Powerwall 3 Installation Manual

with Backup Gateway 2

Notices

For the latest Powerwall 3 installation documents in all supported languages, visit:

www.tesla.com/support/powerwall

To secure the full 10-year product warranty, Powerwall 3 must be registered by completing the device setup process and sending system information to Tesla.

Product Specifications

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at Tesla, we reserve the right to make product modifications at any time.

The images provided in this document are for demonstration purposes only. Depending on product version and market region, details may appear slightly different.

Errors or Omissions

To communicate any inaccuracies or omissions in this document, reach out to your Tesla Account Manager.

Electronic Device: Do Not Throw Away

Proper disposal of batteries is required. Refer to local codes for disposal requirements.

For Private Households: Information on Disposal for Users of WEEE

This symbol on the product(s) and / or accompanying documents means that Waste from Electrical and Electronic Equipment (WEEE) should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points where it will be accepted free of charge. Alternatively, in some countries, you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point.

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

For Professional Users in the European Union

If you wish to discard electrical and electronic equipment (EEE), please contact your dealer or supplier for further information.

For Disposal in Countries Outside of the European Union

This symbol is only valid in the European Union (EU). If you wish to discard this product please contact your local authorities or dealer and ask for the correct method of disposal.

GENERAL WARNINGS AND INFORMATION

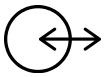
ATTENTION: Read this entire document before installing or using Powerwall. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage Powerwall, potentially rendering it inoperable.

IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions for Powerwall 3 and Backup Gateway 2 that must be followed during installation and maintenance of the system.

NOTE: On detection of abnormal condition for voltage or frequency conditions or in response to a detected unintentional island, the Tesla Powerwall system disconnects from the grid to prevent backfeed.

Symbols Used

	**CAUTION:** Indicates a hazardous situation which, if not avoided, could result in minor injury or damage to the equipment.		**RISK OF ELECTRIC SHOCK:** Indicates components that present risk of electrical shock.
	**WARNING:** Indicates a hazardous situation which, if not avoided, could result in injury or death.		**CAUTION, RISK OF ELECTRIC SHOCK, ENERGY STORAGE TIMED DISCHARGE.** Discharge time is 5 minutes from de-energization.
	**NOTE:** Indicates an important step or tip that leads to best results, but is not safety or damage related.		**BIDIRECTIONAL TERMINAL:** Indicates location of combined input/output connector on the equipment.
	**REFER TO OPERATING INSTRUCTIONS:** Indicates that user should refer to operating or installation instructions before proceeding.		**PROTECTIVE CONDUCTOR TERMINAL:** Indicates location of grounding connection on the equipment.

General Information

WARNING: Read this entire document before installing or using Powerwall. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or may damage Powerwall, potentially rendering it inoperable.

WARNING: A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.

WARNING: Powerwall installation must be carried out only by a competent electrician who is certified by Tesla and who has been trained in dealing with low voltage electricity.

GENERAL WARNINGS AND INFORMATION

WARNING: Powerwall is heavy. Use of lift equipment is recommended.

WARNING: Use Powerwall only as directed.

WARNING: Do not use Powerwall if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.

WARNING: Before beginning the wiring portion of the installation, ensure that Powerwall is switched off, and lock out any associated circuit breakers and disconnect switches (if applicable for the installation).

WARNING: Do not attempt to open, disassemble, repair, tamper with, or modify Powerwall. Powerwall and its components are not user serviceable. Batteries in Powerwall are not replaceable. Contact Tesla Support for guidance on repairs.

WARNING: To protect Powerwall and its components from damage when transporting, handle with care. Do not impact, pull, drag, or step on Powerwall. Do not subject Powerwall to any strong force. To help prevent damage, leave Powerwall in its shipping packaging until it is ready to be installed.

WARNING: Do not insert foreign objects into any part of Powerwall.

WARNING: Do not expose Powerwall or its components to direct flame.

WARNING: Do not install Powerwall within 24 inches (610 mm) of heating vents or radiators. Powerwall can be installed in a mechanical room with HVAC equipment.

WARNING: If installing Powerwall indoors, a detection system for flammable gases should be installed at the site in accordance with local building and fire codes. Example: Smoke or heat detection devices.

WARNING: Ensure that concentrated water sources do not drain onto Powerwall or Backup Gateway, including downspouts, roofs without gutters, or drains.

WARNING: Do not immerse Powerwall or its components in water or other fluids.

CAUTION: Powerwall is not designed nor warrantied for non-stationary applications.

CAUTION: Do not use solvents to clean Powerwall, or expose Powerwall to flammable or harsh chemicals or vapors.

CAUTION: Do not use fluids, parts, or accessories other than those specified in this manual, including use of non-genuine Tesla parts or accessories, or parts or accessories not purchased directly from Tesla or a Tesla-certified party.

CAUTION: Do not place Powerwall in a storage condition for more than one (1) month, or permit the electrical feed on the Powerwall to be severed for more than one (1) month, without placing Powerwall into a storage condition in accordance with Tesla's storage specifications.

CAUTION: Do not paint, coat, or wrap any part of Powerwall, including any internal or external components such as the exterior shell or casing. These may cause Powerwall to overheat, resulting in damage to the product.

SPECIFICATIONS

Powerwall 3 Specifications

System Technical Specifications

Part Number	1707000-xx-y		
Nominal Grid Voltage (Input & Output)	230 VAC		
Grid Type	Single phase		
Frequency	50 Hz		
Nominal Battery Energy[1]	13.5 kWh		
Model Number	1707000 - 5 kVA	1707000 - 10 kVA	1707000 - 11.04 kVA
Nominal Output Power (AC)	5 kW	10 kW	11.04 kW
Maximum Apparent Power	5,000 VA	10,000 VA	11,040 VA
Maximum Continuous Current	48 A		
Overcurrent Protection Device	63 A		
Maximum Continuous Charge Current / Power (Powerwall 3 only)	21.7 A AC / 5 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		
Maximum AC Current Inrush (0 s)	0 A P-P		
Load Start Capability (1 s)	185 locked rotor amps (LRA)		
Power Scalability	Up to 4 Powerwall 3 units supported[2]		
Protection Class	Class I		
Overvoltage Category (AC)	III		
Overvoltage Category (PV)	II		
PV Inverter Topology	Non-Isolated		
BESS Inverter Topology	Isolated		
Surge Withstand Voltage on AC Ports	4 kV		
Surge Withstand Voltage on Communication Ports	2 kV		
Radiated RF Immunity	35 V/m		

SPECIFICATIONS

Solar to Battery to Grid Round Trip Efficiency	89%[1,3]
Solar to Grid Efficiency	97.5%
Supported Islanding Devices	Backup Gateway 2
Connectivity	Wi-Fi (2.4 and 5 GHz), Dual-port switched Ethernet, Cellular (LTE/4G[4])
Hardware Interface	Dry contact relay, Demand Response Enabling Device, RS-485 for meters
AC Metering	Revenue Grade (+/- 0.5%)
Protections	Integrated arc fault circuit interrupter (AFCI), Isolation Monitor Interrupter (IMI), integrated DC isolator
Customer Interface	Tesla Mobile App
Warranty	10 years

[1]Values provided for 25°C, at beginning of life. 3.3 kW charge/discharge power.

[2]The maximum number of Powerwall 3 units per installation may vary by market.

[3]Typical solar shifting use case.

[4]Cellular connectivity subject to network service coverage and signal strength.

NOTE: Powerwall 3 follows the Active islanding methodology by allowing frequency of the Powerwall 3 to be inherently unstable in the absence of a reference frequency (frequency instability).

NOTE: The model numbers in this manual call out "-XX-Y" for the suffix of the equipment model number. The wild cards are defined as follows:

- "X" is a number and the one number in the model number representing a style code; form, fit, and function are not changed, and these numbers have no bearing on compliance.
- "Y" is a letter, and the one letter in the model number representing a pedigree; form, fit, and function are not changed, and this letter has no bearing on compliance.

Solar Technical Specifications

Maximum Solar STC Input	20 kW
Maximum DC Input Voltage	600 V DC
MPPT Voltage Range	60 — 550 V DC
Usable MPPT Voltage Range	60 — 480 V DC
MPPTs	3
Maximum Current per MPPT (I_{MP})	30 A[5]
Maximum Short Circuit Current per MPPT (I_{SC})	38 A
PV Maximum Backfeed Current	0.2 A

[5]Only applicable to Powerwall 3 units with 30 A I_{MP} on the product label. Otherwise, Powerwall 3 has an I_{MP} of 26 A.

Mechanical Specifications

Dimensions	1105 x 609 x 193 mm[6]
Weight	130 kg
Mounting Options	Floor or wall mount

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

Environmental Specifications

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

[7]Powerwall 3 is designed to operate in all climates from temperatures of -20°C to 50°C. Performance may be de-rated at operating temperatures above 40°C.

Compliance Information

Specification	Standard certified
Safety	IEC 62477-1: 2022 - Safety requirements for power electronic converter systems and equipment - Part 1: General
	IEC 62109-1:2010 - Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
	IEC 62109-2: 2011 - Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
	IEC 62933-5-2: 2020 - Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems
	IEC 62619: 2022 - Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications
	UL 1973: Batteries for Use in Stationary and Motive Auxiliary Power Applications
	UL9540A: Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
Grid Interoperability	AS 4777.2 Grid Connection of Energy Systems via inverter Part 2 Inverter Requirements
Energy Storage	Energy Storage Systems and Equipment [ANSI/CAN/UL 9540:2020 Ed.2]
EMC	IEC 61000-6-1:2016 - Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments
	EN IEC 61000-6-3: 2020 - Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments

Backup Gateway 2 Specifications

Backup Gateway 2 Electrical Specifications

AC Voltage (Nominal)	230 V (Line-to-Neutral)
	400 V (Line-to-Line)
Feed-In Type	Single Phase, Three Phase
Grid Frequency	50 Hz
Maximum Overcurrent Protection Device	100 A (single-phase service)
	80 A (2- and 3-phase service)
Maximum Input Short Circuit Current	10 kA
Overvoltage Category	Category III
AC Meter	Revenue accurate (+/– 0.2 %)[1]
Safety	IEC 61439-1, IEC 61439-3
[1]Revenue accurate when using Gateway internal site meter.	

NOTE: Refer to circuit breaker datasheet for rated peak withstand current (Ipk) and associated duration.

Environmental Specifications

Operating Temperature[2]	–20°C to 50°C
Operating Humidity (RH)	Up to 100%, condensing
Maximum Altitude	3000 m
Ingress Rating	IP55
Environmental Category	Indoor and outdoor rated
Wet Location Rating	Yes
Pollution Degree	PD2
[2] Performance may be de-rated in extreme ambient temperatures	

Mechanical Specifications

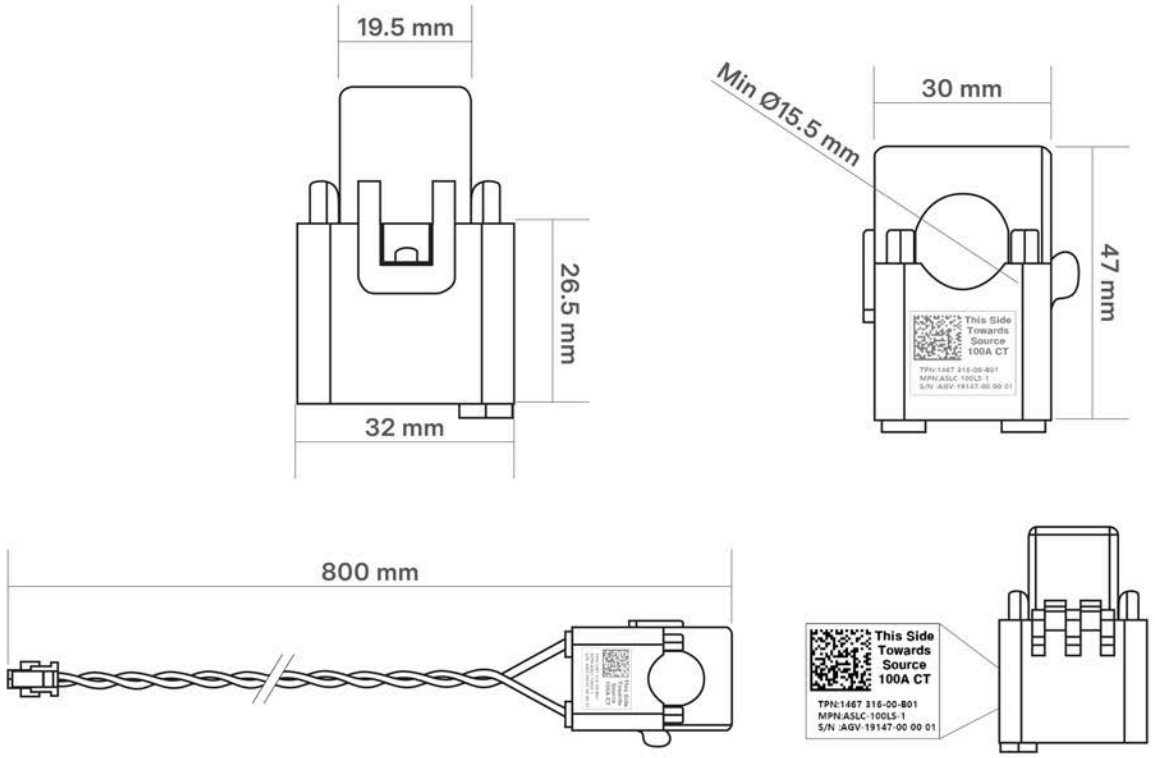
Height	584 mm
Width	380 mm
Depth	127 mm
Weight	11.4 kg

Tesla 100A CT Specifications

Model Number	1467316-00-x
Capacity	100 A

Operating Frequency	50 - 60 Hz
Cable Ratings	600 V, 125°C
Cable Size	0.5 mm^2
Cable Type	Twisted leads
Lead Length	800 mm
Optional Extension (Tesla P/N 1467274-00-x)	3 m (10 ft) **NOTE:** CT leads can be extended a max distance of 330 ft (100 m) by splicing twisted pair or using the Extension. Voltage rating of the extension wire must be equal to or greater than all other adjacent circuits. Use minimum 600V 0.5 mm2 conductors.
CT Splitting	N/A (cannot be split / paralleled) One 100 A CT per terminal
Operating Temperature Range	-20°C to 50°C (-4°F to 122°F)
Max Operating Humidity (with condensation)	RH 95%

Figure 1. Tesla 100A CT Dimensions



Tesla Remote Energy Meter Specifications

Tesla Remote Meter Specifications

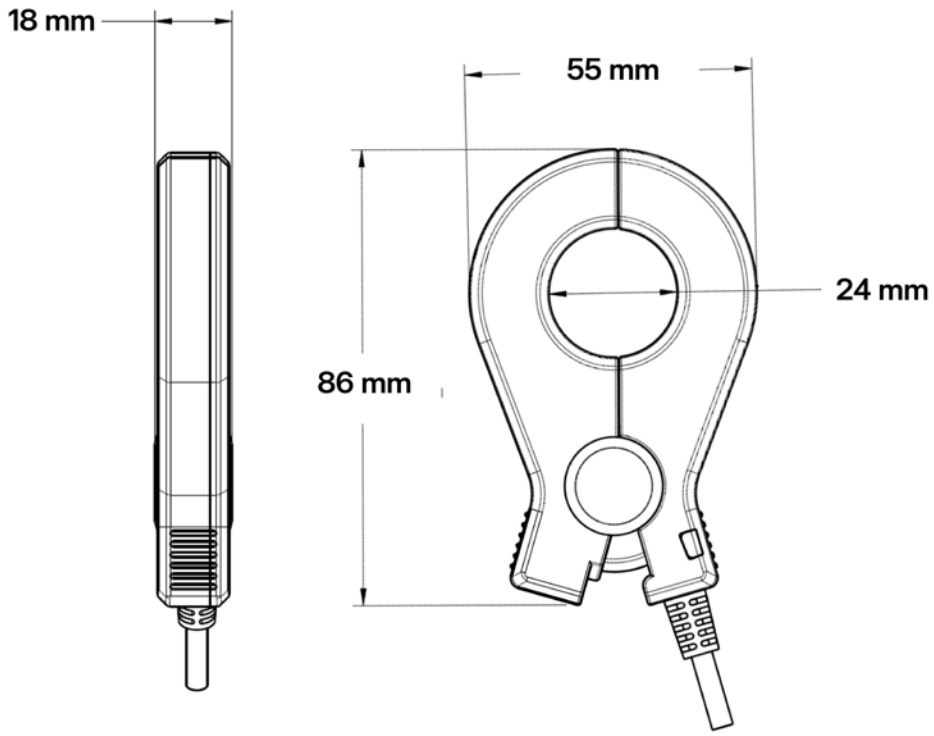
Model Number	2002069-00-x
Accuracy	0.2%
Nominal AC Voltage	230 VAC
AC Frequency	50 - 60 Hz
Maximum Power Consumption	3 W
Compatible CTs	Tesla 200 A CTs (Tesla P/N 2033376-00-x)
Wireless Connection	2.4 and 5 GHz
Wired Connection	RS-485 harness (Tesla P/N 2045794-00-x): 1.2 m (4 ft)
	Maximum extended length: 50 m (164 ft)
Overcurrent Protection Device (OCPD)	16A
Dimensions	145 x 52 x 31 mm
Ambient Operating Temperature	–30°C to 70°C
Conforms to	UL 61010-1, CSA C22.2 No. 61010-1, IEC/EN 61010-1, ANSI C12.1, IEC 62052-11, IEC 62053-21
Supported Applications	Site, Solar, Generator, Conductor
Compatible Grid Types	1ϕ L1-N, 3ϕ L1-L2-L3-N Wye **NOTE:** Connection to L1 and Neutral is always required.

NOTE: Only Tesla Remote Energy Meter accessories are compatible with Tesla Remote Energy Meter. Do not attempt to use Neurio meter accessories, or any other meter accessories, with Tesla Remote Energy Meter.

Tesla 200A CT Specifications

Model Number	2033376-00-x
Capacity	200 A
Insulation Rating	600 V
Lead Length	1.5 m
Optional Extension (Tesla P/N 2045801-xx-y)	3.5 m **NOTE:** CT leads cannot be spliced. Use only up to (2) CT extensions for a maximum lead length of 8.5 m (1.5 m lead + 3.5 m extension + 3.5 m extension).
Optional Y-Splitter	Not available
Dimensions (L, W, H)	86 x 55 x 18 mm
Window Size	24 mm
Operating Temperature	–30°C to 85°C

Figure 2. Tesla 200A CT Dimensions



REGISTERING POWERWALL 3

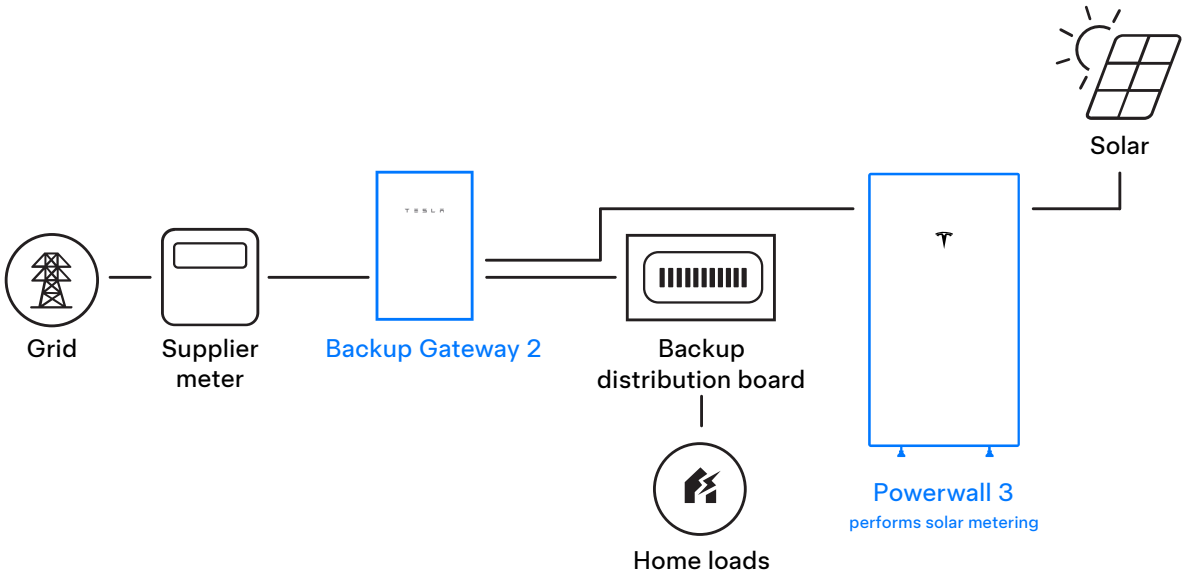
Tesla Powerwall 3 comes with a warranty whose term depends on the connection of Powerwall 3 to the internet. To secure the full 10-year warranty for Powerwall 3, it must be reliably connected to the internet to allow remote firmware upgrades from Tesla. If an internet connection is not established or is interrupted for an extended period, and Tesla is unable to contact the owner, the warranty may be limited to 4 years. To ensure that the owner can receive the full 10-year warranty, be sure to complete the device setup process so that registration information is sent to Tesla.

For more information, refer to the Powerwall 3 Warranty for your region at *www.tesla.com*.

POWERWALL 3 SYSTEM OVERVIEW

Powerwall 3 is a fully integrated solar and battery system. The home's PV array is connected directly to Powerwall 3, which converts solar energy and stores it for future use. Powerwall 3 is installed with Backup Gateway 2 to control the system's connection to the grid and monitor home energy consumption.

Figure 3. Example System Diagram



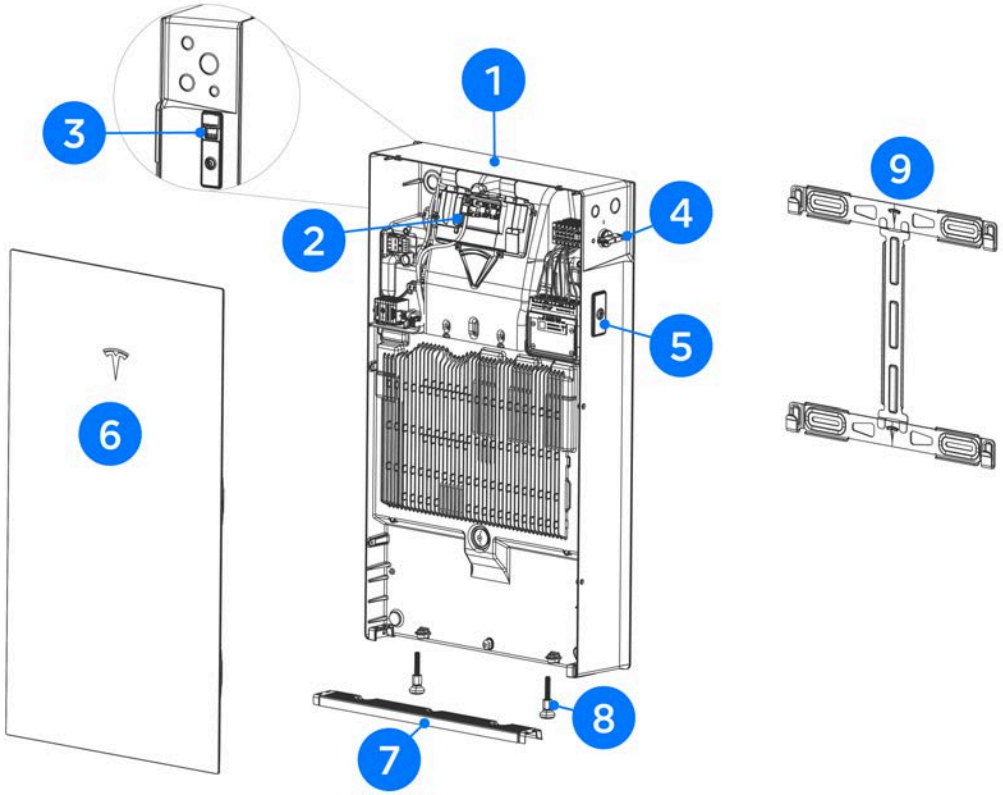
The following table outlines the key Tesla components in a standard Powerwall 3 system.

Tesla Components

Tesla Part Numbers	Component	Description
1707000-xx-y		Powerwall 3 is an integrated solar and battery system that converts energy from solar panels to be used by the home, and stores excess energy for future use. Every system contains at least one Powerwall 3, with additional Powerwall 3 units installed depending on the home's solar system size and/or energy consumption.
1152100-xx-y		Backup Gateway 2 monitors energy usage and manages the transition to and from backup operation.

Powerwall 3 Overview

Figure 4. Expanded View of Powerwall 3



1	Powerwall 3
2	Tesla Asset Controller (TACO)
3	On / Off switch
4	Integrated DC Isolator
5	Expansion port cover
6	Glass front cover
7	Air intake screen
8	Leveling feet
9	Wall mounting bracket

NOTE: Do not remove the expansion port covers. These are protective covers and Powerwall 3 will not operate when they are removed.

NOTE: The Powerwall 3 part number and serial number can be found on the left side of the unit.

POWERWALL 3 SYSTEM DESIGN GUIDANCE

Design Considerations

Supported Configurations

- Up to (4) Powerwall 3 units with (1) Backup Gateway 2, with or without AC-coupled solar

  NOTE: Third party MLPE solutions, such as optimizers, are not compatible with Powerwall 3

- Powerwall 3 is not compatible with the following:
  - Neurio remote energy meters
  - Other batteries (Powerwall 2 or third party batteries)
  - Stacked units (Powerwall 3 must be mounted in a side-by-side configuration)

System Tie-in

- Only Tesla devices are compatible with Powerwall; no third-party equipment in lieu of Backup Gateway 2
- Backup systems must be one of the following:
  - 230 V single phase service
    - 100 A or smaller service, or (in absence of a service rating) maximum 100 A of loads downstream of Backup Gateway 2
  - 230 / 400 V three phase service
    - 80 A or smaller service, or (in absence of a service rating) maximum 80 A of loads downstream of Backup Gateway 2
    - Follow all local requirements for balancing the system equally across the available phases

    NOTE: Regardless of the number of Powerwalls installed, only one phase (L1, L2, or L3) will provide backup during a grid outage.

- A breaker is always utilized for Powerwall 3 tie in; see *Install Powerwall and Generation Breakers in the Backup Gateway on page 59* for breaker size

  NOTE: In line with relevant standards, Powerwall must be wired to support the maximum continuous current of the system.

- Powerwall 3 must always be connected to the Home terminals downstream of the Backup Gateway 2
- Recommend that total Powerwall supply is able to power the single largest automatic load in the backup circuit (see *Backup Loads Supported per Powerwall Quantity on page 20*)
- Any/all backup load centers are adequately protected with an overcurrent protection device
- All three phase loads or solar must be excluded from the backup phase on the Home terminals
- All single phase loads in the backup circuit must be sized appropriately for the configured power output of the Powerwall (see *Install Powerwall and Generation Breakers in the Backup Gateway on page 59* for power output options)

- Site and solar monitoring must be installed to capture overall power flow to/from the site, as well as all solar production
- Powerwall and Backup Gateway 2 are rated for 10 kA of fault current.

Powerwall 3 Solar

Powerwall 3 has an integrated inverter and 3 MPPTs, with a maximum solar input of 20 kW DC.

NOTE: See *AC-Coupled Solar System Sizing on page 24* for information about sizing AC-coupled solar with Powerwall 3.

System Sizing

The following resources explain how to size the Powerwall 3 system to meet customer expectations, as well as how to determine which loads can be included in the backup circuit and what to do with loads that cannot be included.

Backup Loads Supported per Powerwall Quantity

- The largest load in the backup circuit is limited by the quantity of Powerwalls; the largest load/breaker size each Powerwall 3 can support is determined by the selected Powerwall 3 breaker size and configured power output (see *Install Powerwall and Generation Breakers in the Backup Gateway on page 59*)
- See *Appendix E: Installations with Multiple Powerwall 3 Units on page 129* for requirements for installing multiple Powerwall units.

AC Units and Large Motor Loads

- Inrush current (largest instantaneous current draw when a motor starts) is limited to 185 A locked rotor amps (LRA) per Powerwall 3.
- For air conditioner units, use locked rotor amps on equipment label as inrush current.
- Design Options if motor locked rotor amps is greater than the number of Powerwall 3 units multiplied by 185A:
  - Increase number of Powerwalls
  - Relocate AC unit/motor load out of backup circuit
- Example:
  - Motor Load unit with 200 A locked rotor amps
  - Required Powerwall(s): (2) Powerwall 3 units required, so that 200 A < 370 A

NOTE: Double-check that the AC breaker follows the Powerwall breaker sizing rules.

EV Charging

Type of Electric Vehicle Charging	Compatibility
Tesla vehicle charging (Wall Connector or Tesla Mobile Connector)	1 Powerwall*
Third-Party Level 1 EV charging	1 Powerwall*
Third-Party Level 2 EV charging	1-2 Powerwalls*

*Ensure the configured power output is great enough to support the charger(s) when off-grid; for instance, if Powerwall 3 has a configured power output of 5 kW, (2) Powerwall 3 units would be required to back up a Tesla vehicle charger.

Per the *Vehicle Charging During Outage feature*, the system will adjust the charging power during an outage to ensure Powerwall can continue to support the home without overloading Powerwall, and will only charge the vehicle when the percentage of charge is higher than the limit set by the customer.

Powerwall 3 DC System Sizing

- Powerwall 3 can be configured as up to a 11.04 kW / 48 A AC rated inverter that can support up to a maximum DC system size of 20 kW.
  - 20 kW DC is the absolute maximum solar system size that Powerwall 3 can support.
  - Powerwall 3 has a boosting feature that can send 5 kW of DC power continuously from solar to the battery at the same time that up to 11.04 kW / 48 A of solar is inverted to AC power, leading to a potential total DC power of 16.04 kW. This helps alleviate clipping concerns and enables sizing the DC system larger, but only if the battery is being used in a way that it will have available charge power during the peak solar production hours of the day.
  - If Powerwall 3 is power / current limited, a larger DC solar system size may experience curtailment. Size the DC solar system appropriately based on the configured power / current output.
  - Where clipping may occur, the amount of clipping depends on the specific scenario.
- Each Powerwall 3 has (3) MPPTs available for Solar.

> **NOTE:** If there are more than three PV strings, strings can be combined upstream of Powerwall 3 so long as the voltage and current ratings of the system do not exceed the capabilities of Powerwall 3.

- When calculating the minimum and maximum number of modules per string, use the *web version* or *desktop version* (downloads to your system) of the Tesla Solar Stringing Tool available on Partner Portal. For instructions on how to use the tool, see the *User Guide*. Or, you can use the following variables and equation:
  - A = VOC at standard test conditions (STC) for the modules
  - B = Voltage temperature coefficient
  - C = Number of modules in string
  - A * B * C = **X**
  - 60 ≤ **X** ≤ 550V
- Total DC circuit distance, from + MPPT terminal to - MPPT terminal (including module wire leads, jumper wires and all wiring within the array boundary for any individual string), shall not exceed 160 m for single strings or paralleled strings
  - Total DC circuit distance refers to the entire round trip wire distance, from inverter to the roof, then back to the inverter
  - Ensure paralleled strings are the same distance, or as close to the same distance as possible
- Powerwall 3 is a string inverter. Individual strings should not be extended over mounting planes with different pitches and/or azimuths to provide peak performance of the system. Series strings must have modules on the same pitch & azimuth, and strings of equal distance can be combined in parallel.
  - Note that a situation where all 20 kW are simultaneously producing at peak may result in solar clipping. Tesla recommends, but does not require, diversifying azimuths when the array is significantly oversized. The (3) MPPTs are particularly suited for sites where the strings may not be on the same azimuth and are therefore not producing at peak simultaneously.
- If installing multiple Powerwall 3 units, it is recommended but not required to distribute the DC PV system across all Powerwall 3 units so that each Powerwall 3 receives the benefits of DC coupling solar

Available Third-Party Solar Design Tools

Powerwall 3 has been added to the following solar design tool databases:

- Open Solar
- Pylon

AC-Coupled Solar System Sizing

DC-coupled solar (connected directly to Powerwall 3) is strongly preferred over AC-coupled solar for the following reasons:

- Less equipment required for DC-coupled solar, resulting in reduced system cost
- Increased efficiency for DC-coupled solar
- Low energy management during a grid outage

In some scenarios, it is difficult or not feasible to avoid systems with AC-coupled solar. Most commonly, this occurs when Powerwall 3 is installed on a system with existing AC-coupled solar. As shown below, solar can be installed alongside Powerwall 3 solar, or with Powerwall 3 as storage only.

NOTE: Powerwall 3 can also be used without any solar on the site.

Figure 5. Powerwall 3 with AC and DC Coupled Solar

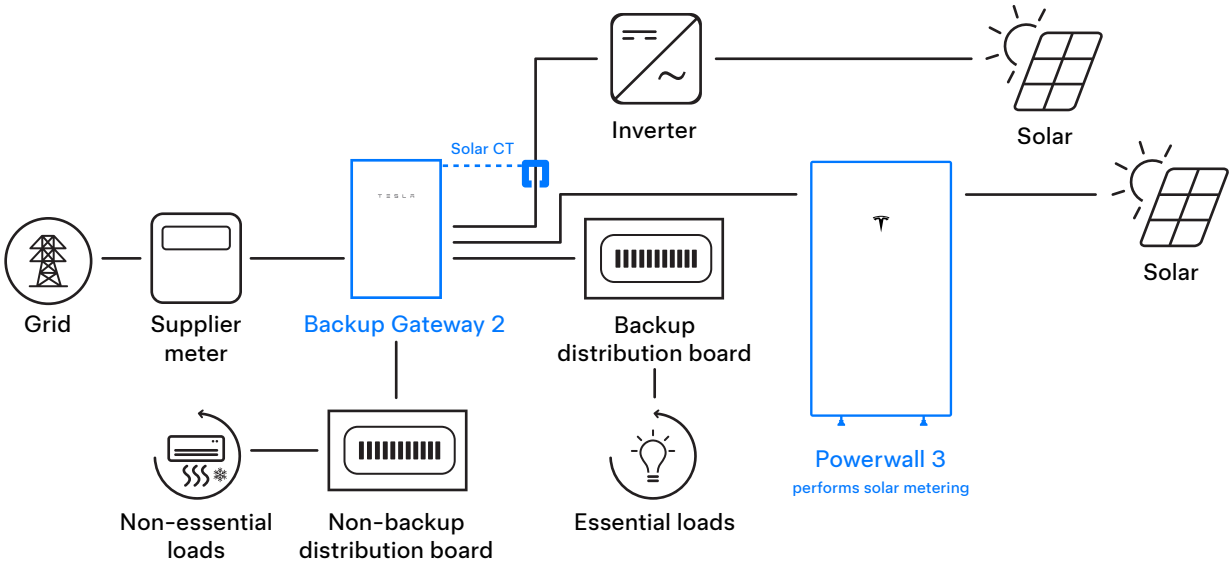
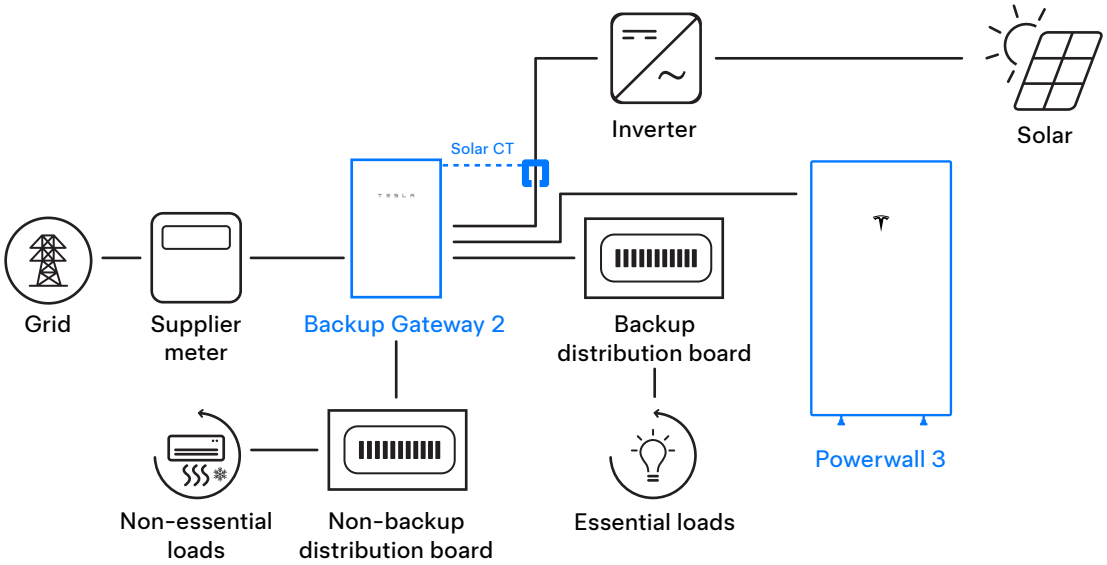


Figure 6. Powerwall 3 with AC Coupled Solar (Storage Only)



For systems with AC-coupled solar only, a maximum of 5 kW AC per Powerwall is allowed in the backup circuit (the smaller of AC inverter rating or DC system size[1]).

[1]The 5 kW PV to Powerwall ratio was put in place to protect the Powerwall system from excessive PV power during a grid outage. 5 kW is used because it is a common solar inverter size, allowing more PV systems to be fully backed up without needing to be split apart, and inverters don't always produce their maximum power. This ratio does not prevent all issues; Powerwall's maximum charge rate is 5 kW under ideal conditions (notably operating temperature). If there is more than 5 kW of excess PV per Powerwall, the system will frequency shift to try to reduce PV power, and may have to shut PV production down completely.

NOTE: The AC-coupled PV to Powerwall ratio and the maximum DC solar system sizing are independent of each other. See *Powerwall 3 DC System Sizing on page 22* for information about sizing the Powerwall 3 DC system.

CAUTION: Exceeding the PV to Powerwall ratio may result in high fault current during a grid outage, which creates a serious risk of damage to Powerwall and/or the customer's home loads. If a Powerwall is damaged by high fault current due to excess PV during an outage, it will be out of warranty.

Options to avoid exceeding the ratio:

1. Increase number of Powerwalls on site
2. Utilize Powerwall 3 for all PV on site to avoid PV to Powerwall ratio
3. Split PV Inverter Point of Interconnection, In / Out of backup (confirm with local electrical regulator that this practice is accepted)
4. Downsize PV to meet ratio
5. Shed part of the PV system using grid dependent relays/contactors

NOTE: The 5 kW PV to Powerwall ratio can be applied to any Powerwall unit in the system, including Powerwall 3. For example, a 5 kW third party solar inverter can be backed up with a single Powerwall 3, as the ratio rule does not apply to the solar inverter portion of the Powerwall 3.

Undersized Powerwall 3 Systems

If a customer acknowledges that they are willing to back up a large load that violates Tesla's guidance on what can be included in backup, design can proceed as long as the customer provides acknowledgment that they accept an undersized system.

NOTE: Undersized systems cannot be designed if the electrical regulator does not allow oversized loads in the backup circuit.

Energy Metering

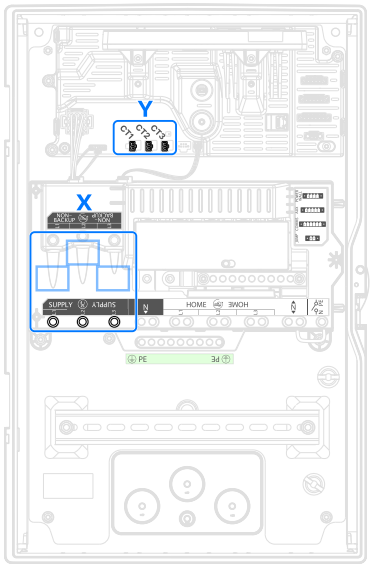
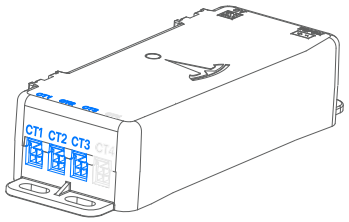
Power measurements are needed for Powerwall 3 system to operate properly, and for system data to appear in the customer's Tesla app. An energy meter accomplishes this by measuring voltage (by voltage tap) and current (by Current Transformer, or CT) at key locations in the system.

CTs are installed around conductors to monitor the current flowing through them. The CTs are connected to a meter which sends the measurements to Powerwall 3. Using this current measurement, the system calculates power measurements to determine how much power the customer is using, or how much power the PV system is producing. The power values are then displayed in the customer's Tesla app and are used by the system to operate as configured by the customer. For instance, a customer may want to store their solar power for use at night. CTs measure both solar production and the home's power consumption so that the system knows how much solar to store during the day and supply at night.

There are many possible configurations for installing metering depending on system design. However, there are two goals, site metering and solar metering.

- **Site Metering**: Site meters show the overall power flow to/from a site from the Grid's perspective, i.e. the Grid is treated as the source of power and the home is a consumer of that power. Site meter(s) must be installed upstream of all solar production, Powerwalls, and home loads.
- **Solar Metering**: Solar meters capture production from solar inverter(s). There must not be any loads or Powerwalls behind the Solar CTs. This would result in under- or over-estimation of solar production.

Metering Options

	Backup Gateway 2 Primary Meter X	Backup Gateway 2 Secondary Meter Y	Tesla Remote Energy Meter
Meter	Figure 7. Backup Gateway 2 internal meters 		Figure 8. Tesla Remote Energy Meter CT terminals  **NOTE:** CT4 functionality will be available at a later date.
Compatible CTs	Not applicable (Primary Meter X has three integrated CTs)	Up to three Tesla 100A CTs (one per phase). For full specifications, see *Tesla 100A CT Specifications on page 10*. **NOTE:** One CT is included in the accessory kit; additional CTs can be ordered individually.	Up to three Tesla 200A CTs (one per phase). For full specifications, see *Tesla 200A CT Specifications on page 13*. **NOTE:** One CT is included in the kit; additional CTs can be ordered individually.
CT Capacity	80 A per phase / 100 A if using only one phase	100 A	200 A
Supported Locations	Site, Conductor, None	Site, Solar, Generator, Conductor, None	Site, Solar, Generator, Conductor

See *Specifications on page 5* for full specifications of the meters and CTs.

- **Primary Meter X** can be used for measuring the site when the Grid connection is at the Supply terminals on Backup Gateway 2.

Figure 9. Example Whole Home Backup Metering Diagram: Meter X Measures Site

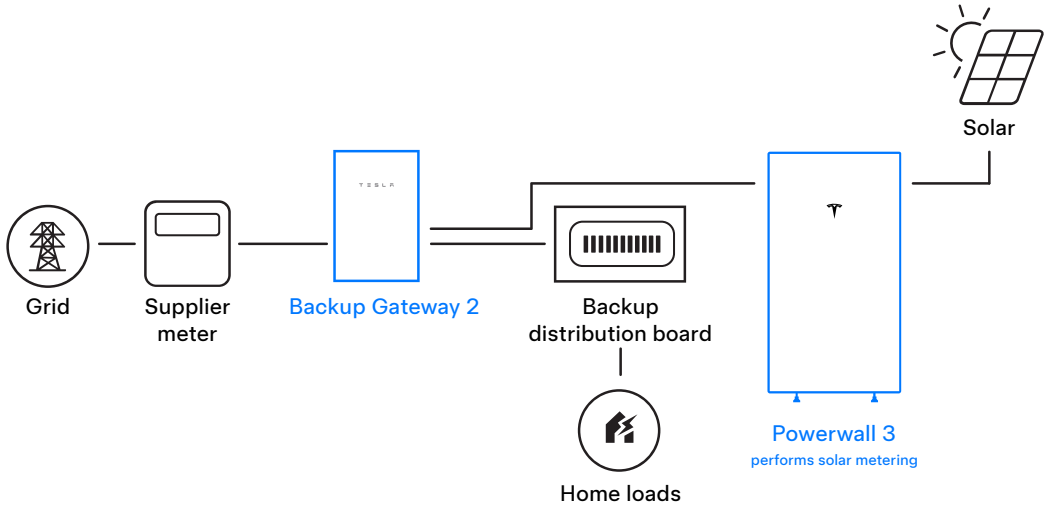
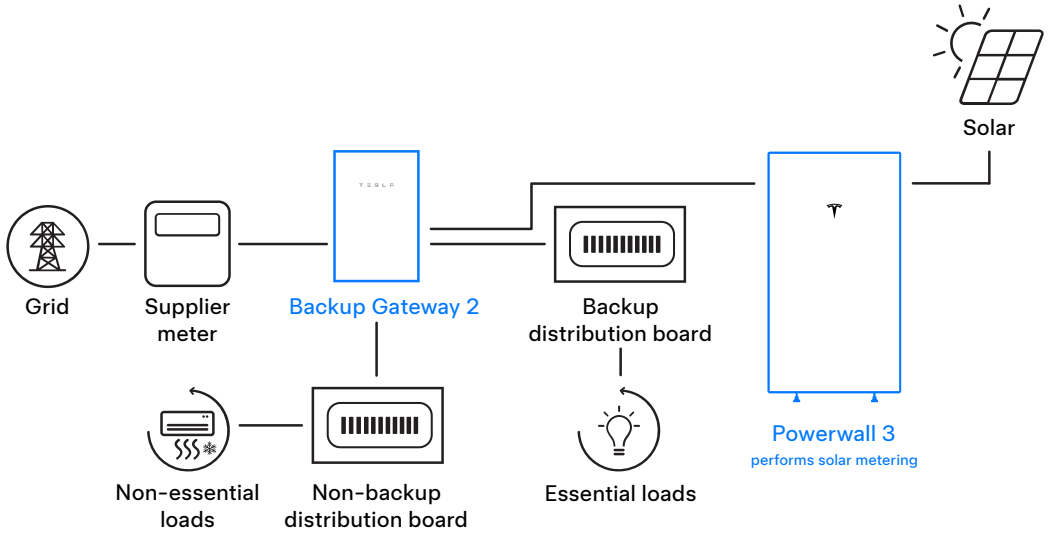


Figure 10. Example Partial Home Backup Metering Diagram: Meter X Measures Site



NOTE: In this configuration, the non-essential loads are downstream of Backup Gateway 2 (i.e., they are connected to the Non-Backup terminals on Backup Gateway 2).

