## 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

## LICENSE

MODULE GROUNDING METHOD: ZEP SOLAR

AHJ: Harnett County

UTILITY: Duke Energy Progress (NC)

## GENERAL NOTES

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

## VICINITY MAP


## INDEX



REV BY DATE COMMENTS

| REV A | NAME | DATE | COMMENTS |
|---|---|---|---|
| * | * | * | * |
| * | * | * | * |
| * | * | * | * |
| * | * | * | * |



JOB NUMBER: JB-275762 00

MOUNTING SYSTEM: ZEP Standing Seam

MODULES: (36) Hanwha Q-CELLS # Q.Peak DUO BLK-G6+ 340

INVERTER: Multiple Inverters

CUSTOMER:
Sara Butler
111 Dees St
Lillington, NC 27546

DESCRIPTION:
12.24 KW PV ARRAY
27 KWH ENERGY STORAGE SYSTEM

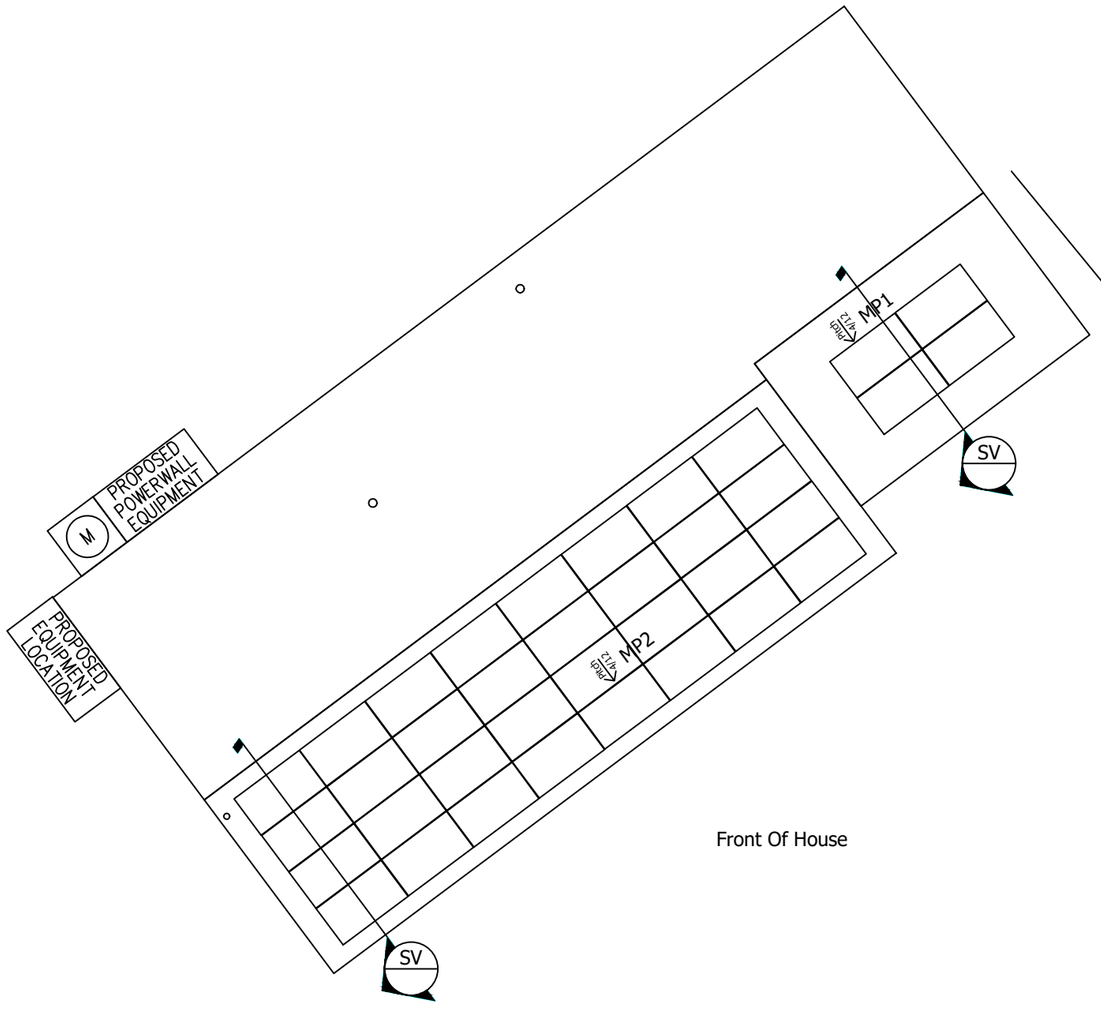
PAGE NAME: COVER SHEET

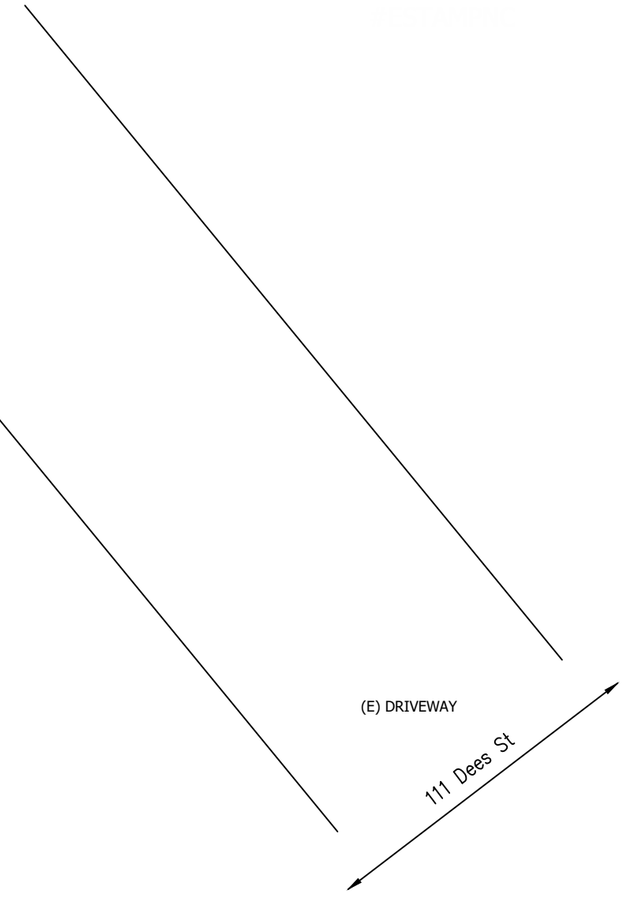
DESIGN: Rodrigo Elvira

SHEET: 1 REV: DATE: 2/15/2021

TESLA

PV ARRAY DEAD LOAD = 3 LBS/SF
MAXIMUM OF 2 LAYERS OF COMP
SHINGLE




| | | |
|---|---|---|
| MP1 | PITCH: 20<br>AZIMUTH: 143<br>MATERIAL: Metal Standing Seam | ARRAY PITCH: 20<br>ARRAY AZIMUTH: 143<br>STORY: 2 Stories |
| MP2 | PITCH: 20<br>AZIMUTH: 143<br>MATERIAL: Metal Standing Seam | ARRAY PITCH: 20<br>ARRAY AZIMUTH: 143<br>STORY: 2 Stories |

