

# Galaxy VX

## UPS with 1250 kW I/O Cabinet

### Installation

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

500 kW/kVA, 500 kW/kVA N+1, 625 kW/kVA, 800 kW/kVA

500 kW/kVA Expandable to 750 kW/kVA, 750 kW/kVA, 750 kW/kVA N+1

500 kW/kVA, 625 kW/kVA, 750 kW/kVA Expandable to 1000 kW/KVA, 1000 kW/kVA, 1000 kW/kVA N+1

1100 kW/kVA, 1100 kW/kVA N+1

500 kW/kVA, 750 kW/kVA, and 1000 kW/kVA Expandable to 1250 kW/kVA, 1250 kW/kVA, 1250 kW/kVA, 1250 kW/kVA N+1

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

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# 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.

Per IEC 62040-1: "Uninterruptible power systems (UPS) -- Part 1: Safety Requirements," this equipment, including battery access, must be inspected, installed and maintained by a skilled person.

The skilled person is a person with relevant education and experience to enable him or her to perceive risks and to avoid hazards which the equipment can create (reference IEC 62040-1, section 3.102).

## 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 C3 according to IEC 62040-2. This is a product for commercial and industrial applications in the second environment - installation restrictions or additional measures may be needed to prevent disturbances. The second environment includes all commercial, light industry, and industrial locations other than residential, commercial, and light industrial premises directly connected without intermediate transformer to a public low-voltage mains supply. The installation and cabling must follow the electromagnetic compatibility rules, e.g.:

- the segregation of cables,
- the use of shielded or special cables when relevant,
- the use of grounded metallic cable tray and supports.

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

## Safety Precautions

### **⚠ DANGER**

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

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

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

## **⚠ DANGER**

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

Read all instructions in the Installation Manual before installing or working on this UPS system.

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

## **⚠ DANGER**

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

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

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

## **⚠ DANGER**

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

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

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

## **⚠ DANGER**

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

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

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

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

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

## **⚠ DANGER**

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

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

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

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

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

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

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

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

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

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

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

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

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

**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.**

## 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 touch current/leakage current, the earthing/grounding conductor must be connected first.

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

The label below must be added if:

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

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

The label below must be also added if backfeed protection is provided external to the equipment. See *Backfeed Protection*, page 92 for more details. The label must be placed adjacent to all upstream power disconnection devices.

### **⚠️⚠️ DANGER**

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

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

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

### **⚠️ DANGER**

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

- Always perform correct Lockout/Tagout before working on the UPS.
- A UPS with autostart enabled will automatically restart when the mains supply returns.
- If autostart is enabled on the UPS, a label must be added on the UPS to warn about this functionality.

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

Add the label below on the UPS if autostart has been enabled:

## DANGER

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

Autostart is enabled. The UPS will automatically restart when the mains supply returns.

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

## NOTICE

### RISK OF UNINTENTIONAL DEVICE OPERATION

If a residual current-operated protective device (RCD-B) is used upstream as ground fault protection, then the RCD-B shall be sized to not trip on the leakage current of this product. The start-up leakage current can be up to 3 A. The continuous maximum leakage current is 350 mA.

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

## Battery Safety

## DANGER

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

- Battery disconnect devices 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.**

# Specifications

## Overview of Configurations

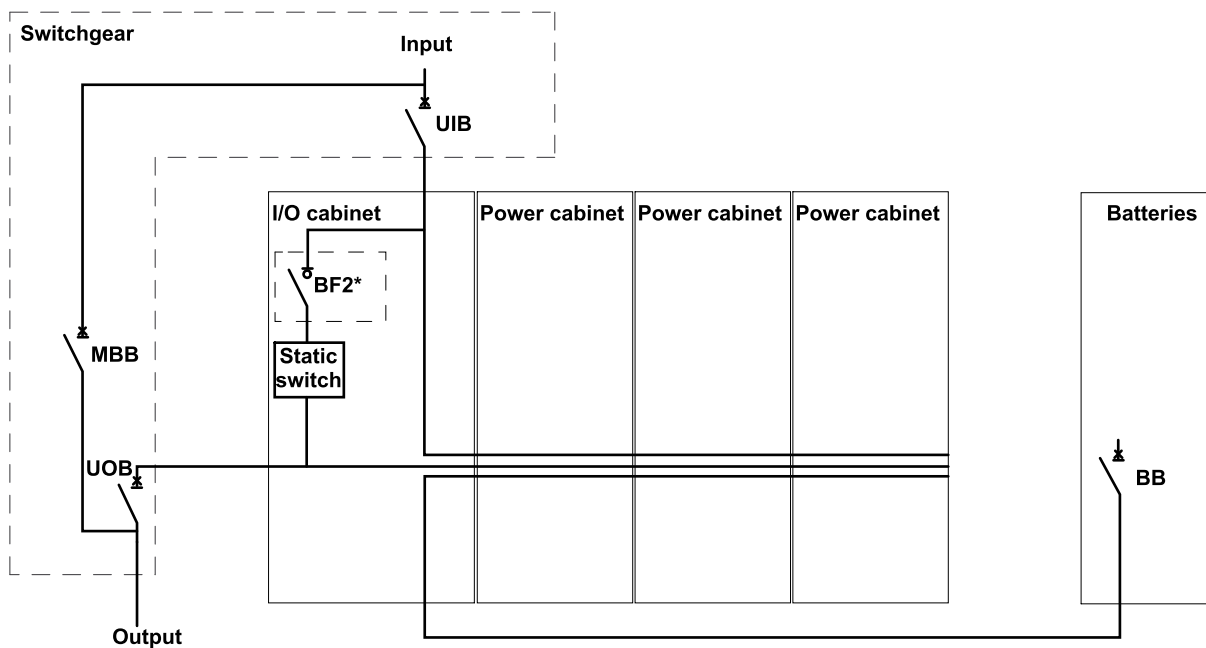
### Breakers in the System

|      |                             |
|------|-----------------------------|
| UIB  | Unit input breaker          |
| SSIB | Static switch input breaker |
| BB   | Battery breaker             |
| MBB  | Maintenance bypass breaker  |
| UOB  | Unit output breaker         |
| BF2  | Backfeed protection switch  |

## Overview of UPSs with 1250 kW I/O Cabinet - Single Utility/Mains

**NOTE:** Depending on your chosen configuration, the backfeed breaker BF2 (marked with \* in the illustration) can be preinstalled in the UPS, delivered as an optional backfeed kit GVXOPT001 to be installed in the UPS, or installed upstream of the UPS in the switchgear.

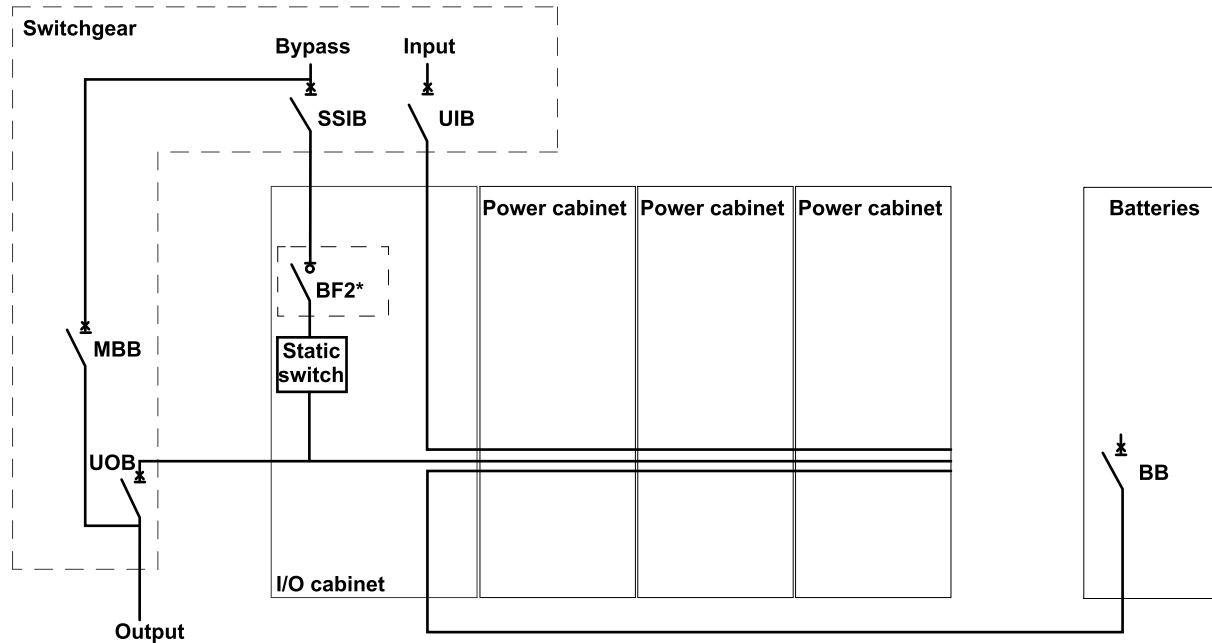
The illustration shows a 750 kW UPS. The principle is the same for the other UPSs with the 1250 kW I/O cabinet.



## Overview of UPSs with 1250 kW I/O Cabinet - Dual Utility/Mains

**NOTE:** Depending on your chosen configuration, the backfeed breaker BF2 (marked with \* in the illustration) can be preinstalled in the UPS, delivered as an optional backfeed kit GVXOPT001 to be installed in the UPS, or installed upstream of the UPS in the switchgear.

The illustration shows a 750 kW UPS. The principle is the same for the other UPSs with the 1250 kW I/O cabinet.



## Parallel System

Galaxy VX can support up to 4+0 UPSs in parallel for capacity and up to 4+1 UPSs in parallel for redundancy.

**NOTE:** Note that for systems over 4 MW it can be difficult to find appropriate breakers/switches in the correct size for the switchgear.

## Specifications for 500 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                                     |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>1</sup><br>UL: L1, L2, L3 + G <sup>2</sup>                                                                                                                                                                                                                                 |         |         |         |                                         |
|        | Input voltage range (V) <sup>3</sup>            | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576                                 |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Nominal input current (A)                       | 816                                                                                                                                                                                                                                                                                                 | 775     | 746     | 699     | 646                                     |
|        | Maximum input current (A) <sup>4</sup>          | 921                                                                                                                                                                                                                                                                                                 | 885     | 852     | 798     | 757                                     |
|        | Input current limitation (A)                    | 890                                                                                                                                                                                                                                                                                                 |         |         | 832     | 760                                     |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                                         |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                                         |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                                         |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>5</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>6</sup> : 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)                      | 813                                                                                                                                                                                                                                                                                                 | 773     | 745     | 703     | 642                                     |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA Icw<br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                                         |         |         |         |                                         |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 1250 kW I/O: 9680<br>1500 kW I/O: 16245                                                                                                                                                                                                                                                             |         |         |         | 1250 kW I/O: 9165<br>1500 kW I/O: 16245 |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                                         |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                                         |

1. TN, TT, and IT power distribution systems are supported.
2. WYE source – solid grounded and high resistance grounded sources are supported. Corner (line) grounding is not permitted.
3. The system can operate at 600 V for 1 minute.
4. At nominal input voltage and full charge.
5. TN, TT, and IT power distribution systems with no earthed line conductors are supported.
6. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                          | 400 | 415 | 440 | 480                                       |
|----------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE or L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>7</sup> or L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>8</sup> : L1, L2, L3, G, GEC <sup>7</sup>                                                                                                 |     |     |     |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>9</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |     |     |     |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                        |     |     |     |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                  |     |     |     |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                            |     |     |     |                                           |
|                | Nominal output current (A)                                      | 760                                                                                                                                                                                                                                                                                                          | 722 | 696 | 656 | 601                                       |
|                | Minimum short circuit rating <sup>10</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                              |     |     |     |                                           |
|                | Maximum short circuit rating <sup>11</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                   |     |     |     |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                         |     |     |     |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                         |     |     |     |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                |     |     |     |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                  |     |     |     |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                    |     |     |     | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 60 at 100% load, 175 at $<80\%$ load                                                                                                                                                                                                                                                                         |     |     |     | 75 at 100% load, 200 at 80% load          |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | 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)    | 1090                                                                                                                                                                                                                                                                                                         |     |     |     |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 1362                                                                                                                                                                                                                                                                                                         |     |     |     |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                        |     |     |     |                                           |
|                | Maximum battery backup time                                     | Unlimited                                                                                                                                                                                                                                                                                                    |     |     |     |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per $^{\circ}\text{C}$ for $T \geq 25^{\circ}\text{C}$ , 0 mV per $^{\circ}\text{C}$ for $T < 25^{\circ}\text{C}$                                                                                                                                                                                    |     |     |     |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                              |     |     |     |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                |     |     |     |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                          |     |     |     |                                           |

7. Per NEC 250.30.

8. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

9. 125% for 480 V.

10. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

11. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Specifications for 625 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|--------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>12</sup><br>UL: L1, L2, L3 + G <sup>13</sup>                                                                                                                                                                                                                               |         |         |         |                    |
|        | Input voltage range (V) <sup>14</sup>           | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576            |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                    |
|        | Nominal input current (A)                       | 1021                                                                                                                                                                                                                                                                                                | 969     | 932     | 870     | 807                |
|        | Maximum input current (A) <sup>15</sup>         | 1151                                                                                                                                                                                                                                                                                                | 1106    | 1065    | 994     | 946                |
|        | Input current limitation (A)                    | 1113                                                                                                                                                                                                                                                                                                |         |         | 1040    | 950                |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                    |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                    |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                    |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                    |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                    |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                    |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>16</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>17</sup> : 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)                      | 1017                                                                                                                                                                                                                                                                                                | 966     | 931     | 878     | 802                |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                    |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA I <sub>cw</sub><br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                             |         |         |         |                    |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 9680 (1250 kW I/O)                                                                                                                                                                                                                                                                                  |         |         |         | 9165 (1250 kW I/O) |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                    |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                    |

12. TN, TT, and IT power distribution systems are supported.

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

14. The system can operate at 600 V for 1 minute.

15. At nominal input voltage and full charge.

16. TN, TT, and IT power distribution systems with no earthed line conductors are supported.

17. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                           | 400 | 415 | 440 | 480                                       |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>18</sup> <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>19</sup> : L1, L2, L3, G, GEC <sup>18</sup>                                                                                 |     |     |     |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>20</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |     |     |     |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                         |     |     |     |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                   |     |     |     |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                             |     |     |     |                                           |
|                | Nominal output current (A)                                      | 950                                                                                                                                                                                                                                                                                                           | 902 | 870 | 820 | 752                                       |
|                | Minimum short circuit rating <sup>21</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                               |     |     |     |                                           |
|                | Maximum short circuit rating <sup>22</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                    |     |     |     |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                          |     |     |     |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                           |     |     |     |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                           |     |     |     |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                 |     |     |     |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                           |     |     |     |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                   |     |     |     |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                     |     |     |     | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 75 at 100% load, 218.75 at <80% load                                                                                                                                                                                                                                                                          |     |     |     | 93.75 at 100% load, 250 at 80% load       |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                           |     |     |     |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                           |     |     |     |                                           |
|                | 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)    | 1362                                                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 1703                                                                                                                                                                                                                                                                                                          |     |     |     |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                         |     |     |     |                                           |
|                | Maximum battery backup time                                     | Unlimited                                                                                                                                                                                                                                                                                                     |     |     |     |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per $^{\circ}\text{C}$ for $T \geq 25^{\circ}\text{C}$ , 0 mV per $^{\circ}\text{C}$ for $T < 25^{\circ}\text{C}$                                                                                                                                                                                     |     |     |     |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                               |     |     |     |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                 |     |     |     |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                           |     |     |     |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                           |     |     |     |                                           |

18. Per NEC 250.30.

19. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

20. 125% for 480 V.

21. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

22. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Specifications for 750 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                                     |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>23</sup><br>UL: L1, L2, L3 + G <sup>24</sup>                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Input voltage range (V) <sup>25</sup>           | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576                                 |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Nominal input current (A)                       | 1225                                                                                                                                                                                                                                                                                                | 1162    | 1119    | 1050    | 969                                     |
|        | Maximum input current (A) <sup>26</sup>         | 1381                                                                                                                                                                                                                                                                                                | 1327    | 1278    | 1199    | 1136                                    |
|        | Input current limitation (A)                    | 1335                                                                                                                                                                                                                                                                                                |         |         | 1248    | 1140                                    |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                                         |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                                         |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                                         |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>27</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>28</sup> : 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)                      | 1220                                                                                                                                                                                                                                                                                                | 1159    | 1117    | 1054    | 964                                     |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA Icw<br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                                         |         |         |         |                                         |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 1250 kW I/O: 9680<br>1500 kW I/O: 16245                                                                                                                                                                                                                                                             |         |         |         | 1250 kW I/O: 9165<br>1500 kW I/O: 16245 |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                                         |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                                         |

23. TN, TT, and IT power distribution systems are supported.

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

25. The system can operate at 600 V for 1 minute.

26. At nominal input voltage and full charge.

27. TN, TT, and IT power distribution systems with no earthed line conductors are supported.

28. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.



|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                           | 400  | 415  | 440 | 480                                       |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-----|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE or L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>29</sup> or L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>30</sup> : L1, L2, L3, G, GEC <sup>29</sup>                                                                                               |      |      |     |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>31</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |      |      |     |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                         |      |      |     |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                   |      |      |     |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                             |      |      |     |                                           |
|                | Nominal output current (A)                                      | 1140                                                                                                                                                                                                                                                                                                          | 1083 | 1043 | 984 | 902                                       |
|                | Minimum short circuit rating <sup>32</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                               |      |      |     |                                           |
|                | Maximum short circuit rating <sup>33</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                    |      |      |     |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                          |      |      |     |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                          |      |      |     |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                           |      |      |     |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                           |      |      |     |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                 |      |      |     |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                           |      |      |     |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                   |      |      |     |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                     |      |      |     | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 90 at 100% load, 262 at $<80\%$ load                                                                                                                                                                                                                                                                          |      |      |     | 112.5 at 100% load, 300 at 80% load       |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                           |      |      |     |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                           |      |      |     |                                           |
|                | 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)    | 1634                                                                                                                                                                                                                                                                                                          |      |      |     |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 2043                                                                                                                                                                                                                                                                                                          |      |      |     |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                         |      |      |     |                                           |
|                | Maximum battery backup time                                     | Unlimited                                                                                                                                                                                                                                                                                                     |      |      |     |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per $^{\circ}\text{C}$ for $T \geq 25^{\circ}\text{C}$ , 0 mV per $^{\circ}\text{C}$ for $T < 25^{\circ}\text{C}$                                                                                                                                                                                     |      |      |     |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                               |      |      |     |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                 |      |      |     |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |     |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |     |                                           |

29. Per NEC 250.30.

30. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

31. 125% for 480 V.

32. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

33. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Specifications for 800 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|--------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>34</sup><br>UL: L1, L2, L3 + G <sup>35</sup>                                                                                                                                                                                                                               |         |         |         |                    |
|        | Input voltage range (V) <sup>36</sup>           | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576            |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                    |
|        | Nominal input current (A)                       | 1307                                                                                                                                                                                                                                                                                                | 1239    | 1193    | 1120    | 1033               |
|        | Maximum input current (A) <sup>37</sup>         | 1474                                                                                                                                                                                                                                                                                                | 1415    | 1363    | 1279    | 1212               |
|        | Input current limitation (A)                    | 1424                                                                                                                                                                                                                                                                                                |         |         | 1331    | 1216               |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                    |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                    |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                    |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                    |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                    |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                    |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>38</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>39</sup> : 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)                      | 1302                                                                                                                                                                                                                                                                                                | 1236    | 1191    | 1124    | 1027               |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                    |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA I <sub>cw</sub><br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                             |         |         |         |                    |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 9680 (1250 kW I/O)                                                                                                                                                                                                                                                                                  |         |         |         | 9165 (1250 kW I/O) |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                    |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                    |

34. TN, TT, and IT power distribution systems are supported.

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

36. The system can operate at 600 V for 1 minute.

37. At nominal input voltage and full charge.

38. TN, TT, and IT power distribution systems with no earthed line conductors are supported.

39. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                           | 400  | 415  | 440  | 480                                       |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>40</sup> <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>41</sup> : L1, L2, L3, G, GEC <sup>40</sup>                                                                                 |      |      |      |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>42</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |      |      |      |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                   |      |      |      |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                             |      |      |      |                                           |
|                | Nominal output current (A)                                      | 1216                                                                                                                                                                                                                                                                                                          | 1155 | 1113 | 1050 | 962                                       |
|                | Minimum short circuit rating <sup>43</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                               |      |      |      |                                           |
|                | Maximum short circuit rating <sup>44</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                    |      |      |      |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                          |      |      |      |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                   |      |      |      |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                     |      |      |      | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 96 at 100% load, 280 at <80% load                                                                                                                                                                                                                                                                             |      |      |      | 120 at 100% load, 320 at 80% load         |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | 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)    | 1743                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 2179                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Maximum battery backup time                                     | Unlimited                                                                                                                                                                                                                                                                                                     |      |      |      |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per °C for $T \geq 25^\circ\text{C}$ , 0 mV per °C for $T < 25^\circ\text{C}$                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                               |      |      |      |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |

40. Per NEC 250.30.

41. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

42. 125% for 480 V.

43. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

44. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Specifications for 1000 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                                     |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>45</sup><br>UL: L1, L2, L3 + G <sup>46</sup>                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Input voltage range (V) <sup>47</sup>           | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576                                 |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Nominal input current (A)                       | 1633                                                                                                                                                                                                                                                                                                | 1549    | 1492    | 1397    | 1291                                    |
|        | Maximum input current (A) <sup>48</sup>         | 1842                                                                                                                                                                                                                                                                                                | 1770    | 1704    | 1595    | 1514                                    |
|        | Input current limitation (A)                    | 1780                                                                                                                                                                                                                                                                                                |         |         | 1664    | 1520                                    |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                                         |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                                         |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                                         |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>49</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>50</sup> : 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)                      | 1627                                                                                                                                                                                                                                                                                                | 1545    | 1489    | 1405    | 1284                                    |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA Icw<br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                                         |         |         |         |                                         |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 1250 kW I/O: 9680<br>1500 kW I/O: 16245                                                                                                                                                                                                                                                             |         |         |         | 1250 kW I/O: 9165<br>1500 kW I/O: 16245 |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                                         |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                                         |

45. TN, TT, and IT power distribution systems are supported.

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

47. The system can operate at 600 V for 1 minute.

48. At nominal input voltage and full charge.

49. TN, TT, and IT power distribution systems with no earthed line conductors are supported.

50. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                           | 400  | 415  | 440  | 480                                       |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>51</sup> <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>52</sup> : L1, L2, L3, G, GEC <sup>51</sup>                                                                                 |      |      |      |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>53</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |      |      |      |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                   |      |      |      |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                             |      |      |      |                                           |
|                | Nominal output current (A)                                      | 1519                                                                                                                                                                                                                                                                                                          | 1443 | 1391 | 1312 | 1203                                      |
|                | Minimum short circuit rating <sup>54</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                               |      |      |      |                                           |
|                | Maximum short circuit rating <sup>55</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                    |      |      |      |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                          |      |      |      |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                   |      |      |      |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                     |      |      |      | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 120 at 100% load, 350 at <80% load                                                                                                                                                                                                                                                                            |      |      |      | 150 at 100% load, 400 at <80% load        |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | 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)    | 2179                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 2724                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Maximum battery backup time                                     | Unlimited                                                                                                                                                                                                                                                                                                     |      |      |      |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per °C for $T \geq 25^\circ\text{C}$ , 0 mV per °C for $T < 25^\circ\text{C}$                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                               |      |      |      |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |

51. Per NEC 250.30.

52. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

53. 125% for 480 V.

54. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

55. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Specifications for 1100 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|--------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>56</sup><br>UL: L1, L2, L3 + G <sup>57</sup>                                                                                                                                                                                                                               |         |         |         |                    |
|        | Input voltage range (V) <sup>58</sup>           | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576            |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                    |
|        | Nominal input current (A)                       | 1796                                                                                                                                                                                                                                                                                                | 1704    | 1641    | 1540    | 1421               |
|        | Maximum input current (A) <sup>59</sup>         | 2026                                                                                                                                                                                                                                                                                                | 1947    | 1874    | 1759    | 1666               |
|        | Input current limitation (A)                    | 1958                                                                                                                                                                                                                                                                                                |         |         | 1830    | 1672               |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                    |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                    |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                    |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                    |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                    |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                    |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>60</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>61</sup> : 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)                      | 1789                                                                                                                                                                                                                                                                                                | 1700    | 1639    | 1545    | 1412               |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                    |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA I <sub>cw</sub><br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                             |         |         |         |                    |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 9680 (1250 kW I/O)                                                                                                                                                                                                                                                                                  |         |         |         | 9165 (1250 kW I/O) |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                    |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                    |

56. TN, TT, and IT power distribution systems are supported.

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

58. The system can operate at 600 V for 1 minute.

59. At nominal input voltage and full charge.

60. TN, TT, and IT power distribution systems with no earthed line conductors are supported.

61. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                           | 400  | 415  | 440  | 480                                       |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>62</sup> <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>63</sup> : L1, L2, L3, G, GEC <sup>62</sup>                                                                                 |      |      |      |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>64</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |      |      |      |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                   |      |      |      |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                             |      |      |      |                                           |
|                | Nominal output current (A)                                      | 1671                                                                                                                                                                                                                                                                                                          | 1588 | 1530 | 1443 | 1323                                      |
|                | Minimum short circuit rating <sup>65</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                               |      |      |      |                                           |
|                | Maximum short circuit rating <sup>66</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                    |      |      |      |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                          |      |      |      |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                   |      |      |      |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                     |      |      |      | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 132 at 100% load, 385 at <80% load                                                                                                                                                                                                                                                                            |      |      |      | 165 at 100% load, 440 at <80% load        |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | 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)    | 2397                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 2996                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Maximum battery backup time                                     | Unlimited                                                                                                                                                                                                                                                                                                     |      |      |      |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per °C for $T \geq 25\text{ °C}$ , 0 mV per °C for $T < 25\text{ °C}$                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                               |      |      |      |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |

62. Per NEC 250.30.

63. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

64. 125% for 480 V.

65. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

66. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Specifications for 1250 kW UPS

|        | Voltage (V)                                     | 380                                                                                                                                                                                                                                                                                                 | 400     | 415     | 440     | 480                                     |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------|
| Input  | Connections                                     | IEC: L1, L2, L3, PE <sup>67</sup><br>UL: L1, L2, L3 + G <sup>68</sup>                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Input voltage range (V) <sup>69</sup>           | 340-456                                                                                                                                                                                                                                                                                             | 340-480 | 353-498 | 374-528 | 408-576                                 |
|        | Frequency (Hz)                                  | 40-70                                                                                                                                                                                                                                                                                               |         |         |         |                                         |
|        | Nominal input current (A)                       | 2041                                                                                                                                                                                                                                                                                                | 1937    | 1865    | 1750    | 1615                                    |
|        | Maximum input current (A) <sup>70</sup>         | 2303                                                                                                                                                                                                                                                                                                | 2212    | 2130    | 1999    | 1893                                    |
|        | Input current limitation (A)                    | 2225                                                                                                                                                                                                                                                                                                |         |         | 2080    | 1900                                    |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 100 kA RMS                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Total harmonic distortion (THDI)                | <3% at 100% load, <4% at 50% load, <9% at 25% load                                                                                                                                                                                                                                                  |         |         |         |                                         |
|        | Input power factor                              | 0.99 at >40% load, 0.98 at >20% load, 0.97 at >10% load                                                                                                                                                                                                                                             |         |         |         |                                         |
|        | Protection                                      | Contactors                                                                                                                                                                                                                                                                                          |         |         |         |                                         |
|        | Ramp-in                                         | Adaptive 1-300 seconds                                                                                                                                                                                                                                                                              |         |         |         |                                         |
| Bypass | Connections                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE <sup>71</sup><br>UL 1250 kW I/O: L1, L2, L3, G <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>72</sup> : 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)                      | 2033                                                                                                                                                                                                                                                                                                | 1931    | 1862    | 1756    | 1605                                    |
|        | Minimum short circuit rating                    | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                     |         |         |         |                                         |
|        | Maximum short circuit rating                    | 1250 kW I/O: 100 kA Icw<br>1500 kW I/O: 100 kA RMS (conditioned by an internal molded switch with 90 kA peak magnetic trip)                                                                                                                                                                         |         |         |         |                                         |
|        | Thyristor I <sup>2</sup> t (kA*s <sup>2</sup> ) | 1250 kW I/O: 9680<br>1500 kW I/O: 16245                                                                                                                                                                                                                                                             |         |         |         | 1250 kW I/O: 9165<br>1500 kW I/O: 16245 |
|        | BF2 magnetic trip                               | 1250 kW I/O: 39 kA<br>1500 kW I/O: 39 kA                                                                                                                                                                                                                                                            |         |         |         |                                         |
|        | Protection                                      | 1250 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection<br>1250 kW I/O with GVXOPT001 installed: Molded switch with trip for backfeed protection<br>1500 kW I/O with preinstalled backfeed breaker BF2: Molded switch with trip for backfeed protection |         |         |         |                                         |

67. TN, TT, and IT power distribution systems are supported.

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

69. The system can operate at 600 V for 1 minute.

70. At nominal input voltage and full charge.

71. TN, TT, and IT power distribution systems with no earthed line conductors are supported.

72. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.



|                | Voltage (V)                                                     | 380                                                                                                                                                                                                                                                                                                           | 400  | 415  | 440  | 480                                       |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------------------------------------------|
| Output         | Connections                                                     | IEC 1250 kW I/O and 1500 kW I/O: L1, L2, L3, N, PE <b>or</b> L1, L2, L3, PE<br>UL 1250 kW I/O: L1, L2, L3, G, GEC <sup>73</sup> <b>or</b> L1, L2, L3, N, G<br>UL 1500 kW I/O <sup>74</sup> : L1, L2, L3, G, GEC <sup>73</sup>                                                                                 |      |      |      |                                           |
|                | Overload capacity                                               | Normal operation: 150% for 1 minute, 125% for 10 minutes<br>Battery operation: 128% for 10 seconds, 115% for 1 minute<br>Bypass operation: 110% <sup>75</sup> continuous, 1000% for 60 milliseconds for systems with 1250 kW I/O cabinet, and 1000% for 100 milliseconds for systems with 1500 kW I/O cabinet |      |      |      |                                           |
|                | Output voltage tolerance                                        | Balanced load: $\pm 1\%$ , Unbalanced load: $\pm 3\%$                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Dynamic load response                                           | $\pm 5\%$ after 2 ms, $\pm 1\%$ after 50 ms                                                                                                                                                                                                                                                                   |      |      |      |                                           |
|                | Output power factor                                             | 1                                                                                                                                                                                                                                                                                                             |      |      |      |                                           |
|                | Nominal output current (A)                                      | 1899                                                                                                                                                                                                                                                                                                          | 1804 | 1739 | 1640 | 1504                                      |
|                | Minimum short circuit rating <sup>76</sup>                      | Dependent on upstream protection. See section for ' <b>Recommended upstream protection and cable sizes – IEC</b> ' for details.                                                                                                                                                                               |      |      |      |                                           |
|                | Maximum short circuit rating <sup>77</sup>                      | 100 kA RMS                                                                                                                                                                                                                                                                                                    |      |      |      |                                           |
|                | Inverter output short circuit capabilities                      | Varies with time. See graph and table values in Inverter Short-Circuit Capabilities (Bypass not Available), page 39.                                                                                                                                                                                          |      |      |      |                                           |
|                | Total harmonic distortion (THDU)                                | <2% at 100% linear load, <3% at 100% non-linear load                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Output frequency (Hz)                                           | 50/60 (synchronized to bypass), 50/60 Hz $\pm 0.1\%$ (free-running)                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Slew rate (Hz/sec)                                              | Programmable: 0.25, 0.5, 1, 2, 4, 6                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Output performance classification (according to IEC/ EN62040-3) | Double-conversion: VFI-SS-111                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Load crest factor                                               | Up to 3 (THDU < 5%)                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Load power factor                                               | 0.7 leading to 0.5 lagging without derating                                                                                                                                                                                                                                                                   |      |      |      |                                           |
| Battery (VRLA) | Charging power in % of output power                             | 35% at $\leq 80\%$ load, 12% at 100% load                                                                                                                                                                                                                                                                     |      |      |      | 40% at $\leq 80\%$ load, 15% at 100% load |
|                | Maximum charging power (kW)                                     | 150 at 100% load, 437 at <80% load                                                                                                                                                                                                                                                                            |      |      |      | 187.5 at 100% load, 500 at <80% load      |
|                | Nominal battery voltage (VDC)                                   | 480                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Nominal float voltage (VDC)                                     | 546                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | 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)    | 2724                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Battery current at full load and minimum battery voltage (A)    | 3405                                                                                                                                                                                                                                                                                                          |      |      |      |                                           |
|                | Maximum short circuit rating                                    | 50 kA                                                                                                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Maximum battery backup time                                     | 1 hour                                                                                                                                                                                                                                                                                                        |      |      |      |                                           |
|                | Temperature compensation (per cell)                             | -3.3 mV per °C for $T \geq 25^\circ\text{C}$ , 0 mV per °C for $T < 25^\circ\text{C}$                                                                                                                                                                                                                         |      |      |      |                                           |
|                | Ripple current                                                  | < 5% C20 (5-minute backup time)                                                                                                                                                                                                                                                                               |      |      |      |                                           |
|                | Battery test                                                    | Manual/automatic (selectable)                                                                                                                                                                                                                                                                                 |      |      |      |                                           |
|                | Deep discharge protection                                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |
|                | Recharge according to battery temperature                       | Yes                                                                                                                                                                                                                                                                                                           |      |      |      |                                           |

73. Per NEC 250.30.

74. 4-wire connection with neutral is not compliant per FCC regulations for the 1500 kW I/O cabinet.

