Liebert®

EXL™

Installation Manual — 625-1200kVA, 1.0PF, 60Hz, Three-Phase, Single-Module and Multi-Module

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures. Visit https://www.VertivCo.com/en-us/support/ for additional assistance.

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Important Safety Instructions

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation of your Liebert EXL UPS. 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.

⚠ WARNING

Risk of electrical shock. Can cause personal injury or death.

This UPS has several circuits that are energized with high DC as well as AC voltages. Check for voltage with both AC and DC voltmeters before working within the UPS. Check for voltage with both AC and DC voltmeters before making contact.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the UPS or preparing the UPS for installation. When performing maintenance with any part of the equipment under power, service personnel and test equipment should be standing on rubber mats.

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 installation and maintenance.

Special safety precautions are required for procedures involving handling, installation and maintenance of the UPS system. Observe all safety precautions in this manual before handling or installing the UPS system. Observe all precautions in the Operation and Maintenance Manual, SL-26030, before as well as during performance of all maintenance procedures. Observe all DC safety precautions before working on or near the DC system.

⚠ AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures graves, voire mortelles.

Ce système ASC comporte plusieurs circuits à haute tension c.a et c.c. Vérifiez les tensions au moyen de voltmètres c.a. et c.c. avant d'utiliser le système ASC. Vérifiez les tensions avec des voltmètres c.a. et c.c. avant d'établir tout contact.

Seuls des employés qualifiés et dûment formés portant un casque, des gants, des chaussures et des lunettes de sécurité adéquats doivent se charger d'installer le système ASC ou de le préparer pour l'installation.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.

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'installation et d'entretien requièrent une extrême prudence.

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. Observez également toutes les précautions décrites dans le manuel d'utilisation et d'entretien, SL-26030, avant et pendant toutes les procédures d'entretien. Observez toutes les précautions de sécurité appropriées lorsque vous travaillez sur à proximité d'une source c.c. de sécurité appropriées dès que vous vous trouvez à proximité d'une source c.c.

WARNING

Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Exercise extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel. The UPS module weight is up to 8095 lb. (3672 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 module cabinets are intended for forklift use. Base slots will support the unit only if the forks are completely beneath the unit.

Read all of the following instructions before attempting to move, lift, or remove packaging from unit, or prepare unit for installation.

AVERTISSEMENT

Le centre de gravité élevé de l'appareil présente un risque de renversement. Une mauvaise manutention peut 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. Le module ASC pèse jusqu'à 3 672 kg (8 095 lb).

Identifiez les symboles de centre de gravité et déterminez le poids de l'appareil avant de manipuler chaque armoire. Testez le levage et l'équilibre des armoires avant de transporter l'appareil. Maintenez en tout temps l'inclinaison verticale minimale.

Les fentes situées à la base des armoires du module 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.

Lisez toutes les instructions ci-dessous avant de tenter de déplacer, lever, déballer ou préparer le système en vue de son installation.

WARNING

Risk of electrical shock and fire. Can cause equipment damage, personal injury or 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.

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 at the capacitor banks and at the DC connections.

All wiring must be installed by a properly trained and qualified electrician. All power and control wiring must comply with all applicable national, state and local codes.

One person should never work alone, even if all power is disconnected from the equipment. A second person should be standing by to assist and to summon help in case of an accident.

AVERTISSEMENT

Risque de décharge électrique et d'incendie. pouvant entraîner des dommages matériels, des blessures 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.

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 les batteries de condensateurs et au niveau des raccords c.c., même une fois l'alimentation coupée.

Tous les raccords doivent être effectués par un électricien dûment formé et qualifié. Tous les câbles d'alimentation et de commande doivent être conformes aux codes nationaux et locaux en vigueur.

Une personne ne devrait jamais travailler seule, même si toute l'alimentation d'entrée est coupée. Une deuxième personne devrait toujours être présente pour porter assistance ou chercher de l'aide en cas d'accident.

NOTE

Materials sold hereunder cannot be used in the patient vicinity (e.g., use where UL, cUL or IEC 60601-1 is required). Medical applications such as invasive procedures and electrical life support equipment are subject to additional terms and conditions.

NOTICE

If optional filtering is installed, 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. Operation of this unit in a residential area may cause harmful interference that the user must correct at his own expense.

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 EXL uninterruptible power supply and related equipment.

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

WARNING

Risk of electrical shock. Can cause injury or death.

Special care must be taken when working with the batteries associated with this equipment. When they are connected together, the battery terminal voltage will exceed 400VDC and is potentially lethal.

AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures graves, voire mortelles.

Des précautions particulières doivent être prises lors de travaux touchant les batteries associées à cet équipement.

Lorsque les batteries sont branchées ensemble, la tension à la borne d'une batterie dépasse 400 V c.c. et est potentiellement mortelle.

NOTE

All equipment not referred to in this manual is shipped with details of its own mechanical and electrical installation.

NOTICE

Three-phase input supply required.

The standard Liebert EXL UPS is suitable for connection to three-phase, three-wire (+ Earth) TN-C and TN-S.

NOTICE

Do not apply electrical power to the UPS equipment before the arrival of the commissioning engineer.

1.2 PRELIMINARY CHECKS

Before installing the UPS, please carry out the following preliminary checks:

- Visually examine the UPS 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 interior doors reporting the type, size and main calibration parameters of the UPS.
- Verify that the UPS room satisfies the environmental conditions stipulated in the equipment specification, paying particular attention to the ambient temperature and air exchange system.

1.3 Environmental Considerations

1.3.1 UPS Room

The UPS module 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 **Environmental Parameters** in **Table 13**).

The Liebert EXL UPS is cooled with the aid of internal fans. To permit air to enter and exit and prevent overheating or malfunctioning, do not cover the ventilation openings.

The Liebert EXL UPS is equipped with air filters located behind the front doors. A schedule for inspection of the air filters is required. The period between inspections will depend upon environmental conditions.

When bottom entry is used, the conduit plate must be installed.

NOTE

The UPS is suitable for mounting on concrete or other non-combustible surface only.

1.3.2 Storing the UPS and Batteries for Delayed Installation

If the Liebert EXL system will not be installed immediately, it must be stored indoors in a clean, dry and cool location (see **Environmental Parameters** in **Table 13**). If the UPS includes batteries, either internally or in a battery cabinet, the batteries' requirements will dictate the storage conditions. Batteries should be unpacked, installed and charged as soon as possible after delivery.

NOTICE

Risk of failure to properly charge batteries. Can cause permanent damage to batteries and void the warranty.

Batteries will self-discharge during storage. Batteries must be recharged as recommended by the battery manufacturer.

A notice of "Charge Before Date" is affixed to each unit that has batteries inside. The "Charge Before Date" is calculated based on the batteries being stored at 77°F (25°C). Storage at a higher temperature will increase the rate of self-discharge, requiring earlier recharge. Consult the battery manufacturer on how to determine when the batteries need to be recharged.

1.4 Positioning

The cabinet is structurally designed to handle lifting from the base.

Access to the power terminals, auxiliary terminal blocks and power switches is from the front.

The door can be opened to give access to the power connection bars, auxiliary terminal blocks and power isolators. Front door can be opened to 90 degrees, and interior doors can be removed for more flexibility in installations.

NOTE

The UPS must be placed on a non-combustible surface suitable to support the weight of the unit.

1.4.1 Moving the Cabinets

The route to be traveled between the point of arrival and the unit's position must be planned to make sure that all passages are wide enough for the unit and that floors are capable of supporting its weight (for instance, check that doorways, lifts, ramps, etc. are adequate and that there are no impassable corners or changes in the level of corridors).

Ensure that the UPS weight is within the designated surface weight loading (lb/in^2) of any handling equipment. For weight details, see **Table 13**.

The UPS can be handled with a forklift or similar equipment. Ensure any lifting equipment used in moving the UPS cabinet has sufficient lifting capacity. When moving the unit by forklift, care must be taken to protect the panels. Do not exceed a 15-degree tilt with the forklift. Bottom structure will support the unit only if the forks are completely beneath the unit.

Handling with straps is not authorized.

WARNING

Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Because the weight distribution in the cabinet is uneven, use extreme care while handling and transporting. Take extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel.

The UPS module weighs up to 8095 lb. (3672 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 de l'appareil présente un risque de renversement. Une mauvaise manutention peut entraîner des dommages matériels, des blessures et même la mort.

En raison de la distribution inégale du poids de l'armoire, vous devez faire preuve d'extrême prudence lors de sa manipulation et de son transport. Faites preuve d'une extrême prudence lors de la manutention des armoires ASC afin d'éviter de les endommager ou de blesser le personnel.

Le module ASC pèse jusqu'à 3 672 kg (8 095 lb).

Identifiez les symboles de centre de gravité et déterminez le poids de l'appareil avant de manipuler chaque armoire. Testez le levage et l'équilibre les armoires avant de transporter l'appareil. Maintenez en tout temps l'inclinaison verticale minimale.

1.4.2 Clearances

The Liebert EXL has no ventilation grilles at either side or at the rear of the UPS. Clearance around the front of the equipment should be sufficient to permit free passage of personnel with the doors fully opened. It is important to leave a distance of 24in. (610mm) between the top of the UPS and any overhead obstacles to allow the module to be serviced and to permit adequate circulation of air coming out of the unit.

1.4.3 Raised-Floor Installations

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. Refer to **Figure 20** to design this pedestal.

1.4.4 Kick Plate Installation

If the unit is to be installed in a position that does not permit access to rear kick plates, then the kick plates should be installed before the unit is placed in its final position.

1.4.5 Special Considerations for 1+N Parallel Systems

Design the grounding configuration of the system before finalizing module placement See **2.7 - Grounding**.

The cabling impedance must be carefully controlled to ensure good load-sharing. Impedance mismatch may cause an overload on one module in a 1+N system, triggering a shutdown and loss of power to the connected load. Mismatched cable impedance is amplified when a 1+N system is operating on bypass because the power on the bypass path is not controlled.

The Liebert 1+N UPS module is supplied with a sharing inductor to minimize the impact of cable impedance mismatch. An impedance mismatch may be further minimized by controlling the wiring length of each unit. The design and the layout of the UPS system and associated panels and cabling must be designed to ensure that cable lengths and impedances are closely matched.

Table 1 shows bypass load sharing when the cabling length is varied for three 800kVA UPS modules powering the load via their static bypass switches.

Table 1 Load distribution for various load cable differences for systems with sharing inductors, 800kVA UPS

***With* Sharing Inductors, 100% System Load (3) 500kcmil per phase, Unity PF**			
% Cable Difference	**% Current UPS #1**	**% Current UPS #2**	**% Current UPS #3**
Bypass Cable Length 50ft. (15.3m)			
0	100	100	100
10	99.5	99.5	101.1
25	98.6	98.6	102.8
50	97.2	97.2	105.8
Bypass Cable Length 75ft. (23m)			
0	100	100	100
10	99.2	99.2	101.6
25	98	98	104
50	96	96	108.3
Bypass cable length 100ft. (30.5m)			
0	100	100	100
10	99	99	102
25	97.5	97.5	105.1
50	94.9	94.9	110.6
Bypass Cable Length 125ft. (38m)			
0	100	100	100
10	98.9	98.9	102.3
25	97.1	97.1	106
50	93.8	93.8	112.8

Shaded cells indicate overloaded unit, causing breaker trip and load shutdown.

For further information about matching cable impedances or refer to TN-00013.pdf “Performance Improvements with Sharing Inductors in Distributed Static Switch UPS Systems” found at the Liebert EXL section of Vertiv’s Web site, **www.vertivco.com** or contact Vertiv® customer support.

1.4.6 Special Considerations for Remote Breaker

The voltage sense cable for the rectifier input breaker must accommodate the pre-charge circuit for the UPS, sized to 60A fuses at the sense location (see **Figure 11**). Breakers must be sized appropriately for the overload curves as shown in the operation and maintenance manual, SL-26030, available at Vertiv's Web site, **www.vertivco.com**

1.5 System Composition

A UPS system can include a number of equipment cabinets, depending on the system design: (*e.g.*, UPS cabinet, battery cabinet, maintenance bypass cabinet). In general, all the cabinets used in a particular installation are of the same height. Refer to the drawings provided in **4.0 - Installation Drawings** for the positioning of the cabinets as shown in **Figures 1** through **6**.

1.6 Cable Entry

Cables can enter the UPS cabinet from bottom or top into the Input/Output (I/O) of the unit; see the figures in **4.0 - Installation Drawings**.

1.7 Cable Routing

Per NEC 300.20 (NEC 2014 or equivalent), all phase conductors and ground conductors must be grouped together when they are installed in ferrous enclosures or go through ferrous material. This is to avoid heating from induction currents.

Figure 1 Top-terminal battery system configurations

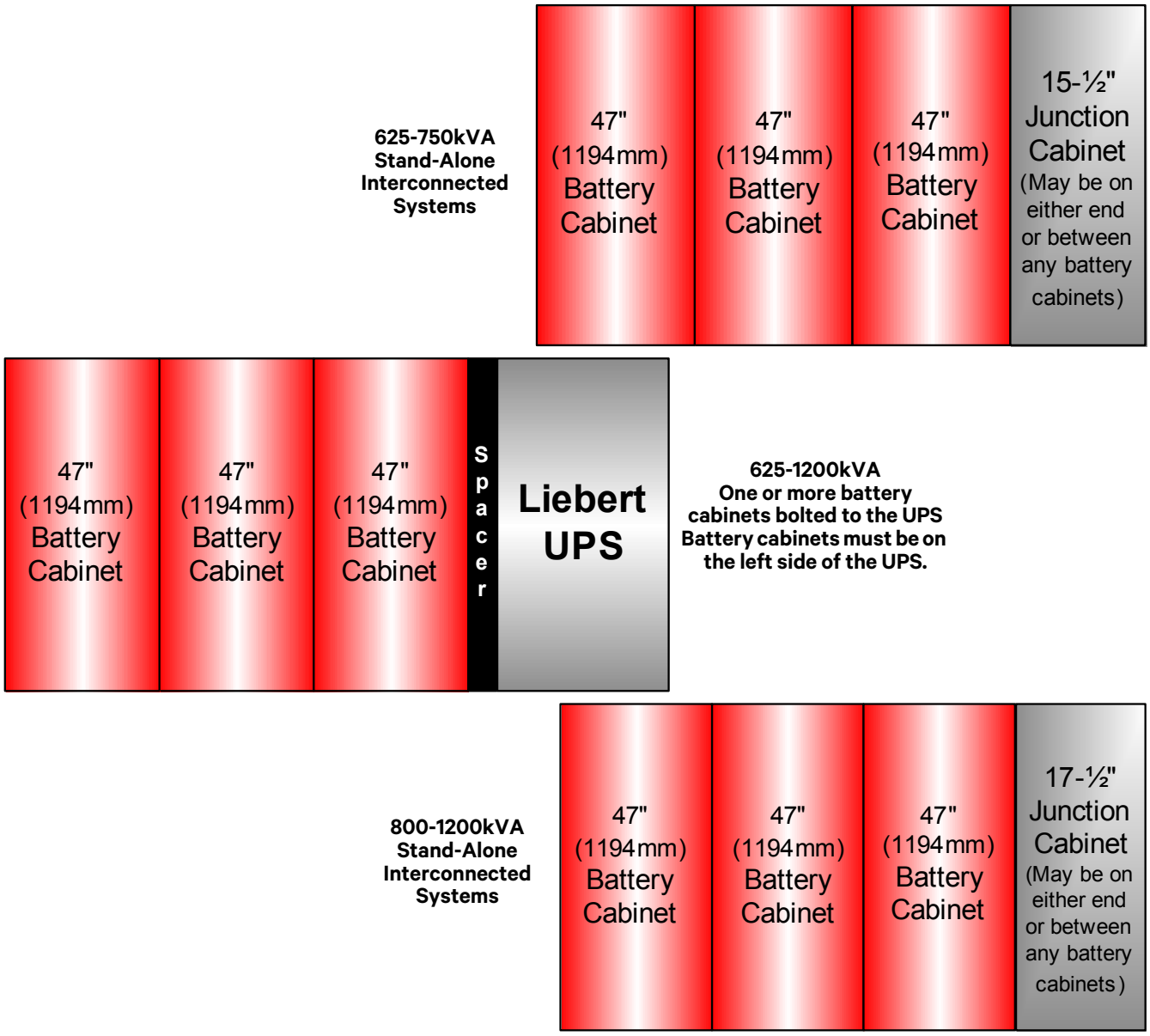


Figure 2 Top-terminal stand-alone battery system configuration

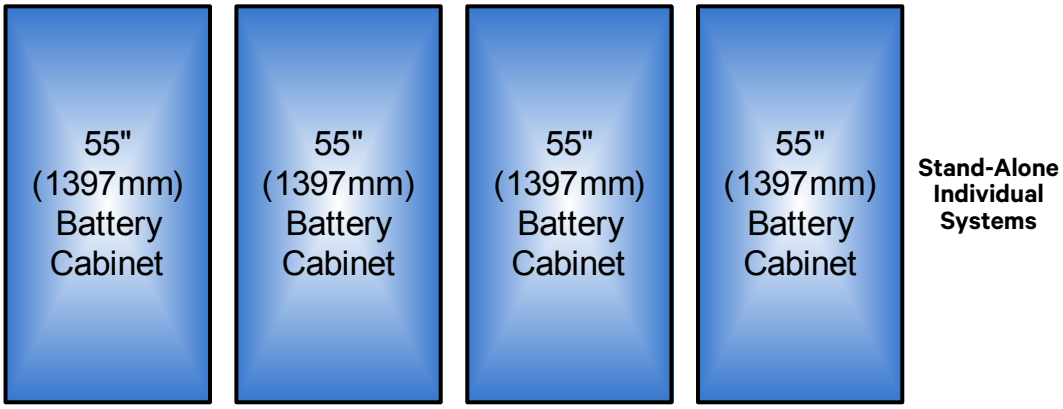


Figure 3 Top-terminal battery system configuration—Battery cabinets not attached to UPS or each other

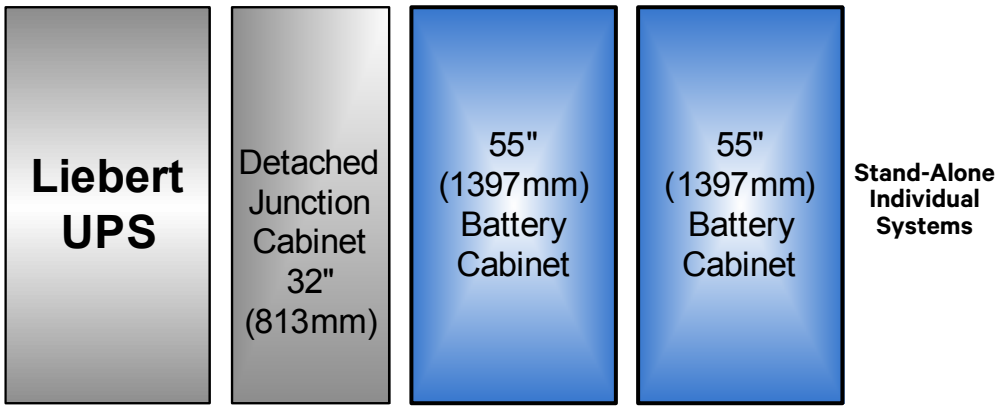


Figure 4 Front-terminal battery system configurations

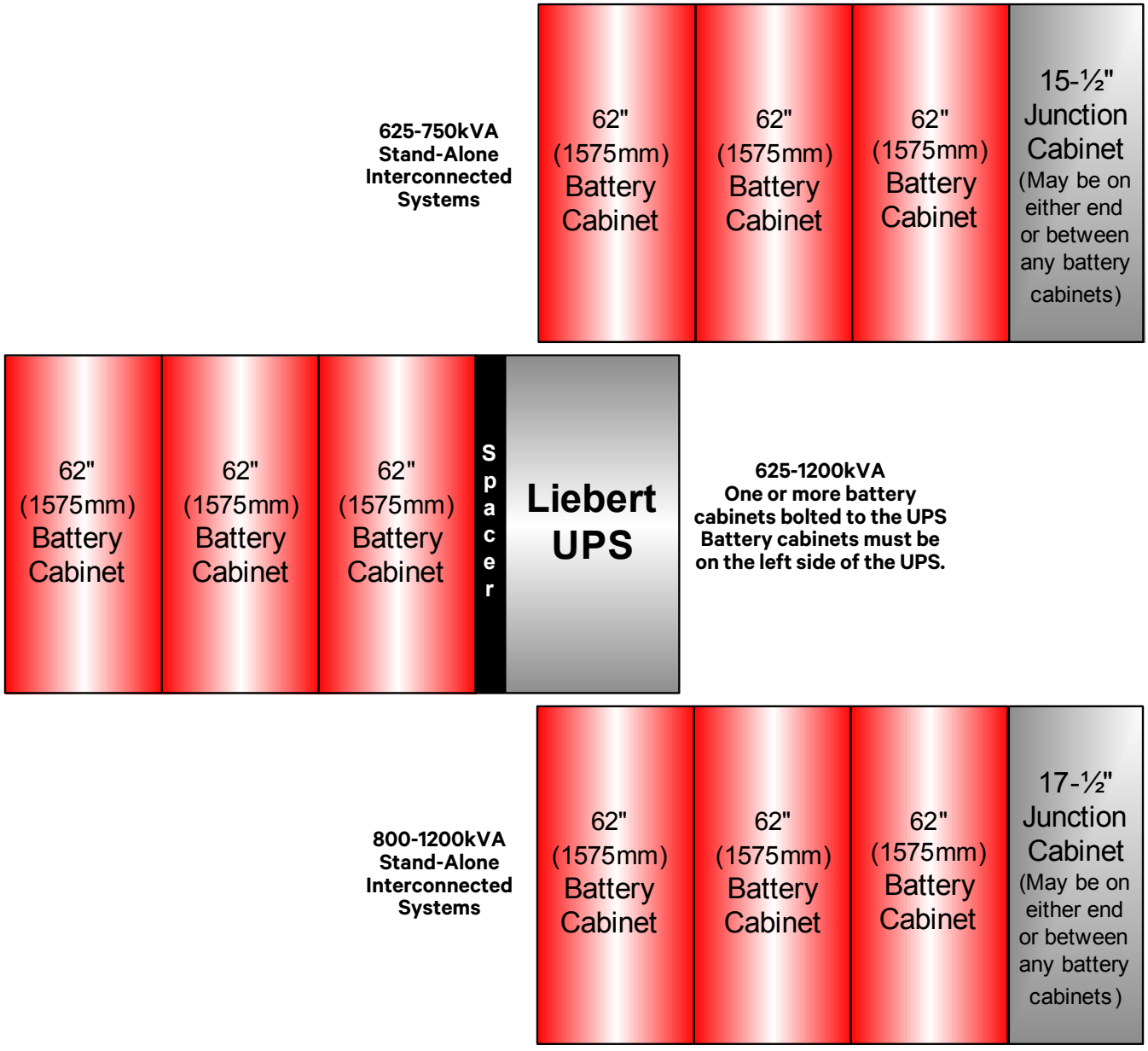


Figure 5 Front-terminal stand-alone battery system configuration

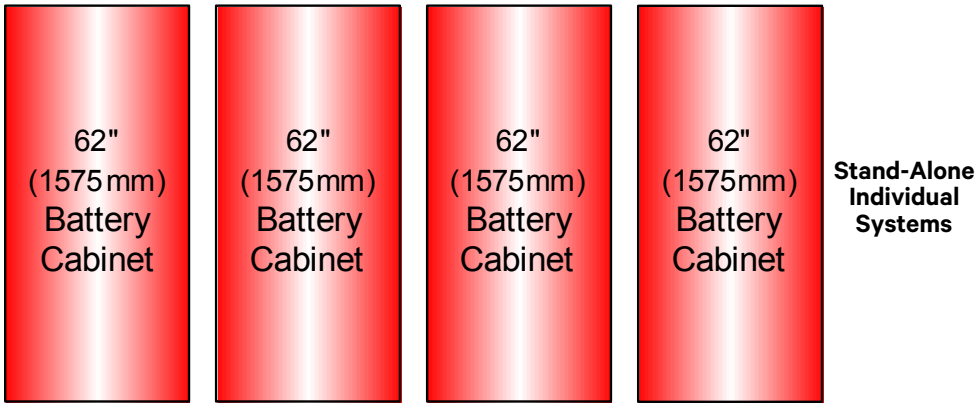
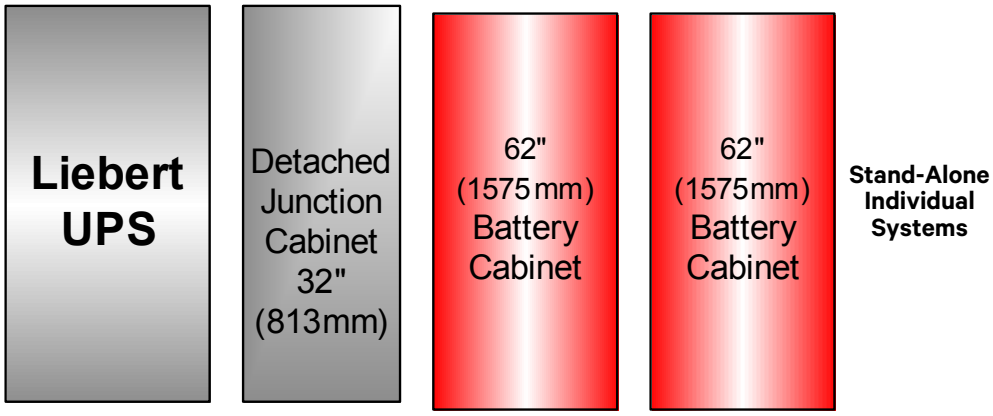


Figure 6 Front-terminal battery system configuration—Battery cabinets not attached to UPS or each other



2.0 UPS ELECTRICAL INSTALLATION

This chapter provides guidelines for qualified installers who must have knowledge of local wiring practices pertaining to the equipment to be installed.

