



# Liebert<sup>®</sup> RX Remote Distribution Cabinet

**User Manual**

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

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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.vertiv.com/en-us/support/> for additional assistance.

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# 1 Important Safety Instructions

## Save These Instructions

This manual contains important instructions that should be followed during installation of the Vertiv™ Liebert® RX. Read this manual thoroughly, paying special attention to the sections that apply to your installation, before installing or operating the Liebert® RX. Retain this manual for use by installing personnel.

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

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 Liebert® RX. Observe all safety precautions in this manual before handling or installing the unit. Observe all precautions in this manual before as well as during performance of all maintenance procedures.



**WARNING! Risk of electric shock. May cause personal injury or death.**

**Verify that all incoming line voltage (power) circuits are de-energized and locked out before installing cables or making connections in the unit.**

**Equipment inspection and startup should be performed only by properly trained and qualified personnel wearing appropriate safety headgear, gloves and shoes. Lethal voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup.**

**Only properly trained and qualified service personnel wearing appropriate safety headgear, gloves, shoes and glasses should perform maintenance on the Liebert® RX. All voltage sources to the unit must be disconnected before inspecting or cleaning within the cabinet.**



**WARNING! Risk of electric shock. May cause personal injury or death.**

**Lethal voltages exist within the equipment during operation. Observe all warnings and cautions in this manual. Failure to comply may result in serious injury or death. Obtain qualified service for this equipment as instructed. All power wiring should be installed by licensed electricians and must comply with the NEC and applicable codes.**



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

**The unit should NOT be loosened from the shipping pallet until after all handling by forklift or pallet jack is completed. Exercise extreme care when handling Liebert® RX cabinets to avoid equipment damage or injury to personnel.**

**Electromagnetic Compatibility**—The Liebert® RX complies with the limits for a Class A Digital Device, pursuant to Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Operating this device in a residential area is likely to cause harmful interference that users must correct at their own expense.

The Vertiv™ Liebert® RX complies with the requirements of EMC Directive 2004/108/EC and the published technical standards. Continued compliance requires installation in accordance with these instructions and use of accessories approved by Vertiv.

## 2 Installation

**NOTE:** Read this entire manual before installing and operating the system. Upon receipt of a Vertiv™ Liebert® RX, the installer should perform the following steps to ensure a top-quality installation.

### 2.1 Unpacking and Preliminary Inspection

A top-quality installation begins on the receiving dock.

- Inspect the shipment for damage or signs of mishandling before unpacking the unit(s).
- Check Shock-Watch indicator.
- Uncrate the unit carefully. Use care to avoid puncturing the container with sharp objects that would damage the contents.
- Remove the packing and vapor barriers and inspect the equipment for any obvious shipping damage.



**WARNING!** Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death. The unit should NOT be loosened from the shipping pallet until after all handling by forklift or pallet jack is completed. Exercise extreme care when handling Liebert® RX cabinets to avoid equipment damage or injury to personnel.

### 2.2 Handling Considerations

The Liebert® RX is bolted to a wooden pallet to allow handling by a forklift, pallet jack or similar equipment.

**Check size and weight**-Refer to the cabinet drawings furnished with the unit for size and weight information. Typical cabinet dimensions and weights are shown in **Figure 2.1** on the next page .

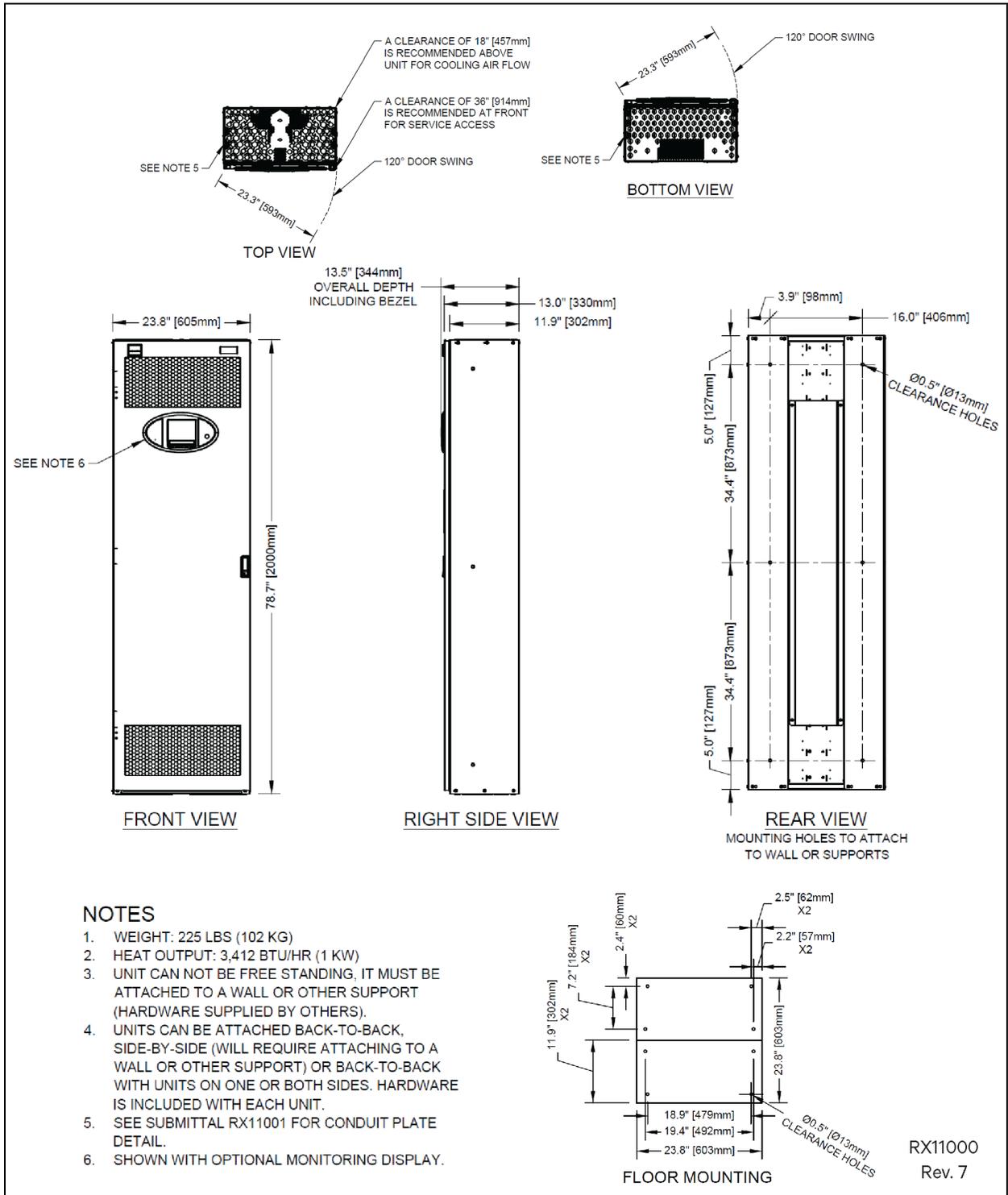
**Plan the route**-The route that the unit will follow to its installation area should be planned to ensure that all passages are large enough to accommodate the unit and that the floors are strong enough to support the weight. Check all doorways, hallways elevators, ramps and other portions of the route to determine if there are any obstructions and to ensure each is large enough and strong enough to allow easy passage.

**Move with care**-The Liebert® RX should be moved to the installation area on the wooden pallet using forklift or pallet jack.

**If any damage is observed**-Immediately file a damage claim with the shipping agency and forward a copy to:

Vertiv  
1050 Dearborn Drive  
P.O. Box 29186  
Columbus, Ohio 43229 USA

Figure 2.1 Typical Cabinet and Floor Planning Dimension Data



## 2.3 Unit Preparation

The Vertiv™ Liebert® RX may be easily removed from the shipping pallet and installed by customer personnel. A typical procedure is as follows:

- Set the shipping pallet in a level area where there is enough room lift the Liebert® RX off the pallet onto the raised floor.
- Remove front door.
- Unbolt the unit from the shipping pallet. There is a bolt in each of the four bottom corners.
- Use a lifting device or an appropriate number of personnel to lift the unit off the pallet and place it on the floor.



**WARNING! Risk of heavy unit falling or tipping over. Can cause property damage, personal injury or death. A single Liebert® RX is not designed to be a free-standing unit and may present a tipping hazard. The Liebert® RX must be properly supported and braced until it is securely attached to a supporting structure.**

**NOTE:** Before maneuvering the unit into its final position, read and follow all advisories in [Location Considerations](#) below .

## 2.4 Location Considerations

The Liebert® RX should be installed in the data center and close to the load(s) it is supplying.

Equipment location should employ the shortest output distribution cable runs consistent with logical equipment arrangement and allowances for additional equipment.

The Liebert® RX should be installed in an environment with an ambient temperature range of 32°F to 104°F (0°C to 40°C) with a relative humidity of 0% to 95% (non-condensing).

Required clearance above the unit for cooling air flow is 18" (460 mm); clearance below for cables is 12" (305mm) minimum. Bottom clearance is required for exit of cables/conduits and for cooling airflow. This clearance is automatically provided by a raised floor with a minimum height of 12" (305mm).

