



# Liebert<sup>®</sup> ITA2

## Installer/User Guide

8 - 10kVA, 60Hz, 208/220V, Three-Phase UPS

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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.

# TABLE OF CONTENTS

<b>Important Safety Information</b> .....	<b>1</b>
<b>1 Product Description</b> .....	<b>3</b>
1.1 Front-panel Components .....	3
1.2 Rear Panel Components .....	4
1.3 UPS States and Operating Modes .....	5
1.3.1 Normal Mode .....	6
1.3.2 Battery Mode .....	7
1.3.3 Bypass Mode .....	8
1.3.4 Auto Restart Mode .....	9
1.3.5 Fault State .....	9
1.3.6 Maintenance Bypass Mode .....	9
1.3.7 Start up on Bypass Mode .....	9
<b>2 Installation</b> .....	<b>11</b>
2.1 Pre-Installation Preparation .....	11
2.1.1 Environment of Installation Area .....	11
2.1.2 Installation Clearances .....	12
2.1.3 Installation Tools .....	12
2.1.4 Storage .....	13
2.1.5 External Protective Devices .....	13
2.2 Equipment Handling and Unpacking .....	14
2.3 Tower Installation .....	14
2.4 Rack Installation .....	16
2.5 Connecting Power Cables .....	18
2.5.1 Connecting a Single-Input Configuration .....	19
2.5.2 Connecting a Dual-input Configuration .....	22
2.6 Connecting a Single Battery Cabinet System .....	23
2.6.1 Connecting the Cables .....	23
2.7 Connecting Additional Battery Cabinet Systems .....	32
2.8 Communication Connections .....	36
2.8.1 Liebert IntelliSlot Ports .....	36
2.8.2 REPO Connection .....	37
2.8.3 Dry Contact Connections .....	38
2.8.4 Connecting USB Communication Cables .....	39
2.9 Connecting Serial Port Communication Cables .....	39
2.9.1 Connecting Multi-Function Port (RJ-45) .....	40
<b>3 Operation and Display Panel</b> .....	<b>41</b>
3.1 LED Indicators .....	42
3.2 Audible Alarm (Buzzer) .....	42

- 3.3 LCD Menu and Screens ..... 43
  - 3.3.1 Startup and UPS Mimic Screens ..... 44
  - 3.3.2 Main Menu ..... 44
- 3.4 Editing Display and Operation Settings ..... 47
  - 3.4.1 Changing the Password ..... 50
  - 3.4.2 Selecting the Display Language ..... 50
  - 3.4.3 Setting the Date and Time ..... 50
- 4 Operating the UPS ..... 53**
  - 4.1 Silencing the Audible Alarm ..... 53
  - 4.2 UPS Startup ..... 53
  - 4.3 Transferring from Normal (Inverter) to Bypass Mode ..... 54
  - 4.4 Transferring from Bypass to Normal (Inverter) Mode ..... 55
  - 4.5 Transferring to Maintenance Bypass Mode ..... 56
  - 4.6 Transferring from Maintenance Bypass to Normal Mode ..... 56
  - 4.7 Remote Emergency Power Off (REPO) ..... 57
- 5 Maintenance ..... 59**
  - 5.1 Cleaning the UPS ..... 59
  - 5.2 Routine Maintenance ..... 59
- 6 Specifications ..... 61**
  - 6.1 Standard Battery Backup Time with a Single UPS ..... 63
- Appendices ..... 67**
  - Appendix A: UPS Prompts and Alarms ..... 67

# Important Safety Information

**IMPORTANT!** This manual contains important safety instructions that must be followed during the installation and maintenance of the UPS and batteries. Read this manual thoroughly and the safety and regulatory information, available at <https://www.vertiv.com/ComplianceRegulatoryInfo>, before attempting to install, connect to supply, or operate this UPS.

