Symmetra™ MW

400–1000 kW 380/400 V

Installation

UPS System with Internal Bypass

10/2015

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Schneider Electric

Legal Information

Table of Contents

Important Safety Information

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.

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

⚠WARNING

HAZARD OF OVERHEATING

Respect the space requirements around the UPS system and do not cover the product's ventilation openings when the UPS system is in operation.

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

⚠WARNING

HAZARD 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 death, serious injury, or equipment damage.

Electrical Safety

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Electrical equipment must be installed, operated, serviced, and maintained only by qualified personnel.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices.
- Turn off all power supplying the UPS system before working on or inside the equipment.
- Before working on the UPS system, check for hazardous voltage between all terminals including the protective earth.
- The UPS contains an internal energy source. Hazardous voltage can be present even when disconnected from the mains supply. Before installing or servicing the UPS system, ensure that the units are OFF and that mains and batteries are disconnected. Wait five minutes before opening the UPS to allow the capacitors to discharge.
- The UPS must be properly earthed/grounded and due to a high leakage current, the earthing/grounding conductor must be connected first.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

In systems where backfeed protection is not part of the standard design, an automatic isolation device (backfeed protection option or other device meeting the requirements of IEC/EN 62040–1 **or** UL1778 4th 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.

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

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

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

Specifications

Input Specifications for Systems with Internal Bypass

	400 kW		600 kW		800 kW		1000 kW	
	380 V	**400 V**	**380 V**	**400 V**	**380 V**	**400 V**	**380 V[1]**	**400 V**
Connection type	3PH+G 3PH+PEN 3PH+N+G							
Input voltage range	± 15% of nominal (while providing nominal charging to the battery system)							
Input frequency (Hz)	50 or 60 ± 0.5% to 8.0% configurable							
THDI	≤ 5%							
Nominal input current[2] (A)	634	602	926	896	1249	1203	1415	1494
Input current limitation[3] (A)	790	733	1185	1100	1580	1466	1777	1833
Input power factor	1 at 100% load and not less than 0.97 at loads greater than 25% of system rating with no additional filters							
Soft start	Linear start from 0–100% input current and shall not exhibit inrush. Configurable from 1 to 60 seconds.							
Maximum short circuit withstand (kA)	200							

1. Derated to 900 kVA
2. Input current based on rated load, nominal input voltage and fully charged batteries
3. Current limitation is maximum allowed via electronic current limiting and is based on full battery recharge + nominal load and —10% input voltage

Output Specifications for Systems with Internal Bypass

	400 kW		600 kW		800 kW		1000 kW	
	380 V	**400 V**	**380 V**	**400 V**	**380 V**	**400 V**	**380 V**	**400 V**
Connection type	3PH+G 3PH+PEN 3PH+N+G							
Output capacity	200% for 60 seconds (normal operation) 125% for 10 minutes (normal operation) 150% for 30 seconds (battery operation) 125% continuous (bypass operation) 1000% for 73 milliseconds (bypass operation)							
Voltage tolerance	±1 %							
Nominal output current (A)	608	578	912	866	1216	1155	1367[4]	1443
Maximum output current[5]	760	723	1140	1083	1520	1444	1709	1804
Nominal output frequency (Hz)	50/60							
Slew rate (Hz/sec)	Selectable: 0.25, 0.5, 1, 2, 4							
THDU	≤ 3% for a 100% linear load ≤ 5% for a 100% non-linear load (no crest factor limitation)							
Output power factor	0.9 leading to 0.8 lagging without derating							
Dynamic load response	VFI SS111							
Output voltage regulation	±1 % for 100 percent balanced linear load ±3 % for 100 percent unbalanced linear load							

Bypass Specifications for Systems with Internal Bypass

	400 kW		600 kW		800 kW		1000 kW	
	380 V	**400 V**	**380 V**	**400 V**	**380 V**	**400 V**	**380 V**	**400 V**
Nominal input frequency (Hz)	50/60							
Nominal input current (A)	608	578	912	866	1216	1155	1367	1443

4. At 380 V, nominal output is reduced from 200 kW to 180 kW in each section
5. This current is at 125% of rated load and is electronically limited to a maximum of 10 minutes. This value is only provided so the engineer can ensure that the selected AC output circuit over-current device's time-current characteristic will support this condition

Battery Specifications for Systems with Internal Bypass

Type	400 kW	600 kW	800 kW	1000 kW
Nominal voltage (VDC)	2 x 384			
Float voltage (VDC)	2 x 438			
Boost voltage	2 x 460			
End of discharge voltage (VDC)	2 x 326			
Battery Current at full load (A)	542	814	1085	1356
Maximum Current (at end of discharge) (A)	638	958	1276	1595
Maximum charging power	10% of nominal output			

NOTE: Refer to the information provided by the battery manufacturer.

Recommended Cable Sizes

Cable sizes in this manual are based on table 52–C2 of IEC 60364–5–52 with the following assertions:

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

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

Required Breaker Settings for Systems with Internal Bypass

A breaker coordination study is required to ensure the highest availability of the UPS. This breaker coordination study should be performed focusing on maintaining the characteristics of the Symmetra MW.

Q1, Q5, and Upstream Breakers – Minimum Settings

Duration (S)	Total load (%)	Event/ Operation	Current (A)			
			400 kW	600 kW	800 kW	1000 kW
< 0.005	–	Internal fault clearing	22 kA[6]	22 kA[6]	22 kA[6]	22 kA[6]
∞	127	Overload on-line	734[7]	1100[7]	1466[7]	1833[7]
∞	100	On-line	598	896	1195	1494
∞	110	On-line + max. battery charge	657	986	1315	1588

6. In the absence of a coordination study conducted by an engineer, the recommended instantaneous trip setting for breakers Q1, Q2, Q4, Q5, and Q6 is 22 kA.
7. Only applicable to Q1.

Q2 and Downstream Breakers – Minimum Settings

Duration (S)	Total load (%)	Event/ Operation	Current (A)			
			400 kW	600 kW	800 kW	1000 kW
< 0.005	–	Internal fault clearing	22 kA[8]	22 kA[8]	22 kA[8]	22 kA[8]
60	200	Overload on-line	1155	1732	2406[9]	2886[9]
600	125	Overload on-line	722	1083	1504[9]	1804[9]
∞	100	On-line	578	866	1155	1443

Q4 Settings in Parallel Systems with Two UPS Units

Duration (S)	Total load (%)	Event/ Operation	Current (A)			
			400 kW	600 kW	800 kW	1000 kW
< 0.005	–	Internal fault clearing	22 kA[8]	22 kA[8]	22 kA[8]	22 kA[8]
60	200	Overload on-line	2312	3464	4812[10]	5772[10]
600	125	Overload on-line	1445	2165	3008[10]	3608[10]
∞	100	On-line	1156	1732	2310	2886

Q4 Settings in Parallel Systems with Three UPS Units

Duration (S)	Total load (%)	Event/ Operation	Current (A)			
			400 kW	600 kW	800 kW	1000 kW
< 0.005	–	Internal fault clearing	22 kA[8]	22 kA[8]	22 kA[8]	22 kA[8]
60	200	Overload on-line	3468	5196	7218[10]	8658[10]
600	125	Overload on-line	2168	3248	4512[10]	5412[10]
∞	100	On-line	1735	2598	3465	4329

In the absence of a proper breaker coordination study and if only the actual Ip on the unit's input terminals is known, this table must be used to optimize the instantaneous trip setting or to choose a breaker with a usable fixed instantaneous trip value.

Ip[11] [kA]	I peak let-through [kA]	I setting [kA]
200	16	18
140	14	16
100	13	15
50	10.5	12
30	9	11

22 kA is the maximum peak let-through current (including safety factor) present during clearing of an internal fault in a 200 kW section or a power module. This maximum peak let-through current is based on and applicable to utility with

8. In the absence of a coordination study conducted by an engineer, the recommended instantaneous trip setting for breakers Q1, Q2, Q4, Q5, and Q6 is 22 kA.
9. Only applicable to Q2 and Q4
10. Only applicable to Q4
11. Abridgement for Prospective short-circuit current. This is the current that would flow in the fault circuit if the fuse was replaced by a link with an infinitely small impedance.

prospective short-circuit currents (Ip) up to 200 kA. During or after a controlled fault clearing, none of the breakers are allowed to trip on the instantaneous trip setting below the specified value. This is also applicable to upstream breakers, and a check of the instantaneous trip setting in this part of the installation is required.

The instantaneous trip setting calculated by an engineer in a breaker coordination study must not disable the functionality of clearing and surviving an internal fault unless there is a written agreement between Schneider Electric and the customer.

By ensuring the unit's fault clearing ability (survival skills) i.e. using the correct instantaneous trip settings in the switchgear (installation), maximum power availability in normal operation is obtained for the load.

NOTE: The instantaneous trip setting can be calculated when the utility/mains Ip is known. An incorrect trip setting can result in limiting the system functionality and jeopardize the load support.

NOTE: The instantaneous trip setting must not be derated even though the UPS system is derated in system output power. The system size has no influence on the instantaneous trip setting.

NOTE: For derated systems, contact Schneider Electric for the correct breaker settings and breaker frame sizes.

NOTE: For upstream breakers not mentioned in the table, contact Schneider Electric for the correct breaker settings for on-line, overload, and trip currents.

Maximum Let-Through Energy (I^2t) for Downstream Protective Devices

SCR maximum let through energy = 4.000.000 A^2s.

Let through energy of recommended Compact NSX breakers:

- NSX160 series 700.000 A^2s (at 100 kA rms)
- NSX250 series 900.000 A^2s (at 100 kA rms)
- NSX400 series 3.000.000 A^2s (at 100 kA rms)
- NSX630 series 4.000.000 A^2s (at 100 kA rms)

Low-Impedance/High-Impedance Earthing

The Symmetra MW is easily integrated into either a low-impedance (solidly) earthed system, or a high-impedance earthed system.

In a solidly earthed system, the power source (mains, generator, or UPS) is solidly earthed. In the event of a downstream earth fault, the fault current will have a path back to the source, and the over-current device feeding the inoperable part of the installation will trip and isolate the earth fault.

In a high-impedance earthed system, the source is earthed with an impedance (earthing resistor). In the event of a downstream fault, the fault current will be limited by the impedance of the earthing resistor. The value of the high-impedance system is its ability to maintain operation with a given system fault to ground faults. For a high-impedance system to provide enhanced power system reliability and availability, a earth-fault monitoring/alarm system is required.

NOTE: The earthing electrode conductor is not provided.

NOTE: For more information on earthing systems refer to the appendix.

External Disconnection Switches

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Ensure that the disconnecting devices are available as separate components for this installation. The UPS has no built-in disconnecting devices to switch off external AC (Q1 and Q5) and DC (Q7 and Q8) input power.
- The installer must provide each external disconnecting device for this UPS system with labels displaying the following text: “Isolate the Uninterruptible Power Supply (UPS) as instructed in the user manual before working on the circuit.”

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

Torque specifications

Bolt Size M8	17.5 Nm (12.91 lb-ft)
Bolt Size M10	30 Nm (22 lb-ft)
Bolt Size M12	50 Nm (36.87 lb-ft)
Bolt Size M14	75 Nm (55.31 lb-ft)

Weights and Dimensions for Systems with Internal Bypass

UPS Cabinet	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)
400 kW	2122	2032	2114	1067
600 kW	2855	2032	2536	1067
800 kW	4591	2032	3539	1067
1000 kW	5445	2032	3959	1067

Environmental

	Operation	Storage
Temperature	0 - 40 °C	-50 - 40 °C
Relative humidity	0 - 95% non-condensing	0 - 95% non-condensing
Altitude derating according to IEC 62040–3	1000 m: 1.000 1500 m: 0.975 2000 m: 0.950 2500 m: 0.925 3000 m: 0.900	≤ 5000 m above sea-level (or in an environment with equivalent air pressure)
Audible noise (1 meter from surface)	400 kW: 72 dBA 600 kW: 73 dBA 800 kW: 74 dBA 1000 kW: 74 dBA	
Protection class	IP20 with IP21 Optional	
Colour	Light grey	

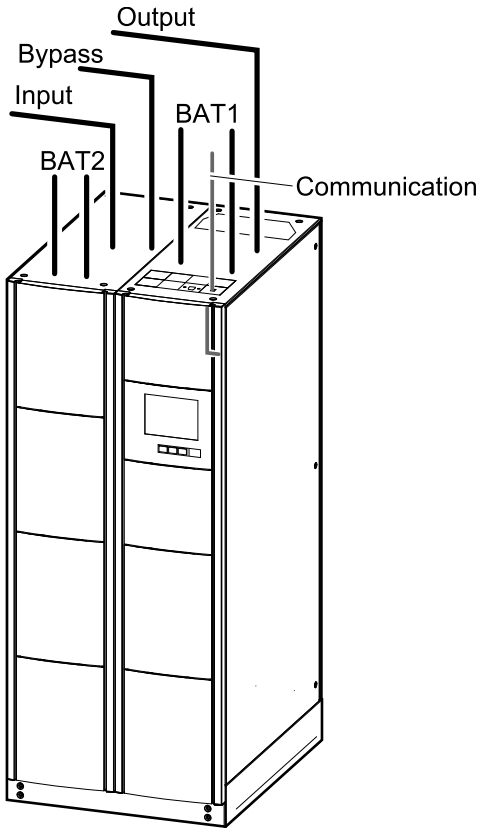
Heat Dissipation for Systems with Internal Bypass

UPS cabinet	400 kW	600 kW	800 kW	1000 kW
Heat dissipation kW (kBTU/hr)[12]	12.37 (42.2)	18.55 (63.3)	24.74 (84.4)	30.92 (105.5)

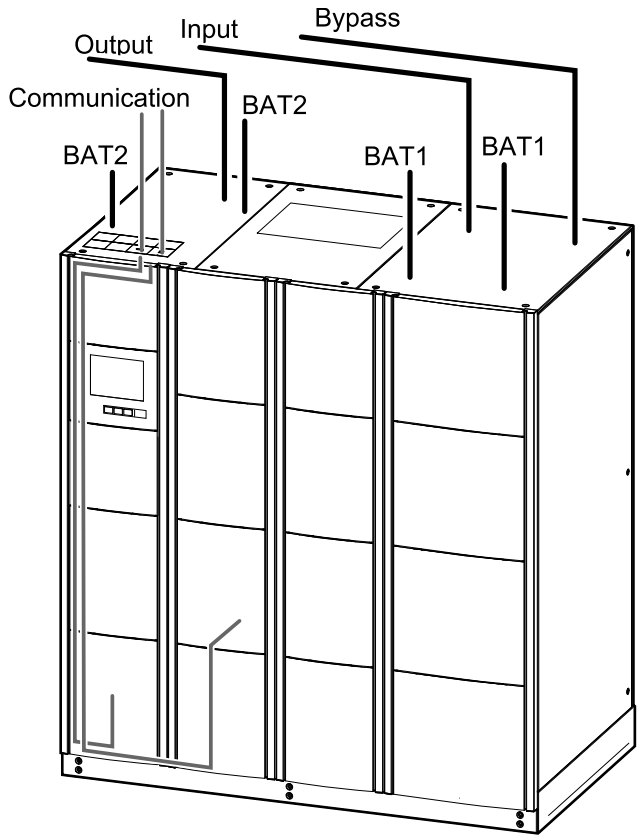
12. Heat dissipation calculated at rated load capacity

Installation Procedure

400–600 kW System



800–1000 kW System



1. In 800 kW and 1000 kW systems only: *Remove the Display and the Relay Panel Temporarily, page 19*.

2. Option: *Convert to a Single Mains System, page 20*.
3. Connect the power cables. Follow one of the procedures:
   – *Connect Power Cables in a Top Entry System, page 22*.
   – *Connect Power Cables in a Bottom Entry System, page 25*.
4. In 800 kW and 1000 kW systems only: *Reinstall the Display and the Relay Panel, page 31*.
5. Option: *Install the Battery CAN I/O Board 0P4512 in the Battery Breaker Box, page 34*.
6. Option: *Install the MBP CAN I/O Board in the Maintenance Bypass Panel, page 35*.
7. Feed communication cables into the UPS. Follow one of the procedures:
   – *Feed the Communication Cables into a 400–600 kW Top Cable Entry System, page 36*.
   – *Feed Communication Cables into a 800–1000 kW Top Cable Entry System, page 36*.
   – *Feed Communication Cables into a 400–600 kW Bottom Cable Entry Systems, page 39*.
   – *Feed Communication Cables into a 800–1000 kW Bottom Cable Entry Systems, page 40*.
8. *Connect the Communication Cables between the UPS and the Battery CAN I/O Board ID 0 in the Battery Breaker Box, page 44*.
9. *Connect the Communication Cables between the Battery CAN I/O Board ID 0 and the Battery CAN I/O Board ID 1 in non-Schneider Electric Battery Breaker Box (if available), page 46*.
10. *Connect the Communication Cables between the UPS and the MBP CAN I/O Board in the Maintenance Bypass Panel, page 47*.
11. *Connect the Communication Cables between the UPS and the External EPO, page 48*.