Recommended minimum service clearances are shown in [Configurations for Vertiv™ Liebert® RX Installation](#) on the next page and **Figure 2.2** on page 7 and **Figure 2.3** on page 8 . The indicated clearance at the front of the unit is required for service access by the National Electrical Code (NEC). Clearance above the unit is required for cooling airflow (exhaust).

As with all electrical devices, the Liebert® RX produces heat under normal operation. The heat output is 3412 BTU/Hr (1 kWh). This heat output should be included when calculating the environmental conditions of the room.

## 2.5 Configurations for Vertiv™ Liebert® RX Installation

The Liebert® RX can be installed in any of five configurations. Installation will vary depending on the chosen configuration.

- Configuration 1-Single unit
- Configuration 2-Two units attached back-to-back
- Configuration 3-Two units attached side-by-side
- Configuration 4-Three units: two attached back-to-back with the third attached to one side
- Configuration 5-Four units: two units attached back-to-back with one unit attached to each side

### 2.5.1 Configuration 1-Single Unit

This single-unit configuration is 24" (610mm) wide and 12" (305mm) deep. It must be secured to a wall, rack or other structure. The required front service access is:

- 36" (914 mm) for units up to 150V to ground
- 42" (1067 mm) for units over 150V to ground



**WARNING! Risk of heavy unit falling or tipping over. Can cause property damage, personal injury or death. The Liebert® RX is not designed to be a free-standing unit in this configuration and may present a tipping hazard. The Liebert® RX must be properly supported until it is securely attached to a supporting structure.**

### 2.5.2 Configuration 2-Back-to-Back

This two-unit configuration is attached back-to-back and is 24" (610mm) wide and 24" (610mm) deep. The two units can be installed in place of a floor tile. Remove one 24" x 24" (610 x 610mm) floor tile and position the Liebert® RX over the opening, the unit will rest on top of the raised floor cross members on all four sides. Refer to **Figure 2.2** on the facing page .

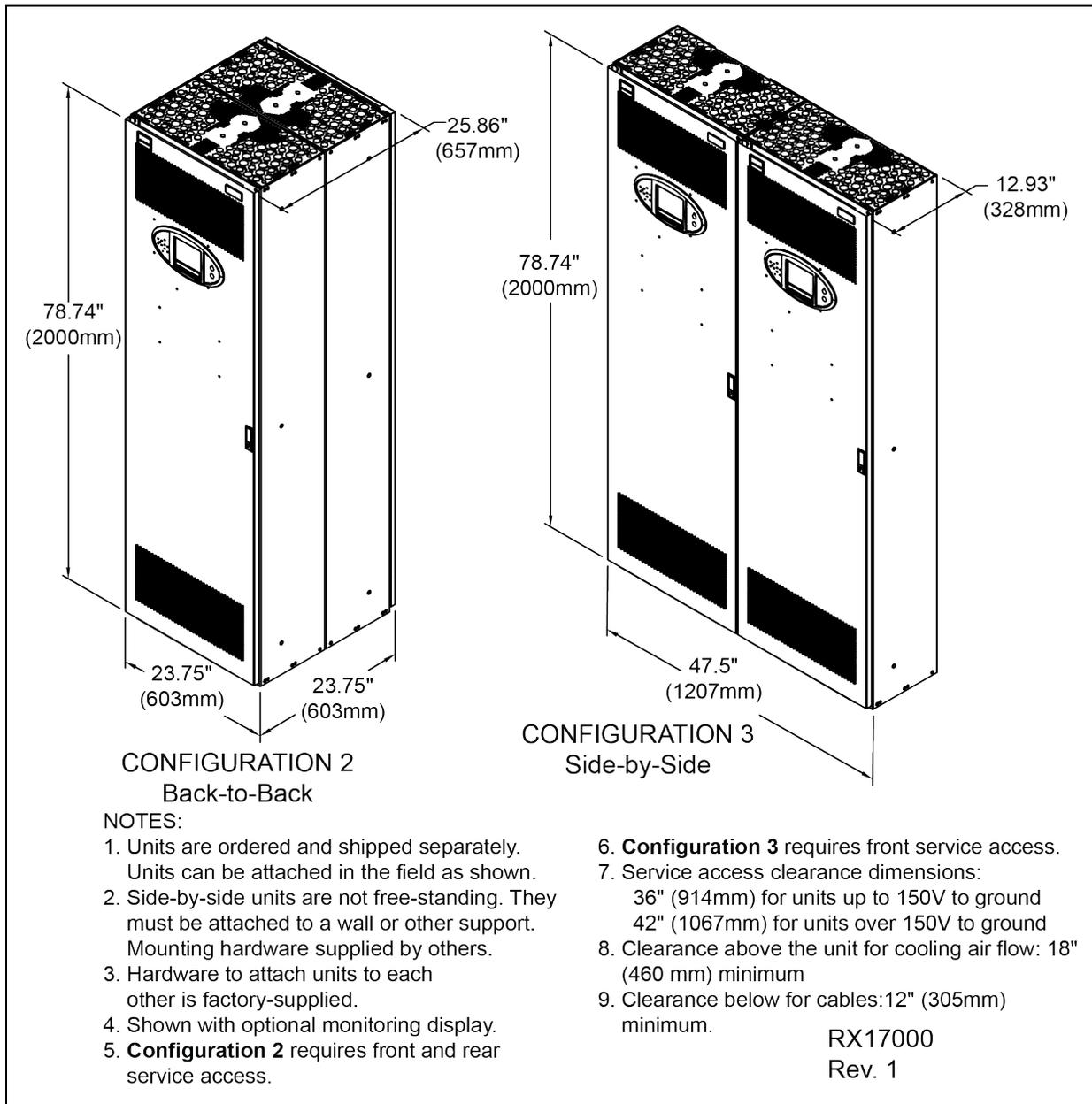
### 2.5.3 Configuration 3-Side-By-Side

This two unit configuration is attached side-by-side and is 48" wide and 12" (305mm) deep. The units must be secured to a wall, rack or other structure. Refer to **Figure 2.2** on the facing page .



**WARNING! Risk of heavy unit falling or tipping over. Can cause property damage, personal injury or death. The Liebert® RX is not designed to be a free-standing unit in this configuration and may present a tipping hazard. The Liebert® RX must be properly supported until it is securely attached to a supporting structure.**

