

Galaxy VS

UPS for External Batteries

Installation

20-150 kW 380/400/415/440/480 V

10-75 kW 200/208/220 V

Latest updates are available on the Schneider Electric website

7/2023



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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, section 3.102).

FCC Statement

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

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

Electromagnetic Compatibility

NOTICE

RISK OF ELECTROMAGNETIC DISTURBANCE

This is a product category 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 touch current/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.

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

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

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

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

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

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

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

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

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

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

Battery Safety

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

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



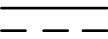




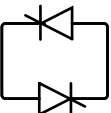


Failure to follow these instructions can result in injury or equipment damage.

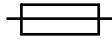
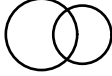
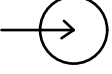
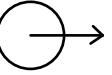
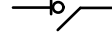
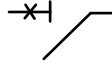
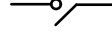


ENERGY STAR Qualification



Select models are ENERGY STAR® qualified. For more information on your specific model go to www.se.com.

Symbols Used

	<p>Earthing/ground symbol.</p>
	<p>Protective earth (PE)/equipment grounding conductor (EGC) symbol.</p>
	<p>Direct current (DC) symbol.</p>
	<p>Alternating current (AC) symbol.</p>
	<p>Positive polarity symbol. It is used to identify the positive terminal(s) of equipment which is used with, or generates direct current.</p>
	<p>Negative polarity symbol. It is used to identify the negative terminal(s) of equipment which is used with, or generates direct current.</p>
	<p>Battery symbol.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>

	<p>Fuse symbol. It is used to identify fuse boxes or their locations.</p>
	<p>Transformer symbol.</p>
	<p>Input symbol. It is used to identify an input terminal when it is necessary to distinguish between inputs and outputs.</p>
	<p>Output symbol. It is used to identify an output terminal when it is necessary to distinguish between inputs and outputs.</p>
	<p>Switch disconnecter symbol. It is used to identify the disconnecting device in the form of switch that protects the equipment from short circuit or heavy load current. It opens the circuits once the current flow crosses its maximum limit.</p>
	<p>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.</p>
	<p>Disconnection device symbol. It is used to identify the disconnecting device in the form of circuit breaker or switch that protects the equipment from short circuit or heavy load current. It opens the circuits once the current flow crosses its maximum limit.</p>
	<p>Neutral symbol. It is used to identify the neutral conductors or their locations.</p>
	<p>Phase conductor symbol. It is used to identify the phase conductors or their locations.</p>

Specifications

Specifications for 400 V Systems

Input Specifications 400 V

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Voltage (V)	380/400/415								
Connections	4-wire (L1, L2, L3, N, PE) WYE (single mains) 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	95/90/87	126/120/116	158/150/144	189/180/173	237/225/217
Maximum input current (A)	39/37/36	58/55/53	77/73/70	93/92/88	116/110/106	154/146/141	185/183/176	231/220/212	278/275/264
Input current limitation (A)	40/38/37	60/57/55	79/75/73	93/93/91	119/113/109	158/148/145	185/184/180	238/226/218	278/278/274
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%								
Total harmonic distortion (THDI)	<5% at 100% load	<3% at 100% load							
Minimum short circuit rating	Dependent on upstream protection. See section for ' Recommended Upstream Protection 400 V ' for details.								
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses								
Ramp-in	Programmable and adaptive 1-40 seconds								

NOTE: For a UPS with N+1 power module, the input power factor is 0.99 at 100% load and the total harmonic distortion (THDI) is <6% at full linear load (symmetrical).

1. TN, TT, and IT power distribution systems are supported. For further information, contact Schneider Electric.
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.

Bypass Specifications 400 V

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Voltage (V)	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)	32/29/28	47/45/43	62/59/57	78/74/71	94/88/85	125/119/114	156/148/143	187/178/172	234/223/215
Nominal neutral current (A) ³	53/50/48	79/75/72	105/100/96	131/125/120	158/150/144	210/200/193	263/250/241	263/250/241	263/250/241
Minimum short circuit rating	Dependent on upstream protection. See section for ' Recommended Upstream Protection 400 V ' for details.								
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s						Built-in backfeed protection and fuses Internal fuse specifications: Rated 550 A, prearcing 52 kA ² s		

3. Harmonic currents in neutral are only considered to be 1.73 x nominal up till 100 kW. Above 100 kW only resistive load is considered.


Output Specifications 400 V

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Voltage (V)	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	91/87/83	122/115/ 111	152/144/ 139	182/173/ 167	228/217/ 209
Minimum short circuit rating ⁴	Dependent on upstream protection. See section for ' Recommended Upstream Protection 400 V ' for details.								
Maximum short circuit rating ⁵	65 kA RMS								
Inverter output short circuit capabilities	Varies with time. See graph and table values in Inverter Short Circuit Capabilities (Bypass not Available), page 52.								
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 62040-3:2021)	VFI-SS-11								
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								

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

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

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.
- Trip delay must be set to zero on all battery breakers.

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

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Charging power in % of output power at 0-40% load ⁶	80%								
Charging power in % of output power at 100% load	20% ⁷								
Maximum charging power (at 0-40% load) (kW) ⁶	16	24	32	40	48	64	80	96	120
Maximum charging power (at 100% load) (kW)	4	6	8	10	12	16	20	24	30
Nominal battery voltage (VDC)	32-48 blocks: 384-576			40-48 blocks: 480-576	35-48 blocks: 420-576	32-48 blocks: 384-576	40-48 blocks: 480-576		
Nominal float voltage (VDC)	32-48 blocks: 436-654			40-48 blocks: 545-654	35-48 blocks: 477-654	32-48 blocks: 436-654	40-48 blocks: 545-654		
Maximum boost voltage (VDC)	720 for 48 blocks								
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C								
End of discharge voltage (full load) (VDC)	32 blocks: 307			40 blocks: 384	35 blocks: 336	32 blocks: 307	40 blocks: 384		
Battery current at full load and nominal battery voltage (A) ⁸	54	81	109	109	130	174	217	260	326
Battery current at full load and minimum battery voltage (A) ⁸	68	102	136	136	163	217	271	326	407
Ripple current	< 5% C20 (5 minute runtime)								
Battery test	Manual/automatic (selectable)								
Maximum short circuit rating	10 kA								

NOTE: For a 60 kW UPS with N+1 power module, the supported battery block quantity is 32-48 blocks.

6. Values based on 48 blocks.
 7. At 380 V only 15% for 50 kW, 100 kW, and 150 kW.
 8. Values based on 20-40 kW: 32 blocks; 50-150 kW: 40 blocks.

Surge Protection Device (SPD)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This UPS is OVCII (Over Voltage Category Class II) compliant. This UPS must only be installed in an OVCII compliant environment.

- If the UPS is installed in an environment with an OVC rating higher than II, an SPD (surge protection device) must be installed upstream of the UPS to reduce the overvoltage category to OVCII.
- The SPD must include a status indicator to show the user if the SPD is operational or is no longer functioning according to design. The status indicator may be visual and/or audible and/or may have remote signalling and/or output contact capability in accordance with IEC 62040-1.

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

Surge Protection Device Requirements

Select a surge protection device that complies with the following requirements:

Class	Type 2
Rated voltage (Ur)	230/400 V, 277/480 V
Voltage protection level (Up)	< 2.5 kV
Short circuit rating (Isc _{cr}) ⁹	According to installation prospective short circuit level
Earthing system ¹⁰	TN-S, TT, IT, TN-C
Poles	3P/4P depending on earthing configuration
Standards	IEC 61643-11 / UL 1449
Monitoring	Yes

9. Lower short circuit rating can be achieved with fuse protection.

10. Corner grounding not permitted.

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+/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 or aluminum 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: For the scalable UPS (GVSUPS50K150HS), always size the cables for a UPS rating of 150 kW.

NOTE: Recommended cable sizes and maximum allowable cable size may vary for the auxiliary products. Not all auxiliary products support aluminum cables. Refer to the installation manual provided with the auxiliary product.

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.

NOTE: 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.

NOTE: 20-40 kW: DC cables are sized according to 32 battery blocks. 50-100 kW: DC cables are sized according to 40 battery blocks.

Copper

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Input phases (mm ²)	6	10	16	25	35	50	70	95	120
Input PE (mm ²)	6	10	16	16	16	25	35	50	70
Bypass/output phases (mm ²)	6	6	10	16	25	35	50	70	95
Bypass PE/output PE (mm ²)	6	6	10	16	16	16	25	35	50
Neutral (mm ²)	10	16	25	35	50	70	95	95	95
DC+/DC- (mm ²)	10	25	35	35	50	70	95	95	2 x 70
DC PE (mm ²)	10	16	16	16	25	35	50	50	70

Aluminum

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Input phases (mm ²)	6	16	25	35	50	70	95	120	150
Input PE (mm ²)	6	16	16	16	25	35	50	70	95
Bypass/output phases (mm ²)	6	10	16	25	35	50	70	95	150
Bypass PE/output PE (mm ²)	6	10	16	16	16	25	35	50	95
Neutral (mm ²)	10	25	35	50	70	95	2 x 70	2 x 70	2 x 70
DC+/DC- (mm ²)	16	35	50	50	70	95	2 x 70	2 x 70	2 x 95
DC PE (mm ²)	16	16	25	25	35	50	70	70	95

Recommended Upstream Protection 400 V

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- For parallel systems, instantaneous override (li) values must not be set higher than 1250 A. Place the label 885-92556 adjacent to the upstream circuit breaker to inform about the hazard.
- For UPS rating 20-120 kW: In parallel systems with three or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (li) values must not be set higher than 1250 A.
- For UPS rating 150 kW: In parallel systems with two or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (li) values must not be set higher than 1250 A.

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

NOTE: Only 3-pole circuit breakers are listed in the table below. For countries where local directives require 4-pole breakers in all positions, the listed references for breakers must be revised for ordering of breakers.

NOTE: For 4-pole breakers in bypass and 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.

NOTE: For the scalable UPS (GVSUPS50K150HS), always size the upstream protection for a UPS rating of 150 kW.

NOTICE

RISK OF UNINTENTIONAL DEVICE OPERATION

If a residual current-operated protective device (RCD-B) is used upstream as ground fault protection, then the RCD-B shall be sized to not trip on the leakage current of this product, which can be up to 91 mA.

Failure to follow these instructions can result in equipment damage.

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

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

Compliance is assured with the recommended breaker (and its settings) from the table below.

Recommended Upstream Protection for 400 V IEC

$I_{k_{Ph-PE}}$ is the minimum prospective phase-to-earth short circuit current required at the input/bypass terminals of the UPS. The $I_{k_{Ph-PE}}$ in the table is based on the recommended protective device.

UPS rating	20 kW		30 kW		40 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
I_{kPh-PE} (kA)	0.6	0.5	0.6	0.5	0.7	0.6
Breaker type	NSX100H TM40D (C10H3TM040)	NSX100H TM32D (C10H3TM032)	NSX100H TM63D (C10H3TM063)	NSX100H TM50D (C10H3TM050)	NSX100H TM80D (C10H3TM080)	NSX100H TM63D (C10H3TM063)
I _n	40	32	63	50	80	63
I _r	40	32	63	50	80	63
I _m	500 (fixed)	400 (fixed)	500 (fixed)	500 (fixed)	640 (fixed)	500 (fixed)

UPS rating	50 kW		60 kW		80 kW		100 kW	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
I_{kPh-PE} (kA)	0.8	0.7	1.5	0.8	1.6	1.5	2	1.6
Breaker type	NSX100H TM100D (C10H3TM100)	NSX100H TM80D (C10H3TM080)	NSX160H TM125D (C16H3TM125)	NSX100H TM100D (C10H3TM100)	NSX160H TM160D (C16H3TM160)	NSX160H TM125D (C16H3TM125)	NSX250H TM200D (C25H3TM200)	NSX160H TM160D (C16H3TM160)
I _n	100	80	125	100	160	125	200	160
I _r	100	80	125	100	160	125	200	160
I _m	800 (fixed)	640 (fixed)	1250 (fixed)	800 (fixed)	1250 (fixed)	1250 (fixed)	≤6 x I _n	1250 (fixed)

UPS rating	120 kW		150 kW	
	Input	Bypass	Input	Bypass
I_{kPh-PE} (kA)	2.5	2	3	2.5
Breaker type	NSX250H TM250D (C25H3TM250)	NSX250H TM200 (C25H3TM200)	NSX400H Mic.L 2.3 (C40H32D400)	NSX250H TM250 (C25H3TM250)
I _n /I _o	250	200	280	250
I _r	250	200	280	250
t _r	–	–	–	–
I _m /I _{sd}	≤5 x I _n	≤6 x I _n	10	≤5 x I _n
t _{sd}	–	–	–	–
I _i	–	–	–	–

UPS rating	20-60 kW	80 kW	100-150 kW
	Battery		
Breaker type	ComPacT NSX250S (C25S3TM250D)		ComPacT NSX630S DC (C63S3TM600D)
I _r	175	225	420
I _m	1250	1250	1500

Recommended Bolt and Lug Sizes for IEC

Cable size mm ²	Bolt size	Cable lug type
6	M8 x 25 mm	TLK6-8
10	M8 x 25 mm	TLK10-8
16	M8 x 25 mm	TLK16-8
25	M8 x 25 mm	TLK25-8
35	M8 x 25 mm	TLK35-8
50	M8 x 25 mm	TLK50-8
70	M8 x 25 mm	TLK70-8
95	M8 x 25 mm	TLK95-8
120	M8 x 25 mm	TLK120-8
150	M8 x 25 mm	TLK150-8

Specifications for 440 V Marine Systems

NOTE: 440 V is only applicable for the marine UPS models.

Input Specifications 440 V Marine Systems

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Connections	3-wire (L1, L2, L3, PE) WYE or 4-wire (L1, L2, L3, N, PE) WYE (single mains) 3-wire (L1, L2, L3, PE) WYE (dual mains)								
Input voltage range (V)	374-506								
Frequency range (Hz)	40-70								
Nominal input current (A)	28	41	55	69	82	109	137	165	204
Maximum input current (A)	34	51	66	82	99	131	166	199	248
Input current limitation (A)	35	53	68	84	103	136	168	205	252
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%								
Total harmonic distortion (THDI)	<5% at 100% load			<3% at 100% load	<5% at 100% load		<3% at 100% load	<5% at 100% load	<3% at 100% load
Minimum short circuit rating	Dependent on upstream protection. See section for ' Recommended Upstream Protection 440 V Marine Systems ' for details.								
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses								
Ramp-in	Programmable and adaptive 1-40 seconds								

NOTE: For a UPS with N+1 power module, the input power factor is 0.99 at 100% load and the total harmonic distortion (THDI) is <6% at full linear load (symmetrical).

Bypass Specifications 440 V Marine Systems

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Connections	3-wire (L1, L2, L3, PE) WYE or 4-wire (L1, L2, L3, N, PE) WYE								
Bypass voltage range (V)	396-484								
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)								
Nominal bypass current (A)	27	40	54	68	81	108	134	162	202
Nominal neutral current (A) ¹¹	45	67	92	116	138	183	228	228	228
Minimum short circuit rating	Dependent on upstream protection. See section for ' Recommended Upstream Protection 440 V Marine Systems ' for details.								
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s						Built-in backfeed protection and fuses Internal fuse specifications: Rated 550 A, prearcing 52 kA ² s		

11. Harmonic currents in neutral are only considered to be 1.73 x nominal up till 100 kW. Above 100 kW only resistive load is considered.

Output Specifications 440 V Marine Systems

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Connections	3-wire (L1, L2, L3, PE) or 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)	26	39	52	66	79	105	131	157	197
Minimum short circuit rating ¹²	Dependent on upstream protection. See section for 'Recommended Upstream Protection 440 V Marine Systems' for details.								
Maximum short circuit rating ¹³	65 kA RMS								
Inverter output short circuit capabilities	Varies with time. See graph and table values in Inverter Short Circuit Capabilities (Bypass not Available), page 52.								
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								

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

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

Battery Specifications 440 V Marine Systems

⚠️⚠️ 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.
- Trip delay must be set to zero on all battery breakers.

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

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Charging power in % of output power at 0-40% load ¹⁴	80%								
Charging power in % of output power at 100% load	20%								
Maximum charging power (at 0-40% load) (kW) ¹⁴	16	24	32	40	48	64	80	96	120
Maximum charging power (at 100% load) (kW)	4	6	8	10	12	16	20	24	30
Nominal battery voltage (VDC)	32-48 blocks: 384-576			40-48 blocks: 480-576	35-48 blocks: 420-576	32-48 blocks: 384-576	40-48 blocks: 480-576		
Nominal float voltage (VDC)	32-48 blocks: 436-654			40-48 blocks: 545-654	35-48 blocks: 477-654	32-48 blocks: 436-654	40-48 blocks: 545-654		
Maximum boost voltage (VDC)	720 for 48 blocks								
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C								
End of discharge voltage (full load) (VDC)	32 blocks: 307			40 blocks: 384	35 blocks: 336	32 blocks: 307	40 blocks: 384		
Battery current at full load and nominal battery voltage (A) ¹⁵	54	81	108	108	130	173	216	260	326
Battery current at full load and minimum battery voltage (A) ¹⁵	68	101	135	135	162	216	270	325	406
Ripple current	< 5% C20 (5 minute runtime)								
Battery test	Manual/automatic (selectable)								
Maximum short circuit rating	10 kA								

14. Values based on 48 blocks.

15. Values based on 20-40 kW: 32 blocks; 50-150 kW: 40 blocks.

Surge Protection Device (SPD)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This UPS is OVCII (Over Voltage Category Class II) compliant. This UPS must only be installed in an OVCII compliant environment.

- If the UPS is installed in an environment with an OVC rating higher than II, an SPD (surge protection device) must be installed upstream of the UPS to reduce the overvoltage category to OVCII.
- The SPD must include a status indicator to show the user if the SPD is operational or is no longer functioning according to design. The status indicator may be visual and/or audible and/or may have remote signalling and/or output contact capability in accordance with IEC 62040-1.

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

Surge Protection Device Requirements

Select a surge protection device that complies with the following requirements:

Class	Type 2
Rated voltage (Ur)	230/400 V, 277/480 V
Voltage protection level (Up)	< 2.5 kV
Short circuit rating (Isc _{cr}) ¹⁶	According to installation prospective short circuit level
Earthing system ¹⁷	TN-S, TT, IT, TN-C
Poles	3P/4P depending on earthing configuration
Standards	IEC 61643-11 / UL 1449
Monitoring	Yes

16. Lower short circuit rating can be achieved with fuse protection.

17. Corner grounding not permitted.

Recommended Cable Sizes 440 V Marine Systems

⚠️ 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+/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 or aluminum 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: Recommended cable sizes and maximum allowable cable size may vary for the auxiliary products. Not all auxiliary products support aluminum cables. Refer to the installation manual provided with the auxiliary product.

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.

NOTE: 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.

NOTE: 20-40 kW: DC cables are sized according to 32 battery blocks. 50-100 kW: DC cables are sized according to 40 battery blocks.

Copper

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Input phases (mm ²)	6	10	16	25	35	50	70	95	120
Input PE (mm ²)	6	10	16	16	16	25	35	50	70
Bypass/output phases (mm ²)	6	6	10	16	25	35	50	70	95
Bypass PE/output PE (mm ²)	6	6	10	16	16	16	25	35	50
Neutral (mm ²)	10	16	25	35	50	70	95	95	95
DC+/DC- (mm ²)	10	25	35	35	50	70	95	95	2 x 70
DC PE (mm ²)	10	16	16	16	25	35	50	50	70

Aluminum

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Input phases (mm ²)	6	16	25	35	50	70	95	120	150
Input PE (mm ²)	6	16	16	16	25	35	50	70	95

Aluminum (Continued)

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Bypass/output phases (mm ²)	6	10	16	25	35	50	70	95	150
Bypass PE/output PE (mm ²)	6	10	16	16	16	25	35	50	95
Neutral (mm ²)	10	25	35	50	70	95	2 x 70	2 x 70	2 x 70
DC+/DC- (mm ²)	16	35	50	50	70	95	2 x 70	2 x 70	2 x 95
DC PE (mm ²)	16	16	25	25	35	50	70	70	95

Recommended Upstream Protection 440 V Marine Systems

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- For parallel systems, instantaneous override (Ii) values must not be set higher than 1250 A. Place the label 885-92556 adjacent to the upstream circuit breaker to inform about the hazard.
- For UPS rating 20-120 kW: In parallel systems with three or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (Ii) values must not be set higher than 1250 A.
- For UPS rating 150 kW: In parallel systems with two or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (Ii) values must not be set higher than 1250 A.

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

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

NOTICE

RISK OF UNINTENTIONAL DEVICE OPERATION

If a residual current-operated protective device (RCD-B) is used upstream as ground fault protection, then the RCD-B shall be sized to not trip on the leakage current of this product, which can be up to 91 mA.

Failure to follow these instructions can result in equipment damage.

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

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

Compliance is assured with the recommended breaker (and its settings) from the table below.

Recommended Upstream Protection 440 V IEC Marine Systems

$I_{k_{Ph-PE}}$ is the minimum prospective phase-to-earth short circuit current required at the input/bypass terminals of the UPS. The $I_{k_{Ph-PE}}$ in the table is based on the recommended protective device.

UPS rating	20 kW		30 kW		40 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
I_{kPh-PE} (kA)	0.6	0.5	0.6	0.5	0.7	0.6
Breaker type	NSX100H TM40D (C10H3TM040)	NSX100H TM32D (C10H3TM032)	NSX100H TM63D (C10H3TM063)	NSX100H TM50D (C10H3TM050)	NSX100H TM80D (C10H3TM080)	NSX100H TM63D (C10H3TM063)
I _n	40	32	63	50	80	63
I _r	40	32	63	50	80	63
I _m	500 (fixed)	400 (fixed)	500 (fixed)	500 (fixed)	640 (fixed)	500 (fixed)

UPS rating	50 kW		60 kW		80 kW		100 kW	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
I_{kPh-PE} (kA)	0.8	0.7	1.5	0.8	1.6	1.5	2	1.6
Breaker type	NSX100H TM100D (C10H3TM100)	NSX100H TM80D (C10H3TM080)	NSX160H TM125D (C16H3TM125)	NSX100H TM100D (C10H3TM100)	NSX160H TM160D (C16H3TM160)	NSX160H TM125D (C16H3TM125)	NSX250H TM200D (C25H3TM200)	NSX160H TM160D (C16H3TM160)
I _n	100	80	125	100	160	125	200	160
I _r	100	80	125	100	160	125	200	160
I _m	800 (fixed)	640 (fixed)	1250 (fixed)	800 (fixed)	1250 (fixed)	1250 (fixed)	≤6 x I _n	1250 (fixed)

UPS rating	120 kW		150 kW	
	Input	Bypass	Input	Bypass
I_{kPh-PE} (kA)	2.5	2	3	2.5
Breaker type	NSX250H TM250D (C25H3TM250)	NSX250H TM200 (C25H3TM200)	NSX400H Mic.L 2.3 (C40H32D400)	NSX250H TM250 (C25H3TM250)
I _n /I _o	250	200	280	250
I _r	250	200	280	250
t _r	–	–	–	–
I _m /I _{sd}	≤5 x I _n	≤6 x I _n	10	≤5 x I _n
t _{sd}	–	–	–	–
I _i	–	–	–	–

UPS rating	20-60 kW	80 kW	100-150 kW
	Battery		
Breaker type	ComPacT NSX250S (C25S3TM250D)		ComPacT NSX630S DC (C63S3TM600D)
I _r	175	225	420
I _m	1250	1250	1500

Recommended Bolt and Lug Sizes for IEC

Cable size mm ²	Bolt size	Cable lug type
6	M8 x 25 mm	TLK6-8
10	M8 x 25 mm	TLK10-8
16	M8 x 25 mm	TLK16-8
25	M8 x 25 mm	TLK25-8
35	M8 x 25 mm	TLK35-8
50	M8 x 25 mm	TLK50-8
70	M8 x 25 mm	TLK70-8
95	M8 x 25 mm	TLK95-8
120	M8 x 25 mm	TLK120-8
150	M8 x 25 mm	TLK150-8

Specifications for 480 V Systems

The supply for input and bypass must be solid-grounded WYE transformers. Delta input supply for either input or bypass is not permitted.

The UPS system must be installed as a separately derived system. Leakage currents will occur in the bonding jumper and the technical/system earth.

Input Specifications 480 V

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Connections	3-wire (L1, L2, L3, G) WYE or 4-wire (L1, L2, L3, N, G) WYE (single mains) 3-wire (L1, L2, L3, G) WYE (dual mains)								
Input voltage range (V)	408-552								
Frequency range (Hz)	40-70								
Nominal input current (A)	25	37	50	62	74	99	124	149	186
Maximum input current (A)	31	46	61	75	91	121	152	182	227
Input current limitation (A)	31	48	63	77	95	126	154	188	231
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%								
Total harmonic distortion (THDI)	<5% at 100% load			<3% at 100% load	<5% at 100% load		<3% at 100% load	<5% at 100% load	<3% at 100% load
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses								
Ramp-in	Programmable and adaptive 1-40 seconds								

NOTE: For a UPS with N+1 power module, the input power factor is 0.99 at 100% load and the total harmonic distortion (THDI) is <6% at full linear load (symmetrical).

Bypass Specifications 480 V

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Connections	3-wire (L1, L2, L3, G) WYE or 4-wire (L1, L2, L3, N, G) WYE								
Bypass voltage range (V)	432-528								
Frequency range (Hz)	50/60 ± 1, 50/60 ± 3, 50/60 ± 10 (user selectable)								
Nominal bypass current (A)	25	37	50	62	74	99	123	148	185
Nominal neutral current (A) ¹⁸	42	62	83	104	125	166	208	208	208
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s							Built-in backfeed protection and fuses Internal fuse specifications: Rated 550 A, prearcing 52 kA ² s	

18. Harmonic currents in neutral are only considered to be 1.73 x nominal up till 100 kW. Above 100 kW only resistive load is considered.


Output Specifications 480 V

NOTE: The number of output connections must match the number of input wires in a single mains system or bypass wires in a dual mains system.

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Connections	3-wire (L1, L2, L3, G, GEC ¹⁹) or 4-wire (L1, L2, L3, N, G)								
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	72	96	120	144	180
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								

19. Per NEC 250.30.

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.
- Trip delay must be set to zero on all battery breakers.

