



# Liebert® EXM™ MBC™

User Manual—10-200kVA, 208/120V and 220/127V, 60Hz



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# IMPORTANT SAFETY INSTRUCTIONS

## SAVE THESE INSTRUCTIONS


This manual contains important instructions that should be followed during installation of your Liebert EXM Maintenance Bypass Cabinet (MBC).

Read this manual thoroughly before working with the Maintenance Bypass Cabinet. Retain this manual for use by installing personnel.

## **WARNING**

Risk of moving heavy units and tipping hazard. Can cause equipment damage, injury and death.

Exercise extreme care when handling cabinets to avoid equipment damage or injury to personnel. The Liebert EXM MBC's weight ranges from 198 to 700 lb. (89.9 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 Maintenance Bypass Cabinet. Observe all safety precautions in this manual before handling or installing the Maintenance Bypass Cabinet. 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 Maintenance Bypass Cabinet. 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.

# 1.0 MECHANICAL INSTALLATION

## 1.1 Introduction

This section describes the requirements that must be taken into account when planning the positioning and cabling of the Liebert EXM MBC.

This chapter is a guide to general procedures and practices that should 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 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. Can cause equipment damage 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.

## 1.2 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.

## 1.3 Environmental Considerations

### 1.3.1 Room

The 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 **3.0 - Specifications**).

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 noncombustible surfaces.*

### 1.3.2 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 10**).

## 1.4 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.

### 1.4.1 Moving the Cabinets

The route to be travelled 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, etc. 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 ( $\text{kg}/\text{cm}^2$ ) of any handling equipment. See **Table 12** for the weight of the Liebert EXM MBC 200mm, 300mm, 600mm, and 800mm models. **Tables 11** through **14** provide detailed dimension and weight information for the 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 to installation drawings in **2.0 - Installation Drawings**.

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 Liebert EXM MBC's weight ranges from 198 to 700 lb. (89.8 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.

### **1.4.2 Clearances**

Liebert EXM MBC's 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" (610mm) between the top of the cabinet and any overhead obstacles to permit adequate circulation of air coming out of the unit.

### **1.4.3 Floor Installation/Anchoring**

The installation diagrams in **2.0 - Installation Drawings** 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.

## **1.5 Cable Entry**

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

## **1.6 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 **Tables 15** through **17**, follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media).

For cable entry locations, refer to **Figures 14** and **15**.

## **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.

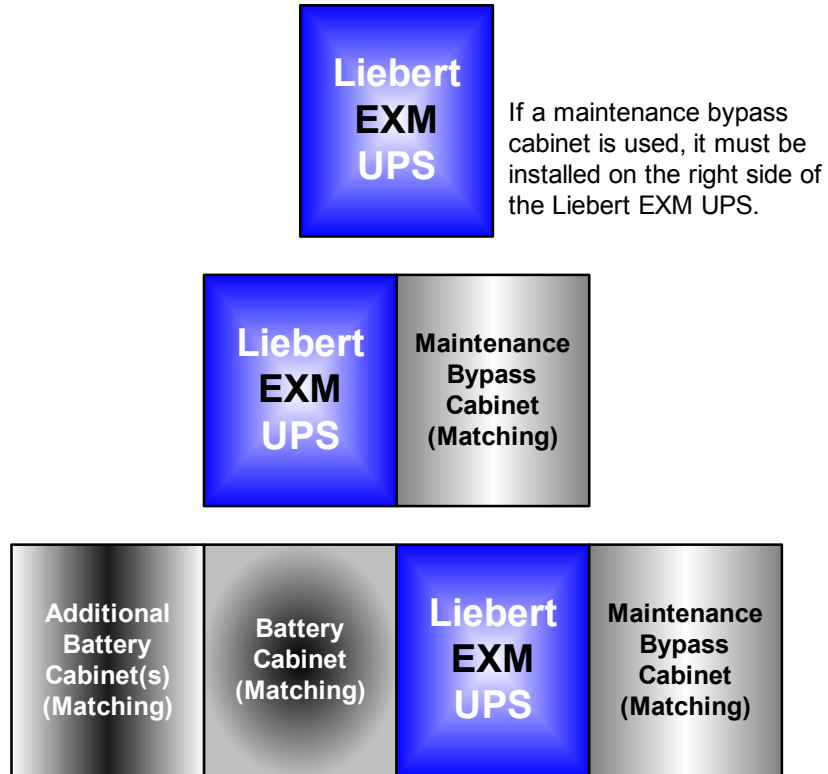
Avant de procéder au câblage de l'armoire, assurez-vous que vous êtes au courant de l'emplacement et du fonctionnement des isolateurs externes qui raccordent l'alimentation d'entrée ou de dérivation.

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 nonlinear loads.
- The grounding conductor should be sized according to local or NEC codes, cable lengths, type of protection, etc. 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 1 Cabinet arrangement—Liebert EXM UPS, battery cabinets, maintenance bypass cabinet**



**NOTE**

*The 200mm and 300mm maintenance bypass cabinets ship attached to the UPS.  
The 600mm and 800mm maintenance bypass cabinets ship separately from the UPS.*

### 1.6.1 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 **2.0 - Installation Drawings**. 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 **2.0 - Installation Drawings**. 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 you have any difficulties, do not hesitate to contact Vertiv® Liebert Services. 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® Liebert Services. 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 **2.0 - Installation Drawings**.

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 or A-B-C-N terminals) and tighten the connections to the proper torque (see **Table 21**). Ensure correct phase rotation!
5. Connect the UPS Input
  - a. For two-breaker Liebert EXM MBC's
    1. 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!
    2. 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 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 21**). Ensure correct phase rotation!
  6. 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 21**). Ensure correct phase rotation!
  7. 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 21**).
  8. Replace the panels.

**Table 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

**Notes**

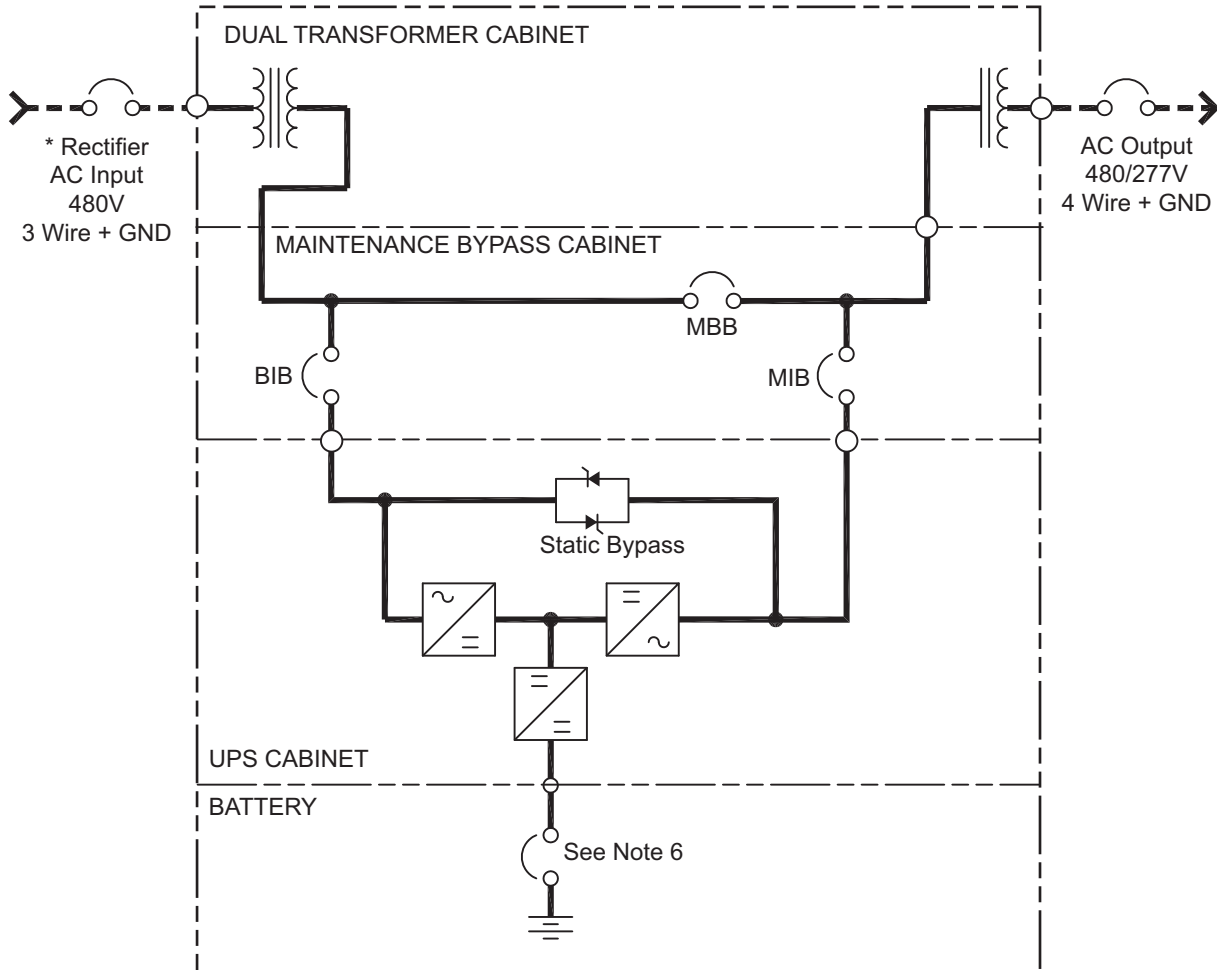
Refer to the Liebert EXM UPS installation manual, SL-25648, SL-25650, or SL-26100, for additional details about the Liebert EXM 10-40kVA, 60-100kVA, and 120-200kVA UPS's. The manual is available at the Liebert Web site: [www.liebert.com](http://www.liebert.com)

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, etc. 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 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.

## 2.0 INSTALLATION DRAWINGS

**Figure 2 One-line diagram, single-input Liebert EXM 10-40kVA UPS with three-breaker Liebert EXM MBC and input/output transformer cabinet**



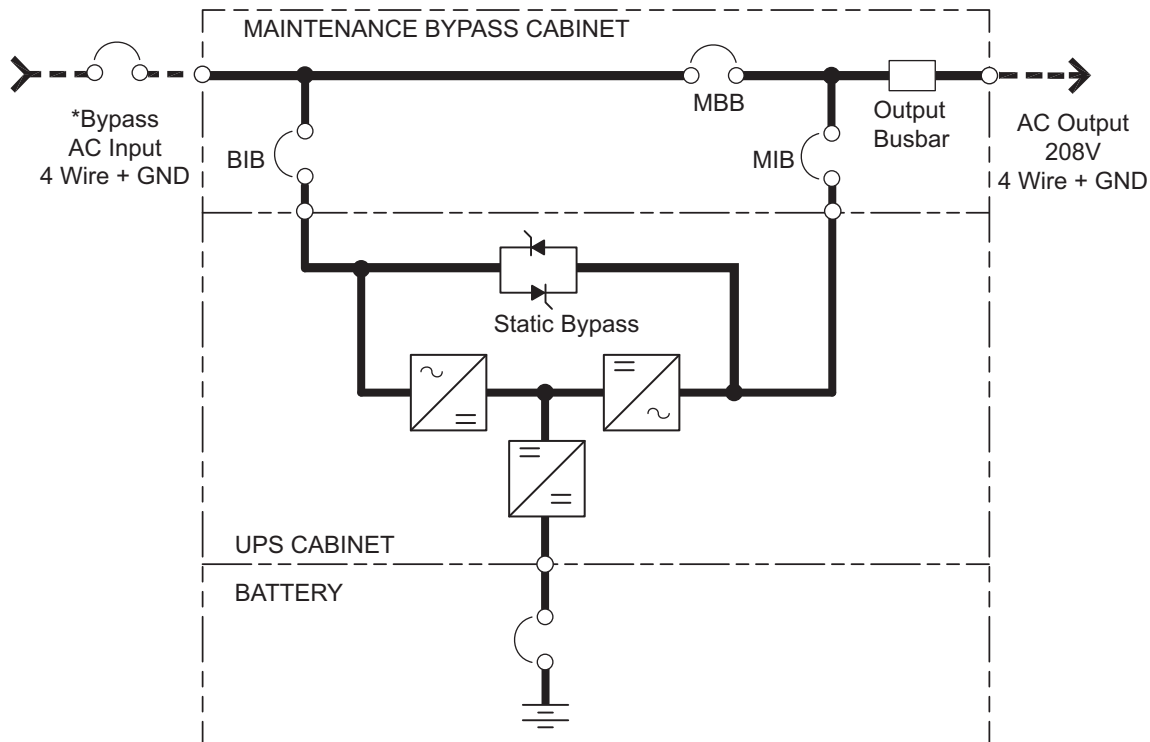
**NOTES:**

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.