## LEGEND

- (M) (E) UTILITY METER & WARNING LABEL
- (Inv) INVERTER W/ INTEGRATED DC DISCO & WARNING LABELS
- RELAY AUTOMATIC RELAY
- DC DISCONNECT & WARNING LABELS
- AC DISCONNECT & WARNING LABELS
- (B) DC JUNCTION/COMBINER BOX & LABELS
- (ESS) ENERGY STORAGE SYSTEM FOR STAND ALONE OPERATION
- (D) DISTRIBUTION PANEL & LABELS
- (LC) LOAD CENTER & WARNING LABELS
- (M) DEDICATED PV SYSTEM METER
- (RSD) 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

Scale: 3/32" = 1'

0 1' 10' 21'

N W E S



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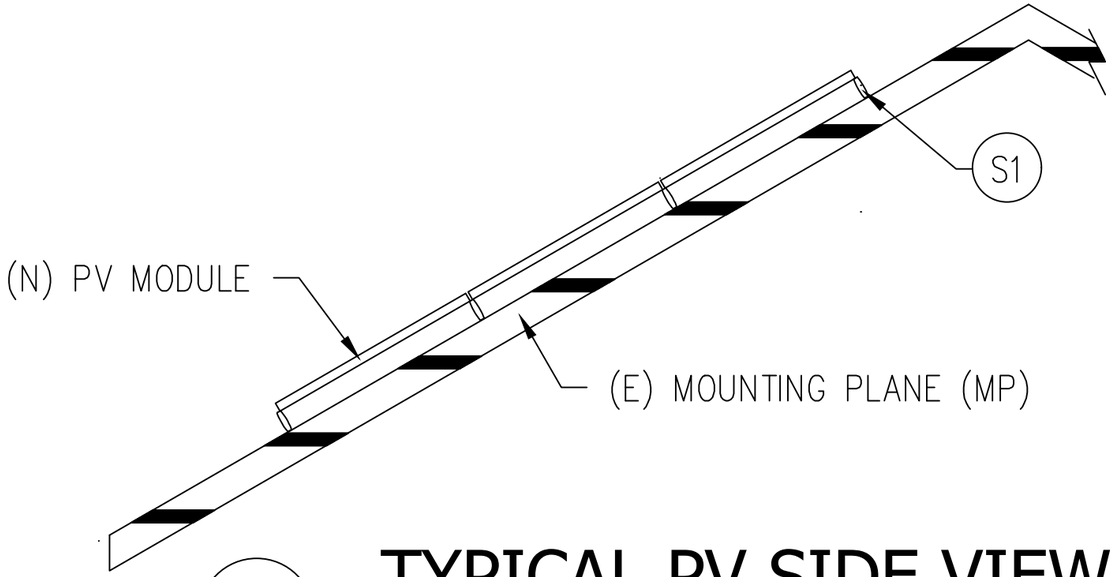
12.24 KW PV ARRAY
27 KWH ENERGY STORAGE SYSTEM

PAGE NAME: SITE PLAN

DESIGN: Rodrigo Elvira

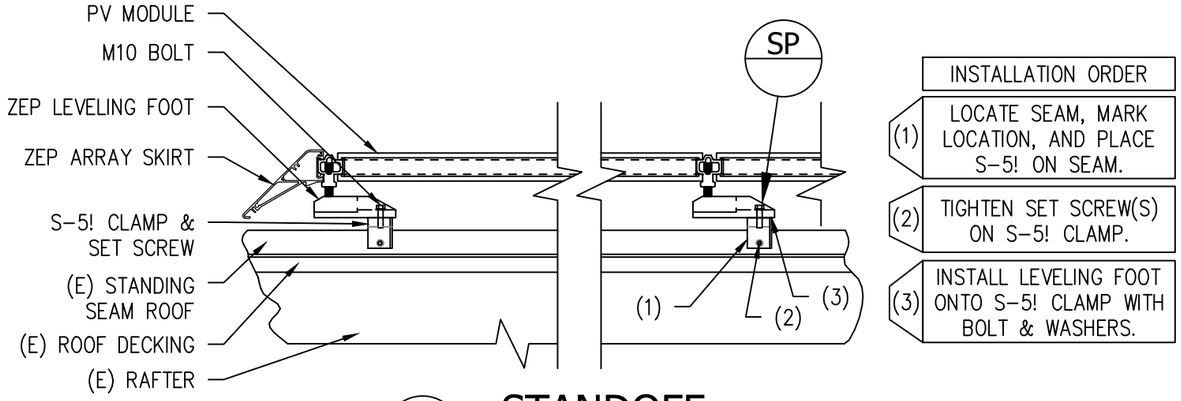
SHEET: 2 REV: DATE: 2/15/2021

TESLA



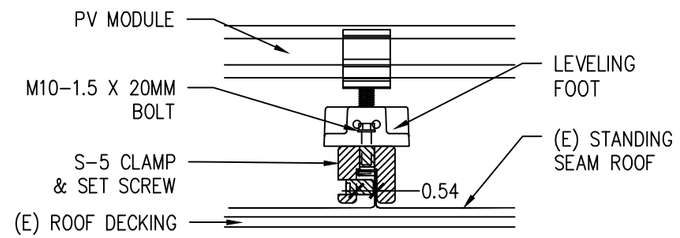

## SV TYPICAL PV SIDE VIEW

NTS




## S1 STANDOFF

Scale: 1 1/2" = 1'




## SP S-5 DETAIL SHOWING SEAM PROFILE

Scale: 3"=1'-0"

INSTALL INSTRUCTIONS:
CLAMPS ARE MADE FOR TYP. STANDING SEAM PROFILES. WHEN ATTACHING THE MACHINE FOLDED SEAMS CLAMPS ARE DESIGNED TO ENGAGE THE SEAM. FOR HORIZONTAL SEAM APPLICATIONS THE SETSCREW MUST BE ACCESSIBLE FROM THE TOP FOR TIGHTENING.

