

APPENDIX A: POWERWALL 3 ANCHORING DETAILS

General Anchoring Notes

A2



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



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



NOTE: All wall framing referenced in the details must be part of the home's main permitted bearing wall and/or lateral force resisting system. The contractor and their licensed design professional are responsible for ensuring the walls, and their load transfer connections, are structurally sound to support all code-specified vertical and lateral loading imposed by the equipment.



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



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

APPENDIX A: POWERWALL 3 ANCHORING DETAILS

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

A6

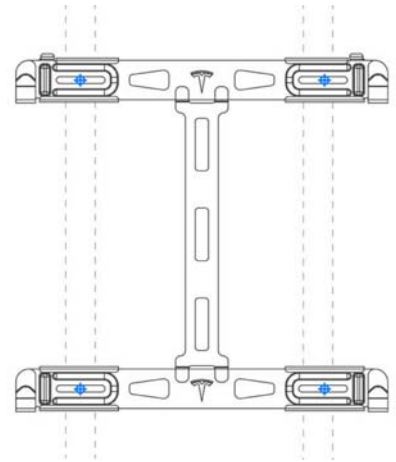
Reference these anchoring details when mounting Powerwall 3 to the provided mounting bracket.

Wood Studs (spaced at 12 to 17 inches)

If anchoring directly into wood studs, use at least four (one in each corner) ¼ inch wood screws with washers, of sufficient length for at least 2-½ inch embedment into the studs.



NOTE: See [Channel Strut \(Unistrut\) on page 94](#) for stud spacing greater than 17 inches, up to 24 inches.

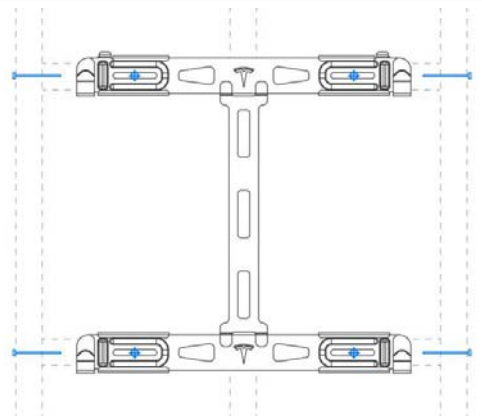


Wood Studs (spaced at 12 to 17 inches)

If anchoring to blocking between wood studs, use minimum 2 x 4 in blocks, end-nailed into studs with two 16d (89 x 4 mm) nails or toe-nailed into studs with four 8d (64 x 3 mm) nails. Use at least four (one in each corner) ¼ inch wood screws with washers, of sufficient length for at least 2-½ inch embedment into the blocking.



NOTE: See [Channel Strut \(Unistrut\) on page 94](#) for stud spacing greater than 17 inches, up to 24 inches.



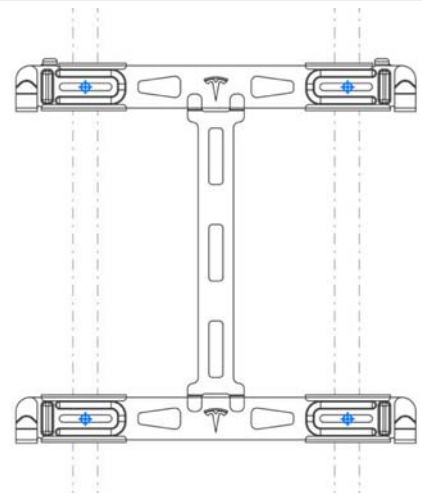
Metal Studs (spaced at 12 to 17 inches)

If anchoring directly to metal studs, studs must be minimum 18 gauge. Use at least four (one in each corner) #14 (¼ inch) sheet metal screws with washers, of sufficient length to penetrate at least 3 threads beyond the stud.

If backing is needed between the studs, the backing must be minimum 18 gauge. Attach backing to metal studs with 12 gauge 3x3 inch angle clip or Simpson SFC2.25 clips with two #10 sheet metal screws in each leg.



NOTE: See [Channel Strut \(Unistrut\) on page 94](#) for stud spacing greater than 17 inches, up to 24 inches.



APPENDIX A: POWERWALL 3 ANCHORING DETAILS

A7 - Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation

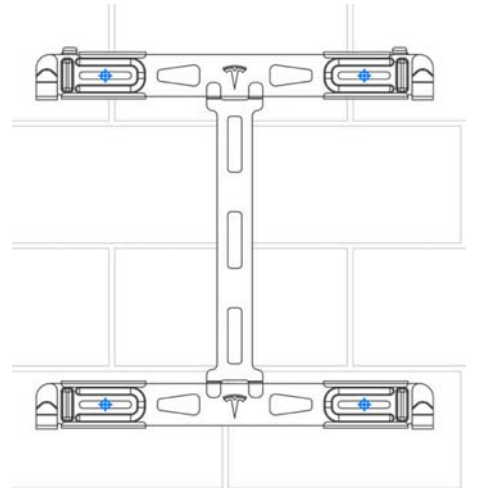
Concrete Masonry Unit Wall

Minimum strength must be 2000 PSI.

Use at least four (one in each corner, in any available anchor slot) 3/8 inch concrete anchors of sufficient length for the embedment listed below.

- [ESR 1056 for Simpson Titen HD 3/8-inch concrete anchor](#). Minimum 2-3/4 inch (70 mm) embedment required
- [ESR 3056 for Hilti KH-EZ 3/8-inch concrete anchor](#) (for fully grouted CMU cells only). Minimum 1-5/8 inch (41.3 mm) embedment required

Anchors shall not be installed within 12 inches (305 mm) of wall edges or 1-1/2 inches (38 mm) of masonry block edges.

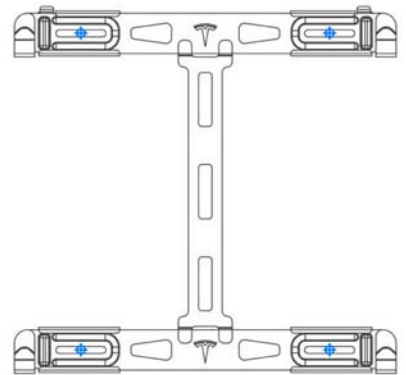


Solid Concrete Wall

Minimum strength must be 2500 PSI.

Use at least four (one in each corner, in any available anchor slot) 3/8 inch concrete anchors of sufficient length for at least 2-1/2 inch embedment into the wall.

- [ESR 2713 for Simpson Titen HD 3/8-inch concrete anchor](#)
- [ESR 3027 for Hilti KH-EZ 3/8-inch concrete anchor](#)



APPENDIX A: POWERWALL 3 ANCHORING DETAILS

A8 - Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation

Brick Wall

(Double and Single Layer of Brick Masonry)

Minimum strength must be 2500 PSI.

Use at least four (one in each corner, in any available anchor slot) ¼ inch masonry anchors of sufficient length for the embedment listed below.

- Kwik Conn 2 (No ESR). Minimum 1-¾ inch (44.5 mm) embedment required

Brick installation is only permitted in seismic design category A or B, and where ESR anchors are not required. Ground mount only.

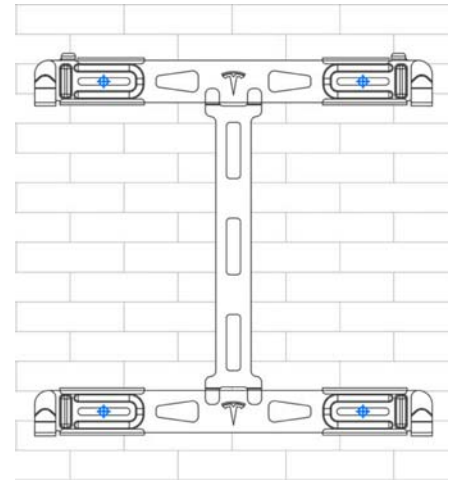
Maximum Wind Speed	Mounting Location
145 mph	Within 10 ft (3048 mm) of wall edge
165 mph	Not within 10 ft (3048 mm) of wall edge



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



NOTE: Fasteners shall not be installed in mortar joints.



Channel Strut (Unistrut)

Struts must be minimum 12 gauge, and either 1-5/8 inch or 7/8 inch.

If mounting on wood studs, attach each strut to at least two studs, using at least one ¼ inch wood screw with washer per stud, of sufficient length for at least 2-½ inch embedment into the studs.

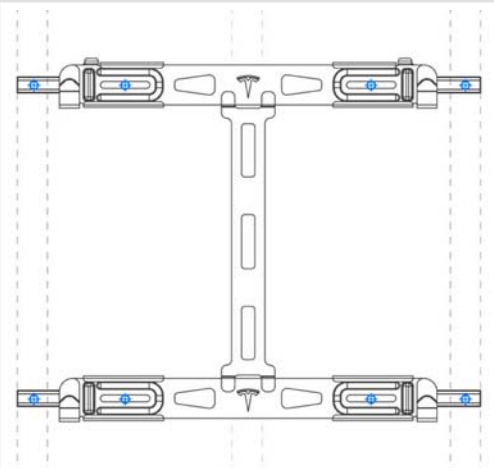
If mounting on metal studs, attach each strut to at least three studs, using at least one #14 (¼ inch) sheet metal screw with washer per stud, of sufficient length to penetrate at least 3 threads beyond the studs.



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

To attach the bracket to the struts, use at least four (one in each corner) 3/8 inch hex head screws with washers and strut nuts.

Channel strut shall have a maximum unsupported span of 24 inches (610 mm) and shall not be cantilevered.



APPENDIX A: POWERWALL 3 ANCHORING DETAILS

Concrete Pad Details for Ground-mounting Powerwall 3 on Poured Concrete with an Existing Structural Wall

A9

In this mounting configuration, a concrete pad is constructed at the base of the existing wall capable of supporting Powerwall 3. Powerwall 3 is mounted to the wall, allowing it to be vertically supported by the concrete pad and laterally supported by the existing wall.

 **NOTE:** All wall framing referenced in the details must be part of the home's main permitted bearing wall and/or lateral force resisting system. The contractor and their licensed design professional are responsible for ensuring the walls, and their load transfer connections, are structurally sound to support all code-specified vertical and lateral loading imposed by the equipment.

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

Concrete Pad Size

Number of Units	Pad Width	Pad Length
1 Powerwall 3	16 in (406 mm)	34 in (864 mm)

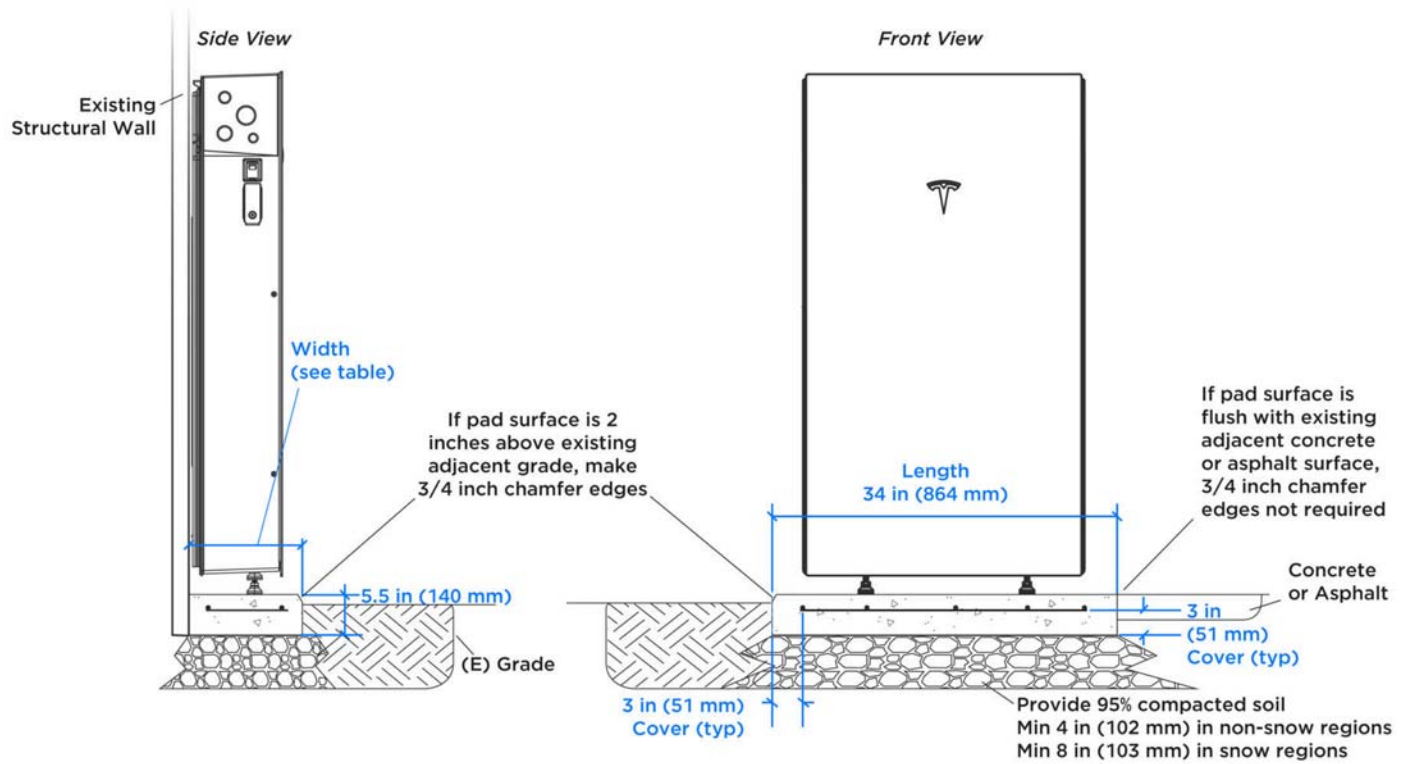
Concrete Pad Requirements

- Within the perimeter of the pad, excavate and remove all loose and organic material, compacting soil to a level surface. Embed the concrete in the soil per detail (below). Compact and fill a 4-inch thick base of crushed, course stone when 10PSF or more ground snow load is expected in site-specific design criteria
- Concrete used for pads shall have a minimum compressive strength of 3,000 PSI at 28 days. Work can begin 14 days after the pad is poured
- Concrete reinforcing shall meet the temperature and shrinkage requirements of ACI 318
 - #4 Rebars ≤ 10 inch O.C. (both ways)
 - ASTM A615 Grade 60 (FY = 60,000 PSI)
 - Minimum 3 inch cover for concrete facing soil

APPENDIX A: POWERWALL 3 ANCHORING DETAILS

A10 - Concrete Pad Details for Ground-mounting Powerwall 3 on Poured Concrete with an Existing Structural Wall

Figure 26. Powerwall 3 Ground Mounted on Existing Structural Wall and Poured Concrete (Side, Front Views)



APPENDIX A: POWERWALL 3 ANCHORING DETAILS

Anchoring and Concrete Pad Details for Ground-mounting Powerwall 3 on Poured Concrete with Steel Posts

A11

In this mounting configuration, a concrete pad is constructed with vertical steel posts attached directly to the concrete pad. Powerwall 3 is mounted to the posts, allowing it to be vertically and laterally supported by the concrete pad.



