



Liebert[®] EXM MBC

User Manual

480 V, 50-250 kVA, 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

1.1 Save These Instructions

This manual contains important instructions that must be followed during installation of Vertiv™ Liebert® EXM 480 V 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® EXM MBC weight ranges from 225-332 lb. (102-151 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 102 à 151 kg (de 225 à 232 lb).

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 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® EXM MBC. Retain this manual for use by installing personal.



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 should 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 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. 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® EXM 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.

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 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 31).

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 room extractor fans.

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

2.3.2 Storage

The equipment must not be installed immediately, it must be stored in a room for protection against excessive humidity or heat sources (see [Table 3.1](#) on page 31).

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

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/cm²) of any handling equipment. Refer [Table 3.3](#) on page 32 for the weight of the Liebert® EXM MBC 200 mm and 300 mm models. [Table 3.2](#) on page 32 through [Table 3.4](#) on page 32 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 fork lift or similar equipment. For operations with a fork lift, refer 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 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. Can cause equipment damage, injury, and death. Exercise extreme care when handling cabinets to avoid equipment damage or injury to personnel. The

Vertiv™ Liebert® EXM MBC weight ranges from 225-332 lb. (102-151 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 102 à 151 kg (de 225 à 232 lb).

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

Liebert®EXM MBC have no ventilation grilles at either side or at the 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 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 must be mounted on a pedestal suitably designed to accept the equipment point loading.

2.5 Cable Entry

The 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 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 3.5** on page 33 through **Table 3.7** on page 33, follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media).

For cable entry locations, refer to **Figure 2.7** on page 18 and **Figure 2.8** on page 19.



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.

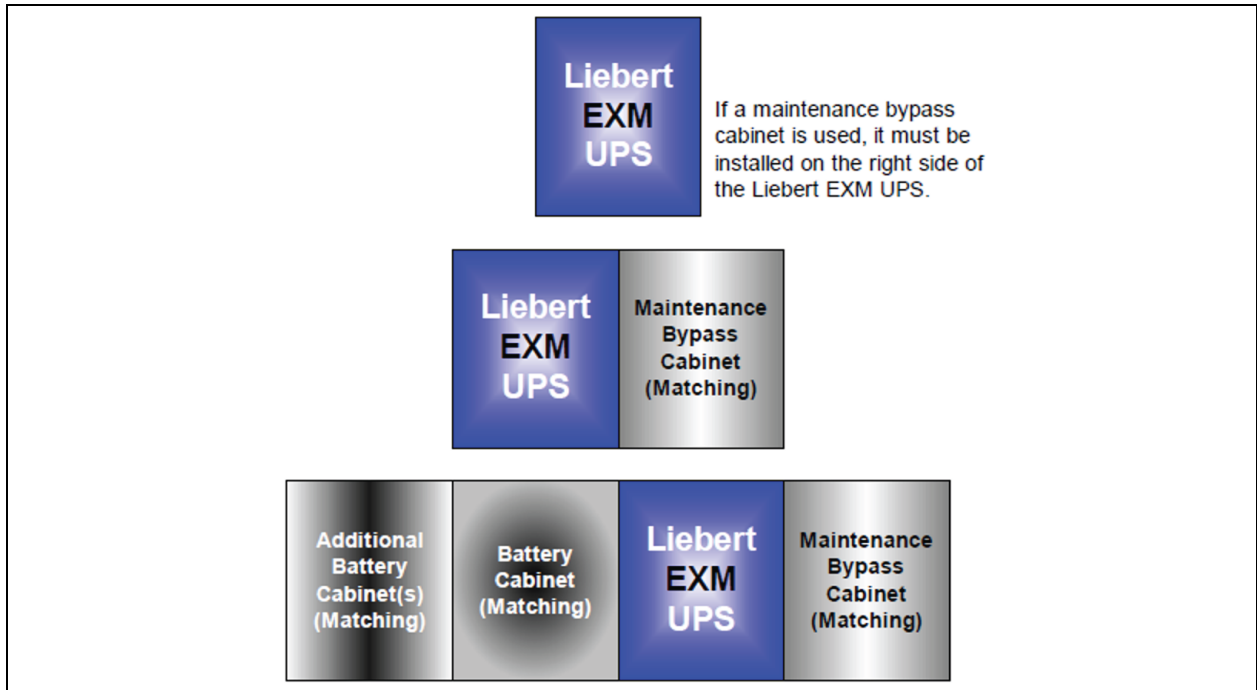
Avant de procéder au câblage de l'armoire, assurez-vous que vous êtes au courant de l'emplacement et du fonctionnement des isolateurs externes qui raccordent l'alimentation d'entrée ou de dérivation.

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 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 1.1 Cabinet Arrangement—Vertiv™ Liebert® EXM 480 V UPS, Battery Cabinets, 480 V MBC



NOTE: The 200 mm and 300 mm maintenance bypass cabinets 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) 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, and 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, 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 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.

Refer to 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 between the power distribution panel and the maintenance bypass input supply busbars (A-B-C terminals) and tighten the connections to the proper torque (see **Table 3.11** on page 35). Ensure correct phase rotation.
5. Connect the UPS Input
 - a. For two-breaker Vertiv™ Liebert® EXM MBC.
 - 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 terminals) and between the power distribution panel and 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 between the Liebert® EXM MBC and the UPS bypass input supply busbars (A-B-C 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 3.11** on page 35). Ensure correct phase rotation.
6. Connect the system output power cables between the Liebert® EXM MBC output (A-B-C terminals) and the critical load and tighten the connections to the proper torque (see **Table 3.11** on page 35). Ensure correct phase rotation.
7. Connect the control wiring from the Liebert® EXM MBC terminal block TB1 to the Vertiv™ Liebert® EXM UPS Bypass Module (X9, J23, and J26). Tighten the connections to the proper torque (see **Table 3.11** on page 35).
8. Replace the panels.

Table 1.1 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 480 V UPS installation manual, SL-26102, for additional details about the Liebert® EXM 50-250 kVA UPS. The manual is available at the Liebert website: www.liebert.com.

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

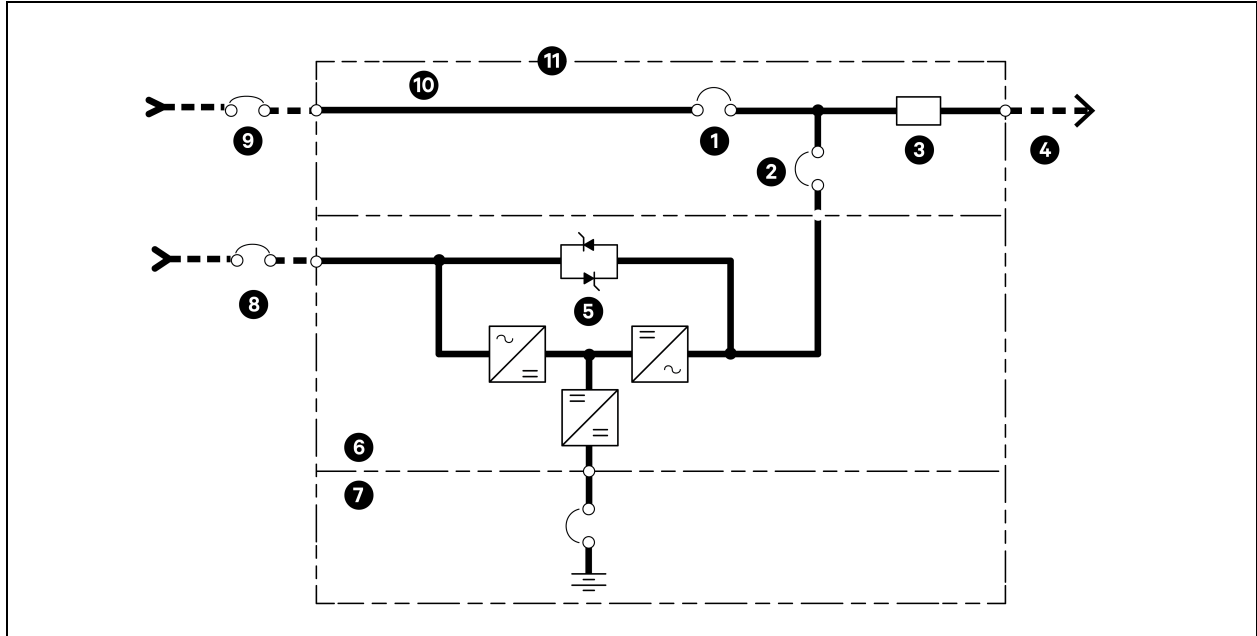
- The ground conductor must be sized according to local or NEC codes, cable lengths, type of protection, and so on. The ground cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consideration must be given to the use of smaller, paralleled cables for heavy 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® 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 2.1 One Line Diagram, Dual Input, Two Breaker Vertiv™ Liebert® 480 V MBC, 50-250 kVA System



Item	Description	Item	Description
1	MBB	7	Battery
2	MIB	8	*UPS AC input 3 wire + GND
3	Output busbar	9	*Bypass AC input 3 wire + GND, see note 5
4	AC output 480 V 3 wire + GND	10	MBC
5	Static bypass	11	Field supplied Wiring
6	UPS cabinet		