WARNING

Risk of electrical shock. Can cause injury or death.
The UPS contains high DC as well as AC voltages. Check for voltage with both AC and DC voltmeters before working within the UPS.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the UPS or preparing the UPS for installation.

AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures graves, voire mortelles.
Le système ASC contient des tensions c.c. et c.a. élevées. Vérifiez les tensions au moyen de voltmètres c.a. et c.c. avant d'utiliser le système ASC.
Seuls des employés qualifiés et dûment formés portant un casque, des gants, des chaussures et des lunettes de sécurité adéquats doivent se charger d'installer le système ASC ou de le préparer pour l'installation.

2.1 External Protective Devices

For safety, circuit breakers must be installed in the input AC supply and external battery system. Given that every installation has its own characteristics, this section provides guidelines for qualified installation personnel with knowledge of operating practices, regulatory standards and the equipment to be installed.

External overcurrent protection must be provided. See **Figures 31**, **32** and **33** for overload capacity.

2.2 Power Cables

The UPS requires both power and control cabling. All control cables, whether shielded or not, should be run separately from the power cables in metal conduits or metal ducts that are electrically bonded to the metalwork of the cabinets to which they are connected.

The cable design must comply with the voltages and currents in **Tables 14** through **17**, follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media), room temperature and conditions of installation of the cable and system's overload capacity (see **5.0 - Specifications**).

WARNING

Risk of electrical shock. Can cause injury or death.
Before cabling the UPS, ensure that you are aware of the location and operation of the external isolators that connect the UPS input/bypass supply to the power distribution panel.
Check that these supplies are electrically isolated, and post any necessary warning signs to prevent their inadvertent operation.

AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures graves, voire mortelles.
Avant de procéder au câblage du système ASC, 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 au panneau de distribution électrique.
Vérifiez que ces raccords sont isolés électriquement et installez tous les panneaux d'avertissement nécessaires pour empêcher leur utilisation accidentelle.

When sizing battery cables, a maximum voltage drop of 2VDC is permissible at the current ratings given in **Table 17**.

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

- The grounding conductor should be sized according to the fault rating, cable lengths, type of protection, etc. The grounding cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consideration should be given to the use of paralleled smaller cables for heavy currents, as this can ease installation considerably.
- AC and DC cables must be run in conduits according to local codes, national codes and standard best practices. This will prevent creation of excess EMI fields.

2.3 Sizing the Input Breaker Feeding a Liebert EXL UPS

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 the NEC.

Maximum input current is controlled by the current limit setting, which is adjustable. Values shown are for default current limit of 125%. If a smaller input feed breaker is used, the input current limit can be adjusted; see your Vertiv representative for more information. The input current limit should not be set less than 105% of the current needed to support the inverter at full load for normal operation. This results in sufficient power to recharge the battery in a reasonable time and to operate over the published input voltage range.

2.3.1 Power Cable Connection Procedure

The rectifier input, bypass, output and battery power cables (all require lug-type terminations) are connected to busbars in the I/O sections (refer to **4.0 - Installation Drawings**).

Equipment Ground

The equipment ground busbars are in the I/O sections (refer to **4.0 - Installation Drawings**). The grounding conductor must be connected to the ground busbar and bonded to each cabinet in the system.

All cabinets and cabling should be grounded in accordance with local regulations.

NOTE

Proper grounding reduces problems in systems caused by electromagnetic interference.

WARNING

Failure to follow adequate grounding procedures can result in electric shock hazard to personnel, or the risk of fire, should a ground fault occur.
All operations described in this section must be performed by properly trained and qualified electricians or technical personnel. If any difficulties are encountered, contact Vertiv. See the back page of this manual for contact information.

AVERTISSEMENT

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.
Toutes les opérations décrites dans cette section ne doivent être effectuées que par des électriciens ou des techniciens professionnels dûment formés et qualifiés . En cas de difficultés, communiquez avec Vertiv. Pour obtenir les renseignements de contact, consultez la dernière page de ce manuel.

Once the equipment has been positioned and secured, connect the power cables as described below (refer to the appropriate cable connection drawing in **4.0 - Installation Drawings**):

1. Verify that the UPS equipment is isolated from its external power source and all the UPS power isolators are open. Check that these supplies are electrically isolated and post any necessary warning signs to prevent their inadvertent operation.
2. Open exterior and interior panels on the front of the I/O sections.
3. Connect the ground to the equipment ground busbar located in the I/O sections.
4. Make power connections and tighten the connections to the proper torque.

Ensure correct phase rotation.

WARNING

Risk of electrical shock. Can cause injury or death.
If the load equipment will not be ready to accept power on the arrival of the commissioning engineer, ensure that the system output cables are safely isolated at their termination.

AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures graves, voire mortelles.
Si les équipements branchés ne sont pas prêts à être alimentés à l'arrivée de l'ingénieur de mise en service, assurez-vous que les bornes des câbles de sortie du système soient isolées de façon sécuritaire.

WARNING

Risk of electrical shock. Can cause injury or death.
When connecting the cables between the battery extremities to the circuit breaker, always connect the circuit breaker end of the cable first.

AVERTISSEMENT

Risque de décharge électrique pouvant causer des blessures graves, voire mortelles.
Lors du raccordement de câbles entre des bornes de batterie et un disjoncteur, branchez toujours en premier l'extrémité du câble qui se raccorde au disjoncteur.

5. For control connection details, see **2.5 - Control Cable and Communication**.

NOTE

If any fault bracing brackets were removed during installation, they MUST be replaced.

6. Close and secure the interior and exterior doors.
7. Attach the kick plates to the bottom of the unit. See **Figure 43**.

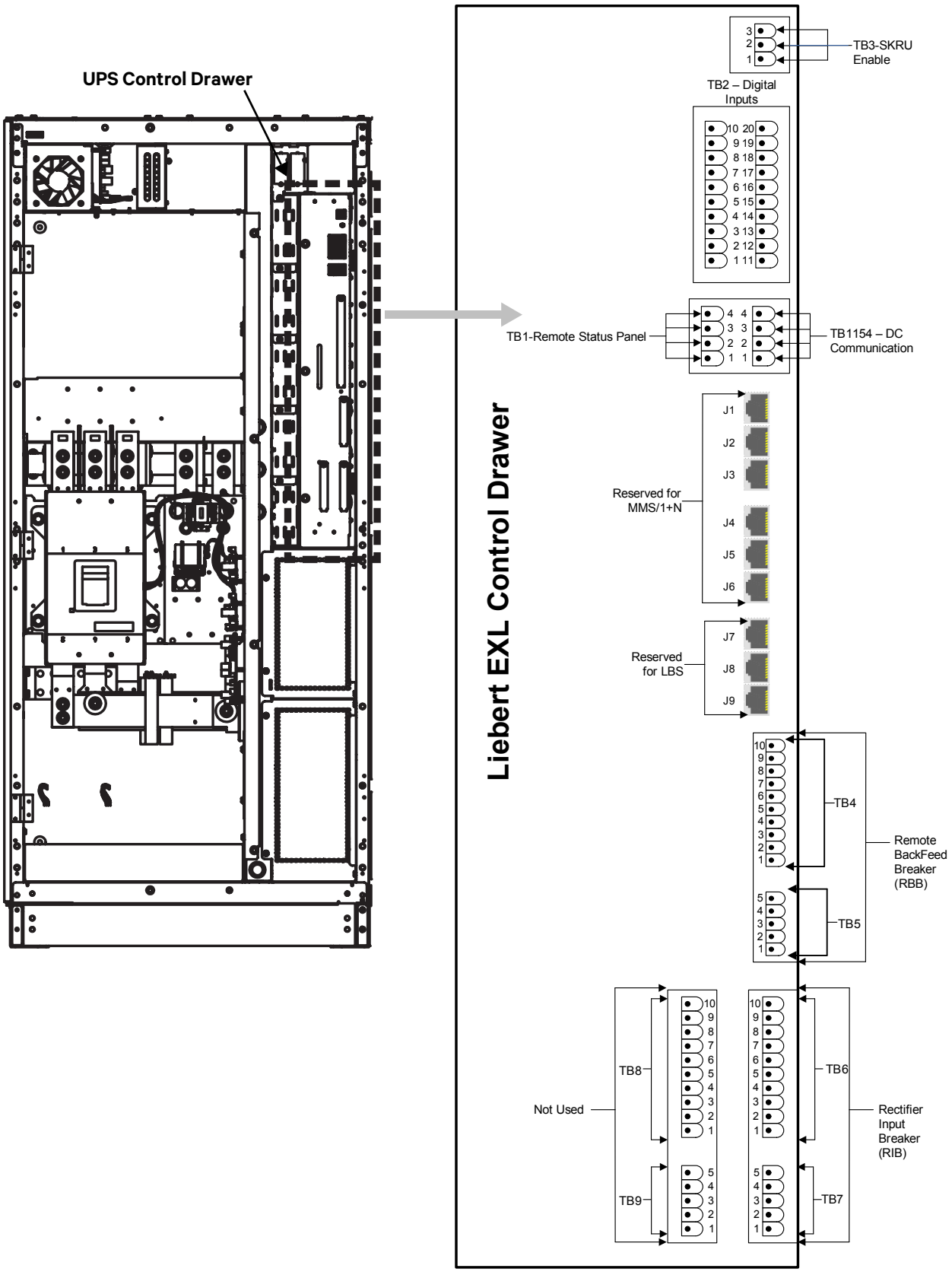
2.4 Remote Breaker

The remote breaker option has remote circuit breakers for both CB1 and the BFB. These remote circuit breakers are referred to as the Rectifier Input Breaker (RIB) and Remote Back-Feed Breaker (RBB). See **3.2 - Remote Breaker UPS Installation**.

2.5 Control Cable and Communication

Based on your site's specific needs, the UPS may require auxiliary connections to manage the battery system (external battery circuit breaker), communicate with a building management system or provide alarm signaling to external devices, or for Remote Emergency Power Off (REPO). The external interface connections, arranged for this purpose, are next to the option box in the Rectifier section (refer to **4.0 - Installation Drawings**).

Figure 7 Liebert EXL customer connections



2.5.1 Dry Contacts

Table 2 UPS Digital Inputs

Item	Terminal Block	Pin	Connect to (Description of External Item)
Maintenance Bypass Breaker (MBB)	TB2	1	MBB Aux Contact, Closed = Circuit Breaker is Closed
	TB2	2	MBB Aux Contact Common
Maintenance Isolation Breaker (MIB)	TB2	3	MIB Aux Contact, Closed = Circuit Breaker is Closed
	TB2	4	MIB Aux Contact Common
Bypass Isolation Breaker (BIB) - Dual Source Input None - Single Source Input	TB2	5	BIB Aux Contact, Closed = Circuit Breaker is Closed
	TB2	6	BIB Aux Contact Common
Rectifier Feed Breaker (RFB) - Dual Source Input UPS Input Breaker (UIB) - Single Source Input	TB2	7	RFB Aux Contact, Closed = Circuit Breaker is Closed
	TB2	8	RFB Aux Contact Common
Reserved for Internal Use (SMS)/ Module Output Breaker (1+N)	TB2	9	Reserved for Internal Use (SMS)/MOB Aux Contact, Closed = Circuit Breaker is Closed (1+N)
	TB2	10	Reserved for Internal Use (SMS)/MOB Aux Contact Common (1+N)
REPO/EPO (N.O.)	TB2	11	REPO Switch, Normally Open Contact
	TB2	12	REPO Switch, Normally Open Common
REPO/EPO (Form-C or N.C.)	TB2	13	REPO Switch, Normally Closed Contact
	TB2	14	REPO Switch, Normally Closed Common
REPO/EPO (Form-C)	TB2	15	REPO Switch, Normally Open Contact
REPO/EPO Additional Common	TB2	16	REPO Switch, Normally Closed Common
Key Status	TB2	17	Key Status Switch, Closed = Key Released
	TB2	18	Key Status Switch, Common
On Generator	TB2	19	On Generator (NO)
	TB2	20	On Generator (COM)

1. All contacts have:
   Maximum voltage: 24VDC
   Maximum current: 10mA
   Wire range: #14-22AWG
   Maximum length: 500' (150m)
2. All external wire furnished by others
3. All wiring must be in accordance with national and local electrical codes
4. If using REPO/EPO with Form-C contacts, Pins 13-15 must be used
5. If using REPO/EPO with normally closed (N.C.) contacts only, a jumper must be placed across Pins 15 and 16

Table 3 UPS Output

Item	Terminal Block	Pin	Connects to (Description of External Item)	Maximum Voltage	Maximum Current	Wire Range	Maximum Length
SKRU Enable	TB3	1	SKRU Enable Common	120VAC	1A	#14-22 AWG	164ft. (50m)
		2	SKRU Enabled, Contact is Open				
		3	SKRU Enabled, Contact is Closed				

1. To prevent signal interference, low-voltage (<48V) and low-current (5A) cable groups should be run in separate, grounded conduit from high-voltage or high-current cable groups.
2. All external wire furnished by others.
3. All wiring must be in accordance with national and local electrical codes.

Table 4 UPS control contacts to Battery Interface Boards

Item	Terminal Block	Pin	Connects to (Description of External Item)	Maximum Voltage	Maximum Current	Wire Range	Maximum Length
Battery Cabinet Communication	TB1154	1	CAN +24V	24VDC	2A	18AWG	1000ft (305m)
		2	CAN Common				
		3	CANbus High				
		4	CANbus Low				

1. To prevent signal interference, low voltage (<48V) and low current (5A) cable groups should be run in separate grounded conduit from high voltage or high current cable groups.
2. All external wire furnished by others.
3. All wiring must be in accordance with national and local electrical codes.
4. The maximum length must take into account all battery communications connections in the system.

Table 5 UPS control contacts to Remote Status Panel

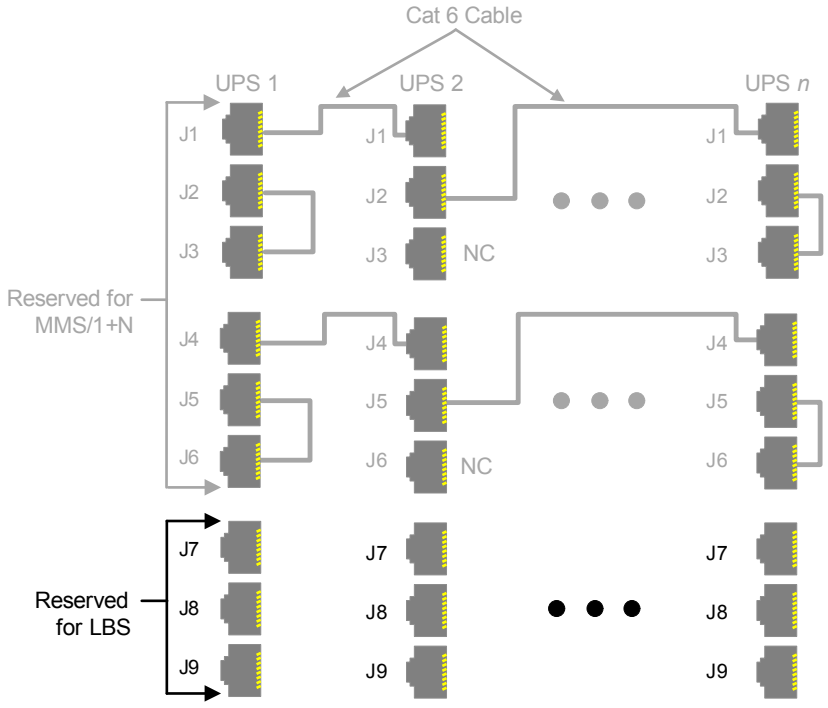
Item	Terminal Block	Pin	Connects To (Description of External Item)	Maximum Voltage	Maximum Current	Wire Range	Maximum Length
Remote Status Panel	TB1	1	CAN +24V	24VDC	150mA	18AWG	1000ft (305m)
		2	CAN Common				
	TB1154	3	CANbus High				
		4	CANbus Low				

1. To prevent signal interference, low voltage (<48V) and low current (5A) cable groups should be run in separate grounded conduit from high voltage or high current cable groups.
2. All external wire furnished by others.
3. All wiring must be in accordance with national and local electrical codes.

2.5.2 Multi-Module Communication

Paralleling cables that connect the module to other modules in the 1+N system are connected via Terminals J1-J6 customer connections on the control drawer. See **Figure 8**.

Figure 8 UPS MMS/1+N connectivity

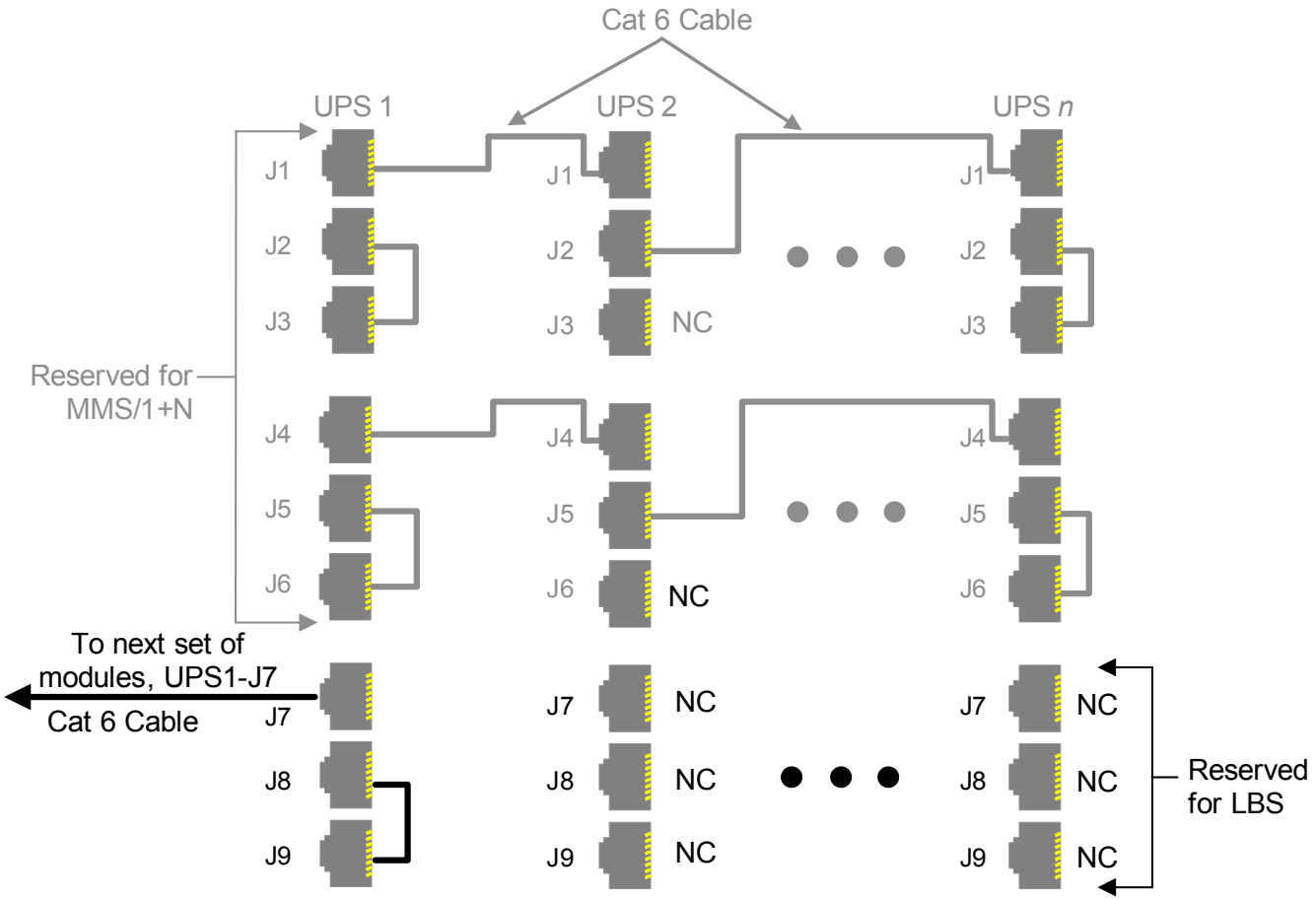


2.6 DIGITAL LBS

The Load Bus Sync interface enables independent UPS units to remain in sync when operating on battery or when supplied by unsynchronized input sources.

Digital LBS cables that connect the module to the system are connected to Terminals J7-J9 customer connections on the control drawer. See **Figure 9**.

Figure 9 LBS connectivity



2.7 GROUNDING

2.7.1 Three-Wire Input connections

This module must NOT be used when single-phase loads are directly connected to the UPS. Note that whenever the UPS module transfers to or from bypass, two AC sources (UPS output and bypass) are briefly connected together and circulating current must flow. In this configuration, the current flows through the ground path and may trip ground fault interrupters (GFI's), distorting the output voltage waveform. Proper adjustment of GFI's is necessary to avoid unwanted tripping. The time delay should be set to at least 0.2 seconds to prevent tripping when the UPS performs a transfer or retransfer operation.

NOTICE

Failure to set the ground fault interrupters properly could cause loss of power to the critical load.

2.7.2 High Resistance Grounding

Contact your Vertiv® representative or the factory to determine whether the Liebert EXL is compatible with the specific type of HRG system involved.

2.7.3 Preferred Grounding Configuration, Battery Systems

Open-rack battery systems, depending on local code requirements and customer preference, are normally:

- Floating (ungrounded) OR
- Center-tapped and floating

Battery cabinet systems must be connected as floating (ungrounded) systems.

Center-tapped or grounded battery systems are not possible with battery cabinet systems.

Whether the battery system is open-rack or cabinet, the metal rack parts or cabinet must be grounded to the UPS module ground bus.

2.8 Internal Breaker Settings

All internal breakers—CB1, CB2 and BFB—were installed and set at the factory.

NOTICE

Risk of incorrect adjustment. Can cause equipment damage.
Factory circuit breaker settings must not be altered without contacting Vertiv® customer support.

3.0 OPTIONAL EQUIPMENT

3.1 SINGLE-MODULE SYSTEM OPTIONS

3.1.1 Battery Temperature Sensor

The optional external battery temperature sensor kit, supplied separately from the battery circuit breaker, contains one probe and one temperature transport board.

3.1.2 Matching Liebert EXL Battery Cabinet

The optional matching Liebert EXL Battery Cabinet can be used to obtain the desired autonomy time. The battery cabinets are designed to be either attached to the UPS or separate from the UPS (for details, see the Liebert EXL Battery Cabinet installation manual, SL-26035, available at Vertiv's Web site, **www.vertivco.com**).

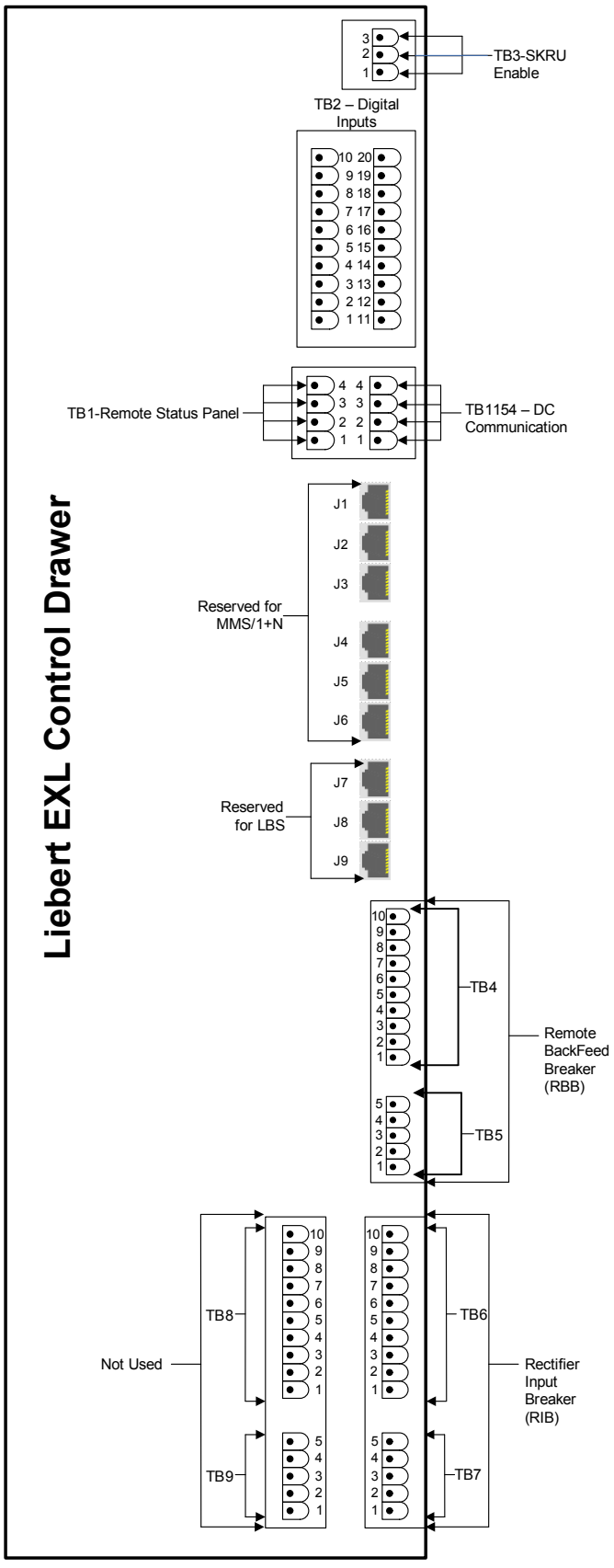
3.1.3 Remote Alarm Status Panel

The remote alarm status panel has LED alarm lights. An audible alarm sounds upon any alarm condition. The surface- or flush-mounted NEMA 1 enclosed panel indicates: Load on UPS, Load on Bypass, Battery Discharging, Low Battery Warning, Overload Warning, Ambient Overtemp Warning, UPS Alarm Condition, New Alarm Condition (For a Second UPS Alarm Condition).

