

# Easy UPS 3L

## 500-600 kVA UPS for External Batteries

### Installation

Latest updates are available on the Schneider Electric website

11/2024



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**IEC (380/400/415 V)**



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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).

## 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 breakers, battery breakers, cabling, etc.) and environmental requirements. No responsibility is assumed by Schneider Electric if these requirements are not respected.
- After the UPS system has been electrically wired, do not start up the system. Start-up must only be performed by Schneider Electric.

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

**⚠ DANGER**

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

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

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

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

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

**⚠ DANGER**

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

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

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

**⚠ DANGER**

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

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

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

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

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

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

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

**⚠ 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

### **⚠ 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.
- 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.
- A disconnection device (e.g. disconnection circuit breaker or switch) must be installed to enable isolation of the system from upstream power sources in accordance with local regulations. The disconnection device must be easily accessible and visible.
- The UPS must be properly earthed/grounded and due to a high leakage current, the earthing/grounding conductor must be connected first.

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

### **⚠ DANGER**

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

In systems where backfeed protection is not part of the standard design, an automatic isolation device (backfeed protection option or other device meeting the requirements of IEC/EN 62040-1 or UL1778 5th Edition – depending on which of the two standards apply to your local area) must be installed to prevent hazardous voltage or energy at the input terminals of the isolation device. The device must open within 15 seconds after the upstream power supply fails and must be rated according to the specifications.

**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 remote 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.**

**⚠ CAUTION****RISK OF ELECTRICAL DISTURBANCE**

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

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

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

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

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

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

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

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

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

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

When replacing batteries, always replace with the same type and number of batteries or battery packs.

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



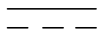











## **▲ CAUTION**

### **RISK OF EQUIPMENT DAMAGE**

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

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

## Symbols Used in the Product

	This is the earthing/ground symbol.
	This is the protective earth/equipment grounding conductor symbol.
	This is the direct current symbol. It is also referred to as DC.
	This is the alternating current symbol. It is also referred to as AC.
	This is the positive polarity symbol. It is used to identify the positive terminal(s) of equipment which is used with, or generates direct current.
	This is the negative polarity symbol. It is used to identify the negative terminal(s) of equipment which is used with, or generates direct current.
	This is the battery symbol.
	This is the static switch symbol. It is used to indicate switches that are designed to connect or disconnect the load to or from the supply respectively without the existence of moving parts.
	This is the AC/DC converter (rectifier) symbol. It is used to identify an AC/DC converter (rectifier) and, in case of plug-in devices, to identify the relevant receptacles.
	This is the DC/AC converter (inverter) symbol. It is used to identify an DC/AC converter (inverter) and, in case of plug-in devices, to identify the relevant receptacles.
	This is the input symbol. It is used to identify an input terminal when it is necessary to distinguish between inputs and outputs.
	This is the output symbol. It is used to identify an output terminal when it is necessary to distinguish between inputs and outputs.
	This is the switch disconnecter symbol. It is used to identify the disconnecting device in the form of switch.
	This is the circuit breaker symbol. It is used to identify the disconnecting device in the form of circuit breaker that protects the equipment from short circuit or heavy load current. It opens the circuits once the current flow crosses its maximum limit.

# Specifications

## Input Specifications

UPS rating	500 kVA			600 kVA		
<b>Voltage (V)</b>	<b>380</b>	<b>400</b>	<b>415</b>	<b>380</b>	<b>400</b>	<b>415</b>
Connections <sup>1</sup>	L1, L2, L3, N, PE					
Input voltage range (V)	323-477 (full load)					
Frequency range (Hz)	40-70					
Nominal input current (A)	808	768	740	970	921	888
Maximum input current (A)	946	899	866	1135	1079	1040
Input current limitation (A)	1080			1320		
Total harmonic distortion (THDI)	<3% for linear loads <5% for non-linear loads					
Input power factor	>0.99					
Maximum short circuit rating	Icc=35 kA					
Ramp-in	7 seconds					

## Bypass Specifications

UPS rating	500 kVA			600 kVA		
<b>Voltage (V)</b>	<b>380</b>	<b>400</b>	<b>415</b>	<b>380</b>	<b>400</b>	<b>415</b>
Connections	L1, L2, L3, N, PE					
Overload capacity	≤115% continuous 125% for 10 minutes 150% for 1 minute					
Minimum bypass voltage (V)	209	221	228	209	221	228
Maximum bypass voltage (V)	475	480	477	475	480	477
Frequency (Hz)	50 or 60					
Frequency range (%)	±1, ±2, ±4, ±5, ±10. Default is ±10 (user selectable).					
Nominal bypass current (A)	767	729	703	921	875	843
Maximum short circuit rating	Icc=35 kA					

1. It is mandatory to have the neutral line for the input and the load. If the input or the load does not have a neutral line, a Δ-Y transformer for input or a Y-Δ transformer for load needs to be installed. And the capacity of the transformer should be >1.2 times the rated capacity of the UPS.

## Output Specifications

UPS rating	500 kVA			600 kVA		
Voltage (V)	380	400	415	380	400	415
Connections <sup>2</sup>	L1, L2, L3, N, PE					
Overload capacity <sup>3</sup>	105% continuous 125% for 10 minutes 150% for 1 minute					
Output voltage regulation	±1%					
Dynamic load response	20 milliseconds					
Output power factor	1					
Nominal output current (A)	760	722	696	912	866	835
Total harmonic distortion (THDU)	<2% at 100% linear load <4% at 100% non-linear load					
Output frequency (Hz)	50 or 60					
Slew rate (Hz/sec)	Programmable: 0.5 to 2.0 Default is 0.5					
Output performance classification (according to IEC/ EN62040-3)	VFI-SS-111					
Load power factor	0.5 leading to 0.5 lagging without derating					
Output short circuit current (inverter)	1.2 kA/200 ms			1.5 kA/200 ms		

2. It is mandatory to have the neutral line for the input and the load. If the input or the load does not have a neutral line, a  $\Delta$ -Y transformer for input or a Y- $\Delta$  transformer for load needs to be installed. And the capacity of the transformer should be >1.2 times the rated capacity of the UPS.
3. At 30 °C and output power factor 0.9.

## Battery Specifications

**NOTE:** The UPS supports 36-50 battery blocks.

UPS rating	500 kVA	600 kVA
Max. charging power in % of output power	21%	22%
Maximum charging power (kW)	108	132
Nominal battery voltage (VDC)	±216 to ±300	
Nominal float voltage (VDC)	±243 to ±337.5	
End of discharge voltage (full load) (VDC)	±172.8 to ±240	
Battery current at full load and nominal battery voltage (A)	1231-886	1470-1058
Battery current at full load and minimum battery voltage (A)	1539-1102	1847-1323
Temperature compensation (per cell) <sup>4</sup>	Programmable from 0 to 7 mV/°C. Default is 0 mV/°C.	
Ripple current	<5% C10	

## Recommended Upstream Protection

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

UPS rating	500 kVA		600 kVA	
	Input	Bypass	Input	Bypass
Breaker type	NS1000N Mic 2.0 (33475/NS33475)	NS1000N Mic 2.0 (33475/NS33475)	NS1250N Mic 2.0 (33480/NS33480)	NS1250N Mic 2.0 (33480/NS33480)
In setting	1	1	1	1
Ir setting	0.95	0.9	0.9	0.9
Im setting	Isd=1.5-10	Isd=1.5-10	Isd=1.5-10	Isd=1.5-10

4. If the temperature is above 25 °C. No compensation below 25 °C.

## Recommended Cables Sizes

### ⚠ DANGER

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

All wiring must comply with all applicable national and/or electrical codes. The maximum allowable cable size is 240 mm<sup>2</sup>.

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

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

- 90 °C conductors
- An ambient temperature of 30 °C
- Use of copper conductors
- Installation method C

PE size is based on table 54.2 of IEC 60364-5-54.

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

**NOTE:** Battery cables are sized according to 36 battery blocks.

**NOTE:** The battery cable sizes given here are recommendations – Always follow the specific instructions in the battery solution documentation for battery cable sizes and battery PE cable sizes and ensure that the battery cable sizes match the battery breaker rating.

**NOTE:** Recommended cable sizes and maximum allowable cable size may vary for the auxiliary products. Refer to the installation manual provided with the auxiliary product.

### 500 kVA – Copper

	Cable size per phase (mm <sup>2</sup> )	Neutral cable size (mm <sup>2</sup> )	PE cable size (mm <sup>2</sup> )
Input	3 x 185	3 x 185	2 x 150
Bypass	3 x 185	3 x 185	2 x 150
Output	3 x 185	3 x 185	2 x 150
Battery	6 x 120	6 x 120	3 x 120

### 600 kVA – Copper

	Cable size per phase (mm <sup>2</sup> )	Neutral cable size (mm <sup>2</sup> )	PE cable size (mm <sup>2</sup> )
Input	3 x 240	3 x 240	2 x 185
Bypass	3 x 240	3 x 240	2 x 185
Output	3 x 240	3 x 240	2 x 185
Battery	6 x 150	6 x 150	3 x 150

## Recommended Bolts and Cable Lugs

Cable Size (mm <sup>2</sup> )	Bolt Size	Cable Lug Type
120	M12x35 mm	TLK 120-12
150	M12x35 mm	TLK 150-12
185	M12x35 mm	TLK 185-12
240	M12x35 mm	TLK 240-12


## Torque Specifications

Bolt Size	Torque
M12	50 Nm

# Requirements for a Third Party Battery Solution

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

## Third Party Battery Breaker Requirements

 **DANGER**

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

All selected battery breakers must be equipped with instantaneous trip functionality with an undervoltage release coil or a shunt trip release coil.

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

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

### Design Requirements for Battery Breaker

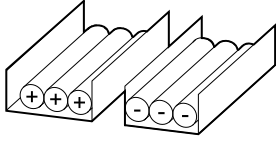
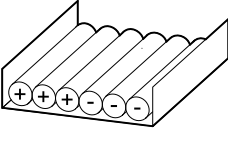
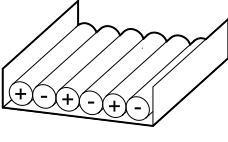
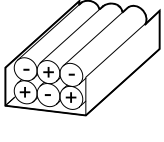
Battery breaker rated DC voltage > Normal battery voltage	The normal voltage of the battery configuration is defined as the highest nominal occurring battery voltage. This can be equivalent to the float voltage which may be defined as <b>number of battery blocks x number of cells x cell float voltage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

## Guidance for Organizing Battery Cables

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

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

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

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

## UPS Weights and Dimensions

UPS rating	Weight kg	Height mm	Width mm	Depth mm
500 kVA	665	1970	1000	850
600 kVA	745	1970	1000	850

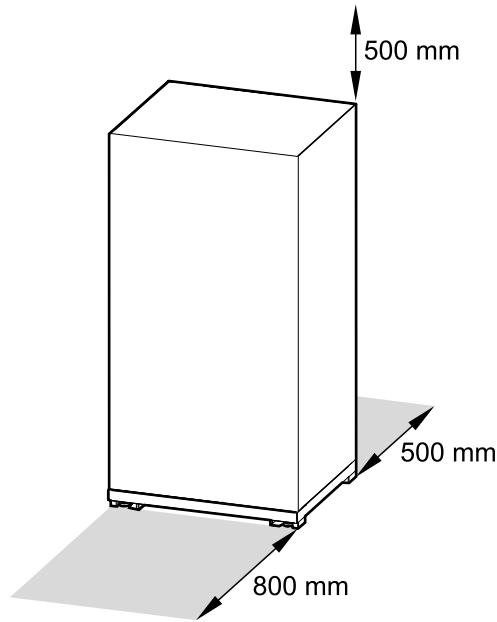
## UPS Shipping Weights and Dimensions

UPS rating	Weight kg	Height mm	Width mm	Depth mm
500 kVA	720	2100	1200	1015
600 kVA	800	2100	1200	1015

## Clearance

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

**NOTE:** The minimum rear clearance is 500 mm for maintenance and 350 mm for operation.



## Environmental

	Operating	Storage
Temperature	0 °C to 30 °C	-15 °C to 40 °C for systems with batteries -25 °C to 55 °C for systems without batteries
Relative humidity	0-95% non-condensing	
Elevation derating according to IEC 62040-3	Power derating factor: 0-1500 m: 1.000 1500-2000 m: 0.975	< 15000 m above sea level (or in an environment with equivalent air pressure)
Audible noise	<72 dBA at 100% load according to ISO3746	
Protection class	IP20 (dust filter as standard)	
Color	RAL 9003	