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

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Charging power in % of output power at 0-40% load ²⁰	80%								
Charging power in % of output power at 100% load	20%								
Maximum charging power (at 0-40% load) (kW) ²⁰	16	24	32	40	48	64	80	96	120
Maximum charging power (at 100% load) (kW)	4	6	8	10	12	16	20	24	30
Nominal battery voltage (VDC)	32-48 blocks: 384-576			40-48 blocks: 480-576	35-48 blocks: 420-576	32-48 blocks: 384-576	40-48 blocks: 480-576		
Nominal float voltage (VDC)	32-48 blocks: 436-654			40-48 blocks: 545-654	35-48 blocks: 477-654	32-48 blocks: 436-654	40-48 blocks: 545-654		
Maximum boost voltage (VDC)	720 for 48 blocks								
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C								
End of discharge voltage (full load) (VDC)	32 blocks: 307			40 blocks: 384	35 blocks: 336	32 blocks: 307	40 blocks: 384		
Battery current at full load and nominal battery voltage (A) ²¹	54	81	108	108	130	173	216	260	326
Battery current at full load and minimum battery voltage (A) ²¹	68	101	135	135	162	216	270	325	406
Ripple current	< 5% C20 (5 minute runtime)								
Battery test	Manual/automatic (selectable)								
Maximum short circuit rating	10 kA								

NOTE: For a 60 kW UPS with N+1 power module, the supported battery block quantity is 32-48 blocks.

20. Values based on 48 blocks.

21. Values based on 20-40 kW: 32 blocks; 50-150 kW: 40 blocks.

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+/DC- busbars; Six on N/G 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) conductors (75 °C (167 °F) termination)
- An ambient temperature of 30 °C (86 °F)
- Use of copper or aluminum conductors

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

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.

NOTE: For the scalable UPS (GVSUPS50K150GS), always size the cables for a UPS rating of 150 kW.

NOTE: Recommended cable sizes and maximum allowable cable size may vary for the auxiliary products. Not all auxiliary products support aluminum cables. Refer to the installation manual provided with the auxiliary product.

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 EGC cable sizes and ensure that the DC cable sizes match the battery breaker rating.

NOTE: 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.

NOTE: 20-40 kW: DC cables are sized according to 32 battery blocks. 50-100 kW: DC cables are sized according to 40 battery blocks.

Copper

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Input phases (AWG/kcmil)	8	6	4	3	1	2/0	3/0	4/0	300
Input EGC (AWG/kcmil)	10	8	8	6	6	6	4	4	4
Bypass/output phases (AWG/kcmil)	10	8	6	4	3	1	2/0	3/0	4/0
Bypass EGC/output EGC (AWG/kcmil)	10	10	8	8	8	6	6	6	4
Neutral (AWG/kcmil)	6	4	2	1/0	2/0	4/0	2 x 1/0	2 x 1/0	2 x 1/0
DC+/DC-(AWG/kcmil)	4	2	1/0	1/0	2/0	4/0	2 x 1/0	2 x 3/0	2 x 4/0
DC EGC (AWG/kcmil)	8	6	6	6	6	4	4	3	2

Aluminum

UPS rating	20 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW
Input phases (AWG/kcmil)	6	4	2	1	1/0	3/0	250	300	2 x 3/0
Input EGC (AWG/kcmil)	6	6	6	4	4	4	2	2	2 x 2
Bypass/output phases (AWG/kcmil)	6	6	4	2	1	2/0	3/0	250	300
Bypass EGC/output EGC (AWG/kcmil)	6	6	6	6	6	4	4	4	2
Neutral (AWG/kcmil)	4	2	1/0	2/0	4/0	2 x 1/0	2 x 2/0	2 x 250	2 x 2/0
DC+/DC-(AWG/kcmil)	3	1/0	2/0	2/0	4/0	2 x 1/0	2 x 3/0	1	2 x 250
DC EGC (AWG/kcmil)	6	4	4	4	4	2	2	2 x 1	2 x 1/0

NOTE: For DC EGC aluminum cables used in parallel conduits, EGC must be full-sized in order to prevent overload or burnout of cables.

NOTE: 80% rated circuit breakers for UIB, UOB, MBB, SSIB.

Recommended Upstream Protection 480 V

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- For parallel systems, instantaneous override (li) values must not be set higher than 1250 A. Place the label 885-92556 adjacent to the upstream circuit breaker to inform about the hazard.
- For UPS rating 20-120 kW: In parallel systems with three or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (li) values must not be set higher than 1250 A.
- For UPS rating 150 kW: In parallel systems with two or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (li) values must not be set higher than 1250 A.

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

⚠ CAUTION

HAZARD OF FIRE

- Connect only to a circuit with the below specifications.
- Connect to a circuit provided with a 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: For the scalable UPS (GVSUPS50K150GS), always size the upstream protection for a UPS rating of 150 kW.

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

NOTE: Circuit breakers listed below are 80% rated.

UPS rating	20 kW		30 kW		40 kW		50 kW	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36100U31X							
I _r	40	35	60	50	80	70	100	80
tr @ 6 I _r	0.5-16							
li (x I _n)	≤8							

UPS rating	60 kW		80 kW		100 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36150U31X	HJF36100U31X	JJF36250U31X	HJF36150U31X	JJF36250U31X	
I _r	125	100	175	125	200	175
tr @ 6 I _r	0.5-16					
li (x I _n)	≤10	≤12	≤5	≤8	≤5	

UPS rating	120 kW		150 kW	
	Input	Bypass	Input	Bypass
Breaker type	JJF36250U31X	JJF36250U31X	LJF36400U31X	JJF36250U31X
I _r	250	200	300	250

UPS rating	120 kW		150 kW	
	Input	Bypass	Input	Bypass
tr @ 6 lr	0.5-16			
li (x ln)	≤5		≤3	≤5

Recommended Bolt and Lug Sizes for UL

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

Aluminum — One Hole Cable Lugs

Cable size	Bolt size	Cable lug type	Crimping tool	Die
6 AWG	M8 x 25 mm	LAA6-56-X	CT-720	CD-720-1 Gray P29
4 AWG	M8 x 25 mm	LAA4-56-X	CT-720	CD-720-2 Green P37
3 AWG	M8 x 25 mm	LAA3-56-X	CT-720	CD-720-2 Green P37
2 AWG	M8 x 25 mm	LAA2-56-X	CT-720	CD-720-2 Pink P42
1 AWG	M8 x 25 mm	LAA1-56-X	CT-720	CD-720-2 Gold P45
1/0 AWG	M8 x 25 mm	LAA1/0-56-X	CT-720	CD-720-2 Tan P50
2/0 AWG	M8 x 25 mm	LAA2/0-56-5	CT-720	CD-720-3 Olive P54
3/0 AWG	M8 x 25 mm	LAA3/0-56-5	CT-720	CD-720-3 Ruby P60
4/0 AWG	M8 x 25 mm	LAA4/0-56-5	CT-720	CD-720-4 White P66
250 kcmil	M8 x 25 mm	LAA250-56-5	CT-720	CD-720-5 Red P71
300 kcmil	M8 x 25 mm	LAA300-56-5	CT-720	CD-720-6 Blue P76

Aluminum — Two Hole Cable Lugs

Cable size	Bolt size	Cable lug type	Crimping tool	Die
2/0 AWG	M8 x 25 mm	LAB2/0-12-5	CT-720	CD-720-3 Olive P54
3/0 AWG	M8 x 25 mm	LAB3/0-12-5	CT-720	CD-720-3 Ruby P60
4/0 AWG	M8 x 25 mm	LAB4/0-12-5	CT-720	CD-720-4 White P66
250 kcmil	M8 x 25 mm	LAB250-12-2	CT-720	CD-720-5 Red P71
300 kcmil	M8 x 25 mm	LAB300-12-2	CT-720	CD-720-6 Blue P76

Specifications for 208 V Systems

Input Specifications 208 V

UPS rating	10 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	75 kW
Voltage (V)	200/208/220								
Connections	4-wire (L1, L2, L3, N, G) WYE (single mains) 3-wire (L1, L2, L3, G) 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	93/90/85	124/119/113	155/149/141	186/179/169	233/224/212
Maximum input current (A)	38/37/35	57/55/52	75/73/69	93/92/86	114/109/104	152/145/137	185/182/172	227/219/206	278/274/258
Input current limitation (A)	40/38/36	59/56/53	78/75/71	93/92/86	117/111/106	156/149/141	185/182/172	233/224/211	278/274/258
Input power factor	0.99 for load greater than 50% 0.95 for load greater than 25%								
Total harmonic distortion (THDI)	<5% at 100% load	<3% at 100% load						<5% at 100% load	<3% at 100% load
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses								
Ramp-in	Programmable and adaptive 1-40 seconds								

NOTE: For a UPS with N+1 power module, the input power factor is 0.99 at 100% load and the total harmonic distortion (THDI) is <6% at full linear load (symmetrical).

Bypass Specifications 208 V

UPS rating	10 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	75 kW
Voltage (V)	200/208/220								
Connections	4-wire (L1, L2, L3, N, G) 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)	30/29/28	45/43/41	59/57/54	74/71/67	88/85/81	119/114/108	148/142/135	178/171/162	223/214/202
Nominal neutral current (A) ²²	50/48/45	75/72/68	100/96/91	125/120/114	150/144/136	200/192/182	250/240/227	250/240/227	250/240/227
Maximum short circuit rating	65 kA RMS								
Protection	Built-in backfeed protection and fuses Internal fuse specifications: Rated 400 A, prearcing 33 kA ² s							Built-in backfeed protection and fuses Internal fuse specifications: Rated 550 A, prearcing 52 kA ² s	

22. Harmonic currents in neutral are only considered to be 1.73 x nominal up till 50 kW. Above 50 kW only resistive load is considered.

Output Specifications 208 V

UPS rating	10 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	75 kW
Voltage (V)	200/208/220								
Connections	4-wire (L1, L2, L3, N, G)								
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	87/83/79	115/111/105	144/139/131	173/167/157	217/208/197
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)	<2%								
Load crest factor	2.5								
Load power factor	From 0.7 leading to 0.7 lagging without any derating								

Battery Specifications 208 V



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.
- Trip delay must be set to zero on all battery breakers.

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

UPS rating	10 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	75 kW
Charging power in % of output power at 0-40% load ²³	80%								
Charging power in % of output power at 100% load	20%								
Maximum charging power (at 0-40% load) (kW) ²³	8	12	16	20	24	32	40	48	60
Maximum charging power (at 100% load) (kW)	2	3	4	5	6	8	10	12	15
Nominal battery voltage (VDC)	32-40 blocks: 384-480								
Nominal float voltage (VDC)	32-40 blocks: 436-545								
Maximum boost voltage (VDC)	600 for 40 blocks								
Temperature compensation (per cell)	-3.3mV/°C, for T ≥ 25 °C – 0mV/°C, for T < 25 °C								
End of discharge voltage (full load) (VDC)	32 blocks: 307								
Battery current at full load and nominal battery voltage (A) ²⁴	27	41	55	68	82	109	136	164	205
Battery current at full load and minimum battery voltage (A) ²⁴	34	51	68	85	102	136	170	204	254
Ripple current	< 5% C20 (5 minute runtime)								
Battery test	Manual/automatic (selectable)								
Maximum short circuit rating	10 kA								

23. Values based on 40 blocks.

24. Values based on 32 blocks.

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+/DC- busbars; Six on N/G 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) conductors (75 °C (167 °F) termination)
- An ambient temperature of 30 °C (86 °F)
- Use of copper or aluminum conductors

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

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

NOTE: For the scalable UPS (GVSUPS25K75FS), always size the cables for a UPS rating of 75 kW.

NOTE: Recommended cable sizes and maximum allowable cable size may vary for the auxiliary products. Not all auxiliary products support aluminum cables. Refer to the installation manual provided with the auxiliary product.

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 EGC cable sizes and ensure that the DC cable sizes match the battery breaker rating.

NOTE: 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.

Copper

UPS rating	10 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	75 kW
Input phases (AWG/kcmil)	8	4	3	2	1/0	3/0	4/0	300	2 x 2/0
Input EGC (AWG/kcmil)	10	8	8	6	6	6	4	4	3
Bypass/output phases (AWG/kcmil)	8	6	4	3	2	1/0	3/0	4/0	300
Bypass EGC/output EGC (AWG/kcmil)	10	10	8	8	6	6	6	4	4
Neutral (AWG/kcmil)	6	3	1	2/0	3/0	2 x 1/0	2 x 2/0	2 x 2/0	2 x 2/0
DC+/DC-(AWG/kcmil)	10	6	4	4	2	1/0	2/0	4/0	250
DC EGC (AWG/kcmil)	10	10	8	8	6	6	6	4	4

Aluminum

UPS rating	10 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	75 kW
Input phases (AWG/kcmil)	6	3	1	1/0	3/0	250	300	2 x 3/0	4/0
Input EGC (AWG/kcmil)	6	6	6	4	4	4	2	2 x 2	1
Bypass/output phases (AWG/kcmil)	6	4	3	1	1/0	3/0	250	300	2 x 3/0
Bypass EGC/output EGC (AWG/kcmil)	6	6	6	6	4	4	4	2	2
Neutral (AWG/kcmil)	4	1	2/0	4/0	2 x 1/0	2 x 2/0	2 x 4/0	2 x 4/0	2 x 4/0
DC+/DC-(AWG/kcmil)	8	4	3	2	1/0	3/0	4/0	250	2 x 3/0
DC EGC (AWG/kcmil)	6	6	6	6	4	4	4	2	2

NOTE: For DC EGC aluminum cables used in parallel conduits, EGC must be full-sized in order to prevent overload or burnout of cables.

NOTE: 80% rated circuit breakers for UIB, UOB, MBB, SSIB.

Recommended Upstream Protection 208 V

⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- For parallel systems, instantaneous override (li) values must not be set higher than 1250 A. Place the label 885-92556 adjacent to the upstream circuit breaker to inform about the hazard.
- For UPS rating 10-60 kW: In parallel systems with three or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (li) values must not be set higher than 1250 A.
- For UPS rating 75 kW: In parallel systems with two or more UPSs, a circuit breaker must be installed on the output of each UPS. The unit output breaker (UOB) instantaneous override (li) values must not be set higher than 1250 A.

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

⚠️ CAUTION

HAZARD OF FIRE

- Connect only to a circuit with the below specifications.
- Connect to a circuit provided with a 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: For the scalable UPS (GVSUPS25K75FS), always size the upstream protection for a UPS rating of 75 kW.

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

UPS rating	10 kW		15 kW		20 kW		25 kW	
	Input	Bypass	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36100U31X						HJF36150-U31X	HJF36100-U31X
I _r	50	40	80	60	100	80	125	100
tr @ 6 I _r	0.5-16							
li (x I _n)	≤8						≤5	≤8

UPS rating	30 kW		40 kW		50 kW	
	Input	Bypass	Input	Bypass	Input	Bypass
Breaker type	HJF36150U31X		JJF36250U31X	HJF36150U31X	JJF36250U31X	
I _r	150	110	200	150	250	200
tr @ 6 I _r	0.5-16					
li (x I _n)	≤10	≤12	≤5	≤8	≤5	

UPS rating	60 kW		75 kW	
	Input	Bypass	Input	Bypass
Breaker type	LJF36400U31X	JJF36250U31X	LJF36400U31X	LJF36400U31X
I _r	300	225	350	300

UPS rating	60 kW		75 kW	
	Input	Bypass	Input	Bypass
tr @ 6 Ir	0.5-16			
li (x In)	≤5		≤3	≤5

Recommended Bolt and Lug Sizes for UL

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

Aluminum — One Hole Cable Lugs

Cable size	Bolt size	Cable lug type	Crimping tool	Die
6 AWG	M8 x 25 mm	LAA6-56-X	CT-720	CD-720-1 Gray P29
4 AWG	M8 x 25 mm	LAA4-56-X	CT-720	CD-720-2 Green P37
3 AWG	M8 x 25 mm	LAA3-56-X	CT-720	CD-720-2 Green P37
2 AWG	M8 x 25 mm	LAA2-56-X	CT-720	CD-720-2 Pink P42
1 AWG	M8 x 25 mm	LAA1-56-X	CT-720	CD-720-2 Gold P45
1/0 AWG	M8 x 25 mm	LAA1/0-56-X	CT-720	CD-720-2 Tan P50
2/0 AWG	M8 x 25 mm	LAA2/0-56-5	CT-720	CD-720-3 Olive P54
3/0 AWG	M8 x 25 mm	LAA3/0-56-5	CT-720	CD-720-3 Ruby P60
4/0 AWG	M8 x 25 mm	LAA4/0-56-5	CT-720	CD-720-4 White P66
250 kcmil	M8 x 25 mm	LAA250-56-5	CT-720	CD-720-5 Red P71
300 kcmil	M8 x 25 mm	LAA300-56-5	CT-720	CD-720-6 Blue P76

Aluminum — Two Hole Cable Lugs

Cable size	Bolt size	Cable lug type	Crimping tool	Die
2/0 AWG	M8 x 25 mm	LAB2/0-12-5	CT-720	CD-720-3 Olive P54
3/0 AWG	M8 x 25 mm	LAB3/0-12-5	CT-720	CD-720-3 Ruby P60
4/0 AWG	M8 x 25 mm	LAB4/0-12-5	CT-720	CD-720-4 White P66
250 kcmil	M8 x 25 mm	LAB250-12-2	CT-720	CD-720-5 Red P71
300 kcmil	M8 x 25 mm	LAB300-12-2	CT-720	CD-720-6 Blue P76

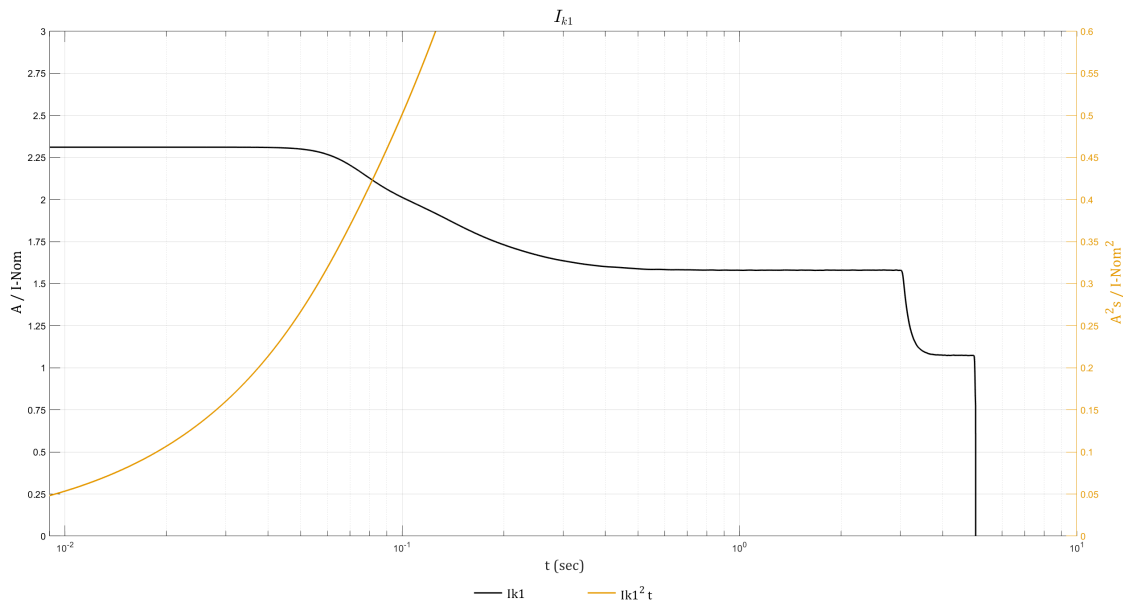
Leakage Current

380/400/415 V UPS system 4-wire installation at 100% load

UPS rating	Leakage current
20-50 kW	62 mA
60-100 kW	67 mA
120-150 kW	91 mA

Inverter Short Circuit Capabilities (Bypass not Available)

IK1 – Short Circuit between a Phase and Neutral



IK1 400 V

S [kVA]	10ms; I[A]/I ² t [A ² t]	20ms; I[A]/I ² t [A ² t]	30ms; I[A]/I ² t [A ² t]	100ms; I[A]/I ² t [A ² t]	1s; I[A]/I ² t [A ² t]
10	33 / 11	33 / 22	33 / 33	29 / 104	23 / 603
15	50 / 25	50 / 50	50 / 75	44 / 235	34 / 1356
20	67 / 45	67 / 89	67 / 134	58 / 418	46 / 2411
30	100 / 100	100 / 200	100 / 300	87 / 940	68 / 5420
40	133 / 180	133 / 360	133 / 530	116 / 1670	91 / 9640
50	167 / 280	167 / 560	167 / 830	145 / 2610	114 / 15070
60	200 / 400	200 / 800	200 / 1200	174 / 3760	137 / 21700
80	267 / 710	267 / 1420	267 / 2140	232 / 6690	182 / 38580
100	334 / 1110	334 / 2230	334 / 3340	291 / 10450	228 / 60270
120	400 / 1600	400 / 3210	400 / 4810	349 / 15050	274 / 86800
150	500 / 2500	500 / 5010	500 / 7510	436 / 23510	342 / 135620

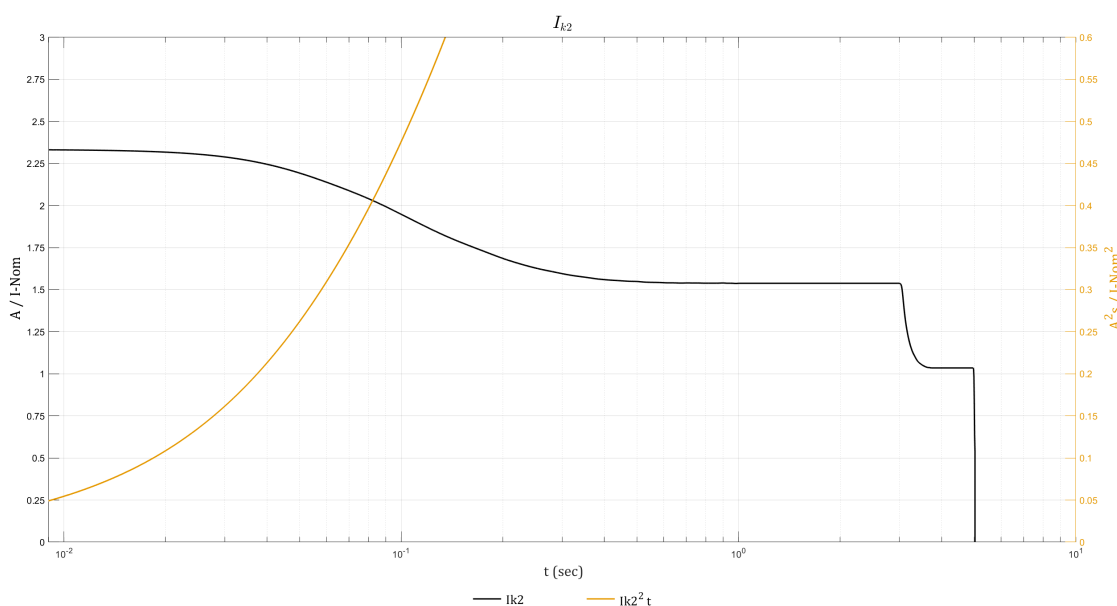
IK1 480 V

S [kVA]	10ms; I[A]/I ² t [A ² t]	20ms; I[A]/I ² t [A ² t]	30ms; I[A]/I ² t [A ² t]	100ms; I[A]/I ² t [A ² t]	1s; I[A]/I ² t [A ² t]
10	28 / 8	28 / 15	28 / 23	24 / 73	19 / 419
15	42 / 17	42 / 35	42 / 52	36 / 163	29 / 942
20	56 / 31	56 / 62	56 / 93	48 / 290	38 / 1674
30	83 / 70	83 / 140	83 / 210	73 / 650	57 / 3770
40	111 / 120	111 / 250	111 / 370	97 / 1160	76 / 6700
50	139 / 190	139 / 390	139 / 580	121 / 1810	95 / 10460
60	167 / 280	167 / 560	167 / 830	145 / 2610	114 / 15070
80	222 / 490	222 / 990	222 / 1480	194 / 4640	152 / 26790
100	278 / 770	278 / 1550	278 / 2320	242 / 7260	190 / 41860
120	334 / 1110	334 / 2230	334 / 3340	291 / 10450	228 / 60270
150	417 / 1740	417 / 3480	417 / 5220	363 / 16330	285 / 94180

IK1 208 V

S [kVA]	10ms; I[A]/I ² t [A ² t]	20ms; I[A]/I ² t [A ² t]	30ms; I[A]/I ² t [A ² t]	100ms; I[A]/I ² t [A ² t]	1s; I[A]/I ² t [A ² t]
10	64 / 41	64 / 82	64 / 123	56 / 386	44 / 2229
15	96 / 93	96 / 185	96 / 278	84 / 869	66 / 5015
20	128 / 160	128 / 330	128 / 490	112 / 1550	88 / 8920
25	160 / 260	160 / 510	160 / 770	140 / 2420	110 / 13930
30	192 / 370	192 / 740	192 / 1110	168 / 3480	132 / 20060
40	257 / 660	257 / 1320	257 / 1980	224 / 6180	175 / 35670
50	321 / 1030	321 / 2060	321 / 3090	279 / 9660	219 / 55730
60	385 / 1480	385 / 2960	385 / 4450	335 / 13910	263 / 80250
75	481 / 2320	481 / 4630	481 / 6950	419 / 21740	329 / 125390

IK2 – Short Circuit between Two Phases



IK2 400 V

S [kVA]	10ms; I[A]/I ^{2t} [A ^{2t}]	20ms; I[A]/I ^{2t} [A ^{2t}]	30ms; I[A]/I ^{2t} [A ^{2t}]	100ms; I[A]/I ^{2t} [A ^{2t}]	1s; I[A]/I ^{2t} [A ^{2t}]
10	34 / 11	33 / 23	33 / 34	28 / 99	22 / 571
15	50 / 26	50 / 51	50 / 76	42 / 223	33 / 1285
20	67 / 45	67 / 90	67 / 135	56 / 397	44 / 2284
30	101 / 100	100 / 200	100 / 300	84 / 890	67 / 5140
40	135 / 180	134 / 360	134 / 540	112 / 1590	89 / 9140
50	168 / 280	167 / 570	167 / 840	141 / 2480	111 / 14280
60	202 / 410	201 / 810	201 / 1210	169 / 3570	133 / 20560
80	269 / 730	268 / 1450	268 / 2150	225 / 6350	178 / 36550
100	336 / 1130	335 / 2260	335 / 3370	281 / 9920	222 / 57110
120	404 / 1630	401 / 3250	401 / 4850	337 / 14280	266 / 82230
150	505 / 2550	502 / 5090	502 / 7580	422 / 22320	333 / 128490

