

# Vertiv™ Liebert® APM2 UPS UL EBC VRLA 208/480 V



## Quick Installation Guide

**IMPORTANT:** Before installing, connecting to supply or operating your Vertiv™ Liebert® APM2 UL External Battery Cabinet (EBC) VRLA, refer the Safety and Regulatory Statements sheet. For detailed installation, operation, maintenance, and troubleshooting information, visit the Vertiv™ Liebert® APM2 UPS product page for the SL-71958 Vertiv™ Liebert® APM2 UL EBC User Manual available at [www.Vertiv.com](http://www.Vertiv.com) or use the QR code below.



### Mechanical Installation

#### Inspecting the Liebert® APM2 UL EBC VRLA

Inspect the Liebert® APM2 UL EBC VRLA for damage. If you find any damage, document and photograph all damage and notify your local Vertiv representative.

#### Choosing the Location

There are four types of Liebert® APM2 UPS UL EBC VRLA.

- 208 V and 600 mm, 23.952 in. x 40.133 in. x 78.75 in. (608.4 mm x 1019.4 mm x 2000 mm).
- 208 V and 880 mm, 34.976 in. x 40.149 in. x 78.75 in. (888.4 mm x 1019.8 mm x 2000 mm).
- 480 V and 880 mm, 34.976 in. x 40.149 in. x 78.75 in. (888.4 mm x 1019.8 mm x 2000 mm).
- 480 V and 1200 mm, 47.381 in. x 40.177 in. x 78.75 in. (1203.5 mm x 1020.5 mm x 2000 mm).

Each UL EBC can be equipped with different types of batteries. Install the UPS in a clean, well-ventilated environment with the ambient temperature range of 32 °F to 104 °F (0 °C to 40 °C). For installation and maintenance, 3 ft. (914 mm) clearance is required in the front of the unit. For standard UPS unit configuration with top fans, rear clearance is not required.

If the following options are selected, the rear clearance is modified by the higher the two values.

- **Seismic anchoring: selection:** Up to 5 in. (127 mm) may be required in the rear of the UPS.
- **UPS Front to rear airflow option configuration selection:** At least 20 in. (500 mm) in the rear.

**NOTE:** For UPS front to rear airflow configuration, to permit proper air flow and prevent overheating, do not block or cover the ventilation openings (perforated panels) or blow air down onto the unit.

#### Handling and Unpacking the Unit

Each Liebert® APM2 UL EBC VRLA weighs differently because of its size and built-in battery type. The weight of Liebert® APM2 UL EBC VRLA is approximately between 1398 lbs and 5432 lbs (634 kg and 2464 kg).

The UPS is shipped on a pallet and Liebert® APM2 UL EBC VRLA is shipped with full batteries, Liebert® APM2 UL EBC VRLA needs to be lifted from the pallet by a crane during installation.

Use a forklift or pallet jack to move the palletted Liebert® APM2 UL EBC VRLA as close as possible to the installation location before removing packing material or loosening shipping brackets.

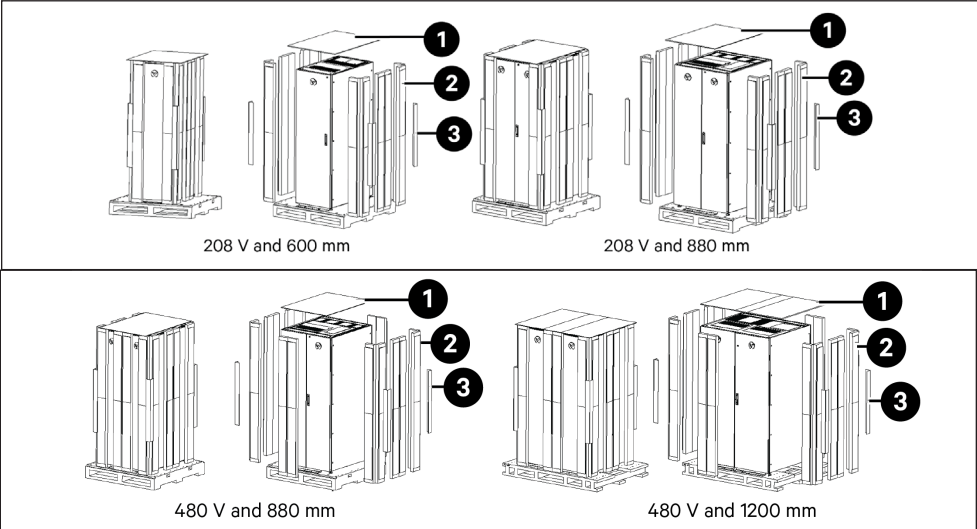
For removing packaging materials, follow the below procedure:

1. Remove the protective packaging, shown in Figure 1.

Locate the accessories package on top of the UPS and set aside.

2. Use a 5/8 in. (16 mm) wrench or socket to remove the shipping brackets from the pallet.
3. Remove the shipping brackets from the front and rear of the UPS.
4. Ensure that the leveling feet are raised to prevent interference when rolling the unit on the casters.
5. Roll the unit down the ramp to the installation location then lower the leveling feet to fix the Liebert® APM2 UL EBC VRLA at the installation location.

