

Galaxy VS

UPS with Up to 5 Internal Battery Strings

Installation

20-50 kW with N+1 Power Module 400/480 V

60-100 kW 400/480 V

10-25 kW with N+1 Power Module 208 V

30-50 kW 208 V

10/2019



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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.

FCC Statement

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

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

Electromagnetic Compatibility

NOTICE

RISK OF ELECTROMAGNETIC DISTURBANCE

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

Failure to follow these instructions can result in equipment damage.

Safety Precautions

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

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

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

⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

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

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

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

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

 WARNING**HAZARD OF ARC FLASH**

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

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

NOTICE**RISK OF OVERHEATING**

Respect the space requirements around the UPS system and do not cover the UPS 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 utility/mains supply. Before installing or servicing the UPS system, ensure that the units are OFF and that utility/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. This 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.

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.

NOTICE**RISK OF EQUIPMENT DAMAGE**

- Wait until the system is ready to be powered up before installing batteries in the system. The time duration from battery installation 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, Schneider Electric recommends 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 equipment damage.

Specifications

Specifications for 400 V Systems

Input Specifications 400 V

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module
Voltage (V)	380/400/415	380/400/415	380/400/415	380/400/415
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) ¹ 3-wire (L1, L2, L3, PE) WYE (dual mains) ^{1 2}			
Input voltage range (V)	380 V: 331-437 400 V: 340-460 415 V: 353-477			
Frequency range (Hz)	40-70			
Nominal input current (A)	32/30/29	47/45/43	63/60/58	79/75/72
Maximum input current (A)	38/36/35	57/54/52	76/72/69	91/90/87
Input current limitation (A)	39/37/36	59/56/54	78/74/72	91/91/90
Input power factor	0.99 at 100% load			
Total harmonic distortion (THDI)	<6% at full linear load (symmetrical)			
Maximum short circuit rating	65 kA RMS			
Protection	Built-in backfeed protection and fuses			
Ramp-in	Programmable and adaptive 1-40 seconds			

UPS rating	60 kW	80 kW	100 kW
Voltage (V)	380/400/415	380/400/415	400/415
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) ¹ 3-wire (L1, L2, L3, PE) WYE (dual mains) ^{1 2}		
Input voltage range (V)	380 V: 331-437 400 V: 340-460 415 V: 353-477		
Frequency range (Hz)	40-70		
Nominal input current (A)	95/90/87	126/120/116	150/144
Maximum input current (A)	114/108/104	151/144/139	180/173
Input current limitation (A)	117/111/107	156/148/143	182/179
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%		
Total harmonic distortion (THDI)	<3% at full linear load (symmetrical)		
Maximum short circuit rating	65 kA RMS		

1. TN and TT power distribution systems are supported. Corner (line) grounding is not supported.
 2. **Only for dual mains system with upstream 4-pole breakers:** Install an N connection with the input cables (L1, L2, L3, N, PE). Refer to earthing schematics for TN-S dual mains 4-pole circuit breaker.

UPS rating	60 kW	80 kW	100 kW
Voltage (V)	380/400/415	380/400/415	400/415
Protection	Built-in backfeed protection and fuses		
Ramp-in	Programmable and adaptive 1-40 seconds		

Bypass Specifications 400 V

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module
Voltage (V)	380/400/415	380/400/415	380/400/415	380/400/415
Connections	4-wire (L1, L2, L3, N, PE) WYE			
Bypass voltage range (V)	380 V: 342-418 400 V: 360-440 415 V: 374-457			
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)			
Nominal bypass current (A)	31/29/28	46/44/42	61/58/56	77/73/70
Nominal neutral current (A)	53/50/48	79/75/72	105/100/96	132/125/120
Maximum short circuit rating ³	65 kA RMS			
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s			

UPS rating	60 kW	80 kW	100 kW
Voltage (V)	380/400/415	380/400/415	400/415
Connections	4-wire (L1, L2, L3, N, PE) WYE		
Bypass voltage range (V)	380 V: 342-418 400 V: 360-440 415 V: 374-457		
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)		
Nominal bypass current (A)	92/87/84	123/117/112	146/141
Nominal neutral current (A)	158/150/144	210/200/193	250/241
Maximum short circuit rating ³	65 kA RMS		
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s		

3. Conditioned by the internal fuse rated 400 A, prearcing 33 kA²s.

Output Specifications 400 V

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module
Voltage (V)	380/400/415	380/400/415	380/400/415	380/400/415
Connections	4-wire (L1, L2, L3, N, PE)			
Output voltage regulation	Symmetrical load $\pm 1\%$ Asymmetrical load $\pm 3\%$			
Overload capacity	150% for 1 minute (in normal operation) 125% for 10 minutes (in normal operation) 125% for 1 minute (in battery operation) 110% continuous (bypass operation) 1000% for 100 milliseconds (bypass operation)			
Dynamic load response	$\pm 5\%$ after 2 milliseconds $\pm 1\%$ after 50 milliseconds			
Output power factor	1			
Nominal output current (A)	30/29/28	46/43/42	61/58/56	76/72/70
Frequency regulation (Hz)	50/60 Hz bypass synchronized – 50/60 Hz $\pm 0.1\%$ free-running			
Synchronized slew rate (Hz/sec)	Programmable to 0.25, 0.5, 1, 2, 4, 6			
Output performance classification (according to IEC/EN62040-3)	VFI-SS-111			
Total harmonic distortion (THDU)	<1% for linear load <3% for non-linear load			
Load crest factor	2.5			
Load power factor	From 0.7 leading to 0.7 lagging without any derating			

UPS rating	60 kW	80 kW	100 kW
Voltage (V)	380/400/415	380/400/415	400/415
Connections	4-wire (L1, L2, L3, N, PE)		
Output voltage regulation	Symmetrical load $\pm 1\%$ Asymmetrical load $\pm 3\%$		
Overload capacity	150% for 1 minute (in normal operation) 125% for 10 minutes (in normal operation) 125% for 1 minute (in battery operation) 110% continuous (bypass operation) 1000% for 100 milliseconds (bypass operation)		
Dynamic load response	$\pm 5\%$ after 2 milliseconds $\pm 1\%$ after 50 milliseconds		
Output power factor	1		
Nominal output current (A)	91/87/83	122/115/111	144/139
Frequency regulation (Hz)	50/60 Hz bypass synchronized – 50/60 Hz $\pm 0.1\%$ free-running		
Synchronized slew rate (Hz/sec)	Programmable to 0.25, 0.5, 1, 2, 4, 6		
Output performance classification (according to IEC/EN62040-3)	VFI-SS-111		
Total harmonic distortion (THDU)	<1% for linear load <3% for non-linear load		

UPS rating	60 kW	80 kW	100 kW
Voltage (V)	380/400/415	380/400/415	400/415
Load crest factor	2.5		
Load power factor	From 0.7 leading to 0.7 lagging without any derating		

Battery Specifications 400 V

DANGER


HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Protection of the energy storage device: An overcurrent protective device must be located in close proximity to the energy storage device.

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

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module	60 kW	80 kW	100 kW
Charging power in % of output power at 0-40% load	80%						
Charging power in % of output power at 100% load	20%						
Maximum charging power (at 0-40% load) (kW)	16	24	32	40	48	64	80
Maximum charging power (at 100% load) (kW)	4	6	8	10	12	16	20
Nominal battery voltage (VDC)	480						
Nominal float voltage (VDC)	545						
Maximum boost voltage (VDC)	572						
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C						
End of discharge voltage (full load) (VDC)	384						
Battery current at full load and nominal battery voltage (A)	43	65	87	109	130	174	217
Battery current at full load and minimum battery voltage (A)	54	81	109	136	163	217	271
Ripple current	< 5% C20 (5 minute runtime)						
Battery test	Manual/automatic (selectable)						
Maximum short circuit rating	10 kA						

Recommended Cable Sizes 400 V

 **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 150 mm².

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

The maximum number of cable connections per busbar: Two on input/output/bypass busbars; Four on DC busbars; Six on N/PE busbars.

NOTE: Overcurrent protection is to be provided by others.

Cable sizes in this manual are based on table B.52.3 and table B.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 cable size is based on table 54.2 of IEC 60364-4-54.

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

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

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module	60 kW	80 kW	100 kW
Input phases (mm ²)	6	10	16	25	35	50	70
Input PE (mm ²)	6	10	16	16	16	25	35
Bypass/output phases (mm ²)	6	6	10	16	25	35	50
Bypass PE/output PE (mm ²)	6	6	10	16	16	16	25
Neutral (mm ²) ⁴	10	16	25	35	50	70	95
DC+/DC- (mm ²)	10	16	25	35	50	70	95
DC PE (mm ²)	10	16	16	16	25	35	50

4. Neutral conductor is sized to handle 1.73 times phase current in case of high harmonic content from non-linear loads. If non or less harmonic currents are expected, neutral conductor can be sized accordingly but not less than the phase conductor.

Recommended Upstream Protection 400 V

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	20 kW with N+1 power module		30 kW with N+1 power module		40 kW with N+1 power module		50 kW with N+1 power module	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	NSX100H TM40D (LV429674)	NSX100H TM32D (LV429675)	NSX100H TM63D (LV429672)	NSX100H TM50D (LV429673)	NSX100H TM80D (LV429671)	NSX100H TM63D (LV429672)	NSX100H TM100D (LV429670)	NSX100H TM80D (LV429671)
In setting	40	32	63	50	80	63	100	80
I _r setting	40	32	63	50	80	63	100	80
I _m setting	500 (fixed)	400 (fixed)	500 (fixed)	500 (fixed)	640 (fixed)	500 (fixed)	800 (fixed)	640 (fixed)

UPS rating	60 kW		80 kW		100 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	NSX160H TM125D (LV430671)	NSX100H TM100D (LV429670)	NSX160H TM160D (LV430670)	NSX160H TM125D (LV430671)	NSX250H TM200D (LV431671)	NSX160H TM160D (LV430670)
In setting	125	100	160	125	200	160
I _r setting	125	100	160	125	200	160
I _m setting	1250 (fixed)	800 (fixed)	1250 (fixed)	1250 (fixed)	5 - 10 x I _n	1250 (fixed)

Specifications for 480 V Systems

In single mains systems, supply the UPS from a grounded 4-wire WYE service.

Schneider Electric also supports 3-wire single mains installations if the mains transformer is a grounded WYE transformer located in the same building. In this installation, the UPS system must be installed as a separately derived system. Leakage currents will occur in the bonding jumper and the technical/system earth.

In dual mains systems, use a 4-wire supply for the bypass and a 3-wire supply for the input. Both must be WYE sources. Delta input supply for either input or bypass is not permitted.

Input Specifications 480 V

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) 3-wire (L1, L2, L3, PE) WYE (single mains or dual mains) ⁵			
Input voltage range (V)	408-552			
Frequency range (Hz)	40-70			
Nominal input current (A)	25	37	50	62
Maximum input current (A)	30	45	60	74
Input current limitation (A)	31	47	62	77
Input power factor	0.99 at 100% load			
Total harmonic distortion (THDI)	<6% at full linear load (symmetrical)			
Maximum short circuit rating	65 kA RMS			
Protection	Built-in backfeed protection and fuses			
Ramp-in	Programmable and adaptive 1-40 seconds			

UPS rating	60 kW	80 kW	100 kW
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) 3-wire (L1, L2, L3, PE) WYE (single mains or dual mains) ⁵		
Input voltage range (V)	408-552		
Frequency range (Hz)	40-70		
Nominal input current (A)	74	99	124
Maximum input current (A)	89	119	149
Input current limitation (A)	93	124	154
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%		
Total harmonic distortion (THDI)	<3% at full linear load (symmetrical)		
Maximum short circuit rating	65 kA RMS		

5. TN and TT power distribution systems are supported. Corner (line) grounding is not supported.

UPS rating	60 kW	80 kW	100 kW
Protection	Built-in backfeed protection and fuses		
Ramp-in	Programmable and adaptive 1-40 seconds		

Bypass Specifications 480 V

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module
Connections	4-wire (L1, L2, L3, N, PE) WYE 3-wire (L1, L2, L3, PE) WYE ⁶			
Bypass voltage range (V)	432-528			
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)			
Nominal bypass current (A)	24	36	49	61
Nominal neutral current (A)	42	62	83	104
Maximum short circuit rating ⁷	65 kA RMS			
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s			

UPS rating	60 kW	80 kW	100 kW
Connections	4-wire (L1, L2, L3, N, PE) WYE 3-wire (L1, L2, L3, PE) WYE ⁶		
Bypass voltage range (V)	432-528		
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)		
Nominal bypass current (A)	73	97	121
Nominal neutral current (A)	125	166	208
Maximum short circuit rating ⁷	65 kA RMS		
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s		

6. TN and TT power distribution systems are supported. Corner (line) grounding is not supported.
7. Conditioned by the internal fuse rated 400 A, prearcing 33 kA²s.

Output Specifications 480 V

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module
Connections	4-wire (L1, L2, L3, N, PE) 3-wire (L1, L2, L3, PE)			
Output voltage regulation	Symmetrical load $\pm 1\%$ Asymmetrical load $\pm 3\%$			
Overload capacity	150% for 1 minute (in normal operation) 125% for 10 minutes (in normal operation) 125% for 1 minute (in battery operation) 125% continuous (bypass operation) 1000% for 100 milliseconds (bypass operation)			
Dynamic load response	$\pm 5\%$ after 2 milliseconds $\pm 1\%$ after 50 milliseconds			
Output power factor	1			
Nominal output current (A)	24	36	48	60
Frequency regulation (Hz)	50/60 Hz bypass synchronized – 50/60 Hz $\pm 0.1\%$ free-running			
Synchronized slew rate (Hz/sec)	Programmable to 0.25, 0.5, 1, 2, 4, 6			
Total harmonic distortion (THDU)	<1% for linear load <3% for non-linear load			
Load crest factor	2.5			
Load power factor	From 0.7 leading to 0.7 lagging without any derating			

UPS rating	60 kW	80 kW	100 kW
Connections	4-wire (L1, L2, L3, N, PE) 3-wire (L1, L2, L3, PE)		
Output voltage regulation	Symmetrical load $\pm 1\%$ Asymmetrical load $\pm 3\%$		
Overload capacity	150% for 1 minute (in normal operation) 125% for 10 minutes (in normal operation) 125% for 1 minute (in battery operation) 125% continuous (bypass operation) 1000% for 100 milliseconds (bypass operation)		
Dynamic load response	$\pm 5\%$ after 2 milliseconds $\pm 1\%$ after 50 milliseconds		
Output power factor	1		
Nominal output current (A)	72	96	120
Frequency regulation (Hz)	50/60 Hz bypass synchronized – 50/60 Hz $\pm 0.1\%$ free-running		
Synchronized slew rate (Hz/sec)	Programmable to 0.25, 0.5, 1, 2, 4, 6		
Total harmonic distortion (THDU)	<1% for linear load <3% for non-linear load		
Load crest factor	2.5		
Load power factor	From 0.7 leading to 0.7 lagging without any derating		

Battery Specifications 480 V

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Protection of the energy storage device: An overcurrent protective device must be located in close proximity to the energy storage device.

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

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module	60 kW	80 kW	100 kW
Charging power in % of output power at 0-40% load	80%						
Charging power in % of output power at 100% load	20%						
Maximum charging power (at 0-40% load) (kW)	16	24	32	40	48	64	80
Maximum charging power (at 100% load) (kW)	4	6	8	10	12	16	20
Nominal battery voltage (VDC)	480						
Nominal float voltage (VDC)	545						
Maximum boost voltage (VDC)	572						
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C						
End of discharge voltage (full load) (VDC)	384						
Battery current at full load and nominal battery voltage (A)	43	65	87	109	130	174	217
Battery current at full load and minimum battery voltage (A)	54	81	109	136	163	217	271
Ripple current	< 5% C20 (5 minute runtime)						
Battery test	Manual/automatic (selectable)						
Maximum short circuit rating	10 kA						

Recommended Cable Sizes 480 V

⚡ ⚠ 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 300 kcmil.

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

The maximum number of cable connections per busbar: Two on input/output/bypass busbars; Four on DC busbars; Six on N/PE busbars.

NOTE: Overcurrent protection is to be provided by others.

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

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

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

Equipment grounding conductors (PE in this manual) are sized in accordance with NEC Article 250.122 and Table 250.122.

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

UPS rating	20 kW with N+1 power module	30 kW with N+1 power module	40 kW with N+1 power module	50 kW with N+1 power module	60 kW	80 kW	100 kW
Input phases (AWG/kcmil)	8	6	4	3	1	2/0	3/0
Input PE (AWG/kcmil)	10	8	8	6	6	6	4
Bypass/output phases (AWG/kcmil)	10	8	6	4	3	1	2/0
Bypass PE/output PE (AWG/kcmil)	10	10	8	8	8	6	6
Neutral (AWG/kcmil)	6	4	2	1/0	2/0	4/0	2 x 1/0
DC+/DC- (AWG/kcmil)	6	4	2	1/0	2/0	4/0	2 x 1/0
DC PE (AWG/kcmil)	8	6	6	6	6	4	4

NOTE: Cable sizes are based on 80% rated circuit breakers for UIB, UOB, MBB, SSIB, and 100% rated circuit breaker for battery breaker(s).

8. Neutral conductor is sized to handle 1.73 times phase current in case of high harmonic content from non-linear loads. If non or less harmonic currents are expected, neutral conductor can be sized accordingly but not less than the phase conductor.

