AC Power
For *Business-Critical Continuity™*

Liebert® NXL™ Battery System

Installation Manual

EMERSON
Network Power

BATTERY CABINET PRECAUTIONS

The following warning applies to all battery cabinets supplied with UPS systems. Additional warnings and cautions applicable to battery cabinets may be found in **Important Safety Instructions** beginning on page 1.

WARNING

Internal battery strapping must be verified prior to moving a battery cabinet (after initial installation).

- Battery cabinets contain non-spillable batteries.
- Keep units upright.
- Do not stack.
- Do not tilt.

Failure to heed this warning could result in smoke, fire or electric hazard.
Call 1-800-LIEBERT prior to moving battery cabinets (after initial installation).

CONTACTING LIEBERT FOR SUPPORT

To contact the Liebert Services section of Emerson Network Power for information or repair service in the United States, call 1-800-LIEBERT (1-800-543-2378). Liebert Services offers a complete range of startup services, repair services, preventive maintenance plans and service contracts.

For repair or maintenance service outside the 48 contiguous United States, contact Liebert Services, if available in your area.

For Liebert Services to assist you promptly, have the following information available:

Part Numbers:	
Serial Numbers:	
Rating:	
Date Purchased:	
Date Installed:	
Location:	
Battery Voltage:	
Battery Reserve Time:	

Product Warranty Registration

To register for warranty protection, visit the **Service and Support** section of our Web site at:

www.liebert.com

Click on **Product Registration** and fill out the form.

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FIGURES

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SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation of your Liebert NXL™ Battery Cabinet and accessories. Read this manual thoroughly, paying special attention to the sections that apply to your installation, before working with the battery system. Retain this manual for use by installing personnel.

WARNING

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

Special safety precautions are required for procedures involving handling, installation and maintenance of the UPS system. Only properly trained and qualified personnel wearing appropriate personal protective equipment should be involved in installing the Liebert NXL Battery system or preparing the system for installation.

Special care must be taken when working with the batteries associated with this equipment. When connected together, the battery terminal voltage will exceed 400VDC and is potentially lethal. Be constantly aware that the battery system contains high DC as well as AC voltages. Check for voltage with AC and DC voltmeters before making contact.

Observe all DC safety precautions before working on or near the DC system.

Follow all battery safety precautions when installing, charging or servicing batteries. In addition to the hazard of electric shock, gas produced by batteries can be explosive and sulfuric acid can cause severe burns.

The following precautions must be observed when working on batteries:

- Remove watches, rings and other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Determine whether the battery is grounded. If it is grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.

If a battery leaks electrolyte, or is otherwise physically damaged, it must be replaced, stored in a container resistant to sulfuric acid and disposed of in accordance with local regulations.

If electrolyte comes into contact with the skin, the affected area should be washed immediately with water.

WARNING

Risk of electric shock, explosive reaction, hazardous chemicals and fire. Can cause equipment damage, personal injury and death.

Lead-acid batteries contain hazardous materials. Batteries must be handled, transported and recycled or discarded in accordance with federal, state and local regulations. Because lead is a toxic substance, lead-acid batteries must be recycled rather than discarded.

Do not dispose of a battery in a fire. The battery may explode.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It is toxic.

WARNING

Risk of electric shock. Can cause personal injury and death.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires.

WARNING

Risk of heavy unit falling over. Can cause equipment damage, injury and death.

Exercise extreme care when handling battery cabinets to avoid equipment damage or injury to personnel. The battery system cabinets weigh from 3760 to 8990 lb. (1706 to 4078kg).

Locate center of gravity symbols and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times.

Slots at the base of the cabinets are intended for forklift use. Base slots will support the unit only if the forks are completely beneath the unit.

WARNING

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

The area around the battery system must be kept free of puddles of water, excess moisture and debris.

Observe all precautions in the Operation and Maintenance Manual, SL 25425, before as well as during all installation and 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 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 batteries.

All power and control wiring must be installed by a properly trained and qualified electrician. All power and control wiring must comply with the NEC and applicable local codes.

When performing maintenance with any part of the equipment under power, service personnel and test equipment must be standing on rubber mats. The service personnel must wear insulating shoes for isolation from direct contact with the floor (earth ground).

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.

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

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 following section describes the requirements that must be taken into account when planning the positioning and cabling of the Liebert NXL battery equipment.

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

NOTICE

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

1.2 Preliminary Checks

Before installing the battery equipment, please carry out the following preliminary checks:

- Visually examine the equipment for transit damage, both internally and externally. Report any damage to the shipper immediately.
- Verify that the correct equipment is being installed. The equipment supplied has an identification tag inside the main door.
- Verify that the battery 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 Battery Room

Batteries should be mounted in an environment where the temperature is consistent and even over the whole battery. Temperature is a major factor in determining the battery life and capacity. Typical battery manufacturer performance data are quoted for an operating temperature between 68 and 77°F (20 and 25°C). Operating above this range will reduce the battery life while operation below this range will reduce the battery capacity.

Battery Temperature

In a normal installation, the battery temperature should be kept between 59 and 77°F (15°C and 25°C).

NOTE

Keep batteries away from main heat sources, main air inlets, etc.

1.3.2 Storage

Should the equipment not be installed immediately, it must be stored in a room for protection against excessive humidity and heat sources (see **Table 28**).

NOTICE

Risk of deep discharge can cause permanent damage to batteries.

An unused battery must be recharged periodically as recommended by the battery manufacturer.

1.4 Positioning

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

Power terminals, auxiliary terminals blocks and power switches are accessed from the front and top.

Removable panels on the top are secured to the chassis by screws. The door can be opened to give access to the power connections bars, auxiliary terminal blocks and power isolators. The front door can be opened 180° for easier service and more flexibility in installation.

1.4.1 Moving the Cabinets

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

Ensure that the cabinet weight is within the designated surface weight loading (kg/cm^2) of any handling equipment. See **Table 28** for weight details.

Ensure that any lifting equipment used to move the battery equipment has sufficient lifting capacity.

Battery system equipment can be handled by a forklift or similar equipment.

Because the weight distribution in the cabinet is not symmetrical, use extreme care during handling and transporting.

When moving the unit by forklift, care must be taken to protect the panels. Do not exceed a 15° tilt with the forklift. Bottom structure will support the unit only if the forks are completely beneath the unit.

Handling the unit with straps is not authorized.

WARNING

Risk of heavy unit falling over. Can cause equipment damage, injury and death.

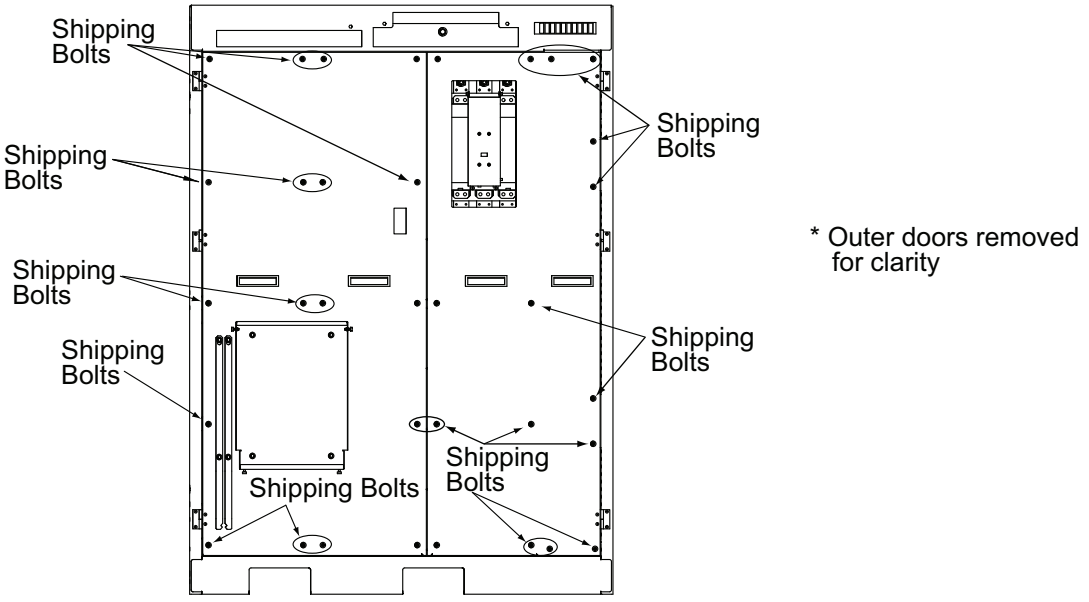
Exercise extreme care when handling battery cabinets. The battery system cabinets weigh from 3760 to 8990 lb. (1706 to 4078kg).

Locate center of gravity symbols and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times.

Slots at the base of the cabinets are intended for forklift use. Base slots will support the unit only if the forks are completely beneath the unit.

The cabinet with top terminal batteries ships with extra bolts installed on the interior doors. Once the cabinet is in the final position, these bolts can be removed. See **Figure 1**

Figure 1 Shipping bolts—Top-Terminal Battery Cabinet



1.4.2 Clearances

Liebert NXL has no ventilation grilles at either side or at the rear of the battery system equipment. Clearance around the front of the equipment should be sufficient to enable free passage of personnel with the doors fully opened. It is important to leave a distance of 24" (610mm) between the top of the cabinet and the ceiling of the room in which it is installed to permit adequate circulation of air coming out of the unit and for service access.

1.4.3 Raised Floor Mounting

If the equipment is to be placed on a raised floor, it should be mounted on a pedestal suitably designed to accept the equipment point loading. Refer to the base view to design this pedestal.

1.5 System Composition

A battery system can consist of a number of equipment cabinets, depending on the individual system design requirements, e.g., Battery Cabinet, Module Battery Disconnect, Junction Cabinet. Refer to **3.0 - Installation Drawings** for the positioning of the cabinets described below.

2.0 BATTERY INSTALLATION

2.1 Safety

Special care should be taken when working with the batteries associated with the Liebert NXL Battery System equipment. When all the cells are connected together, the battery terminal voltage will exceed 400V and is potentially lethal. A primary safety consideration is to install the battery equipment in an isolated area, accessible only to properly trained and qualified maintenance personnel.

WARNING

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

Hazardous battery voltage present behind covers. No user-serviceable parts are located behind covers that require a tool for removal. Only properly trained and qualified service personnel are authorized to remove such covers or perform installation or maintenance.

The following general battery safety precautions and warnings must be observed at all times:

- A battery can present risk of electric shock or burn from high short circuit currents.
- When connected in a string, the voltage will exceed 400VDC. This voltage is potentially lethal. Always observe high-voltage precautions.
- Eye protection must be worn to prevent injury from accidental electrical arcs.
- Remove rings, watches, necklaces, bracelets and all other metal objects.
- Use only tools with insulated handles.
- Wear appropriate personal protective equipment when handling batteries.
- If a battery leaks electrolyte or is otherwise physically damaged, it should be placed in a container resistant to wire and disposed of in accordance with local regulations.
- If electrolyte comes into contact with the skin, the affected area should be washed immediately with plenty of clean water.
- Batteries must always be disposed of according to local environmental laws.
- When replacing batteries, use the same number and type that were originally fitted.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Determine if the battery is grounded. If it is grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock.
- Battery support tray must be used whenever a battery tray is being pulled out.

2.2 Layout

Depending on the site layout, the battery cabinets can be installed in any of several ways:

- **Connected**—Multiple battery cabinets bolted together
- **Stand-Alone**—Cabinet not bolted to Liebert NXL equipment
- **Attached**—Battery cabinets are bolted to a Liebert NXL UPS
- **Detached**—Battery cabinets are not bolted to a Liebert NXL UPS

See **Figures 2** through **5**.

Figure 2 Battery cabinets connected, attached to UPS

Note: Remove knockout in the UPS low-voltage section to route control cables between the battery cabinet and UPS.

Maximum of five battery cabinets in parallel.
If the Liebert NXL UPS is 500kVA or above, battery cabinets must be attached to the left side of the UPS.

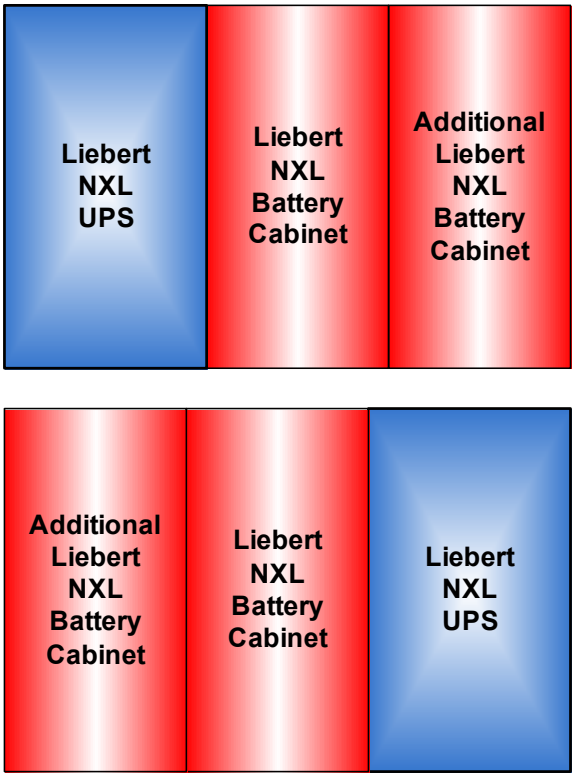


Figure 3 Battery cabinets connected, detached from UPS

Maximum of five battery cabinets in parallel.
The junction cabinet allows for sufficient conduit landing space. It is required for systems of 500kVA or above.

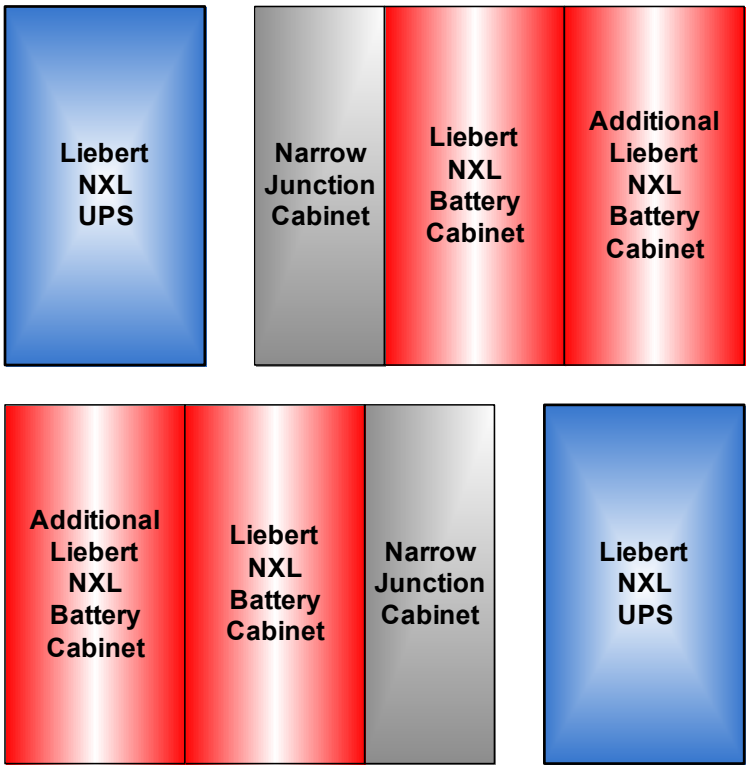


Figure 4 Battery cabinets connected, detached from Module Battery Disconnect, detached from UPS

Battery Strings with a Liebert Module Battery Disconnect can have a maximum of four battery cabinets.
The junction cabinet is used to allow for sufficient conduit landing space and is required for systems of 500kVA or above.

Note: If buy-out Module Battery Disconnect is used, it is possible to have up to eight batteries in the system. Contact the MBD manufacturer for maximum withstand rating.

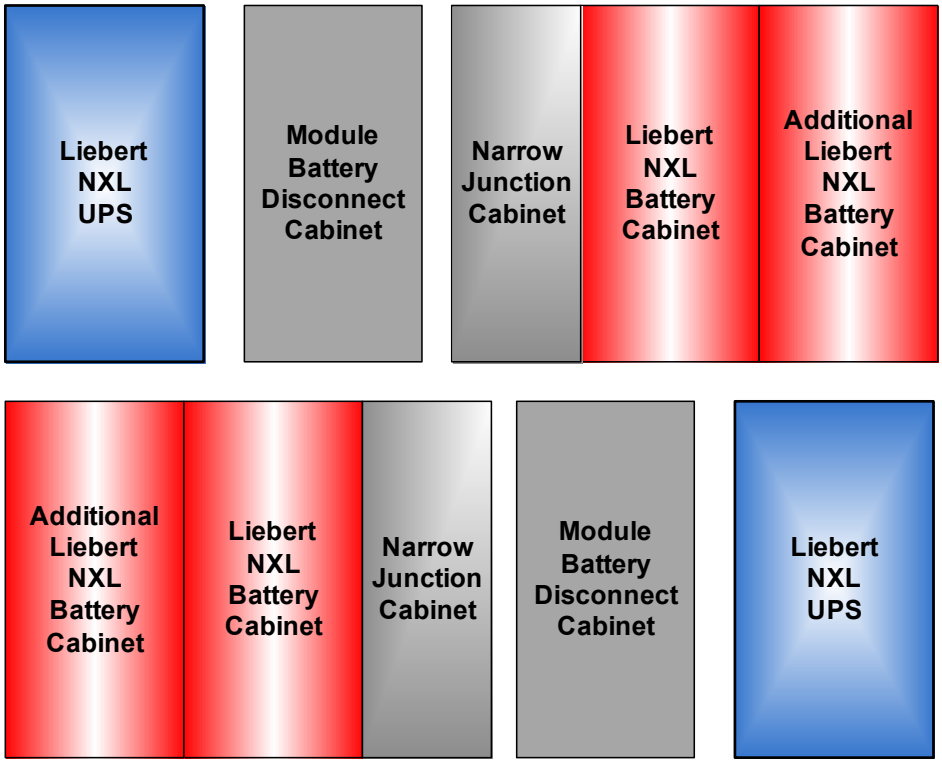
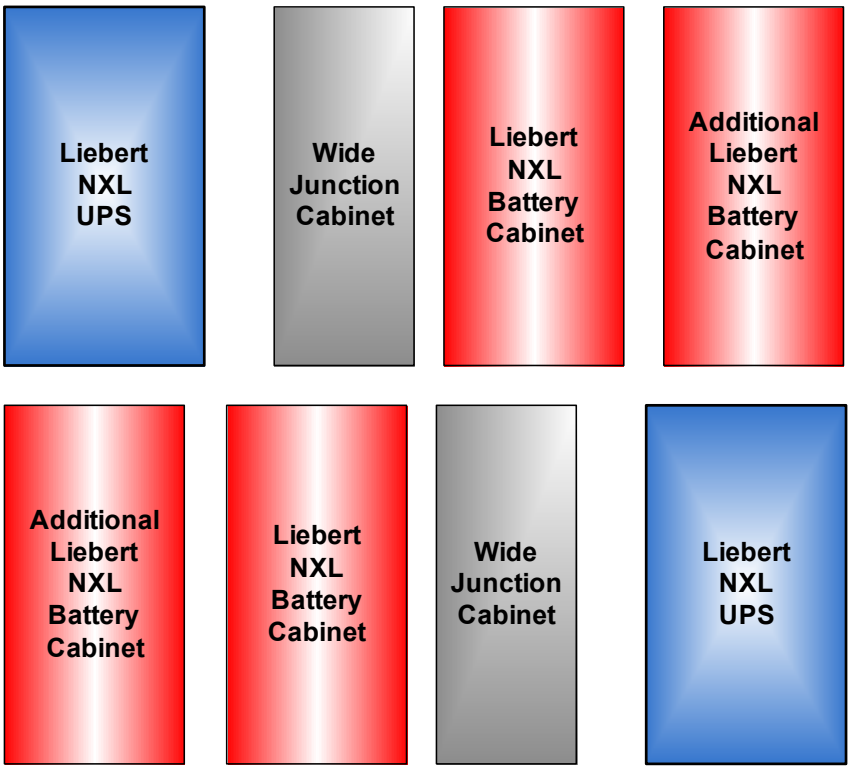


Figure 5 Stand-alone battery cabinets, no Module Battery Disconnect, detached from UPS

Maximum of five battery cabinets.
The junction cabinet provides sufficient conduit landing space and is required for all systems in this configuration.



2.3 Cable Entry

Cables may enter the battery cabinet from the top or bottom. Cable entry is made possible by installing conduit to the removable plate fitted at the top or bottom. See **3.0 - Installation Drawings**.

2.4 Power Connection

Depending on the site layout, the battery cabinets can be cabled several ways. See **Figures 2** through **5**.

CAUTION

Cables between batteries and the UPS should be run in matched pairs, positive-with-negative, within each conduit or cable run.

Grouping like-polarity cables together (i.e., positive-with-positive and negative-with-negative) can cause stress or damage to the cables, conduit or buswork

2.4.1 Connected System

For cabinets ordered as connected (battery cabinets will bolt to each other), the positive and negative busbars are connected between battery cabinets with the supplied busbar connector extensions. See **Figure 25**

2.4.2 Stand-Alone System

For cabinets that are ordered as stand-alone, customer must supply all the interconnecting cables and hardware. See **Table 36** for current ratings and recommended cable sizes.

2.4.3 Attached/Detached System

For battery cabinets that are connecting to a Liebert NXL UPS, or Liebert NXL Junction Cabinet (see **Figures 2** through **4**), cables will run from the positive and negative busbars of the adjacent battery cabinet to the positive and negative DC connections of UPS, MBD or Junction Cabinet.

For attached systems (the cabinets bolt to each other) the cables can run internal to the cabinets and will be supplied.

For detached systems (the cabinets do not bolt to each other), the cables must be run outside the cabinets. The customer must supply all the interconnecting cables and hardware. See **Table 36** for current ratings and recommended cable sizes.

2.4.4 MBD Voltage Sense Leads

For ease of installation, the power cables from the battery cabinets can be installed on either the top or bottom breaker busbars (depending if top or bottom entry is used). The voltage sense leads need to be connected to the busbars on the input of the circuit breaker (busbars that have the cables from the battery system connected.) See **Figure 23**.

WARNING

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

Hazardous battery voltage may be present on busbar. Install battery voltage sense leads before connecting the positive and negative power cables.

2.4.5 Grounding

For cabinets that have been ordered as connected or attached, the ground cables and hardware will be supplied. See **Figure 26** for location of cabinet-to-cabinet grounding.

For cabinets ordered as detached or stand-alone, customer must supply the cables and hardware. See **Table 36** for current ratings and recommended cable sizes. See terminal detail drawings for location of ground busbar.

2.5 Control Connection

Each Liebert NXL Battery Cabinet and Liebert NXL Module Battery Disconnect (MBD) contains a Battery Interface Board (BIB). See **3.0 - Installation Drawings**. All cabinets in a system must have their Battery Interface boards connected in series. See **Figure 11** for battery cabinet details and **Figure 17** for MBD details.

NOTE
Care must be taken to route the control cables away from high voltage cables or busbars.

Figure 6 Wiring external interface board in UPS to battery interface board in battery cabinet

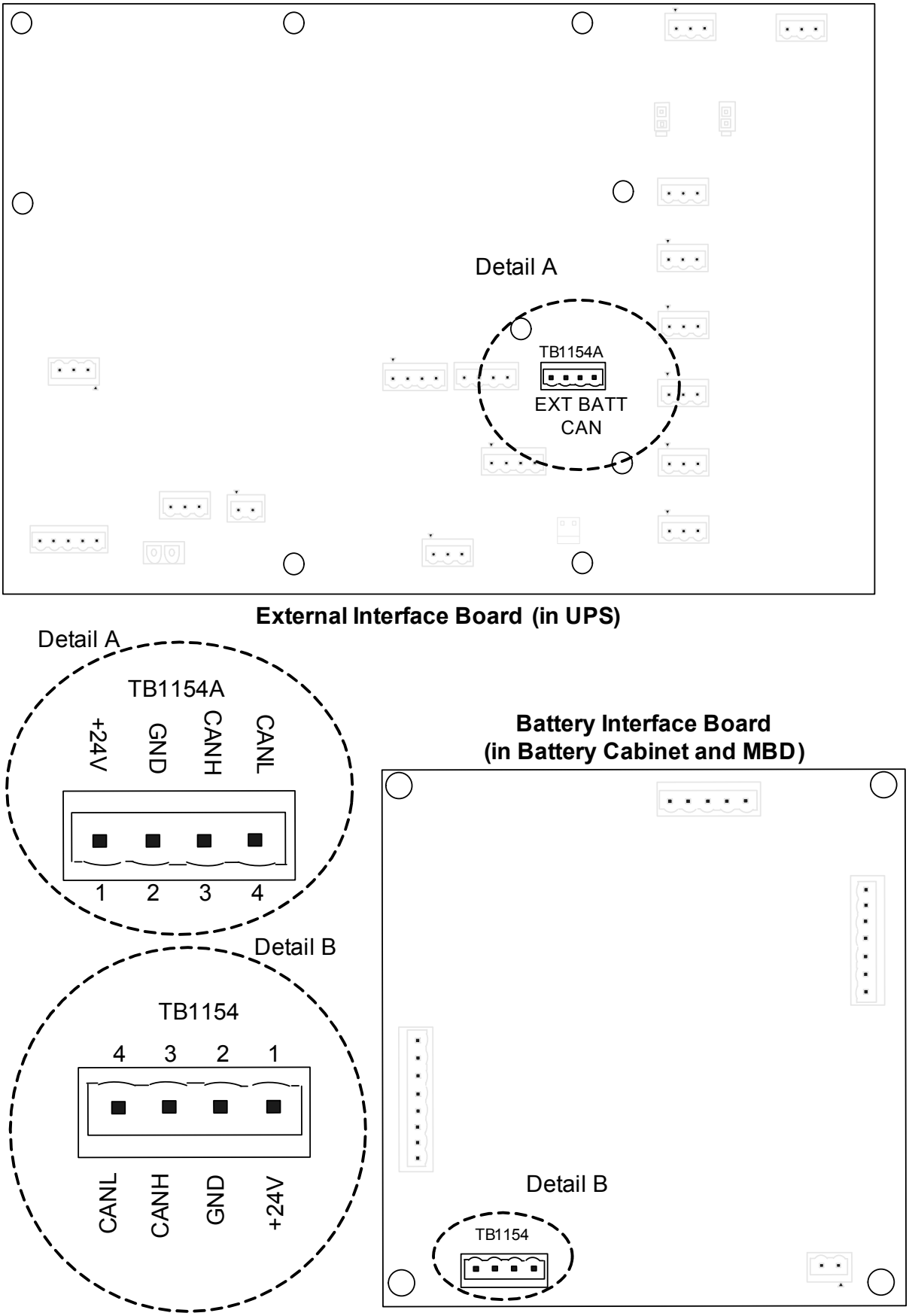
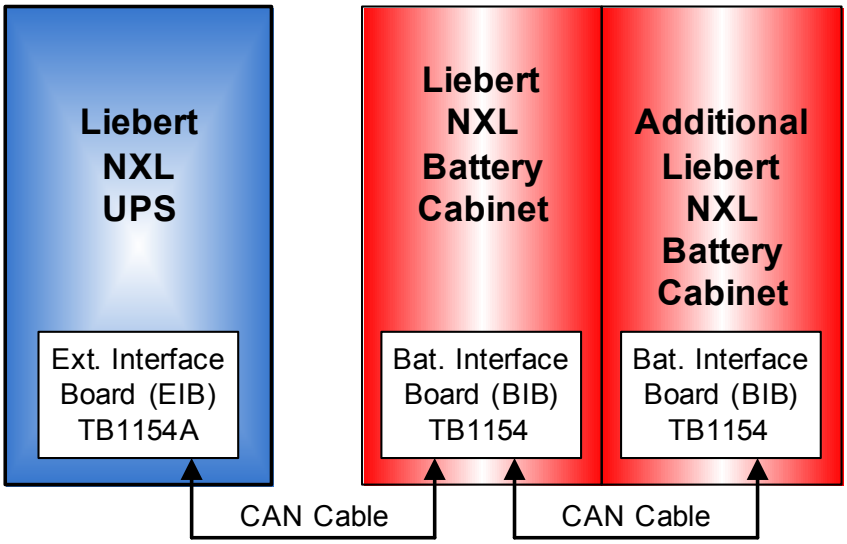


Figure 7 Control cable layout—Liebert NXL UPS to Liebert NXL Battery Cabinet



The CAN cables must be two, twisted pair, shielded 18AWG (Belden 9156 or equivalent). All interconnecting cables and hardware for connected and attached cabinets will be provided.

NOTICE

Risk of improper installation. Can cause equipment damage.

During system commissioning, Liebert Services will set the jumpers on the EIB and the BIB. If another battery cabinet is added to the system after commissioning, it is imperative that Liebert Services reset the jumpers on the EIB board and the BIB board.

2.6 Alber Monitoring System—Optional

The Liebert matching battery cabinet allows installing an optional Alber battery monitoring system in the cabinet. The Alber battery monitoring 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. Additional capabilities include automatic internal DC resistance tests and trend analysis providing the ability to analyze performance and aid in troubleshooting.

The Alber monitoring system is installed inside the battery cabinet (see **Figure 55**). The monitoring system requires approximately 0.5A, single-phase power.

This power can come from the output of the UPS the battery cabinet is suppling (see **Figure 55**).