Figure 1. Removing the Packaging Material from Liebert® APM2 UL EBC VRLA



Item	Description	Item	Description
1	Top cover	3	Corner Guard
2	Honeycomb board		

Power Cable Wiring

Cables must enter the Vertiv™ Liebert® APM2 from the top.

Power Wiring and Conduit

When connecting wiring, follow the local wiring regulations, and take the environment situation into account.

**NOTE:** The conduit size and wiring method must be in accordance with all local, regional, and national codes and regulations, including NEC ANSI/NFPA 70.

The maximum current for operating modes, the recommended wire sizes, and the recommended power cables and plugs are listed in Tables 1. These values are based upon 86 °F (30 °C) an ambient temperature.

Check for Lockout and Tagout on the Breaker

Make sure that the feeder breakers are open, locked out or tagged out to prevent inadvertent operation by unauthorized personnel.

Hardware Input/Output Connection

Connecting a Single-input Configuration

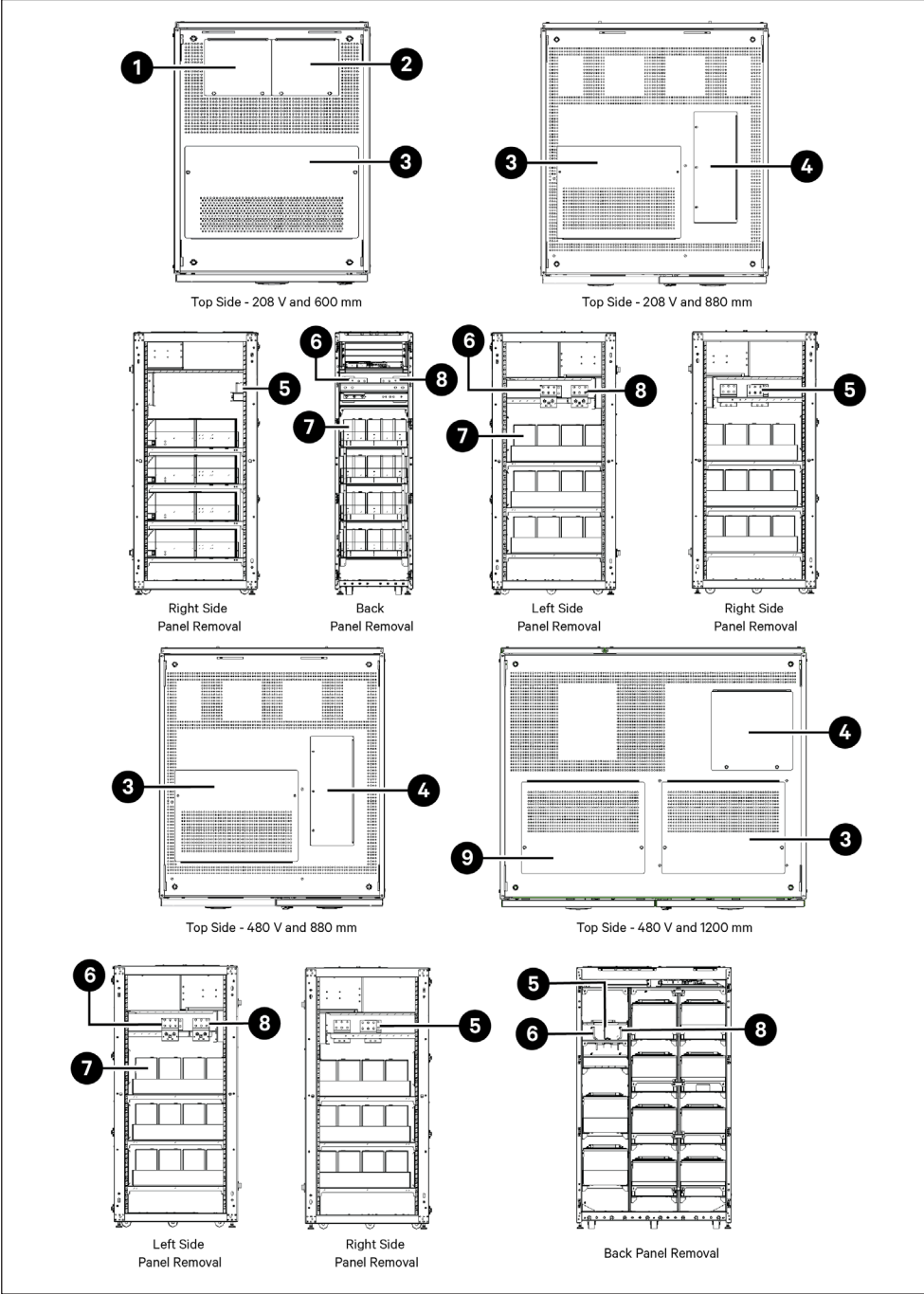
- 1. On the top panel of the UPS, remove the upper conduit entry panel. Punch the holes for the cable conduit. Connect the conduit to the panel, and reinstall the conduit entry panel.
- 2. Remove the lower cover plate to access busbar, as shown in Figure 2.