Recommended Upstream Protection 480 V

⚠ CAUTION
<p>HAZARD OF FIRE</p> <ul style="list-style-type: none"> Connect only to a circuit with the below specifications. Connect to a circuit provided with a 250 A branch circuit overcurrent protection maximum in accordance with the National Electrical Code, ANSI/NFPA70, and the Canadian Electrical Code, Part I, C22.1. <p>Failure to follow these instructions can result in injury or equipment damage.</p>

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

UPS rating	20 kW with N+1 power module		30 kW with N+1 power module		40 kW with N+1 power module		50 kW with N+1 power module	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36100U31X							
I _r setting	40	35	60	50	80	70	100	80
Tr at 6 I _r setting	0.5							
li (x I _n) setting	1.5							

UPS rating	60 kW		80 kW		100 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36150U31X	HJF36100U31X	JJF36250U31X	HJF36150U31X	JJF36250U31X	
I _r setting	125	100	175	125	200	175
Tr at 6 I _r setting	0.5					
li (x I _n) setting	1.5					

Specifications for 208 V Systems

Input Specifications 208 V

UPS rating	10 kW with N+1 power module	15 kW with N+1 power module	20 kW with N+1 power module	25 kW with N+1 power module
Voltage (V)	200/208/220	200/208/220	200/208/220	200/208/220
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) 3-wire (L1, L2, L3, PE) WYE (dual mains)			
Input voltage range (V)	200 V: 170-230 208 V: 177-239 220 V: 187-253			
Frequency range (Hz)	40-70			
Nominal input current (A)	31/30/28	47/45/42	62/60/56	78/75/71
Maximum input current (A)	37/36/34	56/54/51	74/72/68	91/90/85
Input current limitation (A)	39/37/35	58/55/52	77/74/70	91/91/87
Input power factor	0.99 at 100% load			
Total harmonic distortion (THDI)	<6% at full linear load (symmetrical)			
Maximum short circuit rating	65 kA RMS			
Protection	Built-in backfeed protection and fuses			
Ramp-in	Programmable and adaptive 1-40 seconds			

UPS rating	30 kW	40 kW	50 kW
Voltage (V)	200/208/220	200/208/220	200/208/220
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) 3-wire (L1, L2, L3, PE) WYE (dual mains)		
Input voltage range (V)	200 V: 170-230 208 V: 177-239 220 V: 187-253		
Frequency range (Hz)	40-70		
Nominal input current (A)	93/90/85	124/119/113	155/149/141
Maximum input current (A)	112/107/102	149/143/135	182/179/169
Input current limitation (A)	115/110/104	153/147/139	182/182/174
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%		
Total harmonic distortion (THDI)	<3% at full linear load (symmetrical)		
Maximum short circuit rating	65 kA RMS		
Protection	Built-in backfeed protection and fuses		
Ramp-in	Programmable and adaptive 1-40 seconds		

Bypass Specifications 208 V

UPS rating	10 kW with N+1 power module	15 kW with N+1 power module	20 kW with N+1 power module	25 kW with N+1 power module
Voltage (V)	200/208/220	200/208/220	200/208/220	200/208/220
Connections	4-wire (L1, L2, L3, N, PE) WYE			
Bypass voltage range (V)	200 V: 180-220 208 V: 187-229 220 V: 198-242			
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)			
Nominal bypass current (A)	29/28/27	44/42/40	58/56/53	73/70/66
Nominal neutral current (A)	50/48/45	75/72/68	100/96/91	125/120/114
Maximum short circuit rating ⁹	65 kA RMS			
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s			

UPS rating	30 kW	40 kW	50 kW
Voltage (V)	200/208/220	200/208/220	200/208/220
Connections	4-wire (L1, L2, L3, N, PE) WYE		
Bypass voltage range (V)	200 V: 180-220 208 V: 187-229 220 V: 198-242		
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)		
Nominal bypass current (A)	87/84/80	117/112/106	146/140/133
Nominal neutral current (A)	150/144/136	200/192/182	250/240/227
Maximum short circuit rating ⁹	65 kA RMS		
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s		

9. Conditioned by the internal fuse rated 400 A, prearcing 33 kA²s.

Output Specifications 208 V

UPS rating	10 kW with N+1 power module	15 kW with N+1 power module	20 kW with N+1 power module	25 kW with N+1 power module
Voltage (V)	200/208/220	200/208/220	200/208/220	200/208/220
Connections	4-wire (L1, L2, L3, N, PE)			
Output voltage regulation	Symmetrical load $\pm 1\%$ Asymmetrical load $\pm 3\%$			
Overload capacity	150% for 1 minute (in normal operation) 125% for 10 minutes (in normal operation) 125% for 1 minute (in battery operation) 125% continuous (bypass operation) 1000% for 100 milliseconds (bypass operation)			
Dynamic load response	$\pm 5\%$ after 2 milliseconds $\pm 1\%$ after 50 milliseconds			
Output power factor	1			
Nominal output current (A)	29/28/26	43/42/39	58/56/52	73/70/66
Frequency regulation (Hz)	50/60 Hz bypass synchronized – 50/60 Hz $\pm 0.1\%$ free-running			
Synchronized slew rate (Hz/sec)	Programmable to 0.25, 0.5, 1, 2, 4, 6			
Total harmonic distortion (THDU)	<1% for linear load <5% for non-linear load	<1% for linear load <3% for non-linear load		
Load crest factor	2.5			
Load power factor	From 0.7 leading to 0.7 lagging without any derating			

UPS rating	30 kW	40 kW	50 kW
Voltage (V)	200/208/220	200/208/220	200/208/220
Connections	4-wire (L1, L2, L3, N, PE)		
Output voltage regulation	Symmetrical load $\pm 1\%$ Asymmetrical load $\pm 3\%$		
Overload capacity	150% for 1 minute (in normal operation) 125% for 10 minutes (in normal operation) 125% for 1 minute (in battery operation) 125% continuous (bypass operation) 1000% for 100 milliseconds (bypass operation)		
Dynamic load response	$\pm 5\%$ after 2 milliseconds $\pm 1\%$ after 50 milliseconds		
Output power factor	1		
Nominal output current (A)	87/83/79	115/111/105	144/139/131
Frequency regulation (Hz)	50/60 Hz bypass synchronized – 50/60 Hz $\pm 0.1\%$ free-running		
Synchronized slew rate (Hz/sec)	Programmable to 0.25, 0.5, 1, 2, 4, 6		
Total harmonic distortion (THDU)	<1% for linear load <5% for non-linear load		
Load crest factor	2.5		
Load power factor	From 0.7 leading to 0.7 lagging without any derating		

Battery Specifications 208 V

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Protection of the energy storage device: An overcurrent protective device must be located in close proximity to the energy storage device.

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

UPS rating	10 kW with N+1 power module	15 kW with N+1 power module	20 kW with N+1 power module	25 kW with N+1 power module	30 kW	40 kW	50 kW
Charging power in % of output power at 0-40% load	80%						
Charging power in % of output power at 100% load	20%						
Maximum charging power (at 0-40% load) (kW)	8	12	16	20	24	32	40
Maximum charging power (at 100% load) (kW)	2	3	4	5	6	8	10
Nominal battery voltage (VDC)	480						
Nominal float voltage (VDC)	545						
Maximum boost voltage (VDC)	572						
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C						
End of discharge voltage (full load) (VDC)	384						
Battery current at full load and nominal battery voltage (A)	22	33	44	55	65	87	109
Battery current at full load and minimum battery voltage (A)	27	41	54	68	81	109	136
Ripple current	< 5% C20 (5 minute runtime)						
Battery test	Manual/automatic (selectable)						
Maximum short circuit rating	10 kA						

Recommended Cable Sizes 208 V

⚡ ⚠ 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 300 kcmil.

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

The maximum number of cable connections per busbar: Two on input/output/bypass busbars; Four on DC busbars; Six on N/PE busbars.

NOTE: Overcurrent protection is to be provided by others.

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

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

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

Equipment grounding conductors (PE in this manual) are sized in accordance with NEC Article 250.122 and Table 250.122.

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

UPS rating	10 kW with N+1 power module	15 kW with N+1 power module	20 kW with N+1 power module	25 kW with N+1 power module	30 kW	40 kW	50 kW
Input phases (AWG/kcmil)	8	4	3	2	1/0	3/0	4/0
Input PE (AWG/kcmil)	10	8	8	6	6	6	4
Bypass/output phases (AWG/kcmil)	8	6	4	3	2	1/0	3/0
Bypass PE/output PE (AWG/kcmil)	10	10	8	8	6	6	6
Neutral (AWG/kcmil) ¹⁰	6	3	1	2/0	3/0	2 x 1/0	2 x 2/0
DC+/DC- (AWG/kcmil)	10	8	6	4	4	2	1/0
DC PE (AWG/kcmil)	10	10	8	8	6	6	6

NOTE: Cable sizes are based on 80% rated circuit breakers for UIB, UOB, MBB, SSIB, and 100% rated circuit breaker for battery breaker(s).

10. Neutral conductor is sized to handle 1.73 times phase current in case of high harmonic content from non-linear loads. If non or less harmonic currents are expected, neutral conductor can be sized accordingly but not less than the phase conductor.

Recommended Upstream Protection 208 V

⚠ CAUTION

HAZARD OF FIRE

- Connect only to a circuit with the below specifications.
- Connect to a circuit provided with a 250 A branch circuit overcurrent protection maximum in accordance with the National Electrical Code, ANSI/NFPA70, and the Canadian Electrical Code, Part I, C22.1.

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

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

UPS rating	10 kW with N+1 power module		15 kW with N+1 power module		20 kW with N+1 power module		25 kW with N+1 power module	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36100U31X						HJF36150-U31X	HJF36100-U31X
I _r setting	50	40	80	60	100	80	125	100
Tr at 6 I _r setting	0.5							
li (x I _n) setting	1.5							

UPS rating	30 kW		40 kW		50 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36150U31X		JJF36250U31X	HJF36150U31X	JJF36250U31X	
I _r setting	150	110	200	150	250	200
Tr at 6 I _r setting	0.5					
li (x I _n) setting	1.5					

Recommended Bolt and Lug Sizes

NOTICE

RISK OF EQUIPMENT DAMAGE

Use only UL approved compression cable lugs.

Failure to follow these instructions can result in equipment damage.

Copper – One Hole Cable Lugs

Cable size	Bolt size	Cable lug type	Crimping tool	Die
10 AWG	M8 x 25 mm	LCA10-56-L	NA	NA
8 AWG	M8 x 25 mm	LCA8-56-L	CT-720	CD-720-1 Red P21
6 AWG	M8 x 25 mm	LCA6-56-L	CT-720	CD-720-1 Blue P24
4 AWG	M8 x 25 mm	LCA4-56-L	CT-720	CD-720-1 Gray P29
3 AWG	M8 x 25 mm	LCA4-56-L	CT-720	CD-720-1 Gray P29
2 AWG	M8 x 25 mm	LCA2-56-Q	CT-720	CD-720-1 Brown P33
1 AWG	M8 x 25 mm	LCA1-56-E	CT-720	CD-720-2 Green P37
1/0 AWG	M8 x 25 mm	LCA1/0-56-X	CT-720	CD-720-2 Pink P42
2/0 AWG	M8 x 25 mm	LCA2/0-56-X	CT-720	CD-720-2 Black P45
3/0 AWG	M8 x 25 mm	LCA3/0-56-X	CT-720	CD-720-2 Orange P50
4/0 AWG	M8 x 25 mm	LCA4/0-56-X	CT-720	CD-720-3 Purple P54
250 kcmil	M8 x 25 mm	LCA250-56-X	CT-720	CD-720-3 Yellow P62
300 kcmil	M8 x 25 mm	LCA300-56-X	CT-720	CD-720-4 White P66

Copper – Two Hole Cable Lugs

Cable size	Bolt size	Cable lug type	Crimping tool	Die
6 AWG	M8 x 25 mm	LCC6-12-L	CT-930	CD-920-6 Blue P24
4 AWG	M8 x 25 mm	LCC4-12-L	CT-930	CD-920-4 Gray P29
3 AWG	M8 x 25 mm			
2 AWG	M8 x 25 mm	LCC2-12-Q	CT-930	CD-920-2 Brown P33
1 AWG	M8 x 25 mm	LCC1-12-E	CT-930	CD-920-1 Green P37
1/0 AWG	M8 x 25 mm	LCC1/0-12-X	CT-930	CD-920-1/0 Pink P42
2/0 AWG	M8 x 25 mm	LCC2/0-12-X	CT-930	CD-920-2/0 Black P45
3/0 AWG	M8 x 25 mm	LCC3/0-12-X	CT-930	CD-920-3/0 Orange P50
4/0 AWG	M8 x 25 mm	LCC4/0-12-X	CT-930	CD-920-4/0 Purple P54
250 kcmil	M8 x 25 mm	LCC250-12-X	CT-930	CD-920-250 Yellow P62
300 kcmil	M8 x 25 mm	LCC300-12-X	CT-930	CD-920-300 White P66

Torque Specifications

Bolt size	Torque
M4	1.7 Nm (1.25 lb-ft / 15 lb-in)
M5	2.2 Nm (1.62 lb-ft / 19.5 lb-in)
M6	5 Nm (3.69 lb-ft / 44.3 lb-in)
M8	17.5 Nm (12.91 lb-ft / 154.9 lb-in)
M10	30 Nm (22 lb-ft / 194.7 lb-in)

Environment

	Operating	Storage
Temperature	0 °C to 40 °C (32 °F to 104 °F)	-15 °C to 40 °C (5 °F to 104 °F) for systems with batteries.
Relative humidity	0 - 95% non-condensing	10 - 80% non-condensing
Elevation	Designed for operation in 0-3000 m (0-10000 feet) elevation. Power derating required from 1000-3000 m (3300-10000 feet): Up to 1000 m (3300 feet): 1.000 Up to 1500 m (5000 feet): 0.975 Up to 2000 m (6600 feet): 0.950 Up to 2500 m (8300 feet): 0.925 Up to 3000 m (10000 feet): 0.900	
Audible noise one meter (three feet) from unit	400 V 20-60 kW: 49 dB at 70% load, 54 dB at 100% load 400 V 80-100 kW: 57 dB at 70% load, 65 dB at 100% load 480 V 20-60 kW: 49 dB at 70% load, 54 dB at 100% load 480 V 80-100 kW: 57 dB at 70% load, 65 dB at 100% load 208 V 10-30 kW: 49 dB at 70% load, 54 dB at 100% load 208 V 40-50 kW: 57 dB at 70% load, 65 dB at 100% load	
Protection class	IP20	
Color	RAL 9003, gloss level 85%	

UPS Weights and Dimensions

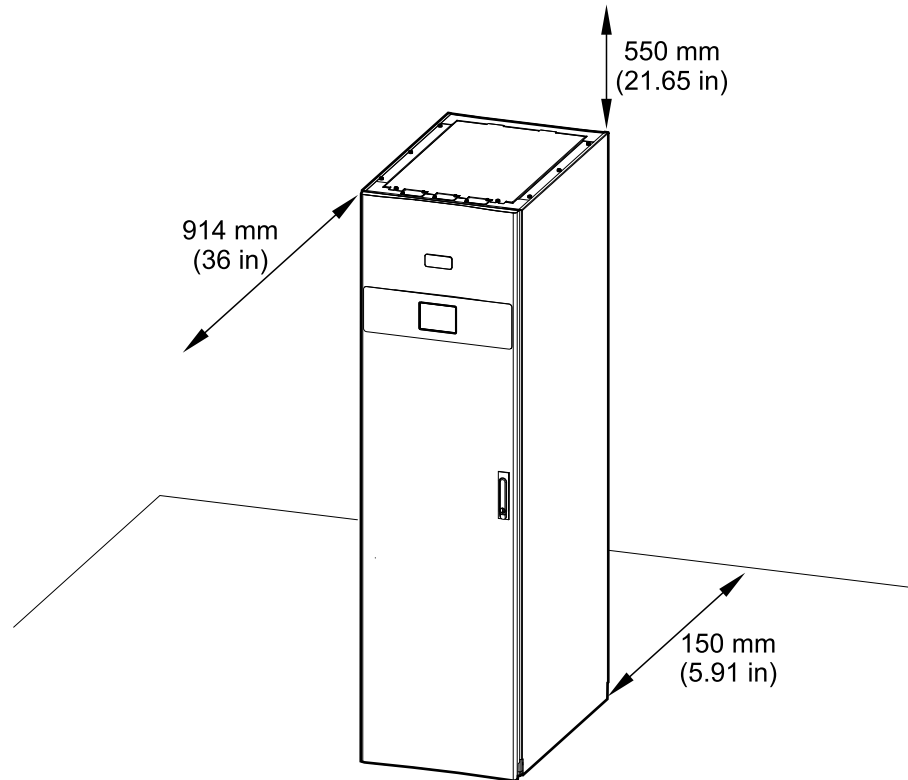
UPS rating	Weight kg (lbs)	Height mm (in)	Width mm (in)	Depth mm (in)
20 kW UPS 400 V with three battery strings ¹¹	650 (1433)	1970 (77.56)	550 (21.65)	847 (33.35)
30-50 kW UPS 400 V with three battery strings ¹¹	680 (1500)	1970 (77.56)	550 (21.65)	847 (33.35)
60 kW UPS 400 V with three battery strings	665 (1466)	1970 (77.56)	550 (21.65)	847 (33.35)
80-100 kW UPS 400 V with three battery strings	680 (1500)	1970 (77.56)	550 (21.65)	847 (33.35)
20 kW UPS 480 V with three battery strings ¹¹	650 (1433)	1970 (77.56)	550 (21.65)	847 (33.35)
30-50 kW UPS 480 V with three battery strings ¹¹	680 (1500)	1970 (77.56)	550 (21.65)	847 (33.35)
60 kW UPS 480 V with three battery strings	665 (1466)	1970 (77.56)	550 (21.65)	847 (33.35)
80-100 kW UPS 480 V with three battery strings	680 (1500)	1970 (77.56)	550 (21.65)	847 (33.35)
10 kW UPS 208 V with three battery strings ¹¹	650 (1433)	1970 (77.56)	550 (21.65)	847 (33.35)
15-25 kW UPS 208 V with three battery strings ¹¹	680 (1500)	1970 (77.56)	550 (21.65)	847 (33.35)
30 kW UPS 208 V with three battery strings	665 (1466)	1970 (77.56)	550 (21.65)	847 (33.35)
40-50 kW UPS 208 V with three battery strings	680 (1500)	1970 (77.56)	550 (21.65)	847 (33.35)

NOTE: One battery module weighs approximately 32 kg (70.5 lbs).

