



# Liebert<sup>®</sup> EXM Parallel Cabinet

## User Manual

10-200kVA, 60Hz, 208V

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Vertiv assumes no responsibility and disclaims all liability for damages result from use of this information or for any errors or omissions.

Refer to local regulations and building codes relating to the application, installation, and operation of this product. The consulting engineer, installer, and/or end user is responsible for compliance with all applicable laws and regulations relation to the application, installation, and operation of this product.

The products covered by this instruction manual are manufactured and/or sold by Vertiv. This document is the property of Vertiv and contains confidential and proprietary information owned by Vertiv. Any copying, use, or disclosure of it without the written permission of Vertiv is strictly prohibited.

Names of companies and products are trademarks or registered trademarks of the respective companies. Any questions regarding usage of trademark names should be directed to the original manufacturer.

### **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.

# TABLE OF CONTENTS

<b>1 Important Safety Instructions</b> .....	<b>1</b>
<b>2 Mechanical Installation</b> .....	<b>3</b>
2.1 Introduction .....	3
2.2 Preliminary Checks .....	3
2.3 Environmental Considerations .....	4
2.3.1 Room .....	4
2.3.2 Storage .....	4
2.4 Positioning .....	4
2.4.1 Moving the Cabinets .....	4
2.4.2 Clearances .....	5
2.4.3 Floor Installation/Anchoring .....	5
2.5 Cable Entry .....	5
2.6 Power Cables .....	5
2.6.1 Power Cable Connection Procedure .....	7
<b>3 Installation Drawings</b> .....	<b>13</b>
<b>4 Specifications</b> .....	<b>31</b>
4.1 Electrical Characteristics .....	32
4.2 Torque Requirements .....	34

This page intentionally left blank


# 1 Important Safety Instructions

## Save These Instructions

This manual contains important instructions that should be followed during installation of your Vertiv™ Liebert® EXM Parallel Cabinet.




**WARNING!** Risk of moving heavy units and tipping hazard. It can cause damage to the equipment, injury and death. Exercise extreme care when handling the UPS cabinets to avoid the equipment damage, injury and death. Exercise extreme care when handling cabinets to avoid the equipment damage or injury to personnel. The weight of the Liebert® EXM Parallel Cabinet ranges from 263 lb. to 714 lb. (119.3kg to 323.8kg). 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 263 lb. à 714 lb. (de 119,3kg à

323,8kg). 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!** Read this manual thoroughly before working with the Liebert® EXM Parallel Cabinet. Retain this manual for use by installing personnel. Risk of arc flash and electric shock. It can cause damage to the equipment, 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 Liebert® Parallel Cabinet. Observe all safety precautions in this manual before handling or installing the Liebert® EXM Parallel 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 Liebert® EXM Parallel 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.

## 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 Parallel Cabinet.

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 Parallel Cabinet 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 Parallel Cabinet, 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 Parallel Cabinet 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 31).

All models of the Liebert® EXM Parallel Cabinet 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 Parallel Cabinet 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 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 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 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 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 ( $\text{kg}/\text{cm}^2$ ) of any handling equipment. Refer [Table 4.1](#) on page 31 for the weight of the Liebert® EXM Parallel Cabinet 300 mm, 600 mm and 800 mm models.

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

The Liebert® EXM Parallel Cabinet can be handled with a forklift or similar equipment. For operations with a forklift, refer to installation drawings in [Installation Drawings](#) on page 13.

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 degrees tilt with the forklift. Handling the unit with straps is not authorized.






**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 equipment damage or injury to personnel. The weight of the Liebert® EXM Parallel Cabinet ranges from 26 lb. to 714 lb. (119.3 kg to 323.8 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 263 lb. à 714 lb. (de 119,3 kg à

323,8 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

Vertiv™ Liebert® EXM Parallel Cabinet 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 13 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

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

## 2.6 Power Cables

The Liebert® EXM Parallel Cabinet requires both the power and the control cabling once it has been mechanically installed. All the control cables must be separate from the power cables. Run control cables in the metal conduits or the 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 4.2** on page 32 and **Table 4.3** on page 32, follow local wiring practices and take into consideration the environmental conditions (The temperature and the physical support media).

For cable entry locations, refer to **Figure 3.7** on page 20 and **Figure 3.8** on page 21.



**WARNING! Risk of electric shock. It can cause damage to the equipment, 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.**

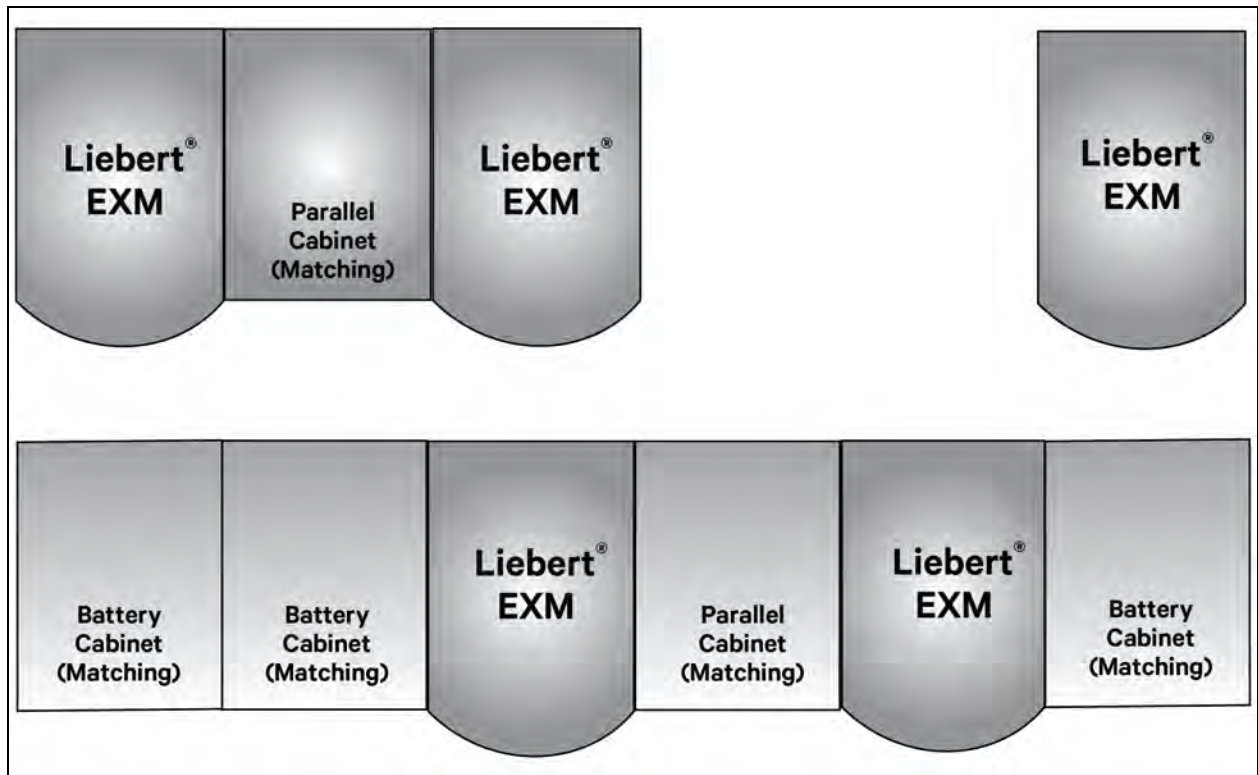


**AVERTISSEMENT! Risque de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort. Avant de procéder au câblage de l'armoire, assurez-vous que vous êtes au courant de l'emplacement et du fonctionnement des isolateurs externes qui raccordent l'alimentation d'entrée 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 the nominal current in the case of non-linear loads.
- The grounding conductor must be sized according to the local or the 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, Vertiv™ Liebert® EXM Parallel Cabinet**



## 2.6.1 Power Cable Connection Procedure

The system input, the UPS bypass, the UPS output, and the 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 13. These are accessible when the side or the top panel is removed.

### Equipment Ground

The equipment ground busbar is near the input and the output power supply connections as shown in [Installation Drawings](#) on page 13. The grounding conductor must be connected to the ground busbar.

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



**WARNING! Risk of electric shock. It can cause damage to the equipment, injury and death. Failure to follow adequate grounding procedures can result in electric shock hazard to the 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 défaillance de la mise à la terre.**



**WARNING! Risk of electric shock. It can cause damage to the equipment, injury and death. The operations described in this section must be performed by the 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 13.

1. Verify that the 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 the neutral bonding arrangement must be in accordance with the local and the national codes of practice.**

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

4. See **Table 2.1** below for all the power connections.
5. Tighten the connections to the proper torque (see **Table 4.5** on page 34). Ensure correct phasing.
6. Connect the control wiring from the Vertiv™ Liebert® EXM Parallel Cabinet terminal blocks TB1 and TB10 to the Vertiv™ Liebert® EXM UPS Bypass Module (X9, J23, and J26). Tighten the connections to the proper torque (see **Table 4.5** on page 34).
7. Replace the panels. If your system has an SKRU interlock, refer to **Table 1.3** on page 1.

**Table 2.1 Power Wiring for Vertiv™ Liebert® EXM UPS to Vertiv™ Liebert® EXM Parallel Cabinet**

System Configuration	From	To
Liebert® EXM 10 kVA to 20 kVA 2+0 Liebert® EXM 10 kVA to 40 kVA 1+1	Utility	UPS1 AC Input
	Utility	UPS 2 AC Input
	Utility	TB4
	UPS 1 AC Output	TB1
	UPS 2 AC Output	TB2
	TB1	MOB1
	TB2	MOB2
Liebert® EXM 30 kVA to 40 kVA 2+0	Utility	UPS1 AC Input
	Utility	UPS 2 AC Input
	Utility	MBB
	UPS 1 AC Output	TB1
	UPS 2 AC Output	TB2
	TB1	MOB1
	TB2	MOB2
Liebert® EXM 10 kVA to 40 kVA 2+1	Utility	UPS1 AC Input
	Utility	UPS 2 AC Input
	Utility	UPS 3 AC Input
	Utility	TB4
	UPS 1 AC Output	TB1
	UPS 2 AC Output	TB2
	UPS 3 AC Output	TB3
	TB1	MOB1
	TB2	MOB2
	TB3	MOB3
TB5	Critical Load	

Table 2.1 Power Wiring for Vertiv™ Liebert® EXM UPS to Vertiv™ Liebert® EXM Parallel Cabinet

System Configuration	From	To
Liebert® EXM 60 kVA to 100 kVA 1+1	Utility	UPS 1 AC Input
	Utility	UPS 2 AC Input
	Utility	TB4
	UPS 1 AC Output	TB1
	UPS 2 AC Output	TB2
	TB1	MOB1
	TB2	MOB2
Liebert® EXM 60 kVA to 100 kVA 2+0	Utility	UPS 1 AC Input
	Utility	UPS 2 AC Input
	Utility	MBB
	UPS 1 AC Output	MOB1
	UPS 2 AC Output	MOB2
	Parallel Cabinet Output	Critical Load
Liebert® EXM 60 kVA to 100 kVA 2+1	Utility	UPS 1 AC Input
	Utility	UPS 2 AC Input
	Utility	UPS 3 AC Input
	UPS 1 AC Output	MOB1
	UPS 2 AC Output	MOB2
	UPS 3 AC Output	MOB3
	Parallel Cabinet Output	Critical Load
Liebert® EXM 120 kVA to 200 kVA 1+1 Liebert® EXM 120 kVA to 160 kVA 2+0	Utility	UPS 1 AC Input
	Utility	UPS 2 AC Input
	Utility	MBB
	UPS 1 AC Output	MOB1
	UPS 2 AC Output	MOB2
	Parallel Cabinet Output	Critical Load