Figure 2.2 Configuration 2 and Configuration 3—Two Vertiv™ Liebert® RX units



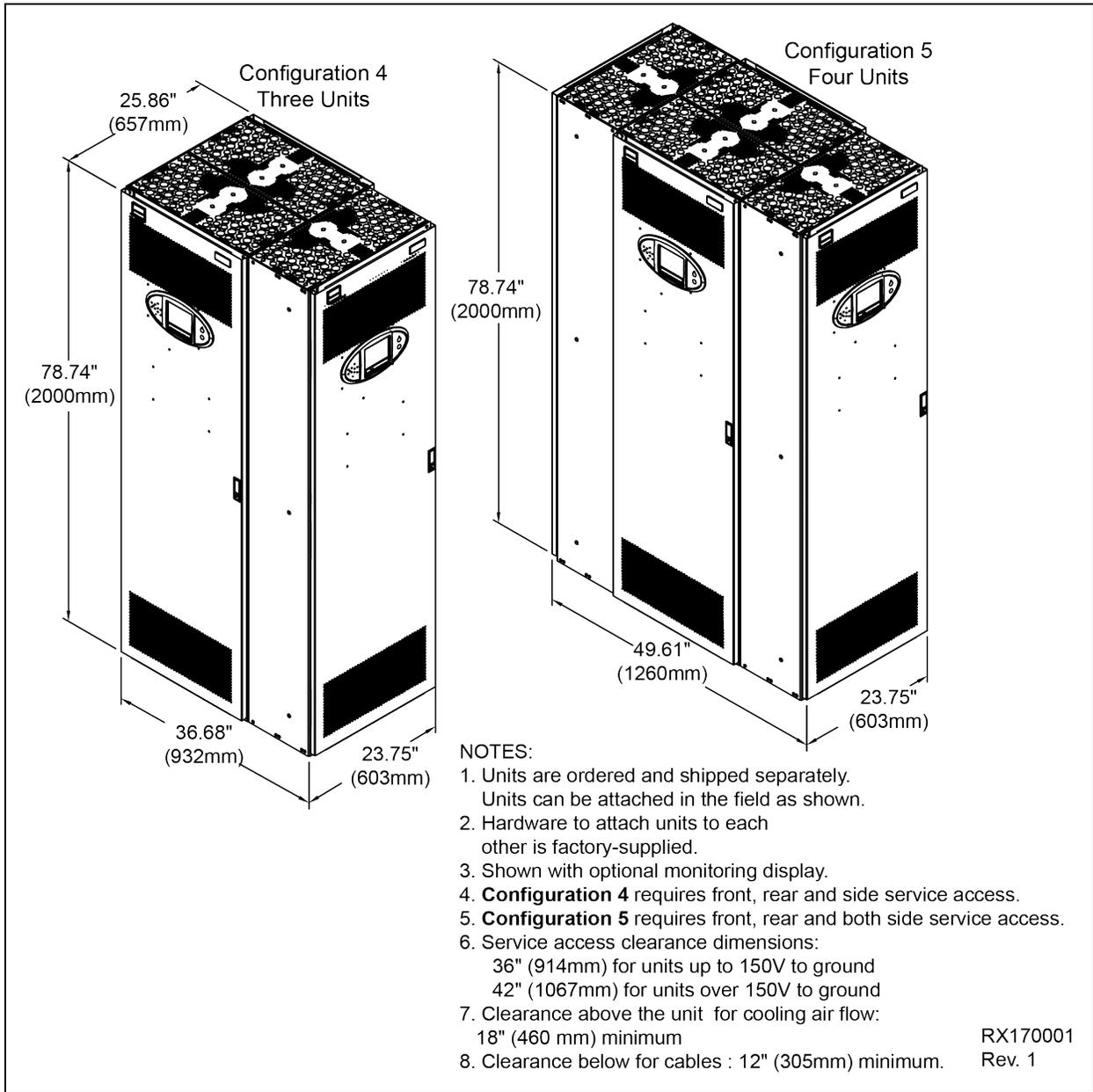
## 2.5.4 Configuration 4—Three Units

This three-unit configuration has two units attached back-to-back with a third unit attached to the side. It is 36" wide and 24" (610mm) deep. These units are free-standing and can be set on a raised floor. Refer to **Figure 2.3** on the next page.

## 2.5.5 Configuration 5—Four Units

This four-unit configuration has two units attached back-to-back with one unit attached to each side. It is 48" wide and 24" (610mm) deep. These units are free-standing and can be set on a raised floor. Refer to **Figure 2.3** on the next page.

Figure 2.3 Configuration 4-Three units and Configuration 5-Four units



## 2.6 Power Wiring

Power wiring should be installed by licensed electricians. All power wiring must comply with the NEC and applicable local codes.

### 2.6.1 Input Power Connections

Remove the front door. Open the accent panel, punch the top and/or bottom conduit tray to match the number and size of the input conduit(s) and attach the input feeder.

Input power cables should be connected to the input lugs located inside the unit. (See **Figure 2.4** below through **Figure 2.7** on page 12 and the electrical field connection drawing supplied with the unit for details.)

**! WARNING! Risk of electric shock. Can cause personal injury or death.**  
**Verify that all incoming line voltage (power) circuits are de-energized and locked out before installing cables or making connections in the unit.**  
**Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. Follow all local codes.**

To minimize disturbances caused by other loads in the building, the 3-phase power input to the unit should be supplied directly from a dedicated power source.

The input feeder circuit should be sized in accordance with the NEC and any local building codes to ensure the feeder's ability to safely carry the system's full load current, including losses.

Input feeder conductors should be sized for no more than 2% voltage drop. If operation at undervoltage conditions for extended periods of time is desired, the input feeders must be oversized.

The main input feeder must consist of 3-phase conductors, one neutral and one (safety) ground conductor (4W + G).

**Figure 2.4 Input electrical field connection location for units with main panelboard breaker**

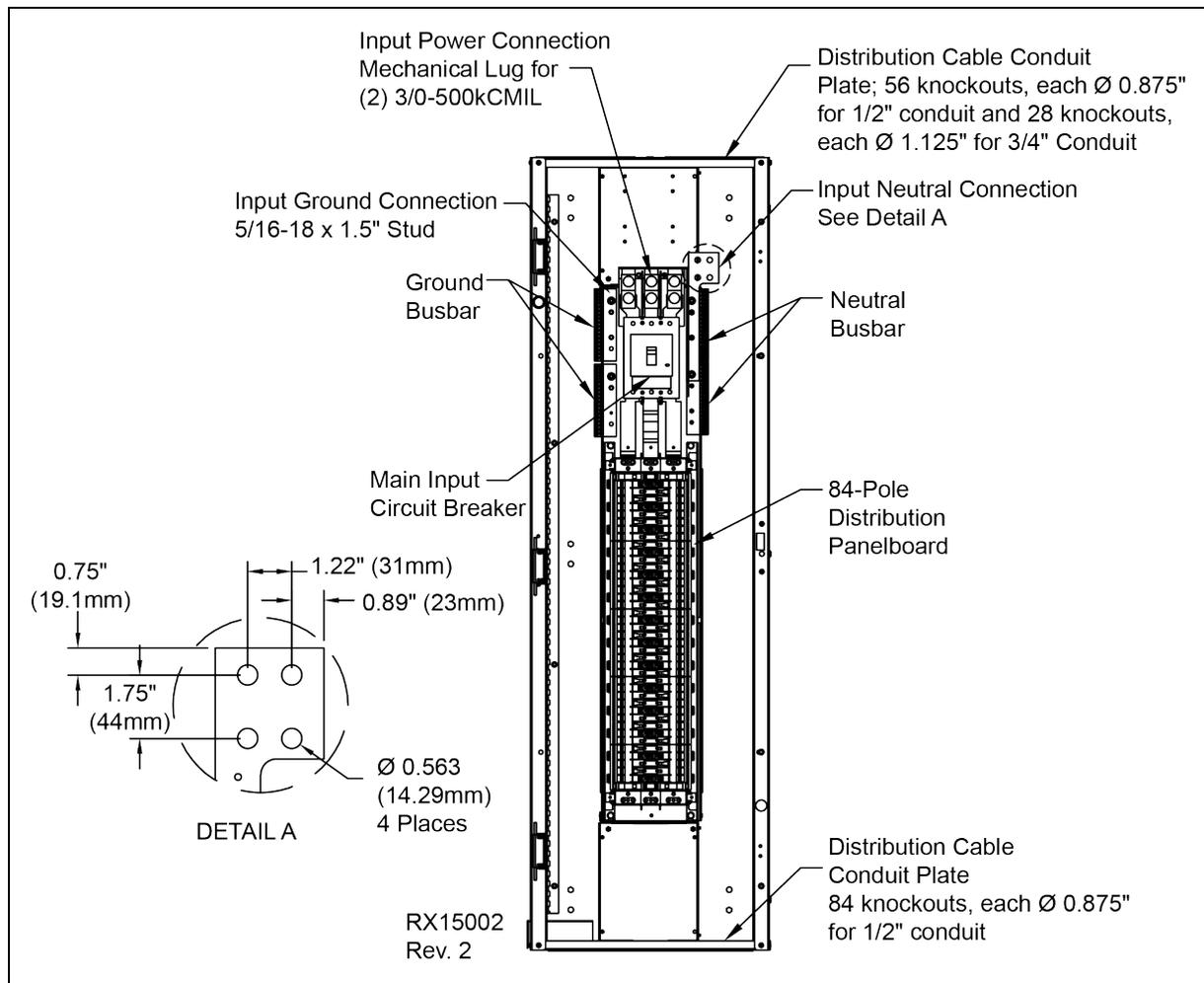


Figure 2.5 Input electrical field connection location for units without main panelboard breaker

