



Liebert® Ancillary Medium Maintenance Bypass Cabinet

User Manual

208/220 V 10 kVA to 150 kVA

480/415/400 V 20 kVA to 300 kVA

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

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1 Important Safety Instructions

Save These Instructions

This manual contains important instructions that must be followed during installation of Vertiv™ Liebert® Ancillary Medium maintenance bypass cabinet (MBC).



WARNING! Risk of moving heavy units and tipping hazard. Can cause equipment damage, injury and death. Exercise extreme care when handling cabinets to avoid equipment damage or injury to personal. The Liebert® Ancillary Medium MBC weight ranges from 198 lbs to 1000 lbs (90 kg to 454 kg).

Locate the center of gravity symbols  and Unit weights are in **Table 4.1** on page 37. Test, lift, and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times. Slots at the base of the cabinets are intended for forklift use. Base slots will support the unit only if the forks are completely beneath the unit. In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires. Extreme caution is required when performing maintenance. Be constantly aware that the system contains high DC as well as AC voltages. Check for voltage with both AC and DC voltmeters prior to making contact.



AVERTISSEMENT! Le centre de gravité élevé des appareils présente un risque de renversement lors des déplacements pouvant entraîner des dommages matériels, des blessures et même la mort. Faites preuve d'une extrême prudence lors de la manutention des armoires afin d'éviter de les endommager ou de blesser le personnel. Les armoires de dérivation d'entretien Liebert® Ancillary Medium de Liebert pèsent de 198 lbs to 1000 lbs (90 kg to 454 kg).

Identifiez les symboles de centre de gravité  et déterminez le poids de l'appareil avant de manipuler chaque armoire. Testez le levage et l'équilibre des armoires avant de transporter l'appareil. Maintenez en tout temps l'inclinaison verticale minimale. Les fentes situées à la base prendront en charge l'unité. Les fentes situées à la base peuvent soutenir le système seulement si les fourches se trouvent complètement sous le système. En cas d'incendie associé à du matériel électrique, n'utilisez que des extincteurs à dioxyde de carbone ou homologues pour la lutte contre les incendies d'origine électrique. Les opérations d'entretien requièrent une extrême prudence. Soyez toujours conscient du fait que le système contient des tensions c.c. etc.a. élevées. Vérifiez les tensions avec des voltmètres c.a. et c.c. avant d'établir tout contact.

Read this manual thoroughly before working with the Liebert® Ancillary Medium MBC. Use this manual during installation of UPS.



WARNING! Risk of arc flash and electric shock. Can cause equipment damage, injury, and death. Under typical operation and with all doors closed, only normal safety precautions are necessary. The area around the system must be kept free of puddles of water, excess moisture, and debris. Special safety precautions are required for procedures involving handling, installation, and maintenance of the MBC. Observe all precautions in the Operation and Maintenance Manual, before as well as during performance of all maintenance procedures. This equipment contains circuits that are energized with high voltage. Only test equipment designed for troubleshooting must be used. This is particularly true for oscilloscopes. Always check with an AC and DC voltmeter to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high potential electric charges may exist. All power and control wiring must be installed by a qualified electrician. All power and control wiring must comply with the NEC and applicable local codes. Only properly trained and qualified personnel must perform maintenance on the MBC. When performing maintenance with any part of the equipment under power, service personnel, and test equipment must be standing on rubber mats. The service personnel should wear insulating shoes for isolation from direct contact with the floor ground. One person must never work alone, even if all power is removed from the equipment. A second person must be standing by to assist and summon help in case of an accident.



AVERTISSEMENT! Risque d'arc ou de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. Les précautions de sécurité habituelles suffisent lorsque le système est en mode de fonctionnement normal et que toutes les portes sont fermées. La zone entourant le système doit être exempte de flaques d'eau, d'humidité excessive et de débris. Des précautions de sécurité spéciales sont requises pour les procédures associées à la manutention, à l'installation et à l'entretien de l'armoire de dérivation d'entretien. Observez toutes les précautions de sécurité décrites dans le présent manuel avant de manipuler ou d'installer l'armoire de dérivation d'entretien. Observez également toutes les précautions décrites dans le manuel d'utilisation et d'entretien, avant et pendant toutes les procédures d'entretien. Cet équipement comporte des circuits à haute tension. Seuls des équipements d'essai conçus pour le dépannage doivent être utilisés. Cette mise en garde couvre notamment les oscilloscopes. Utilisez toujours un voltmètre c.a. et c.c. pour vérifier les tensions avant d'établir un contact ou d'utiliser des appareils. Des tensions dangereusement élevées peuvent demeurer dans le système même une fois l'alimentation coupée. Tous les câbles d'alimentation et de contrôle doivent être installés par un électricien qualifié. Tous les câbles d'alimentation et de contrôle doivent être conformes au Code national de l'électricité des États-Unis (NEC) et ainsi qu'aux codes locaux en vigueur. L'entretien de l'armoire de dérivation d'entretien ne doit être confié qu'à des professionnels qualifiés et dûment formés. Les responsables de l'entretien et l'équipement d'essai doivent reposer sur des tapis de caoutchouc lors de toute intervention sur une pièce d'équipement sous tension. Les responsables de l'entretien doivent porter des chaussures isolantes pour prévenir tout contact direct avec le plancher. Une personne ne devrait jamais travailler seule, même si toute l'alimentation de l'équipement est coupée. Une deuxième personne devrait toujours être présente pour porter assistance ou chercher de l'aide en cas d'accident.

2 Mechanical Installation

2.1 Introduction

This chapter provides brief instructions for mechanical installation of Vertiv™ Liebert® Ancillary Medium MBC, including environmental requirements, mechanical requirements that must be considered when planning the positioning and cabling of the UPS equipment.

This chapter is a guide to general procedures and practices that must be observed by the commissioning engineer. The conditions of each site will determine the applicability of such procedures.



WARNING! Risk of arc flash and electric shock. Can cause equipment damage, injury, and death. Installation must be performed only by properly trained and qualified personnel wearing appropriate safety clothing. Eye protection must be worn to prevent injury from accidental electrical arcs. Remove rings, watches, and all other metal objects. Only use tools with insulated handles. Wear rubber gloves.



AVERTISSEMENT! Risque d'arc ou de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. L'installation ne doit être confiée qu'à des professionnels qualifiés et dûment formés portant des vêtements de sécurité adéquats. Des lunettes de sécurité doivent être portées afin de prévenir les blessures en cas d'arcs accidentels. Retirez montre, bagues et tout autre objet métallique. Utilisez uniquement des outils dont le manche est isolé. Portez des gants de protection en caoutchouc.



WARNING! Risk of improper installation. Can cause equipment damage and void warranty. The Liebert® Ancillary Medium MBC must be installed by a qualified engineer in accordance with the information contained in this chapter. All equipment not referred to in this manual is shipped with details of its own mechanical and electrical installation. Do not apply electrical power to the UPS equipment before the arrival of the commissioning engineer.



AVERTISSEMENT! Risque de mauvaise installation. Peut causer des dommages à l'équipement et annuler la garantie. Le Liebert® L'Ancillary Medium MBC doit être installé par un ingénieur qualifié conformément aux informations contenues dans ce chapitre. Tout équipement non mentionné dans ce manuel est expédié avec des détails sur ses propres caractéristiques mécaniques et installation électrique. N'appliquez pas d'alimentation électrique à l'équipement UPS avant l'arrivée du ingénieur de mise en service.

2.2 Preliminary Checks

Before installing the Liebert® Ancillary Medium MBC, carry out the following preliminary checks.

- Visually examine the equipment for transit damage, both internally and externally. Report any damage to the shipper immediately.
- Verify that the correct equipment is being installed. The equipment supplied has an identification tag on the back of the main door reporting the type, size, and main calibration parameters of the UPS.
- Verify that the room satisfies the environmental conditions stipulated in the equipment specifications, paying particular attention to the ambient temperature and air exchange system.

2.3 Environmental Considerations

2.3.1 UPS Location Selection

The Vertiv™ Liebert® Ancillary Medium MBC is intended for indoor installation and must be located in a cool, dry, clean air environment with adequate ventilation to keep the ambient temperature within the specified operating range. See [Specifications](#) on page 37 for more information.

All models of the Liebert® Ancillary Medium MBC are convection cooled. To permit air to enter and exit and prevent overheating or malfunctioning, do not cover the ventilation openings.

When bottom entry is used, the conduit plate can be removed and punched and replaced. The bottom conduit plate must be replaced for proper airflow. If necessary to cool the room, install a system of room extractor fans.

NOTE: The Liebert® Ancillary Medium MBC is suitable for mounting only on concrete and other non-combustible surfaces.

2.3.2 Storage

If the equipment will not be installed immediately, it must be stored in a room for protection against excessive humidity or heat sources. See **Table 4.1** on page 37 for more information of environmental condition.

2.4 Positioning

The cabinet is structurally designed to handle lifting from the base. Access to the power terminals, auxiliary terminals blocks, and power switches is from the top and sides. The top and side removable panels are secured to the chassis by screws. The side panel can be removed for access to the power connections bars, auxiliary terminal blocks, and power isolators.

2.4.1 Moving the Cabinets



WARNING! Risk of moving heavy units and tipping hazard. Can cause equipment damage, injury, and death. Exercise extreme care when handling cabinets to avoid equipment damage or injury to personnel. The Liebert® Ancillary Medium MBC weight ranges from 198 lbs to 1000 lbs (90 kg to 454 kg). Locate center of gravity symbols  and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Always maintain minimum tilt from vertical.



AVERTISSEMENT! Le centre de gravité élevé des appareils présente un risque de renversement lors des déplacements pouvant entraîner des dommages matériels, des blessures et même la mort. Faites preuve d'une extrême prudence lors de la manutention des armoires afin d'éviter de les endommager ou de blesser le personnel. Les armoires de dérivation d'entretien Liebert® Ancillary Medium MBC de Liebert pèsent de 198 lbs to 1000 lbs (90 kg to 454 kg). Identifiez les symboles de centre de gravité  et déterminez le poids de l'appareil avant de manipuler chaque armoire. Testez le levage et l'équilibre des armoires avant de transporter l'appareil. Maintenez en tout temps l'inclinaison verticale minimale.

The route to be traveled between the point of arrival and the unit's position must be planned to make sure that all passages are wide enough for the unit and that floors are capable of supporting its weight. Check that doorways, lifts, ramps, and so on are adequate and that there are no impassable corners or changes in the level of corridors.

Ensure that the cabinet weight is within the designated surface weight loading (kg/cm² [lbs/sq. ft.]) of any handling equipment. See **Table 4.1** on page 37 for the weight of the Vertiv™ Liebert® Ancillary Medium MBC 7.88 in. (200 mm), 11.9 in. (300 mm), 23.7 in. (600 mm), and 31.5 in. (800 mm) models. See **Table 4.2** on page 38 provide detailed dimension and weight information for the Liebert® Ancillary Medium UPS and Liebert® Ancillary Medium MBC when they are bolted together and shipped as a system.

Ensure that any lifting equipment used in moving the cabinet has sufficient lifting capacity.

The Liebert® Ancillary Medium MBC can be handled by means of a forklift or similar equipment. For operations with a forklift, see the installation drawings in [Installation Drawings](#) on page 11.

Because the weight distribution in the cabinet is uneven, use extreme care during handling and transporting.

When moving the unit by forklift, care must be taken to protect the panels. Do not tilt the cabinet more than 15 degrees from vertical while transportation. Do not handle the unit with straps.

2.4.2 Clearances

Liebert® Ancillary Medium MBC have no perforated panels on the sides or rear. Clearance around the front of the equipment must be sufficient to enable free passage of personnel with the doors fully opened. It is important to leave a distance of 24 in. (610 mm) between the top of the cabinet and any overhead obstacles to permit adequate circulation of air coming out of the unit.

2.4.3 Floor Installation Anchoring

The installation diagrams in [Installation Drawings](#) on page 11 identify the location of the holes in the base plate through which the equipment can be bolted to the floor. If the equipment is to be located on a raised floor it must be mounted on a pedestal suitably designed to accept the equipment point loading.

2.5 Cable Entry

The cables can enter the Liebert® Ancillary Medium MBC from the bottom or top.

2.6 Power Cables



WARNING! Risk of electric shock. Can cause equipment damage, injury, and death. Before cabling up the cabinet, ensure that you are aware of the location and operation of the external isolators that connect the input/bypass supply. Check that these supplies are electrically isolated and post any necessary warning signs to prevent their inadvertent operation.



AVERTISSEMENT! Risque de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. Avant de procéder au câblage de l'armoire, assurez-vous que vous êtes au courant de l'emplacement et du fonctionnement des isolateurs externes qui raccordent l'alimentation d'entrée ou de dérivation. Vérifiez que ces raccords sont isolés électriquement et installez tous les panneaux d'avertissement nécessaires pour empêcher leur utilisation accidentelle.

The Liebert® Ancillary Medium MBC requires both power and control cabling once it has been mechanically installed. All control cables must be separate from the power cables. Run control cables in metal conduits or metal ducts that are electrically bonded to the cabinets they are connected to.

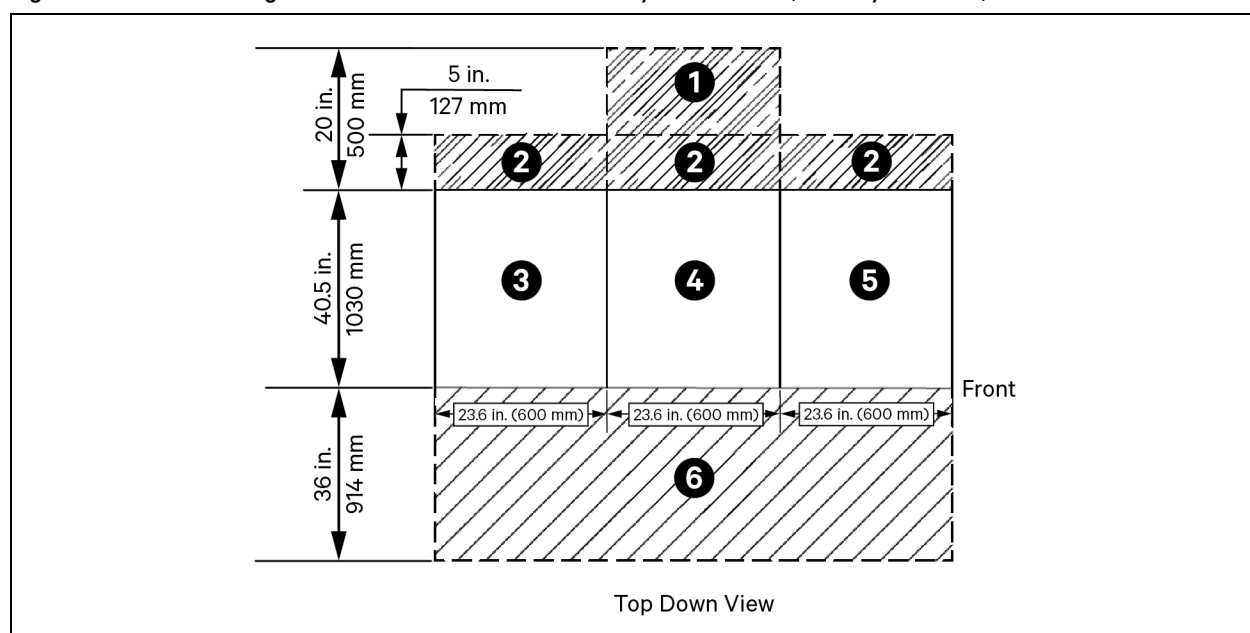
The cable design must comply with the voltages and currents provided in **Table 4.3** on page 38 to **Table 4.12** on page 42, follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media).

For cable entry locations, see **Figure 3.7** on page 18 and **Figure 3.8** on page 19.

The following are guidelines only and are superseded by local regulations and codes of practice where applicable.

- Take special care when determining the size of the neutral cable (grounded conductor), because current circulating on the neutral cable may be greater than nominal current in the case of non-linear loads.
- The grounding conductor must be sized according to local or NEC codes, cable lengths, type of protection, and so on. The grounding cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consider using smaller and paralleled cables for heavy currents as a way of easy installation.