- BIB - Bypass Isolation Breaker
- MBB - Maintenance Bypass Breaker
- MIB - Maintenance Isolation Breaker
- \* External Overcurrent Protection by Others
- Field-Supplied Wiring

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**Figure 3 One-line diagram, single-input Liebert EXM 10-200kVA UPS with three-breaker Liebert EXM MBC**

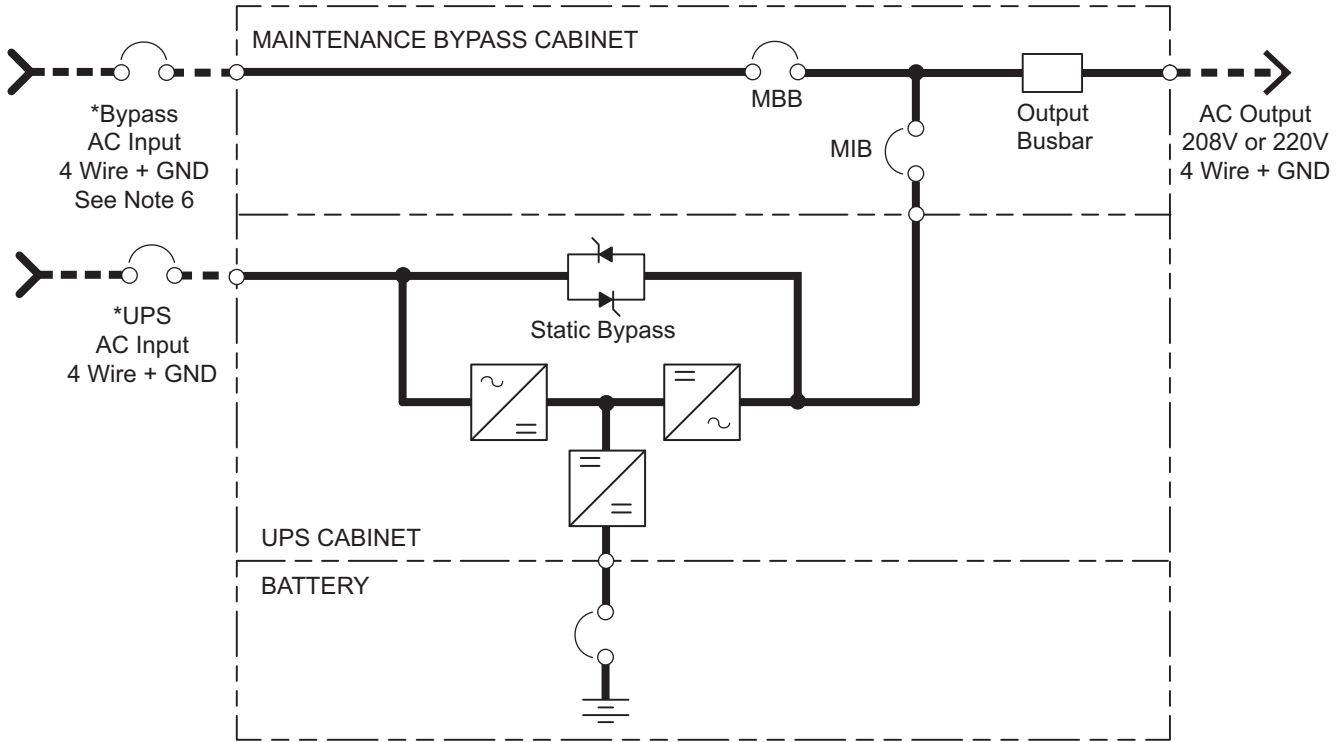


**NOTES:**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Install in accordance with national and local electrical codes.</li> <li>2. Input and bypass must share the same single source.</li> <li>3. A neutral is required from the system AC input source.<br/>Vertiv recommends a full capacity neutral conductor and grounding conductors.</li> <li>4. Bypass and rectifier inputs and output cables must be run in separate conduits.</li> <li>5. Control wiring must be run in separate conduits..</li> <li>6. Internal battery breaker is optional on UPS with internal batteries;<br/>battery breaker is factory-supplied with external Liebert battery cabinets.</li> </ol> | <p>BIB - Bypass Isolation Breaker<br/>         MBB - Maintenance Bypass Breaker<br/>         MIB - Maintenance Isolation Breaker<br/>         * External Overcurrent Protection by Others<br/>         - - - - Field-Supplied Wiring</p> |
|--|--|

EXM11011  
Rev. 2

**Figure 4 One-line diagram, dual-input Liebert EXM 10-100kVA with two-breaker Liebert MBC**



**NOTES:**

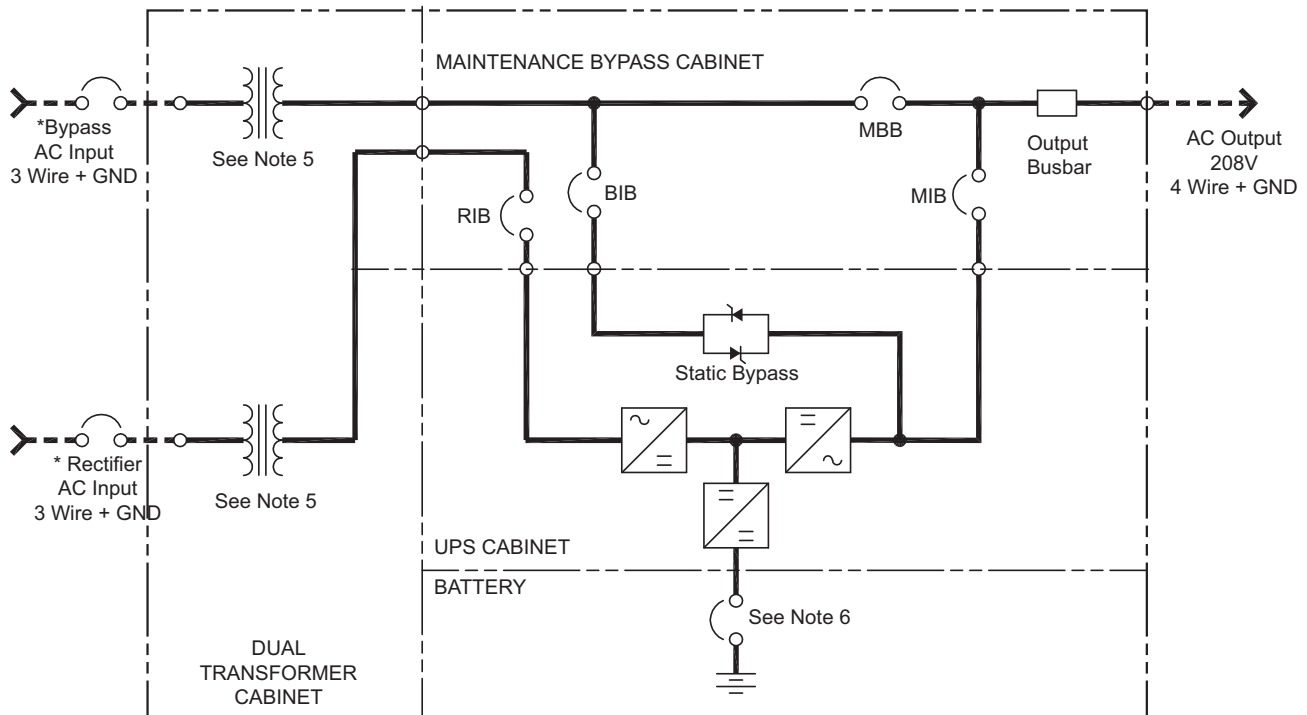
1. Install in accordance with national and local electrical codes.
2. Input and bypass must share the same single source.
3. A neutral is required from the system AC input source.  
Vertiv recommends a full capacity neutral conductor and grounding conductors.
4. Bypass and rectifier inputs and output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

- BIB - Bypass Isolation Breaker
- MBB - Maintenance Bypass Breaker
- MIB - Maintenance Isolation Breaker
- \* External Overcurrent Protection by Others

----- Field-Supplied Wiring



**Figure 5 One-line diagram, dual-input Liebert EXM 10-100kVA UPS with four-breaker Liebert EXM MBC and input isolation transformer cabinet**



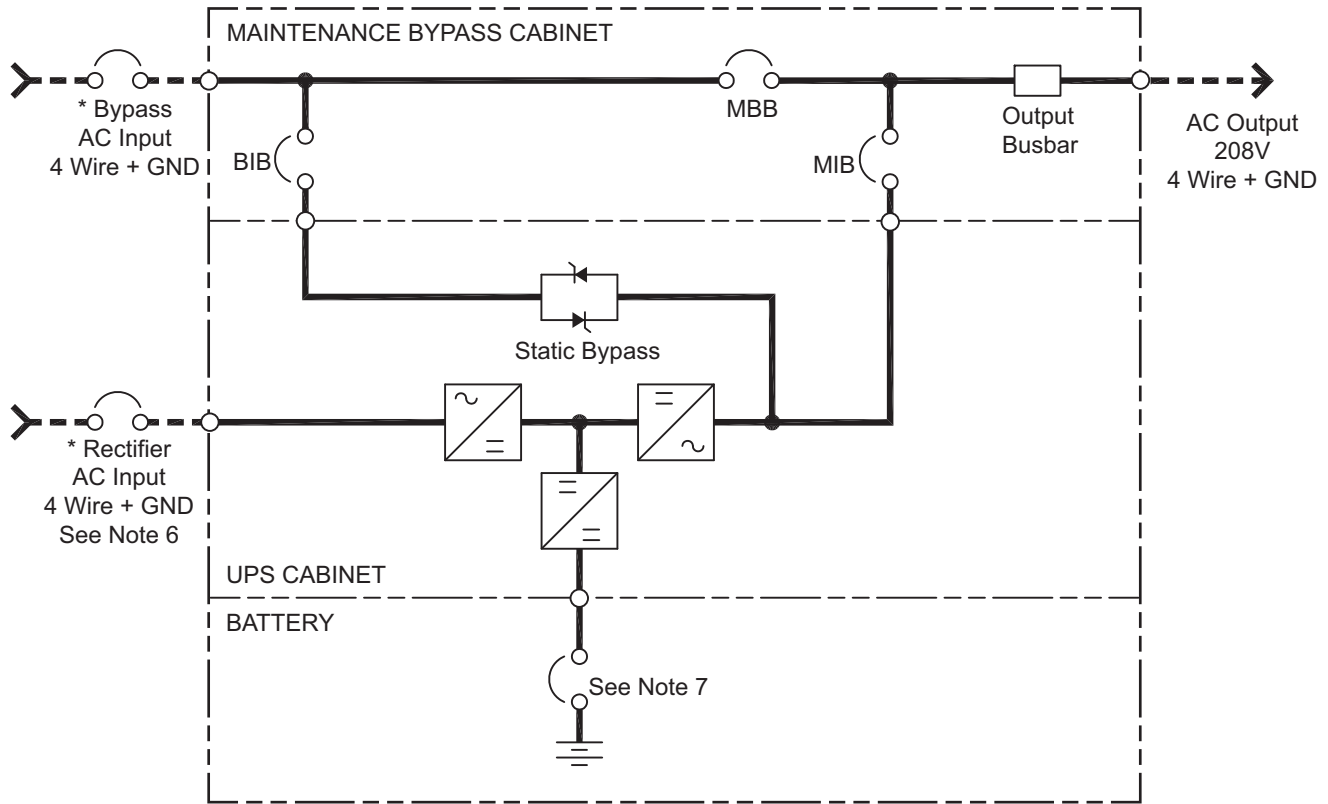
**NOTES:**

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, 220, 480, 600V input.
6. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

- RIB - Rectifier Input Breaker
- BIB - Bypass Isolation Breaker
- MBB - Maintenance Bypass Breaker
- MIB - Maintenance Isolation Breaker
- \* External Overcurrent Protection by Others
- Field-Supplied Wiring

EXM11009  
Rev. 2

**Figure 6 One-line diagram, dual-input Liebert EXM 10-200kVA UPS with three-breaker Liebert EXM MBC**



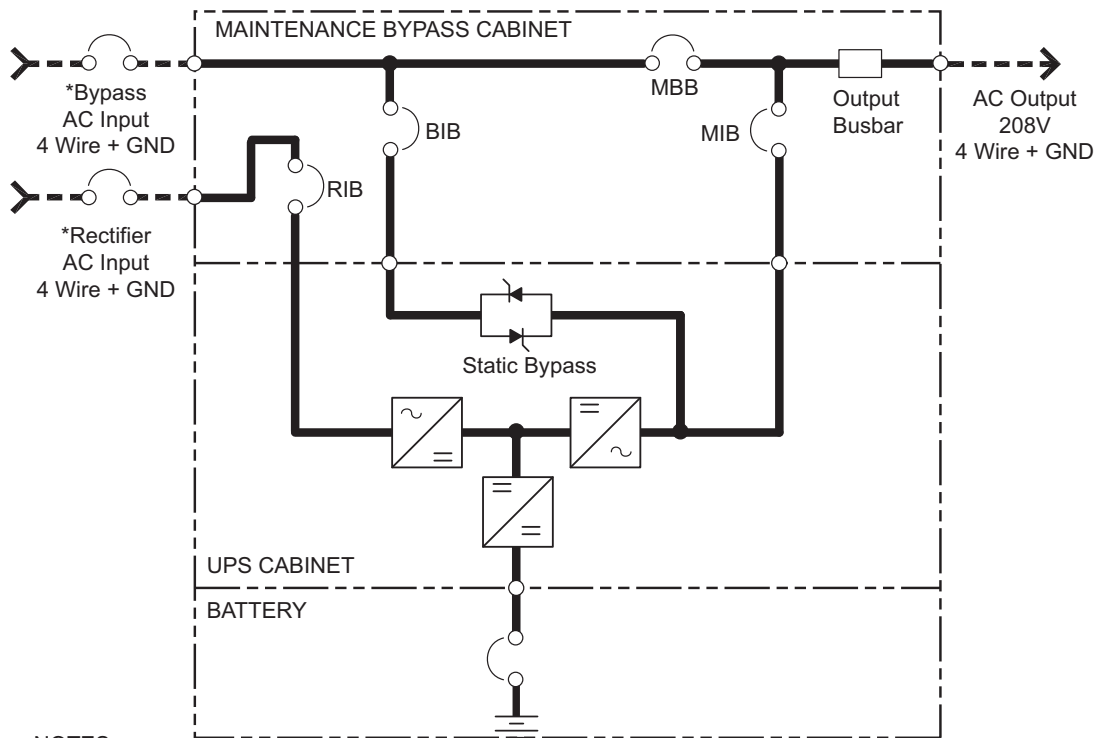
**NOTES:**

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 120V coil is required.
7. Internal battery breaker is optional on UPS with internal batteries; battery breaker is factory-supplied with external Liebert battery cabinets.

