290 MATERIAL: COMP SHINGLE STORY: 2 STORIES
MP3	PITCH: 45° (12:12) ARRAY PITCH: 45° (12:12) AZIMUTH: 110 ARRAY AZIMUTH: 110 MATERIAL: COMP SHINGLE STORY: 2 STORIES

LEGEND

- (M) (E) UTILITY SERVICE METER
- (LC) LOAD CENTER
- (AC) AC DISCONNECT
- (GATEWAY) GATEWAY
- (ESS) ENERGY STORAGE SYSTEM
- (ESS+INV) ENERGY STORAGE SYSTEM W/ SOLAR INVERTER

NORTH CAROLINA PROFESSIONAL SEAL 051417 ENGINEER YONG HENG ZHU

Structural Only
NC Firm D-0427
Digitally signed by yonzhu
Date: 2025-05-07 21:44:19 -07:00

WARNING LABELS PROVIDED AT APPLICABLE EQUIPMENT

- STANDOFF LOCATIONS
- CONDUIT RUN
- GATE/FENCE
- HEAT PRODUCING VENTS ARE RED
- INTERIOR EQUIPMENT / CONDUIT IS DASHED

SITE PLAN

Scale: 3/32" = 1'

0 1' 10' 21'

N W E S

JOB NUMBER: JB-2752635 00

MOUNTING SYSTEM: ZS Comp V4 w Flashing-Insert

MODULES: (39) Hanwha Q Cells Q.PEAK DUO BLK ML-G10+/TS 410

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

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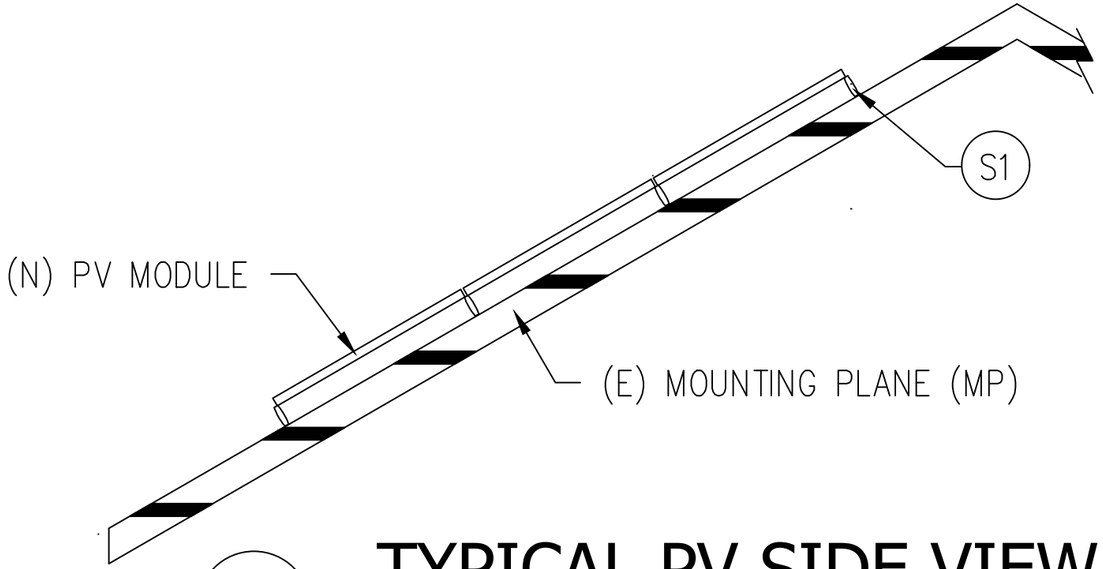
27 KWH ENERGY STORAGE SYSTEM