ON MANY SNAP-TOGETHER TYPE SEAMS, THE SETSCREWS ARE OPPOSITE THE OPEN OR OVERLAP SIDE OF THE SEAM. ON SOME SEAMS THIS ASPECT OF THE CLAMP ORIENTATION IS NOT CRITICAL.

INSTALL WITH A SCREW GUN AND INCLUDED SCREW GUN BIT TIP. FOR OPTIMAL HOLDING STRENGTH. SETSCREWS SHOULD BE TENSIONED AND RE-TENSIONED AS THE SEAM MATERIAL COMPRESSES. SCREWS SHOULD BE TENSIONED TO 130 INCH POUNDS USING A CALIBRATED TORQUE WRENCH. THE S-5 HAS FOUR SETSCREWS LOCATIONS TO MAKE THE CLAMP MORE VERSATILE, HOWEVER ONLY TWO SETSCREWS ARE USED PER CLAMP. THE SETSCREWS SHOULD ALWAYS BE PLACED ON THE SAME SIDE OF THE CLAMP.



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INVERTER: Multiple Inverters

CUSTOMER:
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111 Dees St
Lillington, NC 27546

DESCRIPTION:
12.24 KW PV ARRAY
27 KWH ENERGY STORAGE SYSTEM

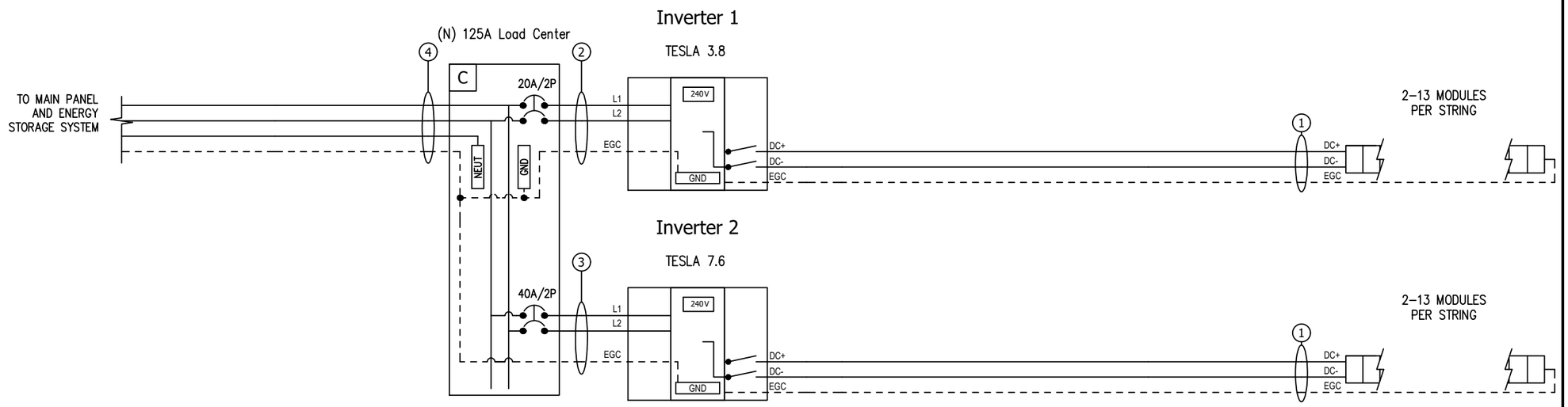
PAGE NAME: STRUCTURAL VIEWS

DESIGN: Rodrigo Elvira

SHEET: 3 REV: DATE: 2/15/2021

TESLA

| GROUND SPECS | | INVERTER SPECS | MODULE SPECS | |
|---|---|---|---|---|
| BOND GEC TO ELECTRODE AT PANEL WITH IRREVERSIBLE CRIMP | | = (1) ~~7.6 kW Tesla Ins 1534000-00-E (240V)~~ | – (36) Hanwha Q-CELLS # Q.Peak DUO BLK-G6+ 340 PV Module; 340W, 318.1 PTC, 40MM, Black Fr, MC4, ZEP, 1000V<br>Voc: 40.66 V Vpmax: 33.94 V<br>Isc AND Imp ARE SHOWN IN THE DC STRINGS IDENTIFIER | |




Rapid Shutdown devices on roof to control conductors inside and outside the array in compliance with 690.12 B 1 & 2

Voc* = MAX VOC AT MIN TEMP

## AC

C — (1) Load Center; 125A, 120/240V, NEMA 3R
— (1) PV BACKFEED BREAKER – 20A
— (1) PV BACKFEED BREAKER – 40A

② 10FT — (1) AWG #10, THWN-2, Black
(1) AWG #10, THWN-2, Red
(1) AWG #10, THWN-2, Green EGC — (1) Conduit Kit; 3/4" EMT
Vmp = 240 VAC Imp= 16 AAC

③ 40FT — (1) AWG #8, THWN-2, Black
(1) AWG #8, THWN-2, Red
(1) AWG #10, THWN-2, Green EGC — (1) Conduit Kit; 3/4" EMT
Vmp = 240 VAC Imp= 32 AAC

④ 10FT — (1) AWG #6, THWN-2, Black
(1) AWG #6, THWN-2, Red
(1) AWG #6, THWN-2, White NEUTRAL
— (1) AWG #10, THWN-2, Green EGC — (1) Conduit Kit; 3/4" EMT
Vmp = 240 VAC Imp= 48 AAC

## DC

GD / PV — Please see MCI wiring detail page for more information
1550379-00-B
MCI, TESLA, 600V, 13A

| | MIN CONDUCTOR SIZE | MAX VALUES |
|---|---|---|
| ① 35FT | (2) AWG #10, PV Wire, 600V, Black | Voc* = 528.58 VDC Isc = 10.52 ADC |
| | (1) AWG #10, THHN/THWN-2, Green EGC | Vmp = 441.22 VDC Imp= 10.02 ADC |
| | (1) Conduit Kit; 3/4" EMT | |



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CUSTOMER:
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111 Dees St
Lillington, NC 27546