BIB - Bypass Isolation Breaker

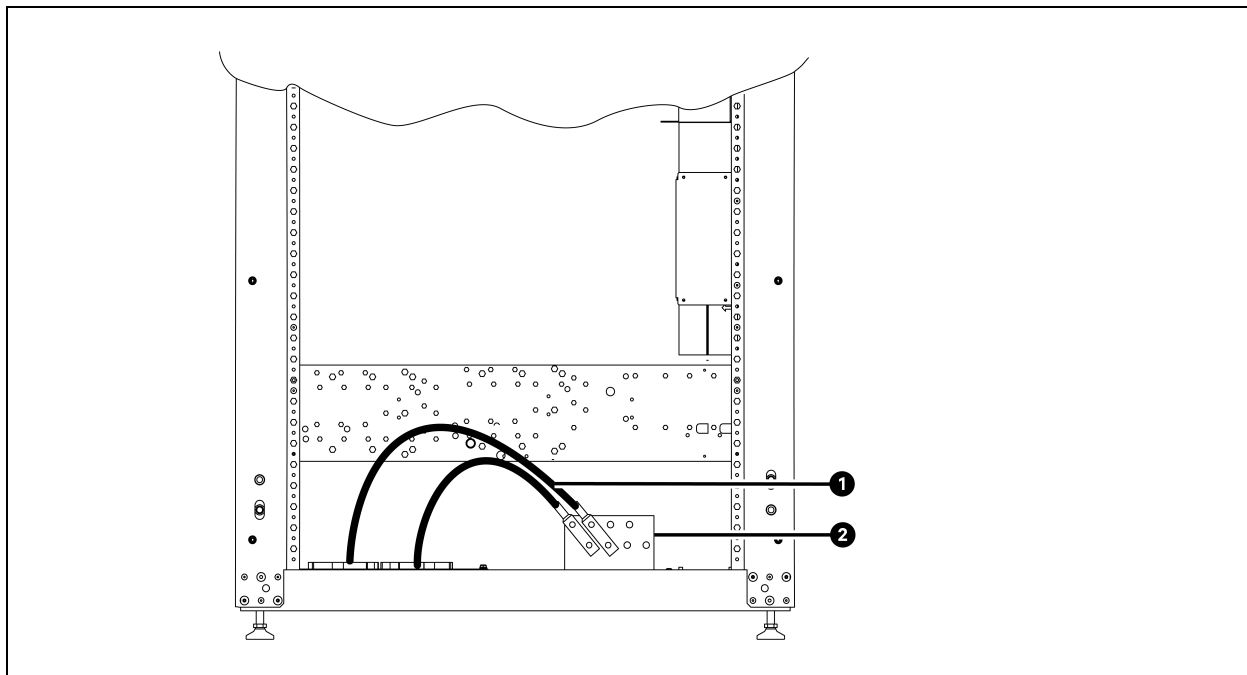
MBB - Maintenance Bypass Breaker

MIB - Maintenance Isolation Breaker

NOTE: * External overcurrent protection by others.

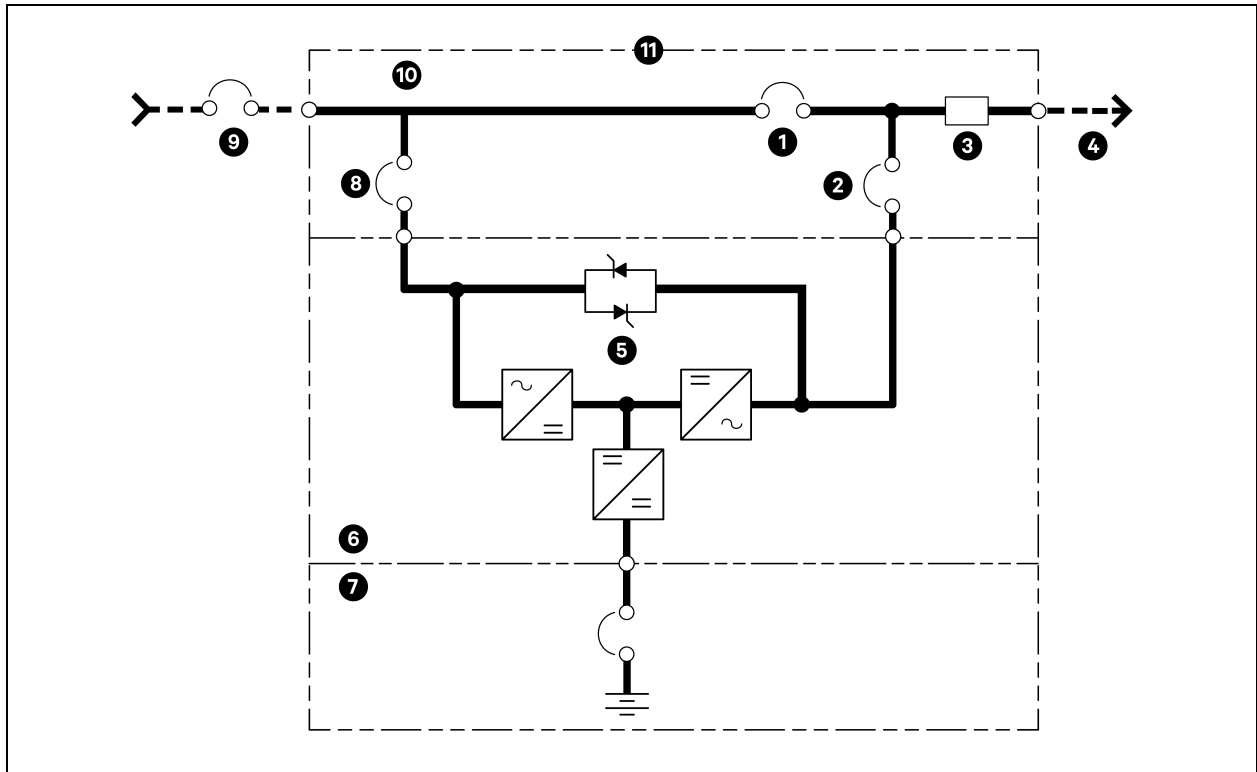
- Make sure national and local electrical codes are in accordance while installing.
- Same single source must be shared between input and bypass.
- Make sure that the bypass and rectifier inputs and output cables are running in separate conduits.
- Make sure that the control wiring is routed in separate conduit.
- Customer must supply shunt trip on bypass breaker with 480 V coil.

Figure 2.2 Bend Radius—Ground Wires through Bottom Feed, 50-250 kVA System



Item	Description
1	When Attaching ground wires from the bottom feed, connection must be made to the ground busbar as shown for required bend radius.
2	Ground Busbar

Figure 2.3 One Line Diagram, Single Input, Three Breaker Vertiv™ Liebert® 480 V MBC, 50-250 kVA

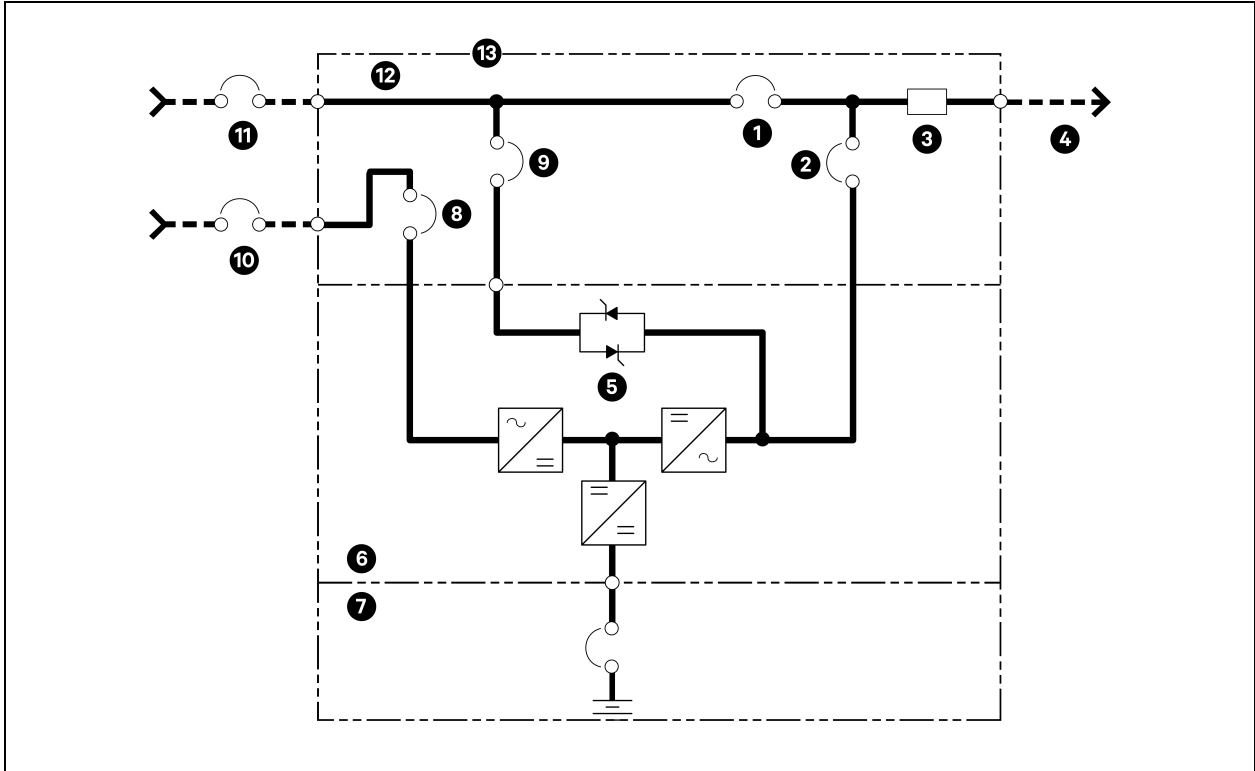


Item	Description	Item	Description
1	MBB	7	Battery
2	MIB	8	BIB
3	Output busbar	9	*Bypass AC input 3 wire + GND
4	AC output 480 V 3 wire + GND	10	MBC
5	Static bypass	11	Field supplied Wiring
6	UPS cabinet		

NOTE: * External overcurrent protection by others.

