Galaxy VM

160–225 kVA 480 V UPS

Installation

GVMPB160KG65S, GVMPB180KG65S, GVMPB225KG65S, GVMRB160KG65S, GVMRB180KG65S, GVMRB225KG65S, GVMSB160KG65S, GVMSB180KG65S, GVMSB225KG65S

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Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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

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Important Safety Instructions — SAVE THESE INSTRUCTIONS

This manual contains important safety instructions for the Galaxy VM 160 kVA, Galaxy VM 180 kVA, and Galaxy VM 225 kVA that should be followed during installation and maintenance of the UPS and batteries.

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.

Symbols in This Manual

 The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

 This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

⚠DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

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

⚠WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

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

⚠CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

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

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this type of safety message.

Failure to follow these instructions can result in equipment damage.

Please Note

Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

FCC Statement

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

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

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

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

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠ 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 product's ventilation openings when the UPS system is in operation.

Failure to follow these instructions can result in equipment damage.

NOTICE

RISK OF EQUIPMENT DAMAGE

Do not connect the UPS output to regenerative load systems including photovoltaic systems and speed drives.

Failure to follow these instructions can result in equipment damage.

Electrical Safety

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

When the UPS input is connected through external isolators that, when opened, isolate the neutral or when the automatic backfeed isolation is provided external to the equipment or is connected to an IT power distribution system, a label must be fitted at the UPS input terminals, and on all primary power isolators installed remote from the UPS area and on external access points between such isolators and the UPS, by the user, displaying the following text (or equivalent in a language which is acceptable in the country in which the UPS system is installed):

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

Battery Safety

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

NOTICE

RISK OF EQUIPMENT DAMAGE

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

Failure to follow these instructions can result in equipment damage.

Symbols Used

	Stand-by
	Hazardous voltage
	Attention or consult accompanying documents
	Output
	Input
	OFF (power disconnection from utility/mains) or output disabled

	ON (power connection to the utility/mains) or output enabled
	Alternating current
	Direct current
N	Connection for the neutral conductor on permanently installed equipment
	Earth (ground)

Specifications

Input Specifications

	160 kVA	180 kVA	225 kVA
Connection type	3–wire (3PH + G)		
Input voltage (V)	480 -25/+20% at 100% load		
Voltage range (V)	360–576		
Nominal input voltage (V)	480		
Frequency range (Hz)	40–70		
Nominal input current (A)	181	204	255
Maximum input current (A)	218	245	306
Input current limitation (A)	247	278	347
Total Harmonic Distortion (THDI)	<3% at 100% load <4% at 50% load <6% at 25% load		
Maximum input short-circuit withstand (kA)	Icw = 65		
Protection	Built-in backfeed contactor		
Ramp-in	Adaptive 1 - 40 sec		

Bypass Specifications

NOTE: Bypass is inoperable when the system is configured as a frequency converter.

	160 kVA	180 kVA	225 kVA
Connection type	4–wire (3PH + N + G) 3–wire (3PH + G)		
Nominal bypass voltage (V)	480		
Bypass voltage range (V)	432–528		
Frequency (Hz)	50 or 60		
Frequency Range (Hz)	Programmable: +/-0.1, +/-3, +/-10. Default is +/-3.		
Nominal bypass current (A)	192	217	271
Maximum bypass short-circuit withstand (kA)	Icw = 65		
Protection	Built-in Backfeed Contactor		

Output Specifications

	160 kVA	180 kVA	225 kVA
Nominal output voltage (V)	480		
Connection type	4–wire (3PH + N + G) 3–wire (3PH + G)		
Overload capacity[1]	150% for 1 minute (normal operation) at 40°C 125% for 10 minutes (normal operation) at 40°C 150% for 1 second (battery operation) at 40°C 125% for 1 minute (battery operation) at 40°C 1000% for 100 ms (bypass operation)		
Output voltage tolerance	Symmetric load (0–100%): +/- 1% static +/- 5% after 2 ms +/- 1% after 50 ms		
Output power factor	0.9		
Nominal output current (A)	192	217	271
Total Harmonic Distortion (THDU)	<2% at 100% linear load <3% at 100% non–linear load		
Output frequency (Hz)	50/60 (sync to bypass) 50/60 Hz +/-0.1% (free-running)		
Slew rate (Hz/sec)	Programmable: 0.25, 0.5, 1, 2, 4, 6		
Output performance classification (according to IEC/EN62040-3)	VFI-SS-111		
Load crest factor	Unlimited		
Load power factor	0.7 leading to 0.5 lagging without derating		

Battery Specifications

	160 kVA	180 kVA	225 kVA
Charging power in % of output power	40% charge ≤ 80% load 20% charge ≤ 100% load		
Nominal battery voltage (VDC)	480		
Nominal float voltage (VDC)	545		
End of discharge voltage (full load) (VDC)	384		
End of discharge voltage (no load) (VDC)	420		
Battery current at full load and nominal battery voltage (A)	313	353	441
Battery current at full load and minimum battery voltage (A)	392	441	551
Temperature compensation	-3.3 mV per °C for T ≥ 25 °C 0 mV per °C for T < 25 °C		
Ripple current	< 5% C20 (5 minuntes backup time)		
Battery test	Programmable: Manual/automatic		
Deep discharge protection	Yes		
Recharge according to battery temperature	Yes		
Cold start	Yes		

1. Overload capabilities are not available when the system is configured as a frequency converter

Requirements for a Third Party Battery Solution

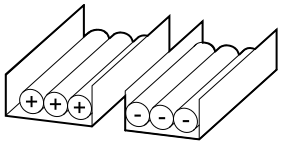
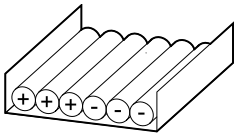
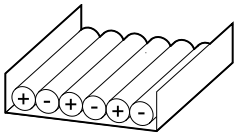
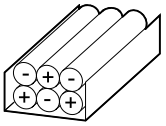
Battery breaker boxes from Schneider Electric are recommended for the battery interface. Please contact Schneider Electric for more information.

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

Recommended Upstream Protection

This equipment is rated for use in a circuit capable of delivering no more than 65 kA RMS symmetrical amperes at 480 V maximum.

The UPS system can be supplied from a 3–wire or 4–wire service. If the load requires a 4–wire service, a 3–wire bypass is not permitted. In systems with a 4–wire service, connect the bypass input neutral, the output neutral, and the inverter midpoint in the I/O cabinet by the busbar jumper 880–3102.

NOTE: All wiring must comply with all applicable local and/or national electrical codes. The maximum allowable conductor size is 300 kcmil for AC cables and 500 kcmil for DC cables.

Cable ampacity is based on NFPA 70–2014 Art. 310.15 Table 310.15 (B) with the following assertions:

- 75 °C termination
- 3 current carrying conductors
- An ambient temperature of 30 °C
- Use of copper conductors

If the ambient room temperature is greater than 30 °C, 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: Refer to the installation manual for your specific battery solution for information on recommenced battery cable sizes.

160 kVA System

	80% Rated Breakers	Cable Size	100% Rated Breakers	Cable Size
Input	400AF/250AT	1 x 250 kcmil	400AF/250AT	1 x 250 kcmil
Bypass	400AF/200AT	1 x 3/0 AWG	400AF/200AT	1 x 3/0 AWG
Output	400AF/200AT	1 x 3/0 AWG	400AF/200AT	1 x 3/0 AWG

180 kVA System

	80% Rated Breakers	Cable Size	100% Rated Breakers	Cable Size
Input	400AF/300AT	1 x 300 kcmil	400AF/300AT	1 x 300 kcmil
Bypass	400AF/225AT	1 x 4/0 AWG	400AF/225AT	1 x 4/0 AWG
Output	400AF/225AT	1 x 4/0 AWG	400AF/225AT	1 x 4/0 AWG

225 kVA System

	80% Rated Breakers	Cable Size	100% Rated Breakers	Cable Size
Input	600AF/350AT	2 x 2/0 AWG	400AF/350AT	2 x 2/0 AWG
Bypass	400AF/300AT	1 x 300 kcmil	400AF/300AT	1 x 300 kcmil
Output	400AF/300AT	1 x 300 kcmil	400AF/300AT	1 x 300 kcmil

Recommended Bolt and Lug Sizes

NOTICE

HAZARD OF EQUIPMENT DAMAGE

Use only UL approved cable lugs.

Failure to follow these instructions can result in equipment damage.

Cable Size	Terminal Bolt Diameter	Cable Lug Type	Crimping Tool/Die
2/0 AWG	M10	LCA2/0-12-X	CT-720/CD-720-2
3/0 AWG	M10	LCA3/0-12-X	CT-720/CD-720-2
4/0 AWG	M10	LCA4/0-12-X	CT-720/CD-720-3
250 kcmil	M10	LCA250-12-X	CT-720/CD-720-3
300 kcmil	M10	LCA300-12-X	CT-720/CD-720-4
400 kcmil	M10	LCA400-12-X	CT-720/CD-720-5
500 kcmil	M10	LCA500-12-X	CT-720/CD-720-6

Trip Settings for Unit Input Breaker (UIB)

	160 kVA	180 kVA	225 kVA
Ir	300	300	400
tr	0.5	0.5	0.5
Ii	1.5	1.5	1.5

Trip Settings for Static Switch Input Breaker (SSIB)

NOTE: tr and li must be set by the installer based on the installation coordination.

	160 kVA	**180 kVA**	**225 kVA**
Ir	250	300	350
tr	0.5–**16**[2]	0.5–**16**[2]	0.5–**16**[2]
li	1.5–**12**[2]	1.5–**12**[2]	1.5–**12**[2]

Trip Settings for Maintenance Bypass Breaker (MBB)

NOTE: tr and li must be set by the installer based on the installation coordination.

	160 kVA	**180 kVA**	**225 kVA**
Ir	250	300	350
tr	0.5–**16**[2]	0.5–**16**[2]	0.5–**16**[2]
li	1.5–**12**[2]	1.5–**12**[2]	1.5–**12**[2]

Trip Settings for Unit Output Breaker (UOB)

	160 kVA	**180 kVA**	**225 kVA**
Ir	250	300	350
tr	4	4	4
li	6	8	8

Torque Specifications

Bolt size	**Torque**
M4	1.7 Nm (1.25 lb-ft)
M5	2.5 Nm (1.84 lb-ft)
M6	5 Nm (3.69 lb-ft)
M8	17.5 Nm (12.91 lb-ft)
M10	30 Nm (22 lb-ft)
M12	50 Nm (36.87 lb-ft)
M14	75 Nm (55.31 lb-ft)

2. The default setting is marked with bold.

Environment

⚠ 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.
- No responsibility is assumed by Schneider Electric if these requirements are not respected.

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

	Operation	**Storage**
Temperature	0 °C to 40 °C (32 °F to 104 °F)	-15 °C to 40 °C (5 °F to 104 °F) for systems with batteries -25 °C to 55 °C (-13 °F to 131 °F) for systems without batteries
Relative humidity	0-95% non-condensing	0-95% non-condensing
Altitude derating according to IEC 62040–3	1000 m (3300 ft): 1.000 1500 m (5000 ft): 0.975 2000 m (6600 ft): 0.950	≤ 5000 m above sea-level (or in an environment with equivalent air pressure)
Audible noise (1 meter from surface)	55 dBA at 70% load and 40 °C 65 dBA at 100% load and 40 °C	
Protection class	IP20	
Color	RAL 9003 White	

Heat Dissipation

NOTE: The maximum air flow through the UPS at highest fan speed is 3600 m³/h.

Heat Dissipation for 160 kVA Systems

Operation Mode	Normal	ECO Mode	ECOnversion	Battery Operation
Heat dissipation at 100% load (BTU/hr)	18348	2469	5465	22076
Heat dissipation at 75% load (BTU/hr)	12970	2224	4854	15354
Heat dissipation at 50% load (BTU/hr)	9174	2231	4249	9704
Heat dissipation at 25% load (BTU/hr)	5385	1871	4061	4719

Heat Dissipation for 180 kVA Systems

Operation Mode	Normal	ECO Mode	ECOnversion	Battery Operation
Heat dissipation at 100% load (BTU/hr)	20642	2778	5583	24836
Heat dissipation at 75% load (BTU/hr)	14591	2502	5035	17273
Heat dissipation at 50% load (BTU/hr)	10321	2510	4494	10917
Heat dissipation at 25% load (BTU/hr)	6058	2104	4127	5309

Heat Dissipation for 225 kVA Systems

Operation Mode	Normal	ECO Mode	ECOnversion	Battery Operation
Heat dissipation at 100% load (BTU/hr)	25802	3472	6979	31045
Heat dissipation at 75% load (BTU/hr)	18239	3128	5764	21592
Heat dissipation at 50% load (BTU/hr)	12901	3137	4905	13646
Heat dissipation at 25% load (BTU/hr)	7573	2630	4611	6637

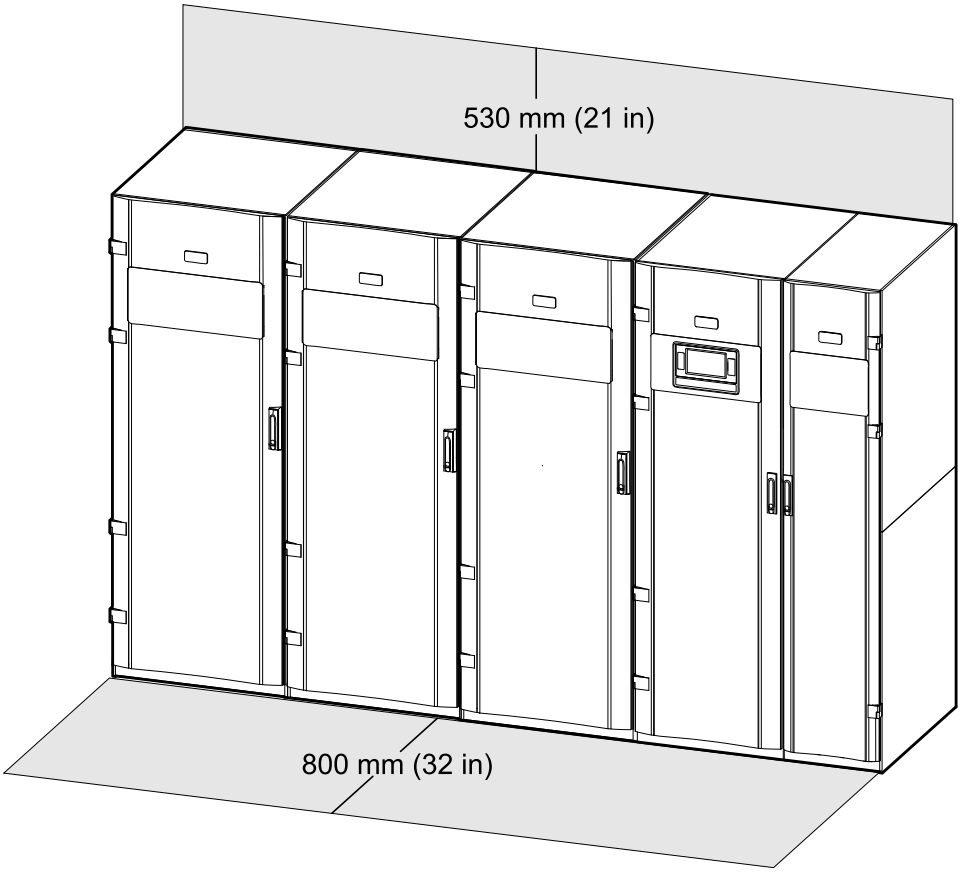
UPS Weights and Dimensions

Part	Weight kg (lbs)	Height mm (in)	Width mm (in)	Depth mm (in)
160 kVA UPS (GVMSB160KG65S) Power cabinet I/O cabinet	 469 (1031.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
180 kVA UPS (GVMSB180KG65S) Power cabinet I/O cabinet	 469 (1031.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
225 kVA UPS (GVMSB225KG65S) Power cabinet I/O cabinet	 494 (1086.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
160 kVA parallel UPS (GVMPB160KG65S) Power cabinet I/O cabinet	 469 (1031.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
180 kVA parallel UPS (GVMPB180KG65S) Power cabinet I/O cabinet	 469 (1031.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
225 kVA parallel UPS (GVMPB225KG65S) Power cabinet I/O cabinet	 494 (1086.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
160 kVA additional UPS for 1+1 configuration (GVMRB160KG65S) Power cabinet I/O cabinet	 469 (1031.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
180 kVA additional UPS for 1+1 configuration (GVMRB180KG65S) Power cabinet I/O cabinet	 469 (1031.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)
225 kVA additional UPS for 1+1 configuration (GVMRB225KG65S) Power cabinet I/O cabinet	 494 (1086.8) 210 (463)	1970 (77.56)	1002 (39.45)	854 (33.62)

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 UPS system can be placed up against the wall and there is no requirement for rear or side access.


530 mm (21 in)
800 mm (32 in)

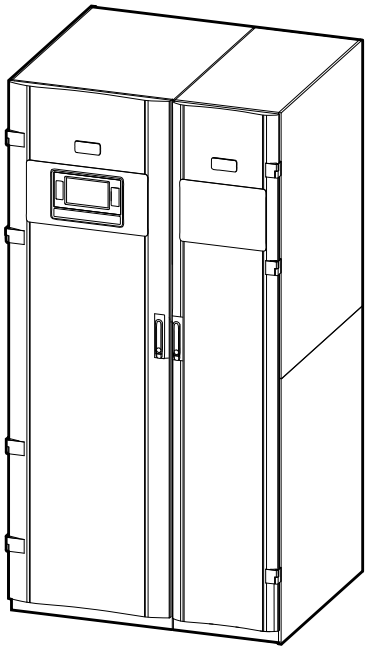
Introduction

The UPS is the core in each Galaxy VM system and consists of two cabinets:

- An I/O cabinet for field wiring which contains system breakers/switches.
- A power cabinet which contains power electronics and the user interface.

The cabinets must be placed with the I/O cabinet to the right.

Front View of the UPS



The Galaxy VM system also consists of the three battery solutions:

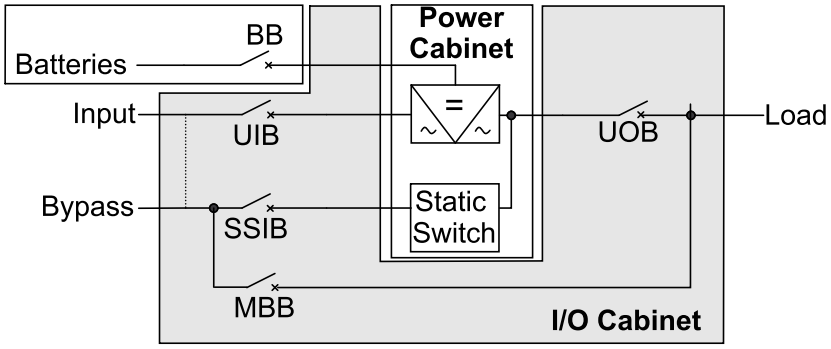
- Galaxy VM modular battery cabinets
- Galaxy VM classic battery cabinets
- Galaxy VM battery breaker box for third party batteries

NOTE: For information on how to install the battery solutions, refer to the installation manual supplied with the battery solution.

Overview of Configurations

Single System

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



1+1 Redundant System

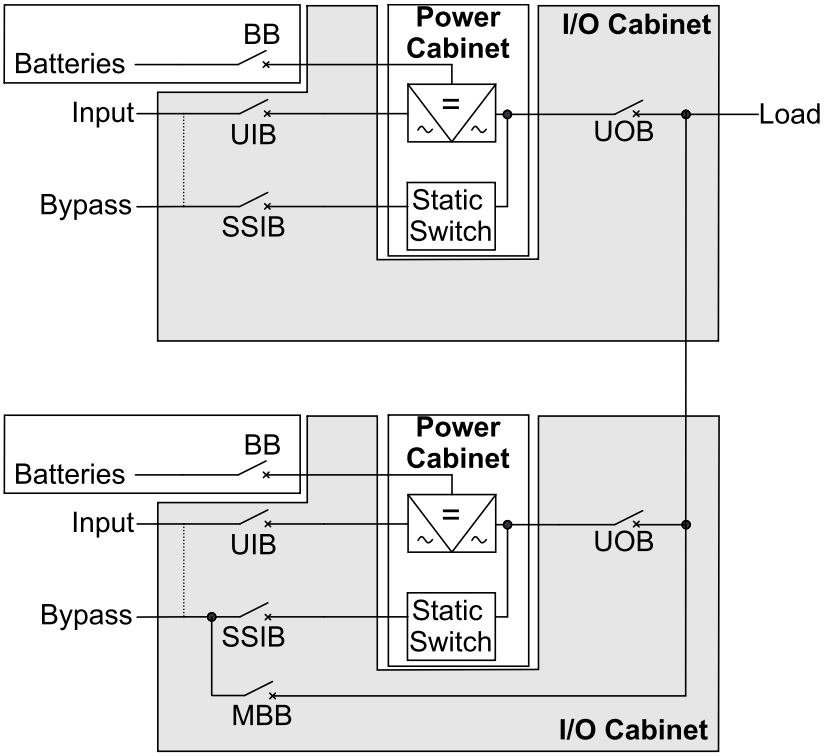
NOTICE

HAZARD OF EQUIPMENT DAMAGE

The cable length for bypass and output must be the same for all parallel UPS units to ensure correct load sharing in bypass operation. In single utility/mains systems all input cables must be same length.

Failure to follow these instructions can result in equipment damage.

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



Parallel System

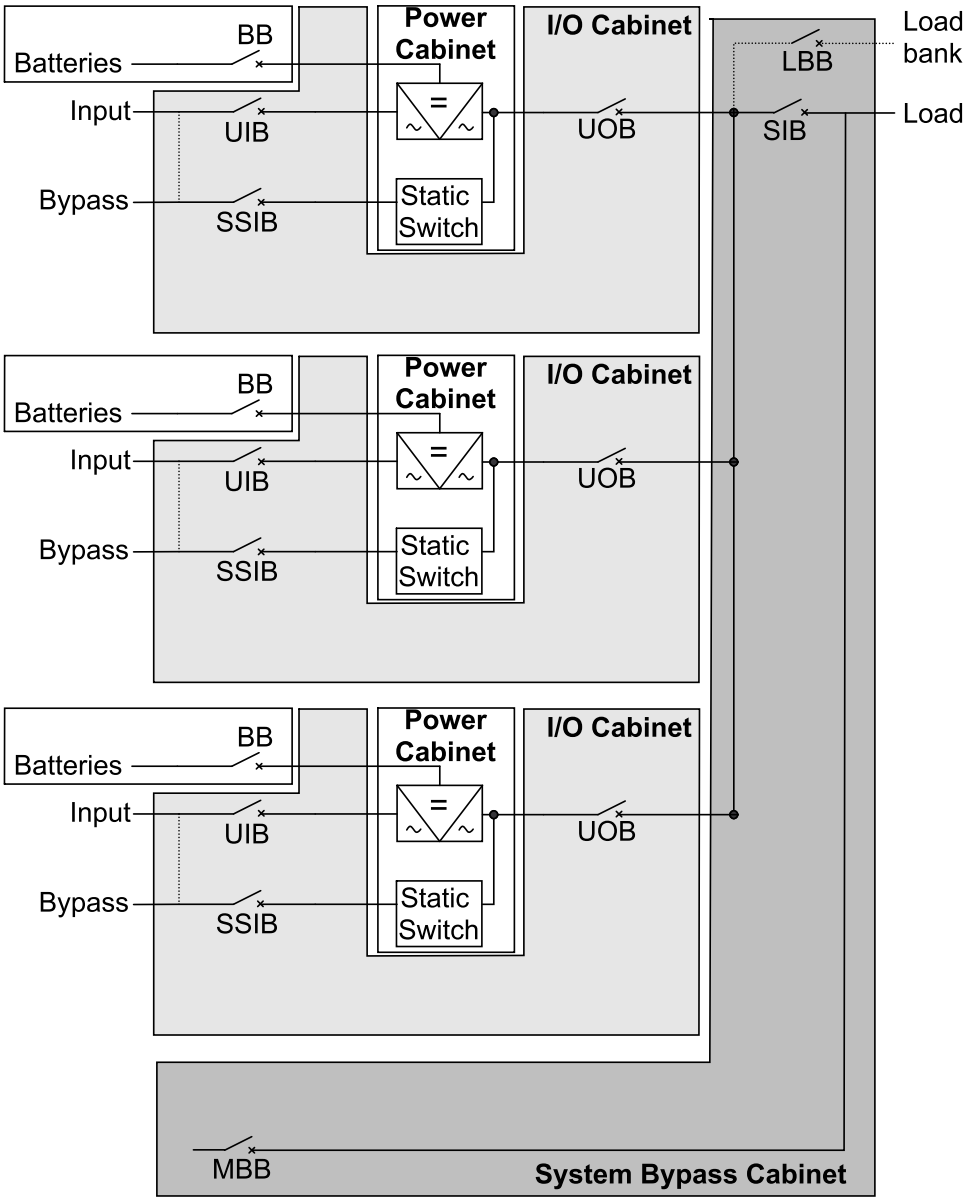
NOTICE

HAZARD OF EQUIPMENT DAMAGE

The cable length for bypass and output must be the same for all parallel UPS units to ensure correct load sharing in bypass operation. In single utility/mains systems all input cables must be same length.

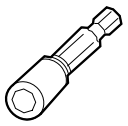
Failure to follow these instructions can result in equipment damage.

