



Liebert® EXMTXC

User Manual—10-100kVA, 60Hz

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation of the Vertiv™ Liebert® EXM TXC (dual transformer cabinet).

Read this manual thoroughly, paying special attention to the sections that apply to your installation, before working with the UPS. Retain this manual for use by installing personnel.


A properly trained and qualified electrical contractor should oversee the installation of the equipment.

The Liebert EXM TXC cannot be put into operation until it is commissioned by the manufacturer or authorized engineer. Otherwise, human safety may be endangered and damage to the UPS will not be covered by the warranty.

The Liebert EXM TXC is designed for commercial and industrial uses and cannot be used as life support equipment.

WARNING

Risk of moving heavy equipment and electric shock. Can cause equipment damage, injury and death. Exercise extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel. The Liebert EXM TXC's weight ranges from 785 to 1969 lb. (356 to 893kg).

Determine the unit's weight and locate the center of gravity symbols before handling the Liebert EXM TXC.  Test lift and balance the cabinet before transporting it. Never tilt equipment more than 15 degrees from vertical.

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 UPS system contains high DC as well as AC voltages.

Check for voltage with both AC and DC voltmeters prior to making contact.

AVERTISSEMENT

Risque lors du déplacement de l'équipement lourd et de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort.

Faites preuve d'une extrême prudence lors de la manutention des armoires ASC afin d'éviter de les endommager ou de blesser le personnel. Les armoires Liebert EXM TXC pèsent de 785 à 1969 lb (de 356 à 893 kg).

Déterminez le poids de l'unité et trouvez les symboles de centre de gravité avant de déplacer l'armoire Liebert EXM TXC. Faites des essais de levage et d'équilibre avant de transporter l'armoire. N'inclinez jamais l'équipement à plus de 15 degrés à la verticale.

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 ASC 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 electric shock. Can cause equipment damage, injury and death.

As with other types of high power equipment, dangerous voltages are present within the UPS and battery enclosure even after input power has been disconnected. The risk of contact with these voltages is minimized as the live component parts are housed behind a metal panel. Further internal safety screens make the equipment protected to IP20 standards. Never remove panels or covers or open doors that will expose internal components to contact.

Read and follow all warnings, cautions and safety and operating instructions to avoid serious injury or death from electric shock. No risk exists to any personnel when operating the equipment in the normal manner, following the recommended operating procedures.

All equipment maintenance and servicing procedures involve internal access and should be carried out only by trained personnel.

AVERTISSEMENT

Risque de décharge électrique pouvant entraîner des dommages matériels, des blessures et même la mort.

À l'instar des autres types d'équipement haute puissance, des tensions dangereuses sont présentes à l'intérieur de l'armoire ASC et du châssis de batteries même après le débranchement de l'alimentation d'entrée. Le risque de contact avec ces tensions est diminué, car les parties de composants sous tension sont abritées derrière un panneau métallique. D'autres écrans de sécurité internes protègent l'équipement en conformité avec les normes IP20. Ne retirez jamais les panneaux ou les couvercles et n'ouvrez pas les portes donnant accès aux composants internes avec lesquels vous pouvez entrer en contact.

Veillez lire et suivre l'ensemble des avertissements, des mises en garde et des instructions de sécurité et de fonctionnement afin d'éviter des blessures graves, voire la mort, pouvant être causées par une décharge électrique. Il n'y a aucun risque pour le personnel lorsque l'équipement est utilisé normalement, en suivant les procédures de fonctionnement recommandées.

Toutes les procédures de réparation et d'entretien de l'équipement exigent un accès à l'intérieur de l'armoire et devraient être menées uniquement par du personnel compétent.

Ground Leakage Currents

WARNING

Risk of electric shock from high leakage current. Can cause injury, property damage and death.

EARTH CONNECTION IS ESSENTIAL BEFORE CONNECTING THE INPUT SUPPLY.

Earth leakage current exceeds 3.5 mA and is less than 1000 mA.

Transient and steady-state earth leakage currents, which may occur when starting the equipment, should be taken into account when selecting instantaneous RCCB or RCD devices.

Residual Current Circuit Breakers (RCCBs) must be selected sensitive to DC unidirectional pulses (Class A) and insensitive to transient current pulses.

Note also that the earth leakage currents of the load will be carried by this RCCB or RCD.

This equipment must be earthed in accordance with the local electrical code of practice.

AVERTISSEMENT

Risque de décharge électrique due à un courant de fuite élevé pouvant causer des blessures, des dommages matériels et même la mort.

IL EST PRIMORDIAL D'ASSURER UNE CONNEXION DE TERRE AVANT DE BRANCHER L'ALIMENTATION D'ENTRÉE. La fuite à la terre est supérieure à 3,5 mA et inférieure à 1 000 mA.

Vous devez tenir compte des fuites de courant transitoires et permanentes à la terre, susceptibles de se produire au démarrage de l'équipement, lors de la sélection des dispositifs DDFT instantanés.

Vous devez sélectionner des disjoncteurs différentiels de fuite à la terre (DDFT) sensibles aux impulsions unidirectionnelles c.c. (classe A) et insensibles aux impulsions de courant transitoires.

Notez également que les courants de fuite à la terre de la charge seront acheminés par ce dispositif DDFT.

Cet équipement doit être mis à la terre conformément au code national de l'électricité.

WARNING

Risk of electric shock. Can cause injury, property damage and death.

Under typical operation and with all UPS doors closed, only normal safety precautions are necessary. The area around the UPS 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 UPS system and the internal batteries (internal batteries accommodated by the 10-40kVA frame only). Observe all safety precautions in this manual before handling or installing the UPS system as well as during all maintenance procedures. Observe all battery safety precautions before working on or near the battery.

This equipment contains several 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 AC and DC voltmeters to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high electric charges may exist within the UPS.

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 qualified service personnel should perform maintenance on the UPS system. 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 (earth ground).

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 an accident should occur.

AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures, des dommages matériels et même la mort. Les précautions de sécurité habituelles suffisent lorsque le système ASC est en mode de fonctionnement normal et que toutes les portes sont fermées. La zone entourant le système ASC 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 du système ASC. Observez toutes les précautions de sécurité décrites dans le présent manuel avant de manipuler ou d'installer le système ASC, ainsi que pendant toutes les procédures d'entretien.

Cet équipement comporte plusieurs 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 des voltmètres c.a. et c.c. pour vérifier les tensions avant d'établir un contact ou d'utiliser des outils. Des tensions dangereusement élevées peuvent demeurer dans le système ASC 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 celui du Canada, ainsi qu'aux codes locaux en vigueur.

L'entretien du système ASC ne doit être confié qu'à des professionnels qualifiés.

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.

Ne travaillez jamais seul, même si toute l'alimentation d'entrée est coupée de l'équipement. Une seconde personne devrait toujours être présente pour porter assistance ou chercher de l'aide en cas d'accident.

NOTICE

Risk of improper ground connection. Can cause equipment damage.

Ground connection is essential before connecting the input supply. This equipment must be grounded in accordance with local electrical codes. Maximum load must not exceed that shown on the UPS rating label.

NOTICE

Risk of improper electromagnetic shielding. Can cause radio communication interference.

This unit complies with the limits for a Class A digital device, pursuant to Part 15 Subpart J of the FCC rules. These limits provide reasonable protection against harmful interference in a commercial environment. This unit generates, uses and radiates radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. This unit is not designed for use in a residential area. Operation of this unit in a residential area may cause harmful interference that the user is solely responsible for correcting.