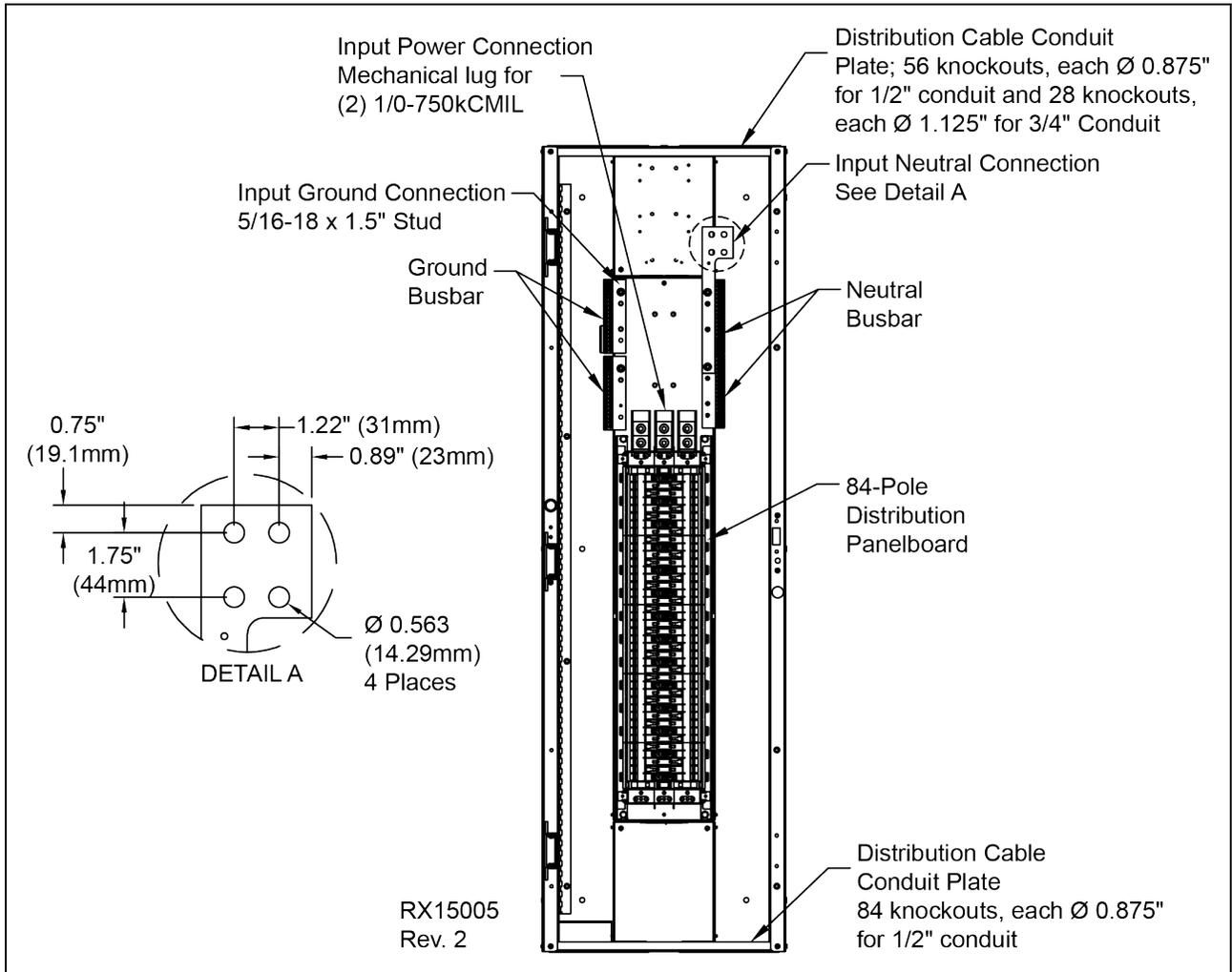


Figure 2.6 Electrical field connections for units with Vertiv™ Liebert® LDMF monitoring

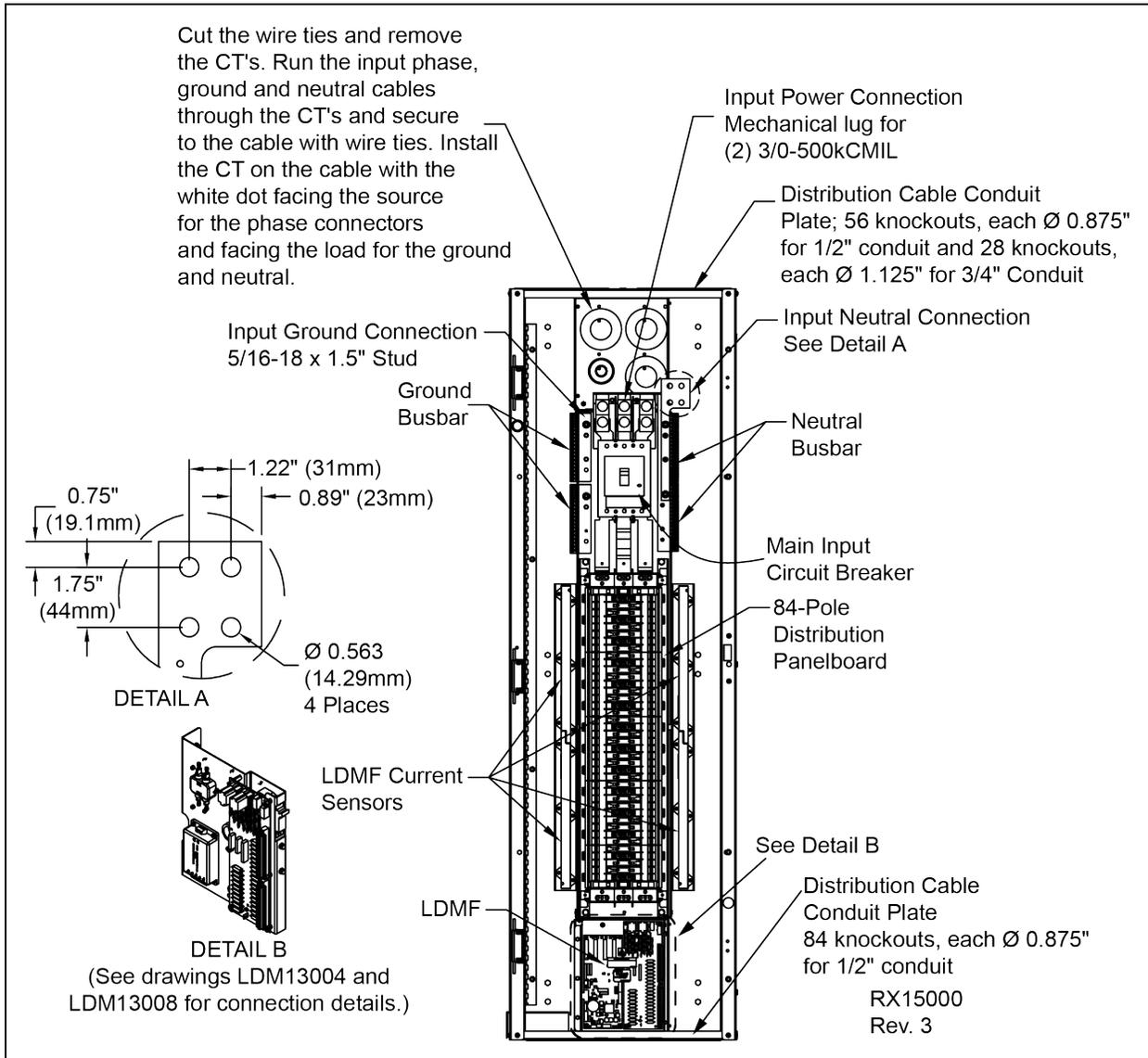
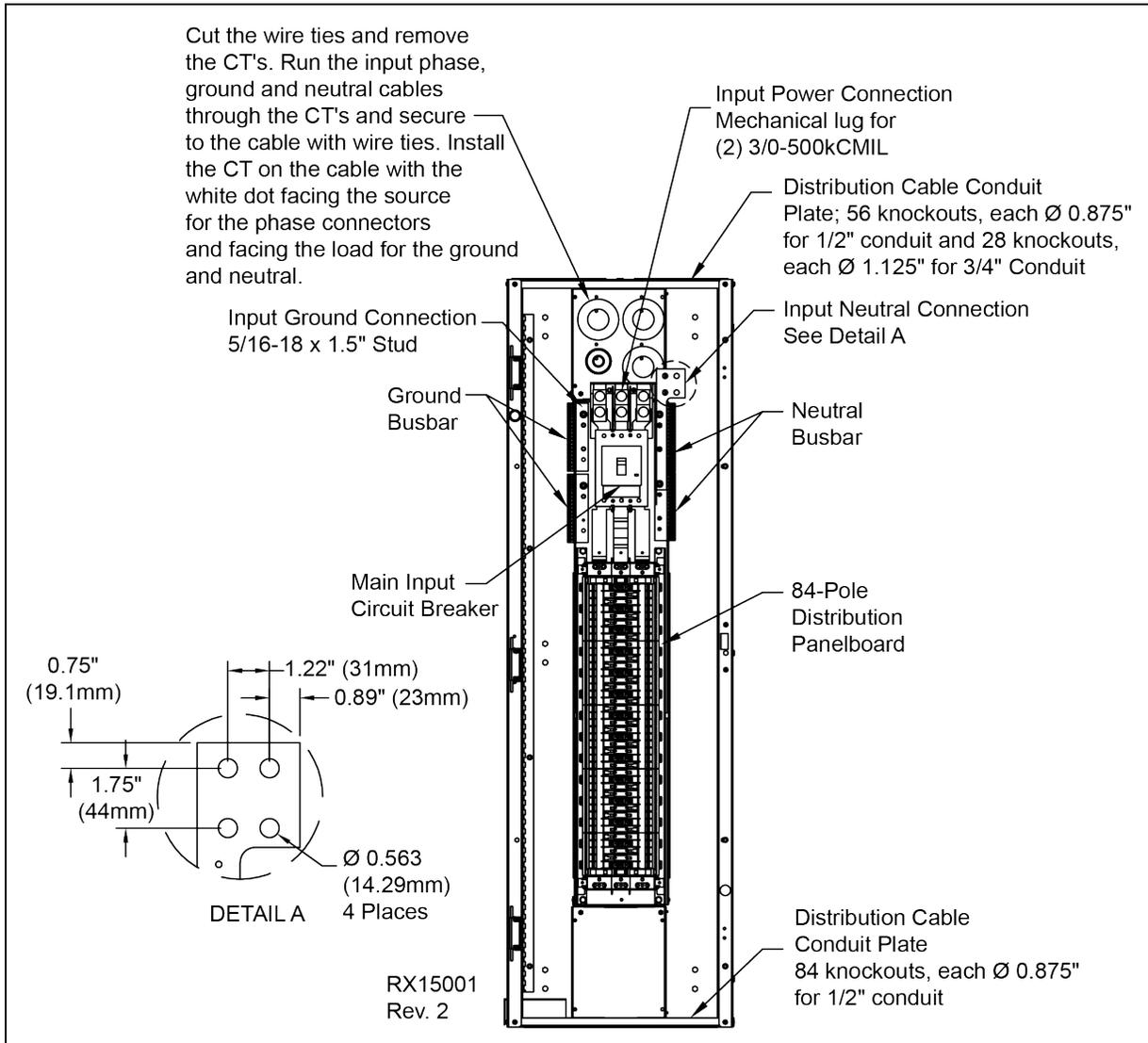
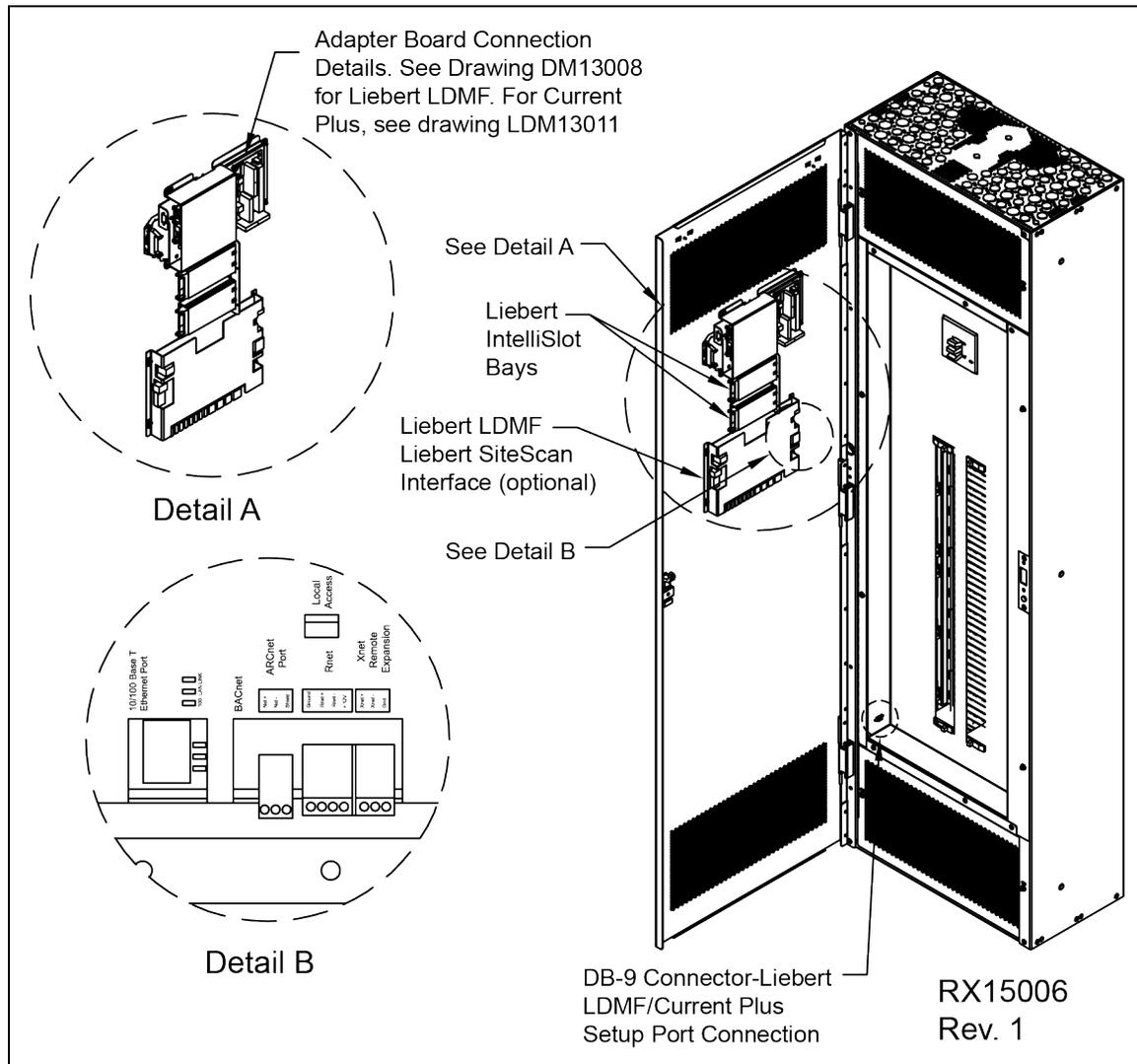