75. 125% for 480 V.

76. Minimum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

77. Maximum short circuit rating for output takes backfeeding energy through the bypass of parallel UPSs into consideration.

## Recommended Upstream Protection and Cable Sizes – IEC

### **DANGER**

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

An easily accessible breaker is required for upstream protection. Maximum fault current disconnection time: 46 seconds at 200% input.

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

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

Cable sizes in this manual are based on table B.52.12 and B.52.13 of IEC 60364-5-52 with the following assertions:

- 90 °C conductors
- An ambient temperature of 30 °C
- Use of copper or aluminum conductors
- Installation method F4 for DC cables and installation method F5 for AC cables, corrected for single layer in perforated cable tray.

PE cables are sized in accordance with IEC 60364-5-54 table 54.2 Minimum cross-sectional area of protective conductors.

**NOTE:** Always consider the PE size according to the complete electrical installation. Minimum size of the PE conductor must comply with local safety regulations for high PE conductor current equipment.

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

**NOTE:** The use of aluminum conductors can limit the number of parallel Lithium-ion battery cabinets. Contact Schneider Electric for more information.

### **NOTICE**

#### **RISK OF EQUIPMENT DAMAGE**

To ensure correct load sharing in bypass operation in a parallel system, the following recommendations apply:

- The bypass cables must be of the same length for all UPSs.
- The output cables must be of the same length for all UPSs.
- The input cables must be of the same length for all UPSs in a single mains system.
- Cable formation recommendations must be followed.
- The reactance of busbar layout in the bypass/input and output switchgear must be the same for all UPSs.

If the above recommendations are not followed the result can be uneven load sharing in bypass and overload of individual UPSs.

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

### **NOTICE**

#### **RISK OF UNINTENTIONAL DEVICE OPERATION**

If a residual current-operated protective device (RCD-B) is used upstream as ground fault protection, then the RCD-B shall be sized to not trip on the leakage current of this product. The start-up leakage current can be up to 3 A. The continuous maximum leakage current is 350 mA.

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

## Upstream Protection for IEC and Minimum Prospective Phase-To-Earth Short Circuit at the UPS Input/Bypass Terminals

### ⚠️⚠️ DANGER

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

The upstream overcurrent protective device (and its settings) must be sized to ensure a disconnecting time within 0.2 seconds for a minimum prospective phase-to-earth short circuit current calculated or measured at the input/bypass terminals of the UPS.

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

If the upstream overcurrent protective device is a breaker with adjustable short time protection, then it is possible to adjust the short time protection current and short time delay (if present) to meet the requirement of 0.2 seconds for a calculated or measured phase-to-earth prospective short circuit current at the input/bypass terminals of the UPS.

## Recommended Upstream Protection and Cable Sizes for 500 kW UPS

|         | Maximum OCPD (A)   |                    |                    |                    | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|---------|--------------------|--------------------|--------------------|--------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
|         | 380                | 400                | 415                | 440                | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input   | 1000<br>$I_r=0.90$ | 1000<br>$I_r=0.90$ | 1000<br>$I_r=0.90$ | 1000<br>$I_r=0.90$ | 2x240/<br>3x185                                              | 2x240/<br>3x185 | 2x240/<br>3x185 | 2x240/<br>3x185 | 1x240/<br>2x150                                       | 1x240/<br>2x150 | 1x240/<br>2x150 | 1x240/<br>2x150 |
| Bypass  | 800<br>$I_r=0.98$  | 800<br>$I_r=0.95$  | 800<br>$I_r=0.9$   | 800<br>$I_r=0.9$   | 2x185/<br>2x240                                              | 2x150/<br>2x240 | 2x150/<br>2x240 | 2x150/<br>2x240 | 1x185/<br>1x240                                       | 1x150/<br>1x240 | 1x150/<br>1x240 | 1x150/<br>1x240 |
| Output  | 800<br>$I_r=0.98$  | 800<br>$I_r=0.95$  | 800<br>$I_r=0.9$   | 800<br>$I_r=0.9$   | 2x185/<br>2x240                                              | 2x150/<br>2x240 | 2x150/<br>2x240 | 2x150/<br>2x240 | 1x185/<br>1x240                                       | 1x150/<br>1x240 | 1x150/<br>1x240 | 1x150/<br>1x240 |
| Battery | 1500               | 1500               | 1500               | 1500               | 3x185/<br>3x240                                              | 3x185/<br>3x240 | 3x185/<br>3x240 | 3x185/<br>3x240 | 2x150/<br>2x185                                       | 2x150/<br>2x185 | 2x150/<br>2x185 | 2x150/<br>2x185 |

## Recommended Upstream Protection and Cable Sizes for 625 kW UPS

|         | Maximum OCPD (A)   |                    |                   |                   | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|---------|--------------------|--------------------|-------------------|-------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
|         | 380                | 400                | 415               | 440               | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input   | 1250<br>$I_r=0.9$  | 1250<br>$I_r=0.9$  | 1250<br>$I_r=0.9$ | 1250<br>$I_r=0.9$ | 3x185/<br>3x240                                              | 3x185/<br>3x240 | 3x185/<br>3x240 | 3x185/<br>3x240 | 2x150/<br>2x185                                       | 2x150/<br>2x185 | 2x150/<br>2x185 | 2x150/<br>2x185 |
| Bypass  | 1000<br>$I_r=0.98$ | 1000<br>$I_r=0.95$ | 1000<br>$I_r=0.9$ | 1000<br>$I_r=0.9$ | 2x240/<br>3x240                                              | 2x240/<br>3x185 | 2x240/<br>3x185 | 2x240/<br>3x185 | 1x240/<br>2x185                                       | 1x240/<br>2x150 | 1x240/<br>2x150 | 1x240/<br>2x150 |
| Output  | 1000<br>$I_r=0.98$ | 1000<br>$I_r=0.95$ | 1000<br>$I_r=0.9$ | 1000<br>$I_r=0.9$ | 2x240/<br>3x240                                              | 2x240/<br>3x185 | 2x240/<br>3x185 | 2x240/<br>3x185 | 1x240/<br>2x185                                       | 1x240/<br>2x150 | 1x240/<br>2x150 | 1x240/<br>2x150 |
| Battery | 2000               | 2000               | 2000              | 2000              | 3x240/<br>4x240                                              | 3x240/<br>4x240 | 3x240/<br>4x240 | 3x240/<br>4x240 | 2x185/<br>2x240                                       | 2x185/<br>2x240 | 2x185/<br>2x240 | 2x185/<br>2x240 |

## Recommended Upstream Protection and Cable Sizes for 750 kW UPS

|             | Maximum OCPD (A)   |                   |                   |                   | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|-------------|--------------------|-------------------|-------------------|-------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
| Voltage (V) | 380                | 400               | 415               | 440               | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input       | 1600<br>$I_r=0.9$  | 1600<br>$I_r=0.9$ | 1600<br>$I_r=0.9$ | 1250<br>$I_r=1.0$ | 3x240/<br>4x240                                              | 3x240/<br>4x240 | 3x240/<br>4x240 | 3x185<br>4x240  | 2x185/<br>2x240                                       | 2x185/<br>2x240 | 2x185/<br>2x240 | 2x150/<br>2x240 |
| Bypass      | 1250<br>$I_r=0.95$ | 1250<br>$I_r=0.9$ | 1250<br>$I_r=0.9$ | 1000<br>$I_r=1.0$ | 3x185/<br>4x185                                              | 3x185/<br>3x240 | 3x185/<br>3x240 | 2x240/<br>3x240 | 2x150/<br>2x185                                       | 2x150/<br>2x185 | 2x150/<br>2x185 | 1x240/<br>2x185 |
| Output      | 1250<br>$I_r=0.95$ | 1250<br>$I_r=0.9$ | 1250<br>$I_r=0.9$ | 1000<br>$I_r=1.0$ | 3x185/<br>4x185                                              | 3x185/<br>3x240 | 3x185/<br>3x240 | 2x240/<br>3x240 | 2x150/<br>2x185                                       | 2x150/<br>2x185 | 2x150/<br>2x185 | 1x240/<br>2x185 |
| Battery     | 2500               | 2500              | 2500              | 2500              | 4x240/<br>5x240                                              | 4x240/<br>5x240 | 4x240/<br>5x240 | 4x240/<br>5x240 | 2x240/<br>3x240                                       | 2x240/<br>3x240 | 2x240/<br>3x240 | 2x240/<br>3x240 |

## Recommended Upstream Protection and Cable Sizes for 800 kW UPS

|             | Maximum OCPD (A)  |                    |                   |                   | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|-------------|-------------------|--------------------|-------------------|-------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
| Voltage (V) | 380               | 400                | 415               | 440               | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input       | 1600<br>$I_r=0.9$ | 1600<br>$I_r=0.9$  | 1600<br>$I_r=0.9$ | 1600<br>$I_r=0.9$ | 3x240/<br>4x240                                              | 3x240/<br>4x240 | 3x240/<br>4x240 | 3x240/<br>4x240 | 2x185/<br>2x240                                       | 2x185/<br>2x240 | 2x185/<br>2x240 | 2x185/<br>2x240 |
| Bypass      | 1250<br>$I_r=1.0$ | 1250<br>$I_r=0.95$ | 1250<br>$I_r=0.9$ | 1250<br>$I_r=0.9$ | 3x185/<br>4x240                                              | 3x185/<br>4x185 | 3x185/<br>3x240 | 3x185/<br>3x240 | 2x150/<br>2x185                                       | 2x150/<br>2x185 | 2x150/<br>2x185 | 2x150/<br>2x185 |
| Output      | 1250<br>$I_r=1.0$ | 1250<br>$I_r=0.95$ | 1250<br>$I_r=0.9$ | 1250<br>$I_r=0.9$ | 3x185/<br>4x240                                              | 3x185/<br>4x185 | 3x185/<br>3x240 | 3x185/<br>3x240 | 2x150/<br>2x185                                       | 2x150/<br>2x185 | 2x150/<br>2x185 | 2x150/<br>2x185 |
| Battery     | 2500              | 2500               | 2500              | 2500              | 4x240/<br>5x240                                              | 4x240/<br>5x240 | 4x240/<br>5x240 | 4x240/<br>5x240 | 2x240/<br>3x240                                       | 2x240/<br>3x240 | 2x240/<br>3x240 | 2x240/<br>3x240 |

## Recommended Upstream Protection and Cable Sizes for 1000 kW UPS

|             | Maximum OCPD (A)   |                    |                   |                   | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|-------------|--------------------|--------------------|-------------------|-------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
| Voltage (V) | 380                | 400                | 415               | 440               | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input       | 2000<br>$I_r=0.9$  | 2000<br>$I_r=0.9$  | 2000<br>$I_r=0.9$ | 2000<br>$I_r=0.9$ | 4x240/<br>6x240                                              | 4x240/<br>6x240 | 4x240/<br>6x240 | 4x240/<br>6x240 | 2x240/<br>3x240                                       | 2x240/<br>3x240 | 2x240/<br>3x240 | 2x240/<br>3x240 |
| Bypass      | 1600<br>$I_r=0.98$ | 1600<br>$I_r=0.95$ | 1600<br>$I_r=0.9$ | 1600<br>$I_r=0.9$ | 4x185/<br>5x240                                              | 4x185/<br>5x240 | 3x240/<br>4x240 | 3x240/<br>4x240 | 2x185/<br>3x240                                       | 2x185/<br>3x240 | 2x185/<br>2x240 | 2x185/<br>2x240 |
| Output      | 1600<br>$I_r=0.98$ | 1600<br>$I_r=0.98$ | 1600<br>$I_r=0.9$ | 1600<br>$I_r=0.9$ | 4x240/<br>6x240                                              | 4x240/<br>6x240 | 3x240/<br>6x240 | 3x240/<br>6x240 | 2x240/<br>3x240                                       | 2x240/<br>3x240 | 2x240/<br>3x240 | 2x240/<br>3x240 |
| Battery     | 3300               | 3300               | 3300              | 3300              | 5x240/<br>7x240                                              | 5x240/<br>7x240 | 5x240/<br>7x240 | 5x240/<br>7x240 | 3x240/<br>4x240                                       | 3x240/<br>4x240 | 3x240/<br>4x240 | 3x240/<br>4x240 |

## Recommended Upstream Protection and Cable Sizes for 1100 kW UPS

**NOTE:** For a 1250 I/O cabinet, it is preferred to use flexible copper power cables with as small a diameter as possible. The number of power cables needed for this kW rating will make large and inflexible power cables more difficult to install.

|             | Maximum OCPD (A)   |                    |                    |                    | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|-------------|--------------------|--------------------|--------------------|--------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
| Voltage (V) | 380                | 400                | 415                | 440                | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input       | 2000<br>$I_r=0.98$ | 2000<br>$I_r=0.98$ | 2000<br>$I_r=0.98$ | 2000<br>$I_r=0.95$ | 4x300/<br>5x300                                              | 4x300/<br>5x300 | 4x300/<br>5x300 | 4x300/<br>5x300 | 2x300/<br>3x300                                       | 2x300/<br>3x300 | 2x300/<br>3x300 | 2x300/<br>3x300 |
| Bypass      | 2000<br>$I_r=0.9$  | 2000<br>$I_r=0.9$  | 1600<br>$I_r=0.98$ | 1600<br>$I_r=0.95$ | 4x240/<br>5x300                                              | 4x240/<br>5x300 | 3x300/<br>4x300 | 3x300/<br>4x300 | 2x240/<br>3x300                                       | 2x240/<br>3x300 | 2x240/<br>2x300 | 2x240/<br>2x300 |
| Output      | 2000<br>$I_r=0.9$  | 2000<br>$I_r=0.9$  | 1600<br>$I_r=0.98$ | 1600<br>$I_r=0.95$ | 4x240/<br>5x300                                              | 4x240/<br>5x300 | 3x300/<br>4x300 | 3x300/<br>4x300 | 2x240/<br>3x300                                       | 2x240/<br>3x300 | 2x240/<br>2x300 | 2x240/<br>2x300 |
| Battery     | 3300               | 3300               | 3300               | 3300               | 5x300/<br>7x300                                              | 5x300/<br>7x300 | 5x300/<br>7x300 | 5x300/<br>7x300 | 3x300/<br>4x300                                       | 3x300/<br>4x300 | 3x300/<br>4x300 | 3x300/<br>4x300 |

## Recommended Upstream Protection and Cable Sizes for 1250 kW UPS

**NOTE:** For a 1250 I/O cabinet, it is preferred to use flexible copper power cables with as small a diameter as possible. The number of power cables needed for this kW rating will make large and inflexible power cables more difficult to install.

|             | Maximum OCPD (A)   |                    |                   |                   | Cable size per phase (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 | PE cable size (mm <sup>2</sup> )<br>Copper / Aluminum |                 |                 |                 |
|-------------|--------------------|--------------------|-------------------|-------------------|--------------------------------------------------------------|-----------------|-----------------|-----------------|-------------------------------------------------------|-----------------|-----------------|-----------------|
| Voltage (V) | 380                | 400                | 415               | 440               | 380                                                          | 400             | 415             | 440             | 380                                                   | 400             | 415             | 440             |
| Input       | 2500<br>$I_r=0.9$  | 2500<br>$I_r=0.9$  | 2500<br>$I_r=0.9$ | 2500<br>$I_r=0.9$ | 5x240/<br>6x300                                              | 5x240/<br>6x300 | 5x240/<br>6x300 | 5x240/<br>6x300 | 3x240/<br>3x300                                       | 3x240/<br>3x300 | 3x240/<br>3x300 | 3x240/<br>3x300 |
| Bypass      | 2000<br>$I_r=0.98$ | 2000<br>$I_r=0.95$ | 2000<br>$I_r=0.9$ | 2000<br>$I_r=0.9$ | 4x300/<br>5x300                                              | 4x300/<br>5x300 | 4x240/<br>5x300 | 4x240/<br>5x300 | 2x300/<br>3x300                                       | 2x300/<br>3x300 | 2x240/<br>3x300 | 2x240/<br>3x300 |
| Output      | 2000<br>$I_r=0.98$ | 2000<br>$I_r=0.95$ | 2000<br>$I_r=0.9$ | 2000<br>$I_r=0.9$ | 4x300/<br>5x300                                              | 4x300/<br>5x300 | 4x240/<br>5x300 | 4x240/<br>5x300 | 2x300/<br>3x300                                       | 2x300/<br>3x300 | 2x240/<br>3x300 | 2x240/<br>3x300 |
| Battery     | 4000               | 4000               | 4000              | 4000              | 6x300/<br>7x300                                              | 6x300/<br>7x300 | 6x300/<br>7x300 | 6x300/<br>7x300 | 3x300/<br>4x300                                       | 3x300/<br>4x300 | 3x300/<br>4x300 | 3x300/<br>4x300 |

## Recommended Bolt and Lug Sizes for IEC

| Cable size mm <sup>2</sup> | Bolt size   | Cable lug type |
|----------------------------|-------------|----------------|
| 16                         | M10 x 40 mm | TLK 16-10      |
| 25                         | M10 x 40 mm | TLK 25-10      |
| 35                         | M10 x 40 mm | TLK 35-10      |
| 50                         | M10 x 40 mm | TLK 50-10      |
| 70                         | M10 x 40 mm | TLK 70-10      |
| 95                         | M10 x 40 mm | TLK 95-10      |
| 120                        | M10 x 40 mm | TLK 120-10     |
| 150                        | M10 x 40 mm | TLK 150-10     |
| 185                        | M10 x 40 mm | TLK 185-10     |
| 240                        | M10 x 40 mm | TLK 240-10     |

## Recommended Upstream Protection and Cable Sizes – UL

### ⚠ CAUTION

#### HAZARD OF FIRE

- Connect only to a circuit with the below specifications.
- Connect only to a circuit provided with a maximum branch circuit overcurrent protection, as specified in the UPS rating tables below, 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.**

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

**NOTE:** All wiring must comply with all applicable national and/or electrical code (National Electrical Code, ANSI/NFPA 70).

Cable sizes in this manual are based on Table 310.15 of the National Electrical Code 2014 (NEC) with the following assertions:

- 90 °C conductors (THHN) for 75 °C termination
- Not more than 3 current carrying conductors in each conduit
- An ambient temperature of max. 30 °C
- Use of copper or aluminium conductors
- 100% rated breakers
- Nominal operating conditions

If the ambient room temperature is greater than 30 °C, use larger or additional parallel conductors in accordance with the correction factors of the NEC. The maximum allowable conductor size is 600 kcmil.

Equipment Grounding Conductors (EGC) are sized in accordance with NEC Article 250.122 and Table 250.122 Minimum size equipment conductor for grounding equipment.

**NOTE:** Always consider the EGC size according to the complete electrical installation.

**NOTE:** The use of aluminium conductors can limit the number of parallel Lithium-ion battery cabinets. Contact Schneider Electric for more information.

### NOTICE

#### RISK OF EQUIPMENT DAMAGE

To ensure correct load sharing in bypass operation in a parallel system, the following recommendations apply:

- The bypass cables must be of the same length for all UPSs.
- The output cables must be of the same length for all UPSs.
- The input cables must be of the same length for all UPSs in a single mains system.
- Cable formation recommendations must be followed.
- The reactance of busbar layout in the bypass/input and output switchgear must be the same for all UPSs.

If the above recommendations are not followed the result can be uneven load sharing in bypass and overload of individual UPSs.

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

## Recommended Upstream Protection and Cable Sizes for 500 kW UPS

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>78</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 800 ( $I_r = 1.0$ )  | 2x500 / 3x400                                         | 1x1/0 / 1x3/0                                                 |
| Bypass  | 700 ( $I_r = 1.0$ )  | 2x350 / 2x500                                         | 1x1/0 / 1x3/0                                                 |
| Output  | 700 ( $I_r = 1.0$ )  | 2x350 / 2x500                                         | 1x1/0 / 1x3/0                                                 |
| Battery | 1600 ( $I_r = 0.9$ ) | 4x500 / 5x500                                         | 1x4/0 / 1x350                                                 |

## Recommended Upstream Protection and Cable Sizes for 625 kW UPS

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>78</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 1000 ( $I_r = 1.0$ ) | 3x400 / 3x600                                         | 1x2/0 / 1x4/0                                                 |
| Bypass  | 800 ( $I_r = 1.0$ )  | 2x600 / 3x400                                         | 1x1/0 / 1x3/0                                                 |
| Output  | 800 ( $I_r = 1.0$ )  | 2x600 / 3x400                                         | 1x1/0 / 1x3/0                                                 |
| Battery | 2000 ( $I_r = 0.9$ ) | 5x500 / 6x500                                         | 1x250 / 1x400                                                 |

## Recommended Upstream Protection and Cable Sizes for 750 kW UPS

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>78</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 1200 ( $I_r = 1.0$ ) | 3x600 / 4x500                                         | 1x3/0 / 1x250                                                 |
| Bypass  | 1000 ( $I_r = 1.0$ ) | 3x400 / 3x600                                         | 1x2/0 / 1x4/0                                                 |
| Output  | 1000 ( $I_r = 1.0$ ) | 3x400 / 3x600                                         | 1x2/0 / 1x4/0                                                 |
| Battery | 2500 ( $I_r = 0.9$ ) | 6x500 / 7x600                                         | 1x350 / 1x600                                                 |

## Recommended Upstream Protection and Cable Sizes for 800 kW UPS

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>78</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 1600 ( $I_r = 0.8$ ) | 4x400 / 4x600                                         | 1x4/0 / 1x350                                                 |
| Bypass  | 1000                 | 3x400 / 3x600                                         | 1x2/0 / 1x4/0                                                 |
| Output  | 1000                 | 3x400 / 3x600                                         | 1x2/0 / 1x4/0                                                 |
| Battery | 2500 ( $I_r = 0.9$ ) | 6x500 / 7x600                                         | 1x350 / 1x600                                                 |

78. If the conductors are run in conduits, there must be one conductor in each conduit.



## Recommended Upstream Protection and Cable Sizes for 1000 kW UPS

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>79</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 1600 ( $I_r = 1.0$ ) | 4x600 / 5x600                                         | 1x4/0 / 1x350                                                 |
| Bypass  | 1600 ( $I_r = 0.8$ ) | 4x400 / 4x600                                         | 1x4/0 / 1x350                                                 |
| Output  | 1600 ( $I_r = 0.8$ ) | 4x400 / 4x600                                         | 1x4/0 / 1x350                                                 |
| Battery | 3000 ( $I_r = 1.0$ ) | 8x500 / 9x600                                         | 1x400 / 1x600                                                 |

## Recommended Upstream Protection and Cable Sizes for 1100 kW UPS

**NOTE:** For a 1250 I/O cabinet, it is preferred to use flexible copper power cables with as small a diameter as possible. The number of power cables needed for this kW rating will make large and inflexible power cables more difficult to install.

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>79</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 2000 ( $I_r = 0.9$ ) | 5x500 / 6x500                                         | 1x250 / 1x400                                                 |
| Bypass  | 1600 ( $I_r = 0.9$ ) | 4x500 / 5x500                                         | 1x4/0 / 1x350                                                 |
| Output  | 1600 ( $I_r = 0.9$ ) | 4x500 / 5x500                                         | 1x4/0 / 1x350                                                 |
| Battery | 3000 ( $I_r = 1.0$ ) | 8x500 / 9x600                                         | 1x400 / 1x600                                                 |

## Recommended Upstream Protection and Cable Sizes for 1250 kW UPS

**NOTE:** For a 1250 I/O cabinet, it is preferred to use flexible copper power cables with as small a diameter as possible. The number of power cables needed for this kW rating will make large and inflexible power cables more difficult to install.

|         | Maximum OCPD (A)     | Cable size per phase (AWG/kcmil)<br>Copper / Aluminum | EGC cable size (AWG/kcmil) <sup>79</sup><br>Copper / Aluminum |
|---------|----------------------|-------------------------------------------------------|---------------------------------------------------------------|
| Input   | 2000 ( $I_r = 1.0$ ) | 5x600 / 6x600                                         | 1x250 / 1x400                                                 |
| Bypass  | 1600 ( $I_r = 1.0$ ) | 4x600 / 5x600                                         | 1x4/0 / 1x350                                                 |
| Output  | 1600 ( $I_r = 1.0$ ) | 4x600 / 5x600                                         | 1x4/0 / 1x350                                                 |
| Battery | 4000 ( $I_r = 0.9$ ) | 9x600 / 11x600                                        | 2x250 / 2x400                                                 |

79. If the conductors are run in conduits, there must be one conductor in each conduit.

## Recommended Bolt and Lug Sizes for Copper Cables

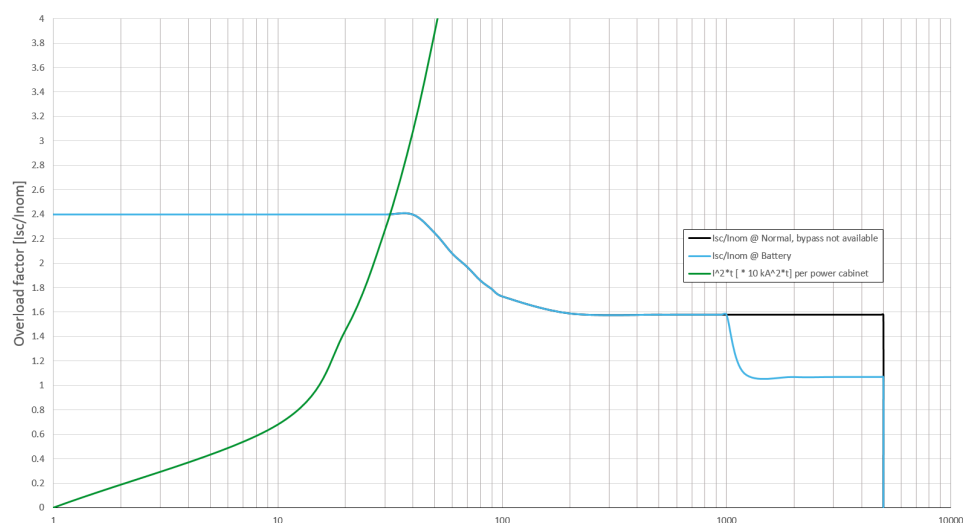
| Cable Size | Terminal Bolt Diameter | Cable Lug Type | Crimping Tool    | Die                   |
|------------|------------------------|----------------|------------------|-----------------------|
| 1/0 AWG    | M12 x 35 mm            | LCCF1/0-12-X   | CT930            | CD-920-2/0 Black P45  |
| 2/0 AWG    | M12 x 35 mm            | LCCF2/0-12-X   | CT930            | CD-920-3/0 Orange P50 |
| 3/0 AWG    | M12 x 35 mm            | LCCF3/0-12-X   | CT930            | CD-920-4/0 Purple P54 |
| 250 kcmil  | M12 x 35 mm            | LCCF250-12-X   | CT-940CH/CT-2940 | CD-920-300 White P66  |
| 300 kcmil  | M12 x 35 mm            | LCCF300-12-6   | CT-940CH/CT-2940 | CD-920-350 Red P71    |
| 400 kcmil  | M12 x 35 mm            | LCCF400-12-6   | CT-940CH/CT-2940 | CD-920-500 Brown P87  |
| 500 kcmil  | M12 x 35 mm            | LCCF500-12-6   | CT-940CH/CT-2940 | CD-920-500A Pink P99  |
| 600 kcmil  | M12 x 40 mm            | LCCF600-12-6   | CT-940CH/CT-2940 | CD-920-750 Black P106 |

## Recommended Bolt and Lug Sizes for Aluminium Cables

| Cable Size | Terminal Bolt Diameter | Cable Lug Type | Crimping Tool | Die        |
|------------|------------------------|----------------|---------------|------------|
| 2/0 AWG    | M12 x 40 mm            | LAB2/0-12-5    | CT930         | Olive P54  |
| 3/0 AWG    | M12 x 40 mm            | LAB3/0-12-5    | CT930         | Ruby P60   |
| 250 kcmil  | M12 x 40 mm            | LAB250-12-5    | CT930         | Red P71    |
| 300 kcmil  | M12 x 40 mm            | LAB300-12-2    | CT930         | Blue P76   |
| 400 kcmil  | M12 x 40 mm            | LAB400-12-2    | CT930         | Green P94  |
| 500 kcmil  | M12 x 40 mm            | LAB500-12-2    | CT930         | Pink P99   |
| 600 kcmil  | M12 x 40 mm            | LAB600-12-2    | CT930         | Black P106 |

# Inverter Short-Circuit Capabilities (Bypass not Available)

## IK1 – Short-Circuit between a Phase and Neutral



### 400 V IK1

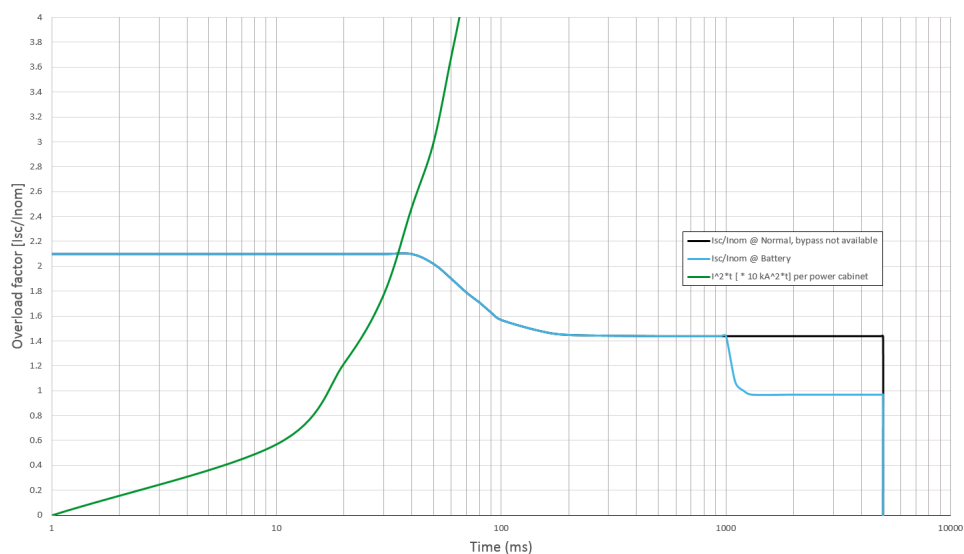
| S [kVA] | Ik10ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik30ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik100ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik500ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik1s [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik5s [A]<br>Normal<br>operation<br>/Battery<br>operation | I² t total [A²s]<br>Normal<br>operation<br>/Battery<br>operation |
|---------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------|
| 250     | 840<br>/840                                                | 820<br>/840                                                | 610<br>/640                                                 | 550<br>/550                                                 | 550<br>/550                                              | 550<br>/360                                              | 1539100<br>/874180                                               |
| 500     | 1680 /1680                                                 | 1640 /1680                                                 | 1220 /1280                                                  | 1100 /1100                                                  | 1100 /1100                                               | 1100<br>/720                                             | 6156400<br>/3496720                                              |
| 750     | 2520 /2520                                                 | 2460 /2520                                                 | 1830 /1920                                                  | 1650 /1650                                                  | 1650 /1650                                               | 1650 /1080                                               | 13851900<br>/7867620                                             |
| 1000    | 3360 /3360                                                 | 3280 /3360                                                 | 2440 /2560                                                  | 2200 /2200                                                  | 2200 /2200                                               | 2200 /1440                                               | 24625600<br>/13986880                                            |
| 1250    | 4200 /4200                                                 | 4100 /4200                                                 | 3050 /3200                                                  | 2750 /2750                                                  | 2750 /2750                                               | 2750 /1800                                               | 38477500<br>/21854500                                            |
| 1500    | 5040 /5040                                                 | 4920 /5040                                                 | 3660 /3840                                                  | 3300 /3300                                                  | 3300 /3300                                               | 3300 /2160                                               | 55407600<br>/31470480                                            |