**Table 2.1 Power Wiring for Vertiv™ Liebert® EXM UPS to Vertiv™ Liebert® EXM Parallel Cabinet**

System Configuration	From	To
Liebert® EXM 120 kVA to 160 kVA 2+1	Utility	UPS 1 AC Input
	Utility	UPS 2 AC Input
	Utility	UPS 3 AC Input
	Utility	MBB
	UPS 1 AC Output	MOB1
	UPS 2 AC Output	MOB2
	UPS 3 AC Output	MOB3
	Parallel Cabinet Output	Critical Load

**Table 2.2 Control Wiring for Liebert® EXM UPS to Vertiv™ Liebert® EXM Parallel Cabinet**

System Configuration		From Liebert® EXM UPS Bypass Module	Parallel Cabinet	Signal Name
2+1	1+1 and 2+0	UPS 1		
		J26-17	TB10-1	MIB Status (NC)
		J26-19	TB10-2	
		J26-21	TB1-8	MBB Status (NO)
		J26-23	TB1-7	
		J26-22	TB1-1	MOB1 Status (NC)
		J26-24	TB1-2	
		UPS2		
		J26-17	TB10-3	MIB Status (NC)
		J26-19	TB10-4	
		J26-21	TB1-10	MBB Status (NO)
		J26-23	TB1-9	
		J26-22	TB1-3	MOB2 Status (NC)
		J26-24	TB1-4	
2+1		UPS3		
		J26-17	TB10-5	MIB Status (NC)
		J26-19	TB10-6	
		J26-21	TB1-12	MBB Status (NO)
		J26-23	TB1-11	
		J26-22	TB1-5	MOB3 Status (NC)
		J26-24	TB1-6	

**Table 2.3 Control Wiring for Vertiv™ Liebert® EXM UPS to Vertiv™ Liebert® EXM Parallel Cabinet with SKRU Interlock**

System Configuration		From Liebert® EXM UPS Bypass Module	TB7	Signal Name
2+1	1+1 and 2+0	UPS 1		
		X9J23-4	TB7-1	UPS1 On-UPS
		X9J23-6	TB7-2	
		UPS2		
		X9J23-4	TB7-3	UPS1 On-UPS
		X9J23-6	TB7-4	
2+1		UPS3		
		X9J23-4	TB7-5	UPS3 On-UPS
		X9J23-6	TB7-6	

**Notice**

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

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

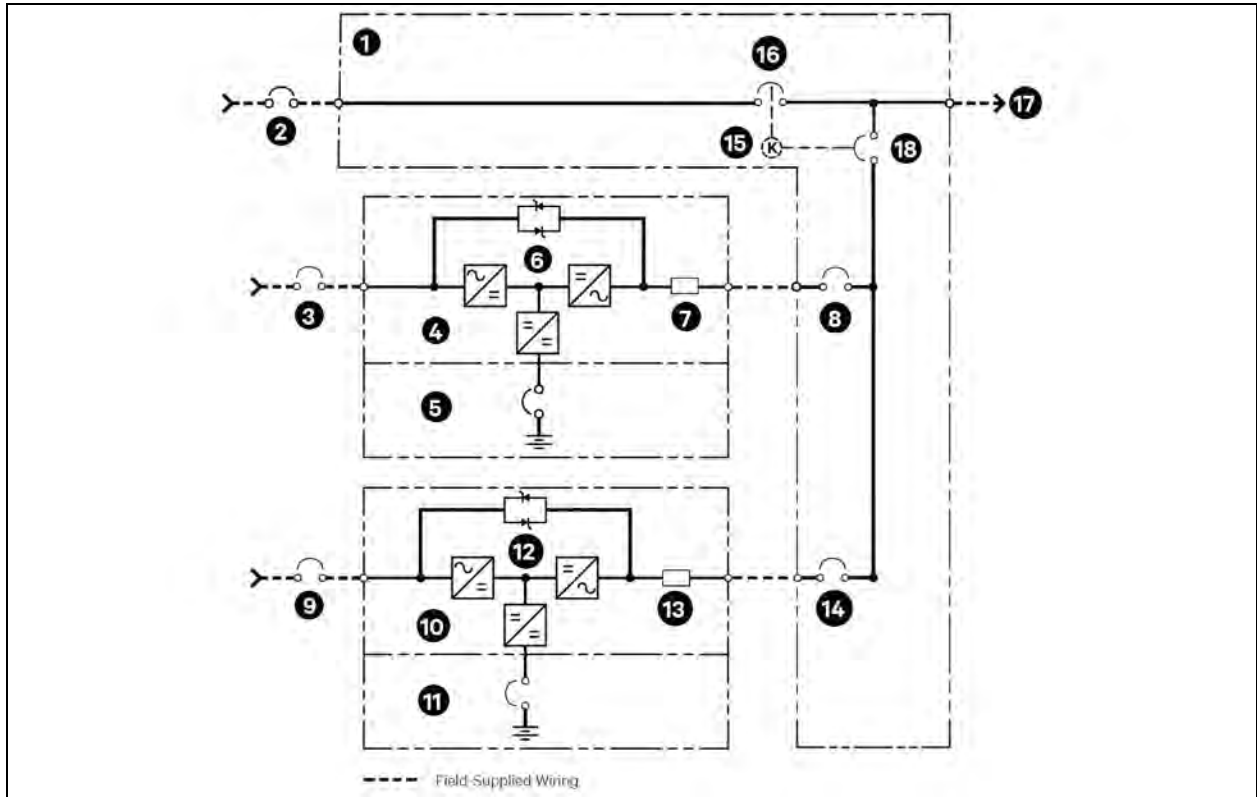
- Take special care when determining the size of the neutral cable because the current circulating on the neutral cable may be greater than nominal current in the case of non-linear loads.
- The ground conductor must be sized according to the local or the NEC codes, cable lengths, type of protection. The ground cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consideration must be given to the use of smaller, paralleled cables for heavy currents, as a way to ease installation.
- In most installations, the load is connected to a distribution network of individually protected busbars fed by the Vertiv™ Liebert® EXM Parallel Cabinet output rather than being connected directly to the Liebert® EXM Parallel Cabinet itself. Where this is the case, the Liebert® EXM Parallel Cabinet 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.

This page intentionally left blank



## 3 Installation Drawings

Figure 3.1 Parallel (1+1, 2+0) Cabinet, 10 kVA to 200 kVA



Item	Description	Item	Description
1	Vertiv™ Liebert® EXM Parallel Cabinet	10	Liebert® EXM #2 UPS Cabinet
2	*System AC Input 4 Wire + Grd	11	Battery
3	*UPS1 AC Input 4 Wire + Grd <b>NOTE: Customer must supply shunt trip breaker with 120 V coil.</b>	12	Static Bypass
4	Liebert® EXM #1 UPS Cabinet	13	Output Busbar
5	Battery	14	Module Output Breaker 2 (MOB2)
6	Static Bypass	15	OPT
7	Output Busbar	16	Maintenance Bypass Breaker (MBB)

Item	Description	Item	Description
8	Module Output Breaker 1 (MOB1)	17	AC Output Wire +Grd
9	*UPS 2 AC Input 4 Wire + Grd <b>NOTE: Customer must supply shunt trip breaker with 120 V coil.</b>	18	Maintenance Isolation Breaker (MIB)

\*External Overcurrent Protection by Others.

**NOTE:**

Install in accordance with the national and the local electrical codes.

The input and the bypass must share the same single source.

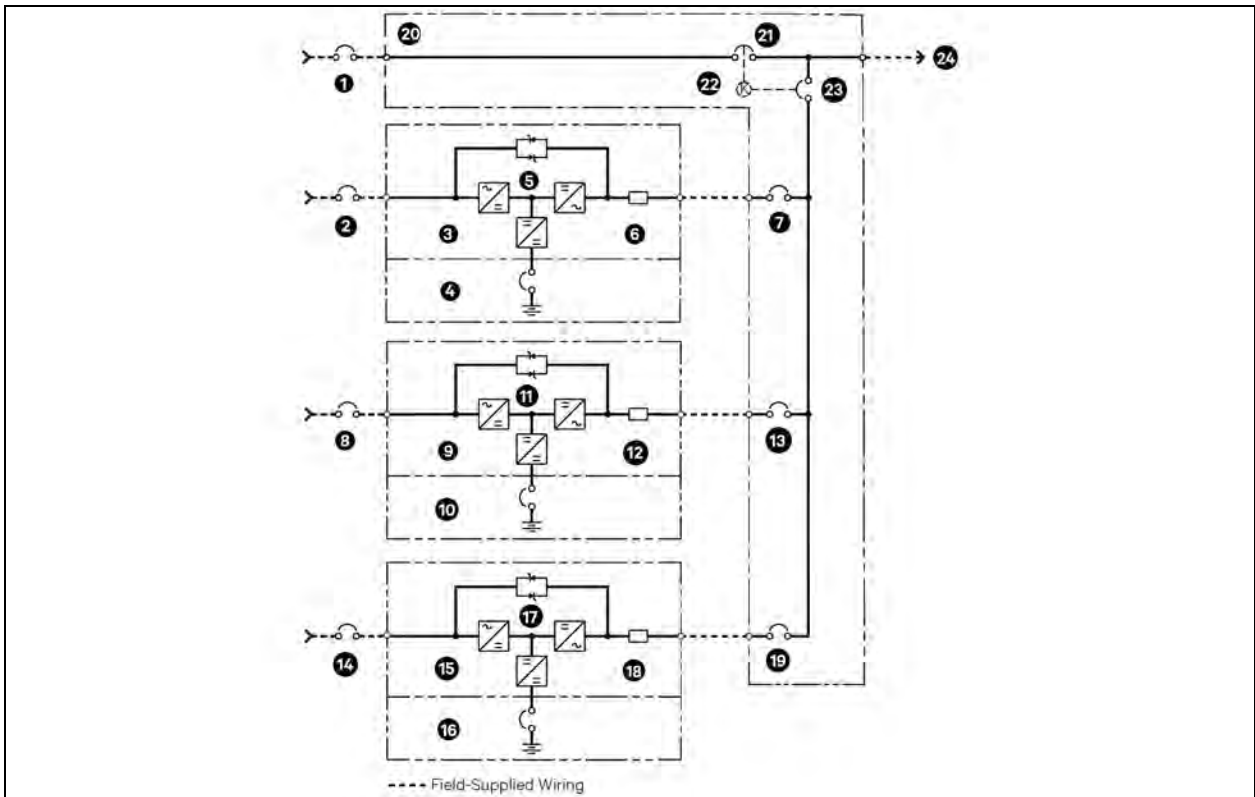
A neutral is required from the system AC input source. A full capacity neutral conductor is recommended. The grounding conductors are recommended.

