



# Powerwall 2 AC Installation Manual

With Backup Gateway 2

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

[www.tesla.com/support/powerwall](http://www.tesla.com/support/powerwall).

To secure the full 10-year product warranty, Powerwall must be registered by completing the commissioning 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 manual, send an email to: [energy-pubs@tesla.com](mailto:energy-pubs@tesla.com).

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**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 used 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 you 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.


**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 the Tesla Powerwall 2 AC and Backup Gateway that must be followed during installation and maintenance of the system.


## SYMBOLS USED

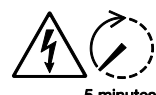
 **WARNING:** indicates a hazardous situation which, if not avoided, could result in injury or death.

 **CAUTION:** indicates a hazardous situation which, if not avoided, could result in minor injury or damage to the equipment.

**NOTE:** indicates an important step or tip that leads to best results, but is not safety or damage related.

 **REFER TO OPERATING INSTRUCTIONS:** indicates that user should refer to operating or installation instructions before proceeding.

 **RISK OF ELECTRIC SHOCK:** indicates components that present risk of electrical shock.

 **CAUTION, RISK OF ELECTRIC SHOCK, ENERGY STORAGE TIMED DISCHARGE.** Discharge time is 5 minutes from de-energization.

 **BIDIRECTIONAL TERMINAL:** Indicates location of combined input/output connector on the equipment.

 **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.
-  **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 near heating equipment.
-  **WARNING:** Do not immerse Powerwall or its components in water or other fluids
-  **WARNING:** Install Powerwall and Backup Gateway in a location that prevents damage from flooding.
-  **WARNING:** Operating or storing Powerwall in temperatures outside its specified range might cause damage to Powerwall.
-  **WARNING:** Do not expose Powerwall to ambient temperatures above 60°C (140°F) or below -30°C (-22°F).
-  **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 any part of Powerwall, including any internal or external components such as the exterior shell or casing.
-  **CAUTION:** Do not connect Powerwall directly to photovoltaic (PV) solar wiring.
-  **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:** Avoid installing Powerwall and Backup Gateway in direct sunlight.
-  **CAUTION:** Ensure that no water sources are above or near Powerwall or Backup Gateway, including downspouts, sprinklers, or faucets.
-  **CAUTION:** Ensure that snow does not accumulate around Powerwall or Backup Gateway.
-  **CAUTION:** Avoid installing the Powerwall and Backup Gateway where it will be exposed to direct sunlight or ambient temperatures greater than 35 deg C.
-  **CAUTION:** The Backup Gateway may not be flush mounted in a wall or cavity.

## Specifications

### Powerwall 2 AC Electrical Specifications

Usable Energy <sup>1</sup>	13.5 kWh
AC Voltage (Nominal)	230 V
Maximum Continuous Current	16 A (UK - G98) 25 A (UK - G99; EU)
Frequency (Nominal)	50 Hz
Real Power, max continuous (charge and discharge)	3.68 kW (UK - G98) 5 kW (UK - G99)
Apparent Power, max continuous (charge and discharge)	3.68 kVA (UK - G98) 5.8 kVA (UK - G99)
Power Factor Output Range	+/- 1.0 adjustable
Overvoltage Category	Category III
Maximum Supply Fault Current	10 kA
Maximum Output Fault Current	32 A
Maximum Inrush Current	0.4 A
Round Trip Efficiency (Beginning of Life) <sup>1</sup>	90%

<sup>1</sup> Values for 25°C, 3.3 kW charge/discharge power

### Backup Gateway 2 Electrical Specifications

Maximum Overcurrent Protection Device	100 A (single-phase service) 80 A (2- and 3-phase service)
Rated Frequency (f <sub>n</sub> )	50-60 Hz
Overvoltage Category	Category III
AC Meter	Revenue accurate (+/- 0.2%)
Maximum Input Short Circuit Rating <sup>2</sup>	16 kA
Compatible Earthing Systems <sup>3</sup>	TN or TT networks
Distribution boards intended to be operated by ordinary persons (DBO) Type	Type B
Safety	IEC 61439-1, IEC 61439-3

<sup>2</sup> 16 kA rating when installed with current limiting fuse compliant to BS 88.3; 10 kA rating without fuse.

<sup>3</sup> TT earthing networks supported for Gateways with part number 1152100-13-H and higher

### Environmental Specifications

	Powerwall 2 AC	Backup Gateway 2
Operating Temperature <sup>4</sup>	-20°C to 50°C	-20°C to 50°C
Optimum Temperature	0°C to 30°C	N/A
Operating Humidity (RH)	Up to 100%, condensing	Up to 100%, condensing
Storage Conditions (up to 12 months)	-20°C to 30°C Up to 95% RH, non-condensing State of Energy (SoE): 25% initial	N/A
Maximum Altitude	3000 m	3000 m
Noise Level @ 1 m	< 40 dBA at 30°C	N/A
Ingress Rating	IP67 (battery and power electronics) IP56 (wiring)	IP55
Environmental Category	N/A	Outdoor
Wet Location Rating	Yes	Yes
Seismic Rating	AC156, IEEE 693-2005 (high)	N/A
Pollution Degree	N/A	PD2

<sup>4</sup> Performance may be de-rated in extreme ambient temperatures.

### Mechanical Specifications

	Powerwall 2 AC <sup>5</sup>	Backup Gateway 2
Height	1150 mm	584 mm
Width	753 mm	380 mm
Depth	147 mm	127 mm
Weight	114 kg	11.4 kg

<sup>5</sup> Powerwalls with part numbers 1092170-XX-H and lower and 2012170-XX-B and lower have the following specifications: 1150 x 755 x 155 mm, 125 kg.

## Registering Powerwall

Tesla Powerwall comes with a warranty whose term depends on the connection of Powerwall to the Internet. To secure the full 10-year warranty for Powerwall, 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 commissioning process so that registration information is sent to Tesla.


For more information, refer to the Powerwall Warranty for your region at [www.tesla.com](http://www.tesla.com).


## Site Requirements and Pre-Installation Guidance

### Powerwall and Backup Gateway 2 Installation Requirements


Powerwall comes with a separate Backup Gateway to enable integration with the electrical grid and generation like solar systems (refer to [Compatibility Matrix](#) for information on what can be connected with Powerwall). The Backup Gateway communicates with the system by means of wireless and wired connections. Wiring and conduit (where required) must be provided by the installer. Where conduit is required, the installation must comply with local codes.

AC disconnect and interconnection requirements between the Powerwall system and the main distribution board are subject to local codes. Ensure that the installation meets local disconnect and interconnection requirements.


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

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

 **WARNING:** Do not connect the Backup Gateway in any way that bypasses or short-circuits its relay.

 **WARNING:** Do not connect the Backup Gateway to the source side only or to the load side only. The Backup Gateway must have both source and load connections, and must be wired in compliance with local codes.

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

 **CAUTION:** The Manual Override switch inside of the product must not be used to simulate a grid outage or take home off-grid. A main isolation switch should be installed upstream of the Backup Gateway for testing the system and for service purposes.

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

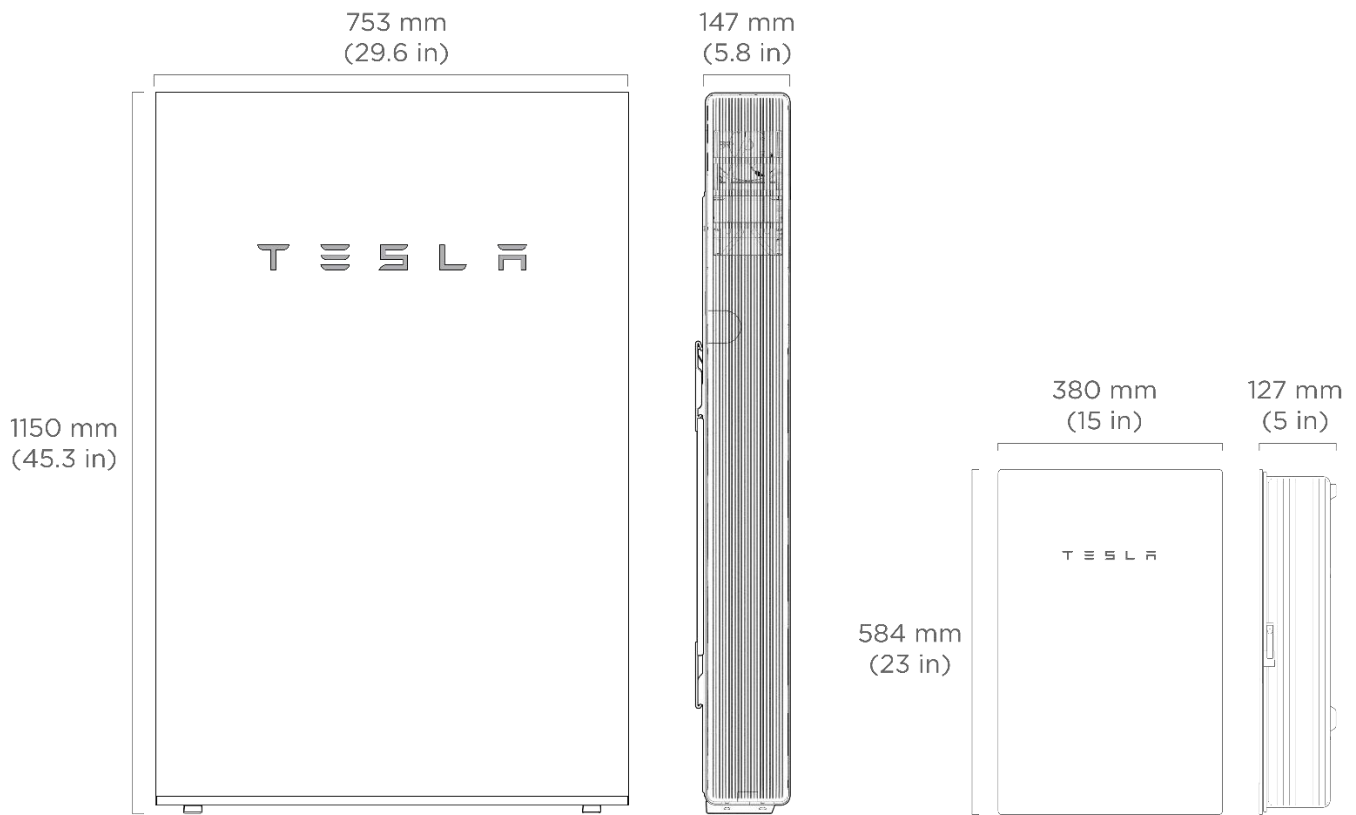


Figure 1: Powerwall 2 AC and Backup Gateway 2 Dimensions

### Powerwall Physical Requirements

Powerwall can be mounted on a floor or wall, and includes a mounting bracket to support either configuration. Mounting Powerwall must follow the guidance outlined in this document. Mounting requirements based on wall type are provided in [Appendix A: Powerwall Mounting Details](#)

Powerwall requires adequate clearance for installation, cabling, and airflow. Do not install anything above Powerwall that limits access to the unit or that might fall and damage the unit. Do not mount Powerwall horizontally or upside down.

**NOTE:** Powerwall has a pump and fan that produce 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 these noise levels when choosing where to install Powerwall.

## Powerwall Identification

Newer Powerwalls have slightly different dimensions for mounting-bracket height. Powerwalls may be easily identified by part number and by comparing the back of the Powerwall (see [Figure 2](#)).

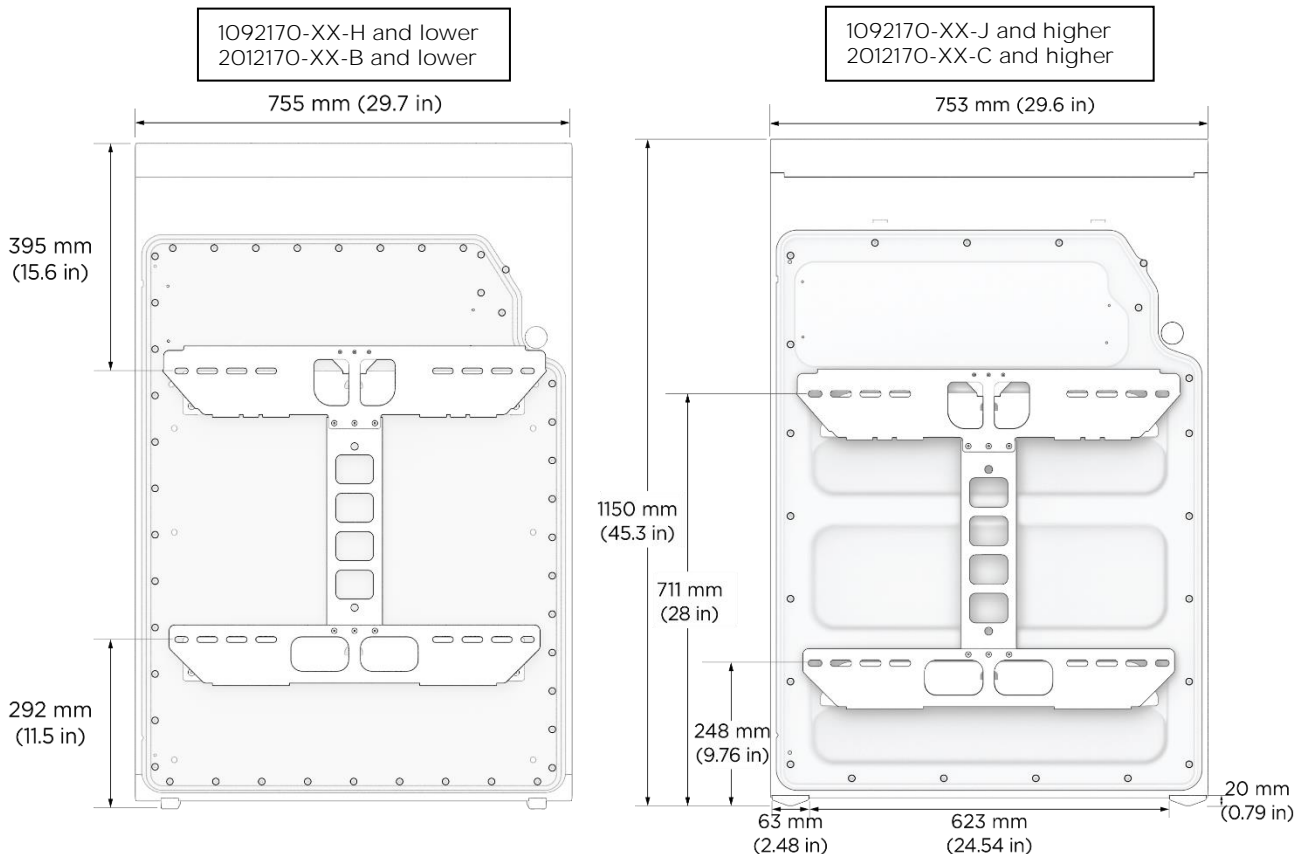


Figure 2: Powerwall 2 Identification by Mounting Bracket Height

## Powerwall Optimum Temperature Range

Powerwall is rated to operate in temperatures from  $-4^{\circ}\text{F}$  to  $122^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ ). However, for best performance Tesla recommends installing Powerwall in locations with ambient temperature between  $32^{\circ}\text{F}$  and  $86^{\circ}\text{F}$  ( $0^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ ) year round. When outside this recommended temperature range, charge/discharge power may be reduced and Powerwall will utilize its thermal control system more frequently to maintain battery cell temperature which will reduce the energy efficiency of the system. Systems operating off-grid for long periods ( $>4$  hours) in cold weather systems may need to curtail PV, and reduce energy used for pre-conditioning.

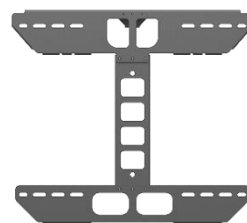
- For cold climates, Tesla recommends installing Powerwall indoors when possible (particularly when long outages are expected).
- For hot climates Tesla recommends keeping Powerwall out of direct sunlight. Installation in full sun raises the temperature inside the enclosure above ambient temperature. This temperature rise is not a safety risk, but may impact battery performance.

Additionally, if stored in a cold environment (e.g. below  $0^{\circ}\text{C}$ ) before installation, it may take several hours for Powerwall to raise its internal temperature using pre-conditioning. Tesla recommends storing Powerwalls in a warm location prior to installation to help efficiently commission and test the system.

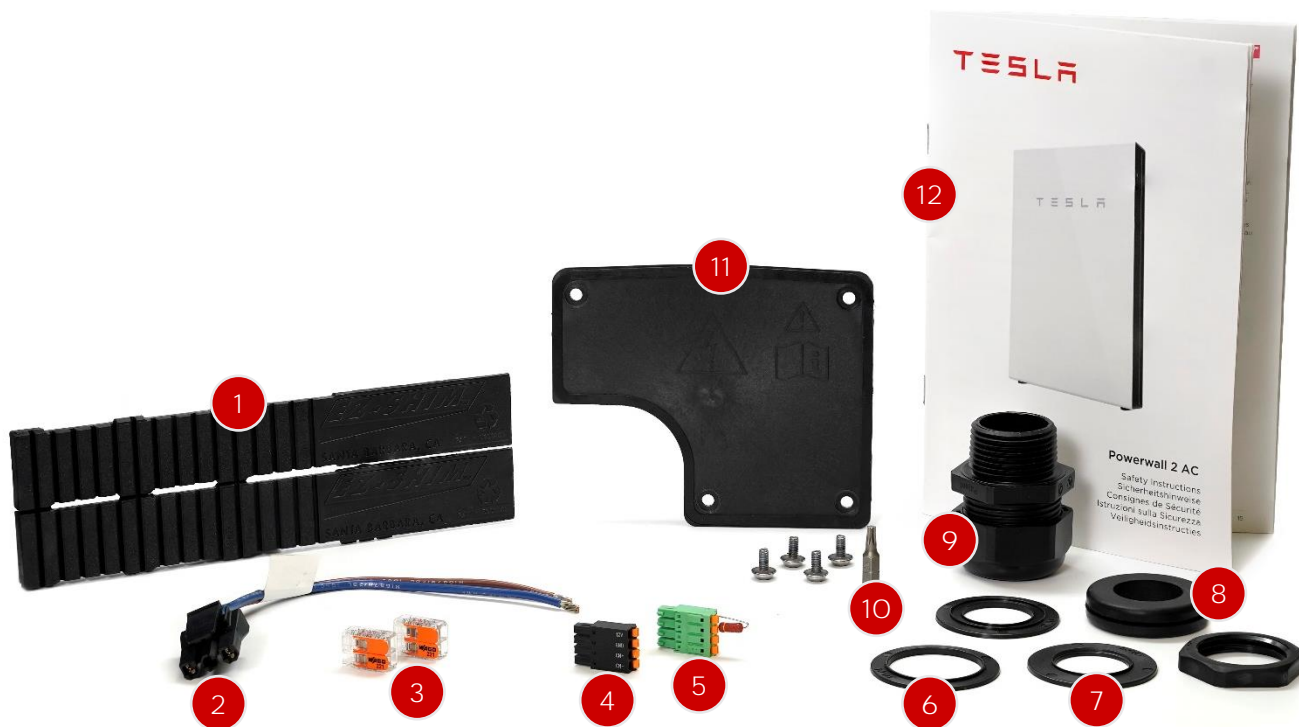


# Installation Quick Reference

## In the Powerwall Box



## In the Powerwall Accessory Bag



1	2	3	4	5	6
(2) Shims	(1) AC power harness	(2) Wago 2-position lever nuts	(1) 4-pin terminal block connector	(1) 4-pin terminal block connector with 120-Ohm terminating resistor	(1) 32-mm reducing washers
7	8	9	10	11	12
(2) 25-mm reducing washers	(1) 35-mm rubber grommet	(1) drillable threaded cable gland	(1) T20 Torx driver bit	Wiring compartment cover with (4) screws	(1) Safety Instruction document

## In the Backup Gateway 2 Box




## In the Backup Gateway Accessory Bag



1	2	3	4
(1) Adhesive circuit label	(1) CT extension cable harness (3m)	(3) ¼-inch rubber boned stainless steel washers	(5) 8mm backplate nuts
5	6	7	
(1) M25 communication gland and insert	(1) Solar CT (100A, split-core)	(1) Circuit breaker blanking hole filler set	

## Required Tools

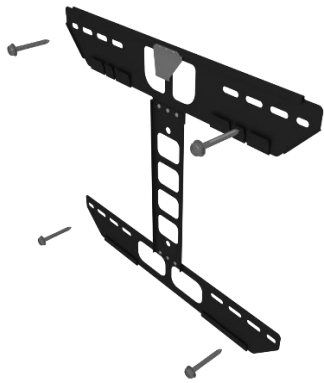
- Personal protective equipment (safety glasses, gloves, protective footwear)
- Drill with the following drill bits:
  - Small bit for drilling pilot holes in Backup Gateway mounting surface
  - Hole saws for drilling cable access holes in Backup Gateway (M12, M20, M25, M32, M40, M50)
- Torque screwdriver with 1/4-inch bit holder (for the provided T20 Torx bit)
- Large (5 mm) flathead driver bit (for Powerwall Earth terminal)
- Small (2 mm) flathead screwdriver (for wiring connector spring terminals)
- Torque wrench with 3mm Allen bit (for Backup Gateway power connections)
- Socket wrench with 8mm hex socket
- Wire strippers/cutters for 0.2 mm<sup>2</sup> to 35 mm<sup>2</sup> wires
- Installation tools (level, stud sensor, tape measure, pencil, painter's tape, flashlight)
- Multimeter and Loop Impedance Tester
- Lift equipment capable of lifting and supporting 125 kg up to 1.5 m
- Ratcheting strap to secure Powerwall to lift equipment
- Digital camera or smartphone for documenting the installation

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

## Required Supplies

- Powerwall mounting bracket hardware (see [Appendix A](#))
- Backup Gateway mounting hardware
- Conduit fitting or cable gland (depending on local electrical requirements)
- Conduit or raceway (depending on local electrical requirements)
- Earthing rod (if local earthing is not present on site)
- Minimum 300 V rated 4-conductor or double-insulated (with one twisted pair) shielded copper (Cu) cable (for communication connection between Powerwall and the Backup Gateway)
- Minimum 600 V rated copper (Cu) cable (for power connections to Powerwall and the Backup Gateway)

# Mount Powerwall and the Backup Gateway



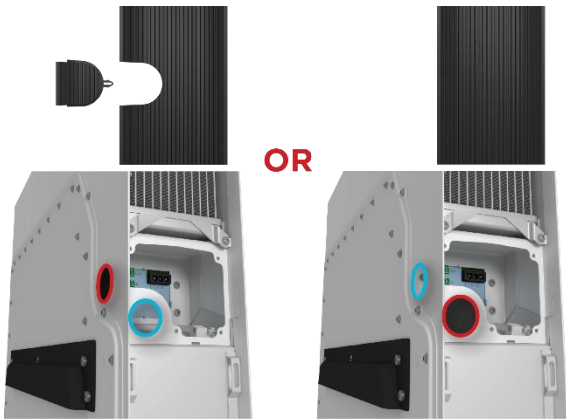
Mount Powerwall Bracket



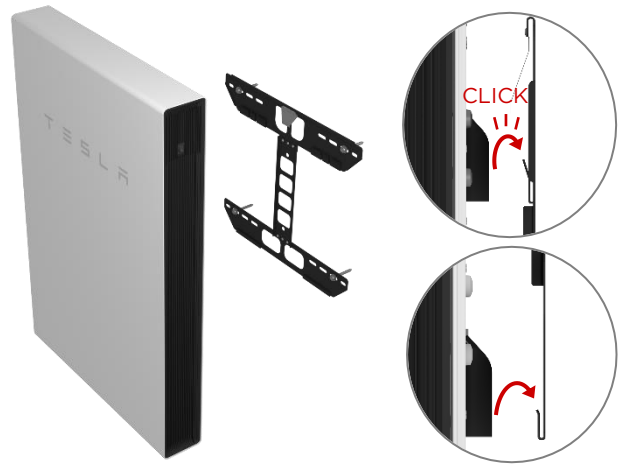
Switch Powerwall Off



Remove Left Side Cover



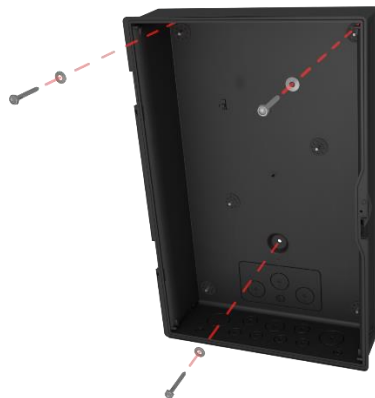
Side Cable Entry OR Rear Cable Entry  
Configure for Side or Back Cable Entry