## Heat Dissipation

UPS rating	500 kVA		600 kVA	
	W	BTU/hr	W	BTU/hr
Normal mode	31800	108507	37200	126932
Battery mode	28550	97417	33960	115877
ECO mode	3250	11090	3480	11874

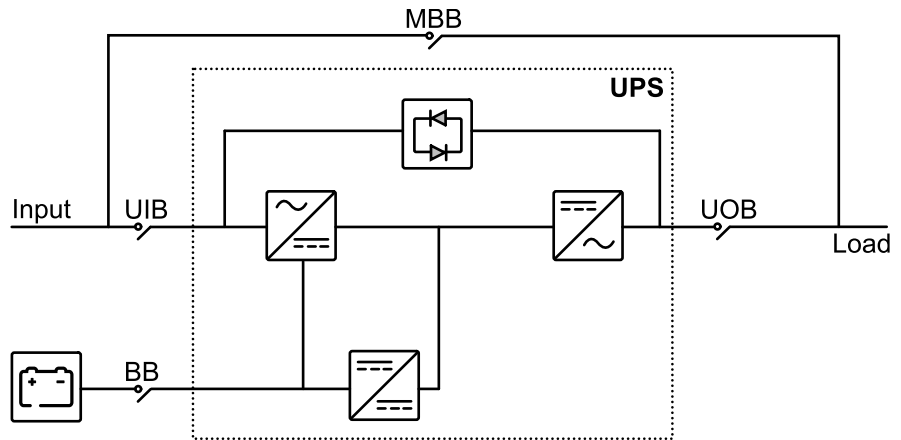
## Compliance

Safety	IEC 62040-1:2017, Edition 2.0, Uninterruptible power systems (UPS) – Part 1: Safety requirements IEC 62040-1: 2008-6, 1st edition, Uninterruptible Power Systems (UPS) – Part 1: General and safety requirements for UPS IEC 62040-1:2013-01, 1st edition amendment 1
EMC	IEC 62040-2:2016, Edition 3.0, Uninterruptible power systems (UPS) – Part 2: Electromagnetic compatibility (EMC) requirements. IEC 62040-2:2005-10, 2nd edition, Uninterruptible Power Systems (UPS) – Part 2: Electromagnetic compatibility (EMC) requirements
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, RCM, EAC, WEEE
Transportation	ISTA 2B
Pollution degree	2
Overvoltage category	III
Earthing system	TN-S, TN-C, TT, or IT

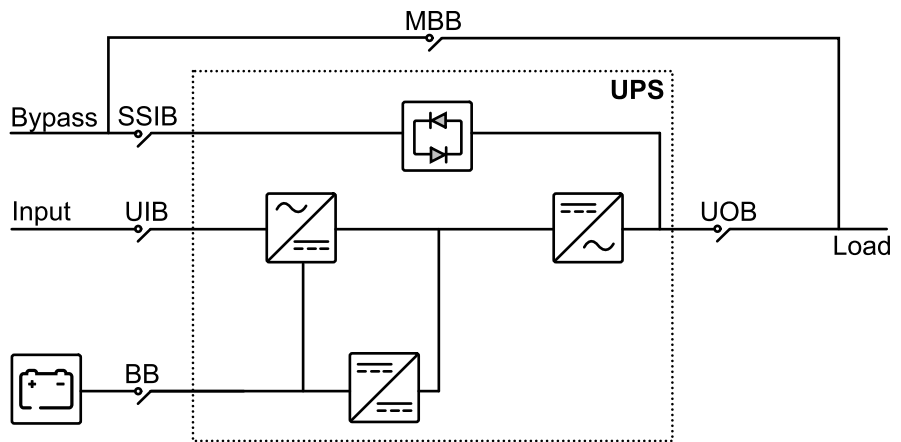
# Overview

## Overview of Single UPS

**Single Mains System**

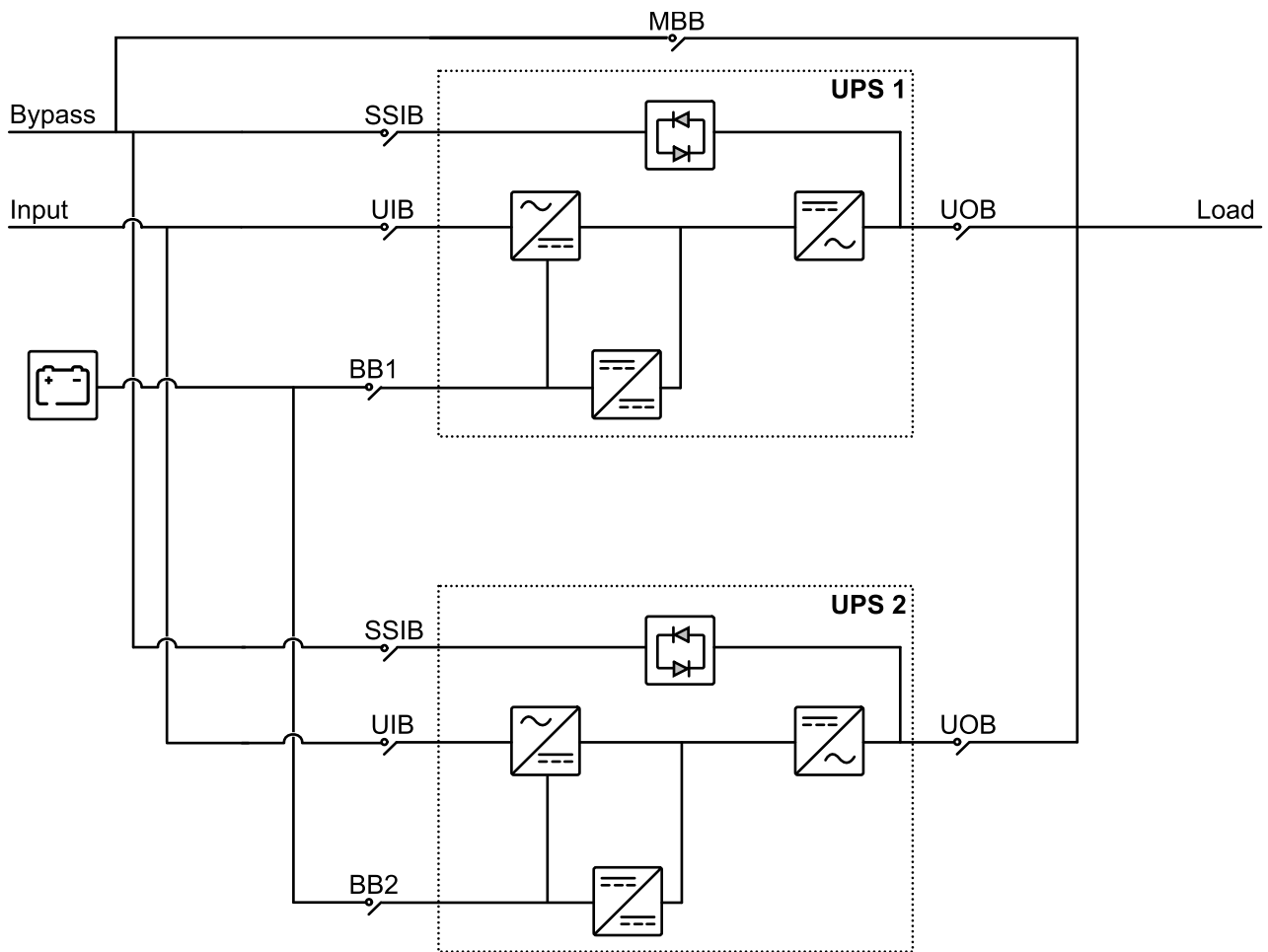


**Dual Mains System**



UIB	Unit input breaker
SSIB	Static switch input breaker
UOB	Unit output breaker
MBB	Maintenance bypass breaker
BB	Battery breaker

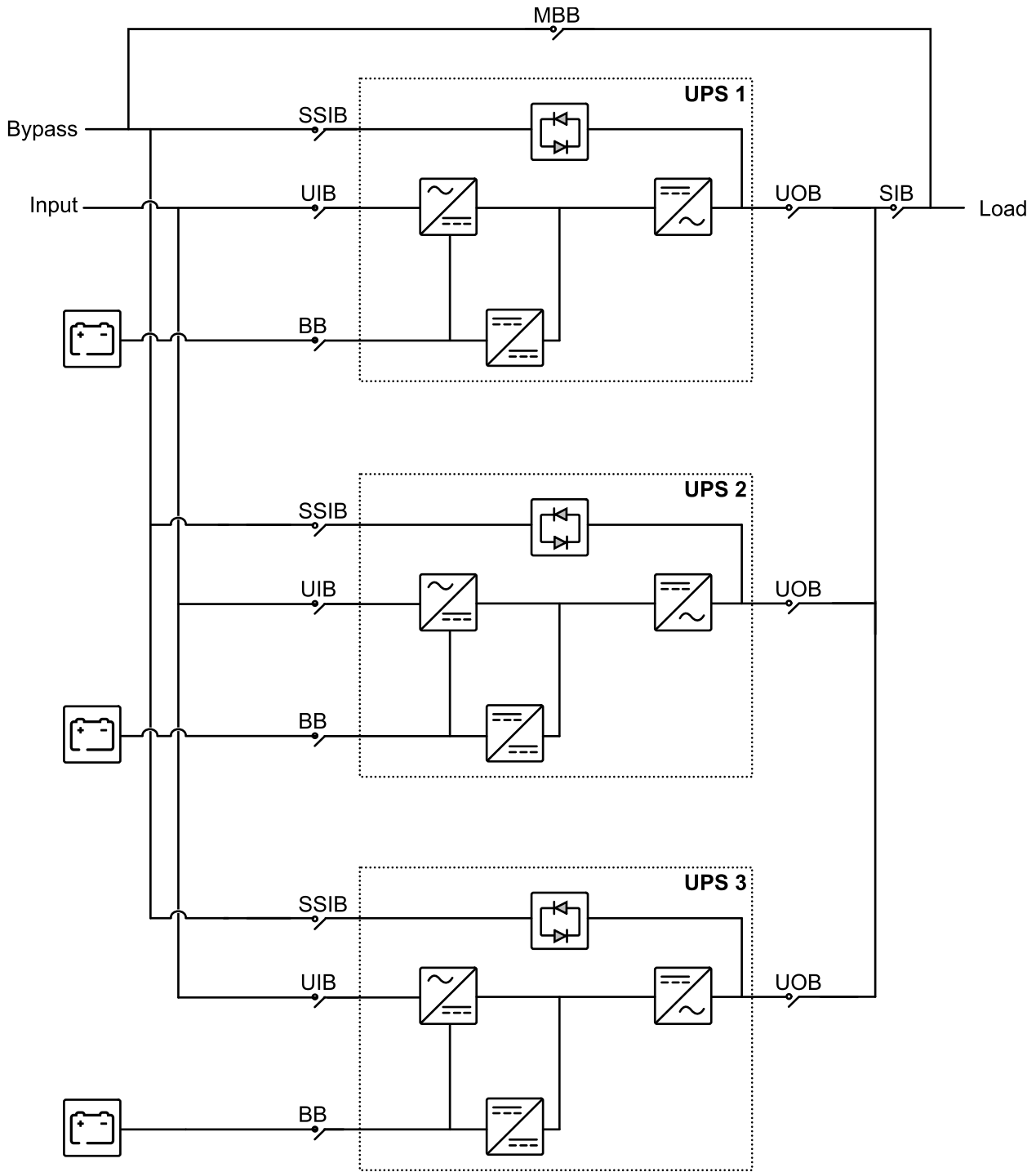
# Overview of 1+1 Redundant Parallel System with Common Battery Bank



UIB	Unit input breaker
SSIB	Static switch input breaker
UOB	Unit output breaker
MBB	Maintenance bypass breaker
BB1	Battery breaker 1
BB2	Battery breaker 2

# Overview of Parallel System

The impedance of the bypass paths need to be controlled in a parallel UPS system. When operating in bypass mode, the parallel load sharing is determined by the total impedance of the bypass path comprising cables, switchgear, static bypass switch, and cable formation.



