# ESS Energy Storage System for UL9540

## Galaxy VL UPS and Galaxy Lithium-ion Battery Cabinets

## Installation

**NOTE: This is a Solution Manual and replaces individual manuals for these products.**

**Latest updates are available on the Schneider Electric website**
**3/2025**

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## Find the UPS Manuals, Relevant Auxiliary Product Manuals, and Option Manuals Here:

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**UL (480 V)**

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Here you can find your UPS installation manual, UPS operation manual, and UPS technical specifications, and you can also find installation manuals for your auxiliary products and options.

This online manual portal is available on all devices and offers digital pages, search functionality across the different documents in the portal, and PDF download for offline use.

## Learn More About the Galaxy VL Here:

Go to *https://www.se.com/ww/en/product-range/22545656* to learn more about this product.

# Table of Contents

# Important Safety Instructions — SAVE THESE INSTRUCTIONS

Read these instructions carefully and look at the equipment to become familiar with it before trying to install, operate, service or maintain it. The following safety messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

**⚠DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

**Failure to follow these instructions will result in death or serious injury.**

**⚠WARNING**

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

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**⚠CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

**Failure to follow these instructions can result in injury or equipment damage.**

***NOTICE***

**NOTICE** is used to address practices not related to physical injury. The safety alert symbol shall not be used with this type of safety message.

**Failure to follow these instructions can result in equipment damage.**

## Please Note

Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

# FCC Statement

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

# Electromagnetic Compatibility

***NOTICE***

**RISK OF ELECTROMAGNETIC DISTURBANCE**

This is a product category C2 UPS product. In a residential environment, this product may cause radio inference, in which case the user may be required to take additional measures.

**Failure to follow these instructions can result in equipment damage.**

# Safety Precautions

**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

All safety instructions in this document must be read, understood and followed.

**Failure to follow these instructions will result in death or serious injury.**

**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Read all instructions in the installation manual before installing or working on this UPS system.

**Failure to follow these instructions will result in death or serious injury.**

**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not install the UPS system until all construction work has been completed and the installation room has been cleaned.

**Failure to follow these instructions will result in death or serious injury.**

## ⚠DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- The product must be installed according to the specifications and requirements as defined by Schneider Electric. It concerns in particular the external and internal protections (upstream disconnect devices, battery disconnect devices, cabling, etc.) and environmental requirements. No responsibility is assumed by Schneider Electric if these requirements are not respected.
- After the UPS system has been electrically wired, do not start up the system. Start-up must only be performed by Schneider Electric.

**Failure to follow these instructions will result in death or serious injury.**

## ⚠DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

The UPS system must be installed according to local and national regulations. Install the UPS according to:

- IEC 60364 (including 60364–4–41- protection against electric shock, 60364–4–42 - protection against thermal effect, and 60364–4–43 - protection against overcurrent), **or**
- NEC NFPA 70, **or**
- Canadian Electrical Code (C22.1, Part 1)

depending on which one of the standards apply in your local area.

**Failure to follow these instructions will result in death or serious injury.**

## ⚠DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Install the UPS system in a temperature controlled indoor environment free of conductive contaminants and humidity.
- Install the UPS system on a non-flammable, level and solid surface (e.g. concrete) that can support the weight of the system.

**Failure to follow these instructions will result in death or serious injury.**

## ⚠DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

The UPS is not designed for and must therefore not be installed in the following unusual operating environments:

- Damaging fumes
- Explosive mixtures of dust or gases, corrosive gases, or conductive or radiant heat from other sources
- Moisture, abrasive dust, steam or in an excessively damp environment
- Fungus, insects, vermin
- Salt-laden air or contaminated cooling refrigerant
- Pollution degree higher than 2 according to IEC 60664-1
- Exposure to abnormal vibrations, shocks, and tilting
- Exposure to direct sunlight, heat sources, or strong electromagnetic fields

**Failure to follow these instructions will result in death or serious injury.**

**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not drill or cut holes for cables or conduits with the gland plates installed and do not drill or cut holes in close proximity to the UPS.

**Failure to follow these instructions will result in death or serious injury.**

**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not make mechanical changes to the product (including removal of cabinet parts or drilling/cutting of holes) that are not described in the Installation Manual.

**Failure to follow these instructions will result in death or serious injury.**

**⚠CAUTION**

**RISK OF HOT SURFACE**

The outer plates of the cabinet can exceed temperatures of 65 °C (149 °F) at 50 °C (122 °F) ambient room temperature, if the air filter(s) in the front door is clogged. Replace the air filter regularly as described in the UPS operation manual.

**Failure to follow these instructions can result in injury or equipment damage.**

***NOTICE***

**RISK OF OVERHEATING**

Respect the space requirements around the UPS system and do not cover the product's ventilation openings when the UPS system is in operation.

**Failure to follow these instructions can result in equipment damage.**

***NOTICE***

**RISK OF EQUIPMENT DAMAGE**

Do not connect the UPS output to regenerative load systems including photovoltaic systems and speed drives.

**Failure to follow these instructions can result in equipment damage.**

## Additional Safety Precautions After Installation

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not install the UPS system until all construction work has been completed and the installation room has been cleaned. If additional construction work is needed in the installation room after this product has been installed, turn off the product and cover the product with the protective packaging bag the product was delivered in.

**Failure to follow these instructions will result in death or serious injury.**

# Electrical Safety

This manual contains important safety instructions that should be followed during the installation and maintenance of the UPS system.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Electrical equipment must be installed, operated, serviced, and maintained only by qualified personnel.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices.
- Disconnection devices for AC and DC must be provided by others, be readily accessible, and the function of the disconnect device marked for its function.
- A disconnection device (e.g. a disconnection circuit breaker or disconnection switch) must be installed to enable isolation of the system from upstream power sources in accordance with local regulations. This disconnection device must be easily accessible and visible.
- Turn off all power supplying the UPS system before working on or inside the equipment.
- Before working on the UPS system, check for hazardous voltage between all terminals including the protective earth.
- The UPS contains an internal energy source. Hazardous voltage can be present even when disconnected from the mains supply. Before installing or servicing the UPS system, ensure that the units are OFF and that mains and batteries are disconnected. Wait five minutes before opening the UPS to allow the capacitors to discharge.
- The UPS must be properly earthed/grounded and due to a high touch current/leakage current, the earthing/grounding conductor must be connected first.

**Failure to follow these instructions will result in death or serious injury.**

The label below must be added if:

1. The UPS input is connected through external isolators that, when opened, isolate the neutral, OR
2. The UPS input is connected via an IT power system.

The label must be placed adjacent to all upstream power disconnection devices that isolate the neutral.

The label below must be also added if backfeed protection is provided external to the equipment. See Backfeed Protection, page 81 for more details. The label must be placed adjacent to all upstream power disconnection devices.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Risk of voltage backfeed. Before working on this circuit: Isolate the UPS and check for hazardous voltage between all terminals including the protective earth.

**Failure to follow these instructions will result in death or serious injury.**

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Always perform correct Lockout/Tagout before working on the UPS. A UPS with autostart enabled will automatically restart when the mains supply returns.

**Failure to follow these instructions will result in death or serious injury.**

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

This product can cause a DC current in the PE conductor. If a residual current-operated protective device (RCD) is used for protection against electrical shock, only an RCD of Type B is allowed on the supply side of this product.

**Failure to follow these instructions will result in death or serious injury.**

# Battery Safety

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Battery circuit breakers must be installed according to the specifications and requirements as defined by Schneider Electric.
- Servicing of batteries must only be performed or supervised by qualified personnel knowledgeable of batteries and the required precautions. Keep unqualified personnel away from batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Do not dispose of batteries in a fire as they can explode.
- Do not open, alter, or mutilate batteries.

**Failure to follow these instructions will result in death or serious injury.**

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Batteries can present a risk of electric shock and high short-circuit current. The following precautions must be observed when working on batteries

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear protective glasses, gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect the charging source prior to connecting or disconnecting battery terminals.
- Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electric shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

**Failure to follow these instructions will result in death or serious injury.**

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

When replacing batteries, always replace with the same battery module type.

**Failure to follow these instructions will result in death or serious injury.**

## *NOTICE*

**RISK OF EQUIPMENT DAMAGE**

- Lithium-ion batteries should not be stored beyond 15 months from the date of production. If they are stored for longer the calendar degradation will cause the batteries to be irreversible degraded beyond what is expected – a reduced runtime will be the consequence. Performance guarantee will be measured from the time of deployment or from production date +15 months, whichever comes first. For storage beyond 15 months, contact Schneider Electric.
- If the UPS system remains de-energized for a long period, Schneider Electric recommends to shut down the battery cabinet completely.

**Failure to follow these instructions can result in equipment damage.**

## ⚠CAUTION

**RISK OF PERSONAL INJURY**

This product contains electrolyte and other chemicals. If the product is received with external damage that causes a person to come into contact with the electrolyte, please proceed as follows:

- **EYE AND SKIN CONTACT:** Immediately flush with plenty of water and seek medical assistance.
- **RESPIRATORY INHALATION:** Immediately move away from vaporized gas, get fresh air and rest, and seek medical assistance if necessary.

**Failure to follow these instructions can result in injury or equipment damage.**

# Specifications

## Overview of ESS Energy Storage Systems

Arc flash related calculation of the battery system is estimated with the Direct-Current Incident Energy Calculations referenced in Informative Annex D of NFPA 70E Standard for Electrical Safety in the Workplace. The ESS system is assumed to estimate the worst-case scenario of 8 LIBSESMG17UL battery cabinets in parallel. Estimated arc flash: < 0.97 cal/cm$^2$.

Input/output voltage, VAC, 3-phase, 50/60 Hz: 480 V.
Ambient temperature range: 23 °C ±5 °C.
Max. short-circuit current: 65 kA.

| ESS model name | Max. input current (A) | Max. output current (A) | Max. energy output (W) | Max. power input (kVA) | Max. power output (kVA) |
|---|---|---|---|---|---|
| GVL200K500DS - 1LIBSESMG17UL | 303 | 241 | 34600 | 252 | 184 |
| GVL200K500DS - 2LIBSESMG17UL | 303 | 241 | 69200 | 252 | 200 |
| GVL200K500DS - 3LIBSESMG17UL | 303 | 241 | 103800 | 252 | 200 |
| GVL200K500DS - 4LIBSESMG17UL | 303 | 241 | 138400 | 252 | 200 |
| GVL200K500DS - 5LIBSESMG17UL | 303 | 241 | 173000 | 252 | 200 |
| GVL200K500DS - 6LIBSESMG17UL | 303 | 241 | 207600 | 252 | 200 |
| GVL200K500DS - 7LIBSESMG17UL | 303 | 241 | 242200 | 252 | 200 |
| GVL200K500DS - 8LIBSESMG17UL | 303 | 241 | 276800 | 252 | 200 |
| GVL200K500DS - 1LIBSESMG16UL | 303 | 241 | 32600 | 252 | 173 |
| GVL200K500DS - 2LIBSESMG16UL | 303 | 241 | 65200 | 252 | 200 |
| GVL200K500DS - 3LIBSESMG16UL | 303 | 241 | 97800 | 252 | 200 |
| GVL200K500DS - 4LIBSESMG16UL | 303 | 241 | 130400 | 252 | 200 |
| GVL200K500DS - 5LIBSESMG16UL | 303 | 241 | 163000 | 252 | 200 |
| GVL200K500DS - 6LIBSESMG16UL | 303 | 241 | 195600 | 252 | 200 |
| GVL200K500DS - 7LIBSESMG16UL | 303 | 241 | 228200 | 252 | 200 |
| GVL200K500DS - 8LIBSESMG16UL | 303 | 241 | 260800 | 252 | 200 |
| GVL300K500DS - 2LIBSESMG17UL | 455 | 361 | 69200 | 378 | 300 |
| GVL300K500DS - 3LIBSESMG17UL | 455 | 361 | 103800 | 378 | 300 |
| GVL300K500DS - 4LIBSESMG17UL | 455 | 361 | 138400 | 378 | 300 |
| GVL300K500DS - 5LIBSESMG17UL | 455 | 361 | 173000 | 378 | 300 |
| GVL300K500DS - 6LIBSESMG17UL | 455 | 361 | 207600 | 378 | 300 |
| GVL300K500DS - 7LIBSESMG17UL | 455 | 361 | 242200 | 378 | 300 |

| ESS model name | Max. input current (A) | Max. output current (A) | Max. energy output (W) | Max. power input (kVA) | Max. power output (kVA) |
|---|---|---|---|---|---|
| GVL300K500DS - 8LIBSESMG17UL | 455 | 361 | 276800 | 378 | 300 |
| GVL300K500DS - 2LIBSESMG16UL | 455 | 361 | 65200 | 378 | 300 |
| GVL300K500DS - 3LIBSESMG16UL | 455 | 361 | 97800 | 378 | 300 |
| GVL300K500DS - 4LIBSESMG16UL | 455 | 361 | 130400 | 378 | 300 |
| GVL300K500DS - 5LIBSESMG16UL | 455 | 361 | 163000 | 378 | 300 |
| GVL300K500DS - 6LIBSESMG16UL | 455 | 361 | 195600 | 378 | 300 |
| GVL300K500DS - 7LIBSESMG16UL | 455 | 361 | 228200 | 378 | 300 |
| GVL300K500DS - 8LIBSESMG16UL | 455 | 361 | 260800 | 378 | 300 |
| GVL400K500DS - 2LIBSESMG17UL | 607 | 481 | 69200 | 505 | 368 |
| GVL400K500DS - 3LIBSESMG17UL | 607 | 481 | 103800 | 505 | 400 |
| GVL400K500DS - 4LIBSESMG17UL | 607 | 481 | 138400 | 505 | 400 |
| GVL400K500DS - 5LIBSESMG17UL | 607 | 481 | 173000 | 505 | 400 |
| GVL400K500DS - 6LIBSESMG17UL | 607 | 481 | 207600 | 505 | 400 |
| GVL400K500DS - 7LIBSESMG17UL | 607 | 481 | 242200 | 505 | 400 |
| GVL400K500DS - 8LIBSESMG17UL | 607 | 481 | 276800 | 505 | 400 |
| GVL400K500DS - 2LIBSESMG16UL | 607 | 481 | 65200 | 505 | 346 |
| GVL400K500DS - 3LIBSESMG16UL | 607 | 481 | 97800 | 505 | 400 |
| GVL400K500DS - 4LIBSESMG16UL | 607 | 481 | 130400 | 505 | 400 |
| GVL400K500DS - 5LIBSESMG16UL | 607 | 481 | 163000 | 505 | 400 |
| GVL400K500DS - 6LIBSESMG16UL | 607 | 481 | 195600 | 505 | 400 |
| GVL400K500DS - 7LIBSESMG16UL | 607 | 481 | 228200 | 505 | 400 |
| GVL400K500DS - 8LIBSESMG16UL | 607 | 481 | 260800 | 505 | 400 |
| GVL500KDS - 3LIBSESMG17UL | 758 | 601 | 103800 | 630 | 500 |
| GVL500KDS - 4LIBSESMG17UL | 758 | 601 | 138400 | 630 | 500 |
| GVL500KDS - 5LIBSESMG17UL | 758 | 601 | 173000 | 630 | 500 |
| GVL500KDS - 6LIBSESMG17UL | 758 | 601 | 207600 | 630 | 500 |
| GVL500KDS - 7LIBSESMG17UL | 758 | 601 | 242200 | 630 | 500 |
| GVL500KDS - 8LIBSESMG17UL | 758 | 601 | 276800 | 630 | 500 |
| GVL500KDS - 3LIBSESMG16UL | 758 | 601 | 97800 | 630 | 500 |

| ESS model name | Max. input current (A) | Max. output current (A) | Max. energy output (W) | Max. power input (kVA) | Max. power output (kVA) |
|---|---|---|---|---|---|
| GVL500KDS - 4LIBSESMG16UL | 758 | 601 | 130400 | 630 | 500 |
| GVL500KDS - 5LIBSESMG16UL | 758 | 601 | 163000 | 630 | 500 |
| GVL500KDS - 6LIBSESMG16UL | 758 | 601 | 195600 | 630 | 500 |
| GVL500KDS - 7LIBSESMG16UL | 758 | 601 | 228200 | 630 | 500 |
| GVL500KDS - 8LIBSESMG16UL | 758 | 601 | 260800 | 630 | 500 |

# Specifications for 200-500 kW UPS

| | UPS rating | 200 kW | 300 kW | 400 kW | 500 kW |
|---|---|---|---|---|---|
| Input | Connections | Single mains: 4-wire[1] (L1, L2, L3, N, G) or 3-wire[1] (L1, L2, L3, G)<br>Dual mains: 3-wire[1] (L1, L2, L3, G) | | | |
| | Input voltage range (V) | 408-552 | | | |
| | Frequency (Hz) | 40-70 | | | |
| | Nominal input current (A) | 249 | 373 | 497 | 621 |
| | Maximum input current (A) | 303 | 455 | 607 | 758 |
| | Input current limitation (A) | 313 | 470 | 626 | 783 |
| | Total harmonic distortion (THDI) | <3% at 100% load | | | |
| | Input power factor | >0.99 at load >25%, 0.95 at >15% load | | | |
| | Protection | Built-in backfeed protection and fuses | | | |
| | Ramp-in | Adaptive 1-300 seconds | | | |
| Bypass | Connections | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G) | | | |
| | Bypass voltage range (V) | 432-528 | | | |
| | Frequency (Hz) | 50 or 60 | | | |
| | Frequency range (Hz) | Programmable: ±1, ±3, ±10. Default is ±3. | | | |
| | Nominal bypass current (A) | 247 | 371 | 494 | 618 |
| | Maximum short circuit rating (three cycles) | 65 kAIC<br>65 kAIC with maintenance bypass cabinet (GVLMBCA200K500G)<br>45 kAIC Icw with bottom entry cabinet (GVBEC)<br>65 kAIC Icw with bottom entry cabinet (GVBEC and GVLOPT012 installed)<br>65 kAIC with backfeed breaker kit (GVLOPT003) installed in the UPS[2] | | | |
| | $I^2t$ thyristor value ($A^2s$) | 3.1 $MA^2s$ | | | |
| | Bypass backfeed protection options | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet (GVLMBCA200K500H / GVLMBCA200K500G), OR<br>3: Installation of backfeed breaker kit (GVLOPT004 / GVLOPT003) in the UPS. | | | |

1. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not permitted.
2. Refer to the physical short circuit rating label on the UPS for the exact short circuit rating options of the specific UPS.

| | UPS rating | 200 kW | 300 kW | 400 kW | 500 kW |
|---|---|---|---|---|---|
| Output | Connections[3] | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC[4]) | | | |
| | Output voltage regulation | Symmetrical load ± 1%<br>Asymmetrical load ± 3% | | | |
| | Overload capacity | Normal operation: 150% for 1 minute, 125% for 10 minutes, (110% continuous[5])<br>Battery operation: 125% for 1 minute<br>Bypass operation: 125% continuous, 1600% for 100 milliseconds | | | |
| | Dynamic load response | ± 5% after 2 ms, ± 1% after 50 ms | | | |
| | Output power factor | 1 | | | |
| | Nominal output current (A) | 241 | 361 | 481 | 601 |
| | Inverter output short circuit capabilities | Varies with time. See graph and table values in Inverter Short Circuit Capabilities (Bypass not Available), page 26. | | | |
| | Output frequency (Hz) | 50/60 (synchronized to bypass), 50/60 Hz ±0.1% (free-running) | | | |
| | Synchronized slew rate (Hz/sec) | Programmable: 0.25, 0.5, 1, 2, 4, 6 | | | |
| | Total harmonic distortion (THDU) | <1% for linear load, <5% for non-linear load | | | |
| | Output performance classification (according to IEC/EN62040-3) | VFI-SS-11 | | | |
| | Load crest factor | 3 | | | |
| | Load power factor | 0.5 leading to 0.5 lagging without derating | | | |

3. The number of output connections must match the number of input connections in a single mains system or the number of bypass connections in a dual mains system.
4. Per NEC 250.30.
5. 110% continuous overload in normal operation at nominal mains voltage and at maximum 40 °C (104 °F) ambient temperature. Contact Schneider Electric to enable this function.

# Specifications for Lithium-ion Battery Cabinets

| | LIBSESMG16UL | LIBSESMG17UL |
|---|---|---|
| Charging power in % of output power | 0-40% load: 80%<br>100% load: 20% | 0-40% load: 80%<br>100% load: 20% |
| Nominal battery voltage (VDC) at 3.8 V per cell | 486 | 517 |
| Peak current at end of discharge voltage (A) | 450 | 450 |
| Charge current default rate (CA rate) | 0.7 | 0.7 |
| Maximum continuous charge current rate (CA rate) | 1.0 | 1.0 |
| Float charge voltage (VDC) at 4.2 V per cell | 538 | 571 |
| End of discharge voltage (VDC) at 3.0 V per cell | 384 | 408 |
| Maximum continuous 100% depth of discharge power (kW) | 173 | 184 |
| Maximum partial depth of discharge power (kW) | 218 | 231 |
| Short circuit rating value (kA) - Isc, RMS (Isc, MAX) | 2.9 (9.0) | 2.9 (9.0) |

**NOTE:** If the battery temperature is higher than the threshold after a full discharge at maximum continuous discharge power, the UPS may have to reduce the charge current to zero to protect the battery.

**NOTE:** The battery temperature must return to room temperature ±3 °C (5 °F) before a new discharge at maximum continuous discharge power. If not, the battery disconnect device may be tripped due to overtemperature protection.

**NOTE:** The working temperature for the busbars should be no more than 100 ℃ (212 °F).

# Upstream and Downstream Protection for UL

## Preconditions for Live Swap of Power Modules

Live Swap of power modules is only allowed under the following preconditions for the UPS installation; Follow either scenario 1 or scenario 2:

| **Preconditions for UPS installation — scenario 1 with instantaneous override values and trip times set according to the tables below in** **Recommended Upstream Protection for UL, page 20** | **Preconditions for UPS installation — scenario 2 with alternative disconnect device configurations supported with GVLOPT011 and disconnect device with ERMS mode[6]** |
|---|---|
| Circuit breakers must have instantaneous trip time of maximum 50 ms. | Circuit breakers must be installed for input (unit input disconnect device UIB) and bypass (static switch input disconnect device SSIB). |
| Circuit breakers must have instantaneous override values set according to the table below. | Circuit breakers (UIB, SSIB) must be equipped with NEC 240.87, NFPA70E, IEEE1584, or EN51110-1 compliant ERMS mode. |
| Circuit breakers must be installed for input (unit input disconnect device UIB) and bypass (static switch input disconnect device SSIB). | For parallel systems with three or more UPSs: Circuit breakers must be installed for the output (unit output disconnect device UOB) of each UPS. The unit output disconnect device (UOB) is sized as the static switch input disconnect device (SSIB). |
| For parallel system with three or more UPSs: Circuit breakers must be installed for the output (unit output disconnect device UOB) of each UPS. The unit output disconnect device (UOB) is sized as the static switch input disconnect device (SSIB). | Circuit breaker (UOB) must be equipped with NEC 240.87, NFPA70E, IEEE1584, or EN51110-1 compliant ERMS mode. |
| Live Swap is not supported for >65kA$_{bf}$ installations where current limiting disconnect devices are used to protect the UPS. | GVLOPT011 (Galaxy VL door switch kit) must be installed in the UPS and connected so ERMS mode is set to ON on UIB and SSIB and UOB when the front door of the UPS is opened. |
| | In ERMS mode, the instantaneous trip current shall be set to 5000 A or less. All time-delay settings shall be set to zero. |

Schneider Electric reserves the right to remove the Live Swap label from the product front if the preconditions for scenario 1 or scenario 2 are not met.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Only perform Live Swap of the power modules in UPS installations that follow the preconditions for scenario 1 or scenario 2.

**Failure to follow these instructions will result in death or serious injury.**

## Recommended Upstream Protection for UL

The bypass/output disconnect devices are sized based on the nominal current +10%. This is to accommodate either low grid voltage or deviation in cable length between parallel UPSs. The battery disconnect devices are sized based on the end-of-discharge voltage which has been defined as 380 VDC.

**NOTE:** Overcurrent protection is to be provided by others and marked with its function.

6. Energy Reduction Maintenance Settings (ERMS)

| **UPS rating** | **200 kW** | | **250 kW** | |
|---|---|---|---|---|
| | **Input** | **Bypass** | **Input** | **Bypass** |
| Breaker type | LJF36400CU31X | LJF36400CU31X | LJF36400CU31X | LJF36400CU31X |
| Ir | 320 | 280 | 400 | 360 |
| tr | ≥4 | ≥4 | ≥4 | ≥4 |
| Ii (x In) | ≤12 | ≤12 | ≤12 | ≤12 |

| **UPS rating** | **300 kW** | | **350 kW** | | **400 kW** | |
|---|---|---|---|---|---|---|
| | **Input** | **Bypass** | **Input** | **Bypass** | **Input** | **Bypass** |
| Breaker type | PJF36060CU31-A | PJF36060CU31A | PJF36060CU31A | PJF36060CU31A | PJF36080CU31A | PJF36060CU31A |
| Ir | 480 | 420 | 540 | 480 | 640 | 540 |
| tr | ≥4 | ≥4 | ≥4 | ≥4 | ≥4 | ≥4 |
| Ii (x In) | ≤12 | ≤12 | ≤10 | ≤12 | ≤10 | ≤12 |

| **UPS rating** | **450 kW** | | **500 kW** | |
|---|---|---|---|---|
| | **Input** | **Bypass** | **Input** | **Bypass** |
| Breaker type | PJF36080CU31A | PJF36080CU31A | PJF36080CU31A | PJF36080CU31A |
| Ir | 720 | 640 | 800 | 720 |
| tr | ≥4 | ≥4 | ≥4 | ≥4 |
| Ii (x In) | ≤8 | ≤10 | ≤8 | ≤10 |

# Recommended Cable Sizes for UL

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- All wiring must comply with all applicable national and/or electrical codes.
- The maximum allowable cable size is 600 kcmil for input/bypass/output/ neutral/ground cables in the UPS.
- The maximum allowable cable size is 500 kcmil for DC cables in the UPS.
- Shrink sleeve must be fitted over cable lug crimped zone and must overlap with the cable insulation on all power cables.

**Failure to follow these instructions will result in death or serious injury.**

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- All wiring must comply with all applicable national and/or electrical codes.
- The maximum allowable cable size is 350 kcmil for DC cables in the Lithium-ion battery cabinet.
- Shrink sleeve must be fitted over cable lug crimped zone and must overlap with the cable insulation on all power cables.

**Failure to follow these instructions will result in death or serious injury.**

The maximum number of cable connections per busbar in the UPS:

- 4 on input/output/bypass busbars
- 4 x 600 kcmil on input/output/bypass busbars
- 5 x 500 kcmil or 8 x 300 kcmil on DC+/DC- busbars
- 8 on N busbar
- 16 on ground busbar

**NOTE:** Overcurrent protection is to be provided by others.

Cable sizes in this manual are based on Table 310.15 (B)(16) of the National Electrical Code (NEC) with the following assertions[7]:

- 90 °C (194 °F) conductors (75 °C (167 °F) termination)
- An ambient temperature of 30 °C (86 °F)
- Use of copper or aluminum conductors for the UPS.
- Use of copper conductors for the Lithium-ion battery cabinet.

If the ambient temperature is greater than 30 °C (86 °F), larger conductors are to be selected in accordance with the correction factors of the NEC.

Equipment grounding conductors (EGC) are sized in accordance with the minimum requirements in NEC Article 250.122 and Table 250.122.

**NOTE:** 100% rated circuit disconnect devices for UIB, UOB, MBB, SSIB. 100% rated disconnect devices for battery disconnect devices.

The bypass/output cables are sized based on the nominal current +10%. This is to accommodate either low grid voltage or deviation in length between parallel UPSs. The battery cables are sized based on end-of-discharge voltage which has been defined as 380 VDC.

7. Using non-recommended cable sizes will affect the eConversion limits for parallel UPS systems. Be sure to check the Standard eConversion Limits Based on Non-recommended Cable Sizes table in this installation scenario.

### Copper

| UPS rating | 200 kW | 300 kW | 400 kW | 500 kW |
|---|---|---|---|---|
| **Voltage (V)** | **480** | **480** | **480** | **480** |
| Input phases (AWG/ kcmil) | 1 x 350 | 2 x 4/0 | 2 x 350 | 2 x 500 |
| Input EGC (AWG/ kcmil) | 1 x 3 | 2 x 2 | 2 x 1/0 | 2 x 1/0 |
| Bypass/output phases (AWG/kcmil) | 1 x 300 | 1 x 600 | 2 x 300 | 2 x 400 |
| Bypass EGC/output EGC (AWG/kcmil) | 1 x 4 | 1 x 2 | 2 x 1 | 2 x 1/0 |
| DC+/DC- (AWG/ kcmil) | 1 x 350 / 2 x 250 | 1 x 350 / 2 x 250 | 1 x 350 / 2 x 250 | 1 x 350 / 2 x 250 |
| DC EGC (AWG/ kcmil) | 1 x 350 / 2 x 250 | 1 x 350 / 2 x 250 | 1 x 350 / 2 x 250 | 1 x 350 / 2 x 250 |
| Inverter midpoint cable for 3-wire parallel (AWG/kcmil) | 1 x 350 | 2 x 4/0 | 2 x 350 | 2 x 500 |

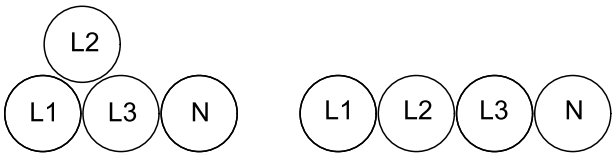
### Aluminum

| UPS rating | 200 kW | 300 kW | 400 kW | 500 kW |
|---|---|---|---|---|
| **Voltage (V)** | **480** | **480** | **480** | **480** |
| Input phases (AWG/ kcmil) | 1 x 500 | 2 x 300 | 2 x 500 | (3 x 400)[8] |
| Input EGC (AWG/ kcmil) | 1 x 1 | 2 x 1/0 | 2 x 3/0 | 3 x 3/0 |
| Bypass/output phases (AWG/kcmil) | 1 x 400 | 2 x 250 | 2 x 400 | 2 x 600 |
| Bypass EGC/output EGC (AWG/kcmil) | 1 x 2 | 2 x 1/0 | 2 x 2/0 | 2 x 3/0 |
| Inverter midpoint cable for 3-wire parallel (AWG/kcmil) | 1 x 500 | 2 x 300 | 2 x 500 | 3 x 400 |

**NOTE:** Aluminum cables are not supported for the Lithium-ion battery cabinets.

## Guidance for Organizing Input, Bypass, And Output Cables

The input, bypass, and output cables must be grouped in circuits. On raceways, use one of the two shown cable formations.




8. For parallel UPS systems, the table shall be used.

# Recommended Bolt and Lug Sizes

| NOTICE |
|---|
| **RISK OF EQUIPMENT DAMAGE**<br>Use only UL approved compression cable lugs.<br>**Failure to follow these instructions can result in equipment damage.** |

### Recommended Bolt and Lug Sizes for the UPS – Copper

| Cable size | Bolt size | Cable lug type (one hole) | Cable lug type (two hole NEMA) | Crimping tool | Die |
|---|---|---|---|---|---|
| 1/0 AWG | M10x35mm | LCB1/0-12-X | LCC1/0-12-X | CT-930 | CD-920-1/0 Pink P42 |
| 2/0 AWG | M10x35mm | LCB2/0-12-X | LCC2/0-12-X | CT-930 | CD-920-2/0 Black P45 |
| 3/0 AWG | M10x35mm | LCB3/0-12-X | LCC3/0-12-X | CT-930 | CD-920-3/0 Orange P50 |
| 4/0 AWG | M10x35mm | LCB4/0-12-X | LCC4/0-12-X | CT-930 | CD-920-4/0 Purple P54 |
| 250 kcmil | M10x35mm | LCB250-12-X | LCC250-12-X | CT-930 | CD-920-250 Yellow P62 |
| 300 kcmil | M10x35mm | LCB300-12-X | LCC300-12-X | CT-930 | CD-920-300 White P66 |
| 350 kcmil | M10x35mm | LCB350-12-X | LCC350-12-X | CT-930 | CD-920-350 Red P71 |
| 400 kcmil | M10x35mm | LCB400-12-X | LCC400-12-6 | CT-930 | CD-920-400 Blue P76 |
| 450 kcmil | M10x35mm | — | LCC450-12-6 | CT-930 | — |
| 500 kcmil | M10x35mm | LCB500-12-X | LCC500-12-6 | CT-930 | CD-920-500 Brown P87 |

### Recommended Bolt and Lug Sizes for the Lithium-ion Battery Cabinet– Copper — One Hole Cable Lugs

| Cable size | Bolt size | Cable lug type | Crimping tool | Die |
|---|---|---|---|---|
| 2 x 250 kcmil | M10x30 | LCB250-12-X | CT-930 | CD-920-250 Yellow P62 |
| 350 kcmil | M10x30 | LCC350-12-X | CT-930 | CD-920-350 Red P71 |

### Recommended Bolt and Lug Sizes for the Lithium-ion Battery Cabinet– Copper — Two Hole Cable Lugs

| Cable size | Bolt size | Cable lug type | Crimping tool | Die |
|---|---|---|---|---|
| 2 x 250 kcmil | M10x30 | LCC250-12-X | CT-930 | CD-920-250 Yellow P62 |
| 350 kcmil | M10x30 | LCC350-12-X | CT-930 | CD-920-350 Red P71 |

### Recommended Bolt and Lug Sizes for the UPS – Aluminum

| Cable size | Bolt size | Cable lug type (one hole) | Cable lug type (two hole NEMA) | Crimping tool | Die |
|---|---|---|---|---|---|
| 1/0 AWG | M10x35mm | LAA1/0-12-5 | LAB1/0-12-X | CT-930 | CD-920-1/0 Pink P42 |
| 2/0 AWG | M10x35mm | LAA2/0-12-5 | LAB2/0-12-5 | CT-930 | CD-920-2/0 Black P45 |
| 3/0 AWG | M10x35mm | LAA3/0-12-5 | LAB3/0-12-5 | CT-930 | CD-920-3/0 Orange P50 |
| 4/0 AWG | M10x35mm | LAA4/0-12-5 | LAB4/0-12-5R | CT-930 | CD-920-4/0 Purple P54 |
| 250 kcmil | M10x35mm | LAA250-12-5 | LAB250-12-5 | CT-930 | CD-920-250 Yellow P62 |
| 300 kcmil | M10x35mm | LAA300-12-2 | LAB300-12-2 | CT-930 | CD-920-300 White P66 |

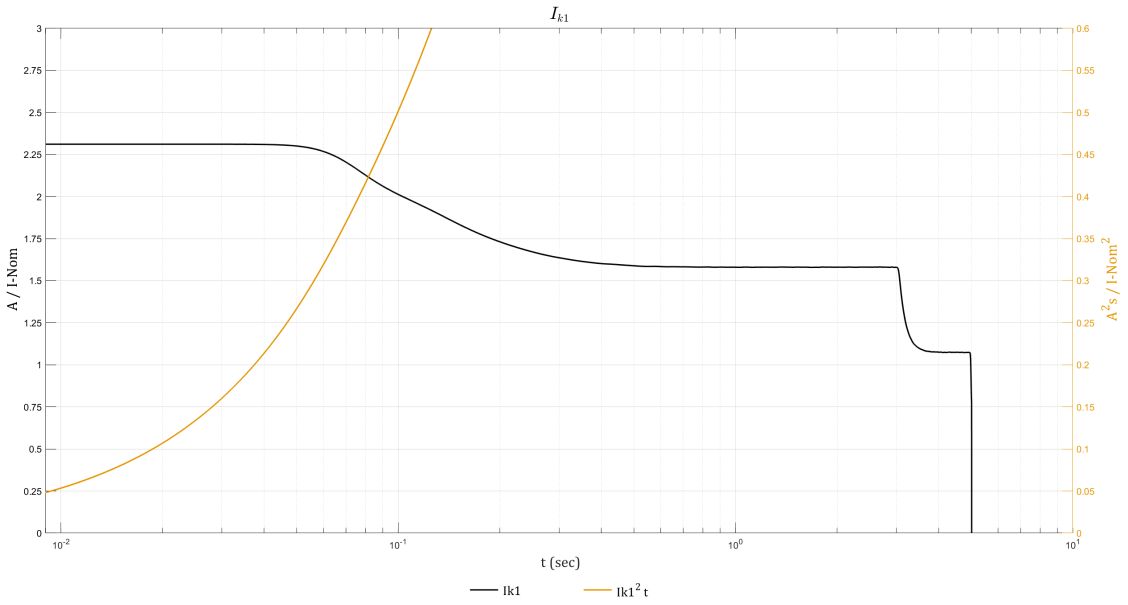
### Recommended Bolt and Lug Sizes for the UPS – Aluminum (Continued)

| Cable size | Bolt size | Cable lug type (one hole) | Cable lug type (two hole NEMA) | Crimping tool | Die |
|---|---|---|---|---|---|
| 350 kcmil | M10x35mm | LAA350-12-2 | LAB350-12-2R | CT-930 | CD-920-350 Red P71 |
| 400 kcmil | M10x35mm | — | LAB400-12-2 | CT-930 | CD-920-400 Blue P76 |
| 500 kcmil | M10x35mm | LAA500-12-2 | LAB500-12-2R | CT-930 | CD-920-500 Brown P87 |