The bypass and the rectifier inputs and output cables must be run in the separate conduits.

The control wiring must be run in the separate conduits.

2+0 available only from 10 kVA to 160 kVA; 180 kVA and 200 kVA are 1+1 only.

Figure 3.2 One Line Diagram, Parallel (2+1) Cabinet, 10 kVA to 160 kVA



Item	Description	Item	Description
1	*System AC Input 4 Wire + Grd	13	Module Output Breaker 2 (MOB2)
2	*UPS 1 AC Input 4 Wire + Grd <b>NOTE: Customer must supply shunt trip breaker with 120 V coil.</b>	14	*UPS 3 AC Input 4 Wire + Grd <b>NOTE: Customer must supply shunt trip breaker with 120 V coil.</b>
3	Vertiv™ Liebert® EXM #1 UPS Cabinet	15	Liebert® EXM #3 UPS Cabinet
4	Battery	16	Battery
5	Static Bypass	17	Static Bypass
6	Output Busbar	18	Output Busbar
7	Module Output Breaker 1 (MOB1)	19	Module Output Breaker 3 (MOB3)
8	*UPS 2 AC Input 4 Wire + Grd <b>NOTE: Customer must supply shunt trip breaker with 120 V coil.</b>	20	Liebert® EXM Parallel Cabinet
9	Liebert® EXM #2 UPS Cabinet	21	Maintenance Bypass Breaker (MBB)
10	Battery	22	OPT
11	Static Bypass	23	Maintenance Isolation Breaker (MIB)
12	Output Busbar	24	AC Output 4 Wire + Grd

\*External Overcurrent Protection by Others.

**NOTE:**

**Install in accordance with the national and the local electrical codes.**

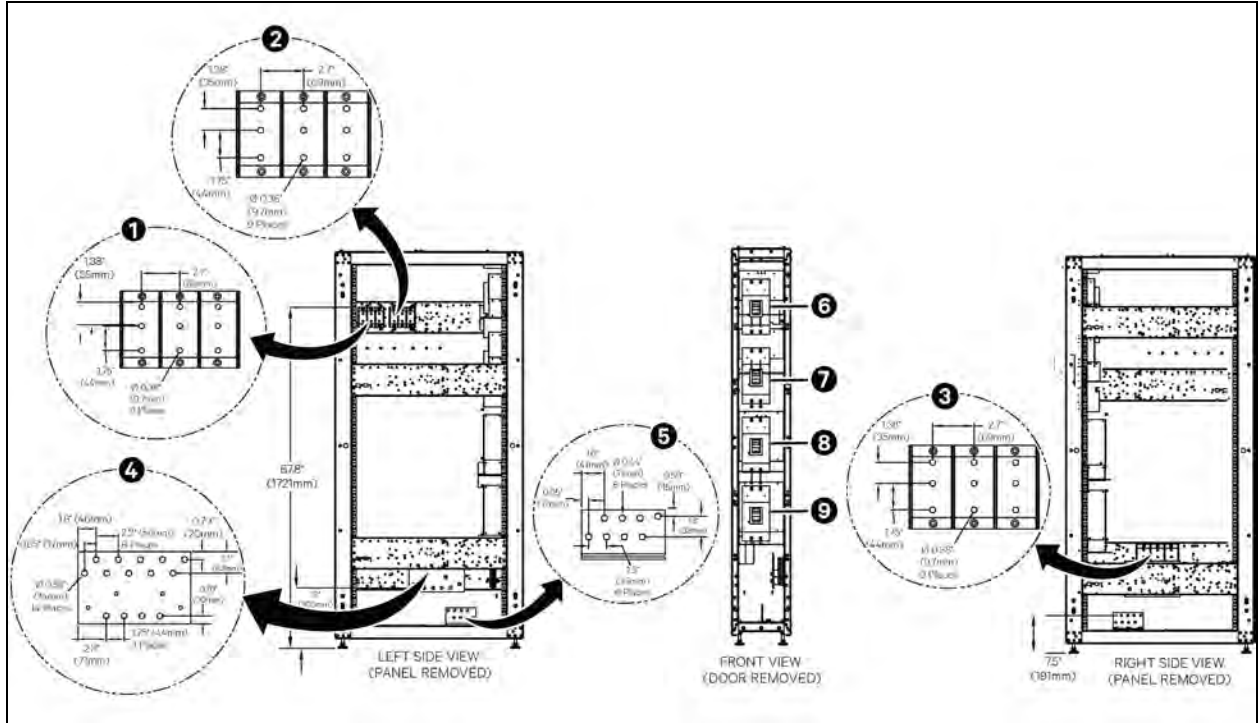
**The input and the bypass must share the same single source.**

**A neutral is required from the system AC input source. A full capacity neutral conductor is recommended. The grounding conductors are recommended.**

**The bypass and the rectifier inputs and output cables must be run in the separate conduits.**

**The control wiring must be run in the separate conduits.**

Figure 3.3 Main Components—300 mm 1+1 Vertiv™ Liebert® EXM Parallel Cabinet



Item	Description	Item	Description
1	Terminal Block 2 (TB2)	6	Module Output Breaker 1 (MOB1)
2	Terminal Block 3 (TB3)	7	Module Output Breaker (MOB2)
3	Terminal Block 5 (TB5)	8	Maintenance Isolation Breaker (MIB)
4	Neutral Busbar	9	Maintenance Bypass Breaker (MBB)
5	Ground Busbar		

**NOTE:**

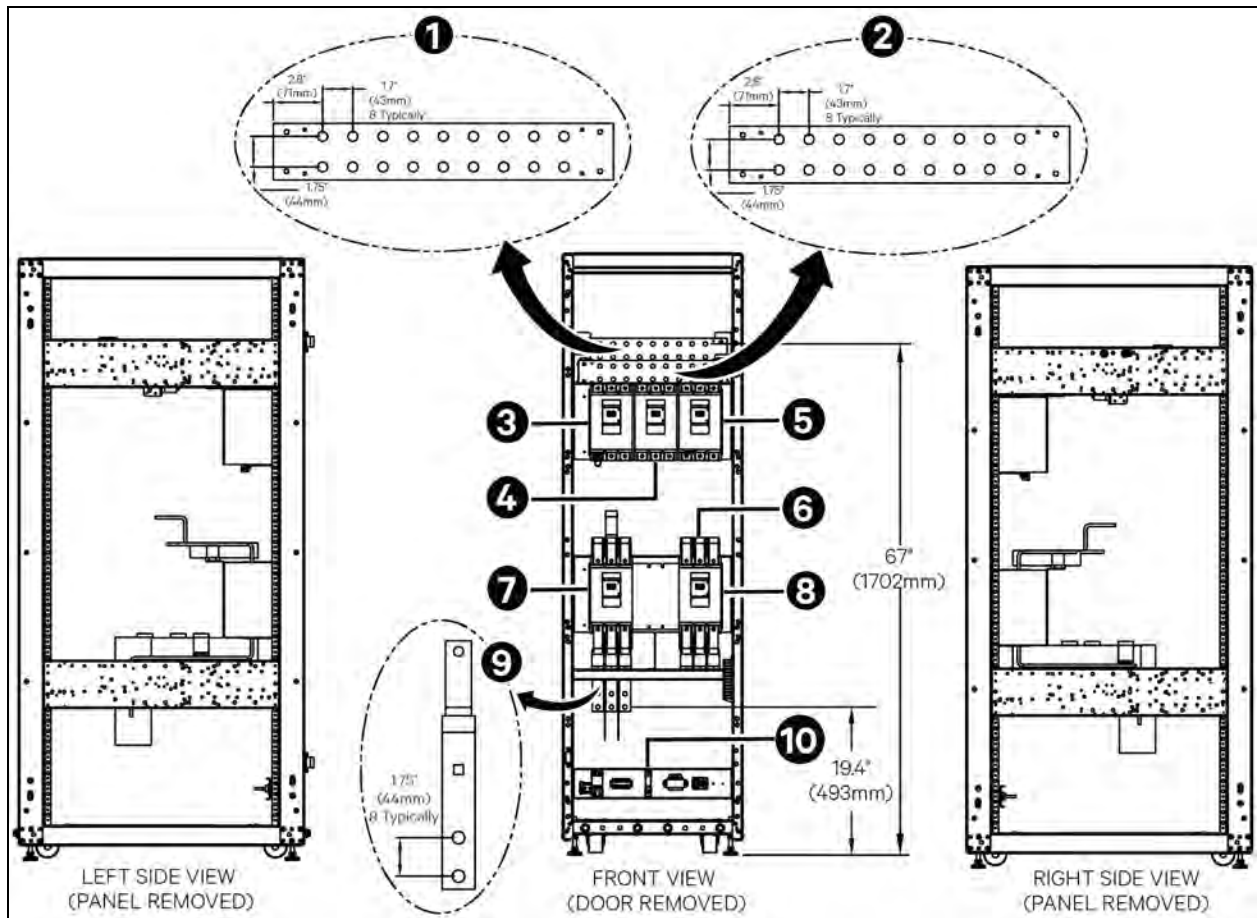
All dimensions are in inches (mm).

The control wiring and the power wiring must be run in the separate conduits.

All the wiring is to be in accordance with the national and the local electrical codes.

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

Figure 3.4 Main Components—600 mm 2+1 Vertiv™ Liebert® EXM Parallel Cabinet



Item	Description	Item	Description
1	Ground Busbar	6	Input Busbars
2	Neutral Busbar	7	Maintenance Bypass Breaker (MBB)
3	Module Output Breaker 1 (MOB1)	8	Maintenance Isolation Breaker (MIB)
4	Module Output Breaker 2 (MOB)	9	Output Busbars
5	Module Output Breaker 3 (MOB3)	10	Terminal Block 1 (TB1)

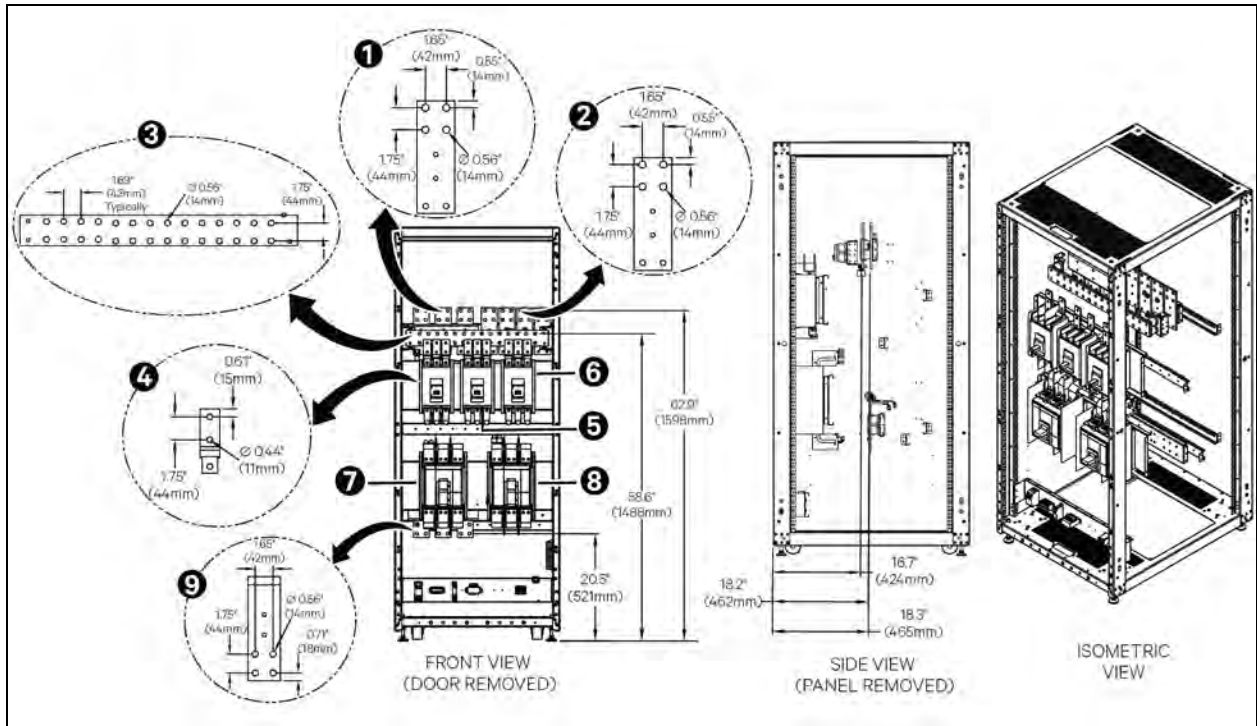
**NOTE:**

The control wiring and the power wiring must be run in the separate conduits.