3.2 REMOTE BREAKER UPS INSTALLATION

The remote breaker option has remote circuit breakers for both CB1 and the BFB. These remote circuit breakers are referred to as the Rectifier Input Breaker (RIB) and Remote Back-Feed Breaker (RBB).

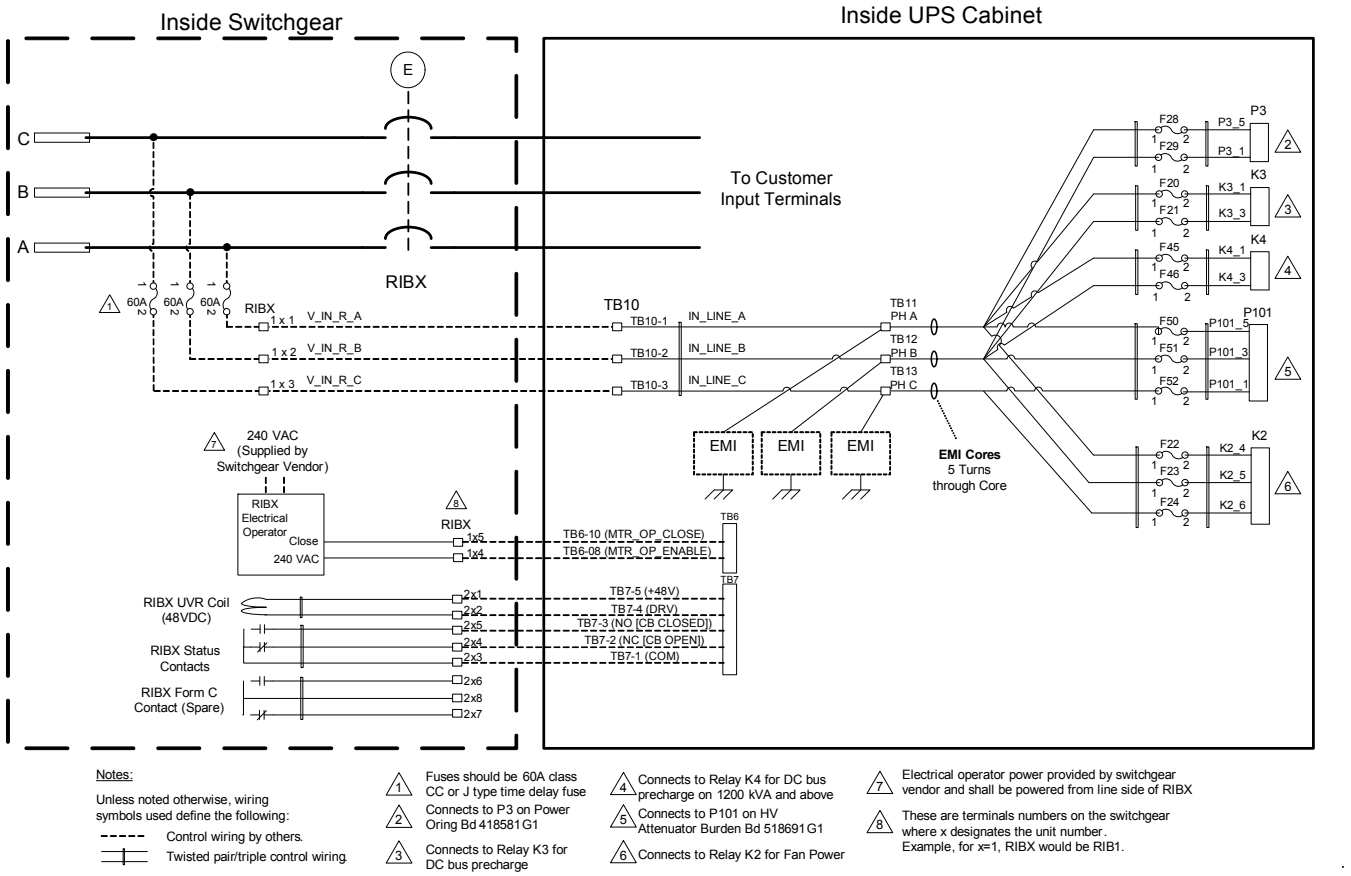
Figure 10 Customer connections (remote breaker)


Liebert EXL Control Drawer
TB3-SKRU Enable
TB2 – Digital Inputs
TB1-Remote Status Panel
TB1154 – DC Communication
J1
J2
J3
Reserved for MMS/1+N
J4
J5
J6
J7
Reserved for LBS
J8
J9
TB4
Remote BackFeed Breaker (RBB)
TB5
TB8
Not Used
TB9
TB6
Rectifier Input Breaker (RIB)
TB7

3.3 RECTIFIER INPUT BREAKER (RIB)

For systems that use a Rectifier Input Breaker (RIB), the controls for the Aux contact, UVR, Motor Operator and voltage sense will go between the remote breaker and the UPS input I/O section. See **Figure 11**.

Figure 11 Rectifier Input Breaker diagram



Notes:

Unless noted otherwise, wiring symbols used define the following:

- Control wiring by others.
- Twisted pair/triple control wiring.

1. Fuses should be 60A class CC or J type time delay fuse
2. Connects to P3 on Power Oring Bd 418581 G1
3. Connects to Relay K3 for DC bus precharge
4. Connects to Relay K4 for DC bus precharge on 1200 kVA and above
5. Connects to P101 on HV Attenuator Burden Bd 518691 G1
6. Connects to Relay K2 for Fan Power
7. Electrical operator power provided by switchgear vendor and shall be powered from line side of RIBX
8. These are terminals numbers on the switchgear where x designates the unit number. Example, for x=1, RIBX would be RIB1.

Table 6 Rectifier Input Breaker specifications

Power Class	kAIC rating	RIB Specification	RIB General Specification	Comments
625-800kVA	65kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 65kA at a maximum voltage of 480V for three cycles.	The remote breaker must be equipped with UVR and auxiliary contacts for proper operation with the UPS.	No UPS internal fuse protection on rectifier and bypass input.
	100kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 100kA at a maximum voltage of 480V for three cycles.		No UPS internal fuse protection on the rectifier input. The bypass input has fuse protection.
1000-1200kVA	65kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 65kA at a maximum voltage of 480V for three cycles.	The remote breaker must be equipped with UVR and auxiliary contacts for proper operation with the UPS.	No UPS internal fuse protection on rectifier and bypass input.
	100kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 100kA at a maximum voltage of 480V for three cycles.		UPS internal fuse protection exists on rectifier and bypass input.

Table 7 Rectifier Input Breaker contacts

Item	Terminal Block	Pin	Connect to (Description of External Item)
Not Used	TB6	1	Not Used
	TB6	2	Not Used
Not Used	TB6	3	Not Used
	TB6	4	Not Used
Not Used	TB6	5	Not Used
	TB6	6	Not Used
Not Used	TB6	7	Not Used
Breaker Motor Operation	TB6	8	Motor Operation Enable (240VAC)
Not Used	TB6	9	Not Used
Breaker Motor Operation	TB6	10	Motor Operation Close Coil

Table 7 Rectifier Input Breaker contacts

Item	Terminal Block	Pin	Connect to (Description of External Item)
Breaker Auxiliary Status	TB7	1	RIB Aux Status Common
	TB7	2	RIB Aux Status, Normally Closed Contact, Closed = CB is Open
	TB7	3	RIB Aux Status, Normally Open Contact, Open = CB is Open
Breaker UVR Control	TB7	4	RIB UVR Return
	TB7	5	RIB UVR +48VDC

1. For TB7, Pins 1-3, each contact has:
   Maximum voltage: 24VDC
   Maximum current: 10mA
   Wire range: #14-22AWG
   Maximum length: 500 ft. (150m)
2. All external wire field-supplied.
3. All wiring must be in accordance with national and local electrical codes.

3.4 REMOTE BACK-FEED BREAKER

For systems that use a Remote Back-Feed Breaker (RBB), the controls for the Aux contact, shunt trip and voltage sense will go between the remote breaker and the UPS output I/O section. See **Figure 12**.

Figure 12 Remote Back-Feed Breaker diagram

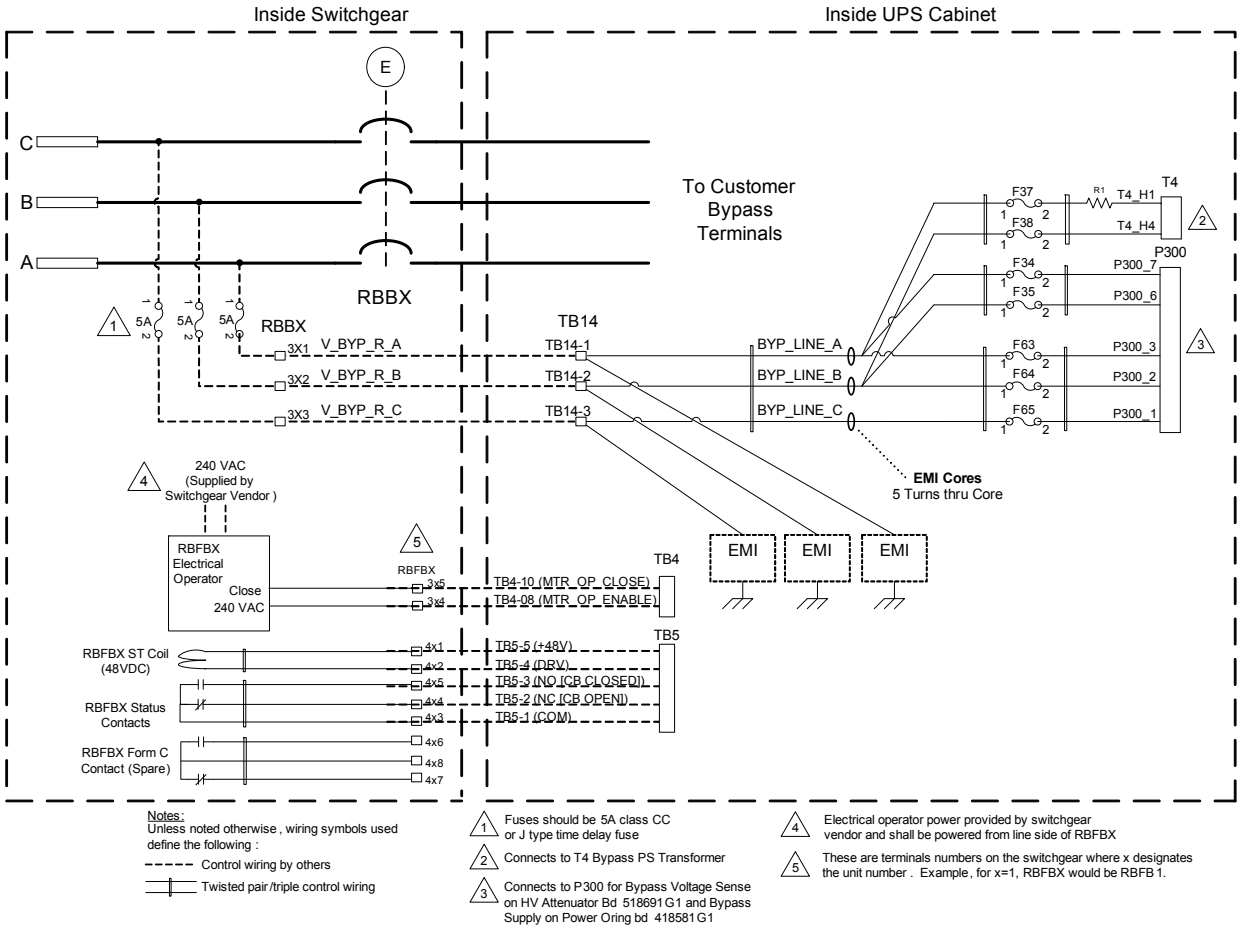


Table 8 Remote Back-Feed Breaker specifications

Power Class	kAIC rating	RBB Specification	RBB General Specification	Comments
625-800kVA	65kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 65kA at a maximum voltage of 480V for three cycles.	The remote breaker must be equipped with shunt trip and auxiliary contacts for proper operation with the UPS.	No UPS internal fuse protection on rectifier and bypass input
	100kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 100kA at a maximum voltage of 480V for three cycles.		No UPS internal fuse protection on the rectifier input. The bypass input has fuse protection.
1000-1200kVA	65kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 65kA at a maximum voltage of 480V for three cycles.	The remote breaker must be equipped with shunt trip and auxiliary contacts for proper operation with the UPS.	No UPS internal fuse protection on rectifier and bypass input
	100kA Module	UL-Listed 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker), which are required for use in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating of 100kA at a maximum voltage of 480V for three cycles.		UPS internal fuse protection exists on rectifier and bypass input

Table 9 Remote Back-Feed Breaker contacts

Item	Terminal Block	Pin	Connect to (Description of External Item)
Not Used	TB4	1	Not Used
	TB4	2	Not Used
Not Used	TB4	3	Not Used
	TB4	4	Not Used
Not Used	TB4	5	Not Used
	TB4	6	Not Used
Not Used	TB4	7	Not Used
Not Used	TB4	8	Not Used
Not Used	TB4	9	Not Used
Not Used	TB4	10	Not Used

Table 9 Remote Back-Feed Breaker contacts

Item	Terminal Block	Pin	Connect to (Description of External Item)
Breaker Auxiliary Status	TB5	1	RBB Aux Status Common
	TB5	2	RBB Aux Status, Normally Closed Contact, Closed = CB is Open
	TB5	3	RBB Aux Status, Normally Open Contact, Open = CB is Open
Breaker ST Control	TB5	4	RBB ST Return
	TB5	5	RBB ST +48VDC

1. For TB7, Pins 1-3, each contact has:
   Maximum voltage: 24VDC
   Maximum current: 10mA
   Wire range: #14-22AWG
   Maximum length: 500 ft. (150m)
2. All external wire field-supplied.
3. All wiring must be in accordance with national and local electrical codes.

3.5 COMMUNICATION AND MONITORING

The Liebert EXL has these monitoring options:

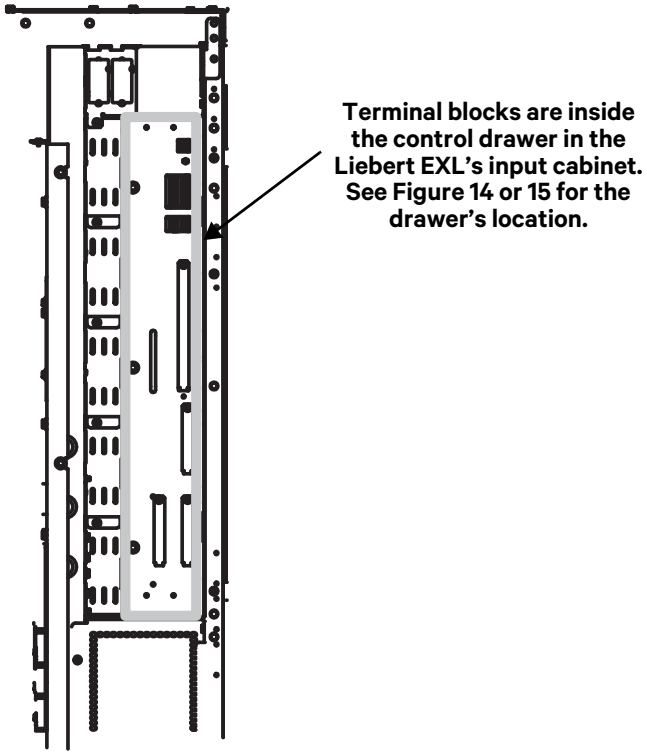
- Liebert IntelliSlot® Unity-DP (Dual Protocol) Card

The Liebert IntelliSlot Unity Card provides Web, embedded Vertiv® LIFE™ Technology, Vertiv Protocol, SNMP, BACnet IP/MSTP, Modbus TCP/RTU, SMTP, SMS, and telnet communication and control capabilities in one unified communication platform. The platform supports 10/100 Mbit Ethernet, IPv4 and IPv6, HTTP/HTTPS for device Web page access, SMTP interface for e-mail, SMS interface for text messaging, Vertiv Protocol for communicating with Trellis™ and Liebert Nform® software applications and LIFE technology for supporting Liebert Remote Service Delivery.

SNMP v1/v2c/v3, Modbus TCP/IP, BACnet IP, Modbus RTU, BACnet MSTP and YDN23 third-party protocols are also supported for building management and network management applications. The Liebert IntelliSlot Unity card provides ground fault isolated 10/100 baseT Ethernet and RS-485 network connectivity.

- Programmable Relay Board
- Input Contact Isolator Board

Figure 13 Terminal block locations—input cabinet



3.5.1 Alber® Monitoring System

The matching Liebert EXL Battery Cabinet has space for an Alber battery monitoring system. The battery monitoring system can be factory-installed or field-installed later.

The Alber Battery Monitor by Vertiv continuously checks all critical battery parameters, such as cell voltage, overall string voltage, current and temperature. Automatic periodic tests of internal resistance of each battery will verify the battery's operating integrity. Capabilities include automatic internal patented DC resistance tests and trend analysis, providing the ability to analyze performance, aid in troubleshooting and detect failing cells before they fail.

4.0 INSTALLATION DRAWINGS

Figure 14 Typical main components, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit

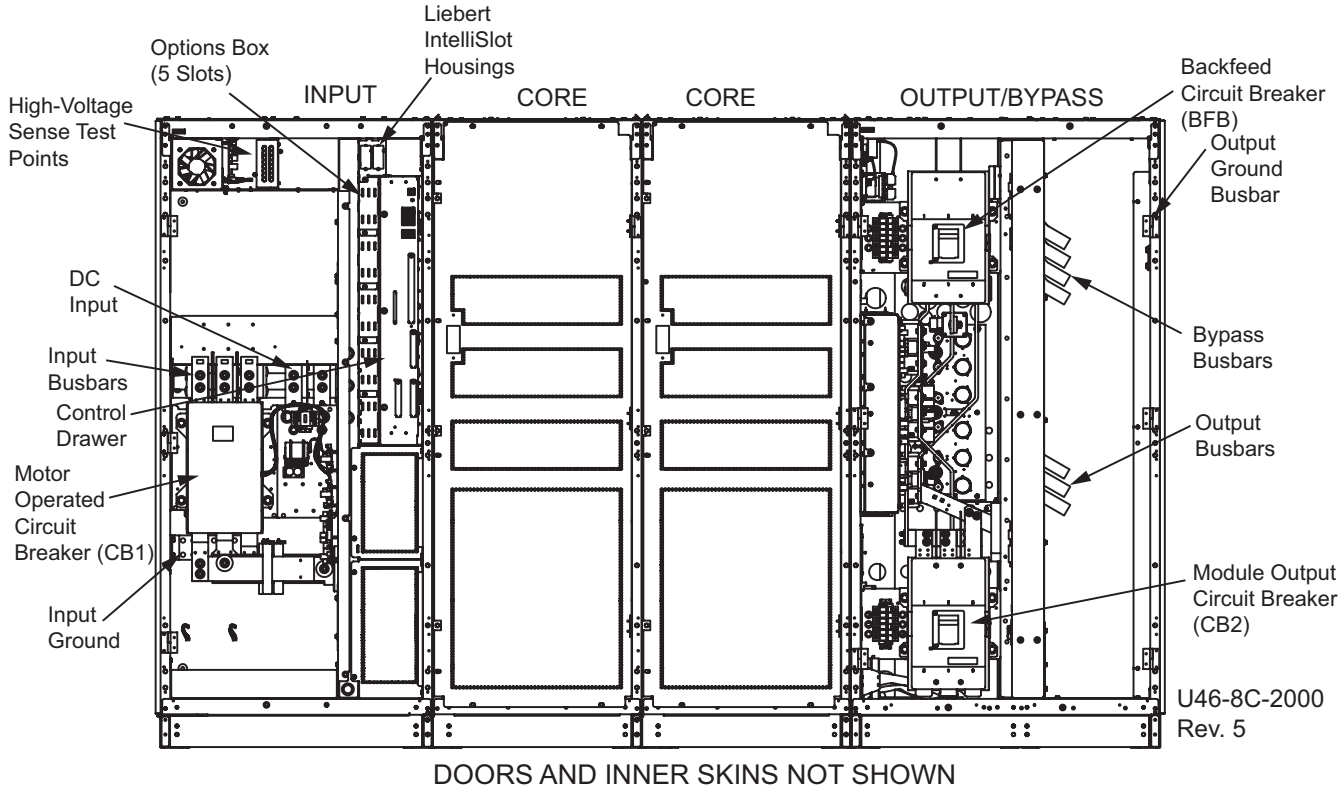
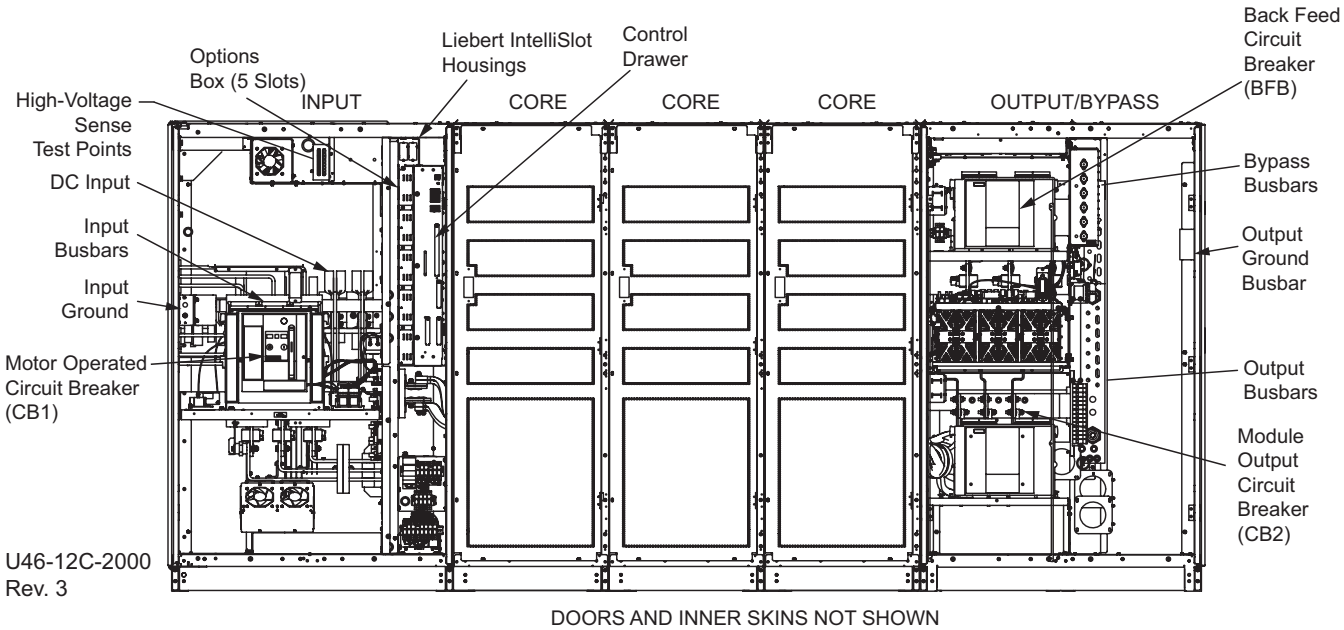


Figure 15 Typical main components, 1000-1200kVA Liebert EXL, SMS and 1+N multi-module unit



The difference between an SMS and 1+N configuration is that the 1+N has sharing inductors present behind CB2 (not visible in drawing)

Figure 16 Main components for remote breaker configuration—Single module with static bypass or 1+N multi-module; 625kVA-800kVA

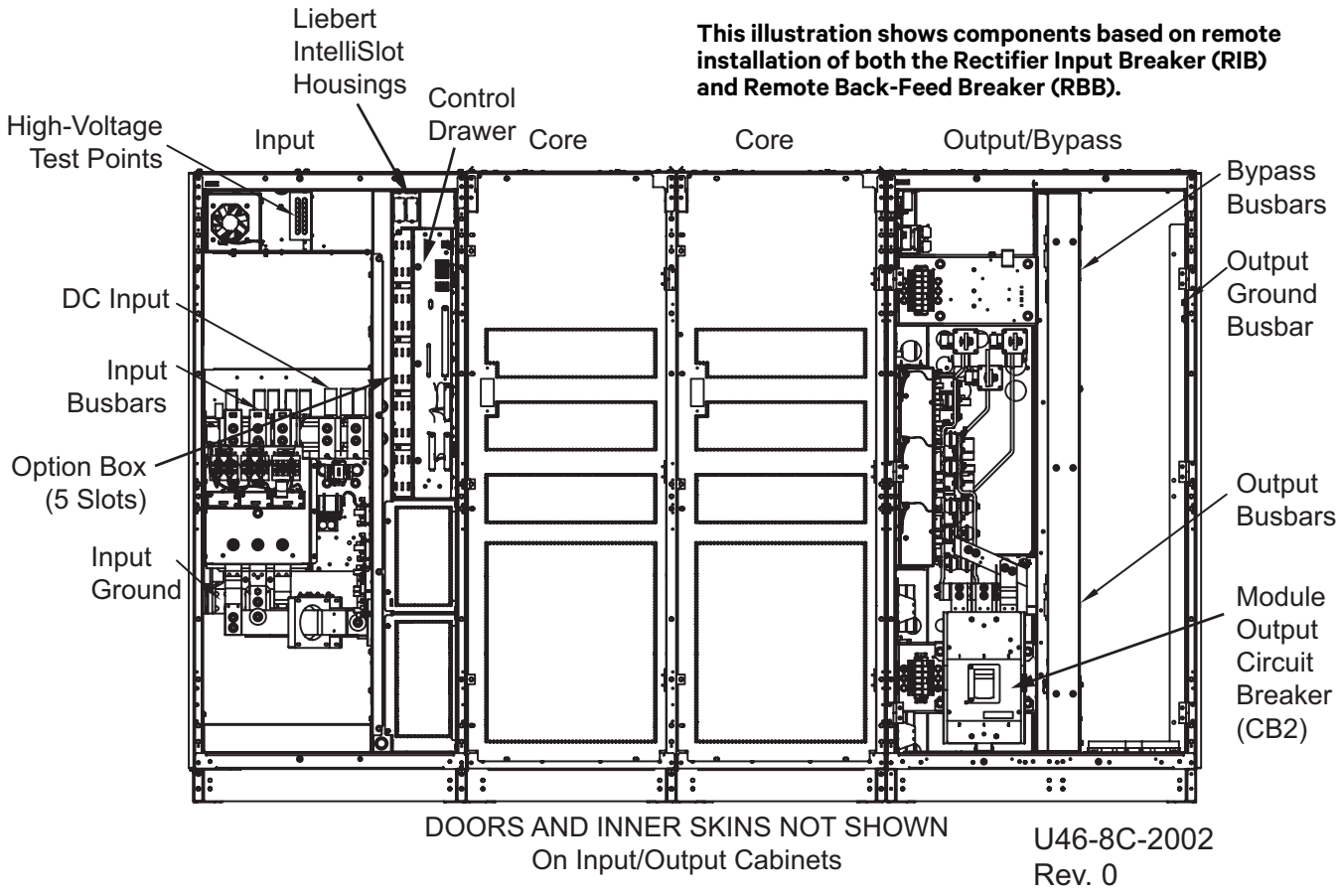


Figure 17 Main components for remote breaker configuration—Single module with static bypass or 1+N multi-module; 1000kVA-1200kVA