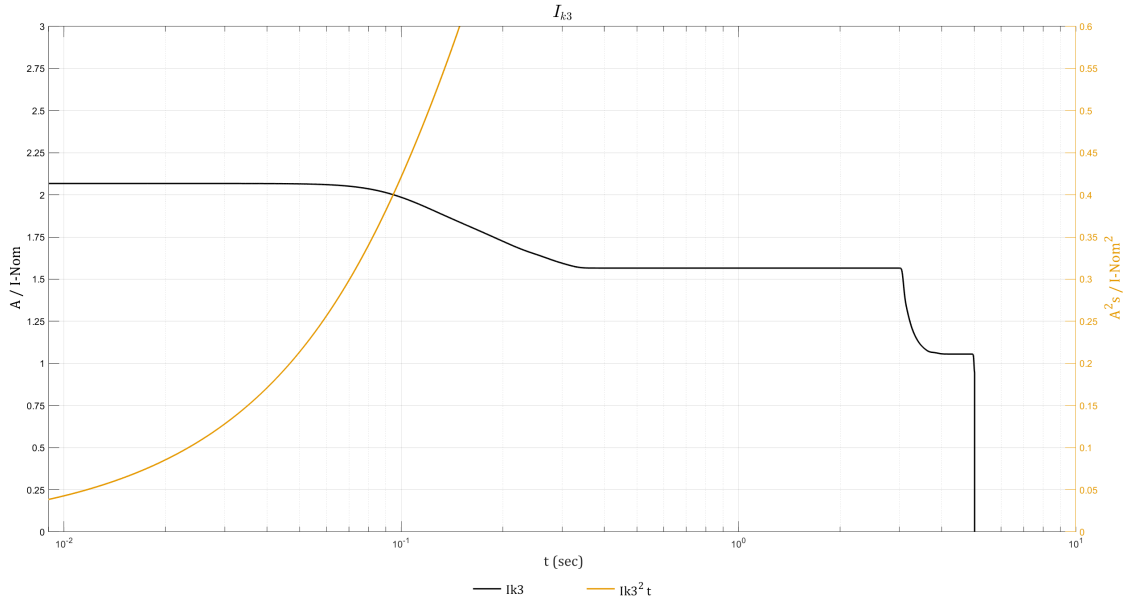
IK2 480 V

S [kVA]	10ms; I[A]/I ^{2t} [A ^{2t}]	20ms; I[A]/I ^{2t} [A ^{2t}]	30ms; I[A]/I ^{2t} [A ^{2t}]	100ms; I[A]/I ^{2t} [A ^{2t}]	1s; I[A]/I ^{2t} [A ^{2t}]
10	28 / 8	28 / 16	28 / 23	23 / 69	18 / 397
15	42 / 18	42 / 35	42 / 53	35 / 155	28 / 892
20	56 / 31	56 / 63	56 / 94	47 / 276	37 / 1586
30	84 / 70	84 / 140	84 / 210	70 / 620	55 / 3570
40	112 / 130	112 / 250	112 / 370	94 / 1100	74 / 6350
50	140 / 200	139 / 390	139 / 580	117 / 1720	92 / 9910
60	168 / 280	167 / 570	167 / 840	141 / 2480	111 / 14280
80	224 / 500	223 / 1000	223 / 1500	187 / 4410	148 / 25380
100	280 / 790	279 / 1570	279 / 2340	234 / 6890	185 / 39660
120	336 / 1130	335 / 2260	335 / 3370	281 / 9920	222 / 57110
150	421 / 1770	418 / 3530	418 / 5260	351 / 15500	277 / 89230

IK2 208 V

S [kVA]	10ms; I[A]/I ^{2t} [A ^{2t}]	20ms; I[A]/I ^{2t} [A ^{2t}]	30ms; I[A]/I ^{2t} [A ^{2t}]	100ms; I[A]/I ^{2t} [A ^{2t}]	1s; I[A]/I ^{2t} [A ^{2t}]
10	65 / 42	64 / 84	64 / 125	54 / 367	43 / 2112
15	97 / 94	96 / 188	96 / 280	81 / 825	64 / 4752
20	129 / 170	129 / 330	129 / 500	108 / 1470	85 / 8450
25	162 / 260	161 / 520	161 / 780	135 / 2290	107 / 13200
30	194 / 380	193 / 750	193 / 1120	162 / 3300	128 / 19010
40	259 / 670	257 / 1340	257 / 1990	216 / 5870	171 / 33790
50	323 / 1050	322 / 2090	322 / 3110	270 / 9170	213 / 52800
60	388 / 1510	386 / 3010	386 / 4480	324 / 13210	256 / 76030
75	485 / 2360	482 / 4700	482 / 7000	406 / 20630	320 / 118790

IK3 – Short Circuit between Three Phases



IK3 400 V

S [kVA]	10ms; I[A]/I ² t [A ² t]	20ms; I[A]/I ² t [A ² t]	30ms; I[A]/I ² t [A ² t]	100ms; I[A]/I ² t [A ² t]	1s; I[A]/I ² t [A ² t]
10	30 / 9	30 / 18	30 / 27	29 / 88	23 / 574
15	45 / 20	45 / 40	45 / 60	43 / 198	34 / 1290
20	60 / 36	60 / 71	60 / 107	57 / 351	45 / 2294
30	90 / 80	90 / 160	90 / 240	86 / 790	68 / 5160
40	119 / 140	119 / 290	119 / 430	115 / 1400	90 / 9180
50	149 / 220	149 / 450	149 / 670	143 / 2200	113 / 14340
60	179 / 320	179 / 640	179 / 960	172 / 3160	136 / 20650
80	239 / 570	239 / 1140	239 / 1710	229 / 5620	181 / 36710
100	298 / 890	298 / 1780	298 / 2670	287 / 8780	226 / 57350
120	358 / 1280	358 / 2570	358 / 3850	344 / 12640	271 / 82590
150	448 / 2000	448 / 4010	448 / 6010	430 / 19760	339 / 129040

IK3 480 V

S [kVA]	10ms; I[A]/I ² t [A ² t]	20ms; I[A]/I ² t [A ² t]	30ms; I[A]/I ² t [A ² t]	100ms; I[A]/I ² t [A ² t]	1s; I[A]/I ² t [A ² t]
10	25 / 6	25 / 12	25 / 19	24 / 61	19 / 398
15	37 / 14	37 / 28	37 / 42	36 / 137	28 / 896
20	50 / 25	50 / 49	50 / 74	48 / 244	38 / 1593
30	75 / 60	75 / 110	75 / 170	72 / 550	57 / 3580
40	99 / 100	99 / 200	99 / 300	96 / 980	75 / 6370
50	124 / 150	124 / 310	124 / 460	119 / 1520	94 / 9960
60	149 / 220	149 / 450	149 / 670	143 / 2200	113 / 14340
80	199 / 400	199 / 790	199 / 1190	191 / 3900	151 / 25490
100	249 / 620	249 / 1240	249 / 1860	239 / 6100	188 / 39830
120	298 / 890	298 / 1780	298 / 2670	287 / 8780	226 / 57350
150	373 / 1390	373 / 2780	373 / 4180	358 / 13720	283 / 89610

IK3 208 V

S [kVA]	10ms; I[A]/I ² t [A ² t]	20ms; I[A]/I ² t [A ² t]	30ms; I[A]/I ² t [A ² t]	100ms; I[A]/I ² t [A ² t]	1s; I[A]/I ² t [A ² t]
10	57 / 33	57 / 66	57 / 99	55 / 325	43 / 2121
15	86 / 74	86 / 148	86 / 222	83 / 731	65 / 4772
20	115 / 130	115 / 260	115 / 400	110 / 1300	87 / 8480
25	143 / 210	143 / 410	143 / 620	138 / 2030	109 / 13260
30	172 / 300	172 / 590	172 / 890	165 / 2920	130 / 19090
40	230 / 530	230 / 1050	230 / 1580	220 / 5200	174 / 33940
50	287 / 820	287 / 1650	287 / 2470	276 / 8120	217 / 53020
60	344 / 1190	344 / 2370	344 / 3560	331 / 11690	261 / 76360
75	430 / 1850	430 / 3710	430 / 5560	413 / 18270	326 / 119310

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)
M12	50 Nm (36.87 lb-ft / 442.5 lb-in)

Requirements for a Third Party Battery Solution

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

Third Party Battery Breaker Requirements

⚠️ ⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

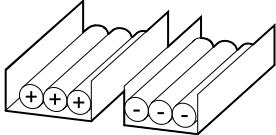
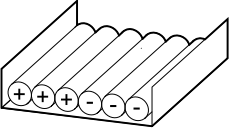
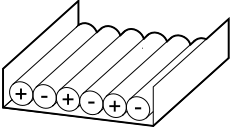
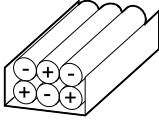
Battery breaker rated DC voltage > Normal battery voltage	The normal voltage of the battery configuration is defined as the highest nominal occurring battery voltage. This can be equivalent to the float voltage which may be defined as number of battery blocks x number of cells x cell float voltage .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

Guidance for Organizing Battery Cables

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

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

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

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

Environment

	Operating	Storage
Temperature	0 °C to 50 °C (32 °F to 122 °F) with load derating above 40 °C (104 °F). ²⁵	-15 °C to 40 °C (5 °F to 104 °F) for systems with batteries. -25 °C to 55 °C (-13 °F to 131 °F) for systems without batteries.
Relative humidity	5-95% non-condensing	10-80% non-condensing
Elevation	Designed for operation in 0-3000 m (0-10000 feet) elevation. 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: 60 dB at 70% load, 68 dB at 100% load 480 V: 57 dB at 70% load, 64 dB at 100% load 208 V: 60 dB at 70% load, 68 dB at 100% load	
Protection class	IP21	
Color	RAL 9003, gloss level 85%	

25. For temperatures between 40 °C (104 °F) and 50 °C (122 °F), derate the load power rating with 2.5% per °C.

Compliance

Safety	IEC 62040-1: 2017, Edition 2.0, Uninterruptible Power Systems (UPS) - Part 1: Safety requirements UL 1778 5th edition
EMC/EMI/RFI	IEC 62040-2: 2016, 3rd edition Uninterruptible Power Systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements C2 FCC Part 15 Subpart B, Class A IEEE C62.41-1991 Location Category B1, IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits
Transportation	IEC 60721-4-2 Level 2M2
Seismic	ICC-ES AC 156 (2015); OSHPD Pre-approved; Sds=1.45 g for z/h=1 and Sds=2.00 g for z/h=0; Ip=1.5
Earthing system	TN-C, TN-S, TT, IT
Overvoltage category	This UPS is OVCII compliant. If the UPS is installed in an environment with an OVC rating higher than II, an SPD (surge protection device) must be installed upstream of the UPS to reduce the overvoltage category to OVCII.
Protective class	I
Pollution degree	2
Emergency Lighting and Power Equipment	UL 924 10th edition and CSA 22.2 NO. 141-15 5th edition
Marine ²⁶	TYPE APPROVAL CERTIFICATE is found to comply with DNV GL rules for classification – Ships, offshore units, and high speed and light craft (Class Guideline: DNVGL-CG-0339). Certificate number: TAE00004A2 TYPE APPROVAL CERTIFICATE is found to comply with Bureau Veritas Rules for the Classification of Steel Ships (Test Specification: E10). Certificate number: 64254/A0 BV

Performance

Performance in accordance with: IEC 62040-3: 2021, 3rd edition Uninterruptible Power Systems (UPS) - Part 3: Method of specifying the performance and test requirements.

Output performance classification (according to IEC 62040-3, Clause 5.3.4): VFI-SS-11

²⁶. Only for marine UPS models.

UPS Weights and Dimensions

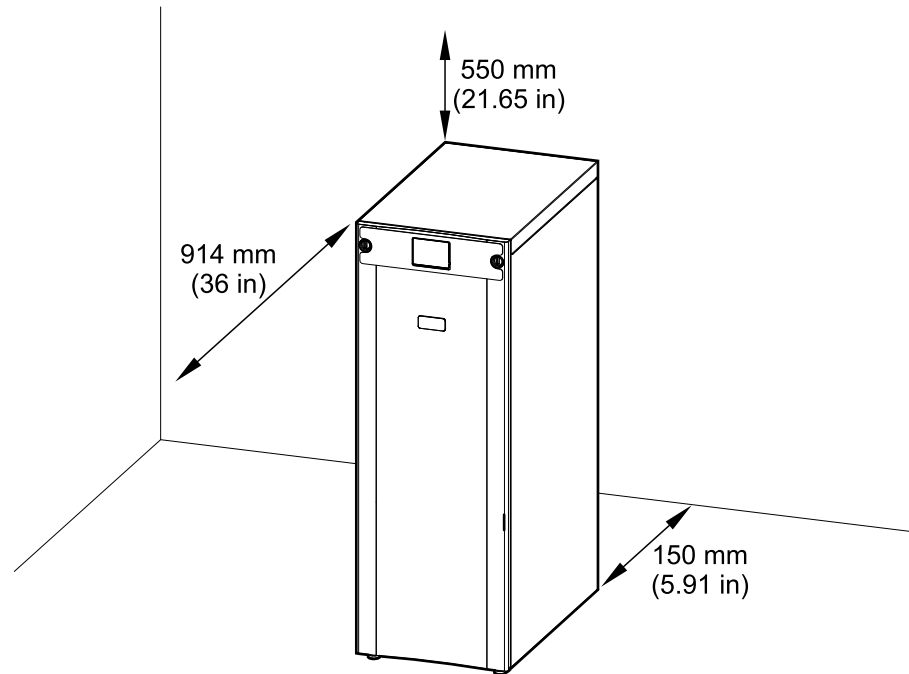
	Weight kg (lbs)	Height mm (in)	Width mm (in)	Depth mm (in)
20-50 kW UPS 400 V	206 (454)	1485 (58.46)	521 (20.51)	847 (33.35)
20-50 kW UPS with N+1 power module 400 V	250 (551)	1485 (58.46)	521 (20.51)	847 (33.35)
60 kW UPS 400 V	238 (525)	1485 (58.46)	521 (20.51)	847 (33.35)
60-100 kW UPS with N+1 power module 400 V	290 (639)	1485 (58.46)	521 (20.51)	847 (33.35)
80-100 kW UPS 400 V	250 (551)	1485 (58.46)	521 (20.51)	847 (33.35)
120 kW UPS 400 V	278 (613)	1485 (58.46)	521 (20.51)	847 (33.35)
150 kW UPS 400 V	290 (639)	1485 (58.46)	521 (20.51)	847 (33.35)
20-50 kW UPS 480 V	206 (454)	1485 (58.46)	521 (20.51)	847 (33.35)
20-50 kW UPS with N+1 power module 480 V	250 (551)	1485 (58.46)	521 (20.51)	847 (33.35)
60 kW UPS 480 V	238 (525)	1485 (58.46)	521 (20.51)	847 (33.35)
60-100 kW UPS with N+1 power module 480 V	290 (639)	1485 (58.46)	521 (20.51)	847 (33.35)
80-100 kW UPS 480 V	250 (551)	1485 (58.46)	521 (20.51)	847 (33.35)
120 kW UPS 480 V	278 (613)	1485 (58.46)	521 (20.51)	847 (33.35)
150 kW UPS 480 V	290 (639)	1485 (58.46)	521 (20.51)	847 (33.35)
10-25 kW UPS 208 V	206 (454)	1485 (58.46)	521 (20.51)	847 (33.35)
10-25 kW UPS with N+1 power module 208 V	250 (551)	1485 (58.46)	521 (20.51)	847 (33.35)
30 kW UPS 208 V	238 (525)	1485 (58.46)	521 (20.51)	847 (33.35)
30-50 kW UPS with N+1 power module 208 V	290 (639)	1485 (58.46)	521 (20.51)	847 (33.35)
40-50 kW UPS 208 V	250 (551)	1485 (58.46)	521 (20.51)	847 (33.35)
60 kW UPS 208 V	278 (613)	1485 (58.46)	521 (20.51)	847 (33.35)
75 kW UPS 208 V	290 (639)	1485 (58.46)	521 (20.51)	847 (33.35)

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 required minimum rear clearance is 150 mm (5.91 in).

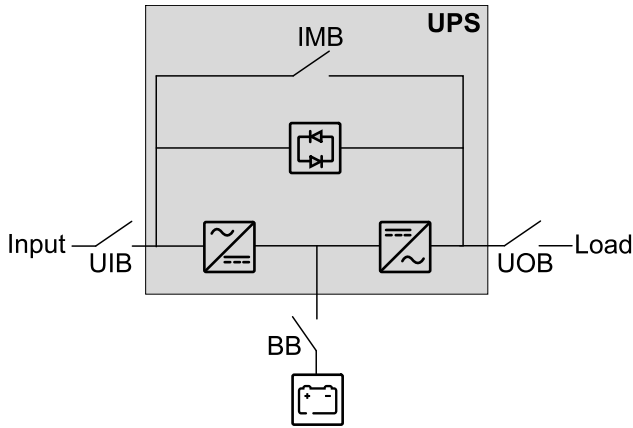
Front View of the UPS



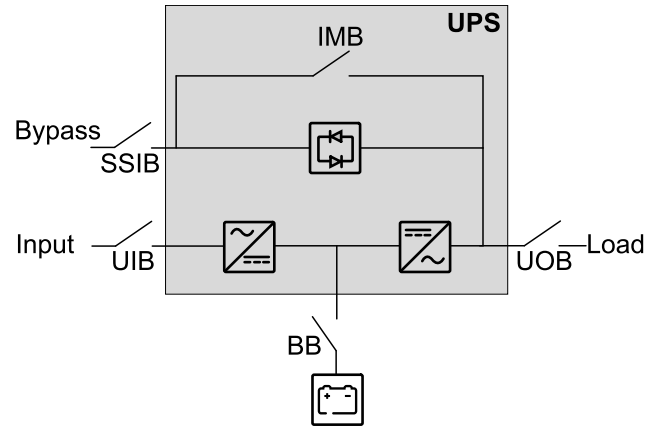
Single System Overview

UIB	Unit input breaker
SSIB	Static switch input breaker
IMB	Internal maintenance breaker
UOB	Unit output breaker
BB	Battery breaker

Single System – Single Mains



Single System – Dual Mains



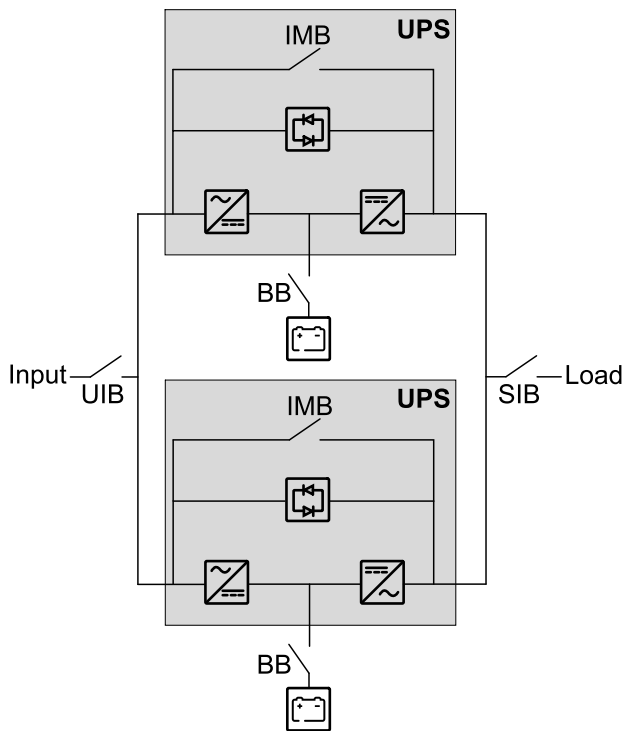
Parallel System Overview

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

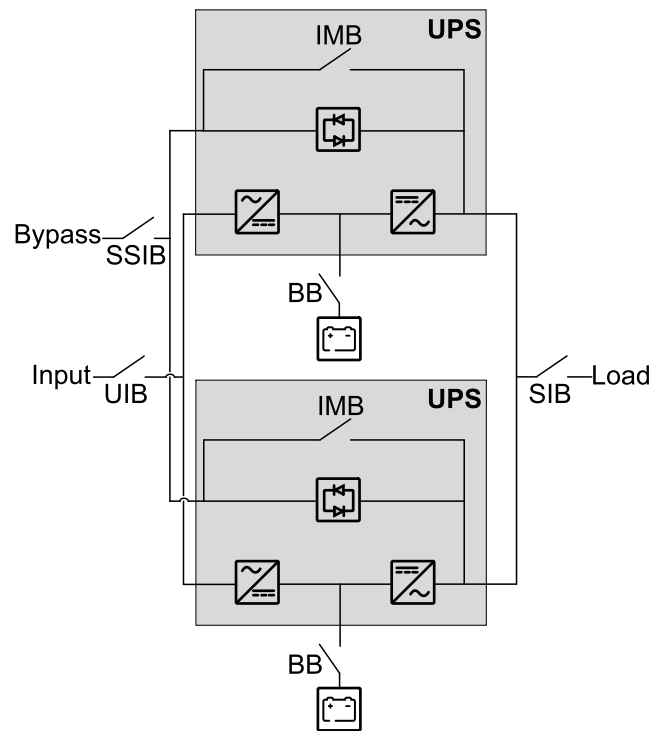
Simplified 1+1 Parallel System

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

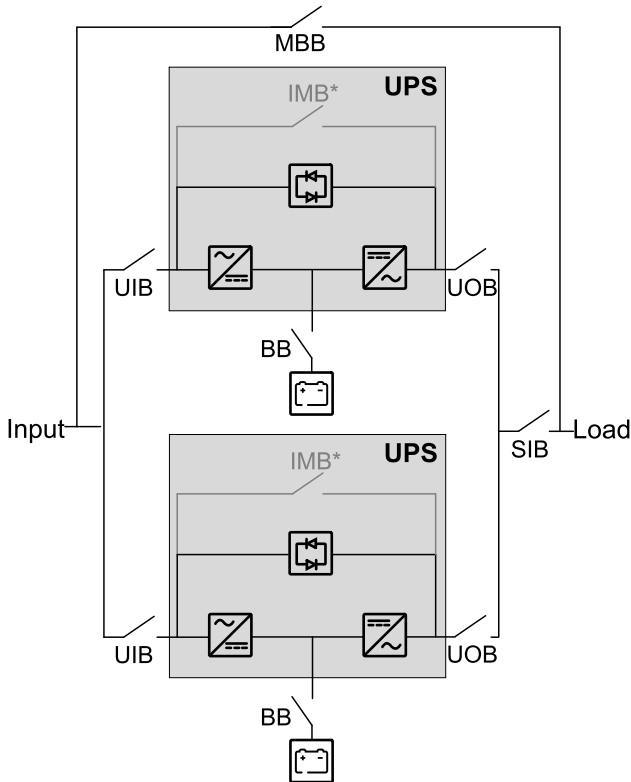


Parallel System with Individual Unit Input Breaker UIB and Static Switch Input Breaker SSIB

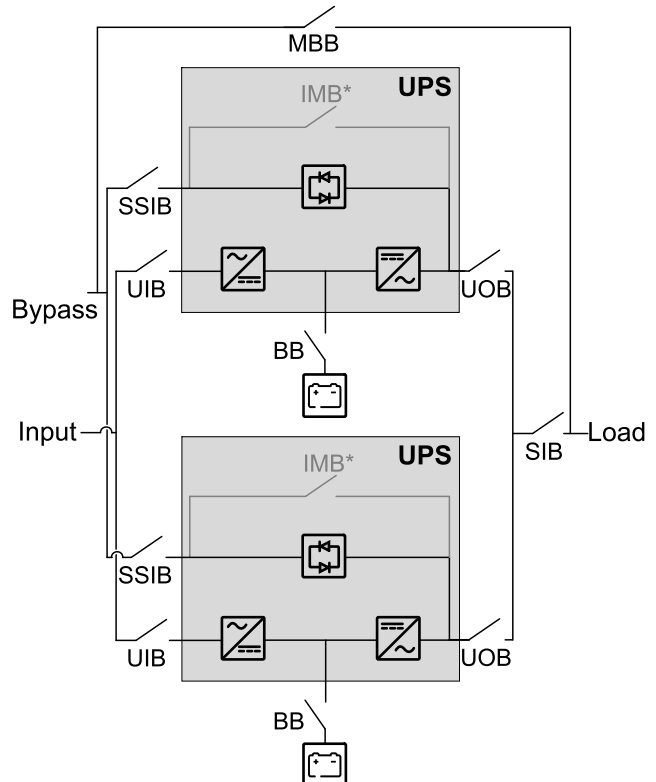
Galaxy VS can support up to 4 UPSs in parallel for capacity and up to 3+1 UPSs in parallel for redundancy with individual unit input breaker UIB and static switch input breaker SSIB.

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

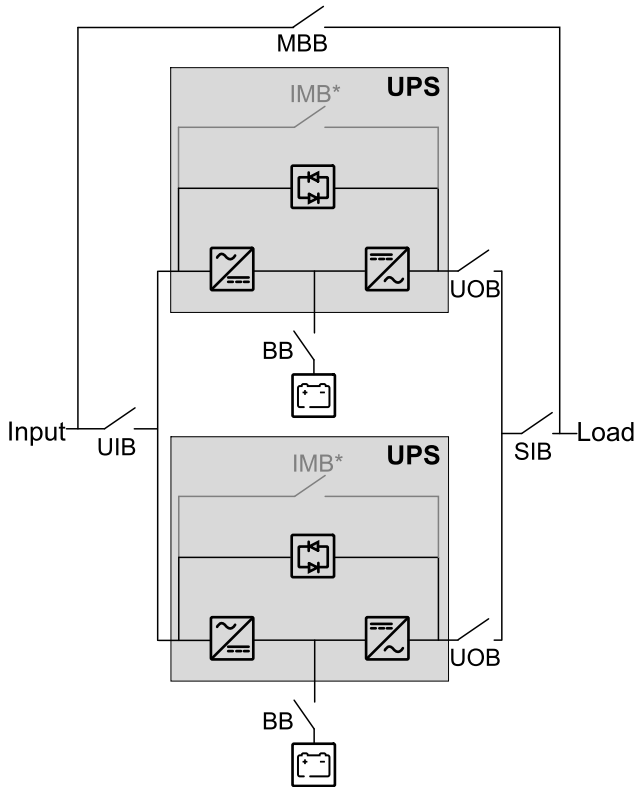


Parallel System with Shared Unit Input Breaker UIB and Static Switch Input Breaker SSIB

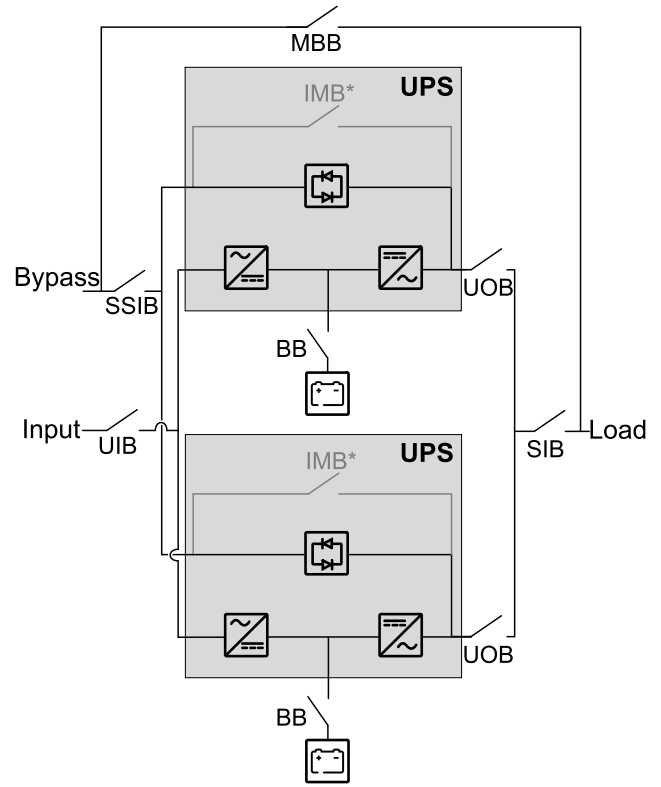
Galaxy VS can support up to 4 UPSs in parallel for capacity and up to 3+1 UPSs in parallel for redundancy with shared unit input breaker UIB and static switch input breaker SSIB.