**NOTE:** Aluminum cables are not supported for the Lithium-ion battery cabinets.

# Inverter Short Circuit Capabilities (Bypass not Available)

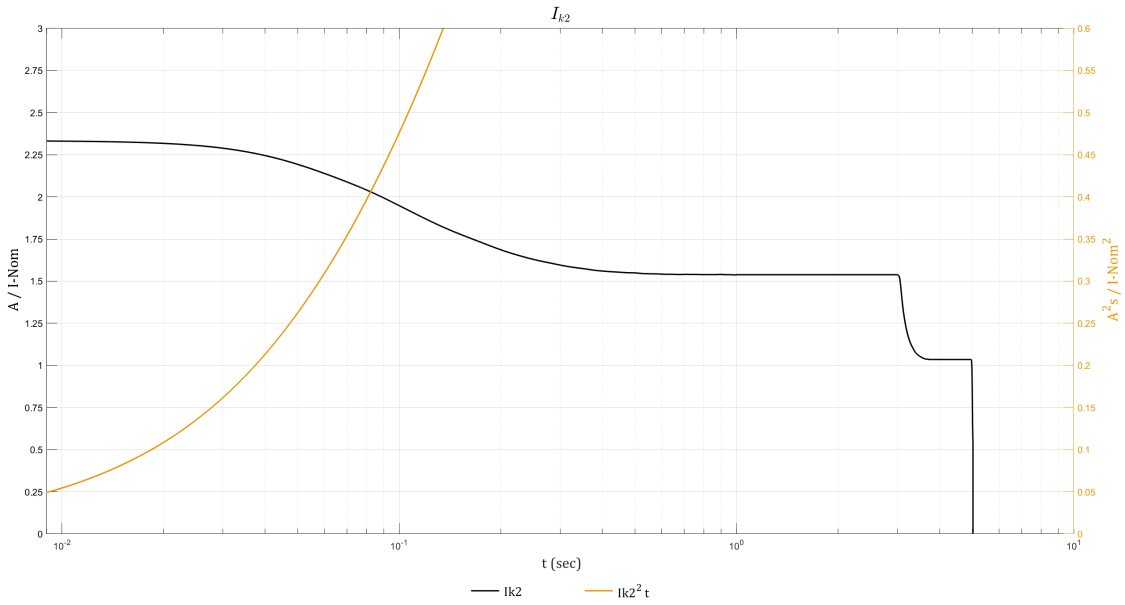
## IK1 – Short Circuit between a Phase and Neutral




### IK1 480 V

| S [kVA] | 10ms; I[A]/I²t [A²t] | 20ms; I[A]/I²t [A²t] | 30ms; I[A]/I²t [A²t] | 100ms; I[A]/I²t [A²t] | 1s; I[A]/I²t [A²t] |
|---|---|---|---|---|---|
| 200 | 560 /3090 | 560 /6180 | 560 /9280 | 480 /29020 | 380 /167430 |
| 250 | 700 /4830 | 700 /9660 | 700 /14490 | 610 /45350 | 480 /261610 |
| 300 | 830 /6960 | 830 /13910 | 830 /20870 | 730 /65300 | 570 /376720 |
| 350 | 970 /9470 | 970 /18940 | 970 /28410 | 850 /88880 | 670 /512750 |
| 400 | 1110 /12370 | 1110 /24740 | 1110 /37100 | 970 /116090 | 760 /669720 |
| 450 | 1250 /15650 | 1250 /31310 | 1250 /46960 | 1090 /146930 | 860 /847610 |
| 500 | 1390 /19330 | 1390 /38650 | 1390 /57970 | 1210 /181390 | 950 /1046430 |

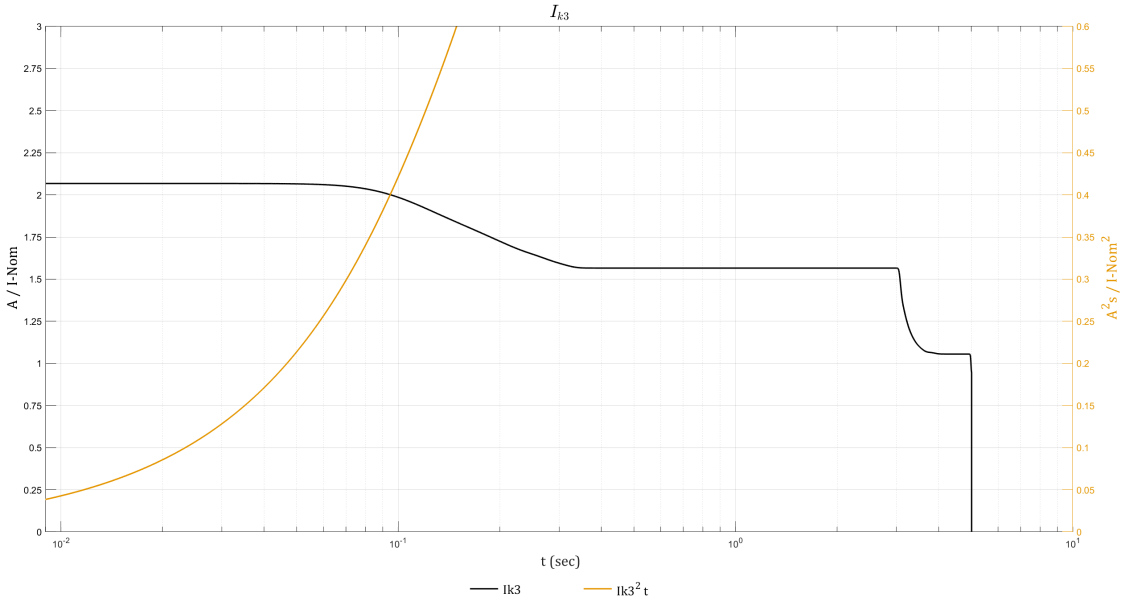
# IK2 – Short Circuit between Two Phases




### IK2 480 V

| S [kVA] | 10ms; I[A]/I²t [A²t] | 20ms; I[A]/I²t [A²t] | 30ms; I[A]/I²t [A²t] | 100ms; I[A]/I²t [A²t] | 1s; I[A]/I²t [A²t] |
|---|---|---|---|---|---|
| 200 | 560 /3150 | 560 /6280 | 560 /9350 | 470 /27550 | 370 /158630 |
| 250 | 700 /4920 | 700 /9810 | 700 /14610 | 590 /43050 | 460 /247850 |
| 300 | 840 /7090 | 840 /14130 | 840 /21040 | 700 /61990 | 550 /356910 |
| 350 | 980 /9640 | 980 /19230 | 980 /28640 | 820 /84380 | 650 /485790 |
| 400 | 1120 /12600 | 1120 /25110 | 1120 /37410 | 940 /110210 | 740 /634500 |
| 450 | 1260 /15940 | 1250 /31790 | 1250 /47350 | 1050 /139480 | 830 /803040 |
| 500 | 1400 /19680 | 1390 /39240 | 1390 /58450 | 1170 /172200 | 920 /991410 |

# IK3 – Short Circuit between Three Phases




### IK3 480 V

| S [kVA] | 10ms; I[A]/I²t [A²t] | 20ms; I[A]/I²t [A²t] | 30ms; I[A]/I²t [A²t] | 100ms; I[A]/I²t [A²t] | 1s; I[A]/I²t [A²t] |
|---|---|---|---|---|---|
| 200 | 500 /2470 | 500 /4950 | 500 /7420 | 480 /24390 | 380 /159310 |
| 250 | 620 /3870 | 620 /7730 | 620 /11600 | 600 /38110 | 470 /248920 |
| 300 | 750 /5570 | 750 /11140 | 750 /16700 | 720 /54880 | 570 /358450 |
| 350 | 870 /7580 | 870 /15160 | 870 /22740 | 840 /74690 | 660 /487890 |
| 400 | 990 /9900 | 990 /19800 | 990 /29700 | 960 /97560 | 750 /637240 |
| 450 | 1120 /12530 | 1120 /25060 | 1120 /37580 | 1070 /123470 | 850 /806510 |
| 500 | 1240 /15470 | 1240 /30930 | 1240 /46400 | 1190 /152440 | 940 /995690 |

# Torque Specifications

| Bolt size | Torque for UPS | Torque for Lithium-ion battery cabinet |
|---|---|---|
| M4 | 1.7 Nm (1.25 lb-ft / 15 lb-in) | 1.7 Nm (1.25 lb-ft / 15 lb-in) |
| M5 | 2.2 Nm (1.62 lb-ft / 19.5 lb-in) | NA |
| M6 | 5 Nm (3.69 lb-ft / 44.3 lb-in) | 5 Nm (3.69 lb-ft / 44.3 lb-in) |
| M8 | 17.5 Nm (12.91 lb-ft / 154.9 lb-in) | 14 Nm (10.33 lb-ft) |
| M10 | 30 Nm (22 lb-ft / 194.7 lb-in) | 30 Nm (22.13 lb-ft) |
| M12 | 50 Nm (36.87 lb-ft / 442.5 lb-in) | 46 Nm (33.93 lb-ft) |

# Environment

| | Operating | | Storage | |
|---|---|---|---|---|
| | **UPS** | **Lithium-ion battery cabinet** | **UPS** | **Lithium-ion battery cabinet** |
| Temperature | 0 °C to 40 °C (32 °F to 104 °F) without load derating.<br>40 °C to 50 °C (104 °F to 122 °F) when derated to 70% power. | Recommended operating temperature is 18 °C to 28 °C (64 °F to 82 °F) | -25 °C to 55 °C (-13 °F to 131 °F) for systems without batteries. | Lithium-ion battery cabinet: 0 °C to 40 °C (32 °F to 104 °F)<br><br>Battery modules: Recommended storage for battery modules is 20 °C (68 °F) or cooler (non-freezing) |
| Relative humidity | 5-95% non-condensing | 0-95% non-condensing | 10-80% non-condensing | Lithium-ion battery cabinet: 0-90% non-condensing<br><br>Lithium-ion battery modules: Recommended storage for battery modules is 40-80% non-condensing |
| Elevation | Designed for operation in 0-3000 m (0-10000 feet) elevation.<br><br>Derating required from 1000-3000 m (3300-10000 feet) with forced air cooling:<br>Up to 1000 m (3300 feet): 1.000<br>Up to 1500 m (5000 feet): 1.000 conditioned by 2 x 300 $mm^2$ input cables at 500 kW<br>Up to 1500 m (5000 feet) : 0.975<br>Up to 2000 m (6600 feet): 1.000 conditioned by 2 x 300 $mm^2$ input cables at 500 kW<br>Up to 2000 m (6600 feet): 0.950<br>Up to 2500 m (8300 feet): 0.975 conditioned by 2 x 300 $mm^2$ input cables at 500 kW<br>Up to 2500 m (8300 feet): 0.925<br>Up to 3000 m (10000 feet): 0.950 conditioned by 2 x 300 $mm^2$ input cables at 500 kW<br>Up to 3000 m (10000 feet): 0.900<br><br>Derating required from 1000-3000 m (3300-10000 feet) with convection cooling:<br>Up to 1000 m (3300 feet): 1.000<br>Up to 1500 m (5000 feet) : 0.985<br>Up to 2000 m (6600 feet): 0.970<br>Up to 2500 m (8300 feet): 0.955<br>Up to 3000 m (10000 feet): 0.940 | 0-3000 m (0-10000 feet) | | |
| Audible noise one meter (three feet) from unit | 62 dB at 70% load<br><br>68 dB at 100% load for 480 V systems | | | |

| | **Operating** | | **Storage** | |
|---|---|---|---|---|
| | **UPS** | **Lithium-ion battery cabinet** | **UPS** | **Lithium-ion battery cabinet** |
| Protection class | IP20 | IP20 | | |
| Color | RAL 9003, gloss level 85% | RAL 9003, gloss level 85% | | |

# Compliance

| | UPS | Lithium-ion battery cabinet |
|---|---|---|
| Safety | IEC 62040-1: 2017, Edition 2.0, Uninterruptible Power Systems (UPS) - Part 1: Safety requirements<br>UL 1778 5th edition | IEC 62619:2017 Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications<br><br>IEC 62477-1:2012+A11:2014 Safety requirements for power electronic converter systems and equipment Part 1: General<br><br>UL 1973:2022 Batteries for Use in Stationary, Vehicle Auxiliary and Light Electric Rail Applications<br><br>UL 9540A:2019 Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems |
| EMC/EMI/RFI | IEC 62040-2: 2016-11, 3rd edition Uninterruptible Power Systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements C2<br>FCC Part 15 Subpart B, Class A | IEC 62040-2:2016 Uninterruptible Power Systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements C2<br><br>FCC Part 15, Radio Frequency Devices, class A |
| Performance | Performance in accordance with: IEC 62040-3: 2021-04, 3rd edition Uninterruptible Power Systems (UPS) - Part 3: Method of specifying the performance and test requirements. | — |
| Environmental | | IEC 60068-2-1:2007 Environmental testing – Part 2-1: Tests – Test A: Cold<br><br>IEC 60068-2-2:2007 Environmental testing – Part 2-2: Tests – Test B: Dry heat<br><br>IEC 60068-2-78:2012 Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state |
| Markings | UL1778 Listing and CSA C22.2 NO.107.3 | ANSI/CAN/UL 1973 Listing |
| Transportation | IEC 60721-4-2 Level 2M2 | IEC60068-2-27:2008 Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock<br><br>IEC60068-2-31:2008 Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens<br><br>IEC60068-2-64:2008 Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance |
| Seismic | ICC-ES AC 156 (2015); OSHPD Pre-approved; Sds= 1.45 g for z/h=1 and Sds=2.00 g for z/h=0; Ip=1.5 | OSHPD, CBC 2019, $S_{DS}$=2.0g (z/h = 1); 2.5g (z/h = 0) |
| Earthing system[9] | TN, TT, TNC, IT, TN-S, TNC-S<br>Solid-grounded, HRG | |
| Overvoltage category | This UPS is OVCII compliant.<br>If the UPS is installed in an environment with an OVC rating higher than II, an SPD (surge protection device) must be installed upstream of the UPS to reduce the overvoltage category to OVCII. | II |
| Protective class | I | |
| Pollution degree | 2 | |

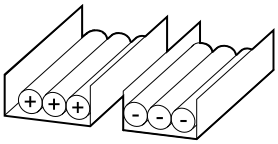
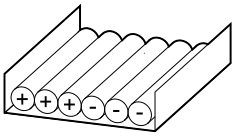
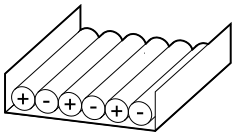
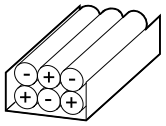
9. Corner grounding not permitted.

# Guidance for Organizing Battery Cables

**NOTE:** For 3rd party batteries, use only high rate batteries for UPS applications.

**NOTE:** When the battery bank is placed remotely, the organizing of the cables is important to reduce voltage drop and inductance. The distance between the battery bank and the UPS must not exceed 200 m (656 ft). Contact Schneider Electric for installations with a longer distance.

**NOTE:** To minimize the risk of electromagnetic radiation, it is highly recommended to follow the below guidance and to use grounded metallic tray supports.

| **Cable Length** |  |  |  |  |
|---|---|---|---|---|
| <30 m | Not recommended | Acceptable | Recommended | Recommended |
| 31–75 m | Not recommended | Not recommended | Acceptable | Recommended |
| 76–150 m | Not recommended | Not recommended | Acceptable | Recommended |
| 151–200 m | Not recommended | Not recommended | Not recommended | Recommended |

# Weights and Dimensions

### UPS Weights and Dimensions

| UPS rating | Weight kg (lbs) | Height mm (in) | Width mm (in) | Depth mm (in) |
|---|---|---|---|---|
| 200 kW | 550 (1212) | 1970 (78) | 850 (33) | 925 (36) |
| 300 kW | 626 (1380) | 1970 (78) | 850 (33) | 925 (36) |
| 400 kW | 702 (1547) | 1970 (78) | 850 (33) | 925 (36) |
| 500 kW | 778 (1715) | 1970 (78) | 850 (33) | 925 (36) |

### Lithium-ion Battery Cabinet Weights and Dimensions

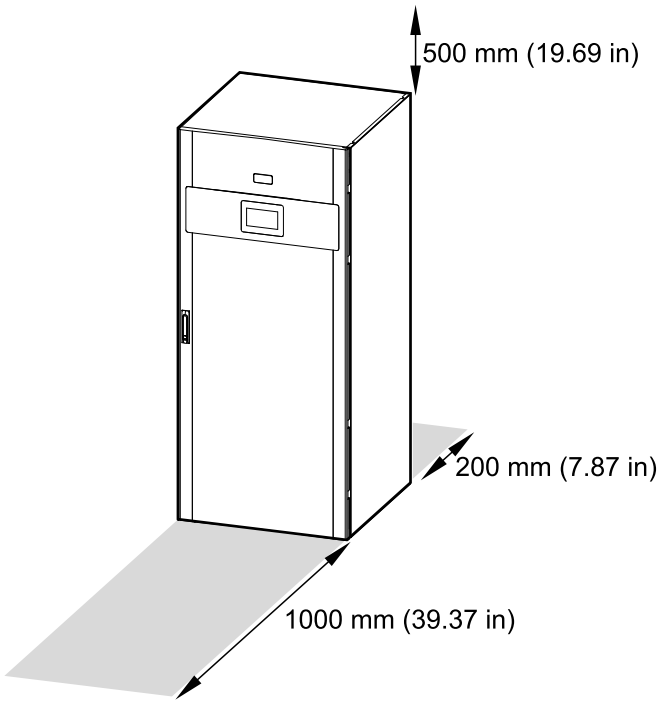
| | Weight kg (lbs) | Height mm (in) | Width mm (in) | Depth mm (in) |
|---|---|---|---|---|
| LIBSESMG16UL | 470 (1036) | 1970 (78) | 650 (25.59) | 587 (23.11) |
| LIBSESMG17UL | 490 (1080) | 1970 (78) | 650 (25.59) | 587 (23.11) |

# Clearance

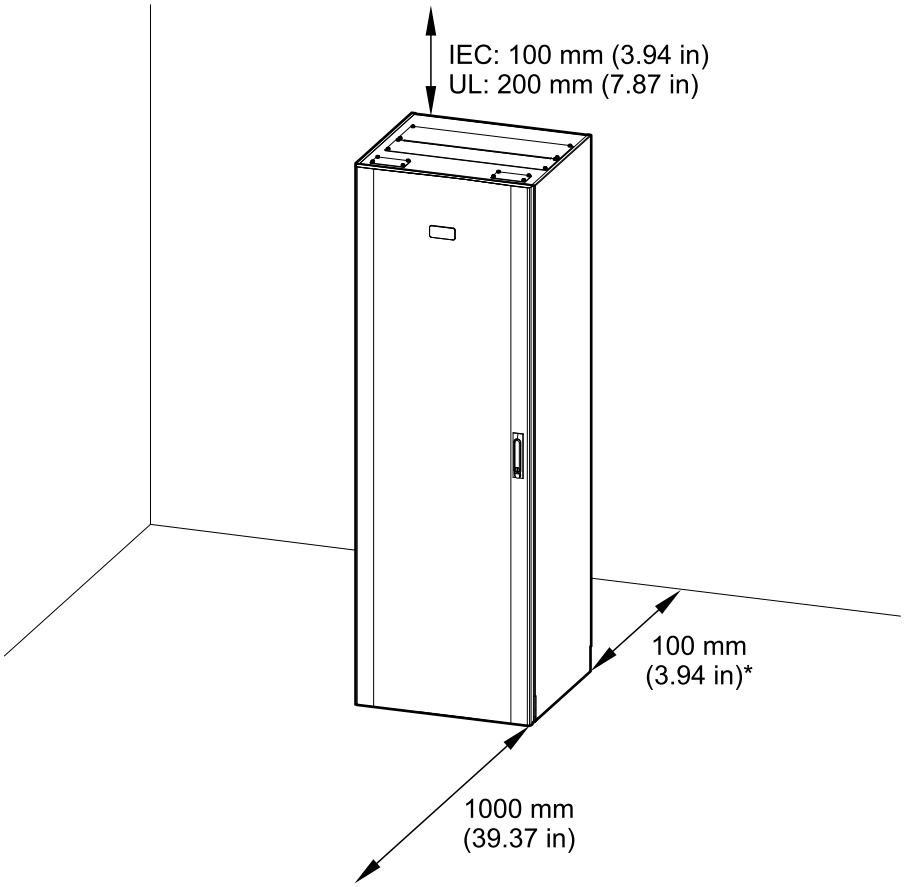
**NOTE:** Clearance dimensions are published for airflow and service access only. Consult with the local safety codes and standards for additional requirements in your local area.

**NOTE:** Clearance dimensions for the lithium-ion battery cabinet have been verified by UL 9540A 4th edition (project No. 4789548397, issued by UL on 21 May 2021).

**Front View of the UPS**



**Lithium-ion Battery Cabinet**



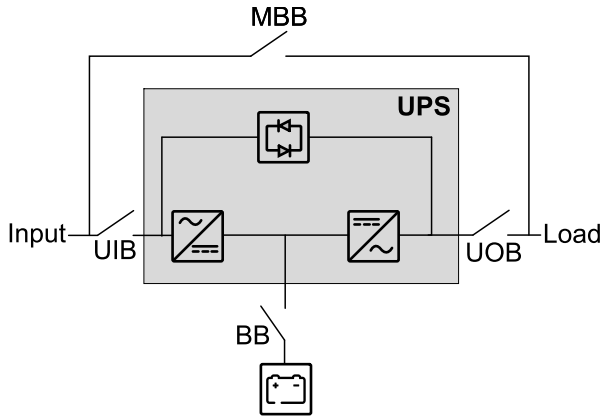

* Rear clearance is only required for Lithium-ion battery cabinet with seismic anchoring.

# Single System Overview

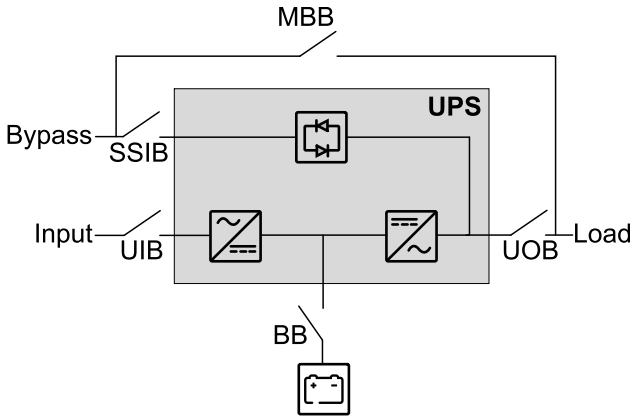
| | |
|---|---|
| UIB | Unit input disconnect device |
| SSIB | Static switch input disconnect device |
| UOB | Unit output disconnect device |
| BB | Battery disconnect device |
| MBB | Maintenance bypass disconnect device |

**NOTE:** In Schneider Electric literature, 'disconnect device' is used as a generic term covering circuit breakers or switches as their position may vary depending on configuration. Details about the individual configuration are found in the electrical diagram and/or by reading the symbol on the front of each disconnect device.

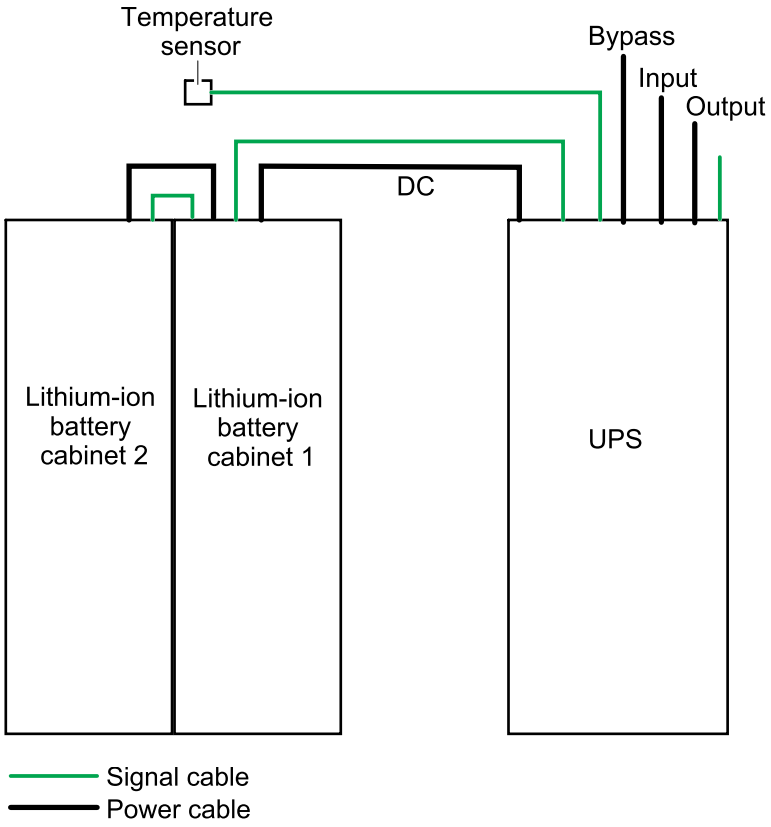
**Single System – Single Mains**




**Single System – Dual Mains**



# Installation Procedure for UPS and Lithium-ion Battery Cabinets




**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

The UPS must be secured against movement. Perform one of the following once the UPS is in its final position:

- Lower the leveling feet until the casters no longer have contact with the floor, OR
- Reinstall the front transportation bracket (870-32577) on the UPS and mount it to the floor, OR
- Install the seismic anchoring kit.

**Failure to follow these instructions will result in death or serious injury.**

1. **Lithium-ion battery cabinet(s)**: Prepare for Installation, page 41.
2. **UPS**: Perform one of the following procedures:
   - Without seismic anchoring: Position the UPS, page 43.
   - With seismic anchoring: Install the Seismic Anchoring and Position the UPS, page 44.
3. **Lithium-ion battery cabinet(s)**: Install the Rear Seismic Anchoring, page 46.
4. **Lithium-ion battery cabinet(s)**: Position and Interconnect the Battery Cabinets, page 48.
5. **Lithium-ion battery cabinet(s)**: Install the Front Seismic Anchoring, page 50.

6. **UPS**: Perform one of the following procedures:
   - Top cable entry: Prepare the UPS for Top Cable Entry, page 51.
   - Bottom cable entry: Follow in the installation manual provided with the bottom entry cabinet.
7. **UPS**: Only for TNC or HRG earthing system:
   - Prepare for TNC Earthing System, page 53.
   - Prepare for HRG Earthing System, page 54.
8. **UPS**: Perform one of the following procedures:
   - Connect Power Cables in the UPS in System over 45 kAIC/kA Icw, page 55, or
   - Connect Power Cables in the UPS in System up to 45 kAIC/kA Icw, page 60.
9. **UPS**: Connect the Signal Cables, page 64.
10. **UPS**: Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 67.
11. **UPS**: Connect the Modbus Cables, page 71.
12. **UPS**: Only for external synchronization: Connect the Signal Cables for External Synchronization, page 73.
13. **UPS**: Option: Install the ERMS Door Switch Kit GVLOPT011 (Option), page 77.
14. **UPS**: Install the Power Module(s), page 78.
15. **UPS**: Add Translated Safety Labels to Your Product, page 80.
16. **UPS**: Final installation, page 84.
17. **Lithium-ion battery cabinet(s)**: Install the Battery Modules in the Battery Cabinet, page 87.
18. **Lithium-ion battery cabinet(s)**: Connect the Power Cables, page 89.
19. **Lithium-ion battery cabinet(s)**: Route the Signal Cables to the Switchgear, Rack BMS, and System BMS Ports, page 93.

**⚠⚠DANGER**

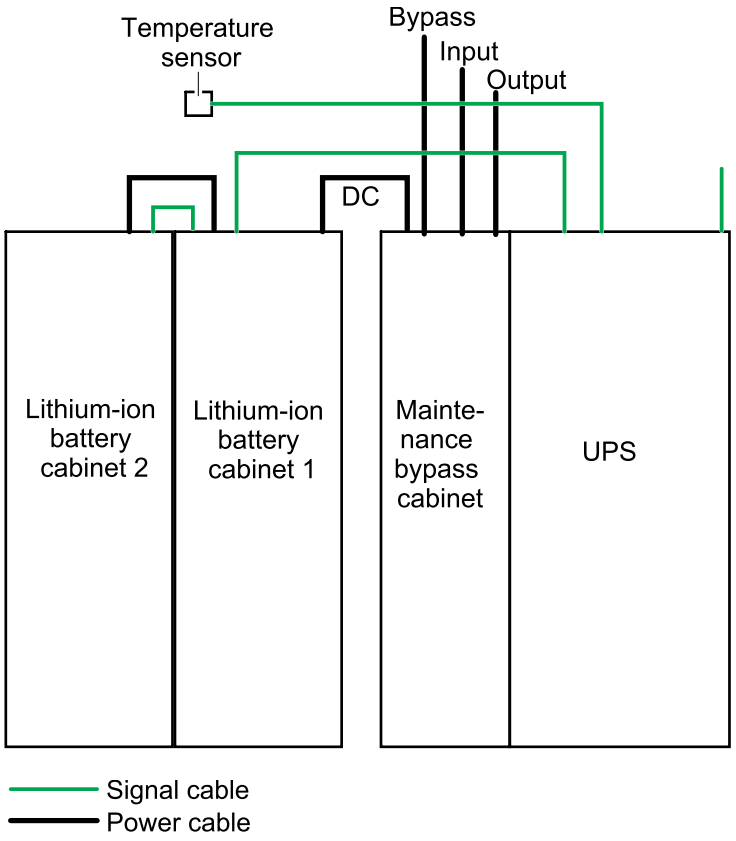
**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Startup must only be performed by Schneider Electric.

**Failure to follow these instructions will result in death or serious injury.**

For moving or decommissioning the UPS or the Lithium-ion battery cabinets after installation has been completed, see Decommission or Move the UPS to a New Location, page 101 or Decommission or Move the Battery Cabinet to a New Location, page 112.

# Installation Procedure for UPS with Maintenance Bypass Cabinet and Lithium-ion Battery Cabinets




**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

The UPS must be secured against movement. Perform one of the following once the UPS is in its final position:

- Lower the leveling feet until the casters no longer have contact with the floor, OR
- Reinstall the front transportation bracket (870-32577) on the UPS and mount it to the floor, OR
- Install the seismic anchoring kit.

**Failure to follow these instructions will result in death or serious injury.**

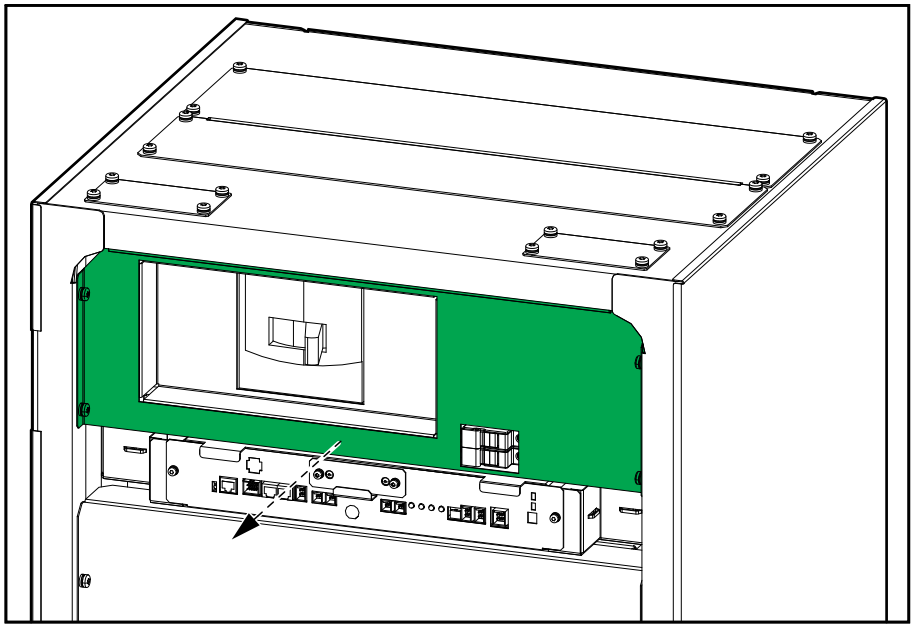
1. **Lithium-ion battery cabinet(s)**: Prepare for Installation, page 41.
2. **UPS**: Follow the maintenance bypass cabinet installation manual for seismic anchoring, mechanical installation, interconnection, power cabling, and signal cable routing for the UPS and the maintenance bypass cabinet. Specifications for the UPS system are listed in the UPS installation manual.
3. **Lithium-ion battery cabinet(s)**: Install the Rear Seismic Anchoring, page 46.
4. **Lithium-ion battery cabinet(s)**: Position and Interconnect the Battery Cabinets, page 48.
5. **Lithium-ion battery cabinet(s)**: Install the Front Seismic Anchoring, page 50.
6. **UPS**: Connect the Signal Cables, page 64.
7. **UPS**: Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 67.

8. **UPS**: Connect the Modbus Cables, page 71.
9. **UPS**: Only for external synchronization: Connect the Signal Cables for External Synchronization, page 73.
10. **UPS**: Install the Power Module(s), page 78.
11. **UPS**: Add Translated Safety Labels to Your Product, page 80.
12. **UPS**: Final installation, page 84.
13. **Lithium-ion battery cabinet(s)**: Install the Battery Modules in the Battery Cabinet, page 87.
14. **Lithium-ion battery cabinet(s)**: Connect the Power Cables, page 89.
15. **Lithium-ion battery cabinet(s)**: Route the Signal Cables to the Switchgear, Rack BMS, and System BMS Ports, page 93.

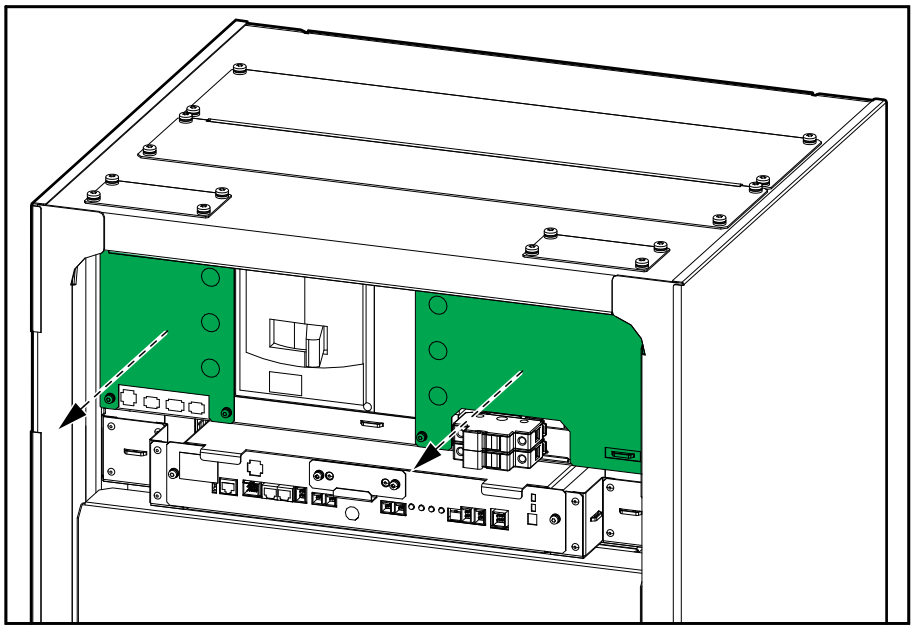
For moving or decommissioning the UPS or the Lithium-ion battery cabinets after installation has been completed, see Decommission or Move the UPS to a New Location, page 101 or Decommission or Move the Battery Cabinet to a New Location, page 112.

# Prepare for Installation

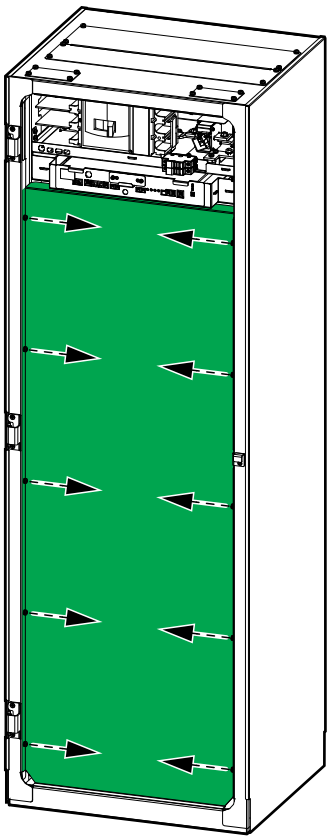
1. Remove the indicated cover.



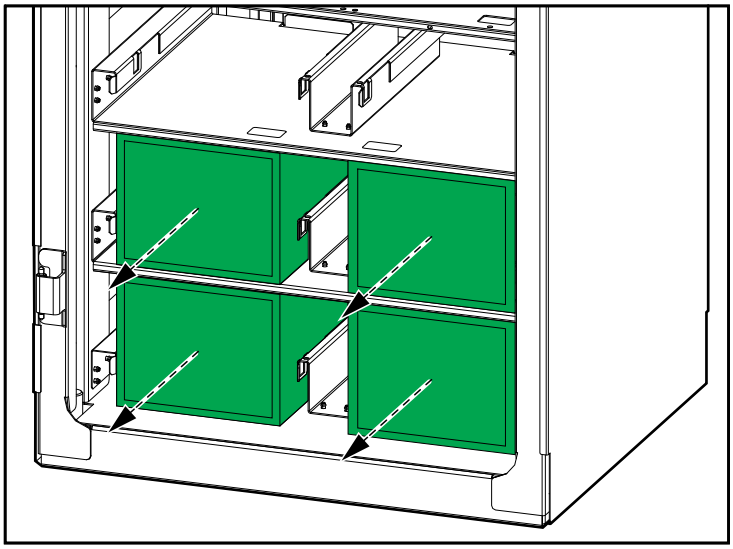
2. Remove the two transparent covers.



3. Remove the plate in front of the battery shelves.



4. Remove the four boxes with accessory kits from the bottom of the cabinet. Refer to for more information on the accessory kits.



