



Liebert® EXM Maintenance Bypass Cabinet

User Manual

10 kVA to 200 kVA, 208/120 V and 220/127 V, 60 Hz

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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 should be followed during installation of Vertiv™ Liebert® EXM Maintenance Bypass Cabinet (MBC).



WARNING! Risk of moving heavy units and tipping hazard. It can cause damage to the equipment, injury, and death. Exercise extreme care when handling cabinets to avoid the equipment damage or injury to personnel. The weight of the Liebert® EXM MBC ranges from 198 lbs to 700 lbs (89.9 kg to 317.5 kg). Locate center of

gravity symbols  and determine unit weight before handling each cabinet. 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 EXM de Liebert pèsent de 198 à 700 lb (de 89.9 à 317.5 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 des armoires sont conçues pour utiliser le chariot élévateur. 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 homologués 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. et c.a. élevées. Vérifiez les tensions avec des voltmètres c.a. et c.c. avant d'établir tout contact.



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 should 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 safety precautions in this manual before handling or installing 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 should 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 should 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 should perform maintenance on the MBC. When performing maintenance with any part of the equipment under power, service personnel and test equipment should be standing on rubber mats. The service personnel should wear insulating shoes for isolation from direct contact with the floor ground. One person should never work alone, even if all power is removed from the equipment. A second person should 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 describes the requirements that must be taken into account when planning, positioning, and cabling of the Vertiv™ Liebert® EXM MBC.

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



WARNING! Risk of arc flash and electric shock. It can cause damage to the equipment, injury and death. Installation must be performed only by properly trained and qualified personnel wearing appropriate safety clothing. Eye protection should 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.

NOTICE

Risk of improper installation. It can cause damage to the equipment and void warranty. The Liebert® EXM MBC should 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.

2.2 Preliminary Checks

Before installing the Liebert® EXM 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 Room

The Vertiv™ Liebert® EXM MBC is intended for indoor installation and should 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 41, for more details.

All models of the Liebert® EXM 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 the room extractor fans.

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

2.3.2 Storage

Should the equipment not be installed immediately, it must be stored in a room for protection against excessive humidity and or heat sources. See **Table 4.1** on page 41, for more information.

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 the screws. The side panel can be removed for access to the power connections bars, the auxiliary terminal blocks and the power isolators.

2.4.1 Moving the Cabinets

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 (for instance, 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/cm^2) of any handling equipment. See **Table 4.3** on page 42 for the weight of the Liebert® EXM MBC 200 mm, 300 mm, 600 mm, and 800 mm models. **Table 4.2** on page 42 through **Table 4.5** on page 42 provide detailed dimension and weight information for the Vertiv™ Liebert® EXM UPS and Liebert® EXM 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® EXM MBC can be handled by means of a forklift or similar equipment. For operations with a forklift, see 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 exceed a 15 degree tilt with the forklift. Handling the unit with straps is not authorized.



WARNING! Risk of moving heavy units and tipping hazard. It can cause equipment damage, injury and death. Exercise extreme care when handling cabinets to avoid equipment damage or injury to personnel. The weight of Vertiv™ Liebert® EXM MBC ranges from 198 lbs to 700 lbs (89.8 kg to 317.5 kg). Locate center of gravity



symbols and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times.



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 EXM de Liebert pèsent de 198 à 700 lb (de 89.8 à 317.5 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.

2.4.2 Clearances

The Liebert® EXM MBC have no ventilation grilles at either side or at the rear. Clearance around the front of the equipment should 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 of this manual 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 should be mounted on a pedestal suitably designed to accept the equipment point loading.

2.5 Cable Entry

Cables can enter the Liebert® EXM MBC from the bottom or top.

2.6 Power Cables

The Liebert® EXM MBC requires both power and control cabling once it has been mechanically installed. All the 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 4.6** on page 43 through **Table 4.8** on page 45, follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media).

For cable entry locations, see **Figure 3.13** on page 23 and **Figure 3.14** on page 24.



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.

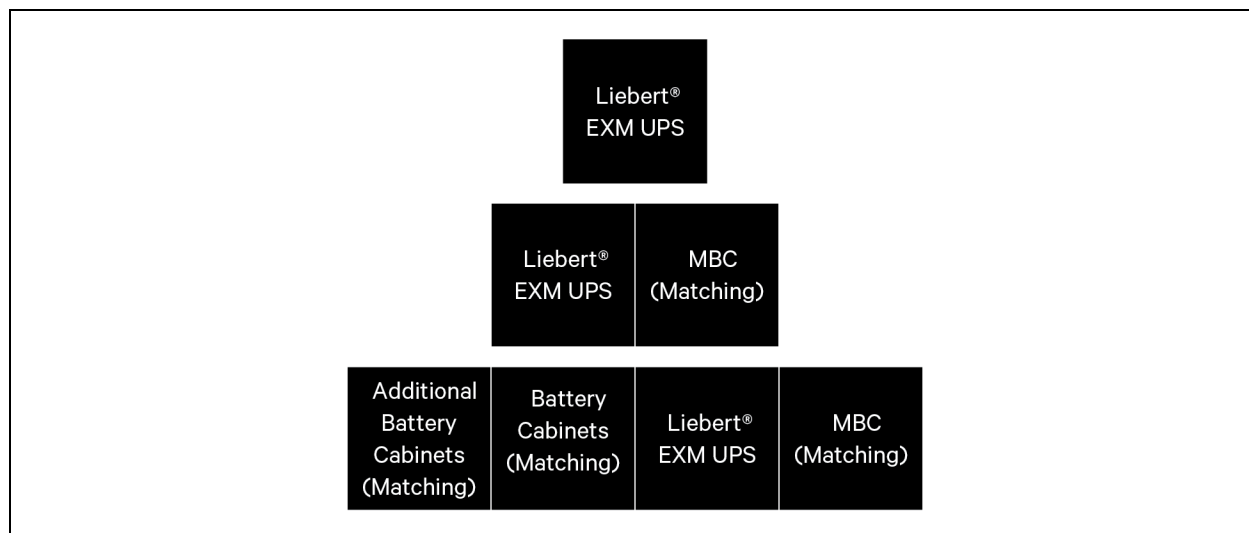


AVERTISSEMENT! Risque de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. Avant de procéder au câblage de l'armoire, assurez-vous que vous êtes au courant de l'emplacement et du fonctionnement des isolateurs externes qui raccordent l'alimentation d'entrée ou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

The following are guidelines only and are superseded by the 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 should 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, paralleled cables for heavy currents as a way of easing installation.

Figure 2.1 Cabinet Arrangement — Vertiv™ Liebert® EXM UPS, Battery Cabinets, MBC



NOTE: If a MBC is used, it must be installed on the right side of the Liebert® EXM UPS.

NOTE: The 200 mm and 300 mm MBCs ship attached to the UPS. The 600 mm and 800 mm MBSs ship separately from 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) 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 should be grounded in accordance with local regulations.



WARNING! Risk of electric shock. Can cause equipment damage, injury and death. Failure to follow adequate grounding procedures can result in electric shock hazard to personnel and the risk of fire, should 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 and 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 case of having any difficulties, contact Vertiv. See [Appendices](#) on page 49 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:

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.

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

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 between the power distribution panel and the maintenance bypass input supply busbars (A-B-C or A-B-C-N terminals) and tighten the connections to the proper torque. See **Table 4.13** on page 48 for more information. Ensure correct phase rotation.
5. Connect the UPS Input.
6. For two-breaker Vertiv™ Liebert® EXM MBC:
 - a. If the system is a two-input type, connect the AC input supply cables between the Liebert® EXM MBC and the UPS bypass input supply busbars (A-B-C or A-B-C-N terminals) and between the power distribution panel and the UPS rectifier input supply busbars (A-B-C or A-B-C-N terminals). Tighten the connections to the proper torque. Ensure correct phase rotation.
 - b. If the system is a single-input type, connect the AC input supply cables between the Liebert® EXM MBC and Vertiv™ Liebert® EXM UPS the UPS bypass input supply busbars (A-B-C or A-B-C-N terminals) and connect 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 4.13** on page 48 for more information. Ensure correct phase rotation.
7. Connect the system output power cables between the Liebert® EXM MBC output (A-B-C or A-B-C-N terminals) and the critical load and tighten the connections to the proper torque. See **Table 4.13** on page 48 for more information. Ensure correct phase rotation.
8. Connect the control wiring from the Liebert® EXM MBC terminal block TB1 to the Liebert® EXM UPS Bypass Module (X9 J23 and J26). Tighten the connections to the proper torque. See **Table 4.13** on page 48 for more information.
9. Replace the panels.

Table 2.1 Control Wiring for Liebert® EXM UPS to Liebert® EXM MBC

From Liebert® EXM UPS Bypass Module (X9, J23, and J26)	To Liebert® EXM MBC Terminal Block (TB1)
J26-15	TB1-6
J26-13	TB1-5
J26-11	TB1-4
J26-9	TB1-3
J23-3	TB1-9
J23-4	TB1-11
J23-6	TB1-12

NOTICE

Refer to the Liebert® EXM UPS UM SL-25648 for 10 kVA to 40 kVA 208/120 V 50/60 Hz, SL-25650 for 20 kVA to 100 kVA 208/120 V 50/60 Hz, or SL-26100 for 20 kVA to 200 kVA 208/120 V 50/60 Hz for additional details. The manual is available at the Liebert website www.liebert.com.

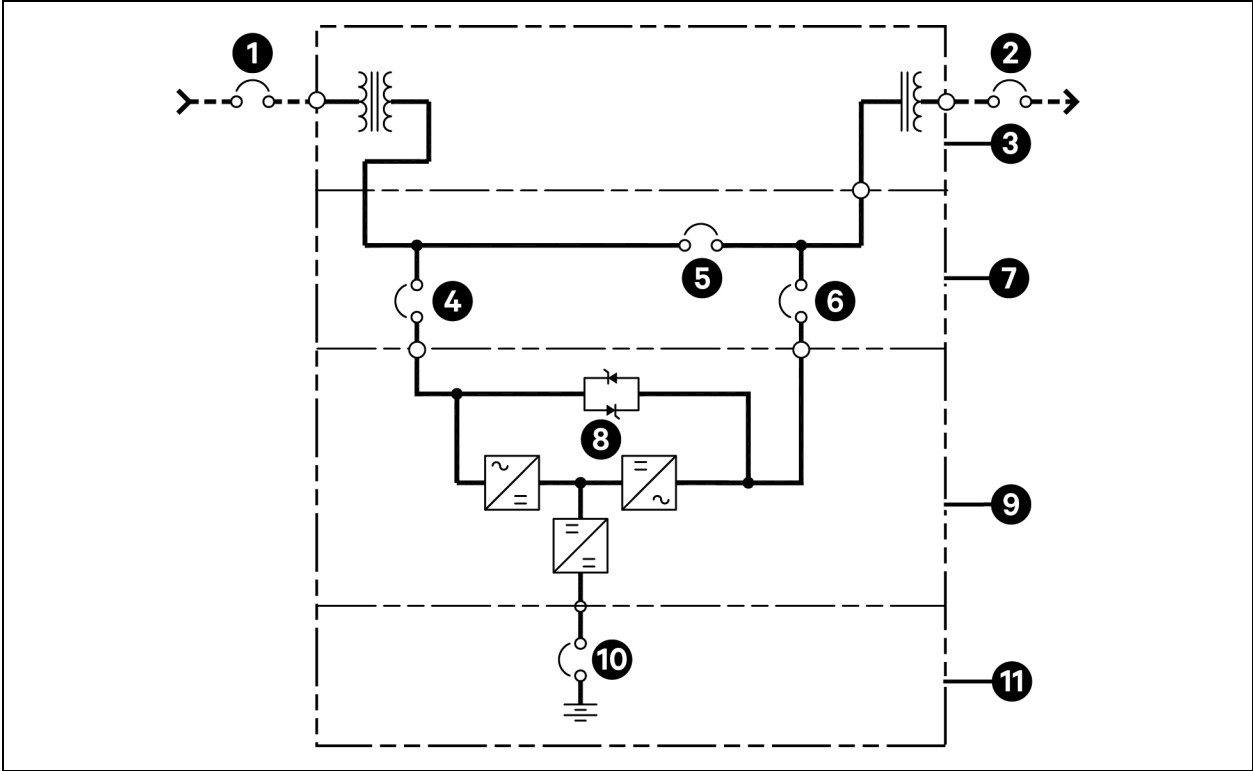
The following are guidelines only and are superseded by local regulations and codes of practice where applicable:

- Take special care when determining the size of the neutral cable, because current circulating on the neutral cable may be greater than nominal current in the case of non-linear loads.
- The ground conductor should be sized according to local or NEC codes, cable lengths, type of protection. The ground cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consideration should 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® EXM MBC output rather than being connected directly to the Liebert® EXM MBC itself. Where this is the case, the Liebert® EXM 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 formation of electromagnetic interference.

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3 Installation Drawings

Figure 3.1 One-line Diagram, Single-input Vertiv™ Liebert® EXM 10 kVA to 40 kVA UPS with Three-breaker Vertiv™ Liebert® EXM MBC and Input/Output Transformer Cabinet



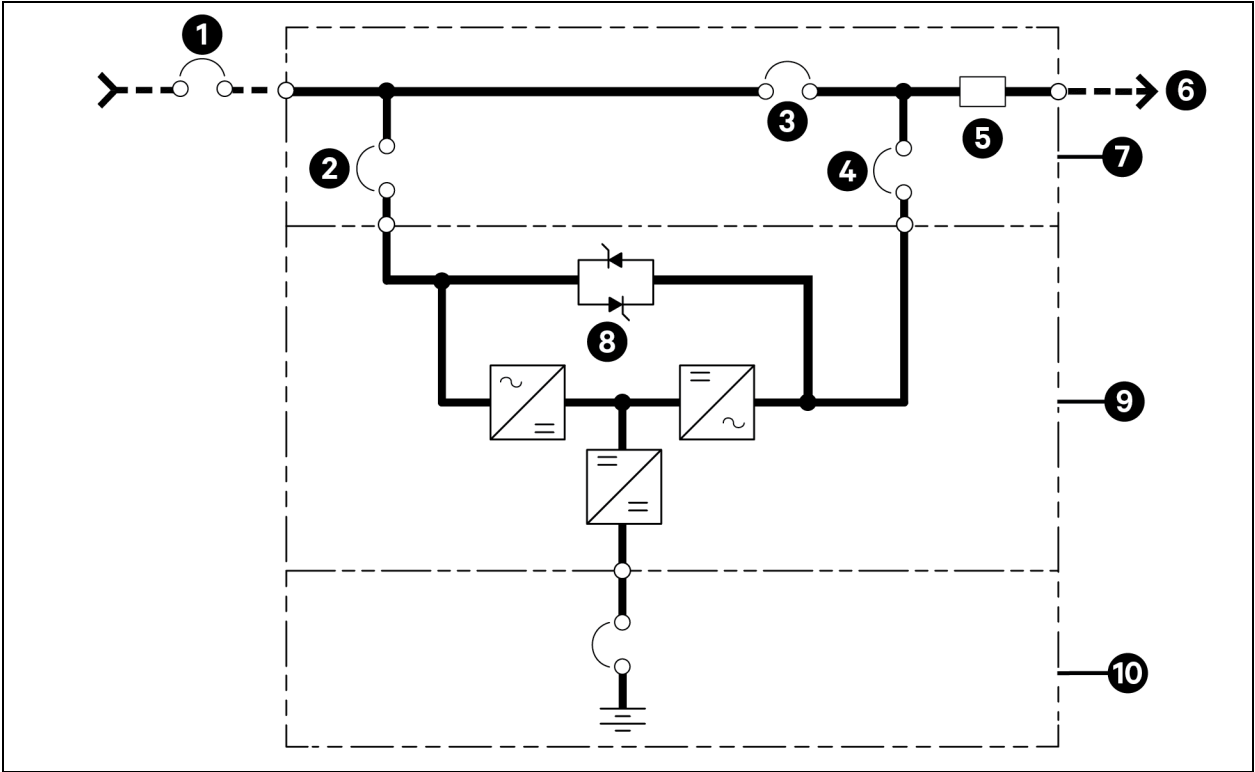
Item	Description	Item	Description	Item	Description
1	*Rectifier AC input 480 V 3-wire + GND	5	Maintenance bypass breaker (MBB)	9	UPS cabinet
2	AC output 277/480 V 4-wire + GND	6	Maintenance isolation breaker (MIB)	10	See Note 5
3	Dual transformer cabinet	7	MBC	11	Battery
4	Bypass isolation breaker (BIB)	8	Static bypass		

*External overcurrent protection by others.