UIB	Unit input breaker
SSIB	Static switch input breaker
UOB	Unit output breaker
MBB	Maintenance bypass breaker
SIB	System isolation breaker
BB	Battery breaker

## **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 the same length for all UPSs.
- The output cables must be the same length for all UPSs.
- The input cables must be 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.**

# Installation Procedure

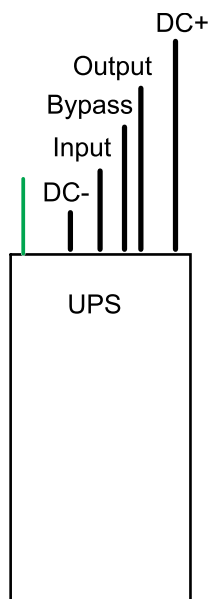
## ⚠ WARNING

### HEAVY LOAD

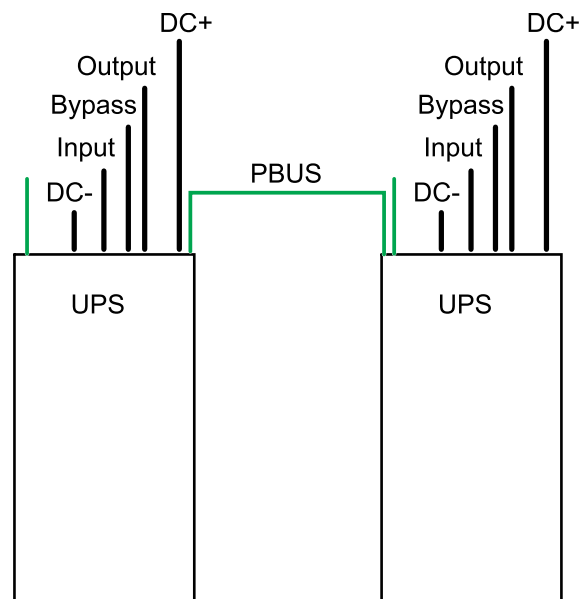
The UPS is tall and heavy. Take appropriate precautions when handling the UPS.

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

### Single System



### Parallel System



— Signal cable  
— Power cable

1. Connect the Power Cables, page 29.
2. Route the Signal Cables, page 34. See Signal Connections, page 37 for signal details.
3. **Only for parallel system:** Connect the Parallel Cables in a Parallel System, page 42.
4. **Optional:** Connect the Synchronization Cables between Two UPS Systems, page 43.
5. Final Installation, page 47.

For moving or decommissioning the UPS after installation has been completed, see Decommission or Move the UPS to a New Location, page 49.

# Connect the Power Cables

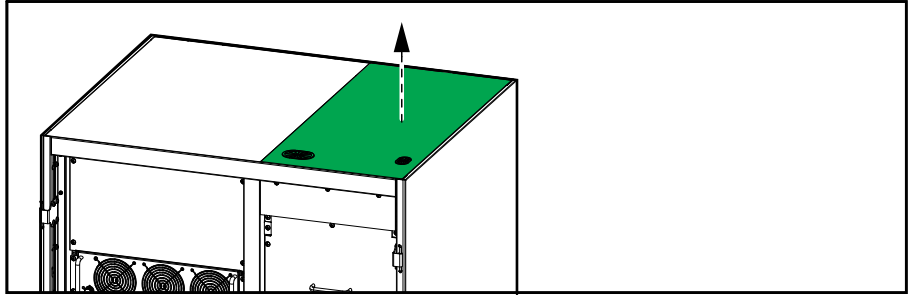
## ⚠ DANGER

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

Do not drill or punch holes with the top plate installed and do not drill or punch holes in close proximity to the UPS.

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

1. Ensure that all breakers are in the OFF (open) position.
2. Remove the top plate.



3. Drill or punch holes for power cables in the top plate.

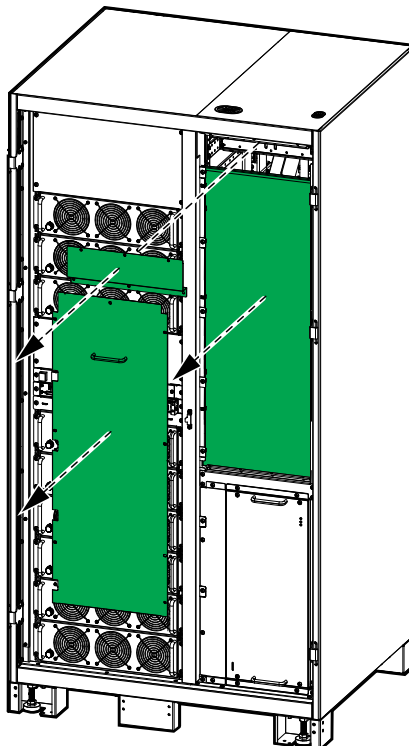
## ⚠ DANGER

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

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

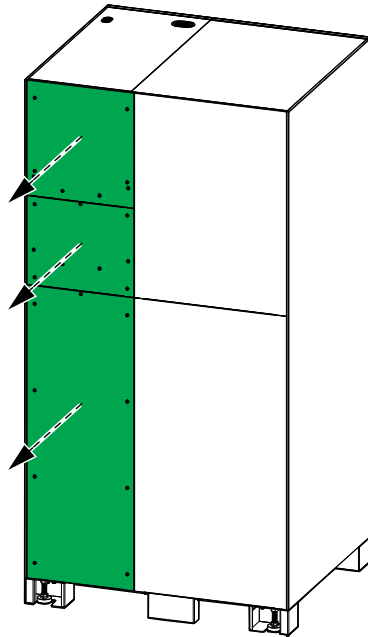
**Failure to follow these instructions will result in death or serious injury.**

4. Reinstall the top plate.
5. Remove the three plates.

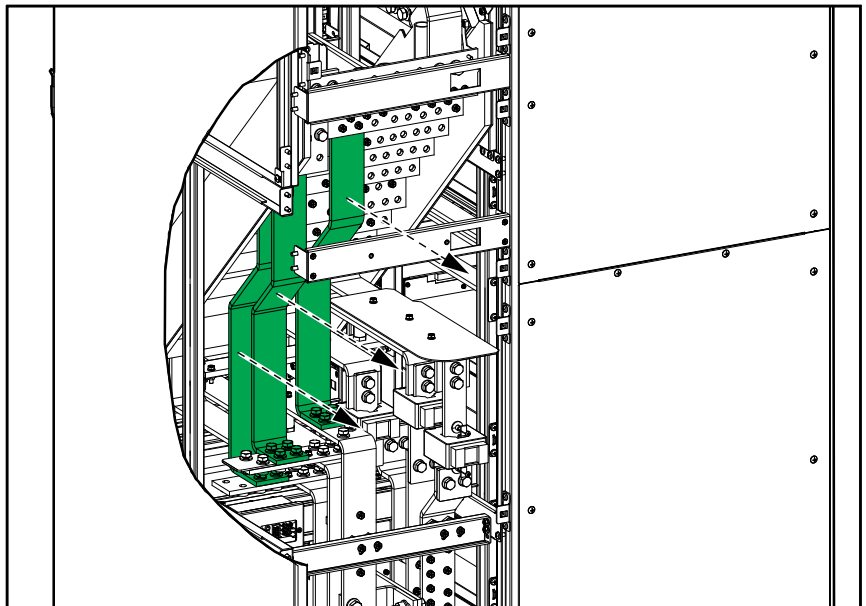


**6. Only for dual mains systems:**

- a. Remove the three rear plates.

**Rear View**

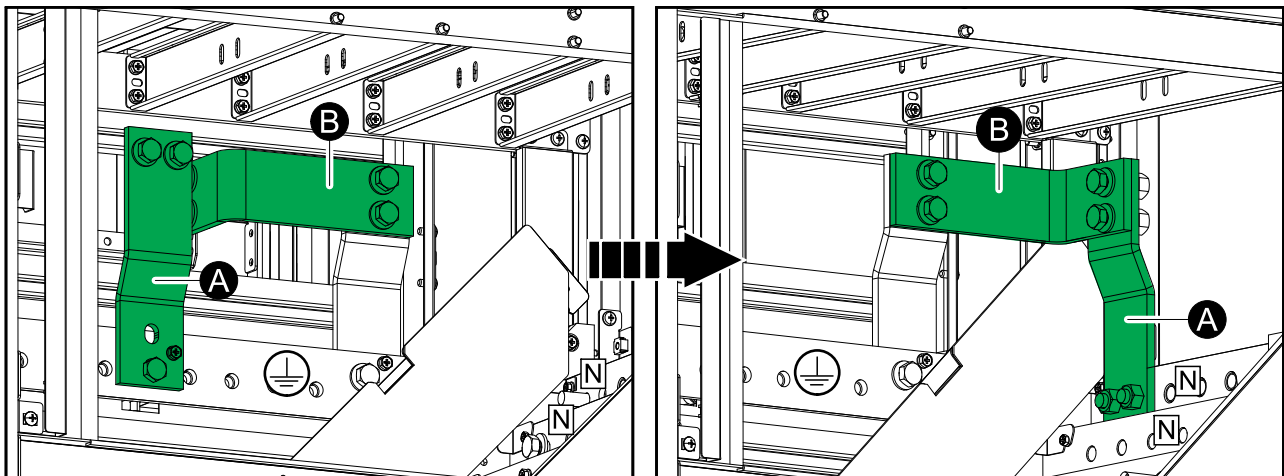
- b. Remove the three single mains busbars.

**Rear View**

- c. Reinstall the rear plates.

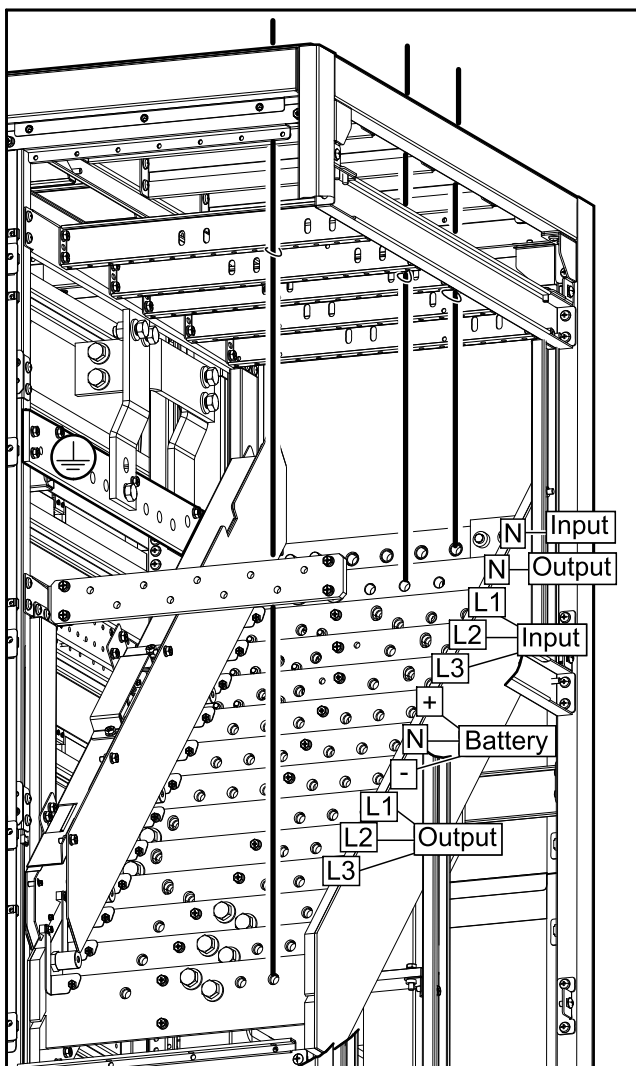
- In TNC systems only:** Remove the busbar (A) and install it on the neutral busbar. Remove the jumper busbar (B) and install it between the PE busbar and the neutral busbar.