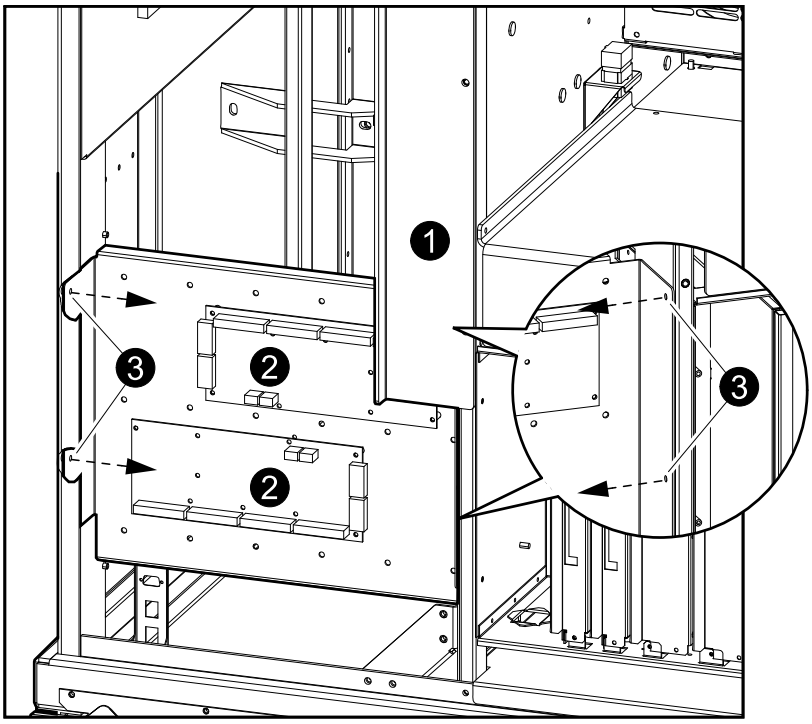
Connect Power Cables

Remove the Display and the Relay Panel Temporarily

NOTE: This procedure is only applicable to 800 kW and 1000 kW systems.

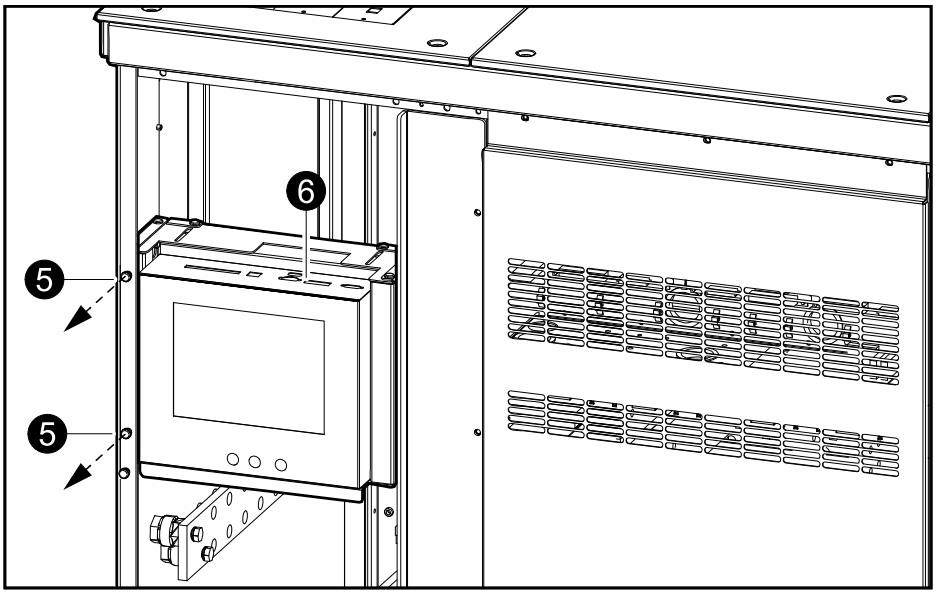
1. Remove the plastic cover in front of the relay panel.
2. Disconnect the cables from the relay boards.

Front View of 800–1000 kW System



3. Loosen the four screws of the relay panel and remove the relay panel.
4. Store the relay panel in a safe place.
5. Remove the two screws on the left holding the display.

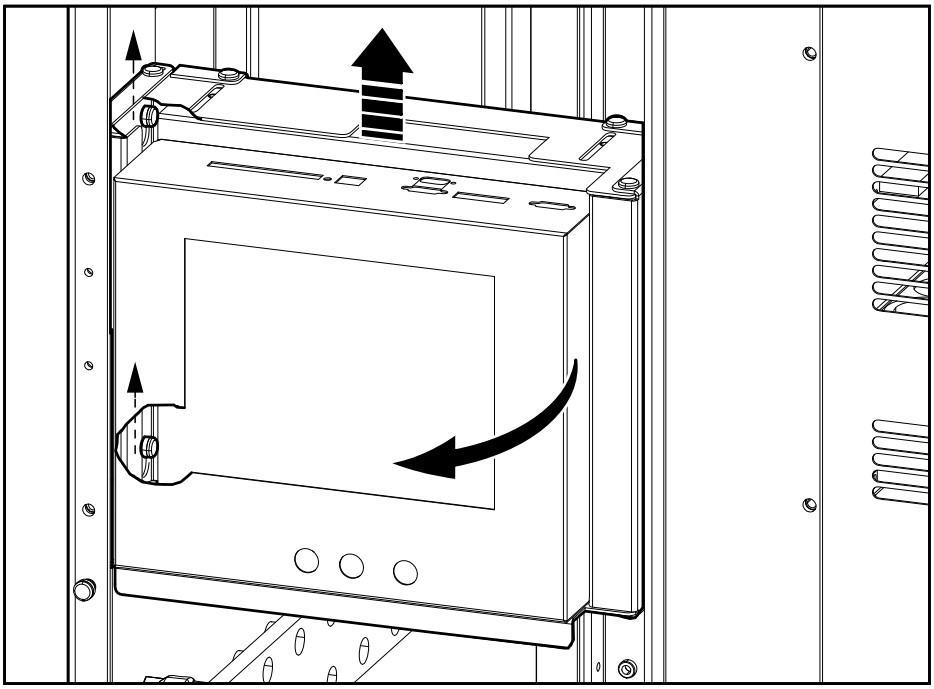
Front View of 800–1000 kW Systems



6. Disconnect the cables from the top of the display.

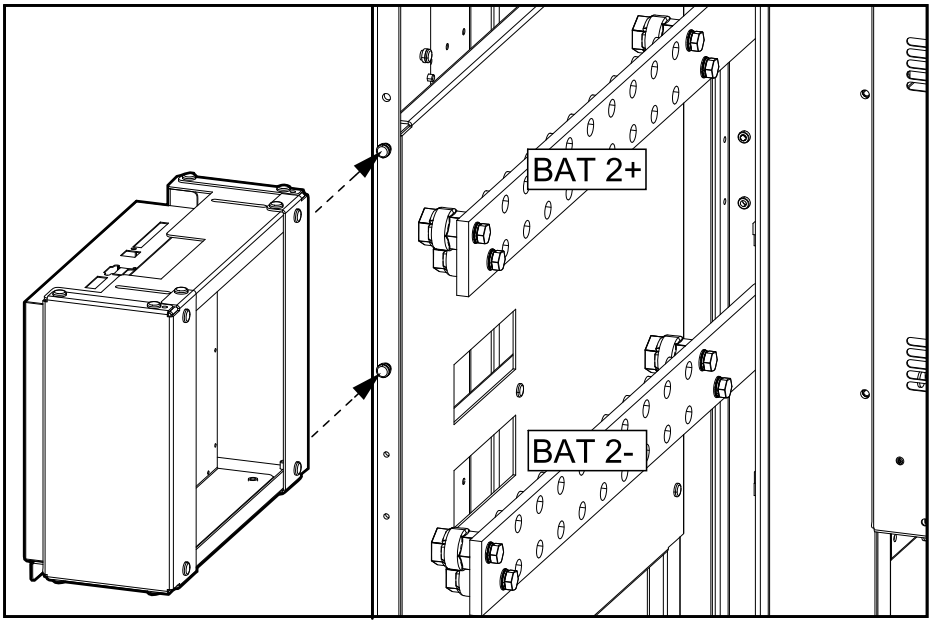
7. Lift the display assembly up and out of the cabinet.

Front View of 800–1000 kW System



8. Store the display in a safe place or hang the display on the hinges on the left side of the cabinet.

Front View of 800–1000 kW Systems



Convert to a Single Mains System

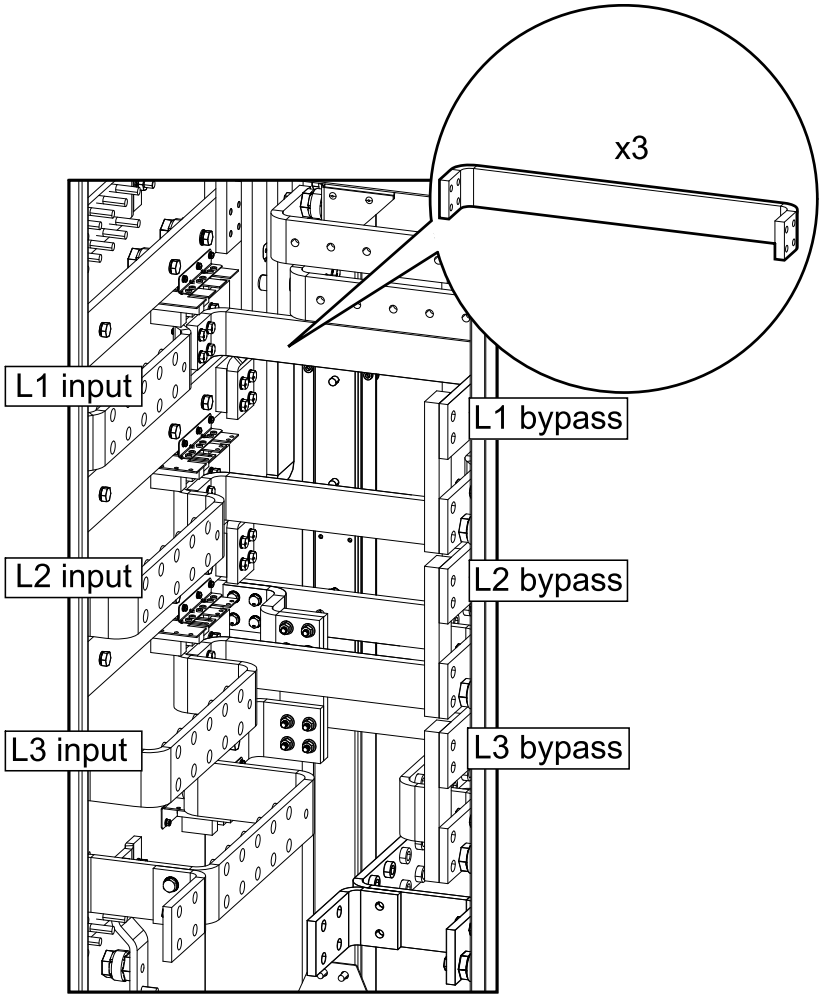
The UPS is designed for both dual and single mains installations and is initially configured as a dual mains system. Follow this procedure to convert to a single mains system.

NOTE: The illustrations on the following pages show dual mains systems.

NOTE: Electrical installation procedures are applicable to both dual and single mains systems. However, in single mains systems, input cables must be connected to either input or bypass cable landings.

1. Install the three single mains busbars between the input and bypass terminals. Mount the busbars with the open angle towards the front of the cabinet.

Front View



Connect Power Cables in a Top Entry System

Prepare for Cables in a Top Entry System

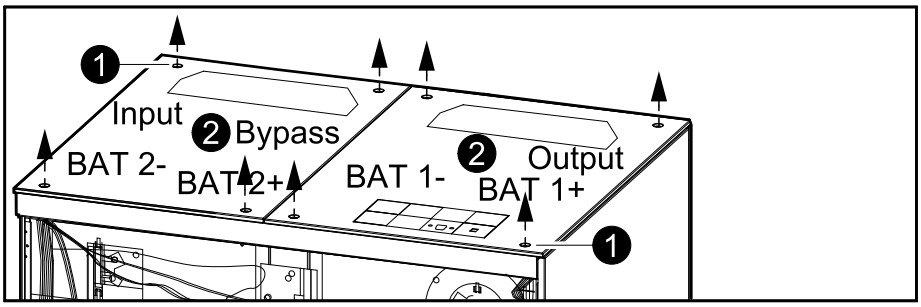
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

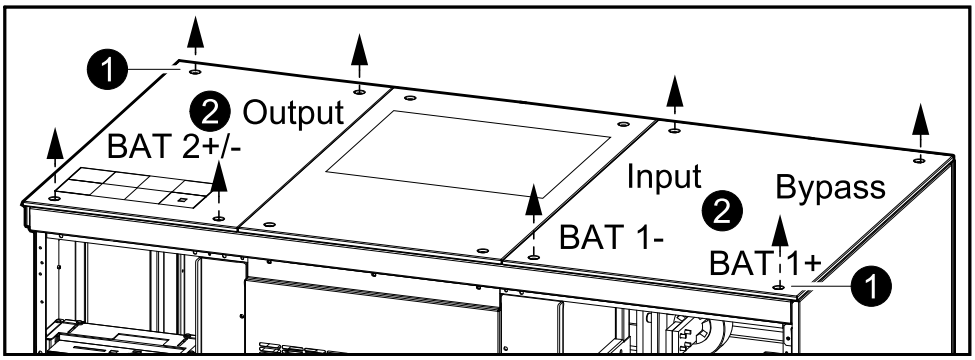
Do not drill or cut holes for cables or conduits with the gland plates installed and do not drill or cut holes in close proximity to the UPS.

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

Front View of 400–600 kW System



Front View of 800–1000 kW System



1. Loosen the bolts and remove the top gland plate.
2. Drill holes for conduits.
3. Reinstall the gland plate and install the conduits.

Connect the Power Cables in Top Entry Systems

NOTE: Supply the UPS from a dedicated 3 x 400/230 V source (L1, L2, L3, N, PE) or a high-impedance grounded system.

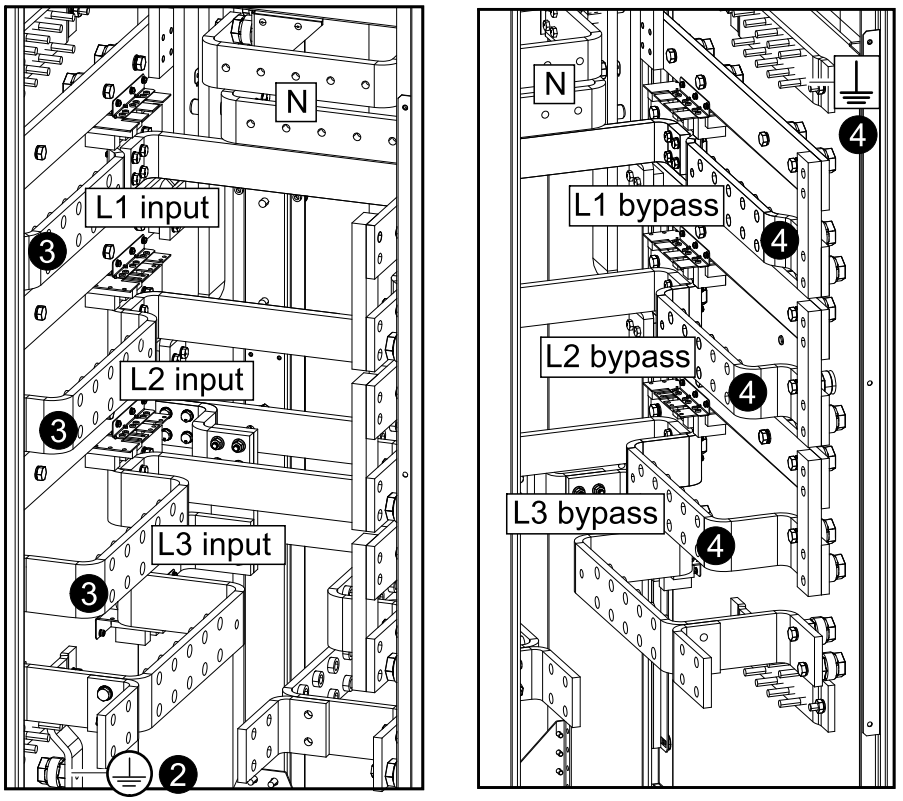
NOTE: Ensure clock-wise phase rotation (L1, L2, L3) of input voltages.