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

Concrete Pad Sizes

The primary design constraint for mounting on a poured concrete pad with steel posts is the risk of wind blowing the Powerwall and pad over. As indicated in the table below, the required thickness and width of the concrete pad depend on which type of units are installed on it and how many units are installed.

Pad Size	Pad Thickness	1 Powerwall 3
36 x 36 in (914 x 914 mm)	6 in (152 mm)	Max wind 155 mph
36 x 36 in (914 x 914 mm)	9 in (229 mm)	Max wind 180 mph

See [Appendix A: Powerwall 3 Anchoring Details on page 90](#) for installation scenarios which require site-specific calculations.

APPENDIX A: POWERWALL 3 ANCHORING DETAILS

A12 - Anchoring and Concrete Pad Details for Ground-mounting Powerwall 3 on Poured Concrete with Steel Posts

Requirements for Poured Concrete Pad with Steel Posts

- Within the perimeter of the pad, excavate and remove all loose and organic material, compacting soil to a level surface. Embed the concrete in the soil per detail (below). Compact and fill a 4-inch thick base of crushed, course stone when 10PSF or more ground snow load is expected in site-specific design criteria
- Concrete used for pads shall have a minimum compressive strength of 3,000 PSI at 28 days. Work can begin 14 days after the pad is poured
- Concrete reinforcing shall meet the temperature and shrinkage requirements of ACI 318
 - #4 Rebars ≤ 16 inch O.C. (both ways)
 - ASTM A615 Grade 60 (FY = 60,000 PSI)
 - Minimum 3 inch cover for concrete facing soil
- Posts shall be 2 inch SCH 40 steel pipes
- Each post is to be attached to the pad through a Hollaender pipe flange with (4) 3/8 inch Simpson Strong-Tie Titen HD concrete screws (ESR 2713) with minimum 2-½ inch embedment. An equivalent concrete anchor approved by the installing company's structural engineering team can be used with compliance letter
- All items to be cast in concrete, such as reinforcing steel, shall be securely and accurately positioned into the forms prior to placing the concrete
- Concrete anchors shall be installed with minimum 6 inch edge distance from all edges of the pad. Typical spacing between posts supporting the same Powerwall is 14 inches on center
- 1-5/8 inch struts and hardware shall be used to attach electrical equipment to posts

APPENDIX A: POWERWALL 3 ANCHORING DETAILS

A13 - Anchoring and Concrete Pad Details for Ground-mounting Powerwall 3 on Poured Concrete with Steel Posts

 **NOTE:** The following images depict the minimum concrete pad dimensions. System configuration and/or site conditions may result in a larger concrete pad being required.

Figure 27. Powerwall 3 Ground Mounted on Poured Concrete Pad with Steel Posts (Side View)

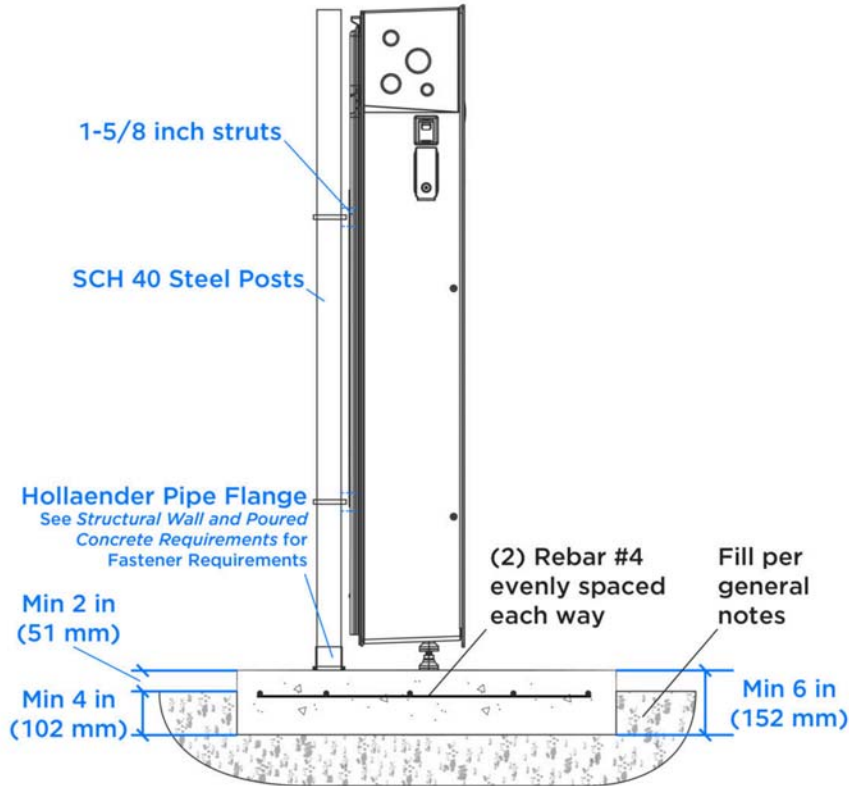
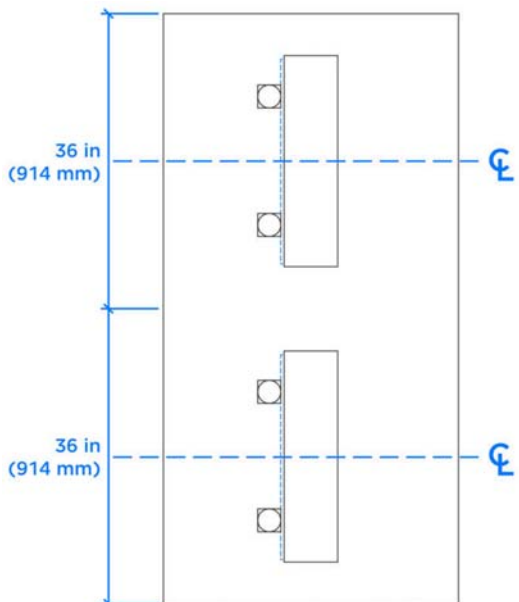


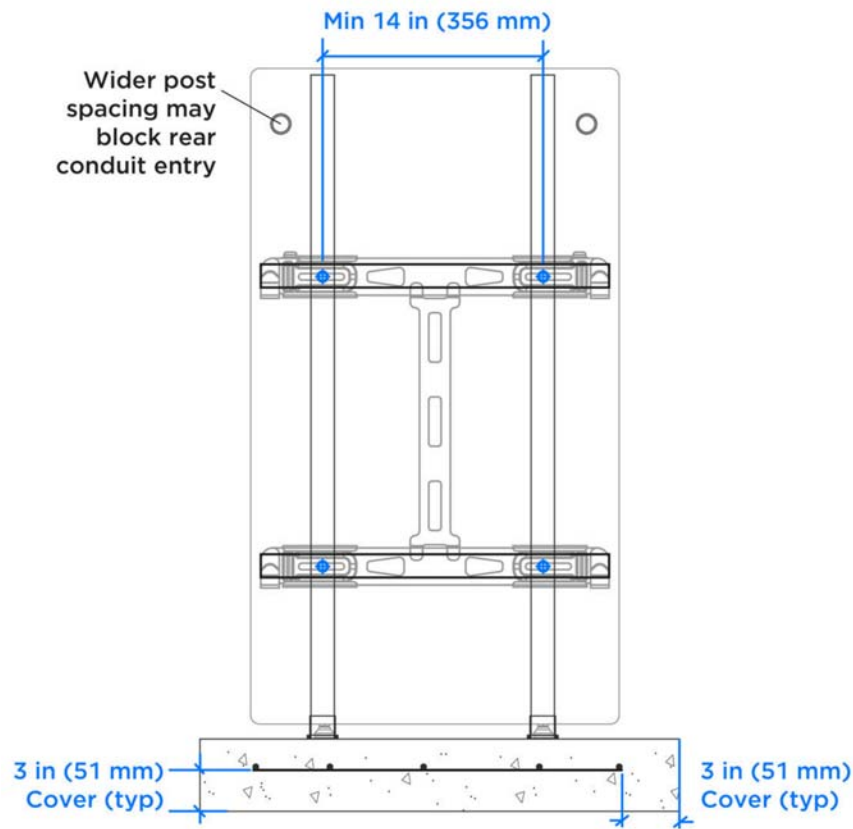
Figure 28. Two Concrete Pads Side by Side (Top View)



APPENDIX A: POWERWALL 3 ANCHORING DETAILS

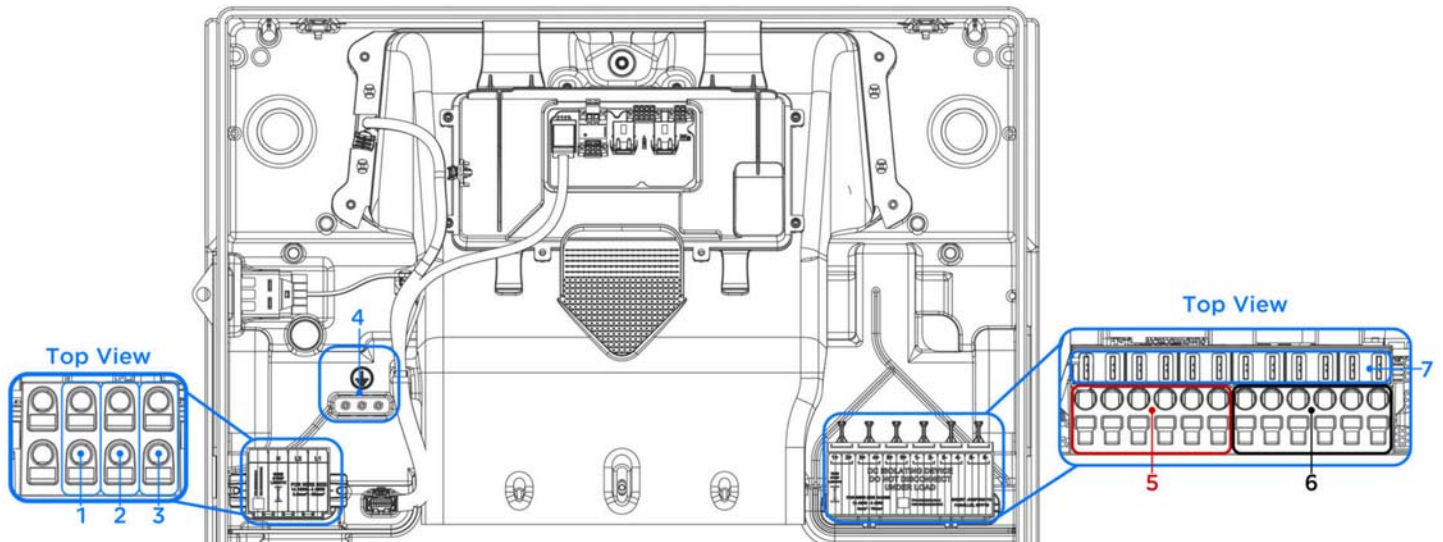
A14 - Anchoring and Concrete Pad Details for Ground-mounting Powerwall 3 on Poured Concrete with Steel Posts

Figure 29. Powerwall 3 Bracket Mounted on Poured Concrete Pad with Steel Posts (Rear View)



APPENDIX B: WIRING REFERENCE

Powerwall 3 AC and PV Wiring



Terminal Name	Recommended Wire Color	Wire Gauge
1 N (Neutral)	White	10 - 4 AWG (6 - 25 mm ²)
2 L2 (Line 2)	Red	10 - 4 AWG (6 - 25 mm ²)
3 L1 (Line 1)	Black	10 - 4 AWG (6 - 25 mm ²)
4 Ground terminals	Green	12 - 4 AWG (2.5 - 25 mm ²)
5 MPPT Positive PV inputs (PV 1+, 2+, 3+, 4+, 5+, 6+)	Red	10 - 6 AWG (6 - 16 mm ²)
6 MPPT Negative PV inputs (PV 1-, 2-, 3-, 4-, 5-, 6-)	Black	10 - 6 AWG (6 - 16 mm ²)
7 MPPT Parallel Jumper Slots	Use provided jumpers (Tesla P/N: 1784893-xx-y)*	

*Do not make jumpers. Use only the jumpers included in the Powerwall 3 accessory bag.



NOTE: The leftmost terminal in the AC connector is not used.



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



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



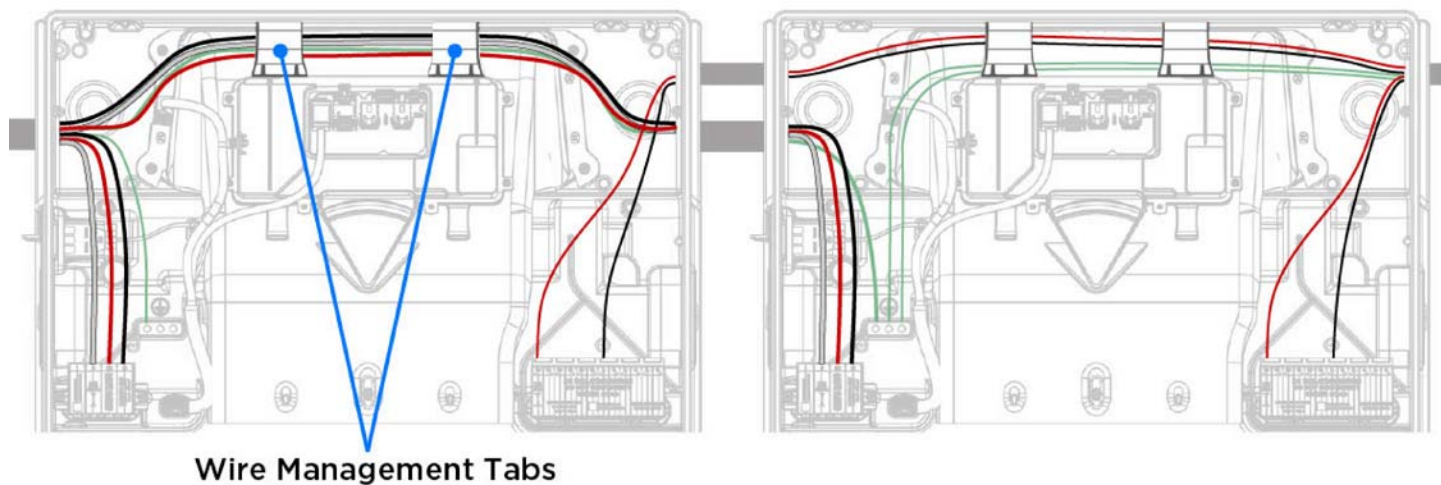
NOTE: PV input terminals (MPPT DC inputs) are rated to a minimum of 75°C.

APPENDIX B: WIRING REFERENCE

Powerwall 3 as a Wiring Raceway (Multi-Unit Installations Only)

Wiring can be passed through one Powerwall 3 unit to another if the wires are routed properly through the dedicated wiring space. The number of wires shall not take up so much space that the wire management tabs are strained and/or pushed outward.