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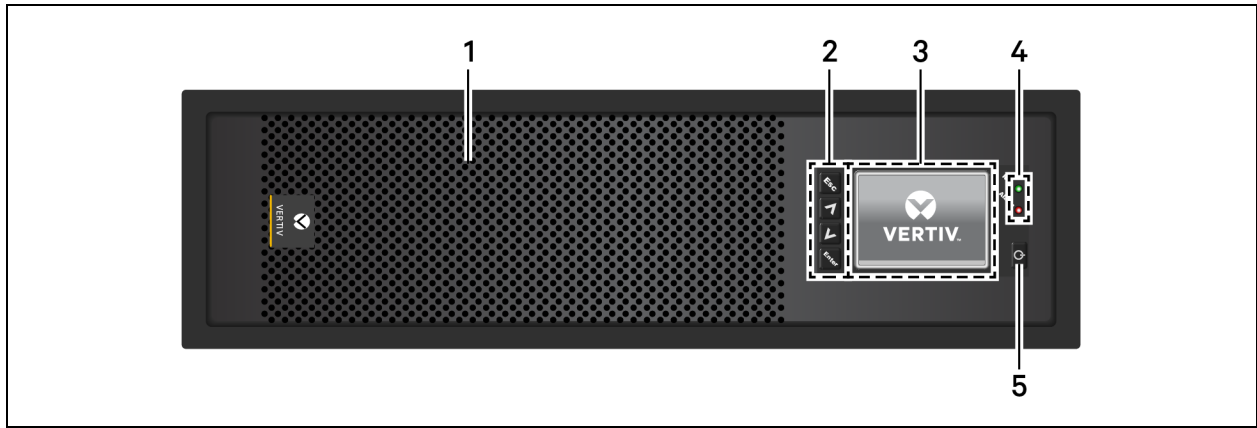
# 1 Product Description

The Vertiv™ Liebert® ITA2 uninterruptible power system (UPS) is an intelligent, online UPS with sine wave output. The UPS offers reliable, high-quality AC power to small-scale computer centers, networks, communication systems, automatic control systems, and similar sensitive electronic equipment.

## 1.1 Front-panel Components

The front panel of the UPS provides ventilation holes and an operation/display panel with LED indicators and function keys.

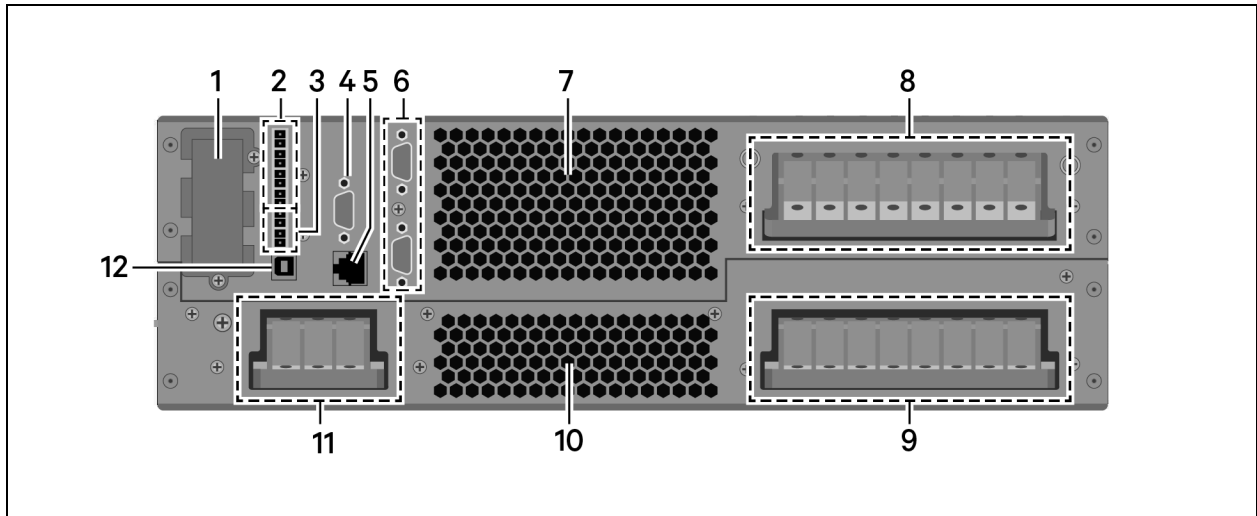
Figure 1.1 Liebert® ITA2 UPS



Item	Description
1	Ventilation holes
2	Menu keys, see <b>1.1</b> above .
3	LCD panel. See <a href="#">Operation and Display Panel</a> on page 41 .
4	Run/Alarm indicator LEDs, see <a href="#">LED Indicators</a> on page 42 .
5	Power button, see <b>1.1</b> above .