PAGE NAME: SITE PLAN

DESIGN: Raul Zepeda Lastra

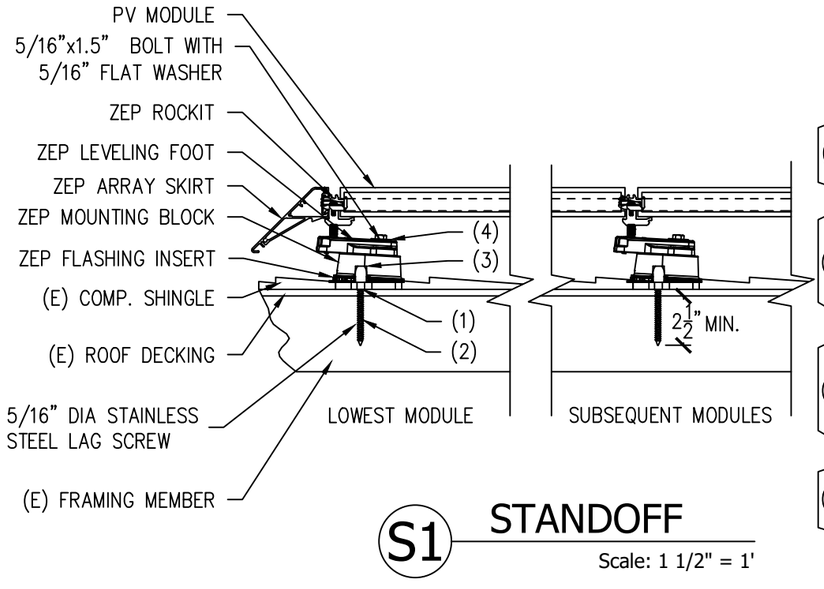
SHEET: 2 REV: D DATE: 5/7/2025

TESLA



SV TYPICAL PV SIDE VIEW

NTS



INSTALLATION ORDER	
(1)	LOCATE FRAMING MEMBER, MARK HOLE LOCATION, AND DRILL PILOT HOLE.
(2)	ATTACH FLASHING INSERT TO MOUNTING BLOCK AND ATTACH TO FRAMING MEMBER USING LAG SCREW.
(3)	INJECT SEALANT INTO FLASHING INSERT PORT, WHICH SPREADS SEALANT EVENLY OVER THE ROOF PENETRATION.
(4)	INSTALL LEVELING FOOT ON TOP OF MOUNTING BLOCK & SECURELY FASTEN WITH BOLT.

S1 STANDOFF

Scale: 1 1/2" = 1'

NORTH CAROLINA PROFESSIONAL SEAL 051417 ENGINEER YONG HENG ZHU

Structural Only
NC Firm D-0427
Digitally signed by yonzhu
Date: 2025-05-07 21:44:20 -07:00

JOB NUMBER: JB–2752635 00

MOUNTING SYSTEM: ZS Comp V4 w Flashing–Insert

MODULES: (39) Hanwha Q Cells Q.PEAK DUO BLK ML–G10+/TS 410

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

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9199468284

DESCRIPTION:
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27 KWH ENERGY STORAGE SYSTEM

PAGE NAME: STRUCTURAL VIEWS

DESIGN: Raul Zepeda Lastra

SHEET: 3 REV: D DATE: 5/7/2025

TESLA

Structural Only
NC Firm D-0427
Digitally signed by yonzhu
Date: 2025-05-07 21:44:20 -07:00

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	20	Table 7-1

D

MP Specific Design Information			
MP Name	MP1	MP2	MP3
Roofing	Comp Shingle	Comp Shingle	Comp Shingle
Standoff	ZS Comp V4 w Flashing-Insert	ZS Comp V4 w Flashing-Insert	ZS Comp V4 w Flashing-Insert
Pitch	37	45	45
SL/RLL: PV	7.6	5.8	5.8
SL/RLL: Non-PV	15.0	12.0	12.0
Edge Zone Width	4.7 ft	4.7 ft	4.7 ft
Azimuth	200	290	110
Stories	2	2	2
Rafter Size/Spacing	2x8 @16" OC	2x8 @16" OC	2x8 @16" OC
CJ Size/Spacing	2x8 @16" OC	2x8 @16" OC	2x8 @16" OC
Standoff Spacing and Layout			
MP Name	MP1	MP2	MP3
Applied Wind Zones$_2$	1	1	1
Wind Pressure	-16.77	-16.77	-16.77
Landscape X-Spacing	64	64	64
Landscape X-Cantilever	24	24	24
Landscape Y-Spacing	41	41	41
Landscape Y-Cantilever	-	-	-
Portrait X-Spacing	48	48	48
Portrait X-Cantilever	16	16	16
Portrait Y-Spacing	74	74	74
Portrait Y-Cantilever	-	-	-
Layout	Staggered	Staggered	Staggered
Applied Wind Zones$_2$	2	2	2
Wind Pressure	-20.36	-20.36	-20.36
Landscape X-Spacing	64	64	64
Landscape X-Cantilever	24	24	24
Landscape Y-Spacing	41	41	41
Landscape Y-Cantilever	-	-	-
Portrait X-Spacing	32	32	32
Portrait X-Cantilever	16	15	15
Portrait Y-Spacing	74	74	74
Portrait Y-Cantilever	-	-	-
Layout	Staggered	Staggered	Staggered
Applied Wind Zones$_2$	3	3	3
Wind Pressure	-20.36	-20.36	-20.36
Landscape X-Spacing	64	64	64
Landscape X-Cantilever	24	24	24
Landscape Y-Spacing	41	41	41
Landscape Y-Cantilever	-	-	-
Portrait X-Spacing	32	32	32
Portrait X-Cantilever	16	15	15
Portrait Y-Spacing	74	74	74
Portrait Y-Cantilever	-	-	-
Layout	Staggered	Staggered	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.