- Make sure national and local electrical codes are in accordance while installing.
- Same single source must be shared between input and bypass.
- Make sure that the bypass and rectifier inputs and output cables are running in separate conduits.
- Make sure that the control wiring is routed in separate conduit.

Figure 2.4 One Line Diagram, Dual Input Four Breaker Vertiv™ Liebert® 480 V MBC, 50-250 kVA



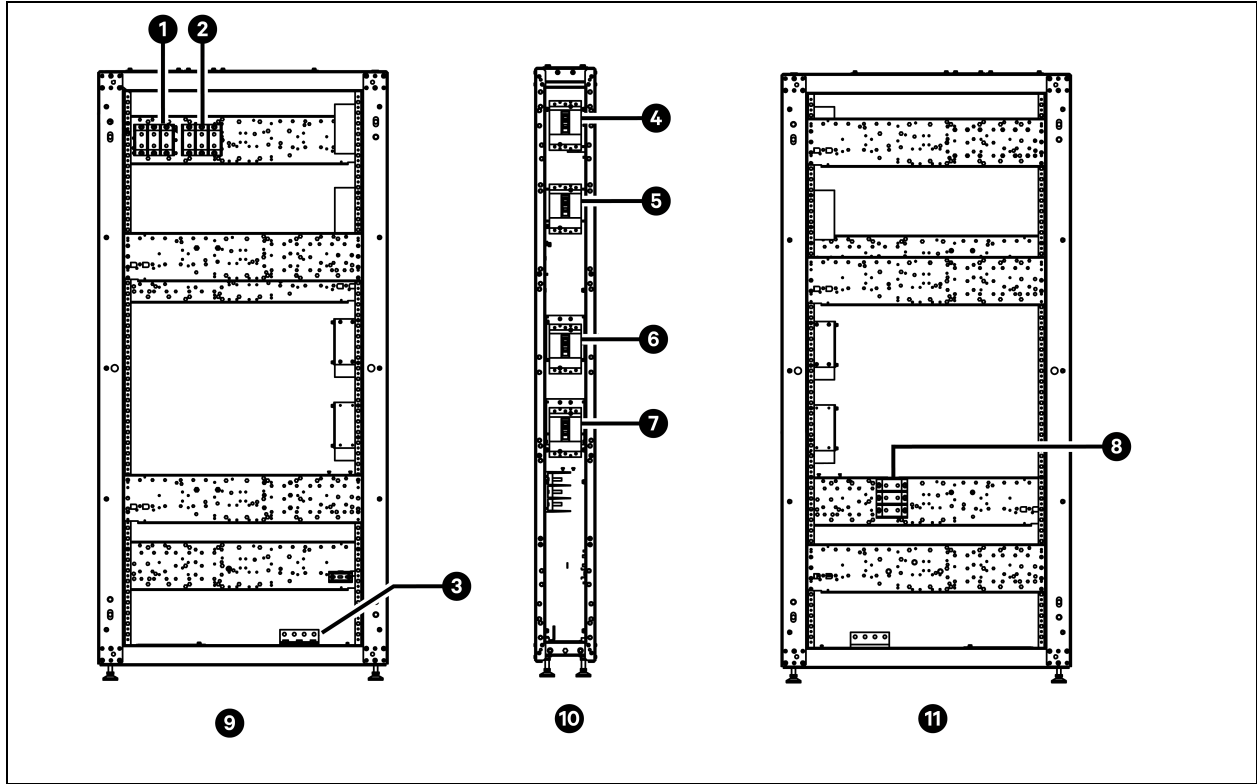
Item	Description	Item	Description
1	MBB	8	RIB
2	MIB	9	BIB
3	Output busbar	10	*Rectifier AC input 3 wire + GND
4	AC output 480 V 3 wire + GND	11	*Bypass AC input 3 wire + GND
5	Static bypass	12	MBC
6	UPS cabinet	13	Field supplied Wiring
7	Battery		

RIB - Rectifier Input Breaker

NOTE: * External overcurrent protection by others.

- Make sure national and local electrical codes are in accordance while installing.
- Same single source must be shared between input and bypass.
- Make sure that the bypass and rectifier inputs and output cables are running in separate conduits.
- Make sure that the control wiring is routed in separate conduit.

Figure 2.5 Main Components—200 mm Vertiv™ Liebert® EXM 480 V MBC, Two to Four Breakers, 50-100 kVA System



Item	Description	Item	Description
1	TB2	7	MBB
2	TB4	8	TB3
3	Ground busbar	9	Left side panel removed
4	RIB	10	Front door removed
5	BIB	11	Right side panel removed
6	MIB		

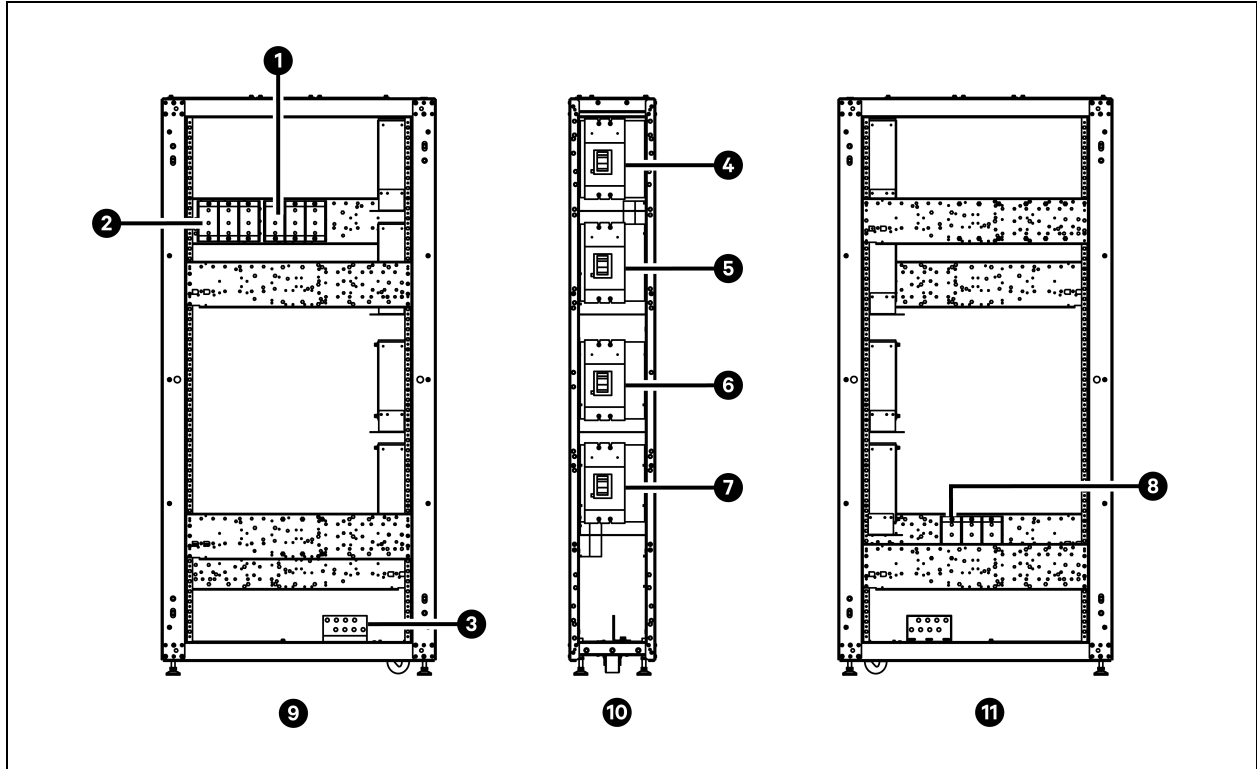
Table 2.1 Breaker Configuration—200 mm Liebert® EXM 480 V MBC, Two to Four Breakers, 50-100 kVA System

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

Table 2.2 Terminal Block Details—200 mm Vertiv™ Liebert® EXM 480 V MBC, Two to Four Breakers, 50-100 kVA System

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

Figure 2.6 Main Components—300 mm Liebert® EXM 480 V MBC, Two to Four Breakers, 150-250 kVA System



Item	Description	Item	Description
1	TB4	7	MBB
2	TB2	8	TB3
3	Ground busbar	9	Left side panel removed
4	RIB	10	Front door removed
5	BIB	11	Right side panel removed
6	MIB		