- **Secondary Meter Y**: When there are loads upstream of Backup Gateway 2 or the system includes AC-coupled solar, Tesla 100A CTs can be installed and connected to the Meter Y CT terminals for measuring the site or solar.

Figure 11. Example Partial Home Backup Metering Diagram: Meter Y Measures Site (Meter X Configured as None).

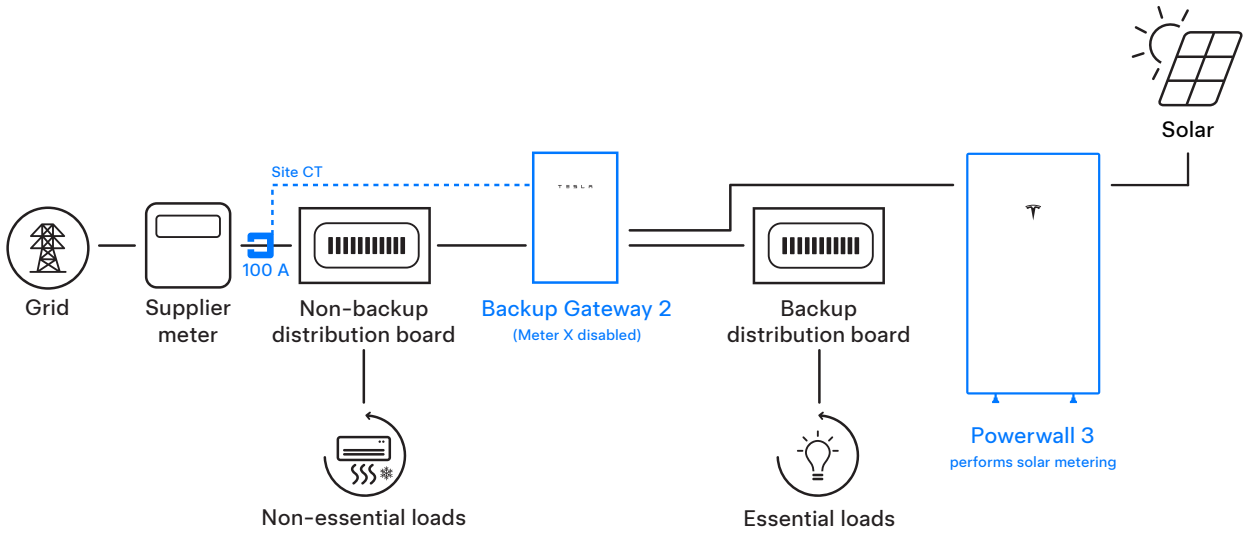


Figure 12. Example Partial Home Backup Metering Diagram: Meter X and Meter Y Measures Site

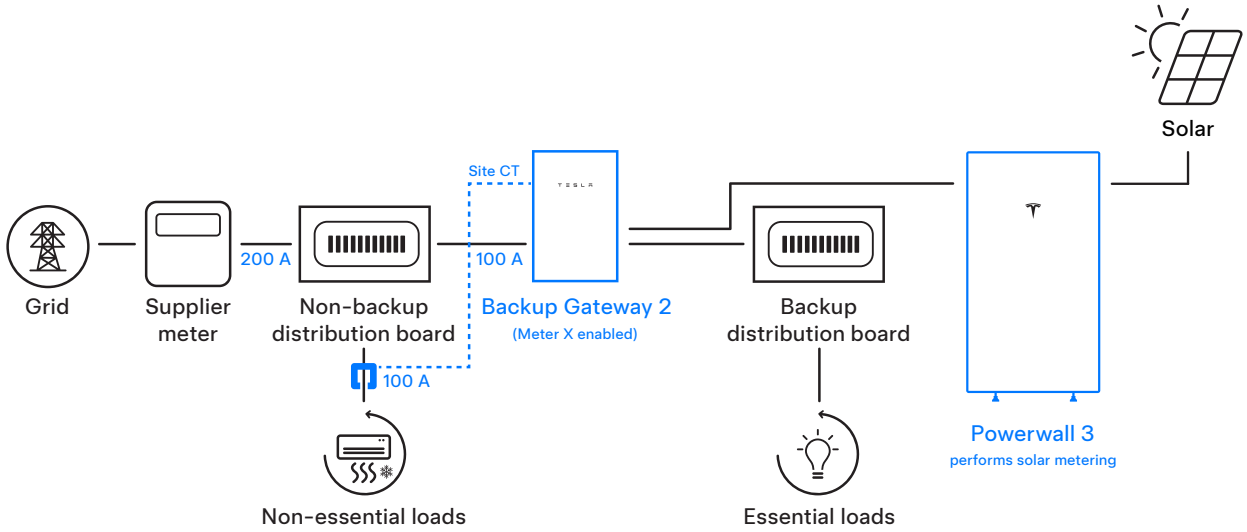
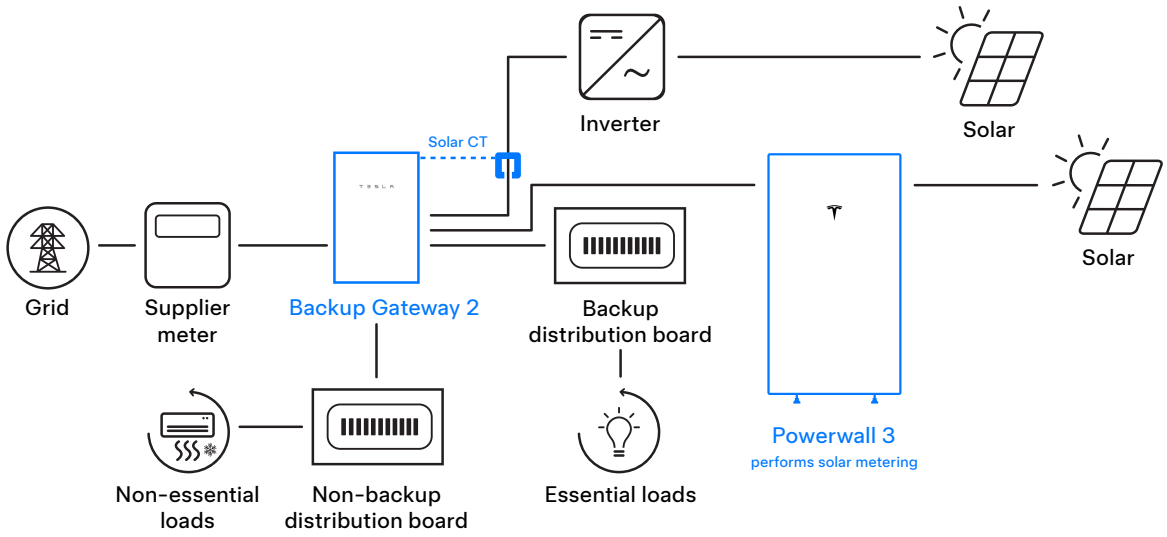


Figure 13. Example Partial Home Backup Metering Diagram: Meter X Measures Site and Meter Y Measures AC-Coupled Solar



NOTE: Meter Y can only measure the site or the AC-coupled solar, not both.

CAUTION: If AC-coupled solar is not metered correctly, Powerwall will not frequency shift to control solar during a grid outage, resulting in a serious risk of damage to the customer's home loads and/or Powerwall.

- **Tesla Remote Energy Meter**: When there are loads upstream of Backup Gateway 2 and the system also includes AC-coupled solar, Tesla 200A CTs can be installed and connected to the Tesla Remote Energy Meter CT terminals for measuring the site or the AC-coupled solar.

  Figure 14. Example Partial Home Backup Metering Diagram: Tesla Remote Energy Meter Measures Site and Meter Y Measures AC-Coupled Solar (Meter X Configured as None)

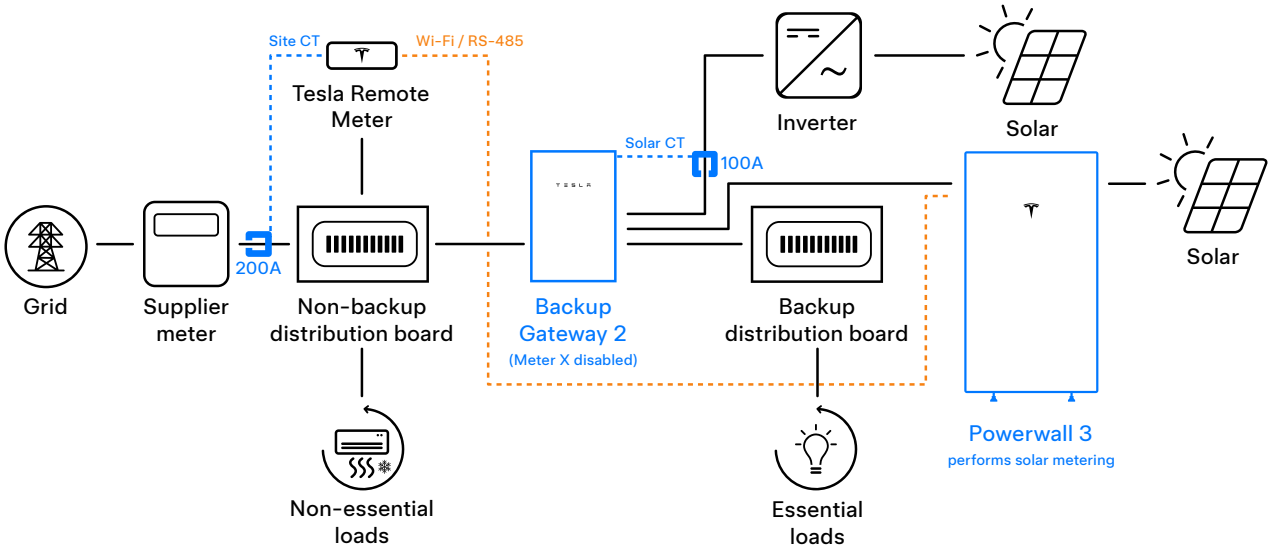
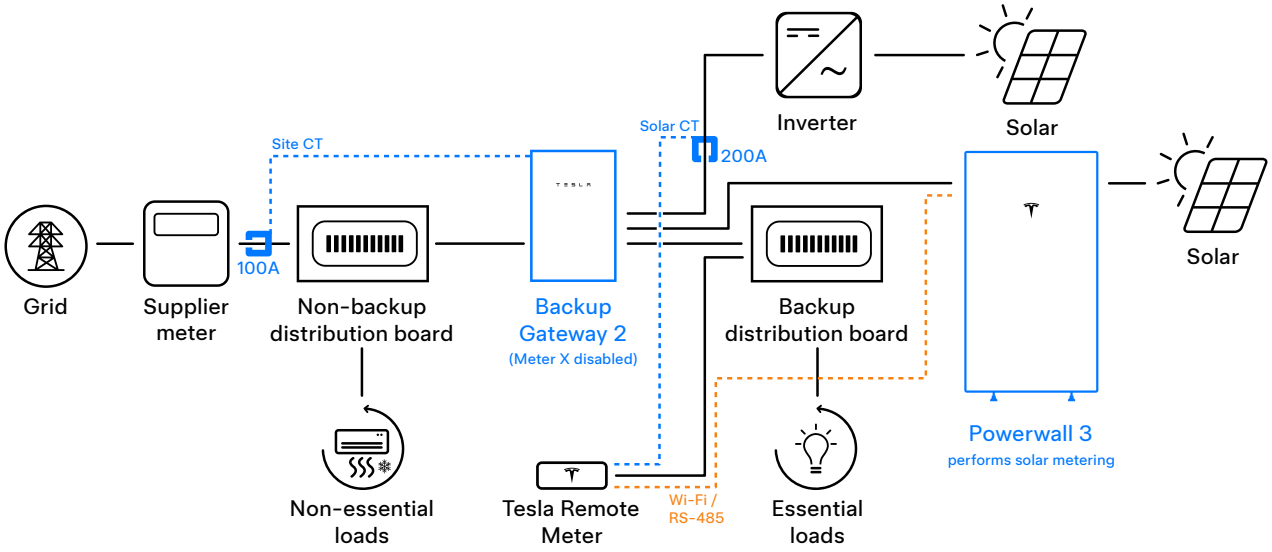


Figure 15. Example Partial Home Backup Metering Diagram: Meter Y Measures Site and Tesla Remote Energy Meter Measures AC-Coupled Solar (Meter X Configured as None)



- **Powerwall 3** measures its own solar (i.e., DC-coupled solar). No additional meter needs to be installed or configured for Powerwall 3.

NOTE: Powerwall 3 is not compatible with Neurio remote energy meters.

NOTE: Powerwall 3 has an internal battery meter which will not be called out in this document, as is not installed or configured by the installer.

SITE REQUIREMENTS AND PRE-INSTALLATION GUIDANCE

Ensure Installation Meets All Local Codes and Requirements

Powerwall 3 comes with a Backup Gateway 2 to enable integration with the electrical grid. Powerwall 3 communicates with Backup Gateway 2 by means of a wired connection; wiring and conduit (where required) must be provided by the installer and installed to comply with local codes.

WARNING: When Powerwall 3 is installed in a dwelling unit, fire detection and protection equipment should be installed in accordance with local building and fire codes.

WARNING: Powerwall is not intended for installation in habitable spaces and living spaces in dwelling units.

WARNING: Install Powerwall in a location that prevents damage from flooding.

CAUTION: When installing Powerwall in a garage or near vehicles, keep it out of the driving path. If possible, install Powerwall on a side wall and/or above the height of vehicle bumpers.

CAUTION: Ensure that no water sources are above or near Powerwall, including downspouts, sprinklers, or faucets.

CAUTION: Ensure that snow does not accumulate around Powerwall.

CAUTION: Before installing, disconnecting, and/or adjusting current transformers for metering, ensure the circuits being measured are not energized and the system is completely powered down. Failure to de-energize the system may compromise operator and equipment safety.

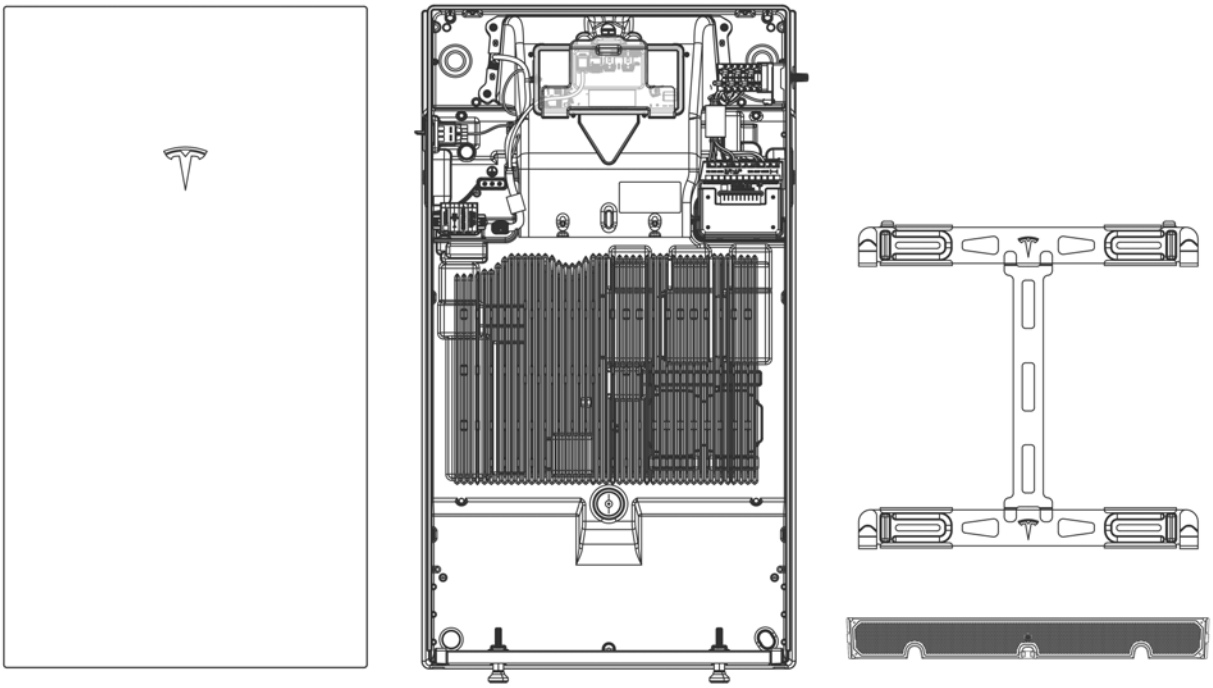
CAUTION: Tesla does not recommend installing Powerwall and Backup Gateway in direct sunlight.

CAUTION: The Backup Gateway may not be recessed into a wall or cavity.

NOTE: All installations must conform to the laws, regulations, codes, and standards applicable in the jurisdiction of installation.

PREPARING FOR INSTALLATION

In the Powerwall 3 Box



- Glass front cover
- Powerwall 3
- Wall mounting bracket
- Air intake screen

In the Powerwall 3 Accessory Bag

Powerwall 3 Accessory Bag: Tesla P/N 1857363-30-x

- (8) fasteners for mounting the Powerwall 3 front cover (Tesla P/N 1847553-00-A)

  NOTE: Early revisions of the front cover fasteners are single use; see *STEP 12: Install Powerwall 3 Front Cover on page 104* for instructions to remove the black gasket from these fasteners to reuse them. Only (6) fasteners are required, with (2) extra fasteners included in the accessory bag.

- (7) PV wiring forked terminals
- (1) small square clamp-on ferrite core with cable tie for the Tesla Asset Controller (TACO) low voltage harness
- (2) medium clamp-on ferrite cores with cable ties for the AC conductors
- (2) medium *marked* (with pink sticker) clamp-on ferrite cores with cable ties for the AC conductors
- (1) small clamp-on ferrite core with cable tie for the Protective Earth

In the Backup Gateway 2 Box

In the Backup Gateway 2 Accessory Bag

- (1) Adhesive circuit label
- (1) CT extension cable harness (3 m)
- (3) M6 rubber bonded stainless steel washers
- (5) 8 mm backplate nuts
- (1) M25 communication gland and insert
- (1) Solar CT (100 A, split-core)
- (1) Powerwall 2 Owner's Manual (can be recycled when Backup Gateway 2 is installed with Powerwall 3; the Powerwall 3 owner's manual is available to the customer via their Tesla mobile app)

Powerwall 3 Service Parts, Orderable Parts, and Accessories

NOTE: Some of the parts and kits listed below may not be orderable by Channel Partners; for a list of parts and kits that can be ordered by Channel Partners, please see the *Powerwall Pricing Guide* on Partner Portal.

NOTE: In the part numbers listed below, -xx-y are placeholder values.

Tesla Part Number	Name	Description
1856187-xx-y	Powerwall Dolly	Custom-designed dolly for lifting and transporting Powerwall
1738120-xx-y	Powerwall 3 Mounting Bracket	(1) Additional Powerwall Wall Mounting Bracket (1 bracket is included with every Powerwall) Only needed if original mounting bracket is lost or damaged
1857363-30-A	Powerwall 3 Accessory Bag	Additional Powerwall 3 accessory bag (1 accessory bag is included with every Powerwall)
2163703-xx-y	Tesla Grid Utility Ancillary Controller (GUAC) interface device	Interface device for installations requiring DRM0 functionality per AS/NZS 4777.2; includes custom wire harness to connect GUAC interface device to Backup Gateway 2 and Powerwall 3 (see *STEP 5: Connect Powerwall 3 to Backup Gateway on page 62* for more information)
1763418-01-y	Powerwall 3 Front Cover Assembly	Service replacement glass front cover and (8) fasteners for Powerwall 3
1899124-xx-y	Powerwall 3 On/Off Switch Cover	Service replacement Powerwall 3 On/Off switch cover
1893723-xx-y	Powerwall 3 Expansion Port Cover	Service replacement Powerwall 3 expansion port cover
1808482-xx-y	Powerwall 3 Foot	Service replacement Powerwall 3 leveling foot (quantity 1)
1775504-xx-y	Powerwall 3 Air Intake Screen	Service replacement Powerwall 3 air intake screen
1857363-02-y	Front Cover Fasteners for Powerwall 3	Additional (8) M6x17 fasteners for securing the Powerwall 3 glass front cover

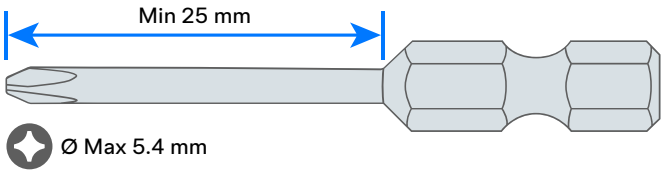
Required Tools

General Tools

- Personal protective equipment (safety glasses, gloves, protective footwear)
- Installation tools (level, stud sensor, tape measure, pencil, painter's tape, flashlight)
- Smart phone with Tesla One app for performing device setup and documenting the installation
- Drill and drill bit for drilling pilot holes in mounting surface
- Torque wrench / screwdriver with T20 Torx bit
- Wire strippers/cutters for 0.2 mm^2 to 120 mm^2 wires
- Up to 3 mm electronics tip slotted screwdriver for AC and communication wiring spring terminals
- RJ45 crimper
- Ethernet cable tester

Powerwall 3 Installation Tools

- Powerwall dolly (preferred, Tesla P/N 1856187-xx-y) OR lift equipment capable of lifting and supporting 287 lb (130 kg)
- ¾-inch hex nut or 19 mm drill socket (if using Powerwall dolly)
- Ratcheting strap to secure Powerwall 3 to lift equipment (if not using Powerwall dolly)
- Ratcheting die crimping tool for crimping forked terminals onto PV wiring; Tesla recommends any of the following or equivalent:
  - TE Connectivity P/N 58433-3
  - TE Connectivity P/N 59824-1
- Phillips #2 (reduced diameter PR2 or PH2R) screwdriver with minimum 25 mm shaft length and maximum 5.4 mm tool diameter for the PV wiring terminals



- Multimeter and Loop Impedance Tester

WARNING: Powerwall 3 is heavy. Wear appropriate personal protective equipment (such as gloves and protective footwear) when handling the unit. Only a sufficient number of trained movers should lift Powerwall 3. Use of lift equipment is recommended.

Backup Gateway Installation Tools

- Small bit for drilling pilot holes in Backup Gateway mounting surface
- Hole saws for drilling cable access holes in Backup Gateway (M12, M20, M25, M32, M40, M50)
- Torque wrench with 3 mm Allen bit (for Backup Gateway power connections)

Required Supplies

- Powerwall 3 Mounting bracket hardware (see *Appendix A: Powerwall 3 Anchoring Details on page 110*)
- Backup Gateway 2 mounting hardware
- External Load Break switch that may be employed with the Powerwall; must conform to AS/NZS 4777.1 and AS 3000
- Minimum 300 V rated, 70°C rated, copper (Cu) wire, 6 mm² to 25 mm², for AC wiring (see *Powerwall 3 AC and PV Wiring on page 113* for details).
- Minimum 600 V rated, 75°C rated, copper (Cu) wire, 4 mm² to 6 mm², for PV wiring (see *Powerwall 3 AC and PV Wiring on page 113* for details).

  NOTE: AC and PV wiring conductors must be made of solid wire, stranded wire or fine stranded wire. Forked terminals are required for fine stranded wire. The wires must be compliant with local regulations.

- Insulated forked terminals for PV wiring; (7) forked terminals are included in the Powerwall 3 accessory bag. If using other forked terminals, Tesla recommends the following or equivalent:
  - TE Connectivity P/N 165015 (4 - 6 mm^2 wire size)
  - Vogt P/N 3654c / 3655c (4 - 6 mm^2 wire size)

  NOTE: Follow the manufacturer's guideline to properly crimp the forked terminals.

- Minimum 300 V rated (or equivalent) 4-conductor shielded copper (Cu) communication cable with at least one twisted pair

  NOTE: This cable is used for communication connection between Powerwall and the Backup Gateway; the twisted pair is required for the CN+ and CN- communication conductors (see *STEP 5: Connect Powerwall 3 to Backup Gateway on page 62* for details).

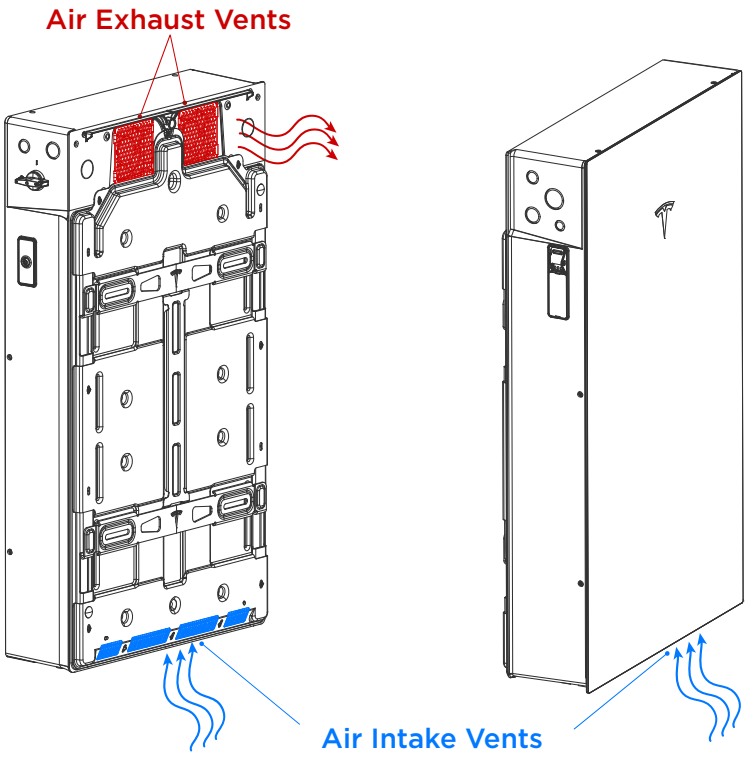
- RJ45 connectors for Ethernet wiring
- Minimum IP65 cable glands or conduit connectors of the following sizes:
  - M20
  - M25
  - M32
  - M40
- 63 A overcurrent protection device (breaker) for the Powerwall 3 circuit

STEP 1: PLAN THE INSTALLATION SITE

Choose a Location that Meets Powerwall 3 Clearance Requirements

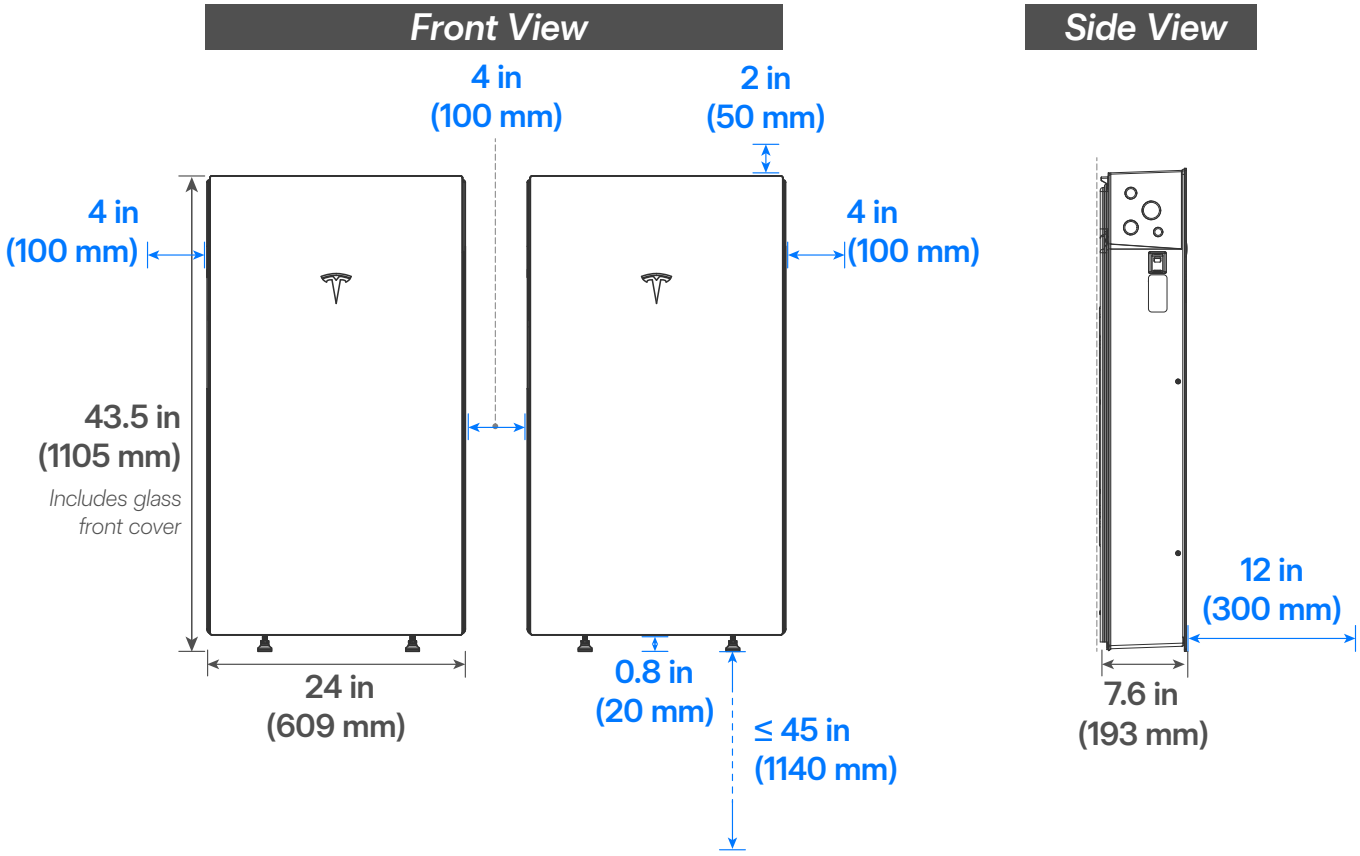
Powerwall 3 requires adequate clearance for installation, cabling, and airflow. The spacing on either side of units and between units is required to ensure there is sufficient clearance for venting and thermal management features. Do not install anything inside the required clearance above Powerwall 3, or anything that might fall and damage the unit. Do not mount Powerwall 3 horizontally or upside down.

Figure 16. Powerwall 3 Air Intake and Exhaust Vents



CAUTION: In addition to meeting all clearance requirements, ensure Powerwall 3 is installed on a flat surface that is clear of obstructions or protrusions that could damage Powerwall or inhibit airflow. The air vents on the rear and lower front of the unit must remain free from obstructions and accumulation of debris (like foliage or dust).

Figure 17. Powerwall 3 Minimum Mounting Clearances



Minimum clearance from left side	100 mm
Minimum clearance from right side	100 mm
Minimum clearance above Powerwall	50 mm
Minimum clearance below Powerwall	20 mm
Minimum clearance between side-by-side Powerwalls	100 mm*
Minimum clearance in front of Powerwall	300 mm**
Maximum height above ground	1140 mm to bottom of unit feet
Maximum slope	+/– 2° side-to-side

*Tesla recommends a minimum of 150 mm between side-by-side units to allow for adequate space for wiring and On/Off switch access.

**This minimum clearance must be maintained at all times, as it ensures adequate airflow for Powerwall 3. Please note that more space may be required depending on local code and/or site conditions.

NOTE: Powerwall 3 has a fan that produces a gentle hum during operation, comparable to a typical refrigerator. The noise level depends on the ambient temperature and the power level of operation. Consider this noise level when choosing where to install Powerwall 3.

Plan Powerwall 3 Mounting Configuration

Choose a Wall Capable of Supporting Powerwall 3

Choose a wall capable of supporting the full weight of Powerwall 3. Walls with the following characteristics are acceptable:

- Wood structural members at regular intervals
- Solid concrete, CMU, or select brick masonry

Other wall types are also acceptable depending on mounting configuration; see *Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation on page 110* for all acceptable wall types when mounting Powerwall 3 on the mounting bracket.

If ground-mounting Powerwall, choose a level surface adjacent to a wall space that meets the above requirements. Ensure the bearing surface is structurally sound and flat, and supports both Powerwall feet.

Plan Cable Length Between Components

Follow the table below for maximum distances between system components. Wire gauge must meet local codes and in some circumstances wire gauge requirements change based on distance. Refer to *Appendix B on page 113* for wire gauge requirements.

	Maximum Cable Length
CAN communication wiring between Backup Gateway 2 and Leader Powerwall 3	45 m for 1.5 mm^2 wire
	35 m for 1 mm^2 wire
Wired Ethernet connection between any two devices*	100 m per Ethernet standard
Total PV circuit distance**	160 m

*This measurement refers to the distance between Powerwall 3 and the customer's internet router, or between two Powerwall 3 units.

**Ensure that total DC circuit distance, from + MPPT terminal to - MPPT terminal (including module wire leads, jumper wires and all wiring within the array boundary for any individual string), does not exceed 160 m for single strings

- Total DC circuit distance refers to the entire round trip wire distance, from Powerwall 3 to the roof, then back to Powerwall 3

CAUTION: Failure to follow minimum cable size and length requirements may result in intermittent or unreliable operation of the Powerwall system. In systems that do not meet these minimum requirements, performance issues may arise even after successful commissioning.

Maximum Tesla 100 A CT Extension

NOTE: The Tesla 100 A CTs are installed with Backup Gateway 2.

Tesla 100 A CTs (Remote Metering)	Maximum Extension Length
Using Tesla 100 A CT Extension 3 m (Tesla P/N 1467274-00-x)	Up to 3.8 m
Using 0.5 mm^2 or larger twisted pair conductors	Up to 100 m

Maximum Tesla 200 A CT Extension

NOTE: The Tesla 200 A CTs are installed with Tesla Remote Meter. See *Install the Tesla Remote Energy Meter and CTs on page 89* for additional distances to measure when installing Tesla Remote Meter.

Tesla 200 A CTs (Remote Metering)	Maximum Extension Length
Using up to (2) Tesla 200 A CT Extension 3.5 m (Tesla P/N 2060713-00-x)	Up to 8.5 m

Choose Powerwall Cable Entry

Determine whether cables will be routed into Powerwall from either side or the back of the unit. A conduit fitting or cable gland must be used to seal the entry into the wiring compartment.

CAUTION: The Powerwall 3 knockouts are **not** expandable. Do not drill into the Powerwall 3 enclosure or change any metal surface for any reason.

Figure 18. Powerwall 3 Knockout Locations

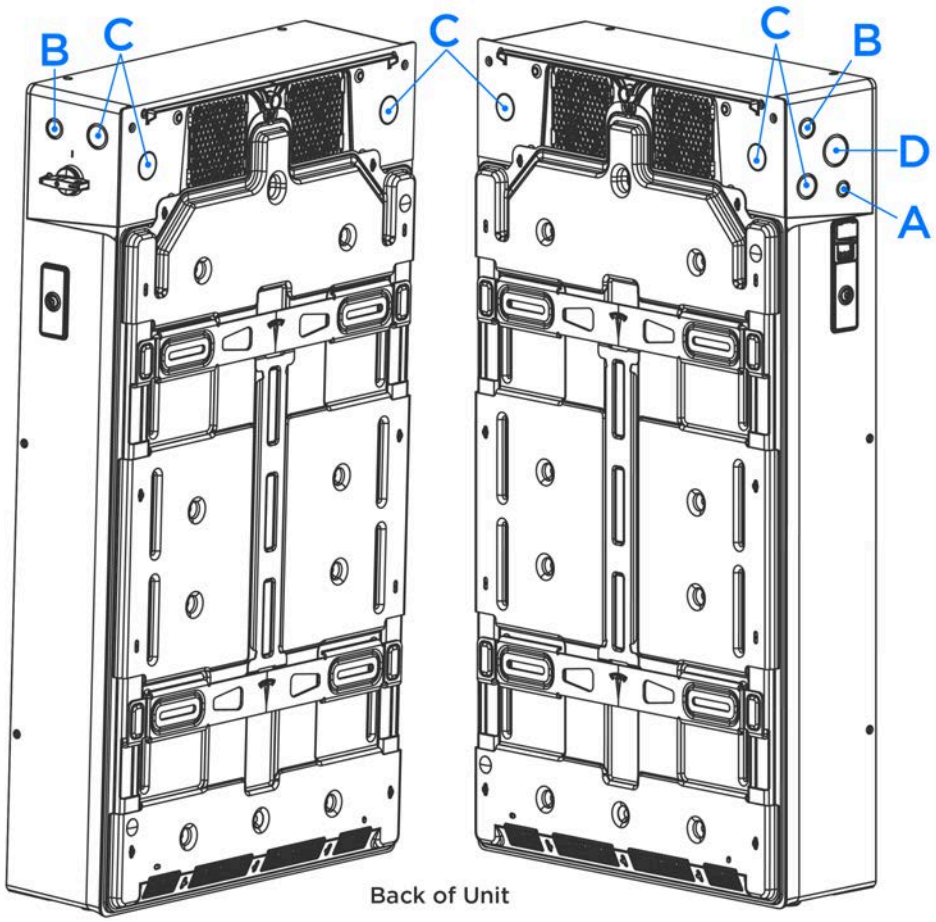


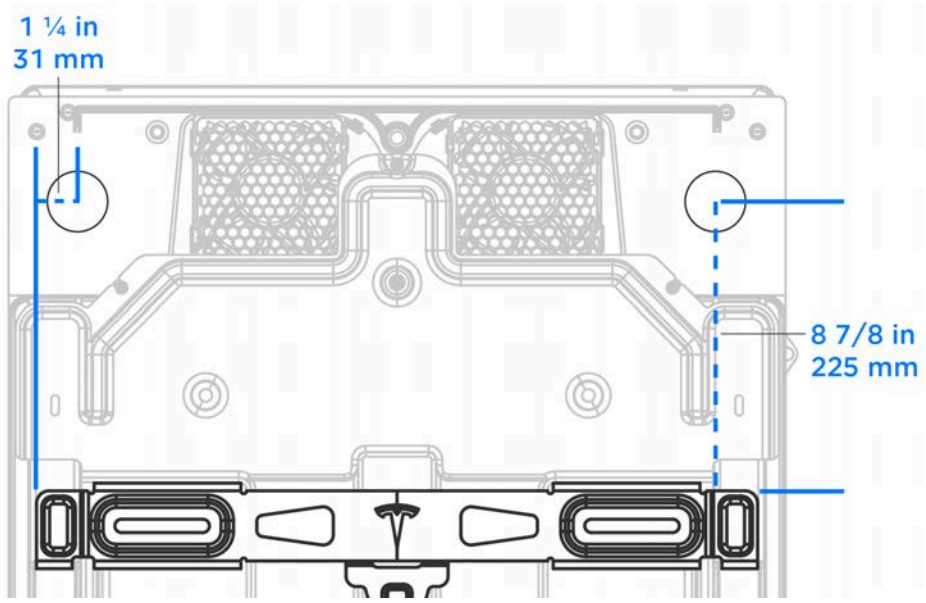
Table 1. Enclosure Knockout Sizes

Knockout	Conduit Size
A	M20
B	M25
C	M32
D	M40

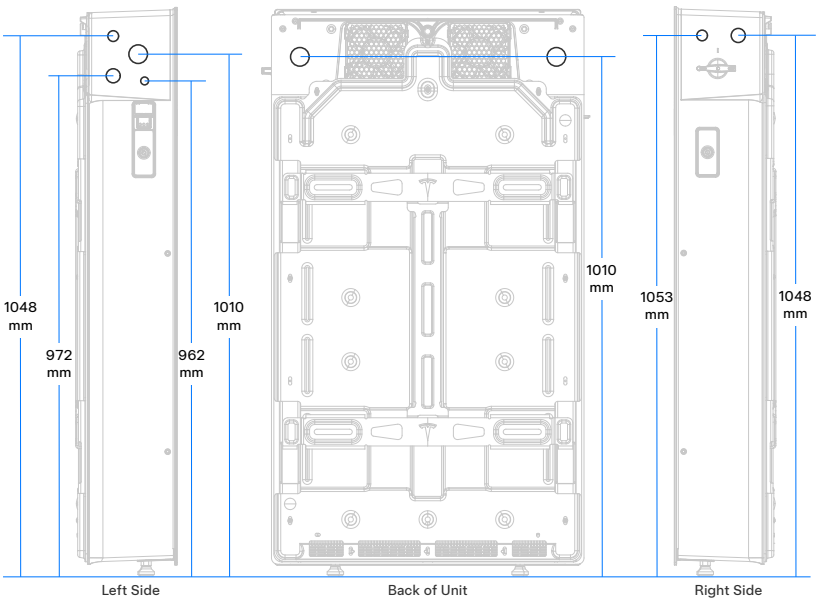
STEP 1: PLAN THE INSTALLATION SITE

The following diagrams provide measurements for:

- Positioning conduit entry holes relative to the Powerwall 3 bracket (the measurements are the same for both knockouts)

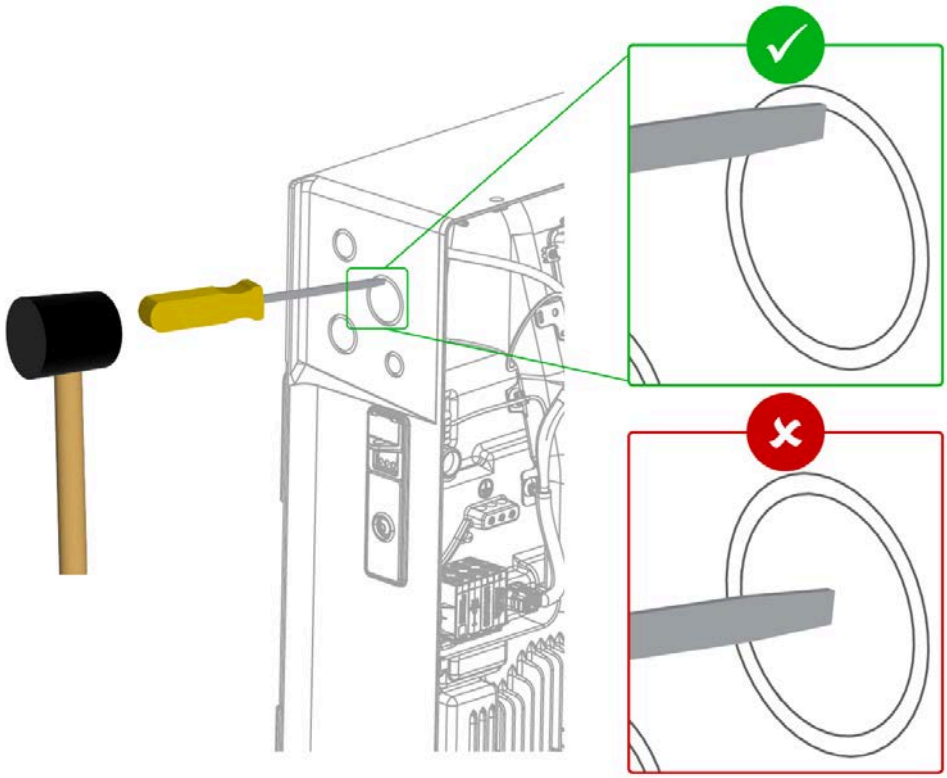


- Positioning conduit entry holes relative to the floor (if mounting Powerwall 3 with its feet at the lowest height setting and touching the floor)



To open a knockout, position the tip of a slotted screwdriver on the inner perimeter of the knockout (on the outside of the enclosure). Hammer the screwdriver to punch out the metal knockout; one well-placed strike is generally sufficient to dislodge the knockout.

NOTE: Placing the screwdriver on the inner perimeter of the knockout rather than the middle allows for the knockout to be opened with significantly less force.



Plan Amount and Size of Conduit or Raceway

Calculate the amount and size of conduit or raceway needed for the installation, based on fill limits and local code requirements. An adapter may be required between the entry into the Powerwall wiring compartment and the conduit.