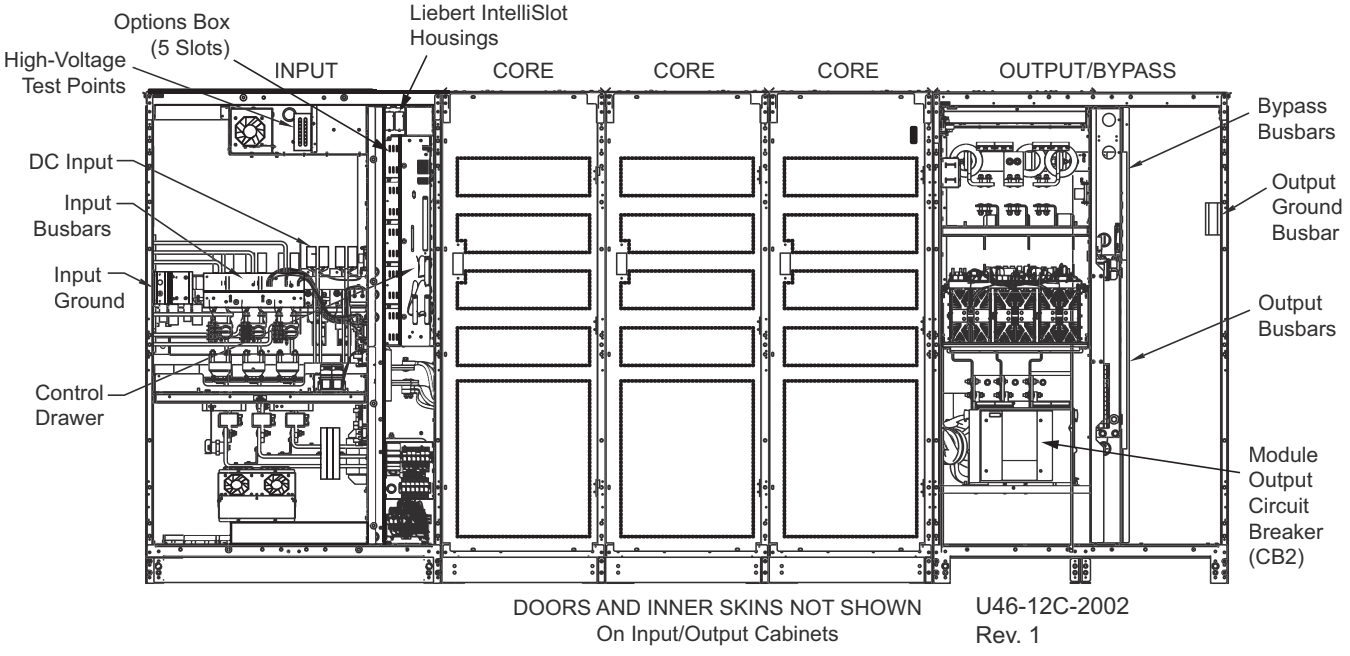
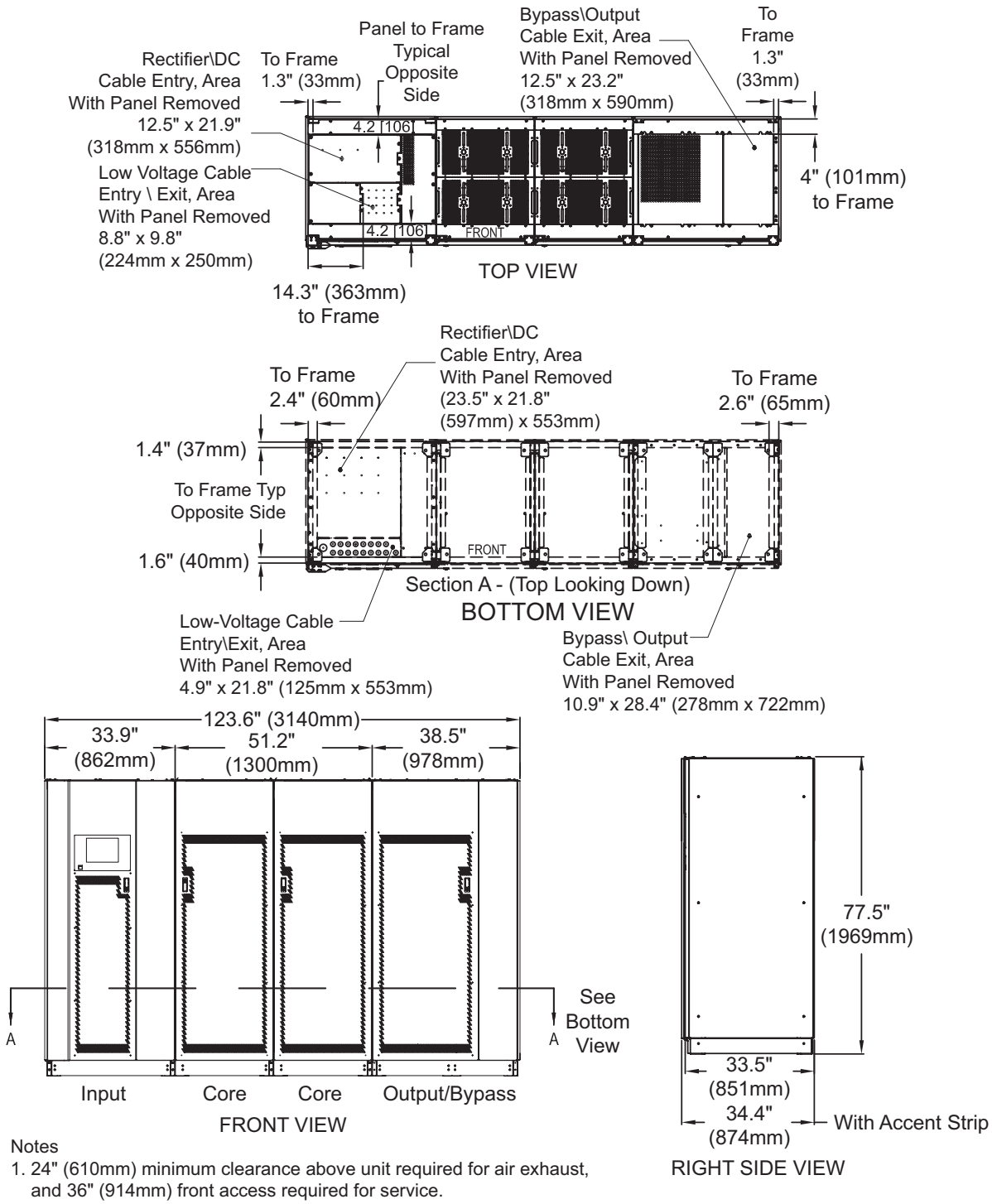


Figure 18 Outline Drawing, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit

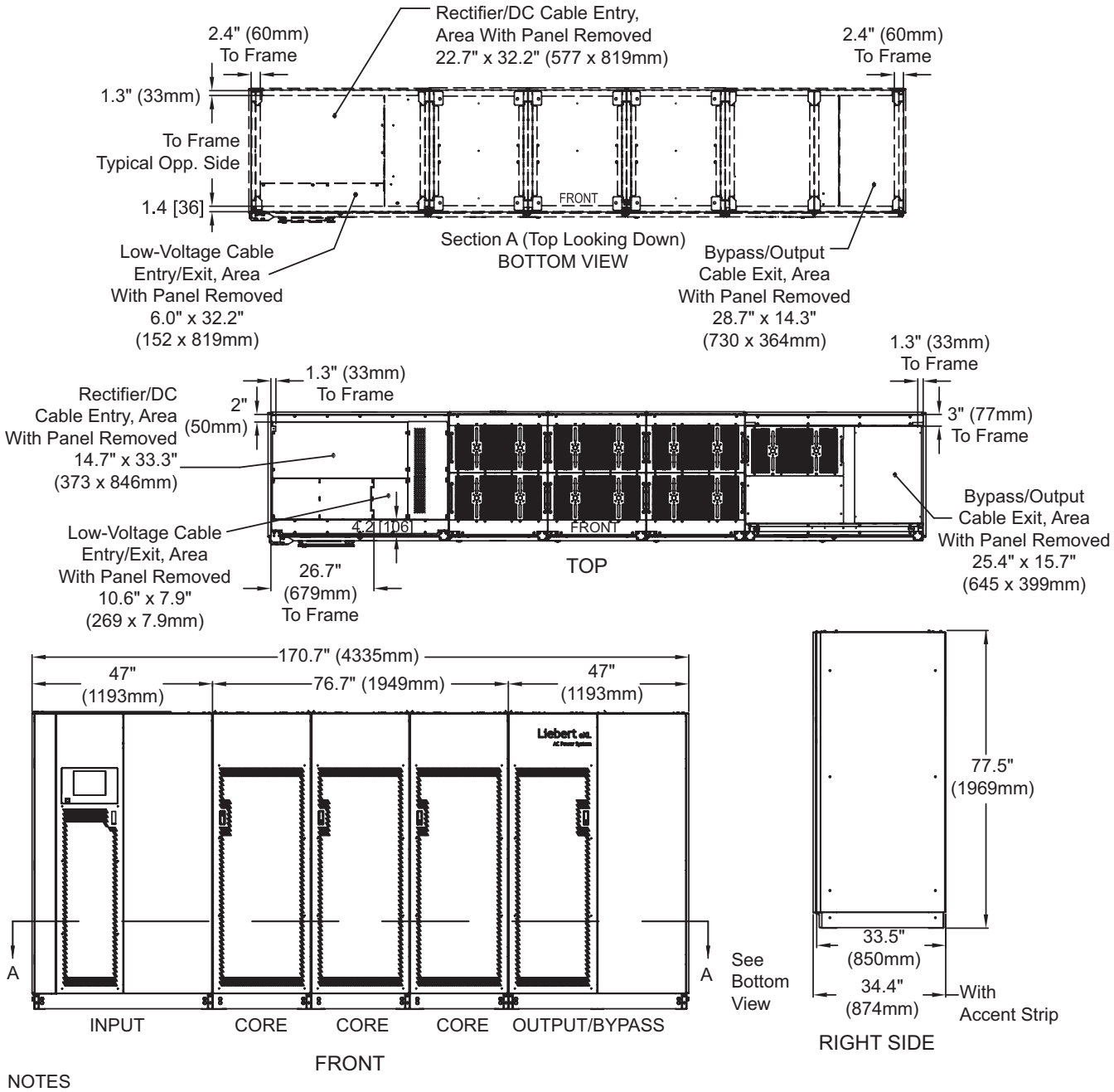


Notes

1. 24" (610mm) minimum clearance above unit required for air exhaust, and 36" (914mm) front access required for service.
2. Keep cabinet within 15 degrees of vertical while handling.
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 is to be in accordance with national and local electrical codes.
7. Width dimension includes side panels. Subtract 1.4" (35mm) when removing both side panels.
8. See technical information drawing for shipping split weights.

U46-8C-2001
Rev. 3

Figure 19 Outline Drawing, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit



NOTES
1. All dimensions are in inches (mm).
2. 24" (610) minimum clearance above unit required for air exhaust;
   36" (914) front access required for service.
3. Keep cabinet within 15 degrees of vertical while handling.
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. Width dimension includes side panels. Subtract 1.4" (35mm) when removing both side panels.
9. See technical information drawing for shipping split weights.

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Figure 20 Base drawing, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit

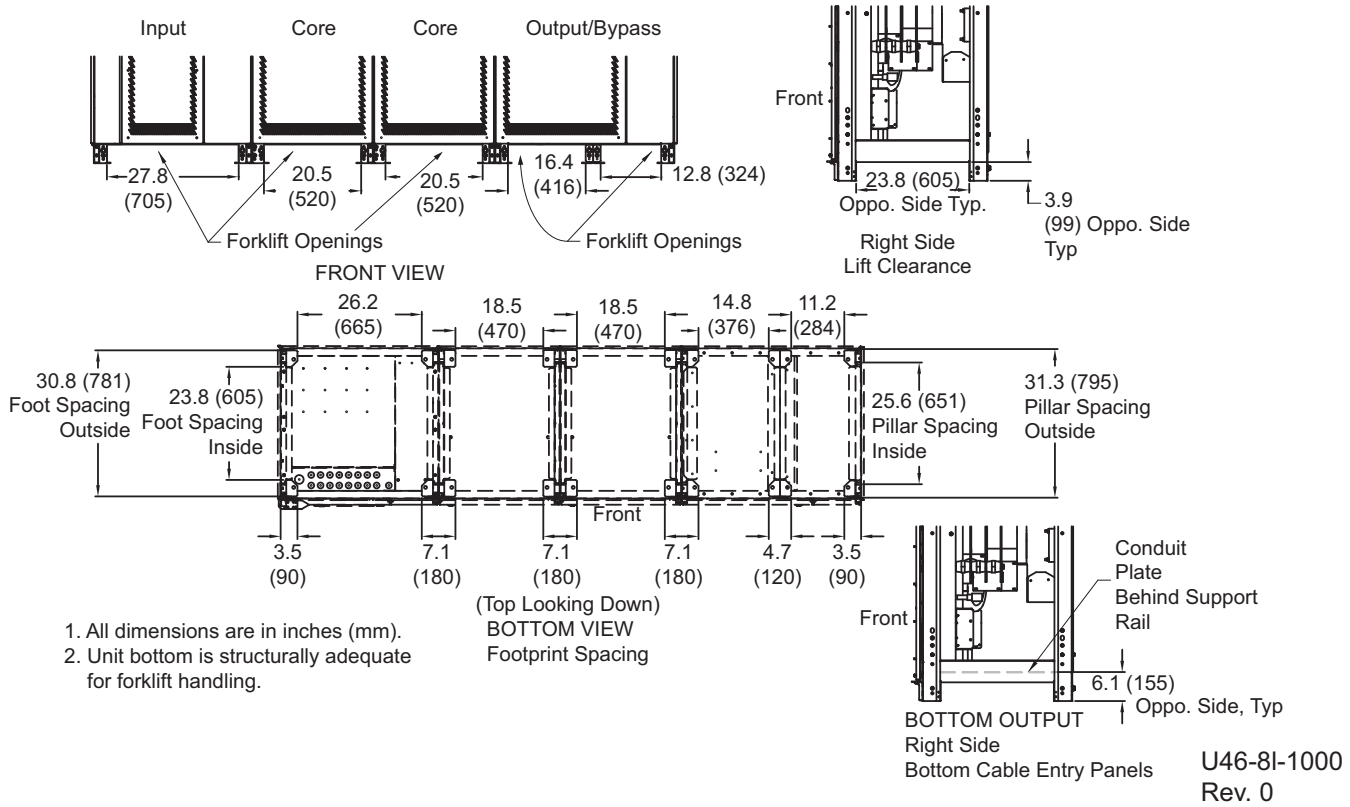
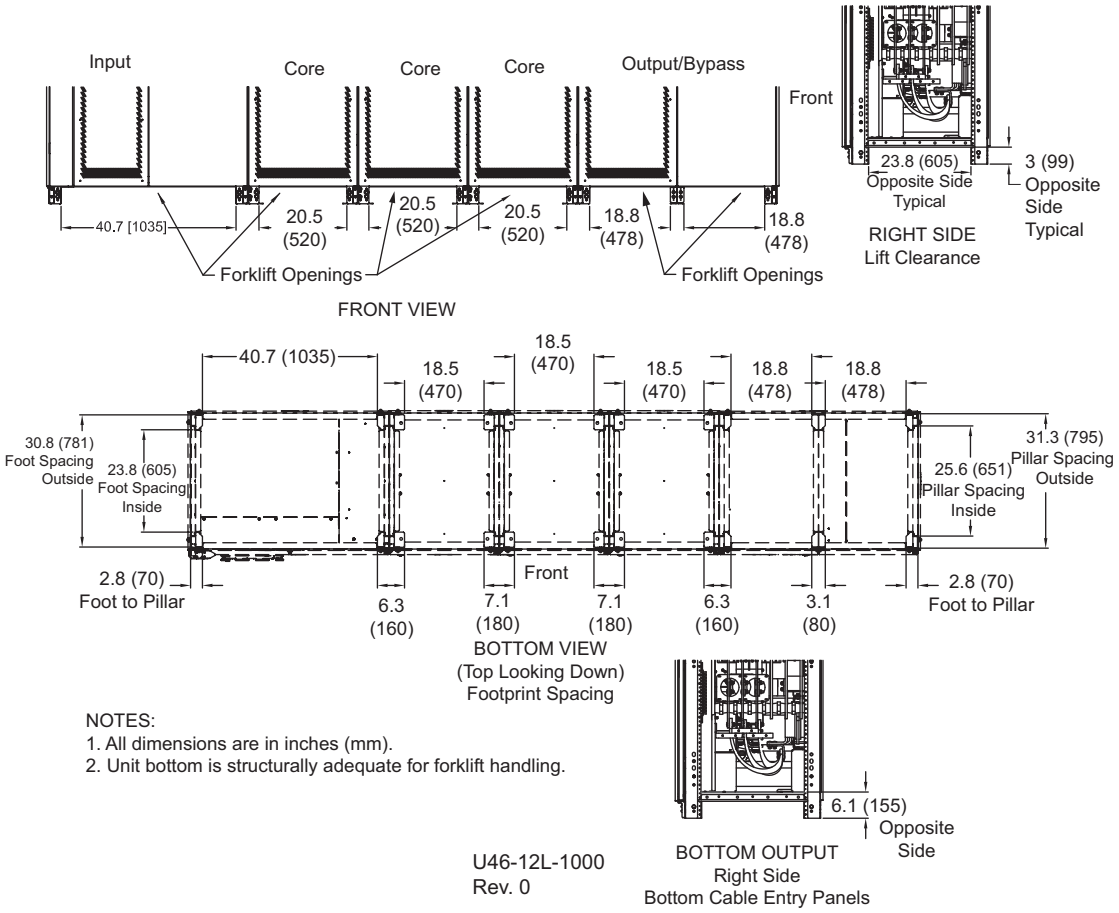


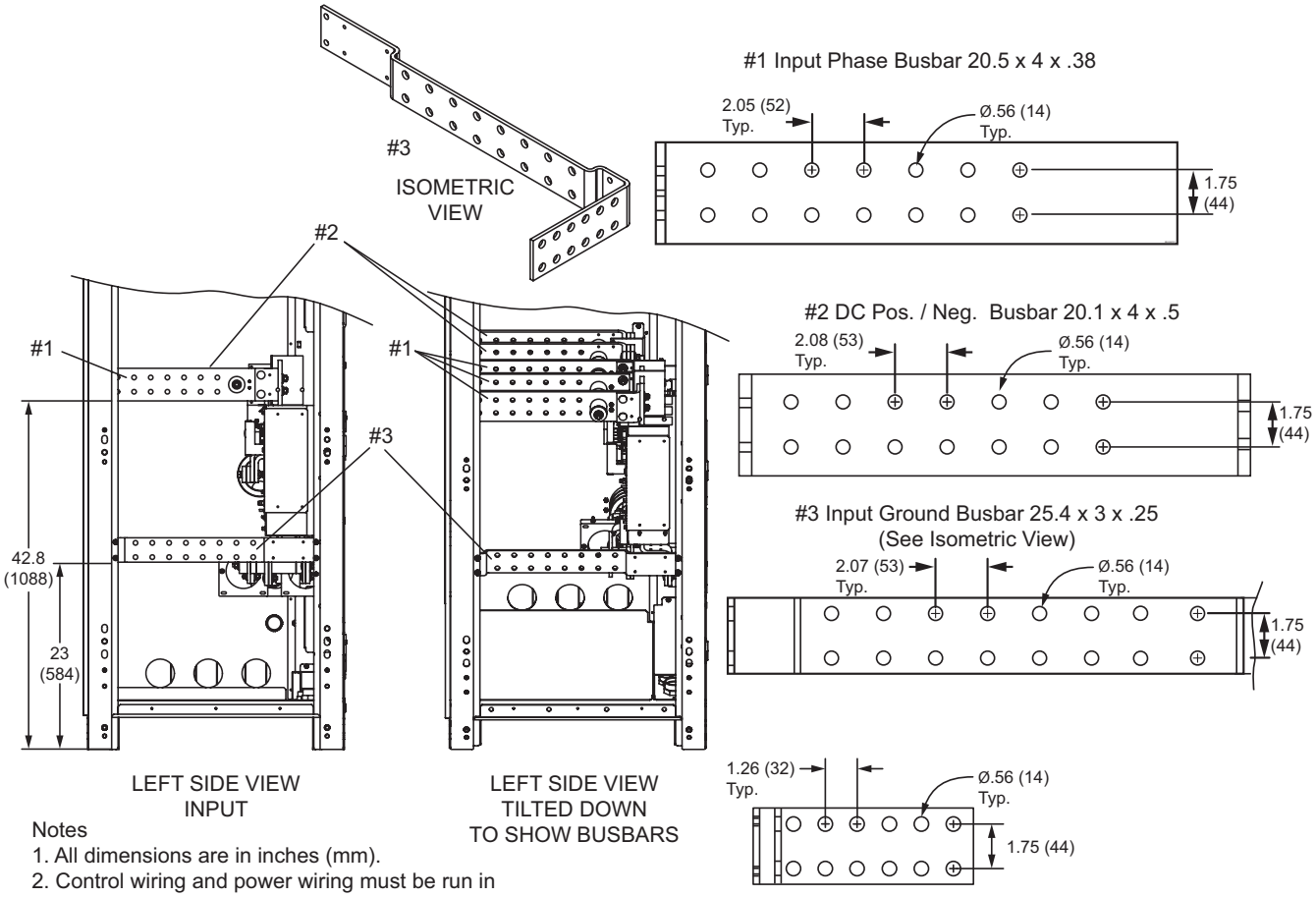
Figure 21 Base drawing, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit



NOTES:
1. All dimensions are in inches (mm).
2. Unit bottom is structurally adequate for forklift handling.

U46-12L-1000
Rev. 0

Figure 22 Input and battery terminal detail, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit

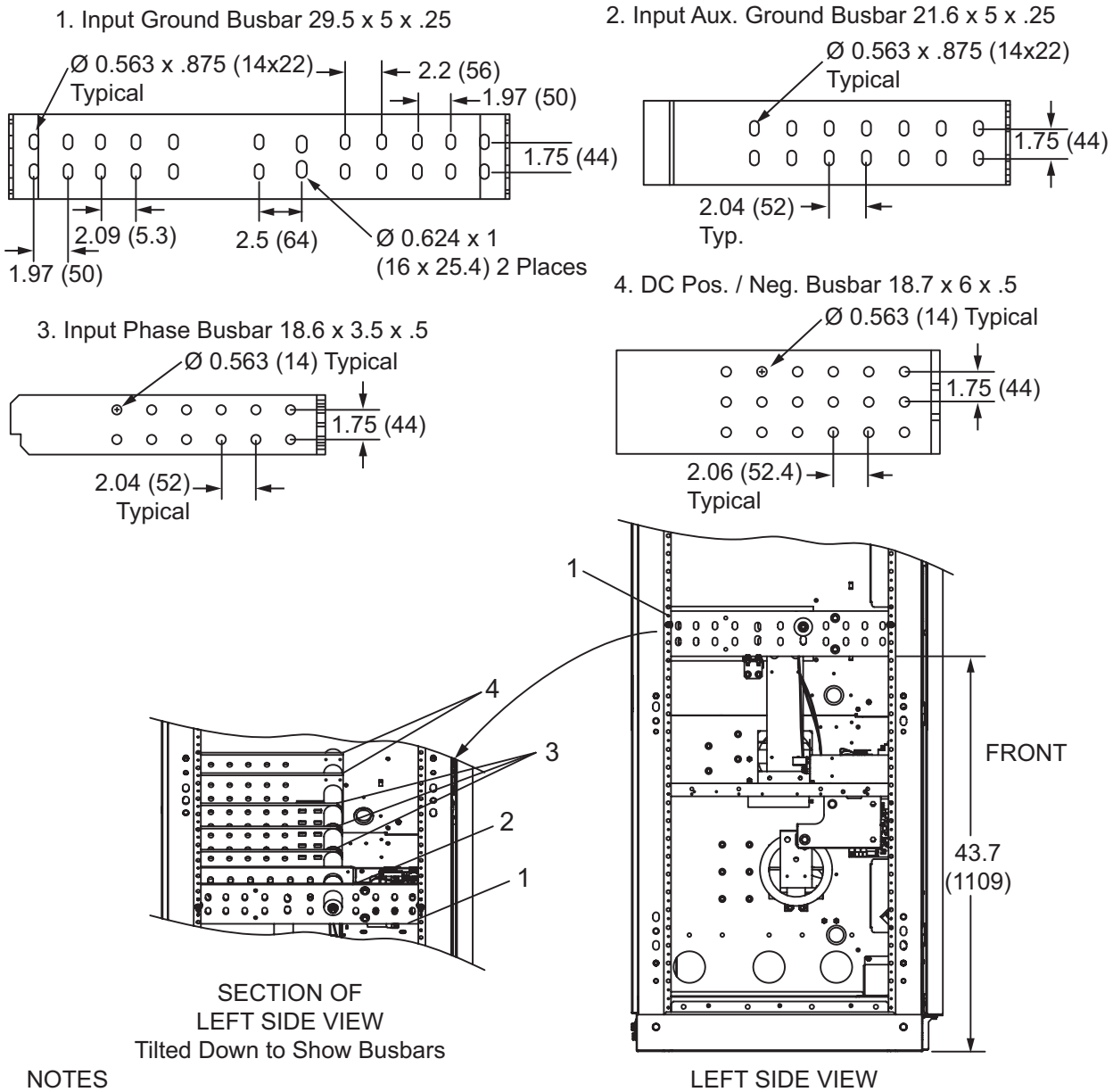


Notes

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits.
3. All wiring is to be in accordance with national and local electrical codes.
4. Based on NEC 408.56 minimum spacing, all live parts, including lugs, must be at least 1" (25mm) from any other live part from a different phase or the chassis frame. If lug stacking is required, the method of stacking and required minimum spacing are the responsibility of the installing contractor and authority having jurisdiction.