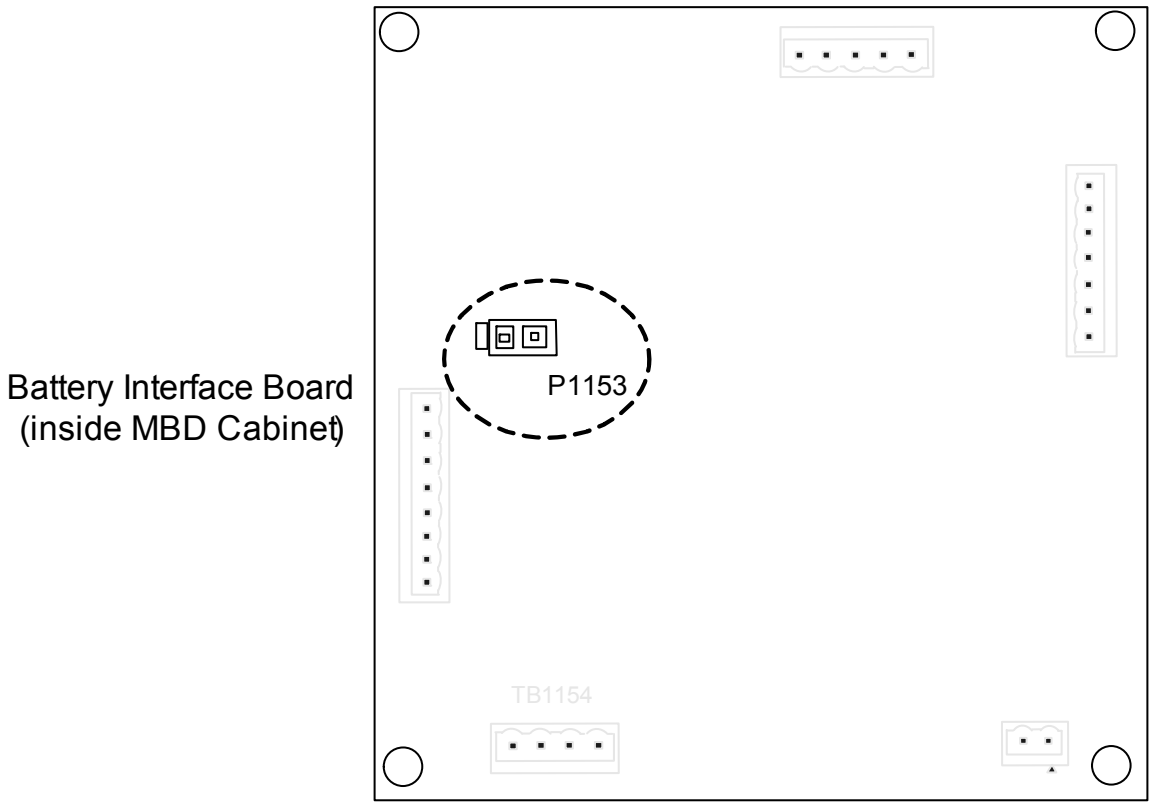
The Alber monitoring system consists of a Controller Module and Data Collector Module (see **Figure 53**). One Controller Module can monitor up to six battery cabinets with a Data Collector Module installed. The battery cabinet with the Controller Module (Battery Cabinet #1) must be installed in the position closest to the UPS.

For details about operating the Alber system, see the Alber Monitoring System manual, available at the Liebert Web Site, **www.liebert.com**

2.7 External Battery Room Temperature Sensor—Optional

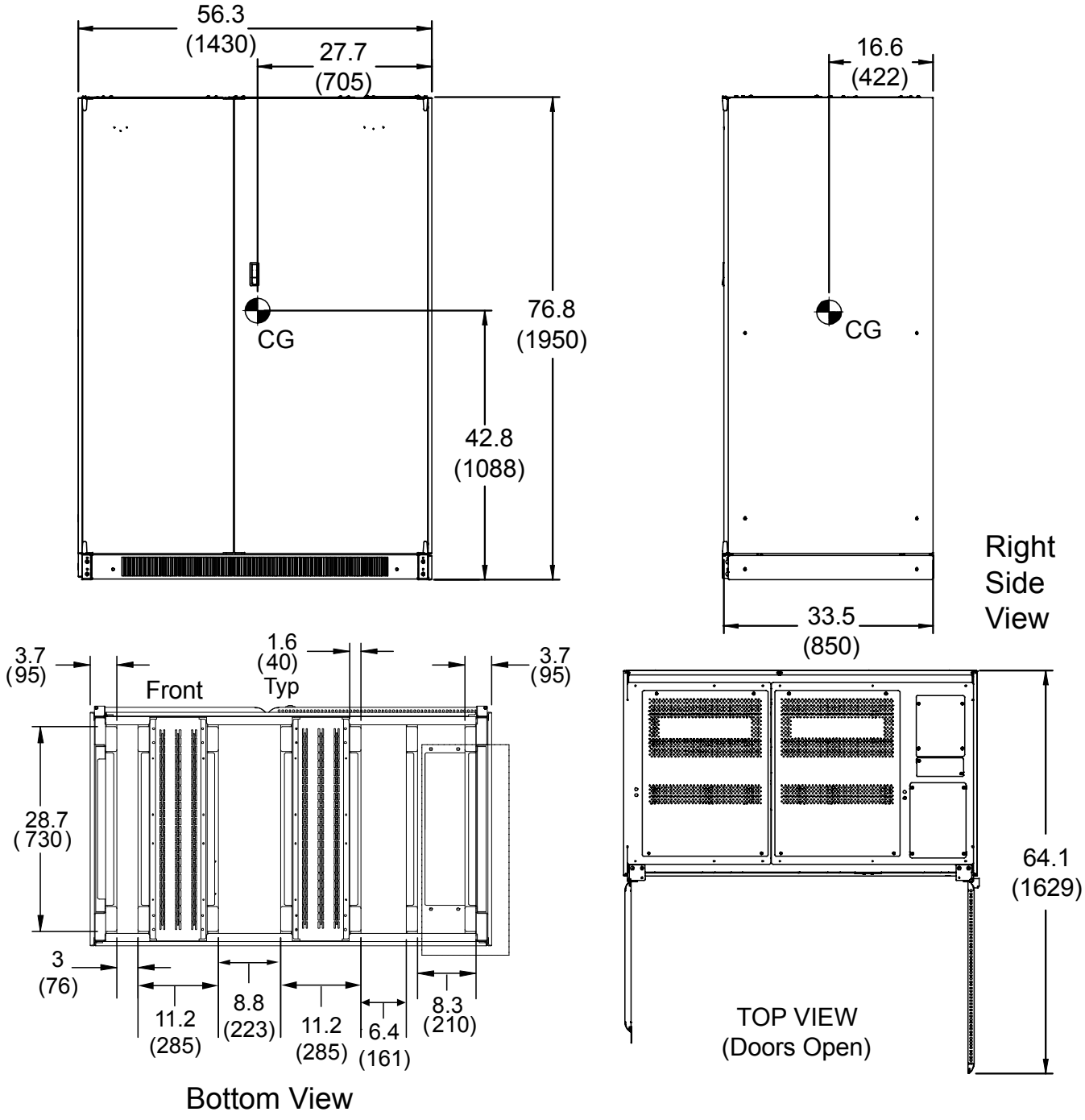
For systems that do not use Liebert NXL Battery Cabinets, an optional temperature sensor can be installed to monitor the ambient room temperature. This sensor is connected to the BIB board (see **Figure 8**). This sensor will allow the Liebert NXL UPS to perform temperature compensation charging.

Figure 8 Battery temperature sensor control connection



3.0 INSTALLATION DRAWINGS

Figure 9 Outline drawing, Liebert Top-Terminal Battery Cabinet



NOTE:
1. All dimensions are in in. (mm)
2. 24" minimum clearance above unit required for air exhaust.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable entry available through removable access plates.
5. Widths are with side panels. The width is 55.1" (1400mm) without side panels.
6.The depth dimension includes the front door and rear panel.

Figure 10 Main components, Liebert Top-Terminal Battery Cabinet

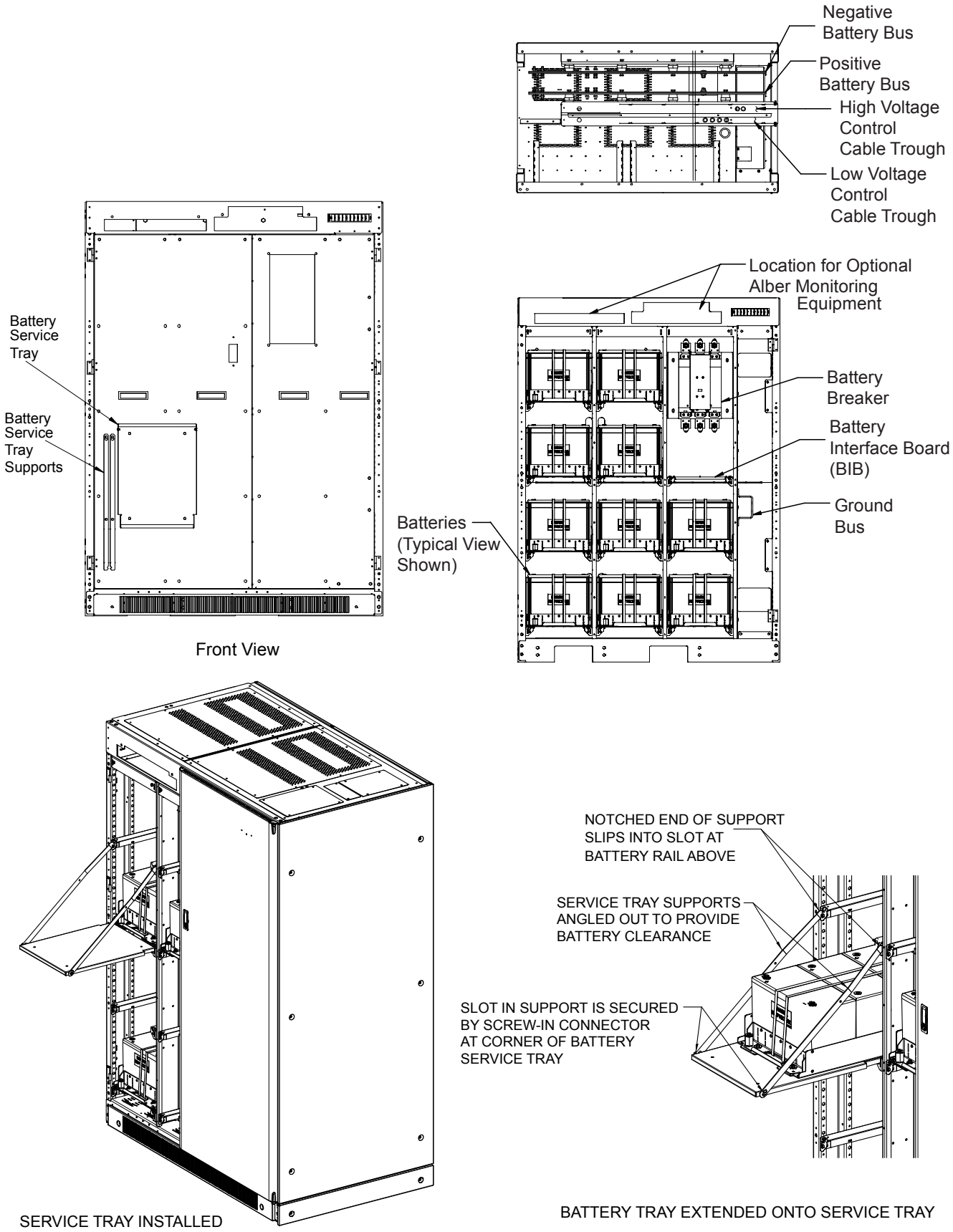
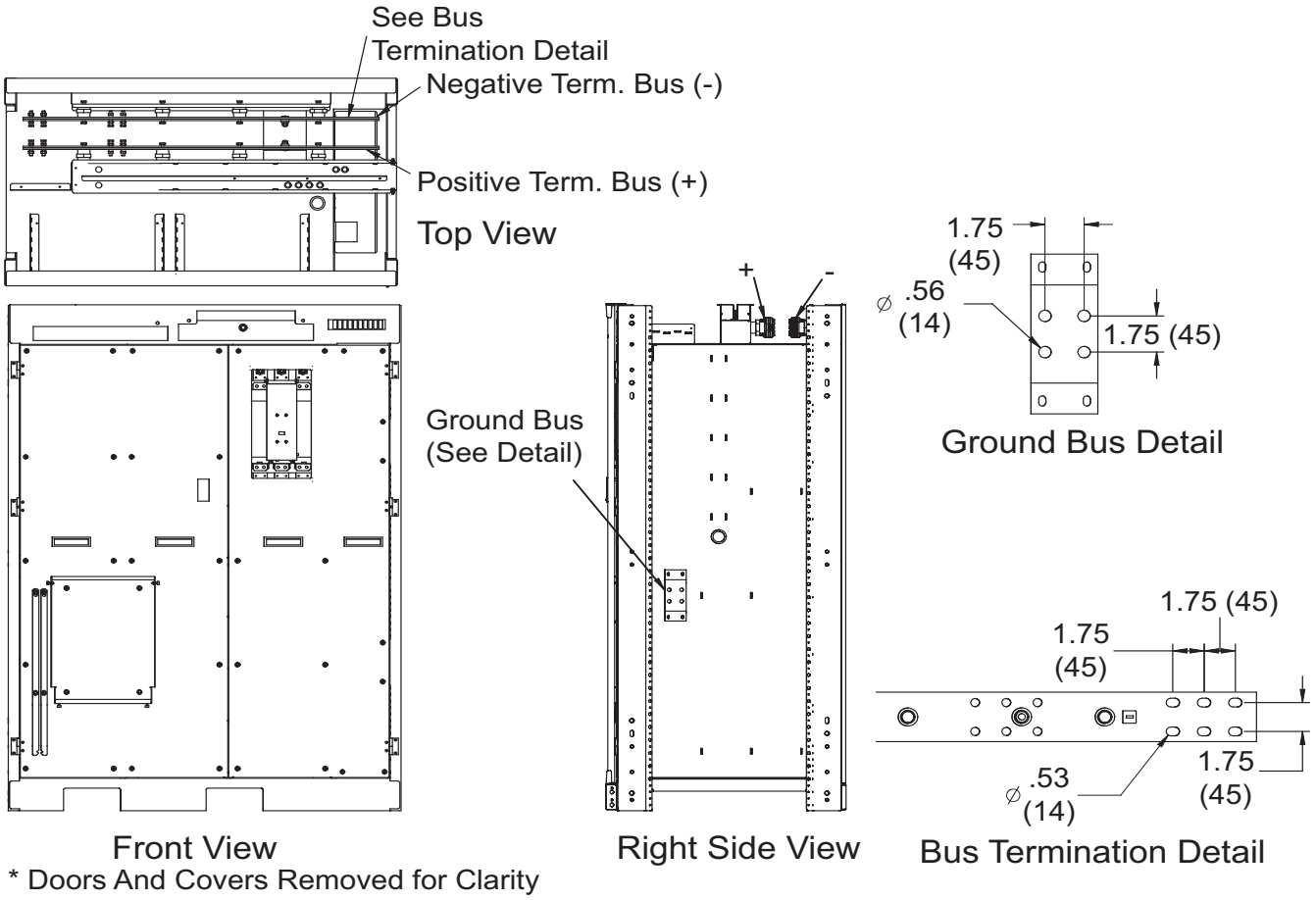


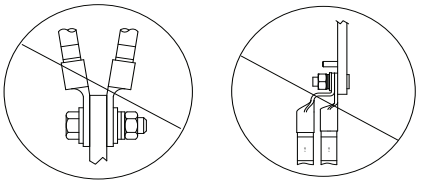
Figure 11 Terminal details, Liebert Top-Terminal Battery Cabinet



* Doors And Covers Removed for Clarity

Notes

1. All dimensions are in inches (mm)
2. Top and bottom cable entry available through removable access plates.
3. Control wiring and power wiring must be run in separate conduit.
4. Aluminum and copper-clad aluminum cables are not recommended.
5. All wiring must be in accordance with national and local electrical codes.
6. For cabinets ordered as stand-alone, the negative and positive terminal bus does not extend to full width of battery cabinet.
7. 24" minimum clearance above unit is required for air exhaust and service access.



DO NOT DOUBLE-STACK LUGS

Figure 12 Front Terminal Battery Cabinet shipping split

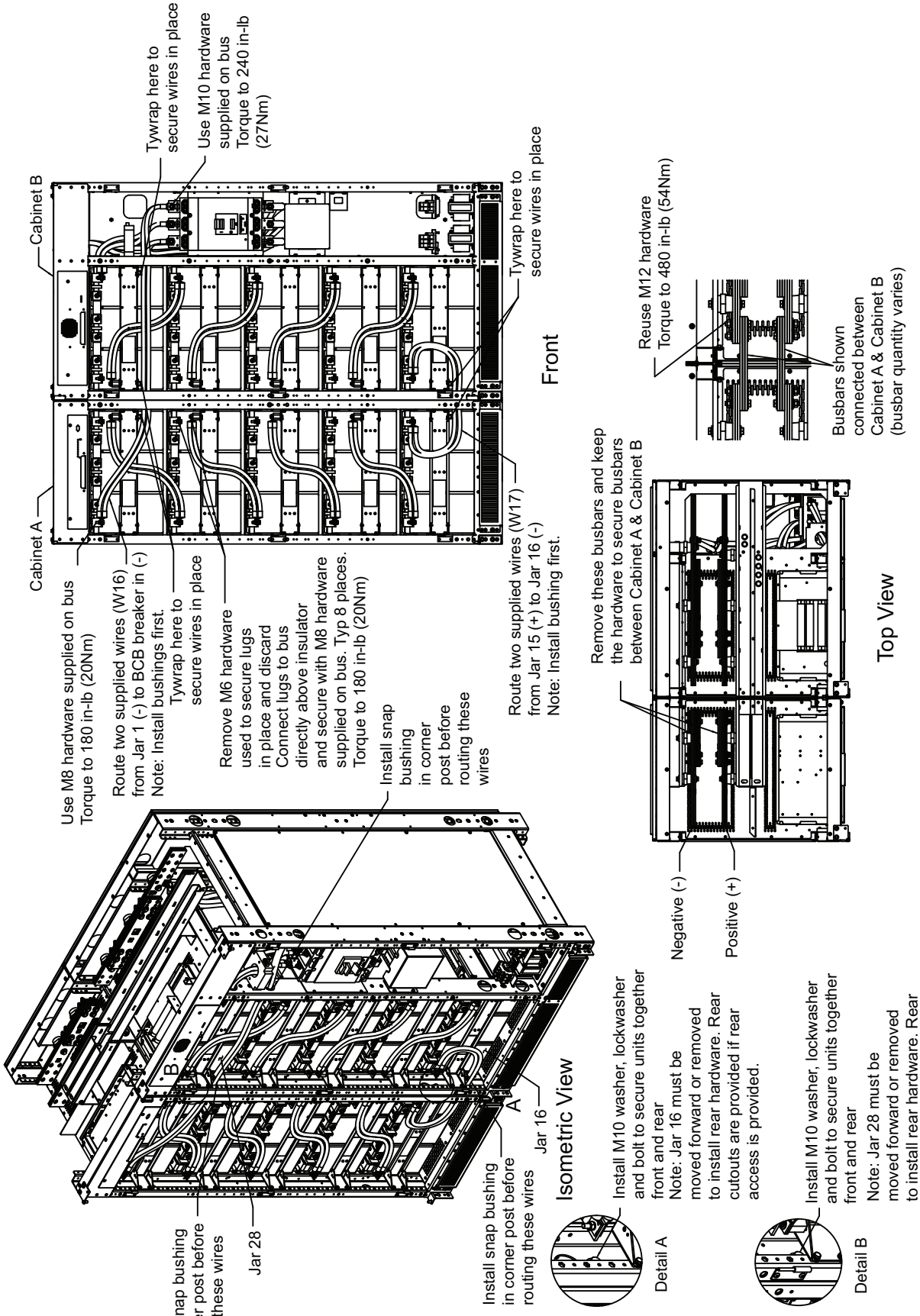
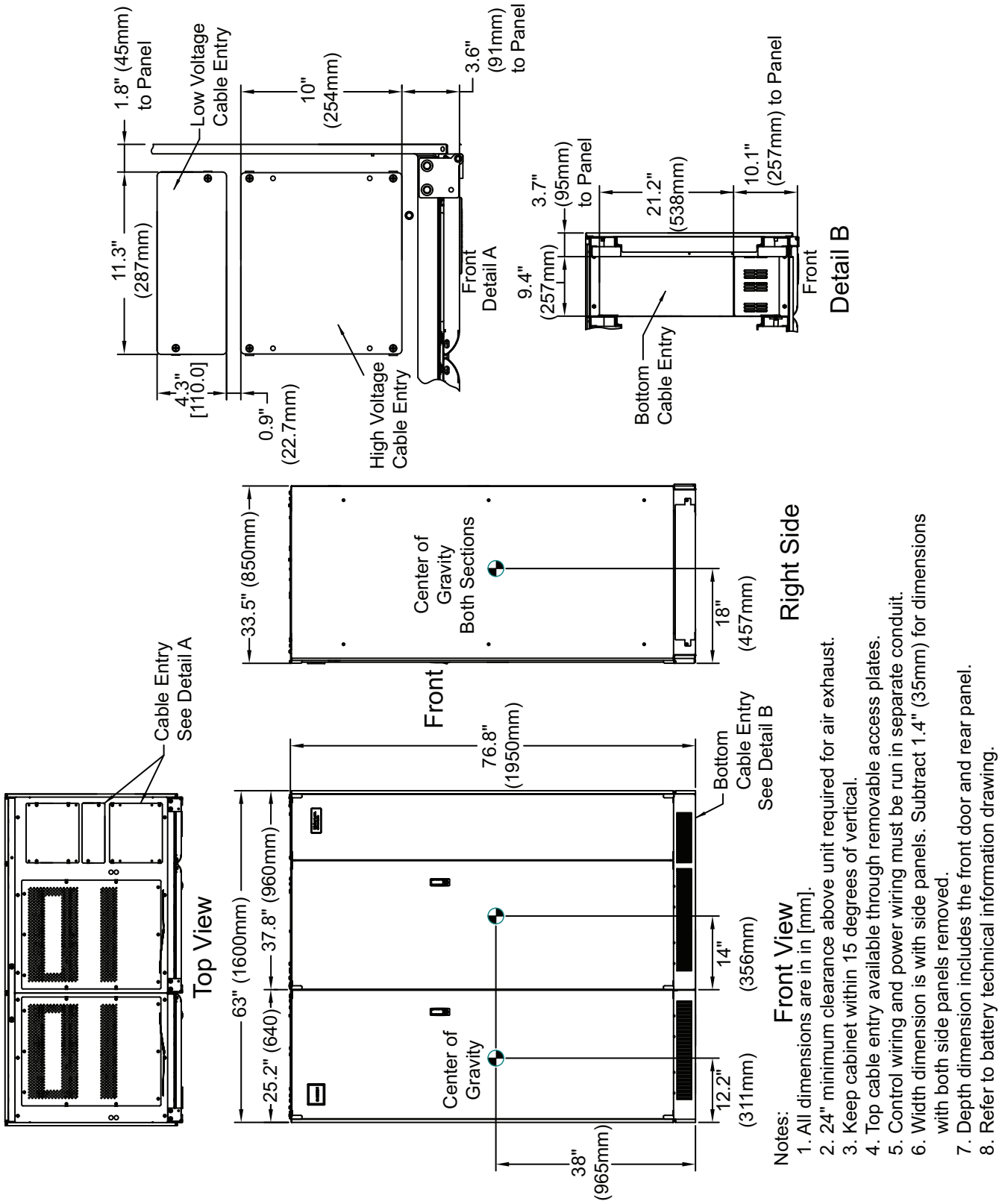


Figure 13 Front Terminal Battery Cabinet outline drawing



Notes:
1. All dimensions are in in [mm].
2. 24" minimum clearance above unit required for air exhaust.
3. Keep cabinet within 15 degrees of vertical.
4. Top cable entry available through removable access plates.
5. Control wiring and power wiring must be run in separate conduit.
6. Width dimension is with side panels. Subtract 1.4" (35mm) for dimensions with both side panels removed.
7. Depth dimension includes the front door and rear panel.
8. Refer to battery technical information drawing.

Figure 14 Front Terminal Battery Cabinet main components, layout

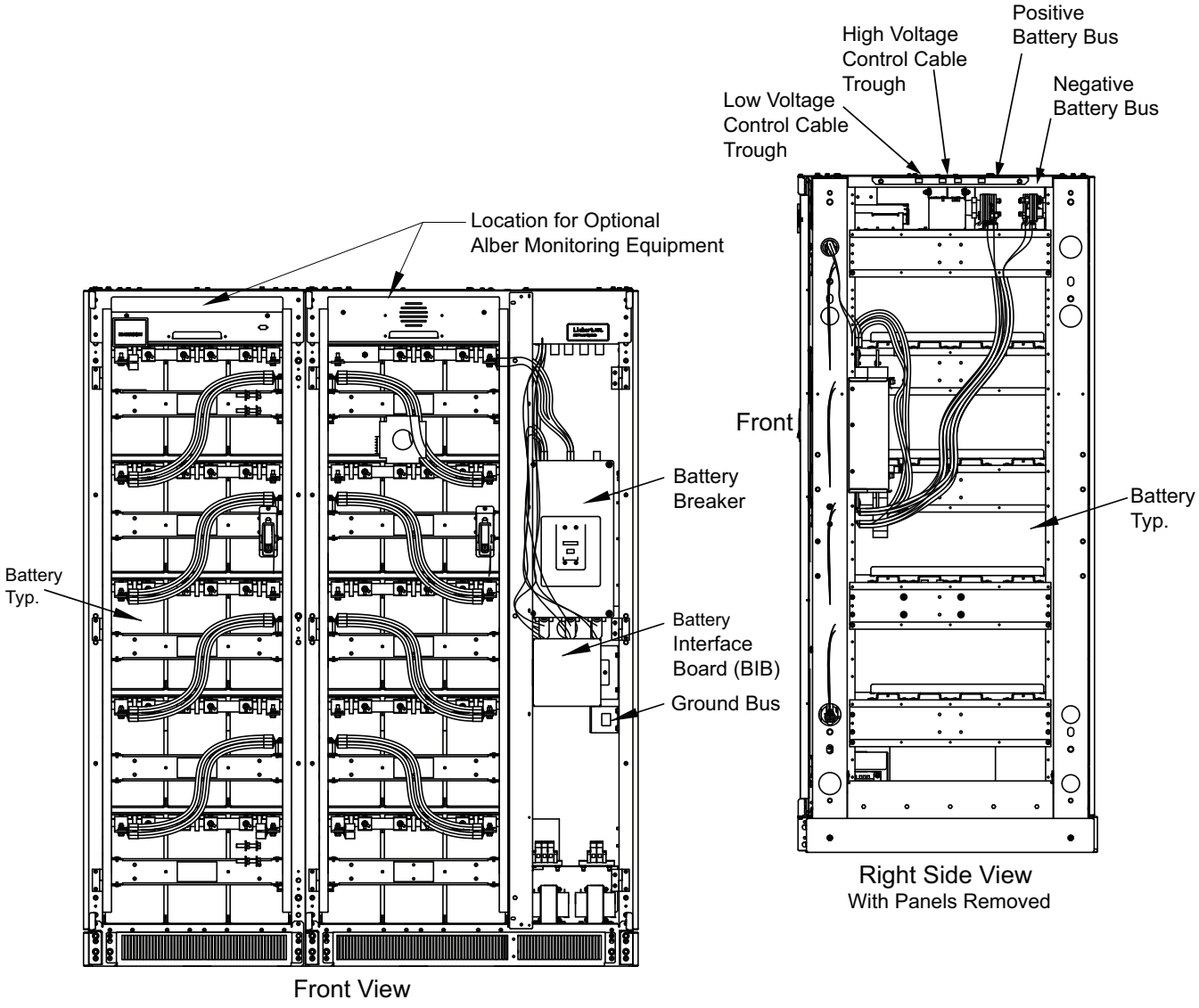
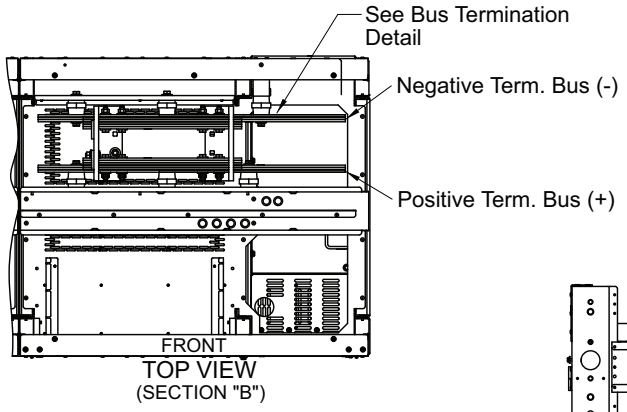
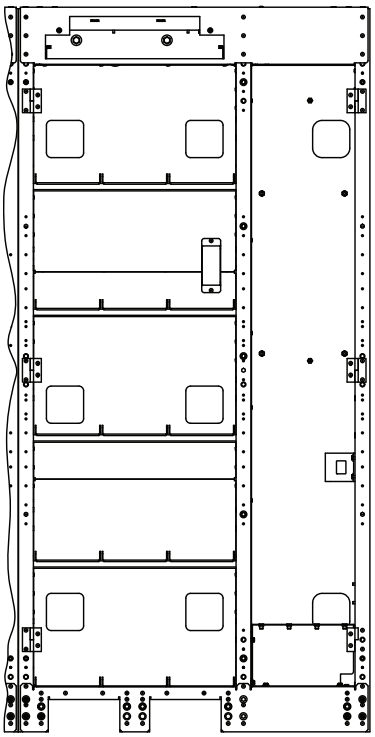


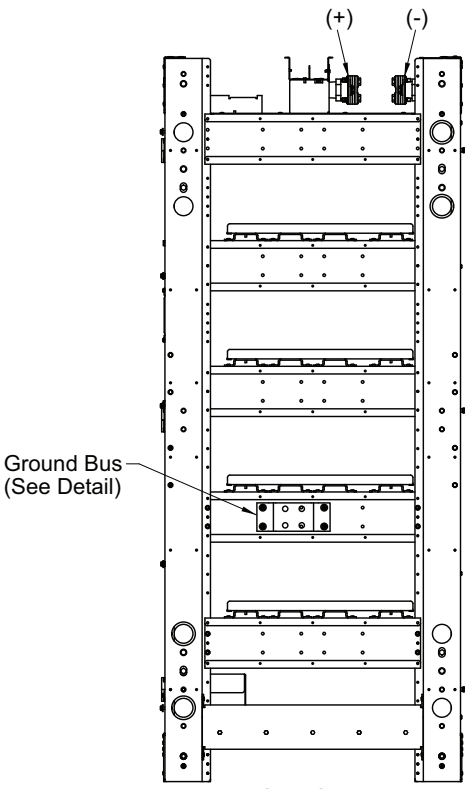
Figure 15 Front terminal detail drawing



TOP VIEW
(SECTION "B")

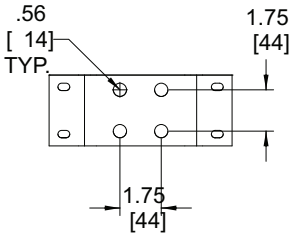


FRONT VIEW
(SECTION "B")