NOTE:

- 1. Install in accordance with national and local electrical codes.
- 2. Input and bypass must share the same single source.
- 3. Bypass and rectifier inputs and output cables must be run in separate conduits.
- 4. Control wiring must be run in separate conduits.
- 5. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

Figure 3.2 One-line Diagram, Single-input Vertiv™ Liebert® EXM 10 kVA to 200 kVA UPS with Three-breaker Vertiv™ Liebert® EXM MBC

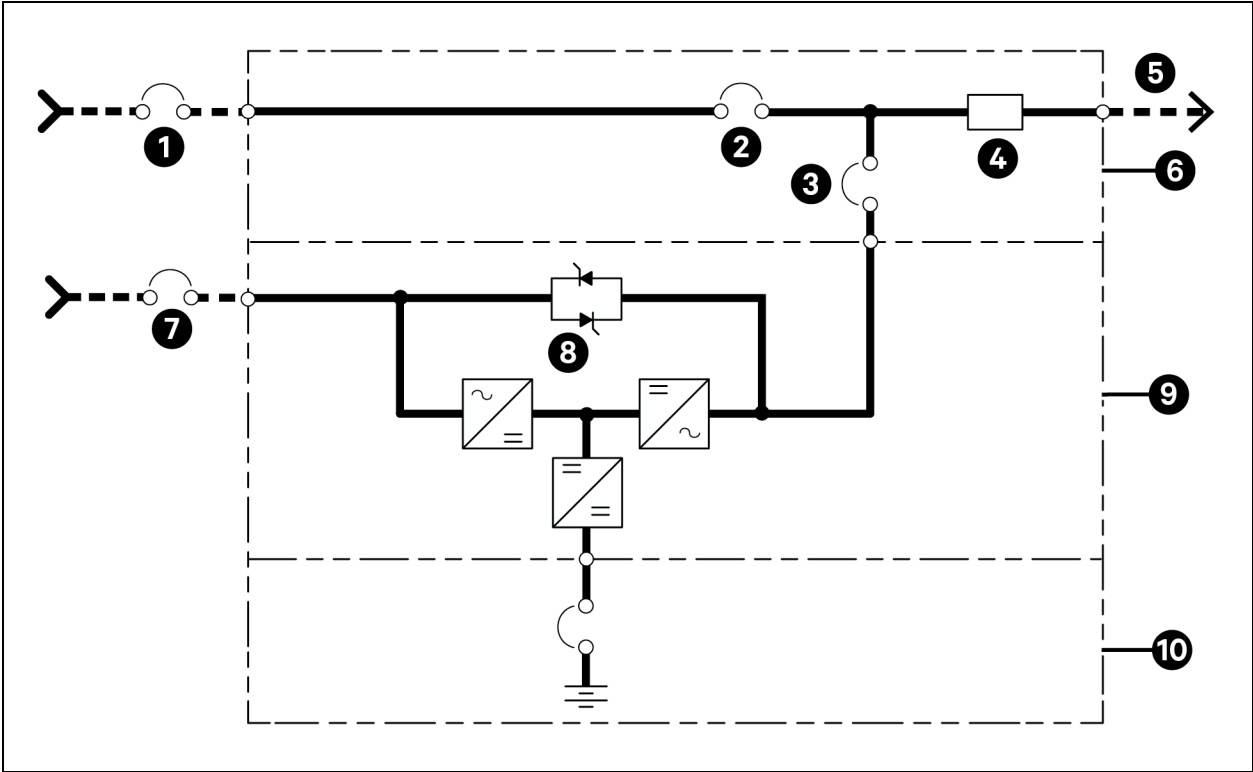


Item	Description	Item	Description	Item	Description
1	*Bypass AC input 4-wire + GND	5	Output busbar	9	UPS cabinet
2	BIB	6	AC Output 208 V 4-wire + GND	10	Battery
3	MBB	7	MBC		
4	MIB	8	Static bypass		

*External overcurrent protection by others.

- NOTE:**
- 1. Install in accordance with national and local electrical codes.
 - 2. Input and bypass must share the same single source.
 - 3. A neutral is required from the system AC input source. Vertiv recommends a full capacity neutral conductor and grounding conductors.
 - 4. Bypass and rectifier inputs and output cables must be run in separate conduits.
 - 5. Control wiring must be run in separate conduits.
 - 6. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

Figure 3.3 One-line Diagram, Dual-input Vertiv™ Liebert® EXM 10 kVA to 100 kVA UPS with Two-breaker Vertiv™ Liebert® EXM MBC

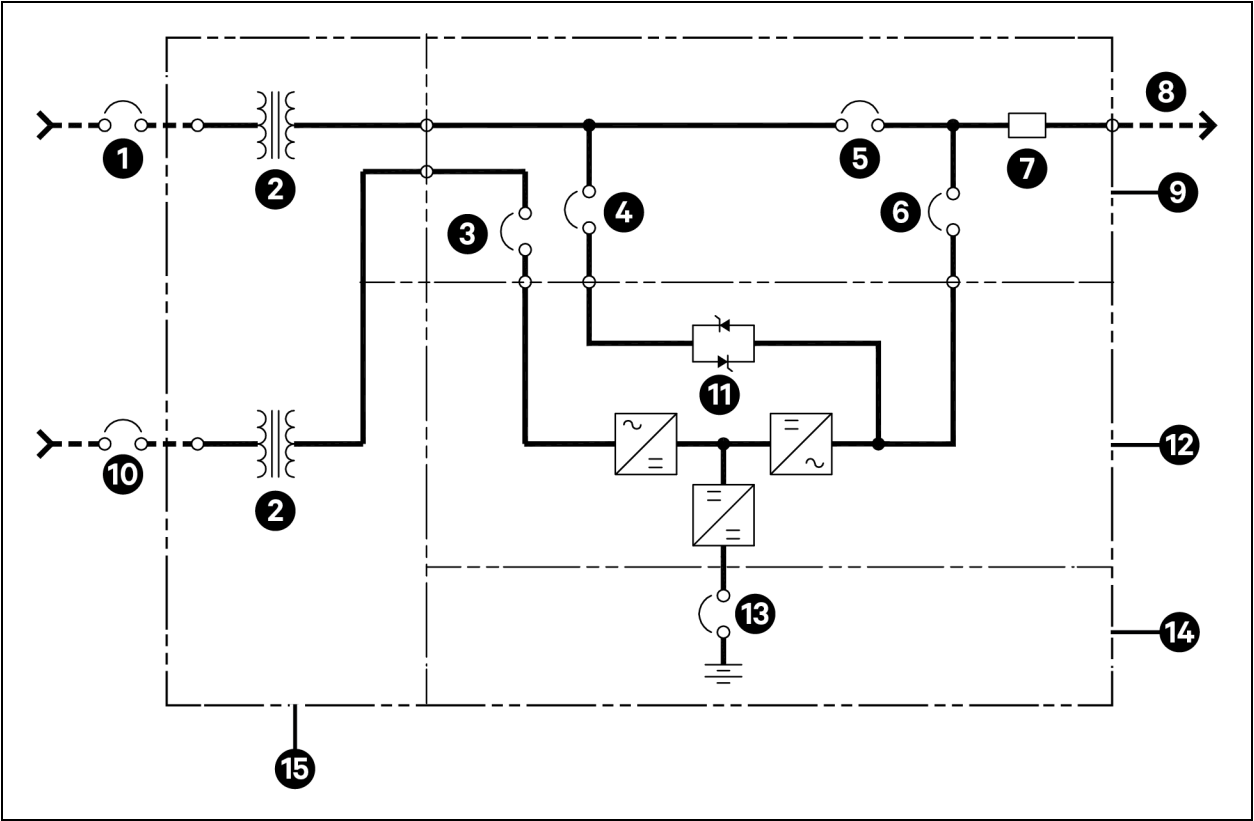


Item	Description	Item	Description	Item	Description
1	*Bypass AC input 4-wire + GND. See Note 6	5	AC output 208/220 V 4-wire + GND	9	UPS cabinet
2	MBB	6	MBC	10	Battery
3	MIB	7	*UPS AC input 4-wire + GND		
4	Output busbar	8	Static bypass		

*External overcurrent protection by others.

- NOTE:**
- 1. Install in accordance with national and local electrical codes.
 - 2. Input and bypass must share the same single source.
 - 3. A neutral is required from the system AC input source. Vertiv recommends a full capacity neutral conductor and grounding conductors.
 - 4. Bypass and rectifier inputs and output cables must be run in separate conduits.
 - 5. Control wiring must be run in separate conduits.
 - 6. Customer must supply shunt trips with 120 V coils on the bypass breaker and rectifier breaker.

Figure 3.4 One-line Diagram, Dual-input Vertiv™ Liebert® EXM 10 kVA to 100 kVA UPS with Four-breaker Vertiv™ Liebert® EXM MBC and Input Isolation Transformer Cabinet



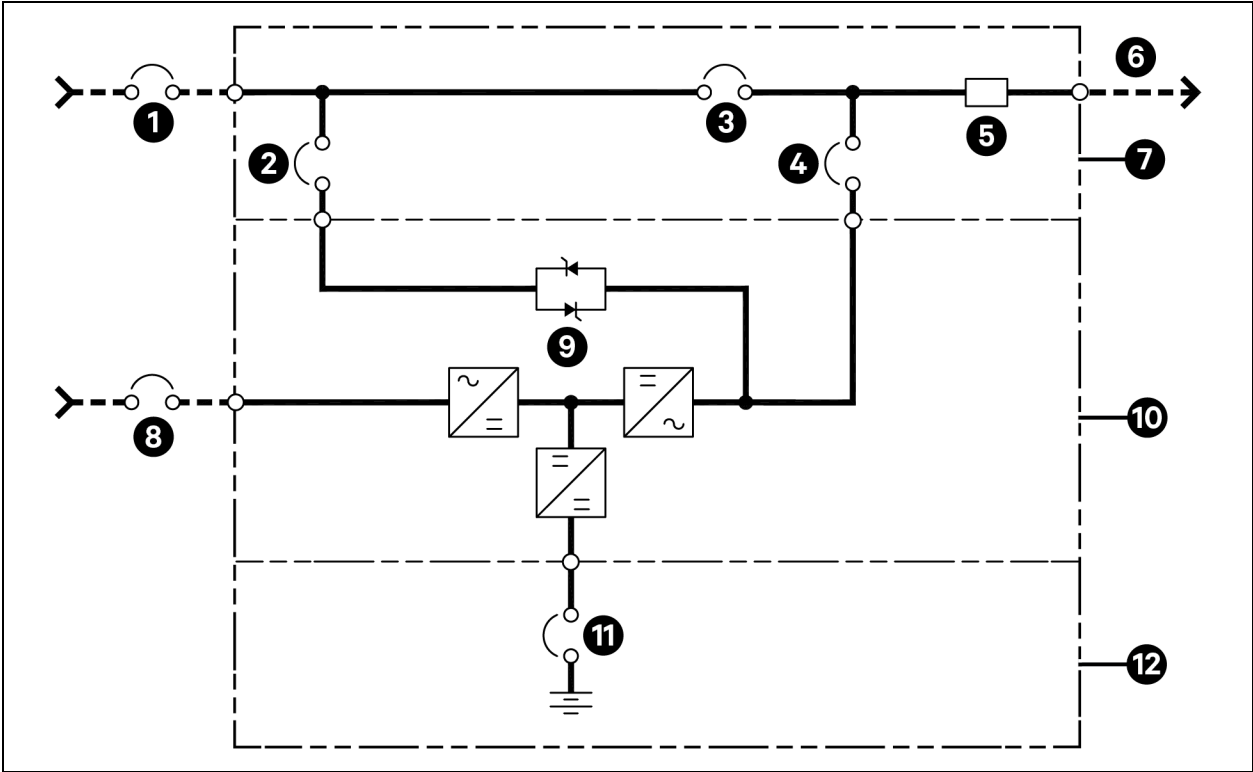
Item	Description	Item	Description	Item	Description
1	*Bypass AC input 3-wire + GND	6	MIB	11	Static bypass
2	See Note 5	7	Output busbar	12	UPS cabinet
3	Rectifier input breaker (RIB)	8	AC output 208 V 4-wire + GND	13	See Note 6
4	BIB	9	MBC	14	Battery
5	MBB	10	*Rectifier AC input 3-wire + GND	15	Dual transformer cabinet

*External overcurrent protection by others.

NOTE:

- 1. Install in accordance with national and local electrical codes.
- 2. Vertiv recommends a full capacity neutral conductor and grounding conductors.
- 3. Bypass and rectifier inputs and output cables must be run in separate conduits.
- 4. Control wiring must be run in separate conduits.
- 5. Transformer available: 208 V, 220 V, 480 V, and 600 V input.
- 6. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

Figure 3.5 One-line Diagram, Dual-input Vertiv™ Liebert® EXM 10 kVA to 200 kVA UPS with Three-breaker Vertiv™ Liebert® EXM MBC

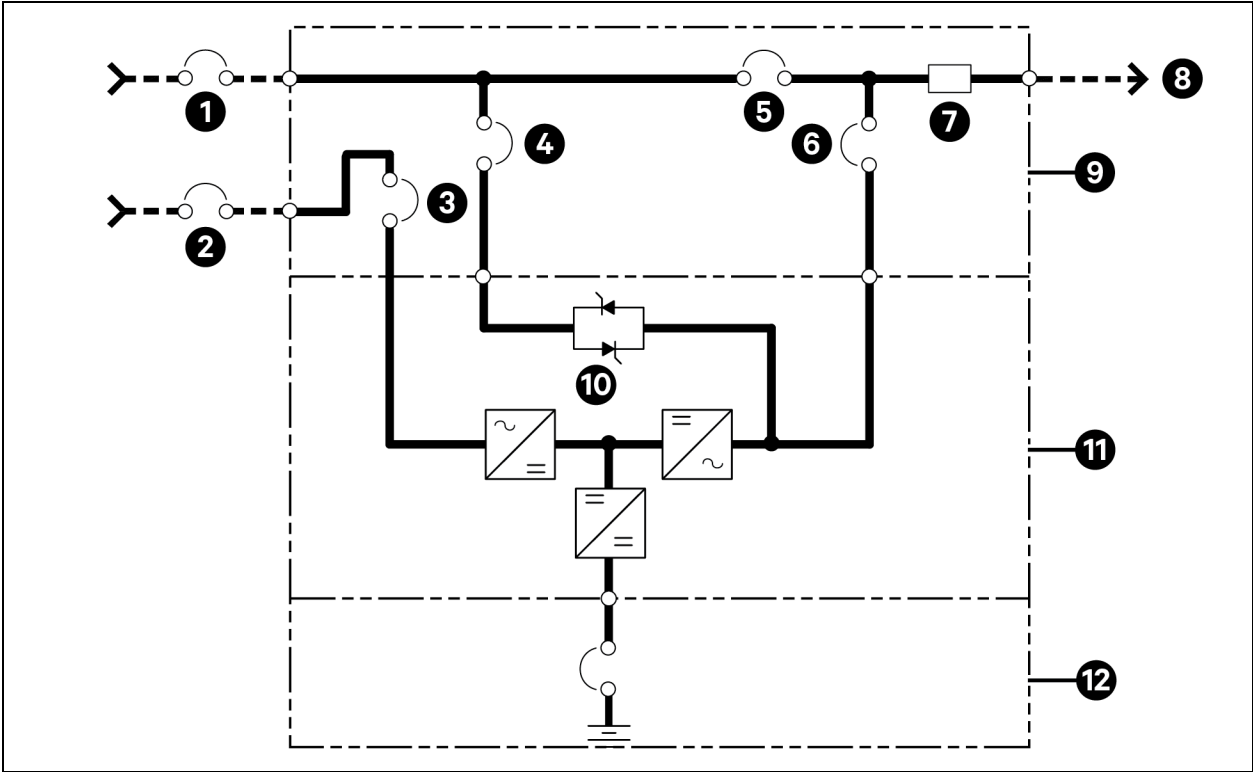


Item	Description	Item	Description	Item	Description
1	*Bypass AC input 4-wire + GND	5	Output busbar	9	Static bypass
2	BIB	6	AC output 208/220 V 4-wire + GND	10	UPS cabinet
3	MBB	7	MBC	11	See Note 7
4	MIB	8	*Rectifier AC input 4-wire + GND. See Note 6.	12	Battery

*External overcurrent protection by others.