## 1.2 Rear Panel Components

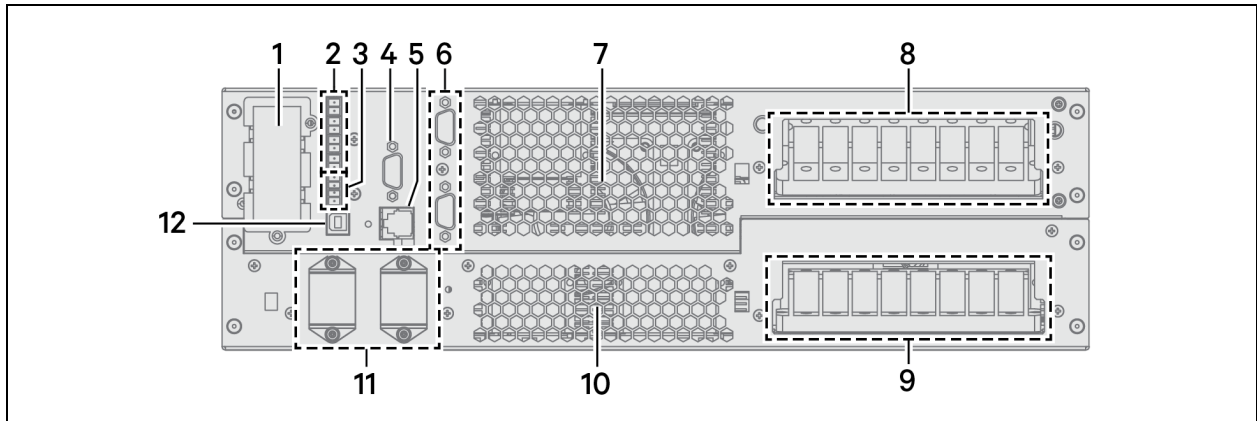
Figure 1.2 UPS Rear Panel with Terminal Block Battery Connectors



Item	Description
1	Vertiv™ Liebert® IntelliSlot™ port
2	Dry contact port
3	REPO port
4	RS-232 port
5	Multi-function port
6	Parallel/LBS ports
7	Ventilation holes
8	AC output terminals
9	AC input terminals
10	Ventilation holes
11	Battery input terminals
12	USB port



Figure 1.3 UPS Rear Panel with Plug-n-Play Battery Connectors



Item	Description
1	Vertiv™Liebert® IntelliSlot™ port
2	Dry contact port
3	REPO port
4	RS-232 port
5	Multi-function port
6	Parallel/LBS ports
7	Ventilation holes
8	AC output terminals
9	AC input terminals
10	Ventilation holes
11	Battery-connector ports
12	USB port