# Position the UPS

**⚠⚠DANGER**

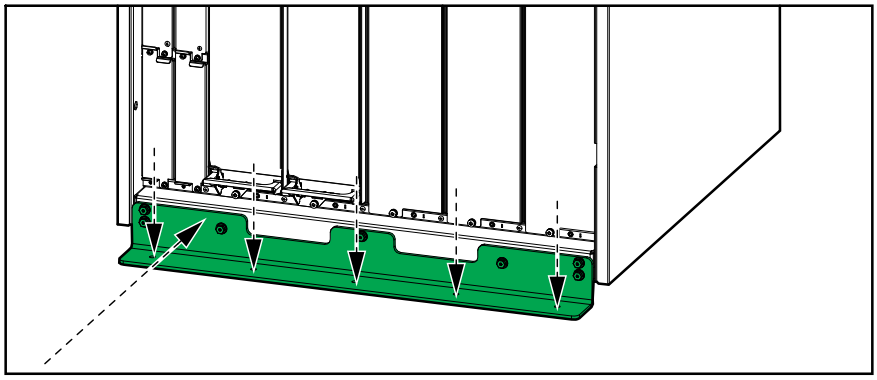
**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

The UPS must be secured against movement. Perform one of the following once the UPS is in its final position:

- Lower the leveling feet until the casters no longer have contact with the floor, OR
- Mount the front transportation bracket (870-32577) on the UPS to the floor.

**Failure to follow these instructions will result in death or serious injury.**

1. Push the UPS into final position.
2. Reinstall the front transportation bracket (870-32577) on the UPS.
3. Perform one of the following:
   – Mount the front transportation bracket to the floor. Use appropriate hardware for the floor type.



   – Lower the front and rear leveling feet on the UPS with a wrench until they connect with the floor. The casters must not have contact with the floor. Use a bubble-leveler to check that the UPS is level.

***NOTICE***

**RISK OF EQUIPMENT DAMAGE**

Do not move the cabinet after the leveling feet have been lowered.

**Failure to follow these instructions can result in equipment damage.**

***NOTICE***

**RISK OF EQUIPMENT DAMAGE**

Install the front transportation bracket to avoid the UPS overheating from circulating hot air from the rear outlets. The front transportation bracket blocks the hot air backflow.

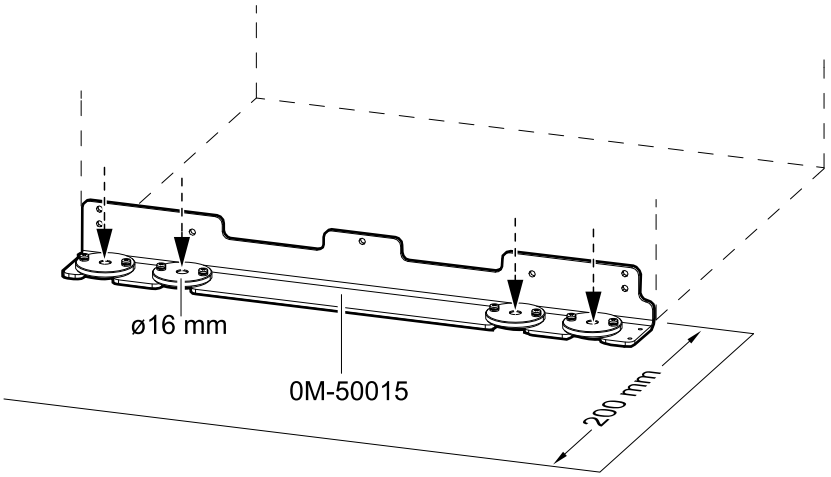
**Failure to follow these instructions can result in equipment damage.**

# Install the Seismic Anchoring and Position the UPS

Use the optional seismic kit GVLOPT002 for this procedure.

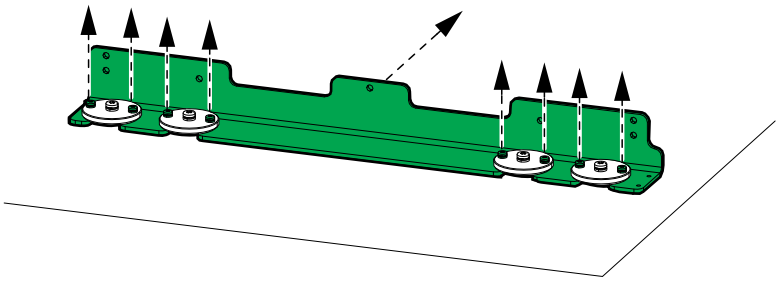
1. Mount the rear anchoring assembly to the floor. Use appropriate hardware for the floor type – the hole diameter in the rear anchors is ø16 mm. Minimum requirement is M12 strength grade 8.8 hardware.

**Rear View**



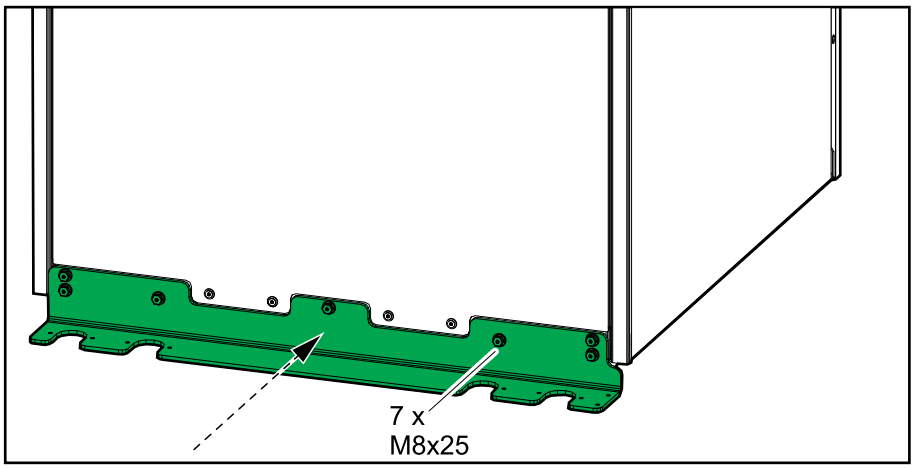

2. Remove all the screws and remove the anchoring bracket.

**Rear View**



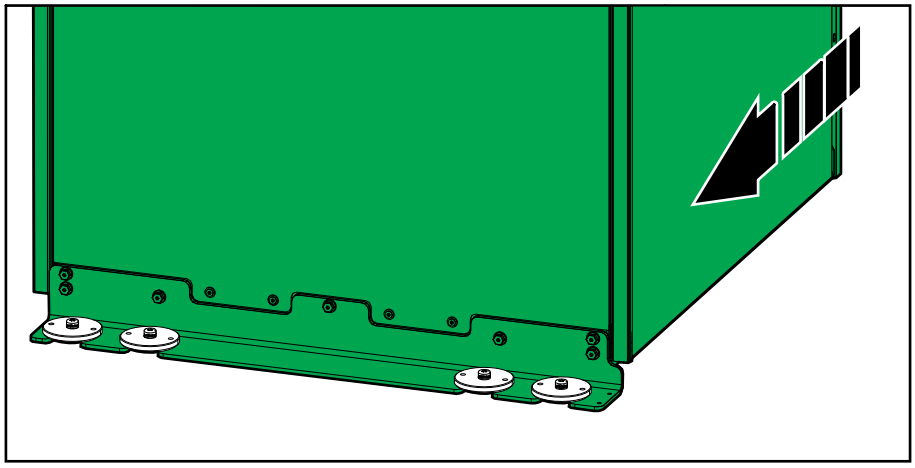
3. Install the rear anchoring brackets on the UPS with the provided M8x25 bolts.

**Rear View**

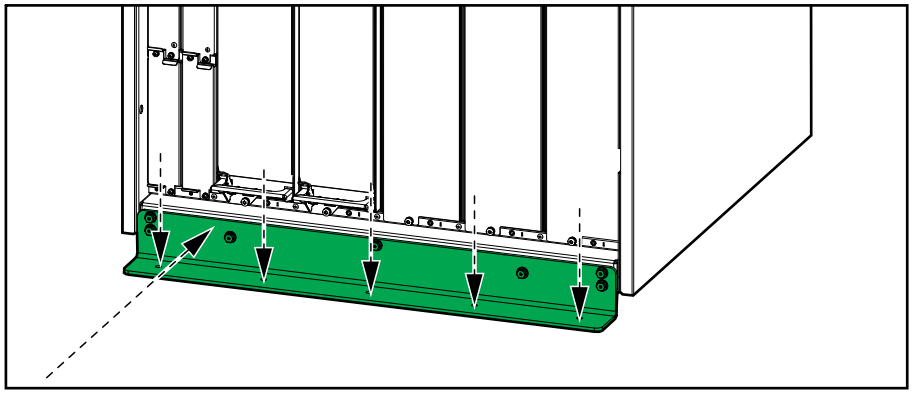


4. Push the UPS into final position. Align with the seismic anchoring.

**Rear View**



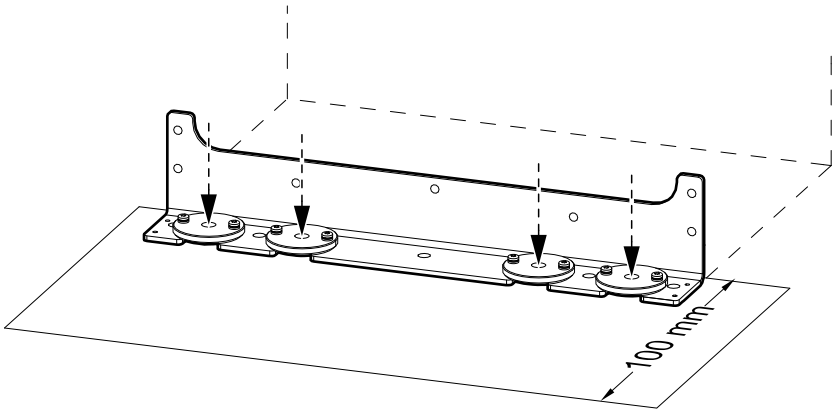
5. Install the seismic front anchoring bracket on the UPS and mount it to the floor. Use appropriate hardware for the floor type – the hole diameter in the bracket is ø9 mm. Minimum requirement is M8 strength grade 8.8 hardware.



# Install the Rear Seismic Anchoring

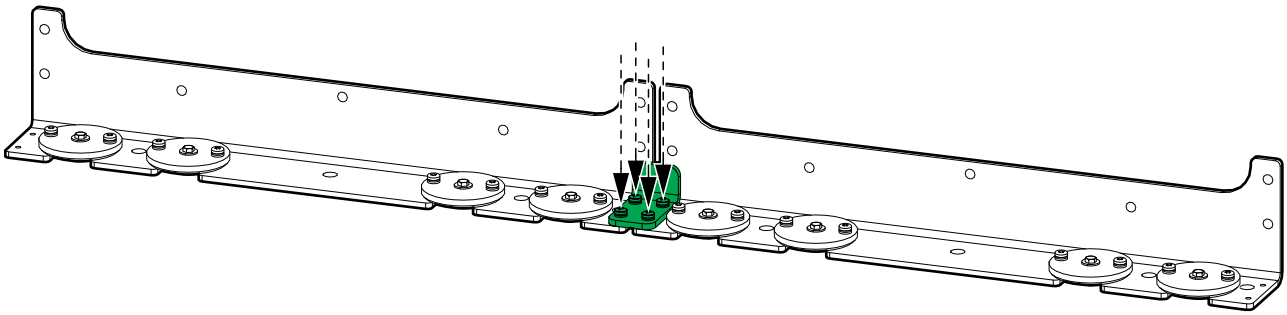
1. Mount the rear seismic assembly (4 x 870-50102 and M6 x 16 torx screws from accessory kit 0M-95331 and the rear shipping bracket) to the floor. Use appropriate hardware for the floor type – the hole diameter in the rear seismic bracket is ø14 mm. The minimum requirement is M12 strength grade 8.8 hardware.

**Rear View**



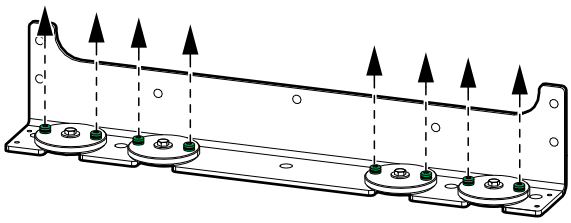

2. In systems with more battery cabinets, interconnect the seismic assemblies with the interconnection plate 870-51172 from the accessory kit 0M-95331.

**Rear View**



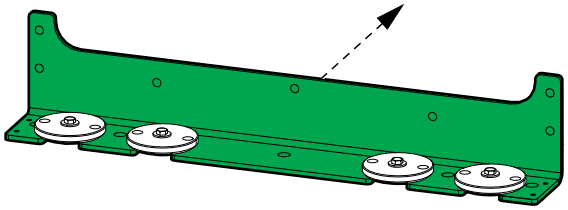
3. Remove the indicated screws.

**Rear View**



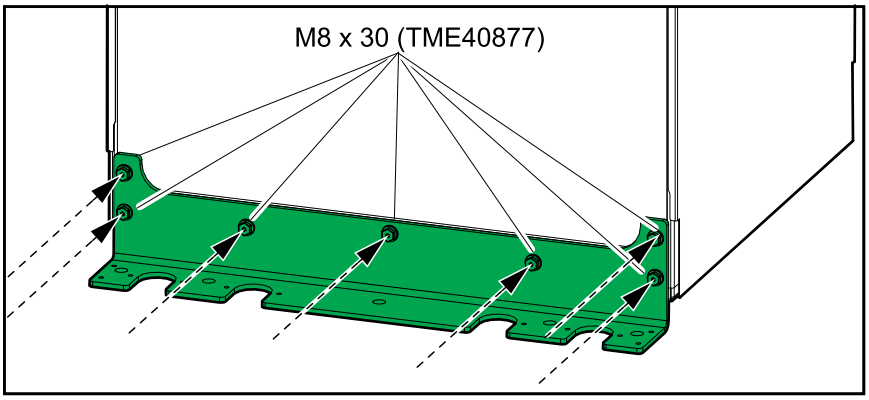
4. Remove the rear seismic bracket.

**Rear View**



5. Install the rear seismic bracket on the battery cabinet(s).

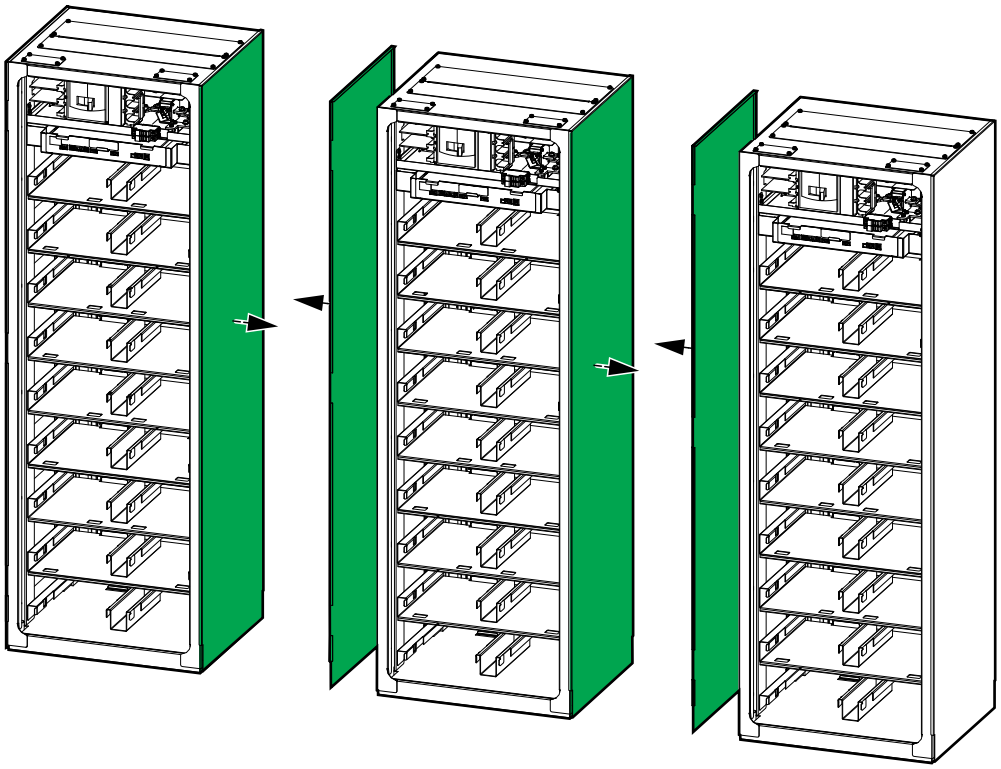
**Rear View**



# Position and Interconnect the Battery Cabinets

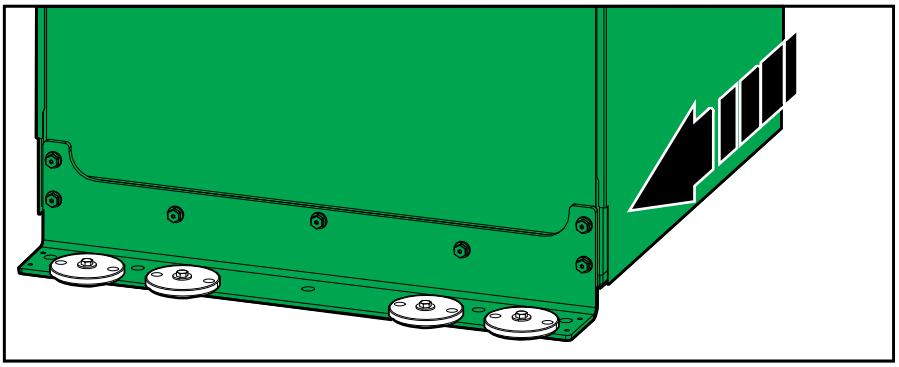
**NOTE:** This procedure describes how to position and interconnect several battery cabinets. If your system only has one battery cabinet, you only need to follow step 2 and step 3.

1. Remove the side panels that are adjacent to the other battery cabinets.

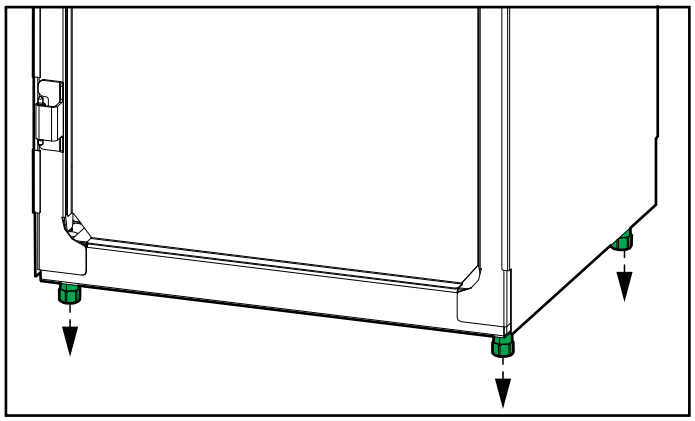


2. Push the right-most battery cabinet into position. For seismic anchoring, ensure that the rear seismic bracket connects to the rear anchors.

**Rear View**



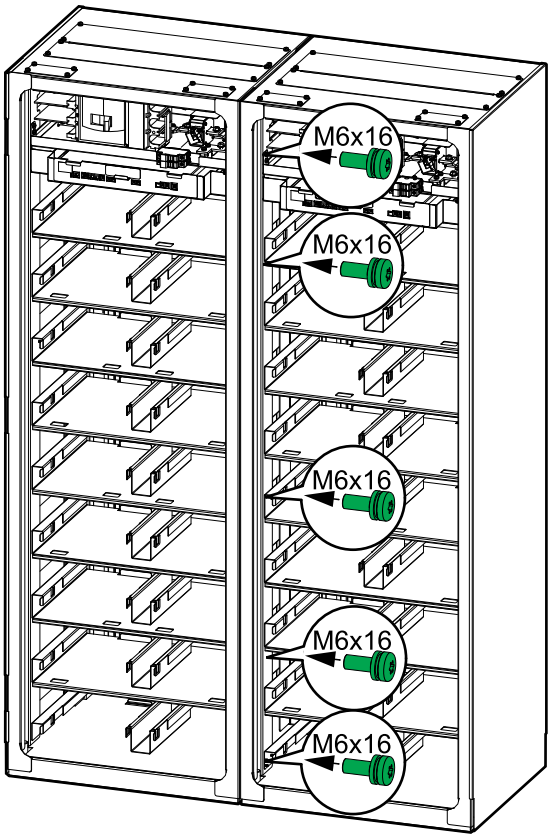
3. Lower the levelling feet until they connect with the floor - use a bubble-leveler to ensure that the cabinet is level.

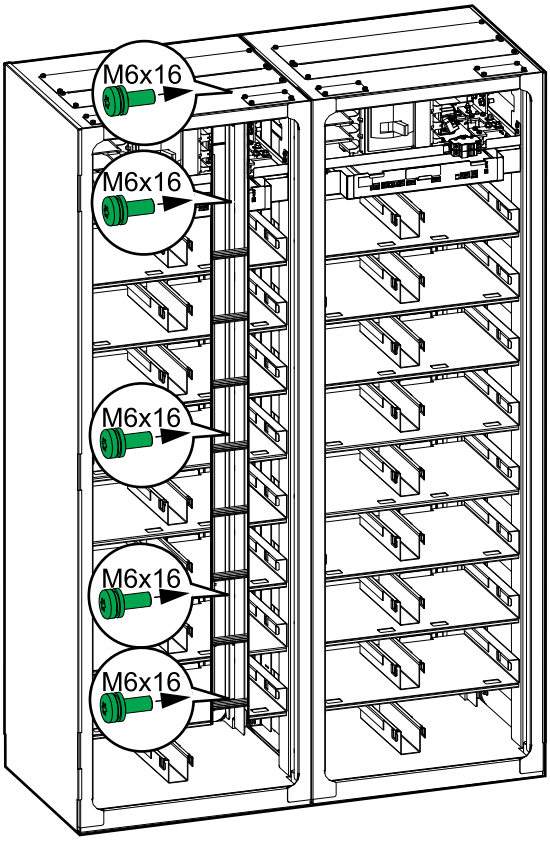


4. Push the second right-most battery cabinet into position, align with the seismic anchoring (if any), and level the battery cabinet as described in step 2 and step 3.

5. Install the ten interconnection screws (five in the front and five in the rear) between the two battery cabinets.

   **NOTE:** To reach the five interconnection screws in the rear of the left-most battery cabinet, the left side panel can be removed. Reinstall the left side panel on the left-most battery cabinet after interconnection.

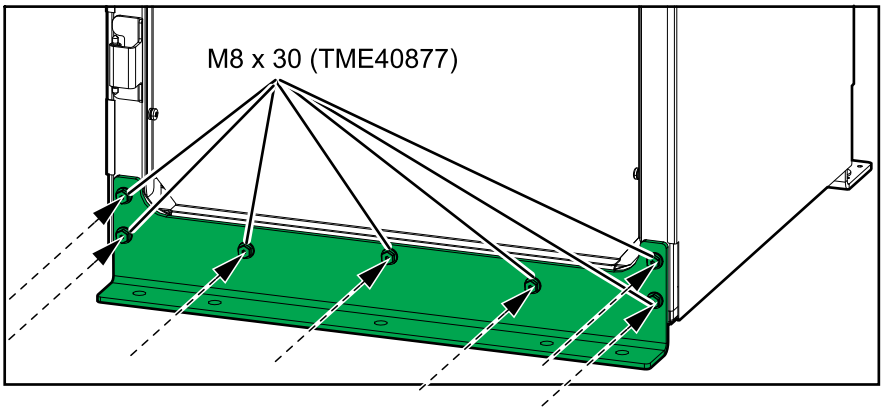



6. Push the third battery cabinet into position, align with the seismic anchoring (if any), level the battery cabinet, and interconnect with the other battery cabinets as described in step 2, step 3, and step 5. Continue until all the battery cabinets are in place, levelled, and interconnected.

# Install the Front Seismic Anchoring

1. Install the front seismic bracket (front shipping bracket) on the battery cabinet.




2. Anchor the front seismic bracket to the floor using appropriate hardware for the floor type – the hole diameter in the front seismic bracket is ø14 mm. The minimum requirement is M12 strength grade 8.8 hardware.

   **NOTE:** Floor anchoring bolts are not supplied.

# Prepare the UPS for Top Cable Entry

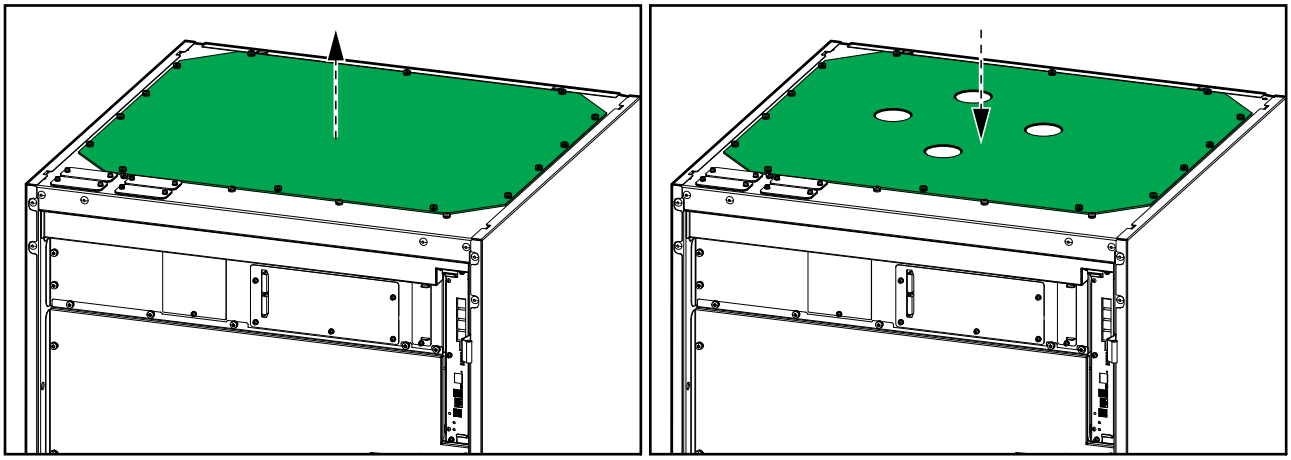
**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

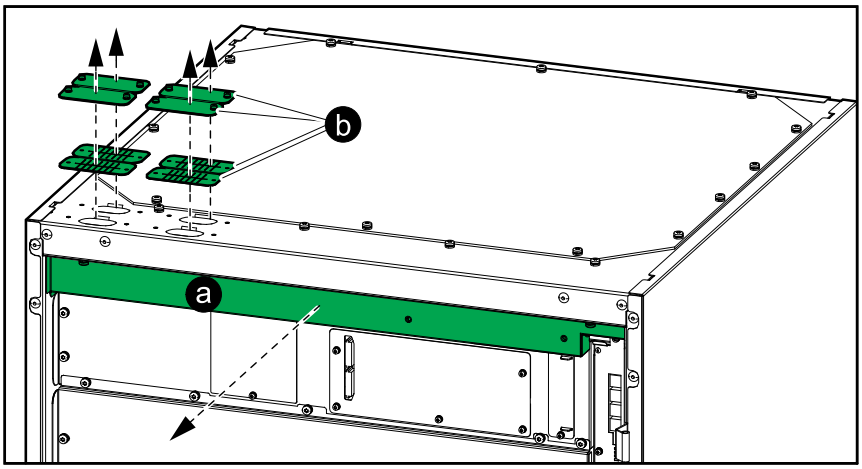
Do not drill or punch holes with the gland plates installed and do not drill or punch holes in close proximity to the cabinet.

**Failure to follow these instructions will result in death or serious injury.**

1. Prepare for power cables:
   a. Remove the gland plate from the top of the UPS.
   b. Drill/punch holes for power cables or conduits/grommets in the gland plate. Install conduits/grommets (not provided), if applicable.
   c. Reinstall the gland plate.

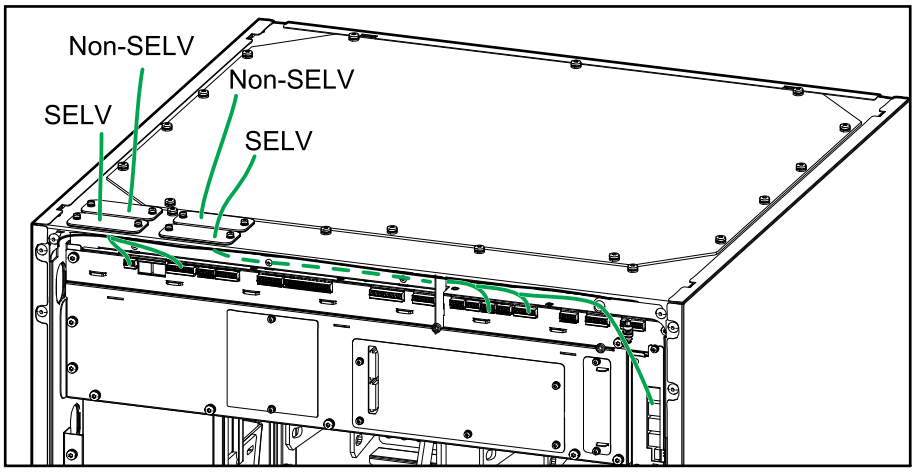


2. Prepare for signal cables:
   a. Remove the cover in front of the signal connections. Save for final installation steps.
   b. Remove the gland plates and brush plates from the top of the UPS.



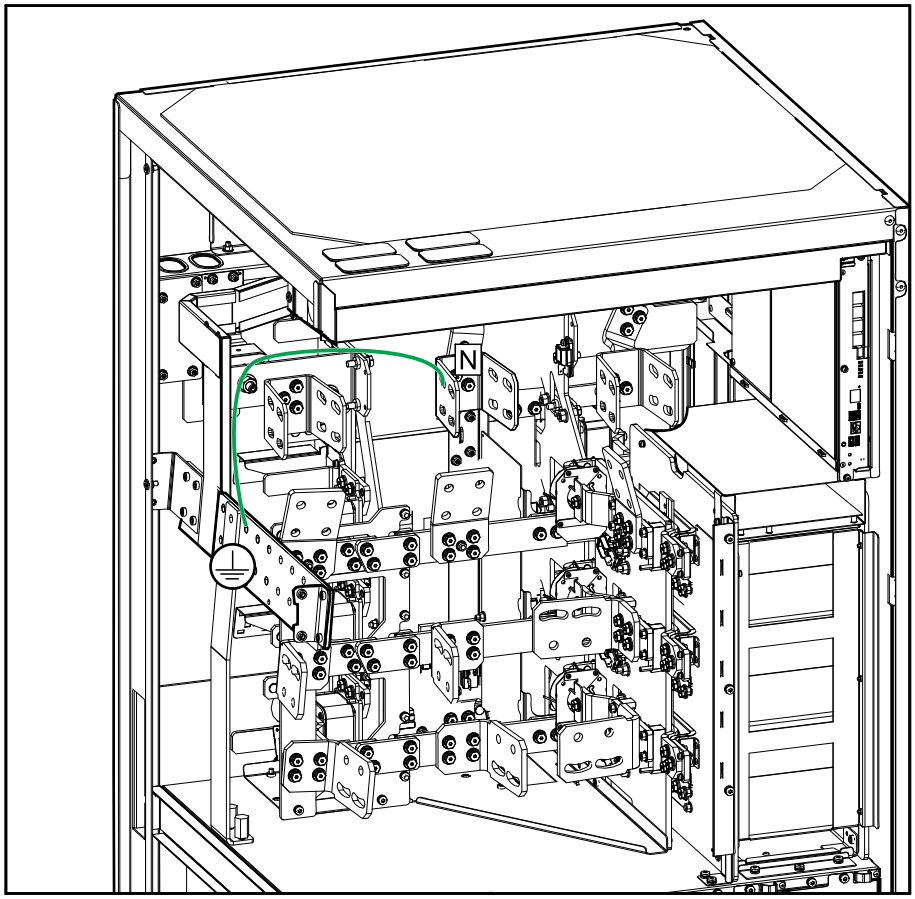

   c. **For installation without conduits/grommets**: Reinstall the brush plates.
   d. **For installation with conduits/grommets**: Drill holes in the gland plates for conduits/grommets, install conduits/grommets, and reinstall the gland plates.

3. Route the signal cables as shown to separate the Class 2/SELV cables from the non-Class 2/non-SELV cables.



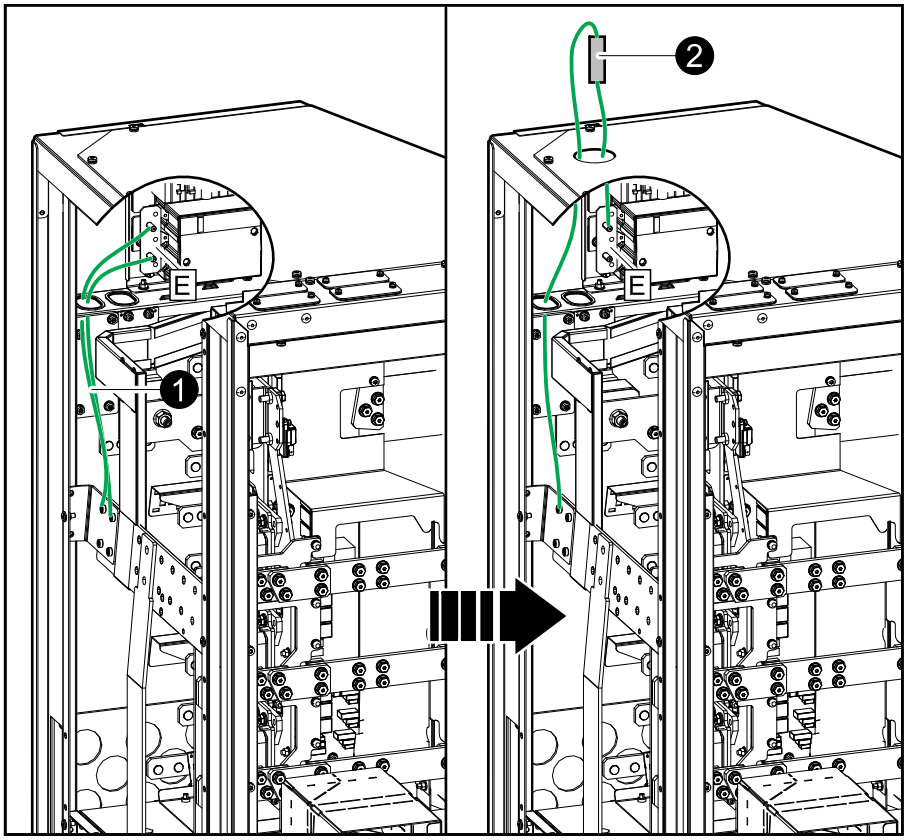
# Prepare for TNC Earthing System

1. Connect power cable(s) (not provided) from the PE busbar to the N busbar. Use the same number of cables and cable size as the output N cables.



# Prepare for HRG Earthing System

1. Remove the two preconnected cables that connect the E terminal on the bonding contactor to the ground busbar. Discard the cables.
2. Connect an external impedance between the E terminal on the bonding contactor and the ground busbar according to NEC article 250.36.



# Connect Power Cables in the UPS in System over 45 kAIC/kA Icw

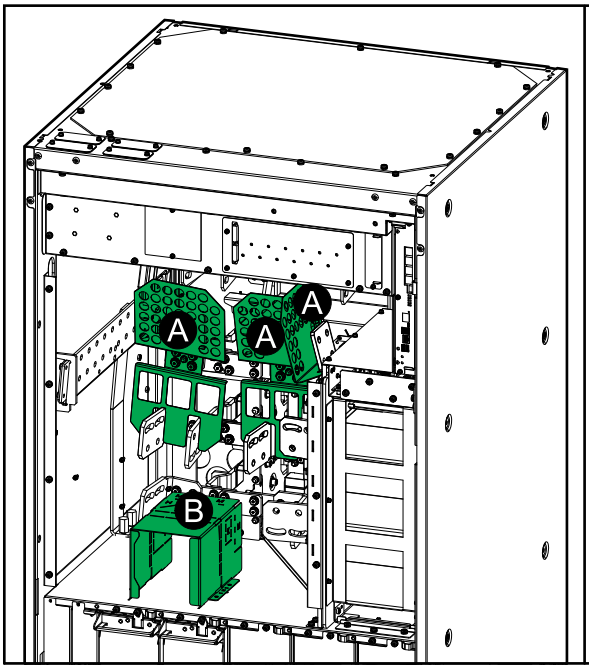
Use kit 0H-1816 for this procedure.

**NOTE:** If a Lithium-ion battery control breaker kit (GVLOPT005) is part of your installation, the Lithium-ion battery control breaker kit must be installed **before** the power cables are connected in the UPS. Follow the installation manual provided with the Lithium-ion battery control breaker kit.

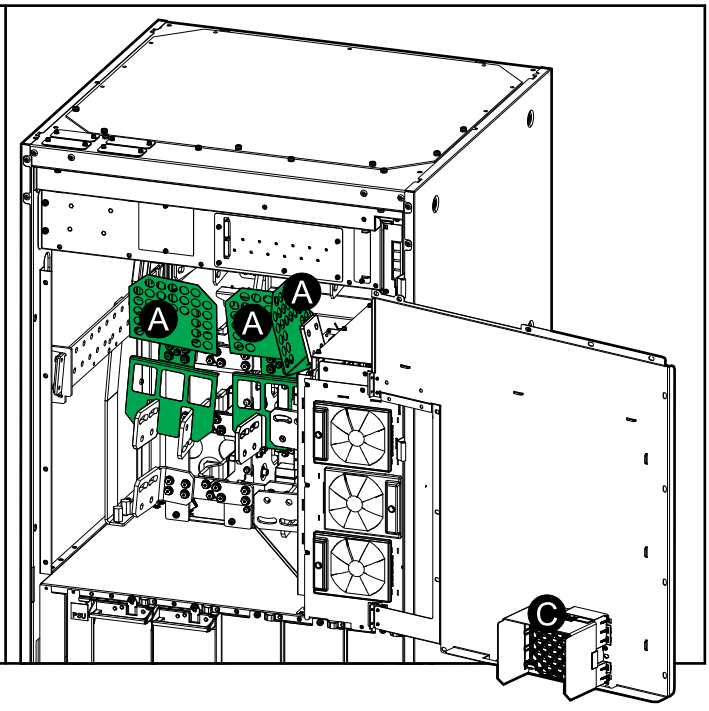
1. Remove the transparent plastic protectors (marked (A) on the illustration) from the busbars. If present, remove the plastic box (marked (B) on the illustration) from the cabling field for easier access. Save all parts for reinstallation after cable connection.