- NOTE:**
- 1. Install in accordance with national and local electrical codes.
 - 2. Input and bypass must share the same single source.
 - 3. A neutral is required from the system AC input source. Vertiv recommends a full capacity neutral conductor and grounding conductors.
 - 4. Bypass and rectifier inputs and output cables must be run in separate conduits.
 - 5. Control wiring must be run in separate conduits.
 - 6. A shunt trip breaker with 120 V coil is required.
 - 7. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

Figure 3.6 One-line Diagram, Dual-input Vertiv™ Liebert® EXM 10 kVA to 200 kVA UPS with Four-breaker Vertiv™ Liebert® EXM MBC

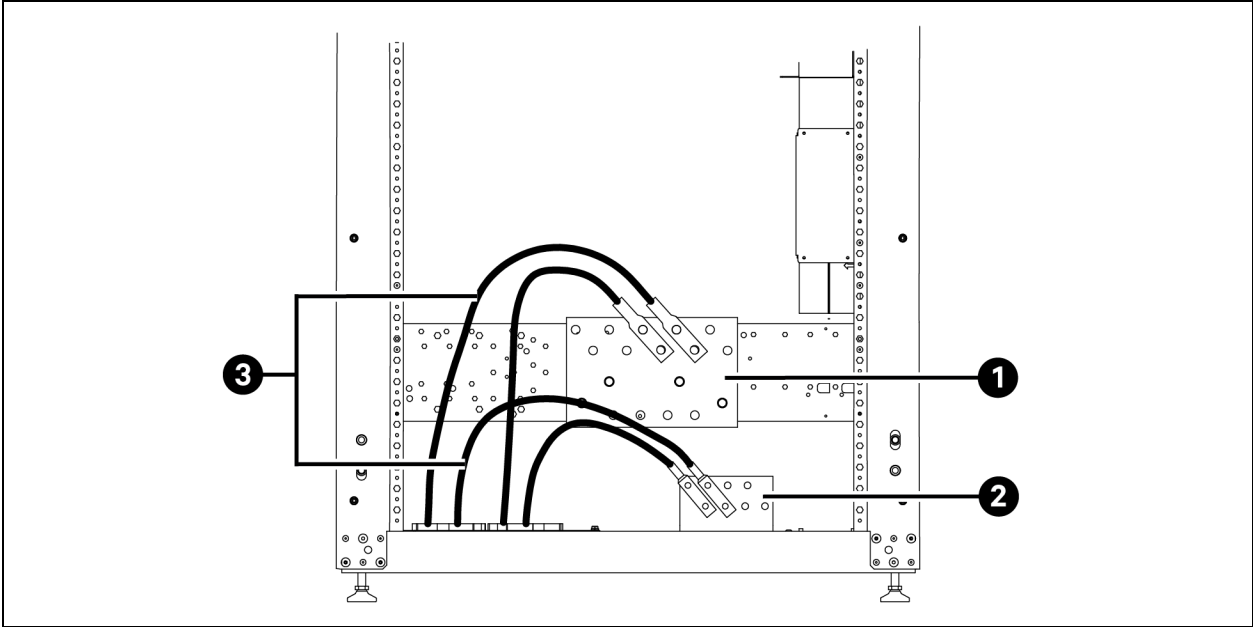


Item	Description	Item	Description	Item	Description
1	*Bypass AC input 4-wire + GND	5	MBB	9	MBC
2	*Rectifier AC input 4-wire + GND	6	MIB	10	Static bypass
3	RIB	7	Output busbar	11	UPS cabinet
4	BIB	8	AC output 208 V 4-wire + GND	12	Battery

*External overcurrent protection by others.

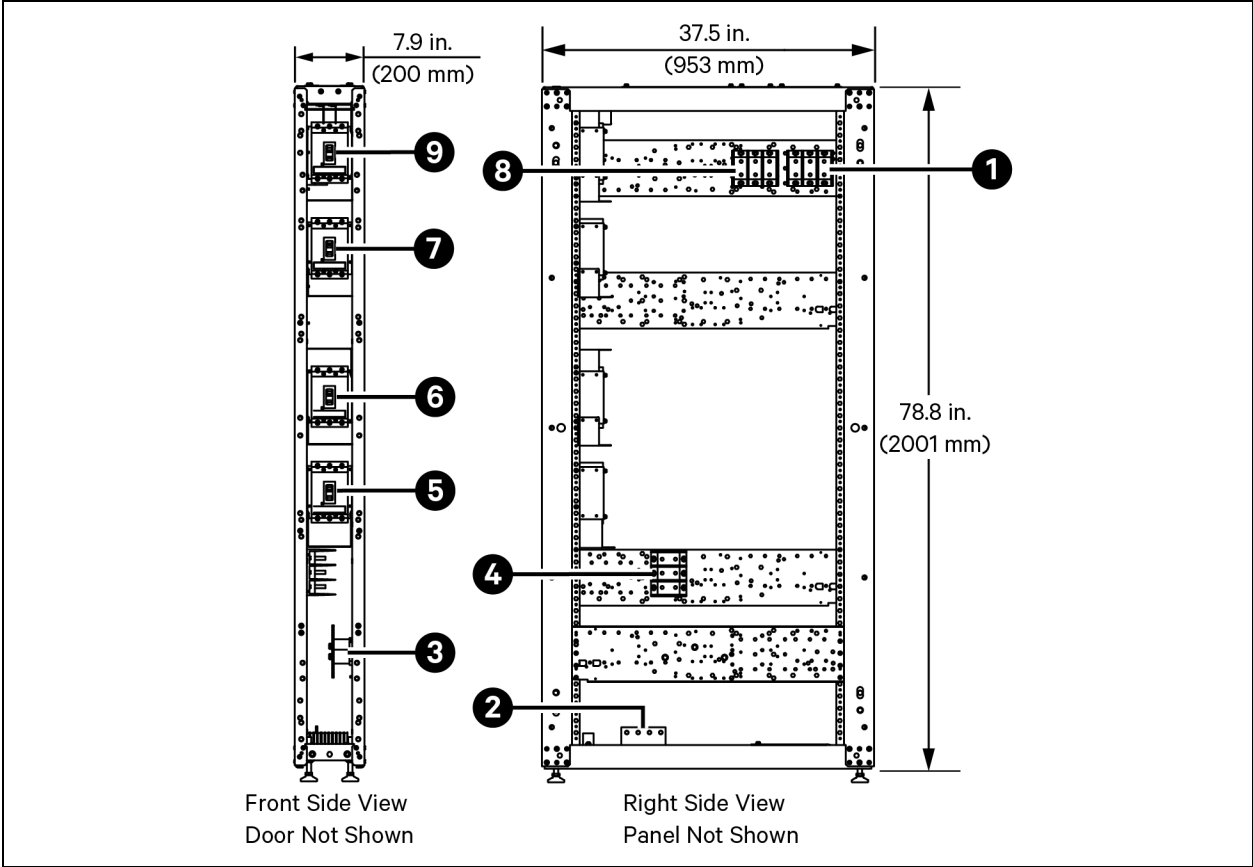
- NOTE:**
- 1. Install in accordance with national and local electrical codes.
 - 2. Input and bypass must share the same single source.
 - 3. A neutral is required from the system AC input source. Vertiv recommends a full capacity neutral conductor and grounding conductors.
 - 4. Bypass and rectifier inputs and output cables must be run in separate conduits.
 - 5. Control wiring must be run in separate conduits.
 - 6. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

Figure 3.7 Bend Radius — Neutral and Ground Wires through Bottom Feed, 10 kVA to 40 kVA System



Item	Description
1	Neutral busbar
2	Ground busbar
3	When attaching neutral and ground wires from the bottom feed, connection must be made to the top of the neutral and ground busbar for required bend radius.

Figure 3.8 Main Components — 200 mm Vertiv™ Liebert® EXM MBC, Two to Four Breakers, 10 kVA to 40 kVA System



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

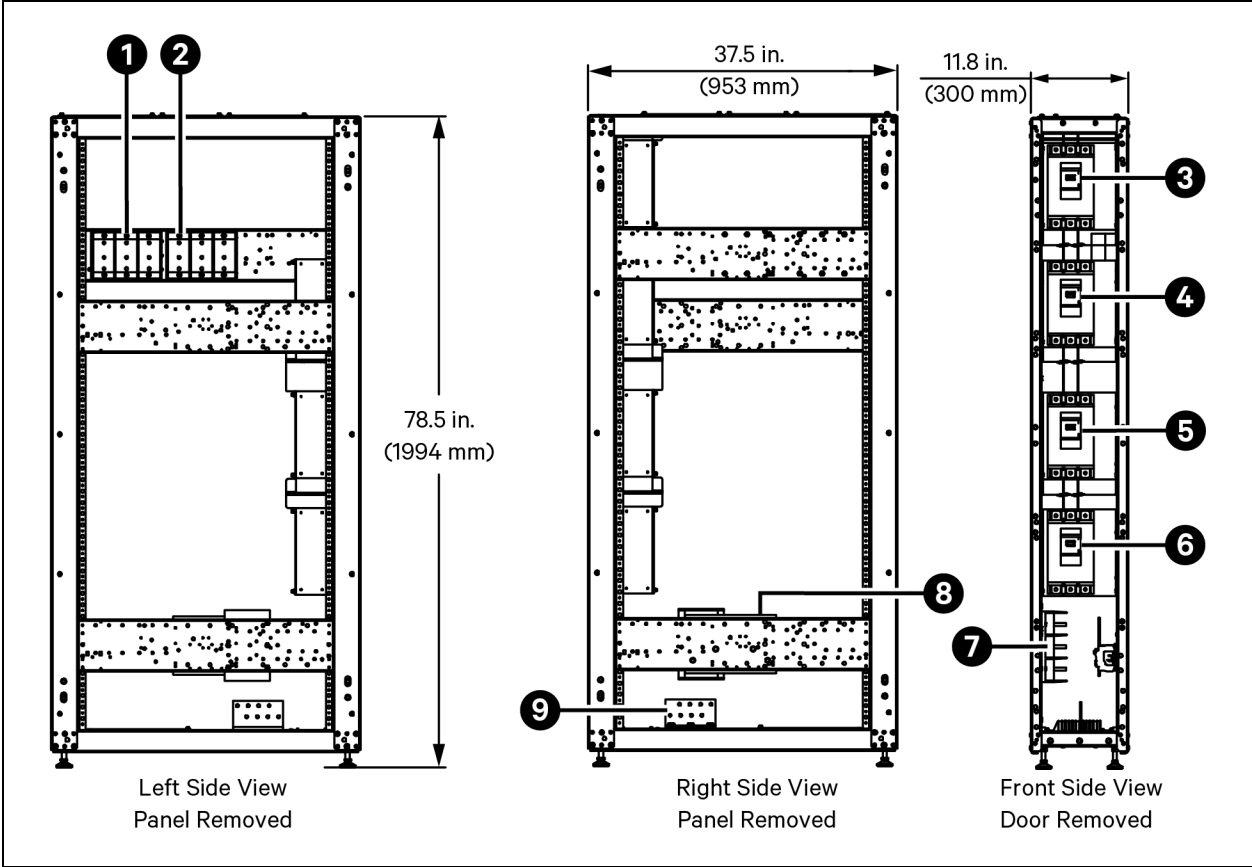
Table 3.1 Breaker Configuration — 200 mm Liebert® EXM MBC, Two to Four Breakers, 10 kVA to 40 kVA System

Liebert® EXM MBC Breaker Configuration	Configured Breaker			
2	—	—	MBB	MIB
3	—	BIB	MBB	MIB
4	RIB	BIB	MBB	MIB

Table 3.2 Terminal Block Details — 200 mm Liebert® EXM MBC, Two to Four Breakers, 10 kVA to 40 kVA system

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

Figure 3.9 Main Components — 300 mm Vertiv™ Liebert® EXM MBC, Two to Four Breakers, 60 kVA to 100 kVA System



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

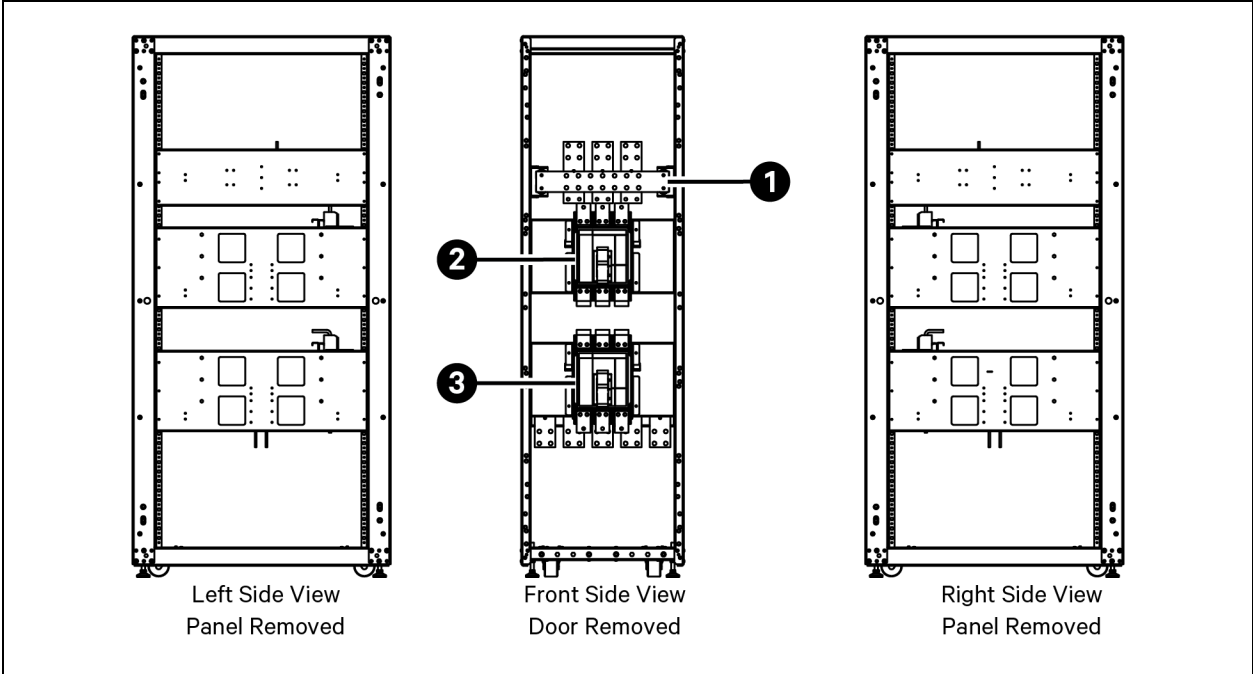
Table 3.3 Breaker Configuration — 300 mm Liebert® EXM MBC, Two to Four Breakers, 60 kVA to 100 kVA System

Liebert® EXM MBC Breaker Configuration		Configured Breaker			
2	—	—	MBB	MIB	
3	—	BIB	MBB	MIB	
4	RIB	BIB	MBB	MIB	

Table 3.4 Terminal Block Details — 300 mm Liebert® EXM MBC, Two to Four Breakers, 60 kVA to 100 kVA system

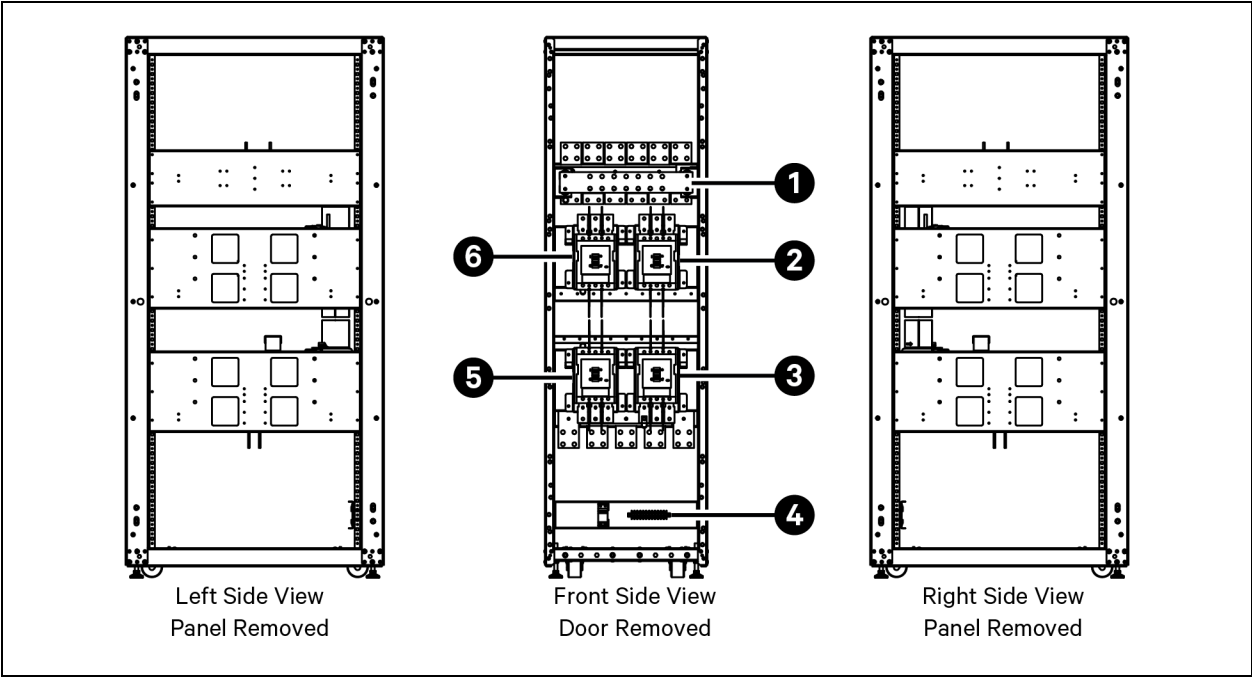
Terminal Block	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