- BIB - Bypass Isolation Breaker  
 MBB - Maintenance Bypass Breaker  
 MIB - Maintenance Isolation Breaker  
 \* External Overcurrent Protection by Others  
 ----- Field-Supplied Wiring

EXM11013  
 Rev. 3

**Figure 7 One-line diagram, dual input Liebert EXM 10-200kVA with four-breaker Liebert MBC**



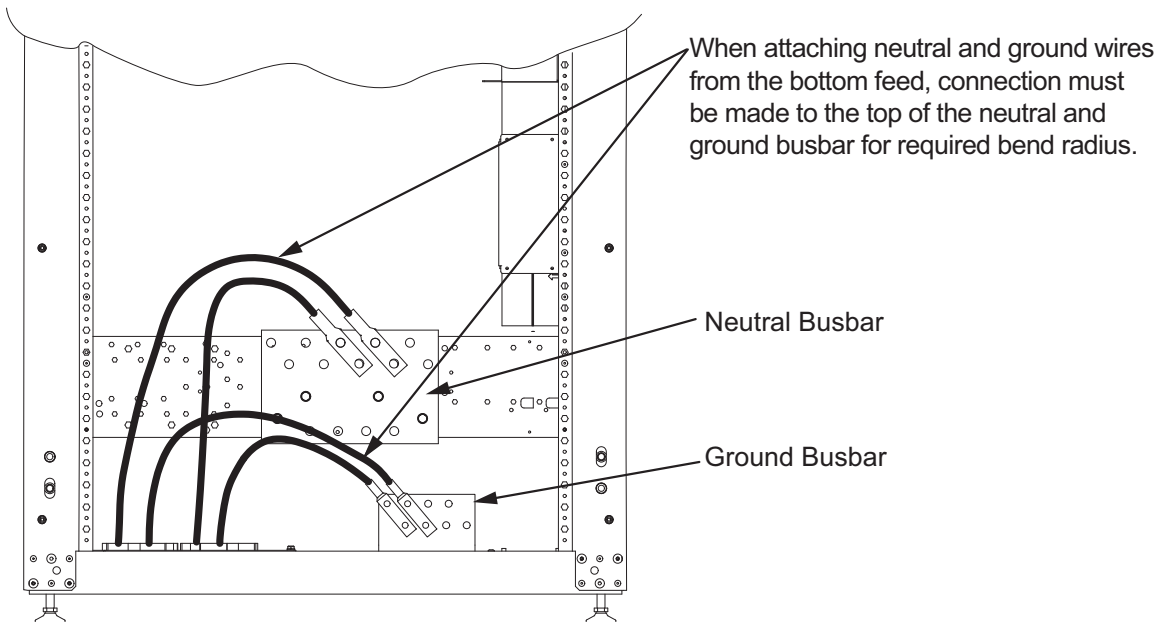
**NOTES:**

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.

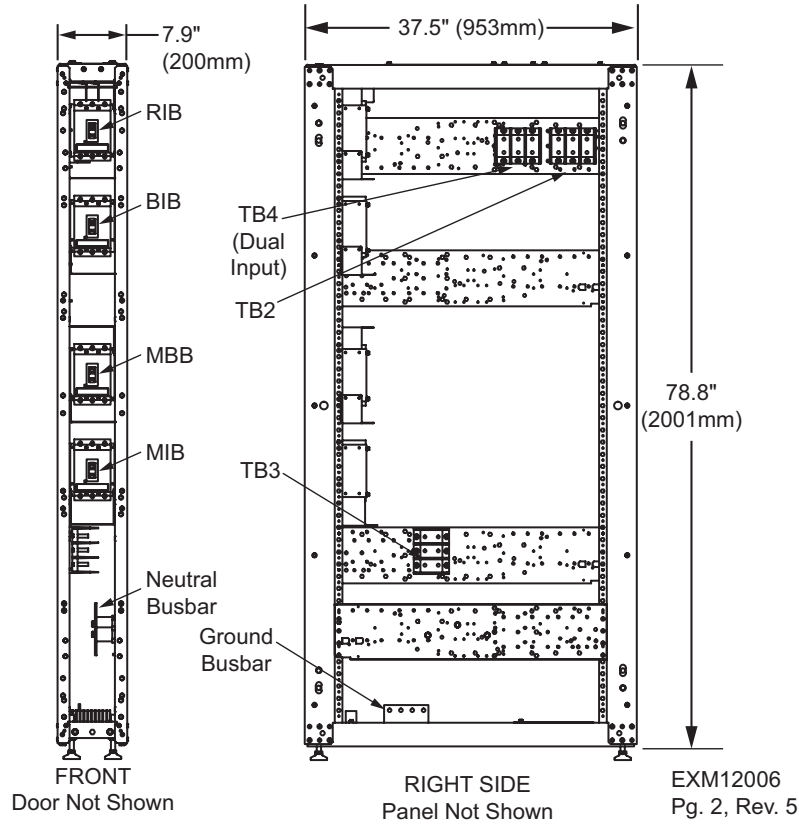
- RIB - Rectifier Input Breaker
- BIB - Bypass Isolation Breaker
- MBB - Maintenance Bypass Breaker
- MIB - Maintenance Isolation Breaker
- \* External Overcurrent Protection by Others
- Field-Supplied Wiring

EXM11014  
Rev. 2

**Figure 8 Bend radius—Neutral and ground wires through bottom feed, 10-40kVA system**



**Figure 9 Main components—200mm Liebert EXM MBC, two to four breakers, 10-40kVA system**



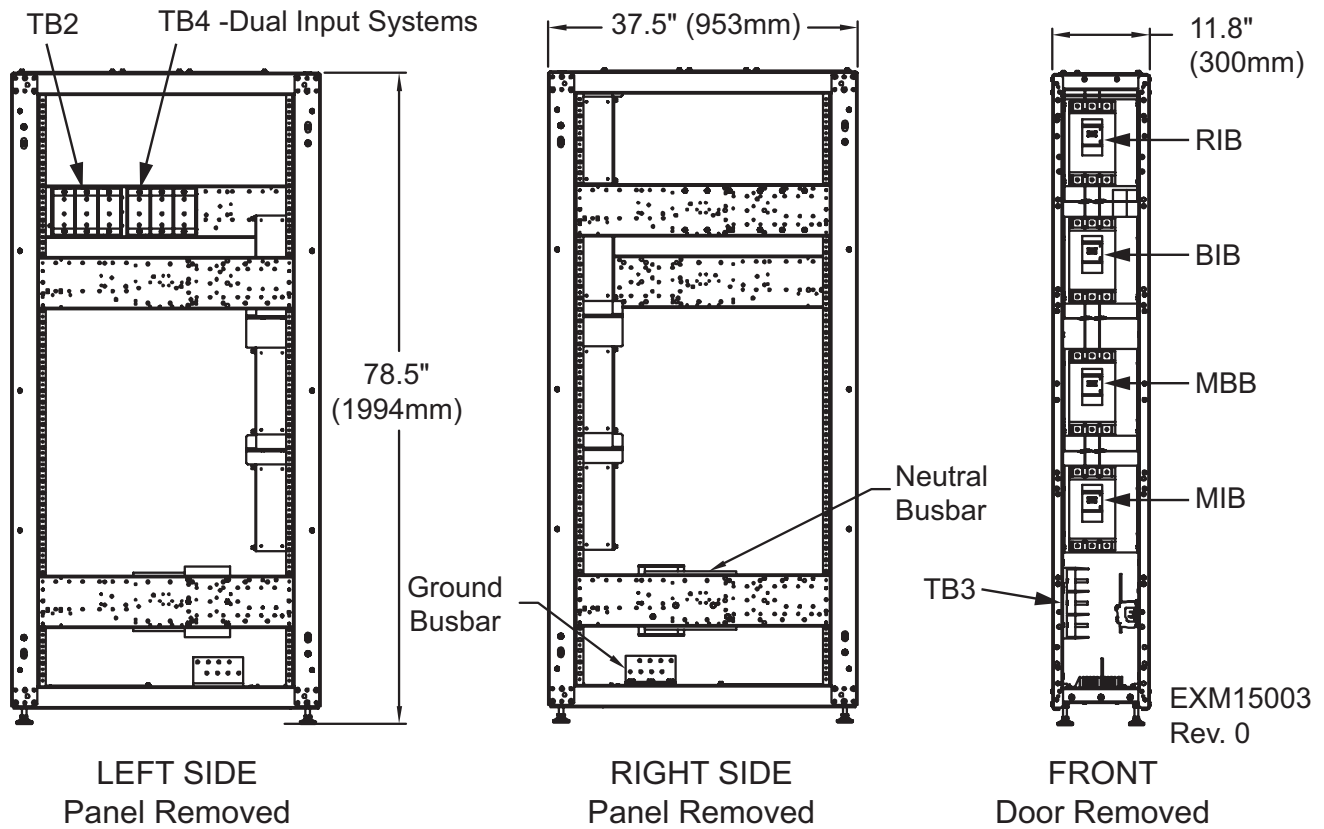
**Table 2 Breaker configuration—200mm Liebert EXM MBC two to four breakers, 10-40kVA system**

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

**Table 3 Terminal block details—200mm Liebert EXM MBC, two to four breakers, 10-40kVA system**

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

**Figure 10 Main components—300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**



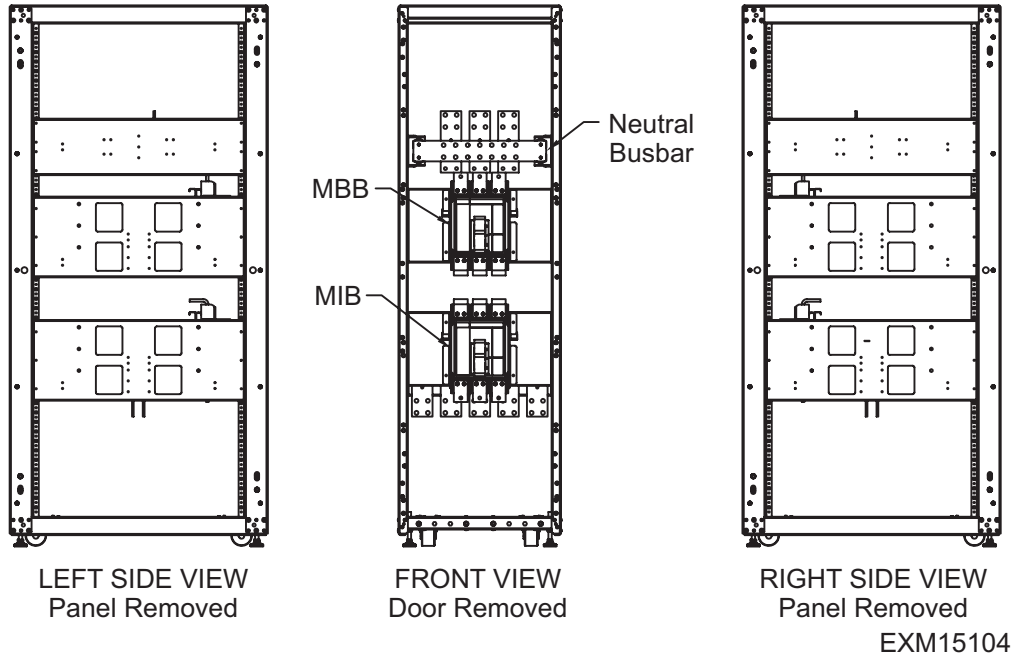
**Table 4 Breaker configuration, 300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**

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

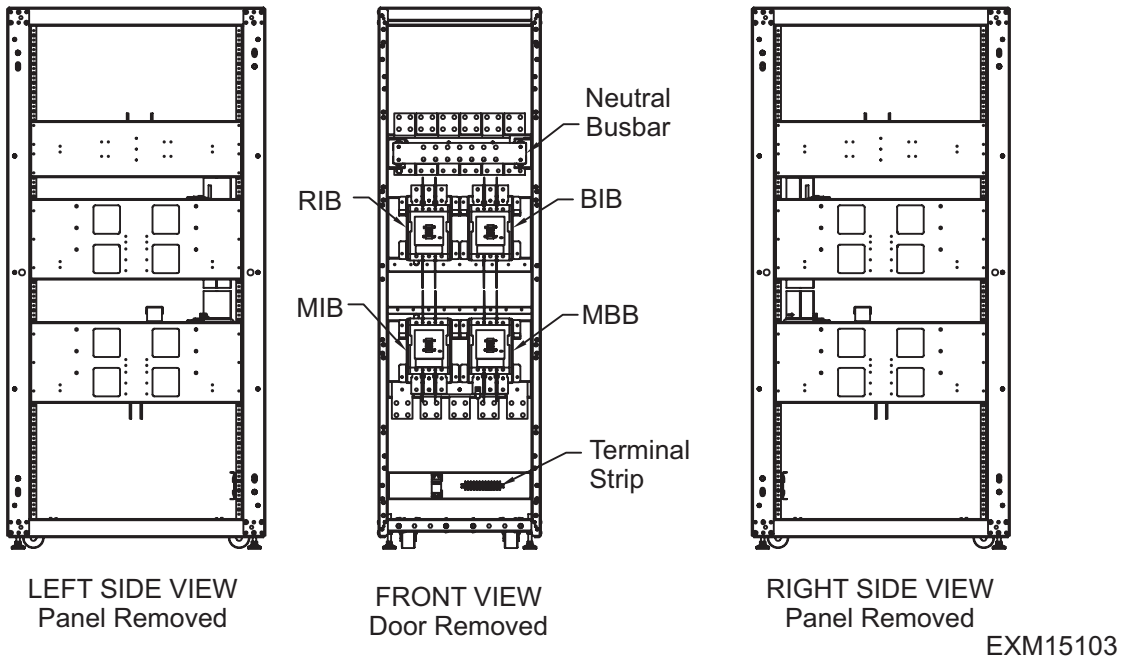
**Table 5 Terminal block details—300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**