STEP 2: REMOVE POWERWALL 3 FROM PACKAGING AND TRANSPORT USING THE POWERWALL DOLLY

WARNING: Do not move Powerwall 3 in its packaging while the packaging is standing upright. In this position, the Powerwall 3 unit can shift within the packaging, which may result in Powerwall 3 falling over.

1. Open the Powerwall packaging:
   a. Carefully remove the box containing the glass Powerwall front cover and set it aside on an even surface.

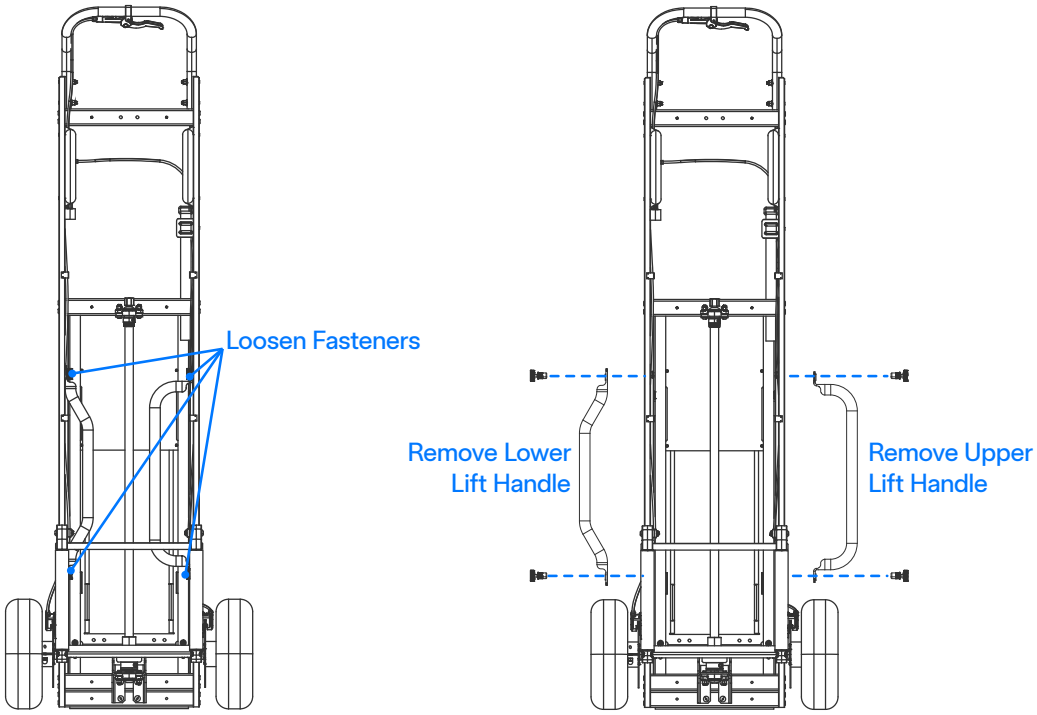
      CAUTION: Handle the glass front cover carefully. Avoid setting the cover on hard, uneven surfaces which could break the glass.

   b. Remove the accessory bag and set it aside.

NOTE: Please return the Powerwall 3 packaging to the warehouse that originally shipped the unit(s). See the for instructions.

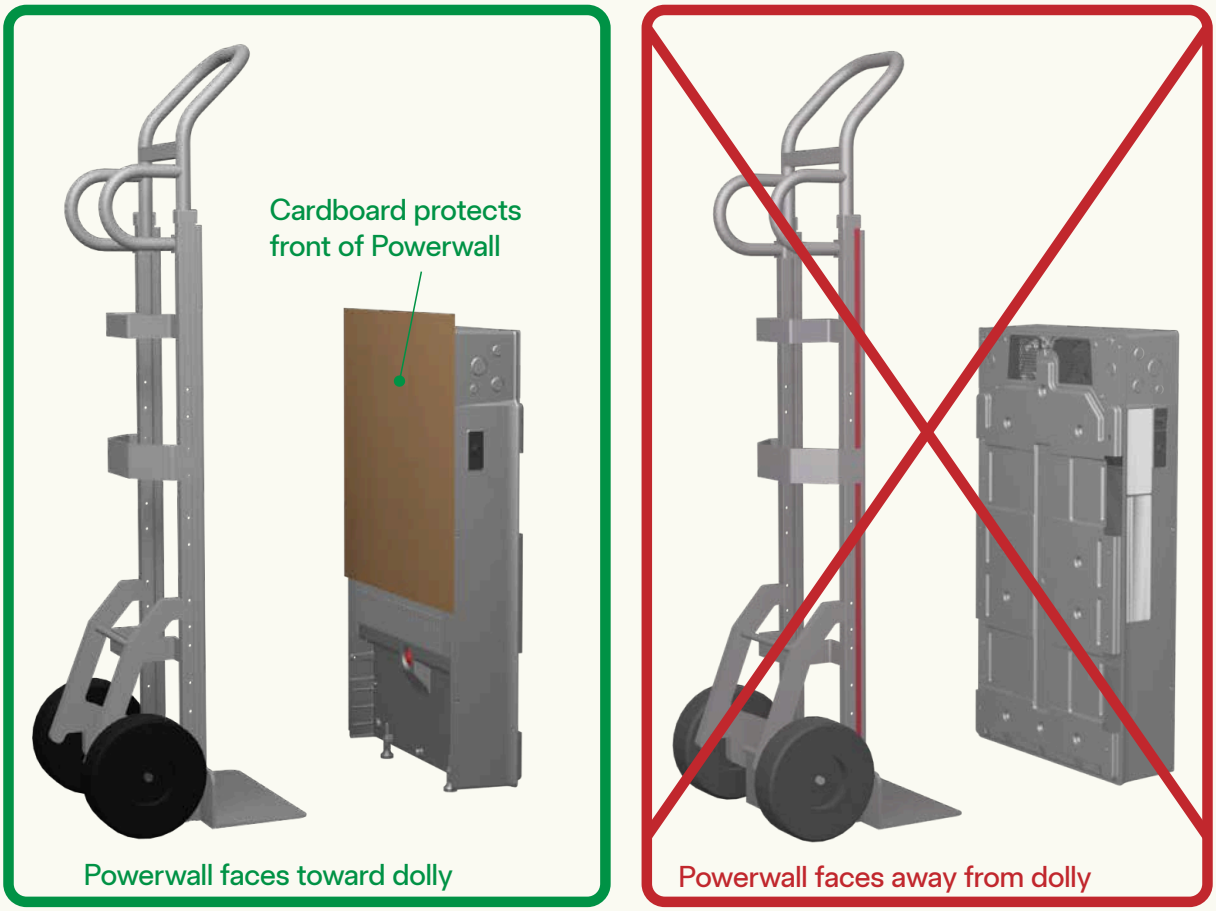
2. To lift Powerwall 3 using the Powerwall dolly, loosen the (2X) fasteners holding each lift handle in place, then detach the handles.

NOTE: Refer to the *Powerwall Dolly User Manual* for instructions on mounting Powerwall 3 using the Powerwall dolly.



STEP 2: REMOVE POWERWALL 3 FROM PACKAGING AND TRANSPORT USING THE POWERWALL DOLLY

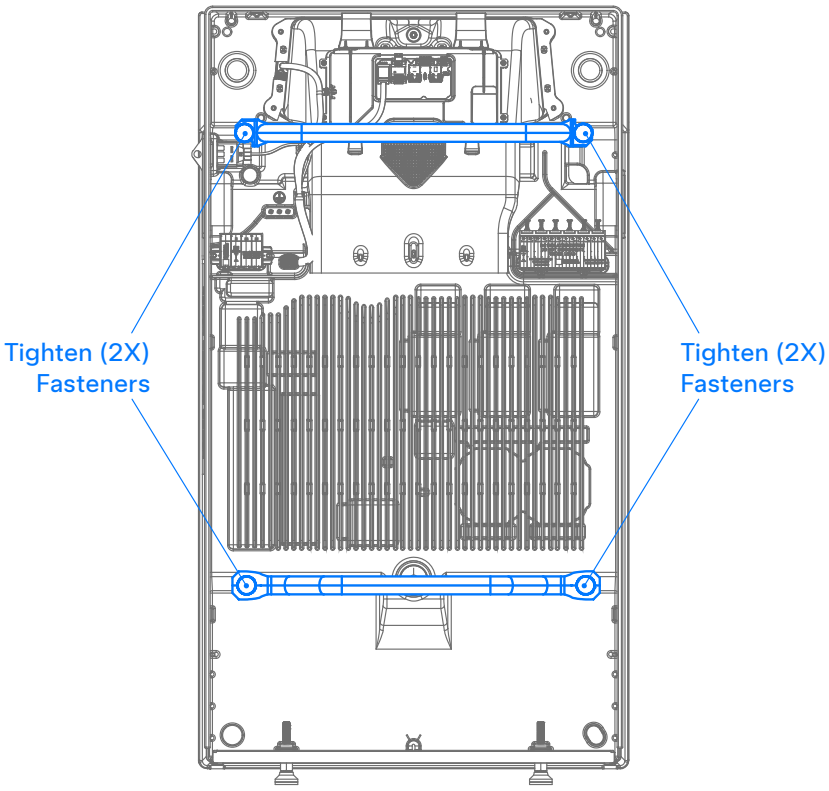
CAUTION: The Powerwall dolly is the recommended tool for transporting Powerwall 3. If using another dolly, ensure Powerwall 3 is facing toward the dolly and the front of the unit is protected by a piece of cardboard (for instance the cardboard box the bracket ships in) or a similar material. Use a strap to secure Powerwall to the dolly.



3. With Powerwall 3 still in the packaging, place the two lift handles on the Powerwall and tighten the (2X) fasteners on each handle to hold them in place. Note that upper handle is the larger, more rounded handle, and the lower handle is the smaller, more angular handle, and they attach to existing threaded mounting points. Perform a pull test to confirm the handles are secure before proceeding.

WARNING: Do not use the handles to manually lift Powerwall 3. These handles are designed to interface with the dolly; they are not designed to be load bearing, and attempting to lift Powerwall 3 with them could result in dropping and damaging the unit.

STEP 2: REMOVE POWERWALL 3 FROM PACKAGING AND TRANSPORT USING THE POWERWALL DOLLY



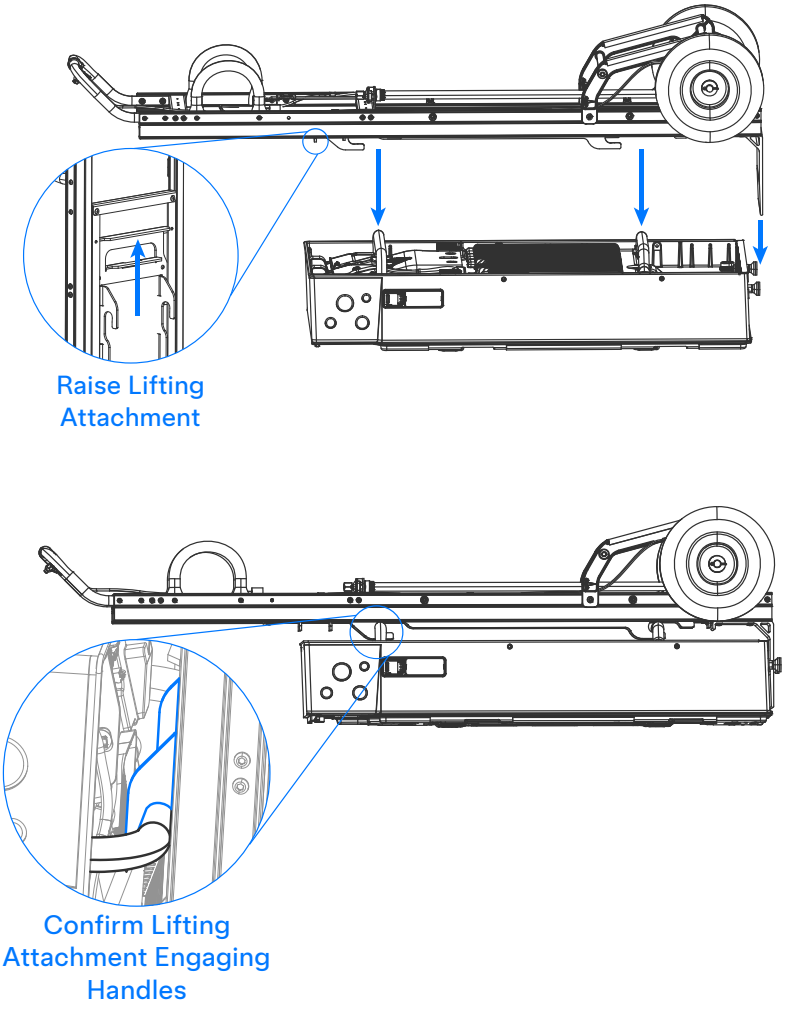
4. Confirm the leveling feet are screwed all the way in to the Powerwall.

   CAUTION: The leveling feet must remain installed on Powerwall 3, regardless of whether it is wall-mounted. The leveling feet ensure the required clearance is maintained between Powerwall 3 and any surface below it.

5. Engage the Powerwall dolly with the lift handles:
   a. Lift the Powerwall dolly, with one person holding either end.
   b. Raise the lifting attachment and lower the Powerwall dolly, inserting the lifting plate between the Powerwall 3 feet as it is lowered, and lowering the lifting attachment so that it engages the handles.

      CAUTION: Confirm the handles are fully engaged with the dolly before proceeding.

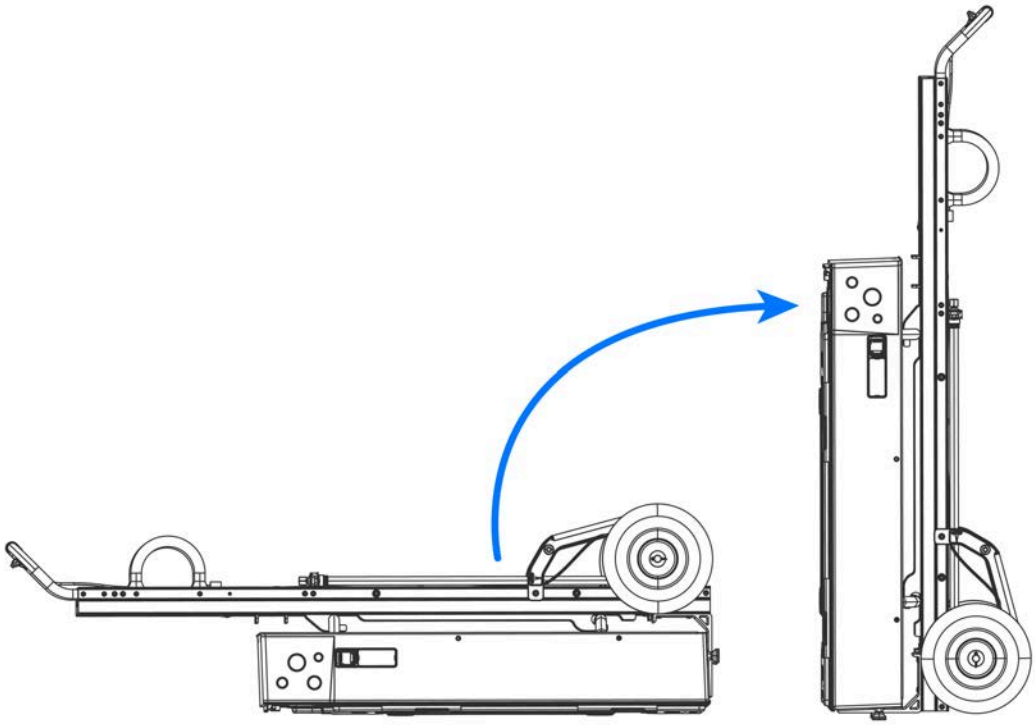
STEP 2: REMOVE POWERWALL 3 FROM PACKAGING AND TRANSPORT USING THE POWERWALL DOLLY



6. Place one foot on the Powerwall packaging as a pivot point, then lift Powerwall and the dolly to a standing position.

> **CAUTION:** Powerwall 3 must be in its packaging when lifting it in this manner; the packaging ensures the corners of the enclosure are protected.

STEP 2: REMOVE POWERWALL 3 FROM PACKAGING AND TRANSPORT USING THE POWERWALL DOLLY



7. Remove the packaging and set it aside.
8. Position Powerwall at the mounting wall.

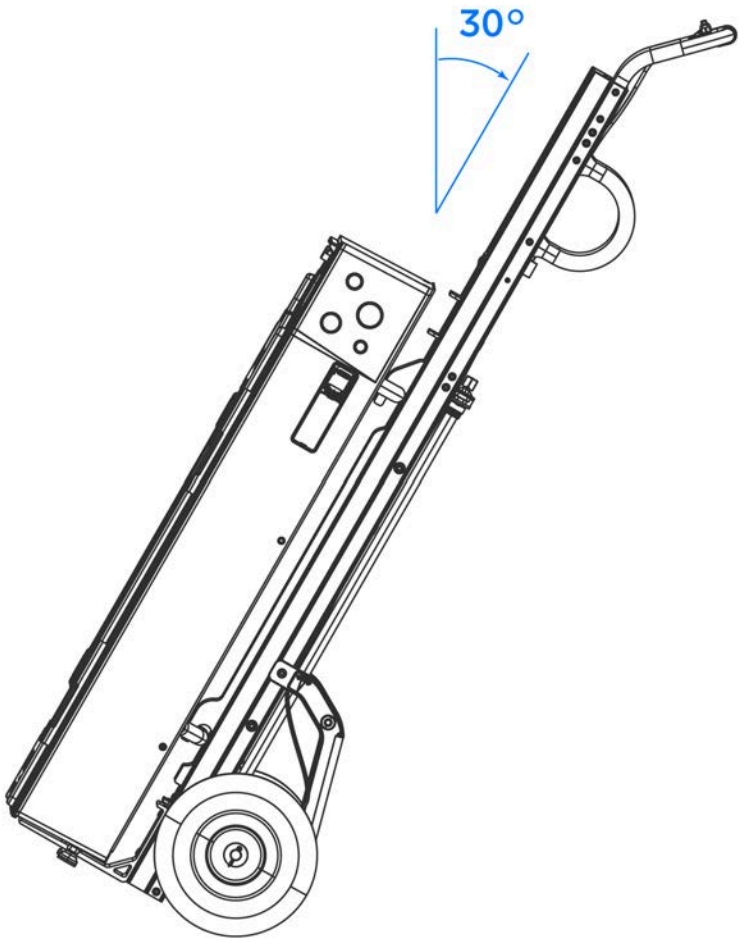
WARNING: Use extreme caution if using the dolly on uneven terrain, such as grass, mud, or loose gravel, or if using on a steep incline.

CAUTION: Always lower the lifting plate to its lowest position before moving the dolly with Powerwall 3 attached.

9. To raise or lower Powerwall 3:

STEP 2: REMOVE POWERWALL 3 FROM PACKAGING AND TRANSPORT USING THE POWERWALL DOLLY

a. Tilt the dolly back 30 degrees to avoid Powerwall tilting forward or catching the wall bracket.

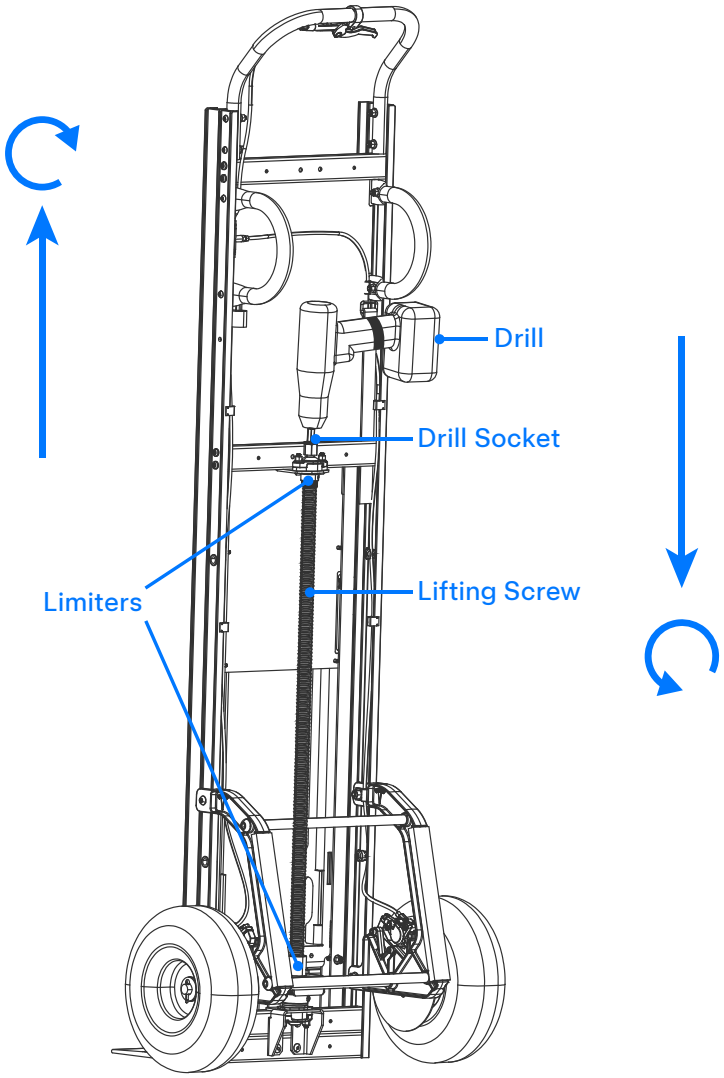


b. Place a ¾-inch hex nut or 19 mm drill socket on the dolly lifting screw.

c. Connect a drill to the hex nut or drill socket, then secure the drill to the side of the dolly using the provided strap.

> **CAUTION:** Do not use an impact drill.

d. Ensure the drill is on the high torque setting (or the slowest setting), then run the drill until Powerwall has been lifted to the desired height. Run the drill in reverse to lower.



CAUTION: Be aware of the limiters on the lifting screw, and do not attempt to drive the screw beyond those limiters.

CAUTION: Only lift Powerwall 3 using the Powerwall dolly or a platform lifting tool.

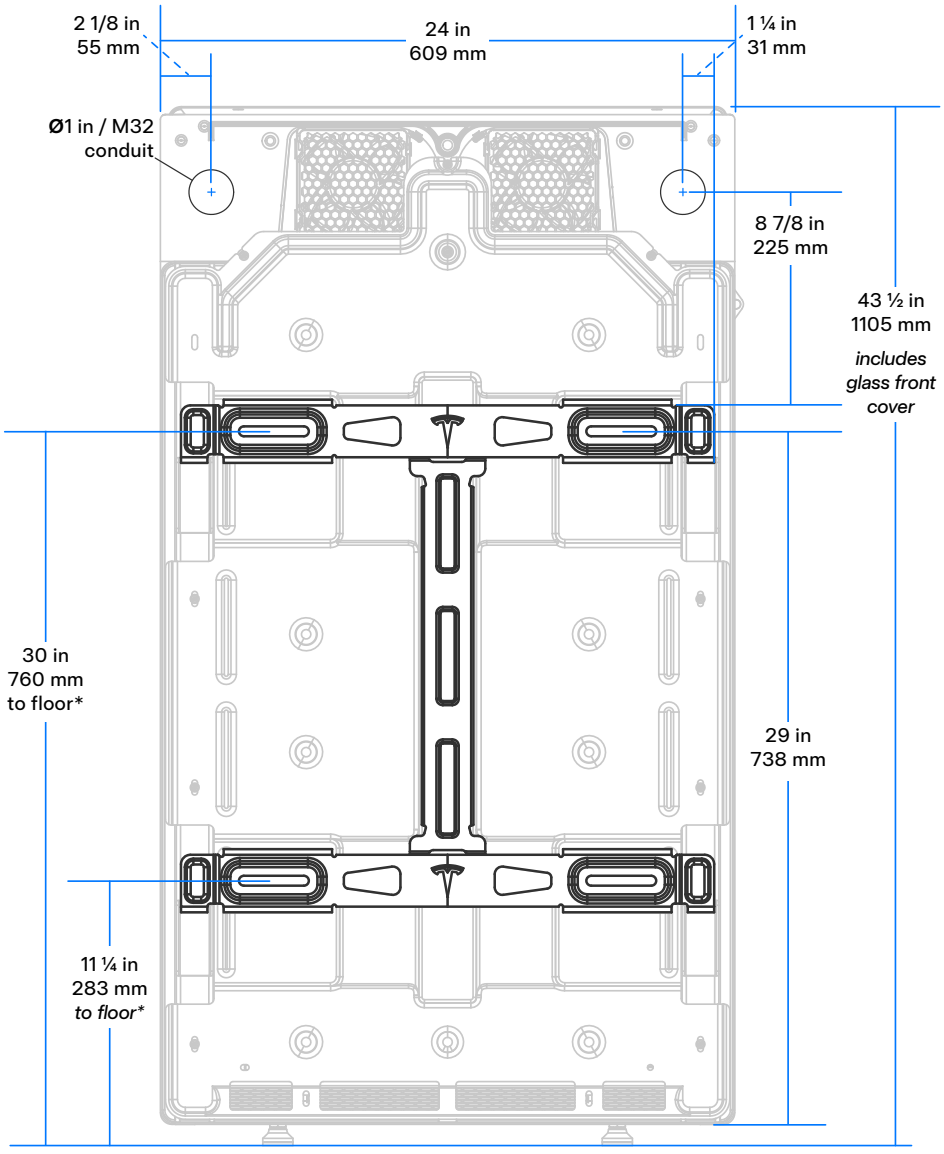
10. To disengage the dolly from Powerwall 3:
    a. Raise the lifting attachment to disengage the dolly from the handles.
    b. Move the dolly away from Powerwall 3.
    c. Using the drill, lower the lifting platform to its lowest position.
    d. Remove the two lifting handles and reattach them to the dolly.

STEP 3: WALL-MOUNT POWERWALL 3 USING WALL BRACKET

WARNING: Powerwall 3 must be mounted using the wall bracket at all times to secure the unit to the supporting structure.

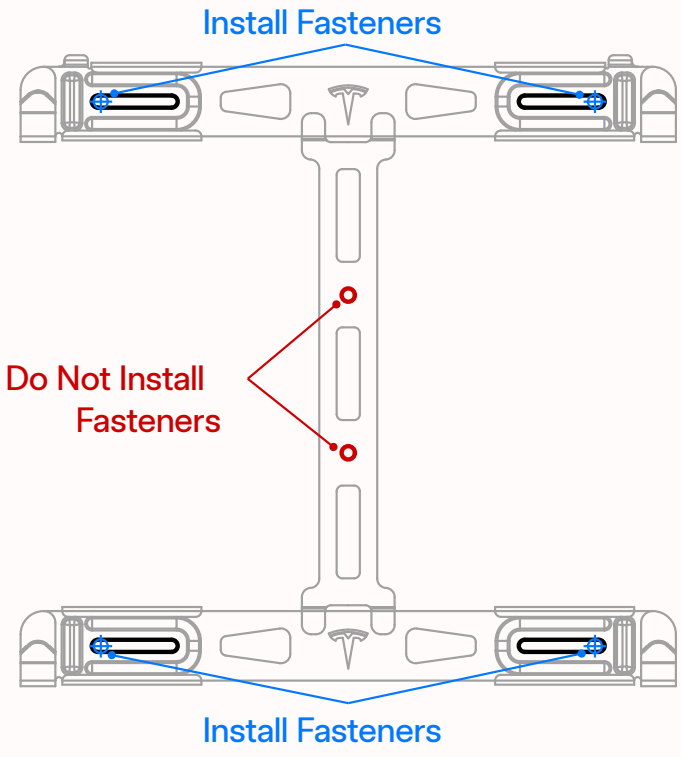
1. Using a drill and level, mount the Powerwall bracket to a wall capable of supporting the full weight of Powerwall 3. See *Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation on page 110* for additional details on the type and number of fasteners to use.

   Figure 19. Bracket Measurements Relative to Powerwall and Floor

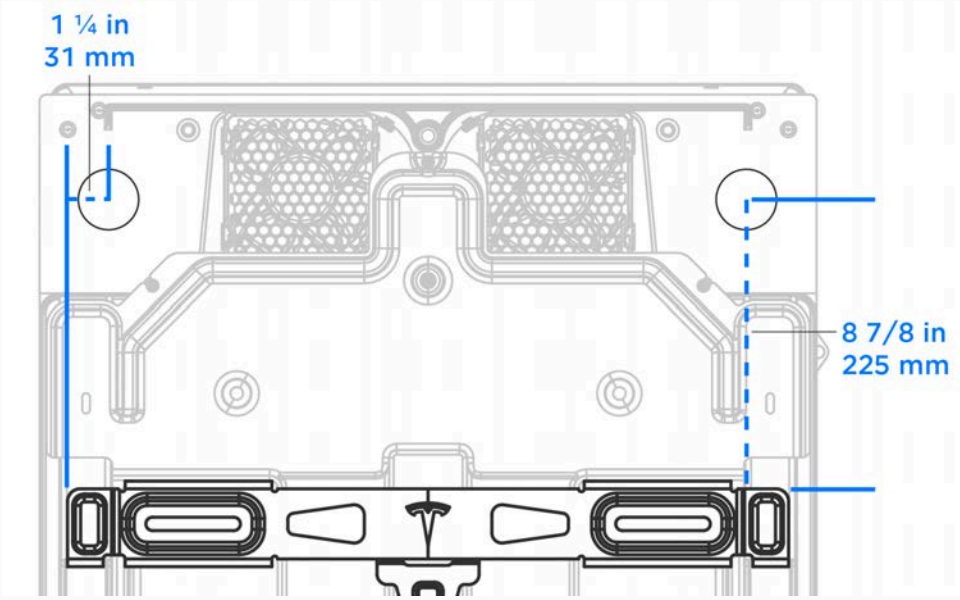


STEP 3: WALL-MOUNT POWERWALL 3 USING WALL BRACKET

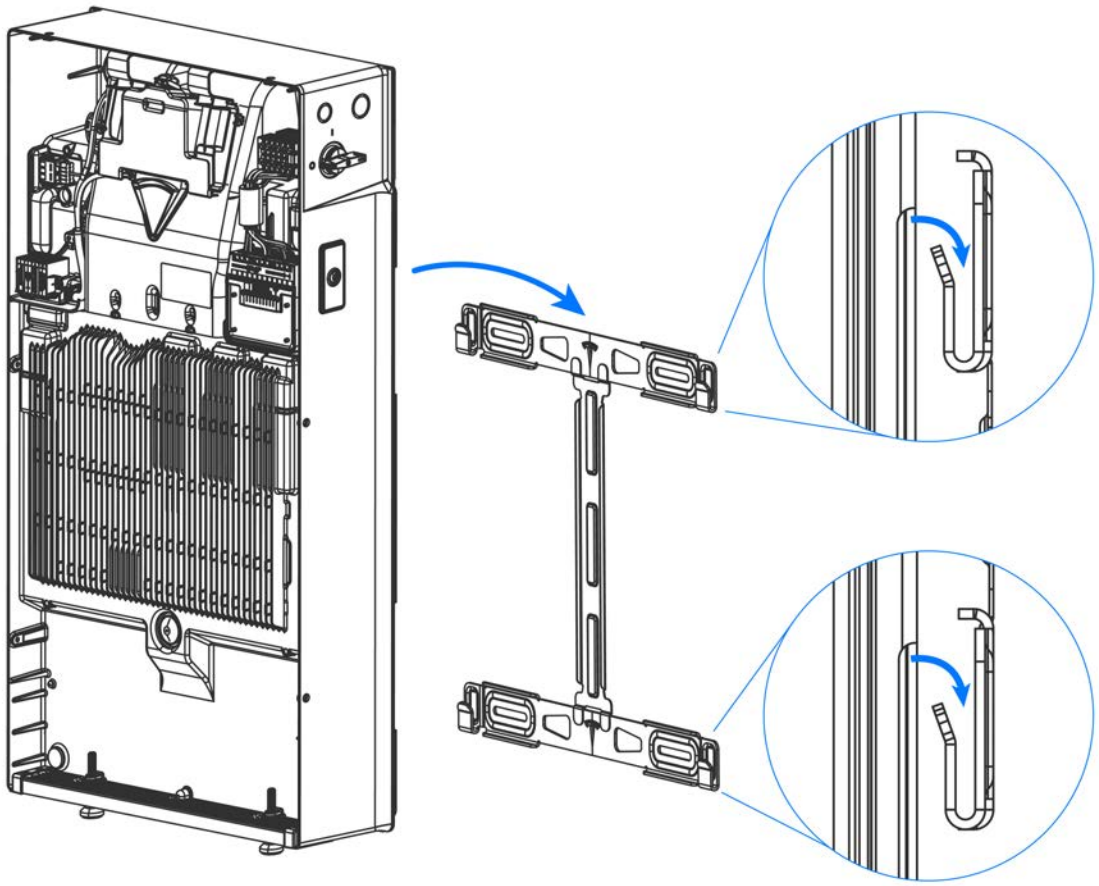
WARNING: Only install fasteners in the (4) slots on the horizontal bracket segments. Do not install fasteners on the vertical (center) segment, as these are not structural mounting holes.



NOTE: The following diagram provides measurements for positioning rear conduit entry holes relative to the Powerwall 3 bracket (the measurements are the same for both knockouts).



2. Move the dolly toward the wall, positioning Powerwall so that the mounting cleats are just above the flanges on the bracket.



3. Lower Powerwall until both the upper and lower sets of cleats engage the flanges on the bracket.

> **CAUTION:** Confirm Powerwall 3 is fully seated on all four cleats before proceeding.

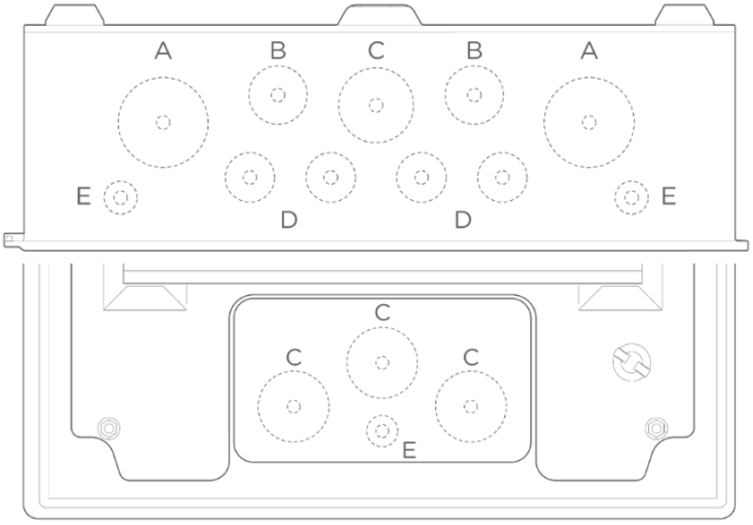
4. If ground-mounting Powerwall, use a 17 mm wrench to adjust the leveling feet until Powerwall is level. The unit should be level within ± 2 degrees side-to-side and within ± 5 degrees front-to-back.

> **NOTE:** The top of each foot must be visible above the threaded boss; do not unscrew the foot so far that the top is no longer visible.

STEP 4: INSTALL BACKUP GATEWAY 2

Mount the Backup Gateway

1. Using a hole saw, drill out the necessary cable access holes from the Backup Gateway.
   Figure 20. Top / Bottom (above) and Back (below) Cable Access Drill Guides

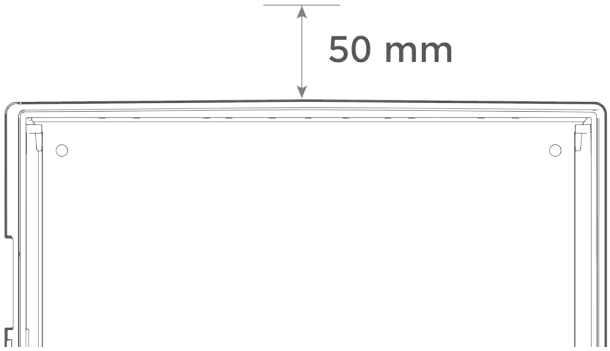


Drill Guide Diameters	
A	M40, expandable to M50
B	M25
C	M32
D	M20
E	M12

CAUTION: When Backup Gateway is installed outdoors, top cable entry is prohibited as it may result in water ingress.

2. Using a drill and level, mount the Backup Gateway enclosure.

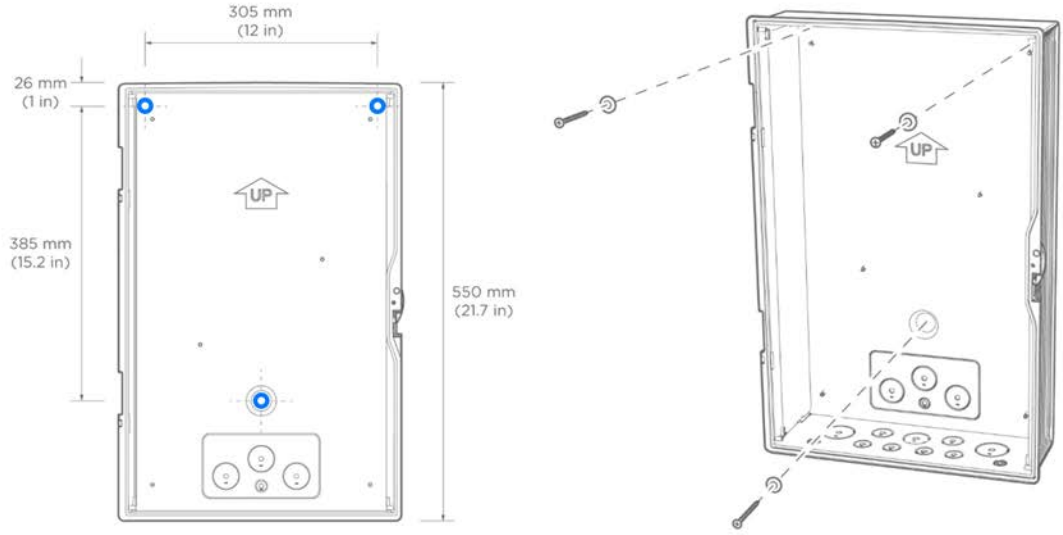
NOTE: Leave a minimum clearance of 50 mm above the Backup Gateway.



NOTE: The enclosure must be installed in the orientation shown below. Do not mount the Backup Gateway enclosure horizontally or upside down.

CAUTION: To ensure IP55 ingress rating is maintained, the enclosure must only be mounted at these three points.

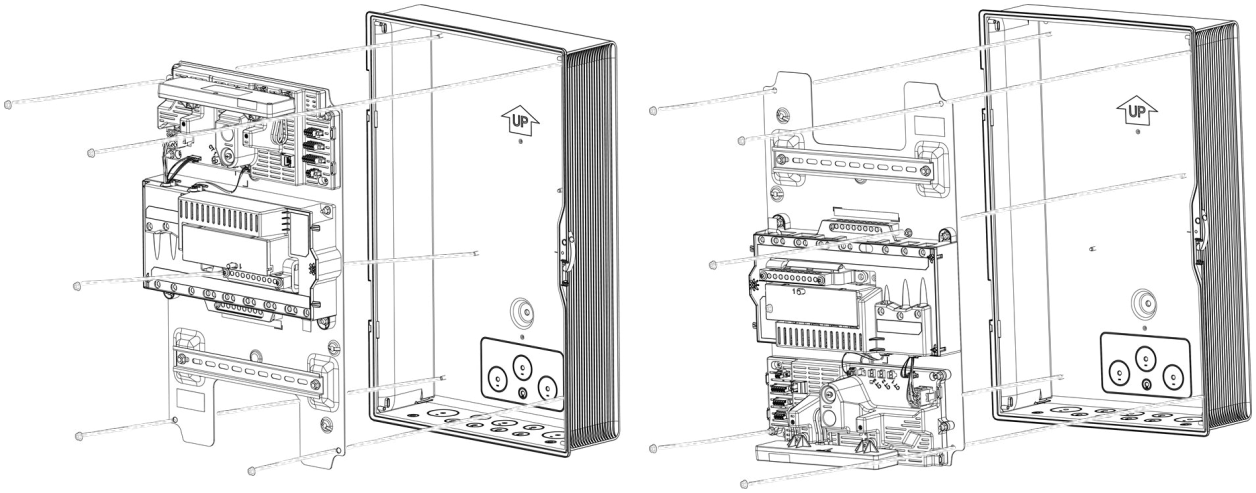
Figure 21. Backup Gateway Enclosure Mounting Holes



CAUTION: The sealing washers must be installed to guarantee IP55 ingress rating.

3. Install the Backplate Assembly in the enclosure, orienting it for bottom or top cable entry. Attach it to the five (5) studs using the five (5) supplied 8 mm nuts. Use a torque wrench with 8 mm socket to tighten the nuts to 6 Nm.

   Figure 22. Backplate Orientation for Bottom Cable Entry (left) or Top Cable Entry (right)



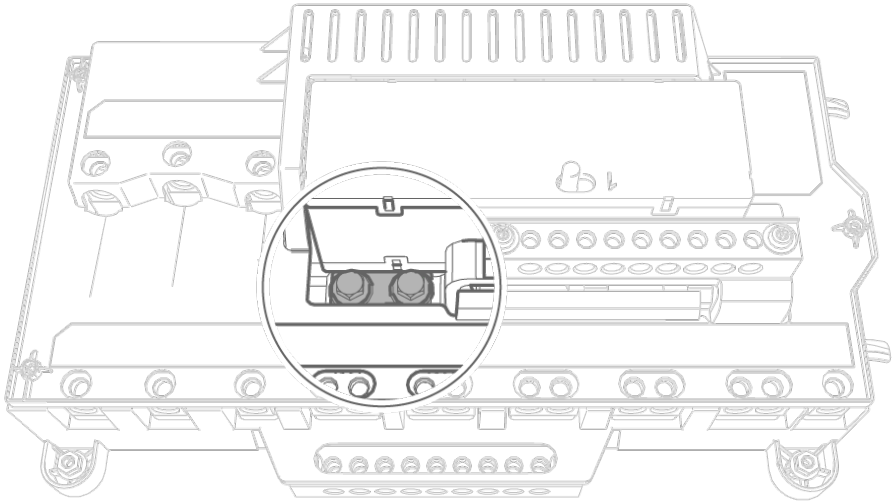
4. Locate the Backup Gateway serial number on the label on the dead front cover. Record the serial number for reference.

Verify Neutral-Earth Bonding Scheme

Proper earth connection and Neutral-to-Physical Earth (N-PE) bonding is required for safe operation of the Powerwall system and for compliance with local code requirements. The correct Neutral-to-Earth bonding scheme must be maintained even when the system is disconnected from the grid.

The neutral conductors must not be broken in Australia and New Zealand on **TN-C-S** networks in off-grid operation. Neutral and Protective Earth (PE) conductors are separated at the main switchboard, and the MEN (Mutliple Earthed Neutral) link is maintained at a single point of connection between neutral and protective earth. With the **N-N Jumper Bar** installed, neutral will not be broken during off-grid operation.

Figure 23. Neutral Conductors are not disconnected in Off-Grid Operation with Factory Installed N-N Jumper Bar



STEP 4: INSTALL BACKUP GATEWAY 2

WARNING: Incorrect earthing or Neutral-to-Protective Earth (N-PE) bonding presents a risk of electrical shock or damage to equipment. Verify that the system is properly earthed and that the correct Neutral-to-Earth bonding scheme meets regional and local requirements.

Make AC Power Connections to Supply and Load Panels

In each of the following steps:

- Strip the ends of the wires, install wire ferrules, and insert into the corresponding Backup Gateway terminal lugs.
- Using an M3 Allen bit, tighten the lugs to 4 Nm.

1. Connect the main service conductors to the Backup Gateway Supply terminals according to *Conductor Connections for Single Phase (left) and Three-Phase (right) on page 58*.
2. Connect the home load panel conductors to the Backup Gateway terminals according to the table on the following page.
3. Depending on the quantity of Non-Backup circuits, a Non-Backup panel will be required. Connect the conductors (Line(s), Neutral, and Protective Earth) from the Non-Backup panel to the Backup Gateway's Non-Backup terminals.

   Non-Backup circuits include: 3-phase PV inverters, 3-phase loads, large single-phase loads.

4. Connect the non-backup panel conductors to the Backup Gateway Non-Backup terminals according to the table on the following page. Any circuits connected here will *not* be powered when disconnected from the grid. During on-grid operation, these circuits are still metered by the internal site metering with no additional metering hardware required.

WARNING: Installing 3-phase equipment on the backup circuit may result in equipment damage.

WARNING: Always ensure all equipment is safely de-energized and locked out prior to working, to prevent risk of electric shock. To avoid shock hazard, never power on the system without a connection to Earth at the Gateway. The Earth bar and backplate voltage may float when ungrounded. If conducting earth loop impedance testing, ensure the Gateway always has a suitable Earth connection.