NOTE: All wiring must comply with all applicable national and/or local electrical wiring rules.

1. Feed the power cables through the top of the cabinet.

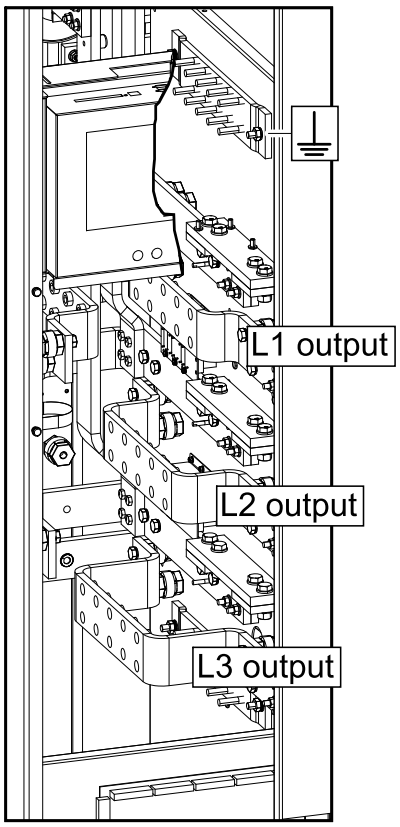
2. Connect the PE cable to the PE busbar.

Front View



3. Connect the input cables to the input cable landings.
4. In dual utility/mains systems, connect the bypass cables to the bypass cable landings.
5. Connect the output cables to the output cable landings.

Front View



Connect the Battery Cables in a Top Entry System

⚠ DANGER

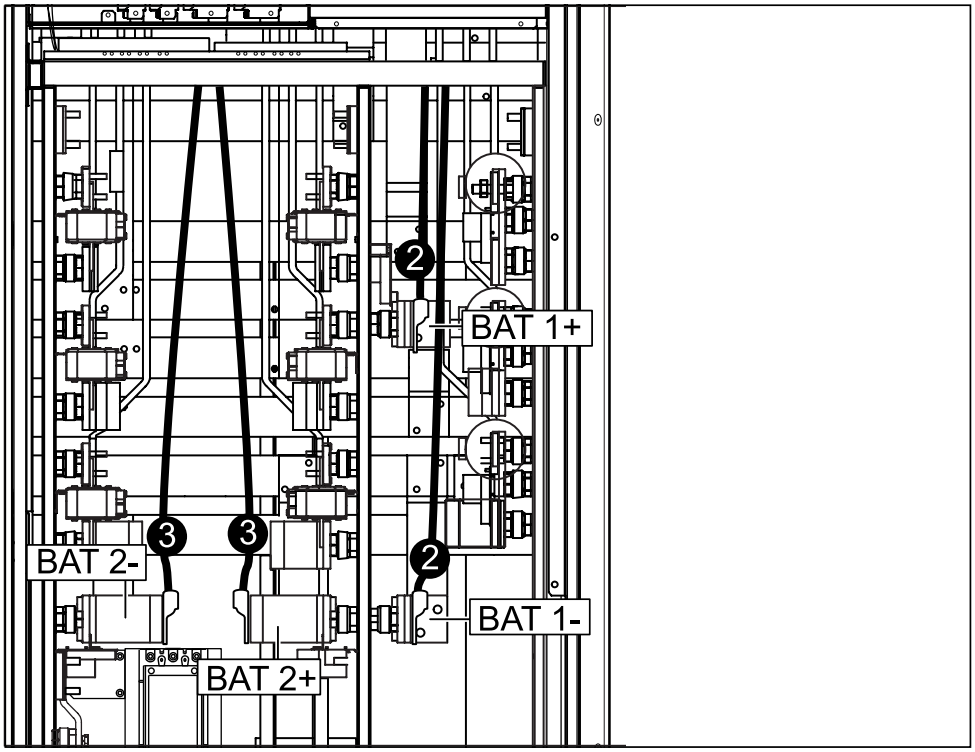
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Set the battery breakers in the open (OFF) position before connecting the battery cables.
- The minimum DC voltage rating of the battery supply over-current protective device that should be installed near the battery supply is 500 V.
- Over-current protection for the battery circuit is required by code.

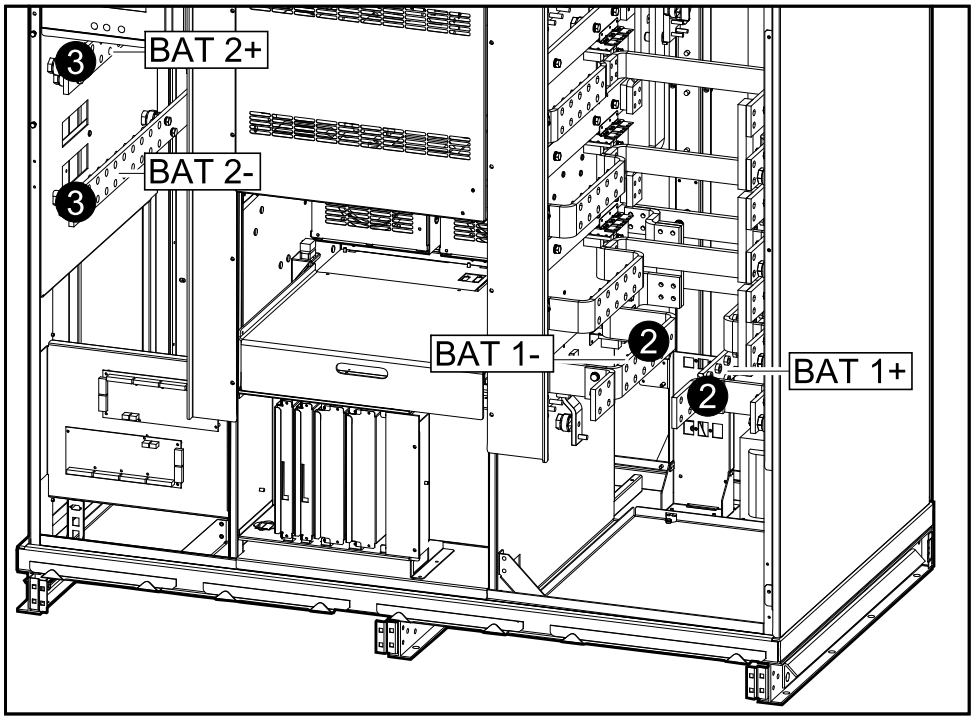
Failure to follow these instructions will result in death or serious injury.

NOTE: Refer to the battery manufacturer's installation manual.

Front View of 400–600 kW System



Front View of 800–1000 kW System



1. Feed the battery cables through the conduits.
2. Connect the battery cables from battery 1 to BAT 1+ and BAT 1-.
3. Connect the battery cables from battery 1 to BAT 2+ and BAT 2-.

Connect Power Cables in a Bottom Entry System

Prepare for Cables in a Bottom Entry System

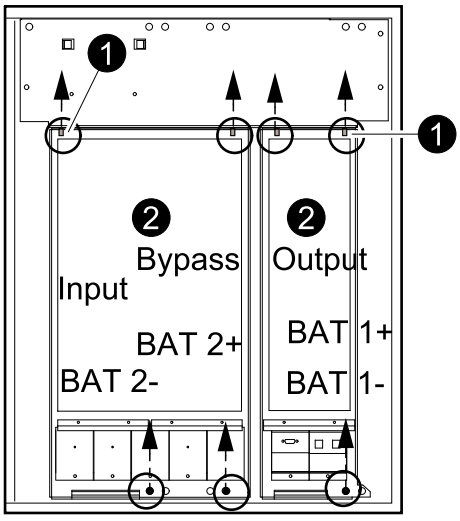
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

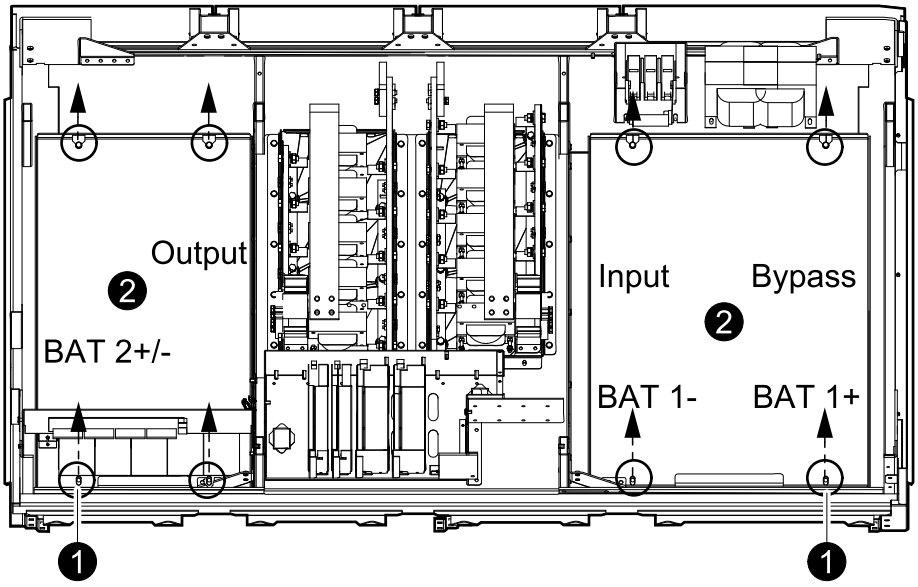
Do not drill or cut holes for cables or conduits with the gland plates installed and do not drill or cut holes in close proximity to the UPS.

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

Top View of Bottom Gland Plate in 400–600 kW System

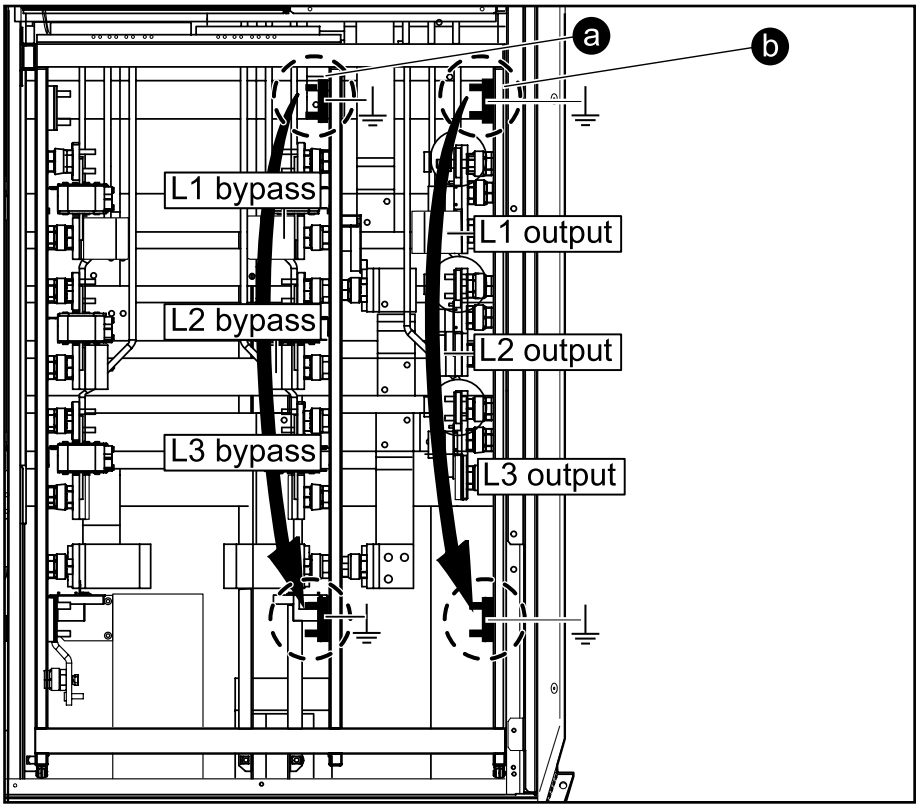


Top View of Bottom Gland Plate in 800–1000 kW System



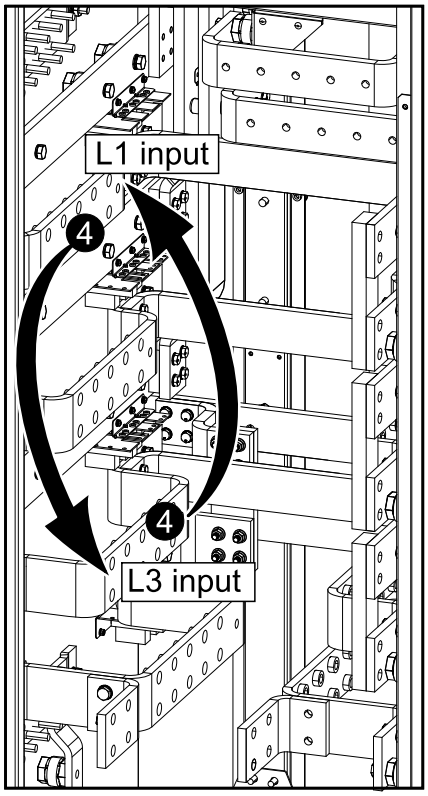
1. Loosen the bolts and remove the gland plates.
2. Drill holes for conduits. Reinstall the gland plates and install the conduits.
3. In 400 and 600 kW systems only:
   a. In the bypass side, move the grounding busbar to the bottom of the cabinet.
   b. In the output side, move the grounding busbar to the bottom of the cabinet.

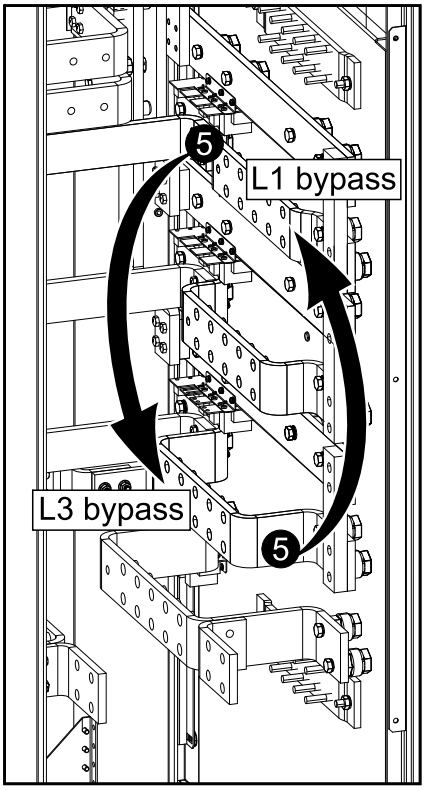
Front View of 400–600 kW System



4. Exchange the L1 and L3 input busbars.

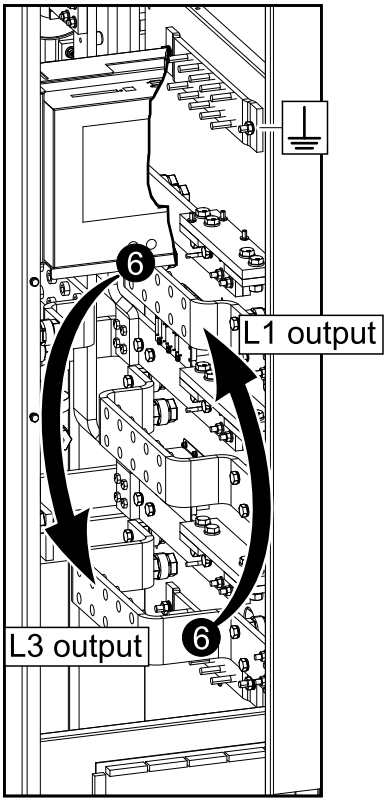
Front View





5. Exchange the L1 and L3 bypass busbars.
6. Exchange the L1 and L3 output busbars.

Front View



Connect the Power Cables in Bottom Entry Systems

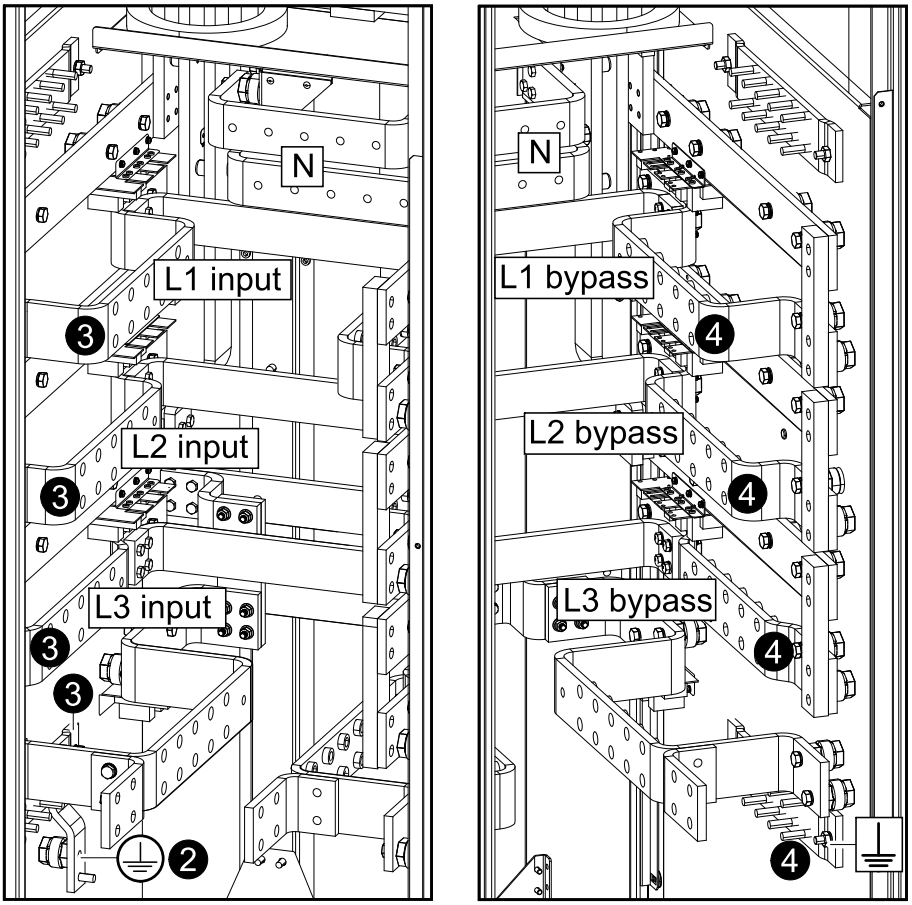
NOTE: Supply the UPS from a dedicated 3 x 400/230 V source (L1, L2, L3, N, PE) or a high-impedance grounded system.

