Vertiv™ Liebert® APM2 UPS UL 10 to 60 kVA 208 V, 20 to 120 kVA 480 V

Quick Installation Guide

IMPORTANT: *Before installing, connecting to supply or operating your Vertiv™ Liebert® APM2 UPS, refer the Safety and Regulatory Statements sheet. For detailed installation, operation, maintenance, and troubleshooting information, visit the Liebert® APM2 UPS product page for the SL-71938 Vertiv™ Liebert® APM2 10 to 120 kVA User Manual available at www.vertiv.com or use the QR code below.*

Mechanical Installation

Inspecting the UPS

Inspect the UPS for damage. If you find any damage, document and photograph all damage and notify your local Vertiv representative.

Choosing the Location

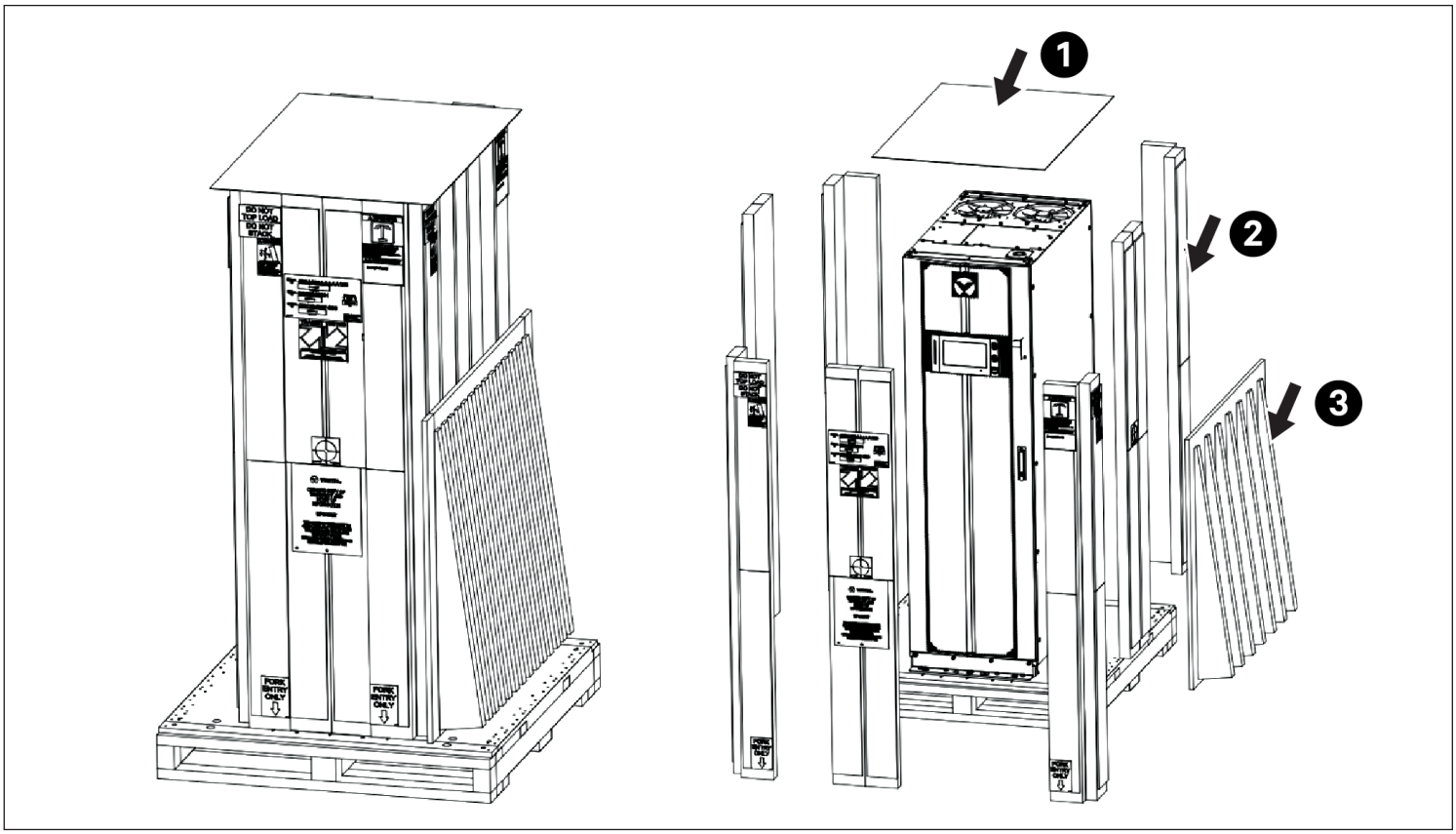
The UPS measures 23.6 in. x 40.5 in. x 78.7 in. (600 mm x 1030 mm x 2000 mm). Install the UPS in a clean, well-ventilated environment with an ambient temperature range of 32 °F to 104 °F (0 °C to 40 °C). For installation and maintenance, minimum 3 ft. (914 mm) clearance is required in the front of the unit. For standard 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 anchor 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.*