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

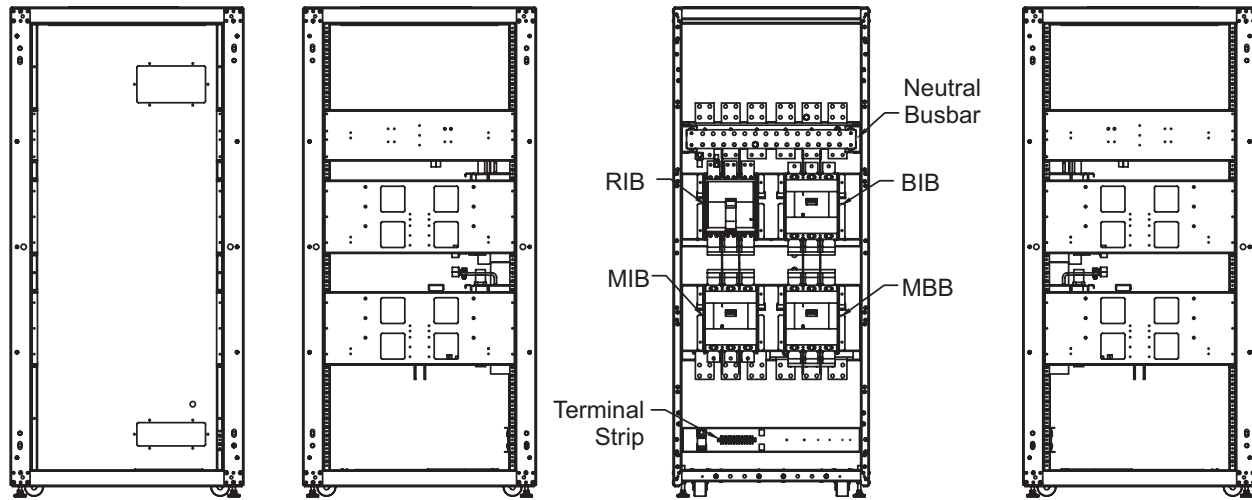
**Figure 11 Main components—600mm Liebert EXM MBC, two breakers, 120-200kVA system**



**Figure 12 Main components—600mm Liebert EXM MBC, three to four breakers, 120-160kVA system**



**Figure 13 Main components—800mm Liebert EXM MBC, three or four breakers, 160-200kVA system**



LEFT SIDE VIEW  
Panel Removed  
(200kVA Model Only)

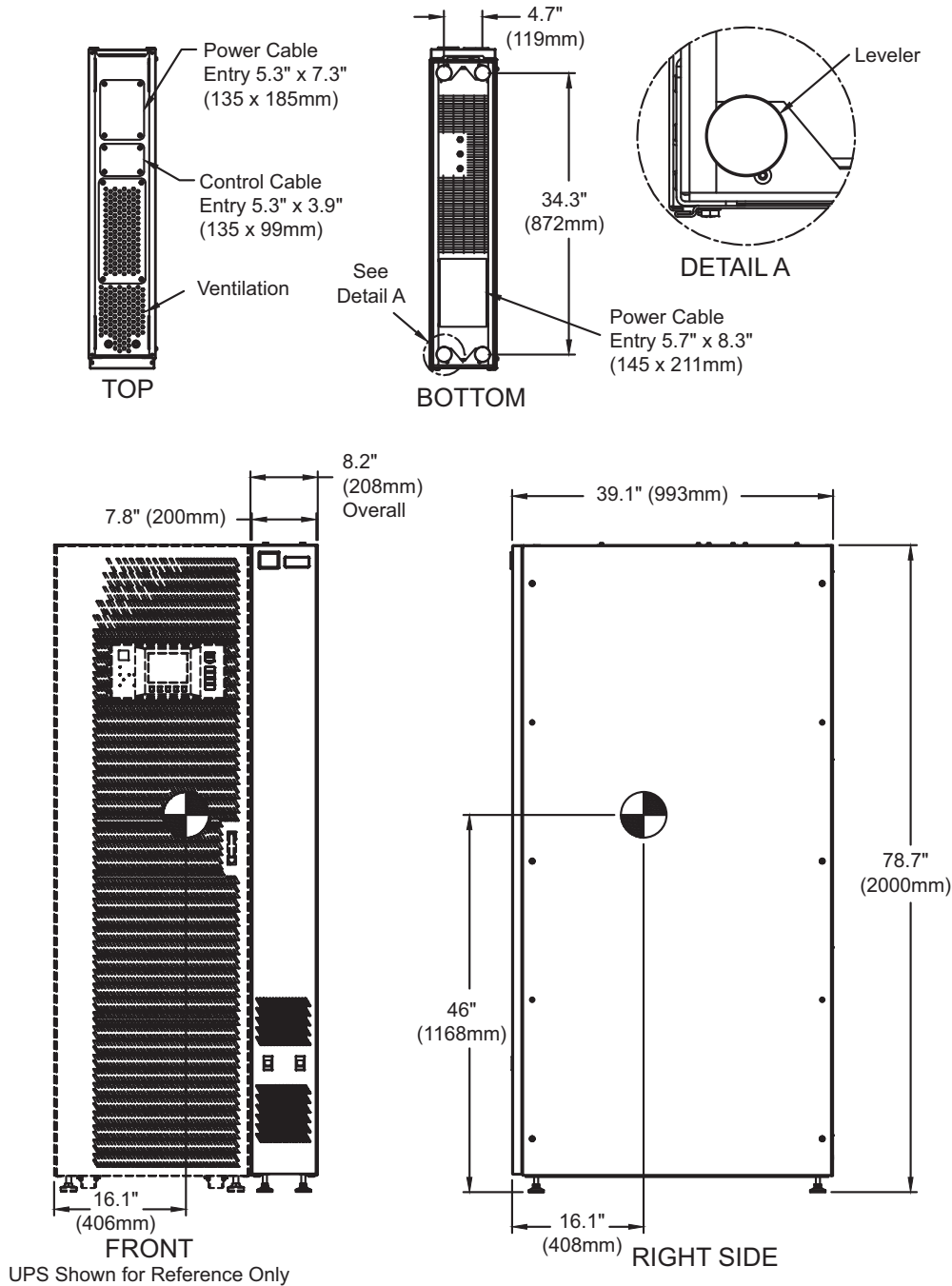
LEFT SIDE VIEW  
with Panel Removed  
(160/180kVA Models)

FRONT VIEW  
Door Removed

RIGHT SIDE VIEW  
Panel Removed

EXM15105  
Rev. 0

**Figure 14 Outline drawing—200mm Liebert EXM MBC, two to four breakers, 10-40kVA system**



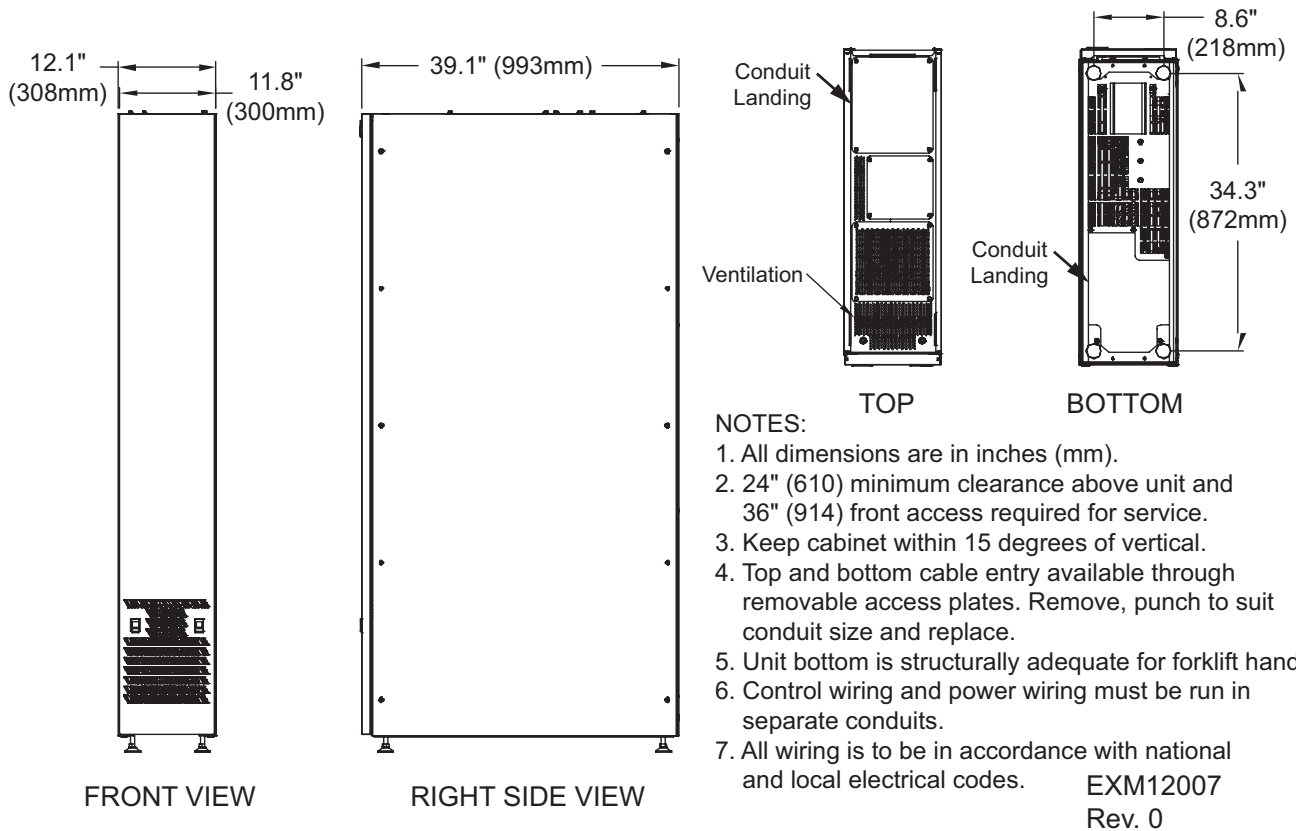
**NOTES**

1. 24" (610) minimum clearance above unit for air exhaust and 36" (914) 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. Liebert EXM MBC will always be attached to the UPS; UPS shown for reference only.
8. Overall dimensions are shown with side panels.