NOTE: Ensure clock-wise phase rotation (L1, L2, L3) of input voltages.

NOTE: All wiring must comply with all applicable national and/or local electrical wiring rules.

1. Feed the power cables through the bottom of the cabinet.
2. Connect the PE cable to the PE busbar.

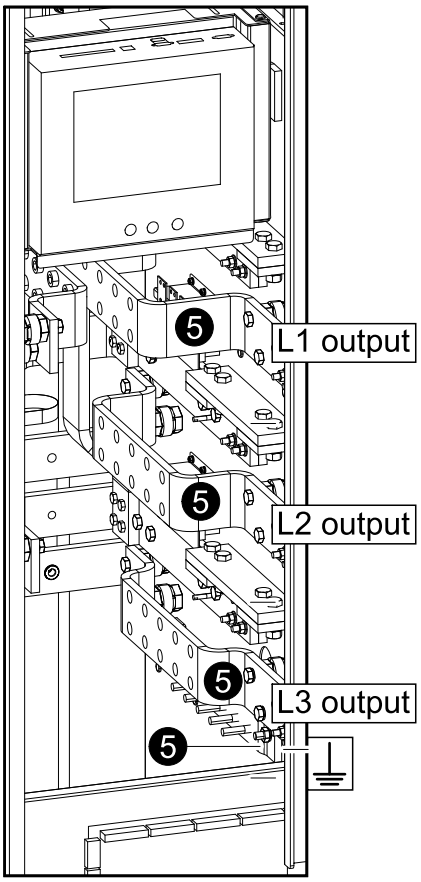
Front View



3. Connect the input cables to the input cables landings.
4. In dual utility systems, connect the bypass cables to the bypass cable landings.

5. Connect the output cables to the output cable landings.

Front View



Connect the Battery Cables in a Bottom Entry System

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

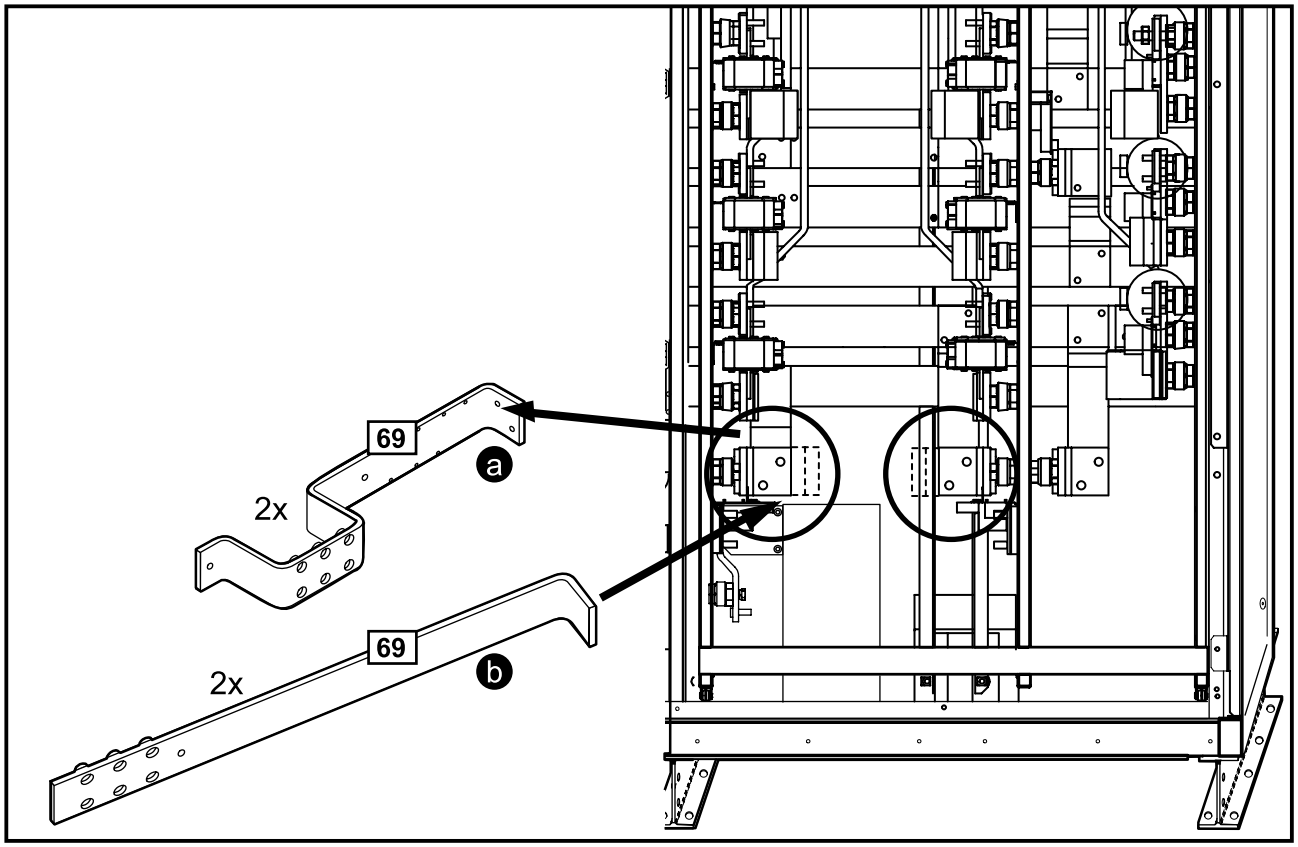
- Set the battery breakers in the open (OFF) position before connecting the battery cables.
- The minimum DC voltage rating of the battery supply over-current protective device that should be installed near the battery supply is 500 V.
- Over-current protection for the battery circuit is required by code.

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

NOTE: Refer to the battery manufacturer's installation manual.

1. In 400 and 600 kW systems only:
   a. Remove the two angled busbars 69 for battery connections.
   b. Insert the two straight busbars 69 for battery connections in the original positions of the angled busbars.

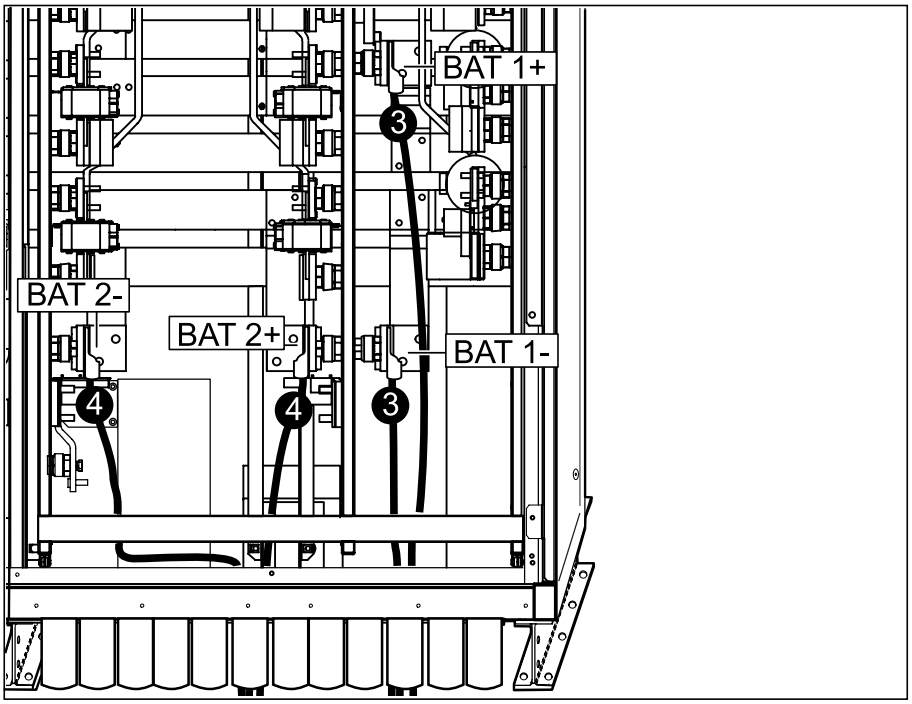
Front View of 400–600 kW System



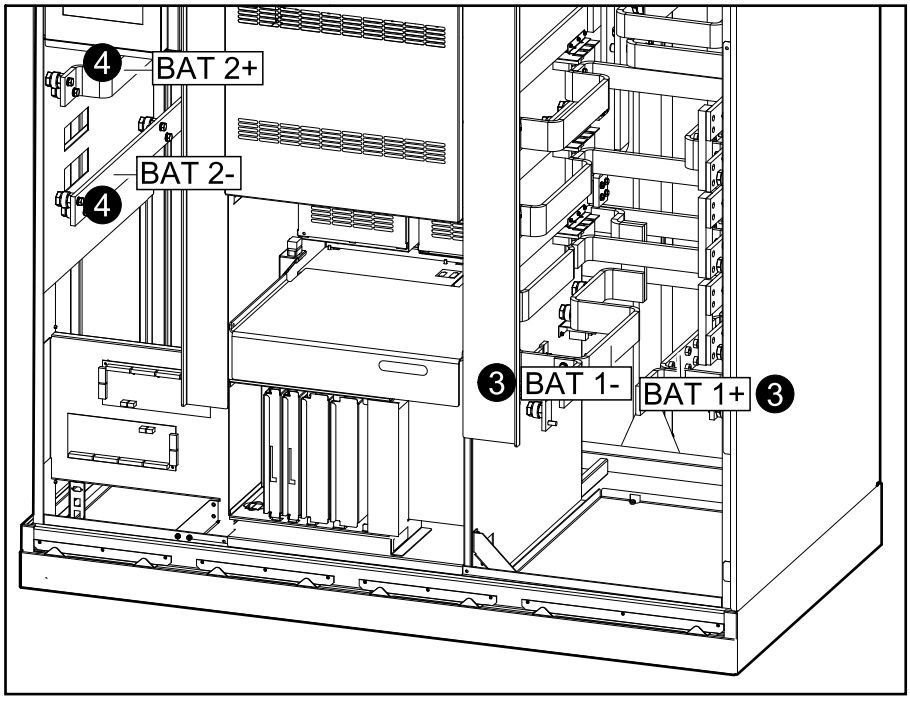
2. Feed the battery cables through the conduits.

3. Connect the battery cables from battery 1 to BAT 1+ and BAT 1-.

Front View of 400–600 kW System



Front View of 800–1000 kW System



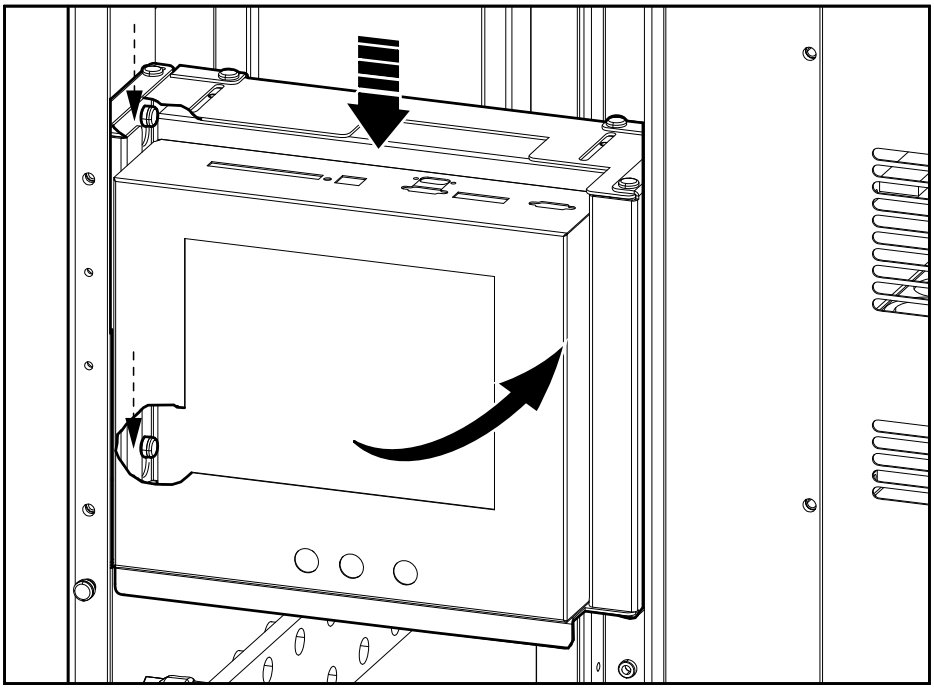
4. Connect the battery cables from battery 2 to BAT 2+ and BAT 2-.

Reinstall the Display and the Relay Panel

NOTE: This procedure is only applicable to 800 kW and 1000 kW systems.

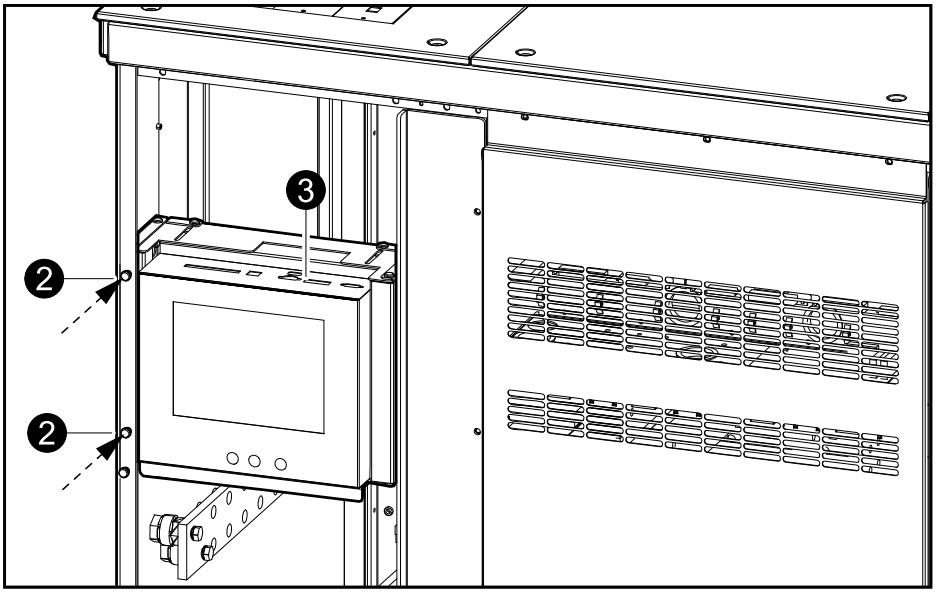
1. Reinstall the display over the key slots in the left side.