Figure 1. Removing the Packaging Material



Item	Description	Item	Description
1	Top cover	3	Unloading ramp
2	Honeycomb board		

Handling and Unpacking the Unit

The unit weighs up to 1102.31 lbs (500 kg), depending on the options selected. The UPS is shipped on a pallet and is equipped with casters that permit two or more people to roll it off the pallet for installation. Use a forklift or pallet jack to move the palleted UPS as close as possible to the installation location before removing packing material or loosening shipping brackets.

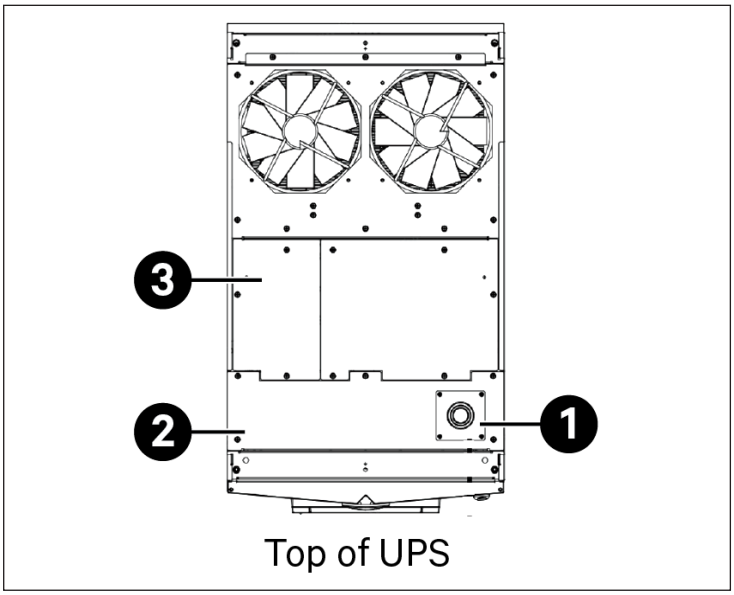
For removing packaging materials, follow the below procedure:

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 UPS at the installation location.

Figure 2. Cable Entry Location



Item	Description
1	Signal wire knockout plate
2	AC power cable entry plate
3	DC power cable entry plate

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 and 2. 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.
3. Do not remove the factory installed single-input jumpers from rectifier input and BIB for single-input configured UPS.

Make the input connections between the upstream feeder panel and the input terminal as mentioned below:

- Phase A to mA
- Phase B to mB
- Phase C to mC
- Neutral bus to N (for 4-wire installation)
- Ground cable to PE

Make the output connections from the UPS output busbar to the downstream distribution panel main lug breaker:

- oA to Phase A
- oB to Phase B
- oC to Phase C
- oN to neutral bus (for 4-wire installation)
- PE to ground bus

Torque phase conductor connections are up to 50 lb-in (5.7 Nm). Neutral and ground conductor connections are up to 126 lb-in (14.4 Nm).

4. Reinstall the busbar cover plate.

Connecting a Dual-input Configuration

1. On the rear 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.
3. If present, remove the factory installed single-input jumpers from rectifier input and bypass input busbars for dual-input configured UPS.

Make the connections between the upstream feeder panel and the main/rectifier input busbar as mentioned below:

- Phase A to mA
- Phase B to mB
- Phase C to mC
- Neutral to mN
- Ground cable PE

Make the connections between the upstream feeder panel and the bypass input busbar as mentioned below:

- Phase A to bA
- Phase B to bB
- Phase C to bC
- Neutral to mN
- Ground cable to PE

Table 1. Recommended Cross-sectional Area (CSA) for Vertiv™ Liebert® APM2 10 to 60 kVA 208 V 4-Wire System

Model (kVA)	Voltage (V)	Input		Output		Bypass		Neutral/Ground		Battery	
		Qty.	Size (AWG)	Qty.	Size (AWG)	Qty.	Size (AWG)	Qty.	Size (AWG)	Qty.	Size (AWG)
10	208	2	8	2	12	2	12	1	4	2	10
15	208	2	6	2	8	2	8	1	4	2	6
20	208	2	4	2	6	2	6	1	4	2	4
25	208	2	3	2	6	2	6	1	4	2	3
30	208	2	3	2	4	2	4	1	4	2	2
40	208	2	1	2	3	2	3	1	4	2	1/0
45	208	2	1/0	2	2	2	2	1	4	2	2/0
50	208	2	2/0	2	1	2	1	1	4	2	3/0
60	208	3	3/0	2	1/0	2	1/0	1	4	2	4/0