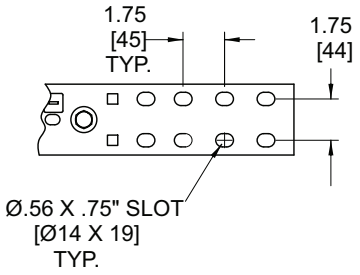


RIGHT SIDE VIEW

* Doors and covers removed for clarity



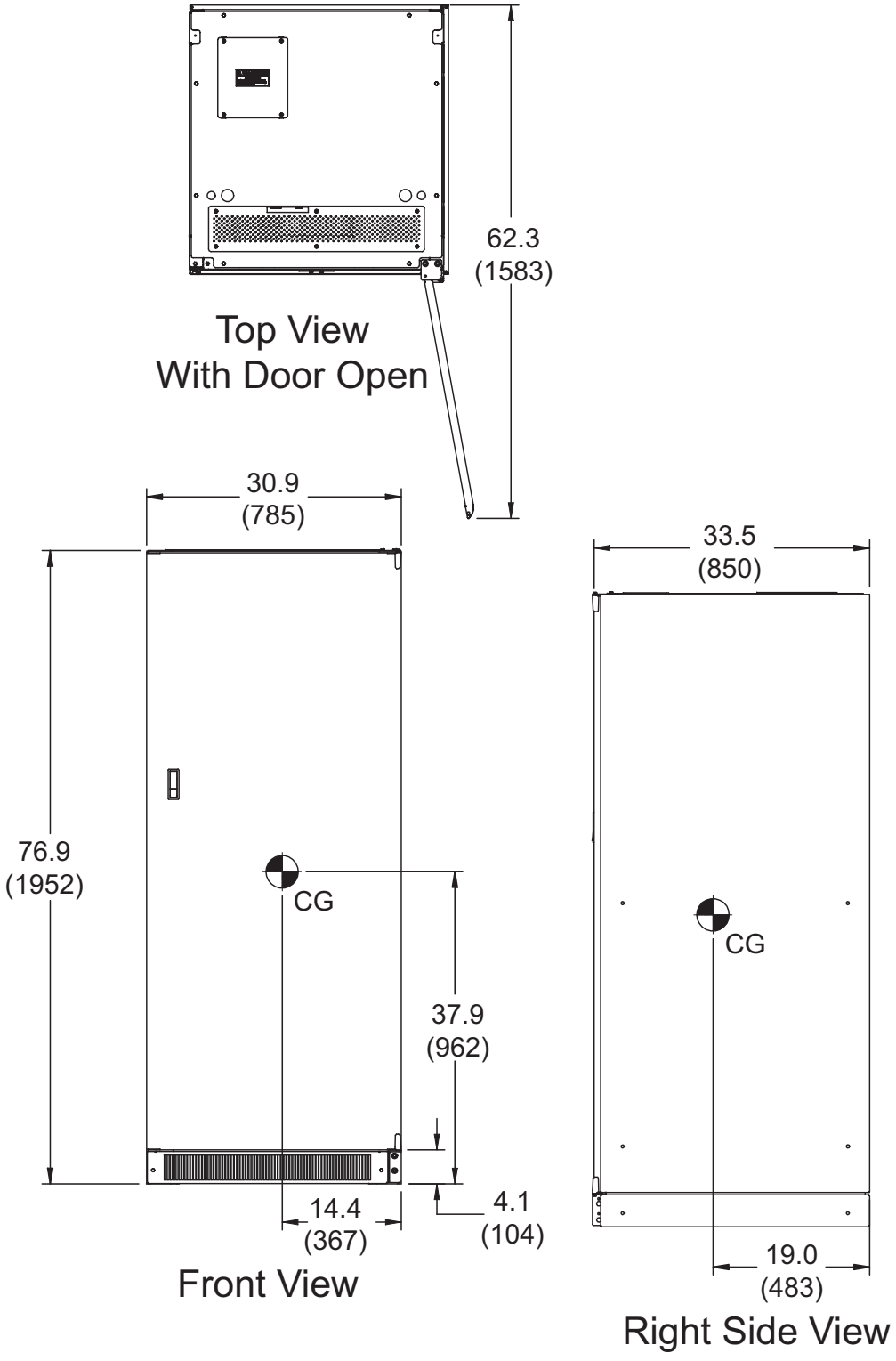
GROUND BUS DETAIL



BUS TERMINATION DETAIL
FOR POS. AND NEG. BUSBAR

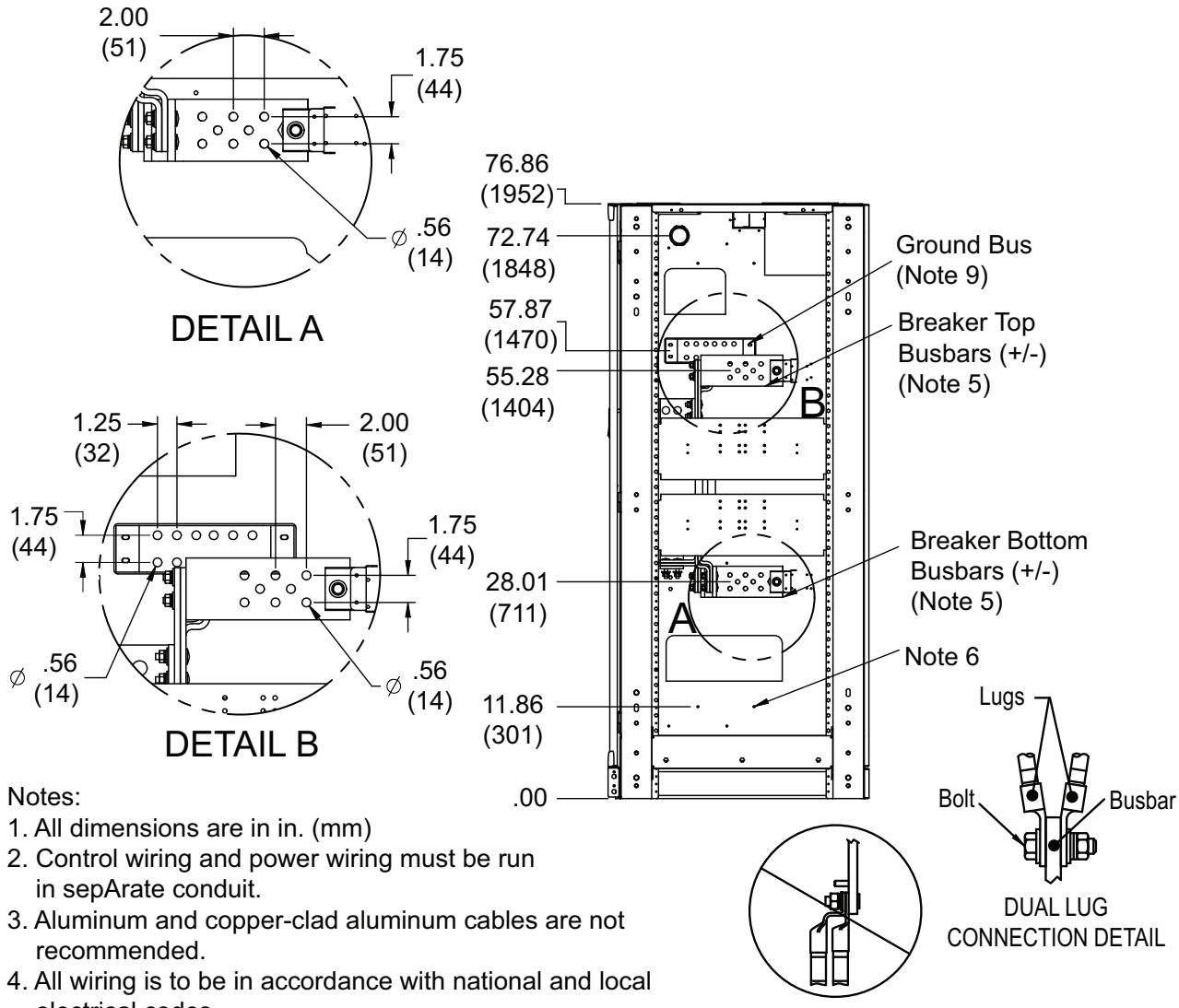
NOTES:
1. All dimensions are in in [mm].
2. Top and bottom cable entry available through removable access plates.
3. Control wiring and power wiring must be run in separate conduit.
4. Aluminum and copper-clad aluminum cables are not recommended.
5. All wiring is to be in accordance with national and local electrical codes.
6. For cabinets ordered as stand-alone, the negative and positive terminal bus does not extend to full width of battery cabinet.
7. 24" minimum clearance above unit is required for air exhaust and service.

Figure 16 Outline drawing, 250-400kVA, Liebert Module Battery Disconnect



1. All dimensions are in inches (mm).
2. 24" minimum clearance above unit required for air exhaust.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable entry available through removable access plates.
5. Widths are without side panels. The width is 32.1" (815mm) with side panels.
6. The depth dimension includes the front door and rear panel.

Figure 17 Terminal detail drawing, Liebert Module Battery Disconnect

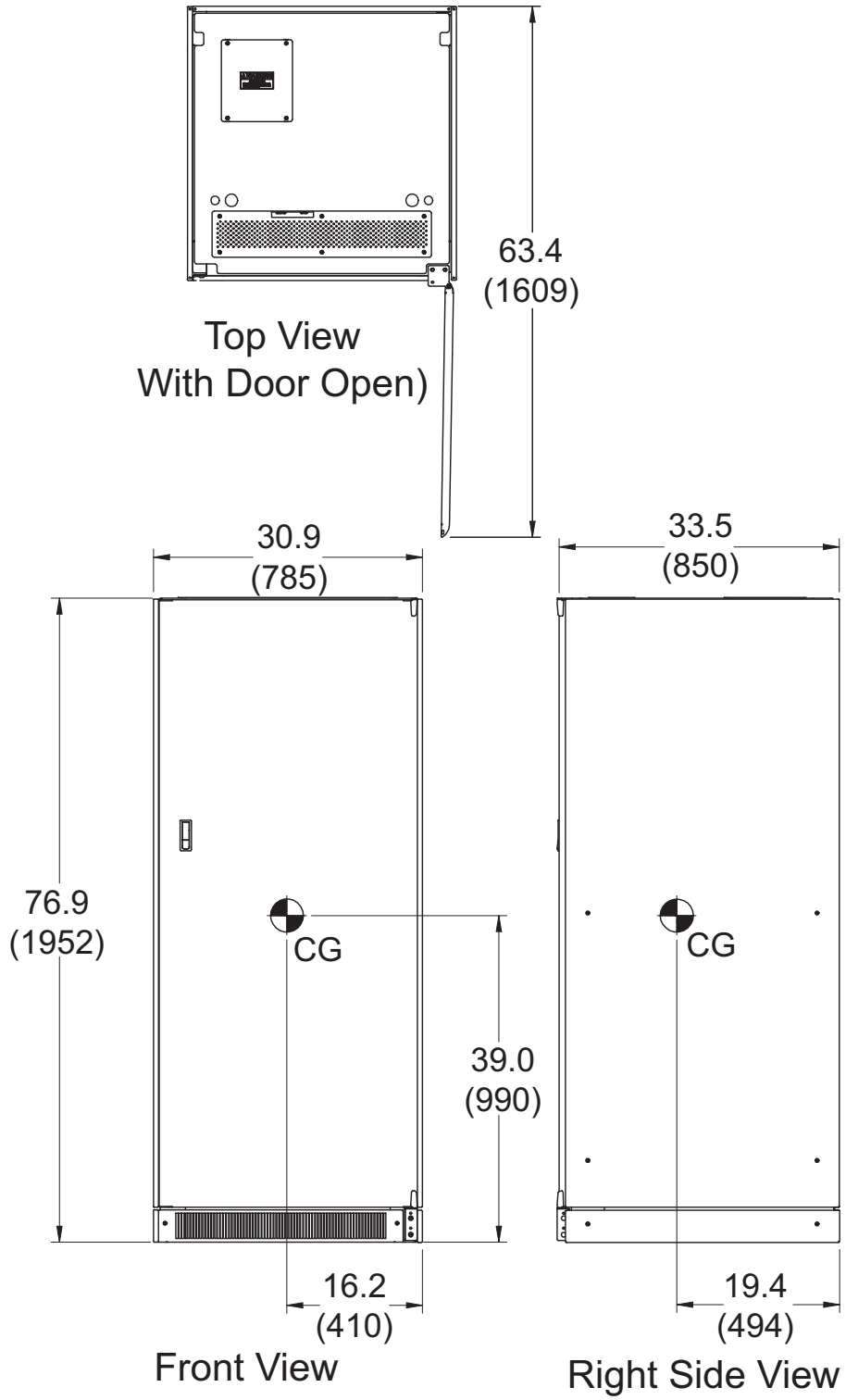


Notes:

1. All dimensions are in in. (mm)
2. Control wiring and power wiring must be run in sepArate conduit.
3. Aluminum and copper-clad aluminum cables are not recommended.
4. All wiring is to be in accordance with national and local electrical codes.
5. Cables from battery system can be connected to either breaker top or bottom busbars.
6. Ground bus shown in factory-installed location, optional ground bus mount location located near bottom of cabinet.

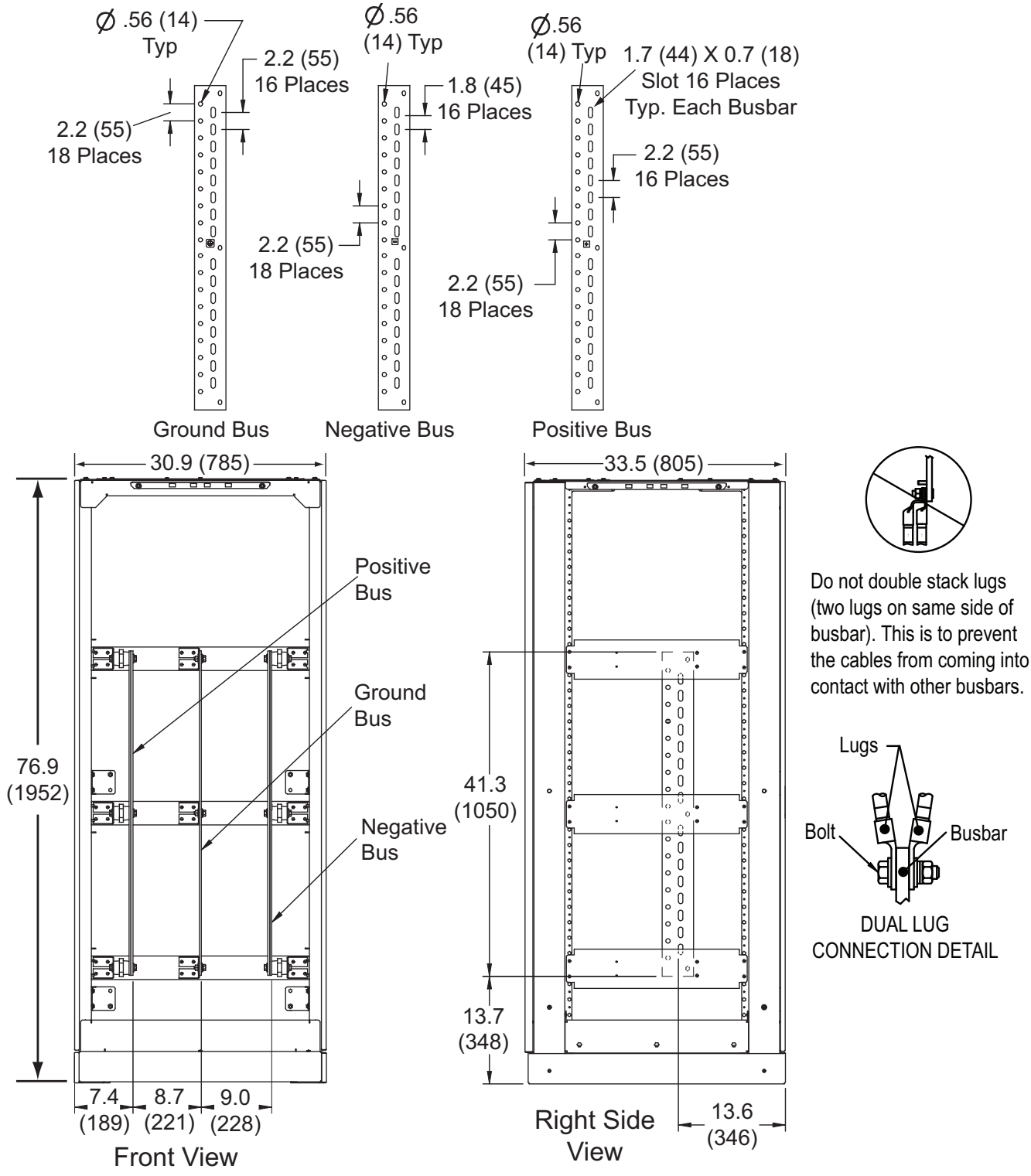
DO NOT DOUBLE-STACK LUGS
(two lugs on same side of busbar).
This is to prevent the cables from
coming into contact with other busbars.

Figure 18 Outline drawing, 500-750kVA, Liebert Module Battery Disconnect



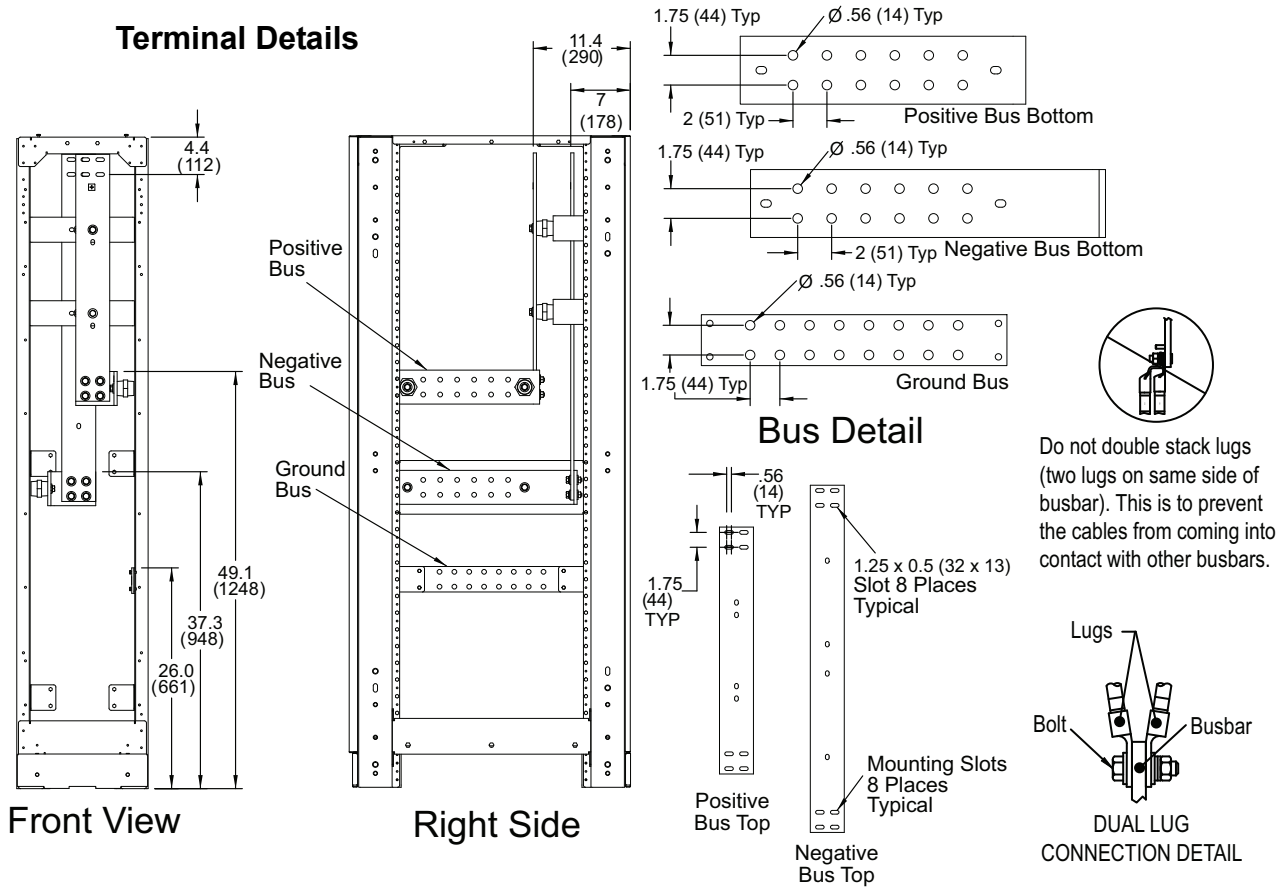
1. All dimensions are in inches (mm).
2. 24" minimum clearance above unit required for air exhaust.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable enry available through removable access plates.
5. Widths are without side panels. The width is 32.1" (815mm) with side panels.
6. The depth dimension includes the front door and rear panel.

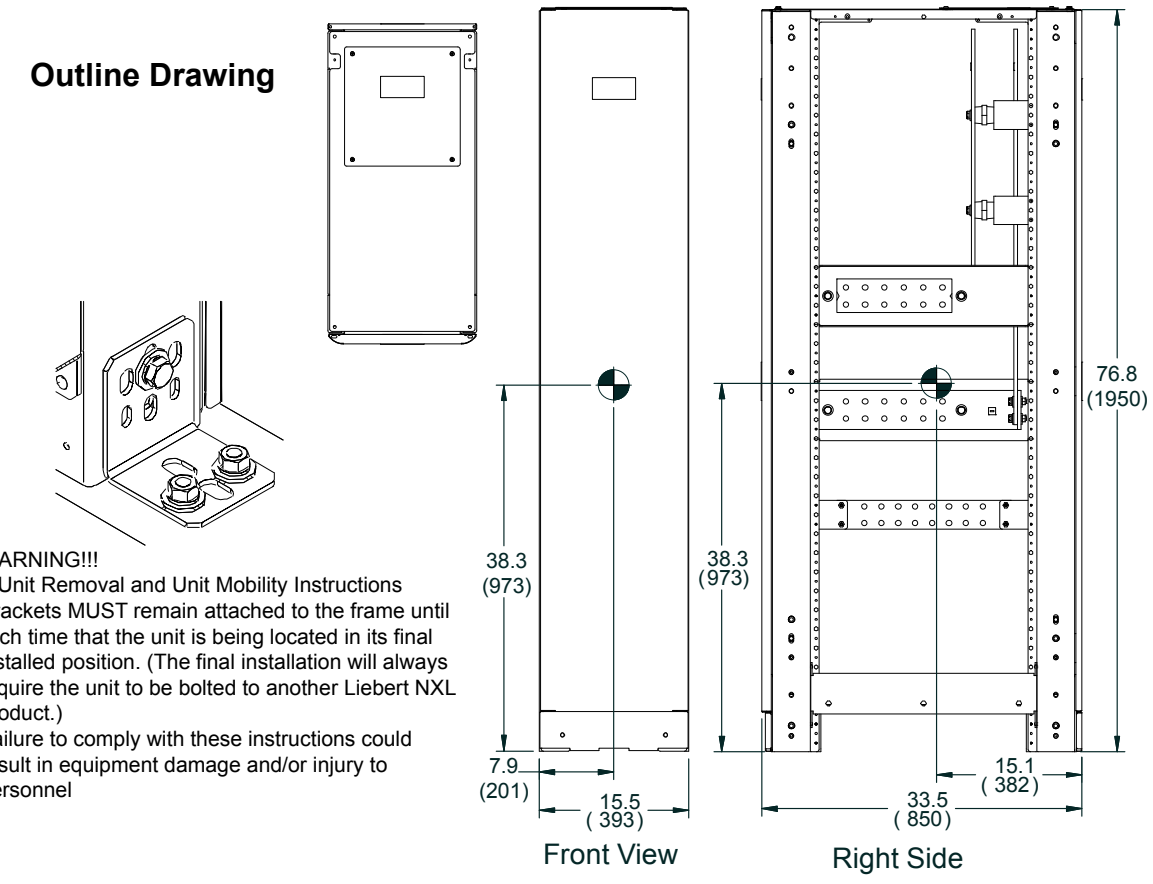
Figure 19 Liebert NXL Wide Junction Cabinet terminal wiring



Notes:
1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduit.
3. Aluminum and copper-clad aluminum cables are not recommended.
4. Widths are without side panels. The width is 32.1" (815mm) with side panels.
5.The depth dimension includes the front door and rear panel.

Figure 20 Liebert NXL Narrow Junction Cabinet—terminal detail and outline drawing





WARNING!!!

Unit Removal and Unit Mobility Instructions Brackets MUST remain attached to the frame until such time that the unit is being located in its final installed position. (The final installation will always require the unit to be bolted to another Liebert NXL product.)

Failure to comply with these instructions could result in equipment damage and/or injury to personnel