Front View of 800–1000 kW System



2. Fasten the display with the two screws.

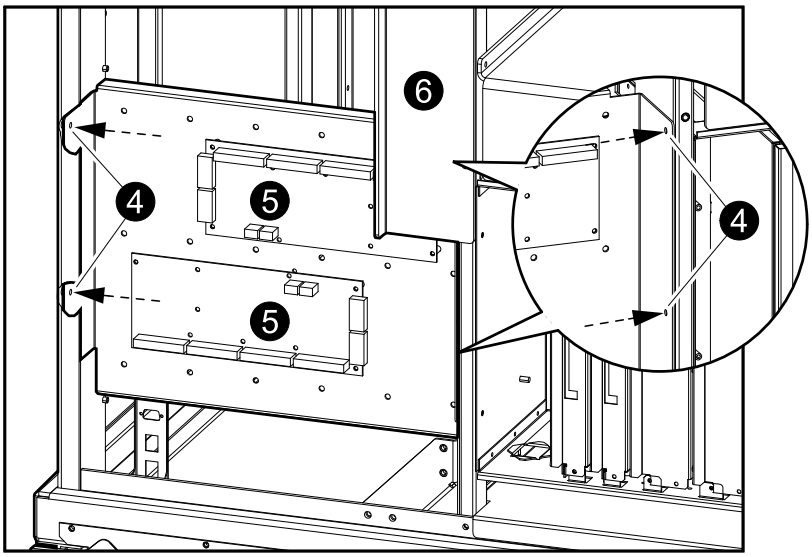
Front View of 800–1000 kW Systems



3. Reconnect the cable on top of the display.

4. Reinstall the relay panel and secure the four screws.

Front View of 800–1000 kW Systems

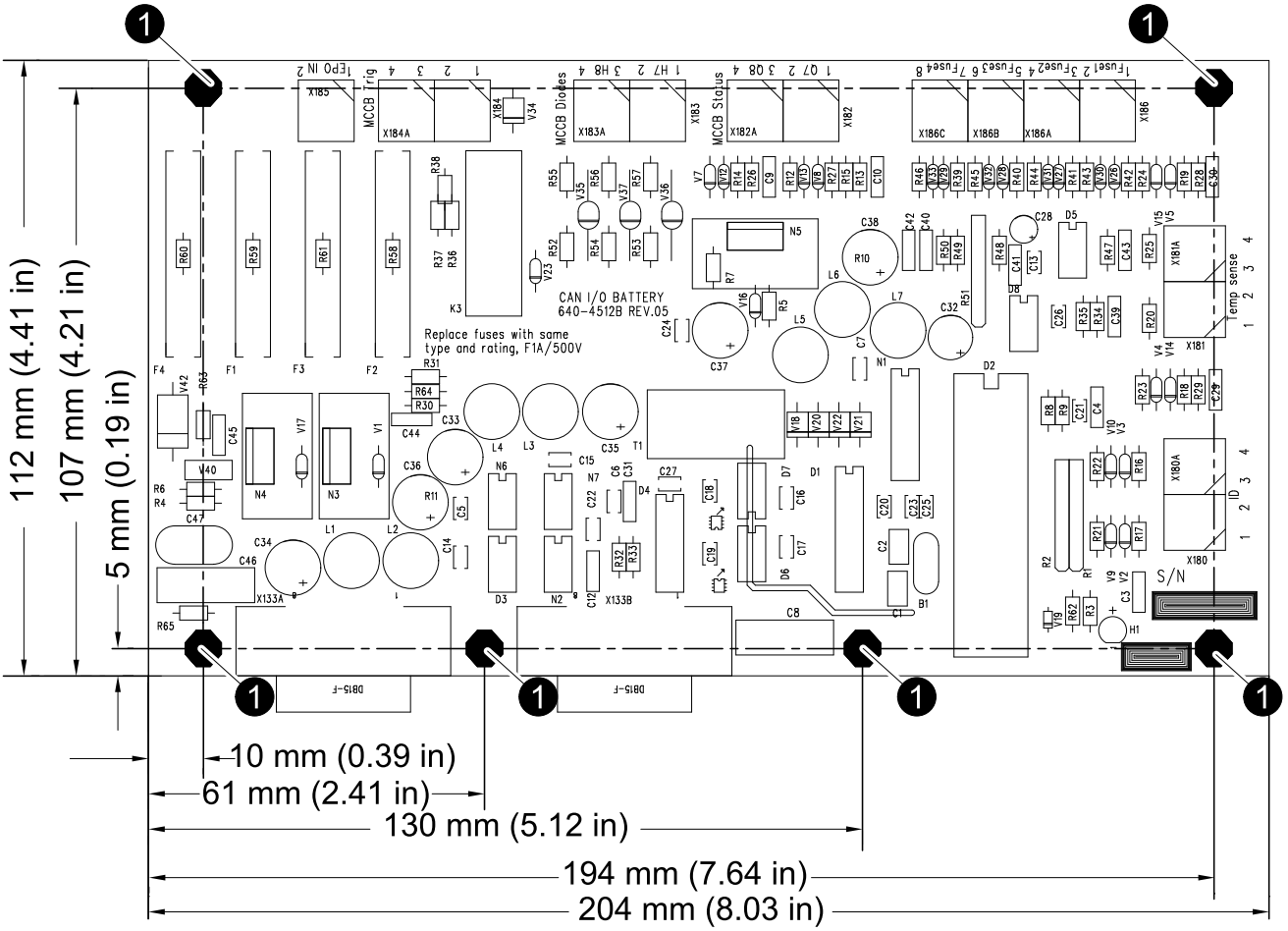


5. Reconnect the cables to the relay boards.
6. Reinstall the plastic cover in front of the relay panel.

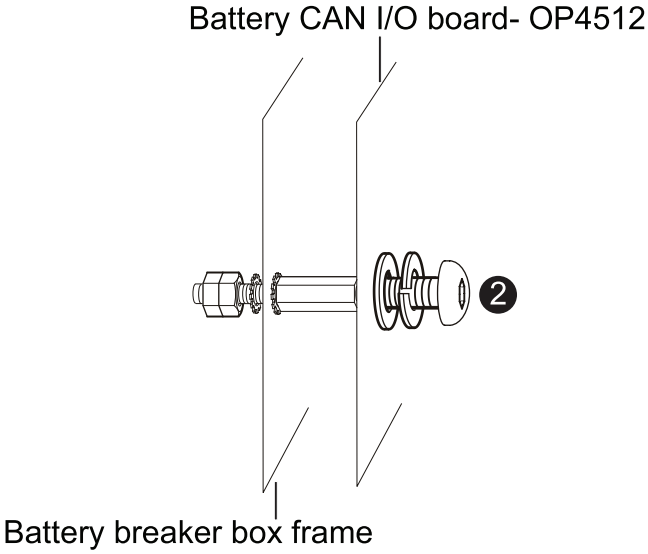
Install Optional Equipment

Install the Battery CAN I/O Board 0P4512 in the Battery Breaker Box

1. Drill six 4.5 mm (0.18 in) holes in a grounded surface in the battery breaker box according to the measurements on the illustration. Leave 110 mm (4.33 in) free space for connection of the ABUS cables to ensure recommended bending radius.

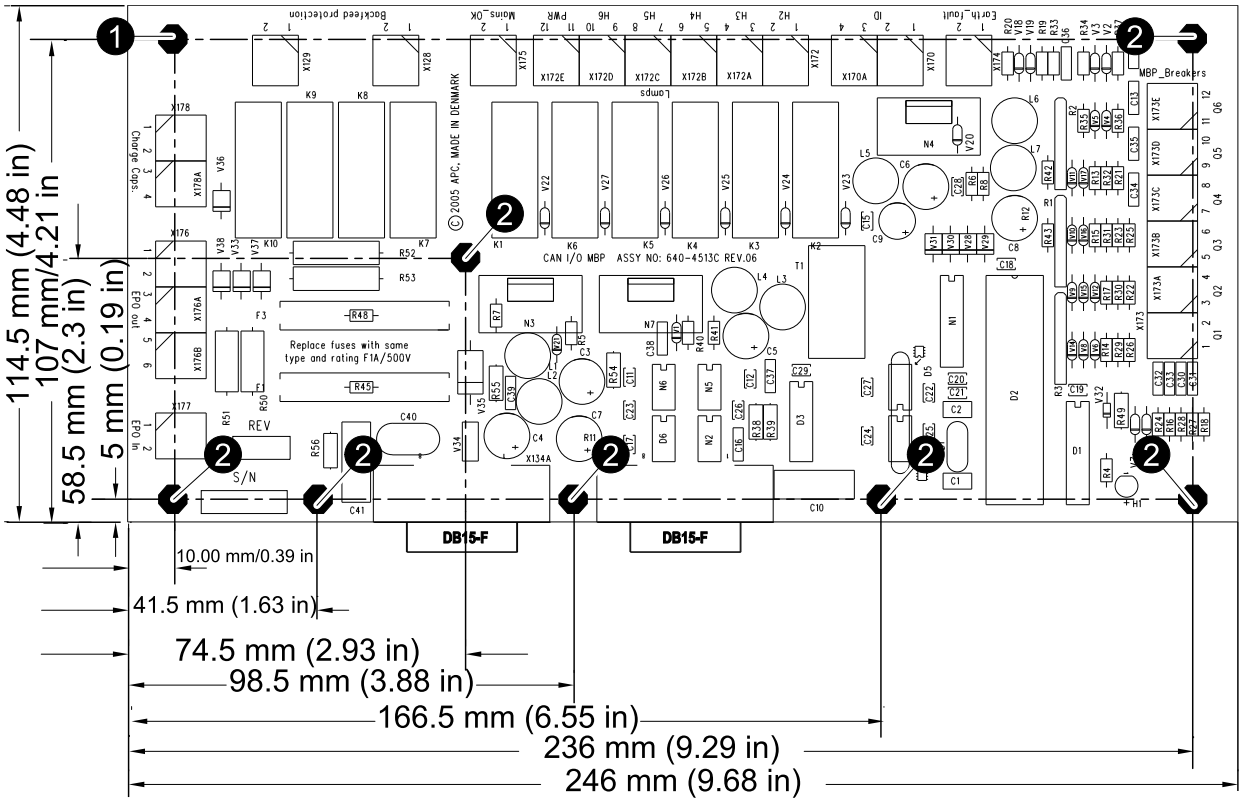


2. Attach the battery CAN I/O board to the frame with the supplied stays, bolts, and nuts.

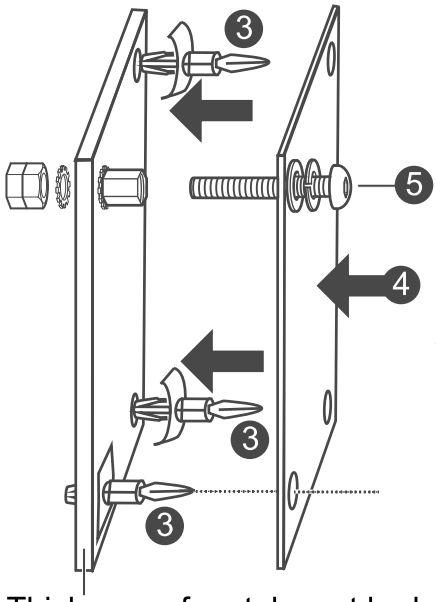


Install the MBP CAN I/O Board in the Maintenance Bypass Panel

1. Drill one 4.5 mm (0.18 in) hole in a grounded surface in the maintenance bypass panel in upper left corner according to the measurements. Leave 110 mm (4.33 in) free space for ABUS cables to ensure recommended bending radius.



2. Drill seven 4.7 mm (1.8 in) holes for the remaining marked holes in the maintenance bypass panel for the nylon stand offs.
3. Insert the seven nylon stand offs (supplied) in the prepared holes.



4. Fasten the CAN I/O board to the nylon stand offs by pushing it gently in place.
5. Attach the CAN I/O board with the supplied stay, bolt, and nut in the upper left corner.

Connect Communication Cables

Feed the Communication Cables into a 400–600 kW Top Cable Entry System

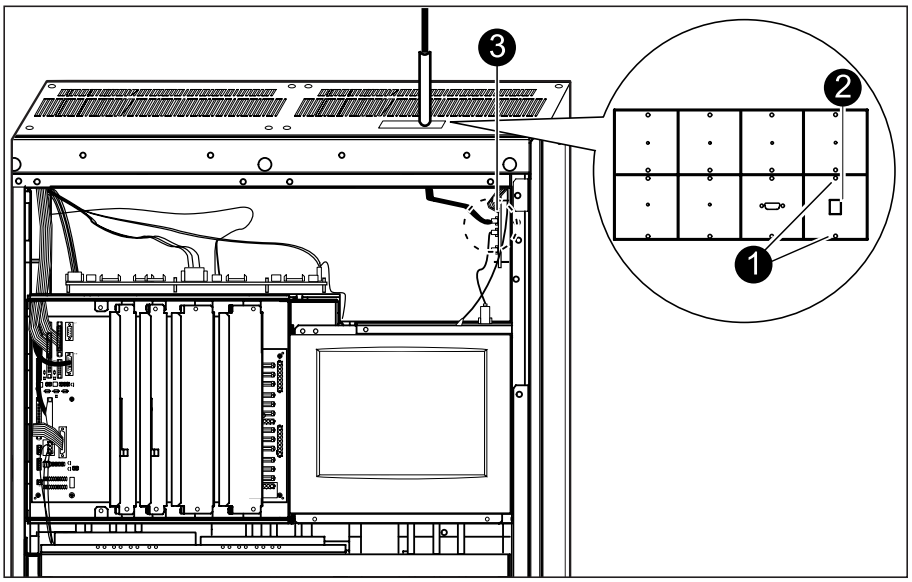
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

Front View of 400–600 kW System



1. Loosen the screws and remove the communication cover.
2. Drill or punch holes in as large an area as necessary in the cover. Use conduits to feed cables through the punched holes and reinstall the communication cover.
3. Route the communication cables through the cable trays provided at the top and along the side of the unit to the connection plane as illustrated.

Feed Communication Cables into a 800–1000 kW Top Cable Entry System

⚠ DANGER

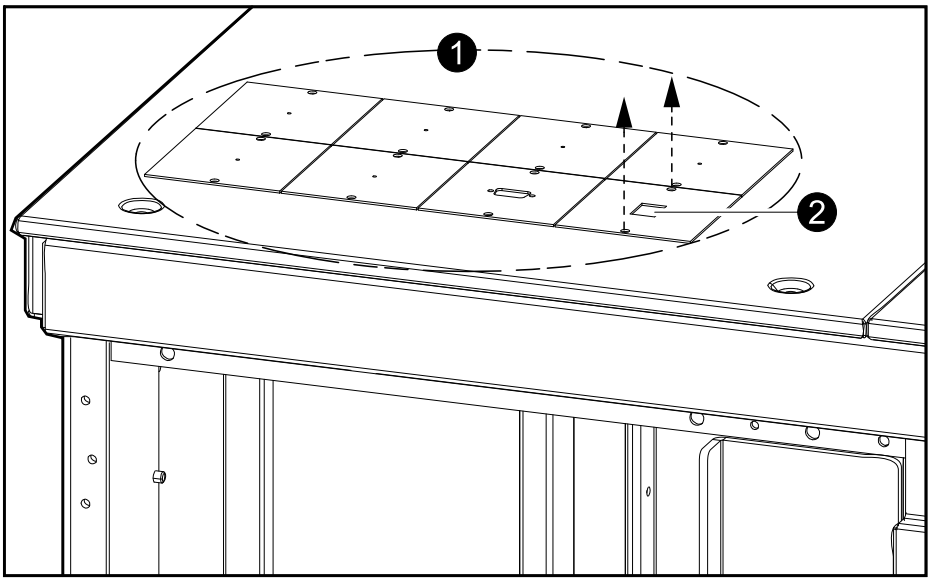
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

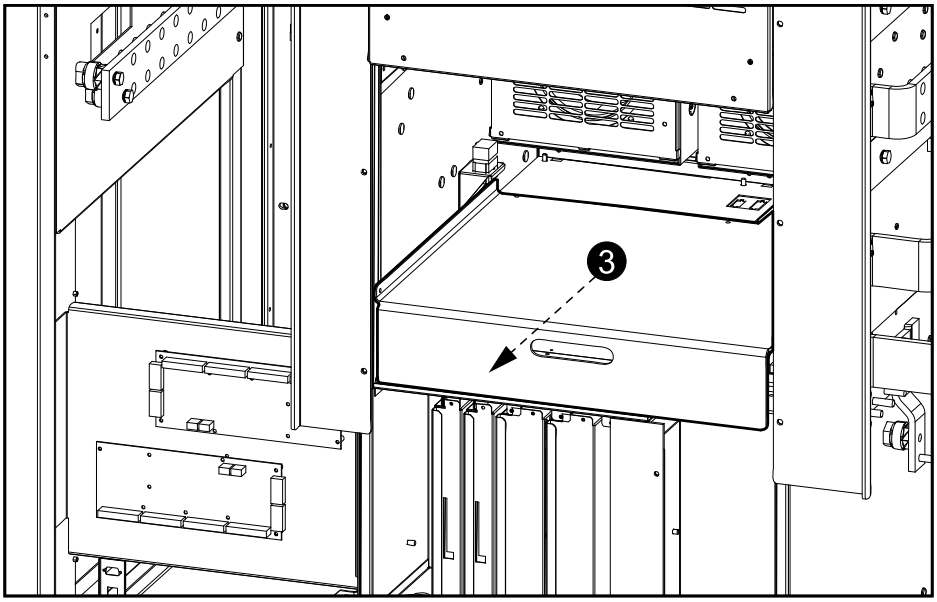
1. Loosen the screws and remove the communication cover.