Figure 3.10 Main Components — 600 mm Vertiv™ Liebert® EXM MBC, Two Breakers, 120 kVA to 200 kVA System



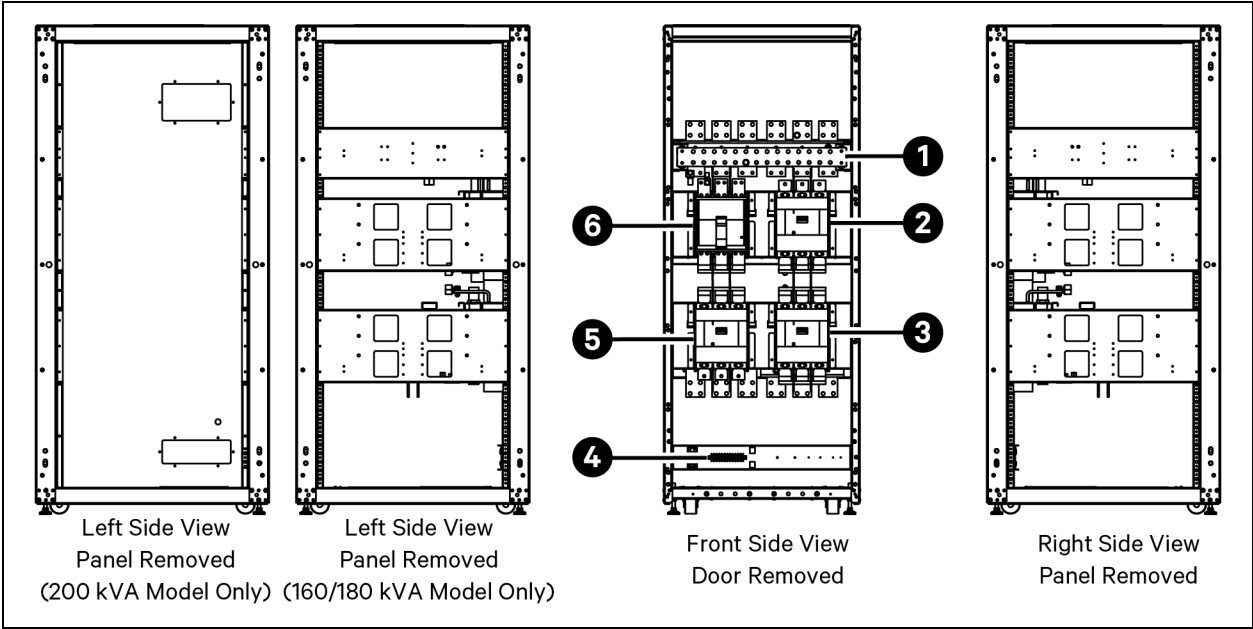
Item	Description
1	Neutral busbar
2	MBB
3	MIB

Figure 3.11 Main Components — 600 mm Vertiv™ Liebert® EXM MBC, Three Breakers to Four Breakers, 120 kVA to 160 kVA System



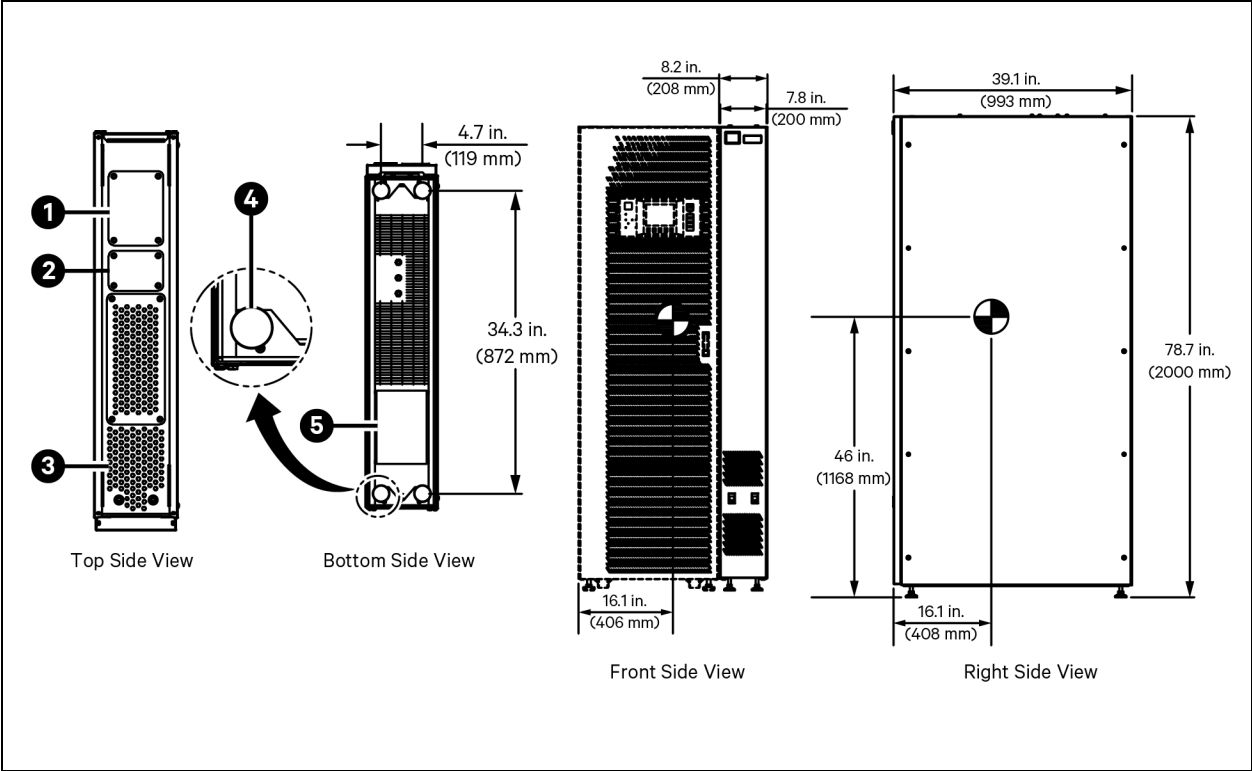
Item	Description	Item	Description
1	Neutral busbar	4	Terminal strip
2	BIB	5	MIB
3	MBB	6	RIB

Figure 3.12 Main Components — 800 mm Vertiv™ Liebert® EXM MBC, Three Breakers to Four Breakers, 160 kVA to 200 kVA System



Item	Description	Item	Description
1	Neutral busbar	4	Terminal strip
2	BIB	5	MIB
3	MBB	6	RIB

Figure 3.13 Outline Drawing — 200 mm Vertiv™ Liebert® EXM MBC, Two to Four Breakers, 10 kVA to 40 kVA System

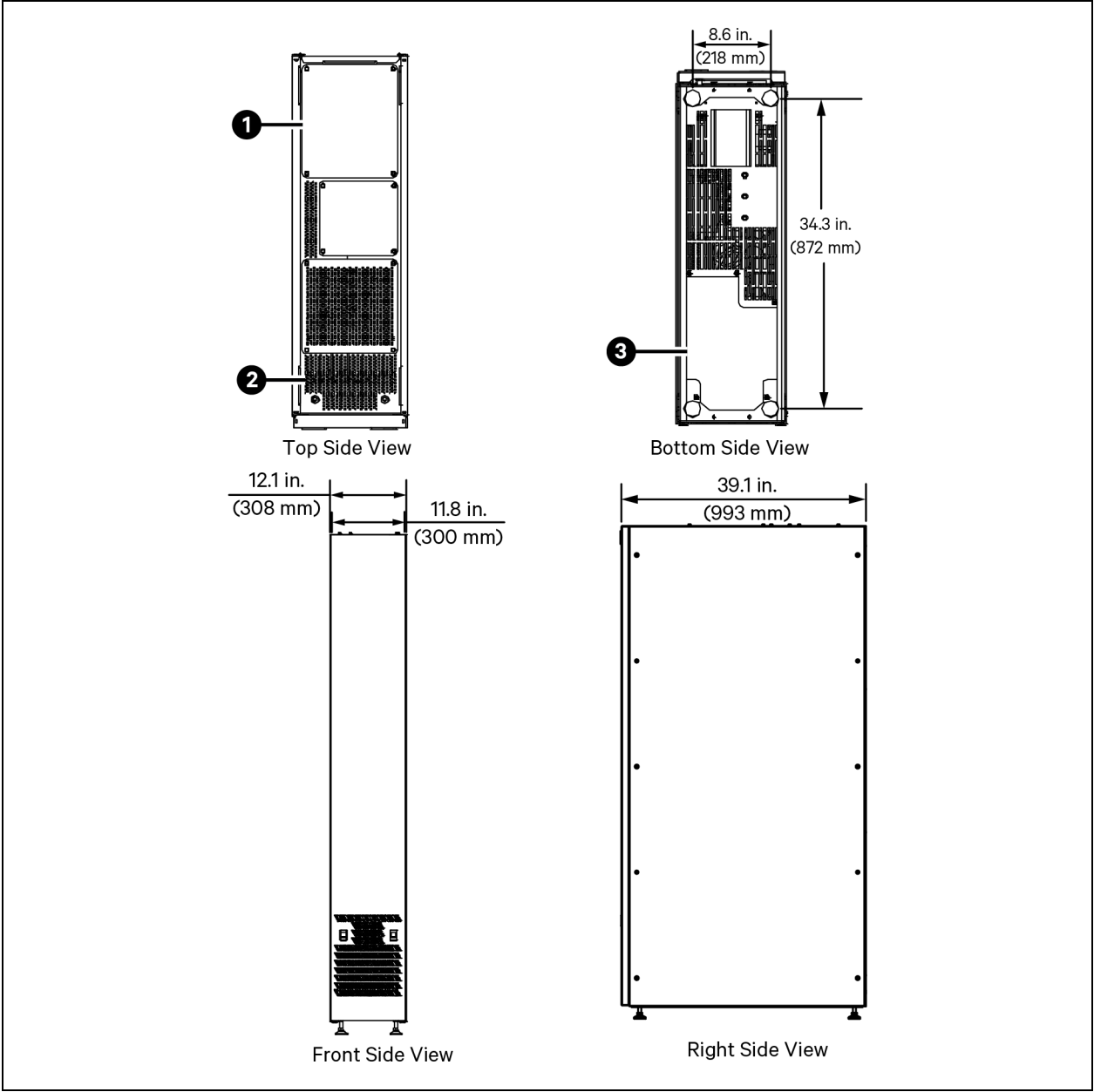


Item	Description	Item	Description
1	Power cable entry 5.3 in. x 7.3 in. (135 mm x 185 mm)	4	Leveler
2	Control cable entry 5.3 in. x 3.9 in. (135 mm x 99 mm)	5	Power cable entry 5.7 in. x 8.3 in. (145 mm x 211 mm)
3	Ventilation		

NOTE:

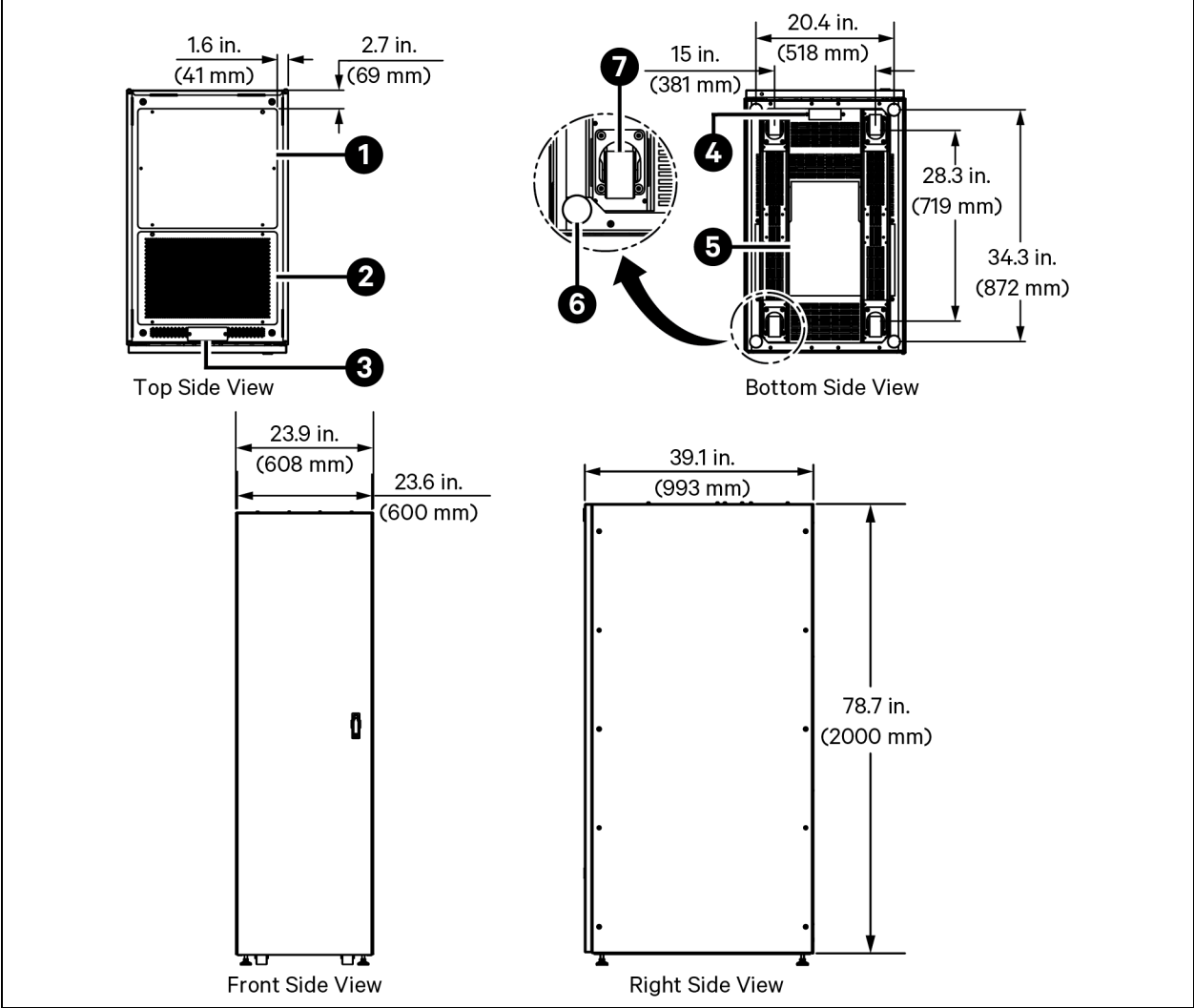
- 24 in. (610 mm) minimum clearance above unit for air exhaust and 36 in. (914 mm) front access required for service.
- Keep cabinet within 15 degrees of vertical.
- Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
- Unit bottom is structurally adequate for forklift handling.
- Control wiring and power wiring must be run in separate conduits.
- All wiring must be in accordance with national and local electrical codes.
- Liebert® EXM MBC will always be attached to the UPS; UPS shown for reference only.
- Overall dimensions are shown with side panels.

Figure 3.14 Outline Drawing — 300 mm Vertiv™ Liebert® EXM MBC, Two to Four Breakers, 60 kVA to 100 kVA System



Item	Description	Item	Description	Item	Description
1	Conduit Landing	2	Ventilation	3	Conduit Landing
NOTE: 1. 24 in. (610 mm) minimum clearance above unit for air exhaust and 36 in. (914 mm) front access required for service. 2. Keep cabinet within 15 degrees of vertical. 3. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace. 4. Unit bottom is structurally adequate for forklift handling. 5. Control wiring and power wiring must be run in separate conduits. 6. All wiring must be in accordance with national and local electrical codes.					