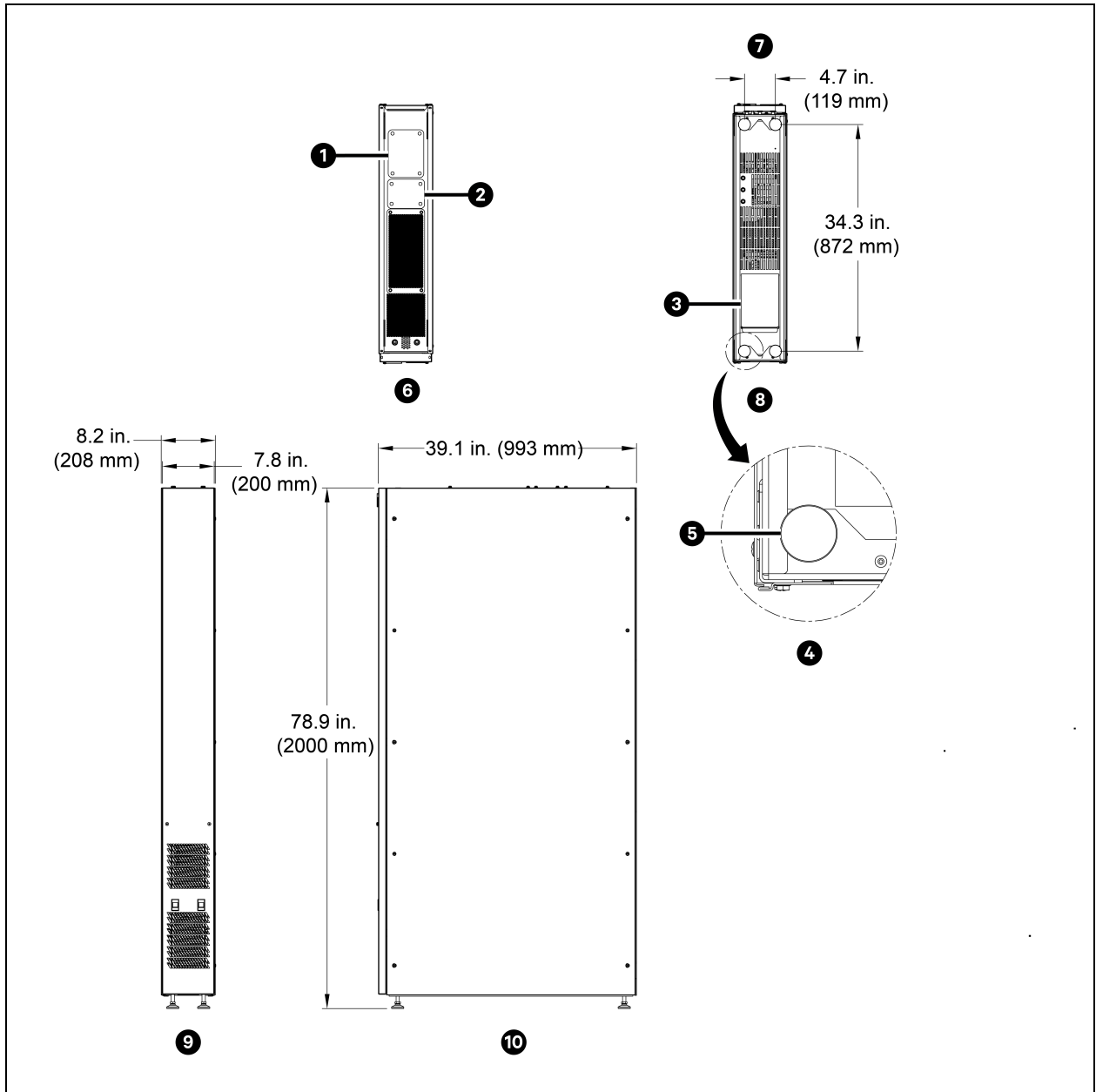
Table 2.3 Breaker Configuration—300 mm Vertiv™ Liebert® EXM 480 V MBC, Two to Four Breakers, 150-250 kVA System

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

Table 2.4 Terminal Block Details—300 mm Liebert® EXM 480 V MBC, Two to Four Breakers, 150-250 kVA System

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

Figure 2.7 Outline Drawing—200 mm Vertiv™ Liebert® EXM 480 V MBC, Two to Four Breakers, 50-100 kVA System

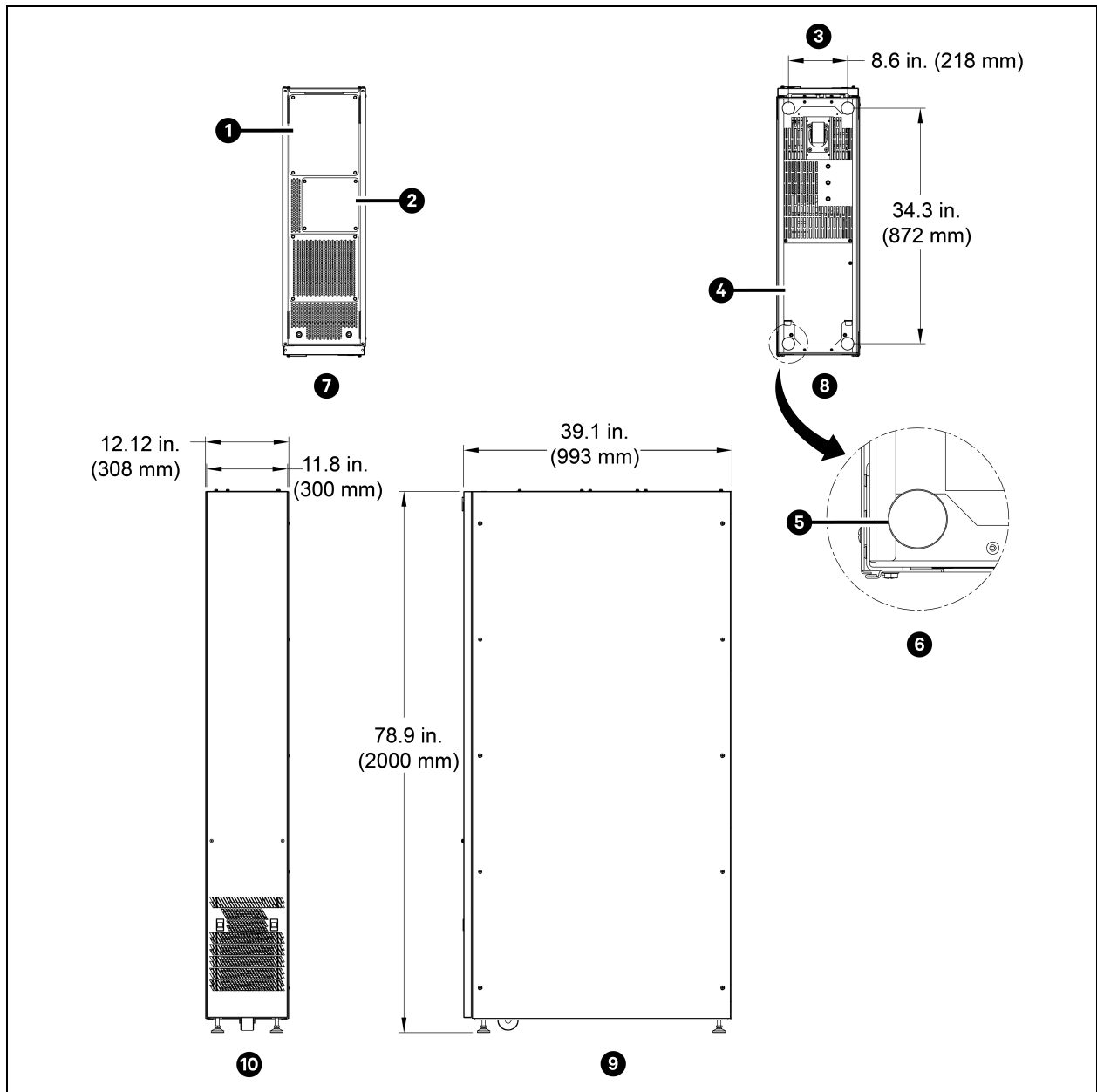


Item	Description	Item	Description
1	Cable entry area 5.3 in. x 7.3 in. (135 mm x 185 mm)	6	Top
2	Cable entry area 8.3 in. x 7.9 in. (211 mm x 201 mm)	7	Front
3	Cable entry area 5.7 in. x 8.3 in. (145 mm x 211 mm)	8	Bottom
4	Detail A	9	Front
5	Leveler	10	Right side