When EBC is connected to different devices (EBC OR UPS), different Conduits are used.

The wiring connection of Vertiv™ Liebert® APM2 UL EBC VRLA and Vertiv™ Liebert® APM2 UL UPS is as follows. For details, see Appendix.

- 1. Connect BAT+ of Liebert® APM2 UL EBC VRLA to UPS.

Figure 2. Liebert® APM2 UL EBC VRLA



Item	Description	Item	Description
1	Positive power cables conduit cove	6	Negative busbar
2	Negative power cables conduit cover and grounding cables conduit cover	7	Battery
3	Signal line conduit cover	8	Positive busbar
4	Positive power cables, negative power cables, and grounding cables conduit cover	9	Grounding cables conduit cove
5	Ground bus		

**Table 1. Recommended Cross-sectional area for Vertiv™ Liebert® APM2 UL EBC VRLA System**

Liebert® APM2 UL EBC VRLA Model	Liebert® APM2 UL EBC UPS Model	EBC Rated Voltage (V)	Cables	
			Qty.	Size
208 V and 600 mm	60 kVA UPS Frame	288	2	1/0 AWG
	150 kVA UPS Frame		2	400 kcmil
208 V and 880 mm	60 kVA UPS Frame	288	2	1/0 AWG
	150 kVA UPS Frame		2	400 kcmil
480 V and 880 mm	120 kVA UPS Frame	432	2	2/0 AWG
480 V and 1200 mm	120 kVA UPS Frame	480	2	1/0 AWG
	300 kVA UPS Frame		2	500 kcmil
	600 kVA UPS Frame		5	500 kcmil

2. Connect BAT- of Liebert® APM2 UL EBC VRLA to UPS.
3. Connect GROUND of Liebert® APM2 UL EBC VRLA to UPS.
4. Liebert® APM2 UL EBC VRLA lead-acid acquisition module 485 communication RJ45 connects with Liebert® APM2 UL UPS control module X6 board RJ45 or connects another Liebert® APM2 UL EBC VRLA lead-acid acquisition module 485 communication RJ45. Liebert® APM2 UL EBC VRLA lead-acid acquisition module 485 communication DB9 connects another Liebert® APM2 UL EBC VRLA lead-acid acquisition module 485 communication DB9.
5. Liebert® APM2 UL EBC VRLA lead-acid acquisition module backplane X1 board J12 terminal connects with Liebert® APM2 UL 60 kVA 208 V/120 kVA 480 V UPS Frame C2 board J3 terminal 5 and 6 pin or connects Liebert® APM2 UL 150 kVA 208 V/300 kVA 480 V Frame and 600 kVA 480 V UPS Frame control module X6 board J22 terminal 6 pin and X7 board J3 terminal 1 pin. Liebert® APM2 UL EBC VRLA lead-acid acquisition module backplane X1 board J13 terminal connects another

Liebert® APM2 UL EBC VRLA lead-acid acquisition module backplane X1 board J12 terminal. Torque conductor connections to 48 lbs-in. (5.5 Nm).

6. Reinstall the busbar cover plate.

### Connecting cabinets of Liebert® APM2 UL EBC VRLA and UPS

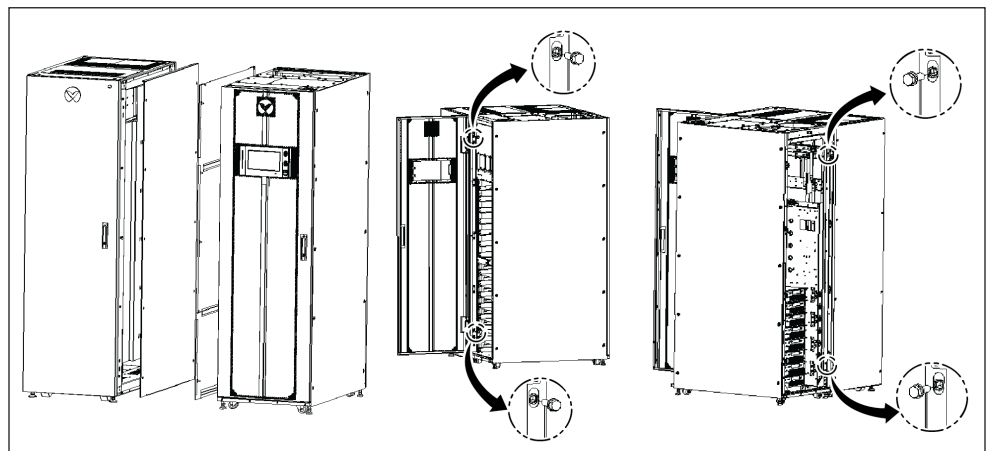
#### Liebert® APM2 UL EBC VRLA 208 V and 600 mm and 60 kVA UPS Frame Connection and Installation

The following are the steps for connecting cabinets. For details, see Figure 3.

1. Remove the right panel of Liebert® APM2 UL EBC VRLA.

2. Remove the left panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

**Figure 3. Liebert® APM2 UL EBC VRLA 208 V and 600 mm and 60 kVA UPS Frame Connection and Installation Diagram**



**Vertiv™ Liebert® APM2 UL EBC VRLA 208 V and 880 mm and 60 kVA UPS Frame Connection and Installation**

The following are the steps for connecting cabinets. For details, see Figure 4.