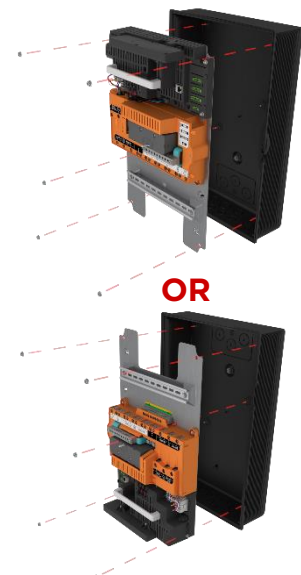
Mount Powerwall



Drill Cable Entry Holes  
in Backup Gateway Enclosure

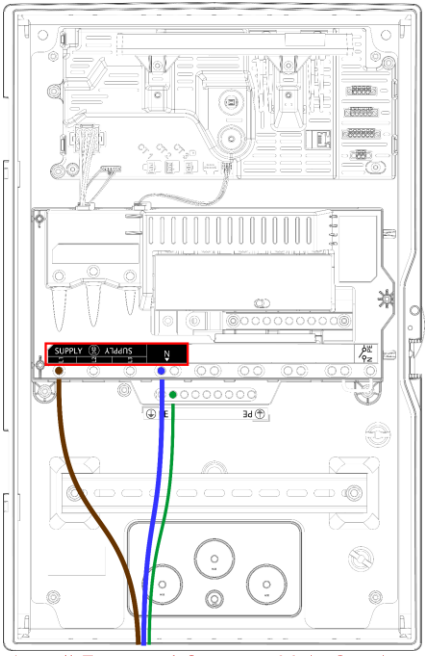


Mount Backup Gateway Enclosure

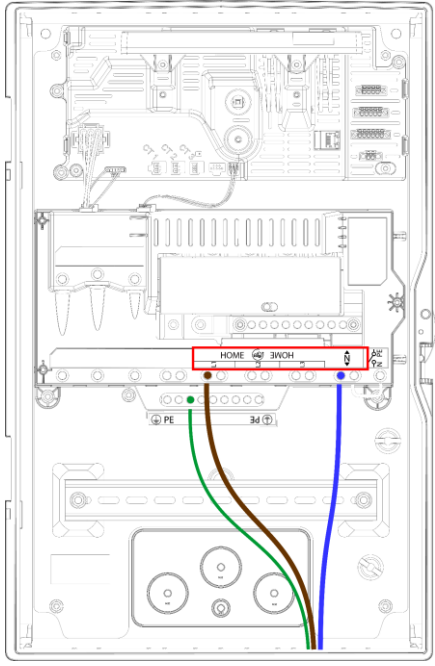


Install Backup Gateway Backplate Assembly

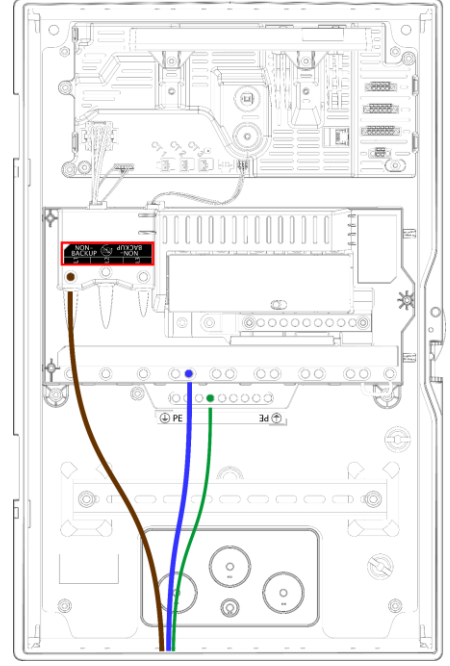
# Make AC Power Connections



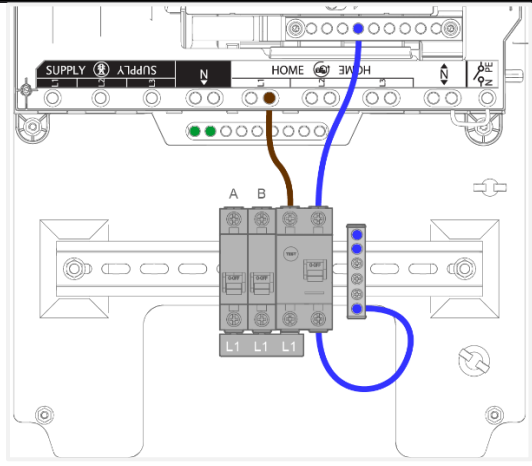
Install Fuse and Connect Main Service Conductors



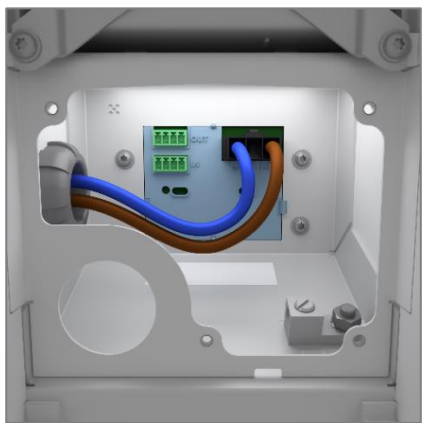
Connect Home Load Panel Conductors



Connect Non-Backup Panel Conductors



Install Generation Breakers



Connect AC Power to Powerwall

# Connect Communication Wiring



Connect Communication Wiring in Backup Gateway

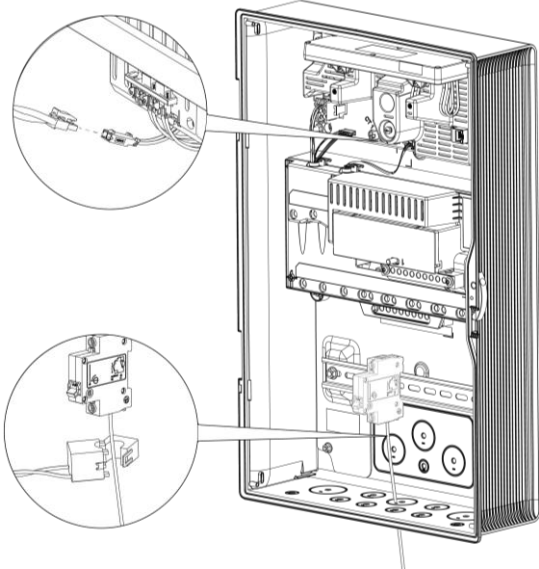


Connect Communication Wiring in Powerwall



Install Terminating Resistor

## Install Energy Metering



[Install Energy Metering for Solar and Site Measurement](#)

## Close Wiring Compartments and Turn System On



[Replace Dead front and Close Backup Gateway Door](#)



[Power On Powerwall and Backup Gateway](#)

## Commission the System



[Locate the Wi-Fi password on the Backup Gateway dead front](#)

### Ethernet Communication

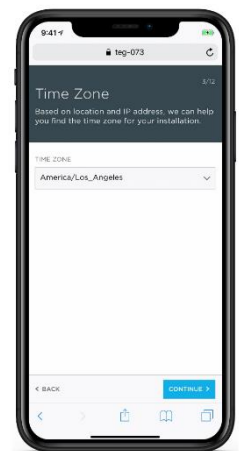
<http://192.168.90.2>

### Wi-Fi Communication

<http://192.168.91.1>

Connect to “**TEG-xxx**” network  
Wi-Fi password located on Backup Gateway dead front (previous step)

[Establish Communication with Backup Gateway and Connect to Internet](#)



[Follow the instructions in the Commissioning Wizard to complete Commissioning](#)

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# Installation Instructions

## Step 1. Plan the Installation Site



### Choose a Location

Choose a wall capable of supporting the full weight of Powerwall, with one of the following characteristics:

- Wood studs at regular intervals
- Plywood sheeting of sufficient thickness
- Solid concrete or masonry
- Metal studs of sufficient gauge

If floor-mounting Powerwall, choose a level surface adjacent to a wall space that meets the above requirements. Make sure the area is isolated from hazards that could damage Powerwall, such as vehicle traffic or flooding. Consider the spacing requirements for Powerwall (see [Appendix A: Powerwall Mounting Details](#)).



### Choose Side or Rear Cable Entry for Powerwall

Determine whether cables will be routed into Powerwall from the side or the back of the unit.

- For side cable entry, a conduit fitting or cable gland must be used to seal the entry into the wiring compartment.
- For back cable entry, a rubber grommet or cable gland is used to seal the entry into the wiring compartment.

**NOTE:** If Powerwall is mounted on a wall with studs spaced 24 in (610 mm) apart, cable entry from the back of Powerwall may be blocked.



### Choose Top, Bottom, or Rear Cable Entry for Backup Gateway

Determine whether cables will be routed into the Backup Gateway from the top or bottom of the enclosure. The internal Backplate Assembly can be installed in either orientation to accommodate cable runs.

**NOTE:** The Backup Gateway does not support cable entry from both the top and bottom of the enclosure. A given backplate orientation supports entry from only one direction.



### Plan the Electrical Service Connection to Backup Gateway

The Backup Gateway is service entrance rated, and can be located between the main switch and the distribution board. A main isolation switch should be installed upstream of the Backup Gateway for testing the system and for service purposes



### Plan Distance 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](#) for wire gauge requirements.

	Maximum Cable Length
Backup Gateway to Powerwall(s)*	45 m
Neurio Energy Meter to Backup Gateway (RS485 wired connection)	50 m
Backup Gateway to Internet router (wired Ethernet connection)	100 m

\*Total length of communications cable, including daisy-chained connections, through last Powerwall in chain

**⚠ 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.



## Step 2. Anchor the Powerwall Mounting Bracket

[Return to Quick Guide](#)

**NOTE:** For detailed instructions on mounting Powerwall, including minimum spacing requirements, refer to [Appendix A](#).

1. Using a drill and level, mount the bracket to the selected wall. See [Powerwall Mounting Details](#) for additional details on the type and number of fasteners to use.

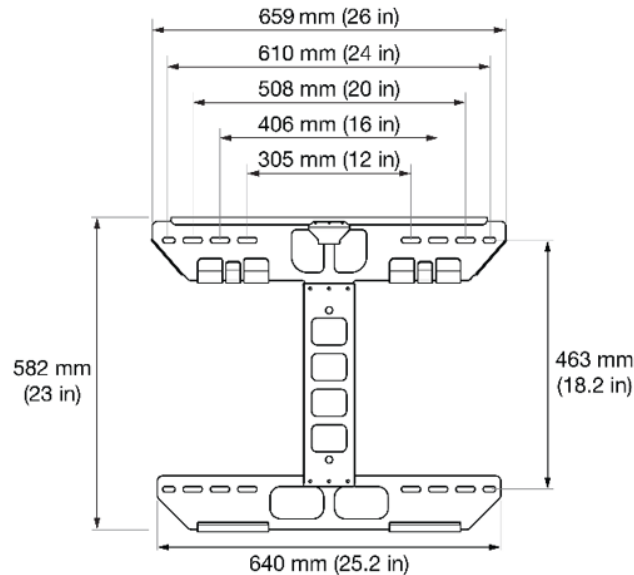


Figure 3: Mounting Bracket Dimensions

2. For back cable entry installations, drill a hole in the wall corresponding to the back cable entry port.

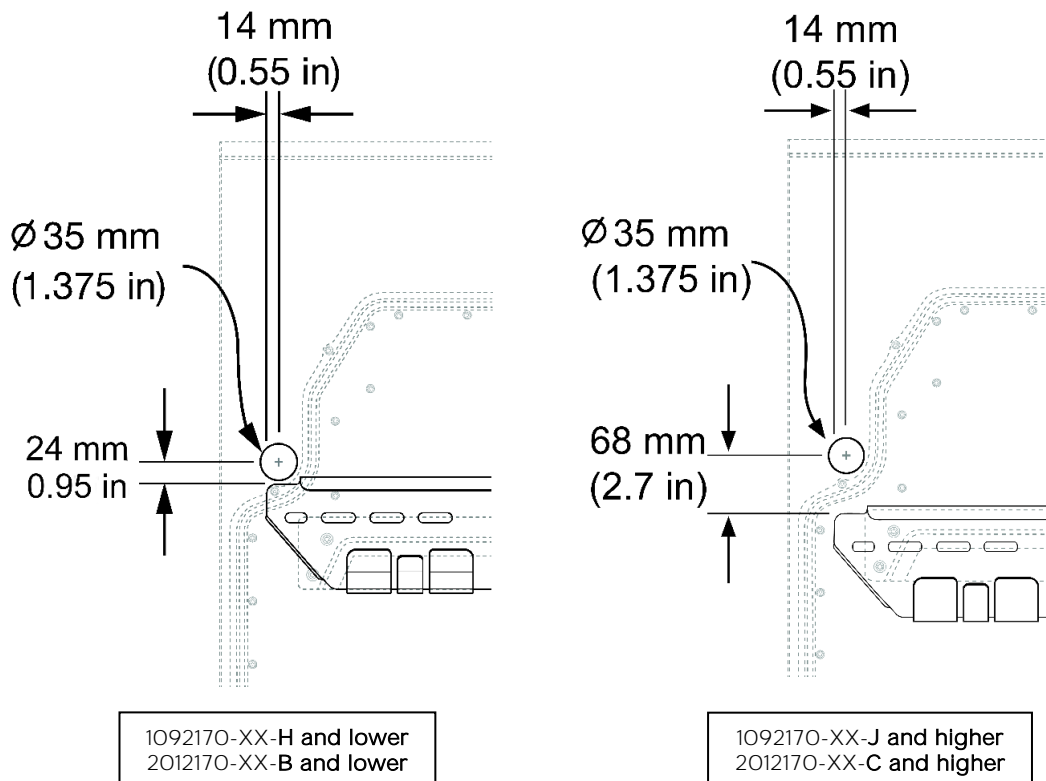


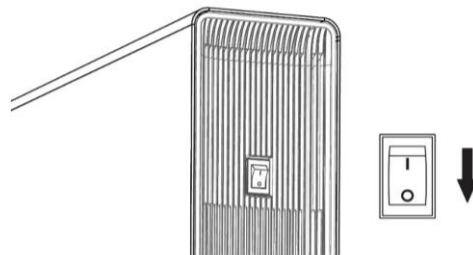
Figure 4: Location of Back Cable Entry Port in Relation to Bracket

### Step 3. Mount Powerwall on the Bracket

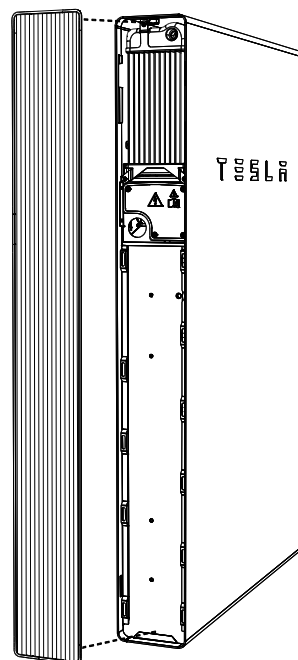
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1. Switch off Powerwall.

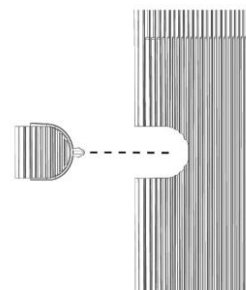
**⚠ WARNING:** Switching off will ensure Powerwall does not grid form. However, AC voltage may still be present from the grid. Ensure all equipment is safely de-energized before working.



2. Remove the left side cover from Powerwall.

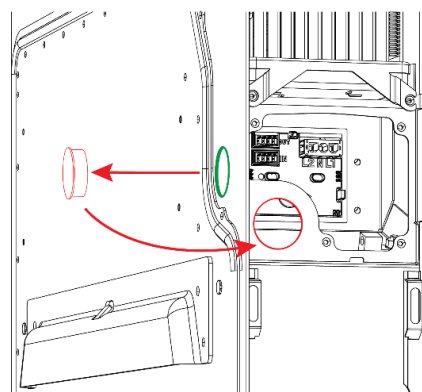


3. For side cable entry installations, remove the side cable entry door from the left side cover.



4. For back cable entry installations, remove the plug from the back cable entry port and place it in the side cable entry port.

**Note:** The plug must always be placed in either the back or side cable entry port.



5. Using lift equipment, position Powerwall close to the wall and adjust the height of Powerwall until its mounting cleats are just above the flanges on the bracket.
6. Lower Powerwall until the top cleat engages the top flange on the bracket and the bottom cleat aligns with the bottom flange.
7. With both cleats engaged, lower Powerwall onto the bracket. An audible click will be heard when the cleats are seated in the bracket and the locking mechanism at the center of the top flange clicks into place.

**NOTE:** To remove Powerwall from the mounting bracket, place a thin piece of sheet metal between the Powerwall unit and the bracket to compress the locking mechanism, and lift the Powerwall straight up.

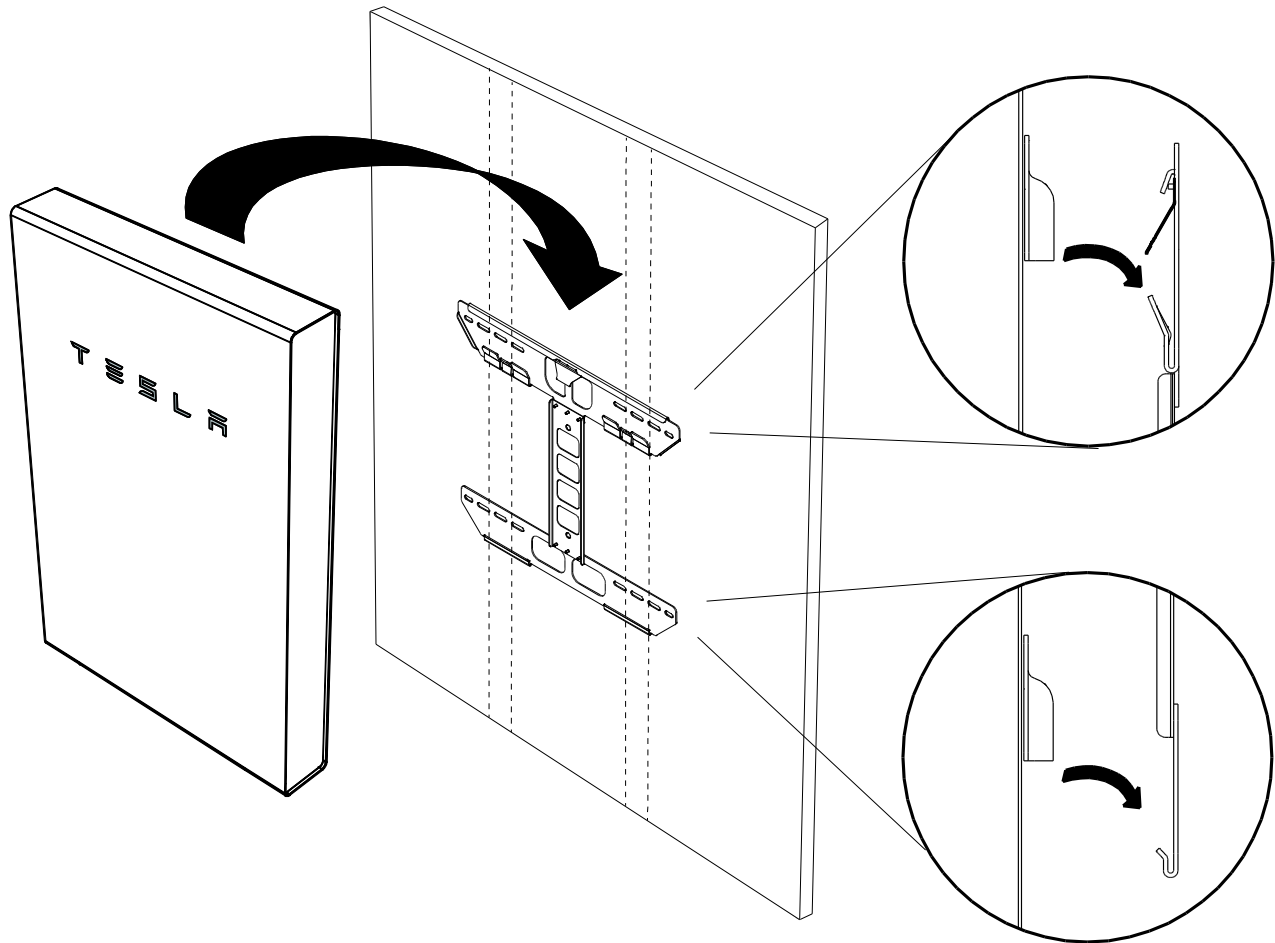


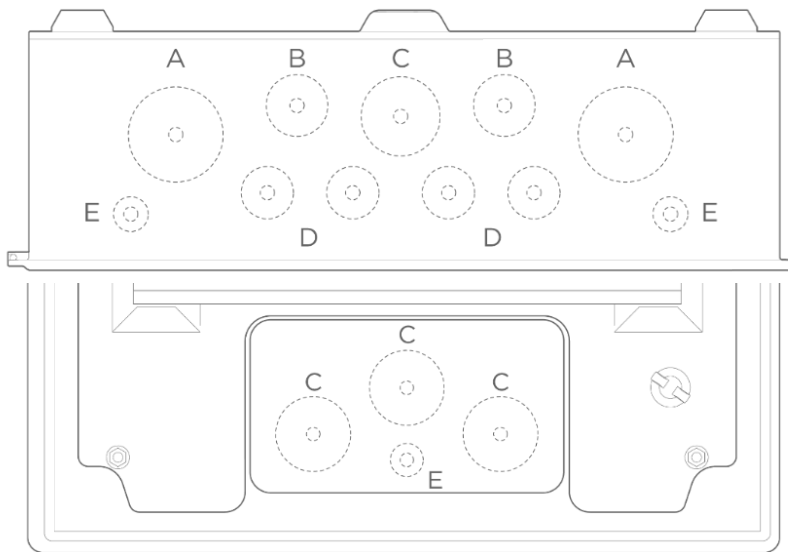
Figure 5: Mounting Powerwall on the Bracket

8. If floor-mounting Powerwall, use the provided shims to ensure that Powerwall is level. The unit should be level within  $\pm 2$  degrees side-to-side and within  $\pm 5$  degrees front-to-back.
9. If wall-mounting Powerwall, remove the feet from the unit (applicable only to updated versions of Powerwall, see [Figure 2](#)).

## Step 4. Mount the Backup Gateway

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1. Using a hole saw, drill out the necessary cable access holes from the Backup Gateway.



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

Figure 6: Top / Bottom (above) and Back (below) Cable Access Drill Guides

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

NOTE: The enclosure must be installed in the orientation shown below. Do not install the enclosure upside down or on its side.

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

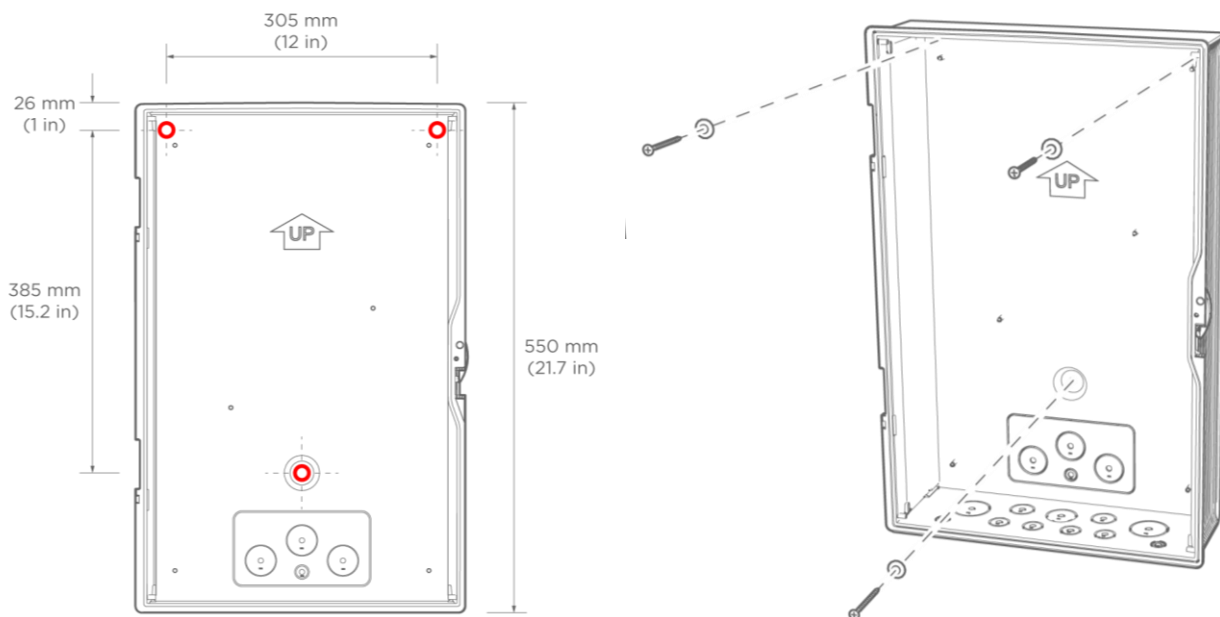


Figure 7: Backup Gateway Enclosure Mounting Holes

**⚠ CAUTION:** The sealing washers must be installed to guarantee IP55 ingress rating (see [Figure 7](#), right).

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 8mm nuts. Use a torque wrench with 8mm socket to tighten the nuts to 6 Nm.