DESCRIPTION:
12.24 KW PV ARRAY
27 KWH ENERGY STORAGE SYSTEM

PAGE NAME: THREE LINE DIAGRAM

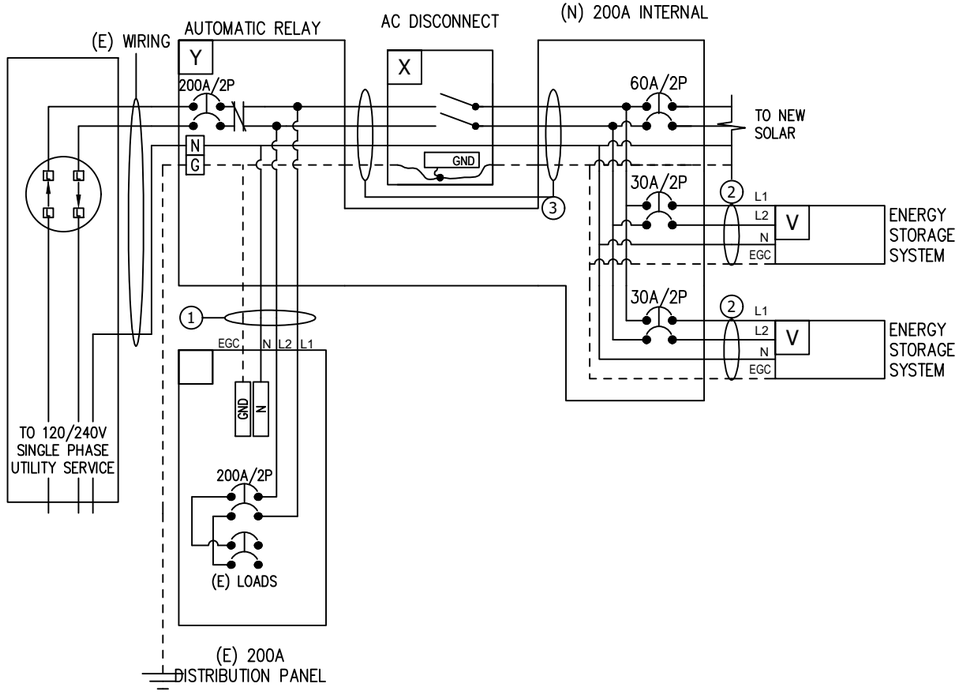
DESIGN: Rodrigo Elvira

SHEET: 4 REV: DATE: 2/15/2021

TESLA

| GROUND SPECS | MAIN PANEL SPECS | GENERAL NOTES | | | LICENSE |
|---|---|---|---|---|---|
| BOND (N) AWG #6 TO (E) GROUND ROD AT PANEL WITH IRREVERSIBLE CRIMP | Panel Number:<br>Meter Number:<br>Underground Service Entrance | * | | | |

(E) 200A MAIN SERVICE PANEL
(E) 200A/2P MAIN CIRCUIT BREAKER




Y
- (1) Tesla # 1232100-00-E Back-up Gateway 2.0 NA for AC PW 2.0
- (1) 200A Main Circuit Breaker; 2-Pole, 240V, 10kAIC
- (2) Breaker; 30A/2P, 2 Spaces
- (1) Breaker; 60A/2P, 2 Spaces
- (1) Panelboard Accessory Kit for GW 2.0 NA 200A, 6sp/12cir, 120/240V, 1PH

X
- (1) Ground/Neutral Kit; 200A General, Heavy Duty (DG, DH), NEMA 1, 3R
- (1) Disconnect; 200A, 240Vac, Non-Fusible, NEMA 3R

V
- (2) 1092170-05-J TESLA AC POWERWALL 2.0; Home Energy Storage,13.5KWH, Stackable, 5.8kVA

AC

① 10ft
- (3) AWG #2/0, THWN-2, Black
- (1) AWG #6, THWN-2, Green
- (1) Conduit 2" PVC; Schedule 80

② 10ft
- (1) AWG #10, THWN-2, Black
- (1) AWG #10, THWN-2, Red
- (1) AWG #10, THWN-2, White
- (1) AWG #10, THWN-2, Green
- (1) Conduit Kit; 1" EMT

③ 10ft
- (3) AWG #2/0, THWN-2, Black
- (1) AWG #6, THWN-2, Green



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PAGE NAME: THREE LINE DIAGRAM CONT.

DESIGN: Rodrigo Elvira

SHEET: 5 REV: DATE: 2/15/2021

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

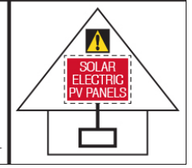
**⚠ WARNING**

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:
(MP)
Per Code:
NEC 705.12.B.2.3.C

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

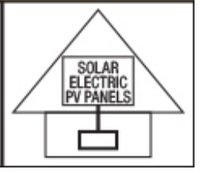
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT




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/Delta M-Series 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

| | | | |
|---|---|---|---|
| | Label Set | | |

BACKUP LOAD CENTER

Label Location:
(BLC)
Per Code:
NEC 408.4

CAUTION
DO NOT ADD NEW LOADS

Label Location:
(BLC)
Per Code:
NEC 220

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

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

CAUTION
DUAL POWER SOURCE
SECOND SOURCE IS
ENERGY STORAGE SYSTEM

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

ENERGY STORAGE SYSTEM ON SITE
LOCATED WITHIN LINE OF SIGHT

Label Location:
(MP)
Per Code:

ENERGY STORAGE SYSTEM ON SITE
LOCATED ON ADJACENT WALL

Label Location:
(MP)
Per Code:

ENERGY STORAGE SYSTEM ON SITE
LOCATED ON OPPOSITE WALL

Label Location:
(MP)
Per Code:

ENERGY STORAGE SYSTEM ON SITE
LOCATED INSIDE

Label Location:
(MP)
Per Code:

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

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

(AC): AC Disconnect
(BLC): Backup Load Center
(MP): Main Panel

| | | | |
|---|---|---|---|
| | Label Set | | |

## S-5! Attachment Hardware

Modern standing seam roofing systems boast that by design, fastening through the weathering membrane is greatly reduced or eliminated. Unfortunately, when it becomes necessary to attach something to the roof, there has never been a way to do it without compromising roof integrity and voiding system warranties. Such attachments have in the past been the source of leaks, panel corrosion and repeated maintenance problems.

**Look at all the things you don't get with S-5!**

- no holes
- no leaks
- no corrosion
- no caulking
- no panel damage
- no wood blocking
- no violation of thermal movement
- no warranty violation
- no maintenance
- no hassles
- no callbacks
- NO PROBLEMS

The S-5! clamp systems now offer a complete solution to the attachment of a wide variety of ancillary rooftop accessories, including HVAC equipment, signage, solar panels, snow retention hardware, gas piping and conduit, rooftop lighting, fascias, equipment screens, parapet bracing, condensate lines, stack and flue bracing, antennae, roof walkways and more.

A variety of S-5! clamp styles are available:


- The **S-5-U** will fit most "structural" and "architectural" panel seam styles.
- The **S-5-Z** is specially designed to fit ZipRib, Kal-Zip and similar profiles.
- The **S-5-B** is a brass clamp, designed for use on double-folded standing seam or traditional batten seam copper.
- The **S-5-E** is an aluminum clamp designed to fit traditional double-folded standing seam profiles.