1. Remove the right panel of Liebert® APM2 UL EBC VRLA.
2. Remove the left panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

**Liebert® APM2 UL EBC VRLA 208 V and 600 mm and 150 kVA 208 V UPS Frame Connection and Installation**

The following are the steps for connecting cabinets. For details, see Figure 5.

1. Remove the right panel of Liebert® APM2 UL EBC VRLA.
2. Remove the left panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.

Figure 4. Liebert® APM2 UL EBC VRLA 208 V and 880 mm and 60 kVA UPS Frame Connection and Installation Diagram

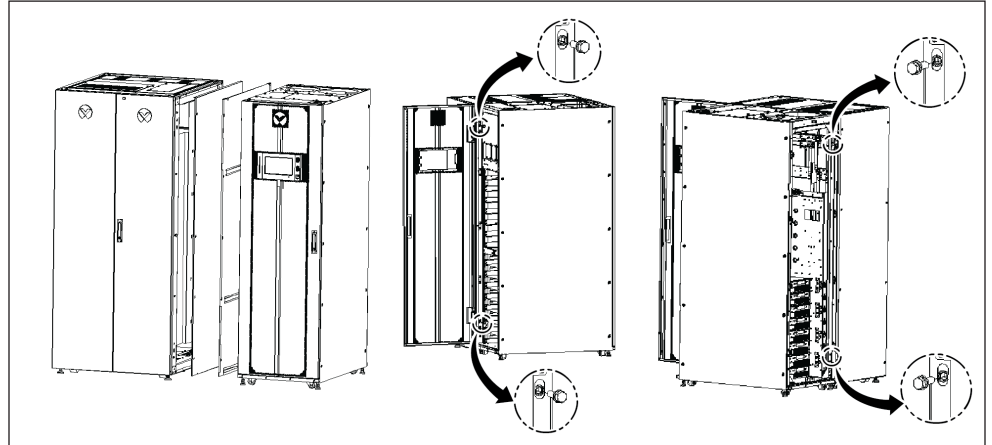
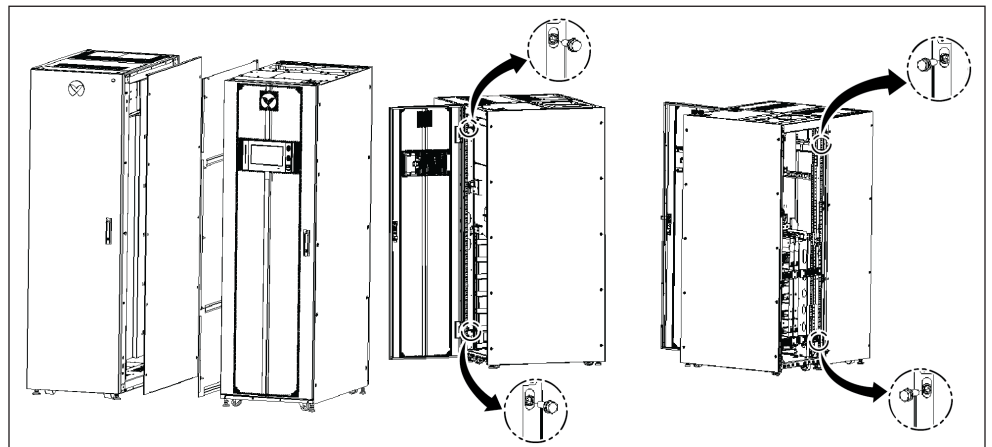


Figure 5. Liebert® APM2 UL EBC VRLA 208 V and 600 mm and 150 kVA 208 V UPS Frame Connection and Installation Diagram



4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

**Liebert® APM2 UL EBC VRLA 208 V and 880 mm and 150 kVA UPS Frame Connection and Installation**

The following are the steps for connecting cabinets. For details, see Figure 6.

1. Remove the right panel of Liebert® APM2 UL EBC VRLA.
2. Remove the left panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.

6. Install the rear panel of the Vertiv™ Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

### Vertiv™ Liebert® APM2 UL EBC VRLA 480 V and 880 mm and 120 kVA 480 V UPS Frame Connection and Installation

The following are the steps for connecting cabinets. For details, see Figure 7.