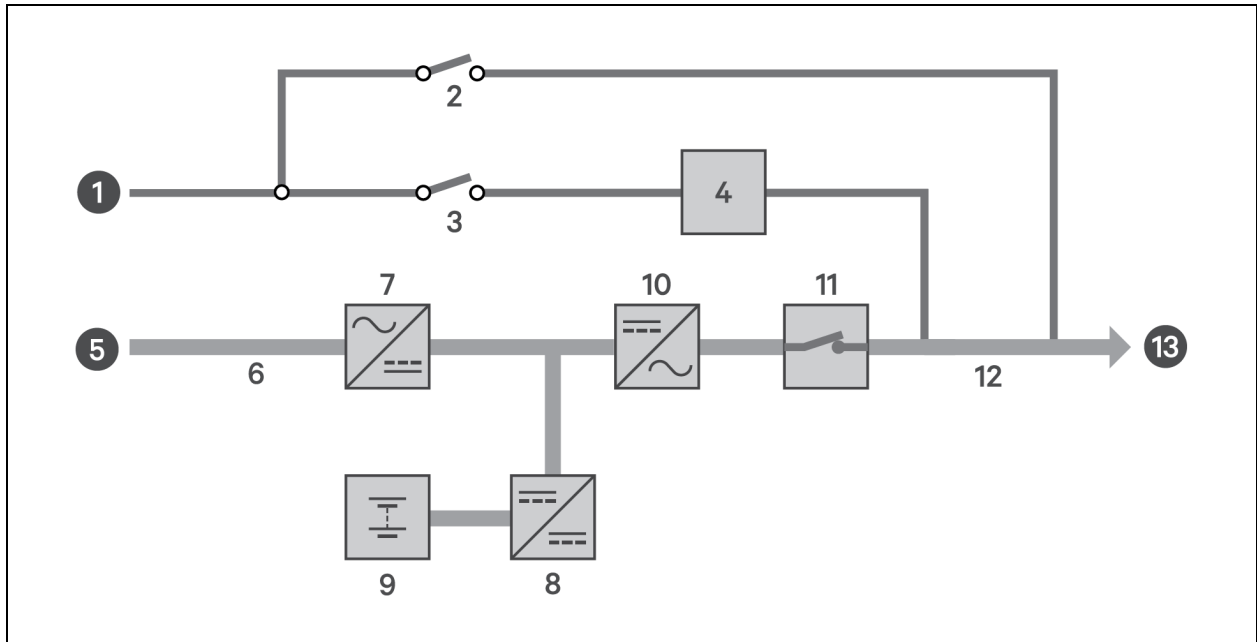
## 1.3 UPS States and Operating Modes

**NOTE:** See **Table 3.2** on page 42 , for description of the run indicator and alarm indicator LED's mentioned in this section.

### 1.3.1 Normal Mode

Normal operation supplies clean, conditioned, sine wave power to connected equipment from normal utility input. The battery charger charges the batteries. On the front panel display, the run indicator (green) is On, the alarm indicator is Off and the buzzer is silent.

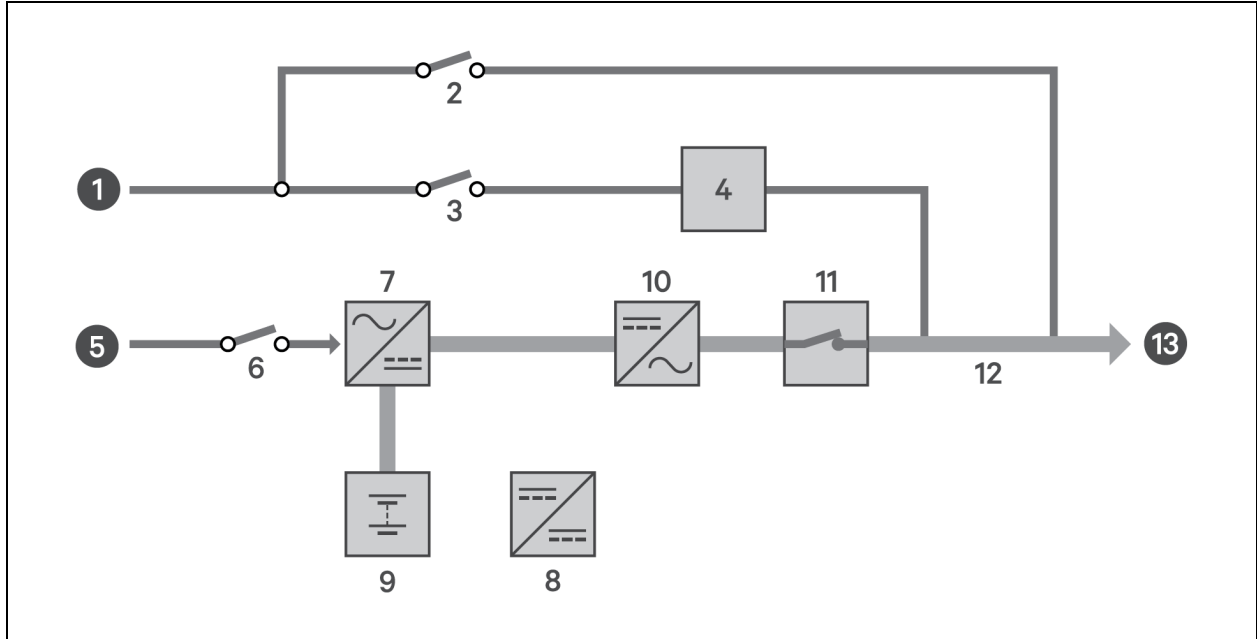
Figure 1.4 Normal Mode Operation



### 1.3.2 Battery Mode

Battery Mode supplies battery power to the load if utility power fails or if the utility voltage goes outside of the permissible range. On the front panel display, the run indicator (green) is On, the alarm indicator (yellow) is On, and the buzzer beeps once each second. The LCD "Current" screen displays "On Battery."