**Right Side View**

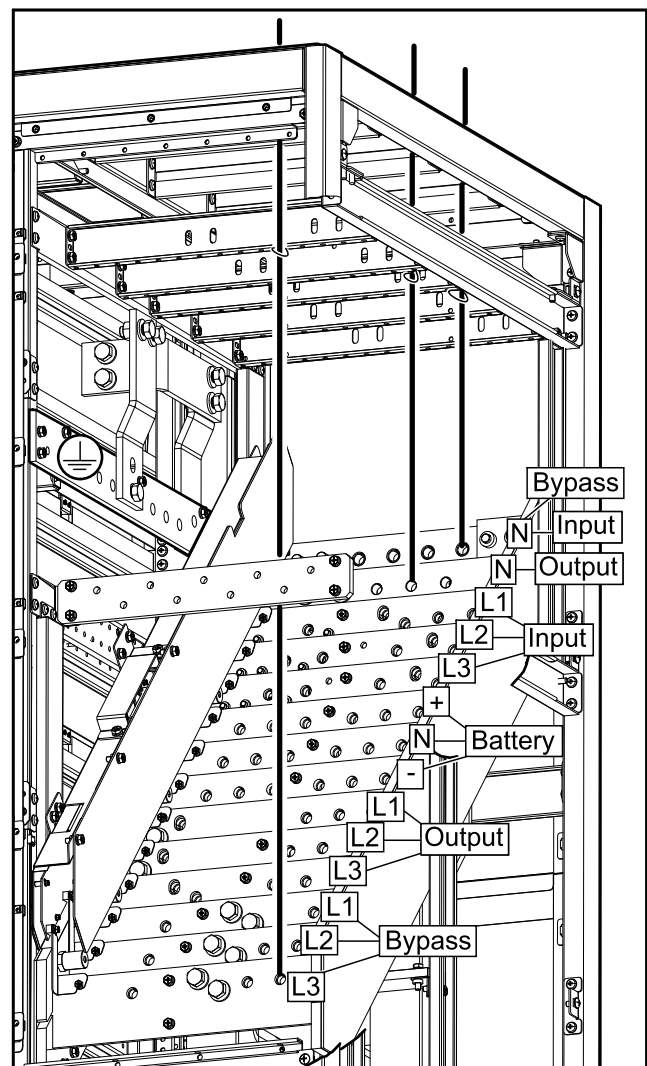


- Route the power cables through the top of the UPS and between the ladders.
- Connect the PE cable to the PE terminal.

**Single Mains System**

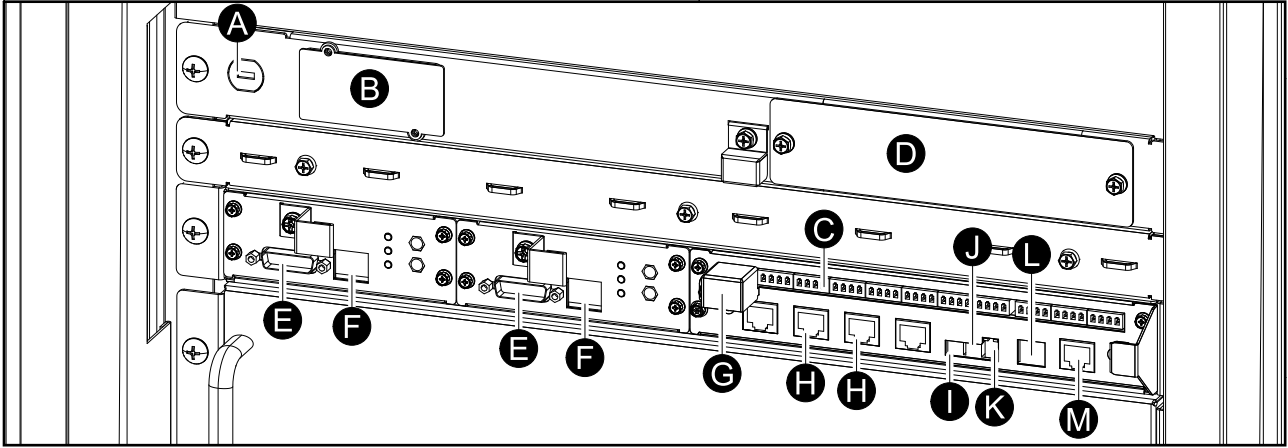


**Dual Mains System**

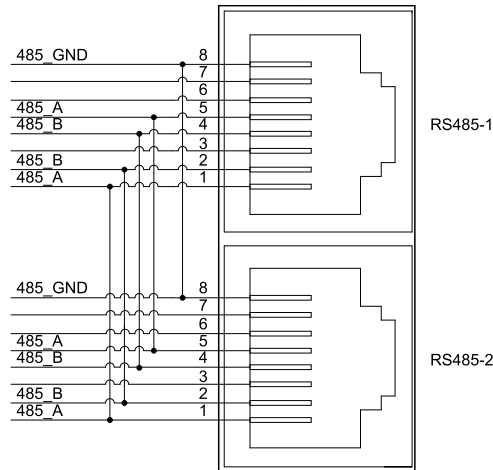


10. Connect the input cables, output cables, bypass cables (for dual mains systems), and battery cables.
11. Fasten the cables to the cable reliefs/the ladders.

# Communication Interfaces



- A. Slot for optional cold start button
- B. Network management card (NMC)
- C. Dry contacts
- D. Auxiliary contacts
- E. Parallel ports
- F. Load Bus Synchronization port
- G. Remote EPO
- H. RS485

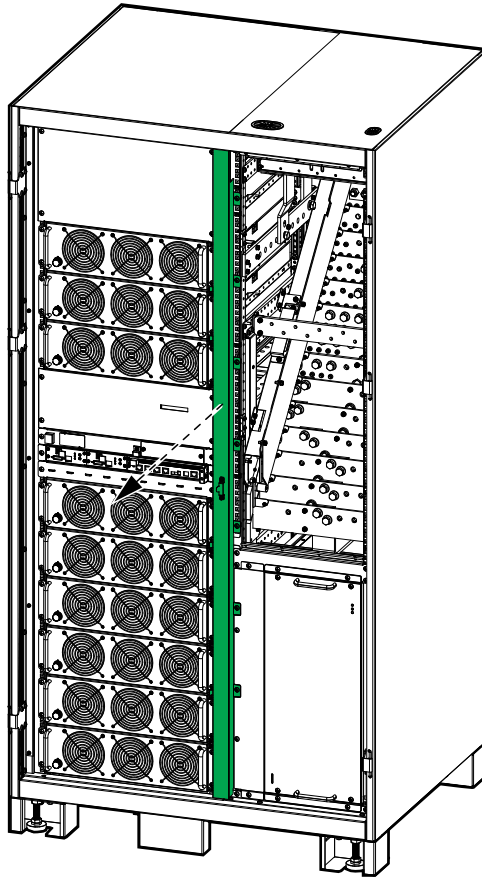


- I. Battery temperature sensor terminal<sup>5</sup>
- J. Ambient temperature sensor terminal (internal use)
- K. CAN\_R: CAN termination resistor
- L. USB port (for service)
- M. Display port (internal use)

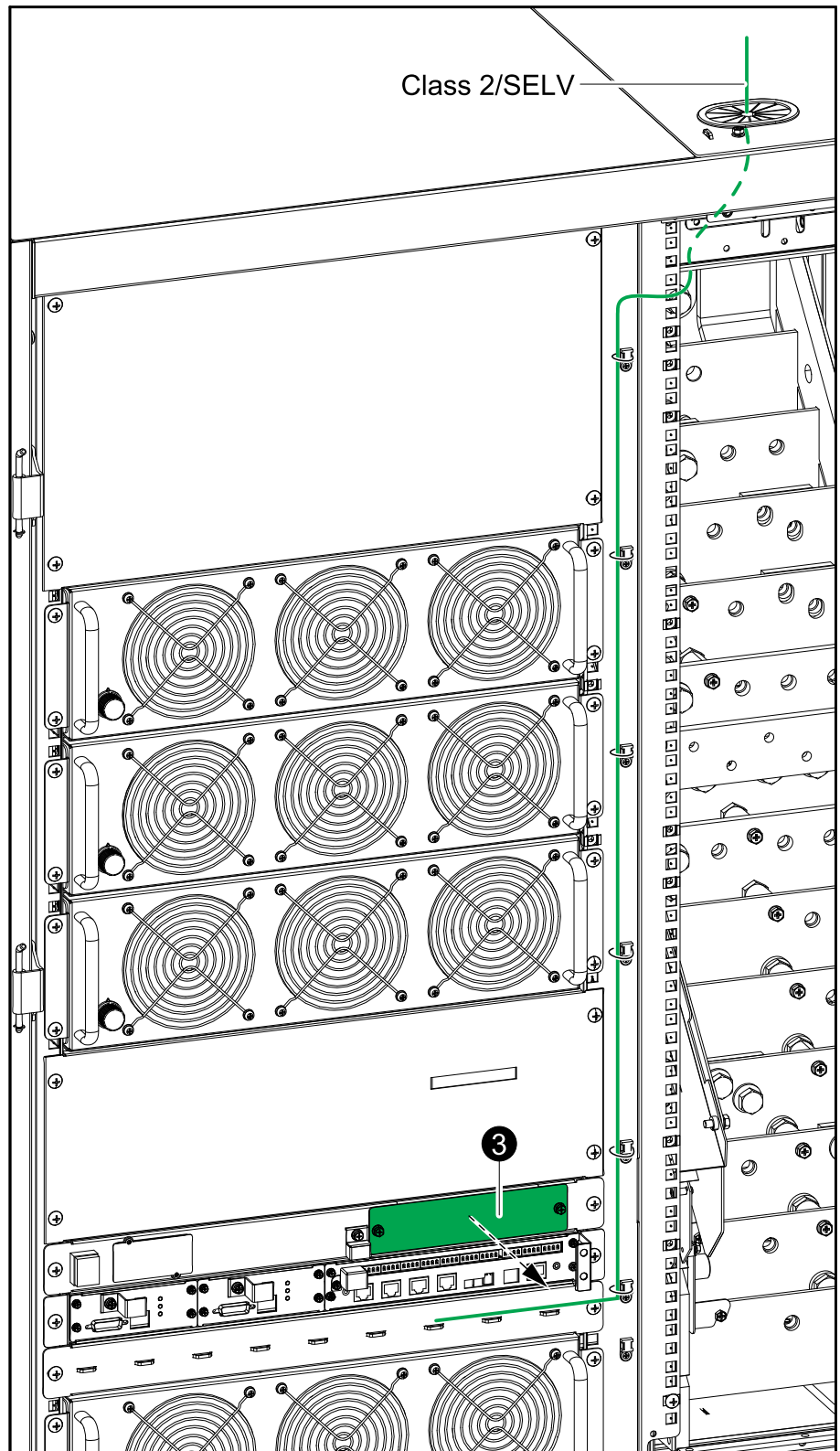
5. NTC: R25=30 kOhm, B25/50=3950 k

## Route the Signal Cables

1. Remove the signal cable cover from the UPS.

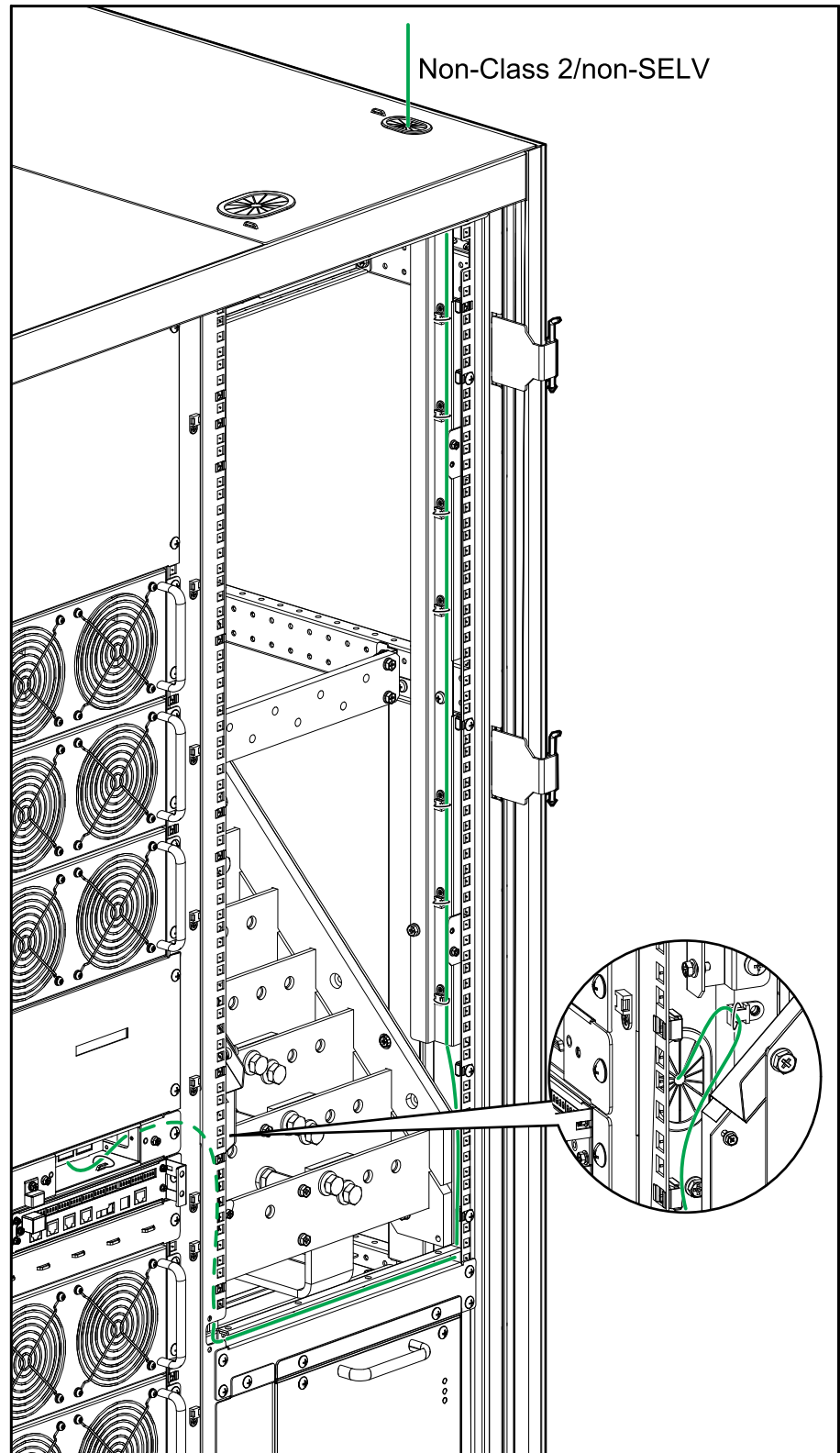


2. Route the Class 2/SELV signal cables through the top left entry opening and down along the front plate to the connection points.