UIB	Unit input breaker
SSIB	Static switch input breaker
BB	Battery breaker
MBB	Maintenance bypass breaker
UOB	Unit output breaker
SIB	System isolation breaker
LBB	Load bank breaker (optional)

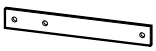


Overview of Supplied Installation Kits

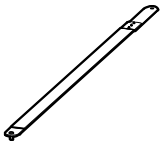
Installation Kit 0M-816661

Part	Used in	Number of units
Jack	*Remove the Cabinets from the Pallet, page 30*	1 
Floor protection plate		1 
Hexagonal socket for drilling machine		1 

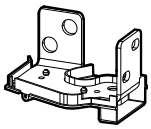
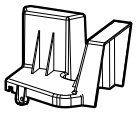
Installation Kit 0N-9763

Part	Used in	Number of Units
Cable ties for signal cables	*Connect Communication and Signal Cables between the Power Cabinet and the I/O Cabinet, page 61*	50
Cable reliefs	*Connect Power Cables in a Single Utility/Mains System, page 47* or *Connect Power Cables in a Dual Utility/Mains System, page 50*	16 
Cable ties for power cables		100
Jumper busbar for 4–wire installations	*Install Jumper Busbar in 4–Wire Systems, page 45*	1 
M8 nut with washer		3 

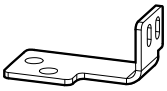
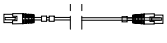
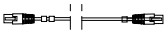
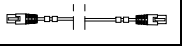
Installation Kit 0M-816662

Part	Used in	Number of Units
Crossbar 0M-815835	*Install the I/O Cabinet, page 40*	1 

Installation Kit 0M-816653

Part	Used in	Number of Units
Interconnection busbar	*Install the Power Cabinet, page 56*	12 
Busbar protection		12 

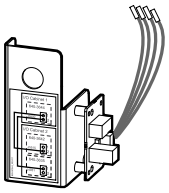
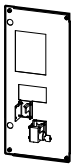
Installation Kit 0M-816654

Part	Used in	Number of Units
Top baying bracket	*Install the Power Cabinet, page 56*	1 
M8 nut with washer		30 
M6 x 16 mm torx screw with washer		2 
Grounding busbar		1 
Tolerance busbar		13 
10 mm threaded torx screw		12 
M8 x 20 mm hexagonal torx with washer		28 
1 mm leveling shims	*Mount the Rear Anchoring Brackets for the I/O Cabinet and the Power Cabinet, page 39*, *Position the I/O Cabinet, page 40*, and *Install the Power Cabinet, page 56*	20 
PBUS 1 cable 0W7980	*Connect Communication and Signal Cables between the Power Cabinet and the I/O Cabinet, page 61*	1 
PBUS 2 cable 0W7982		1 
ABUS cable 0W7989		1 

Part	Used in	Number of Units
Temperature sensor 0M-1160	Refer to the installation manual for your specific battery solution for information on how to install and connect the temperature sensor.	1 
Auxiliary switch	*Connect Signal Cable for Monitoring the MBB in the 1+1 Redundant Parallel System, page 73*	1 

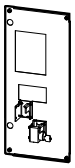
Installation Kit 0H-9047

NOTE: This kit is supplied with parallel UPSs only.

Part	Used in	Number of Units
Bracket assembly	*Connect Signal Cable for Monitoring the MBB in the 1+1 Redundant Parallel System, page 73*	1 
Dead front cover for 1+1 I/O cabinet 0M-820406		1 

Installation Kit 0M-97217

NOTE: This kit is supplied with parallel UPSs only.

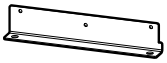
Part	Used in	Number of Units
Dead front cover for 1+1 I/O cabinet	*Connect Signal Cable for Monitoring the MBB in the 1+1 Redundant Parallel System, page 73*	1 

Installation Kit 0H-0889

NOTE: This kit is supplied with parallel UPSs only.

Part	Used in	Number of Units
PBUS 1 cable 0W7995	*Connect PBUS Cables Between Parallel UPS Units, page 67*	1 
PBUS 2 cable 0W7996		1 

Installation Kit 0M-96507

Part	Used in	Number of Units
Front anchoring bracket for I/O cabinet	*Mount the Front Anchoring Brackets on the I/O Cabinet and Power Cabinet, page 61*	1 

Installation Kit 0M-96506

Part	Used in	Number of Units
Front anchoring bracket for power cabinet	*Mount the Front Anchoring Brackets on the I/O Cabinet and Power Cabinet, page 61*	1 

Installation Procedure

For the installation procedures below, these symbols have been used:

Power cables

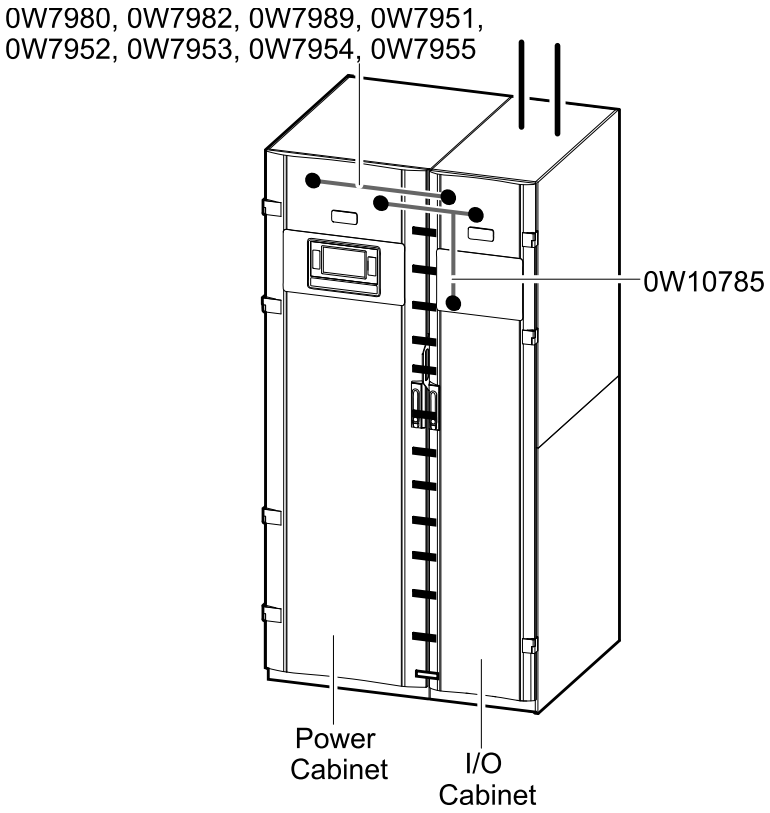
Signal cables

Busbar connection

Protective earth (PE) busbar connection

Installation Procedure for UPS

Overview of Busbar, Signal Cable and Power Cable Connections



1. *Remove the Cabinets from the Pallet, page 30*.
2. *Mount the Rear Anchoring Brackets for the I/O Cabinet and the Power Cabinet, page 39*.
3. *Install the I/O Cabinet, page 40*.
4. Prepare for cables. Follow either the procedure:
   - *Prepare for Cables in a Top Cable Entry System, page 42* or
   - *Prepare for Cables in a Bottom Cable Entry System, page 43*
5. In 4–wire systems only: *Install Jumper Busbar in 4–Wire Systems, page 45*.
6. Connect power cables. Follow either the procedure:
   - *Connect Power Cables in a Single Utility/Mains System, page 47* or
   - *Connect Power Cables in a Dual Utility/Mains System, page 50*

7. *Set the Trip Settings, page 54*.
8. *Install the Power Cabinet, page 56*.
9. *Mount the Front Anchoring Brackets on the I/O Cabinet and Power Cabinet, page 61*.
10. *Connect Communication and Signal Cables between the Power Cabinet and the I/O Cabinet, page 61*.
11. In 1+1 redundant parallel systems and parallel systems only: *Connect PBUS Cables Between Parallel UPS Units, page 67*.
12. In 1+1 redundant parallel systems only: *Connect Signal Cable for Monitoring the MBB in the 1+1 Redundant Parallel System, page 73*
13. Option: *Connect Signal Cables between the I/O Cabinet and Optional Equipment, page 79*.

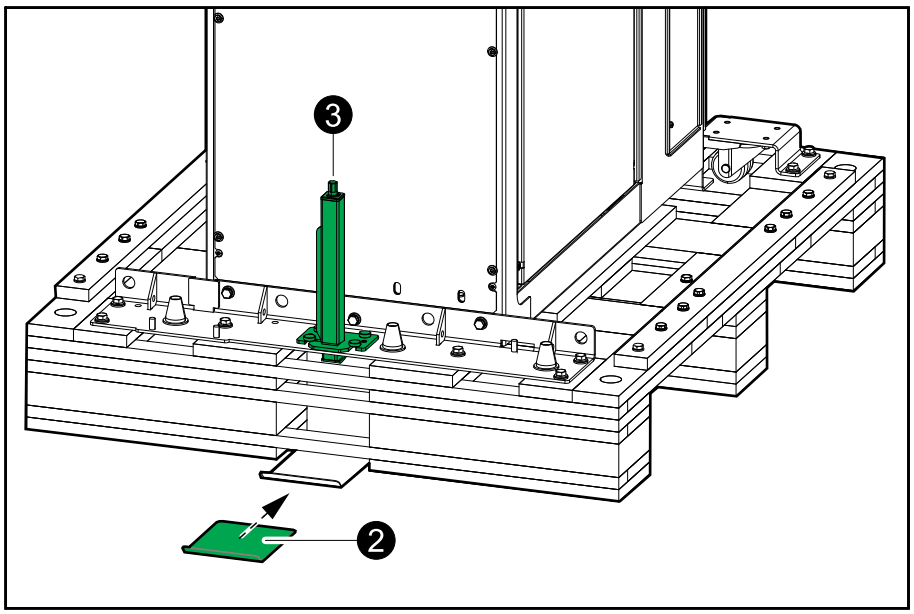
Remove the Cabinets from the Pallet

Remove the I/O Cabinet from the Pallet

NOTICE
HAZARD OF EQUIPMENT DAMAGE Ensure that the floor is level and can support the weight of the jack when it carries the cabinet. **Failure to follow these instructions can result in equipment damage.**

1. Take the installation kit 0M-816661 shipped on the I/O cabinet pallet.
2. Place the floor protection plate under the pallet on the rear of the cabinet.

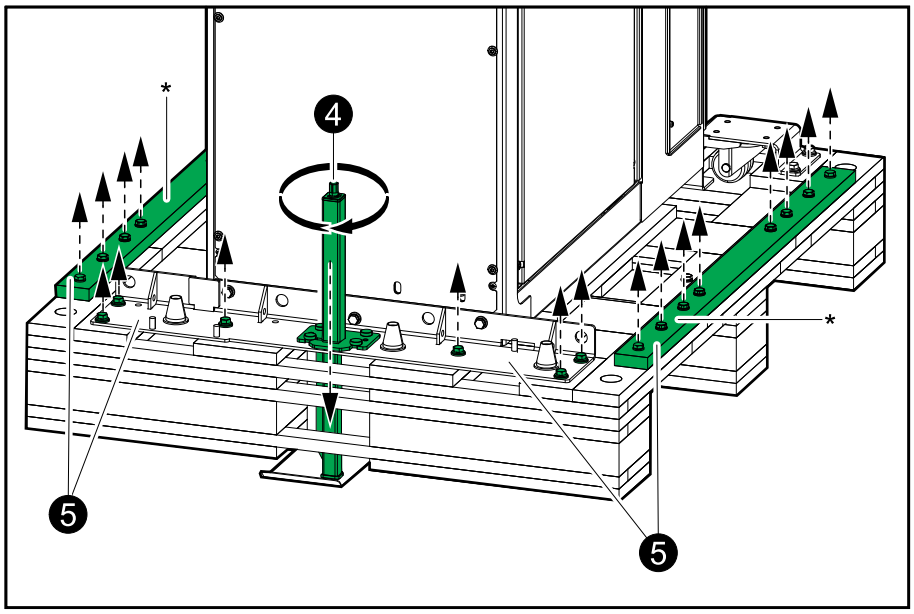
Rear View of the I/O Cabinet



3. Place the jack from the installation kit in the hole in the transport bracket on the rear of the cabinet.

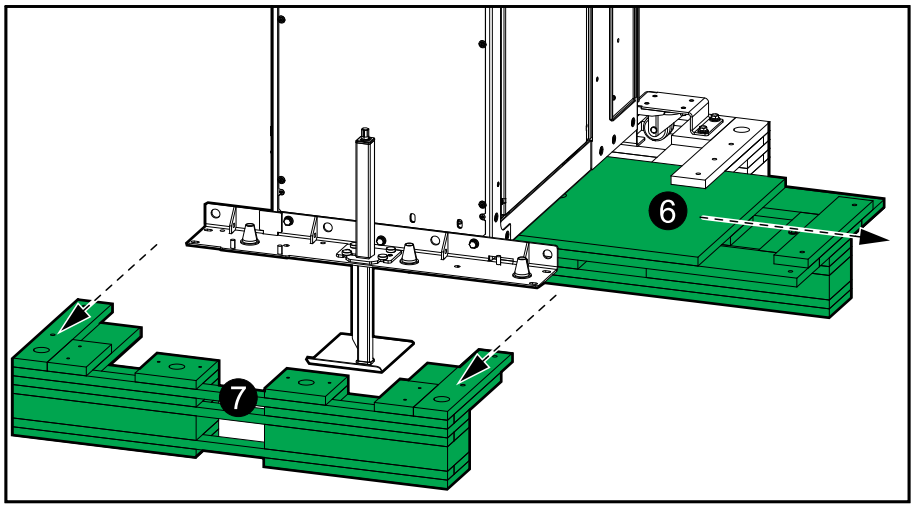
4. Use a drilling machine with the provided hexagonal socket to activate the jack, slide it into position in the bracket, and to lift the pallet to the top position.

Rear View of the I/O Cabinet



5. Loosen and remove the bolts shown on the drawing that attach the transport bracket and the wooden plates to the pallet. Save the pallet parts marked with * for step 8.
6. Remove the middle pallet part.

Rear View of the I/O Cabinet



⚠WARNING

HAZARD OF SERIOUS INJURY

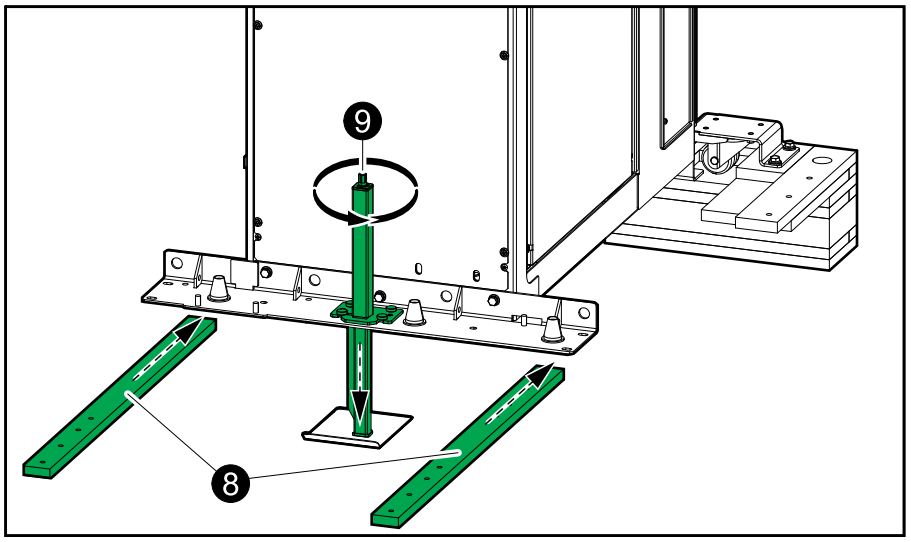
Do not put your hands or feet under the pallet while removing the wooden side part.

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

7. Remove the rear pallet part.

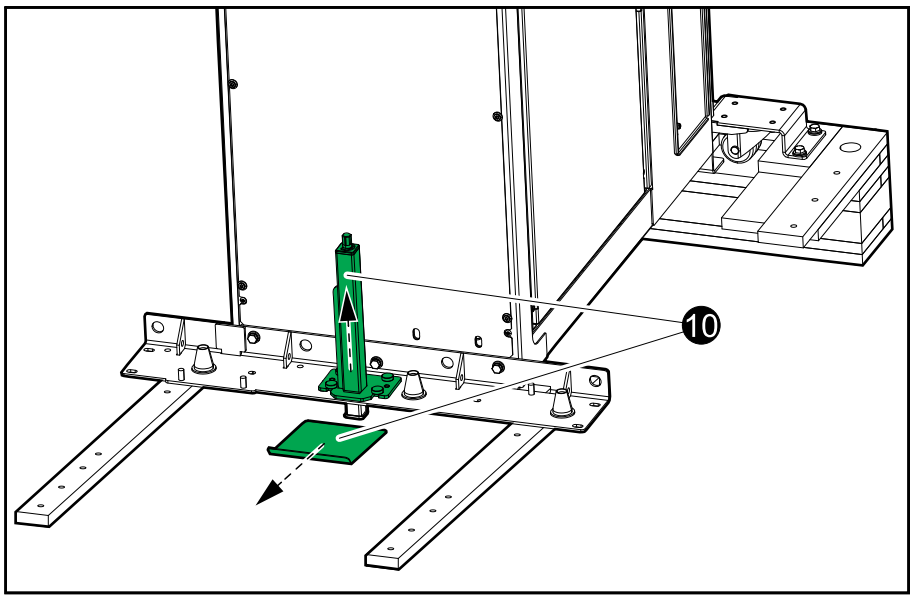
8. Place the pallet parts from step 5 as a support under the metal bracket.

Rear View of the I/O Cabinet



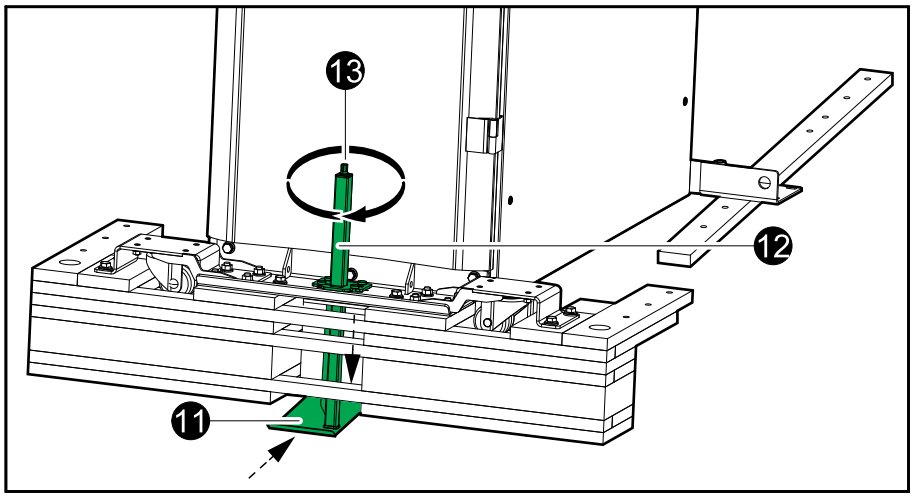
9. Lower the cabinet down onto the support using the jack and the drilling machine.
10. Remove the floor protection plate and the jack.

Rear View of the I/O Cabinet



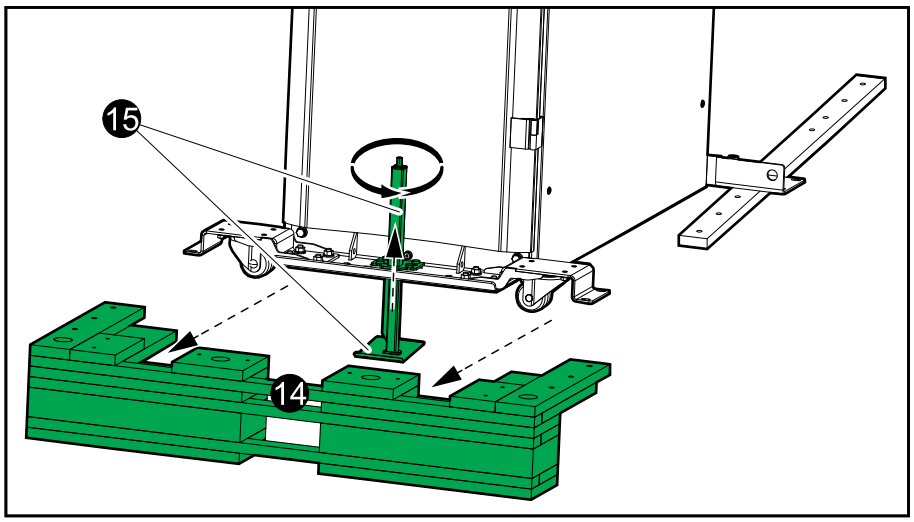
11. Place the floor protection plate under the pallet on the front of the cabinet.

Front View of the I/O Cabinet



12. Place the jack in the hole in the transport bracket on the front of the pallet.
13. Use a drilling machine with the provided hexagonal socket to activate the jack, slide it into position in the bracket, and to lift the pallet to the top position.
14. Loosen the bolts that attach the transport bracket to the pallet and remove the front pallet part.

Front View of the I/O Cabinet



⚠WARNING

HAZARD OF SERIOUS INJURY

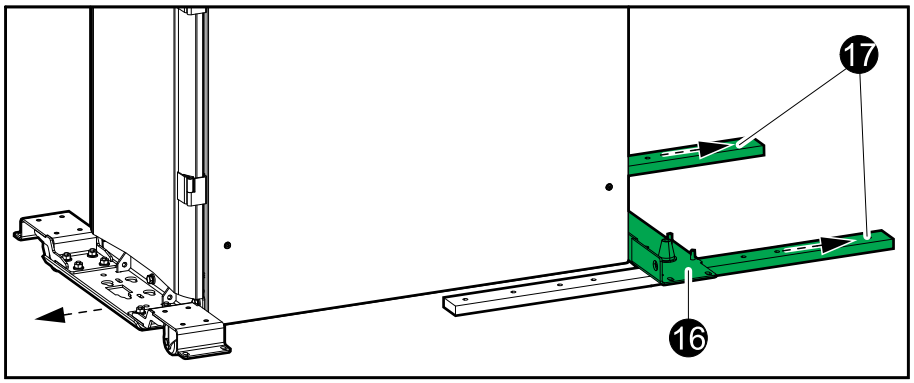
Do not put your hands or feet under the pallet while removing the wooden side part.

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

15. Use the jack to lower the cabinet onto the floor until the wheels connect with the floor. Remove the jack and the floor protection plate.

16. Remove the rear anchor.

Side View of the I/O Cabinet



17. Wheel the cabinet away and remove the remaining pallet parts. The cabinet can now be moved on the built-in wheels to the installation area.

⚠WARNING

HAZARD OF SERIOUS INJURY

Be carefully of uneven floors and doorsteps when moving the cabinet on its wheels to avoid overbalancing and tipping the cabinet.

Remove the Power Cabinets from the Pallet

⚠CAUTION

HAZARD OF EQUIPMENT DAMAGE

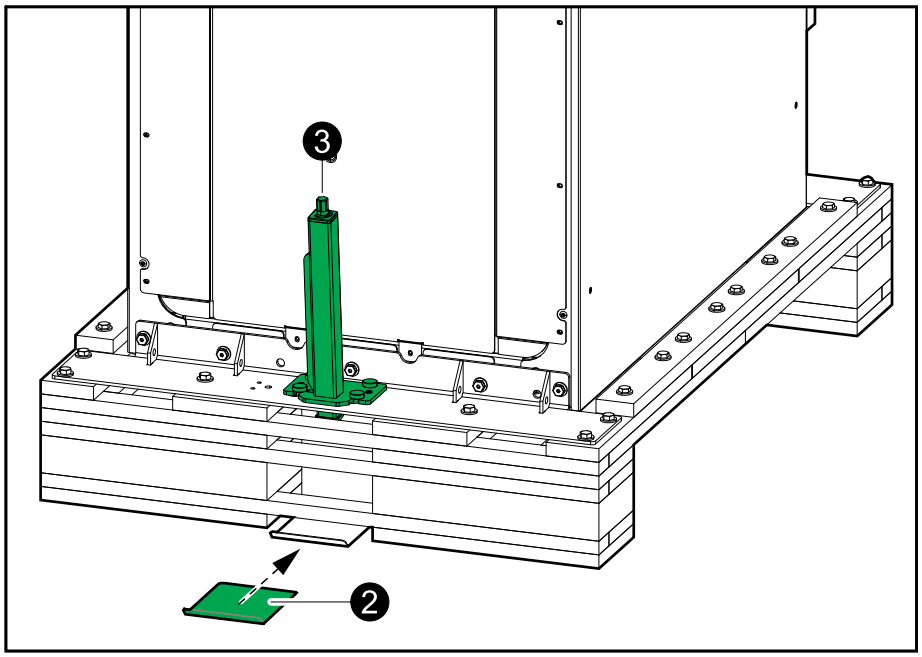
Ensure that the floor is level and can support the weight of the jack when it carries the cabinet.

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

1. Take the installation kit 0M-816661 shipped on the I/O cabinet pallet. Use the jack and the floor protection plate in the kit for all cabinets in this procedure.

2. Place the floor protection plate under the pallet on the rear of the cabinet.

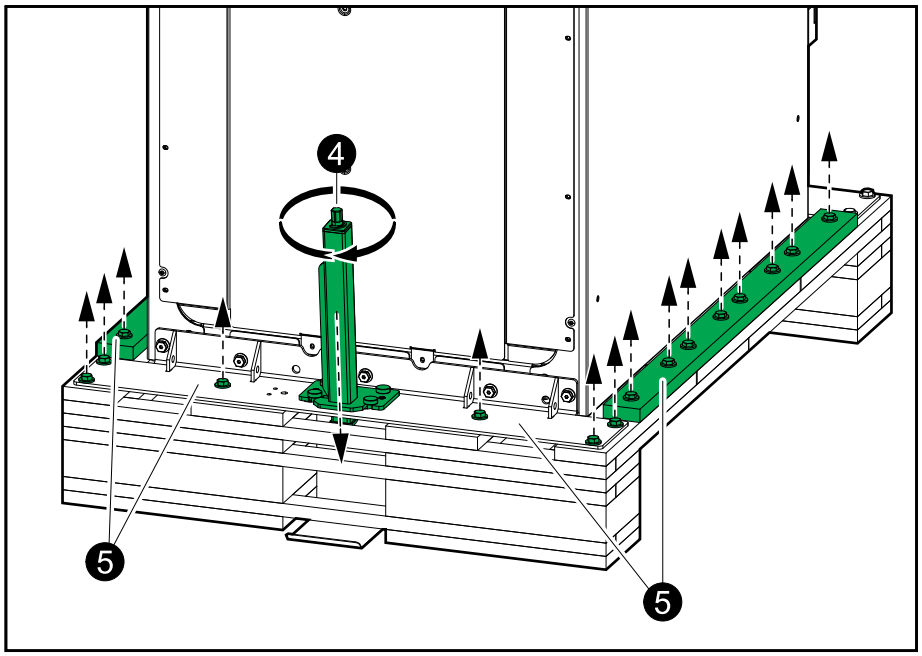
Rear View of the Power Cabinet



3. Place the jack from the installation kit in the hole in the transport bracket on the rear of the cabinet.
4. Use a drilling machine with the provided hexagonal socket to activate the jack, slide it into position in the bracket, and to lift the pallet to the top position.