Figure 2.1 Cabinet Arrangement — Vertiv™ Liebert® Ancillary Medium UPS, Battery Cabinets, 480 V MBC



Item	Description
1	Front to rear UPS airflow (option) clearance*
2	Seismic bracket (option) clearance**
3	Battery Cabinet
4	UPS
5	MBS (23.6 in. [600 mm] shown)
6	Service clearance***
*Clearance when front to rear airflow option selected for UPS. **Clearance when front to when seismic option selected. ***Required front service clearance. NOTE: If the front to rear airflow or seismic bracket options are not selected then there is no requirement for rear clearance.	

NOTE: The 7.9 in. (200 mm) and 11.9 in. (300 mm) MBC ship attached to the UPS.

2.6.1 Power Cable Connection Procedure

The system input, UPS bypass, UPS output, and system output cables all require lug type terminations and are connected to power blocks behind the power isolator switches as shown in [Installation Drawings](#) on page 11. These are accessible when the side or top panel is removed.

Equipment ground

The equipment ground busbar is near the input and output power supply connections as shown in [Installation Drawings](#) on page 11. The grounding conductor must be connected to the ground busbar.

All cabinets and cable trunking must be grounded in accordance with local regulations.



WARNING! Risk of electric shock. Can cause equipment damage, injury, or death. Failure to follow adequate grounding procedures can result in electric shock hazard to personnel and the risk of fire, must a ground fault occur.



AVERTISSEMENT! Risque de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. Le non-respect des procédures de mise à la terre peut entraîner des risques d'électrocution du personnel, ou des risques d'incendie en cas de défectuosité de la mise à la terre.



WARNING! Risk of electric shock. Can cause equipment damage, injury, or death. The operations described in this section must be performed by authorized electricians or properly trained and qualified technical personnel wearing adequate safety clothing, eye protection, and gloves. If you have any difficulties, do not hesitate to contact Vertiv. See the back page of this manual for contact information.



AVERTISSEMENT! Risque de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. Toutes les opérations décrites dans cette section ne doivent être effectuées que par des électriciens ou des techniciens professionnels dûment formés et qualifiés portant gants, lunettes et vêtements de protection adéquats. En cas de problème, n'hésitez pas à communiquer avec Vertiv. Pour obtenir les renseignements de contact, consultez la dernière page de ce manuel.

NOTE: Proper grounding considerably reduces problems in systems caused by electromagnetic interference.

Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

See the appropriate cable connection drawing in [Installation Drawings](#) on page 11.

1. Verify that the bypass equipment is isolated from its external power source and all the power isolators are open. Check that these supplies are electrically isolated and post any necessary warning signs to prevent their inadvertent operation.
2. Remove the panels.
3. Connect the ground and any necessary main bonding jumper to the equipment ground busbar.

NOTE: The grounding and neutral bonding arrangement must be in accordance with local and national codes of practice.

NOTE: Care must be taken when routing power cables. Ensure that the cables do not touch other busbars.

4. Connect the AC input supply cables from the power distribution panel to the maintenance bypass input supply busbars (A-B-C terminals). Tighten the connections to the proper torque. See **Table 4.18** on page 45. Ensure correct phase rotation.
5. Connect the UPS input.

For two breaker Vertiv™ Liebert® Ancillary Medium MBC.

- If the system is a dual input type, connect the AC input supply cables from the Liebert® Ancillary Medium MBC bypass input supply breaker to UPS bypass input supply busbars (A-B-C terminals) and from Liebert® Ancillary Medium MBC rectifier input supply breaker to the UPS rectifier input supply busbars (A-B-C terminals). Tighten the connections to the proper torque. Ensure correct phase rotation.
 - If the system is a single input type, connect the AC input supply cables from the Liebert® Ancillary Medium MBC bypass input supply breaker to the UPS bypass input supply busbars (A-B-C terminals) and verify installation of AC jumper connectors between UPS bypass input supply busbars and UPS rectifier input supply busbars (A-B- C terminals). Tighten the connections to the proper torque. See **Table 4.18** on page 45. Ensure correct phase rotation.
6. Connect the system output power cables from the Liebert® Ancillary Medium MBC output (A-B-C terminals) to the critical load and tighten the connections to the proper torque. See **Table 4.18** on page 45. Ensure correct phase rotation.
 7. Connect the control wiring from the Liebert® Ancillary Medium MBC terminal block TB1 to the Liebert® Ancillary Medium UPS control module Vertiv™ Liebert® APM2 control wiring ports. Tighten the connections to the proper torque. See **Table 4.18** on page 45.
 8. Replace the panels.

Table 2.1 Control Wiring from Liebert® Ancillary Medium UPS to Liebert® Ancillary Medium MBC

Signal Name		From Vertiv™ Liebert® APM2		To Vertiv™ Liebert® APM2 MBC Terminal Block (TB1)
INPUT SHUNT TRIP	Rectifier input breaker (RIB) SHUNT TRIP	C2 board J4*	C2 J4-1	TB1-1
	RIB SHUNT TRIP GND		C2 J4-2	TB1-2
BYPASS SHUNT TRIP	Bypass input breaker (BIB) SHUNT TRIP	Control module X6 J22	X6 J22-1	TB1-5
	BIB SHUNT TRIP GND		X6 J22-6	TB1-6

Table 2.1 Control Wiring from Liebert® Ancillary Medium UPS to Liebert® Ancillary Medium MBC (continued)

Signal Name		From Vertiv™ Liebert® APM2		To Vertiv™ Liebert® APM2 MBC Terminal Block (TB1)
BREAKER STATUS	RIB STATUS	Control module 7 J1 and J2	X7 J2-5	TB1-3
	RIB STATUS GND		X7 J2-7	TB1-4
	BIB STATUS		X7 J2-14	TB1-7
	BIB STATUS GND		X7 J2-16	TB1-8
	Maintenance bypass breaker (MBB) STATUS		X7 J1-17	TB1-9
	MBB STATUSGND		X7 J1-19	TB1-10
	Maintenance isolation breaker (MIB) STATUS		X7 J1-18	TB1-11
	MIB STATUSGND		X7 J1-20	TB1-12
Solenoid Key Release Unit (SKRU) FUNCTION	BYPASS ENABLE COM	Control module 7 J1 and J2	X7 J3-1	TB1-18
	BYPASS ENABLE N.C.		X7 J3-3	TB1-19
	INVERTER INHIBIT		X7 J1-13	TB1-20
	INVERTER INHIBIT COM		X7 J1-15	TB1-21
*RIB shunt trip only used for 10 kVA to 120 kVA frame Vertiv™ Liebert® APM2 UPS.				

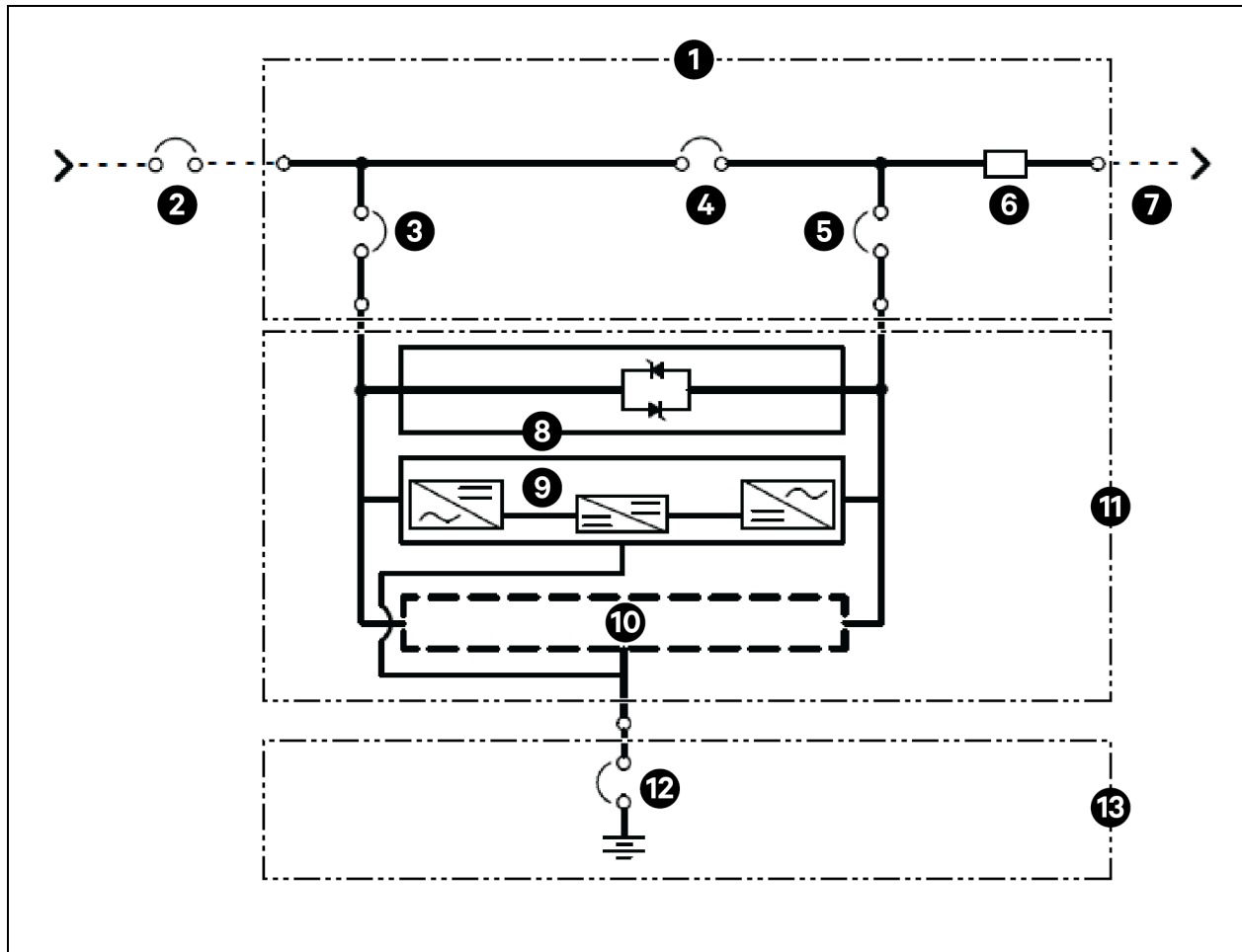
Following are guidelines and are superseded by local regulations and codes of practice where applicable.

- The ground conductor must be sized according to local or NEC codes, cable lengths, and type of protection. The ground cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consideration must be given to the use of smaller, paralleled cables for heavy currents as a way to ease installation.
- In most installations, the load equipment is connected to a distribution network of individually protected busbars fed by the Vertiv™ Liebert® Ancillary Medium MBC output rather than being connected directly to the Liebert® Ancillary Medium MBC itself. Where this is the case, the Liebert® Ancillary Medium MBC output cables can be rated to suit the individual distribution network demands rather than being fully load rated.
- When laying the power cables, do not form coils to avoid increasing electromagnetic interference.

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3 Installation Drawings

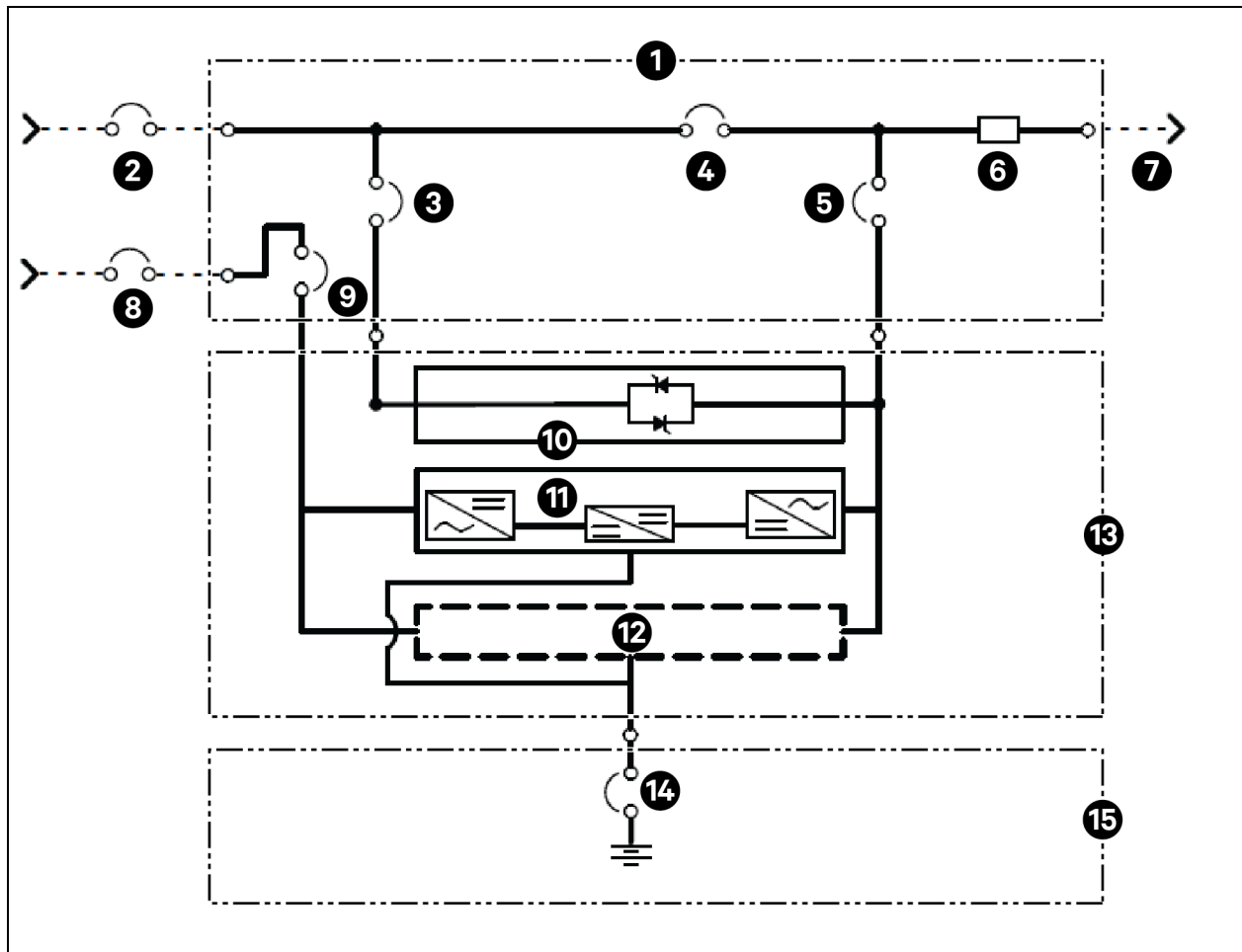
Figure 3.1 One Line Diagram, Single Input, Three Breaker Vertiv™ Liebert® Ancillary Medium MBC, 10 kVA to 300 kVA



Item	Description	Item	Description
1	MBC	8	Bypass module
2	Bypass AC input*	9	Power module 1
3	BIB	10	Power module N
4	MBB	11	UPS cabinet
5	MIB	12	Battery breaker
6	Output busbar	13	Battery cabinet
7	AC output		
*External overcurrent protection by others.			

Notes to Figure:

- Install in accordance with national and local electrical codes.
- Input and bypass must share the same single source.
- For 4-wire configurations a neutral is required from the system AC input source. A full capacity neutral conductor is recommended, grounding conductors are recommended.
- Bypass and rectifier inputs and output cables must be run in separate conduits.
- Control wiring must be run in separate conduits.
- Batteries may be internal depending on selected options. Battery breakers are supplied for both internal and external Vertiv supplied battery options.
- UPS must be configured as 4-wire for 208 V operation and can be configured as 3-wire or 4-wire for 400 V and 480 V operation.
- Grounding conductors are required.