3. Remove the protection cover in front of the non-Class 2/non-SELV terminals.

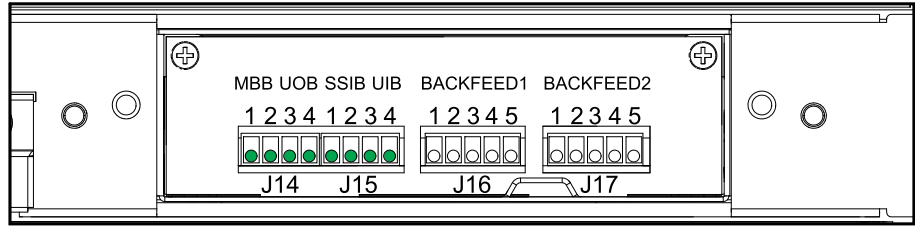
4. Route the non-Class 2/non-SELV signal cables through the top right opening and down to the non-Class 2/non-SELV terminals as shown.



5. Fasten the signal cables with cable ties as shown.

# Signal Connections

## AUX Switch Signal

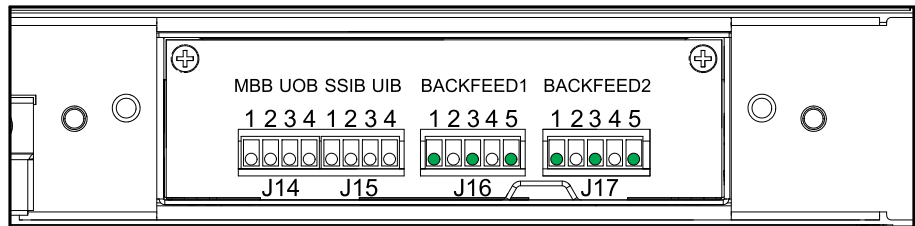


**NOTE:** These signal cables are non-Class 2/non-SELV.

**NOTE:** To use Class 2/SELV signal cables, you can connect the maintenance bypass breaker MBB to J2 instead.

Terminal	Function	
J14-1	Maintenance bypass breaker (MBB) AUX switch	12 VDC/12 mA non-Class 2/ non-SELV
J14-2	Signal ground (GND)	
J14-3	Unit output breaker (UOB) AUX switch	
J14-4	Signal ground (GND)	
J15-1	Static switch input breaker (SSIB) AUX switch	12 VDC/12 mA non-Class 2/ non-SELV
J15-2	Signal ground (GND)	
J15-3	Unit input breaker (UIB) AUX switch	
J15-4	Signal ground (GND)	

## Backfeed Signal



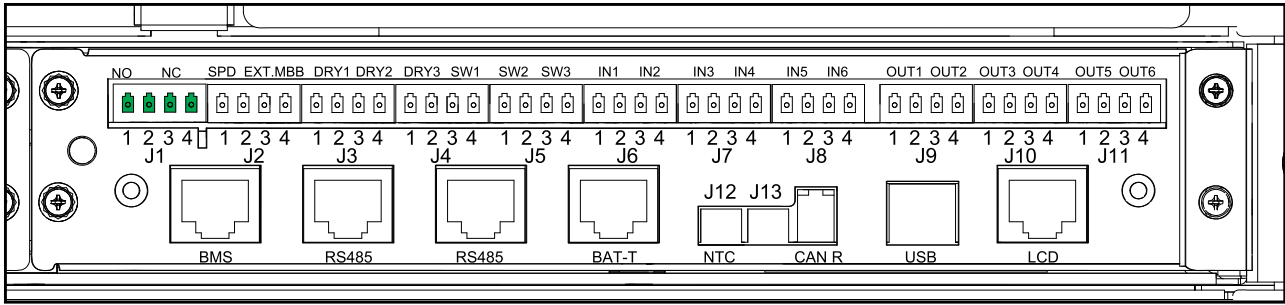
**NOTE:** These signal cable connections are non-Class 2/non-SELV.

Backfeed 1: Backfed on bypass.

Backfeed 2: Backfed on input.

Terminal	Function	
J16-1	Backfeed relay 1 common	30 VDC/1 A 230 VAC/1A non-Class 2/ non-SELV
J16-3	Backfeed relay 1 normally open (NO)	
J16-5	Backfeed relay 1 normally closed (NC)	
J17-1	Backfeed relay 2 common	30 VDC/1 A 230 VAC/1A non-Class 2/ non-SELV
J17-3	Backfeed relay 2 normally open (NO)	
J17-5	Backfeed relay 2 normally closed (NC)	

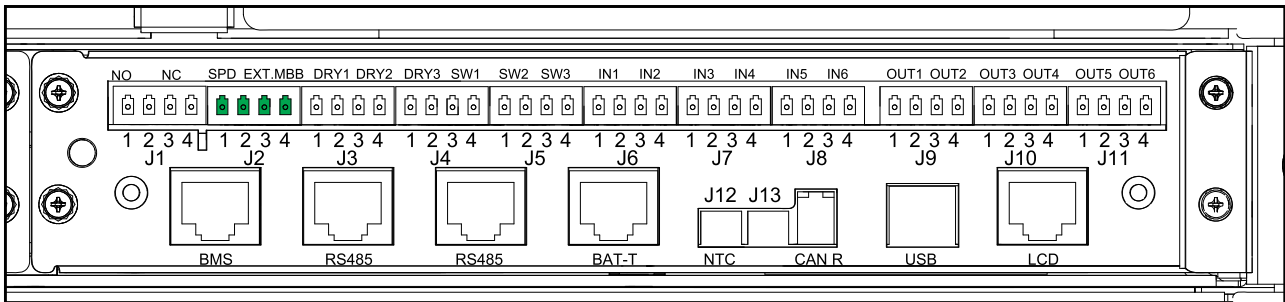
## EPO Signal



**NOTE:** These signal cables are Class 2/SELV.

Terminal	Function	
J1-1	EPO input contact normally open (NO)	<p><b>EPO Normally Open (NO)</b></p> <p>12 VDC/12 mA Class 2/SELV</p> <p><b>EPO Normally Closed (NC)</b></p> <p>12 VDC/12 mA Class 2/SELV</p>
J1-2	+12 V	
J1-3	EPO input contact normally closed (NC)	
J1-4	+12 V	

## Maintenance Bypass Breaker (MBB) Signal



**NOTE:** These signal cables are Class 2/SELV.

**NOTE:** To use non-Class 2/non-SELV signal cables, you can connect the maintenance bypass breaker MBB to J14 instead.

Terminal	Function	
J2-1	Internal use	<p>12 VDC/12 mA Class 2/SELV</p>
J2-2	Internal use	
J2-3	Maintenance bypass breaker (Ext. MBB) AUX switch	
J2-4	Signal ground (GND)	

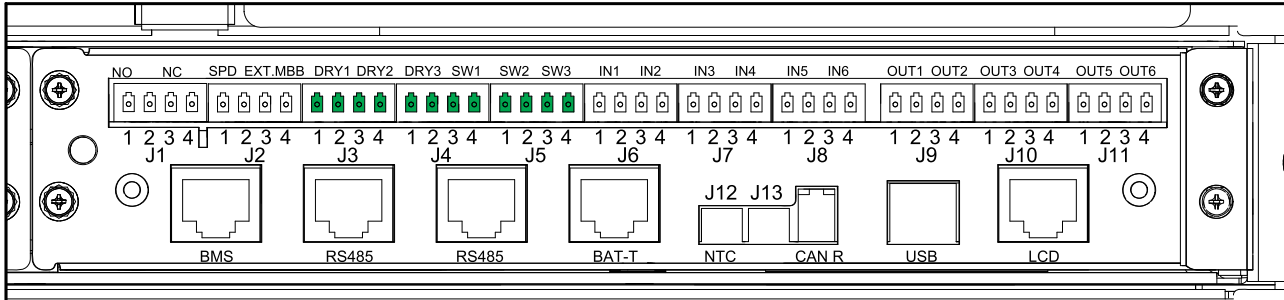
# Battery Signal

## NOTICE

**RISK OF EQUIPMENT DAMAGE**

The battery breaker contact drive J3, J4-1, and J4-2 can provide a maximum of +24 VDC 250 mA to the undervoltage release coil or shunt trip release coil. If this value is exceeded, it can damage the UPS.

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

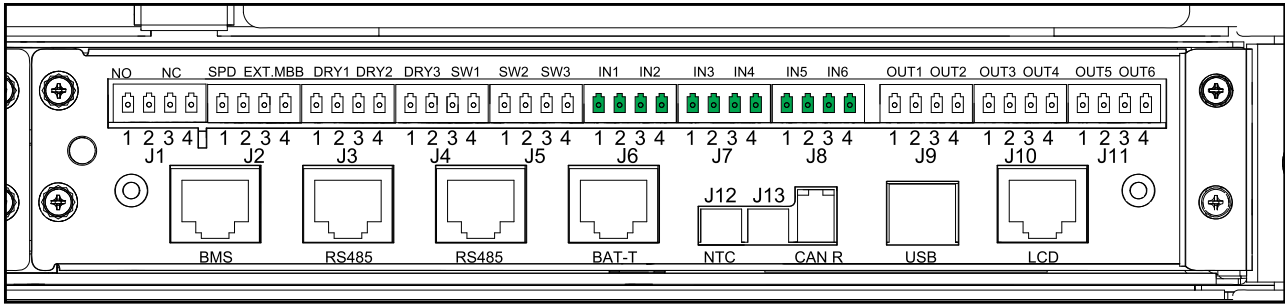


**NOTE:** These signal cables are Class 2/SELV.

Terminal	Function	
J3-1	Battery relay 1, normally closed (NC) <sup>6</sup>	
J3-2	Battery relay 1, signal ground (GND)	
J3-3	Battery relay 2, normally closed (NC) <sup>6</sup>	
J3-4	Battery relay 2, signal ground (GND)	
J4-1	Battery relay 3, normally closed (NC) <sup>6</sup>	
J4-2	Battery relay 3, signal ground (GND)	
J4-3	BB1 AUX switch	
J4-4	Signal ground (GND)	
J5-1	BB2 AUX switch	
J5-2	Signal ground (GND)	
J5-3	BB3 AUX switch	
J5-4	Signal ground (GND)	

6. Supports undervoltage release coil by default. For support for shunt trip release coil, please contact Schneider Electric.