Figure 3.15 Outline Drawing — 600 mm Vertiv™ Liebert® EXM MBC, 120 kVA to 200 kVA System

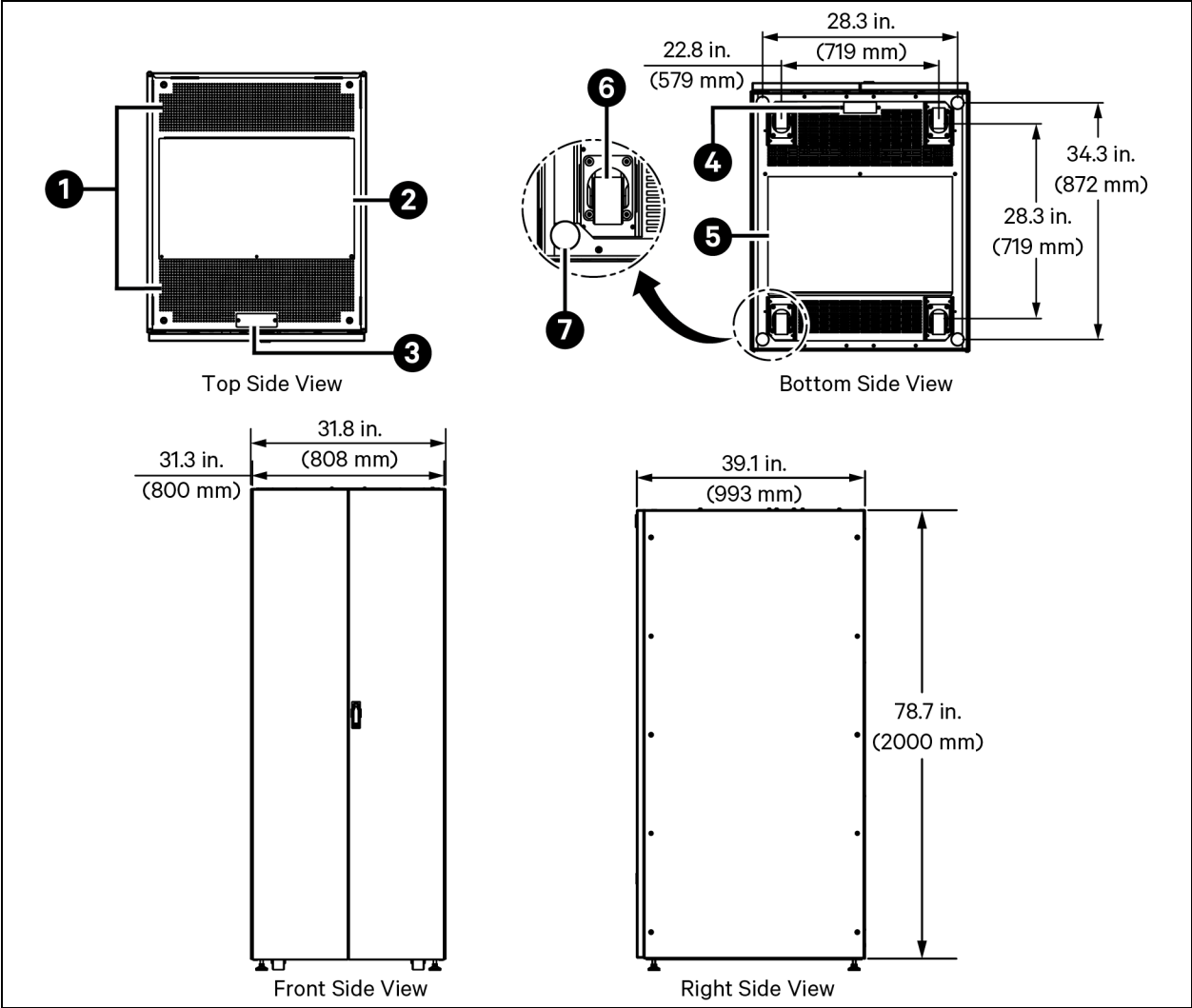


Item	Description	Item	Description
1	Power cable entry 20.7 in. x 17.7 in. (526 mm x 450 mm)	5	Power cable entry 10.6 in. (269 mm) x 16.9 in. (429 mm)
2	Ventilation	6	Leveler
3	Control cable entry 5.9 in. x 2 in. (150 mm x 51 mm)	7	Caster
4	Control cable entry 4.7 in. (119 mm) x 1.6 in. (41 mm)		

NOTE:

- 1. 24 in. (610 mm) minimum clearance above unit for air exhaust and 36 in. (914 mm) front access required for service.
- 2. Keep cabinet within 15 degrees of vertical.
- 3. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
- 4. Unit bottom is structurally adequate for forklift handling.
- 5. Control wiring and power wiring must be run in separate conduits.
- 6. All wiring must be in accordance with national and local electrical codes.
- 7. The MBC will always be attached to the UPS.

Figure 3.16 Outline Drawing — 800 mm Vertiv™ Liebert® EXM MBC, 160 kVA to 200 kVA System

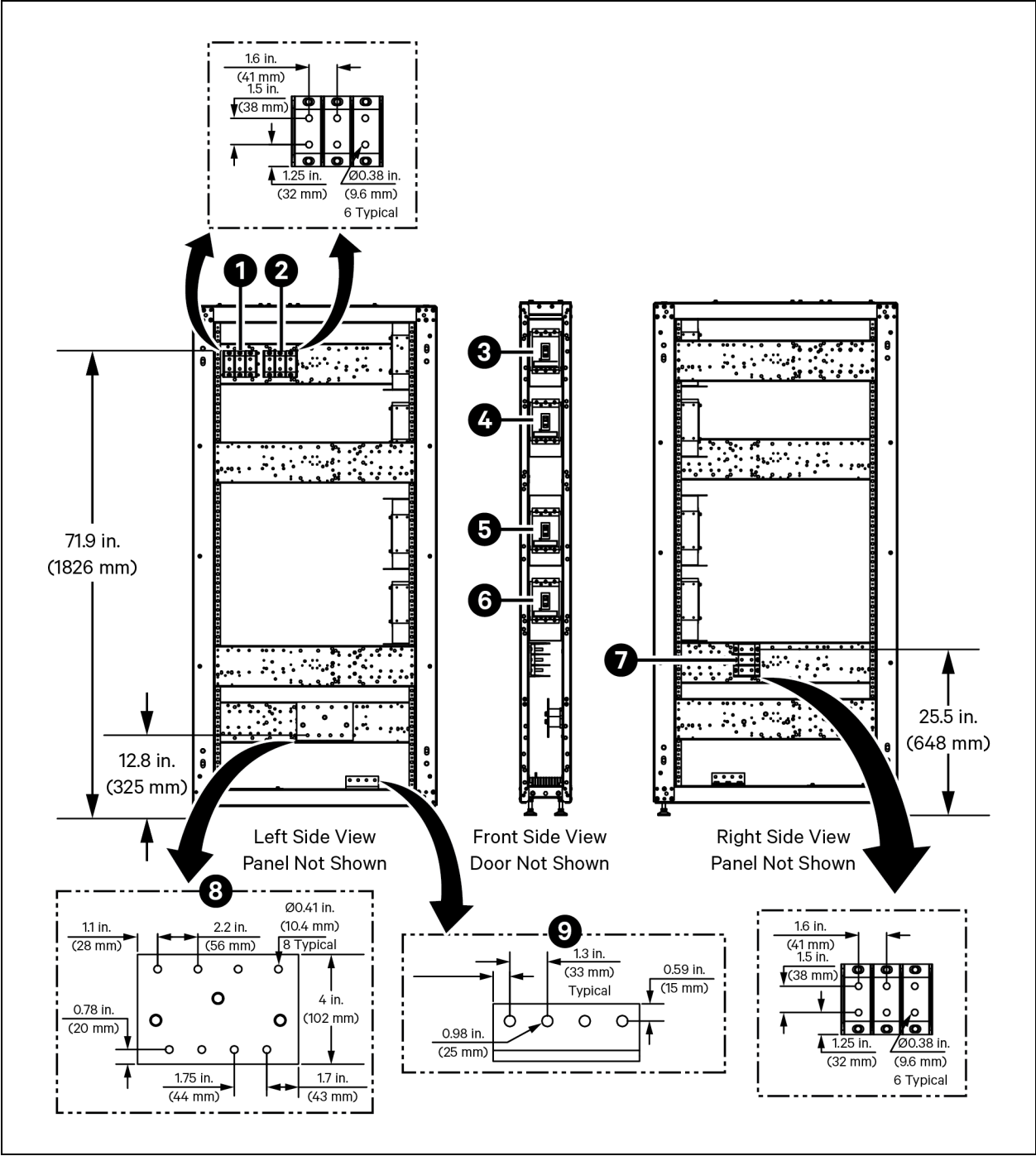


Item	Description	Item	Description
1	Ventilation	5	Power cable entry 26.8 in. x 16.8 in. (681 mm x 427 mm)
2	Power cable entry 28.3 in. x 17.5 in. (719 mm x 445 mm)	6	Caster
3	Control cable entry 5.9 in. x 2 in. (150 mm x 51 mm)	7	Leveler
4	Control cable entry 4.7 in. x 1.6 in. (119 mm x 41 mm)		

NOTE:

- 1. 24 in. (610 mm) minimum clearance above unit for air exhaust and 36 in. (914 mm) front access required for service.
- 2. Keep cabinet within 15 degrees of vertical.
- 3. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
- 4. Unit bottom is structurally adequate for forklift handling.
- 5. Control wiring and power wiring must be run in separate conduits.
- 6. All wiring must be in accordance with national and local electrical codes.
- 7. The MBC will always be attached to the UPS.

Figure 3.17 Terminal Details — 200 mm Vertiv™ Liebert® EXM MBC, Two to Four Breakers, 10 kVA to 40 kVA System



Item	Description	Item	Description
1	Input (TB2)	6	MIB
2	Rectifier input (TB4)	7	Output (TB3)
3	RIB	8	Neutral busbar
4	BIB	9	Ground busbar
5	MBB		

NOTE:

1. Control wiring and power wiring must be run in separate conduits.
2. All wiring must be in accordance with national and local electrical codes.
3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

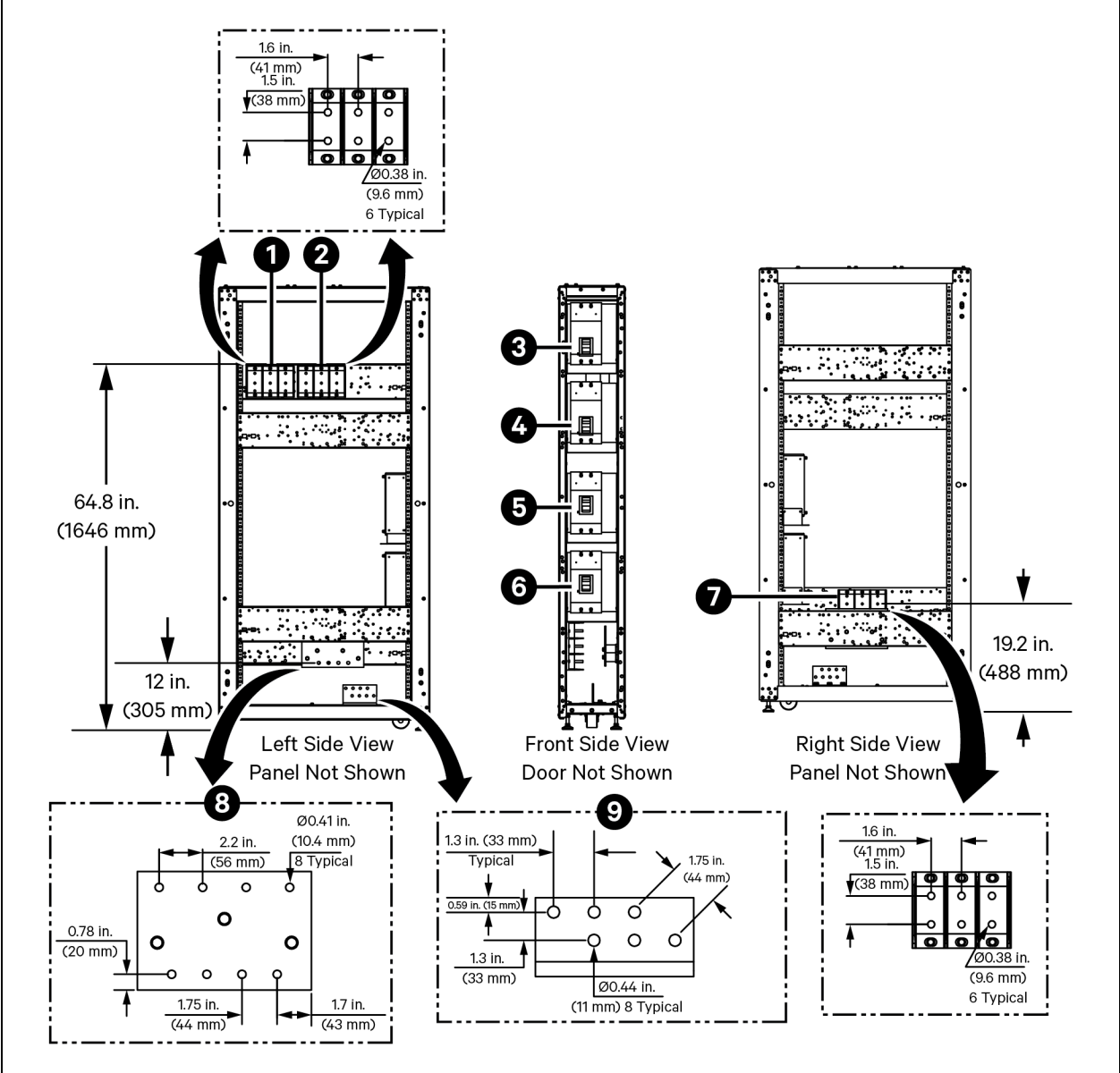
Table 3.5 Breaker Configuration — 200 mm Liebert® EXM MBC Two to Four Breakers, 10 kVA to 40 kVA System

Liebert® EXM MBC Breaker Configuration	Configured Breaker			
2	—	—	MBB	MIB
3	—	BIB	MBB	MIB
4	RIB	BIB	MBB	MIB

Table 3.6 Terminal Block Details — 200 mm Liebert® EXM MBC, Two to Four Breakers, 10 kVA to 40 kVA system

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

Figure 3.18 Terminal Details — 300 mm Vertiv™ Liebert® EXM MBC, Two to Four Breakers, 60 kVA to 100 kVA System



Item	Description	Item	Description
1	Input (TB2)	6	MIB
2	Rectifier input (TB4)	7	Output (TB3)
3	RIB	8	Neutral busbar
4	BIB	9	Ground busbar
5	MBB		

NOTE:

1. Control wiring and power wiring must be run in separate conduits.
2. All wiring must be in accordance with national and local electrical codes.
3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

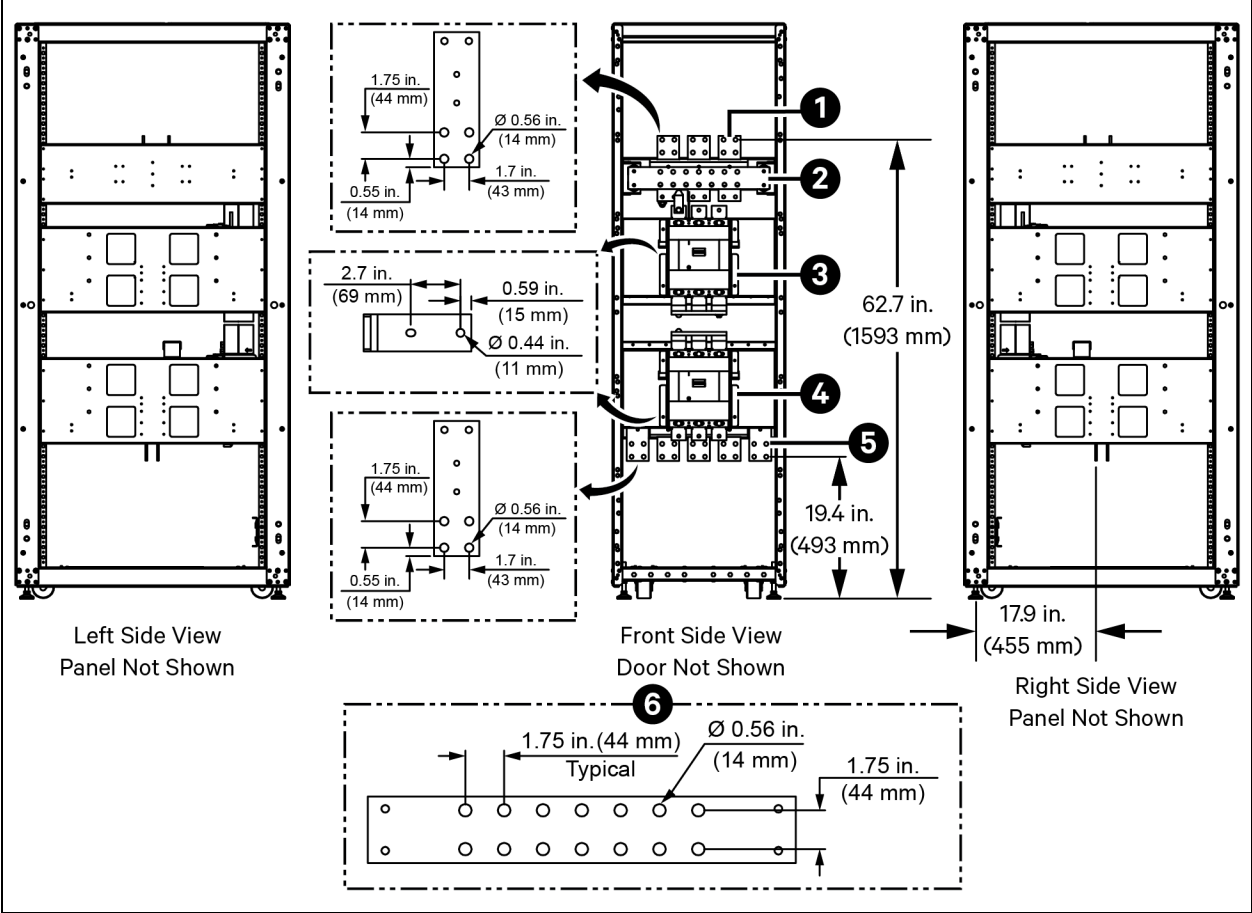
Table 3.7 Breaker Configuration — 300 mm Liebert® EXM MBC Two to Four Breakers, 60 kVA to 100 kVA System