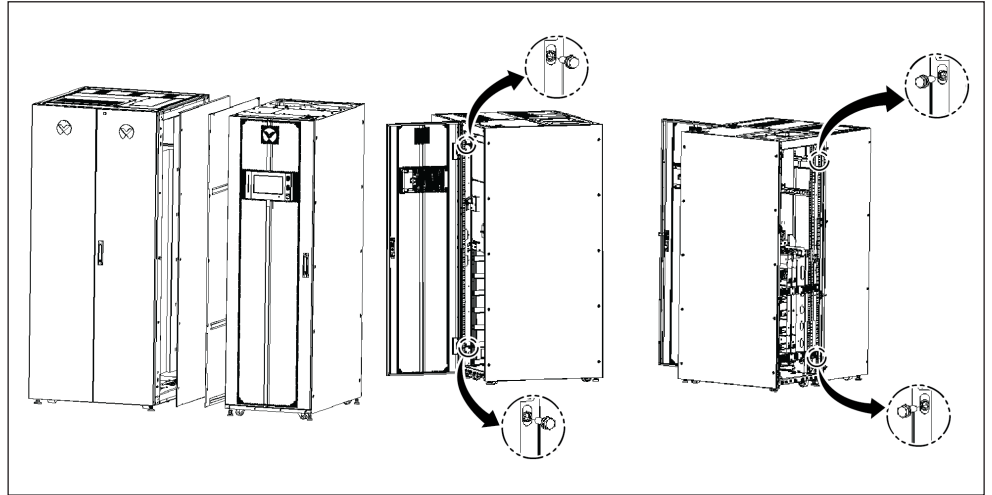
1. Remove the right panel of Liebert® APM2 UL EBC VRLA.
2. Remove the left panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

### Liebert® APM2 UL EBC VRLA 480 V and 1200 mm and 120 kVA 480 V UPS Frame Connection and Installation

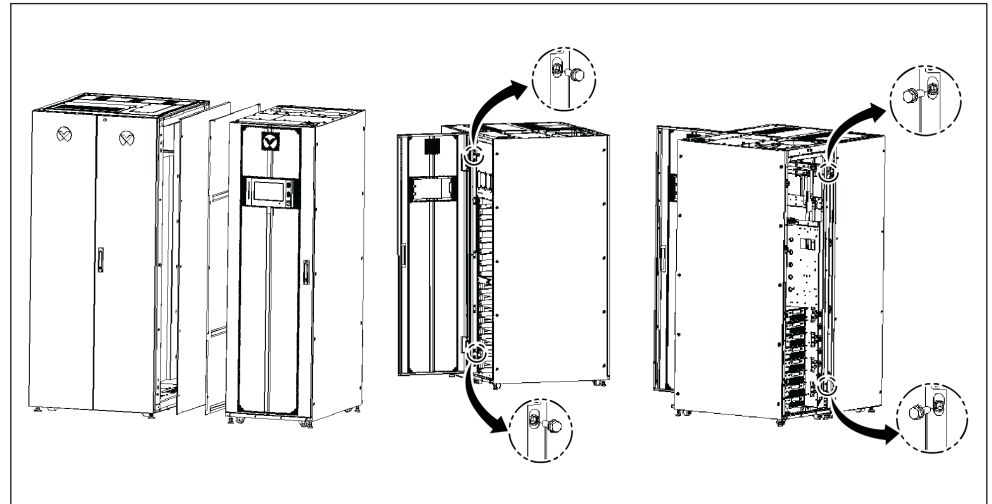
The following are the steps for connecting cabinets. For details, see Figure 8.

1. Remove the right panel of Liebert® APM2 UL EBC VRLA.
2. Remove the left panel of Liebert® APM2 UL UPS.

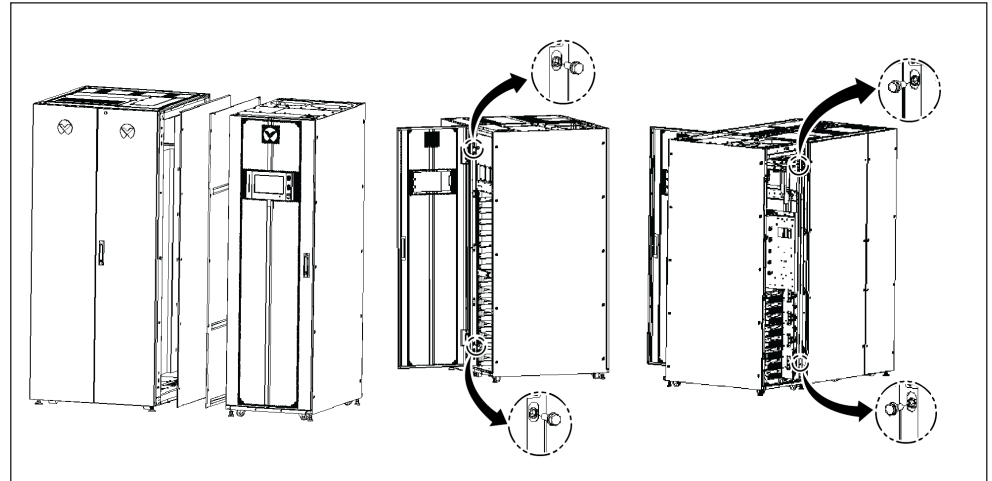
**Figure 6. Liebert® APM2 UL EBC VRLA 208 V and 880 mm and 150 kVA UPS Frame Connection and Installation Diagram**



**Figure 7. Liebert® APM2 UL EBC VRLA 480 V and 880 mm and 120 kVA 480 V UPS Frame Connection and Installation Diagram**



**Figure 8. Liebert® APM2 UL EBC VRLA 480 V and 1200 mm and 120 kVA 480 V UPS Frame Connection and Installation Diagram**