Table 2. Recommended CSA for Liebert® APM2 20 to 120 kVA 480 V 4-Wire System

Model (kVA)	Voltage (V)	Input		Output		Bypass		Neutral/Ground		Battery	
		Qty.	Size (AWG)	Qty.	Size (AWG)	Qty.	Size (AWG)	Qty.	Size (AWG)	Qty.	Size (AWG)
20	480	2	8	2	12	2	12	1	4	2	8
30	480	2	8	2	10	2	10	1	4	2	6
40	480	2	6	2	6	2	6	1	4	2	4
50	480	2	4	2	6	2	6	1	4	2	3
60	480	2	3	2	6	2	6	1	4	2	2
80	480	2	2	2	3	2	3	1	4	2	1/0
90	480	2	1	2	2	2	2	1	4	2	2/0
100	480	2	1	2	2	2	2	1	4	2	2/0
120	480	3	1/0	2	1	2	1	1	4	2	4/0

Make the following output connections from the UPS output terminal to the downstream distribution panel main lug breaker as mentioned below:

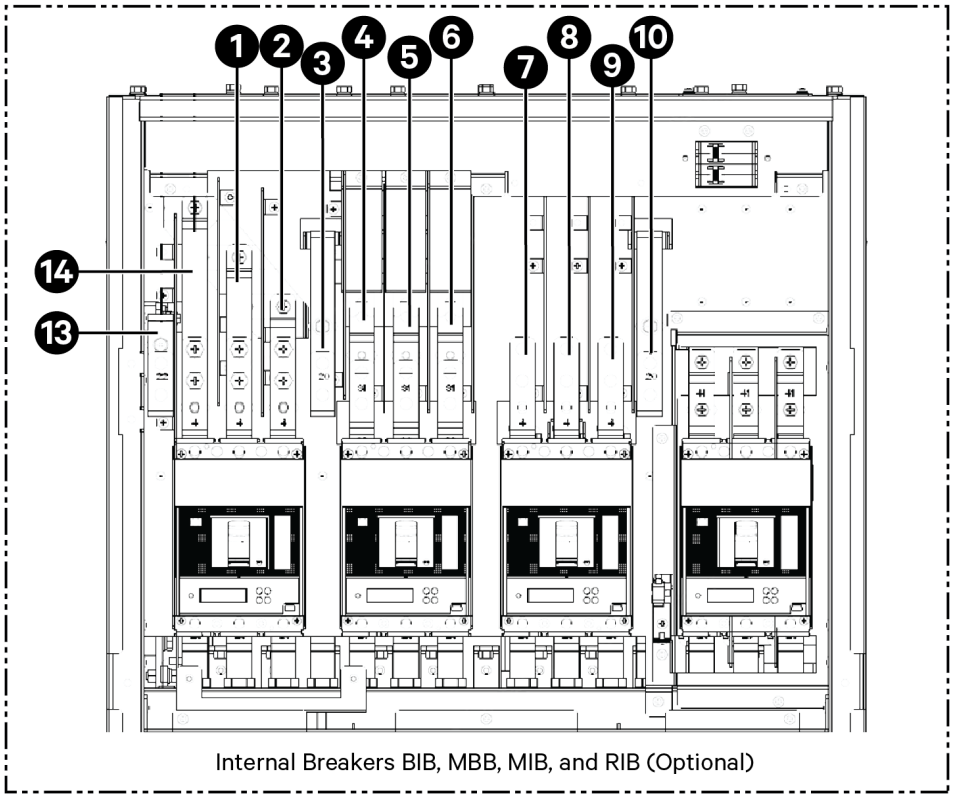
- oA to Phase A
- oB to Phase B
- oC to Phase C
- oN to neutral bus
- PE to ground bus

Torque phase conductor connections are up to 177 lb-in (20 Nm). Neutral and ground conductor connections are up to to 177 lb-in (20 Nm).

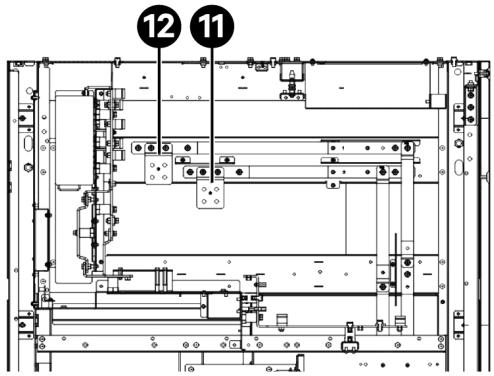
4. Reinstall the busbar cover plate.