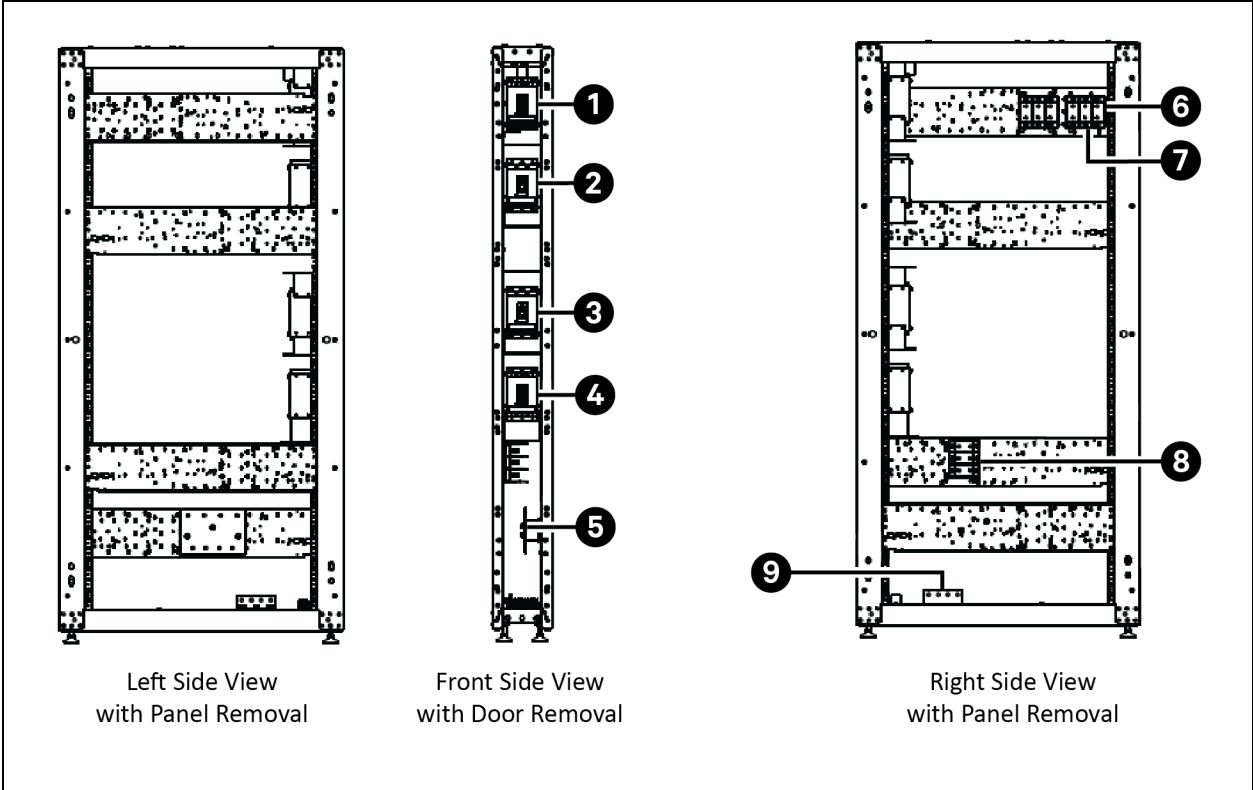
Figure 3.2 One Line Diagram, Single Input, Four Breaker Vertiv™ Liebert® Ancillary Medium MBC

Item	Description	Item	Description
1	MBC	9	RIB
2	Bypass AC input*	10	Bypass module
3	BIB	11	Power module 1
4	MBB	12	Power module N
5	MIB	13	UPS cabinet
6	Output busbar	14	Battery breaker
7	AC output	15	Battery cabinet
8	Rectifier AC input*		
*External overcurrent protection by others.			

Notes to Figure:

- Follow local and national electrical codes when installing.
- Input and bypass must share the same single source for 4-wire applications.
- For 4-wire configurations a neutral is required from the system AC input source. A full capacity neutral conductor is recommended. Grounding conductors are recommended.
- Bypass and rectifier inputs and output cables must be run in separate conduits.
- Control wiring must be run in separate conduits.
- Batteries may be internal depending on selected options. Battery breakers are supplied for both internal and external Vertiv supplied battery options.
- UPS must be configured as 4-wire for 208 V operation and can be configured as 3-wire or 4-wire for 400 V and 480 V operation.
- Grounding conductors are required.

Figure 3.3 Main Components — 7.9 in. (200 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



Item	Description	Item	Description
1	RIB	6	TB2
2	BIB	7	TB4
3	MBB	8	TB3
4	MIB	9	Ground busbar
5	Neutral busbar		

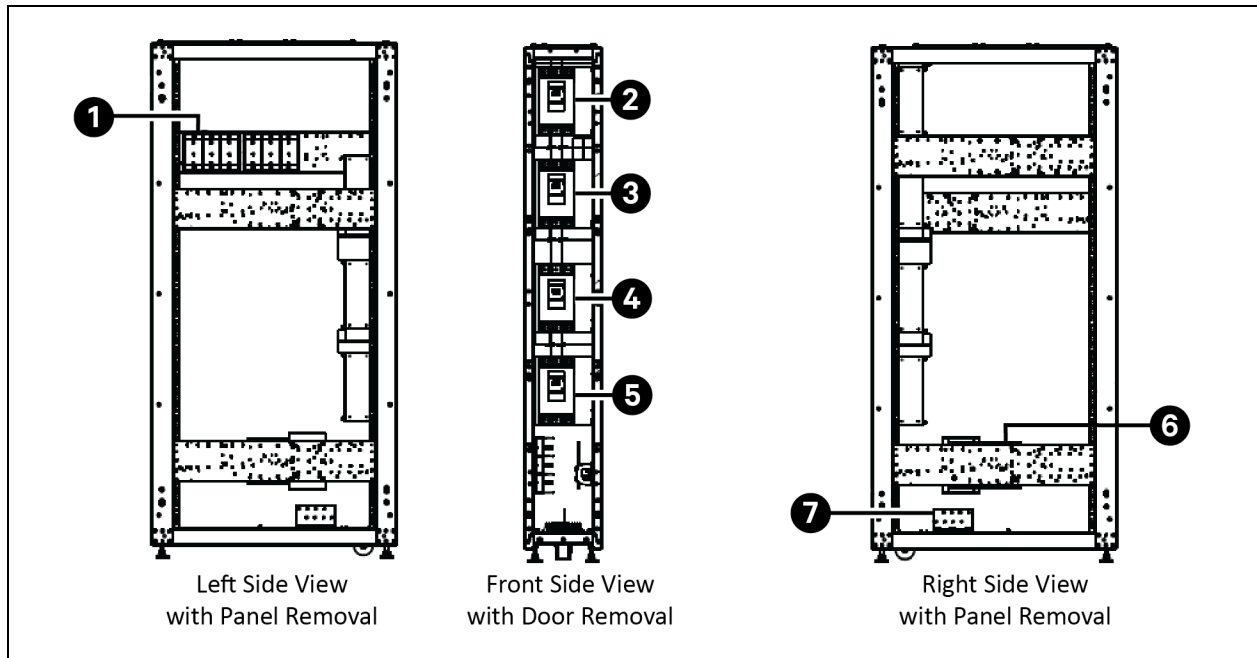
Table 3.1 Breaker Configuration — 7.9 in. (200 mm) Liebert® Ancillary Medium MBC, Three to Four Breakers

Liebert® Ancillary Medium MBC Breaker Configuration	Configured Breaker			
3	—	BIB	MBB	MIB
4	RIB	BIB	MBB	MIB

Table 3.2 Terminal Block Details — 7.9 in. (200 mm) Liebert® Ancillary Medium MBC, Three to Four Breakers

Terminal Block	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

Figure 3.4 Main Components — 11.9 in. (300 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



Item	Description	Item	Description
1	Power block	5	MIB
2	RIB	6	Neutral busbar
3	BIB	7	Ground busbar
4	MBB		

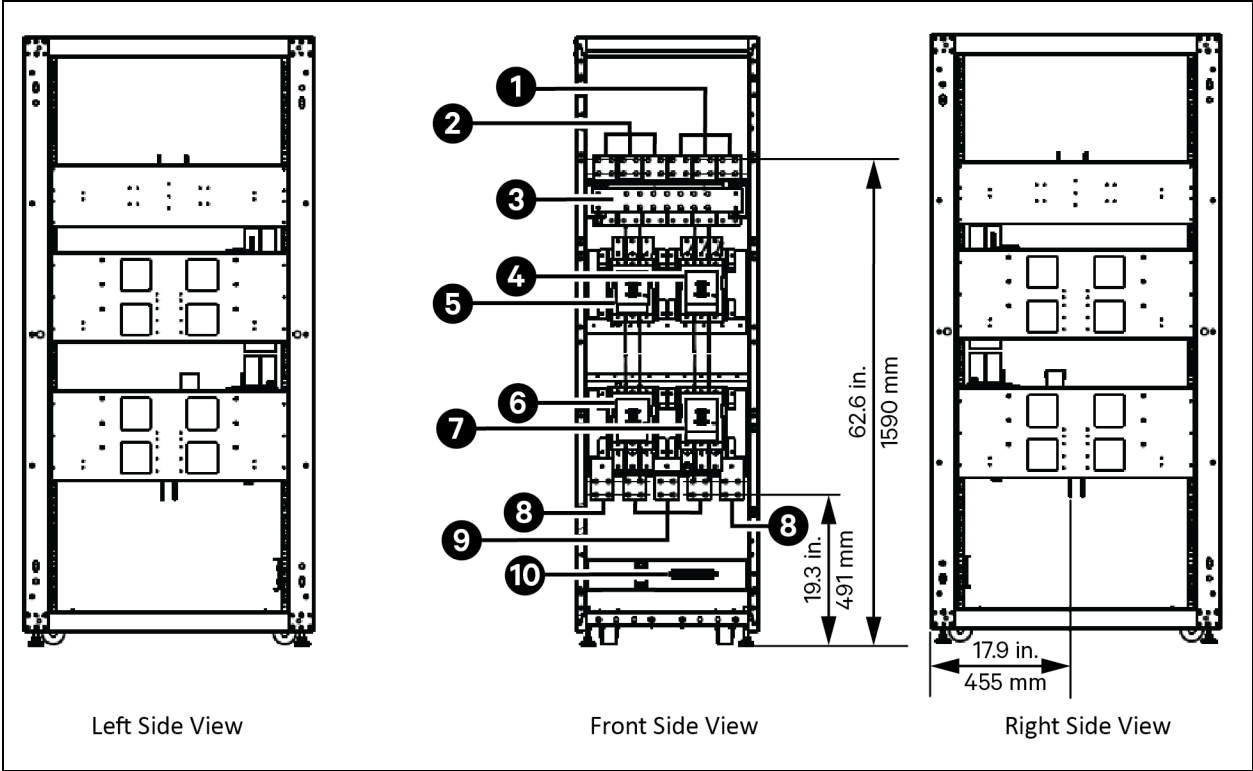
Table 3.3 Breaker Configuration — 11.9 in. (300 mm) Liebert® Ancillary Medium MBC, Three to Four Breakers

Liebert® Ancillary Medium MBC Breaker Configuration	Configured Breaker			
3	—	BIB	MBB	MIB
4	RIB	BIB	MBB	MIB

Table 3.4 Terminal Block Details — 11.9 in. (300 mm) Liebert® Ancillary Medium MBC, Three to Four Breakers

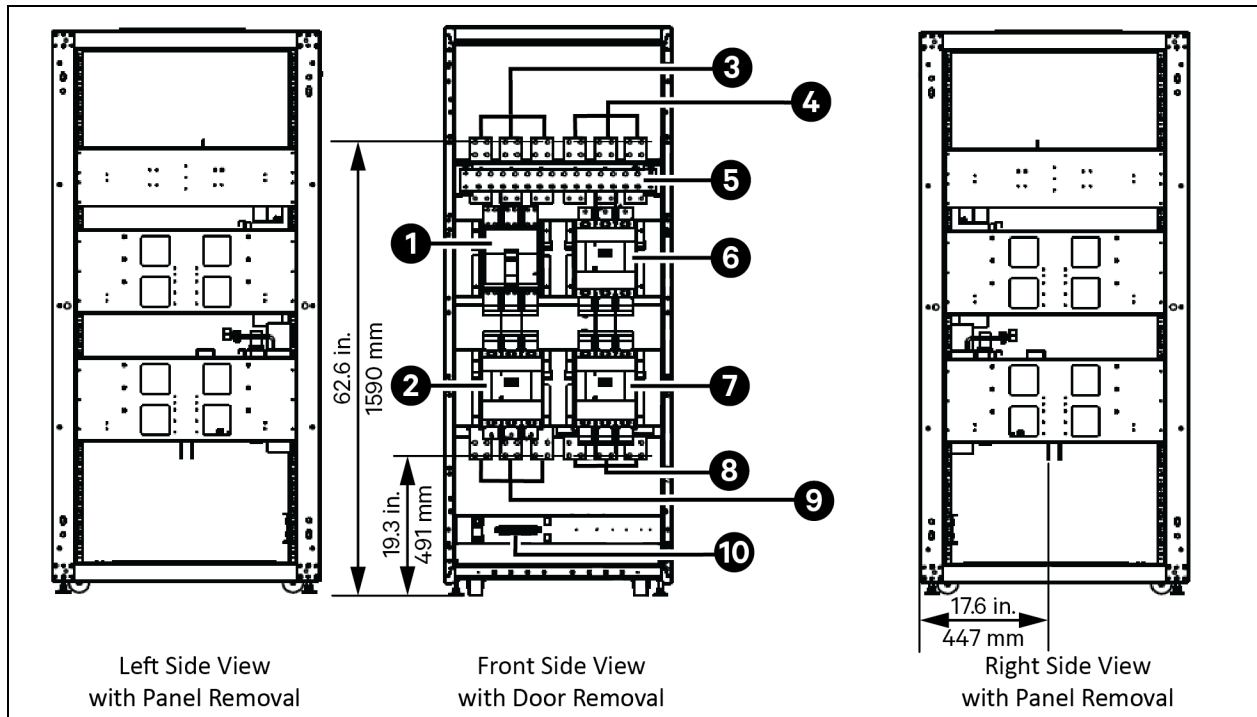
Terminal Block	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

Figure 3.5 Main Components — 23.7 in. (600 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



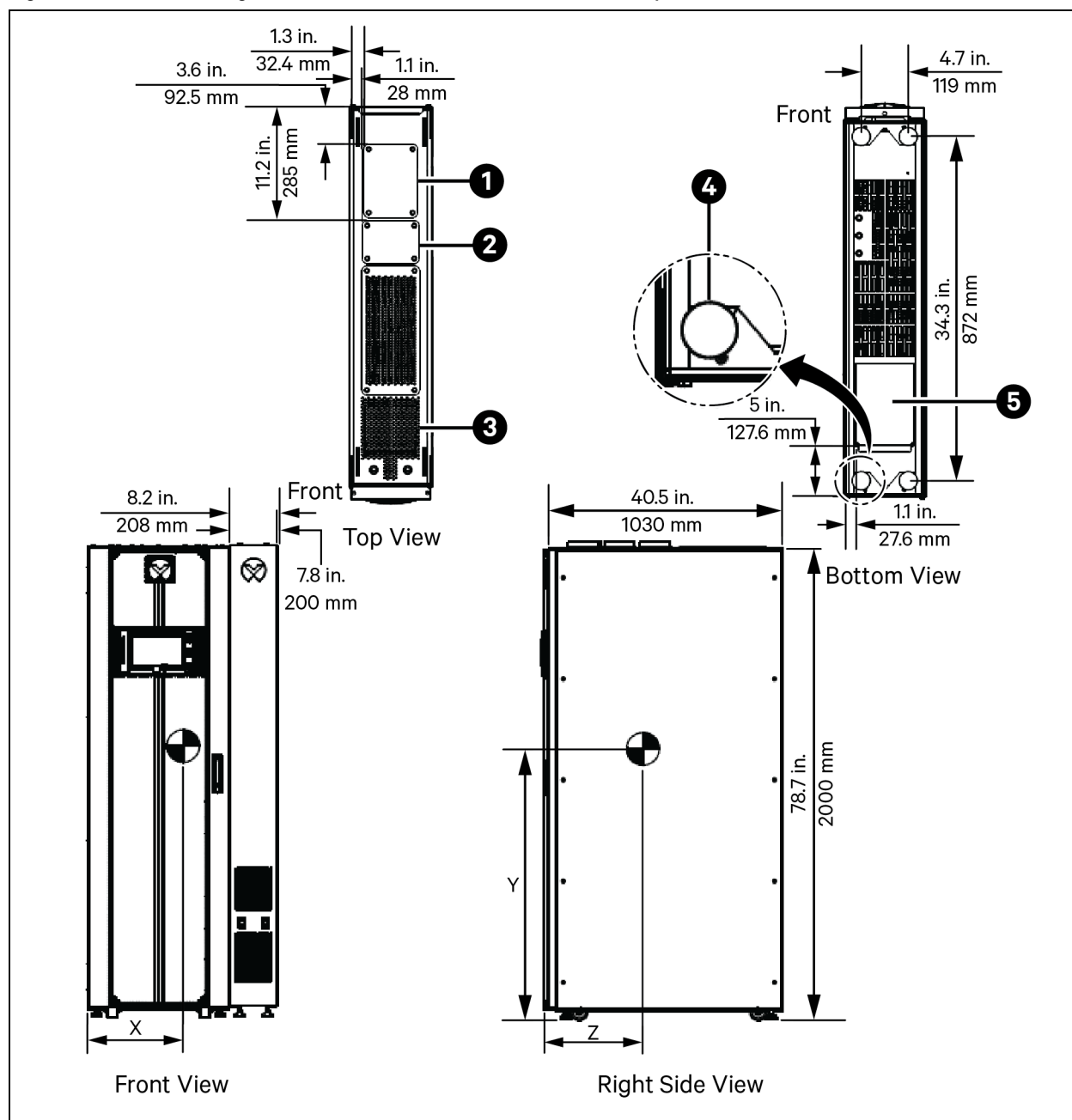
Item	Description	Item	Description
1	Bypass input	6	MBB
2	Rectifier input	7	MBB
3	Neutral	8	Ground
4	BIB	9	Output
5	RIB*	10	TB1
*Four breaker option only			

Figure 3.6 Main Components — 31.5 in. (800 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



Item	Description	Item	Description
1	RIB*	6	BIB
2	MIB	7	MBB
3	Rectifier input	8	Output
4	Bypass input	9	Ground
5	Neutral	10	TB1
*Four breaker option only.			

