

# Galaxy VL

## 200-500 kW UPS

### Installation

380 V, 400 V, 415 V, 440 V, and 480 V

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# Table of Contents

|  |    |
|--|----|
| Important Safety Instructions — SAVE THESE                 |    |
| INSTRUCTIONS .....   | 5  |
| FCC Statement .....  | 6  |
| Electromagnetic Compatibility .....                        | 6  |
| Safety Precautions .....                                   | 6  |
| Additional Safety Precautions After Installation.....      | 8  |
| Electrical Safety .....                                    | 9  |
| Battery Safety .....                                       | 10 |
| Specifications .....                                       | 12 |
| Specifications for 200 kW UPS .....                        | 12 |
| Specifications for 250 kW UPS .....                        | 14 |
| Specifications for 300 kW UPS .....                        | 16 |
| Specifications for 350 kW UPS .....                        | 18 |
| Specifications for 400 kW UPS .....                        | 20 |
| Specifications for 450 kW UPS .....                        | 22 |
| Specifications for 500 kW UPS .....                        | 24 |
| Upstream and Downstream Protection for IEC .....           | 26 |
| Recommended Cable Sizes for IEC .....                      | 27 |
| Upstream and Downstream Protection for UL .....            | 31 |
| Recommended Cable Sizes for UL .....                       | 32 |
| Recommended Bolt and Lug Sizes .....                       | 35 |
| Torque Specifications.....                                 | 36 |
| Requirements for a Third Party Battery Solution.....       | 37 |
| Third Party Battery Breaker Requirements .....             | 37 |
| Guidance for Organizing Battery Cables .....               | 38 |
| Environment.....   | 39 |
| Compliance.....  | 40 |
| UPS Weights and Dimensions .....                           | 41 |
| Clearance .....  | 41 |
| Single System Overview .....                               | 42 |
| Parallel System Overview.....                              | 43 |
| Installation Procedure for UPS.....                        | 44 |
| Installation Procedure for UPS with Maintenance Bypass     |    |
| Cabinet .....  | 45 |
| Position the UPS .....                                     | 46 |
| Install the Seismic Anchoring (Option) .....               | 47 |
| Prepare the UPS for Top Cable Entry .....                  | 49 |
| Prepare for TNC Earthing System.....                       | 51 |
| Prepare for HRG Earthing System .....                      | 52 |
| Connect Power Cables in the UPS in System up to 45 kAIC/kA |    |
| Icw .....  | 53 |
| Connect Power Cables in the UPS in System over 45 kAIC/kA  |    |
| Icw .....  | 57 |
| Connect the Signal Cables .....                            | 64 |

|   |    |
|---|----|
| Connect the Signal Cables from Switchgear and Third-Party<br>Auxiliary Products ..... | 67 |
| Connect the Modbus Cables .....   | 71 |
| Connect the PBUS Cables .....   | 73 |
| Connect Signal Cables for External Synchronization.....                               | 74 |
| Install the Power Module(s).....  | 78 |
| Add Translated Safety Labels to Your Product.....                                     | 79 |
| Backfeed Protection .....   | 80 |
| Final installation .....  | 83 |



# 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 interference, 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 breakers, battery breakers, 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.**

**⚠ WARNING****HAZARD OF 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 can result in death, serious 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.
- 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 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 80 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.**

## 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. Released electrolyte is harmful to the skin and eyes. It may be toxic.

**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 type and number of batteries or battery packs.

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

## **▲ CAUTION**

### **RISK OF EQUIPMENT DAMAGE**

- Mount the batteries in the UPS system, but do not connect the batteries until the UPS system is ready to be powered up. The time duration from battery connection until the UPS system is powered up must not exceed 72 hours or 3 days.
- Batteries must not be stored more than six months due to the requirement of recharging. If the UPS system remains de-energized for a long period, we recommend that you energize the UPS system for a period of 24 hours at least once every month. This charges the batteries, thus avoiding irreversible damage.

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

**NOTE:** Always follow the battery manufacturer's installation manual for battery installation and maintenance instructions.

# Specifications

## Specifications for 200 kW UPS

|                                    | Voltage (V)  | 380   | 400     | 415     | 440     | 480   |
|------------------------------------|--|---|---------|---------|---------|---|
| Input                              | Connections  | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)  |         |         |         | Single mains: 4-wire <sup>1</sup> (L1, L2, L3, N, G) or 3-wire <sup>1</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>1</sup> (L1, L2, L3, G)  |
|                                    | Input voltage range (V)  | 331-437   | 340-460 | 353-477 | 374-506 | 408-552   |
|                                    | Frequency (Hz)   | 40-70   |         |         |         |   |
|                                    | Nominal input current (A)  | 316   | 299     | 288     | 272     | 249   |
|                                    | Maximum input current (A)  | 364   | 359     | 346     | 326     | 298   |
|                                    | Input current limitation (A)   | 364   | 364     | 360     | 336     | 308   |
|                                    | 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, PE) or 3-wire (L1, L2, L3, PE)   |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|                                    | Bypass voltage range (V)   | 342-418   | 360-440 | 374-457 | 396-484 | 432-528   |
|                                    | Frequency (Hz)   | 50 or 60  |         |         |         |   |
|                                    | Frequency range (Hz)   | Programmable: ±0.1, ±3, ±10. Default is ±3.   |         |         |         |   |
|                                    | Nominal bypass current (A)   | 307   | 292     | 281     | 265     | 243   |
|                                    | Maximum input short circuit level (three cycles)   | 65 kA I <sub>cw</sub><br>25 kA I <sub>cw</sub> with maintenance bypass cabinet<br>45 kA I <sub>cw</sub> with bottom entry cabinet<br>45 kA I <sub>cc</sub> with backfeed breaker kit installed in the UPS |         |         |         | 65 kA I <sub>C</sub><br>65 kA I <sub>C</sub> with maintenance bypass cabinet<br>45 kA I <sub>C</sub> with bottom entry cabinet<br>45 kA I <sub>C</sub> with backfeed breaker kit installed in the UPS |
|                                    | I <sup>2</sup> t thyristor value (A <sup>2</sup> s)  | 3.1 MA <sup>2</sup> s   |         |         |         |   |
| Bypass backfeed protection options | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS. |   |         |         |         |   |

1. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.



|                              | Voltage (V)   | 380  | 400                               | 415 | 440 | 480  |
|------------------------------|---|--|-----------------------------------|-----|-----|--|
| Output                       | Connections <sup>2</sup>  | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |                                   |     |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>3</sup> )  |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |                                   |     |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |                                   |     |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |                                   |     |     |  |
|                              | Output power factor   | 1  |                                   |     |     |  |
|                              | Nominal output current (A)                                      | 304  | 289                               | 278 | 262 | 241  |
|                              | 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-111   |                                   |     |     |  |
|                              | Load crest factor   | 2.5  |                                   |     |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |                                   |     |     |  |
| Battery                      | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  | 0-40% load: 80%<br>100% load: 20% |     |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 160<br>100% load: 30   | 0-40% load: 160<br>100% load: 40  |     |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |                                   |     |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |                                   |     |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |                                   |     |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |                                   |     |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |                                   |     |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |                                   |     |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 434  |                                   |     |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 543  |                                   |     |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |                                   |     |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |                                   |     |     |  |
| Maximum short circuit rating | 30 kA   |  |                                   |     |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

- 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.
- Per NEC 250.30.

## Specifications for 250 kW UPS

|               | Voltage (V)   | 380  | 400     | 415     | 440     | 480   |
|---------------|---|--|---------|---------|---------|---|
| <b>Input</b>  | Connections   | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)   |         |         |         | Single mains: 4-wire <sup>4</sup> (L1, L2, L3, N, G) or 3-wire <sup>4</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>4</sup> (L1, L2, L3, G)    |
|               | Input voltage range (V)                             | 331-437  | 340-460 | 353-477 | 374-506 | 408-552   |
|               | Frequency (Hz)                                      | 40-70  |         |         |         |   |
|               | Nominal input current (A)                           | 395  | 374     | 360     | 340     | 311   |
|               | Maximum input current (A)                           | 455  | 449     | 432     | 408     | 373   |
|               | Input current limitation (A)                        | 455  | 455     | 450     | 420     | 385   |
|               | 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   |         |         |         |   |
| <b>Bypass</b> | Connections   | 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)  |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|               | Bypass voltage range (V)                            | 342-418  | 360-440 | 374-457 | 396-484 | 432-528   |
|               | Frequency (Hz)                                      | 50 or 60   |         |         |         |   |
|               | Frequency range (Hz)                                | Programmable: ±0.1, ±3, ±10. Default is ±3.  |         |         |         |   |
|               | Nominal bypass current (A)                          | 384  | 364     | 351     | 331     | 304   |
|               | Maximum input short circuit level (three cycles)    | 65 kA Icw<br>25 kA Icw with maintenance bypass cabinet<br>45 kA Icw with bottom entry cabinet<br>45 kA Icc with backfeed breaker kit installed in the UPS                                  |         |         |         | 65 kAIC<br>65 kAIC with maintenance bypass cabinet<br>45 kAIC with bottom entry cabinet<br>45 kAIC with backfeed breaker kit installed in the UPS |
|               | I <sup>2</sup> t thyristor value (A <sup>2</sup> s) | 3.1 MA <sup>2</sup> s  |         |         |         |   |
|               | Bypass backfeed protection options                  | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS. |         |         |         |   |

4. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.

|                              | Voltage (V)   | 380  | 400                               | 415 | 440 | 480  |
|------------------------------|---|--|-----------------------------------|-----|-----|--|
| <b>Output</b>                | Connections <sup>5</sup>  | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |                                   |     |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>6</sup> )  |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |                                   |     |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |                                   |     |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |                                   |     |     |  |
|                              | Output power factor   | 1  |                                   |     |     |  |
|                              | Nominal output current (A)                                      | 380  | 361                               | 348 | 328 | 301  |
|                              | 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-111   |                                   |     |     |  |
|                              | Load crest factor   | 2.5  |                                   |     |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |                                   |     |     |  |
| <b>Battery</b>               | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  | 0-40% load: 80%<br>100% load: 20% |     |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 200<br>100% load: 37.5   | 0-40% load: 200<br>100% load: 50  |     |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |                                   |     |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |                                   |     |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |                                   |     |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |                                   |     |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |                                   |     |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |                                   |     |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 543  |                                   |     |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 678  |                                   |     |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |                                   |     |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |                                   |     |     |  |
| Maximum short circuit rating | 30 kA   |  |                                   |     |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

5. 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.  
6. Per NEC 250.30.

## Specifications for 300 kW UPS

|               | Voltage (V)   | 380   | 400     | 415     | 440     | 480   |
|---------------|---|---|---------|---------|---------|---|
| <b>Input</b>  | Connections   | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)  |         |         |         | Single mains: 4-wire <sup>7</sup> (L1, L2, L3, N, G) or 3-wire <sup>7</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>7</sup> (L1, L2, L3, G)  |
|               | Input voltage range (V)                             | 331-437   | 340-460 | 353-477 | 374-506 | 408-552   |
|               | Frequency (Hz)                                      | 40-70   |         |         |         |   |
|               | Nominal input current (A)                           | 474   | 449     | 432     | 408     | 373   |
|               | Maximum input current (A)                           | 546   | 539     | 519     | 490     | 447   |
|               | Input current limitation (A)                        | 546   | 546     | 540     | 504     | 462   |
|               | 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  |         |         |         |   |
| <b>Bypass</b> | Connections   | 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)   |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|               | Bypass voltage range (V)                            | 342-418   | 360-440 | 374-457 | 396-484 | 432-528   |
|               | Frequency (Hz)                                      | 50 or 60  |         |         |         |   |
|               | Frequency range (Hz)                                | Programmable: ±0.1, ±3, ±10. Default is ±3.   |         |         |         |   |
|               | Nominal bypass current (A)                          | 460   | 437     | 422     | 398     | 364   |
|               | Maximum input short circuit level (three cycles)    | 65 kA I <sub>cw</sub><br>25 kA I <sub>cw</sub> with maintenance bypass cabinet<br>45 kA I <sub>cw</sub> with bottom entry cabinet<br>45 kA I <sub>cc</sub> with backfeed breaker kit installed in the UPS |         |         |         | 65 kA I <sub>C</sub><br>65 kA I <sub>C</sub> with maintenance bypass cabinet<br>45 kA I <sub>C</sub> with bottom entry cabinet<br>45 kA I <sub>C</sub> with backfeed breaker kit installed in the UPS |
|               | I <sup>2</sup> t thyristor value (A <sup>2</sup> s) | 3.1 MA <sup>2</sup> s   |         |         |         |   |
|               | Bypass backfeed protection options                  | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS.                |         |         |         |   |

7. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.

|                              | Voltage (V)   | 380  | 400                               | 415 | 440 | 480  |
|------------------------------|---|--|-----------------------------------|-----|-----|--|
| <b>Output</b>                | Connections <sup>8</sup>  | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |                                   |     |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>9</sup> )  |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |                                   |     |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |                                   |     |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |                                   |     |     |  |
|                              | Output power factor   | 1  |                                   |     |     |  |
|                              | Nominal output current (A)                                      | 456  | 433                               | 417 | 394 | 361  |
|                              | 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-111   |                                   |     |     |  |
|                              | Load crest factor   | 2.5  |                                   |     |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |                                   |     |     |  |
| <b>Battery</b>               | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  | 0-40% load: 80%<br>100% load: 20% |     |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 240<br>100% load: 45   | 0-40% load: 240<br>100% load: 60  |     |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |                                   |     |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |                                   |     |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |                                   |     |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |                                   |     |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |                                   |     |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |                                   |     |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 651  |                                   |     |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 814  |                                   |     |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |                                   |     |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |                                   |     |     |  |
| Maximum short circuit rating | 30 kA   |  |                                   |     |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

8. 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.  
9. Per NEC 250.30.

## Specifications for 350 kW UPS

|                                    | Voltage (V)  | 380   | 400     | 415     | 440     | 480   |
|------------------------------------|--|---|---------|---------|---------|---|
| Input                              | Connections  | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)  |         |         |         | Single mains: 4-wire <sup>10</sup> (L1, L2, L3, N, G) or 3-wire <sup>10</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>10</sup> (L1, L2, L3, G) |
|                                    | Input voltage range (V)  | 331-437   | 340-460 | 353-477 | 374-506 | 408-552   |
|                                    | Frequency (Hz)   | 40-70   |         |         |         |   |
|                                    | Nominal input current (A)  | 553   | 524     | 505     | 476     | 435   |
|                                    | Maximum input current (A)  | 637   | 629     | 605     | 571     | 522   |
|                                    | Input current limitation (A)   | 637   | 637     | 630     | 588     | 539   |
|                                    | 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, PE) or 3-wire (L1, L2, L3, PE)   |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|                                    | Bypass voltage range (V)   | 342-418   | 360-440 | 374-457 | 396-484 | 432-528   |
|                                    | Frequency (Hz)   | 50 or 60  |         |         |         |   |
|                                    | Frequency range (Hz)   | Programmable: $\pm 0.1$ , $\pm 3$ , $\pm 10$ . Default is $\pm 3$ .   |         |         |         |   |
|                                    | Nominal bypass current (A)   | 537   | 510     | 492     | 464     | 425   |
|                                    | Maximum input short circuit level (three cycles)   | 65 kA I <sub>cw</sub><br>25 kA I <sub>cw</sub> with maintenance bypass cabinet<br>45 kA I <sub>cw</sub> with bottom entry cabinet<br>45 kA I <sub>cc</sub> with backfeed breaker kit installed in the UPS |         |         |         | 65 kAIC<br>65 kAIC with maintenance bypass cabinet<br>45 kAIC with bottom entry cabinet<br>45 kAIC with backfeed breaker kit installed in the UPS |
|                                    | I <sup>2</sup> t thyristor value (A <sup>2</sup> s)  | 3.1 MA <sup>2</sup> s   |         |         |         |   |
| Bypass backfeed protection options | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS. |   |         |         |         |   |

10. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.

|                              | Voltage (V)   | 380  | 400                               | 415 | 440 | 480  |
|------------------------------|---|--|-----------------------------------|-----|-----|--|
| <b>Output</b>                | Connections <sup>11</sup>                                       | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |                                   |     |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>12</sup> )   |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |                                   |     |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |                                   |     |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |                                   |     |     |  |
|                              | Output power factor   | 1  |                                   |     |     |  |
|                              | Nominal output current (A)                                      | 532  | 505                               | 487 | 459 | 421  |
|                              | 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-111   |                                   |     |     |  |
|                              | Load crest factor   | 2.5  |                                   |     |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |                                   |     |     |  |
| <b>Battery</b>               | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  | 0-40% load: 80%<br>100% load: 20% |     |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 280<br>100% load: 52.5   | 0-40% load: 280<br>100% load: 70  |     |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |                                   |     |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |                                   |     |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |                                   |     |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |                                   |     |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |                                   |     |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |                                   |     |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 760  |                                   |     |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 949  |                                   |     |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |                                   |     |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |                                   |     |     |  |
| Maximum short circuit rating | 30 kA   |  |                                   |     |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

11. 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.  
12. Per NEC 250.30.

## Specifications for 400 kW UPS

|                                    | Voltage (V)  | 380   | 400     | 415     | 440     | 480   |
|------------------------------------|--|---|---------|---------|---------|---|
| <b>Input</b>                       | Connections  | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)  |         |         |         | Single mains: 4-wire <sup>13</sup> (L1, L2, L3, N, G) or 3-wire <sup>13</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>13</sup> (L1, L2, L3, G) |
|                                    | Input voltage range (V)  | 331-437   | 340-460 | 353-477 | 374-506 | 408-552   |
|                                    | Frequency (Hz)   | 40-70   |         |         |         |   |
|                                    | Nominal input current (A)  | 632   | 599     | 577     | 544     | 497   |
|                                    | Maximum input current (A)  | 728   | 719     | 692     | 653     | 596   |
|                                    | Input current limitation (A)   | 728   | 728     | 720     | 672     | 616   |
|                                    | 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  |         |         |         |   |
| <b>Bypass</b>                      | Connections  | 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)   |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|                                    | Bypass voltage range (V)   | 342-418   | 360-440 | 374-457 | 396-484 | 432-528   |
|                                    | Frequency (Hz)   | 50 or 60  |         |         |         |   |
|                                    | Frequency range (Hz)   | Programmable: ±0.1, ±3, ±10. Default is ±3.   |         |         |         |   |
|                                    | Nominal bypass current (A)   | 614   | 583     | 562     | 691     | 486   |
|                                    | Maximum input short circuit level (three cycles)   | 65 kA I <sub>cw</sub><br>25 kA I <sub>cw</sub> with maintenance bypass cabinet<br>45 kA I <sub>cw</sub> with bottom entry cabinet<br>45 kA I <sub>cc</sub> with backfeed breaker kit installed in the UPS |         |         |         | 65 kAIC<br>65 kAIC with maintenance bypass cabinet<br>45 kAIC with bottom entry cabinet<br>45 kAIC with backfeed breaker kit installed in the UPS |
|                                    | I <sup>2</sup> t thyristor value (A <sup>2</sup> s)  | 3.1 MA <sup>2</sup> s   |         |         |         |   |
| Bypass backfeed protection options | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS. |   |         |         |         |   |

13. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.



|                              | Voltage (V)   | 380  | 400 | 415                               | 440 | 480  |
|------------------------------|---|--|-----|-----------------------------------|-----|--|
| <b>Output</b>                | Connections <sup>14</sup>                                       | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |     |                                   |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>15</sup> )   |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |     |                                   |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |     |                                   |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |     |                                   |     |  |
|                              | Output power factor   | 1  |     |                                   |     |  |
|                              | Nominal output current (A)                                      | 608  | 577 | 556                               | 525 | 481  |
|                              | 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-111   |     |                                   |     |  |
|                              | Load crest factor   | 2.5  |     |                                   |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |     |                                   |     |  |
| <b>Battery</b>               | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  |     | 0-40% load: 80%<br>100% load: 20% |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 320<br>100% load: 60   |     | 0-40% load: 320<br>100% load: 80  |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |     |                                   |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |     |                                   |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |     |                                   |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |     |                                   |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |     |                                   |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |     |                                   |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 868  |     |                                   |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 1085   |     |                                   |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |     |                                   |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |     |                                   |     |  |
| Maximum short circuit rating | 30 kA   |  |     |                                   |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

14. 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.  
15. Per NEC 250.30.