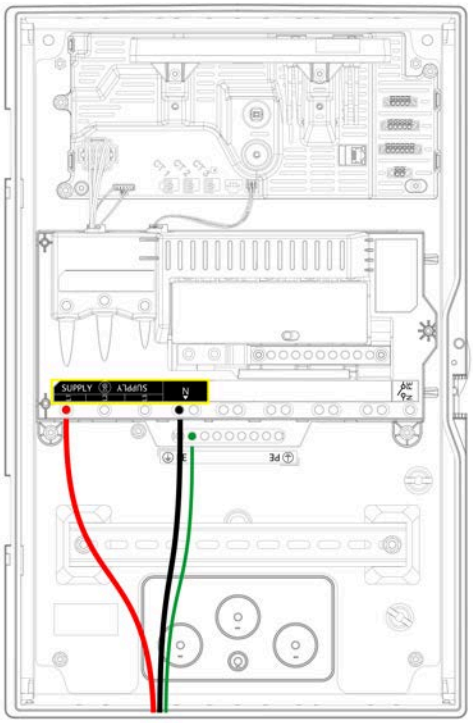
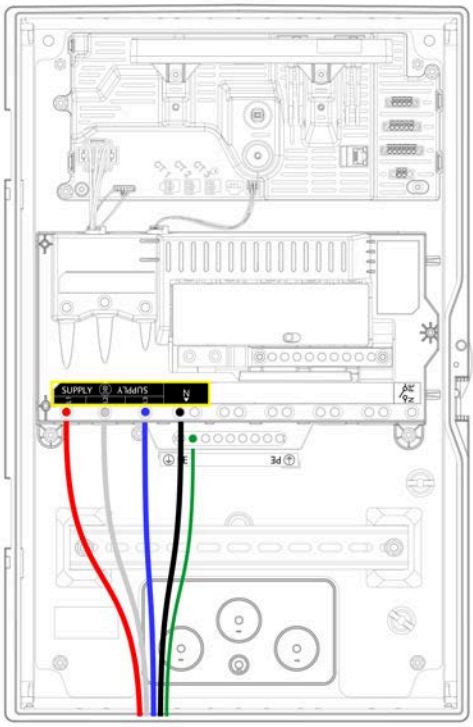
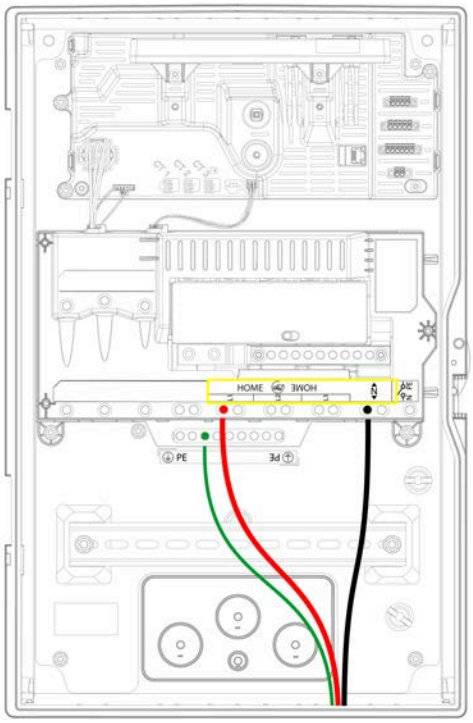
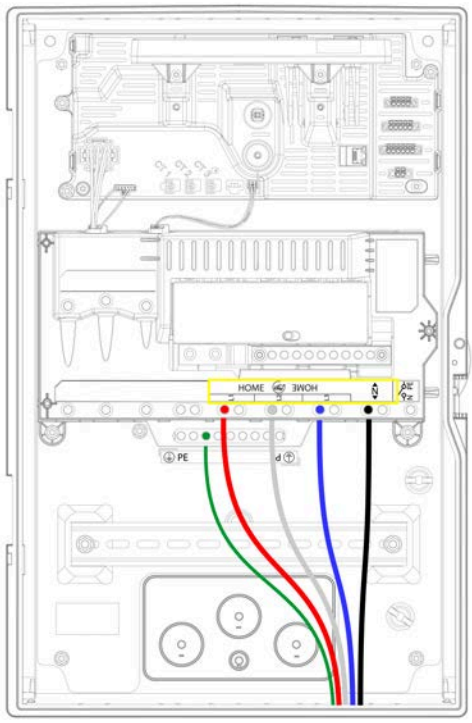
WARNING: Incorrect wiring of AC conductors presents a risk of electrical shock or damage to equipment. Before energizing the system, ensure all connections are made correctly according to the instructions in this document and in accordance with local wiring codes and regulations.

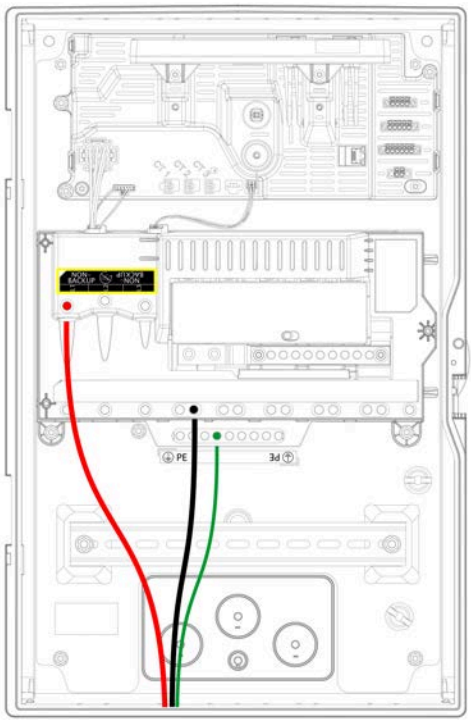
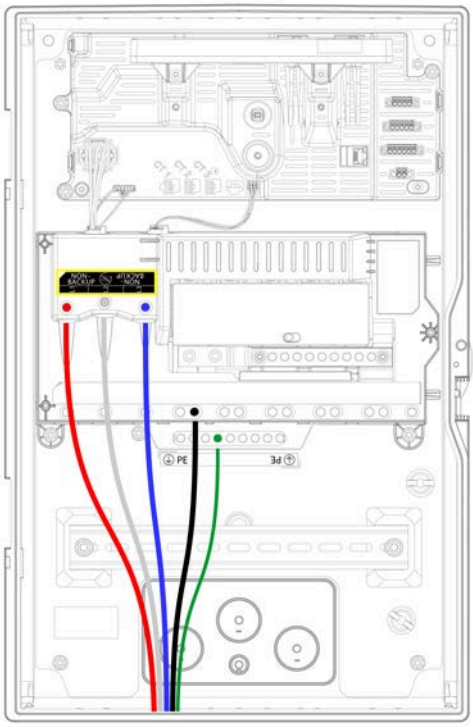
CAUTION: To ensure IP55 ingress protection, appropriate fittings and/or cable glands must be used to secure all cables passing into the enclosure.

Refer to *Appendix B: Wiring Reference on page 113* for all wiring requirements and recommendations, including wire colors and gauges.

Refer to *Appendix C: System Wiring Diagrams on page 121* for example system wiring diagrams.

Table 2. Conductor Connections for Single Phase (left) and Three-Phase (right)

	Single Phase	Three-Phase
Supply Connections		
Home Load and Backup Connections		

Non-Backup Connections		

Terminal	Maximum Wire Gauge	Strip Length	Torque
Supply	35 mm^2	12.5 mm	4 Nm
Non-Backup	35 mm^2	12.5 mm	4 Nm
Home (Backup)	35 mm^2	12.5 mm	4 Nm
Neutral terminal bar	25 mm^2	12.5 mm	4 Nm
PE terminal bar	25 mm^2	12.5 mm	4 Nm

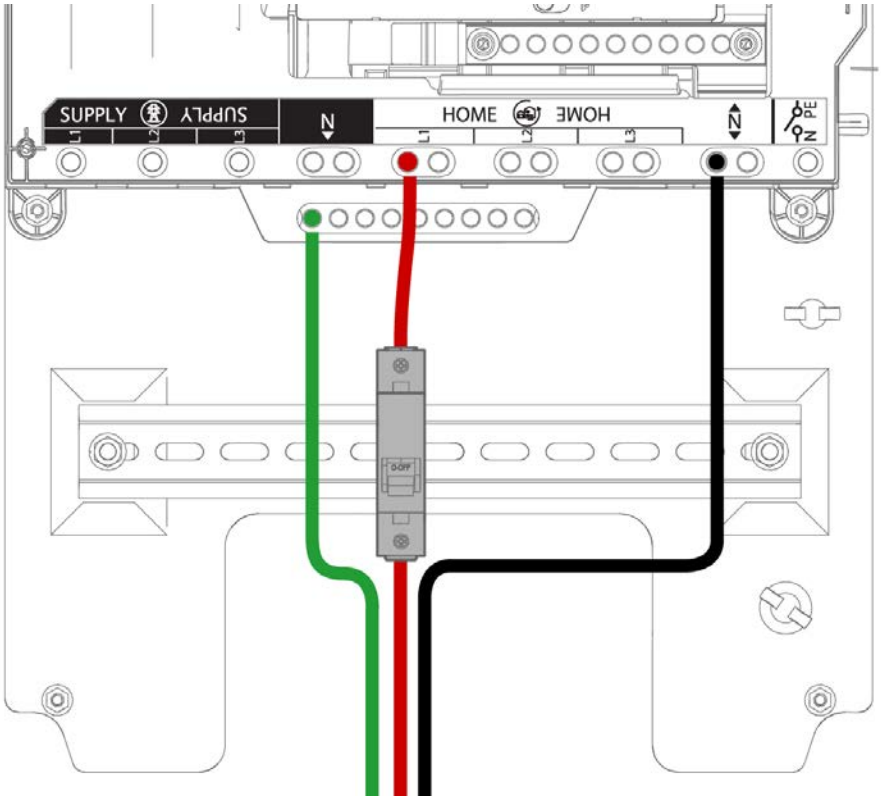
Install Powerwall and Generation Breakers in the Backup Gateway

1. Install the Powerwall and generation circuit breakers on the DIN rail, and connect using an appropriately rated DIN rail circuit breaker busbar.

   WARNING: All Powerwalls in the system must be installed on the 'Backup' ('Home') side of the Backup Gateway's relay.

2. Connect the line conductors from the bussed generation circuit breakers to the Backup Gateway's Backup terminals (see figure below). These conductors must be appropriately rated to carry the current of the main supply fuse.
3. Connect Neutral and PE conductors from Powerwall and generation circuits to the Neutral and PE wiring bars, respectively.

Figure 24. Single Phase Wiring Example



Design Considerations

CAUTION: If installing greater than 100 A of generation, a separate overcurrent protection (such as a generation sub-board) is required to maintain maximum current rating of the Backup Gateway.

The Backup Gateway 2 can accommodate up to nine (9) 1-pole MCB slots on the DIN rail for generation circuits and fuse carrier(s).

The Powerwall connection to the Backup Gateway requires a 63 A circuit breaker. This breaker serves as circuit protection for the Powerwall, and must be wired in accordance with local wiring codes and regulations.

NOTE: Some regions may require use of an external Residual Current Device (RCD) / Residual Current Circuit Breaker with Overcurrent Protection (RCBO) on the solar PV inverter and/or Powerwall circuits. Refer to *Residual Current Devices (RCDs) / Residual Current Circuit Breakers with Overcurrent Protection (RCBOs) on page 120* for additional guidance.

Configuring Powerwall(s) on Three-Phase Installations

- When installing multiple Powerwalls, they must be distributed evenly across the three phases. Installation must meet local generation imbalance rules.
- During the commissioning process, the **Backup Phase** will be selected (L1, L2, or L3). During an outage, the system will provide backup power only to loads on this phase, and Powerwalls on other phases will not operate. Ensure that all critical loads in the Home Load Panel are connected on the desired Backup Phase.
- **To ensure Powerwall charges from solar production, the single-phase PV circuit(s) must be installed on the same phase as Powerwall(s).**

STEP 4: INSTALL BACKUP GATEWAY 2

WARNING: Installing 3-phase PV inverters or 3-phase equipment on the Backup side may result in equipment damage during off-grid operation. 3-phase PV inverters and 3-phase equipment should always be installed on the Non-Backup side of the Backup Gateway. The only exceptions to this rule are the Tesla Wall Connector or sockets feeding Tesla Mobile Connectors (please see the *Vehicle Charging During Power Outage* page for more information). The Powerwall system's backup phase should be connected to L1 of the Wall Connector or Mobile Connector socket.

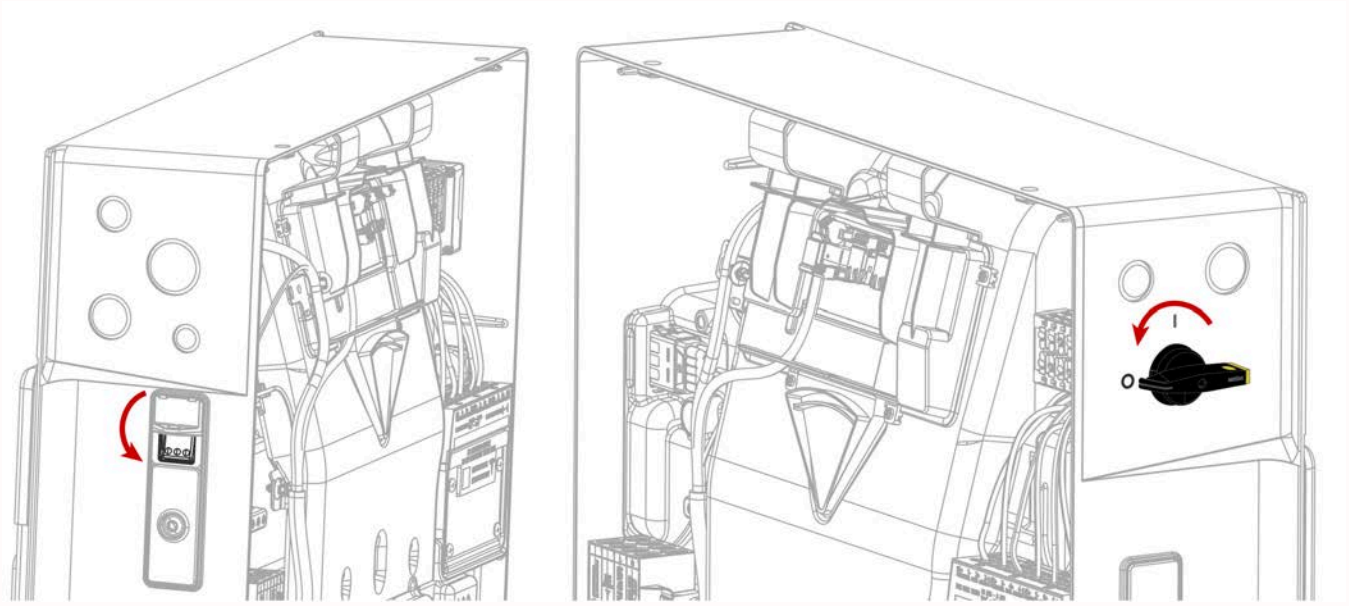
Inverter Configuration

During backup operation, the Gateway will shift the system frequency to control the power output of solar inverters. Therefore, all solar inverters connected to the Backup terminals should be configured for the local grid code. This ensures that the inverter will respond correctly to frequency curtailment efforts. If the inverter is not compliant with the grid code requirements, it might not perform as expected during Backup operation. This could lead to hardware damage due to over-voltage. Please see more information regarding backup operation on our *website*.

STEP 5: CONNECT POWERWALL 3 TO BACKUP GATEWAY

For installations utilizing DRM0 in Australia, instructions are provided to install a DRED controller and connect it to Backup Gateway 2 and Powerwall 3. All other installations will proceed with connecting Backup Gateway 2 directly to Powerwall 3.

WARNING: Before terminating any conductors inside Powerwall 3, turn the Powerwall 3 switch OFF to shut the system down, then turn the integrated DC isolator OFF. Before proceeding, confirm there is a lack of voltage at the AC and PV terminals.



Connect Communication Wiring to Backup Gateway 2

1. Run the 4-conductor communication cable from the Backup Gateway through the conduit or cable gland and pull it into the Powerwall 3 wiring compartment.

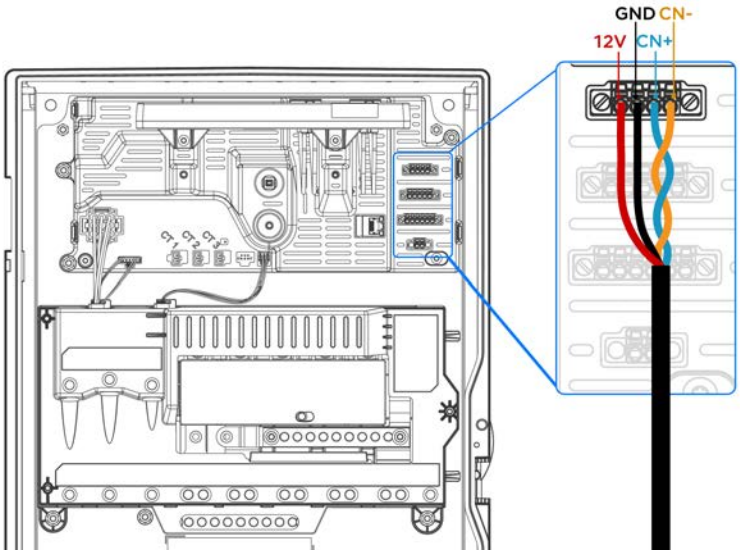
   NOTE: See *Plan Cable Length Between Components on page 40* for the maximum distance between components.

2. At the Backup Gateway, strip the communication wire jacket about 76 mm and strip each conductor 8 mm.
3. Cut back the drain wire from the communication wiring. **The drain wire should be terminated at the Powerwall 3 ground terminal only**.
4. Insert a cabinet tip or electronics tip slotted screwdriver (up to 3 mm) to open each lever on the 4-pin **Powerwall 12V & CAN** connector.
5. Insert each conductor as far as possible into the terminal and then release the connector lever to close the connector.

   CAUTION: Excessive force may damage the connector; do not apply more force than is necessary to open the terminal and insert the conductor (do not lean on connectors when prying them open).

   NOTE: Reference *Backup Gateway 2 Wiring on page 117* for additional information on wire requirements and wire order in the connector.

6. Plug the 4-pin connector into the 4-pin socket labeled "Powerwall". Tighten the screws on the connector.



Option 1 (Non-DRM0 Installations): Connect Communication Wiring to Powerwall 3

CAUTION: At Powerwall 3, Tesla recommends routing the communication wiring into the left side of the enclosure; always use the wire management tabs to ensure wires do not block the Tesla Asset Controller. Do not route loose wires through the front of the enclosure.

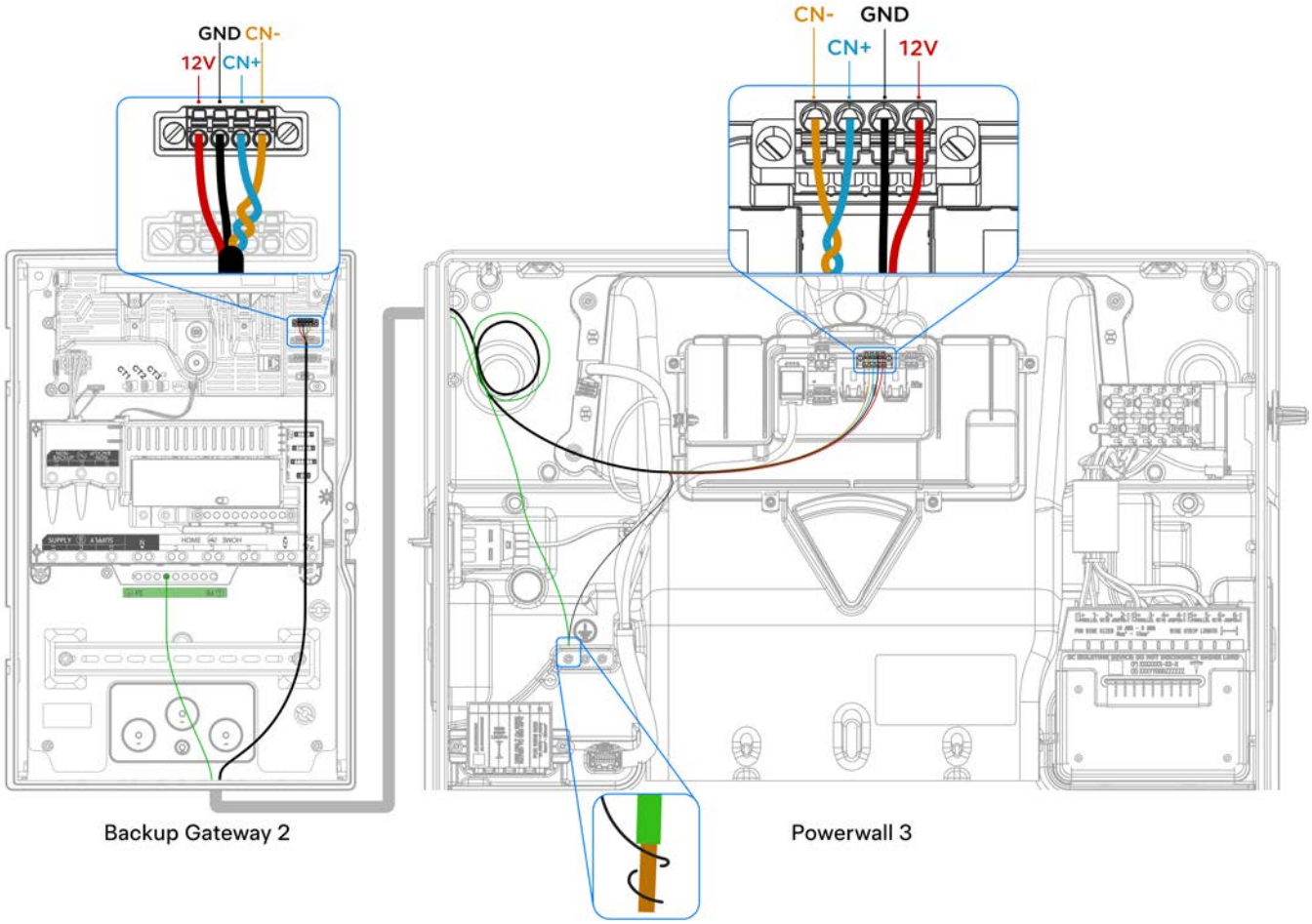
1. At Powerwall 3, strip the communication wire jacket about 76 mm and strip each conductor 8 mm.
2. Insert a cabinet tip or electronics tip slotted screwdriver (up to 3 mm) to open each lever on the 4-pin **Backup Gateway 2 Communication** connector.
3. Insert each conductor as far as possible into the terminal and then release the connector lever to close the connector.

   CAUTION: Excessive force may damage the connector; do not apply more force than is necessary to open the terminal and insert the conductor (do not lean on connectors when prying them open).

   NOTE: Reference *Powerwall 3 AC and PV Wiring on page 113* for additional information on wire requirements and wire order in the connector.

4. Plug the 4-pin connector into the 4-pin **Backup Gateway 2 Communication** socket. Tighten the screws on the connector.
5. Wrap the communication cable drain wire around the Protective Earth lead and insert the wires in the equipment grounding terminal. Tighten the screw to 4.5 Nm.

STEP 5: CONNECT POWERWALL 3 TO BACKUP GATEWAY



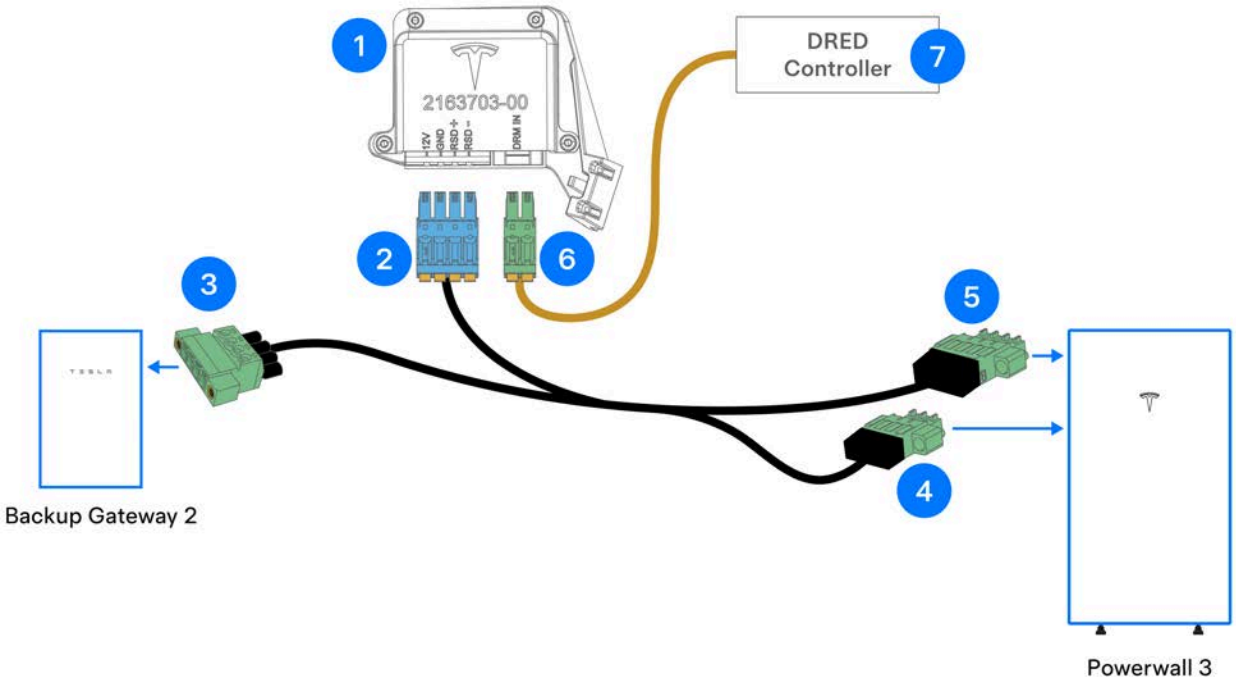
Option 2 (DRM0 Installations): Connect GUAC Interface Device to Powerwall 3 and Backup Gateway 2

Some installations may require DRM0 functionality per AS/NZS 4777.2, which allows the DNSP to control the system when needed. The following are required components of the DRED:

- **DRED Controller**: This device (often provided by the DNSP or a similar entity) receives DRM commands from the utility to the home installation.
- **Tesla Grid Utility Ancillary Controller (GUAC) DRED Interface Device (Tesla P/N 2163703-xx-y)**: Converts signal from DRM to shut down / reduce PV production to a System Shutdown signal for the Powerwall 3 Tesla Asset Controller (TACO).

  NOTE: The switch state is normally closed.

- **2-Wire Communication Cable**: Used to connect the DRED controller to the GUAC interface device.

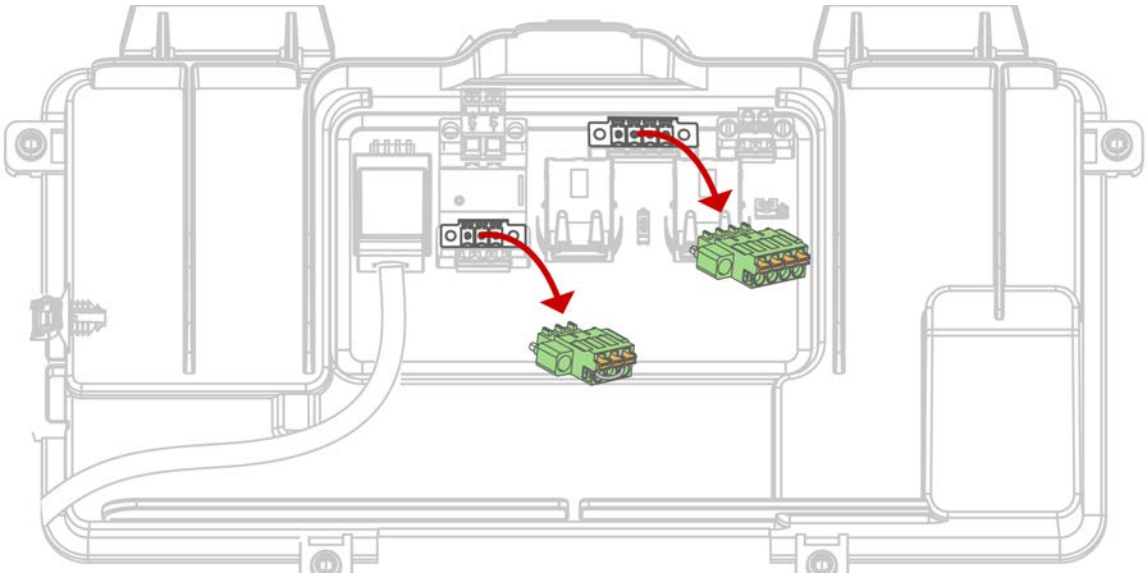


1	Tesla GUAC Interface Device
2	Blue 4-pin connector, plugs into GUAC
3	Green female 4-pin connector, wiring is connected from ***Backup Gateway 2 CAN & 12V*** connector
4	Green 3-pin connector, plugs into ***Powerwall 3 RSD*** socket
5	Green 4-pin connector, plugs into ***Powerwall 3 CAN & 12V*** socket
6	Green 2-pin connector, connects DRED controller to GUAC (not part of GUAC wiring harness)
7	DRED controller

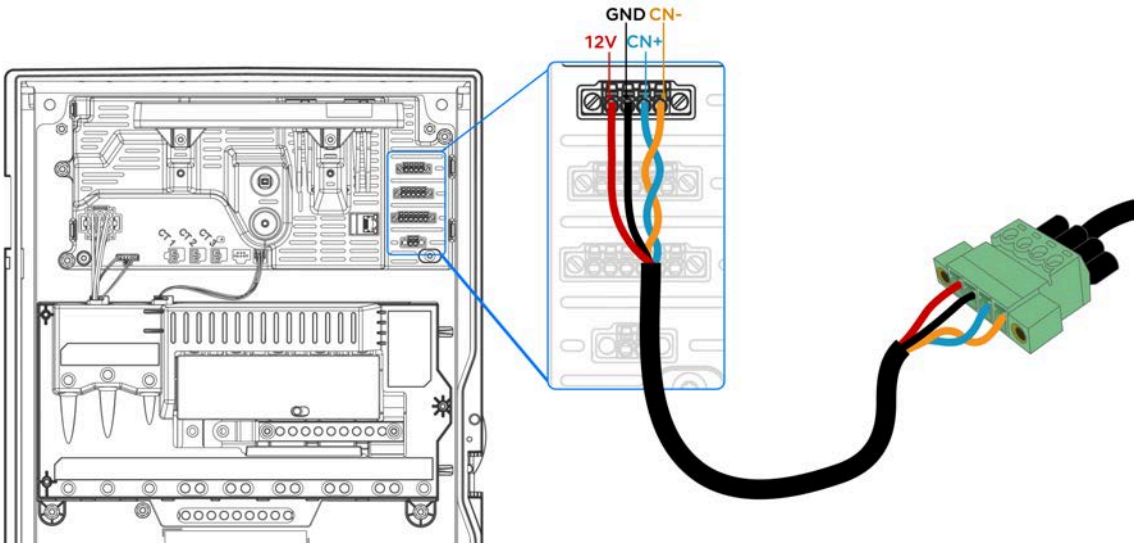
STEP 5: CONNECT POWERWALL 3 TO BACKUP GATEWAY

Connect Backup Gateway 2 and Powerwall 3 to the GUAC interface device:

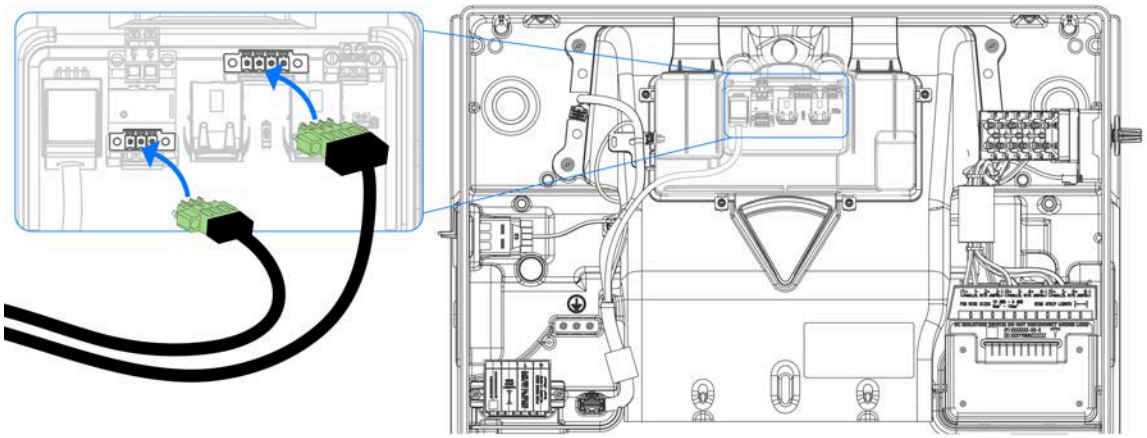
1. At Powerwall 3, remove the 4-pin ***Powerwall 3 CAN & 12V*** connector and the 3-pin ***System Shutdown*** connector.
    a. Save the 4-pin ***Powerwall 3 CAN & 12V*** connector for a future step.
    b. Recycle the 3-pin ***Powerwall 3 RSD*** connector, as it will not be used in this installation.



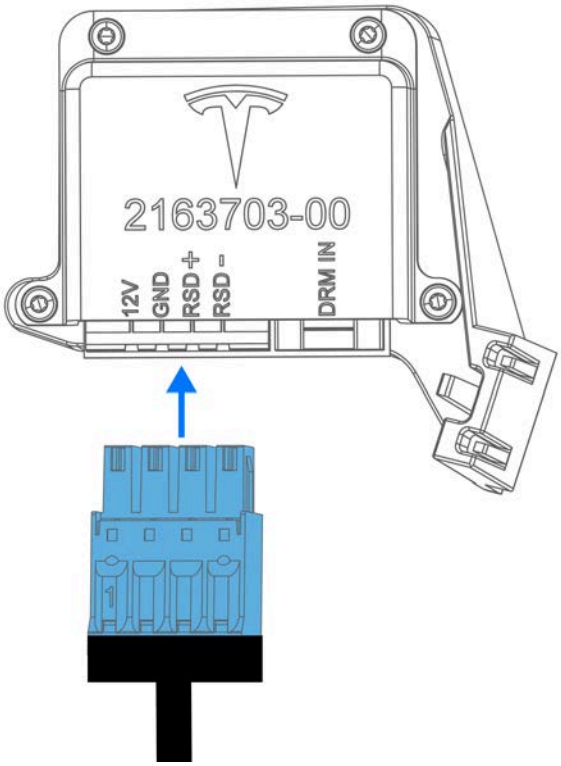
2. Take the communication wiring previously routed from Backup Gateway 2 and strip the wire jacket about 76 mm, then strip each conductor 8 mm.
3. Connect the communication wiring to the 4-pin connector from *Step 1* above, then plug that connector into the female 4-pin connector on the GUAC interface device wiring harness.



4. Plug the green 4-pin male connector on the GUAC interface device wiring harness into the open ***Powerwall 3 CAN & 12V*** socket. Tighten the screws on the connector.
5. Plug the 3-pin connector on the wiring harness into the open ***Powerwall 3 RSD*** socket. Tighten the screws on the connector.

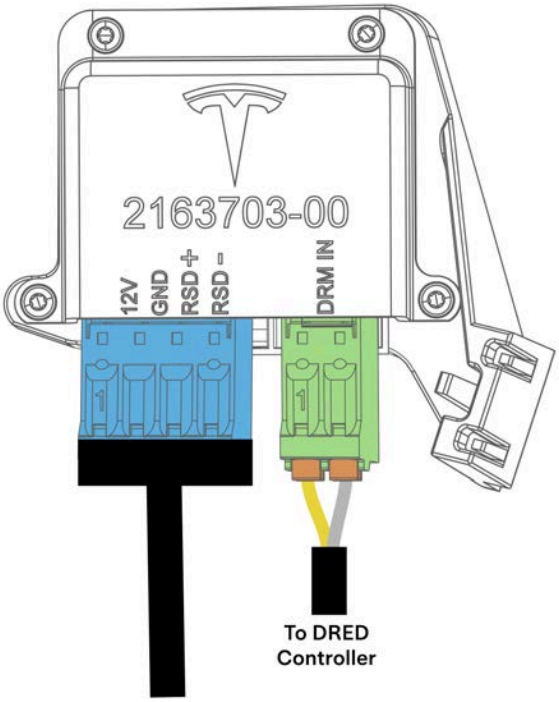


6. Plug the remaining blue 4-pin connector into the GUAC interface device.

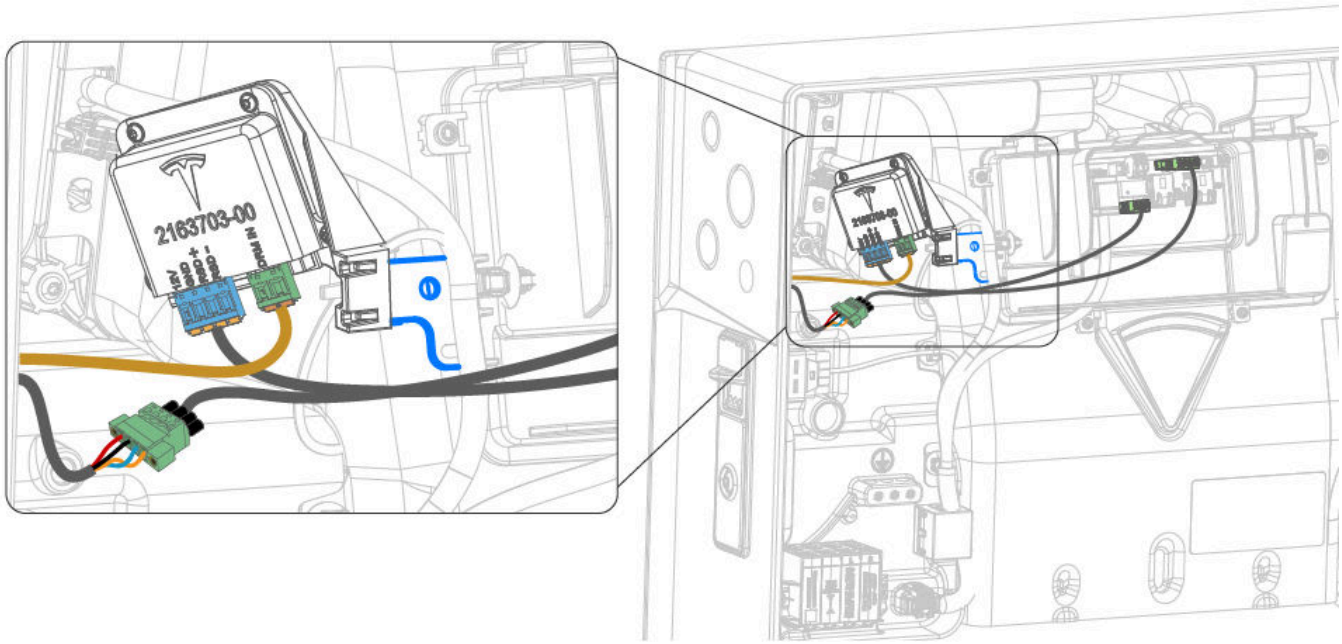


7. Install the utility-side DRED controller in the appropriate location per local requirements.
8. Using the 2-wire communication cable, connect the DRED controller to the 2-pin **DRM IN** connector on the GUAC interface device, following the manufacturer's instructions and wiring diagram.

STEP 5: CONNECT POWERWALL 3 TO BACKUP GATEWAY

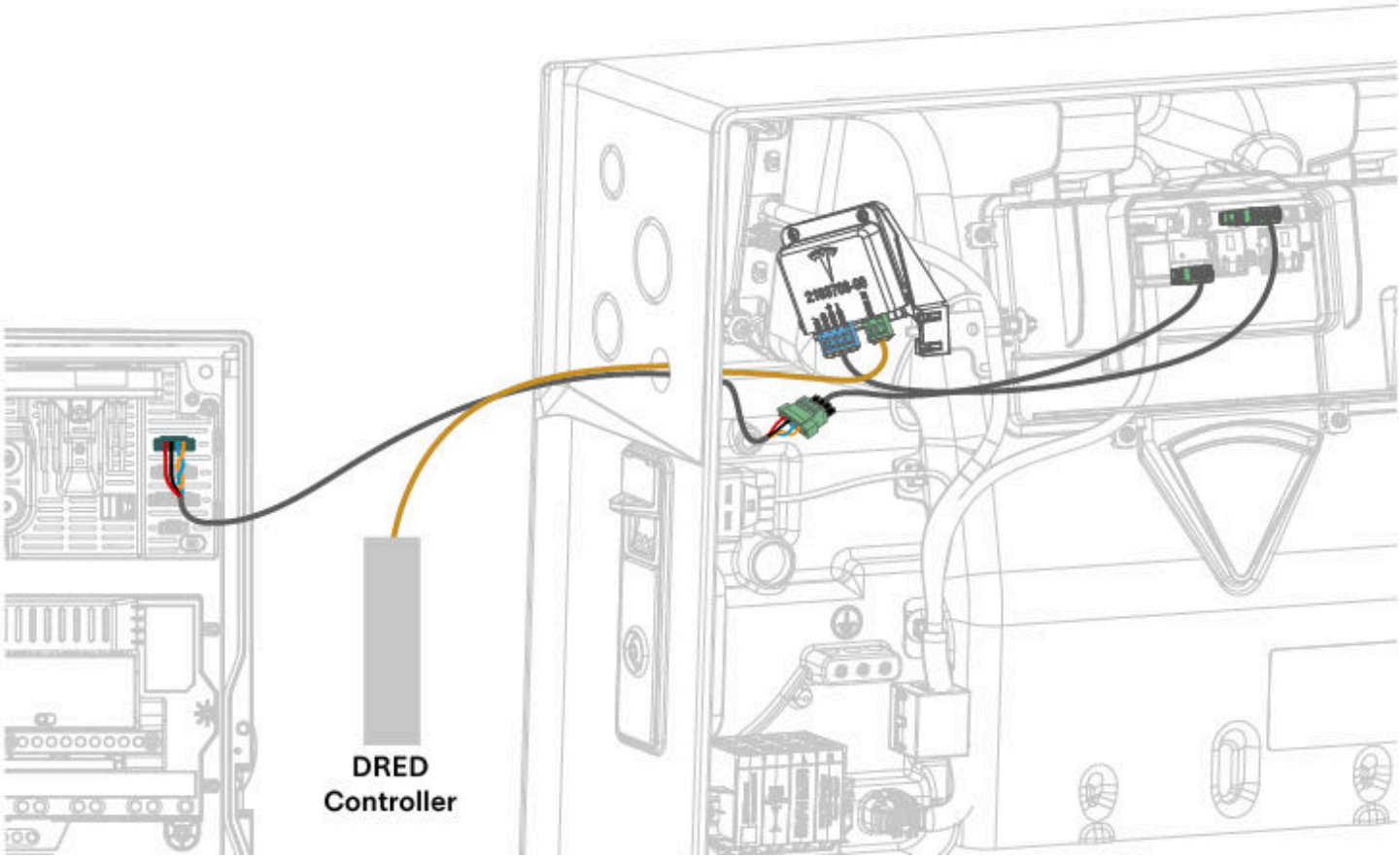


9. Arrange the GUAC interface device and all wiring on the left side of the Tesla Asset Controller (TACO), then clip the interface device to the plastic connector on the side of the TACO.



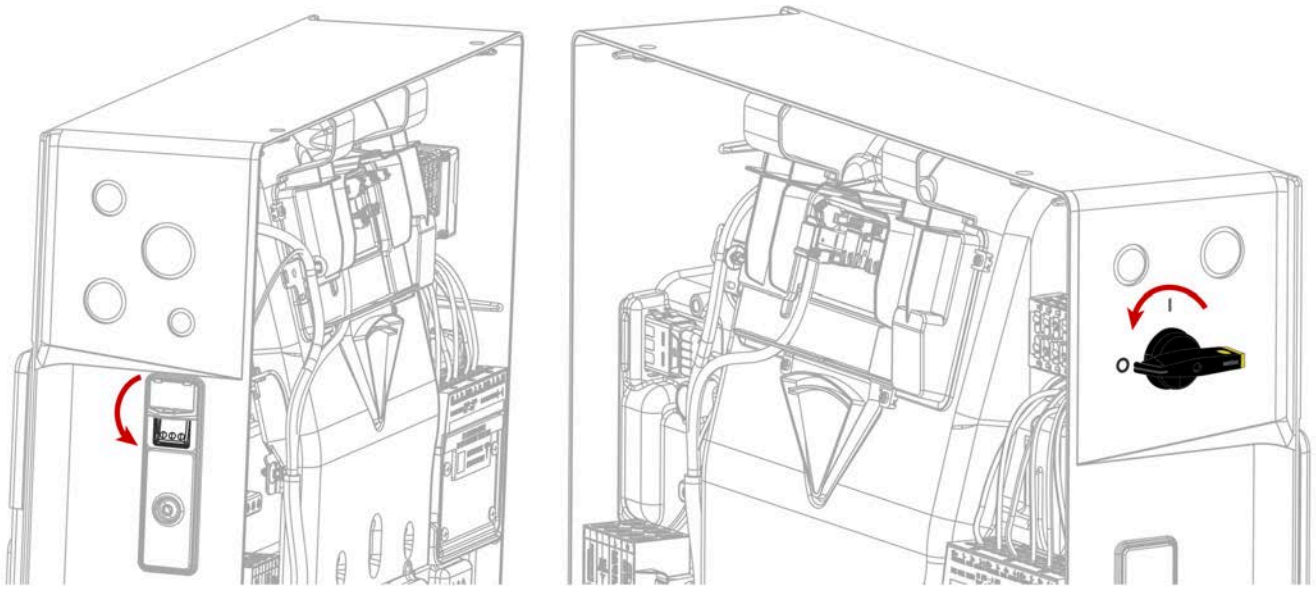
10. After the full installation is complete (including commissioning), verify that the system functions normally by unplugging the DRED controller wiring connector from the GUAC. Confirm the inverter shuts down as expected.