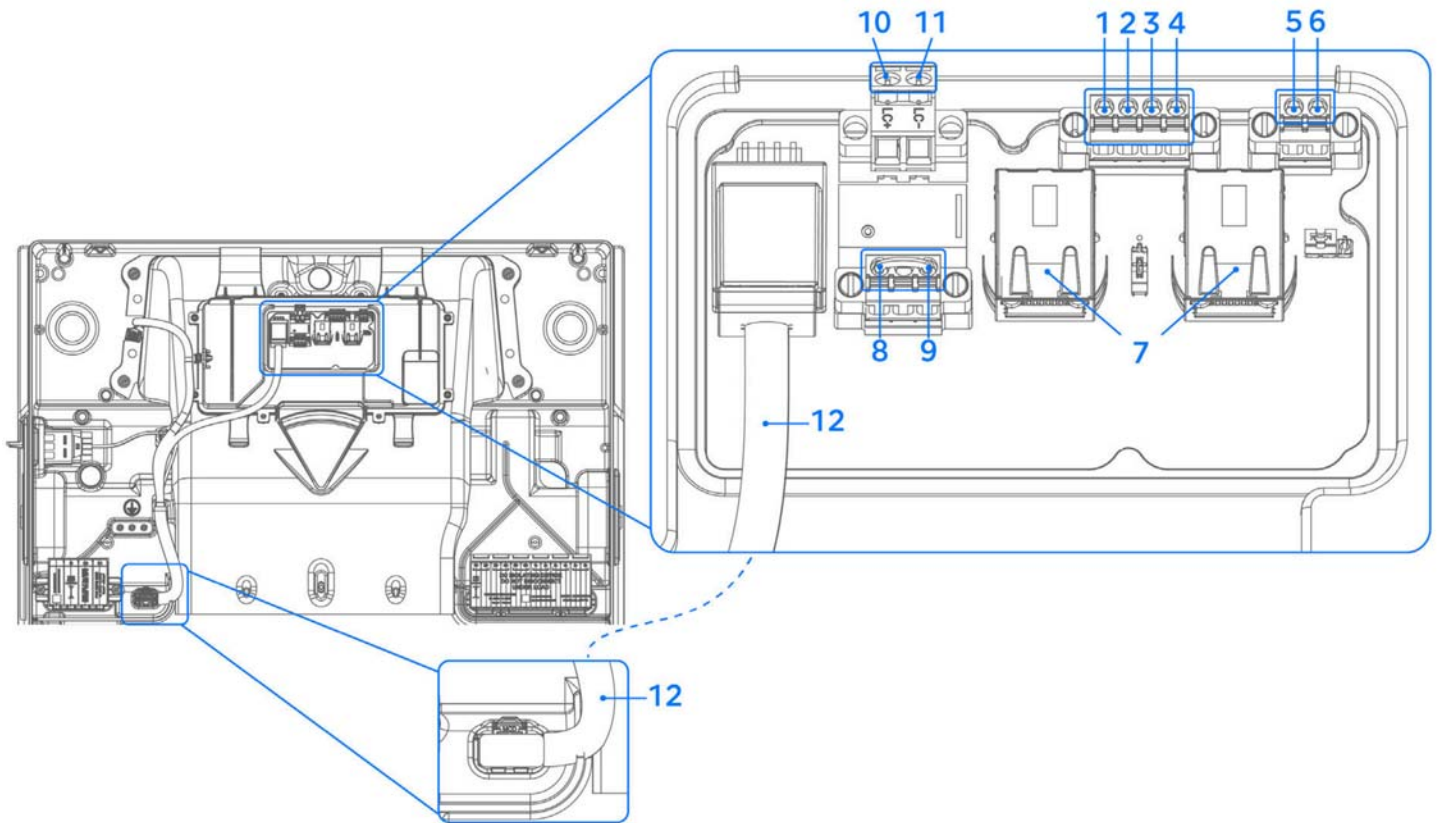
Figure 30. AC Wiring for Both Units Routed from Left, PV Wiring for Both Units Routed from Right



 **NOTE:** See the [Powerwall 3 Installation Quick Guide](#) for additional guidance on routing wiring through Powerwall 3.

APPENDIX B: WIRING REFERENCE

Tesla Asset Controller (TACO) Low Voltage and Communication Wiring



Communication Wiring to Gateway 3



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

	Terminal Name	Recommended Wire Color	Wire Gauge
1	CN- (CAN LO)	Orange	24 - 16 AWG (0.2 - 1.5 mm ²)
2	CN+ (CAN HI)	Blue	24 - 16 AWG (0.2 - 1.5 mm ²)
3	GND (Earth)	Black	24 - 16 AWG (0.2 - 1.5 mm ²)*
4	12V+ (Logic+)	Red	24 - 16 AWG (0.2 - 1.5 mm ²)*

* The recommended minimum wire gauge is 18 AWG (0.8 mm²) due to potential voltage drop on long wire runs with smaller conductors.

Remote Energy Meter Wiring

	Terminal Name	Recommended Wire Color	Wire Gauge
5	RS-485 +	Red	24 - 16 AWG (0.2 - 1.5 mm ²)
6	RS-485 -	Black	24 - 16 AWG (0.2 - 1.5 mm ²)

APPENDIX B: WIRING REFERENCE

Ethernet Jacks

	Terminal Name	Recommended Wire Color	Wire Requirements
7	RJ45 Ethernet jacks	-	CAT5 or CAT6 Ethernet wiring (see Prepare Ethernet Wiring with RJ45 Connectors on page 105)

Rapid Shutdown (RSD) Wiring

	Terminal Name	Recommended Wire Color	Wire Gauge
8	Rapid Shutdown +	Red	24 - 16 AWG (0.2 - 1.5 mm ²)
9	Rapid Shutdown -	Black	24 - 16 AWG (0.2 - 1.5 mm ²)



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

Aux Wiring

	Terminal Name	Recommended Wire Color	Wire Gauge
10	Load Control +	-	24 - 16 AWG (0.2 - 1.5 mm ²)
11	Load Control -	-	24 - 16 AWG (0.2 - 1.5 mm ²)

TACO Factory-Installed Harness

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

APPENDIX B: WIRING REFERENCE

Prepare Ethernet Wiring with RJ45 Connectors

Recommended Tools

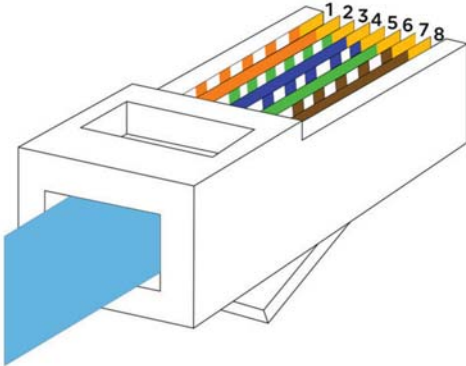
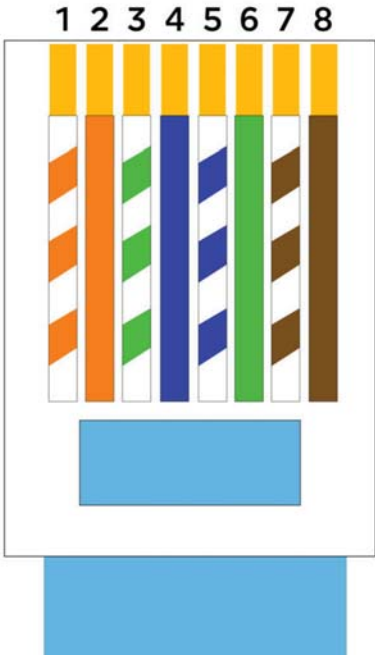
- RJ45 Ethernet crimping tool
- Ethernet tester

Prepare Ethernet Wiring

1. Cut the desired length of CAT5 wire.

 **NOTE:** See [Plan Cable Length Between Components on page 28](#) for maximum wire length between components.

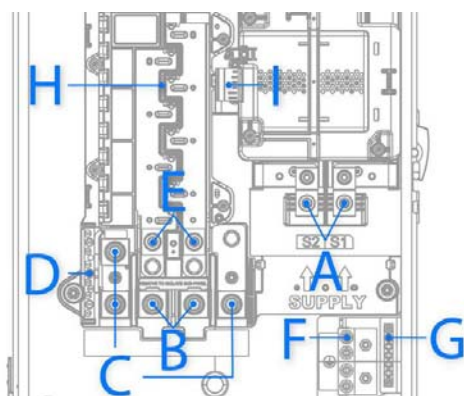
2. Using an RJ45 Ethernet crimping tool, crimp the RJ45 connectors to the T-568B wire color standard as shown below:

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

3. Test the Ethernet cable using an Ethernet tester (see the [Powerwall 3 Device Setup Guide](#) for example testing instructions). Ensure the readings from either end of the cable match, 1-8 in ascending order.

APPENDIX B: WIRING REFERENCE

Gateway 3 Wiring Overview



	Component	Recommended Wire Color	Wire Gauge ¹	Tool Size	Wire Strip Length	Torque
A	Supply Terminals	Black, Red	6 AWG – 250 kcmil	5/16-inch hex	1 ¼-inch (32 mm)	275 in-lb, 23 ft-lb
B	Backup Terminals	Black, Red	(1x) #4 AWG - 250 kcmil	3/8-inch hex	1 ¼-inch (32 mm)	250 in-lb, 21 ft-lb
			(2x) #4 AWG - 4/0 stranded ²			
C	Main Neutral Terminals	White	(1x) #4 AWG - 250 kcmil	3/8-inch hex	1 ¼-inch (32 mm)	250 in-lb, 21 ft-lb
			(2x) #4 AWG - 4/0 stranded ^{2, 3}			
D	Load / Generation Neutral Terminals	White	See table in Gateway 3 Neutral Bar and Ground Bars on page 109			
E	Backup Terminals on Internal Panelboard	Black, Red	6 AWG – 250 kcmil	5/16-inch hex	1 ¼-inch (32 mm)	275 in-lb, 23 ft-lb
F	Main Ground Terminals	Green or Bare	6 AWG – 2/0	3/16-inch hex	¾-inch (20 mm)	120 in-lb, 10 ft-lb
G	Load/Generation Ground Terminals	Green or Bare	See table in Gateway 3 Neutral Bar and Ground Bars on page 109			
H	Internal Panelboard	See Acceptable Circuit Breakers on page 110 and Install Load / Generation Breakers on Internal Panelboard on page 62				
I	Communication connector	See Gateway 3 Communication Wiring on page 107				

¹ Use copper or aluminum conductors rated to a minimum of 75°C.

² Conductors must be the same size and material when terminating more than one conductor under these terminals.

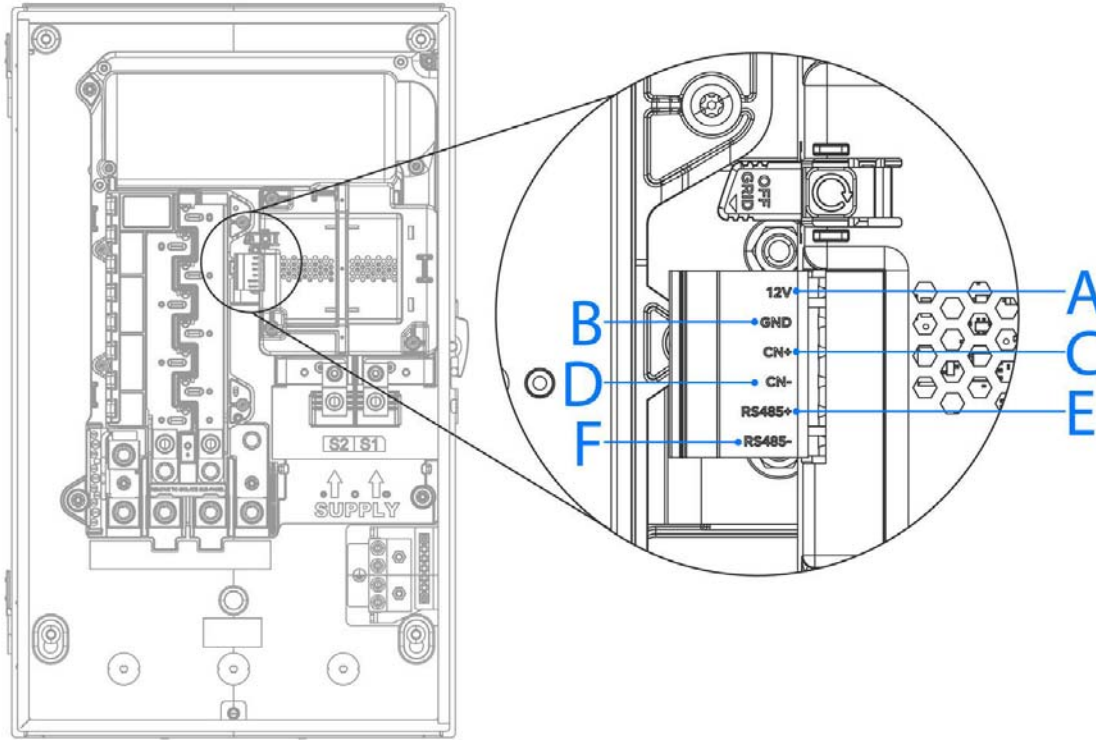
³ Double lugging is allowed only when conductors are paralleled to increase ampacity for a single circuit.



CAUTION: Do not modify the factory lug configuration.

APPENDIX B: WIRING REFERENCE

Gateway 3 Communication Wiring

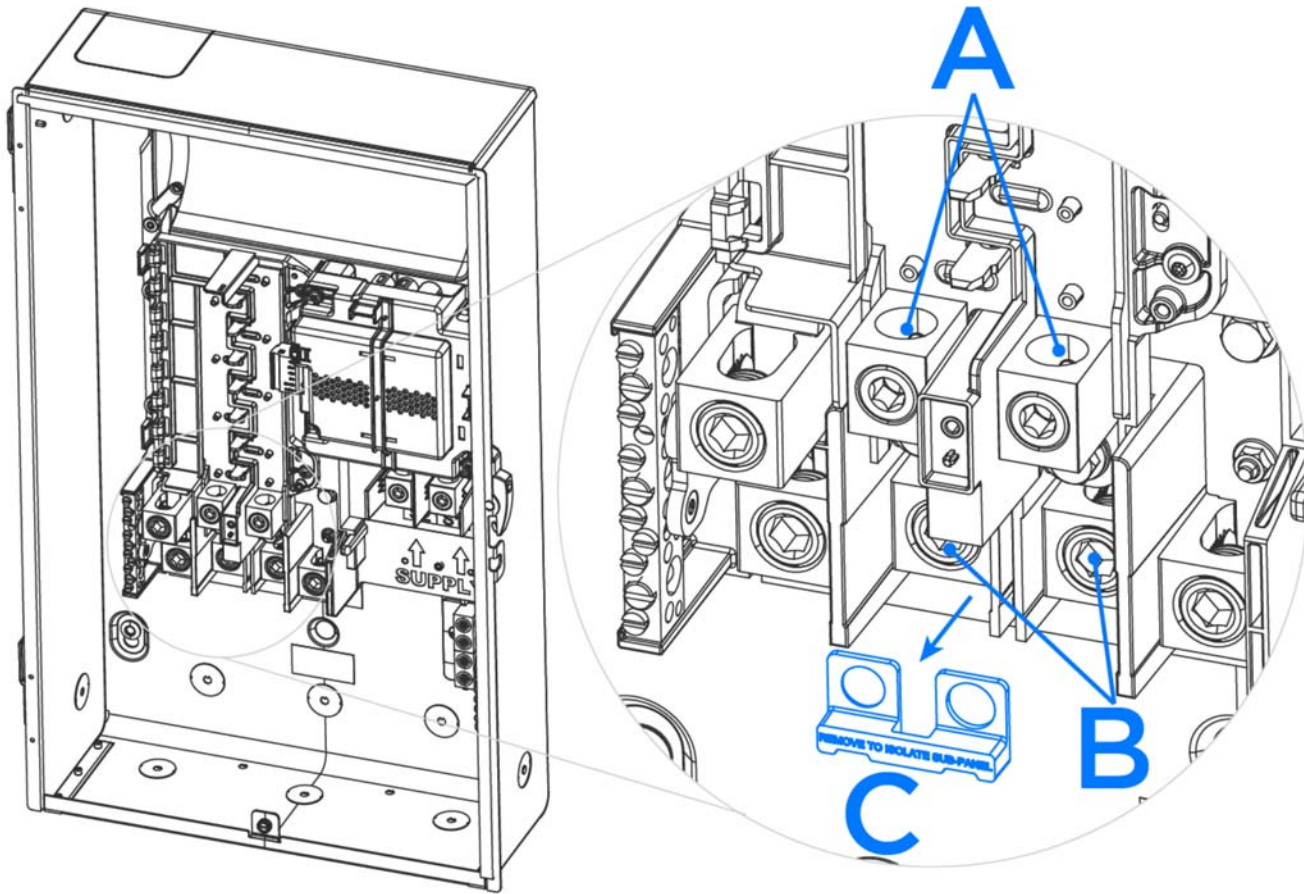


	Description	Recommended Wire Color	Wire Gauge ¹
A	12V + (Logic +)	Red	18 - 16 AWG (0.8 - 1.5 mm ²)
B	GND (Earth)	Black	18 - 16 AWG (0.8 - 1.5 mm ²)
C	CN + (CAN HI)	Blue	24 - 16 AWG (0.2 - 1.5 mm ²)
D	CN - (CAN LO)	Orange	24 - 16 AWG (0.2 - 1.5 mm ²)
E	RS-485 +	Not used	Not used
F	RS-485 -	Not used	Not used

¹ At a minimum, the communication cable assembly must be rated for use with 300 Volts.