   NOTE: Reduce the drill torque to minimum to prevent kickback.

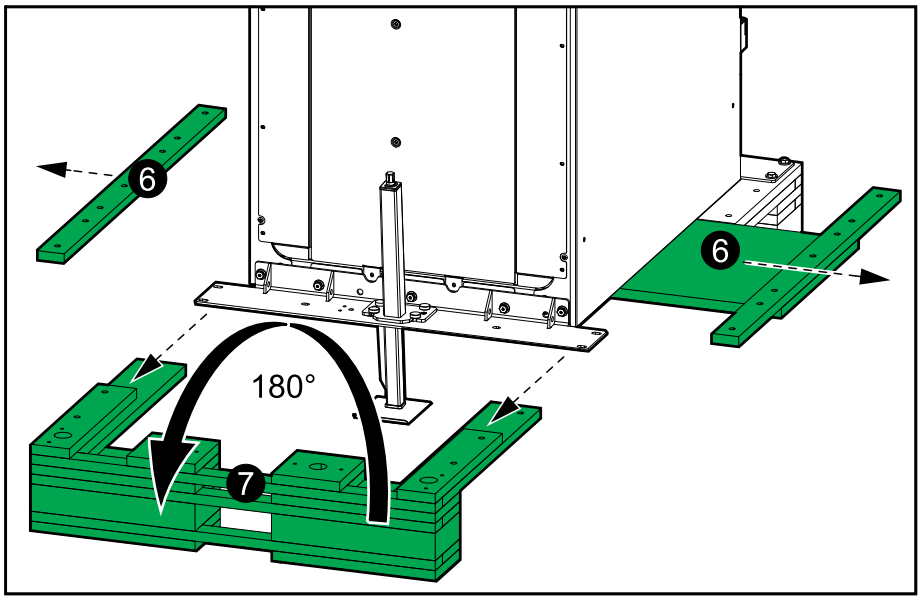
Rear View of the Power Cabinet



5. Loosen and remove the bolts shown on the drawing that attach the transport bracket and the wooden plates to the pallet.

6. Remove the wooden side parts of the pallet and the bottom plate.

Rear View of the Power Cabinet



⚠WARNING

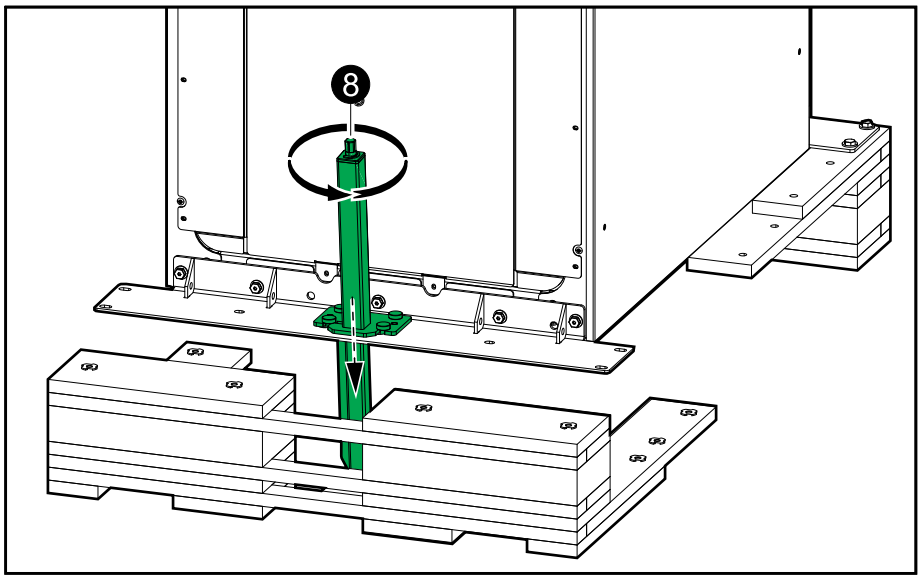
HAZARD OF SERIOUS INJURY

Do not put your hands or feet under the pallet while removing the wooden side part.

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

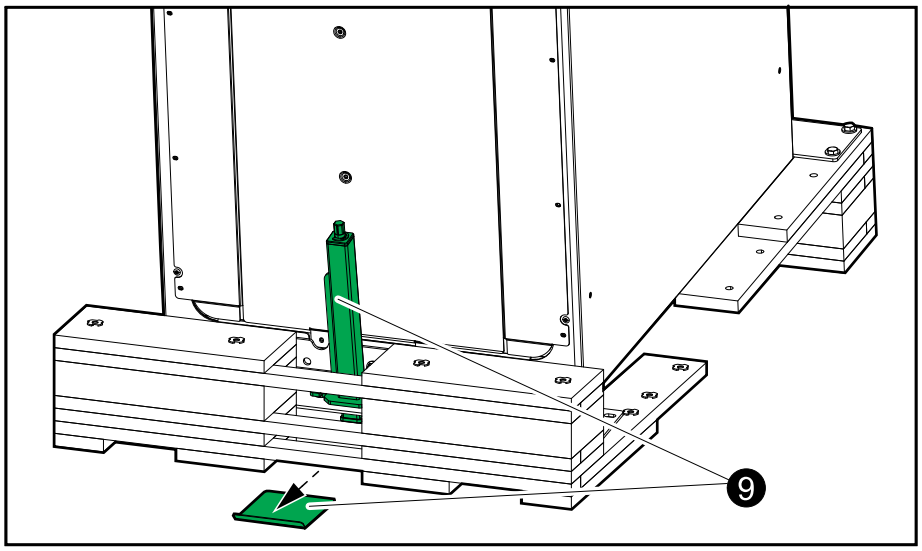
7. Turn the wooden part 180 degrees and place it under the metal bracket as a support.
8. Lower the cabinet down onto the support using the jack and the drilling machine.

Rear View of the Power Cabinet



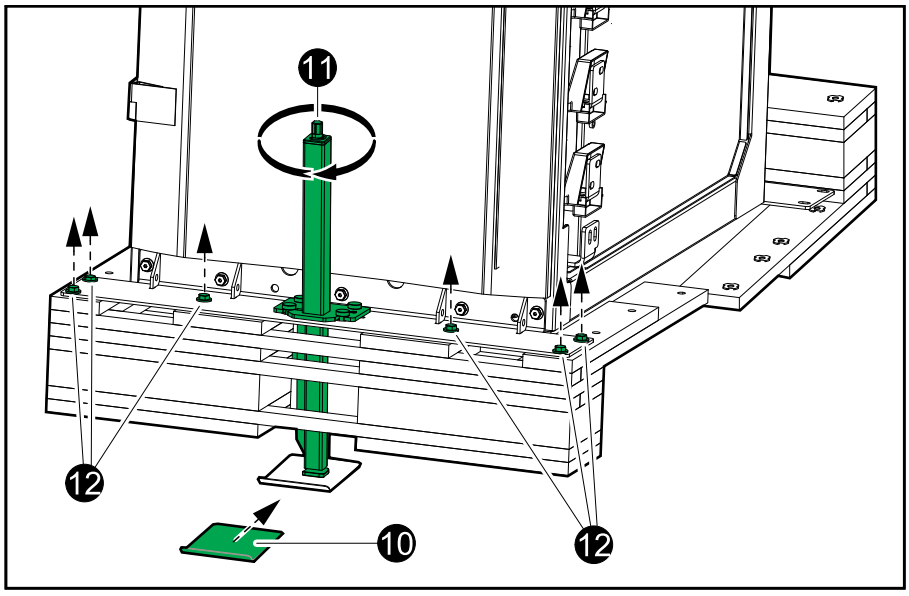
9. Remove the floor protection plate and the jack.

Rear View of the Power Cabinet



10. Place the floor protection plate under the pallet on the front of the cabinet.

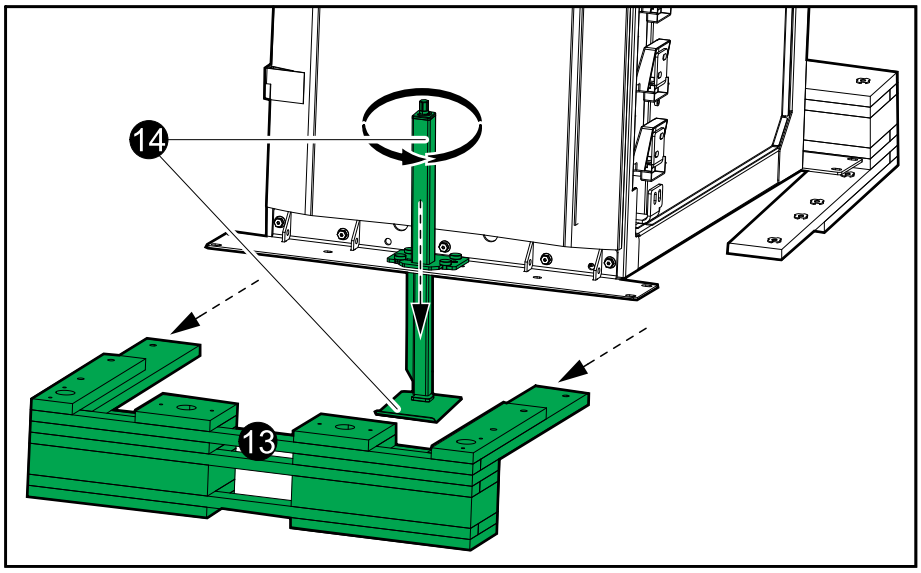
Front View of the Power Cabinet



11. Place the jack in the hole in the transport bracket on the front of the pallet. Use a drilling machine with the provided hexagonal socket to activate the jack, slide it into position in the bracket, and to lift the pallet to the top position.
12. Loosen and remove the bolts that fasten the transport bracket to the pallet. The number of bolts depends on the cabinet type.

13. Remove the front pallet.

Front View of the Power Cabinet



⚠WARNING

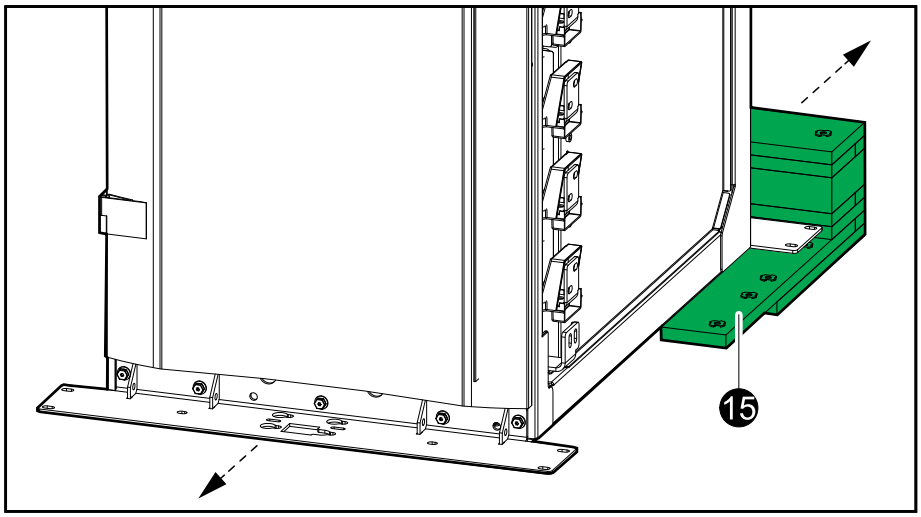
HAZARD OF SERIOUS INJURY

Do not put your hands or feet under the pallet while removing the wooden plate.

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

14. Use the jack to lower the cabinet onto the floor until the wheels connect with the floor. Remove the jack and the floor protection plate.
15. Wheel the cabinet away and remove the remaining pallet parts. The cabinet can now be moved on the built-in wheels to the installation area.

Front View of the Power Cabinet



⚠WARNING

HAZARD OF TILTING

Be carefully of uneven floors and doorsteps when moving the cabinet on its wheels to avoid overbalancing and tipping the cabinet.

Mount the Rear Anchoring Brackets for the I/O Cabinet and the Power Cabinet

⚠DANGER

HAZARD OF TILTING

All front and rear anchoring brackets must be installed.

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

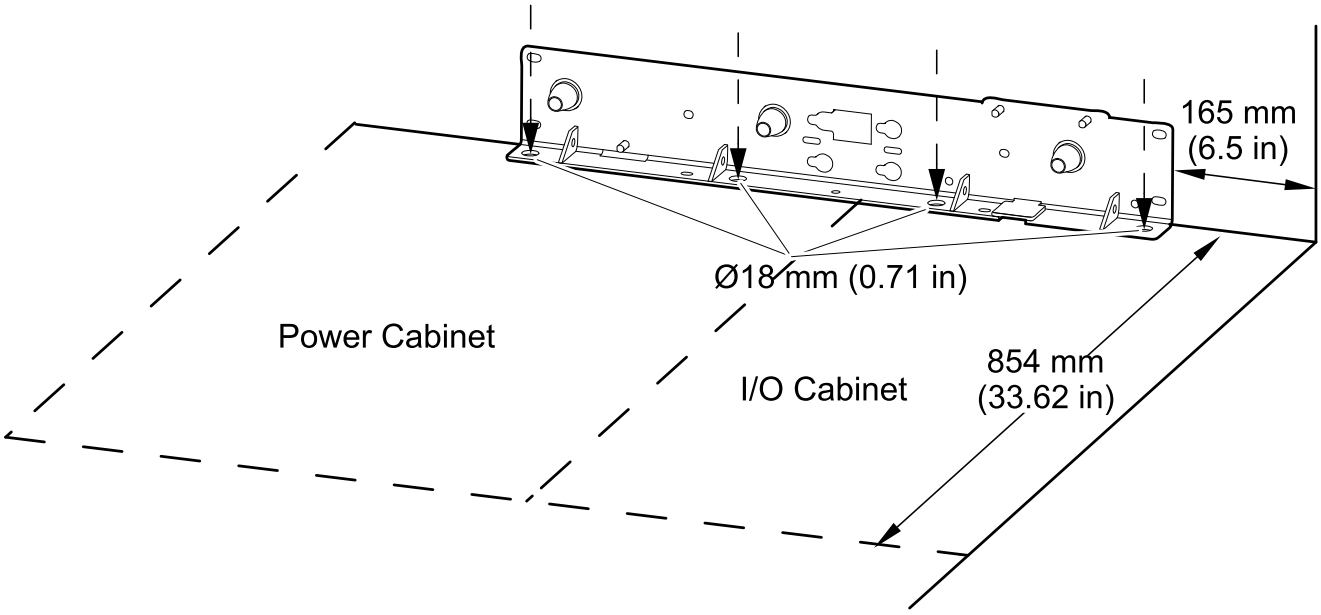
⚠DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

Leave the UPS system covered while making anchoring holes to prevent dust or other conductive parts in the system.

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

1. Use the rear anchoring bracket that was attached to the rear pallet of the I/O cabinet. Place the rear anchoring bracket in the final installation area and mark the anchoring hole locations on the floor. The minimum distance from the wall to the right side of the bracket is 165 mm to allow for the installation of the I/O cabinet.



2. Drill anchoring holes according to national and local requirements.

   NOTE: A minimum of four bolts are required.

3. Mount the rear anchoring bracket to the floor. Bolts are not supplied.
4. Use a bubble-leveler to ensure that the bracket is level. Use the provided leveling shims if necessary.
5. If your installation includes a line-up modular battery cabinet or a line-up classic battery cabinet, mount their respective rear anchoring brackets now. Refer to the installation manual of your specific battery solution.

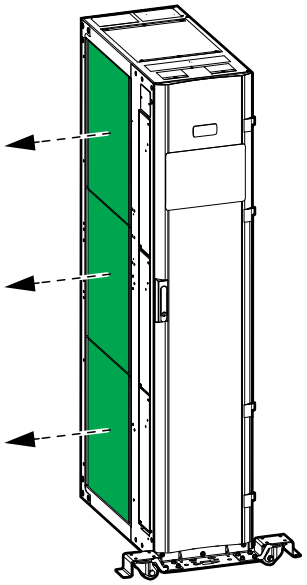
Install the I/O Cabinet

Position the I/O Cabinet

The parts used in this procedure are provided in the installation kits 0M-816654 and 0M-816662.

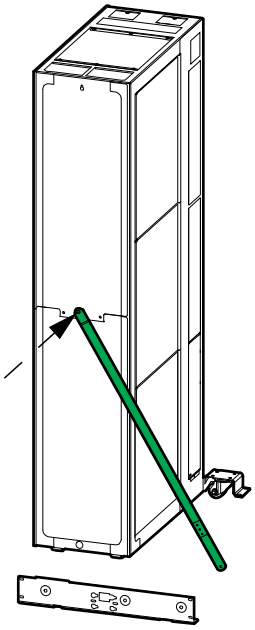
1. Remove the three side covers from the left side of the I/O cabinet and save for later use.

Front View of the I/O Cabinet



2. Before pushing the I/O cabinet up against the wall, the crossbar shipped inside the I/O cabinet must be installed. Guide the crossbar bolt through the rear of the I/O cabinet and fasten it with the provided M8 nut on the inside of the I/O cabinet.

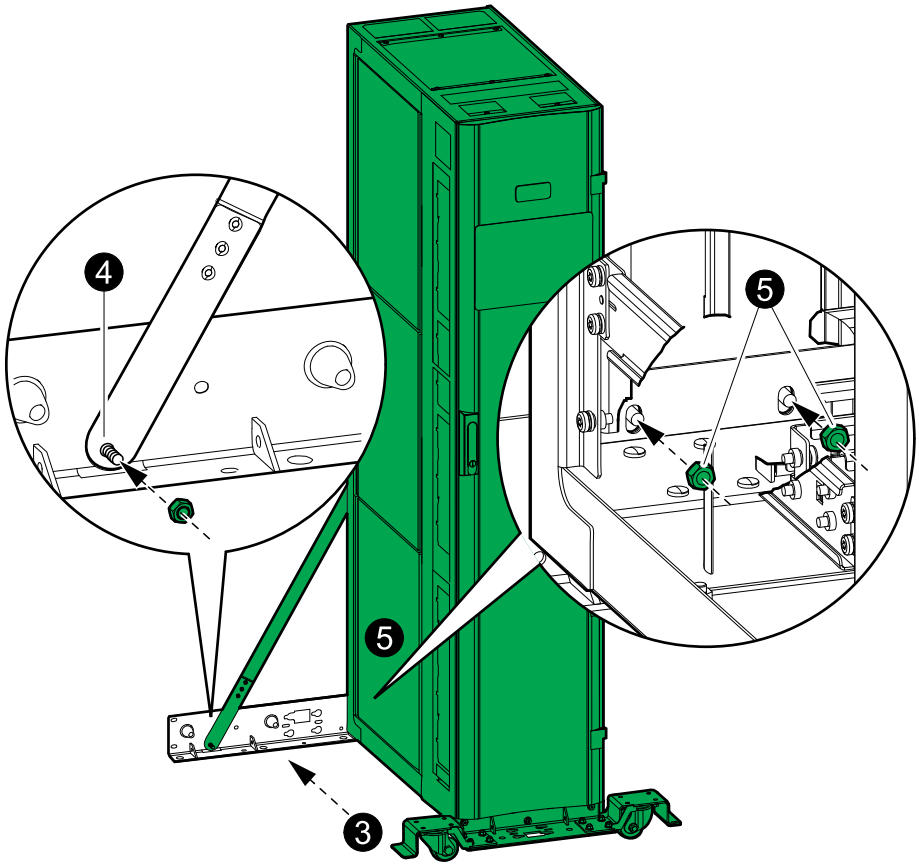
Rear view of the I/O Cabinet



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

   NOTE: If the I/O cabinet is placed up against a wall on the right side, the right wheel on the front bracket can be rotated 90 degrees.

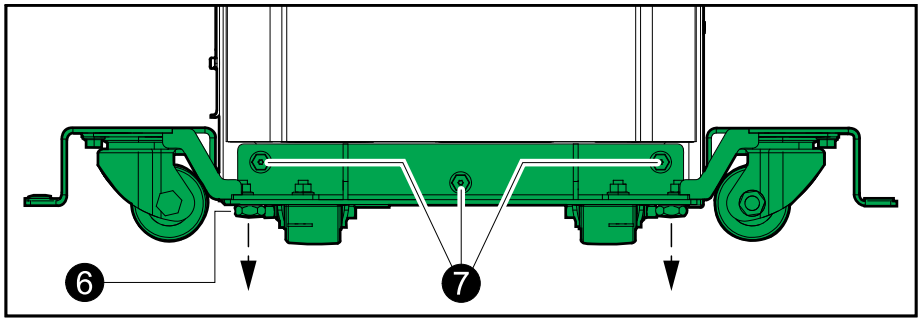
Front View of the I/O Cabinet



4. Fasten the crossbar to the anchoring bracket using the provided M8 nut.
5. Fasten the I/O cabinet with the provided M8 nuts to the rear anchoring bracket through the side of the I/O cabinet.
6. Lower the two cabinet front feet until they connect with the floor — use a bubble-leveler to ensure that the I/O cabinet is level. Use the provided levelling shims if necessary.

   NOTE: If the I/O cabinet is placed up against a wall on the right side, lower the left foot and then remove the right wheel to get access to the right foot.

Front View of the I/O Cabinet



7. Remove the front bracket with wheels from the I/O cabinet.

Connect Power Cables to the I/O Cabinet

Prepare for Cables in a Top Cable Entry System

⚠ DANGER

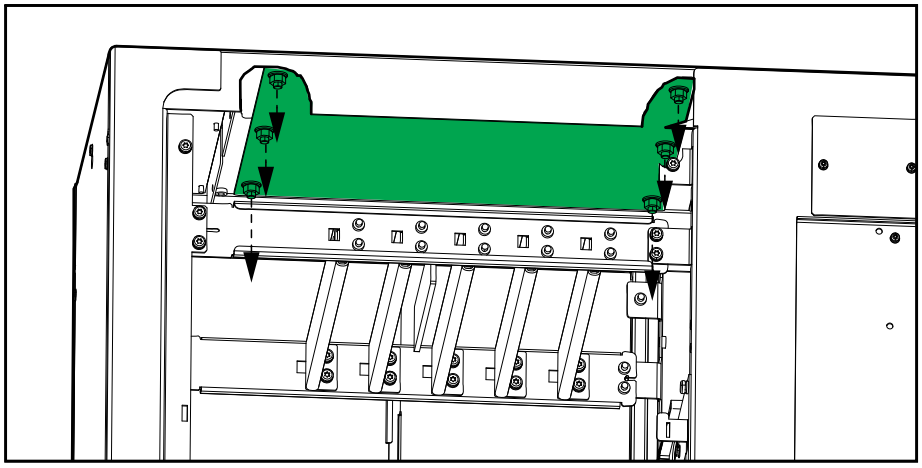
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not drill or cut holes for cables or conduits with the 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.

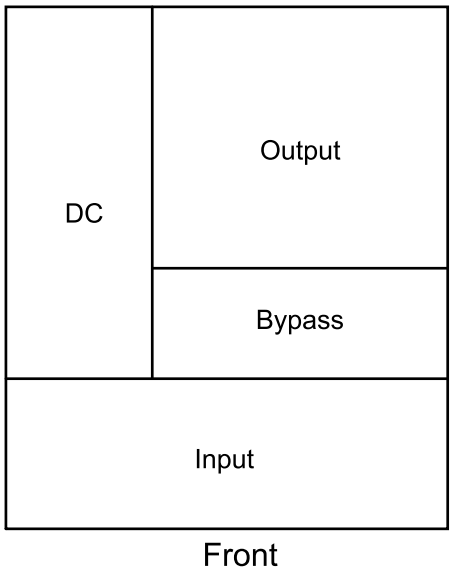
1. Loosen the bolts from the top gland plate of the I/O cabinet and remove the gland plate.

Side View of the I/O Cabinet



2. Drill or cut holes for conduits in the top gland plate according to these guidelines:

Top View of the Top Gland Plate



3. Install conduits and refit the gland plate.

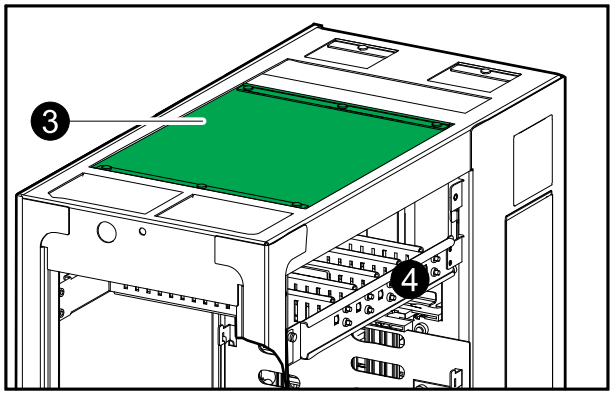
⚠DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION, OR ARC FLASH

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

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

Rear View of the I/O Cabinet



4. Route the cables through the ladder in the following order from front to back: input cables, bypass cables (optional), output cables and battery cables.