Figure 25. Completed GUAC Interface Device Installation



STEP 6: MAKE POWERWALL 3 AC CIRCUIT CONNECTIONS

1. Before terminating any conductors inside Powerwall 3, turn the Powerwall 3 switch OFF to shut the system down, then turn the integrated DC isolator OFF.

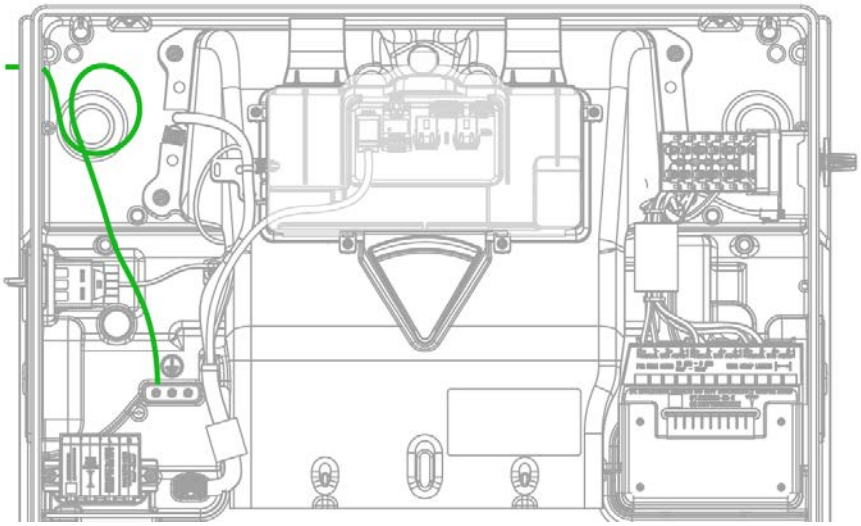


WARNING: Before proceeding, confirm both switches are OFF and there is a lack of voltage at the AC and PV terminals.

2. (Conduit installations only) Run conduit as needed and attach the conduit fitting to the Powerwall 3 AC wiring knockout.
3. Run the AC Line, Neutral, and the Protective Earth conductors through the conduit or cable gland. Route the conductors to the appropriate terminals, creating a service loop with the extra wiring.
4. Clear out any debris that may be present in the AC wiring terminals.

WARNING: Metal debris like loose wires or metal shavings could create a high voltage risk when Powerwall is turned on.

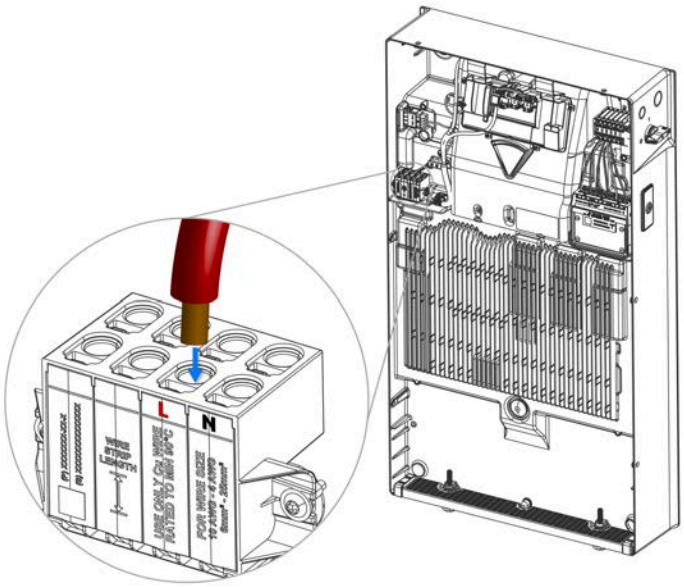
5. Connect the Protective Earth:
    a. Strip the conductor insulation up to 19 mm.
    b. Insert the grounding conductor in an equipment grounding terminal and tighten the screw in the Earth terminal to 4 Nm.



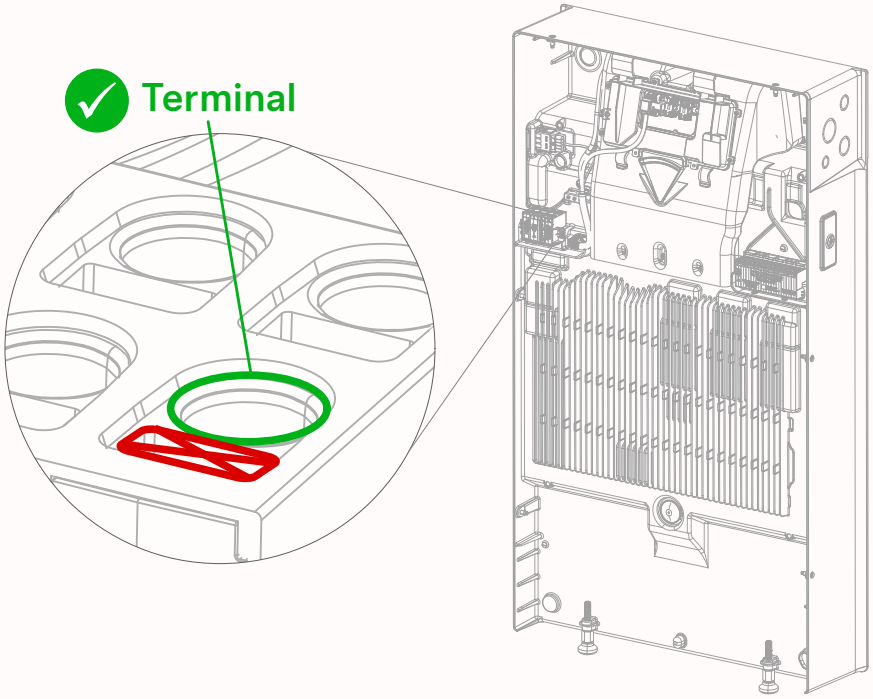
NOTE: It is best practice to connect the ground circuit before making any AC circuit connections.

6. For each AC conductor:
    a. Strip the conductor insulation up to 11 mm. Add a wire ferrule if the conductor is finely stranded.
    b. Insert the conductor as far as possible into the terminal.

Figure 26. Insert Conductor in Terminal

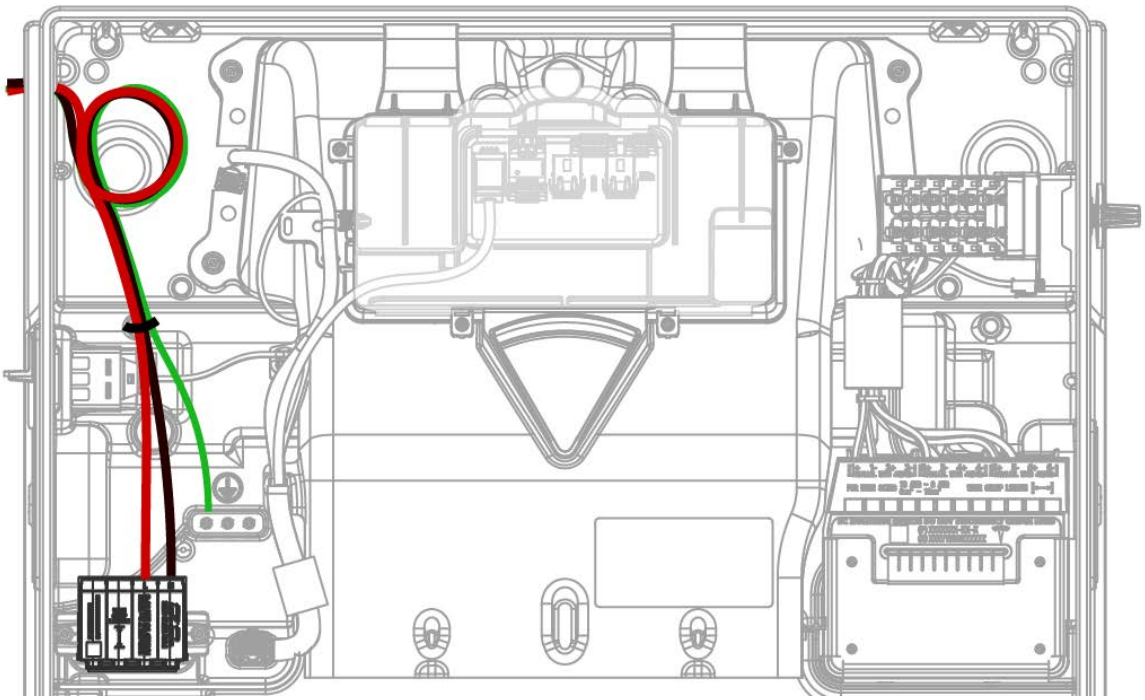


WARNING: Ensure the conductors are inserted into the round terminals and not the rectangular slots. Inserting the conductors anywhere other than the round terminals will result in poor wire termination.



c. Perform a pull test to ensure the conductor is fully seated in the terminal. Push the conductor back in after the pull test.

Figure 27. Powerwall 3 AC Wiring

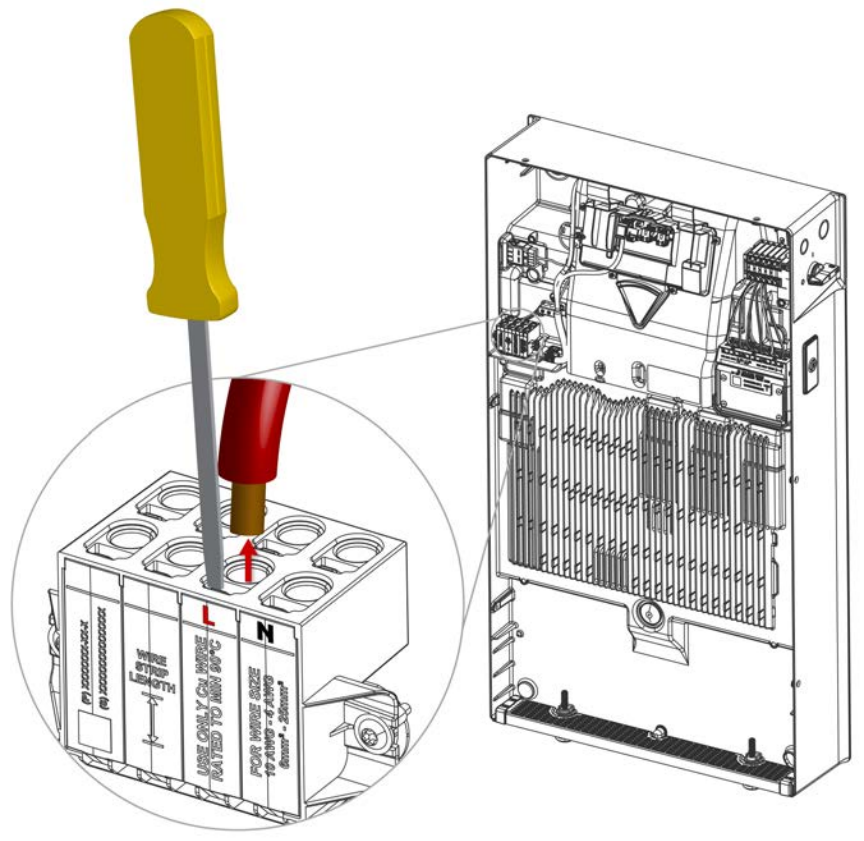


CAUTION: Any wire routing must be done through the wire management tabs at the top of the enclosure. Do not route loose wires through the front of the enclosure or over the Tesla Asset Controller.

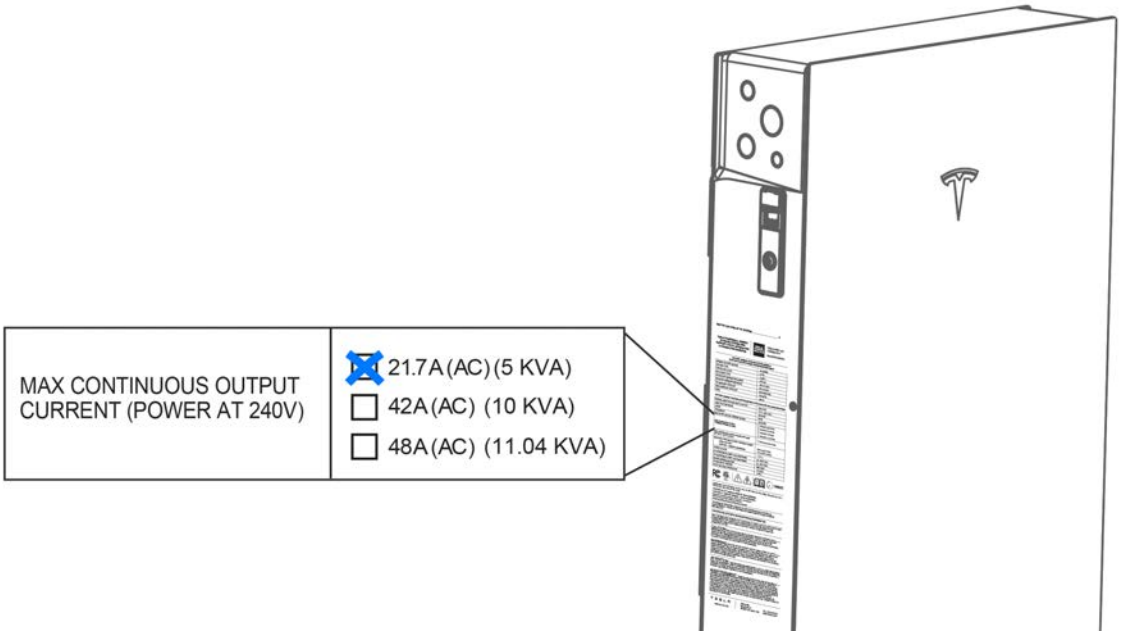
d. After installing the conductors, gather them and secure them with the provided cable tie as shown above.

NOTE: If a conductor must be removed from the connector, insert a cabinet or electronics tip slotted screwdriver (up to 4.5 mm) into the actuation shaft to open the terminal. Pull the conductor free, then remove the screwdriver.

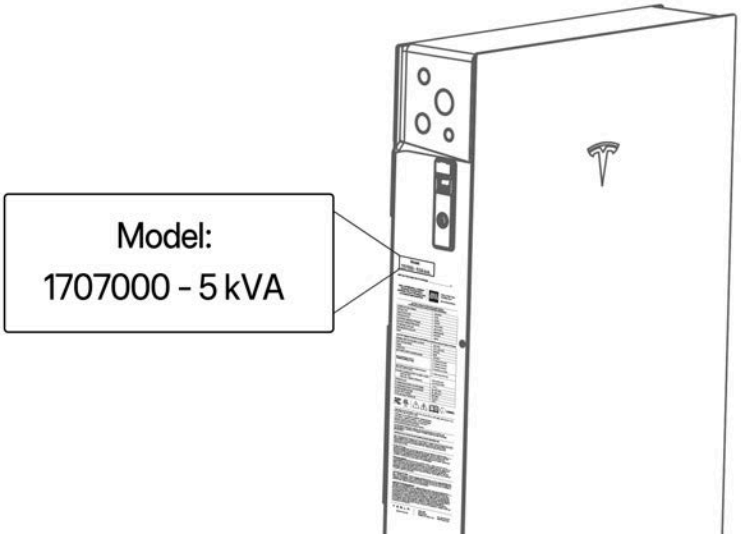
Figure 28. Spring Terminal with Screwdriver and Insert Conductor in Terminal



7. On the Powerwall 3 product label on the left side of the unit, use a paint pen, permanent marker, or similar to mark the configured power / current output.



8. On the left side of Powerwall 3, above the product label, install the appropriate model number label depending on the configured power / current output. In the following example, the Powerwall 3 has been configured with a power output of 5 kVA.

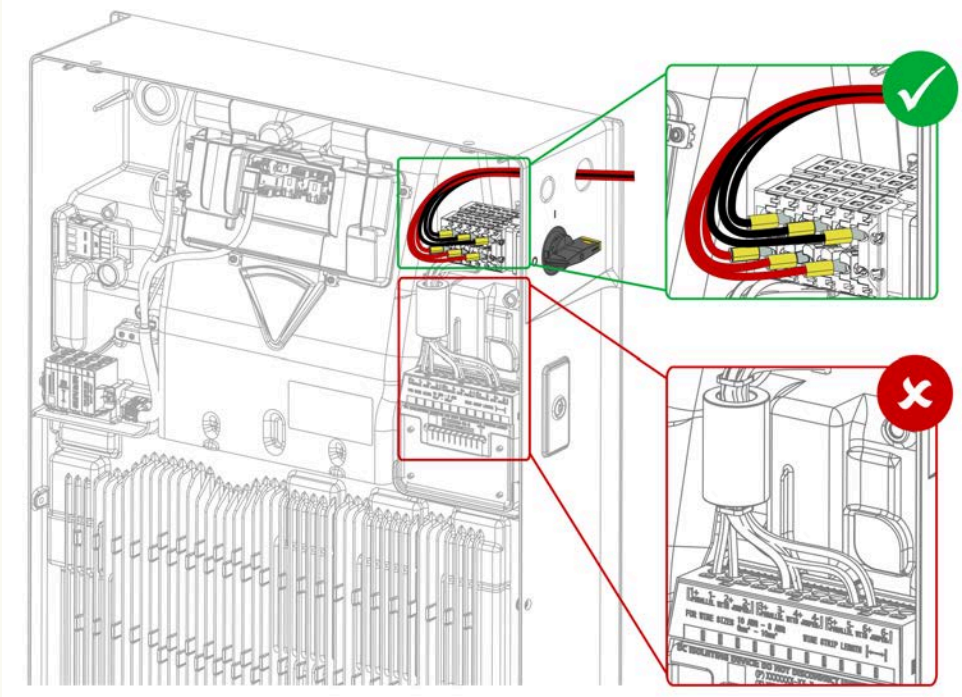


STEP 7: MAKE SOLAR PV CONNECTIONS

NOTE: See *Powerwall 3 AC and PV Wiring on page 113* for wiring specifications.

NOTE: As noted in *Design Considerations on page 19*, third party MLPE solutions, such as optimizers, are not compatible with Powerwall 3.

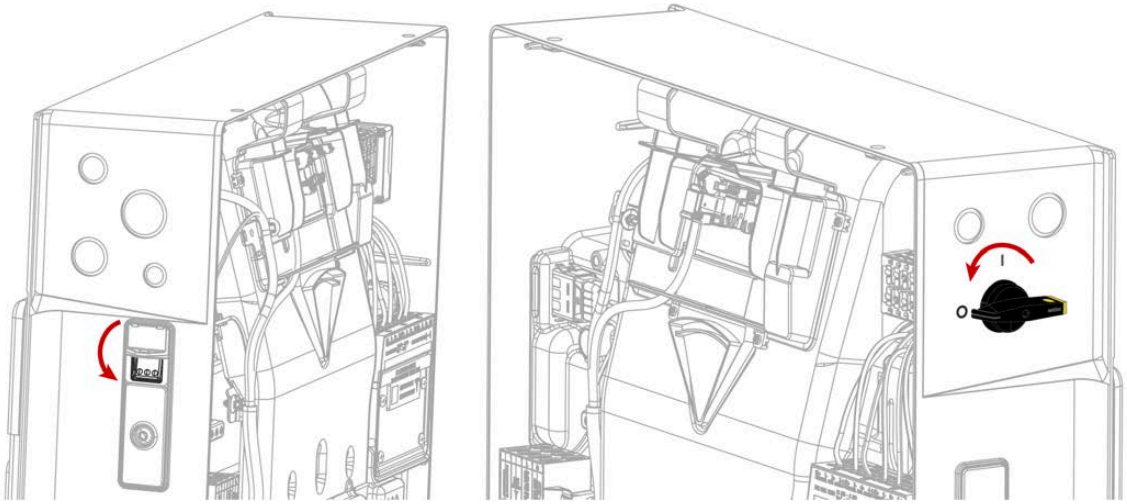
CAUTION: Only connect PV wires to the integrated DC isolator as described in this step. Do not attempt to modify factory-installed wiring or connect PV wires to any other terminals.



NOTE: If there are more than three PV strings, strings can be combined upstream of Powerwall 3 so long as the voltage and current ratings of the system do not exceed the capabilities of Powerwall 3.

1. Before connecting the PV strings to Powerwall 3, use a PV string tester to test each string, confirming it is performing as expected. Refer to the testing requirements of AS/NZS5033:2021 cl 6.3.2.
2. Before terminating any conductors inside Powerwall 3, turn the Powerwall 3 switch OFF to shut the system down, then turn the integrated DC isolator OFF. See *Powerwall 3 Switch Locking Mechanisms on page 124* for instructions to lock the integrated DC isolator in the OFF position.

STEP 7: MAKE SOLAR PV CONNECTIONS

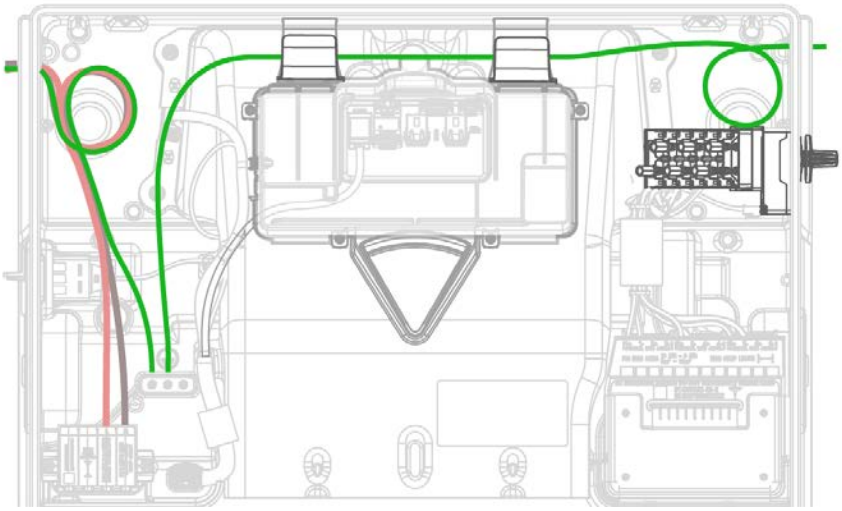


WARNING: Before proceeding, confirm both switches are OFF and there is a lack of voltage at the PV terminals.

3. Clear out any debris that may be present in the PV wiring terminals.

   WARNING: Metal debris like loose wires or metal shavings could create a high voltage risk when Powerwall is turned on.

4. Route the PV conductors and PV array Protective Earth into the enclosure, through the conduit or cable gland. Create a service loop with extra wiring.
5. Connect the PV array Protective Earth to an equipment grounding terminal in Powerwall:
   a. Strip the conductor insulation up to 19 mm.
   b. Insert the grounding conductor in an equipment grounding terminal and tighten the screw in the Earth terminal to 4 Nm.



NOTE: It is best practice to connect the ground circuit before making any PV circuit connections.

6. Starting with MPPT 1:

   NOTE: If MPPT 1 is not wired first, it will not be possible to access that wiring terminal once conductors are connected to MPPT 2 or MPPT 3.

STEP 7: MAKE SOLAR PV CONNECTIONS

WARNING: Before proceeding, confirm there is a lack of voltage on the PV wires.

a. Strip the conductor insulation so that the ends of the copper strands are visible.

b. Crimp the following insulated forked terminal onto the end of the conductor; a ratcheting die crimping tool is strongly recommended.

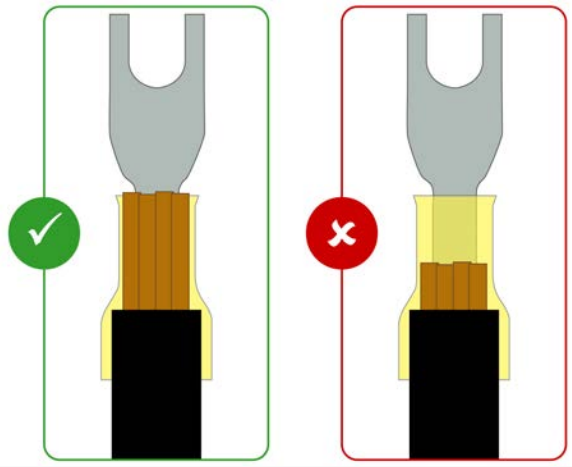
- TE Connectivity P/N 165015 (4 - 6 mm^2 wire size)
- Vogt P/N 3654c / 3655c (4 - 6 mm^2 wire size)

CAUTION: Forked terminals are required for PV wiring. Do not connect bare wires or any type of forked terminal other than those listed above due to increased risk of poor electrical connection.

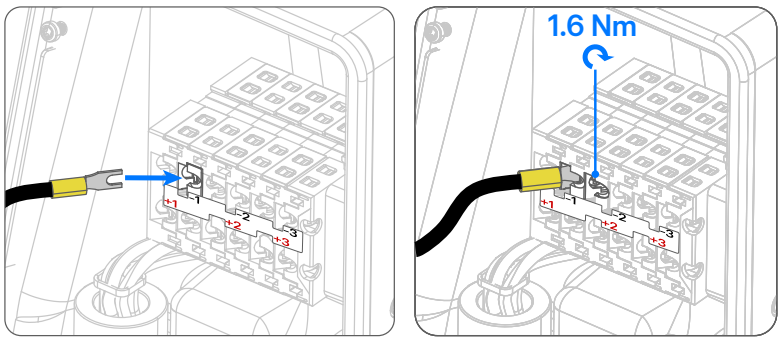
CAUTION: Do not attempt to insert multiple forked terminals in a single wiring terminal. Only connect **one** forked terminal to each wiring terminal.

CAUTION: Do not attempt to connect multiple wires to a single forked terminal. If the system has more than three PV strings, combine strings upstream of Powerwall 3 and connect no more than three strings to the integrated DC isolator.

NOTE: Ensure the ends of the copper strands are visible at the bottom of the fork, indicating the conductor is making strong contact with the forked terminal.



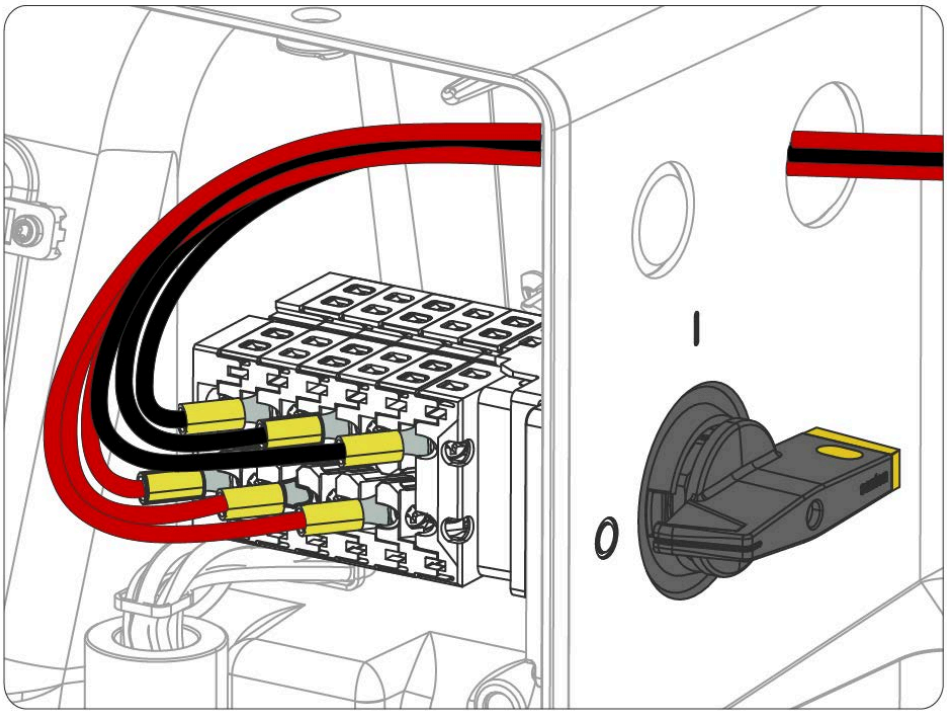
c. Insert the forked terminal into the wiring terminal and, using a Philips PH2 torque screwdriver (see *Required Tools on page 35* for additional details), tighten the screw in the PV wiring terminal to 1.6 Nm.



CAUTION: Confirm the forked terminal is fully inserted before tightening the screw to avoid damaging the connector.

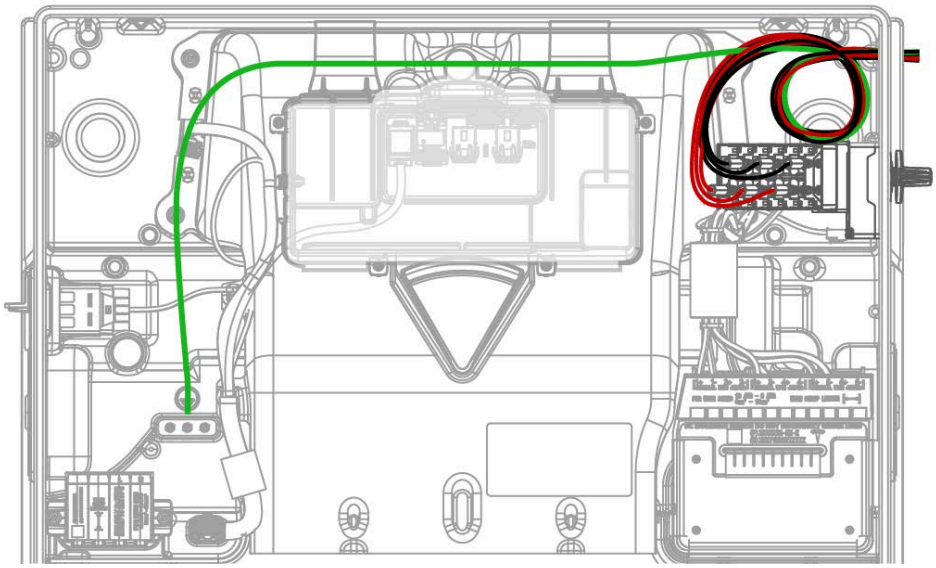
7. Repeat Step 5 for MPPT 2, then MPPT 3.

Figure 29. Powerwall 3 PV Wiring Connected to Integrated DC Isolator



CAUTION: Before energizing the system, use a multimeter to confirm the polarity of the PV strings is as pictured above (positive strings in bottom row of terminals, negative strings in top row of terminals). Reversed polarity of the PV strings may cause damage to the system.

Figure 30. Powerwall 3 PV Wiring and Protective Earth



CAUTION: All PV strings must pass through the integrated DC isolator. Do not attempt to connect PV strings via any other terminals. For more information on the integrated DC isolator, see *Appendix F: Shutting Down Powerwall 3 on page 133*.

STEP 7: MAKE SOLAR PV CONNECTIONS

CAUTION: Any wire routing must be done through the wire management tabs at the top of the enclosure. Do not route loose wires through the front of the enclosure or over the Tesla Asset Controller.

STEP 8: INSTALL CLAMP-ON FERRITE CORES

Powerwall 3 ships with (6) clamp-on ferrite cores for AC wiring and the Powerwall Protective Earth. Additional ferrite cores are factory-installed for the PV wiring and the Tesla Asset Controller (TACO) low voltage harness.

CAUTION: Ferrite cores are fragile; handle with caution.

CAUTION: Ensure all conductors have been stripped properly so that no live conductors come in contact with the ferrite cores.

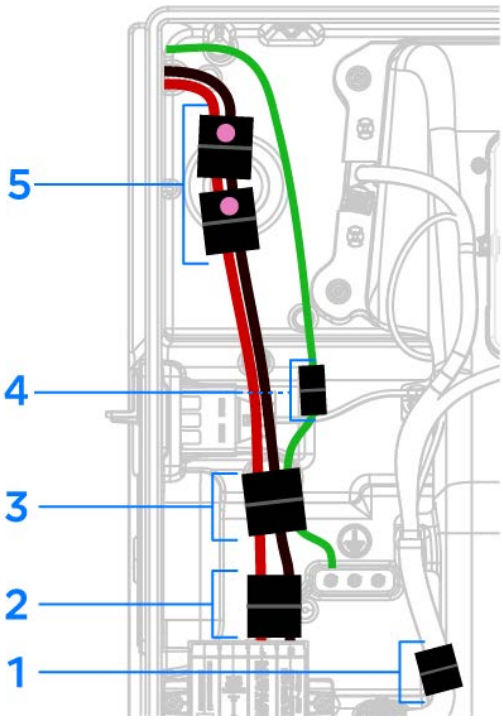
NOTE: All ferrite cores provided with Powerwall 3 are split core; they can be opened to be placed around the conductor(s) rather than threading them over the conductor(s).

1. Install the **small square** clamp-on ferrite core around the TACO factory-installed harness.

   NOTE: If the ferrite core has already been installed by the factory, skip this step. If the accessory bag contains an additional small square ferrite core when there is already one installed on the harness, the extra ferrite core can be recycled or saved as a spare.

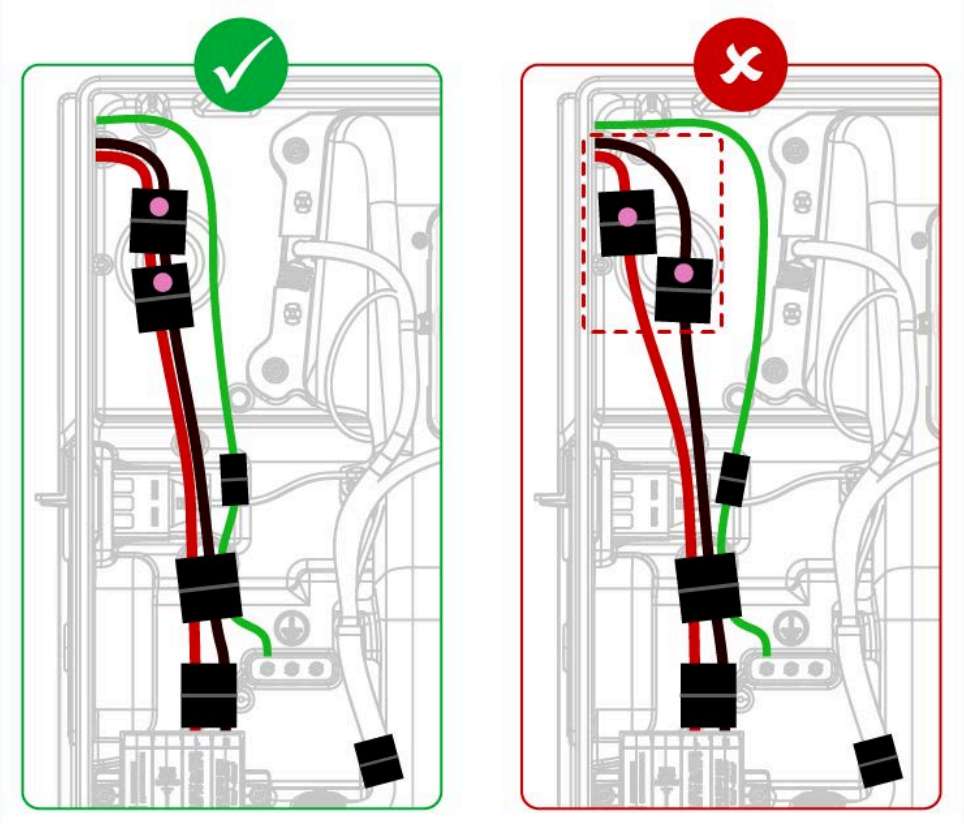
2. Install (1) of the **medium** clamp-on ferrite cores around L1 and N. Ensure the ferrite core is as close to the AC connector as possible without bending or deforming the wires.
3. Install (1) of the **medium** clamp-on ferrite cores around L1, N, and the Protective Earth.
4. Install the (1) **small** clamp-on ferrite core around the Protective Earth.
5. Install the (2) **marked (with pink sticker) medium** clamp-on ferrite cores around L1 and N in the top of the wiring compartment.
6. Secure all ferrite cores closed with the provided cable ties.

Figure 31. Ferrite Core Around AC Conductors and Protective Earth



STEP 8: INSTALL CLAMP-ON FERRITE CORES

NOTE: Ensure the ferrite cores are installed as described here; for instance, do not clamp a ferrite core around only L1 or N when it is required to be clamped around both L1 *and* N:



STEP 9: INSTALL ENERGY METERING

Before you start, see *Energy Metering on page 25* to find the available metering options and the example metering diagrams.

For Backup Gateway 2 Primary Meter X, there is no additional step required to install the meter or CTs as they are integrated in Backup Gateway 2. For Backup Gateway 2 Secondary Meter Y, Tesla 100A CTs must be installed and connected to the Meter Y CT terminals (see *Install Tesla 100 A CTs on page 83* for the installation instructions).

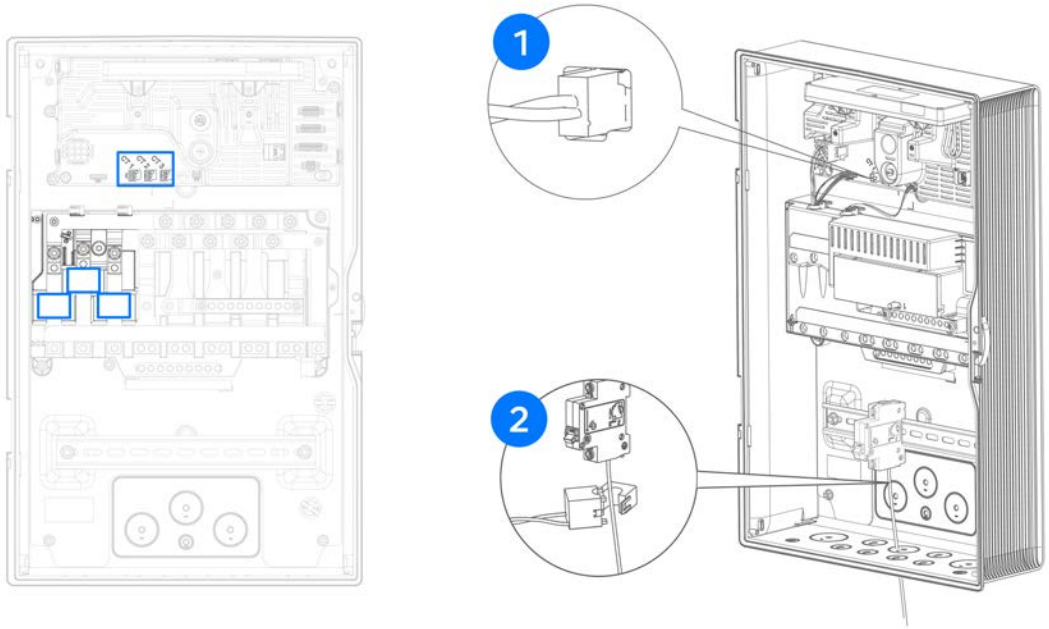
Depending on the site layout, it may not be possible to use the Backup Gateway 2 internal meters. Tesla Remote Energy Meter and Tesla 200A CTs can be installed when needed (see *Install Tesla Remote Energy Meter and CTs on page 84* for the installation instructions).

Install Tesla 100 A CTs

WARNING: Before installing, disconnecting, and/or adjusting CTs, ensure the circuits being measured are not energized and the system is completely powered down. Failure to de-energize the system may compromise operator and equipment safety.

1. Plug the Tesla 100 A CT into the terminal in the Backup Gateway. Ensure the connector is fully seated in the terminal.
2. Clamp the CT around the conductor to be measured.

Figure 32. Embedded Site CTs and Solar CT Connectors



Tips

- When metering 3-phase solar inverters, install CTs on L1, L2, and L3 output of the solar inverter AC circuit.

  NOTE: A single CT can be installed on L1 and connected to CT1 port to measure the solar power from a 3-phase solar inverter. Make sure to toggle **1CTx3** button to the ON position when configuring the CT during commissioning; the software triples the power measured by the CT. To ensure that the total power output calculated by software is correct, the solar power must be converted by a balanced 3-phase solar inverter, which distributes power evenly between the three phases.

- Ensure CTs are facing the proper direction as indicated on the label. A CT will show negative current if installed backwards.

Install Tesla Remote Energy Meter and CTs

Tesla Remote Energy Meter can be installed to provide additional metering for Powerwall systems.

Figure 33. Tesla Remote Energy Meter Metering Site in Partial Home Backup Configuration with AC-Coupled Solar

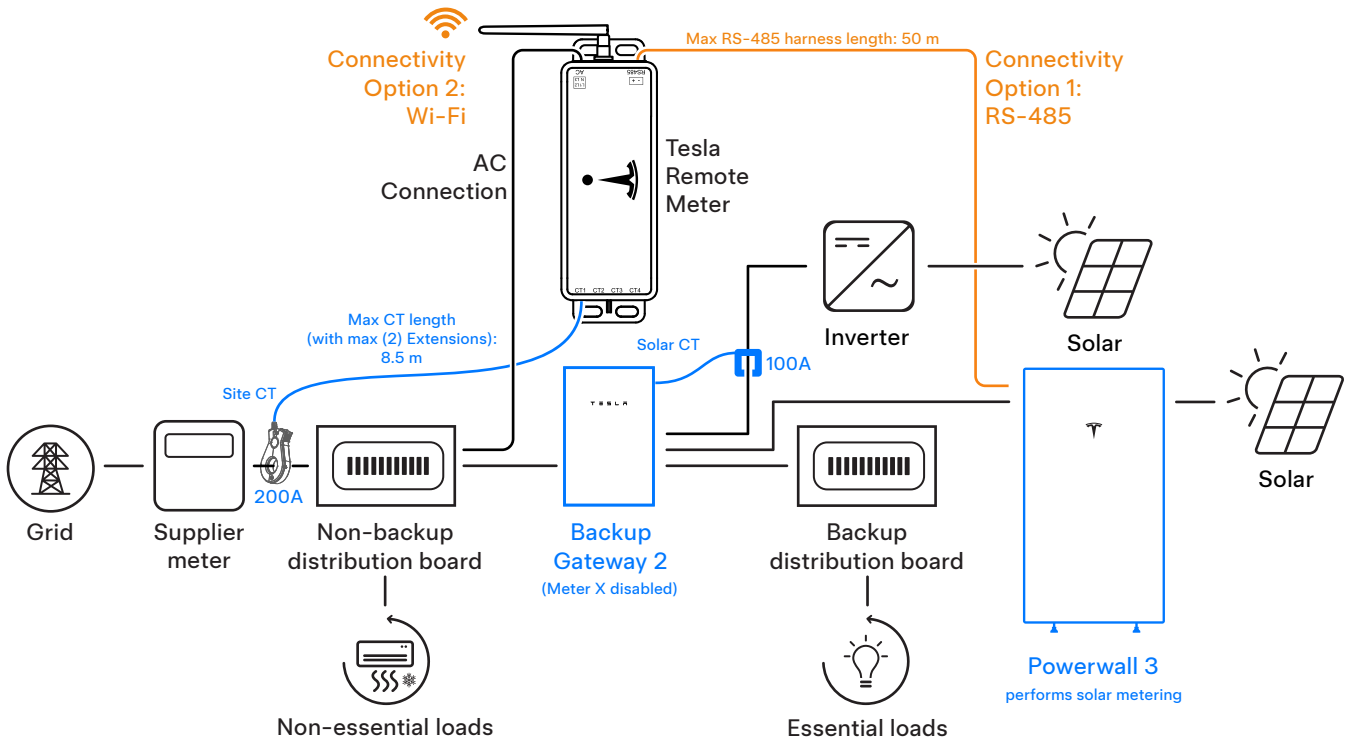


Table 3. Tesla Remote Energy Meter Kit Contents (Tesla P/N 2083765-xx-y)

Part Description	Quantity
Tesla Remote Energy Meter	1
Tesla 200 A CT (1.5 m)	1
Voltage harness (600 mm)	1
External antenna	1
Antenna extension	1
Fasteners	2

Table 4. Tesla Remote Energy Meter Accessories

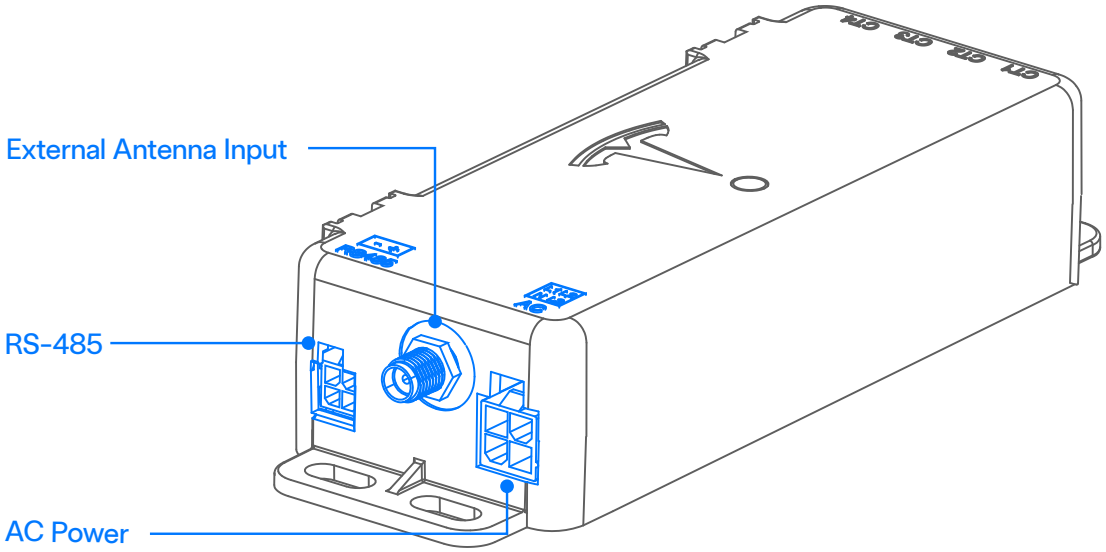
Part Description	Tesla P/N	Quantity
Tesla 200 A CT (1.5 m)	2033376-xx-y	1
RS-485 harness (1.2 m)	2045794-xx-y	1
CT extension (3.5 m)	2060713-xx-y	1

About Tesla Remote Energy Meter

Tesla Remote Energy Meter Overview

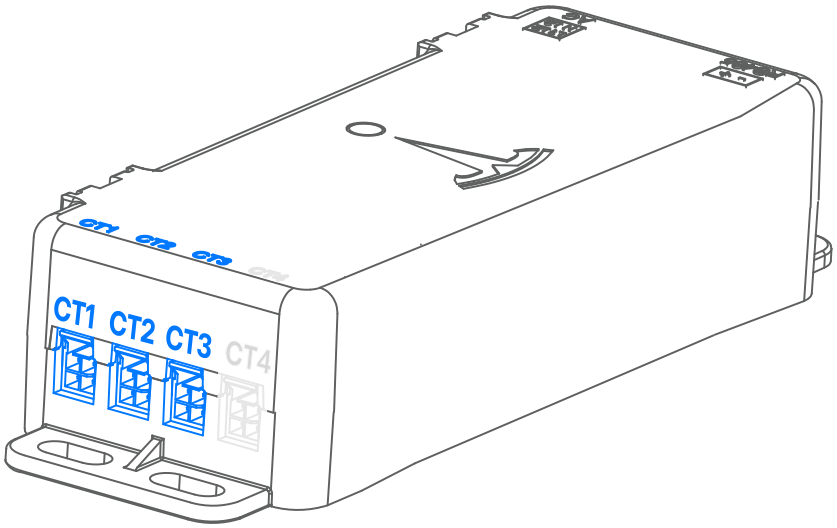
Tesla Remote Energy Meter can be connected to Powerwall 3 via Wi-Fi or an RS-485 wiring harness.

