



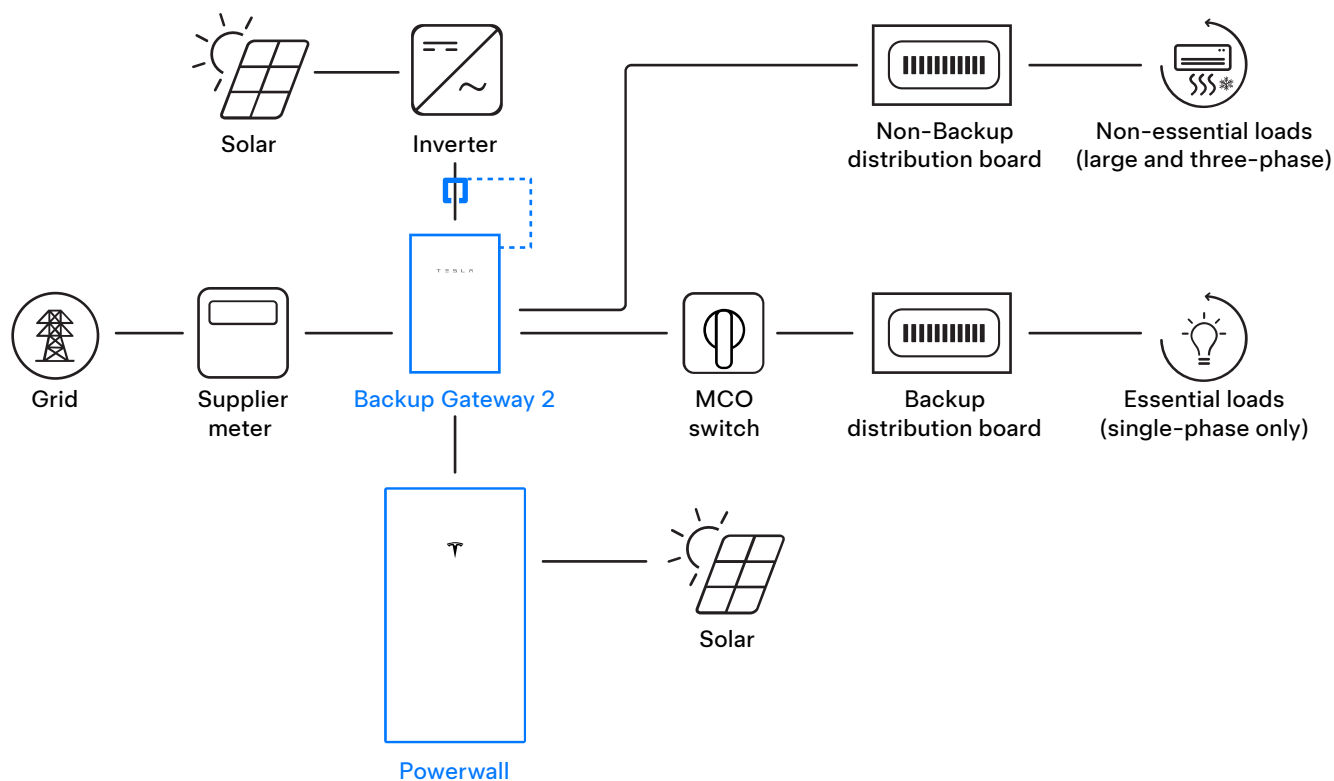
POWERWALL APPLICATION NOTE: BACKUP SINGLE-PHASE LOADS ON THREE-PHASE INSTALLATIONS

Overview

Powerwall is a single-phase device. In three-phase residential and commercial installations, Powerwall can only be connected to any one phase and that phase can be selected as a backup phase during commissioning. During a grid outage, Powerwall powers only the single-phase loads connected to the backup phase. For this reason, it is recommended to ensure that all essential single-phase loads are connected to the backup phase.

However, this may not be practical in installations where a customer wants to backup all single-phase loads distributed across the three phases of an existing installation. In such installations, a manual change-over (MCO) switch can be installed to distribute power from the backup phase to all single-phase loads distributed across three phases during a grid outage.

System Configuration Diagram



See [Example Wiring Diagram on page 3](#) for more details

- NOTE:**
- This configuration is not intended to provide backup for three-phase loads such as pumps, motors, or compressors. All such loads must be connected to the non-backup terminals on the Backup Gateway 2 through a separate non-backup distribution board to prevent potential equipment damage.
 - Before you install Powerwall in this configuration, verify that this configuration is supported by the local network operator's phase-balancing requirements.



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Installation Location

The MCO switch can be mounted on the DIN rail inside Backup Gateway 2, next to the Powerwall circuit breaker or residual current device (RCD). Depending on the site conditions, you can also install it in other locations, such as in a sub-distribution board.

The following MCO switches are compatible with Powerwall; other switches with equivalent current ratings may also be considered:

- Kraus & Naimer KA63B.T903
- Hager HIM306
- ABB OT63F3C



NOTE: Tesla doesn't supply the MCO switch. You must procure it from a local electrical store for any installations that require it.

System Operation

On-Grid

When the system is connected to the grid, the islanding contactor in the Backup Gateway 2 is closed. The MCO switch must be in its default position, with all single-phase loads balanced across the three phases. The Powerwall connected to the backup phase charges either from the grid or solar.