Figure 2.7 Electrical field connection for units with Vertiv™ Liebert® Current Plus Monitoring



**Figure 2.8 Vertiv™ Liebert® LDMF, Vertiv™ Liebert® SiteScan™ and Vertiv™ Liebert® IntelliSlot location and connection details**



## 2.7 Output Power Connections

An output panelboard with ground and neutral provisions is provided inside the unit for connecting load(s) as required. (See **Figure 2.4** on page 9, **Figure 2.5** on page 10 and **Figure 2.6** on page 11).

Flexible output distribution cables are used in data processing areas under a raised floor. Cable lengths and layout should be well planned:

- Cable routes should follow aisles between equipment. This will facilitate access to cables for installation, routine inspection and future changes.
- Determine the required cable length by measuring the distance to the load equipment following right-angle paths, rather than diagonally or directly. Always measure to the extreme far side of the equipment with respect to the unit to insure adequate cable length.
- Prevent restriction of airflow under the raised floor by running the flexible conduits flat on the sub-floor, in parallel paths.

- Initial system output loading should be between 50% and 75% of rated capacity. This allows the addition of future loads without immediately investing in another Vertiv™ Liebert® RX.
- Balancing of loads is good design practice on any 3-phase system.



**WARNING! Risk of electric shock. Can cause personal injury or death.**

**Verify that all incoming line voltage (power) circuits are de-energized and locked out before installing cables or making connections in the unit.**

**Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. Follow all local codes.**

- All output cables and connections must comply with the NEC and all other applicable codes.
- All output cables without receptacles that are hard-wired to the load equipment must be equipped with a padlock-off accessory for the output circuit breaker. The padlock-off accessory is used to lock out and tag the circuit breaker while service is performed on the hard-wired load equipment in accordance with OSHA safety rules.

## 2.8 Vertiv™ Liebert® Current Plus Monitoring-Optional

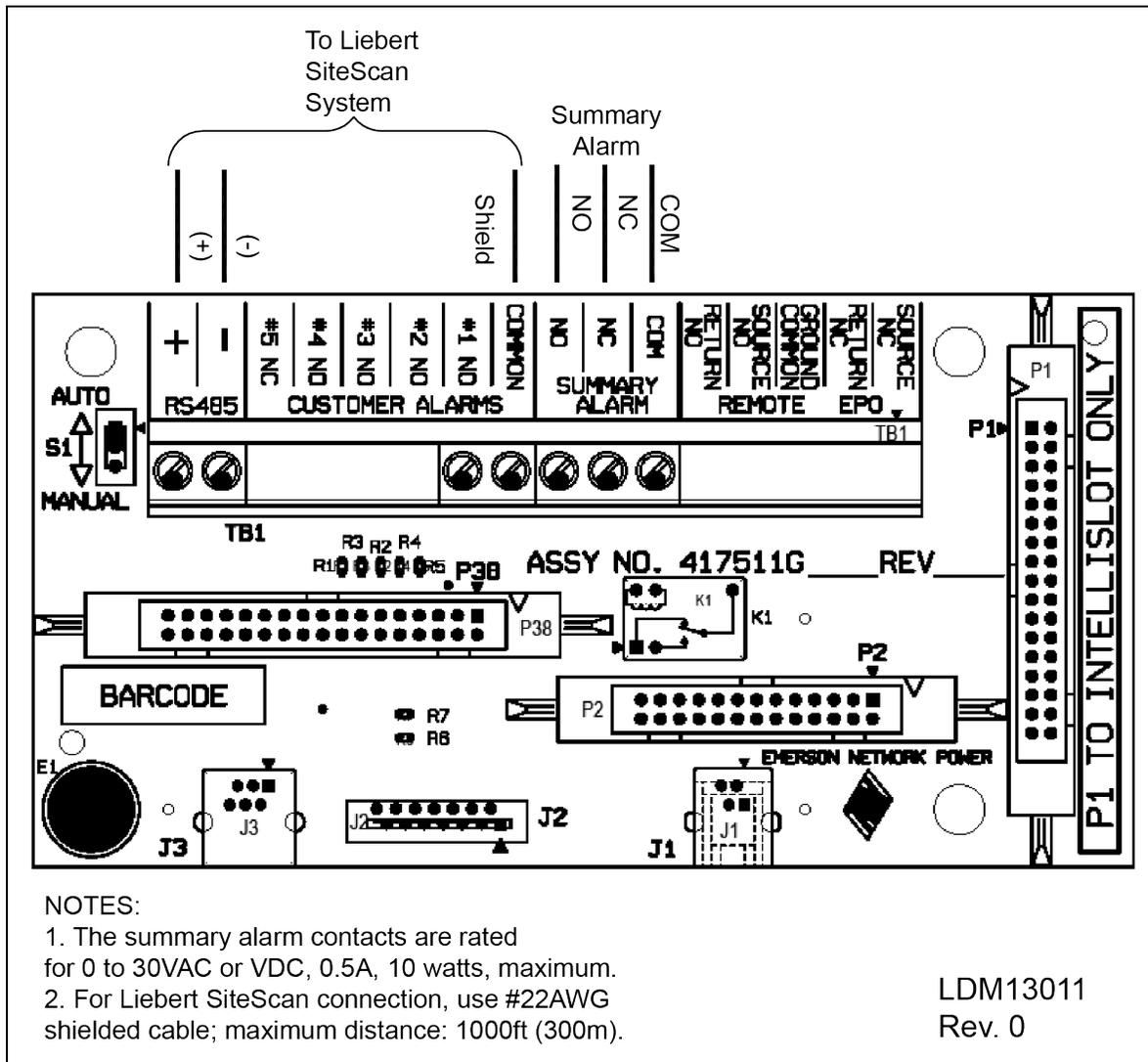
If Liebert® Current Plus Monitoring (CPM) is supplied, remote communications and summary alarm connections are available.