Metal Roof Innovations, Ltd., also develops custom clamps. We invite you to Contact Us with inquiries about special requirements.

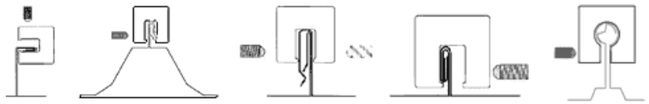
Aluminum clamps are metallurgically compatible with bare or painted galvanized, Galvalume, Aluminized and Galfan coated steel, as well as bare or painted aluminum, stainless and zinc sheet products. In most applications, the clamp should be installed at a location on the seam that avoids the panel's attachment clip location. S-5! clamps may also be used at a clip location, provided the clip is an expansion (dual-component) clip. All aluminum clamps are furnished with a stainless steel bolt and washer (3/8" diameter x 5/8" length; bolt head size is 9/16").

For more detailed installation instructions, see the Installation section.

S-5! clamps attach to the panel seam by the tightening of two "bullet-nosed" stainless steel set screws against the seam material (this is usually done with an industrial grade screwgun). The set screws compress the seam material against the opposite wall of the clamp. They will "dimple" the seam material, but will not penetrate it. Threaded holes in the clamp (and stainless hardware provided) enable the easy attachment of various ancillary items to the clamps.


S-5-U on a vertical seam


S-5-U on a horizontal seam



# POWERWALL

Tesla Powerwall is a fully-integrated AC battery system for residential or light commercial use. Its rechargeable lithium-ion battery pack provides energy storage for solar self-consumption, time-based control, and backup.

Powerwall's electrical interface provides a simple connection to any home or building. Its revolutionary compact design achieves market-leading energy density and is easy to install, enabling owners to quickly realize the benefits of reliable, clean power.


## PERFORMANCE SPECIFICATIONS

| | |
|---|---|
| **AC Voltage (Nominal)** | 120/240 V |
| **Feed-In Type** | Split Phase |
| **Grid Frequency** | 60 Hz |
| **Total Energy**[1] | 14 kWh |
| **Usable Energy**[1] | 13.5 kWh |
| **Real Power, max continuous**[2] | 5 kW (charge and discharge) |
| **Real Power, peak (10s, off-grid/backup)**[2] | 7 kW (charge and discharge) |
| **Apparent Power, max continuous** | 5.8 kVA (charge and discharge) |
| **Apparent Power, peak (10s, off-grid/backup)** | 7.2 kVA (charge and discharge) |
| **Maximum Supply Fault Current** | 10 kA |
| **Maximum Output Fault Current** | 32 A |
| **Overcurrent Protection Device** | 30 A |
| **Imbalance for Split-Phase Loads** | 100% |
| **Power Factor Output Range** | +/– 1.0 adjustable |
| **Power Factor Range (full-rated power)** | +/– 0.85 |
| **Internal Battery DC Voltage** | 50 V |
| **Round Trip Efficiency**[1,3] | 90% |
| **Warranty** | 10 years |

[1] Values provided for 25°C (77°F), 3.3 kW charge/discharge power.
[2] In Backup mode, grid charge power is limited to 3.3 kW.
[3] AC to battery to AC, at beginning of life.

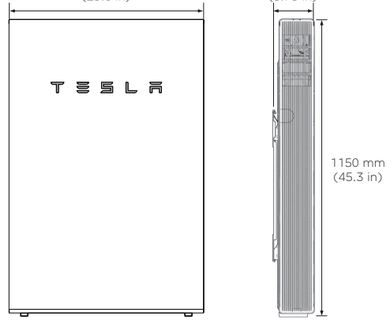
## COMPLIANCE INFORMATION

| | |
|---|---|
| **Certifications** | UL 1642, UL 1741, UL 1973, UL 9540, IEEE 1547, UN 38.3 |
| **Grid Connection** | Worldwide Compatibility |
| **Emissions** | FCC Part 15 Class B, ICES 003 |
| **Environmental** | RoHS Directive 2011/65/EU |
| **Seismic** | AC156, IEEE 693-2005 (high) |

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Dimensions**[1] | 1150 mm x 753 mm x 147 mm (45.3 in x 29.6 in x 5.75 in) |
| **Weight**[1] | 114 kg (251.3 lbs) |
| **Mounting options** | Floor or wall mount |

[1] Dimensions and weight differ slightly if manufactured before March 2019. Contact Tesla for additional information.



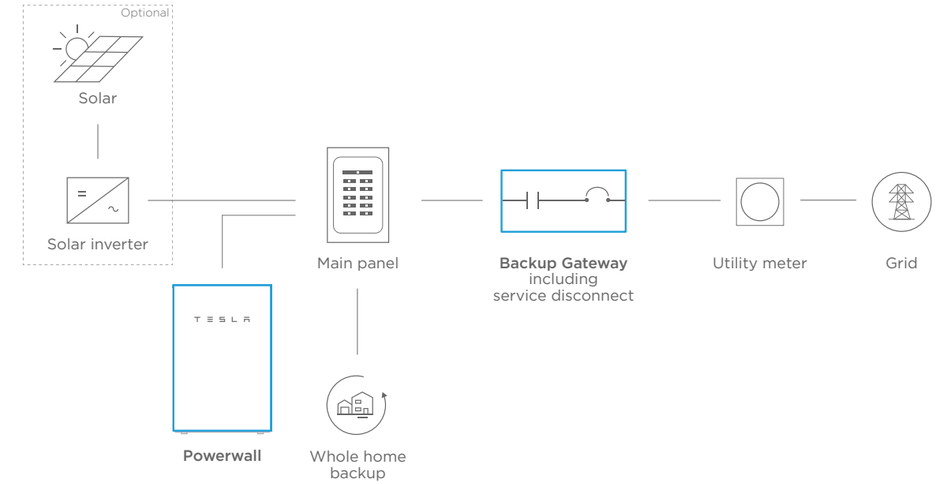

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| **Operating Temperature** | –20°C to 50°C (–4°F to 122°F) |
| **Recommended Temperature** | 0°C to 30°C (32°F to 86°F) |
| **Operating Humidity (RH)** | Up to 100%, condensing |
| **Storage Conditions** | –20°C to 30°C (–4°F to 86°F)<br>Up to 95% RH, non-condensing<br>State of Energy (SoE): 25% initial |
| **Maximum Elevation** | 3000 m (9843 ft) |
| **Environment** | Indoor and outdoor rated |
| **Enclosure Type** | NEMA 3R |
| **Ingress Rating** | IP67 (Battery & Power Electronics)<br>IP56 (Wiring Compartment) |
| **Wet Location Rating** | Yes |
| **Noise Level @ 1m** | < 40 dBA at 30°C (86°F) |