U46-8E-3200B
Rev. 3

Figure 23 Input and battery terminal detail, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit

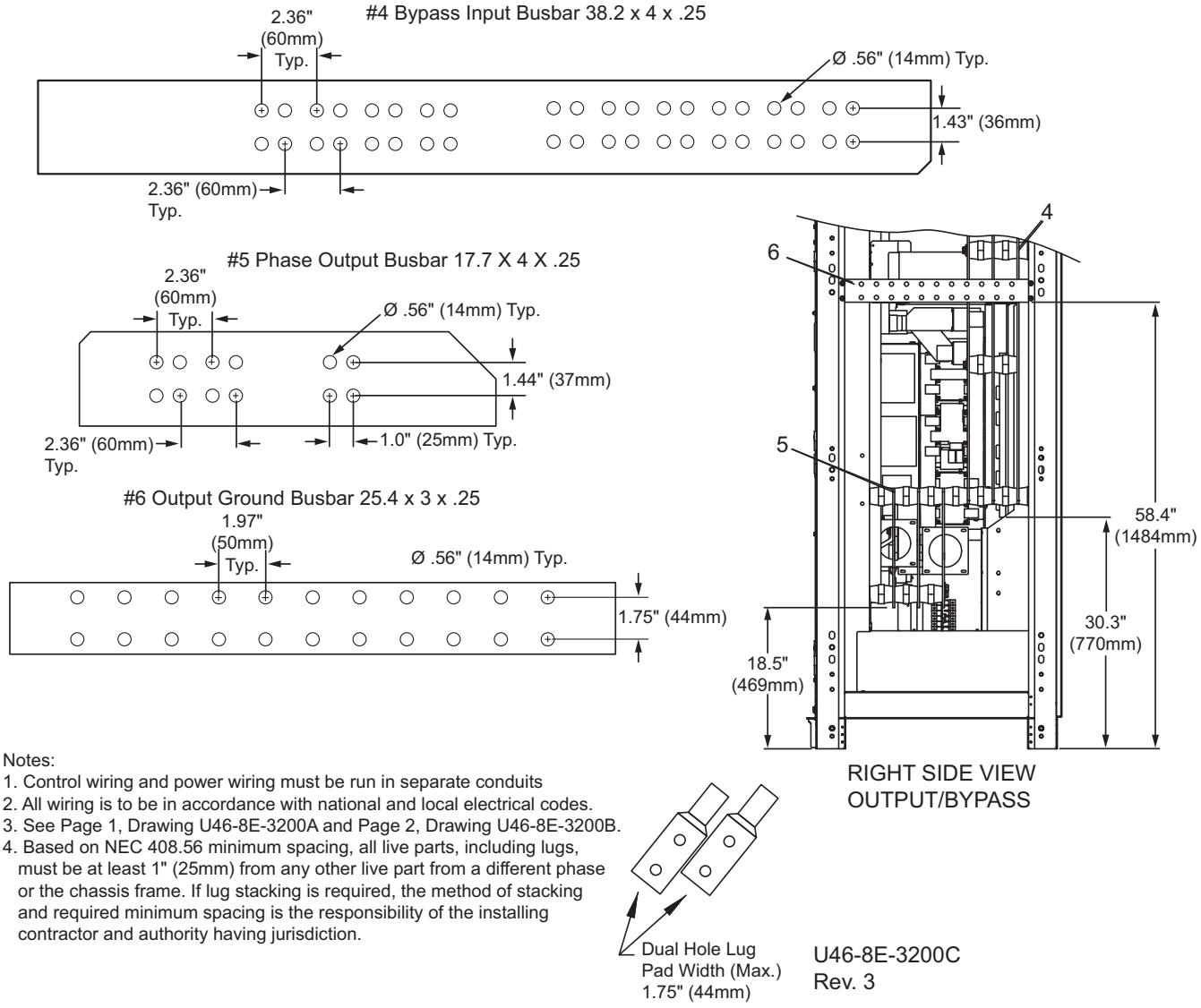


NOTES

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits
3. All wiring is to be in accordance with national and local electrical codes.
4. See Page 1, Drawing U46-12E-3200A and Page 3, Drawing U46-12E-3200C.
5. Based on NEC 408.56 minimum spacing, all live parts, including lugs, need to be at least 1 inch (25.4mm) from any other live part from a different phase or the chassis frame. If lug stacking is required, the method of stacking and required minimum spacing is the responsibility of the installing contractor and authority having jurisdiction (AHJ).

U46-12E-3200B
Rev. 0

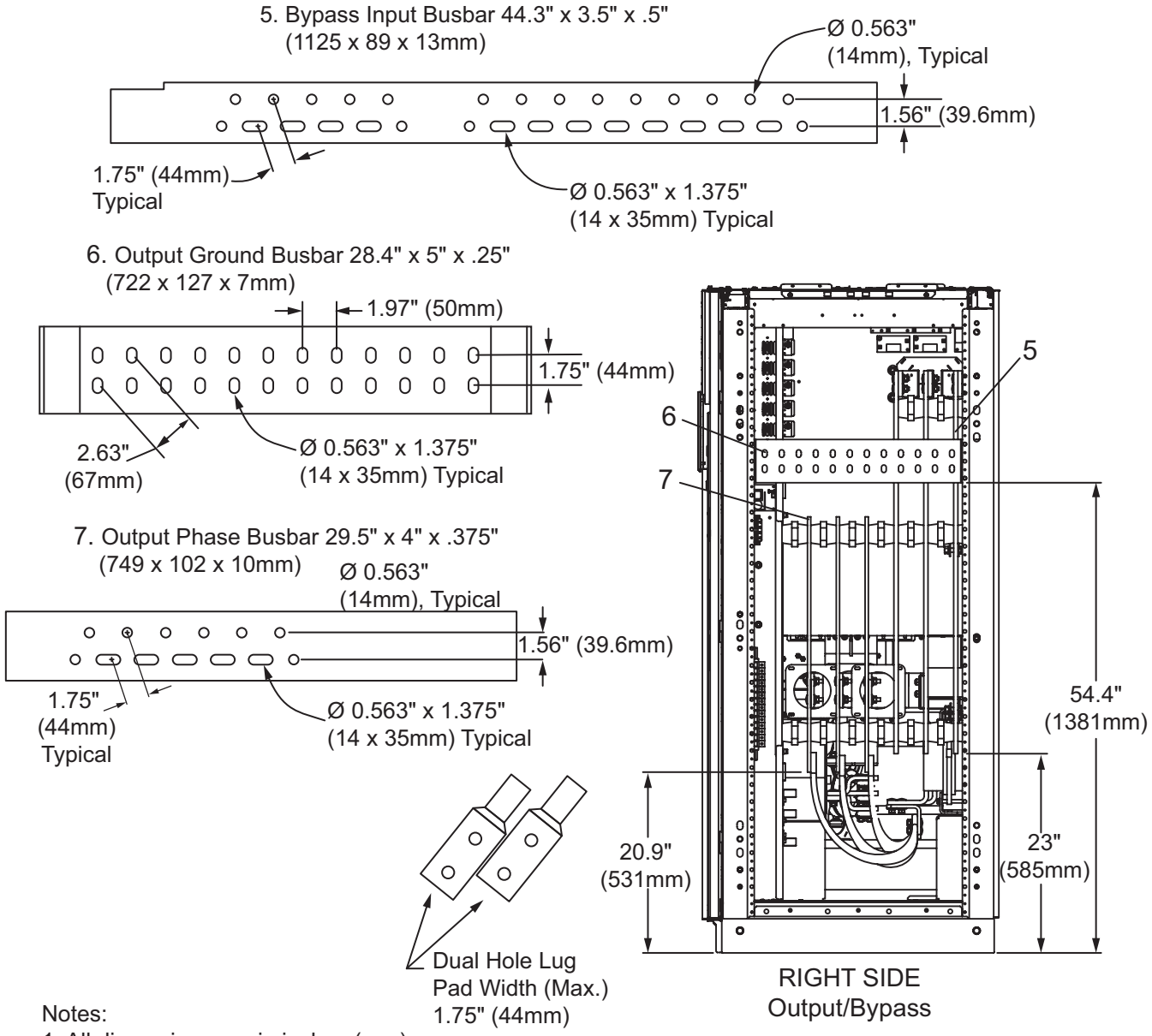
Figure 24 Output and bypass terminal detail, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit



Notes:
1. Control wiring and power wiring must be run in separate conduits
2. All wiring is to be in accordance with national and local electrical codes.
3. See Page 1, Drawing U46-8E-3200A and Page 2, Drawing U46-8E-3200B.
4. Based on NEC 408.56 minimum spacing, all live parts, including lugs, must be at least 1" (25mm) from any other live part from a different phase or the chassis frame. If lug stacking is required, the method of stacking and required minimum spacing is the responsibility of the installing contractor and authority having jurisdiction.

U46-8E-3200C
Rev. 3

Figure 25 Output and bypass terminal detail, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit

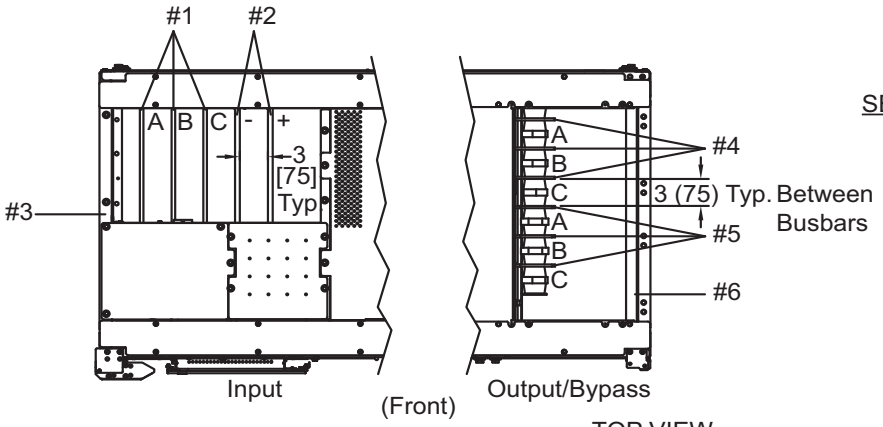


Notes:

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits
3. All wiring is to be in accordance with national and local electrical codes.
4. See Page 1, Drawing U46-12E-3200A and Page 2, Drawing U46-12E-3200B.
5. Based on NEC 408.56 minimum spacing, all live parts, including lugs, must be at least 1 inch (25.4mm) from any other live part from a different phase or the chassis frame. If lug stacking is required, the method of stacking and required minimum spacing is the responsibility of the installing contractor and authority having jurisdiction (AHJ).

U46-12E-3200C
Rev. 0

Figure 26 Input, output and bypass terminal spacing details, 625-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit



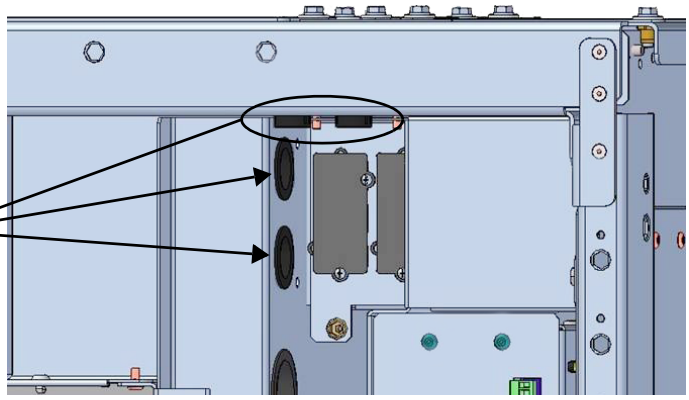
SEE BUSBAR DETAIL PAGES 2 & 3

#1 Input Phase Busbar
#2 DC Positive / Negative Busbar
#3 Input Ground Busbar
#4 Bypass Input Busbar
#5 Phase Output Busbar
#6 Output Ground Busbar

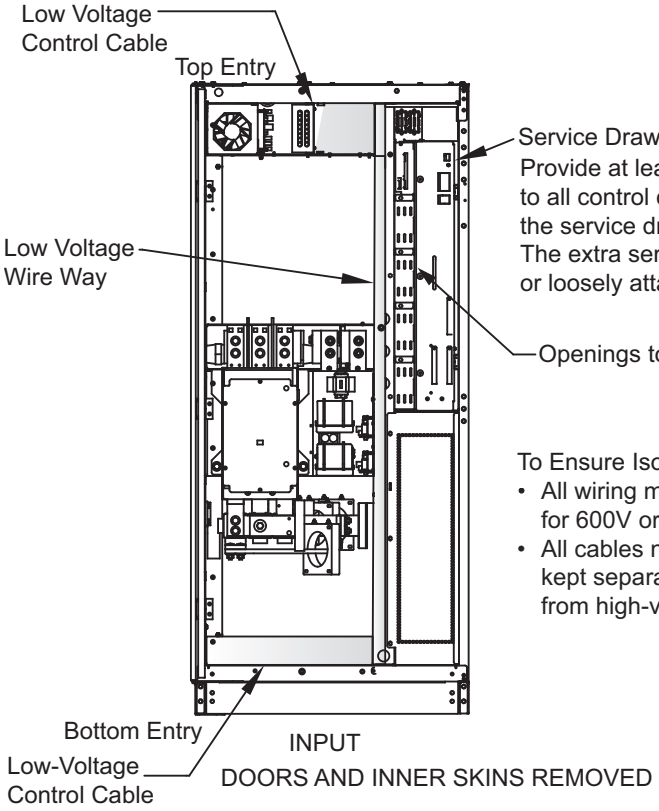
1. All dimensions are in inches [mm].
2. Control wiring and power wiring must be run in separate conduits.
3. All wiring is to be in accordance with national and local electrical codes.
4. See Page 2, Drawing U46-8E-3200B and Page 3, Drawing U46-8E-3200C.

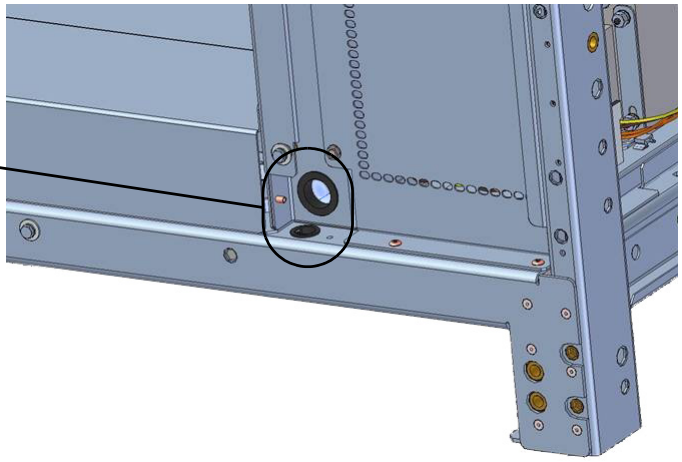
U46-8E-3200A
Rev. 0

Figure 27 Low-voltage cable routing



Use these entry holes for Liebert IntelliSlot® Unity™ card cables only

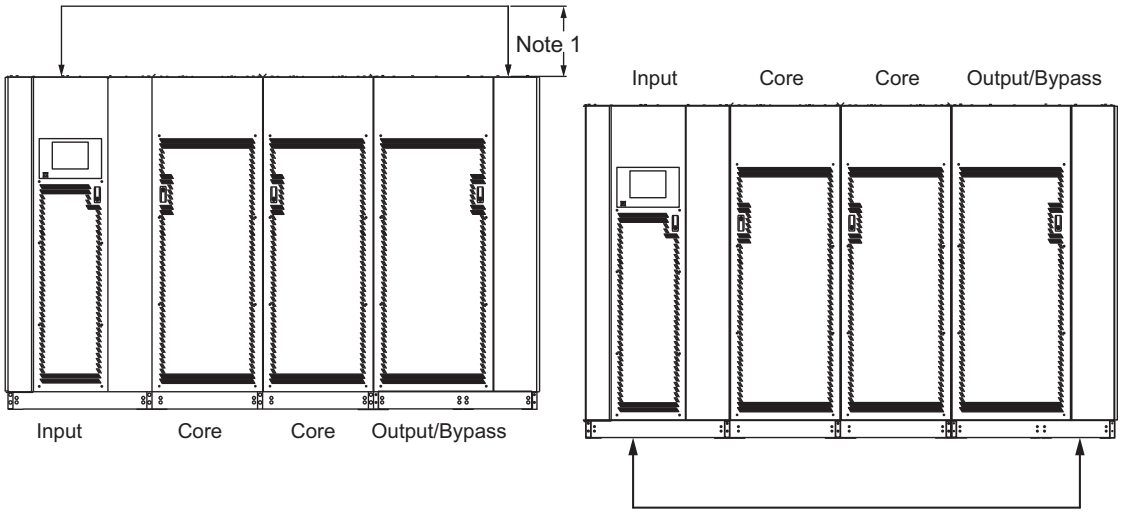




Use these entry holes for Liebert IntelliSlot Unity card cables only

Figure 28 Cabling for single input configuration

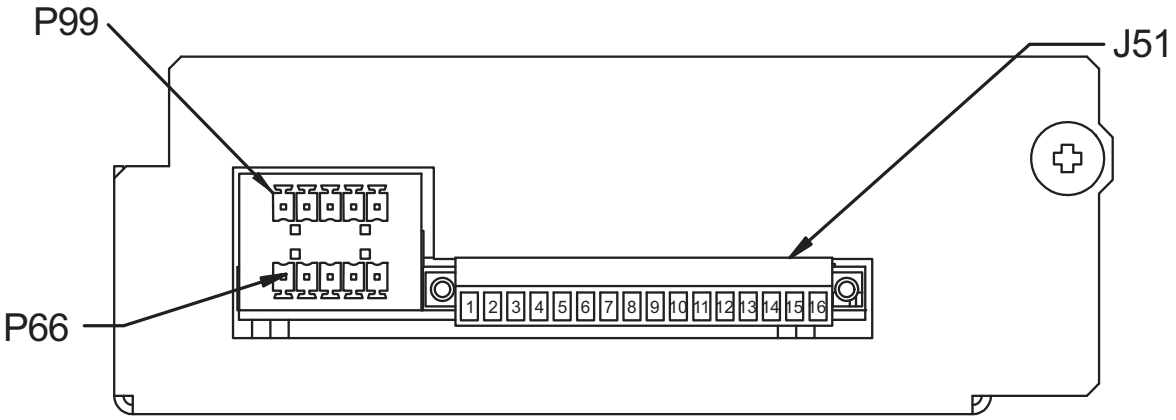
625-800kVA unit shown, similar configuration for 1000-1200kVA unit



NOTES

1. 24" (610) minimum clearance above the unit is required for air exhaust.
2. Top and bottom cable entry is available through removable access plates. Remove, punch to suit conduit size and replace.
3. All wiring is to be in accordance with national and local electrical codes.
4. See **Table 18** for cable sizing
5. Connections between the rectifier and bypass busbars are supplied by others.
6. Based on NEC 408.56 minimum spacing, all live parts, including lugs, must be at least 1 inch (25.4mm) from any other live part from a different phase or the chassis frame. If lug stacking is required, the method of stacking and

Figure 29 Optional Input Contact Isolator Board



1. Customer control wiring connection points are Terminals 1 through 16 (see **Table 11**).
2. Customer-provided, normally open dry contacts for user alarm messages.
3. All control wiring (by others) must be run separate from power wiring.
4. Signal voltage: 100mA @ 12VDC.
5. Maximum cable length is 500 ft. (152m) with #16AWG and flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

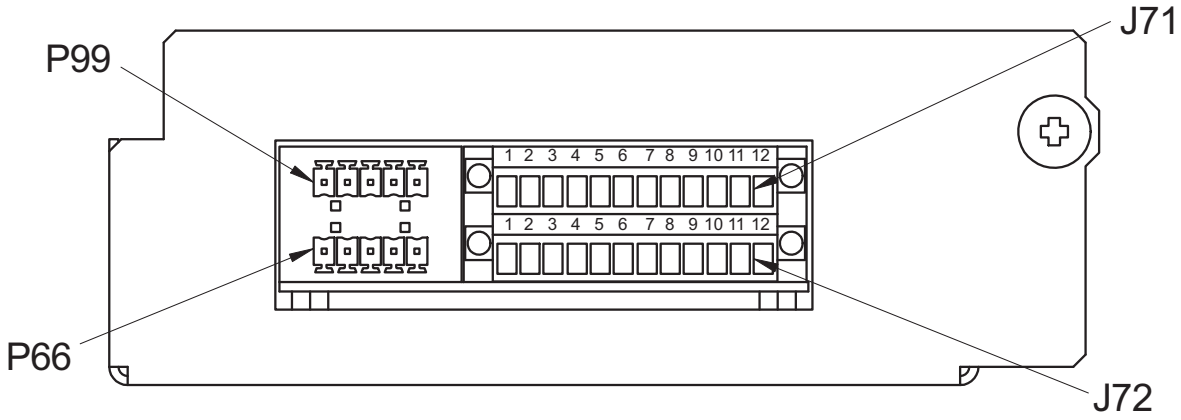
Table 10 Input Contact Isolator Board pre-assigned values

Channel #	ICI #1	ICI #2
	Pre-Assigned Label	Pre-Assigned Label
1	Reduced Rect ILimit	None
2	Reduced Batt ILimit	None
3	Stop Battery Charge	None
4	—	None
5	EcoMode Suspended	None
6	—	None
7	—	None
8	—	None

Table 11 Input Contact Isolator Board control wiring connections

Input Contact	Pin No.
1	1
	2
2	3
	4
3	5
	6
4	7
	8
5	9
	10
6	11
	12
7	13
	14
8	15
	16

Figure 30 Control wiring, Programmable Relay Board



1. Customer control wiring connection points are Terminals 1 through 12.
2. Programmable Relay Board option includes eight signal channels with one Form-C dry contact per channel (see **Table 12**).
3. All control wiring (by others) must be run separate from power wiring.
4. Contact ratings: 1A @ 30VDC or 125VAC @ 0.45A
5. Maximum cable length is 500 ft. (152m) with #16AWG and flexible stranded cable.