### 480 V IK1

| S [kVA] | Ik10ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik30ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik100ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik500ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik1s [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik5s [A]<br>Normal<br>operation<br>/Battery<br>operation | I² t total [A²s]<br>Normal<br>operation<br>/Battery<br>operation |
|---------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------|
| 250     | —<br>/810                                                  | —<br>/810                                                  | —<br>/570                                                   | —<br>/290                                                   | —<br>/290                                                | —<br>/290                                                | —<br>/493600                                                     |
| 500     | —<br>/1620                                                 | —<br>/1620                                                 | —<br>/1140                                                  | —<br>/580                                                   | —<br>/580                                                | —<br>/580                                                | —<br>/1974400                                                    |
| 750     | —<br>/2430                                                 | —<br>/2430                                                 | —<br>/1710                                                  | —<br>/870                                                   | —<br>/870                                                | —<br>/870                                                | —<br>/4442400                                                    |
| 1000    | —<br>/3240                                                 | —<br>/3240                                                 | —<br>/2280                                                  | —<br>/1160                                                  | —<br>/1160                                               | —<br>/1160                                               | —<br>/7897600                                                    |

**480 V IK1 (Continued)**

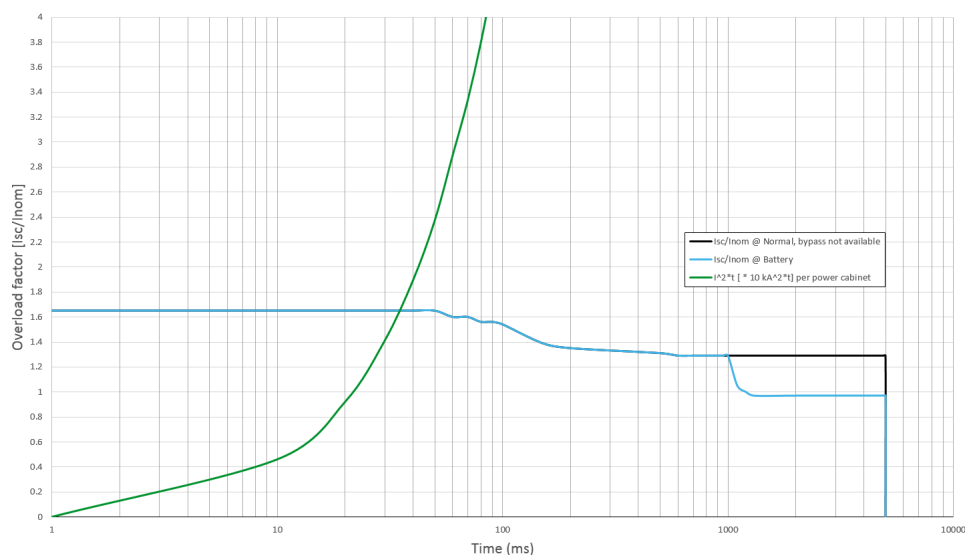
| S [kVA]     | Ik10ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik30ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik100ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik500ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik1s [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik5s [A]<br>Normal<br>operation<br>/Battery<br>operation | I <sup>2</sup> t total [A <sup>2</sup> s]<br>Normal<br>operation<br>/Battery<br>operation |
|-------------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>1250</b> | —<br>/4050                                                 | —<br>/4050                                                 | —<br>/2850                                                  | —<br>/1450                                                  | —<br>/1450                                               | —<br>/1450                                               | —<br>/12340000                                                                            |
| <b>1500</b> | —<br>/4860                                                 | —<br>/4860                                                 | —<br>/3420                                                  | —<br>/1740                                                  | —<br>/1740                                               | —<br>/1740                                               | —<br>/17769600                                                                            |

**IK2 – Short-Circuit between Two Phases****400 V IK2**

| S [kVA]     | Ik10ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik30ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik100ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik500ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik1s [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik5s [A]<br>Normal<br>operation<br>/Battery<br>operation | I <sup>2</sup> t total [A <sup>2</sup> s]<br>Normal<br>operation<br>/Battery<br>operation |
|-------------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>250</b>  | 780<br>/780                                                | 780<br>/780                                                | 600<br>/600                                                 | 510<br>/510                                                 | 510<br>/510                                              | 510<br>/330                                              | 1312100<br>/740520                                                                        |
| <b>500</b>  | 1560 /1560                                                 | 1560 /1560                                                 | 1200 /1200                                                  | 1020 /1020                                                  | 1020 /1020                                               | 1020<br>/660                                             | 5248400<br>/2962080                                                                       |
| <b>750</b>  | 2340 /2340                                                 | 2340 /2340                                                 | 1800 /1800                                                  | 1530 /1530                                                  | 1530 /1530                                               | 1530<br>/990                                             | 11808900<br>/6664680                                                                      |
| <b>1000</b> | 3120 /3120                                                 | 3120 /3120                                                 | 2400 /2400                                                  | 2040 /2040                                                  | 2040 /2040                                               | 2040 /1320                                               | 20993600<br>/11848320                                                                     |
| <b>1250</b> | 3900 /3900                                                 | 3900 /3900                                                 | 3000 /3000                                                  | 2550 /2550                                                  | 2550 /2550                                               | 2550 /1650                                               | 32802500<br>/18513000                                                                     |
| <b>1500</b> | 4680 /4680                                                 | 4680 /4680                                                 | 3600 /3600                                                  | 3060 /3060                                                  | 3060 /3060                                               | 3060 /1980                                               | 47235600<br>/26658720                                                                     |

**480 V IK2**

| S [kVA]     | Ik10ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik30ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik100ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik500ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik1s [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik5s [A]<br>Normal<br>operation<br>/Battery<br>operation | I <sup>2</sup> t total [A <sup>2</sup> s]<br>Normal<br>operation<br>/Battery<br>operation |
|-------------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>250</b>  | 790<br>/790                                                | 770<br>/770                                                | 550<br>/550                                                 | 430<br>/280                                                 | 430<br>/280                                              | 280<br>/280                                              | 606450<br>/460820                                                                         |
| <b>500</b>  | 1580 /1580                                                 | 1540 /1540                                                 | 1100 /1100                                                  | 860<br>/560                                                 | 860<br>/560                                              | 560<br>/560                                              | 2425800<br>/1843280                                                                       |
| <b>750</b>  | 2370 /2370                                                 | 2310 /2310                                                 | 1650 /1650                                                  | 1290<br>/840                                                | 1290<br>/840                                             | 840<br>/840                                              | 5458050<br>/4147380                                                                       |
| <b>1000</b> | 3160 /3160                                                 | 3080 /3080                                                 | 2200 /2200                                                  | 1720 /1120                                                  | 1720 /1120                                               | 1120 /1120                                               | 9703200<br>/7373120                                                                       |
| <b>1250</b> | 3950 /3950                                                 | 3850 /3850                                                 | 2750 /2750                                                  | 2150 /1400                                                  | 2150 /1400                                               | 1400 /1400                                               | 15161250<br>/11520500                                                                     |
| <b>1500</b> | 4740 /4740                                                 | 4620 /4620                                                 | 3300 /3300                                                  | 2580 /1680                                                  | 2580 /1680                                               | 1680 /1680                                               | 21832200<br>/16589520                                                                     |

**IK3 – Short-Circuit between All Three Phases****400 V IK3**

| S [kVA]     | Ik10ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik30ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik100ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik500ms [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik1s [A]<br>Normal<br>operation<br>/Battery<br>operation | Ik5s [A]<br>Normal<br>operation<br>/Battery<br>operation | I <sup>2</sup> t total [A <sup>2</sup> s]<br>Normal<br>operation<br>/Battery<br>operation |
|-------------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>250</b>  | 720<br>/720                                                | 720<br>/720                                                | 670<br>/640                                                 | 540<br>/360                                                 | 540<br>/360                                              | 540<br>/360                                              | 1507600<br>/711360                                                                        |
| <b>500</b>  | 1440 /1440                                                 | 1440 /1440                                                 | 1340 /1280                                                  | 1080<br>/720                                                | 1080<br>/720                                             | 1080<br>/720                                             | 6030400<br>/2845440                                                                       |
| <b>750</b>  | 2160 /2160                                                 | 2160 /2160                                                 | 2010 /1920                                                  | 1620 /1080                                                  | 1620 /1080                                               | 1620 /1080                                               | 13568400<br>/6402240                                                                      |
| <b>1000</b> | 2880 /2880                                                 | 2880 /2880                                                 | 2680 /2560                                                  | 2160 /1440                                                  | 2160 /1440                                               | 2160 /1440                                               | 24121600<br>/11381760                                                                     |
| <b>1250</b> | 3600 /3600                                                 | 3600 /3600                                                 | 3350 /3200                                                  | 2700 /1800                                                  | 2700 /1800                                               | 2700 /1800                                               | 37690000<br>/17784000                                                                     |
| <b>1500</b> | 4320 /4320                                                 | 4320 /4320                                                 | 4020 /3840                                                  | 3240 /2160                                                  | 3240 /2160                                               | 3240 /2160                                               | 54273600<br>/25608960                                                                     |

**480 V IK3**

| <b>S [kVA]</b> | <b>Ik10ms [A]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> | <b>Ik30ms [A]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> | <b>Ik100ms [A]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> | <b>Ik500ms [A]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> | <b>Ik1s [A]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> | <b>Ik5s [A]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> | <b>I<sup>2</sup> t total [A<sup>2</sup>s]<br/>Normal<br/>operation<br/>/Battery<br/>operation</b> |
|----------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>250</b>     | 670<br>/660                                                           | 670<br>/660                                                           | 610<br>/610                                                            | 440<br>/440                                                            | 360<br>/440                                                         | 300<br>/300                                                         | 580600<br>/589380                                                                                 |
| <b>500</b>     | 1340 /1320                                                            | 1340 /1320                                                            | 1220 /1220                                                             | 880<br>/880                                                            | 720<br>/880                                                         | 600<br>/600                                                         | 2322400<br>/2357520                                                                               |
| <b>650</b>     | 1742 /1716                                                            | 1742 /1716                                                            | 1586 /1586                                                             | 1144 /1144                                                             | 936<br>/1144                                                        | 780<br>/780                                                         | 3924856<br>/3984209                                                                               |
| <b>1000</b>    | 2680 /2640                                                            | 2680 /2640                                                            | 2440 /2440                                                             | 1760 /1760                                                             | 1440 /1760                                                          | 1200 /1200                                                          | 9289600<br>/9430080                                                                               |
| <b>1250</b>    | 3350 /3300                                                            | 3350 /3300                                                            | 3050 /3050                                                             | 2200 /2200                                                             | 1800 /2200                                                          | 1500 /1500                                                          | 14515000<br>/14734500                                                                             |
| <b>1500</b>    | 4020 /3960                                                            | 4020 /3960                                                            | 3660 /3660                                                             | 2640 /2640                                                             | 2160 /2640                                                          | 1800 /1800                                                          | 20901600<br>/21217680                                                                             |

## Torque Specifications

### WARNING

#### HAZARD OF ELECTRIC SHOCK

All electrical connections must be torqued according to this table.

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

| Bolt size | Torque                |
|-----------|-----------------------|
| M6        | 5 Nm (3.69 lb-ft)     |
| M8        | 17.5 Nm (12.91 lb-ft) |
| M10       | 30 Nm (22 lb-ft)      |
| M12       | 50 Nm (36.87 lb-ft)   |

## Environment

|                                                                | Operating                                                                                                                            | Storage                                                                                                                         |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Temperature                                                    | 0 °C to 40 °C (32 °F to 104 °F)<br>0 °C to 50 °C (32 °F to 122 °F) when derated to 75% power <sup>80</sup>                           | -15 °C to 40 °C (5 °F to 104 °F) for systems with batteries<br>-25 °C to 55 °C (-13 °F to 131 °F) for systems without batteries |
| Relative humidity                                              | 5-95% non-condensing                                                                                                                 | 10-80% non-condensing                                                                                                           |
| Elevation derating according to ANSI C57.96–1999 <sup>81</sup> | 1000 m (3300 ft): 1.000<br>1500 m (5000 ft): 0.975<br>2000 m (6600 ft): 0.950<br>2500 m (8300 ft): 0.925<br>3000 m (10000 ft): 0.900 | 0-15000 m (0-50000 ft)                                                                                                          |
| Audible noise one meter (three feet) from unit                 | 62 dB at 70% load<br>69.5 dB at 100% load for 400 V systems<br>68 dB at 100% load for 480 V systems                                  |                                                                                                                                 |
| Protection class                                               | IP20                                                                                                                                 |                                                                                                                                 |
| Color                                                          | RAL 9003 white                                                                                                                       |                                                                                                                                 |

80. For temperatures between 40 °C (104 °F) and 50 °C (122 °F), the load power rating must be derated with 2.5% per °C of rated output power. Above 40 °C (104 °F) the minimum input voltage is 340 V, and from 380 V to 340 V, the charge power must be linearly derated from 12% to 1%.

81. Maximum operation elevation is 3000 m (10000 ft).

## Compliance

|                      |                                                                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety               | IEC 62040-1: 2017, Edition 2.0, Uninterruptible Power Systems (UPS) - Part 1: Safety requirements<br>UL 1778 5th edition                             |
| EMC/EMI/RFI          | IEC 62040-2: 2016, 3rd edition Uninterruptible Power Systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements C2<br>FCC 15B, class A |
| Performance          | IEC 62040-3: 2011-03, 2nd edition Uninterruptible Power Systems (UPS) - Part 3: Method of specifying the performance and test requirements           |
| Environmental        | IEC 62040-4: 2013-04, 1st edition Uninterruptible Power Systems (UPS) - Part 4: Environmental aspects – Requirements and reporting                   |
| Markings             | CE, C-Tick<br>UL1778 Listing and CSA C22.2 NO.107.3                                                                                                  |
| Transportation       | ISTA 2B<br>IEC 60721-4-2 Level 2M2                                                                                                                   |
| Seismic              | OSHPD, IBC2012 and CBC2013 to $S_{DS} = 1.83$ g                                                                                                      |
| Overvoltage category | III                                                                                                                                                  |
| Earthing system      | TN, TT, IT                                                                                                                                           |
| Protective class     | I                                                                                                                                                    |
| Pollution degree     | 2                                                                                                                                                    |



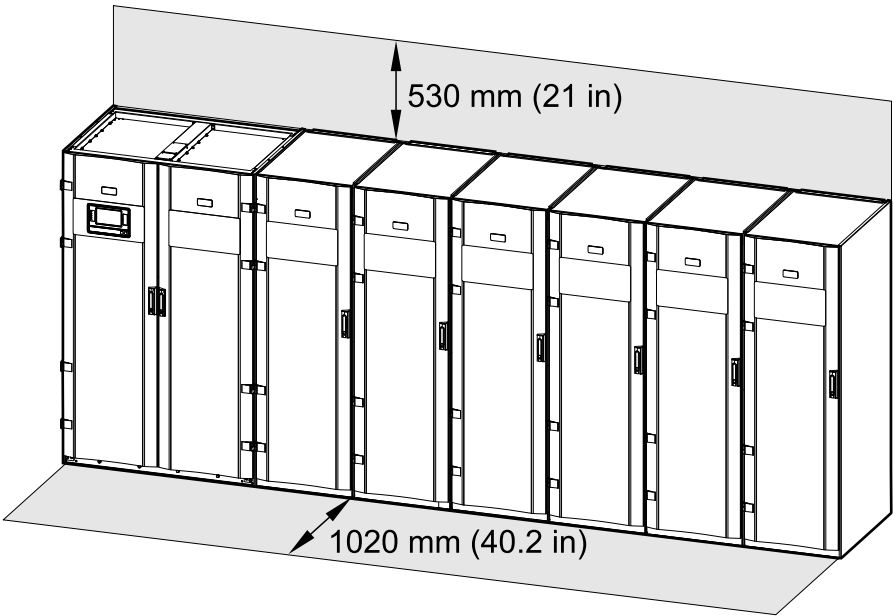
## Weights and Dimensions for UPSs with 1250 kW I/O Cabinet

| Commercial reference                                                                                                                                                                                                                                                                                                               |                                            | Weight kg (lbs)                                 | Height mm (in) | Width mm (in)                                     | Depth mm (in) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------|----------------|---------------------------------------------------|---------------|
| <ul style="list-style-type: none"> <li>GVX500K500NHS</li> <li>GVX500K500NGS</li> <li>GVX500K750NHS</li> <li>GVX500K750NGS</li> <li>GVX500K1000NHS</li> <li>GVX500K1000NGS</li> <li>GVX500K1250NHS</li> <li>GVX500K1250NGS</li> </ul>                                                                                               | Total<br>– Power cabinets<br>– I/O cabinet | 1700 (3748)<br>2 x 540 (2 x 1190)<br>620 (1367) | 1970 (77.6)    | 2400 (94.5)<br>2 x 600 (2 x 23.6)<br>1200 (47.2)  | 900 (35.4)    |
| <ul style="list-style-type: none"> <li>GVX625K625NHS</li> <li>GVX625K625NGS</li> <li>GVX625K1000NHS</li> <li>GVX625K1000NGS</li> <li>GVX750K500NHS</li> <li>GVX750K500NGS</li> <li>GVX750K750NHS</li> <li>GVX750K750NGS</li> <li>GVX750K1000NHS</li> <li>GVX750K1000NGS</li> <li>GVX750K1250NHS</li> <li>GVX750K1250NGS</li> </ul> | Total<br>– Power cabinets<br>– I/O cabinet | 2240 (4938)<br>3 x 540 (3 x 1190)<br>620 (1367) | 1970 (77.6)    | 3000 (118.1)<br>3 x 600 (3 x 23.6)<br>1200 (47.2) | 900 (35.4)    |
| <ul style="list-style-type: none"> <li>GVX800K800NHS</li> <li>GVX800K800NGS</li> <li>GVX1000K750NHS</li> <li>GVX1000K750NGS</li> <li>GVX1000K1000NHS</li> <li>GVX1000K1000NGS</li> <li>GVX1000K1250NHS</li> <li>GVX1000K1250NGS</li> </ul>                                                                                         | Total<br>– Power cabinets<br>– I/O cabinet | 2780 (6129)<br>4 x 540 (4 x 1190)<br>620 (1367) | 1970 (77.6)    | 3600 (141.7)<br>4 x 600 (4 x 23.6)<br>1200 (47.2) | 900 (35.4)    |
| <ul style="list-style-type: none"> <li>GVX1100K1100NHS</li> <li>GVX1100K1100NGS</li> <li>GVX1250K1000NHS</li> <li>GVX1250K1000NGS</li> <li>GVX1250K1250NHS</li> <li>GVX1250K1250NGS</li> </ul>                                                                                                                                     | Total<br>– Power cabinets<br>– I/O cabinet | 3320 (7319)<br>5 x 540 (5 x 1190)<br>620 (1367) | 1970 (77.6)    | 4200 (165.4)<br>5 x 600 (5 x 23.6)<br>1200 (47.2) | 900 (35.4)    |
| <ul style="list-style-type: none"> <li>GVX1500K1100NHS</li> <li>GVX1500K1100NGS</li> <li>GVX1500K1250NHS</li> <li>GVX1500K1250NGS</li> </ul>                                                                                                                                                                                       | Total<br>– Power cabinets<br>– I/O cabinet | 3860 (8510)<br>6 x 540 (6 x 1190)<br>620 (1367) | 1970 (77.6)    | 4800 (189.0)<br>6 x 600 (6 x 23.6)<br>1200 (47.2) | 900 (35.4)    |

## Clearance for UPSs with 1250 kW I/O Cabinet

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

**NOTE:** The UPS system can be placed up against a wall and there is no requirement for rear or side access.

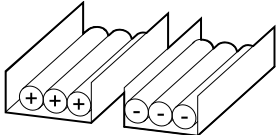
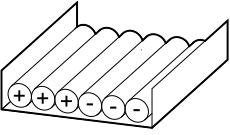
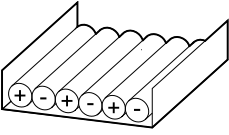
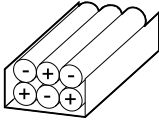


## Guidance for Organizing Battery Cables

**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.

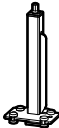
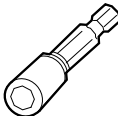
**NOTE:** To minimize the risk of electromagnetic radiation, it is highly recommended to follow the below guidance and to use grounded metallic tray supports.

| 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                                                                           |

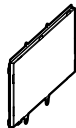
# Overview of Supplied Installation Kits

## Installation Kits Shipped with the I/O Cabinet

### Installation Kit 0M-816661

| Part                                  | Used in                                                                                                       | Number of units                                                                          |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Jack                                  | Follow the receiving and unpacking manual to remove the cabinets from the pallet using this installation kit. | 1<br> |
| Floor protection plate                |                                                                                                               | 1<br> |
| Hexagonal socket for drilling machine |                                                                                                               | 1<br> |

### Installation Kit 0H-9385

| Part                                                         | Used in                                                                                                                                                     | Number of Units                                                                             |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Angle for right side of the rear anchoring bracket 870-30412 | Mount the Rear Anchoring Brackets, page 52                                                                                                                  | 1<br>  |
| M8 x 20 hexagonal torx with washer                           |                                                                                                                                                             | 2<br>  |
| 1 mm leveling shims                                          |                                                                                                                                                             | 30<br> |
| EMC cover right 0M-98993                                     | Position the Cabinets, page 54                                                                                                                              | 1<br>  |
| M6 nut with washer                                           |                                                                                                                                                             | 8<br>  |
| M10 x 45 hexagonal torx with washer                          | Save for the field service representative. They will be used for fastening the busbars and will be installed by Schneider Electric during assembly service. | 16<br> |
| M8 x 35 hexagonal torx with washer                           |                                                                                                                                                             | 2                                                                                           |

| Part                      | Used in                                    | Number of Units                                                                          |
|---------------------------|--------------------------------------------|------------------------------------------------------------------------------------------|
|                           |                                            |       |
| M10 x 35 bolt with washer |                                            | 4                                                                                        |
| Terminator for modbus     | Modbus Connections (Board 0P6502), page 86 | 2<br> |

## Installation Kit 0H-9384

| Part                                    | Used in                                     | Number of Units                                                                          |
|-----------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------|
| Front anchoring bracket for I/O cabinet | Mount the Front Anchoring Brackets, page 70 | 1<br> |

## Installation Kit 0H-1789

| Part                         | Used in                                                                                       | Number of Units                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Optical fiber cable 0W13010  | Route the Signal Cables between the I/O Cabinet and the Power Cabinets, page 71               | 1<br>  |
| Optical fiber cable 0W13022  |                                                                                               | 1<br>  |
| Cable ties for signal cables | Signal Cables, page 71                                                                        | 40<br> |
| Temperature sensor 0M-1160   | Signal Cable Connections to Classic Battery Cabinets (Boards 0P6547, 0P6549, 0P6552), page 84 | 2<br>  |

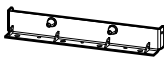
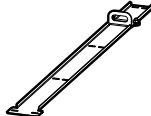
## Installation Kit 0H-0889

| Part                | Used in                                        | Number of Units                                                                            |
|---------------------|------------------------------------------------|--------------------------------------------------------------------------------------------|
| PBUS 1 cable 0W7995 | PBUS Cable Connections (Board 0P3643), page 85 | 1<br> |
| PBUS 2 cable 0W7996 |                                                | 1<br> |

# Installation Kits Shipped with the Power Cabinet

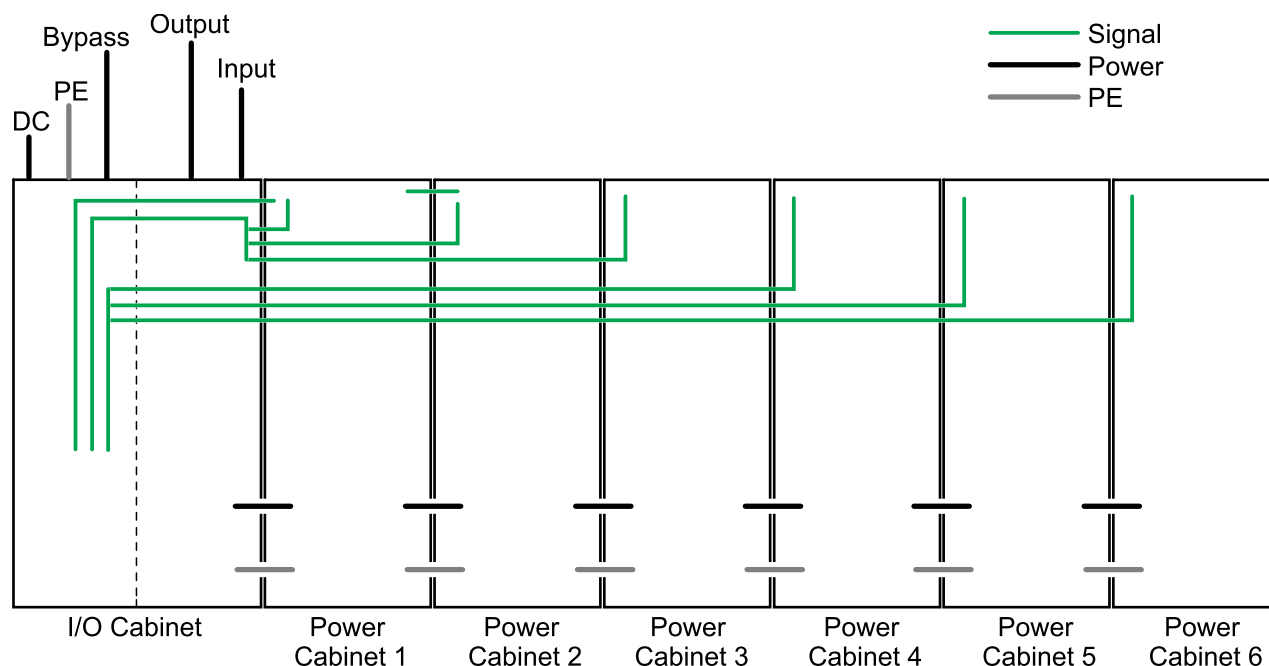
## Installation Kit 0H-9102

**NOTE:** These installation kit parts are shipped in the packaging of the power cabinet.

| Part                                                                                        | Used in                                                                                                                 | Number of Units                                                                             |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Rear anchoring bracket for power cabinet 0M-818242                                          | Mount the Rear Anchoring Brackets, page 52                                                                              | 1<br>    |
| M8 x 20 hexagonal torx with washer                                                          |                                                                                                                         | 2<br>    |
| Front anchoring bracket for power cabinet 0M-816684                                         | Mount the Front Anchoring Brackets, page 70                                                                             | 1<br>    |
| Long top baying bracket 0M-821220                                                           | Position the Cabinets, page 54                                                                                          | 1<br>    |
| M6 x 16 torx screw with washer                                                              |                                                                                                                         | 15<br> |
| M10 nut with washer                                                                         |                                                                                                                         | 24<br> |
| M10 x 35 hexagonal torx with washer                                                         |                                                                                                                         | 12<br> |
| 1 mm leveling shims                                                                         |                                                                                                                         | 10<br> |
| Ground interconnection busbar 880-99027                                                     |                                                                                                                         | 1<br>  |
| M8 nut with washer                                                                          | Save for the field service representative. The busbars will be installed by Schneider Electric during assembly service. | 4<br>  |
| M8 x 35 mm hexagonal torx with washer                                                       |                                                                                                                         | 4<br>  |
| Interconnection busbar 880-10146 and 880-9720 from power cabinet to power cabinet (neutral) |                                                                                                                         | 1<br>  |
| Interconnection busbar 0M-140035 power cabinet to power cabinet (battery +)                 |                                                                                                                         | 1                                                                                           |

| Part                                                                        | Used in | Number of Units                                                                          |
|-----------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------|
|                                                                             |         |       |
| Interconnection busbar 0M-97886 power cabinet to power cabinet (output)     |         | 3<br> |
| Interconnection busbar 0M-819336 power cabinet to power cabinet (battery -) |         | 1<br> |
| Interconnection busbar 0M-97885 power cabinet to power cabinet (input)      |         | 3<br> |

# Installation Procedure



1. Follow the receiving and unpacking manual to remove the cabinets from the pallet.
2. Mount the Rear Anchoring Brackets, page 52.
3. Position the Cabinets, page 54.
4. Prepare the I/O cabinet for power cables. Follow one of the procedures:
  - Prepare the I/O Cabinet for Power Cables in Top Cable Entry Systems, page 60, OR
  - Prepare the I/O Cabinet for Power Cables in Bottom Cable Entry Systems, page 61.
5. For dual mains systems only: Remove the Single Mains Busbars, page 62.
6. Connect the power cables. Follow one of the procedures:
  - Connect the Power Cables in a 380/400/415/440 V System, page 63, OR
  - Connect the Power Cables in a 480 V System, page 66.
7. Connect Cables to the External Supply for Lithium-ion Battery Solution (Optional), page 68.
8. Mount the Front Anchoring Brackets, page 70.
9. Route the Signal Cables between the I/O Cabinet and the Power Cabinets, page 71.
10. Route External Signal Cables to the Boards, page 77.
11. Final Mechanical Assembly, page 95.

For moving or decommissioning the UPS after installation has been completed, see Decommission or Move the UPS to a New Location, page 98.

# Mechanical Installation

## Mount the Rear Anchoring Brackets

### ⚠ DANGER

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

Leave the UPS system covered while making anchoring holes to prevent dust or other conductive particles from entering the system.

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

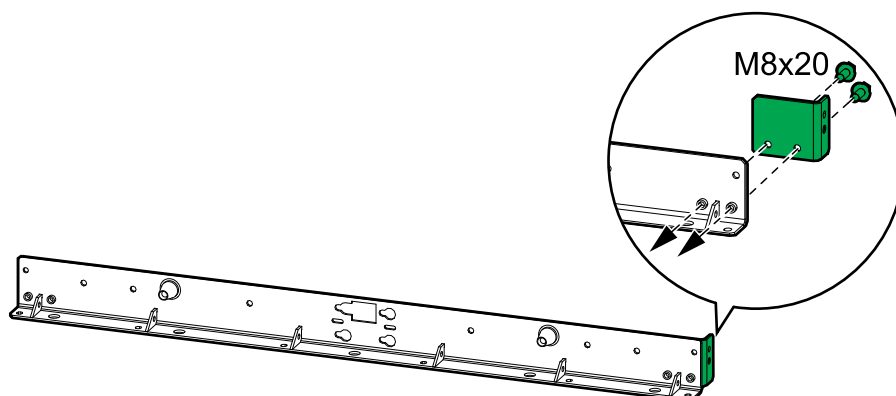
### ⚠ WARNING

#### HAZARD OF TILTING

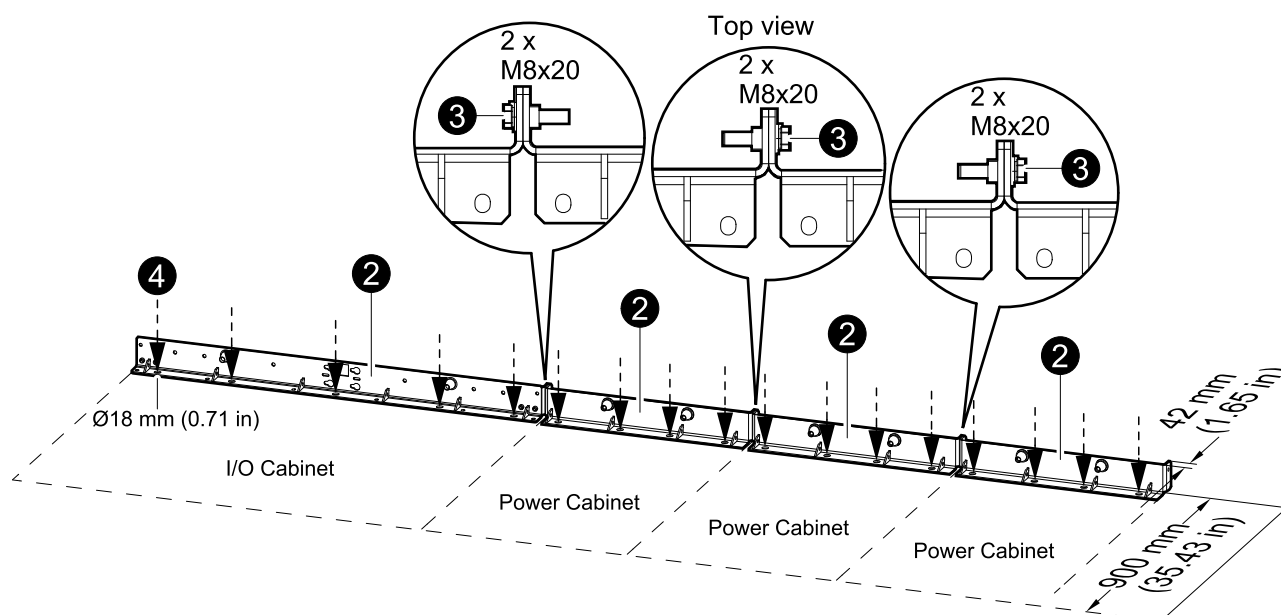
All rear and front anchoring brackets must be installed.