   **NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part. The integrated box must not be removed from the inner door.

**Front View of the UPS Model with Separate Plastic Box**



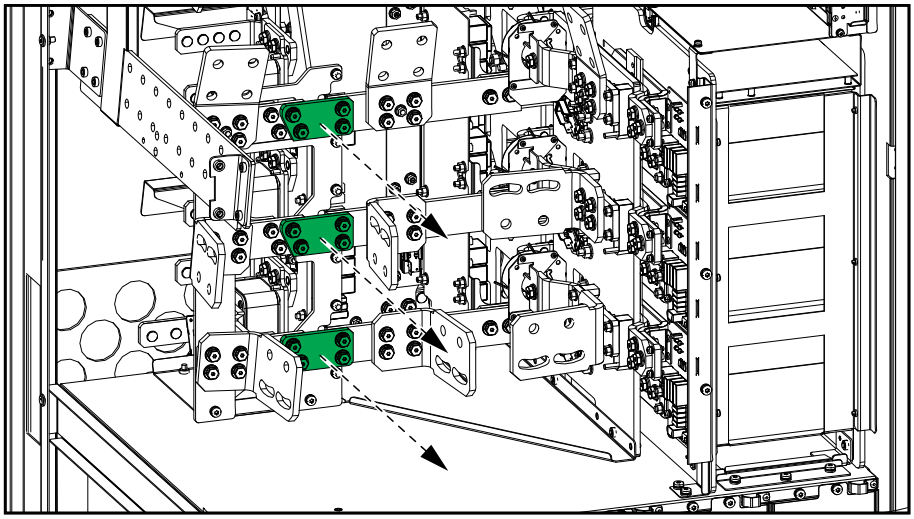

**Front View of the UPS Model with the Box Integrated in the Inner Door**



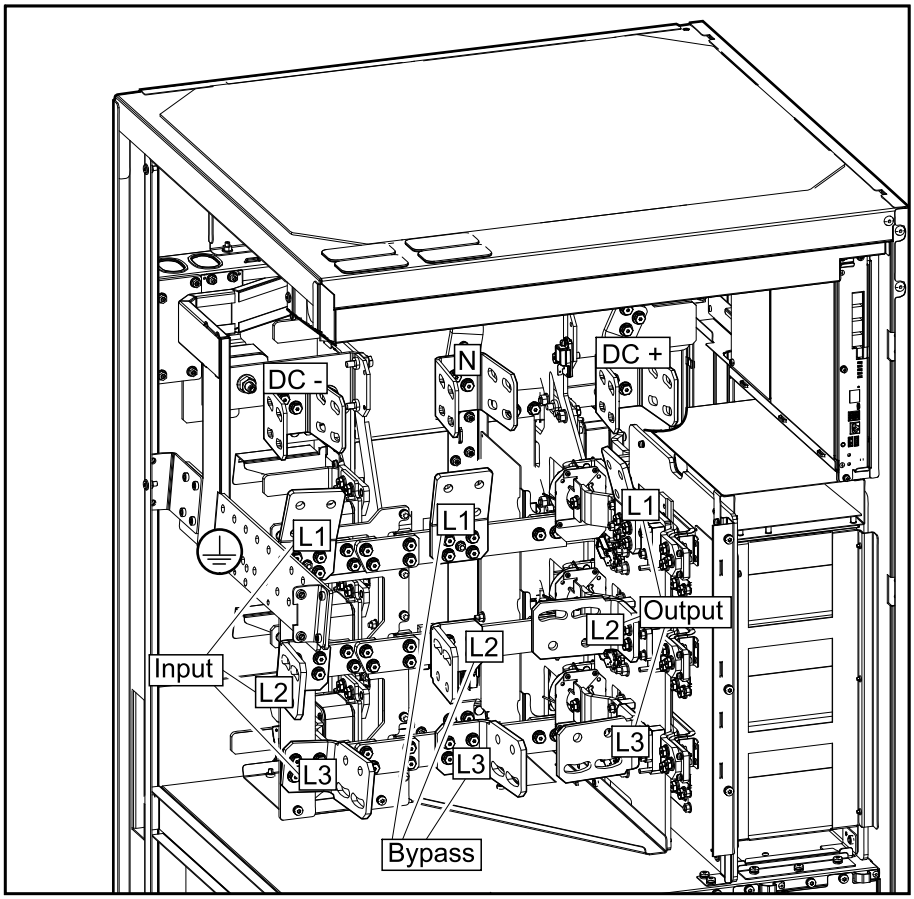
2. **Only for dual mains**: Remove the single mains busbars.

   **NOTE:** Save the three single mains busbars. They are needed for testing during start-up of the UPS.

**Front View of the UPS**



3. Connect the power cables in the described order. Assemble the cable lugs to the busbars as shown.




   a. Connect the PE cables/equipment grounding conductor (EGC).

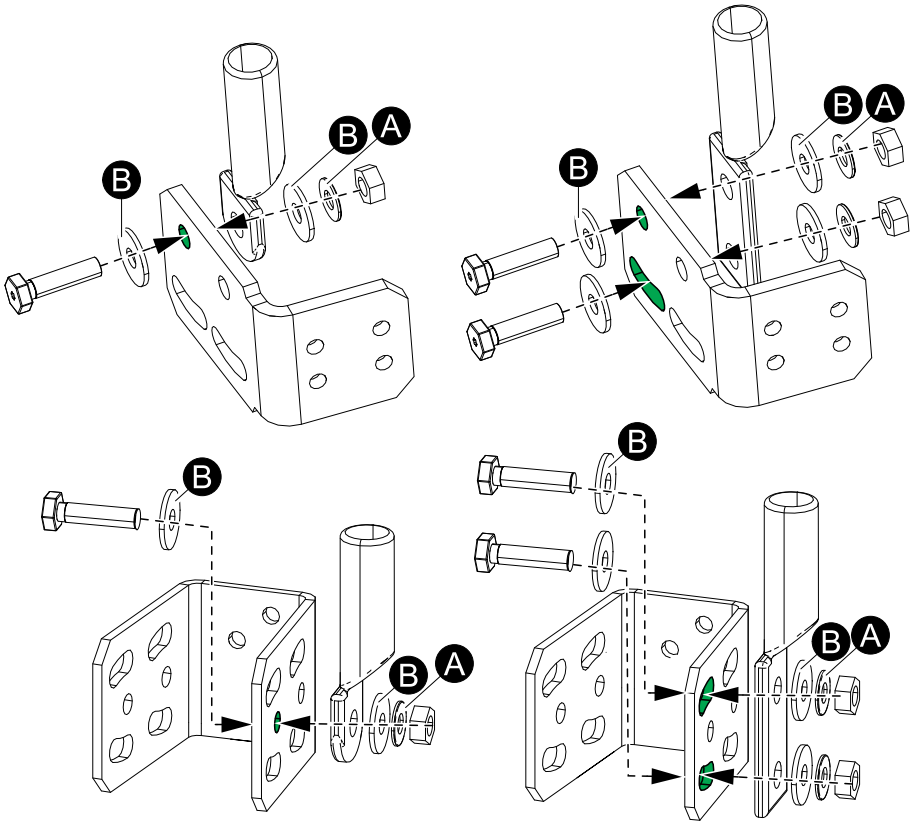
   b. Connect the DC cables (DC+, DC-).

   c. Connect the input cables. Ensure to install the L2 and L3 power cable through both the busbar and the bracket.

   d. **Only for dual mains**: Connect the bypass cables. Ensure to install the L2 and L3 power cable through both the busbar and the bracket.

e. Connect the output cables. Ensure to install the L2 and L3 power cable through both the busbar and the bracket.

**Cable Lug to Busbar Assembly**




A. Spring washer – provided in kit

B. Flat washer (not provided)

## ⚠CAUTION

**RISK OF CABLE LUG DISCONNECTION**

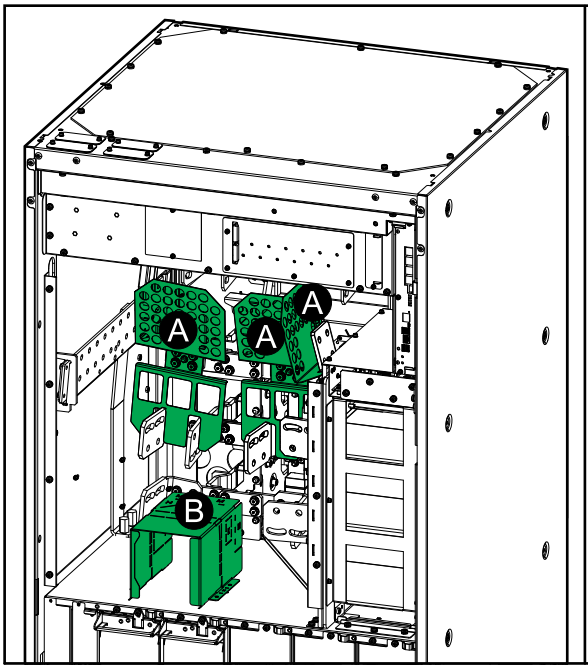
- Use the provided spring washers when connecting the cable lugs to the busbars as shown in the illustration.
- Connect one hole cable lugs and two hole cable lugs to the busbars as shown in the illustration.

**Failure to follow these instructions can result in injury or equipment damage.**

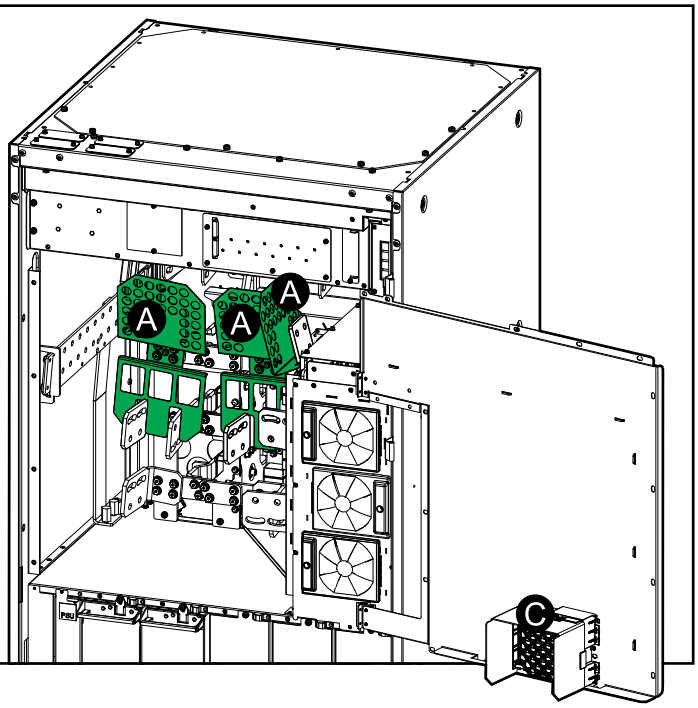
4. Reinstall the transparent plastic protectors (marked (A) on the illustration) and the plastic box (marked (B) on the illustration) in the original position.

   **NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part.

**Front View of the UPS Model with Separate Plastic Box**




**Front View of the UPS Model with the Box Integrated in the Inner Door**




## ⚠CAUTION

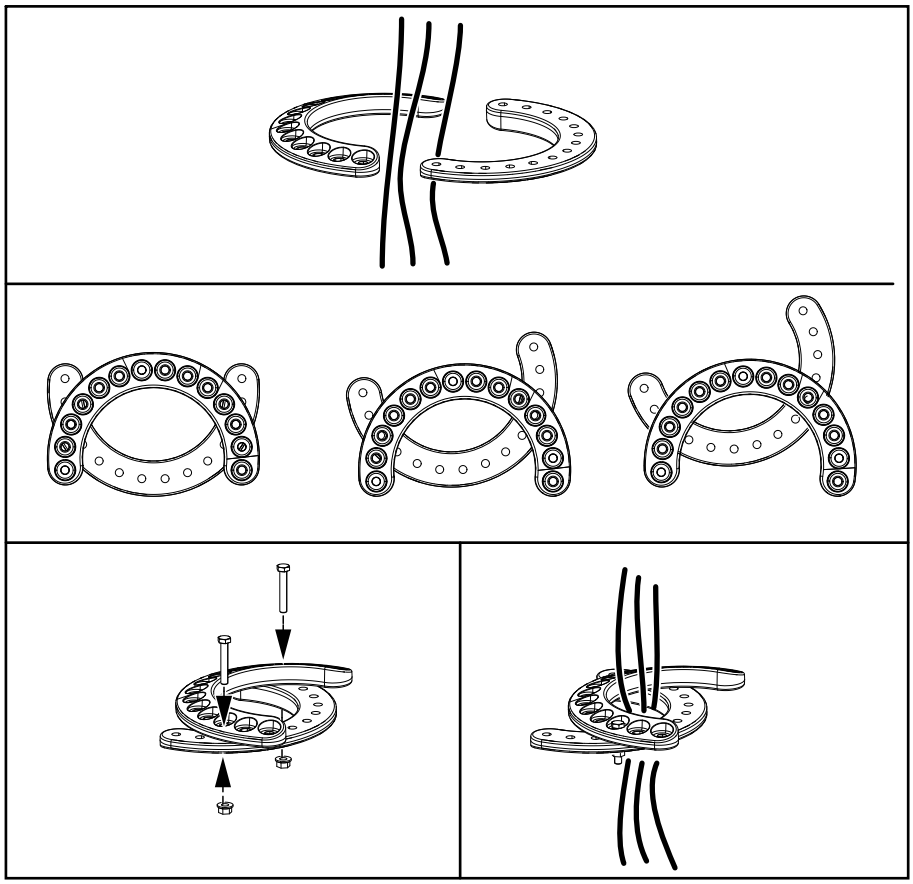
**RISK OF ARC FLASH AND OVERHEATING**

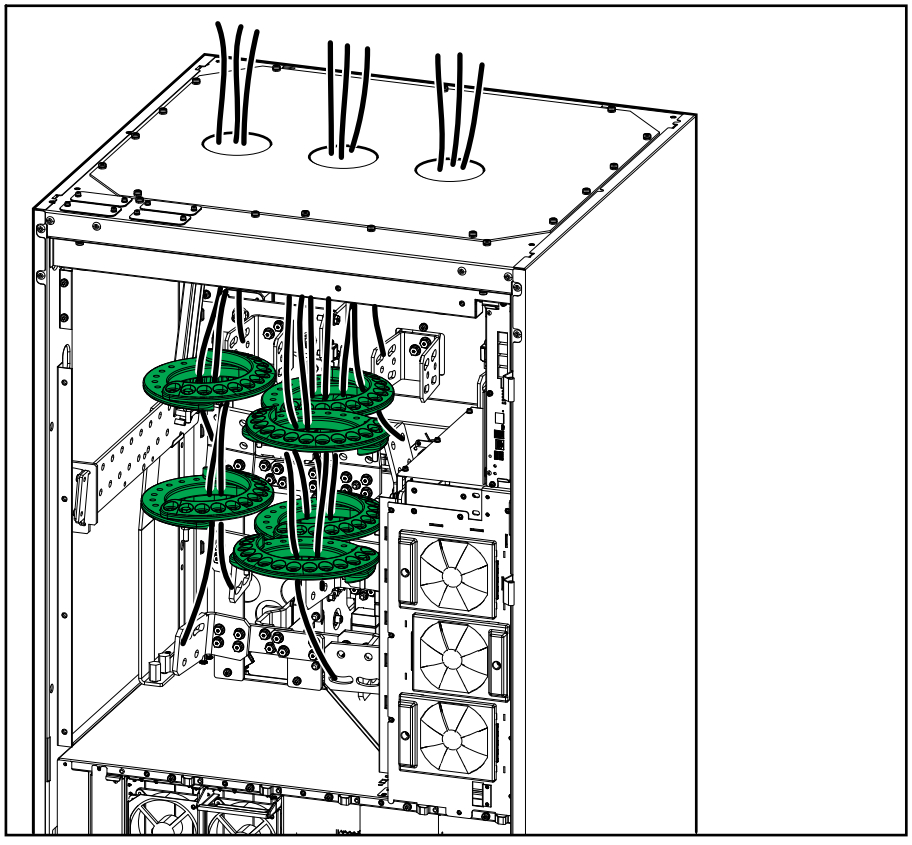
The transparent plastic protectors and the plastic box must be reinstalled in the original position after power cabling is completed. **Note:** On newer UPS models, the box is integrated in the inner door of the UPS instead of being a separate part.

**Failure to follow these instructions can result in injury or equipment damage.**

5. Fasten the power cables with the provided plastic fasteners in the shown positions. Adjust the plastic fastener sets to the power cables so they are fitted as tightly together as possible.

**Assembly of a Plastic Fastener Set**





# Connect Power Cables in the UPS in System up to 45 kAIC/kA Icw

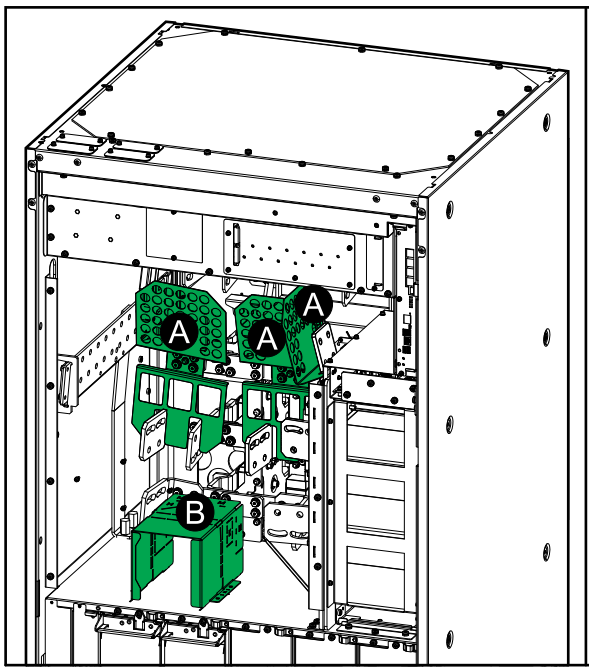
**NOTE:** If a backfeed kit (GVLOPT003 or GVLOPT004) is part of your installation, the backfeed kit must be installed **before** the power cables are connected in the UPS. Follow the installation manual provided with the backfeed kit.

**NOTE:** If a Lithium-ion battery control breaker kit (GVLOPT005) is part of your installation, the Lithium-ion battery control breaker kit must be installed **before** the power cables are connected in the UPS. Follow the installation manual provided with the Lithium-ion battery control breaker kit.

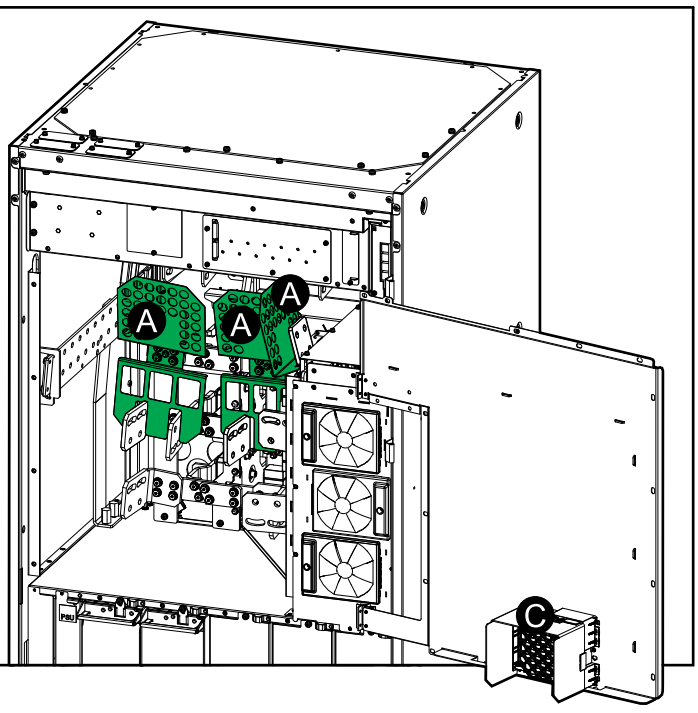
1. Remove the transparent plastic protectors (marked (A) on the illustration) from the busbars. If present, remove the plastic box (marked (B) on the illustration) from the cabling field for easier access. Save all parts for reinstallation after cable connection.

   **NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part. The integrated box must not be removed from the inner door.

**Front View of the UPS Model with Separate Plastic Box**



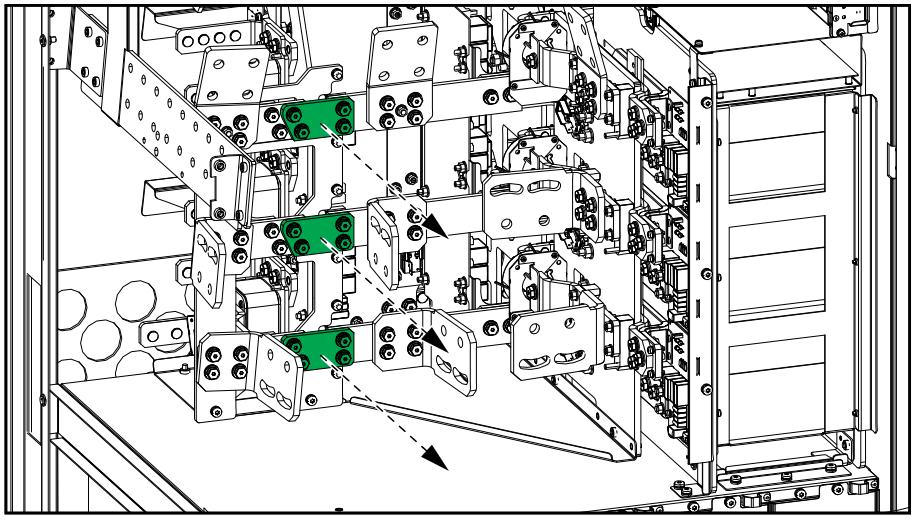

**Front View of the UPS Model with the Box Integrated in the Inner Door**



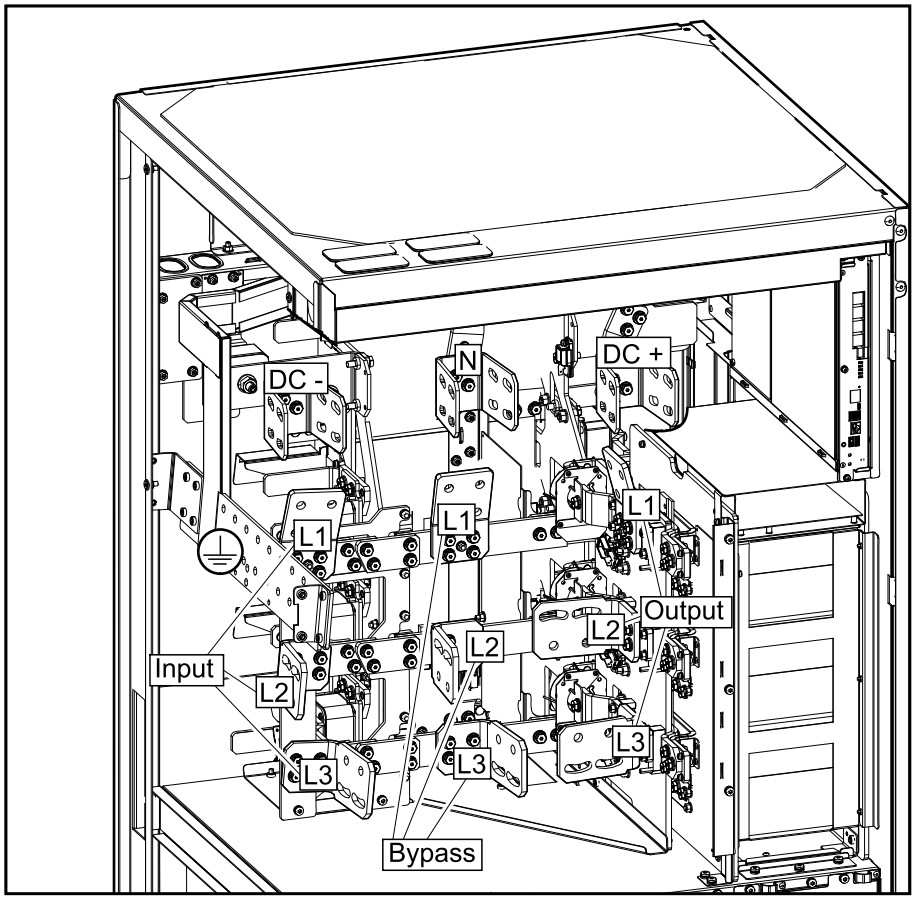
2. **Only for dual mains**: Remove the single mains busbars.

   **NOTE:** Save the three single mains busbars. They are needed for testing during start-up of the UPS.

**Front View of the UPS**



3. Connect the power cables in the described order. Assemble the cable lugs to the busbars as shown.




   a. Connect the PE cables/equipment grounding conductor (EGC).

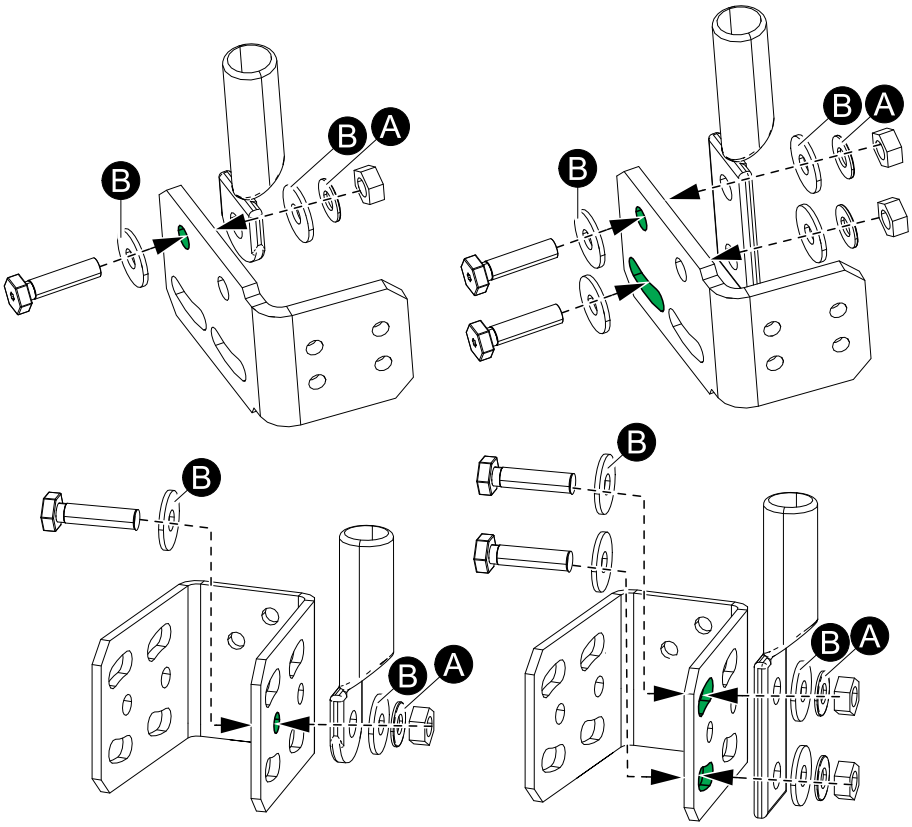
   b. Connect the DC cables (DC+, DC-).

   c. Connect the input cables.

   d. **Only for dual mains**: Connect the bypass cables.

   e. Connect the output cables.

**Cable Lug to Busbar Assembly**




A. Spring washer – provided in kit

B. Flat washer (not provided)

## ⚠CAUTION

**RISK OF CABLE LUG DISCONNECTION**

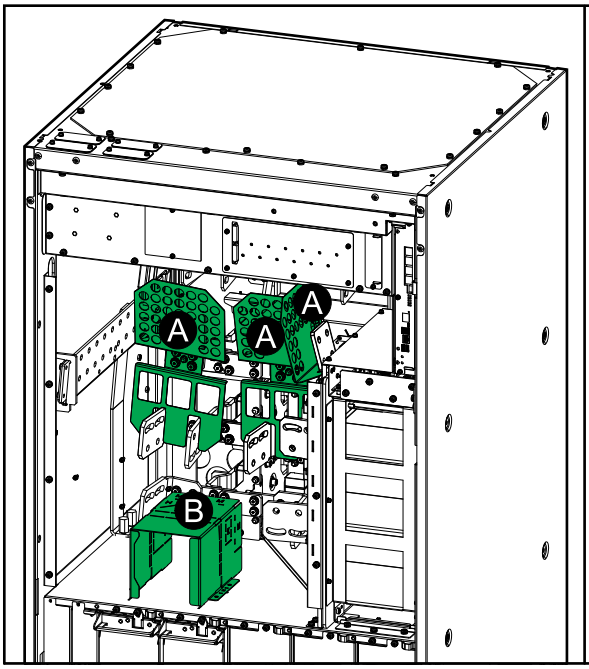
- Use the provided spring washers when connecting the cable lugs to the busbars as shown in the illustration.
- Connect one hole cable lugs and two hole cable lugs to the busbars as shown in the illustration.

**Failure to follow these instructions can result in injury or equipment damage.**

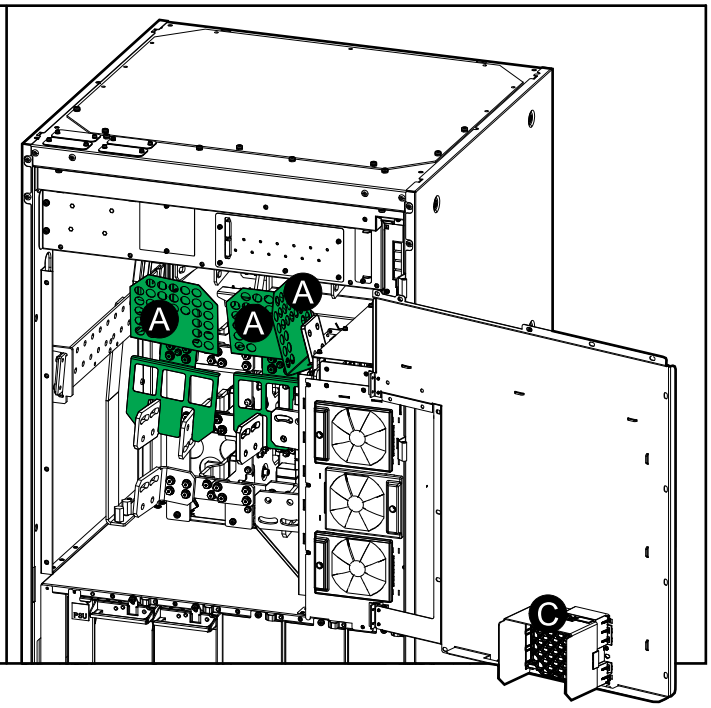
4. Reinstall the transparent plastic protectors (marked (A) on the illustration) and the plastic box (marked (B) on the illustration) in the original position.

   **NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part.

**Front View of the UPS Model with Separate Plastic Box**




**Front View of the UPS Model with the Box Integrated in the Inner Door**




## ⚠CAUTION

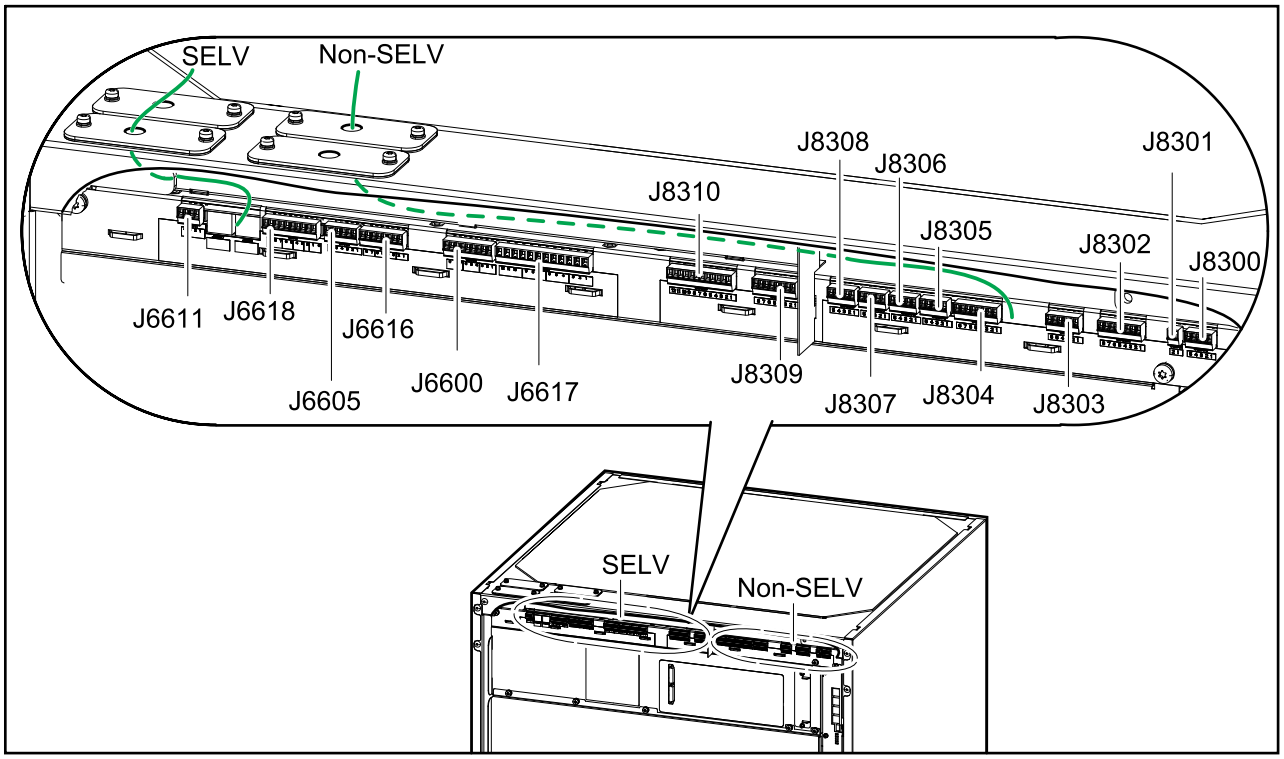
**RISK OF ARC FLASH AND OVERHEATING**

The transparent plastic protectors and the plastic box must be reinstalled in the original position after power cabling is completed. **Note:** On newer UPS models, the box is integrated in the inner door of the UPS instead of being a separate part.

**Failure to follow these instructions can result in injury or equipment damage.**

# Connect the Signal Cables

### Overview of Signal Connection Terminals in the UPS




**NOTE:** Route the signal cables separately from the power cables and route the Class 2/SELV cables separately from the non-Class 2/non-SELV cables. A divider inside the cable channel separates the cables.

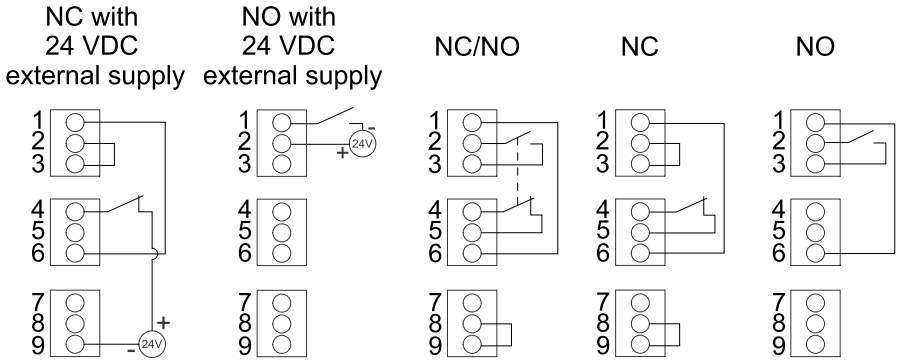
All Class 2/SELV signal cables shall be double insulated/jacket cable and minimum rated for 30 VDC. All non-Class 2/non-SELV signal cables shall be double insulated/jacket cable and minimum rated for 600 VAC.

| Distance from UPS to equipment | Recommended signal cable size | |
|---|---|---|
| 50 m (164 feet) | 0.5 $mm^2$ | 20 AWG |
| 100 m (328 feet) | 0.75 $mm^2$ | 18 AWG |
| 200 m (656 feet) | 1 $mm^2$ | 17 AWG |

1. Connect the Class 2/SELV signal cables from the building EPO to terminal J6600 in the UPS according to one of the options below.

   The EPO circuit is considered Class 2/SELV. Class 2/SELV circuits must be isolated from the primary circuitry. Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is Class 2/SELV.

   **EPO Configurations (Terminal J6600, 1-9)**




   The EPO input supports 24 VDC.

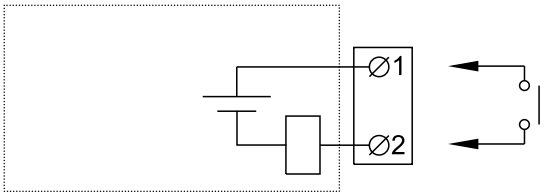
   **NOTE:** The default setting for the EPO activation is to turn off the inverter.

   If you want the EPO activation to transfer the UPS into forced static bypass operation instead, please contact Schneider Electric.

2. Connect the Class 2/SELV signal cables to the input contacts and output relays in the UPS.

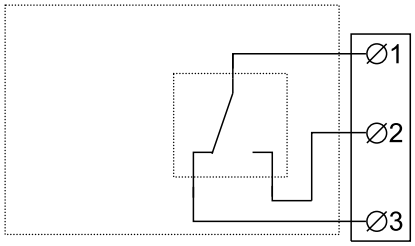
   Do not connect any circuit to the input contacts unless it can be confirmed that the circuit is Class 2/SELV.