## Specifications for 450 kW UPS

|                                    | Voltage (V)  | 380   | 400     | 415     | 440     | 480   |
|------------------------------------|--|---|---------|---------|---------|---|
| Input                              | Connections  | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)  |         |         |         | Single mains: 4-wire <sup>16</sup> (L1, L2, L3, N, G) or 3-wire <sup>16</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>16</sup> (L1, L2, L3, G) |
|                                    | Input voltage range (V)  | 331-437   | 340-460 | 353-477 | 374-506 | 408-552   |
|                                    | Frequency (Hz)   | 40-70   |         |         |         |   |
|                                    | Nominal input current (A)  | 711   | 674     | 649     | 612     | 559   |
|                                    | Maximum input current (A)  | 819   | 809     | 778     | 734     | 671   |
|                                    | Input current limitation (A)   | 819   | 819     | 810     | 756     | 693   |
|                                    | 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, PE) or 3-wire (L1, L2, L3, PE)   |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|                                    | Bypass voltage range (V)   | 342-418   | 360-440 | 374-457 | 396-484 | 432-528   |
|                                    | Frequency (Hz)   | 50 or 60  |         |         |         |   |
|                                    | Frequency range (Hz)   | Programmable: $\pm 0.1$ , $\pm 3$ , $\pm 10$ . Default is $\pm 3$ .   |         |         |         |   |
|                                    | Nominal bypass current (A)   | 691   | 656     | 632     | 596     | 547   |
|                                    | Maximum input short circuit level (three cycles)   | 65 kA I <sub>cw</sub><br>25 kA I <sub>cw</sub> with maintenance bypass cabinet<br>45 kA I <sub>cw</sub> with bottom entry cabinet<br>45 kA I <sub>cc</sub> with backfeed breaker kit installed in the UPS |         |         |         | 65 kAIC<br>65 kAIC with maintenance bypass cabinet<br>45 kAIC with bottom entry cabinet<br>45 kAIC with backfeed breaker kit installed in the UPS |
|                                    | I <sup>2</sup> t thyristor value (A <sup>2</sup> s)  | 3.1 MA <sup>2</sup> s   |         |         |         |   |
| Bypass backfeed protection options | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS. |   |         |         |         |   |

16. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.

|                              | Voltage (V)   | 380  | 400 | 415                               | 440 | 480  |
|------------------------------|---|--|-----|-----------------------------------|-----|--|
| <b>Output</b>                | Connections <sup>17</sup>                                       | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |     |                                   |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>18</sup> )   |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |     |                                   |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |     |                                   |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |     |                                   |     |  |
|                              | Output power factor   | 1  |     |                                   |     |  |
|                              | Nominal output current (A)                                      | 684  | 650 | 626                               | 590 | 541  |
|                              | 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-111   |     |                                   |     |  |
|                              | Load crest factor   | 2.5  |     |                                   |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |     |                                   |     |  |
| <b>Battery</b>               | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  |     | 0-40% load: 80%<br>100% load: 20% |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 360<br>100% load: 67.5   |     | 0-40% load: 360<br>100% load: 90  |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |     |                                   |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |     |                                   |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |     |                                   |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |     |                                   |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |     |                                   |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |     |                                   |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 977  |     |                                   |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 1221   |     |                                   |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |     |                                   |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |     |                                   |     |  |
| Maximum short circuit rating | 30 kA   |  |     |                                   |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

17. 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.  
18. Per NEC 250.30.

## Specifications for 500 kW UPS

|                                    | Voltage (V)  | 380   | 400     | 415     | 440     | 480   |
|------------------------------------|--|---|---------|---------|---------|---|
| <b>Input</b>                       | Connections  | Single mains: 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)<br>Dual mains: 3-wire (L1, L2, L3, PE)  |         |         |         | Single mains: 4-wire <sup>19</sup> (L1, L2, L3, N, G) or 3-wire <sup>19</sup> (L1, L2, L3, G)<br>Dual mains: 3-wire <sup>19</sup> (L1, L2, L3, G) |
|                                    | Input voltage range (V)  | 331-437   | 340-460 | 353-477 | 374-506 | 408-552   |
|                                    | Frequency (Hz)   | 40-70   |         |         |         |   |
|                                    | Nominal input current (A)  | 790   | 749     | 721     | 680     | 621   |
|                                    | Maximum input current (A)  | 910   | 898     | 865     | 816     | 746   |
|                                    | Input current limitation (A)   | 910   | 910     | 900     | 840     | 770   |
|                                    | 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  |         |         |         |   |
| <b>Bypass</b>                      | Connections  | 4-wire (L1, L2, L3, N, PE) or 3-wire (L1, L2, L3, PE)   |         |         |         | 4-wire (L1, L2, L3, N, G) or 3-wire (L1, L2, L3, G)   |
|                                    | Bypass voltage range (V)   | 342-418   | 360-440 | 374-457 | 396-484 | 432-528   |
|                                    | Frequency (Hz)   | 50 or 60  |         |         |         |   |
|                                    | Frequency range (Hz)   | Programmable: $\pm 0.1$ , $\pm 3$ , $\pm 10$ . Default is $\pm 3$ .   |         |         |         |   |
|                                    | Nominal bypass current (A)   | 767   | 729     | 703     | 663     | 607   |
|                                    | Maximum input short circuit level (three cycles)   | 65 kA l <sub>cw</sub><br>25 kA l <sub>cw</sub> with maintenance bypass cabinet<br>45 kA l <sub>cw</sub> with bottom entry cabinet<br>45 kA l <sub>cc</sub> with backfeed breaker kit installed in the UPS |         |         |         | 65 kAIC<br>65 kAIC with maintenance bypass cabinet<br>45 kAIC with bottom entry cabinet<br>45 kAIC with backfeed breaker kit installed in the UPS |
|                                    | I <sup>2</sup> t thyristor value (A <sup>2</sup> s)  | 3.1 MA <sup>2</sup> s   |         |         |         |   |
| Bypass backfeed protection options | 1: Upstream installation of breaker with shunt trip connected to the UPS, OR<br>2: Installation with maintenance bypass cabinet, OR<br>3: Installation of backfeed breaker kit in the UPS. |   |         |         |         |   |

19. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not supported.

|                              | Voltage (V)   | 380  | 400                               | 415 | 440 | 480  |
|------------------------------|---|--|-----------------------------------|-----|-----|--|
| Output                       | Connections <sup>20</sup>                                       | 4-wire (L1, L2, L3, N, PE) or<br>3-wire (L1, L2, L3, PE)   |                                   |     |     | 4-wire (L1, L2, L3, N, G) or<br>3-wire (L1, L2, L3, G, GEC <sup>21</sup> )   |
|                              | Output voltage regulation                                       | Symmetrical load ± 1%<br>Asymmetrical load ± 3%  |                                   |     |     |  |
|                              | Overload capacity   | 150% for 1 minute, 125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>110% continuous, 1000% for 100 milliseconds (bypass operation) |                                   |     |     | 150% for 1 minute,<br>125% for 10 minutes (normal operation)<br>125% for 1 minute (battery operation)<br>125% continuous,<br>1000% for 100 milliseconds (bypass operation) |
|                              | Dynamic load response   | ± 5% after 2 ms, ± 1% after 50 ms  |                                   |     |     |  |
|                              | Output power factor   | 1  |                                   |     |     |  |
|                              | Nominal output current (A)                                      | 760  | 722                               | 696 | 656 | 601  |
|                              | 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-111   |                                   |     |     |  |
|                              | Load crest factor   | 2.5  |                                   |     |     |  |
|                              | Load power factor   | 0.5 leading to 0.5 lagging without derating  |                                   |     |     |  |
| Battery                      | Charging power in % of output power                             | 0-40% load: 80%<br>100% load: 15%  | 0-40% load: 80%<br>100% load: 20% |     |     |  |
|                              | Maximum charging power (kW)                                     | 0-40% load: 400<br>100% load: 75   | 0-40% load: 400<br>100% load: 100 |     |     |  |
|                              | Nominal battery voltage (VDC)                                   | 480 for 40 blocks<br>576 for 48 blocks   |                                   |     |     |  |
|                              | Nominal float voltage (VDC)                                     | 545 for 40 blocks<br>654 for 48 blocks   |                                   |     |     |  |
|                              | Maximum boost voltage (VDC)                                     | 571 for 40 blocks<br>685 for 48 blocks   |                                   |     |     |  |
|                              | Temperature compensation (per cell)                             | -3.3mV/°C for T ≥ 25 °C, 0mV/°C for T < 25 °C  |                                   |     |     |  |
|                              | End of discharge voltage (full load) (VDC)                      | 384  |                                   |     |     |  |
|                              | End of discharge voltage (no load) (VDC)                        | 420  |                                   |     |     |  |
|                              | Battery current at full load and nominal battery voltage (A)    | 1085   |                                   |     |     |  |
|                              | Battery current at full load and minimum battery voltage (A)    | 1356   |                                   |     |     |  |
|                              | Ripple current  | < 5% C20 (5 minute runtime)  |                                   |     |     |  |
|                              | Battery test  | Manual/automatic (selectable)  |                                   |     |     |  |
| Maximum short circuit rating | 30 kA   |  |                                   |     |     |  |

**NOTE:** Battery specifications are based on VRLA batteries.

20. 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.  
21. Per NEC 250.30.

## Upstream and Downstream Protection for IEC

**⚠ DANGER**

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

- Circuit breakers must have instantaneous trip time of maximum 60 ms.
- Circuit breakers must have instantaneous override values set according to the table below.
- Circuit breakers must be installed for input (unit input breaker UIB) and bypass (static switch input breaker SSIB).
- Circuit breakers must be installed for the output (unit output breaker UOB) of each UPS in a parallel system.

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

**NOTE:** For local directives which require 4-pole circuit breakers: If neutral conductor is expected to carry a high current, due to line-neutral non-linear load, the circuit breaker must be rated according to expected neutral current.

### Recommended Upstream Protection for IEC

| UPS rating      | 200 kW                     |                            | 250 kW                     |                            |
|-----------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                 | Input                      | Bypass                     | Input                      | Bypass                     |
| Breaker type    | NSX400H Mic 2.2 (LV432695) | NSX400H Mic 2.2 (LV432695) | NSX630H Mic 2.2 (LV432895) | NSX400H Mic 2.2 (LV432695) |
| Io              | 400                        | 320                        | 500                        | 400                        |
| I <sub>r</sub>  | 1                          | 1                          | 1                          | 1                          |
| I <sub>sd</sub> | ≤10                        | ≤10                        | ≤10                        | ≤10                        |

| UPS rating                         | 300 kW                     |                            | 350 kW                 |                            | 400 kW                 |                            |
|------------------------------------|----------------------------|----------------------------|------------------------|----------------------------|------------------------|----------------------------|
|                                    | Input                      | Bypass                     | Input                  | Bypass                     | Input                  | Bypass                     |
| Breaker type                       | NSX630H Mic 2.2 (LV432895) | NSX630H Mic 2.2 (LV432895) | NS800H Mic 5.0 (33553) | NSX630H Mic 2.2 (LV432895) | NS800H Mic 5.0 (33553) | NSX630H Mic 2.2 (LV432895) |
| Io                                 | 1                          | 1                          | 0.8                    | 0.96                       | 0.95                   | 1                          |
| I <sub>r</sub>                     | 570                        | 500                        | —                      | 570                        | —                      | 630                        |
| t <sub>r</sub>                     | —                          | —                          | ≥4                     | —                          | ≥4                     | —                          |
| I <sub>i</sub> (x I <sub>n</sub> ) | —                          | —                          | ≤10                    | —                          | ≤10                    | —                          |
| I <sub>sd</sub>                    | ≤10                        | ≤10                        | ≤10                    | ≤10                        | ≤10                    | ≤10                        |

| UPS rating                         | 450 kW                  |                        | 500 kW                  |                        |
|------------------------------------|-------------------------|------------------------|-------------------------|------------------------|
|                                    | Input                   | Bypass                 | Input                   | Bypass                 |
| Breaker type                       | NS1000H Mic 5.0 (33559) | NS800H Mic 5.0 (33553) | NS1000H Mic 5.0 (33559) | NS800H Mic 5.0 (33553) |
| I <sub>r</sub>                     | 0.9                     | 0.9                    | 0.95                    | 0.95                   |
| t <sub>r</sub>                     | ≥4                      | ≥4                     | ≥4                      | ≥4                     |
| I <sub>i</sub> (x I <sub>n</sub> ) | ≤8                      | ≤10                    | ≤8                      | ≤10                    |

### Recommended Downstream Protection for IEC

**NOTE:** The recommended downstream protection given below is not valid for tripping the breaker when the UPS is in battery operation, only for tripping the breaker when the UPS is in static bypass operation.

| UPS rating      | 200 kW          | 250 kW | 300 kW          | 350 kW | 400 kW | 450 kW | 500 kW |
|-----------------|-----------------|--------|-----------------|--------|--------|--------|--------|
| Breaker type    | NSX160H Mic 2.2 |        | NSX250H Mic 2.2 |        |        |        |        |
| I <sub>r</sub>  | 160             |        | 250             |        |        |        |        |
| I <sub>sd</sub> | 10              |        | 10              |        |        |        |        |

## Recommended Cable Sizes for IEC

**⚠️ ⚠️ 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 240 mm<sup>2</sup>.
- 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:

- 4 on input/output/bypass busbars
- 4 x 240 mm<sup>2</sup> on input/output/bypass busbars
- 4 x 240 mm<sup>2</sup> or 8 x 150 mm<sup>2</sup> on DC+/DC- busbars
- 8 on N busbar
- 16 on PE busbar

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

Cable sizes in this manual are based on the minimum requirements in table B.52.3 and table B.52.5 of IEC 60364-5-52 with the following assertions<sup>22</sup>:

- 90 °C conductors
- An ambient temperature of 30 °C
- Use of copper or aluminum conductors
- Installation method F
- Single layer on a perforated cable tray

PE cable size is based on table 54.2 of IEC 60364-4-54.

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

### Copper

| UPS rating                              | 200 kW     |            |            |            | 250 kW     |            |            |            | 300 kW     |            |            |            | 350 kW     |            |            |            |
|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|   | 380        | 400        | 415        | 440        | 380        | 400        | 415        | 440        | 380        | 400        | 415        | 440        | 380        | 400        | 415        | 440        |
| Input phases (mm <sup>2</sup> )         | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 | 2 x<br>185 | 2 x<br>185 | 2 x<br>150 | 1 x<br>150 | 1 x<br>240 | 1 x<br>240 | 1 x<br>240 | 1 x<br>185 | 2 x<br>120 | 2 x<br>120 | 2 x<br>120 | 1 x<br>240 |
| Input PE (mm <sup>2</sup> )             | 1 x<br>70  | 1 x<br>70  | 1 x<br>70  | 1 x<br>70  | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 | 1 x<br>95  | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 |
| Bypass/output phases (mm <sup>2</sup> ) | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>150 | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 | 1 x<br>185 | 1 x<br>150 | 1 x<br>150 | 1 x<br>150 | 1 x<br>240 | 1 x<br>240 | 1 x<br>185 | 1 x<br>185 |
| Bypass PE/output PE (mm <sup>2</sup> )  | 1 x<br>50  | 1 x<br>50  | 1 x<br>50  | 1 x<br>50  | 1 x<br>95  | 1 x<br>70  | 1 x<br>70  | 1 x<br>70  | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>120 | 1 x<br>120 | 1 x<br>95  | 1 x<br>95  |
| Neutral (mm <sup>2</sup> )              | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>95  | 1 x<br>150 | 1 x<br>120 | 1 x<br>120 | 1 x<br>120 | 1 x<br>185 | 1 x<br>150 | 1 x<br>150 | 1 x<br>150 | 1 x<br>240 | 1 x<br>240 | 1 x<br>185 | 1 x<br>185 |

22. 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, page 30 table for this installation scenario.

**Copper (Continued)**

| UPS rating                 | 200 kW  |     |     |     | 250 kW  |     |     |     | 300 kW  |     |     |     | 350 kW  |     |     |     |
|----------------------------|---------|-----|-----|-----|---------|-----|-----|-----|---------|-----|-----|-----|---------|-----|-----|-----|
| Voltage (V)                | 380     | 400 | 415 | 440 | 380     | 400 | 415 | 440 | 380     | 400 | 415 | 440 | 380     | 400 | 415 | 440 |
| DC+/DC- (mm <sup>2</sup> ) | 1 x 185 |     |     |     | 1 x 240 |     |     |     | 2 x 150 |     |     |     | 2 x 185 |     |     |     |
| DC PE (mm <sup>2</sup> )   | 1 x 95  |     |     |     | 1 x 120 |     |     |     | 1 x 150 |     |     |     | 1 x 185 |     |     |     |

**Copper**

| UPS rating                              | 400 kW  |         |         |         | 450 kW  |         |         |         | 500 kW  |         |         |         |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Voltage (V)                             | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     |
| Input phases (mm <sup>2</sup> )         | 2 x 150 | 2 x 150 | 2 x 150 | 2 x 150 | 2 x 240 | 2 x 240 | 2 x 185 | 2 x 150 | 2 x 240 | 2 x 240 | 2 x 240 | 2 x 240 |
| Input PE (mm <sup>2</sup> )             | 1 x 150 | 1 x 150 | 1 x 150 | 1 x 150 | 1 x 240 | 1 x 240 | 1 x 185 | 1 x 150 | 1 x 240 | 1 x 240 | 1 x 240 | 1 x 240 |
| Bypass/output phases (mm <sup>2</sup> ) | 2 x 120 | 1 x 240 | 1 x 240 | 1 x 240 | 2 x 150 | 2 x 150 | 2 x 120 | 1 x 240 | 2 x 185 | 2 x 150 | 2 x 150 | 2 x 150 |
| Bypass PE/output PE (mm <sup>2</sup> )  | 1 x 120 | 1 x 120 | 1 x 120 | 1 x 120 | 1 x 150 | 1 x 150 | 1 x 120 | 1 x 120 | 1 x 185 | 1 x 150 | 1 x 150 | 1 x 150 |
| Neutral (mm <sup>2</sup> )              | 2 x 120 | 1 x 240 | 1 x 240 | 1 x 240 | 2 x 150 | 2 x 150 | 2 x 120 | 1 x 240 | 2 x 185 | 2 x 150 | 2 x 150 | 2 x 150 |
| DC+/DC- (mm <sup>2</sup> )              | 2 x 240 |         |         |         | 3 x 150 |         |         |         | 3 x 185 |         |         |         |
| DC PE (mm <sup>2</sup> )                | 1 x 240 |         |         |         | 2 x 120 |         |         |         | 2 x 150 |         |         |         |

**Aluminum**

| UPS rating                              | 200 kW  |         |         |         | 250 kW  |         |         |         | 300 kW  |         |         |         | 350 kW  |         |         |         |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Voltage (V)                             | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     |
| Input phases (mm <sup>2</sup> )         | 1 x 185 | 1 x 185 | 1 x 185 | 1 x 185 | 2 x 120 | 2 x 120 | 1 x 240 | 1 x 240 | 2 x 150 | 2 x 150 | 2 x 150 | 2 x 120 | 2 x 185 | 2 x 185 | 2 x 185 | 2 x 150 |
| Input PE (mm <sup>2</sup> )             | 1 x 95  | 1 x 95  | 1 x 95  | 1 x 95  | 1 x 120 | 1 x 120 | 1 x 120 | 1 x 120 | 1 x 150 | 1 x 150 | 1 x 150 | 1 x 120 | 1 x 185 | 1 x 185 | 1 x 185 | 1 x 150 |
| Bypass/output phases (mm <sup>2</sup> ) | 1 x 150 | 1 x 150 | 1 x 150 | 1 x 120 | 1 x 185 | 1 x 185 | 1 x 185 | 1 x 185 | 2 x 120 | 1 x 240 | 1 x 240 | 1 x 240 | 2 x 150 | 2 x 150 | 2 x 120 | 2 x 120 |
| Bypass PE/output PE (mm <sup>2</sup> )  | 1 x 95  | 1 x 95  | 1 x 95  | 1 x 70  | 1 x 95  | 1 x 95  | 1 x 95  | 1 x 95  | 1 x 120 | 1 x 120 | 1 x 120 | 1 x 120 | 1 x 150 | 1 x 150 | 1 x 120 | 1 x 120 |
| Neutral (mm <sup>2</sup> )              | 1 x 150 | 1 x 150 | 1 x 150 | 1 x 120 | 1 x 185 | 1 x 185 | 1 x 185 | 1 x 185 | 2 x 120 | 1 x 240 | 1 x 240 | 1 x 240 | 2 x 150 | 2 x 150 | 2 x 120 | 2 x 120 |
| DC+/DC- (mm <sup>2</sup> )              | 2 x 120 |         |         |         | 2 x 150 |         |         |         | 2 x 240 |         |         |         | 3 x 150 |         |         |         |
| DC PE (mm <sup>2</sup> )                | 1 x 120 |         |         |         | 1 x 150 |         |         |         | 1 x 240 |         |         |         | 2 x 120 |         |         |         |

**Aluminum**

| UPS rating                              | 400 kW  |         |         |         | 450 kW                  |                         |         |         | 500 kW                  |                         |                         |                         |
|---|---------|---------|---------|---------|-------------------------|-------------------------|---------|---------|-------------------------|-------------------------|-------------------------|-------------------------|
| Voltage (V)                             | 380     | 400     | 415     | 440     | 380                     | 400                     | 415     | 440     | 380                     | 400                     | 415                     | 440                     |
| Input phases (mm <sup>2</sup> )         | 2 x 240 | 2 x 240 | 2 x 240 | 2 x 240 | (3 x 185) <sup>23</sup> | (3 x 185) <sup>23</sup> | 2 x 240 | 2 x 240 | (3 x 185) <sup>23</sup> | (3 x 185) <sup>23</sup> | (3 x 185) <sup>23</sup> | (3 x 185) <sup>23</sup> |
| Input PE (mm <sup>2</sup> )             | 1 x 240 | 1 x 240 | 1 x 240 | 1 x 240 | 2 x 150                 | 2 x 150                 | 1 x 240 | 1 x 240 | 2 x 150                 | 2 x 150                 | 2 x 150                 | 2 x 150                 |
| Bypass/output phases (mm <sup>2</sup> ) | 2 x 185 | 2 x 150 | 2 x 150 | 2 x 150 | 2 x 240                 | 2 x 240                 | 2 x 185 | 2 x 150 | 2 x 240                 | 2 x 240                 | 2 x 240                 | 2 x 240                 |
| Bypass PE/output PE (mm <sup>2</sup> )  | 1 x 185 | 1 x 150 | 1 x 150 | 1 x 150 | 1 x 240                 | 1 x 240                 | 1 x 185 | 1 x 150 | 1 x 240                 | 1 x 240                 | 1 x 240                 | 1 x 240                 |

23. For parallel UPS systems, the Standard EConversion Limits Based on Non-recommended Cable Sizes, page 30 table shall be used.