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

1. Use the rear anchoring bracket that was attached to the rear of the I/O cabinet. Fasten the plate from the installation kit 0H-9385 to the right side of the rear anchoring bracket of the I/O cabinet. Note the direction of the plate.



2. Place the rear anchoring brackets for the I/O cabinet and the power cabinets in the final installation area.





3. Interconnect the rear anchoring brackets using the provided screws and bolts.
4. Mark the hole locations.
5. Drill anchoring holes according to the national and local requirements.
6. Mount the rear anchoring brackets to the floor. Bolts are not supplied.
7. Use a bubble-leveler to ensure that the rear anchoring brackets are level. Use the provided leveling shims if necessary.

## Position the Cabinets

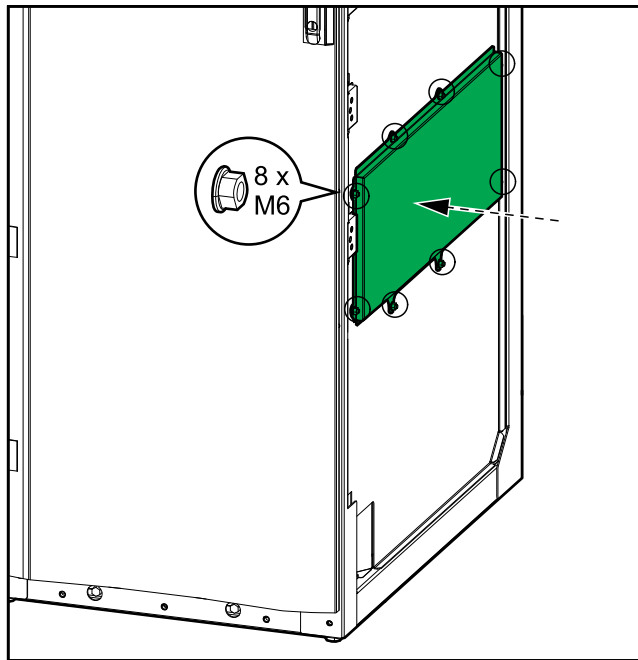
### DANGER

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

Do not step/walk on top of the cabinets.

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

1. Install the cover from installation kit 0M-98993 on the right-most power cabinet.



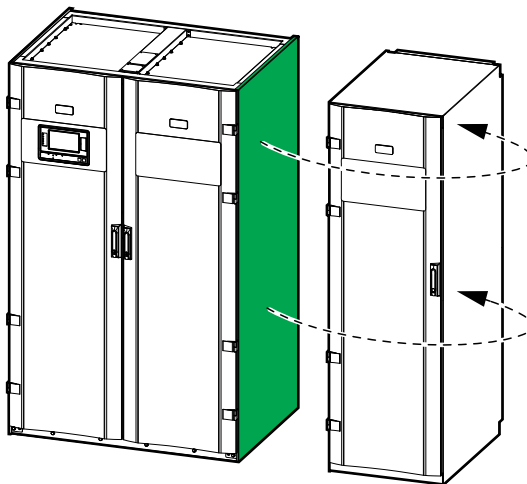
2. Move the side panel from the right side of the I/O cabinet and install it on the right-most power cabinet.

## **⚠ ⚠ WARNING**

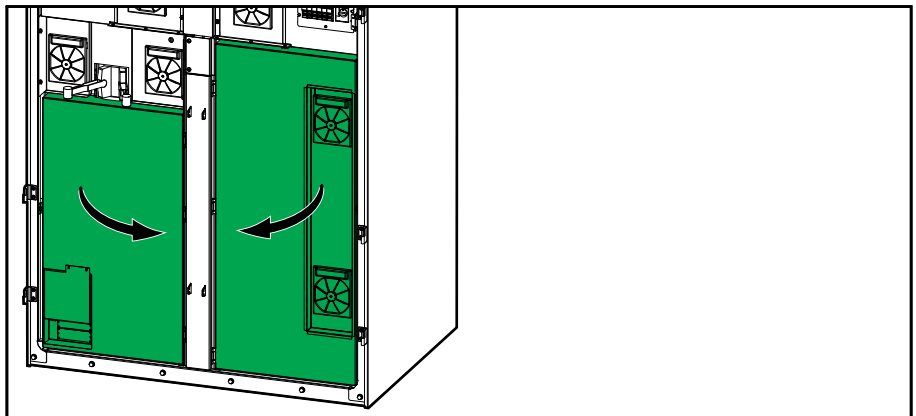
### **HAZARD OF ARC FLASH**

- 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.
- Move and install the indicated side panel in all installation types (including parallel installations with no air gap between the frames or in installations where the right-most power cabinet is placed against a wall).

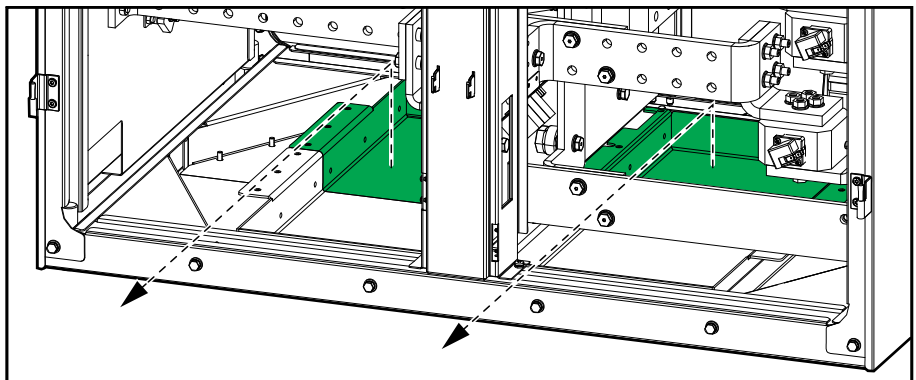
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**



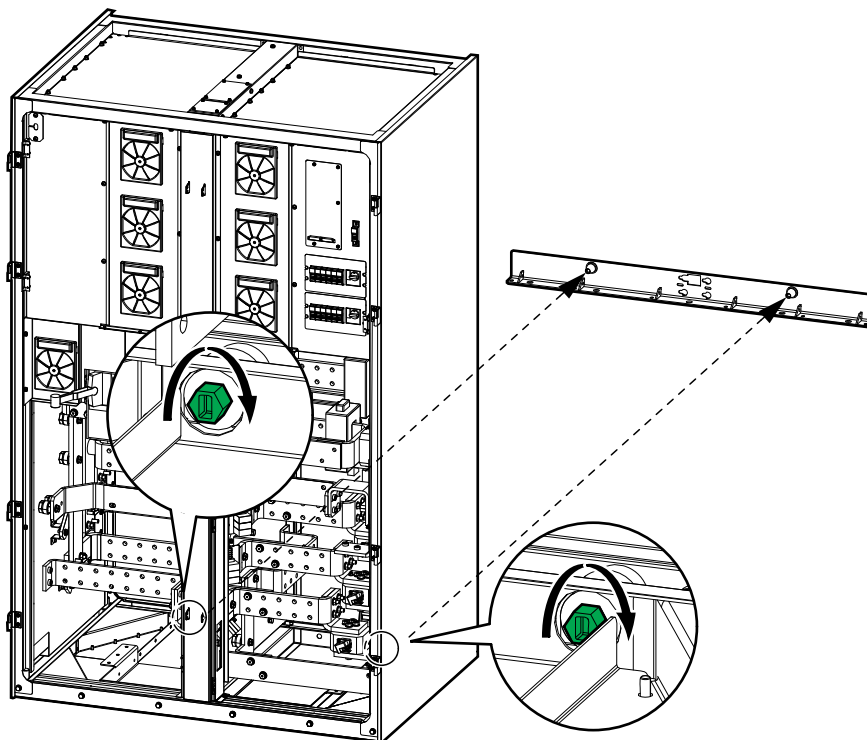
3. Open the two inner doors of the I/O cabinet.



4. Remove the two rear bottom plates.



5. Push the I/O cabinet into position against the rear anchoring bracket - the I/O cabinet will connect to the conic outcroppings on the rear anchoring bracket.



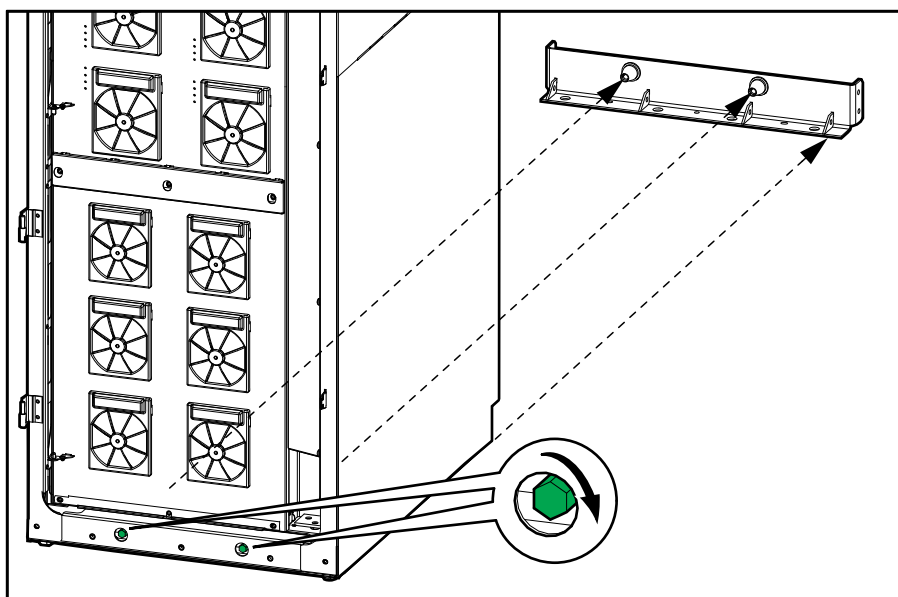
6. Fasten the cabinet to the rear anchoring bracket by tightening the bolts. Torque to 50 Nm (36.87 lb-ft).
7. Reinstall the two rear bottom plates.
8. Push the power cabinets one by one into position against the rear anchoring brackets – the cabinets will connect to the conic outcroppings on the brackets.

## ⚠ CAUTION

### RISK OF EQUIPMENT DAMAGE

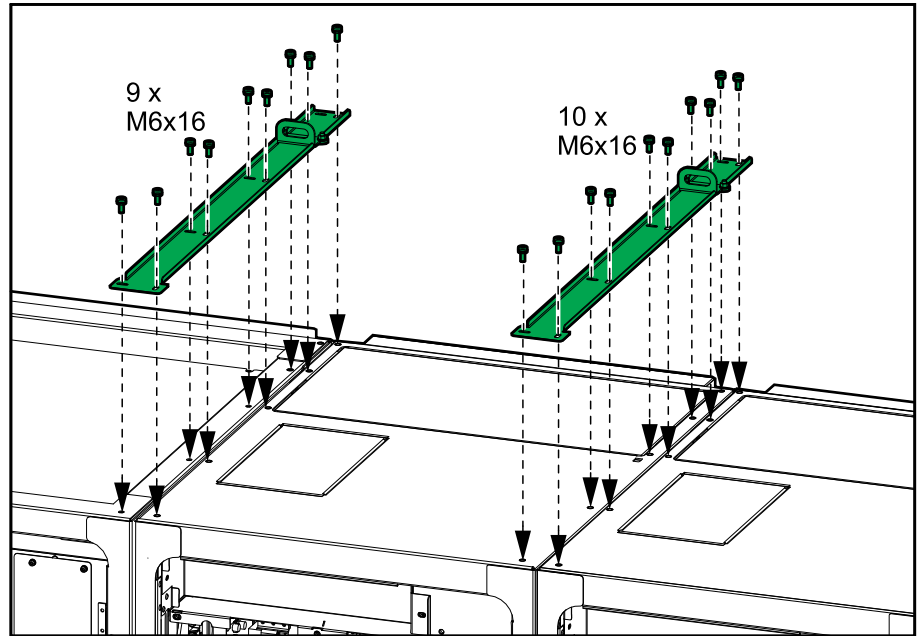
When pushing the power cabinet into position, push on the frame to avoid damaging the signal cables.

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

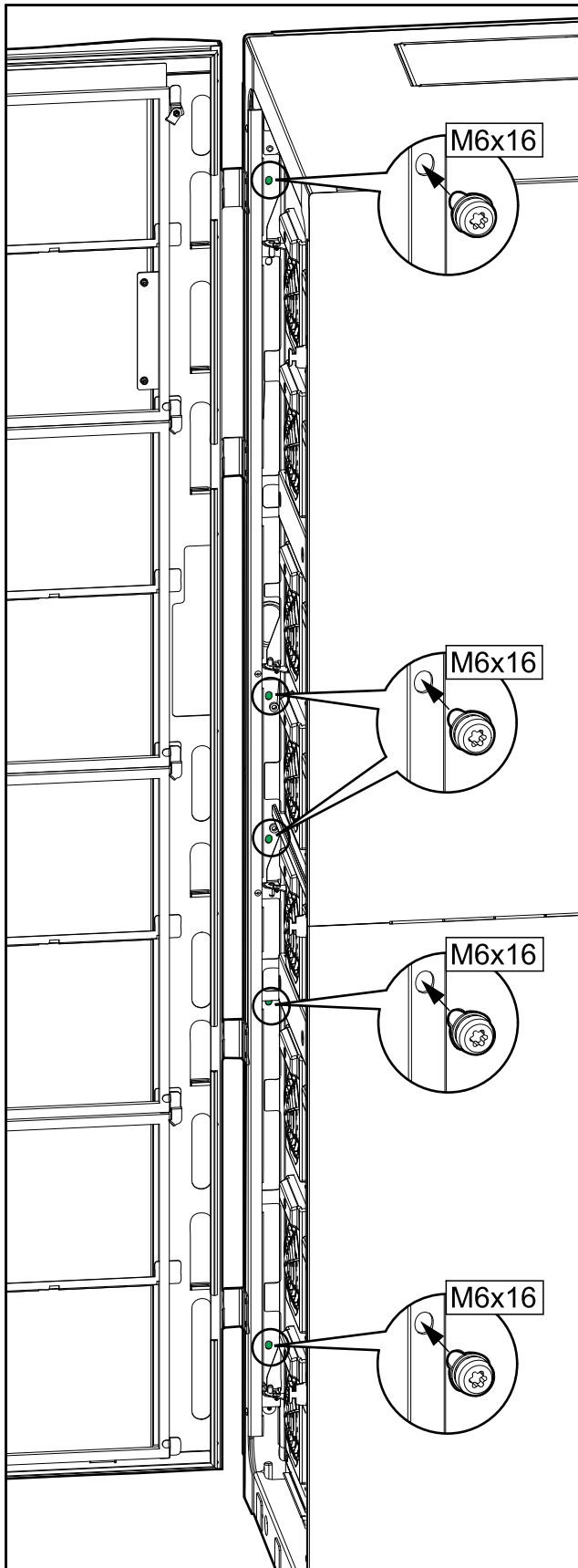
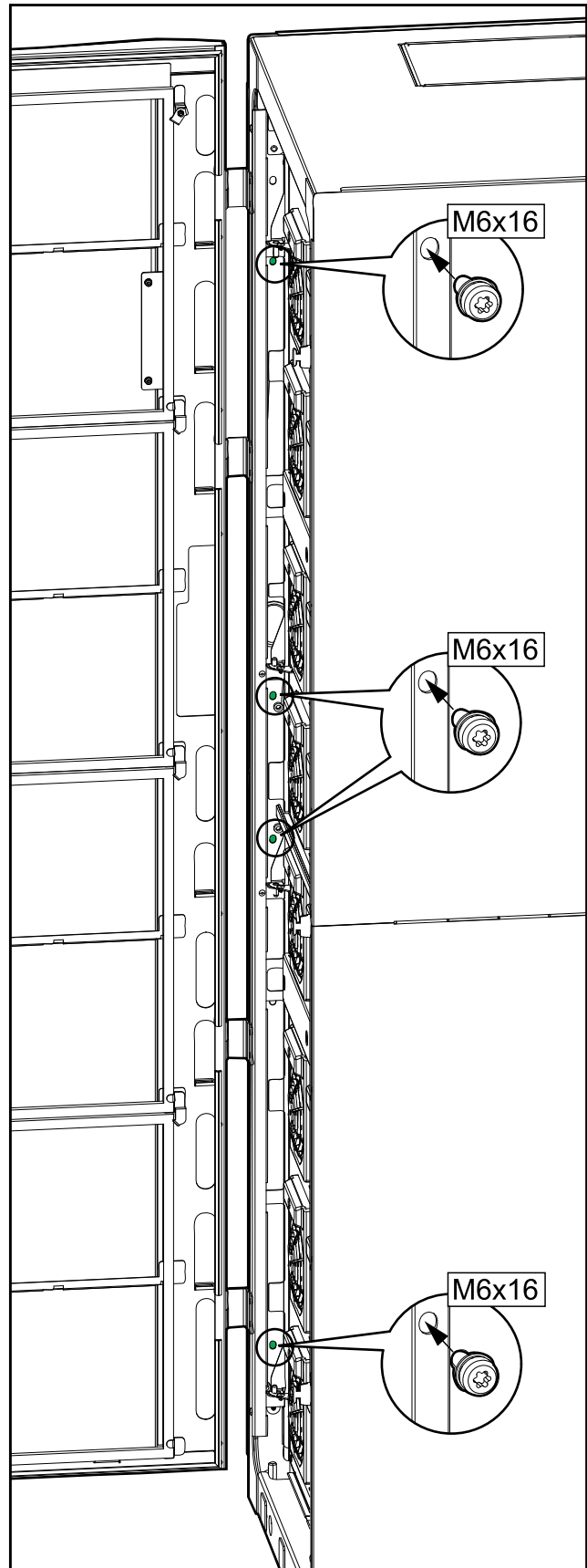


9. Fasten the power cabinets to the rear anchoring brackets by tightening the bolts on the front of the power cabinet. Torque to 50 Nm (36.87 lb-ft).
10. Lower the two front feet on all cabinets until they connect with the floor – use a bubble-leveler to ensure that the cabinets are level. Use the provided levelling shims if necessary.
11. Install the top baying bracket on the top of the cabinets and fasten with the provided screws.

#### I/O Cabinet and Two Power Cabinets



12. Mount the M6 screws from the installation kit from right to left in the five marked positions between the power cabinets and in the four marked positions between the power cabinet and the I/O cabinet to interconnect the cabinets.

**From Power to Power Cabinet****From Power to I/O Cabinet**

13. Verify that the right-most power cabinet for the I/O cabinet has the cover 0M-98993 and the side panel installed before continuing.

**1250 kW I/O with Maximum Number of Power Cabinets**



## Connect the Power Cables

### Prepare the I/O Cabinet for Power Cables in Top Cable Entry Systems

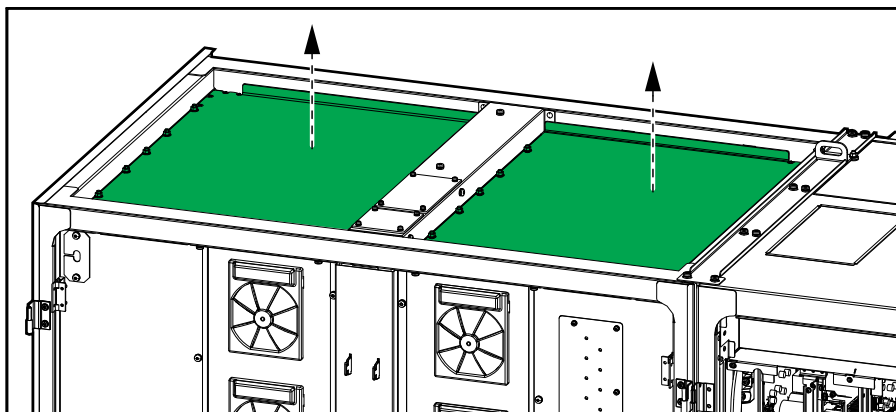
#### **⚠ DANGER**

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

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

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

1. Loosen the bolts and remove the gland plates from the top of the I/O cabinet.



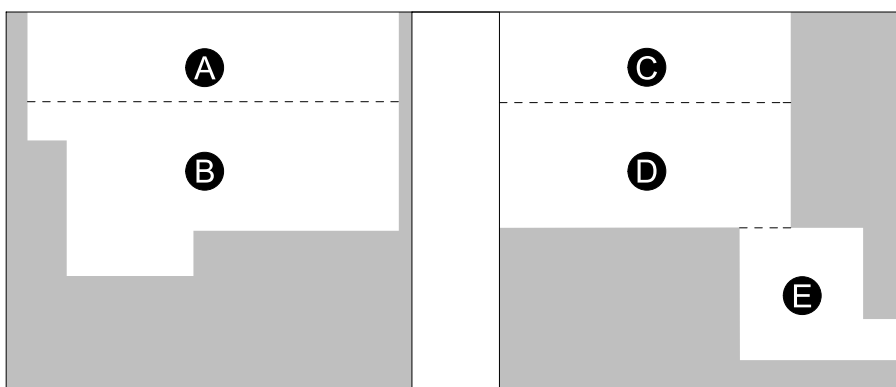
2. Drill or cut holes for cables/conduits in the top gland plate.

#### **⚠ DANGER**

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

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

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



- A. For bypass cables
- B. For DC cables
- C. For output cables
- D. For input cables
- E. For cables to the external supply for Li-Ion

3. Install conduits and reinstall the top gland plate.



# Prepare the I/O Cabinet for Power Cables in Bottom Cable Entry Systems

## ⚠ DANGER

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

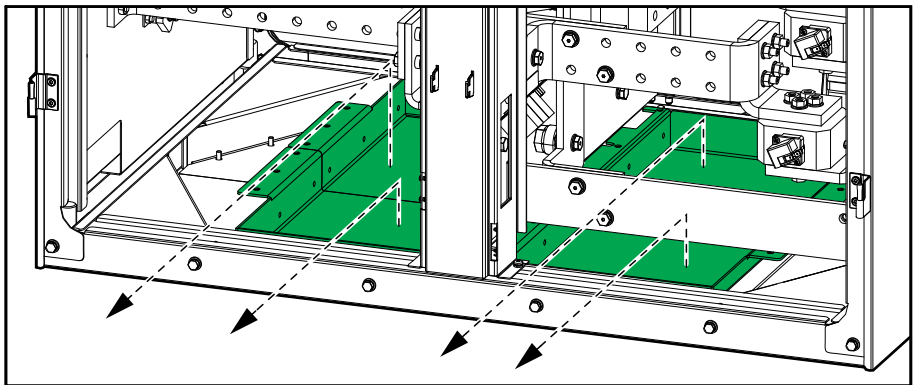
Do not drill/punch holes for cables or conduits with the gland plates installed and do not drill/punch holes in close proximity to the UPS.

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

**NOTE:** Cables to the external supply for Lithium-ion battery solution must be routed through the top of the I/O cabinet. Follow the procedure [Prepare the I/O Cabinet for Power Cables in Top Cable Entry Systems](#), page 60 to prepare for cables to the external supply.

**NOTE:** You may need to elevate the cabinet by lowering the cabinet feet or reduce the floor height directly beneath the bottom gland plates to get correct wire bending range for the power cables.

1. Loosen the bolts and remove the gland plates in the bottom of the I/O cabinet.



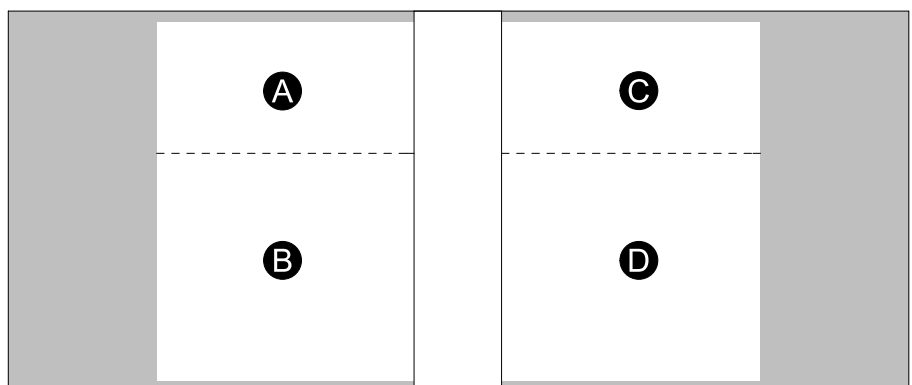
2. Drill or cut holes for cables/conduits in the bottom gland plate.

## ⚠ DANGER

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

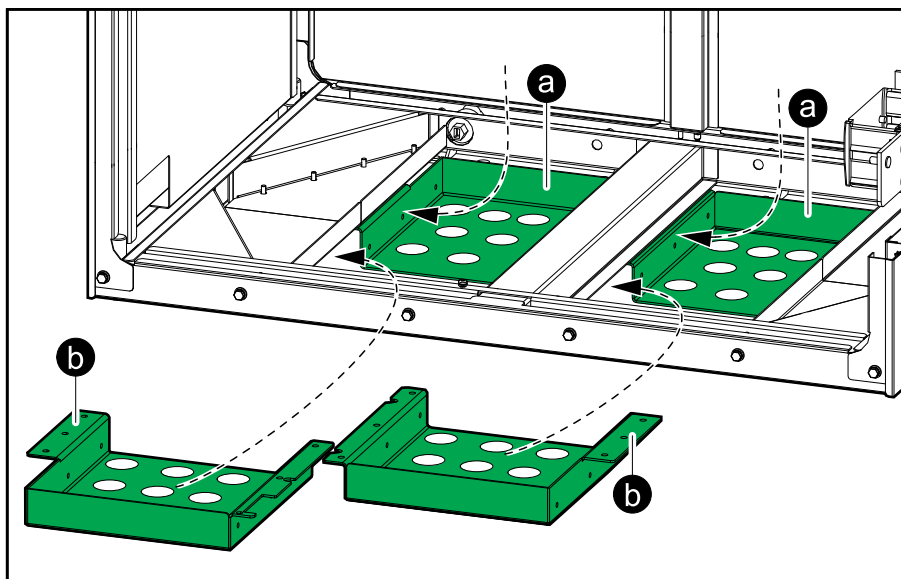
Ensure that there are no sharp edges that can damage the cables.

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



- A. For bypass cables
- B. For DC cables
- C. For output cables
- D. For input cables

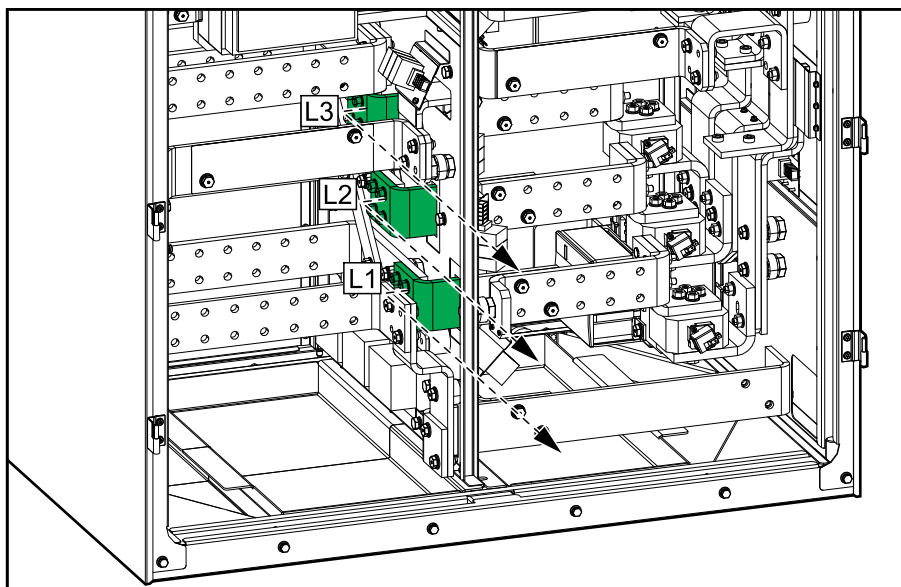
3. Install conduits and install the bottom gland plates in the indicated order below the frame.



## Remove the Single Mains Busbars

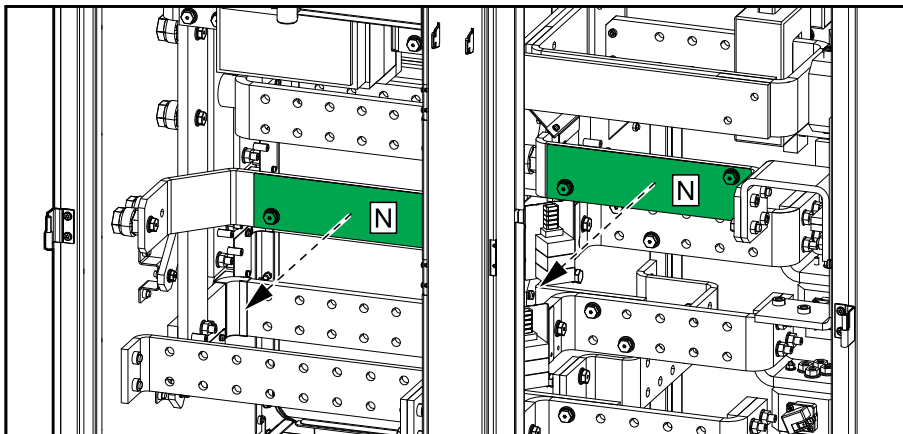
**NOTE:** This procedure is only applicable to dual mains systems.