All the wiring is to be in accordance with the national and the local electrical codes.

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

Figure 3.5 Main Components—800 mm 2+1 Vertiv™ Liebert® EXM Parallel Cabinet



Item	Description	Item	Description
1	Main Input Busbar	6	Module Output Breaker 3 (MOB3)
2	Bypass Input Busbar	7	Maintenance Isolation Breaker (MIB)
3	Neutral Busbar	8	Maintenance Bypass Breaker (MBB)
4	Module Output Breaker 1 (MOB1)	9	Ground Busbar
5	Module Output Breaker 2 (MOB2)		

**NOTE:**

All the dimensions are in inches(mm).

The control wiring and the power wiring must be run in the separate conduits.

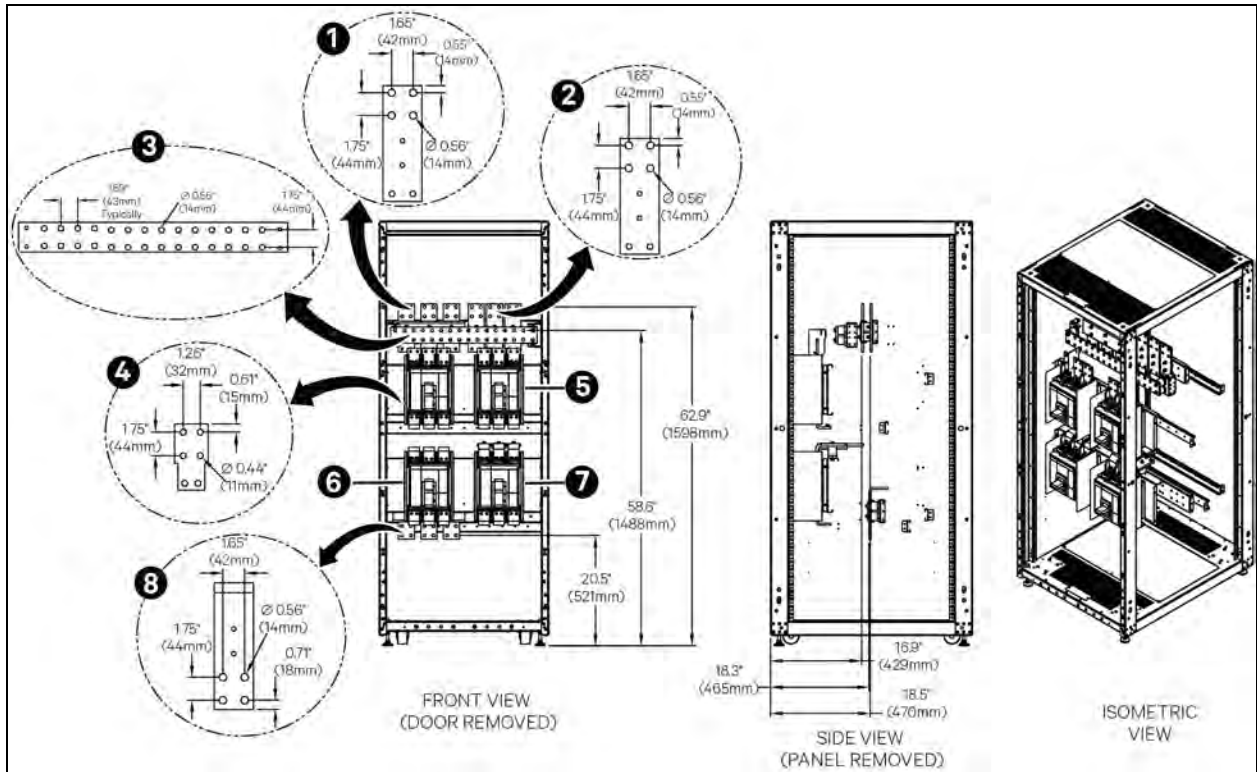
All the wiring is to be in accordance with the national and the local electrical codes.

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

2+1 available only from 120 kVA to 160 kVA.



Figure 3.6 Main Components—800 mm 1+1 and 2+0 Vertiv™ Liebert® EXM Parallel Cabinet



Item	Description	Item	Description
1	Main Input Busbar	5	Module Output Breaker 2 (MOB2)
2	Bypass Input Busbar	6	Maintenance Isolation Breaker (MIB)
3	Neutral Busbar	7	Maintenance Bypass Breaker (MBB)
4	Module Output Breaker 1 (MOB1)	8	Ground Busbar

**NOTE:**

All the dimensions are in inches (mm).

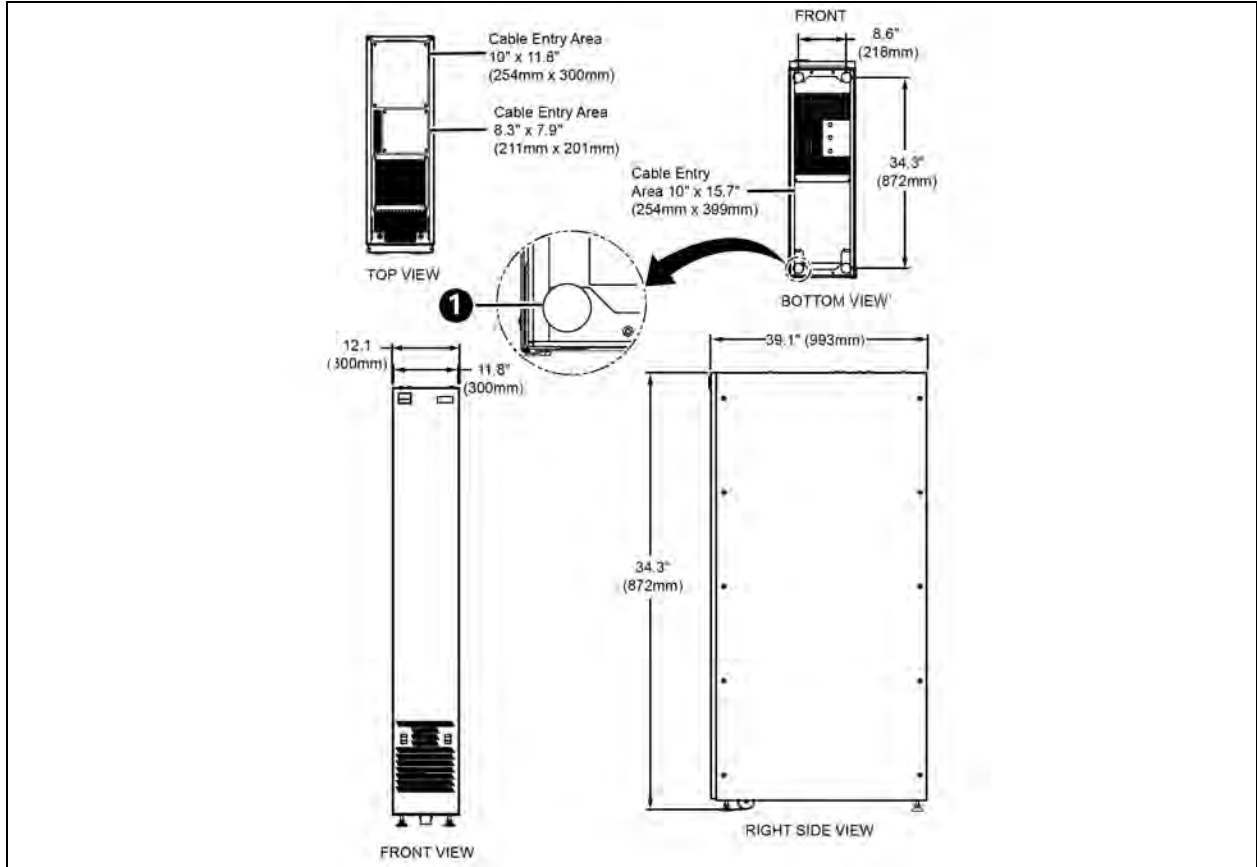
The control wiring and the power wiring must be run in the separate conduits.

All wiring is to be in accordance with the national and the local electrical codes.

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

1+1 available from 120 kVA to 200 kVA, 2+0 available from 120 kVA to 160 kVA.

