

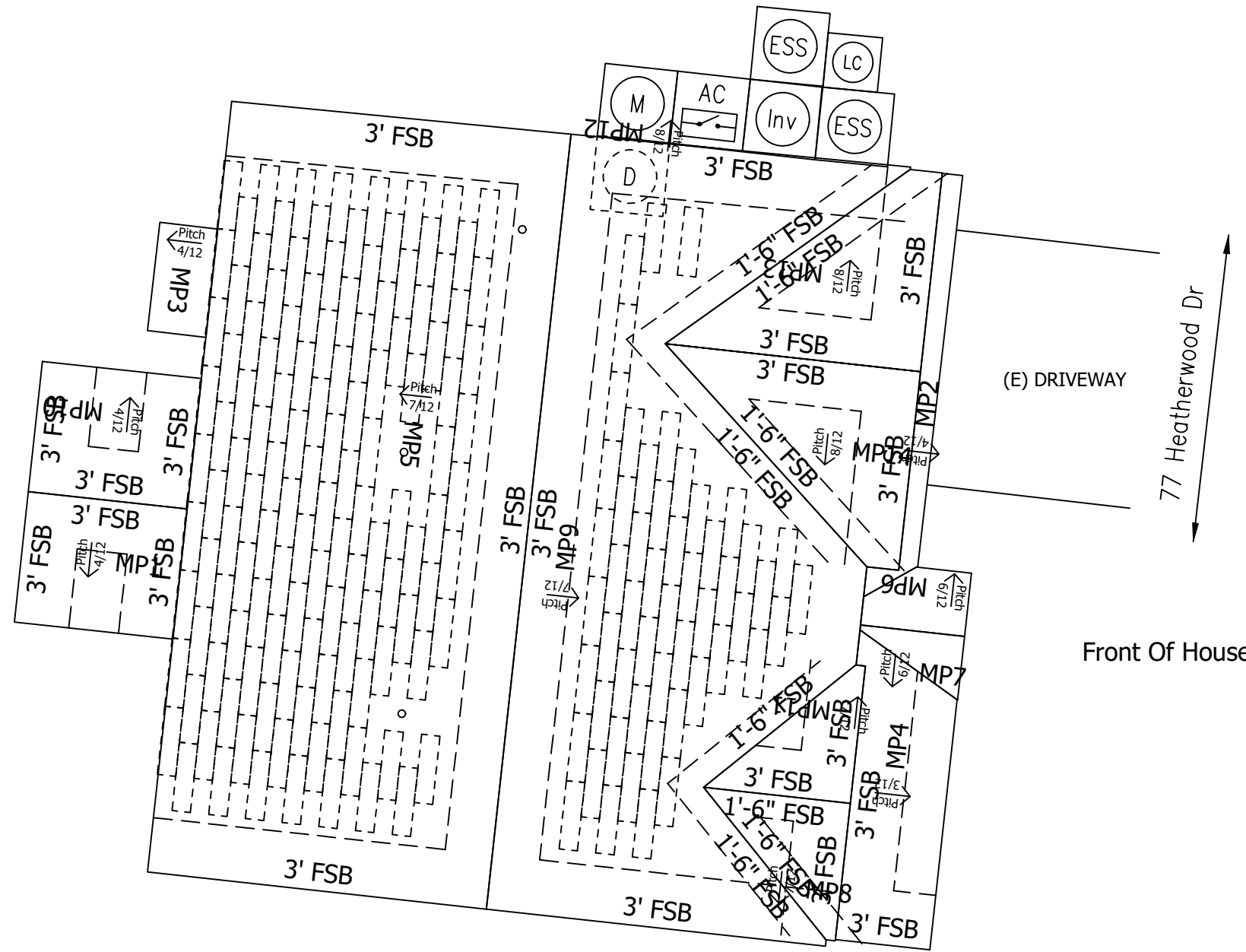
ABBREVIATIONS	ELECTRICAL NOTES	JURISDICTION NOTES
<p>A AMPERE AC ALTERNATING CURRENT BLDG BUILDING CONC CONCRETE DC DIRECT CURRENT EGC EQUIPMENT GROUNDING CONDUCTOR (E) EXISTING EMT ELECTRICAL METALLIC TUBING FSB FIRE SET-BACK GALV GALVANIZED GEC GROUNDING ELECTRODE CONDUCTOR GND GROUND HDG HOT DIPPED 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 MULTI-WIRE 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> </ol>	<p>SOLAR ROOF WILL BE INSTALLED OVER BARE SOLID OR CLOSELY FITTED SHEATHING, AS FOLLOWS:</p> <ul style="list-style-type: none"> <li>DOC PS-1 COMPLIANT / EXTERIOR GRADE PLYWOOD: MINIMUM 15/32" (11.9 MM) THICK OR</li> <li>DOC POS-2 OSB</li> <li>SHEATHING: MINIMUM 7/16" THICK (11.1 MM) OR</li> <li>CLOSELY-FITTED SHEATHING BOARDS: MINIMUM OF 3/4" (19.1 MM) THICK</li> </ul> <p>SOLAR ROOF CAN ALSO BE INSTALLED OVER COMPATIBLE EXISTING ROOFS, AS FOLLOWS:</p> <ul style="list-style-type: none"> <li>THREE-TAB COMPOSITION SHINGLE, SINGLE LAYER</li> <li>ARCHITECTURAL COMPOSITION SHINGLE, SINGLE LAYER</li> </ul> <p>SOLAR ROOF WILL NOT BE INSTALLED OVER RAISED PRESIDENTIAL-STYLE COMPOSITION SHINGLE, ROOFS WITH MORE THAN ONE LAYER OF COMPOSITION SHINGLE, OR EXISTING NON-COMPOSITION SHINGLE ROOF TYPES LIKE TILED ROOFS.</p>



Revised

LICENSE	GENERAL NOTES	VICINITY MAP	INDEX																								
<p>AHJ: Harnett County</p> <p>UTILITY: Central Electric Membership Corp. (NC)</p>	<ol style="list-style-type: none"> <li>ALL WORK SHALL COMPLY WITH THE 2018 NORTH CAROLINA STATE BUILDING CODE.</li> <li>ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.</li> </ol>	<p>Imagery ©2021 Maxar Technologies, USDA Farm Service Agency</p>	<p>Sheet 1 COVER SHEET  Sheet 2 SITE PLAN  Sheet 3 THREE LINE DIAGRAM  Sheet 4 ELECTRICAL LOAD CALCULATIONS  Sheet 5 SITE PLAN PLACARD  Cutsheets Attached</p> <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>	REV	BY	DATE	COMMENTS	REV A	NAME	DATE	COMMENTS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
REV	BY	DATE	COMMENTS																								
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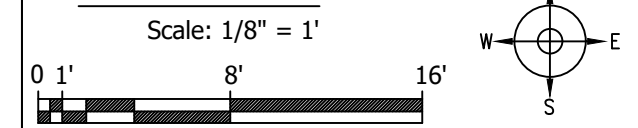


MP9	PITCH: 30° (7:12) ARRAY PITCH: 30° (7:12) AZIMUTH: 96 ARRAY AZIMUTH: 96 MATERIAL: Solar Roof STORY: Two
MP5	PITCH: 30° (7:12) ARRAY PITCH: 30° (7:12) AZIMUTH: 276 ARRAY AZIMUTH: 276 MATERIAL: Solar Roof STORY: Two