Liebert® EXM MBC Breaker Configuration	Configured Breaker			
2	—	—	MBB	MIB
3	—	BIB	MBB	MIB
4	RIB	BIB	MBB	MIB

Table 3.8 Terminal Block Details — 300 mm Liebert® EXM MBC, Two to Four Breakers, 60 kVA to 100 kVA system

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

Figure 3.19 Terminal Details — 600 mm Vertiv™ Liebert® EXM MBC, Two Breakers, 120 kVA to 200 kVA System

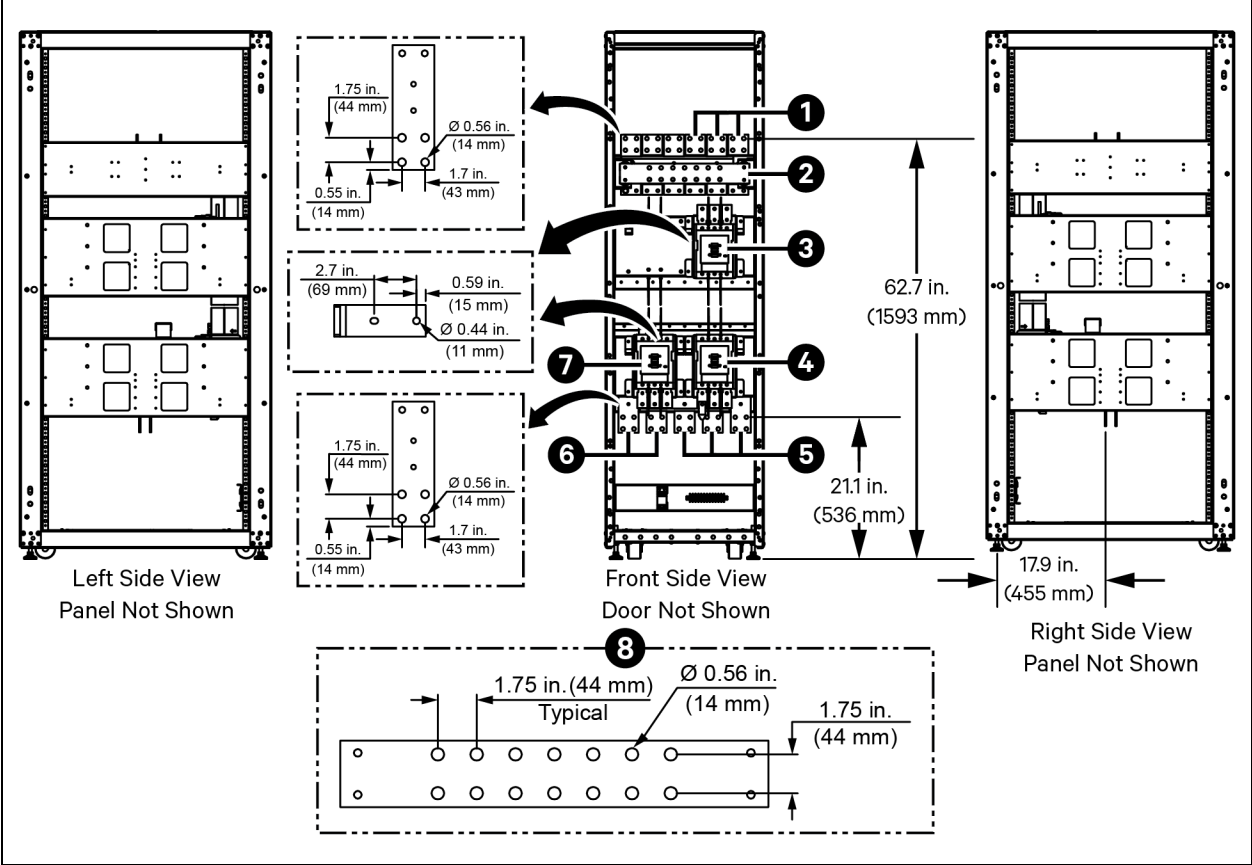


Item	Description	Item	Description
1	MBB input	4	MIB
2	Neutral busbar	5	Ground busbar
3	MBB	6	Neutral busbar

NOTE:

- 1. Control wiring and power wiring must be run in separate conduits.
- 2. All wiring must be in accordance with national and local electrical codes.
- 3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

Figure 3.20 Terminal Details — 600 mm Vertiv™ Liebert® EXM MBC, Three Breakers, 120 kVA to 160 kVA System

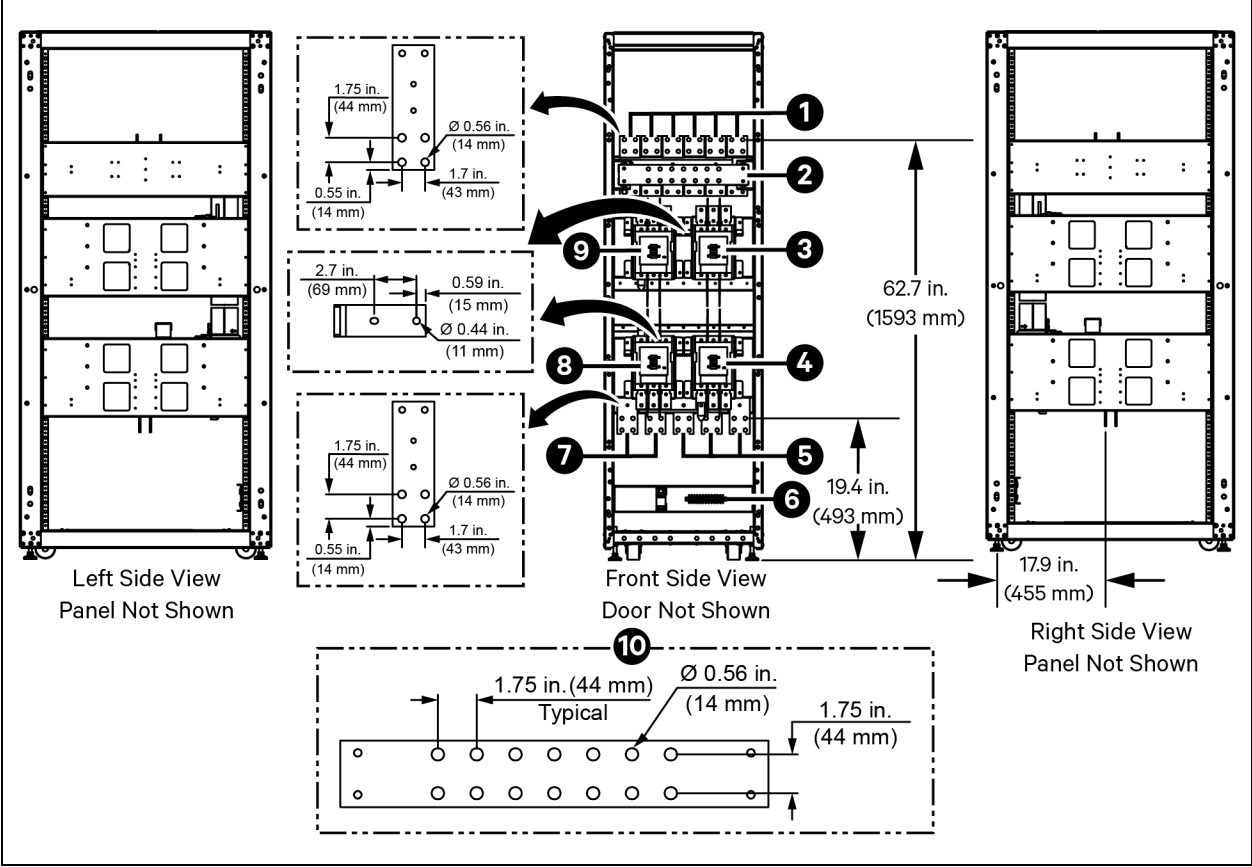


Item	Description	Item	Description
1	Bypass input busbar	5	Output busbar
2	Neutral busbar	6	Ground busbar
3	BIB	7	MIB
4	MBB	8	Neutral busbar

NOTE:

- 1. Control wiring and power wiring must be run in separate conduits.
- 2. All wiring must be in accordance with national and local electrical codes.
- 3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

Figure 3.21 Terminal Details — 600 mm Vertiv™ Liebert® EXM MBC, Four Breakers, 120 kVA to 160 kVA System

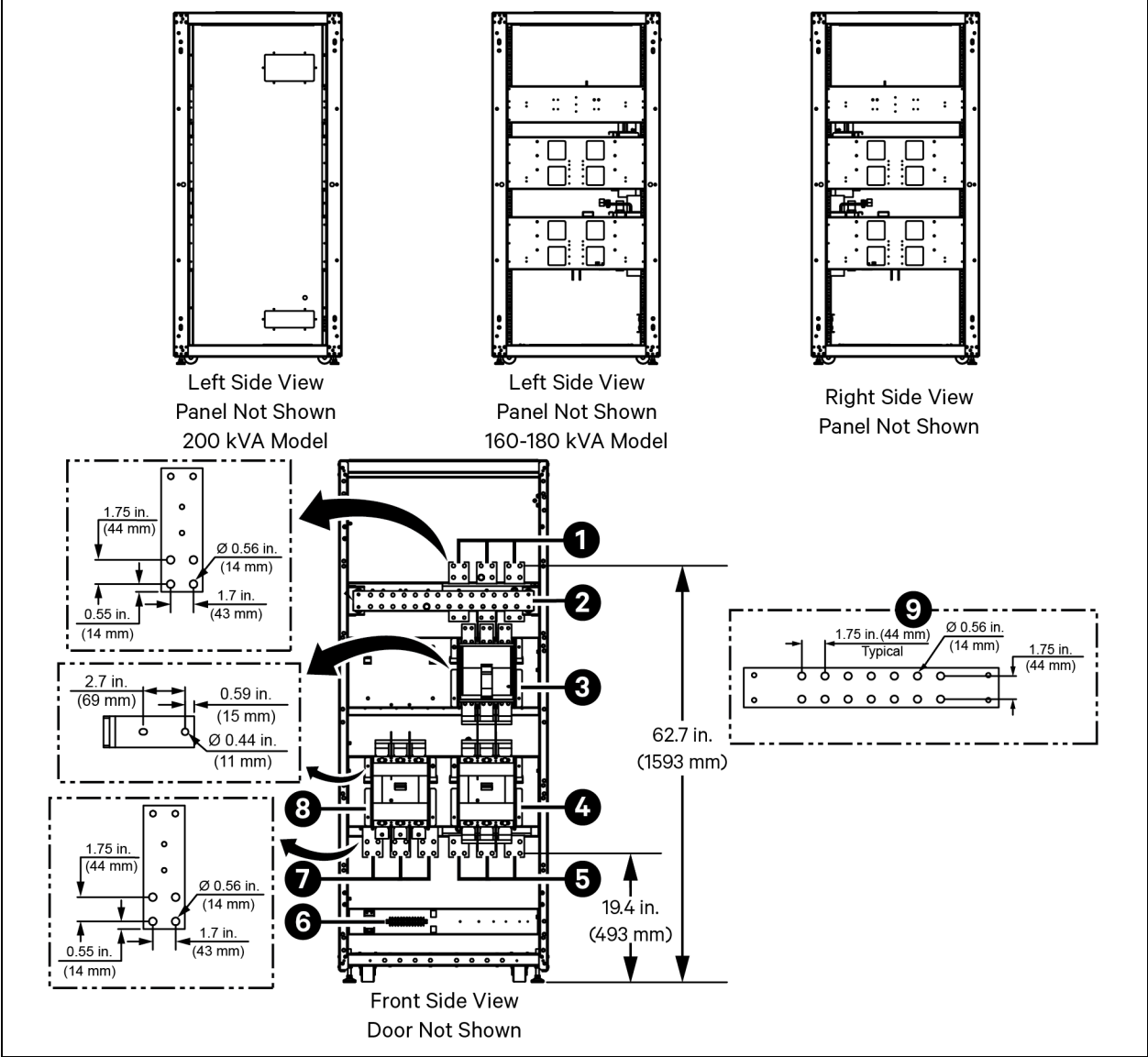


Item	Description	Item	Description
1	Bypass input busbar	6	TBI
2	Neutral busbar	7	Ground busbar
3	BIB	8	MIB
4	MBB	9	RIB
5	Output busbar	10	Neutral busbar

NOTE:

- 1. Control wiring and power wiring must be run in separate conduits.
- 2. All wiring must be in accordance with national and local electrical codes.
- 3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

Figure 3.22 Terminal Details — 800 mm Vertiv™ Liebert® EXM MBC, Three Breakers, 160 kVA to 200 kVA System

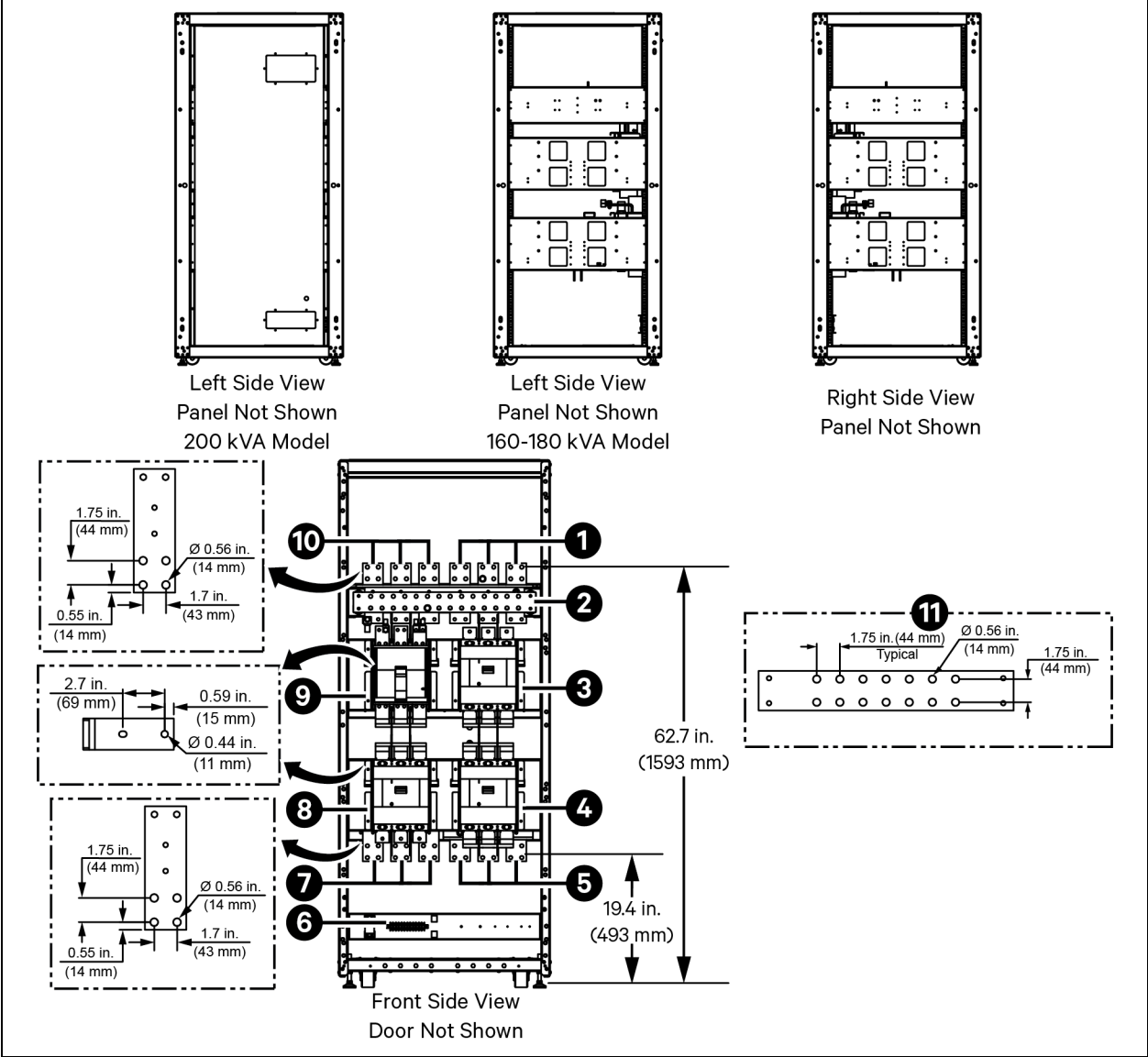


Item	Description	Item	Description
1	Bypass input busbar	6	TBI
2	Neutral busbar	7	Ground busbar
3	BIB	8	MIB
4	MBB	9	Neutral busbar
5	Output busbar		