Front View of 800–1000 kW System



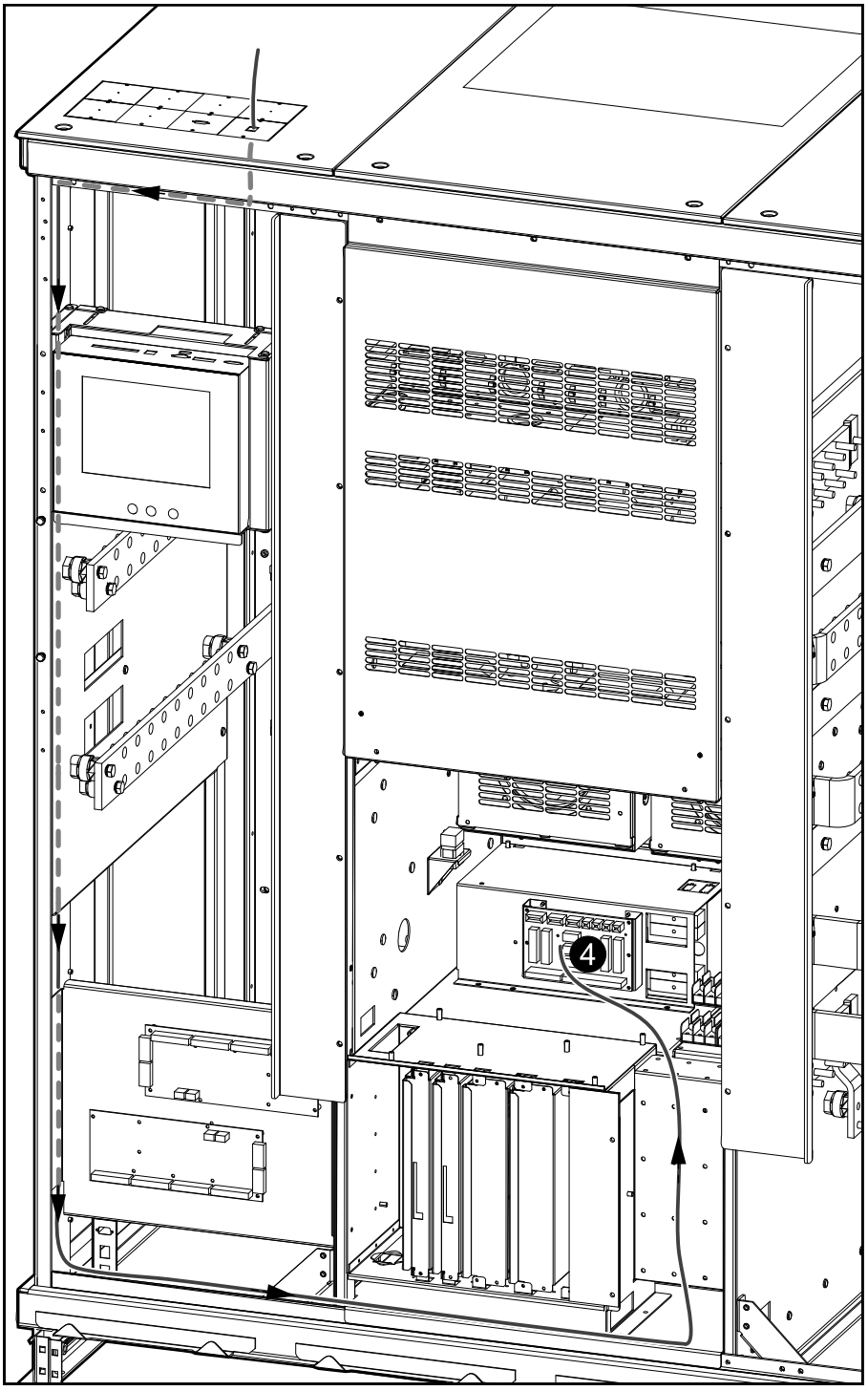
2. Drill or punch holes in as large an area as necessary in the cover. Use conduits to feed cables through the punched holes and reinstall the communication cover.
3. Remove the cover protecting the connection plane.

Front View of 800–1000 kW System



4. Route the communication cables through the cable trays provided at the top and along the side of the unit to the connection plane as illustrated.

Front View of 800–1000 kW System



Feed Communication Cables into a 400–600 kW Bottom Cable Entry Systems

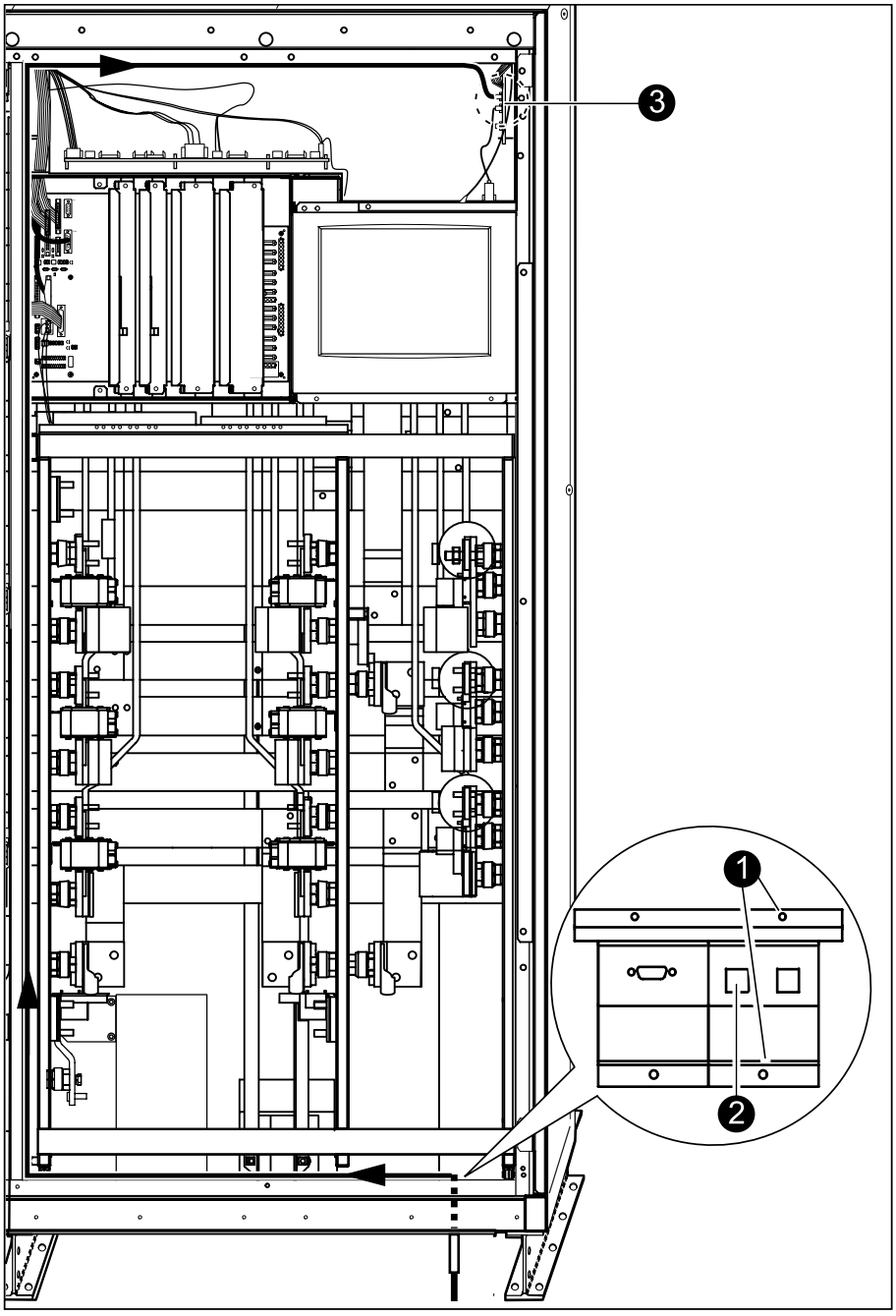
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

Front View of 400–600 kW System



1. Loosen the screws and remove the communication cover.
2. Drill or punch holes in as large an area as necessary in the cover. Use conduits to feed the cables through the punched holes and reinstall the communication cover.

3. Route the communication cables through the cable trays provided at the bottom and along the side of the unit to the connection plane as illustrated.

Feed Communication Cables into a 800–1000 kW Bottom Cable Entry Systems

⚠ DANGER

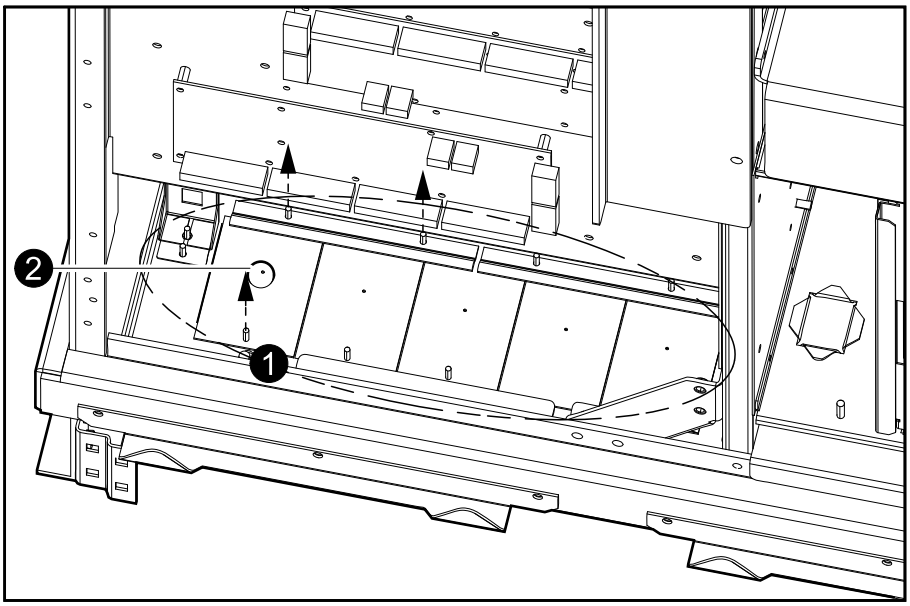
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

1. Loosen the screws and remove the communication cover.

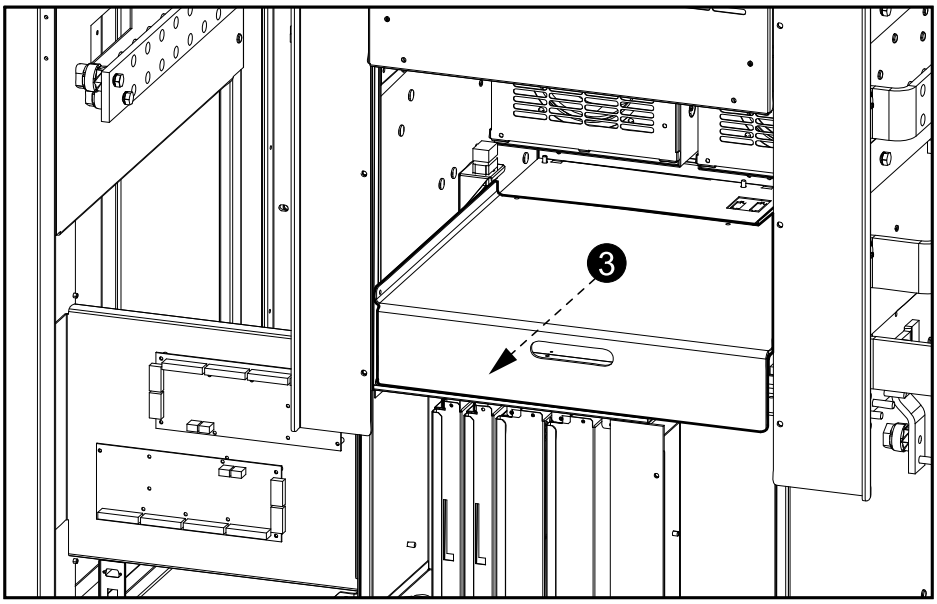
Front View of 800–1000 kW System



2. Drill or punch holes in as large an area as necessary in the cover. Use conduits to feed the cables through the punched holes and reinstall the communication cover.

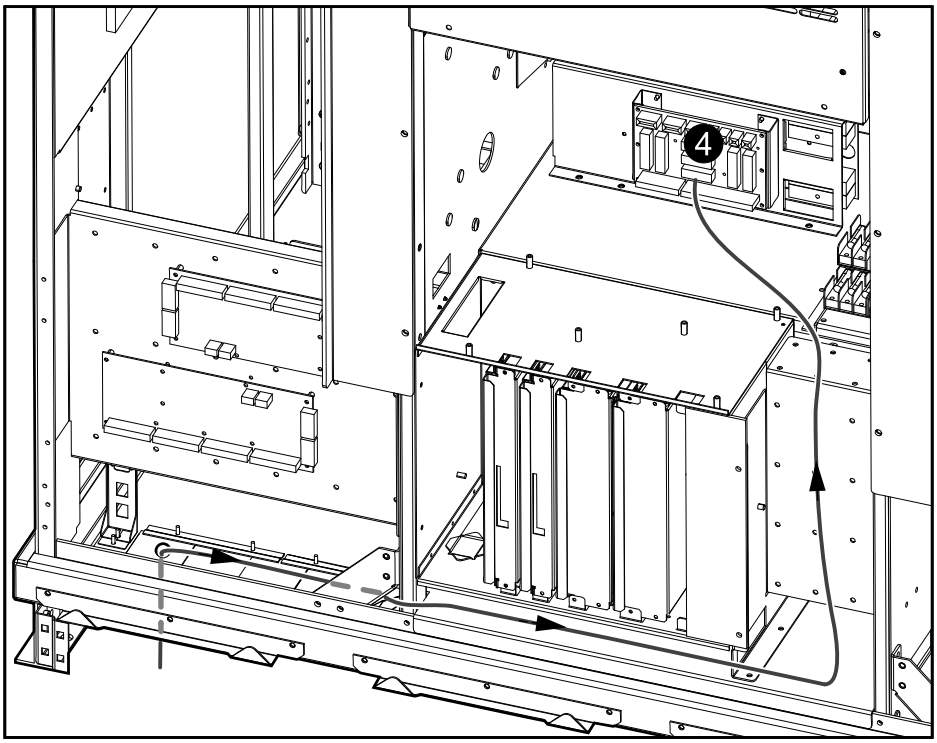
3. Remove the cover protecting the connection plane.