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


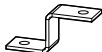


Overview of Installation Kits




Installation Kit 0M-100883

Part	Used in	Number of units
Spring washer	Connect the Power Cables, page 83.	40 


Installation Kit 0M-100917

Part	Used in	Number of units
M8 nut with washer	Prepare the UPS for TN-C/480 V Solid-Grounded System, page 82.	2 
Bonding busbar		1 




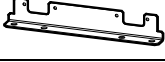

Installation Kit 0M-88357

Part	Used in	Number of units
USB cable	Connect the Modbus Cables, page 104.	1 
150 Ohm resistor		10 
Terminal connector		2 

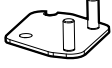




Installation Kit 0J-0M-1160

Part	Used in	Number of units
Temperature sensor	For third-party battery solution, see Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 95. Refer to the installation manual for your specific battery solution for information on how to install and connect the temperature sensor.	1 

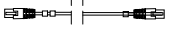


Optional Seismic Kit GVSOPT002

Part	Used in	Number of units
M8 x 20 mm bolt with washer	Install the Seismic Anchoring (Option), page 81 and Final Installation, page 107.	12 
Rear anchor		1 
Rear anchoring bracket		1 
Front anchoring bracket		1 
Rear connection plate	Used for installation with an adjacent product. Follow instructions in the installation manual for the adjacent product.	1 

Optional NEMA 2 Hole Kit GVSOPT005







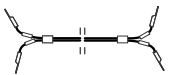
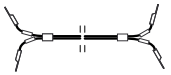
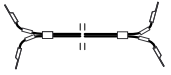
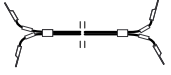
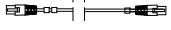
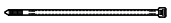

Part	Used in	Number of units
NEMA 2 hole plate (output, DC+, N)	Connect the Power Cables with NEMA 2 Hole Plates, page 87.	7 
NEMA 2 hole plate (input, bypass, DC-)		8 
M8 nut with washer		30 
Spring washer		30 
M8x24 mm flat washer		60 

Optional Parallel Kit GVSOPT006

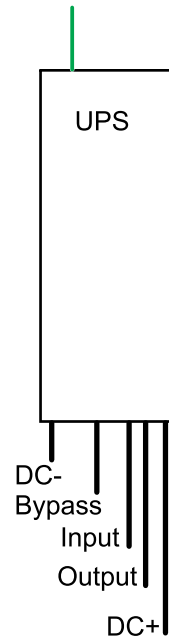
Part	Used in	Number of units
PBUS1 cable 0W6268	Connect the PBUS Cables, page 103.	1 
PBUS2 cable 0W6267		1 
AUX switch	Connect the IMB Signal Cables in a Simplified 1+1 Parallel System, page 99.	2 
This kit contains parts for use with other UPS models which are not relevant for this installation.		

Optional Kit GVSOPT030

Only for installation with adjacent modular battery cabinet(s). Follow the modular battery cabinet installation manual.

Part	Used in	Number of units
Interconnection clamp	For interconnection.	3 
M6 x 16 mm screw with washer		3 
M6 nut with washer		3 
M8 x 25 mm bolt with washer	For power cable connection.	9 
M8 nut with washer		9 
PE cable 0W13065 (for modular battery cabinet 1)	For power cable connection for modular battery cabinet 1.	1 
DC cable 0W13071 (for modular battery cabinet 1)		1 
DC cable 0W13066 (for modular battery cabinet 2)	Only for power cable connection for modular battery cabinet 2,3,4 for a UPS rated over 50 kW. For a UPS rated for maximum 50 kW, use the provided DC cables.	1 
DC cable 0W13068 (for modular battery cabinet 3)		1 
DC cable 0W13067 (for modular battery cabinet 4)		1 
Signal cable 0W13070		For signal cable connection for modular battery cabinet 1.
Signal cable 0W13069	1 	
Cable tie	For power cable fastening.	18 
Cable tie		30 

Installation Procedure for Single Systems



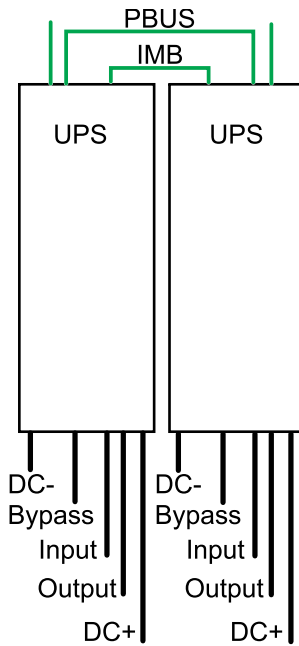
— Signal cable
 — Power cable

1. Prepare for Installation, page 76.
2. **For UPS without preinstalled power modules:** Install the Power Module(s), page 80.
3. Install the Seismic Anchoring (Option), page 81.
4. **Only for TN-C/480 V solid-grounded earthing system (no neutral connection):** Prepare the UPS for TN-C/480 V Solid-Grounded System, page 82.
5. Perform one of the following:
 - Connect the Power Cables, page 83, or
 - Connect the Power Cables with NEMA 2 Hole Plates, page 87.
6. Connect the Signal Cables, page 91.
7. Connect the Signal Cables from a Modular Battery Cabinet, page 93.
8. Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 95.
9. Connect the External Communication Cables, page 104.
10. Add Translated Safety Labels to Your Product, page 106.
11. Final Installation, page 107.

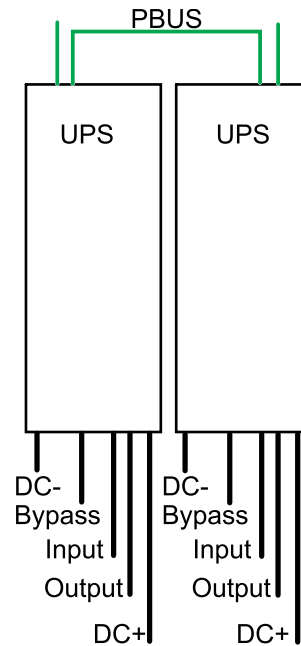
For moving or decommissioning the UPS after installation has been completed, see Decommission or Move the UPS to a New Location, page 111.

Installation Procedure for Parallel Systems

Simplified 1+1 Parallel System



Parallel System

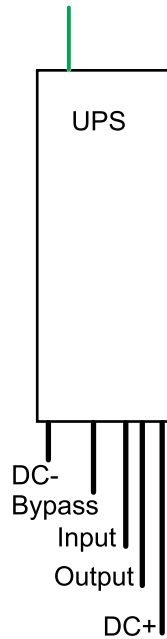


— Signal cable
— Power cable

1. Prepare for Installation, page 76.
2. **For UPS without preinstalled power modules:** Install the Power Module(s), page 80.
3. Install the Seismic Anchoring (Option), page 81.
4. Only for TN-C/480 V solid-grounded earthing system (no neutral connection): Prepare the UPS for TN-C/480 V Solid-Grounded System, page 82.
5. Perform one of the following:
 - Connect the Power Cables, page 83, or
 - Connect the Power Cables with NEMA 2 Hole Plates, page 87.
6. Connect the Signal Cables, page 91.
7. Connect the Signal Cables from a Modular Battery Cabinet, page 93.
8. Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 95.
9. Perform one of the following:
 - **For simplified 1+1 parallel system:** Connect the IMB Signal Cables in a Simplified 1+1 Parallel System, page 99.
 - **For parallel system:** Install a padlock on the internal maintenance breaker IMB in the open position on all UPSs in the parallel system.
10. Connect the PBUS Cables, page 103.
11. Connect the External Communication Cables, page 104.
12. Add Translated Safety Labels to Your Product, page 106.
13. Final Installation, page 107.

For moving or decommissioning the UPS after installation has been completed, see [Decommission or Move the UPS to a New Location](#), page 111.

Installation Procedure for Single Marine Systems



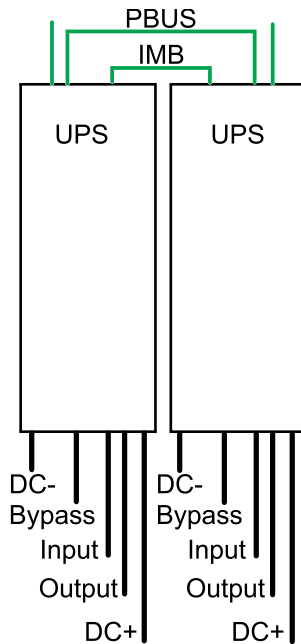
— Signal cable
— Power cable

1. Install the IP22 kit GVSOPT026 on the UPS – follow the installation manual provided with the kit.
2. Install the UPS and the modular battery cabinet (if present) on the mounting skid kit GVSOPT027 – follow the installation manual provided with the kit.
3. Prepare for Installation, page 76.
4. Install the Power Module(s), page 80.
5. Install the Seismic Anchoring (Option), page 81.
6. Connect the Power Cables, page 83.
7. Connect the Signal Cables, page 91.
8. Connect the Signal Cables from a Modular Battery Cabinet, page 93.
9. Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 95.
10. Connect the External Communication Cables, page 104.
11. Add Translated Safety Labels to Your Product, page 106.
12. Final Installation, page 107.

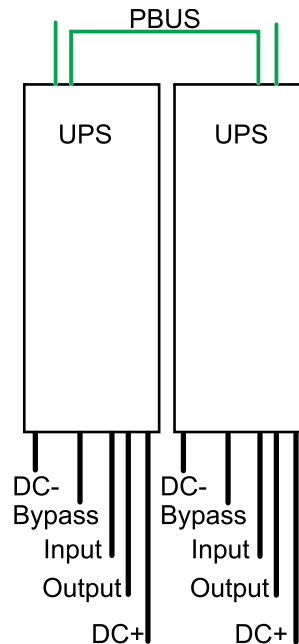
For moving or decommissioning the UPS after installation has been completed, see Decommission or Move the UPS to a New Location, page 111.

Installation Procedure for Parallel Marine Systems

Simplified 1+1 Parallel System



Parallel System



— Signal cable
— Power cable

1. Install the IP22 kit GVSOPT026 on the UPSs – follow the installation manual provided with the kit.
2. Install the UPSs and the modular battery cabinet(s) (if present) on the mounting skid kit GVSOPT027 – follow the installation manual provided with the kit.
3. Prepare for Installation, page 76.
4. Install the Power Module(s), page 80.
5. Install the Seismic Anchoring (Option), page 81.
6. Connect the Power Cables, page 83
7. Connect the Signal Cables, page 91.
8. Connect the Signal Cables from a Modular Battery Cabinet, page 93.
9. Connect the Signal Cables from Switchgear and Third-Party Auxiliary Products, page 95.
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 99.
 - **For parallel system:** Install a padlock on the internal maintenance breaker IMB in the open position on all UPSs in the parallel system.
11. Connect the PBUS Cables, page 103.
12. Connect the External Communication Cables, page 104.
13. Add Translated Safety Labels to Your Product, page 106.
14. Final Installation, page 107.

For moving or decommissioning the UPS after installation has been completed, see Decommission or Move the UPS to a New Location, page 111.

Prepare for Installation

⚡ ⚠ DANGER

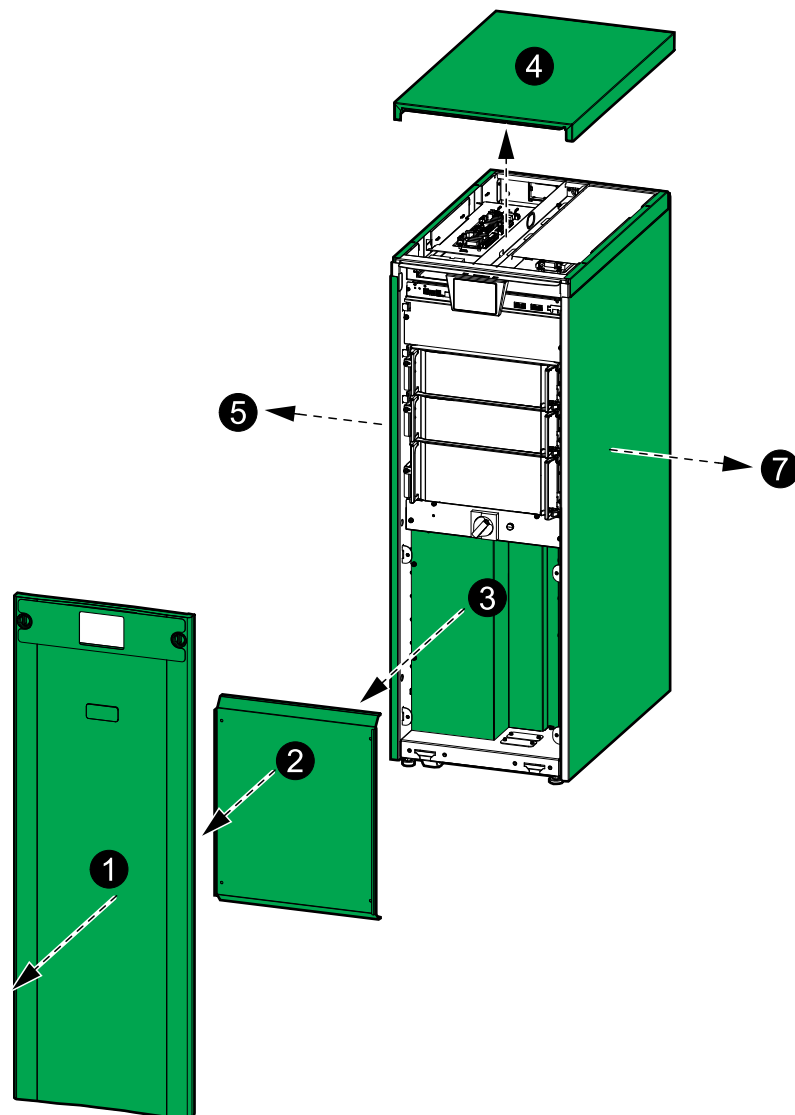
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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.

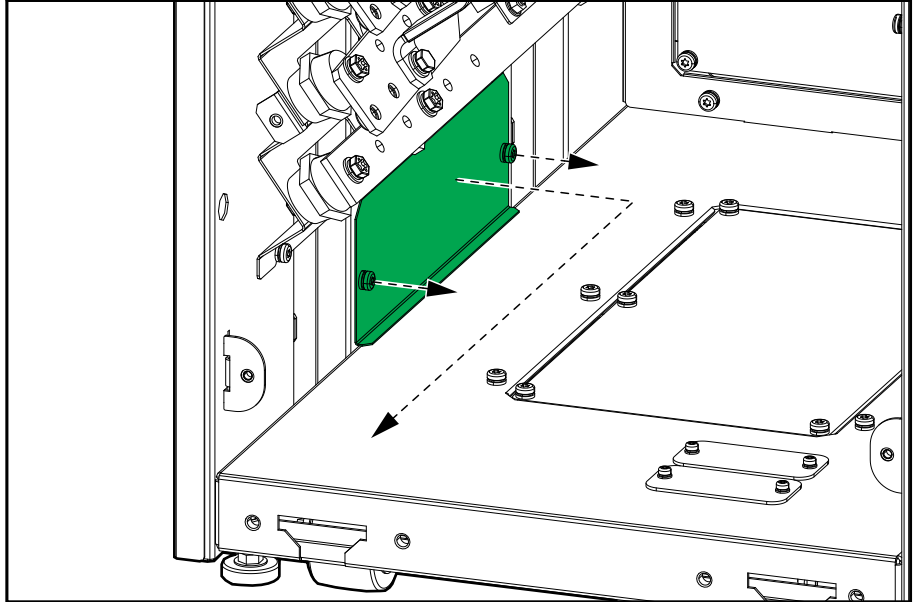
1. Remove the front panel.



2. Remove the lower front plate.
3. Remove the transparent cover.
4. Remove the top cover:
 - a. Remove the screws and tilt the front of the top cover upwards.
 - b. Slide the top cover towards the rear to remove it. Tabs in the rear of the top cover must disconnect from the slots in the rear of the UPS.

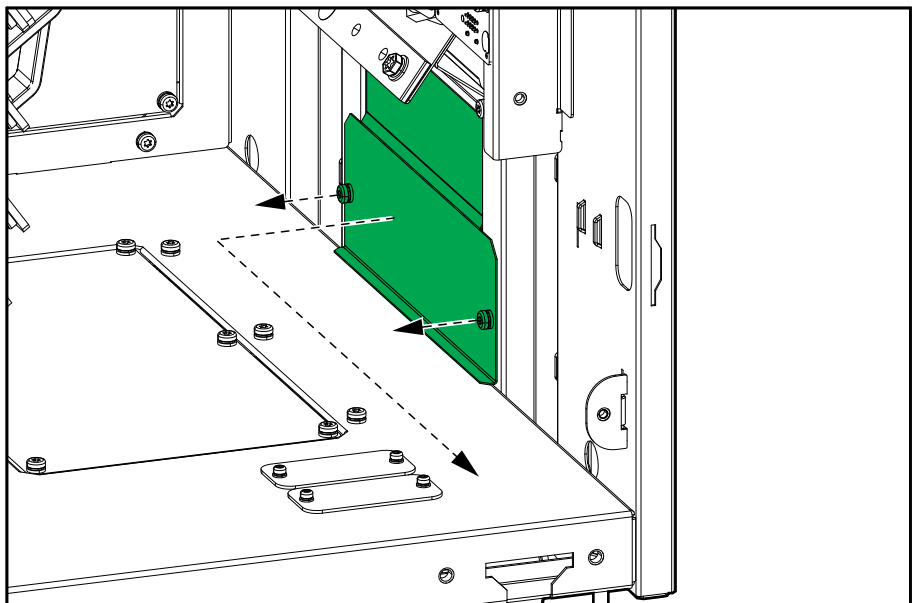
5. **For installation with adjacent auxiliary cabinet on the left side of the UPS:** Remove the left side panel. The side panel is reinstalled on some adjacent auxiliary cabinets. Follow the adjacent auxiliary product manual.
6. **For installation with adjacent auxiliary cabinet on the left side of the UPS:** Remove the lower left side plate for internal power cabling between the UPS and the adjacent auxiliary cabinet.

Front View of the UPS



7. **For installation with adjacent auxiliary cabinet on the right side of the UPS:** Remove the right side panel. The side panel is reinstalled on some adjacent auxiliary cabinets. Follow the adjacent auxiliary product manual.
8. **For installation with adjacent auxiliary cabinet on the right side of the UPS:** Remove the lower right side plate for internal power cabling between the UPS and the adjacent auxiliary cabinet.

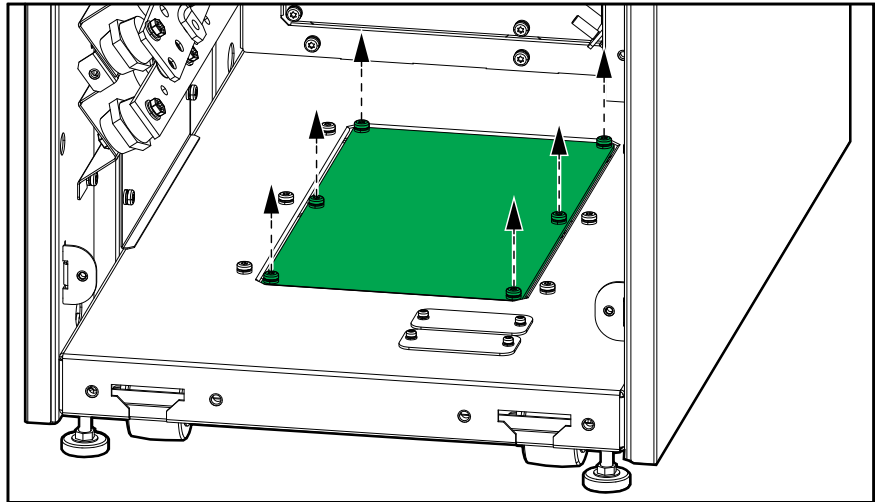
Front View of the UPS



9. Perform one of the following:

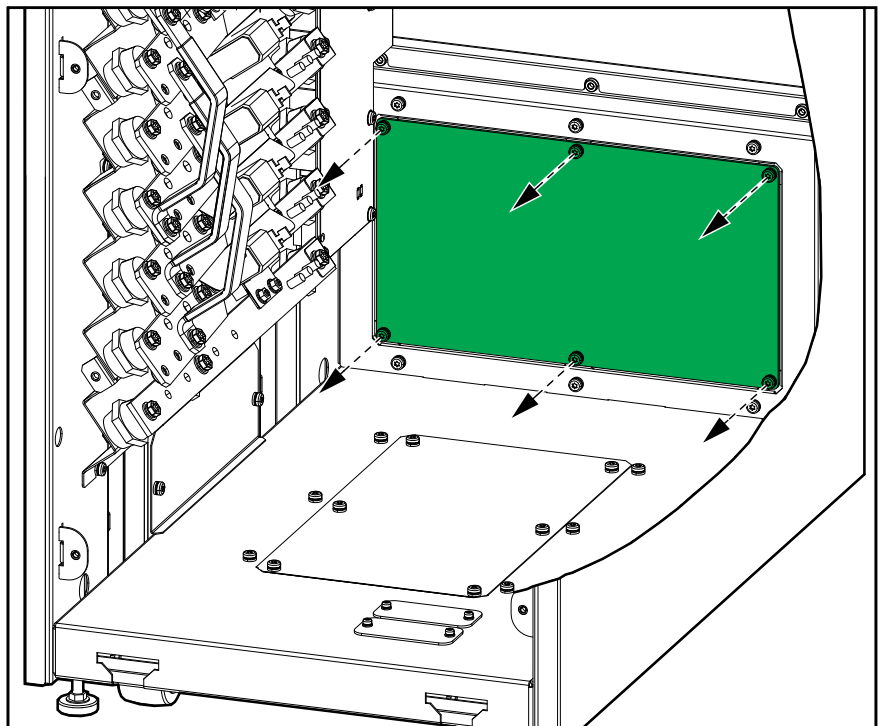
- **For bottom cable entry:** Remove the gland plate in the bottom of the UPS.

Front View of the UPS



- **For rear cable entry:** Remove the gland plate in the rear of the UPS.

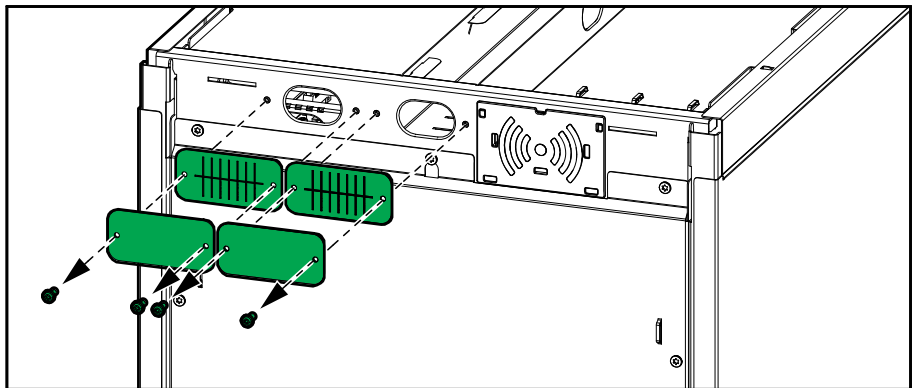
Front View of the UPS



10. Drill/punch holes for power cables/conduits in the gland plate. Install conduits (not provided), if applicable.
11. Install the gland plate in the bottom or rear of the UPS.

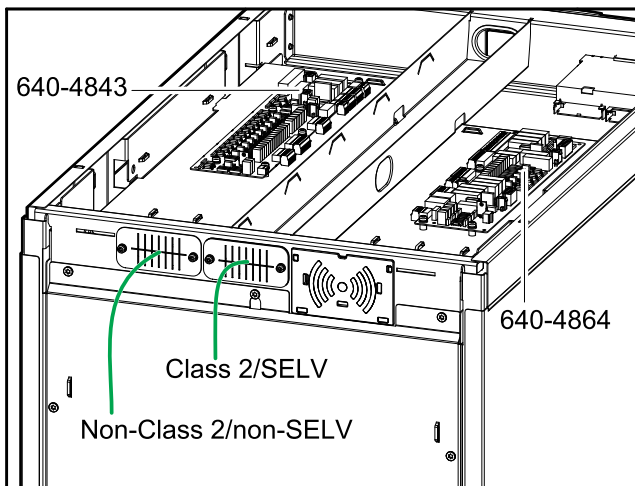
12. Remove the rear gland plates and the rear brush plates from the UPS.

Rear View of the UPS

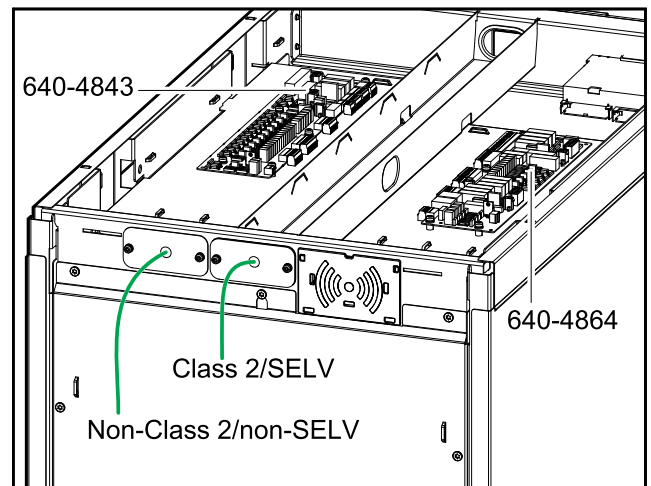


13. Perform one of the following:
 - **For installation without conduits:** Reinstall the brush plates.
 - **For installation with conduits:** Drill a hole in the gland plates for conduits, install conduits, and reinstall the gland plates.