A Vertiv™ Liebert® IntelliSlot card provides connection to a Building Management System (BMS) or Vertiv™ Liebert® SiteScan™ monitoring interface. The following cards are available:

- IS-WEBS card for SNMP/Web output to Ethernet LAN
- IS-485S card for Modbus 485 output using a two-wire connection
- IS-IPBMS card for Modbus IP output using an RJ-45 connection
- IS-UNITY-DP card for HTTP/HTTPS, Vertiv Protocol, e-mail, SMS, SNMP v1/v2c/v3, BACnet IP/MSTP and Modbus TCP/RTU output using a serial RS-485 two-wire connection

Check Liebert® IntelliSlot slots on the back of the door to determine which card is supplied, more than one card might be supplied. See **Figure 2.8** on the previous page and **Figure 2.9** on the facing page for location and connection details.

Figure 2.9 Vertiv™ Liebert® Current Plus Monitoring adapter board electrical field connections



## 2.8.1 Summary Alarm

Liebert® Current Plus Monitoring provides a Form C (one NO and one NC) summary alarm contact for remote alarm status. The summary alarm contacts change state upon occurrence of any alarm including warnings and reset when the alarm is cleared. The summary alarm connection is on the Adapter Board (see [Figure 2.8](#) on page 13, Detail A, and [Figure 2.11](#) on page 18) marked Summary Alarm (NC) (NO) and (COMM). The contacts are rated at 24VAC at 1A.

## 2.9 Vertiv™ Liebert® LDMF Monitoring-Optional

If Liebert® LDMF monitoring is supplied, remote communications and summary alarm connections are available.

A Vertiv™ Liebert® IntelliSlot card provides connection to a Building Management System (BMS) or to Vertiv™ Liebert® SiteScan™ monitoring interface. The following cards are available:

- IS-WEBS card for SNMP/Web output to Ethernet LAN
- IS-485S card for Modbus 485 output using a two-wire connection

- IS-IPBMS card for Modbus IP output using an RJ-45 connection
- IS-UNITY-DP card for HTTP/HTTPS, Vertiv Protocol, e-mail, SMS, SNMP v1/v2c/v3, BACnet IP/MSTP and Modbus TCP/RTU output using a serial RS-485 two-wire connection

Check Vertiv™ Liebert® IntelliSlot bays on the back of the door to determine which card is supplied; more than one card might be supplied. See **Figure 2.7** on page 12, **Figure 2.8** on page 13 and **Figure 2.11** on page 18 for location and connection details.



**WARNING! Risk of electric shock. Can cause personal injury or death.**  
**Verify that the panelboard voltage (power) circuit is de-energized and locked out before installing branch breakers and cables or making connections in the unit. Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. Follow all local codes**

## 2.9.1 Replacing a CT in the CT Module

In the unlikely event a CT in the CT Module should fail, up to six replacement CTs may be installed using a split core CT kit, available separately from your local Vertiv representative.

1. Verify that the branch breaker is Off and power is de-energized.
2. Route wiring from the transformer through the panel to the control board.
3. Connect the CT connector to the proper panel location using the first available connection. See **Figure 2.10** on the facing page for details.
  - a. For panelboard A use P2 (A1), P3 (A2), P4 (A3).
  - b. For panelboard B use P5 (B1), P6 (B2), P7 (B3).

Ensure all routed wiring is properly secured to the panel with tie wraps.

4. The top piece of the current transformer (CT) is removable by pulling away from the center of the transformer ( **Figure 2.10** on the facing page , Item 2).
5. Place the main body of the current transformer around the cable, making sure the CT is installed in the direction shown in **Figure 2.10** on the facing page , Item 2.
6. Replace the top piece of the CT to complete securing the CT around the cable (**Figure 2.10** on the facing page , Item 3), then use the enclosed tie wraps to secure the CT to the cable.



**WARNING! Risk of electric shock. Can cause personal injury or death.**  
**Lethal voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup. Do not open circuit the secondary windings of current transformers. Failure to follow these instructions may result in serious injury or death.**

Figure 2.10 Electrical field connections for CT Module replacement CTs

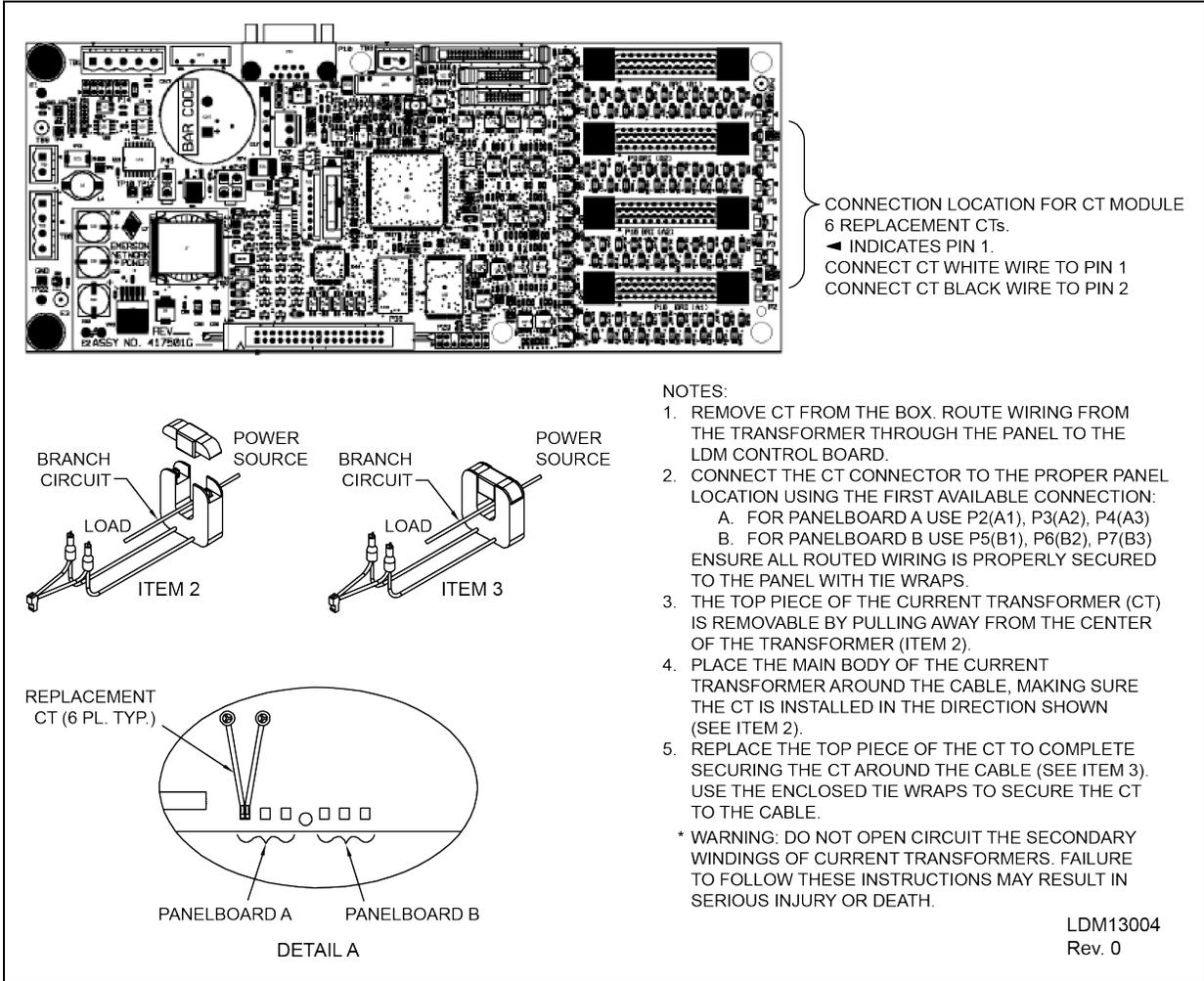
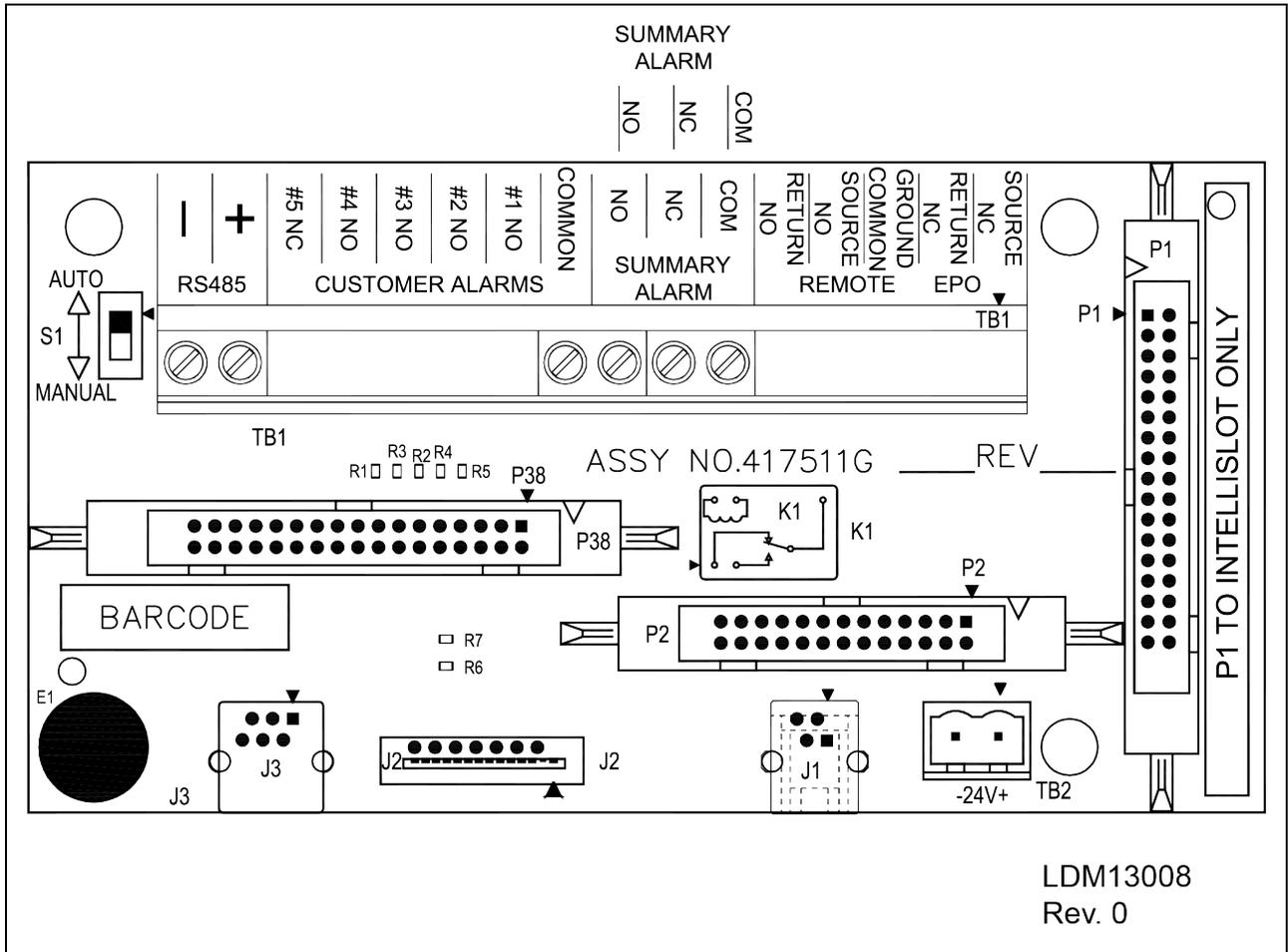