### 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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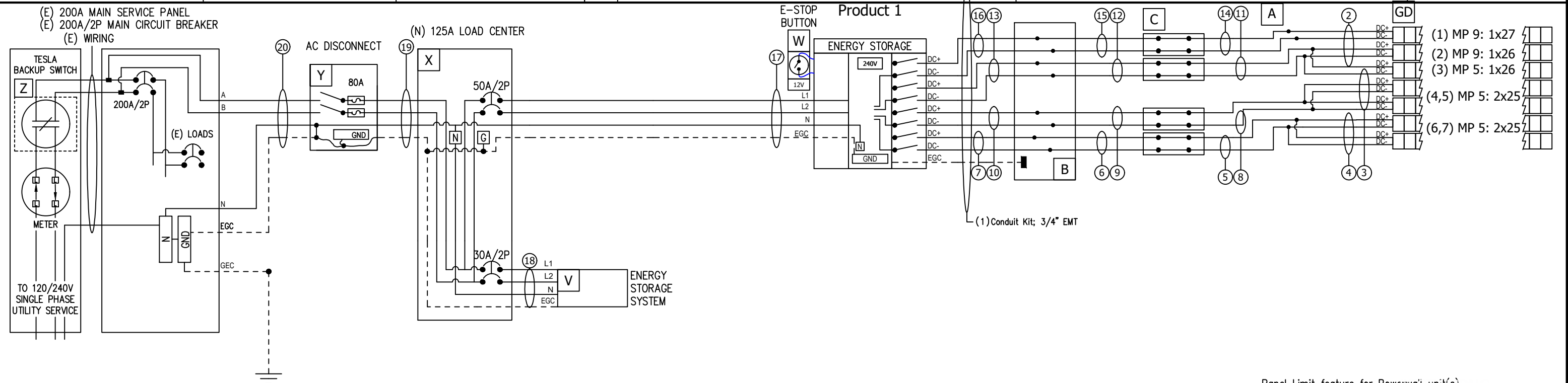
CUSTOMER: Kalim Hasan  
 77 Heatherwood Dr  
 Lillington, NC 27546  
 9109850182

DESCRIPTION: 12.82893 KW PV ARRAY  
 27 KWH ENERGY STORAGE SYSTEM  
 PAGE NAME: SITE PLAN

DESIGN: Diego Trapala  
 SHEET: 2 REV: a DATE: 11/10/2021



MAIN PANEL SPECS	GENERAL NOTES	PRODUCT SPECS	MODULE SPECS	LICENSE
Panel Number: Meter Number: 167022911 Underground Service Entrance	Inv 1: DC Ungrounded	1 - (1) Powerwall+ Tesla Inc [240V] # 1850000-00-B 7.6 kW / 13.5 kWh 2 3	- (179) 1547745-80-A TESLA SR72T2; 71.67 W, 65.40 W PTC  Voc: 14.2 Vpmax: 11.34 Isc AND Imp ARE SHOWN IN THE DC STRINGS IDENTIFIER	



<b>Z</b>	(1) 1624171-00-F Backup Switch	<b>18</b>	(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; 3/4" EMT	<b>13</b>	(1) AWG #10, THWN-2, Black (1) AWG #10, THWN-2, White (1) AWG #10, THWN-2, Green EGC (2) PV Wire, AWG 10, Black Voc* = 406.52VDC Isc = 13.6 ADC Vmp = 294.84VDC Imp = 12.6 ADC - (1) Conduit Kit; 3/4" EMT Voc* = 422.15VDC Isc = 6.8 ADC Vmp = 306.18VDC Imp = 6.3 ADC	<b>GD</b>	- Please see MCI wiring detail page for more information
<b>POI</b>	(2) ILSCO # IPC 4/0-2/0 Insulation Piercing Connector; Main 4/0-2, Tap 2/0-6	<b>19</b>	(1) AWG #4, THWN-2, Red (1) AWG #4, THWN-2, White (1) AWG #8, THWN-2, Green (1) AWG #4, THWN-2, Black (1) AWG #4, THWN-2, Red (1) AWG #4, THWN-2, White - (1) Conduit Kit; 1-1/4" EMT	<b>14</b>	(2) PV Wire, AWG 10, Black (1) Conduit; 3/4" LFMC Voc* = 422.15VDC Isc = 6.8 ADC Vmp = 306.18VDC Imp = 6.3 ADC	<b>A</b>	(2) EE-000550-001 MC4 Y-Connector, Receptacle (2) EE-000550-000 MC4 Y-Connector, Plug
<b>Y</b>	(1) CUTLER-HAMMER #DS16FK Class R Fuse Kit (2) FERRAZ SHAWMUT # TR80R Fuse; 80A, 250V, Class RK5 (1) CUTLER-HAMMER # DG100NB Ground/Neutral Kit; 60-100A, General Duty (DG) (1) CUTLER-HAMMER # DG223NRB Disconnect; 100A, 240Vac, Fusible, NEMA 3R	<b>20</b>	(1) AWG #8, THWN-2, Black (1) AWG #8, THWN-2, Red (1) AWG #10, THWN-2, Green EGC (1) AWG #8, THWN-2, White - (1) Conduit Kit; 3/4" EMT	<b>15</b>	(2) PV Wire, AWG 10, Black (1) Conduit; 3/4" LFMC Voc* = 422.15VDC Isc = 6.8 ADC Vmp = 306.18VDC Imp = 6.3 ADC	<b>PV</b>	(2) Tesla MCI, 600V, 13A
<b>X</b>	(1) SQUARE D # HOM1224L125PRB Load Center; 125A, Convertible, NEMA 3R, 12sp/24Cir, 120v/240v, 10kAIC, Surface (1) SQUARE D # HOM250 Breaker; 50A/2P, 2 Spaces (1) SQUARE D # HOM230 Breaker; 30A/2P, 2 Spaces	<b>17</b>	(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	<b>16</b>	(1) AWG #10, THWN-2, Black (1) AWG #10, THWN-2, White (1) AWG #10, THWN-2, Green EGC (1) Conduit Kit; 3/4" EMT Voc* = 422.15VDC Isc = 6.8 ADC Vmp = 306.18VDC Imp = 6.3 ADC	<b>1</b>	(2) PV Wire, AWG 10, Black Voc* = 422.15VDC Isc = 6.8 ADC Vmp = 306.18VDC Imp = 6.3 ADC
<b>W</b>	(1) Eaton M22-PVT-K01 Emergency Stop Button	<b>AC</b>		<b>7</b>	(1) AWG #10, THWN-2, Black (1) AWG #10, THWN-2, White (1) AWG #10, THWN-2, Green EGC (2) PV Wire, AWG 10, Black Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC - (1) Conduit Kit; 3/4" EMT Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC	<b>2</b>	(4) PV Wire, AWG 10, Black Voc* = 406.52VDC Isc = 6.8 ADC Vmp = 294.84VDC Imp = 6.3 ADC
<b>V</b>	(1) 3012170-05-B ASY, AC POWERWALL 2.1, 5KW, 13.5KWH, M48	<b>B</b>	(1) AWG #8, THWN-2, Black (1) AWG #8, THWN-2, Red (1) AWG #10, THWN-2, Green EGC (1) AWG #8, THWN-2, White - (1) Conduit Kit; 3/4" EMT Vmp = 240 VAC Imp = 32 AAC	<b>8</b>	(2) PV Wire, AWG 10, Black (1) Conduit; 3/4" LFMC Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC	<b>3</b>	(4) PV Wire, AWG 10, Black Voc* = 390.88VDC Isc = 6.8 ADC Vmp = 283.5 VDC Imp = 6.3 ADC
		<b>C</b>		<b>9</b>	(2) PV Wire, AWG 10, Black (1) Conduit; 3/4" LFMC Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC	<b>4</b>	(4) PV Wire, AWG 10, Black Voc* = 390.88VDC Isc = 6.8 ADC Vmp = 283.5 VDC Imp = 6.3 ADC
		<b>ENERGY STORAGE SYSTEM</b>		<b>10</b>	(1) AWG #10, THWN-2, Black (1) AWG #10, THWN-2, White (1) AWG #10, THWN-2, Green EGC (2) PV Wire, AWG 10, Black Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC Voc* = 406.52VDC Isc = 13.6 ADC Vmp = 294.84VDC Imp = 12.6 ADC	<b>5</b>	(2) PV Wire, AWG 10, Black Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC
		<b>ENERGY STORAGE SYSTEM</b>		<b>11</b>	(2) PV Wire, AWG 10, Black (1) Conduit; 3/4" LFMC Voc* = 406.52VDC Isc = 13.6 ADC Vmp = 294.84VDC Imp = 12.6 ADC	<b>6</b>	(2) PV Wire, AWG 10, Black (1) Conduit; 3/4" LFMC Voc* = 390.88VDC Isc = 13.6 ADC Vmp = 283.5 VDC Imp = 12.6 ADC

Voc\* = MAX VOC AT MIN TEMP

Panel Limit feature for Powerwall unit(s) to be utilized  
Field label to be at the point of interconnection:  
"PCS Controlled Current Setting: 200A  
The maximum output current from this system towards the main panel is controlled electronically. Refer to manufacturer's instructions for more information."