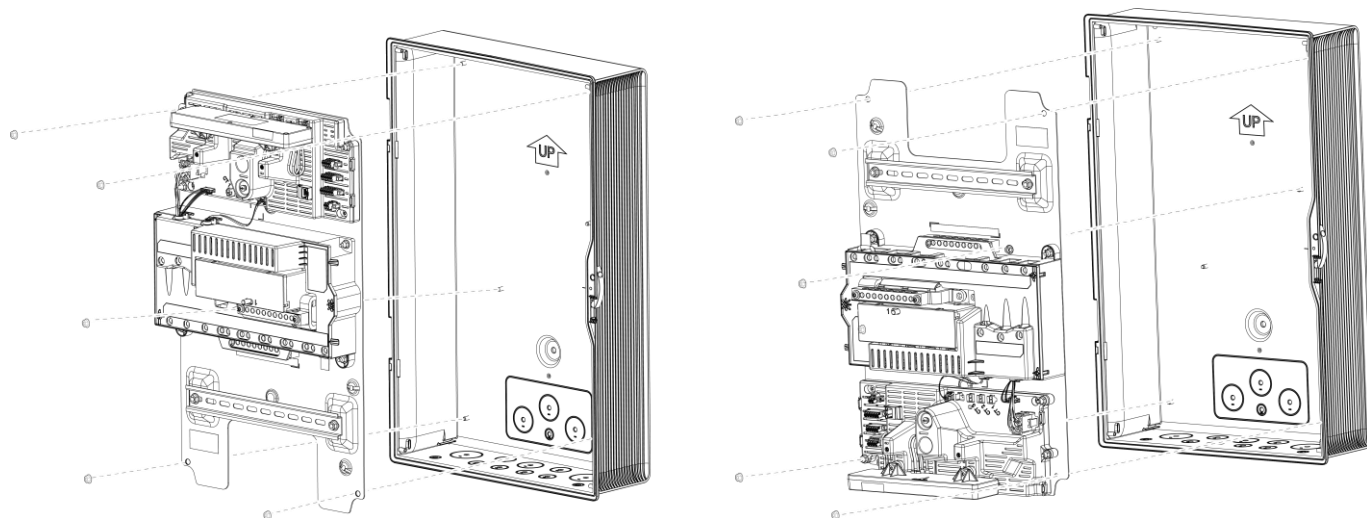


Figure 8: Backplate Orientation for Bottom Cable Entry (left) or Top Cable Entry (right)

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

## Step 5. Verify Neutral-Earth Bonding Scheme and Install Earthing Rod

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.

To meet UK regulations, the Neutral must be disconnected in off-grid operation. For typical UK supply arrangements, disconnecting the Neutral means that the N-PE bond will be lost when off-grid. With the Switched Earth (N-PE) Jumper installed, the Backup Gateway's internal contactor will re-bond Neutral to Earth locally when the Line and Neutral contacts are open.

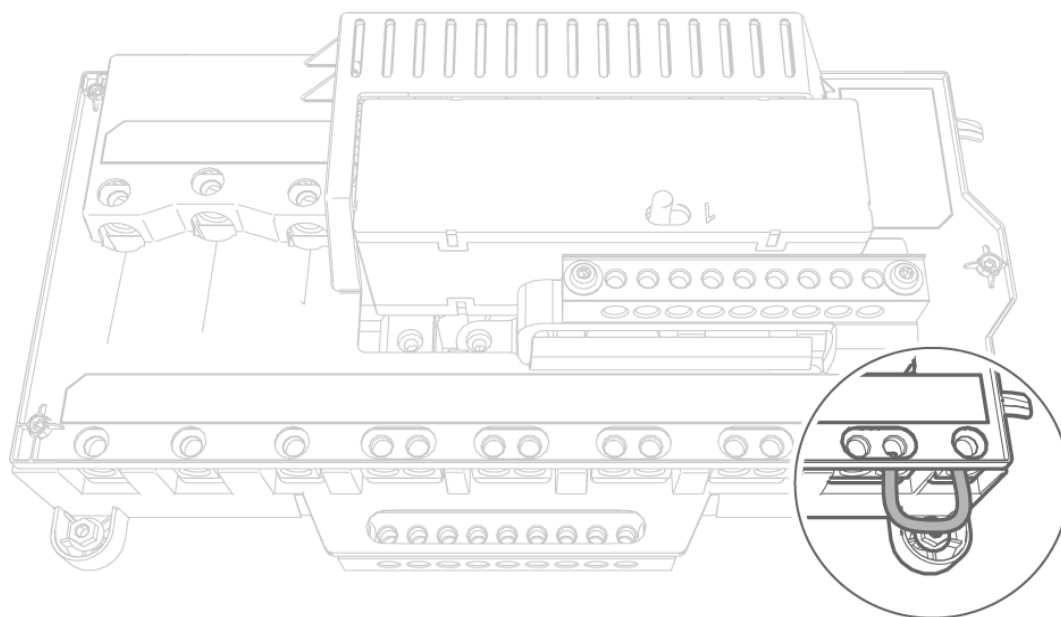


Figure 9: Neutral Re-bonded to Earth During Off-Grid Operation with Switched Earth (N-PE) Jumper

**⚠ WARNING:** To ensure safe operation in Backup Mode or when operating off-grid, a local earth connection 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.

**⚠ 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.

See [Powerwall 2 AC RCD and Fault Protection Application Note](#) for additional information on earthing and fault protection.

## Step 6: Make AC Power Connections to Supply and Load Panels

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In each of the following steps,

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

1. Install 22x55mm DIN-mounted fuse holder and 22x58mm **type aM** cartridge fuse on the Backup Gateway's internal DIN rail. The fuse must be placed in the cable between the Backup Gateway and the grid. See [Appendix D](#) for additional information about fuse requirements.

2. Connect the main service conductors to the Backup Gateway Supply terminals according to [Figure 10](#) and the accompanying table.

**⚠ CAUTION:** Where site-level RCDs are required, one of the following methods must be used to avoid risk of upstream RCD nuisance tripping:

- Relocate the site-level RCD into the Backup Gateway enclosure after Gateway's contactor
- Use a Type-S time-delayed RCD upstream of Backup Gateway

See [Powerwall 2 AC RCD and Fault Protection Application Note](#) for additional information.

3. Connect the home load panel conductors to the Backup Gateway Backup terminals according to [Figure 10](#) and the accompanying table.

4. 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.

5. Connect the non-backup panel conductors to the Backup Gateway Non-Backup terminals according to [Figure 10](#) and the accompanying table. 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](#) for all wiring requirements and recommendations, including wire colors and gauges.

Refer to [Appendix C](#) for example system wiring diagrams.

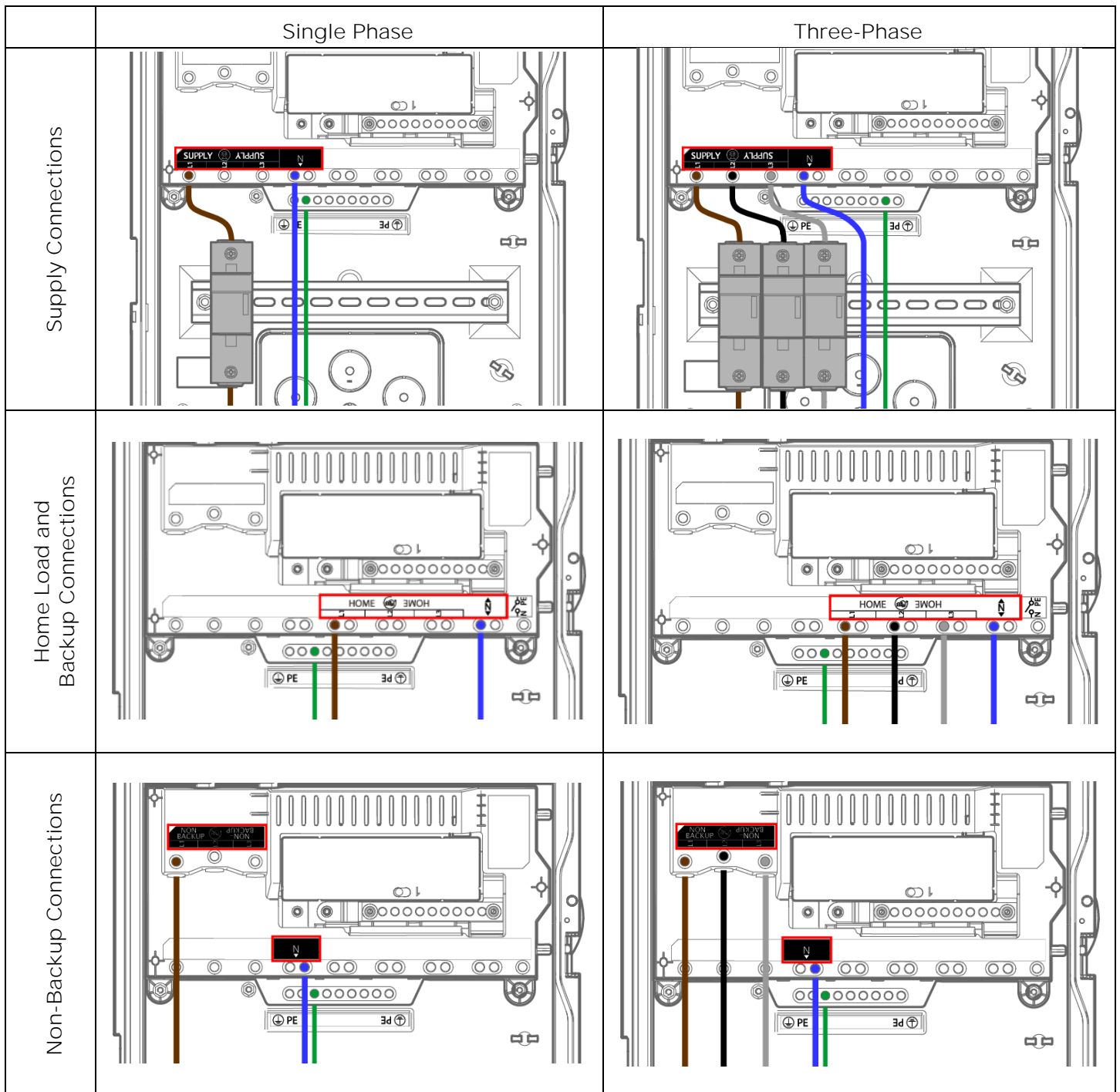


Figure 10: Conductor Connections for Single Phase (left) and Three-Phase (right)

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



## Step 7. Install Powerwall and Generation Breakers in the Backup Gateway

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1. Install the Powerwall and generation circuit breakers on the DIN rail, and connect using an appropriately rated DIN rail circuit breaker busbar.
2. Connect the line conductors from the bussed generation circuit breakers to the Backup Gateway's Backup terminals ([Figure 11](#)). 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.

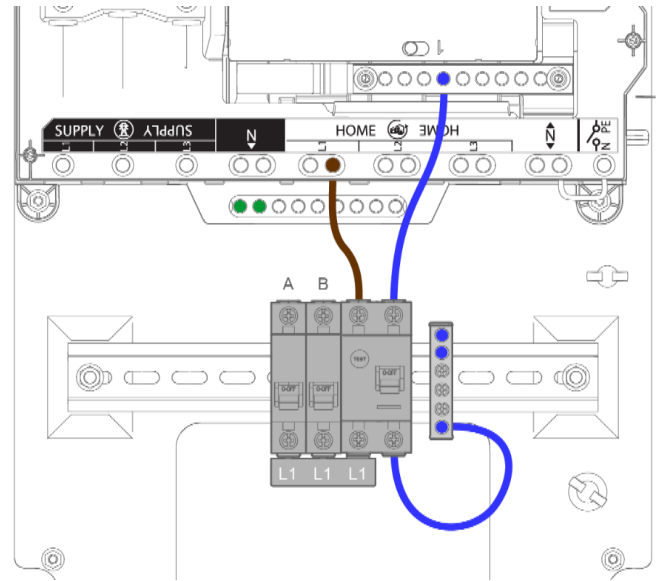


Figure 11: Single Phase Wiring Example Using RCD Main Switch

### 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 32 A circuit breaker. This breaker serves as circuit protection for the Powerwall, and must be wired in accordance with local wiring codes and regulations.

Some regions may require use of an external Residual Current Device (RCD) on the solar PV inverter and/or Powerwall circuits.

### Configuring Powerwall(s) on Three-Phase Installations

- When installing multiple Powerwalls, they may be installed in parallel on one phase or 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).**

**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.

## Step 8. Connect Powerwall to the Backup Gateway

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Note: Refer to [Appendix B](#) for wiring specifications.

Depending on local requirements, Powerwall wiring can be installed through conduit or through a cable gland. Refer to local codes to determine wiring requirements. If necessary, use the included 1 in-to-32 mm or 1 in-to-25 mm reducing washers to adapt the cable gland to the wiring compartment inlet.

1. (Conduit installations only) Run conduit as needed and attach the conduit fitting to the inlet of the wiring compartment. The wiring compartment inlet accepts a standard 1-inch conduit fitting.
2. (Conduit installations only) If the conduit connector does not have an integrated bushing, affix the provided insulation bushing to the conduit opening on the inside of the wiring compartment.

**NOTE:** Ensure that all conduit joints and outlets have smooth edges so that wiring is not damaged as it is run through the conduit.

3. Run the 4-conductor communication cable, the AC power conductors, and equipment grounding conductor from the Backup Gateway through the conduit or cable gland and pull them into the Powerwall wiring compartment.
4. At the Powerwall, strip the ends of the AC conductors and attach them to the corresponding leads on the AC power harness.
5. Plug the AC power harness into the AC connector in the Powerwall wiring compartment. Ensure that the connector clicks into place.

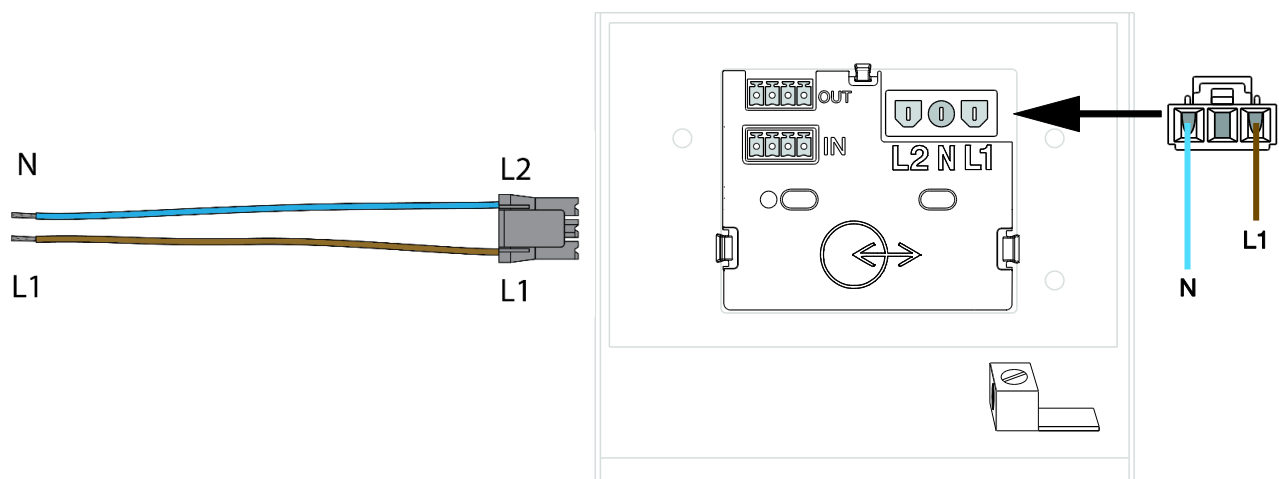


Figure 12: Powerwall 2 AC Power Harness Connection

6. On each end of the 4-conductor communication cable, strip and insert the wires into the provided 4-pin connectors ([Figure 13](#)). On the Powerwall side, use the black connector provided in the accessory bag. On the Backup Gateway side, use the connector that came plugged into the corresponding connector socket in the Backup Gateway.

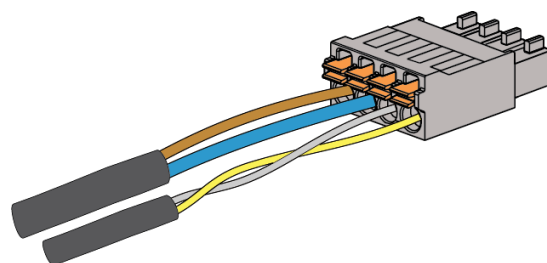



Figure 13: Communication Connector Wiring

7. On the Backup Gateway side of the 4-conductor communication cable, cut the cable shield. **The shield should be terminated at the Powerwall chassis Earth terminal only.**
8. On the Backup Gateway side, plug the 4-pin connector into the 4-pin socket labelled “Powerwall”. Tighten screws on the connector (see [Backup Gateway 2 Communication](#) in [Appendix B](#)).
9. On the Powerwall side, plug the 4-pin connector into the bottom 4-pin socket (labeled “IN”) in the Powerwall wiring compartment.
10. Plug the provided 4-pin connector with the terminating 120-Ohm resistor into the top 4-pin socket (labeled “OUT”) in the Powerwall wiring compartment. (In multi-Powerwall installations, use this connector only in the last Powerwall in the chain.)
11. On the Powerwall side, strip the end of the equipment grounding conductor and wrap the communication cable drain wire around the grounding conductor lead.
12. Insert the grounding conductor and drain wire in the Powerwall chassis Earth terminal ([Figure 14](#)). The Earth terminal is identified with the following symbol: . Tighten the screw in the Earth terminal to 4.5 Nm.

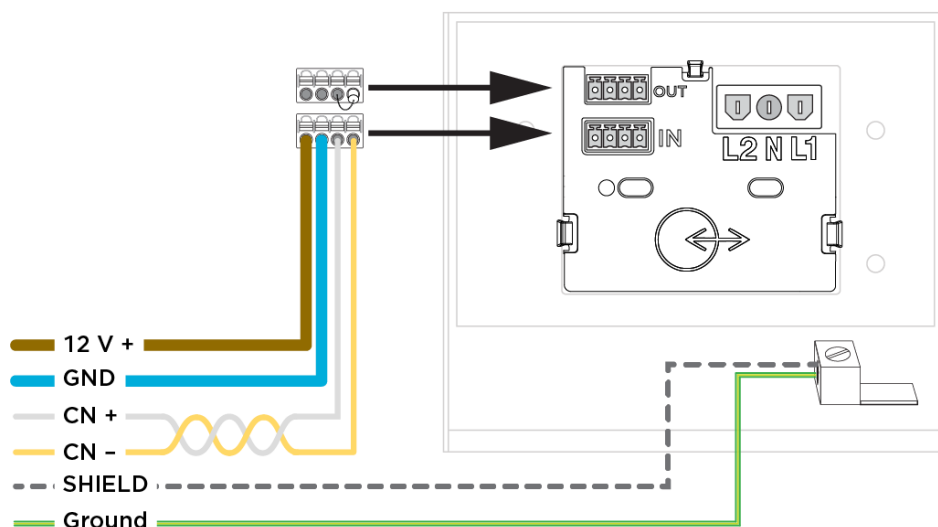


Figure 14: Powerwall Earth/Ground and Communication Connections with Terminating Resistor

## Step 9. Install Energy Metering for the System

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Visibility on power and energy data is needed for the Powerwall system to operate properly. An energy meter accomplishes this by measuring voltage (by voltage tap) and current (by Current Transformer, CT) at certain points in the system.

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

- Metering the Site – Site meters show the overall power flow to/from a site from the Grid's perspective. Thus, Site meter(s) must be installed upstream of all solar production, Powerwalls, and loads. Multiple physical Site meters can be installed together where needed, but their sum should capture all of the power flows from load, solar, and Powerwall(s).
- Metering all Solar – Solar meters capture production from PV 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.

Backup Gateway 2 makes metering simple with built-in options for Site and Solar metering:

- Internal Site Meter – This Site meter may be used when the Grid connection is at the *Supply* terminals. No additional steps are needed during install. If there are any loads or solar upstream of the *Supply* terminals, an External Energy Meter must be used to meter the Grid connection point.
- Internal Auxiliary Meter – Metering solar circuits inside the Gateway or in adjacent switchboards is simple with the three (3) internal CT connections for use with Tesla 100-amp-rated split-core solar CTs (one included in the Accessory Kit). Additional 100 Amp Tesla CTs (1112477-00-x) may be ordered individually.

The Tesla 100A split-core CTs may be extended a max distance of 100 m by splicing twisted pair or using 3 m CT extension harnesses (1125547-03-x). CAT5 (0.2 mm<sup>2</sup>, 24 AWG) conductors are suitable only up to 15 m extension. Use 0.5mm<sup>2</sup> (20 AWG) conductors or larger to extend CTs up to 100 m. Voltage rating of the extension wire must be equal to or greater than all other adjacent circuits.

**NOTE:** Neurio meter CTs **cannot** be extended beyond 15 m without significant accuracy loss.

Depending on site layout it may not be possible to use internal Gateway 2 meters, and external Energy Meters is required.

- See [Appendix E](#) for further guidance on metering.
- See [Appendix F](#) for external Energy Meter installation instructions.

### TIPS

- See [Appendix E: Configuring Energy Metering](#) for additional diagrams on configuring energy metering
- When metering 3-phase solar inverters, install CTs on L1, L2, and L3 output of the solar inverter AC circuit.
- Ensure CTs are facing the proper direction as indicated on the label. A CT will show negative current if installed backwards.
- When upgrading a Gateway 1 system, the existing Energy Meter(s) may be left in place and re-paired with the new Gateway. The Neurio Meter must be power cycled within one minute prior to re-pairing. If metering Site power with the Neurio Meter, ensure the Backup Gateway 2 internal site meter is de-selected in Commissioning.
- See [Appendix G: Installation Troubleshooting](#) for CT configuration troubleshooting tips

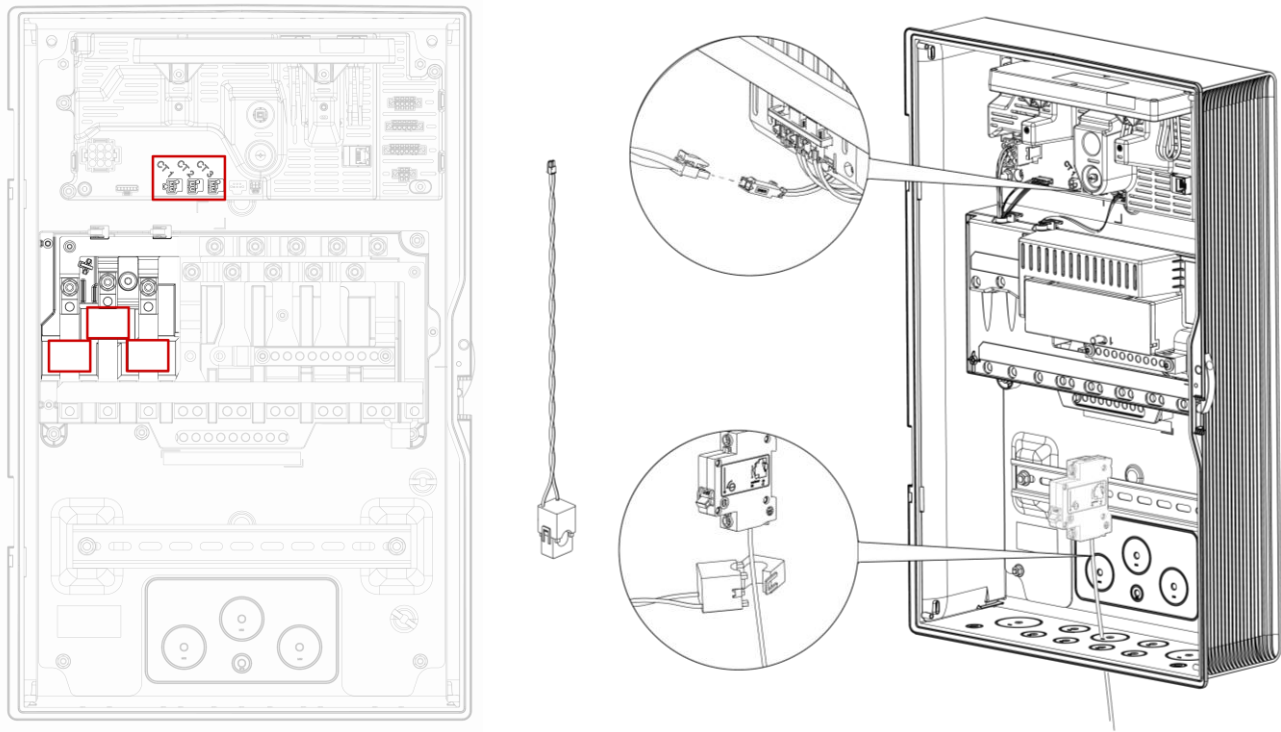


Figure 15: Embedded Site CTs and Solar CT Connectors

**⚠ WARNING:** Disconnecting CTs under load can cause equipment damage or electric shock. Do not connect/disconnect unterminated CTs from live cables.