Table 12 Programmable Relay Board pinout

Terminal Block	Channel	Pin No.	Common	Normally Closed	Normally Open
J71	CH1	1-3	1	2	3
	CH2	4-6	4	5	6
	CH3	7-9	7	8	9
	CH4	10-12	10	11	12
J72	CH5	1-3	1	2	3
	CH6	4-6	4	5	6
	CH7	7-9	7	8	9
	CH8	10-12	10	11	12

5.0 SPECIFICATIONS

Table 13 Liebert EXL UPS specifications

Model Size	625-800kVA	1000-1200kVA
Input Parameters		
Input Voltage to Rectifier, VAC	480V 3-phase, 3-wire	480V 3-phase, 3-wire
Input Voltage to Bypass, VAC	480V 3-phase, 3-wire	480V 3-phase, 3-wire
Input Voltage Range, VAC	+10% to -30%	+10% to -30%
Input Frequency, Hz	60	60
Permissible Input Frequency Range, Hz	55 to 65	55 to 65
Reflected Input THDi, Nominal Voltage, Full Load, %	<5%	<5%
Power Walk-In, sec	1 to 30 (selectable) in 1 sec. Increments	1 to 30 (selectable) in 1 sec. Increments
Battery & DC Parameters		
Battery Type	VRLA (Valve Regulated Lead Acid) or FLA (Flooded Lead Acid)	VRLA (Valve Regulated Lead Acid) or FLA (Flooded Lead Acid)
Nominal Battery Bus, VDC	480V	480V
Battery Float Voltage, VDC	540V	540V
Minimum End of Discharge Voltage, VDC	384V (for VRLA / Flooded Lead Acid)	384V (for VRLA / Flooded Lead Acid)
DC Ripple Voltage in Float & Const V Ch. Mode, %	<1 (RMS value) < 3,4% Vpp	<1 (RMS value) < 3,4% Vpp
Temperature Compensated Battery Charging	Optional (with temperature probe)	Optional (with temperature probe)
Output Parameters		
Inverter Type	IGBT-Based PWM Controlled	IGBT-Based PWM Controlled
Output Power, kW	625 | 750 | 800	1000 | 1100 | 1200
Output Voltage, VAC	480V 3-ph, 3-wire	480V 3-ph, 3-wire
Output Voltage Regulation, %	< 1% (3-phase RMS average)	< 1% (3-phase RMS average)
Output Voltage Regulation (50% Unbalanced Load)	< 2% (3-phase RMS average)	< 2% (3-phase RMS average)
Output Frequency, Hz	60	60
Output Frequency Regulation, %	± 0.1	± 0.1
Output THDv Linear Load at Nominal Voltage, %	<3%	<3%
Output THDv at Nominal Voltage Including a 100kVA Non-Linear Load per EN 62040-3, %	6% (max)	6% (max)
Capacity to Handle High Crest Factor Load	3:1	3:1
Capacity to handle Step Load, %	0-100 or 100-0	0-100 or 100-0
Step Load Transient Recovery (linear loads), %	IEC 62040-3, Section 5.3.1 Figure 1	IEC 62040-3, Section 5.3.1 Figure 1
Unbalance Loads Current Capacity	100% of nominal phase current	100% of nominal phase current
Load Power Factor Supported (Without Derating)	0.7 Leading to 0.7 Lagging	0.7 Leading to 0.7 Lagging

Table 13 Liebert EXL UPS specifications *(continued)*

Model Size	625-800kVA	1000-1200kVA
Voltage Displacement, ° (Electrical Degree)	120° ±1° (with 50% unbalanced load)	120° ±1° (with 50% unbalanced load)
Overload Conditions, % FL	See **Figures 31**, **32** and **33**	
Physical Parameters and Standards		
Width, in (mm), With Static Bypass	123.6 (3140)	170.7 (4335)
Depth, in (mm)	34.4 (874)	34.4 (874)
Height, in (mm)	77.5 (1969)	77.5 (1969)
Weight, Unpackaged, lb. (kg) approximate with Static Bypass (1+N)	5687 (2580)	8095 (3672)
Maximum Heat Dissipation, Full Load, BTU/hr (kW)		
	625kVA UPS: 77,417 (22.7)	1000kVA UPS: 123,867 (36.3)
	750kVA UPS: 95,653 (28.0)	1100kVA UPS: 136,253 (39.9)
	800kVA UPS: 102,030 (29.9)	1200kVA UPS: 148,640 (43.5)
Cooling Air, CFM	≤4,600	≤6,700
Color	Black (ZP-7021)	Black (ZP-7021)
Front Door Opening (for serviceability)	90°	90°
Degree of Protection for UPS Enclosure	IP 20 (with and without front door open)	IP 20 (with and without front door open)
Minimum Clearance, Top, in (mm)	24 (610)	24 (610)
Minimum Clearance, Back, in (mm)	0	0
Minimum Clearance, Sides, in (mm)	0	0
Location of Cable Entrance	Top or Bottom	Top or Bottom
Standards and Conformities	UL 1778, 5th Ed. CSA 22.2 107.3 FCC Part 15, Class A (with optional filters installed) IEC62040-2, Level 4, Criteria A ANSI C62.41, Category A3 &B3 ISTA WEEE	UL 1778, 5th Ed. CSA 22.2 107.3 FCC Part 15, Class A (with optional filters installed) IEC62040-2, Level 4, Criteria A ANSI C62.41, Category A3 &B3 ISTA WEEE
Environmental Parameters		
Storage Temperature Range, °F (°C)	-4 to 104 (-20 to 40) [3]	-4 to 104 (-20 to 40) [3]
Operating Temperature Range, °F (°C)	32°F to 95°F (0°C to 35°C) at full rated load 1.5% maximum kW / degrees C derating up to 50°C 122°F (50°C) absolute maximum with derating	32°F to 95°F (0°C to 35°C) at full rated load 1.5% maximum kW / degrees C derating up to 50°C 122°F (50°C) absolute maximum with derating
Relative Humidity	95% or less Non-Condensing (Operating and Non-Operating)	95% or less Non-Condensing (Operating and Non-Operating)
Maximum Altitude Above MSL	3300 ft.(1000m) (per IEC 62040/3) - 1% Maximum kW derating / 1000 ft. rise between 3300 and 10,000 ft. (305m rise between 1000 and 3000m)	3300 ft. (1000m) (per IEC 62040/3) - 1% Maximum kW derating / 1000 ft. rise between 3300 and 10,000 ft. (305m rise between 1000 and 3000m)

1. Width dimensions are with side panels attached. Subtract 1.4" (35mm) for dimensions without side panels.
2. Depth dimensions include the front door and rear panel.
3. Contact the factory before storing at temperatures exceeding 104°F (40°C)

Table 14 Current ratings—rectifier input

UPS Rating		Voltage VAC	Nominal Current	Maximum Current
kVA	kW			
625	625	480	779	818
750	750	480	935	982
800	800	480	995	1044
1000	1000	480	1244	1308
1100	1100	480	1368	1438
1200	1200	480	1493	1569

Table 15 Current ratings—bypass input

UPS Rating		Voltage VAC	Nominal Current
kVA	kW		
625	625	480	752
750	750	480	902
800	800	480	962
1000	1000	480	1203
1100	1100	480	1323
1200	1200	480	1443

Table 16 Current ratings—output

UPS Rating		Voltage VAC	Nominal Current
kVA	kW		
625	625	480	752
750	750	480	902
800	800	480	962
1000	1000	480	1203
1100	1100	480	1323
1200	1200	480	1443

Table 17 Current ratings—DC source

UPS Rating		Voltage VAC	Maximum Current at EOD
kVA	kW		
625	625	480	1601
750	750	480	1923
800	800	480	2051
1000	1000	480	2591
1100	1100	480	2850
1200	1200	480	3109

Notes on Tables 14 through 17

1.Nominal rectifier AC input current (considered continuous) is based on full rated output load. Maximum current includes nominal input current and maximum battery recharge current (considered non-continuous).

2.The rectifier overload current is controlled by the input current limit setting, which is adjustable from 25 to 200% (default:125%).

3.For breaker coordination while the module is overloaded, see the current versus time values on the overload curves.

4.Nominal battery voltage is shown at 2.0 volts/cell.

5.DC Source current based at 401VDC.

Figure 31 Inverter overload data

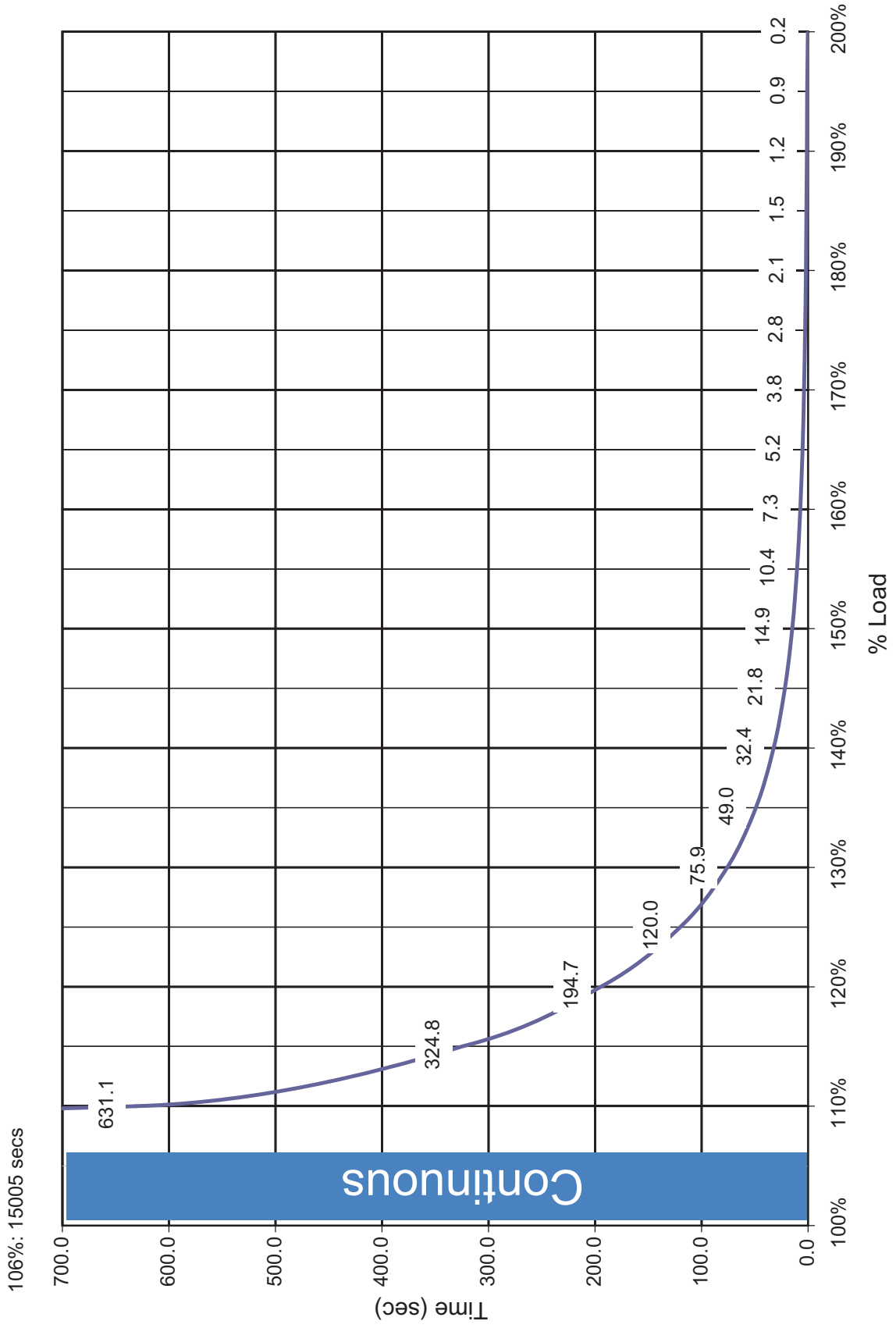


Figure 32 Rectifier overload data

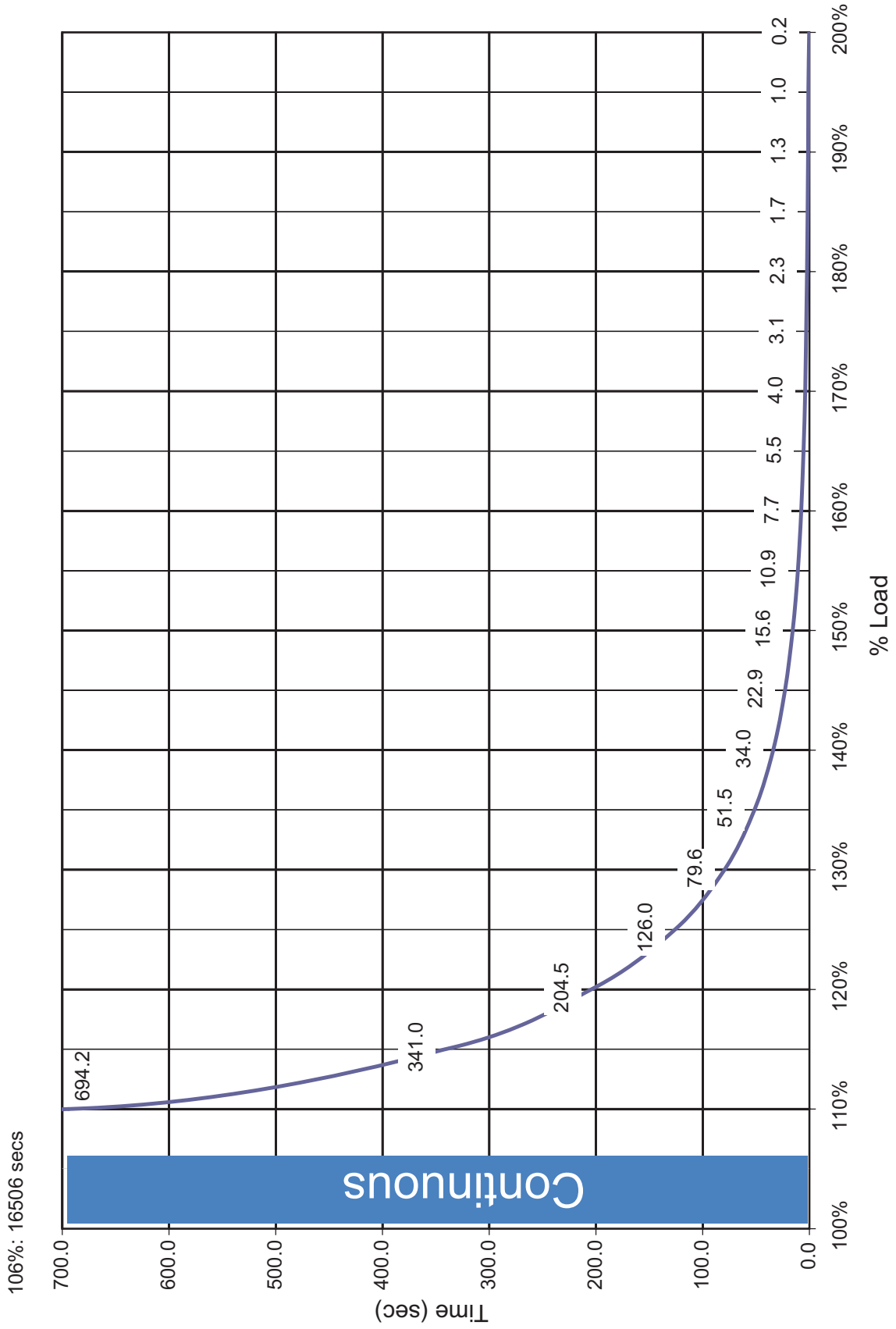


Figure 33 Bypass overload data

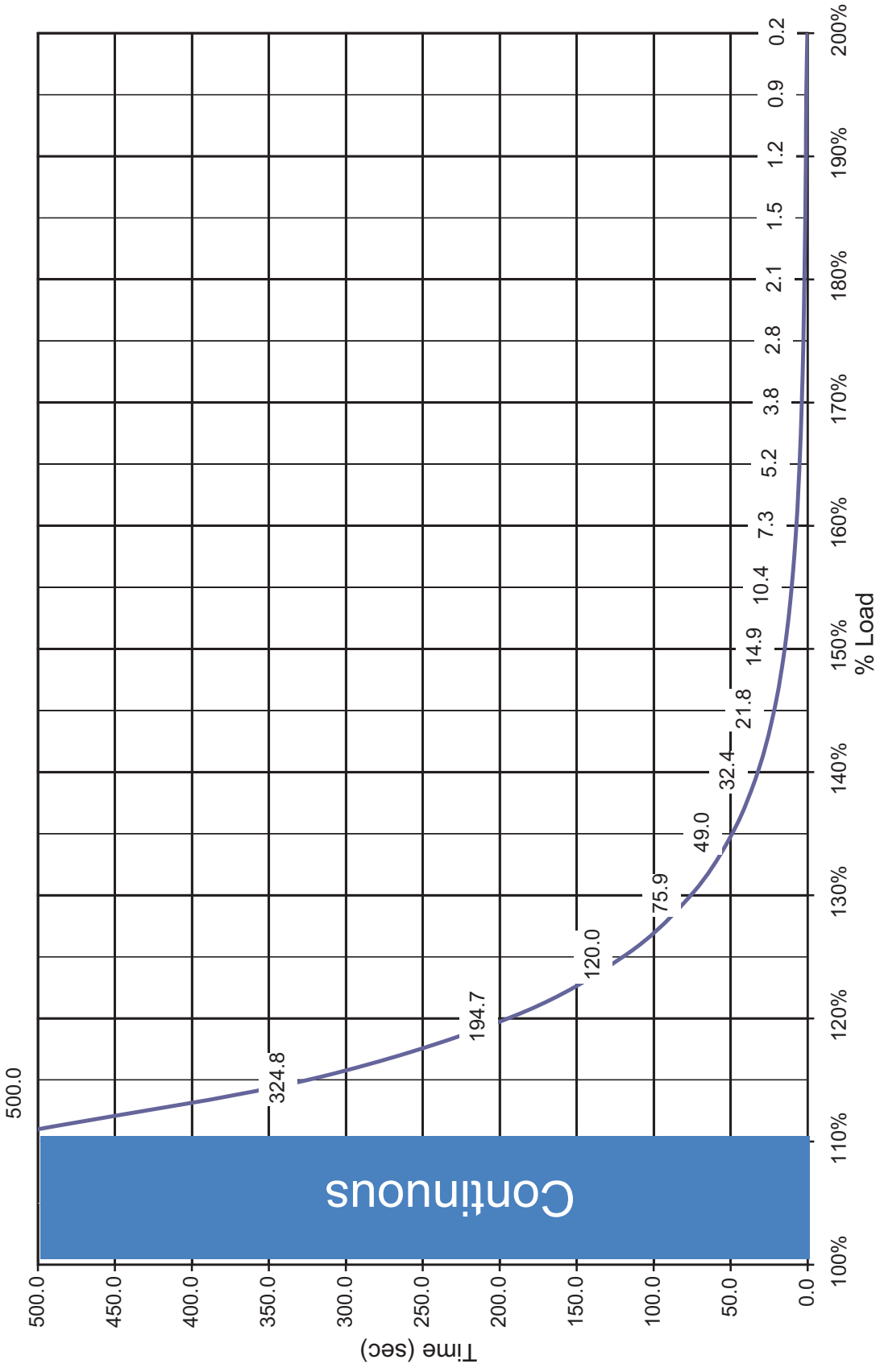


Table 18 Recommended conduit and cable sizes for use with 100% rated breakers

Rectifier Input					
UPS Rating		Voltage VAC	Cable Entry	(# of conduits); size of conduits; # -size of phase cables per conduit; size of cable for ground per conduit	
kVA	kW			Copper Conductors	Aluminum Conductors
625	625	480	Top	(3) 2.5"C 3-350kcmil; #2/0AWG	(3) 3"C 3-500kcmil; #4/0AWG
			Bottom	(3) 3"C 3-350kcmil; #2/0AWG	(3) 3.5"C 3-500kcmil; #4/0AWG
750	750		Top	(3) 3"C 3-500kcmil; #2/0AWG	(3) 3"C 3-600kcmil; #4/0AWG
			Bottom	(3) 3.5"C 3-500kcmil; #2/0AWG	(3) 3.5"C 3-600kcmil; #4/0AWG
800	800		Top	(4) 2.5"C 3-350kcmil; #3/0AWG	(4) 3"C 3-500kcmil; 250kcmil
			Bottom	(4) 3"C 3-350kcmil; #3/0AWG	(4) 3.5"C 3-500kcmil; 250kcmil
1000	1000	480	Top	(4) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-500kcmil; 350kcmil
			Bottom	(4) 3.5"C 3-500kcmil; #4/0AWG	(5) 3.5"C 3-500kcmil; 350kcmil
1100	1100		Top	(5) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-600kcmil; 350kcmil
			Bottom	(5) 3.5"C 3-500kcmil; #4/0AWG	(5) 4"C 3-600kcmil; 350kcmil
1200	1200		Top	(5) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-600kcmil; 350kcmil
			Bottom	(5) 3.5"C 3-500kcmil; #4/0AWG	(5) 4"C 3-600kcmil; 350kcmil
Bypass Input					
UPS Rating		Voltage VAC	Cable Entry	(# of conduits); size of conduits; # - size of phase cables per conduit; size of cable for ground per conduit	
kVA	kW			Copper Conductors	Aluminum Conductors
625	625	480	Top	(3) 2.5"C 3-350kcmil; #1/0AWG	(3) 3"C 3-500kcmil; #3/0AWG
			Bottom	(3) 3"C 3-350kcmil; #1/0AWG	(3) 3.5"C 3-500kcmil; #3/0AWG
750	750		Top	(3) 3"C 3-500kcmil; #2/0AWG	(3) 3"C 3-600kcmil; #4/0AWG
			Bottom	(3) 3.5"C 3-500kcmil; #2/0AWG	(3) 3.5"C 3-600kcmil; #4/0AWG
800	800		Top	(3) 3"C 3-500kcmil; #2/0AWG	(3) 3"C 3-600kcmil; #4/0AWG
			Bottom	(3) 3.5"C 3-500kcmil; #2/0AWG	(3) 3.5"C 3-600kcmil; #4/0AWG
1000	1000	480	Top	(4) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-500kcmil; 350kcmil
			Bottom	(4) 3.5"C 3-500kcmil; #4/0AWG	(5) 3.5"C 3-500kcmil; 350kcmil
1100	1100		Top	(4) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-500kcmil; 350kcmil
			Bottom	(4) 3.5"C 3-500kcmil; #4/0AWG	(5) 3.5"C 3-500kcmil; 350kcmil
1200	1200		Top	(5) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-600kcmil; 350kcmil
			Bottom	(5) 3.5"C 3-500kcmil; #4/0AWG	(5) 4"C 3-600kcmil; 350kcmil
Output					
UPS Rating		Voltage VAC	Cable Entry	(# of conduits); size of conduits; # -size of phase cables per conduit; size of cable for ground per conduit	
kVA	kW			Copper Conductors	Aluminum Conductors
625	625	480	Top	(3) 2.5"C 3-350kcmil; #1/0AWG	(3) 3"C 3-500kcmil; #3/0AWG
			Bottom	(3) 3"C 3-350kcmil; #1/0AWG	(3) 3.5"C 3-500kcmil; #3/0AWG
750	750		Top	(3) 3"C 3-500kcmil; #2/0AWG	(3) 3"C 3-600kcmil; #4/0AWG
			Bottom	(3) 3.5"C 3-500kcmil; #2/0AWG	(3) 3.5"C 3-600kcmil; #4/0AWG
800	800		Top	(3) 3"C 3-500kcmil; #2/0AWG	(3) 3"C 3-600kcmil; #4/0AWG
			Bottom	(3) 3.5"C 3-500kcmil; #2/0AWG	(3) 3.5"C 3-600kcmil; #4/0AWG
1000	1000	480	Top	(4) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-500kcmil; 350kcmil
			Bottom	(4) 3.5"C 3-500kcmil; #4/0AWG	(5) 3.5"C 3-500kcmil; 350kcmil
1100	1100		Top	(4) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-500kcmil; 350kcmil
			Bottom	(4) 3.5"C 3-500kcmil; #4/0AWG	(5) 3.5"C 3-500kcmil; 350kcmil
1200	1200		Top	(5) 3"C 3-500kcmil; #4/0AWG	(5) 3"C 3-600kcmil; 350kcmil
			Bottom	(5) 3.5"C 3-500kcmil; #4/0AWG	(5) 4"C 3-600kcmil; 350kcmil

Table 18 Recommended conduit and cable sizes for use with 100% rated breakers *(continued)*

Battery					
UPS Rating		Voltage VAC	Cable Entry	(# of conduits); size of conduits; # -size of phase cables per conduit; size of cable for ground per conduit	
kVA	kW			Copper Conductors	Aluminum Conductors
625	625	480	Top	(5)3"C 2-600kcmil; 250kcmil	(6) 3"C 2-600kcmil; 400kcmil
			Bottom	(5)3"C 2-600kcmil; 250kcmil	(6) 3.5"C 2-600kcmil; 400kcmil
750	750		Top	(5)3"C 2-600kcmil; 250kcmil	(6) 3"C 2-600kcmil; 400kcmil
			Bottom	(5)3"C 2-600kcmil; 250kcmil	(6) 3.5"C 2-600kcmil; 400kcmil
800	800		Top	(6)3"C 2-600kcmil; 350kcmil	(7) 3"C 2-700kcmil; 600kcmil
			Bottom	(6)3"C 2-600kcmil; 350kcmil	(7) 3.5"C 2-700kcmil; 600kcmil
1000	1000	480	Top	(8)3"C 2-600kcmil; 500kcmil	(8) 3"C 2-700kcmil; 600kcmil
			Bottom	(8) 3.5"C 2-600kcmil; 500kcmil	(8) 3.5"C 2-700kcmil; 600kcmil
1100	1100		Top	(8)3"C 2-600kcmil; 500kcmil	(8) 3"C 2-700kcmil; 600kcmil
			Bottom	(8) 3.5"C 2-600kcmil; 500kcmil	(8) 3.5"C 2-700kcmil; 600kcmil
1200	1200		Top	(9)3"C 2-750kcmil; 500kcmil	(11) 3"C 2-700kcmil; 750kcmil
			Bottom	(9) 3.5"C 2-750kcmil; 500kcmil	(11) 3.5"C 2-700kcmil; 750kcmil

1. Recommended cable sizes are 167°F (75°C) (THW) wire at 86°F (30°C) ambient.
2. Refer to NEC recommendations for 104°F (40°C) ambient rated conductors.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. Recommended cables and conduits are based on breaker trip setting sized for the maximum continuous rated current for the rectifier input and the nominal current for the bypass and output listed in **Tables 14** through **17**.
5. Conduit size is based on RNC type conduit for bottom input and EMT-type conduit for top input.
6. Vertiv® recommends that the site planner choose the appropriate cable type based on the particular installation requirements.
7. These recommendations are for use with 100% rated breakers. For 125% rated breakers, refer to the NEC recommended conduit and cable sizes.
8. Upstream and downstream non-standard recommended breaker settings have their trip adjustment behind a suitable cover in accordance with 240.6(c) of the NEC.