Figure 34. Location of RS-485, AC, and External Antenna Terminals



At the time of publication, Tesla Remote Energy Meter has (3) CT terminals:

Figure 35. Location of CT Terminals



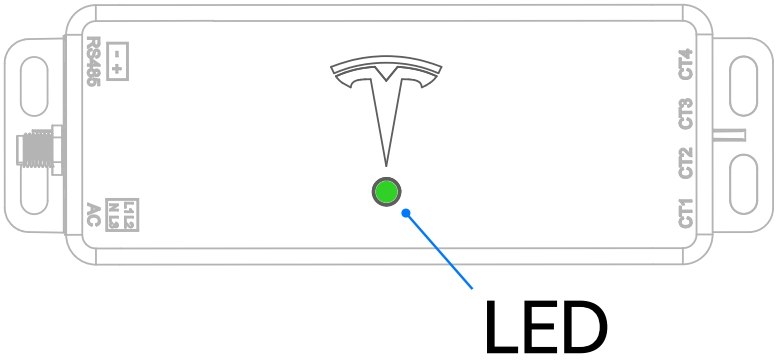
CT4 functionality will be available at a later date.

Tesla Remote Energy Meter LED

Tesla Remote Energy Meter has an LED which indicates the following status:

Solid green ON	Powered and operational

Figure 36. Tesla Remote Energy Meter LED Location



About Voltage Taps and Current Transformer Connections

The Tesla Remote Energy Meter functions by measuring voltage (by voltage tap) and current (by Current Transformer, or CT) at key locations in the system. For the meter to function correctly, the following are critical:

1. The Tesla Remote Energy Meter voltage line harness leads must be connected to the correct phases.

   NOTE: Regardless of the grid type the system is connected to, Tesla Remote Energy Meter must always be connected to L1 and N. If the meter is connected to L2 and/or L3, but not L1, it will not be powered.

2. The CTs must be placed around conductors of the correct phase:
   - CT1 = L1
   - CT2 = L2
   - CT3 = L3

The following illustrations provide some high level correct voltage harness wiring / CT installations:

Figure 37. Voltage Harness Wiring and CT Placement (1-Phase Service)

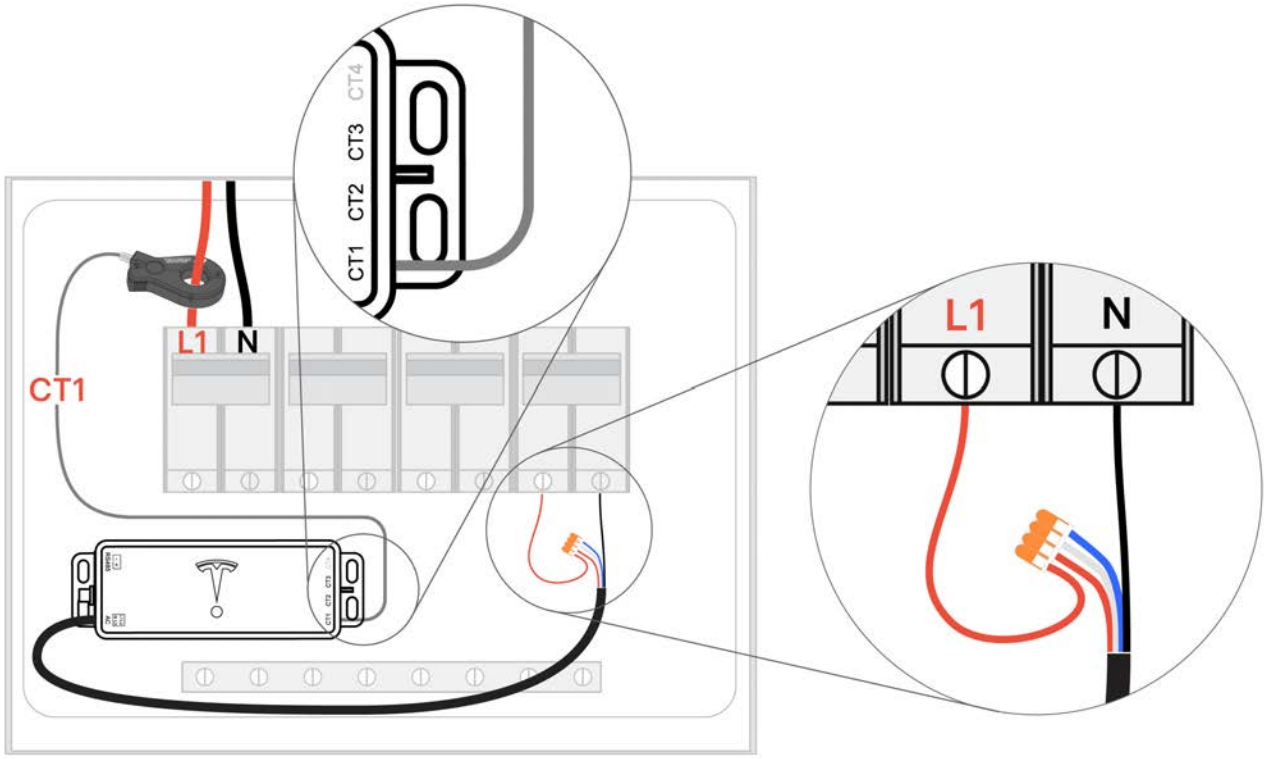
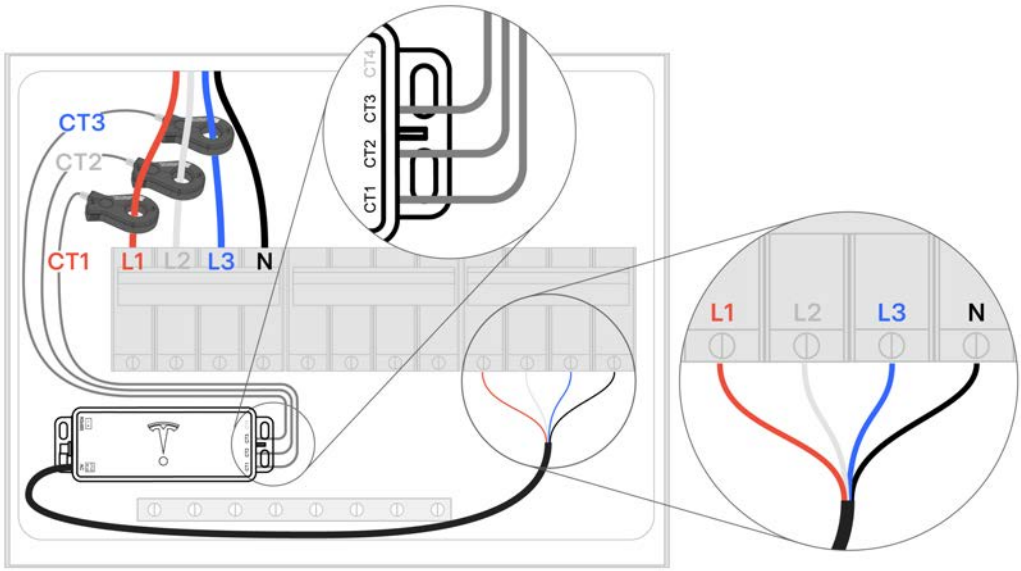
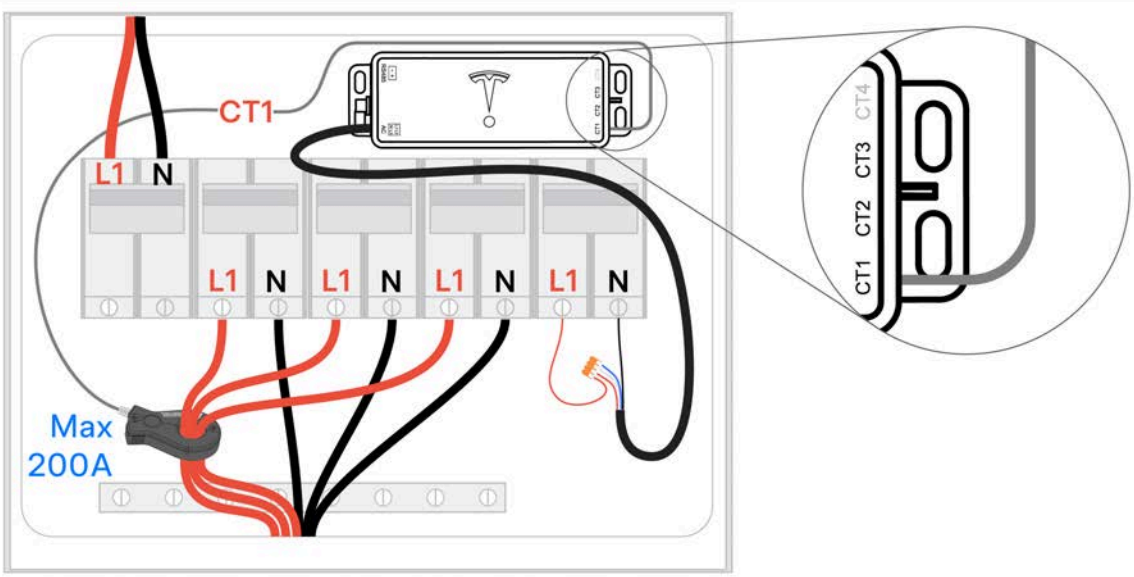


Figure 38. Voltage Harness Wiring and CT Placement (3-Phase Service)



NOTE: A single Tesla 200A CT can be placed around multiple conductors which are on the same phase, provided the sum of the conductor's current ratings does not exceed the CT's maximum current capacity. This is especially useful for systems with multiple solar inverters.

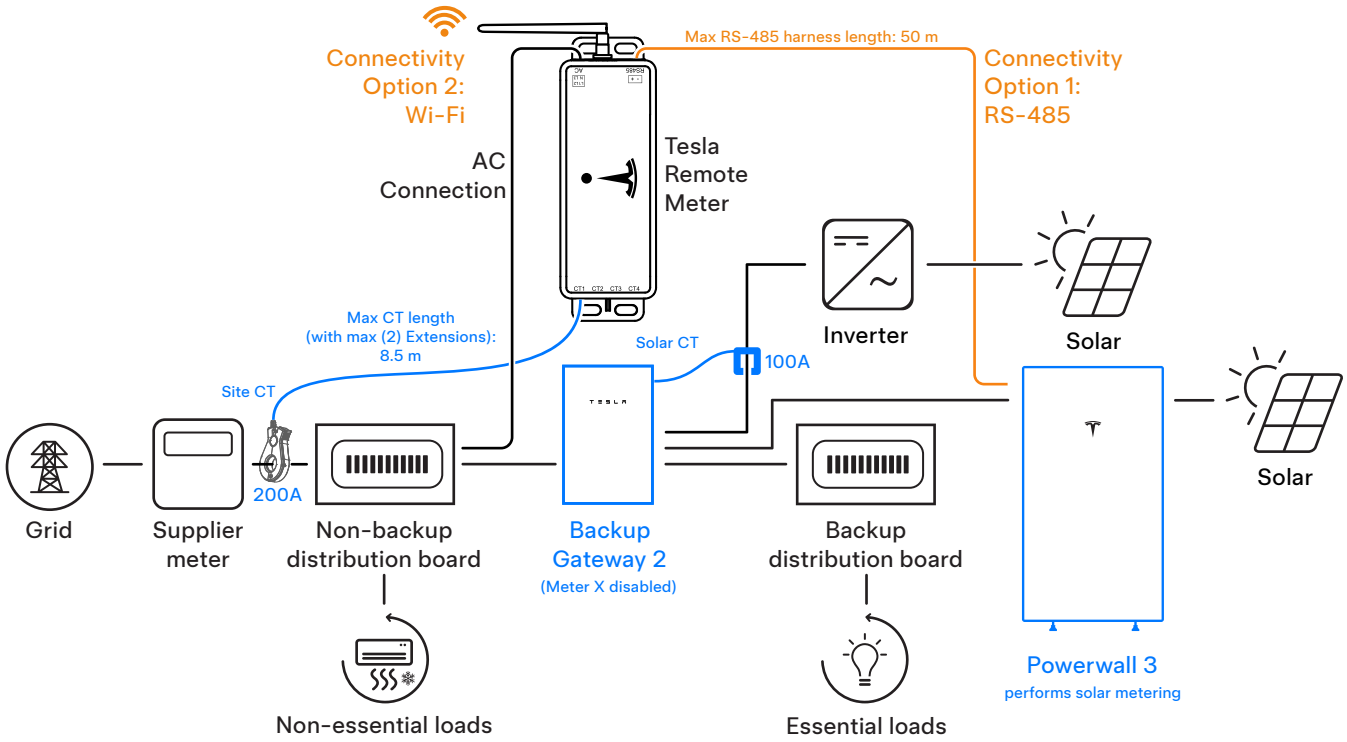
Figure 39. CT Placement Around Multiple Conductors of Same Phase



Install the Tesla Remote Energy Meter and CTs

Plan Meter and CT Locations

Before installing the meter and/or CTs, ensure none of the following maximum distances are exceeded:

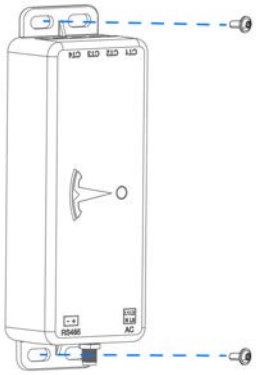


Distance to Measure	Wiring Option	Tesla P/N (if applicable)	Maximum Distance
Meter to Point of Measurement	CT lead only	2033376-xx-y	1.5 m
	If additional length is required: CT extension (3.5 m long)	2060713-xx-y	8.5 m (CT extension (3.5 m) + CT extension (3.5 m) + CT lead (1.5 m) = max 8.5 m)
Meter to Powerwall 3 TACO (RS-485 wired connection)	RS-485 harness	2045794-xx-y	1.2 m
	If additional length is required: 0.2 - 1.5 mm^2 communication wiring	Not applicable (wiring supplied by installer)	50 m
Meter to Breaker	Voltage Harness	Not applicable (included in the kit)	600 mm
	If additional length is required: 1.5 - 6 mm^2 AC wiring	Not applicable (wiring supplied by installer)	To maintain accuracy, keep the meter within 61 m of its breaker when using 2.5 mm^2 wire

STEP 9: INSTALL ENERGY METERING

Install the Meter

1. Using the screws provided in the meter kit, attach the meter to the inside of the main distribution board or to another surface.



2. Connect the voltage line harness leads to a dedicated 16A circuit breaker of corresponding phase inside the distribution board.
    a. **Red Wire**: Connect to L1 pole
    b. **White Wire**: Connect to L2 pole
    c. **Blue Wire**: Connect to L3 pole
    d. **Black Wire**: Connect to the circuit breaker's Neutral pole or Neutral busbar in the distribution board

> **NOTE:** If a dedicated circuit breaker is not available, the voltage line harness can be spliced to existing breakers (see *Voltage Harness Wiring and CT Placement (1-Phase Service) on page 87*)

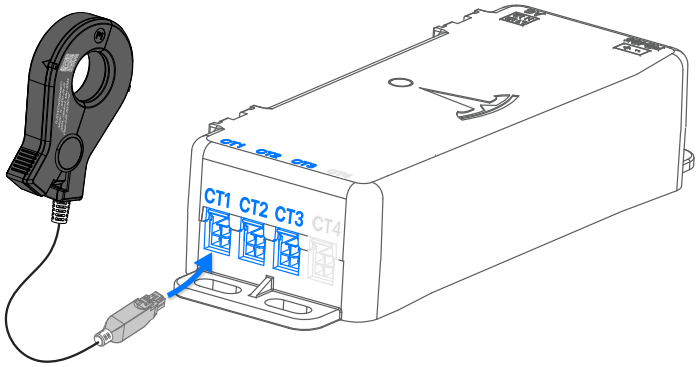
3. Plug the voltage line harness into the meter (see *Location of RS-485, AC, and External Antenna Terminals on page 85*).

Install the CTs

For measuring the site, the CT must be placed around the corresponding conductor wire in the main distribution board, after the supplier meter and ahead of any loads. If the site includes solar equipment, place an additional CT on the solar conductor wire in the distribution board.

To install a CT:

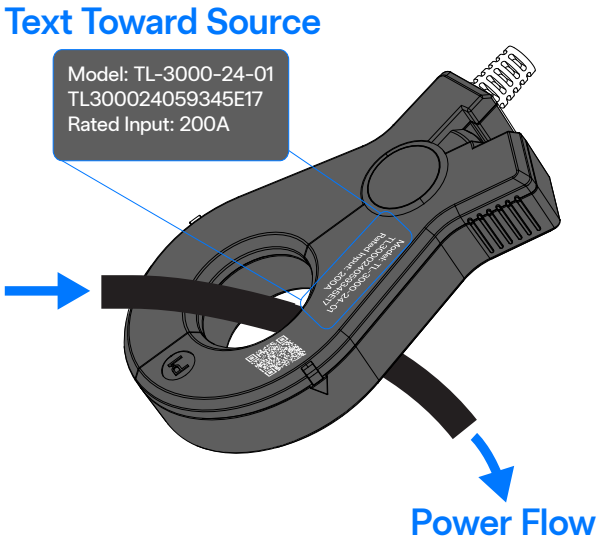
1. Plug the CT into the corresponding CT terminal on the meter.



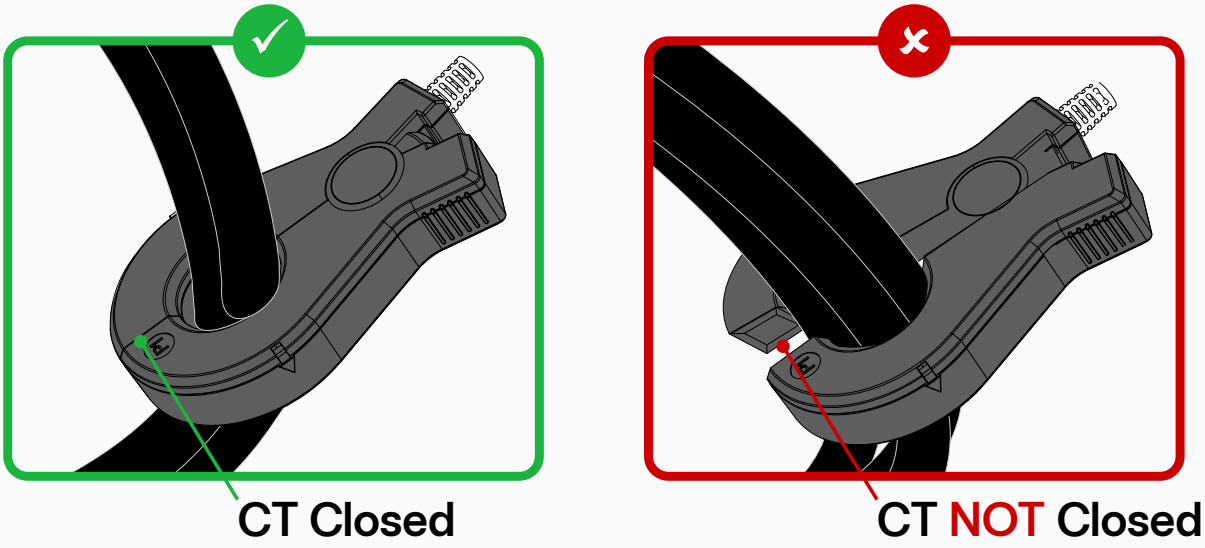
2. Pinch the CT to open it, then close the CT around the conductor(s) being measured.

> **NOTE:** Ensure the CT is installed so that the side with white text on the CT housing pointing toward the power source (service entrance / grid for Site CTs, solar inverter for Solar CTs). Always verify CTs are in the correct orientation by observing power flow in the Tesla One app.

Figure 40. CT Orientation in Relation to Power Flow



NOTE: Ensure the CT closes completely. If the CT is not closed, it will not measure properly. This is especially relevant if installing a CT around multiple conductors, or around large gauge wire.

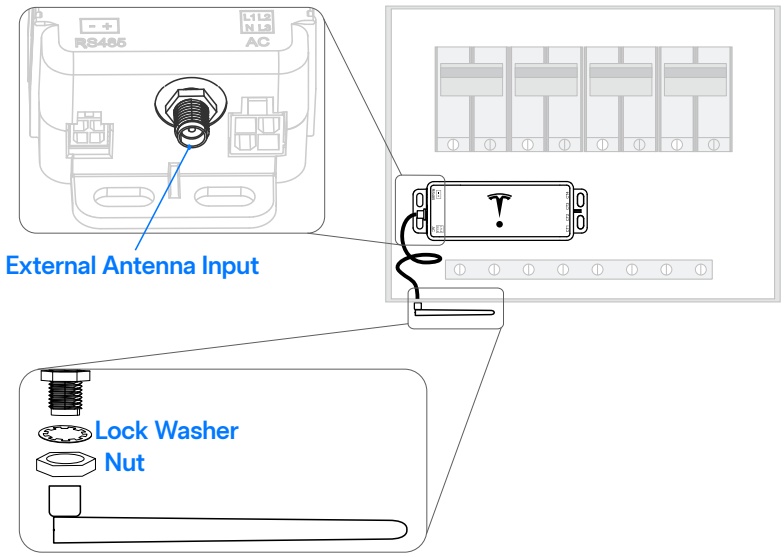


Connect Tesla Remote Energy Meter to Powerwall 3

Connection Option 1: Connect Tesla Remote Energy Meter via Wi-Fi:

Install the external antenna on the end of the meter. If installing the meter in a metal enclosure:

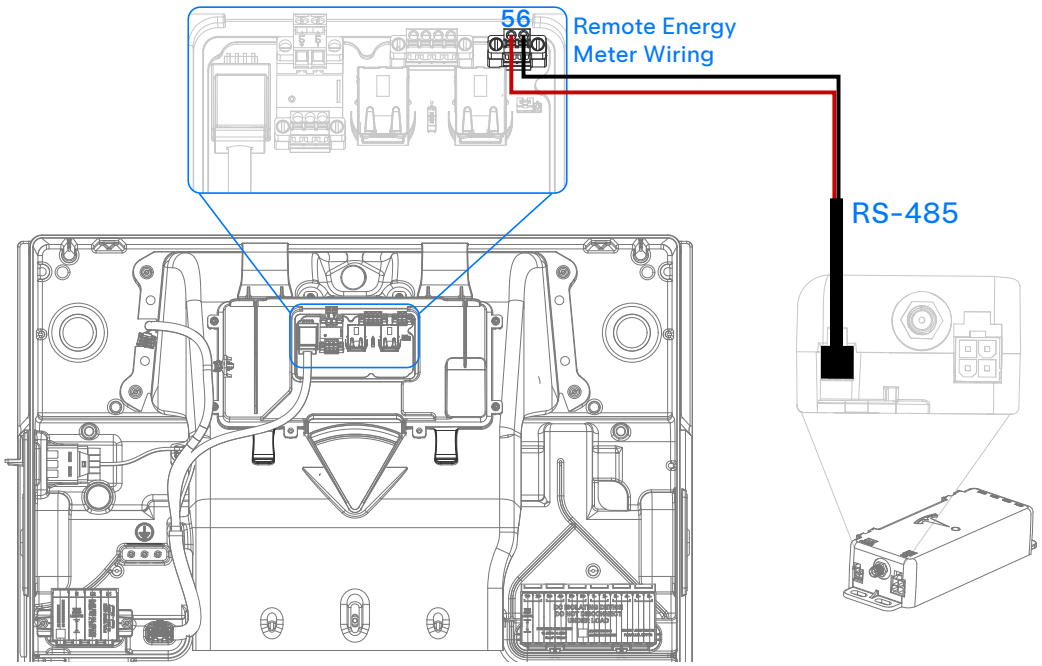
1. Drill a 6 mm hole in the bottom of the enclosure.
2. Route the provided antenna extender through the bottom of the enclosure as shown below.
3. Thread the provided lock washer and nut onto the extender, then thread the antenna onto the end of the extender. Secure the antenna against the bottom of the enclosure.



Meter configuration, including pairing the meter via Wi-Fi must be performed during commissioning in the Tesla One app. See commissioning instructions in the Powerwall 3 Commissioning Guide.

Connection Option 2: Wire Tesla Remote Energy Meter via RS-485:

1. Plug the 2-conductor RS-485 harness into the RS-485 terminal on the meter.
2. Connect the harness leads to the TACO by inserting them in the corresponding **Remote Energy Meter** connector.



Powerwall 3 TACO

TACO Remote Energy Metering Port Pin	Terminal Name	Wire Gauge
5	RS-485 +	0.2-1.5 mm^2 or CAT5
6	RS-485 -	

Meter and CT(s) configuration must be performed during commissioning in the Tesla One app. See commissioning instructions in the Powerwall 3 Commissioning Guide.

NOTE: If extending the RS-485 harness with wiring that includes a metal shield or drain wire, cut the excess shield and/or drain and insulate it with electrical tape.

Power On the Meter

Once the meter and CT(s) have been installed, the meter breaker can be closed to power on the meter for commissioning.

CAUTION: For any changes to meter wiring and/or CT placement, always **Open** the meter breaker to power the meter off before performing any work.

STEP 10: COMPLETE THE INSTALLATION

Plan Internet Connection for Powerwall

Internet connectivity is required to receive the full 10-year Powerwall warranty, and for the customer to see their system in the Tesla App.

Cellular is available for commissioning and as a backup connection when Wi-Fi or Ethernet connections are lost. Once Powerwall has been registered to the customer, they can configure a Wi-Fi connection using the Tesla app. For customers without a strong Wi-Fi connection, install an Ethernet connection as follows.

NOTE: If the customer Wi-Fi network is available during the installation, the Wi-Fi connection can be configured during Device Setup.

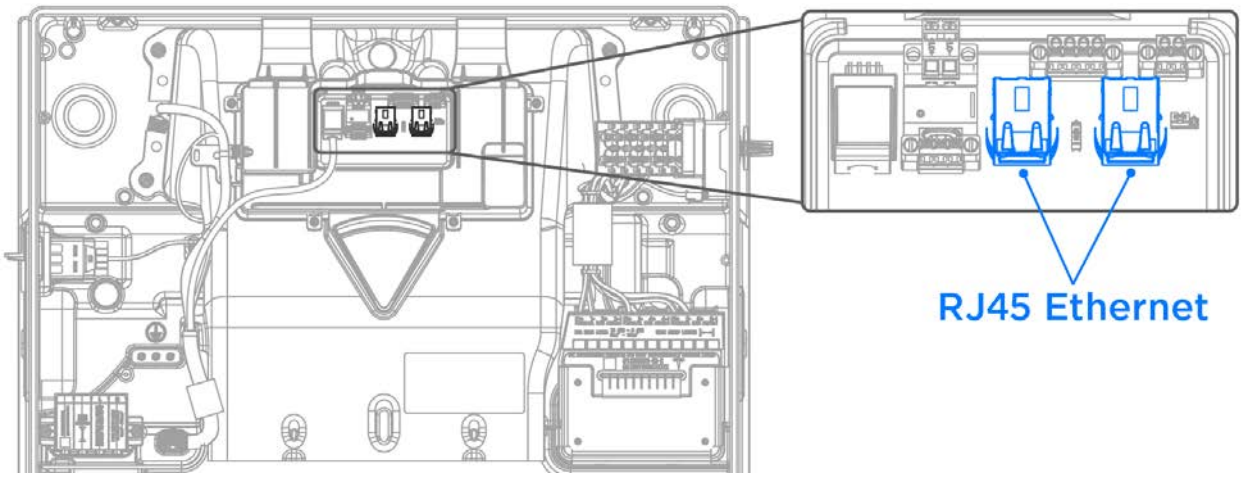
Install Ethernet Connection

- Ethernet cable must be CAT5 cable at minimum.
- If not possible to run an Ethernet cable directly to the customer's network router, Powerline Ethernet socket adapters may be used.

  NOTE: If installing Powerline Ethernet socket adapters, ensure they are installed in the backup circuit.

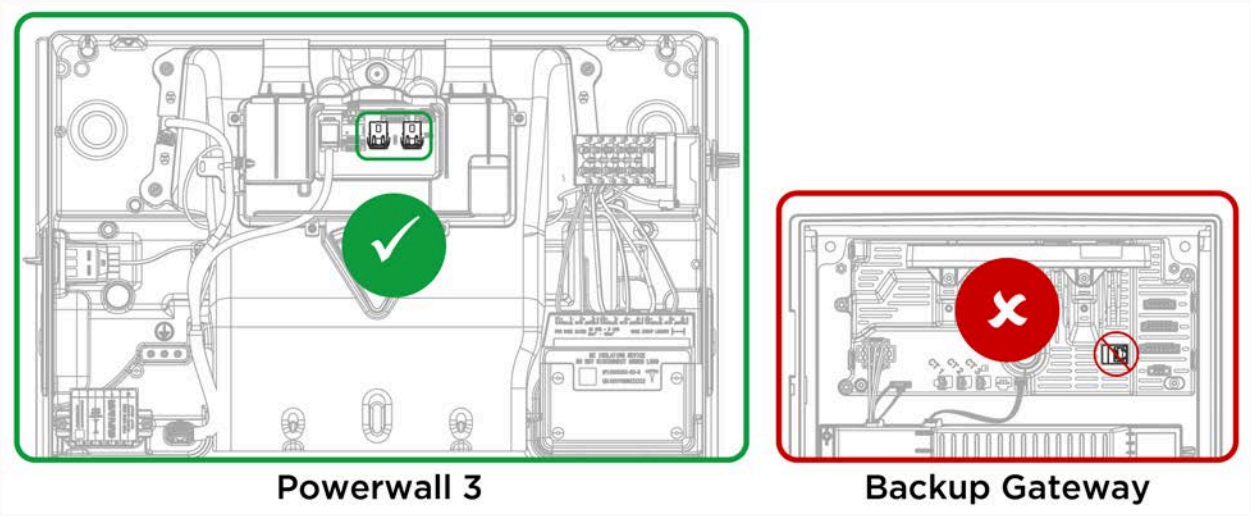
- Connect the Ethernet cable to one of the RJ45 Ethernet terminals in the Powerwall 3. The LED on the Ethernet terminal will illuminate green to indicate Ethernet is connected.

  NOTE: The amber LED on the Ethernet terminal will not illuminate. This is expected behavior.



NOTE: See *Prepare Ethernet Wiring with RJ45 Connectors on page 116* for instructions to crimp RJ45 connectors on CAT5 or CAT6 cable.

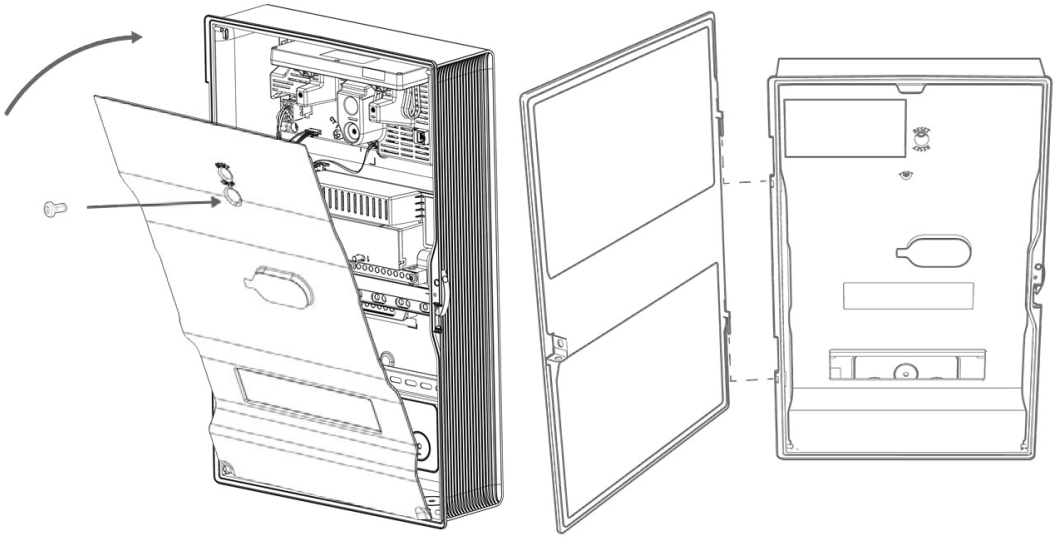
NOTE: Only connect Ethernet wiring to the Powerwall 3 Ethernet ports. The Tesla Asset Controller in Powerwall 3 controls system operation, so these Ethernet ports are the only functional ports in the system. **Do not** connect Ethernet to the Backup Gateway Ethernet port.



Close Backup Gateway 2 Wiring Compartment

1. **Before closing any installed hardware**, take photos of the completed wiring in the Powerwall, Backup Gateway 2, and main distribution board.
2. Inspect the AC and PV wiring terminals to ensure all wire strands are properly inserted.
3. Ensure that all conduit junctions and cable entry points are secure and properly sealed.
4. Install the Backup Gateway deadfront panel and secure it firmly with the original screw. Mount the Backup Gateway door, and latch it shut.

   Figure 41. Install the Backup Gateway Deadfront Cover and Glass Door



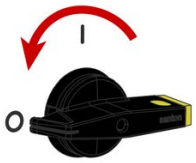
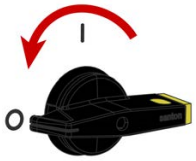
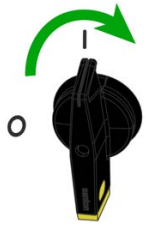
NOTE: If the Backup Gateway is installed outdoors or in a high-traffic area, the latch can be locked shut.

5. Clearly label all circuit breakers.

STEP 11: TURN ON AND COMMISSION THE SYSTEM

WARNING: Before terminating any conductors inside Powerwall 3, ensure that the integrated DC isolator and Powerwall 3 On/Off switch are both turned OFF to de-energize the system. Confirm lack of voltage at the AC and PV terminals before proceeding.

Prepare the System for Commissioning

Powerwall Installation Complete?	Solar Installed?	Powerwall 3 On / Off Switch	Integrated DC Isolator	Powerwall 3 Breaker	Commissioning
No (no AC service, install crew unable to complete, etc.)	No	Leave the Powerwall 3 switch **OFF** 	Leave the integrated DC isolator **OFF** 	Leave the Powerwall 3 breaker **OPEN** (OFF)	Commissioning cannot be completed at this time
Yes	No	Leave the Powerwall 3 switch **ON** 	Leave the integrated DC isolator **OFF** 	Leave the Powerwall 3 breaker **CLOSED** (ON)	See *Commission the System Ahead of Solar Installation on page 98* **WARNING:** Turn the Powerwall 3 switch OFF to de-energize the system terminating any conductors inside Powerwall 3. Confirm lack of voltage at the AC and PV terminals before proceeding.
Yes	Yes	Leave the Powerwall 3 switch **ON** 	Leave the integrated DC isolator **ON** 	Leave the Powerwall 3 breaker **CLOSED** (ON)	See *Commission the System After Powerwall and Solar Installation on page 102*

Commission the System Ahead of Solar Installation

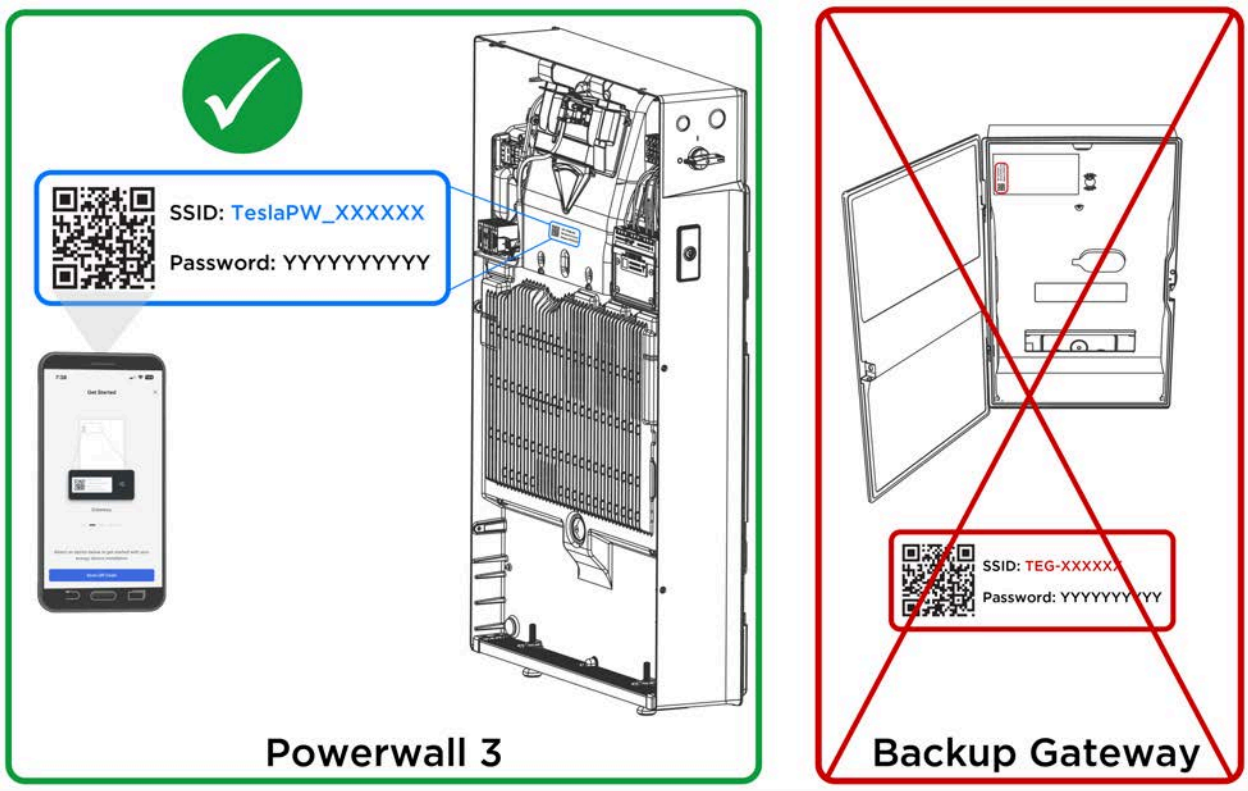
Powerwall Installation Crew Instructions

1. Close the AC circuit breaker for Powerwall 3 and the Backup Gateway.
2. Turn the Powerwall 3 switch **ON**.
3. Launch the **Tesla One** app.

   NOTE: Ensure Tesla One is updated to version 7.9.1 or greater, or *install Tesla One* if using for the first time.

4. Navigate to **Device Setup** to begin commissioning.
5. Select **Scan** and scan the Powerwall 3 QR label to connect to the TeslaPW Wi-Fi network.

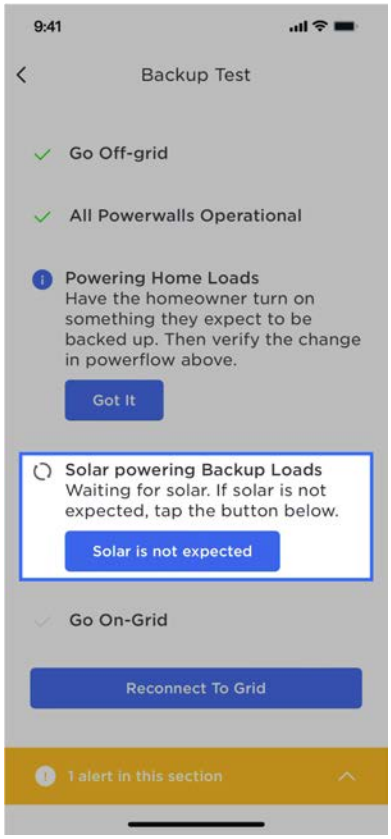
   NOTE: Connect to Powerwall 3 to commission the system. **Do not attempt to connect to Backup Gateway to commission**.



6. Address any alerts to complete commissioning, skipping PV commissioning steps.

   NOTE: When commissioning a system with no solar, Powerwall will charge from grid until State of Energy (SOE) is 20%. This is expected behavior.

7. Perform the Backup Test, selecting **Solar is not expected**.



NOTE: The Backup Test can be performed during the Backup Gateway 2 device update. There is no need to wait for the update to complete before performing the Backup Test.

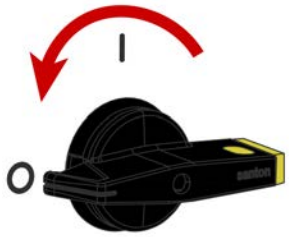
8. Leave the system running in Tesla One.
9. Leave the Powerwall 3 switch **ON** and the breaker **CLOSED** to enable charging.
10. Leave the Powerwall 3 integrated DC isolator **OFF**.
11. Leave the following accessories with the customer, for use by the Solar installation crew:
    - Extra T20 fasteners for front cover
    - Installation quick guide (for guidance on correctly installing PV wiring)

NOTE: See the *Powerwall 3 Device Setup Guide* for instructions.

Solar Installation Crew Instructions

1. Retrieve the Powerwall 3 accessories from the customer. These should have been left by the Powerwall crew.
2. Turn the Powerwall 3 switch OFF to de-energize the system; see *Appendix F: Shutting Down Powerwall 3 on page 133* for complete de-energization instructions.

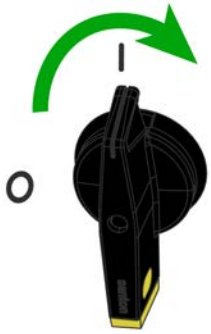
3. Confirm the Powerwall 3 integrated DC isolator is OFF.