Figure 3.7 Outline Drawing—300 mm Vertiv™ Liebert® EXM Parallel Cabinet



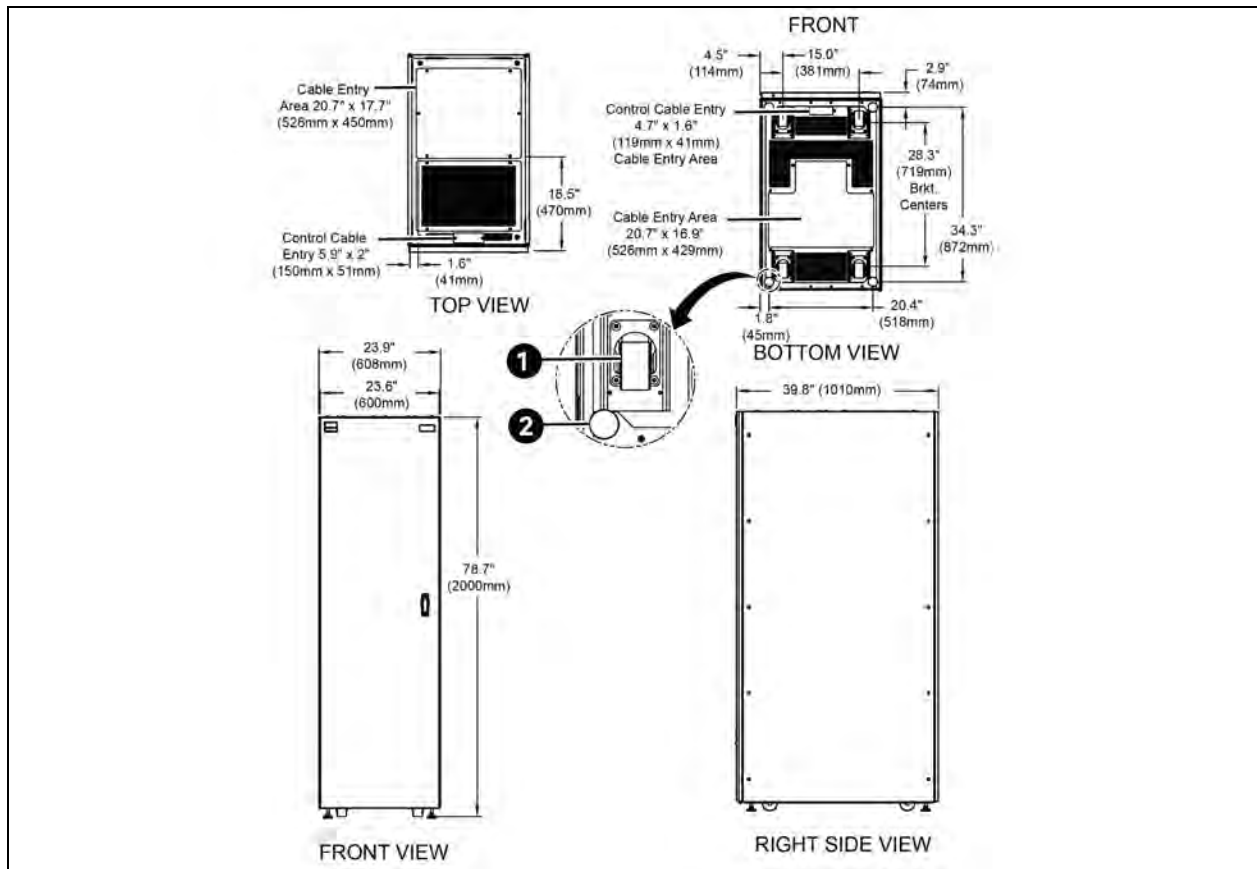
Item	Description
1	Leveler

**NOTE:**

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



Figure 3.8 Outline Drawing—600 mm Vertiv™ Liebert® EXM Parallel Cabinet



Item	Description
1	Caster
2	Leveler

**NOTE:**

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

Keep the cabinet within 15 degrees of vertical.

The top and the bottom cable entry are available through removable access plates. Remove, punch to suit the conduit size and replace.

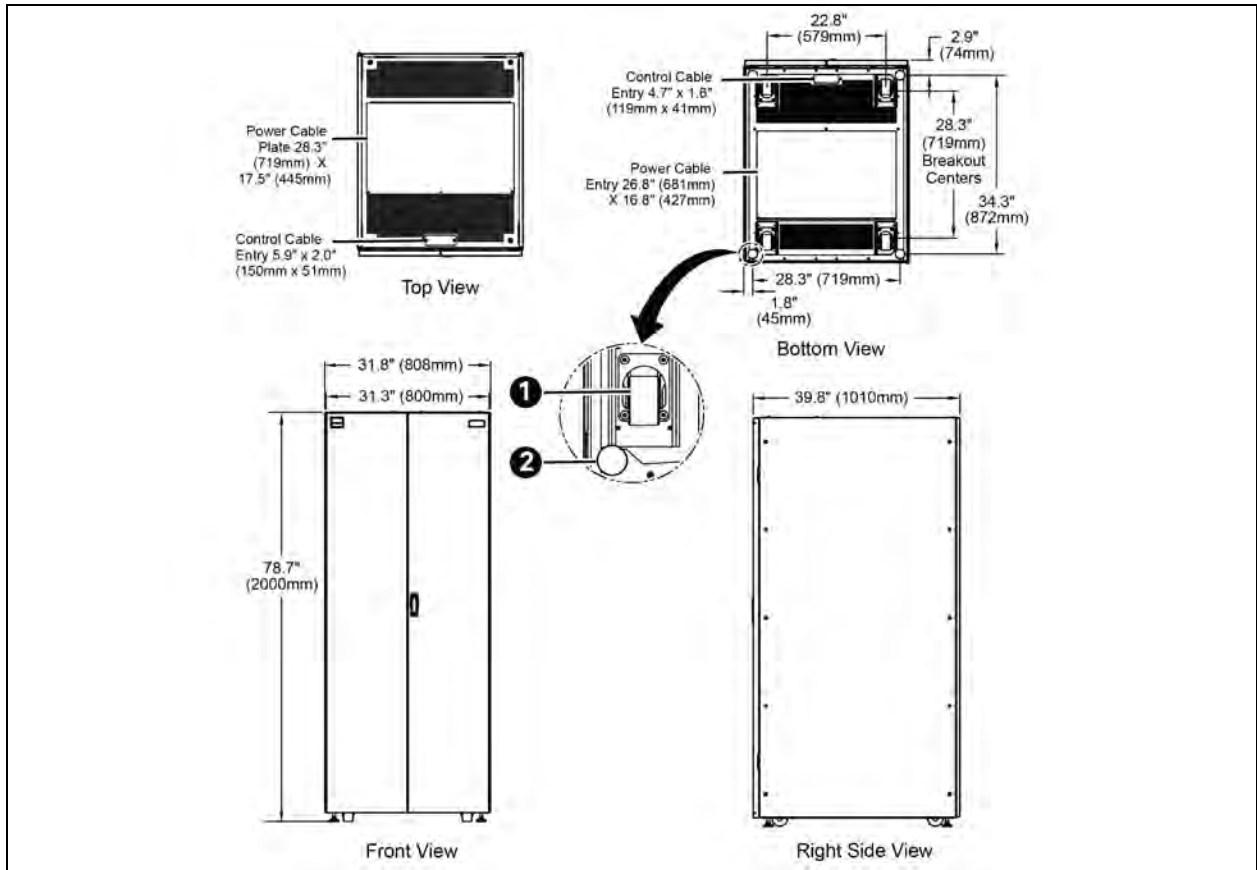
Unit bottom is structurally adequate for forklift handling.

The control wiring and the power wiring must be run in the separate conduits.

Only the copper cables are recommended.

All the wiring is to be in accordance with the national and the local electrical codes.

Figure 3.9 Outline Drawing—800 mm Vertiv™ Liebert® EXM Parallel Cabinet



Item	Description
1	Caster
2	Leveler

**NOTE:**

- All dimensions are in inches (mm).
- 24 in. (610 mm) minimum clearance above the unit for air exhaust and 36 in. (914 mm) front access required for service.
- Keep the cabinet within 15 degrees pf vertical.
- The top and the bottom cable entry is available through removable access plates. Remove, punch to suit the conduit size and replace.
- Unit bottom is structurally adequate for forklift handling.
- The control wiring and the power wiring must be run in the separate conduits.
- All the wiring is to be done in accordance with the national and the local electrical codes.

Figure 3.10 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 1+1 and 2+0 Paralleling

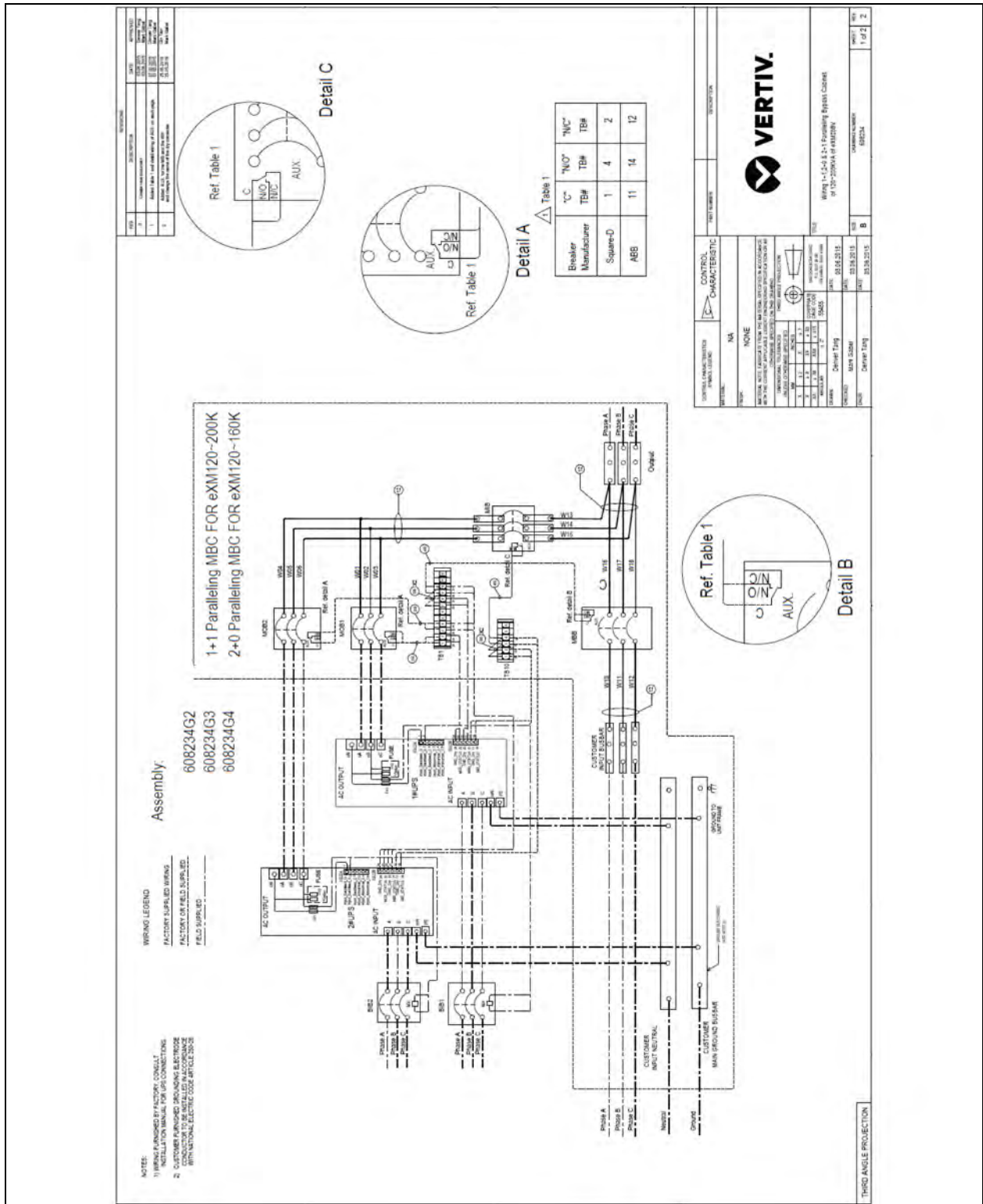


Figure 3.11 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 2+1 Paralleling