Prepare for Cables in a Bottom Cable Entry System

⚠DANGER

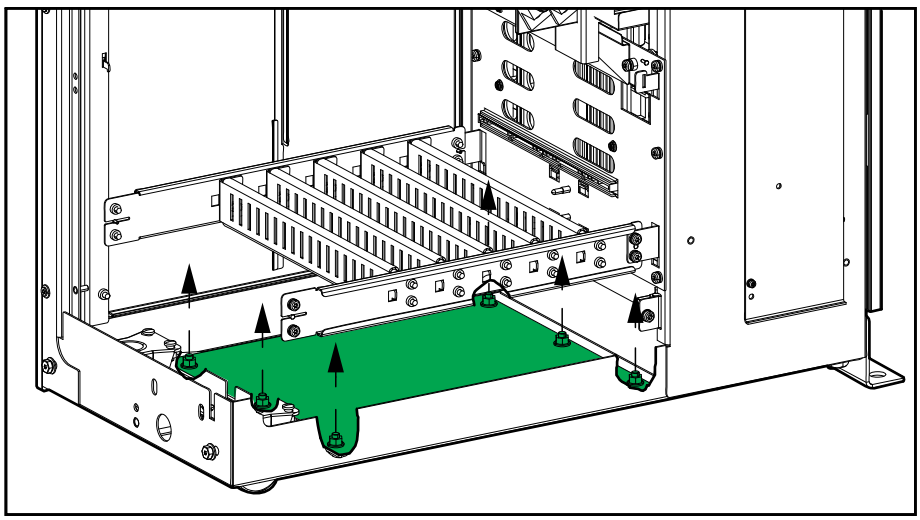
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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.

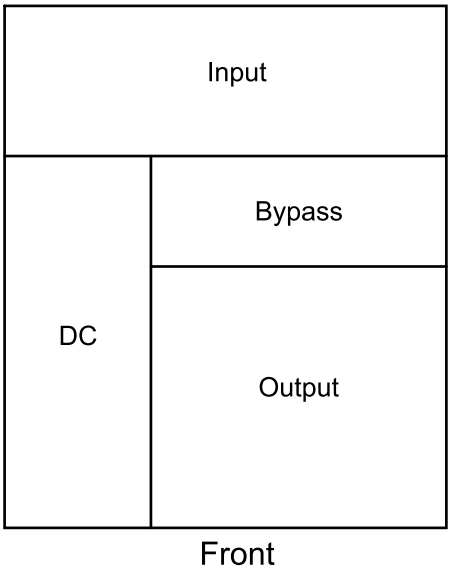
1. Loosen the bolts from the bottom gland plate of the I/O cabinet and remove the bottom gland plate.

Side View of the I/O Cabinet



2. Drill or cut holes for cables/conduits in the bottom gland plate according to the guidelines shown below.

Top View of the Bottom Gland Plate



3. Install conduits and reinstall the bottom gland plate.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

4. Route the cables through the ladder in the following order from front to back: battery cables (if present), output cables, bypass cables (if present), and input cables.

Install Jumper Busbar in 4–Wire Systems

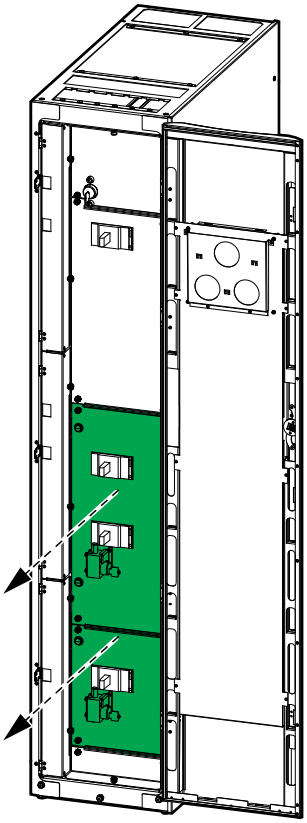
NOTE: This procedure is only applicable to 4–wire systems. The jumper must only be installed when required by local regulations.

NOTE: The jumper is making a bolted connection of the neutral so that the neutral is not disconnected when the 4–pole switches/breakers are opened.

The parts used in this procedure are provided in the installation kit 0N-9763.

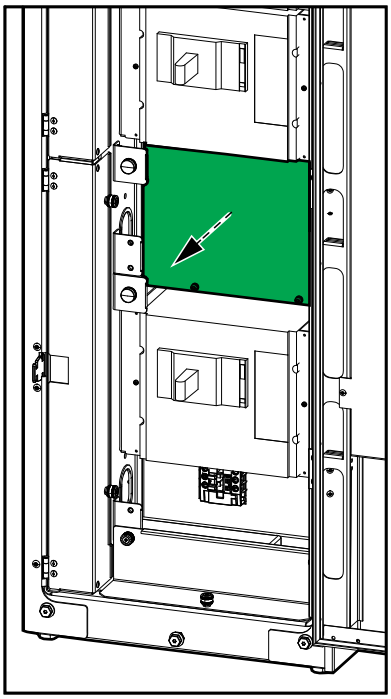
1. Remove two bottom dead front panels from the I/O cabinet.

Front View of the I/O Cabinet



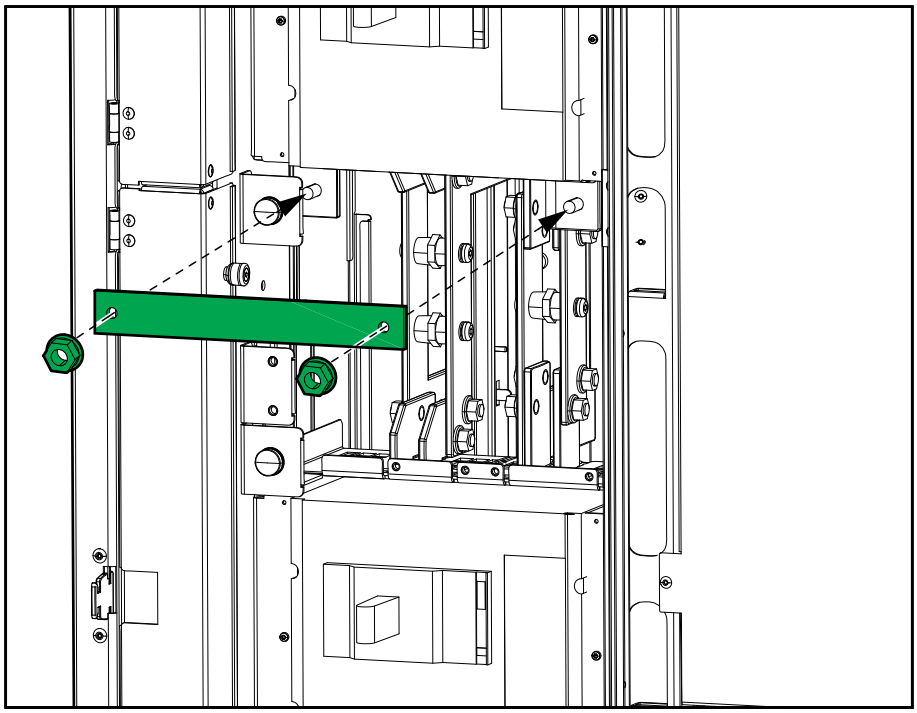
2. Remove the isolation cover.

Front View of the I/O Cabinet



3. Slide the provided jumper busbar over the studs of the busbars and secure using the provided M8 nuts.

Front View of the I/O Cabinet



4. Reinstall the isolation cover and the dead front panel.

Connect Power Cables in a Single Utility/Mains System

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not remove the isolation covers between the busbars. The isolation covers are not shown on the drawings.

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

⚠CAUTION

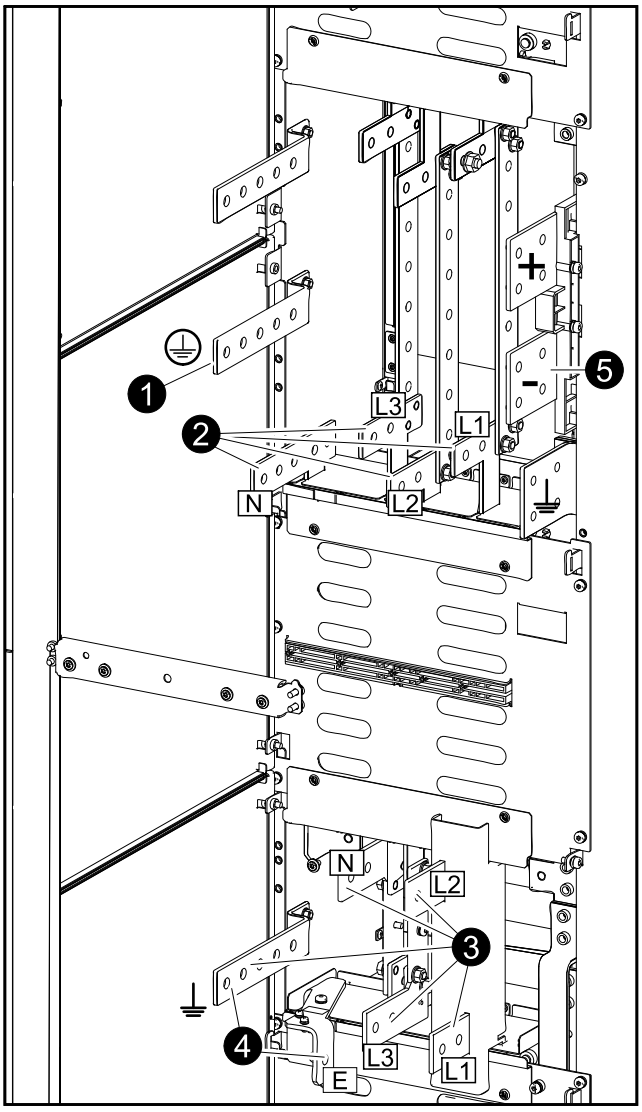
HAZARD OF EQUIPMENT DAMAGE

When the system is configured as a frequency converter:

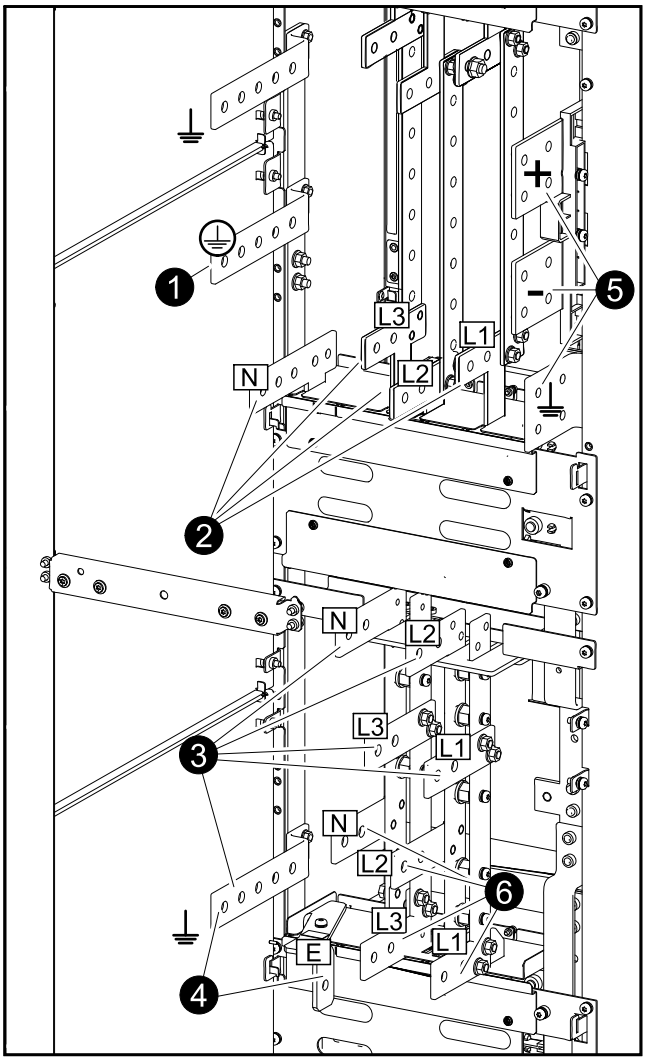
- Only the single I/O cabinet can be used.
- The three single mains busbars must be removed.
- The bypass terminals must not be used.
- The SSIB must be locked in open position before the system is started up.

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

Rear View of the Single I/O Cabinet



Rear View of the 1+1 Redundant I/O Cabinet and the Parallel I/O Cabinet

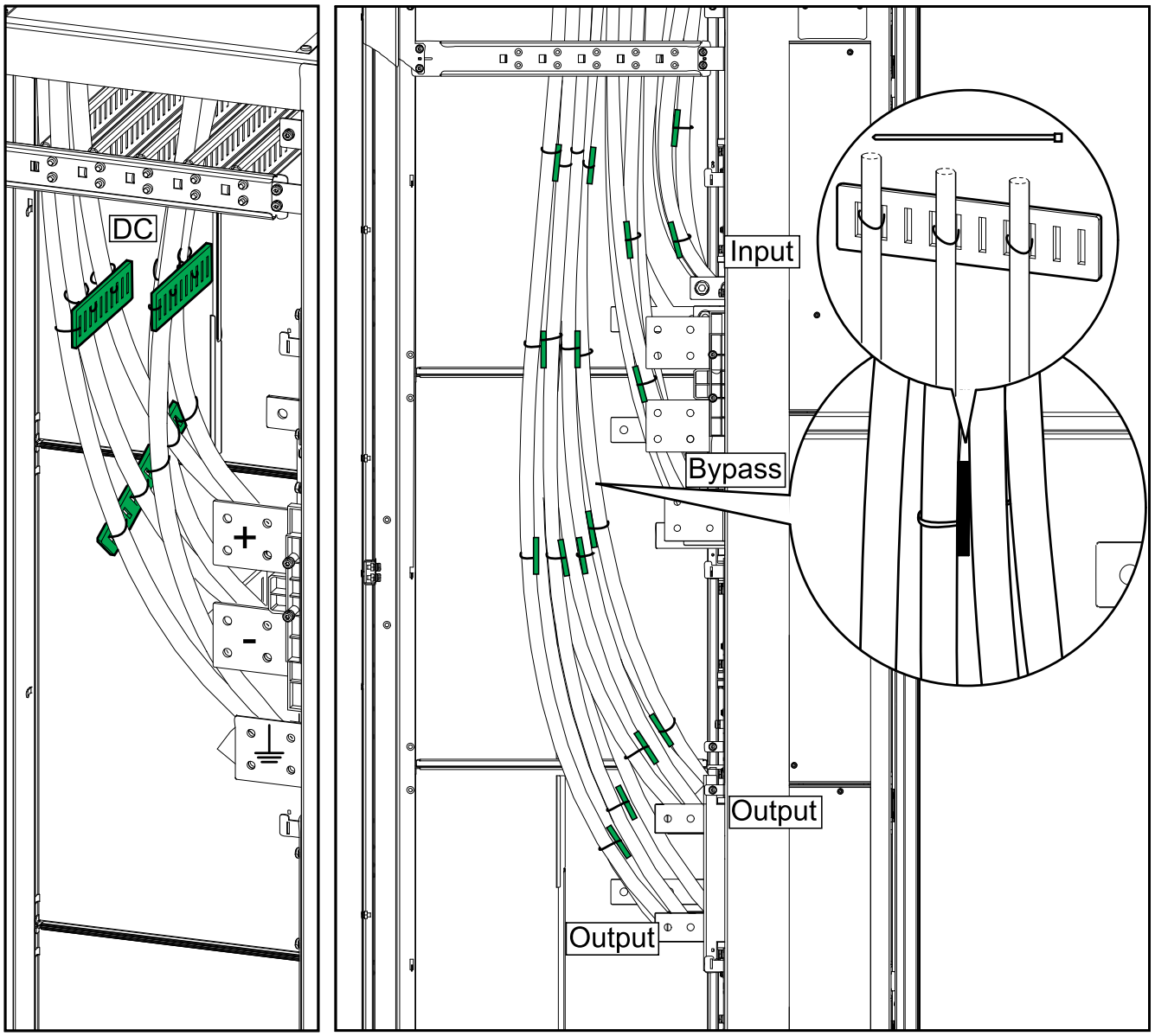


1. Connect the equipment grounding conductor/PE cable to the PE busbar.
2. Connect the AC input cables to the input terminals in the I/O cabinet.
3. Connect the AC output cables to the output terminals in the I/O cabinet.
4. Only applicable to 3–wire systems: Connect one of the following:
   - In high impedance grounding systems, connect an external impedance between the “E” terminal and the output grounding terminal according to NEC 1214 article 250.36.

     NOTE: For high impedance grounding systems, the installation must include a ground-fault detection circuitry.
   - In low impedance grounding systems, connect the “E” terminal to the output grounding terminal. The size of the cable must be the same as the input cable.
5. Only applicable to systems with remote batteries or a battery breaker box: Connect the battery cables to the battery terminals in the I/O cabinet.
6. Only applicable to parallel systems:
   - In parallel systems with system bypass cabinet: Connect the UPS output cables to the terminals in the system bypass cabinet
   - In 1+1 parallel systems: Connect the output cables from the single I/O cabinet to the terminals in the 1+1 I/O cabinet.

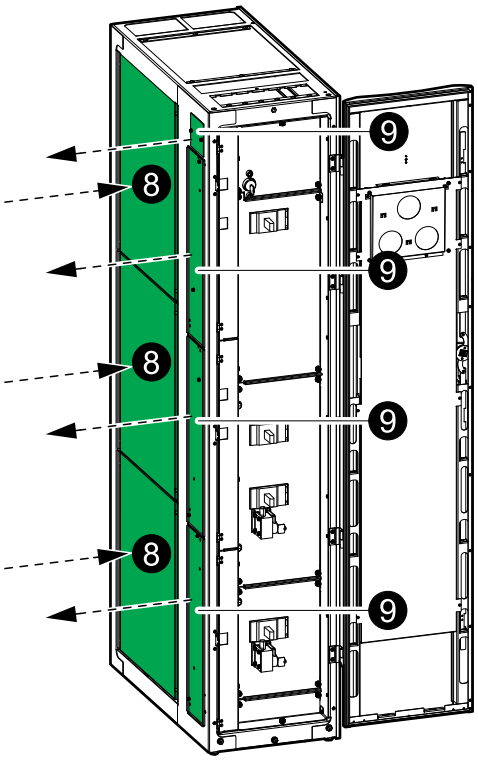
7. Fasten the cables to the provided cable reliefs using the cable ties. Use:
   - Two cable reliefs for input cables
   - Six cable reliefs for output cables
   - Three cable reliefs for battery cables
   - In 1+1 systems: Six cables reliefs for 1+1 output cables

Side View of the I/O Cabinet



8. Reinstall the three side covers on the left side of the I/O cabinet.

Front View of the I/O Cabinet



9. Remove the four covers protecting the busbars.
10. Lock out/tag out the MBB, UIB, SSIB, and UOB breakers with the provided locking device.
11. Lock out/tag out the battery breakers in the selected battery solution.

Connect Power Cables in a Dual Utility/Mains System

⚠ DANGER

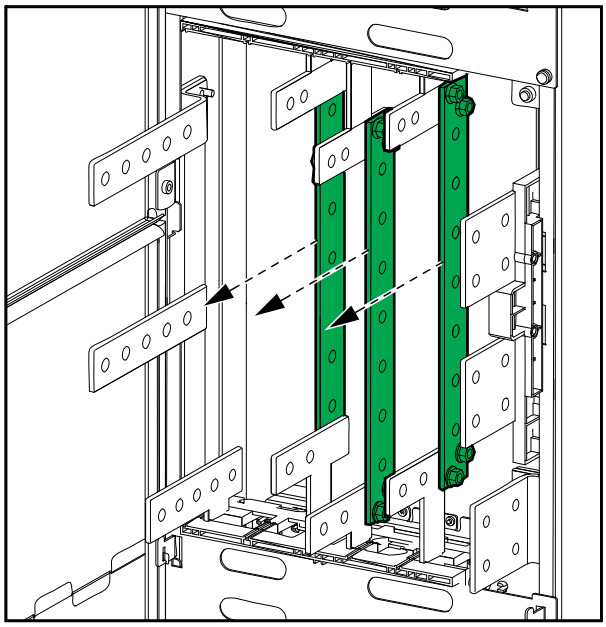
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not remove the isolation covers between the busbars. The isolation covers are not shown on the drawings.

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

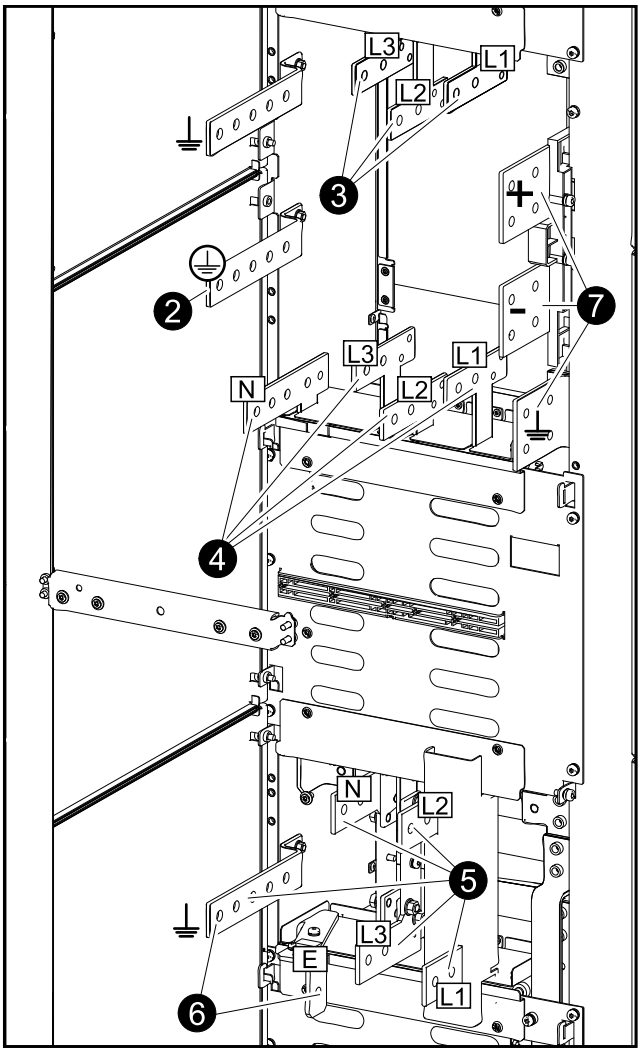
1. Remove the single utility/mains busbars.

Rear View of the I/O Cabinet

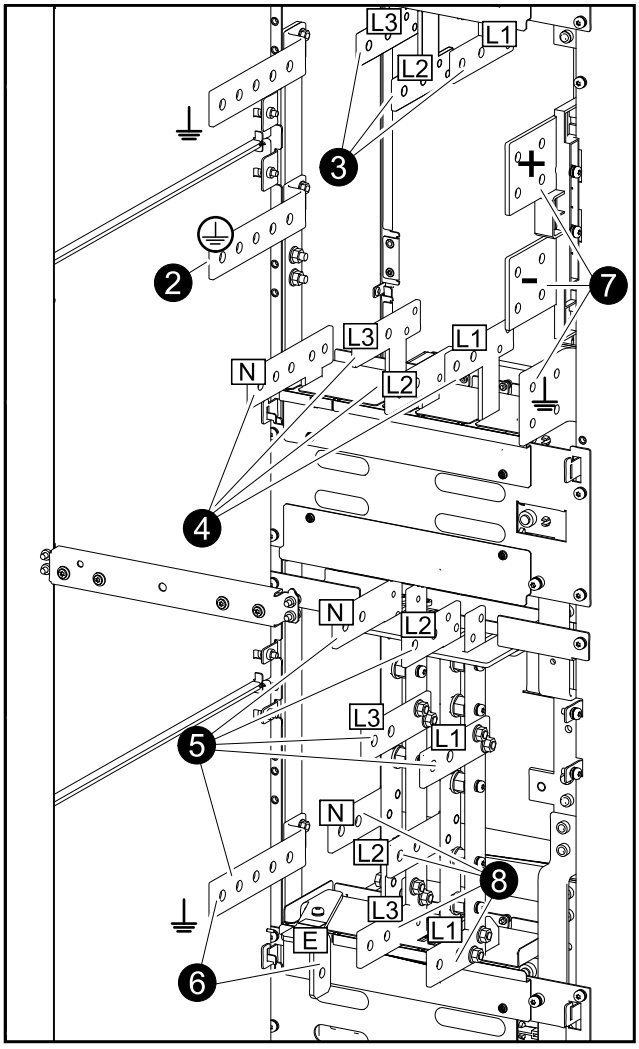


2. Connect the equipment grounding conductor/PE cable to the PE busbar.

Rear View of the Single I/O Cabinet



Rear View of the 1+1 Redundant I/O Cabinet and the Parallel I/O Cabinet



3. Connect the AC input cables to the input terminals in the I/O cabinet.
4. Connect the AC bypass cables to the bypass terminals in the I/O cabinet.
5. Connect the AC output cables to the output terminals in the I/O cabinet.
6. Only applicable to 3–wire systems: Connect one of the following:
   - In high impedance grounding systems, connect an external impedance between the “E” terminal and the output grounding terminal according to NEC 1214 article 250.36.

     NOTE: For high impedance grounding systems, the installation must include a ground-fault detection circuitry.
   - In low impedance grounding systems, connect the “E” terminal to the output grounding terminal. The size of the cable must be the same as the input cable.
7. Only applicable to systems with remote batteries or a battery breaker box: Connect the battery cables to the battery terminals in the I/O cabinet.
8. Only applicable to parallel systems:
   - In parallel systems with system bypass cabinet: Connect the UPS output cables to the terminals in the system bypass cabinet
   - In 1+1 parallel systems: Connect the output cables from the single I/O cabinet to the terminals in the 1+1 I/O cabinet.