Figure 3.7 Outline Drawing — 7.9 in. (200 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



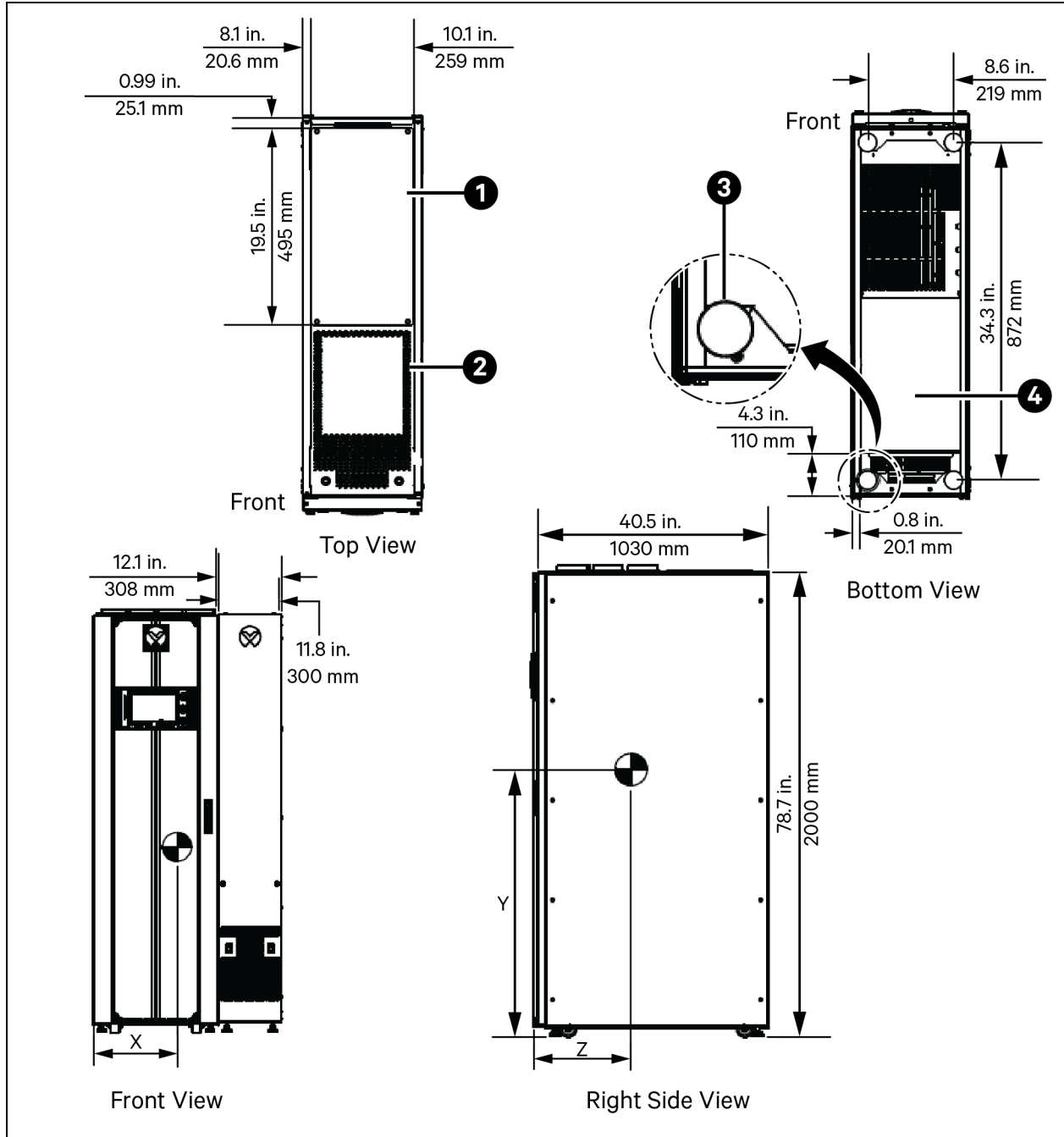
Item	Description	Item	Description
1	Power cable entry 5.3 in. (135 mm) x 7.3 in. (185 mm)	4	Leveler
2	Control cable entry 5.6 in. (143 mm) x 4.2 in. (108 mm)	5	Power cable entry 3.7 in. (145 mm) x 8.3 in. (210 mm)
3	Ventilation		

Notes to Figure:

- Minimum space required for service is 24 in. (610 mm) minimum clearance above unit for air exhaust and 36 in. (914 mm) for front access.

- Keep cabinet within 15 degree of vertical.
- Top and bottom cable entry available through removable access plates. Remove and punch to suit conduit size and replace.
- Ensure that the unit bottom is structurally adequate for forklift handling.
- Control wiring and power wiring must be run in separate conduits.
- Only copper cables are recommended.
- All wiring is to be in accordance with national and local electrical codes.

Figure 3.8 Outline Drawing — 11.9 in. (300 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers

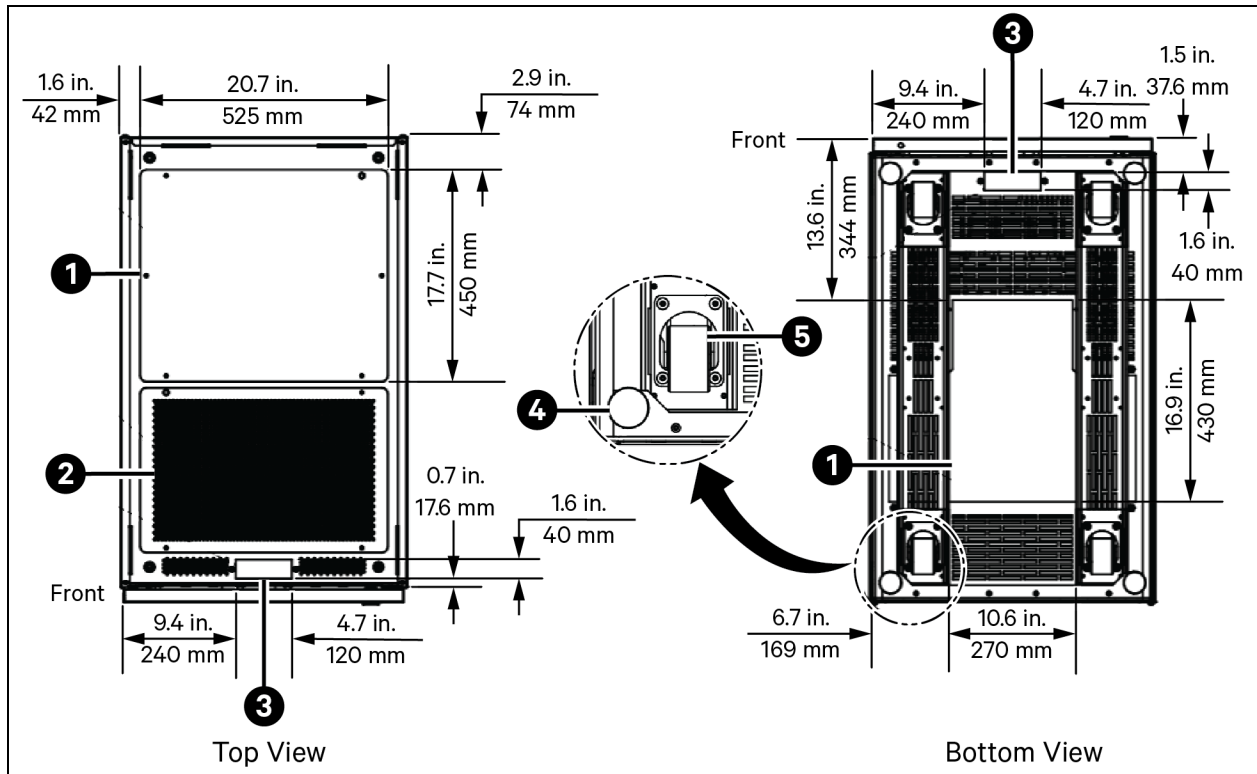


Item	Description
1	Power cable entry 10.1 in. (259 mm) x 19.5 in. (495 mm)
2	Ventilation
3	Leveler
4	Power cable entry 10.8 in. (275 mm) x 16.3 in. (415 mm)

Notes to Figure:

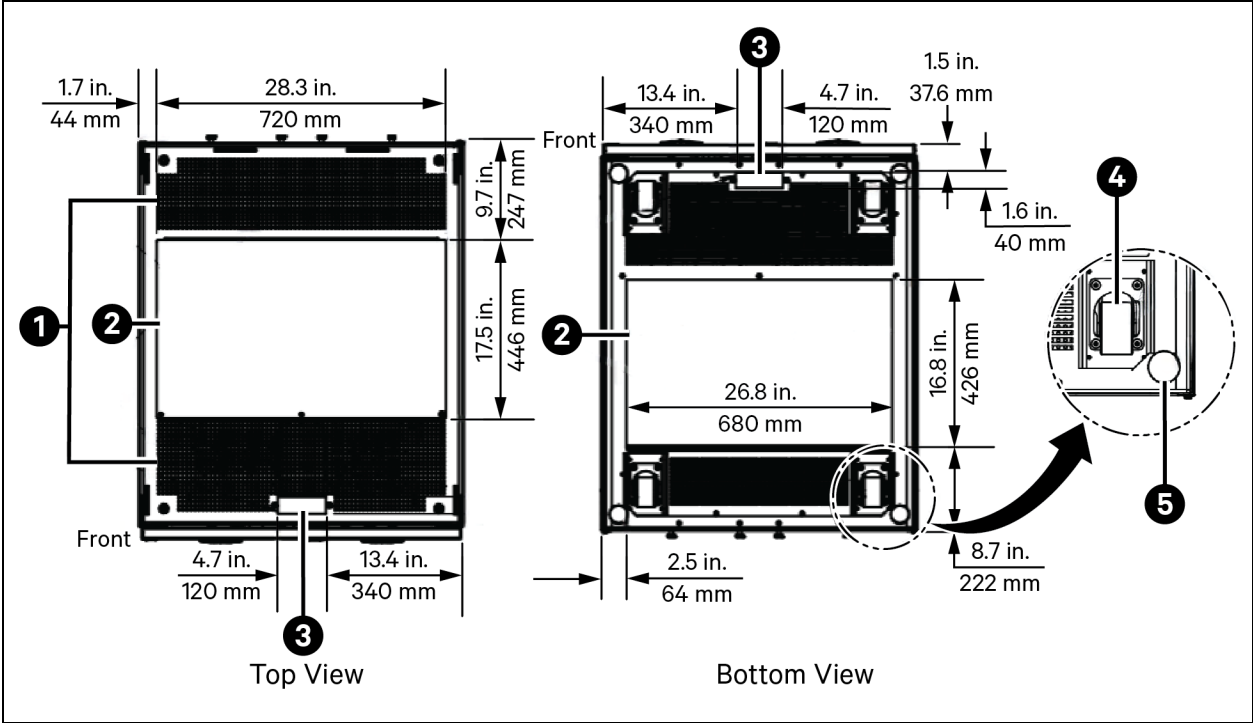
- Minimum space required for service is 24 in. (610 mm) minimum clearance above unit for air exhaust and 36 in. (914 mm) for front access.
- Keep cabinet within 15 degree of vertical.
- Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
- Ensure that the unit bottom is structurally adequate for forklift handling.
- Control wiring and power wiring must be run in separate conduits.
- Only copper cables are recommended.
- All wiring is to be in accordance with national and local electrical codes.

Figure 3.9 Outline Drawing — 11.9 in. (600 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



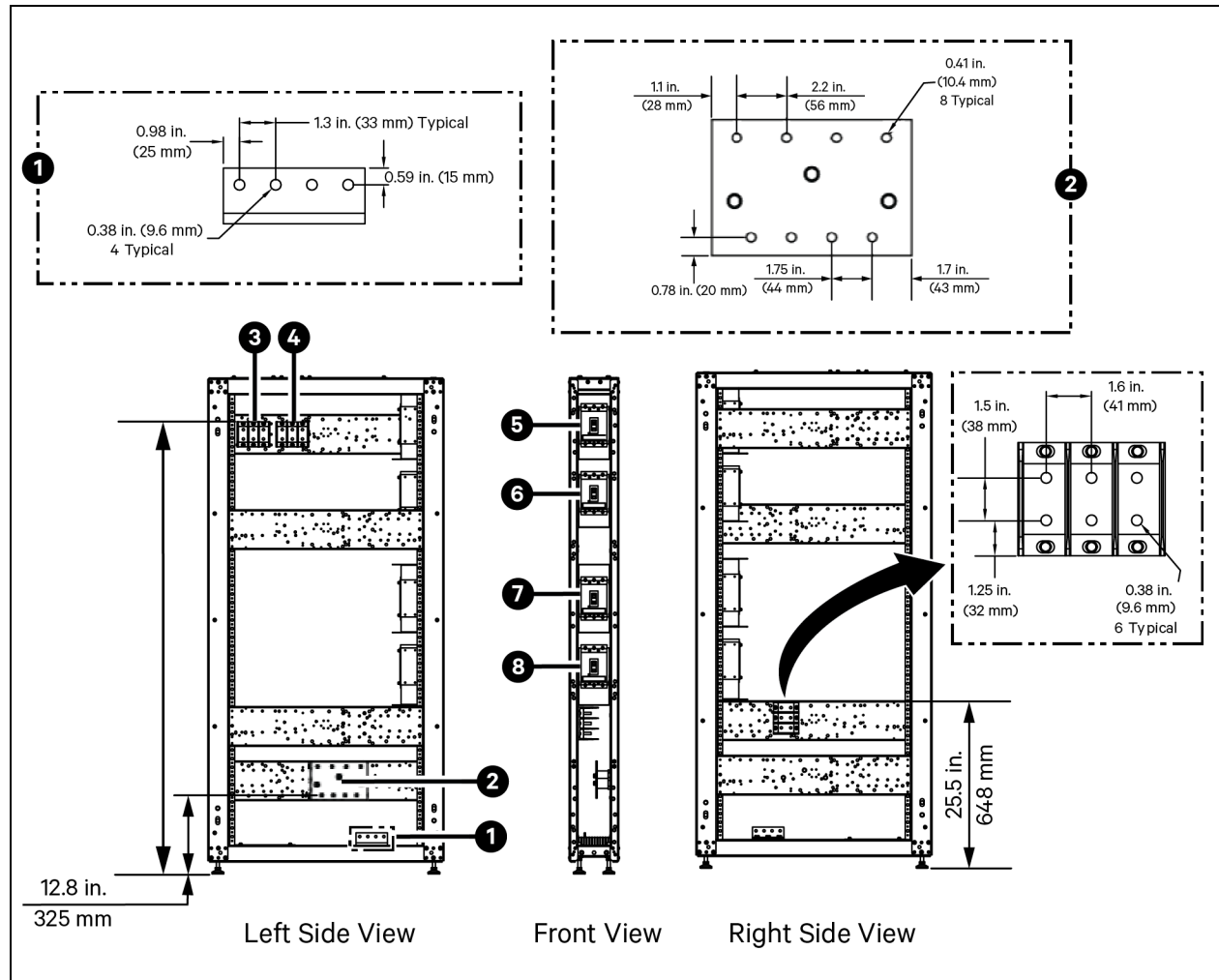
Item	Description
1	Power cable entry
2	Ventilation
3	Control cable entry
4	Leveler
5	Caster