JOB NUMBER: JB-2752635 00
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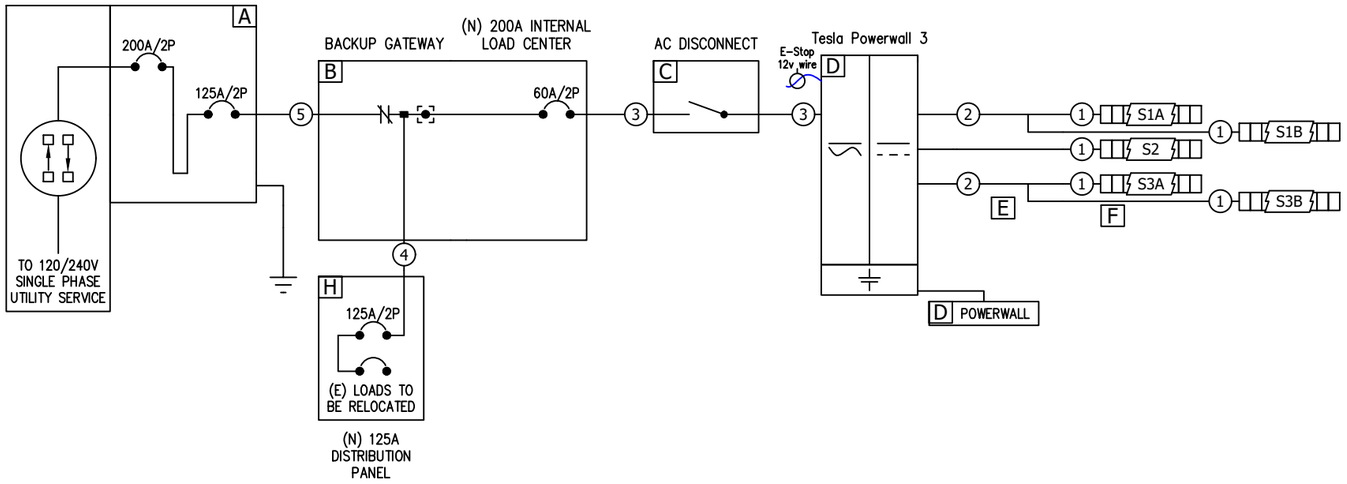
PAGE NAME:
UPLIFT CALCULATIONS

DESIGN:
Raul Zepeda Lastra

SHEET: 4 REV: D DATE: 5/7/2025

TESLA

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



Panel Limit feature for Powerwall unit(s) to be utilized
PCS Controlled Current Setting:
(Panel Rating * 0.8) = 160A
(200A Busbar)

The maximum output current from this system towards the main panel is controlled electronically. Refer to manufacturer's instructions for more information."

net metering/billing

1. 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.
2. SOLAR SHUTDOWN DEVICE TO BE INSTALLED FOR SYSTEM RAPID SHUTDOWN (RSD) IN ACCORDANCE WITH ARTICLE 690 OF THE APPLICABLE NEC.
3. CONDUIT TYPE CAN CHANGE DUE TO SITE CONDITIONS AND WILL FOLLOW THE NEC REQUIREMENTS FOR THAT CONDUIT TYPE.

G — 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

PARTS

Ref	Qty	Description
A	1	Eaton # CH2125: 125A CB; 2-Pole, 120V/240V, 10kAIC, Tan Handle
B	1	Breaker; 60A/2P, 2 Spaces
	1	Tesla # 1841000-XX-Y: Back-up Gateway 3.0 NA for PW
C	1	Disconnect; 60A, 240Vac, Non-Fusible, NEMA 3R: 2P, 2W, Lockable
	1	Ground/Neutral Kit; 60-100A, General Duty (DG)
D	1	Powerwall 3 Expansion Tesla Inc [240V] # 1807000-XX-Y 13.5 kWh
	1	Tesla Powerwall 3 [240V] # 1707000-XX-Y 11.5 kW / 13.5 kWh
E	2	MC4-EVO 2 Y CONNECTOR, PLUG (MALE)
	2	MC4-EVO2 Y CONNECTOR, SOCKET (FEMALE)
F	14	Tesla MCI, 650V, 12A
G	1	UL 508 Emergency Stop Device - NEMA 4X
H	1	Load Center;125A,Convertible,NEMA3R,12sp/24Cir,120v/240v,10kAIC,Surface
	1	Breaker; 125A, Main, For 100A and 125A panels, Field-Installable, 22 kAIR

DC CONDUCTOR TABLE

Ref	Type	Qty	Size (AWG, Cu)	EGC (AWG, Cu)	Conduit	Isc (ADC)	Imp (ADC)
1	PV Wire	2	#10	#10	3/4" EMT	11.10	10.65
2	PV Wire	2	#10	#10	3/4" EMT	22.20	21.30

AC CONDUCTOR TABLE

Ref	Type	Qty	Size (AWG)		Min EGC (AWG, Cu)	Conduit		Length (ft)	Imp (AAC)	Vmp (VAC)
			(Cu)	(Al)		(Cu)	(Al)			
3	THWN-2	3	#06	#04	#10	PVC Jacketed MC	1" EMT	5ft	48	240
4	THWN-2	3	#01	#2/0	#06	1 1/4" EMT	2" PVC	2ft	-	240
5	THWN-2	3	#01	#2/0	#06	1 1/4" EMT	2" PVC	2ft	-	240

STRING TABLE

Product Ref	String Ref	Module per String	MCI per String	Voc* (VDC)	Vmp (VDC)	Mounting Plane
D	S3B	3	1	148.77	112.92	MP3
	S3A	3	1	148.77	112.92	MP2
	S2	11	4	545.50	414.04	MP1
	S1B	11	4	545.50	414.04	MP1
	S1A	11	4	545.50	414.04	MP1

SITE SPECIFICATIONS

Main Panel Rating	(E) 200A
Main Breaker Rating	(E) 200A
General Notes	DC Ungrounded Inverters
Panel Number	CMBX1212B200BTS
Meter Number	349491462
Service Entrance	Underground

MODULE SPECIFICATIONS

Hanwha Q Cells Q.PEAK DUO BLK ML-G10.a+/TS 410: PV Mod, 410W, 381.0PTC, ZEP, Blk Frm, Blk Backsht, MC4, 1kV