APPENDIX B: WIRING REFERENCE

Backup Lugs



	Component	Wire Gauge ¹	Tool Size	Wire Strip Length	Torque
A	Backup Terminals on Internal Panelboard	6 AWG - 250 kcmil	5/16-inch hex	1 ¼-inch (32 mm)	275 in-lb, 23 ft-lb
B	Backup Terminals	(1x) #4 AWG - 250 kcmil, or (2x) #4 AWG - 4/0 stranded ²	3/8-inch hex	1 ¼-inch (32 mm)	250 in-lb, 21 ft-lb
C	Internal panelboard jumper bridge	N/A	7/16-inch hex	N/A	(2) Factory-installed 7/16" bolts, 80 in-lb (9 N-m)

¹ Use copper or aluminum conductors rated to a minimum of 75°C.

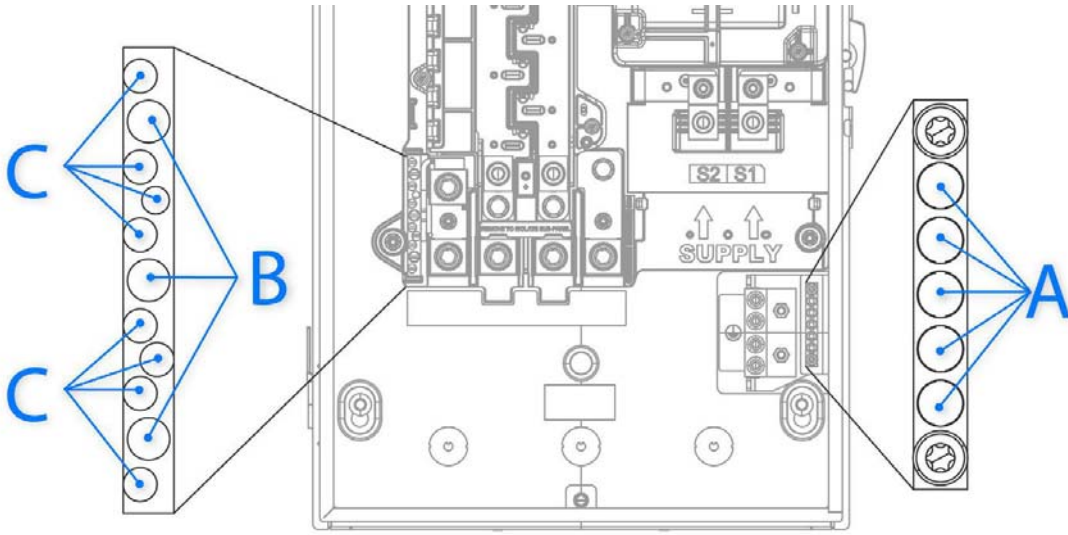
² Conductors must be the same size and material when terminating more than one conductor under these terminals.



NOTE: The internal panelboard jumper bridge replaces the pre-bent jumper conductors that were used to supply power to the internal panelboard in previous generations of the Tesla Gateway.

APPENDIX B: WIRING REFERENCE

Gateway 3 Neutral Bar and Ground Bars



	Wire Gauge ¹	Torque
A	14 AWG - 10 AWG	20 in-lbs (2.3 N-m)
	8 AWG	25 in-lbs (2.8 N-m)
	6 AWG - 4 AWG	35 in-lbs (4.0 N-m)
B	14 AWG - 10 AWG	35 in-lbs (4.0 N-m)
	8 AWG	40 in-lbs (4.5 N-m)
	6 AWG - 4 AWG	45 in-lbs (5.1 N-m)
	3 AWG - 1/0	50 in-lbs (5.6 N-m)
C	14 AWG - 10 AWG	35 in-lbs (4.0 N-m)
	8 AWG	40 in-lbs (4.5 N-m)
	6 AWG - 4 AWG	45 in-lbs (5.1 N-m)

¹ Use copper or aluminum conductors rated to a minimum of 75°C.

APPENDIX B: WIRING REFERENCE

Acceptable Circuit Breakers

Table 6. All Allowable Installation Combinations

Transformer Supply Current	Main Breakers		Branch Breakers - Up to 80A Rating		
	Manufacturer / Model	Current Rating	Eaton BR	Siemens QP	Schneider / Square D Homeline
10 kAIC	Eaton CSR	100-200A	X	X	X
	Eaton BWH	100-200A	X	X	X
	Eaton BW	100-200A	X	X	X
	Square D QOM	100-200A	X	X	X
22 kAIC	Eaton CSR	100-200A	X	X	-
	Eaton BWH	100-200A	X	X	-
	Square D QOM	100-200A	X	X	-
25 kAIC	Eaton CSR	100-200A	X	X	-
	Eaton BWH	100-200A	X	X	-

² Where "x" represents the number of poles and "y" represents the rating of the breaker.

APPENDIX C: SYSTEM WIRING DIAGRAMS

Overview

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

Gateway 3 Wiring Diagrams

Powerwall 3 with Gateway 3 (Whole Home Backup)

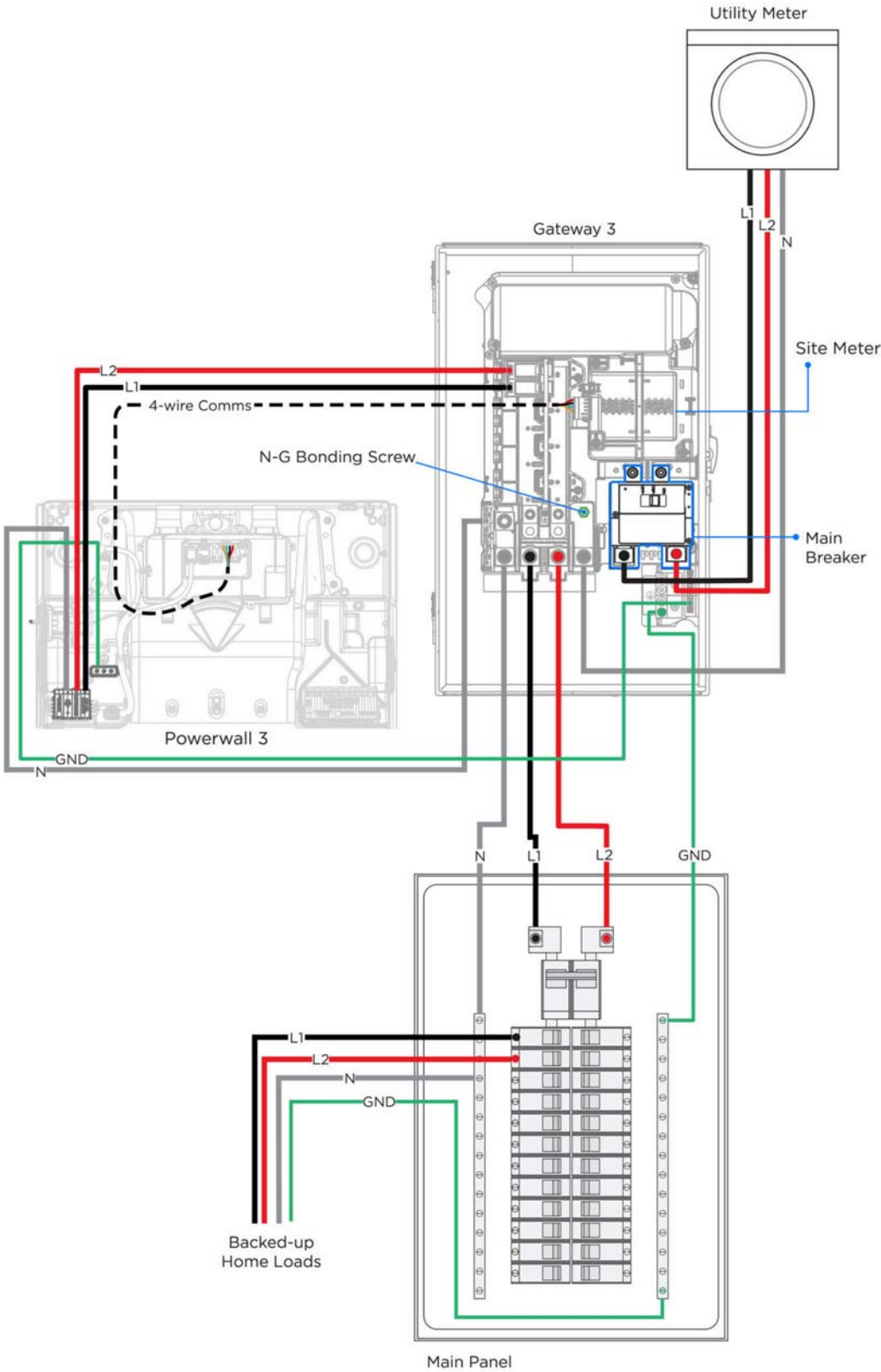
- All loads and Tesla equipment breakers are downstream of the Gateway 3 contactor.
- Site-level metering is performed by integrated Site CTs.
- Internal panelboard may be used for Tesla equipment breakers.
- Neutral-Ground Bonding Screw remains installed only if Gateway 3 is main service entrance equipment.



NOTE: Partial home backup is not possible on Powerwall 3 with Gateway 3 installations, as there are no metering options for non-backup loads.