NOTE:

1. Control wiring and power wiring must be run in separate conduits.
2. All wiring must be in accordance with national and local electrical codes.
3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

Figure 3.23 Terminal Details — 800 mm Vertiv™ Liebert® EXM MBC, Four Breakers, 160 kVA to 200 kVA System

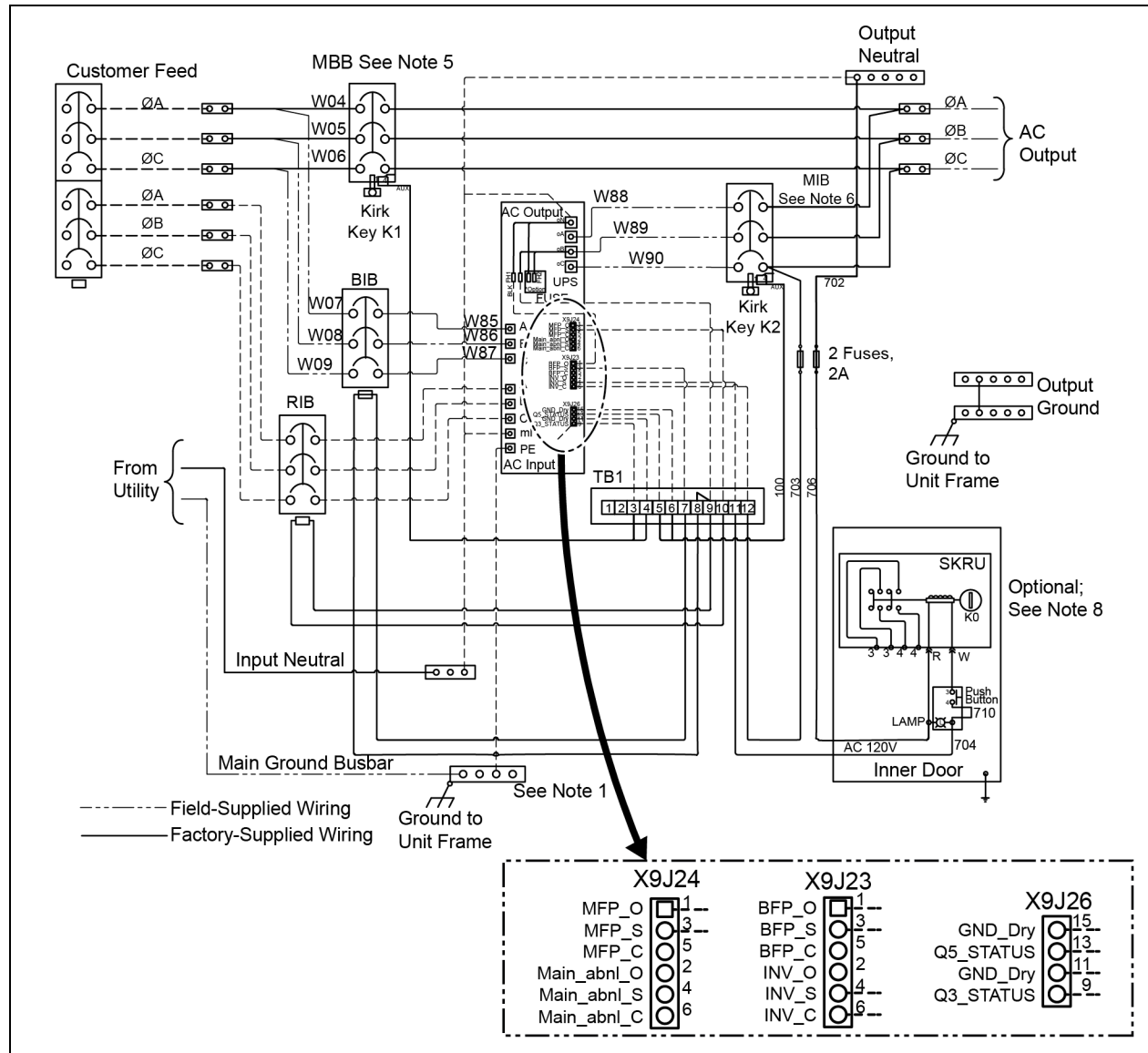


Item	Description	Item	Description	Item	Description
1	Bypass input busbar	5	Output busbar	9	RIB
2	Neutral busbar	6	TBI	10	Main input busbar
3	BIB	7	Ground busbar	11	Neutral busbar
4	MBB	8	MIB		

NOTE:

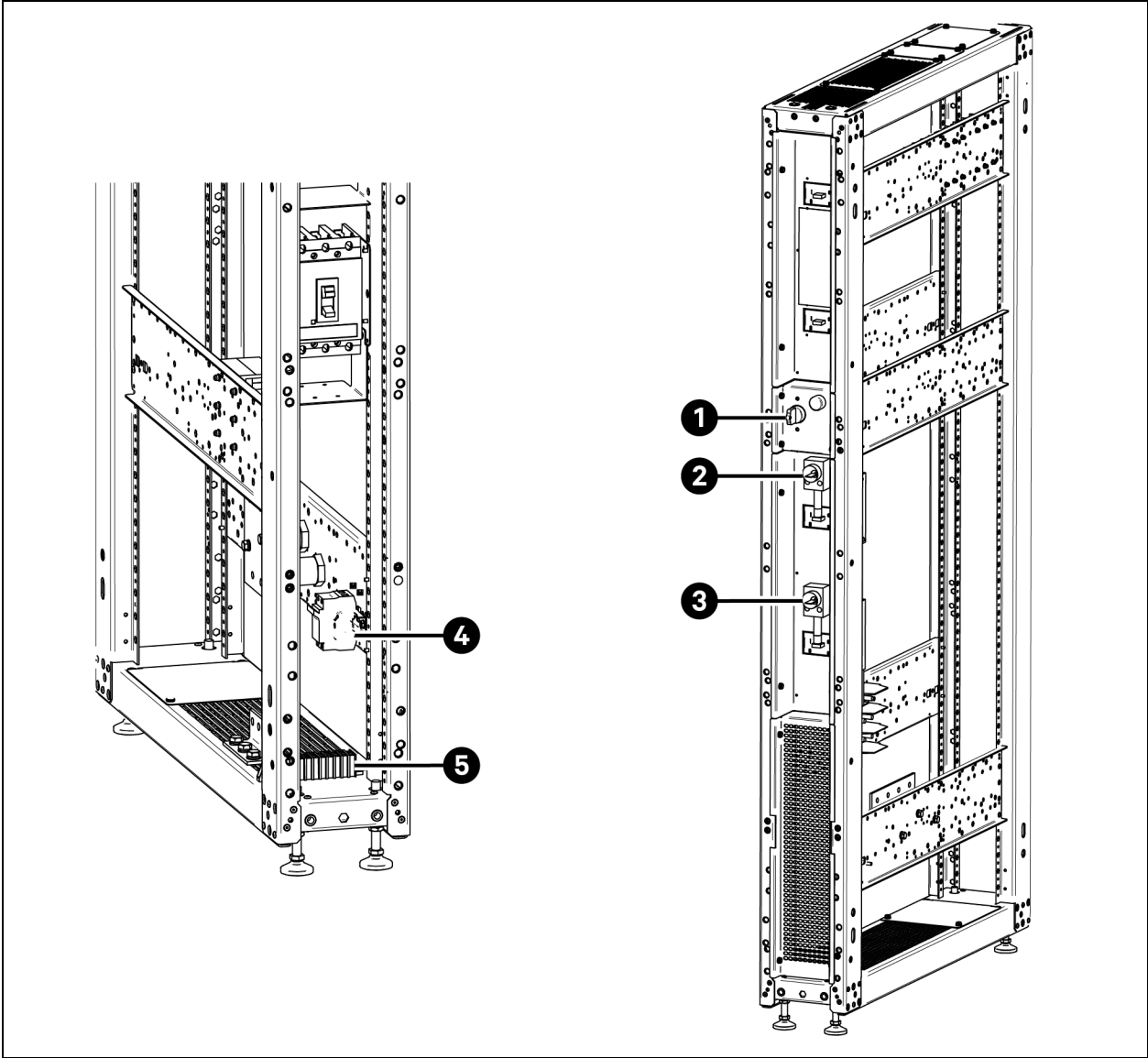
- 1. Control wiring and power wiring must be run in separate conduits.
- 2. All wiring must be in accordance with national and local electrical codes.
- 3. If the MBC is attached to the UPS, Vertiv will supply the interconnection cables.

Figure 3.24 Control Wiring Diagram, Vertiv™ Liebert® EXM MBC, Two to Four Breakers, with Interlock

**NOTE:**

1. Wiring shown for a four-breaker system. See Notes 8 and 9 for two-breaker and three-breaker.
2. Customer-furnished electrode conductor must be installed in accordance with national and local electrical codes.
3. Overcurrent protection is based on 80% rated devices.
4. MBB auxiliary switch connections are on the normally open and common positions.
5. MIB auxiliary switch connections are on the normally closed and common positions.
6. MBC when connected to UPS module, all control and power wiring is supplied by Vertiv. If the MBC is remote from 7. the UPS module, the cables between the MBC and UPS module must be supplied by others.
8. Optional Solenoid key release unit (SKRU) and associated wiring (703, 704, 706).
9. Typical four-breaker configuration is shown. Also available a two-breaker configuration (MIB, MBB) and a three-breaker configuration (BIB, MIB, MBB).
10. If configuration is a two-breaker MBC, the customer must supply the 120V shunt trip coil for the bypass and rectifier.

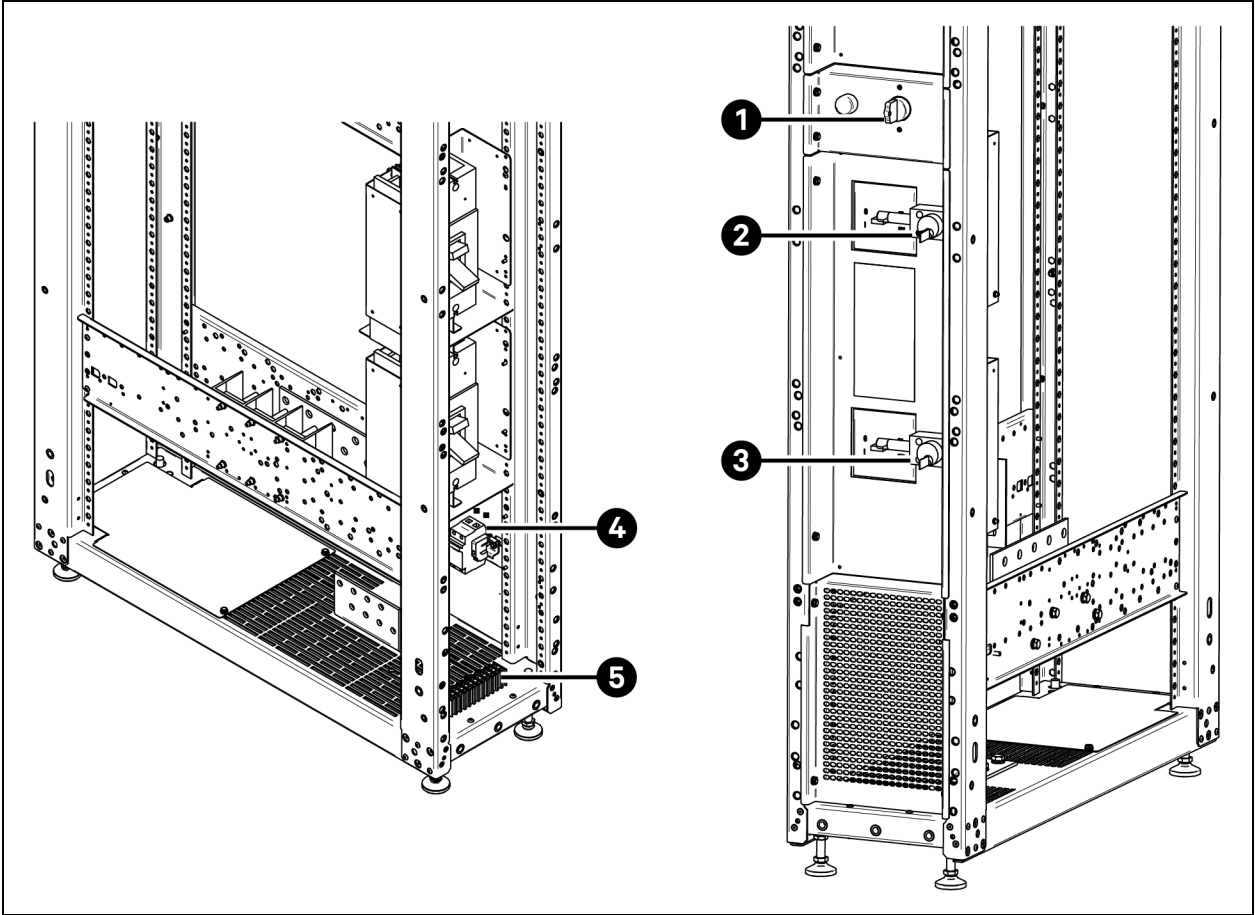
Figure 3.25 SKRU, 200 mm Vertiv™ Liebert® EXM MBC



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

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

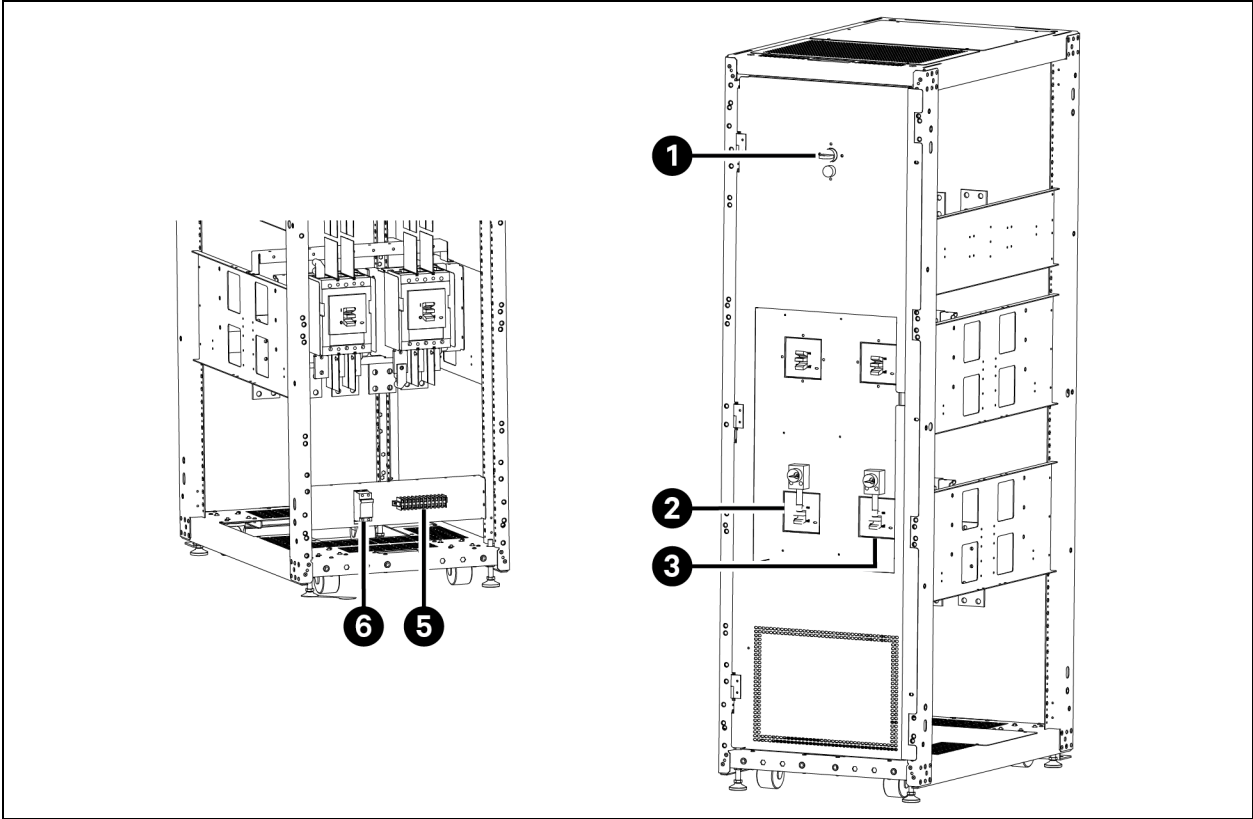
Figure 3.26 SKRU, 300 mm Vertiv™ Liebert® EXM MBC