**Aluminum (Continued)**

| UPS rating                 | 400 kW  |         |         |         | 450 kW  |         |         |         | 500 kW  |         |         |         |
|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Voltage (V)                | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     | 380     | 400     | 415     | 440     |
| Neutral (mm <sup>2</sup> ) | 2 x 185 | 2 x 150 | 2 x 150 | 2 x 150 | 2 x 240 | 2 x 240 | 2 x 185 | 2 x 150 | 2 x 240 | 2 x 240 | 2 x 240 | 2 x 240 |
| DC+/DC- (mm <sup>2</sup> ) | 3 x 185 |         |         |         | 3 x 240 |         |         |         | 4 x 185 |         |         |         |
| DC PE (mm <sup>2</sup> )   | 2 x 150 |         |         |         | 2 x 185 |         |         |         | 2 x 185 |         |         |         |

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

**NOTICE**

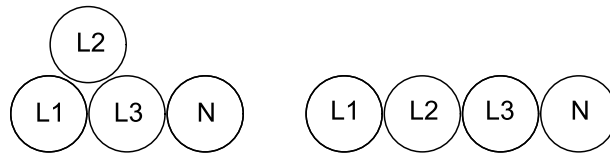
**RISK OF EQUIPMENT DAMAGE**

To ensure correct load sharing in bypass operation in a parallel system:

- All bypass cables must be the same length (within 10% deviation) for all UPSs.
- All output cables must be the same length (within 10% deviation) for all UPSs.
- All input cables must be the same length (within 10% deviation) for all UPSs (only required in single mains system).

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

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



**ECONversion Limits for Parallel UPS Systems**

ECONversion requires a minimum load percentage on the UPS for parallel UPS systems. The minimum required load percentages depend on the power cable sizes.

**NOTE:** For installations using the recommended cable sizes, refer to the Standard ECONversion Limits Based on Recommended Cable Sizes, page 29 table for the minimum load percentages.

**Standard ECONversion Limits Based on Recommended Cable Sizes**

| UPS rating | Minimum load % |
|------------|----------------|
| 200 kW     | 34%            |
| 250 kW     | 27%            |
| 300 kW     | 23%            |
| 350 kW     | 19%            |
| 400 kW     | 17%            |
| 450 kW     | 15%            |
| 500 kW     | 14%            |

The other prerequisites to use this table include:

- The values are calculated based on the use of recommended cable sizes.
- Installations with maximum two cables on each phase are supported.

- The bypass and output cables must be the same length (within 10% deviation) for all UPSs.

**NOTE:** For certain installations such as installations with 80% breakers or where other installation methods have been applied to comply with the IEC standard, it is possible that non-recommended cable sizes will be used. For installations using non-recommended cable sizes, refer to the [Standard EConversion Limits Based on Non-recommended Cable Sizes](#), page 30 table for the voltage ratings percentages.

#### Standard EConversion Limits Based on Non-recommended Cable Sizes

| UPS rating | Minimum load % |
|------------|----------------|
| 200 kW     | 50%            |
| 250 kW     | 40%            |
| 300 kW     | 34%            |
| 350 kW     | 29%            |
| 400 kW     | 25%            |
| 450 kW     | 22%            |
| 500 kW     | 20%            |

The other prerequisites to use this table include:

- The values are calculated based on the scenario of using non-recommended cable sizes.
- Installations with three or four cables on each phase are supported.
- The bypass and output cables must be the same length (within 10% deviation) for all UPSs.

## Upstream and Downstream Protection for UL

### **⚠ DANGER**

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

- Circuit breakers must have instantaneous trip time of maximum 50 ms.
- Circuit breakers must have instantaneous override values set according to the table below.
- Circuit breakers must be installed for input (unit input breaker UIB) and bypass (static switch input breaker SSIB).
- Circuit breakers must be installed for the output (unit output breaker UOB) of each UPS in a parallel system.

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

### **⚠ CAUTION**

#### **HAZARD OF FIRE**

- Connect only to a circuit with the below specifications.
- Connect to a circuit provided with a 1200 A branch circuit overcurrent protection maximum in accordance with the National Electrical Code, ANSI/NFPA70, and the Canadian Electrical Code, Part I, C22.1.

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

## Recommended Upstream Protection for UL

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

| UPS rating                         | 200 kW        |               | 250 kW        |               |
|------------------------------------|---------------|---------------|---------------|---------------|
|                                    | Input         | Bypass        | Input         | Bypass        |
| Breaker type                       | LJF36400CU31X | LJF36400CU31X | PJF36060CU31A | LJF36400CU31X |
| I <sub>r</sub>                     | 400           | 300           | 540           | 400           |
| t <sub>r</sub>                     | ≥4            | ≥4            | ≥4            | ≥4            |
| I <sub>i</sub> (x I <sub>n</sub> ) | ≤12           | ≤12           | ≤12           | ≤12           |

| UPS rating                         | 300 kW         |               | 350 kW        |               | 400 kW        |               |
|------------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|
|                                    | Input          | Bypass        | Input         | Bypass        | Input         | Bypass        |
| Breaker type                       | PJF36060CU31-A | PJF36060CU31A | PJF36080CU31A | PJF36060CU31A | PJF36080CU31A | PJF36060CU31A |
| I <sub>r</sub>                     | 600            | 480           | 720           | 600           | 800           | 600           |
| t <sub>r</sub>                     | ≥4             | ≥4            | ≥4            | ≥4            | ≥4            | ≥4            |
| I <sub>i</sub> (x I <sub>n</sub> ) | ≤12            | ≤12           | ≤10           | ≤12           | ≤10           | ≤12           |

| UPS rating                         | 450 kW        |               | 500 kW        |               |
|------------------------------------|---------------|---------------|---------------|---------------|
|                                    | Input         | Bypass        | Input         | Bypass        |
| Breaker type                       | PJF36100CU31A | PJF36080CU31A | PJF36100CU31A | PJF36080CU31A |
| I <sub>r</sub>                     | 900           | 720           | 1000          | 800           |
| t <sub>r</sub>                     | ≥4            | ≥4            | ≥4            | ≥4            |
| I <sub>i</sub> (x I <sub>n</sub> ) | ≤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 500 kcmil.
- 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:

- 4 on input/output/bypass busbars
- 4 x 500 kcmil on input/output/bypass busbars
- 4 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<sup>24</sup>:

- 90 °C (194 °F) conductors (75 °C (167 °F) termination)
- An ambient temperature of 30 °C (86 °F)
- Use of copper or aluminum conductors

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 breakers for UIB, UOB, MBB, SSIB. 100% rated breakers for battery breakers.

### Copper

| UPS rating                        | 200 kW     | 250 kW     | 300 kW     | 350 kW     | 400 kW     | 450 kW     | 500 kW     |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Voltage (V)</b>                | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b> |
| Input phases (AWG/kcmil)          | 1 x 350    | 1 x 500    | 2 x 4/0    | 2 x 300    | 2 x 350    | 2 x 400    | 2 x 500    |
| Input EGC (AWG/kcmil)             | 1 x 3      | 1 x 3      | 2 x 2      | 2 x 1      | 2 x 1/0    | 2 x 1/0    | 2 x 1/0    |
| Bypass/output phases (AWG/kcmil)  | 1 x 250    | 1 x 350    | 1 x 500    | 2 x 4/0    | 2 x 250    | 2 x 300    | 3 x 350    |
| Bypass EGC/output EGC (AWG/kcmil) | 1 x 4      | 1 x 3      | 1 x 3      | 2 x 2      | 2 x 2      | 2 x 1      | 2 x 1/0    |
| DC+/DC- (AWG/kcmil)               | 2 x 300    | 2 x 400    | 3 x 350    | 3 x 400    | 4 x 350    | 4 x 400    | 4 x 500    |
| DC EGC (AWG/kcmil)                | 2 x 1      | 2 x 1/0    | 3 x 2/0    | 3 x 2/0    | 4 x 3/0    | 4 x 4/0    | 4 x 4/0    |

24. Using non-recommended cable sizes will affect the ECOConversion limits for parallel UPS systems. Be sure to check the Standard ECOConversion Limits Based on Non-recommended Cable Sizes, page 34 table in this installation scenario.

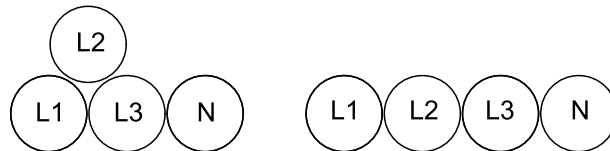
**Aluminum**

| UPS rating                        | 200 kW     | 250 kW     | 300 kW     | 350 kW     | 400 kW     | 450 kW                  | 500 kW                  |
|-----------------------------------|------------|------------|------------|------------|------------|-------------------------|-------------------------|
| <b>Voltage (V)</b>                | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b> | <b>480</b>              | <b>480</b>              |
| Input phases (AWG/kcmil)          | 1 x 500    | 2 x 250    | 2 x 300    | 2 x 400    | 2 x 500    | (3 x 300) <sup>25</sup> | (3 x 400) <sup>25</sup> |
| Input EGC (AWG/kcmil)             | 1 x 1      | 2 x 1      | 2 x 1/0    | 2 x 2/0    | 2 x 3/0    | 3 x 3/0                 | 3 x 3/0                 |
| Bypass/output phases (AWG/kcmil)  | 1 x 350    | 1 x 500    | 2 x 250    | 2 x 300    | 2 x 350    | 2 x 500                 | 2 x 500                 |
| Bypass EGC/output EGC (AWG/kcmil) | 1 x 2      | 1 x 1      | 2 x 1      | 2 x 1/0    | 2 x 1/0    | 2 x 2/0                 | 2 x 3/0                 |
| DC+/DC- (AWG/kcmil)               | 2 x 500    | 3 x 300    | 3 x 500    | 4 x 350    | 4 x 500    | 5 x 400                 | 5 x 500                 |
| DC EGC (AWG/kcmil)                | 1 x 2/0    | 3 x 3/0    | 3 x 4/0    | 4 x 4/0    | 4 x 250    | 5 x 350                 | 5 x 350                 |

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

|  |
|--|
| <b>NOTICE</b>  |
| <p><b>RISK OF EQUIPMENT DAMAGE</b></p> <p>To ensure correct load sharing in bypass operation in a parallel system:</p> <ul style="list-style-type: none"> <li>• All bypass cables must be the same length (within 10% deviation) for all UPSs.</li> <li>• All output cables must be the same length (within 10% deviation) for all UPSs.</li> <li>• All input cables must be the same length (within 10% deviation) for all UPSs (only required in single mains system).</li> </ul> <p><b>Failure to follow these instructions can result in equipment damage.</b></p> |

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



**ECONversion Limits for Parallel UPS Systems**

ECONversion requires a minimum load percentage on the UPS for parallel UPS systems. The minimum required load percentages depend on the power cable sizes.

**NOTE:** For installations using the recommended cable sizes, refer to the Standard ECONversion Limits Based on Recommended Cable Sizes, page 33 table for the minimum load percentages.

**Standard ECONversion Limits Based on Recommended Cable Sizes**

| UPS rating | Minimum load % |
|------------|----------------|
| 200 kW     | 34%            |
| 250 kW     | 27%            |

25. For parallel UPS systems, the Standard ECONversion Limits Based on Non-recommended Cable Sizes, page 34 table shall be used.

### Standard EConversion Limits Based on Recommended Cable Sizes (Continued)

|        |     |
|--------|-----|
| 300 kW | 23% |
| 350 kW | 19% |
| 400 kW | 17% |
| 450 kW | 15% |
| 500 kW | 14% |

The other prerequisites to use this table include:

- The values are calculated based on the use of recommended cable sizes.
- Installations with maximum two cables on each phase are supported.
- The bypass and output cables must be the same length (within 10% deviation) for all UPSs.

**NOTE:** For certain installations such as installations with 80% breakers or where other installation methods have been applied to comply with the IEC standard, it is possible that non-recommended cable sizes will be used. For installations using non-recommended cable sizes, refer to the [Standard EConversion Limits Based on Non-recommended Cable Sizes](#), page 34 table for the voltage ratings percentages.

### Standard EConversion Limits Based on Non-recommended Cable Sizes

| UPS rating | Minimum load % |
|------------|----------------|
| 200 kW     | 50%            |
| 250 kW     | 40%            |
| 300 kW     | 34%            |
| 350 kW     | 29%            |
| 400 kW     | 25%            |
| 450 kW     | 22%            |
| 500 kW     | 20%            |

The other prerequisites to use this table include:

- The values are calculated based on the scenario of using non-recommended cable sizes.
- Installations with three or four cables on each phase are supported.
- The bypass and output cables must be the same length (within 10% deviation) for all UPSs.

## Recommended Bolt and Lug Sizes

**NOTICE**

**RISK OF EQUIPMENT DAMAGE**

Use only UL approved compression cable lugs.

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

### 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 Red 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 Blue P87   |

### 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 Red P66    |
| 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 Blue P87   |

## Torque Specifications

| Bolt size | Torque                              |
|-----------|-------------------------------------|
| M6        | 5 Nm (3.69 lb-ft / 44.3 lb-in)      |
| M8        | 17.5 Nm (12.91 lb-ft / 154.9 lb-in) |
| M10       | 30 Nm (22 lb-ft / 194.7 lb-in)      |
| M12       | 50 Nm (36.87 lb-ft / 442.5 lb-in)   |



## Requirements for a Third Party Battery Solution

Battery breaker boxes from Schneider Electric are recommended for the battery interface. Please contact Schneider Electric for more information.

### Third Party Battery Breaker Requirements

**⚠️ ⚠️ DANGER**

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

- All selected battery breakers must be equipped with instantaneous trip functionality with an undervoltage release coil or a shunt trip release coil.
- Trip delay must be set to zero on all battery breakers.

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

**NOTE:** There are more factors to consider when selecting a battery breaker than the requirements listed below. Please contact Schneider Electric for more information.

### Design Requirements for Battery Breaker

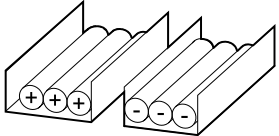
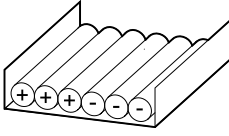
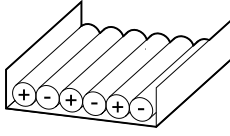
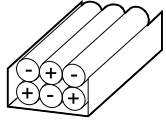
|  |   |
|--|---|
| Battery breaker rated DC voltage > Normal battery voltage          | The normal voltage of the battery configuration is defined as the highest nominal occurring battery voltage. This can be equivalent to the float voltage which may be defined as <b>number of battery blocks x number of cells x cell float voltage</b> . |
| Battery breaker rated DC current > Rated discharge battery current | This current is controlled by the UPS and must include maximum discharge current. This will typically be the current at the end of discharge (minimum operation DC voltage or in overload condition or a combination).                                    |
| DC landings  | Two DC landings for DC cables (DC+ and DC-) are required.   |
| AUX switches for monitoring  | One AUX switch must be installed in each battery breaker and connected to the UPS. The UPS can monitor up to four battery breakers.   |
| Short-circuit breaking capability                                  | The short-circuit breaking capability must be higher than the short-circuit DC current of the (largest) battery configuration.  |
| Minimum trip current   | The minimum short-circuit current to trip the battery breaker must match the (smallest) battery configuration, to make the breaker trip in case of a short circuit, up to the end of its life time.   |

## 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   |

## Environment

|  | Operating   | Storage   |
|--|---|---|
| Temperature                                    | 0 °C to 40 °C (32 °F to 104 °F) without load derating.  | -25 °C to 55 °C (-13 °F to 131 °F) for systems without batteries. |
| Relative humidity                              | 0-95% non-condensing  | 10-80% non-condensing   |
| Elevation                                      | <p>Designed for operation in 0-3000 m (0-10000 feet) elevation.</p> <p>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): 0.975<br/>           Up to 2000 m (6600 feet): 0.950<br/>           Up to 2500 m (8300 feet): 0.925<br/>           Up to 3000 m (10000 feet): 0.900</p> <p>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</p> |   |
| Audible noise one meter (three feet) from unit | 62 dB at 70% load<br><br>69.5 dB at 100% load for 400 V systems<br><br>68 dB at 100% load for 480 V systems   |   |
| Protection class                               | IP20  |   |
| Color  | RAL 9003, gloss level 85%   |   |

## Compliance

|                 |   |
|-----------------|---|
| Safety          | IEC 62040-1: 2008-06, 1st edition Uninterruptible Power Systems (UPS) - Part 1: General and safety requirements for UPS<br>IEC 62040-1: 2013-01, 1st edition amendment 1<br>UL 1778 5th edition   |
| 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   |
| 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.<br><br>Output performance classification (according to IEC 62040-3, Clause 5.3.4): VFI-SS-111 |
| Transportation  | IEC 60721-4-2 Level 2M2   |
| 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   |
| Earthing system | TN, TT, TNC, IT<br><br>Solid-grounded, HRG  |

## Regional Seismic Compliance

Certificate available upon request.

| Country/Region       | Code ID                         | Hazard level ground               | Hazard level roof                 |
|----------------------|---------------------------------|-----------------------------------|-----------------------------------|
| Argentina            | INPRES-CIRSOC103                | Zone 4                            | Zone 4                            |
| Australia            | AS 1170.4-2007                  | Z = 0.22                          | Z = 0.22                          |
| Canada <sup>26</sup> | 2020 NBCC                       | S <sub>a</sub> = 1.95             | S <sub>a</sub> = 1.44             |
| Chile                | NCh 433.Of1996                  | Zone 3                            | Zone 2                            |
| China                | GB 50011-2010 (2016)            | α <sub>Max</sub> = 1.4            | α <sub>Max</sub> = 0.9            |
| Europe               | Eurocode 8 EN1998-1             | α <sub>gR</sub> = 0.375           | α <sub>gR</sub> = 0.25            |
| India                | IS 1893 (Part 1) : 2016         | Z = 0.36                          | Z = 0.36                          |
| Japan                | Building Standard Law           | Zone A                            | Zone A                            |
| New Zealand          | NZS 1170.5:2004+A1              | Z = 0.54                          | Z = 0.37                          |
| Peru                 | N.T.E. - E.030                  | Zone 4                            | Zone 4                            |
| Russia               | SNIP II-7-81 (SP 14.13330.2014) | MSK 9                             | MSK 9                             |
| Taiwan               | CPA 2011 Seismic Design Code    | S <sub>S</sub> <sup>D</sup> = 0.8 | S <sub>S</sub> <sup>D</sup> = 0.8 |
| U.S.A. <sup>26</sup> | ASCE 7-16 / IBC 2018            | S <sub>DS</sub> = 1.98            | S <sub>DS</sub> = 1.45            |

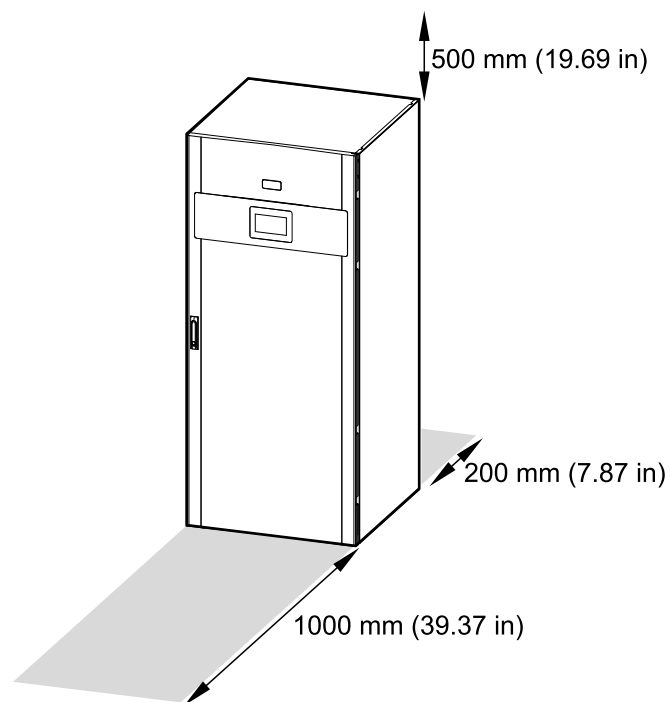
26. OSHPD Pre-approved in accordance with AC156 test protocol.