1. All dimensions are in in. (mm).

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

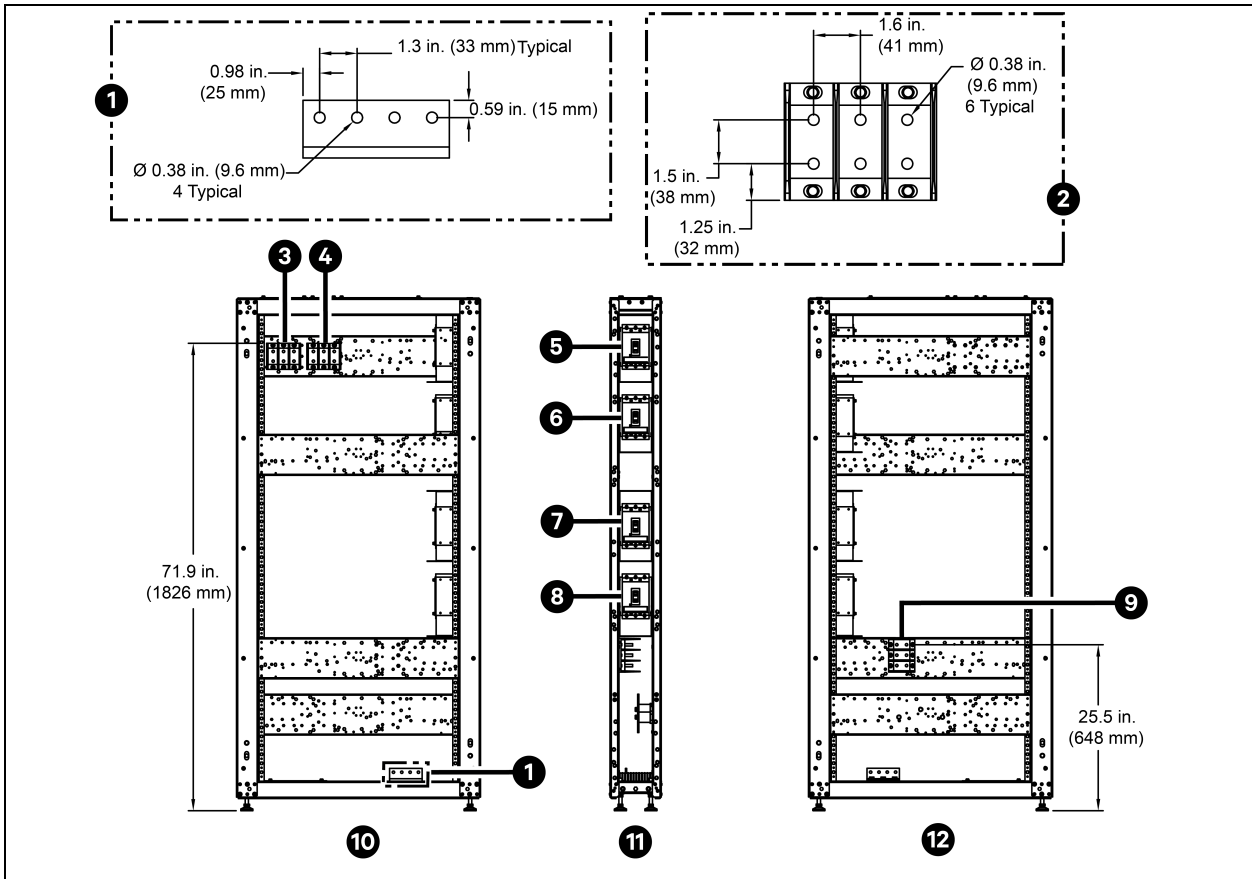
Figure 2.8 Outline Drawing—300 mm Vertiv™ Liebert® EXM 480 V MBC, Two to Four Breakers, 150-250 kVA System



Item	Description	Item	Description
1	Cable entry area 10 in. x 11.8 in. (254 mm x 300 mm)	6	Detail A
2	Cable entry area 8.3 in. x 7.9 in. (211 mm x 201 mm)	7	Top
3	Front	8	Bottom
4	Cable entry area 10 in. x 14.8 in. (254 mm x 376 mm)	9	Right side
5	Leveler	10	Front

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

Figure 2.9 Terminal Details—200 mm Vertiv™ Liebert® EXM 480 V MBC, Four Breakers, 50-100 kVA System



Item	Description	Item	Description
1	Ground busbar	7	MBB
2	Detail TB2, TB3, TB4	8	MIB
3	Input (TB2) See detail A	9	Output (TB3) See Detail A
4	Rectifier input (TB4) See detail A	10	Left side panel removed
5	RIB	11	Front door removed
6	BIB	12	Right side panel removed

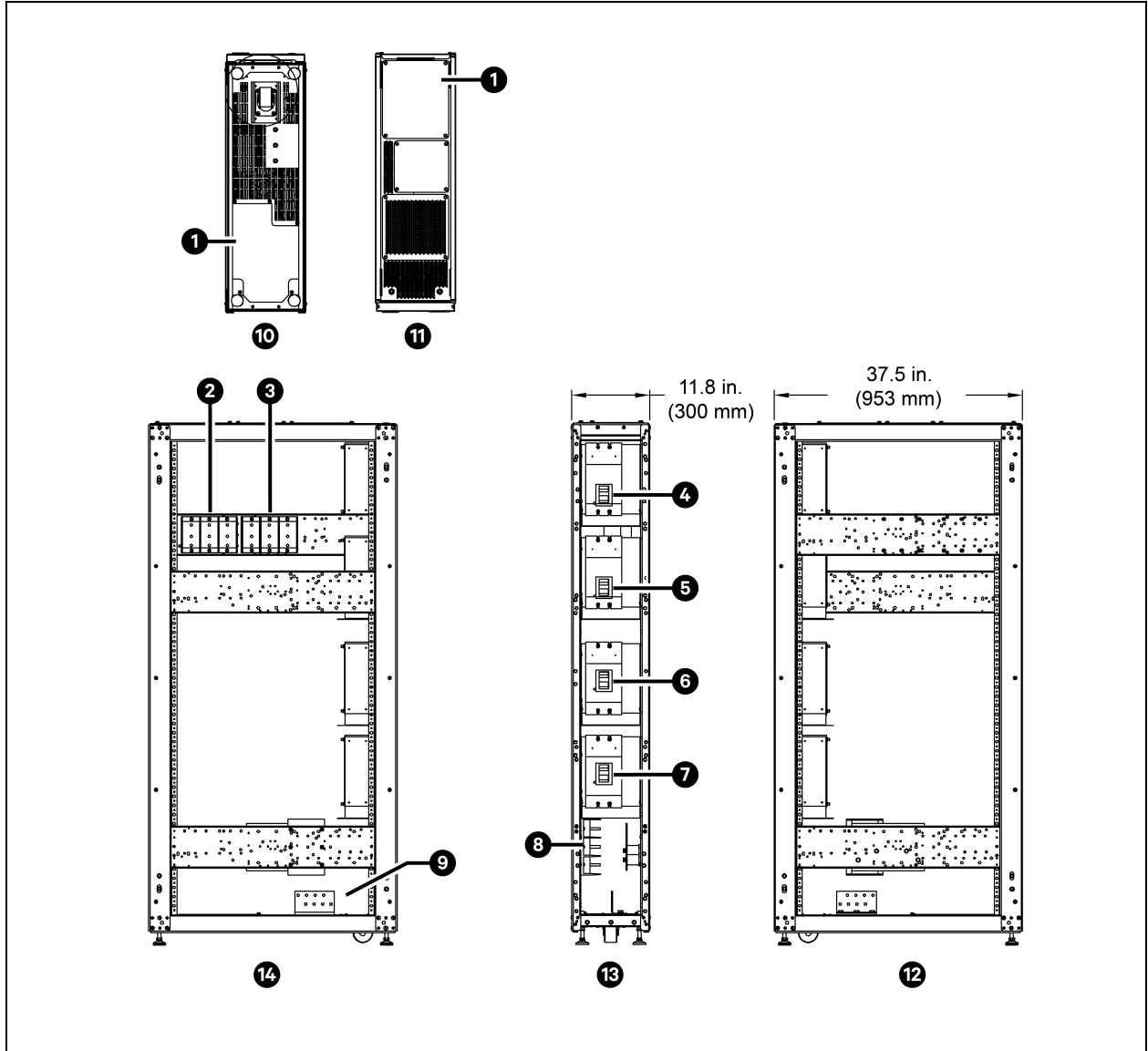
Table 2.5 Breaker Configuration—200 mm Vertiv™ Liebert® EXM 480 V MBC, Four Breaker System

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

Table 2.6 Terminal Block Details—200 mm Liebert® EXM 480 V MBC, Four Breaker System

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

Figure 2.10 Terminal Details—300 mm Vertiv™ Liebert® EXM 480 V MBC, Four Breaker System, 150-250 kVA



Item	Description	Item	Description
1	Conduit landing	8	TB3
2	TB2	9	Ground busbar
3	TB4-Dual input systems	10	Bottom view
4	RIB	11	Top view
5	BIB	12	Right side panel view
6	MBB	13	Front view door removed
7	MIB	14	Left side view panel removed