Figure 21 Liebert NXL Battery Cabinet control wiring

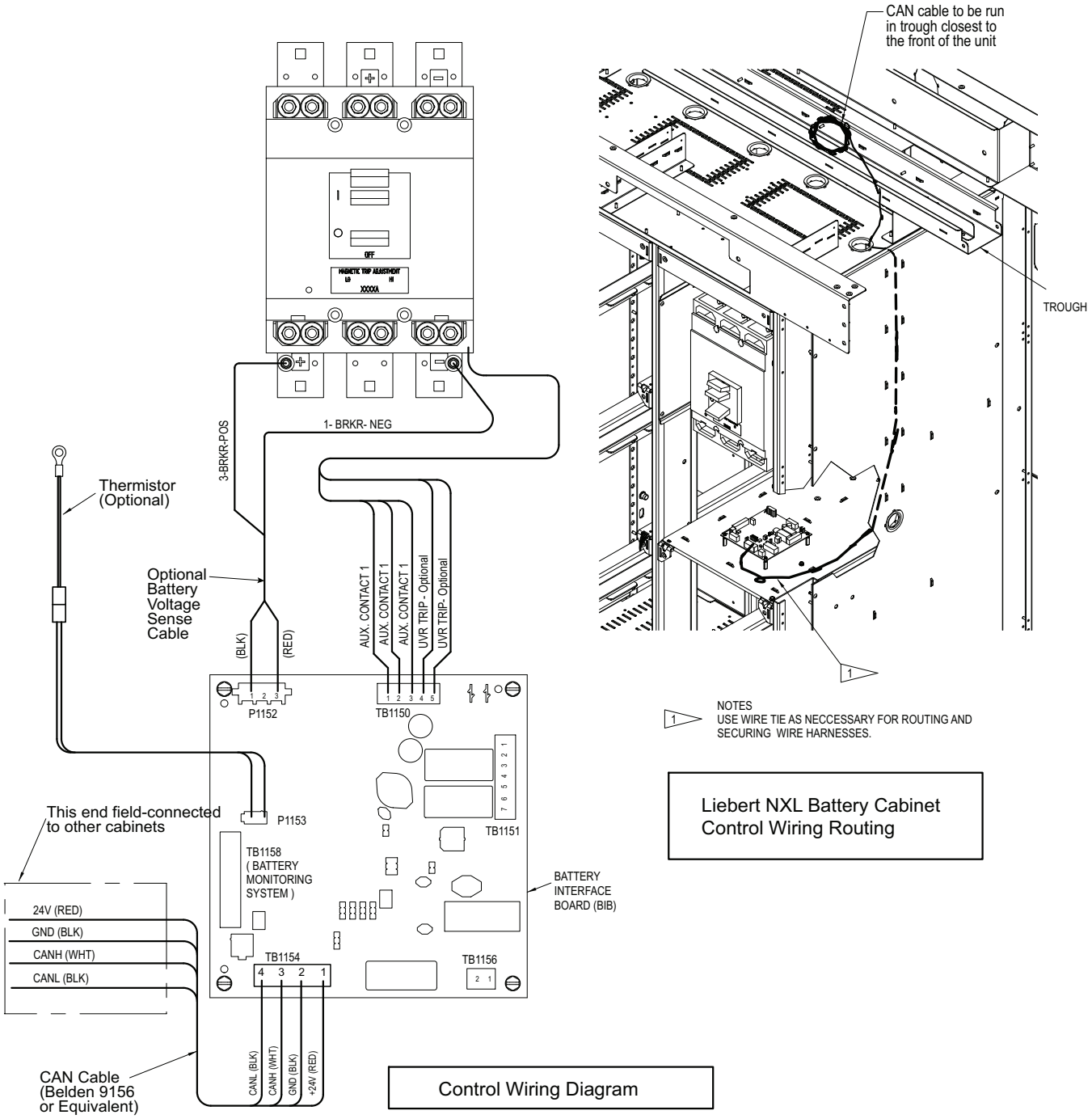


Figure 22 Liebert NXL Module Battery Disconnect control wiring

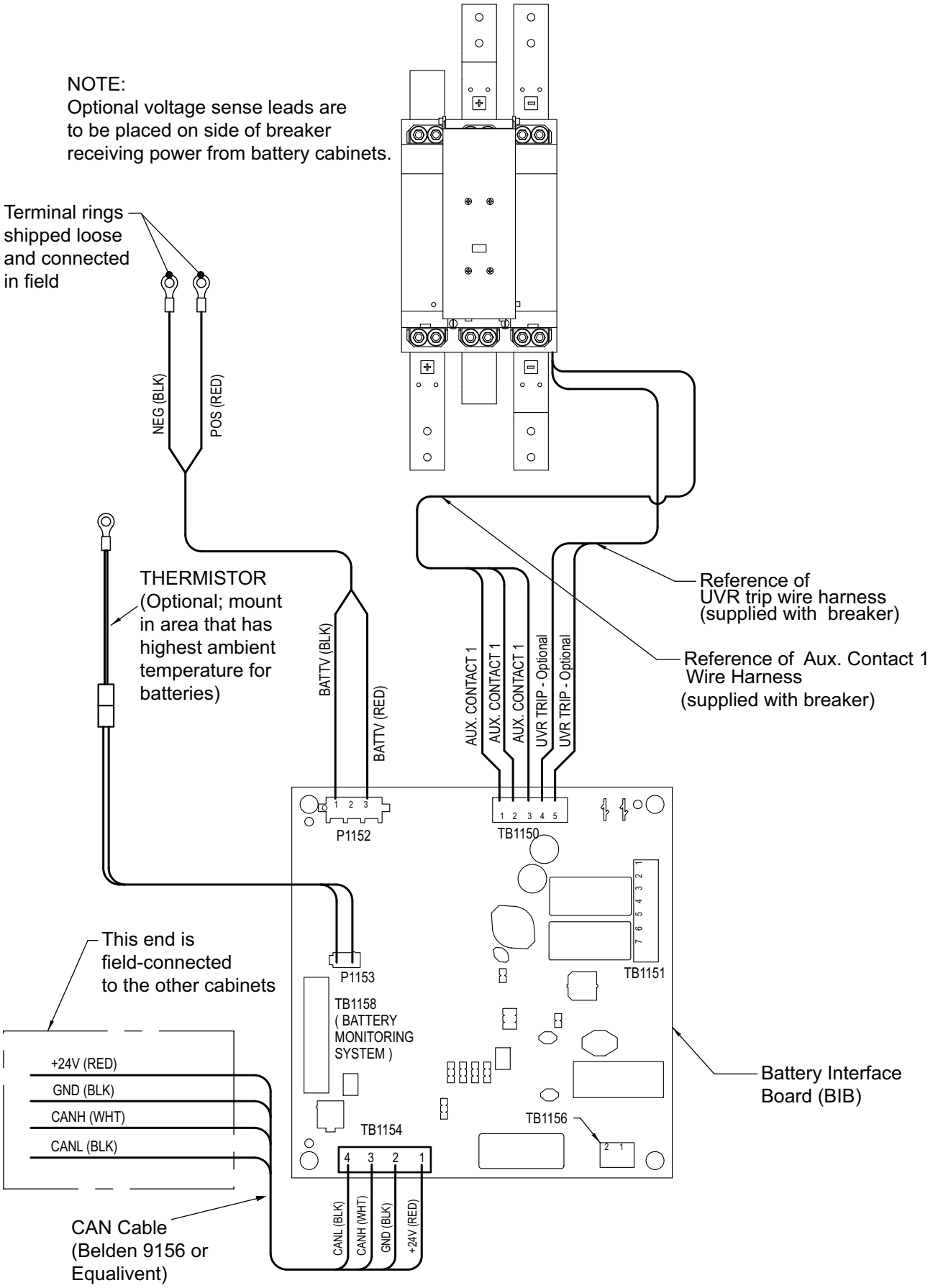
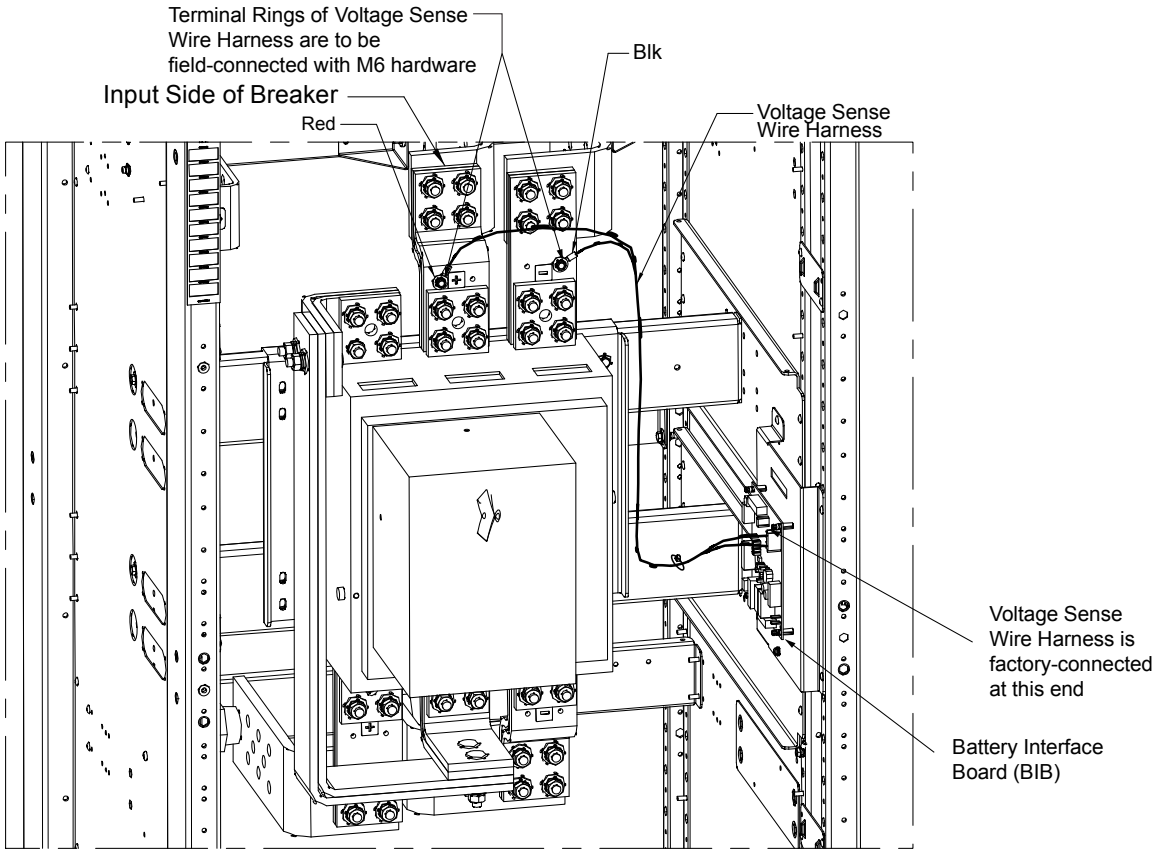
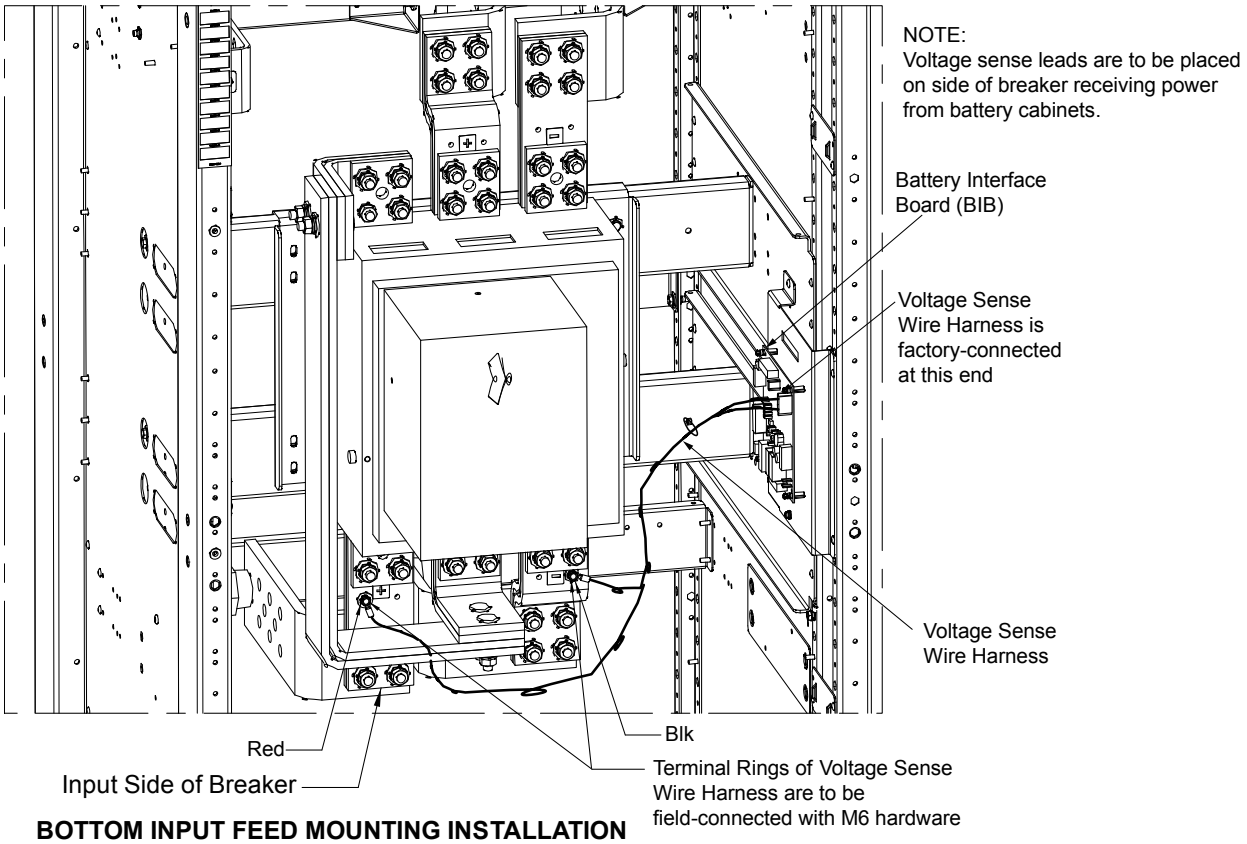


Figure 23 Optional voltage sense wire harness top input and bottom input



TOP INPUT FEED MOUNTING INSTALLATION



BOTTOM INPUT FEED MOUNTING INSTALLATION

Figure 24 Liebert NXL Module Battery Disconnect CAN wire harness connection

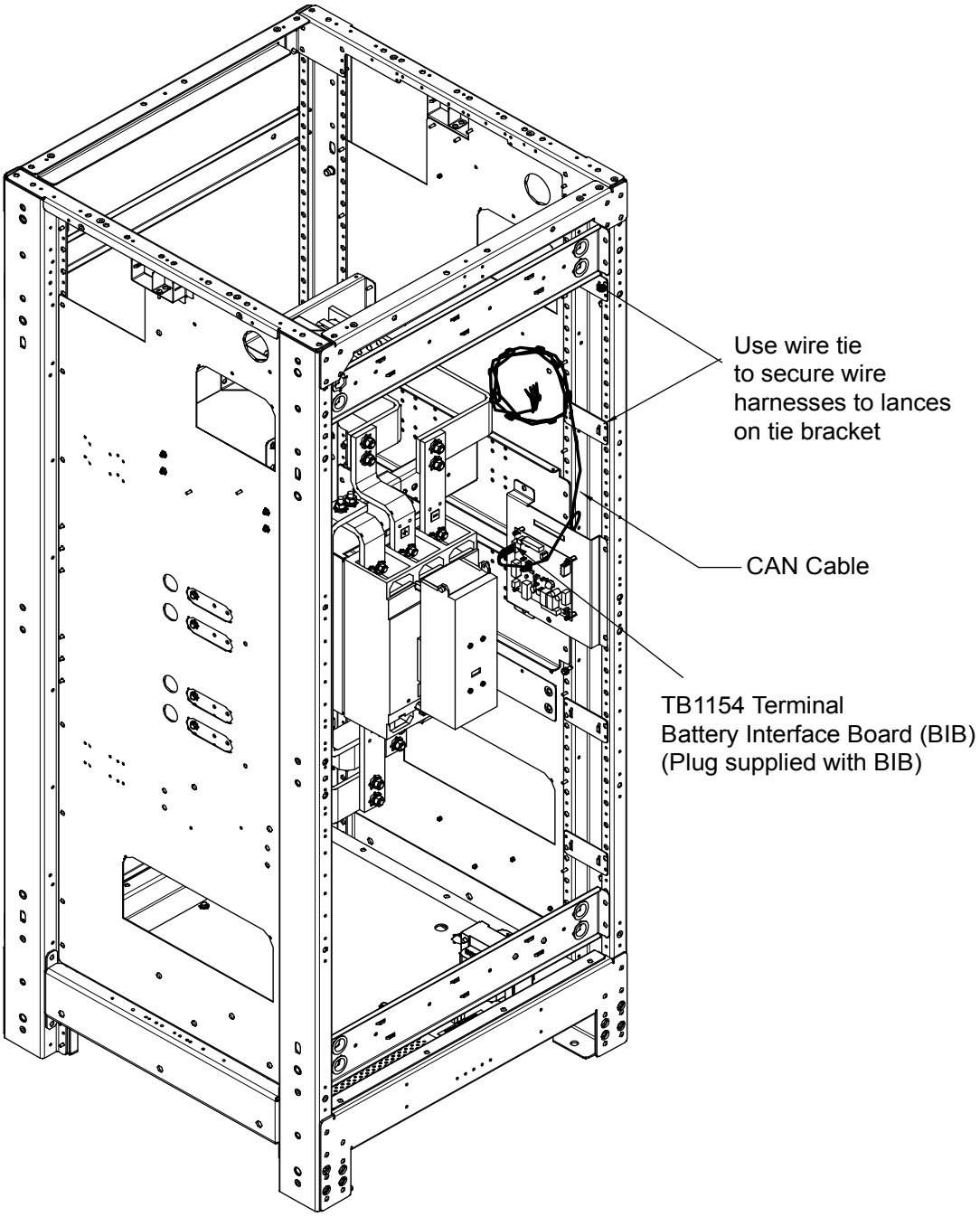


Figure 25 Attached battery cabinet connections

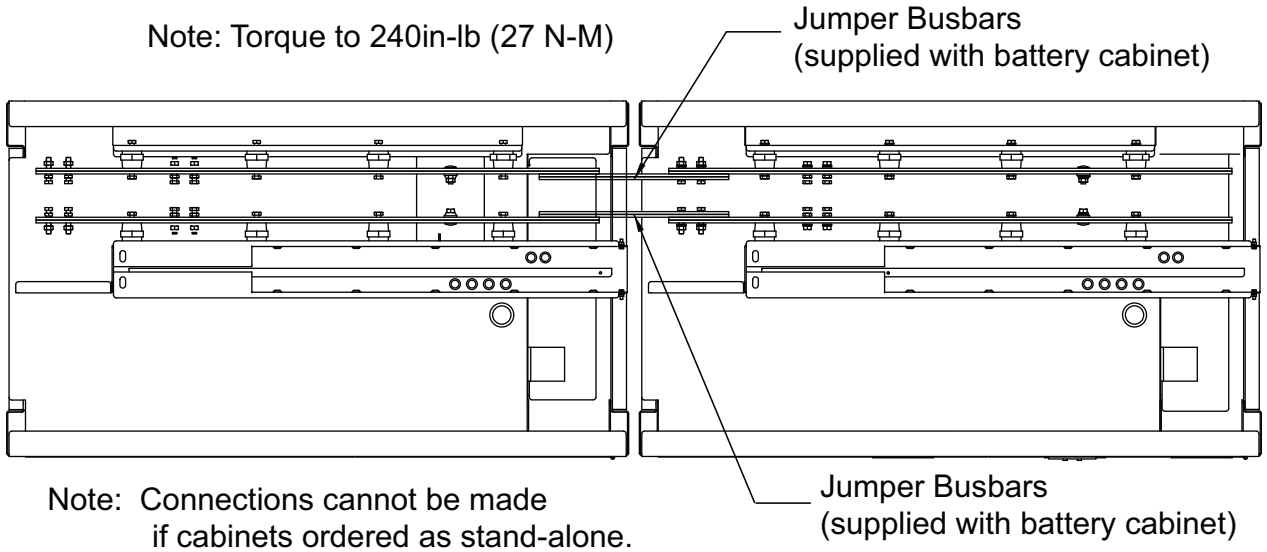
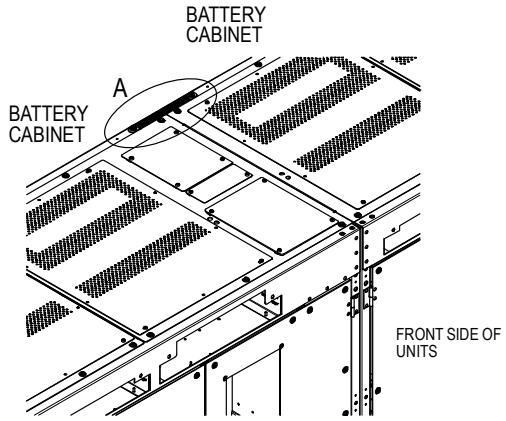
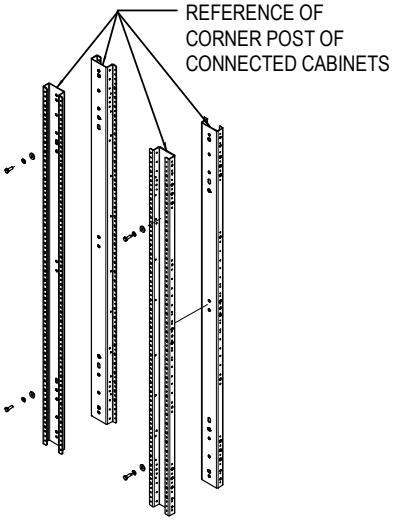


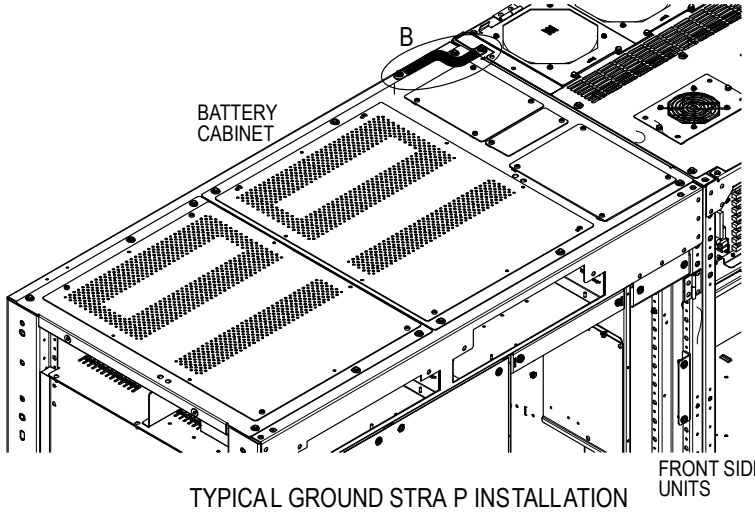
Figure 26 Ground strap location for connected cabinets



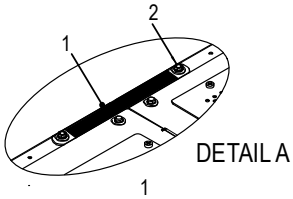
TYPICAL GROUND STRAP INSTALLATION
FOR BATTERY CABINET TO BATTERY CABINET
CONNECTIONS



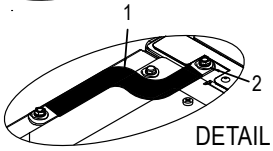
CABINET-TO-CABINET
BOLTING INSTRUCTIONS



TYPICAL GROUND STRAP INSTALLATION
FOR BATTERY CABINET TO
UPS OR ANCILLARY CABINET CONNECTIONS



DETAIL A



DETAIL B

NOTES:
1. Apply ground strap hardware to specified locations.
2. Torque Values: M6: (5 Nm) 40 IN-LB
M10: (14 Nm) 120 IN-LB

Figure 27 Top-Terminal Battery Cabinet interconnection wiring to 250-400kVA UPS

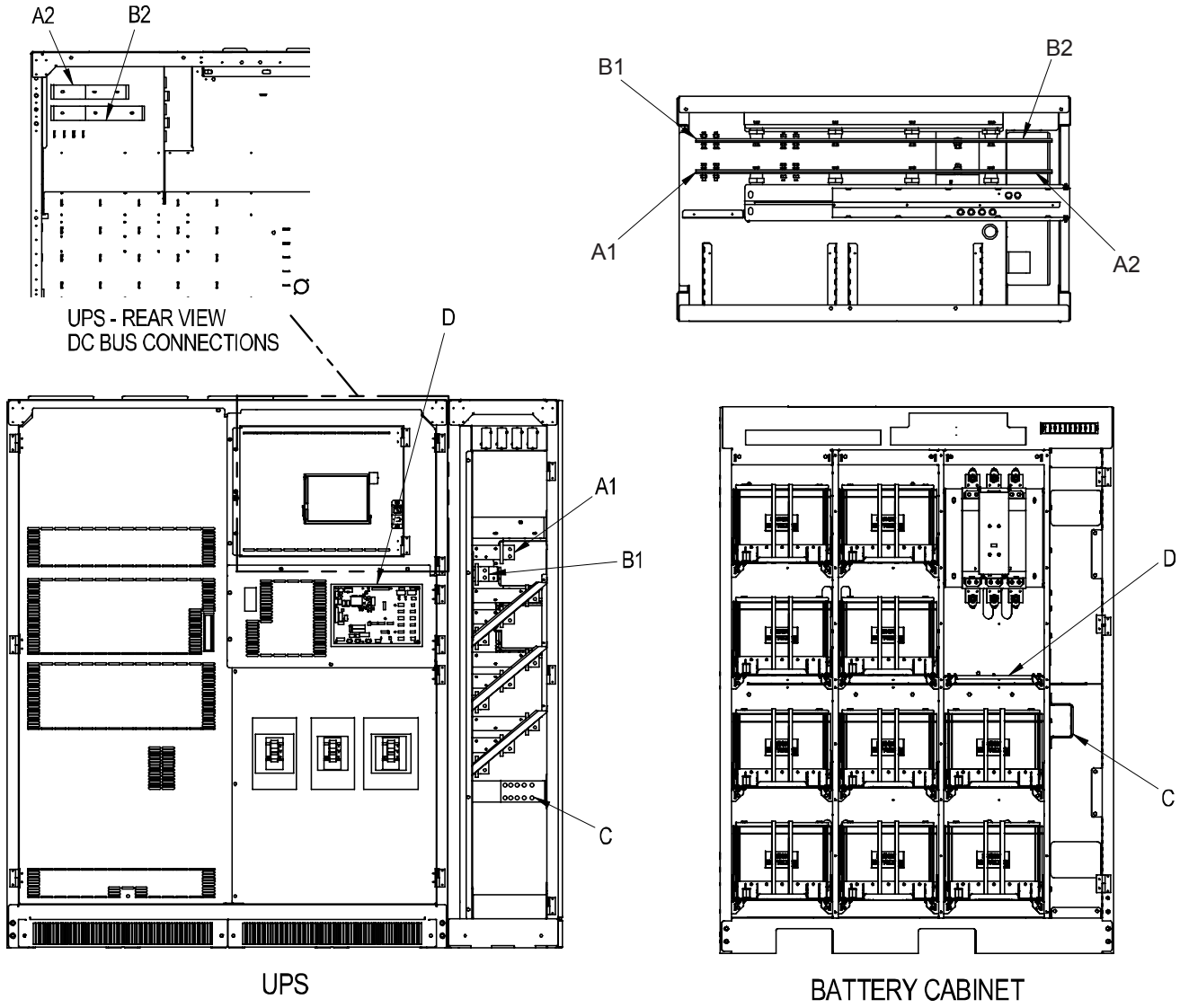


Table 1 Top-Terminal Battery Cabinet interconnection wiring to 250-400kVA UPS

Run	From	To	Conductors
A1	UPS - DC+ Busbar	Battery Cabinet - DC+ Busbar	Positive Power - RH Mount/Stand Alone
B1	UPS - DC- Busbar	Battery Cabinet - DC- Busbar	Negative Power - RH Mount/Stand Alone
A2	UPS - DC+ Busbar	Battery Cabinet - DC+ Busbar	Positive Power - Left Mount
B2	UPS - DC- Busbar	Battery Cabinet - DC- Busbar	Negative Power - Left Mount
C *	UPS - Ground	Battery Cabinet - Ground	Ground
D	UPS - External Interface Board (EIB)	Battery Cabinet - Battery Interface Board (BIB)	CAN Control Cables

* This is used only for detached cabinets. If the cabinets are attached, use the grounding shown in **Figure 26**.

Figure 28 Liebert NXL Module Battery Disconnect interconnect wiring to 250-400kVA UPS

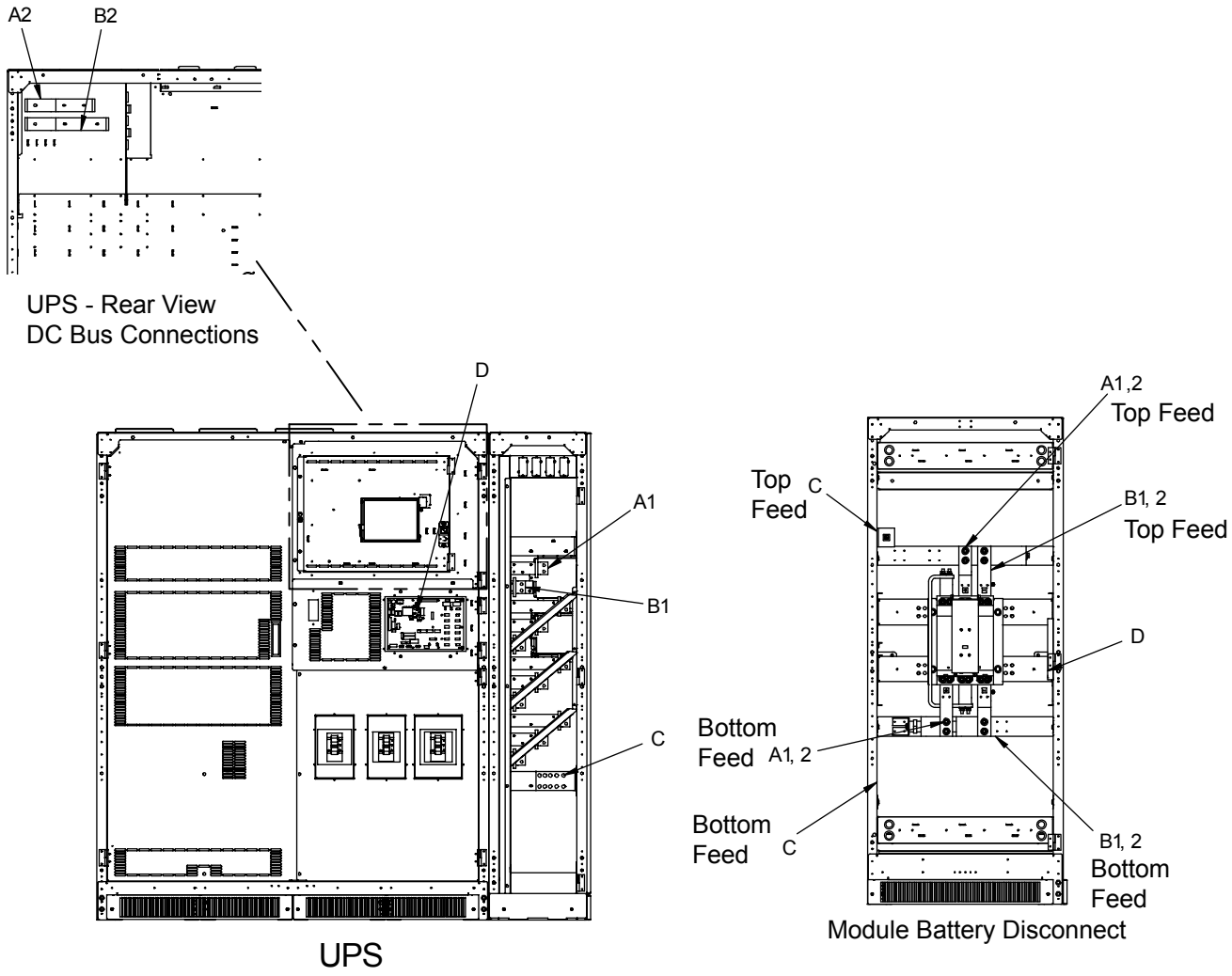


Table 2 Liebert NXL Module Battery Disconnect interconnect wiring to 250-400kVA UPS

Run	From	To	Conductors
A1	UPS - DC+ Busbar	MBD - DC + Busbar	Positive Power - Right Mount
B1	UPS - DC- Busbar	MBD - DC - Busbar	Negative Power - Right Mount
A2	UPS - DC+ Busbar	MBD - DC + Busbar	Positive Power - Left Mount
B2	UPS - DC- Busbar	MBD - DC - Busbar	Negative Power - Left Mount
C	UPS - GROUND	MBD - GROUND	Ground
D	UPS - External Interface Board (EIB)	MBD - Battery Interface Board (BIB)	CAN Control Cables

Figure 29 Liebert NXL Top-Terminal Battery Cabinet interconnect wiring to Liebert NXL Junction Cabinet