1. Remove the three single mains busbars.

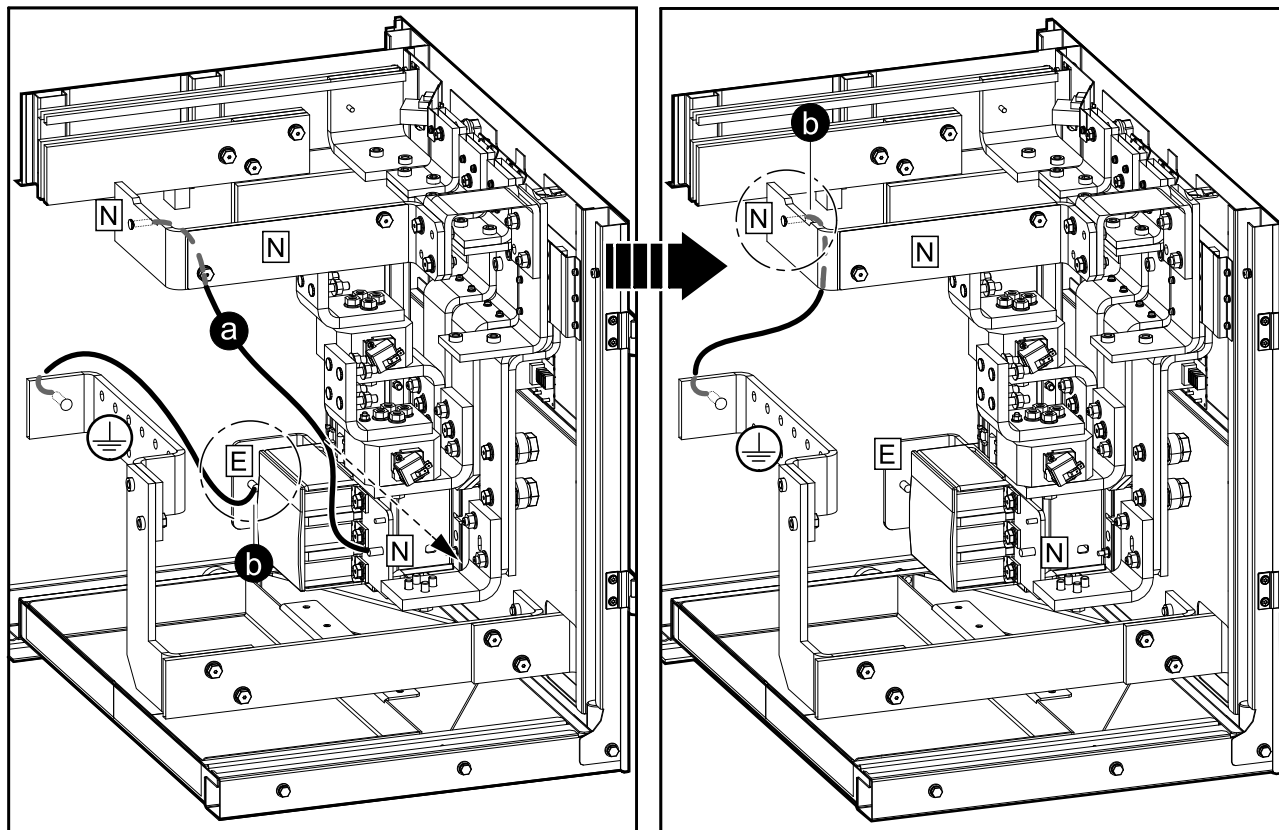


## Connect the Power Cables in a 380/400/415/440 V System

1. Only applicable to installations with neutral connection: Remove the lexan plate from the N busbars.

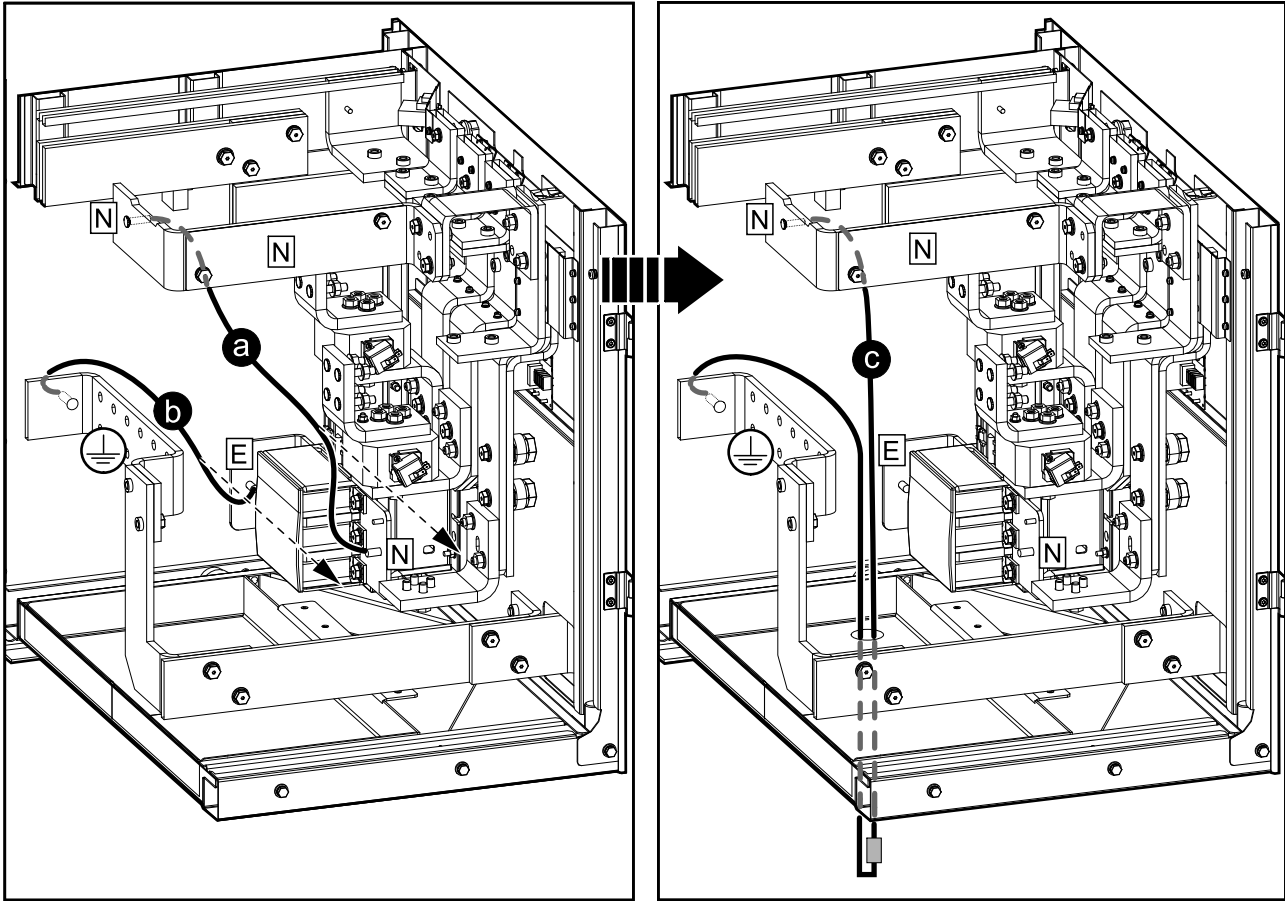


2. Only applicable to TNC systems:



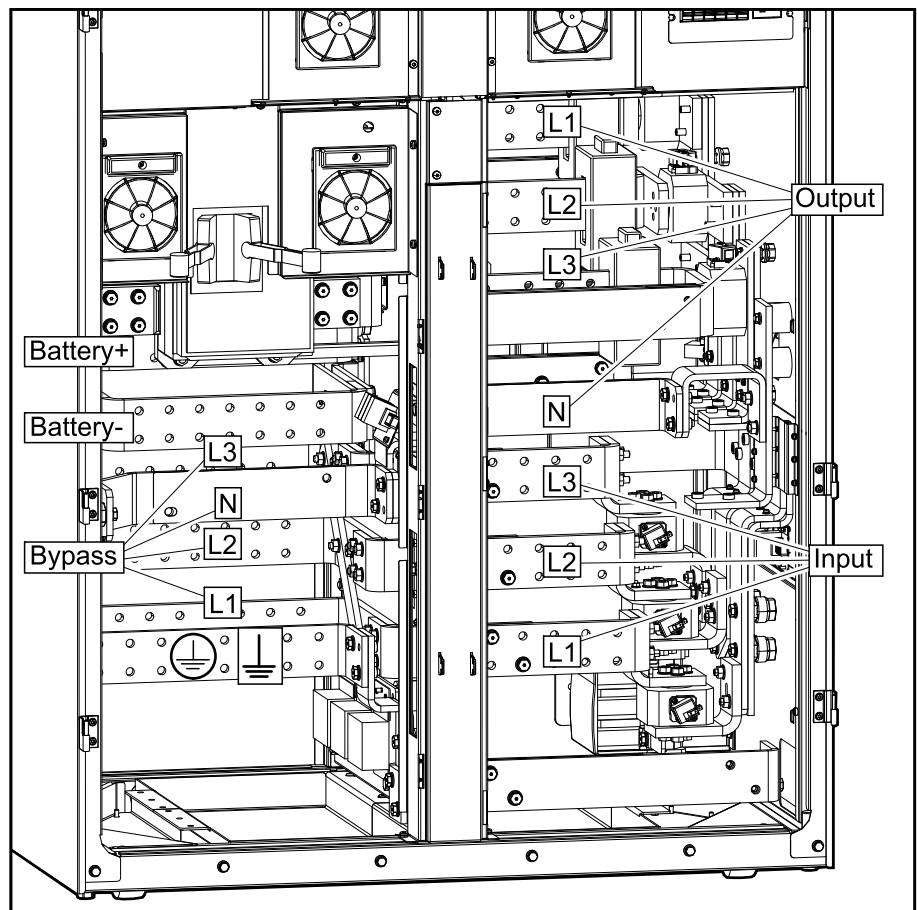
- a. Remove the jumper cable between the N terminal on the bonding contactor and the N busbar.
- b. Disconnect the jumper cable from the E terminal on the bonding contactor and connect to the N busbar.

## 3. Only applicable to 4-wire IT systems:

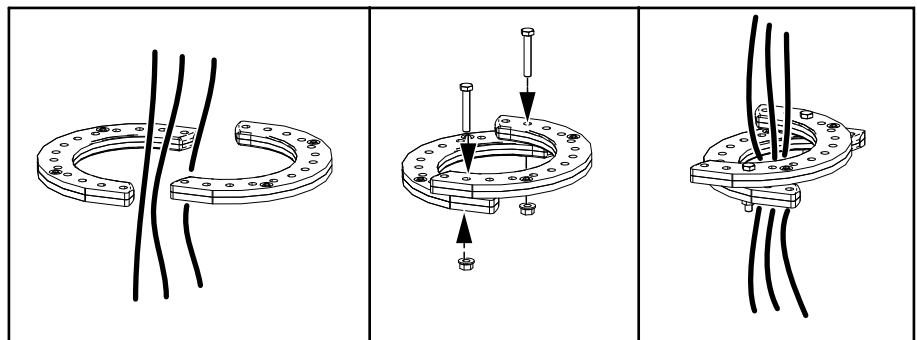


- a. Remove the jumper cable between the N terminal on the bonding contactor and the N busbar.
- b. Remove the jumper cable between the E terminal and the PE busbar.
- c. Connect an external impedance between the PE busbar and the N busbar.

4. Connect the equipment earthing conductor/PE to the PE busbar.



5. Connect the input cables.
6. Only applicable to dual mains systems: Connect the bypass cables.
7. Connect the output cables.
8. Connect the DC cables to the battery+ and battery- busbars.
9. **For systems without internal backfeed breaker BF2:** Fasten the provided plastic fasteners on the bypass cables in four places at 30 cm intervals. Adjust the fasteners to the bypass cables so they are fitted tightly together.
10. **For systems without internal backfeed breaker BF2:** Fasten the provided plastic fasteners on the output cables in two places at 30 cm intervals. Adjust the fasteners to the output cables so they are fitted tightly together.



## Connect the Power Cables in a 480 V System

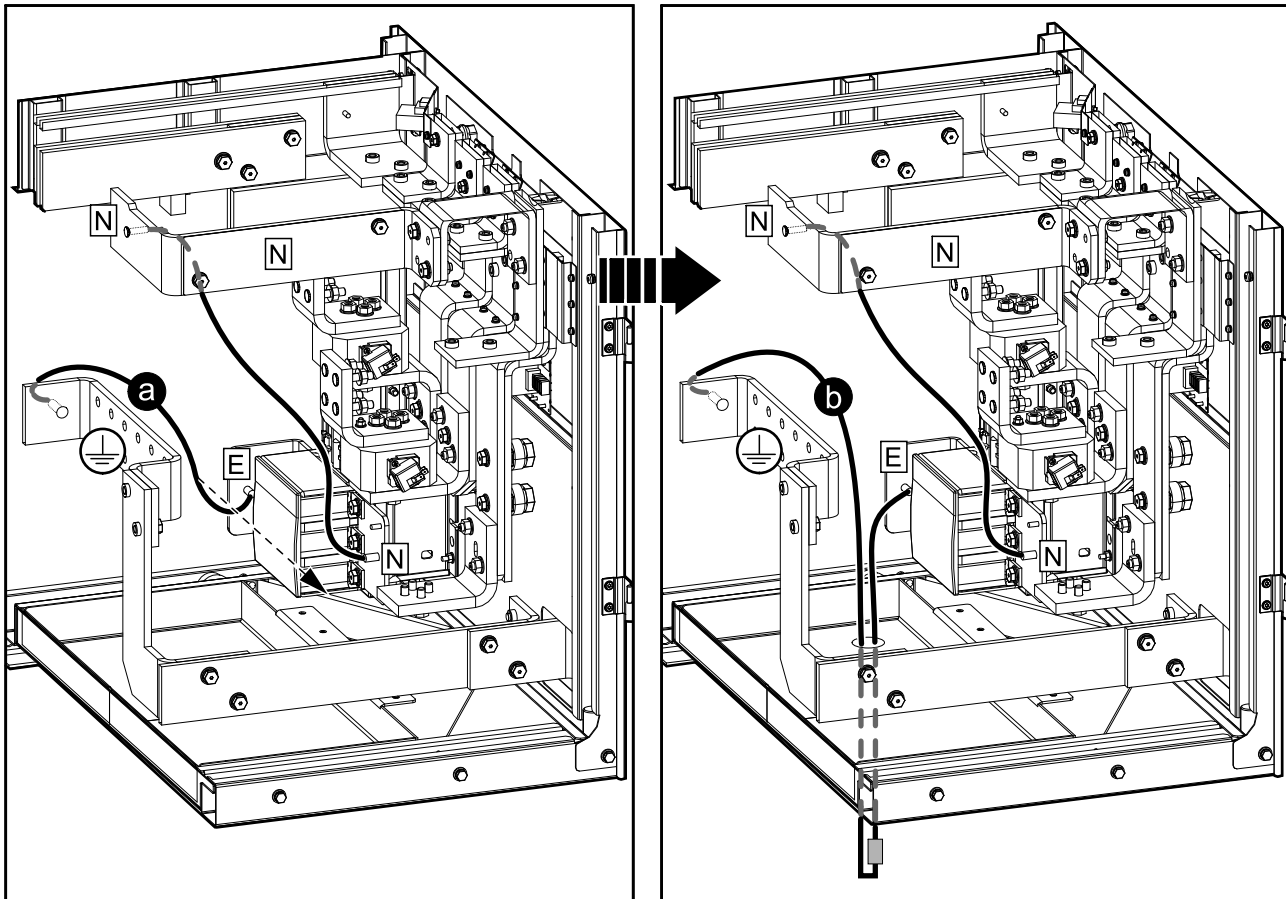
For 4-wire systems:

- Bonding jumper: Not connected
- Technical/system earth: No local grounding electrode connected

For 3-wire systems:

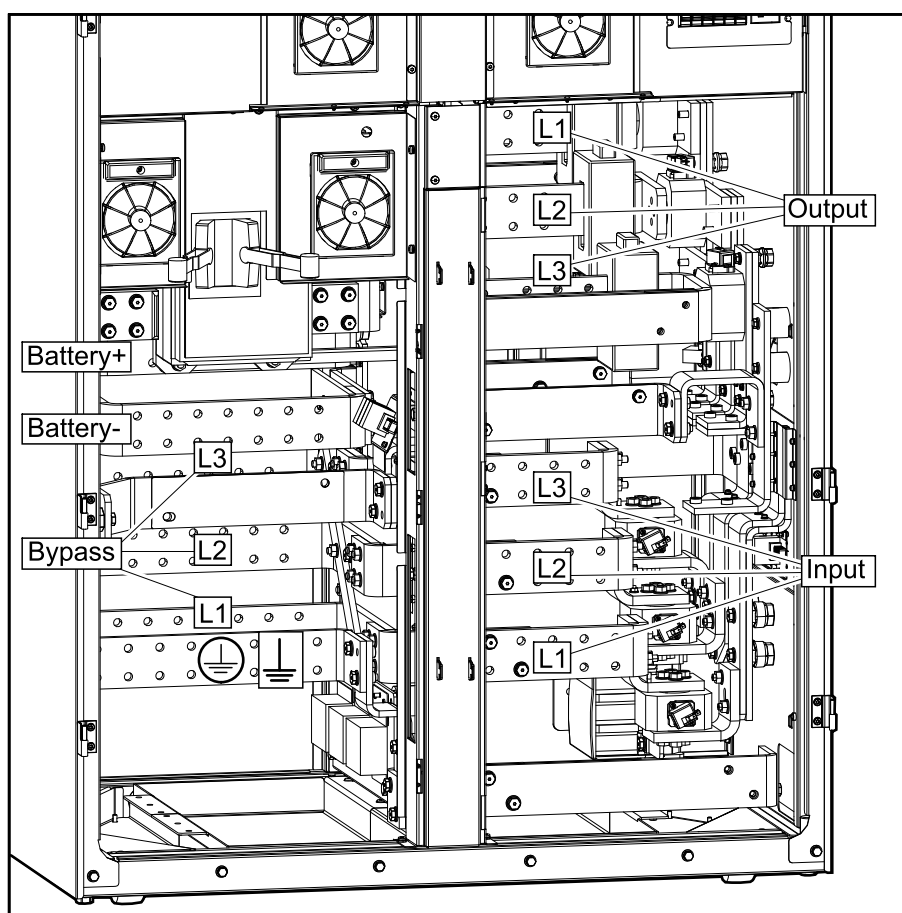
- Bonding jumper: Must be connected
- Technical/system earth: A grounding electrode must be connected via the grounding electrode conductor.

1. Only applicable to high impedance grounding systems:

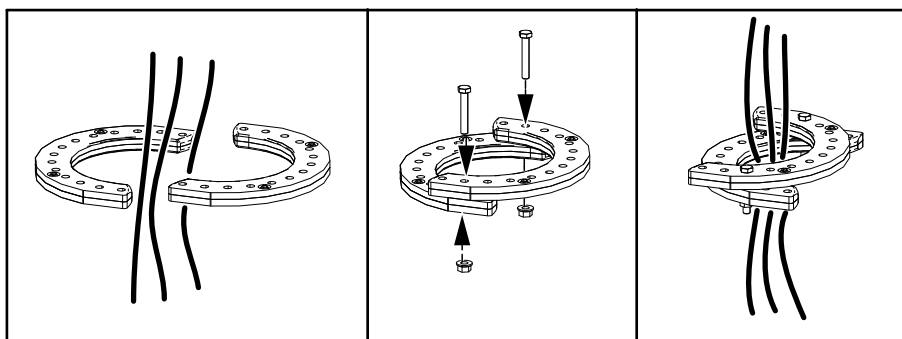


- a. Remove the jumper cable between the PE busbar and the E terminal.
- b. Connect an external impedance between the PE busbar and E terminal according to NEC 2014 article 250.36.

2. Connect the equipment grounding conductor/PE to the PE busbar.



3. Connect the input cables.
4. Only applicable to dual mains systems: Connect the bypass cables.
5. Connect the output cables.
6. Connect the DC cables to the battery+ and battery- busbars.
7. **For systems without internal backfeed breaker BF2:** Fasten the provided plastic fasteners on the bypass cables in four places at 30 cm intervals. Adjust the fasteners to the bypass cables so they are fitted tightly together.
8. **For systems without internal backfeed breaker BF2:** Fasten the provided plastic fasteners on the output cables in two places at 30 cm intervals. Adjust the fasteners to the output cables so they are fitted tightly together.



## Connect Cables to the External Supply for Lithium-ion Battery Solution (Optional)

Depending on your chosen configuration, the 1250 kW I/O cabinet may not have the battery control breakers preinstalled. If needed, the Galaxy VX Lithium-ion BMS Power Supply Kit (GVXOPT002) can be ordered and installed on site.

### **⚠ DANGER**

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

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

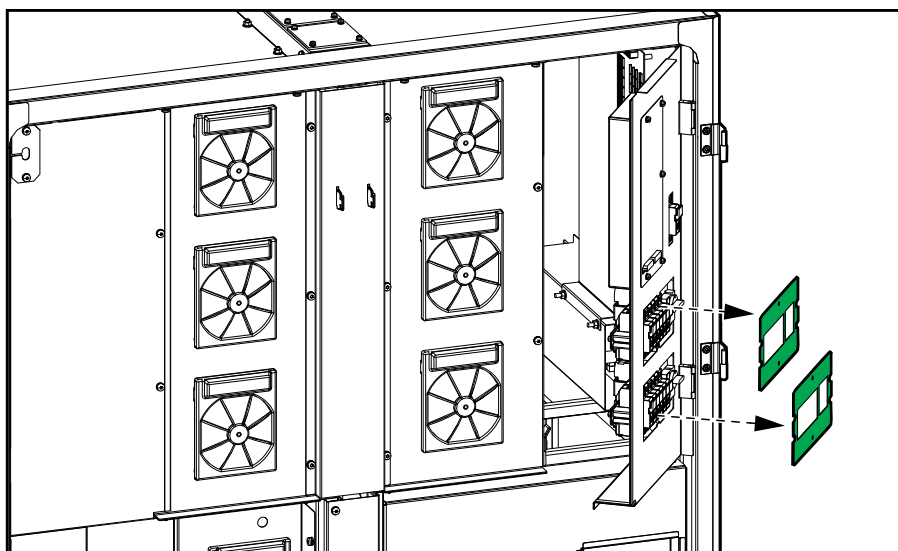
**Failure to follow these instructions will result in death or serious injury.**

The rating of the external supply breaker is 6.3 A.

#### Cable Sizes for External Supply

|                                             | Conductors per Phase | PE Conductor/Equipment Grounding Conductor | Conduit |
|---------------------------------------------|----------------------|--------------------------------------------|---------|
| Cable sizes for 400 V systems               | 1.5 mm <sup>2</sup>  | 1.5 mm <sup>2</sup>                        | NA      |
| Cable sizes for 480 V systems <sup>82</sup> | 1x12-18 AWG          | 1x18 AWG                                   | 0.5 in  |

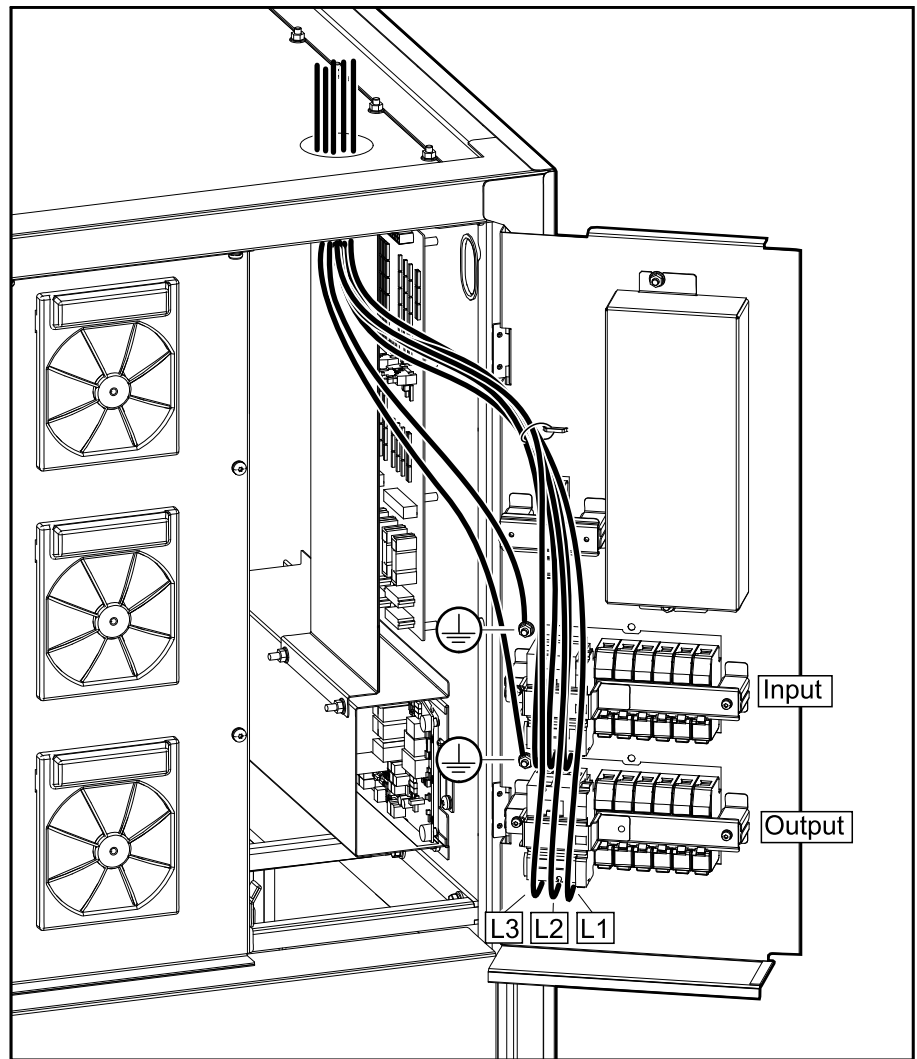
1. Follow the procedure [Prepare the I/O Cabinet for Power Cables in Top Cable Entry Systems](#), page 60 to prepare the top gland plate for cables.
2. Open the indicated door and remove the covers in front of the battery control breakers.



82. An external branch circuitry protection in accordance with the National Electric code NFPA 70 shall be provided externally if required by local regulations.



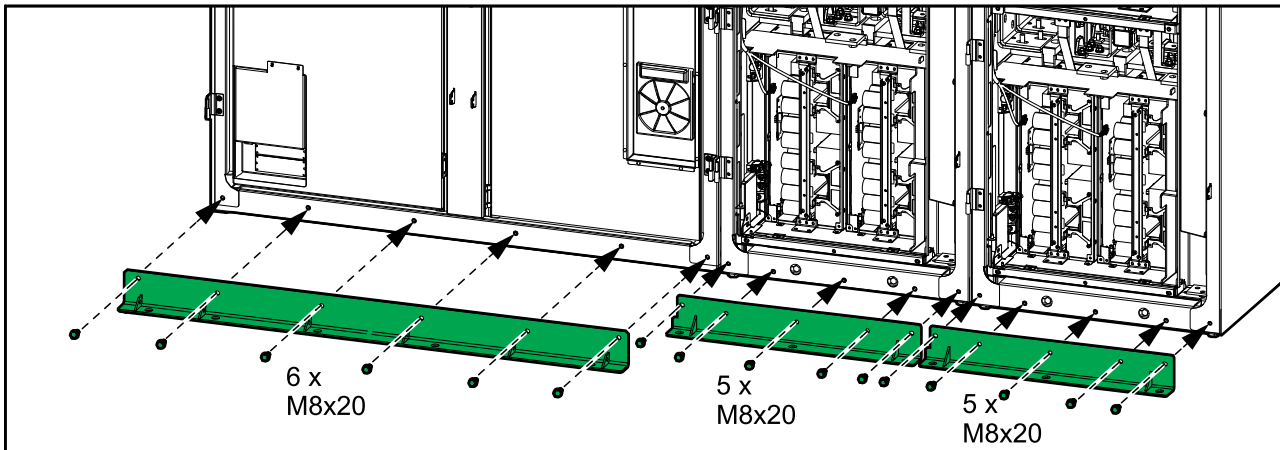
3. Connect the cables from the equipment to be supplied by the UPS.



4. Reinstall the covers in front of the battery control breakers.
5. Close the door.

## Mount the Front Anchoring Brackets

1. Fasten the front anchoring brackets to the front of the cabinets using the provided bolts.



2. Anchor the front anchoring brackets to the floor.

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

## Signal Cables

### ⚠ CAUTION

#### RISK OF EQUIPMENT DAMAGE

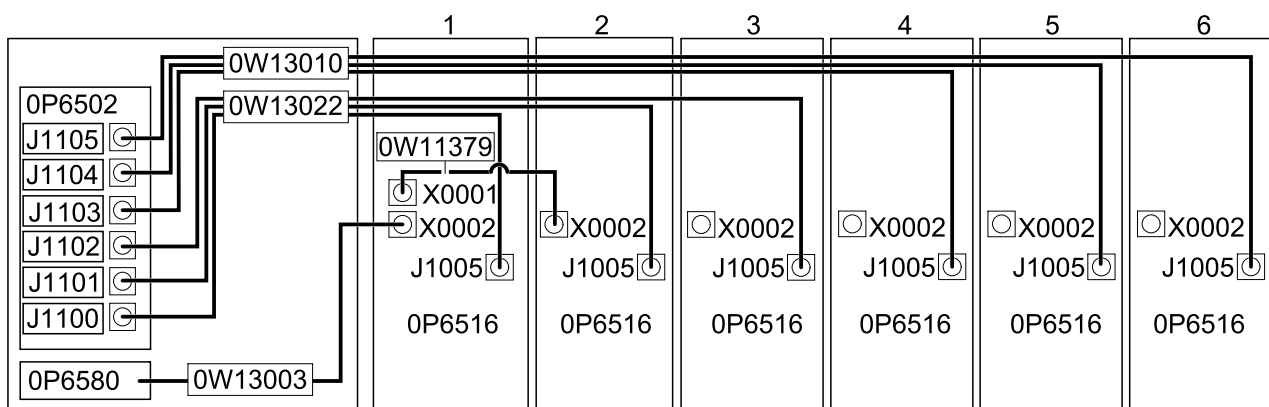
- All Class 2/SELV signal cables shall be double insulated/jacket cable and minimum rated for 30 VDC. All non-Class 2/non-SELV signal cables shall be double insulated/jacket cable and minimum rated for 600 VAC.
- The cable supplying the shunt trip shall be a jacket cable and rated for 600 VAC. The cables shall be sized taking the cable voltage drop and the recommendation of the shunt trip manufacturer into consideration.

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

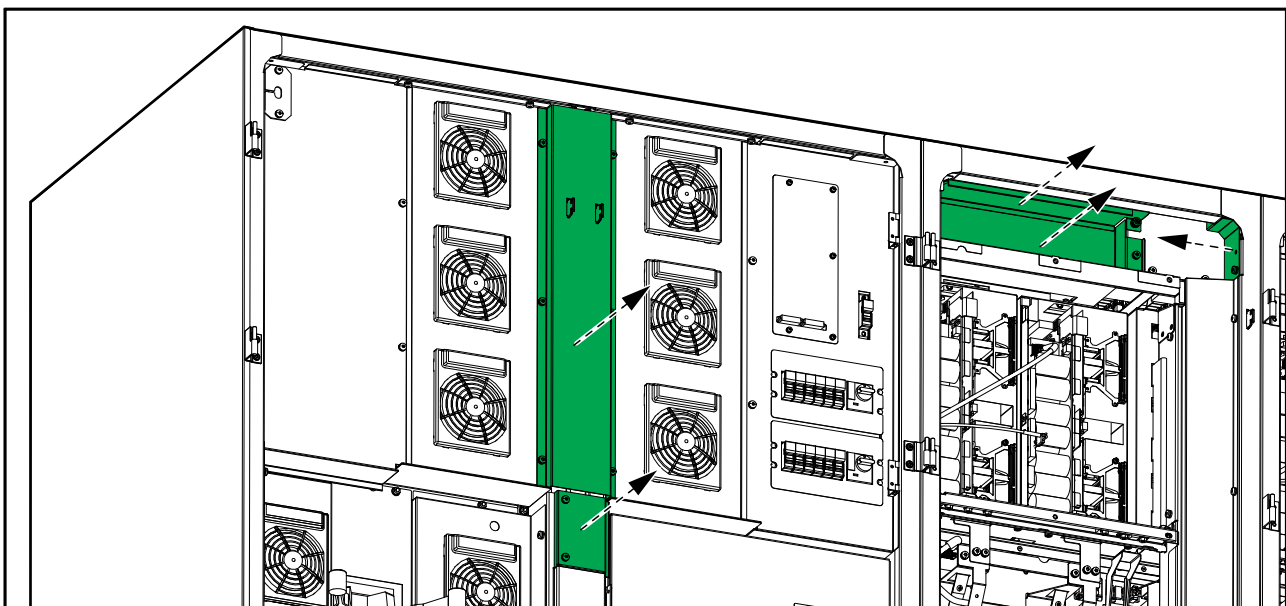
## Route the Signal Cables between the I/O Cabinet and the Power Cabinets

**NOTE:** Do not connect the signal cables. Signal cables will be connected by Schneider Electric during the assembly service.