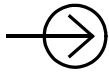
GLOSSARY OF SYMBOLS



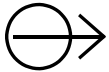
Risk of electrical shock



Indicates caution followed by important instructions



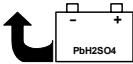
AC input



AC output



Requests the user to consult the manual



Indicates the unit contains a valve-regulated lead acid battery



Recycle



DC voltage



AC voltage



Equipment grounding conductor

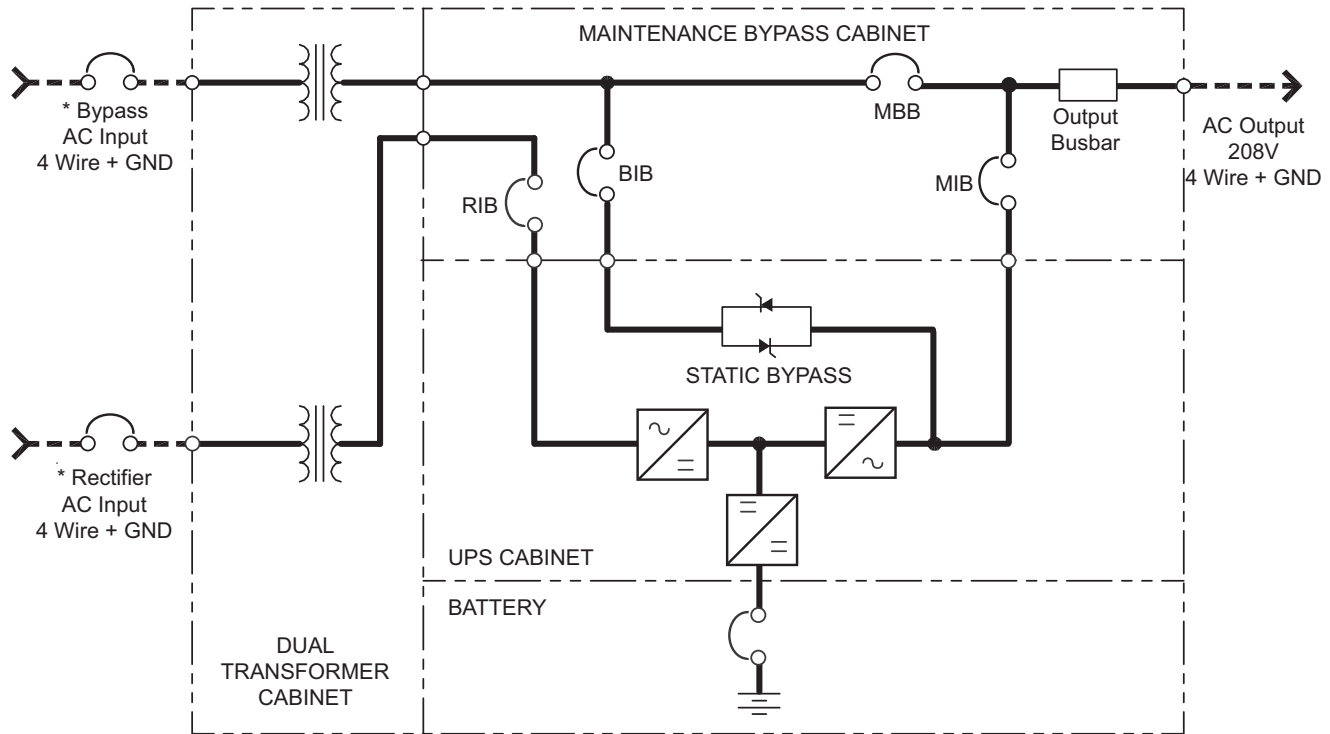


Bonded to ground

1.0 LIEBERT® EXM TXC

The Liebert EXM TXC offers 10-100kVA capacity to match the associated Liebert EXM frame offerings. Each of the Liebert EXM TXC capacities offer optional input 208V, 220V, 480V and 600V internal transformers in a dual input configuration.

Figure 1 Single input UPS with external Liebert EXM TXC with optional dual transformer cabinet—Typical configuration



NOTES

1. Install in accordance with national and local electrical codes.
2. A neutral is required from the system AC input source. Vertiv recommends a full capacity neutral conductor and grounding conductors.
3. Bypass and rectifier input and output cables must be run in separate conduits.
4. Control wiring must be run in separate conduits.

- 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. 0

1.1 LOCATING THE CABINET

This Liebert EXM TXC may be mounted to the right of the UPS. Ensure that the unit is in a well-ventilated area and that there is clearance for access to the switches and cable connections as required by national and local codes.

1.2 CABLE INSTALLATION

1.2.1 Wiring Preparation

Be sure that the unit is not connected to any AC utility power source or UPS before installing any wiring to this unit. This Liebert EXM TXC should be installed by a qualified / certified electrician.

WARNING

Risk of electrical shock and arc flash. Can cause property damage, injury and death.

Read this section thoroughly before attempting to install wiring to this unit. Read and comply with all warnings and cautions in this manual.

Removing the Cover Plates

Plates cover the input and output terminals on the front of the Liebert® EXM TXC (see **Figure 7**). Remove these and keep the screws and plates for reinstallation.

1.2.2 Power Cable Installation

Refer to **3.0 - Specifications** when selecting cables. Refer to the electrical tables listed in the back of this manual.



NOTE

Transient and steady state earth leakage currents may occur when starting the equipment. This should be taken into account when selecting ground current detection devices because these will carry the earth leakage currents of both the UPS equipment and the load.

1.2.3 Input/Output Wiring

Follow the steps below to connect the input wiring:



NOTE

Input wiring must be installed using conduit if cabinet is not mounted to the immediate right of the UPS.

1. Locate the input wiring access (top or bottom access), remove the conduit landing plate and punch the appropriate size hole for the size conduit being used. Pull the three/four input wires through the hole, allowing some slack for installation. For cabinets that are located to the immediate left of the UPS, the access plate is on the lower right of the cabinet. Remove the access plate and verify that the edge guarding is installed and intact.
2. Secure the conduit to the access plate of the Liebert EXM TXC.
3. Input power cables connect to the TXC at TB1 and TB2; refer to **Figure 6, Tables 1 and 2**.
4. Connect the ground cable from sources #1 and #2 to the TXC ground busbar and tighten them to 192 lb-in (22Nm) for M10 bolt.
5. Connect the neutral cable from sources #1 and #2 to the TXC neutral busbar and tighten them to 192 lb-in (22Nm) for M10 bolt.



NOTE

If the Liebert EXM TXC is not to be bolted to the UPS, use either top or bottom access plate.

6. Connect the source #1 cables to TB1 (A-B-C) and tighten the connections to 192 lb-in (22Nm) for M10 bolt.
7. Connect the source #2 cables to TB2 (A-B-C) and tighten the connections to 192 lb-in (22Nm) for M10 bolt.
8. Connect the GEC from the Liebert EXM TXC to the customer GEC and tighten the connections to 192 lb-in (22Nm) for M10 bolt.
9. Connect the neutral cable between the Liebert EXM TXC and UPS and tighten the connections to 192 lb-in (22Nm) for M10 bolt. 11.
10. Connect the ground cable between the Liebert EXM TXC and UPS and tighten the connections to 192 lb-in (22Nm) for M10 bolt.

NOTICE

Risk of improper wiring connection. Can cause equipment damage.

The control wire must be installed to ensure proper operation of the system and fully protect the load when switching between bypass cabinet and UPS.