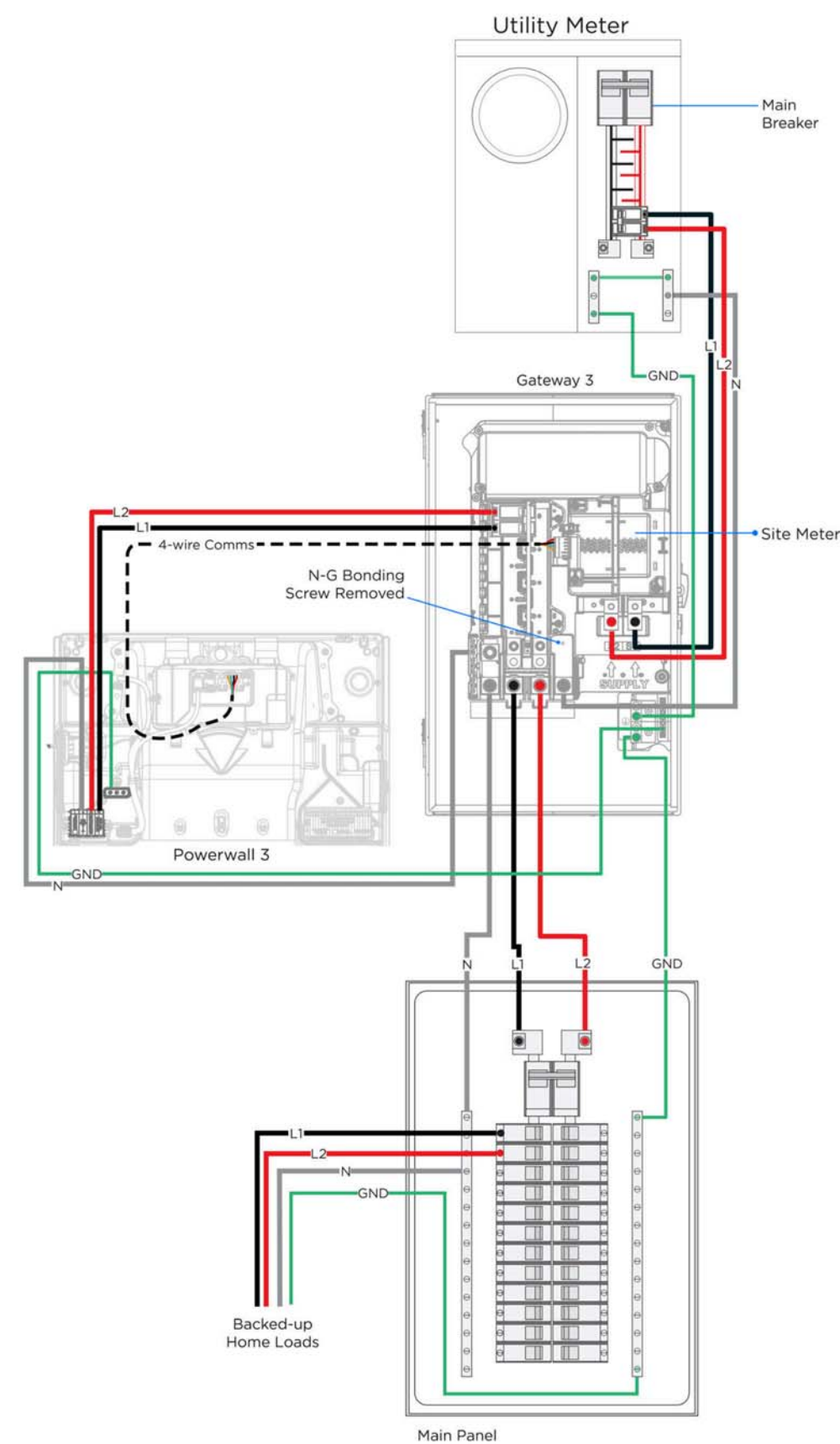
APPENDIX C: SYSTEM WIRING DIAGRAMS

Figure 31. Whole Home Backup with Standalone Meter



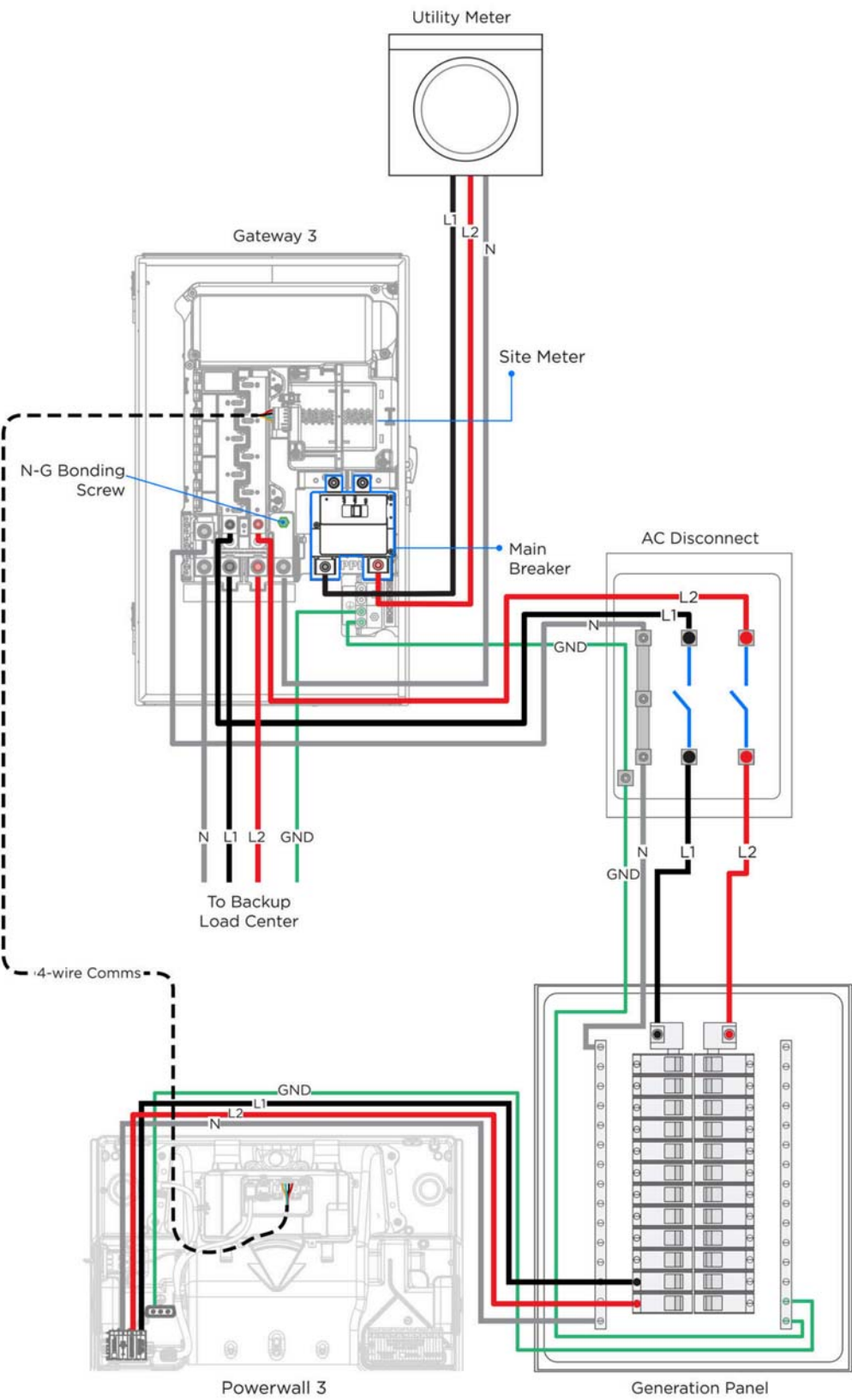
APPENDIX C: SYSTEM WIRING DIAGRAMS

Figure 32. Whole Home Backup with Meter Load Center



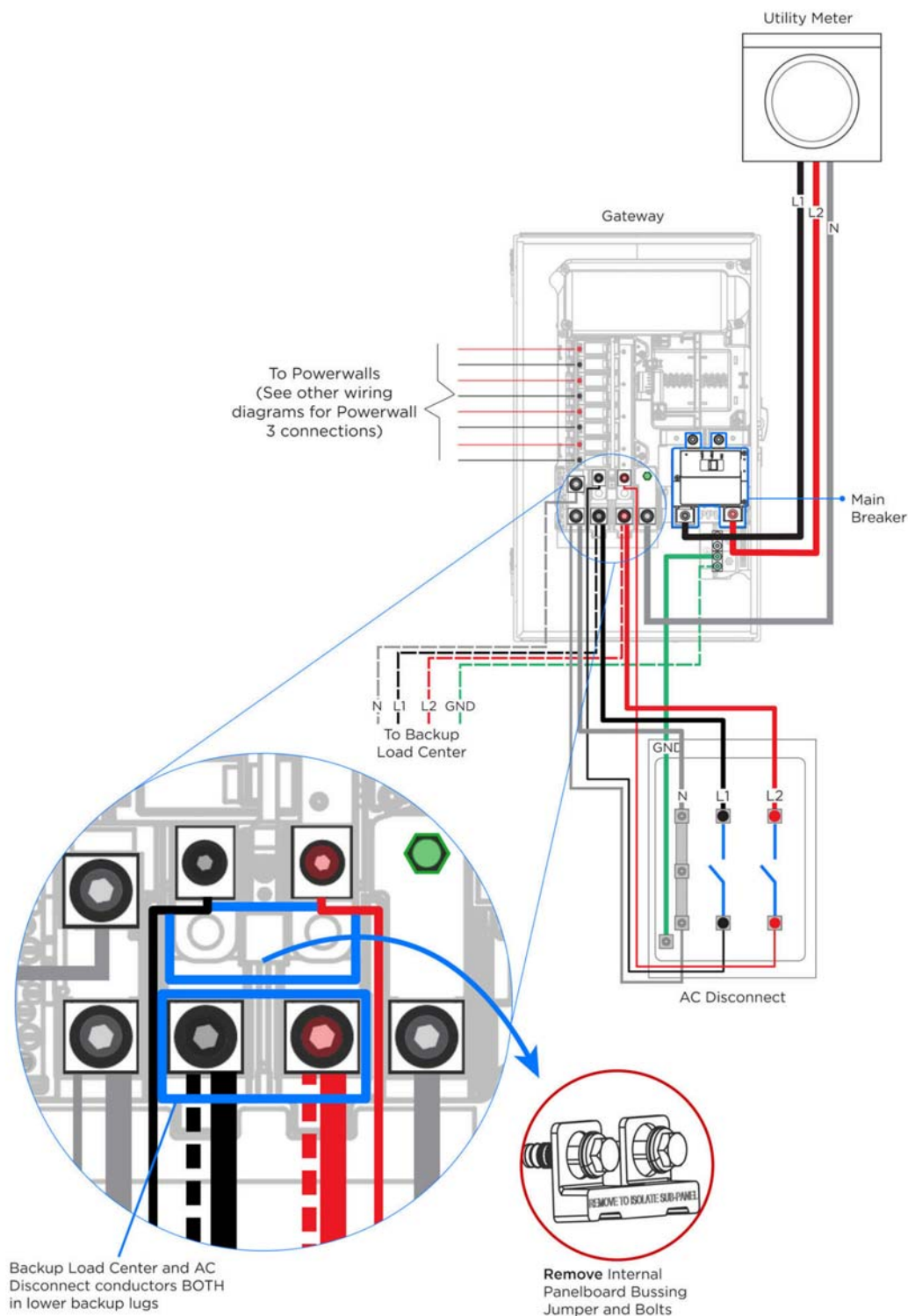
APPENDIX C: SYSTEM WIRING DIAGRAMS

Figure 33. Whole Home Backup with Standalone Meter - Disconnect before External Generation Panel



APPENDIX C: SYSTEM WIRING DIAGRAMS

Figure 34. Whole Home Backup with Standalone Meter - Disconnect before Internal Panelboard



 **NOTE:** This configuration requires the removal of the jumper between the backup lugs and the internal panelboard. Two conductors of the same size and material are landed in each of the lower backup lugs.

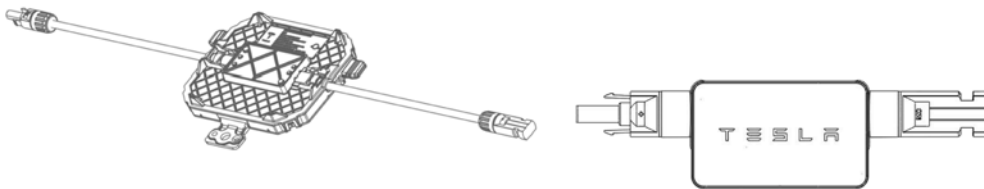
APPENDIX D: SOLAR RAPID SHUTDOWN

Powerwall 3 performs Rapid Shutdown in compliance with NEC 690.12(B)(2) and 690.12(B)(1) and UL1741 standards to reduce shock hazard for emergency responders.

When Powerwall 3 is used with Tesla MCIs, it qualifies as a Photovoltaic Rapid Shutdown System (PVRSS). The PVRSS is compatible with grid support functions and any limitations on the grid support functionality.

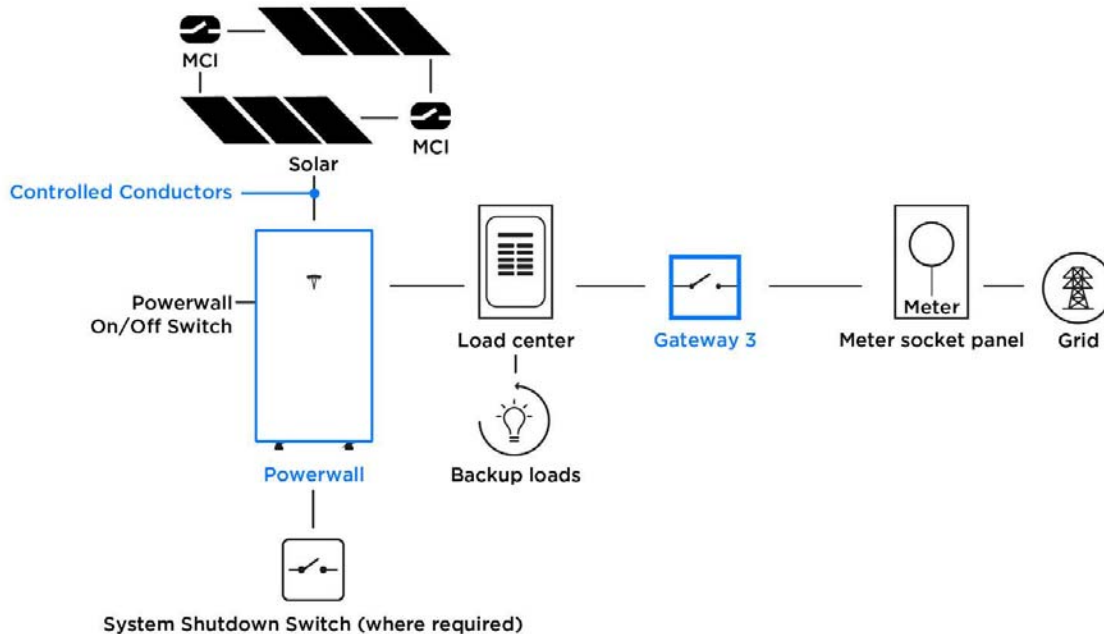
The Tesla MCIs are **normally open** solid-state switches (no moving parts). Powerwall 3 has a built-in exciter circuit that activates (closes) all MCIs via a 250 kHz AC frequency signal when the inverter is operating.

Figure 35. Tesla MCI-1 (left) and MCI-2 (right)



In compliance with PVRSS requirements, the conductors entering the solar assembly are controlled conductors.

Figure 36. Controlled Conductors in Powerwall 3 System with Gateway 3



Rapid Shutdown Initiation

Upon initiating Rapid Shutdown, the MCI excitation signal is lost and all MCIs will open within 30 seconds, bringing all voltages across Powerwall 3 and the PV strings to safe levels.

APPENDIX D: SOLAR RAPID SHUTDOWN

Rapid Shutdown Manual Initiation

Rapid Shutdown is initiated using the Powerwall 3 On/Off switch or the System Shutdown Switch (if installed).

Self-Test Function

Powerwall 3 has an automatic self-test function. Each morning Powerwall 3 performs a safety test to ensure Rapid Shutdown can successfully limit array voltage i.e. rendered high impedance and collapse. Failure of the Rapid Shutdown self-test will initiate an alarm and a faulted state that prevents the solar assembly from operating until service is performed.

Rapid Shutdown Initiator Label

The system Rapid Shutdown initiator must be labeled according to Section 690.56C of the NEC marking requirements. The label must include the following wording, and must be reflective, with all letters capitalized and must be a minimum height of 3/8-inch (9.5 mm) in white on a red background.

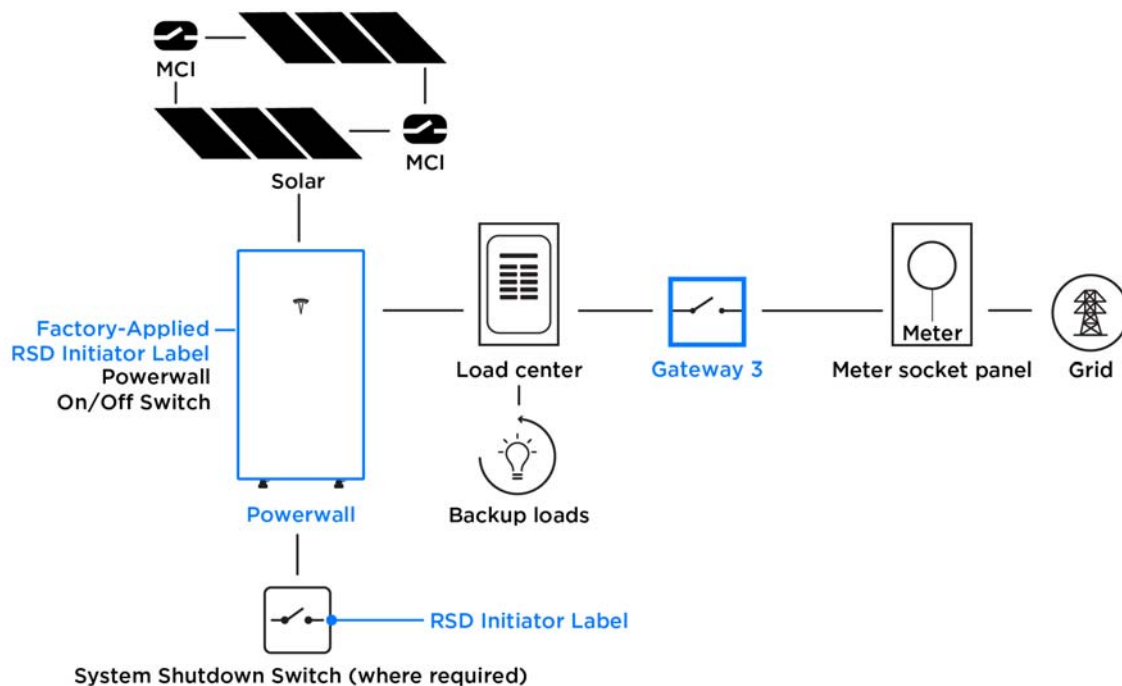
RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

 **NOTE:** The Powerwall 3 On/Off switch has a Rapid Shutdown initiator label applied at the factory.

RSD Initiator Label Location

The following diagram depicts Rapid Shutdown initiator label placement.