¹¹. UPS model with N+1 power module.

Clearance

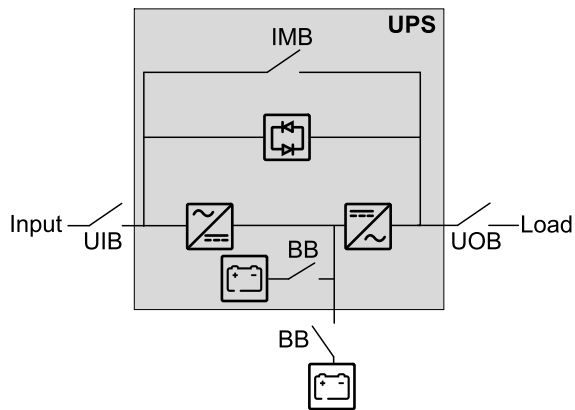
NOTE: Clearance dimensions are published for airflow and service access only. Consult with the local safety codes and standards for additional requirements in your local area.



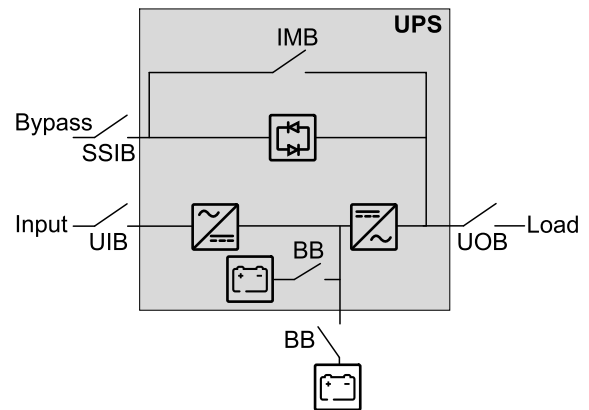
Single System Overview

UIB	Unit input breaker
SSIB	Static switch input breaker
IMB	Internal maintenance breaker
UOB	Unit output breaker
BB	Battery breaker in UPS for internal batteries and in external battery solution (if present)

Single System – Single Mains



Single System – Dual Mains



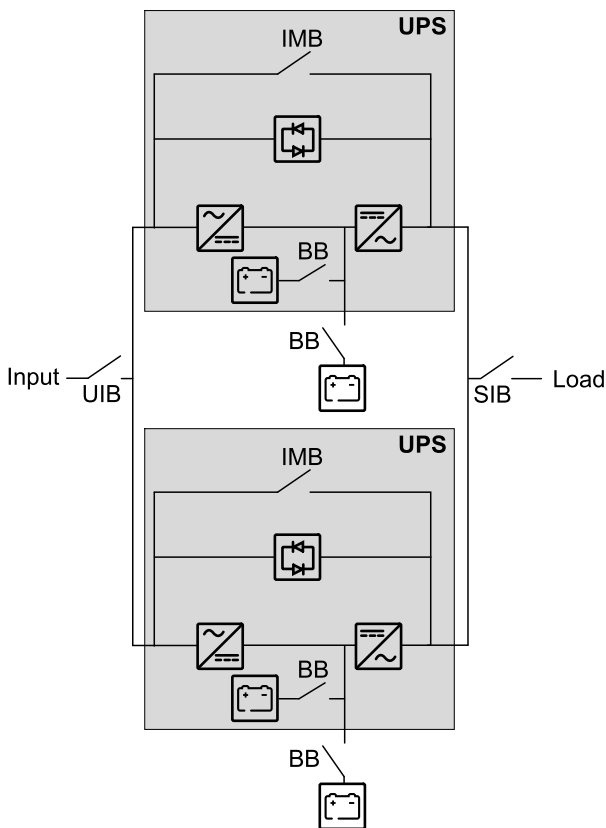
Parallel System Overview

UIB	Unit input breaker
SSIB	Static switch input breaker
IMB	Internal maintenance breaker
UOB	Unit output breaker
SIB	System isolation breaker
BB	Battery breaker in UPS for internal batteries and in external battery solution (if present)
MBB	External maintenance bypass breaker

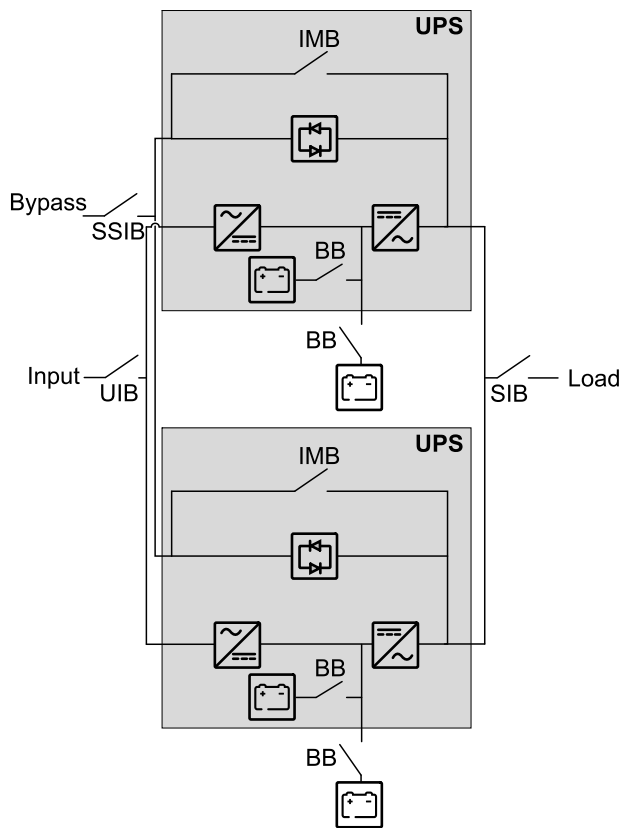
Simplified 1+1 Parallel Systems

Galaxy VS can support 2 UPSs in a simplified 1+1 parallel system for redundancy with shared unit input breaker UIB and static switch input breaker SSIB.

Simplified 1+1 Parallel System – Single Mains



Simplified 1+1 Parallel System – Dual Mains

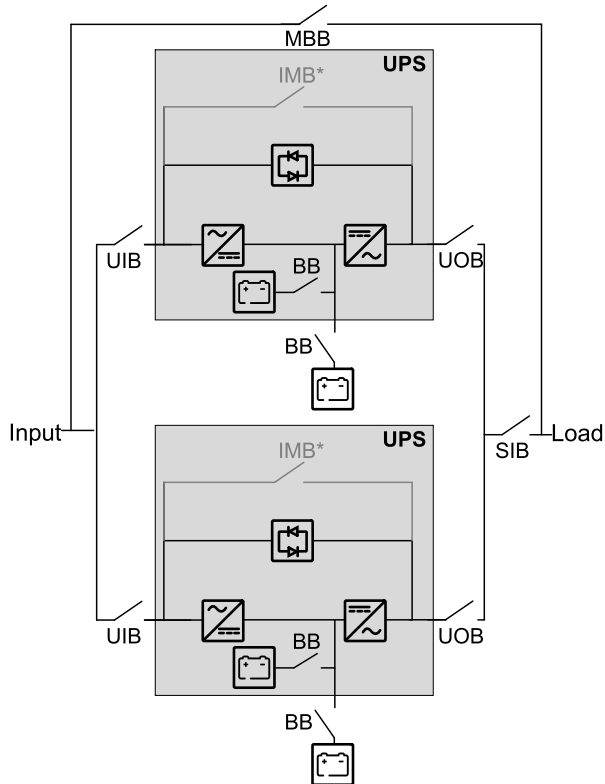


Parallel Systems with Individual Unit Input Breaker UIB and Static Switch Input Breaker SSIB

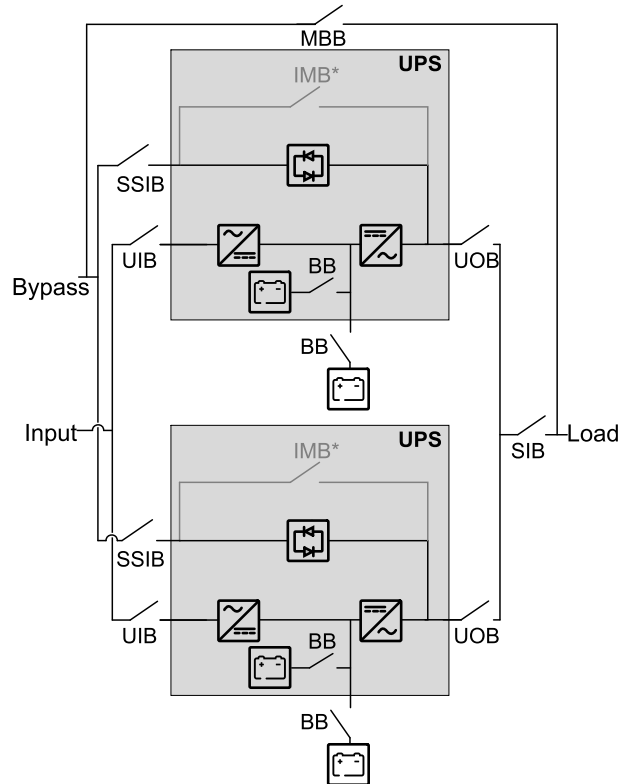
Galaxy VS can support up to 3 UPSs in parallel for capacity and up to 3+1 UPSs in parallel for redundancy with individual unit input breaker UIB and static switch input breaker SSIB.

NOTE: The internal maintenance breaker IMB* can only be used in a simplified 1+1 parallel system. In any other parallel system, an external maintenance bypass breaker MBB must be provided and the internal maintenance breaker IMB* must be padlocked in the open position.

Parallel System – Single Mains



Parallel System – Dual Mains

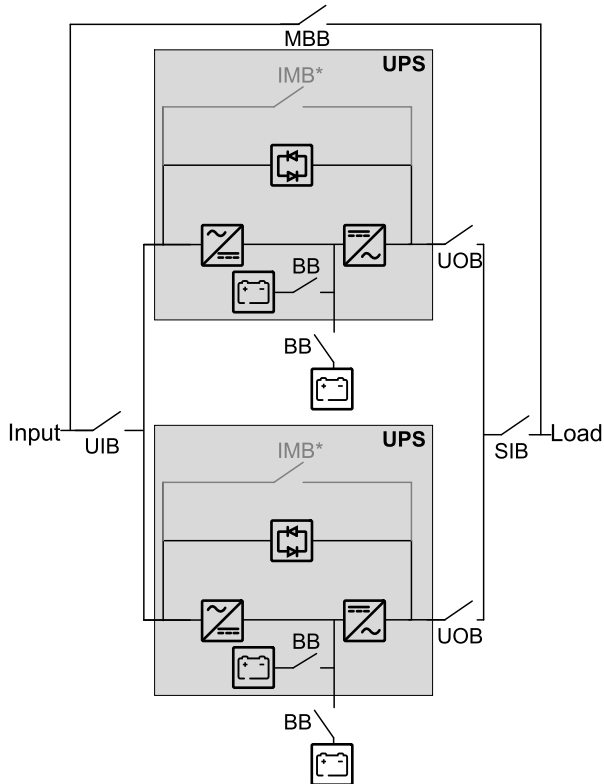


Parallel Systems with Shared Unit Input Breaker UIB and Static Switch Input Breaker SSIB

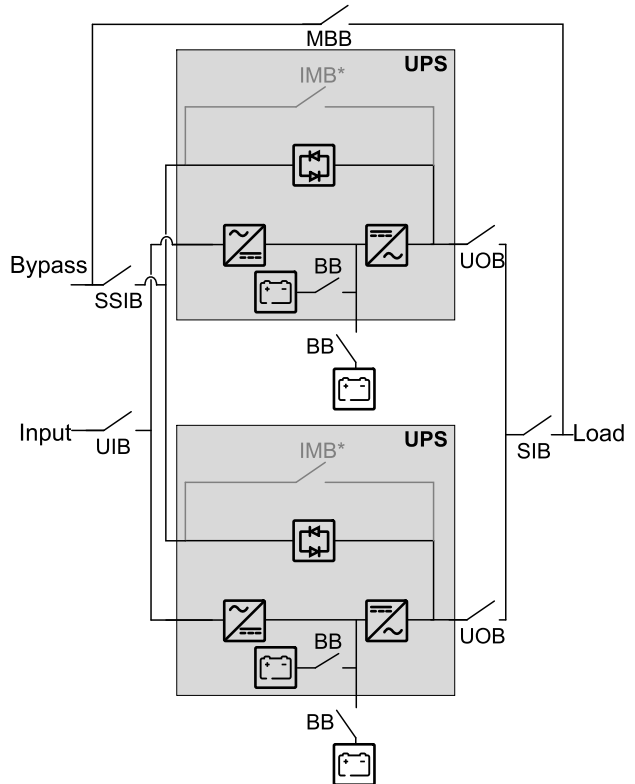
Galaxy VS can support up to 3 UPSs in parallel for capacity and up to 3+1 UPSs in parallel for redundancy with shared unit input breaker UIB and static switch input breaker SSIB.

NOTE: The internal maintenance breaker IMB* can only be used in a simplified 1+1 parallel system. In any other parallel system, an external maintenance bypass breaker MBB must be provided and the internal maintenance breaker IMB* must be padlocked in the open position.

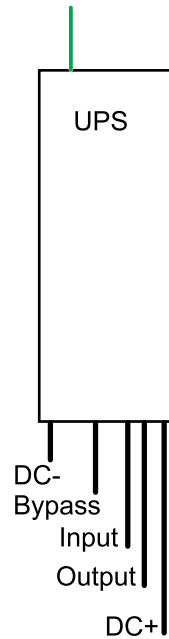
Parallel System – Single Mains



Parallel System – Dual Mains



Installation Procedure for Single Systems

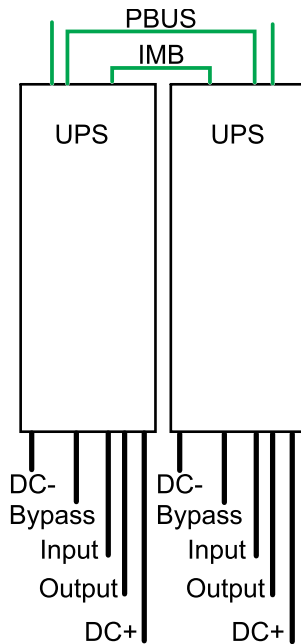


— Signal cable
— Power cable

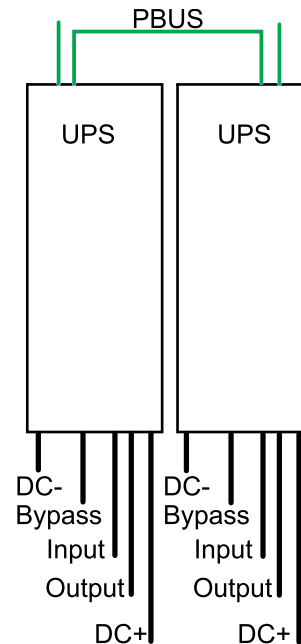
1. *Install the Seismic Anchoring (Option), page 39.*
2. *Prepare for Installation, page 41.*
3. *Convert to a Dual Mains System, page 44.*
4. *Connect the Power Cables, page 45.*
5. *Connect the Power Cables from an Adjacent Modular Battery Cabinet, page 47.*
6. *Prepare for Signal Cables, page 48.*
7. *Connect the Signal Cables, page 49.*
8. *Connect the Signal Cables from a Modular Battery Cabinet, page 51.*
9. *Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 54.*
10. *Connect the External Communication Cables, page 60.*
11. *Connect the Modbus Cables, page 61.*
12. *Add Translated Safety Labels to Your Product, page 63.*
13. *Final Installation, page 64.*