Figure 1.5 Battery Mode Operation

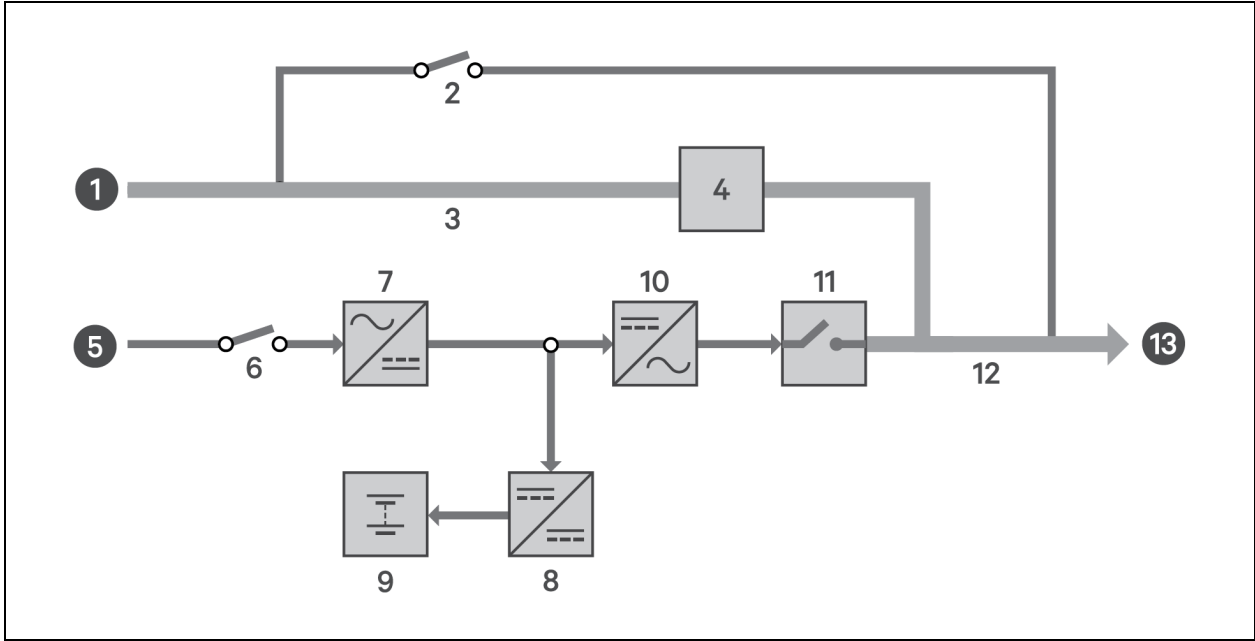


Item	Description
1	Bypass input
2	Maintenance bypass breaker (MBB)
3	Bypass input breaker (BIB)
4	Static switch
5	Rectifier input
6	Rectifier input breaker (RIB)
7	Rectifier
8	Battery charger
9	Battery
10	Inverter
11	Automatic inverter switch
12	Maintenance isolation breaker (MIB)
13	UPS output

### 1.3.3 Bypass Mode

Bypass Mode supplies power to the load from the bypass source if an overload or fault occurs during normal operation. On the front panel display, the run indicator (green) is On, the alarm indicator (yellow) is On, and the buzzer beeps once each second. The LCD "Current" screen displays "On Bypass."