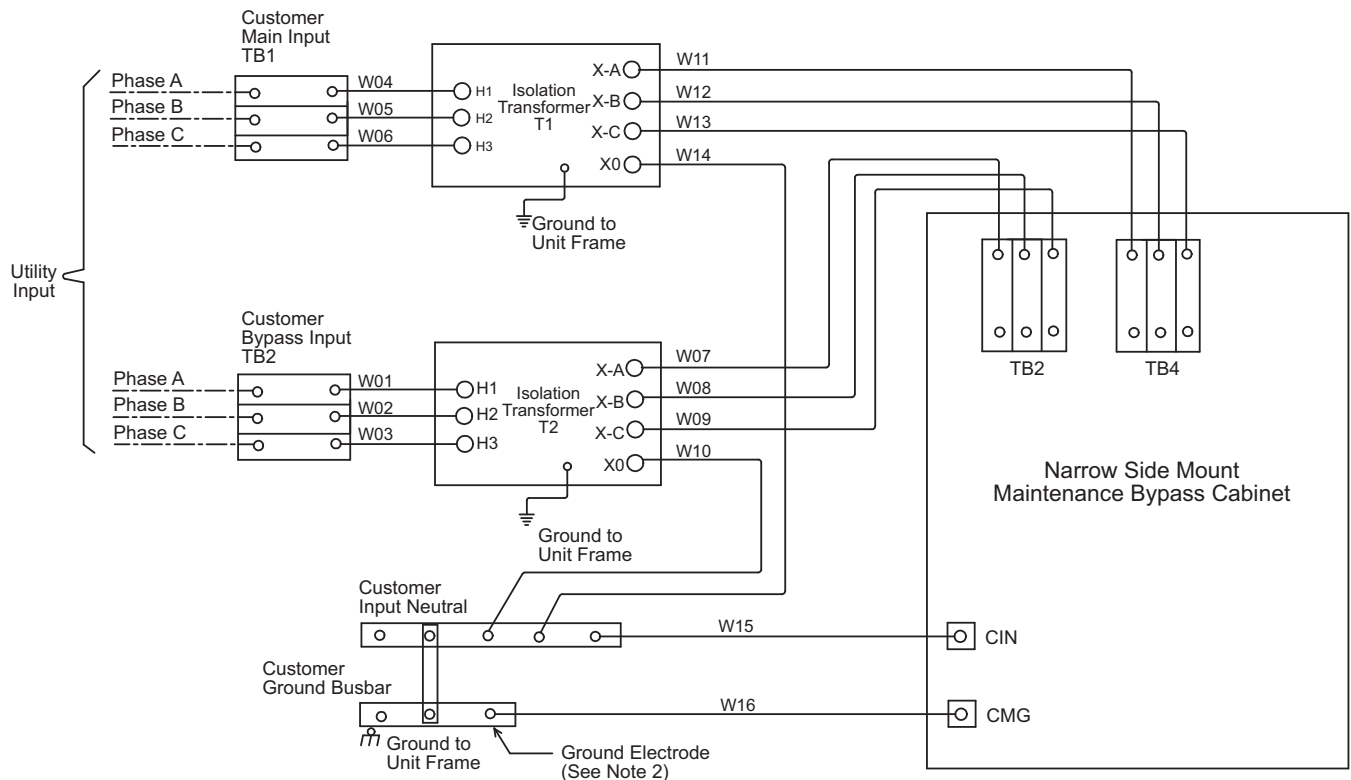
NOTES

1. All interconnection hardware supplied by Vertiv™.
2. AC connections must be made to the UPS module before attaching Liebert EXM TXC to UPS module.
3. Liebert EXM TXC's must attach to the right side only of the Liebert EXM UPS.
4. Refer to the individual drawing of each piece of equipment for additional details.

Table 1 Wiring for Liebert® EXM TXC to Liebert EXM

Run	From	To	Conductors
A	Utility Source #1	TXC Rectifier Input TB1	Phase A, B, C
B	Utility Neutral #1	TXC Neutral Busbar	Neutral
C	Utility Ground #1	TXC Ground Busbar	Ground
D	Utility Source #2	TXC Bypass Input TB2	Phase A, B, C
E	Utility Neutral #2	TXC Neutral Busbar	Neutral
C	Utility Ground #2	TXC Ground Busbar	Ground
H	TXC GEC	Customer GEC	GEC

Figure 2 Schematic - Liebert EXM TXC to Maintenance Bypass Cabinet



Wiring Legend

- Factory Supplied
- - - - - Field Supplied

NOTES:

1. Wiring furnished by the factory. Consult the installation manual for UPS connections
2. Customer-furnished grounding electrode conductor is to be installed in accordance with National Electric Code Article 250-26.
3. Refer to Liebert EXM MBC manual SL-25652 for additional details about connections to Liebert EXM UPS.

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1.3 BOLTING CABINETS TOGETHER

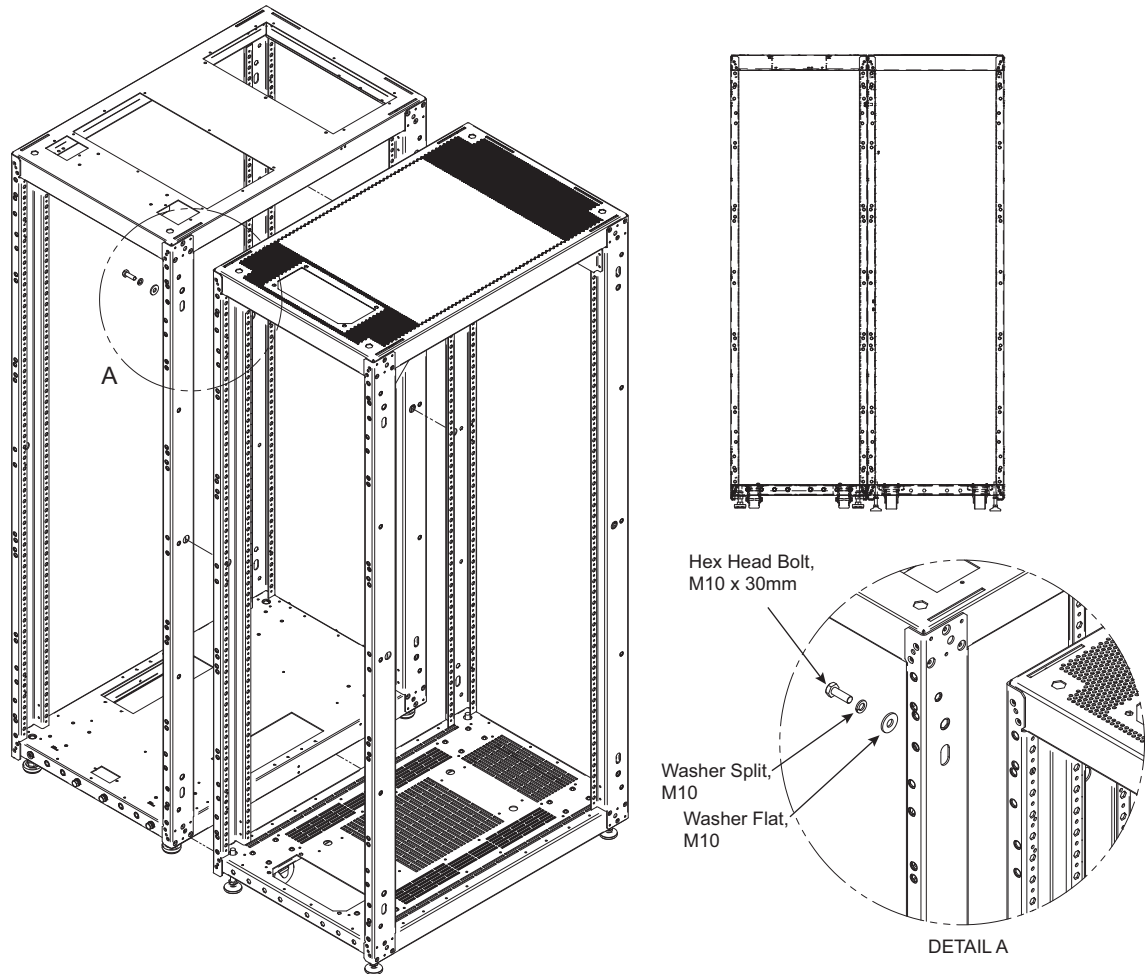


NOTE

UPS wiring must be completed before the cabinets are bolted together.