## Step 10. Plan Internet Connection for Backup Gateway 2

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

For best performance, ensure Ethernet and Wi-Fi connections are both configured during commissioning. The Gateway will automatically select the network option with best connection.

Cellular is available only as a backup connection when Wi-Fi and Ethernet connections are lost. Cellular should not be relied on as the default connection method.

### Install Ethernet Connection

- Ethernet cable must be CAT5 (24 AWG) 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.
- An M25 cable gland for communications cables is provided in the Accessory Kit.
- See ([Appendix B](#)) for the position of the Ethernet port

## Step 11. Close the Wiring Compartments and Turn the System On

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1. **Before closing any installed hardware**, take photos of the completed wiring in the Powerwall, Backup Gateway, and main distribution board.
2. Ensure that all conduit or cable gland junctions and cable entry points are secure and properly sealed.
3. Arrange the communication and AC power wires neatly inside the Powerwall wiring compartment.
4. Replace the cover on the Powerwall wiring compartment. Ensure that the cover seats properly on the gasket so that the compartment is sealed. Using the provided Torx T20 bit, tighten the fasteners to 1.5 Nm.
5. Replace the left side cover on Powerwall by pushing the top into place and working toward the bottom to reattach it to the clips along the length of the unit.
6. Install the Backup Gateway dead front panel and secure it firmly with the original screw. Mount the Backup Gateway door, and latch it shut.

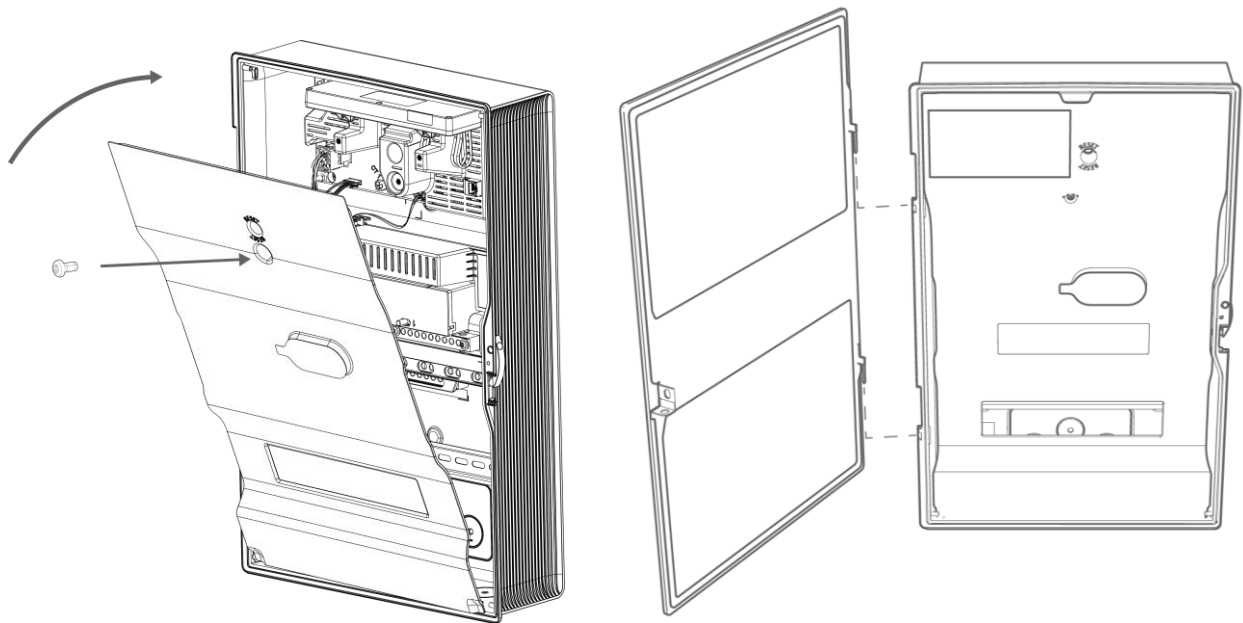


Figure 16: Install the Dead Front Cover and Glass Door

7. Use the provided breaker label sheet to clearly label the circuit breakers.

**NOTE:** The provided snap-in breaker pole-fillers must be installed to ensure touch safety.

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

8. Switch on the AC circuit breakers for the Backup Gateway and Powerwall.
9. Switch on Powerwall by moving the switch on the right side of the unit to the ON position. When Powerwall establishes communication with the Backup Gateway, the LED on the right side of Powerwall illuminates.

**⚠ CAUTION:** Always leave site with Powerwall breaker closed for battery to maintain a base level of charge. Leaving the Powerwall disconnected from AC for extended periods increases risk of damage.

## Step 12. Commission the System

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1. Find the Wi-Fi password on the label on the Backup Gateway dead front ([Figure 17](#)).

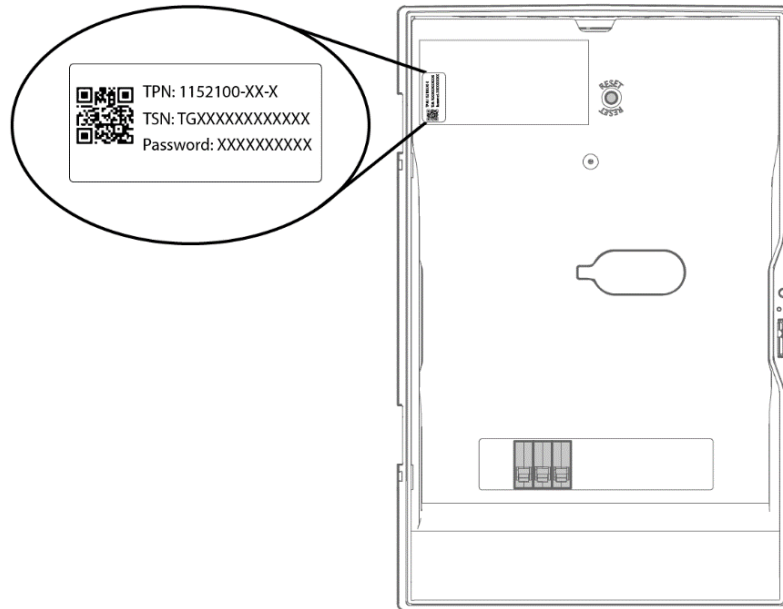
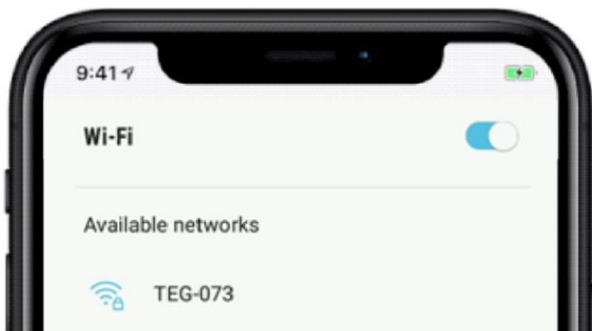


Figure 17: Serial Number and Password Label

2. Using a computer, smartphone, or tablet, establish communication with the Backup Gateway via Wi-Fi or Ethernet:

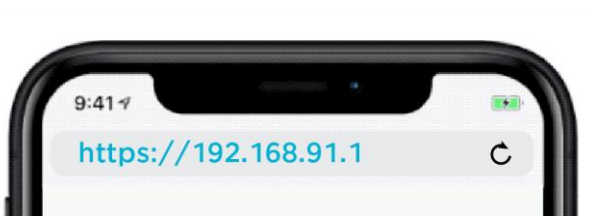
### Wi-Fi

Connect to “TEG-xxx” network where xxx are the last 3 digits in the Backup Gateway serial number



Enter the Wi-Fi password ([Figure 17](#))

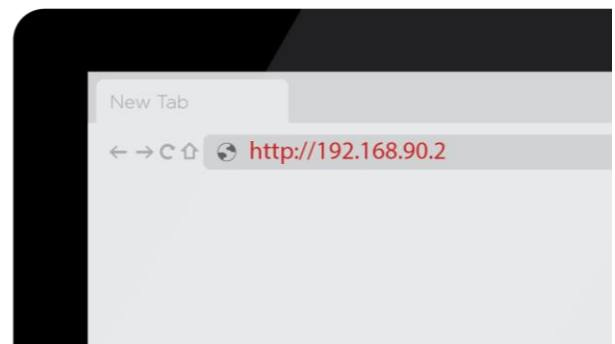
Navigate to IP address <https://192.168.91.1>



### Ethernet

Connect a computer to the Ethernet port of the Backup Gateway with a standard CAT5 Ethernet cable

Launch a browser and enter the following IP address: <https://192.168.90.2>



**NOTE:** If the Backup Gateway Wi-Fi network doesn't appear or the connection to the Backup Gateway fails, power cycle the Backup Gateway using the Reset button, wait 2 minutes, and try connecting again.

3. Once communication is established, the browser may show a Security Warning page. This is normal. To enter the Commissioning Wizard, click Advanced and then Proceed. The browser should then show the login page to the Commissioning Wizard.

4. Log into the Commissioning Wizard:

- Username: Enter the e-mail address of the installer who is carrying out the work
- Password: Enter the Wi-Fi Password ([Figure 17](#))
- Click Continue

5. Connect the Backup Gateway to the Internet by the following means:

**NOTE:** Either an Ethernet or a Wi-Fi connection must be connected. For best reliability, ensure Wi-Fi and Ethernet options are **both** configured.

#### Wi-Fi (2.4 or 5 GHz)

#### Ethernet


- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• In the Commissioning Wizard, click the arrow for Wi-Fi</li> <li>• Scan and locate the home Wi-Fi network name (SSID)</li> <li>• Enter the homeowner's network password</li> <li>• Click the blue arrow</li> </ul> | <ul style="list-style-type: none"> <li>• In the Commissioning Wizard, click the arrow for Ethernet</li> <li>• Choose DHCP (most common) or Static (only if necessary and you know the Network settings)</li> <li>• Click Connect</li> </ul> |
|--|---|

**NOTE:** Cellular connection must only be relied on as fallback connection if Wi-Fi and/or Ethernet is lost.

6. Click Check Connection to verify that the Internet connection is working. Click Continue.

**NOTE:** See [Appendix G: Installation Troubleshooting](#) for troubleshooting steps on accessing the Commissioning Wizard.

7. Click Check for Update to apply any firmware updates to the Backup Gateway and Powerwall. After the update is staged, click Update. After the update is complete, re-establish connection to the Backup Gateway and the Internet, starting with procedure #1 above.

 **WARNING:** Software updates may take several minutes, especially for installations with multiple Powerwalls. Never power down during an update, as it may result in damage to the system.

8. Follow the Commissioning Wizard steps to complete the commissioning process.

### Step 13. Finish and Demonstrate the Installation

1. After installation is complete, remove the protective film from Powerwall.
2. Remove the plastic straps from the left and right side covers by cutting them and carefully pulling them through the slots in the covers.
3. If necessary, ask the homeowner to download and install the Tesla mobile app and connect to the system.
4. Demonstrate the capabilities of the Tesla mobile app, such as how to change the operation mode.
5. Simulate an outage by opening the main breaker and show that Powerwall is powering backup loads.
6. Leave the *Powerwall Owner's Manual* with the owner of the newly installed system, with all system serial numbers recorded in the back inside cover.
7. Archive the photos from the installation.



## Troubleshooting

See [Appendix G: Installation Troubleshooting](#) for common installation troubleshooting steps.

## Technical Support

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

<https://partners.teslamotors.com>

If further support is needed, contact the Tesla Service team at the support phone number for your region. Support numbers for all regions are found at:

<https://www.tesla.com/support/powerwall>

This information is useful to have ready when contacting Tesla:

- Owner name
- Best point of contact for Tesla to return contact (name, phone number, email)
- Powerwall part number and serial number
- Backup Gateway part number and serial number
- Brief description of the issue

## Maintenance

Powerwall 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.

To clean Powerwall, 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, or expose Powerwall to flammable or harsh chemicals or vapors.

## Appendix A. Powerwall Mounting Details

### Powerwall Space Requirements

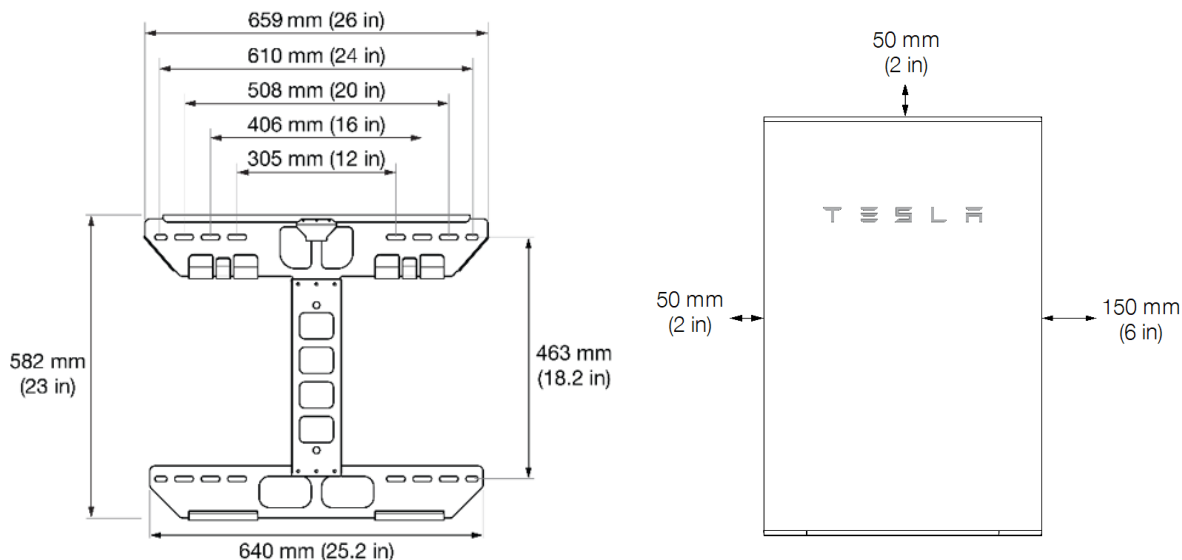


Figure 18: Powerwall 2 Mounting Bracket Dimensions and Space Requirements

Minimum lateral wall space	960 mm
Minimum clearance from left side (air intake)	50 mm
Minimum clearance from right side (air exhaust)	150 mm
Minimum clearance above single Powerwall	50 mm
Minimum clearance above side-by-side Powerwalls	300 mm
Minimum clearance between side-by-side Powerwalls	250 mm
Maximum height above ground	1.5 m to bottom of unit
Maximum slope	+/- 2° side-to-side +/- 5° front-to-back

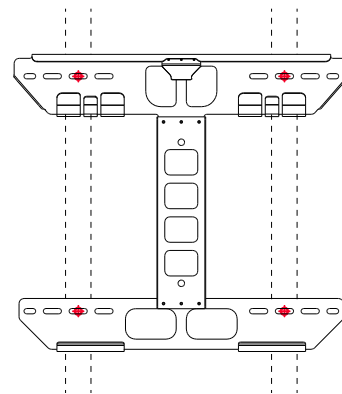
**NOTE:** Powerwall has a pump and fan that produce a gentle hum during operation, comparable to a typical refrigerator. The noise level depends on the ambient temperature and the power level of operation. Consider these noise levels when choosing where to install Powerwall.

## Mounting Bracket Anchoring Details

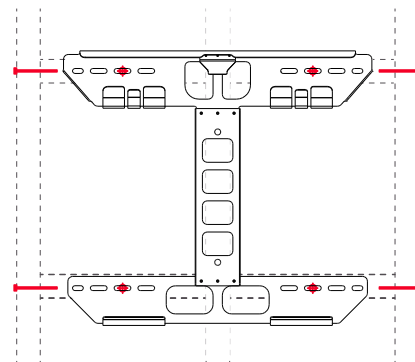
**NOTE:** The details below are minimum guidelines and are not guaranteed to be applicable. Refer to local building codes to ensure the use of appropriate fasteners. Refer to *Powerwall 2 Anchorage Details* for complete mounting information.

Wood Studs (spaced from 300 mm to 600 mm)

If anchoring directly into wood studs, use at least **four (one in each corner)** 10 mm wood screws with washers, of sufficient length for at least 64 mm embedment into the studs.

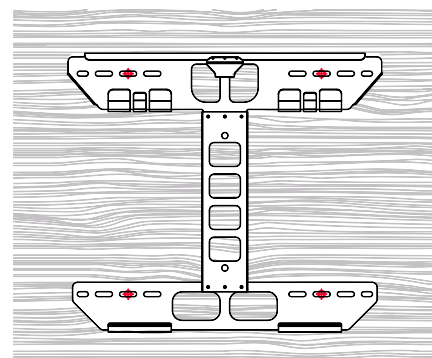


If anchoring to blocking between wood studs, use minimum 50 mm x 100 mm blocks, end-nailed into studs with two 16d (100 mm) nails or toe-nailed into studs with four 8d (75 mm) nails. Use at least **four (one in each corner)** 10 mm wood screws with washers, of sufficient length for at least 64 mm embedment into the blocking.



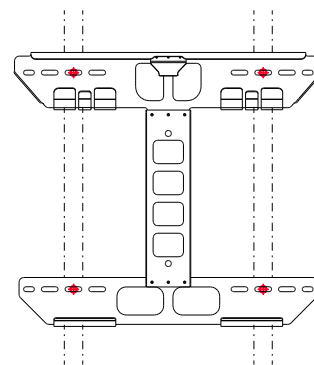
Plywood

If anchoring to plywood wall material, the plywood must be minimum 38 mm thick. Use at least **four (one in each corner)** 10 mm wood screws with washers, of sufficient length to penetrate at least 7 mm beyond the backside of the plywood.



Metal Studs (spaced from 300 mm to 600 mm)

If anchoring directly to metal studs, studs must be minimum 1.2 mm thick. Use at least **four (one in each corner)** 10 mm sheet metal screws with washers, of sufficient length to penetrate at least 3 threads beyond the stud.



If anchoring to backing between metal studs, studs must be minimum 0.5 mm thick, and backing must be minimum 0.7 mm thick. Use at least **eight (two in each corner)** 10 mm sheet metal screws with washers, of sufficient length to penetrate at least 3 threads beyond the backing.

If anchoring to backing between metal studs in an outdoor high wind area, studs must be minimum 0.5 mm thick, and backing must be minimum 0.7 mm thick. Use at least **twelve (three in each corner)** 10 mm hexhead sheet metal screws with washers, of sufficient length to penetrate at least 3 threads beyond the backing.

#### Concrete or Masonry

Minimum strength must be 18 MPa (concrete), 12 MPa (clay brick), or 11 MPa (masonry).

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

**NOTE:** Avoid weak compositions and always inspect the surface prior to mounting.

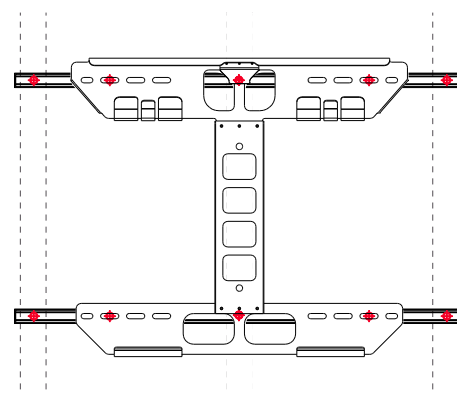
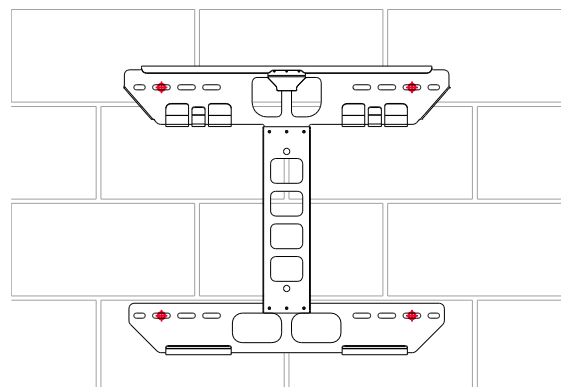
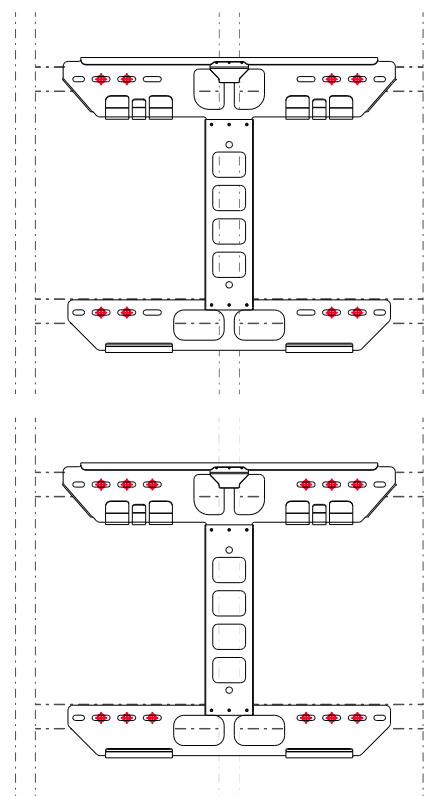
#### Channel Strut (Unistrut)

Struts must be minimum 42 mm x 42 mm x 2.5 mm thick.

If mounting on wood studs, attach the strut to at least three studs, using at least one 10 mm wood screw with washer per stud, of sufficient length for at least 64 mm embedment into the studs.

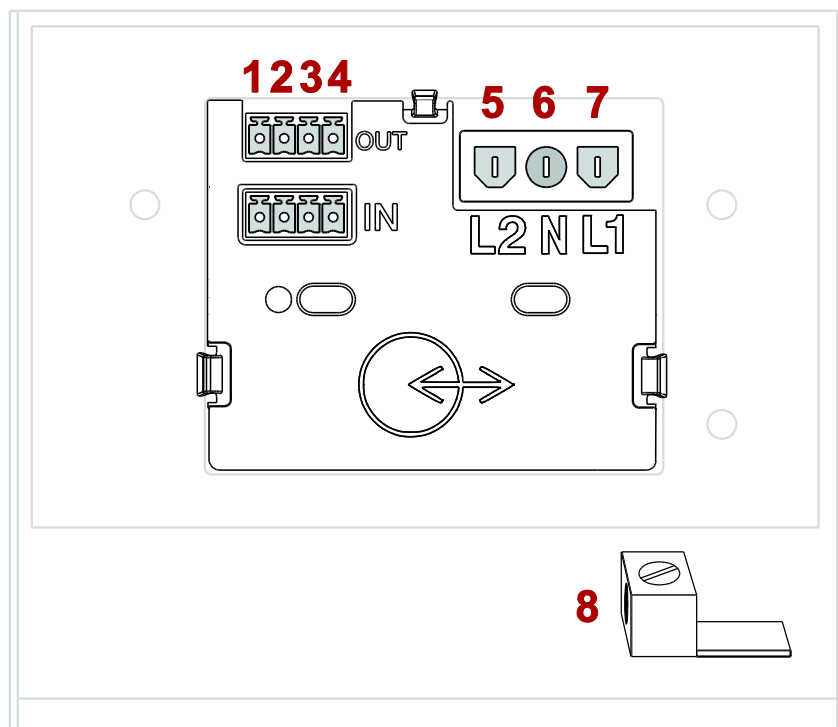
If mounting on metal studs, attach the strut to at least three studs, using at least two 10 mm sheet metal screws with washers per stud, of sufficient length to penetrate at least 3 threads beyond the studs.

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



## Appendix B. Wiring Reference

### Powerwall Wiring



Powerwall Wiring			
	Powerwall Terminal	Recommended Wire Color	Wire Gauge
Communication			
1	12V + (Logic +)	Brown	1.0 mm <sup>2</sup> (max 35 m)
2	GND (Earth)	Blue	1.5 mm <sup>2</sup> (max 45 m)
3	CN + (CAN HI)	White	0.2-1.5 mm <sup>2</sup>
4	CN - (CAN LO)	Yellow	
Power*			
5	L2 (Line 2) - to Neutral	Blue	4-10 mm <sup>2</sup>
6	N (Neutral) [Unused]		
7	L1 (Line 1)	Brown	4-10 mm <sup>2</sup>
8	Chassis Earth Terminal	Green/Yellow	2.5-10 mm <sup>2</sup>

\* Depending on local code for installation methods and cable sizing calculations.