Rear View of the UPS without Conduits



Rear View of the UPS with Conduits



14. Route the non-Class 2/non-SELV signal cables through the left rear brush/gland plate and into the left side of the UPS.
15. Route the external cables that connect to the controller box through the right rear brush/gland plate and through the cable channel to the front of the UPS.
16. Route the Class 2/SELV signal cables through the right rear brush/gland plate and into the right side of the UPS.

Install the Power Module(s)

⚠ CAUTION

HEAVY LOAD

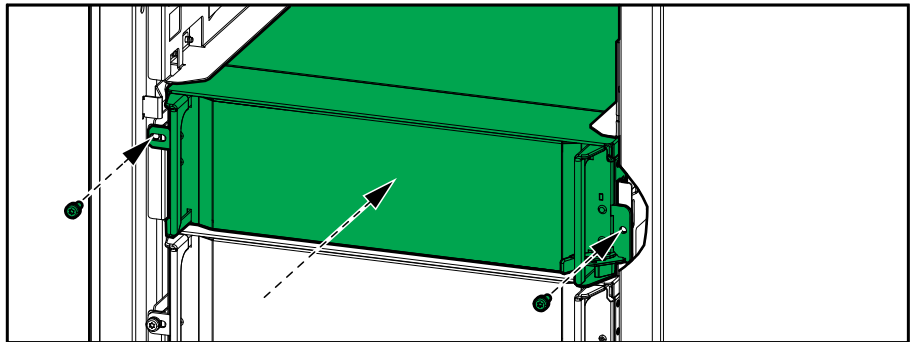
Power modules are heavy and require two persons to lift.

- 20 kW power module weighs 25 kg (55 lbs).
- 50 kW power module weighs 38 kg (84 lbs).

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

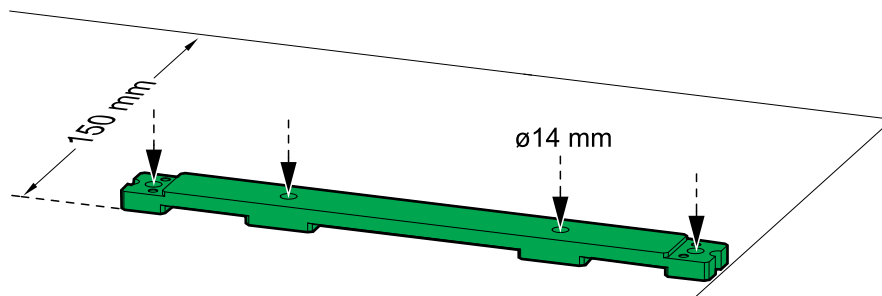
NOTE: Always install power modules starting with the bottom position and upwards.

1. Remove the screw in each side of the empty power module slot. Remove filler plate, if present.
2. Push the power module into the slot.
3. Reinstall the screw in each side of the slot.



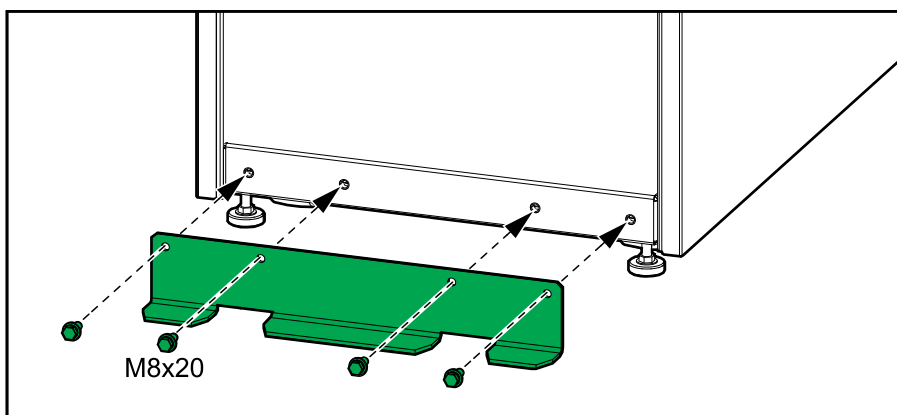
Install the Seismic Anchoring (Option)

1. Mount the rear anchor(s) to the floor. Use appropriate hardware for the floor type – the hole diameter in the rear anchor is $\varnothing 14$ mm.



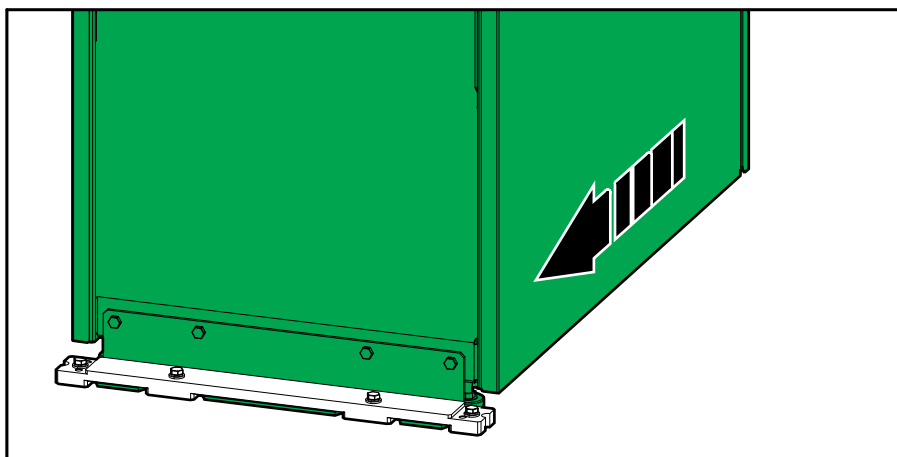
2. Install the rear anchoring bracket on the UPS with the provided M8 bolts.

Rear View of the UPS



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

Rear View of the UPS



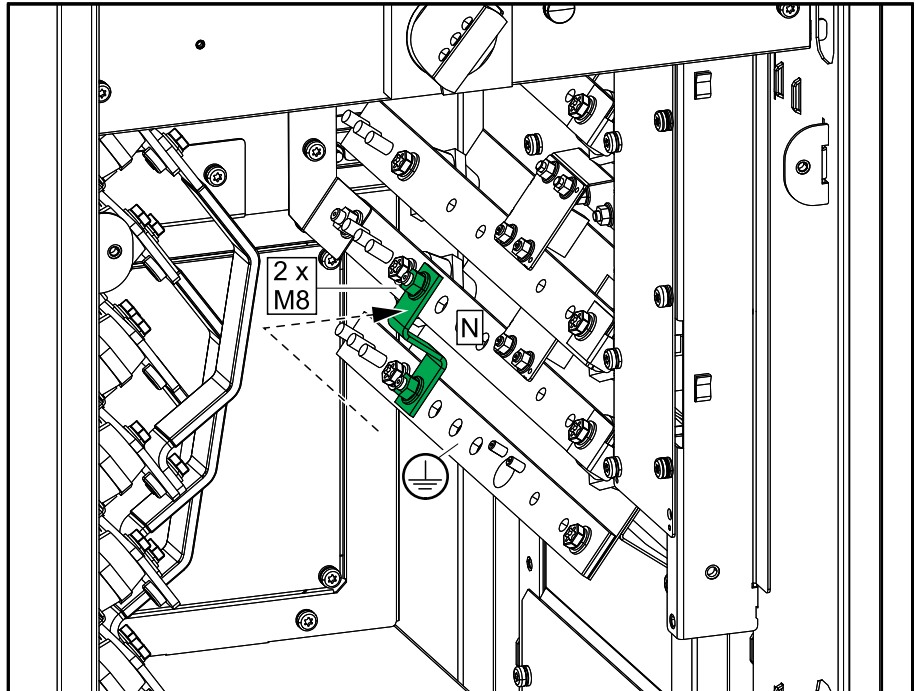
Prepare the UPS for TN-C/480 V Solid-Grounded System

NOTE: The UPS is preconfigured for TNS earthing system.

NOTE: 480 V solid-grounded system (no neutral connection) using a bonding busbar will result in a higher leakage current.

1. **Only for TN-C/480 V solid-grounded system (no neutral connection):**
Install the supplied bonding busbar.

Front View of the UPS – TN-C/480 V Solid-Grounded System (No Neutral Connection)



Connect the Power Cables

⚡⚡ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

In single mains systems where power cables are split due to the cable size restriction, use the bypass busbars for the second input cable set. There is not enough space to land two input cable sets on the input busbars due to the single mains jumper busbars.

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

NOTICE

RISK OF EQUIPMENT DAMAGE

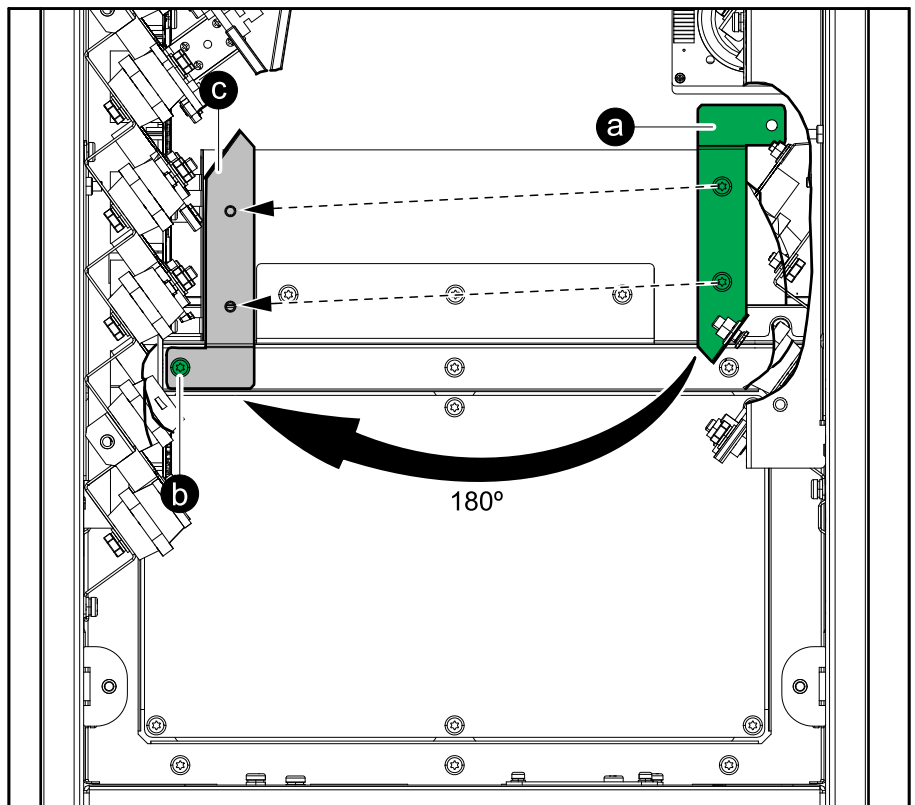
To ensure correct load sharing in bypass operation in a parallel system:

- All bypass cables must be the same length 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).

Failure to follow these instructions can result in equipment damage.

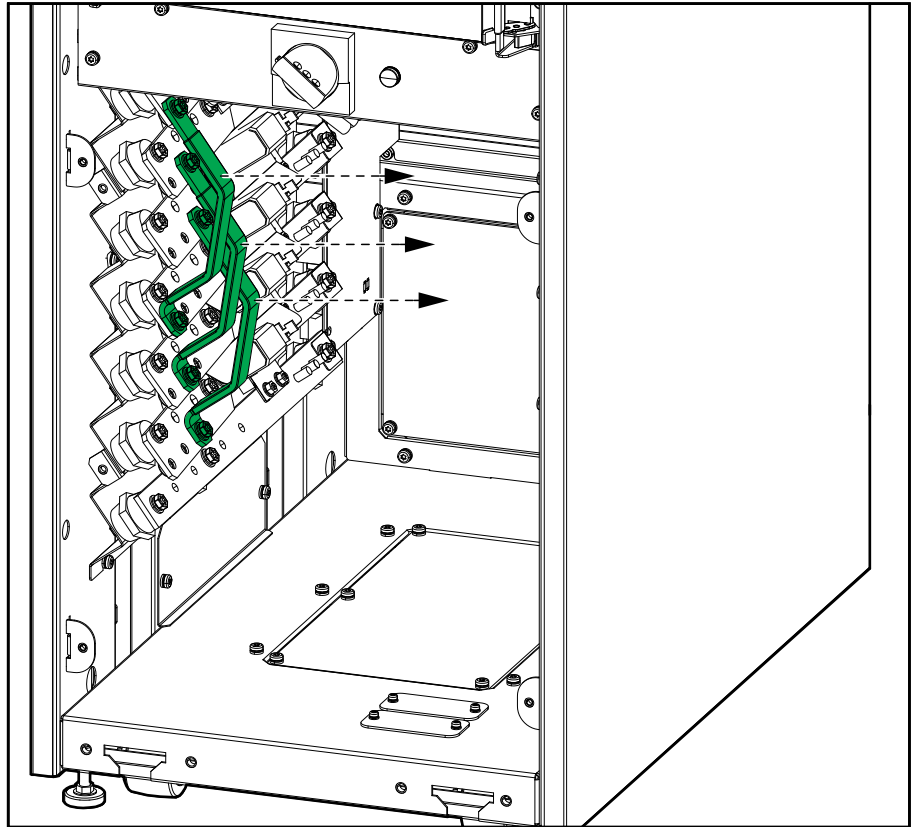
1. **Only for 480 V solid-grounded systems (no neutral cable connection):**
 - a. Remove the RFI bracket. Save the two screws.
 - b. Remove the screw in the left side and save it.
 - c. Install the RFI bracket in the left side with the three screws.

Front View of the UPS

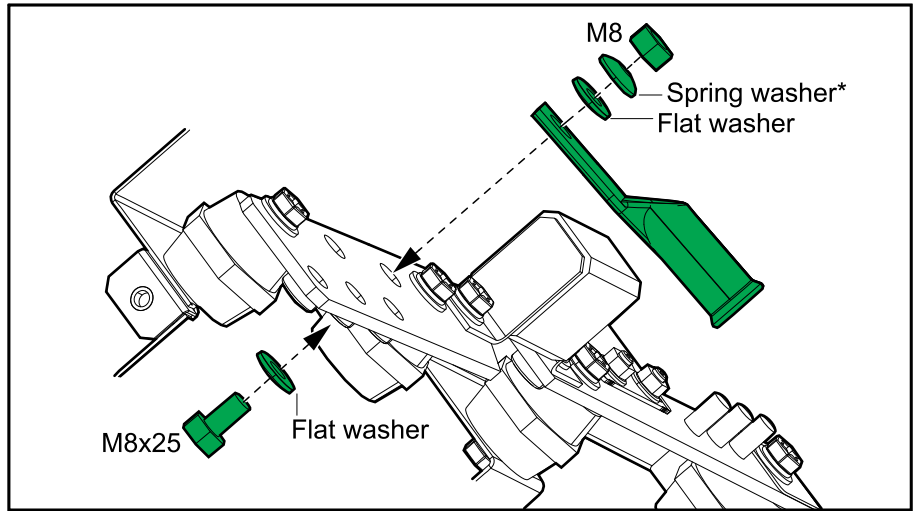


2. **Only for dual mains system:** Remove the three single mains jumper busbars.

Front View of the UPS



3. Connect the power cables as shown in the described order:

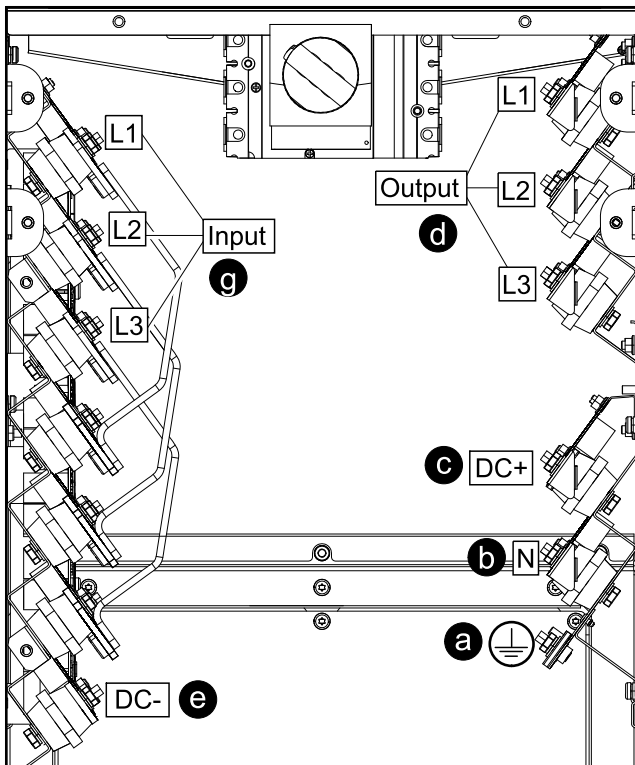


*Provided in kit.

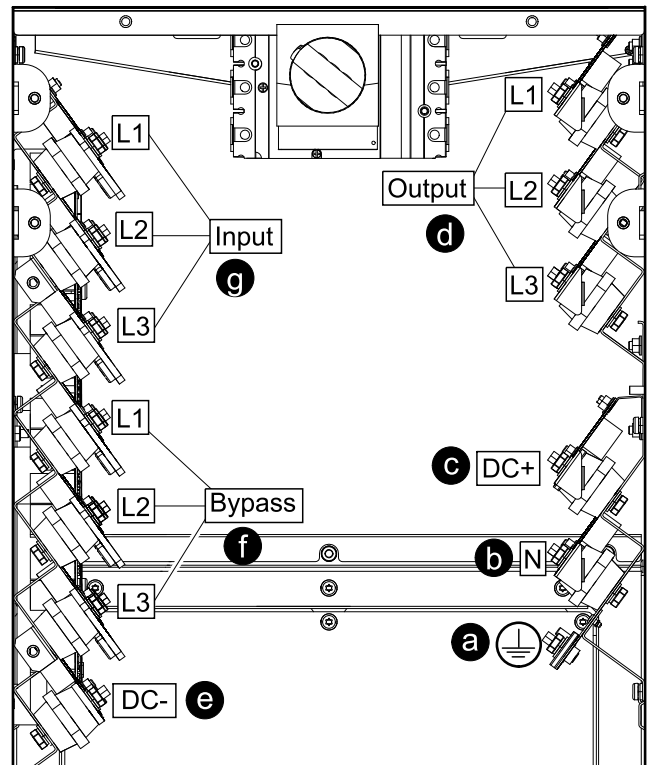
- a. Connect the equipment grounding conductor/PE cables.
- b. Connect the N cables. Connect battery midpoint (if present in battery solution).
- c. Connect the DC+ cables.
- d. Connect the output cables.
- e. Connect the DC- cables.
- f. **Only for dual mains system:** Connect the bypass cables.
- g. Connect the input cables.

NOTE: Ensure to connect the input cables to the correct input busbars in the top left side of the UPS.

Front View of the UPS – Single Mains System



Front View of the UPS – Dual Mains System



▲ CAUTION**RISK OF EQUIPMENT DAMAGE**

Check the fastening of the cable lugs. If the cable lugs move due to pulling on cables, the bolt can become loose.

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

Connect the Power Cables with NEMA 2 Hole Plates

⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

In single mains systems where power cables are split due to the cable size restriction, use the bypass busbars for the second input cable set. There is not enough space to land two input cable sets on the input busbars due to the single mains jumper busbars.

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

NOTICE

RISK OF EQUIPMENT DAMAGE

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

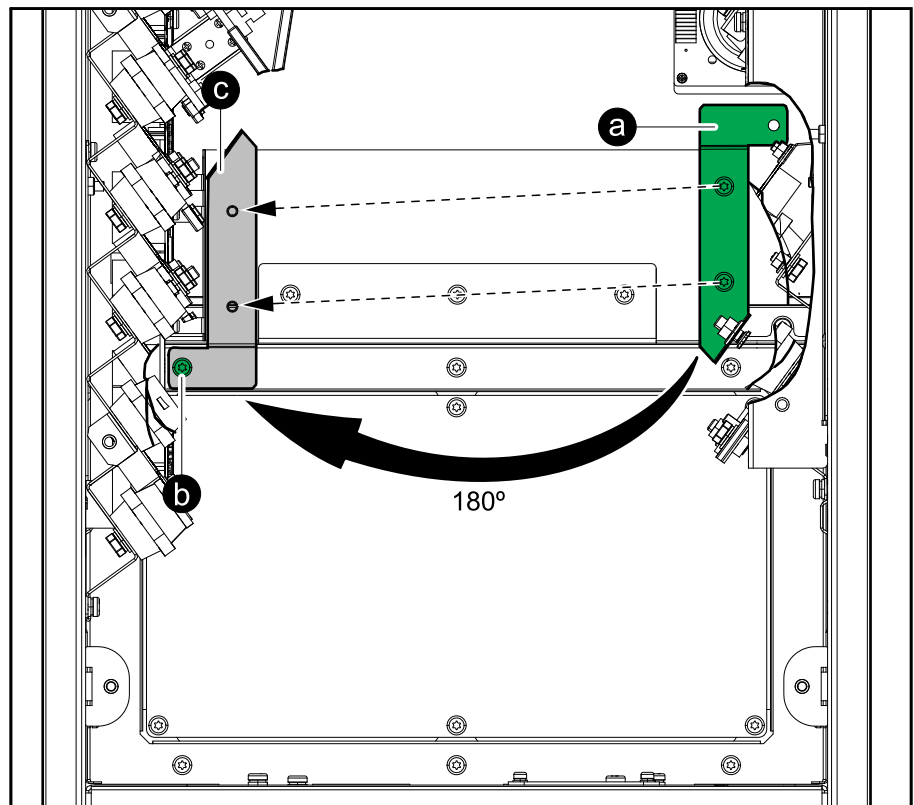
- All bypass cables must be the same length for all UPSs.
- All output cables must be the same length for all UPSs.
- All input cables must be the same length for all UPSs (only required in single mains system).

Failure to follow these instructions can result in equipment damage.

1. Only for 480 V solid-grounded systems (no neutral cable connection):

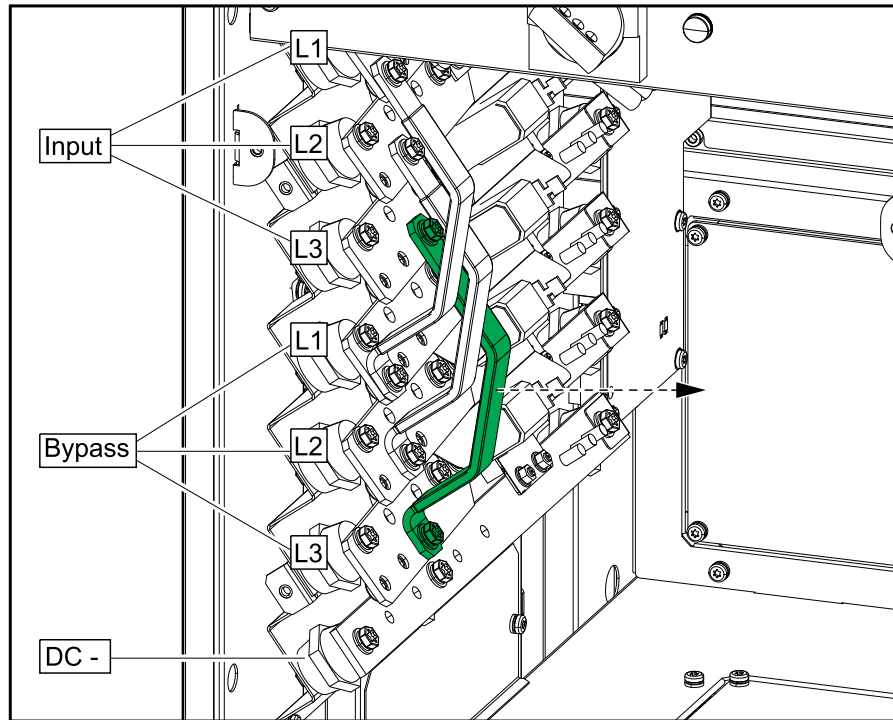
- Remove the RFI bracket. Save the two screws.
- Remove the screw in the left side and save it.
- Install the RFI bracket in the left side with the three screws.

Front View of the UPS

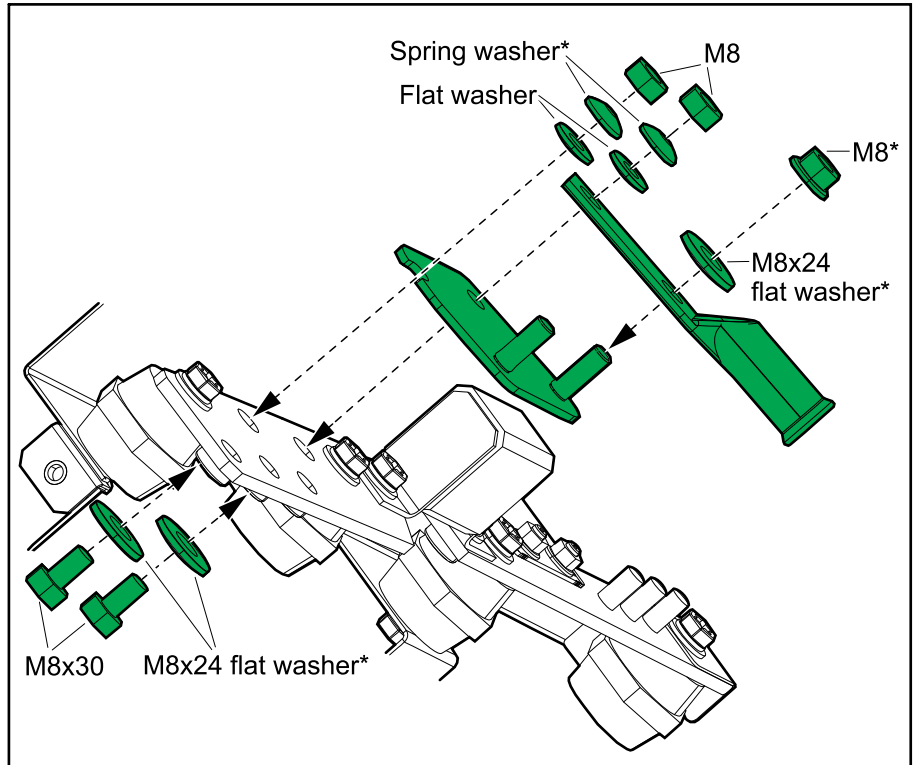


2. Perform one of the following:
 - **Only for single mains system:** Remove the indicated L3 jumper busbar in the left side of the UPS. Save the L3 jumper busbar for reinstallation later.
 - **Only for dual mains system:** Remove the three single mains jumper busbars in the left side of the UPS.