WARNING: Confirm lack of voltage at the AC and PV terminals before proceeding.

4. See *STEP 7: Make Solar PV Connections on page 75* for instructions to complete the solar installation.
5. Re-energize Powerwall 3:
   a. Remove the lock / tag and breaker hasp from the Powerwall 3 breaker, then turn the breaker ON.
   b. Turn the Powerwall 3 switch ON.

6. Turn the Powerwall 3 integrated DC isolator **ON**.



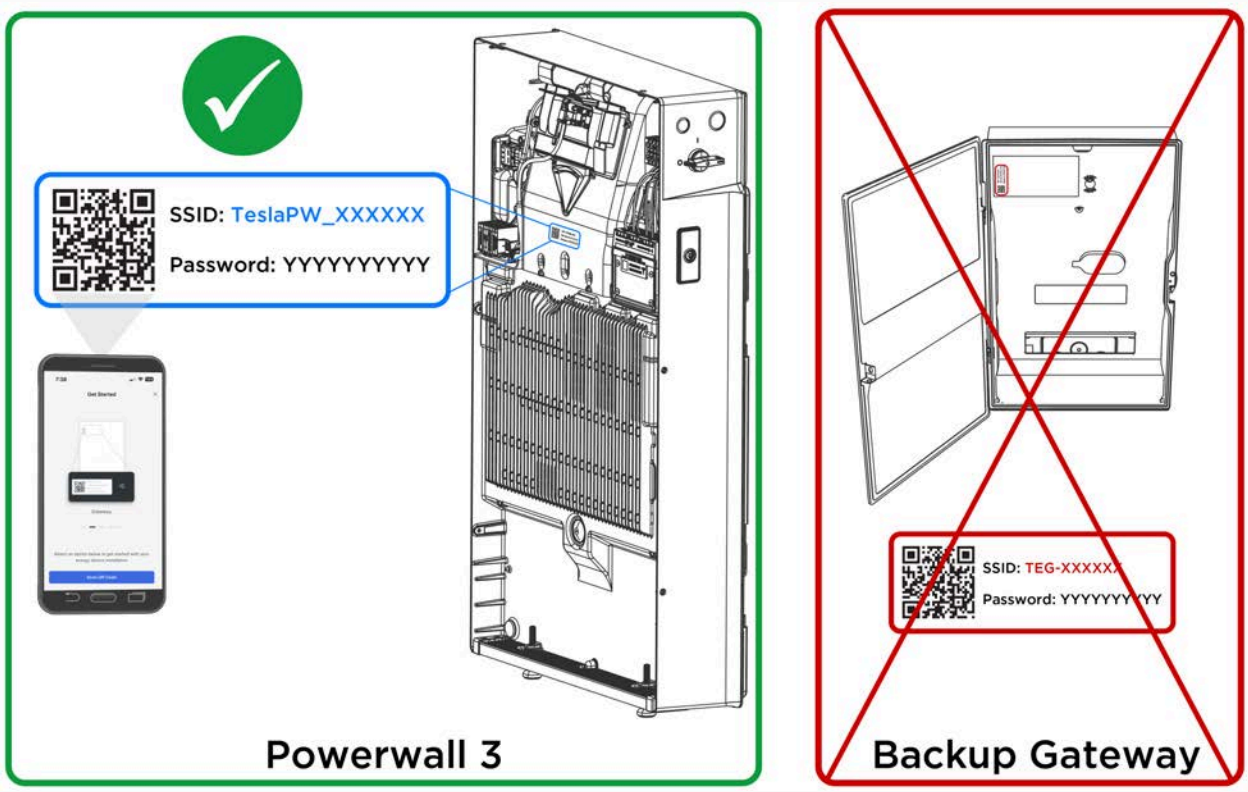
7. Launch the **Tesla One** app.

NOTE: Ensure Tesla One is updated to version 7.9.1 or greater, or *install Tesla One* if using for the first time.

8. Navigate to **Device Setup** to begin commissioning.
9. Select **Scan** and scan the Powerwall 3 QR label to connect to the TeslaPW Wi-Fi network.

STEP 11: TURN ON AND COMMISSION THE SYSTEM

NOTE: Connect to Powerwall 3 to commission the system. **Do not attempt to connect to Backup Gateway to commission**.



10. Address any alerts to complete commissioning.
11. On the Powerwall 3 *Device* page, compare the MPPT voltages with those listed on the planset to confirm the installation matches what is expected for the strings.
12. Perform the Backup Test with solar.
13. Install the Powerwall 3 front cover, fastening with the new T20 fasteners that were left with the customer.
14. Leave the system running in Tesla One.
15. Leave the Powerwall switch **ON** and the breaker **CLOSED** to enable charging.

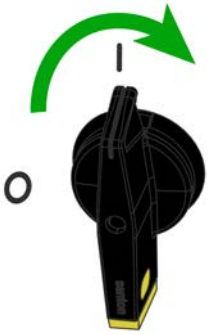
NOTE: See the *Powerwall 3 Device Setup Guide* for instructions.

NOTE: The Powerwall 3 On / Off switch has a locking mechanism. When the switch is locked it cannot be turned on. See *Powerwall 3 Switch Locking Mechanisms on page 124* for more information.

Commission the System After Powerwall and Solar Installation

1. Close the AC circuit breaker for Powerwall 3 and the Backup Gateway.
2. Turn the Powerwall 3 switch **ON**.

3. Turn the Powerwall 3 Integrated DC Isolator **ON**.



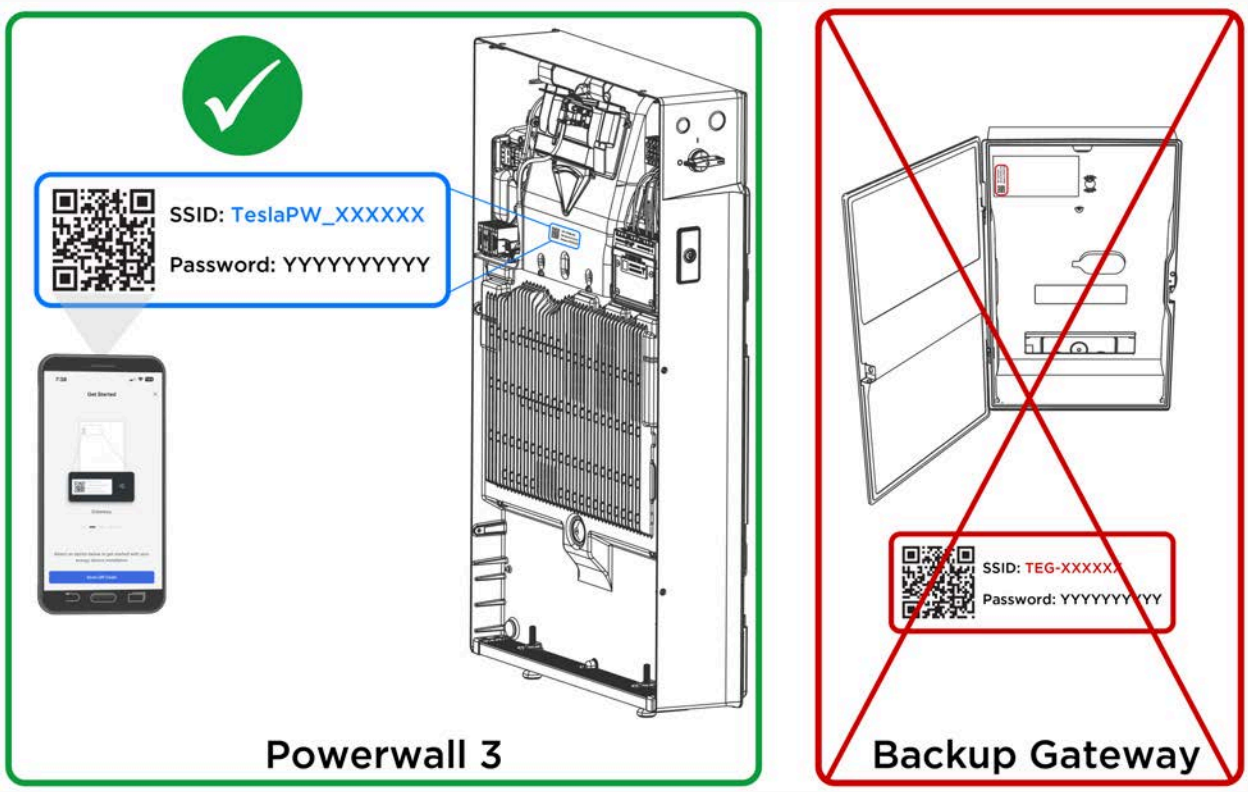
4. Launch the **Tesla One** app.

> **NOTE:** Ensure Tesla One is updated to version 7.9.1 or greater, or *install Tesla One* if using for the first time.

5. Navigate to **Device Setup** to begin commissioning.
6. Select **Scan** and scan the Powerwall 3 QR label to connect to the TeslaPW Wi-Fi network.

STEP 11: TURN ON AND COMMISSION THE SYSTEM

NOTE: Connect to Powerwall 3 to commission the system. **Do not attempt to connect to Backup Gateway to commission**.



7. Address any alerts to complete commissioning.

NOTE:

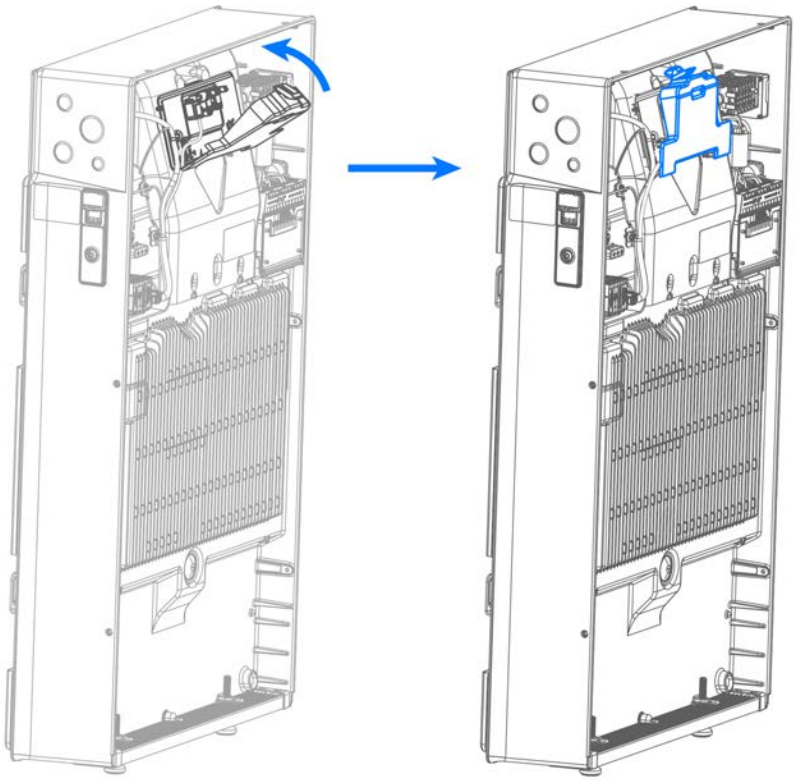
- See the *Powerwall 3 Device Setup Guide* for instructions.
- The Backup Test can be performed during the Backup Gateway 2 device update. There is no need to wait for the update to complete before performing the Backup Test.

8. Leave the system running in Tesla One.
9. Leave the Powerwall switch **ON** and the breaker **CLOSED** to enable charging.

NOTE: The Powerwall 3 On / Off switch has a locking mechanism. When the switch is locked it cannot be turned on. See *Powerwall 3 Switch Locking Mechanisms on page 124* for more information.

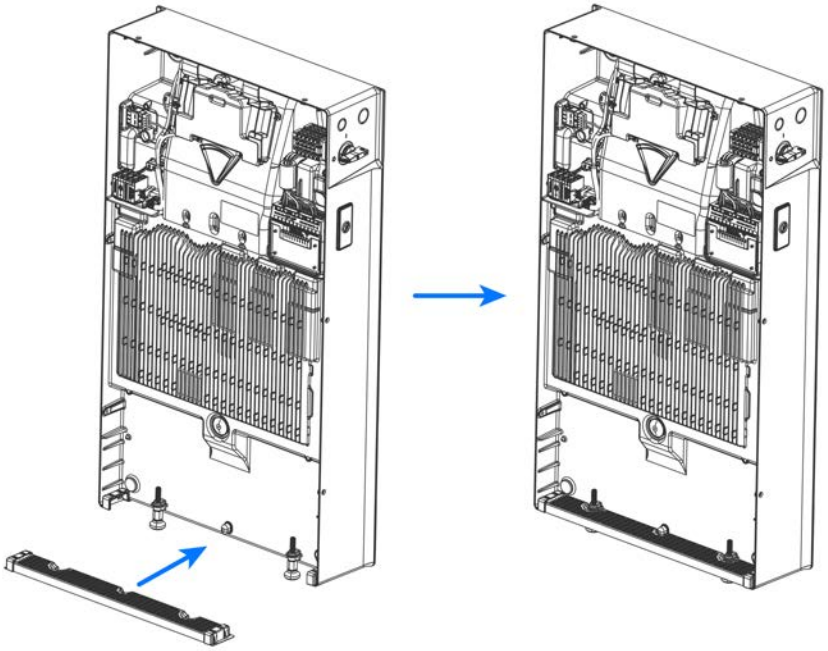
STEP 12: INSTALL POWERWALL 3 FRONT COVER

1. Inspect the AC and PV wiring terminals to ensure all wire strands are properly inserted.
2. Ensure that all conduit junctions and cable entry points are secure and properly sealed.
3. Arrange all communication wires inside the Tesla Asset Controller cover, then close the cover.



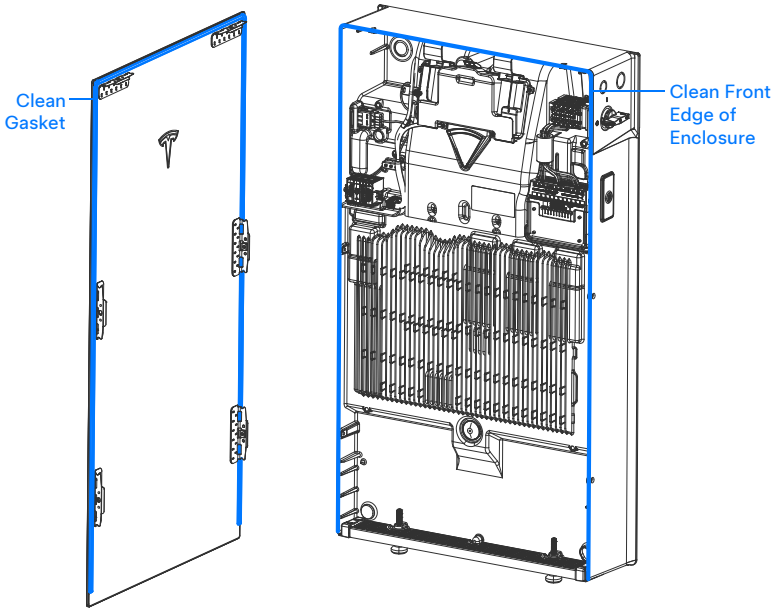
4. Arrange all wires neatly inside the Powerwall wiring compartment.

5. Install the air intake screen over the opening at the bottom of Powerwall, ensuring it snaps into place.



6. Clean the front edge of the Powerwall enclosure with a microfiber cloth to remove any debris that might interfere with the seal.
7. Carefully remove the glass front cover from its packaging and, using a microfiber cloth, clean the sealing gasket around the edge of the front cover to remove any debris that might interfere with the seal.

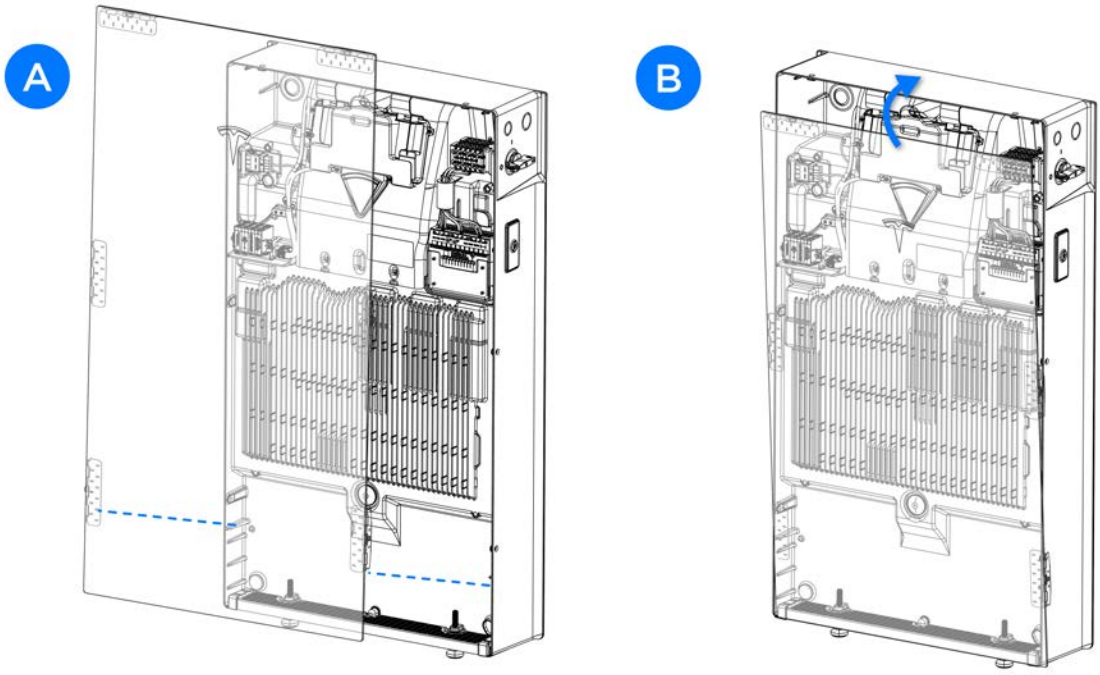
> **CAUTION:** Take extreme care when handling the sealing gasket. Damage to or contamination of the gasket or its mating surface could compromise Powerwall's ingress protection, resulting in product damage.



8. Carefully install the glass front cover:
    a. Align the lower mounting tabs with the two alignment shelves in the enclosure (**A**).

b. Rotate the front cover toward the enclosure to engage the top mounting tabs with the enclosure (**B**). Maintain pressure (approximately 2 Nm) on the front of the cover to compress the sealing gasket.

> ⚠ **CAUTION:** Maintain pressure to keep the sealing gasket compressed until all fasteners are installed and tightened. If the sealing gasket is not compressed, the fasteners may thread form in the enclosure, breaking the front cover mounting tabs.



c. Install and tighten the top (2X) T20 fasteners in the fastener slots (**C**).

NOTE: T20 fasteners (Tesla P/N 1847553-00-A) are included in the accessory bag:

- Early revisions of the fasteners (left, below) include a black gasket and are single use; remove the gasket to reuse these fasteners to reinstall the glass front cover
- Later revisions of the fasteners (right, below) do not include a gasket and can be reused to reinstall the glass front cover

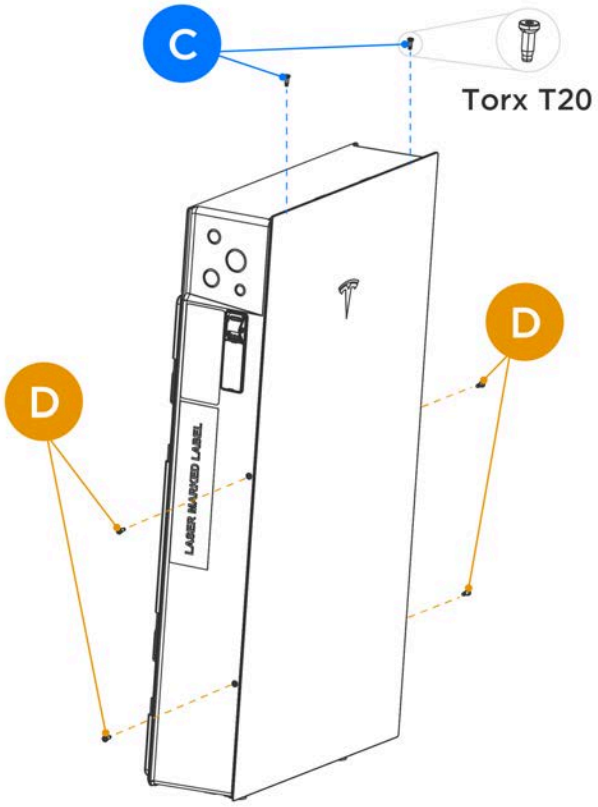
The gasket is not required and does not impact the enclosure rating of Powerwall 3.

d. Install and tighten the remaining (4X) T20 fasteners in the fastener slots on the sides of the unit (**D**).

e. Tighten each fastener to approximately (2.8 Nm) or hand-tight.

CAUTION: Do not use an impact driver to torque the fasteners.

STEP 12: INSTALL POWERWALL 3 FRONT COVER



STEP 13: DEMONSTRATE THE INSTALLATION

1. Ask the homeowner to download and install the Tesla mobile app, log in or create a new Tesla account, and assist them with registering their product.
2. Show the homeowner the location of the serial number sticker on the left side of Powerwall, below the On/Off switch.
3. Demonstrate the capabilities of the Tesla mobile app, such as how to change the operation mode.
4. Simulate an outage by opening the main breaker and show that Powerwall is powering backup loads.
5. Archive the photos from the installation.

Technical Support

Resources for Certified Installers, including the latest versions of installation manuals, are available within the Tesla Partner Portal:

https://partners.tesla.com

Maintenance

Powerwall 3 does not require pre-scheduled preventative maintenance. The only maintenance required by an owner is to keep the unit connected to the internet and free and clear of debris, especially around the air intake and exhaust. When needed, the air intake vent can be removed and hosed off.

To clean Powerwall 3, use a soft, lint-free cloth. If needed, the cloth can be dampened with mild soap and water only. Do not use cleaning solvents to clean Powerwall 3, or expose Powerwall 3 to flammable or harsh chemicals or vapors.

APPENDIX A: POWERWALL 3 ANCHORING DETAILS

General Anchoring Notes

NOTE: The details below are minimum guidelines and are not guaranteed to be applicable.

NOTE: All fasteners shall be galvanized or stainless steel for exterior applications.

NOTE: All wall framing referenced in the details must be part of the home's main permitted bearing wall and/or lateral force resisting system. The contractor and their licensed design professional are responsible for ensuring the walls, and their load transfer connections, are structurally sound to support all code-specified vertical and lateral loading imposed by the equipment. Improper mounting or the use of a wall that is not structurally sound could result in serious injury and/or product damage.

NOTE: At the contractor's expense and with no liability to Tesla, the homeowner and contractor can work with a third party licensed engineer and building department to develop alternative supports.

NOTE: Do not mount below or above windows of the same story wall. Mounting equipment on fences, half walls, retaining walls, or other non-structural construction is not allowed. Supporting framing must be part of a permitted structure and any unusual framing near the mounting area that may compromise the wall's integrity shall be evaluated by the contractor and their licensed design professional.

Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation

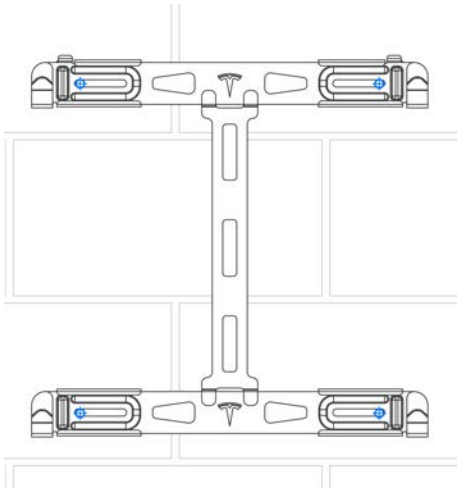
Reference these anchoring details when mounting Powerwall 3 to the provided mounting bracket.

Concrete Masonry Unit Wall

Minimum strength must be 11 MPa.

Use at least four (one in each corner, in any available anchor slot) 10 mm concrete anchors of sufficient length for 50 mm embedment into the material.

Anchors shall not be installed within 305 mm of wall edges or 38 mm of masonry block edges.

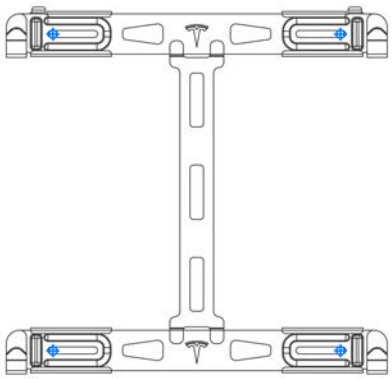


APPENDIX A: POWERWALL 3 ANCHORING DETAILS

Solid Concrete Wall

Minimum strength must be 18 MPa.

Use at least four (one in each corner, in any available anchor slot) 10 mm concrete anchors of sufficient length for at least 64 mm embedment into the wall.



Brick Wall

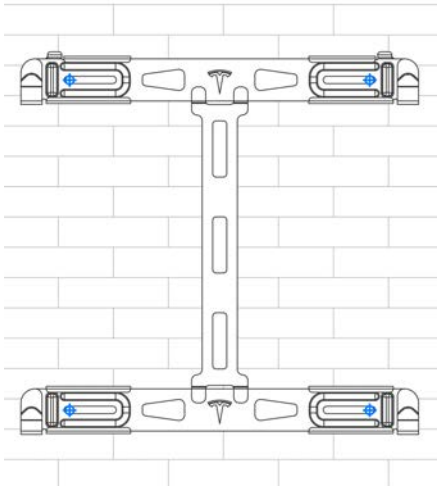
(Double and Single Layer of Brick Masonry)

Minimum strength must be 12 MPa.

Use at least four (one in each corner, in any available anchor slot) 6 mm masonry anchors of sufficient length for 79 mm embedment.

NOTE: Faux brick veneer is not a supported wall type for Powerwall installations.

NOTE: Fasteners shall not be installed in mortar joints.



Channel Strut (Unistrut)

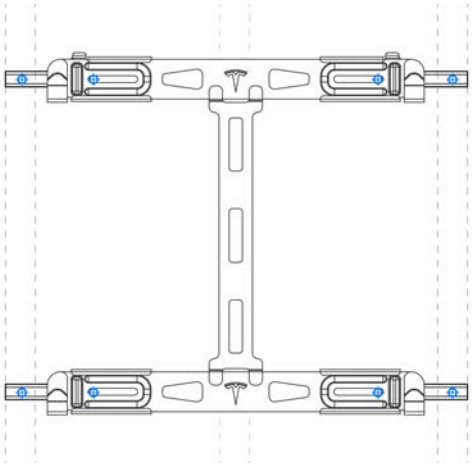
Struts must be minimum 12 gauge, and either 22 mm or 41 mm.

If mounting on wood structural members, attach each strut to at least two structural members, using at least one 6 mm wood screw with washer per structural member, of sufficient length for at least 64 mm embedment into the structural members.

If mounting on metal structural members, attach each strut to at least three structural members, using at least one #14 (6 mm) sheet metal screw with washer per structural member, of sufficient length to penetrate at least 3 threads beyond the structural members.

NOTE: For either wood or metal structural members, these requirements are per Powerwall (e.g. two structural members per Powerwall on wood structural members, or three structural members per Powerwall on metal structural members).

To attach the bracket to the struts, use at least four (one in each corner) 10 mm hex head screws with washers and strut nuts.

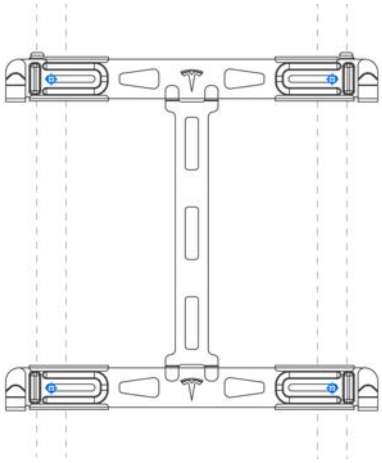


Channel strut shall have a maximum unsupported span of 610 mm and shall not be cantilevered.

Wood Structural Members 305 mm to 432 mm

If anchoring directly into wood structural members, use at least four (one in each corner) 6 mm wood screws with washers, of sufficient length for at least 64 mm embedment into the structural members.

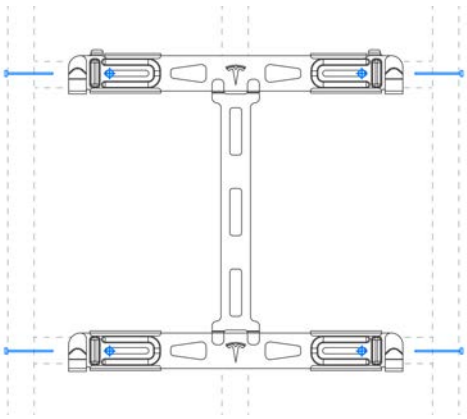
NOTE: See *Channel Strut (Unistrut) on page 111* for structural member spacing greater than 432 mm, up to 610 mm.



Wood Structural Members 305 mm to 432 mm

If anchoring to blocking between wood structural members, use minimum 38 x 89 mm blocks, end-nailed into structural members with two 16d (89 x 4 mm) nails or toe-nailed into structural members with four 8d (64 x 3 mm) nails. Use at least four (one in each corner) 6 mm wood screws with washers, of sufficient length for at least 64 mm embedment into the blocking.

NOTE: See *Channel Strut (Unistrut) on page 111* for structural member spacing greater than 432 mm, up to 610 mm.

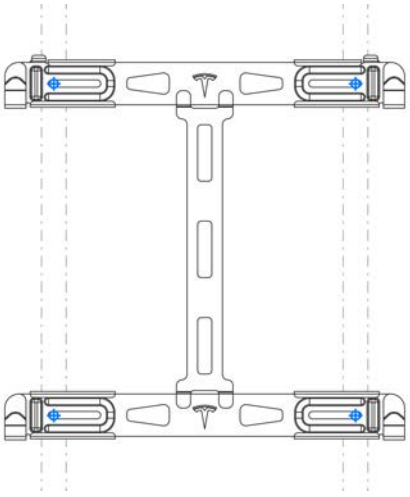


Metal Structural Members 305 mm to 432 mm

If anchoring directly to metal structural members, structural members must be minimum 18 gauge. Use at least four (one in each corner) #14 (6 mm) sheet metal screws with washers, of sufficient length to penetrate at least 3 threads beyond the structural member.

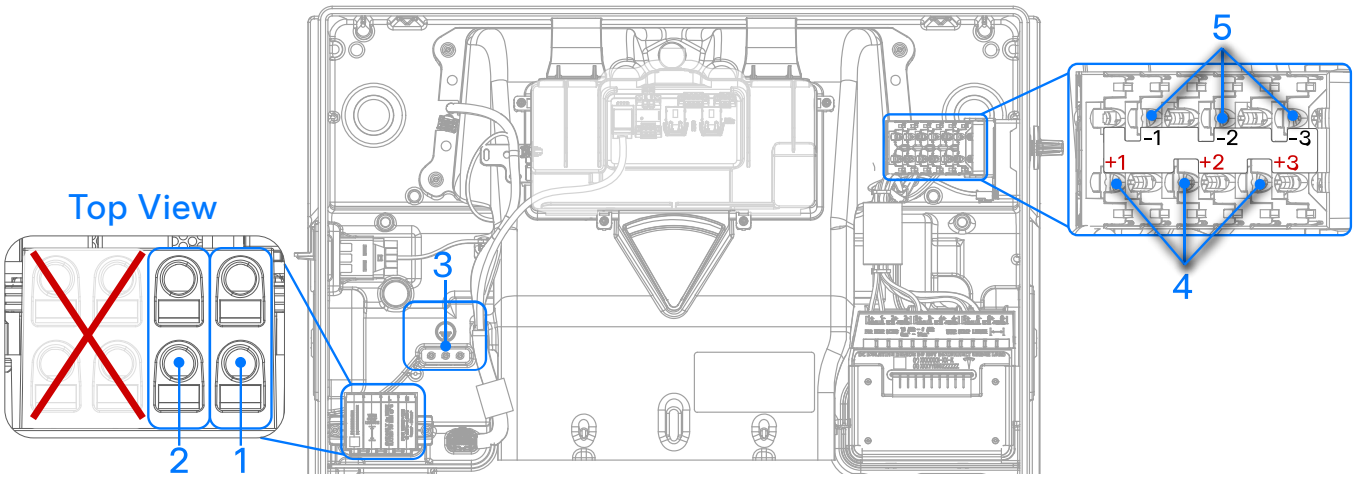
If backing is needed between the structural members, the backing must be minimum 18 gauge. Attach backing to metal structural members with 12 gauge 76 x 76 mm angle clip or Simpson SFC2.25 clips with two #10 sheet metal screws in each leg.

NOTE: See *Channel Strut (Unistrut) on page 111* for structural member spacing greater than 432 mm, up to 610 mm.



APPENDIX B: WIRING REFERENCE

Powerwall 3 AC and PV Wiring



	Terminal Name	Recommended Wire Color	Wire Size
1	N (Neutral)	Black	6 - 25 mm^2
2	L1 (Line 1) **NOTE:** The two terminals to the left of L1 are not used.	Red	
3	Protective Earth terminals	Green	2.5 - 25 mm^2
4	Integrated DC Isolator Positive inputs (PV 1+, 2+, 3+)	Red	Use forked terminals; Tesla recommends the following or equivalent: • TE Connectivity P/N 165015 (4 - 6 mm^2 wire size) • Vogt P/N 3654c / 3655c (4 - 6 mm^2 wire size)
5	Integrated DC Isolator Negative inputs (PV 1-, 2-, 3-)	Black	

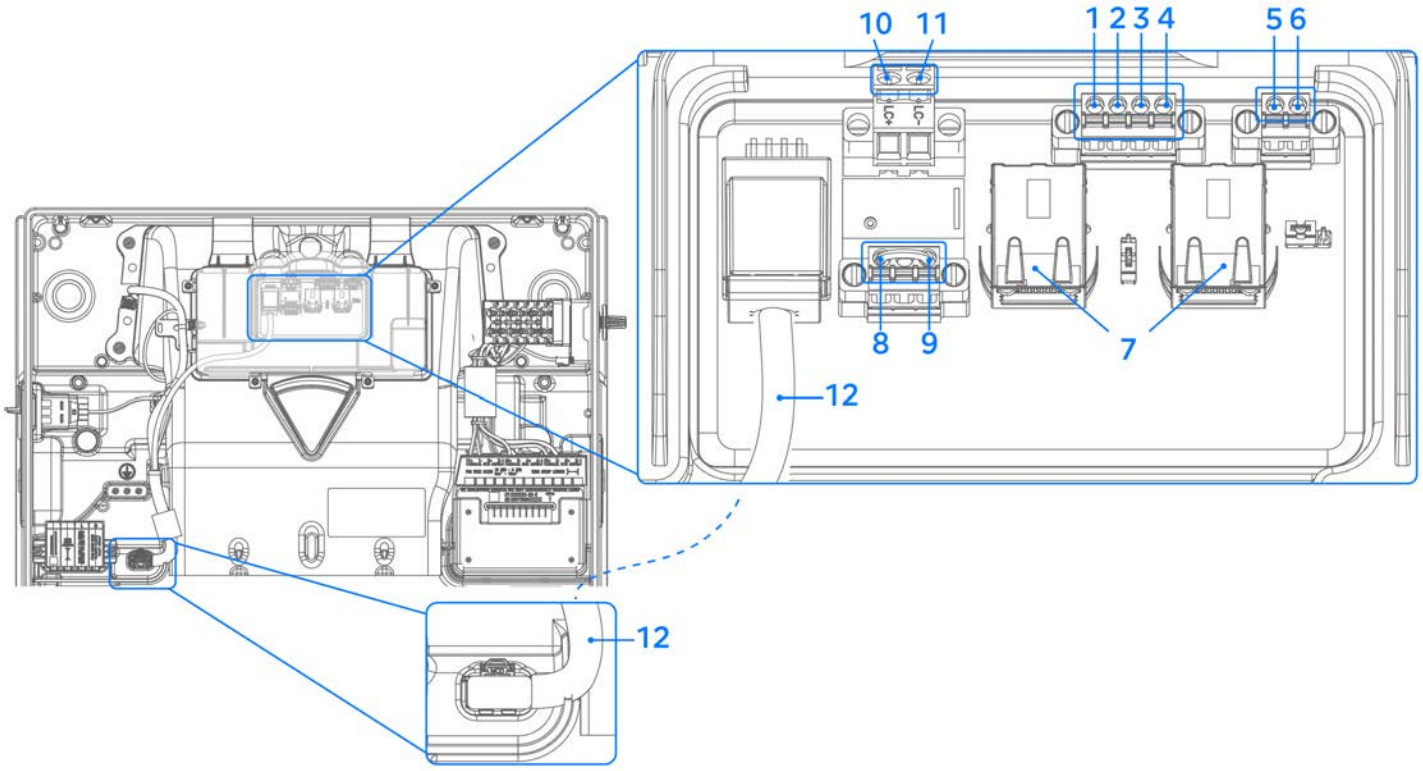
NOTE: The two leftmost terminals in the AC connector are not used.

NOTE: AC power output terminals are rated to a minimum of 90°C.

NOTE: Use only copper conductors in the PV connector and GND terminals.

NOTE: PV input terminals (MPPT DC inputs) are rated to a minimum of 75°C.

Tesla Asset Controller (TACO) Low Voltage and Communication Wiring



Communication Wiring to Backup Gateway 2

NOTE: Refer to local codes and standards for correct wiring practices and wire colors.

	Terminal Name	Recommended Wire Color	Wire Gauge
1	CN- (CAN LO)	Orange	0.2 - 1.5 mm^2
2	CN+ (CAN HI)	Blue	0.2 - 1.5 mm^2
3	GND (Earth)	Black	1 - 1.5 mm^2
4	12V+ (Logic+)	Red	1 - 1.5 mm^2

Tesla Remote Energy Meter Wiring

	Terminal Name	Recommended Wire Color	Wire Gauge
5	RS-485 +	Red	0.2 - 1.5 mm^2
6	RS-485 -	Black	0.2 - 1.5 mm^2

Ethernet Jacks

	Terminal Name	Recommended Wire Color	Wire Requirements
7	RJ45 Ethernet jacks	-	CAT5 or CAT6 Ethernet wiring (see *Prepare Ethernet Wiring with RJ45 Connectors on page 116*)

(Optional) System Shutdown Switch Wiring

	Terminal Name	Recommended Wire Color	Wire Gauge
8	System Shutdown +	Red	0.2 - 1.5 mm^2
9	System Shutdown -	Black	0.2 - 1.5 mm^2

NOTE: The terminal between the two System Shutdown terminals is not used.

Aux Wiring (Not Yet Available)

NOTE: The load control functionality is not yet available.

	Terminal Name	Recommended Wire Color	Wire Gauge
10	Load Control +	-	0.2 - 1.5 mm^2
11	Load Control -	-	0.2 - 1.5 mm^2

TACO Low Voltage Harness

	Terminal Name	Recommended Wire Color	Wire Gauge
12	TACO low voltage harness (provides 12V power to TACO)	-	-

Prepare Ethernet Wiring with RJ45 Connectors

Recommended Tools

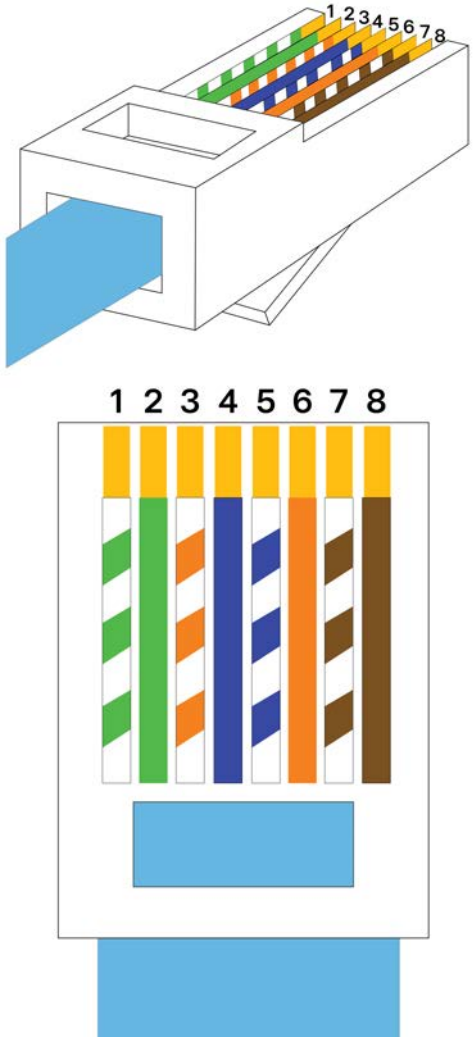
- RJ45 Ethernet crimping tool
- Ethernet tester

Prepare Ethernet Wiring

1. Cut the desired length of CAT5 wire.

   NOTE: See *Plan Cable Length Between Components on page 40* for maximum wire length between components.

2. Using an RJ45 Ethernet crimping tool, crimp the RJ45 connectors to the T-568A wire color standard as shown below:



Pin-out	Wire Color
1	Green striped
2	Green
3	Orange striped
4	Blue
5	Blue striped
6	Orange
7	Brown striped
8	Brown

3. Test the Ethernet cable using an Ethernet tester. Ensure the readings from either end of the cable match, 1-8 in ascending order.

Backup Gateway 2 Wiring

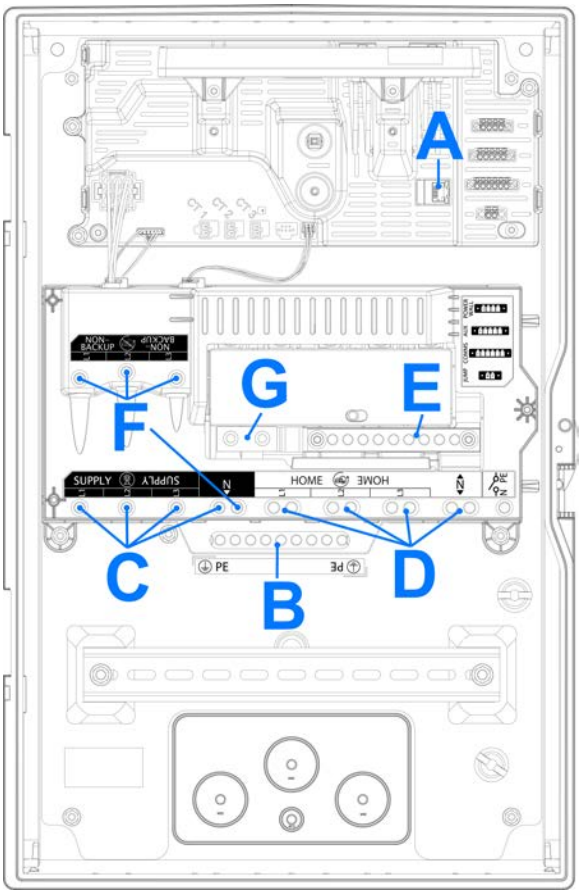


Table 5. Backup Gateway 2 Wiring: Power

	Terminal Name	Recommended Wire Color	Wire Size
A	Ethernet terminal - not used, see *Ethernet Jacks on page 114*		
B	Earth Bar	Green or Green/Yellow	2.5 – 25 mm^2
C	Grid Supply (L1, L2, L3, N)	Red, White, Blue, Black	2.5 – 35 mm^2
D	Backup Loads and Generation (L1, L2, L3, N)	Red, White, Blue, Black	2.5 – 35 mm^2
E	Generation Neutral Bar (N)	Black	2.5 – 25 mm^2
F	Non-Backup Loads and Generation Backup Loads and Generation (L1, L2, L3, N)	Red, White, Blue, Black	2.5 – 35 mm^2
G	Switched Neutral-Earth link	-	16 mm^2

Backup Gateway 2 Communication Wiring

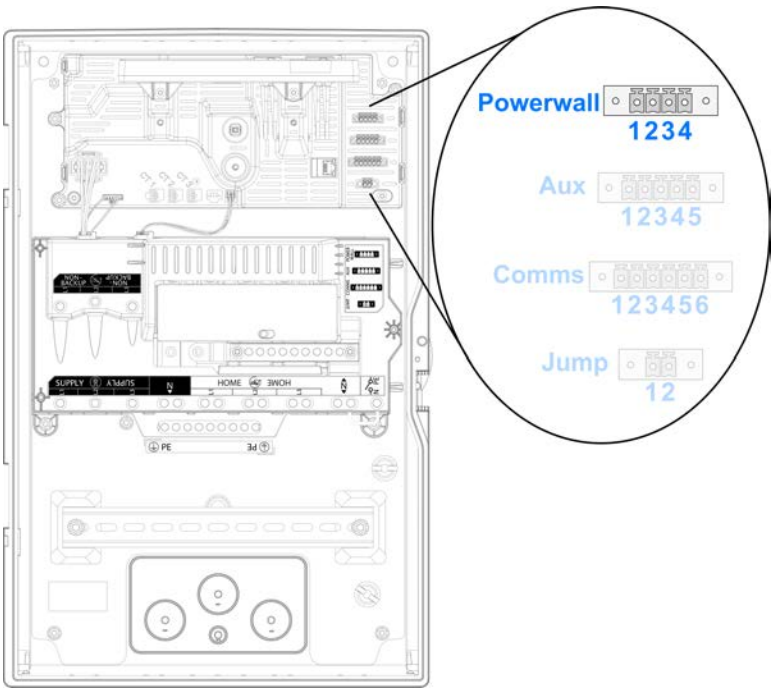


Table 6. Powerwall Communication Wiring

	Terminal Name	Recommended Wire Color	Wire Size
1	12V + (Logic +)	Red	1.0 mm^2 (max 35 m) 1.5 mm^2 (max 45 m)
2	GND (Earth)	Black	
3	CN + (CAN HI)	Blue	0.2 - 1.5 mm^2
4	CN – (CAN LO)	Orange	

NOTE: 4-conductor communication cable must be 300 V rated or double insulated with one twisted pair shielded copper cable.