Front View of 800–1000 kW System



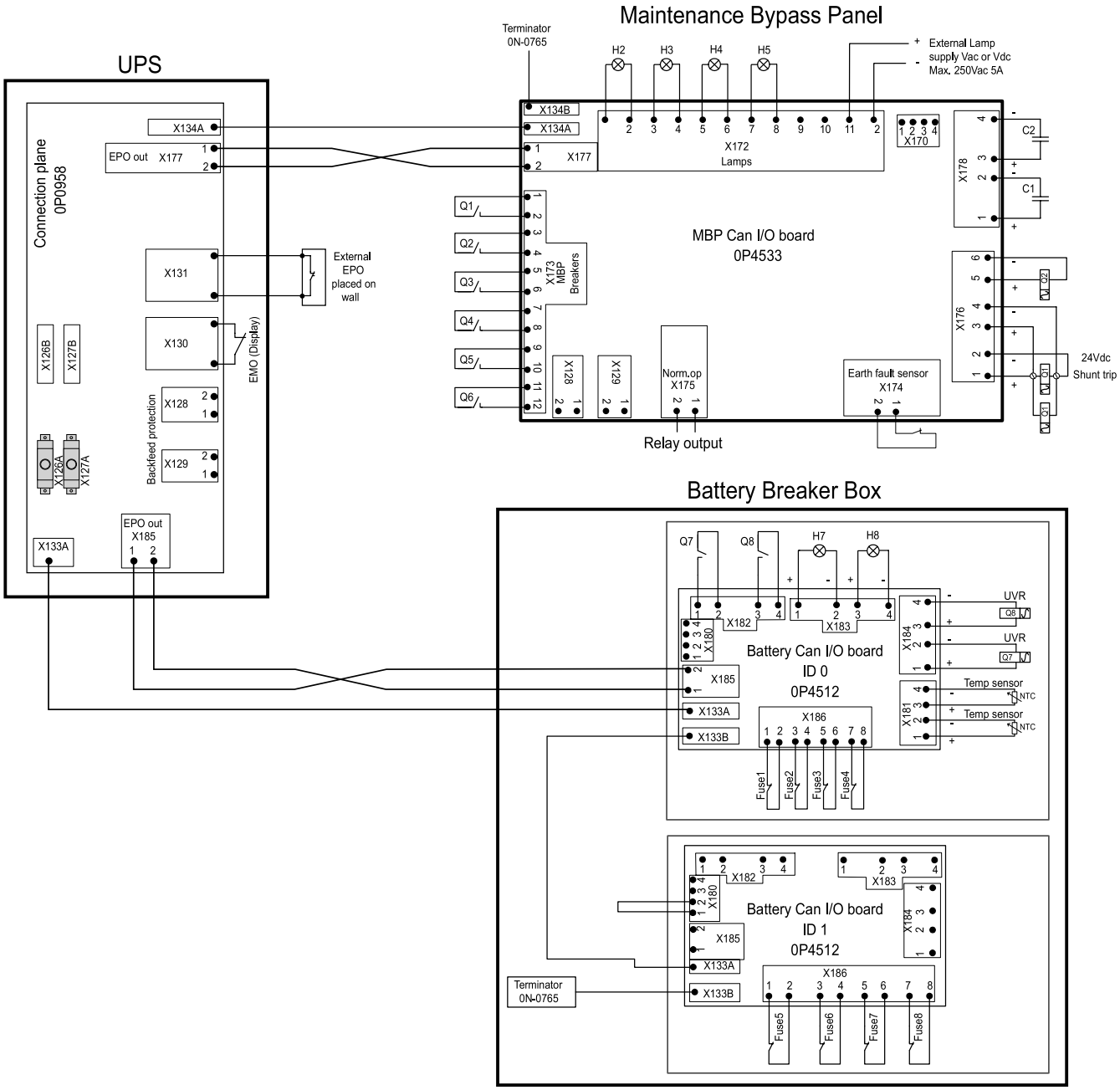
4. Route the communication cables through the cable trays provided at the bottom and to the connection plane as illustrated.

Front View of 800–1000 kW System

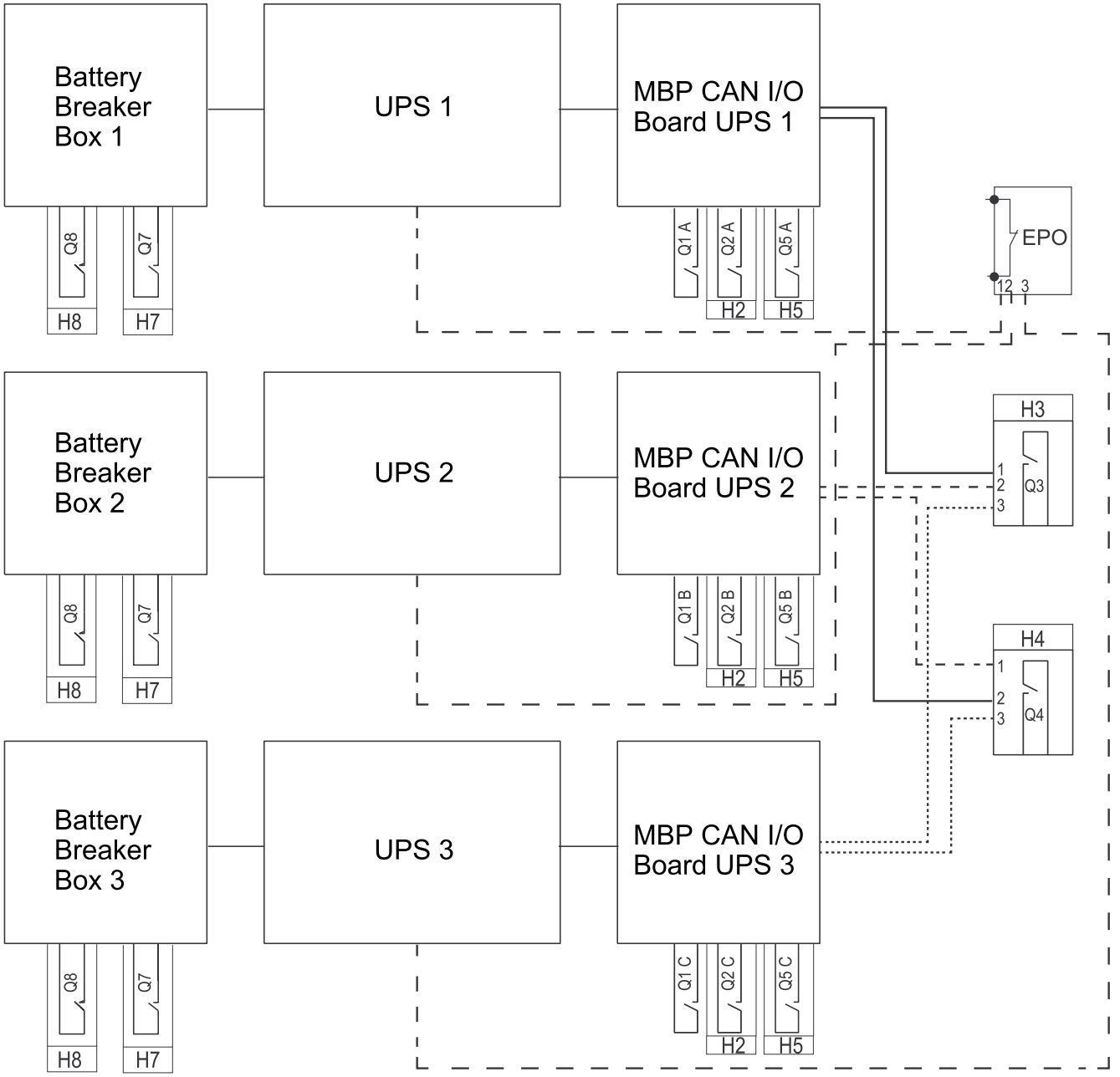


Overview of Communication Cables

Overview of Communication Cables in Single Systems



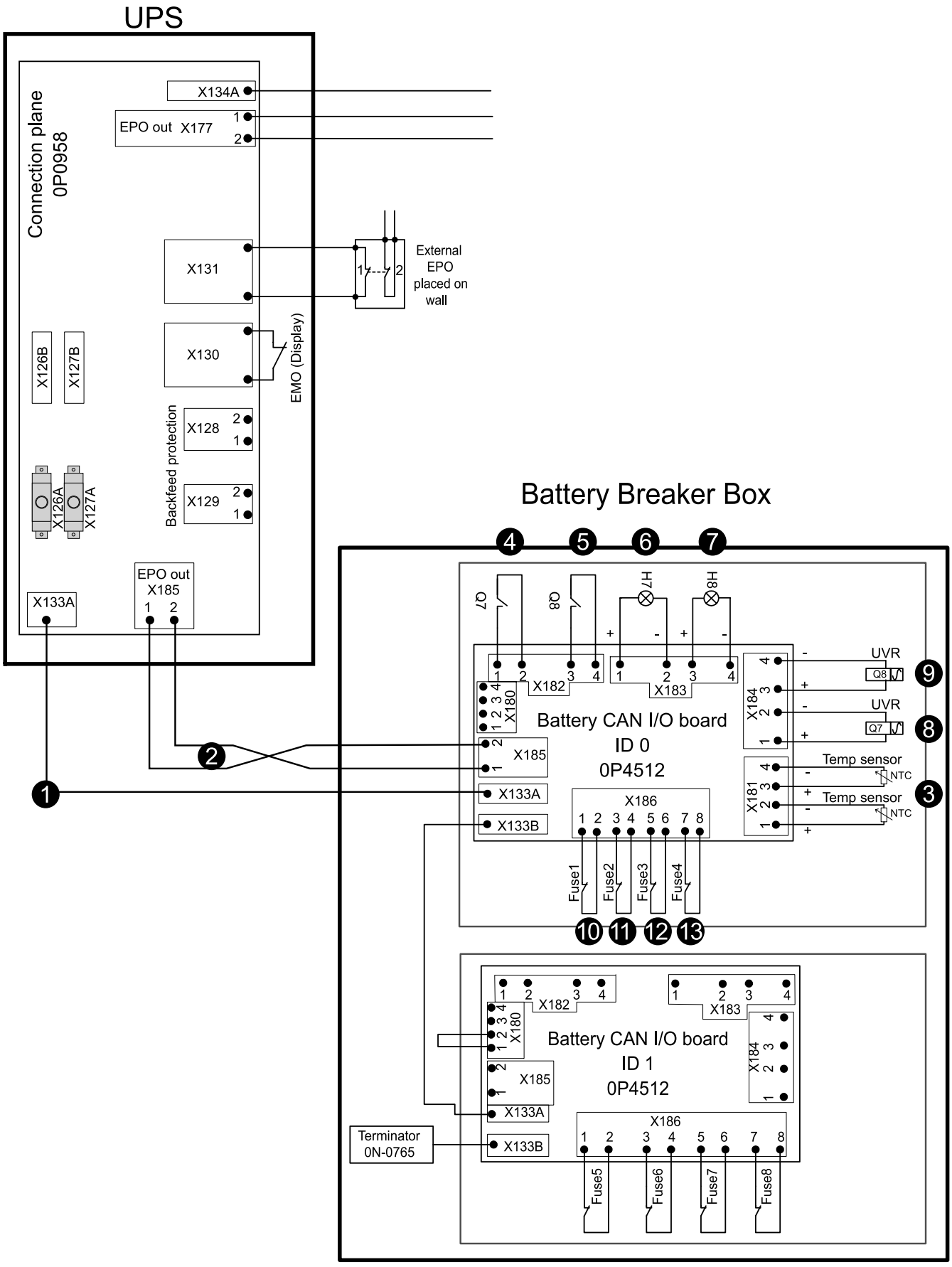
Overview of Communication Cables in Parallel Systems



Connect the Communication Cables between the UPS and the Battery CAN I/O Board ID 0 in the Battery Breaker Box

Perform the below steps on all UPS units in the system.

NOTE: Steps 4–13 are only applicable to systems with equipment not provided by Schneider Electric.

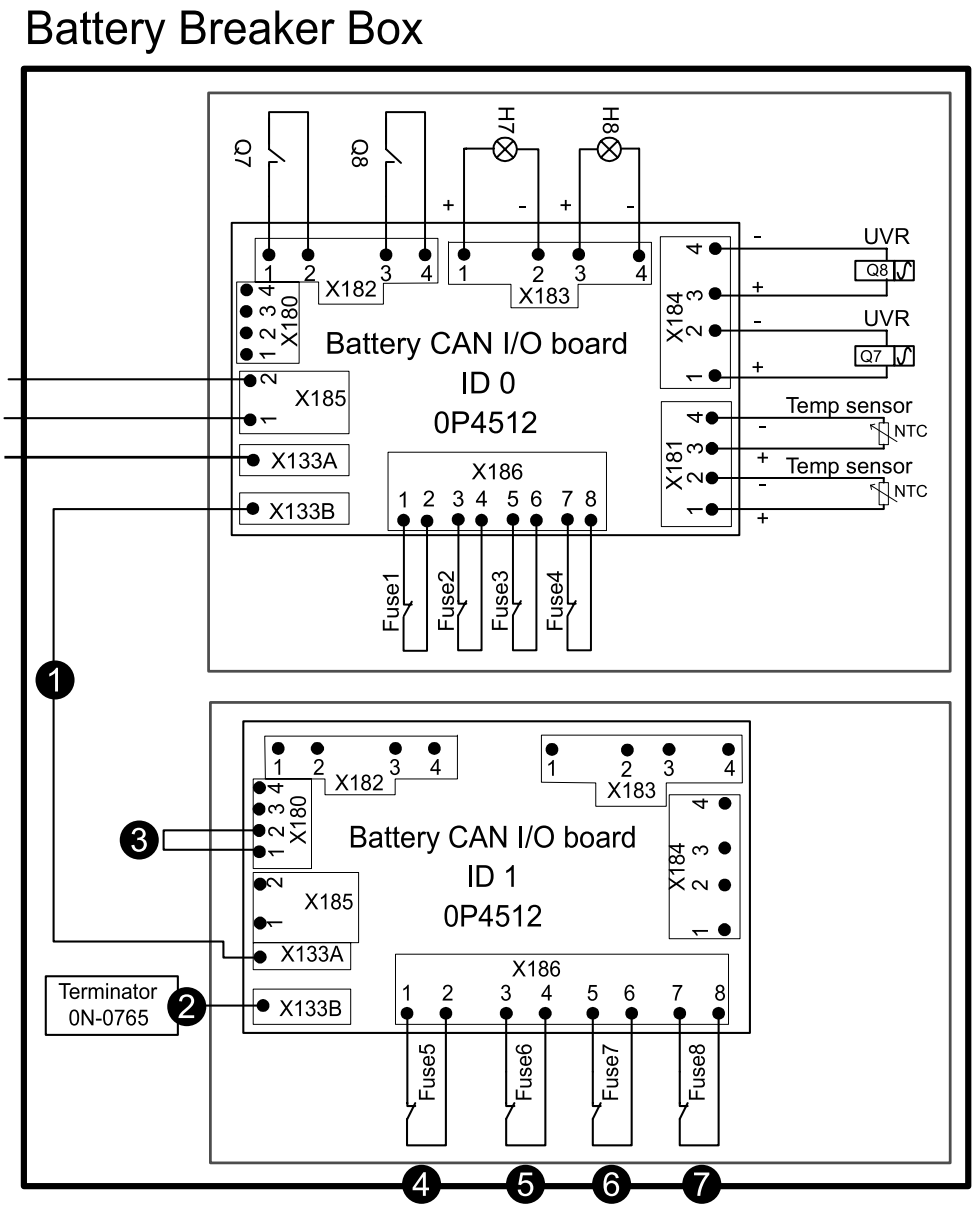


1. Connect X133A from the UPS to X133A on the battery CAN I/O board ID 0.
2. Connect X185 from the UPS to X185 on the battery CAN I/O board ID 0.
3. Connect the temperature sensors provided with the battery breaker box to X181 on the battery CAN I/O board ID 0.
4. On battery CAN I/O board ID 0, connect X182, pin 1, 2 to Q7.
5. On battery CAN I/O board ID 0, connect X182, pin 3, 4 to Q8.
6. On battery CAN I/O board ID 0, connect X183, pin 1, 2 to H7.
7. On battery CAN I/O board ID 0, connect X183, pin 3, 4 to H8.
8. On battery CAN I/O board ID 0, connect X184, pin 1, 2 to UVR Q7 (relay for tripping of Q7 in non-Schneider Electric battery cabinet).
9. On battery CAN I/O board ID 0, connect X184, pin 3, 4 to UVR Q8 (relay for tripping of Q8 in non-Schneider Electric battery cabinet).
10. On battery CAN I/O board ID 0, connect X186, pin 1, 2 to fuse indicator 1 on battery string (if available). If not, connect jumper.
11. On battery CAN I/O board ID 0, connect X186, pin 3, 4 to fuse indicator 2 on battery string (if available). If not, connect jumper.
12. On battery CAN I/O board ID 0, connect X186, pin 5, 6 to fuse indicator 3 on battery string (if available). If not, connect jumper.
13. On battery CAN I/O board ID 0, connect X186, pin 7, 8 to fuse indicator 4 on battery string (if available). If not, connect jumper.

Connect the Communication Cables between the Battery CAN I/O Board ID 0 and the Battery CAN I/O Board ID 1 in non-Schneider Electric Battery Breaker Box (if available)

Perform the below steps on all UPS units in the system.

NOTE: Steps 4–7 are only applicable to systems with equipment not provided by Schneider Electric.