1. All dimensions are in in. (mm).

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

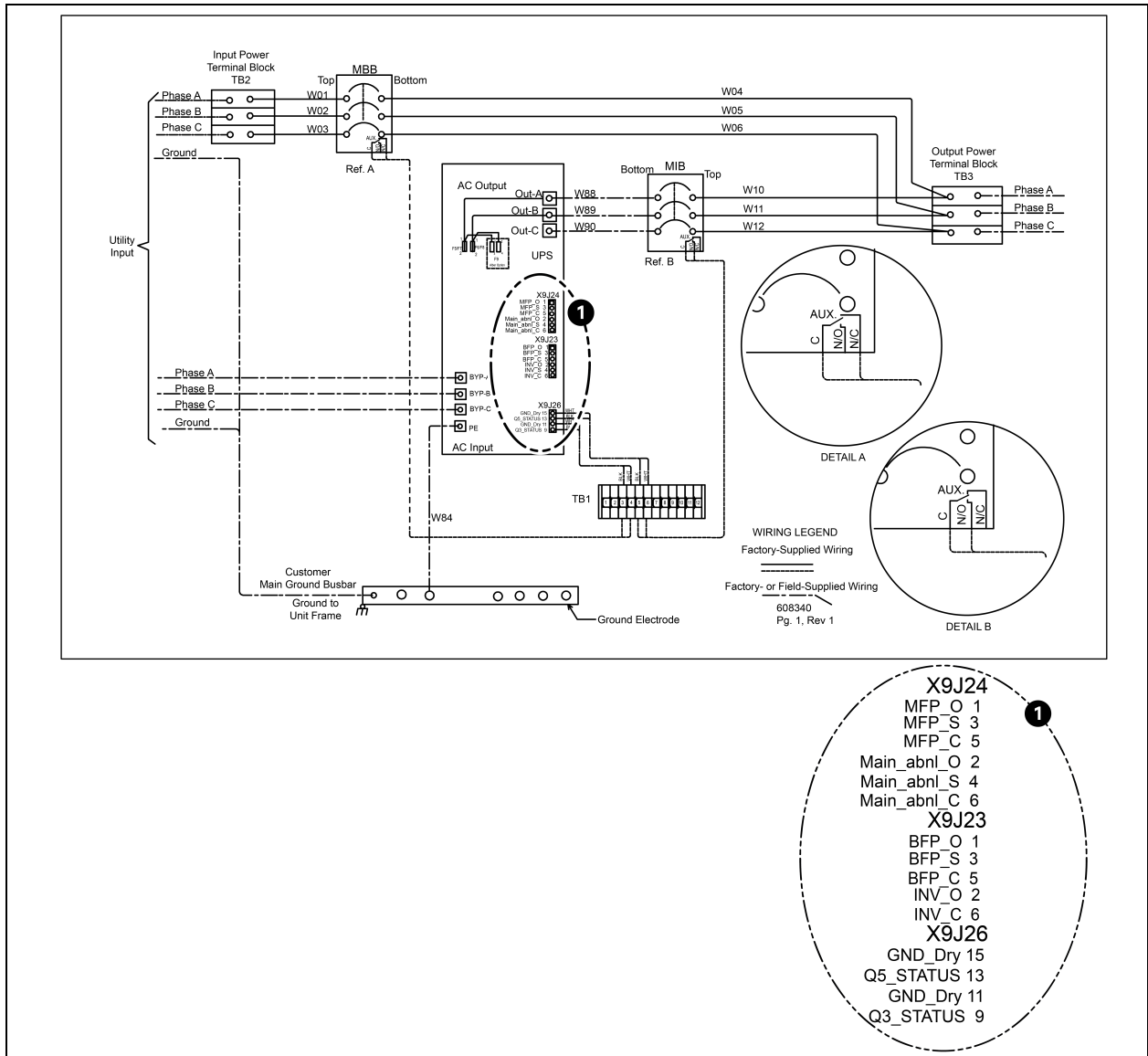
Table 2.7 Breaker Configuration—300 mm Vertiv™ Liebert® EXM 480 V MBC, Four Breaker System

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

Table 2.8 Terminal Block Details—300 mm Liebert® EXM 480 V MBC, Four Breaker System

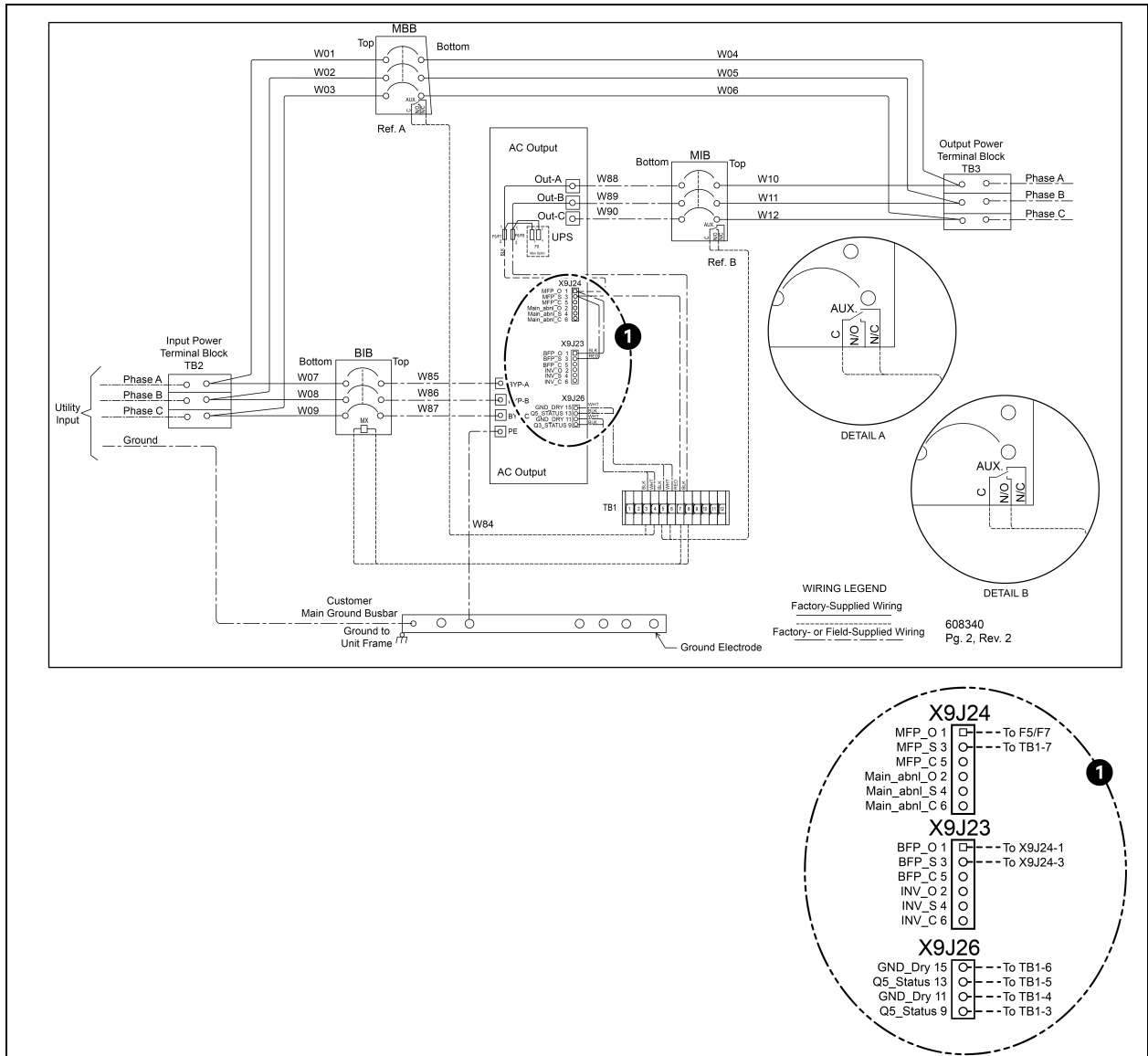
Terminal Block	Configured Breaker	
	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

Figure 2.11 Control Wiring Diagram, Vertiv™ Liebert® EXM 480 V MBC, Two Breakers



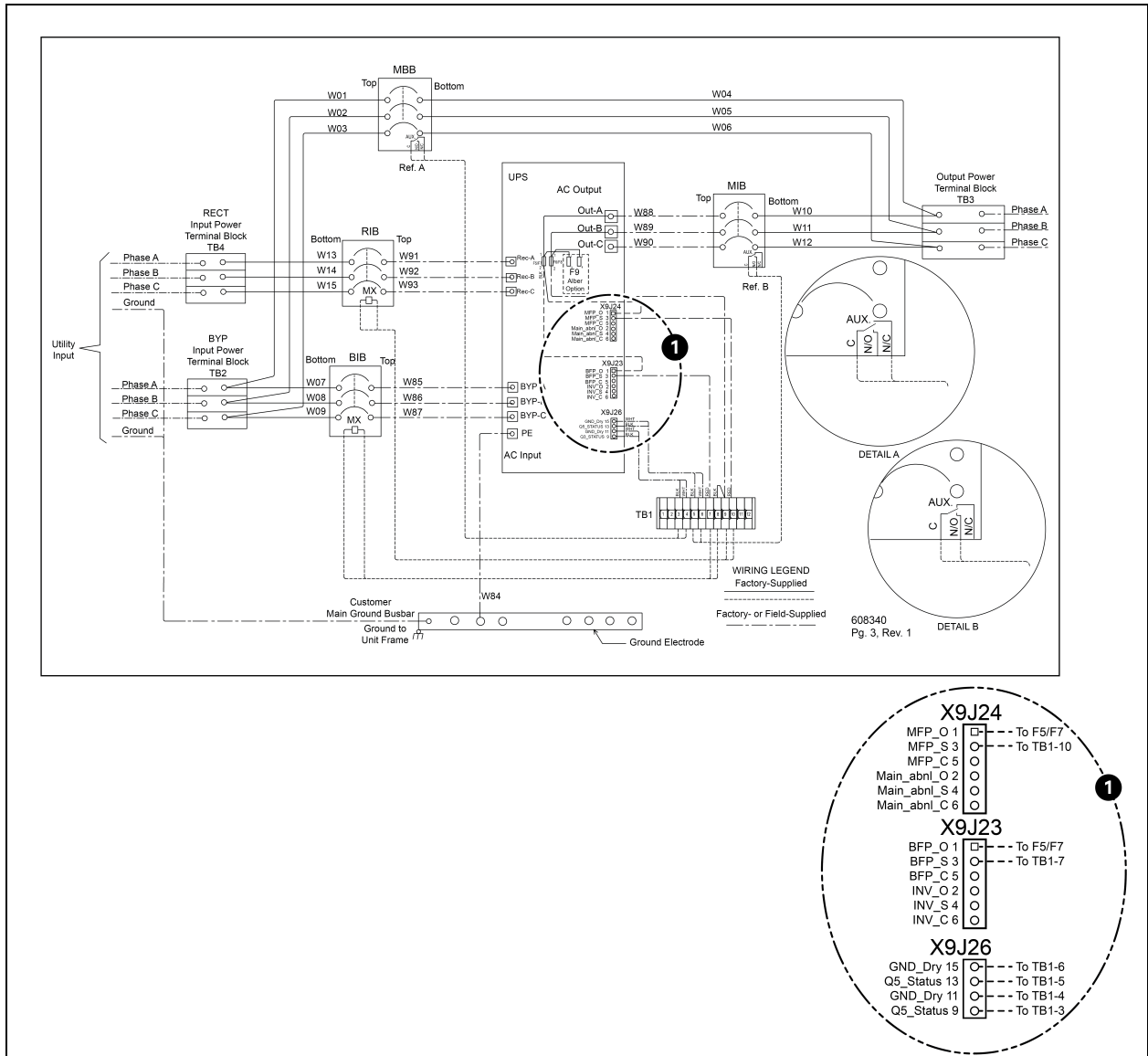
Item	Description
1	X9J24, X9J23, X9J26

Figure 2.12 Control Wiring Diagram, Vertiv™ Liebert® EXM 480 V MBC, Three Breakers