## 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)      |
| 250 kW     | 588 (1296)      | 1970 (78)      | 850 (33)      | 925 (36)      |
| 300 kW     | 626 (1380)      | 1970 (78)      | 850 (33)      | 925 (36)      |
| 350 kW     | 664 (1463)      | 1970 (78)      | 850 (33)      | 925 (36)      |
| 400 kW     | 702 (1547)      | 1970 (78)      | 850 (33)      | 925 (36)      |
| 450 kW     | 740 (1631)      | 1970 (78)      | 850 (33)      | 925 (36)      |
| 500 kW     | 778 (1715)      | 1970 (78)      | 850 (33)      | 925 (36)      |

## Clearance

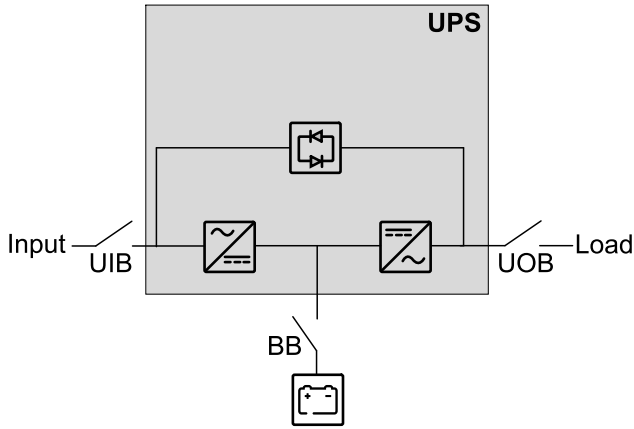
**NOTE:** Clearance dimensions are published for airflow and service access only. Consult with the local safety codes and standards for additional requirements in your local area.



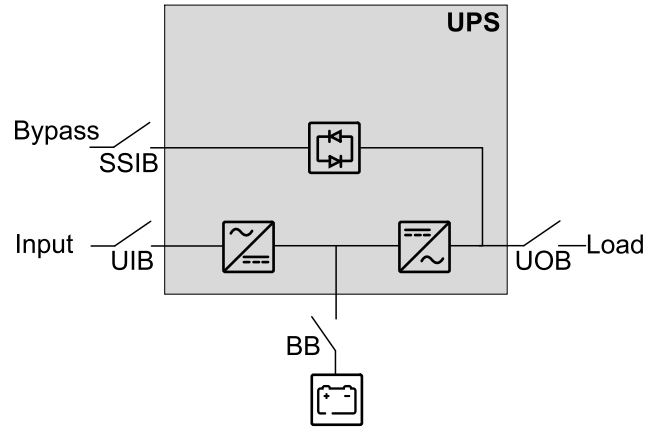
# Single System Overview

|      |                             |
|------|-----------------------------|
| UIB  | Unit input breaker          |
| SSIB | Static switch input breaker |
| UOB  | Unit output breaker         |
| BB   | Battery breaker             |

**Single System – Single Mains**



**Single System – Dual Mains**

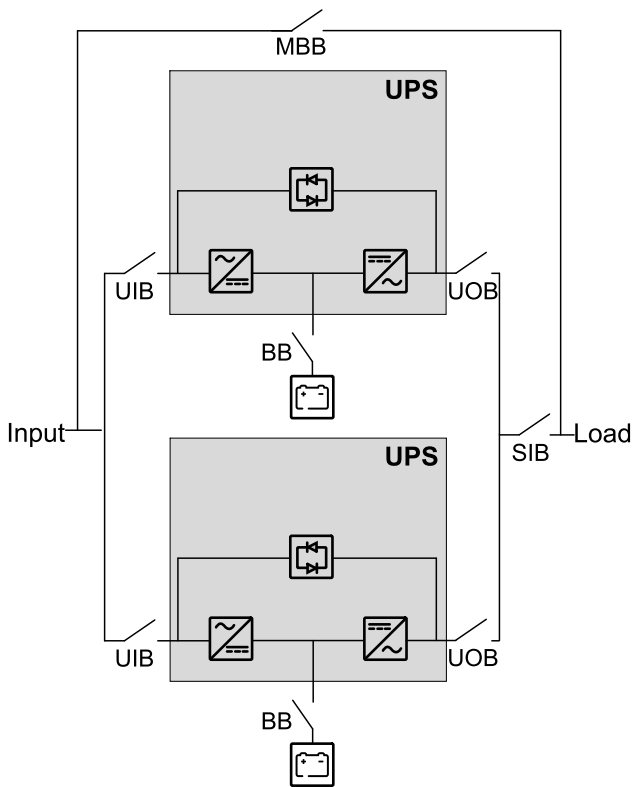


# Parallel System Overview

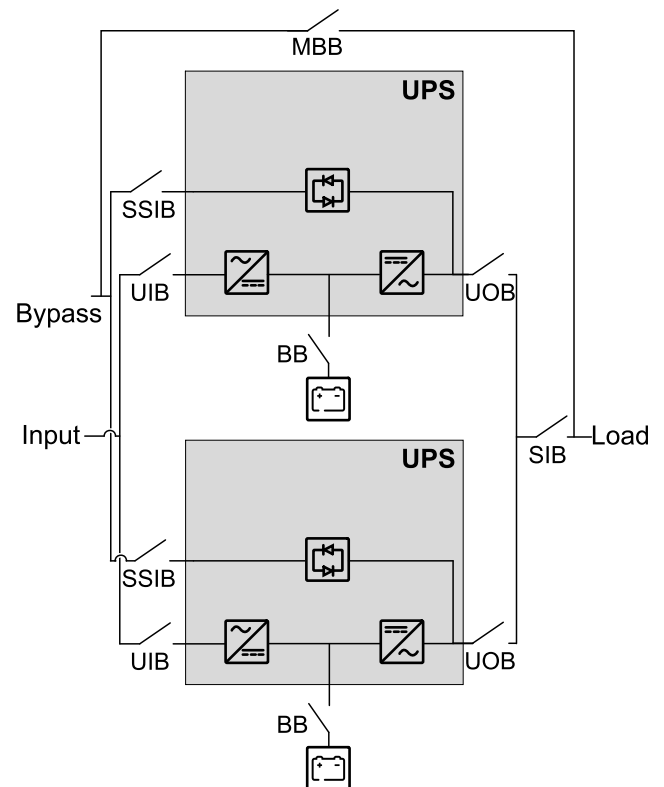
|      |                                     |
|------|-------------------------------------|
| UIB  | Unit input breaker                  |
| SSIB | Static switch input breaker         |
| UOB  | Unit output breaker                 |
| SIB  | System isolation breaker            |
| BB   | Battery breaker                     |
| MBB  | External maintenance bypass breaker |

Galaxy VL can support up to 4 UPSs in parallel for capacity and up to 3+1 UPSs in parallel for redundancy with individual unit input breaker UIB and static switch input breaker SSIB.

**Parallel System – Single Mains**



**Parallel System – Dual Mains**



# Installation Procedure for 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
- 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. Perform one of the following procedures:
  - Without seismic anchoring: Position the UPS, page 46.
  - With seismic anchoring: Install the Seismic Anchoring (Option), page 47.
2. Perform one of the following procedures:
  - Top cable entry: Prepare the UPS for Top Cable Entry, page 49.
  - Bottom cable entry: Follow in the installation manual provided with the bottom entry cabinet.
3. Only for TNC or HRG earthing system:
  - Prepare for TNC Earthing System, page 51.
  - Prepare for HRG Earthing System, page 52.
4. Perform one of the following procedures:
  - Connect Power Cables in the UPS in System up to 45 kAIC/kA Icw, page 53.
  - Connect Power Cables in the UPS in System over 45 kAIC/kA Icw, page 57.
5. Connect the Signal Cables, page 64.
6. Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 67.
7. Connect the Modbus Cables, page 71.
8. Only for parallel system: Connect the PBUS Cables, page 73.
9. Only for external synchronization: Connect Signal Cables for External Synchronization, page 74.
10. Install the Power Module(s), page 78.
11. Add Translated Safety Labels to Your Product, page 79.
12. Final installation, page 83.



# Installation Procedure for UPS with Maintenance Bypass Cabinet

## **⚠ 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. 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.
2. Connect the Signal Cables, page 64.
3. Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 67.
4. Connect the Modbus Cables, page 71.
5. **Only for external synchronization:** Connect Signal Cables for External Synchronization, page 74.
6. Install the Power Module(s), page 78.
7. Add Translated Safety Labels to Your Product, page 79.
8. Final installation, page 83.

# Position the UPS

## **⚡⚠ DANGER**

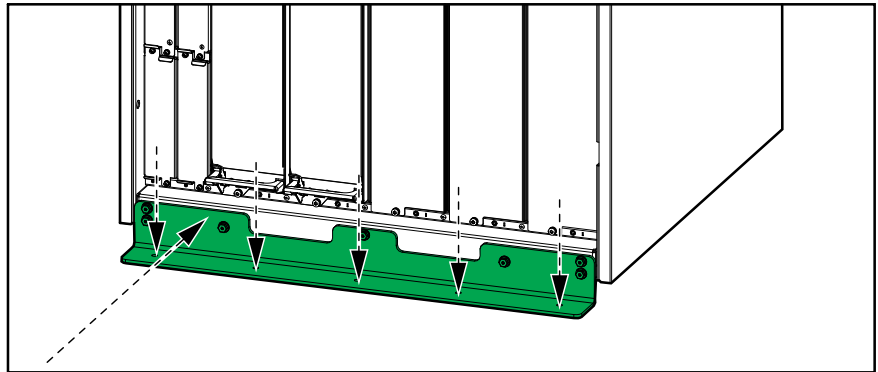
### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

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
- Reinstall the front transportation bracket (870-32577) on the UPS and mount it to the floor.

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

1. Push the UPS into final position.
2. Perform one of the following:
  - Reinstall the front transportation bracket (870-32577) on the UPS and mount it to the floor. Use appropriate hardware for the floor type – the hole diameter in the bracket is  $\varnothing 14$  mm. Minimum requirement is M12 strength grade 8.8 hardware.



- 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**

If leveling feet are used, the UPS may overheat because of the circulating hot air from the rear outlets. Be sure to install the front transportation bracket to block the backflow.

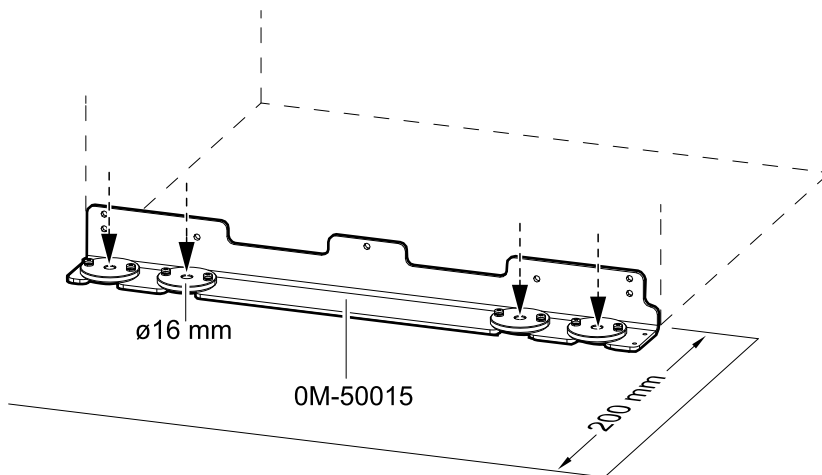
**Failure to follow these instructions can result in equipment damage.**

# Install the Seismic Anchoring (Option)

Use the optional seismic kit GVLOPT002 for this procedure.

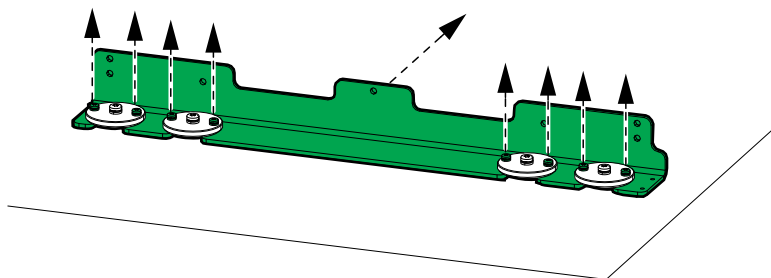
1. Mount the rear anchoring assembly to the floor. Use appropriate hardware for the floor type – the hole diameter in the rear anchors is  $\varnothing 16$  mm. Minimum requirement is M12 strength grade 8.8 hardware.

**Rear View**



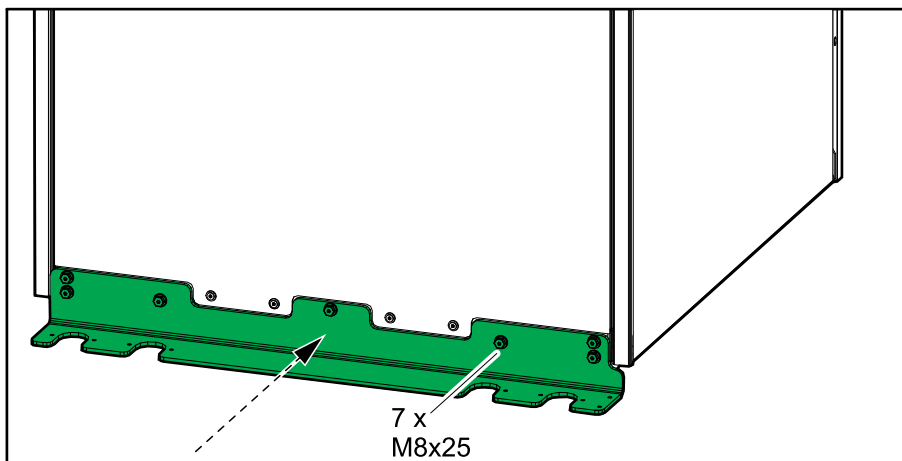
2. Remove all the screws and remove the anchoring bracket.

**Rear View**



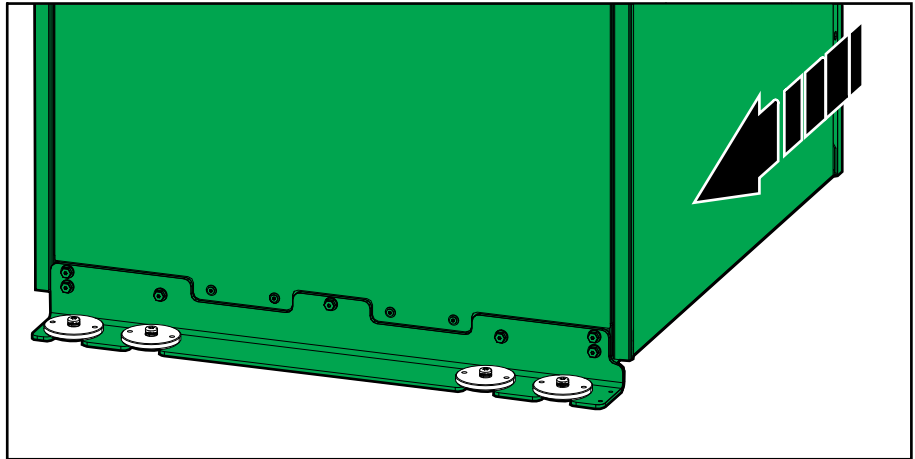
3. Install the rear anchoring brackets on the UPS with the provided M8x25 bolts.

**Rear View**

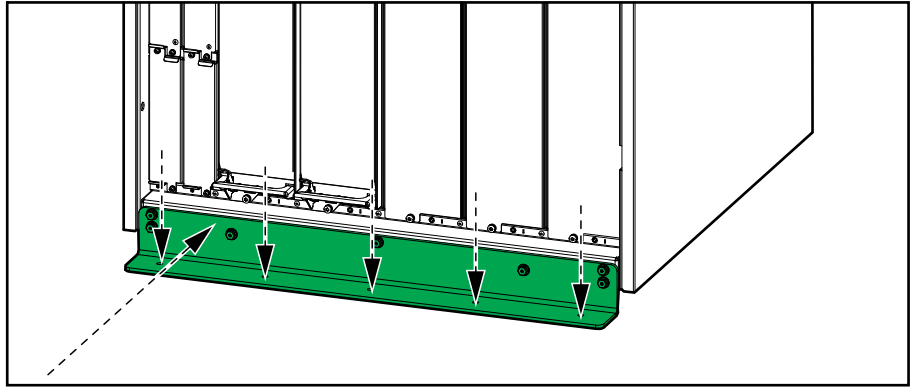


4. Push the UPS into final position. Align with the seismic anchoring.

#### 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  $\varnothing 14$  mm. Minimum requirement is M12 strength grade 8.8 hardware.



# Prepare the UPS for Top Cable Entry

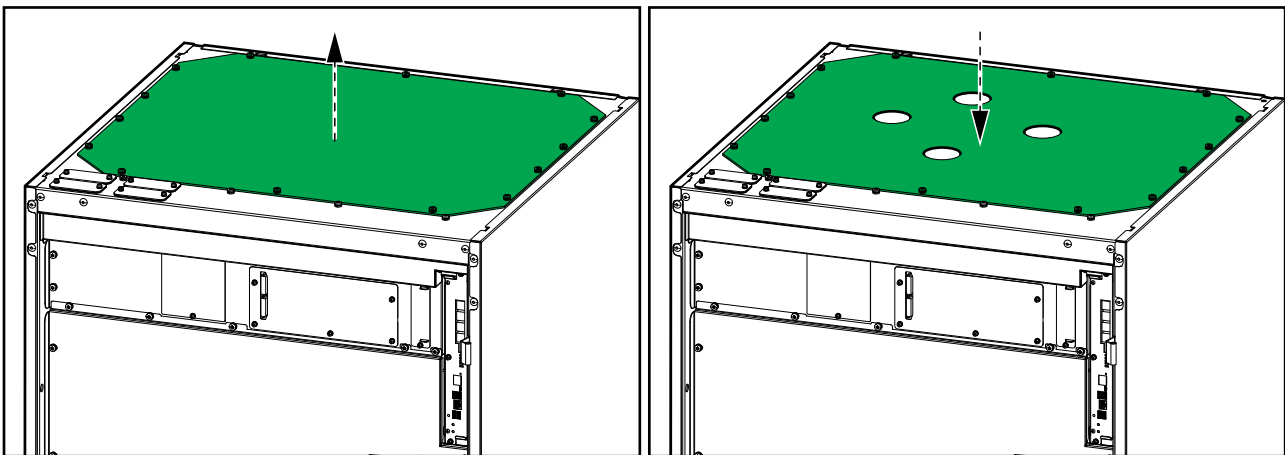
## ⚠ DANGER

### 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.

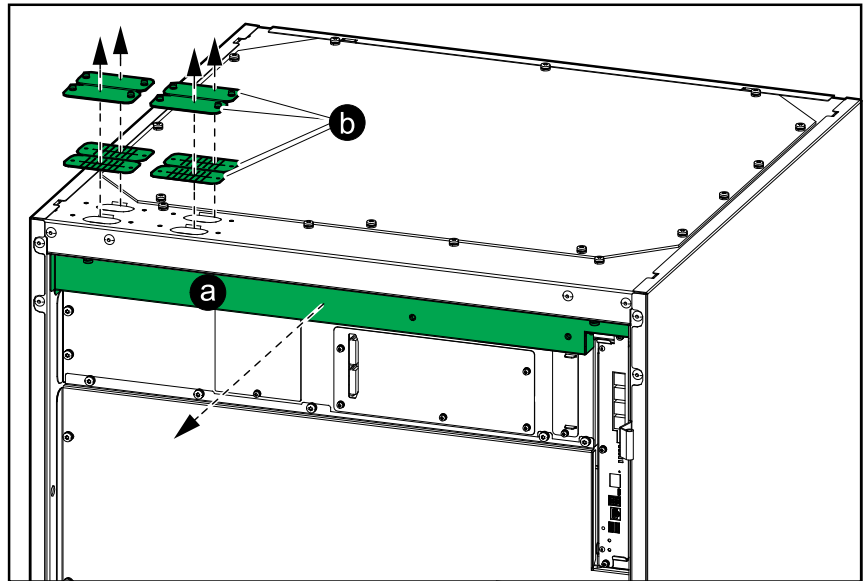
**Failure to follow these instructions will result in death or serious injury.**

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.

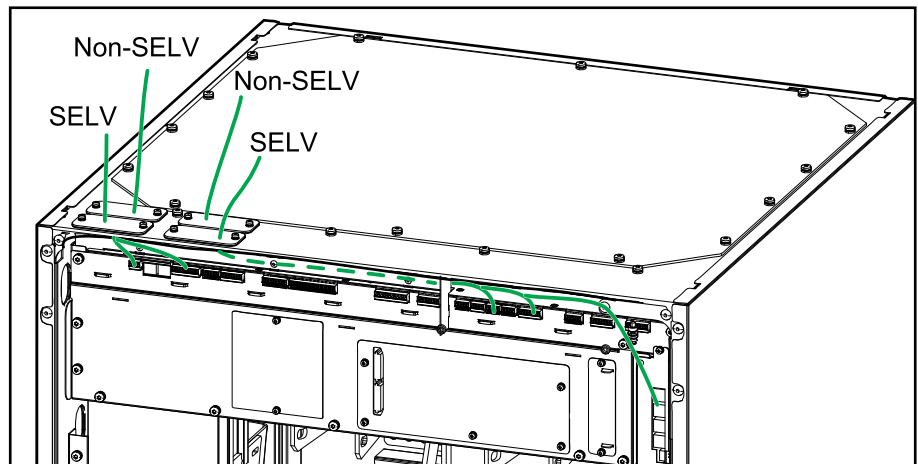


## 2. Prepare for signal cables:

- 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.