NOTE: *Neutral line is not required in 3-wire system.*

Figure 3. Cable Connection Terminals

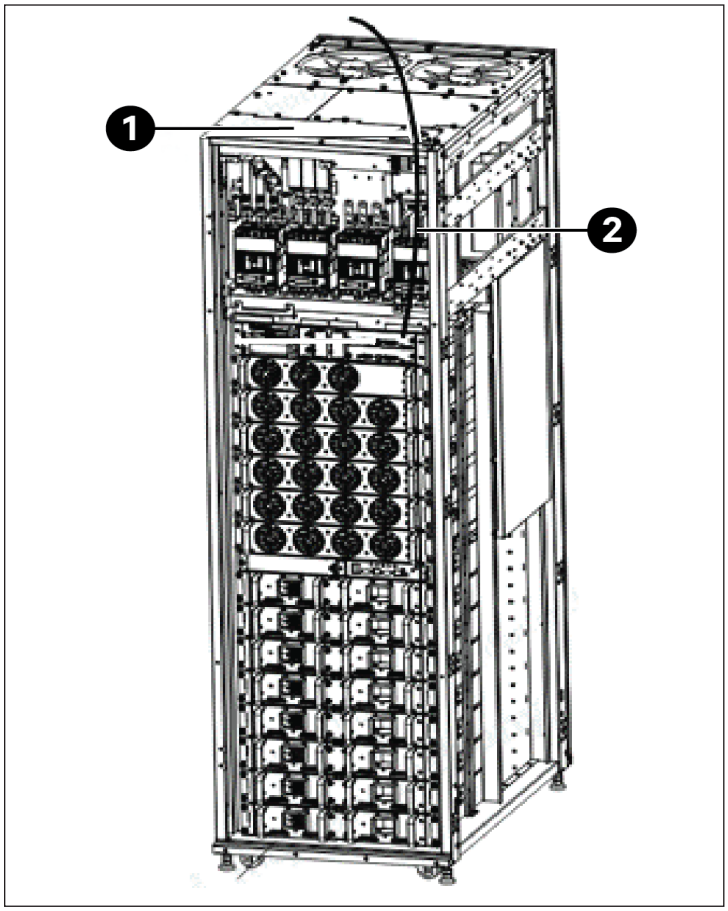


Internal Breakers BIB, MBB, MIB, and RIB (Optional)



Item	Description	Item	Description	Item	Description	Item	Description	Item	Description
1	mB	4	bA	7	oA	10	oN	13	mN
2	mC	5	bB	8	oB	11	BAT-	14	mA
3	mN	6	bC	9	oC	12	BAT+		

Figure 4. Wiring Route



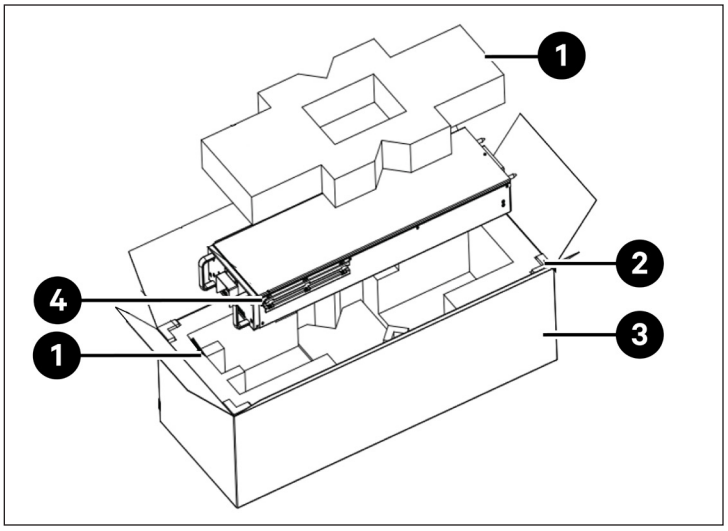
Item	Description
1	Power cable through the top cabinet knockout hole
2	Signal cable through the top cabinet knockout hole

Unpacking and Installation of Lead-acid Battery Module

The installation steps of the built-in lead-acid battery module are as follows, and see Figure 5 for more details.