1. Line up cabinets so that mounting holes are aligned.

Figure 3 Bolting Liebert® EXM UPS to a Liebert EXM TXC



Place cabinets so mounting holes are aligned.

A bolt from the adjacent cabinet may be screwed into the threaded top hole, or a bolt may be inserted through the lower hole and screwed into the threaded hole in the adjacent cabinet.

2. Using supplied hardware, bolt the cabinets together. The bolts may be inserted from either the UPS side or from the Liebert EXM TXC side, whichever is more convenient.



WARNING

Risk of heavy units tipping over while being moved. Can cause property damage, injury and death. The Liebert EXM TXC and battery cabinets must be properly prepared and secured for lifting. Improper lifting may cause the cabinets to fall, causing equipment damage, personal injury and death. Vertiv™ recommends lifting the units by placing suitable straps on the Liebert® EXM TXC. The straps must go under the unit to be lifted.

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.

Les armoires Liebert® EXM TXC et de batterie doivent être correctement préparées et sécurisées avant d'être levées. Un mauvais levage peut faire tomber les armoires, causant des dommages à l'équipement, des blessures, voire la mort.

Vertiv™ recommande de soulever les unités en suivant l'une des méthodes suivantes :

- En installant quatre anneaux de levage dans les ouvertures fabriquées en usine, avec un anneau dans chaque coin de l'appareil, pour ensuite fixer les câbles ou sangles aux anneaux afin d'effectuer le levage à l'aide d'un mécanisme approprié.
- En plaçant des sangles convenables sur l'armoire Liebert ou de batterie. Les sangles doivent passer sous l'unité à soulever.

1.3.1 Floor Installation

If the Liebert EXM TXC is to be placed on a raised floor, the UPS should be mounted on a pedestal that will support the equipment point loading. Refer to the Liebert EXM UPS manual, SL-25648 or SL-25650, to design this pedestal.

1.3.2 Cable Entry

Cables can enter the Liebert EXM TXC from the top or bottom through removable metal plates.

Some plates have factory-punched holes and others are designed to allow the personnel to punch holes for fitting and securing the conduit. Once the conduit holes are punched, these plates should be reattached to the UPS. The conduit size and wiring method must be in accordance with all local, regional and national codes and regulations, including NEC ANSI/NFPA 70.



NOTE

When installing the UPS, the customer must provide a disconnect with overcurrent protection at the output of the UPS.

1.3.3 Optional Cabinets

The Liebert EXM TXC must be bolted to right side of the Liebert EXM (see **Figure 4**).

The Liebert EXM TXC must be cabled and bolted to the Liebert EXM before the UPS and bypass distribution cabinet are moved into their final position. Connect input wiring to the Liebert EXM TXC ONLY after the units are internally cabled and positioned.

Battery cabinets may be bolted only to the left side of the Liebert EXM; see **Figure 4**.

Figure 4 Cabinet arrangement

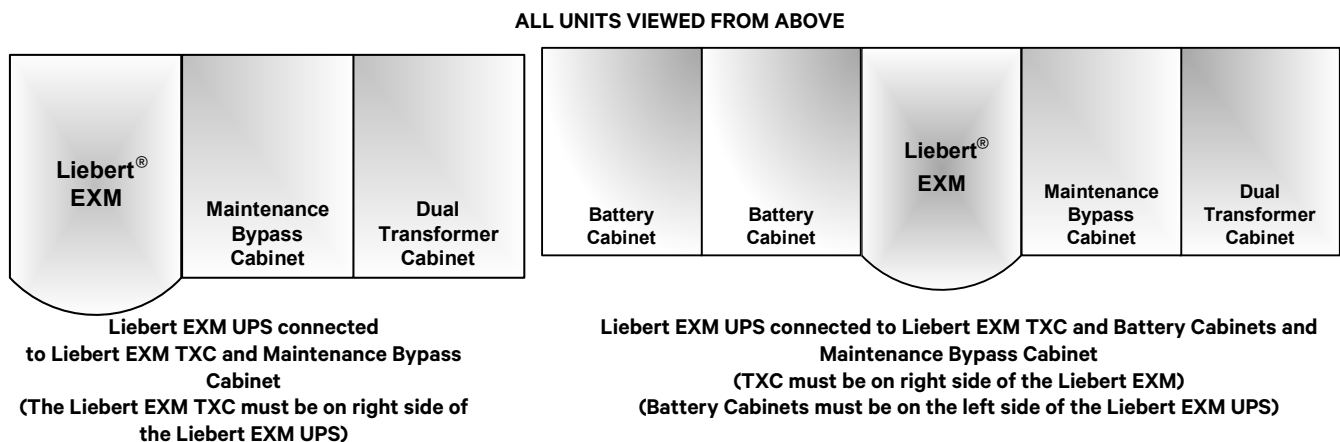
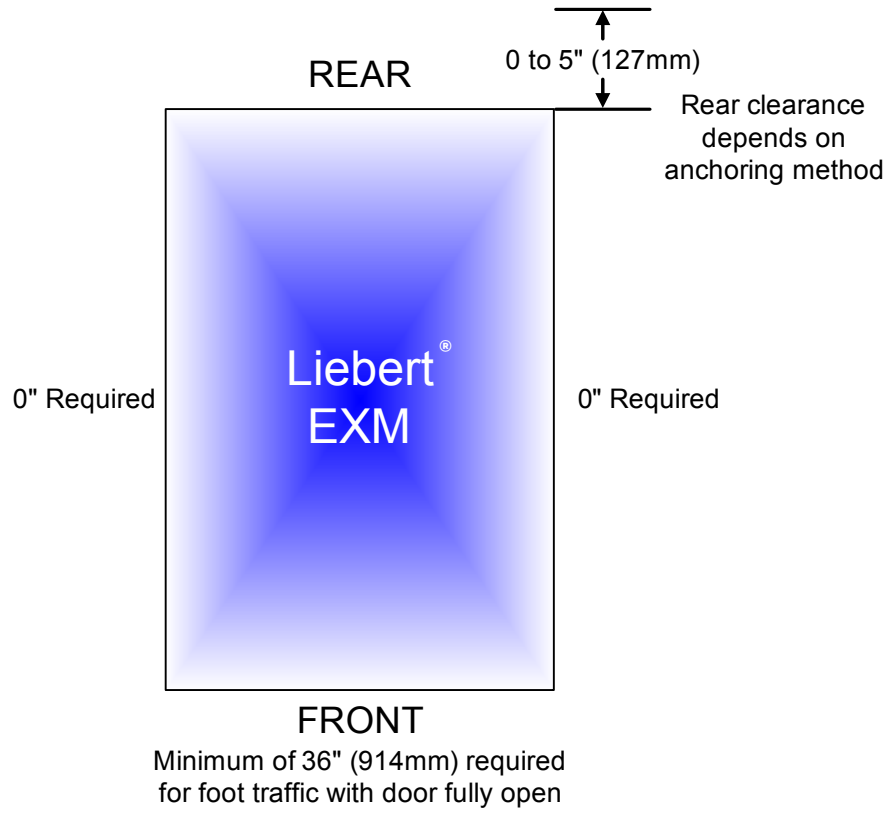