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

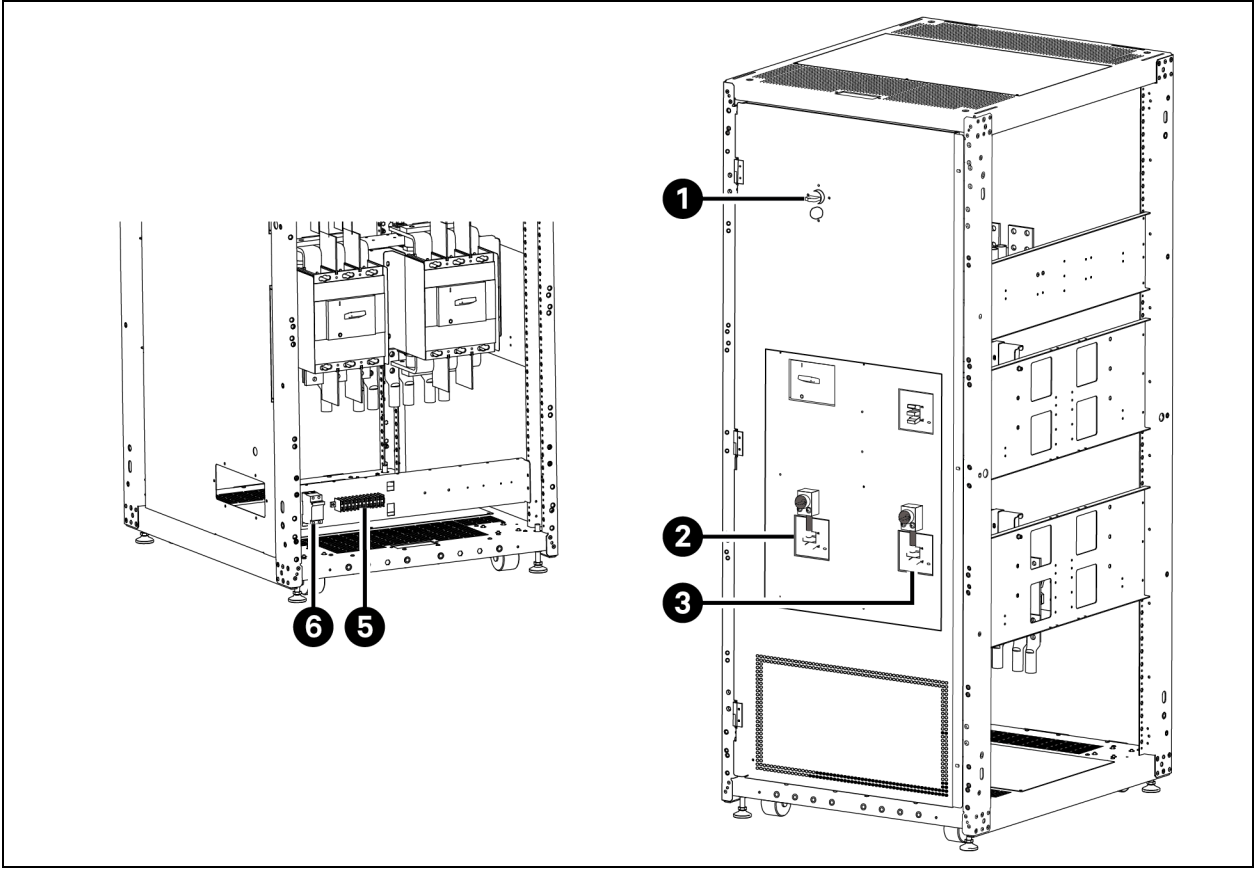
NOTE: SKRU is mounted between the BIB and MBB breakers.

Figure 3.27 SKRU, 600 mm Vertiv™ Liebert® EXM MBC



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

Figure 3.28 SKRU, 800 mm Vertiv™ Liebert® EXM MBC



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

4 Specifications

Table 4.1 Vertiv™ Liebert® EXM MBC Specifications

Model Size	10 kVA to 40 kVA UPS	60 kVA to 100 kVA UPS	120 kVA to 140 kVA UPS	160 kVA to 200 kVA UPS
Input Parameters				
Input Voltage to Bypass, VAC	208/120 V or 220/127 V, 3-Phase, 4-Wire			
Input Current, AAC	See Table 4.6 on page 43, Table 4.7 on page 44, and Table 4.8 on page 45, for more information.			
Input Frequency, Hz	60			
Output Parameters				
Output Power, kW	10-40	60-100	120-140	160-200
Output Voltage, VAC	208/120 V or 220/127 V, 3-Phase, 4-Wire			
Output Current, AAC	See Table 4.9 on page 46 for more information.			
Output Frequency, Hz	60			
Physical Parameters and Standards, in (mm)				
Cabinet Width, in. (mm) with side panels attached	8.2 (208)	12 (308)	23.9 (608)	31.8 (808)
Depth, in. (mm)	39.4 (1000)			
Height, in. (mm)	78.74 (2000)			
Weight, lbs (kg)	198 (90)	288 (131)	535 (243)	700 (318)
Color	Black (ZP-7021)			
Degree of Protection for UPS Enclosure	IP 20 (with and without front door open)			
Standards and Conformities	UL1778 5th Edition; CSA 22.2 107-3-14; ISTA Procedure 1H; WEEE			
Minimum Clearance, Top, in. (mm)	24 (610)			
Minimum Clearance, Back, in. (mm)	0			
Minimum Clearance, Sides, in. (mm)	0			
Cable Entrance	Top or Bottom			
Environmental Parameters				
Storage Temperature Range, °F (°C)	-13 to 158 (-25 to 70)			
Operating Temperature Range, °F (°C)	32 to 104 (0 to 40) UPS			
Relative Humidity	Maximum 95% Non-Condensing (Operating and Non-Operating)			
Maximum Altitude above MSL, ft. (m)	Refer to the Liebert® EXM UPS UM SL-25648 for 10 kVA to 40 kVA 208/120 V 50/60 Hz or SL-26100 for 20 kVA to 200 kVA 208/120 V 50/60 Hz			

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

Components	UPS Rating, kVA	
	10-40	60-100
	Dimensions, WxDxH, in. (mm)	
UPS only	23-5/8 x 39-1/2 x 78-3/4 (600 x 1000 x 2000)	23-5/8 x 39-1/2 x 78-3/4 (600 x 1000 x 2000)
UPS with 200 mm MBC	31-1/2 x 39-1/2 x 78-3/4 (800 x 1000 x 2000)	—
UPS with 300 mm MBC	—	23-5/8 x 39-1/2 x 78-3/4 (600 x 1000 x 2000)

Table 4.3 Weights — Liebert® EXM UPS, 10 kVA to 40 kVA, and 200 mm Liebert® EXM MBC

UPS Rating kVA	UPS Weight lbs (kg)	Liebert® EXM MBC 200 mm Weight lbs (kg)	Combined Weight UPS and Liebert® EXM MBC Weight lbs (kg)
10	684 (310)	198 (90)	882 (400)
15	684 (310)	198 (90)	882 (400)
20	684 (310)	198 (90)	882 (400)
30	758 (344)	198 (90)	956 (434)
40	758 (344)	198 (90)	956 (434)

Table 4.4 Weights — Liebert® EXM UPS, 60 kVA to 100 kVA, and 300 mm Liebert® EXM MBC

UPS Rating kVA	UPS Weight lbs (kg)	Liebert® EXM MBC 300 mm Weight lbs (kg)	Combined Weight UPS and Liebert® EXM MBC Weight lbs (kg)
60	844 (383)	288 (131)	1132 (514)
80	918 (416)	288 (131)	1206 (547)
100	992 (450)	288 (131)	1280 (581)

Table 4.5 Additional Weight for Liebert® EXM 10 kVA to 40 kVA UPS with Internal Batteries*

Battery Model	Battery Code	Added Battery Weight, lbs (kg)
12HX100-FR	F	528 (240)
12HX150-FR	H	624 (283)
12HX205-FR	M	1032 (468)
HR1500	G	648 (294)
HR2000	L	960 (435)
*For total system weight, add the weight for the UPS, Liebert® EXM MBC and the Liebert® EXM 10 kVA to 40 kVA UPS internal batteries.		

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 4.6 Vertiv™ Liebert® EXM MBC Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Max	Phase	Recommended Upstream Protection, A	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
208/120 220/127	10	34	3W + N + G	45	65	(1) #6	(1) #4	M10
208/120 220/127	15	51	3W + N + G	70	85	(1) #4	(1) #2	M10
208/120 220/127	20	68	3W + N + G	90	115	(1) #2	(1) 1/0	M10
208/120 220/127	30	102	3W + N + G	150	175	(1) 2/0	(1) 4/0	M10
208/120 220/127	40	136	3W + N + G	175	230	(1) 4/0	(2) 1/0	M10
208/120 220/127	60	205	3W + N + G	300	400	(2) 3/0	(2) 4/0	M10
208/120 220/127	80	273	3W + N + G	350	460	(2) 4/0	(2) 300	M10
208/120 220/127	100	341	3W + N + G	450	610	(2) 350	(2) 400	M10
208/120 220/127	120	409	3W + N + G	600	760	(2) 500	(3) 350	M12
208/120 220/127	140	478	3W + N + G	600	760	(2) 500	(3) 350	M12
208/120 220/127	160	546	3W + N + G	700	930	(3) 350	(3) 500	M12
208/120 220/127	180	614	3W + N + G	800	1140	(3) 500	(4) 400	M12
208/120 220/127	200	682	3W + N + G	1000	1240	(4) 350	(4) 500	M12

Table 4.7 Vertiv™ Liebert® EXM MBC Input Currents, Dual Input, Rectifier

Voltage 3-Phase 60Hz	MBC Rating kVA	Rectifier Input Current RIB A, Max	Rectifier Recommended Upstream Protection, A	Phase	167 °F (75 °C) Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
208/120 220/127	10	34	45	3W + N + G	65	(1) #6	(1) #4	M10
208/120 220/127	15	51	70	3W + N + G	85	(1) #3	(1) #2	M10
208/120 220/127	20	68	90	3W + N + G	115	(1) #2	(1) 1/0	M10
208/120 220/127	30	102	150	3W + N + G	175	(1) 2/0	(1) 4/0	M10
208/120 220/127	40	136	175	3W + N + G	230	(1) 4/0	(2) 1/0	M10
208/120 220/127	60	205	300	3W + N + G	400	(2) 3/0	(2) 4/0	M10
208/120 220/127	80	273	350	3W + N + G	460	(2) 4/0	(2) 300	M10
208/120 220/127	100	341	450	3W + N + G	610	(2) 350	(2) 400	M10
208/120 220/127	120	409	600	3W + N + G	760	(2) 500	(3) 350	M12
208/120 220/127	140	478	600	3W + N + G	760	(2) 500	(3) 350	M12
208/120 220/127	160	546	700	3W + N + G	930	(3) 350	(3) 500	M12
208/120 220/127	180	614	800	3W + N + G	1140	(3) 500	(4) 400	M12
208/120 220/127	200	682	1000	3W + N + G	1240	(4) 350	(4) 500	M12

Table 4.8 Vertiv™ Liebert® EXM MBC Input Currents, Dual Input, Bypass

Voltage 3-Ph, 60 Hz	MBC Rating kVA	Bypass Input Current BIB/MBB A, Max	Bypass Recommended Upstream Protection, A	Phase	167 °F (75 °C) Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
208/120 220/127	10	28	40	3W + N + G	50	(1) #6	(1) #4	M10
208/120 220/127	15	42	60	3W + N + G	85	(1) #4	(1) #2	M10
208/120 220/127	20	56	70	3W + N + G	115	(1) #2	(1) #2	M10
208/120 220/127	30	83	110	3W + N + G	130	(1) 1/0	(1) 2/0	M10
208/120 220/127	40	111	150	3W + N + G	175	(1) 3/0	(1) 4/0	M10
208/120 220/127	60	167	225	3W + N + G	285	(2) 300	(2) 2/0	M10
208/120 220/127	80	222	300	3W + N + G	400	(2) 3/0	(2) 4/0	M10
208/120 220/127	100	278	350	3W + N + G	460	(2) 4/0	(2) 300	M10
208/120 220/127	120	333	450	3W + N + G	620	(2) 350	(2) 500	M12
208/120 220/127	140	389	500	3W + N + G	620	(2) 350	(2) 500	M12
208/120 220/127	160	444	600	3W + N + G	760	(2) 500	(3) 350	M12
208/120 220/127	180	500	700	3W + N + G	930	(3) 350	(3) 500	M12
208/120 220/127	200	555	700	3W + N + G	930	(3) 350	(3) 500	M12

Table 4.9 Vertiv™ Liebert® EXM MBC Output Currents

Voltage 3-Ph, 60Hz	MBC Rating, kVA	System Output Current, A, Max	Phase	Recommend ed Upstream Protection, A	75 °C Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
208/120 220/127	10	28	3W + N + G	40	50	(1) #6	(1) #4	M10
208/120 220/127	15	42	3W + N + G	60	85	(1) #4	(1) #2	M10
208/120 220/127	20	56	3W + N + G	70	115	(1) #2	(1) #2	M10
208/120 220/127	30	83	3W + N + G	110	130	(1) 1/0	(1) 2/0	M10
208/120 220/127	40	111	3W + N + G	150	175	(1) 3/0	(1) 4/0	M10
208/120 220/127	60	167	3W + N + G	225	285	(2) 300 kcmil	(2) 2/0	M10
208/120 220/127	80	222	3W + N + G	300	400	(2) 3/0	(2) 4/0	M10
208/120 220/127	100	278	3W + N + G	350	460	(2) 4/0	(2) 300 kcmil	M10
208/120 220/127	120	333	3W + N + G	450	620	(2) 350	(2) 500	M12
208/120 220/127	140	389	3W + N + G	500	620	(2) 350	(2) 500	M12
208/120 220/127	160	444	3W + N + G	600	760	(2) 500	(3) 350	M12
208/120 220/127	180	500	3W + N + G	700	930	(3) 350	(3) 500	M12
208/120 220/127	200	555	3W + N + G	700	930	(3) 350	(3) 500	M12

Table 4.10 Recommended Lug Sizes (Compression Type) M10, 3/8 in. Bolt

Cable Size, AWG	T and B Copper One Hole	T and B Aluminum One Hole
#8	54132	60104-TB
#6	54136	60109
#4	54140	60114
#2	54143	60118
#1	54148	60124
#1/0	54109	60130
#2/0	54110	60136
#3/0	54111	60142
#4/0	54112	60148

Table 4.11 Recommended Lug Sizes (Compression Type) M10, 3/8 in. Bolt

Cable Size, kcmil	T and B Copper One Hole	T and B Aluminum One Hole
250	54174	60154
300	54179	60160
350	256-30695-112	—
400	256-30695-1403	—
500	256-30695-339	—

Table 4.12 Recommended Lug Sizes (Compression Type) M12, 1/2 in. 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	—
#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

Table 4.12 Recommended Lug Sizes (Compression Type) M12, 1/2 in. Bolt (continued)

Cable Size	T and B Copper Two-Hole	T and B Aluminum Two-Hole
600 kcmil	54878BE	60275
700 kcmil	54879BE	60277
750 kcmil	54880BE	60278

4.2 Torque Requirements

All electrical connections must be tight.

Table 4.13 below and **Table 4.14** below provide the torque values for the connections to the Vertiv™ Liebert® EXM MBC. Use these values unless the equipment is labeled otherwise.

Table 4.13 Busbar Torque for Power Wiring

Bolt Shaft Size, in.	Torque, lb-in (Nm)
3/8 in. (M10)	192 (22)
1/2 in. (M12)	428 (48)

Table 4.14 Terminal block torque with compression lugs for control wiring

Wire Size or Range, AWG	Torque, lb-in (Nm)
#22 to #14	3.5 to 5.3 (0.4 to 0.6)

NOTE: Refer to the manufacturer's data for proper torque for circuit breaker power connections.

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

1-800-543-2378

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

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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