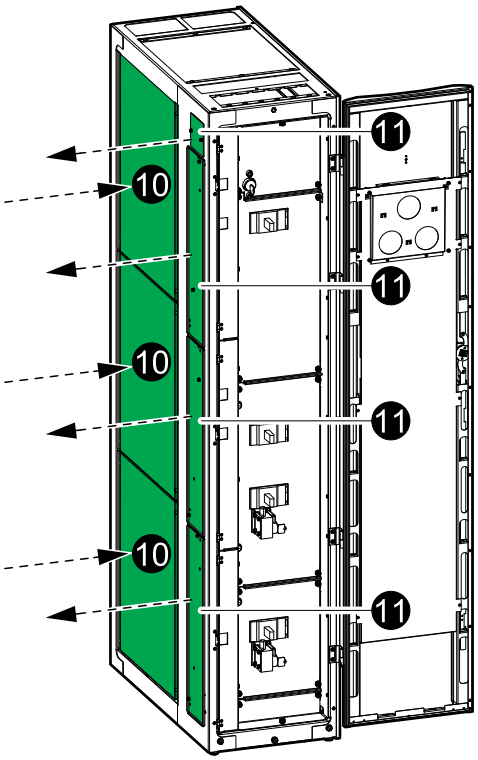
9. Fasten the cables to the provided cable reliefs using the cable ties. Use:
   - Two cable reliefs for input cables
   - Two cable reliefs for bypass cables
   - Six cable reliefs for output cables
   - Three cable reliefs for battery cables
   - In 1+1 systems: Six cable reliefs for 1+1 output cables

Side View of the I/O Cabinet



10. Reinstall the three side covers on the left side of the I/O cabinet.

Front View of the I/O Cabinet

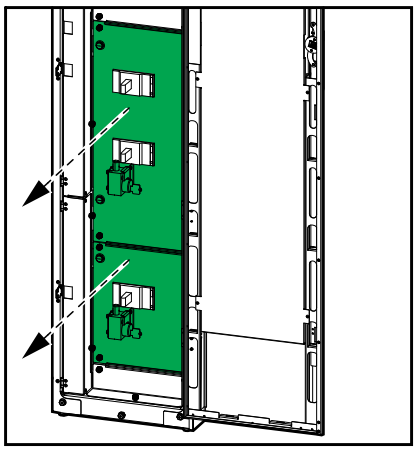


11. Remove the four covers protecting the busbars.
12. Lock out/tag out the MBB, UIB, SSIB, and UOB breakers with the provided locking device.
13. Lock out/tag out the battery breakers in the selected battery solution.

Set the Trip Settings

1. Remove the two bottom dead front panels covering the UOB and the MBB.

Front View of I/O Cabinet



2. Adjust the breaker trip settings at the specific breaker according to:
   - *Trip Settings for Unit Input Breaker (UIB), page 15*
   - *Trip Settings for Static Switch Input Breaker (SSIB), page 16*
   - *Trip Settings for Maintenance Bypass Breaker (MBB), page 16*
   - *Trip Settings for Unit Output Breaker (UOB), page 16*

3. Note down the selected configuration on the name plate in the right side of the I/O cabinet and sign the name plate.
4. Reinstall the two bottom dead front panels.

Install the Power Cabinet

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

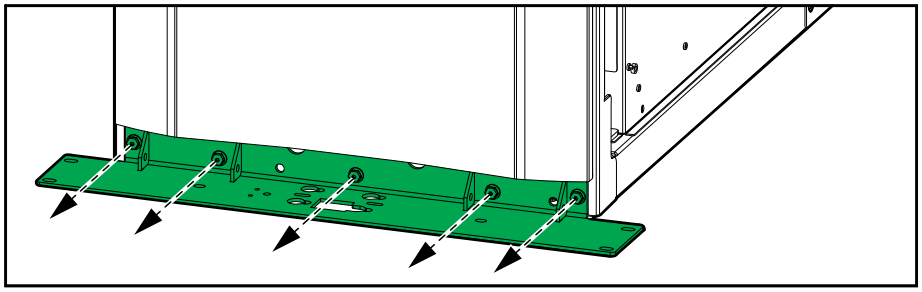
Do not install the power cabinet until all construction work has been completed and the installation room has been cleaned.

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

The parts used in this procedure are provided in the installation kits 0M-816653 and 0M-816654.

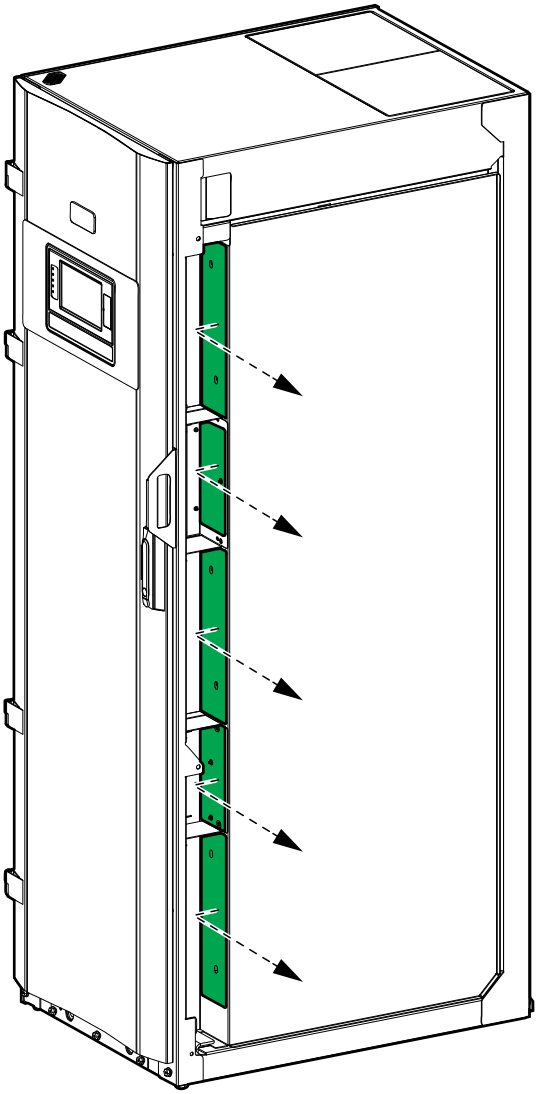
1. Remove the bracket from the bottom of the power cabinet.

Front View of the Power Cabinet



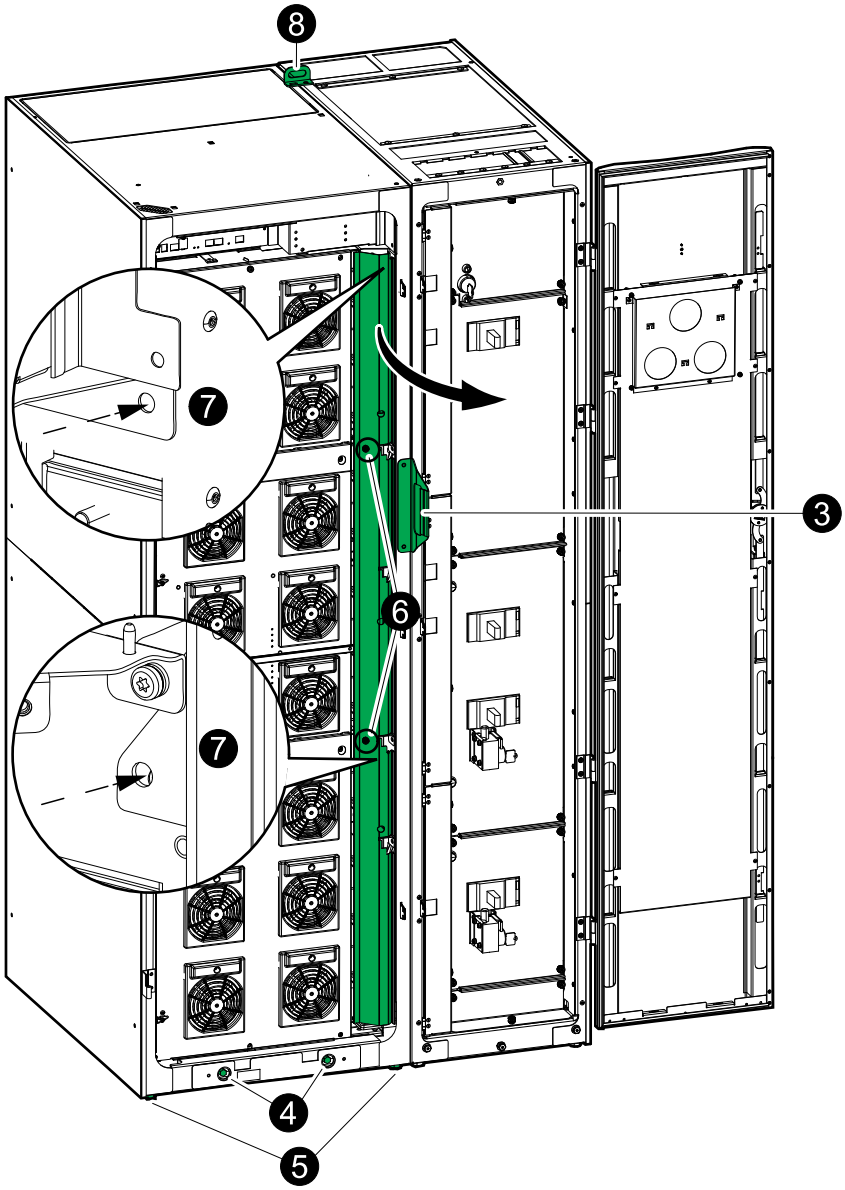
2. Remove the protection covers to get access to the busbars.

Front Right View of the Power Cabinet



3. Using the handle on the front, push the power cabinet into position against the rear anchoring bracket to the left (front view) of the I/O cabinet – the cabinet will connect to the conic outcroppings on the bracket. Remove the handle from the power cabinet by loosening the two screws that hold the handle.

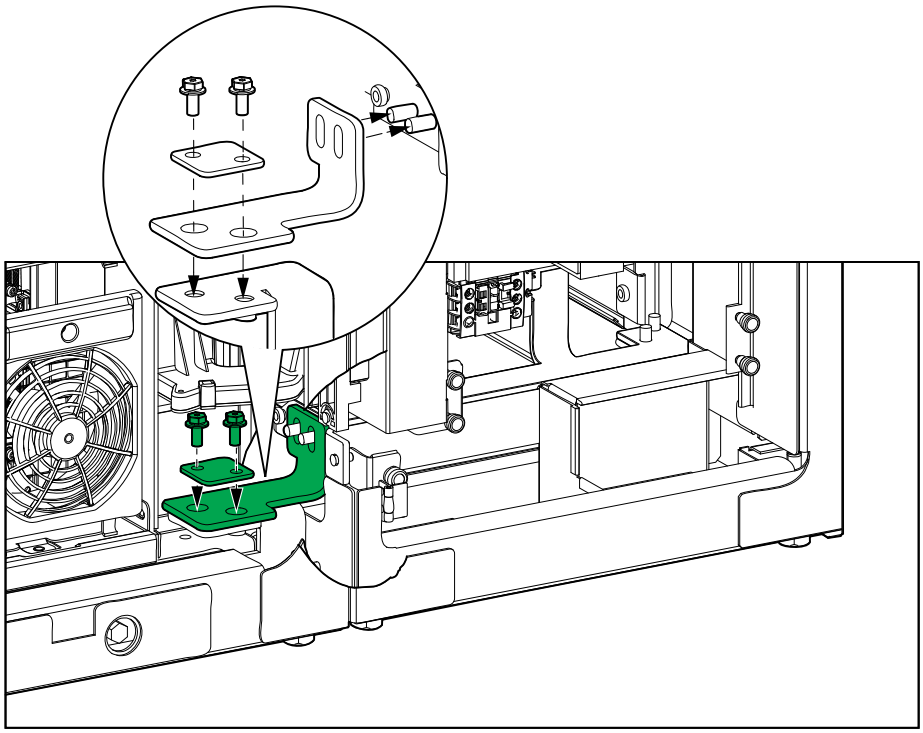
Front View of the Power Cabinet and the I/O Cabinet



4. Fasten the cabinet to the rear anchoring bracket by tightening the two bolts on the front of the power cabinet.
5. Lower the two cabinet front feet until they connect with the floor – use a bubble-leveler to ensure that the cabinets are level. Use the provided levelling shims if necessary.
6. Open the covers in the right side of the power cabinet. The cover can also be lifted off during installation for better access.
7. Mount the two M8 screws from the installation kit in the two marked positions to tighten the two cabinets together.
8. Install the top baying bracket on the top of the cabinets and secure with the two provided M6 x 16 screws.

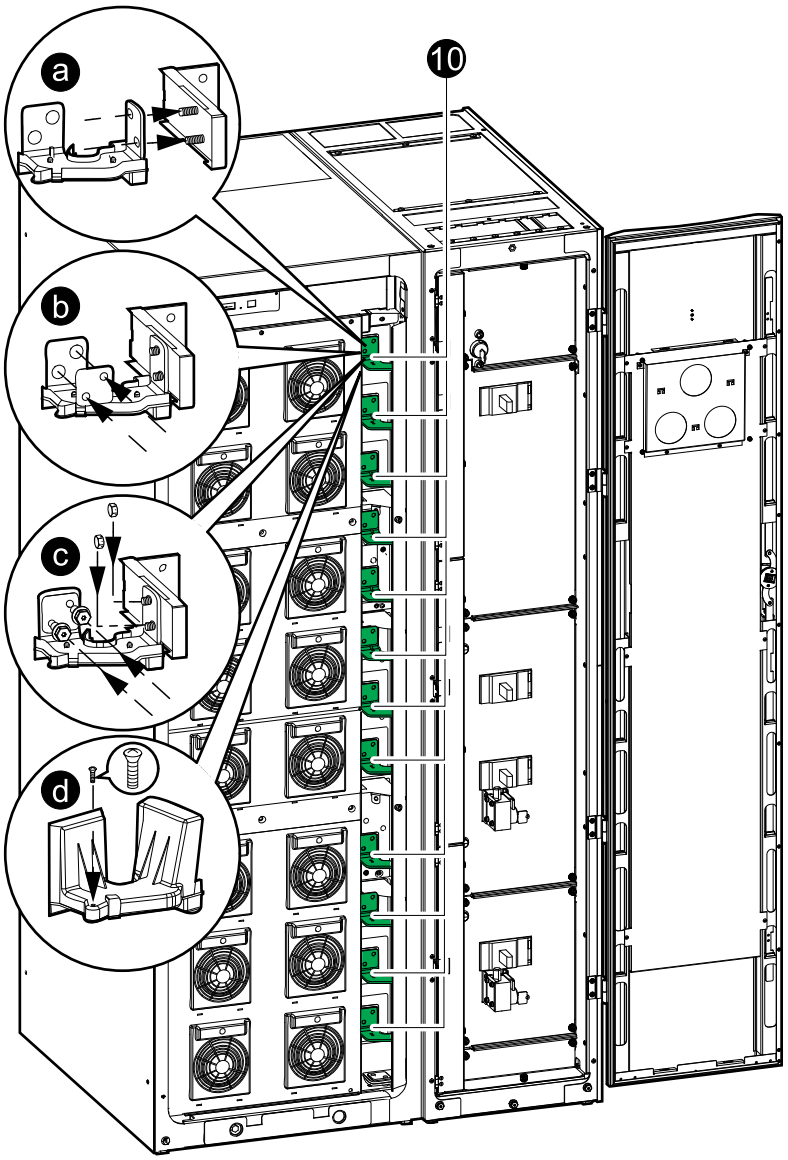
9. Install the PE busbar assembly between the power cabinet and I/O cabinet.

Front View of the Power Cabinet and the I/O Cabinet



10. Install interconnection busbars between the power cabinet and the I/O cabinet:

Front View of the Power Cabinet and the I/O Cabinet



a. Through the side of the power cabinet, slide the busbar on the stays in the I/O cabinet.

b. Place the tolerance busbar up against the connection in the power cabinet.

c. Secure the busbars with the provided screws and nuts.

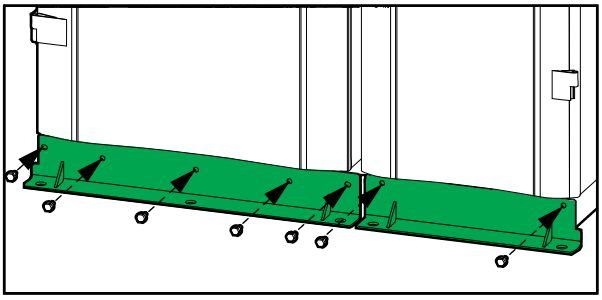
d. Place the top busbar protection over the busbar and secure with the provided 10 mm torx screws in the front left corner of the busbar protection.

11. Re-install all plates and covers removed.

Mount the Front Anchoring Brackets on the I/O Cabinet and Power Cabinet

1. Fasten the front anchoring brackets to the front of the I/O cabinet and the power cabinet using the provided bolts.

Front View of the Power Cabinet and the I/O Cabinet



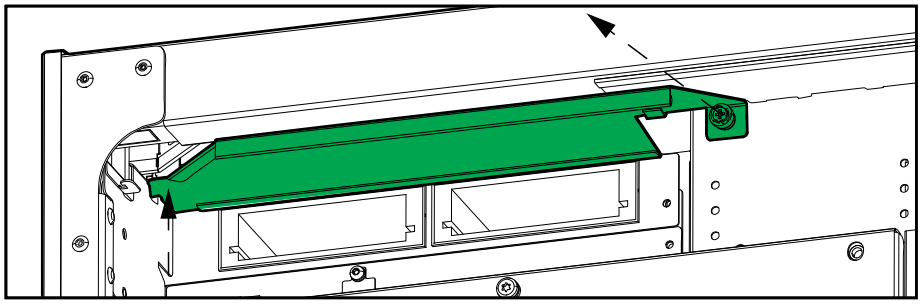
2. Anchor the front anchoring brackets to the floor.

NOTE: Floor anchoring bolts are not supplied.

Connect Communication and Signal Cables between the Power Cabinet and the I/O Cabinet

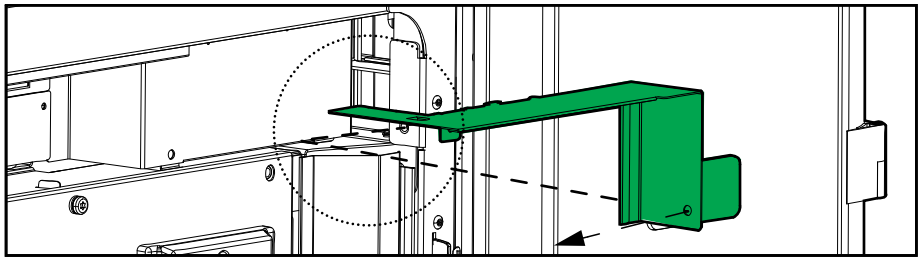
1. Remove the cover plate in the top left side of the power cabinet to get access to the terminals.

Front View of the Power Cabinet



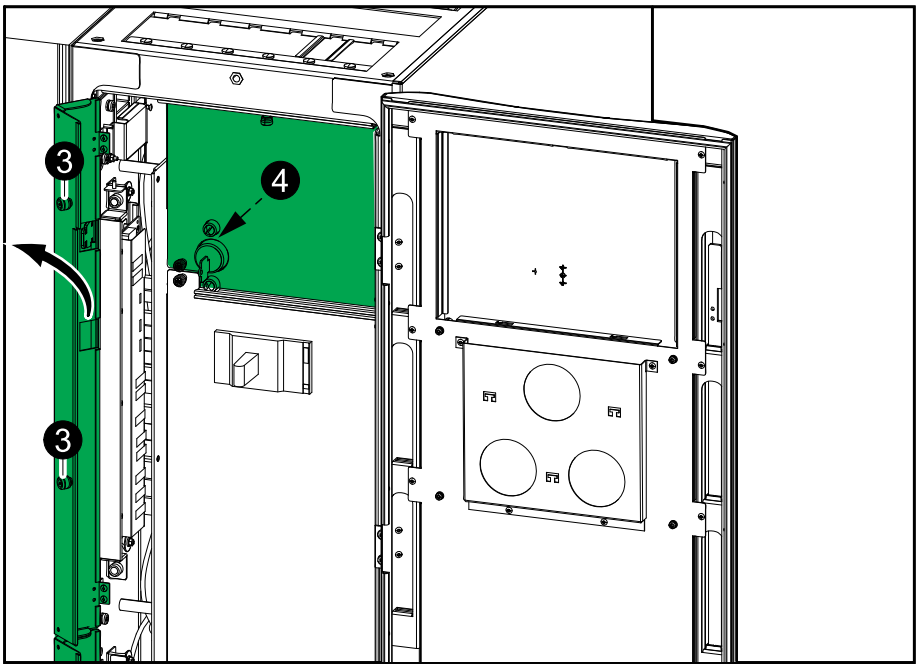
2. Remove the cover plate in the top right side of the power cabinet.

Front View of the Power Cabinet



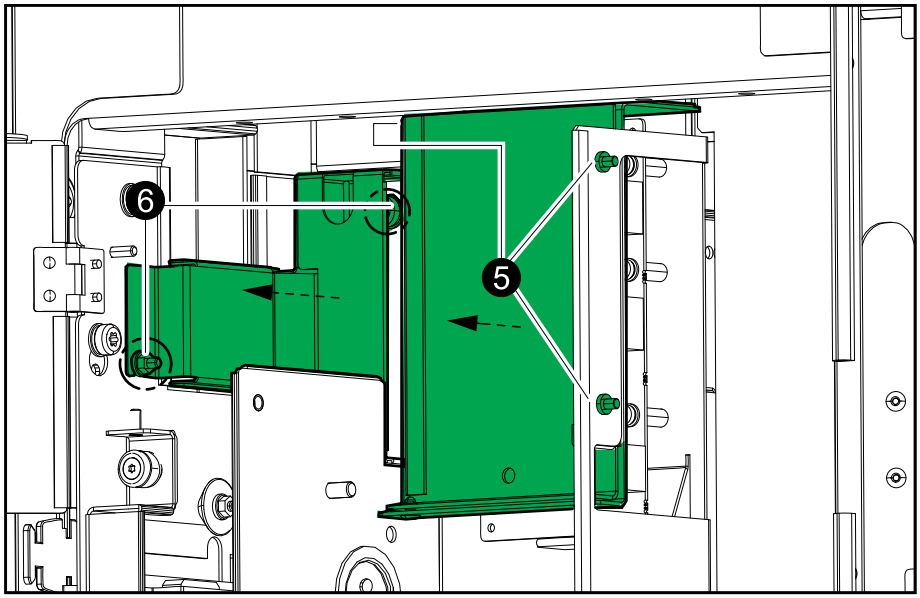
3. Open the cover in the left side of the I/O cabinet.

Front View of the I/O Cabinet



4. Remove the cover plate in the top of the I/O cabinet to get access to the ABUS and PBUS terminals.
5. Loosen the screws and remove the indicated cover.

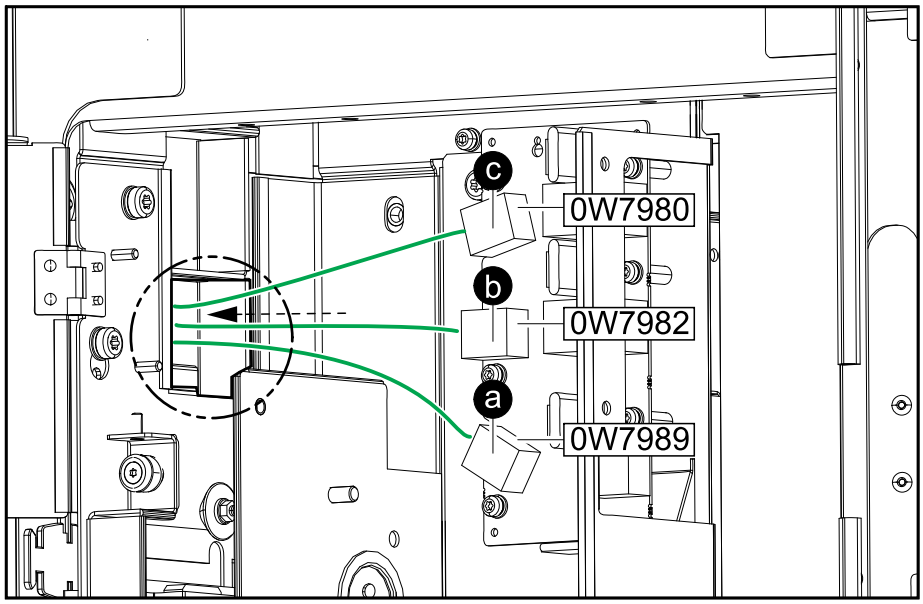
Front View of the I/O Cabinet



6. Loosen the screw and the hex nut and remove the indicated plate to get access to the power cabinet.

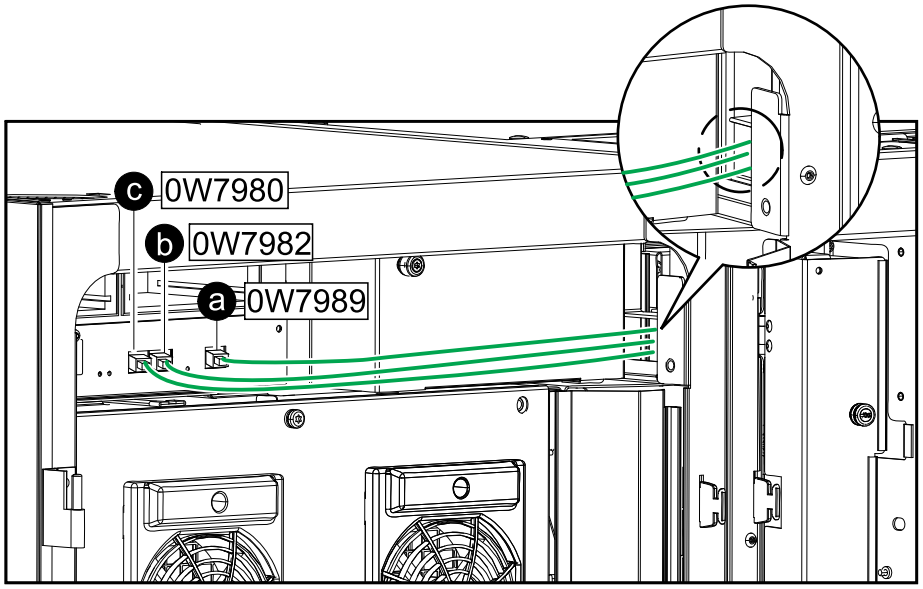
7. Use the ABUS and PBUS cables 0W7989, 0W7980, and 0W7982 from the installation kit 0M-816654:
   a. Connect the ABUS cable 0W7989 to the ABUS terminal in the I/O cabinet.
   b. Connect the PBUS 2 cable 0W7982 to the PBUS 2 terminal in the I/O cabinet.
   c. Connect the PBUS 1 cable 0W7980 to the PBUS 1 terminal in the I/O cabinet.