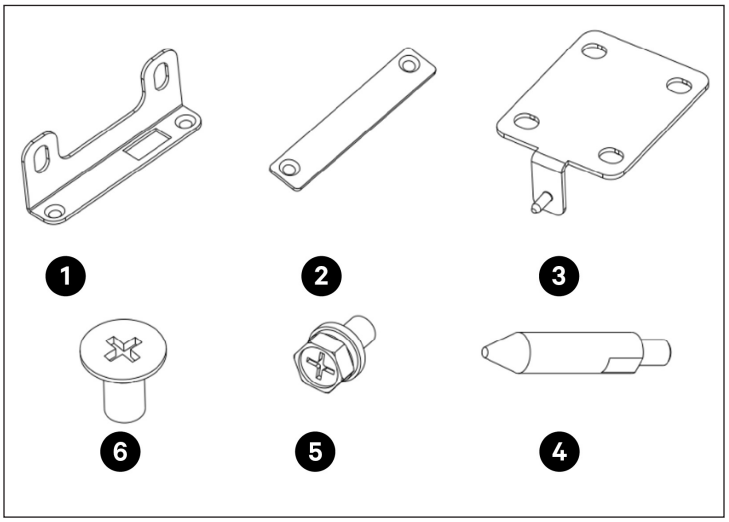
1. Take out the battery module and the accessory bag. The accessory bag contains screws, baffles, and connecting pieces.
2. Two modules per string 208 V or Four modules per string 480/400 V. Install two lead-acid battery module in each battery shelf. Install the mounting ears to the left and right sides of the battery module. If the module is installed on the left side of the rack, install the mounting ears on the left side and the brackets on the right side. If the module is installed on the right side of the rack, install the mounting ear on the right side and the bracket on the left side. Use two M4 screws to secure the mounting ears to the UPS frame.

Figure 5. Unpacking of Lead-acid Battery



Item	Description
1	EPE Cushion
2	Wooden corner
3	Carboard box
4	Plastic bag and desiccant

Figure 6. Hardware Battery Attachment



Item	Description	Quantity
1	Mounting bracket (side)	1
2	Mounting bracket	1
3	Mounting bracket (middle)	1
4	Alignment pin (rear)	2
5	M6 x 12 screw	6
6	M6 x 8 screw	4

3. Install the two guide pins into rear of the battery module.
4. Install the battery module into the cabinet along the guide grooves on the left and right sides of the cabinet.

NOTE: *Install battery modules starting from the lowest shelf to the highest shelf.*

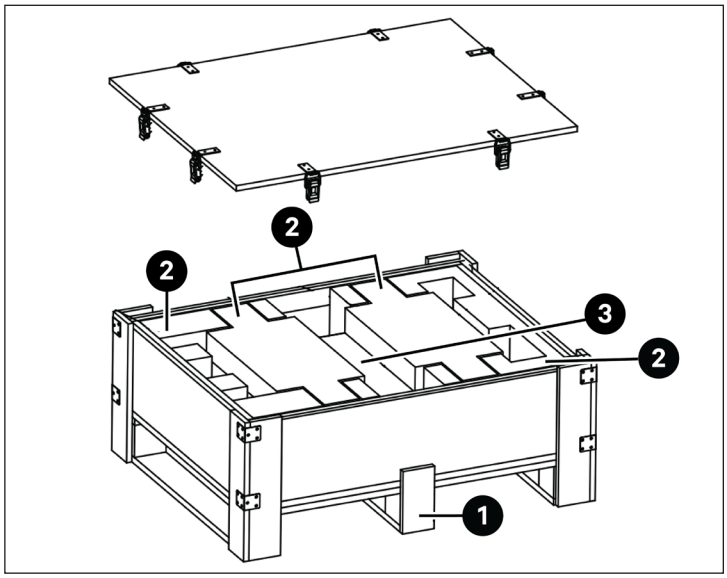
5. Take out the connection piece from the accessory bag, fasten it with four M6 screws. Fasten the mounting ears of the two modules to the cabinet with four M6 screws.

Unpacking and Installation of Lithium-ion Battery Module

The installation steps of the built-in lithium-ion battery module are as follows, and see Figure 6 for more details.

1. Take out the battery module and the accessory bag. The accessory bag contains screws, baffles, and connecting pieces.
2. One lithium module for 208 V or Two for 480/400 V. Install one lithium-ion battery module in each battery shelf. Install the mounting ears to the left and right sides of the battery module. Use four M4 screws to secure the mounting ears to the UPS frame.
3. Install the four guide pins into rear of the battery module.