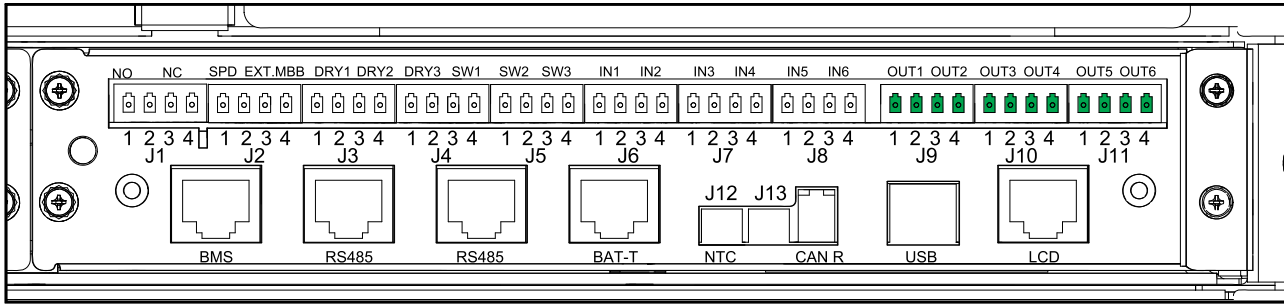
## Input Contact Signal



**NOTE:** These signal cables are Class 2/SELV.

Terminal	Function	
J6-1	Input contact 1, select function via display	12 VDC/12 mA Class 2/SELV 
J6-2	Input contact 1, signal ground (GND)	
J6-3	Input contact 2, select function via display	
J6-4	Input contact 2, signal ground (GND)	
J7-1	Input contact 3, select function via display	12 VDC/12 mA Class 2/SELV 
J7-2	Input contact 3, signal ground (GND)	
J7-3	Input contact 4, select function via display	
J7-4	Input contact 4, signal ground (GND)	
J8-1	Input contact 5, select function via display	12 VDC/12 mA Class 2/SELV 
J8-2	Input contact 5, signal ground (GND)	
J8-3	Input contact 6, select function via display	
J8-4	Input contact 6, signal ground (GND)	

## Output Relay Signal



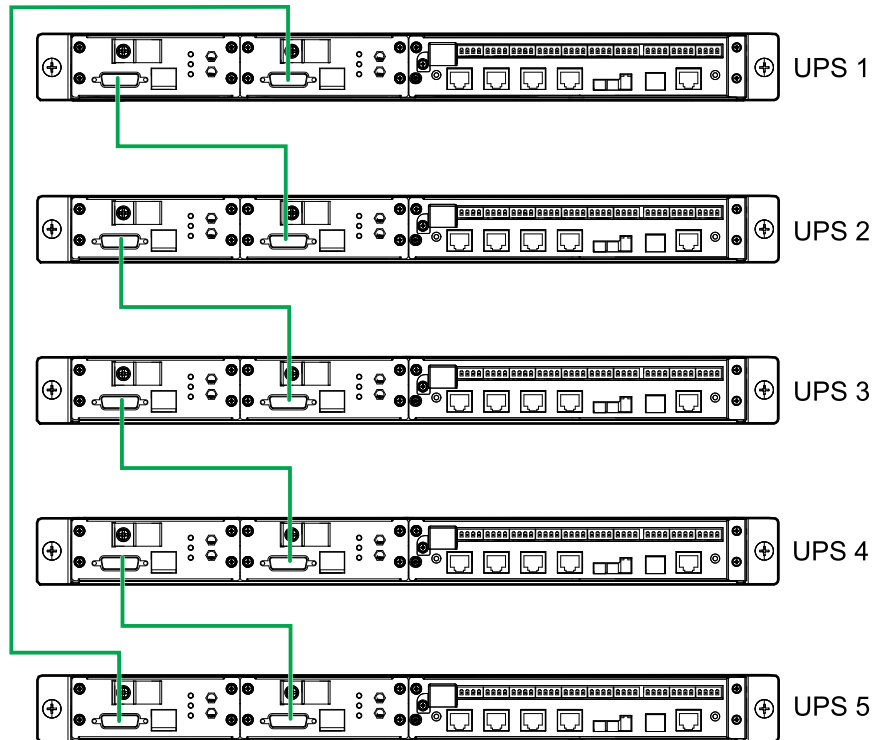
**NOTE:** These signal cables are Class 2/SELV.

Terminal	Function	
J9-1	Output relay 1, normally open (NO)	30 VDC/1 A Class 2/SELV
J9-2	Output relay 1, common	
J9-3	Output relay 2, normally open (NO)	
J9-4	Output relay 2, common	
J10-1	Output relay 3, normally open (NO)	30 VDC/1 A Class 2/SELV
J10-2	Output relay 3, common	
J10-3	Output relay 4, normally open (NO)	
J10-4	Output relay 4, common	
J11-1	Output relay 5, normally open (NO)	30 VDC/1 A Class 2/SELV
J11-2	Output relay 5, common	
J11-3	Output relay 6, normally open (NO)	
J11-4	Output relay 6, common	

## Connect the Parallel Cables in a Parallel System

1. Connect the optional parallel cables between all the UPSs of the parallel system.

**NOTE:** For location of parallel ports see *Communication Interfaces*, page 33.



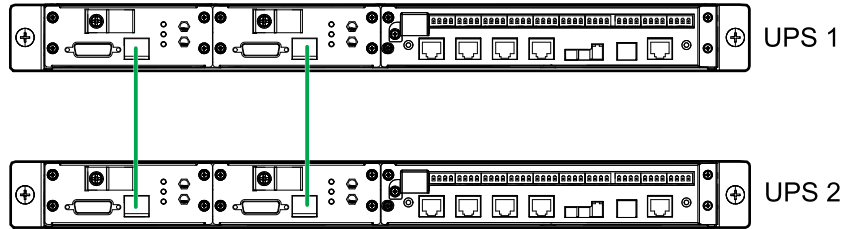
2. Verify the setting of the CAN\_R (for location of CAN\_R see *Communication Interfaces*, page 33).
  - For parallel systems with  $\leq 4$  parallel UPSs, CAN\_R of all UPSs must be in the ON position.
  - For parallel systems with  $\geq 5$  parallel UPSs, CAN\_R of all UPSs must be in the OFF position.

# Connect the Synchronization Cables between Two UPS Systems

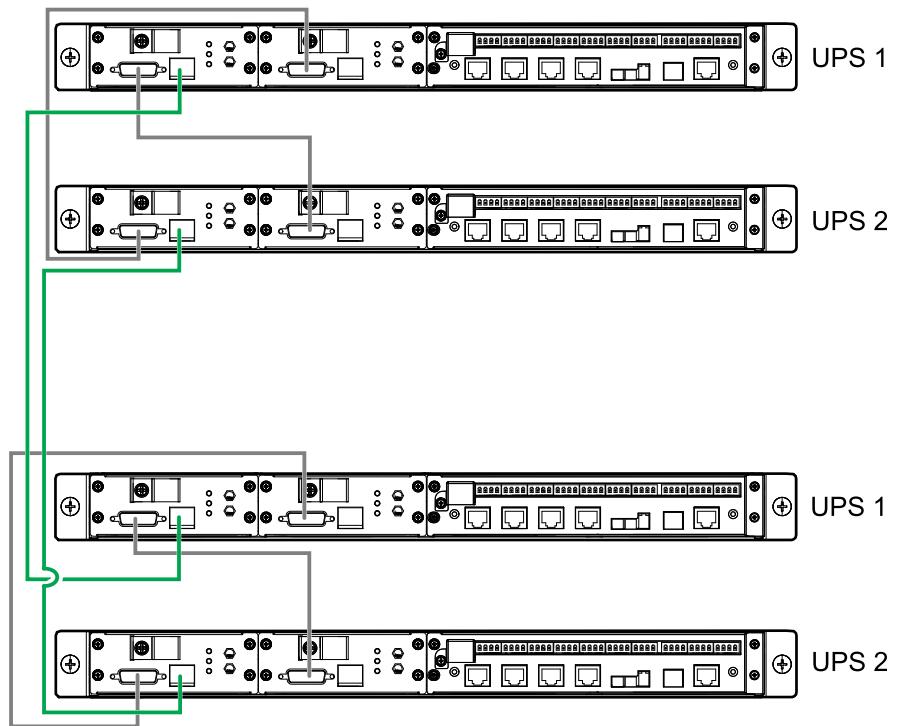
Supports synchronization for up to 4+4 parallel systems.

1. Connect the optional synchronization cables between the UPS systems.

## For Two Single UPS Systems



## For Two Parallel UPS Systems



## Backfeed Protection

### **DANGER**

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

In systems where backfeed protection is not part of the standard design, an automatic isolation device (backfeed protection option or other device meeting the requirements of IEC/EN 62040-1) must be installed to prevent hazardous voltage or energy at the input terminals of the isolation device. The device must open within 15 seconds after the upstream power supply fails and must be rated according to the specifications.

**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 remote 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.**

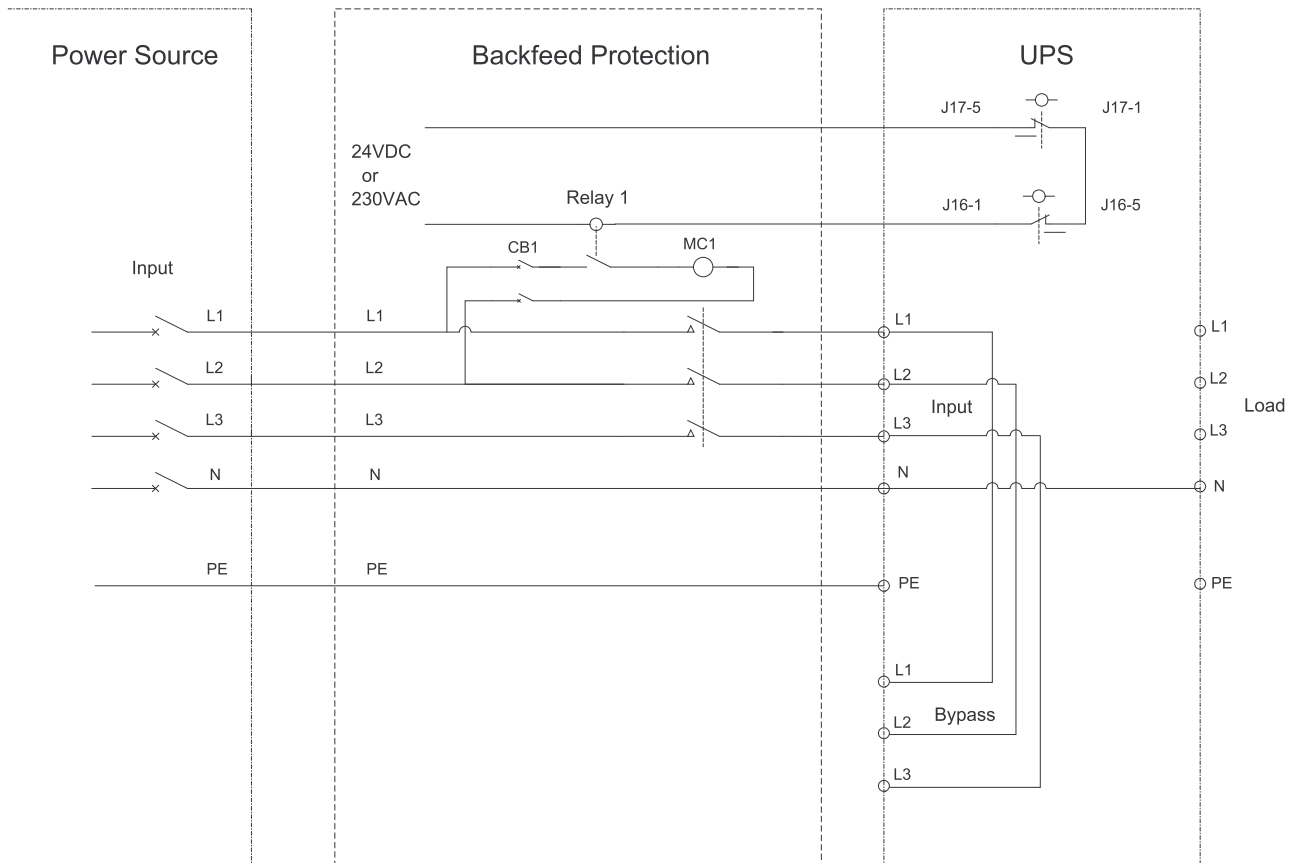
An additional external isolation device must be installed in the UPS system. A contactor can be used for this purpose. In the shown examples, the isolation device is a contactor (marked with a **MC1** for single mains systems and marked with a **MC1** and **MC2** for dual mains systems).

The isolation device must be able to withstand the electrical characteristics as described in the input specifications.