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JOB NUMBER: JB-275816 00  
MOUNTING SYSTEM: TESLA SOLAR ROOF  
MODULES: (179) 1547745-80-A  
INVERTER: (1) Powerwall+ Tesla Inc [240V] # 1850000-00-B 7.6 kW / 13.5 kWh

CUSTOMER: Kalim Hasan  
77 Heatherwood Dr  
Lillington, NC 27546  
9109850182

DESCRIPTION: 12.82893 KW PV ARRAY  
27 KWH ENERGY STORAGE SYSTEM  
PAGE NAME: THREE LINE DIAGRAM

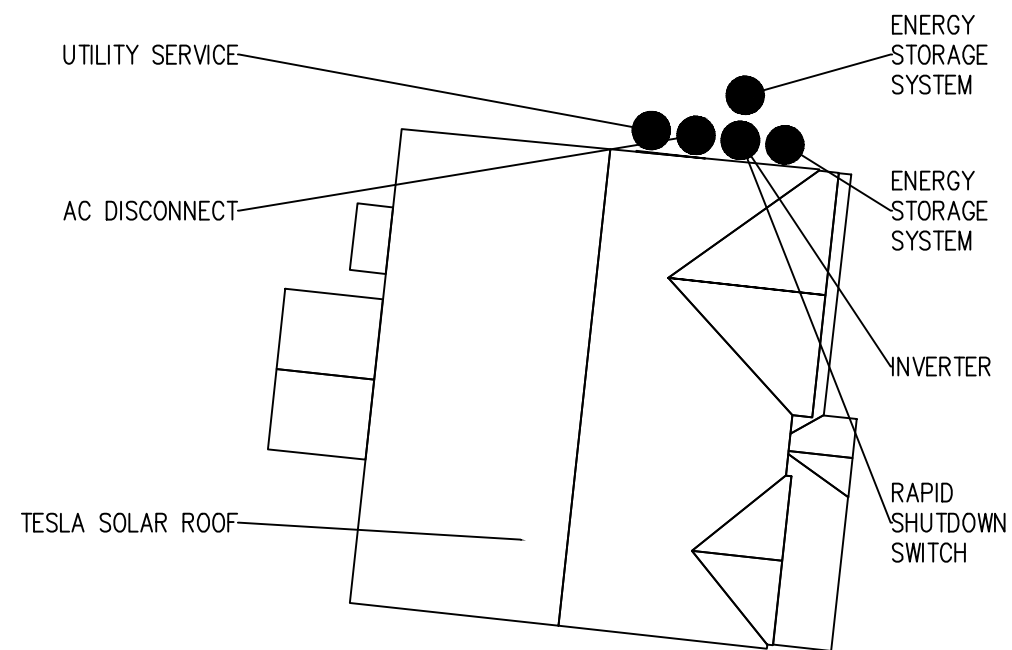
DESIGN: Diego Trapala  
SHEET: 3 REV: DATE: a 11/10/2021



# 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

Address: 77 Heatherwood Dr



OPERATING VOLTAGE = 240

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TESLA SOLAR ROOF

MODULES:  
(179) 1547745-80-A

INVERTER:  
(1) Powerwall+ Tesla Inc [240V] # 1850000-00-B 7.6 kW / 13.5 kWh

CUSTOMER:  
Kalim Hasan  
77 Heatherwood Dr  
Lillington, NC 27546

0109850182

DESCRIPTION:  
12.82893 KW PV ARRAY  
27 KWH ENERGY STORAGE SYSTEM

PAGE NAME:  
SITE PLAN PLACARD

DESIGN:  
Diego Trapala

SHEET: 5 REV: a DATE: 11/10/2021

TESLA

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.

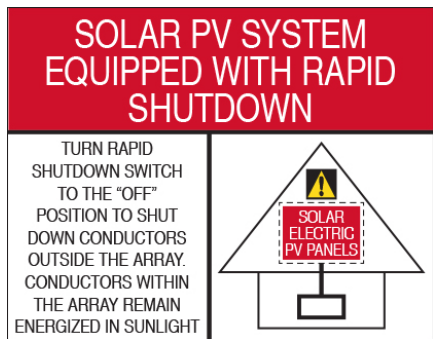
Label Location:  
(MSP)  
Per Code:  
NEC 705.12.B.2.3.C

**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



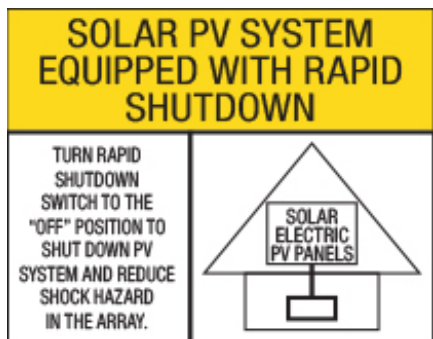
Label Location:  
ABB/Delta Solivia Inverter  
Per Code:  
690.56(C)(1)(b)

**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

## 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 <sup>1</sup>	14 kWh
Usable Energy <sup>1</sup>	13.5 kWh
Real Power, max continuous	5 kW (charge and discharge)
Real Power, peak (10s, off-grid/backup)	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)
Load Start Capability	106 A LRA for each Powerwall
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 <sup>1,2</sup>	90%
Warranty	10 years

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

<sup>2</sup>AC to battery to AC, at beginning of life.

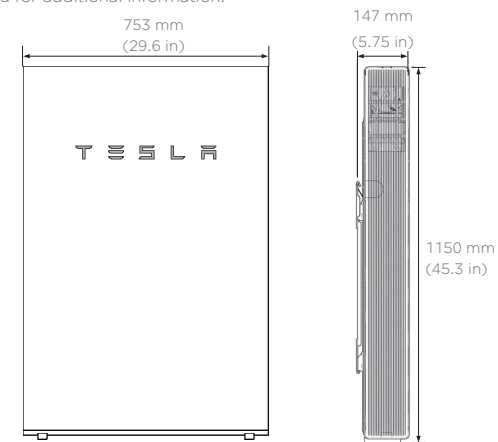
### COMPLIANCE INFORMATION

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 <sup>3</sup>	1150 mm x 753 mm x 147 mm (45.3 in x 29.6 in x 5.75 in)
Weight <sup>3</sup>	114 kg (251.3 lbs)
Mounting options	Floor or wall mount

<sup>3</sup>Dimensions and weight differ slightly if manufactured before March 2019. Contact Tesla for additional information.