Table 19 Recommended breakers, upstream and downstream

UPS Rating kVA	System Input Nominal Current	Recommended External Breaker Trip, Amps
Upstream Breakers		
625	777	900
750	933	1000
800	995	1200
1000	1246	1400
1100	1371	1600
1200	1496	1600
Downstream Breakers		
625	752	800
750	902	1000
800	962	1000
1000	1203	1400
1100	1323	1400
1200	1443	1600

Table 20 Recommended lug sizes

Cable Size	T&B Copper One Hole	T&B Copper Two Hole	T&B Aluminum One Hole	T&B Aluminum Two Hole
#8AWG	54930BE	54850BE	60104-TB	—
#6AWG	54905BE	256-30695-868	60109-TB	—
#4AWG	54906BE	256-30695-733	60114-TB	—
#2-3AWG	54942BE	54811BE	60120	—
#1AWG	54947BE	54857BE	60126	—
#1/0AWG	54950BE	256-30695-593	60132	—
#2/0AWG	54951BE	54862BE	60138	60238
#3/0AWG	54965BE	54864BE	60144	60244
#4/0AWG	54970BE	54866BE	60150	60250
250kcmil	54913BE	54868BE	60156	60256
300kcmil	54914BE	54870BE	60162	60262
350kcmil	54915BE	54872BE	60165	60267
400kcmil	54916BE	54874BE	60168	60269
500kcmil	54918BE	54876BE	60171	60273
600kcmil	54920BE	54878BE	60176	60275
750kcmil	54922BE	54880BE	60178	60277 (750kcmil)

Table 21 Recommended torque values

Grade 5 Steel: Unified Thread System Torque, lbf.*in.			
Fastener Finish ⇒		Plain Steel	Zinc Plating
Size	Threads/ Inch, Tpi	No Washer/ Flat Washer	No Washer/ Flat Washer
1/4	20	101	91
	28	116	104
5/16	18	209	188
	24	231	208
3/8	16	370	333
	24	420	378
7/16	14	593	534
	20	662	596
1/2	13	904	814
	20	1,020	918
9/16	12	1305	1,175
	18	1456	1310

Class 8.8 Steel: Metric Thread System Torque, N*m			
Fastener Finish ⇒		Plain Steel	Zinc Plating
Size	Thread Pitch, Tp	No Washer/ Flat Washer	No Washer/ Flat Washer
M5	0.8	6.1	5.5
	0.5	6.9	6.2
M6	1	10	9
	0.75	11	10
M8	1.25	25	23
	1	27	24
M10	1.5	50	45
	1.25	53	47
M12	1.75	87	78
	1.25	95	86
M14	2	139	125
	1.5	151	136

APPENDIX A - SHIPPING SPLITS, KICKPLATES

Figure 34 Shipping split, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit

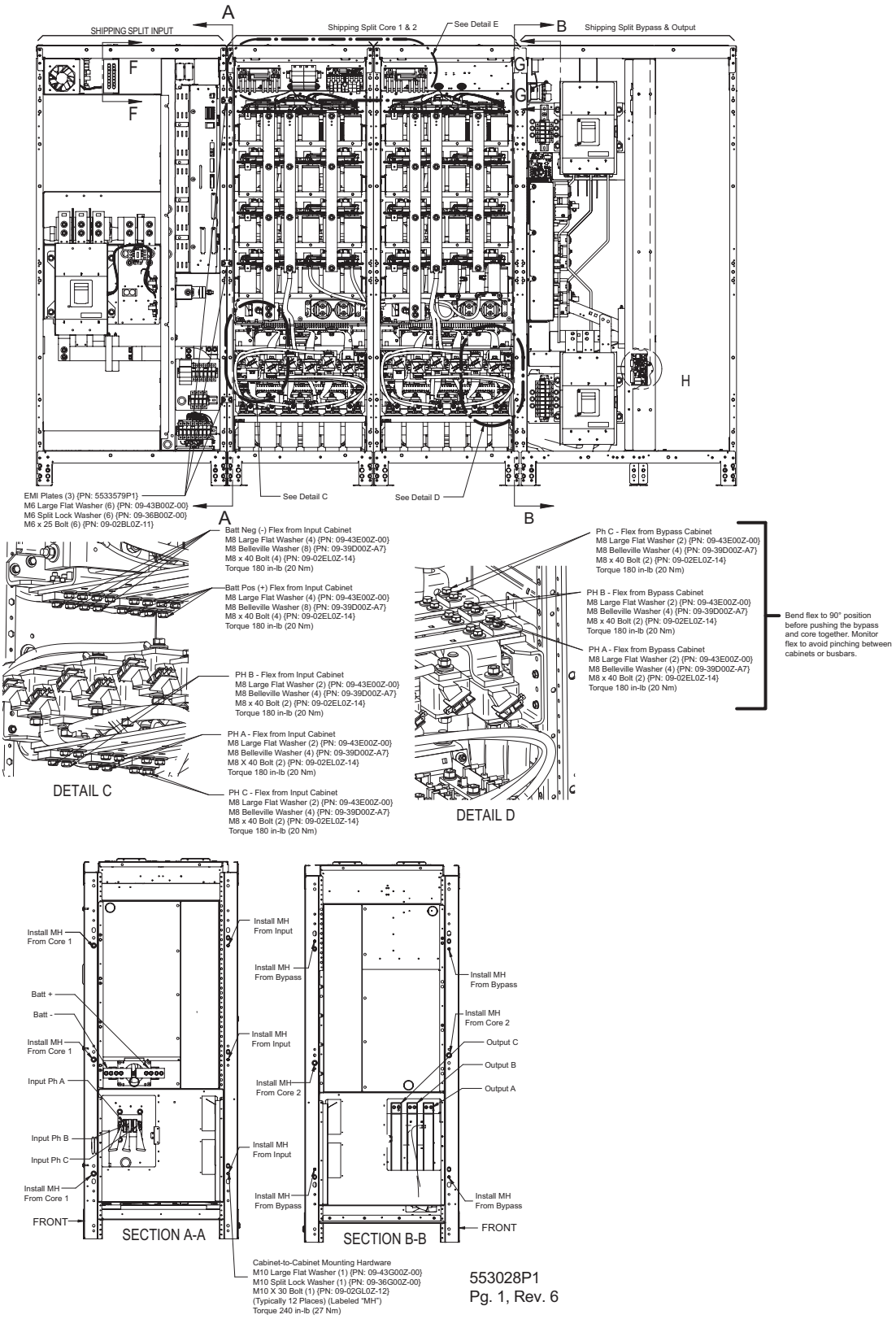
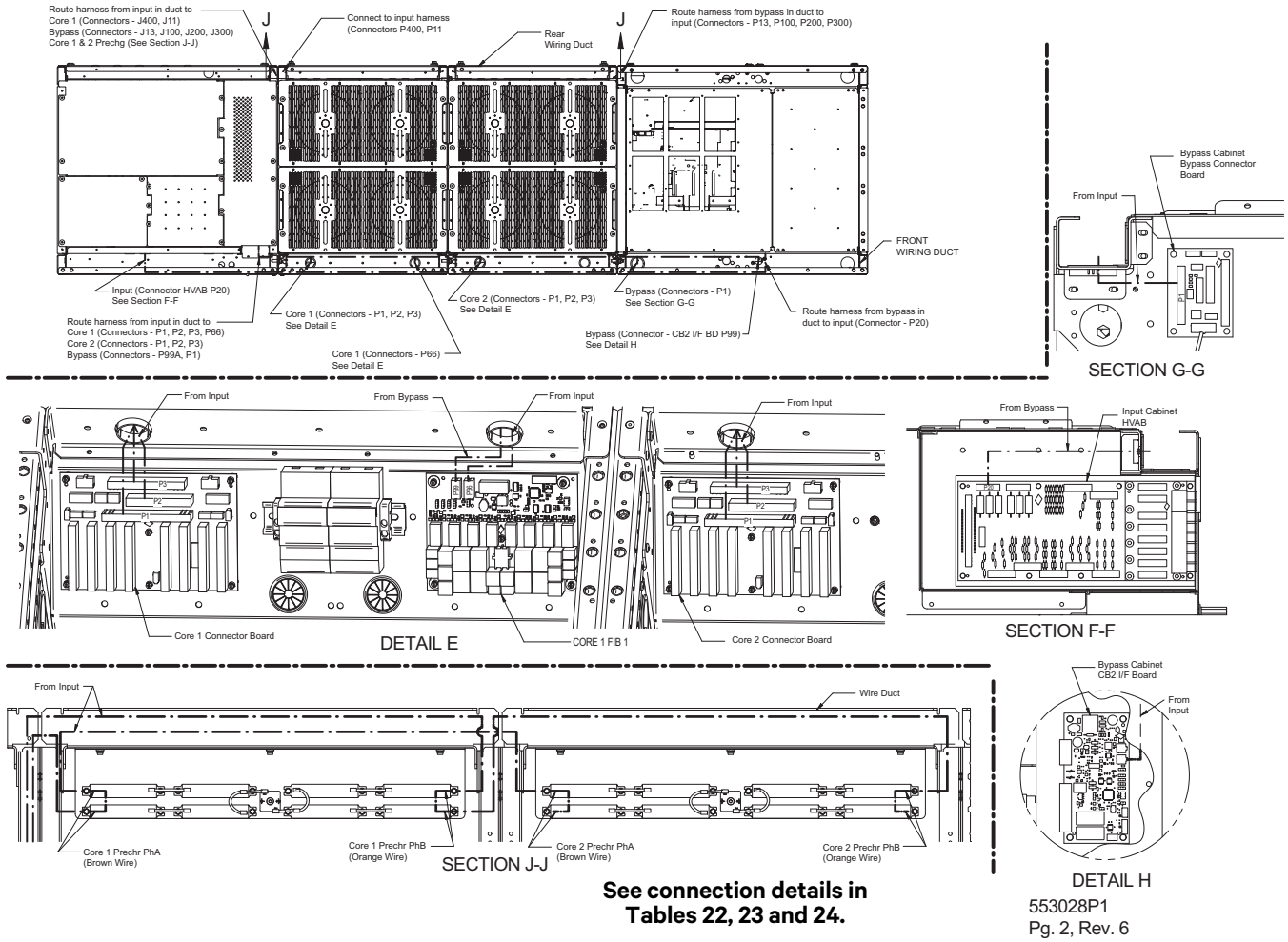


Figure 35 Shipping split, 625-800kVA Liebert EXL UPS, SMS and 1+N multi-module unit, *continued*



See connection details in Tables 22, 23 and 24.

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Table 22 Connections associated with top-down view

Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Duct
Input	J100	Bypass	P100	Rear
Input	J13	Bypass	P13	Rear
Input	J200	Bypass	P200	Rear
Input	J300	Bypass	P300	Rear
Input	J11	Core 1	P11	Rear
Input	J400	Core 1	P400	Rear

Connected together in the rear duct.

Table 23 Section J-J connections

Cabinet Start	Connector Label	Cabinet Finish	Cabinet Finish	Duct
Input	Core Prechg Ph A	Core 1 Prechg Ph A	Core 2 Prechg Ph A	Rear
Input	Core Prechg Ph B	Core 1 Prechg Ph A	Core 2 Prechg Ph A	Rear

Table 24 Connections associated with sections in "View" column

Cabinet Start	Connector Label	Cabinet Finish	Connector Label (Connect This End)	Duct	View
Bypass	CT7-CT9	Input	P20 HVAB	Front	Section F-F
Input	P50	Bypass	P1 Bypass Connector Board	Front	Section G-G
Input	P66A	Bypass	P99A CB2 I/F BD	Front	Detail H
Input	P11	Core 1	P1 Core Connector Board	Front	Detail E
Input	P12	Core 1	P2 Core Connector Board	Front	Detail E
Input	P1	Core 1	P3 Core Connector Board	Front	Detail E
Input	P99	Core 1	P66 FIB 1	Front	Detail E
Input	P21	Core 2	P1 Core Connector Board	Front	Detail E
Input	P22	Core 2	P2 Core Connector Board	Front	Detail E
Input	P2	Core 2	P3 Core Connector Board	Front	Detail E
Bypass	P66	Core 1	P99 FIB 1	Front	Detail E

Figure 36 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit,

Page 1

See Figure 37 for Section A-A, Section B-B and Detail C See Figure 40 for Detail D and Detail E.

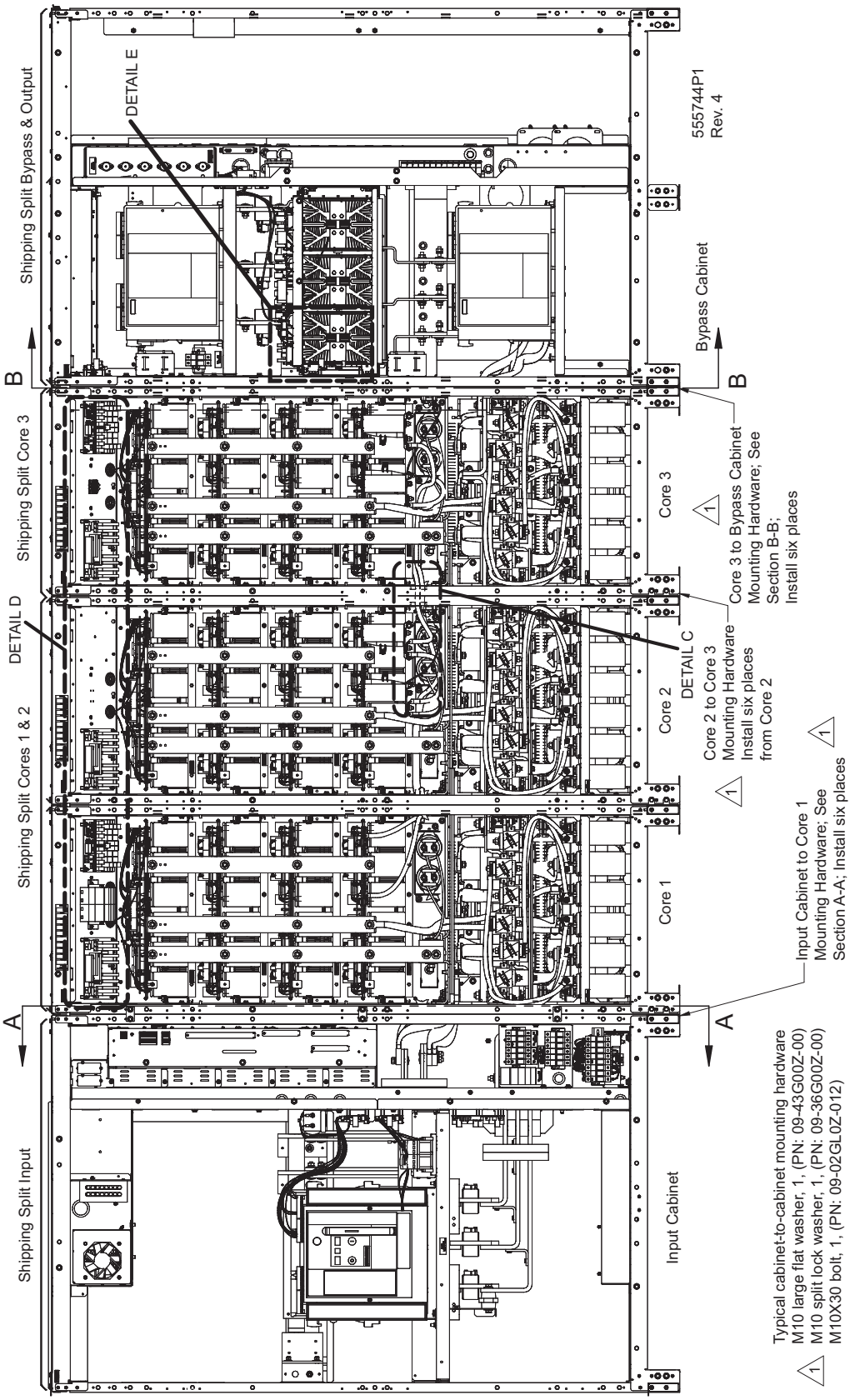
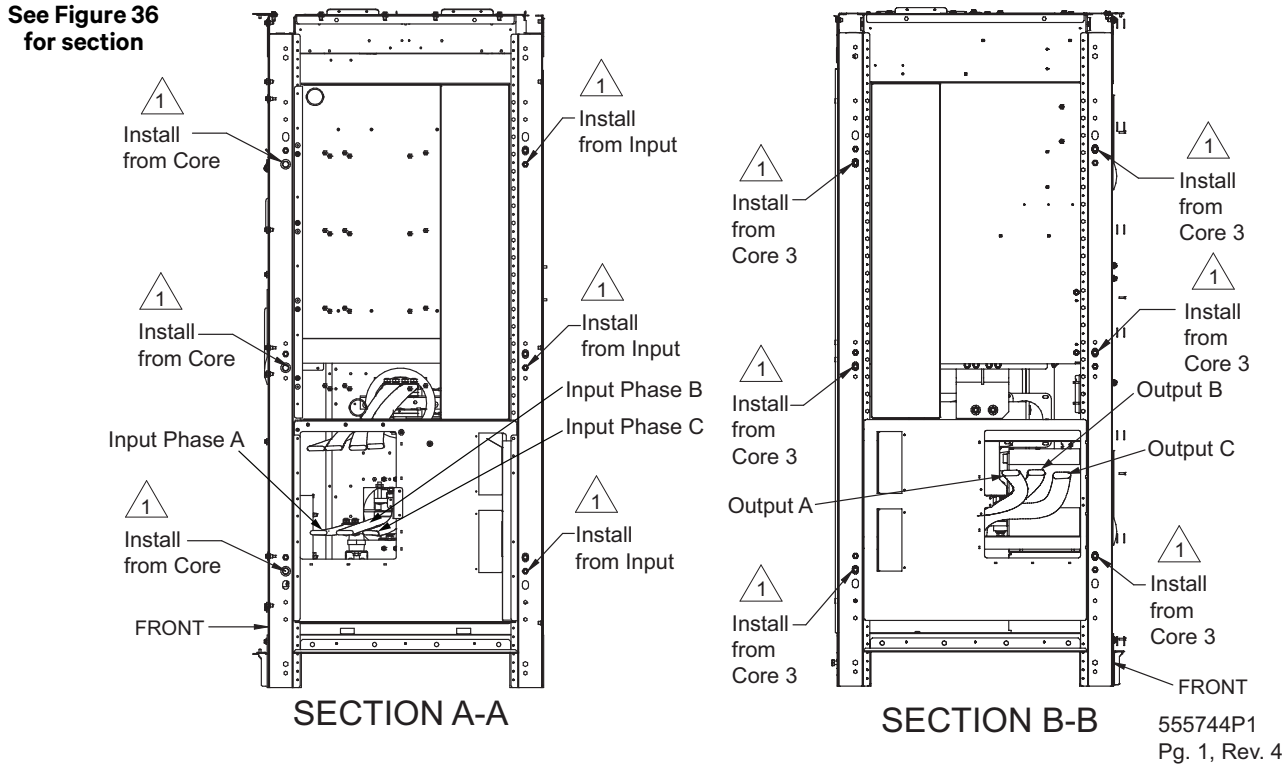


Figure 37 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit, Pages 1 and 2



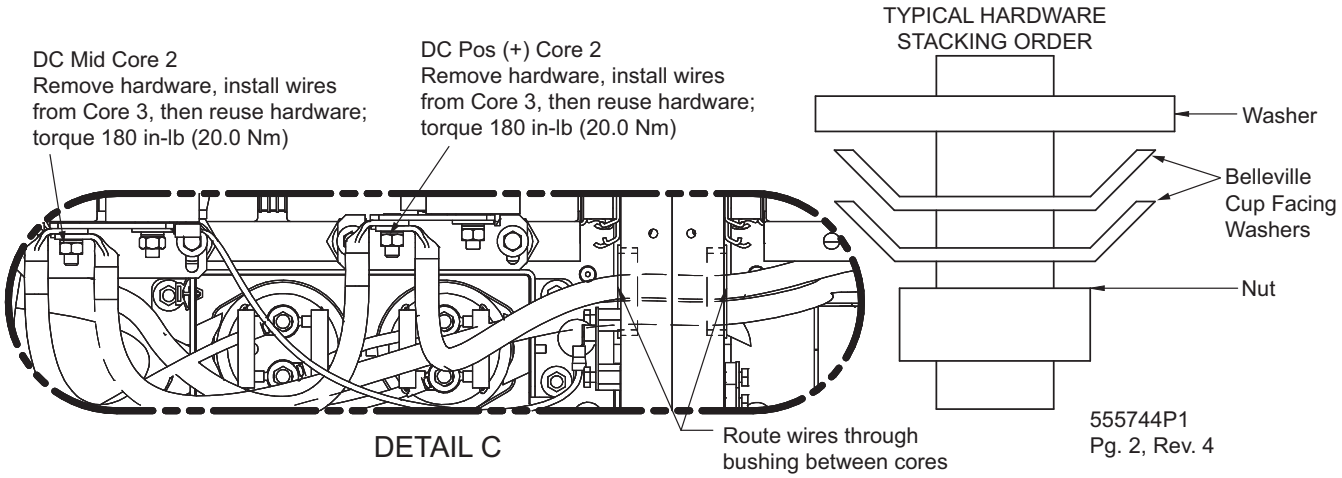


Figure 38 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit,

Page 3

See Figure 39 for Cabinet-to-Cabinet Power

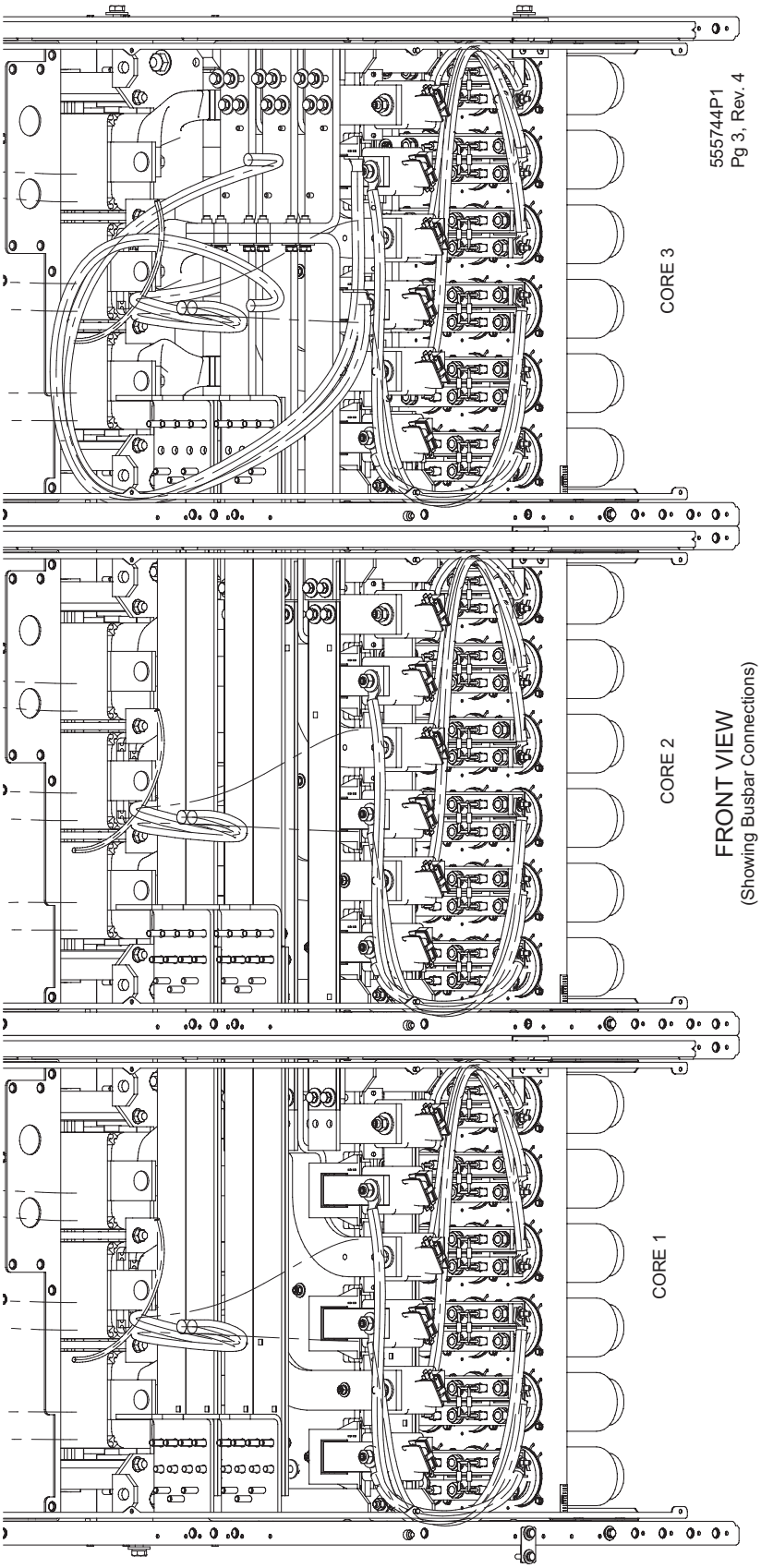


Figure 39 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit, Page 3, *continued*