Front View of the I/O Cabinet



8. Route the ABUS and PBUS cables through the bottom opening between the I/O cabinet and the power cabinet:
   a. Connect the ABUS cable 0W7989 to the ABUS terminal in the power cabinet.
   b. Connect the PBUS 2 cable 0W7982 to the PBUS 2 terminal in the power cabinet.
   c. Connect the PBUS 1 cable 0W7980 to the PBUS 1 terminal in the power cabinet.

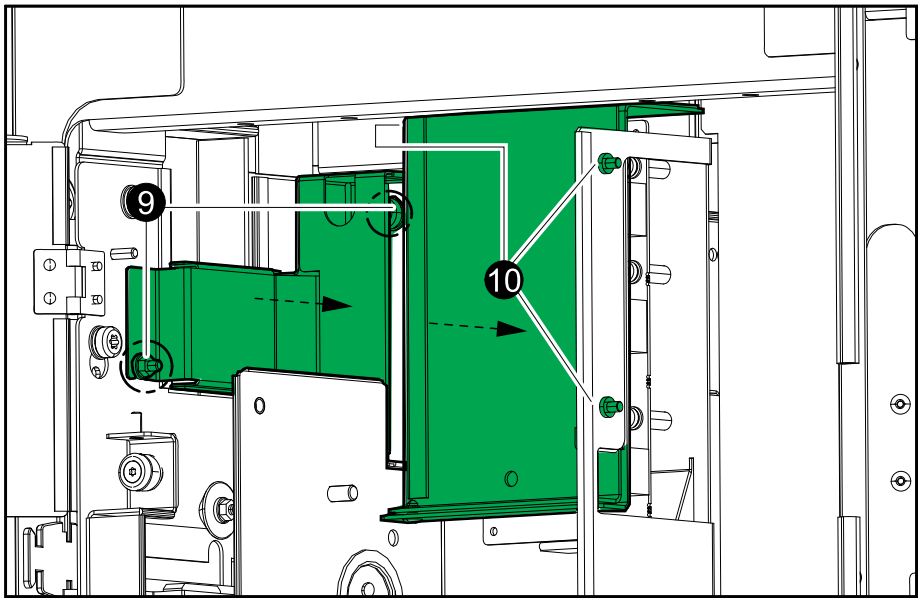
Front View of the Power Cabinet



9. Reinstall the plate and fasten it using the screw and the hex nut.

> **⚠CAUTION**
>
> **HAZARD OF EQUIPMENT DAMAGE**
>
> Ensure that the cables are routed in the channel behind the cover and be careful not to squeeze the cables.
>
> **Failure to follow these instructions can result in injury or equipment damage.**

Front View of the I/O Cabinet

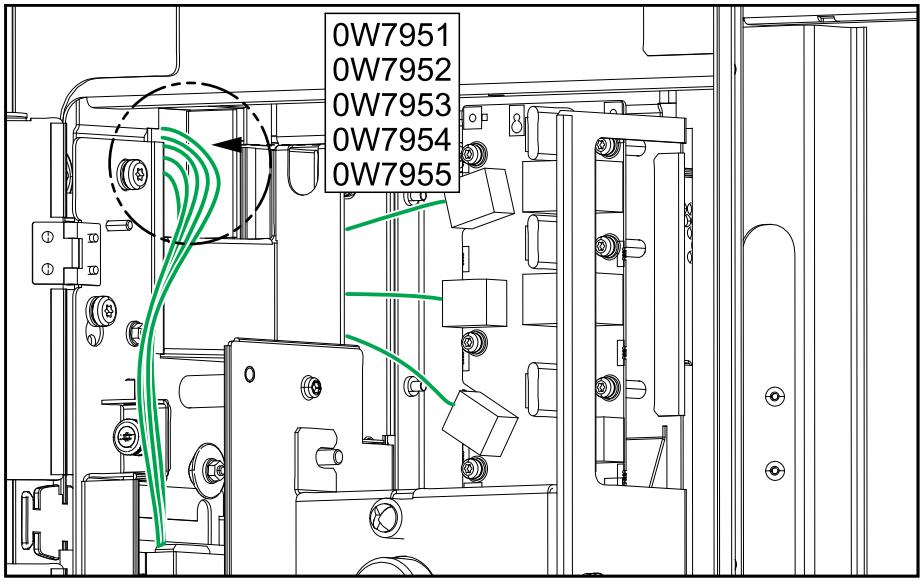


10. Reinstall the cover and fasten it using the screws.

    NOTE: For parallel systems, do not install the cover until the PBUS cables between parallel units have been connected.

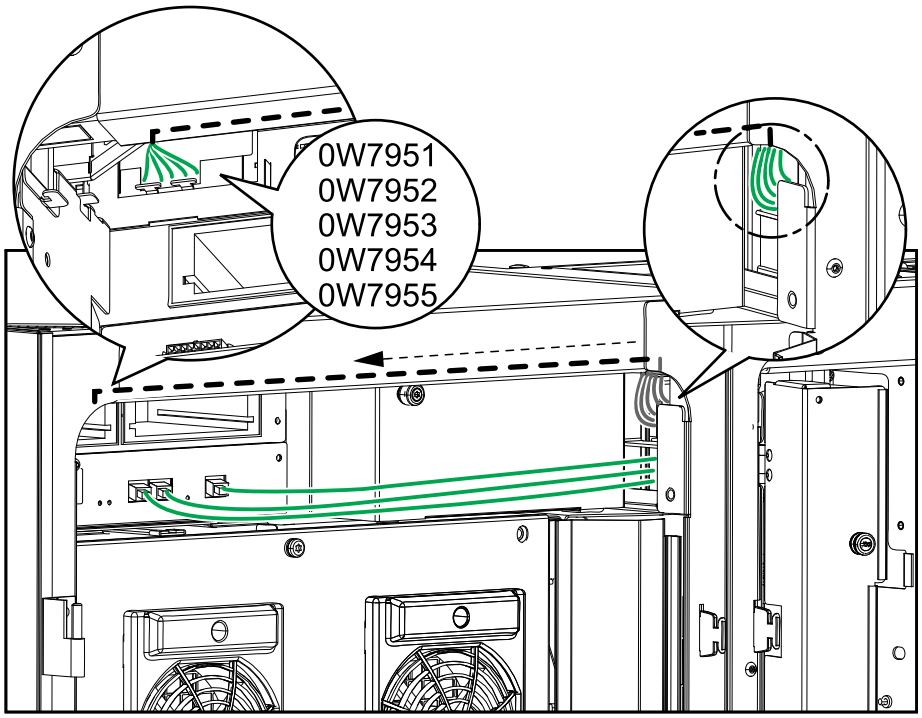
11. Route the signal cables 0W7951, 0W7952, 0W7953, 0W7954, and 0W7955 that are connected in the I/O cabinet through the top opening between the I/O cabinet and the power cabinet.

Front View of the I/O Cabinet



12. Connect the signal cables to the terminals in the top left corner of the power cabinet.

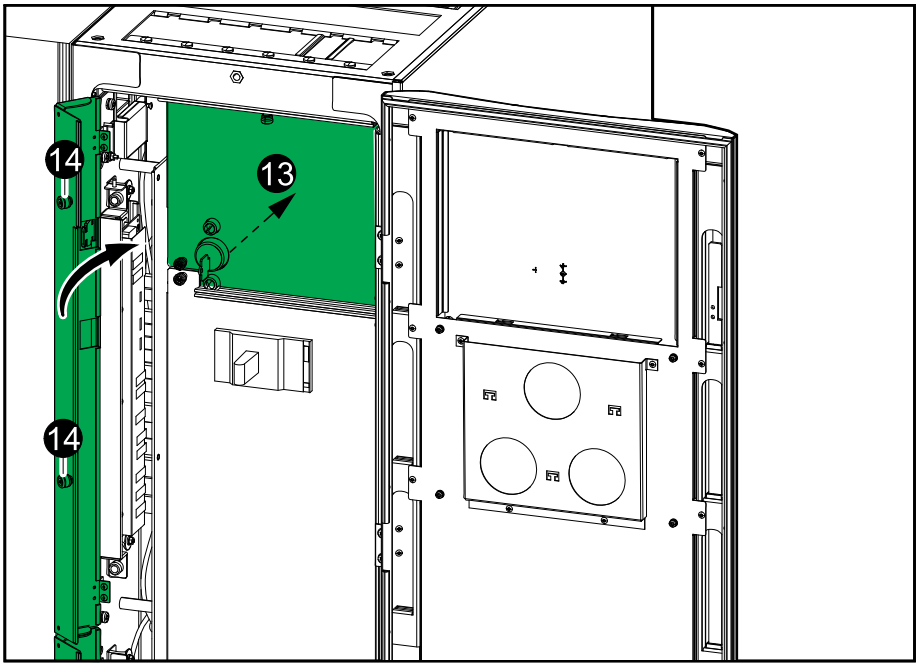
Front View of the Power Cabinet



13. Reinstall the cover plate removed in the top of the I/O cabinet in step 4.

NOTE: For parallel systems, do not install the cover until the PBUS cables between parallel units have been connected.

Front View of the I/O Cabinet

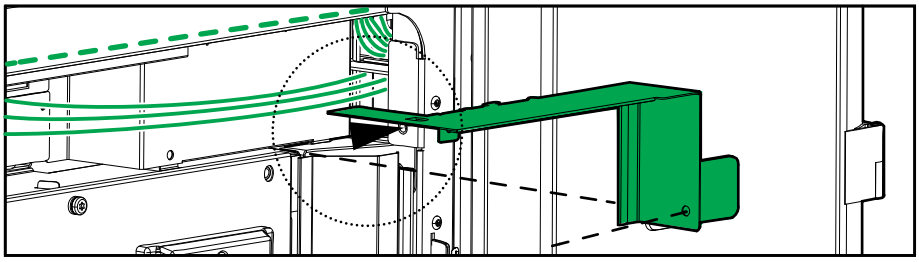


14. Close the cover that was opened in step 3 in the left side of the I/O cabinet.

15. Reinstall the cover plate in the right side of the power cabinet.

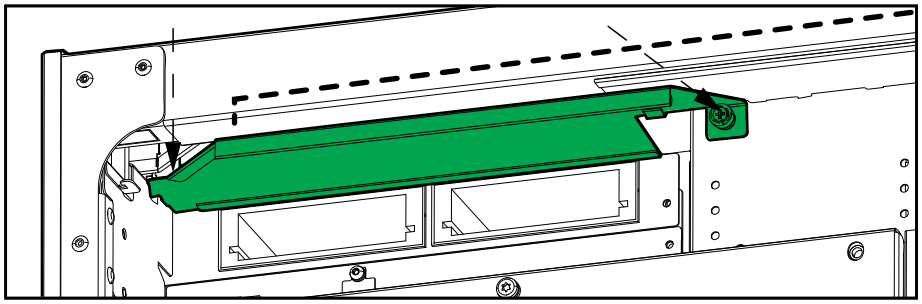
> **⚠CAUTION**
>
> **RISK OF EQUIPMENT DAMAGE**
>
> Ensure that the cables are routed in the cable channel behind the cover and be careful not to squeeze the cables.
>
> **Failure to follow these instructions can result in injury or equipment damage.**

Front View of the Power Cabinet



16. Reinstall the cover plate in the left side of the power cabinet.

Front View of the Power Cabinet



Connect PBUS Cables Between Parallel UPS Units

NOTE: PBUS cables must be connected in both 1+1 redundant parallel systems and parallel systems with a system bypass cabinet.

Connect PBUS Cables Between Parallel UPS Units in Top Cable Entry Systems

⚠ DANGER

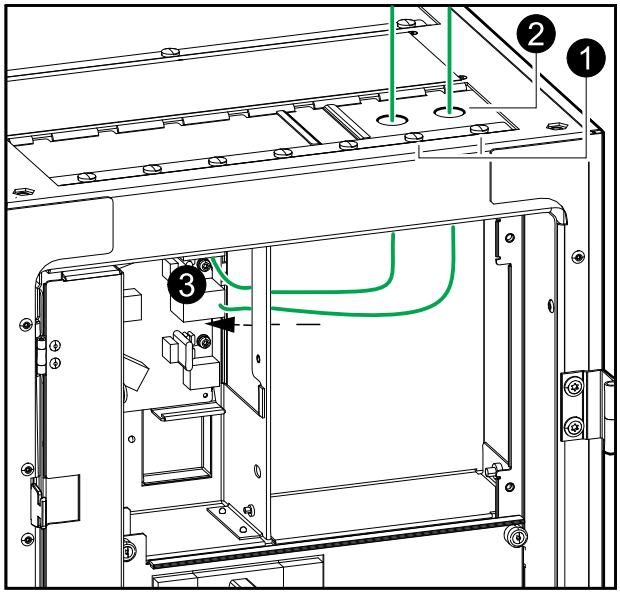
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not drill or cut holes for cables 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.

1. Loosen the screws and remove the cover in the front right corner of the top gland plate on the I/O cabinet.

   Front View of the I/O Cabinet

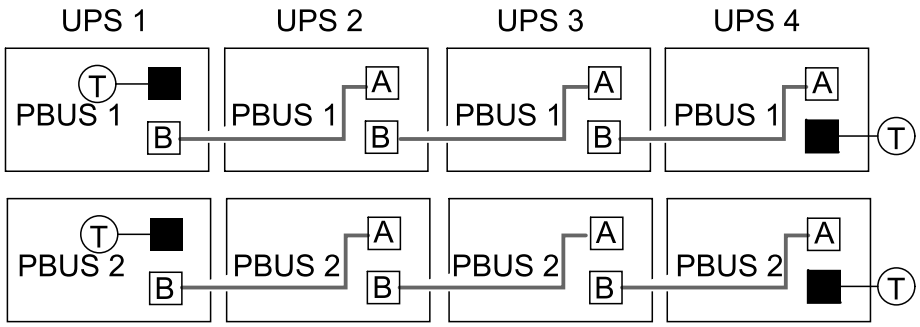


2. Drill or cut holes for cables in the top gland plate and reinstall the top gland plate.

3. Route the cables through the cover, and connect the PBUS cables 0H0889 between the I/O cabinets of the parallel system according to the diagram below.

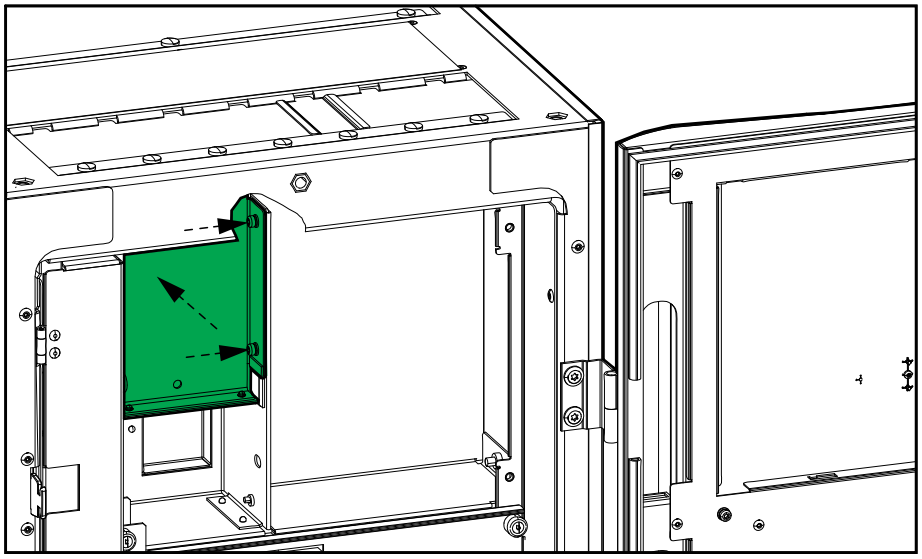
   NOTE: The PBUS 1 cables are white and the PBUS 2 cables are red.

   PBUS Cables Between the I/O Cabinets in a Parallel System



4. Reinstall the cover in front of the communication board.

   Front View of the I/O Cabinet



5. Reinstall the cover plate in the top of the I/O cabinet.

Connect PBUS Cables Between Parallel UPS Units in Bottom Cable Entry Systems

⚠DANGER

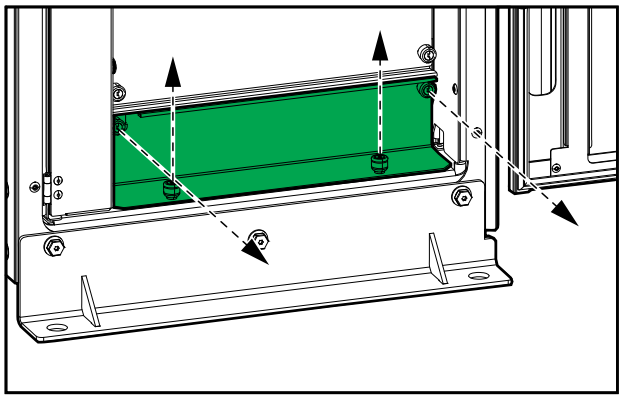
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

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

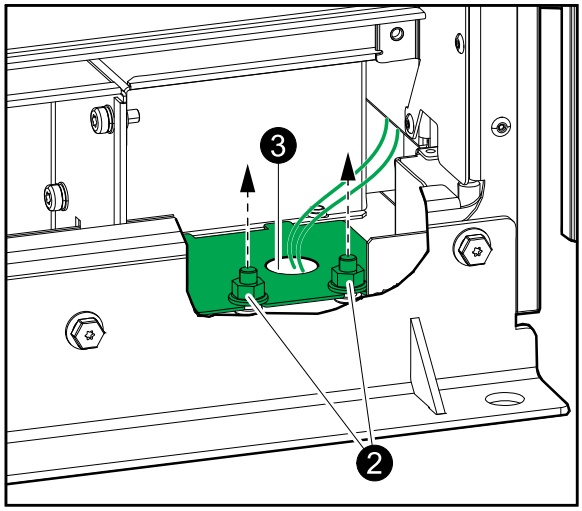
1. Loosen the thumb screws and remove the gland plate in the bottom of the I/O cabinet.

Front View of the I/O Cabinet



2. Loosen the screws and remove the cover in the front right corner of the bottom plate.

Front View of the I/O Cabinet

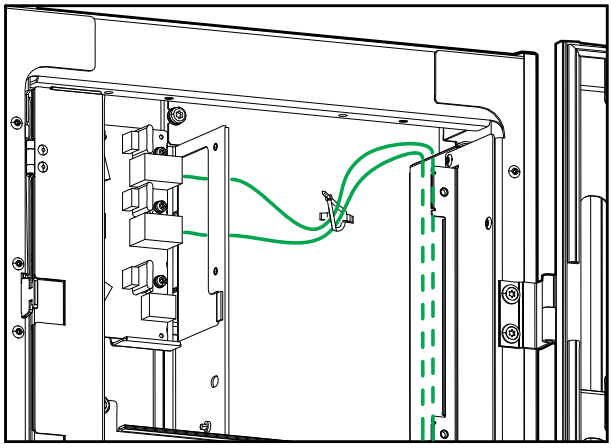


3. Drill or cut holes for cables in the cover and reinstall the cover.

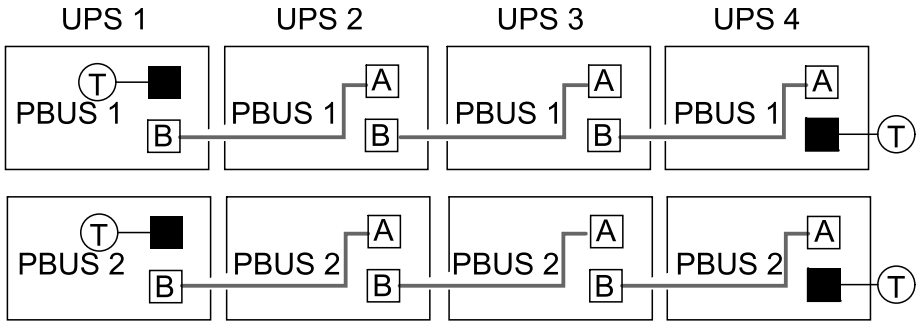
4. Route the PBUS cables through the cover behind the plate in the right side, and connect the PBUS cables from 0H0889 between the I/O cabinets of the parallel system according to the diagram below.

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

   Front View of the I/O Cabinet

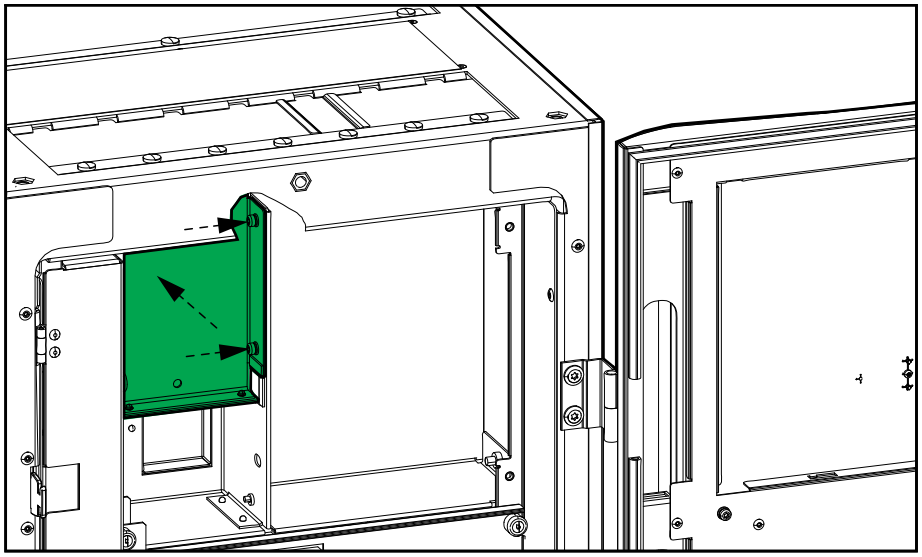


   PBUS Cables Between the I/O Cabinets in a Parallel System



5. Reinstall the cover in front of the communication board.

   Front View of the I/O Cabinet



6. Reinstall the cover plate in the top of the I/O cabinet.

Prepare the I/O Cabinet for Connection of Signal Cables in Top Cable Entry System

⚠DANGER

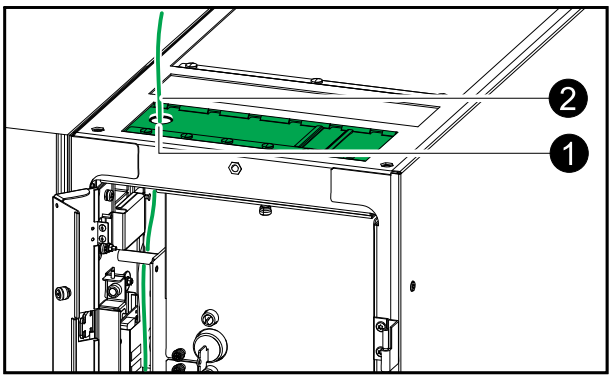
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not drill or cut holes for cables or conduits with the gland plate 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.

1. Loosen the screw and remove the gland plate in the front left corner of the I/O cabinet.

   Front View of the I/O Cabinet



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

Prepare the I/O Cabinet for Connection of Signal Cables in Bottom Cable Entry Systems

⚠DANGER

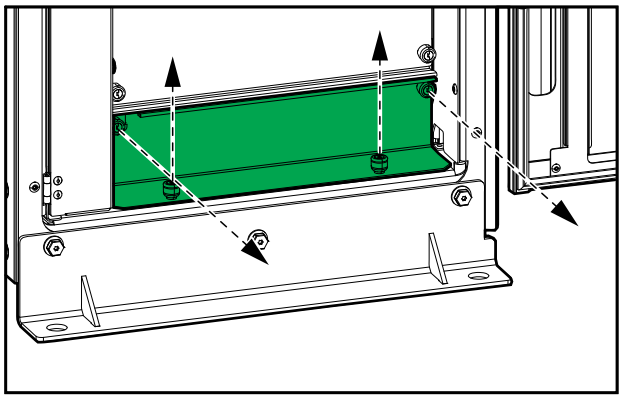
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not drill or cut holes for cables or conduits with the 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.

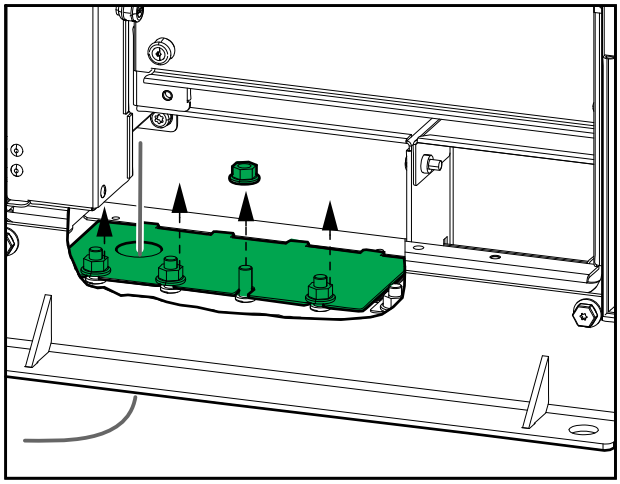
1. Loosen the thumb screws and remove the gland plate in the bottom of the I/O cabinet.