Figure 5 Clearances—Front, side and rear



2.0 INSTALLATION DRAWINGS

Figure 6 Liebert® EXM TXC Main components

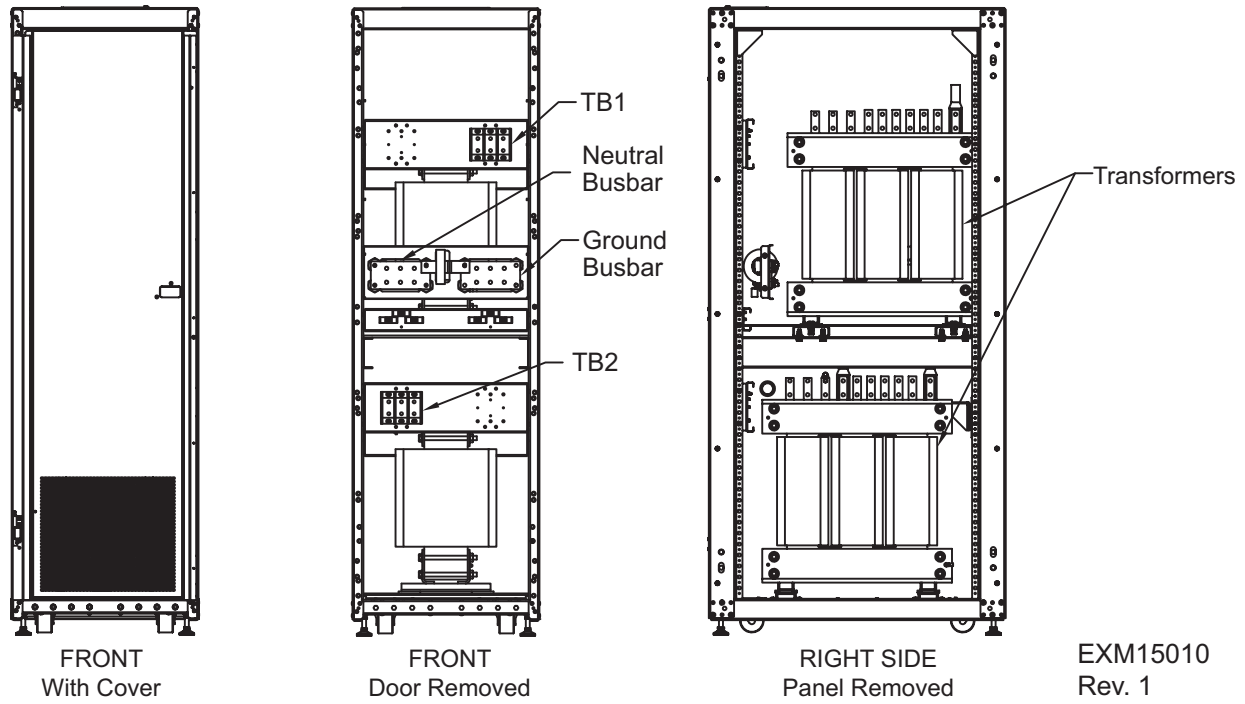


Figure 7 Busbars—Liebert® EXM TXC

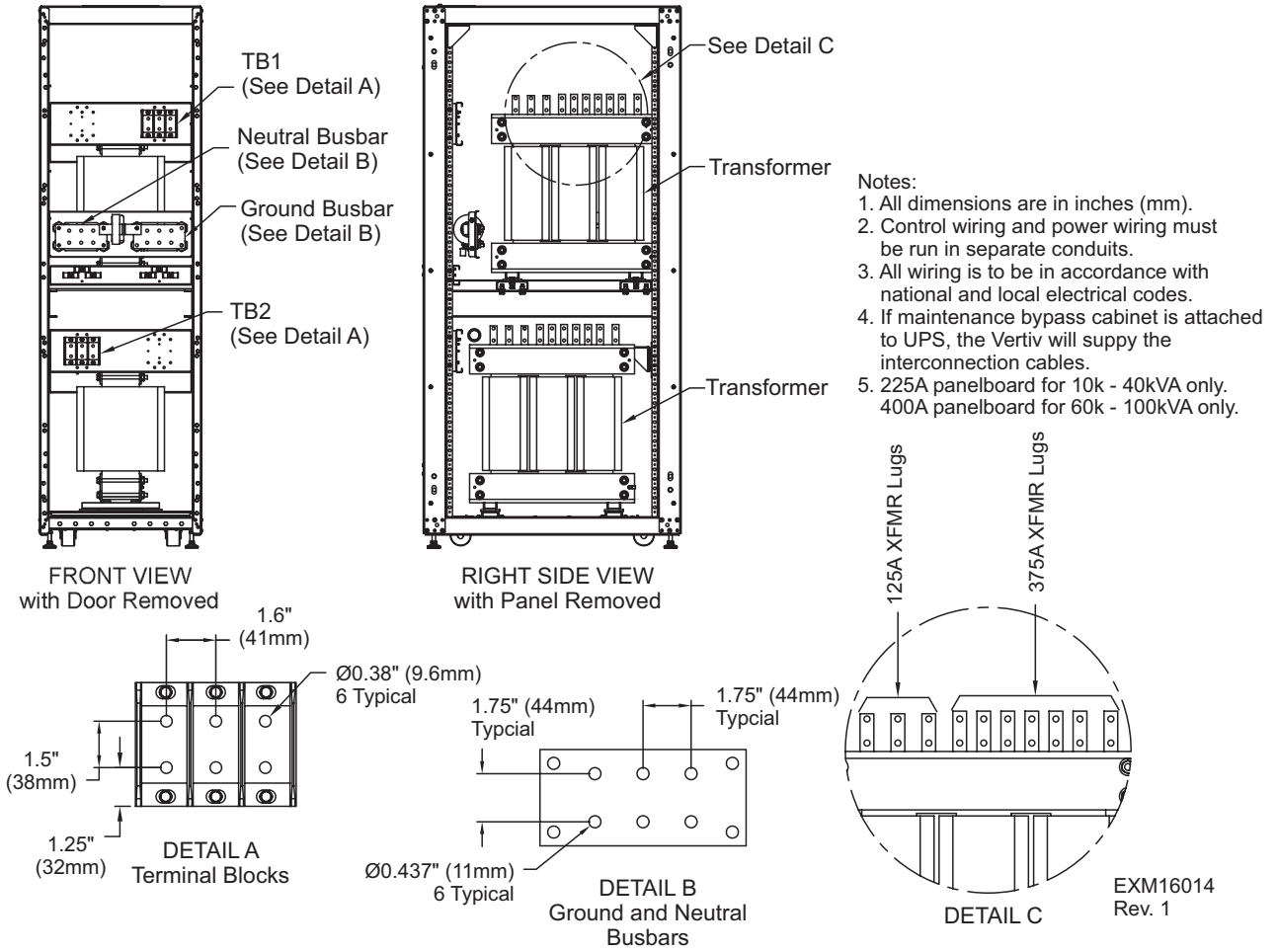
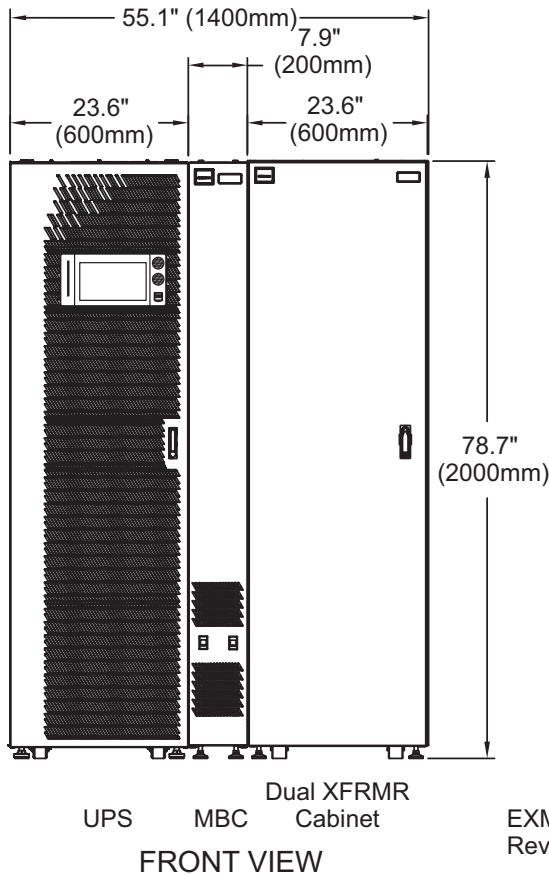