Figure 37. RSD Initiator Label(s) in Powerwall 3 System with Gateway 3



APPENDIX E: INVERTER SETTINGS

Inverter settings must be configured in advance by Tesla. Talk to your Tesla representative if any of the default settings should be modified. The defaults for the inverter follow each region's grid code. Any changes to the settings shall be authorized by the AHJ.

Response to Abnormal Frequencies requirements for abnormal operating performance Category II & Category III

Shall Trip Category II & III				
Shall Trip Function	Default Settings		Ranges of Allowable Settings	
	Frequency (Hz)	Clearing Time (s)	Frequency (Hz)	Clearing Time (s)
OF2	62.0	0.16	61.8-66.0	0.16-1000.0
OF1	61.2	300.0	61.0-66.0	180.0-1000.0
UF1	58.5	300.0	50.0-59.0	180.0-1000.0
UF2	56.5	0.16	50.0-57.0	0.16-1000.0

Response to Abnormal Voltage requirements for abnormal operating performance Category II & Category III

Shall Trip Category II				
Shall Trip Function	Default Settings		Ranges of Allowable Settings	
	Voltage (p.u. of Nominal Voltage)	Clearing Time (s)	Voltage (p.u. of Nominal Voltage)	Clearing Time (s)
OV2	1.20	0.16	Fixed at 1.2	Fixed at 0.16
OV1	1.10	2	1.10-1.20	1.0-13.0
UV1	0.70	10	0.0-0.88	2.0-21.0
UV2	0.45	0.16	0.0-0.50	0.16-2.0

Shall Trip Category III				
Shall Trip Function	Default Settings		Ranges of Allowable Settings	
	Voltage (p.u. of Nominal Voltage)	Clearing Time (s)	Voltage (p.u. of Nominal Voltage)	Clearing Time (s)
OV2	1.20	0.16	Fixed at 1.2	Fixed at 0.16
OV1	1.10	13.0	1.10-1.20	1.0-13.0
UV1	0.88	21.0	0.0-0.88	21.0-50.0
UV2	0.50	2.0	0.0-0.50	2.0-21.0

APPENDIX E: INVERTER SETTINGS

Accuracy

Setting	Accuracy
Voltage	+/- 1% of nominal voltage
Frequency	+/- 0.01 Hz
Time	0.032 s for <5 s 1% of set point for >5 s
Active Power	+/- 5% of rated apparent power
Reactive Power	+/- 5% of rated apparent power

APPENDIX E: INVERTER SETTINGS

Volt Watt Capabilities

Voltage-Active Power Parameters	Default Values (p.u)	Range (p.u)	Description	240V (Split Phase)
V1	1.06Vn	1.05-1.09	Output power rating (W)	11500
P1	1.0	1	AC voltage range with function enabled (Vac)	247.2 - 288
V2	1.1Vn	1.1	Nominal AC voltage (Vac)	240
P2	0	0		
P'2	0	0- -0.435		
Response Time	10s	0.5 to 60		

Frequency Watt Capabilities

Parameters	Default Values Category II & III	Range	Description	240V (Split Phase)
dbUF(Hz), dbOF(Hz)	0.036	0.017-1	Output power rating (W)	11500
KOF, kUF	0.05	0.02-0.07		
Tr(s)	5		Settling time (sec)	0.2 to 10

APPENDIX E: INVERTER SETTINGS

Watt-Var Capabilities

Active Power - Reactive Power Parameters	Default Values (p.u)	Range (p.u)
P3	1	0.5 - 1
P2	0.5	0.4 - 0.8
P1	0.2	0 - 0.7
P1'	0	-0.7 - 0
P2'	-0.21	-0.8 - -0.4
P3'	-0.43	-1 - -0.5
Q3	-0.44	-1 - 1
Q2	0	-1 - 1
Q1	0	-1 - 1
Q1'	0	-1 - 1
Q2'	0	-1 - 1
Q3'	0.44	-1 - 1

Volt-Var Capabilities

Voltage - Reactive power parameters	Default values	Range p.u	Description	Value (240V Split Phase)
VRef	Vn	0.95-1.05	Apparent power rating (VA)	11500
V2	0.98Vn	0.93-1.04	Output power rating (W)	11500
Q2	0	0.5- -0.5	Nominal AC EPS voltage (V)	240
V3	1.02Vn	0.96-1.07	AC EPS voltage range with function enabled (Vac)	196.8-283.2
Q3	0	0.5- -0.5	Reactive Power Accuracy (% or Var)	±5%
V1	0.92Vn	0.88-1	Max rated reactive Power (capacitive, overexcited) (VAr)	11500
Q1	0.44	1- -1	Max rated reactive Power (inductive, underexcited) (VAr)	-11500
V4	1.08Vn	1-1.1	Settling Time (sec)	1-90
Q4	-0.44	1 - -1		

Ramp Characterization

Parameters Description	Value (240V split phase)
Output current rating (Aac)	48
Minimum normal ramp-up rate (%I _{rated} / sec)	1
Maximum normal ramp-up rate (%I _{rated} / sec)	100

APPENDIX E: INVERTER SETTINGS

Parameters Description	Value (240V split phase)
Output current range of function (% I_{rated})	0% to 100%
Ramp rate accuracy (% I_{rated} / sec)	0.5%

Maximum Backfeed Current

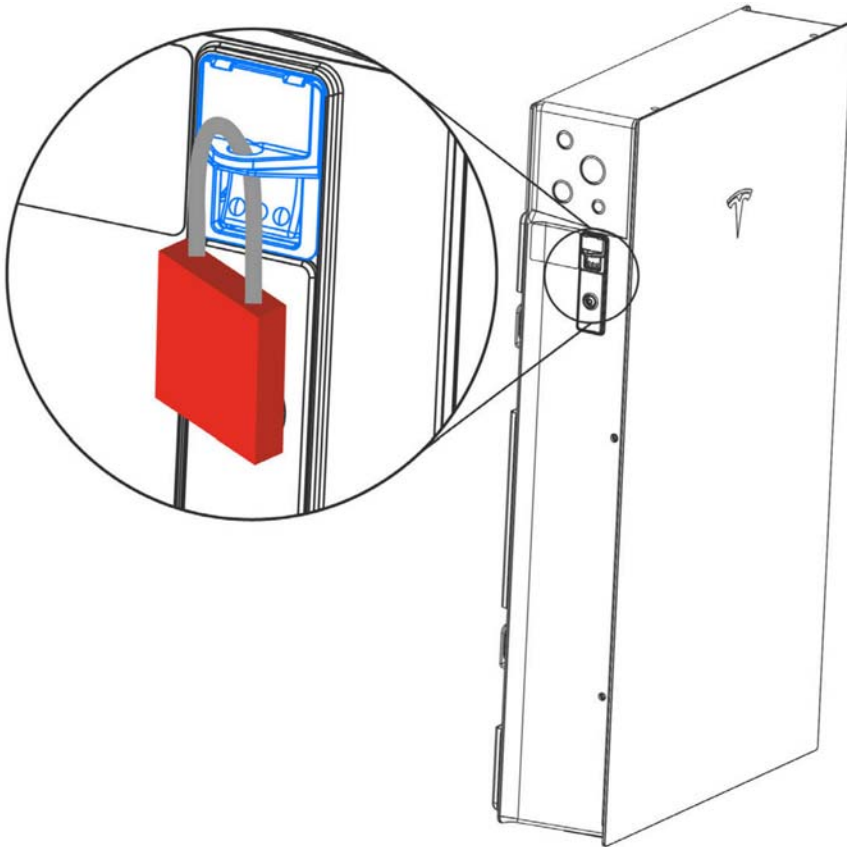
The maximum backfeed current is 48 A.

APPENDIX F: SAFETY FEATURES

Powerwall 3 Switch Locking Mechanism

On / Off Switch Locking Mechanism

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



Arc Fault Detection and Protection

The Arc-Fault Circuit Interrupter (AFCI) mechanism is compliant with NEC code section 690.11, UL1699B and UL1998 standards. Arc fault detection is performed to detect series arcs within the PV array.

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

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

Ground Fault Protection

Powerwall 3 is capable of detecting ground faults in compliance with UL 1741.

APPENDIX F: SAFETY FEATURES

Protective Earth Impedance Check

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

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

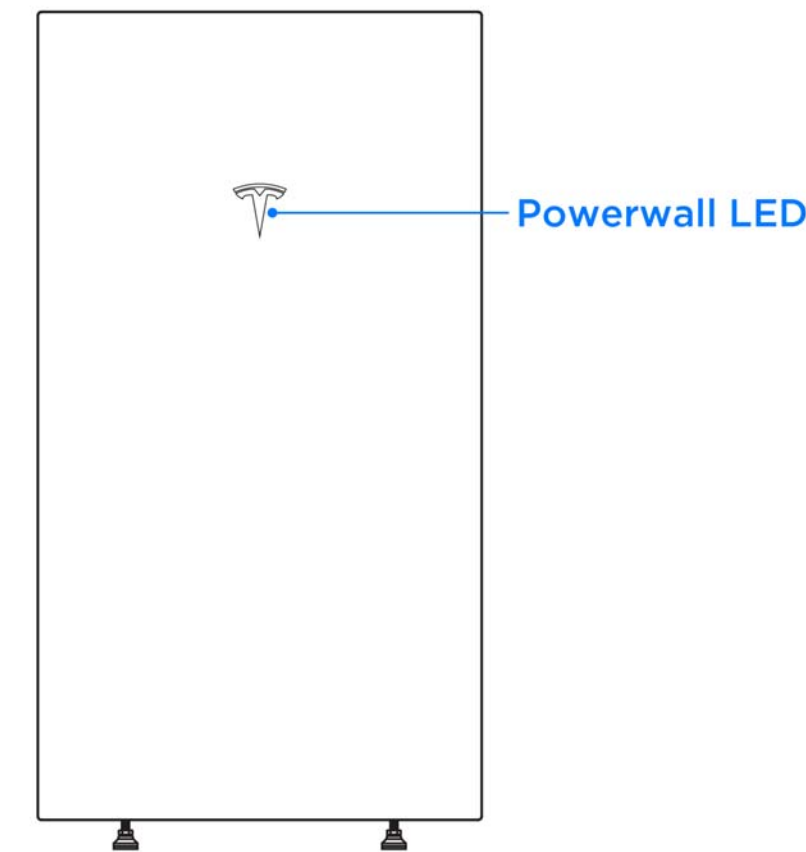
Upon detected loss of PE or identification of a high impedance value Powerwall 3 does not connect to the grid until the fault is cleared manually or a repeated PE impedance test demonstrates a sufficiently low impedance.

APPENDIX F: SAFETY FEATURES

System LED Behavior

Powerwall 3 LED Behavior

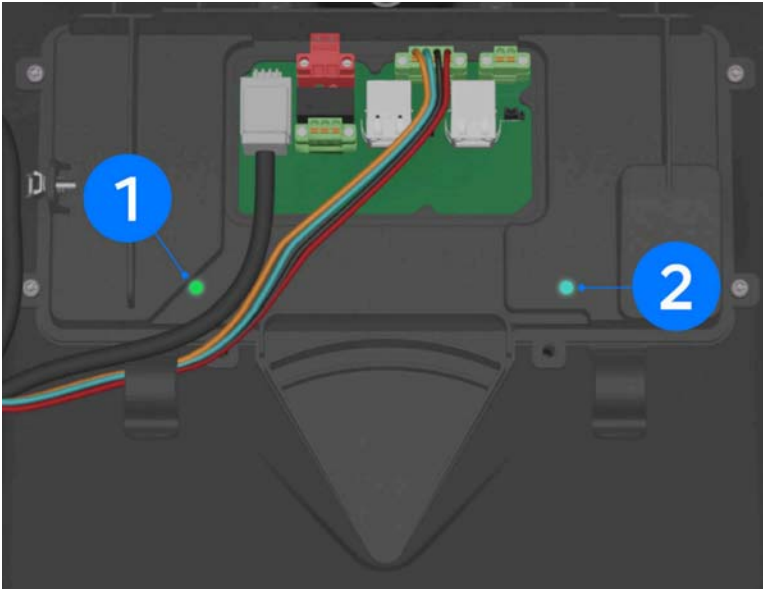
Tesla Logo LED



LED State	Indication
Flashing Red	Inverter (PWS) fault, e.g. AFCI or GFCI, RSD, etc.

APPENDIX F: SAFETY FEATURES

Tesla Asset Controller (TACO) LEDs



(1) Power LED	(2) Status LED	Status	Details
Solid green	Solid light blue	Ready to commission	TACO is powered and the config application is running. TeslaPW network should be broadcasting
Solid Green	Solid Green	Not ready to commission	TACO is powered but the config application is not yet running. If Powerwall 3 remains in this state permanently, contact Install Support
Solid Green	Red	Not ready to commission	TACO is powered but the unit is still booting up. If Powerwall 3 remains in this state permanently, contact Install Support
OFF	OFF	No power (12V) to TACO	Note that power can be provided by either the Backup Gateway 2 12V or internal 12V. 1. Turn the Powerwall 3 switch ON and wait at least 5 minutes 2. Confirm the TACO factory-installed harness is plugged all the way in (see TACO Factory-Installed Harness on page 104) 3. Confirm the 12V wiring from Gateway 3 to Powerwall 3 (TACO terminals 1-4 in Communication Wiring to Gateway 3 on page 103) is correct If Powerwall 3 remains in this state, contact Install Support

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

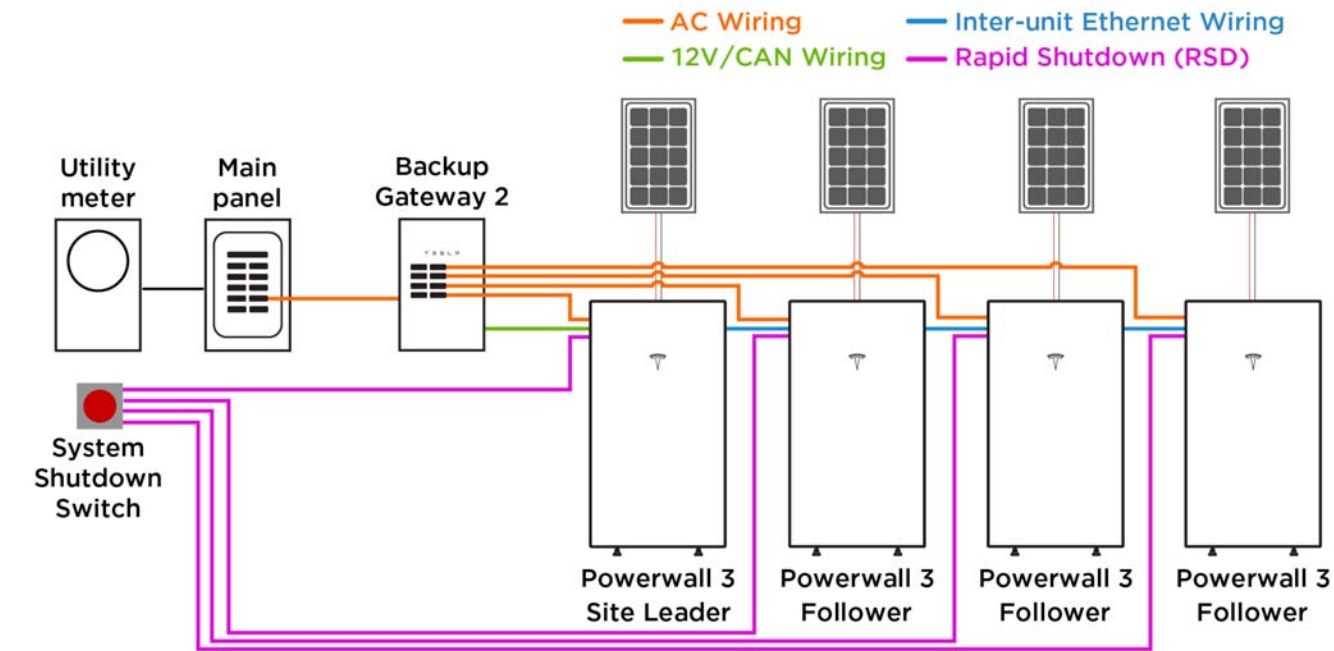
 **NOTE:** The Tesla Asset Controller LEDs are not visible when the Powerwall 3 front cover is installed.