Front View of the I/O Cabinet



2. Loosen the screws and remove the gland plate in the front left corner of the I/O cabinet bottom cover. Drill or cut holes for cables/conduits in the gland plate and reinstall the gland plate.

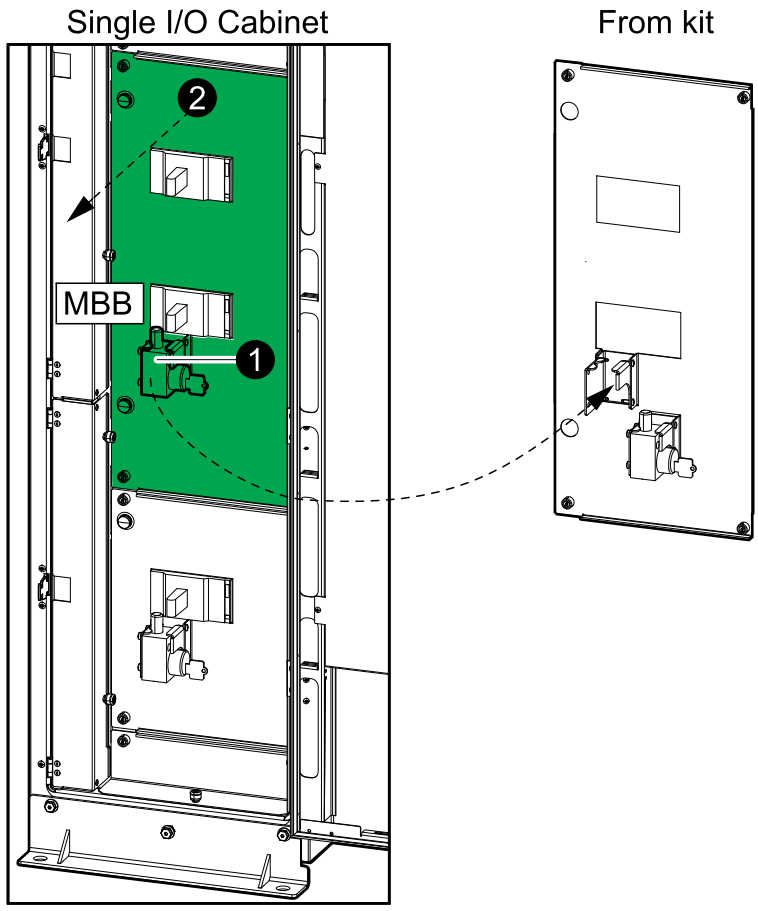
Front View of the I/O Cabinet



3. Reinstall the gland plate removed in step 1.

Connect Signal Cable for Monitoring the MBB in the 1+1 Redundant Parallel System

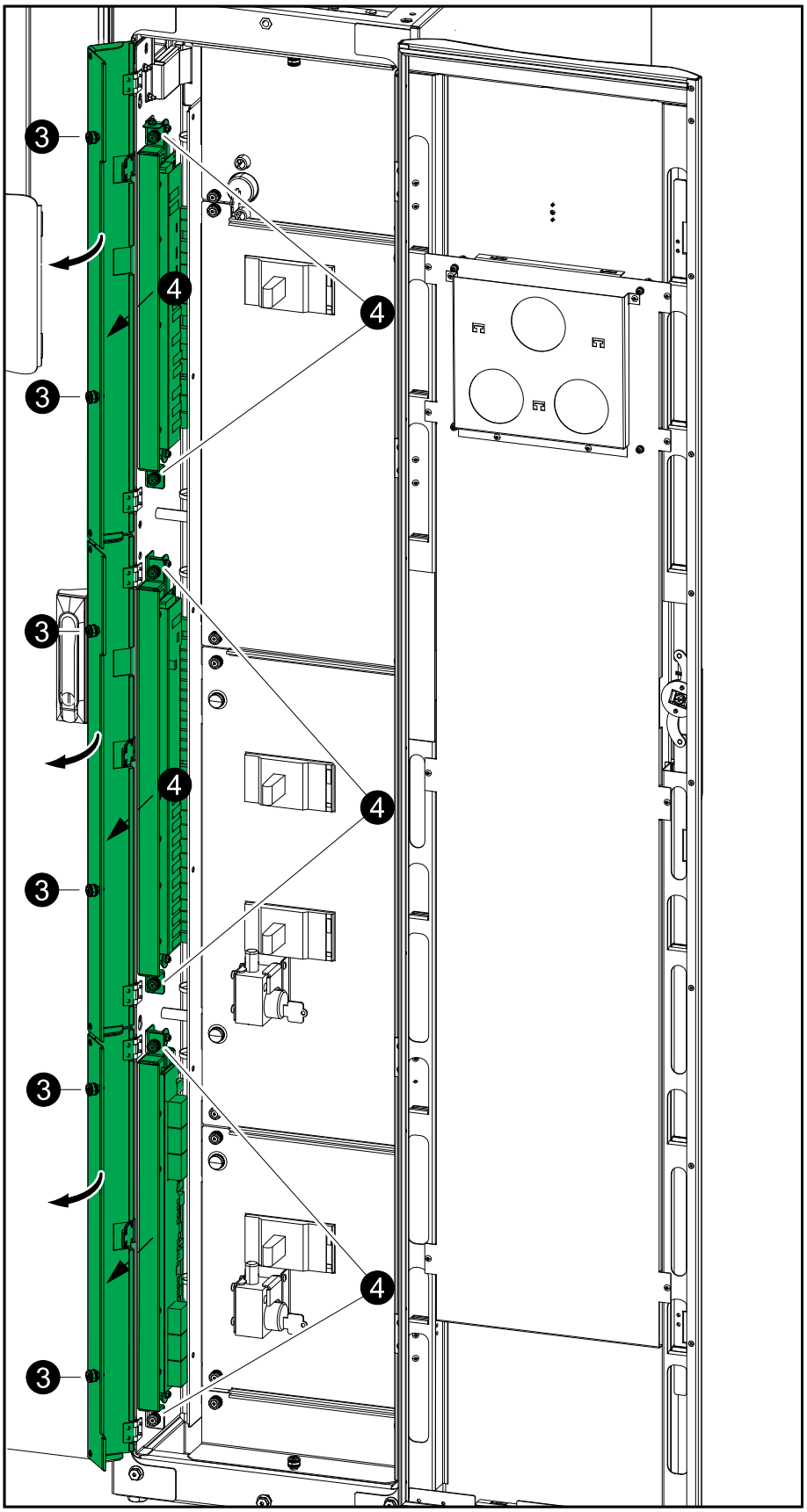
1. Remove the key interlock from the MBB on the single I/O cabinet and install it on the dead front panel from the installation kit 0M-819500.



2. Remove the indicated dead front panel from the single I/O cabinet.

3. Loosen the thumb screws and open the covers in the left side of the single I/O cabinet and the 1+1 I/O cabinet.

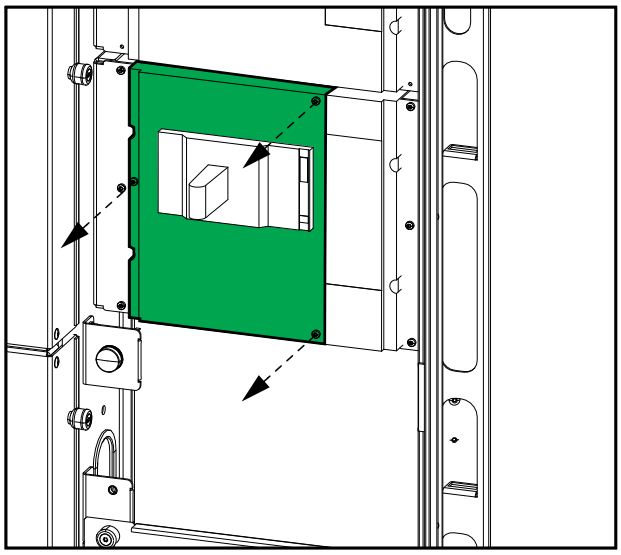
Front View of the I/O Cabinets



4. Loosen the thumb screws of all interface boards in the single I/O cabinet and the 1+1 I/O cabinet and pull out the interface boards.

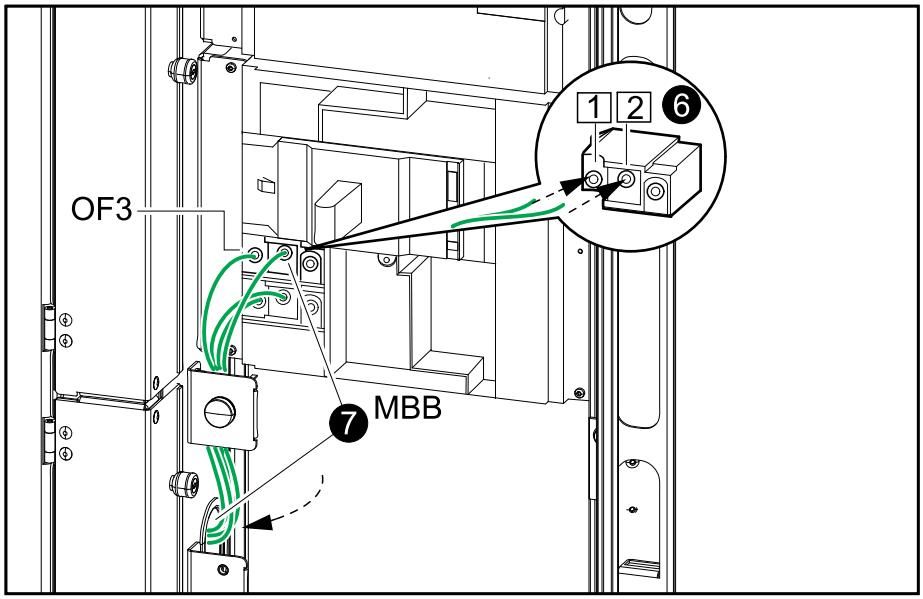
5. Remove the cover from the front of the MBB on the single I/O Cabinet.

Front View of the Single I/O Cabinet

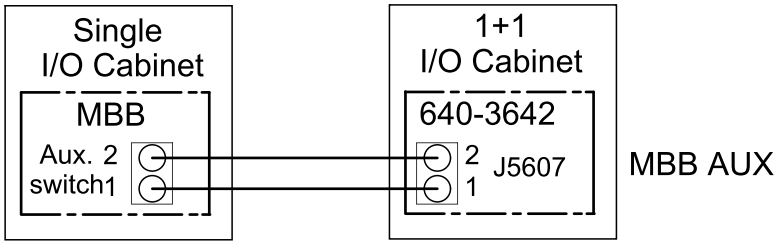


6. Take the auxiliary switch from the installation kit 0M–816654 and install it on the front of the MBB in the OF3 slot. Modify the breaker cover to allow for an additional signal cable.

Front View of the Single I/O Cabinet

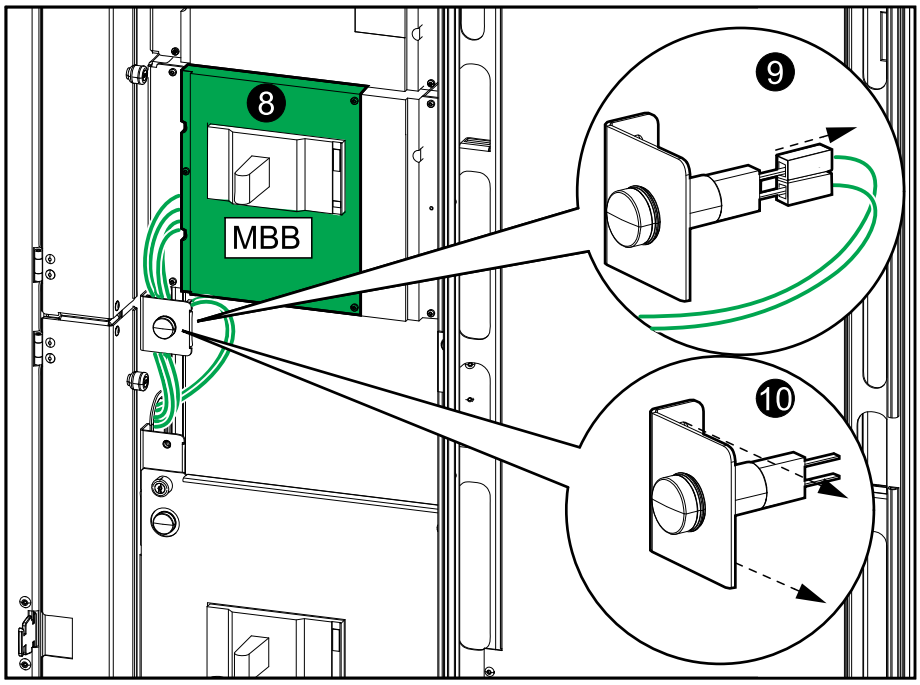


7. Route signal cables from the auxiliary switch in the single I/O cabinet through the top or bottom gland plate to the bottom interface board in the 1+1 I/O cabinet. Connect the signal cable to the J5607 terminal on 640–3642 in the bottom of the 1+1 I/O cabinet.

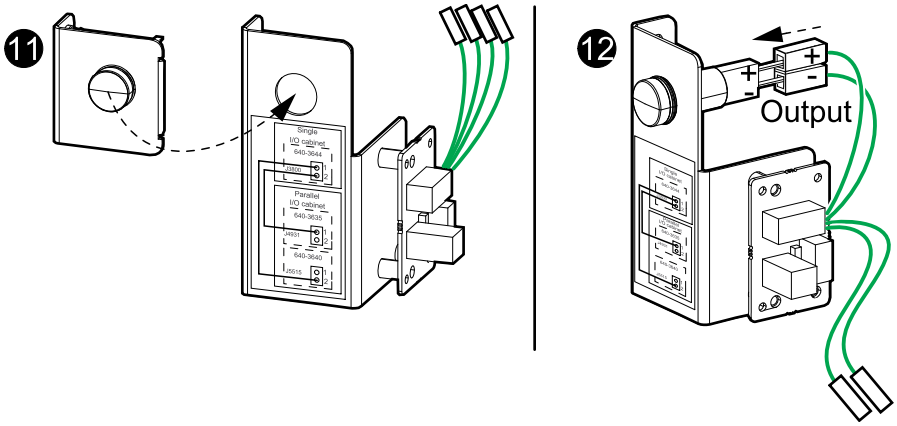


8. Reinstall the cover on the front of the MBB.

Front View of the Single I/O Cabinet



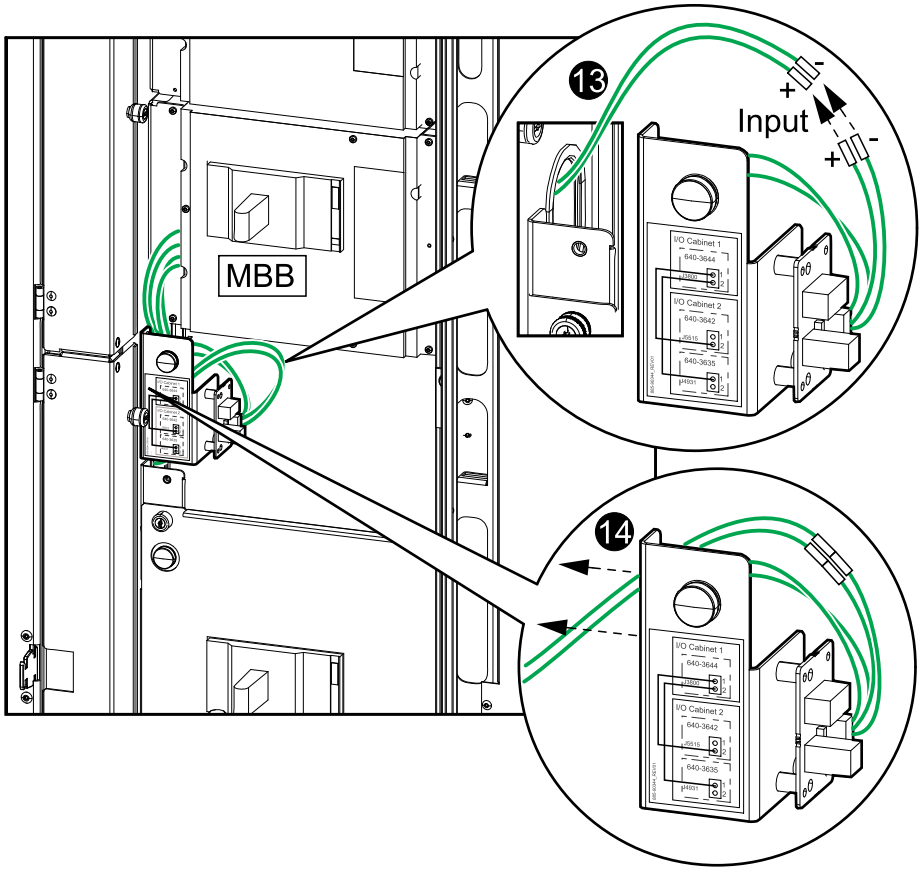
9. Disconnect the signal cables from the diode in the left side of the single I/O cabinet.
10. Loosen the screws and remove the bracket with the diode from the cabinet. Save the screws for later use.
11. Move the diode from the removed bracket to the bracket supplied in the installation kit 0H-9047.



12. Connect the two output signal cables from the cables connected to J3801 and connect to the diode.

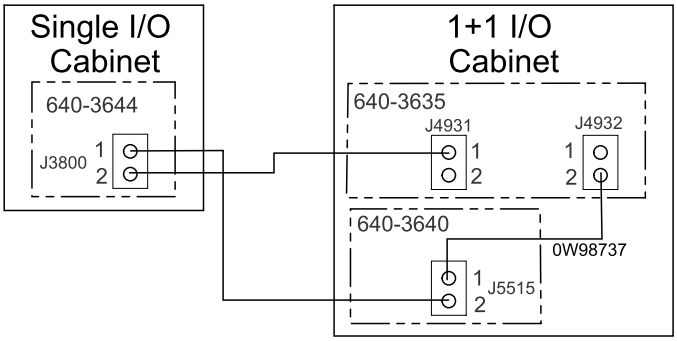
13. Connect the two input signal cables from the cable connected to J3801 and connect to the cables that were disconnected from the diode.

Front View of the Single I/O Cabinet



14. Install the new bracket in the cabinet and secure using the two screws from step 10.

15. Route signal cables from the J3800 terminal on 640–3644 in the single I/O cabinet to the top and middle interface boards in the 1+1 I/O cabinet.



a. Connect the signal cables to J5515 on 640–3640 and J4931 on 640–3635.

b. In the 1+1 I/O cabinet, connect the jumper cable 0W98737 from J5515–1 to J4932–2.

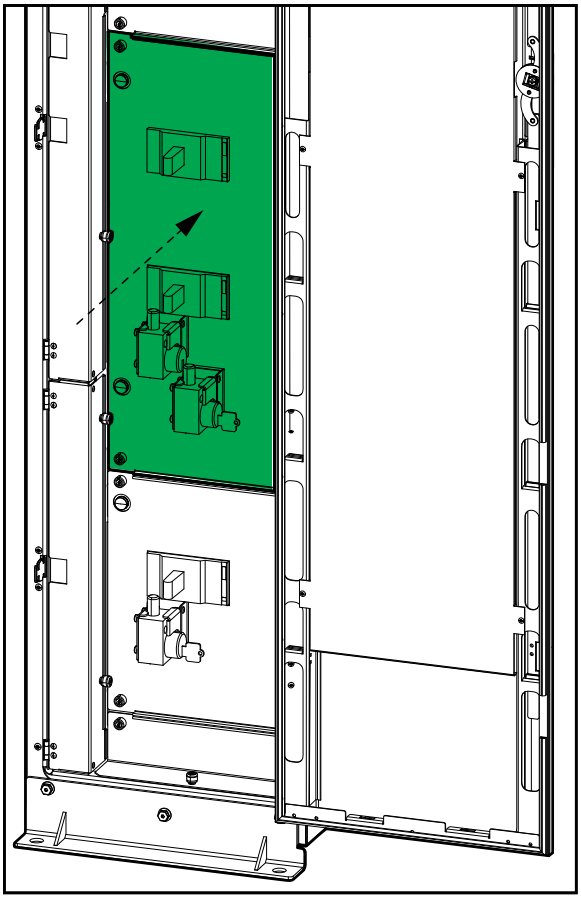
NOTE: In J4932–2 a cable is already installed. Both this cable and 0W98737 must be installed in J4932–2.

16. Push all interface boards back into position in both the single I/O cabinet and the 1+1 I/O cabinet and fasten the thumb screws.

17. Close the covers in the left side of both the single I/O cabinet and the 1+1 I/O cabinet and fasten the thumb screws.

18. Install 0M-820406 with the two key interlocks on the single I/O cabinet.

Front View of the Single I/O Cabinet



Connect Signal Cables between the I/O Cabinet and Optional Equipment

Connect the Emergency Power Off (EPO)

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

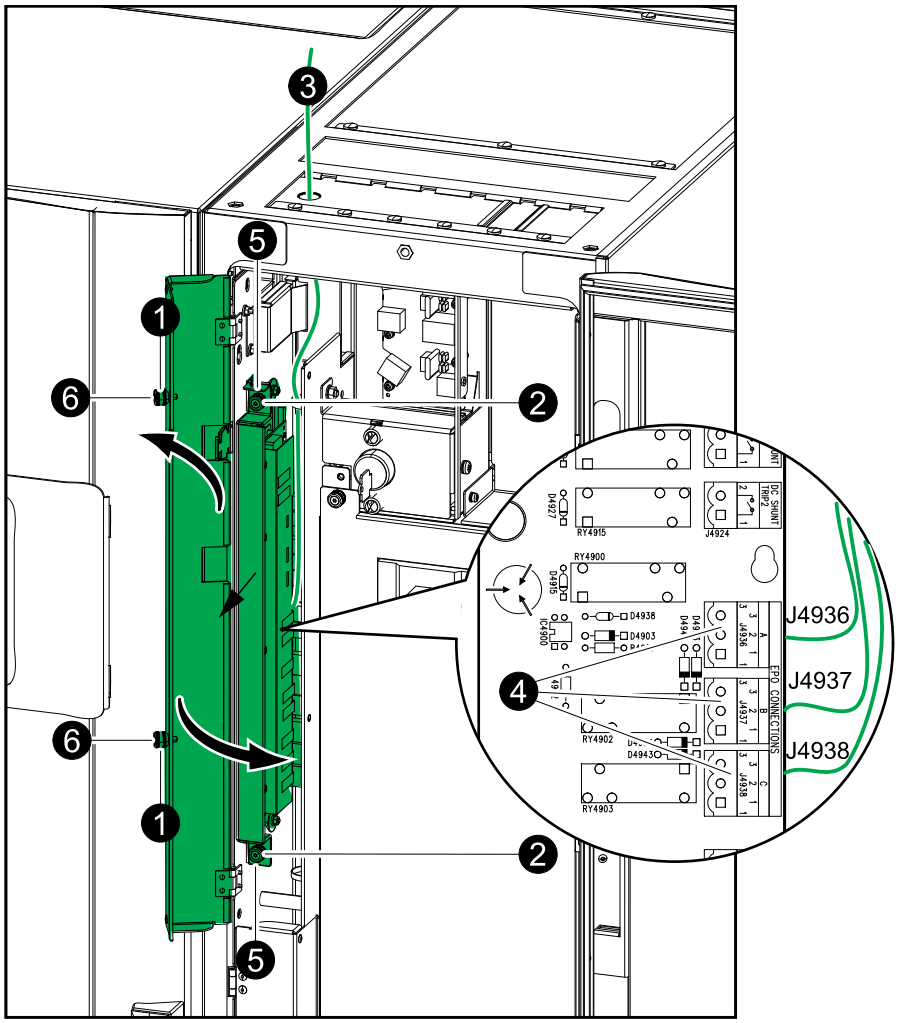
Do not drill or cut holes for cables or conduits with the gland plate installed and do not drill or cut holes in close proximity to the UPS.

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

The EPO circuit is considered Class 2 and SELV. Class 2 and 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 SELV or Class 2.

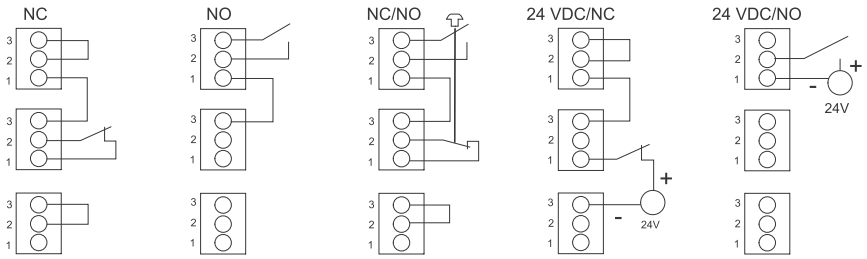
1. Loosen the thumb screws and open the cover in the left side of the I/O cabinet.

Front View of the I/O Cabinet



2. Loosen the thumb screws of the top interface board and pull out the board.
3. Route the cable from your EPO through the top or bottom gland plate and to the EPO terminals.

4. Connect the building EPO according to one of the options below.



5. Push the top interface board back into the I/O cabinet and fasten the thumb screws.
6. Close the cover in the left side of the I/O cabinet and fasten the thumb screws.