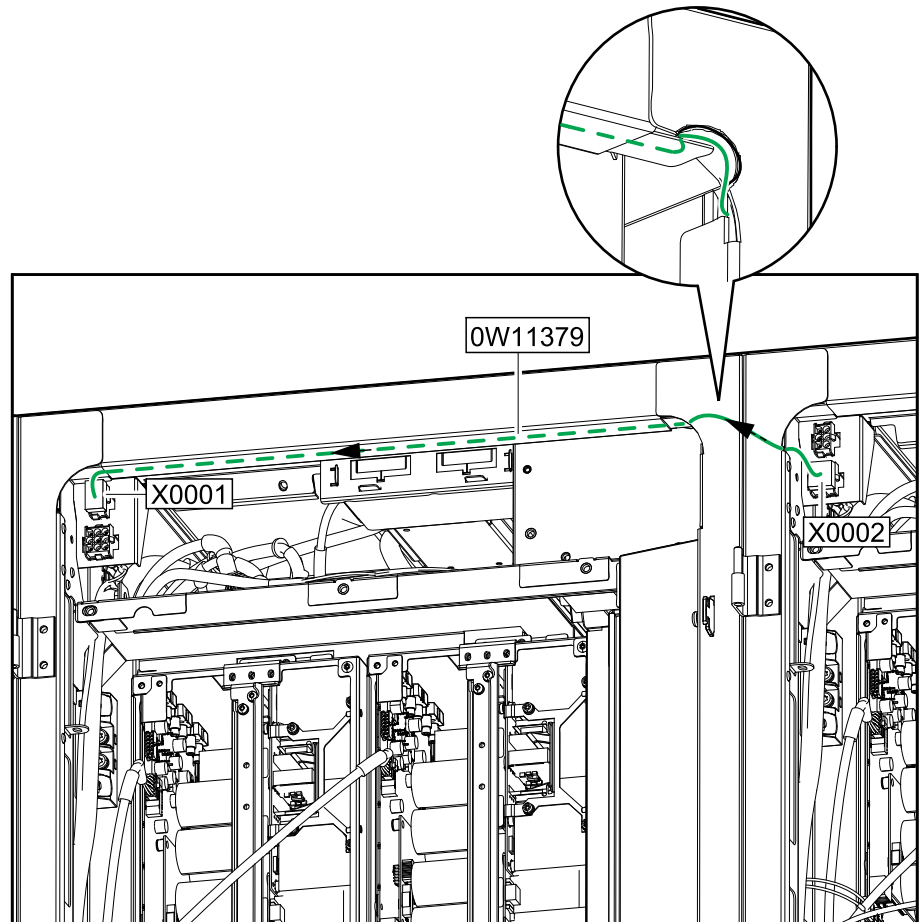
### Overview of Signal Cables between the I/O Cabinet and the Power Cabinets



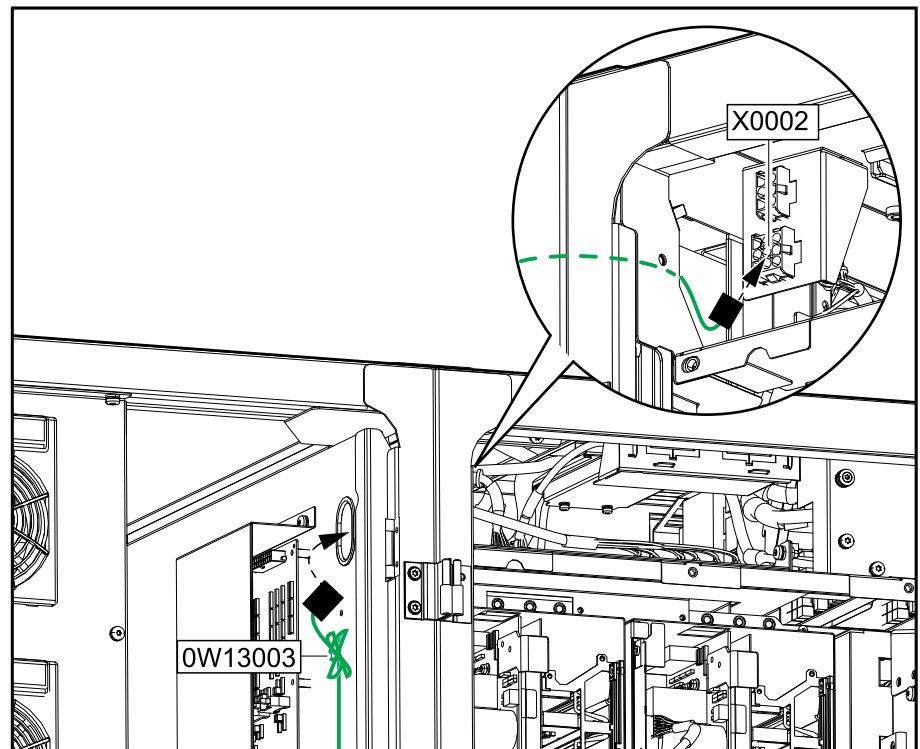
1. Remove the indicated plates from the I/O cabinet and all the power cabinets.



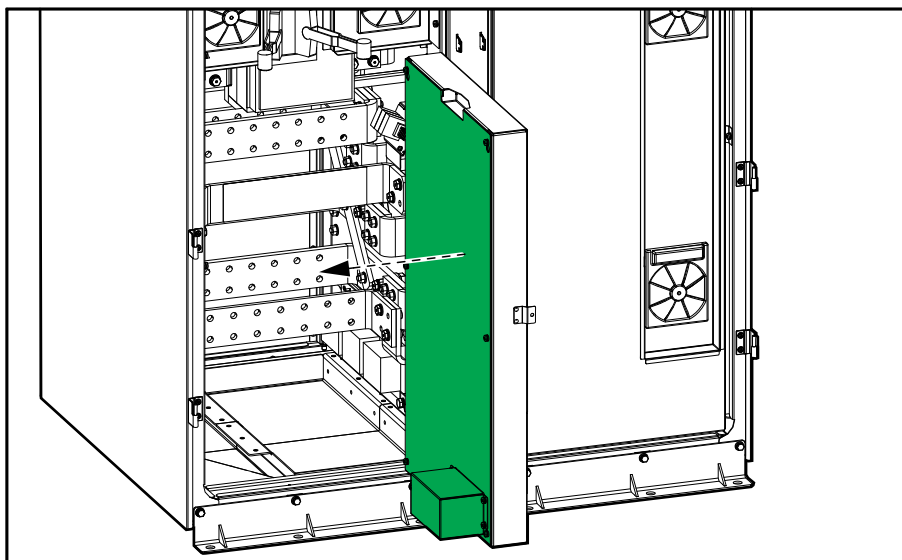
2. Route signal cable 0W11379 from X0002 in the power cabinet 2 to X0001 in power cabinet 1.



3. Route the signal cable 0W13003 preconnected in the right side of the I/O cabinet to X0002 in power cabinet 1.

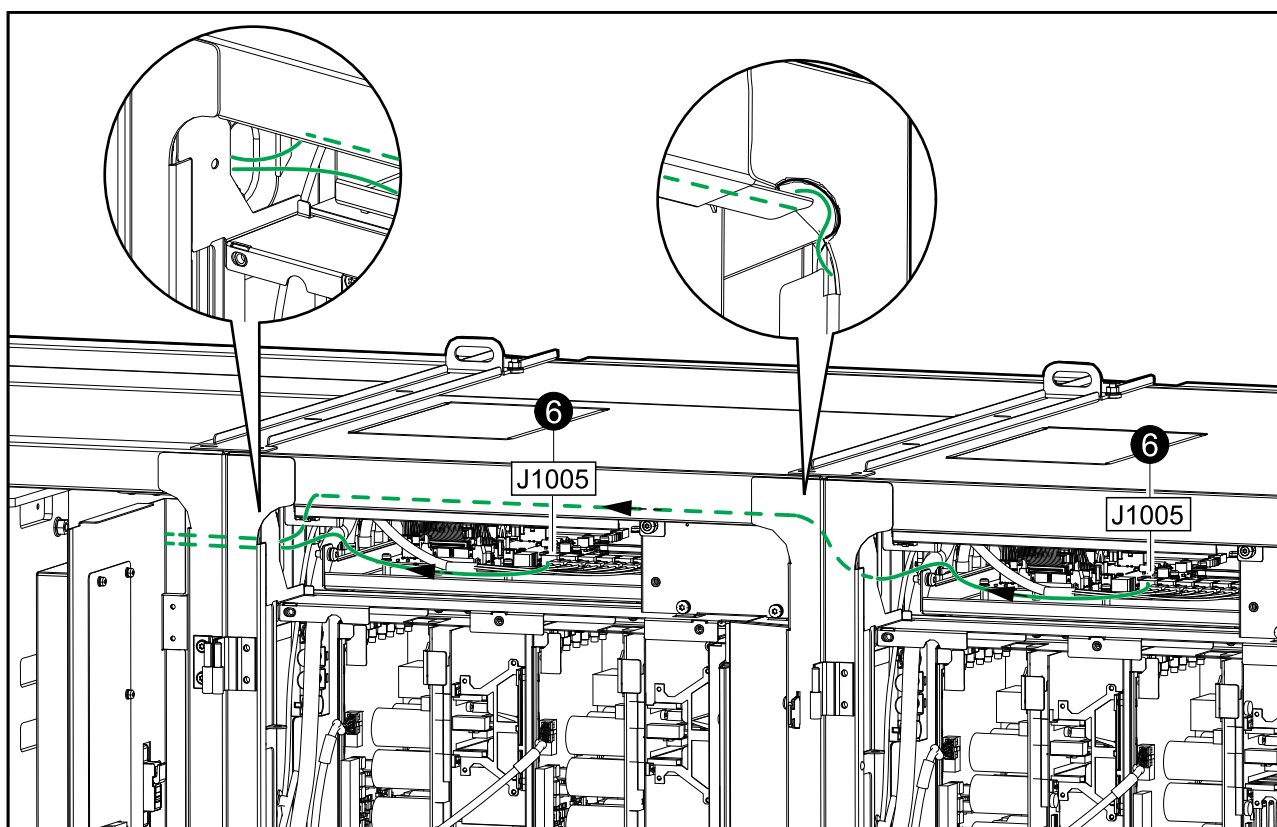


4. Open the left inner door and remove the indicated plate from the door.

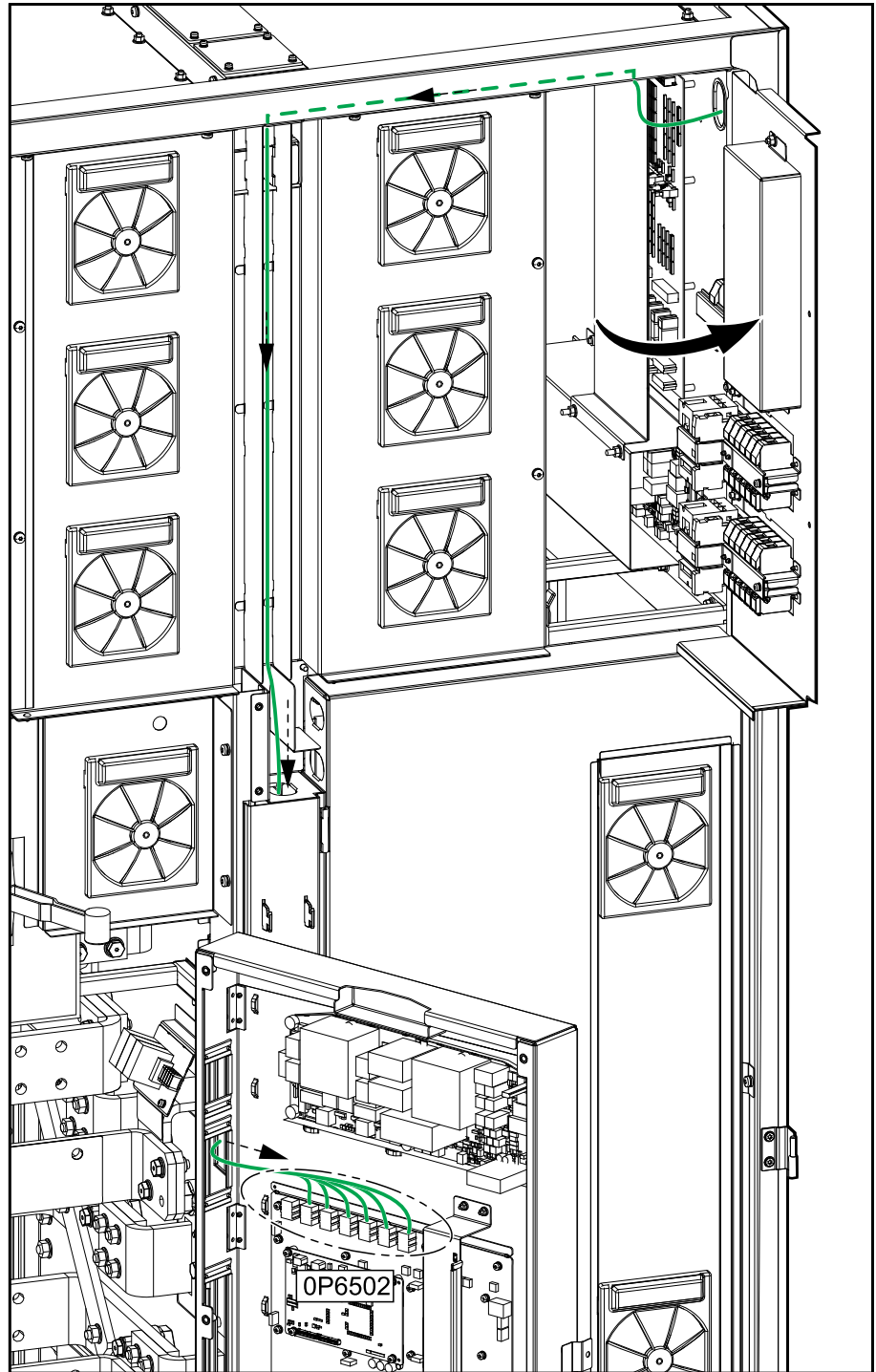


5. Route the signal cables 0W13022 (power cabinets 1-3) and 0W13010 (power cabinets 4-6) from the J1005 terminals in the power cabinets to the I/O cabinet.

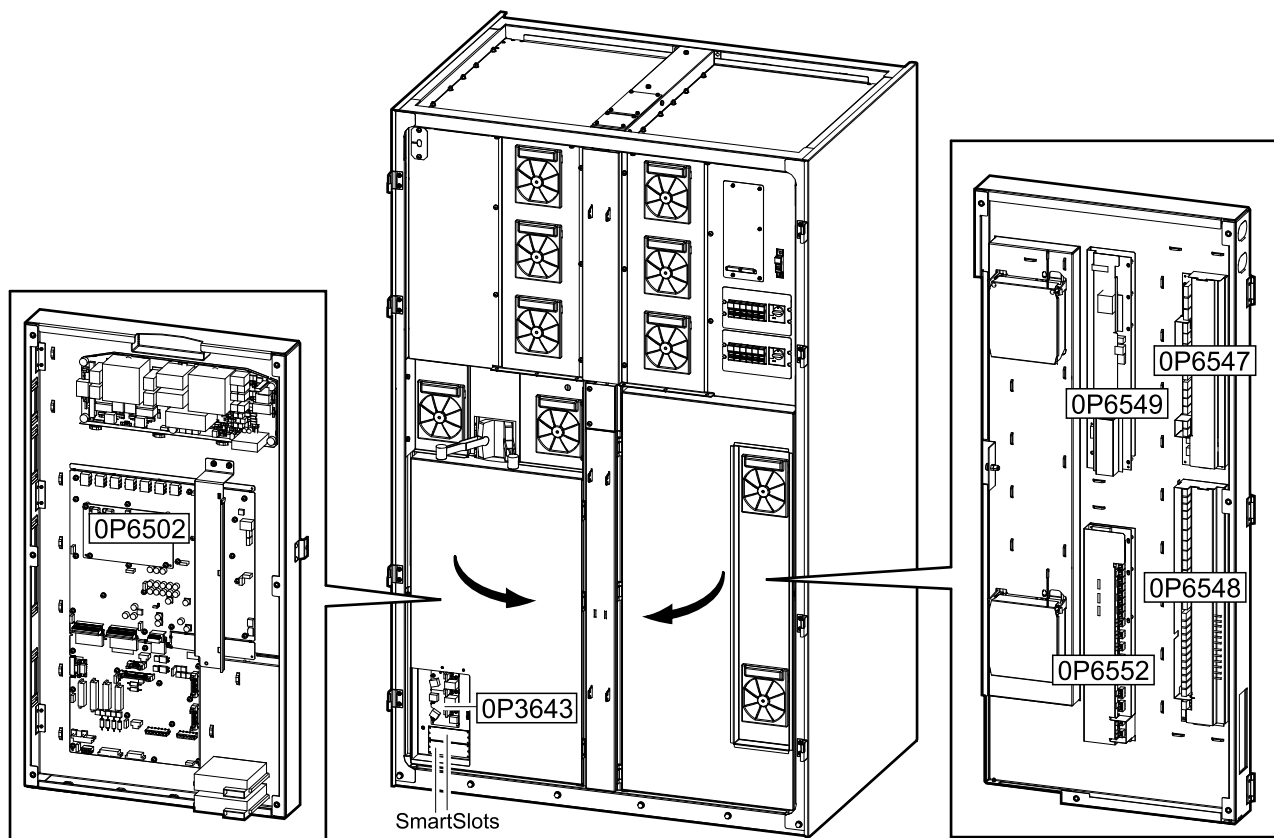
**NOTE:** Minimum bending radius is 50 mm.



6. Route the signal cables 0W13022 and 0W13010 to the board 0P6502 in the left door.



## Overview of Board Locations for External Signal Cables



Follow the procedure [Route External Signal Cables to the Boards](#), page 77 to route the external signal cables to the boards.

### Class 2/SELV

| Board  | Terminal           | Description             | See                                                                                 |
|--------|--------------------|-------------------------|-------------------------------------------------------------------------------------|
| 0P6547 | J4931, J4932       | +24V SELV               | Connect the Emergency Power Off (EPO), page 88                                      |
|        | J4936-J4938        | EPO connections         |                                                                                     |
| 0P6548 | J5502-J5505, J5510 | Input contacts IN1-IN5  | Overview of Input Contacts and Output Relays, page 81                               |
|        | J5506              | Input contact IN9       |                                                                                     |
|        | J5520-J5525, J5528 | Output relays OUT8,9,10 |                                                                                     |
|        | J5527              | Kirk key control        |                                                                                     |
|        | J5514              | UOB lamp control        | Signal Cable Connections to the Switchgear (Boards 0P6547, 0P6548, 0P6549), page 83 |
|        | J5515              | MBB lamp control        |                                                                                     |
|        | J5516              | SIB lamp control        |                                                                                     |
|        | J5517              | SSIB lamp control       |                                                                                     |
|        | J5509              | Redundant UOB AUX       |                                                                                     |
| 0P3643 | PBUS1, PBUS2       | PBUS                    | PBUS Cable Connections (Board 0P3643), page 85                                      |
| 0P6502 |                    | Modbus                  | Modbus Connections (Board 0P6502), page 86                                          |

**Non-Class 2/Non-SELV**

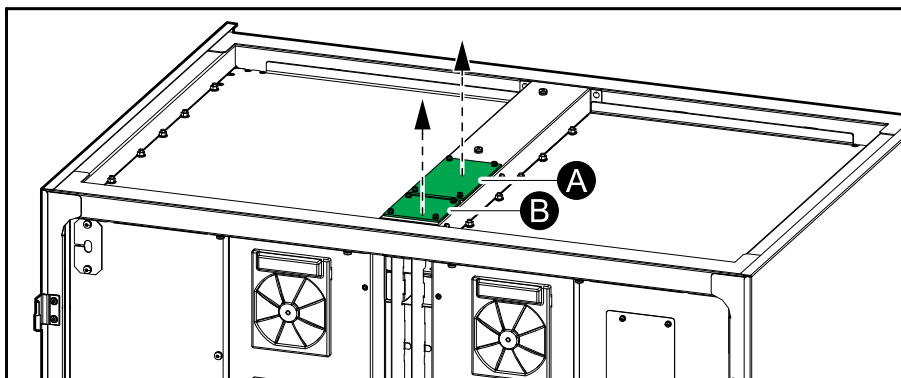
| Board  | Terminal                  | Description                                 | See                                                                                                                                                                                            |
|--------|---------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0P6547 | J4939-J4941 <sup>83</sup> | Configurable output relays OUT1, OUT2, OUT3 | Overview of Input Contacts and Output Relays, page 81                                                                                                                                          |
| 0P6549 | J5607                     | MBB                                         | Signal Cable Connections to the Switchgear (Boards 0P6547, 0P6548, 0P6549), page 83                                                                                                            |
|        | J5608                     | SIB                                         |                                                                                                                                                                                                |
|        | J5620                     | SSIB                                        |                                                                                                                                                                                                |
|        | J5621                     | UOB                                         |                                                                                                                                                                                                |
|        | J5622                     | UIB                                         |                                                                                                                                                                                                |
|        | J5611, J5612, J5613       | External sync - L1, L2, L3                  | Signal Cables for External Synchronization, page 88                                                                                                                                            |
|        | J5609                     | Battery breaker 1                           | Signal Cable Connections to Classic Battery Cabinets (Boards 0P6547, 0P6549, 0P6552), page 84 and Signal Cable Connections to Battery Breaker Cabinet (Boards 0P6547, 0P6548, 0P6549), page 85 |
|        | J5610                     | Battery breaker 2                           |                                                                                                                                                                                                |
| 0P6548 | J5529                     | Battery temperature sensor 1                |                                                                                                                                                                                                |
| 0P6547 | J4942, J4943              | 24V supply 1                                |                                                                                                                                                                                                |
|        | J4929, J4930              | 24V supply 2                                |                                                                                                                                                                                                |
|        | J4923                     | DC shunt trip 1                             |                                                                                                                                                                                                |
|        | J4924                     | DC shunt Trip 2                             |                                                                                                                                                                                                |
| 0P6552 | J9019                     | Battery breaker 3                           |                                                                                                                                                                                                |
|        | J9020                     | Battery breaker 4                           |                                                                                                                                                                                                |
|        | J9021                     | Battery temperature sensor 2                |                                                                                                                                                                                                |
|        | J9022, J9023              | 24V supply 3                                |                                                                                                                                                                                                |
|        | J9024, J9025              | 24V supply 4                                |                                                                                                                                                                                                |

83. These output relays can also be Class 2/SELV but the three output relays must have identical reference.

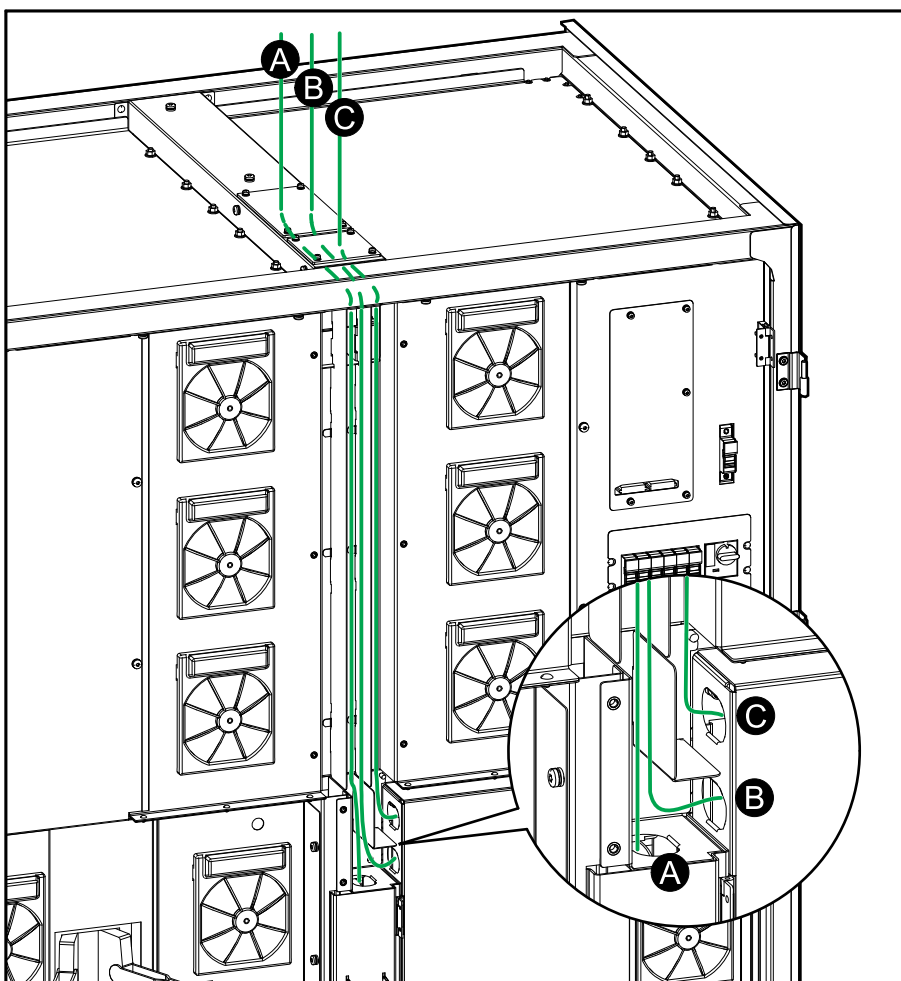


## Route External Signal Cables to the Boards

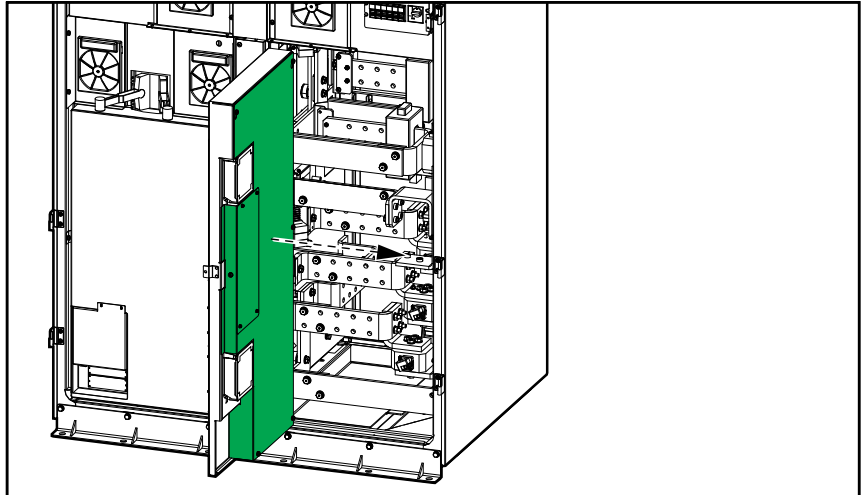
1. Remove the two gland plates from the top of the I/O cabinet and drill holes for the applicable Class 2/SELV (A) and non-Class 2/non-SELV (B) signal cables. Install conduits and reinstall the plates.



2. Route the external signal cables through the cable channel and through the correct openings:
  - A. Class2/SELV cables to the boards in the left door.
  - B. Class2/SELV cables to the boards in the right door.
  - C. Non-class 2/Non-SELV cables to the boards in the right door.

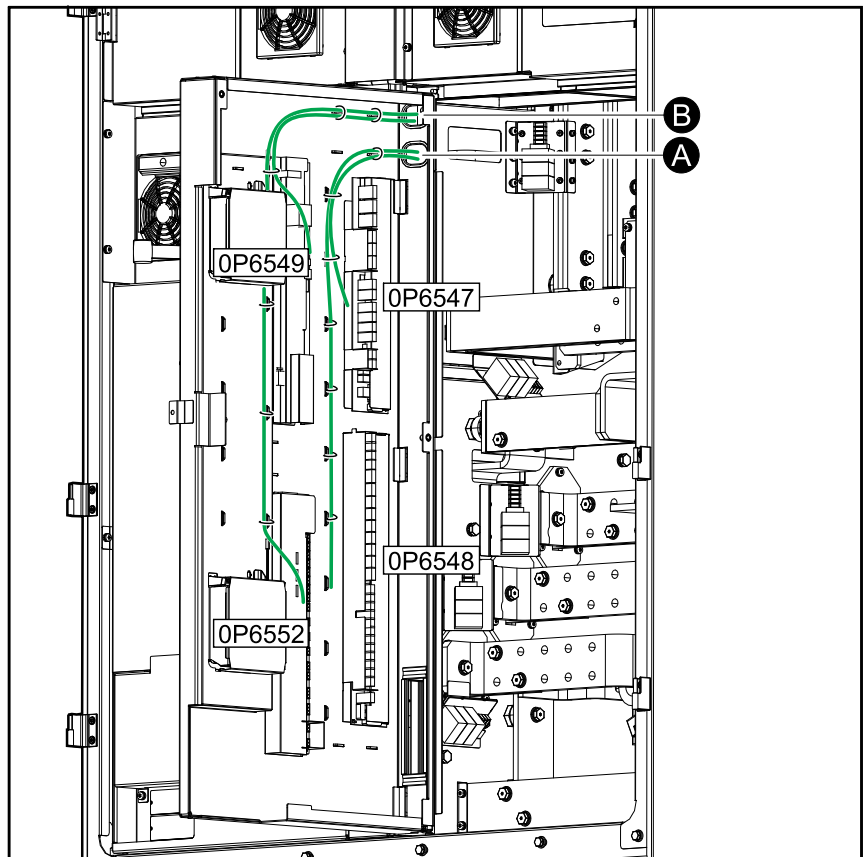


3. Route the external signal cables to the boards in the right door:
  - a. Open the right door and remove the plate from the inner door.

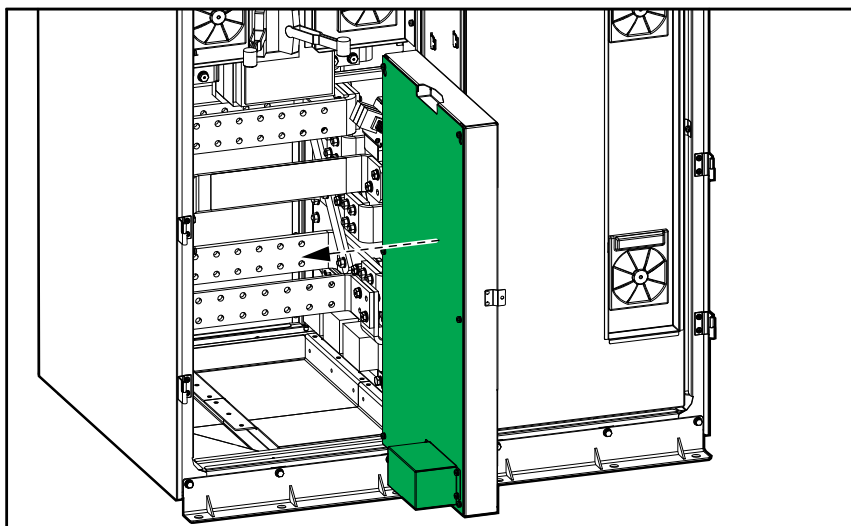


- b. Route the cables to the board terminals and fasten with the provided cable ties. Class 2/SELV cables (A) must be routed separated from non-Class 2/non-SELV cables (B) as shown on the illustration.

**NOTE:** The external signal cables must be long enough for the door to fully open.



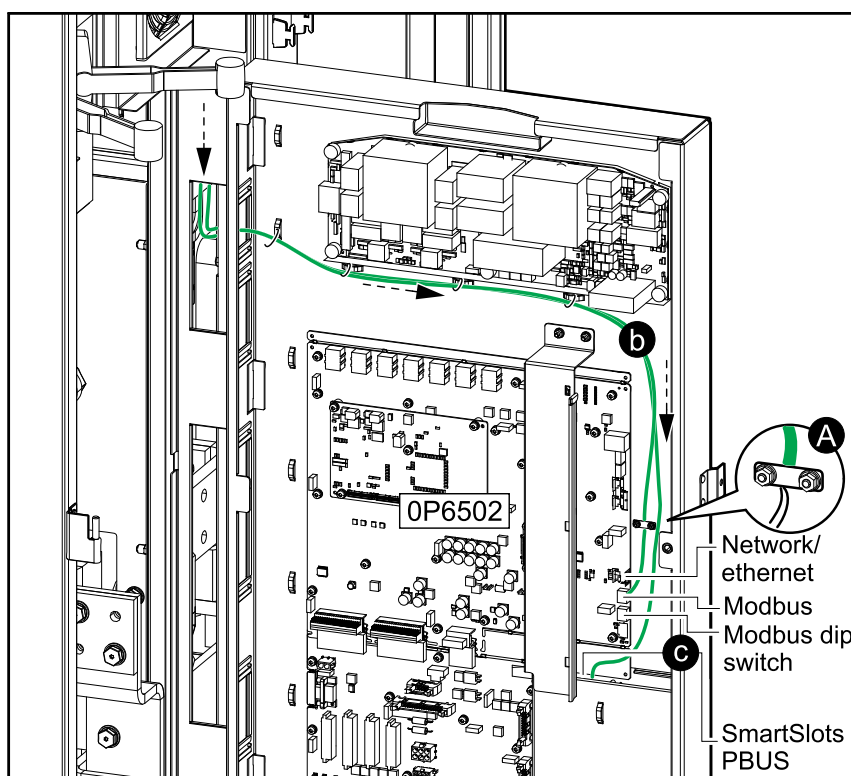
4. Route the external signal cables to the boards in the left door:
  - a. Open the left door and remove the plate from the inner door.