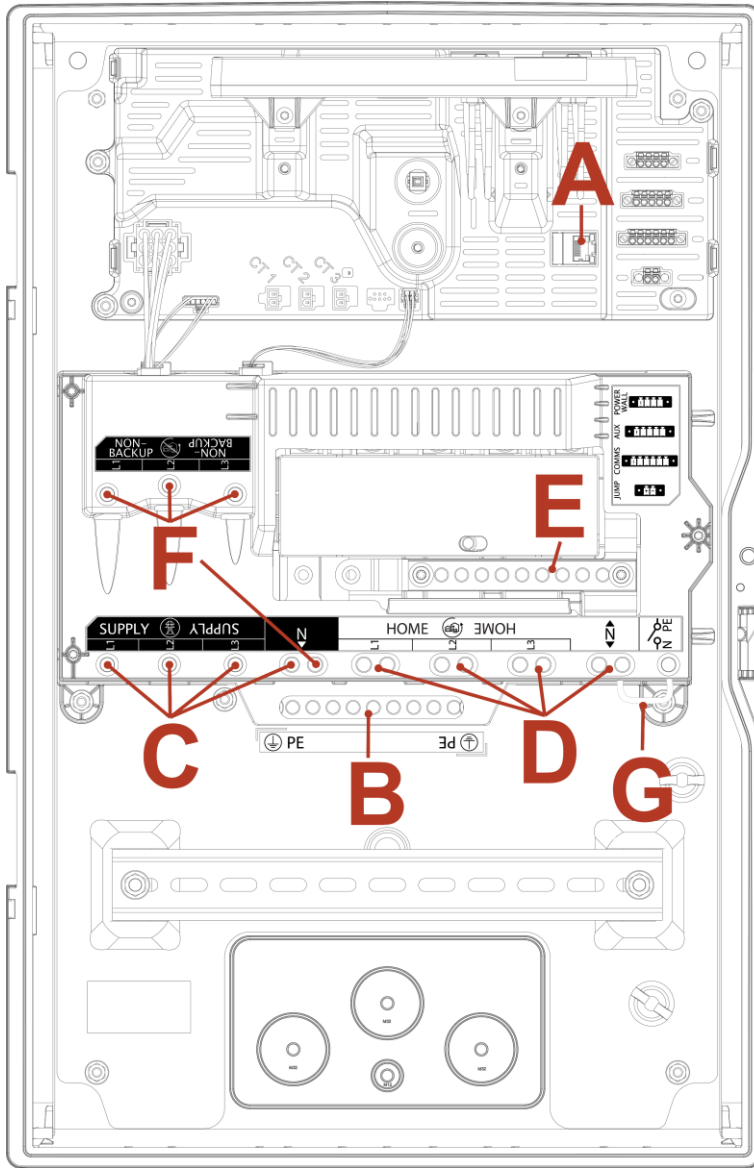
**NOTE:** Refer to local codes and standards for correct wiring practices and wire colors.

(2) Wago lever nuts are provided for use with up to 6 mm<sup>2</sup> cable. If 10 mm<sup>2</sup> cables are required per wiring methods, other appropriate connectors may be used, or a junction box near the Powerwall can be used to convert from 10 to 6 mm<sup>2</sup> cables. **Follow all code wiring requirements.**

**NOTE:** Suitable wire ferrules may be used with Wago connectors, but are not required.

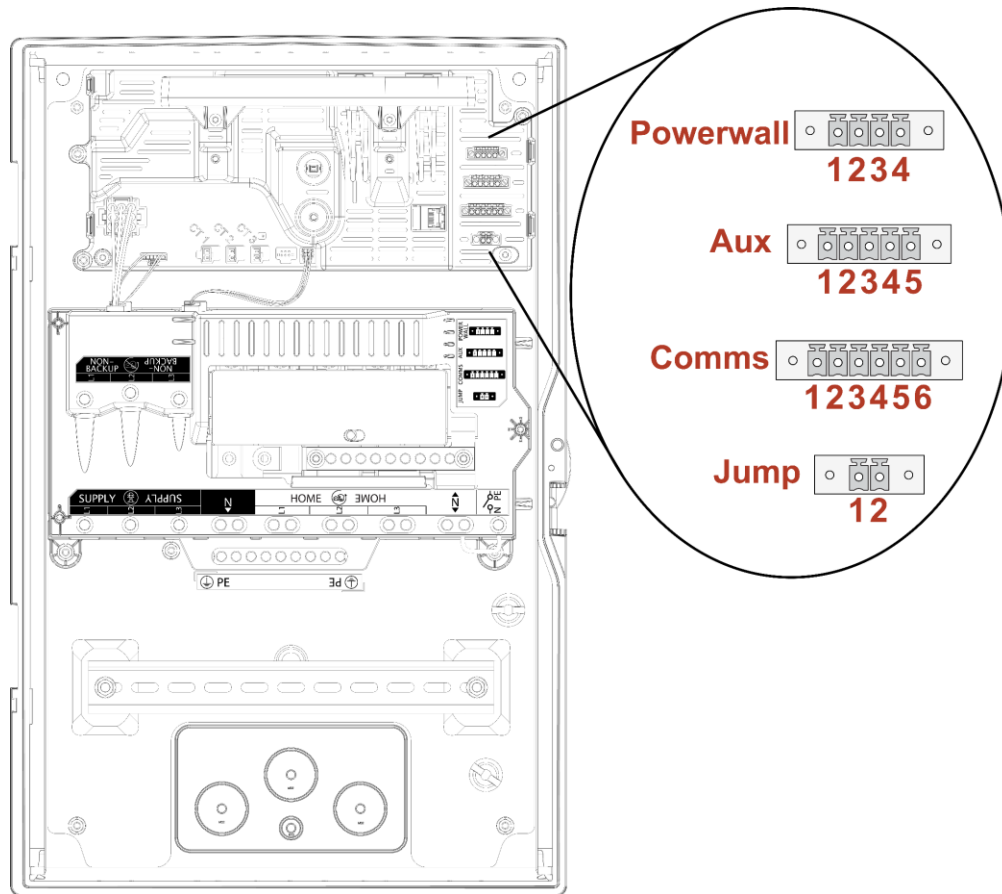
**⚠ CAUTION:** For single-phase service, Neutral is not **connected to the Powerwall N terminal**. It is instead connected to the Powerwall L2 terminal.

## Backup Gateway 2 Wiring



Backup Gateway 2 Wiring			
	Terminal Name	Recommended Wire Color	Wire Gauge
A	Ethernet	-	24 AWG CAT5 or better
B	Earth Bar	Green or Green/Yellow	2.5-25 mm <sup>2</sup>
C	Grid Supply (L1, L2, L3, N)	Brown, Black, Grey, Blue	2.5-35 mm <sup>2</sup>
D	Backup Loads and Generation (L1, L2, L3, N)	Brown, Black, Grey	2.5-35 mm <sup>2</sup>
E	Generation Neutral Bar (N)	Blue	2.5-25 mm <sup>2</sup>
F	Non-Backup Loads and Generation (L1, L2, L3, N)	Brown, Black, Grey, Blue	2.5-35 mm <sup>2</sup>
G	Switched Neutral-Earth link	-	16 mm <sup>2</sup>

## Backup Gateway 2 Communication



Backup Gateway 2 Communication Wiring			
	Terminal Name	Recommended Wire Color	Wire Gauge
Powerwall Communication			
1	12V + (Logic +)	Brown	1.0 mm <sup>2</sup> (max 35 m) 1.5 mm <sup>2</sup> (max 45 m)
2	GND (Earth)	Blue	
3	CN + (CAN HI)	White	0.2-1.5 mm <sup>2</sup>
4	CN - (CAN LO)	Yellow	
Aux			
1	Site Shutdown (IN)		0.2-1.5 mm <sup>2</sup>
2	Site Shutdown (OUT)		0.2-1.5 mm <sup>2</sup>
3	(reserved for future use)		0.2-1.5 mm <sup>2</sup>
4	(reserved for future use)		0.2-1.5 mm <sup>2</sup>
5	(reserved for future use)		0.2-1.5 mm <sup>2</sup>
Communication (External Meter)			
1	GND (Earth)/Shield		0.2-1.5 mm <sup>2</sup>
2	RS485 HI #1	Red	0.2-1.5 mm <sup>2</sup>
3	RS485 LO #1	Black	0.2-1.5 mm <sup>2</sup>
4	GND (Earth)/Shield		0.2-1.5 mm <sup>2</sup>
5	RS485 HI #2	Red	0.2-1.5 mm <sup>2</sup>
6	RS485 LO #2	Black	0.2-1.5 mm <sup>2</sup>
Jump Start			
1	12V	Red	0.2-1.5 mm <sup>2</sup>
2	GND	Black	0.2-1.5 mm <sup>2</sup>

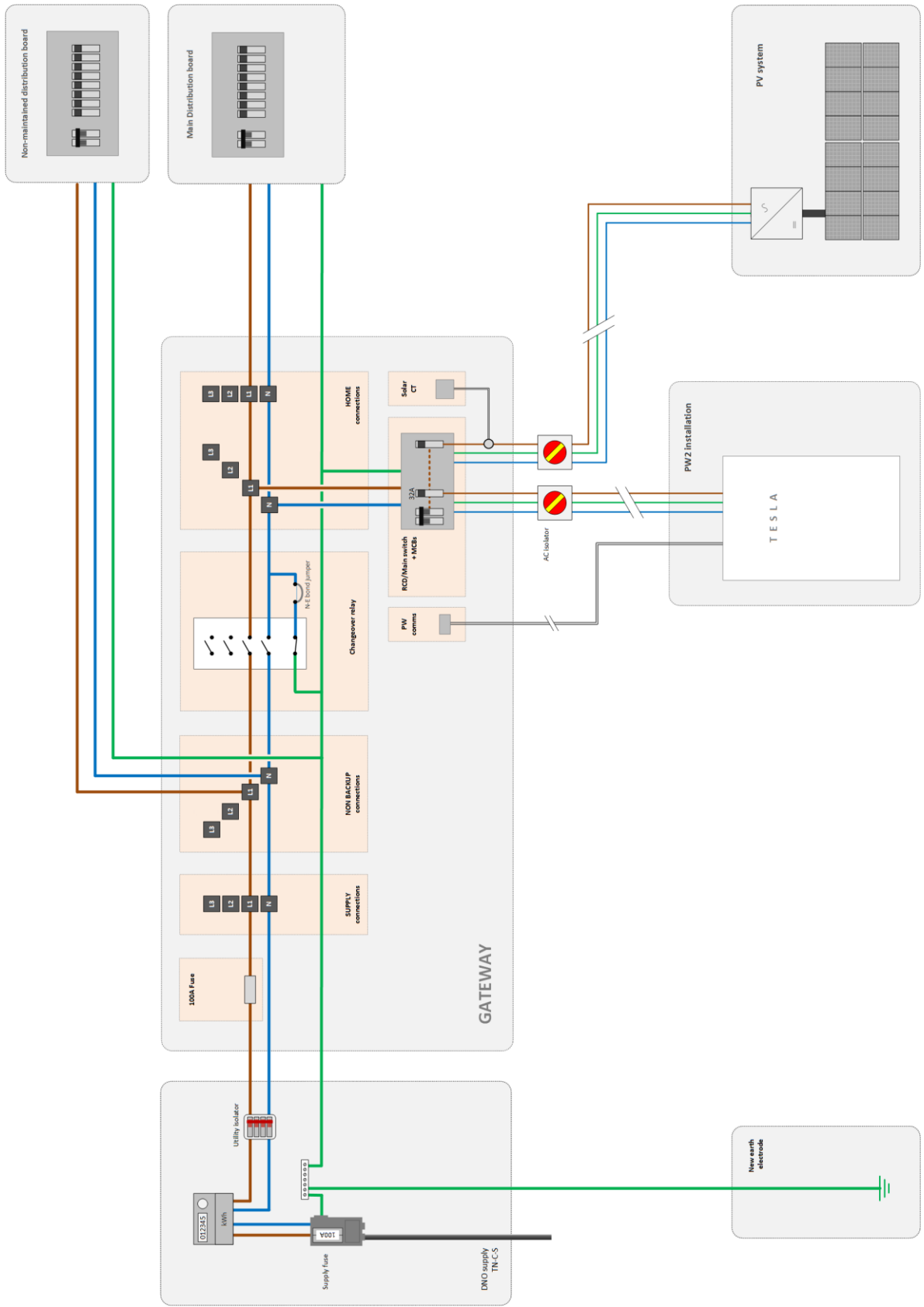
## Appendix C. System Diagrams

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.

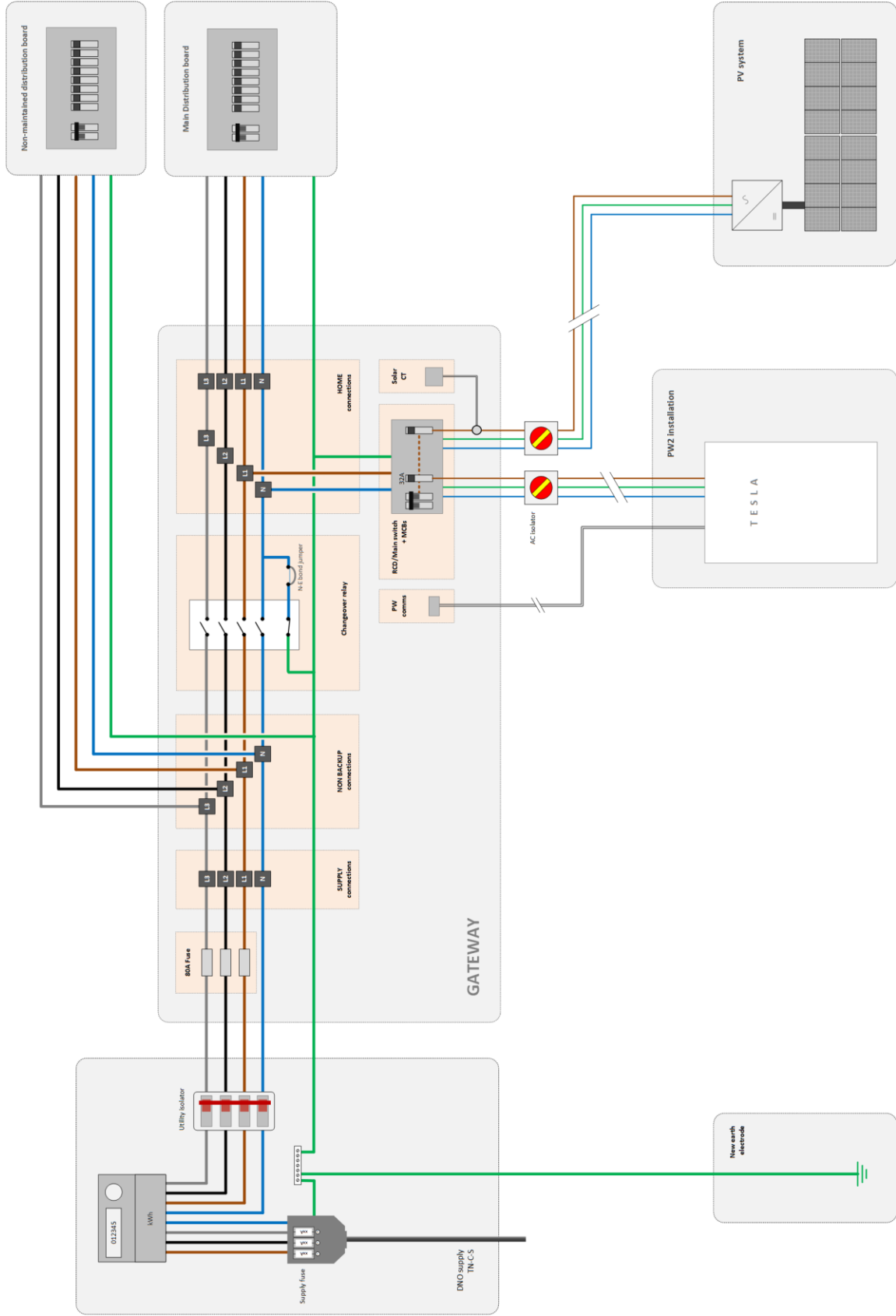
1. Single-phase supply, single-phase solar, partial backup
2. Three-phase supply, three-phase solar, single-phase partial backup



# Single-Phase Service (TN Network)



### Three Phase Service (TN Network)



## Appendix D. Grid Supply Fuse and Fuse Holder

The grid supply fuse and fuse holder are installed during [Step 6: Make AC Power Connections to Supply and Load Panels](#).

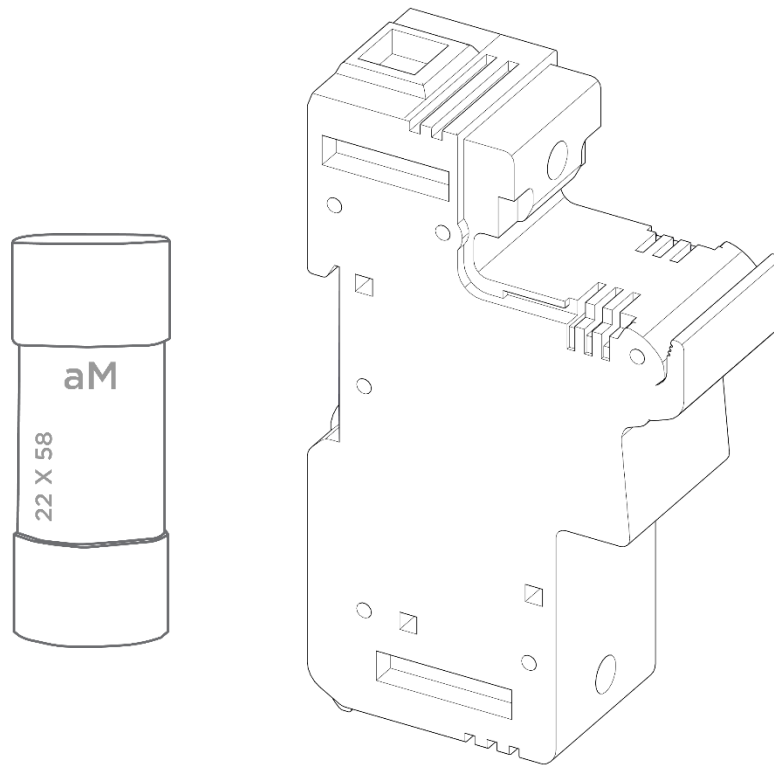


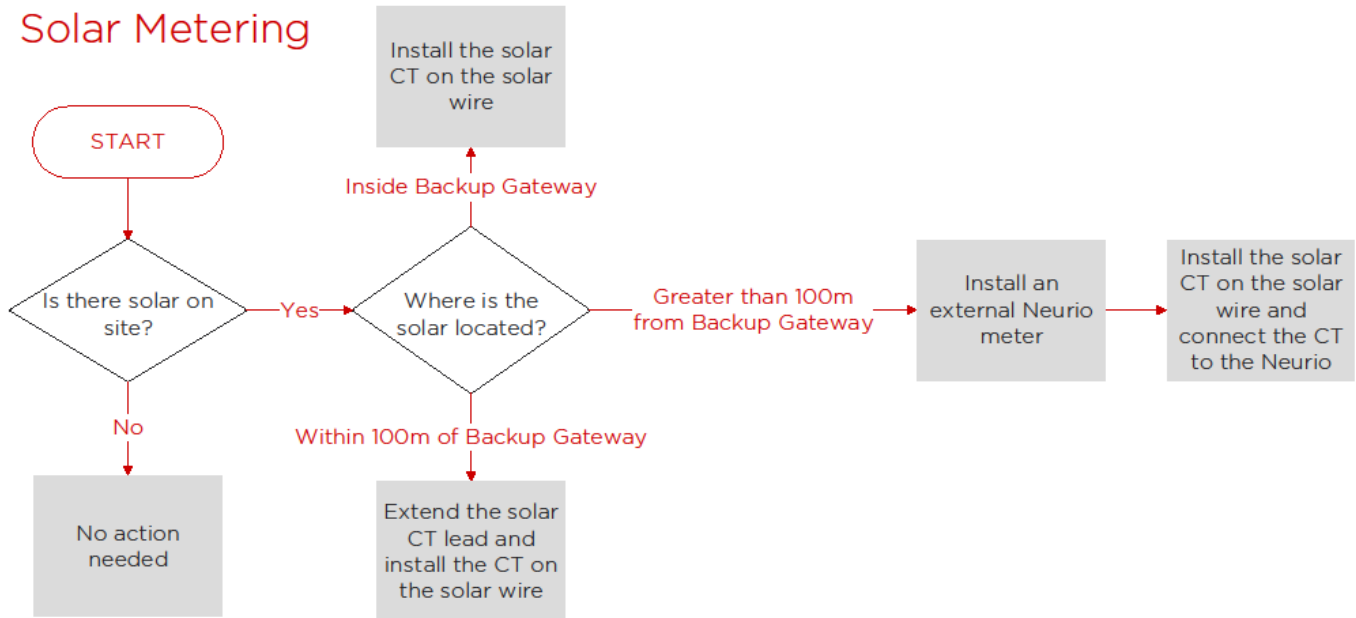
Figure 19: Grid Supply Fuse and Fuse Holder for 16kA protection

**NOTE:** The 'type aM' fuse ensures 16 kA short circuit current protection per DNO requirements. Without this fuse, the product is rated to a 10 kA short circuit current. If replacing fuses or breakers, they must be of equivalent trip/open and short circuit ratings and CE marked.

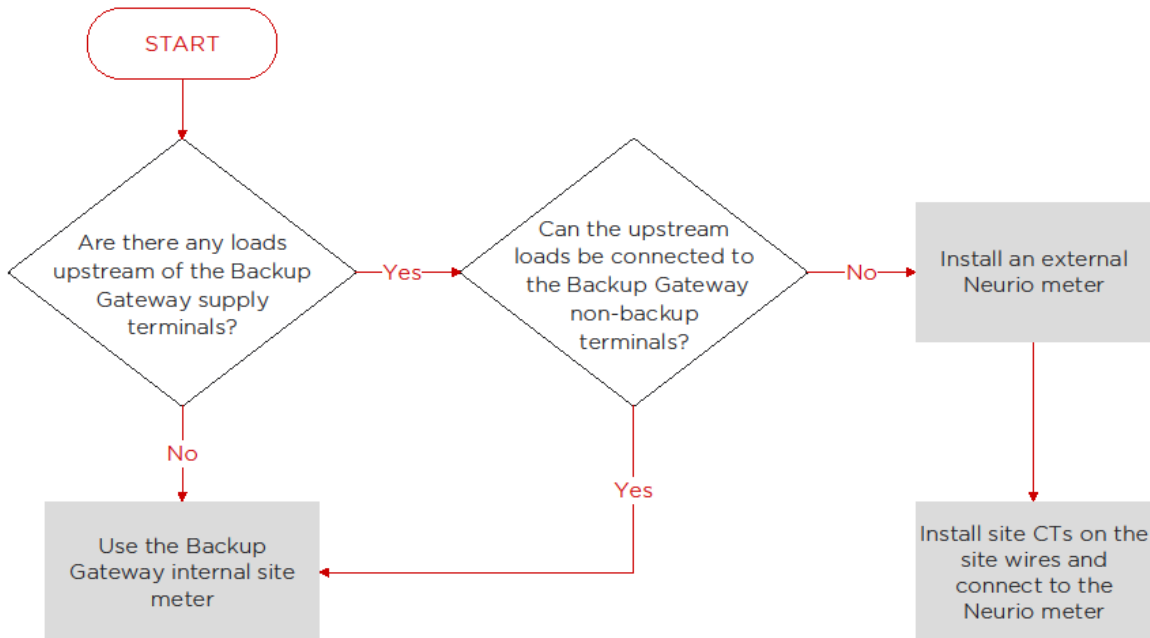
**NOTE:** For single-phase sites, a single 100 A fuse is required and for 3-phase sites three (3) 80 A fuses are required. Fuse type fuses should comply to BS 88.3, type aM, 22x58mm cartridge fuse.