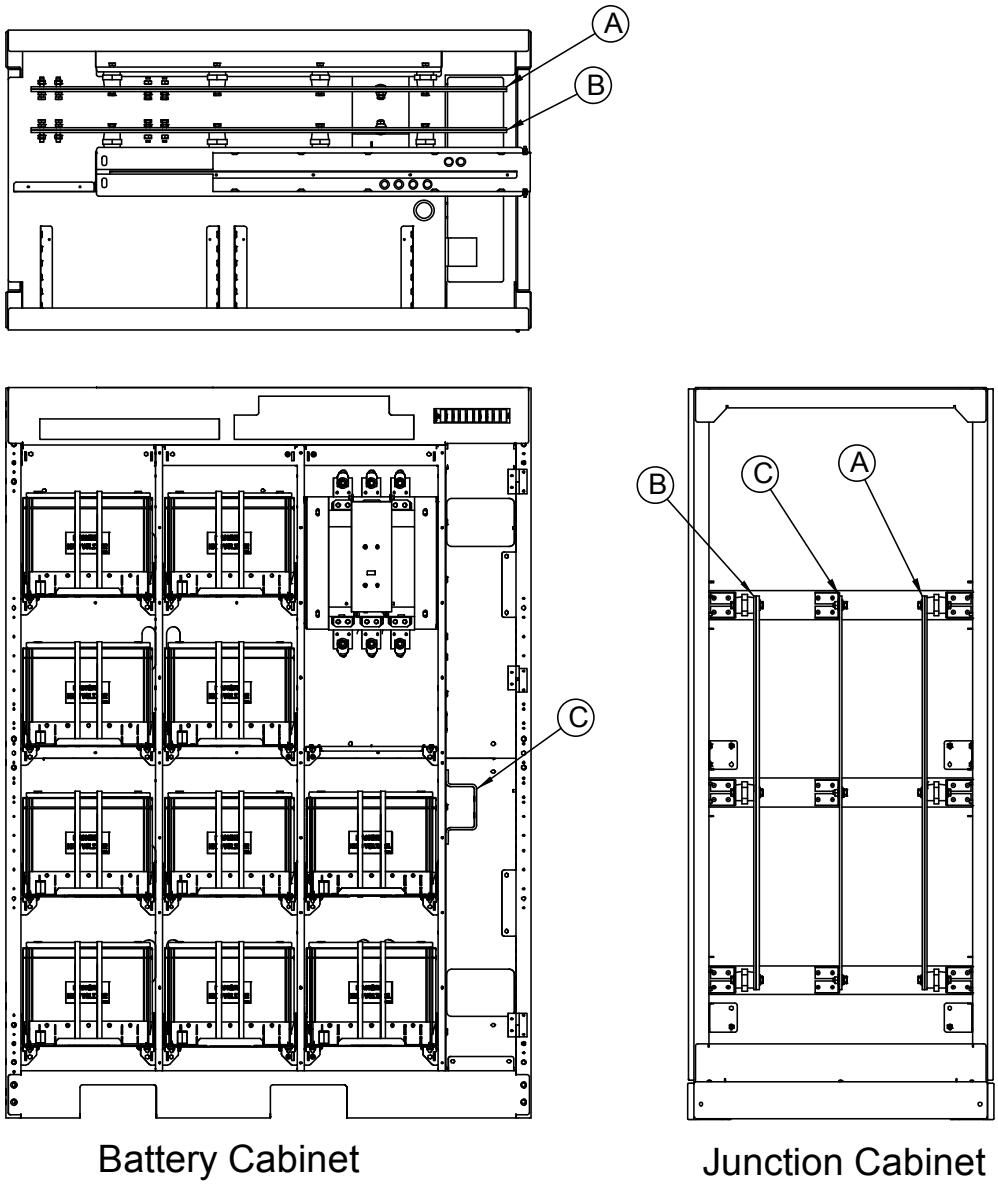
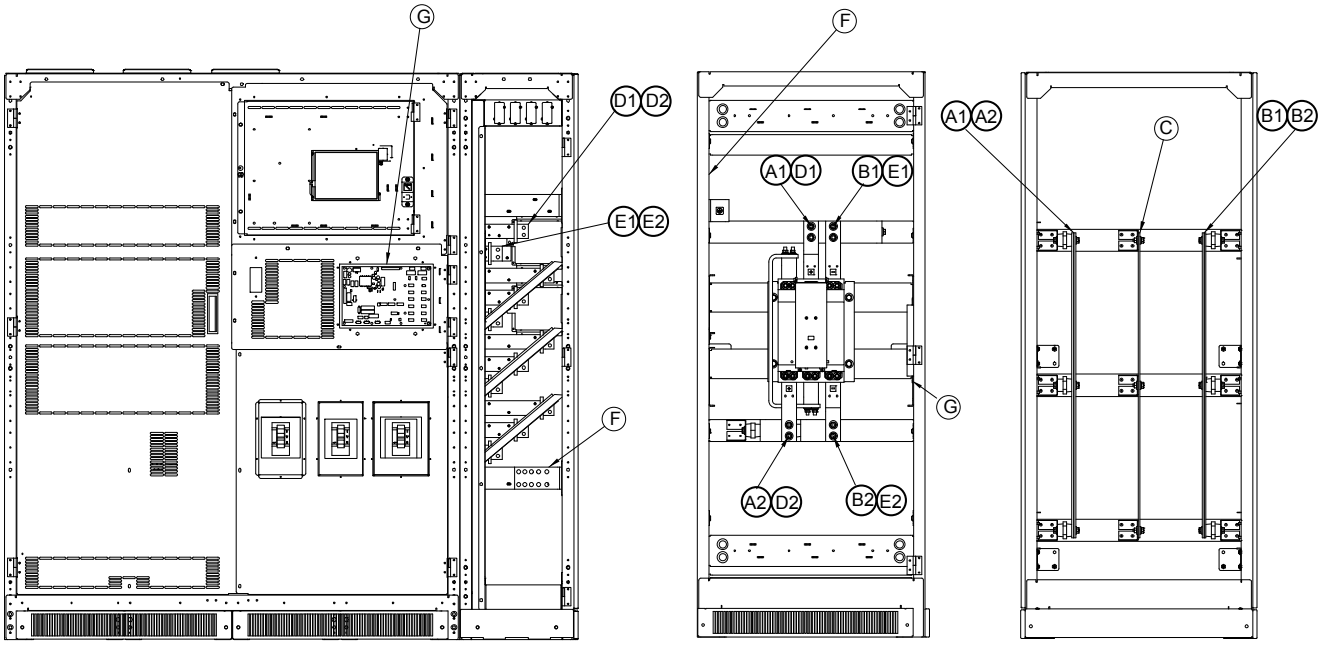


Table 3 Liebert NXL Top-Terminal Battery Cabinet interconnect wiring to Liebert NXL Junction Cabinet

Run	From	To	Conductors
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground

Figure 30 Liebert NXL 250-400kVA UPS to Liebert NXL Module Battery Disconnect to wide Liebert NXL Junction Cabinet

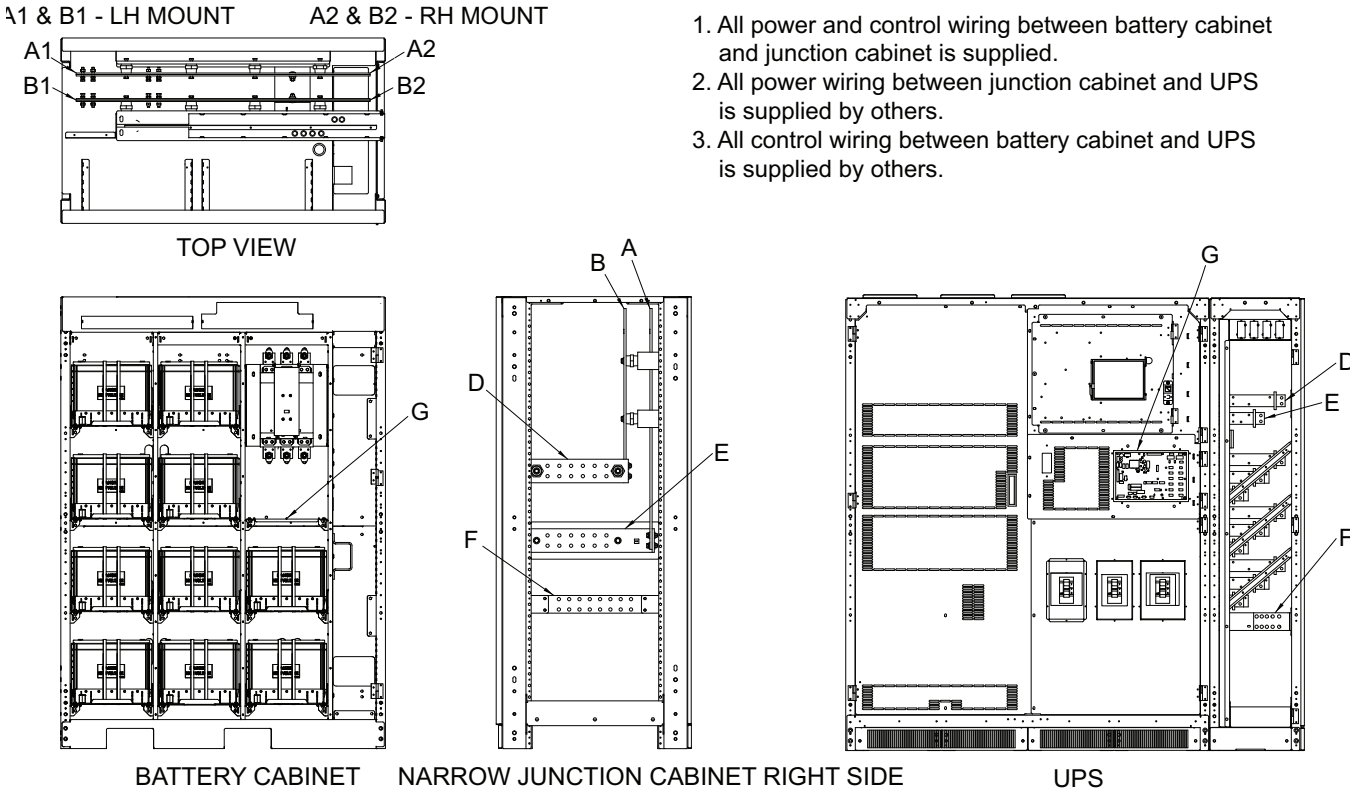


UPS Module Battery Disconnect Wide Junction Cabinet

Table 4 Liebert NXL 250-400kVA UPS to Liebert NXL Module Battery Disconnect to wide Liebert NXL Junction Cabinet

Run	From	To	Conductors
A1	MBD - DC Positive Busbar	Junction Positive Busbar	Positive - Top Feed
A2	MBD - DC Positive Busbar	Junction Positive Busbar	Positive - Bottom Feed
B1	MBD - DC Negative Busbar	Junction Negative Busbar	Negative - Top Feed
B2	MBD - DC Negative Busbar	Junction Negative Busbar	Negative - Bottom Feed
C	MBD Ground	Junction - Ground	Ground (see **Figure 26**)
D1	UPS - DC Positive Busbar	MBD - DC Positive Busbar	Positive - Top Feed
D2	UPS - DC Positive Busbar	MBD - DC Positive Busbar	Positive - Bottom Feed
E1	UPS - DC Negative Busbar	MBD - DC Negative Busbar	Negative - Top Feed
E2	UPS - DC Negative Busbar	MBD - DC Negative Busbar	Negative - Bottom Feed
F	UPS Ground	MBD Ground	Ground
G	UPS - External Interface Board (EIB)	MBD - Battery Interface Board (BIB)	CAN Control Cables

Figure 31 Terminal details Liebert NXL UPS 250kVA - 400kVA to Top-Terminal battery and Narrow Junction Cabinet point-to-point wiring



1. All power and control wiring between battery cabinet and junction cabinet is supplied.
2. All power wiring between junction cabinet and UPS is supplied by others.
3. All control wiring between battery cabinet and UPS is supplied by others.

Table 5 Terminal details Liebert NXL UPS 250kVA - 400kVA to battery and Narrow Junction Cabinet point-to-point Interconnect wiring

Run	From	To	Conductors
A1	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (LH Mount)
B1	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (LH Mount)
A2	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (RH Mount)
B2	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (RH Mount)
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 32 Terminal details Liebert NXL UPS 250kVA - 400kVA to Top-Terminal battery to Wide Junction Cabinet point-to-point wiring

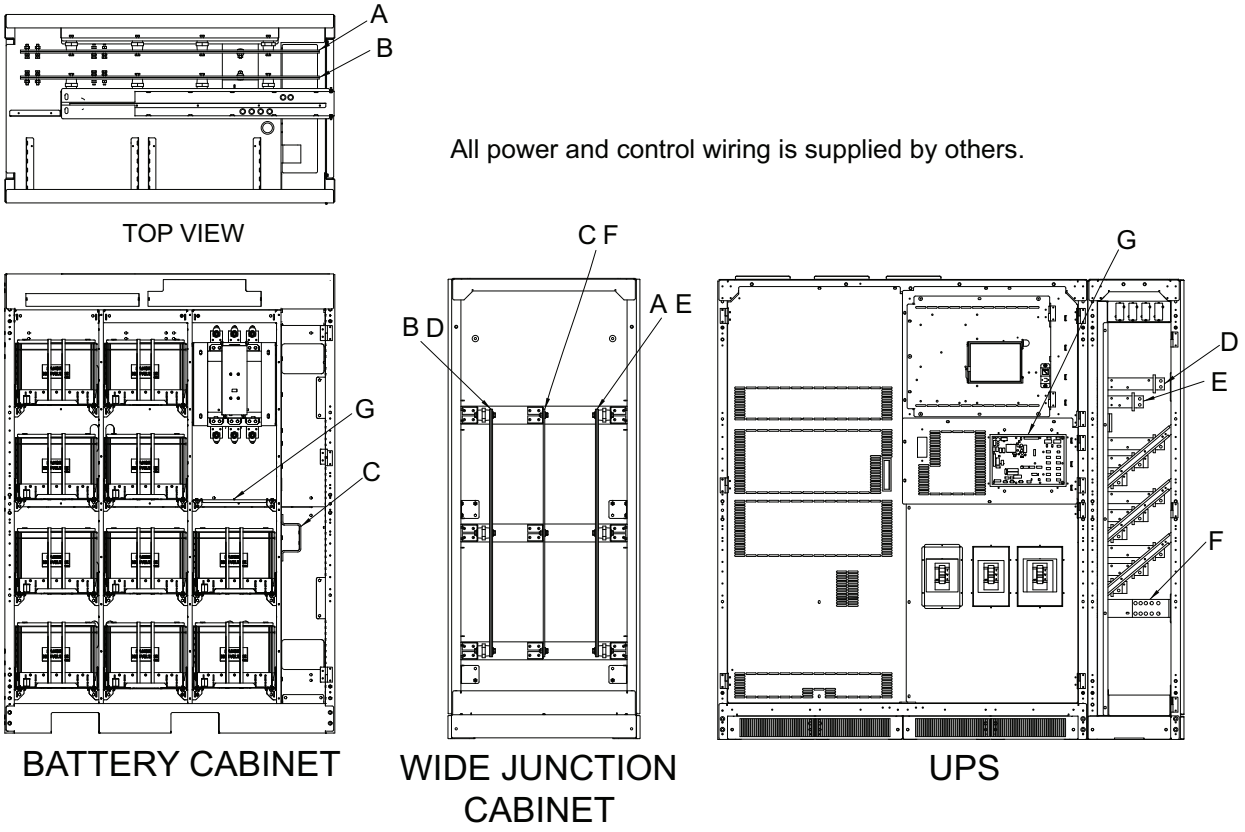


Table 6 Terminal details Liebert NXL UPS 250kVA - 400kVA to Top-Terminal battery to Wide Junction Cabinet point-to-point interconnect wiring

Run	From	To	Conductors
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 33 Terminal details Liebert NXL UPS 250kVA - 400kVA to front terminal battery point-to-point wiring

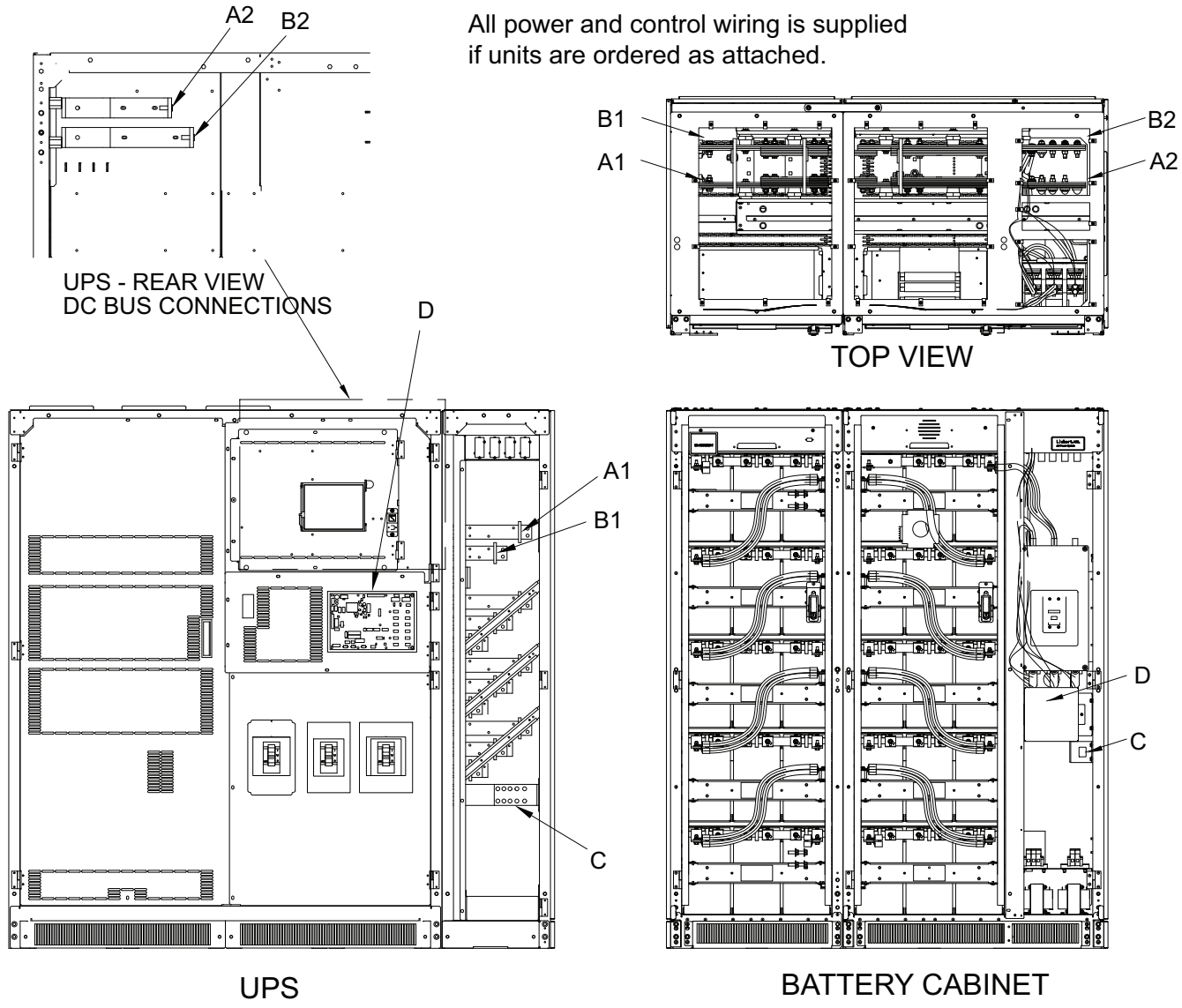


Table 7 Terminal details Liebert NXL UPS 250kVA - 400kVA to front terminal battery point-to-point interconnect wiring

Run	From	To	Conductors
A1	UPS DC Positive Busbar	Battery Cabinet Positive Bus	Positive DC Power RH Mount / Stand Alone
B1	UPS DC Negative Busbar	Battery Cabinet Negative Bus	Negative DC Power RH Mount / Stand-Alone
A2	UPS DC Positive Busbar	Battery Cabinet Positive Bus	Positive DC Power Left Mount
B2	UPS DC Negative Busbar	Battery Cabinet Negative Bus	Negative DC Power Left Mount
C*	UPS Ground	Battery Cabinet Ground	Ground
D	UPS External Interface Board (EIB)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables

* For detached units only

Figure 34 Terminal details Liebert NXL UPS 250kva - 400kva to MBD and front terminal battery point-to-point wiring

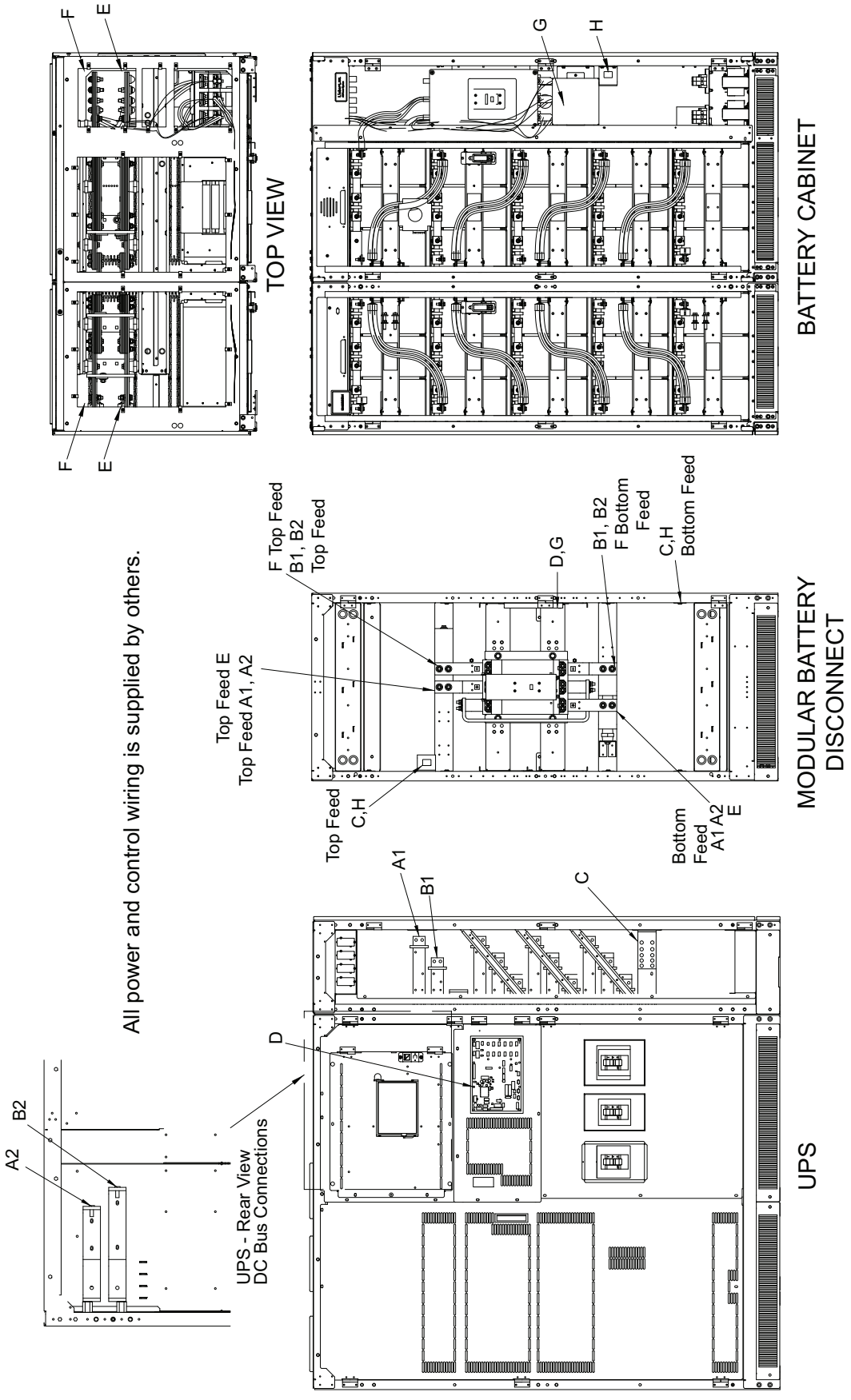


Table 8 Terminal details Liebert NXL UPS 250kva - 400kva to MBD and front terminal battery point-to-point interconnect wiring

Run	From	To	Conductors
A1	UPS Positive Bus	MBD Positive Bus	Positive DC Power RH Mount / Stand Alone
B1	UPS Negative Bus	MBD Negative Bus	Negative DC Power RH Mount / Stand Alone
A2	UPS Positive Bus	MBD Positive Bus	Positive DC Power Left Mount
B2	UPS Negative Bus	MBD Negative Bus	Negative DC Power Left Mount
C	UPS Ground	MBD Ground	Ground
D	UPS External Interface Board (EIB)	MBD Battery Interface Board (BIB)	CAN Control Cables
E	MBD Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
F	MBD Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
G	MBD Battery Interface Board (BIB)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables
H	MBD Ground	Battery Cabinet Ground	Ground

Figure 35 Terminal details Liebert NXL 250-400kVA to front terminal battery and Narrow Junction Cabinet point-to-point wiring

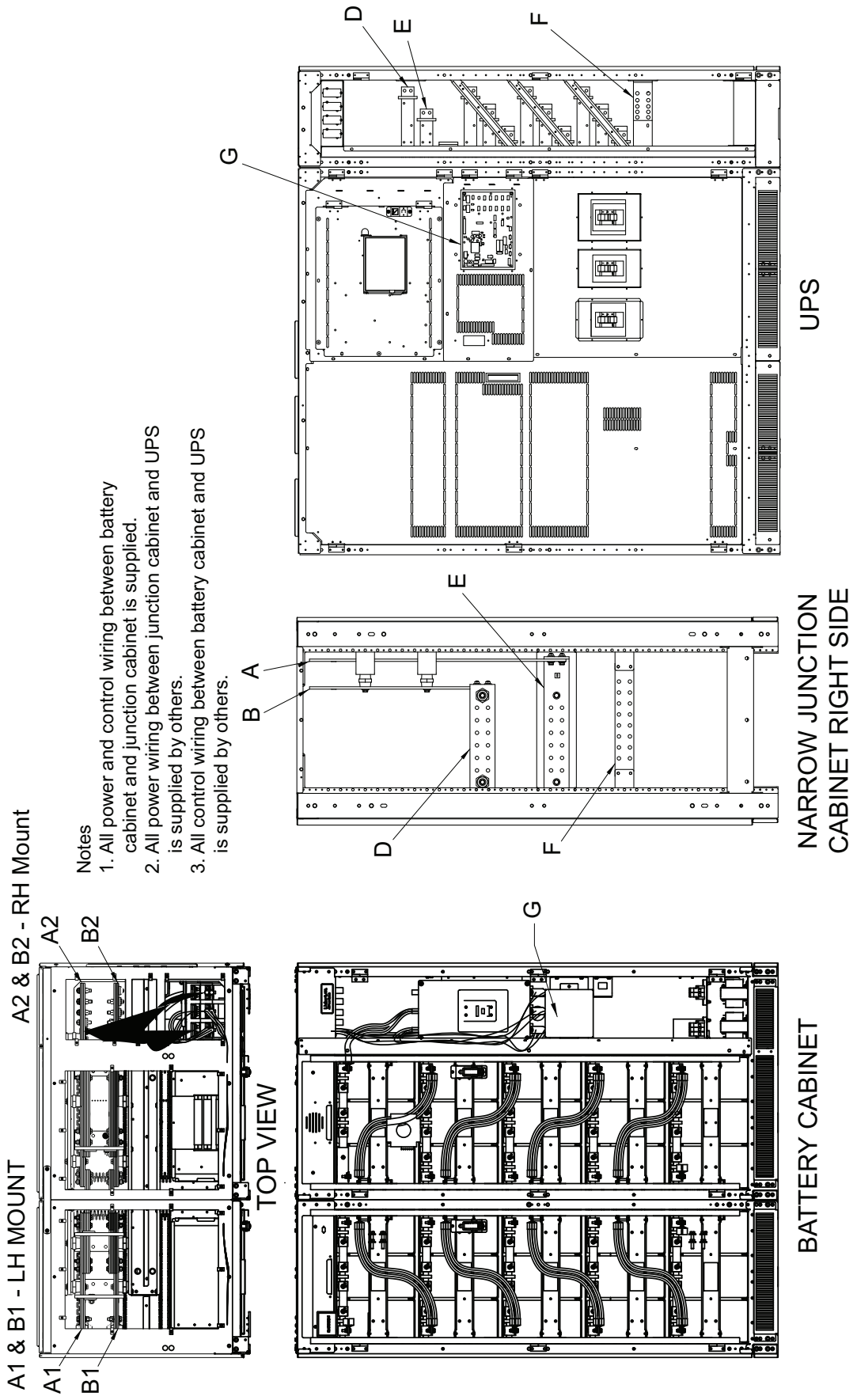


Table 9 Terminal details NXL 250-400kVA front terminal battery and Narrow Junction Cabinet point-to-point interconnect wiring

Run	From	To	Conductors
A1	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (LH Mount)
B1	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (LH Mount)
A2	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (RH Mount)
B2	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (RH Mount)
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 36 Terminal details Liebert NXL 250-400kVA front terminal battery and Wide Junction Cabinet point-to-point wiring

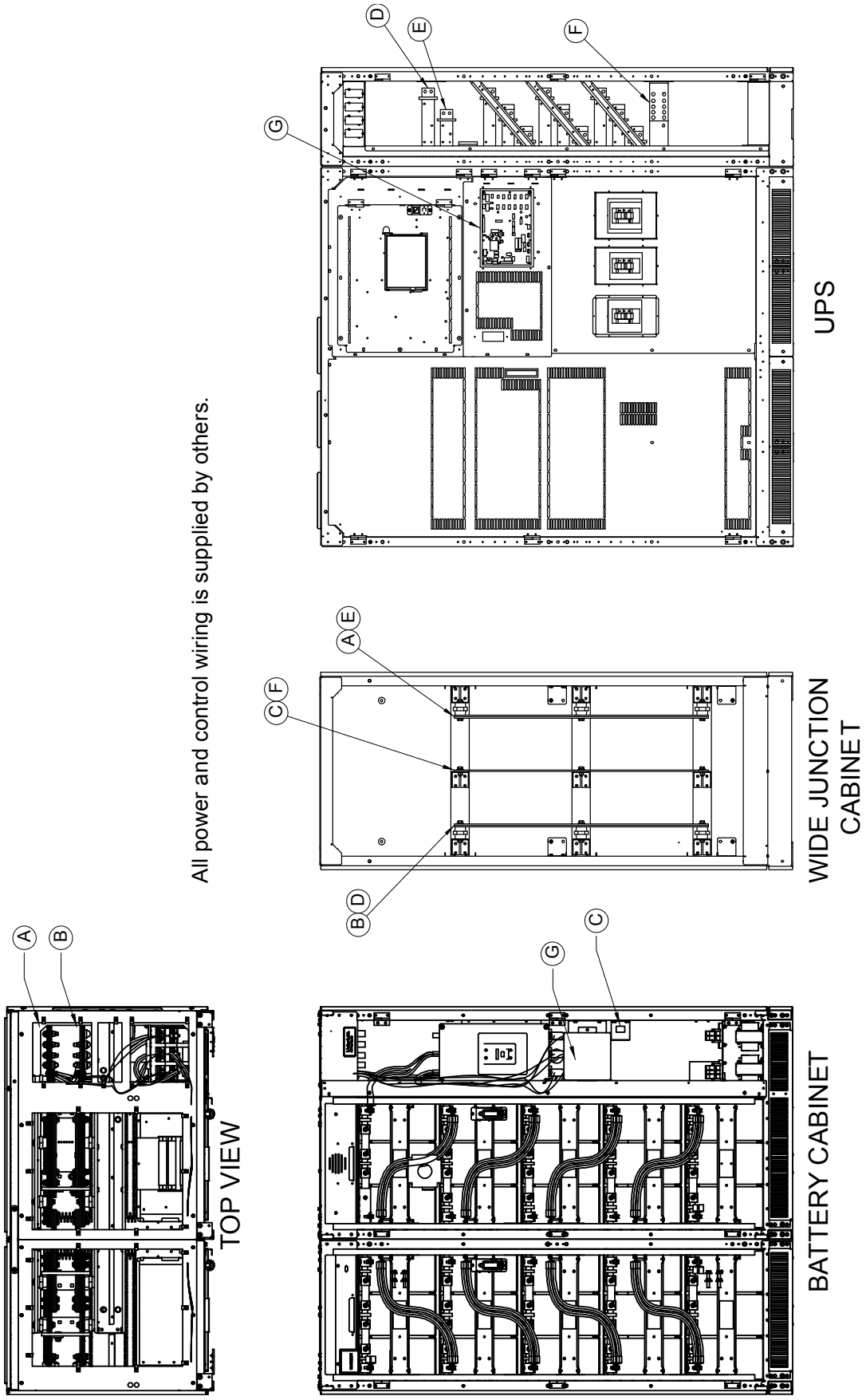


Table 10 Terminal details Liebert NXL 250-400kVA front terminal battery and Wide Junction Cabinet point-to-point interconnect wiring