Installation Procedure for Parallel Systems

Simplified 1+1 Parallel System



Parallel System



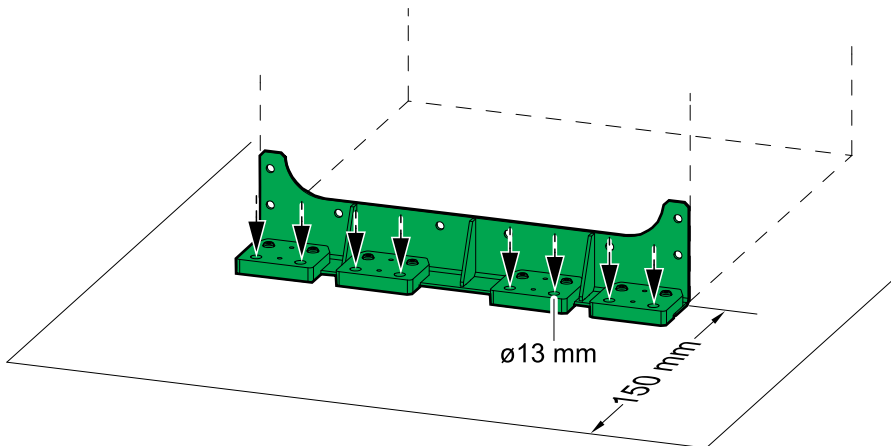
— Signal cable
— Power cable

1. *Install the Seismic Anchoring (Option), page 39.*
2. *Prepare for Installation, page 41.*
3. *Convert to a Dual Mains System, page 44.*
4. *Connect the Power Cables, page 45.*
5. *Connect the Power Cables from an Adjacent Modular Battery Cabinet, page 47.*
6. *Prepare for Signal Cables, page 48.*
7. *Connect the Signal Cables, page 49.*
8. *Connect the Signal Cables from a Modular Battery Cabinet, page 51.*
9. *Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 54.*
10. Perform one of the following:
 - **For simplified 1+1 parallel system:** *Connect the IMB Signal Cables in a Simplified 1+1 Parallel System, page 56.*
 - **For parallel system:** Lock the internal maintenance bypass breaker IMB in the open position on all UPSs in the parallel system with a padlock.
11. *Connect the PBUS Cables, page 59.*
12. *Connect the External Communication Cables, page 60.*
13. *Connect the Modbus Cables, page 61.*
14. *Add Translated Safety Labels to Your Product, page 63.*
15. *Final Installation, page 64.*

Install the Seismic Anchoring (Option)

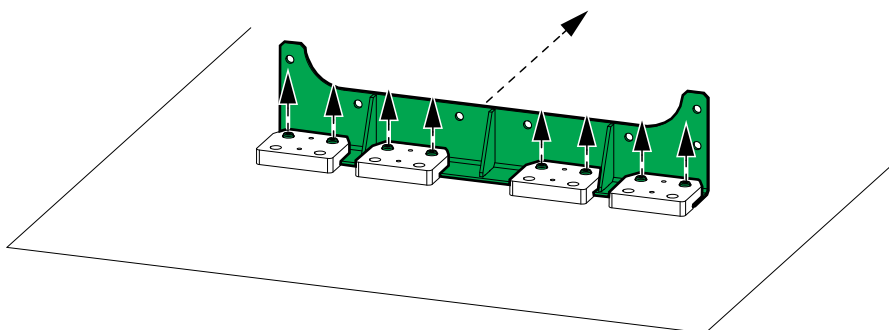
1. Mount the rear anchor assembly to the floor. Use appropriate hardware for the floor type – the hole diameter in the rear anchors is $\varnothing 13$ mm. Minimum requirement is M12 grade 8.8 hardware.

Rear View



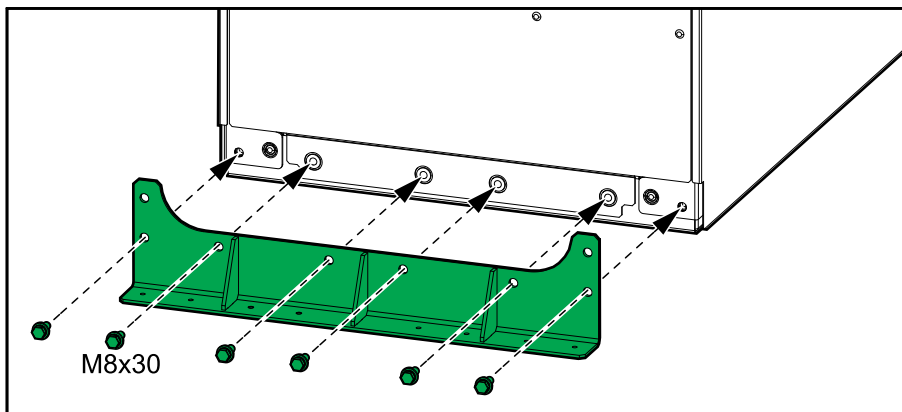
2. Remove the bolts and remove the rear anchoring bracket. Save the bolts for adjacent installation of cabinets.

Rear View



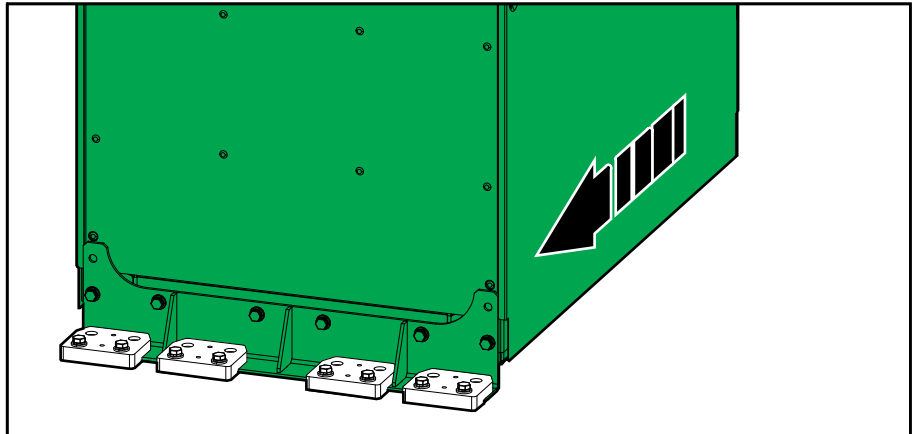
3. Install the rear anchoring bracket on the UPS with the provided M8 bolts.

Rear View of the UPS



4. Push the UPS into position so the rear anchoring bracket connects to the rear anchors. The front anchoring bracket is installed in the final installation steps.

Rear View of the UPS



Prepare for Installation

⚠️⚠️ DANGER

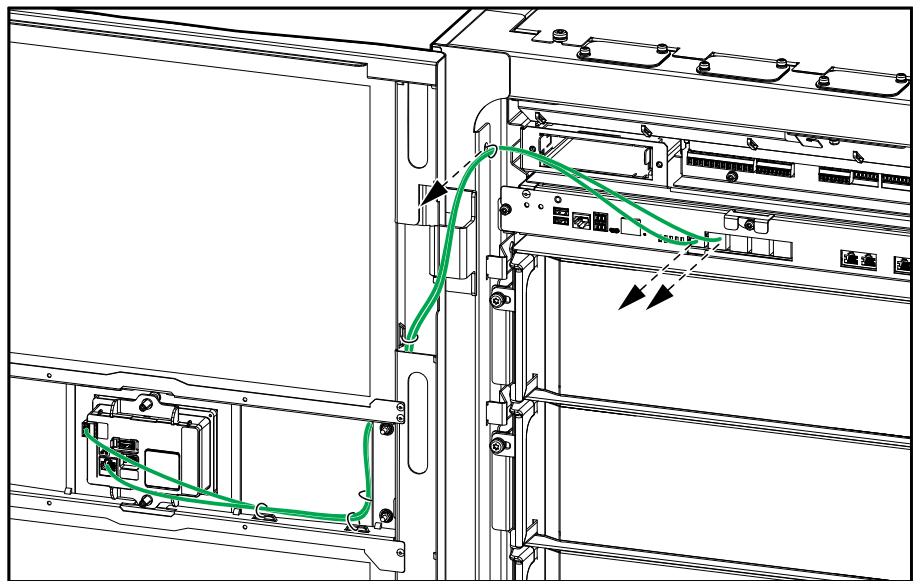
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

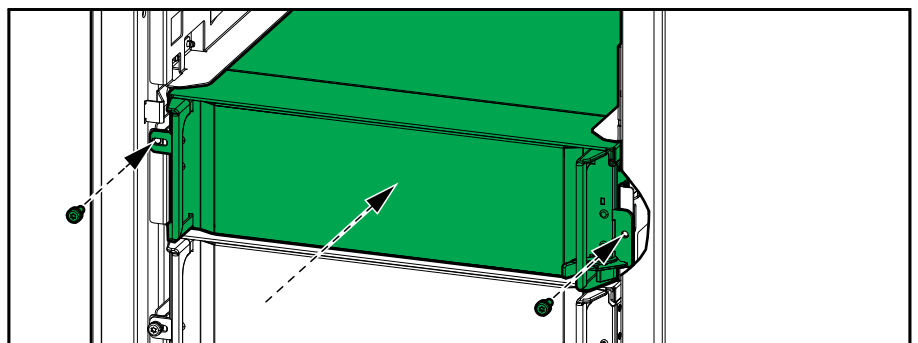
Failure to follow these instructions will result in death or serious injury.

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

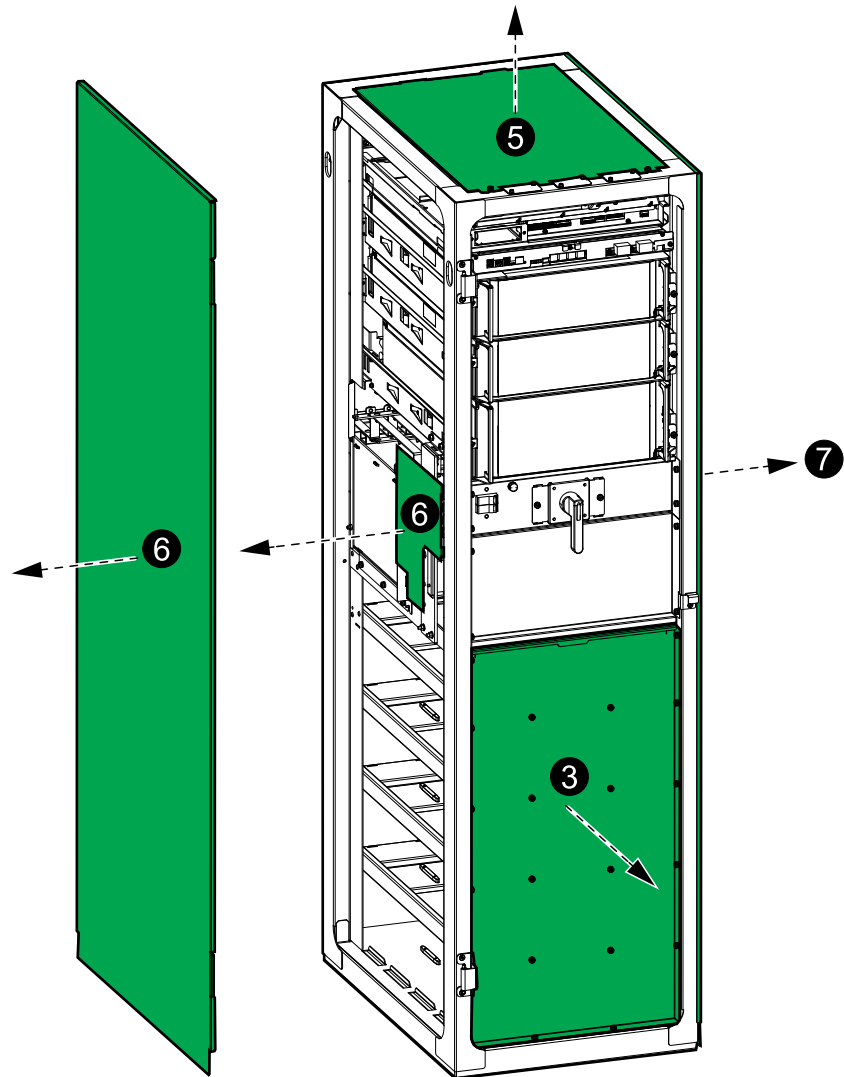
1. Disconnect the two signal cables from the display on the UPS and remove the front door.



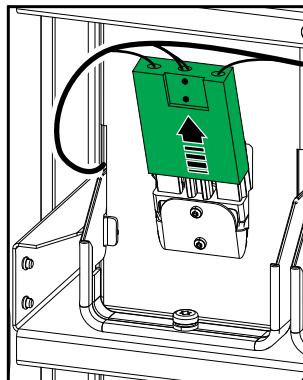
2. **For UPS without preinstalled power modules:** Install the power modules starting with the bottom shelf:
 - a. Remove the screw in each side of the empty power module shelf.
 - b. Push the power module onto the shelf.
 - c. Reinstall the screw in each side of the shelf.



3. Remove the battery cover.



4. Disconnect the battery terminals from the front of any preinstalled battery modules.

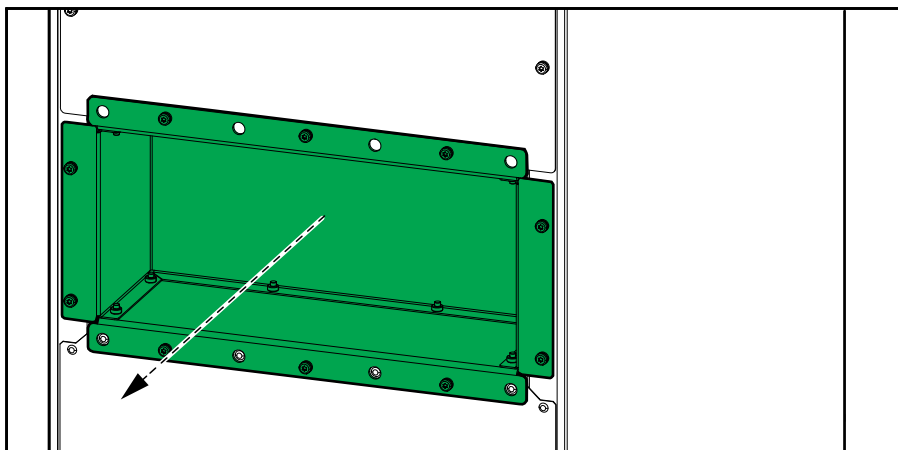
5. **For installation with a modular battery cabinet:** Remove the top plate:

- a. Remove the screws and tilt the front of the top plate upwards.
- b. Slide the top plate towards the front to remove it. Taps in the rear of the top plate must disconnect from the slots in the rear of the UPS.

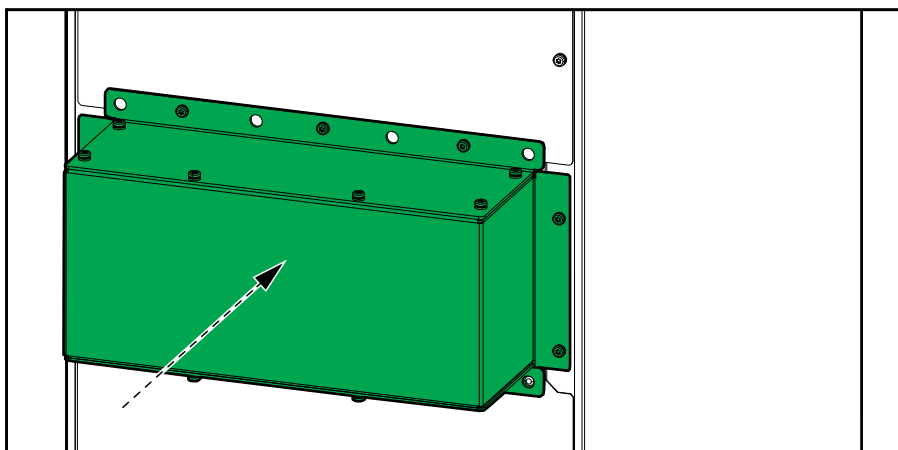
6. **For installation with an adjacent modular battery cabinet:** Remove the left side panel and the plate. Discard the plate.7. **For installation with a maintenance bypass cabinet or simplified 1+1 parallel installation:** Remove the right side panel. Save the right side panel.

8. Remove the conduit box from the rear of the UPS.

Rear View of the UPS

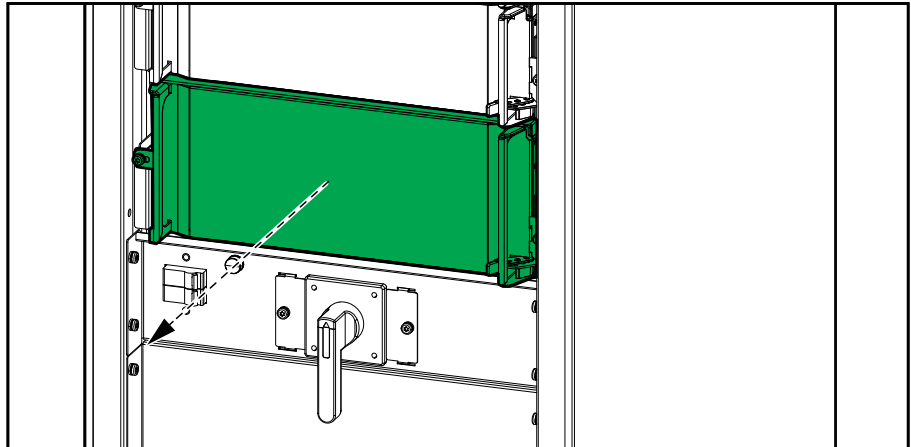


9. Remove the top or bottom gland plate from the conduit box.
10. Drill/punch holes for power cables/conduits in the top or bottom gland plate. Install conduits (not provided), if applicable.
11. Reinstall the top or bottom gland plate on the conduit box.
12. Install the conduit box on the UPS. Note that the conduit box is installed in the reverse position.