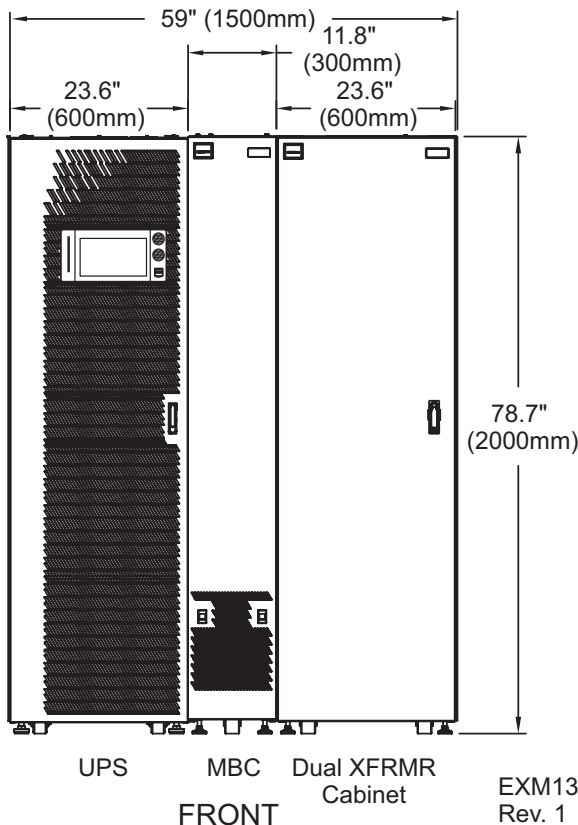
Figure 8 Lineup arrangement, Liebert® EXM with Liebert EXM TXC, 10-40kVA