APPENDIX G: INSTALLATIONS WITH MULTIPLE POWERWALL 3 UNITS

Maximum Number of Powerwall 3 Units	Up to (4X) Powerwall 3 units  NOTE: The maximum number of Powerwall 3 units per installation may vary by market.
Overcurrent Protection Devices	Each Powerwall 3 requires its own 60 A circuit breaker
Site Leader	The Powerwall 3 connected to the Gateway 3 is designated as the Leader Powerwall 3  NOTE: The system is commissioned by connecting to the Leader Powerwall 3.
Follower Unit	Any Powerwall 3 <u>not</u> connected to the Gateway 3 is designated as a Follower unit
Leader to Follower Communication	Ethernet (see Prepare Ethernet Wiring with RJ45 Connectors on page 105)
Internet Connection for Multiple Units	Option 1: The Leader Powerwall 3 is connected to customer router over Wi-Fi Option 2: Either the first or last Powerwall 3 (can be Leader or Follower) in the chain is connected to customer router via Ethernet  NOTE: Only connect the router to a Powerwall 3 at either end of the chain; do not connect it in the middle of the chain (see Connecting Powerwall 3 Units via Ethernet on page 130 for example diagrams).
Allowable Mounting Configuration	Side-by-side (front-to-back stacking is not supported for multiple Powerwall 3 units)
Maximum Wire Length Between Units	See Plan Cable Length Between Components on page 28
Splitting PV Production Between Multiple Units	Split PV production [strings] equally between the Powerwall 3 units
System Shutdown Switch with Multiple Units	Where a single System Shutdown Switch is required, each unit must be wired to a dedicated switching pole of the switch. Ensure the installed System Shutdown Switch has enough switching poles for the number of units installed. See STEP 8: Install System Shutdown Switch Where Required on page 75 for switch requirements and additional information

APPENDIX G: INSTALLATIONS WITH MULTIPLE POWERWALL 3 UNITS

Figure 38. Multi-Powerwall 3 System with Backup Gateway 2

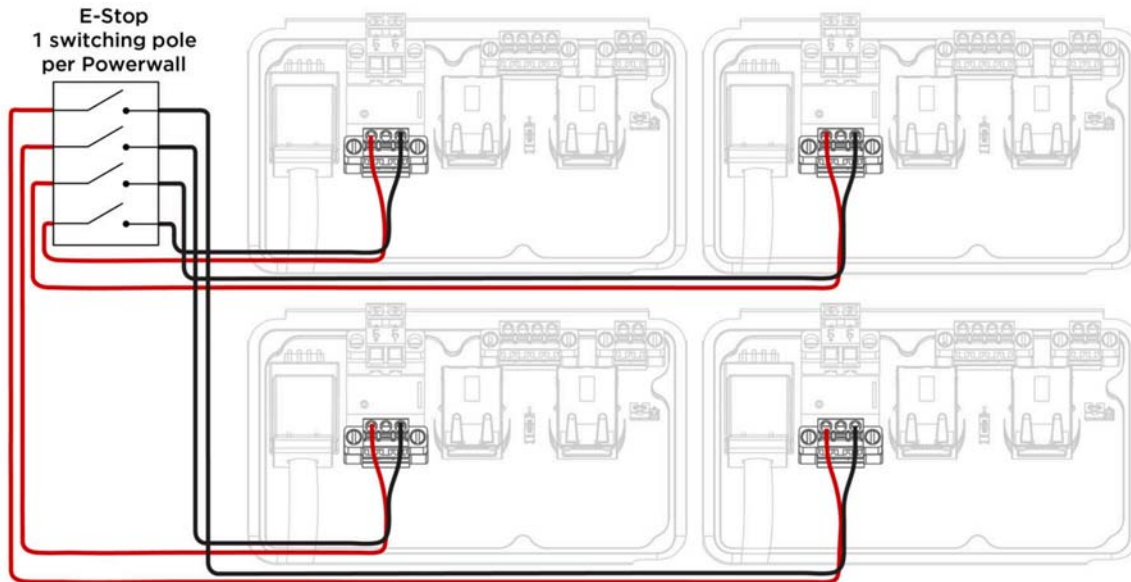


APPENDIX G: INSTALLATIONS WITH MULTIPLE POWERWALL 3 UNITS

System Shutdown Switch with Multiple Powerwall 3 Units

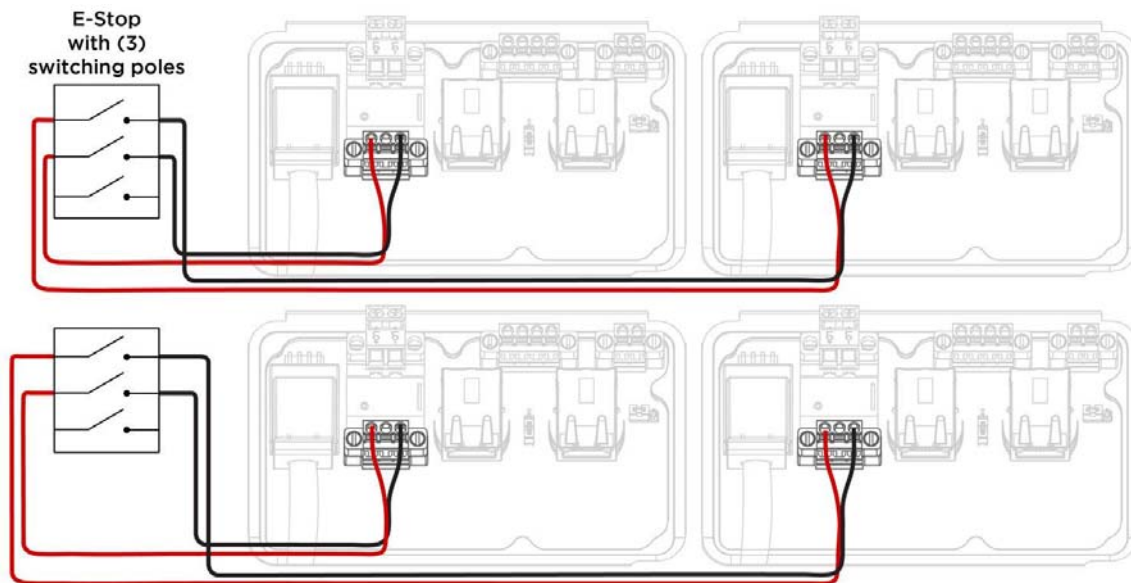
Where a System Shutdown Switch is required, each Powerwall 3 must be wired to a dedicated switching pole of the switch. Ensure the installed System Shutdown Switch has enough switching poles for the number of units installed.

Figure 39. 4-Pole System Shutdown Switch with Four Powerwall 3 Units



In the event multiple System Shutdown Switches are required to accommodate the number of Powerwall 3 units installed, simply install multiple switches, placing them physically near each other and following all local codes and requirements.

Figure 40. Two 3-Pole System Shutdown Switches with Four Powerwall 3 Units



APPENDIX G: INSTALLATIONS WITH MULTIPLE POWERWALL 3 UNITS

Connecting Powerwall 3 Units via Ethernet

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

Figure 41. Example 1: Leader Powerwall 3 at Start of Chain, Connected to Customer Router via Wi-Fi

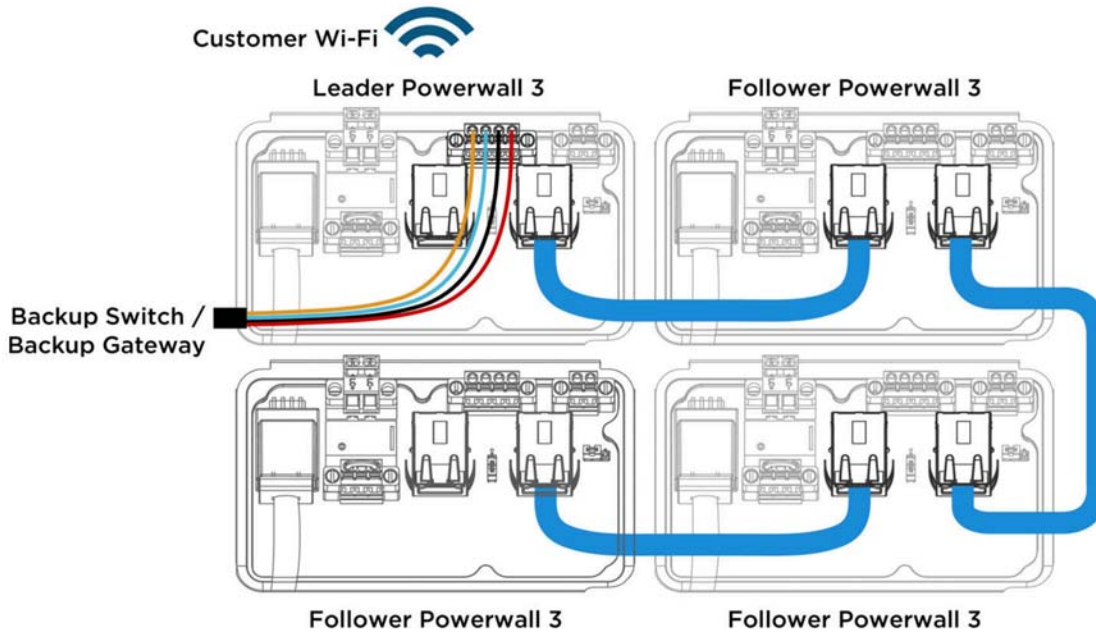
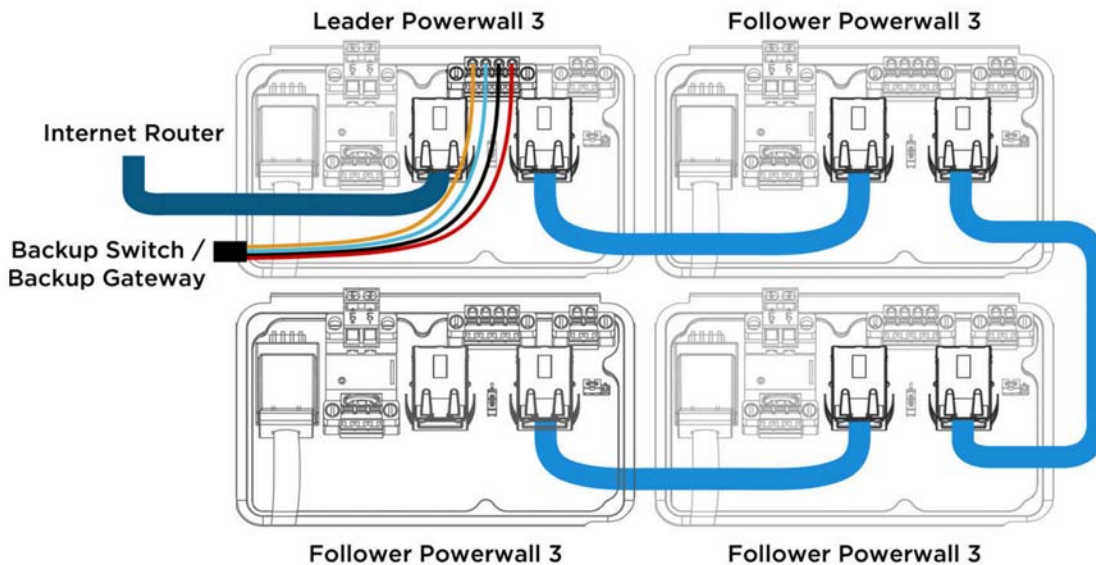
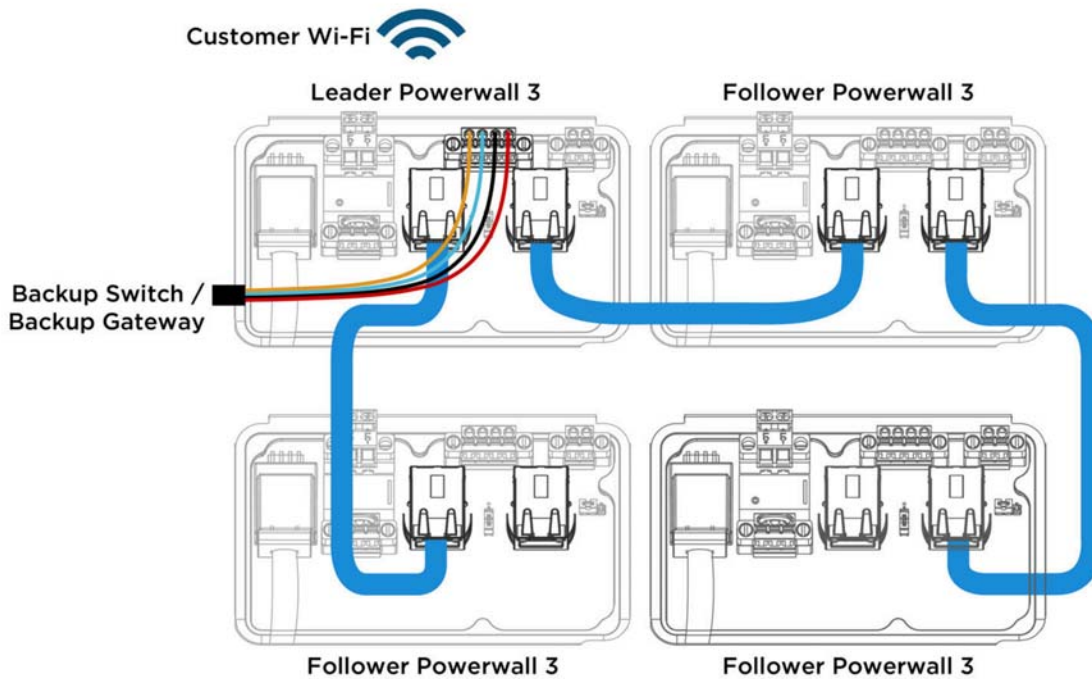