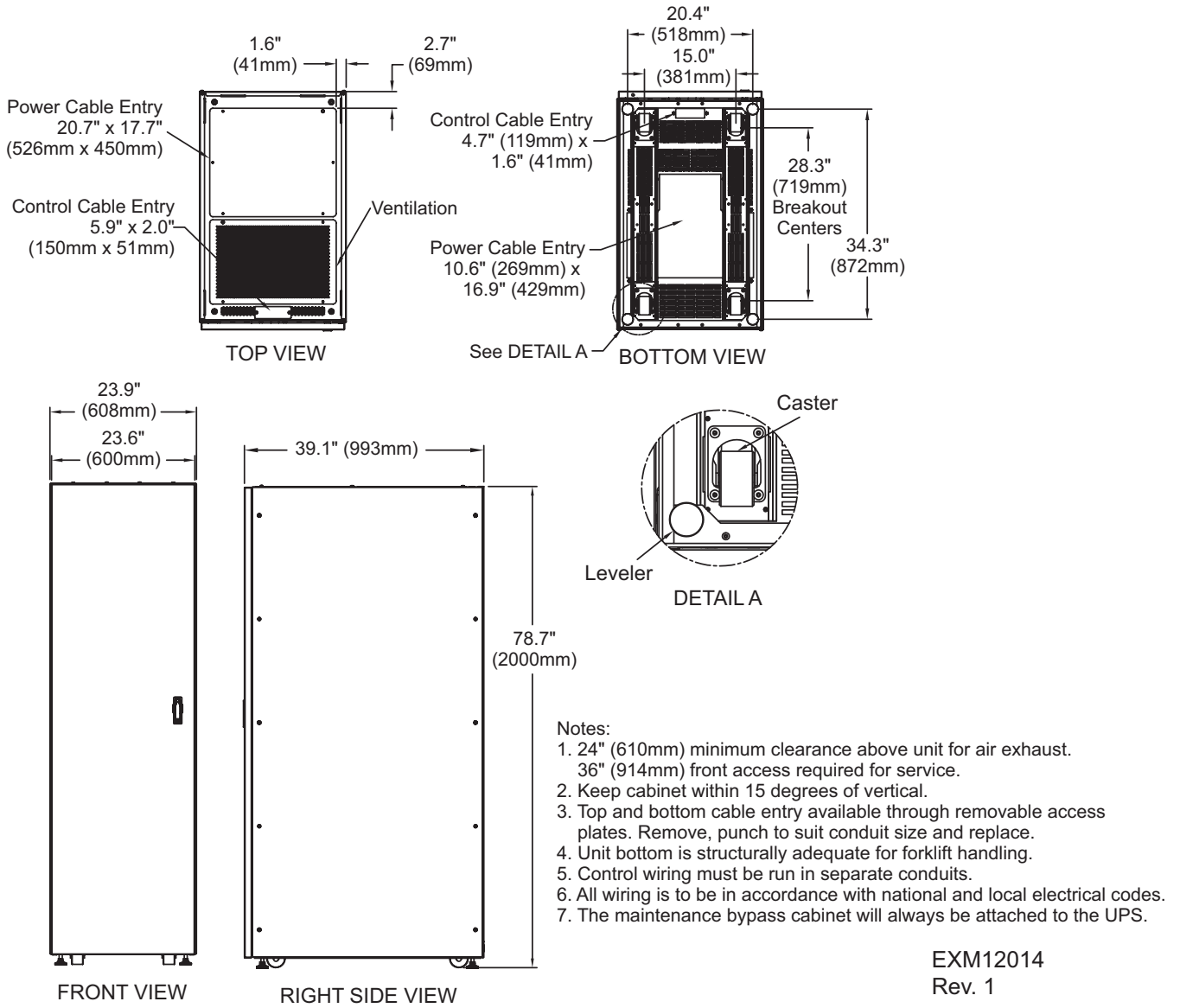
EXM12006  
Pg. 1, Rev. 5



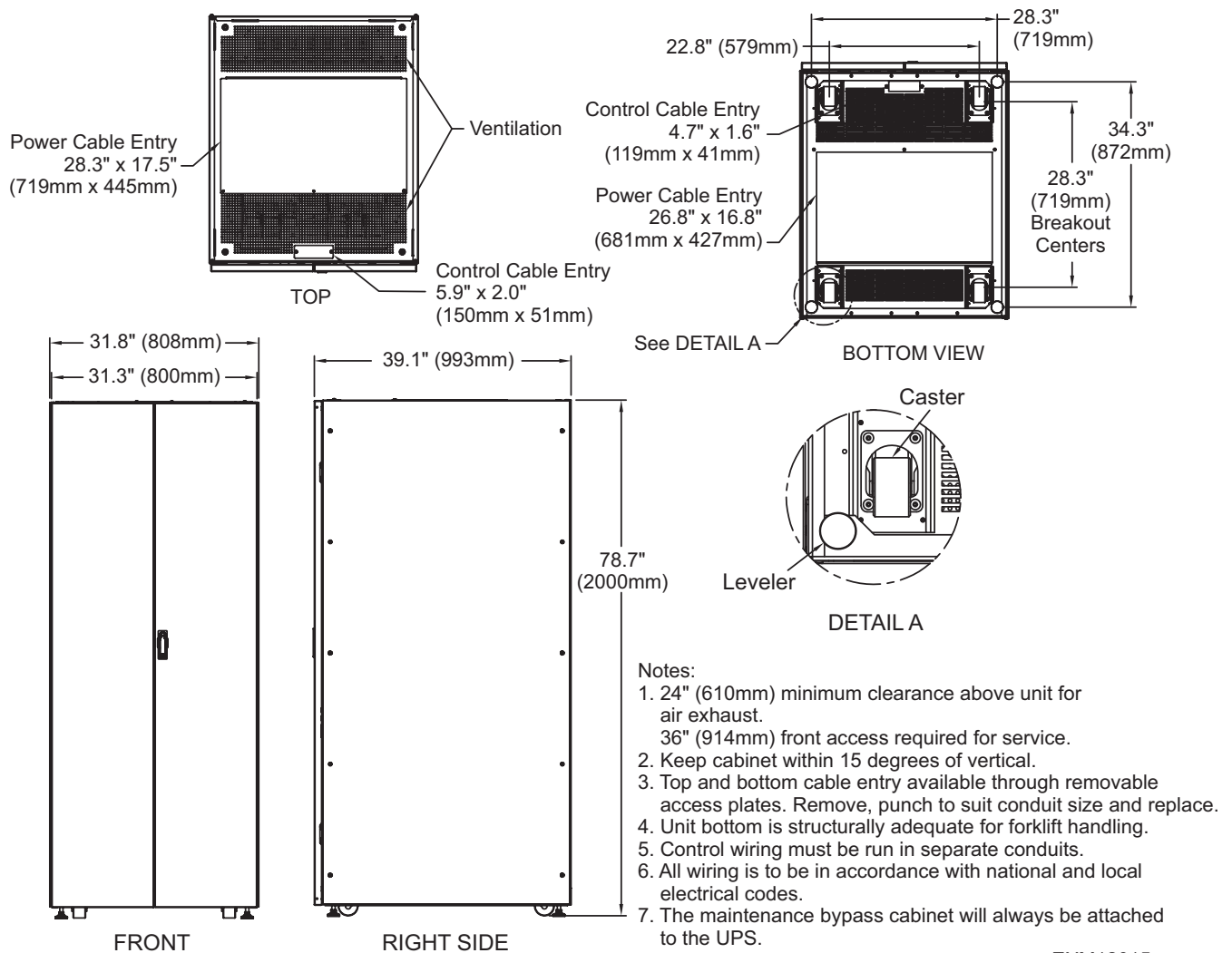
**Figure 15 Outline drawing—300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**



**Figure 16 Outline drawing—600mm Liebert EXM MBC 120-200kVA system**

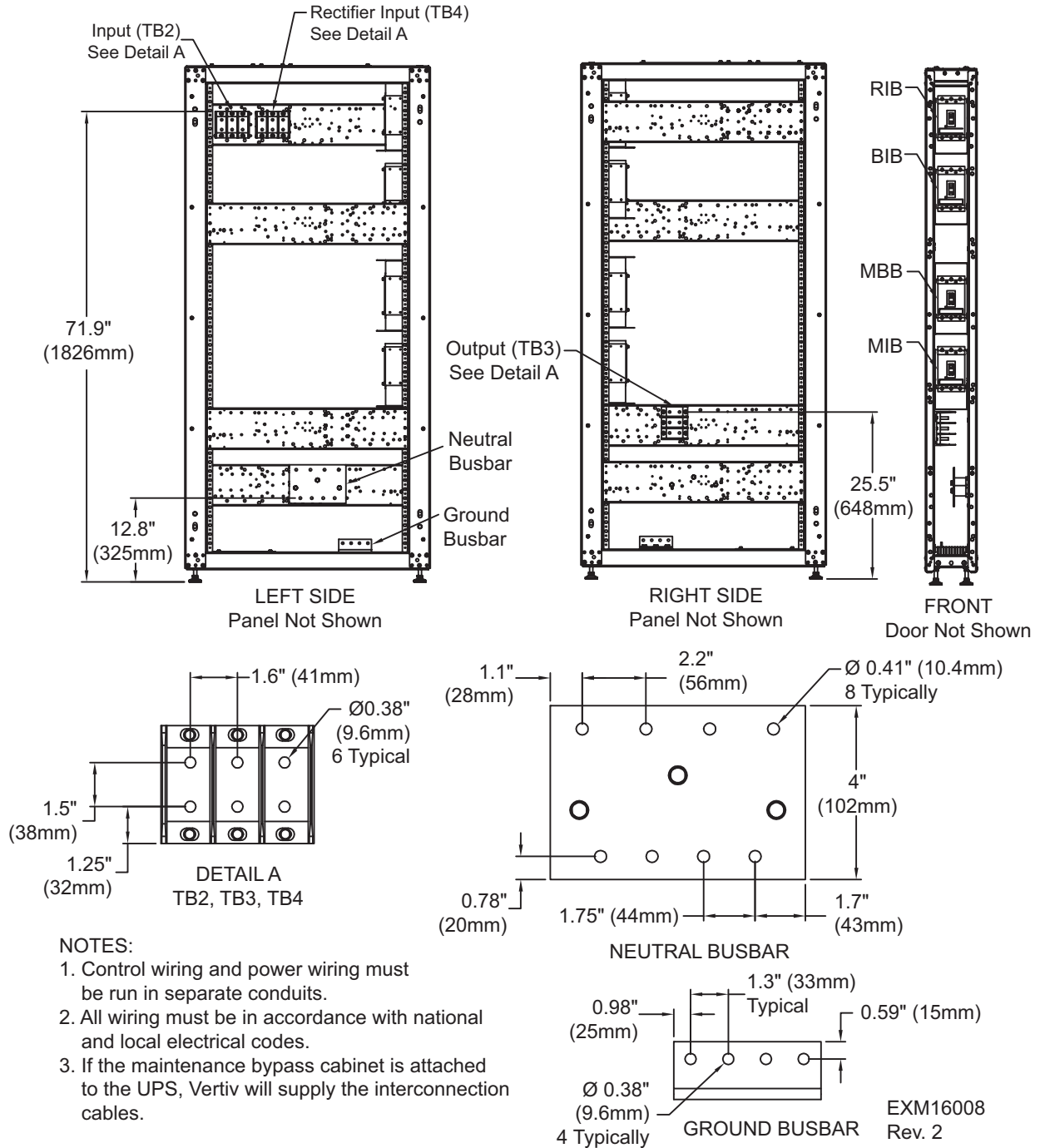


**Figure 17 Outline drawing—800mm Liebert EXM MBC 160-200kVA system**



EXM12015  
Rev. 1

**Figure 18 Terminal details—200mm Liebert EXM MBC, two to four breakers, 10-40kVA system**



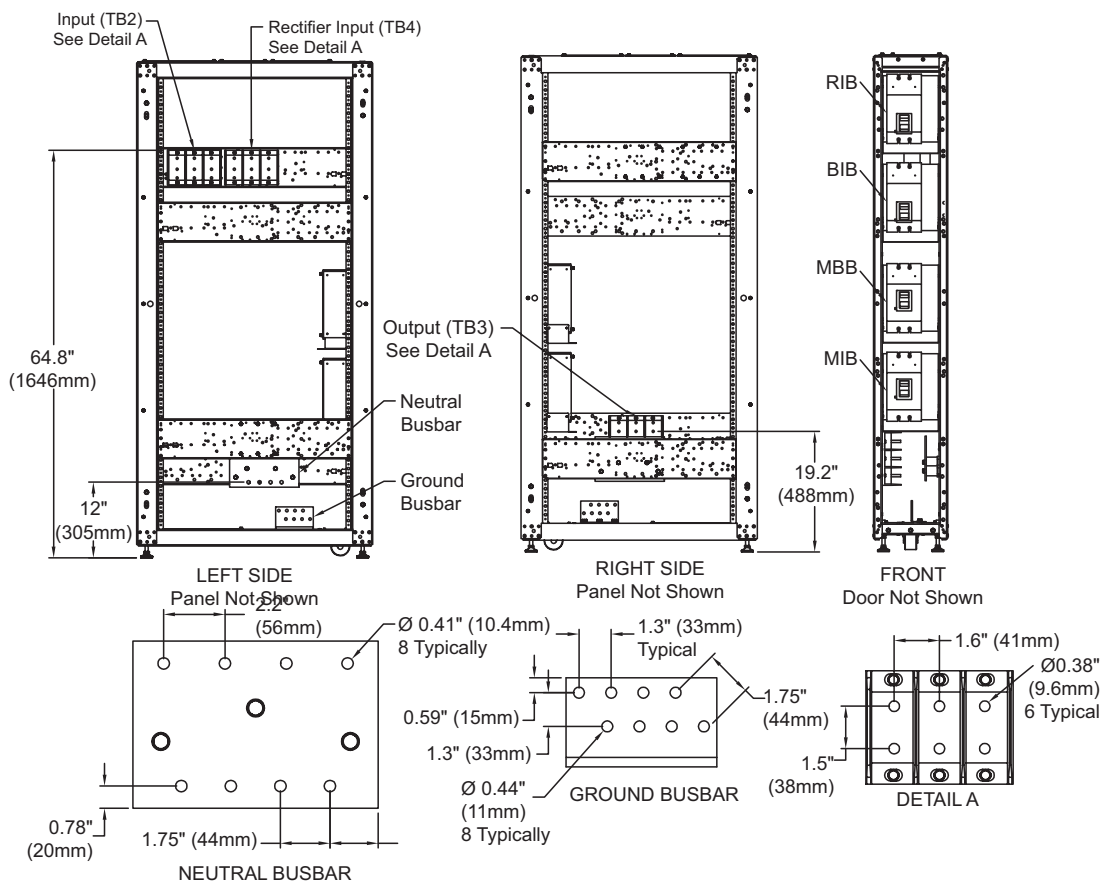
**Table 6 Breaker configuration—200mm Liebert EXM MBC, two to four breakers, 10-40kVA system**

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

**Table 7 Terminal block details—200mm Liebert EXM MBC, two to four breakers, 10-40kVA system**

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

**Figure 19 Terminal details—300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**



**NOTES**

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 maintenance bypass cabinet is attached to the UPS, Vertiv will supply the interconnection cables.