Front View of the UPS



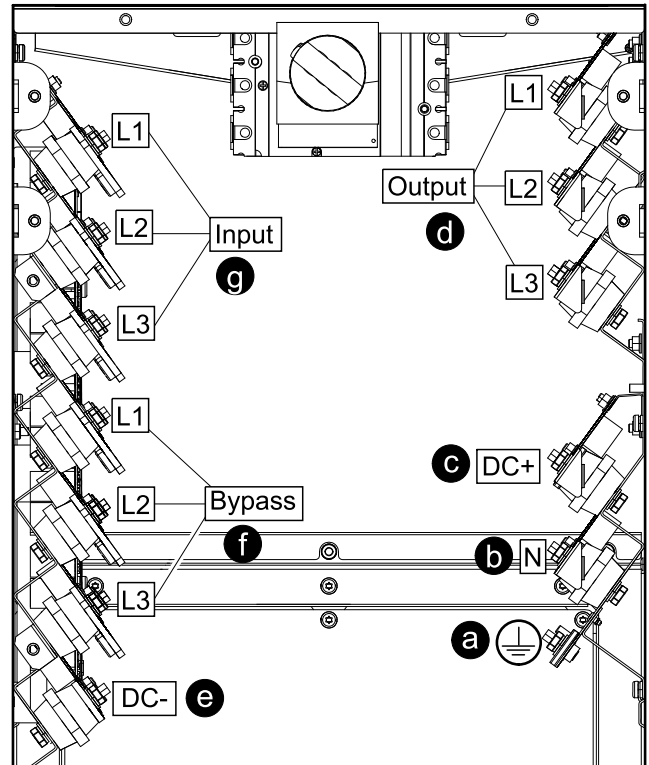
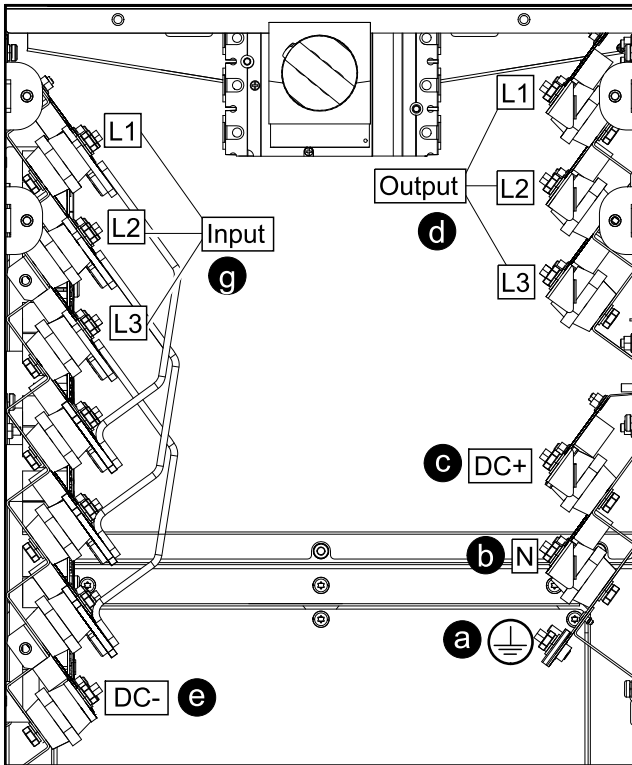
3. Install the NEMA 2 hole plates and connect the power cables as shown in the described order:



*Provided in kit.

Front View of the UPS — Single Mains System

Front View of the UPS — Dual Mains System



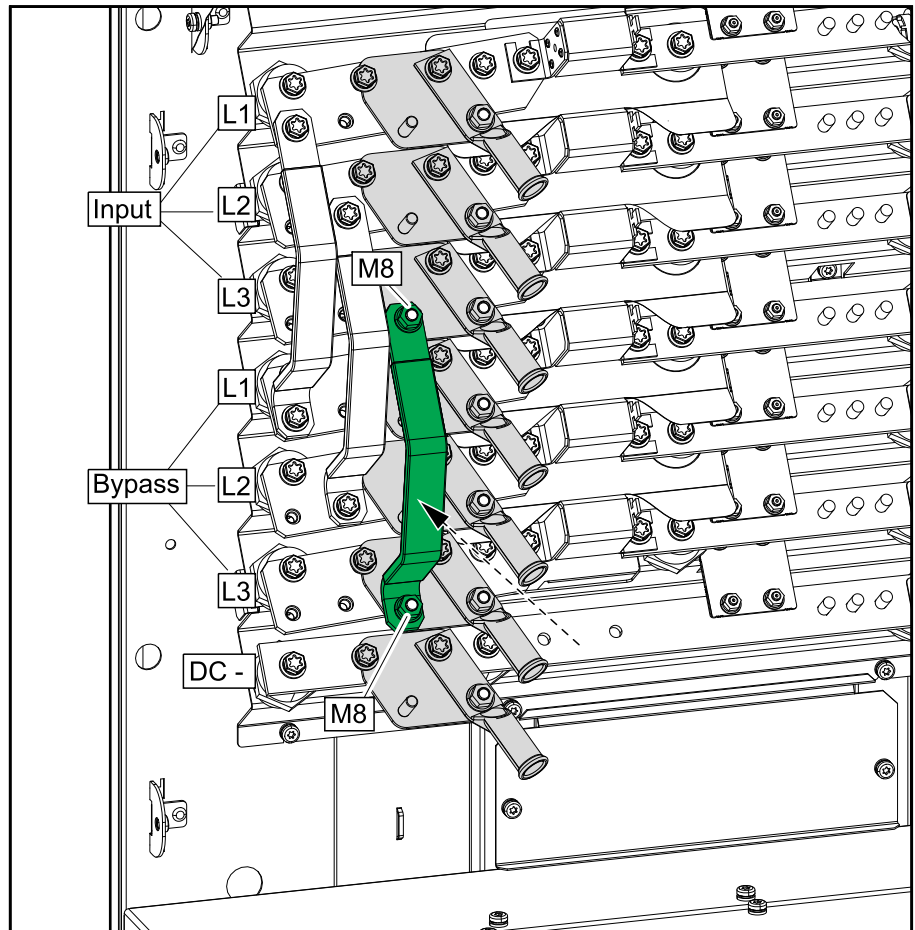
- a. Connect the equipment grounding conductor/PE cables.
- b. Connect the N cables. Connect battery midpoint (if present in battery solution).
- c. Connect the DC+ cables.

- d. Connect the output cables.
- e. Connect the DC- cables.
- f. **Only for dual mains system:** Connect the bypass cables.
- g. Connect the input cables.

NOTE: Ensure to connect the input cables to the correct input busbars in the top left side of the UPS.

4. **Only for single mains system:** Reinstall the L3 jumper busbar in its original position with two M8 nuts.

Front Right View of the UPS



Connect the Signal Cables

⚠ CAUTION

RISK OF EQUIPMENT DAMAGE

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

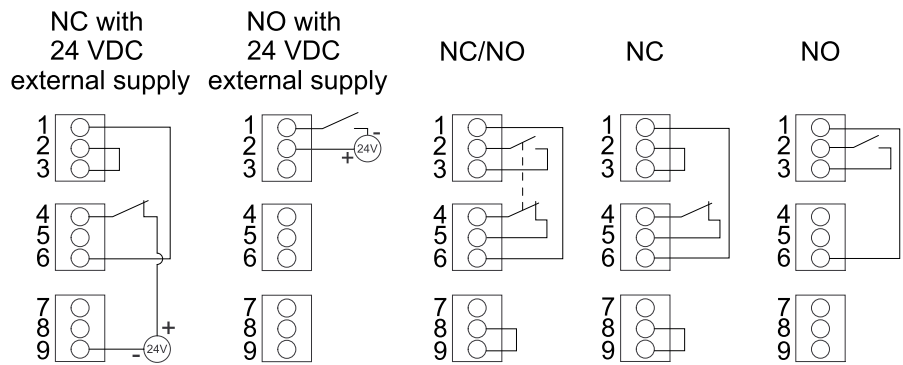
Failure to follow these instructions can result in injury or equipment damage.

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. 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.

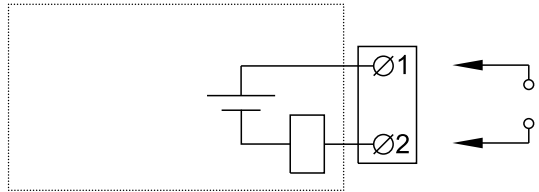
If you want the EPO activation to transfer the UPS into forced static bypass operation instead, please contact Schneider Electric.

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.

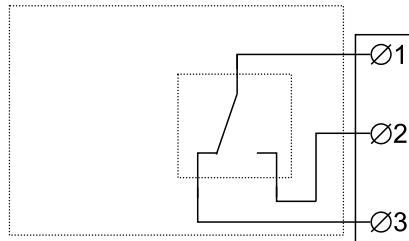
Do not connect any circuit to the input contacts unless it can be confirmed that the circuit is Class 2/SELV.

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

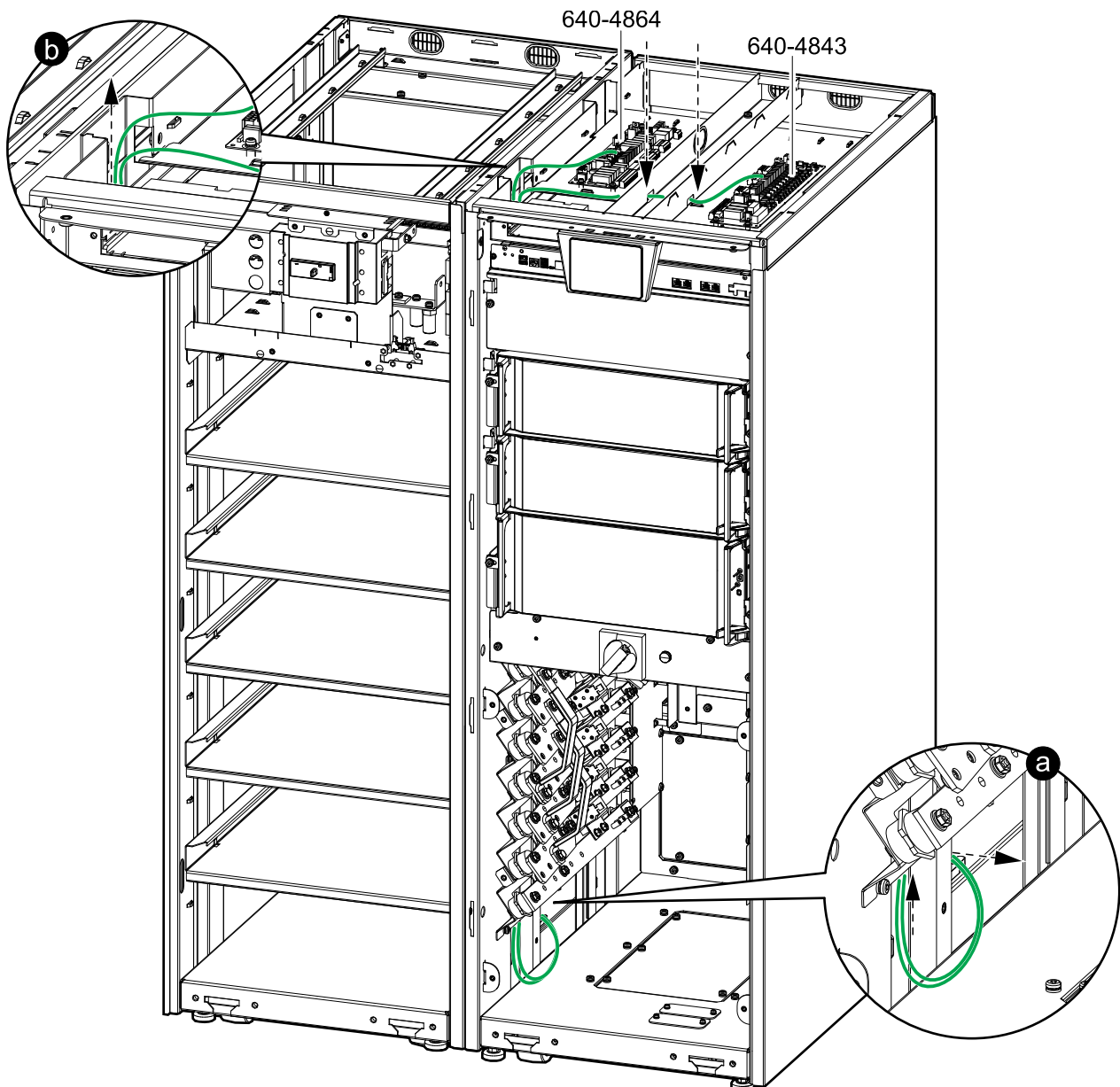
4. Connect the non-Class 2/non-SELV signal cables from the auxiliary products to board 640-4843 in the UPS. Follow the instructions in the auxiliary product manuals.

Connect the Signal Cables from a Modular Battery Cabinet

For installation with adjacent modular battery cabinet, use the signal cables provided in optional installation kit GVSOPT030. For installation with remote modular battery cabinets, signal cables are not provided. Follow the modular battery cabinet installation manual to prepare for installation.

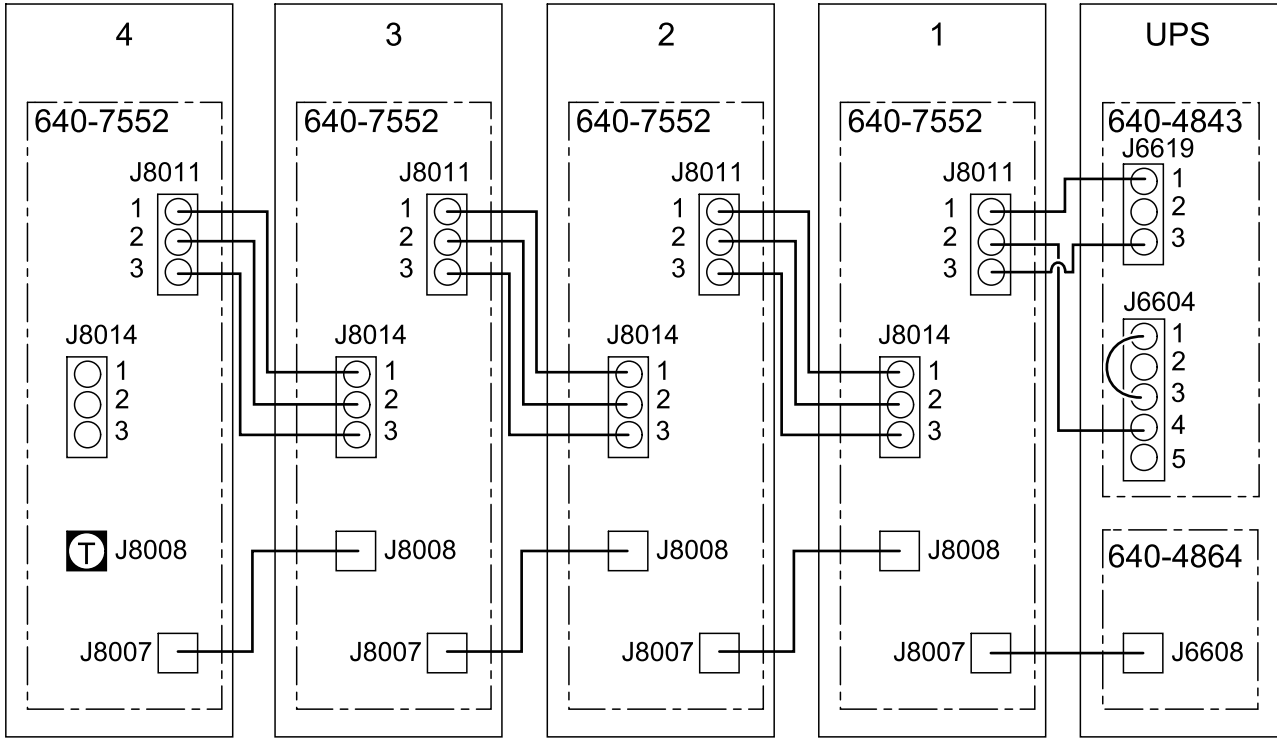
1. **For a remote modular battery cabinet:** Route the signal cables from modular battery cabinet 1 through the rear of the UPS.
2. **For an adjacent modular battery cabinet:** Route the signal cables from modular battery cabinet 1 to the UPS as shown.
 - a. Route the signal cables from modular battery cabinet 1 into the UPS through the opening.
 - b. Route the signal cables up through the cable channel 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. Mount a termination plug in J8008 on board 640-7552 in the last modular battery cabinet (T).
 - b. Connect the signal cable from J8011 on board 640-7552 in modular battery cabinet 1 to J6619 and J6604 on board 640-4843 in the UPS.
 - c. Connect the signal cable from J8007 on board 640-7552 in modular battery cabinet 1 to J6608 on board 640-4864 in the UPS.

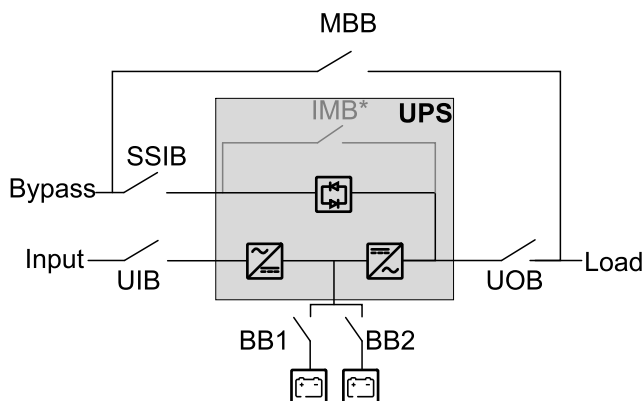
Signal Cable Connections between Four Modular Battery Cabinets and the UPS



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

⚠ WARNING

HAZARD OF FIRE

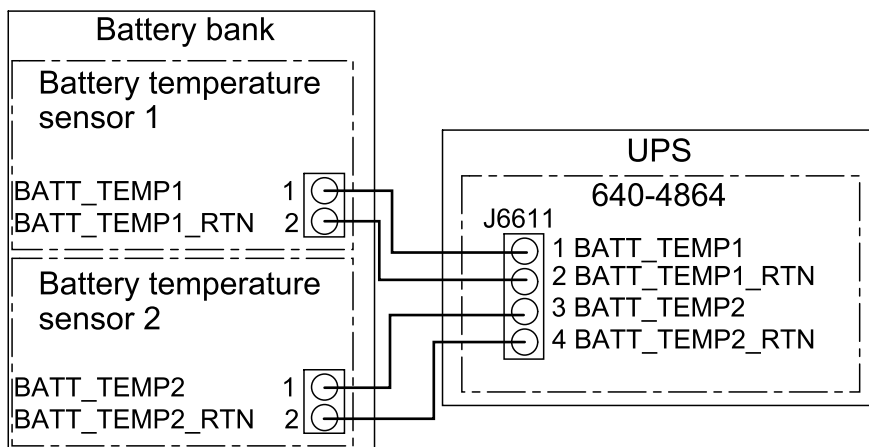
Position the temperature sensor as described to ensure correct temperature measurements.

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

2. Route the battery temperature sensor cables from the battery solution to the UPS and connect on board 640-4864 in the top of the UPS as shown.

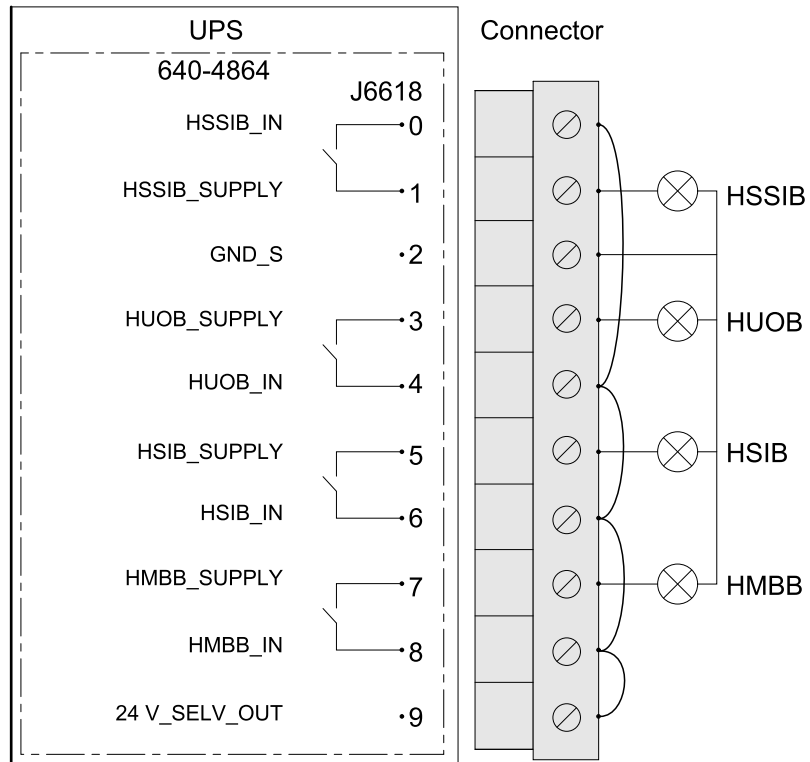
NOTE: One temperature sensor is provided with the UPS. Contact Schneider Electric if you want to buy an additional temperature sensor.

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



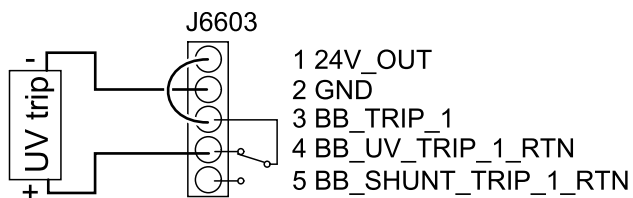
3. Connect signal cables from the breaker indicator lights in your switchgear to board 640-4864 terminal J6618 in the top of the UPS. If an external supply is used, remove jumper from J6618 pin 8 and 9.

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.

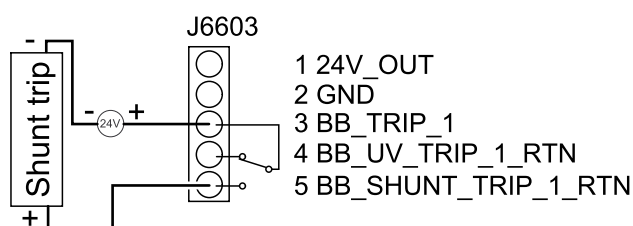
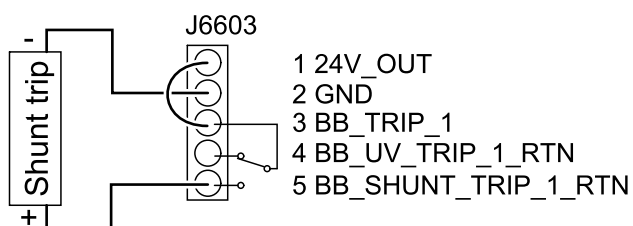
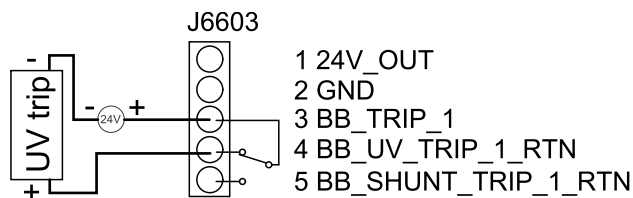


- Connect the signal cables from battery breaker 1 in your battery solution for shunt trip or undervoltage (UV) trip connection to board 640-4843 terminal J6603. Follow the illustration for connection with internal or external 24 VDC supply.

Battery Breaker Trip Connection with Internal 24 VDC Supply



Battery Breaker Trip Connection with External 24 VDC Supply



Supported Shunt

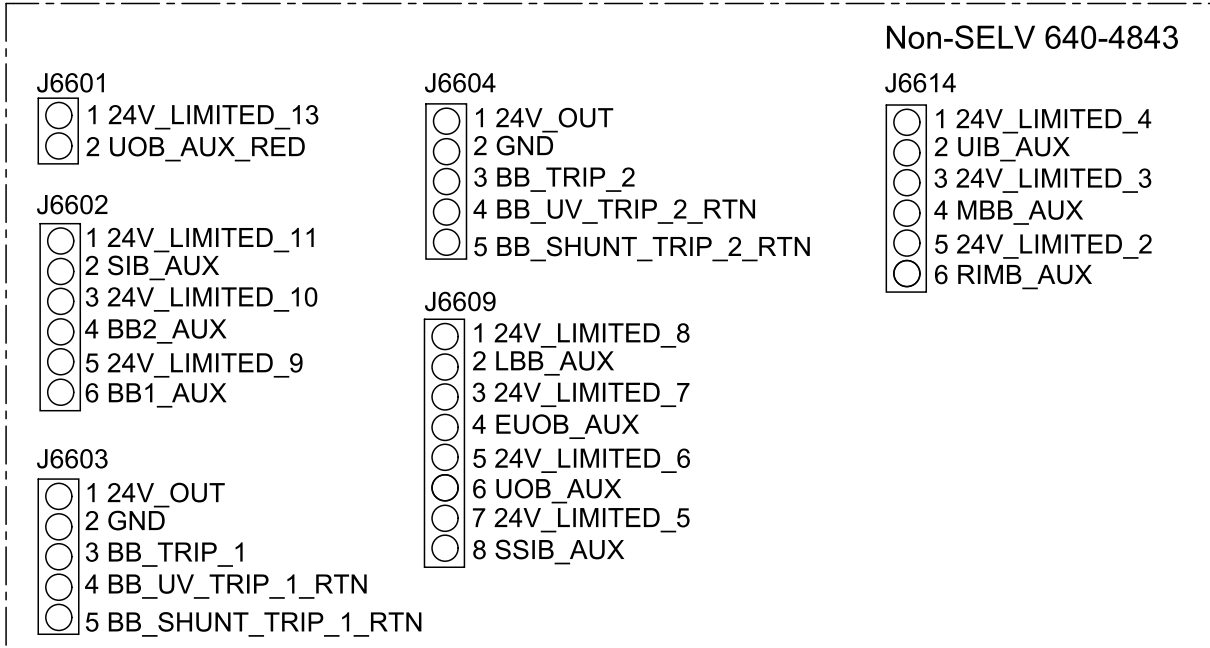
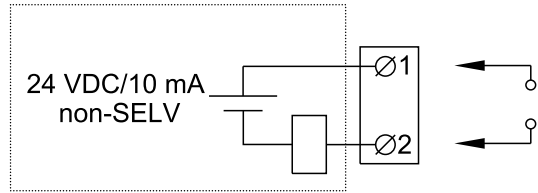
Voltage (V)	Current (A)	Time (ms)	Temperature	Recommended cable size ²⁷	
				IEC	UL
24	1.6	Continuous	20 °C (68 °F)	0.5 mm ² copper	20 AWG copper
24	10	1300	20 °C (68 °F)	1.5 mm ² copper	16 AWG copper
24	20	200	20 °C (68 °F)	2.5 mm ² copper	13 AWG copper
24	30	60	20 °C (68 °F)	4 mm ² copper	11 AWG copper

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

- Connect the signal cables from battery breaker 2 (if present) in your battery solution for shunt trip or undervoltage (UV) trip connection to board 640-4843 terminal J6604. The connection principle is the same as for battery breaker 1.