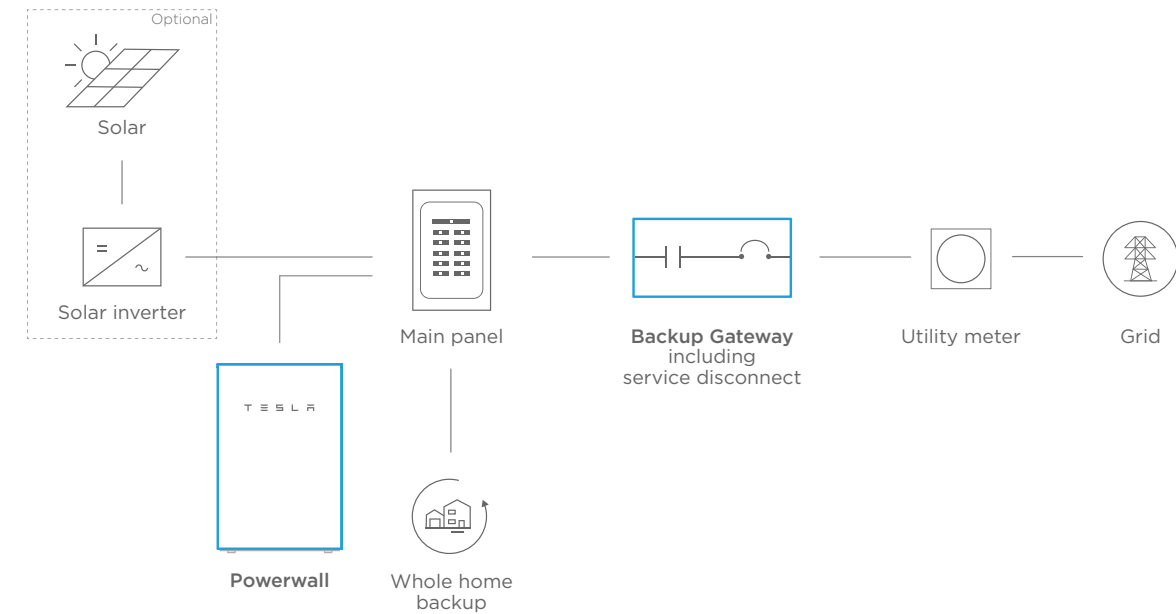


### ENVIRONMENTAL SPECIFICATIONS

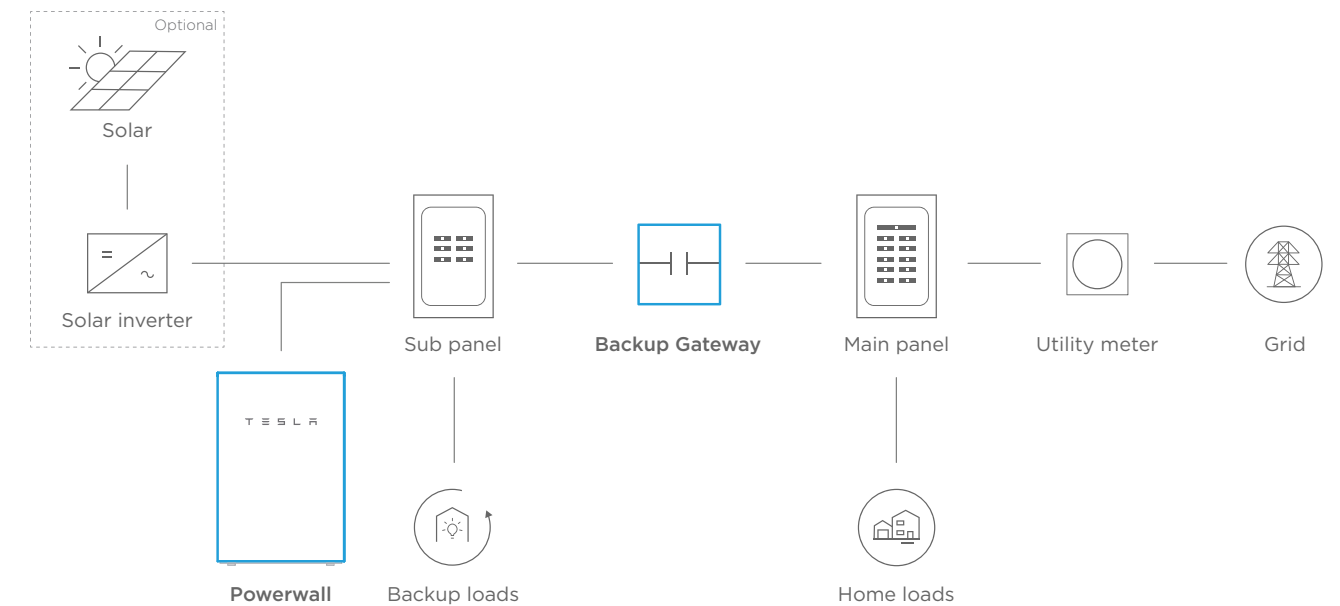
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Recommended Temperature	0°C to 30°C (32°F to 86°F)
Operating Humidity (RH)	Up to 100%, condensing
Storage Conditions	-20°C to 30°C (-4°F to 86°F) Up to 95% RH, non-condensing State of Energy (SoE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R
Ingress Rating	IP67 (Battery & Power Electronics) 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



# MCI WIRING DETAIL

## GENERAL NOTES

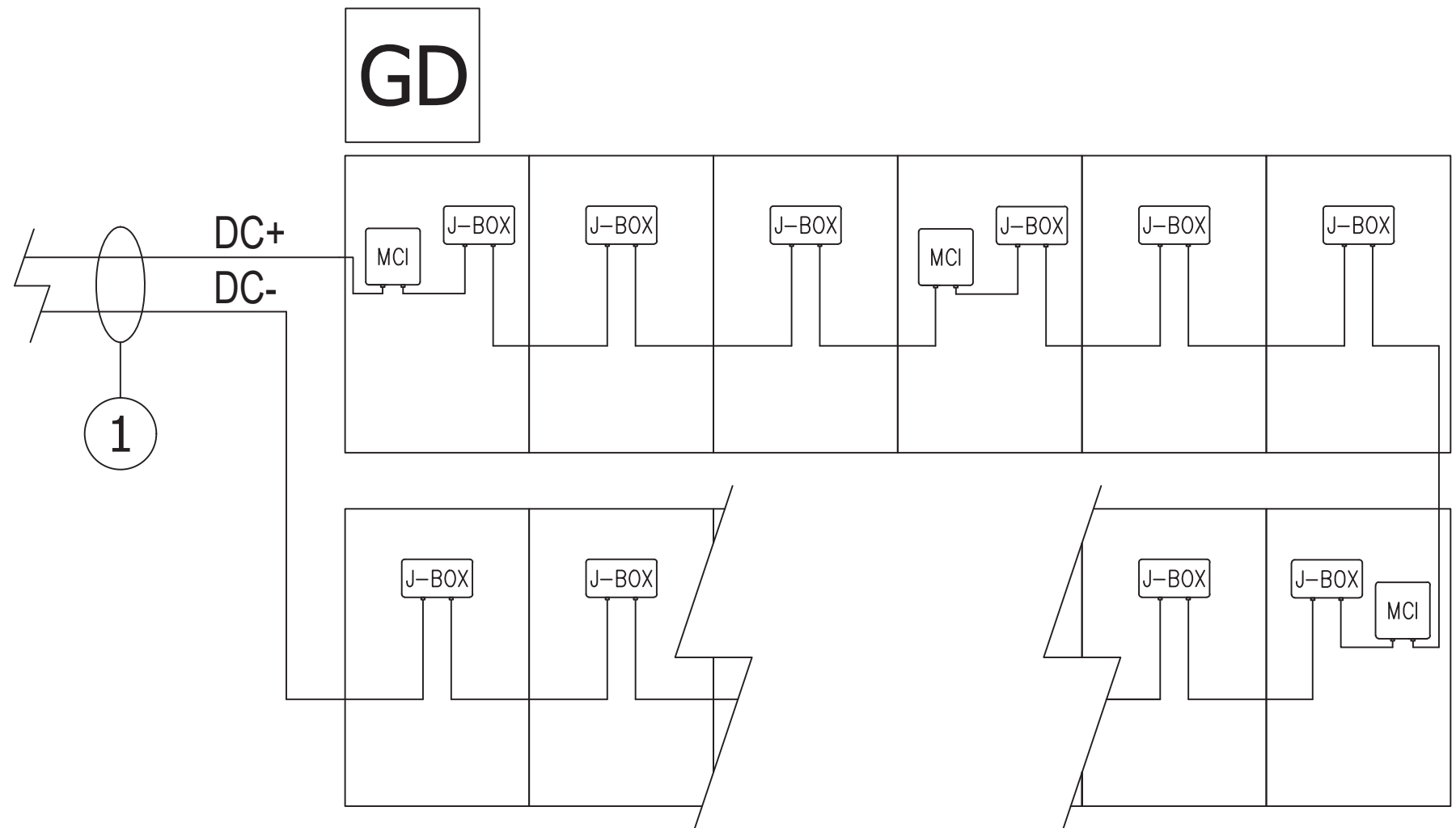
- DRAWING OF STANDARD MCI WIRING DETAIL FOR ANY GIVEN STRING LENGTH
- IF INITIATED, RAPID SHUTDOWN OCCURS WITHIN 30 SECONDS OF ACTIVATION AND LIMITS VOLTAGE ON THE ROOF TO NO GREATER THAN 165V (690.12.B.2.1)
- MID CIRCUIT INTERRUPTER (MCI) IS A UL 1741 PVRSE CERTIFIED RAPID SHUTDOWN DEVICE (RSD)