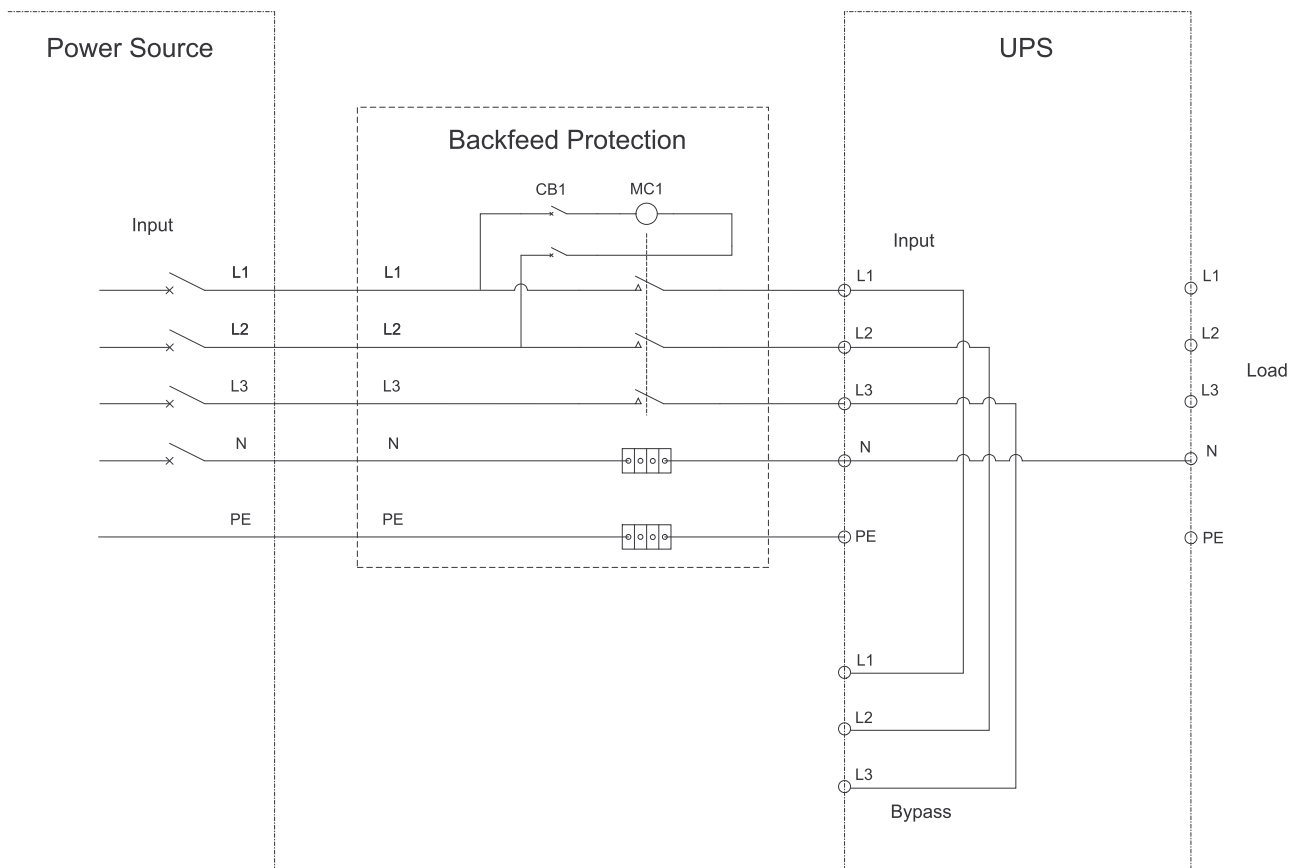
**NOTE:** The 24 VDC/230 VAC source should be generated from the switchgear input source in single mains configurations and from both the switchgear input and bypass source in dual mains configurations.

**NOTE:** The backfeed box in the diagrams is a customized device – please contact Schneider Electric for details.

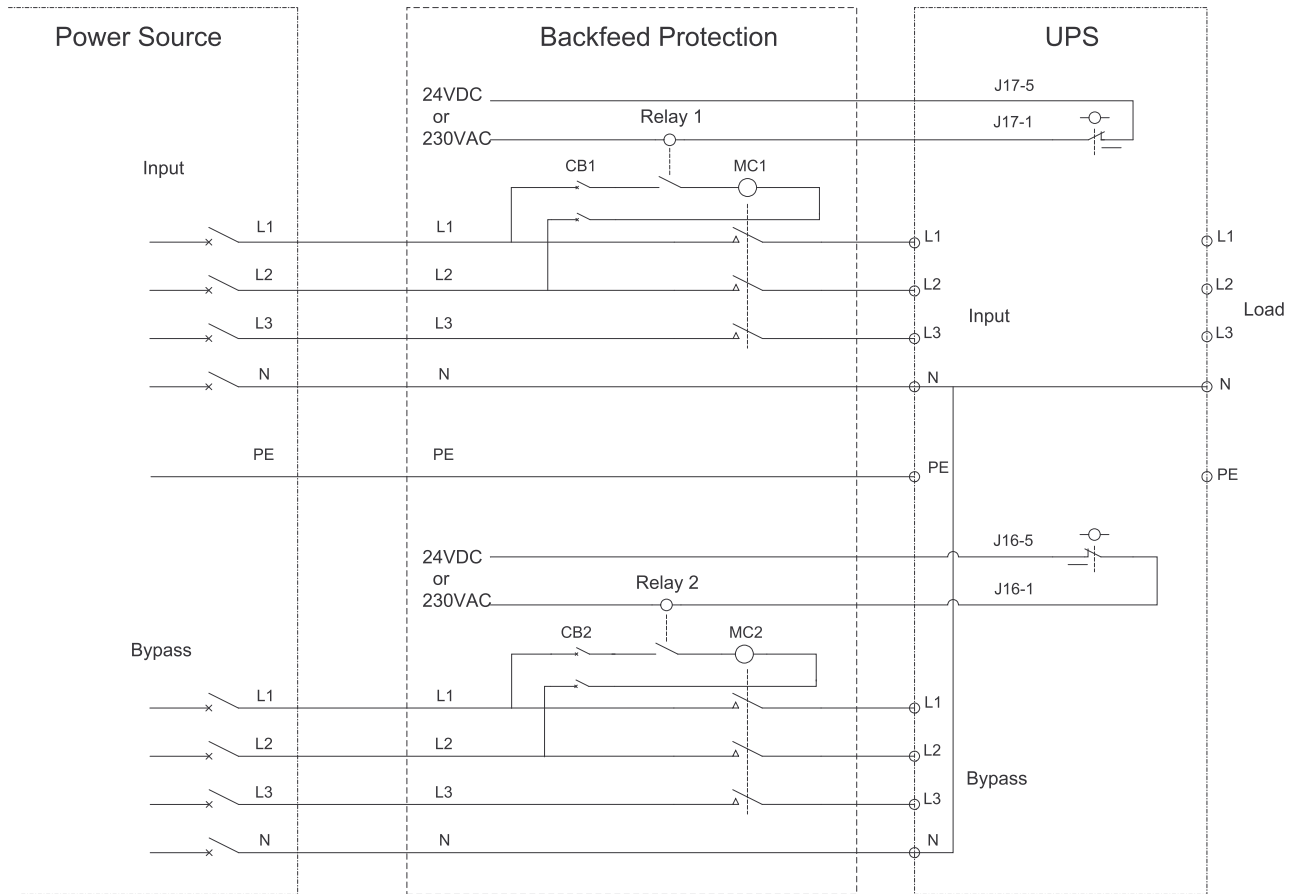
### Single Mains UPS and External Isolation Device