Figure 1.6 Bypass Mode Operation



Item	Description
1	Bypass input
2	Maintenance bypass breaker (MBB)
3	Bypass input breaker (BIB)
4	Static switch
5	Rectifier input
6	Rectifier input breaker (RIB)
7	Rectifier
8	Battery charger
9	Battery
10	Inverter
11	Automatic inverter switch
12	Maintenance isolation breaker (MIB)
13	UPS output

### 1.3.4 Auto Restart Mode

When enabled, which is the default setting, Auto Restart Mode automatically restarts the UPS after a shutdown that resulted from depleted batteries after an extended power outage. A built-in 10-second delay after utility power is restored allows other equipment to start first and stabilize before the UPS restarts.

### 1.3.5 Fault State

When the UPS is in Normal Mode and the inverter fails or UPS overtemperature occurs, operation transfers to Bypass Mode. When the UPS is in Battery Mode (with no bypass utility), and the inverter fails or overtemperature occurs, the UPS shuts down and stops output power. During a fault state, the front panel display alarm indicator (red) is On, the buzzer beeps continuously, and fault information displays on the LCD.

### 1.3.6 Maintenance Bypass Mode

Used when the UPS requires maintenance or repair, Maintenance Bypass Mode operation powers the connected equipment with utility power while electrically isolating the internal UPS components.

The optional Vertiv™ Liebert® ITA2 Maintenance Bypass Cabinet (MBC) is required for this mode. If your system includes a Liebert ITA2 MBC, refer to the Liebert® ITA2 MBC Installer/User Guide available on the product page at [www.Vertiv.com](http://www.Vertiv.com).

#### NOTICE

Risk of power interruption. Can damage the connected equipment.

If utility power fails or if its quality is out of range while the UPS is in Maintenance Bypass Mode, the UPS may shut down without notice and shut off output power to the load.

**NOTE: The UPS has no user-serviceable parts. If the UPS malfunctions and requires service, visit <http://www.Vertiv.com/en-us/support/> or contact your local Vertiv representative.**

### 1.3.7 Start up on Bypass Mode

Default : Disabled. When the inverter is in the soft start stage, the bypass mode will not be automatically triggered.

Change the startup on bypass via Paramset or the LCD settings page to enable.

When the DC bus soft start is completed, the bypass mode will be automatically triggered. If the inverter can enter the soft start stage and the soft start is completed, the ups will automatically switch from bypass mode to normal mode.

When the DC bus soft start is completed, the bypass mode will be automatically triggered. If the inverter can not automatically enter the soft start phase, the ups will always operate in the bypass mode.

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## 2 Installation

Installation must be performed by properly trained and qualified personnel. Do not start the UPS until after the installation is finished and the system is commissioned by an authorized engineer.

**WARNING! Risk of electrical shock. Can cause property damage, injury, and death. The unit has several circuits that are energized with high DC and AC voltages. Check for voltage with both AC and DC voltmeters before making contact and before working within the UPS. Only properly trained and qualified personnel wearing appropriate, OSHA-approved personal protective equipment (PPE) should prepare for installation, install and maintain the equipment. When performing maintenance with any part of the equipment under power, service personnel and test equipment must stand on rubber mats.**

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

**WARNING! Risk of heavy unit falling. Improper handling can cause equipment damage, injury, and death. Exercise extreme care when handling unit cabinets and rack-mounted units to avoid equipment damage or injury to personnel. The UPS weighs approximately 50.7 lb. (23kg).**

**NOTE: The UPS can be connected to 3-phase, 5-wire (A, B, C, N, PE) TN, TT and IT AC power distribution system (IEC60364-3).**

### 2.1 Pre-Installation Preparation

Before beginning the installation, consider the environmental requirements, service clearances and external protective devices for installing the equipment.

#### 2.1.1 Environment of Installation Area

Install the UPS in a clean, well-ventilated environment with the ambient temperature within the specifications listed in Specifications .