Transition to Backup

During a grid outage, the islanding contactor in the Backup Gateway 2 opens. The customer must turn the MCO switch into a backup position. The MCO switch physically couples the backup phase with all three phases and distributes power from Powerwall to all single-phase loads distributed across the three phases.

Transition Back to Grid

When the grid restores, the islanding contactor in the Backup Gateway 2 closes. The customer must turn the MCO switch back into its default position to resume normal operation with all loads restored to their default phase distribution.

System Sizing

Powerwall Output Capability

If the load demand exceeds the maximum power output capability of the Powerwall system, it will stop operation. Calculate the overall load size depending on the devices and appliances that the customer wants to backup during a grid outage and determine if it exceeds the maximum power output capability of the Powerwall system. If necessary, you can install additional Powerwall units on the backup phase. Otherwise, for safe operation, the essential loads must be supplied through a separate backup distribution board, and large loads or three-phase loads must be supplied through another separate non-backup distribution board.

Overcurrent Protection

The rated current of the Powerwall circuit breaker or RCD and the wire size used for the backup phase between the Backup Gateway 2, Powerwall, and MCO switch must be determined by considering the full load current (i.e., when all devices and appliances installed on the backup phase are demanding power) for all equipment and appliances in the installation supplied during the full home backup mode.



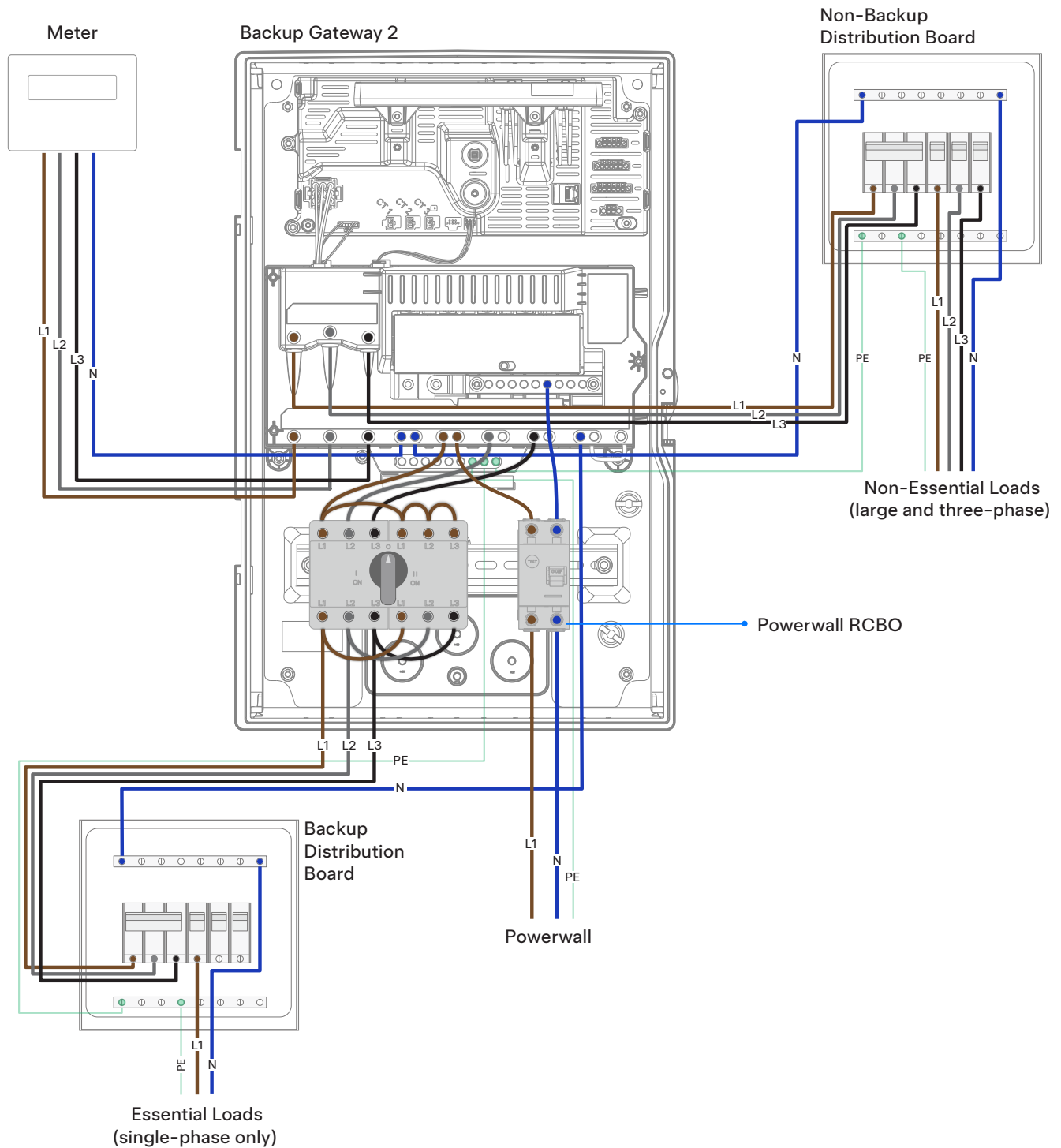
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Example Wiring Diagram



NOTE:

- The Powerwall and MCO switch must be directly connected to the home terminals inside Backup Gateway 2.
- Solar and meter wiring are not included in the diagram.





REVISION HISTORY

Date	Rev	Changes
19-08-2024	1.0	Initial publication
23-07-2025	1.1	Updated the wiring diagram with standard meter drawing