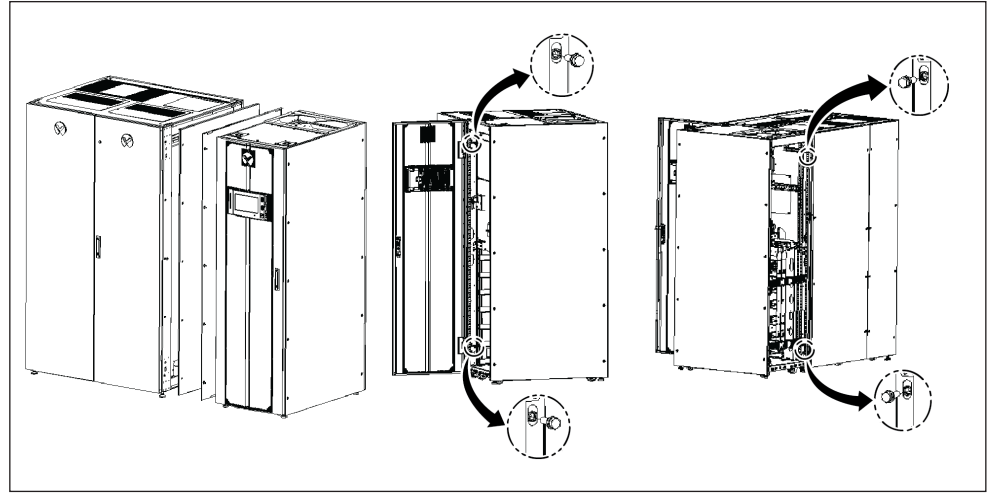
3. After Vertiv™ Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

**Liebert® APM2 UL EBC VRLA  
480 V and 1200 mm and 300 kVA 480 V  
UPS Frame Connection and Installation**

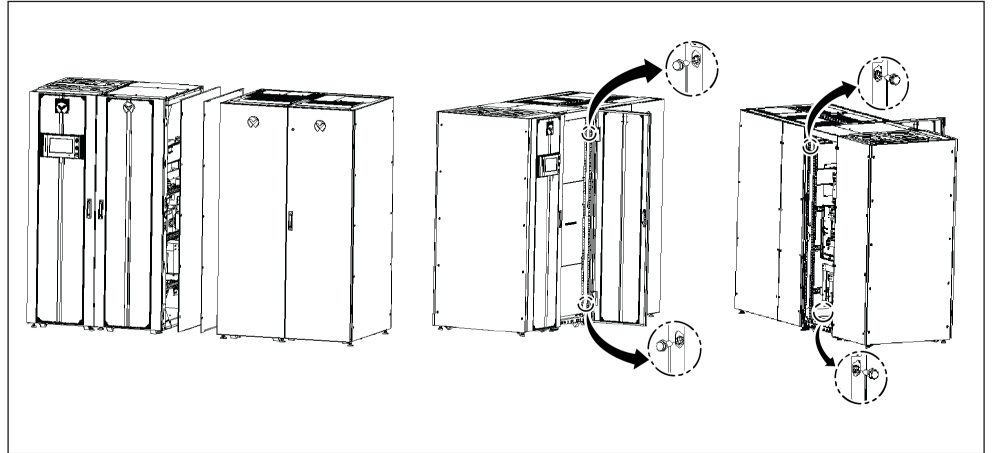
The following are the steps for connecting cabinets. For details, see Figure 9.

1. Remove the right panel of Liebert® APM2 UL EBC VRLA.
2. Remove the left panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

**Figure 9. Liebert® APM2 UL EBC VRLA 480 V and 1200 mm and 300 kVA 480 V UPS  
Frame Connection and Installation Diagram**



**Figure 10. Liebert® APM2 UL EBC VRLA 480 V and 1200 mm and 600 kVA 480 V UPS  
Frame Connection and Installation Diagram**



**Liebert® APM2 UL EBC VRLA  
480 V and 1200 mm and 600 kVA 480 V  
UPS Frame Connection and Installation**

The following are the steps for connecting cabinets. For details, see Figure 10.

1. Remove the left panel of Liebert® APM2 UL EBC VRLA.
2. Remove the right panel of Liebert® APM2 UL UPS.
3. After Liebert® APM2 UL EBC VRLA and UPS are aligned, open the front panel of Liebert® APM2 UL UPS and use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
4. Remove the rear panel of the Liebert® APM2 UL UPS.
5. Use two M10x30 mm screws to connect and fasten Liebert® APM2 UL EBC VRLA and UPS at the top and bottom.
6. Install the rear panel of the Liebert® APM2 UL UPS. Close the front panel of the Liebert® APM2 UL UPS.

## UPS Startup

The Vertiv™ Liebert® APM2 UPS UL EBC VRLA must be completely installed and commissioned before startup by an authorized engineer.

Liebert® APM2 UL EBC VRLA operation steps are as follows.