- b. Route the external signal cables to the terminals and fasten with the provided cable ties.

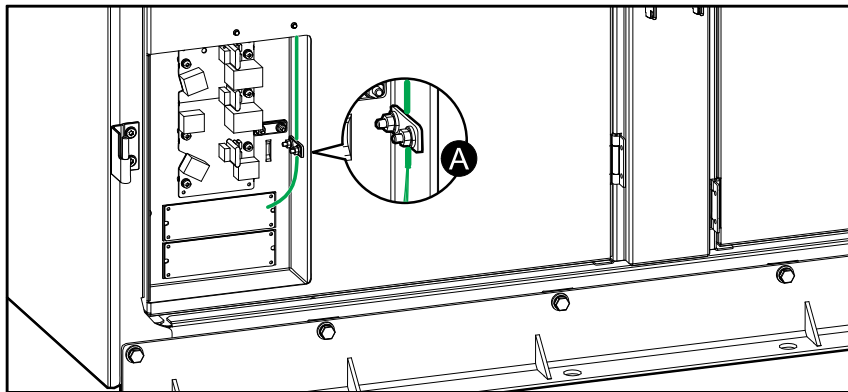
**NOTE:** The external signal cables must be long enough for the doors to fully open.

**NOTE:** Use the plate (A) for shielding of the Modbus cable.



- c. Close the door and route the PBUS cables and cables for the network management cards to the front.

**NOTE:** If the input dry contact AP9810 is connected to AP9631 or AP9635CH, the total length of cables for connected equipment must not exceed 30 m (98 ft). Use the plate for shielding (A).



## Overview of Input Contacts and Output Relays

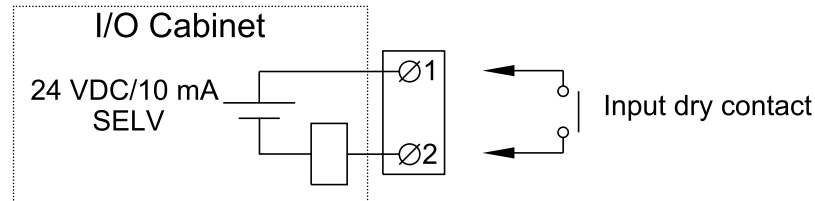
### Input Contacts

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

All circuits connected must have the same 0 V reference.

The input contacts support 24 VDC 10 mA.

The switch SW5500 on 0P6548 is used to select between internal SELV supply for inputs (standard setting) and external supply<sup>84</sup>. If external supply is selected, the supply must be connected to J5530.

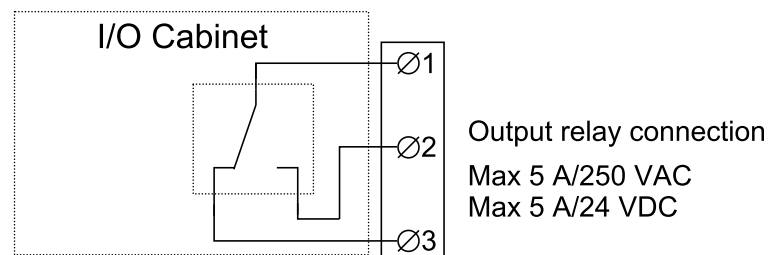


| Name             | Description                           | Location                            |
|------------------|---------------------------------------|-------------------------------------|
| IN 1 (Contact 1) | Configurable input contact            | 0P6548 terminal J5502 <sup>85</sup> |
| IN 2 (Contact 2) | Configurable input contact            | 0P6548 terminal J5503 <sup>85</sup> |
| IN 3 (Contact 3) | Configurable input contact            | 0P6548 terminal J5504 <sup>85</sup> |
| IN 4 (Contact 4) | Configurable input contact            | 0P6548 terminal J5505 <sup>85</sup> |
| IN 5 (Contact 5) | Configurable input contact            | 0P6548 terminal J5510 <sup>85</sup> |
| IN 6             | UOB redundant AUX contact             | 0P6548 terminal J5509 <sup>85</sup> |
| IN 7             | Transformer temperature switch        | 0P6548 terminal J5508 <sup>85</sup> |
| IN 8             | External bonding contact              | 0P6548 terminal J5507 <sup>85</sup> |
| IN 9             | Forced external synchronization input | 0P6548 terminal J5506 <sup>85</sup> |
| IN 10            | External synchronization requested    | 0P6548 terminal J5511 <sup>85</sup> |
| IN 11            | Use static bypass standby             | 0P6548 terminal J5512 <sup>85</sup> |
| IN 14            | MegaTie                               | 0P6552 terminal J9027 <sup>85</sup> |

### Output Relays

**NOTE:** Maximum 250 VAC 5 A must be connected to the output relays.

All external circuitry must be fused with maximum 5 A fast acting fuses.



<sup>84</sup>. An external supply is useful in parallel systems where inputs are connected between different UPSs. This is to have a common reference and to avoid cross currents.

<sup>85</sup>. Class 2/SELV wiring

| Name             | Description                               | Location                            |
|------------------|-------------------------------------------|-------------------------------------|
| OUT 1 (Relay 1)  | Configurable output relay                 | 0P6547 terminal J4939               |
| OUT 2 (Relay 2)  | Configurable output relay                 | 0P6547 terminal J4940               |
| OUT 3 (Relay 3)  | Configurable output relay                 | 0P6547 terminal J4941               |
| OUT 4            | Forced external synchronization output    | 0P6548 terminal J5520 <sup>86</sup> |
| OUT 5            | MegaTie                                   | 0P6548 terminal J5521 <sup>86</sup> |
| OUT 6            | External synchronization requested output | 0P6548 terminal J5522 <sup>86</sup> |
| OUT 7            | UPS in inverter ON                        | 0P6548 terminal J5523 <sup>86</sup> |
| OUT 8 (Relay 4)  | Configurable output relay                 | 0P6548 terminal J5524 <sup>86</sup> |
| OUT 9 (Relay 5)  | Configurable output relay                 | 0P6548 terminal J5525 <sup>86</sup> |
| OUT 10 (Relay 6) | Configurable output relay                 | 0P6548 terminal J5528 <sup>86</sup> |
| OUT 14           | Bonding contactor                         | 0P6552 terminal J9029 <sup>86</sup> |

**NOTE:** Refer to the operation manual for configuration options.

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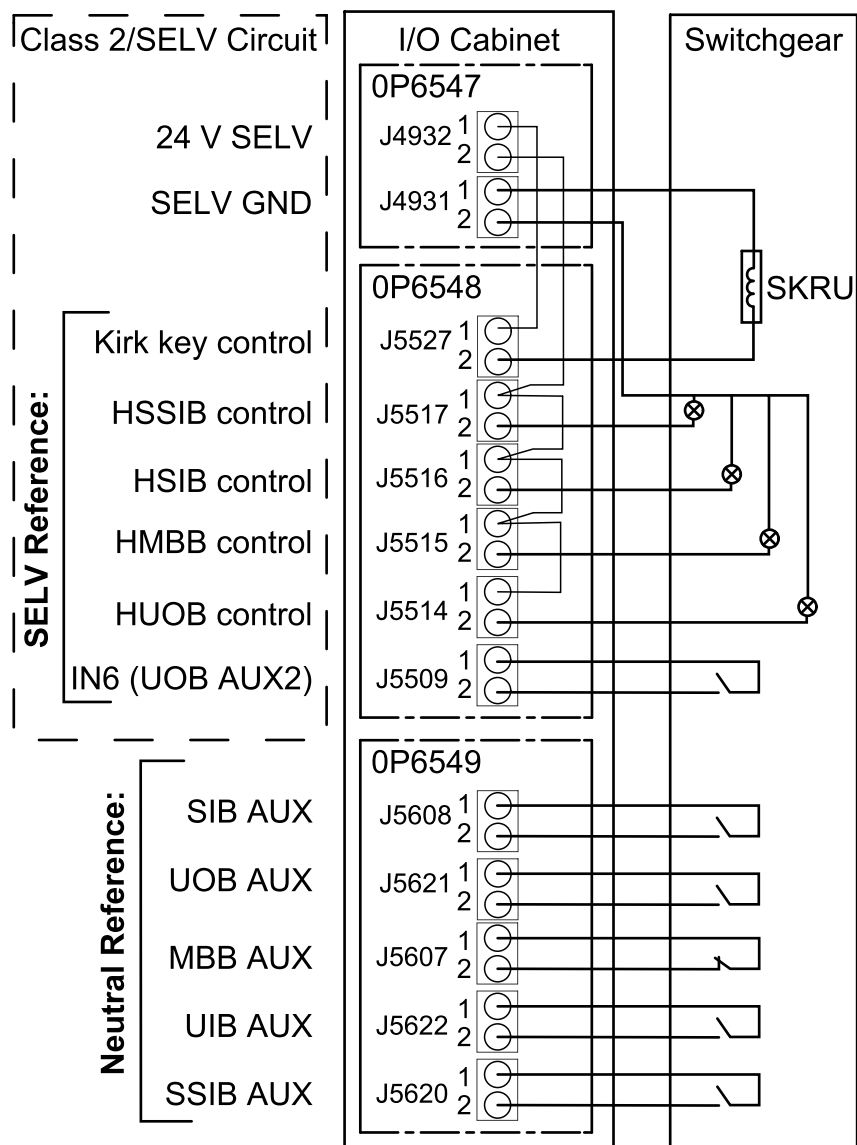
<sup>86</sup>. Class 2/SELV wiring

## Signal Cable Connections to the Switchgear (Boards 0P6547, 0P6548, 0P6549)

**NOTE:** The unit output breaker UOB must include two separated AUX switches.

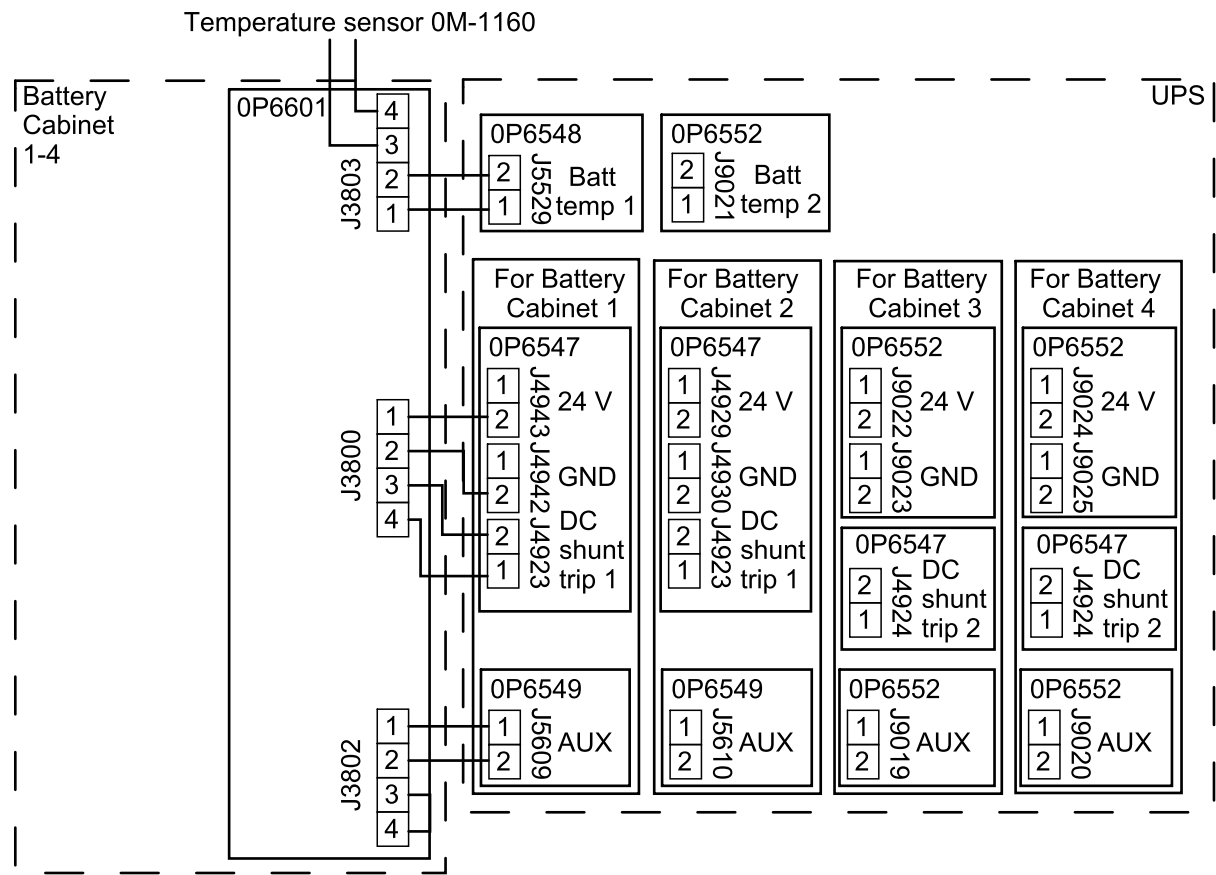
**NOTE:** The solenoid key release unit (SKRU) is only applicable to 480 V systems.

All circuits connected must have the same 0 V reference.

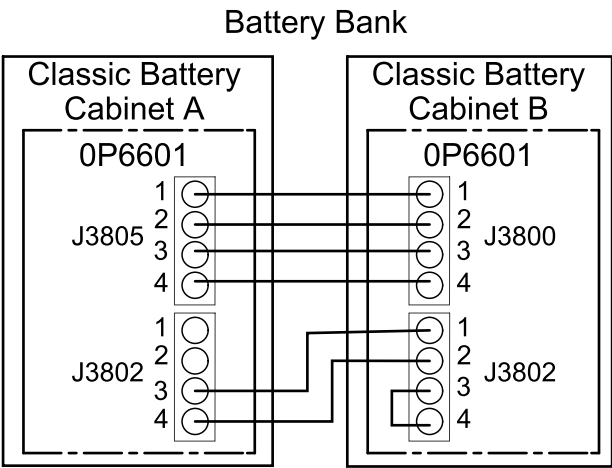


# Signal Cable Connections to Classic Battery Cabinets (Boards 0P6547, 0P6549, 0P6552)

**NOTE:** The illustration below shows a system with four battery banks, each consisting of one classic battery cabinet. Connect signal cables according to the number of classic battery cabinets in your installation.

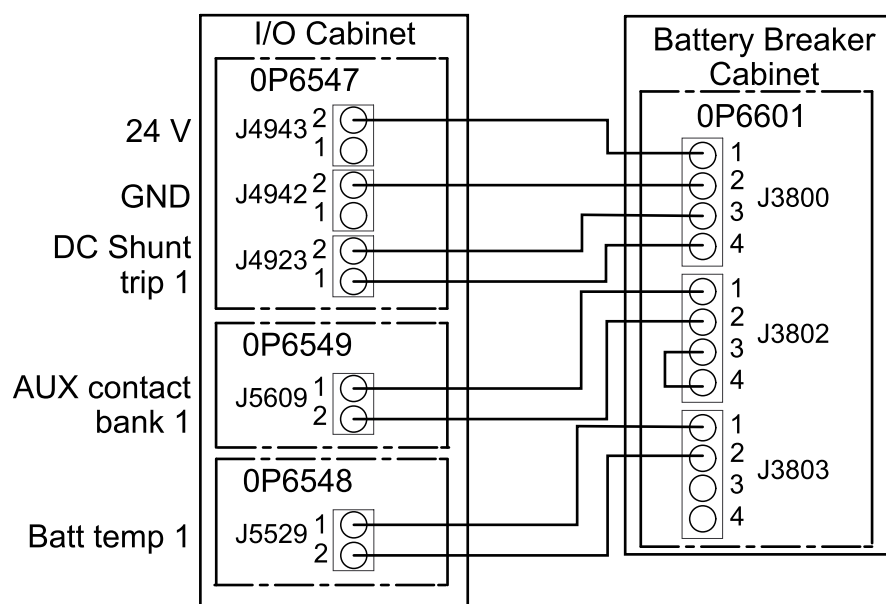


If the battery bank is consisting of two classic battery cabinets, connect signal cables between the two classic battery cabinets in one battery bank as shown.





## Signal Cable Connections to Battery Breaker Cabinet (Boards 0P6547, 0P6548, 0P6549)

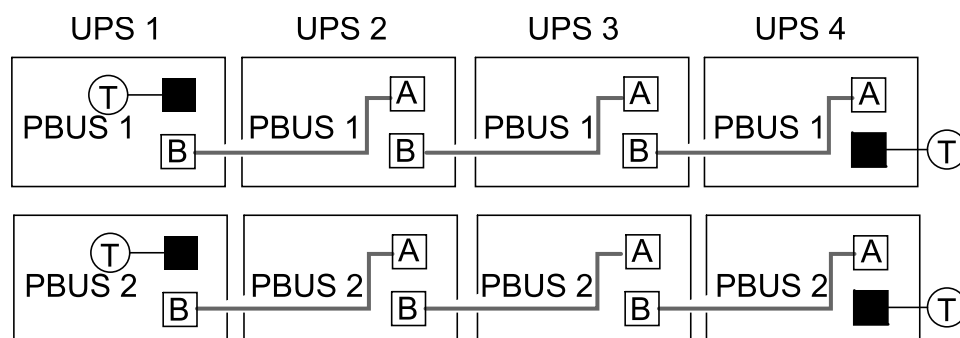


## PBUS Cable Connections (Board 0P3643)

**NOTE:** The PBUS 1 cables are white and the PBUS 2 cables are red.

**NOTE:** The total length of the PBUS cables must not exceed 60 m (197 ft).

### Example of System with Four UPSs in Parallel

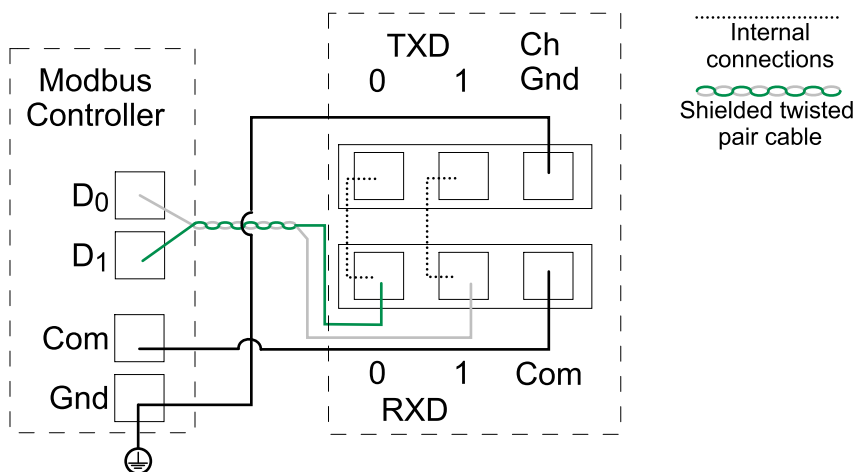


## Modbus Connections (Board 0P6502)

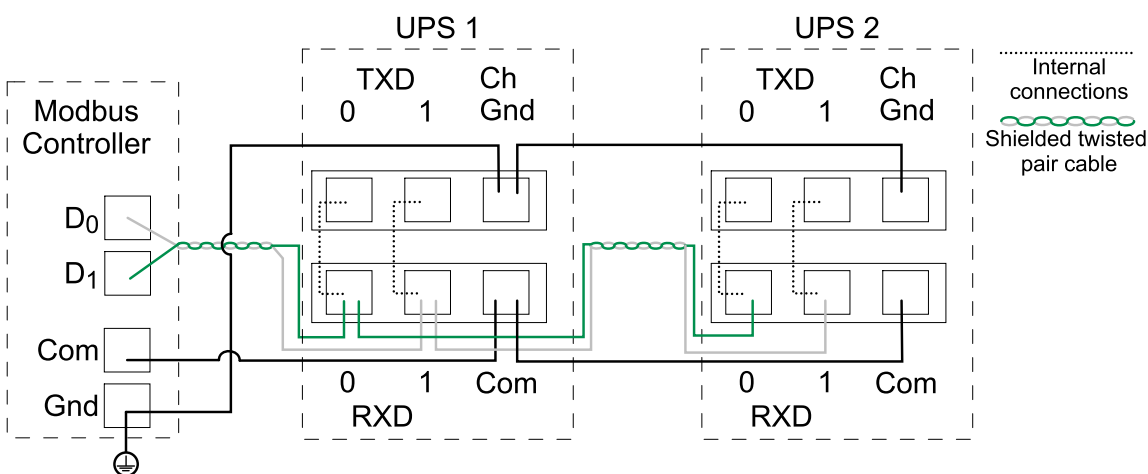
**NOTE:** Terminators for Modbus connection is provided in installation kit 0H-9385.

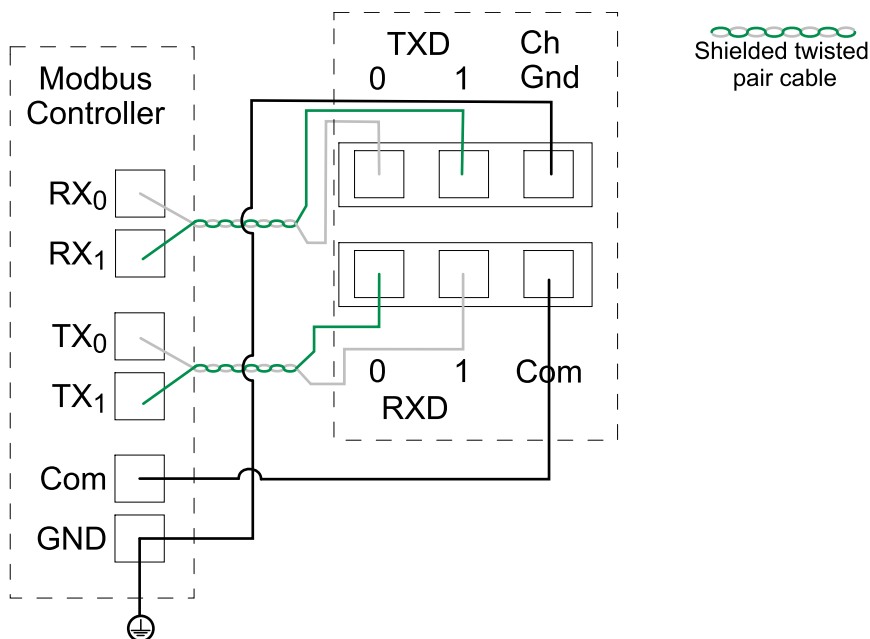
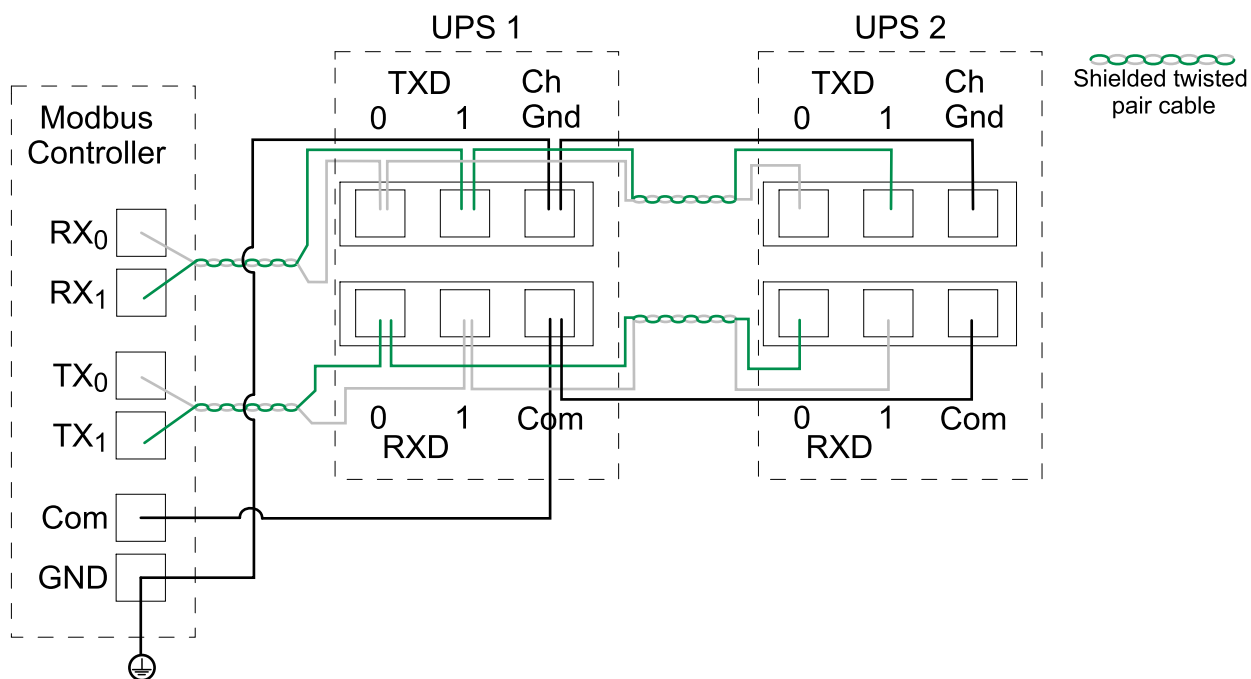
**NOTE:** Shielded cables must be used for Modbus connections. The shield connection to the ground must be as short as possible (ideally below 1 cm). All Modbus signal cables shall be double insulated/jacket cable and minimum rated for 30 VDC.

### 2-Wire Connection with One UPS

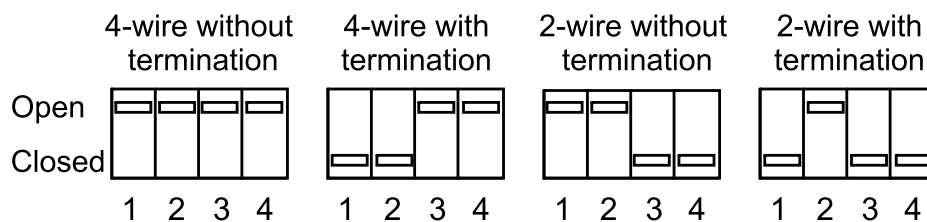


### Example: 2-Wire Connection with Two UPSs



**Example: 4-Wire Connection with One UPS****Example: 4-Wire Connection with Two UPSs****Modbus Dip Switch Settings**

The Modbus dip switches must be set to match your installation:



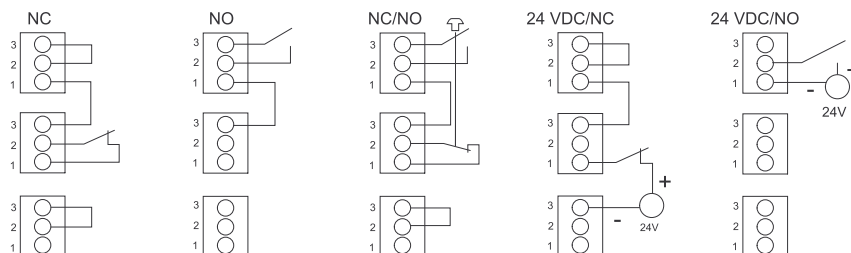
## Connect the Emergency Power Off (EPO)

Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is Class 2/SELV.

All circuits connected must have the same 0 V reference.

The EPO input supports 24 VDC.

1. Route the cables from your EPO through the top of the I/O cabinet and to the EPO terminals J4936-J4938 on 0P6547 as shown in Route External Signal Cables to the Boards, page 77.
2. Connect the building EPO to the terminal block according to one of the options below.



**NOTE:** Do not connect the terminal block to the board. Signal cables will be connected by Schneider Electric during the assembly service.

## Signal Cables for External Synchronization

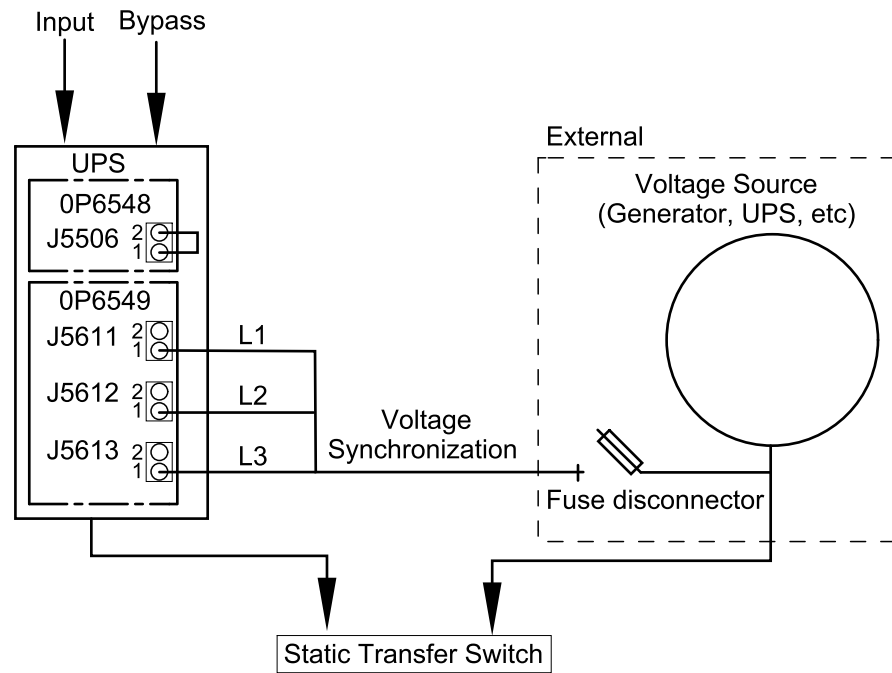
The maximum voltage for external synchronization is equal to the input voltage range given in the specifications. The non-Class 2/non-SELV cables for external synchronization shall be a jacket cable and rated for 600 VAC.