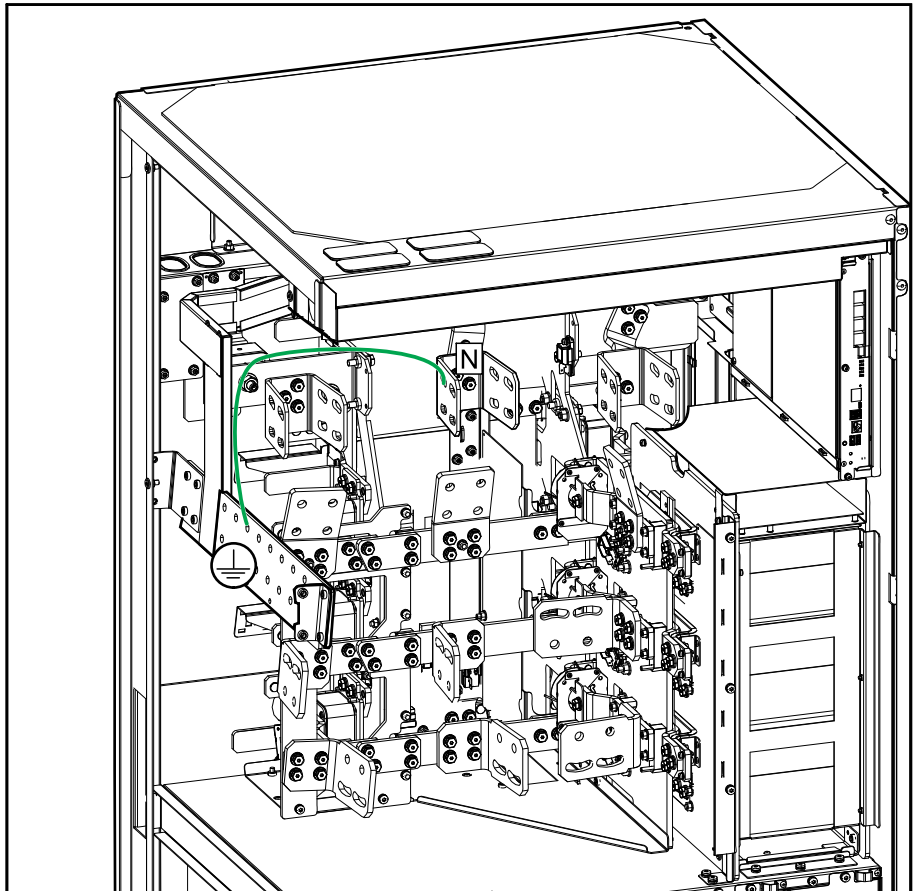


- c. **For installation without conduits/grommets:** Reinstall the brush plates.
  - d. **For installation with conduits/grommets:** Drill holes in the gland plates for conduits/grommets, install conduits/grommets, and reinstall the gland plates.
3. Route the signal cables as shown to separate the Class 2/SELV cables from the non-Class 2/non-SELV cables.



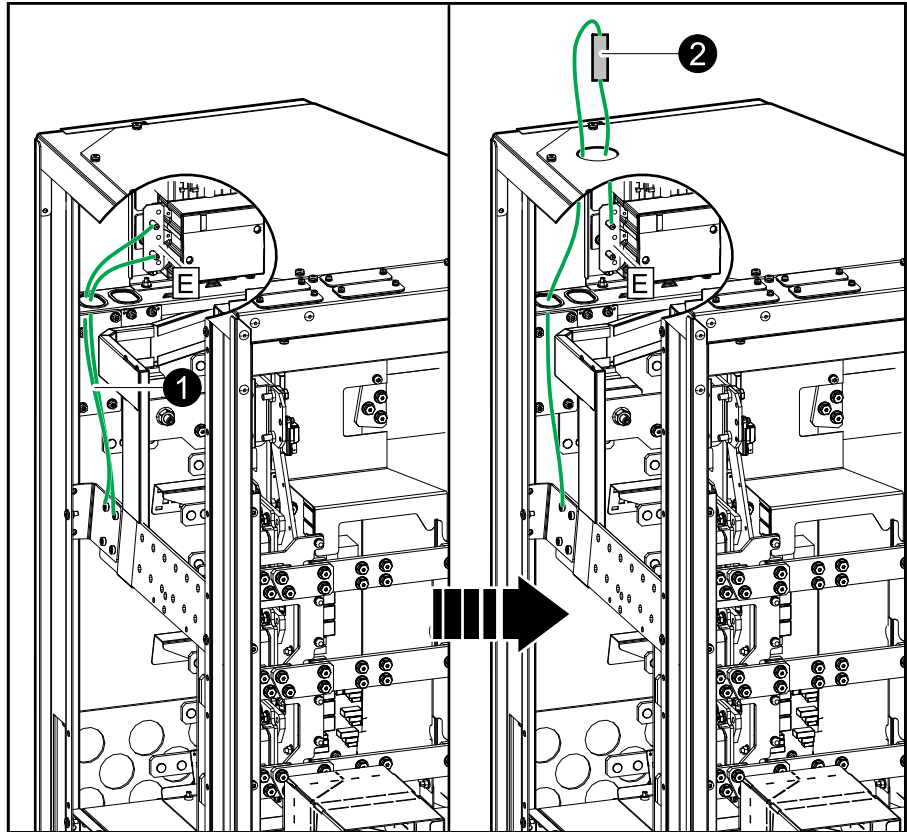
## Prepare for TNC Earthing System

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.



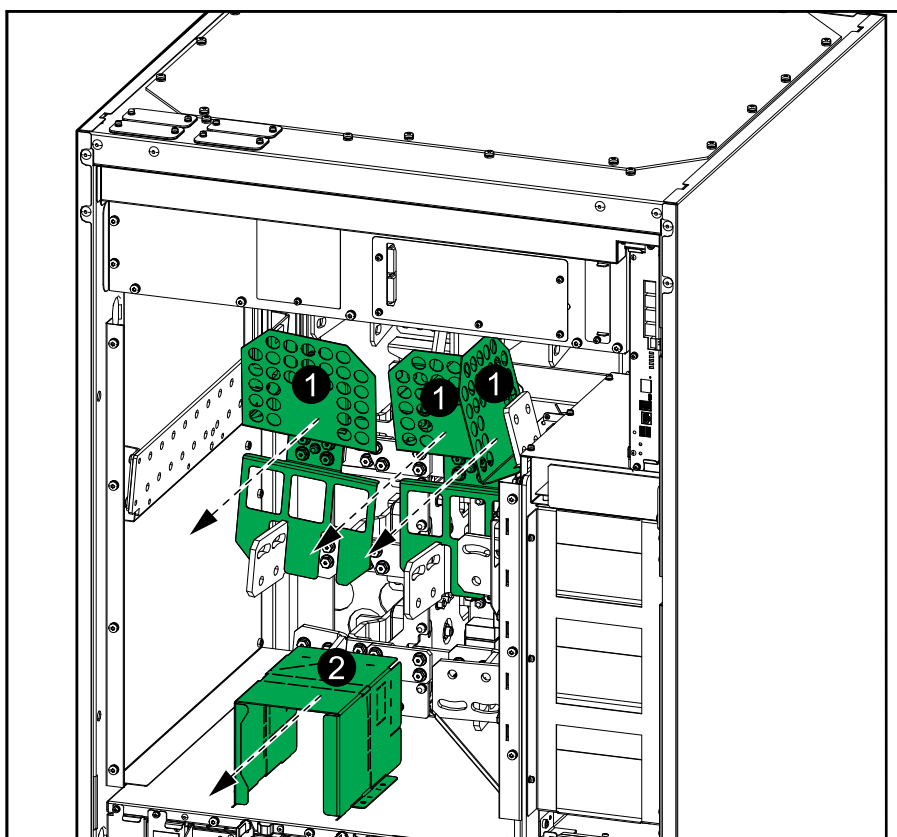


## Connect Power Cables in the UPS in System up to 45 kAIC/kA I<sub>cw</sub>

**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 Li-Ion battery control breaker kit (GVLOPT005) is part of your installation, the Li-Ion battery control breaker kit must be installed **before** the power cables are connected in the UPS. Follow the installation manual provided with the Li-Ion battery control breaker kit.

1. Remove the transparent plastic protectors from the busbars. Save for reinstallation after cable connection.

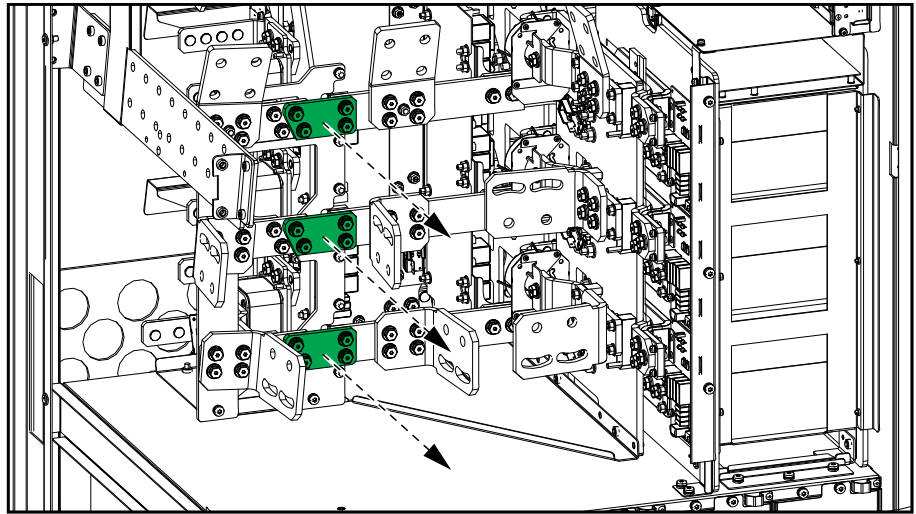


2. Remove the plastic box for easier access. Save for reinstallation after cable connection.

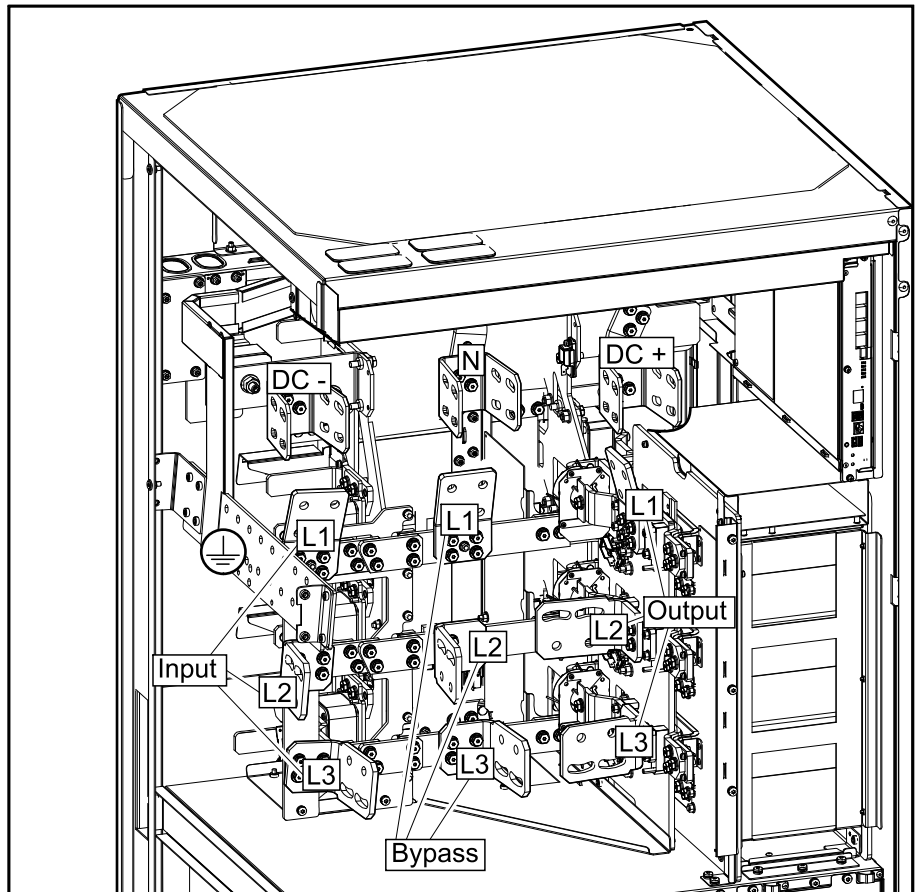
3. **Only for dual mains:** Remove the single mains busbars.

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

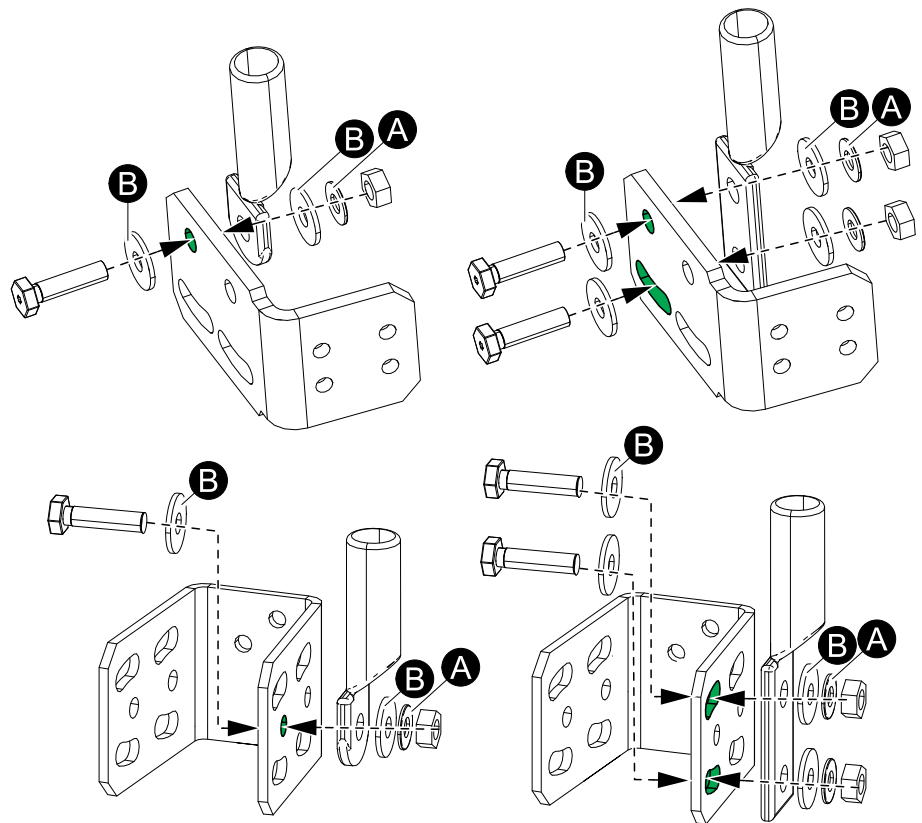
### Front View of the UPS



4. 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).

|   |
|---|
| <b>⚠ CAUTION</b>  |
| <b>RISK OF CABLE LUG DISCONNECTION</b>  |
| <ul style="list-style-type: none"> <li>• Use the provided spring washers when connecting the cable lugs to the busbars as shown in the illustration.</li> <li>• Connect one hole cable lugs and two hole cable lugs to the busbars as shown in the illustration.</li> </ul> |
| <b>Failure to follow these instructions can result in injury or equipment damage.</b>   |

5. Reinstall the transparent plastic protectors in the original position.
6. Reinstall the plastic box in the original position.

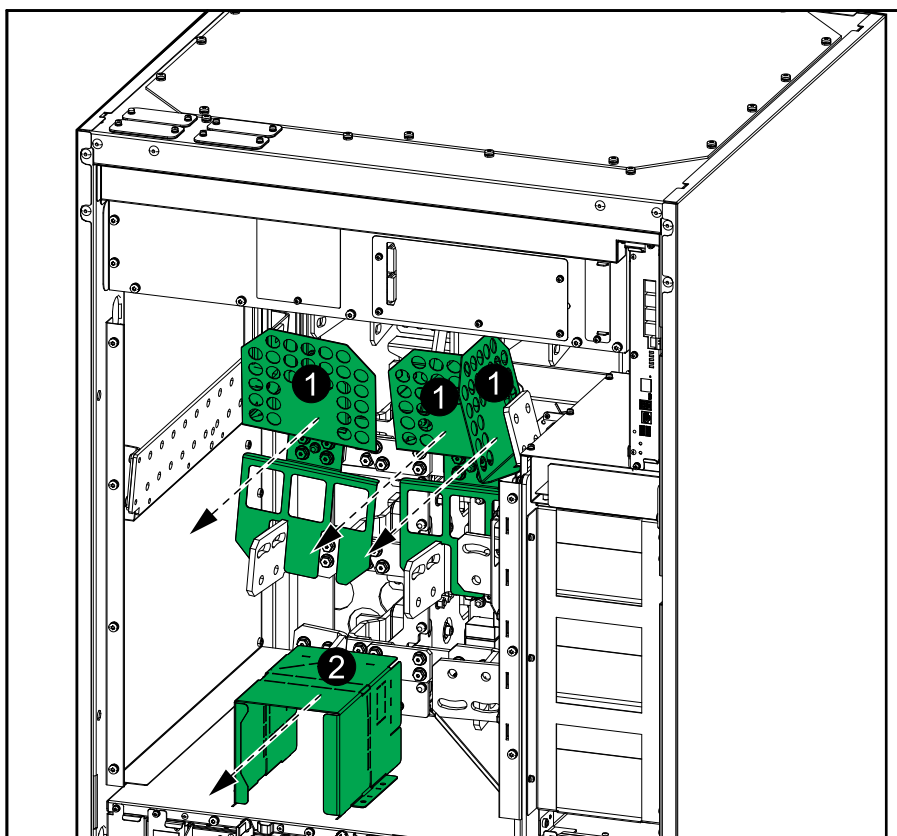
|   |
|---|
| <b>⚠ CAUTION</b>  |
| <b>RISK OF ELECTRIC SHOCK</b>   |
| The transparent plastic protectors and the plastic box must be reinstalled in the original position after power cabling is completed. |
| <b>Failure to follow these instructions can result in injury or equipment damage.</b>   |

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

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

Use kit 0H-1816 for this procedure.

1. Remove the transparent plastic protectors from the busbars. Save for reinstallation after cable connection.

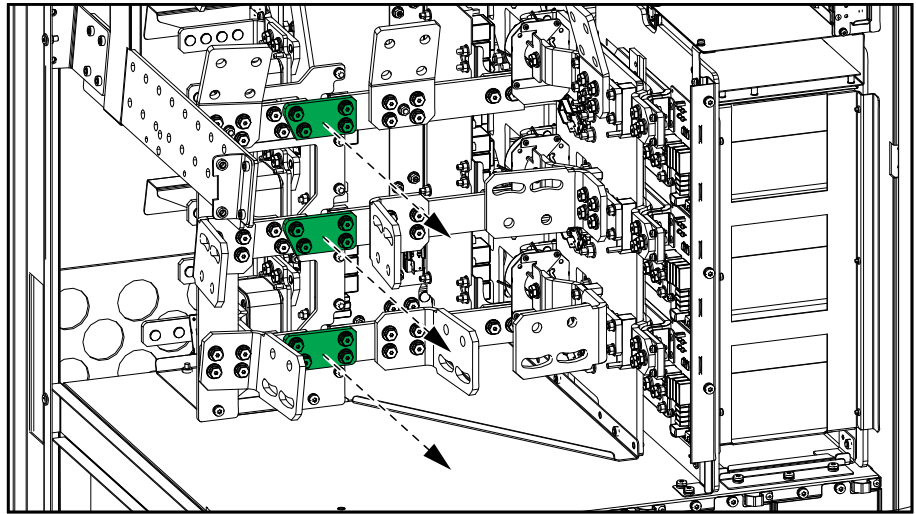


2. Remove the plastic box for easier access. Save for reinstallation after cable connection.

3. **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



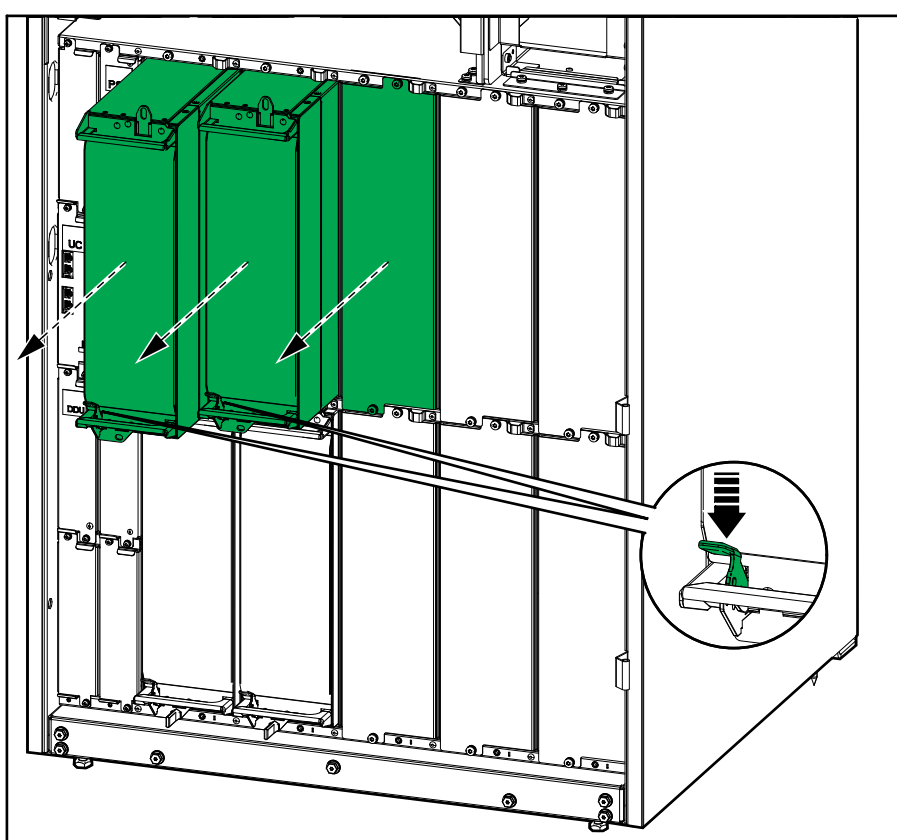
4. Remove the two top power modules and the left-most filler plate:
  - a. Remove the screws in the top and bottom of the power module and push the unlock switch.
  - b. Pull the power module halfway out. A locking mechanism prevents the power module from being pulled all the way out.
  - c. Release the lock by pressing the release button on the top of the power module and remove the power module.