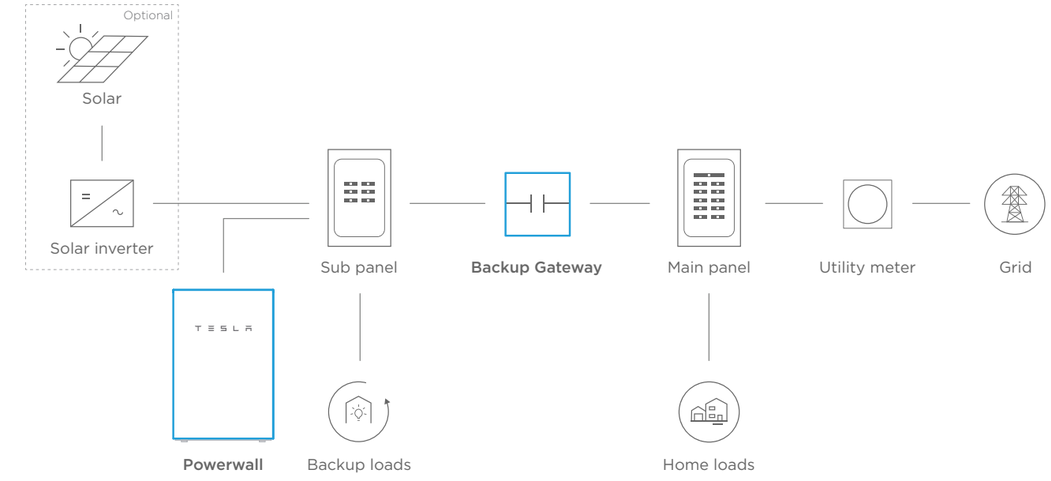


# TYPICAL SYSTEM LAYOUTS

## WHOLE HOME BACKUP

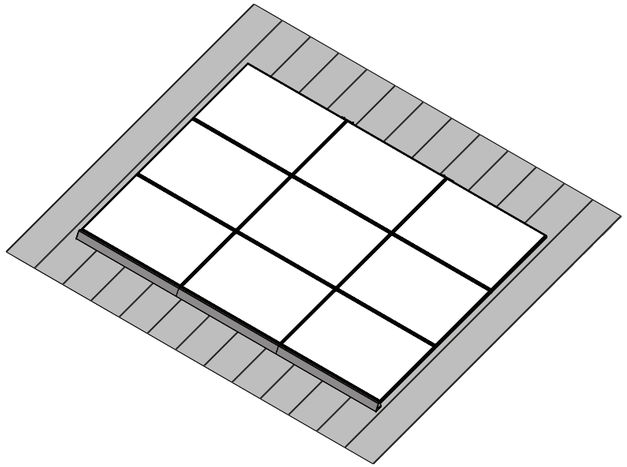



## PARTIAL HOME BACKUP



# ZS Seam

for standing seam metal roofs



ZEP COMPATIBLE

UL LISTED

## Description

- PV mounting solution for standing seam metal 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
- ZS Seam grounding products are UL listed to UL 2703 and UL 467
- ZS Seam bonding products are UL listed to UL 2703
- Engineered for spans up to 72” and cantilevers up to 24”
- Zep wire management products listed to UL 1565 for wire positioning devices





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Date last exported: August 31, 2016 11:00 AM

SolarCity | ZepSolar

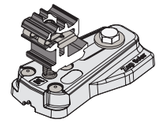
Next-Level PV Mounting Technology

## Components

**Seam Mount**
**S-5-U, S or N**

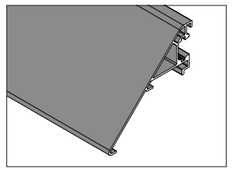
**OR**

**Seam Mount**
**Ace Clamp A-2**



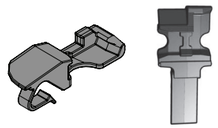
**Leveling Foot**

Part No. 850-1397
Listed to UL 2703



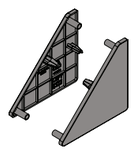
**Array Skirt**

Part No. 850-1608 or 500-0113
Listed to UL 2703



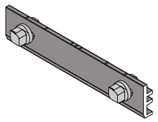
**Grip**

Part No. 850-1606 or 850-1421
Listed to UL 2703



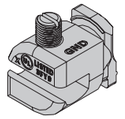
**End Cap**

Part No.
(L) 850-1586 or 850-1460
(R) 850-1588 or 850-1467
Listed to UL 2703



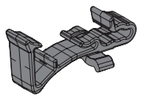
**Interlock**

Part No. 850-1388 or 850-1613
Listed to UL 2703



**Ground Zep V2**

Part No. 850-1511
Listed to UL 467 and UL 2703



**DC Wire Clip**

Part No. 850-1509
Listed to UL 1565



This document does not create any express warranty by Zep Solar or about its products or services. Zep Solar's sole warranty is contained in the written product warranty for each product. The end-user documentation shipped with Zep Solar’s products constitutes the sole specifications referred to in the product warranty. The customer is solely responsible for verifying the suitability of ZepSolar’s products for each use. Specifications are subject to change without notice. Patents and Apps: zspats.com.

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Date last exported: August 31, 2016 11:00 AM

# POWERWALL
## Backup Gateway 2

The Backup Gateway 2 for Tesla Powerwall provides energy management and monitoring for solar self-consumption, time-based control, and backup.

The Backup Gateway 2 controls connection to the grid, automatically detecting outages and providing a seamless transition to backup power. When equipped with a main circuit breaker, the Backup Gateway 2 can be installed at the service entrance. When the optional internal panelboard is installed, the Backup Gateway 2 can also function as a load center.

The Backup Gateway 2 communicates directly with Powerwall, allowing you to monitor energy use and manage backup energy reserves from any mobile device with the Tesla app.