## Appendix E. Configuring Energy Metering

### Solar Metering



### Site Metering



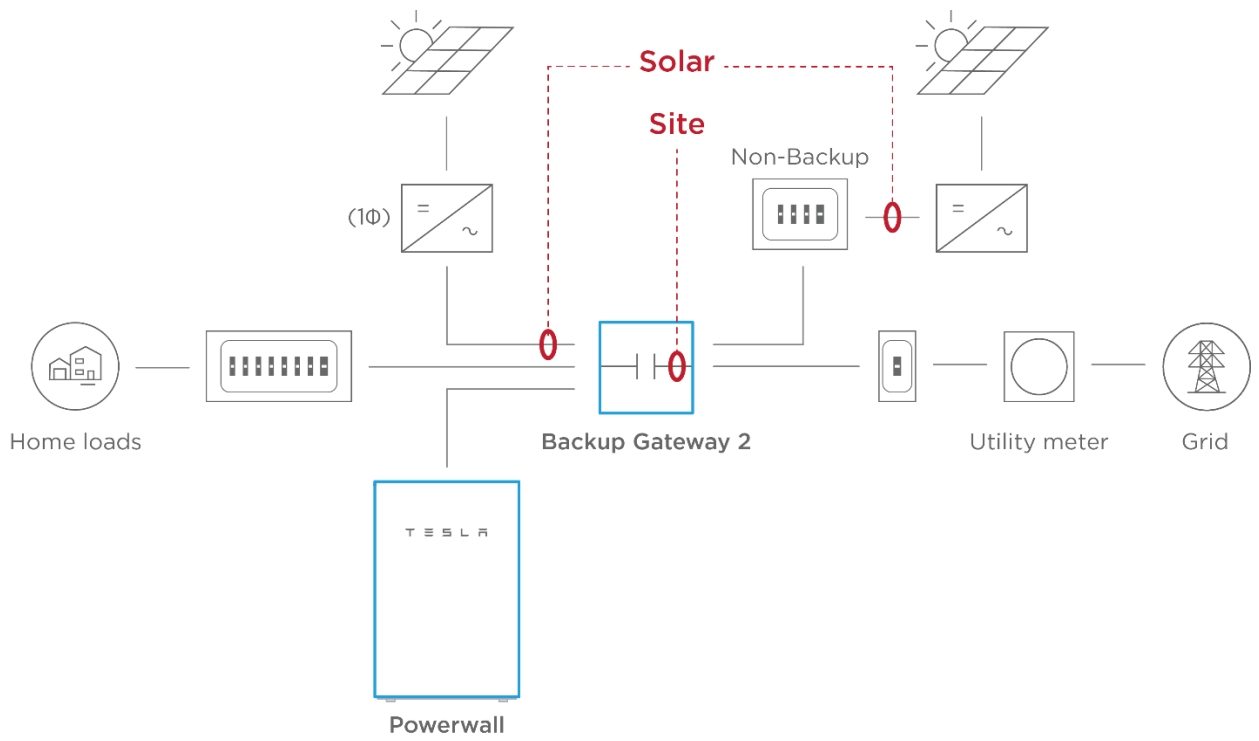


Figure 20: CT Installation Using Built-in CTs

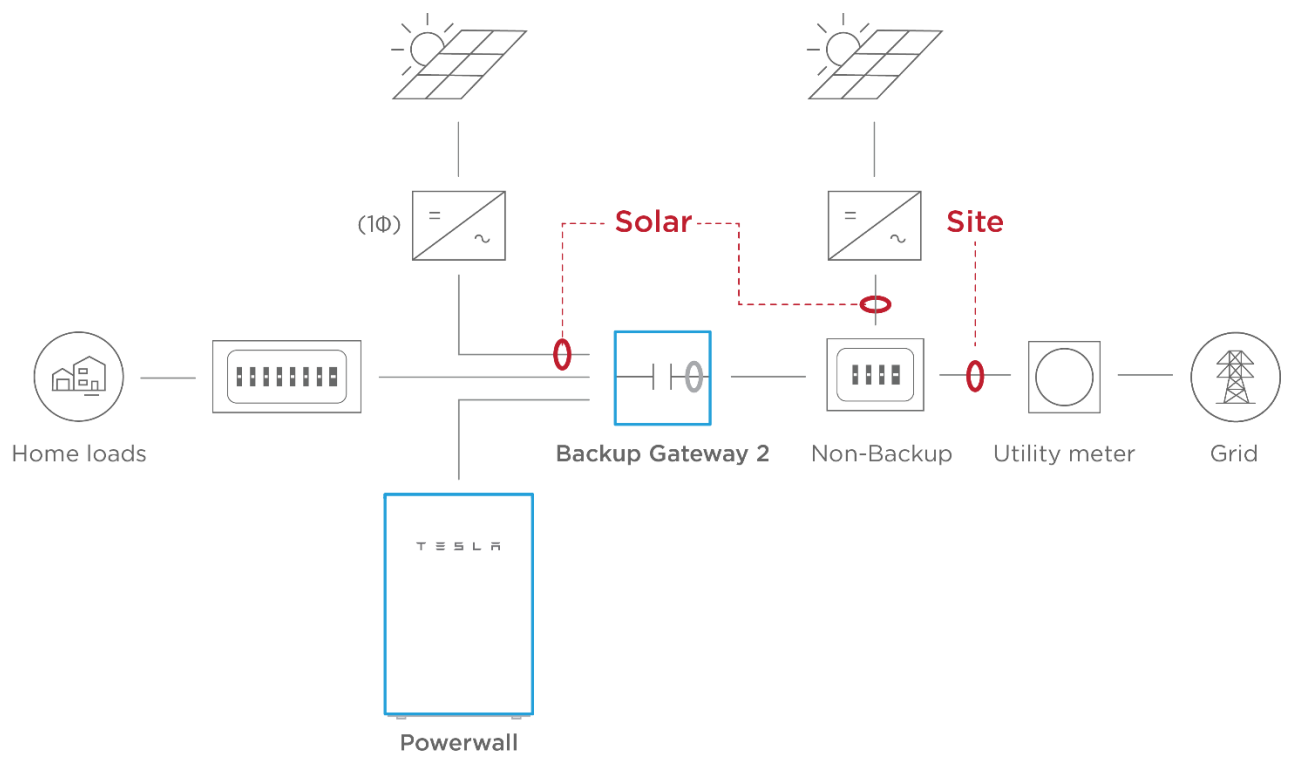


Figure 21: CT Installation with Upstream Loads or Generation

## Appendix F. Installing a Neurio Energy Meter

If energy metering in addition to the built-in Site and Solar metering is required, Neurio Energy Meter(s) may be paired with Backup Gateway.

The Neurio Meter(s) connect to Backup Gateway 2 by wireless connection, or wired communication between the meter and the Backup Gateway using an optional 2-conductor meter communication harness (Tesla P/N 1133339-00-A). The Backup Gateway can support wired communication for up to two meters.

**NOTE:** When upgrading a Gateway 1 system with Gateway 2, the existing Neurio Energy Meter(s) may be left in place in the main distribution board and re-paired. The Neurio Meter must be power cycled within one minute prior to re-pairing. If metering Site power with the Neurio Meter, ensure the Gateway 2's internal site meter is deselected in Commissioning.

### *Wireless Communication to Backup Gateway 2*

The Neurio Energy Meter may be wirelessly paired with Backup Gateway as part of the normal Powerwall commissioning process within the Commissioning Wizard.

### *Wired Communication to Backup Gateway 2*

As an alternative to wireless communication, it is possible to establish wired communication between the meter and the Gateway using an optional 2-conductor meter communication harness (Tesla P/N 1133339-00-A). Up to two meters can be wired directly to the Gateway.

If the meter is located outside the Gateway, the harness leads can be extended by splicing additional wire to the harness, as follows:

- Shielded twisted pair with drain wire (such as CAT5)
- Terminate the harness shield/drain wire in the corresponding Gateway earth terminal
- Total extended length of up to 50 m

The meter antenna is always required, even if the meter is located inside the Gateway enclosure or connected to the Gateway using the optional wired communication harness.

**NOTE:** When possible, Tesla recommends connecting the Neurio Energy Meter via wireless Wi-Fi rather than using a wired connection. This will enable firmware updating the Energy Meter. If using a wired connection, first connect the meter to the gateway wirelessly to update the meter firmware, then re-pair via a wired connection.

1. Plug the 2-conductor harness into the port on the top of the meter.
2. Connect the harness leads to the Backup Gateway Meter Communication ports by inserting them into the corresponding connector, according to the following table and diagram ([Figure 22](#)).

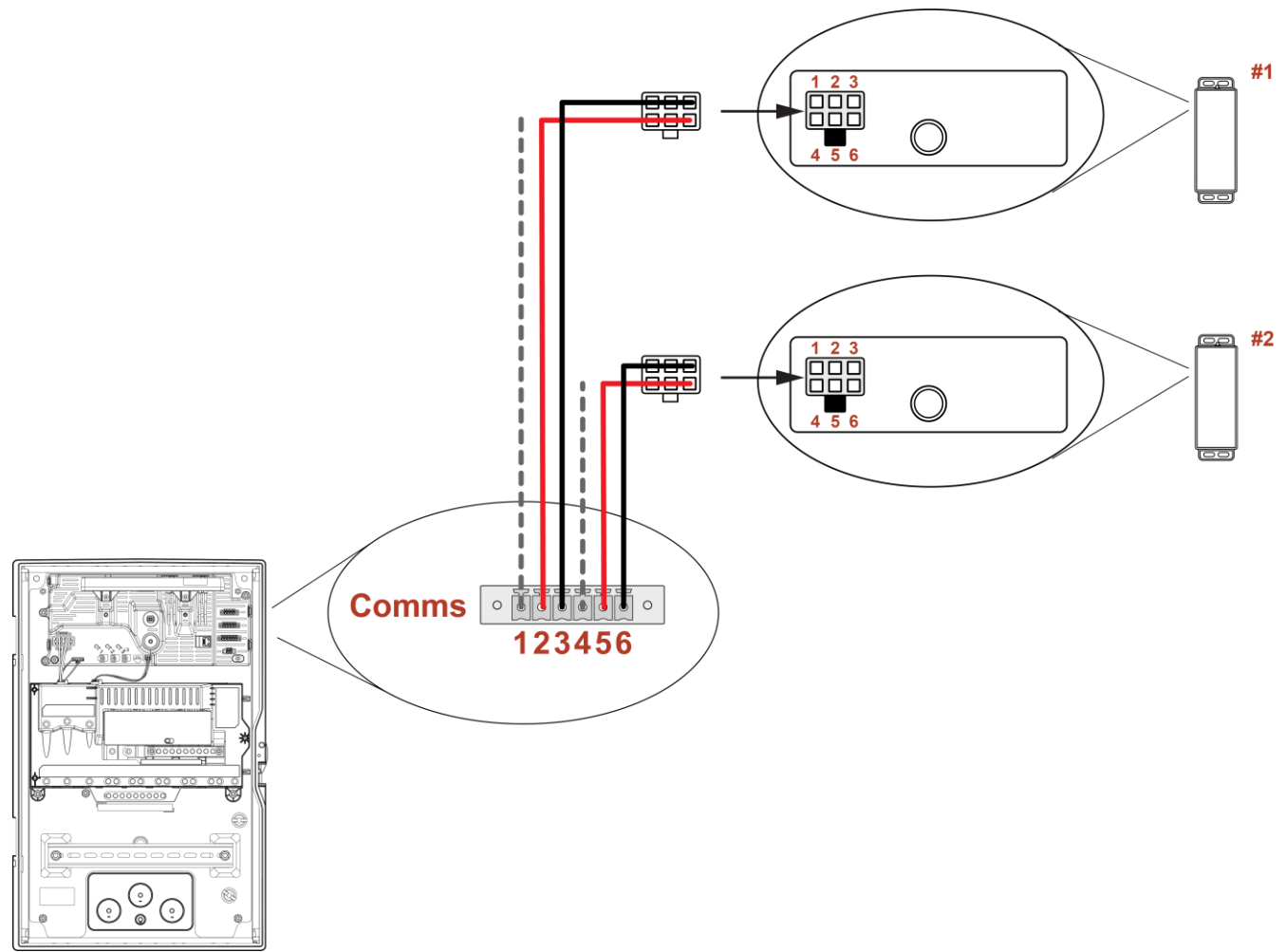


Figure 22: Meter Communication Wiring

Meter #1 Communication Port Pin	Meter Terminal	Backup Gateway Meter Communication Pin	Wire Gauge
3	RS485 LO	3	0.2-1.5 mm <sup>2</sup>
6	RS485 HI	2	0.2-1.5 mm <sup>2</sup>
(Harness shield)	(Earth/Shield)	1	0.2-1.5 mm <sup>2</sup>

Meter #2 Communication Port Pin	Meter Terminal	Backup Gateway Meter Communication Pin	Wire Gauge
3	RS485 LO	6	0.2-1.5 mm <sup>2</sup>
6	RS485 HI	5	0.2-1.5 mm <sup>2</sup>
(Harness shield)	(Earth/Shield)	4	0.2-1.5 mm <sup>2</sup>

### Meter Voltage Taps – Single-Phase Electrical Service

If the site has single-phase electrical service, before installing the meter, modify the provided voltage line harness by capping the black and grey leads. (Single-phase systems only require the brown and blue leads.)

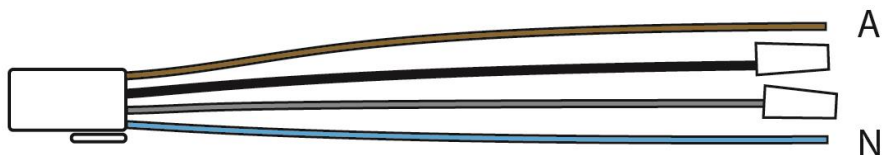


Figure 23: Voltage Line Harness with Capped Leads for Single-Phase Service

### Meter Voltage Taps – Three-Phase Electrical Service

If the site has three-phase electrical service, all leads on the voltage line harness are used.

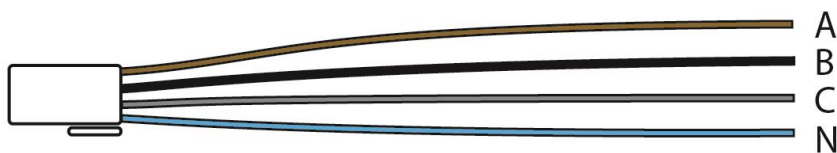


Figure 24: Voltage Line Harness for Three-Phase Service

### Current Transformer Placement

CT placement locations include the following:

Site (Grid) A CT is placed between the utility meter and main switch to measure both load and generation.

Solar If the site includes solar equipment, a CT is placed after the solar inverter to measure the solar output.

Load Site and solar metering are preferred. However, in configurations where it is not possible to locate CTs between the utility meter and the main switch, load metering can substitute for site metering.

### Voltage Tap and Current Transformer Connections

Voltage taps and current transformers must be connected so they are measuring the same phase. They must correspond according to the following table and diagram:

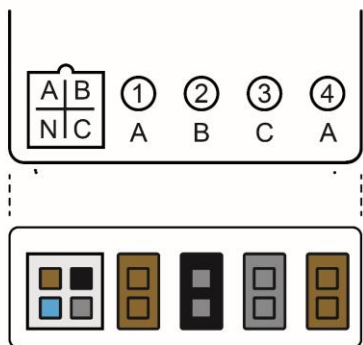


Figure 25: Voltage Tap Port (left) and four CT Ports (right) on Bottom of Meter

Phase	Meter Voltage Tap Port	Meter CT Port
Site L1	A	1/A
Site L2	B	2/B
Site L3	C	3/C
Solar L1	(A)	4/A



### Meter Placement and CT Wire Lengths

CT leads are 1.5 m long and can be extended to a maximum length of 15 m, as follows:

- For a total extended length of up to 4.5 m: CT wiring can be extended with up to one 3 m (10 ft) CT extension kit (Tesla P/N 1125547-03-x)
- For a total extended length of up to 15 m: CT wiring can be extended by using wire with the following properties:
  - Shielded, twisted pair with drain wire
  - Wire gauge of 0.2–1.5 mm<sup>2</sup>
  - Voltage rating equal to or greater than all other circuits in shared enclosures or raceways
- If the distance between the meter and the CT is greater than 15 m, the meter can be relocated, or a second meter can be used. When the meter is relocated into the main distribution board, use the antenna extension to place the antenna on the outside of the distribution board.

### Current Transformer Orientation

CTs must be installed with the label on the CT housing pointing toward the power source, according to the following table and diagram (Figure 26). Always verify CTs are in the correct orientation by observing power flow in the Commissioning Wizard.

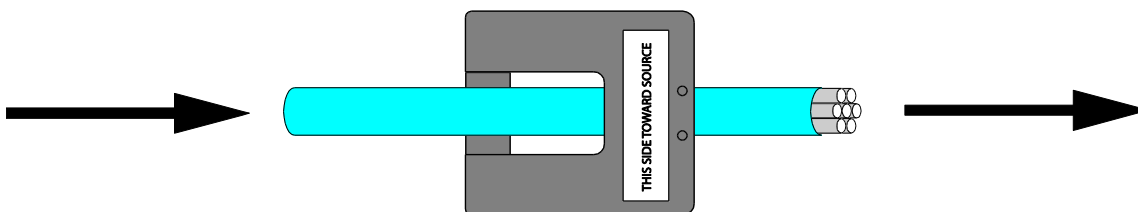


Figure 26: CT Orientation in Relation to Power Flow

CT Usage	CT Orientation
Site CTs	CT label facing <i>toward</i> the service entrance/grid
Solar CTs	CT label facing <i>toward</i> the solar inverter
Load CTs	CT label facing <i>away</i> from the loads

### Current Transformer Capacity

Each CT that can be connected to a Neurio energy meter a capacity of 200 A.

If the wiring configuration allows, it is possible to pass multiple conductors of the same type through a single CT, provided the sum of the conductor's current ratings does not exceed the CT current handling capacity. This is especially useful for systems with multiple solar inverters.

**NOTE:** Multiple conductors through a single CT is only possible if all conductors are on the same phase.

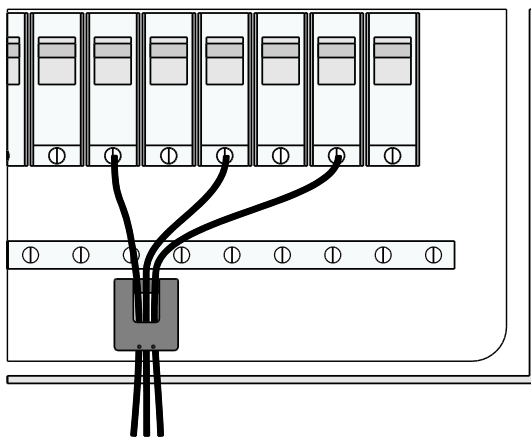


Figure 27: Multiple Conductors Passing Through a Single CT

If a site has multiple solar inverters spaced far apart, or if a distribution board has two main breakers, a Y-splitter cable (Tesla P/N 1129625-00-x) can be used to connect two CTs on the same phase to a single meter port.

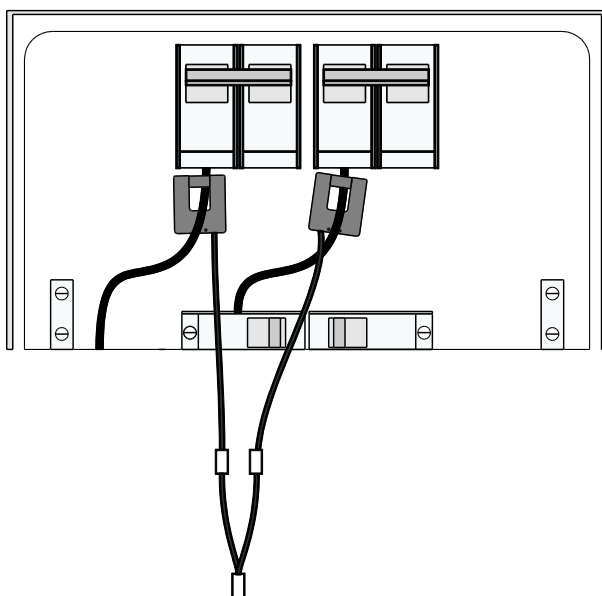


Figure 28: Y-Cable Connecting CTs

800 A CTs are also available for larger service sizes (Tesla P/N 1447689-00-x). The 800 A CTs do not require a special Neurio Energy Meter, but must be selected in the Commissioning Wizard. If using a Y-splitter with 800 A CTs, total current should not exceed 1100 A.

### *Installing the Meter*

Using the self-drilling screws provided in the meter kit, attach the meter to the inside of the main distribution board or to another surface. Choose a location that takes into account the voltage line harness and CT cable lengths.

To wire the voltage taps:

1. Plug the voltage line harness into the meter in its new location.
2. Connect the voltage line harness leads to a dedicated circuit breaker (not exceeding 16 A) of corresponding phase inside the distribution board:

Voltage Harness Port/Wire Color	Distribution Board Connection
A / Brown	L1 breaker terminal
B / Black	L2 breaker terminal
C / Gray	L3 breaker terminal
N / Blue	Neutral bus bar

To locate the CTs:

- Place a CT on the corresponding power wire in the main distribution board, after the utility meter and ahead of any loads.
- If the site includes solar equipment, place an additional CT on the solar wire in the main distribution board.

## Appendix G. Installation Troubleshooting

### Accessing the Powerwall User Interface

Use Chrome: Incognito mode or Safari: Private Browsing mode.
Work in one browser tab only.
For security message <b>Your connection is not private.</b> select <b>Advanced</b> and <b>Proceed to 192.168.xx.x (unsafe)</b> .
For <b>Error: Bad Credentials</b> , select <b>FORGOT PASSWORD</b> to reset password.
For <b>Error: Login Error (Cannot Start Wizard)</b> , select <b>Click for More</b> and tick the <b>Force Launch Wizard</b> option. Try again.
If experiencing other issues in the Commissioning Wizard, refresh the web page.
If issues persist, reboot Gateway using RESET button.

### Updating Firmware

<b>CHECK INTERNET CONNECTION</b> to verify Gateway network connection.
<b>Check for Update</b> to verify you are on the latest firmware. Factory firmware ending in GF must be updated.
Never power down or modify wiring during an update.
During the update, the Gateway will reboot which will cause the “TEG-xxx” Wi-Fi to disconnect. When reconnected, refresh the web page.

### Configuring Energy Meters

Conduct all CT tests with at least 1 kW of power flowing.
Ensure all solar inverters are monitored with CTs.
When using only 1 CT for solar, select <b>Solar (1CT x2)</b> on the Current Transformers screen in the Commissioning Wizard.
For each CT, select the applicable function on the Current Transformers screen and perform the following steps to ensure it is in the correct location and orientation: <ul style="list-style-type: none"> <li>Adjust the Amps/kW slider to see what the CTs are reading.</li> </ul>

- Verify the on-screen values for the CT against the applicable meter (such as the solar inverter meter or utility meter).
- Ensure that:
  - Site CTs are positive for import, negative for export.
  - Solar CTs are positive when the PV array is producing power (Solar is NEVER negative during daytime).

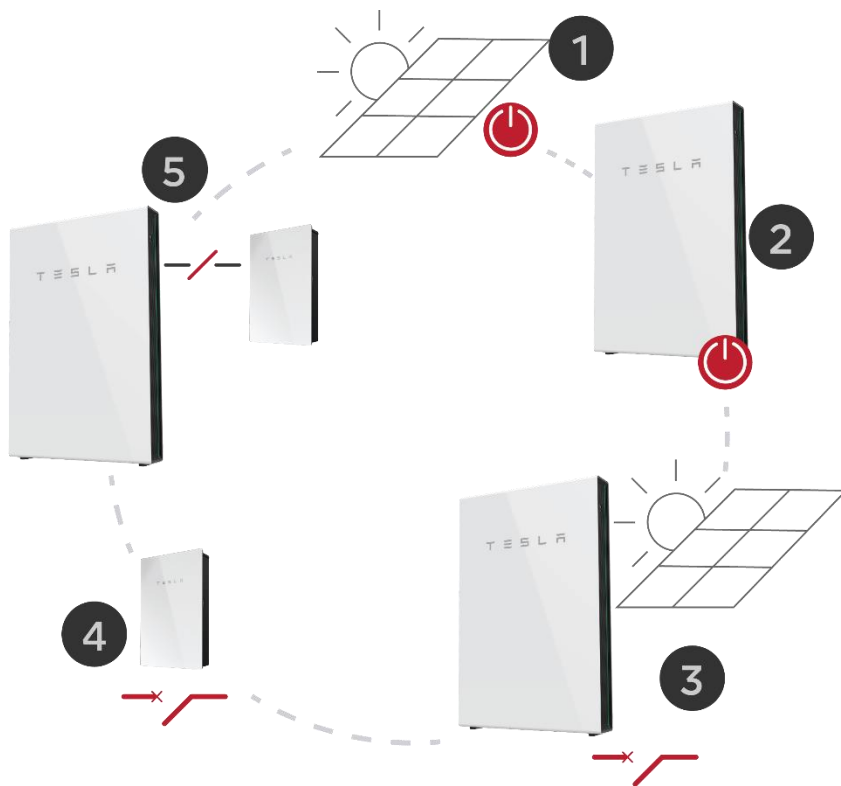
Negative power flow may indicate CT is installed on the wrong phase!

- If the “toward source” CT label is correctly facing the solar inverter but power flow is negative, a voltage-current mismatch is likely.
- Physically move the CT to the correct phase with the label facing the correct direction. Do not use the Flip checkbox in this case.

Solar CTs should only meter generation sources. It is never recommended to meter both generation and loads using the Solar (1 CT x2) option. If it is absolutely necessary to install solar and a small amount of loads together without independent metering, you must install the solar CT on the phase without any downstream loads.

Use a handheld clamp or fork meter to verify CT readings.