Figure 3.10 Outline Drawing — 11.9 in. (800 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers



Item	Description
1	Ventilation
2	Power cable entry
3	Control cable entry
4	Caster
5	Leveler

Figure 3.11 Terminal Details — 7.9 in. (200 mm) Vertiv™ Liebert® Ancillary Medium MBC, Four Breakers



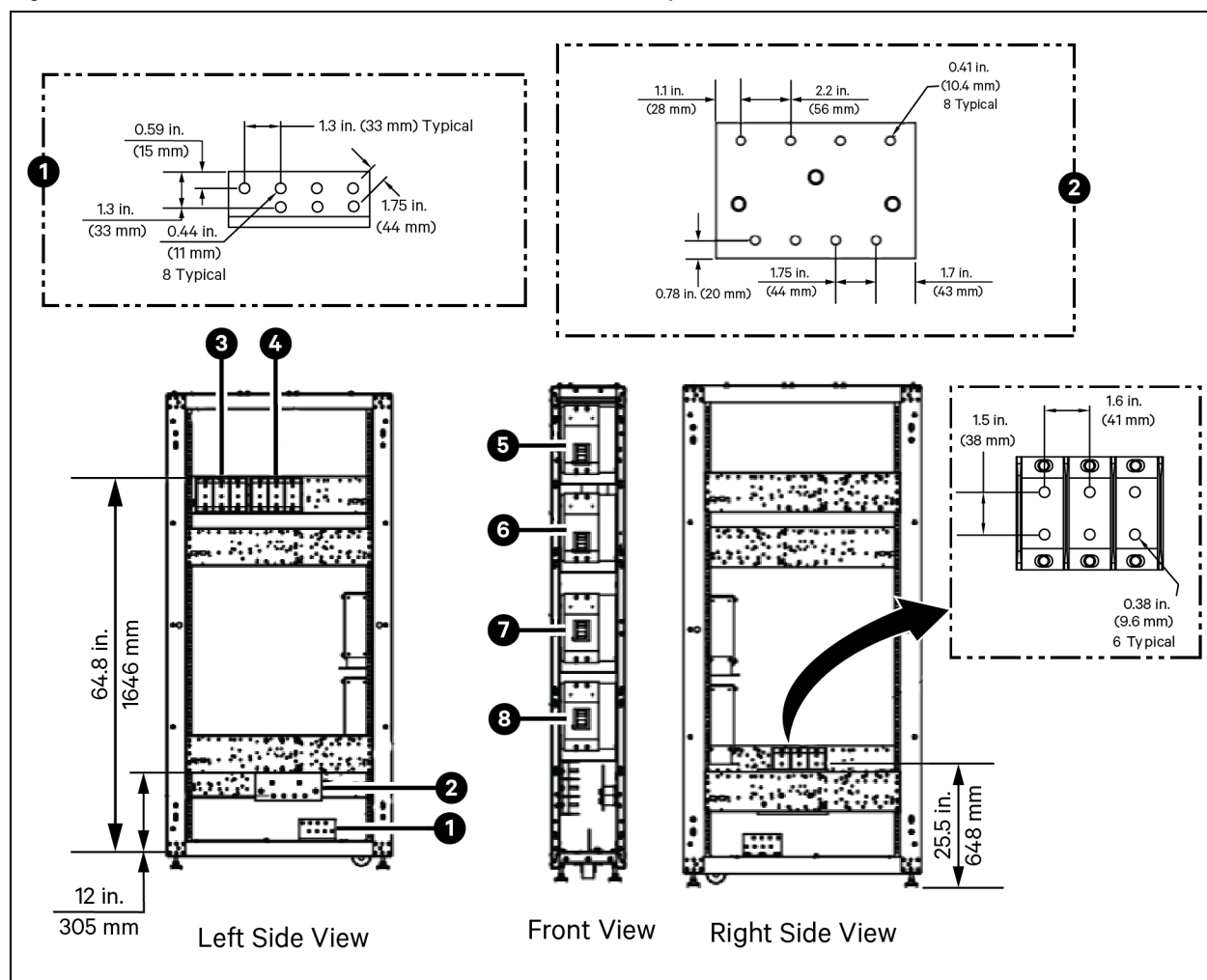
Item	Description	Item	Description
1	Ground busbar	5	RIB
2	Neutral busbar	6	BIB
3	Input (TB2)	7	MBB
4	Rectifier input (TB4)	8	MIB

Table 3.5 Breaker Configuration — 7.9 in. (200 mm) Liebert® Ancillary Medium MBC, Four Breakers

Liebert® Ancillary Medium MBC Breaker Configuration		Configured Breaker			
3		—	BIB	MBB	MIB
4		RIB	BIB	MBB	MIB

Table 3.6 Terminal Block Details — 7.9 in. (200 mm) Vertiv™ Liebert® Ancillary Medium MBC, Three to Four Breakers

Terminal Block	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

Figure 3.12 Terminal Details — 11.9 in. (300 mm) Liebert® Ancillary Medium MBC, Four Breakers

Item	Description	Item	Description
1	Ground busbar	5	RIB
2	Neutral busbar	6	BIB
3	Input (TB2)	7	MBB
4	Rectifier input (TB4)	8	MIB

Notes to Figure:

- Control wiring and power wiring must be run in separate conduits.

- All wiring is to be in accordance with national and local electrical codes.
- If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

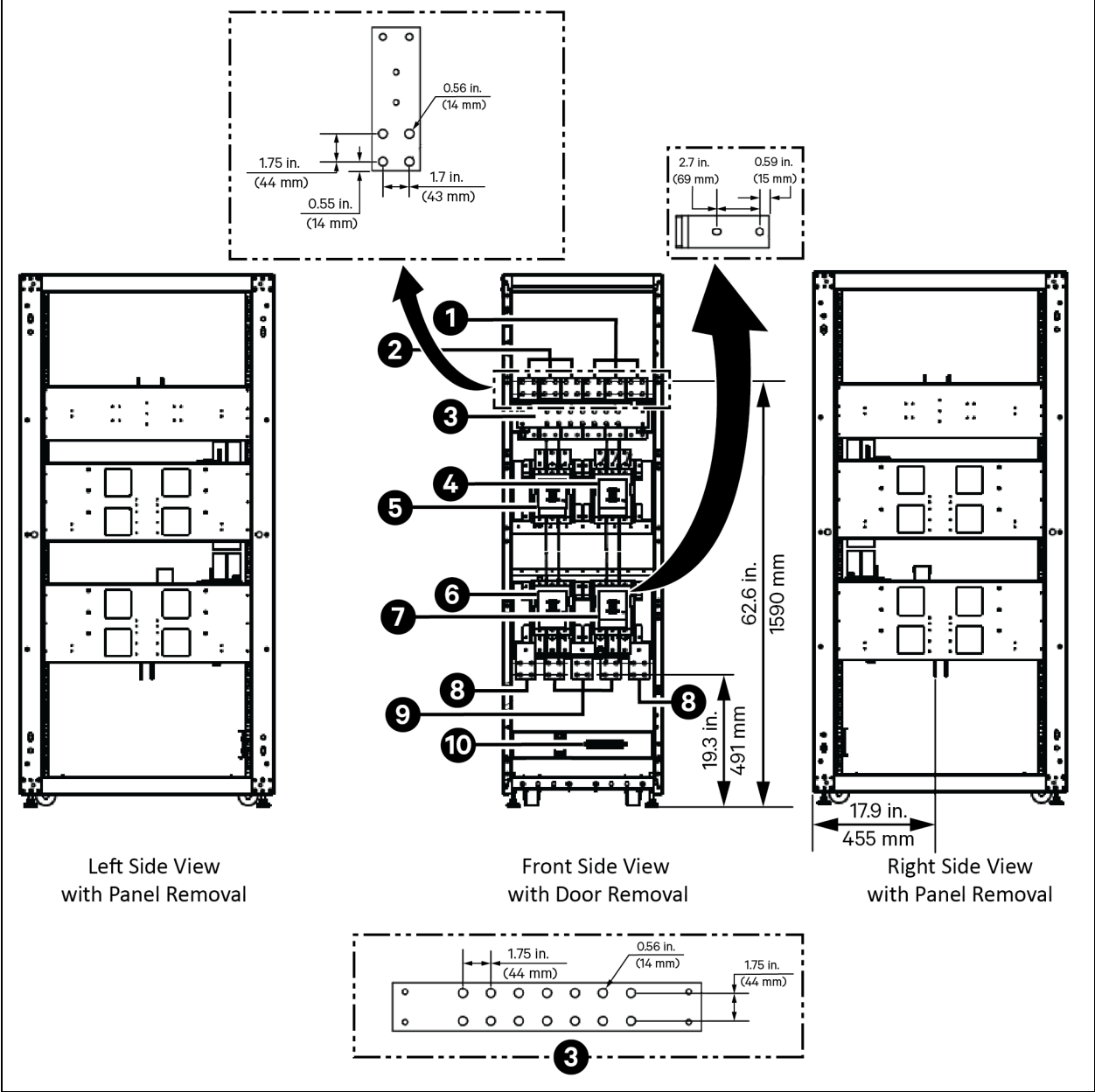
Table 3.7 Breaker Configuration — 11.9 in. (300 mm) Vertiv™ Liebert® Ancillary Medium MBC, Four Breakers

Liebert® Ancillary Medium MBC Breaker Configuration	Configured Breaker			
3	—	BIB	MBB	MIB
4	RIB	BIB	MBB	MIB

Table 3.8 Terminal Block Details — 11.9 in. (300 mm) Liebert® Ancillary Medium MBC, Four Breakers

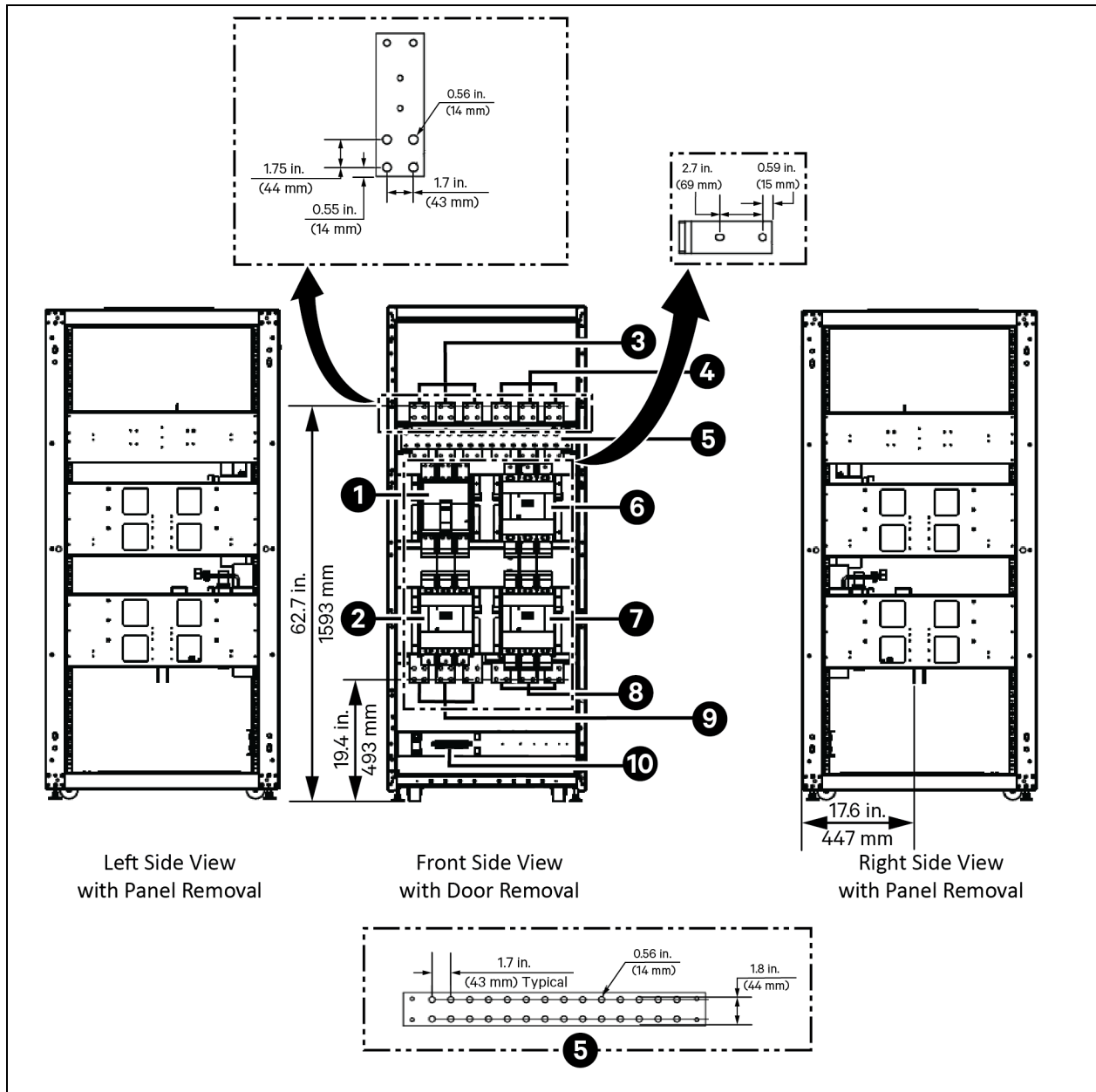
Terminal Block	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

Figure 3.13 Terminal Details — 23.7 in. (600 mm) Vertiv™ Liebert® Ancillary Medium MBC, Four Breakers



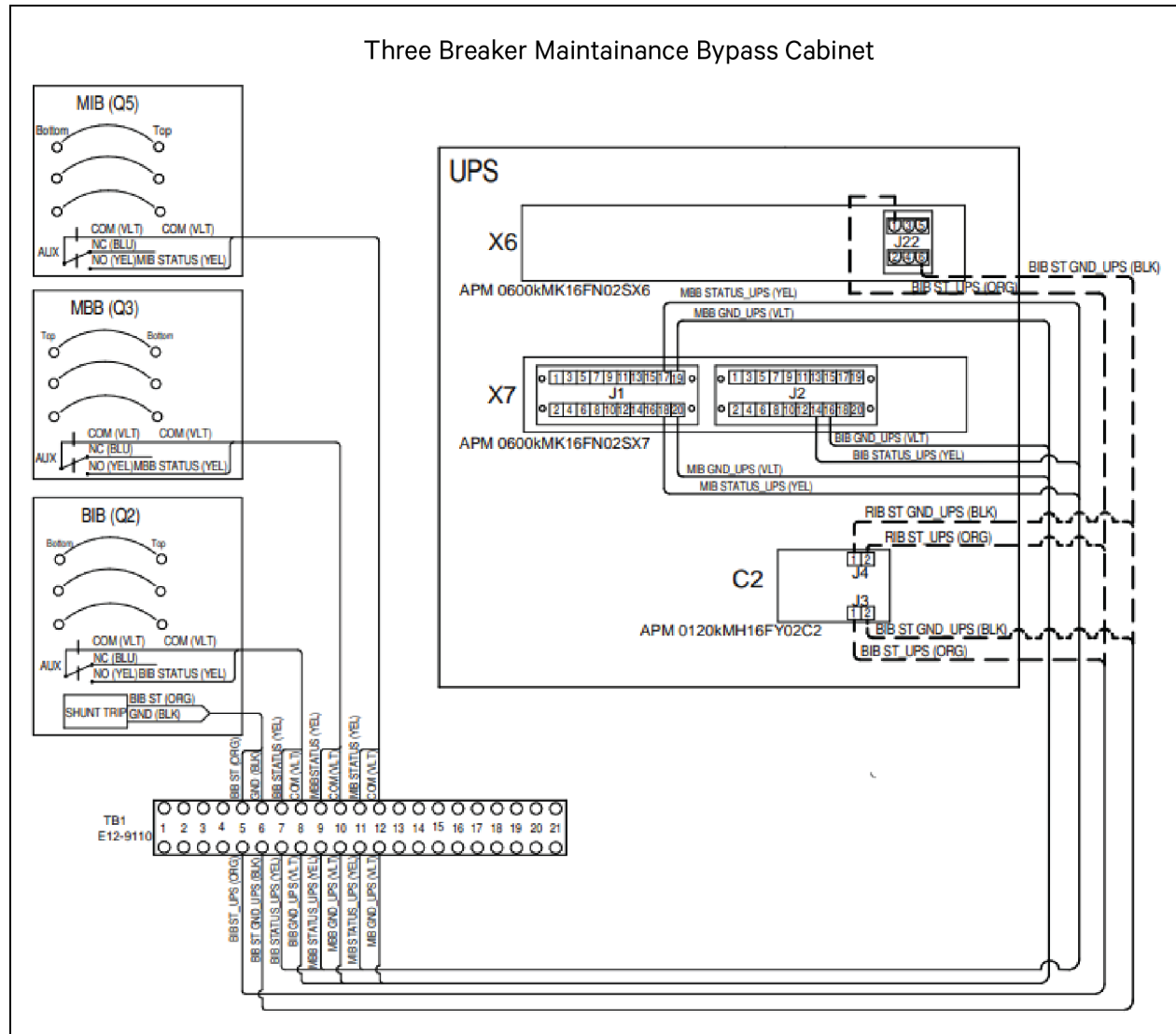
Item	Description	Item	Description
1	Bypass input	6	MBB
2	Rectifier input	7	MIB
3	Neutral busbar	8	Ground busbar
4	BIB	9	Output
5	RIB	10	TB1