EXM16011  
Rev. 2

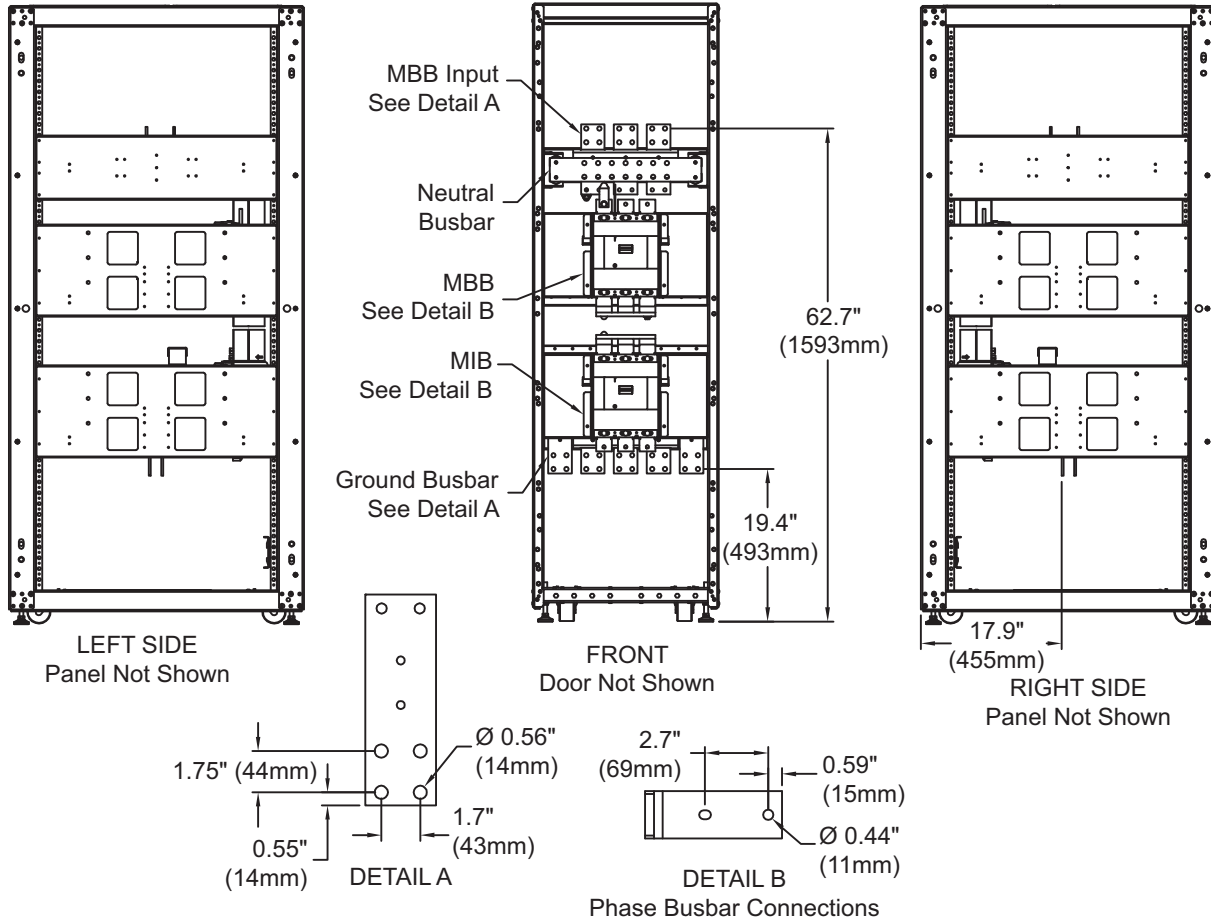
**Table 8 Breaker configuration—300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**

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

**Table 9 Terminal block details—300mm Liebert EXM MBC, two to four breakers, 60-100kVA system**

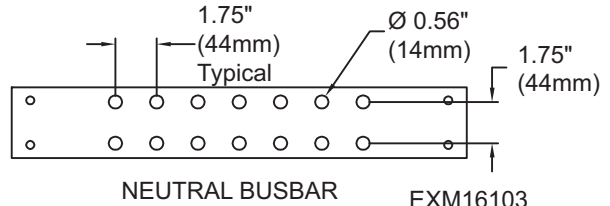
Terminal Block	Single Input System	Dual Input System
TB2	Input	Bypass
TB3	Output	Output
TB4	—	Rectifier

**Figure 20 Terminal details—600mm Liebert EXM MBC, two breakers, 120-200kVA system**



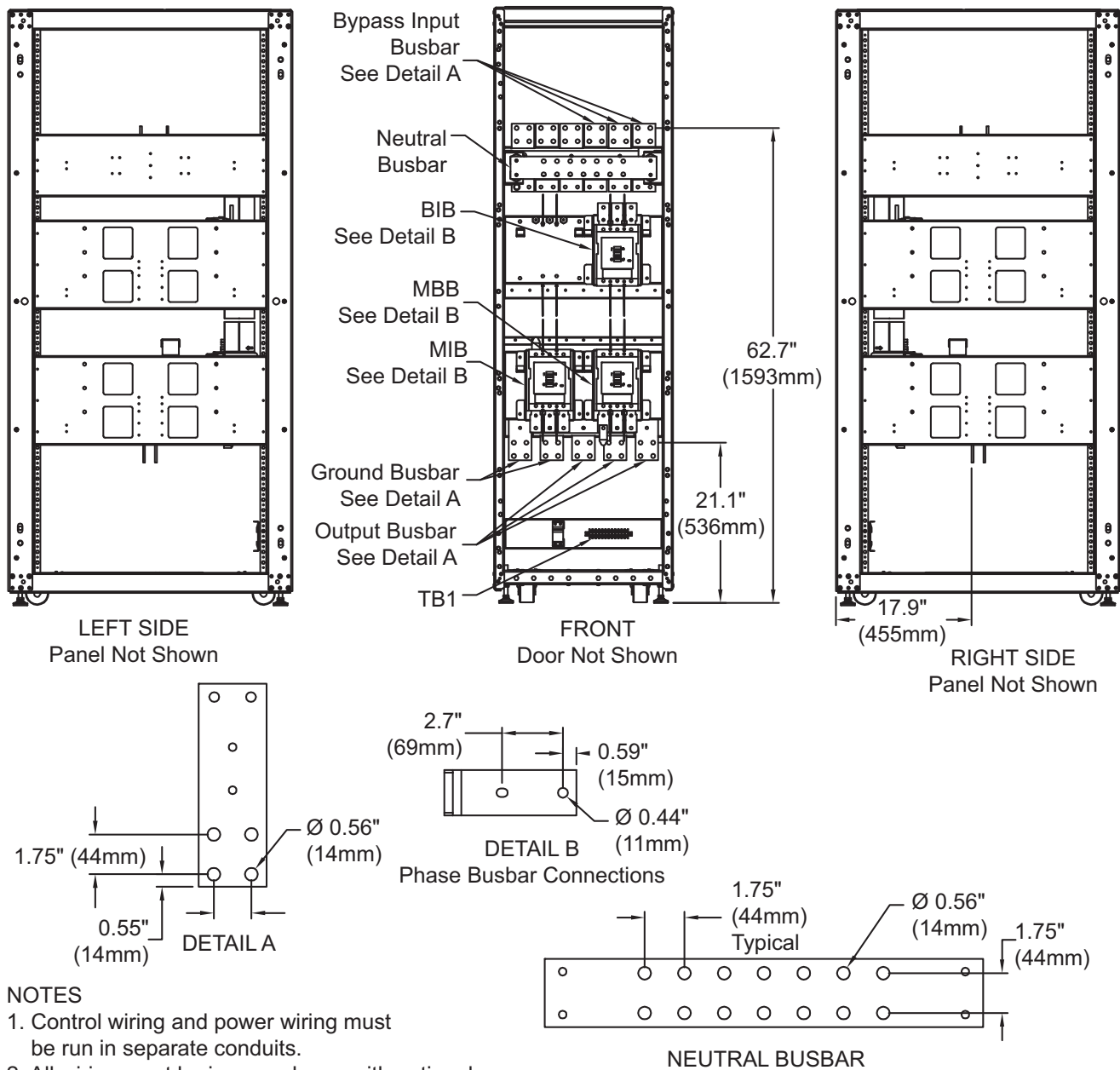
**NOTES**

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 maintenance bypass cabinet is attached to the UPS, Vertiv will supply the interconnection cables.



EXM16103  
Rev. 2

**Figure 21 Terminal details—600mm Liebert EXM MBC, three breakers, 120-160kVA system**

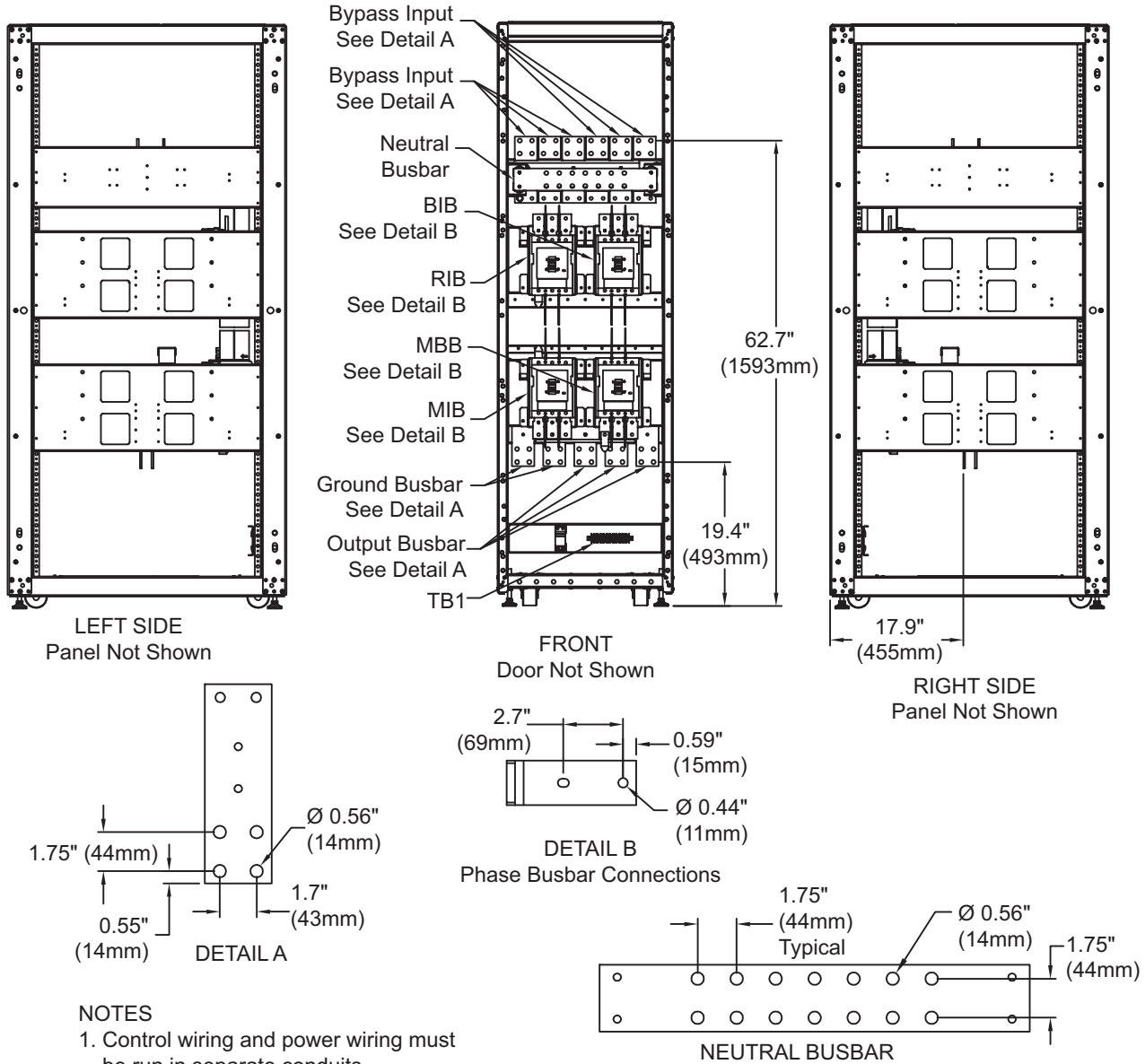


**NOTES**

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 maintenance bypass cabinet is attached to the UPS, Vertiv will supply the interconnection cables.

EXM16104  
Rev. 2

**Figure 22 Terminal details—600mm Liebert EXM MBC, four breakers, 120-160kVA system**



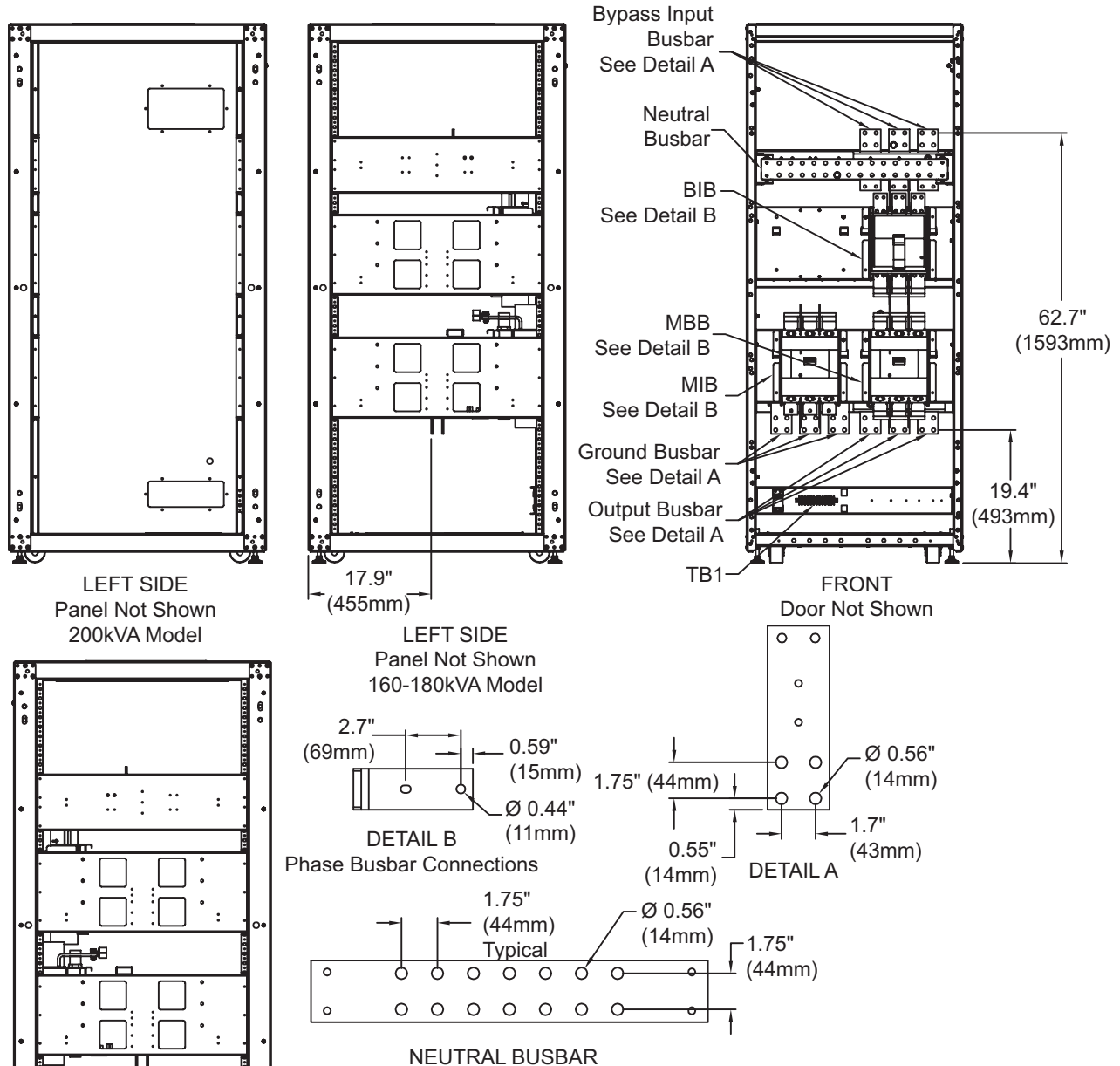
**NOTES**

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 maintenance bypass cabinet is attached to the UPS, Vertiv will supply the interconnection cables.