Qty	39
Voc	45.31
Vmp	37.64

Isc and Imp are in the DC Conductor Table

JOB NUMBER: JB-2752635 00
MOUNTING SYSTEM: ZS Comp V4 w Flashing-Insert
MODULES: (39) Hanwha Q Cells Q.PEAK DUO BLK ML-G10+/TS 410
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PAGE NAME:
THREE LINE DIAGRAM

DESIGN:
Raul Zepeda Lastra

SHEET: 5 REV: D DATE: 5/7/2025

TESLA

WARNING: PHOTOVOLTAIC POWER SOURCE

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

DC PHOTOVOLTAIC DISCONNECT

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

MAXIMUM POWER-POINT CURRENT (Imp) ____ A
MAXIMUM POWER-POINT VOLTAGE (Vmp) ____ V
MAXIMUM SYSTEM VOLTAGE (Voc) ____ V
SHORT-CIRCUIT CURRENT (Isc) ____ A

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

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

⚠ 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

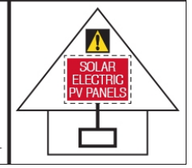
⚠ WARNING

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

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

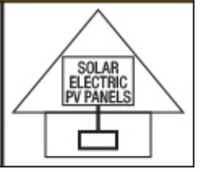
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT



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

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY.



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

(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:
408.4

CAUTION
DO NOT ADD NEW LOADS

Label Location:
(BLC)
Per Code:
220

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

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

CAUTION
DUAL POWER SOURCE
SECOND SOURCE IS
ENERGY STORAGE SYSTEM

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

ENERGY STORAGE SYSTEM ON SITE
LOCATED WITHIN LINE OF SIGHT

Label Location:
(MSP)
Per Code:
706.7.E

ENERGY STORAGE SYSTEM ON SITE
LOCATED ON ADJACENT WALL

Label Location:
(MSP)
Per Code:
706.7.E

ENERGY STORAGE SYSTEM ON SITE
LOCATED ON OPPOSITE WALL

Label Location:
(MSP)
Per Code:
706.7.E

ENERGY STORAGE SYSTEM ON SITE
LOCATED INSIDE

Label Location:
(MSP)
Per Code:
706.7.E

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

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

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:
706.7.D (Label to be marked in field per code)

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

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	1841000-01-y
Nominal Grid Voltage	120/240 V AC
Grid Configuration	Split phase
Grid Frequency	60 Hz
Continuous Current Rating	200 A
Maximum Supply Short Circuit Current	22 kA with Square D or Eaton main breaker 25 kA with Eaton main breaker[1]
IEC Protective Class	Class I
Overvoltage Category	Category IV

[1]Only Eaton CSR or BWH main breakers are 25 kA rated

AC Meter	Revenue accurate (+/- 0.5%)
Communication	CAN
User Interface	Tesla App
Backup Transition	Automatic disconnect for seamless backup
Overcurrent Protection Device	100–200 A Service entrance rated Eaton CSR, BWH, or BW, or Square D QOM breakers
Internal Panelboard	200 A 8-space/16 circuit breakers Eaton BR, Siemens QP, or Square D HOM breakers rated to 10–125A
Warranty	10 years

Environmental Specifications

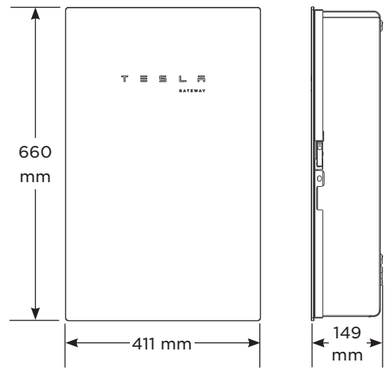
Operating Temperature	–20°C to 50°C (–4°F to 122°F)
Operating Humidity (RH)	Up to 100%, condensing
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R

Compliance Information

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

Mechanical Specifications

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



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[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
Configurable Maximum Continuous Discharge Power Off-Grid (PV Only, -20°C to 25°C)	15.4 kW[3]			
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%[1,4]			
Solar to Home/Grid Efficiency	97.5%[5]			
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[6])			
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] 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.

[4] Typical solar shifting use case.

[5] Tested using CEC weighted efficiency methodology.

[6] 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 [7]
Maximum Short Circuit Current per MPPT (I_{sc})	15 A [7]

[7] 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) [8]
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

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

Compliance Information

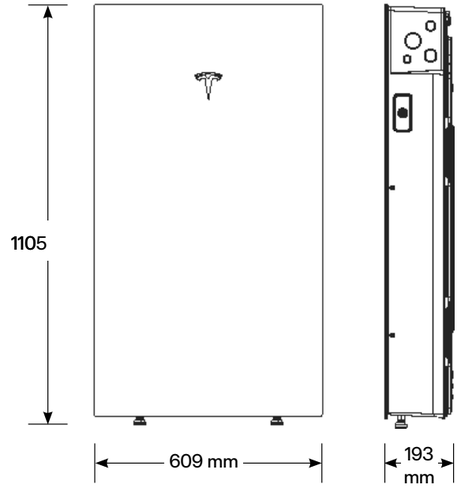
Certifications	UL 1741, UL 9540, UL 9540A, UL 3741, UL 1741 PCS, UL 1741 SA, UL 1741 SB, UL 1973, UL 1699B, UL 1998, CSA C22.2 No. 0.8, CSA C22.2 No. 107.1, CSA C22.2 No. 330, CSA 22.3 No. 9, IEEE 1547, IEEE 1547A, IEEE 1547.1, CA Rule No.21
Grid Connection	United States and Canada
Emissions	FCC Part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

[9] These dimensions include the glass front cover being installed on Powerwall 3.