## ⚠ CAUTION

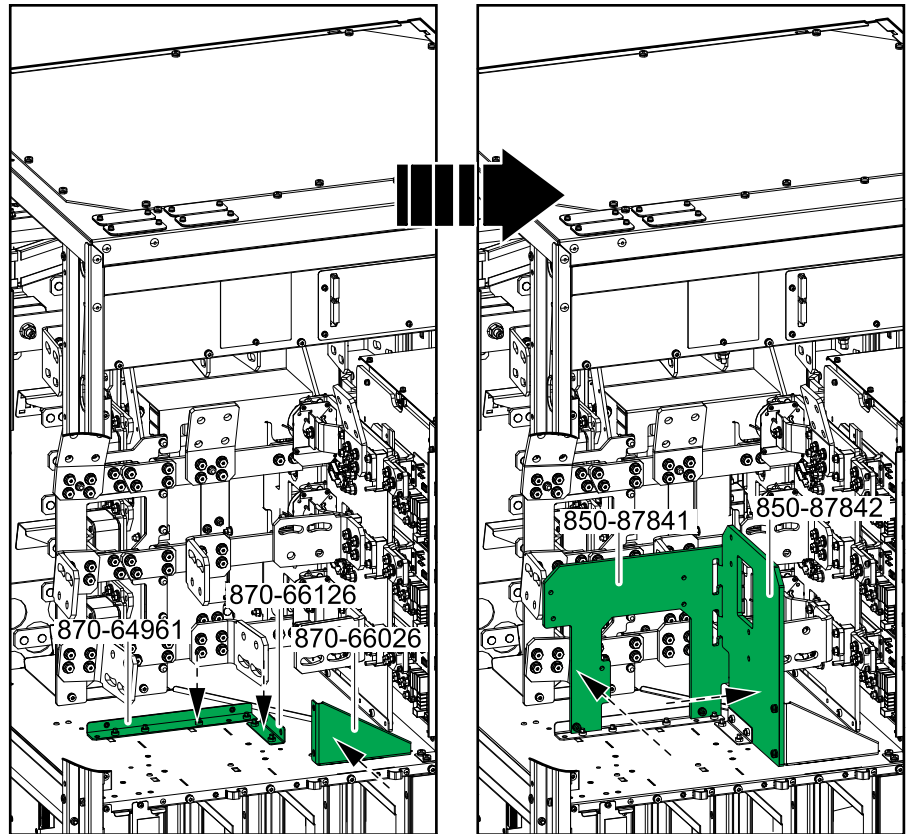
### HEAVY LOAD

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

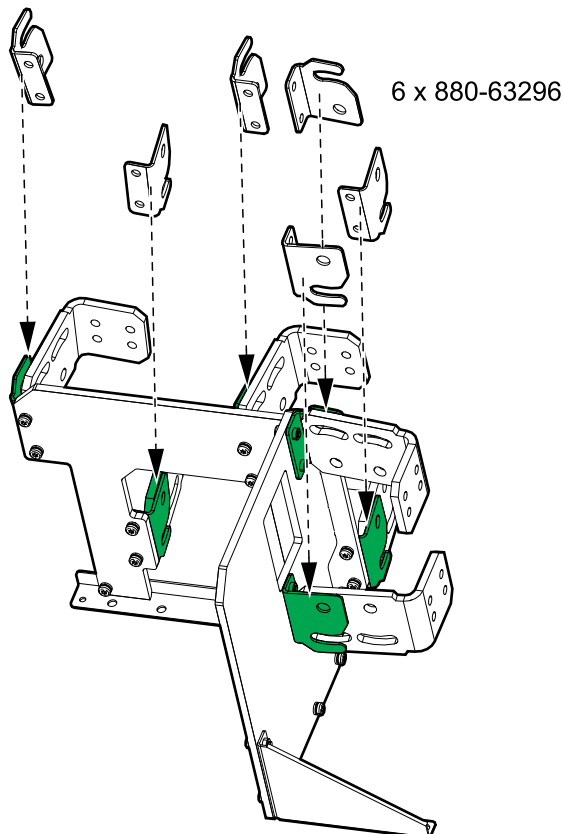
**Failure to follow these instructions can result in injury or equipment damage.**



- 5. Install the three brackets and the two insulator parts on the shelf with the provided screws.

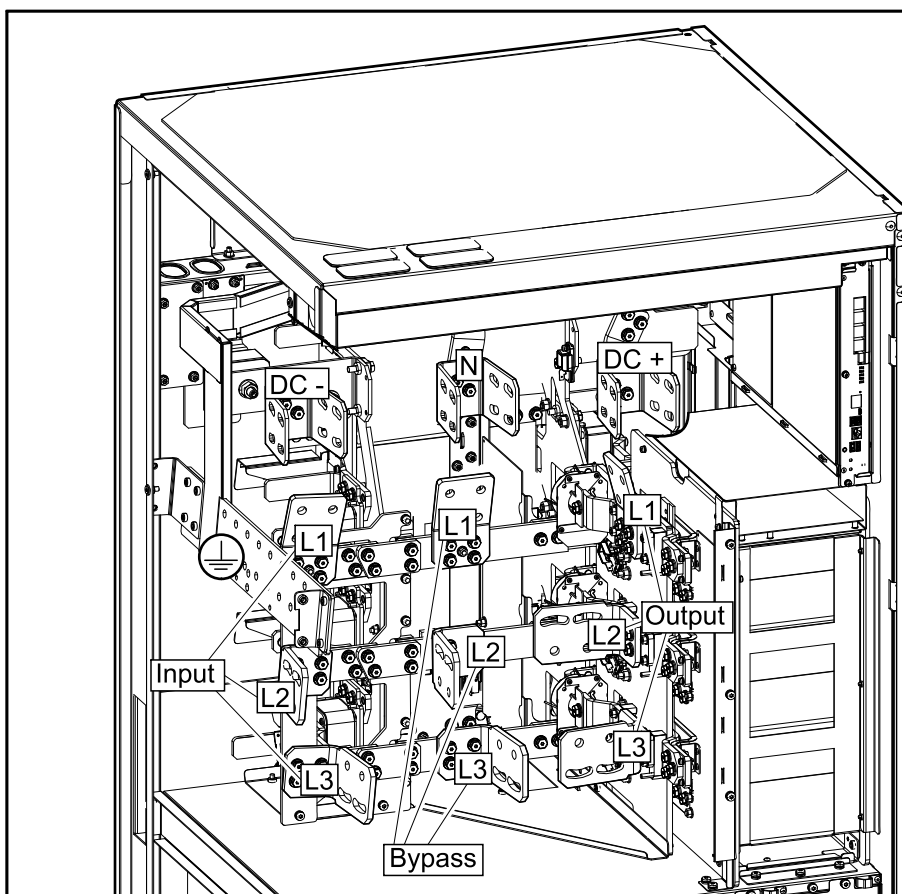


- 6. Install the six brackets on the rear and right side of the insulator parts with the provided screws. The brackets connect from the insulator parts to the busbars. The bracket is fastened to the busbar when the power cable is installed.

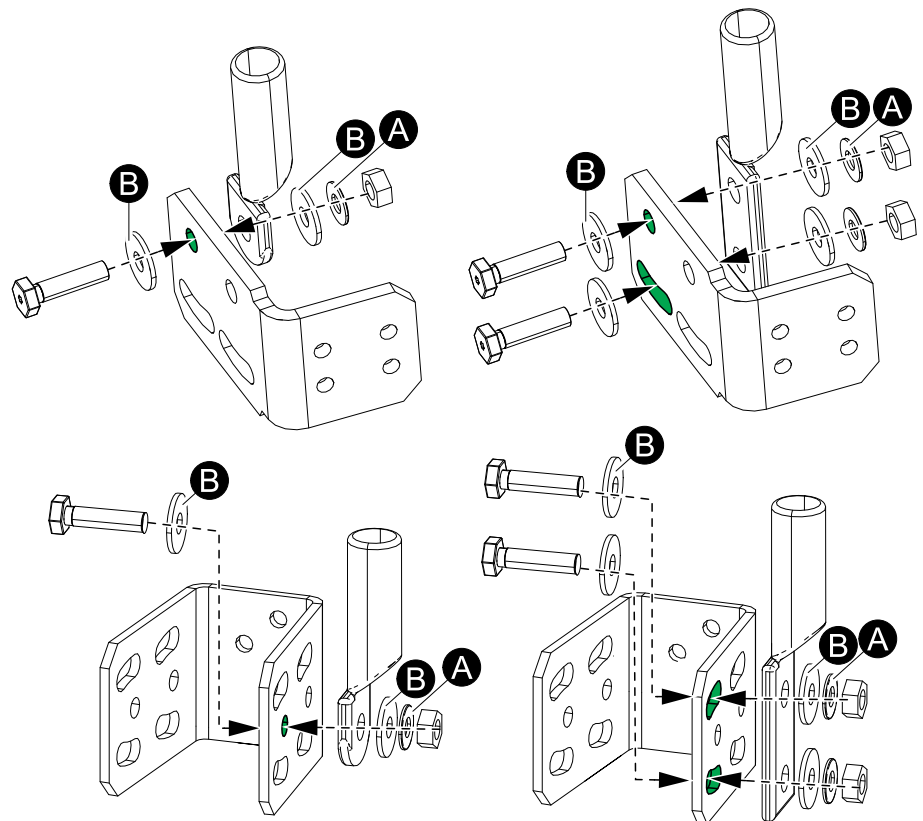




7. Connect the power cables in the described order. Assemble the cable lugs to the busbars as shown.
  - a. Connect the PE cables/equipment grounding conductor (EGC).
  - b. Connect the DC cables (DC+, DC-).
  - c. Connect the input cables. Ensure to install the L2 and L3 power cable through both the 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

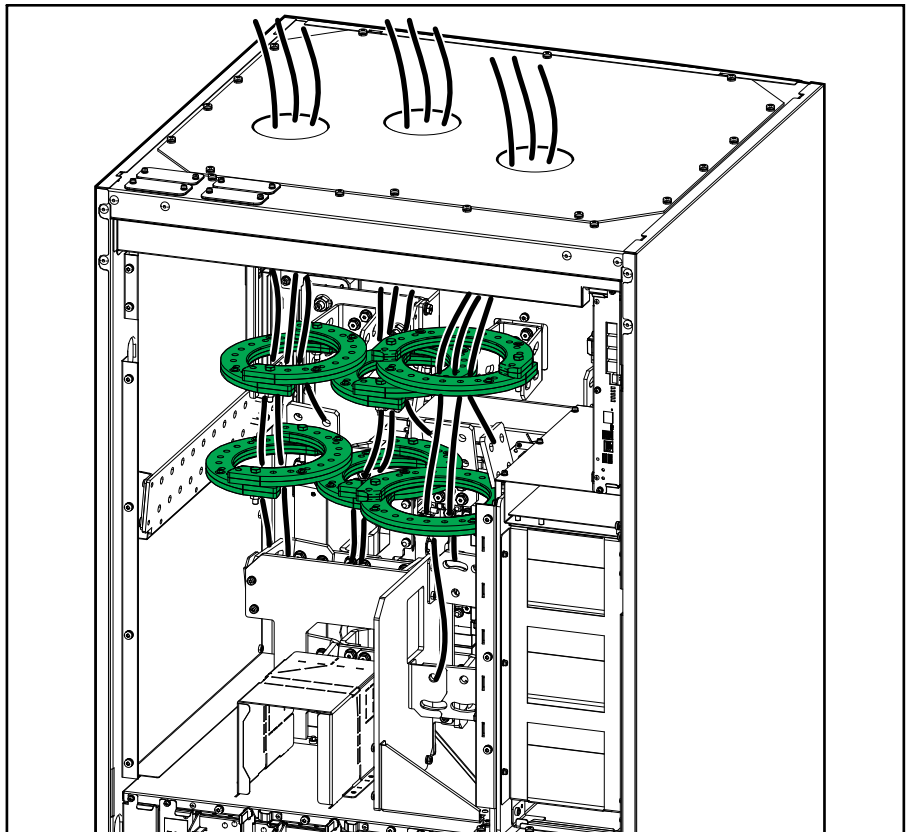
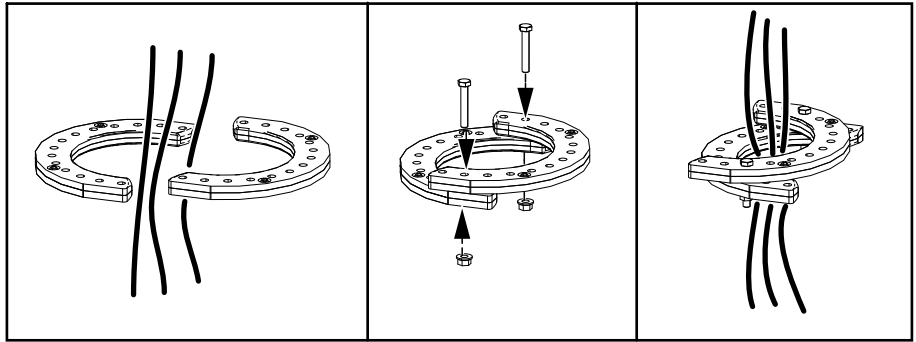
#### RISK OF CABLE LUG DISCONNECTION

- 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.**

8. Reinstall the plastic box in the original position.

9. Fasten the power cables with the provided plastic fasteners in the shown positions. Adjust the fasteners to the power cables so they are fitted tightly together.



10. Reinstall the transparent plastic protectors in the original position.
11. Reinstall the two power modules and the filler plate.

### **⚠ CAUTION**

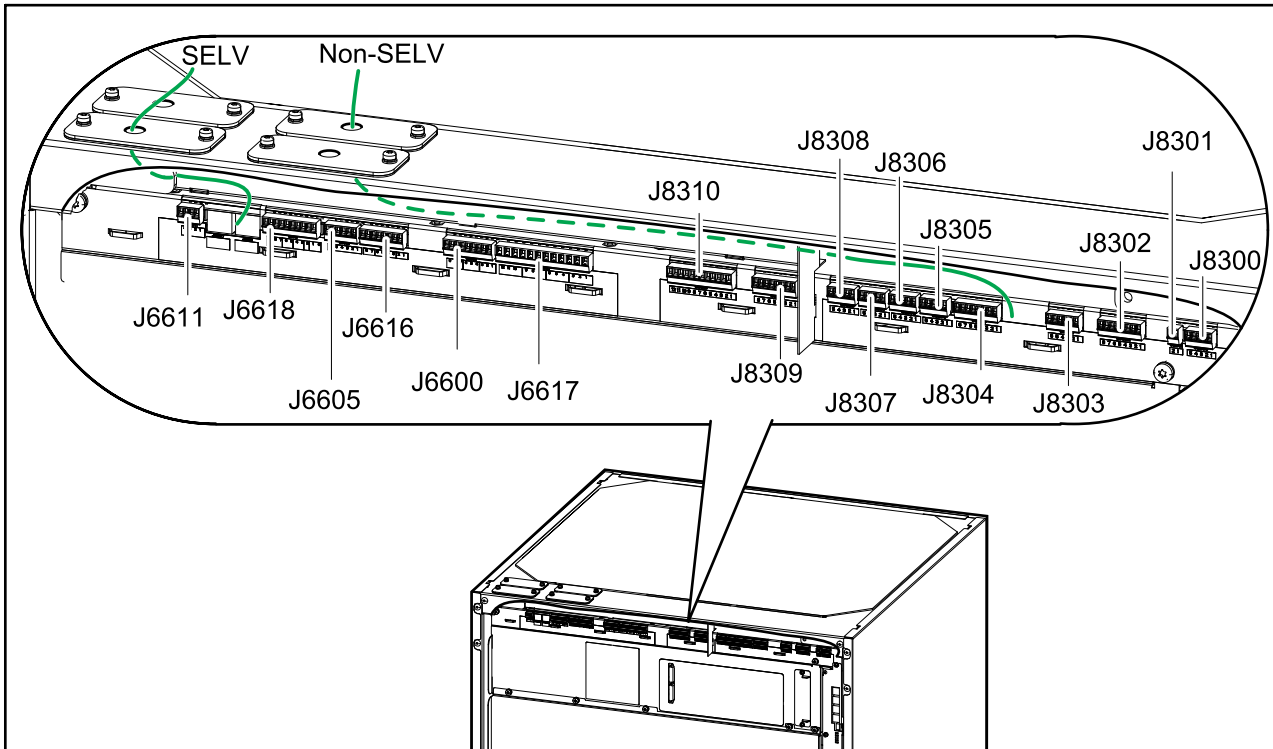
#### **RISK OF ELECTRIC SHOCK**

The transparent plastic protectors and the plastic box must be reinstalled in the original position after power cabling is completed.

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

# Connect the Signal Cables

## Overview of Signal Connection Terminals in the UPS



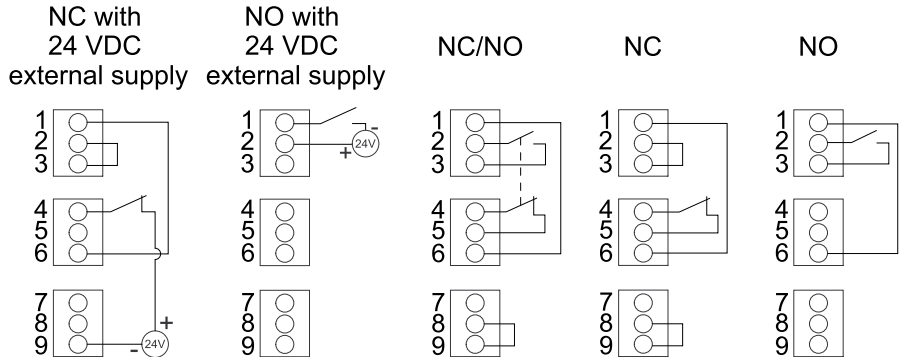
**NOTE:** Route the signal cables separately from the power cables and route the Class 2/SELV cables separately from the non-Class 2/non-SELV cables. A divider inside the cable channel separates the cables.

| Distance from UPS to equipment | Recommended signal cable size |        |
|--------------------------------|-------------------------------|--------|
| 50 m (164 feet)                | 0.5 mm <sup>2</sup>           | 20 AWG |
| 100 m (328 feet)               | 0.75 mm <sup>2</sup>          | 18 AWG |
| 200 m (656 feet)               | 1 mm <sup>2</sup>             | 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.

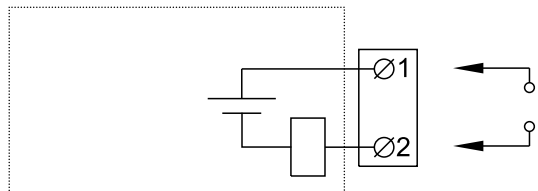
**NOTE:** The default setting for the EPO activation is to turn off the inverter.

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.

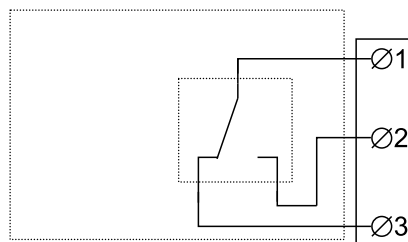
Do not connect any circuit to the input contacts unless it can be confirmed that the circuit is Class 2/SELV.