## 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

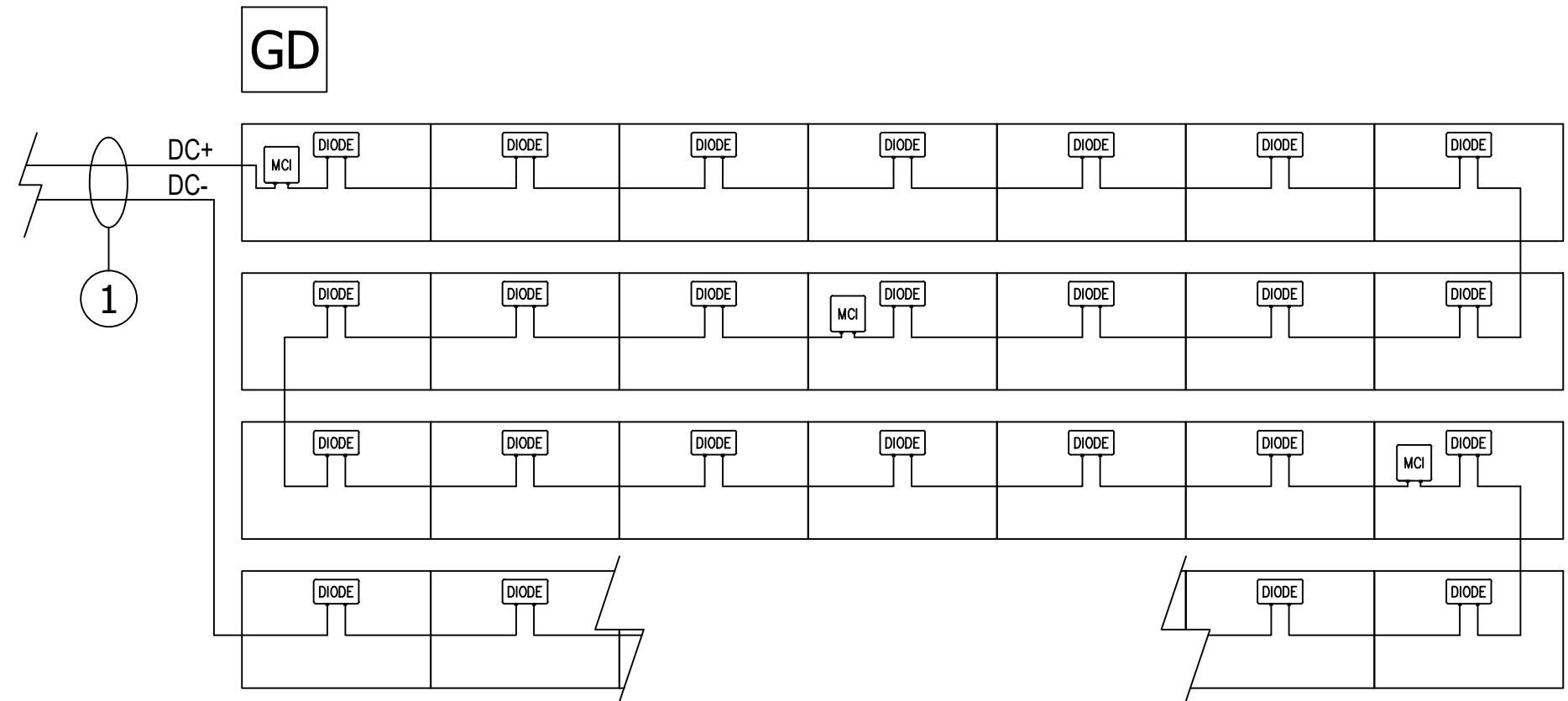
# MCI WIRING DETAIL

## 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)

## SOLAR ROOF TILES

- MCIS ARE LOCATED AT DECK LEVEL, JUST UNDER THE TILES IN ACCORDANCE WITH 690.12 REQUIREMENTS
- THE QUANTITY OF MCIS PER STRING IS DETERMINED BY STRING LENGTH
  - NUMBER OF TILES BETWEEN MCI UNITS = 0-10
  - MAXIMUM NUMBER OF TILES PER MCI UNIT = 10
  - MINIMUM NUMBER MCI UNITS = TILE COUNT/10



PLEASE REFER TO MCI CUTSHEET AND PVRSA INSERT FOR MORE INFORMATION

① (2)AWG, PV Wire, 600V, Black

DC



## BACKUP SWITCH

The Tesla Backup Switch controls connection to the grid and easily installs behind the utility meter, providing whole home backup with Powerwall.

The Backup Switch automatically detects grid outages, providing a seamless transition to backup power. It communicates directly with Powerwall, allowing home energy usage monitoring from any mobile device with the Tesla app.



## PERFORMANCE SPECIFICATIONS

<b>Model Number</b>	1624171-xx-y
<b>Continuous Load Rating</b>	200A, 120/240V Split phase
<b>Short Circuit Current Rating</b>	10 kA with any breaker <sup>1</sup> 22 kA with minimum 22 kA breaker <sup>1</sup>
<b>Communication</b>	CAN
<b>Product Compatibility</b>	Powerwall 2 with Backup Gateway 2, Powerwall+
<b>Expected Service Life</b>	21 years
<b>Warranty</b>	10 years

<sup>1</sup> See section 27.12.4 in UL 414.