2024 Powerwall 3 Datasheet

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 [11]

[11] 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) [12]
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

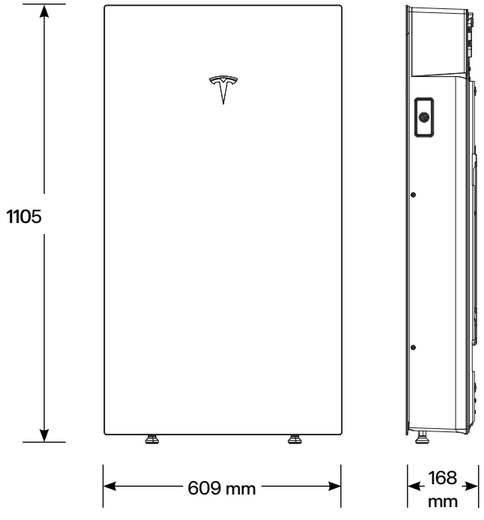
[12] Performance may be de-rated at operating temperatures above 40°C (104°F).

Compliance Information

Certifications	UL 1973, UL 9540

Mechanical Specifications

Dimensions	1105 x 609 x 168 mm (43.5 x 24 x 6.6 in) [13]
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 [14]



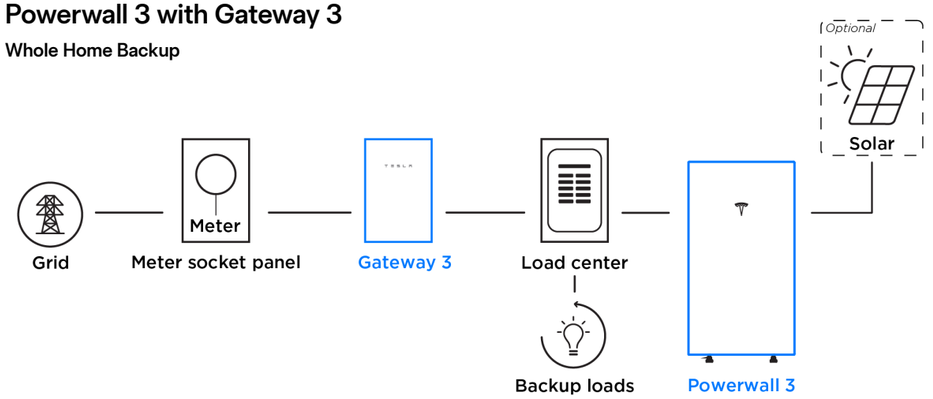
[13] These dimensions include the glass front cover being installed on Powerwall 3 Expansion.

[14] The Powerwall 3 Expansion harness is a listed component of the UL 9540 certification.