EXM16105  
Rev. 2



**Figure 23 Terminal details—800mm Liebert EXM MBC, three breakers, 160-200kVA system**

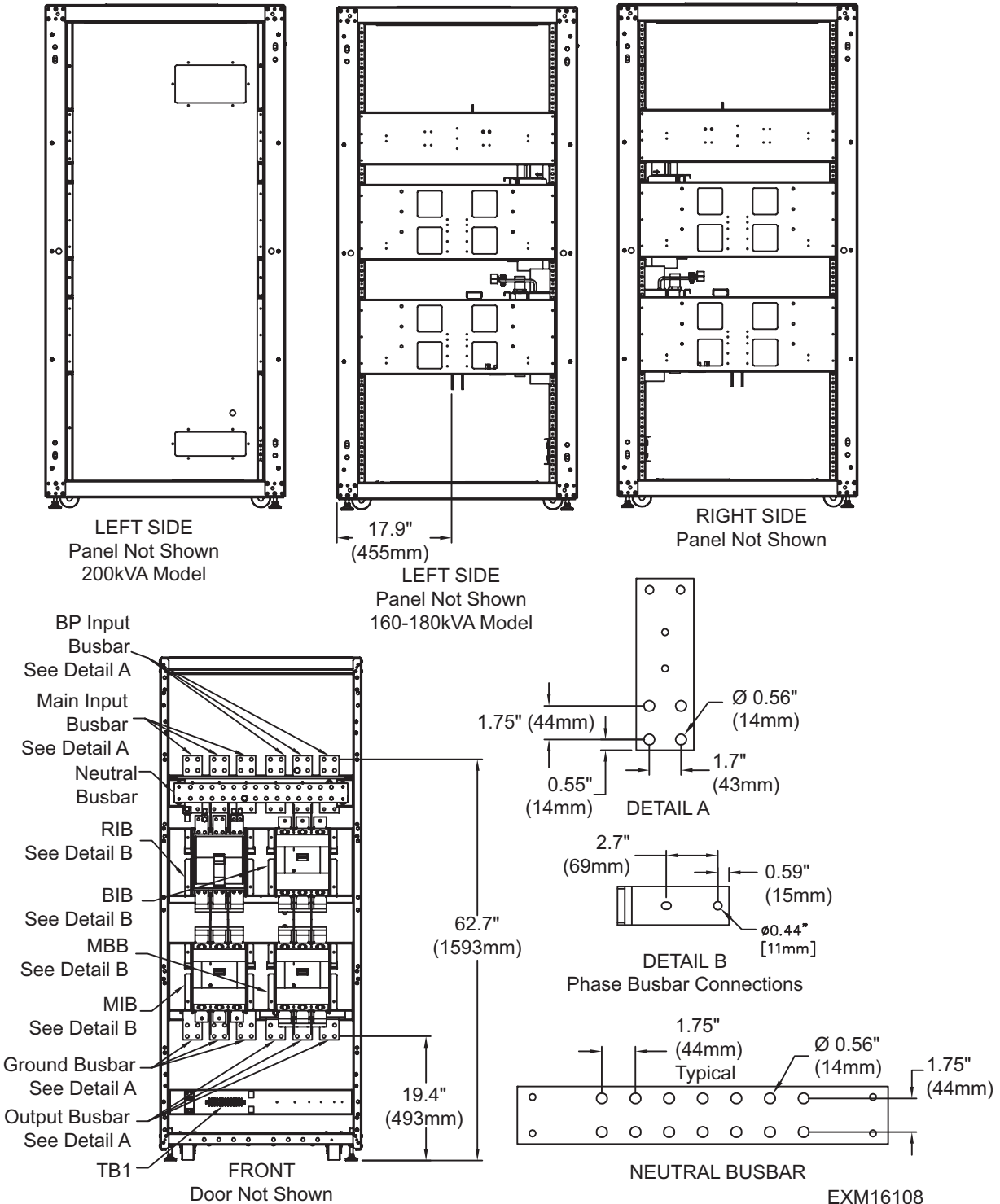


**NOTES**

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

EXM16107  
Rev. 2

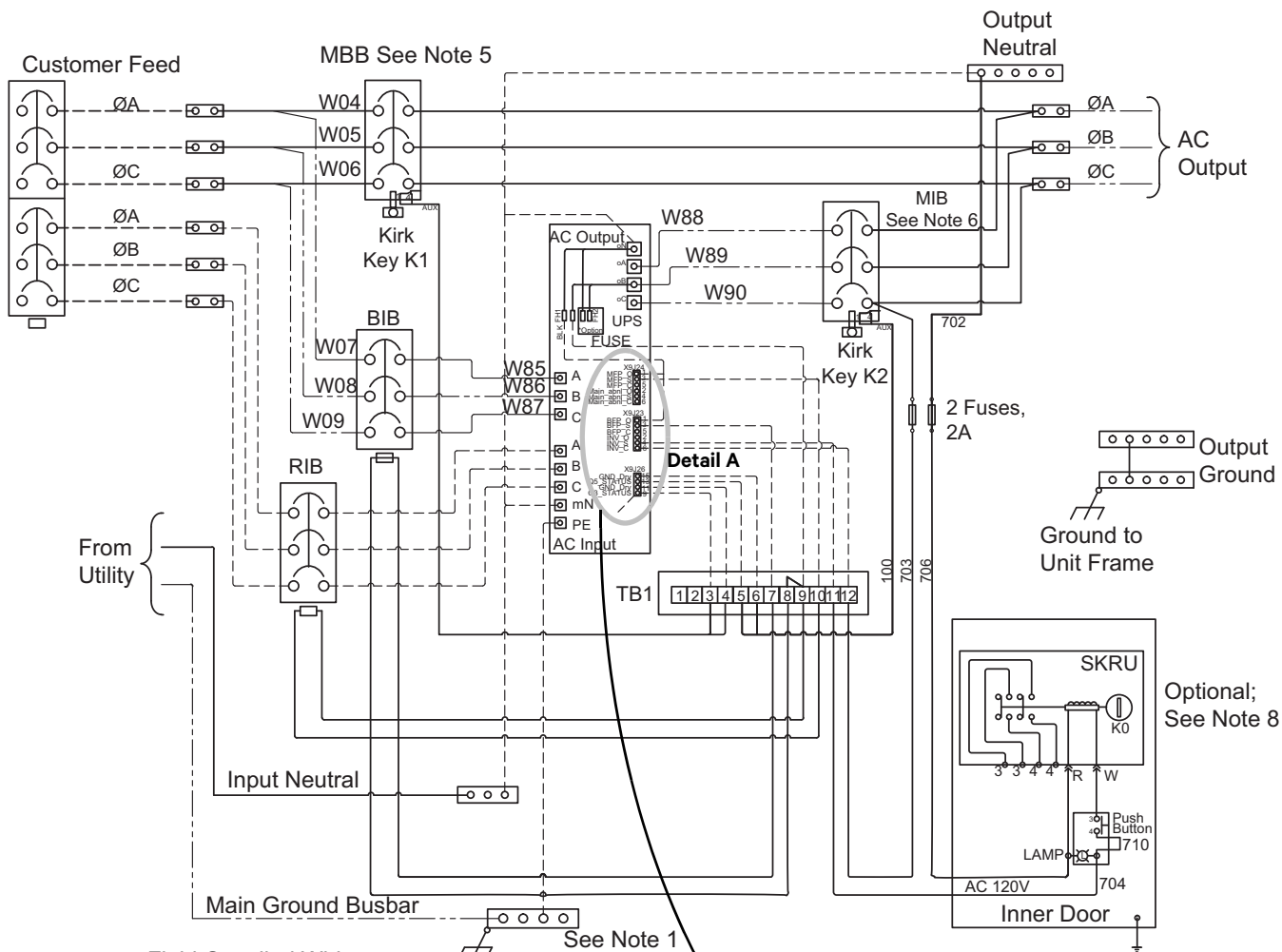
Figure 24 Terminal details—800mm Liebert EXM MBC, four breakers, 160-200kVA system



- NOTES:
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 maintenance bypass cabinet is attached to the UPS, Vertiv will supply the interconnection cables.

EXM16108  
Rev. 2

**Figure 25 Control wiring diagram, Liebert EXM MBC, two to four breakers, with interlock**



----- Field-Supplied Wiring  
 \_\_\_\_\_ Factory-Supplied Wiring  
 SKRU - Solenoid Key Release Unit  
 KO-Key Operator