Run	From	To	Conductors
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 37 Terminal details, Liebert NXL 500kVA UPS to MBD, point-to-point wiring

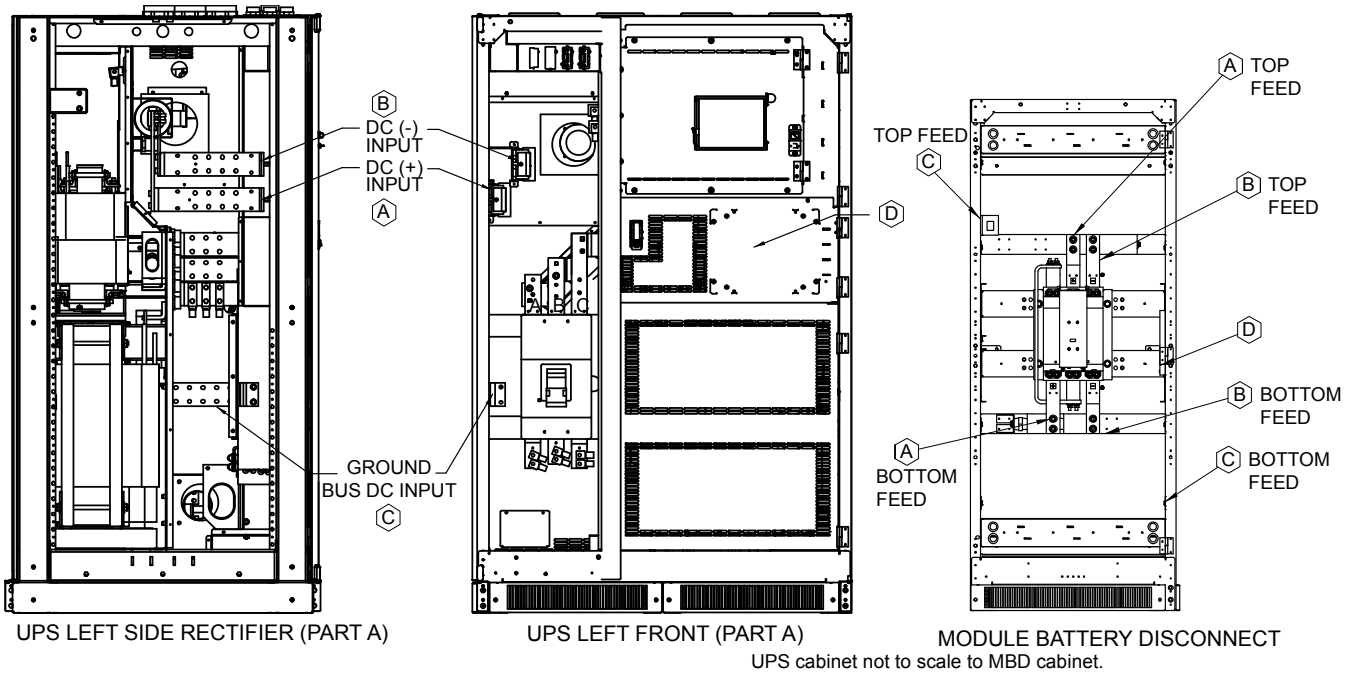


Table 11 Terminal details, Liebert NXL 500kVA UPS to MBD, point-to-point interconnect wiring

Run	From	To	Conductors
A	UPS Positive Bus	MBD Positive Bus	Positive DC Power
B	UPS Negative Bus	MBD Negative Bus	Negative DC Power
C	UPS Ground	MBD Ground	Ground
D	UPS External Interface Board (EIB)	MBD Battery Interface Board (BIB)	CAN Control Cables

Figure 38 Terminal details, Liebert NXL 500kVA UPS to Top-Terminal battery and Narrow Junction Cabinet, point-to-point wiring

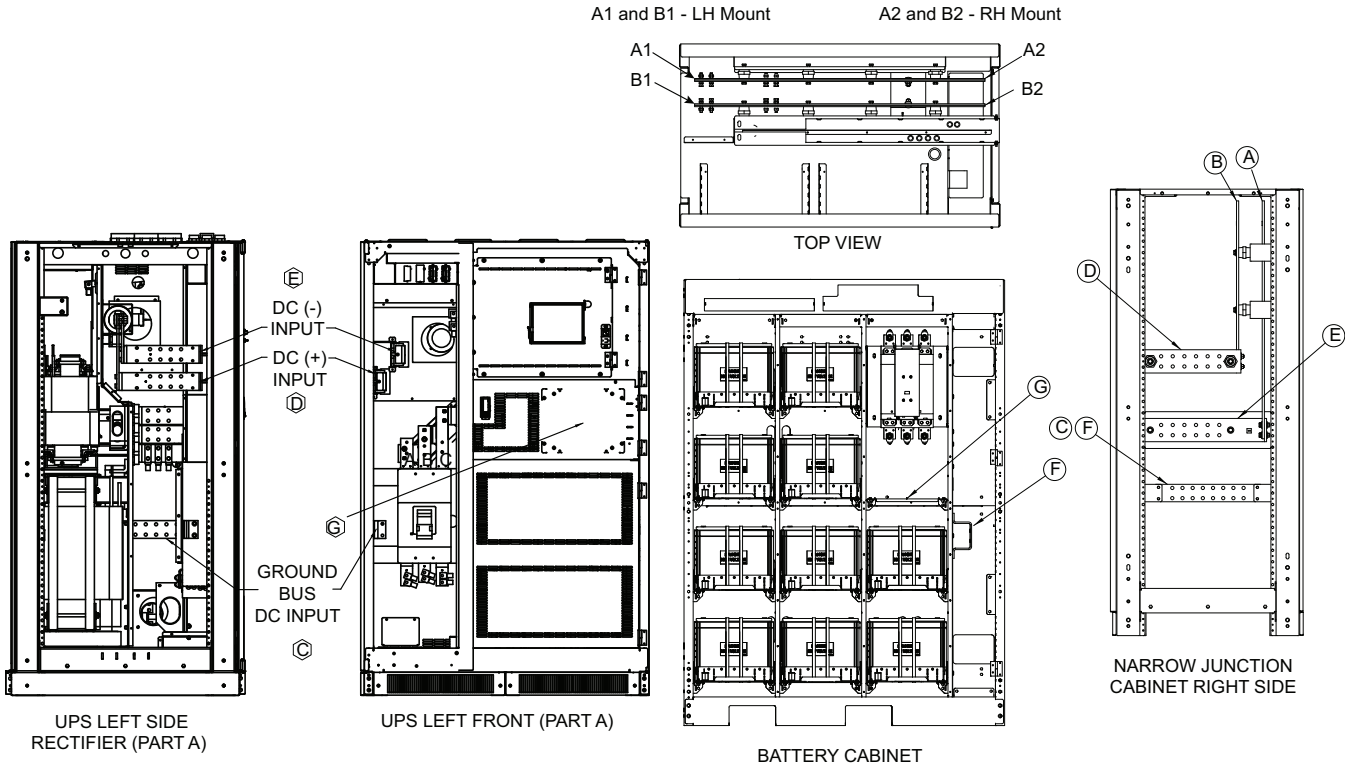


Table 12 Terminal details, Liebert NXL 500kVA UPS to Top-Terminal battery and Narrow Junction Cabinet, point-to-point interconnect wiring

Run	From	To	Conductors
A1	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (LH Mount)
B1	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (LH Mount)
A2	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (RH Mount)
B2	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (RH Mount)
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 39 Terminal details, Liebert NXL 500kVA UPS to Top-Terminal battery and Wide Junction Cabinet, point-to-point wiring

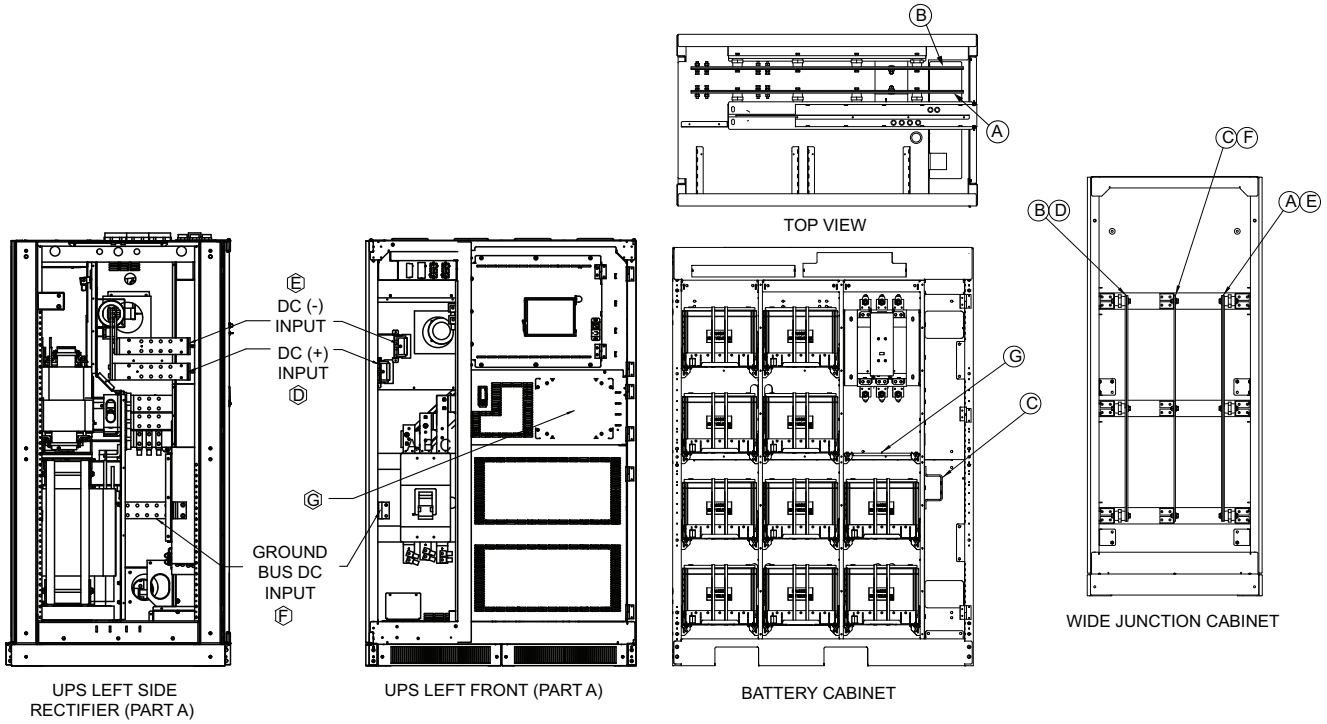


Table 13 Terminal details, Liebert NXL 500kVA UPS to Top-Terminal battery and Wide Junction Cabinet, point-to-point interconnect wiring

Run	From	To	Conductors
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 40 Terminal details Liebert NXL 500kVA to Top-Terminal battery point-to-point wiring

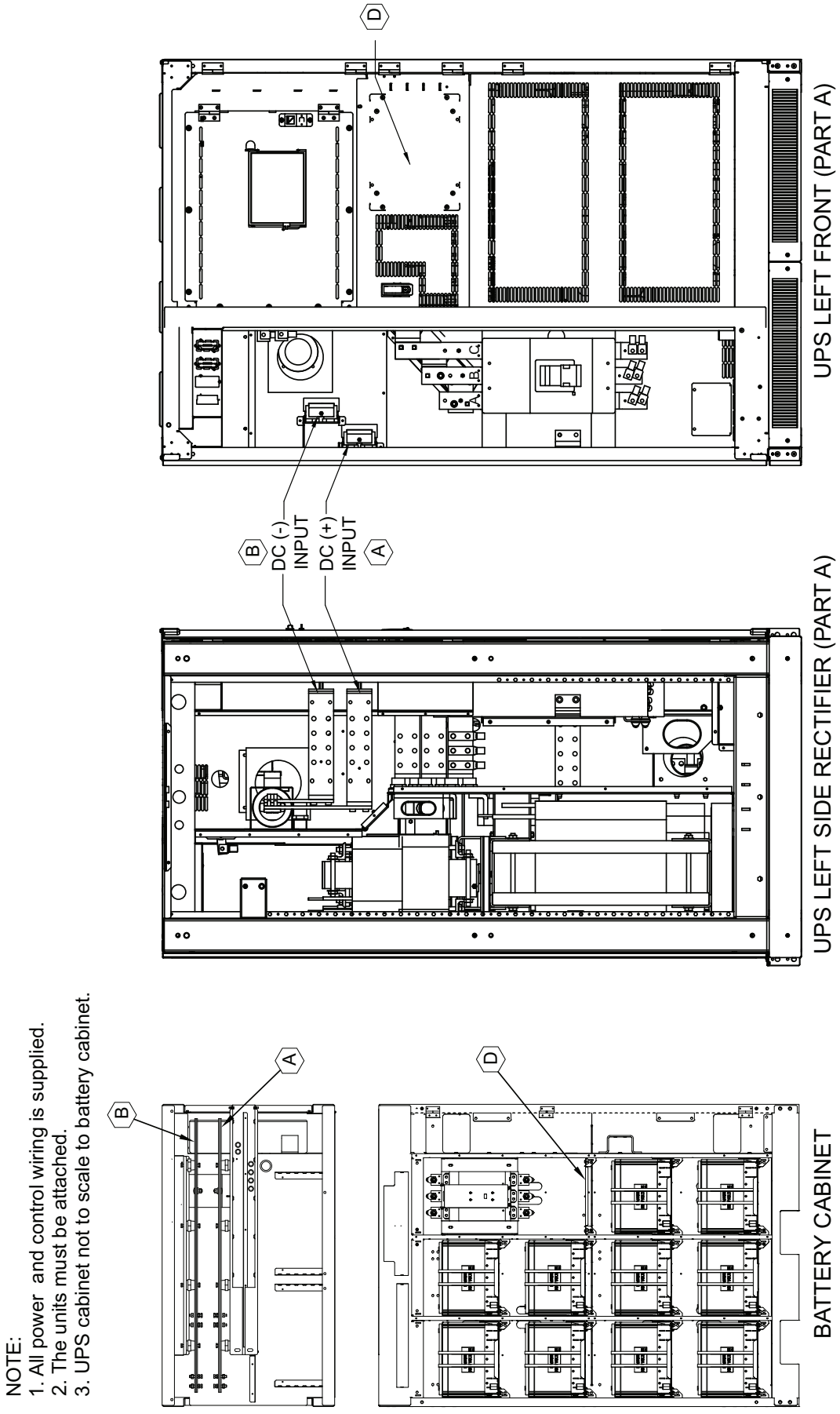


Table 14 Terminal details Liebert NXL 500kVA to top-terminal battery point-to-point interconnect wiring

Run	From	To	Conductors
A	UPS Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
B	UPS Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
D	UPS External Interface Board (Eib)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables

Figure 41 Terminal details Liebert NXL UPS 500kVA to front terminal battery point-to-point wiring

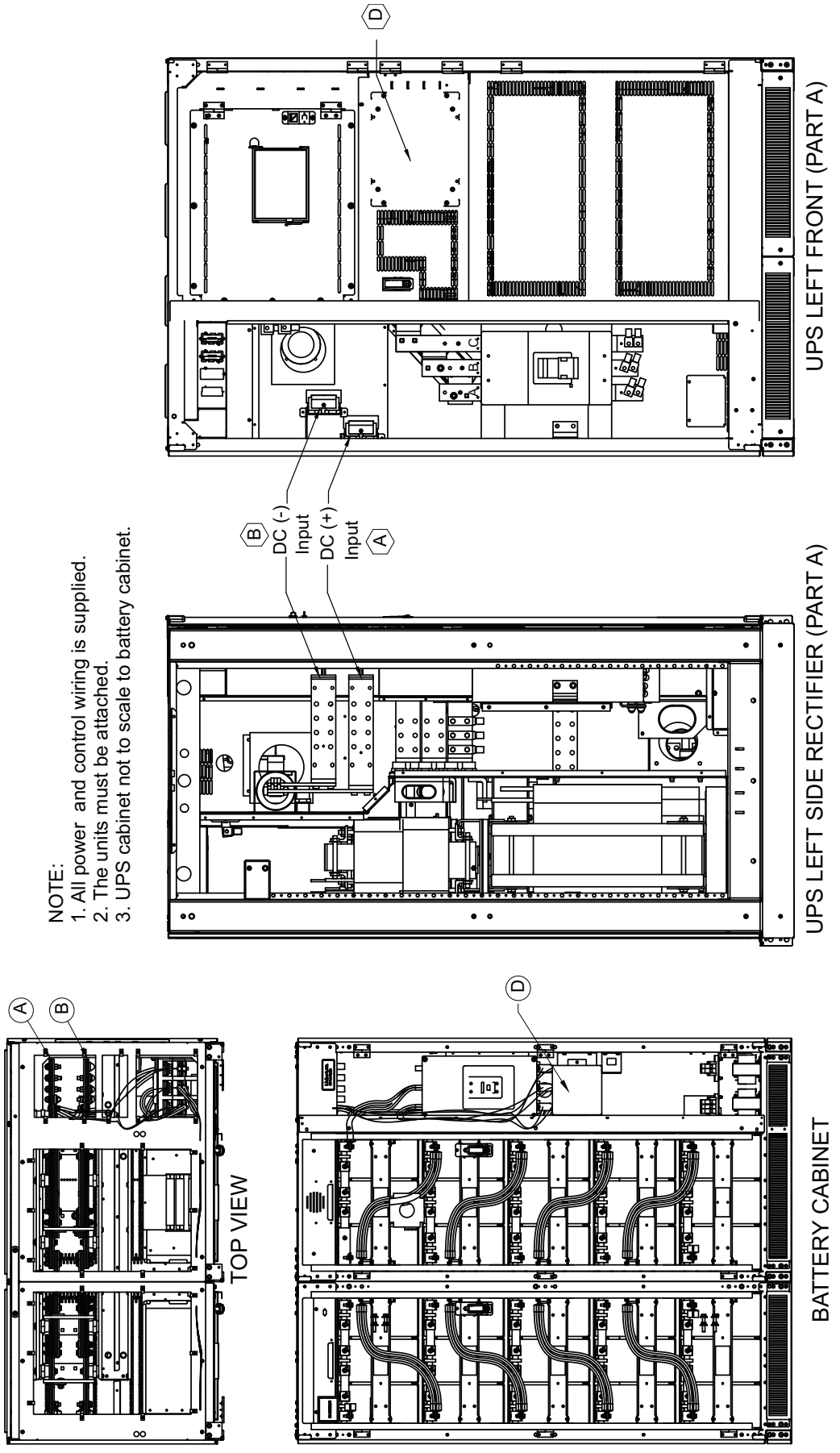


Table 15 Terminal details Liebert NXL UPS 500kVA to front terminal battery point-to-point interconnect wiring

Run	From	To	Conductor
A	UPS Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
B	UPS Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
D	UPS External Interface Board (EIB)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables

Figure 42 Liebert terminal details UPS 500kVA to MBD and front terminal battery point-to-point wiring

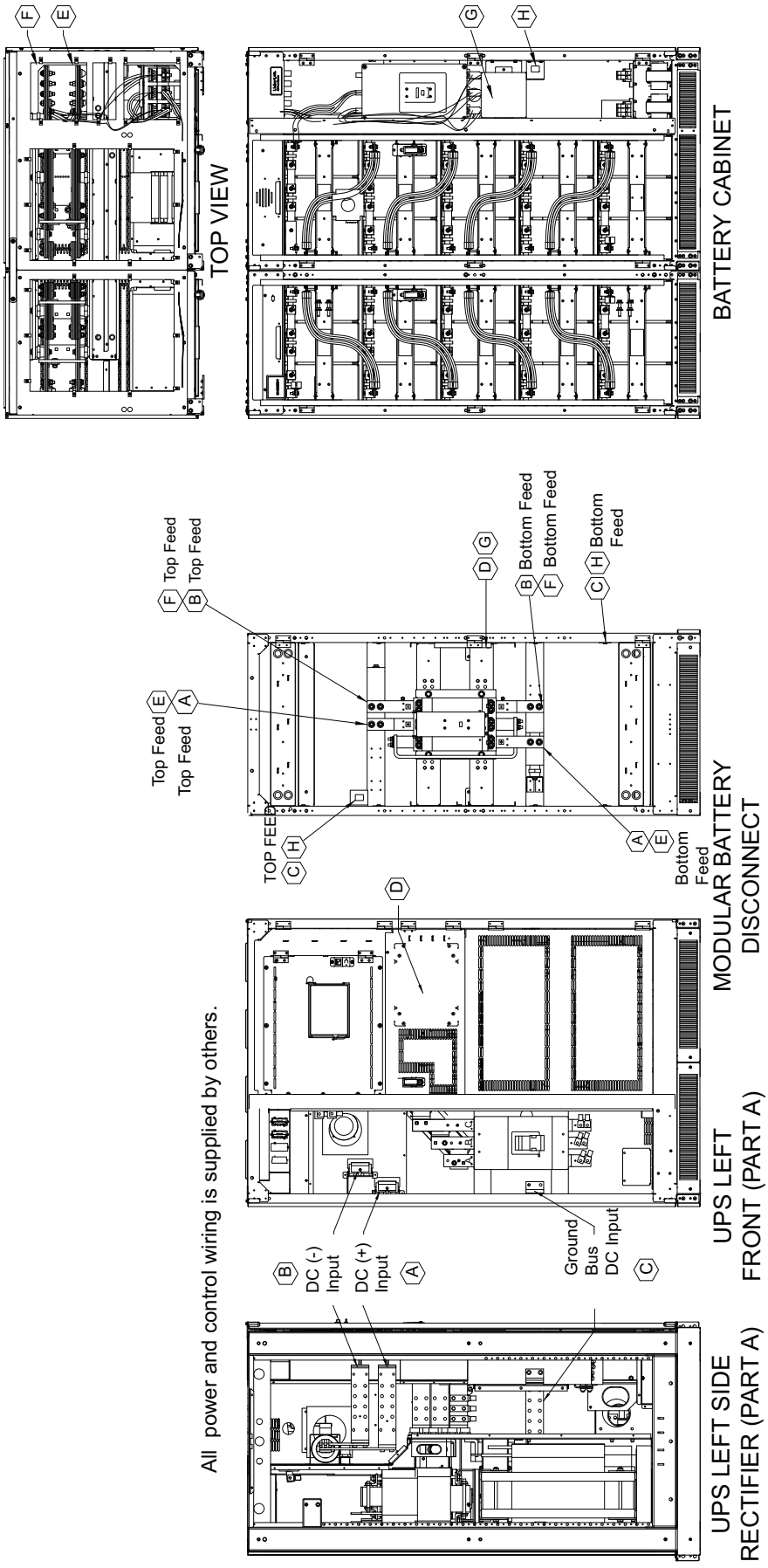


Table 16 Liebert terminal details UPS 500kVA to MBD and front terminal battery point-to-point Interconnect wiring

Run	From	To	Conductor
A	UPS Positive Bus	MBD Positive Bus	Positive DC Power
B	UPS Negative Bus	MBD Negative Bus	Negative DC Power
C	UPS Ground	MBD Ground	Ground
D	UPS External Interface Board (EIB)	MBD Battery Interface Board (BIB)	CAN Control Cables
E	MBD Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
F	MBD Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
G	MBD Battery Interface Board (BIB)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables
H	MBD Ground	Battery Cabinet Ground	Ground

Figure 43 Liebert NXL terminal details UPS 625/750kVA to front terminal battery and Narrow Junction Cabinet point-to-point wiring

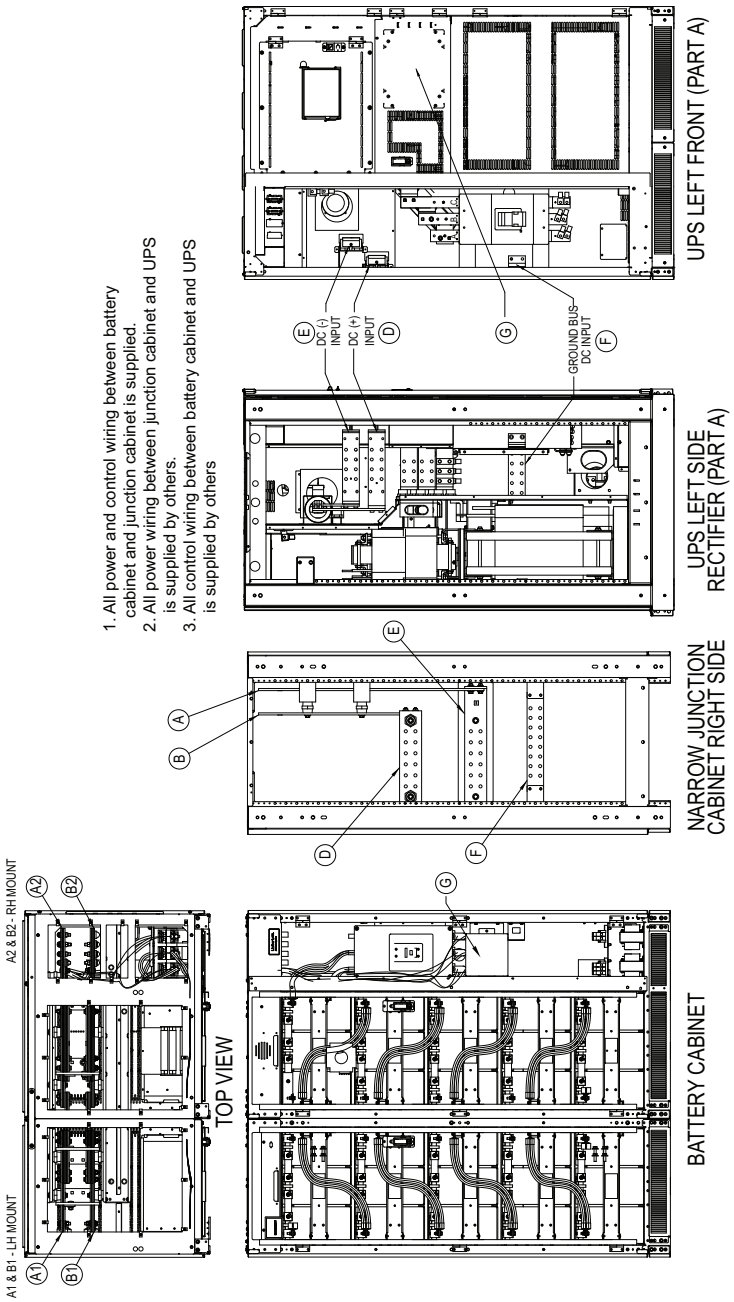


Table 17 Liebert nxl terminal details UPS 625/750kVA to front terminal battery and Narrow Junction Cabinet point-to-point Interconnect wiring

Run	From	To	Conductors
A1	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (LH Mount)
B1	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (LH Mount)
A2	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (RH Mount)
B2	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (RH Mount)
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 44 Llebert NXL terminal details UPS 625/750kVA to front terminal battery and Wide Junction Cabinet point-to-point wiring

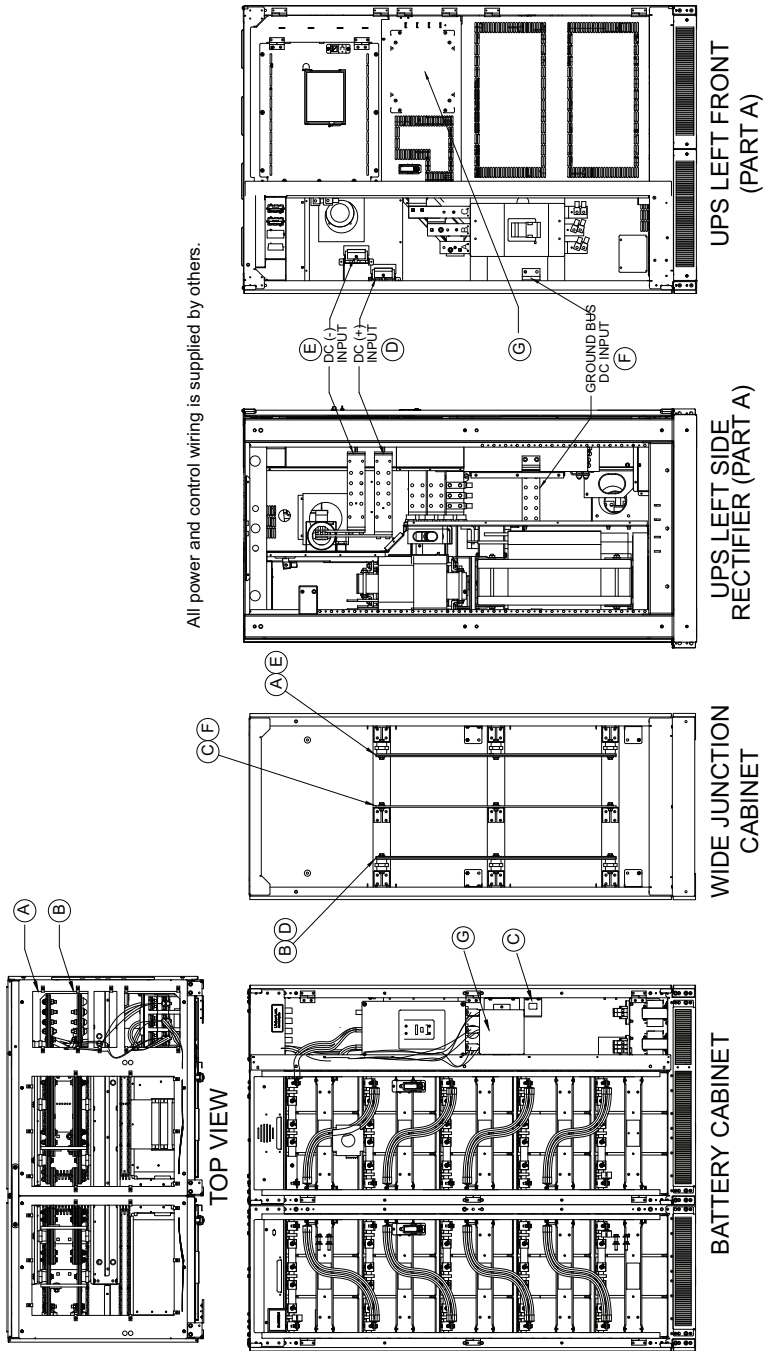
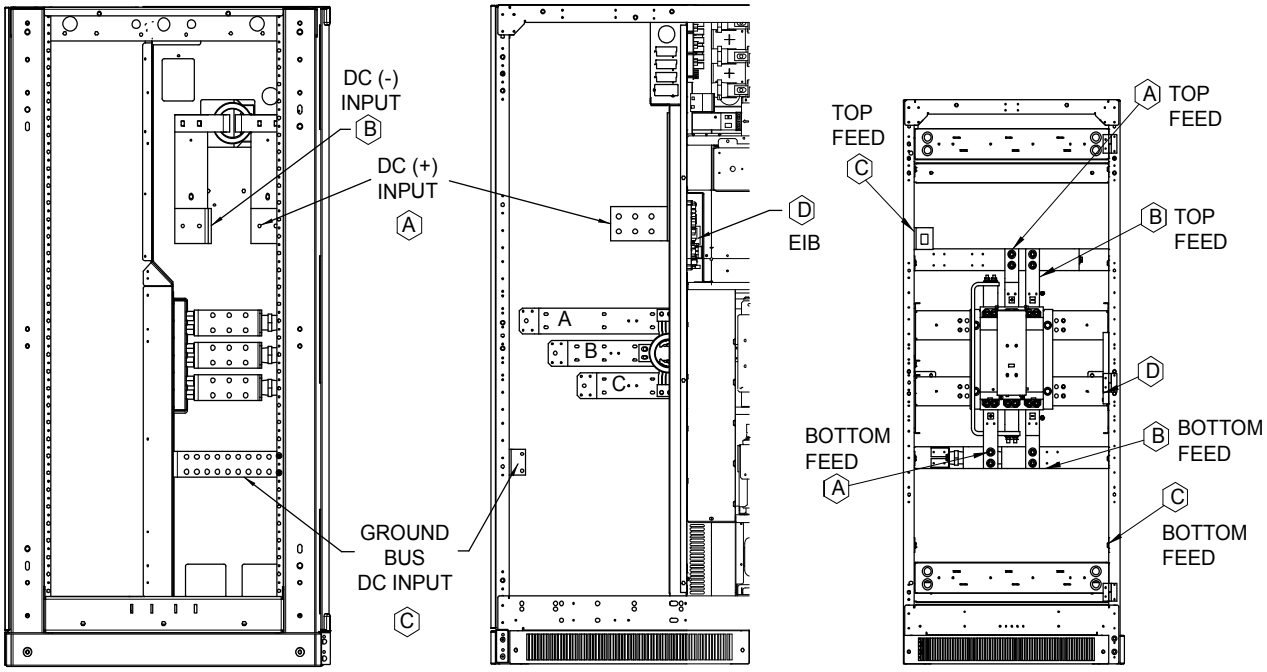


Table 18 Llebert NXL terminal details UPS 625/750kVA to front terminal battery and Wide Junction Cabinet point-to-point interconnect wiring

Run	From	To	Conductors
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	Ps Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 45 Terminal details, Liebert NXL 625/750kVA UPS to MBD, point-to-point wiring



UPS cabinet not to scale to MBD cabinet.