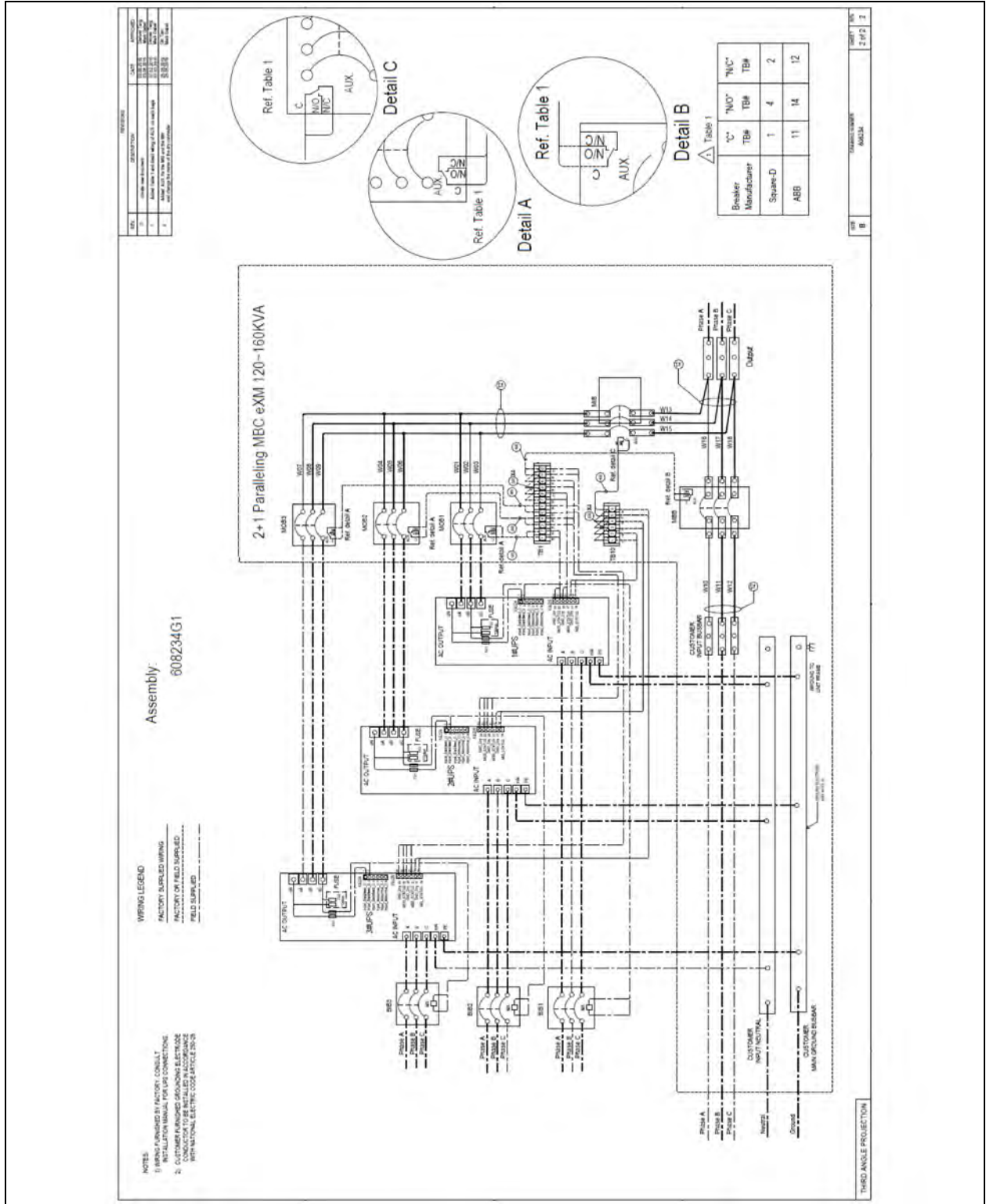


Figure 3.12 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 2+0 and 1+1 Paralleling with SKRU

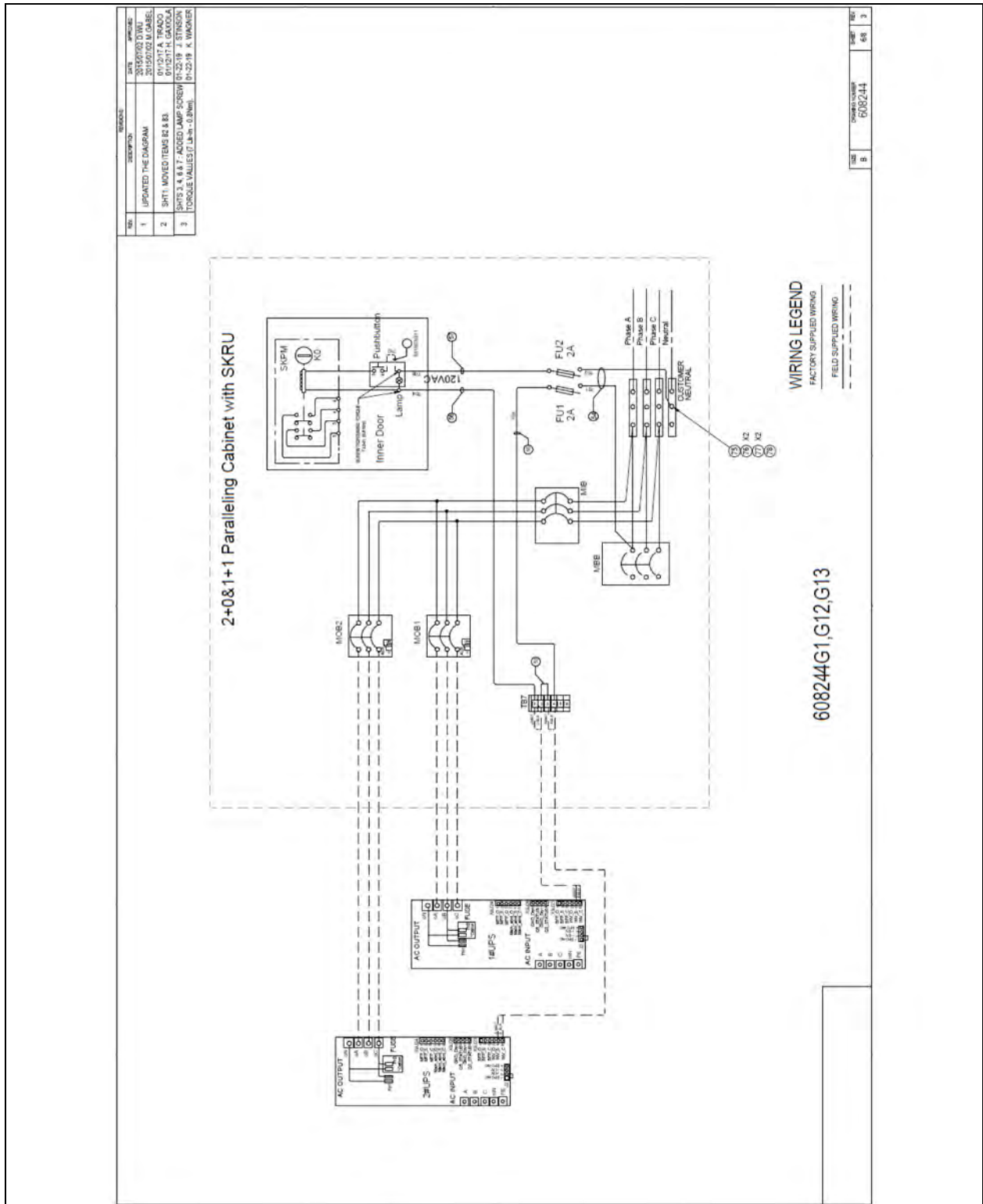


Figure 3.13 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 2+1 Paralleling with SKRU