Figure 3.14 Terminal Details — 31.5 in. (800 mm) Vertiv™ Liebert® Ancillary Medium MBC, Four Breakers



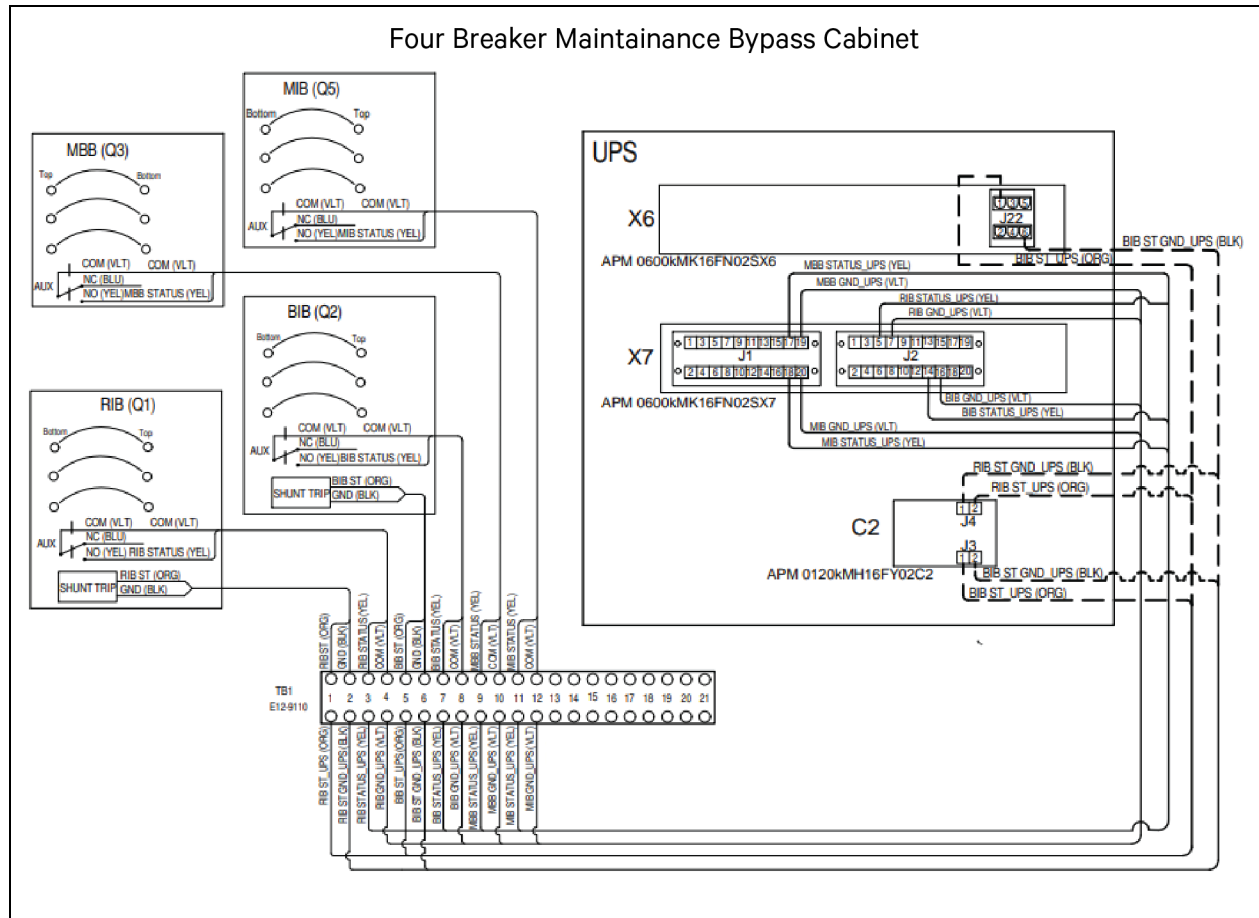
Item	Description	Item	Description
1	RIB	6	BIB
2	MIB	7	MBB
3	Rectifier input busbar	8	Output busbar
4	Bypass input busbar	9	Ground busbar
5	Neutral busbar	10	TB1

Figure 3.15 Control Wiring Diagram, Vertiv™ Liebert® Ancillary Medium MBC, Three Breakers

**Notes to Figure:**

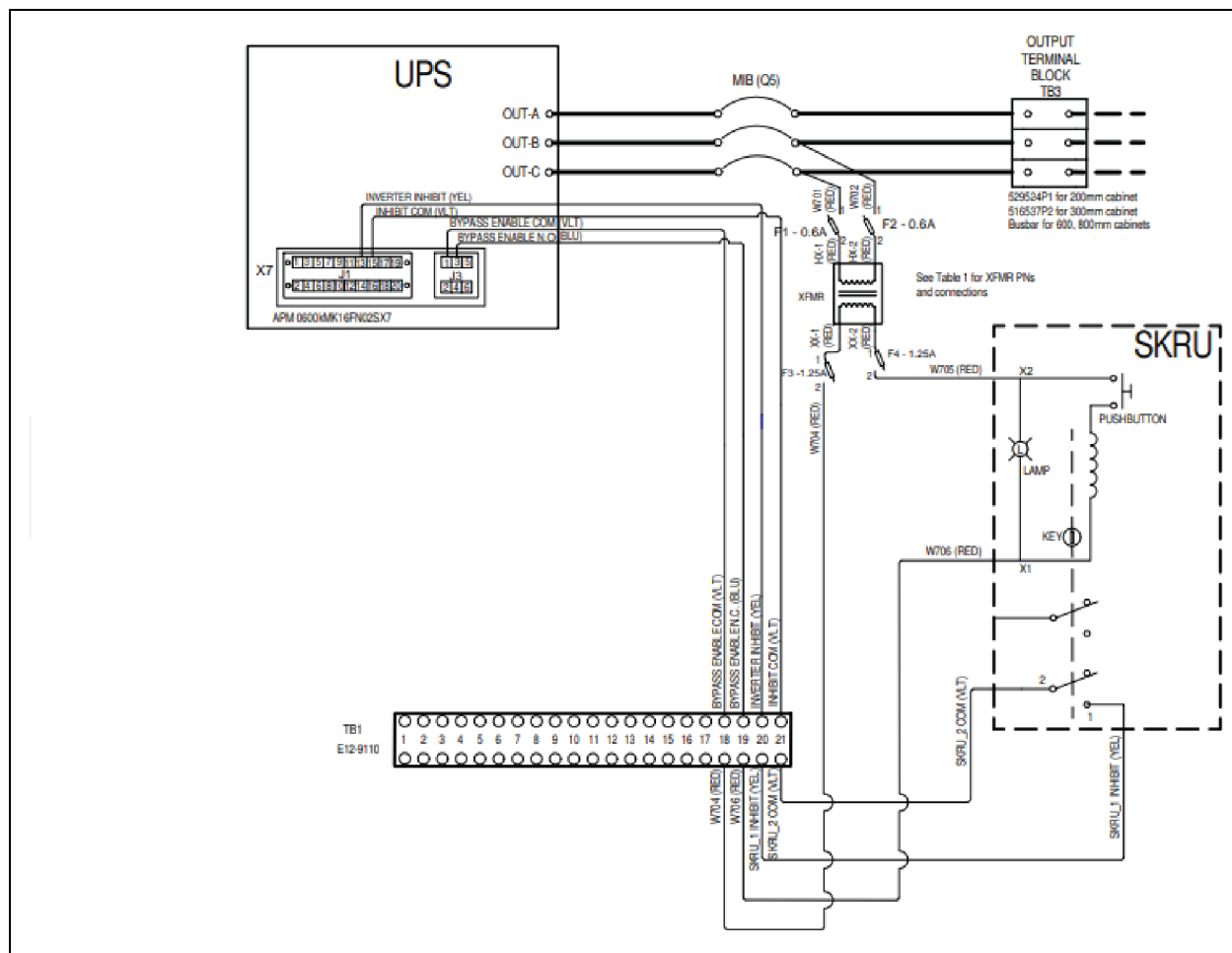
- For MBCs attached to 120 kVA frame Vertiv™ Liebert® APM2 UPS, BIB and RIB shunt trip to C2 board (APM 0120kMH16FY02C2).
- For MCBs attached to 300 kVA frame Liebert® APM2 UPS, wire BIB shunt trip only to X6 board (APM 0600kMK16FN02SX6).
- RIB shunt trip used for 120 kVA frame Liebert® APM2 UPS only.
- Terminal board shown is for Vertiv supplied MBB only.

Figure 3.16 Control Wiring Diagram, Vertiv™ Liebert® Ancillary Medium MBC, Four Breakers

**Notes to Figure:**

- For MBCs attached to 120 kVA frame Vertiv™ Liebert® APM2 UPS, BIB and RIB shunt trip to C2 board (APM 0120kMH16FY02C2).
- For MCBs attached to 300 kVA frame Liebert® APM2 UPS, wire BIB shunt trip only to X6 board (APM 0600kMK16FN02SX6).
- RIB shunt trip used for 120 kVA frame Liebert® APM2 UPS only.
- Terminal board shown is for Vertiv supplied MBB only.

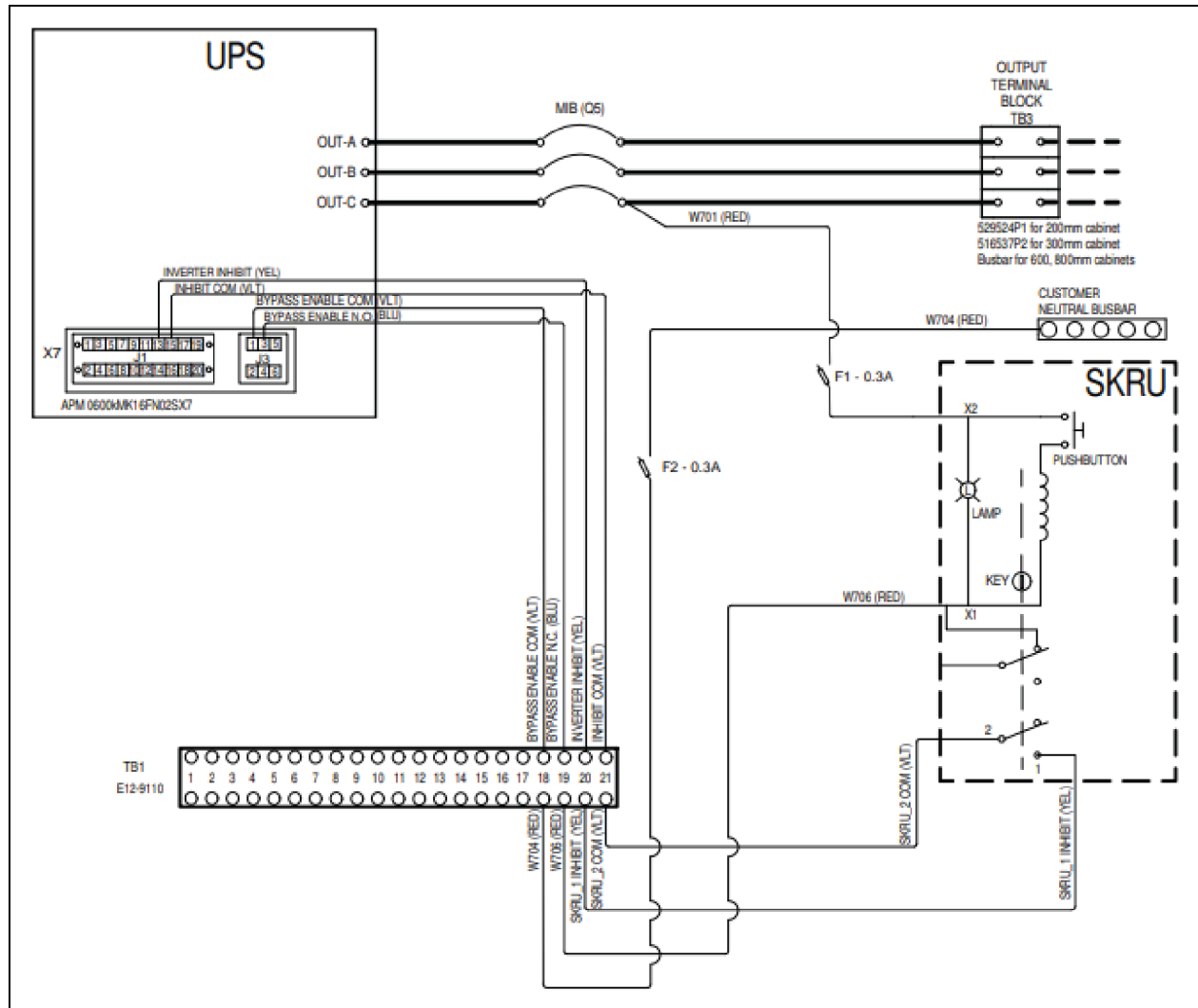
Figure 3.17 Vertiv™ Liebert® Ancillary Medium MBC, 400 V to 480 V Key Interlock Control Wiring



Notes to Figure:

- SKRU contacts shown with key captive.
- Jumpers are factory supplied.
- Terminal board and transformer shown are for Vertiv supplied MBB only.