See Figure 38 for Busbar

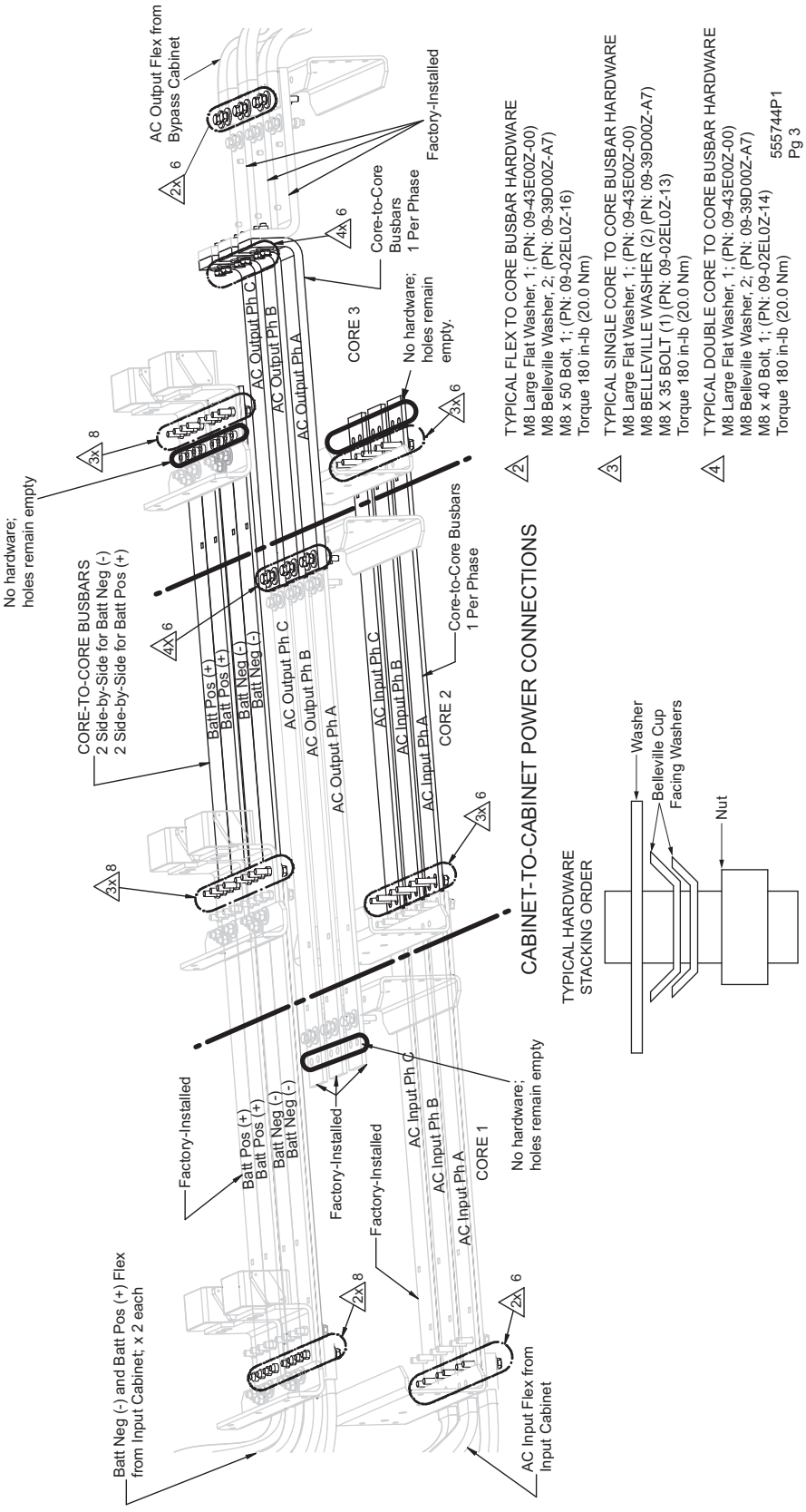
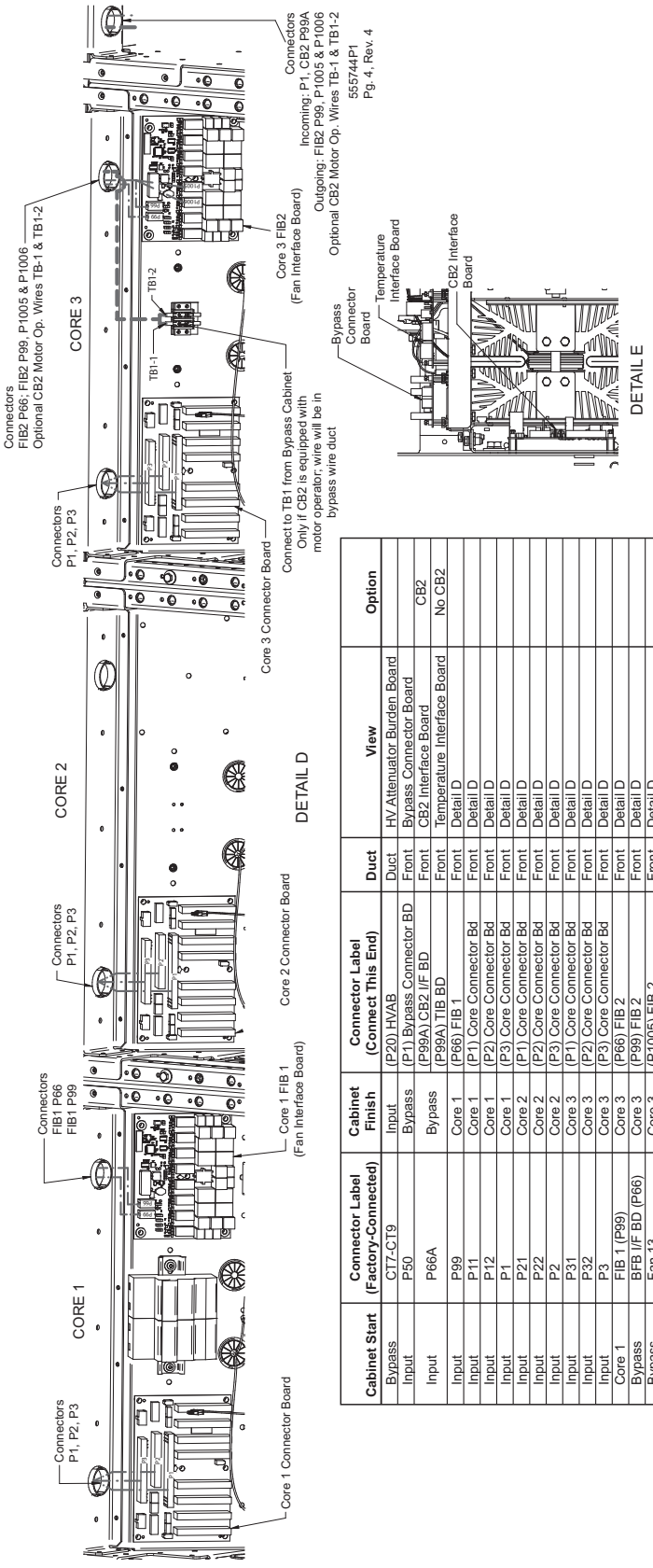


Figure 40 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit, Page 4

See Figure 36 for the location of Detail D and



Cabinet Start	Connector Label (Factory-Connected)	Cabinet Finish	Connector Label (Connect This End)	Duct	View	Option
Bypass	CT7-CT9	Input	(P20) HVAB	Duct	HV Attenuator Burden Board	
Input	P50	Bypass	(P1) Bypass Connector BD	Front	Bypass Connector Board	
Input	P66A	Bypass	(P99A) CB2 I/F BD	Front	CB2 Interface Board	CB2
			(P99A) TIB BD	Front	Temperature Interface Board	No CB2
Input	P99	Core 1	(P66) FIB 1	Front	Detail D	
Input	P11	Core 1	(P1) Core Connector Bd	Front	Detail D	
Input	P12	Core 1	(P2) Core Connector Bd	Front	Detail D	
Input	P1	Core 1	(P3) Core Connector Bd	Front	Detail D	
Input	P21	Core 2	(P1) Core Connector Bd	Front	Detail D	
Input	P22	Core 2	(P2) Core Connector Bd	Front	Detail D	
Input	P2	Core 2	(P3) Core Connector Bd	Front	Detail D	
Input	P31	Core 3	(P1) Core Connector Bd	Front	Detail D	
Input	P32	Core 3	(P2) Core Connector Bd	Front	Detail D	
Input	P3	Core 3	(P3) Core Connector Bd	Front	Detail D	
Core 1	FIB 1 (P99)	Core 3	(P66) FIB 2	Front	Detail D	
Bypass	BFB I/F BD (P66)	Core 3	(P99) FIB 2	Front	Detail D	
Bypass	Fan 13	Core 3	(P1005) FIB 2	Front	Detail D	
Bypass	Fan 14	Core 3	(P1006) FIB 2	Front	Detail D	
Bypass	F70-1	Core 3	(TB1-1)	Front	Detail D	CB2 Mtr Op Only
Bypass	F69-1	Core 3	(TB1-2)	Front	Detail D	CB2 Mtr Op Only

Figure 41 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module unit,

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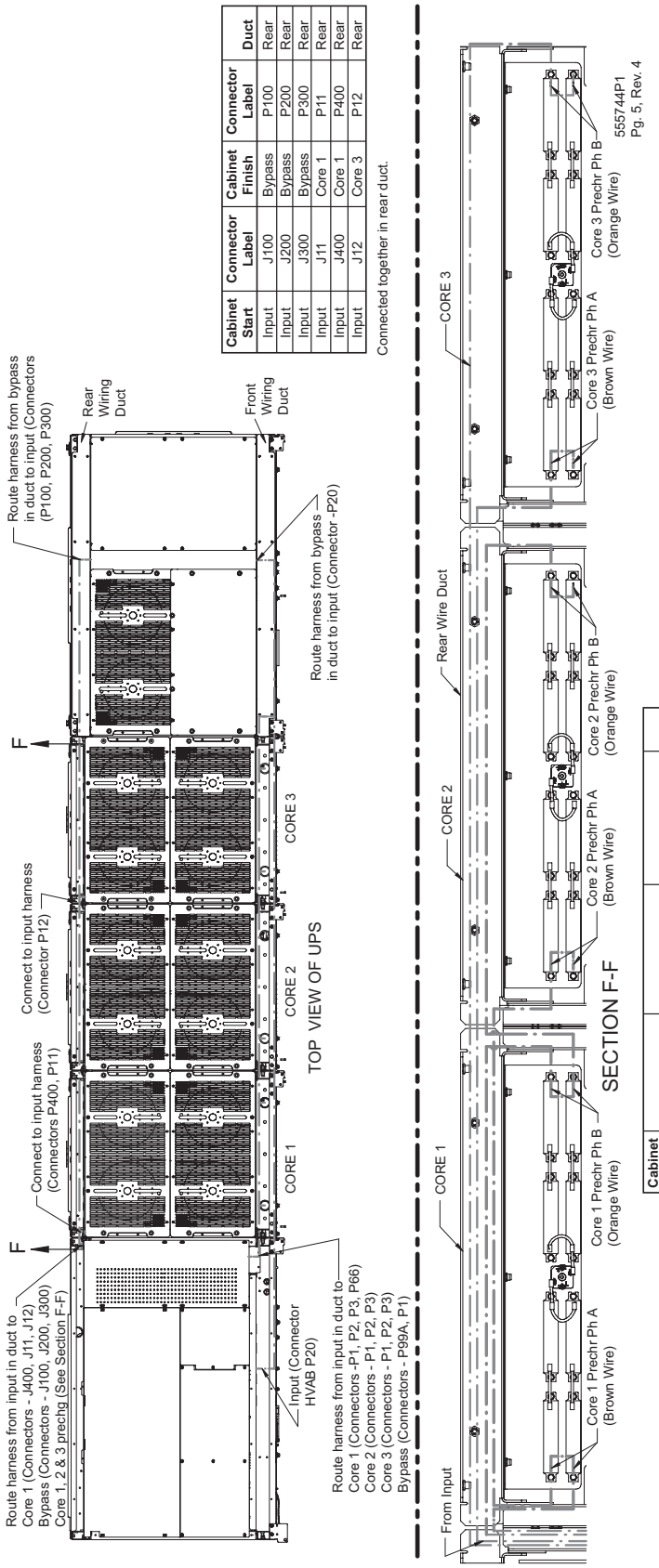


Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Duct
Input	J100	Bypass	P100	Rear
Input	J200	Bypass	P200	Rear
Input	J300	Bypass	P300	Rear
Input	J11	Core 1	P11	Rear
Input	J400	Core 1	P400	Rear
Input	J12	Core 3	P12	Rear

Connected together in rear duct.

Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Duct
Input	Core Precharge Ph A	Core 1 Precharge Ph A	Core 2 Precharge Ph A	Rear
Input	Core Precharge Ph B	Core 1 Precharge Ph B	Core 2 Precharge Ph B	Rear
Input	Core Precharge Ph A	Core 3 Precharge Ph A		Rear
Input	Core Precharge Ph B	Core 3 Precharge Ph B		Rear

See Figure 42 for Input (Connector

Figure 42 Shipping split interconnections, 1000-1200kVA Liebert EXL UPS, SMS and 1+N multi-module units, Pg. 6

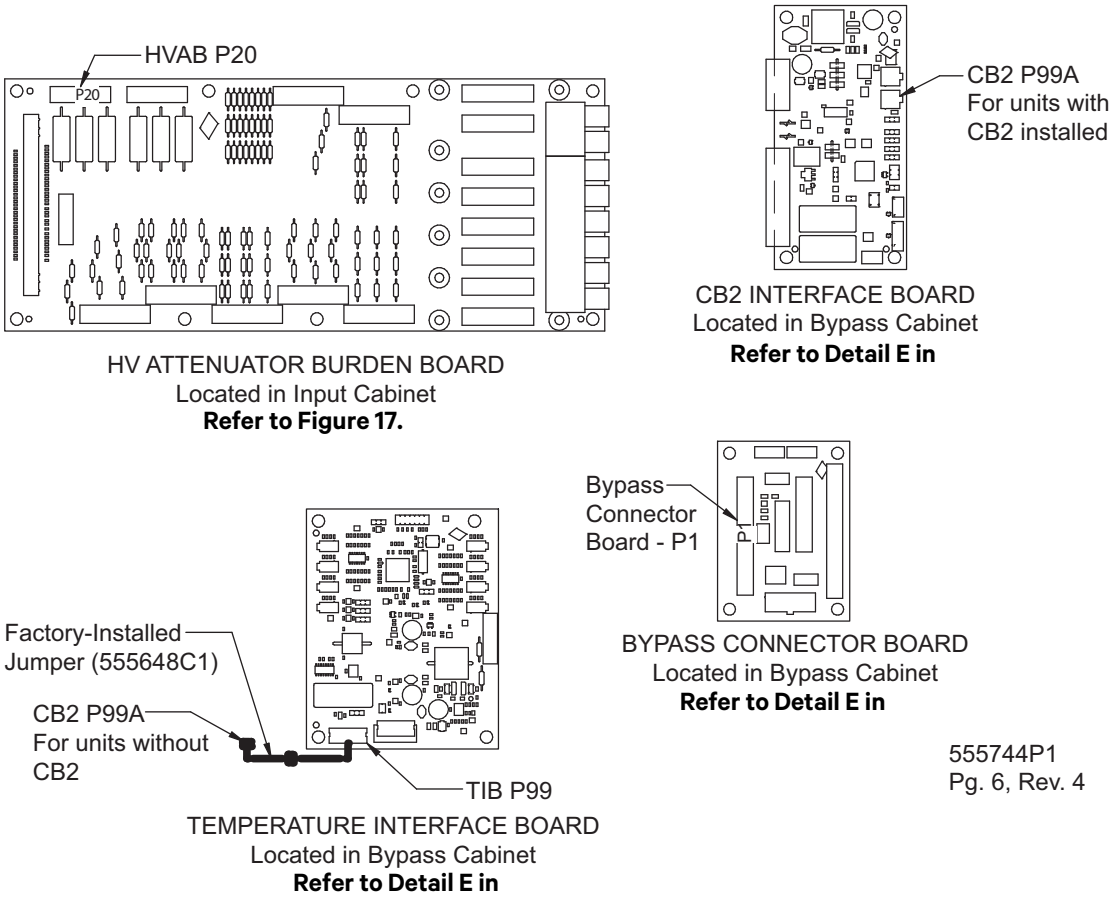


Figure 43 Kickplate installation—625-800kVA units

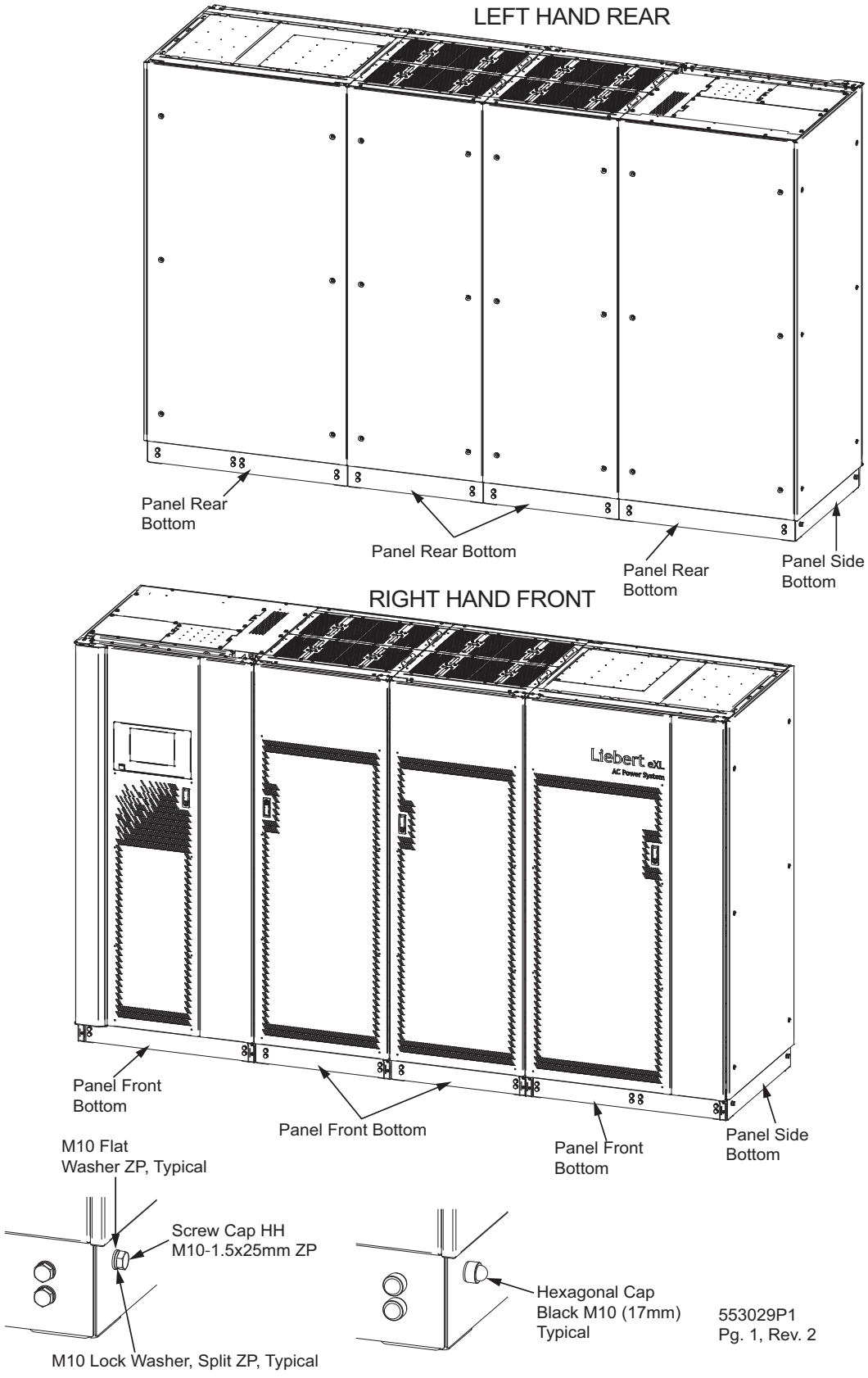


Figure 44 Kickplate installation—1000-1200kVA, single module units

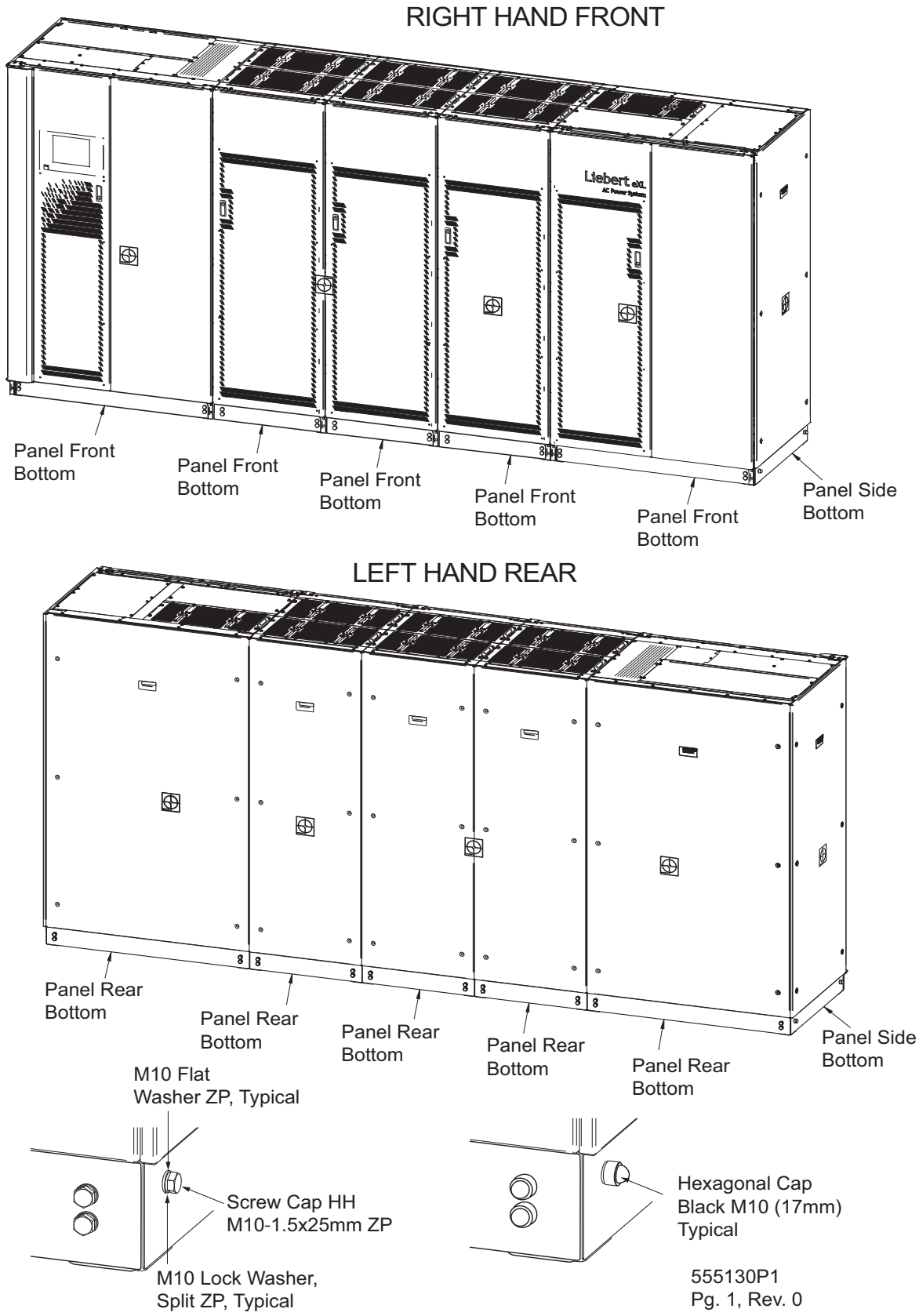
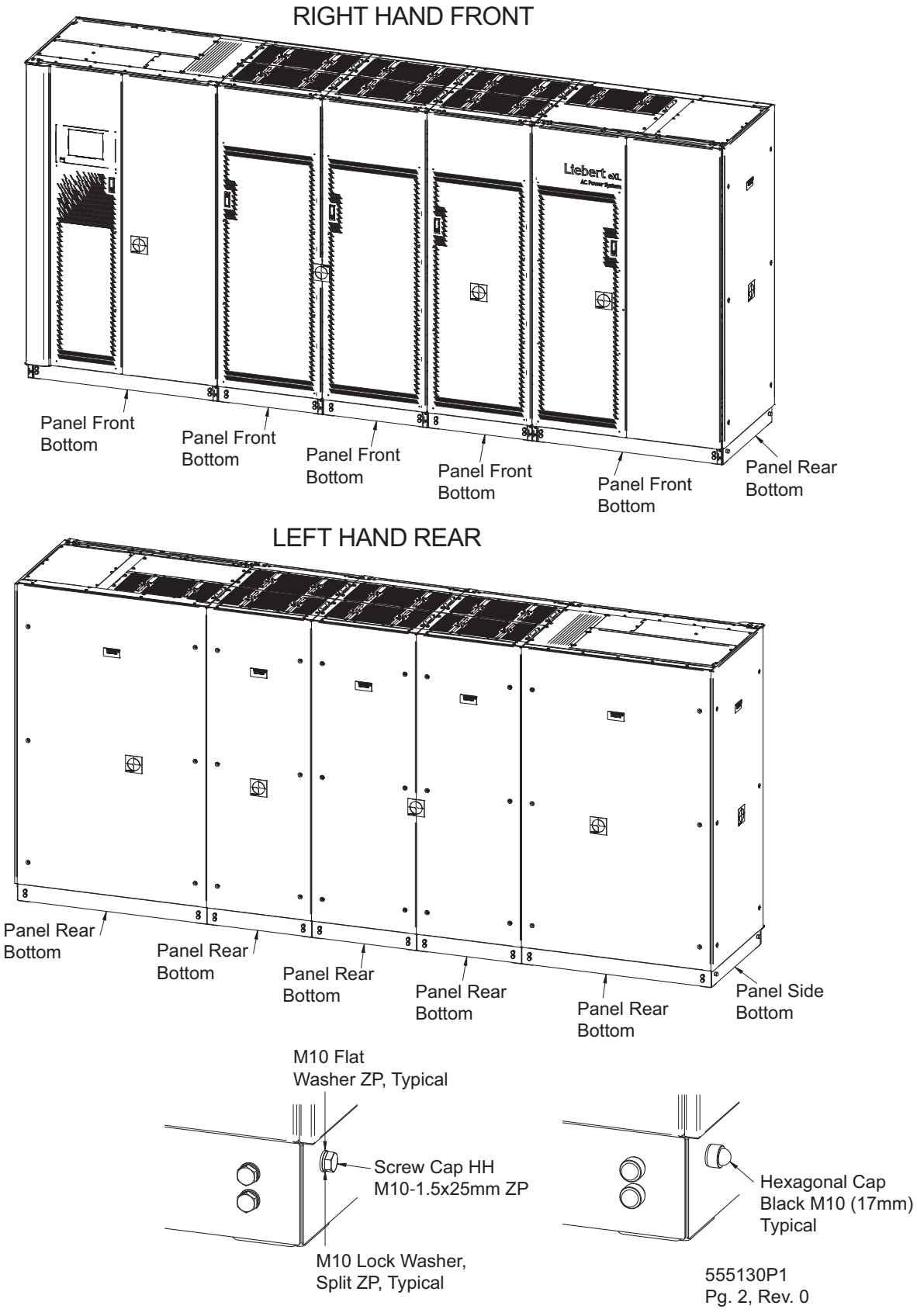


Figure 45 Kickplate installation—1000-1200kVA, 1+N multi-module units



NOTES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