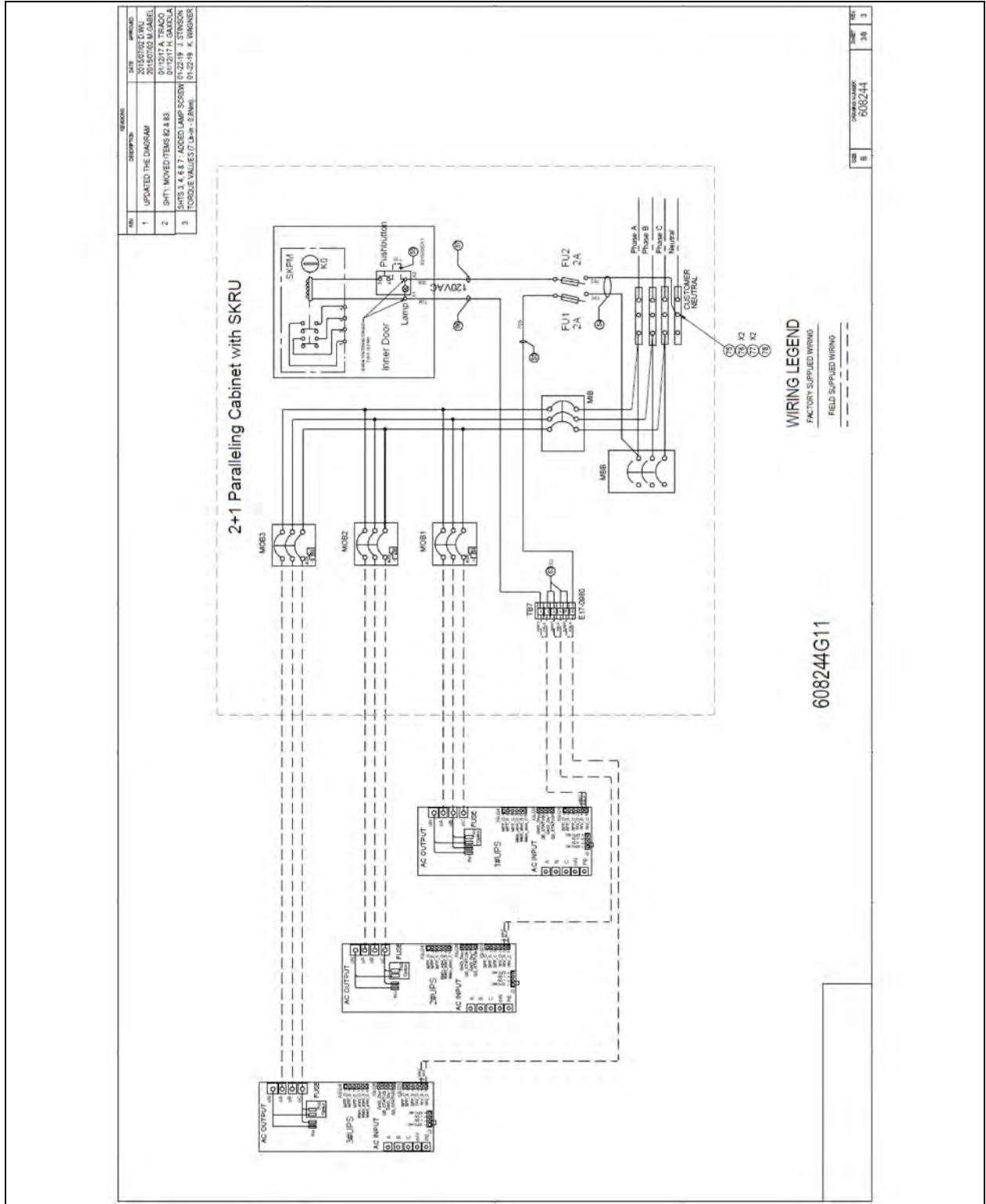




Figure 3.14 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 2+1 with REPO

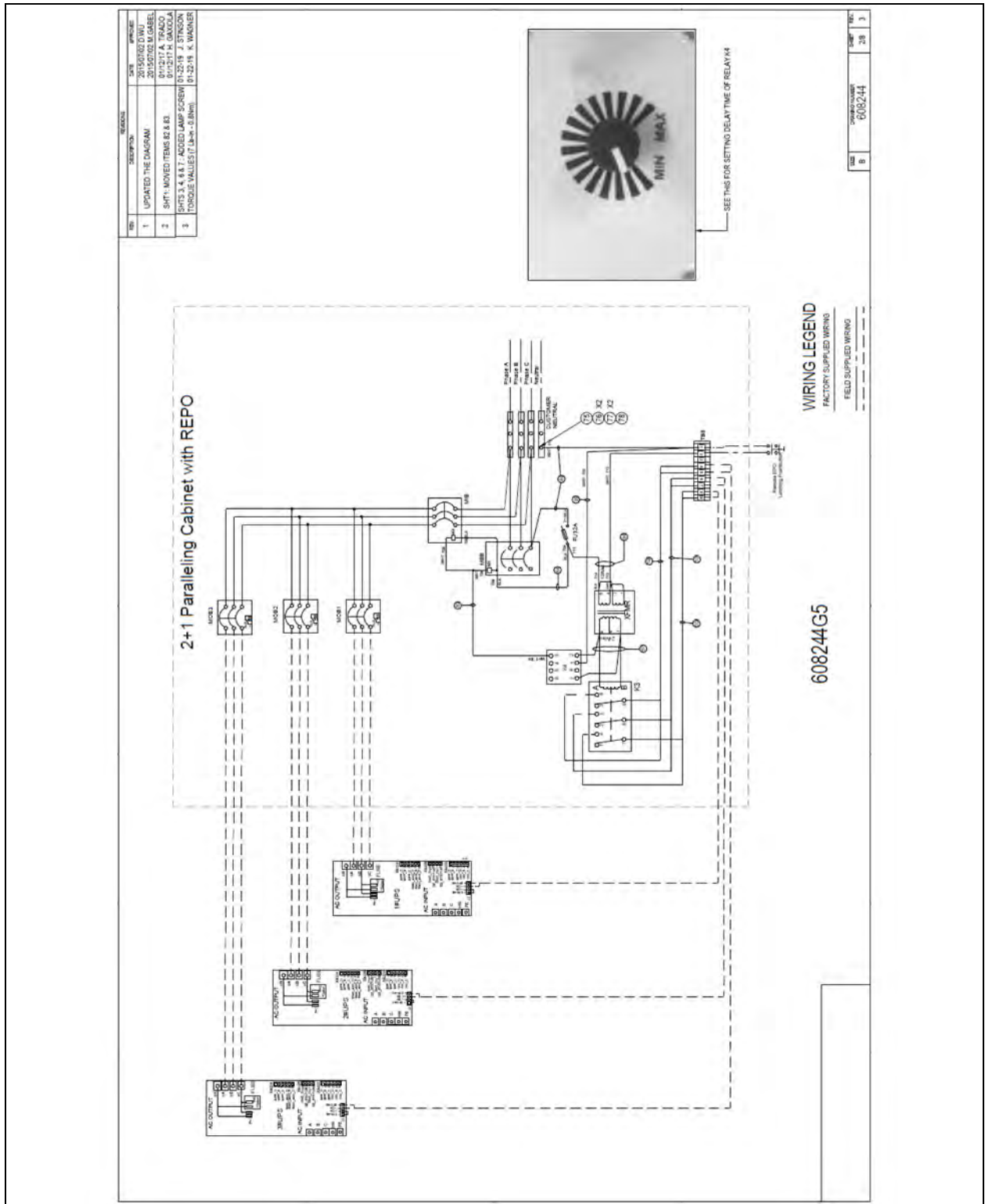


Figure 3.15 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 2+0 and 1+1 with REPO

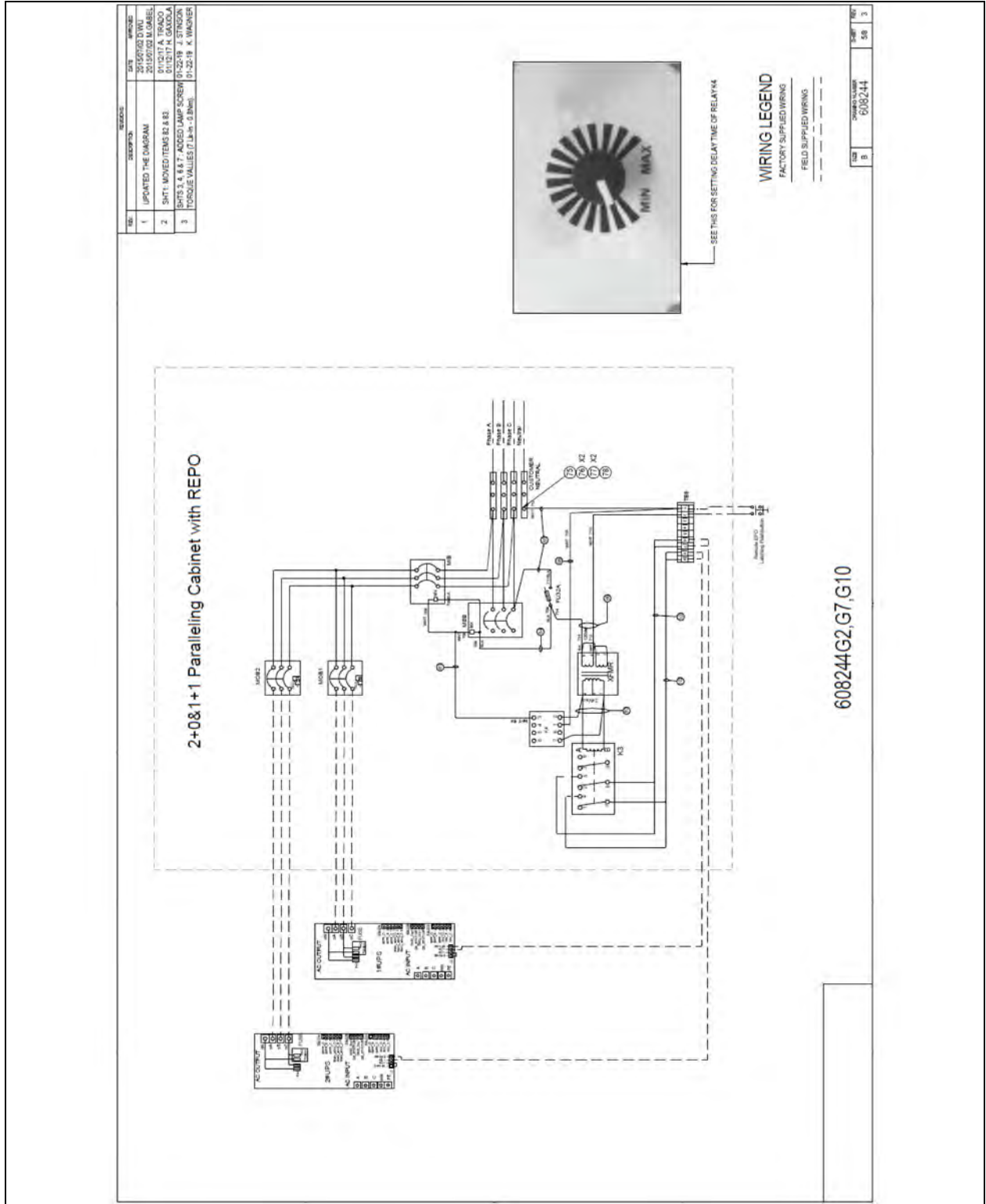




Figure 3.16 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 1+1 and 2+0 Paralleling with REPO and SKRU