   The input contacts support 24 VDC 10 mA. All circuits connected must have the same 0 V reference.




| Name | Description | Location |
|---|---|---|
| IN _1 (input contact 1) | Configurable input contact | Terminal J6616, 1-2 |
| IN _2 (input contact 2) | | Terminal J6616, 3-4 |
| IN _3 (input contact 3) | | Terminal J6616, 5-6 |
| IN _4 (input contact 4) | | Terminal J6616, 7-8 |

   The output relays support 24 VAC/VDC 1 A. All external circuitry must be fused with maximum 1 A fast acting fuses.



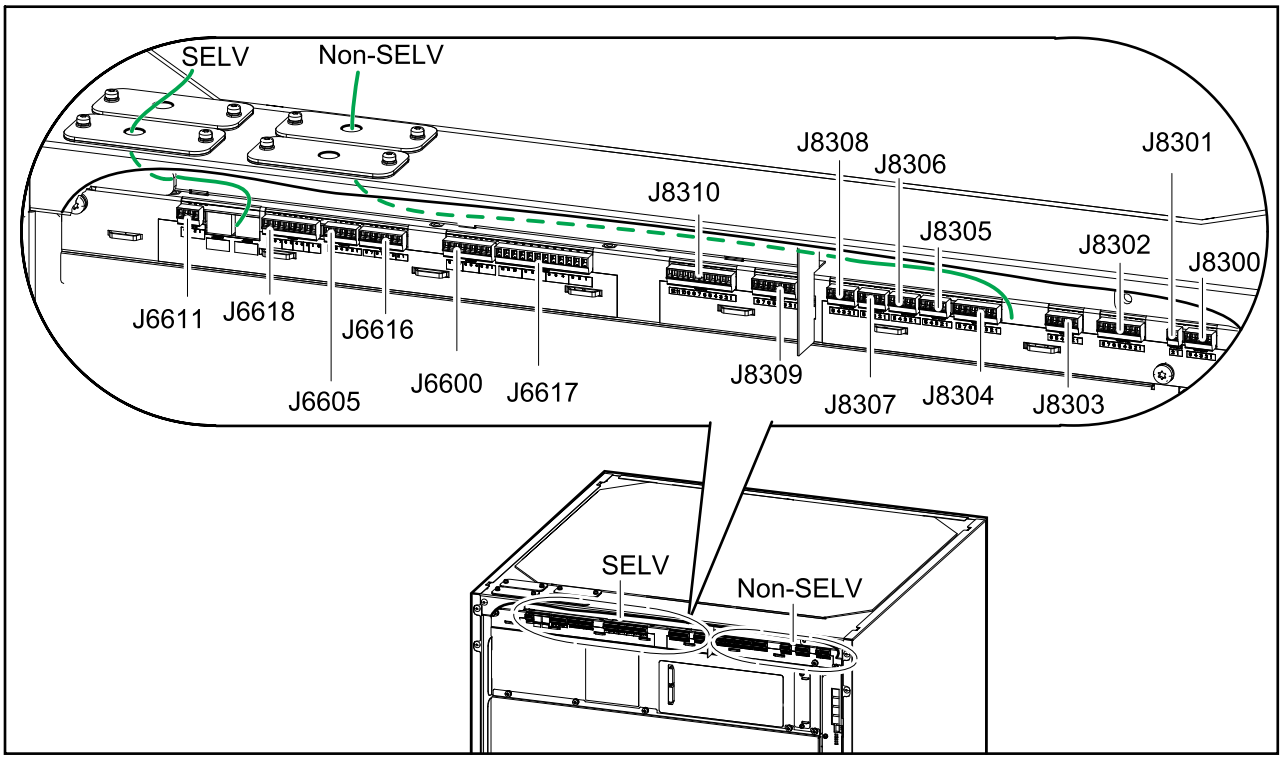

| Name | Description | Location |
|---|---|---|
| OUT _1 (output relay 1) | Configurable output relay | Terminal J6617, 1-3 |

| Name | Description | Location |
|---|---|---|
| OUT _2 (output relay 2) | | Terminal J6617, 4-6 |
| OUT _3 (output relay 3) | | Terminal J6617, 7-9 |
| OUT _4 (output relay 4) | | Terminal J6617, 10-12 |

3. Connect the signal cables from the auxiliary products to the UPS. Follow the instructions in the auxiliary product manuals.

# Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products

**Overview of Signal Connection Terminals in the UPS**




**NOTE:** Route the signal cables separately from the power cables and route the Class 2/SELV cables separately from the non-Class 2/non-SELV cables.

1. Install the temperature sensor provided with the UPS in the battery solution. In battery cabinets, install the temperature sensor in the top corner of the battery cabinet.

**⚠WARNING**

**HAZARD OF FIRE**

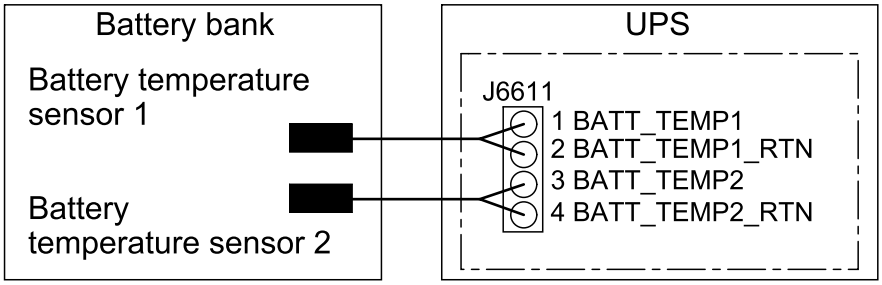
Position the temperature sensor as described to ensure correct temperature measurements.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

2. Route the battery temperature sensor cables from the battery solution to the UPS and connect as shown.

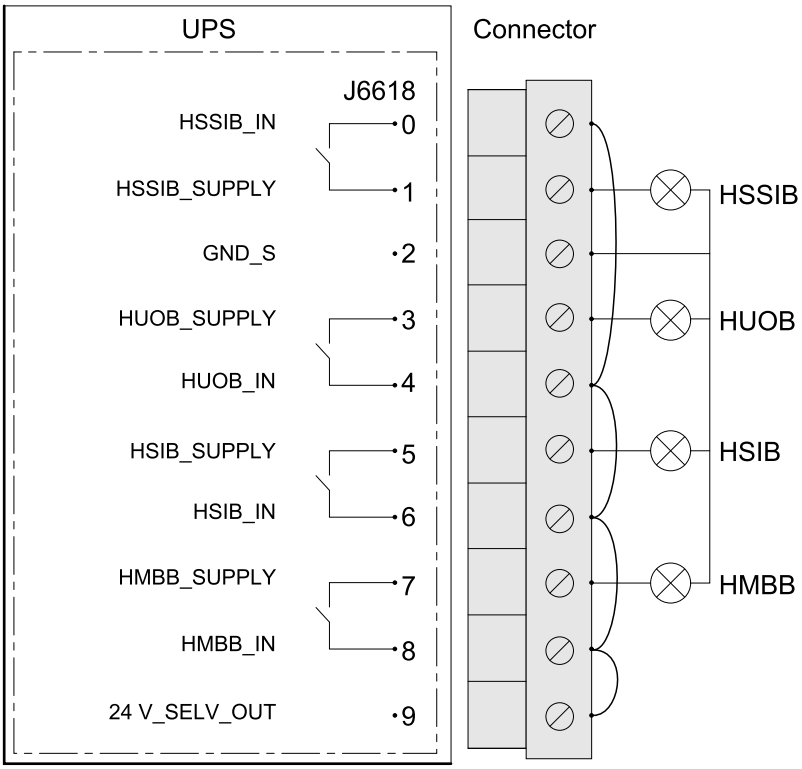
   **NOTE:** Two temperature sensors are provided with the UPS.

   **NOTE:** The battery temperature sensor cables are considered Class 2/ SELV. Class 2/SELV circuits must be isolated from the primary circuitry.



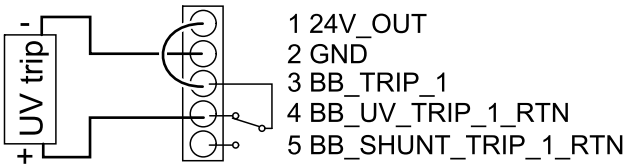
3. Connect signal cables from the disconnect device indicator lights in your switchgear to terminal J6618 in the top of the UPS. If an external supply is used, remove jumper from J6618 pin 8 and 9.

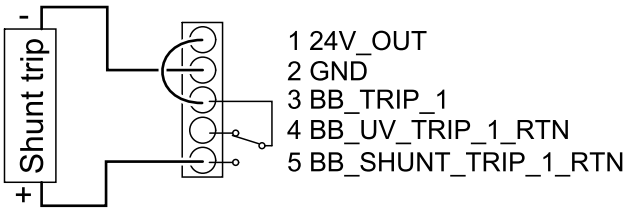
   **NOTE:** The disconnect device indicator light circuit is considered Class 2/SELV. Class 2/SELV circuits must be isolated from the primary circuitry. Do not connect any circuit to the disconnect device indicator light terminals unless it can be confirmed that the circuit is Class 2/SELV.



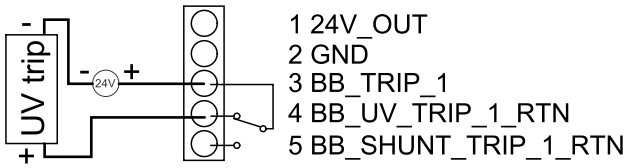
4. Connect the signal cables from the battery disconnect device(s) in your battery solution for shunt trip or undervoltage (UV) trip connection to the UPS. Follow the illustration for connection with internal or external 24 VDC supply. The UPS can connect to and monitor up to four battery disconnect devices.
   a. Connect battery disconnect device 1 to terminal J8305 in the UPS.
   b. Connect battery disconnect device 2 to terminal J8306 in the UPS.
   c. Connect battery disconnect device 3 to terminal J8307 in the UPS.
   d. Connect battery disconnect device 4 to terminal J8308 in the UPS.

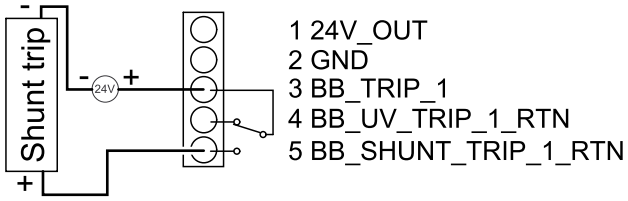
**Battery Disconnect Device Trip Connection with Internal 24 VDC Supply**




**Battery Disconnect Device Trip Connection with External 24 VDC Supply**



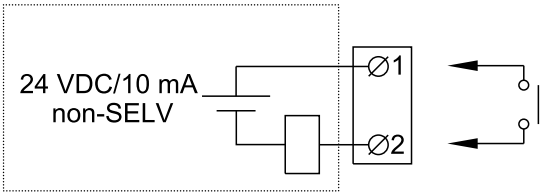

**Supported Shunt**

| Voltage (V) | Current (A) | Time (ms) | Temperature | Recommended cable size[10] | |
|---|---|---|---|---|---|
| | | | | IEC | UL/NEC |
| 24 | 1.6 | Continuous | 20 °C (68 °F) | 0.5 $mm^2$ copper | 20 AWG copper |
| 24 | 10 | 1300 | 20 °C (68 °F) | 1.5 $mm^2$ copper | 16 AWG copper |
| 24 | 20 | 200 | 20 °C (68 °F) | 2.5 $mm^2$ copper | 13 AWG copper |
| 24 | 30 | 60 | 20 °C (68 °F) | 4 $mm^2$ copper | 11 AWG copper |

The cable supplying the shunt trip shall be a jacket cable and rated for 600 VAC. The specifications and recommendations of the shunt trip manufacturer must always be considered when selecting the cable.

10. The recommended cable size is based on a voltage drop of maximum 0.8x24 VDC for 30 meter cables.

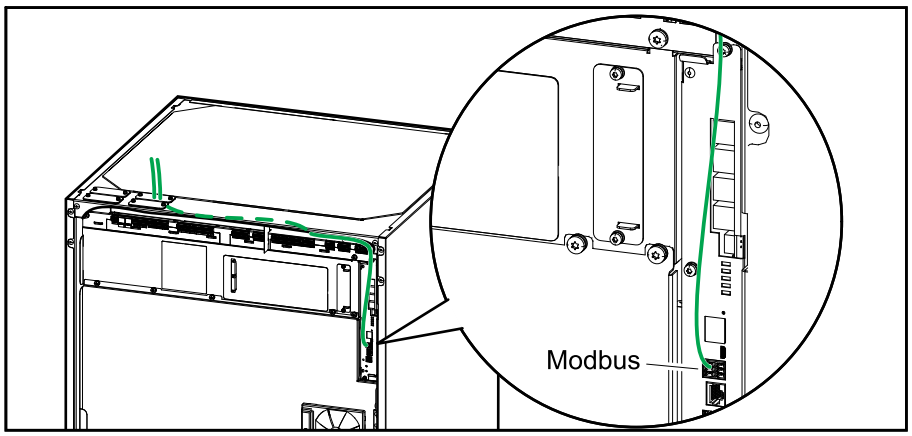
5. Connect signal cables from AUX switches in your switchgear to the UPS.




| Terminal number | Function | Connection |
|---|---|---|
| J8303, 1-2 | UOB_RED (redundant AUX switch in unit output disconnect device) | Connect to redundant AUX switch in unit output disconnect device UOB. |
| J8303, 3-4 | Grid interactive UPS feature: Force UPS into battery operation | Connect to normally open (NO) input contact used for grid interactive UPS feature (fast frequency response). Contact Schneider Electric for details and setup of this feature. |
| J8303, 5-6 | SIB (system isolation disconnect device) | Connect to normally open (NO) AUX switch in system isolation disconnect device SIB for parallel system. SIB must contain an AUX switch for each connected UPS. |
| J8304, 1-2 | BB1 (battery disconnect device 1) | Connect to normally open (NO) AUX switch in battery disconnect device number 1. |
| J8304, 3-4 | BB2 (battery disconnect device 2) | Connect to normally open (NO) AUX switch in battery disconnect device number 2. |
| J8304, 5-6 | BB3 (battery disconnect device 3) | Connect to normally open (NO) AUX switch in battery disconnect device number 3. |
| J8304, 7-8 | BB4 (battery disconnect device 4) | Connect to normally open (NO) AUX switch in battery disconnect device number 4. |
| J8302, 7-8 | UOB (unit output disconnect device) | Connect to normally open (NO) AUX switch in unit output disconnect device UOB. |
| J8302, 3-4 | SSIB (static switch input disconnect device) | Connect to normally open (NO) AUX switch in static switch input disconnect device SSIB. SSIB must contain an AUX switch for each connected UPS. |
| J8302, 1-2 | UIB (unit input disconnect device) | Connect to normally open (NO) AUX switch in unit input disconnect device UIB. UIB must contain an AUX switch for each connected UPS. |
| J8302, 5-6 | MBB (maintenance bypass disconnect device) | Connect to normally closed (NC) AUX switch in maintenance bypass disconnect device MBB. MBB must contain an AUX switch for each connected UPS. |
| J8300, 1-5 | EXT BF (external backfeed disconnect device) | See Backfeed Protection, page 81. |
| J8301, 1-2 | EXT BF RED (redundant power supply for external backfeed disconnect device) | See Backfeed Protection, page 81. |

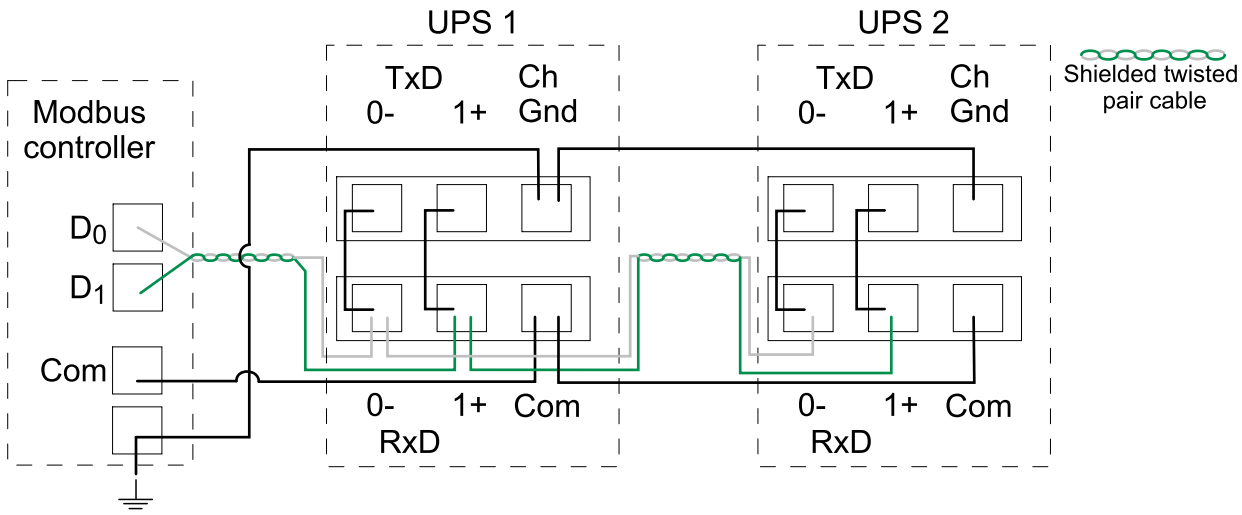
# Connect the Modbus Cables

1. Connect the Modbus cables to the UPS(s). Use either 2-wire or 4-wire connection.

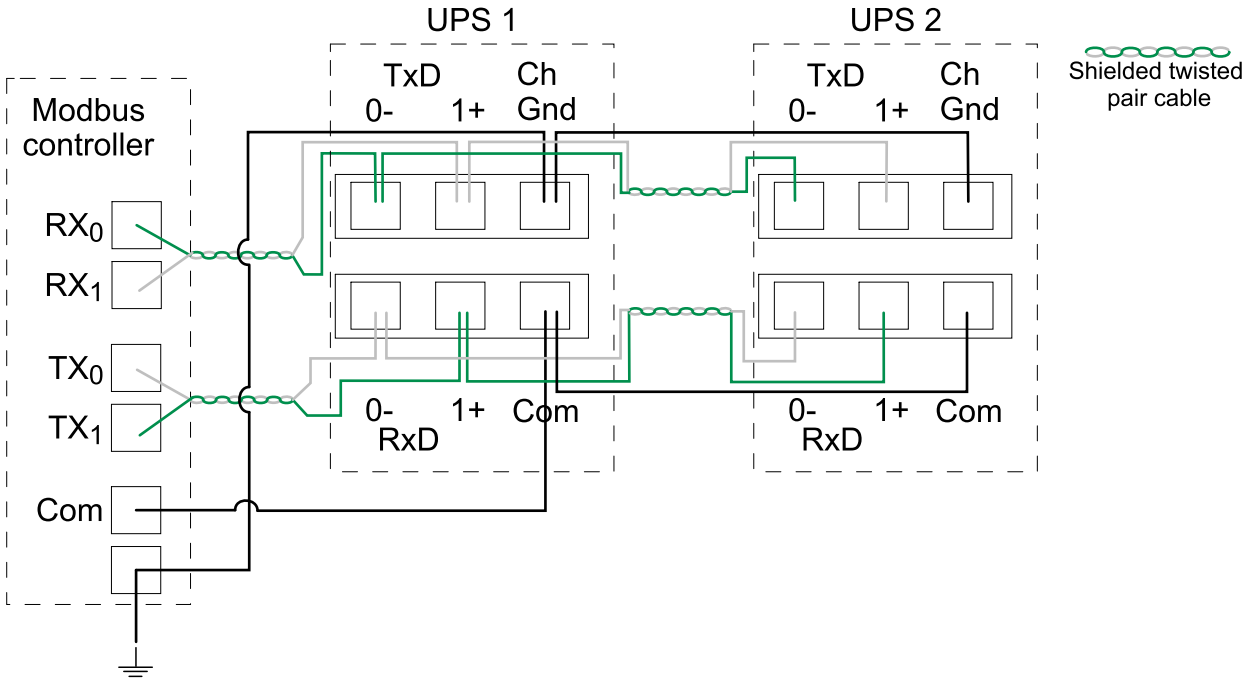



- All Modbus signal cables shall be double insulated/jacket cable and minimum rated for 30 VDC.
- Shielded twisted pair cables must be used for Modbus connections. The shield connection to the ground must be as short as possible (ideally below 1 cm). The cable shield must be connected to the Ch Gnd pin on each device.
- Wiring should be done in accordance with local wiring codes.
- Route signal cables separately from power cables to ensure sufficient isolation.
- The Modbus port is galvanically isolated with the Com pin as ground reference.

**Example: 2-Wire Connection with Two UPSs**



**Example: 4-Wire Connection with Two UPSs**




2. Install 150 Ohm termination resistors at each end of each bus if the buses are very long and operate at high data rates. Busses under 610 meters (2000 feet) at 9600 baud or under 305 meters (1000 feet) at 19200 baud should not require termination resistors.

# Connect the Signal Cables for External Synchronization

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Check for absence of voltage for all three signal terminals on the external synchronization board 0P4809. When the external synchronization cables are installed, the terminals on the external synchronization board 0P4809 may be energized. Disconnect the fuse disconnector device at the source before removing the transparent protection cover.

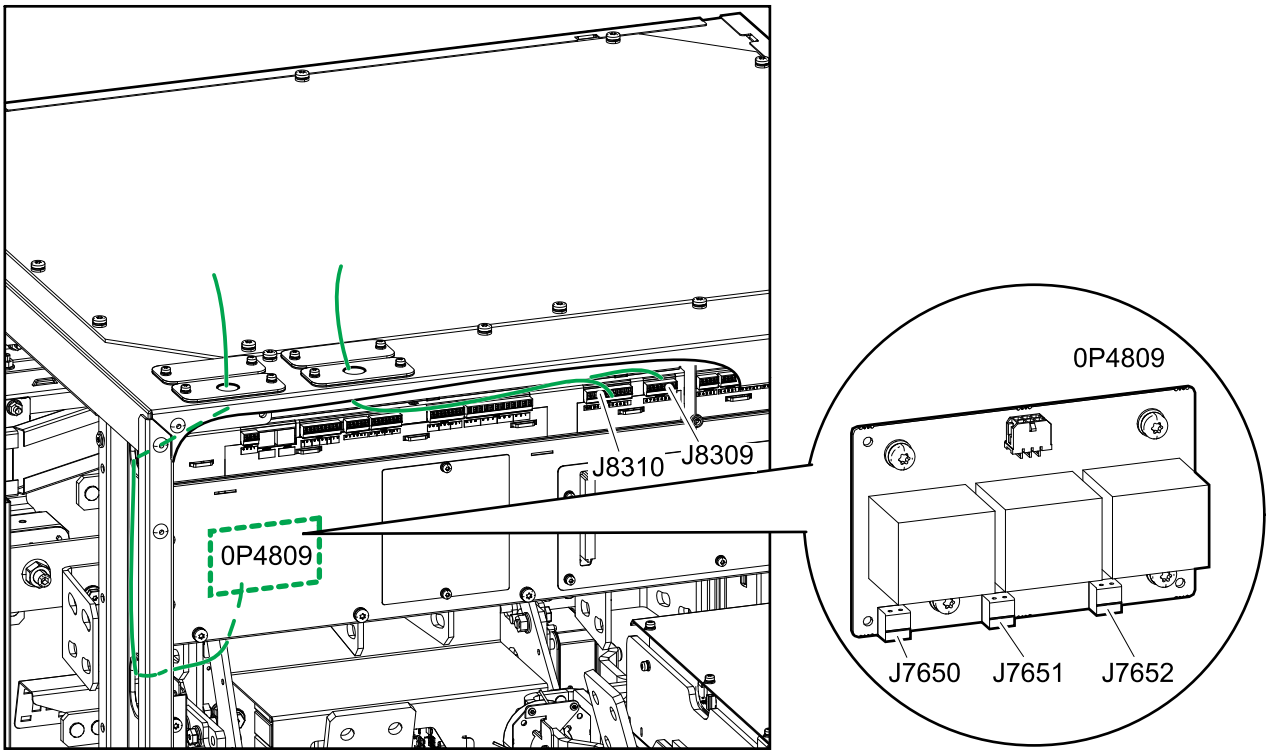
**Failure to follow these instructions will result in death or serious injury.**

**Cable Size and Fuse Disconnector Device for External Synchronization**

| | Fuse and disconnector at source | Fuse disconnector marking | Cable size | Conduits |
|---|---|---|---|---|
| IEC | In = 2A, I.R=65 kAiC | Fuse disconnector identification number and external synchronization UPS number. | 2 x 1.5 $mm^2$ | – |
| UL/NEC | | | 2 x 16 AWG | 0.5 inch |

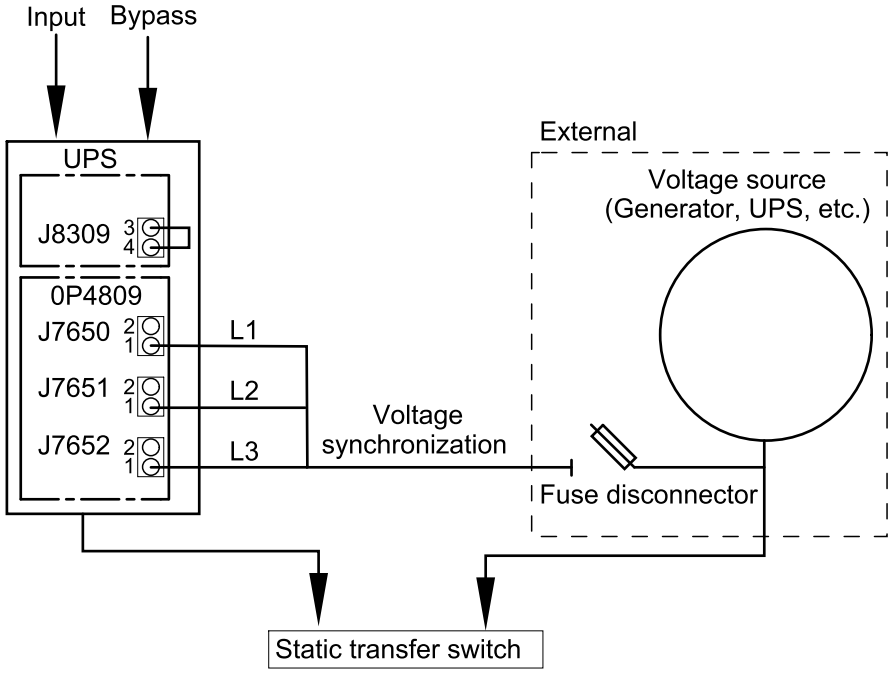
The maximum voltage for external synchronization is equal to the input voltage range given in the specifications. The non-Class 2/non-SELV cables for external synchronization shall be a jacket cable and rated for 600 VAC.

1. Remove the transparent protection cover from the external synchronization board 0P4809. The external synchronization board 0P4809 is located on the rear of the front plate.
2. Connect the cables for external synchronization to the external synchronization board 0P4809 and to terminals J8309 and J8310. See cable routing on the illustration. Connect the external synchronization per your configuration according to one of the diagrams below. Ensure that fuse disconnector devices are installed at the source as shown in the diagrams.

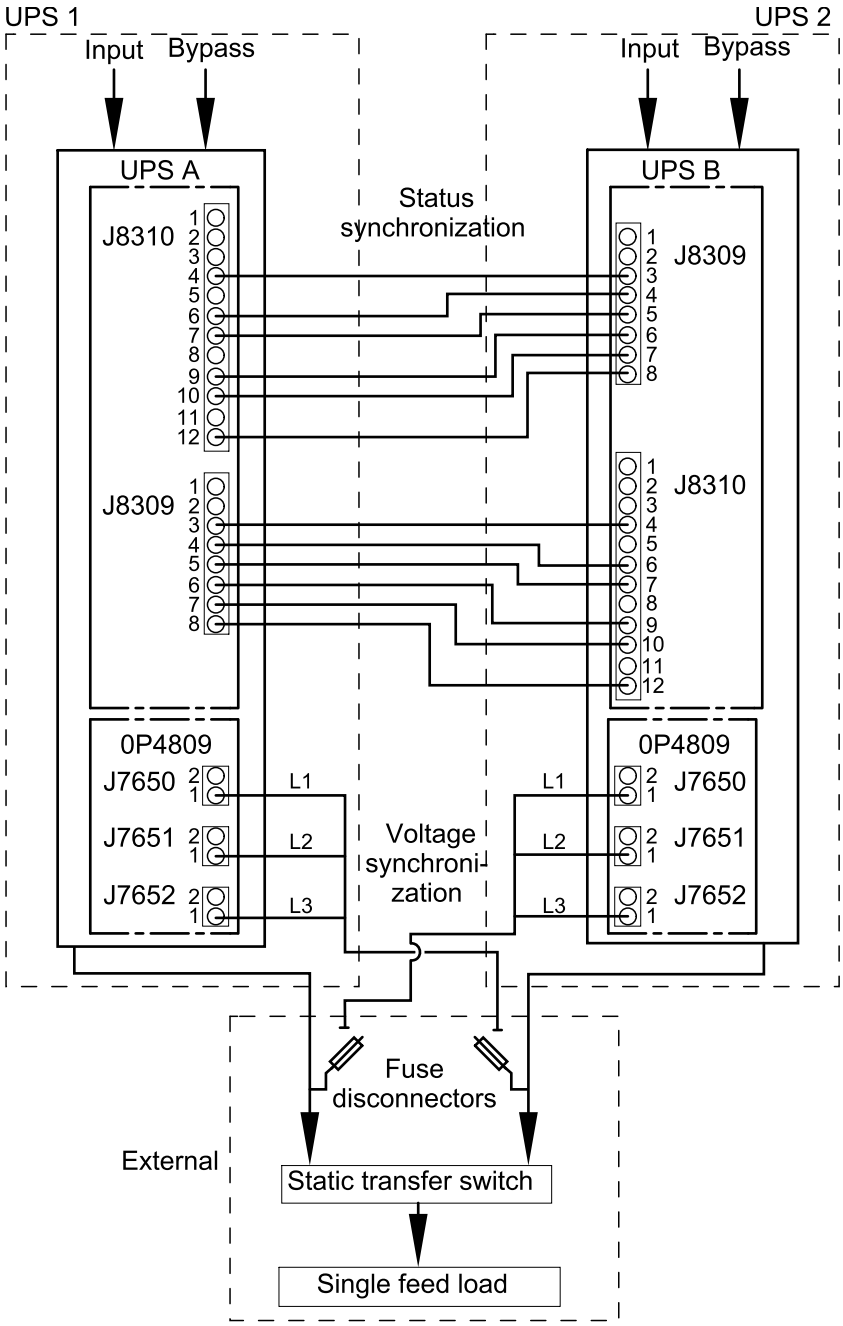



**Signal Cable Connections for UPS Synchronization to a Fixed Voltage Source**

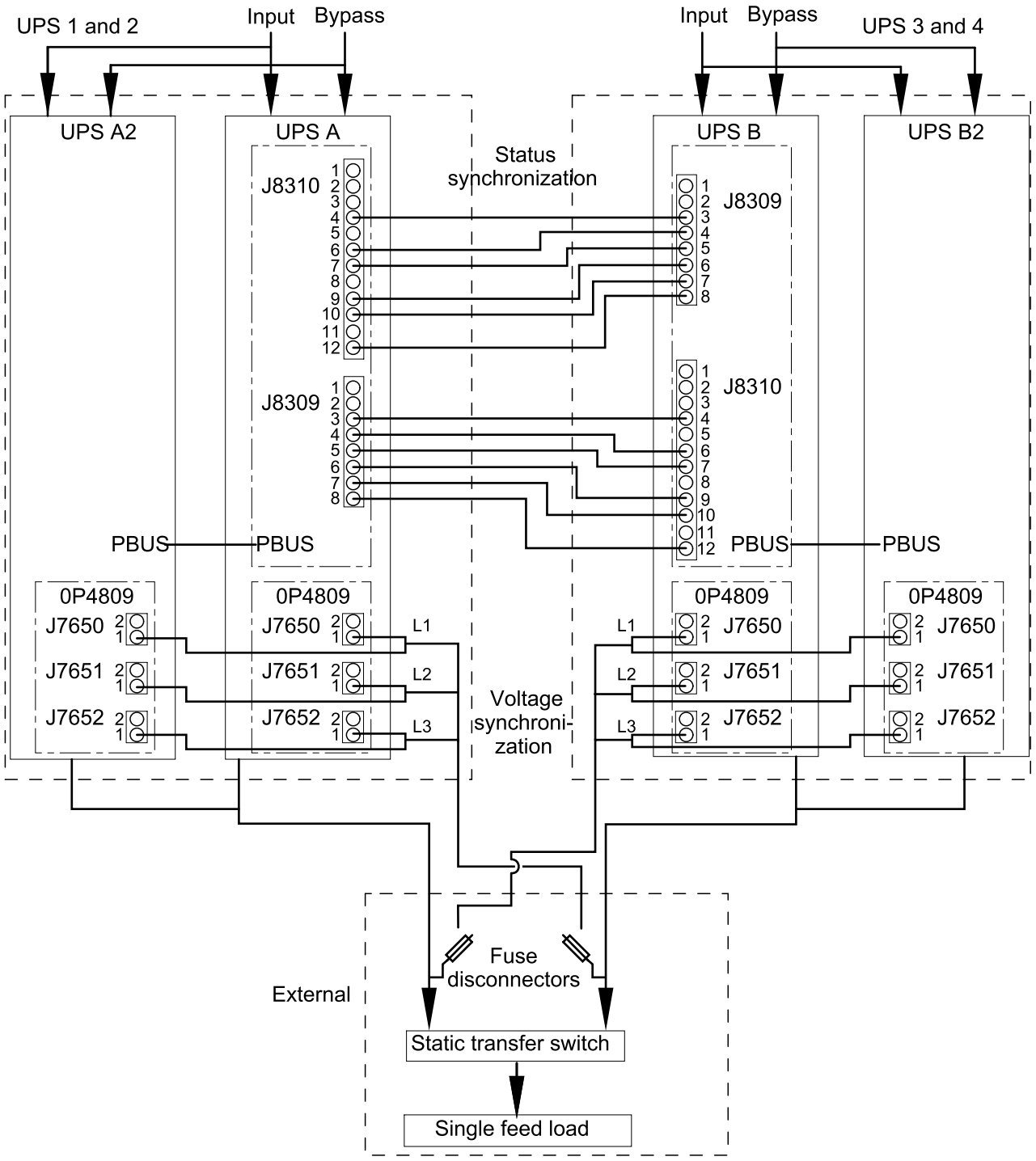
**NOTE:** The connection on J8309 pin 3 and 4 can be with a jumper or can be controlled externally from a PLC or another external system.



**Signal Cable Connections for Advanced Dual UPS Synchronization**



**Signal Cable Connections for Advanced Dual UPS Synchronization in a Parallel UPS System with Fixed Sync Master**




3. Reinstall the transparent protection cover on the external synchronization board 0P4809 after signal cabling is completed.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

The transparent protection cover must be installed over the external synchronization board 0P4809.

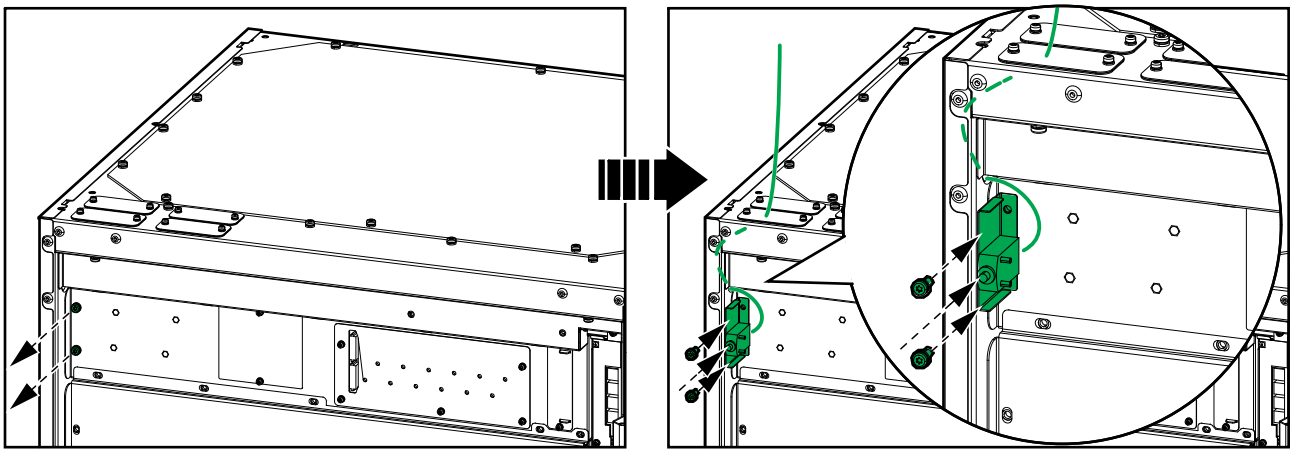
**Failure to follow these instructions will result in death or serious injury.**

4. Mark the transparent protection cover with the external synchronization fuse disconnector identification number.

# Install the ERMS Door Switch Kit GVLOPT011 (Option)

The ERMS (Energy Reduction Maintenance Settings) door switch kit GVLOPT011 is prescribed in installations where the upstream/downstream circuit breakers' trip settings exceed the recommended values specified in this manual. Refer to details for 'scenario 2' on Upstream and Downstream Protection for UL, page 20.