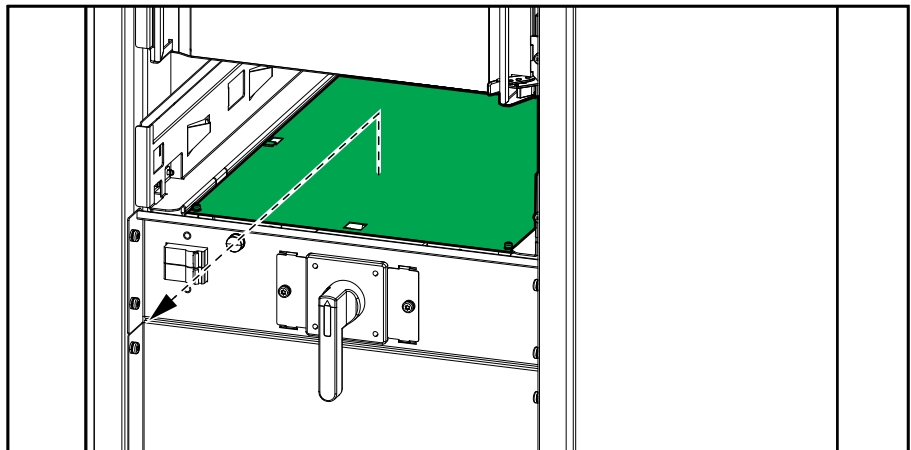


Convert to a Dual Mains System

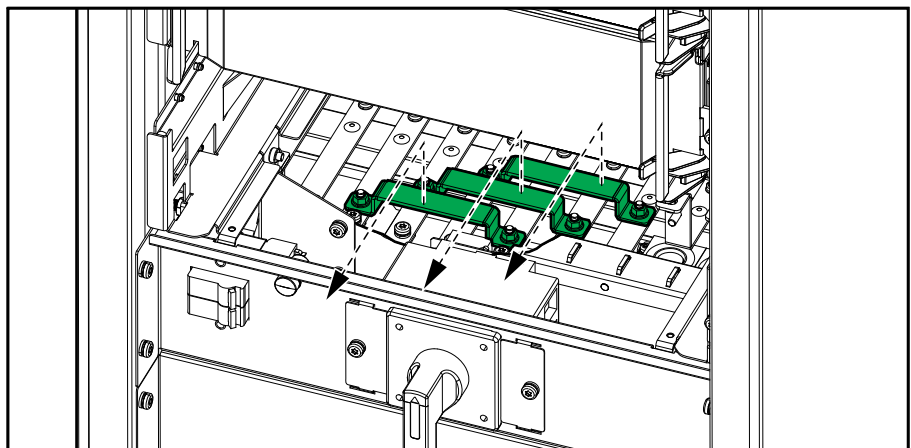
1. Remove the static switch module.



2. Remove the indicated plate.



3. Remove the three single mains jumper busbars.



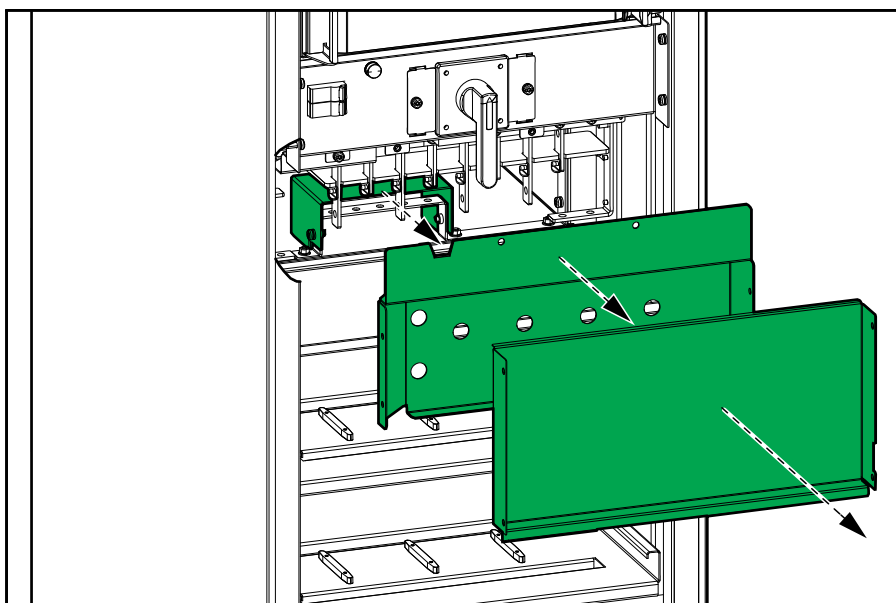
4. Reinstall the plate and the static switch module.

Connect the Power Cables

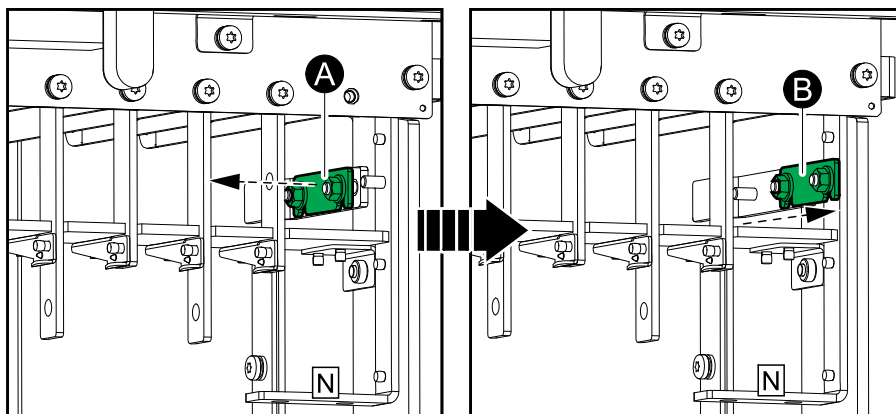
NOTICE
<p>RISK OF EQUIPMENT DAMAGE</p> <p>To ensure correct load sharing in bypass operation in a parallel system:</p> <ul style="list-style-type: none"> • All bypass cables must be the same length for all UPSs. • All output cables must be the same length for all UPSs. • All input cables must be the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

NOTE: The UPS is preconfigured for TNS earthing system. 3-wire installation using a bonding busbar will result in a higher leakage current.

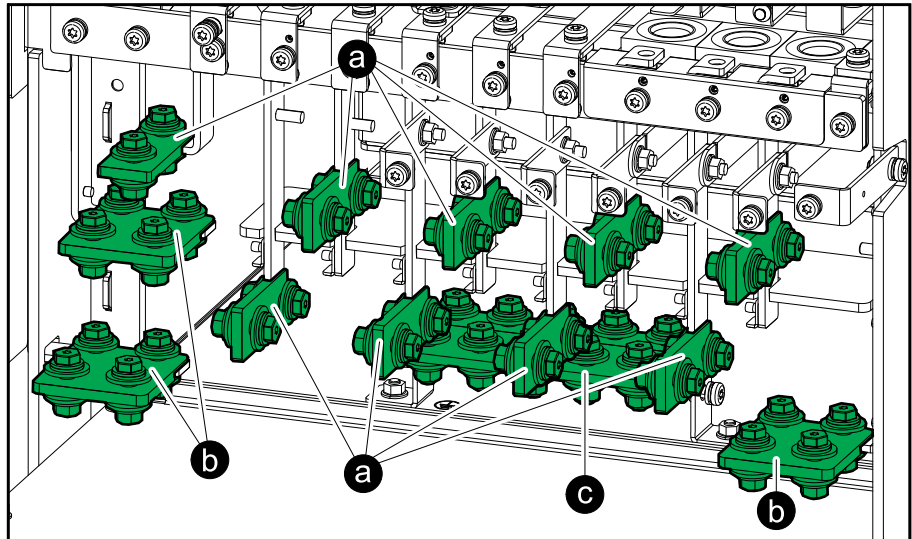
1. Remove the indicated plates.



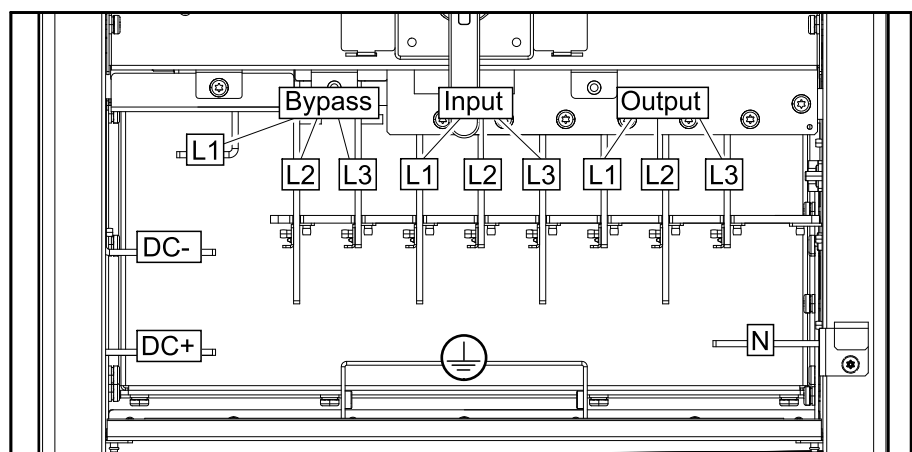
2. **Only for TN-C/3-wire earthing system:** Move the bonding busbar from position (A) to position (B) to connect the N busbar to the PE busbar.



3. **Only for NEMA 2 hole plates:** Install the optional kit GVSOPT020 for NEMA 2 hole plates:
 - a. Install the nine NEMA 2 hole plates for input/bypass/output (part number 880-5803) as indicated.
 - b. Install the three NEMA 2 hole plates for DC and N (part number 880-5802) as indicated.
 - c. Install the NEMA 2 hole plate for PE (part number 880-5801) as indicated.



4. Connect the PE cables.
5. Connect the input cables.
6. **For dual mains system:** Connect the bypass cables.
7. Connect the output cables.
8. **For installation with a remote modular battery cabinet:** Connect the DC cables to the DC busbars.
9. **For installation with an adjacent modular battery cabinet:** See *Connect the Power Cables from an Adjacent Modular Battery Cabinet*, page 47.



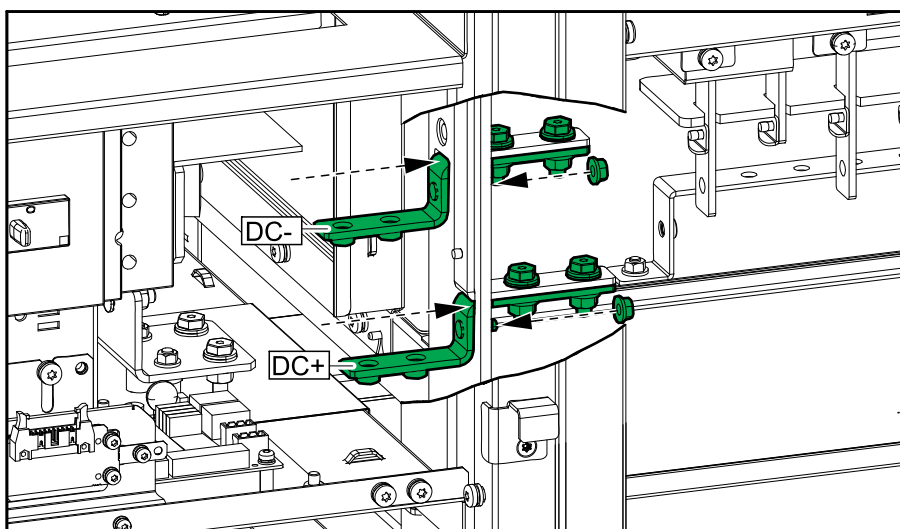
10. Reinstall the three plates removed in step 1.

Connect the Power Cables from an Adjacent Modular Battery Cabinet

Use installation kit 0H-220042 from the modular battery cabinet for this procedure.

1. Set the battery breakers BB to the open (OFF) position and disconnect the battery terminals from the front of any preinstalled battery modules in the modular battery cabinet(s) and the UPS.
2. Connect the preinstalled PE cable from modular battery cabinet 1 to the PE busbar in the UPS.
3. Install the provided DC extension busbars in the UPS.

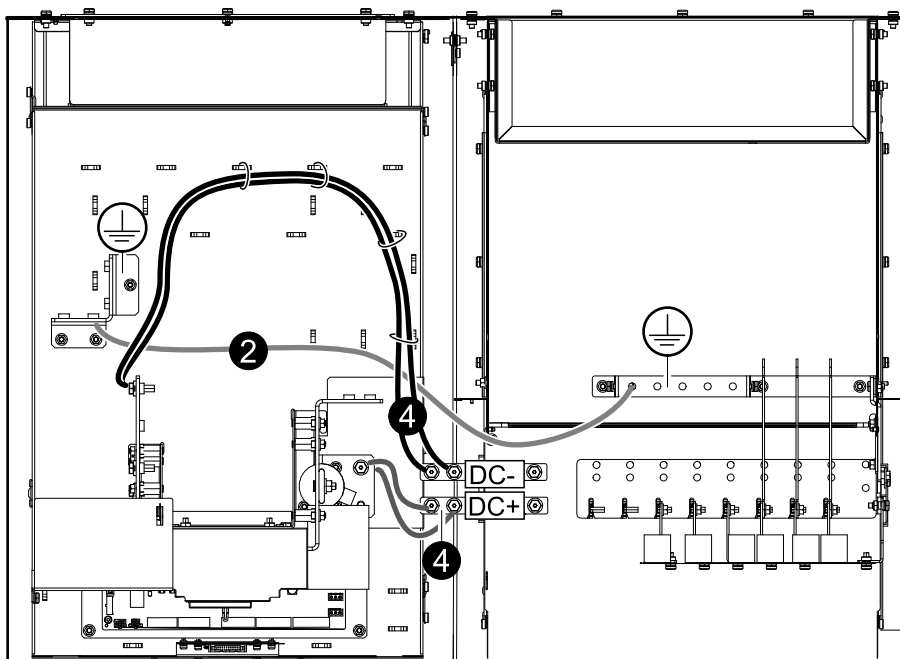
Front View of Modular Battery Cabinet 1 and the UPS



4. Connect the preinstalled DC cables from modular battery cabinet 1 to the DC extension busbars in the UPS.

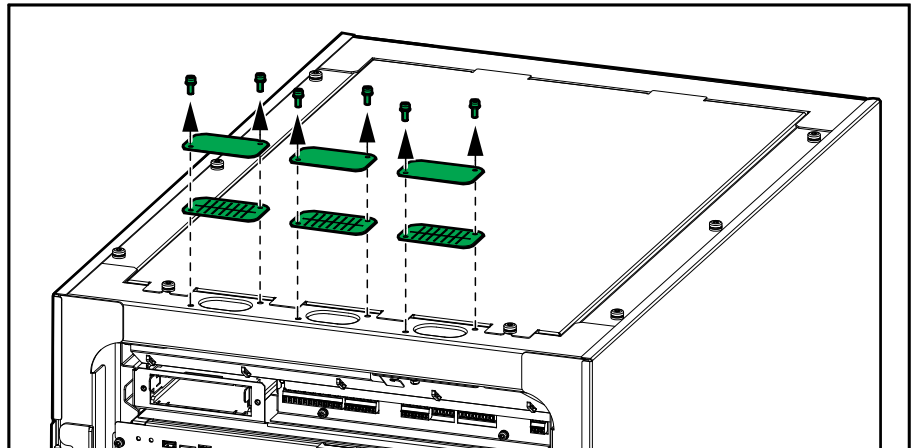
NOTE: The preinstalled DC cables come in pairs: Two cables for DC- connection and two cables for DC+ connection. Ensure to connect all pairs between modular battery cabinet 1 and the UPS.

Top View of Modular Battery Cabinet 1 and the UPS

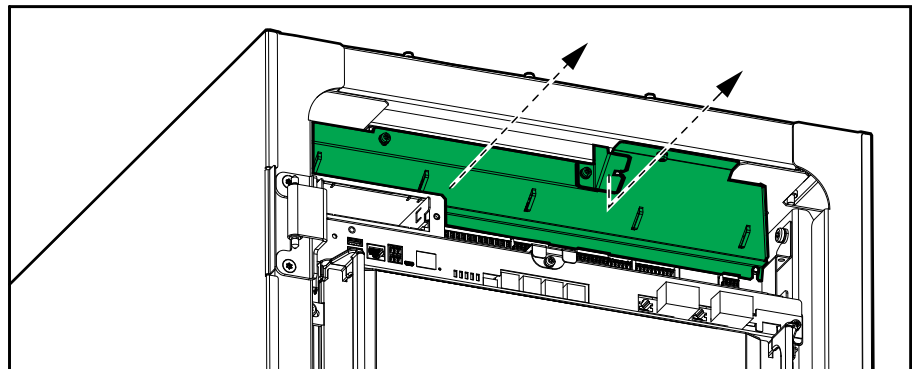


Prepare for Signal Cables

1. Remove the top gland plates and the top brush plates from the UPS. These are for signal cable routing.

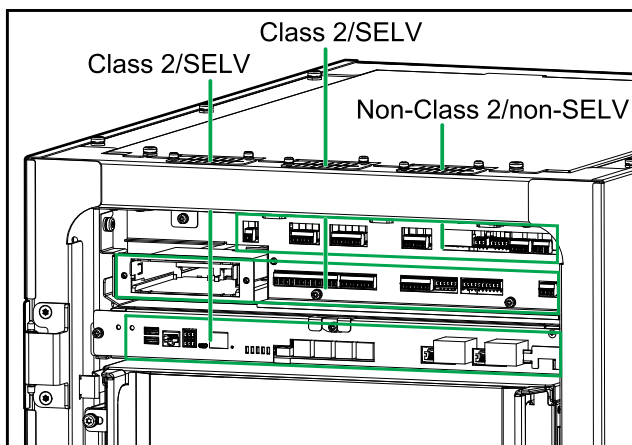


2. Perform one of the following:
 - **For installation without conduits:** Reinstall the brush plates.
 - **For installation with conduits:** Drill a hole in the gland plates for conduits, install conduits, and reinstall the gland plates.
3. Remove the indicated covers.