1. Check the connection cables between Liebert® APM2 UPS UL EBC VRLA and UPS to ensure the wiring is correct.
2. Open the front panel of the Liebert® APM2 UL EBC VRLA.
3. Open the circuit breaker of the Liebert® APM2 UL EBC VRLA.
4. Press the button of Liebert® APM2 UPS UL EBC VRLA lead acid acquisition module.
5. The breaker light of the Liebert® APM2 UL EBC VRLA lead-acid acquisition module turns green, indicating that the lead-acid acquisition board is working properly.
6. Close the front panel of the Liebert® APM2 UL EBC VRLA.
7. Wait for about 30 seconds and check whether the charger and discharger on the Liebert® APM2 UPS UL monitoring screen are working properly and whether there is no fault on the Liebert® APM2 UPS UL monitoring screen. If the charger and discharger are working properly and there is no fault, it means that the Liebert® APM2 UL EBC VRLA has been turned on normally.

Figure 11. Liebert® APM2 UL EBC VRLA Lead-acid Acquisition Module

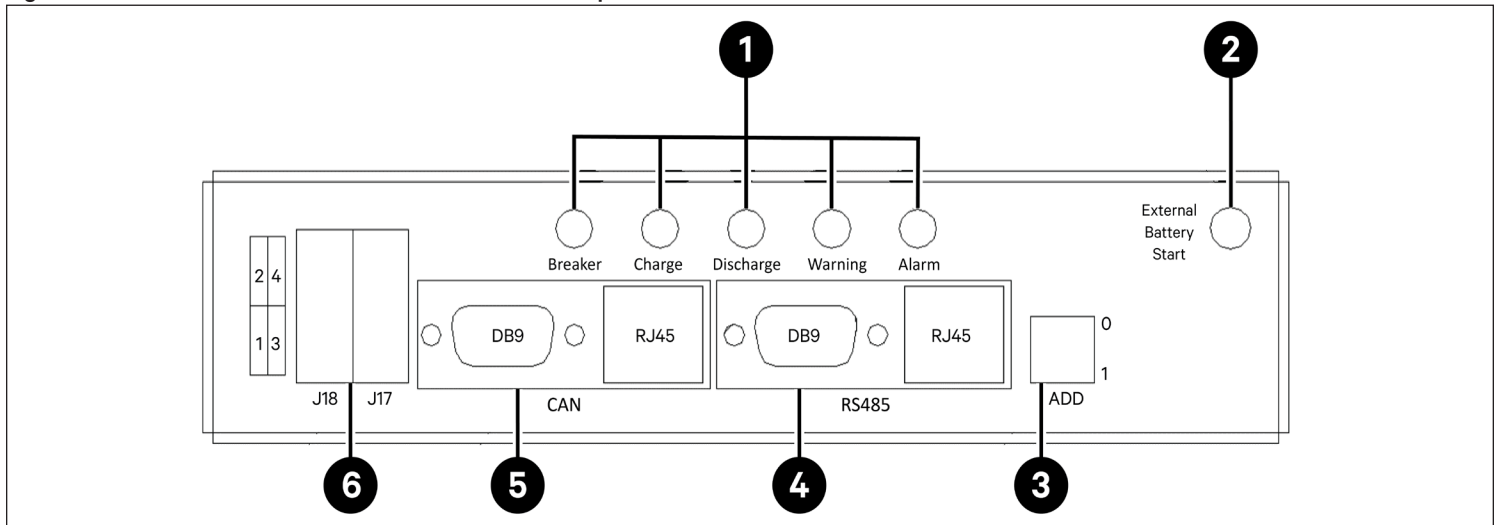
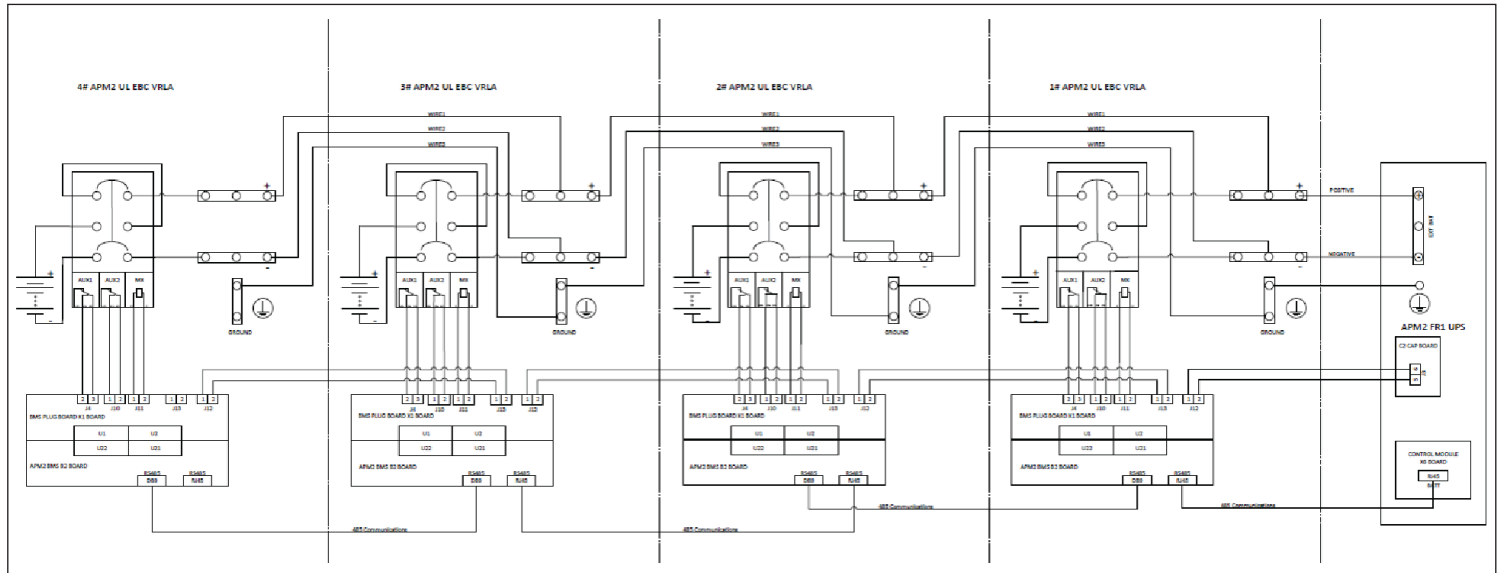