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

6. 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.
	BB2 (battery breaker 2)	Connect to normally open (NO) AUX switch in battery breaker number 2 ²⁸
	BB1 (battery breaker 1)	Connect to normally open (NO) AUX switch in battery breaker number 1 ²⁸
J6603	BB1_TRIP (battery breaker 1)	Connect to shunt trip or UV trip in battery breaker number 1 ²⁸
J6604	BB2_TRIP (battery breaker 2)	Connect to shunt trip or UV trip in battery breaker number 2 ²⁸
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.

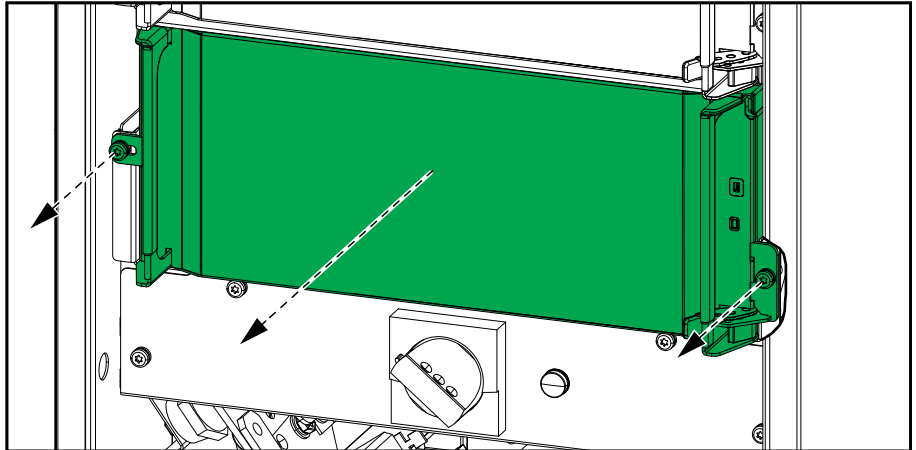
28. The UPS can connect to and monitor up to two battery breakers.

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.

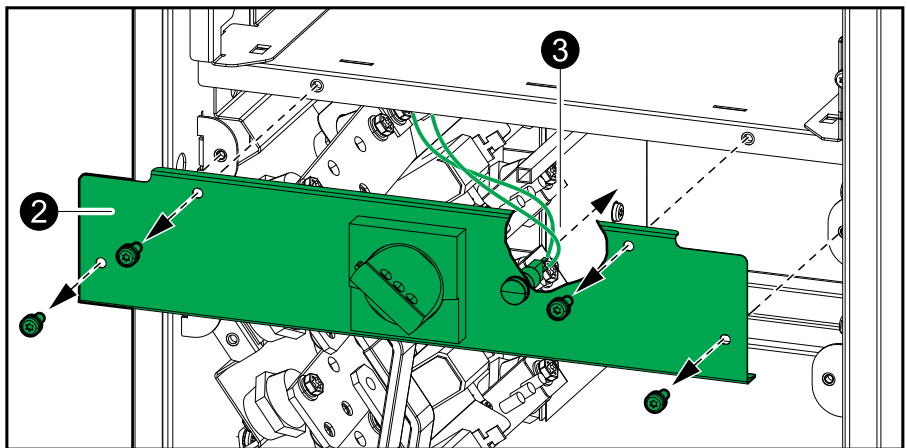
1. Remove the static switch module from both UPSs.

Front View of the UPS



2. Remove the cover from both UPSs.

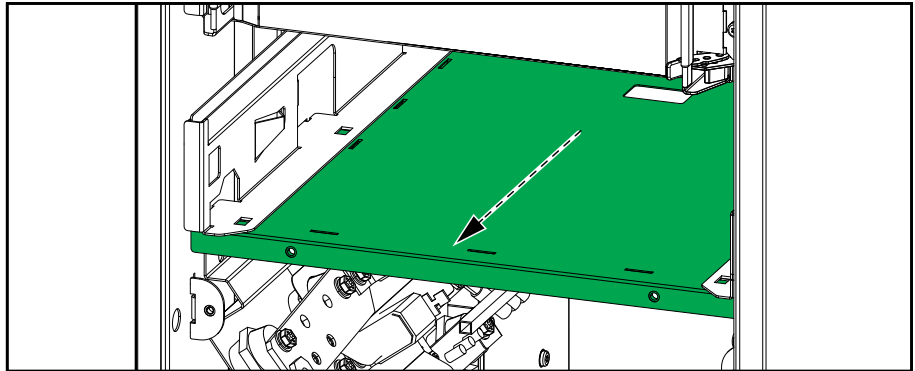
Front View of the UPS



3. Disconnect the signal cables from the internal maintenance breaker IMB indicator light on both UPSs.

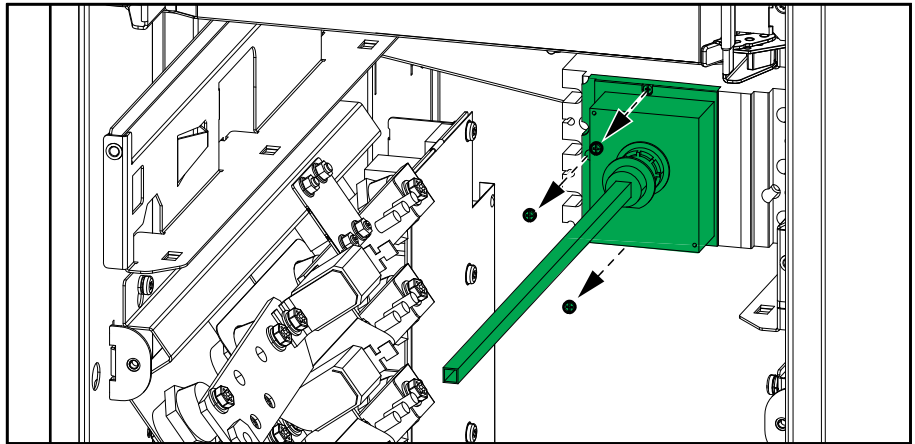
4. Remove the shelf from both UPSs.

Front View of the UPS



5. Remove the front cover from the internal maintenance breaker IMB on both UPSs.

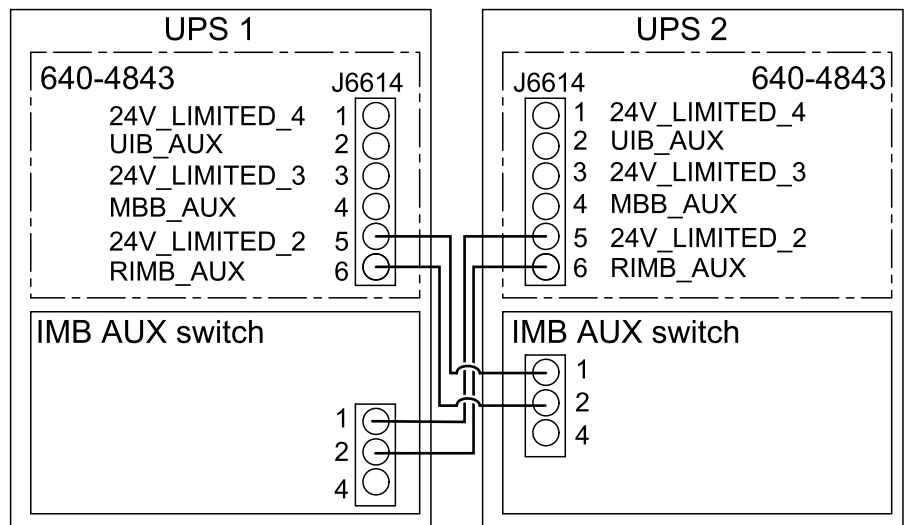
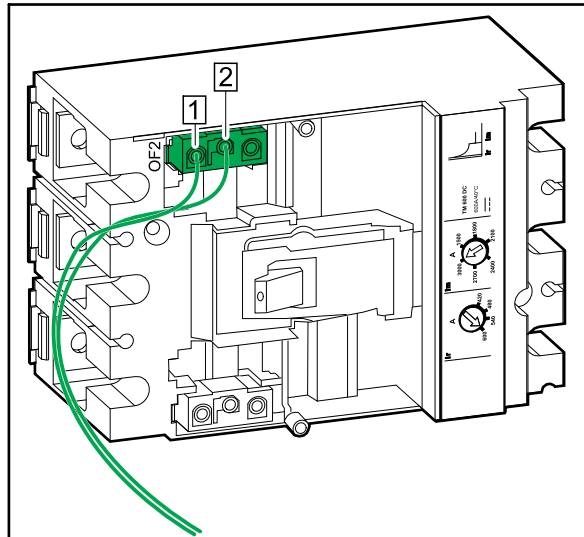
Front View of the UPS

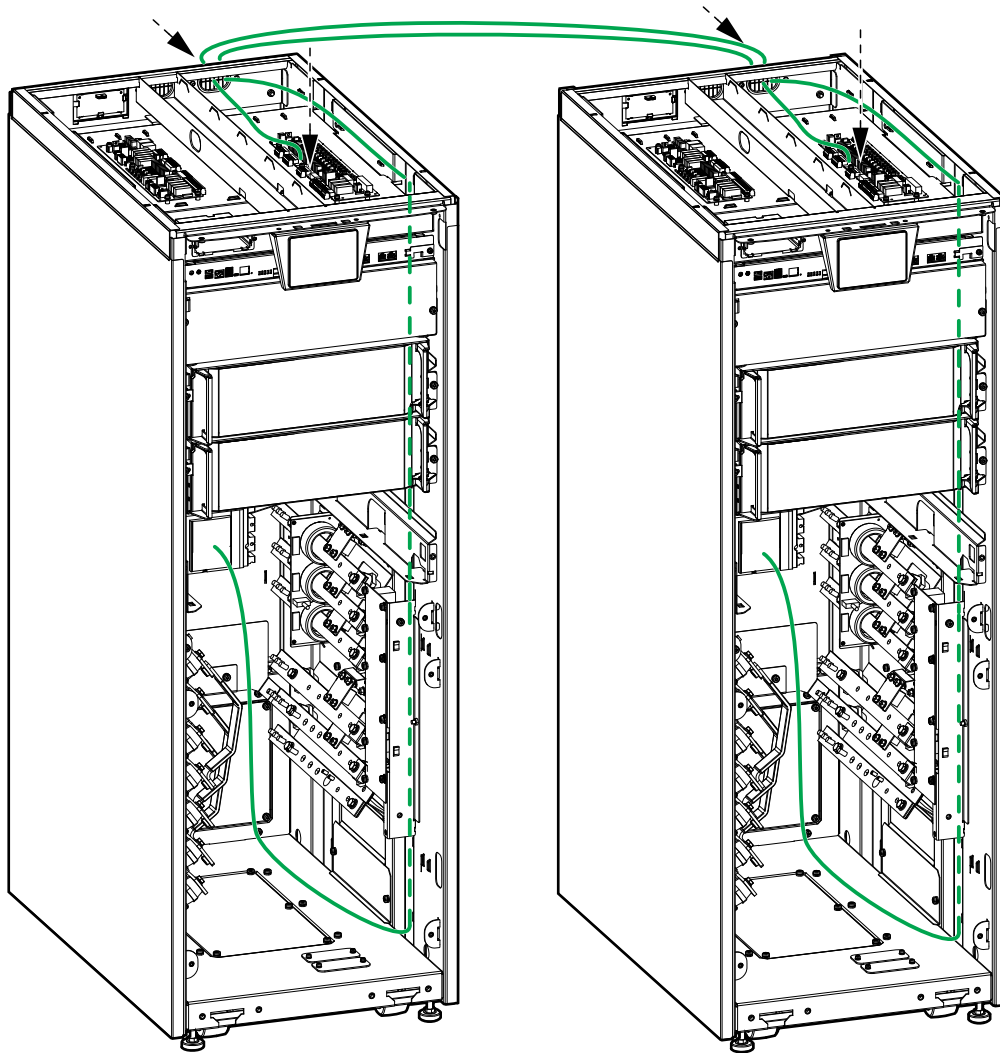


6. Install an additional AUX switch (provided) in the OF2 position in the internal maintenance breaker IMB on both UPSs.

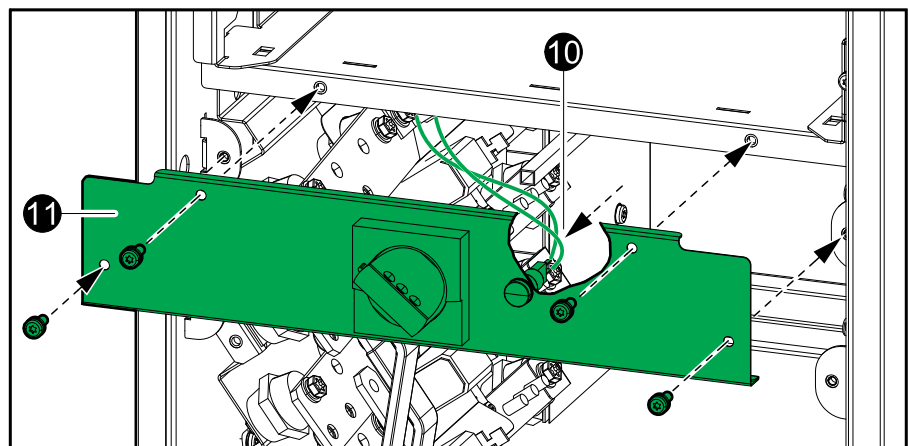
7. Connect the non-Class 2/non-SELV signal cables between the two UPSs:
 - a. Connect the non-Class 2/non-SELV signal cables (not provided) from the AUX switch terminal 1 and 2 in the internal maintenance breaker IMB in UPS 1 to J6614-5 and J6614-6 on board 640-4843 in UPS 2 as shown.
 - b. Connect the non-Class 2/non-SELV signal cables (not provided) from the AUX switch terminal 1 and 2 in the internal maintenance breaker IMB in UPS 2 to J6614-5 and J6614-6 on board 640-4843 in UPS 1 as shown.

Front View of Internal Maintenance Breaker IMB



Front View of Simplified 1+1 Parallel System

8. Reinstall the front cover on the internal maintenance breaker IMB on both UPSs.
9. Reinstall the shelf on both UPSs.
10. Reconnect the signal cables from the internal maintenance breaker IMB to the indicator light on both UPSs.

Front View of the UPS

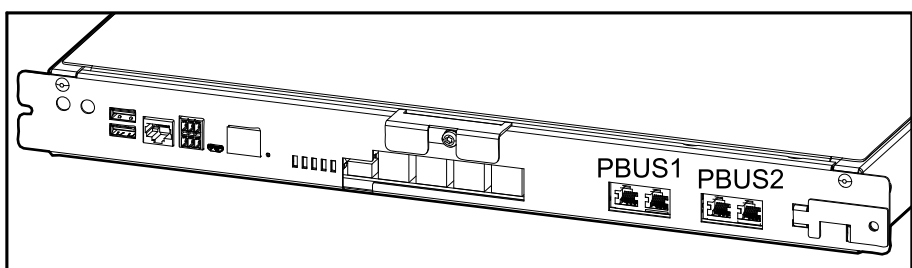
11. Reinstall the cover on both UPSs.
12. Reinstall the static switch module on both UPSs.

Connect the PBUS Cables

⚠ CAUTION
RISK OF EQUIPMENT DAMAGE
All PBUS cables shall be double insulated/jacket cable and minimum rated for 30 VDC. It is recommended to use the PBUS cables provided by Schneider Electric.
Failure to follow these instructions can result in injury or equipment damage.

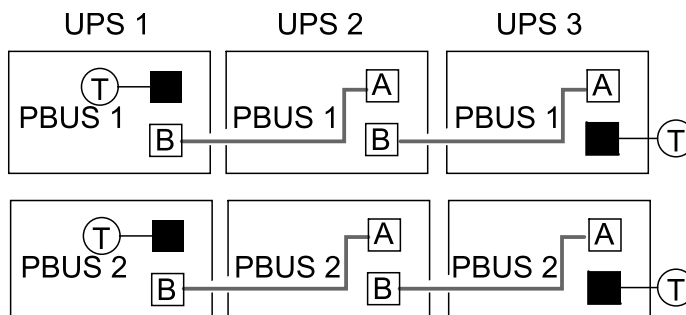
1. Connect the provided PBUS 1 (white) and PBUS 2 (red) cables to the PBUS ports in the UPS controller boxes. Route the PBUS cables through the cable channel in the UPSs.

Front View of Controller Box



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

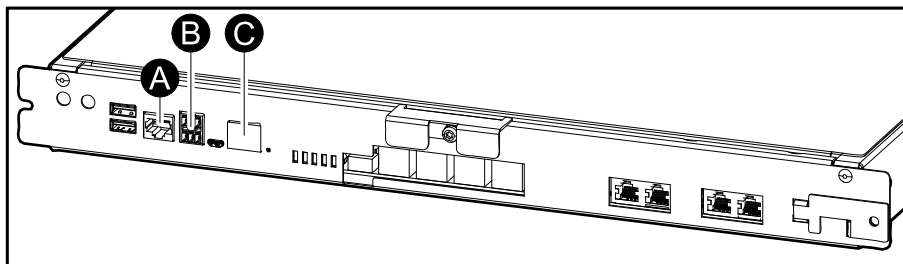
Example of System with Three UPSs in Parallel



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



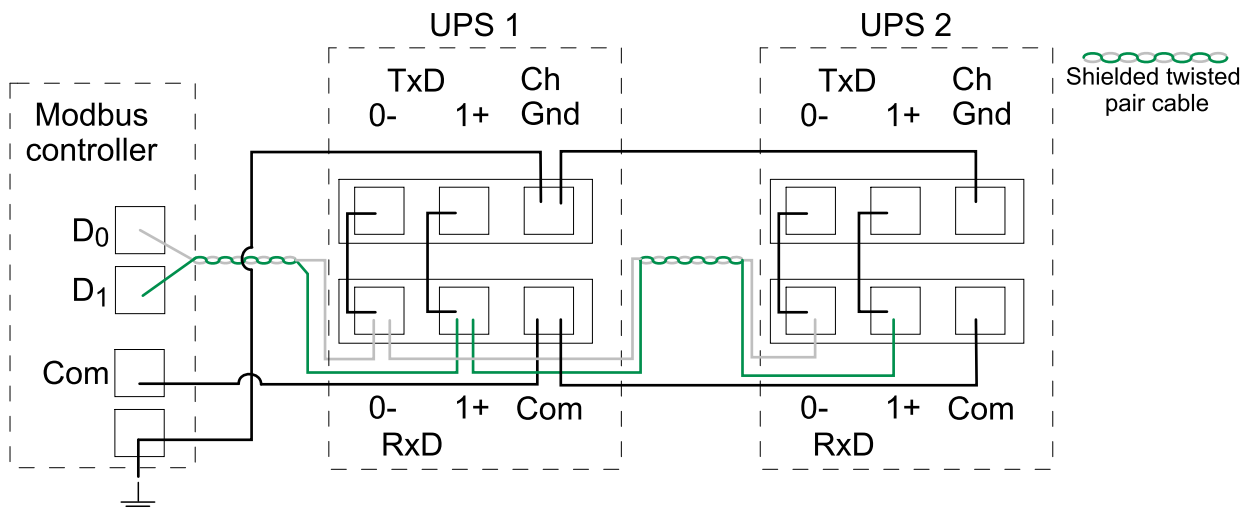
- A. Universal I/O port for built-in network management card.
- B. Modbus port for built-in network management card.
- C. Network port for built-in network management card. Use a shielded network cable.

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

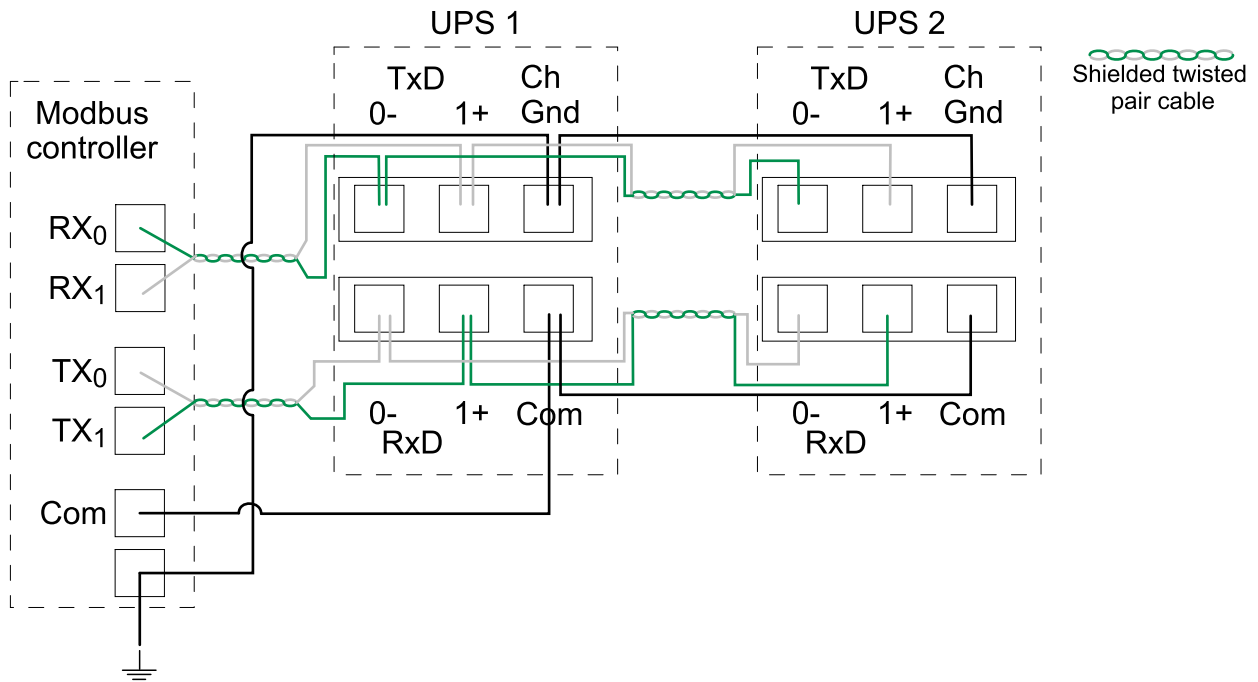
Connect the Modbus Cables

1. Connect the Modbus cables to the UPS(s). Use either 2-wire or 4-wire connection.
 - All Modbus signal cables shall be double insulated/jacket cable and minimum rated for 30 VDC.
 - Shielded twisted pair cables must be used for Modbus connections. The shield connection to the ground must be as short as possible (ideally below 1 cm). The cable shield must be connected to the Ch Gnd pin on each device.
 - Wiring should be done in accordance with local wiring codes.
 - Route signal cables separately from power cables to ensure sufficient isolation.
 - The Modbus port is galvanically isolated with the Com pin as ground reference.

Example: 2-Wire Connection with Two UPSs



Example: 4-Wire Connection with Two UPSs



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

Add Translated Safety Labels to Your Product

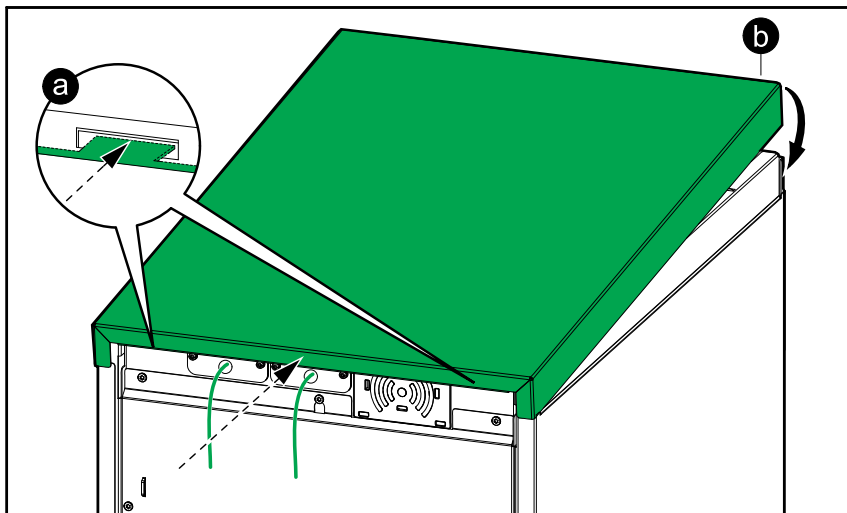
The safety labels on your product are in English and French. Sheets with translated safety labels are provided with your product.

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

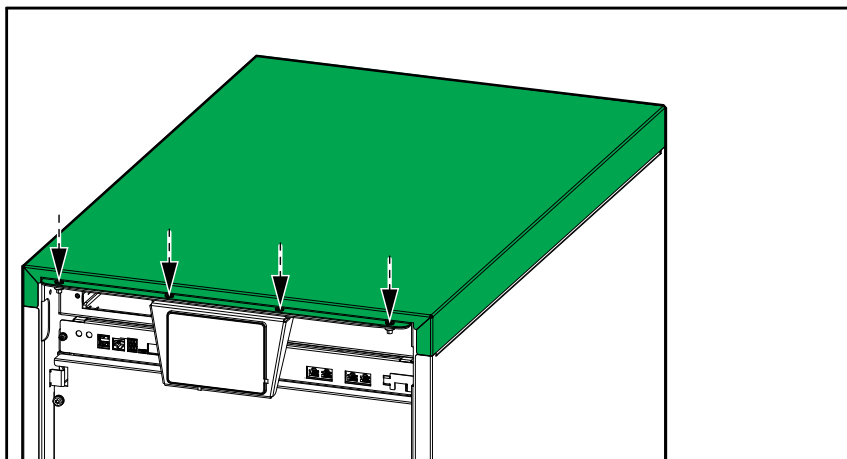
1. Reinstall the top cover:
 - a. Tilt the top cover and slide it onto the UPS from the rear. Tabs in the rear of the top cover must connect to the slots in the rear of the UPS.
 - b. Push the top cover down in the front.