1. Remove the two screws from the UPS.
2. Install the ERMS door switch with the two screws.



3. Route the signal cables from the ERMS door switch up and out through the top of the UPS.
4. Connect the signal cables from the ERMS door switch to the upstream circuit breakers UIB and SSIB and to the downstream circuit breaker UOB. Follow the documentation provided with the ERMS door switch and the upstream and downstream circuit breakers for connection details.

# Install the Power Module(s)

The UPS can arrive with or without preinstalled power modules. Additional power modules are shipped separately and must be installed to reach the correct UPS kW rating.

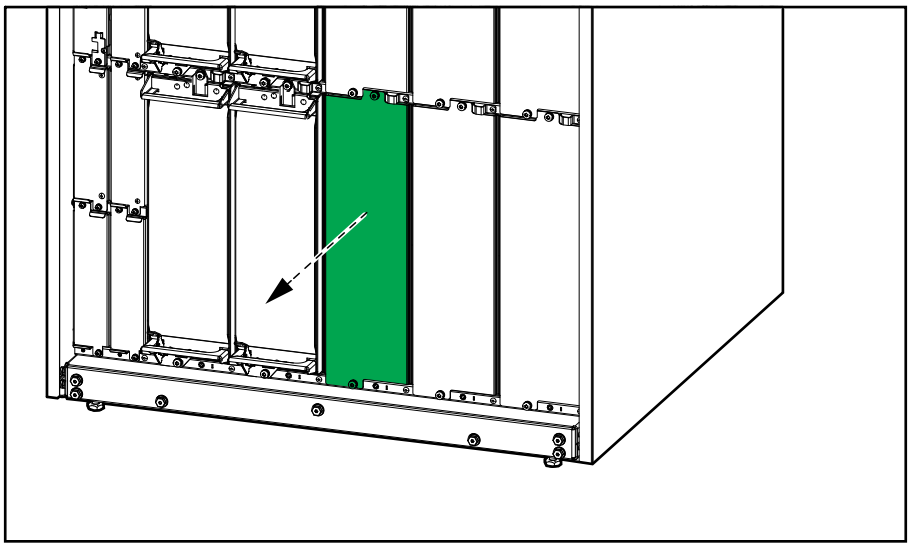
**⚠CAUTION**

**HEAVY LOAD**

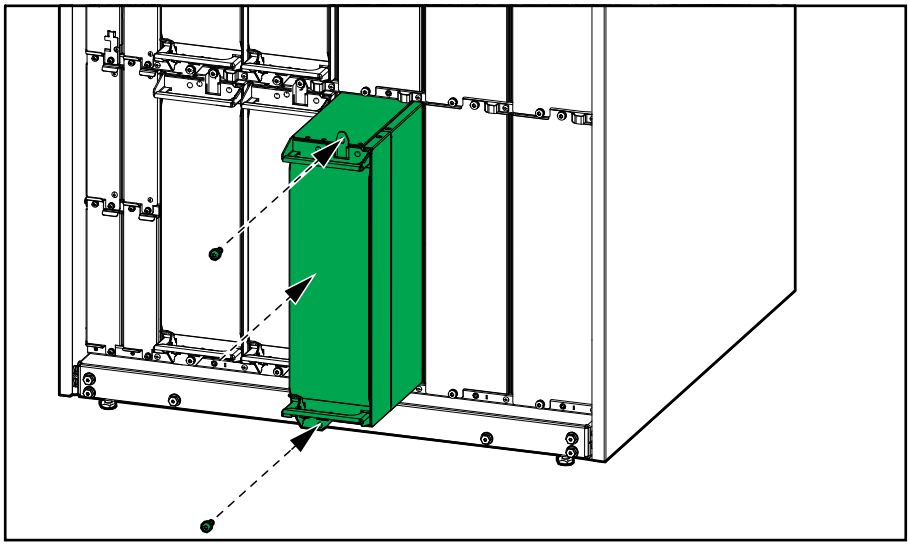
Power modules are heavy (38 kg (83.77 lbs)) and require two persons to lift.

**Failure to follow these instructions can result in injury or equipment damage.**

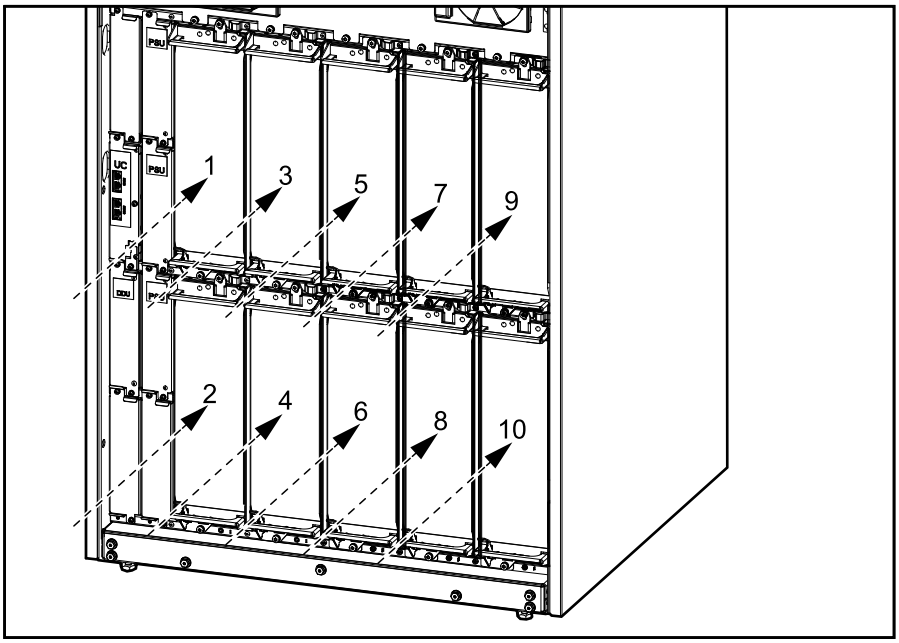
1. Remove the filler plate from the empty power module slot. Save the filler plate for future use.



2. Push the power module into the slot. The enable mechanism will latch when the power module is correctly inserted.
3. Install the provided screws in the top and the bottom of the power module.



**Post-requisite:** Install the power modules in the shown order from 1-10.


PSU
PSU
UC
DDU
1
3
5
7
9
2
4
6
8
10

# Add Translated Safety Labels to Your Product

The safety labels on your product are in English and French. Sheets with translated safety labels are provided with your product.

1. Find the sheets with translated safety labels provided with your product.
2. Check which 885-xxx/TMExxxx numbers are on the sheet with translated safety labels.
3. Locate the safety labels on your product that match the translated safety labels on the sheet – look for the 885-xxx/TMExxxx numbers.
4. Add the replacement safety label in your preferred language to your product on top of the existing French safety label.

# Backfeed Protection

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Mandatory backfeed protection on bypass must be implemented by one of the following methods:

- Installation of upstream disconnect device with shunt trip connected to the UPS. See diagrams and instructions in Installation of Third Party Backfeed Protection, page 81.
- Installation of internal backfeed kit (GVLOPT003 or GVLOPT004) in the UPS. The internal backfeed kit must be installed **before** the power cables are connected in the UPS. Follow the installation manual provided with the internal backfeed kit.
- Installation of maintenance bypass cabinet (GVLMBCA200K500H or GVLMBCA200K500G) where the disconnect device is included. Follow the installation manual provided with the maintenance bypass cabinet. Label 885-91965 (provided with the UPS) must be placed visible on the maintenance bypass cabinet.

**Failure to follow these instructions will result in death or serious injury.**

# Installation of Third Party Backfeed Protection

Connect the disconnect device shunt trip and AUX switch to the UPS as shown below. Use double insulated cables. Disconnect device shunt trip must be rated for 24 VDC nominal, inrush max 100 W. The cable supplying the shunt trip shall be a jacket cable and rated for 600 VAC. The cables shall be sized taking the cable voltage drop and the recommendation of the shunt trip manufacturer into consideration.

Label 885-91965 (provided with the UPS) must be placed visible at the bypass upstream disconnect device.

**⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

In systems where backfeed protection is not a part of the standard design, an automatic isolation device (Schneider Electric backfeed protection option or other device, such as a circuit breaker, switch, or contactor with trip function, meeting the requirements of IEC62040-1 or UL1778 5th edition – depending on which standard apply to your local area), is required to be installed to prevent hazardous voltage or energy at the input terminals of the isolation device. The device must be rated and controlled according to the specifications in this manual.

**Failure to follow these instructions will result in death or serious injury.**

When the UPS input is connected through external isolators that, when opened, isolate the neutral or when the automatic backfeed isolation is provided external to the equipment or is connected to an IT power distribution system, a label must be fitted at the UPS input terminals, and on all primary power isolators installed remotely from the UPS area and on external access points between such isolators and the UPS, by the user, displaying the following text (or equivalent in a language which is acceptable in the country in which the UPS system is installed):

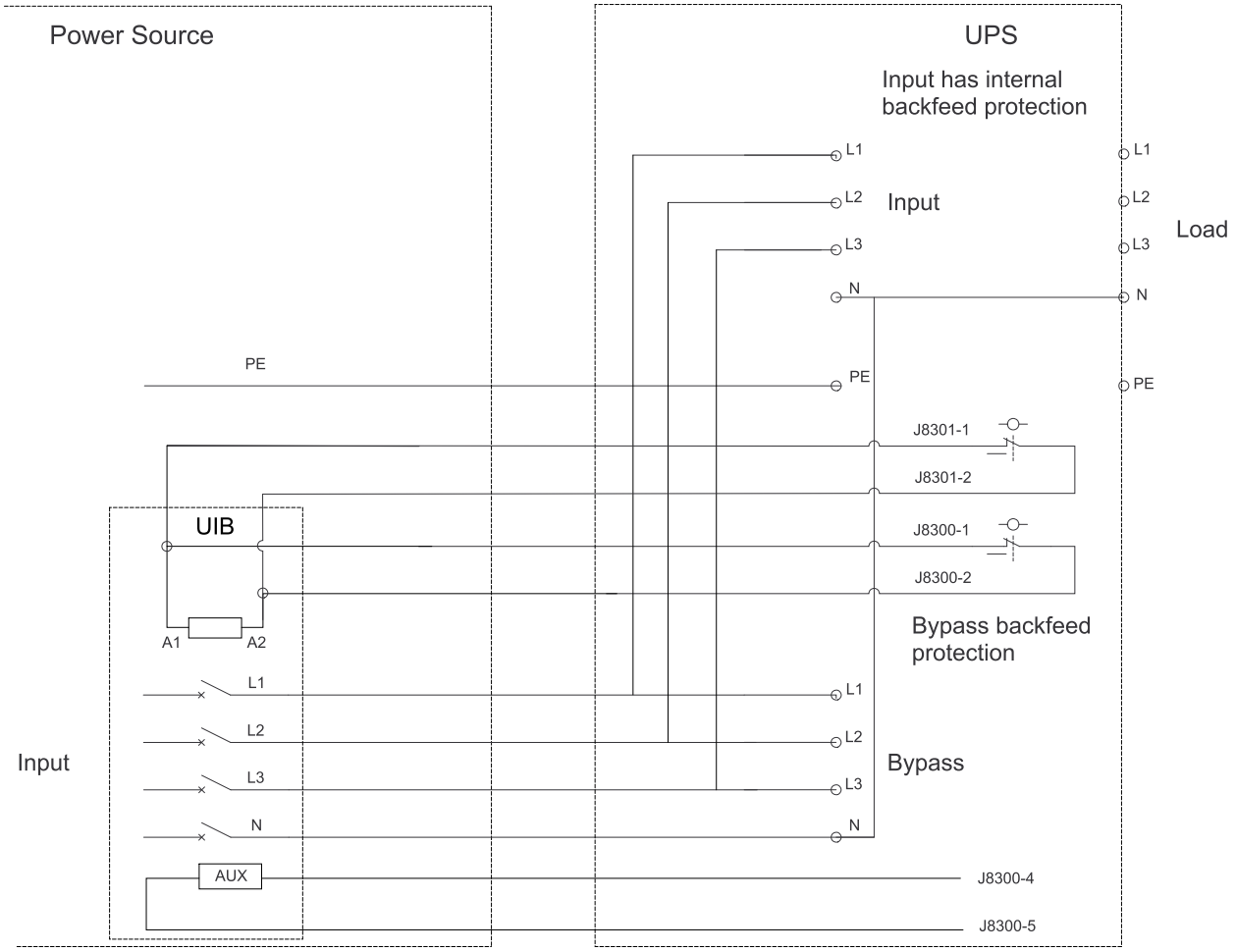
**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

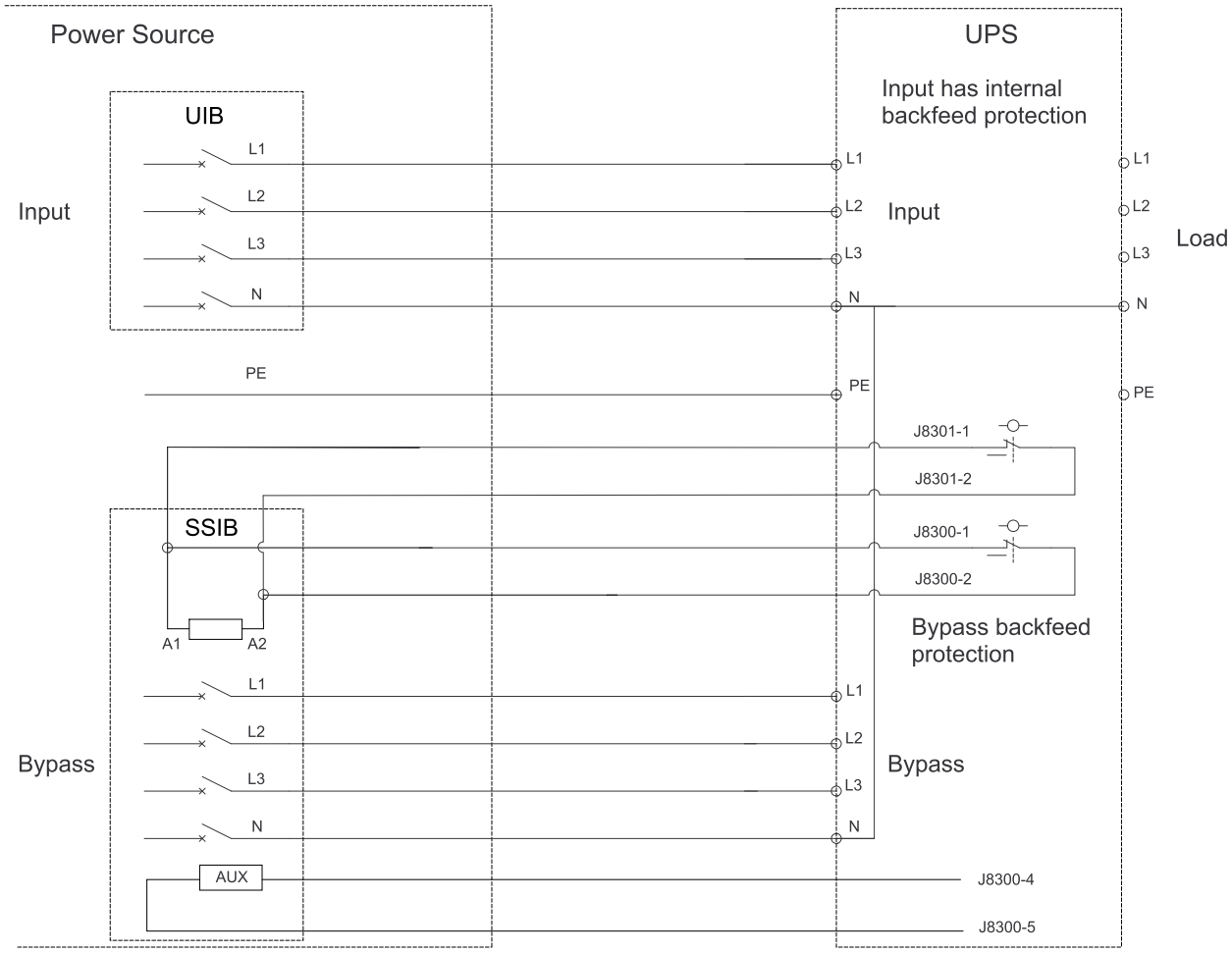
Risk of voltage backfeed. Before working on this circuit: Isolate the UPS and check for hazardous voltage between all terminals including the protective earth.

**Failure to follow these instructions will result in death or serious injury.**

### UPS and Third Party Backfeed Protection – Single Mains



### UPS and Third Party Backfeed Protection – Dual Mains

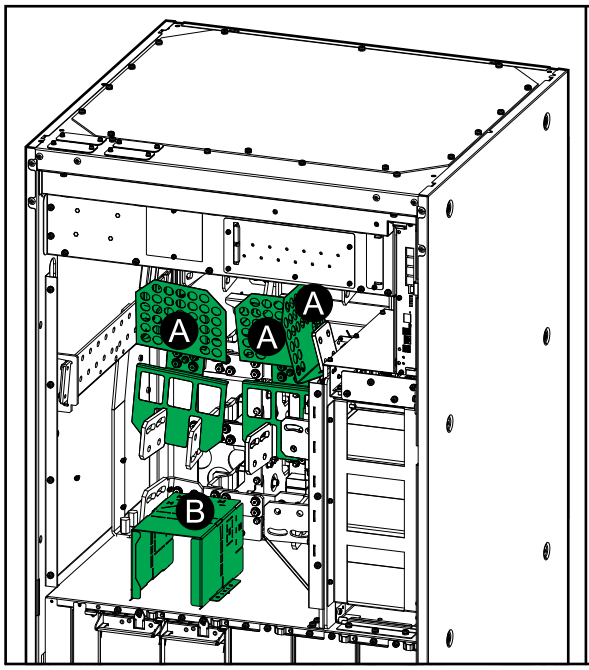


# Final installation

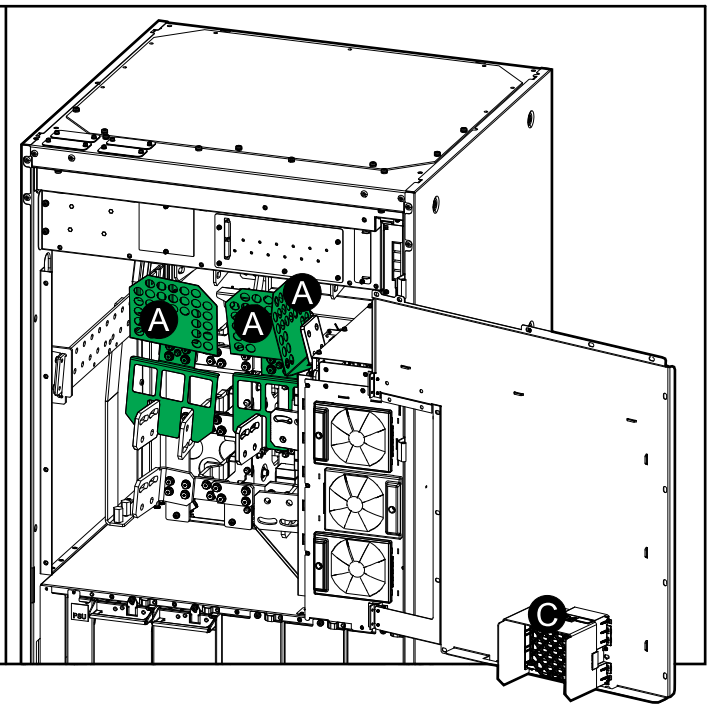
1. Verify that the transparent plastic protectors (marked (A) on the illustration) and the plastic box (marked (B) on the illustration) removed in Connect Power Cables in the UPS in System up to 45 kAIC/kA Icw, page 60 or Connect Power Cables in the UPS in System over 45 kAIC/kA Icw, page 55 have been reinstalled in the original position.

   **NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part.

**Front View of the UPS Model with Separate Plastic Box**




**Front View of the UPS Model with the Box Integrated in the Inner Door**




**⚠CAUTION**

**RISK OF ARC FLASH AND OVERHEATING**

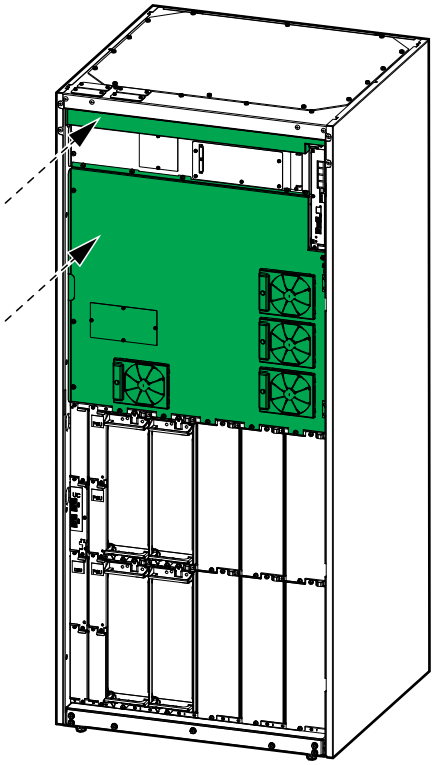
The transparent plastic protectors and the plastic box must be reinstalled in the original position after power cabling is completed. **Note:** On newer UPS models, the box is integrated in the inner door of the UPS instead of being a separate part.

**Failure to follow these instructions can result in injury or equipment damage.**

2. Verify that the transparent protection cover on the external sync board 0P4809 (removed in Connect the Signal Cables for External Synchronization, page 73) has been reinstalled in its original position.
3. Clean/vacuum the UPS of any debris and foreign objects.
4. Close the inner door and fasten with screws.

5. Reinstall the cover over the signal connections.

**Front View of the UPS**



6. On the label 885-91896 on the front of the UPS, mark the short circuit rating relevant for this UPS system depending on installed auxiliaries and options.

   **NOTE:** The physical short circuit rating label on the UPS shows the exact short circuit rating options of the specific UPS. Values may vary for older UPS models.

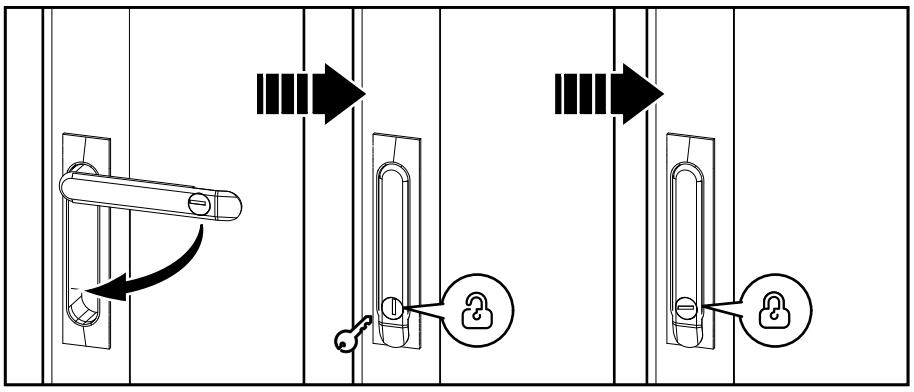
| | |
|---|---|
| | 65 kAIC/kA Icw (UPS alone) |
| | 65 kAIC with GVLMBCA200K500G (UPS with maintenance bypass cabinet for UL) |
| | 45 kAIC/kA Icw with GVBEC (UPS with bottom entry cabinet) |
| | 65 kAIC/kA Icw with GVBEC (UPS with bottom entry cabinet and GVLOPT012) |
| | 65 kAIC/kA Icc with GVLOPT003/GVLOPT004 installed (UPS with backfeed kit for UL/ backfeed kit for IEC installed) |
| | 25 kA Icw with GVLMBCA200K500H (UPS with maintenance bypass cabinet for IEC) |

7. **Only with GVLOPT011 ERMS door switch kit installed**:

   a. Verify that the upstream/downstream disconnect devices change to ERMS mode when the front door is opened and exit ERMS mode when the front door is closed.

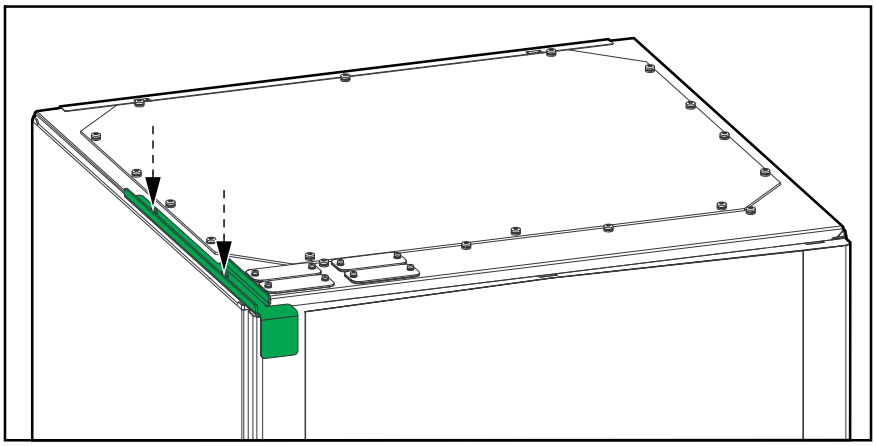
   b. Verify that the upstream/downstream disconnect devices' ERMS mode settings follow the instructions given for 'scenario 2' in Upstream and Downstream Protection for UL, page 20.

8. Close the front door(s) and lock the handle with the provided key.



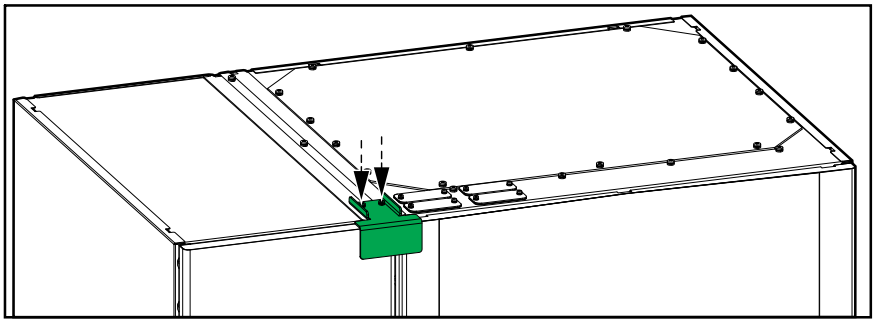
9. **Only for seismic anchoring**: Perform one of the following:
   – For UPS alone, install the provided seismic top bracket 870-18110 in the top left side of the UPS.

**The UPS**



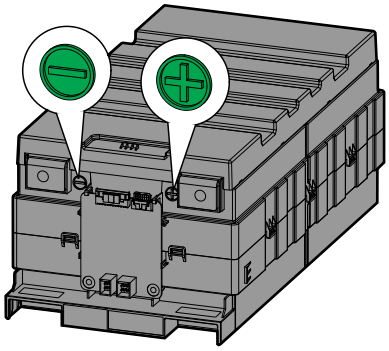
   – For UPS with maintenance bypass cabinet or bottom entry cabinet, install the provided seismic top bracket 870-51238 between the two cabinets.

**The Bottom Entry Cabinet/Maintenance Bypass Cabinet and the UPS**

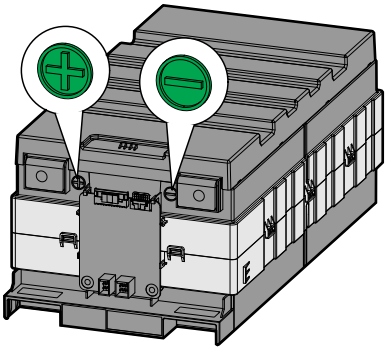


# Install the Battery Modules in the Battery Cabinet

**Type A Battery Module**



**Type B Battery Module**



**⚠⚠WARNING**

**HAZARD OF INJURY AND ELECTRIC SHOCK**

- Be careful when installing and removing the battery modules (>17 kg).

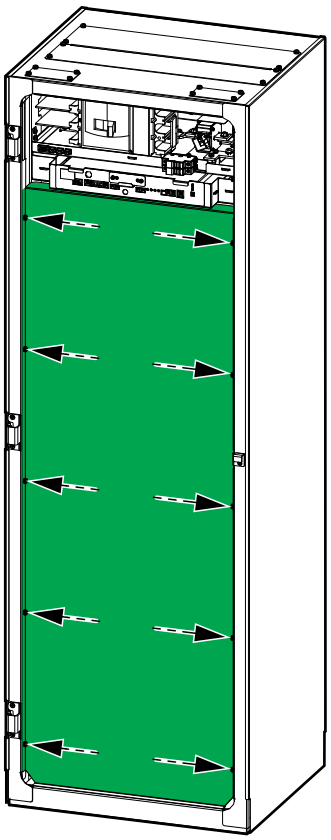
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

1. Install the battery modules on the shelves from top to bottom.

   **NOTE:** Pay special attention to the location of type A and type B battery modules.

**Battery Configurations for Battery Cabinets with 17, 16, 13, and 10 Battery Modules**

2. Reinstall the plate in front of the battery shelves.



# Connect the Power Cables

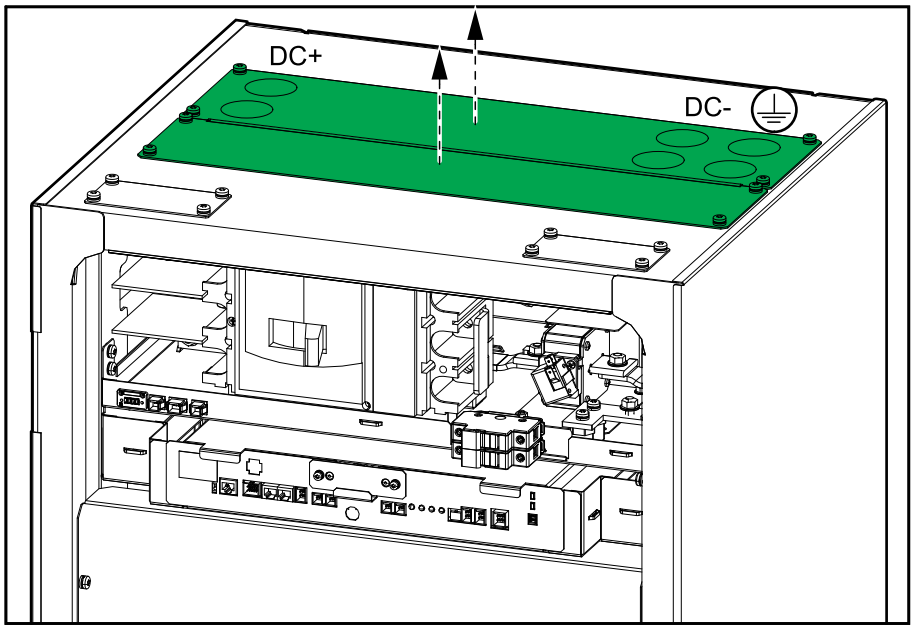
**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not drill or punch holes with the gland plates installed and do not drill or punch holes in close proximity to the battery cabinet.

**Failure to follow these instructions will result in death or serious injury.**

1. Remove the gland plates.




2. Drill or punch holes for cables/conduits in the rear gland plate according to the label on the gland plate.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Ensure that there are no sharp edges that can damage the cables.

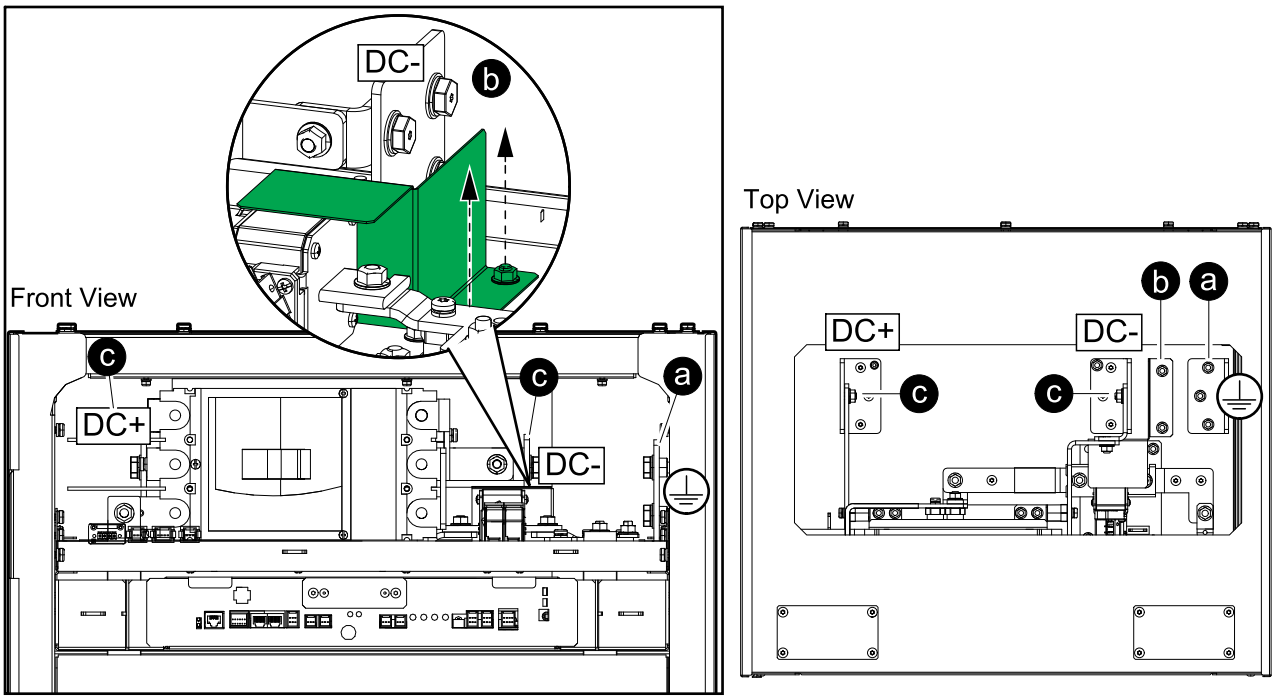
**Failure to follow these instructions will result in death or serious injury.**

3. Install conduits (if applicable) and reinstall the gland plates.

4. Route the power cables through the gland plate and connect to the terminals:
   a. Connect the PE cable to the PE terminal/Connect the EGC cable to the grounding terminal.
   b. For installations with two hole cable lugs only, temporarily remove the protection cover.

      **NOTE:** The protection cover must be reinstalled when the DC- cable has been connected.

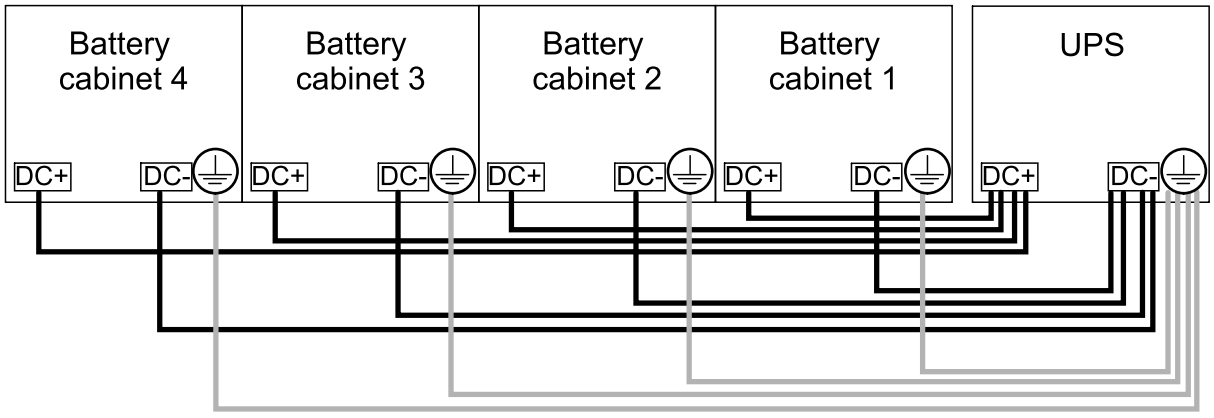
   c. Connect the DC+ and DC- cables to the DC+ and DC- terminals.



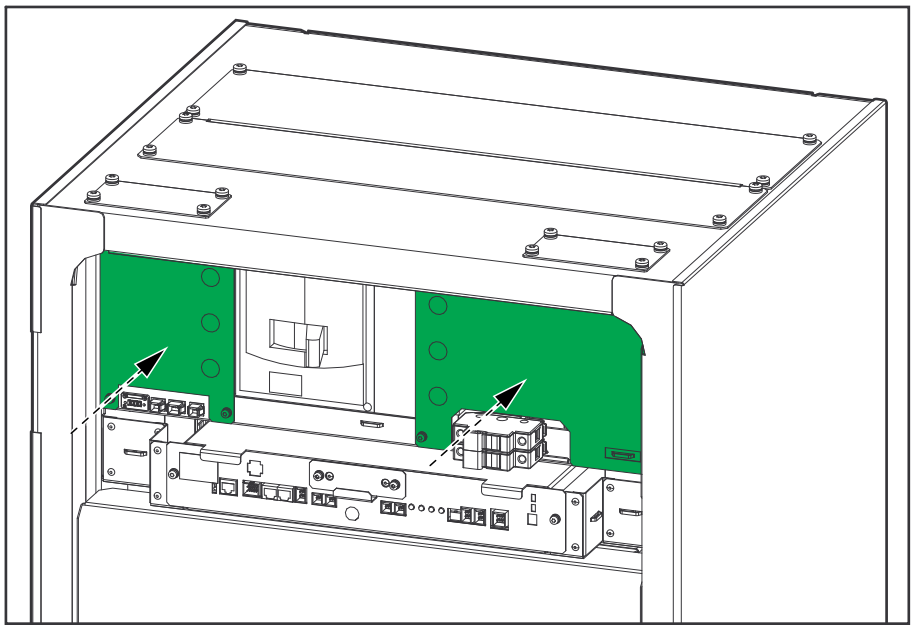

5. Connect the power cables in the UPS. If more battery cabinets are part of the solution, connect all battery cabinets to the UPS according to the diagram below.