Table 2. Recommended Cross-sectional area for Liebert® APM2 UL EBC VRLA System

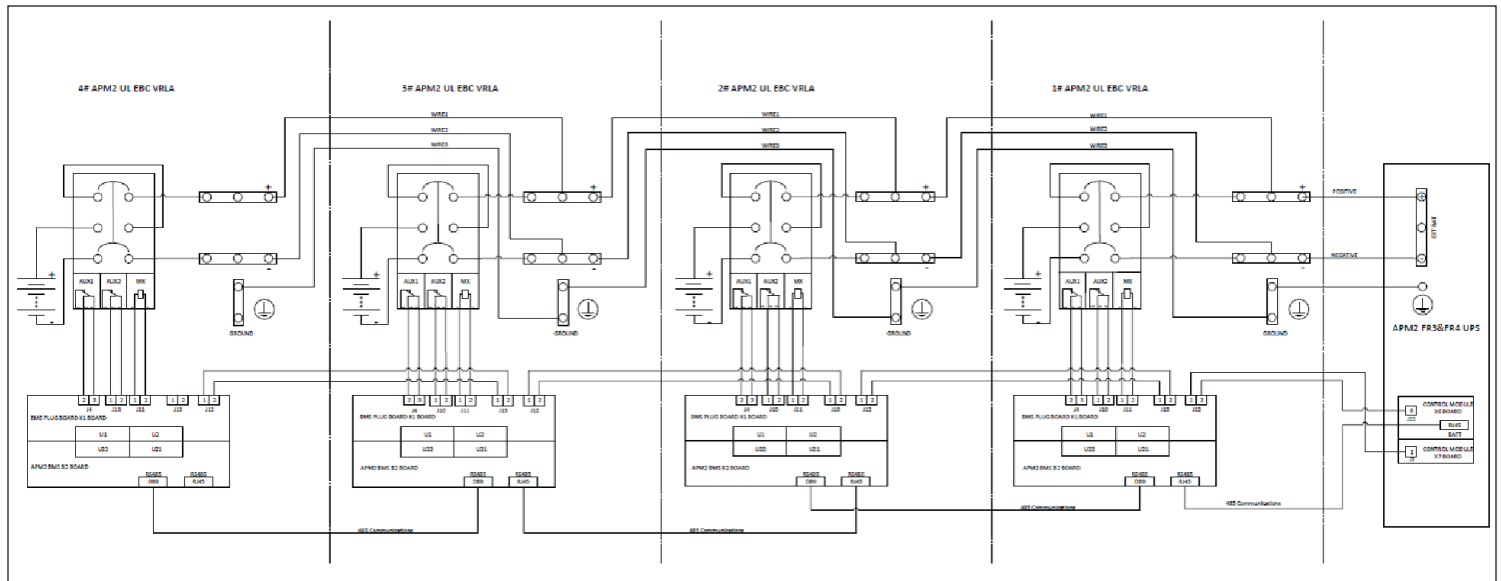
Number	Description	Function
1	BMS indicator light	<b>Breaker light:</b> The light is on, indicating that lead-acid collection board is working normally. <b>Charge and discharge:</b> Illuminates when display function reserved. <b>Warning:</b> Illuminates when system work abnormally. <b>Alarm:</b> Illuminates when system fail.
2	Lead-acid battery management system (BMS) start button	Push the start button and the lead-acid acquisition BMS will operate.
3	DIP switch	UPS identifies the EBC through this DIP switch number: Liebert® APM2 UL EBC 1000 Liebert® APM2 UL EBC 0100 Liebert® APM2 UL EBC 1100 Liebert® APM2 UL EBC 0010
4	RS485 communication	EBC communicates with UPS through RS485.
5	CAN communication	Reserve
6	Dry contact	There are four dry contacts, one for BCB online and the other three for reservation.

## Appendices

### Appendix A.1: Vertiv™ Liebert® APM2 UL EBC VRLA and 60 kVA 208 V/120 kVA 480 V UPS Frame Wiring Diagram



### Appendix A.2: Liebert® APM2 UL EBC VRLA, 150 kVA 208 V/300 kVA 480 V UPS Frame, and 600 kVA UPS Frame Wiring Diagram



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