### Power Cycle the System



To power the system off:

1. Turn off solar equipment.
2. Turn off all Powerwalls.
3. Open breakers feeding Powerwall and solar.
4. Open breaker feeding Gateway.
5. Disconnect communication wiring.

Reverse steps to power the system on.

## Appendix H. Multi-Powerwall Installations

### Multi-Powerwall Installations with Backup Gateway

#### *Overview*

This section describes the requirements for installations with 2 or more Powerwalls per phase with a Backup Gateway in Europe.

#### *Pre-Requisites for Design*

Before designing a Powerwall system with 2 or more Powerwalls per phase:

- Measure AC Line-to-Neutral impedance at the service head to ensure the utility grid connection is able to support the desired quantity of Powerwalls. Refer to the Line Impedance Requirements section below for more information.
- Minimize Impedance:
  - Install the Powerwalls as close as possible to the point of interconnection with the grid.
  - Install wires larger than required by code between the Powerwall generation panel and the point of interconnection with the grid. For example, while 4 or 6mm<sup>2</sup> may be sufficient to meet regulations (provide sufficient current carrying capacity), increasing the cable to 10mm<sup>2</sup> or even 16mm<sup>2</sup> for longer runs should be considered, especially on sites with high grid impedance. Maximum recommended AC voltage drop between the Powerwall and the point of interconnection is 2%.

#### *Service Capacity Requirements*

The Backup Gateway supports systems of up to 10 Powerwalls, but the actual maximum number of Powerwalls may be limited by the electrical service size or local requirements.

Powerwall is a single-phase device. Large multi-Powerwall systems can be installed at single-phase or three-phase sites, according to the local standard. For three-phase sites, many local codes require phase balancing, so it may be necessary to have an equal number of Powerwalls on each phase. Typical Multi-Powerwall systems have three, six or nine Powerwalls. Other configurations are also possible if in compliance with the local standard.

#### *Line Impedance Requirements*

Measure the impedance between Line and Neutral at the service head, as shown in [Figure 29](#), and compare it to the values in [Table 1](#). The sensitivity of the system to line impedance increases with the number of Powerwalls in the system, therefore the maximum allowable impedance relates to the number of Powerwalls. If the measurement exceeds the maximum allowable value, do one of the following:

- Decrease the impedance of the site grid connection. This may require coordinating with the local electrical utility.
- Decrease the number of Powerwalls to meet the maximum allowable impedance value.
- Contact Tesla Technical Support

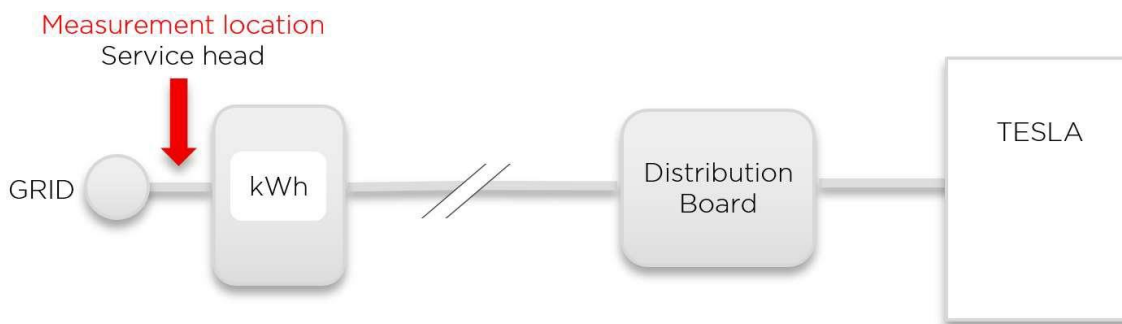


Figure 29: Impedance Measurement Location Before Designing the System

Number of Powerwalls per Phase	Maximum Line-Neutral Impedance at the Service Head (Point A)
1	0.80 Ohms
2	0.40 Ohms
3	0.27 Ohms
4	0.20 Ohms
5	0.16 Ohms
6	0.13 Ohms
7	0.11 Ohms
8	0.10 Ohms
9	0.09 Ohms
10	0.08 Ohms

Table 1: Impedance Requirements for Multi-Powerwall Systems\*

\*Values to be measured before designing the Powerwall system.

#### Example of Line-to-Neutral Impedance Test Instructions

Take the measurement with test equipment such as the following:

- Fluke 1660 Series Installation Tester (1662, 1663, or 1664)
- Metrel-MI3000 Multifunction Tester
- Megger LTW315 Loop Impedance Tester

For details on line impedance testing, refer to the test equipment manufacturer's instructions. The steps below are general guidelines only.

**⚠ WARNING:** Impedance tests must be performed on an energized electrical system. Impedance tests should be carried out only by trained electricians using appropriate safety equipment and safety practices.

1. Follow manufacturer instructions to calibrate and zero the impedance tester before taking measurements.
2. If the site has a 3-phase electrical system, complete the test on L1 first, then move to L2 and L3 in sequence.
3. Follow manufacturer instructions to verify that the correct voltage is present. Switch the tester to a voltage measurement mode and check Line-to-Neutral and Line-to-Ground voltages.
4. Follow manufacturer instructions to take an impedance measurement at the service head ([Figure 29](#)). Switch the tester to the appropriate impedance measurement mode and take the readings between Line and Neutral.
5. Record the impedance measurements.

### System Installation

Multiple Powerwall units can be installed side-by-side, or stacked up to three units deep with the Powerwall Stack Kit. Stacked multi-Powerwall systems must be floor-mounted and must be anchored to an adjacent wall. In a 9 Powerwall installation, there will be 3 groups of 3 Powerwalls each, stacked with 3 different kits. Refer to [Multi-Powerwall Installations with the Stack Kit](#) for more information.

After the installation, measure the impedance between Line and Neutral at the terminals of Powerwall, as shown in [Figure 30](#) and again at the service head and compare the two measurements. In a standard installation, the difference is within 0.1 ohm. Where a difference of greater than 0.1 ohm is measured, do either of the following:

- Increase wire size on the circuits supplying the Powerwalls: This simple and effective means reduces the impedance seen at the terminals of the Powerwall.
- Reduce and improve electrical connections. Every connection contributes to the overall impedance seen by the Powerwall.

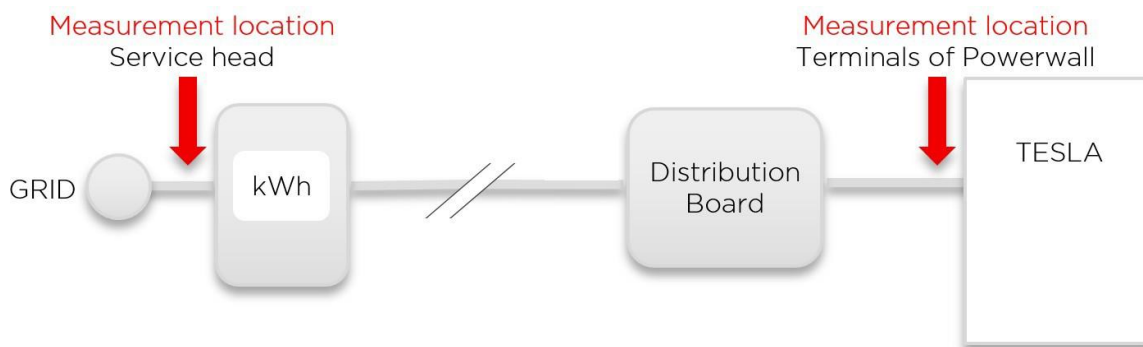


Figure 30: Measurement Locations After Installing the System

### System Commissioning

Plan for the commissioning process to take longer with multi-Powerwall installation. Each Powerwall can take up to 3 minutes to complete the commissioning scan and verify process, so a 10-Powerwall system can take up to 30 minutes during this stage of commissioning.

NOTE: During the commissioning process, do not interrupt a step, turn off the system, or unplug the communication wiring at any time.

[Figure 31](#) shows the Multi-Powerwall installations flowchart, from design to commissioning .



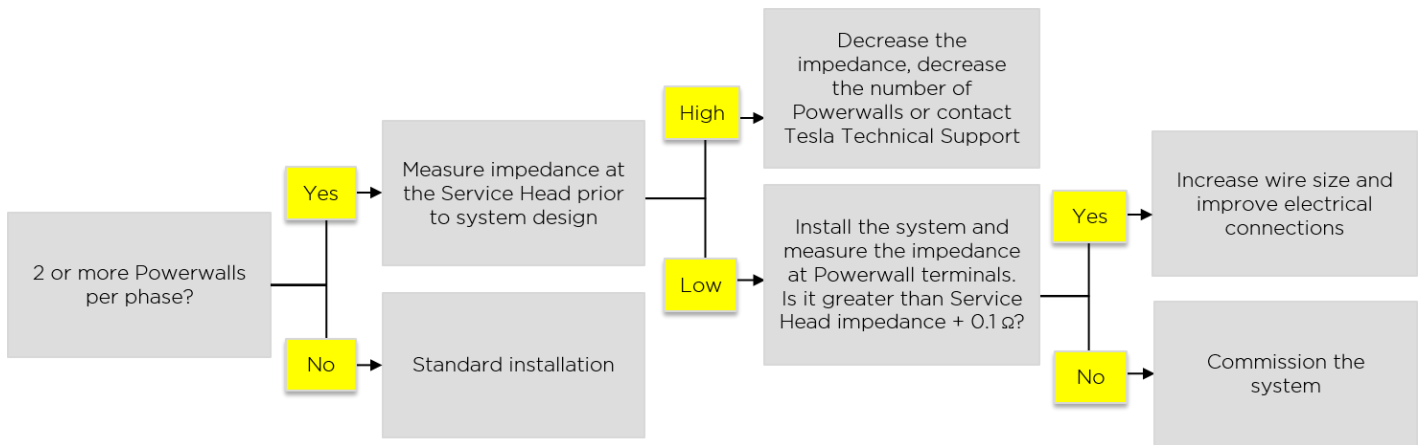


Figure 31: Multi-Powerwall Installations Flowchart

### System Operation on Three-Phase Systems

NOTE: This paragraph is applicable to all Powerwall systems installed on three-phase systems, regardless of the number of Powerwalls installed.

Powerwall systems installed to maximize solar self-consumption operate according to Three Phase Vector Sum Compensation: the system targets an aggregate import from the grid of 0 kW (calculated as difference between imports and exports across the 3 phases) using all available Powerwalls. To achieve this, the site may import on some of the phases while exporting on the other phases as shown in [Figure 32](#): the systems have 1 and 3 Powerwall units installed but the same principle is applicable to systems with a larger number of Powerwall units installed.

- Example on the left: Solar produces 9 kW, total loads are 12 kW. Powerwall unit discharges 3 kW to keep the aggregate import from the grid at 0 kW.
- Example on the right: Solar produced 9 kW, total loads are 12 kW. Powerwall units discharge 3 kW in total to keep the aggregate import at 0 kW. Since there are 3 units installed, each unit discharges 1 kW.

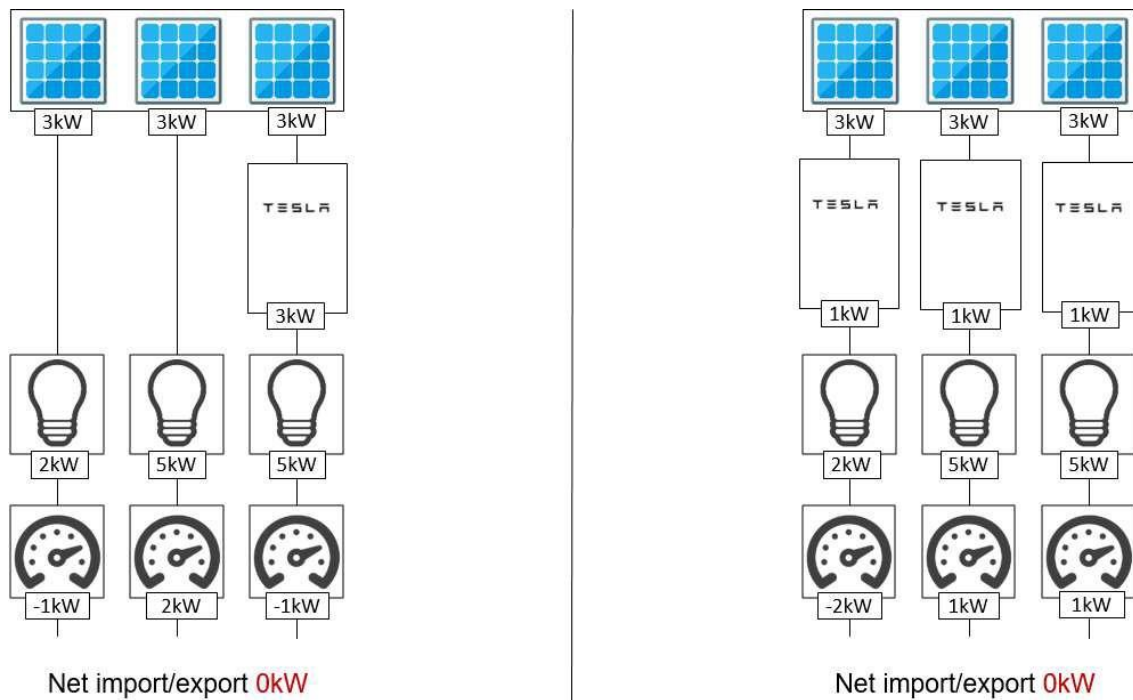


Figure 32: Examples of Multi-Powerwall System Operation

### *Note for UK Market*

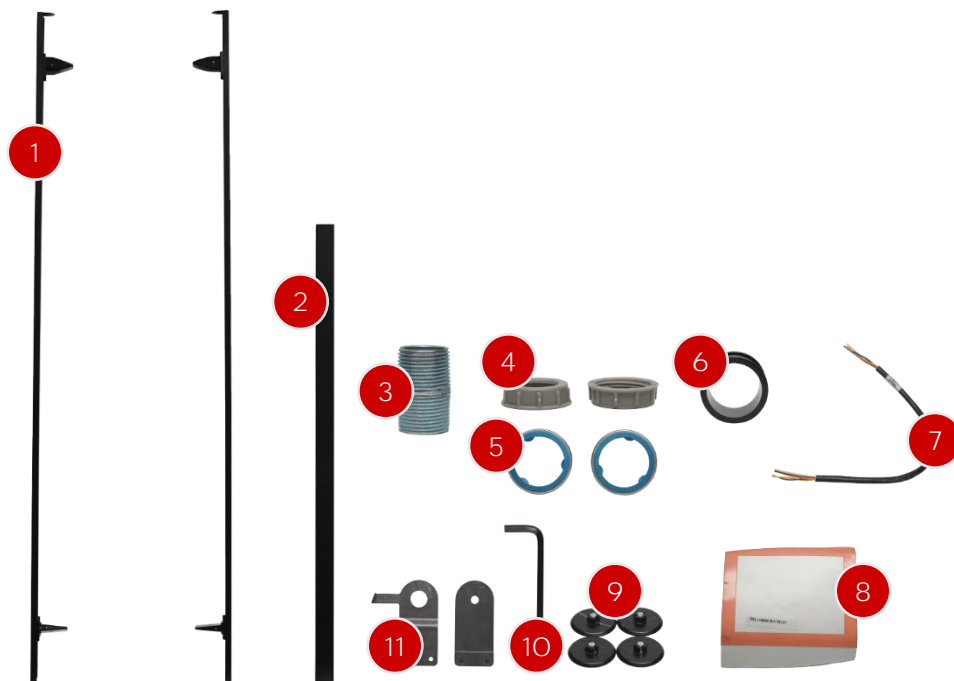
Before designing the system, please ensure that the installed utility three-phase meter records the sum of the imports less any exports (vector-sum meter type). Not all multi-phase meters are vector-sum type, for example some measure only the imports without detracting the exports. Vector-sum meter is required to make the application work correctly. If a multi-phase non-vector sum meter is installed, please coordinate with the customer and the customer's energy supplier to replace it with a vector-sum one. If that is not possible, do not proceed with the Powerwall installation.

### *Multi-Powerwall Installation Notes*

- For single-phase solar, Powerwall(s) must be installed on the same phase(s) as the solar inverter(s).
- Ensure that loads are balanced across the three phases.
- Meter voltage taps must be matched phase-by-phase to their respective current transformers (CTs).
- In Backup installations, the Backup phase is selected during the commissioning process. During an outage, the system provides backup power only to the loads on this phase. Ensure that all critical loads in the Home Load Panel are connected on the desired Backup phase.

## Multi-Powerwall Installations with the Stack Kit

### In the Powerwall Stack Kit



1	2	3	4
(2) Side clips	(1) Top cover	(1) Conduit nipple	(2) Conduit insulation bushings
5	6	7	8
(2) Conduit sealing O-rings	(1) Bridge piece	(1) 5-conductor communication cable	(1) Wiring interface cover
9	10	11	
(4) Magnetic camshaft caps	(1) 6 mm Allen wrench	(1) Drill guide (two pieces)	

#### Required Tools

- Personal protective equipment (safety glasses, gloves, protective footwear)
- Drill and 6 mm (1/4-inch) drill bit (for drilling pilot hole in Powerwall chassis)
- 35 mm (1-3/8 inch) hole saw (for drilling conduit hole in Powerwall chassis)
- Small metal file (for removing burrs from Powerwall chassis sheet metal)
- Rubber mallet or small hammer and wood block (for seating side clips in Powerwall)
- Wire strippers/cutters for 1.5 to 8 mm<sup>2</sup> (24 to 8 AWG) wires
- Small grease applicator (wooden craft stick or cotton swab)
- Water-resistant heavy-duty grease (Dow Corning Molykote BR-2 Plus High Performance Grease or equivalent, for preventing corrosion on side clips)
- Installation tools (level, tape measure, pencil, flashlight)

### Site Requirements

Stacked multi-Powerwall systems must be floor-mounted and must be anchored to an adjacent wall. The wall must be capable of supporting the lateral load of the Powerwall stack.

A maximum number of 3 floor-mounted Powerwall units may be joined together with two Powerwall Stack Kits. For systems with more than 3 Powerwalls, separate groups of 3 units should be assembled, with each group of 3 attached to a wall.

For complete Powerwall Mechanical Specifications and Site Requirements, see [Site Requirements and Pre-Installation Guidance](#).

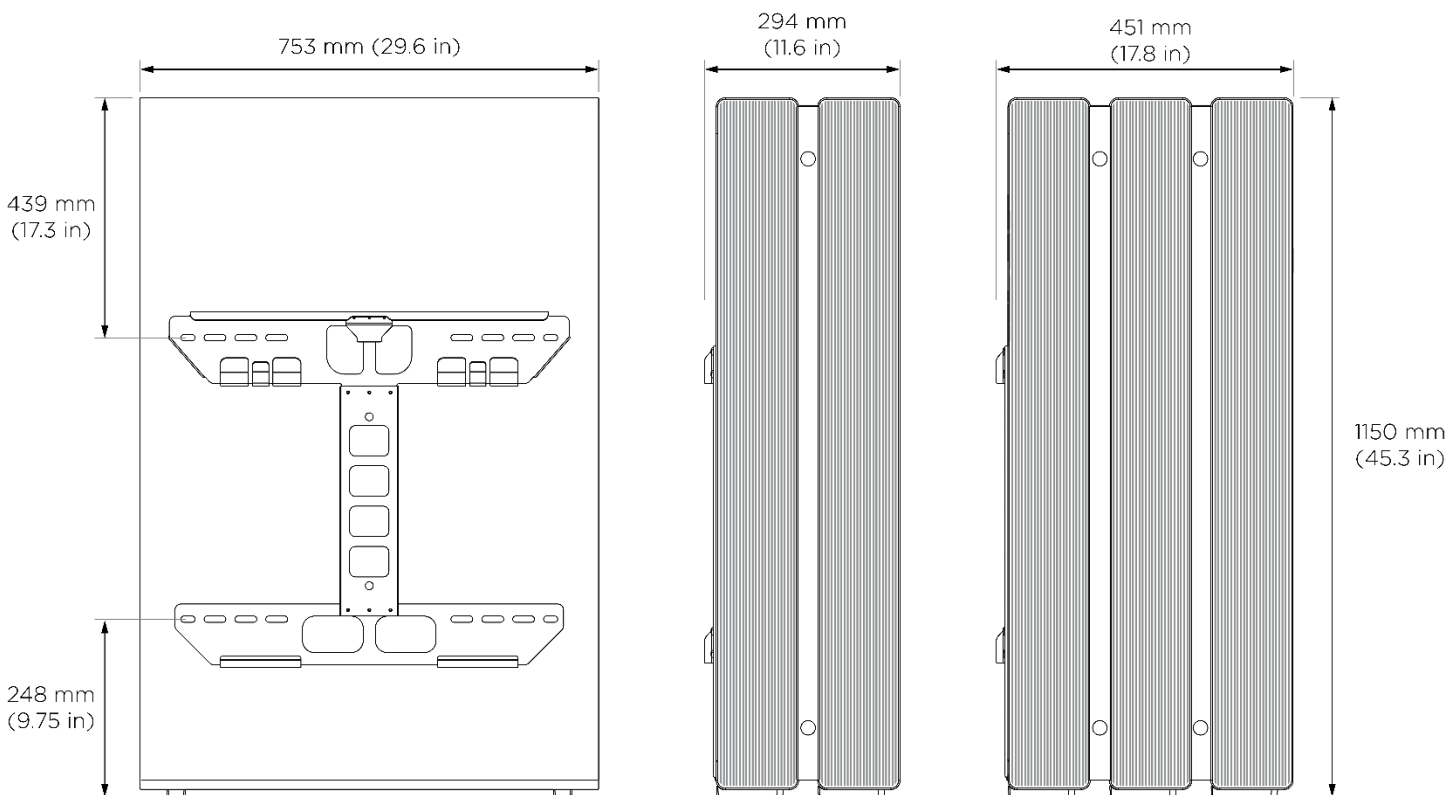


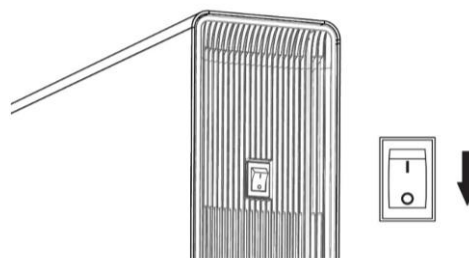
Figure 33: Dimensions for 2-unit and 3-unit Powerwall Stacks

### Installation Instructions

These instructions assume that at least one Powerwall has been installed and additional Powerwall units are being installed using the stack kit. Complete installation instructions begin on page 16 of this manual.

#### Step 1. Prepare for Installation

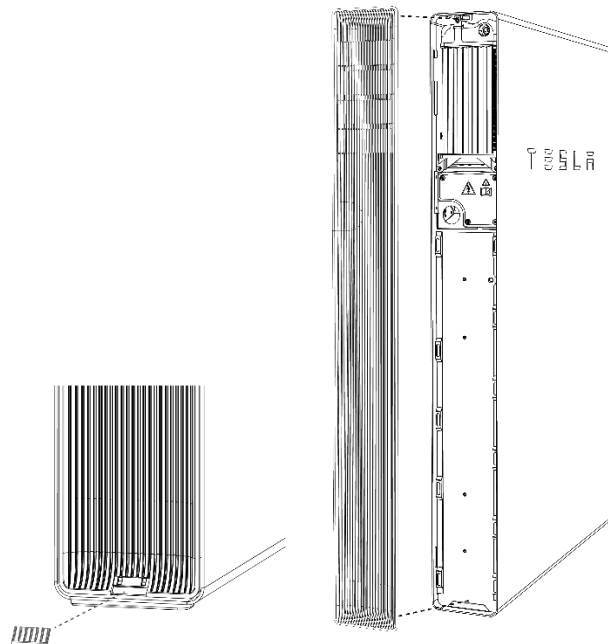
1. Turn off the first (previously installed) Powerwall by setting its On/Off switch to the OFF position.
2. Turn off the AC circuit breaker for the Powerwall.
3. Ensure that the second Powerwall is turned off by verifying that its On/Off switch is set to the OFF position.



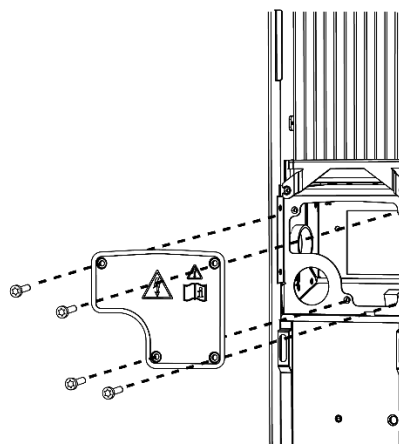
4. Remove both side covers from each Powerwall to be joined.

NOTE: On the first (previously installed) Powerwall, it may be necessary to remove the small plastic insert at the bottom of the covers to help with removal.

For the right (LED) side covers, do not disconnect the switch and LED leads. Turn the cover to one side and rest it against the Powerwall chassis.