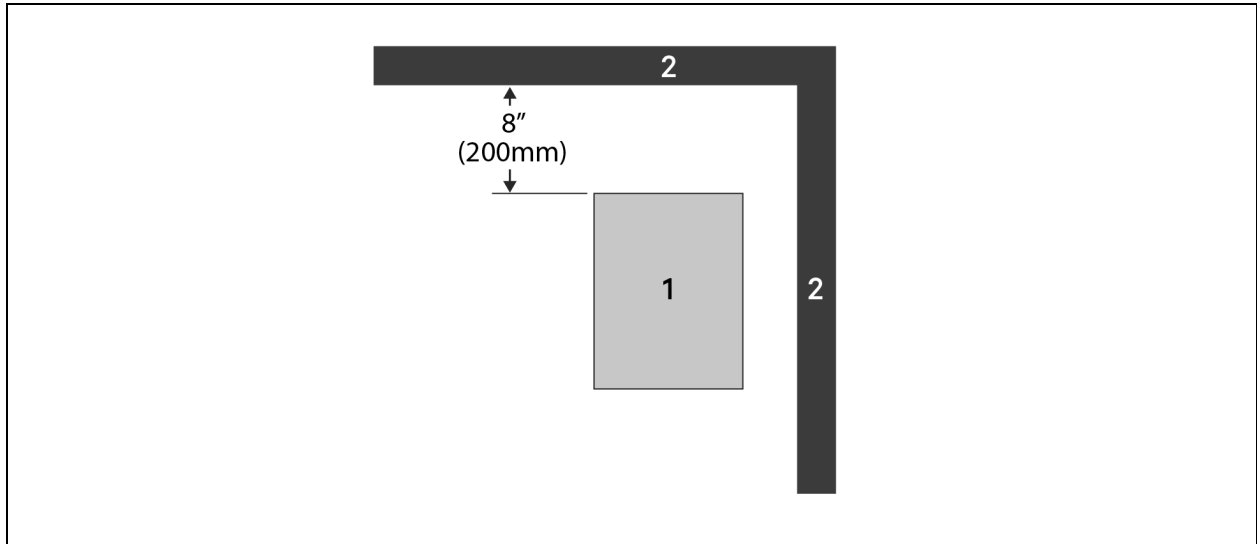
The environment must:

- Have convenient wiring.
- Have adequate access for operators.
- Be clean and well-ventilated.
- Be free from water, heat source and flammable and explosive substances.
- Be free from dust, volatile gases and corrosive materials.
- Comply with local fire codes.

## 2.1.2 Installation Clearances

Internal fans provide forced-air cooling for the UPS. Cooling air enters through the front panel and hot air is exhausted through the back. Maintain at least 8 in. (200mm) in the front and rear of the UPS, see **Figure 2.1** below .

**Figure 2.1 Required Clearances**



Item	Description
1	UPS (top view).
2	Wall or other solid surface.

## 2.1.3 Installation Tools

**IMPORTANT! All tools used to install and maintain the Liebert® ITA2 UPS and equipment must be insulated.**

The following tools are required to properly install your UPS:

- Torque Wrench
- Slotted screwdriver
- Multimeter
- #3 Phillips-head screwdriver
- T10 Torx screwdriver



## 2.1.4 Storage

If you do not install the UPS immediately, you must store it indoors and protect it from excessive moisture, heat and other harsh conditions. Store the batteries in a dry, well-ventilated environment with a temperature range of 68°F ~ 77°F (20°C ~ 25°C).

### NOTICE

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

Batteries will lose charge during storage. Batteries must be recharged as recommended by the battery manufacturer every 3 to 6 months, depending on the storage temperature:

- At 68-77°F (20-25°C): charge after 6 months in storage
- At 78-86°F (26-30°C): charge after 3 months in storage
- At 87°F or higher (31°C or higher): charge after 1 month in storage.

## 2.1.5 External Protective Devices

Circuit breakers and other external protective devices must be installed on the UPS input. The following sections provide general guidance for installation by properly trained and qualified personnel.

### Rectifier and Bypass Input Protection

**Overcurrent Protection**—Install an appropriate overcurrent protective device on the utility input power distribution terminals. Consider the current capacity of power cables and the system-overload requirements in selection of the input protection and wiring, see **Table 2.1** on page 19 , and **Table 2.2** on page 19 .

**Dual-Input System Protection**—In a dual-input system, install separate protective devices for the rectifier and bypass at the utility input power distribution terminals.