Rear View of the UPS



- c. Reinstall the screws.

Front View of the UPS



2. Check the fastening of the cable lugs.

⚠ CAUTION

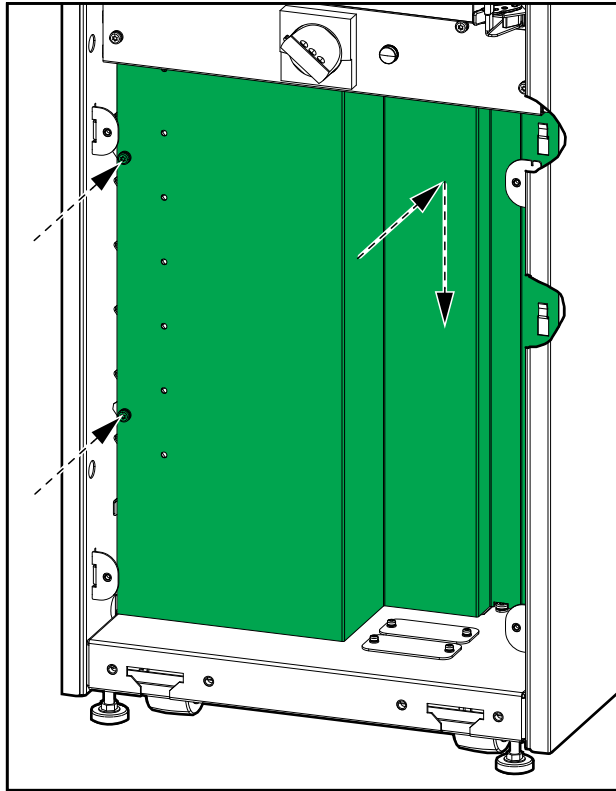
RISK OF EQUIPMENT DAMAGE

Check the fastening of the cable lugs. If the cable lugs move due to pulling on cables, the bolt can become loose.

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

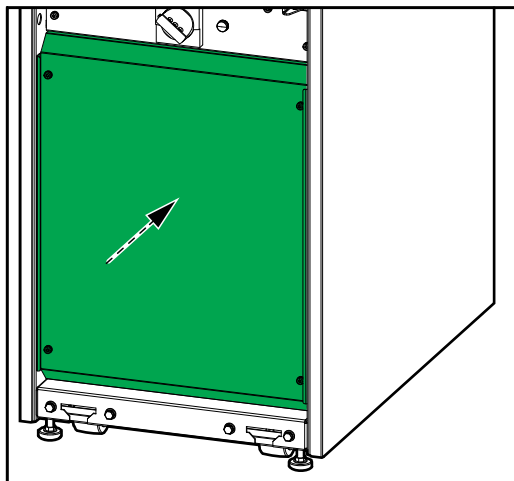
3. Reinstall the transparent cover.

Front View of the UPS



4. Reinstall the lower front plate.

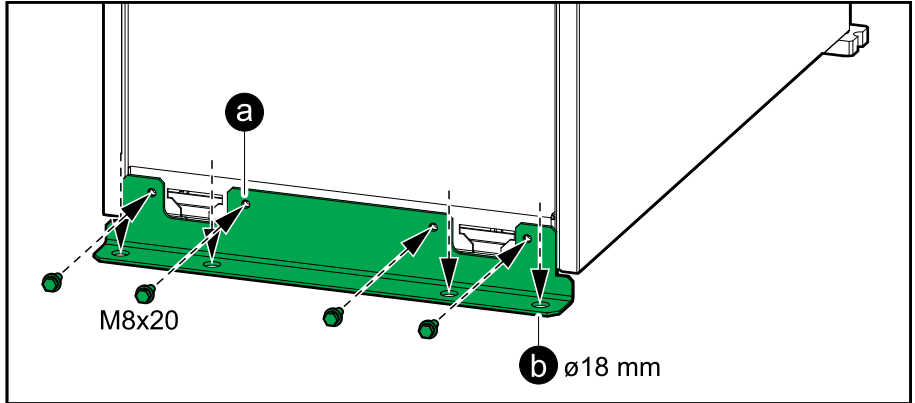
Front View of the UPS



5. Only for seismic anchoring:

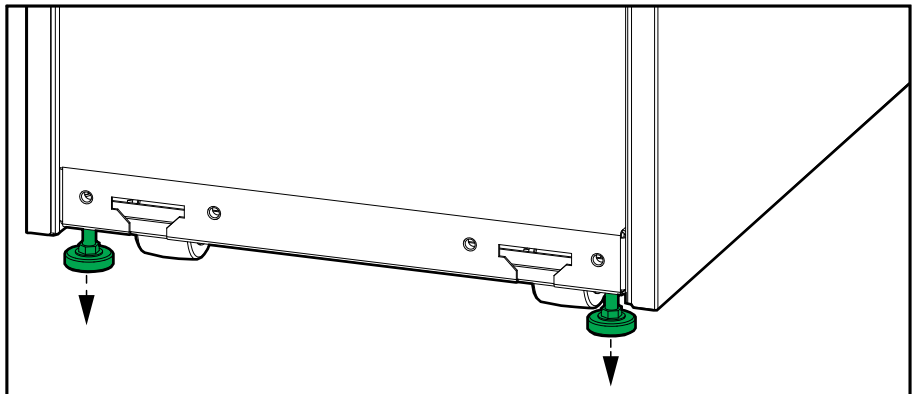
- a. Install the seismic front anchoring bracket on the UPS with the provided M8 bolts.
- b. Mount the seismic front anchoring bracket on the UPS to the floor. Use appropriate hardware for the floor type – the hole diameter in the front anchoring bracket is $\varnothing 18$ mm.

Front View of the UPS



- 6. 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. This step is not necessary for a UPS with seismic anchoring.

Front View of the UPS



⚠ CAUTION

TIP HAZARD

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

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

- 7. Only for UL 924 and CSA C22.2 NO. 141-15 solutions: Fill out the label on the lower front plate with the UPS output rating in kW.

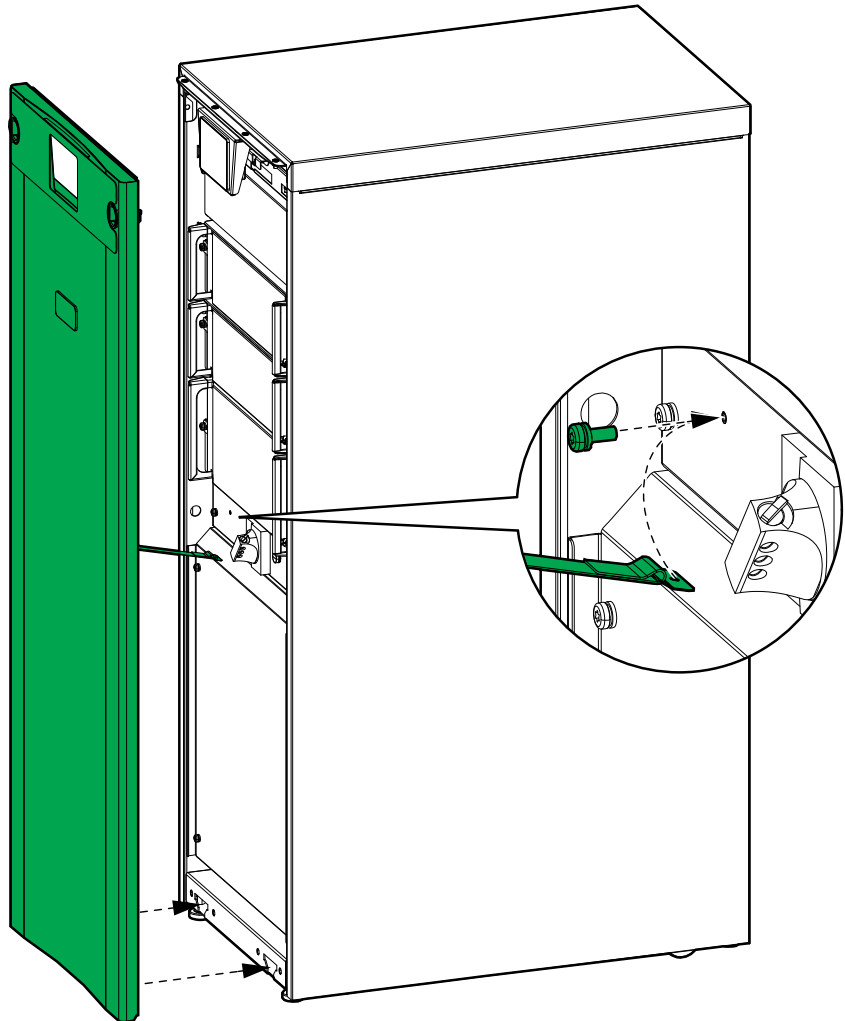
⚠ CAUTION

HAZARD OF EQUIPMENT DAMAGE

The total load must not exceed the output rating.
Total load _____ kW maximum.

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

8. Reinstall the front panel on the UPS:
 - a. Insert the two tabs in the bottom of the front panel in the UPS at a tilted angle.
 - b. Reconnect the front panel strap to the UPS.
 - c. Close the front panel and lock with the two locking knobs.

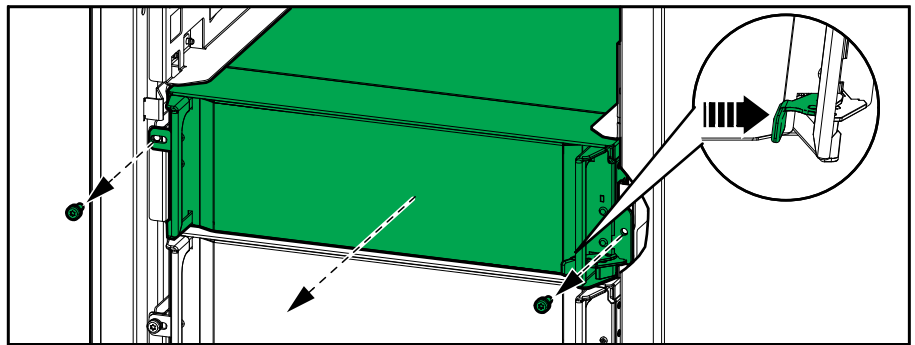


Decommission or Move the UPS to a New Location

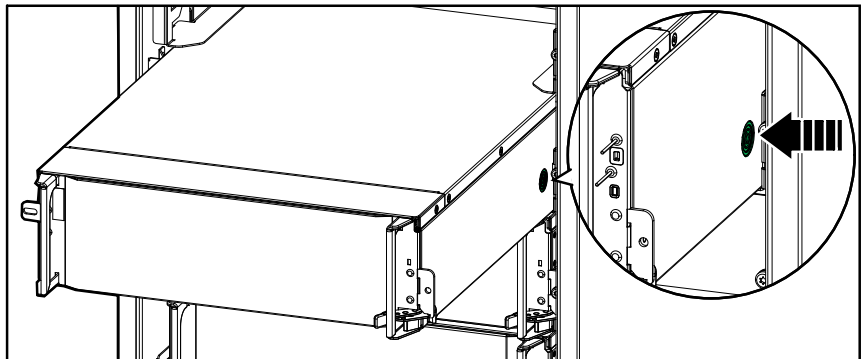
1. Shut down the UPS completely – follow the instructions in the UPS operation manual.
2. Lockout/Tagout all breakers in the maintenance bypass cabinet/maintenance bypass panel/switchgear in the OFF (open) position.
3. Lockout/Tagout all battery breakers in the switchgear/battery solution in the OFF (open) position.
4. Remove the front panel from the UPS.
5. Lockout/Tagout the internal maintenance breaker IMB in the OFF (open) position.

6. Remove all power modules from the UPS:

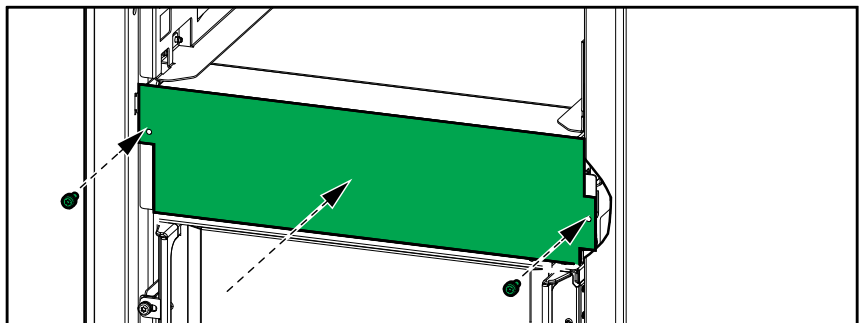
▲ CAUTION
<p>HEAVY LOAD</p> <p>Power modules are heavy and require two persons to lift.</p> <ul style="list-style-type: none"> • 20 kW power module weighs 25 kg (55 lbs). • 50 kW power module weighs 38 kg (84 lbs). <p>Failure to follow these instructions can result in injury or equipment damage.</p>



- a. Pull the power module halfway out. A locking mechanism prevents the power module from being pulled all the way out.
- b. Release the lock by pressing the release button on both sides of the power module and remove the power module.



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



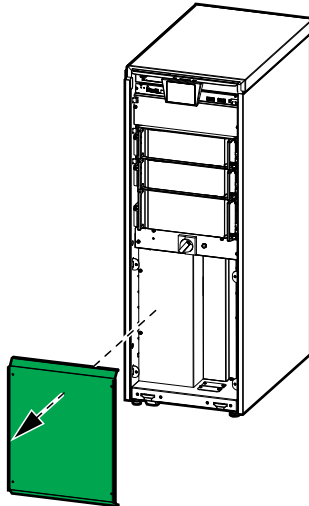
- d. Store the power modules safely until reinstallation.

▲ WARNING**RISK OF EQUIPMENT DAMAGE**

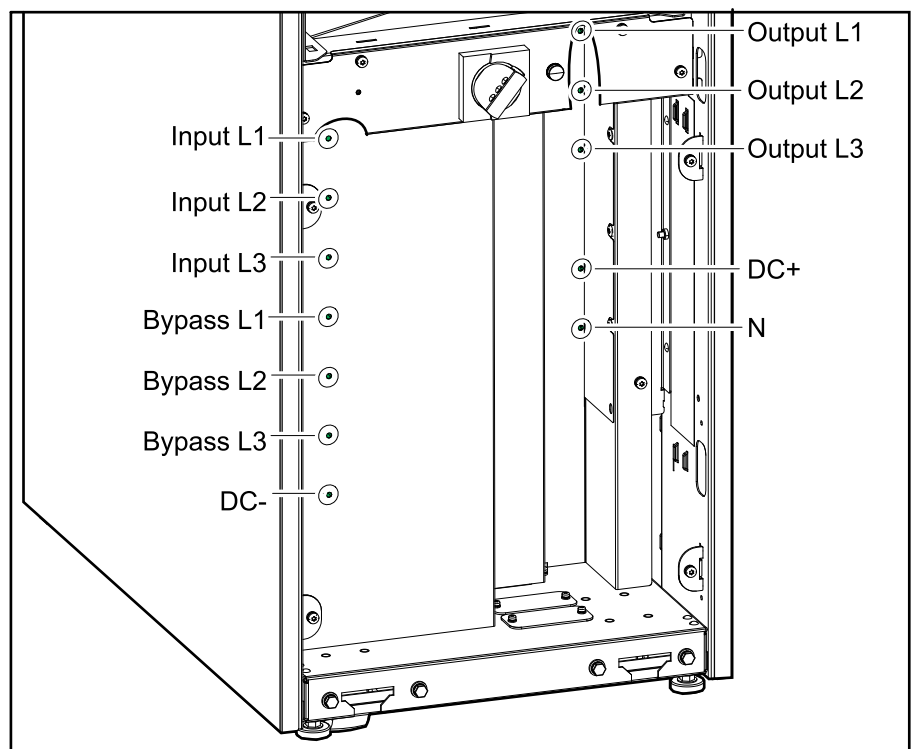
- Store the power modules at an ambient temperature of -15 to 40 °C (5 to 104 °F), 10-80% non-condensing humidity.
- Store the power modules in their original protective packaging.

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

7. Remove the lower front plate.



8. Measure for and verify ABSENCE of voltage with a multimeter probe through the holes in the transparent cover for input, bypass, output, neutral, and DC.



9. Remove the transparent cover.

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

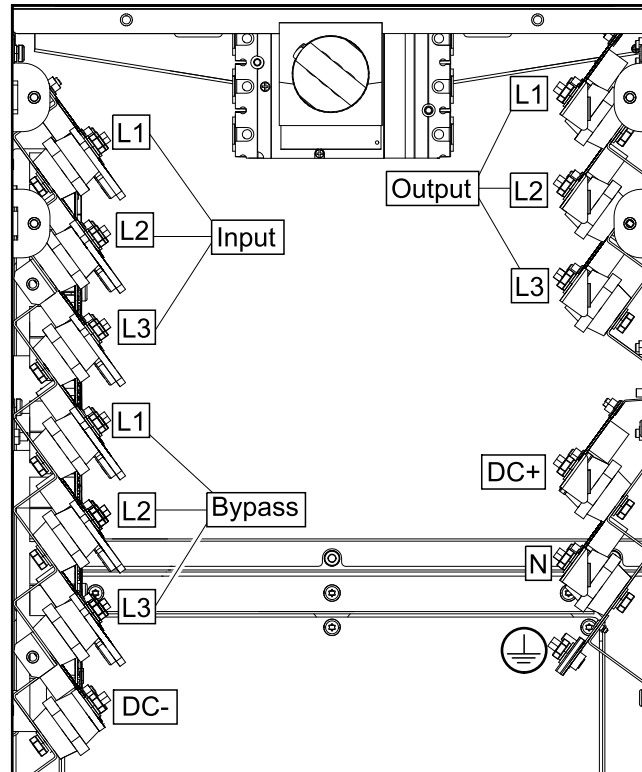
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

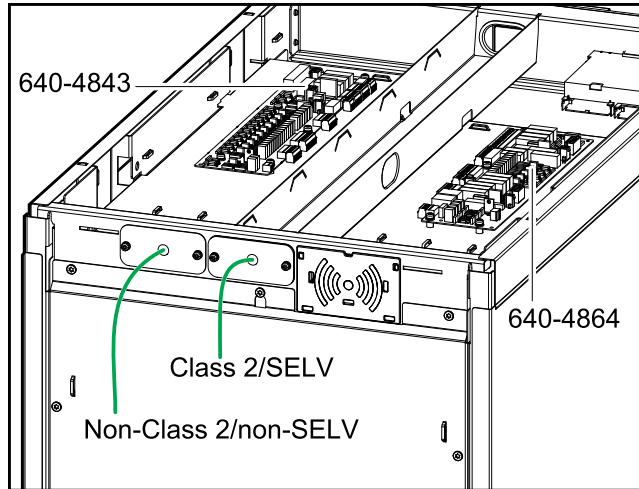
Front View of the UPS



11. Disconnect and remove all power cables from the UPS. See *Connect the Power Cables*, page 83 or *Connect the Power Cables with NEMA 2 Hole Plates*, page 87 for details.
12. Remove the top cover.

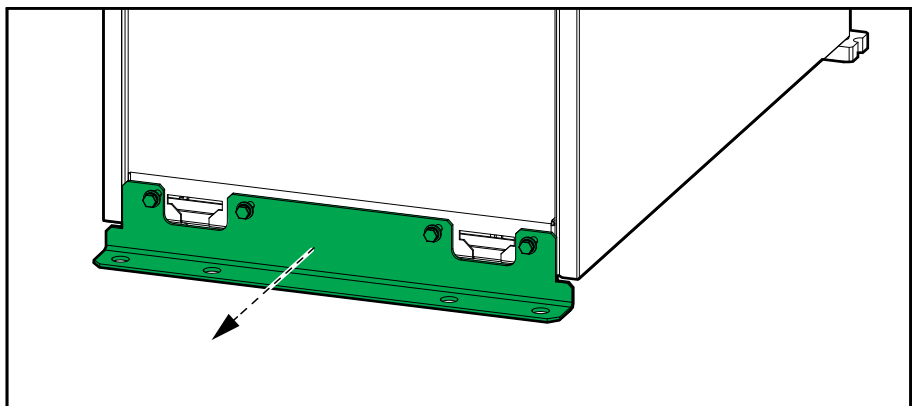
13. Disconnect and remove any signal cables from the top and the front of the UPS. **For UPS system with modular battery cabinet(s):** See *Connect the Signal Cables from a Modular Battery Cabinet*, page 93 for details. **For simplified 1+1 parallel UPS system:** See *Connect the IMB Signal Cables in a Simplified 1+1 Parallel System*, page 99 for details.

Rear View of the UPS with Conduits



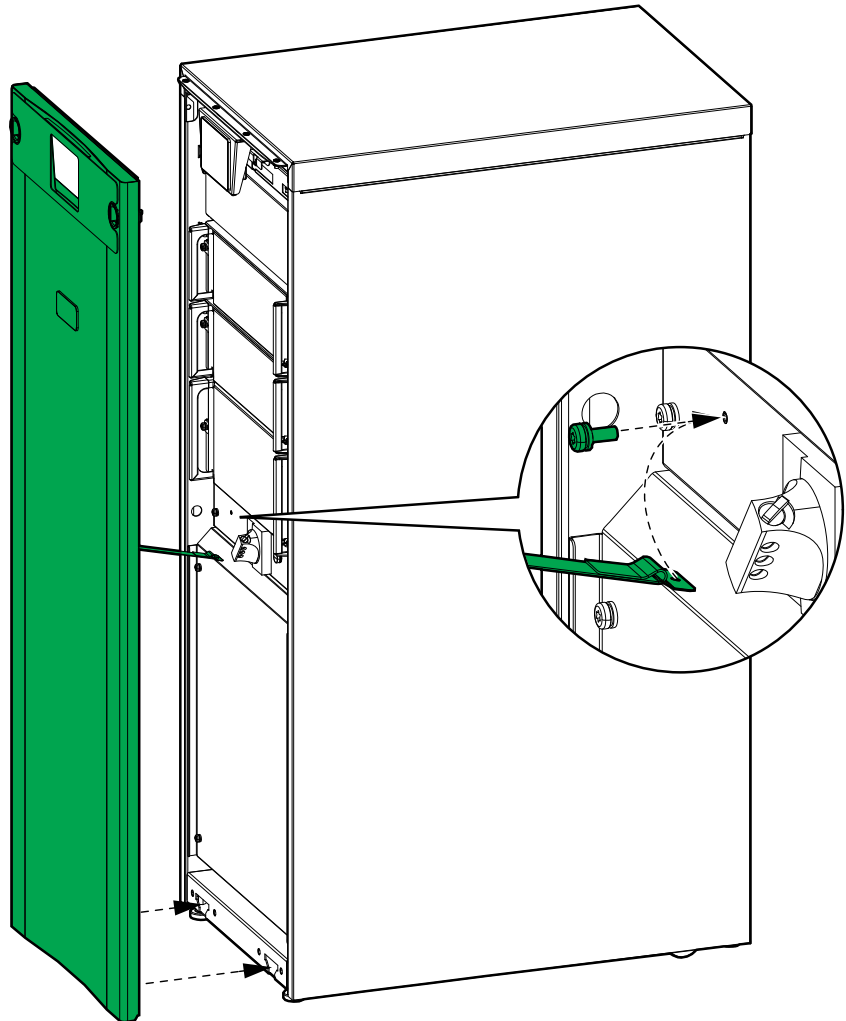
14. **For UPS system with maintenance bypass cabinet:** Remove the interconnection hardware between the UPS and the maintenance bypass cabinet. See the installation manual provided with the maintenance bypass cabinet for details. Save all parts for reinstallation.
15. **For UPS system with adjacent battery cabinet:** Remove the interconnection hardware between the UPS and the adjacent battery cabinet. See the installation manual provided with the adjacent battery cabinet for details. Save all parts for reinstallation.
16. Reinstall all removed plates and covers. See *Final Installation*, page 107 for details.
17. If present, remove the seismic front anchoring bracket from the UPS. Save for reinstallation.

Front View of the UPS



18. If the UPS is installed on the mounting skid kit GVSOPT027, dismount the UPS from the mounting skid. See the installation manual provided with the kit for details.

19. Reinstall the front panel on the UPS:
 - a. Insert the two tabs in the bottom of the front panel in the UPS at a tilted angle.
 - b. Reconnect the front panel strap to the UPS.
 - c. Close the front panel and lock with the two locking knobs.



20. Raise the feet of the UPS until the casters have full contact with the floor.
21. You can now move the UPS by rolling it over the floor on the casters.

▲ WARNING

TIPPING HAZARD

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

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

22. If present, remove the rear seismic anchoring bracket from the UPS and remove the seismic anchors from the floor. Save for reinstallation. See *Install the Seismic Anchoring (Option)*, page 81 for details.

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

⚠ WARNING
<p>TIPPING HAZARD</p> <p>For transport over longer distances or in conditions that are not suitable for the casters of the UPS, ensure:</p> <ul style="list-style-type: none"> • that personnel performing the transport have necessary skills 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). <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Transportation requirements:

- Mount the UPS in a vertical position in the center of a suitable pallet with minimum pallet dimensions: 680 mm x 1040 mm (27 in x 41 in)). The pallet must be suitable for the weight of the UPS (180 kg (397 lbs) with no power modules installed).
- Use appropriate means of fixation to mount the UPS to the pallet.
- The original shipping pallet in combination with the original transportation brackets can be reused, if in undamaged condition.

⚠ DANGER
<p>TIPPING HAZARD</p> <ul style="list-style-type: none"> • 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. <p>Failure to follow these instructions will result in death or serious injury.</p>

⚠ WARNING
<p>UNEXPECTED EQUIPMENT BEHAVIOR</p> <p>Do not lift the UPS with a forklift/pallet truck directly on the frame as it may bend or damage the frame.</p> <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

24. Perform one of the following:

- Decommission the UPS, OR
- Move the UPS to a new location to install it.

25. **Only for installing the UPS in a new location:** Follow the installation manual to install UPS in the new location. See Installation Procedure for Single Systems, page 70, Installation Procedure for Parallel Systems, page 71, Installation Procedure for Single Marine Systems, page 73, or Installation Procedure for Parallel Marine Systems, page 74 for installation overview. Startup must only be performed by Schneider Electric.

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

Startup must only be performed by Schneider Electric.

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

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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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