5. Using a T20 Torx bit (provided with each Powerwall unit), remove the wiring compartment covers from the previously installed Powerwall.



## Step 2: Choose a Wiring Option

In multi-Powerwall systems, communication wiring is daisy-chained between Powerwall units. Power wiring is direct (home run) from each Powerwall to a dedicated circuit breaker in the electrical panel. Wiring between Powerwalls can be concealed, or run externally.

### Concealed Wiring

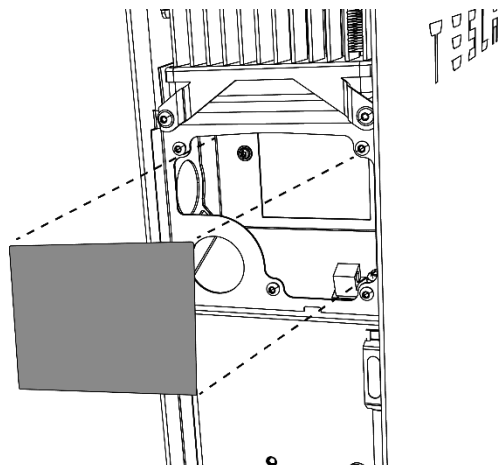
For concealed wiring, a hole is drilled from the front of the first Powerwall into its wiring compartment and wires are run directly into it from the back port of the second Powerwall. To use this wiring method, proceed to Step 3, “Prepare for Concealed Wiring.”

### External Wiring

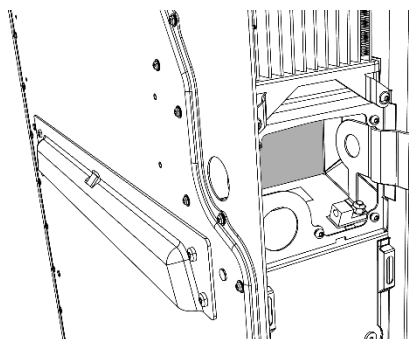
For external wiring, wires are run through conduit or raceway that spans the wiring compartment ports on the side of each Powerwall. To use this wiring method, skip to Step 4, “Join the Powerwall Units.”

### Step 3: Prepare for Concealed Wiring

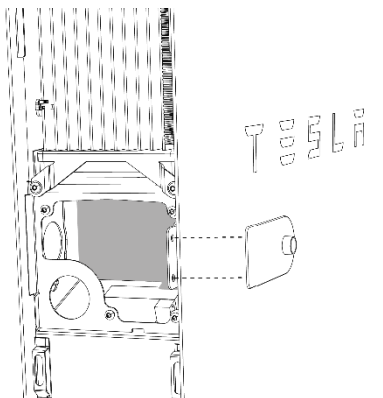
1. Disconnect all wiring from the wiring compartment of the first Powerwall.
2. Locate the wiring interface cover and peel back the film to expose the adhesive on the cover gasket. With the gasket facing inward, place the cover over the interface board at the back of the wiring compartment. The cover is intended to protect the circuit board and its components from metal shavings while drilling into the wiring compartment.



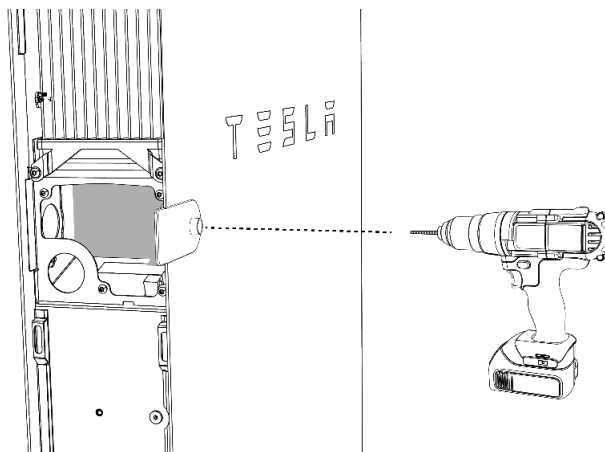
3. Attach the included drill guide to the front of the first Powerwall by bracing the inside half of the guide against the bottom of its wiring compartment.



4. Clip the outside half of the drill guide to the inside half so that the guide engages the hem of the Powerwall enclosure.

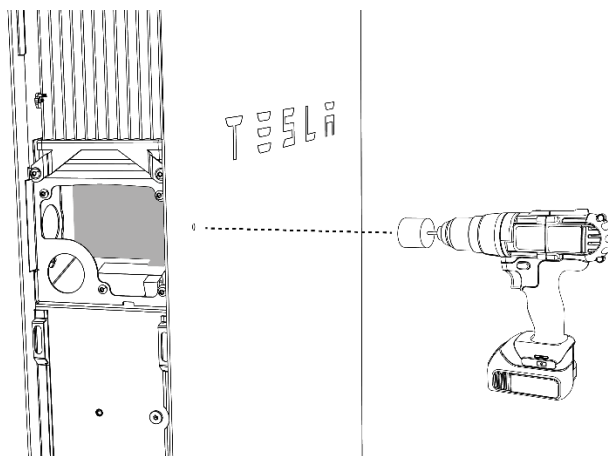


5. While holding the drill guide to make sure it conforms to the edge of the Powerwall chassis, drill a 6 mm (1/4-inch) pilot hole using the small hole in the drill guide.



6. Remove the drill guide.

7. Drill the full-size 35 mm (1-3/8 in) hole with a hole saw, using the pilot hole as a guide.



8. File the edges of the hole to remove any burrs.

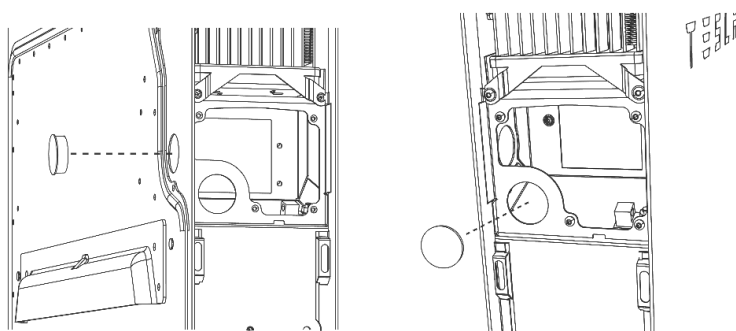
9. Clear the wiring compartment of all metal shavings and debris.

10. Remove the protective cover from the wiring compartment.

11. If the first Powerwall still has its protective film, remove the film.

12. Peel back the protective film from the feet of the second Powerwall before moving it into place.

13. Remove the plug from the back cable entry port of the second Powerwall and place it in the side cable entry port of the same Powerwall.

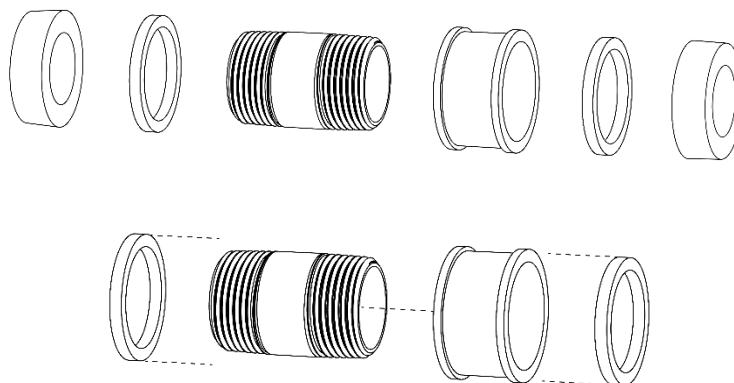


#### Step 4. Join the Powerwall Units

1. Orient the second Powerwall about 2 cm (1 in) in front of the first, with its back cable entry port facing the hole you drilled in the front of the first Powerwall.

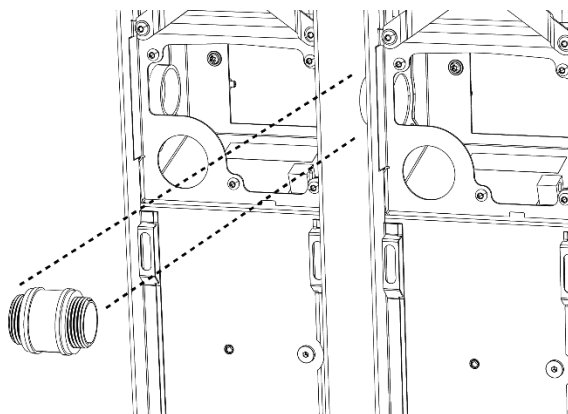
2. (Concealed wiring installations only) Do the following to bridge the gap between the Powerwall wiring compartments:

- Locate the bridge piece, conduit nipple, two O-rings, and two insulation bushings.
- Assemble the conduit nipple, bridge piece and O-rings. Center the bridge and O-rings on the nipple.

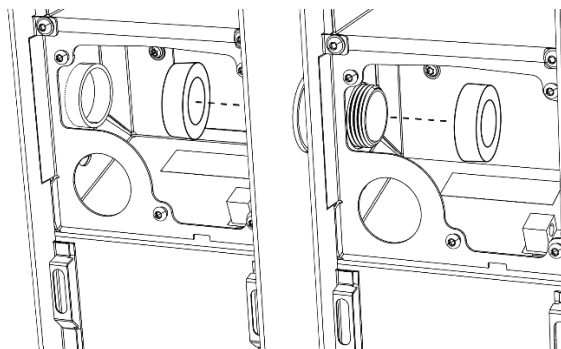


NOTE: Orient the O-rings so that the sides with greater surface area (marked "Box Side") point to the outside, toward the Powerwall chassis.

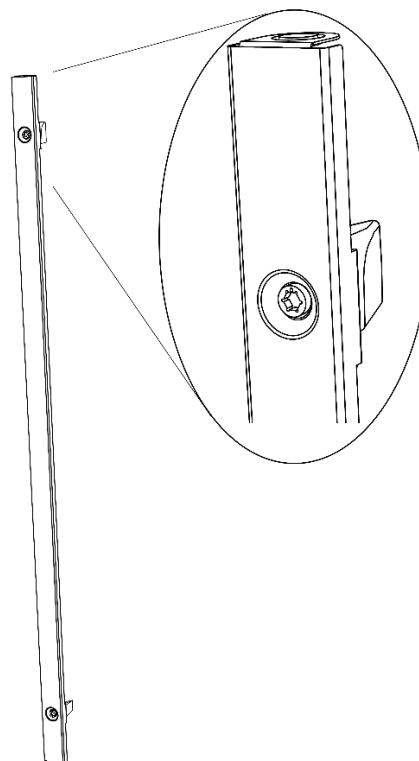
- Install the assembly between the two Powerwalls so it spans the two wiring compartments.



- Thread an insulation bushing onto each end of the conduit nipple, but do not fully tighten the bushings.

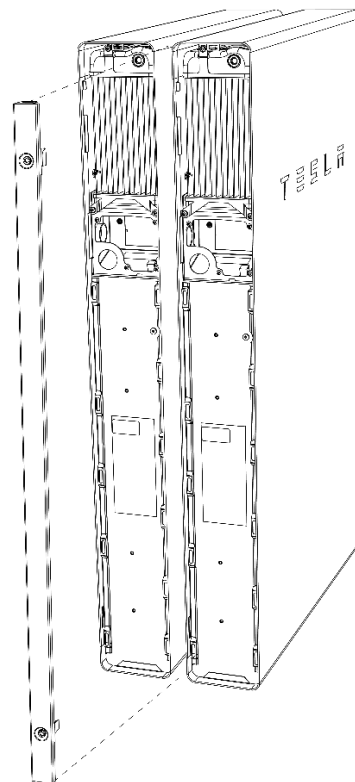


3. (All installations) Locate a side clip, making sure the flange (with magnet) is positioned at the top and that the cams are rotated vertically in relation to the clip.

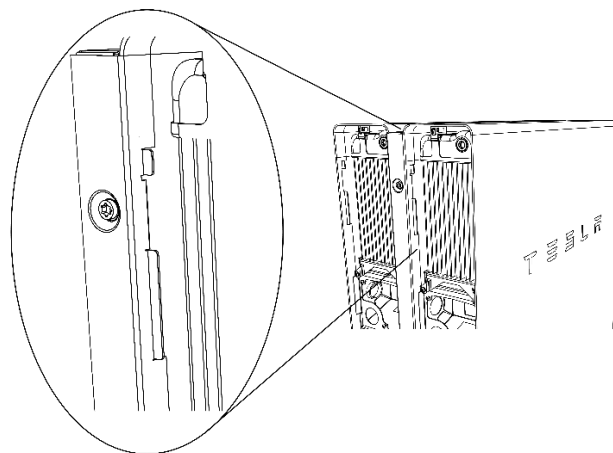




4. Slide the side clip into the gap between the two Powerwalls so that its flanges engage the side hem of each enclosure.



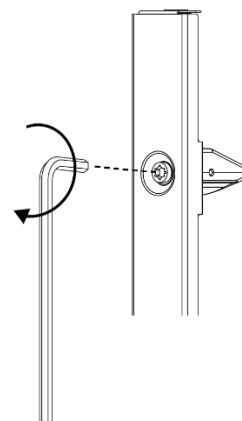
NOTE: The Powerwall enclosure hems have cutouts that mate with tabs in the clip.



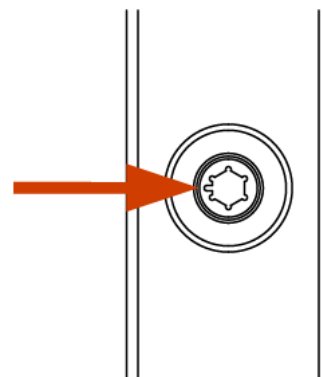
5. Press the clip until it is flush with the sides of the Powerwalls.

6. Using the provided 6 mm Allen hex wrench, do the following:

- Turn the top cam 90 degrees clockwise until it clicks into place and stops rotating.



- Turn the bottom cam toward the wall (toward the first Powerwall) so that the cam indicator notch on the hex camshaft head points toward the wall, until the cam clicks into place.



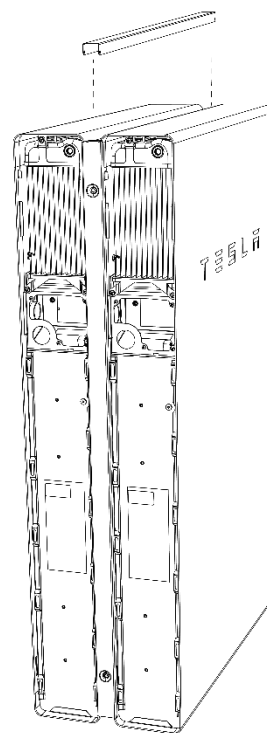
NOTE: The top cam is symmetrical and can be rotated in either direction to secure the side clip. The bottom cam must be rotated toward the first Powerwall so that its stepped side (indicated by the notch on the hex camshaft head) engages the housing of one of the Powerwalls.

7. Repeat steps 3-6 to install a side clip on the other side of the Powerwalls.

NOTE: If necessary, use a small rubber mallet or a hammer and wood block to gently tap the side clips so that they are fully seated in the hem of the Powerwall.

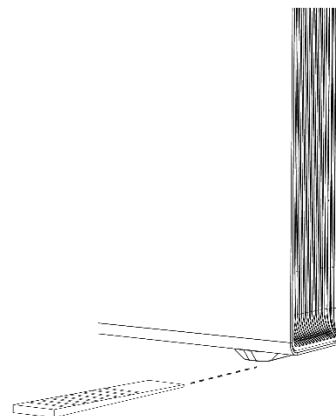
8. Position the top cover across the gap between the Powerwalls so that its flanges engage the tops of each side clip. The cover is held in place by the magnets on the tops of the side clips.

9. (Concealed wiring installations only) Tighten the insulation bushing on each side of the conduit nipple to secure the bridge between the two Powerwall wiring compartments.



10. Use the provided shims to ensure that the Powerwalls are level.

NOTE: When joined, the units should be level within  $\pm 2$  degrees side-to-side and within  $\pm 5$  degrees front-to-back.

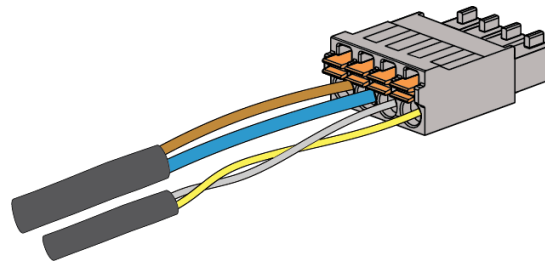


## Step 5. Wire the Powerwall Units

1. Connect the communication ports of the two Powerwalls by doing the following:

- Run the provided 5-conductor communication harness between the Powerwall wiring compartments. The end with the shield/drain wire should be in the second Powerwall.

NOTE: The orange conductor is unused in Powerwall 2 AC installations.



- Attach the provided Phoenix connector to one end of the harness, and attach the extra Phoenix connector that came with the Powerwall to the other end of the harness. See [Appendix B](#) for additional wiring information.
- Connect the communication OUT connector of the first Powerwall to the communication IN connector of the second Powerwall.
- Insert the shield/drain wire in the second Powerwall chassis ground lug (Fig 24). The ground lug is identified with the following symbol: . Tighten the screw in the ground lug to 4.5 Nm (40 lb-in).

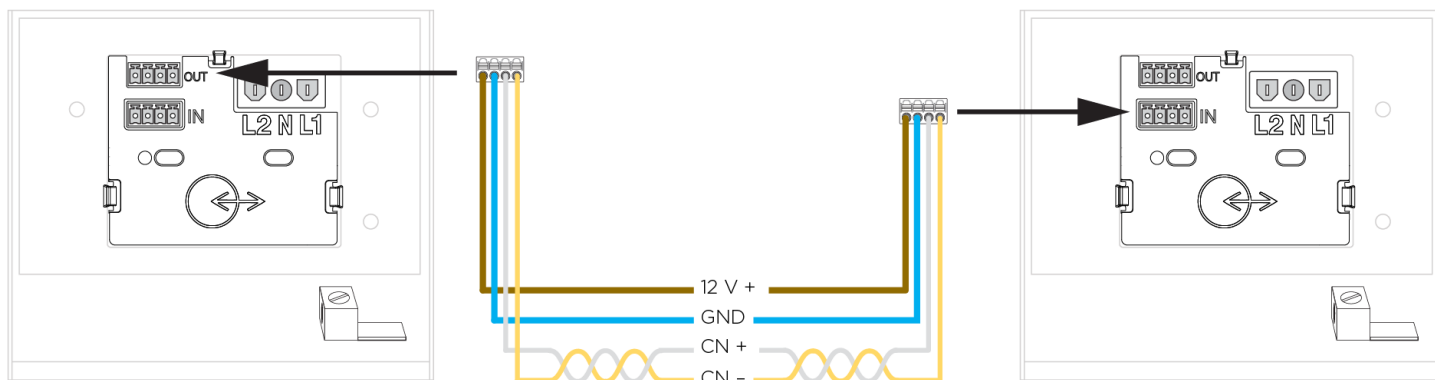


Figure 34: Connecting Powerwall Communication Ports

- In the last Powerwall in the communication chain, plug the 4-pin Phoenix connector with the terminating 120-Ohm resistor into the top 4-pin socket (labeled “OUT”). See [Figure 14](#).

2. Connect each AC Powerwall to the main or sub electrical panel of the installation (depending on the system configuration) according to the electrical service type.

3. On the Powerwall side, strip the ends of the wires and attach them to the corresponding leads on the 3-pin AC power harness.

4. Plug the AC power harness into the AC connector in the Powerwall wiring compartment. Ensure that the connector clicks into place (see [Figure 12](#)).

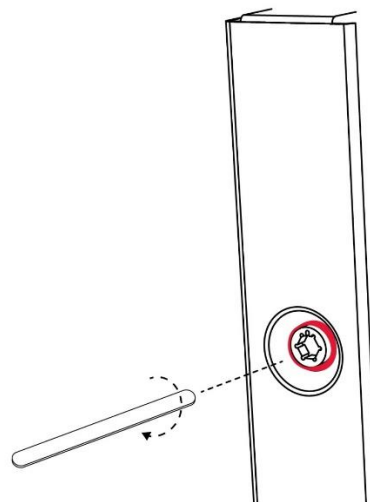
NOTE: Each Powerwall connection to the main electrical panel requires an independent 32 A circuit breaker (20 A circuit breaker for CH). This breaker serves as the disconnect for the Powerwall, and must be wired in accordance with local wiring codes and regulations.

5. Reconnect the power and communications leads that were disconnected from the first Powerwall at the beginning of the installation.

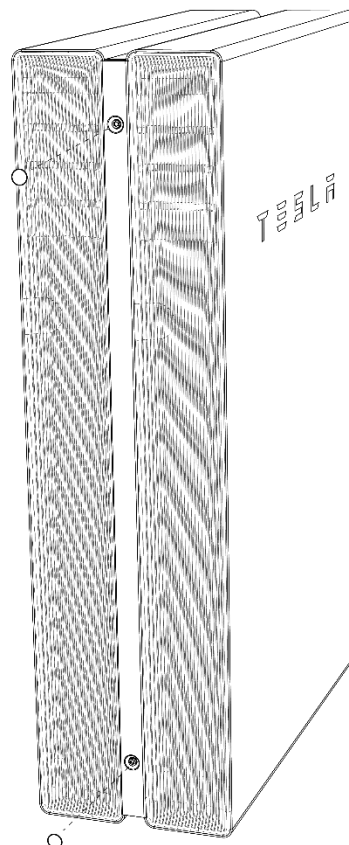
### Step 6. Close the Wiring Compartments and Replace the Covers

1. Arrange the communication and AC power wires inside the Powerwall wiring compartments.
2. Ensure that all conduit junctions and cable entry points are secure and properly sealed.
3. Replace the wiring compartment cover on each Powerwall. Ensure that the cover seats properly on the gasket so that the compartment is sealed. Tighten the fasteners using the Torx T20 bit. Torque to 1.5 Nm.
4. Replace each of the side covers on the Powerwalls by pushing the top into place and working toward the bottom to reattach it to the clips along the length of the unit.

5. (Optional) In humid or rainy climates, or in locations where the installation may be exposed to salt, fog, or other corrosive elements use a small applicator (such as a wooden craft stick or cotton swab) to apply a generous bead of heavy duty water-resistant grease around the outside edge of each camshaft head where it contacts the side clip.



6. Place a magnetic camshaft cap on each of the four hex camshaft heads



## Step 7. Turn On and Commission the System

1. Switch on the AC circuit breakers for the Gateway and each Powerwall.
2. Switch on each Powerwall by moving the switch on the right (LED) side of the unit to the ON position. When each Powerwall establishes communication with the Gateway, the LED on the right side of Powerwall illuminates.
3. See the [Commissioning step](#) for instructions on updating system firmware and commissioning the system.

NOTE: During commissioning, ensure that when scanning for Powerwalls, the Commissioning Wizard shows all Powerwalls in the system.

4. After installation is complete, remove the protective film from the second Powerwall.

## Appendix I. Revision Log

Revision	Date	Description
1.0	2019-02-20	Initial Release
1.1	2019-03-06	<ul style="list-style-type: none"> <li>• Updated fuse requirements</li> <li>• Updated product dimensions</li> <li>• Updated grid codes (G98, G99)</li> </ul>
1.2	2019-03-11	<ul style="list-style-type: none"> <li>• Updated wiring figures for clarity</li> </ul>
1.3	2019-04-18	<ul style="list-style-type: none"> <li>• Included warning statement regarding electrical shock safety and earthing at Gateway</li> <li>• Included section on multi-Powerwall installation</li> <li>• Included example system diagrams</li> <li>• Included note on leaving Powerwall breaker closed for maintenance charging</li> <li>• Updated Powerwall mechanical specifications</li> <li>• Included instructions for 800 A CTs with the Neurio Energy Meter</li> <li>• Included Gateway Reset Button in troubleshooting steps</li> </ul>
1.4	2019-06-06	<ul style="list-style-type: none"> <li>• Included additional graphics for clarity in Energy Metering section</li> <li>• Updated Neurio meter Wi-Fi pairing details for firmware updates</li> <li>• Added location of back and side cable entry ports in updated mounting layout</li> </ul>
1.5	2019-06-07	<ul style="list-style-type: none"> <li>• Included note on earthing network type when off-grid</li> <li>• Included note on using existing Energy Meters from Gateway 1 when upgrading to Gateway 2</li> <li>• Updated AC wiring requirements with note on following local code</li> <li>• Updated recommended temperature range for Powerwall installation</li> </ul>
1.6	2019-11-07	<ul style="list-style-type: none"> <li>• Updated and simplified Installation Manual format</li> <li>• Updated guidance for installation on TT Networks</li> </ul>
1.7	2020-01-08	<ul style="list-style-type: none"> <li>• Updated maximum Tesla CT distance</li> <li>• Added Multi-Powerwall Installation content as an appendix</li> </ul>



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