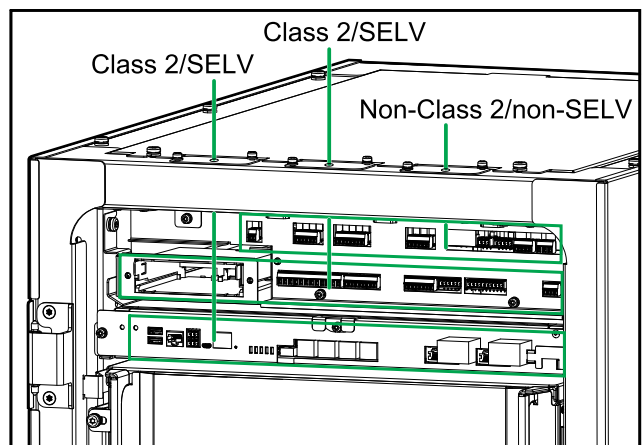


4. Route the non-Class 2/non-SELV signal cables through the right brush/gland plate.
5. Route the Class 2/SELV signal cables through the left and middle brush/gland plate.

UPS without Conduits



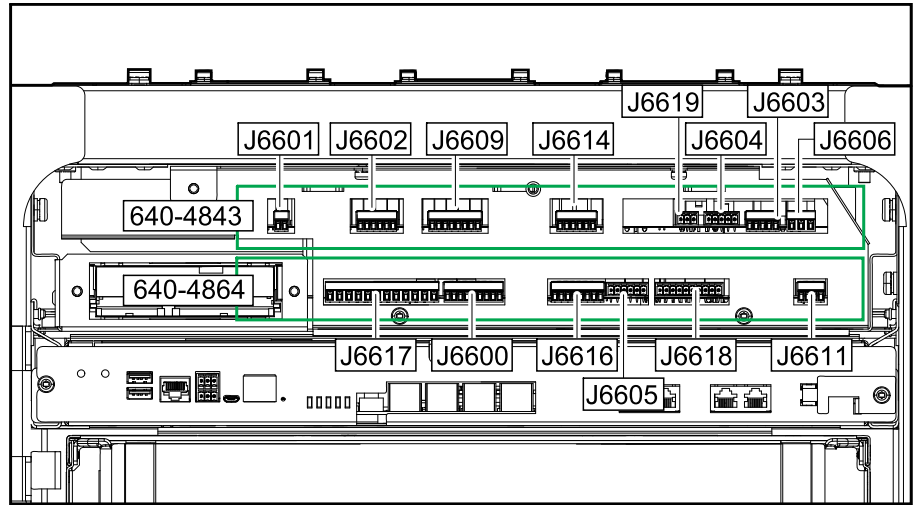
UPS with Conduits



Connect the Signal Cables

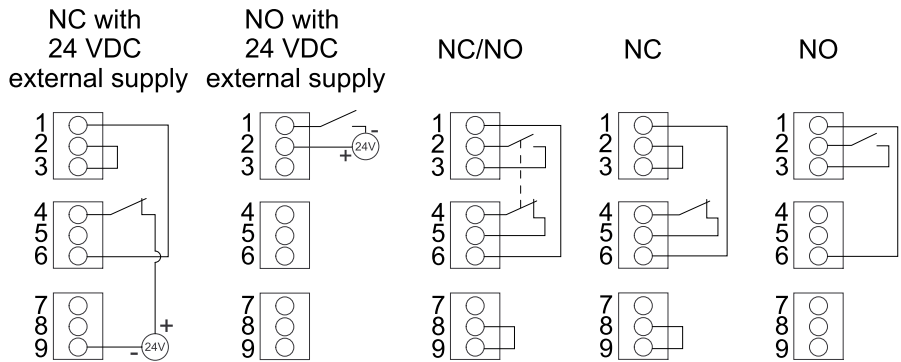
NOTE: Route the signal cables separately from the power cables and route the Class 2/SELV cables separately from the non-Class 2/non-SELV cables.

Front View of the UPS – Board 640-4843 and 640-4864



1. Connect the Class 2/SELV signal cables from the building EPO to board 640-4864 terminal J6600 in the UPS according to one of the options below.
The EPO circuit is considered Class 2/SELV. Class 2/SELV circuits must be isolated from the primary circuitry. Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is Class 2/SELV.

EPO Configurations (640-4864 terminal J6600, 1-9)



The EPO input supports 24 VDC.

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

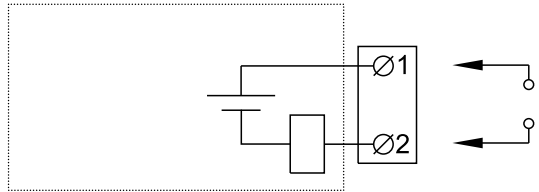
If you want the EPO activation to transfer the UPS into forced static bypass operation instead, please contact Schneider Electric.

2. Connect the Class 2/SELV signal cables from the auxiliary products to board 640-4864 in the UPS. Follow the instructions in the auxiliary product manuals.

3. Connect the Class 2/SELV signal cables to the input contacts and output relays on board 640-4864 in the UPS.

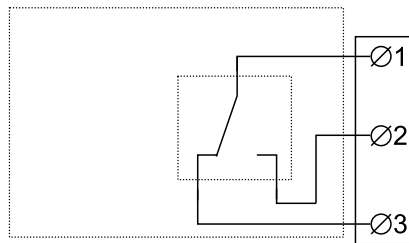
Do not connect any circuit to the input contacts unless it can be confirmed that the circuit is Class 2/SELV.

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



Name	Description	Location
IN_1 (input contact 1)	Configurable input contact	640-4864 terminal J6616, 1-2
IN_2 (input contact 2)	Configurable input contact	640-4864 terminal J6616, 3-4
IN_3 (input contact 3)	Configurable input contact	640-4864 terminal J6616, 5-6
IN_4 (input contact 4)	Configurable input contact	640-4864 terminal J6616, 7-8

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



Name	Description	Location
OUT_1 (output relay 1)	Configurable output relay	640-4864 terminal J6617, 1-3
OUT_2 (output relay 2)	Configurable output relay	640-4864 terminal J6617, 4-6
OUT_3 (output relay 3)	Configurable output relay	640-4864 terminal J6617, 7-9
OUT_4 (output relay 4)	Configurable output relay	640-4864 terminal J6617, 10-12

4. Connect the non-Class 2/non-SELV signal cables from the auxiliary products to board 640-4843 in the UPS. Follow the instructions in the auxiliary product manuals.

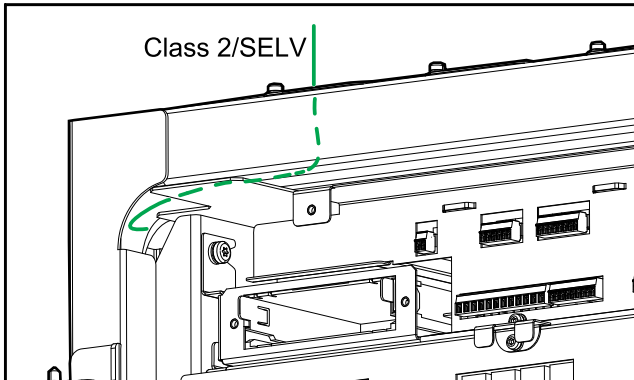
Connect the Signal Cables from a Modular Battery Cabinet

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

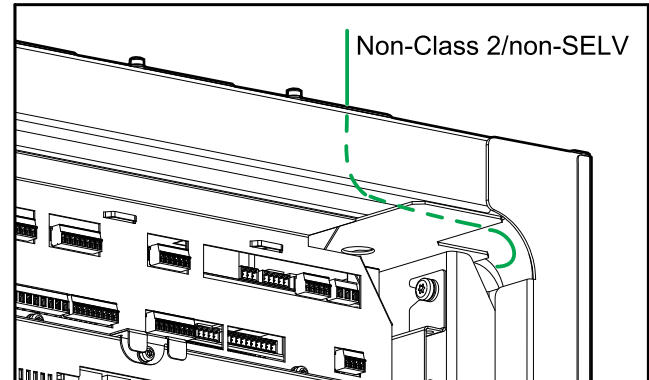
1. **Only for remote modular battery cabinet:**

- a. Route the Class 2/SELV cables and non-Class 2/non-SELV cables into the UPS as shown.

Class 2/SELV

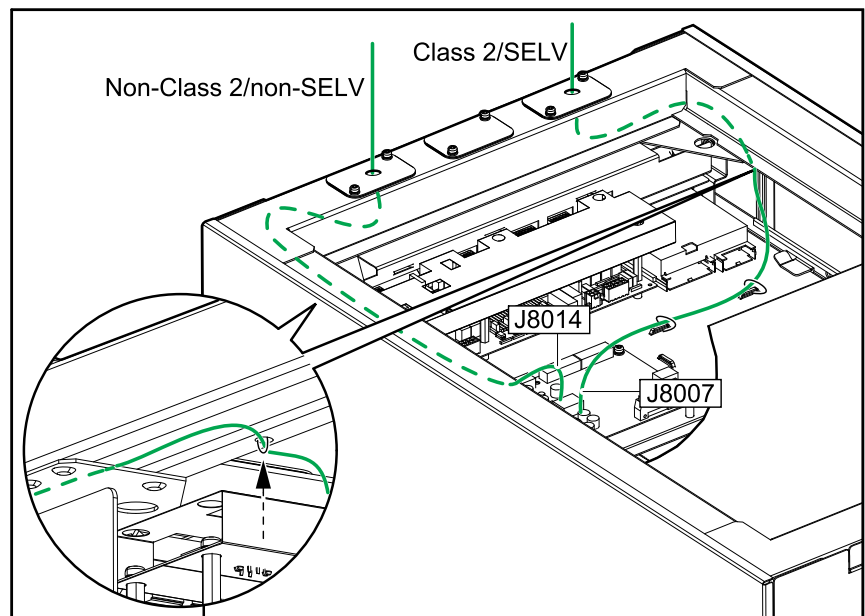


Non-Class 2/non-SELV



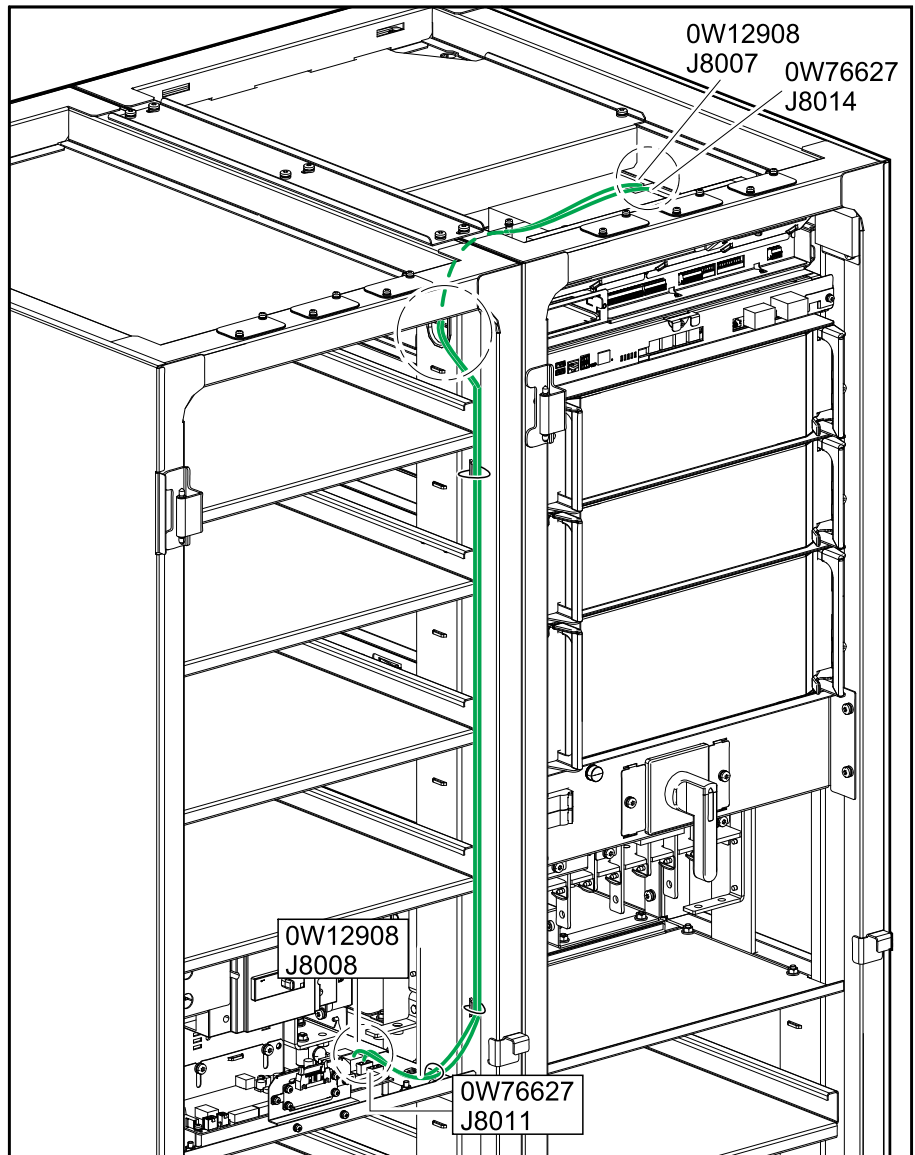
- b. Route the Class 2/SELV cables and non-Class 2/non-SELV cables to board 640-7552 in the UPS.

Top View of the UPS



2. **Only for adjacent modular battery cabinet:** Route the provided signal cables 0W76627 and 0W12908 to board 640-7552 in the UPS.

Front View of Adjacent Modular Battery Cabinet 1 and the UPS

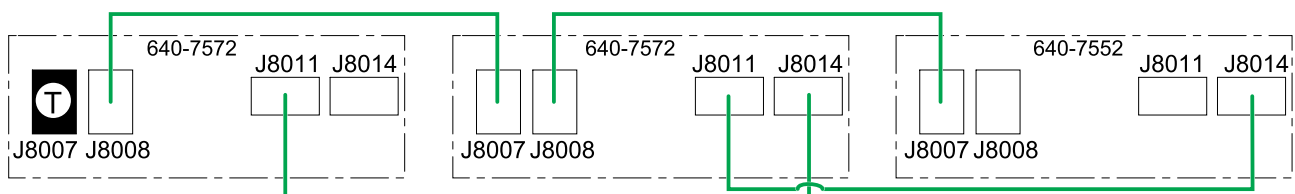


3. Connect the signal cables from modular battery cabinet 1 to the UPS:
 - a. Disconnect the termination plug from J8007 on board 640-7552 in the UPS.
 - b. Mount the termination plug in J8007 on board 640-7572 in the last modular battery cabinet (T).
 - c. Connect the signal cable from J8011 on board 640-7572 in modular battery cabinet 1 to J8014 on board 640-7552 in the UPS.
 - d. Connect the signal cable from J8008 on board 640-7572 in modular battery cabinet 1 to J8007 on board 640-7552 in the UPS.

Modular Battery Cabinet 2,3,4

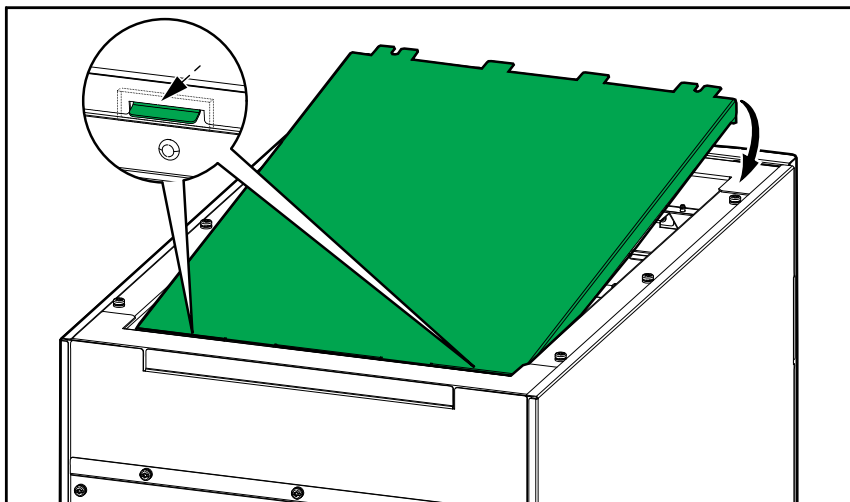
Modular Battery Cabinet 1

UPS

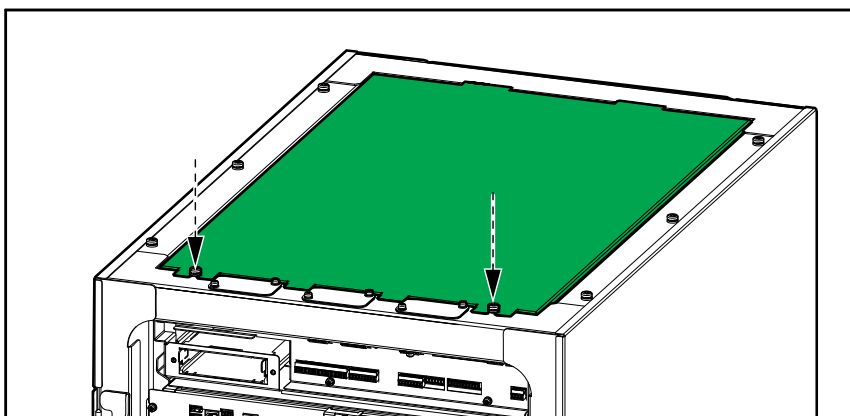


4. Reinstall the top plate on the UPS.
 - a. Tilt the top plate and slide it onto the UPS from the rear. Taps in the rear of the top plate must connect to slots in the rear of the UPS.