   **NOTE:** If the combined short circuit current of the battery cabinets exceeds the short circuit rating of the UPS, a pull box with fuses or an external box with a battery breaker must be installed. Please contact Schneider Electric for more information and refer to the submittal drawings for your specific UPS.

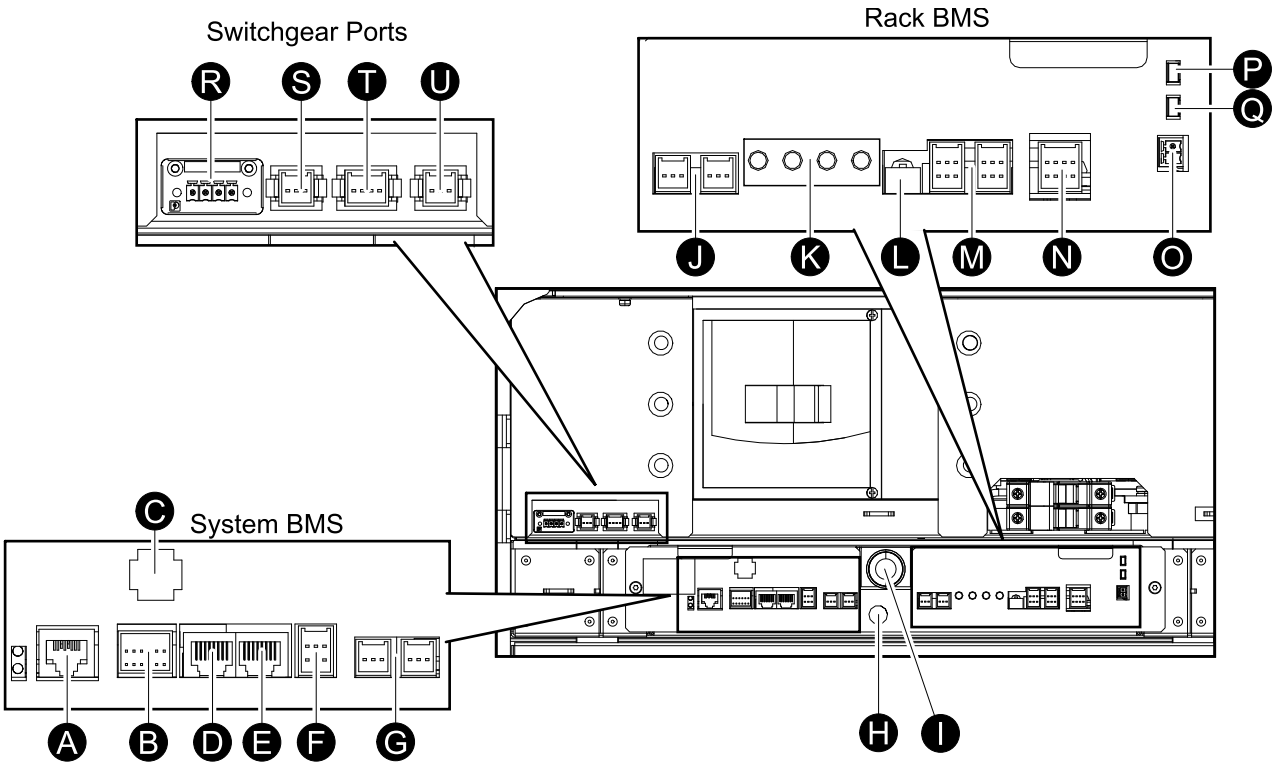
**2-Wire Connection**



6. Reinstall the two transparent covers.



# Overview of Communication Interface




A. TCP/IP
B. DRY CONTACT ports
C. SMPS I/O
D. CAN I/O
E. RS485
F. System BMS CAN I/O
G. DC OUT 1 and DC OUT 2
H. Reset switch
I. Start-up button
J. DC IN 1 and DC IN 2
K. Status LEDs
L. CAN bus loop termination resistor switch
M. CAN 1 port, CAN 2 port
N. Module
O. EPO
P. PSU 1 LED
Q. PSU 2 LED
R. SG IO 1
S. SG IO 2
T. MCCB AUX 1
U. MCCB AUX 2

# Route the Signal Cables to the Switchgear, Rack BMS, and System BMS Ports

**⚠⚠DANGER**

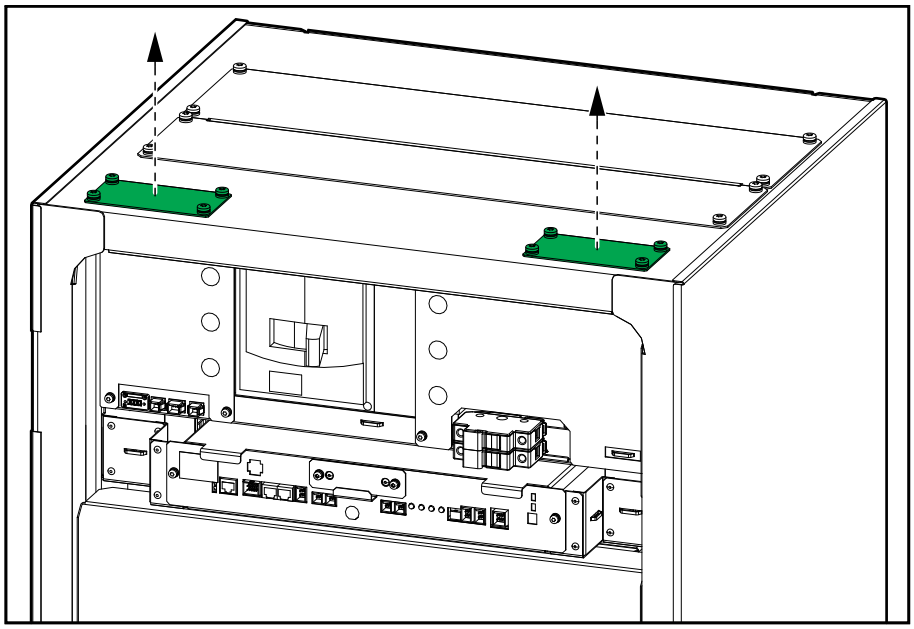
**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not drill or punch holes with the gland plates installed and do not drill or punch holes in close proximity to the battery cabinet.

**Failure to follow these instructions will result in death or serious injury.**

**NOTE:** Please refer to the UPS submittal drawings to get a complete overview of the connections before preparing for and routing the signal cables.

1. Remove the gland plates for signal cables.



2. Drill or punch holes for cables/conduits and install conduits (if applicable).

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Ensure that there are no sharp edges that can damage the cables.

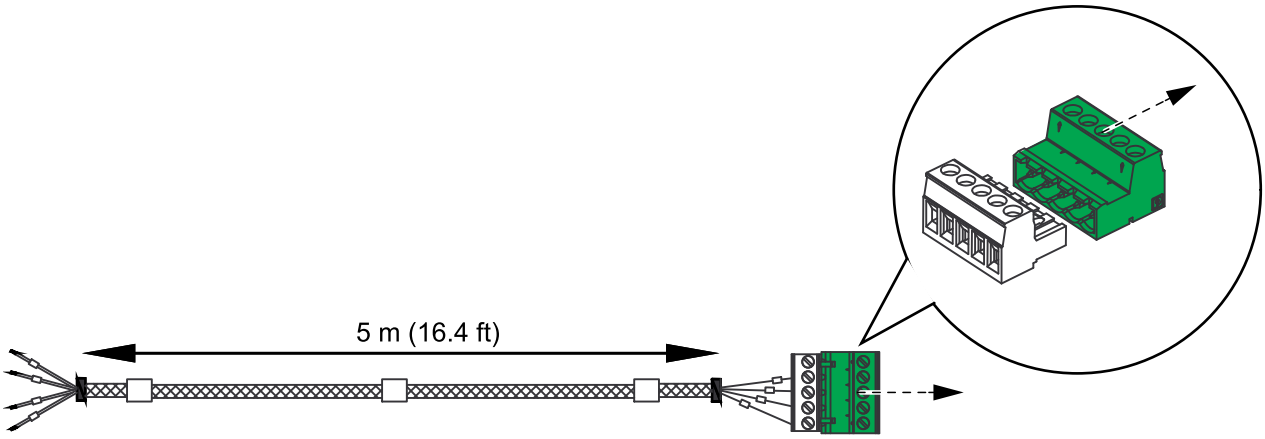
**Failure to follow these instructions will result in death or serious injury.**

3. The provided SELV signal cable 0W13444 and the ELV signal cables 0W76929 and 0W13442 are 5 m (16.4 ft) long. You can extend the length of the three signal cables if the distance to the UPS is more than the expected 5 m (16.4 ft). Follow one of the instructions below:

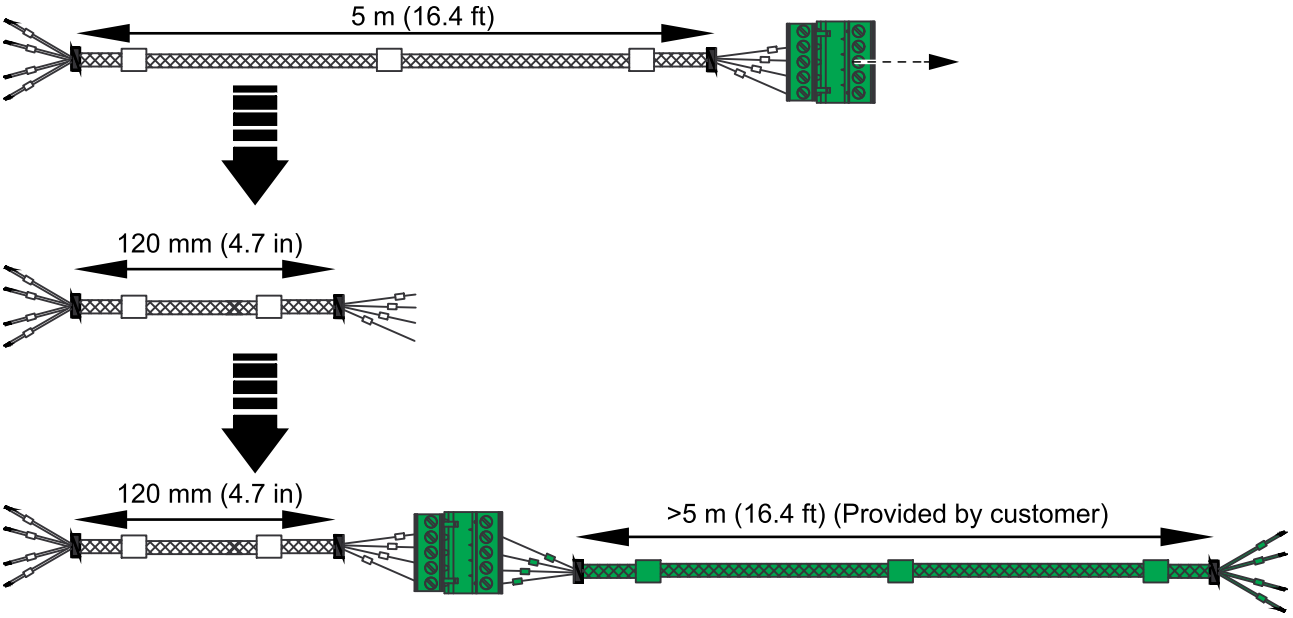
**Signal cable specifications**

| | |
|---|---|
| 0W13444 | 4 conductors, 22 AWG, 600 V ETFE UL10086, strand, 90 °C |
| 0W76929 | 2 conductors, 24 AWG, 600 V ETFE UL10086, double insulation, strand, 90 °C |
| 0W13442 | 2 conductors, 22 AWG, 600 V ETFE UL10086, double insulation, strand, 90°C |

– **The provided signal cable is long enough to reach between the battery cabinet and the UPS**: Remove the male adapter connector from the end of the signal cables and continue to the next step. OR



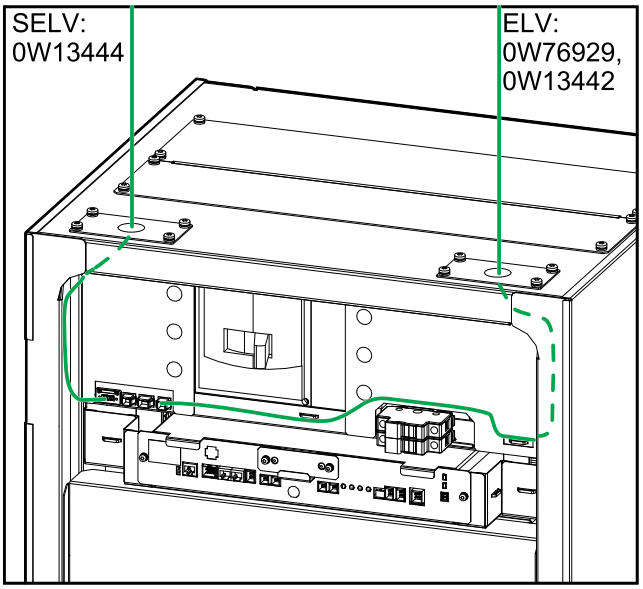

– **The provided signal cable is NOT long enough to reach between the battery cabinet and the UPS**: Remove the female connector and the male adapter connector from the end of the signal cable, shorten the signal cable to 120 mm (4.7 in) length, and reattach the labels and the female connector and male adapter connector to the signal cable. Attach a signal cable[11] (not provided) to the male adapter connector in the correct length to reach from the battery cabinet to the UPS. As an alternative, you can also crimp the signal cable extensions. Ensure that the crimp point is inside the battery cabinet, not in conduits or cable trays outside the battery cabinet.



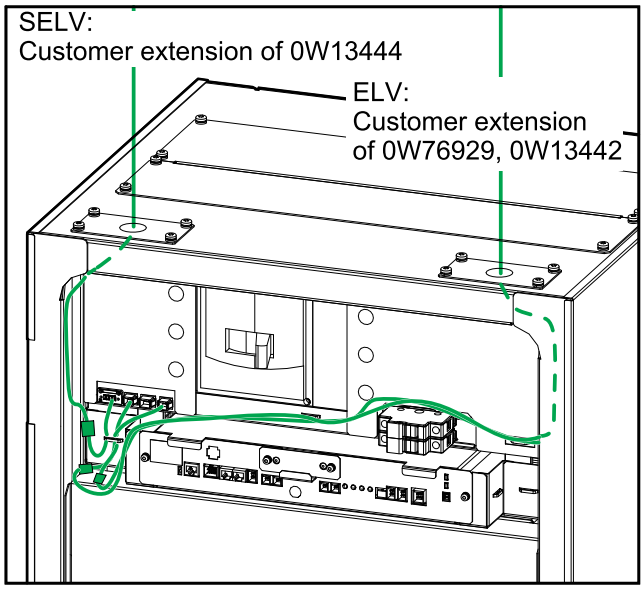

11. Select the extension signal cables according to the *Signal cable specifications*.

4. Route the SELV signal cable 0W13444 and the ELV signal cables 0W76929 and 0W13442 into the battery cabinet and to the switchgear ports. Do not connect the signal cables, Schneider Electric service will complete the connections during start-up.

**With Provided Signal Cables**

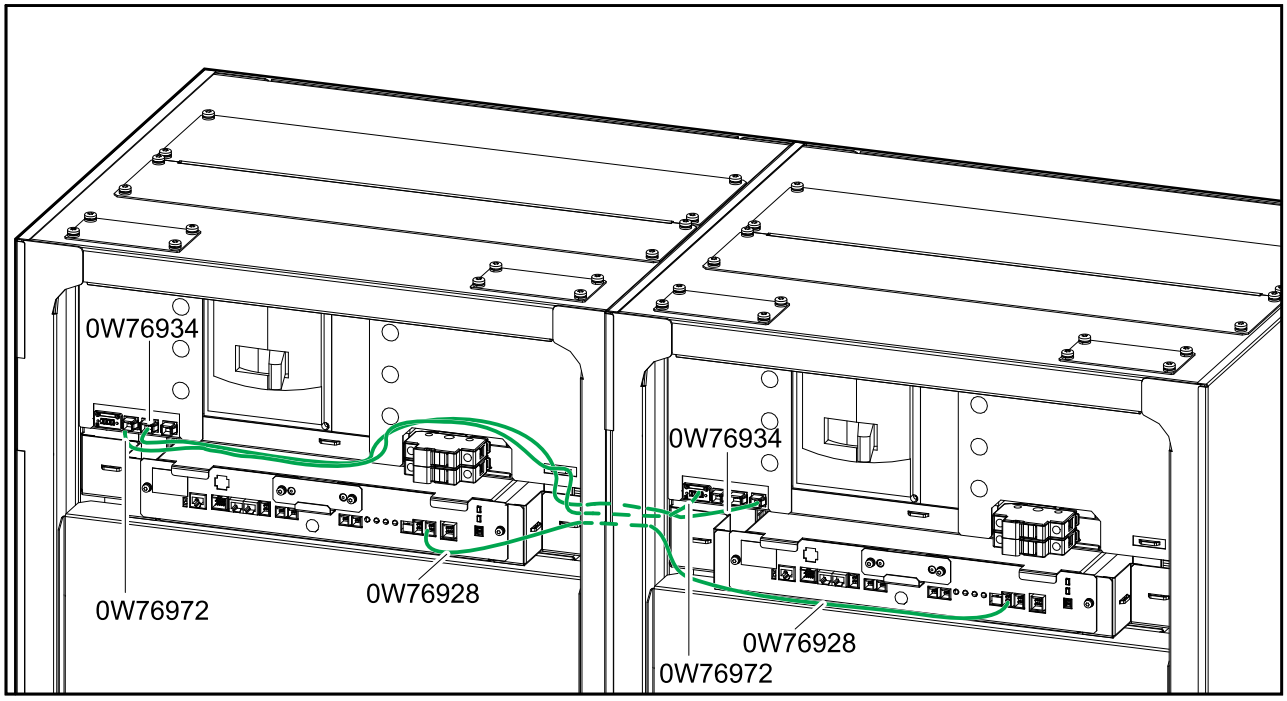



**With Extended Signal Cables**

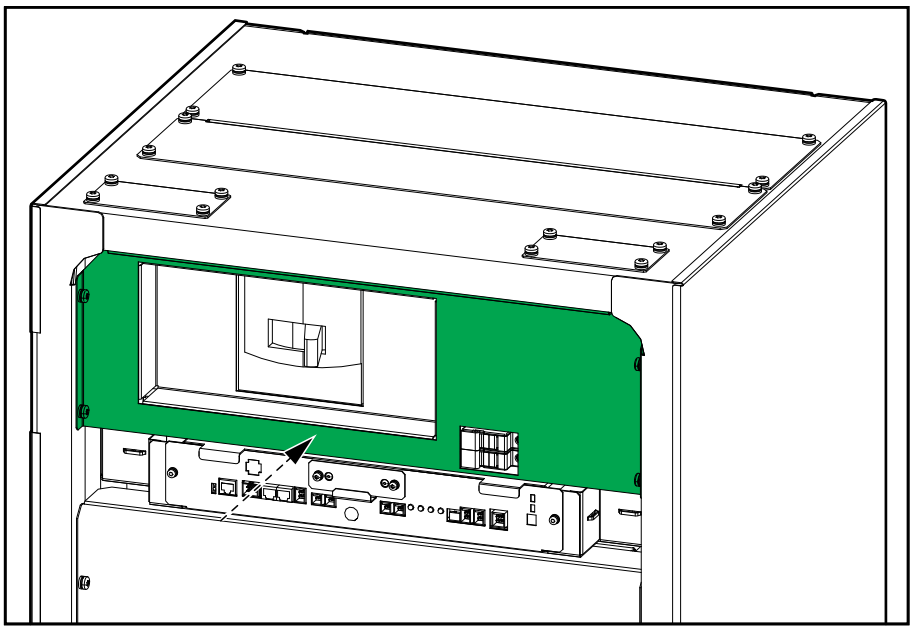



5. Route the signal cable 0W76928, 0W76934, and 0W76972 through the openings in the sides of the battery cabinets and to the ports in the rack BMS and the switchgear ports. Do not connect the signal cables, Schneider Electric service will complete the connections during start-up.

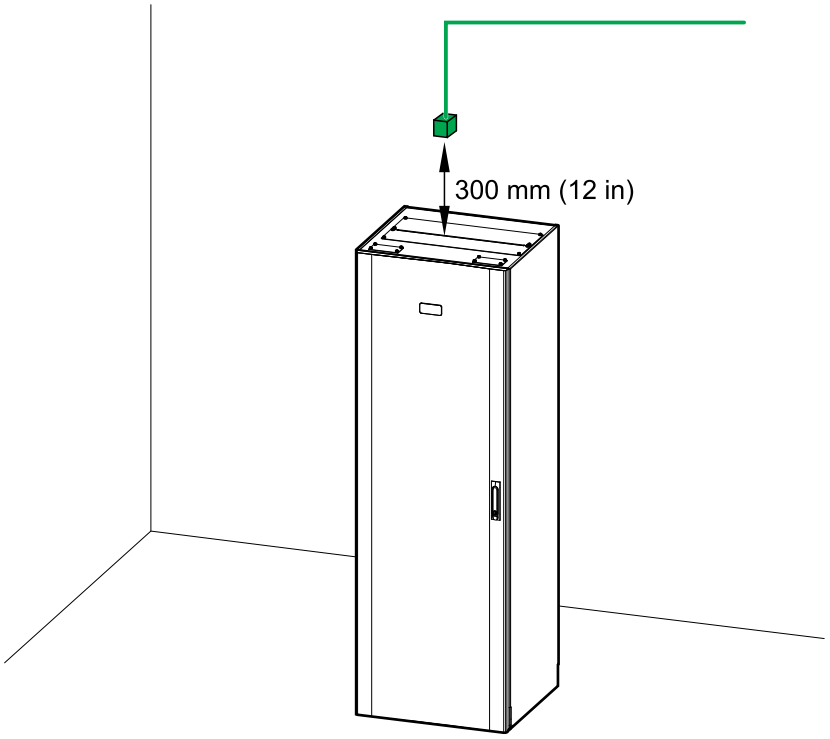
   **NOTE:** All cables between rack BMS and rack BMS as well as between system BMS and rack BMS are considered Class 2/SELV.



6. Reinstall the plate in front of the battery breaker.



7. Reinstall the front door of the battery cabinet.
8. Install the temperature sensor provided with the UPS above the battery cabinet, approximately 300 mm (12 in) from the top. Route the signal cable to the UPS and connect according to the instructions in the UPS installation manual.



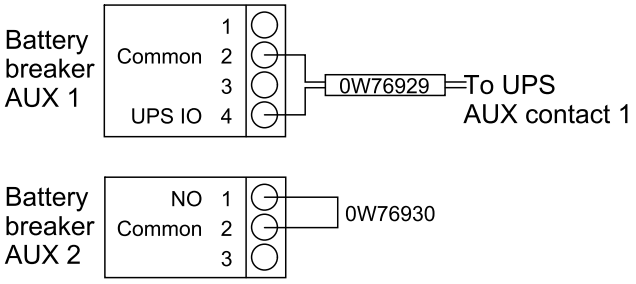

**NOTE:** The temperature sensor measures the ambient temperature. Do not place the temperature sensor close to external heating or cooling equipment which may give an incorrect measurement of the ambient temperature.

# Overview of Signal Cables between the Battery Cabinets and the Auxiliary Contacts in the UPS

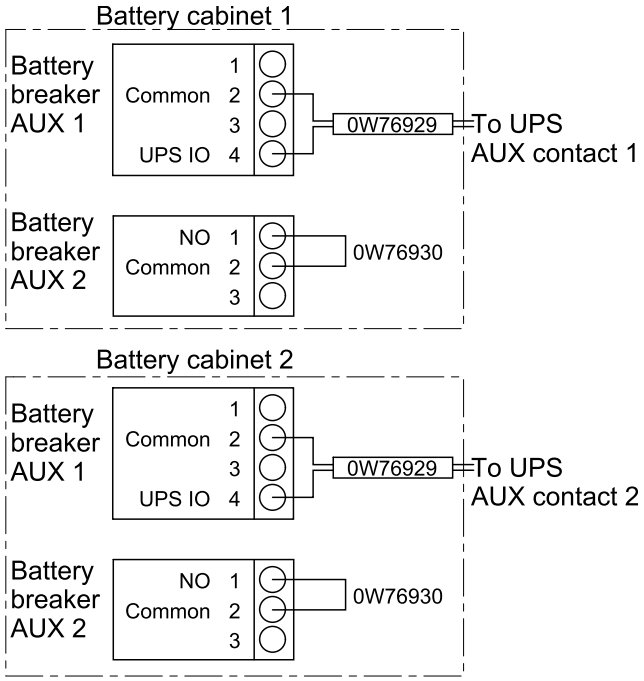
The connection of auxiliary contacts is dependent on the number of battery breakers supported by the UPS. In the examples below two banks of battery breakers are supported.

**NOTE:** If the combined short circuit current of the battery cabinets exceeds the short circuit rating of the UPS, a pull box with fuses or an external box with a battery breaker must be installed. Please contact Schneider Electric for more information.

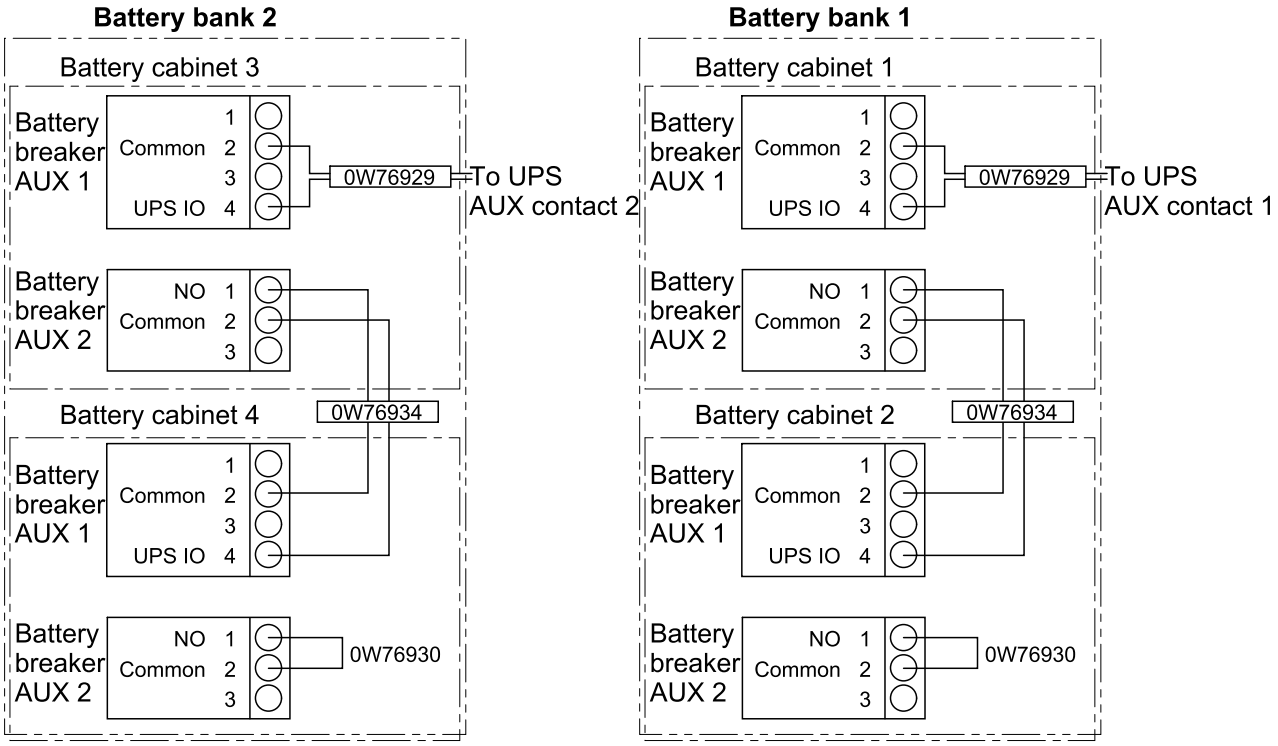
### System with One Battery Cabinet




### System with Two Battery Cabinets




### System with Four Battery Cabinets in Two Battery Banks

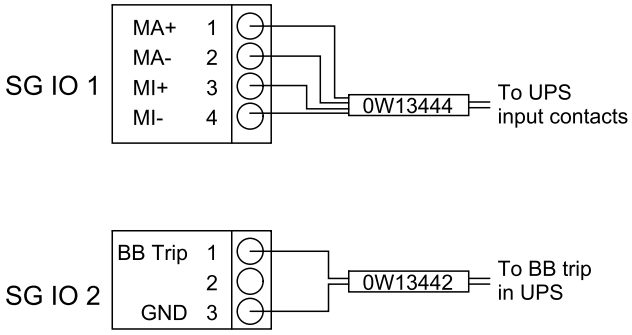


# Overview of Signal Cables for Alarms and Battery Breaker Trip

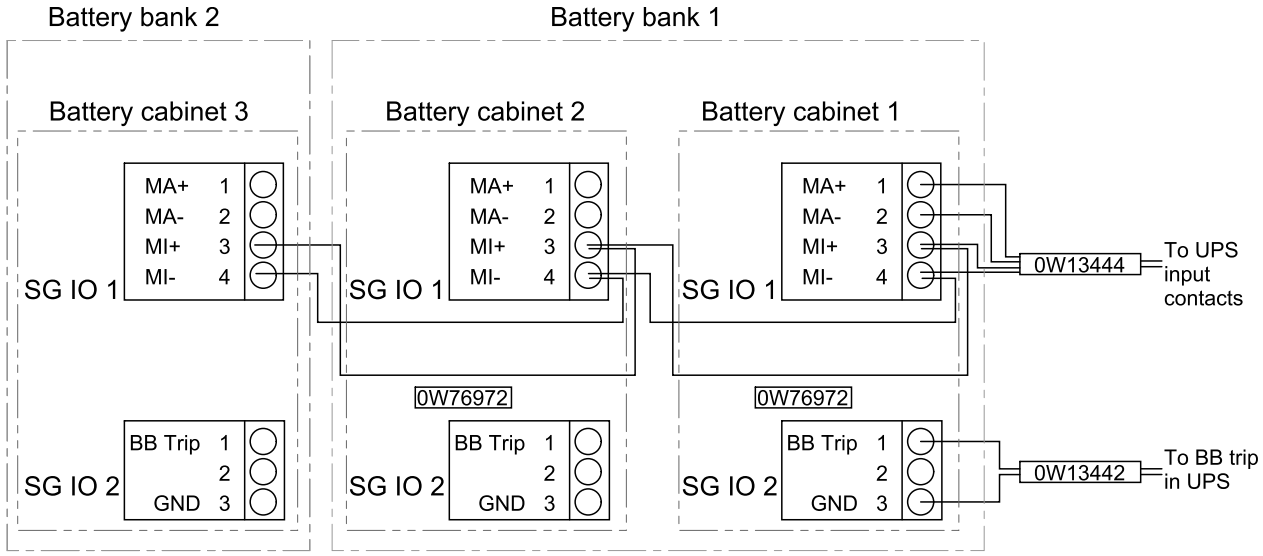
In systems with more battery cabinets, only the system BMS of battery cabinet 1 (the battery cabinet closest to the UPS) is connected to the UPS. Remove signal cable 0W13441 between the SMPS I/O port and the DRY CONTACT ports on battery cabinet 2 and battery cabinet 3.

- SG IO 1: Used for sending signals for minor and major alarms to the UPS.
- SG IO 2: Used for receiving trip signal from the UPS.

**System with One Battery Cabinet**



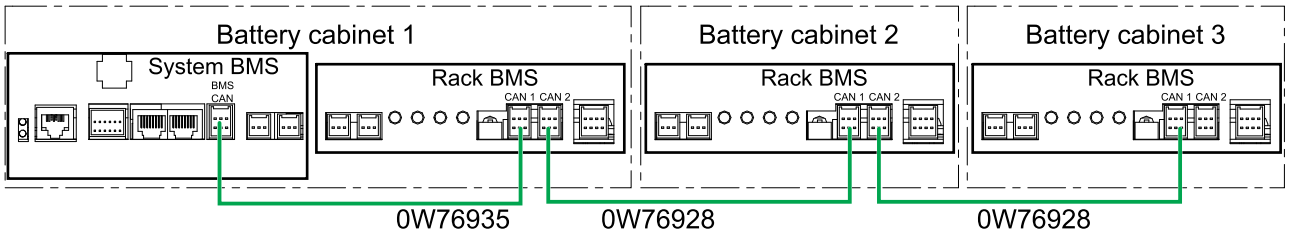

**System with Three Battery Cabinets in Two Battery Banks**



# Overview of CAN Bus Cables between the Battery Cabinets

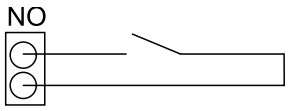
**NOTE:** In systems with more battery cabinets, remove the cables 0W76935 from CAN 1 in the rack BMS to the System BMS CAN I/O in battery cabinet 2 and battery cabinet 3.

1. Route signal cable 0W76928 from CAN 2 port of battery cabinet 1 to the CAN 1 port of battery cabinet 2. Repeat for the remaining battery cabinets. Do not connect the CAN cables, Schneider Electric service will complete the connections during start-up.




# Overview of EPO Signal Cables

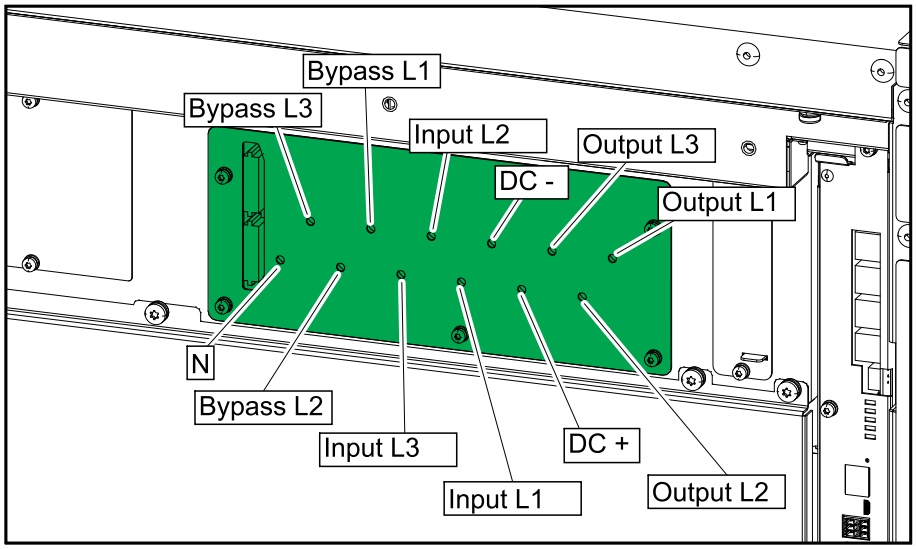
Connect the Class 2/SELV signal cables from the building EPO to the rack BMS. Class 2/SELV circuits must be isolated from the primary circuitry. Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is Class 2/SELV.



# Decommission or Move the UPS to a New Location

1. Shut down the UPS completely – follow the instructions in the UPS operation manual.
2. Lockout/Tagout all disconnect devices in the maintenance bypass cabinet/the switchgear in the OFF (open) position.
3. Lockout/Tagout all battery disconnect devices in the switchgear/battery solution in the OFF (open) position.
4. Open the front door of the UPS.
5. If present, Lockout/Tagout the backfeed disconnect device BF2 in the OFF (open) position.
6. Measure for and verify ABSENCE of voltage with a multimeter probe through the holes in the transparent plate for input, bypass, output, neutral, and DC.

**Front View of the UPS**




7. Remove all power modules from the top row of the UPS:

**⚠WARNING**

**TOP-HEAVY CABINET**

Do not remove any power modules from the bottom row of the UPS. This will make the UPS top-heavy and make it tilt more easily.

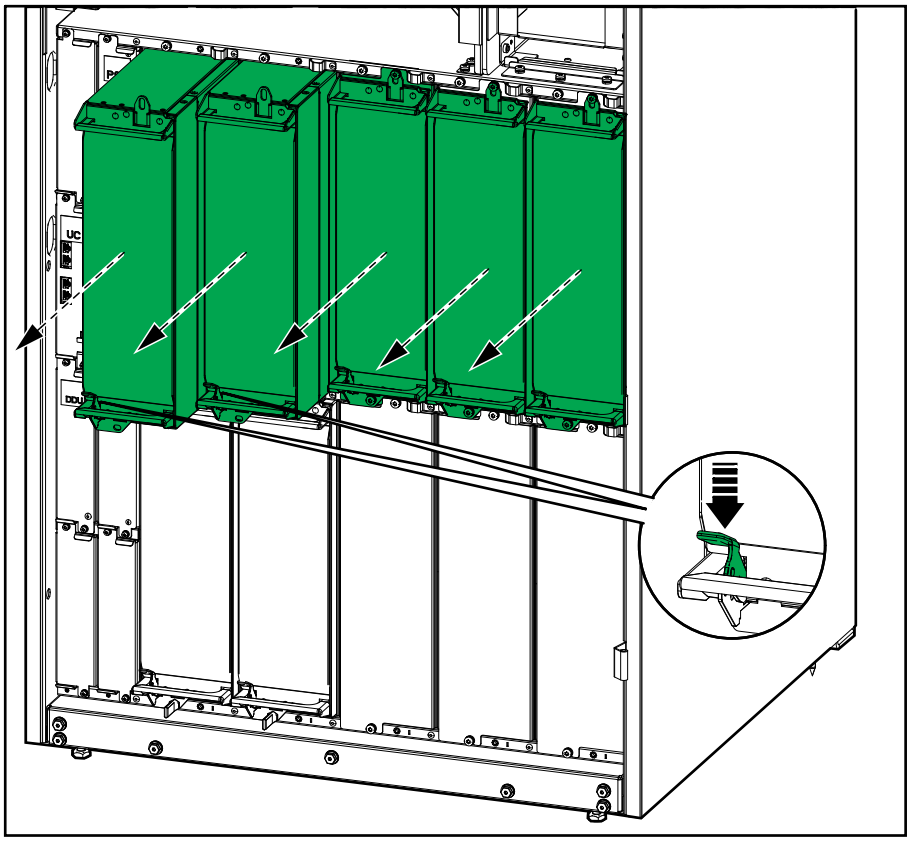
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**⚠CAUTION**

**HEAVY LOAD**

Power modules are heavy (38 kg (83.77 lbs)) and require two persons to lift.