1. Route the external synchronization cables through the top of the I/O cabinet to 0P6549 as shown in Route the Signal Cables between the I/O Cabinet and the Power Cabinets, page 71.
2. Connect the three phases to the terminal block:

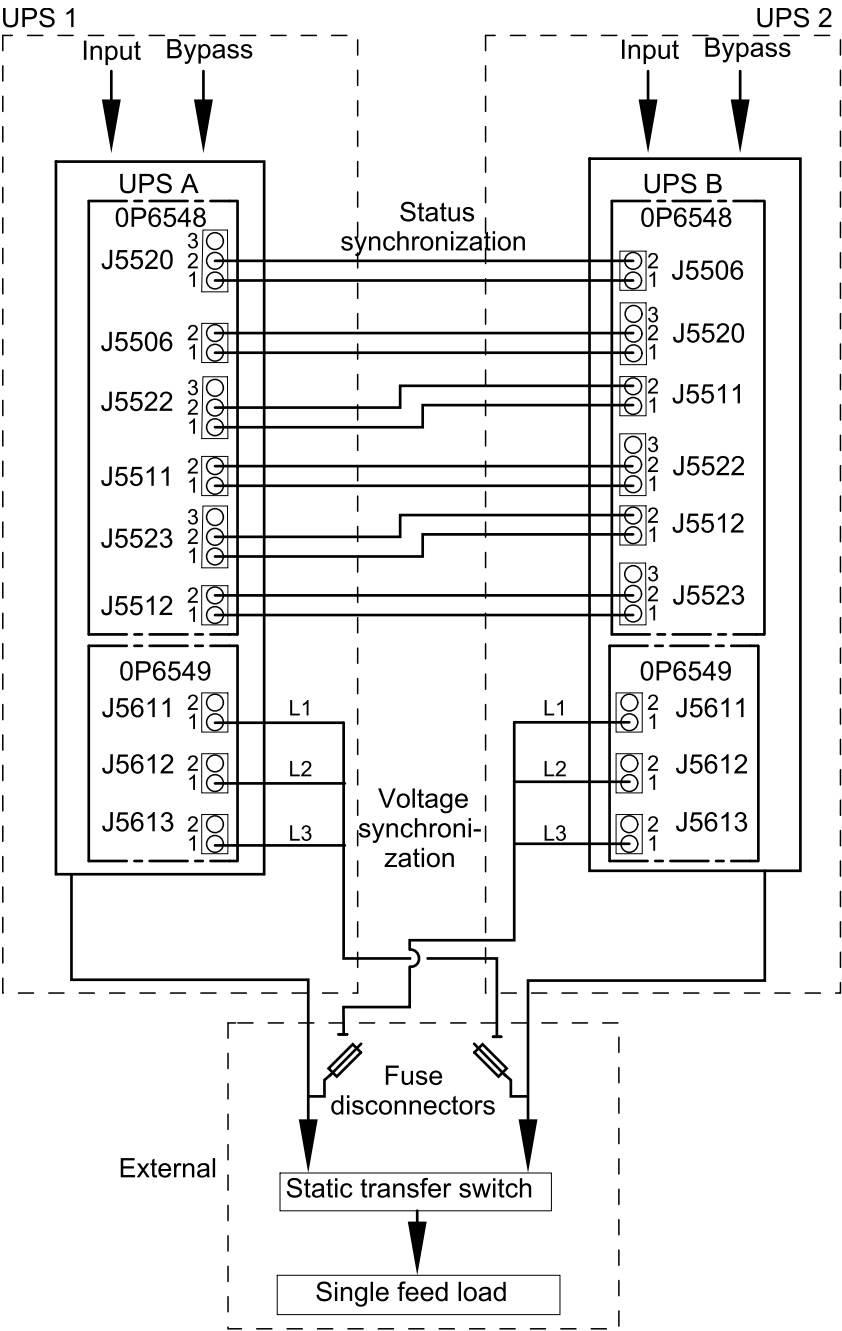
**NOTE:** The phases from the synchronization source must be protected by a fuse of maximum 0.5 A.

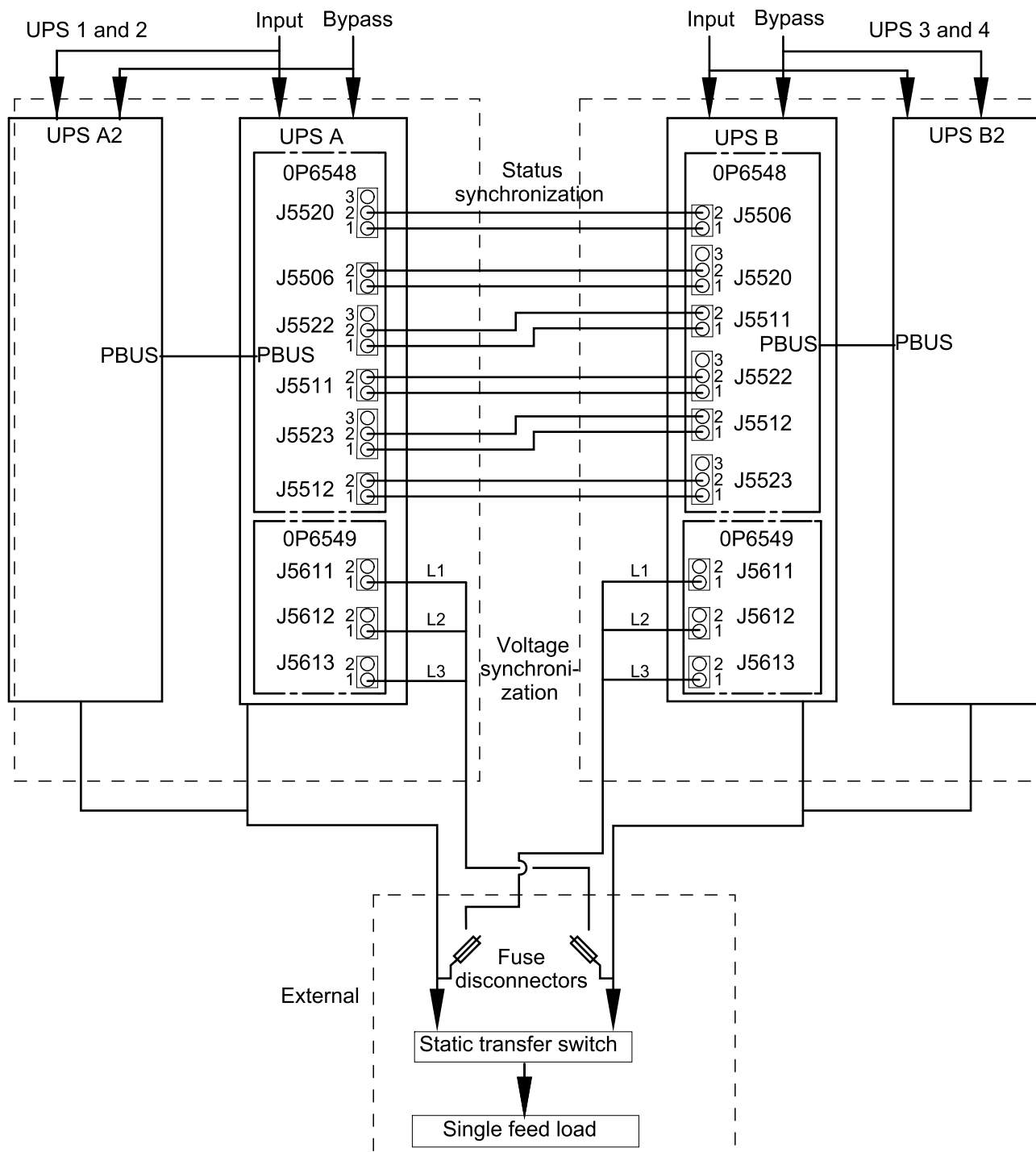
**NOTE:** Do not connect the terminal block to the board. Signal cables will be connected by Schneider Electric during the assembly service.

- a. Connect L1 to J5611 on 0P6549.
- b. Connect L2 to J5612 on 0P6549.
- c. Connect L3 to J5613 on 0P6549.

**Signal Cable Connections for Basic UPS Synchronization to a Fixed Voltage Source (Boards 0P6548, 0P6549)**

Signal Cable Connections for Dual UPS Synchronization with a Floating Synchronization Master (Boards 0P6548, 0P6549)



**Signal Cable Connections for Fixed Parallel Synchronization Master (Boards 0P6548, 0P6549)**

## 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:

- Preinstalled backfeed breaker BF2 in the UPS.
- Installation of internal backfeed kit (GVXOPT001) in the UPS. Follow the installation manual provided with the internal backfeed kit.
- Installation of upstream breaker with shunt trip connected to the UPS. See diagrams and instructions in *Installation of Third Party Backfeed Protection*, page 92.

**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. The cable supplying the shunt trip shall be a jacket cable and rated for 600 VAC. The cables shall be sized taking the cable voltage drop and the recommendation of the shunt trip manufacturer into consideration.

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

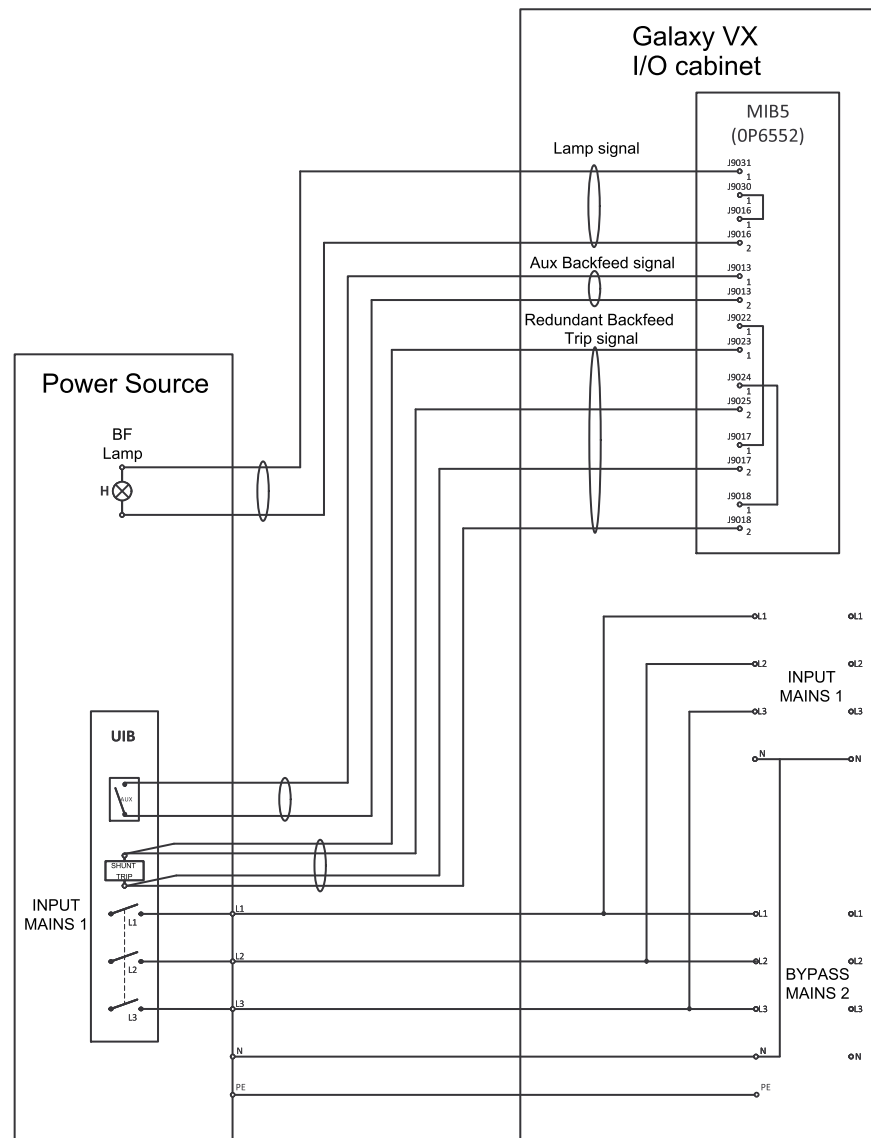
#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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.**

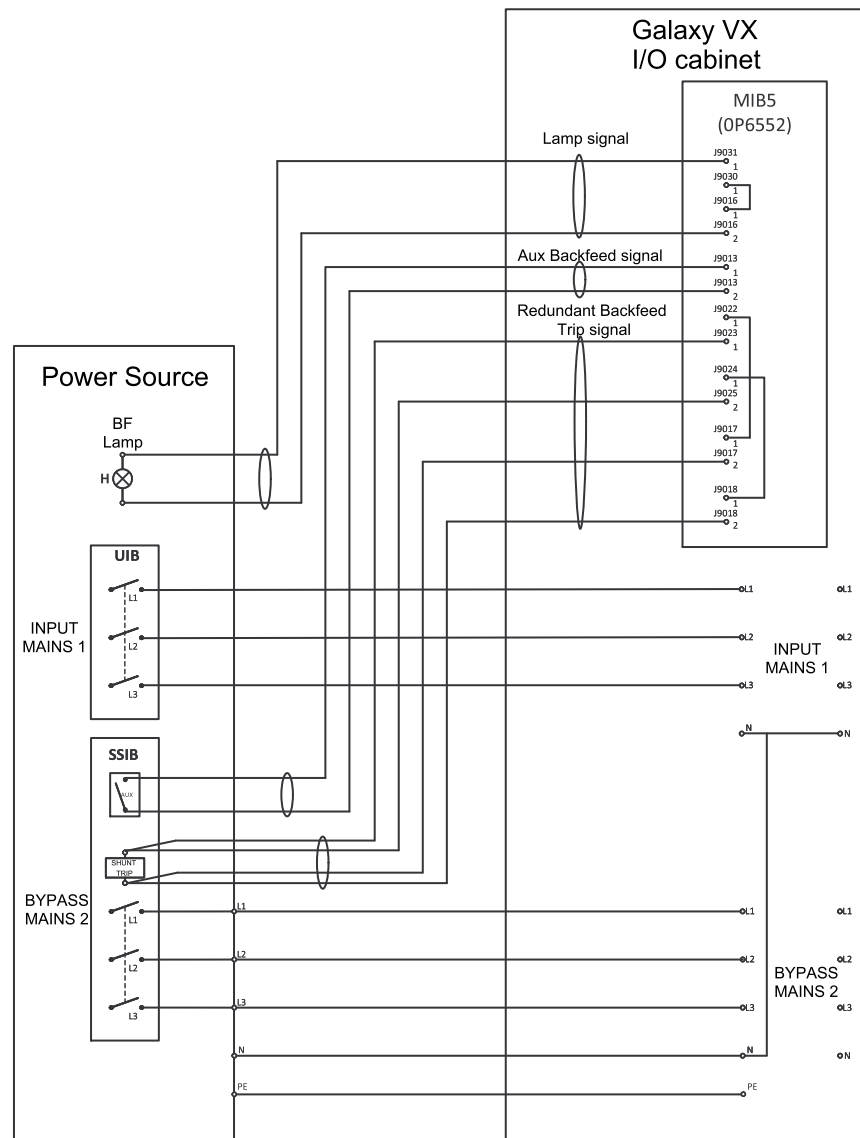


## UPS and Third Party Backfeed Protection – Single Mains



**NOTE:** One extra AUX switch is needed in UIB for backfeed signalling.

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



**NOTE:** One extra AUX switch is needed in SSIB for backfeed signalling.

# Final Mechanical Assembly

## Final Mechanical Assembly of the I/O Cabinet

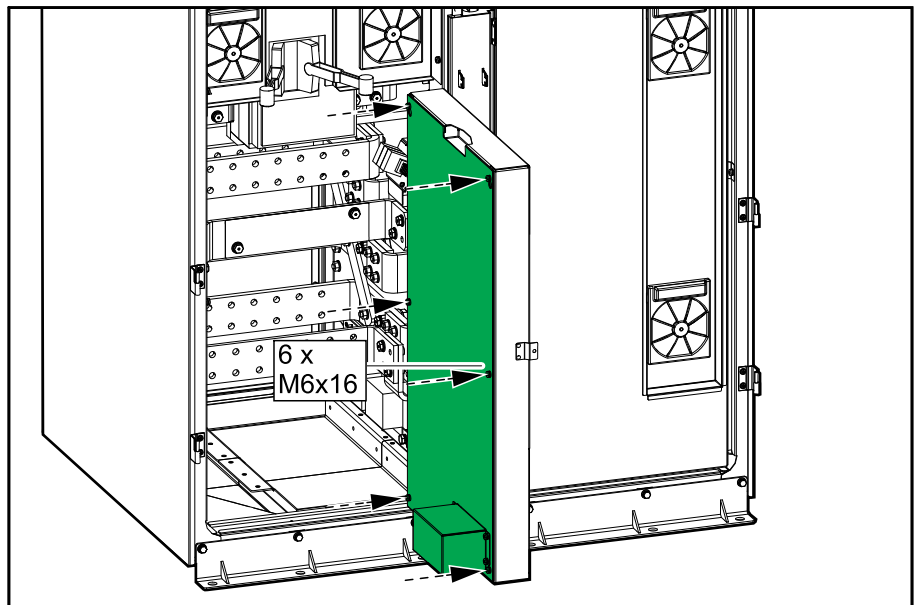
### ⚡⚡ DANGER

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

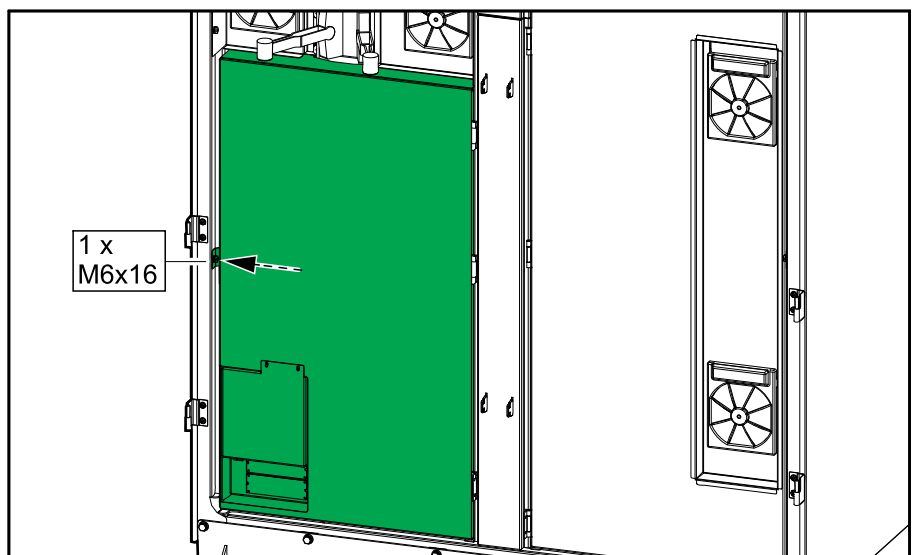
All panels and covers must be properly reinstalled prior to energizing the UPS.

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

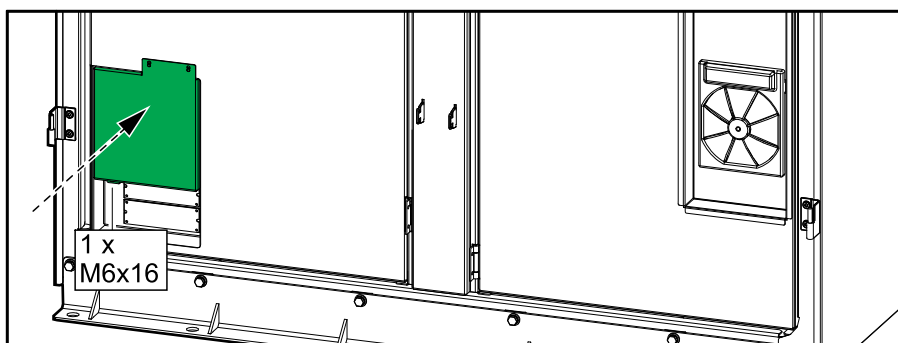
1. Reinstall the cover on the door in the left side and fasten with the screws.



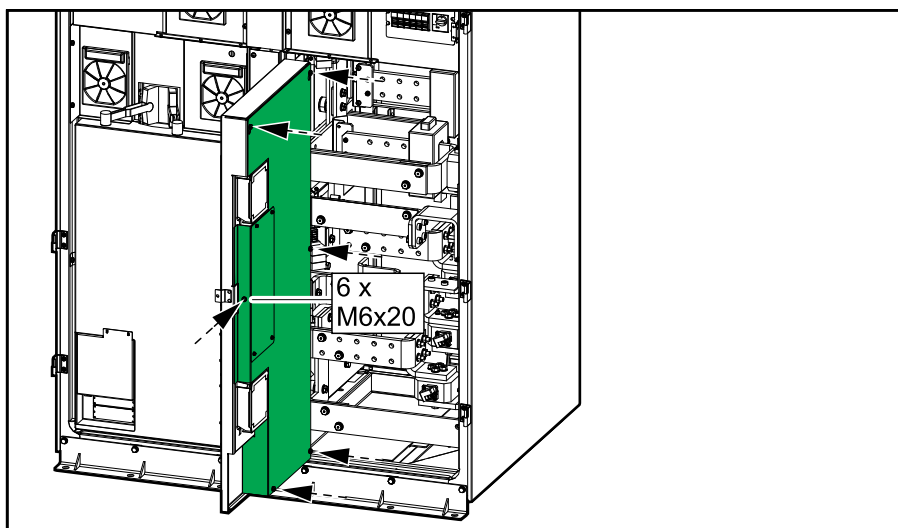
2. Close the door and fasten with the screw.



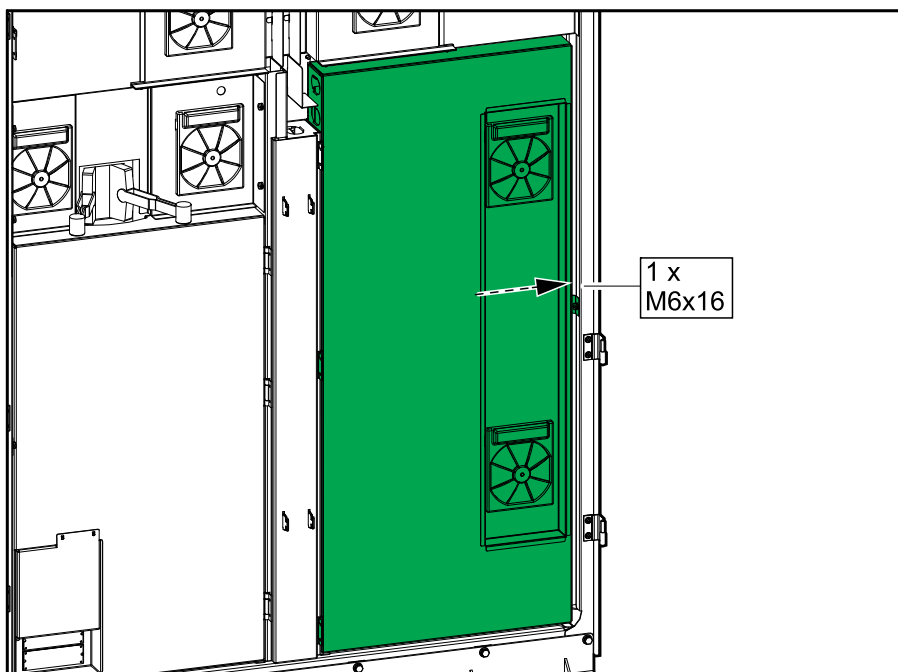
3. Reinstall the indicated cover if removed and fasten with the screws.



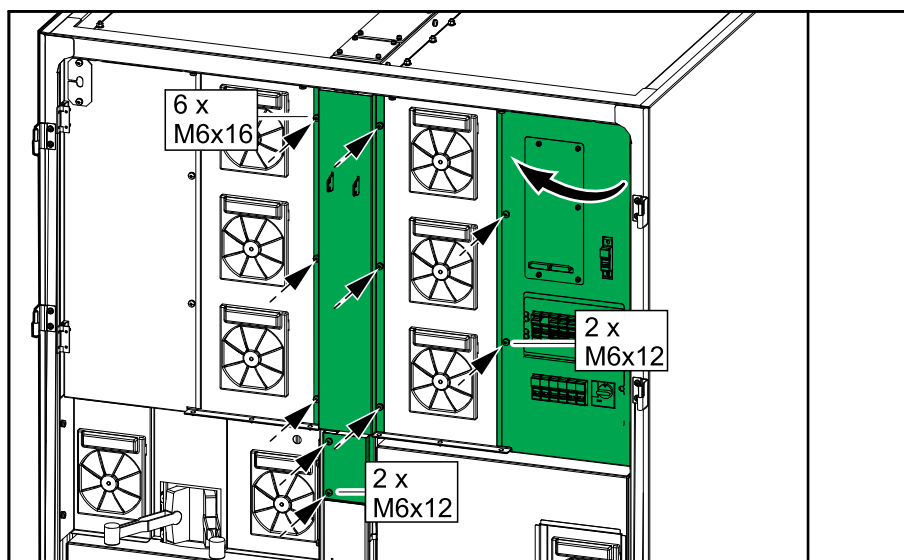
4. Reinstall the cover on the door in the right side and fasten with the screws.



5. Close the door and fasten with the screw.



6. Reinstall the two indicated covers and close the door in the top right corner. Fasten with screws.



7. Close the front doors.

## Final Mechanical Assembly of the Power Cabinets

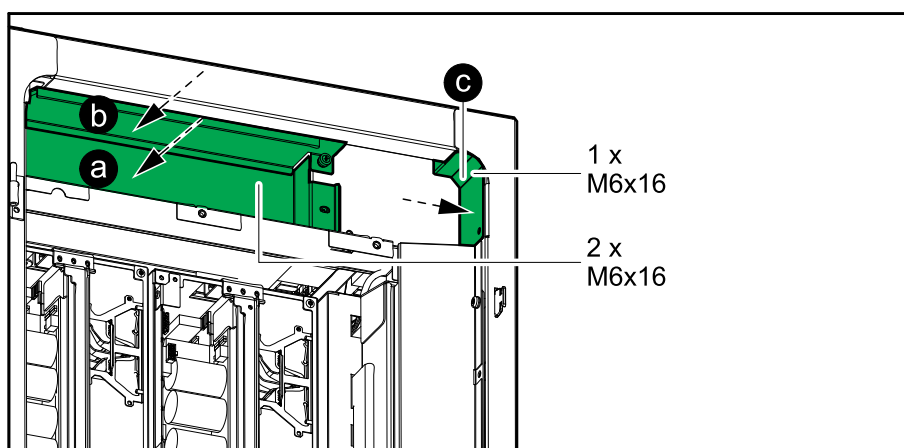
### **⚡⚠ DANGER**

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

All panels and covers must be properly reinstalled prior to energizing the UPS.

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

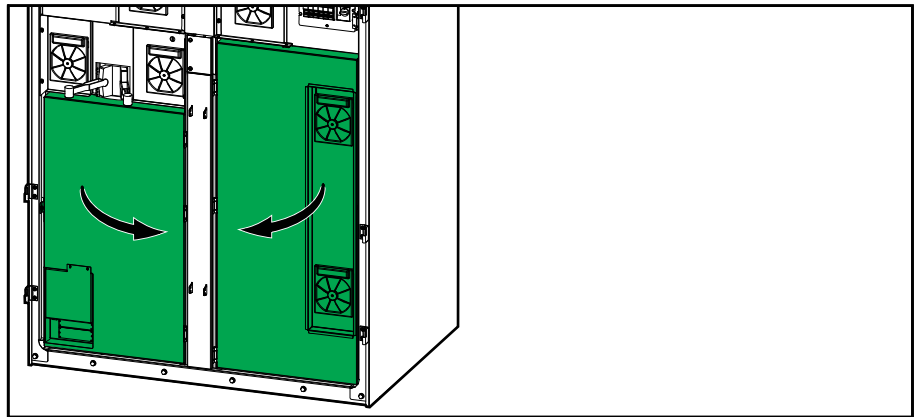
1. Reinstall the three plates in the given order (a-c) on each power cabinet.



# Decommission or Move the UPS to a New Location

**NOTE:** Contact Schneider Electric for removal of the interconnection busbars between the cabinets.

1. Shut down the UPS completely – follow the instructions in the UPS operation manual.
2. Lockout/Tagout all breakers in the switchgear in the OFF (open) position.
3. Lockout/Tagout all battery breakers in the switchgear/battery solution in the OFF (open) position.
4. Open the front door of the UPS.
5. If present, Lockout/Tagout the backfeed breaker BF2 in the OFF (open) position.
6. Open the front door of the I/O cabinet and the power cabinets.
7. Open the two inner doors of the I/O cabinet.



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

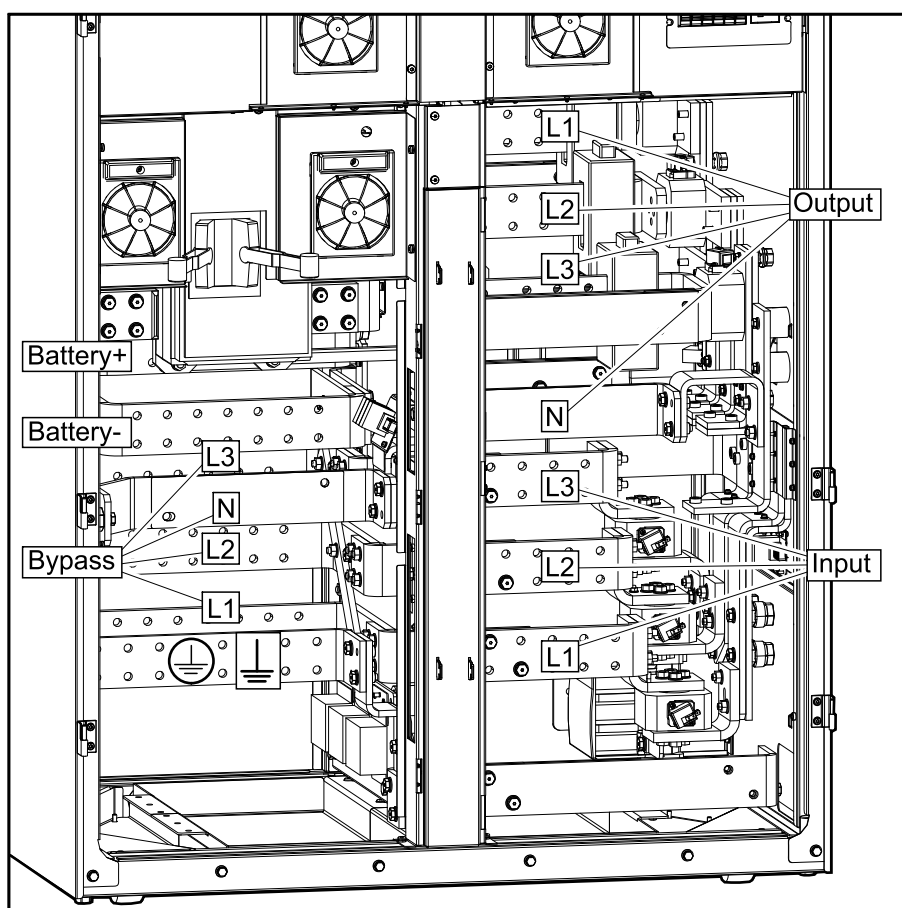
**⚡ ⚠ DANGER**

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

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

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

#### Front View of the I/O Cabinet



9. Disconnect and remove all power cables from the I/O cabinet. See [Connect the Power Cables in a 380/400/415/440 V System](#), page 63 or [Connect the Power Cables in a 480 V System](#), page 66 for details.
10. If present, disconnect and remove the external supply cables from the Lithium-ion battery solution. See [Connect Cables to the External Supply for Lithium-ion Battery Solution \(Optional\)](#), page 68 for details.
11. Disconnect and remove all signal cables from the I/O cabinet. See [Signal Cables](#), page 71 for details.
12. Contact Schneider Electric for removal of the interconnection busbars between the cabinets. The interconnections busbars must only be removed by a Schneider Electric-certified field service representative or service partner.
13. Remove the seismic front anchoring brackets from the cabinets. Save for reinstallation. See [Mount the Front Anchoring Brackets](#), page 70 for details.

14. Remove the top baying brackets and interconnection screws from the cabinets. Release the cabinets from the rear anchoring brackets by loosening the bolts on the front of the cabinets. See *Position the Cabinets*, page 54 for details.
15. Reinstall all removed plates and covers in the cabinets. See *Final Mechanical Assembly of the I/O Cabinet*, page 95 and *Final Mechanical Assembly of the Power Cabinets*, page 97 for details.
16. Close and lock the front door of the cabinets.
17. Raise the feet of the cabinets until the casters have full contact with the floor.
18. You can now move each cabinet individually by rolling it over the floor on the casters.

## **WARNING**

### **TIPPING HAZARD**

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

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

19. Remove the rear anchoring brackets from the floor. Save for reinstallation. See *Mount the Rear Anchoring Brackets*, page 52 for details.



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

## **⚠ WARNING**

### **TIPPING HAZARD**

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

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

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

## **⚠ WARNING**

### **TOP-HEAVY CABINET**

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

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

Transportation requirements:

- Mount the cabinet in a vertical position in the center of a suitable pallet. The pallet must be suitable for the weight of the cabinet. The I/O cabinet weighs 620 kg (1367 lbs). The power cabinet weighs 540 kg (1190 lbs).
- Use appropriate means of fixation to mount the cabinet to the pallet.

## **⚠ DANGER**

### **TIPPING HAZARD**

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

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

## **⚠ WARNING**

### **UNEXPECTED EQUIPMENT BEHAVIOR**

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

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

21. Perform one of the following:
- Decommission the cabinets, OR
  - Move the the I/O cabinet/power cabinet to a new location to install it.

22. **Only for installing the UPS in a new location:** Follow the installation manual to install the I/O cabinet and power cabinets in the new location. See *Installation Procedure*, page 51 for installation overview. Startup must only be performed by Schneider Electric.

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

Startup must only be performed by Schneider Electric.

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

Schneider Electric



\* 9 9 0 - 6 2 6 4 6 - 0 0 1 \*

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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