## COMPLIANCE INFORMATION

<b>Safety Standards</b>	USA: UL 414, UL 2735, UL 916 CA Prop 65
<b>Emissions</b>	FCC, ICES

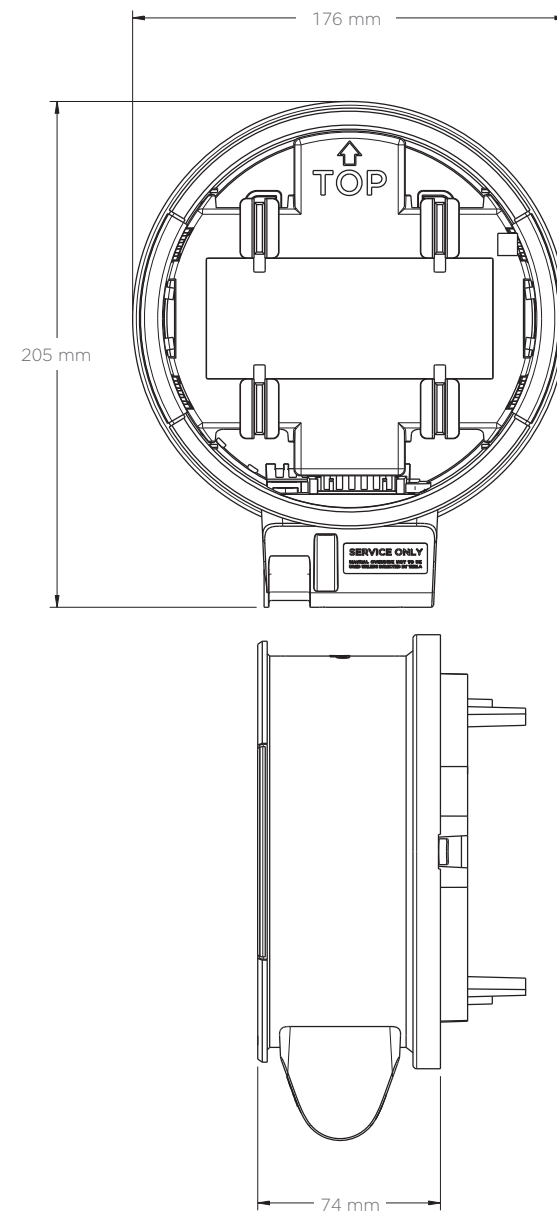
## ENVIRONMENTAL SPECIFICATIONS

<b>Operating Temperature</b>	-40°C to 50°C (-40°F to 122°F)
<b>Storage Temperature</b>	-40°C to 85°C (-40°F to 185°F)
<b>Enclosure Rating</b>	NEMA 3R
<b>Pollution Rating</b>	PD3

## MECHANICAL SPECIFICATIONS

<b>Dimensions</b>	176 mm x 205 mm x 74 mm (6.9 in x 8.1 in x 2.9 in)
<b>Weight</b>	2.8 lbs
<b>Meter and Socket Compatibility</b>	ANSI Type 2S, ringless or ring type
<b>External Service Interface</b>	Contactors manual override <sup>2</sup> Reset button
<b>Conduit Compatibility</b>	1/2-inch NPT

<sup>2</sup> Manually overrides the contactor position during a service event.





## POWERWALL+

Powerwall+ is an integrated solar battery system that stores energy from solar production. Its integrated design and streamlined installation allow for simple connection to any home, and improved surge power capability brings whole home backup in a smaller package. Smart system controls enable owners to customize system behavior to suit their renewable energy needs.

### KEY FEATURES

- Integrated battery, inverter, and system controller for a more compact install
- A suite of application modes, including self-powered, time-based control, and backup modes
- Wi-Fi, Ethernet, and LTE connectivity with easy over-the-air updates

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## POWERWALL+

### PHOTOVOLTAIC (PV) AND BATTERY ENERGY STORAGE SYSTEM (BESS) SPECIFICATIONS

<b>Powerwall+ Model Number</b>	1850000-xx-y
<b>Solar Assembly Model Number</b>	1538000-xx-y
<b>Nominal Battery Energy</b>	13.5 kWh
<b>Nominal Grid Voltage (Input / Output)</b>	120/240 VAC
<b>Grid Voltage Range</b>	211.2 - 264 VAC
<b>Frequency</b>	60 Hz
<b>Phase</b>	240 VAC: 2W+N+GND
<b>Maximum Continuous Power On-Grid</b>	7.6 kW full sun / 5.8 kW no sun <sup>1</sup>
<b>Maximum Continuous Power Off-Grid</b>	9.6 kW full sun / 7 kW no sun <sup>1</sup>
<b>Peak Off-Grid Power (10 s)</b>	22 kW full sun / 10 kW no sun <sup>1</sup>
<b>Maximum Continuous Current On-Grid</b>	32 A output
<b>Maximum Continuous Current Off-Grid</b>	40 A output
<b>Load Start Capability</b>	118 A LRA
<b>PV Maximum Input Voltage</b>	600 VDC
<b>PV DC Input Voltage Range</b>	60 - 550 VDC
<b>PV DC MPPT Voltage Range</b>	60 - 480 VDC
<b>MPPTs</b>	4
<b>Input Connectors per MPPT</b>	1-2-1-2
<b>Maximum Current per MPPT (<math>I_{mp}</math>)</b>	13 A
<b>Maximum Short Circuit Current per MPPT (<math>I_{sc}</math>)</b>	15 A
<b>Allowable DC/AC Ratio</b>	1.7
<b>Overcurrent Protection Device</b>	50 A breaker
<b>Maximum Supply Fault Current</b>	10 kA
<b>Output Power Factor Rating</b>	+/- 0.9 to 1
<b>Round Trip Efficiency</b>	90% <sup>2</sup>
<b>Solar Generation CEC Efficiency</b>	97.5% at 208 V 98.0% at 240 V
<b>Customer Interface</b>	Tesla Mobile App
<b>Internet Connectivity</b>	Wi-Fi, Ethernet, Cellular LTE/4G <sup>3</sup>
<b>PV AC Metering</b>	Revenue grade (+/-0.5%)
<b>Protections</b>	Integrated arc fault circuit interrupter (AFCI), PV Rapid Shutdown
<b>Warranty</b>	10 years

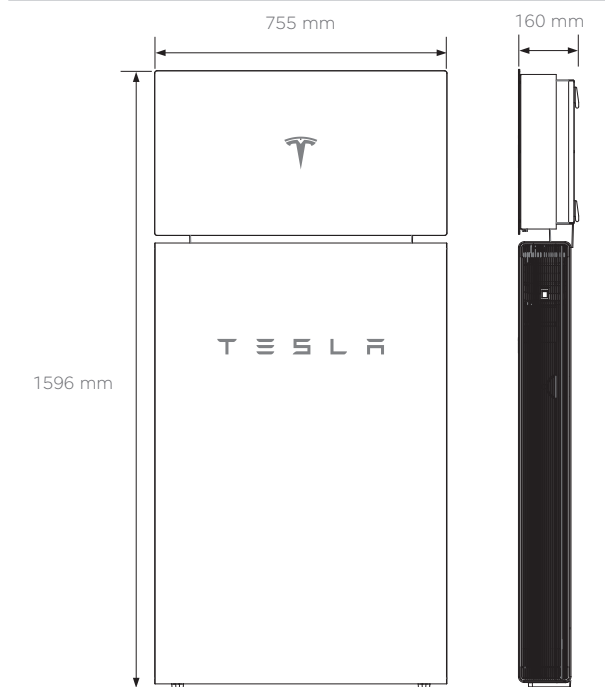
### COMPLIANCE INFORMATION

<b>PV Certifications</b>	UL 1699B, UL 1741, UL 3741, UL 1741 SA, UL 1998 (US), IEEE 1547, IEEE 1547.1
<b>Battery Energy Storage System Certifications</b>	UL 1642, UL 1741, UL 1741 PCS, UL 1741 SA, UL 1973, UL 9540, IEEE 1547, IEEE 1547.1, UN 38.3
<b>Grid Connection</b>	United States
<b>Emissions</b>	FCC Part 15 Class B
<b>Environmental</b>	RoHS Directive 2011/65/EU
<b>Seismic</b>	AC156, IEEE 693-2005 (high)