Rear View of the UPS



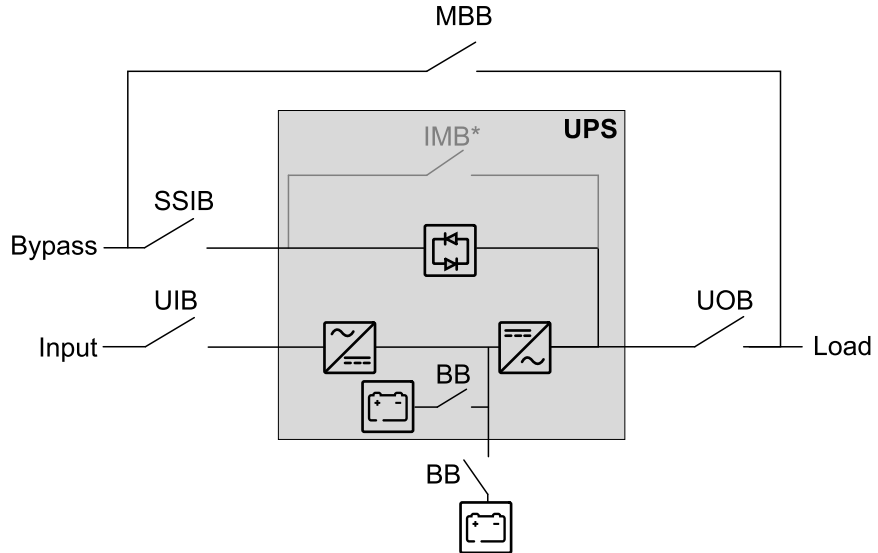
- b. Push the top plate down in the front and reinstall the screws.



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

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

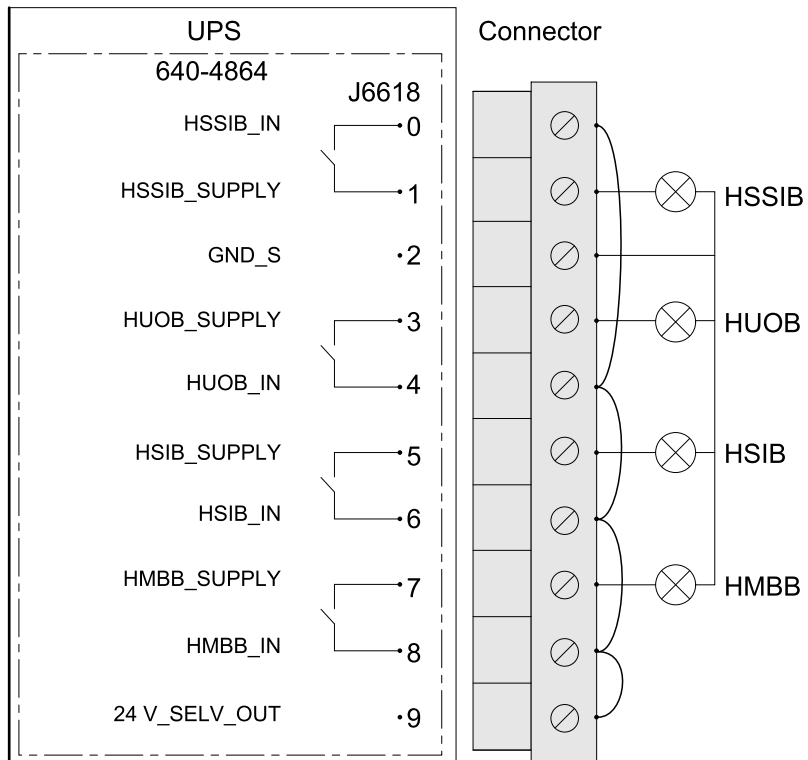
Example of Single System with Third-Party Switchgear



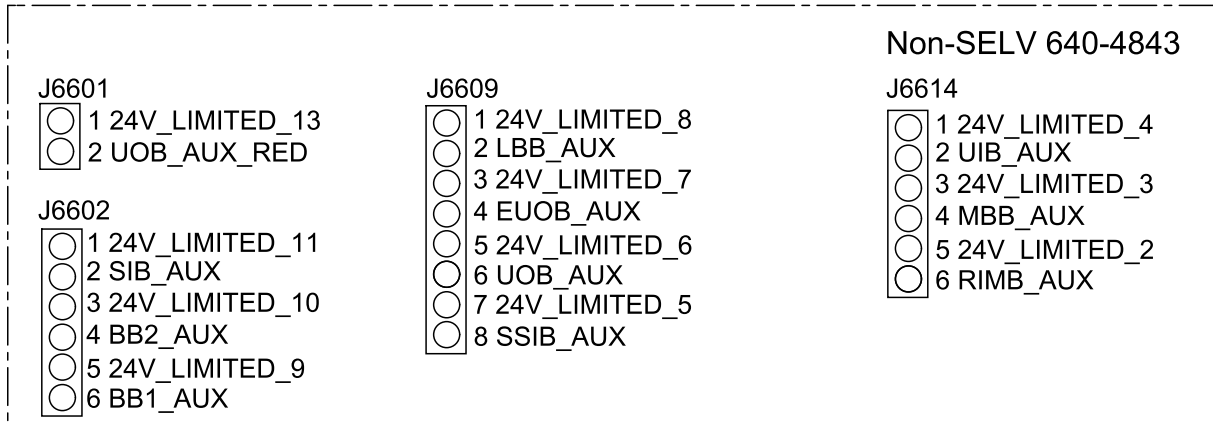
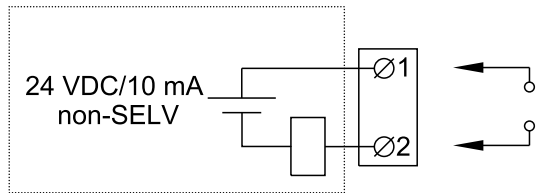
NOTE: The internal maintenance breaker IMB* cannot be used in a system with an external maintenance bypass breaker MBB and the internal maintenance breaker IMB* must be padlocked in the open position.

1. Connect signal cables from the breaker indicator lights in your switchgear to board 640-4864 terminal J6618 in the top of the UPS. If an external supply is used, remove jumper from J6618 pin 8 and 9.

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



2. Connect signal cables from AUX switches in your switchgear to board 640-4843 in the top of the UPS.



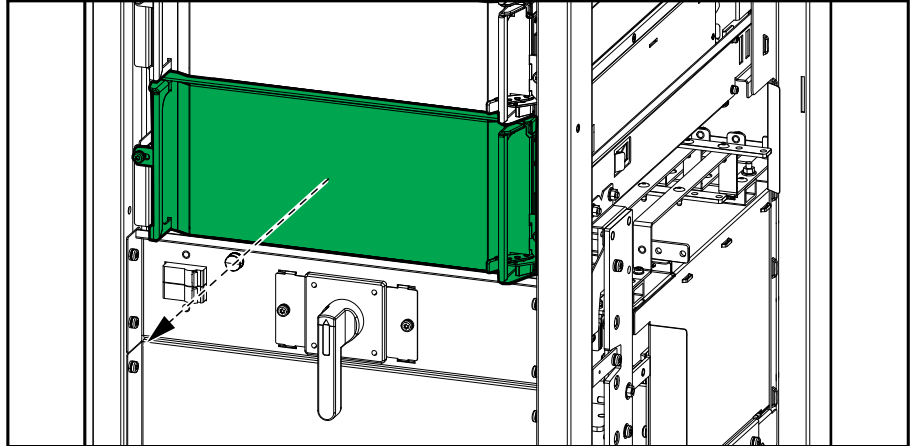
Terminal number	Function	Connection
J6601	UOB_RED (redundant AUX switch in unit output breaker)	Connect to redundant AUX switch in unit output breaker UOB.
J6602	SIB (system isolation breaker)	Connect to normally open (NO) AUX switch in system isolation breaker SIB for parallel system. SIB must contain an AUX switch for each connected UPS.
J6609	UOB (unit output breaker)	Connect to normally open (NO) AUX switch in unit output breaker UOB.
	SSIB (static switch input breaker)	Connect to normally open (NO) AUX switch in static switch input breaker SSIB. SSIB must contain an AUX switch for each connected UPS.
J6614	UIB (unit input breaker)	Connect to normally open (NO) AUX switch in unit input breaker UIB. UIB must contain an AUX switch for each connected UPS.
	MBB (maintenance bypass breaker)	Connect to normally closed (NC) AUX switch in maintenance bypass breaker MBB. MBB must contain an AUX switch for each connected UPS.

Connect the IMB Signal Cables in a Simplified 1+1 Parallel System

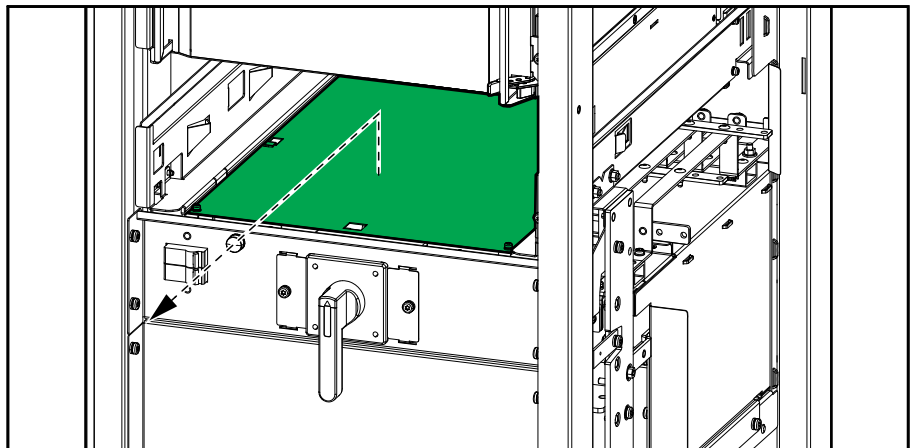
NOTE: Route the signal cables separately from the power cables to ensure sufficient isolation.

Use optional kit GVSOPT006 for this procedure.

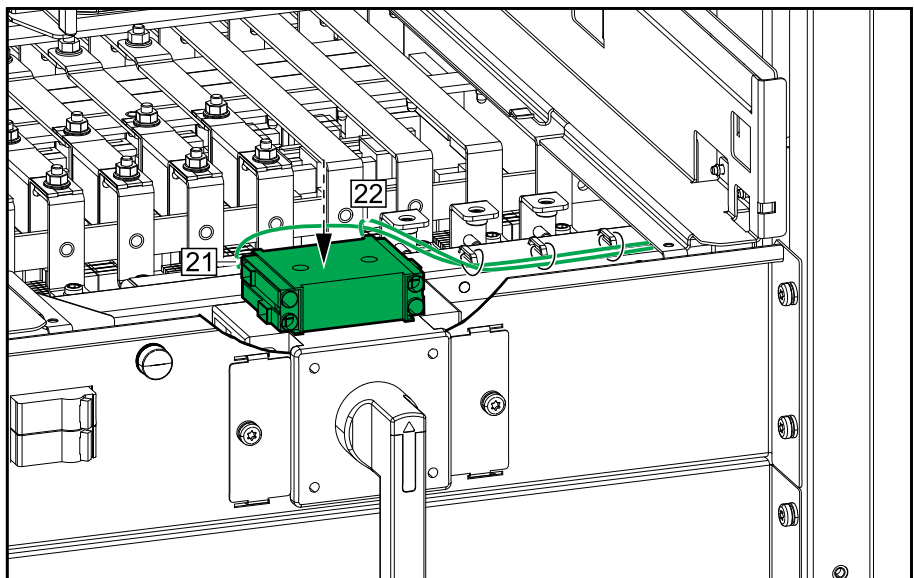
1. Remove the static switch module.



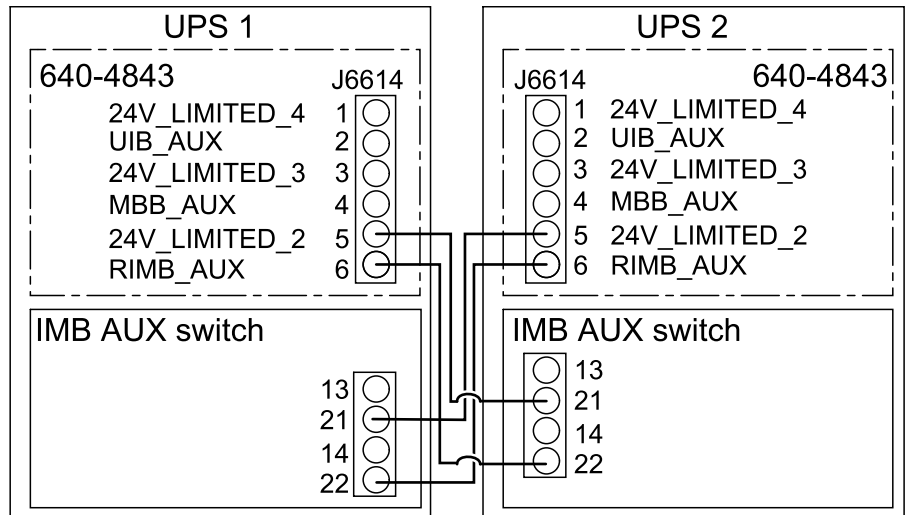
2. Remove the indicated plate.



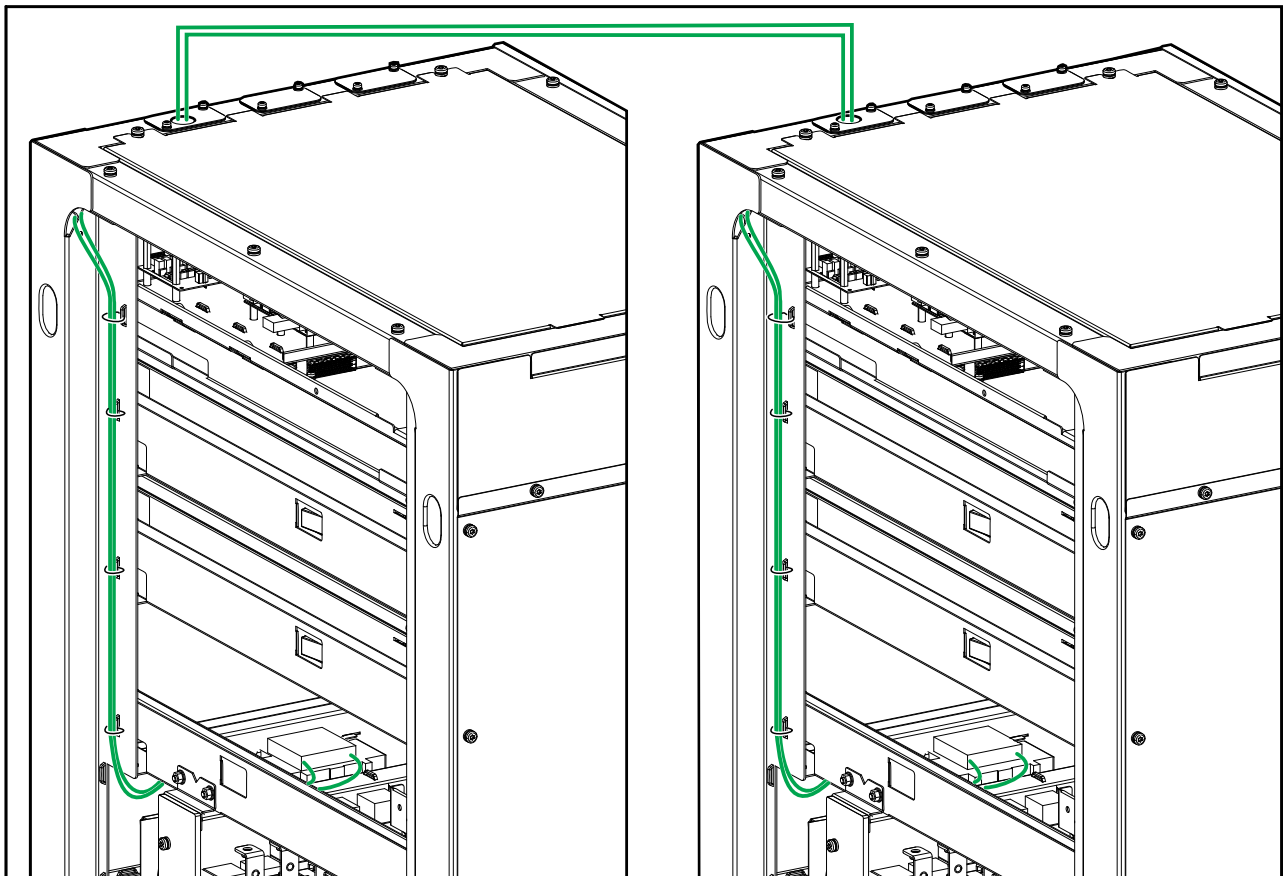
3. Install an additional AUX switch (provided) on the internal maintenance breaker IMB on both UPSs.