Table 19 Terminal details, Liebert NXL 625/750kVA UPS to MBD, point-to-point interconnect wiring

Run	From	To	Conductor
A	UPS Positive Bus	MBD Positive Bus	Positive DC Power
B	UPS Negative Bus	MBD Negative Bus	Negative DC Power
C	UPS Ground	MBD Ground	Ground
D	UPS External Interface Board (EIB)	MBD Battery Interface Board (BIB)	CAN Control Cables

Figure 46 Terminal details, Liebert NXL 625/750kVA UPS to Top-Terminal battery and Narrow Junction Cabinet, point-to-point wiring

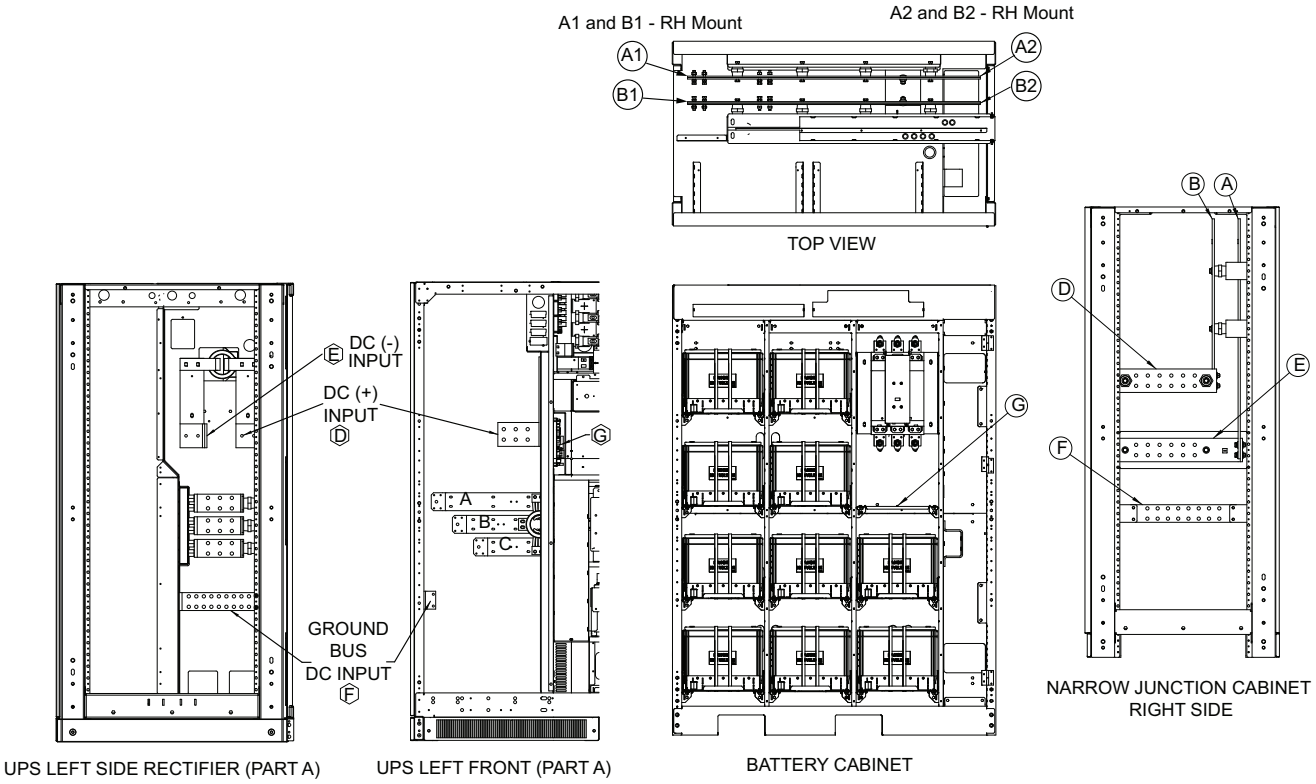


Table 20 Terminal details, Liebert NXL 625/750kVA UPS to Top-Terminal battery and Narrow Junction Cabinet, point-to-point wiring

Run	From	To	Conductor
A1	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (LH Mount)
B1	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (LH Mount)
A2	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (RH Mount)
B2	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (RH Mount)
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet, Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 47 Terminal details, Liebert NXL 625/750kVA UPS to Top-Terminal battery and Wide Junction Cabinet, point-to-point wiring

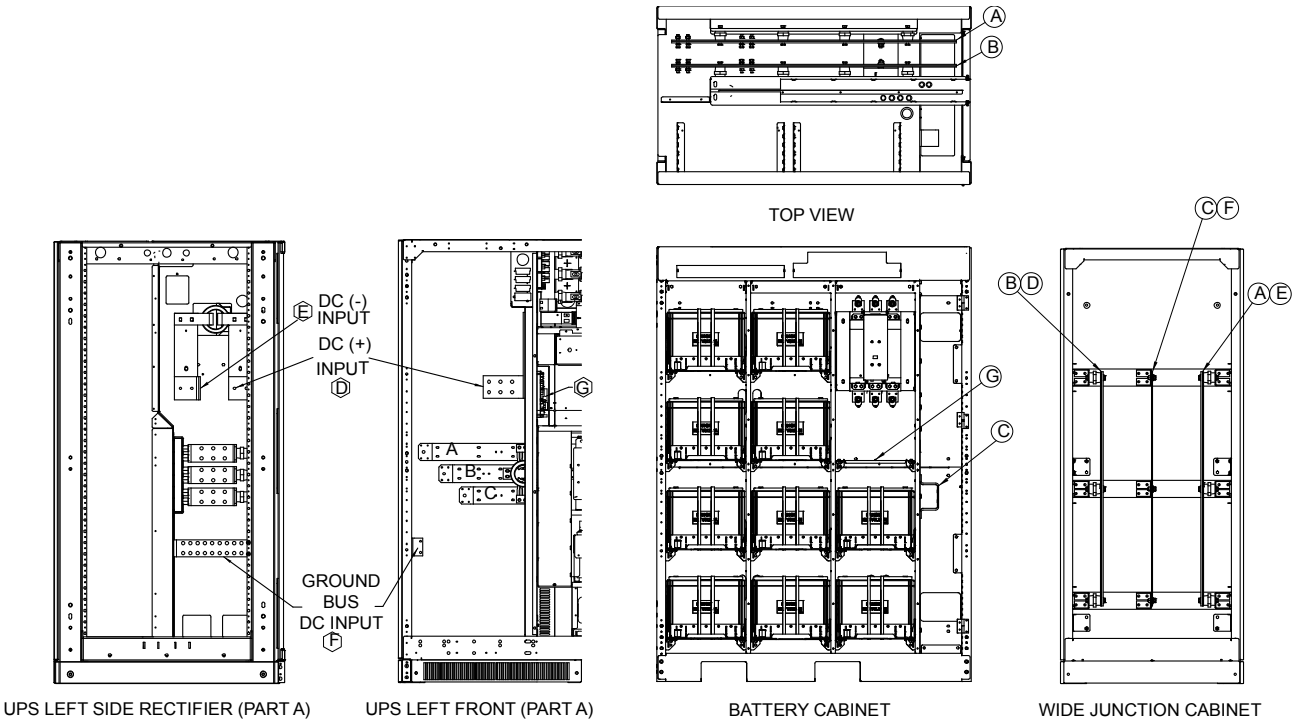


Table 21 Terminal details, Liebert NXL 625/750kVA UPS to Top-Terminal battery and Wide Junction Cabinet, point-to-point interconnect wiring

Run	From	To	Conductors
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 48 Terminal details Liebert NXL UPS 625/750kVA to battery point-to-point wiring

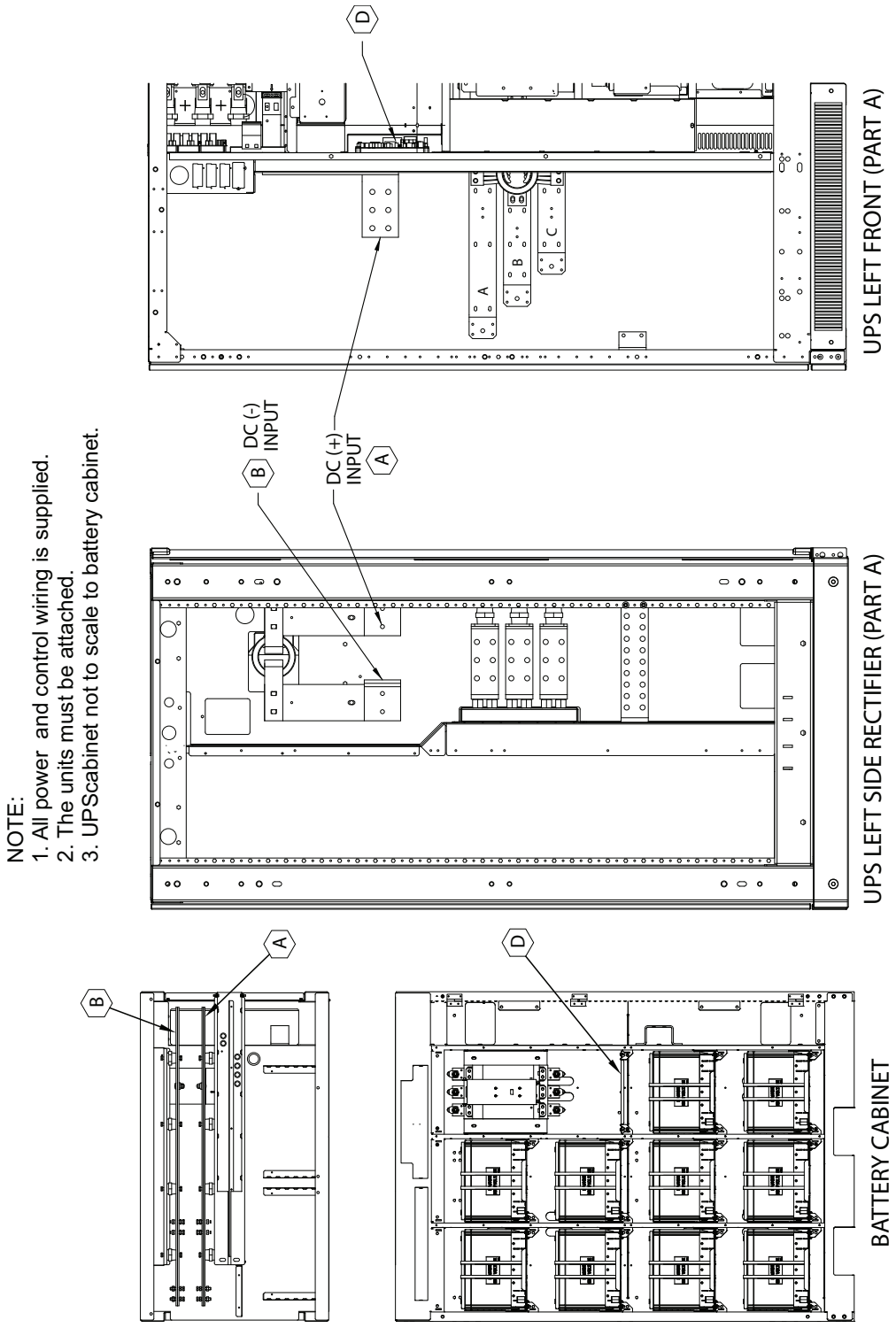


Table 22 Terminal details Liebert NXL UPS 625/750kVA to battery point-to-point interconnect wiring

Run	From	To	Conductor
A	UPS Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
B	UPS Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
D	UPS External Interface Board (EIB)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables

Figure 49 Terminal details Liebert NXL UPS 625/750kVA to MBD and front terminal battery point-to-point wiring

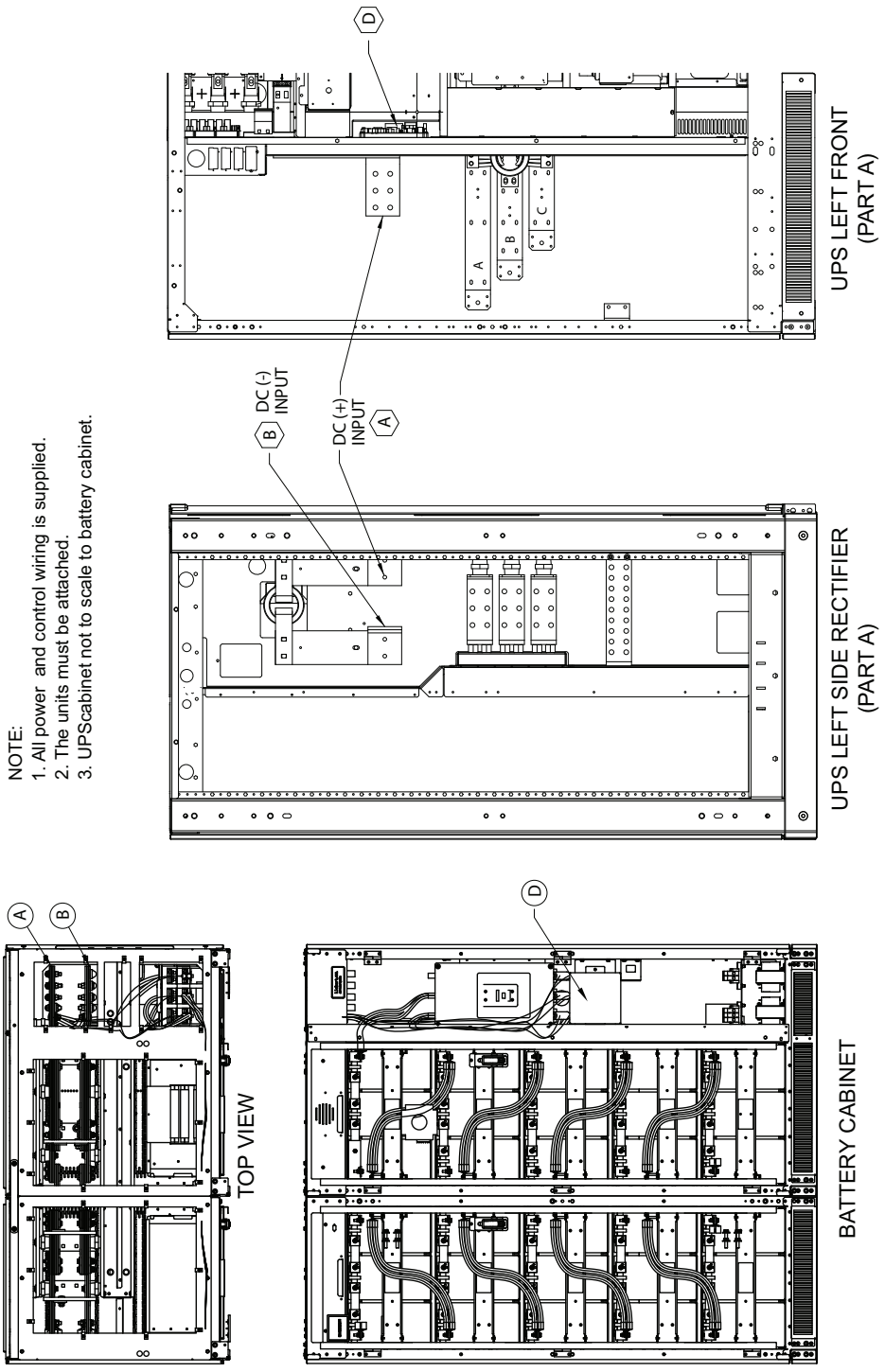


Table 23 Terminal details Liebert NXL UPS 625/750kVA to MBD and front terminal battery point-to-point interconnect wiring

Run	From	To	Conductor
A	UPS Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
B	UPS Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
D	UPS External Interface Board (EIB)	Battery Cabinet Battery Interface Board (BIB	CAN Control Cables

Figure 50 Terminal details Liebert NXL UPS 625/750kVA to MBD and front terminal battery point-to-point wiring

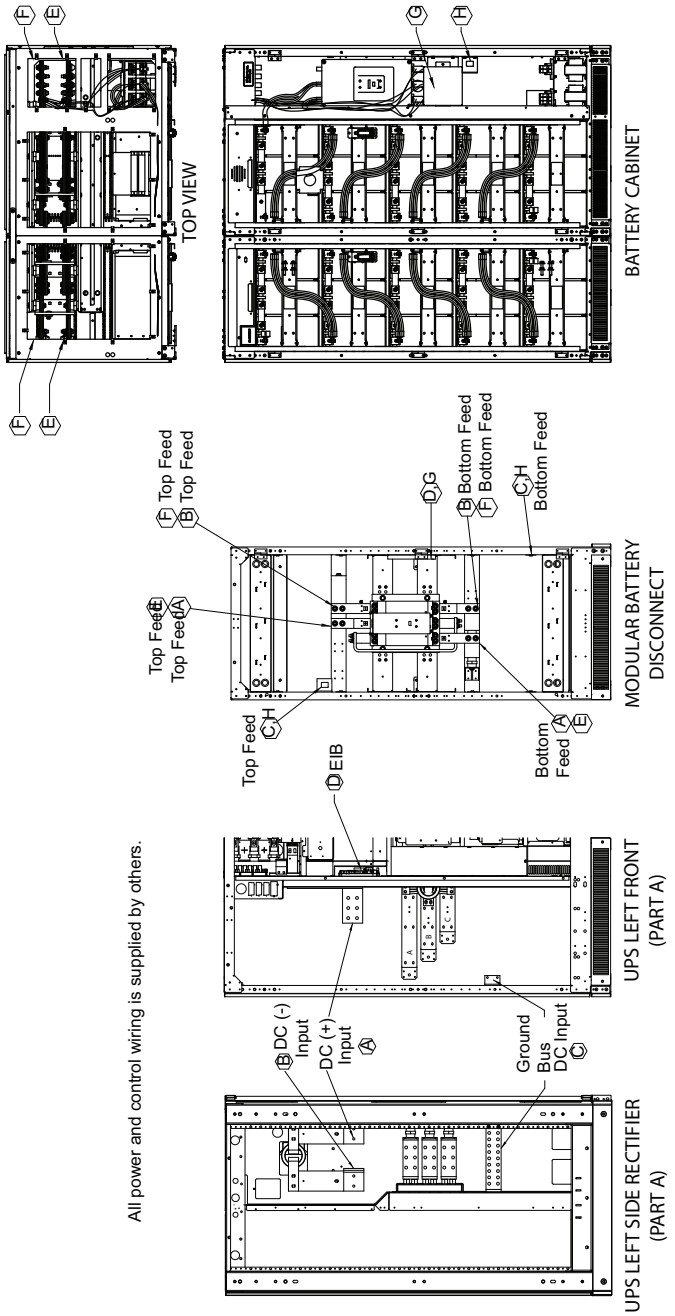


Table 24 Terminal details Liebert NXL UPS 625/750kVA to MBD and front terminal battery point-to-point interconnect wiring

Run	From	To	Conductors
A	UPS Positive Bus	MBD Positive Bus	Positive DC Power
B	UPS Negative Bus	MBD Negative Bus	Negative DC Power
C	UPS Ground	MBD Ground	Ground
D	UPS External Interface Board (EIB)	MBD Battery Interface Board (BIB)	CAN Control Cables
E	MBD Positive Bus	Battery Cabinet Positive Bus	Positive DC Power
F	MBD Negative Bus	Battery Cabinet Negative Bus	Negative DC Power
G	MBD Battery Interface Board (BIB)	Battery Cabinet Battery Interface Board (BIB)	CAN Control Cables
H	MBD Ground	Battery Cabinet Ground	Ground

Figure 51 Terminal details UPS 625/750kVA to front terminal battery and Narrow Junction Cabinet point-to-point wiring

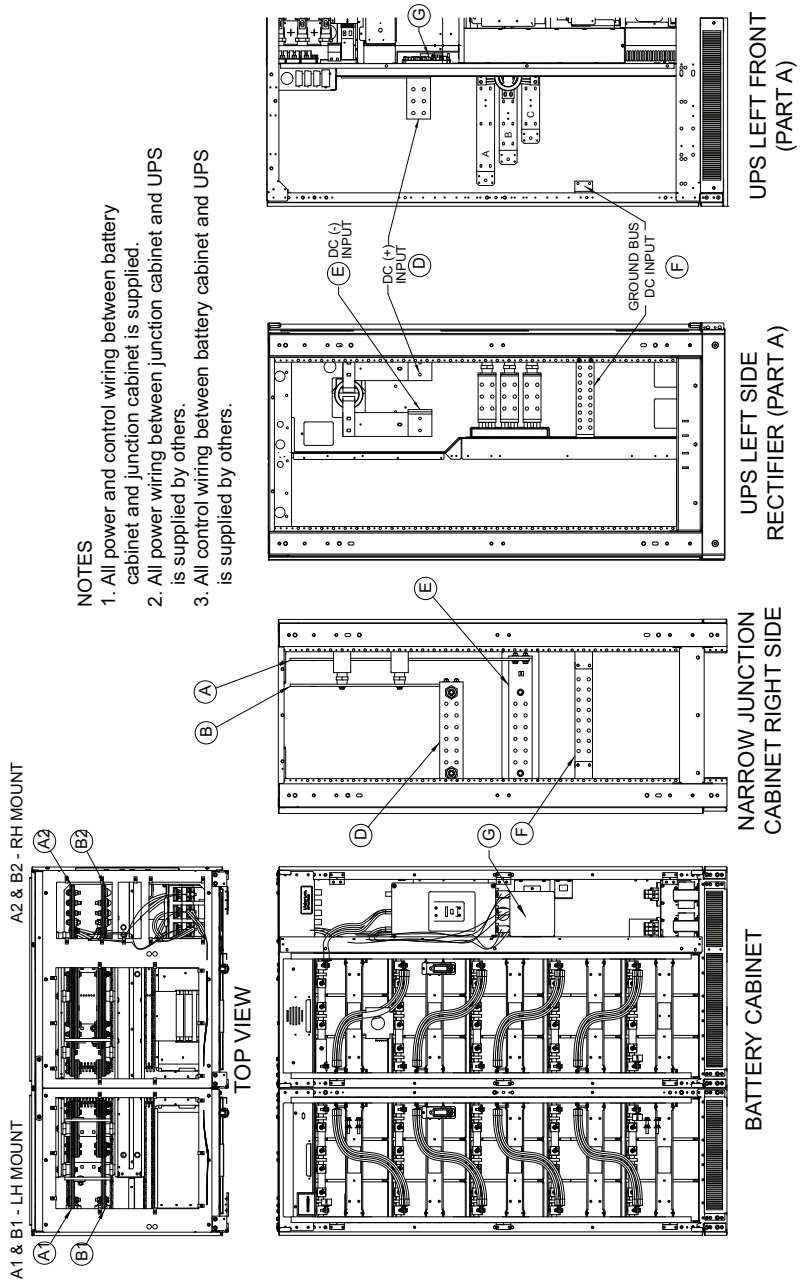


Table 25 Terminal details UPS 625/750kVA to front terminal battery and Narrow Junction Cabinet point-to-point interconnect wiring

Run	From	To	Conductor
A1	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (LH Mount)
B1	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (LH Mount)
A2	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power (RH Mount)
B2	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power (RH Mount)
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 52 Terminal details 625/750kVA to front terminal battery and Wide Junction Cabinet point-to-point wiring

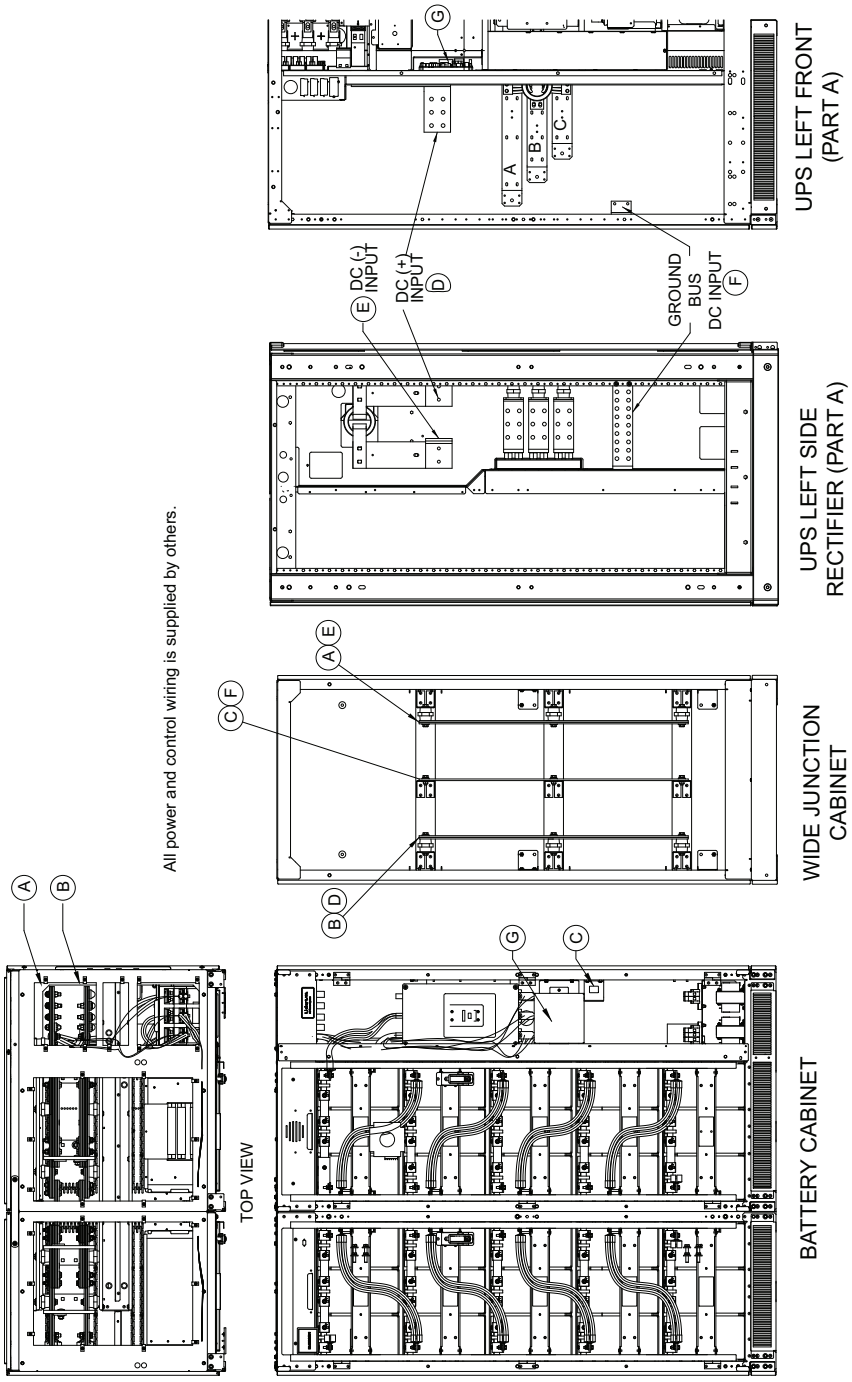


Table 26 Terminal details 625/750kVA to front terminal battery and Wide Junction Cabinet point-to-point interconnect wiring