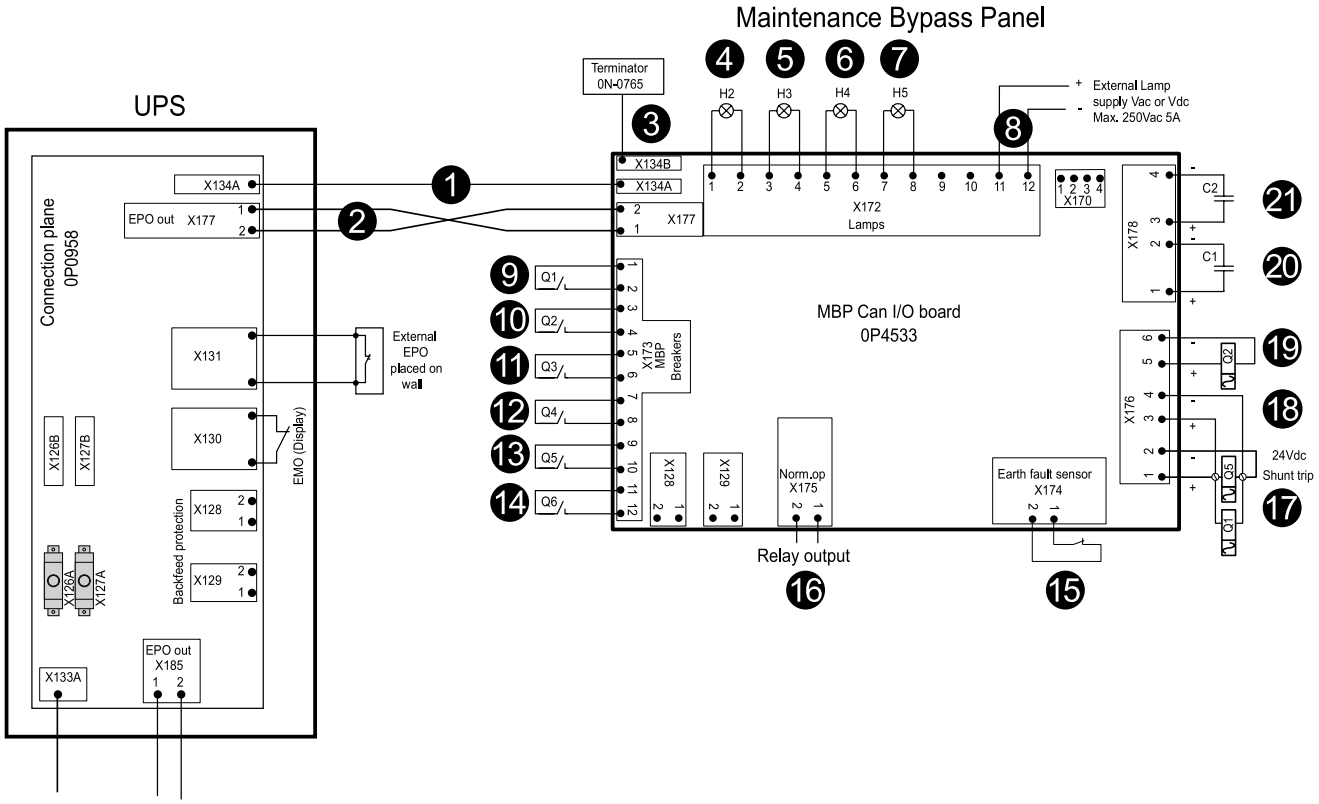
1. Connect X133B from battery CAN I/O board ID 0 to X133A on battery CAN I/O board ID 1.
2. On battery CAN I/O board ID 1, connect terminator 0N-0765A to X133B.
3. On battery CAN I/O board ID 1, connect jumper from X180, pin 1 to X180, pin 2.
4. On battery CAN I/O board ID 1, connect X186, pin 1, 2 to fuse indicator 5 on battery string (if available - if not connect jumper).
5. On battery CAN I/O board ID 1, connect X186, pin 3, 4 to fuse indicator 6 on battery string (if available - if not connect jumper).
6. On battery CAN I/O board ID 1, connect X186, pin 5, 6 to fuse indicator 7 on battery string (if available - if not connect jumper).
7. On battery CAN I/O board ID 1, connect X186, pin 7, 8 to fuse indicator 8 on battery string (if available - if not connect jumper).

Connect the Communication Cables between the UPS and the MBP CAN I/O Board in the Maintenance Bypass Panel

Perform the below steps on all UPS units in the system.

NOTE: The breakers Q3 and Q4 and the lamps H3 and H4 are shared between all UPSs. Use separate contacts for each UPS.

NOTE: Steps 4–21 are only applicable to systems with equipment not provided by Schneider Electric.

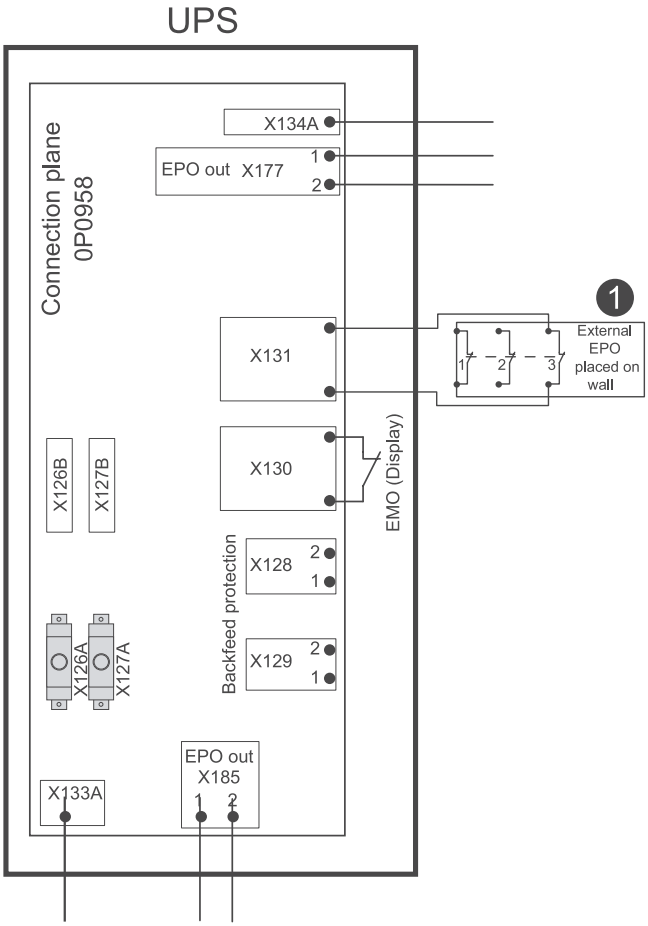


1. Connect X134A from the UPS to X134A on MBP CAN I/O board.
2. Connect X177 from the UPS to X177 on MBP CAN I/O board.
3. On MBP CAN I/O board, connect terminator 0N-0765 to X134B.
4. On MBP CAN I/O board, connect X172, pin 1, 2 to H2 lamp.
5. On MBP CAN I/O board, connect X172, pin 3, 4 to H3 lamp.
6. On MBP CAN I/O board, connect X172, pin 5, 6 to H4 lamp.
7. On MBP CAN I/O board, connect X172, pin 7,8 to H5 lamp.
8. On MBP CAN I/O board, connect X172, pin 11, 12 to external supply.
9. On MBP CAN I/O board, connect X173, pin 1, 2 to Q1 breaker indicator.
10. On MBP CAN I/O board, at X173, connect pin 3, 4 to Q2 breaker indicator.
11. On MBP CAN I/O board, connect X173, pin 5, 6 to Q3 breaker indicator.
12. On MBP CAN I/O board, connect X173, pin 7, 8 to Q4 breaker indicator. If Q4 is not available, connect jumper between pins 7 and 8.
13. On MBP CAN I/O board, connect X173, pin 9, 10 to Q5 breaker indicator.
14. On MBP CAN I/O board, connect X173, pin 11, 12 to Q6 breaker indicator. If Q6 is not available, connect jumper between pins 11 and 12.
15. On MBP CAN I/O board, connect X174, pin 1, 2 to earth fault sensor (if available).
16. On MBP CAN I/O board, connect X175 (normal operation output indicator).
17. On MBP CAN I/O board, connect X176, pin 1, 2 to shunt trip breaker Q1 and Q5.

18. On MBP CAN I/O board, connect X176, pin 3, 4 to shunt trip breaker Q1 (3, 4 redundant with 1, 2).
19. On MBP CAN I/O board, connect X176, pin 5, 6 to shunt trip breaker Q2 (if available).
20. On MBP CAN I/O board, connect X178, pin 1, 2 to shunt trip capacitor C1.
21. On MBP CAN I/O board, connect X178, pin 3, 4 to shunt trip capacitor C2.

Connect the Communication Cables between the UPS and the External EPO

Connect all UPSs in the system to the EPO. Use separate contacts for each UPS.

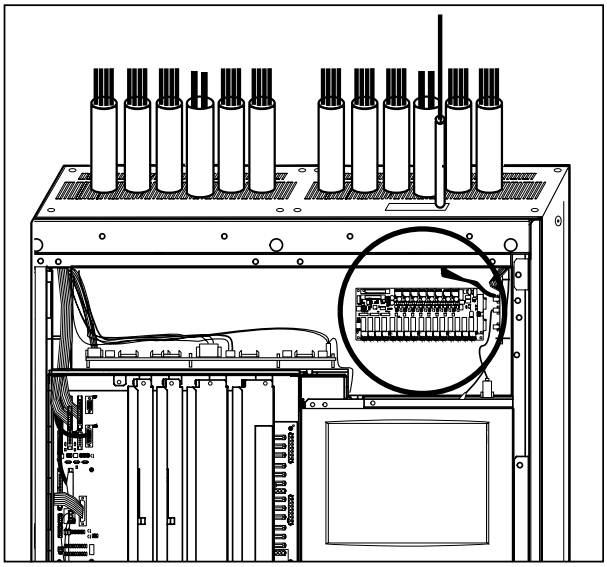


1. Connect X131 to the external EPO placed on the wall.

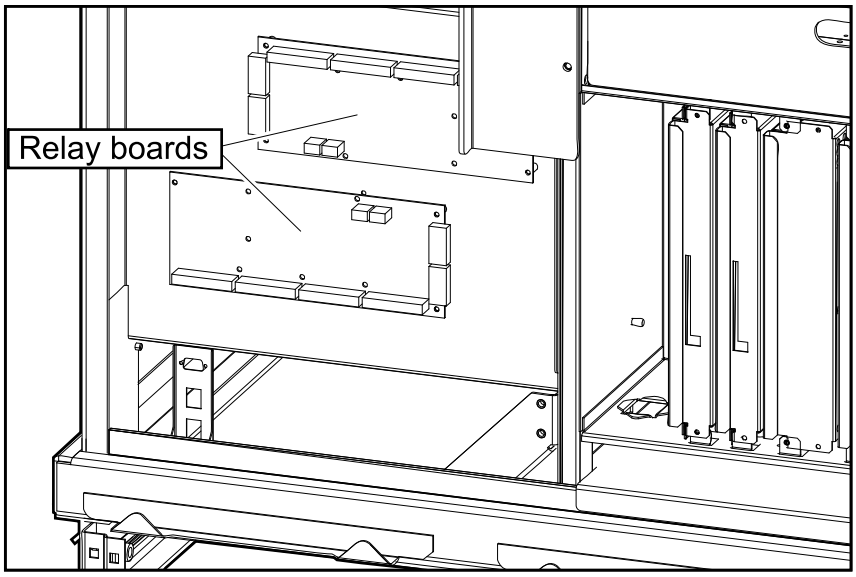
Relay Boards

Location of Relay Boards

Front View of 400–600 kW System

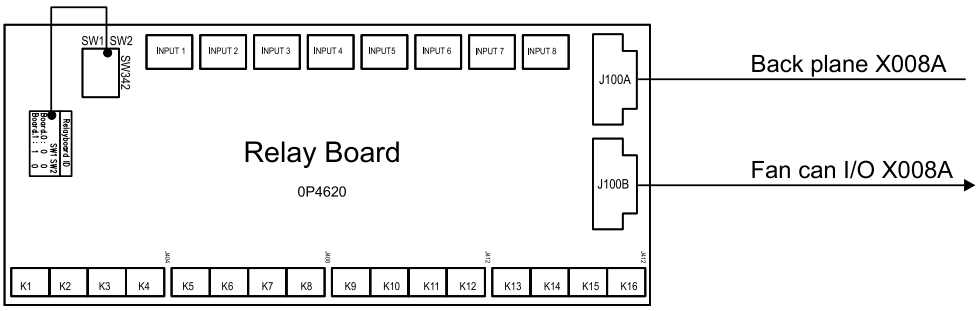


Front View of 800–1000 kW System



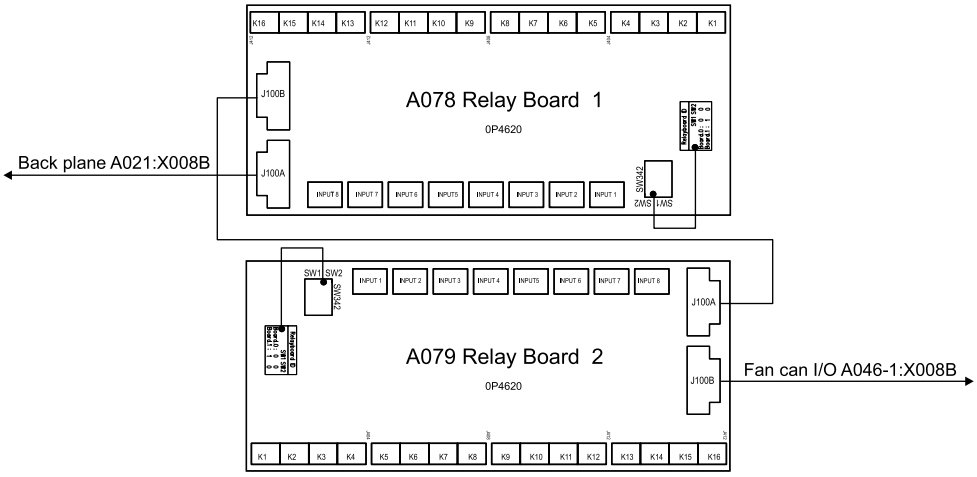
Relay Board Communication Cables

400–600 kW System



Relay board 1 switch position: SW1 = open, SW2 = open.

800–1000 kW System



Relay board 1 switch position: SW1 = open, SW2 = open.

Relay board 2 switch position: SW1 = closed, SW2 = open.

Relay Board Functions

Relay Board 1 Functions

Relay	Function	Mode	Special	Comments
Output 1	Common alarm	Fail safe		
Output 2	Normal operation	Active on		
Output 3	Bypass operation	Active on		
Output 4	Battery operation	Active on		
Output 5	VDC out of tolerance	Fail safe		
Output 6	Battery condition fault	Fail safe		Battery fault detected by battery monitor.
Output 7	Maintenance bypass operation	Active on		
Output 8	Mains out of tolerance	Fail safe		
Output 9	Bypass out of tolerance	Fail safe		
Output 10	Output out of tolerance	Fail safe		
Output 11	MCCB open	Fail safe		Battery breakers open.
Output 12	System overload	Fail safe		
Output 13	Good utility	Active on		If UPS goes into bypass, this relay goes on without delay.
Output 14	Boost charge active	Fail safe		
Output 15	Fan inoperable	Fail safe		
Output 16	Temperature alarm	Fail safe		Temperature switch active or inoperable temperature sensor.
Input 1	Generator active		Master will handle signal	Input for indicating that a generator is active. This will be used to reduce the charge power. This also activates the use of online delay.
Input 2	Battery room ventilation alarm		Individual	Input for indicating that the ventilation in battery rooms is inoperable. This will be used to reduce the charge power.
Input 3	DC ground fault detection		Individual	
Input 4	Reserved for future use		Master will handle signal	

Relay	Function	Mode	Special	Comments
Input 5	Plant clock synchronization		Master will handle signal	Input for real time clock synchronization.
Input 6	Power tie detection		Master will handle signal	Input from PLC to detect if power tie is active.
Input 7	Force battery operation		Individual	This input will force the unit to battery operation when activated in normal operation and report it in the event log.
Input 8	Lock requested bypass		Individual	This input will lock bypass operation when system is in bypass.

Relay Board 2 Functions

NOTE: Relay board 2 is not available in 400 and 600 kVA systems.

Relay	Function	Mode	Special	Comments
Output 1	Info level alarm	Fail safe		
Output 2	Warning level alarm	Fail safe		
Output 3	Severe level alarm	Fail safe		
Output 4	Input frequency too high	Fail safe		
Output 5	Input frequency too low	Fail safe		
Output 6	Output frequency too high	Fail safe		
Output 7	Output frequency too low	Fail safe		
Output 8	Bypass source alarm	Fail safe		
Output 9	Close Q7 pulse	Active on	No delay	
Output 10	Close Q8 pulse	Active on	No delay	
Output 11	Power tie mode active	Active on	No delay	
Output 12	Close Q2	Fail safe	No delay	
Output 13	Reserved for future use			
Output 14	Reserved for future use			
Output 15	Reserved for future use			
Output 16	Reserved for future use			
Input 1	Remove charge derating on Generator active		Individual	Input for deactivation of charge derating when on generator (relay input 1 board 1). Will activate the derating when the load is over 90% and deactivate when the load is below 80% load.
Input 2	Reserved for future use			
Input 3	Reserved for future use			
Input 4	Reserved for future use			
Input 5	Reserved for future use			
Input 6	Reserved for future use			
Input 7	Reserved for future use			
Input 8	Reserved for future use			

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