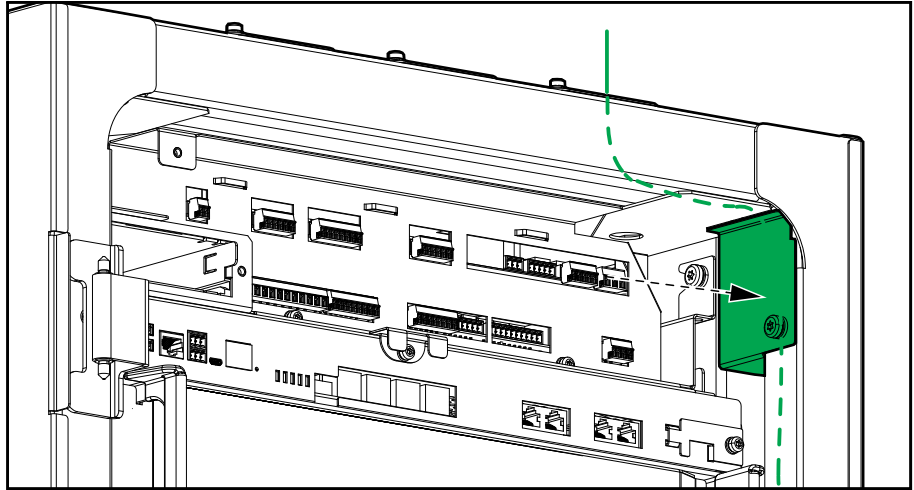
4. Connect the non-Class 2/non-SELV signal cables between the two UPSs.



Rear Right Side View of Simplified 1+1 Parallel System



5. Install the provided cover in the upper right corner.

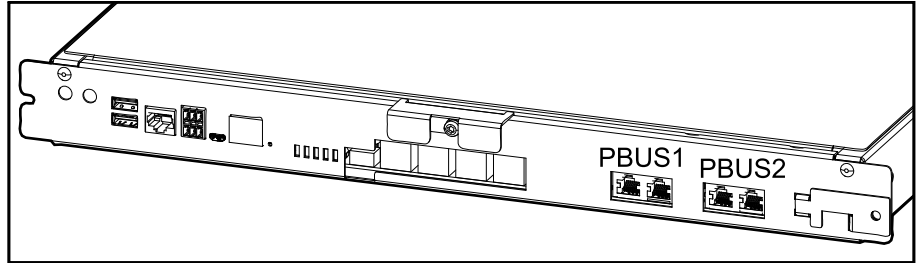


6. Reinstall the plate and the static switch module.
7. Reinstall the right side panel.

Connect the PBUS Cables

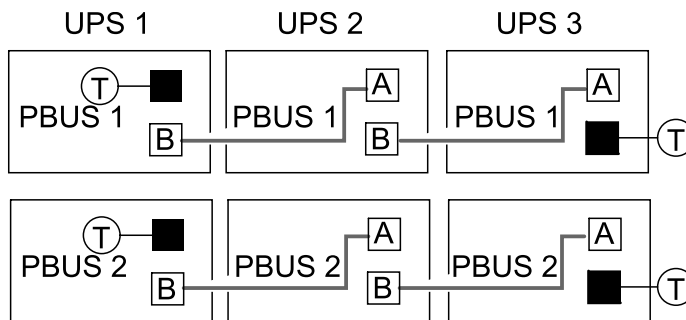
1. Connect the provided PBUS 1 (white) and PBUS 2 (red) cables to the PBUS ports in the UPS controller boxes. Route the PBUS cables through the cable channel in the UPSs.

Front View of Controller Box



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

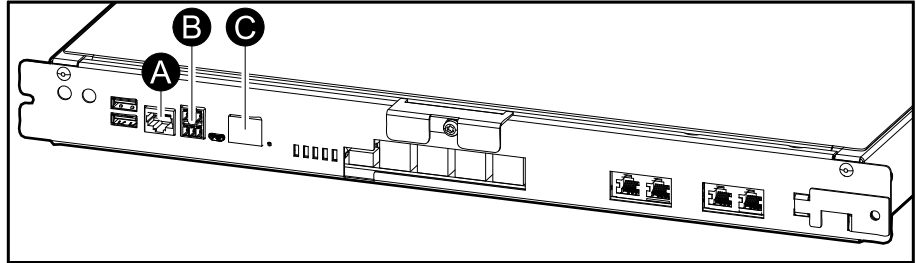
Example of System with Three UPSs in Parallel



Connect the External Communication Cables

1. Connect the external communication cables to the ports in the UPS controller box.

Front View of the Controller Box



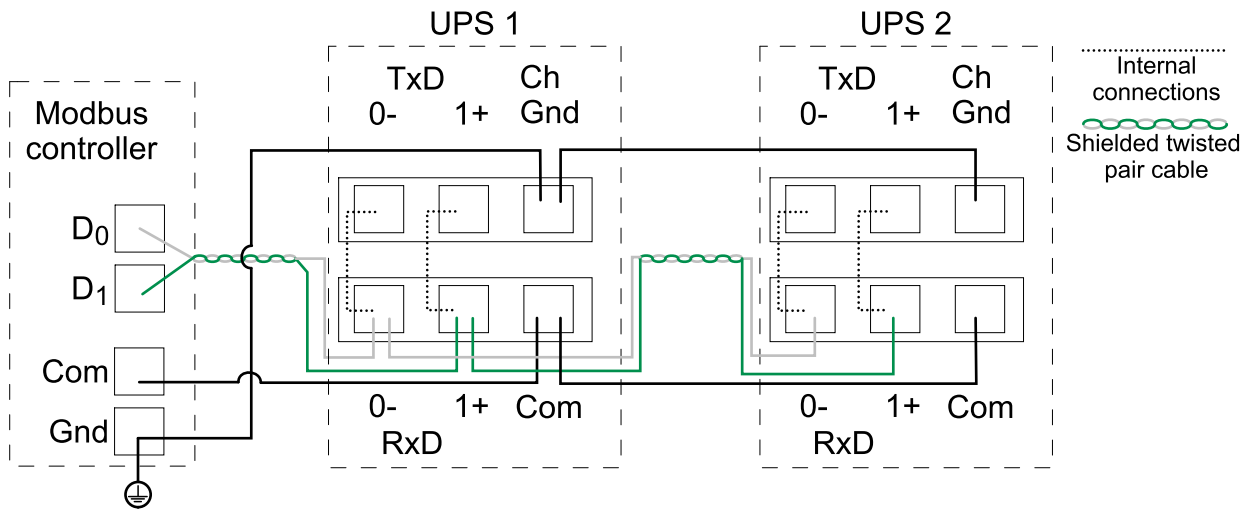
- A. Universal I/O port for built-in network management card.
- B. Modbus port for built-in network management card. See *Connect the Modbus Cables*, page 61.
- C. Network port for built-in network management card. Use a shielded network cable.

NOTE: Check that you are connecting to the correct port to avoid network communication conflicts.

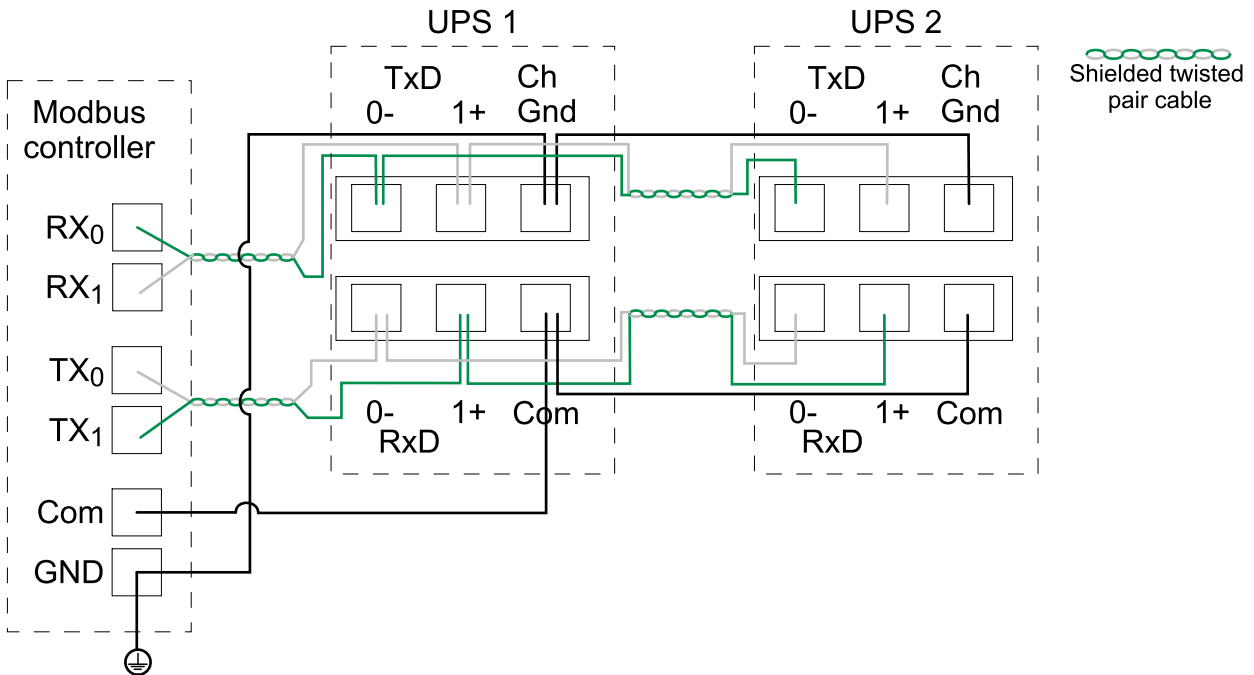
Connect the Modbus Cables

1. Connect the Modbus cables to the UPS(s). Use either 2–wire or 4–wire connection. Shield the cables as shown.
 - Shielded twisted pair cables must be used for Modbus connections. The shield connection to the ground must be as short as possible (ideally below 1 cm). The shield must be connected to each device.
 - Wiring should be done in accordance with local wiring codes.
 - Route signal cables separately from power cables to ensure sufficient isolation.
 - The Modbus port is optically isolated. The ground of the Modbus port is not connected to any other ground.

Example: 2–Wire Connection with Two UPSs



Example: 4–Wire Connection with Two UPSs



2. Install 150 Ohm termination resistors at each end of each bus if the buses are very long and operate at high data rates. Busses under 610 meters (2000 feet) at 9600 baud or under 305 meters (1000 feet) at 19.200 baud should not require termination resistors.

3. Install 400–650 Ohm bias resistors at or inside the system controller; one from D0 to ground and one from D1 to +5 VDC.

Add Translated Safety Labels to Your Product

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

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

Final Installation

⚡⚠ 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.

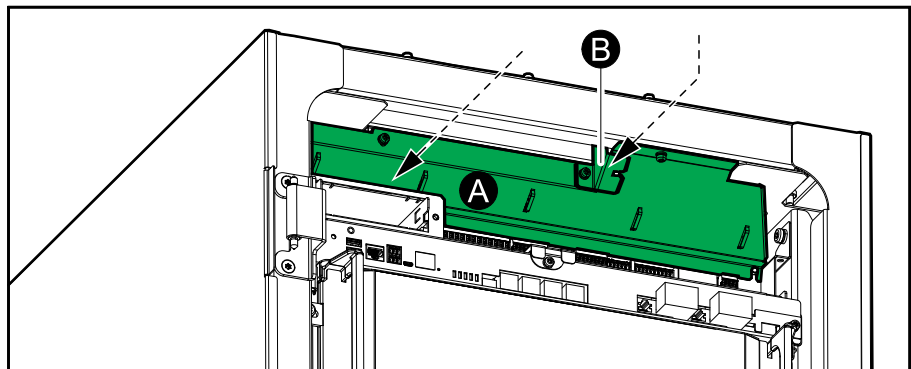
⚠ WARNING

RISK OF EQUIPMENT DAMAGE

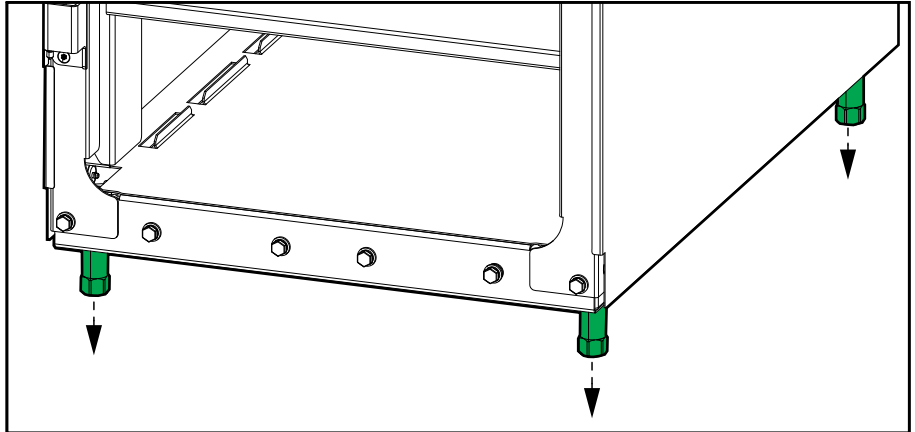
Wait until the system is ready to be powered up before installing batteries in the system. The time duration from battery installation until the UPS system is powered up must not exceed 72 hours or 3 days.

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

1. Reinstall the indicated covers (first A and then B). It may be necessary to disconnect the Class 2/SELV signal cables while fitting the covers in place. Fasten the Class 2/SELV signal cables to the bridges on the covers.



- Lower the front and rear leveling feet on the UPS with a wrench until they connect with the floor. Use a bubble-leveler to check that the UPS is level.



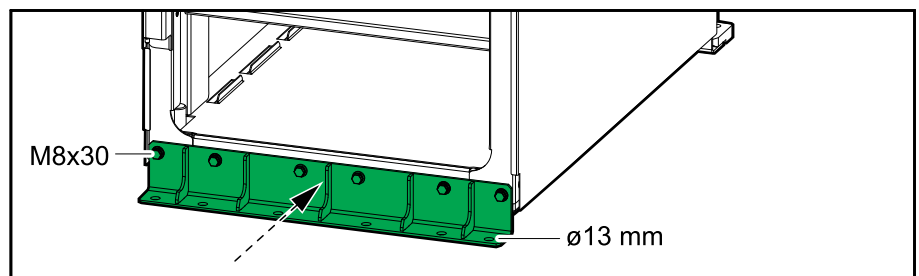
NOTICE

RISK OF EQUIPMENT DAMAGE

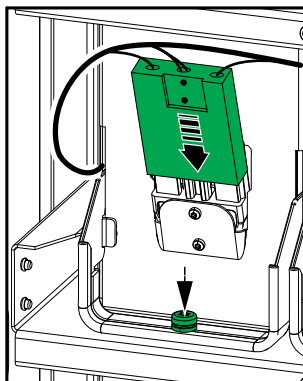
Do not move the cabinet after the leveling feet have been lowered.

Failure to follow these instructions can result in equipment damage.

- Only for seismic anchoring:** Mount the front anchoring bracket on the UPS and to the floor. Use appropriate hardware for the floor type – the hole diameter in the front anchoring bracket is $\varnothing 13$ mm. Minimum requirement is M12 grade 8.8 hardware.

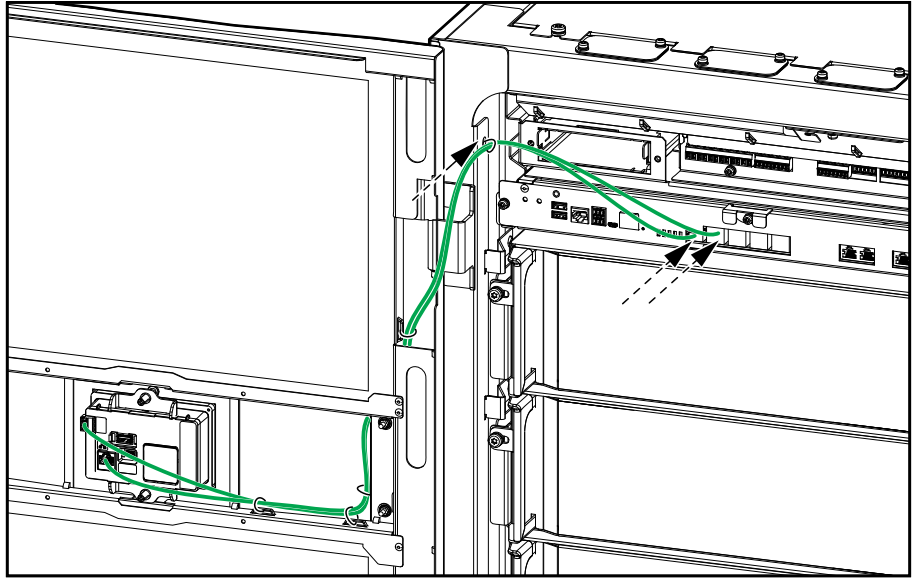


- Set the battery breaker BB to the open (OFF) position.
- Push the battery modules into the slot. Fill the shelves from the bottom and upwards. Always install a complete battery string (four battery modules) on each shelf.
- Turn down the handle on the battery modules and fasten the handle to the shelf with the provided screw.
- Connect the battery terminals to the front of the battery modules.



- Reinstall the battery cover on the UPS.
- Reinstall the front door.

10. Reconnect the two signal cables from the display. Fasten the signal cables with cable ties in the upper left corner.



Schneider Electric
35 rue Joseph Monier
92500 Rueil Malmaison
France

+ 33 (0) 1 41 29 70 00



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

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