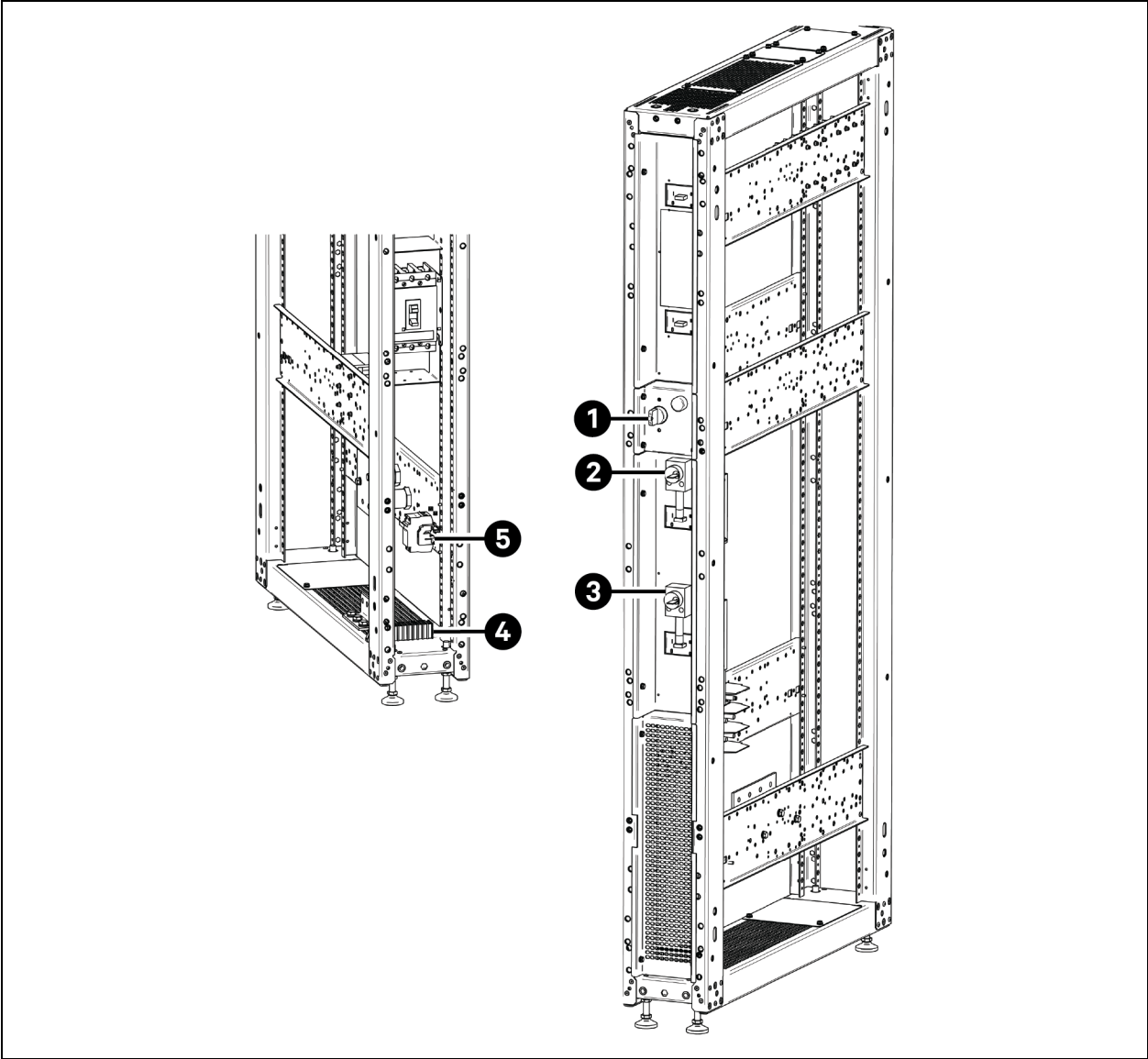
Figure 3.18 Vertiv™ Liebert® Ancillary Medium MBC, 208 V Key Interlock Control Wiring



Notes to Figure:

- SKRU contacts are shown with key captive.
- Terminal board shown is for Vertiv supplied MBB only.

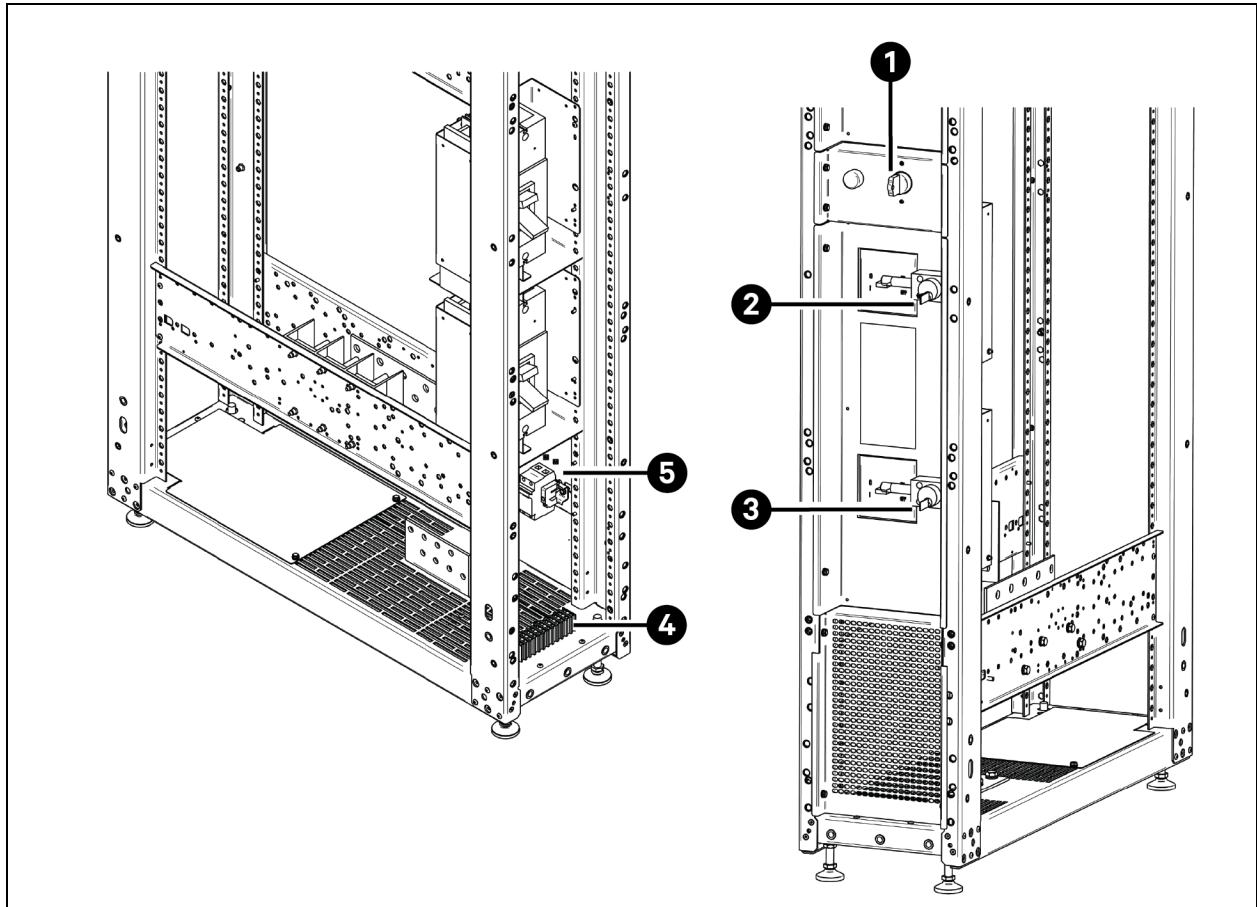
Figure 3.19 SKRU, 7.9 in. (200 mm) Vertiv™ Liebert® Ancillary Medium MBC



Item	Description
1	K0
2	K1
3	K2
4	TB1
5	Fuse block for SKRU

NOTE: SKRU is mounted between the BIB and MBB breakers.

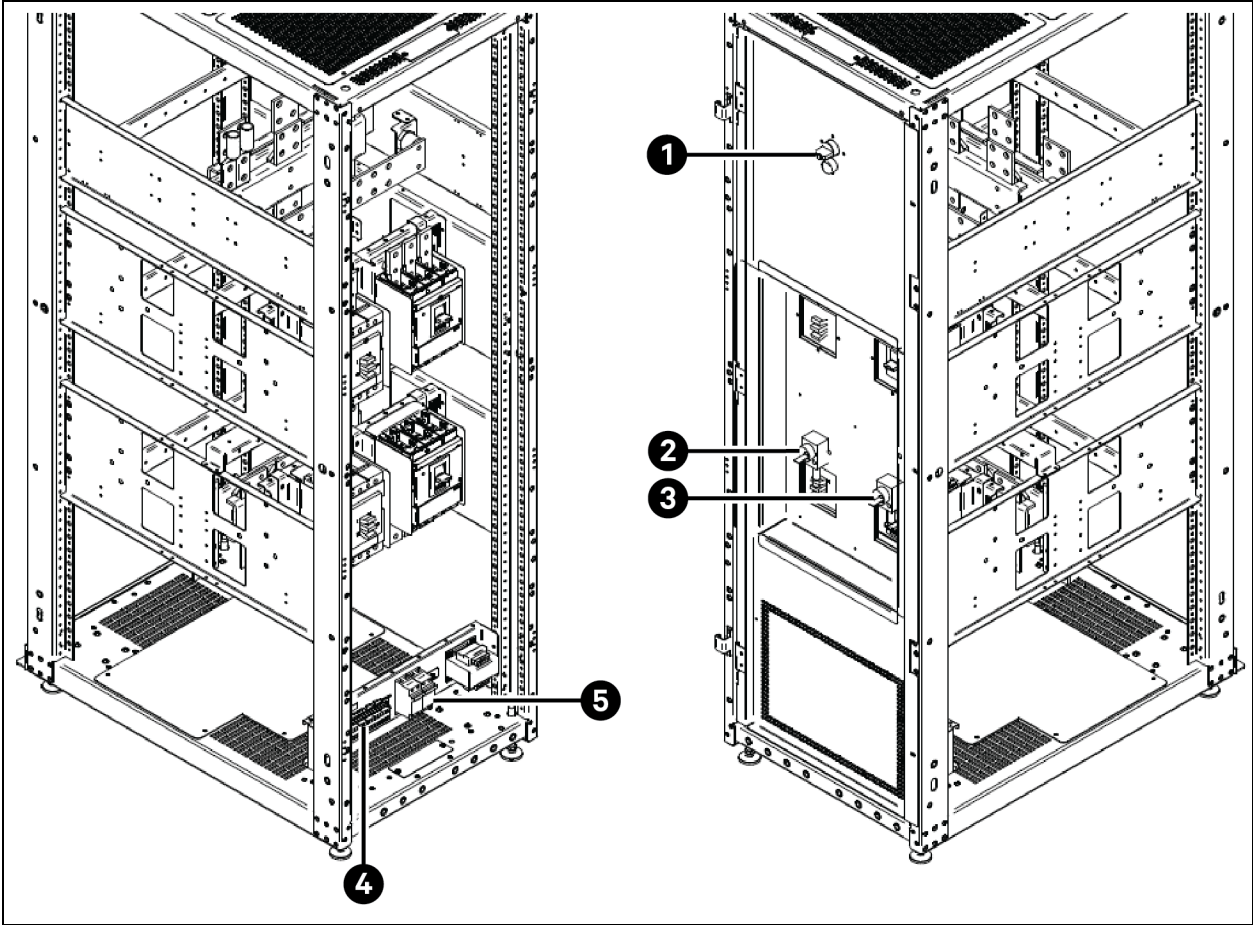
Figure 3.20 SKRU, 11.9 in. (300 mm) Vertiv™ Liebert® Ancillary Medium MBC



Item	Description
1	K0
2	K1
3	K2
4	TB1
5	Fuse block for SKRU

NOTE: SKRU is mounted between the BIB and MBB breakers.

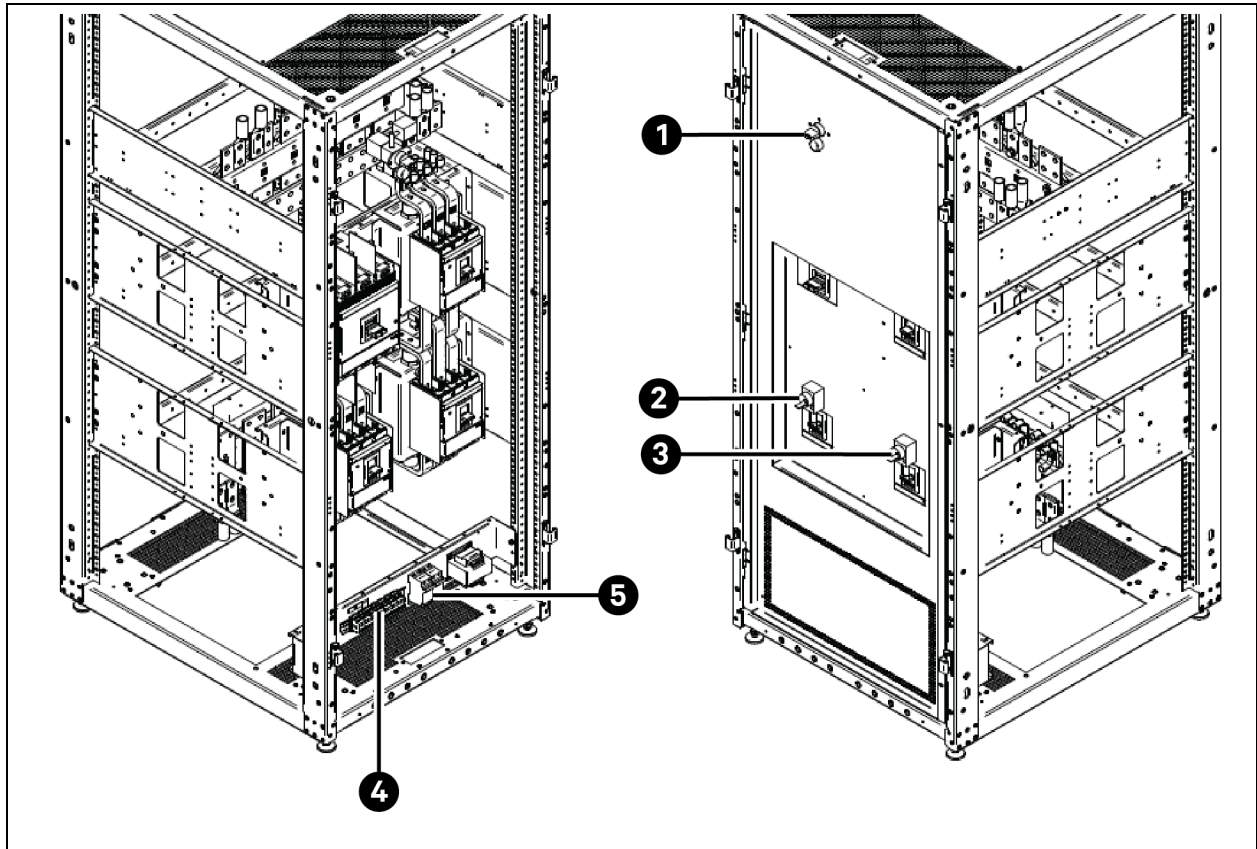
Figure 3.21 SKRU, 23.7 in. (600 mm) Vertiv™ Liebert® Ancillary Medium MBC



Item	Description
1	K0
2	K1
3	K2
4	TB1
5	Fuse block for SKRU

NOTE: SKRU is mounted above all the MBC breakers.

Figure 3.22 SKRU, 31.5 in. (800 mm) Vertiv™ Liebert® Ancillary Medium MBC



Item	Description
1	K0
2	K1
3	K2
4	TB1
5	Fuse block for SKRU

NOTE: SKRU is mounted above all the MBC breakers.