**Failure to follow these instructions can result in injury or equipment damage.**



a. Remove the screws in the top and bottom of the power module and push the unlock switch.

b. Pull the power module halfway out. A locking mechanism prevents the power module from being pulled all the way out.

c. Release the lock by pressing the release button on the top of the power module and remove the power module.

d. Install a filler plate (if available) in front of the empty power module slot.

e. Store the power modules correctly until reinstallation.

**⚠WARNING**

**RISK OF EQUIPMENT DAMAGE**

- Store the power modules at an ambient temperature of -15 to 40 °C (5 to 104 °F), 10-80% non-condensing humidity.
- Store the power modules in their original protective packaging.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

8. Open the inner door of the UPS.
9. Measure for and verify ABSENCE of voltage on each input/bypass/output/neutral/DC busbar before continuing.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Measure for and verify ABSENCE of voltage on each input/bypass/output/neutral/DC busbar before continuing.

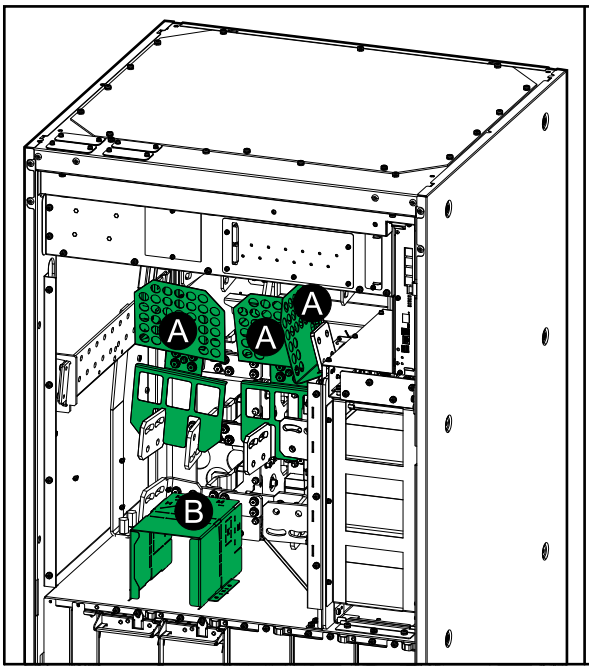
**Failure to follow these instructions will result in death or serious injury.**

10. **For UPS system without maintenance bypass cabinet**: Perform the following steps.

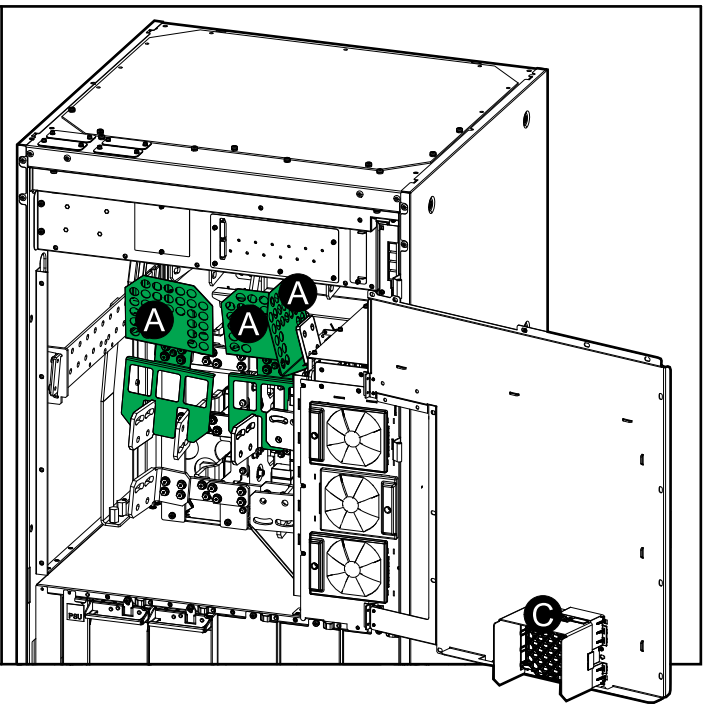
    a. Remove the transparent plastic protectors from the busbars. Remove the plastic box for easier access. Save all parts for reinstallation after cable disconnection.

    **NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part. The integrated box must not be removed from the inner door.

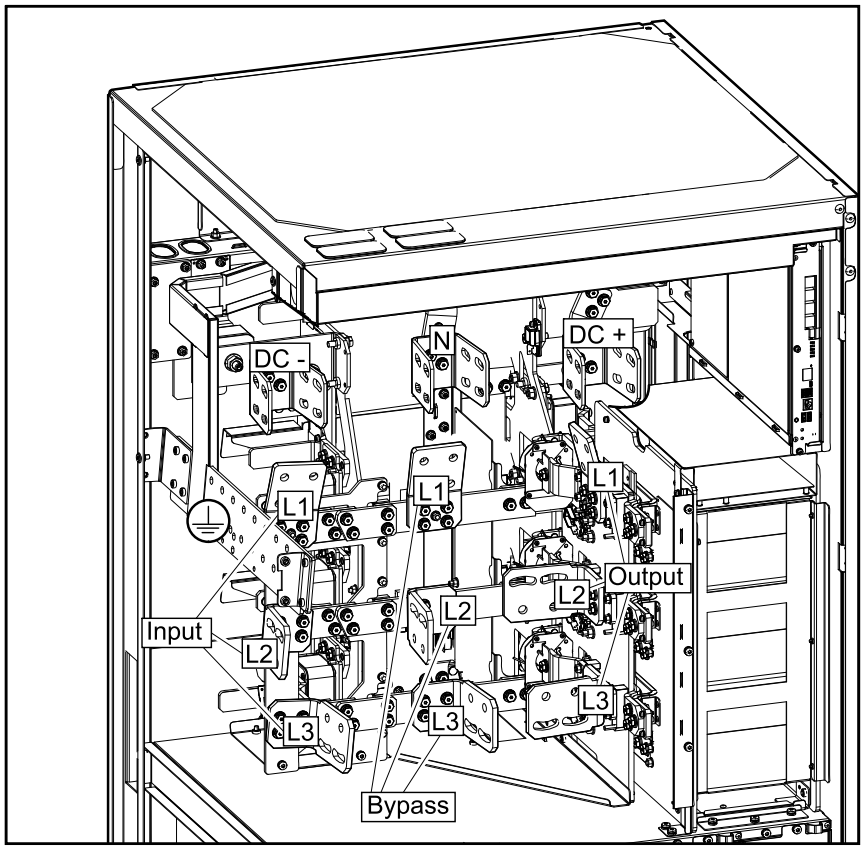
**Front View of the UPS Model with Separate Plastic Box**




**Front View of the UPS Model with the Box Integrated in the Inner Door**



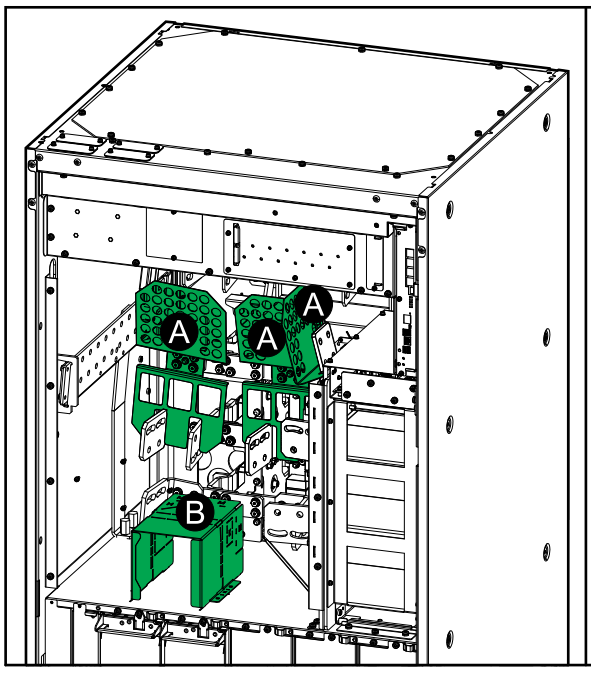

    b. Disconnect all power cables from the UPS.



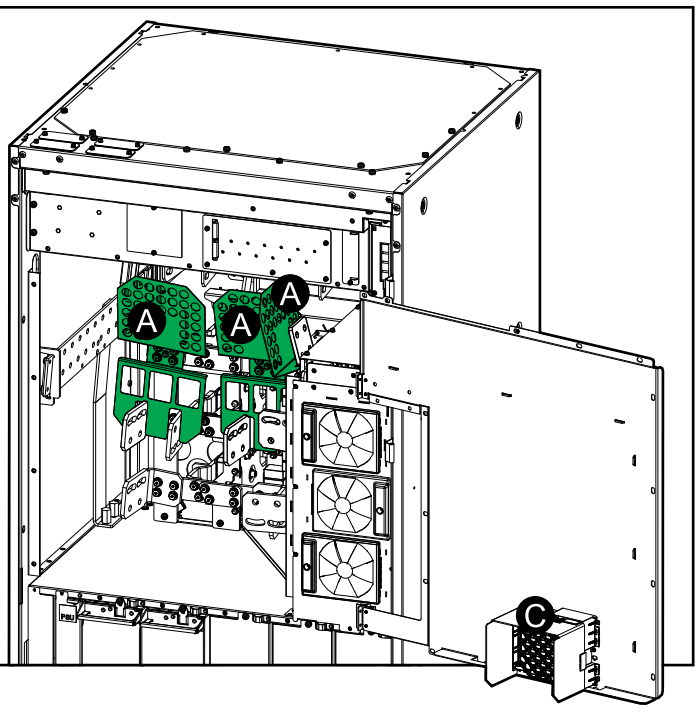

c. Reinstall the transparent plastic protectors (marked (A) on the illustration) and the plastic box (marked (B) on the illustration) in the original position.

**NOTE:** On newer UPS models, the box (marked (C) on the illustration) is integrated in the inner door of the UPS instead of being a separate part.

**Front View of the UPS Model with Separate Plastic Box**




**Front View of the UPS Model with the Box Integrated in the Inner Door**



**⚠CAUTION**

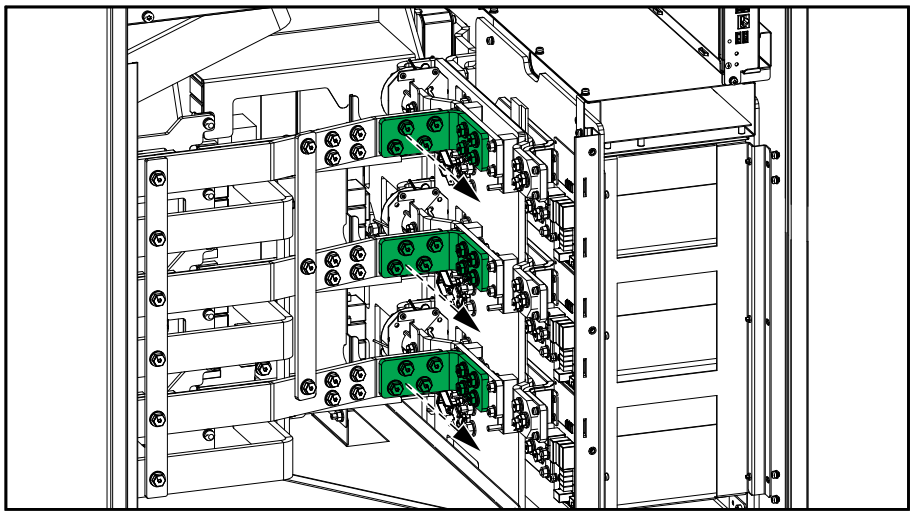
**RISK OF ARC FLASH AND OVERHEATING**

The transparent plastic protectors and the plastic box must be reinstalled in the original position after power cabling is completed. **Note:** On newer UPS models, the box is integrated in the inner door of the UPS instead of being a separate part.

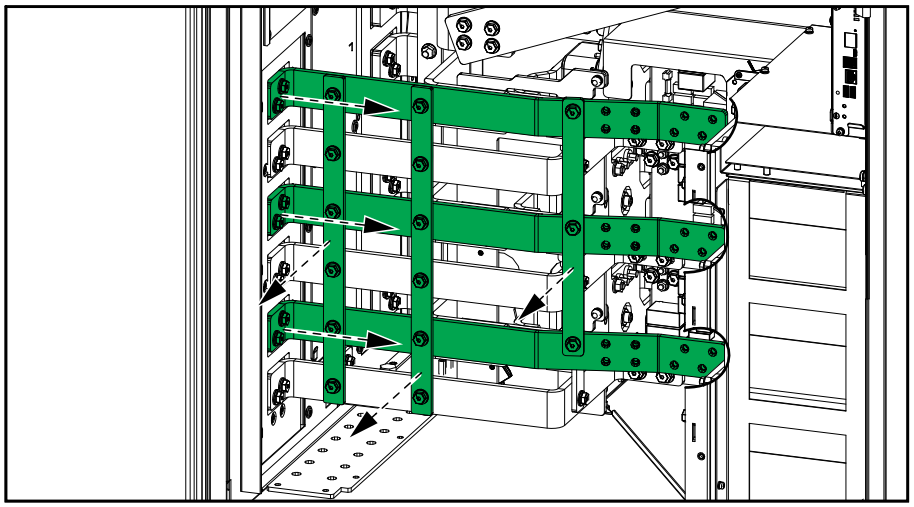
**Failure to follow these instructions can result in injury or equipment damage.**

11. **For UPS system with maintenance bypass cabinet**: Remove the busbars and insulator parts that connect the UPS to the maintenance bypass cabinet. Refer to the maintenance bypass cabinet installation manual for details. Save all parts for reinstallation.

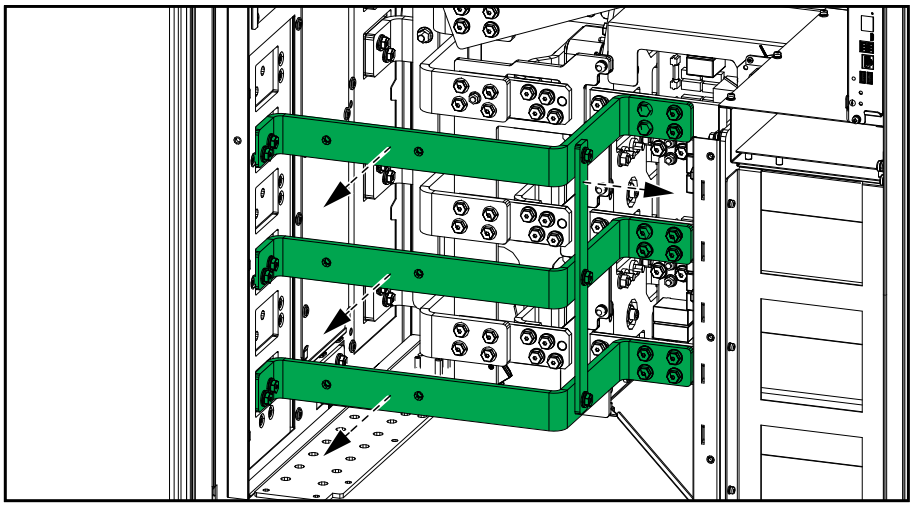
**Front View of the UPS**



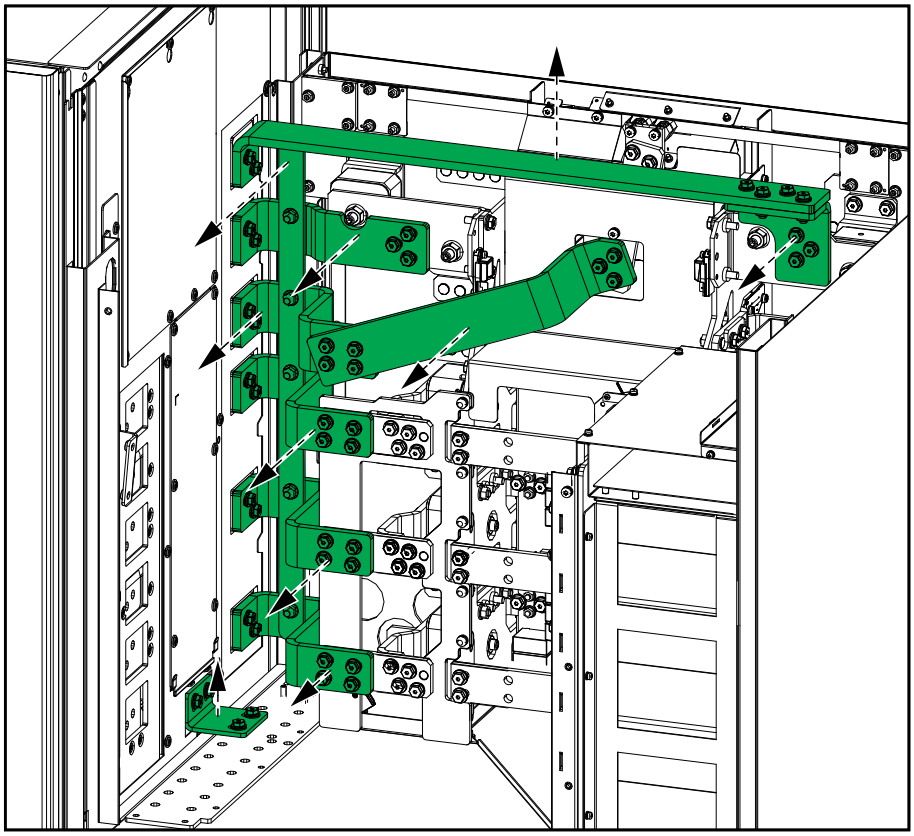
**Front View of the UPS**



**Front View of the UPS**

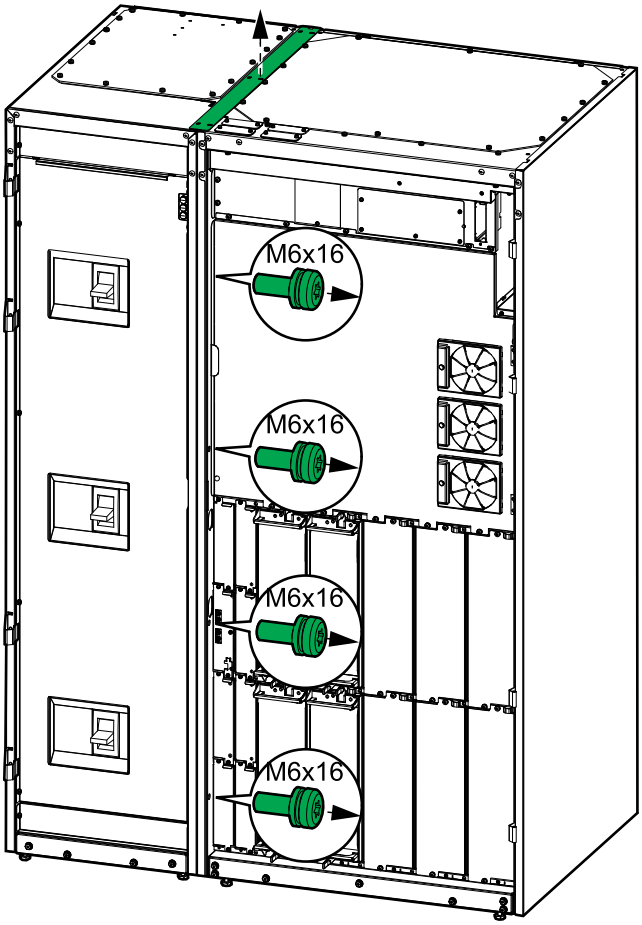


**Front View of the UPS**

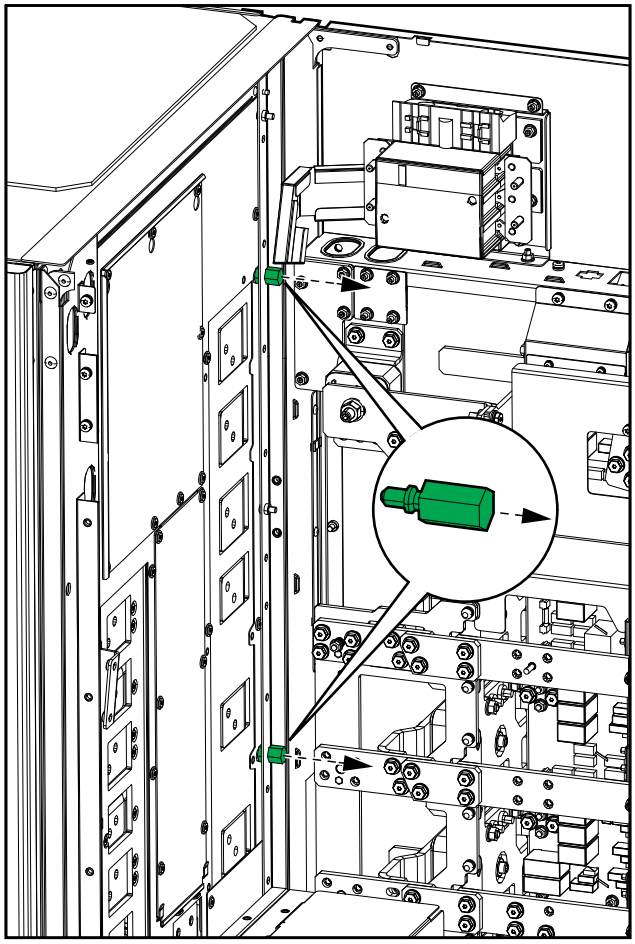


12. **For UPS system with maintenance bypass cabinet**: Remove the top bracket and the screws in the front that interconnect the UPS and the maintenance bypass cabinet externally. Remove the two special screws that interconnect the UPS and the maintenance bypass cabinet internally. Refer to the maintenance bypass cabinet installation manual for details. Save all parts for reinstallation.

**Front View of the Maintenance Bypass Cabinet and the UPS**




**Inside View of the Maintenance Bypass Cabinet and the UPS**



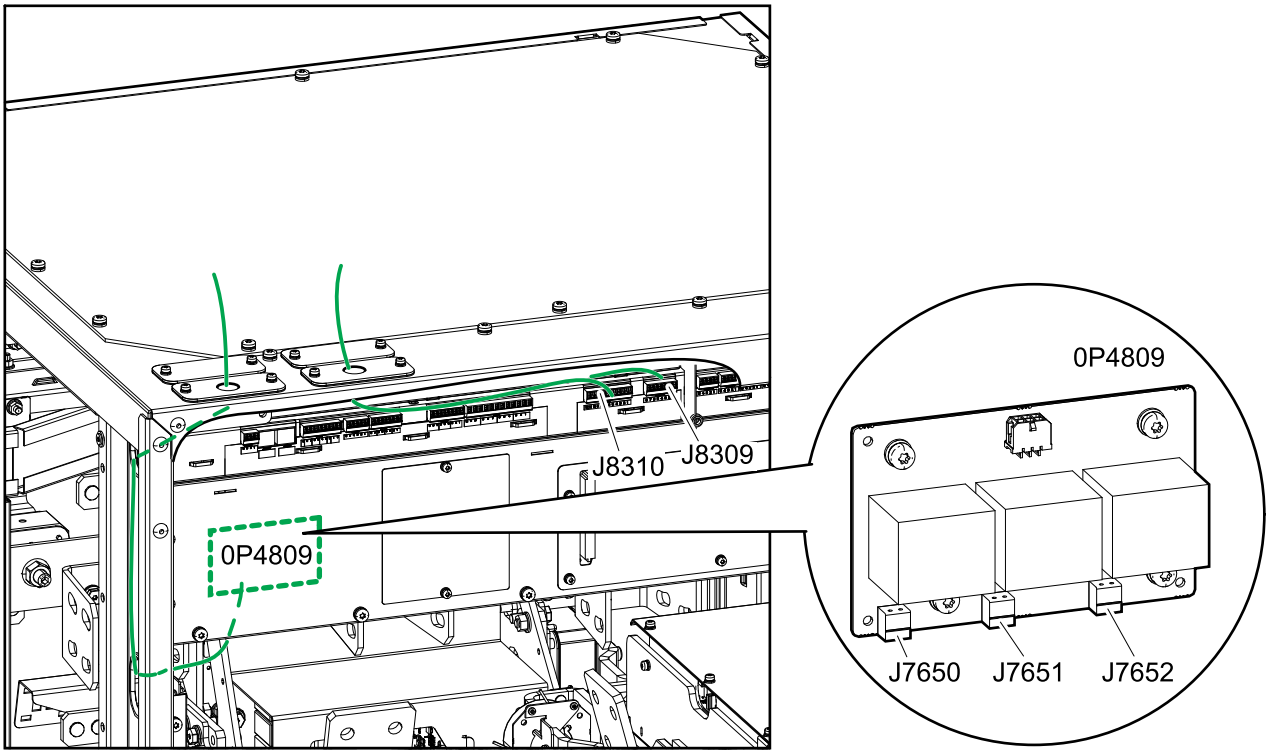
13. **If external sync is present**: Remove the transparent protection cover from the external synchronization board 0P4809. The external synchronization board 0P4809 is located on the rear of the front plate. Disconnect the signal cables from the external synchronization board 0P4809.

**⚠⚠DANGER**

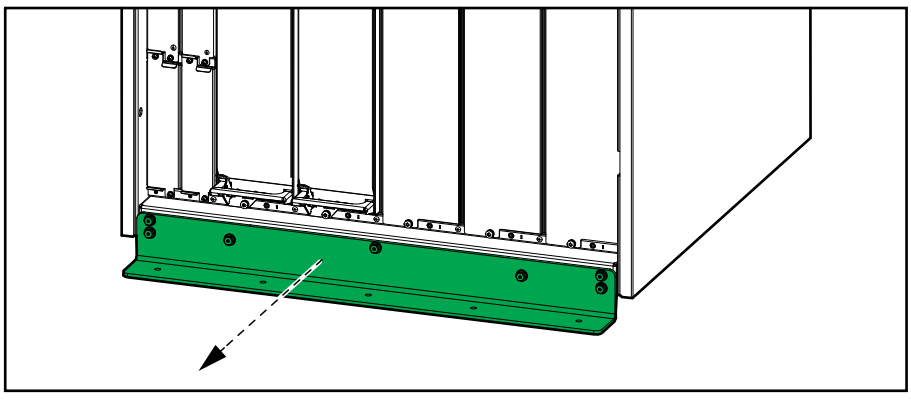
**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Check for absence of voltage for all three signal terminals on the external synchronization board 0P4809. When the external synchronization cables are installed, the terminals on the external synchronization board 0P4809 may be energized. Disconnect the fuse disconnector device at the source before removing the transparent protection cover.

**Failure to follow these instructions will result in death or serious injury.**




14. Close the inner door and reinstall the screws.
15. Disconnect and remove any signal cables from the UPS.
16. Remove the seismic front anchoring bracket/front transportation bracket from the UPS. Save for reinstallation.



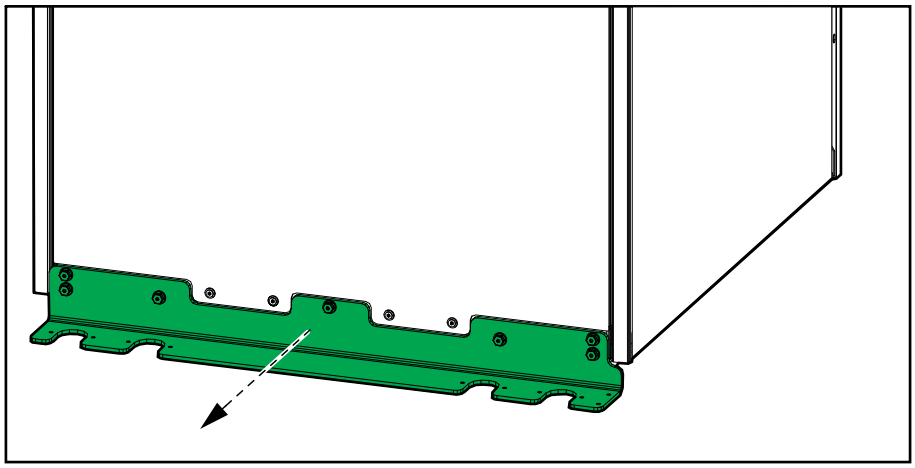
17. Close and lock the front door.
18. Raise the feet of the UPS until the casters have full contact with the floor.

19. You can now move the UPS by rolling it over the floor on the casters.

> **⚠WARNING**
>
> **TIPPING HAZARD**
>
> - The casters of the UPS are exclusively for transport on flat, even, hard, and horizontal surfaces.
> - The casters of the UPS are intended for transport over short distances (i.e. inside the same building).
> - Move at a slow pace and pay close attention on the floor conditions and the balance of the UPS.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

20. If present, remove the rear seismic anchoring bracket from the UPS and remove the seismic anchors from the floor. Save for reinstallation.

**Rear View**



21. **For transport over longer distances or in conditions that are not suitable for the casters of the UPS**: Open the front door, remove all power modules from the bottom row of the UPS, close and lock the front door.

> **⚠WARNING**
>
> **TOP-HEAVY CABINET**
>
> The UPS will be top-heavy with no power modules installed. Take appropriate precautions during handling and preparation for transport/ shipment.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

> **⚠CAUTION**
>
> **HEAVY LOAD**
>
> Power modules are heavy (38 kg (83.77 lbs)) and require two persons to lift.
>
> **Failure to follow these instructions can result in injury or equipment damage.**

**⚠WARNING**

**RISK OF EQUIPMENT DAMAGE**

- Store the power modules at an ambient temperature of -15 to 40 °C (5 to 104 °F), 10-80% non-condensing humidity.
- Store the power modules in their original protective packaging.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**⚠WARNING**

**TIPPING HAZARD**

For transport over longer distances or in conditions that are not suitable for the casters of the UPS, ensure:

- that personnel performing the transport have necessary skill and have received adequate training;
- to use appropriate tools to safely lift and transport the UPS;
- to protect the product against damage by using appropriate protection (like wrapping or packaging).

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Transportation requirements:

- Mount the UPS in a vertical position in the center of a suitable pallet with minimum pallet dimensions: 1000 mm x 1150 mm (39.4 in x 45.3 in)). The pallet must be suitable for the weight of the UPS (400 kg (882 lbs) with no power modules installed).
- Use appropriate means of fixation to mount the UPS to the pallet.
- The original shipping pallet in combination with the original transportation brackets can be reused, if in undamaged condition.

**⚠DANGER**

**TIPPING HAZARD**

- The UPS must be appropriately fixed to the pallet immediately after being placed on the pallet.
- The fixation hardware must be strong enough to withstand vibrations and shocks during loading, transport, and unloading.

**Failure to follow these instructions will result in death or serious injury.**

**⚠WARNING**

**UNEXPECTED EQUIPMENT BEHAVIOR**

Do not lift the UPS with a forklift/pallet truck directly on the frame as it may bend or damage the frame.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

22. Perform one of the following:
    – Decommission the UPS, OR
    – Move the UPS to a new location to install it.

23. **Only for installing the UPS in a new location**: Follow the installation manual to install the UPS in the new location. See Installation Procedure for UPS and Lithium-ion Battery Cabinets, page 37 or Installation Procedure for UPS with Maintenance Bypass Cabinet and Lithium-ion Battery Cabinets, page 39 for installation overview. Startup must only be performed by Schneider Electric.

**⚠⚠DANGER**

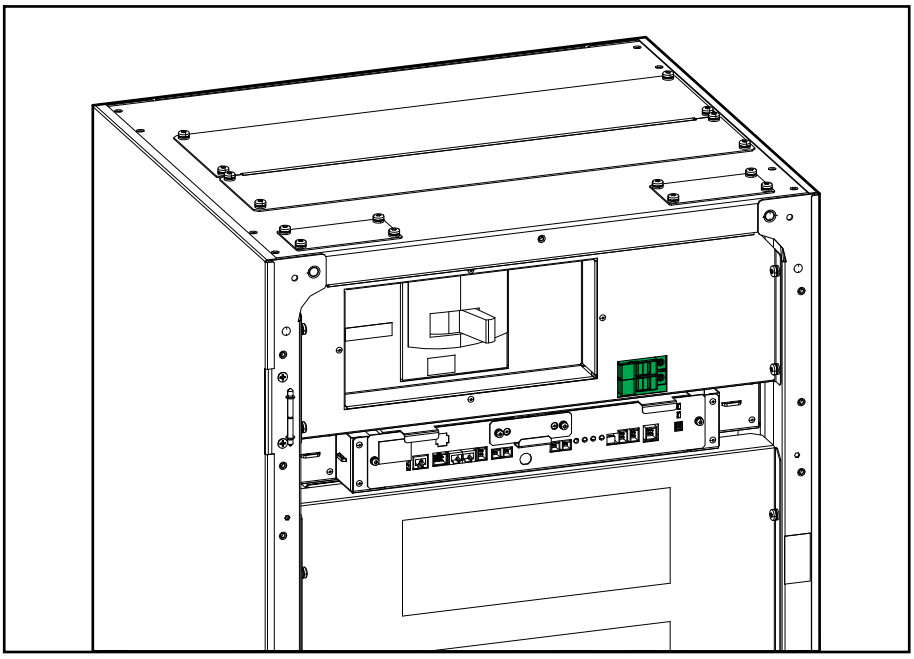
**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Startup must only be performed by Schneider Electric.

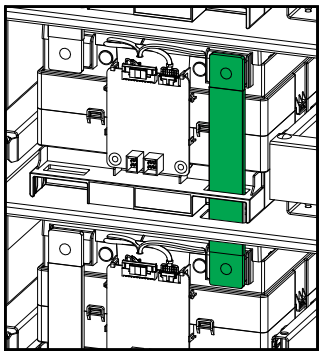
**Failure to follow these instructions will result in death or serious injury.**

# Decommission or Move the Battery Cabinet to a New Location

1. Lockout/Tagout the battery breaker in the OFF (open) position and open the two fuse holders in the battery cabinet.



2. Lockout/Tagout the power to the SMPS AC/DC converter upstream (if applicable).
3. Disconnect and remove all power cables from the battery cabinet. See Connect the Power Cables, page 89 for details.



4. Disconnect and remove all signal cables from the battery cabinet. See Route the Signal Cables to the Switchgear, Rack BMS, and System BMS Ports, page 93 for details.
5. Disconnect and remove power cables to the SMPS AC/DC converter (if applicable). Refer to the SMPS AC/DC converter installation manual for details.
6. Contact Schneider Electric for removal of the battery busbars and fuse kits. The battery busbars and fuse kits must only be removed by a Schneider Electric-certified field service representative or service partner.

7. Remove the batteries from the shelves. Recycle or reuse the batteries as appropriate.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Servicing of batteries must only be performed or supervised by qualified personnel knowledgeable of batteries and the required precautions. Keep unqualified personnel away from batteries.

- Recycle lead-acid batteries correctly. Batteries contain lead and dilute sulfuric acid.
- Dispose of the batteries in accordance with country and local regulations.

**Failure to follow these instructions will result in death or serious injury.**

8. Contact Schneider Electric for removal of the interconnection busbars between the cabinets. The interconnections busbars must only be removed by a Schneider Electric-certified field service representative or service partner.
9. Remove the seismic front and rear anchoring brackets from the cabinets. Save for reinstallation. See Install the Front Seismic Anchoring, page 50 and Install the Rear Seismic Anchoring, page 46 for details.
10. Close and lock the front door of the cabinets.
11. Raise the feet of the cabinets until the casters have full contact with the floor.
12. You can now move each cabinet individually by rolling it over the floor on the casters.

**⚠WARNING**

**TIPPING HAZARD**

- The casters of the cabinet are exclusively for transport on flat, even, hard, and horizontal surfaces.
- The casters of the cabinet are intended for transport over short distances (i.e. inside the same building).
- Move at a slow pace and pay close attention on the floor conditions and the balance of the cabinet.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

13. **For transport over longer distances or in conditions that are not suitable for the casters of the cabinet**:

**⚠WARNING**

**TIPPING HAZARD**

For transport over longer distances or in conditions that are not suitable for the casters of the battery cabinet, ensure:

- that personnel performing the transport have necessary skills and have received adequate training;
- to use appropriate tools to safely lift and transport the cabinet;
- to protect the product against damage by using appropriate protection (like wrapping or packaging).

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**⚠WARNING**

**TOP-HEAVY CABINET**

The battery cabinet is top-heavy. Take appropriate precautions during handling and preparation for transport/shipment.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Transportation requirements:

- Mount the cabinet in a vertical position in the center of a suitable pallet. The pallet must be suitable for the weight of the cabinet.
- Use appropriate means of fixation to mount the cabinet to the pallet.

**⚠DANGER**

**TIPPING HAZARD**

- The cabinet must be appropriately fixed to the pallet immediately after being placed on the pallet.
- The fixation hardware must be strong enough to withstand vibrations and shocks during loading, transport, and unloading.

**Failure to follow these instructions will result in death or serious injury.**

**⚠WARNING**

**UNEXPECTED EQUIPMENT BEHAVIOR**

Do not lift the cabinet with a forklift/pallet truck directly on the frame as it may bend or damage the frame.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

14. Perform one of the following:
    – Decommission the battery cabinet, OR
    – Move the battery cabinet to a new location to install it.

15. **Only for installing the battery cabinet in a new location**: Follow the installation manual to install the battery cabinet in the new location. See the chapter titled **Installation Procedure** for installation overview. Start-up must only be performed by Schneider Electric.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Start-up must only be performed by Schneider Electric.

**Failure to follow these instructions will result in death or serious injury.**

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.



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