Item	Description
1	X9J24, X9J23, X9J26

Figure 2.13 Control Wiring Diagram, Vertiv™ Liebert® EXM 480 V MBC, Four Breakers



Item	Description
1	X9J24, X9J23, X9J26

Figure 2.14 Vertiv™ Liebert® EXM 480 V MBC, Key Interlock Control Wiring

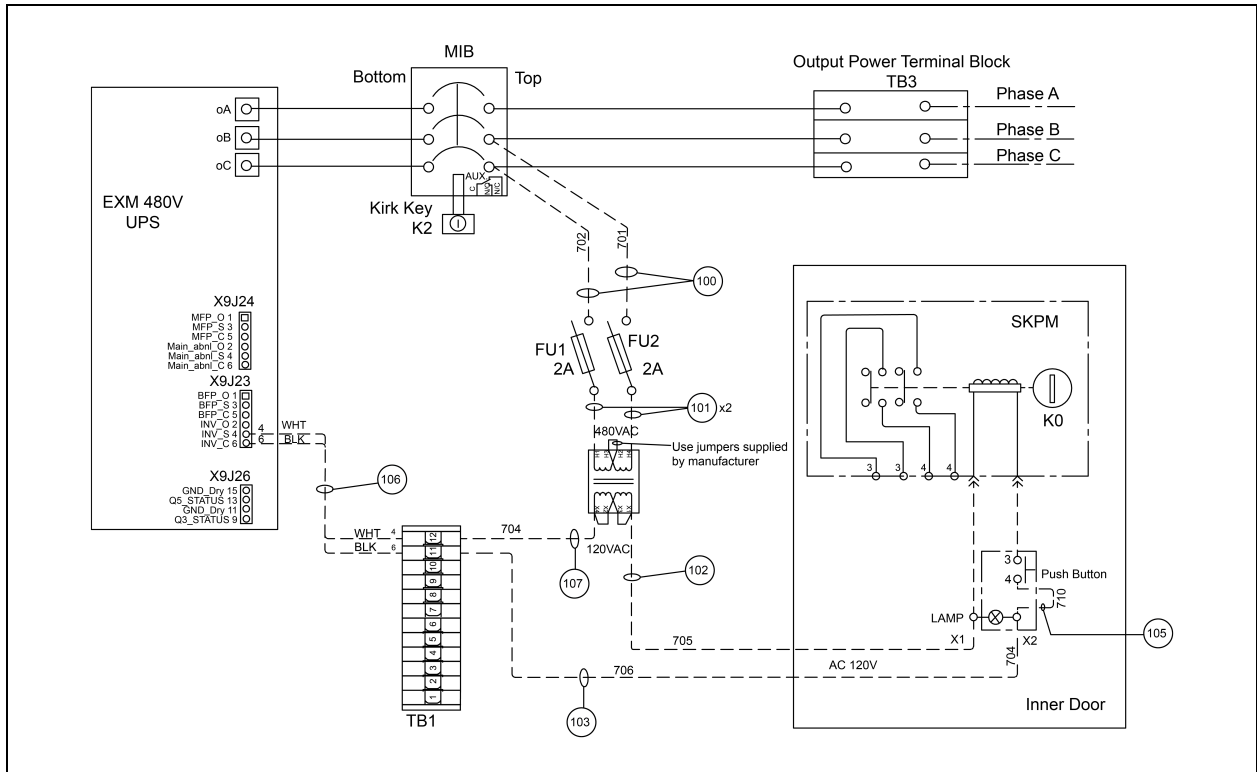
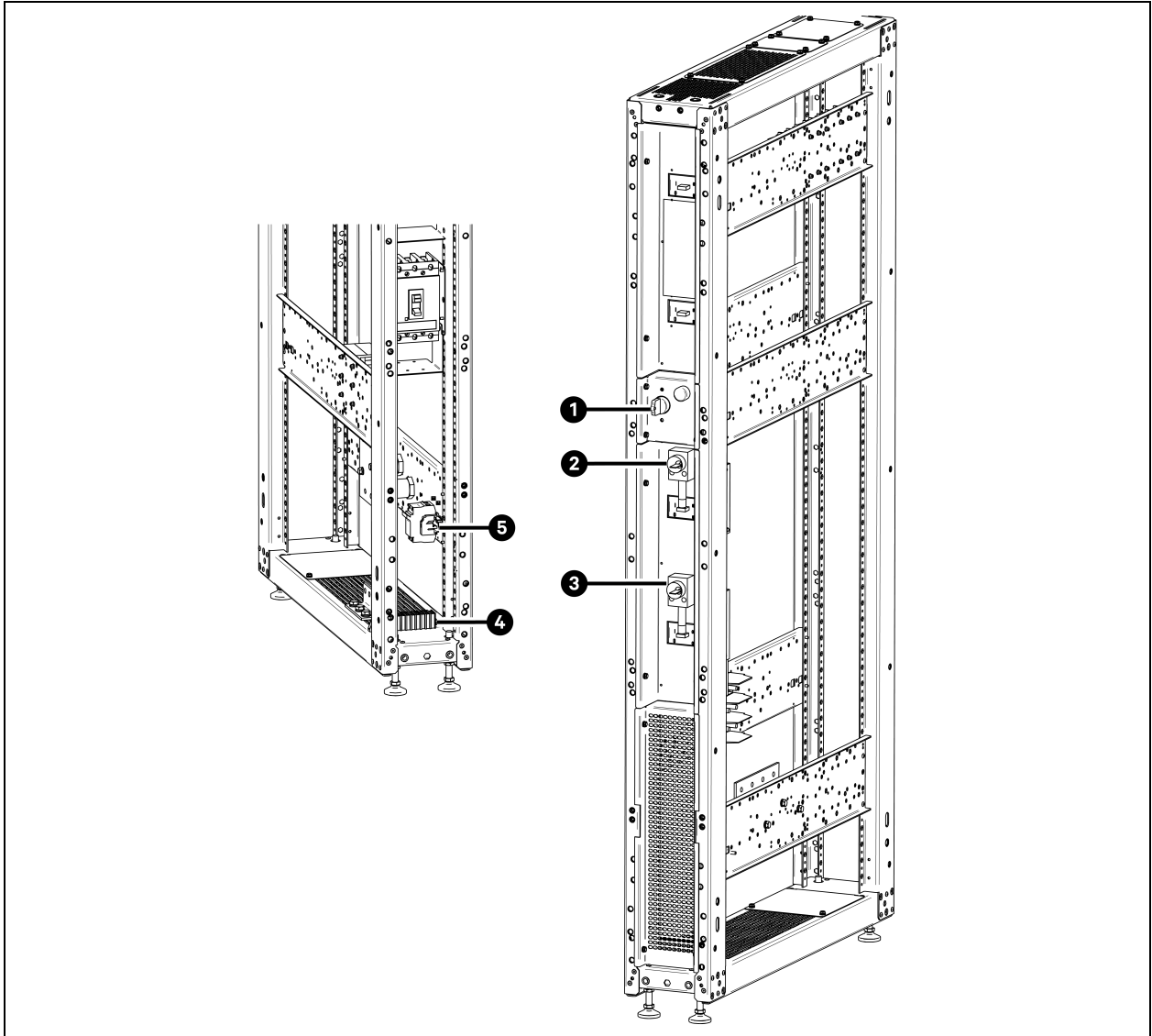