Figure 7. Unpacking of Lithium-ion Battery



Item	Description
1	Wooden crate
2	EPE cushion
3	Plastic bag and disiccant

4. Install the battery module into the cabinet along the guide grooves on the left and right sides of the cabinet.

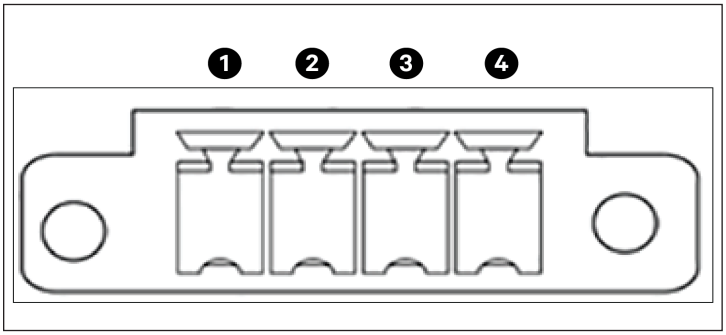
NOTE: *Install battery modules starting from the lowest shelf to the highest shelf.*

Remote Emergency Power Off Port

If a remote emergency power off (REPO) connection is not required, leave the factory installed jumper between pins 1 and 2 on the REPO busbar.

If using a REPO connection, refer to the detailed installation steps in the SL-71938 Vertiv™ Liebert® APM2 10 to 120 kVA User Manual available at www.vertiv.com.

Figure 8. REPO Port



Pin	Name	Description
1	EPO-NC	EPO activated when opened to Pin 2
2	+ 12 V	EPO activated when opened to Pin 1
3	+ 12 V	EPO activated when shorted to Pin 4
4	EPO-NO	EPO activated when shorted to Pin 3

UPS Startup

The audible alarm sounds at various points during operation. The alarm canceled at any time by pressing the Silence On/ Off key.

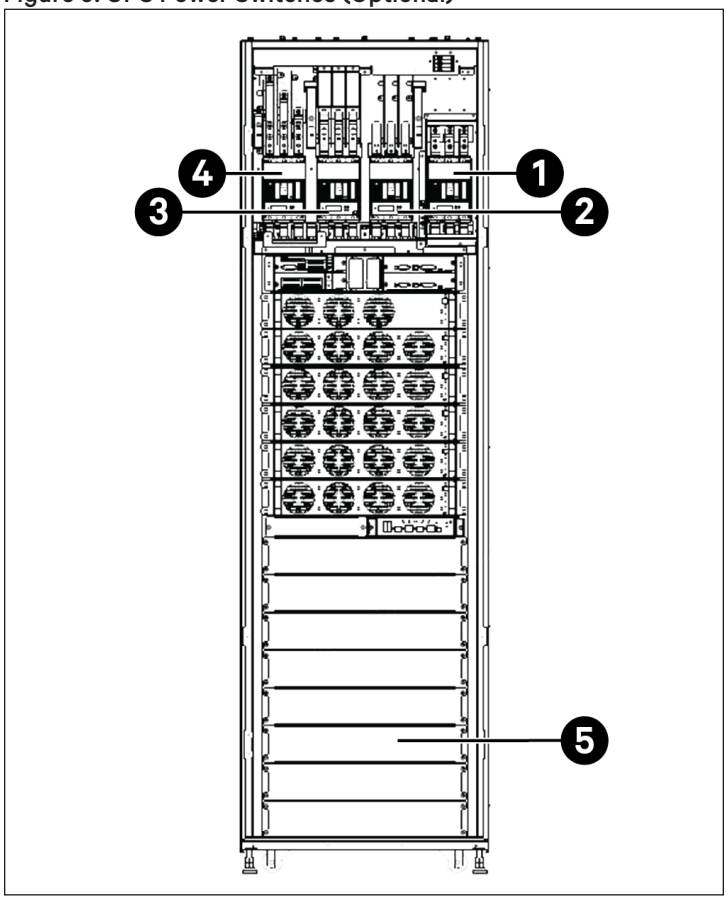
The Vertiv™ Liebert® APM2 UPS must be completely installed and commissioned before startup by an authorized engineer.

After an external power supply switch closed, the UPS can be started.

To start the UPS from a fully powered down condition, follow the below procedure:

1. Open the front panel of the UPS.
2. Verify that the maintenance bypass breaker (MBB) is open.
3. Close the external feeder breaker to the UPS.
4. Ensure that the input voltage, frequency, and phase rotation are normal.

Figure 9. UPS Power Switches (Optional)



Item	Description
1	Maintenance bypass breaker (MBB)
2	Maintenance isolation breaker (MIB)
3	Bypass input breaker (BIB)
4	Rectifier input breaker (RIB)
5	Battery Section

5. In the following order, close these switches MIB, BIB, RIB, and all external breakers of the UPS.
6. Wait for 25 seconds, touch the LOG IN icon to enter the system by entering the correct password.

NOTE: *Default password is 1234.*

7. When the rectifier start process is finished, close the battery circuit breaker (BCB).

Now, the system is powered On, and system in bypass mode.