Notes

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

Figure 9 Lineup arrangement, Liebert EXM with Liebert EXM TXC, 60-100kVA



Notes

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

Figure 10 Outline drawing, Liebert® EXM TXC for Liebert EXM, 10-100kVA

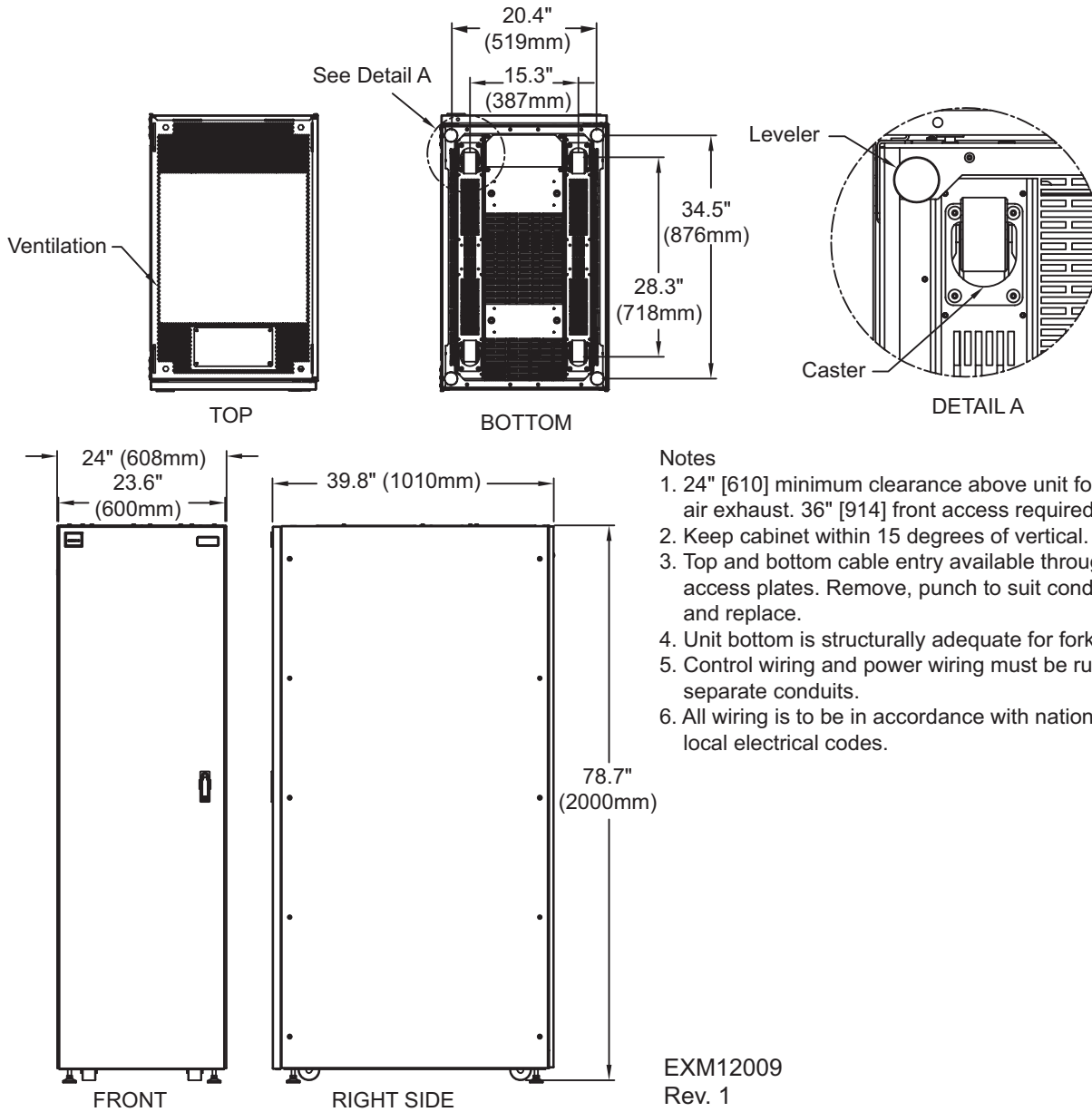


Figure 11 Liebert® EXM TXC transformer location

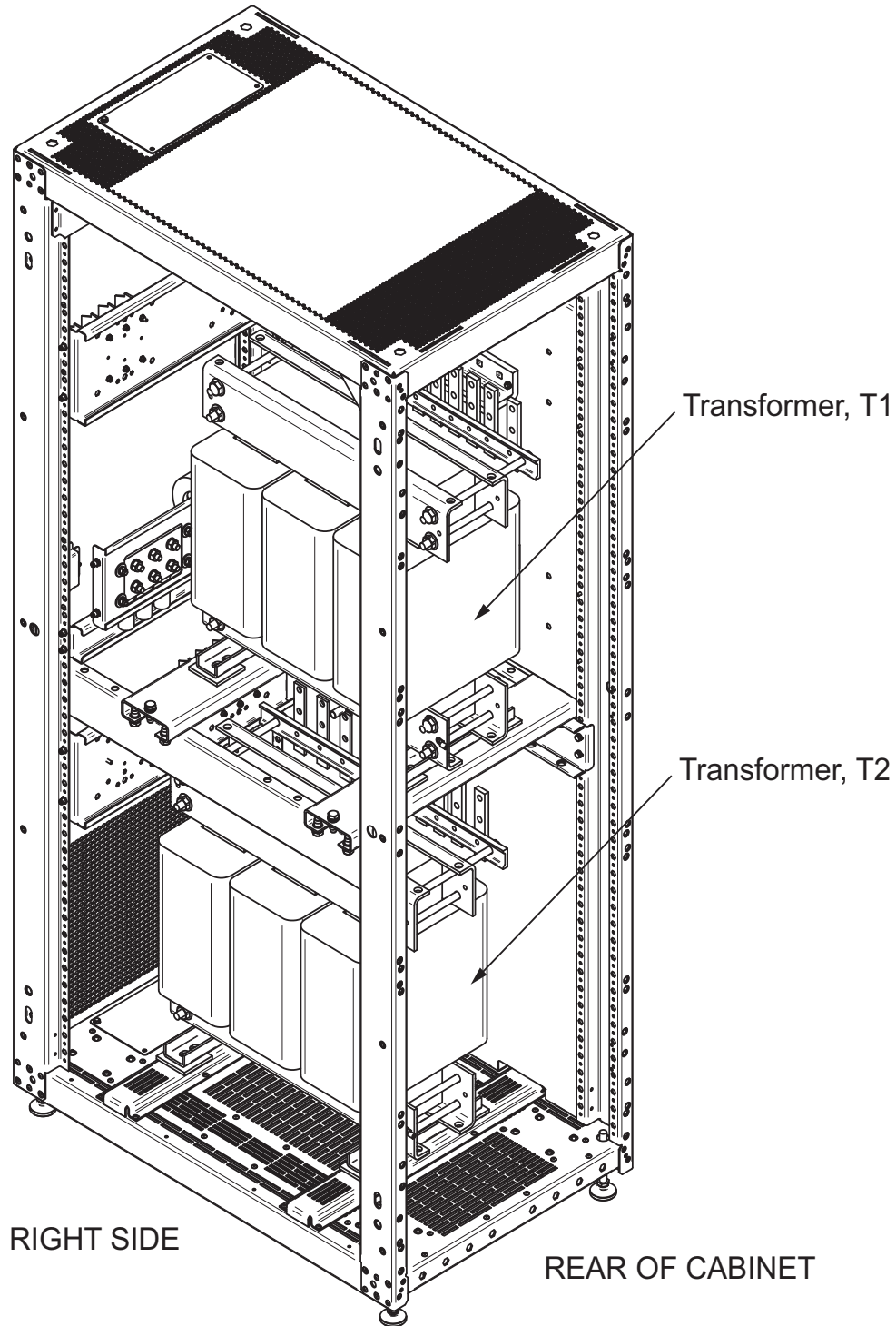
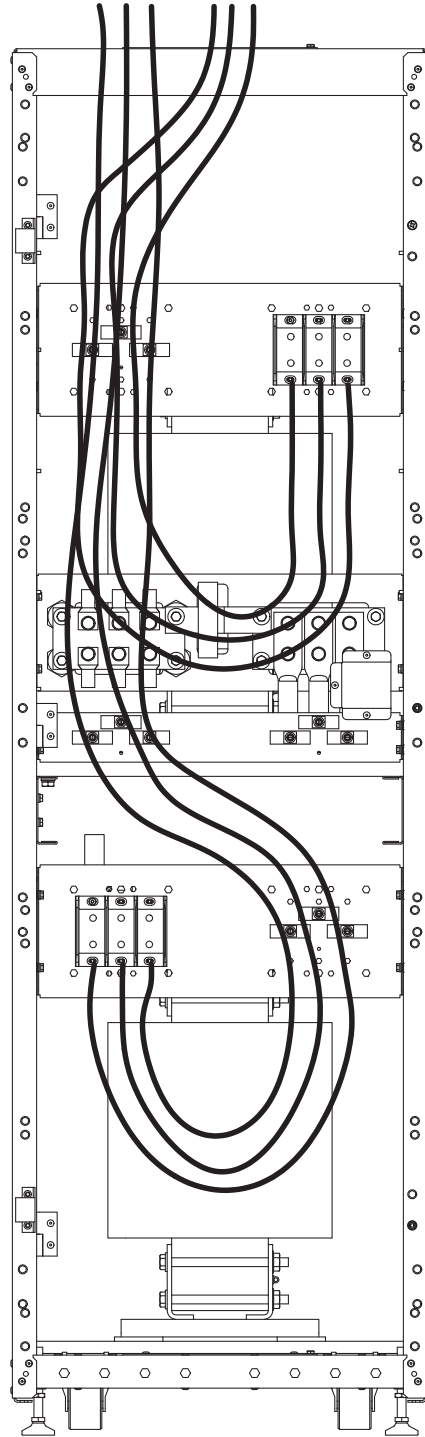


Figure 12 Bend radius - Top feed power connections, 10-100kVA system



NOTE

Interconnection wiring between the UPS and bypass distribution cabinet is supplied by Vertiv™ when the Liebert® EXM TXC and Liebert EXM UPS are ordered as a system.

Table 2 Hardware torque values

Hardware	Two Belleville Washers
M10 (3/8")	240 lb-in. (27 Nm)
M12 (1/2")	428 lb-in (48Nm)

3.0 SPECIFICATIONS

Table 3 Physical standards and parameters

Dual Transformer Cabinet Parameters	Values
Standard Color	Black (ZP-7021)
Front Door Opening (for serviceability)	More than 180°
Degree of Protection for UPS Enclosure	IP 20 (with and without front door open)
Minimum Clearance, Top	24" (610mm)
Minimum Clearance, Back	0" (5" [127mm] when seismic brackets are used)
Minimum Clearance, Sides	0"
Cable Entrance	Top or Bottom
Standards & Conformities	UL 71778 5th Ed.; CSA 22.2 107.3-14 ISTA Procedure 1H; WEEE
Environmental	
Storage Temperature Range, °F (°C)	-13°F to 158°F (-25°C to 70°C)
Operating Temperature Range, °F (°C)	32°F to 104°F (0 to 40°C) 32°F to 86°F (0-30°C) when seismic brackets are used
Relative Humidity	Up to 95% Non-Condensing (Operating and Non-Operating)
Maximum Altitude Above MSL, ft (m)	4920 (1500) (as per IEC 62040/3) - 1% Maximum kW derate / 100m rise between 1500-3000m

Table 4 Liebert® EXM TXC, 10-100k, mechanical characteristics

Mechanical Characteristics	Values
Dimensions, W x D x H, in (mm)	23.625 x 39.375 x 78.75 (600 x 1000 x 2000)
Color	ZP 7021 (Black)
Protection Degree IEC (60529)	IP20 (finger-proof with front doors open or closed)
Rated Power, kVA	Weight, lb (kg)
10	827 (376)
15	883 (401)
20	941 (428)
30	1280 (582)
40	1307 (594)
60	1569 (713)
80	1815 (825)
100	2043 (929)

Table 5 Liebert EXM TXC heat dissipation, both transformers, full load

Liebert EXM TXC Rating, kVA	Heat Dissipation 208:208 Transformer BTU/Hr (kW)	Heat Dissipation 220:220 Transformer BTU/Hr (kW)	Heat Dissipation 480:208 Transformer BTU/Hr (kW)	Liebert EXM Heat Dissipation 600:208 Transformer BTU/Hr (kW)
10	3992 (1.152)	3616 (1.060)	3446 (1.010)	3500 (1.026)
15	5008 (1.468)	4640 (1.360)	4948 (1.450)	4906 (1.438)
20	5876 (1.722)	5186 (1.520)	5916 (1.734)	5972 (1.750)
30	9694 (2.842)	8816 (2.584)	8686 (2.546)	9792 (2.870)
40	11,352 (3.328)	10,332 (3.028)	10,010 (2.934)	9976 (2.924)
60	14,958 (4.384)	13,608 (3.988)	13,340 (3.910)	12,890 (3.798)
80	19,224 (5.634)	17,422 (5.106)	18,002 (5.276)	17,784 (5.212)
100	19,456 (5.702)	17,762 (5.206)	19,906 (5.834)	20,084 (5.886)



NOTE

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

Table 6 Recommended lug sizes (compression type) M10, 3/8" 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

Table 7 Busbar torque for power wiring

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

Table 8 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.