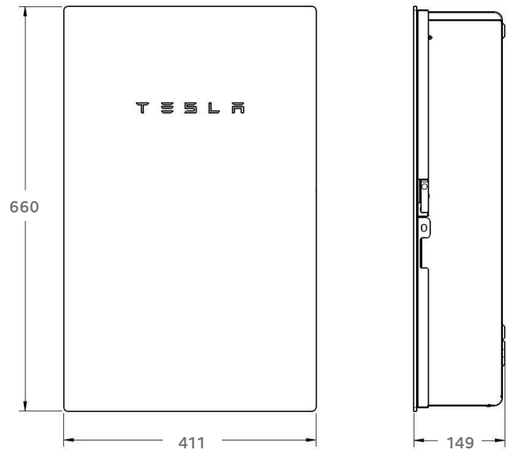

## PERFORMANCE SPECIFICATIONS

| | |
|---|---|
| **AC Voltage (Nominal)** | 120/240V |
| **Feed-In Type** | Split Phase |
| **Grid Frequency** | 60 Hz |
| **Current Rating** | 200 A |
| **Maximum Input Short Circuit Current** | 10 kA[1] |
| **Overcurrent Protection Device** | 100-200A; Service Entrance Rated[1] |
| **Overvoltage Category** | Category IV |
| **AC Meter** | Revenue accurate (+/– 0.2 %) |
| **Primary Connectivity** | Ethernet, Wi-Fi |
| **Secondary Connectivity** | Cellular (3G, LTE/4G)[2] |
| **User Interface** | Tesla App |
| **Operating Modes** | Support for solar self-consumption, time-based control, backup, and off-grid |
| **Backup Transition** | Automatic disconnect for seamless backup |
| **Modularity** | Supports up to 10 AC-coupled Powerwalls |
| **Optional Internal Panelboard** | 200A 6-space / 12 circuit Eaton BR Circuit Breakers |
| **Warranty** | 10 years |

[1] When protected by Class J fuses, Backup Gateway 2 is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.
[2] The customer is expected to provide internet connectivity for Backup Gateway 2; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Dimensions** | 660 mm x 411 mm x 149 mm<br>(26 in x 16 in x 6 in) |
| **Weight** | 20.4 kg (45 lb) |
| **Mounting options** | Wall mount, Semi-flush mount |




## COMPLIANCE INFORMATION

| | |
|---|---|
| **Certifications** | UL 67, UL 869A, UL 916, UL 1741 PCS<br>CSA 22.2 0.19, CSA 22.2 205 |
| **Emissions** | FCC Part 15, ICES 003 |

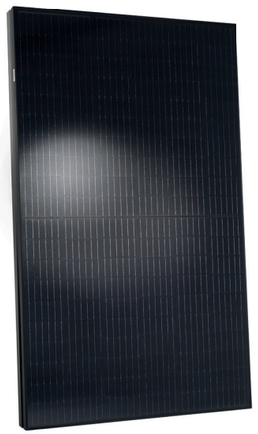
## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| **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 |

# Q.PEAK DUO BLK-G6+ / SC

## 330-345

ENDURING HIGH PERFORMANCE



### Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.5%.

### INNOVATIVE ALL-WEATHER TECHNOLOGY

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

### ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID and Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

### ZEP COMPATIBLE™ FRAME DESIGN

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

### A RELIABLE INVESTMENT

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

### STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (–1500 V, 168 h)
[2] See data sheet on rear for further information

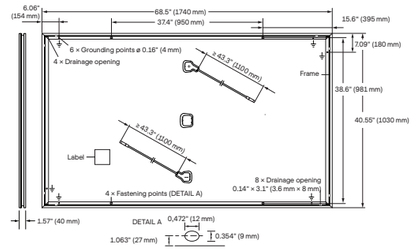
### THE IDEAL SOLUTION FOR:

Rooftop arrays on commercial and industrial buildings

Engineered in Germany

## MECHANICAL SPECIFICATION

| | |
|---|---|
| Format | 68.5 × 40.6 × 1.57 in (including frame) (1740 × 1030 × 40 mm) |
| Weight | 47.4 lbs (21.5 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 × 20 monocrystalline Q.ANTUM solar half cells |
| Junction Box | 2.09–3.98 × 1.26–2.36 × 0.59–0.71 in (53–101 × 32–60 × 15–18 mm), Protection class IP67, with bypass diodes |
| Cable | 4 mm² Solar cable; (+) ≥ 43.3 in (1100 mm), (–) ≥ 43.3 in (1100 mm) |
| Connector | Stäubli MC4; IP68 |

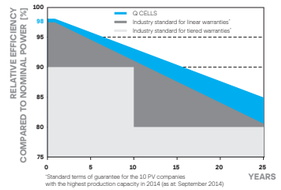



## ELECTRICAL CHARACTERISTICS

| POWER CLASS | | | | 330 | 335 | 340 | 345 |
|---|---|---|---|---|---|---|---|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W) | | | | | | | |
| Minimum | Power at MPP[1] | $P_{MPP}$ | [W] | 330 | 335 | 340 | 345 |
| | Short Circuit Current[1] | $I_{SC}$ | [A] | 10.41 | 10.47 | 10.52 | 10.58 |
| | Open Circuit Voltage[1] | $V_{OC}$ | [V] | 40.15 | 40.41 | 40.66 | 40.92 |
| | Current at MPP | $I_{MPP}$ | [A] | 9.91 | 9.97 | 10.02 | 10.07 |
| | Voltage at MPP | $V_{MPP}$ | [V] | 33.29 | 33.62 | 33.94 | 34.25 |
| | Efficiency[1] | η | [%] | ≥18.4 | ≥18.7 | ≥19.0 | ≥19.3 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2] | | | | | | | |
| Minimum | Power at MPP | $P_{MPP}$ | [W] | 247.0 | 250.7 | 254.5 | 258.2 |
| | Short Circuit Current | $I_{SC}$ | [A] | 8.39 | 8.43 | 8.48 | 8.52 |
| | Open Circuit Voltage | $V_{OC}$ | [V] | 37.86 | 38.10 | 38.34 | 38.59 |
| | Current at MPP | $I_{MPP}$ | [A] | 7.80 | 7.84 | 7.89 | 7.93 |
| | Voltage at MPP | $V_{MPP}$ | [V] | 31.66 | 31.97 | 32.27 | 32.57 |

[1] Measurement tolerances $P_{MPP}$ ±3%; $I_{SC}$; $V_{OC}$ ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

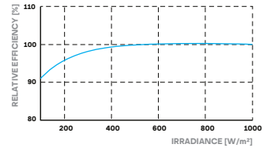
### Q CELLS PERFORMANCE WARRANTY




At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organization of your respective country.