Table 7. Aux Wiring (Not Used with Powerwall 3)

	Terminal Name	Recommended Wire Color	Wire Size
1	Site Shutdown (OUT)	-	0.2 - 1.5 mm^2
2	Site Shutdown (IN)	-	0.2 - 1.5 mm^2
3	Generator / Load Control (+)	Red	0.2 - 1.5 mm^2
4	Generator / Load Control (-)	Black	0.2 - 1.5 mm^2
5	Interlock pin	-	0.2 - 1.5 mm^2

Table 8. External Meter Communication Wiring (Not Used with Powerwall 3)

	Terminal Name	Recommended Wire Color	Wire Size
1	GND (Earth)/Shield	-	0.2 - 1.5 mm^2
2	RS485 HI #1	Red	0.2 - 1.5 mm^2
3	RS485 LO #1	Black	0.2 - 1.5 mm^2

	Terminal Name	Recommended Wire Color	Wire Size
4	GND (Earth)/Shield	-	0.2 - 1.5 mm^2
5	RS485 HI #2	Red	0.2 - 1.5 mm^2
6	RS485 LO #2	Black	0.2 - 1.5 mm^2

Table 9. Jump Start (Not Used with Powerwall 3)

	Terminal Name	Recommended Wire Color	Wire Size
1	12V	Red	0.2 - 1.5 mm^2
2	GND	Black	0.2 - 1.5 mm^2

Residual Current Devices (RCDs) / Residual Current Circuit Breakers with Overcurrent Protection (RCBOs)

Residual Current Devices (RCDs) and Residual Current Circuit Breakers with Overcurrent Protection (RCBOs) are electrical devices for protection against electrocution or fire risk caused by an earth fault. This section provides basic guidance on selection and installation of RCDs / RCBOs with Powerwall systems when mandated by local code.

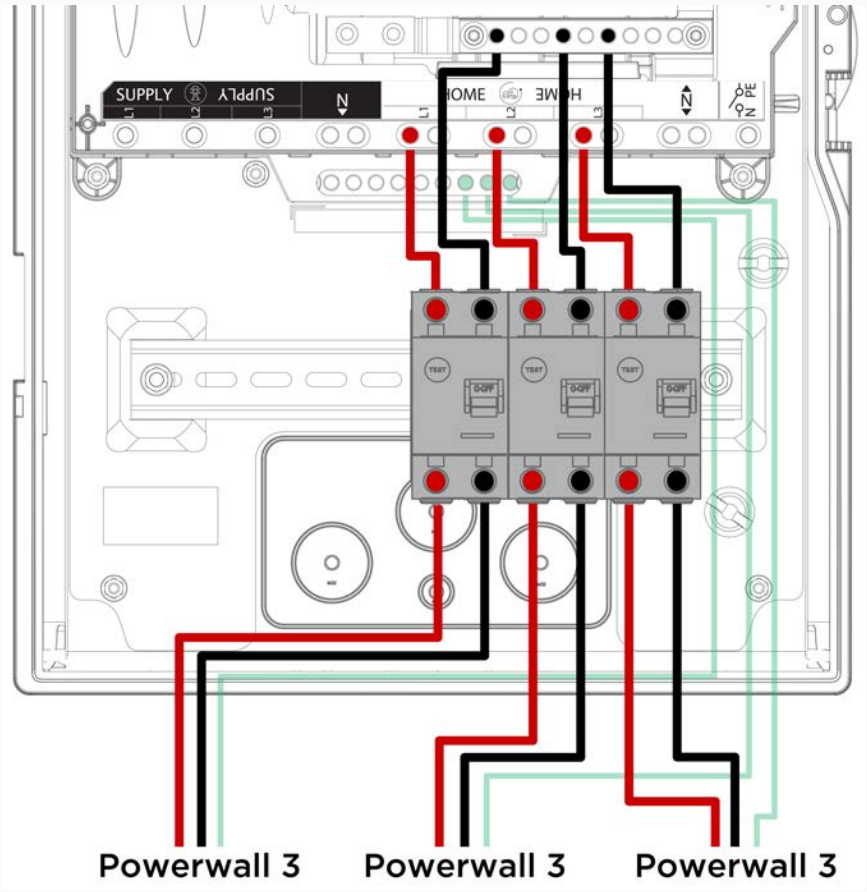
RCDs / RCBOs on Circuits Supplying Powerwall

Where required by local regulations, the installer may select an RCD or RCBO with an appropriate residual current rating for the circuit supply of Powerwall 3. However, to minimize the risk of nuisance trips, a 300 mA Type AC or A RCD / RCBO is recommended.

Powerwall 3 does not require a Type B RCD / RCBO, as it is not capable of feeding DC fault current into the electrical installation as per IEC 60364-7-712:2002.

NOTE: For systems with multiple Powerwall 3 units and or Powerwall 3 with additional solar inverter(s) installed, each device must be installed with its own RCD / RCBO.

Figure 42. (3) Powerwall 3 Units, Each with Its Own RCBO in Backup Gateway 2



APPENDIX C: SYSTEM WIRING DIAGRAMS

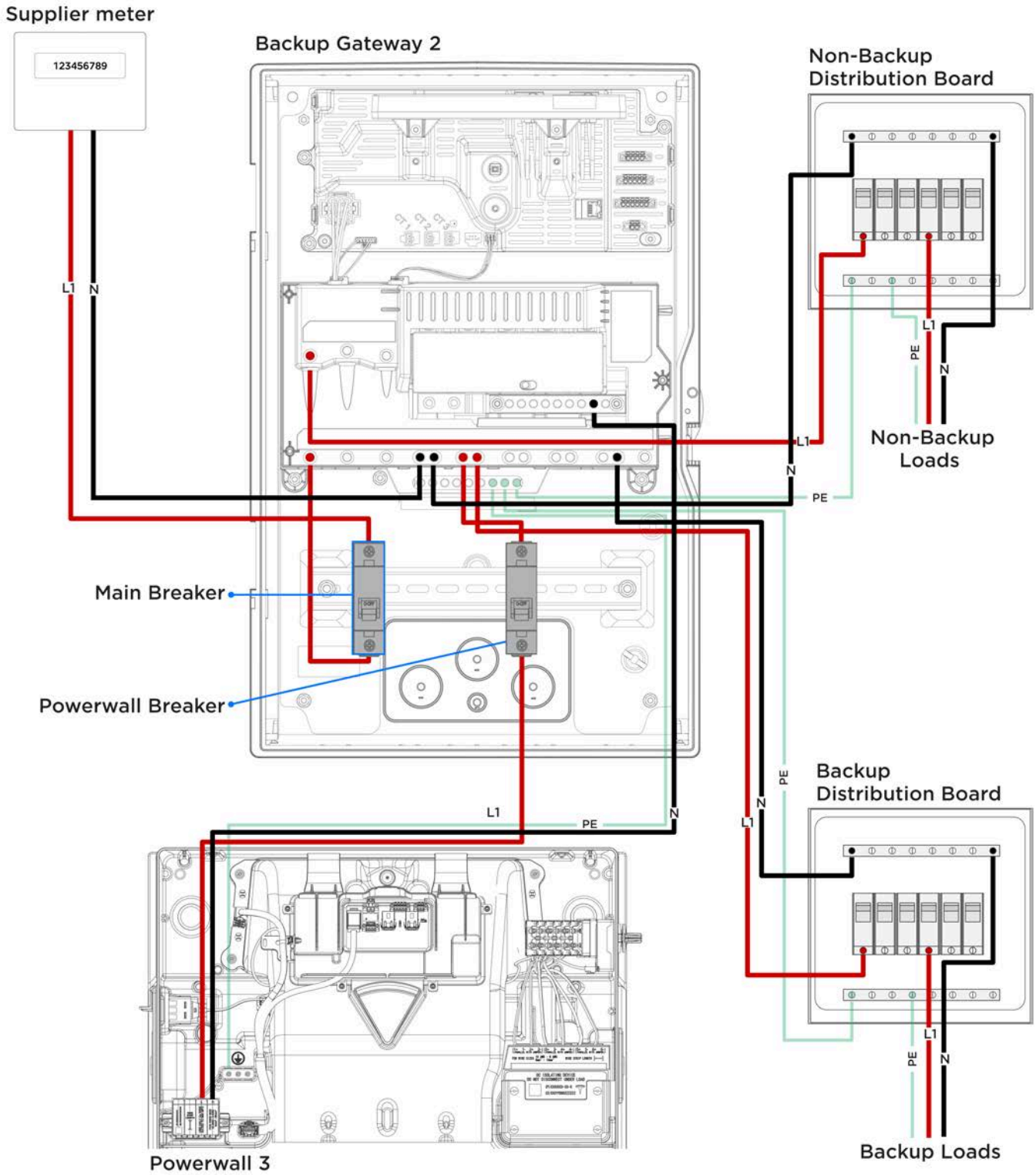
The following diagrams are intended for illustration purposes only. Drawings represent sample site layouts to show example system layout and metering. These diagrams should not be considered complete plan sets.

Overview

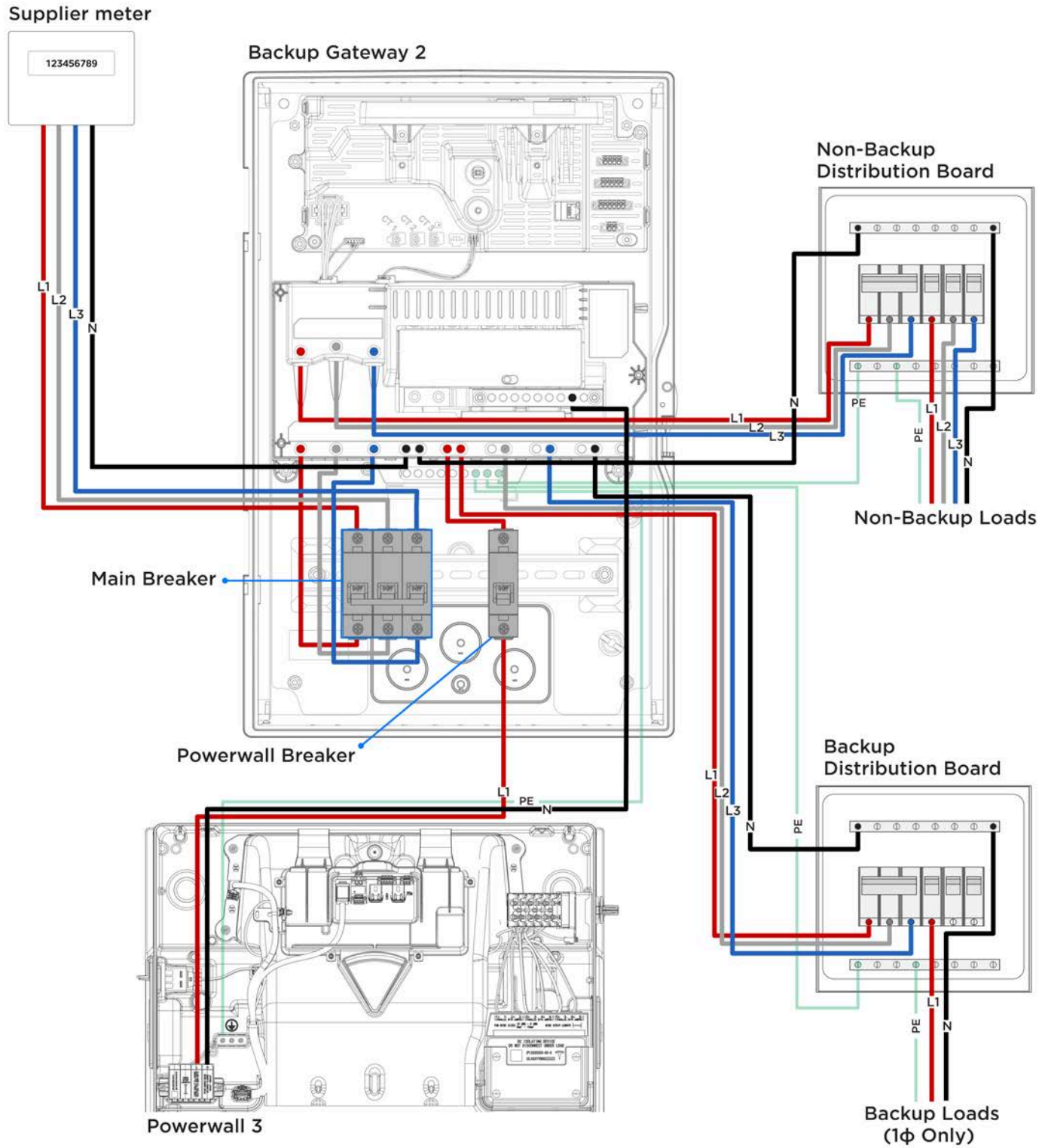
The following diagrams are intended for illustration purposes only. Drawings represent sample site layouts to show example system layout and metering. These diagrams should not be considered complete plan sets.

1. Single-phase supply, single-phase solar, partial backup
2. Three-phase supply, three-phase solar, single-phase partial backup

Single-Phase Service (TN Network)



Three-Phase Service (TN Network)

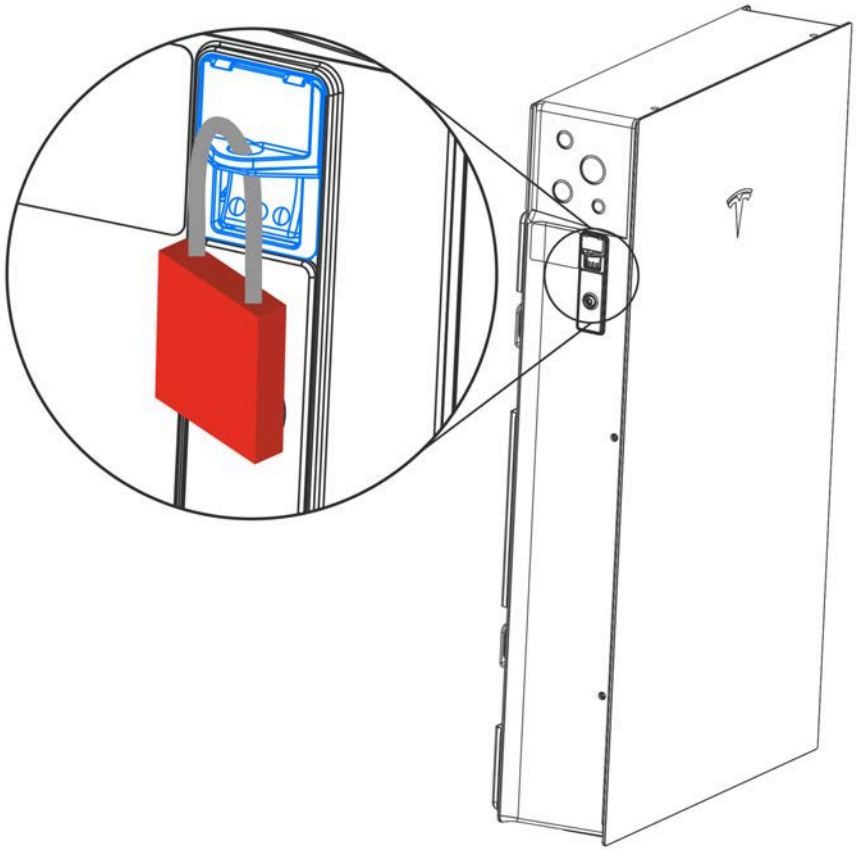


APPENDIX D: SAFETY FEATURES

Powerwall 3 Switch Locking Mechanisms

On / Off Switch Locking Mechanism

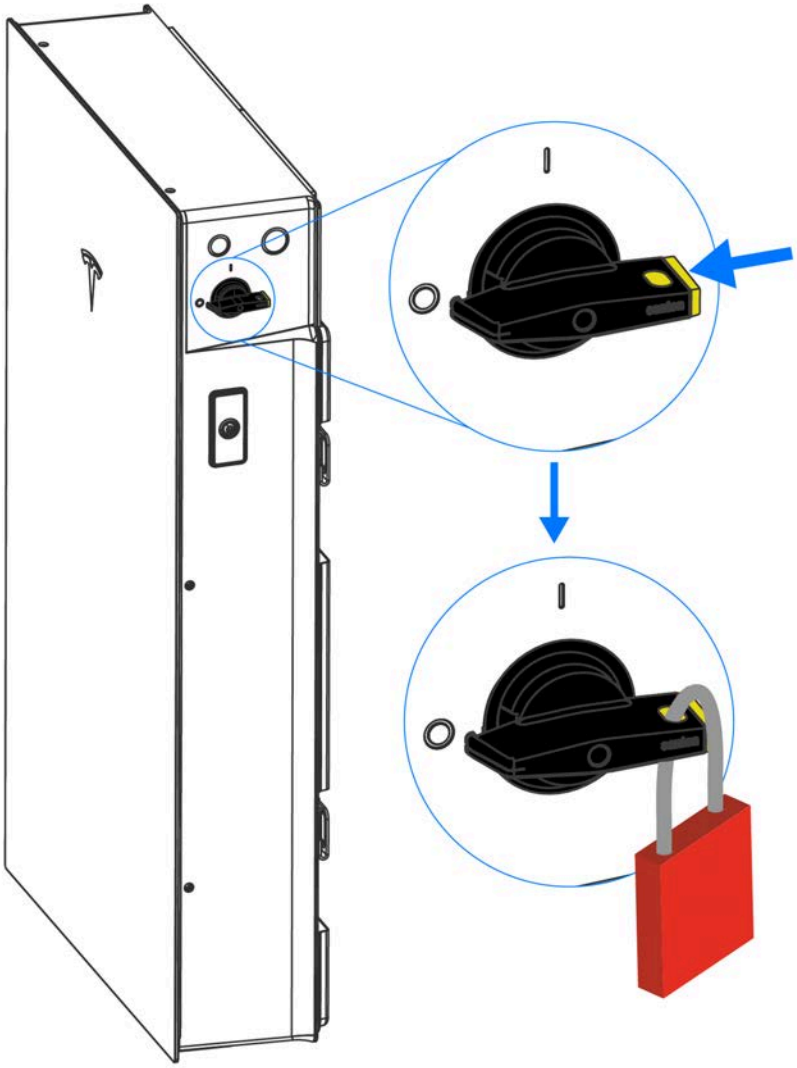
The Powerwall 3 On / Off switch has a locking mechanism. When the switch is locked it cannot be turned on.



Integrated DC Isolator Locking Mechanism

The Powerwall 3 integrated DC isolator has a locking mechanism. When locked, it cannot be turned on. To use the locking mechanism:

1. Push in the yellow tab on the end of the switch to make the keyhole accessible.
2. Place a 4 mm shackle lock through the keyhole.



NOTE: Earlier versions of Powerwall 3 have a red integrated DC isolator. The color of the integrated DC isolator does not impact its function.

Arc Fault Detection and Protection

The Arc-Fault Circuit Interrupter (AFCI) mechanism detects series arcs within the PV array.

The detection algorithms work based on both voltage and current. When an arc fault is detected, Powerwall 3 stops converting power and disconnects from the grid. Once a fault has been detected, it can only be reset manually on-site using the mobile app via remote command. The reset cannot be automatically cleared. The fault is displayed with an LED visual indicator, which cannot be reset automatically.

To activate the AFCI self-test feature, power cycle the unit.

Protective Earth Impedance Check

The protective earth (PE) connection is checked for sufficiently low impedance at least once per day.

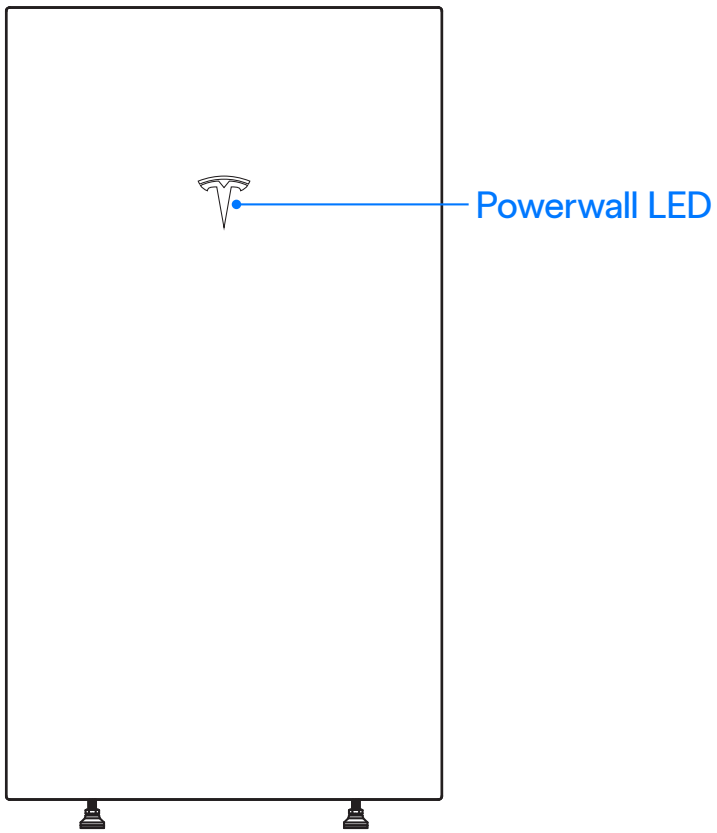
The scheduled time for the PE impedance test is every morning before closing the inverter side AC relays.

Upon detected loss of PE or identification of a high impedance value Powerwall 3 does not connect to the grid until the fault is cleared manually or a repeated PE impedance test demonstrates a sufficiently low impedance.

System LED Behavior

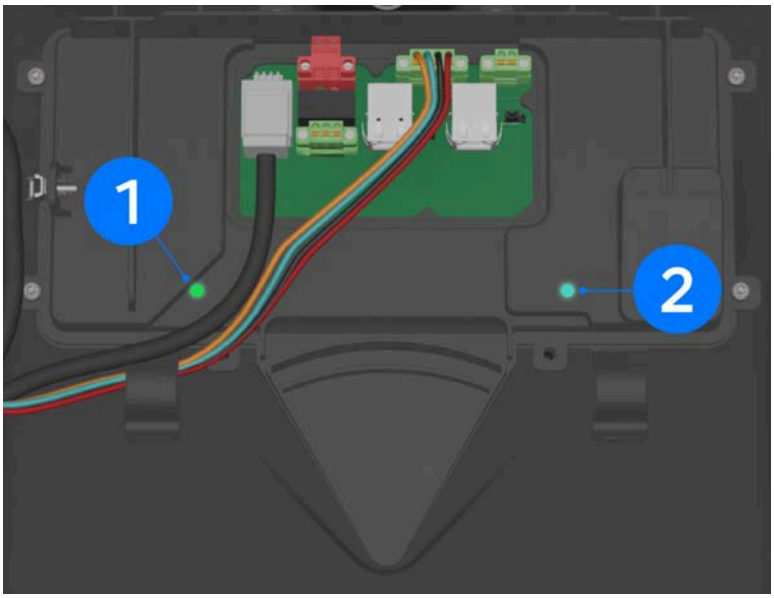
Powerwall 3 LED Behavior

Tesla Logo LED



LED State	Indication
Solid white	Normal operation
Flashing white	Powerwall 3 is idle. Will enter sleep state if no actions in progress
Off	Powerwall 3 is off or in sleep state
Flashing Red	Inverter (PWS) fault, e.g. AFCI or GFCI, etc.

Tesla Asset Controller (TACO) LEDs



(1) Power LED	(2) Status LED	Status	Details
Solid green	Solid light blue	Ready to commission	TACO is powered and the config application is running. TeslaPW network should be broadcasting
Solid Green	Solid Green	Not ready to commission	TACO is powered but the config application is not yet running. If Powerwall 3 remains in this state permanently, contact Install Support
Solid Green	Red	Not ready to commission	TACO is powered but the unit is still booting up. If Powerwall 3 remains in this state permanently, contact Install Support
OFF	OFF	No power (12V) to TACO	Note that power can be provided by either the Backup Gateway 2 12V or internal 12V. 1. Turn the Powerwall 3 switch ON and wait at least 5 minutes 2. Confirm the TACO low voltage harness is plugged all the way in 3. Confirm the 12V wiring from Backup Gateway 2 to Powerwall 3 is correct If Powerwall 3 remains in this state, contact Install Support

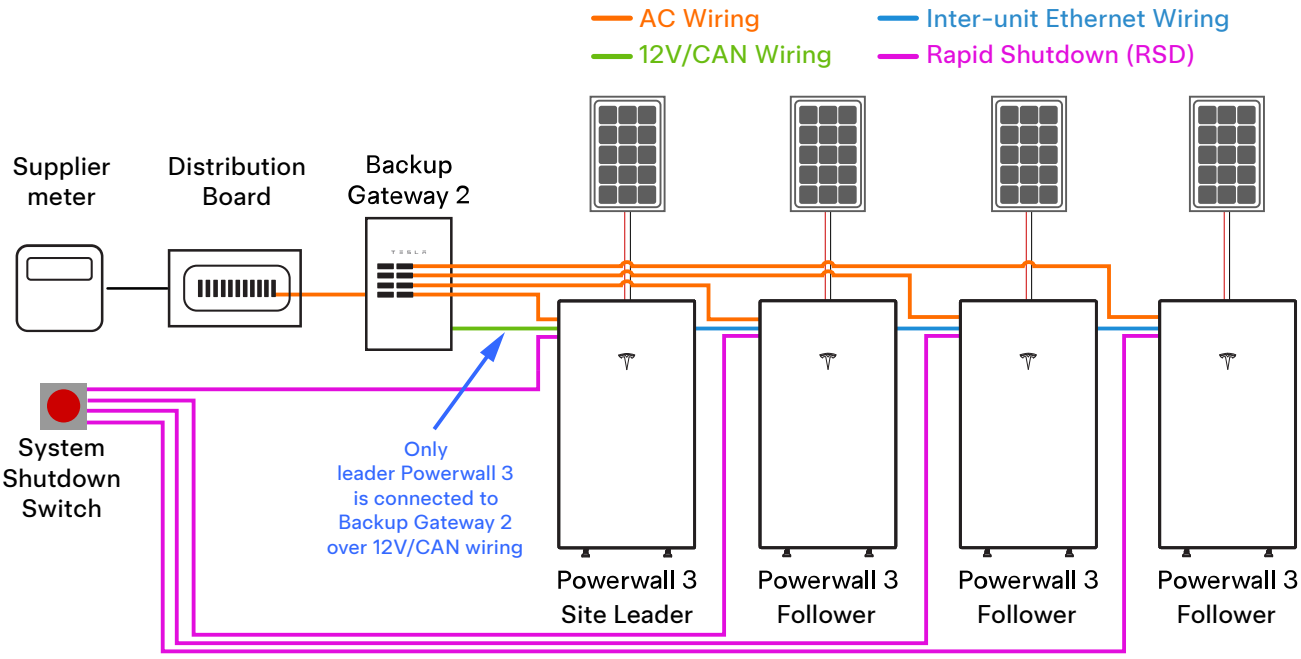
NOTE: During a firmware update, LED 2 may flash red. This is expected behavior, and the flashing will stop once the firmware update is complete.

NOTE: The Tesla Asset Controller LEDs are not visible when the Powerwall 3 front cover is installed.

APPENDIX E: INSTALLATIONS WITH MULTIPLE POWERWALL 3 UNITS

Maximum Number of Powerwall 3 Units	Up to (4X) Powerwall 3 units **NOTE:** The maximum number of Powerwall 3 units per installation may vary by market.
Overcurrent Protection Devices	Each Powerwall 3 requires its own circuit breaker.
Site Leader	The Powerwall 3 connected to the Backup Gateway 2 over 12V/CAN wiring is designated as the **Leader Powerwall 3** unit. **NOTE:** The system is commissioned by connecting to the Leader Powerwall 3 unit.
Follower Unit	Any Powerwall 3 other than the Leader is connected via inter-Powerwall Ethernet wiring and is designated as a **Follower** unit.
Leader to Follower Communication	Ethernet (see *Prepare Ethernet Wiring with RJ45 Connectors on page 116*)
Internet Connection for Multiple Units	**Option 1**: The Leader Powerwall 3 is connected to customer router over Wi-Fi.
	Option 2: Either the first or last Powerwall 3 (can be Leader or Follower) in the chain is connected to customer router via Ethernet. **NOTE:** Only connect the router to a Powerwall 3 at either end of the chain; do not connect it in the middle of the chain (see *Connecting Powerwall 3 Units via Ethernet on page 131* for example diagrams).
Allowable Mounting Configuration	Side-by-side (front-to-back stacking is not supported for multiple Powerwall 3 units)
Maximum Wire Length Between Units	See *Plan Cable Length Between Components on page 40*
Splitting PV Production Between Multiple Units	Split PV production (strings) equally between the Powerwall 3 units.

Figure 43. Multi-Powerwall 3 System with Backup Gateway 2



Connecting Powerwall 3 Units via Ethernet

All Powerwall 3 units must be connected via Ethernet. The units can be connected in any order, so long as each unit is connected to at least one other unit.

Figure 44. Example 1: Leader Powerwall 3 at Start of Chain, Connected to Customer Router via Wi-Fi

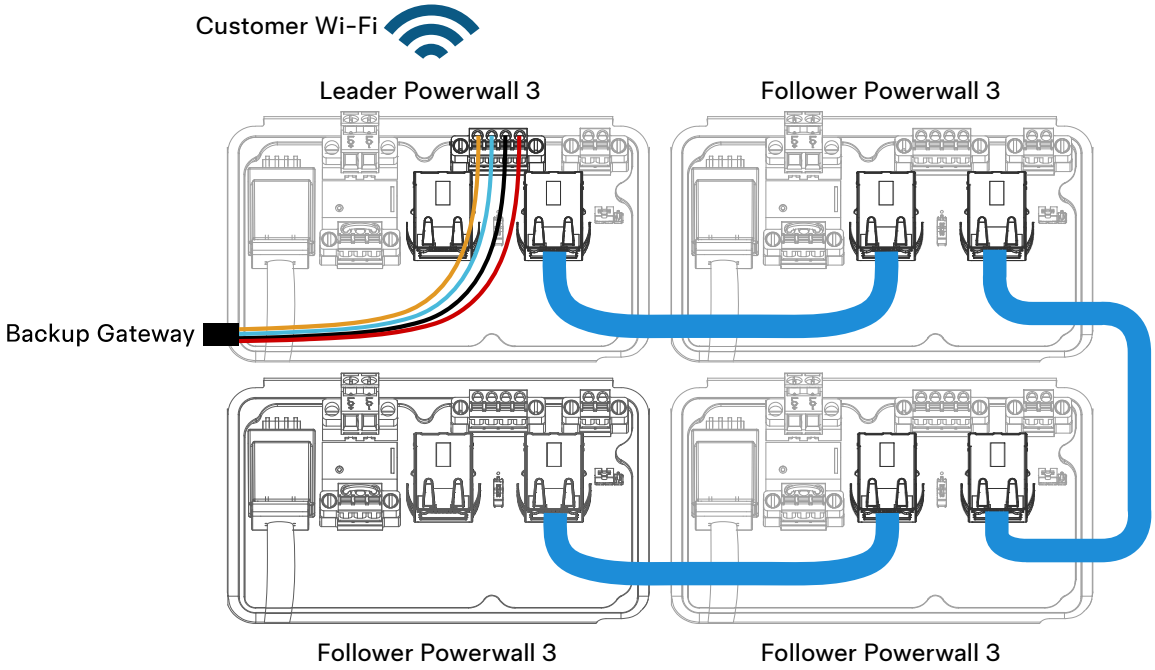


Figure 45. Example 2: Leader Powerwall 3 at Start of Chain, Connected to Customer Router via Ethernet

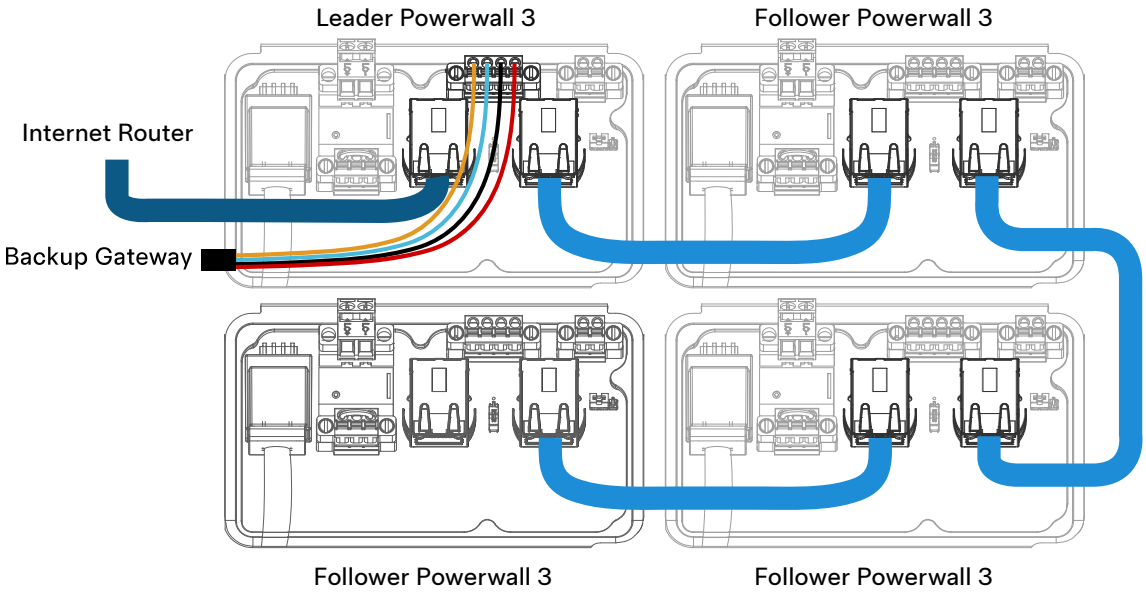
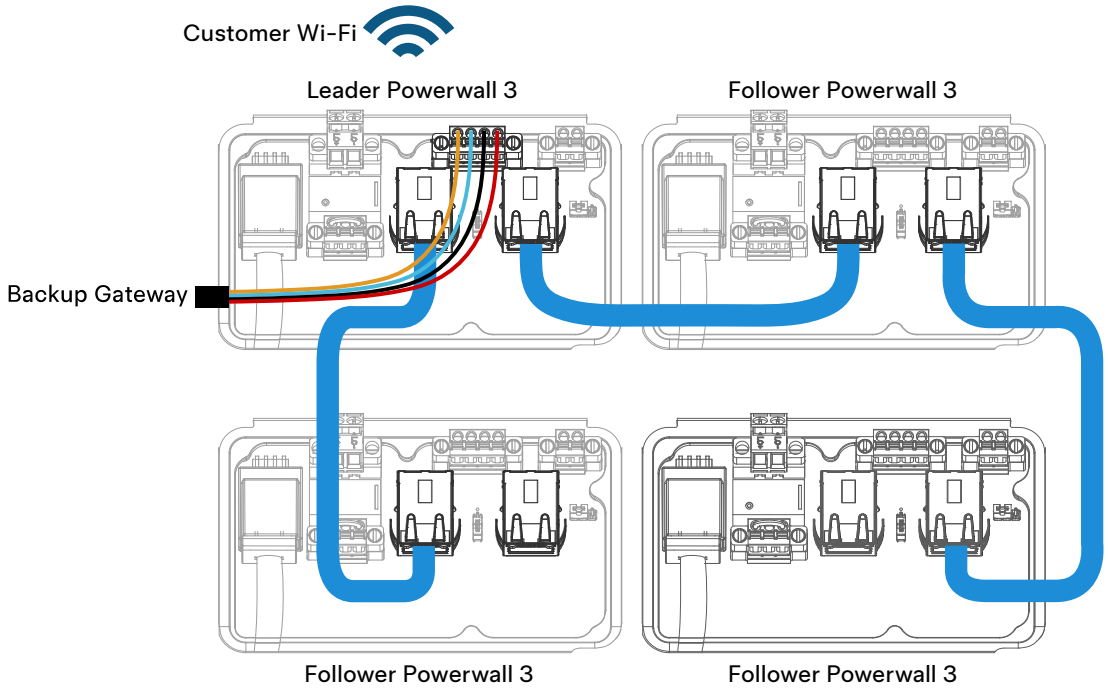
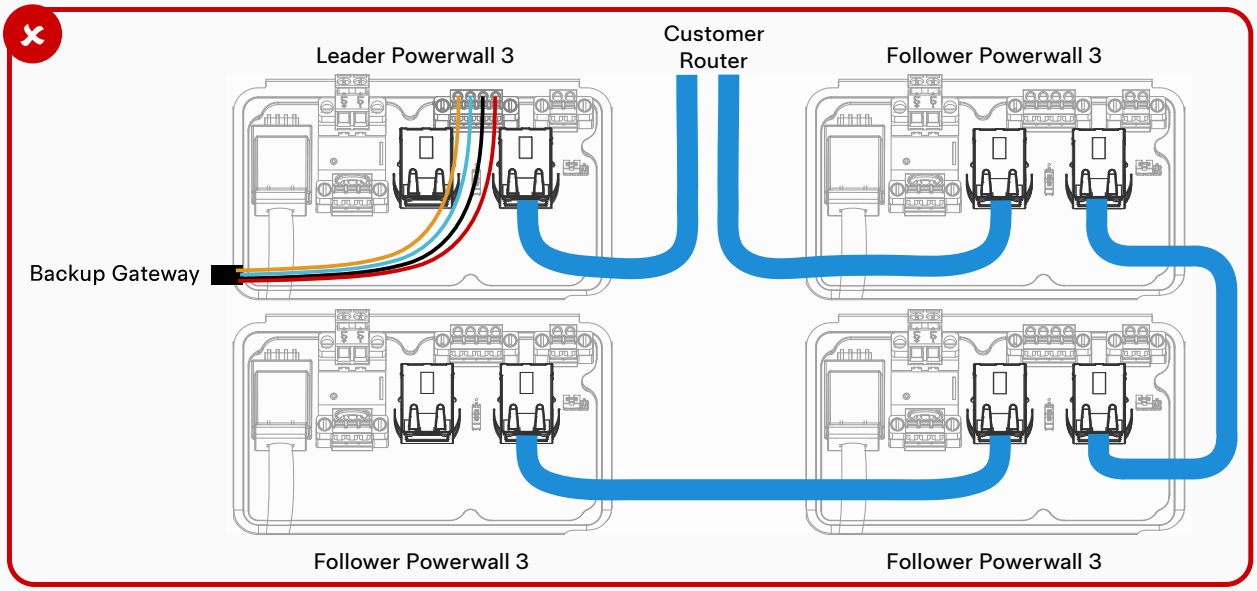


Figure 46. Example 3: Leader Powerwall 3 in Middle of Chain, Connected to Customer Router via Wi-Fi



NOTE: If connecting the system to the customer router via Ethernet, connect the router to either the first or last Powerwall 3 in the chain. Do NOT connect the router in the middle of the chain.



Commissioning Multi-Powerwall 3 Systems

For instructions to commission a multi-Powerwall 3 system, see the *Powerwall 3 Device Setup Guide*.

APPENDIX F: SHUTTING DOWN POWERWALL 3

Powerwall 3 system shutdown for emergency response or maintenance requires system shutdown and disabling solar output.

CAUTION: Open all third party solar inverter breakers or handled disconnects before shutting down the Powerwall 3 system.

Safely Shut Down Powerwall 3 for Maintenance or Service

1. Turn the Powerwall 3 On/Off switch OFF.
2. Turn the Powerwall 3 integrated DC isolator switch OFF.
3. Open the Powerwall 3 AC circuit breaker.
4. Wait 30 seconds before proceeding with any work.

   WARNING: Risk of electric shock from stored energy. Wait 30 seconds after disconnecting all sources of supply before proceeding.

5. Use a lock-out device on the disconnecting means listed in the table below whenever performing work on equipment that is not within sight of the switch.

Disabling Solar, System Shutdown, and Disconnecting Means for Powerwall 3

Action	Powerwall 3				AC-coupled Solar Inverter
	On/Off Switch	Integrated DC Isolator	AC Breaker / Isolator	External DC Isolator	AC Breaker / Isolator
Disables DC-coupled Solar	Yes	Yes	No	Yes	No
Disables AC-coupled Solar	No	No	No	No	Yes
Disables AC Inverter (Input and Output)	Yes	No	Yes	No	No
Isolates DC side for maintenance	No	No	No	Yes	Yes
Isolates AC side for maintenance	No	No	Yes	No	No

APPENDIX G: TROUBLESHOOTING

Situations in Which Powerwall 3 Stops Grid Forming

Some situations in which the Powerwall will not be allowed to grid-form are:

- The Powerwall 3 **On/Off switch is switched OFF**.
- An **open circuit** between any Powerwall and the Backup Gateway. *Example: an open Powerwall AC breaker*.
- **Excessive voltage drop** between any Powerwall and Backup Gateway. *Example: poor connections at AC wire terminals or wiring damage between Powerwall and Gateway*.
- **Loss of communications** between any internal system or meter (for instance loss of communication with Backup Gateway 2).

Earthing

When operating off-grid, the Backup Gateway 2 forms a local **TN-S supply** to the connected distribution board(s):

- *Relationship of power system to earth*: **T** – Direct connection of one point to Earth – this is provided by the local earth, connected into the main earthing terminal
- *Relationship of the exposed conductive parts to Earth*: **N** – Direct connection to the earthed point (neutral) of the power supply system - this is facilitated by the local N-PE bond created within the Gateway during off-grid operation
- *Arrangement of neutral and protective conductors*: **S** - Separate conductors - separate neutral and protective conductors are connected between the Gateway and downstream distribution board(s)

Proper earth connection and Neutral-to-Earth (N-PE) bonding during on-grid and off-grid operation is required for safe operation of the Powerwall system and for compliance with local code requirements. For instruction regarding the switched earth connection, refer to *Verify Neutral-Earth Bonding Scheme on page 56*.

WARNING: To ensure safe operation when operating off-grid, **a local earth must be present on the site**, such as by earth rod or ground electrode. During a grid fault it cannot be assumed that the DNO's Earth or PEN conductors are intact. Installation of earth rod must comply with local codes.

APPENDIX H: REVISION HISTORY

Revision	Date	Description
1.4	March 28, 2025	• Updated *Energy Metering on page 25* and added *Install Tesla Remote Energy Meter and CTs on page 84* • Updated images of integrated DC isolator and updated *Integrated DC Isolator Locking Mechanism on page 125* to reflect new black isolator switch
1.3	March 7, 2025	• Updated *Powerwall 3 Specifications on page 5* to reflect updated Powerwall 3 I_{MP} of 30 A and I_{SC} of 38 A • Updated *Powerwall 3 Specifications on page 5*, *Required Supplies on page 36*, and *Install Powerwall and Generation Breakers in the Backup Gateway on page 59* to reflect that maximum continuous current is 48 A and a 63 A breaker is required for Powerwall 3 installations, regardless of configured power / current output • Updated *Energy Metering on page 25* with additional detail about monitoring Powerwall 3 systems • Updated *STEP 5: Connect Powerwall 3 to Backup Gateway on page 62* with instructions to install Tesla Grid Utility Ancillary Controller (GUAC) interface device for installations requiring DRM0 functionality • Updated *Prepare Ethernet Wiring with RJ45 Connectors on page 116* to reflect T-568A wire color standard
1.2	January 6, 2025	• Updated *Design Considerations on page 19* and *STEP 7: Make Solar PV Connections on page 75* to reflect that third party MLPE solutions, such as optimizers, are not compatible with Powerwall 3
1.1	October 15, 2024	• Added distance from center of each conduit hole to the floor in *Choose Powerwall Cable Entry on page 40* • Updated PV wire requirements in *Required Supplies on page 36* • Updated *STEP 6: Make Powerwall 3 AC Circuit Connections on page 70* and *STEP 7: Make Solar PV Connections on page 75* to clarify that it is best practice to connect the ground circuit before making any AC or PV connections
1.0	August 14, 2024	Initial publication