Connect External Synchronization

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

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

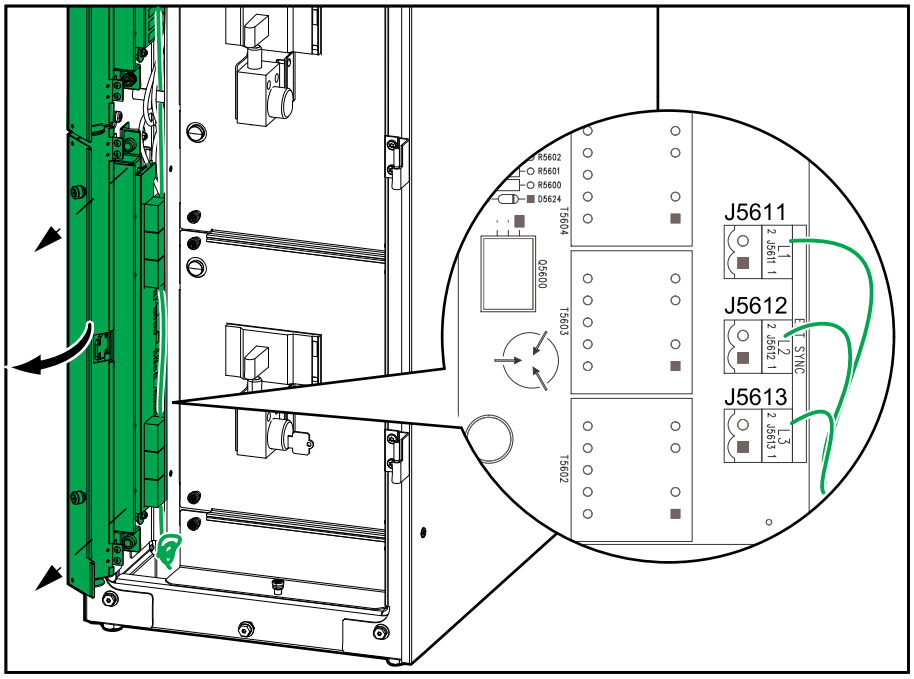
Failure to follow these instructions will result in death or serious injury.

1. Loosen the thumb screws and open the cover in the left side of the I/O cabinet.
2. Loosen the thumb screws of the middle and bottom interface boards and pull out the interface boards.
3. Route the external synchronization cables through the top or bottom gland plate and to the middle and bottom interface boards.
4. Connect the status synchronization cables according to one of the diagrams below.

5. Connect the voltage synchronization cables according to one of the diagrams below:

   NOTE: The external synchronization must at a minimum be connected by a 600 V 30–12 AWG stranded wire that must be protected by a 0.5 A fuse capable of withstanding 65 kA.

   Front View of the I/O Cabinet



   a. Connect L1 to J5611 on 640–3642.

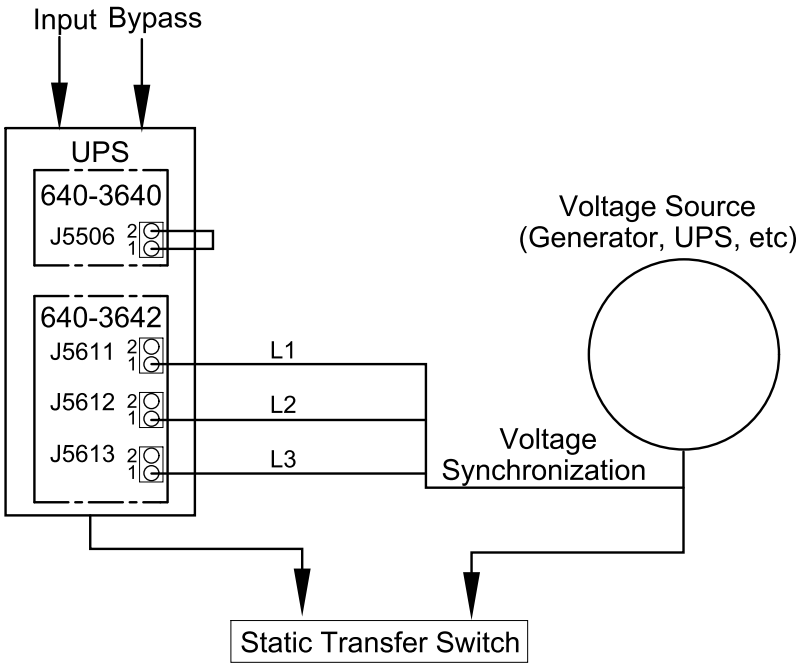
   b. Connect L2 t0 J5612 on 640–3642.

   c. Connect L3 to J5613 on 640–3642.

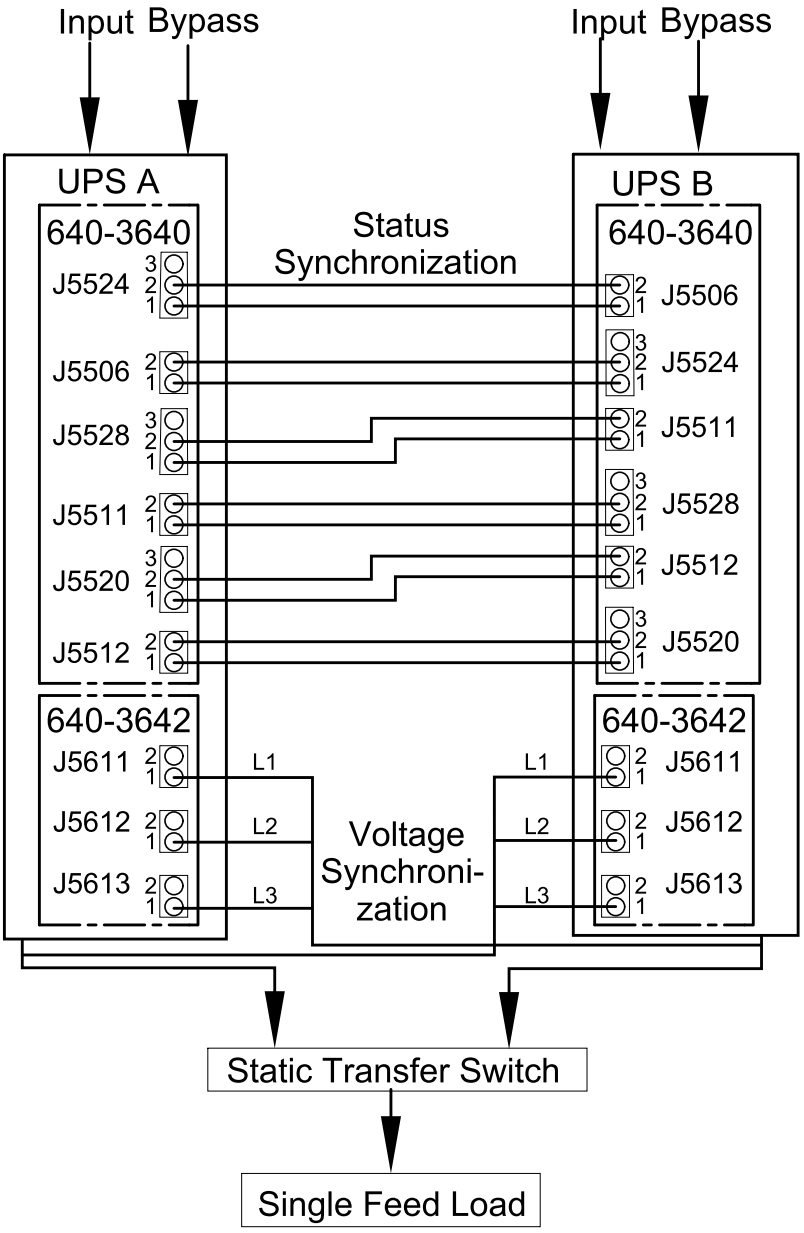
6. Push the interface boards back into position and fasten the thumb screws.

7. Close the cover in the left side of the I/O cabinet and fasten the thump screws.

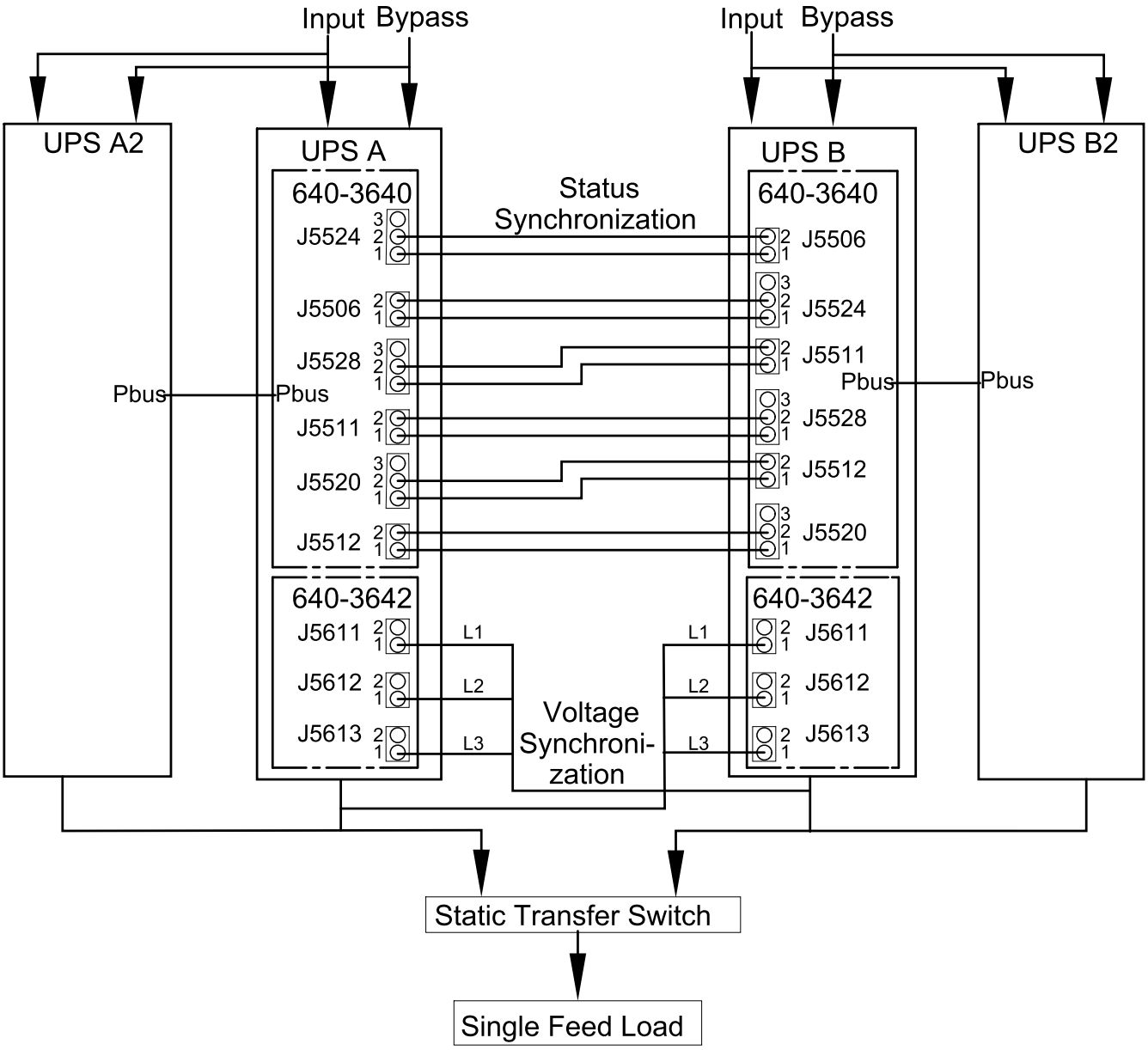
Basic UPS Synchronization to a Fixed Voltage Source Diagram



Dual UPS Synchronization with Floating Synchronization Master Diagram



Fixed Parallel Synchronization Master Diagram



Connect Equipment to the Input Contacts and the Output Relays

NOTE: Max. 250 VAC 5 A must be connected.

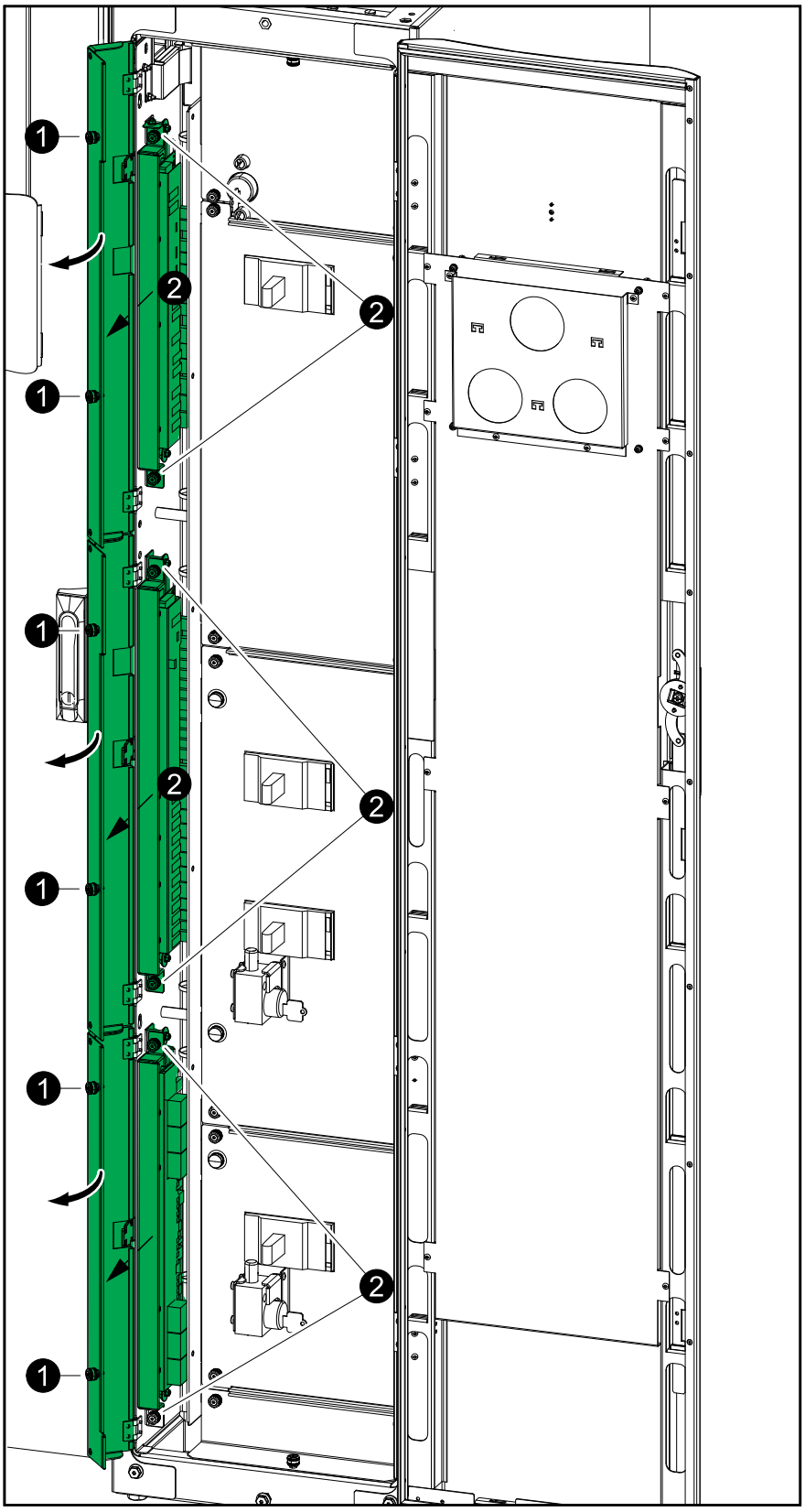
Input connections are considered Class 2 and SELV. Class 2 and SELV circuits must be isolated from the primary circuitry. Do not connect any circuit to the contacts unless it can be confirmed that the circuit is SELV or Class 2.

All SELV circuits connected must be grounded.

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

1. Loosen the thumb screws and open the cover in the left side of the I/O cabinet.

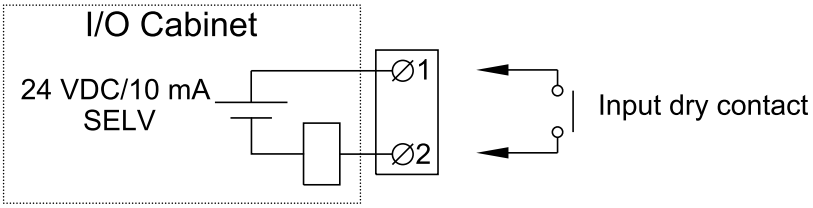
Front View of the I/O Cabinet



2. Loosen the thumb screws of the top and middle interface boards and pull out the boards.
3. Route the cables from your relays through the top or bottom of the I/O cabinet to the top and middle interface boards and connect.

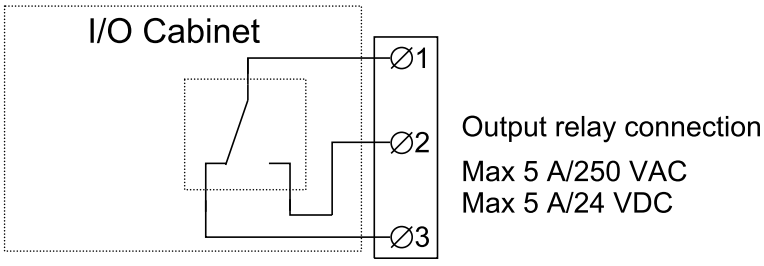
Overview of Input Contacts and Output Relays

Input Contacts



Name	Description	Location
IN 1 (Contact 1)	Configurable input contact	640-3640 terminal J5502
IN 2 (Contact 2)	Configurable input contact	640-3640 terminal J5503
IN 3 (Contact 3)	Configurable input contact	640-3640 terminal J5504
IN 4 (Contact 4)	Configurable input contact	640-3640 terminal J5505
IN 5 (Contact 5)	Configurable input contact	640-3640 terminal J5510
IN 6 (Contact 6)	Configurable input contact	640-3640 terminal J5509
IN 7	Transformer temperature switch	640-3640 terminal J5508
IN 9	Forced external synchronization input	640-3640 terminal J5506
IN 10	External synchronization requested input	640-3640 terminal J5511
IN 11	Use static bypass standby	640-3640 terminal J5512

Output Relays

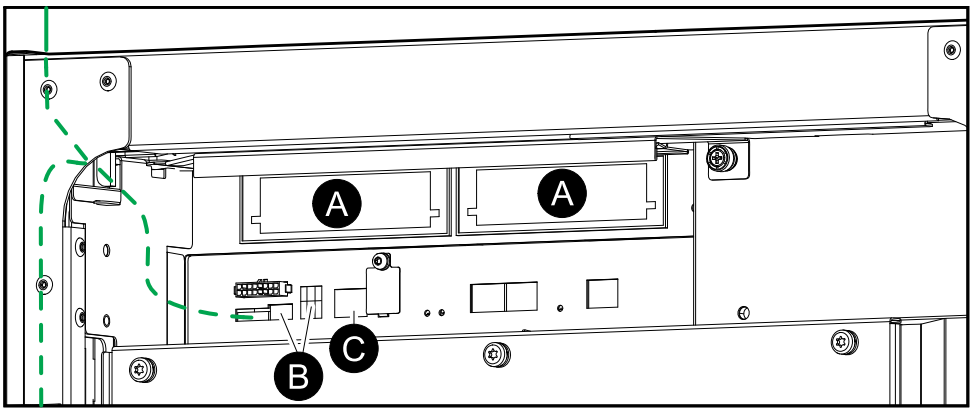


Name	Description	Location
OUT 1 (Relay 1)	Configurable output relay	640–3635 terminal J4939
OUT 2 (Relay 2)	Configurable output relay	640–3635 terminal J4940
OUT 3 (Relay 3)	Configurable output relay	640–3635 terminal J4941
OUT 4	Forced external synchronization output	640–3640 terminal J5520
OUT 5	Reserved for future use	640–3640 terminal J5521
OUT 6	External synchronization requested output	640–3640 terminal J5522
OUT 7	UPS in inverter ON	640–3640 terminal J5523
OUT 8 (Relay 4)	Configurable output relay	640–3640 terminal J5524
OUT 9 (Relay 5)	Configurable output relay	640–3640 terminal J5525
OUT 10 (Relay 6)	Configurable output relay	640–3640 terminal J5528

External Communication

The following external communication interfaces are supported:

Front View of the Power Cabinet



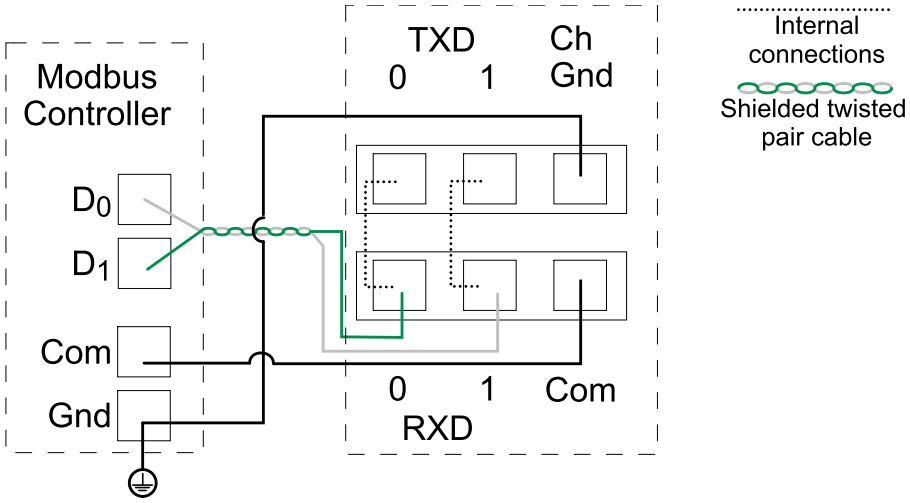
A. Two smart slots for optional network management cards (AP9630, AP9631, or AP9635CH)

B. Modbus and modbus dip switch settings

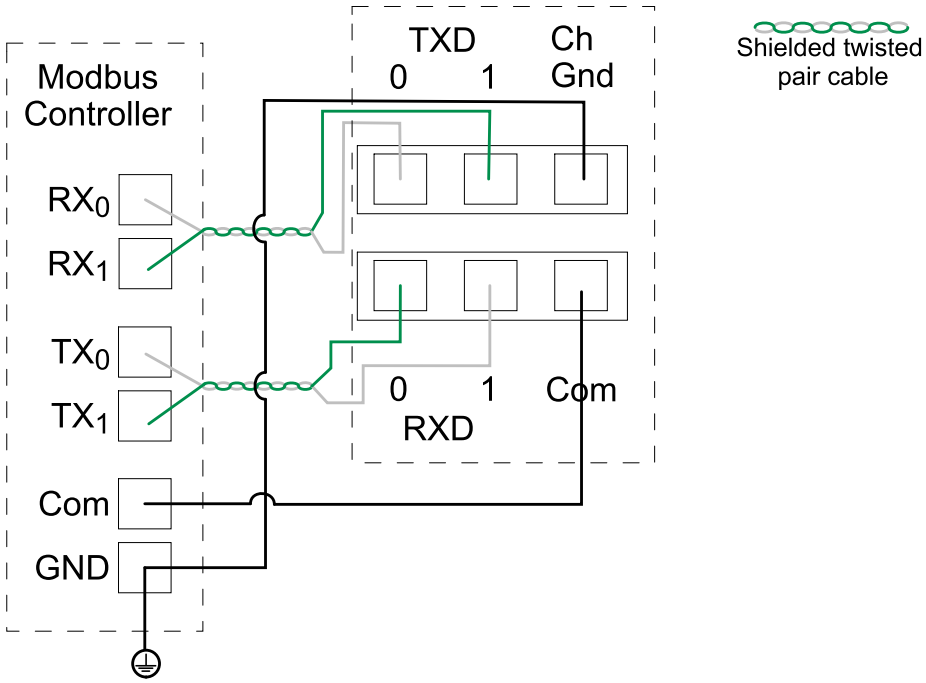
C. Ethernet

Modbus Wiring

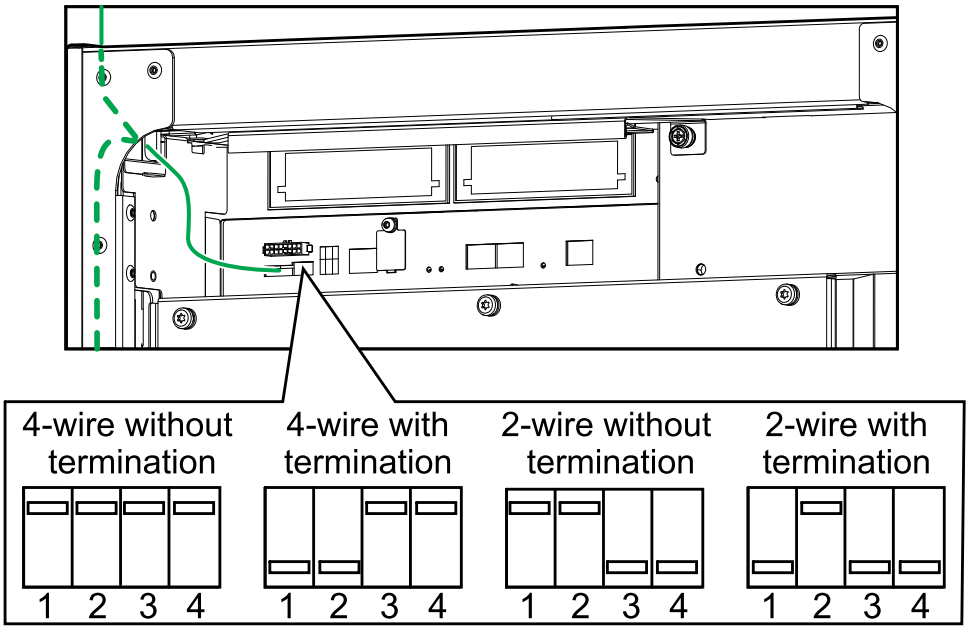
2–Wire Configuration



4–Wire Configuration



Modbus Dip Switch Settings



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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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