### PERFORMANCE AT LOW IRRADIANCE




Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

| TEMPERATURE COEFFICIENTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Temperature Coefficient of $I_{SC}$ | α | [%/K] | +0.04 | Temperature Coefficient of $V_{OC}$ | β | [%/K] | –0.27 |
| Temperature Coefficient of $P_{MPP}$ | γ | [%/K] | –0.36 | Normal 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) | Protection Class | II |
| Maximum Series Fuse Rating | [A DC] | 20 | Fire Rating based on ANSI / UL 1703 | C (IEC) / TYPE 2 (UL) |
| Max. Design Load, Push / Pull (UL)[3] | [lbs / ft²] | 50 (2400 Pa) / 50 (2400 Pa) | Permitted Module Temperature on Continuous Duty | –40 °F up to +185 °F (–40 °C up to +85 °C) |
| Max. Test Load, Push / Pull (UL)[3] | [lbs / ft²] | 75 (3600 Pa) / 75 (3600 Pa) | | |

[3] See Installation Manual

## QUALIFICATIONS AND CERTIFICATES

UL 1703, CE-compliant, IEC 61215:2016, IEC 61730:2016, Application Class II, U.S. Patent No. 9,893,215 (solar cells)

**Note:** Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

**Hanwha Q CELLS America Inc.**
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748 59 96 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.us

Specifications subject to technical changes © **Q CELLS** Q.PEAK DUO BLK-G6+/SC_330-345_2019-11_Rev01_NA

# 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
- No neutral wire simplifies installation
- 2x the standard number of MPPTs for high production on complex roofs


## 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<br>3,840 VA at 240 V | 6,656 VA at 208 V<br>7,680 VA at 240 V |
| **Maximum Continuous Current** | 16 A | 32 A |
| **Breaker (Overcurrent Protection)** | 20 A | 40 A |
| **Nominal Power Factor** | 1 - 0.85 (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**[1] | 60 - 480 VDC | |
| **Maximum Current per MPPT ($I_{mp}$)** | 11 A | |
| **Maximum Short Circuit Current per MPPT ($I_{sc}$)** | 15 A | |

## PERFORMANCE SPECIFICATIONS

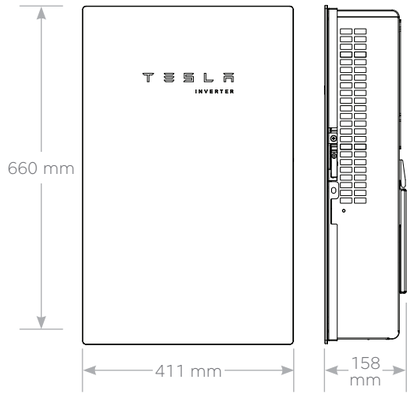
| | | |
|---|---|---|
| **Peak Efficiency**[2] | 97.5% | 98.0% |
| **CEC Efficiency**[2] | 97.5% | |
| **Allowable DC/AC Ratio** | 1.4 | |
| **Customer Interface** | Tesla Mobile App | |
| **Internet Connectivity** | Wi-Fi (2.4 GHz, 802.11 b/g/n), Ethernet, Cellular (LTE/4G)[3] | |
| **AC Remote Metering 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<br>60 Hz, 208 V Wye | |
| **Required Number of Tesla Solar Shutdown Devices per Solar Module** | See *Solar Shutdown Device Requirements per Module* on page 3 | |
| **Warranty** | 12.5 years | |

[1] Maximum current.
[2] Expected efficiency pending final CEC listing.
[3] 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[4] |
| **Mounting options** | Wall mount (bracket) |

[4] Door and bracket can be removed for a mounting weight of 37 lb.




## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| **Operating Temperature**[5] | -30°C to 45°C (-22°F to 113°F) |
| **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 |

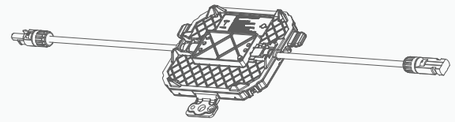
[5] For the 7.6 kW Solar Inverter, performance may be de-rated to 6.2 kW at 240 V or 5.37 kW at 208 V when operating at temperatures greater than 45°C.

## COMPLIANCE INFORMATION

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

# SOLAR SHUTDOWN DEVICE

The Tesla Solar Shutdown Device is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with the Tesla Solar Inverter, the PVRSS is initiated by any loss of AC power.



## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Nominal Input DC Current Rating ($I_{MP}$)** | 12 A |
| **Maximum Input Short Circuit Current ($I_{SC}$)** | 15 A |
| **Maximum System Voltage** | 600 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 |

## COMPLIANCE INFORMATION

| | |
|---|---|
| **Certifications** | UL 1741 PVRSS<br>PVRSA (Photovoltaic Rapid Shutdown Array) |

## PVRSS

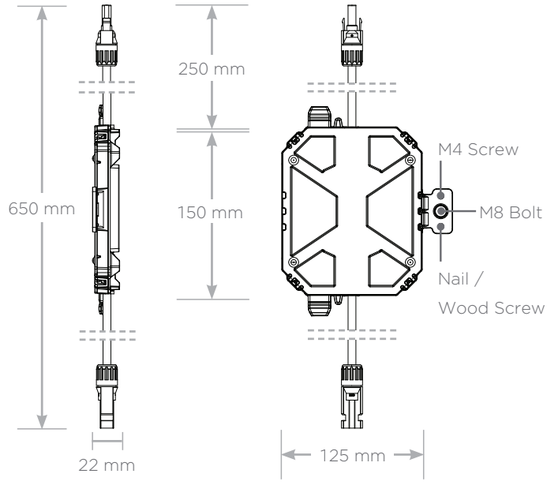
| | |
|---|---|
| **RSD Initiation Method** | Loss of AC power |
| **Compatible Equipment** | Tesla Solar Inverter |

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| **Ambient Temperature** | -40°C to 50°C (-40°F to 122°F) |
| **Storage Temperature** | -30°C to 70°C (-22°F to 158°F) |
| **Enclosure Rating** | NEMA 4 / IP65 |

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Electrical Connections** | MC4 Connector |
| **Housing** | Plastic |
| **Dimensions** | 125 mm x 150 mm x 22 mm<br>(5 in x 6 in x 1 in) |
| **Weight** | 350 g (0.77 lb) |
| **Mounting Options** | ZEP Home Run Clip<br>M4 Screw (#10)<br>M8 Bolt (5/16")<br>Nail / Wood screw |




## SOLAR SHUTDOWN DEVICE REQUIREMENTS PER MODULE

The following modules have been certified as part of a PV Rapid Shutdown Array (PVRSA) when installed together with the Tesla Solar Inverter and Tesla Solar Shutdown Devices. See the Tesla Solar Inverter Installation Manual for guidance on installing Tesla Solar Inverter and Solar Shutdown Devices with other modules.

| Brand | Model | Required Solar Shutdown Devices |
|---|---|---|
| Tesla | Solar Roof V3 | 1 Solar Shutdown Device per 10 modules |
| Hanwha | Q.PEAK DUO BLK-G5 | 1 Solar Shutdown Device per 3 modules |
| Hanwha | Q.PEAK DUO BLK-G6+ | 1 Solar Shutdown Device per 3 modules |