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4 Specifications

Table 4.1 Vertiv™ Liebert® Ancillary Medium MBC Specifications

Model Size	7.9 in. (200 mm)	11.9 in. (300 mm)	23.7 in. (600 mm)	31.5 in. (800 mm)
Input Parameters				
Input voltage to bypass, VAC	(400 V/415 V/480 V, 3-phase, 3-wire), (208 V/220 V/400 V/415 V/480 V, 3-phase, 4-wire)			
Input current, AAC	See Table 4.3 on the next page to Table 4.12 on page 42.			
Input frequency, Hz	50/60 Hz (UPS dependent)			
Output Parameters				
Output power, kW	208/220 V (10 to 30 kVA), 400/415 V (20 to 60 kVA), 480 V (20 to 90 kVA)	208/220 V (40 to 100 kVA), 400/415 V (80 to 200 kVA), 480 V (100 to 240 kVA)	208/220 V (120 kVA), 400/415 V (225 to 250 kVA), 480 V (250 kVA)	208/220 V (140 to 150 kVA), 400/415 V (300 kVA), 480 V (300 kVA)
Output voltage, VAC	(400 V/415 V/480 V, 3-phase, 3-wire), (208 V/220 V/400 V/415 V/480 V, 3-phase, 4-wire)			
Output current, AAC	See Table 4.13 on page 42 to Table 4.15 on page 43.			
Output frequency, Hz	50/60 Hz (UPS dependent)			
Physical Parameters and Standers, in. (mm)				
Cabinet width, in. (mm) with side panels attached	8.2 (208)			
Depth, in. (mm)	39.4 (1000)			
Height, in. (mm)	78.74 (2000)			
Weight, lbs (kg)	Three breaker 201.6 (91.5)/four breaker 209 (94.8)	Three breaker 278 (126)/four breaker 287 (130.18)	Three breaker 533 (241.7)/four breaker 547 (248.2)	Three breaker 701.5 (318.2)/four breaker 718 (325.6)
Color	Black (ZP-7021)			
Degree of protection for UPS enclosure	IP 20 (with and without front door open)			
Standards and conformity	UL 1778 5th Edition; CSA 22.2107-3-14; ISTA Procedure 1H; WEEE			
Minimum clearance, top, in. (mm)	24 (610)			
Minimum clearance, back, in. (mm)	0 (5 in. [127 mm] with seismic bracket installed)			
Minimum clearance, sides, in. (mm)	0			
Cable entrance	Top or bottom			
Environmental Conditions				
Storage Temperature, °F (°C)	-13 to 158 (-25 to 70)			
Operating Temperature Range, °F (°C)	32 to 104 (0 to 40)			
Relative humidity	Maximum 95% non-condensing (operating and non-operating)			

Table 4.2 Dimensions for Vertiv™ Liebert® APM2 UPS with Liebert® APM2 MBC

Components	Liebert® APM2 10 to 120 kVA Frame and Liebert® APM2 120 to 300 kVA Frame
	Dimensions, W x D x H, in. (mm)
UPS Only	23.6 x 39.5 x 78.75 (600 x 1000 x 2000)
UPS with 7.9 in. (200 mm) MBC	31.5 x 39.5 x 78.75 (800 x 1000 x 2000)
UPS with 11.9 in. (300 mm) MBC	35.4 x 39.5 x 78.75 (900 x 1000 x 2000)
UPS with 23.7 in. (600 mm) MBC	47.2 x 39.5 x 78.75 (1200 x 1000 x 2000)
UPS with 31.5 in. (800 mm) MBC	55.1 x 39.5 x 78.75 (1400 x 1000 x 2000)

4.1 Electrical Characteristics

NOTE: The breakers and cables used must be in accordance with NEC ANSI/NFPA 70. A disconnect breaker must be provided for AC input, bypass and AC output. Recommended cable sizes are suitable for operation at a maximum temperature of 104 °F (40 °C).

Table 4.3 Vertiv™ Liebert® APM2 208 VAC 60 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
208	10	35	4W+G	45	65	6 AWG	4 AWG	M10
208	15	53	4W+G	70	100	3 AWG	2 AWG	M10
208	20	70	4W+G	90	115	2 AWG	1/0 AWG	M10
208	25	88	4W+G	110	150	1/0 AWG	4/0 AWG	M10
208	30	105	4W+G	150	230	4/0 AWG	250 kcmil	M10
208	40	140	4W+G	200	255	250 kcmil	350 kcmil	M10
208	45	158	4W+G	200	255	250 kcmil	350 kcmil	M10
208	50	175	4W+G	225	310	350 kcmil	500 kcmil	M10
208	60	210	4W+G	300	460	2 x 4/0 AWG	2 x 250 kcmil	M10

Table 4.4 Liebert® APM2 208 VAC 150 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
208	60	218	4W+G	300	460	2 x 4/0 AWG	2 x 250 kcmil	M10
208	75	272	4W+G	350	460	2 x 4/0 AWG	2 x 300 kcmil	M10
208	80	290	4W+G	400	510	2 x 250 kcmil	3 x 4/0 AWG	M10
208	90	326	4W+G	450	620	2 x 350 kcmil	2 x 500 kcmil	M10
208	100	363	4W+G	450	620	2 x 350 kcmil	2 x 500 kcmil	M10

Table 4.4 Liebert® APM2 208 VAC 150 kVA Frame Input Currents, Single Input, Main (continued)

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
208	120	435	4W+G	600	760	2 x 500 kcmil	3 x 350 kcmil	M12
208	140	508	4W+G	700	930	3 x 350 kcmil	4 x 350 kcmil	M12
208	150	544	4W+G	700	930	3 x 350 kcmil	4 x 350 kcmil	M12

Table 4.5 Vertiv™ Liebert® APM2 3-Wire 400 VAC 120 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
400	20	40	3W+G	45	50	8 AWG	6 AWG	M10
400	30	60	3W+G	70	85	4 AWG	3 AWG	M10
400	40	80	3W+G	90	100	3 AWG	2 AWG	M10
400	50	100	3W+G	125	130	1 AWG	2/0 AWG	M10
400	60	120	3W+G	150	150	1/0 AWG	3/0 AWG	M10
400	80	159	3W+G	200	230	4/0 AWG	250 kcmil	M10
400	90	179	3W+G	225	230	4/0 AWG	250 kcmil	M10
400	100	199	3W+G	225	230	4/0 AWG	250 kcmil	M10
400	120	239	3W+G	300	310	350 kcmil	500 kcmil	M10
*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.								

Table 4.6 Liebert® APM2 3-Wire 400 VAC 300 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
400	60	118	3W+G	150	150	1/0 AWG	3/0 AWG	M10
400	100	197	3W+G	250	255	250 kcmil	350 kcmil	M10
400	120	237	3W+G	300	310	350 kcmil	500 kcmil	M10
400	150	296	3W+G	350	380	500 kcmil	2 x 4/0 AWG	M10
400	180	355	3W+G	450	460	2 x 4/0 AWG	2 x 300 kcmil	M10
400	200	394	3W+G	500	510	2 x 250 kcmil	2 x 350 kcmil	M10
400	225	444	3W+G	600	620	2 x 350 kcmil	2 x 500 kcmil	M12
400	240	473	3W+G	600	620	2 x 350 kcmil	2 x 500 kcmil	M12
400	250	493	3W+G	600	620	2 x 350 kcmil	2 x 500 kcmil	M12
400	300	591	3W+G	700	765	3 x 250 kcmil	3 x 350 kcmil	M12
*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.								

Table 4.7 Vertiv™ Liebert® APM2 3-Wire 480 VAC 120 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480	20	30	3W+G	40	50	8 AWG	8 AWG	M10
480	30	45	3W+G	60	65	6 AWG	4 AWG	M10
480	40	60	3W+G	80	85	4 AWG	2 AWG	M10
480	50	74	3W+G	100	100	3 AWG	1/0 AWG	M10
480	60	89	3W+G	125	130	1 AWG	2/0 AWG	M10
480	80	119	3W+G	150	150	1/0 AWG	3/0 AWG	M10
480	90	134	3W+G	175	175	2/0 AWG	4/0 AWG	M10
480	100	149	3W+G	200	230	4/0 AWG	250 kcmil	M10
480	120	179	3W+G	225	230	4/0 AWG	250 kcmil	M10

*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.

Table 4.8 Liebert® APM2 3-Wire 480 VAC 300 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480	60	91	3W+G	125	130	1 AWG	2/0 AWG	M10
480	100	152	3W+G	200	230	4/0 AWG	250 kcmil	M10
480	120	183	3W+G	250	255	250 kcmil	350 kcmil	M10
480	150	228	3W+G	300	310	350 kcmil	500 kcmil	M10
480	180	273	3W+G	350	380	500 kcmil	2 x 4/0 AWG	M10
480	200	303	3W+G	400	460	2 x 4/0 AWG	2 x 250 kcmil	M10
480	225	341	3W+G	450	460	2 x 4/0 AWG	2 x 300 kcmil	M10
480	240	364	3W+G	500	510	2 x 250 kcmil	2 x 350 kcmil	M10
480	250	380	3W+G	500	510	2 x 250 kcmil	2 x 350 kcmil	M12
480	300	455	3W+G	600	620	2 x 350 kcmil	2 x 500 kcmil	M12

*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.

Table 4.9 Liebert® APM2 4-Wire 400 VAC 120 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
400	20	40	4W+G	45	65	6 AWG	4 AWG	M10
400	30	60	4W+G	70	115	3 AWG	2 AWG	M10
400	40	80	4W+G	90	150	2 AWG	1/0 AWG	M10
400	50	100	4W+G	125	175	2/0 AWG	4/0 AWG	M10

Table 4.9 Liebert® APM2 4-Wire 400 VAC 120 kVA Frame Input Currents, Single Input, Main (continued)

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
400	60	120	4W+G	150	230	4/0 AWG	250 kcmil	M10
400	80	159	4W+G	200	255	250 kcmil	350 kcmil	M10
400	90	179	4W+G	225	310	350 kcmil	500 kcmil	M10
400	100	199	4W+G	225	310	350 kcmil	500 kcmil	M10
400	120	239	4W+G	300	460	2 x 4/0	2 x 250 kcmil	M10

*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.

Table 4.10 Vertiv™ Liebert® APM2 4-Wire 400 VAC 300 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
400	60	118	4W+G	150	230	4/0 AWG	250 kcmil	M10
400	100	197	4W+G	250	350	2 x 2/0	2 x 4/0	M10
400	120	237	4W+G	300	460	2 x 4/0	2 x 250 kcmil	M10
400	150	296	4W+G	350	460	2 x 4/0	3 x 300 kcmil	M10
400	180	355	4W+G	450	620	2 x 350 kcmil	2 x 500 kcmil	M10
400	200	394	4W+G	500	760	2 x 500 kcmil	3 x 300 kcmil	M10
400	225	444	4W+G	600	760	2 x 500 kcmil	3 x 350 kcmil	M12
400	240	473	4W+G	600	760	2 x 500 kcmil	3 x 350 kcmil	M12
400	250	493	4W+G	600	760	2 x 500 kcmil	3 x 350 kcmil	M12
400	300	591	4W+G	700	930	3 x 350 kcmil	4 x 350 kcmil	M12

*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.

Table 4.11 Liebert® APM2 4-Wire 480 VAC 120 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480	20	30	4W+G	40	50	8 AWG	6 AWG	M10
480	30	45	4W+G	60	85	4 AWG	3 AWG	M10
480	40	60	4W+G	80	100	3 AWG	1 AWG	M10
480	50	74	4W+G	100	130	1 AWG	2/0 AWG	M10
480	60	89	4W+G	125	175	2/0 AWG	4/0 AWG	M10
480	80	119	4W+G	150	230	4/0 AWG	250 kcmil	M10
480	90	134	4W+G	175	230	4/0 AWG	350 kcmil	M10

Table 4.11 Liebert® APM2 4-Wire 480 VAC 120 kVA Frame Input Currents, Single Input, Main (continued)

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480	100	149	4W+G	200	255	250 kcmil	350 kcmil	M10
480	120	179	4W+G	225	310	350 kcmil	500 kcmil	M10

*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.

Table 4.12 Vertiv™ Liebert® APM2 4-Wire 480 VAC 300 kVA Frame Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Number of Wires*	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480	60	91	4W+G	125	175	2/0 AWG	4/0 AWG	M10
480	100	152	4W+G	200	255	250 kcmil	350 kcmil	M10
480	120	183	4W+G	250	350	2 x 2/0 AWG	2 x 4/0 AWG	M10
480	150	228	4W+G	300	460	2 x 4/0 AWG	2 x 250 kcmil	M10
480	180	273	4W+G	350	460	2 x 4/0 AWG	2 x 300 kcmil	M10
480	200	303	4W+G	400	510	2 x 250 kcmil	3 x 4/0 AWG	M10
480	225	341	4W+G	450	620	2 x 350 kcmil	2 x 500 kcmil	M10
480	240	364	4W+G	500	760	2 x 500 kcmil	3 x 300 kcmil	M10
480	250	380	4W+G	500	760	2 x 500 kcmil	3 x 300 kcmil	M12
480	300	455	4W+G	600	760	2 x 500 kcmil	3 x 350 kcmil	M12

*400 V/415 V/480 V can be configured as 3W+G or 4W+G depending on UPS configuration.

Table 4.13 Vertiv™ Liebert® Ancillary Medium MBC 208 V Output Current

Output kVA	Output Voltage	Nominal Current, A	Recorded Overhead Power Distribution
10	208	27.8	40.0
15	208	41.6	60.0
20	208	55.5	80.0
25	208	69.4	100.0
30	208	83.3	125.0
40	208	111.0	175.0
45	208	124.9	175.0
50	208	138.8	200.0
60	208	166.5	250.0
75	208	208.2	300.0
80	208	222.1	350.0
90	208	249.8	350.0

Table 4.13 Vertiv™ Liebert® Ancillary Medium MBC 208 V Output Current (continued)

Output kVA	Output Voltage	Nominal Current, A	Recorded Overhead Power Distribution
100	208	277.6	400.0
120	208	333.1	500.0
140	208	388.6	600.0
150	208	416.4	600.0

Table 4.14 Liebert® Ancillary Medium MBC 400 V Output Current

Output kVA	Output Voltage	Nominal Current, A	Recommended Overhead Power Distribution
20	400	28.9	40.0
30	400	43.3	60.0
40	400	57.7	80.0
50	400	72.2	100.0
60	400	86.6	125.0
80	400	115.5	175.0
90	400	129.9	200.0
100	400	144.3	200.0
120	400	173.2	250.0
150	400	216.5	300.0
180	400	259.8	400.0
200	400	288.7	400.0
225	400	324.8	450.0
240	400	346.4	500.0
250	400	360.8	500.0
300	400	433.0	600.0

Table 4.15 Liebert® Ancillary Medium MBC 480 V Output Current

Output kVA	Output Voltage	Nominal Current, A	Recommended Overhead Power Distribution
20	480	24.1	35.0
30	480	36.1	50.0
40	480	48.1	70.0
50	480	60.1	90.0
60	480	72.2	100.0
80	480	96.2	150.0

Table 4.15 Liebert® Ancillary Medium MBC 480 V Output Current (continued)

Output kVA	Output Voltage	Nominal Current, A	Recommended Overhead Power Distribution
90	480	108.3	150.0
100	480	120.3	175.0
120	480	144.3	200.0
150	480	180.4	250.0
180	480	216.5	300.0
200	480	240.6	350.0
225	480	270.6	400.0
240	480	288.7	400.0
250	480	300.7	450.0
300	480	360.8	500.0

Table 4.16 Recommended Lug Sizes (Compression Type) M10, 3/8 in. (9.6 mm) Bolt

Cable Size	T and B Copper One Hole	T and B Aluminum One Hole
8 AWG	54132	60104-TB
6 AWG	54136	60109
4 AWG	54140	60114
2 AWG	54143	60118
1 AWG	54148	60124
1/0 AWG	54109	60130
2/0 AWG	54110	60136
3/0 AWG	54111	60142
4/0 AWG	54112	60148
250 kcmil	54174	60154
300 kcmil	54179	60160
350 kcmil	256-30695-112	—
400 kcmil	256-30695-1403	—
500 kcmil	256-30695-339	—

Table 4.17 Recommended Lug Sizes (Compression Type) M12, 1/2 in. (12.7 mm) Bolt

Cable Size	T and B Copper Two Hole	T and B Aluminum Two Hole
6 AWG	256-030695-868	—
4 AWG	256-030695-733	—
2-3 AWG	54811BE	—

Table 4.17 Recommended Lug Sizes (Compression Type) M12, 1/2 in. (12.7 mm) Bolt (continued)

Cable Size	T and B Copper Two Hole	T and B Aluminum Two Hole
1 AWG	54857BE	—
1/0 AWG	256-30695-593	—
2/0 AWG	54862BE	60238
3/0 AWG	54864BE	60244
4/0 AWG	54866BE	60250
250 kcmil	54868BE	60256
300 kcmil	54870BE	60262
350 kcmil	54872BE	60267
400 kcmil	54874BE	60269
500 kcmil	54876BE	60273
600 kcmil	54878BE	60275
700 kcmil	54879BE	60277
750 kcmil	54880BE	60278

4.2 Torque Requirements

All electrical connections must be tight. **Table 4.18** below and **Table 4.19** below provide the torque values for the connections to the Vertiv™ Liebert® Ancillary Medium MBC. Use these values unless the equipment is labeled otherwise.

Table 4.18 Busbar Torque for Power Wiring

Bolt Shaft Size in. (mm)	Torque lbs-in (Nm)
3/8 (9.6) M10	192 (22)
1/2 (12.7) M12	428 (48)

Table 4.19 Terminal Clock Torque with Compression Lugs for Control Wiring

Wire Size or Range AWG	Torque lbs-in (Nm)
22-14	3.5 to 5.3 (0.4 to 0.6)
NOTE: Refer to the manufacturer data for proper torque for circuit breaker power connections.	

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Appendices

Appendix A: Technical Support and Contacts

A.1 Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2778

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

A.2 Locations

United States

Vertiv Headquarters

505 N Cleveland Ave

Westerville, OH, 43082, USA

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road, Wanchai

Hong Kong

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