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

**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.

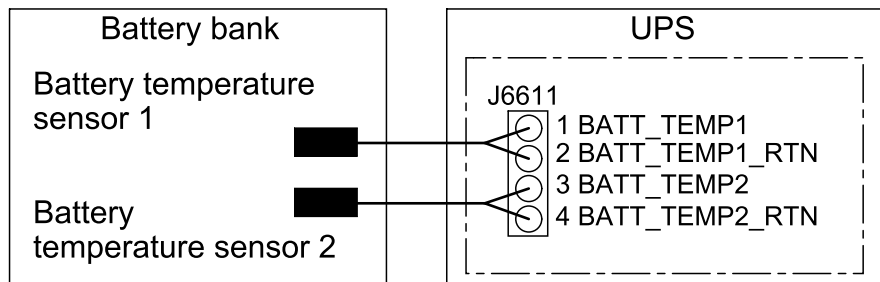
1. Install the temperature sensor provided with the UPS in the battery solution. In battery cabinets, install the temperature sensor in the top corner of the battery cabinet.

|   |
|---|
| <b>⚠ WARNING</b>  |
| <b>HAZARD OF FIRE</b>   |
| Position the temperature sensor as described to ensure correct temperature measurements.              |
| <b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b> |

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

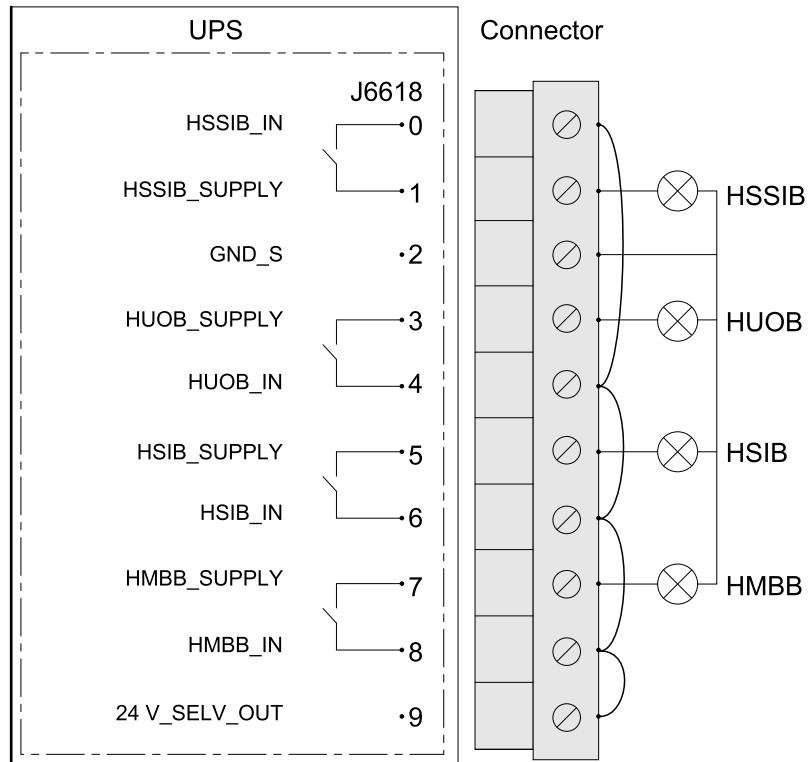
**NOTE:** Two temperature sensors are provided with the UPS.

**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 breaker 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.

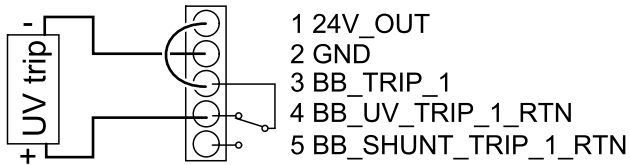
**NOTE:** The breaker indicator light circuit is considered Class 2/SELV. Class 2/SELV circuits must be isolated from the primary circuitry. Do not connect any circuit to the breaker indicator light terminals unless it can be confirmed that the circuit is Class 2/SELV.



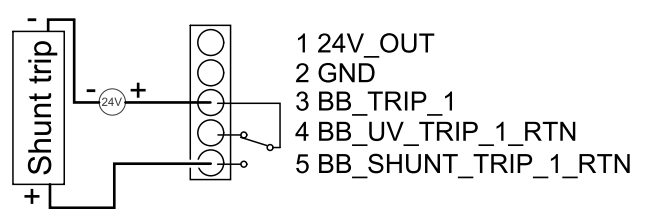
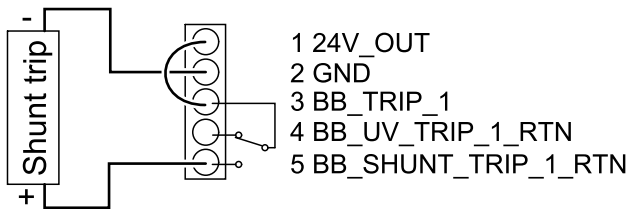
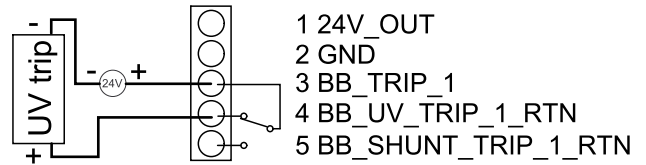


4. Connect the signal cables from the battery breaker(s) in your battery solution for shunt trip or undervoltage (UV) trip connection to the UPS. Follow the illustration for connection with internal or external 24 VDC supply. The UPS can connect to and monitor up to four battery breakers.
  - a. Connect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

**Battery Breaker Trip Connection with Internal 24 VDC Supply**



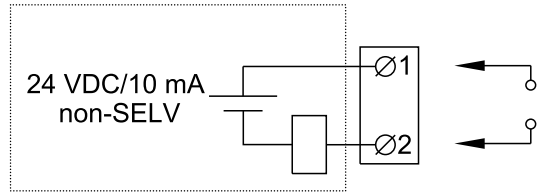
**Battery Breaker Trip Connection with External 24 VDC Supply**



**Supported Shunt**

| Current (A) | Time (ms)  | Temperature   |
|-------------|------------|---------------|
| 1.6         | Continuous | 20 °C (68 °F) |
| 10          | 1300       | 20 °C (68 °F) |
| 20          | 200        | 20 °C (68 °F) |
| 30          | 60         | 20 °C (68 °F) |

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

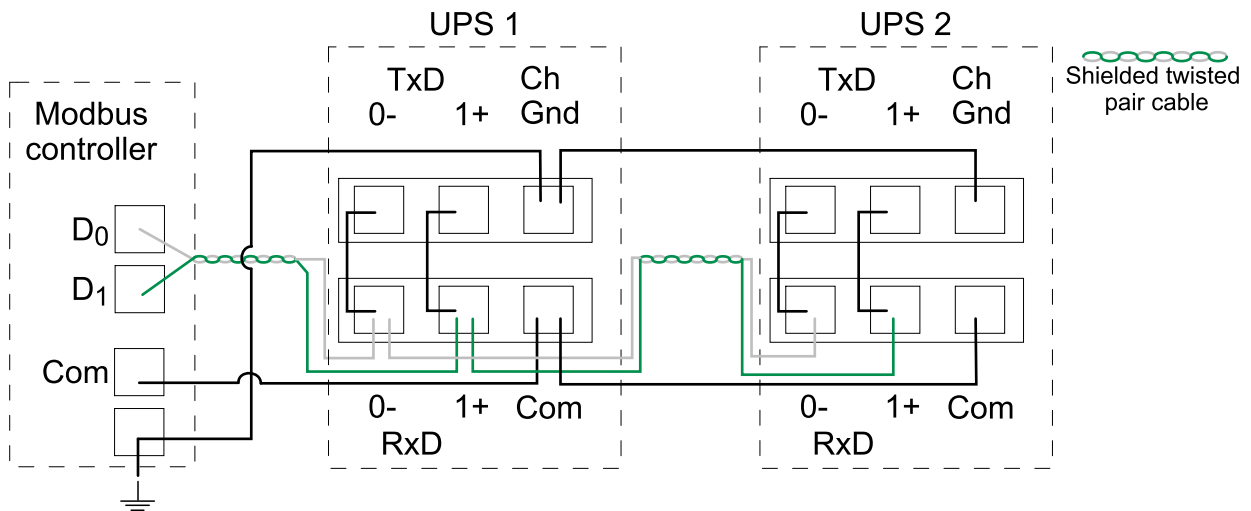


| Terminal number | Function  | Connection   |
|-----------------|---|--|
| J8303, 1-2      | UOB_RED (redundant AUX switch in unit output breaker)             | Connect to redundant AUX switch in unit output breaker UOB.  |
| J8303, 5-6      | SIB (system isolation breaker)                                    | Connect to normally open (NO) AUX switch in system isolation breaker SIB for parallel system. SIB must contain an AUX switch for each connected UPS. |
| J8304, 1-2      | BB1 (battery breaker 1)   | Connect to normally open (NO) AUX switch in battery breaker number 1.  |
| J8304, 3-4      | BB2 (battery breaker 2)   | Connect to normally open (NO) AUX switch in battery breaker number 2.  |
| J8304, 5-6      | BB3 (battery breaker 3)   | Connect to normally open (NO) AUX switch in battery breaker number 3.  |
| J8304, 7-8      | BB4 (battery breaker 4)   | Connect to normally open (NO) AUX switch in battery breaker number 4.  |
| J8302, 7-8      | UOB (unit output breaker)   | Connect to normally open (NO) AUX switch in unit output breaker UOB.   |
| J8302, 3-4      | SSIB (static switch input breaker)                                | Connect to normally open (NO) AUX switch in static switch input breaker SSIB. SSIB must contain an AUX switch for each connected UPS.                |
| J8302, 1-2      | UIB (unit input breaker)  | Connect to normally open (NO) AUX switch in unit input breaker UIB. UIB must contain an AUX switch for each connected UPS.                           |
| J8302, 5-6      | MBB (maintenance bypass breaker)                                  | Connect to normally closed (NC) AUX switch in maintenance bypass breaker MBB. MBB must contain an AUX switch for each connected UPS.                 |
| J8300, 1-5      | EXT BF (external backfeed breaker)                                | See Backfeed Protection, page 80.  |
| J8301, 1-2      | EXT BF RED (redundant power supply for external backfeed breaker) | See Backfeed Protection, page 80.  |

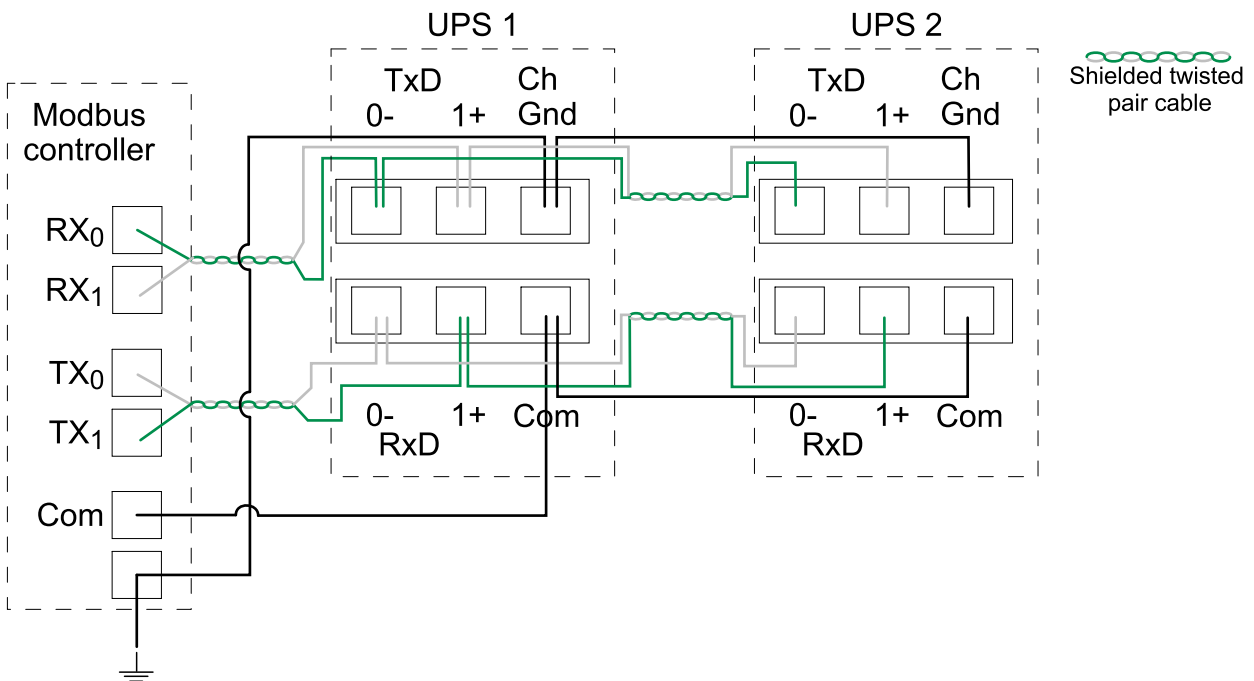
# Connect the Modbus Cables

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



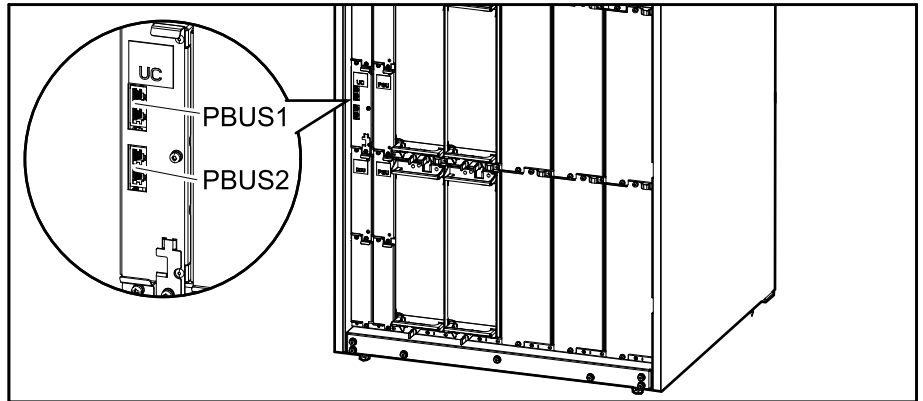
## Example: 4-Wire Connection with Two UPSs



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 19.200 baud should not require termination resistors.

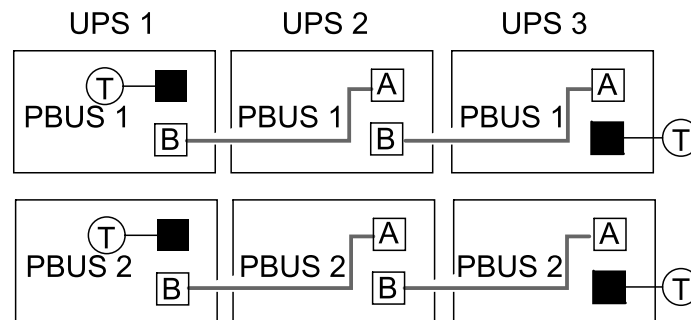
# Connect the PBUS Cables

1. Connect the provided PBUS 1 (white) and PBUS 2 (red) cables to the PBUS ports on the UPSs.



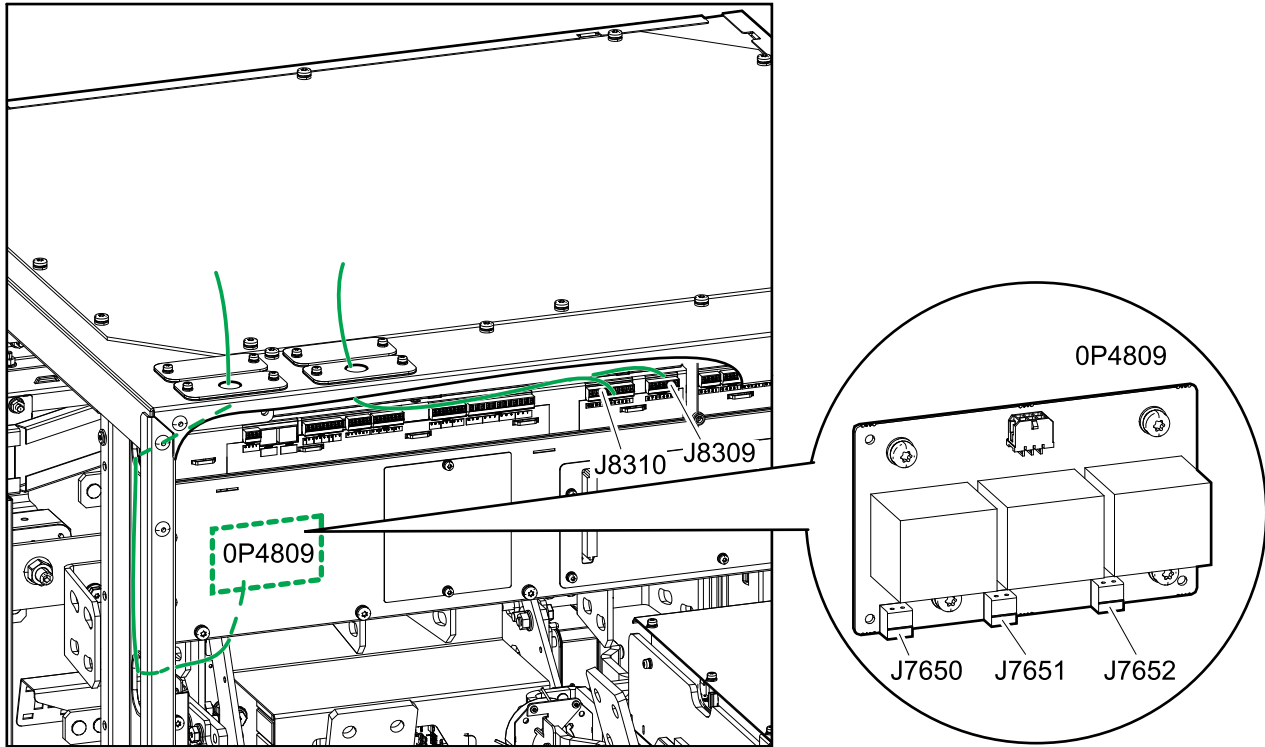
2. Mount termination plugs (T) in the unused connectors.

### Example of System with Three UPSs in Parallel



# Connect Signal Cables for External Synchronization

1. Remove the transparent protection cover from the external sync board 0P4809. The external sync board 0P4809 is located on the rear of the front plate.
2. Connect the cables for external synchronization to the external sync board 0P4809 and to terminals J8309 and J8310. See cable routing on the illustration. Connect the external synchronization according to the diagram below that matches your UPS system.



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

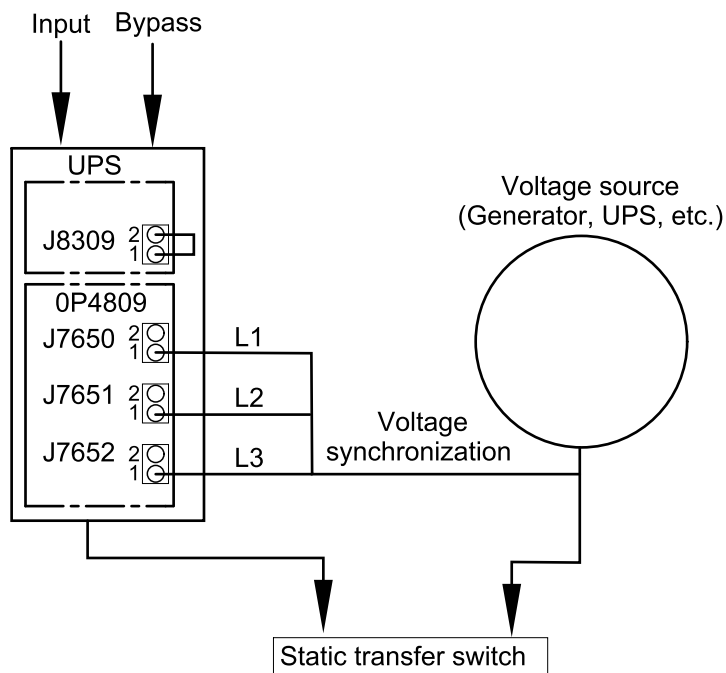
## **⚡⚠ DANGER**

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

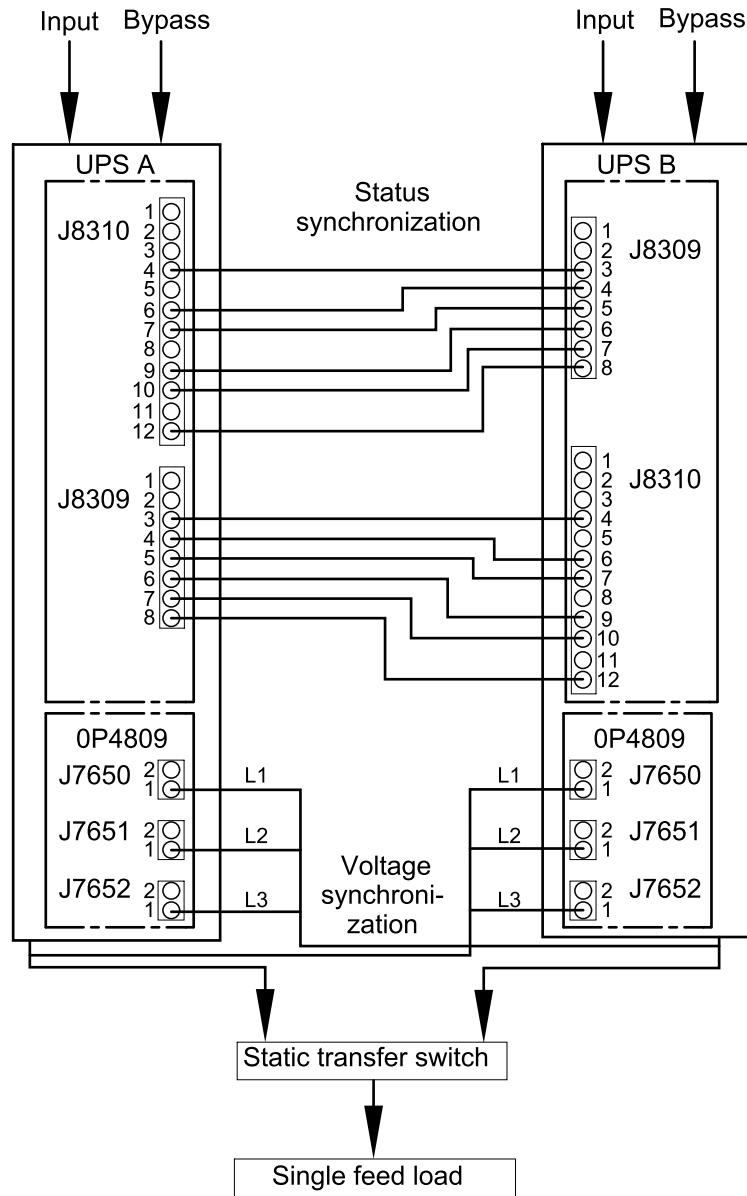
The transparent protection cover must be installed over the external sync board 0P4809.