Powerwall 3 Example System Configurations

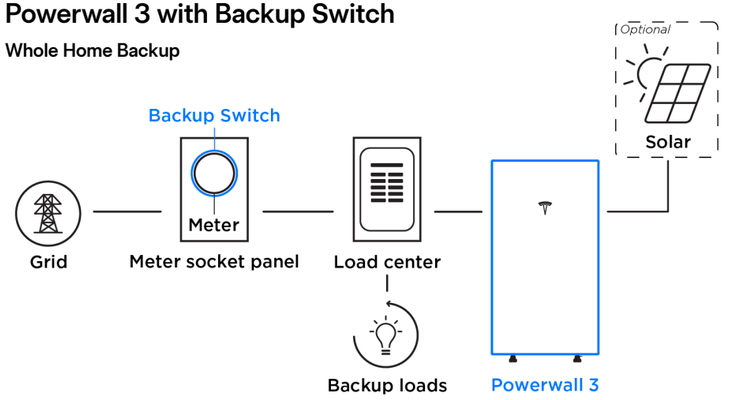
Powerwall 3 with Gateway 3

Whole Home Backup



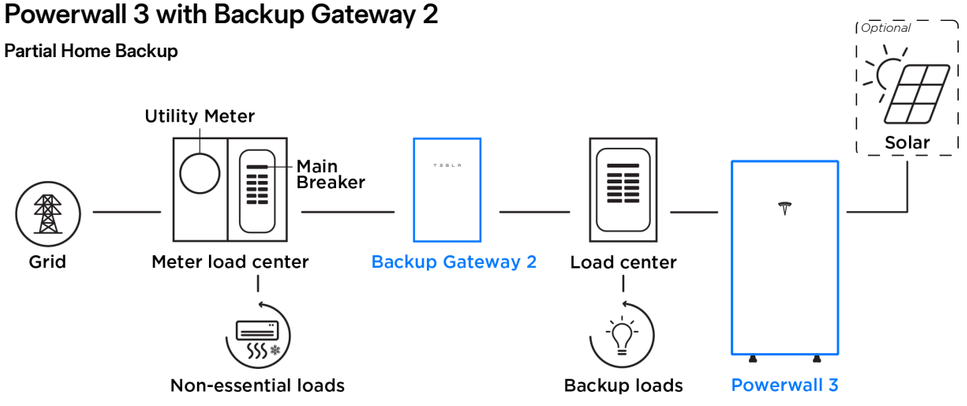
Powerwall 3 with Backup Switch

Whole Home Backup



Powerwall 3 with Backup Gateway 2

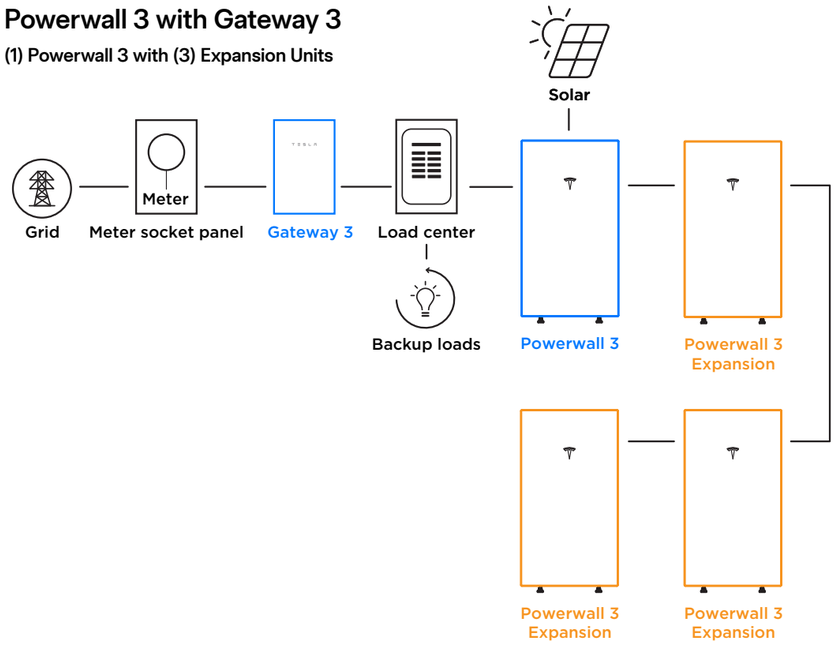
Partial Home Backup



Powerwall 3 Example System Configurations

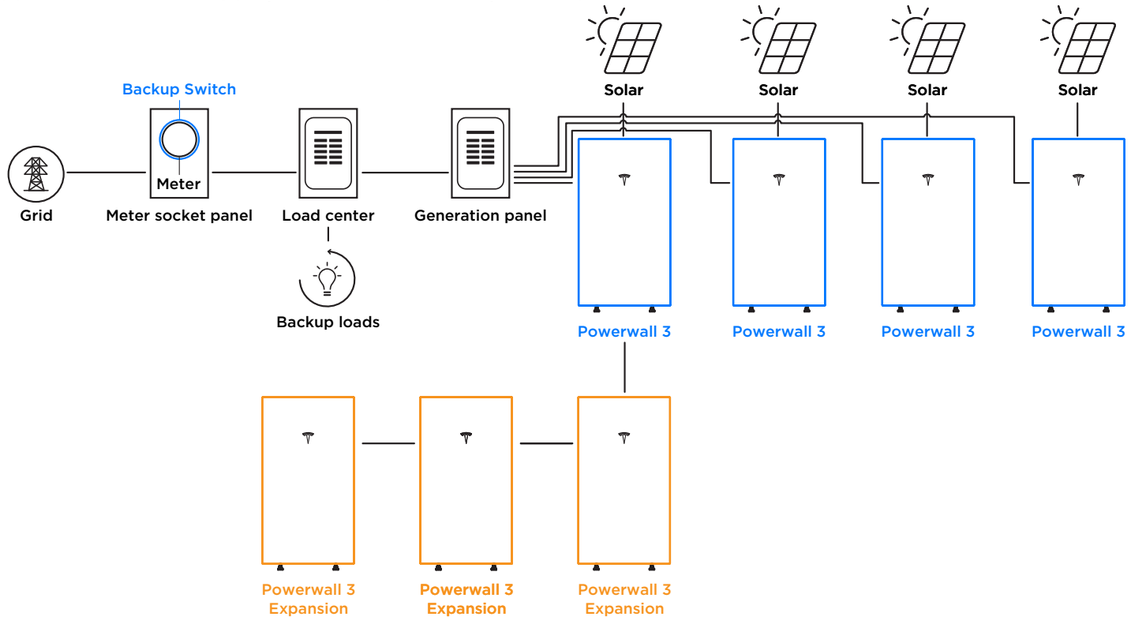
Powerwall 3 with Gateway 3

(1) Powerwall 3 with (3) Expansion Units



Powerwall 3 with Backup Switch

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



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[1].

Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology[2] 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 CompatibleTM 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.