Figure 2.11 Electrical field connections for Vertiv™ Liebert® LDMF summary alarm



## 2.10 Liebert® LDMF Communication

Connecting locally to the Liebert® LDMF Monitoring option requires a female-to-female (F-F) DB9 null modem cable. There will be an external port on the Vertiv™ Liebert® RX labeled LDMF SETUP. Connect the DB9 null modem cable to a local PC. Once connected you may run any of the provided software tools that can be downloaded from the Support area of the Vertiv Web site, [www.vertiv.com](http://www.vertiv.com) (see the Vertiv™ Liebert® LDMF User Manual, SL-20200, for details on downloading and using the software).

### 2.10.1 Liebert® LDMF Setup Port Connection

The local LDMF Setup port is not intended to be a service terminal or hyperterminal connection. It is intended only for use of the Liebert® LDMF software tools provided.



**NOTE:** The images above are intended for illustration only. The location of the external port may vary.

**NOTE:** Before making any changes to an existing configuration or uploading a file to another Vertiv™ Liebert® LDMF system, make a note of the Software Address. When overwriting an existing configuration file due to changes, modifications or breaker addition/deletion, the Software Address will revert to the value of the file that is loaded. This can lead to incorrect Software Addresses causing Modbus communication errors.

### 2.10.2 Vertiv™ Liebert® SiteScan™ Web Monitoring Interface

The optional monitoring interface module allows the Liebert® LDMF to communicate with Liebert® SiteScan™ Web 4.0 or greater. The option includes software and graphics that support up to 168 branch breakers using an Ethernet connection. The monitoring interface is on the back of the Vertiv™ Liebert® RX front door and has connections for RJ-45 Ethernet and BACnet. See **Figure 2.8** on page 13 for location and wiring details.

### 2.10.3 Summary Alarm

The Liebert® LDMF provides a Form C (one NO and one NC) summary alarm contact for remote alarm status. The summary alarm contacts change state upon occurrence of any alarm including warnings and reset when the alarm is cleared. The summary alarm connection is on the Adapter Board (see **Figure 2.8** on page 13, Detail A, and **Figure 2.11** on the previous page) marked Summary Alarm (NC) (NO) and (COMM). The contacts are rated at 24VAC at 1A.

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## 3 Equipment Inspection and Startup

### 3.1 Internal Inspection

A detailed internal inspection should be performed after the unit is in place and before it is energized, to ensure trouble-free startup. The same internal inspection should be carried out when performing preventive maintenance.



**WARNING! Risk of electric shock. Can cause personal injury or death.**  
**Verify that all incoming power circuits are de-energized and locked out before performing the internal inspection.**

Gain access to the internal components of the Vertiv™ Liebert® RX by opening the accent panel. Inspect the wiring and components to be sure they are not damaged.

Check all power connections for tightness. Refer to **Table 3.1** below for torque requirements of all electrical connections. Follow the procedures described in [Inspection and Startup Checklist](#) on page 23 when performing a detailed inspection.

**Table 3.1 Maximum wire range recommended torque values**

Terminal	Connector Max. Wire Range	Torque, in/lb
<b>Main Lug</b>	No. 3/0-500 MCM Copper	275
<b>Ground Main</b>	No. 6-250 MCM Cu	200
<b>Ground Neutral Bar</b>		
1/4" Holes (No. 14-4 AWG)	No. 14-10 Copper	20
	No. 8 Copper	25
5/16" Holes (No. 14-2 AWG)	No. 6-4 Copper	35
	No. 2 Copper	50
<b>Connector Mounting Hardware</b>		
1/2"-13 Bolt and Nut	—	480
QOB Breaker Connector Screw	—	18-21
See branch breaker for lug torque.		

### 3.2 Startup

Follow the detailed step-by-step checklist in [Inspection and Startup Checklist](#) on page 23 when installing and starting up the Liebert® RX.

A qualified electrician should be employed to perform the equipment inspection and startup. System startup may be arranged by calling your local Vertiv sales representative or Vertiv. In the USA, call 1-800-543-2378.

A copy of the appropriate checklist (furnished with the equipment) must be completed, signed, dated and returned to Vertiv. Warranty coverage of the equipment is not effective unless the Checklist is received by the factory.



**WARNING! Risk of improper startup. Can cause equipment damage, personal injury and death. Hazardous voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup.**

**Equipment inspection and startup should be performed only by properly trained and qualified personnel wearing appropriate safety headgear, gloves and shoes.**

## 4 Inspection and Startup Checklist

Unit Serial Number: \_\_\_\_\_  
 Unit Model Number: \_\_\_\_\_  
 Date: \_\_\_\_\_

### 4.1 Inspection



**WARNING! Risk of electric shock. Can cause personal injury or death.**  
**Lethal voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup. Verify that all incoming power circuits are de-energized and locked out before performing any internal inspection.**

#### Exterior Inspection

1. Confirm that the exterior of unit is undamaged.
2. Confirm that service and ventilation clearances are adequate. (See [Configurations for Vertiv™ Liebert® RX Installation](#) on page 6 ).

#### Interior Inspection

1. Open the accent panel.
2. Inspect all wire and conductor insulation for damage.
3. Check all breaker connections for tightness. Retorque if necessary.
4. Check trip settings of adjustable breakers.
5. Check all terminal block connections for tightness. Retorque if necessary.
6. Remove any foreign objects from the components or the interior area of the unit.
7. Check that the intake and exhaust air screens are clean and free of obstructions.
8. Close the accent panel, leaving access to circuit breakers for the following startup procedure.