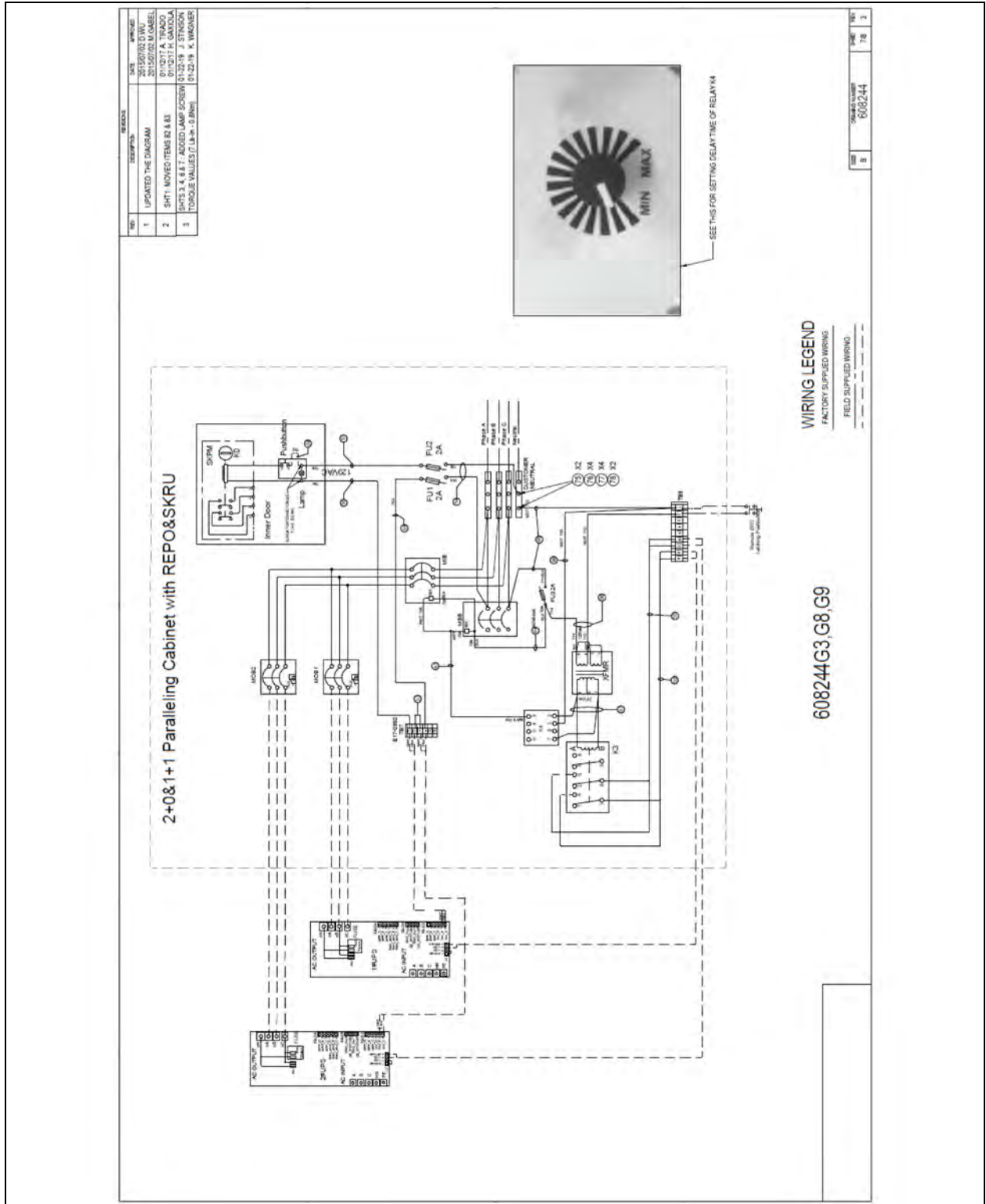
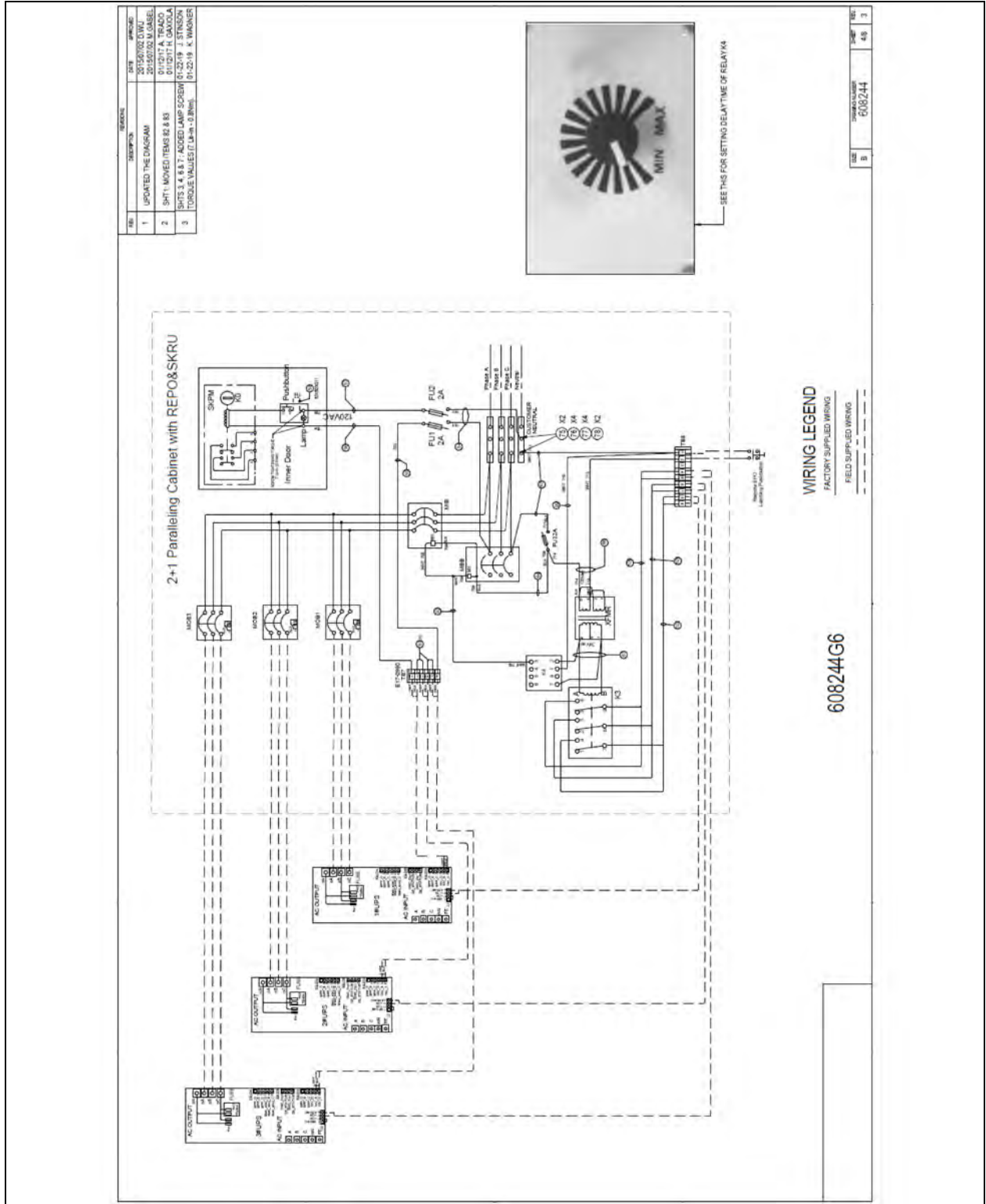


Figure 3.17 Control Wiring Diagram of Vertiv™ Liebert® EXM Parallel Cabinet, 2+1 Paralleling with REPO and SKRU



## 4 Specifications

**Table 4.1 Vertiv™ Liebert® EXM Parallel Cabinet Specifications**

Model Size	10 kVA to 40 kVA	60 kVA to 100 kVA	120 kVA to 200 kVA
Cabinet Width	300 mm	600 mm	800 mm
<b>Input Parameters</b>			
Input Voltage to Bypass, VAC	208 V or 120 V or 220 V or 127 V, 3-Phase, 4-Wire		
Input Current	Refer to the <b>UPS User Manual (SL-25648, SL-25650, or SL-26100)</b>		
Input Frequency	60		
<b>Output Parameters</b>			
Output Power, kW	10 to 40	60 to 100	120 to 200
Output Voltage, VAC	208 V or 120 V or 220 V or 127 V, 3-Phase, 4-Wire		
Output Current, AAC	Refer to <b>Table 4.2</b> on the next page and <b>Table 4.3</b> on the next page		
Output Frequency	60		
<b>Physical Parameters and Standards</b>			
Dimensions, in. (mm)			
Cabinet Width, side panels attached	11.81 (300)	23.62 (600)	31.49 (800)
Depth, in. (mm)	39.4 (1000)		
Height, in. (mm)	78.74 (2000)		
Weight, lb. (kg)			
1+1 and 2+0	263 (119.3)	—	—
1+1 and 2+0	—	594 (269.4)	—
2+1	—	594 (269.4)	—
1+1 and 2+0	—	—	686 (311.2)
2+1	—	—	714 (323.8)
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)		

**Table 4.1 Vertiv™ Liebert® EXM Parallel Cabinet Specifications**

Model Size	10 kVA to 40 kVA	60 kVA to 100 kVA	120 kVA to 200 kVA
Operating Temperature, °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 UPS manual (SL-25648, SL-25650, or SL-26100).		

## 4.1 Electrical Characteristics

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

**Table 4.2 Liebert® EXM Parallel Cabinet Output Currents, 1+1 Configuration**

1+1 Configuration						
System Rating	Nominal Output Current	OCP Device Rating	Bolt Size	75 °C Current Total	Copper Wire	Aluminum Wire
10	28	40	M10	50	(1) #6	(1) #2
15	42	60	M10	85	(1) #4	(1) #2
20	56	70	M10	115	(1) #2	(1) #2
30	83	110	M10	130	(1) 1/0	(1) 2/0
40	111	150	M10	175	(1) 3/0	(1) 4/0
60	167	225	M12	285	(1) 300	(2) 2/0
80	222	300	M12	400	(2) 3/0	(2) 4/0
100	278	350	M12	460	(2) 4/0	(2) 300 kcmil
120	333	450	M12	620	(2) 350 kcmil	(2) 500 kcmil
140	389	500	M12	620	(2) 350 kcmil	(2) 500 kcmil
160	444	600	M12	760	(2) 500 kcmil	—
180	500	700	M12	930	(3) 350 kcmil	(3) 500 kcmil
200	555	700	M12	930	(3) 350 kcmil	(3) 500 kcmil

**Table 4.3 Liebert® EXM Parallel Cabinet Output Currents, 2+0 and 2+1 Configurations**

2+0 and 2+1 Configuration							
UPS Size in Parallel	System Rating	Nominal Output Current	OCP Device Rating	Bolt Size	75 °C Current Total	Copper Wire	Aluminum Wire
10	20	56	70	M10	115	(1) #2	(1) #2
15	30	83	110	M10	130	(1) 1/0	(1) 2/0
20	40	111	150	M10	175	(1) 3/0	(1) 4/0
30	60	167	225	M10	400	(2) 3/0	(2) 4/0

**Table 4.3 Liebert® EXM Parallel Cabinet Output Currents, 2+0 and 2+1 Configurations**

2+0 and 2+1 Configuration							
UPS Size In Parallel	System Rating	Nominal Output Current	OCP Device Rating	Bolt Size	75 °C Current Total	Copper Wire	Aluminum Wire
40	80	222	300	M10	460	(2) 4/0	(2) 300 kcmil
60	120	333	450	M12	501	(2) 300 kcmil	(2) 350 kcmil
80	160	444	600	M12	607	(3) 4/0	(3) 300 kcmil
100	200	555	700	M12	752	(3) 300 kcmil	(4) 250 kcmil
120	240	666	1000	M12	1003	(4) 300 kcmil	(4) 500 kcmil
140	280	778	1000	M12	1091	(4) 350 kcmil	(4) 500 kcmil
160	320	888	1200	M12	1337	(4) 500 kcmil	—

**NOTE:** For UPS input, bypass and output currents, see **UPS user manuals**.

**Table 4.4 Recommended Lug Sizes (Compression Type) M10, 3/8 in. Bolt**

Cable Size	T&B Copper One Hole	T&B Aluminum One Hole	T&B Copper Two Hole	T&B Aluminum Two Hole
#8AWG	54132	60104-TB	—	—
#6AWG	54136	60109	256-030695-868	—
#4AWG	54140	60114	256-030695-733	—
#2AWG	54143	60118	54811BE	—
#1AWG	54148	60124	54857BE	—
#1/0AWG	54109	60130	256-30695-593	—
#2/0AWG	54110	60136	54862BE	60238
#3/0AWG	54111	60142	54864BE	60244
#4/0AWG	54112	60148	54866BE	60250
250kcmil	54174	60154	54868BE	60256
300kcmil	54179	60160	54870BE	60262
350kcmil	256-30695-112	—	54872BE	60267
400kcmil	256-30695-1403	—	54874BE	60269
500kcmil	256-30695-339	—	54876BE	60273

## 4.2 Torque Requirements

All electrical connections must be tight. **Table 4.5** below and **Table 4.6** below provide the torque values for the connections to the Vertiv™ Liebert® EXM Parallel Cabinet. Use these values unless the equipment is labeled otherwise.

**Table 4.5 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 4.6 Terminal Block Torque with Compression Lugs for the 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 the circuit breaker power connections.

### Connect with Vertiv on Social Media



<https://www.facebook.com/vertiv/>



<https://www.instagram.com/vertiv/>



<https://www.linkedin.com/company/vertiv/>



<https://www.twitter.com/Vertiv/>



---

Vertiv.com | Vertiv Headquarters, 505 N Cleveland Ave, Westerville, OH 43082 USA

©2024 Vertiv Group Corp. All rights reserved. Vertiv™ and the Vertiv logo are trademarks or registered trademarks of Vertiv Group Corp. All other names and logos referred to are trade names, trademarks or registered trademarks of their respective owners. While every precaution has been taken to ensure accuracy and completeness here, Vertiv Group Corp. assumes no responsibility, and disclaims all liability, for damages resulting from use of this information or for any errors or omissions.

SL-25654\_REV7\_06-24