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

The ideal solution for:

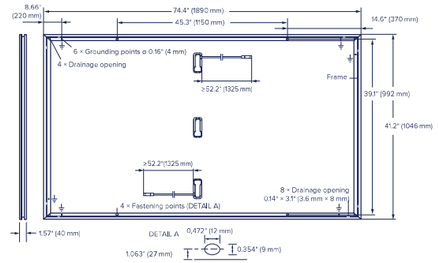
Rooftop arrays on residential buildings

Rooftop arrays on commercial / industrial buildings

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 mm² Solar cable; (+) ≥ 52.2 in (1325 mm), (−) ≥ 52.2 in (1325 mm)
Connector	Stäubli MC4; IP68

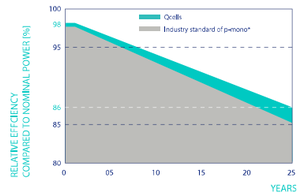


Electrical Characteristics

POWER CLASS			385	390	395	400	405	410	415
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)									
Minimum	Power at MPP[1]	P_{MPP} [W]	385	390	395	400	405	410	415
	Short Circuit Current[1]	I_{SC} [A]	11.04	11.07	11.10	11.14	11.17	11.20	11.23
	Open Circuit Voltage[1]	V_{OC} [V]	45.19	45.23	45.27	45.3	45.34	45.37	45.41
	Current at MPP	I_{MPP} [A]	10.59	10.65	10.71	10.77	10.83	10.89	10.95
	Voltage at MPP	V_{MPP} [V]	36.36	36.62	36.88	37.13	37.39	37.64	37.89
	Efficiency[1]	η [%]	≥ 19.5	≥ 19.7	≥ 20.0	≥ 20.2	≥ 20.5	≥ 20.7	≥ 21.0
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]									
Minimum	Power at MPP	P_{MPP} [W]	288.8	292.6	296.3	300.1	303.8	307.6	311.3
	Short Circuit Current	I_{SC} [A]	8.90	8.92	8.95	8.97	9.00	9.03	9.05
	Open Circuit Voltage	V_{OC} [V]	42.62	42.65	42.69	42.72	42.76	42.79	42.83
	Current at MPP	I_{MPP} [A]	8.35	8.41	8.46	8.51	8.57	8.62	8.68
	Voltage at MPP	V_{MPP} [V]	34.59	34.81	35.03	35.25	35.46	35.68	35.89

[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

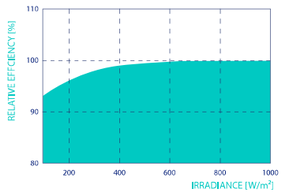


At least 98 % of nominal power during first year. Thereafter max. 0.5 % degradation per year. At least 93.5 % of nominal power up to 10 years. At least 86 % of nominal power up to 25 years.

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/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.34	Nominal Module Operating Temperature	NMOT	[°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]	20	Fire Rating based on ANSI / UL 61730			TYPE 2
Max. Design Load, Push / Pull[3]		[lbs / ft²]	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[3]		[lbs / ft²]	128 (6120 Pa) / 128 (6120 Pa)				

[3] 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),

*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 hqc-inquiry@qcells.com | WEB www.qcells.com

ROOFING SYSTEM SPECIFICATIONS

DESCRIPTION

PV mounting solution for composition shingle roofs.

Works with all Zep Compatible Modules.

Auto bonding UL-listed hardware creates structural and electrical bond.

SPECIFICATIONS

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, 7-16, and 7-22 wind load requirements.

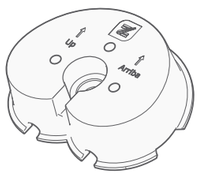
Zep wire management products listed to UL 1565 for wire positioning devices.

ZS Comp grounding products are listed to UL 2703 and UL 467.

ZS Comp bonding products are listed to UL 2703.