### 4.2 Startup



**WARNING! Risk of electric shock. Can cause personal injury or death.**  
**Hazardous voltages are present in the equipment throughout the startup procedure. This unit has several circuits that are energized with high AC voltage.**  
**Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in starting this unit. When performing any procedure with any part of the equipment under power, 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.**  
**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.**

1. Make certain that all circuit breakers are in the Off position and that power to the unit is locked out.

2. Turn On the building power to the unit. Check the phase rotation at the panelboard main breaker or panelboard input lugs if no panelboard main breaker is supplied. Phase rotation should be A, B, C, as indicated.
3. Check and record the input voltages at the panelboard main breaker or panelboard input lugs if no panelboard main breaker is supplied:

	Input 1	Input 2	Input 3	Input 4
Volts, phase A to phase B =	_____	_____	_____	_____
Volts, phase B to phase C =	_____	_____	_____	_____
Volts, phase C to phase A =	_____	_____	_____	_____

4. Turn Off and lock out the building power to the unit.
5. Replace the junction box cover.
6. Verify proper input power connections to unit, including equipment grounding conductor.
7. Turn On the building input power to the unit.
8. Check the phase rotation at the panelboard main breaker. Phase rotation should be A, B, C, left to right.
9. Check and record the input voltage at the panelboard main breaker. Measured voltages should correspond to the unit's nameplate input voltage.

	Panelboard 1			
Volts, phase A to phase B =	_____	_____	_____	_____
Volts, phase B to phase C =	_____	_____	_____	_____
Volts, phase C to phase A =	_____	_____	_____	_____

If output voltage is incorrect, check for wiring errors or incorrect input voltage. Contact Vertiv at 1-800-543- 2378 in the USA or the local factory representative for assistance.

10. Turn On the panelboard main breaker.

### 4.3 Monitoring System Check Out

If the unit is equipped with Vertiv™ Liebert® Current Plus Monitoring or Vertiv™ Liebert® LDMF:

1. Turn the unit On.
2. Ensure that the LCD is On. The Monitor Panel displays output and neutral currents for the panelboard (load must be applied to get an accurate reading).

## 5 Operating Instructions

### 5.1 Startup Procedures

Before the unit is placed in service after initial installation, after equipment relocation or after equipment has been de-energized for an extended period of time, perform equipment inspection and startup procedures as detailed in [Equipment Inspection and Startup](#) on page 21 and in [Inspection and Startup Checklist](#) on page 23.

After initial system startup, the following guidelines can be used for standard equipment operation. These guidelines should be reviewed for any special equipment modifications, special site considerations or company policies that may require changes to the standard equipment operation.

### 5.2 Normal System Shutdown

To perform a normal system shutdown, perform an orderly load equipment shutdown according to the load equipment manufacturer's recommended shutdown sequence. The load equipment can be turned Off at each piece of load equipment or at the Vertiv™ Liebert® RX panelboards (circuit breaker) located behind the unit's front door. Turn Off the unit panelboard main breaker. To remove all power from the unit, turn Off the building power to the unit.

### 5.3 Normal System Turn On

Make certain all unit circuit breakers are in the Off position. All unit circuit breakers are located behind the front door. Turn On building power to the unit. Turn On the panelboard main circuit breakers if supplied. If the circuit breaker has been tripped Off (instead of being turned Off), the circuit breaker handle must be moved to the Off position before being turned On. Individually turn On each panelboard circuit breaker following the load equipment manufacturer's startup sequence.

### 5.4 Vertiv™ Liebert® Current Plus Monitoring-Optional

The Liebert® RX has a Liebert® Current Plus Monitoring (CPM) feature that monitors the current and voltage of the panelboard. The Liebert® CPM includes a monochrome liquid crystal display (LCD) with power and alarm LEDs, an audible alarm and a Silence push button.

The Liebert® CPM displays the power parameters and alarms listed below for each panelboard.

The Liebert® CPM displays circuit identification, the status of each breaker and the following parameters:

- Voltage-Line-to-Line
- Voltage-Line-to-Neutral
- Neutral Current
- Ground Current
- kVA
- Power Factor
- Voltage Total Harmonic Distortion (THD)
- Current Total Harmonic Distortion (THD)
- Crest Factor

The Liebert® CPM annunciates alarm messages for the following conditions. Alarm thresholds for monitored parameters are adjustable through the service port to match site requirements. The alarms and their factory setpoints for the alarms are:

Alarm	Default Setpoint
Overvoltage	A line-to-line voltage is more than 6% above nominal
Undervoltage	A line-to-line or line-to-neutral voltage is 13% below nominal
Neutral Overcurrent	Current exceeds 95% of breaker amps
Ground Overcurrent	Current exceeds 5 amps
Phase Overcurrent Warning	Current exceeds 75% of breaker amps
Phase Overcurrent	Current exceeds 80% of breaker amps
Summary Alarm	

**Summary Alarm-** Detects and annunciates upon occurrence of any alarm.

**Summary Alarm Contacts-**The Vertiv™ Liebert® CPM has a Form C (1 NO and 1 NC) summary alarm contacts for remote alarm status. The contacts are rated at 24VAC @ 1A. The contacts change state when any alarm or warning occurs and reset when the alarm is cleared.

To facilitate troubleshooting, all alarms are stored in non-volatile memory to protect against erasure by a power outage. Alarms must be manually reset after alarm conditions are corrected.

**Communication-**Remote communication and summary alarm connections are available.

A Vertiv™ Liebert® IntelliSlot card provides connection to a Building Management System (BMS) or to Vertiv™ Liebert® SiteScan™ monitoring using RS485, see **Figure 2.9** on page 15 . The following cards are available:

- IS-WEBS card for SNMP/Web output to Ethernet LAN
- IS-485S card for Modbus 485 output using a two-wire connection
- IS-IPBMS card for Modbus IP output using an RJ-45 connection
- IS-UNITY-DP card for HTTP/HTTPS, Vertiv Protocol, e-mail, SMS, SNMP v1/v2c/v3, BACnet IP/MSTP and Modbus TCP/RTU output using a serial RS-485 two-wire connection

Check the Liebert® IntelliSlot ports on the back of the door to determine which cards are supplied; more than one card might be supplied. See **Figure 2.7** on page 12 , **Figure 2.8** on page 13 and **Figure 5.1** on the facing page for location and connection details.



**WARNING! Risk of electric shock. Can cause personal injury or death.**  
Verify that the panelboard voltage (power) circuit is de-energized and locked out before installing branch breakers and cables.

## 5.5 Vertiv™ Liebert® LDMF-Optional

If the Vertiv™ Liebert® RX is equipped with the optional Liebert® LDMF, the monitoring unit is On whenever power is supplied to the unit. The Liebert® LDMF is factory-configured for 1-pole, 20A branch breakers. Alarms, alarm setpoints, circuit breaker names and circuit breaker ratings are all field- adjustable through the DB9 connector (LDMF SETUP port; see **Figure 2.8** on page 13 ).

For more information, refer to [Liebert® LDMF Communication](#) on page 18 for communication options and connections and the Liebert® LDMF User Manual (SL-20200).

The Liebert® LDMF local display allows users to view monitoring information for the panelboard as well as each individual branch circuit breaker. Alarm data can be viewed from the local display for up-to-date breaker status.

Figure 5.1 Vertiv™ Liebert® LDMF local display



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## 6 Maintenance

### 6.1 Repair

Even the most reliable equipment may fail. Vertiv is at your service to assure fast repair of your unit and minimum down-time of your installation.



**WARNING! Risk of electric shock. May cause personal injury or death.**

**Only properly trained and qualified service personnel wearing appropriate safety headgear, gloves, shoes and glasses should perform maintenance on the Vertiv™ Liebert® RX. All voltage sources to the unit must be disconnected before inspecting or cleaning within the cabinet.**

Standard electrical troubleshooting procedures should be used to isolate problems in the unit. If there are questions, don't hesitate to contact Vertiv.

Repair or replacement of standard items, such as circuit breakers and fuses can be either handled by qualified electricians or referred to Vertiv.

Repairs related to the monitoring system should be referred to Vertiv.

To contact Vertiv for information or repair service in the USA, call 1-800-543-2378.

### 6.2 Inspection and Cleaning

Air circulation through the cabinet may cause dust to accumulate on internal components. Cleaning should be done as necessary during electrical inspections.

Annual general system inspections, cleaning and operation checks are recommended to ensure system performance and long service life.



**WARNING! Risk of electric shock. May cause personal injury or death.**

**Only properly trained and qualified service personnel wearing appropriate safety headgear, gloves, shoes and glasses should perform maintenance on the Liebert® RX. All voltage sources to the unit must be disconnected before inspecting or cleaning within the cabinet.**

#### 6.2.1 Inspection Schedule

- It is difficult to establish a schedule for periodic cleaning because conditions vary from site to site. Inspections after the first 24 hours, after 30 days and after 6 months of operation should help determine a pattern for the inspection schedule.
- Electrical connections and component mountings should be inspected after the first 24 hours, after 30 days and after 6 months of operation. Inspections should be conducted annually thereafter.
- Ventilation openings and grilles should be inspected and cleaned every 6 months to one year.
- A complete inspection and operational checkout should be performed annually. This is best done by performing the inspection and startup procedure as detailed in [Inspection and Startup Checklist](#) on page 23.
- Vertiv offers a complete range of preventive maintenance services. These include thorough equipment performance checks and calibration of electronics. Contact Vertiv in the USA (1-800-543-2378) for details.

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