Table 9 Electrical data—Liebert® EXM TXC, 480VAC input, 208VAC output, rectifier input, with 480V:208V transformer

Liebert EXM TXC Rating, kVA	Maximum Rectifier Input Current, A	Phase	Recommended Upstream Protection, A	75°C Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
10	15	3W + G	20	40	(1) #8	(1) #8	M10
15	23	3W + G	30	40	(1) #8	(1) #8	M10
20	31	3W + G	40	40	(1) #8	(1) #8	M10
30	46	3W + G	60	65	(1) #6	(1) #4	M10
40	61	3W + G	80	85	(1) #4	(1) #2	M10
60	91	3W + G	125	150	(1) #2	(1) 1/0	M10
80	122	3W + G	175	200	(1) 1/0	(1) 3/0	M10
100	152	3W + G	200	205	(1) 4/0	(1) 250 kcmil	M10

See Notes on Tables on page 22.

Table 10 Electrical data—Liebert EXM TXC, 480VAC input, 208VAC output, bypass input, with 480V:208V transformer

Liebert EXM TXC Rating, kVA	Maximum System Input Current, A	Phase	Recommended Upstream Protection, A	75°C Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
10	13	3W + G	20	40	(1) #8	(1) #8	M10
15	19	3W + G	25	40	(1) #8	(1) #8	M10
20	25	3W + G	35	40	(1) #8	(1) #8	M10
30	38	3W + G	50	65	(1) #6	(1) #4	M10
40	50	3W + G	70	85	(1) #4	(1) #2	M10
60	74	3W + G	100	150	(1) #2	(1) 1/0	M10
80	99	3W + G	125	200	(1) 1/0	(1) 3/0	M10
100	124	3W + G	175	205	(1) 4/0	(1) 250 kcmil	M10

See Notes on Tables on page 22.

Table 11 Electrical data—Liebert EXM TXC, 600VAC input, 208VAC output, rectifier input, with 600V:208V transformer

Liebert EXM TXC Rating, kVA	Maximum Rectifier Input Current, A	Phase	Recommended Upstream Protection, A	75°C Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
10	12	3W + G	20	40	(1) #8	(1) #8	M10
15	18	3W + G	25	40	(1) #8	(1) #8	M10
20	25	3W + G	35	40	(1) #8	(1) #8	M10
30	37	3W + G	50	50	(1) #8	(1) #6	M10
40	49	3W + G	70	85	(1) #4	(1) #3	M10
60	73	3W + G	100	100	(1) #3	(1) #1	M10
80	98	3W + G	125	130	(1) #1	(1) 2/0	M10
100	122	3W + G	175	150	(1) 1/0	(1) 3/0	M10

See Notes on Tables on page 22.

Table 12 Electrical data—Liebert® EXM TXC, 600VAC input, 208VAC output, bypass input, with 600V:208V transformer

Liebert EXM TXC Rating, kVA	Maximum System Input Current, A	Phase	Recommended Upstream Protection, A	75°C Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
10	10	3W + G	15	40	(1) #8	(1) #8	M10
15	15	3W + G	20	40	(1) #8	(1) #8	M10
20	20	3W + G	30	40	(1) #8	(1) #8	M10
30	30	3W + G	40	50	(1) #8	(1) #6	M10
40	40	3W + G	60	85	(1) #6	(1) #4	M10
60	60	3W + G	80	150	(1) #3	(1) #2	M10
80	79	3W + G	100	200	(1) #1	(1) 1/0	M10
100	99	3W + G	125	205	(1) 1/0	(1) 3/0	M10

See Notes on Tables on page 22.

Table 13 Electrical data—Liebert EXM TXC, 208VAC or 220VAC input, rectifier input, with 208V:208V or 220V:220V transformer

Liebert EXM TXC Rating, kVA	Maximum Rectifier Input Current, A	Phase	Recommended Upstream Protection, A	75°C Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
10	36	3W + G	45	65	(1) #6	(1) #4	M10
15	53	3W + G	70	85	(1) #4	(1) #2	M10
20	71	3W + G	90	100	(1) #3	(1) #1	M10
30	107	3W + G	150	175	(1) 2/0	(1) 4/0	M10
40	141	3W + G	200	230	(1) 4/0	(1) 300 kcmil	M10
60	211	3W + G	300	335	(1) 400 kcmil	(2) 4/0	M10
80	281	3W + G	400	460	(2) 4/0	(2) 300 kcmil	M10
100	352	3W + G	450	510	(2) 250 kcmil	(2) 400 kcmil	M10

See Notes on Tables on page 22.

Table 14 Electrical data—Liebert EXM TXC, 208VAC or 220VAC input, bypass input, with 208V:208V or 220V:220V transformer

Liebert EXM TXC Rating, kVA	Maximum System Input Current, A	Phase	Recommended Upstream Protection, A	75°C Wire Current A Total	Copper Wire	Aluminum Wire	Bolt Size
10	29	3W + G	40	65	(1) #6	(1) #4	M10
15	43	3W + G	60	85	(1) #4	(1) #2	M10
20	58	3W + G	80	100	(1) #3	(1) #1	M10
30	87	3W + G	110	150	(1) 1/0	(1) 3/0	M10
40	116	3W + G	150	230	(1) 4/0	(1) 300 kcmil	M10
60	172	3W + G	225	285	(1) 300 kcmil	(1) 400 kcmil	M10
80	229	3W + G	300	350	(2) 2/0	(2) 4/0	M10
100	286	3W + G	400	460	(2) 4/0	(2) 300 kcmil	M10

See Notes on Tables below.

Table 15 Liebert® EXM TXC inrush multiplier

Liebert EXM TXC Rating kVA	TXC 480V:208V	TXC 600V:208V	TXC 208V:208V	TXC 220V:220V
10	11.7	11.1	8.9	10.8
15	11.3	7.85	6.4	10.2
20	7.8	8.3	6.4	7.7
30	7.4	7.85	6.4	7.7
40	7.65	8.5	6.8	8.2
60	6.7	7.45	5.1	6.2
80	7.1	7.1	6.2	7.5
100	7.1	7.8	6.9	7.4

Note: Inrush Current = NFLA x Table Value

Notes on Tables

Notes apply to **Tables 9** through **14**.

- Nominal input current (considered continuous) is based on full rated output load maximum current includes nominal input current and maximum battery recharge current (considered noncontinuous). Continuous and noncontinuous current are defined in NEC 100. Recommended overcurrent protection is based on 80% rated devices.
*The recommended overcurrent protection represents 125% of nominal full load current (continuous) per NEC 215.
- Maximum input current is controlled by the current limit setting.
- Recommended AC input external overcurrent protection is based on 80% rated devices and maximum input current limit setting.
- Recommended AC output external overcurrent protection is based on 80% rated devices and full rated output current.
- Input power factor of 0.99 is used for the calculations.

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