To transfer the UPS from bypass mode to normal mode on inverter, follow the below procedure:

1. Touch the operate tab on the global human machine interface, the unit operations screen will open.
2. Touch the On next to the Inverter On as shown in Figure 10. The inverter start a self-test and synchronization screen will open.
3. The UPS will transfer from bypass mode to normal mode on inverter as shown in Figure 10.
4. Startup is finished.

Figure 10. Log In Screen Overview

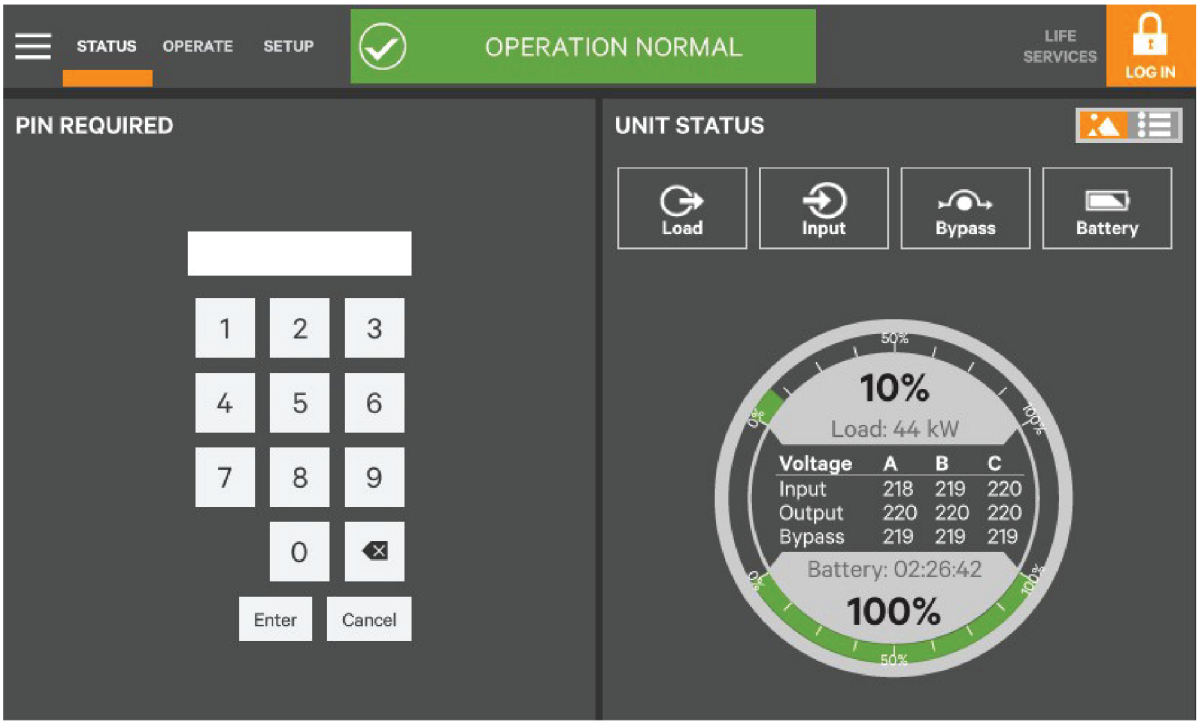


Figure 11. Unit Operations Screen

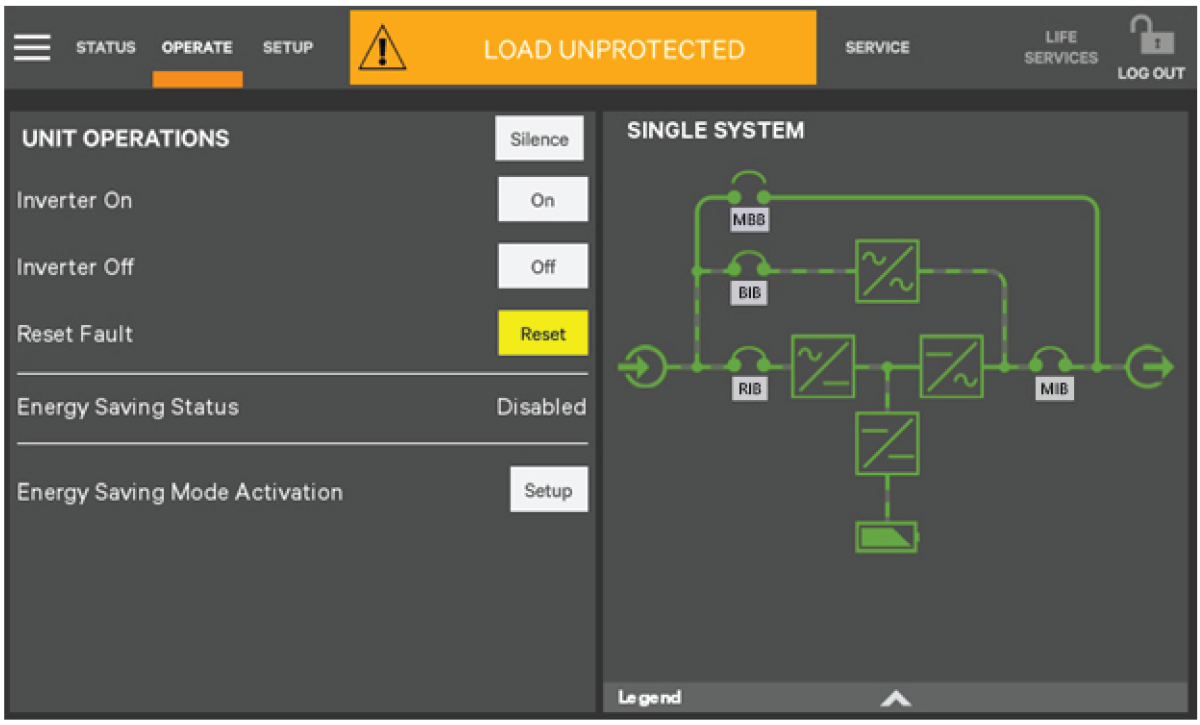
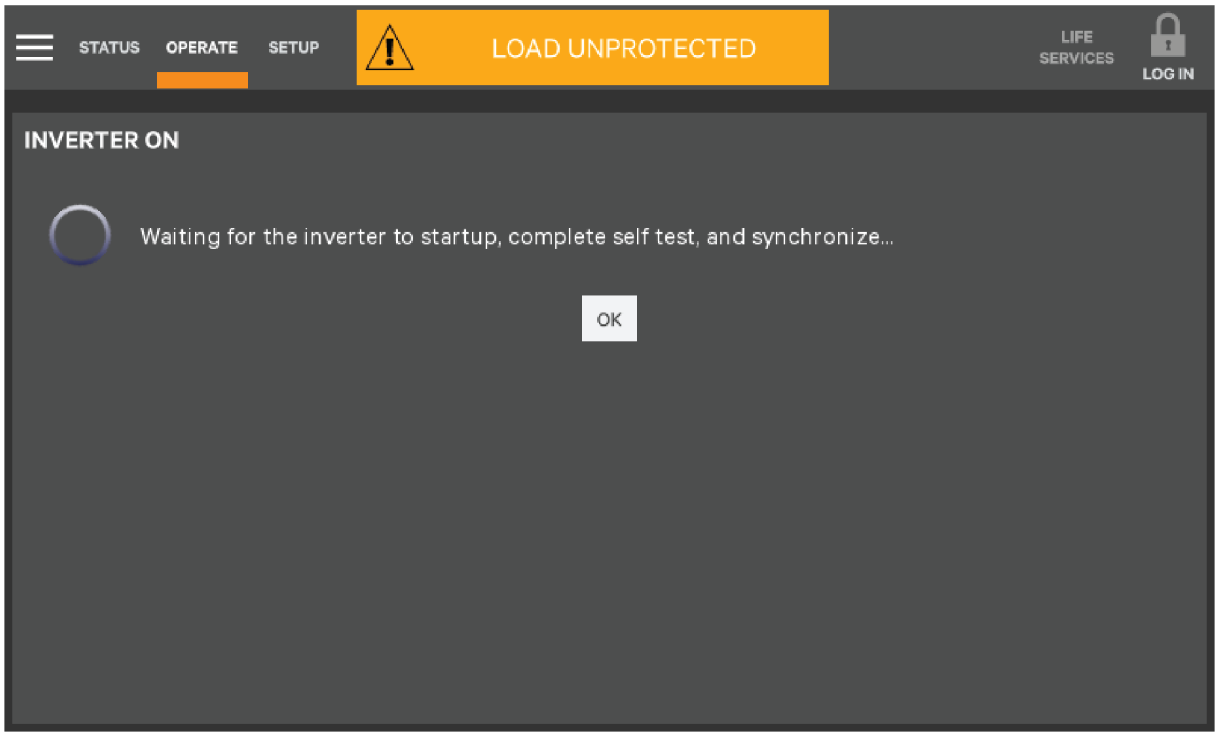


Figure 12. Inverter Self-Test and Synchronization



To contact Vertiv Technical Support: visit www.Vertiv.com