TESLA

### MECHANICAL SPECIFICATIONS

<b>Dimensions</b>	1596 x 755 x 160 mm (62.8 x 29.7 x 6.3 in)
<b>Total Weight</b>	140 kg (310 lb) <sup>4</sup>
<b>Battery Assembly</b>	118 kg (261 lb)
<b>Solar Assembly</b>	22 kg (49 lb)
<b>Mounting options</b>	Floor or wall mount



### ENVIRONMENTAL SPECIFICATIONS

<b>Operating Temperature</b>	-20°C to 50°C (-4°F to 122°F) <sup>5</sup>
<b>Recommended Temperature</b>	0°C to 30°C (32°F to 86°F)
<b>Operating Humidity (RH)</b>	Up to 100%, condensing
<b>Storage Conditions</b>	-20°C to 30°C (-4°F to 86°F) Up to 95% RH, non-condensing State of Energy (SoE): 25% initial
<b>Maximum Elevation</b>	3000 m (9843 ft)
<b>Environment</b>	Indoor and outdoor rated
<b>Enclosure Type</b>	Type 3R
<b>Solar Assembly Ingress Rating</b>	IP55 (Wiring Compartment)
<b>Battery Assembly Ingress Rating</b>	IP56 (Wiring Compartment) IP67 (Battery & Power Electronics)
<b>Noise Level @ 1 m</b>	< 40 db(A) optimal, < 50 db(A) maximum

<sup>1</sup>Values provided for 25°C (77°F).

<sup>2</sup>AC to battery to AC, at beginning of life.

<sup>3</sup>Cellular connectivity subject to network service coverage and signal strength.

<sup>4</sup>The total weight does not include the Powerwall+ bracket, which weighs an additional 9 kg (20 lb).

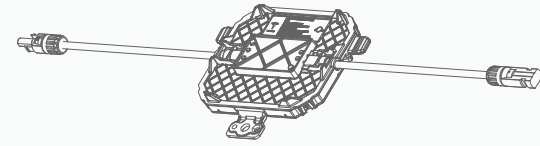
<sup>5</sup>Performance may be de-rated at operating temperatures below 10°C (50°F) or greater than 43°C (109°F).

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## 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 Powerwall+, solar array shutdown is initiated by turning the Powerwall+ Enable switch off, or by pushing the System Shutdown Switch if one is present.



### 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 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)
RSD Initiation Method	External System Shutdown Switch
Compatible Equipment	See Compatibility Table below

### ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature	-40°C to 50°C (-40°F to 122°F)
Storage Temperature	-30°C to 60°C (-22°F to 140°F)
Enclosure Rating	NEMA 4 / IP65

### UL 3741 PV HAZARD CONTROL (AND PVRSA) COMPATIBILITY

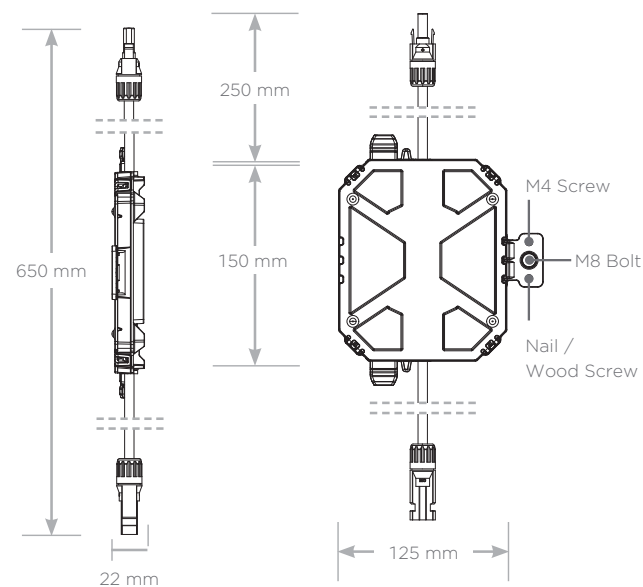
Tesla Solar Roof and Tesla/Zep ZS Arrays using the following modules are certified to UL 3741 and UL 1741 PVRSA when installed with the Powerwall+ and Solar Shutdown Devices. See the Powerwall+ Installation Manual for detailed instructions and for guidance on installing Powerwall+ and Solar Shutdown Devices with 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)	1 Solar Shutdown Device per 3 modules <sup>1</sup>
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

<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 MCIs.

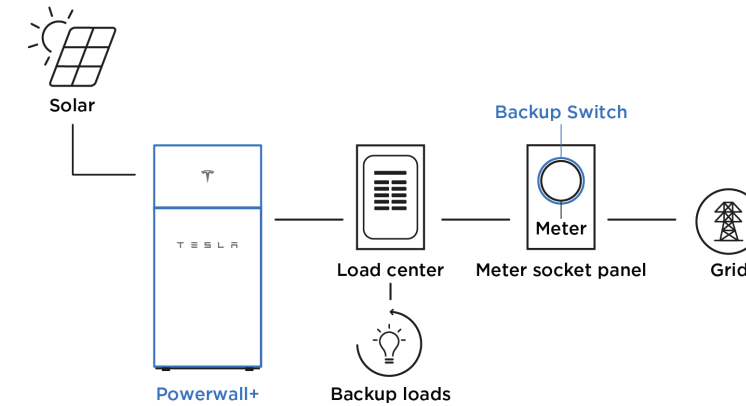
### MECHANICAL SPECIFICATIONS

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

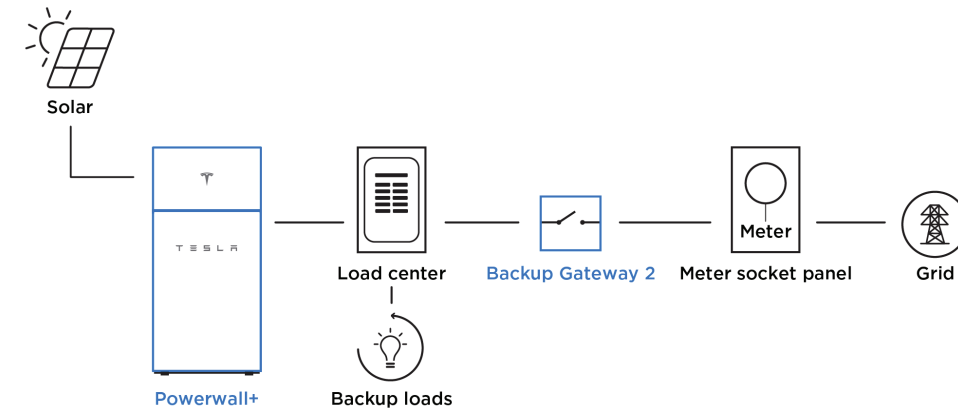


## SYSTEM LAYOUTS

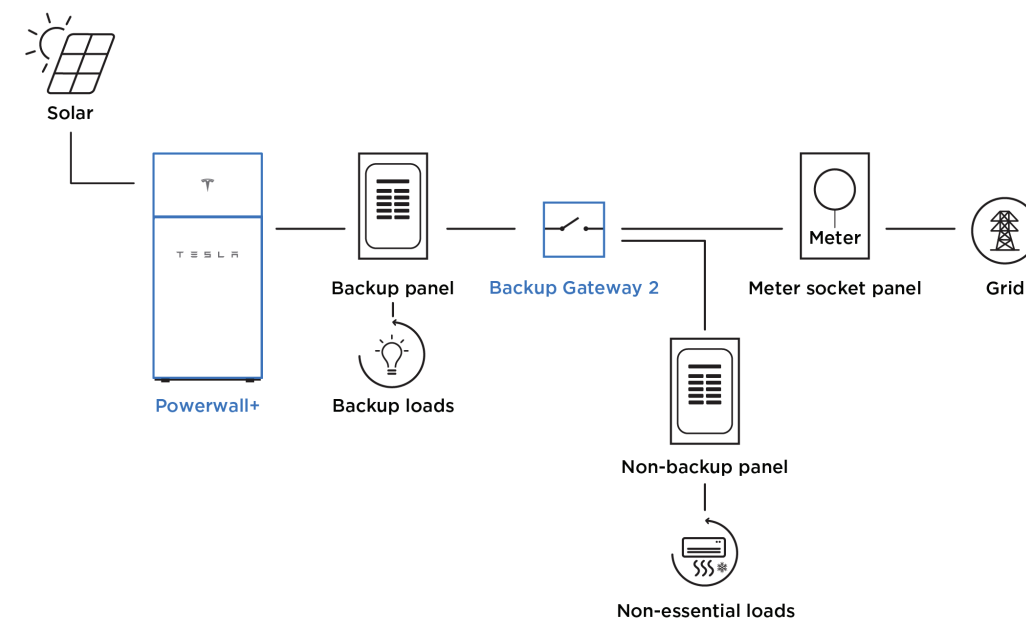
Powerwall+ with Backup Switch for Whole Home Backup