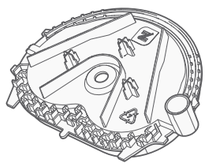
MOUNTING BLOCK

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

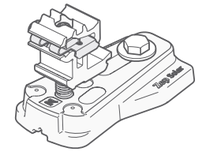
Part #850-1631-002 and #850-1631-004

GROUND ZEP

Listed to UL 2703
Part #850-1511

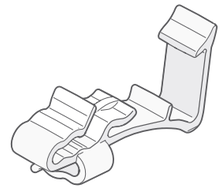
LEVELING FOOT

Listed to UL 2703
Part #850-1397



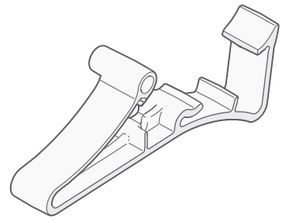
DC WIRE CLIP

Listed to UL 1565
Part #850-1509



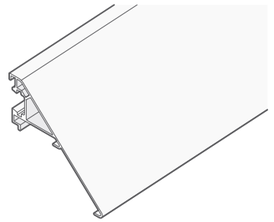
HOME RUN CLIP

Listed to UL 1565
Part #850-1510



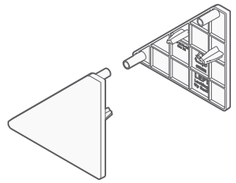
ARRAY SKIRT

Listed to UL 2703
Part #850-1608



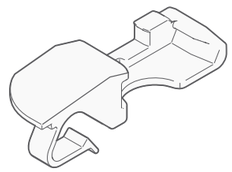
END CAP

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



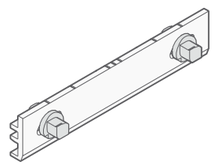
SKIRT GRIP

Listed to UL 2703
Part #850-1606



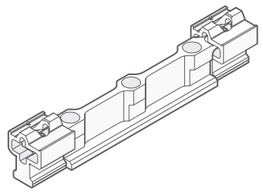
INTERLOCK

Listed to UL 2703
Part #850-1613



HYBRID INTERLOCK

Listed to UL 2703
Part #850-1281



MCI WIRING DETAIL

GENERAL NOTES

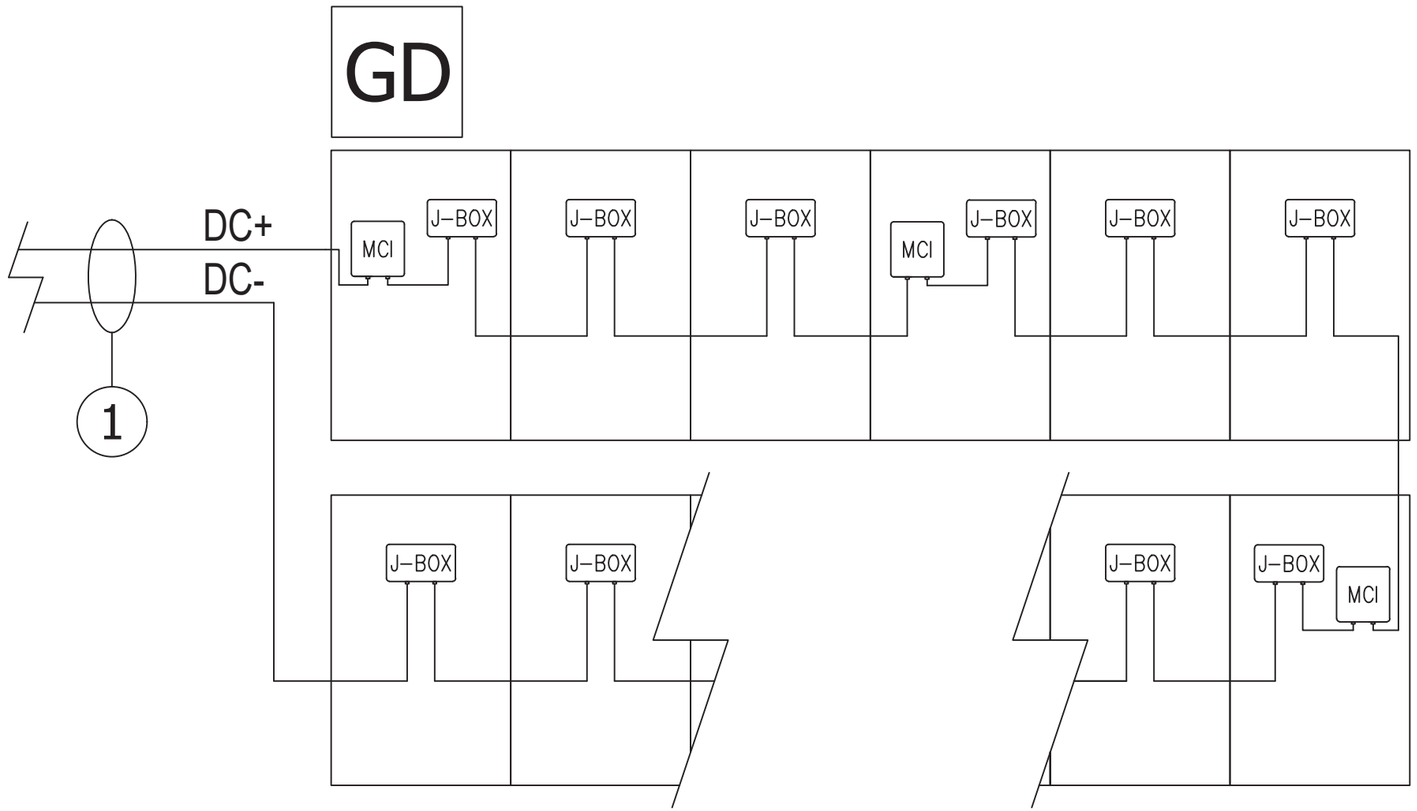
- DRAWING OF STANDARD MCI WIRING DETAIL FOR ANY GIVEN STRING LENGTH
- IF INITIATED, RAPID SHUTDOWN OCCURS WITHIN 30 SECONDS OF ACTIVATION AND LIMITS VOLTAGE ON THE ROOF TO NO GREATER THAN 165V (690.12.B.2.1)
- MID CIRCUIT INTERRUPTER (MCI) IS A UL 1741 PVRSE CERTIFIED RAPID SHUTDOWN DEVICE (RSD)

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

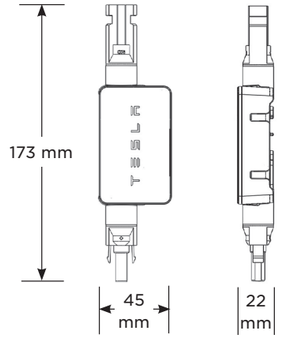
Ambient Temperature	-45°C to 70°C (-49°F to 158°F)
Enclosure Rating	NEMA 4X / IP65

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 [1]
Hanwha	Q.PEAK DUO BLK-G5 or Q.PEAK DUO BLK-G6+	1 Solar Shutdown Device per 3 modules

[1] 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.