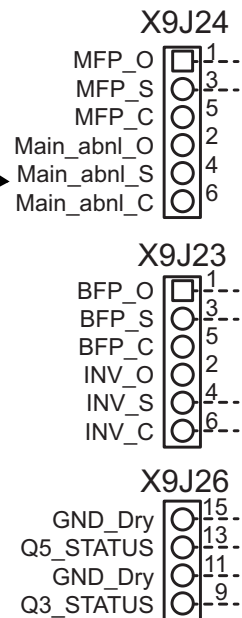
**NOTES**

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

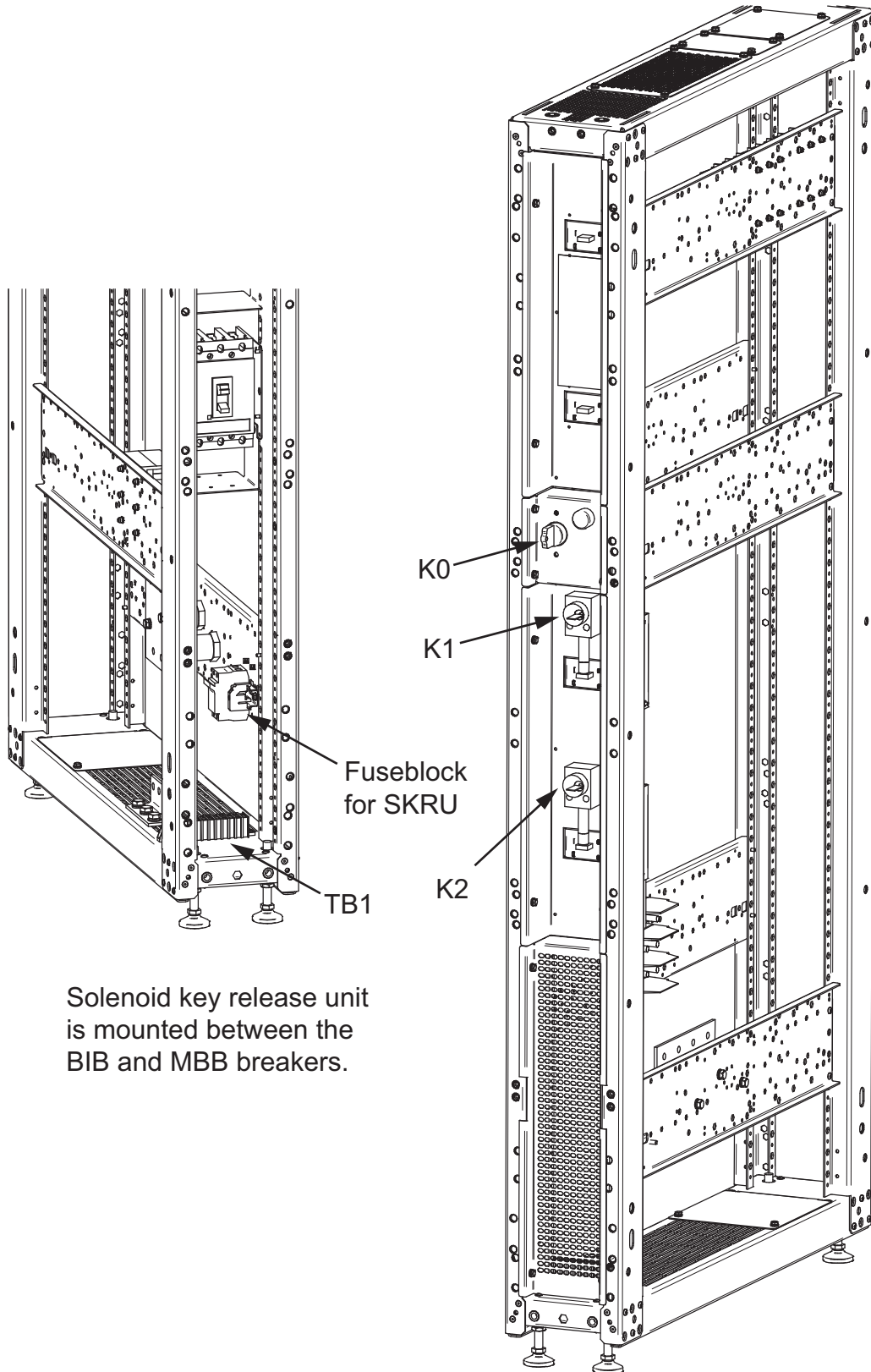
EXM14004  
 Rev. 4

**Wiring shown for a four-breaker system.  
 Refer to Notes 7 and 8 for two- and three-breaker configurations.**

**DETAIL A**

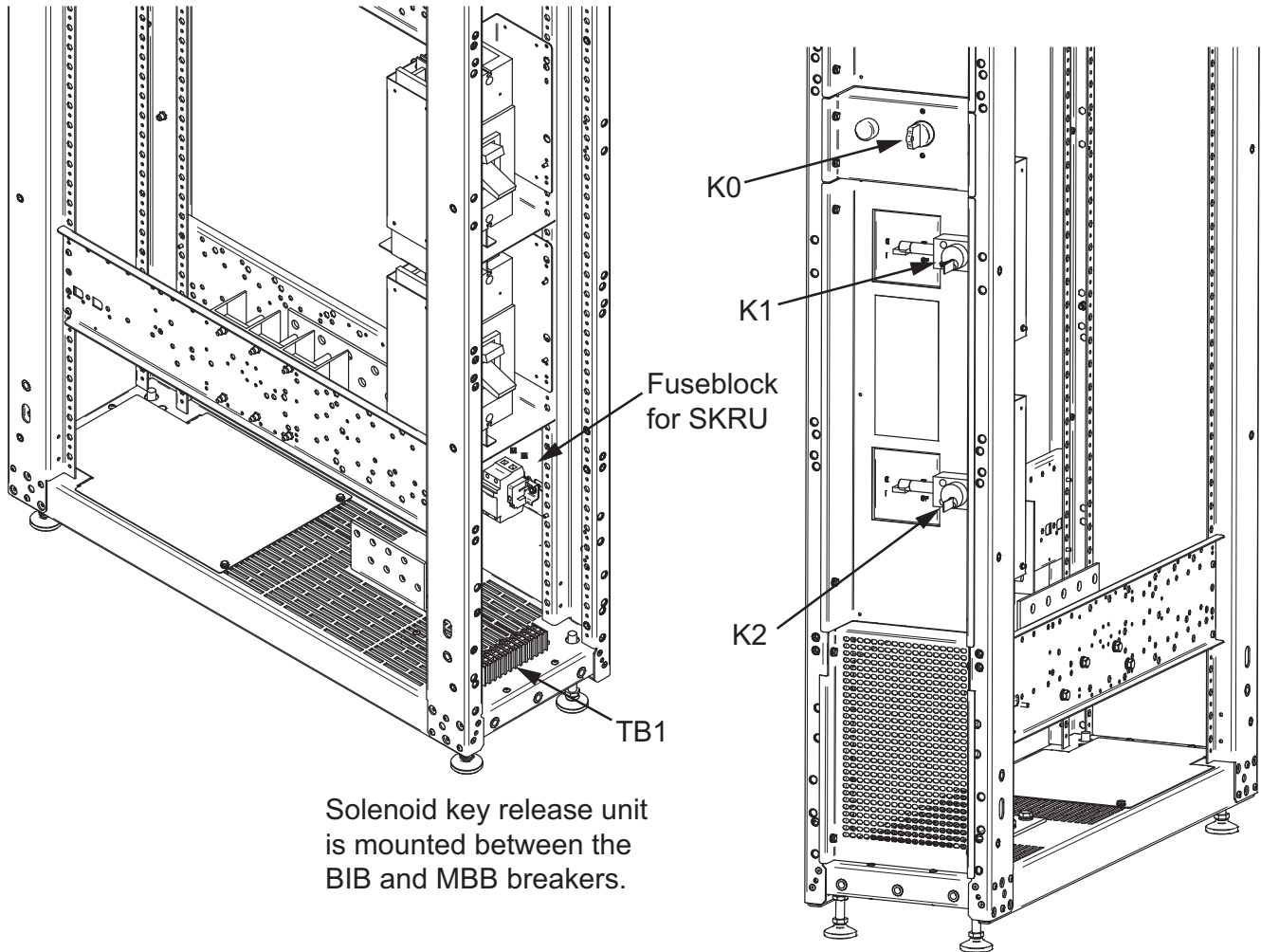


**Figure 26 Solenoid key release unit, 200mm Liebert EXM MBC**



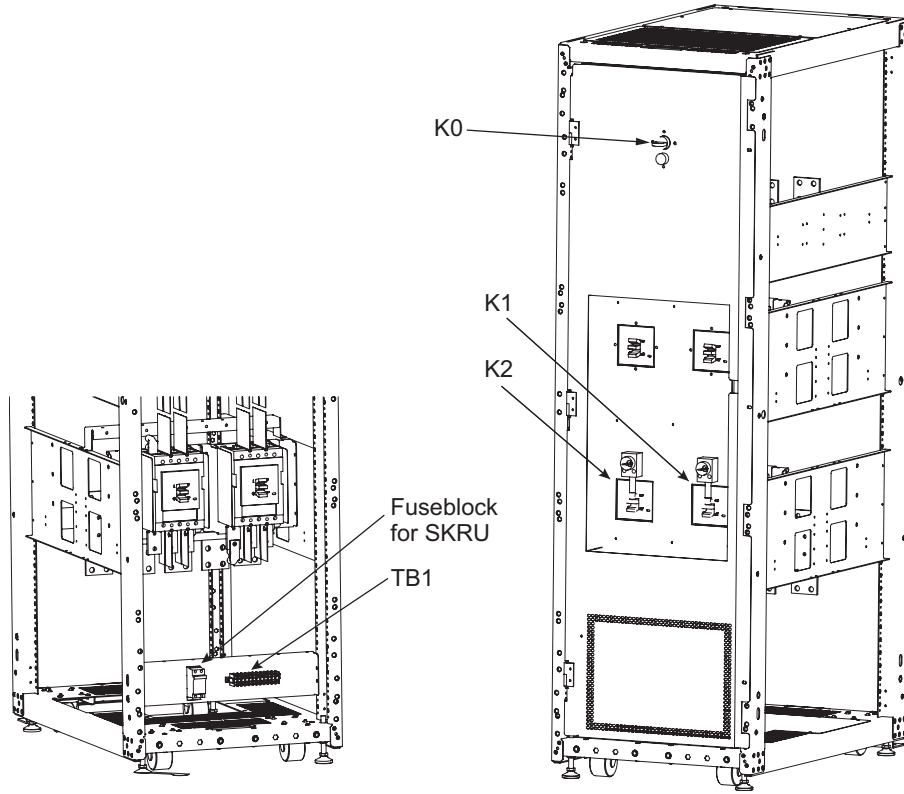
Solenoid key release unit is mounted between the BIB and MBB breakers.

**Figure 27 Solenoid key release unit, 300mm Liebert EXM MBC**

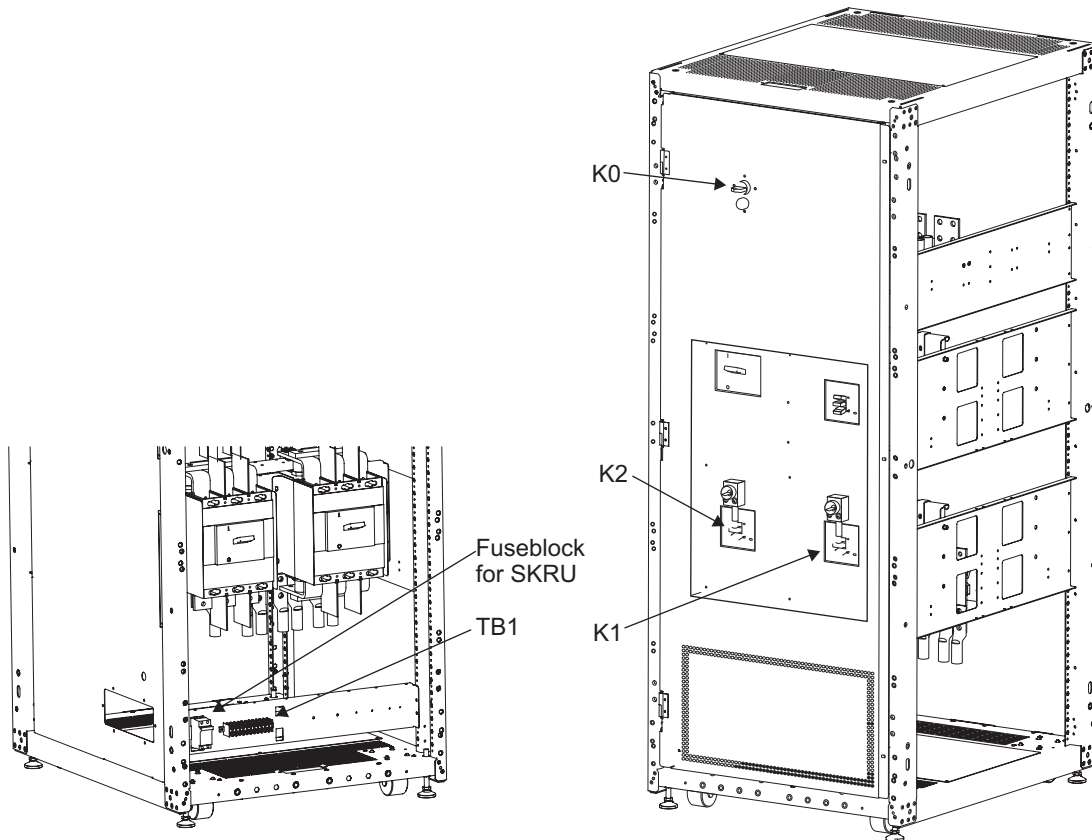


Solenoid key release unit is mounted between the BIB and MBB breakers.

**Figure 28 Solenoid key release unit, 600mm Liebert EXM MBC**



**Figure 29 Solenoid key release unit, 800mm Liebert EXM MBC**



## 3.0 SPECIFICATIONS

**Table 10 Liebert EXM MBC specifications**

Model Size	10-40kVA UPS	60-100kVA UPS	120-140kVA UPS	160-200kVA UPS
<b>Input Parameters</b>				
Input Voltage to Bypass, VAC	208/120V or 220/127V, 3-Phase, 4-Wire			
Input Current, AAC	Refer to <b>Tables 15, 16 and 17</b>			
Input Frequency, Hz	60			
<b>Output Parameters</b>				
Output Power, kW	10-40	60-100	120-140	160-200
Output Voltage, VAC	208/120V or 220/127V, 3-Phase, 4-Wire			
Output Current, AAC	Refer to <b>Table 18</b>			
Output Frequency, Hz	60			
<b>Physical Parameters and Standards, in (mm)</b>				
Cabinet Width, in. (mm) with side panels attached	8.2 (208)	12.0 (308)	23.9 (608)	31.8 (808)
Depth, in. (mm)	39.4 (1000)			
Height, in. (mm)	78.74 (2000)			
Weight, lb. (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			
<b>Environmental Parameters</b>				
Storage Temperature Range, °F (°C)	-13 to 158 (-25 to 70)			
Operating Temperature Range, °F (°C)	0 to 40 (UPS)			
Relative Humidity	Maximum 95% Non-Condensing (Operating and Non-Operating)			
Maximum Altitude above MSL, ft. (m)	Refer to UPS Manual, SL-25648 or SL-26100			

**Table 11 Dimensions for Liebert EXM UPS with 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 200mm MBC	31-1/2 x 39-1/2 x 78-3/4 (800 x 1000 x 2000)	—
UPS with 300mm MBC	—	35-1/2 x 39-1/2 x 78-3/4 (900 x 1000 x 2000)

**Table 12 Weights—Liebert EXM UPS, 10-40kVA, and 200mm Liebert EXM MBC**

UPS Rating, kVA	UPS Weight lb (kg)	Liebert EXM MBC 200mm Weight, lb (kg)	Combined Weight UPS and Liebert EXM MBC, lb (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 13 Weights—Liebert EXM UPS, 60-100kVA, and 300mm Liebert EXM MBC**

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

**Table 14 Additional weight for Liebert EXM 10-40kVA UPS with internal batteries \***

Battery Model	Battery Code	Added Battery Weight, lb (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 10-40kVA UPS internal batteries.



### 3.1 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 15** 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	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 16** 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	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 17 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	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 18 Liebert EXM MBC output currents**

Voltage 3-Ph, 60Hz)	MBC Rating, kVA	System Output Current, A, Max	Phase	Recommended 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) 300kcmil	(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) 300kcmil	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 19 Recommended lug sizes (compression type) M10, 3/8" bolt**

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

**Table 20 Recommended lug sizes (Compression Type) M12, 1/2" bolt**

Cable Size	T&B Copper Two-Hole	T&B Aluminum Two-Hole
#6AWG	256-030695-868	—
#4AWG	256-030695-733	—
#2-3AWG	54811BE	—
#1AWG	54857BE	—
#1/0AWG	256-30695-593	—
#2/0AWG	54862BE	60238
#3/0AWG	54864BE	60244
#4/0AWG	54866BE	60250
250kcmil	54868BE	60256
300kcmil	54870BE	60262
350kcmil	54872BE	60267
400kcmil	54874BE	60269
500kcmil	54876BE	60273
600kcmil	54878BE	60275
700kcmil	54879BE	60277
750kcmil	54880BE	60278

### 3.2 Torque Requirements

All electrical connections must be tight.

**Tables 21** and **22** provide the torque values for the connections to the Liebert EXM MBC. Use these values unless the equipment is labeled otherwise.

**Table 21 Busbar torque for power wiring**

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

**Table 22 Terminal block 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's data for proper torque for circuit breaker power connections.

## NOTES

## **TECHNICAL SUPPORT / SERVICE**

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