Powerwall+ with Backup Gateway 2 for Whole Home Backup



Powerwall+ with Backup Gateway 2 for Partial Home Backup



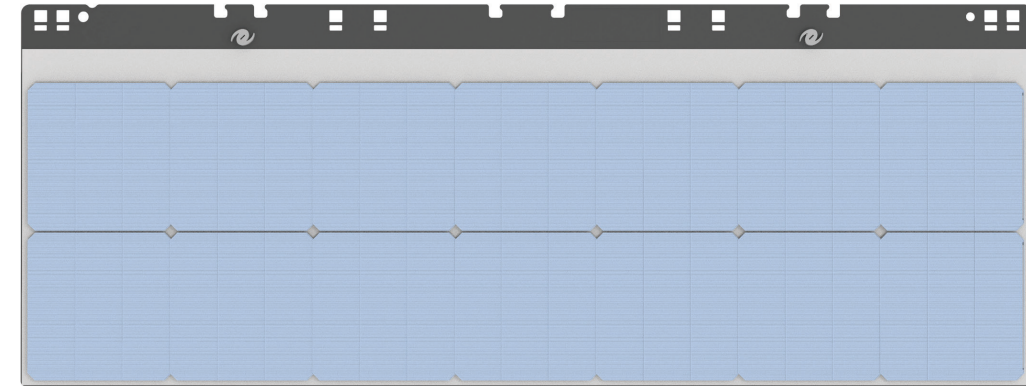
# SOLAR ROOF DATASHEET

FOR FULL TEAR-OFF AND OVERLAY INSTALLATIONS



## 14-CELL PV MODULE

MODEL #: SR72T1



### ELECTRICAL SPECIFICATIONS

Maximum open circuit voltage rating of connected branch circuits per diode (at STC): 14.2 V

Maximum series fuse rating: 10 A

Maximum system voltage: 600 V

Irradiance (W/m <sup>2</sup> )	Temp. (Celsius)	Voc (V)	Vmp (V)	Isc (A)	Imp (A)	Pmax (W)
1000	25	14.20	11.34	6.80	6.32	71.67

These electrical characteristics are within  $\pm 5\%$  of the indicated values of Isc, Voc, and Pmax under standard test conditions (irradiance of 1000 W/m<sup>2</sup>, AM 1.5 spectrum, and a cell temperature of 25 °C or 77 °F).

### MECHANICAL SPECIFICATIONS

Dimensions: 430 mm x 1140 mm

Thickness: Appx. 5 mm module thickness with 35.3 mm maximum height from deck

Principal Materials: Glass, Polymers, Fiberglass and Silicon

Installed System Weight: Textured Glass: 15 kg/m<sup>2</sup> or 3.1 psf

(Installed weights include all components of system above roof sheathing).

### ROOF PITCH RANGE

2:12 - 24:12

Certain features can be installed up to 62:12

### CERTIFICATIONS

UL 61730 (UL Listed); UL 9703 (UL Listed); UL 1741 (UL Listed)

UL 790 Class A (ETL Listed); ASTM D3161 Class F (ETL Listed); TAS100 (ETL Listed)

## SHEATHING SPECIFICATIONS

Solar Roof will be installed over bare solid or closely fitted sheathing, as follows:

- DOC PS-1 compliant / exterior grade plywood: minimum 15/32" (11.9 mm) thick or
- DOC POS-2 OSB sheathing: minimum 7/16" thick (11.1 mm) or
- Closely-fitted sheathing boards: minimum of 3/4" (19.1 mm) thick

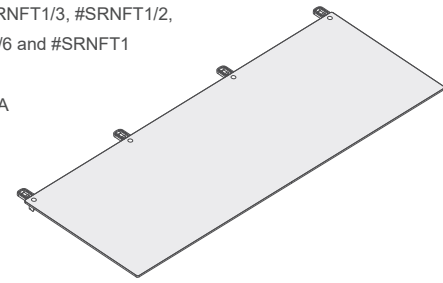
Solar Roof can also be installed over compatible existing roofs, as follows:

- Three-tab composition shingle, single layer
- Architectural composition shingle, single layer

Solar Roof will not be installed over raised presidential-style composition shingle, roofs with more than one layer of composition shingle, or existing non-composition shingle roof types like tiled roofs.

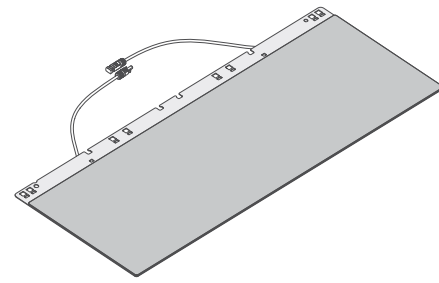
### ROOFING MODULES, FULL AND PARTIAL

Model #SRNFT1/6, #SRNFT1/3, #SRNFT1/2,  
#SRNFT2/3, #SRNFT5/6 and #SRNFT1  
Listed to UL 61730  
Listed to UL 790 Class A  
ASTM D3161 Class F  
TAS100



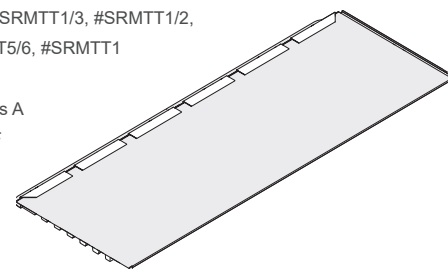
### PV MODULE

Model #SR60T1  
Listed to UL 61730  
UL 790 Class A  
ASTM D3161 Class F  
TAS100



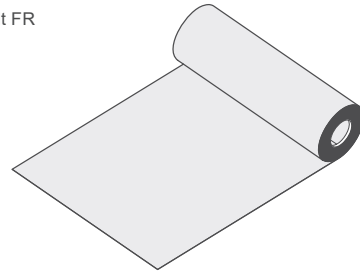
### METAL TILES, FULL AND PARTIAL

Model #SRMTT1/6, #SRMTT1/3, #SRMTT1/2,  
#SRMTT2/3, #SRMTT5/6, #SRMTT1  
Listed to UL 1897  
Listed to UL 790 Class A  
ASTM D3161 Class F  
TAS100



### UNDERLAYMENT

Model #SR-SAUL-1 or FT Cobalt FR  
ASTM D1970/ICC AC48  
ICC AC188  
ASTM E108 Class -A



### DIODE HARNESS

Model #SRDTH  
UL 9703  
Listed (ZKLA) "PV Wire"  
Short and long lead variants  
interchangeable



### PASS THROUGH BOX

Model #SRPTB-4  
UL 1741, File #E318357