Run	From	To	Conductor
A	Battery Cabinet Negative Bus	Junction Negative Bus	Negative DC Power
B	Battery Cabinet Positive Bus	Junction Positive Bus	Positive DC Power
C	Battery Cabinet Ground	Junction Ground	Ground
D	Junction Positive Bus	UPS Cabinet Positive Bus	Positive DC Power
E	Junction Negative Bus	UPS Cabinet Negative Bus	Negative DC Power
F	Junction Ground	UPS Cabinet Ground	Ground
G	Battery Cabinet Battery Interface Board (BIB)	UPS External Interface Board (EIB)	CAN Control Cables

Figure 53 Typical Alber battery monitoring connections

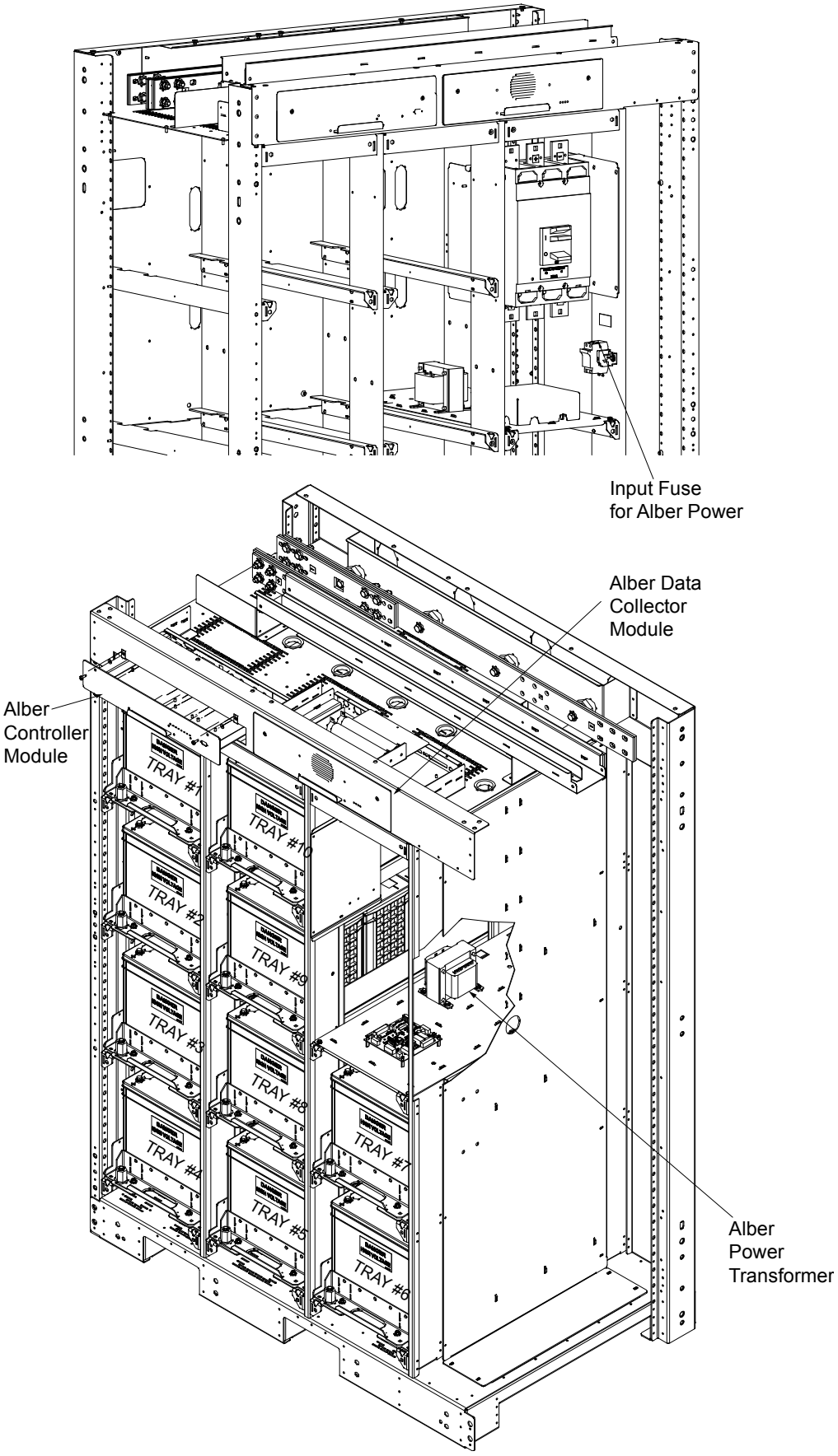


Figure 54 Alber battery monitoring wiring to multiple battery cabinets

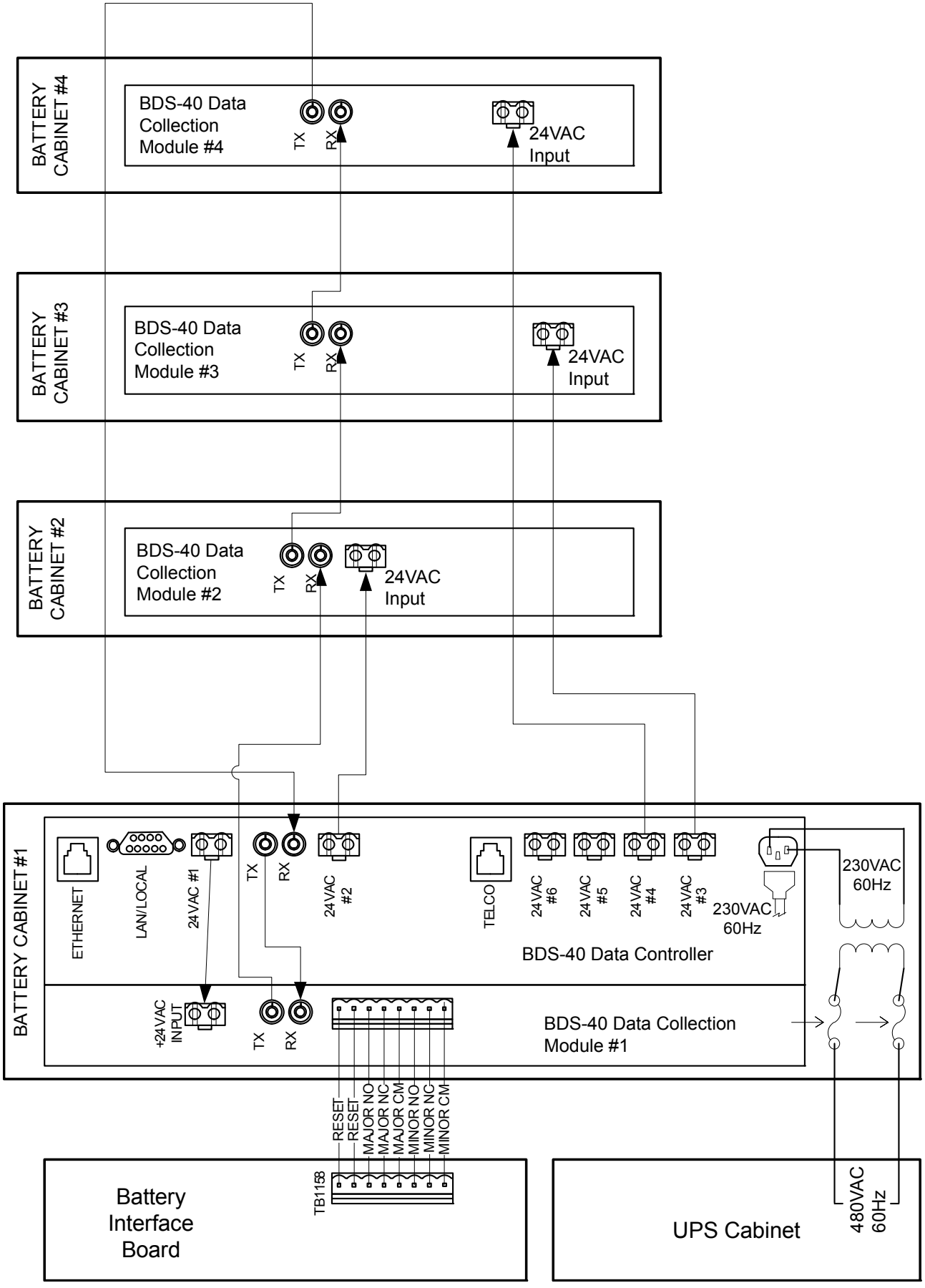


Figure 55 Alber battery monitoring assembly diagram

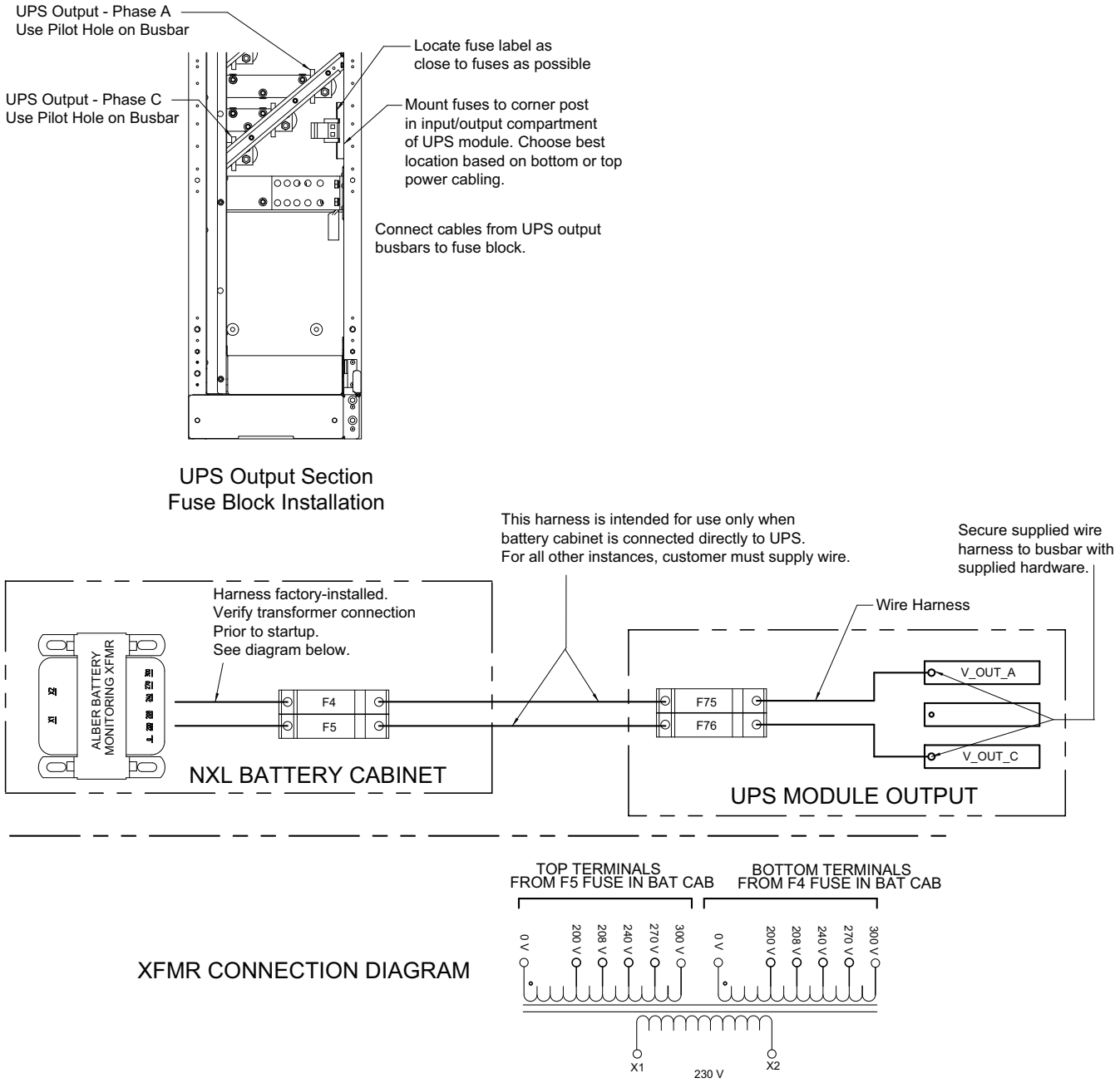
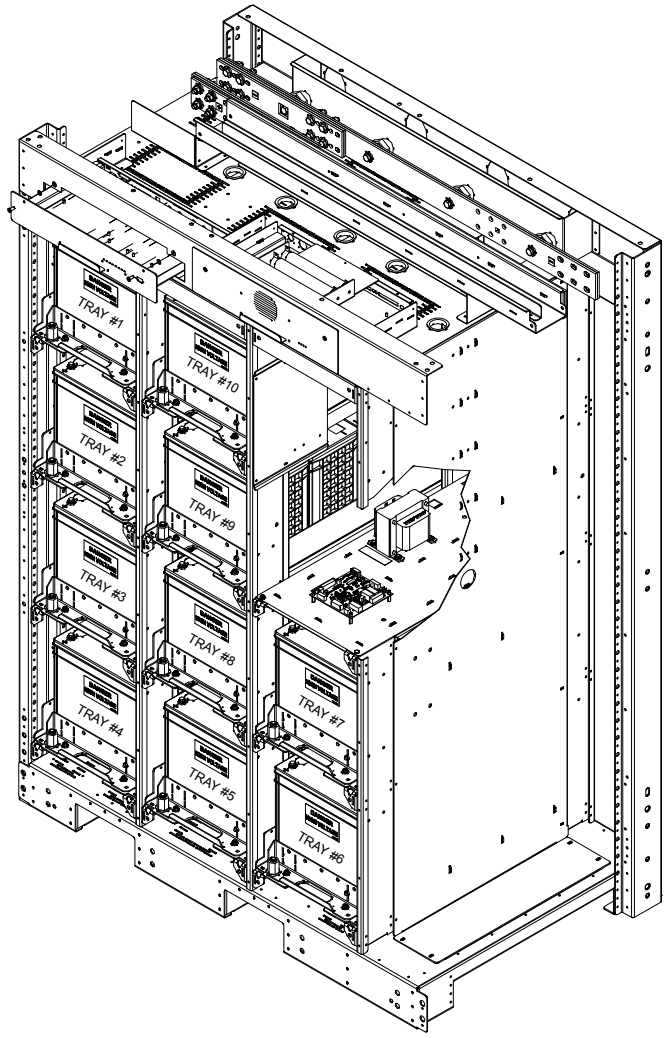


Table 27 Alber battery monitoring assembly connections

Input Voltage	Alber Transformer-2 (Wht)	Jumper	Alber Transformer-1 (Blk)	F4-F5 Fuse Rating
600	0 (Top)	300 (Top) to 0 (Bottom)	300 (Bottom)	2.25 A, 600VAC
480	0 (Top)	240 (Top) to 0 (Bottom)	240 (Bottom)	1.25 A, 600VAC
380	0 (Top)	300 (Top) to 208 (Bottom)	300 (Bottom)	1 A, 600VAC
208	0 (Top)	0 (Top) to 0 (Bottom) and 208 (Top) to 208 (Bottom)	208 (Top)	0.75A, 600VAC

Figure 56 Top-Terminal battery configuration



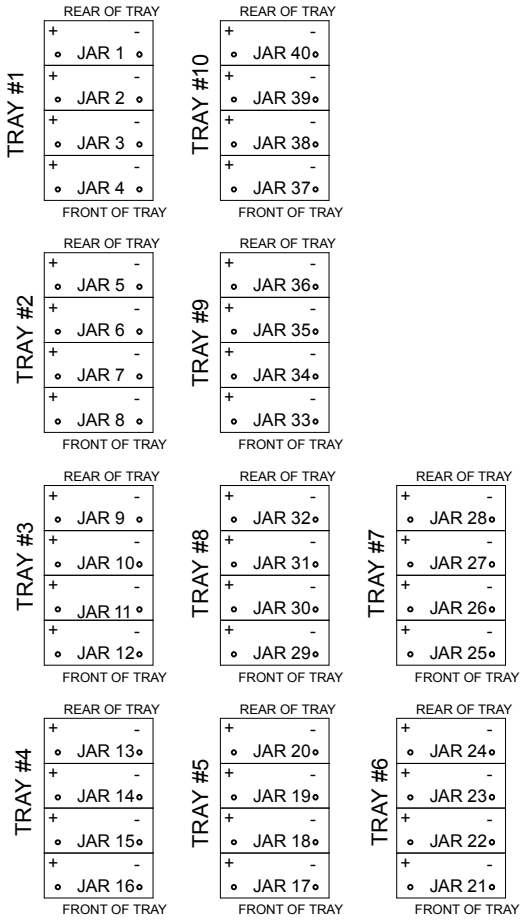
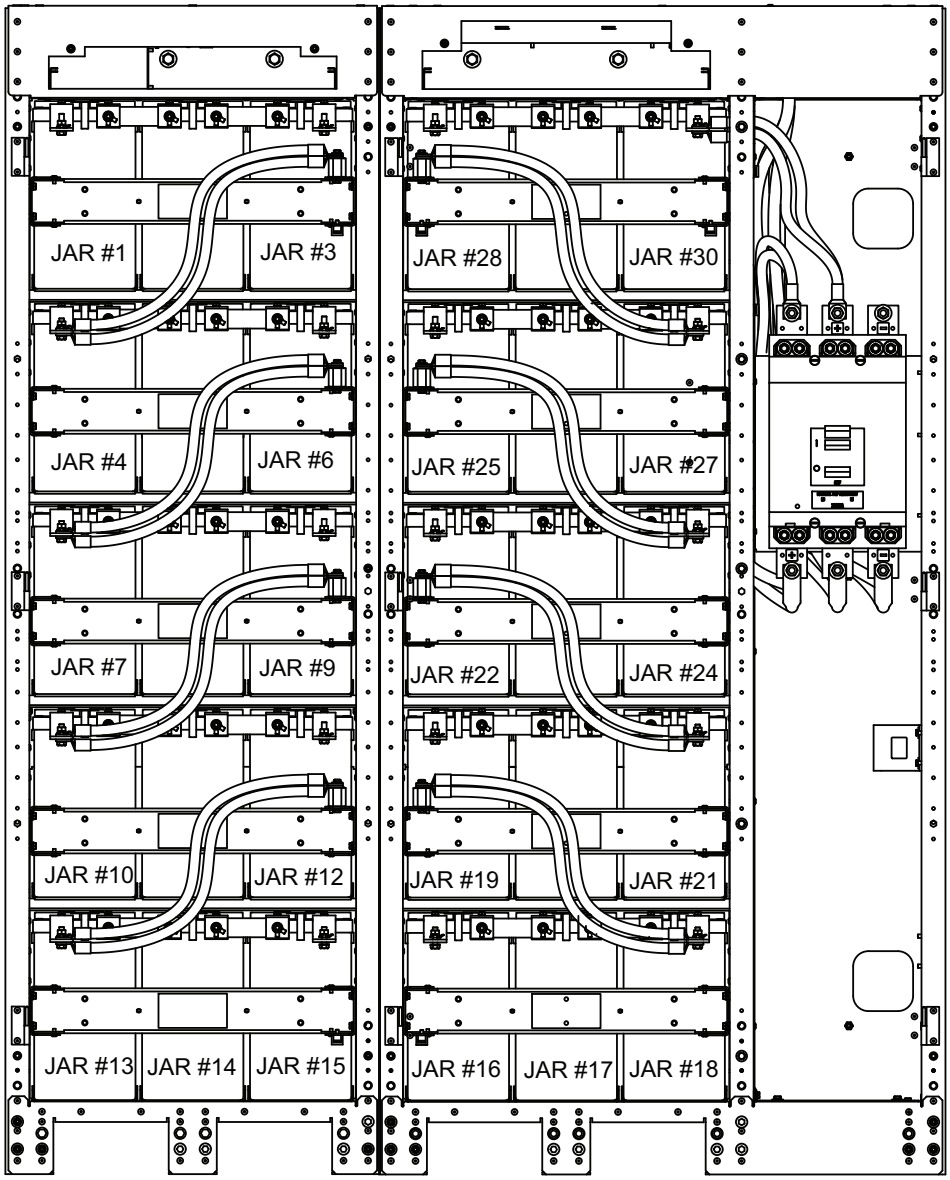
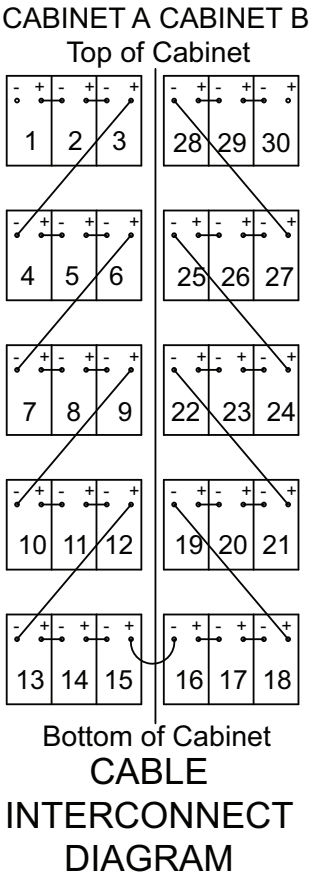


Figure 57 Top-Terminal battery configuration





4.0 SPECIFICATIONS

Table 28 Liebert NXL Battery Cabinet specifications

Battery Cabinet Parameters	Values	
	Top-Terminal Cabinet	**Front-Terminal Cabinet**
Battery Type	VRLA (Valve Regulated Lead Acid)	
Nominal Battery Bus, VDC	480V	
Battery Float Voltage, VDC	540V	
Minimum EOD Voltage, VDC	384V (for VRLA / Flooded Lead Acid)	
Battery Discharging Max current (EOD), A	See **Table 33**	
Physical Parameters and Standards		
Width, in. (mm) [1]	56.5 (1435)	63.0 (1600)
Depth, in. (mm) [2]	33.5 (850)	33.5 (850)
Height, in. (mm)	76.8 (1950)	76.8 (1950)
Weight, lb (kg) approx.	**Table 34**	
Standard Color	Charcoal (ZP-0420)	
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"	
Minimum Clearance, Sides	0"	
Cable Entrance	Top or Bottom	
Standards & Conformities	UL 1778; CSA 22.2 107.3 FCC Part 15, Class A; ISTA Procedure 1H; WEEE	
Environmental		
Storage Temperature Range, °F (°C)	-13°F to 158°F (-25°C to 70°C) 74°F to 80°F (23-27°C) for optimal battery life	
Operating Temperature Range, °F (°C)	32°F to 104°F (0 to 40°C) 74°F to 80°F (23-27°C) for optimal battery life	
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	

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.

Table 29 Liebert NXL Module Battery Disconnect Cabinet specifications

Battery Parameters	Values
Nominal Battery Bus, VDC	480V
Battery Float Voltage, VDC	540V
Minimum EOD Voltage, VDC	384V (for VRLA / Flooded Lead Acid)
Battery Discharging Max current (EOD), A	See **Table 32**
Physical Parameters	
Width in. (mm) *	32.3 (820)
Depth, in. (mm) **	33.5 (850)
Height, in. (mm)	76.8 (1950)
Weight, lb (kg) approx.	See **Table 35**
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"
Minimum clearance, Sides)	0"
Location of cable entrance	Top or Bottom
Standards & Conformities	UL 1778; CSA 22.2 107.3 FCC Part 15, Class A; ISTA Procedure 1H; WEEE
Environmental Parameters	
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)
Relative Humidity	Maximum 95% Non-Condensing (Operating and Non-Operating)
Maximum Altitude Above Mean Sea Level, ft (m)	4920 (1500) (as per IEC 62040/3) - 1% Max kW derate / 100m rise between 1500-3000m

* Width dimensions are with side panels attached. Subtract 1.4" (35mm) for dimensions without side panels.

** Depth dimensions include the front door and rear panel.

Table 30 Liebert NXL Junction Cabinet specifications

Battery Specifications	Value		
	Top-Terminal Cabinet	**Top-Terminal Cabinet - Wide**	**Front-Terminal Cabinet**
Nominal Battery Bus, VDC	480V		
Battery Float Voltage, VDC	540V		
Minimum EOD Voltage, VDC	384V (for VRLA / Flooded Lead Acid)		
Battery Discharging Max current (EOD), A	**Table 32**		
Physical Parameters			
Width, * in (mm)	15.5 (393)	30.9 (785)	17.5 (445)
Depth, in (mm) **	33.5 (850)	33.5 (850)	33.5 (850)
Height, in (mm)	76.8 (1950)	76.8 (1950)	76.8 (1950)
Weight, lb (kg) approx.	**Table 35**		
Color	Black (ZP-7021)		
Degree of Protection for UPS Enclosure	IP 20		
Minimum clearance, Top	24" (610mm)		
Minimum clearance, Back	0"		
Minimum clearance, Sides	0"		
Location of cable entrance	Top or Bottom		
Standards and Conformities	UL 1778 CSA 22.2 107.3 FCC Part 15, Class A 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)		
Relative Humidity	Maximum 95% Non-Condensing (Operating and Non-Operating)		
Maximum Altitude above MSL, ft (m)	4920 (1500) (as per IEC 62040/3) - 1% maximum kW derate / 328ft rise between 4900-9800ft (100m rise between 1500-3000m)		

* Width dimensions are with side panels attached. Subtract 1.4" (35mm) for dimensions without side panels.

** Depth dimensions include the front door and rear panel.

Table 31 Alber battery monitoring option specifications

Electrical Data	Value
Input Voltage	220-600VAC
Input Current	< 0.5A
Frequency	60Hz

Table 32 DC currents for Liebert NXL modules

UPS Rating		Output Voltage	Max Battery Current at EOD	External Breaker Trip, A
kVA	kW			
250	225	480	615	700
300	275	480	730	800
400	360	480	980	1000
500	450	480	1241	1400
750	675	480	1845	2000
750	675	575	1851	2000
750	675	600	1845	2000

Table 33 Liebert NXL Battery Cabinet internal breaker

Model Number Code	Battery Type	Required Breaker Thermal Trip Amps
PR	UPS12-300MR	400
RR	UPS12-350MR	450
UR	UPS12-400MR	500
WS	UPS12-490MRLP	600
XR	UPS12-540MR	600
PX	HX300-FR	400
RX	HX330-FR	450
UX	HX400-FR	500
WX	HX500-FR	600
XX	HX540-FR	600
2K	16HX800F-FR	250kVA - 700A 300kVA - 800A 400kVA & above - 900A
4K	16HX925F-FR	
RA	27HR3500	400
UA	31HR4000	500
WA	31HR5000	600

Table 34 Liebert NXL Battery Cabinet approximate weights

Battery Code	Manufacturer	Battery Model	Total Weight lb (kg)
PR	C&D Batteries	UPS12-300MR	3910 (1774)
RR		UPS12-350MR	4265 (1935)
UR		UPS12-400MR	4600 (2087)
WS		UPS12-490MRLP	5545 (2515)
XR		UPS12-540MR	5545 (2515)

Table 34 Liebert NXL Battery Cabinet approximate weights

Battery Code	Manufacturer	Battery Model	Total Weight lb (kg)
PX	Enersys	HX300-FR	3760 (1706)
RX		HX330-FR	4200 (1905)
UX		HX400-FR	4760 (2159)
WX		HX500-FR	5750 (2608)
XX		HX540-FR	5850 (2653)
2K		16HX800F-FR	8510 (3860)
4K		16HX925F-FR	8990 (4078)
QA	East Penn	27HR3500	4000 (1814)
SA		31HR4000	4320 (1960)
WA		31HR5000	5280 (2395)

Table 35 Approximate weights, Liebert NXL Module Battery Disconnect and Liebert NXL Junction Cabinets

Module Battery Disconnect Cabinet		Junction Cabinet	
Cabinet Size	Weight, lb (kg)	Cabinet Size	Weight, lb (kg)
250-400kVA	544 (247)	Narrow	255 (115)
500-750kVA	744 (338)	Wide	400 (180)

Table 36 Recommended conduit and cable sizes from Liebert NXL UPS to DC supply

UPS Rating kVA	(#) Conduit Size, Ph, G
250	(2) 2.5C 2-350kcmil, #1/0AWG
300	(2) 3C 2-500kcmil, #1/0AWG
400	(3) 2.5C 2-500kcmil, #2/0AWG
500	(4) 3C 2-600kcmil, #4/0AWG
625	(4) 3C 2-600kcmil, #4/0AWG
750	(5) 3C 2-600kcmil, 250kcmil

The recommendations in this table are guidelines only and are superseded by local regulations and codes of practice where applicable:

1. Recommended cable sizes are 75C (THW) wire at 86°F (30°C) ambient.
2. For continuous operations not at 86°F (30°C), Emerson recommends selecting the appropriate cable type based on the particular installation requirements.
3. The ground conductor should be sized according to the fault rating, cable lengths, type of protection, etc. The ground cable connecting the UPS to the main ground system must follow the most direct route possible.
4. When laying the power cables, do not form coils. Coiling power cables increases the likelihood of electromagnetic interference.

Table 37 Battery torque values

Battery Code	Manufacturer	Battery Model	Torque Value in-lb (Nm)
PR	C&D Batteries	UPS12-300MR	110 (12.4)
RR		UPS12-350MR	110 (12.4)
UR		UPS12-400MR	110 (12.4)
WS		UPS12-490MRLP	110 (12.4)
XR		UPS12-540MR	110 (12.4)
PX	Enersys	HX300-FR	65 (7.3)
RX		HX330-FR	65 (7.3)
UX		HX400-FR	65 (7.3)
WX		HX500-FR	65 (7.3)
XX		HX540-FR	65 (7.3)
2K		16HX800F	100 (11.3)
4K		16HX925F	100 (11.3)
QA	East Penn	27HR3500	65 (7.3)
SA		31HR4000	65 (7.3)
WA		31HR5000	65 (7.3)

Table 38 Torque specifications, unless otherwise labeled

Nut and Bolt Combinations		
Bolt Shaft Size	**Grade 2 Standard lb-in (Nm)**	**Electrical Connections with Belleville Washers lb-in (Nm)**
1/4 (M6)	53 (6.0)	46 (5.2)
5/16 (M8)	107 (12)	60 (6.8)
3/8 (M10)	192 (22)	95 (11)
1/2 (M12)	428 (48)	256 (29)
Circuit Breakers with Compression Lugs (For Power Wiring)		
Current Rating	**lb-in (Nm)**	**—**
400 - 1200 Amps	300 (34)	—
Circuit Breakers with Compression Lugs (For Control Wiring)		
AWG Wire Size or Range	**lb-in (Nm)**	**—**
#22 - #14	3.5 to 5.3 (0.4 to 0.6)	—

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