Figure 42. Example 2: Leader Powerwall 3 at Start of Chain, Connected to Customer Router via Ethernet

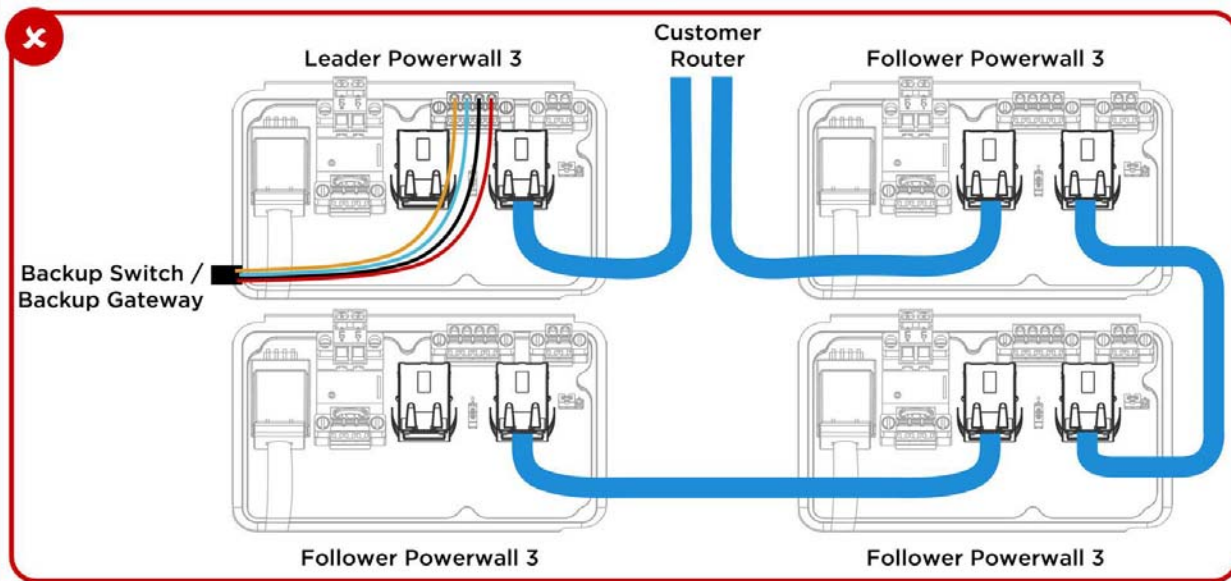


APPENDIX G: INSTALLATIONS WITH MULTIPLE POWERWALL 3 UNITS

Figure 43. Example 3: Leader Powerwall 3 in Middle of Chain, Connected to Customer Router via Wi-Fi



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



Commissioning Multi-Powerwall 3 Systems

For instructions to commission a multi-Powerwall 3 system, as well as for troubleshooting steps for common issues, see the [Powerwall 3 Device Setup Guide on Partner Portal](#).

APPENDIX H: SHUTTING DOWN POWERWALL 3

Powerwall 3 system shutdown for emergency response or maintenance requires initiation of rapid shutdown, emergency shutdown, and opening of the disconnecting means.

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

Safely Shut Down Powerwall 3 for Maintenance or Service

1. If there is third party solar on-site, turn off the AC breaker for each solar inverter.
2. If a System Shutdown Switch is present, push it to initiate Rapid Shutdown. If there is no System Shutdown Switch, turn the Enable switch on the Powerwall 3 to OFF.
3. Open the Powerwall 3 AC circuit breaker.
4. Wait 30 seconds before proceeding with any work.

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

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

Rapid Shutdown, Emergency Shutdown, and Disconnecting Means for Powerwall 3

Device	PV Rapid Shutdown per NEC 690.12	Emergency Shutdown per NEC 706.15	Disconnecting Means
System Shutdown Switch (Emergency Stop Device)	Initiates PV rapid shutdown	Disconnects and de-energizes output of PV and ESS equipment and initiates PV array shutdown	Lockable switch that disconnects all poles of the Powerwall 3 from the premises AC circuits. Provides line-of-sight secondary disconnecting means when the AC breaker is not within sight of the Powerwall 3.
Powerwall 3 Enable Switch	Initiates PV rapid shutdown	Disconnects and de-energizes output of PV and ESS equipment and initiates PV array shutdown	Lockable switch that disconnects all poles of the Powerwall 3 from the premises AC circuits. Provides line-of-sight secondary disconnecting means when the AC breaker is not within sight of the Powerwall 3
Breaker or Handled Disconnect	N/A	N/A	Primary disconnecting means to isolate all poles of the Powerwall 3 conductors from the premises AC circuits.

APPENDIX I: SERVICING POWERWALL 3

De-Energize Powerwall 3 Before Performing Service

WARNING: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions unless you are qualified to do so.

WARNING: Live voltage may be present on the PV terminals even when there is no power source from the PV modules. To ensure the PV bus is not powered, always turn the AC breaker **OFF** to disconnect Powerwall 3 from the grid before performing any service work. This will activate Rapid Shutdown.

Required Tools and PPE

Required tools:

- T20 Torx driver
- Digital multimeter

Required PPE:

- Class 00 Electrical Protective Gloves

De-Energize Powerwall 3

In Powerwall 3, Rapid Shutdown is initiated by turning the Powerwall 3 Enable switch OFF, or by pushing the System Shutdown Switch if one is present. Upon initiation of Rapid Shutdown, Powerwall 3 will stop power conversion and initiate Rapid Shutdown (all MCIs will open and PV voltages will drop to safe levels). Once Powerwall 3 is in this state, it is safe to perform service.

To de-energize Powerwall 3:

1. If a System Shutdown Switch is present, push it to initiate Rapid Shutdown.
2. Turn the Powerwall 3 Enable switch OFF.



3. Open the Powerwall 3 AC circuit breaker and install a breaker clasp and lock out / tag out to secure it against reconnection.

APPENDIX I: SERVICING POWERWALL 3



- This will initiate Rapid Shutdown and bring the PV voltage to a safe level.

4. Wait 30 seconds before proceeding.



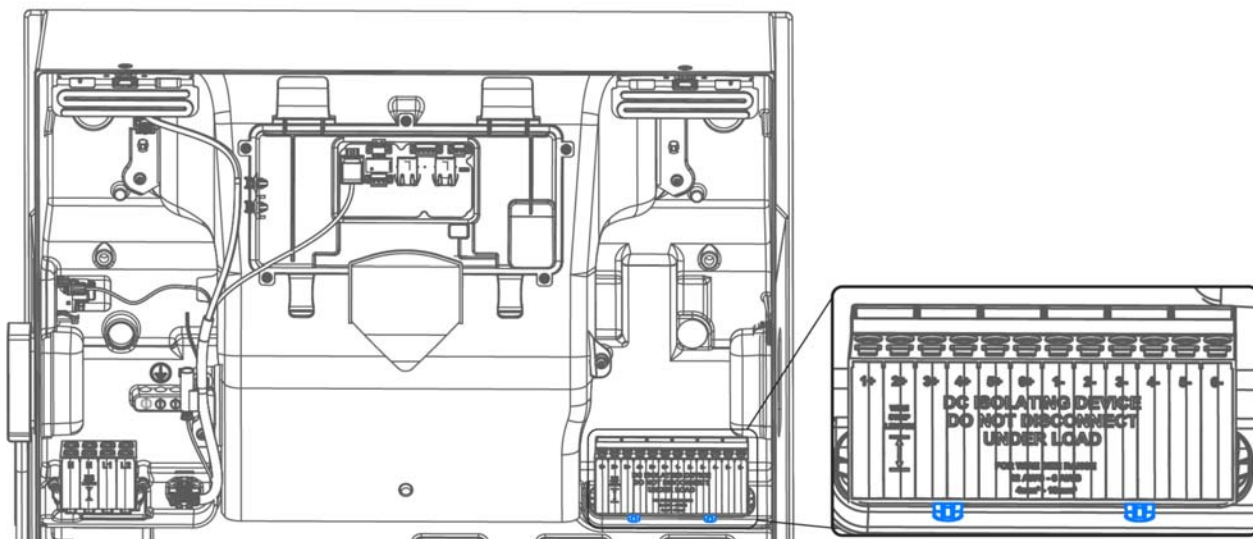
WARNING: Risk of electric shock from stored energy. Wait 30 seconds after disconnecting all sources of supply before proceeding.

5. Remove the (6X) fasteners holding the glass front cover in place, then carefully remove the front cover and set it aside.

6. Remove the PV isolator connector:

- a. Push the plastic levers to release the PV isolator connector.
- b. Remove the PV isolator connector.

Figure 44. PV Isolator in Powerwall 3



WARNING: The PV isolator is not load breaking. Ensure AC power is disconnected before unplugging this connector.



NOTE: The connector inside the unit that serves as the PV isolator is defined as a Disconnecting Means for Isolating PV Equipment in compliance with NEC sec. 690.15.

7. Using a suitable measuring device:

- a. Place the test probe in each rectangular screwdriver slot in the PV-in terminal blocks to ensure there is no voltage present.
- b. Place the test probe in each rectangular screwdriver slot in the equipment grounding conductor block to ensure there is no voltage present.

APPENDIX I: SERVICING POWERWALL 3

- c. Place the test probe in each rectangular screwdriver slot in the AC-out terminal block to ensure there is no voltage present.



NOTE: See [Appendix B: Wiring Reference on page 101](#) for a labeled diagram of all terminal blocks.

8. Using cabinet or electronics tip slotted screwdriver (up to 3/16-inch or 4.5 mm):
 - a. Open the jaws of each opening in the PV-in terminal blocks and unplug each wire from the blocks.
 - b. Open the jaws of each opening in the AC-out terminal blocks and unplug each wire from the block.
 - c. Open the jaws of each opening in the ground conductor terminal blocks and unplug each wire from the block.
9. If performing any work away from Powerwall 3, lock and tag out the Powerwall 3 AC breaker.

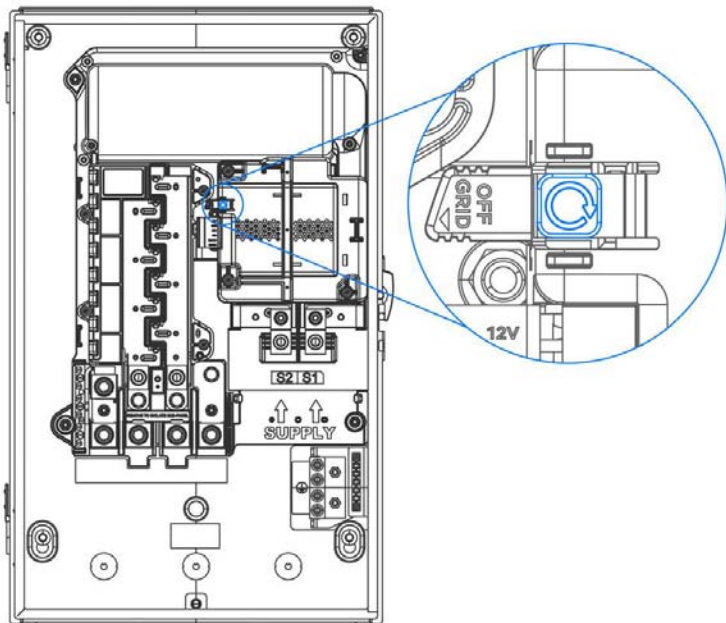


NOTE: Before replacing the glass front cover, clean out the enclosure and vacuum out any dust, and clean the rubber gasket.

APPENDIX I: SERVICING POWERWALL 3

Reset the Islanding Controller in Gateway 3

If experiencing issues with the Gateway 3, reset the Gateway's islanding controller using the Reset button, pictured below.



NOTE: The reset button should only be used after exhausting all other troubleshooting options.



NOTE: The reset button can be accessed through the opening in the deadfront cover, without removing the cover.



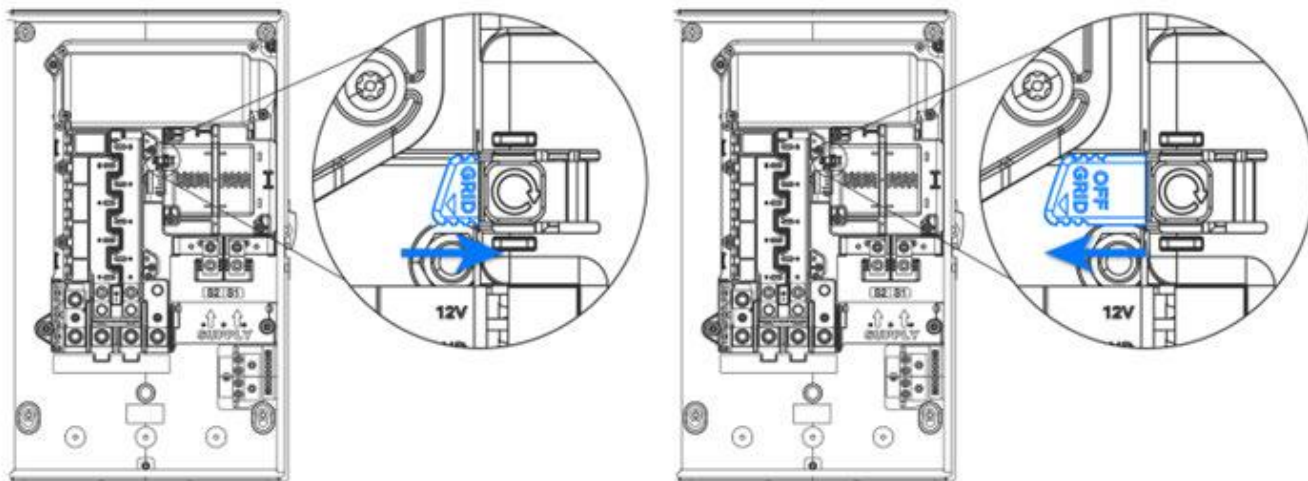
APPENDIX I: SERVICING POWERWALL 3

Gateway 3 Manual Override Switch

During normal operation, the system automatically senses grid outages and transitions to off-grid operation. If the grid outage ends and the system is unable to transition back to on-grid operation and is dropping loads, perform a manual override to bring the system back to on-grid operation.

CAUTION: Use the Manual Override only during service events. The system may override a user prompted manual override action for safety reasons. If the manual override is not successful, contact Tesla Service before taking any additional steps.

Override switch in the on-grid position (left image), and the off-grid position (right image):



1. Turn off all home load breakers.
2. Turn the power supply breaker to the Gateway 3 OFF.
3. Remove the Gateway deadfront cover.
4. While wearing electrical safety PPE, use a multimeter to verify that there are no faults in the backup or grid side of Gateway.
5. Push the Manual Override switch in ONCE to perform a manual override. Tesla installers, certified electricians, utility personnel, and customers are authorized to perform this task.
 - If the Manual Override switch remains closed in the “Grid” position and power is restored, the process is complete and the system is functional.
 - If the Manual Override switch trips open again to the “Off Grid” position and power is not restored, reset the Gateway 3 (see [Reset the Gateway on page 136](#)), unplug the communication cable, and contact the Installation Hotline.