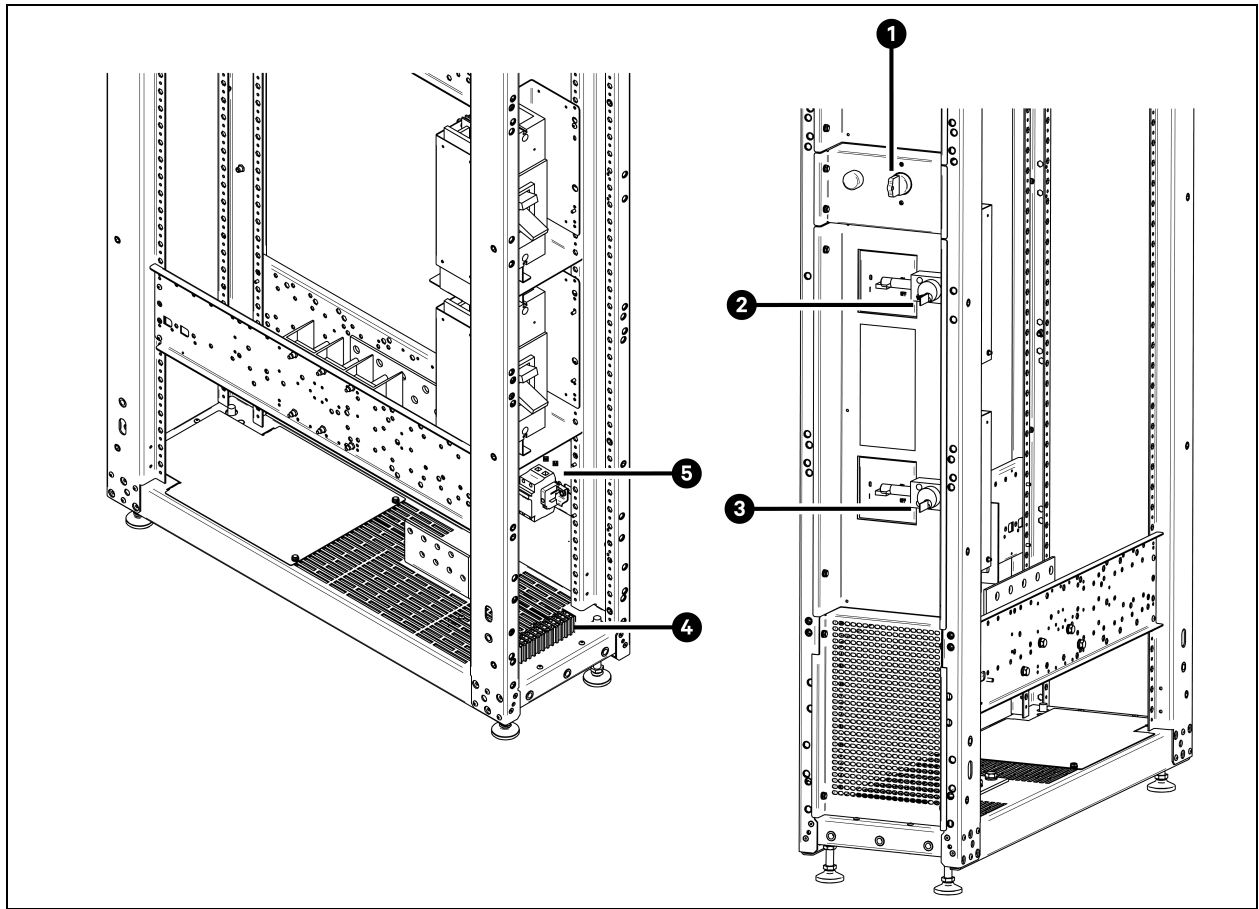
Figure 2.15 Solenoid Key Release Unit, 200 mm Vertiv™ Liebert® EXM 480 V MBC



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

NOTE: Solenoid key release unit is mounted between the BIB and MBB breakers.

Figure 2.16 Solenoid Key Release Unit, 300 mm Vertiv™ Liebert® EXM 480 V MBC



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

NOTE: Solenoid key release unit is mounted between the BIB and MBB breakers.

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4 Specifications

Table 3.1 Vertiv™ Liebert® EXM 480 V MBC Specifications

Model Size	50-100 kVA	150-250 kVA
Input Parameters		
Input voltage to bypass, VAC	480 V, 3-phase, 3-wire	
Input current, AAC	Refer Table 3.1 above to Table 3.7 on page 33	
Input frequency, Hz	60	
Output Parameters		
Output power, kW	50-100	150-250
Output voltage, VAC	480 V, 3-phase, 3-wire	
Output current, AAC	See Table 3.8 on page 34	
Output frequency, Hz	60	
Physical Parameters and Standers, in. (mm)		
Cabinet width, in. (mm) with side panels attached	8.2 (208)	12.0 (308)
Depth, in. (mm)	39.4 (1000)	
Height, in. (mm)	78.74 (2000)	
Weight, lb. (kg)	198 (89.9)	288 (130.6)
Color	Black (ZP-7021)	
Degree of protection for UPS enclosure	IP 20 (with and without front door open)	
Standards and conformities	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	
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) (UPS)	
Relative humidity	Maximum 95% non-condensing (operating and non-operating)	
Maximum altitude above MSL, ft. (m)	Refer to UPS manual	

Table 3.2 Dimensions for Vertiv™ Liebert® EXM 480 V UPS with Vertiv™ Liebert® EXM 480 V MBC

Components	UPS Rating, kVA		
	50-100	150	200-250
	Dimensions, W x D x H, in. (mm)		
UPS Only	23.6 X 39.5 X 78.75 (600 X 1000 X 2000)	23.6 X 39.5 X 78.75 (600 X 1000 X 2000)	33.07 X 39.52 X 78.75 (840 X 1000 X 2000)
UPS with 200 mm MBC	31.5 X 39.5 X 78.75 (800 X 1000 X 2000)	—	—
UPS with 300 mm MBC	—	35.5 X 39.5 X 78.75 (900 X 1000 X 2000)	44.88 X 39.52 X 78.75 (1140 X 1000 X 2000)

Table 3.3 Weights Liebert® EXM UPS, 50-100 kVA and 200 mm Liebert® EXM 480V MBC*

UPS Rating, kVA	UPS Weight lb. (kg)	Liebert® EXM MBC 200 mm Weight, lb. (kg)	Combined Weight UPS and Liebert® EXM MBC, lb. (kg)
50	748 (339)	240 (109)	988 (448)
100	842 (382)	240 (109)	1082 (491)

NOTE: * Configured with four breakers.

Table 3.4 Weights—Liebert® EXM UPS, 150-250 kVA, and 300 mm Liebert® EXM 480 V MBC*

UPS Rating, kVA	UPS Weight lb. (kg)	Liebert® EXM MBC, 300 mm Weight, lb. (kg)	Combined Weight UPS and Liebert® EXM MBC, lb. (kg)
150	936 (425)	240 (109)	1176 (533)
200	1030 (400)	332 (131)	1362 (618)
250	1244 (433)	332 (131)	1576 (715)

NOTE: * Configured with four breakers.

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 3.5 Vertiv™ Liebert® EXM 480 V MBC Input Currents, Single Input, Main

Voltage 3-Ph, 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Phase	Recommended Upstream Protection, A	75 °C Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480 V	50	69	3 W+G	90	100	(1)#3	(1) #1	M12
480 V	100	138	3 W+G	175	175	(1) 2/0	(1) 4/0	M12
480 V	150	208	3 W+G	300	300	(2) 1/0	(2) 3/0	M12
480 V	200	277	3 W+G	350	350	(2) 2/0	(2) 4/0	M12
480 V	250	346	3 W+G	450	460	(2) 4/0	(2) 300	M12

Table 3.6 Liebert® EXM 480 V MBC Input Currents, Dual Input, Rectifier

Voltage 3-Ph 60 Hz	MBC Rating kVA	System Input Current A, Maximum	Phase	Recommended Upstream Protection, A	75 °C Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480 V	50	69	3 W+G	90	85	(1)#3	(1) #2	M12
480 V	100	138	3 W+G	175	175	(1) 2/0	(1) 4/0	M12
480 V	150	208	3 W+G	300	310	(2)1/0	(2) 1/0	M12
480 V	200	277	3 W+G	350	350	(2) 2/0	(2) 3/0	M12
480 V	250	346	3 W+G	450	460	(2) 4/0	(2) 300	M12

Table 3.7 Liebert® EXM 480 V MBC Input Currents, Dual Input, Bypass

Voltage 3-Ph 60 Hz	MBC Rating kVA	Bypass Input Current BIB/MBB A, Maximum	Phase	Recommended Upstream Protection, A	75 °C Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480 V	50	60	3 W+G	80	85	(1) #4	(1) #2	M12
480 V	100	120	3 W+G	150	150	(1) 1/0	(1) 3/0	M12
480 V	150	180	3 W+G	225	230	(1)4/0	(2)1/0	M12
480 V	200	241	3 W+G	300	350	(2) 2/0	(2) 3/0	M12
480 V	250	301	3 W+G	400	460	(2) 4/0	(2) 250	M12

Table 3.8 Vertiv™ Liebert® EXM 480 V MBC Output Currents

Voltage 3-Ph 60 Hz	MBC Rating kVA	System Output Current MIBA, Maximum	Phase	Recommended Upstream Protection, A	75 °C Wire Current A, Total	Copper Wire	Aluminum Wire	Bolt Size
480 V	50	60	3 W+G	80	85	(1) #4	(1) #2	M12
480 V	100	120	3 W+G	150	150	(1) 1/0	(1) 3/0	M12
480 V	150	180	3 W+G	225	230	(1) 4/0	(2) 1/0	M12
480 V	200	241	3 W+G	300	350	(2) 2/0	(2) 3/0	M12
480 V	250	301	3 W+G	400	460	(2) 4/0	(2) 250	M12

Table 3.9 Recommended Lug Sizes (Compression Type) M10, 3/8 in. 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 3.10 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

Table 3.10 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
#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 3.11 below and **Table 3.12** below provide the torque values for the connections to the Vertiv™ Liebert® EXM 480 V MBC. Use these values unless the equipment is labeled otherwise.

Table 3.11 Busbar Torque for Power Wiring

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

Table 3.12 Terminal Clock Torque with Compression Lugs for Control Wiring

AWG Wire Size or Range	Torque lb.-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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