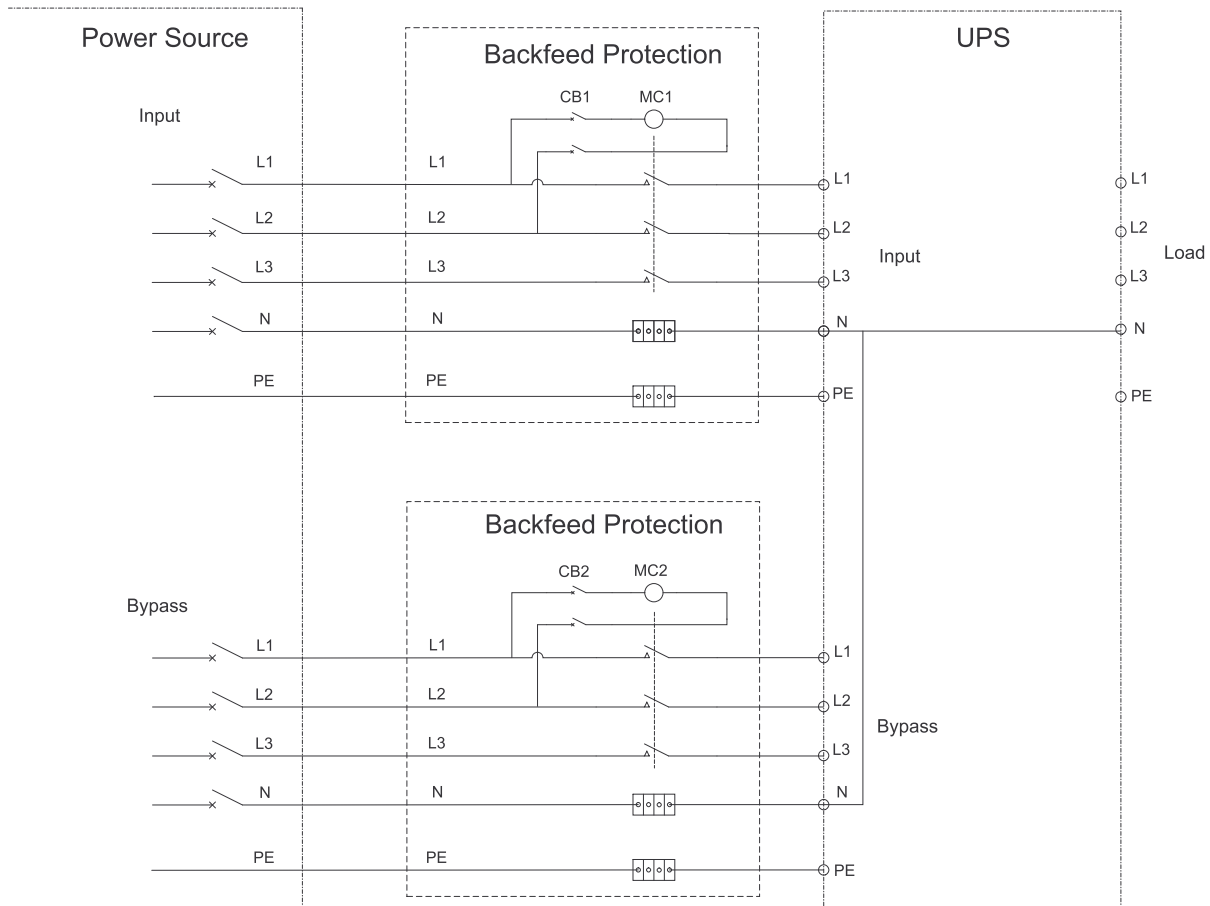
### Single Mains UPS with Backfeed Box



**Dual Mains UPS and External Isolation Device**

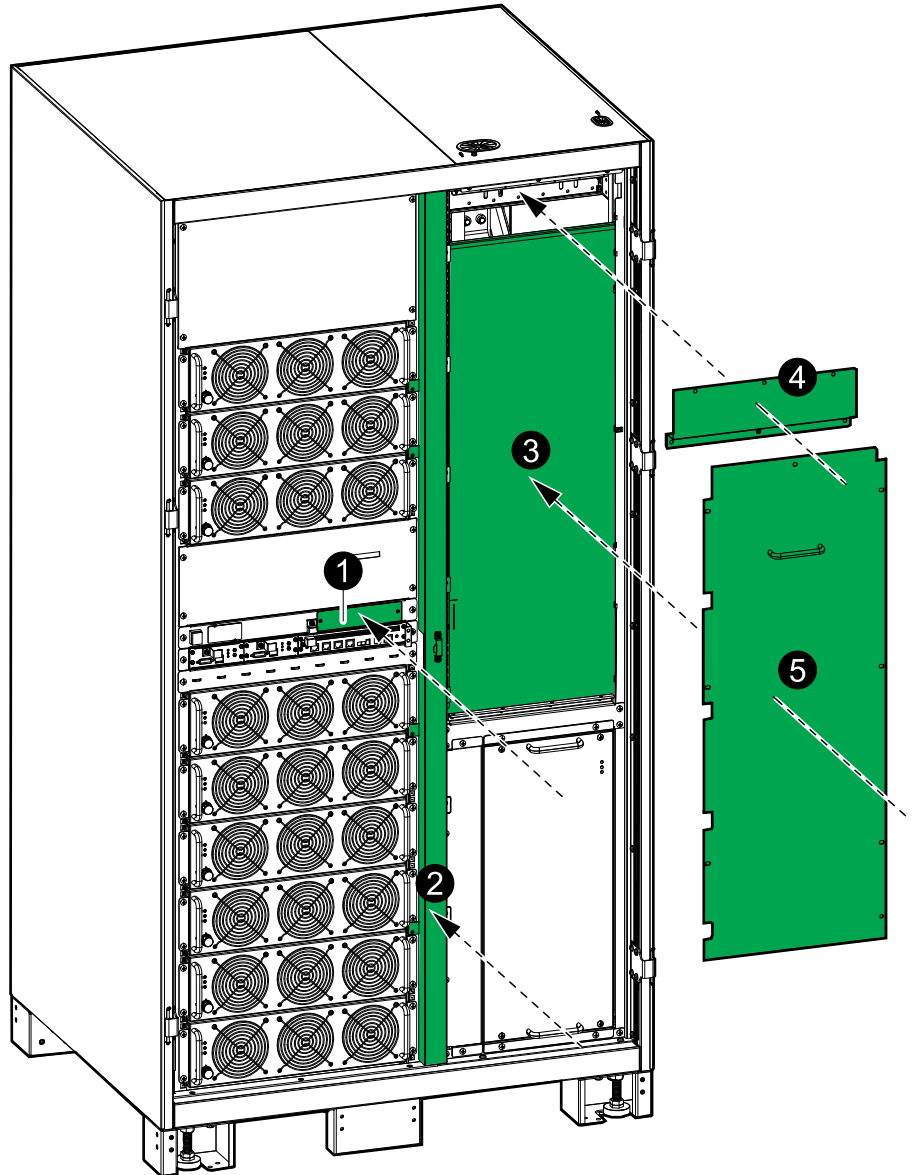


**Dual Mains UPS with Backfeed Box**



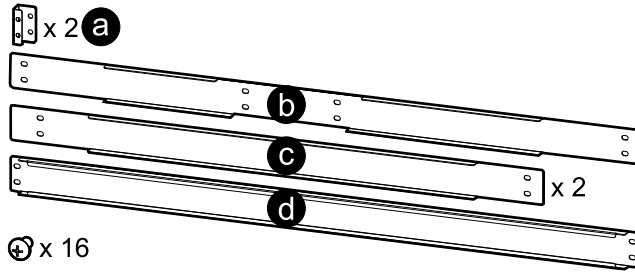
## Final Installation

1. Reinstall the protection cover in front of the non-Class 2/non-SELV terminals.
2. Reinstall the signal cable cover.
3. Reinstall the protection cover.
4. Reinstall the upper plate.
5. Reinstall the lower plate.

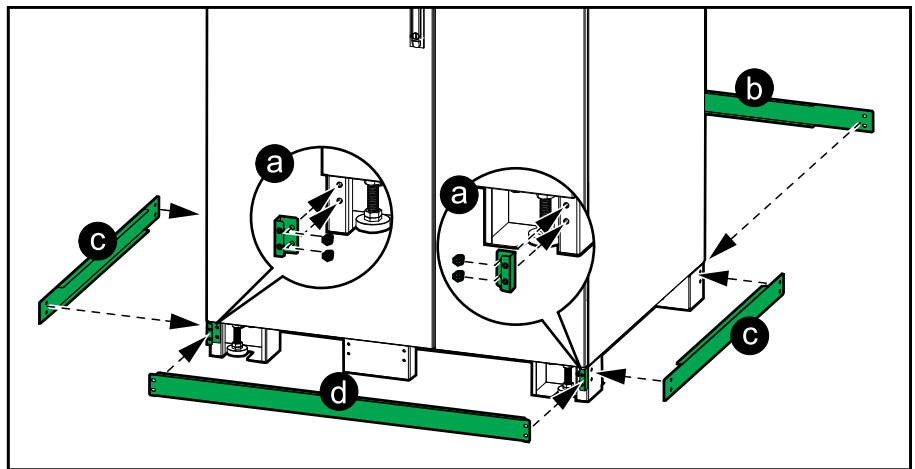


6. Install the kick plates:

**NOTE:** The kick plate parts are delivered in the UPS packaging.



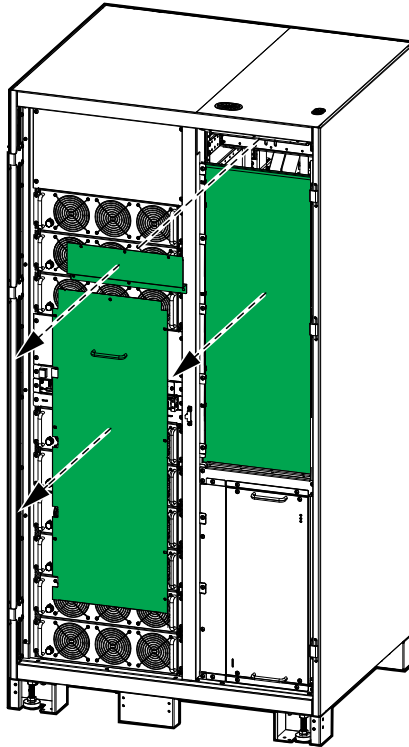
- a. Install the two brackets on the right and left front feet.
- b. Install the rear kick plate.
- c. Install the side kick plates.
- d. Install the front kick plate.



7. Close the doors.

# Decommission or Move the UPS to a New Location

1. Shut down the UPS completely – follow the instructions in the UPS operation manual.
2. Lockout/Tagout all 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 doors of the UPS.
5. Remove the three plates. Save all parts for reinstallation.



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

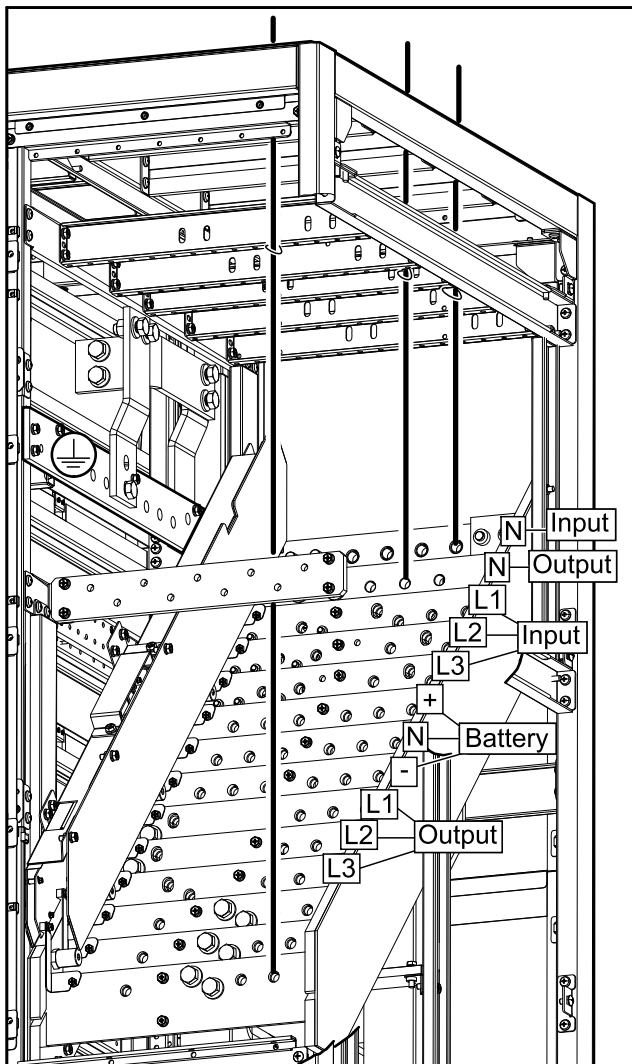
## **⚡ DANGER**

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

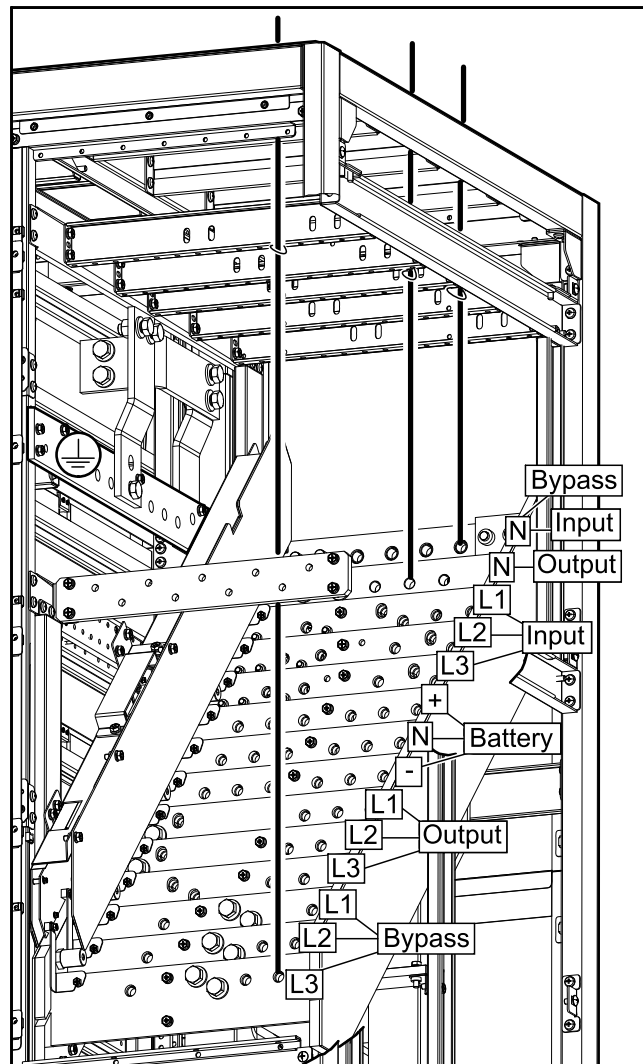
Measure for and verify ABSENCE of voltage on each input/bypass/output/neutral/battery busbar before continuing.

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

**Single Mains System**



**Dual Mains System**



7. Disconnect and remove all power cables from the UPS. See [Connect the Power Cables](#), page 29 for details.
8. Disconnect and remove all signal cables from the UPS. See [Route the Signal Cables](#), page 34, [Connect the Parallel Cables in a Parallel System](#), page 42, and [Connect the Synchronization Cables between Two UPS Systems](#), page 43 for details.
9. Reinstall all removed plates and covers. See [Final Installation](#), page 47 for details.
10. Close and lock the front doors.

11. Remove the kick plates and save for reinstallation. See Final Installation, page 47 for details.
12. The UPS can now be moved on a forklift or pallet truck.

### **⚠ WARNING**

#### **TIPPING HAZARD**

Move at a slow pace and pay close attention to the floor conditions and the balance of the UPS.

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

13. For transport over longer distances:

### **⚠ WARNING**

#### **HEAVY LOAD**

The UPS is tall and 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.**

### **⚠ WARNING**

#### **TIPPING HAZARD**

For transport over short or longer distances, ensure:

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

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

Transportation requirements:

- Mount the UPS in a vertical position in the center of a suitable pallet with minimum pallet dimensions: 1325 mm x 1185 mm. The pallet must be suitable for the weight of the UPS (665 kg for 500 kVA UPS, 745 kg for 600 kVA UPS).
- Use appropriate means of fixation to mount the UPS to the pallet.
- The original shipping pallet in combination with the original transportation brackets can be reused, if in undamaged condition.

### **⚠ DANGER**

#### **TIPPING HAZARD**

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

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

**⚠ WARNING****UNEXPECTED EQUIPMENT BEHAVIOR**

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

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

14. Perform one of the following:
  - Decommission the UPS, OR
  - Move the UPS to a new location to install it.
15. **Only for installing the UPS in a new location:** Follow the installation manual to install the UPS in the new location. See *Installation Procedure*, page 28 for installation overview. Start-up must only be performed by Schneider Electric.

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

Start-up must only be performed by Schneider Electric.

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







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

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