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

### Signal Cable Connections for Basic UPS Synchronization to a Fixed Voltage Source

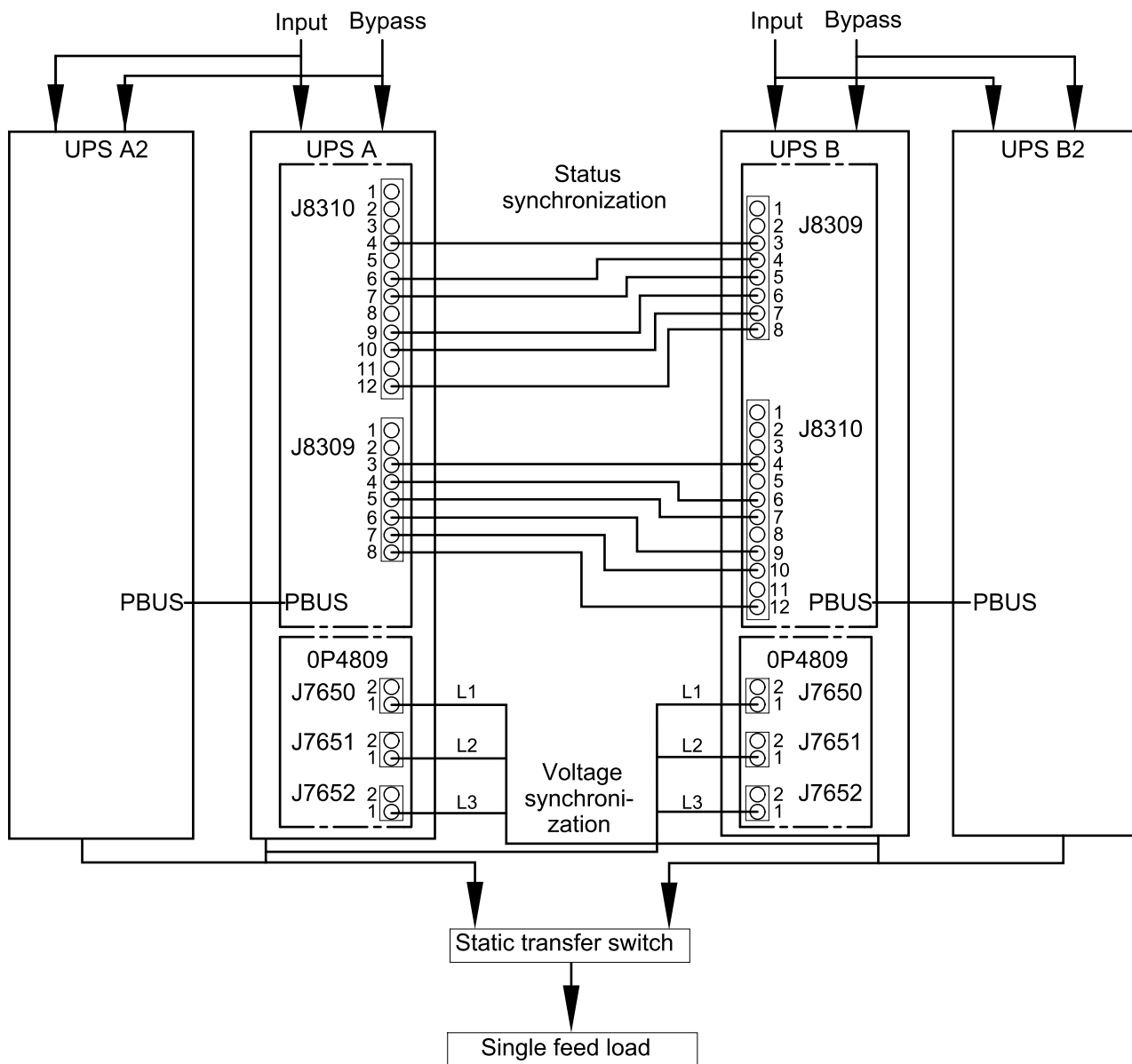


### Signal Cable Connections for Dual UPS Synchronization with a Floating Synchronization Master





### Signal Cable Connections for Fixed Parallel Synchronization Master



# Install the Power Module(s)

Four power modules are preinstalled in the UPS. Extra power modules for UPS ratings over 200 kW are shipped separately and must be installed.

## ⚠ CAUTION

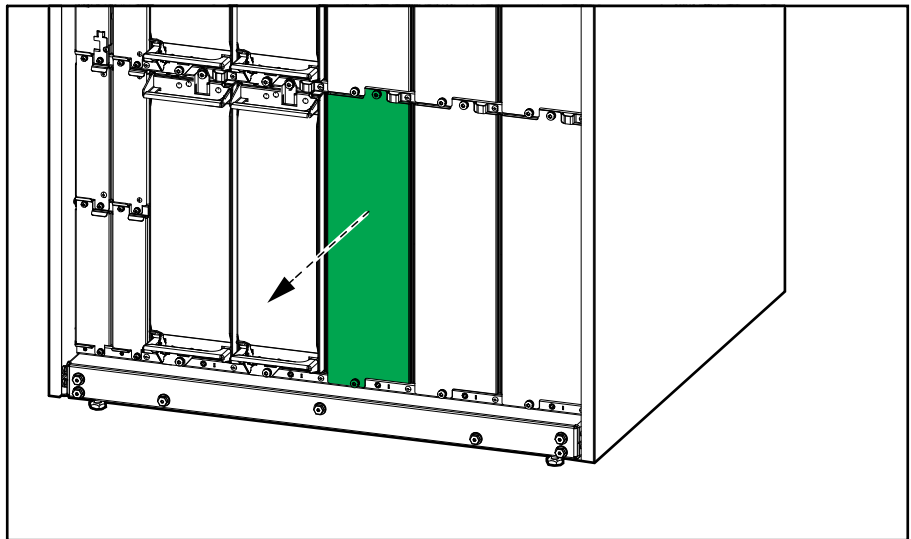
### HEAVY LOAD

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

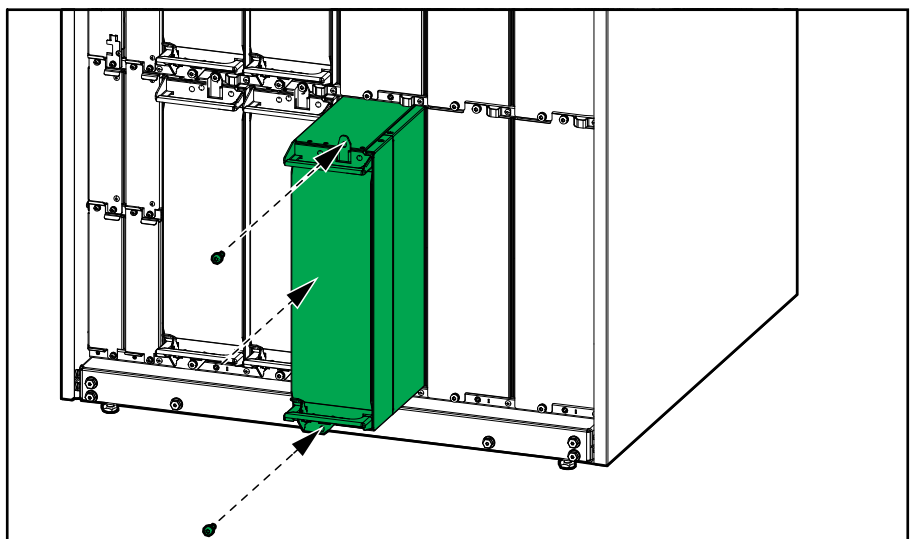
**Failure to follow these instructions can result in injury or equipment damage.**

**NOTE:** Install power modules starting with the bottom positions and upward.

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.



# 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 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 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 breaker with shunt trip connected to the UPS. See diagrams and instructions in Installation of Third Party Backfeed Protection, page 80.
- 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 breaker 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 breaker shunt trip and AUX switch to the UPS as shown below. Use double insulated cables. Breaker shunt trip must be rated for 24 VDC nominal, inrush max 100 W.

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

### 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 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):

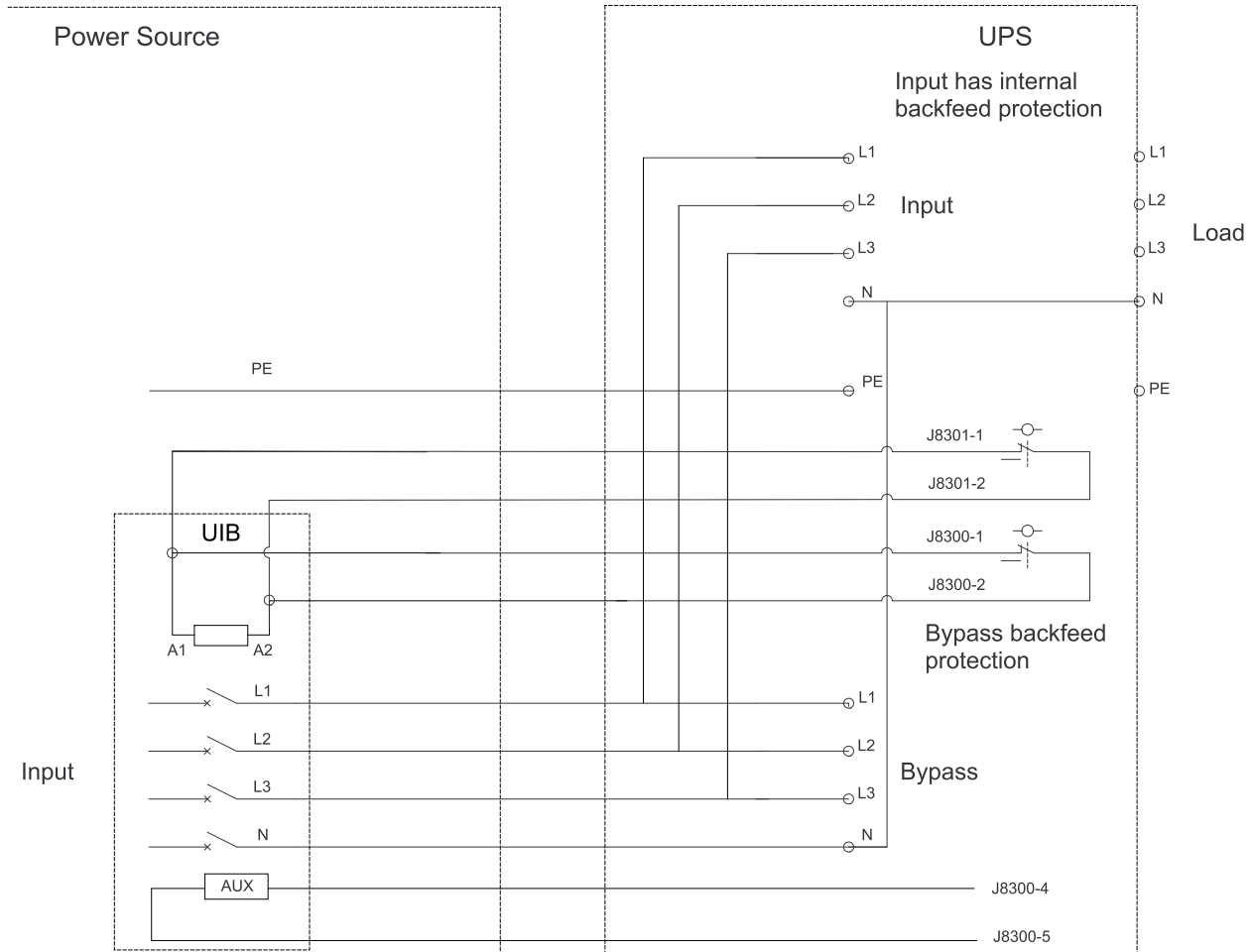
**⚠️ ⚠️ DANGER**

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

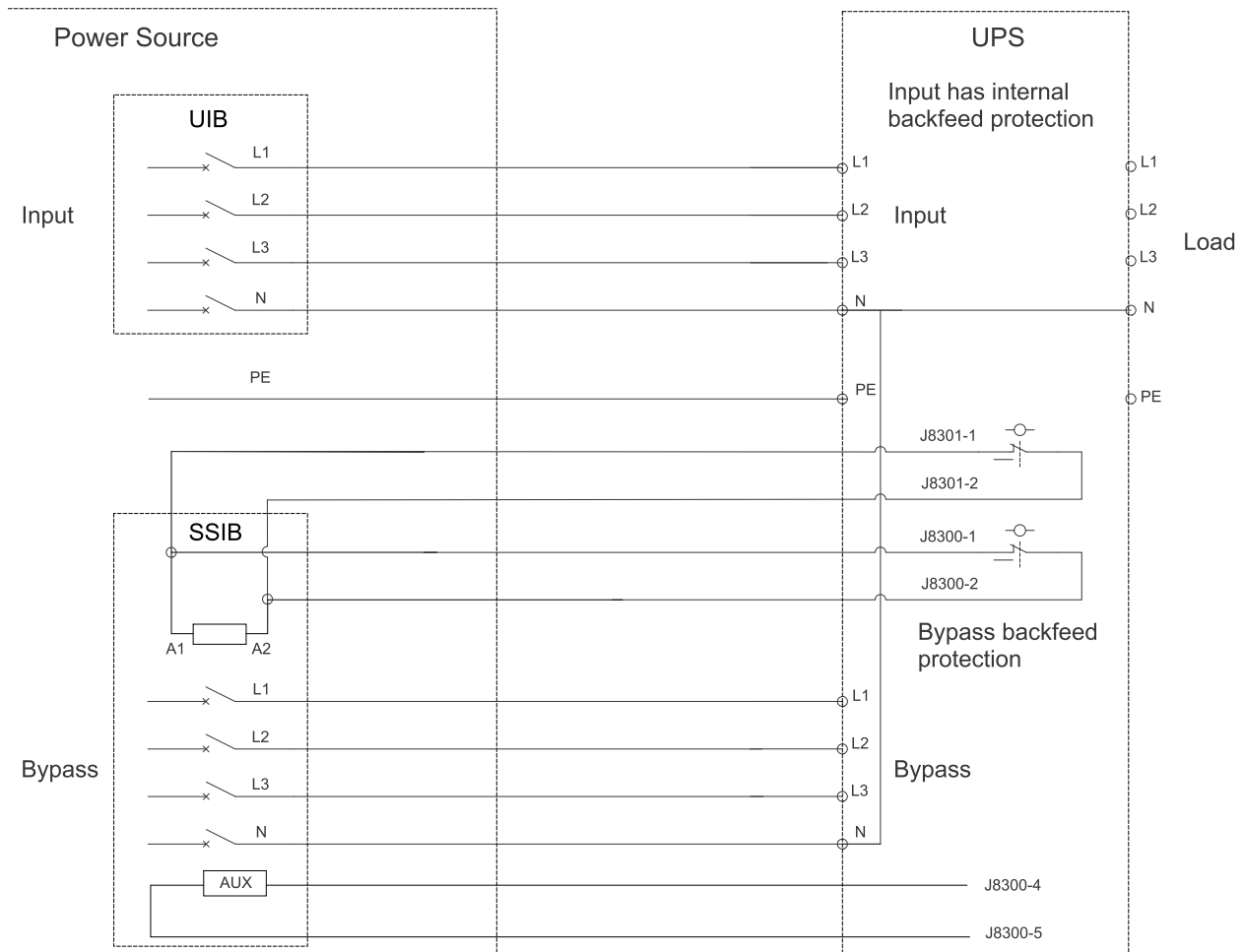
Risk of voltage backfeed. Before working on this circuit: Isolate the UPS and check for hazardous voltage between all terminals including the protective earth.

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

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



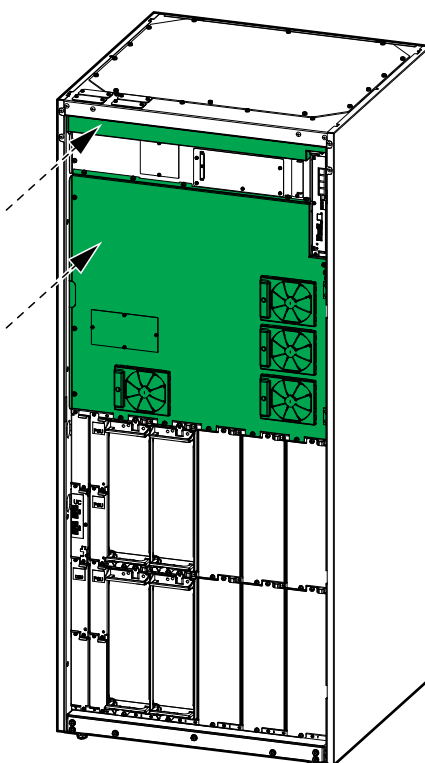
### UPS and Third Party Backfeed Protection – Dual Mains



## Final installation

1. Verify that the transparent plastic protectors and the plastic box (removed in Connect Power Cables in the UPS in System up to 45 kAIC/kA I<sub>cw</sub>, page 53 or Connect Power Cables in the UPS in System over 45 kAIC/kA I<sub>cw</sub>, page 57) have been reinstalled in their original position.
2. Verify that the transparent protection cover on the external sync board 0P4809 (removed in Connect Signal Cables for External Synchronization, page 74) has been reinstalled in its original position.
3. Close the inner door and fasten with screws.
4. Reinstall the cover over the signal connections.

### Front View of the UPS

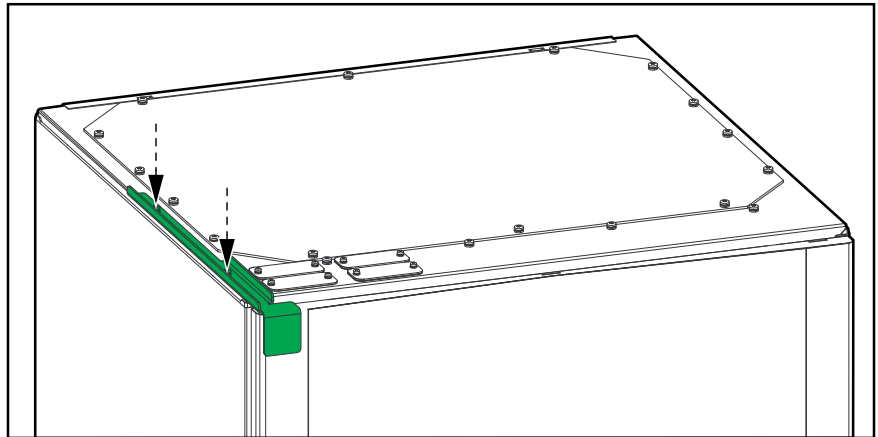


5. On the label 885-91896 on the front of the UPS, mark the short circuit rating relevant for this UPS system depending on installed auxiliaries and options.

|  |   |
|--|---|
|  | 65 kAIC/kA I <sub>cw</sub> (UPS alone)  |
|  | 65 kAIC with GVLBCA200K500G (UPS with maintenance bypass cabinet for UL)  |
|  | 45 kAIC/kA I <sub>cw</sub> with GVBECC (UPS with bottom entry cabinet)  |
|  | 45 kAIC/kA I <sub>cc</sub> with GVLOPT003/GVLOPT004 installed (UPS with backfeed kit for UL/<br>backfeed kit for IEC installed) |
|  | 25 kA I <sub>cw</sub> with GVLBCA200K500H (UPS with maintenance bypass cabinet for IEC)   |

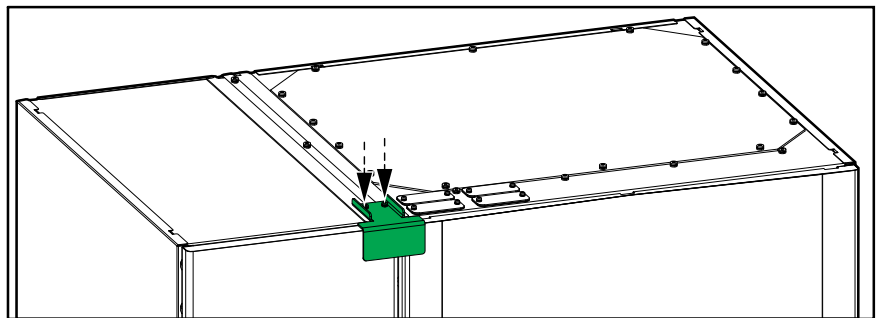
6. **Only for seismic anchoring:** Close the front door(s) and perform one of the following:
- For UPS alone, install the provided seismic top bracket 870-18110 in the top left side of the UPS.

#### 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











Schneider Electric  
35 rue Joseph Monier  
92500 Rueil Malmaison  
France

+ 33 (0) 1 41 29 70 00



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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