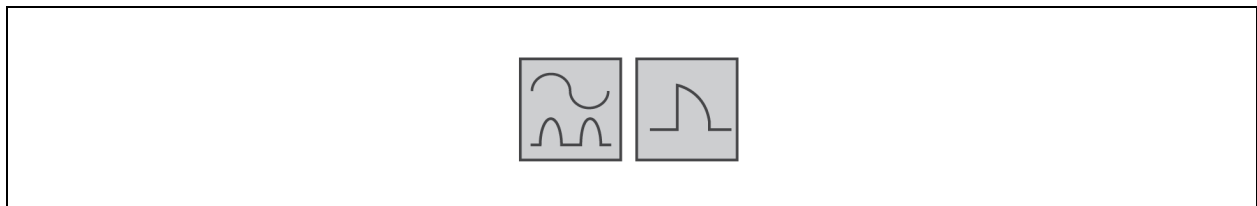
**Back-Feed Protection**—The UPS includes back-feed protection in the event of a fault to prevent conducting hazardous voltages upstream of the UPS when the supply has been removed from the UPS.

**Earth Leakage Current**—The residual current detector (RCD) for the UPS upstream input power distribution should be:

- Sensitive to the DC unidirectional pulse (Level A) in the power distribution network
- Insensitive to the transient current pulse
- General sensitivity type, settable: 0.3A ~ 1A

The residual current circuit breaker (RCCB) must be sensitive to the DC unidirectional pulse (Level A) in the power distribution network, but insensitive to the transient current pulse, see **Figure 2.2** below .

**Figure 2.2 RCCB Symbols**



When using the earth RCD in a split-bypass system, the RCD should be installed at the upstream input power distribution end to prevent false alarms. The earth leakage current fed by the RFI filter in the UPS ranges from 3.5 mA to 100 mA. Vertiv recommends that you verify the sensitivity of each differential device of the upstream input power distribution and downstream power distribution (to load).

## Battery

The UPS includes an overcurrent protection device for the battery.

## UPS Output

The UPS includes output overcurrent protection in all modes of operation. If the customer-provided output distribution panel is not within sight of the UPS, the distribution panel must include a main breaker.

## 2.2 Equipment Handling and Unpacking

**WARNING! Risk of heavy unit falling. Improper handling can cause equipment damage, injury, and death. Exercise extreme care when handling unit cabinets and rack-mounted units to avoid equipment damage or injury to personnel. The UPS weighs approximately 50.7 lb. (23kg).**

During unpacking:

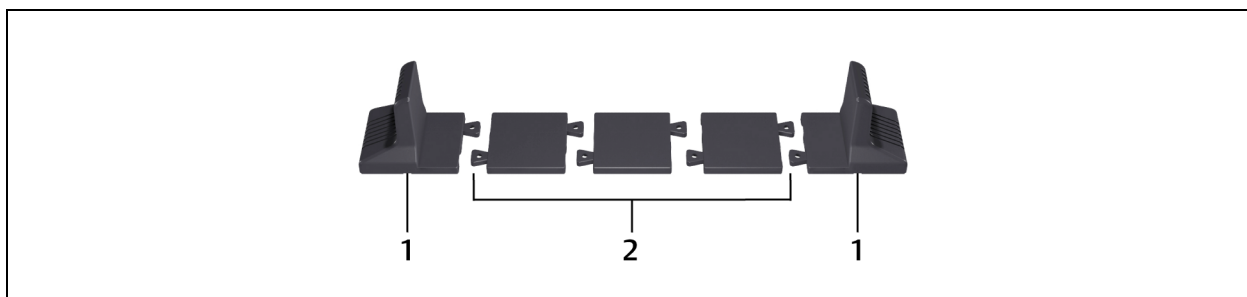
- Inspect the UPS for damage. If you find any problem, file a damage claim with the carrier immediately and send a copy to Vertiv at:  
  
Attn: Traffic Department  
  
Vertiv Corporation  
  
1050 Dearborn Drive  
  
P.O. Box 29186  
  
Columbus, Ohio 43085 USA
- Check the accessories and model numbers against the delivery list. If you find any problem, notify your local Vertiv representative immediately.

## 2.3 Tower Installation

**NOTE: The UPS may be installed with a maintenance bypass cabinet (MBC) or battery cabinets. If so, install the MBC and battery cabinets before installing the UPS.**

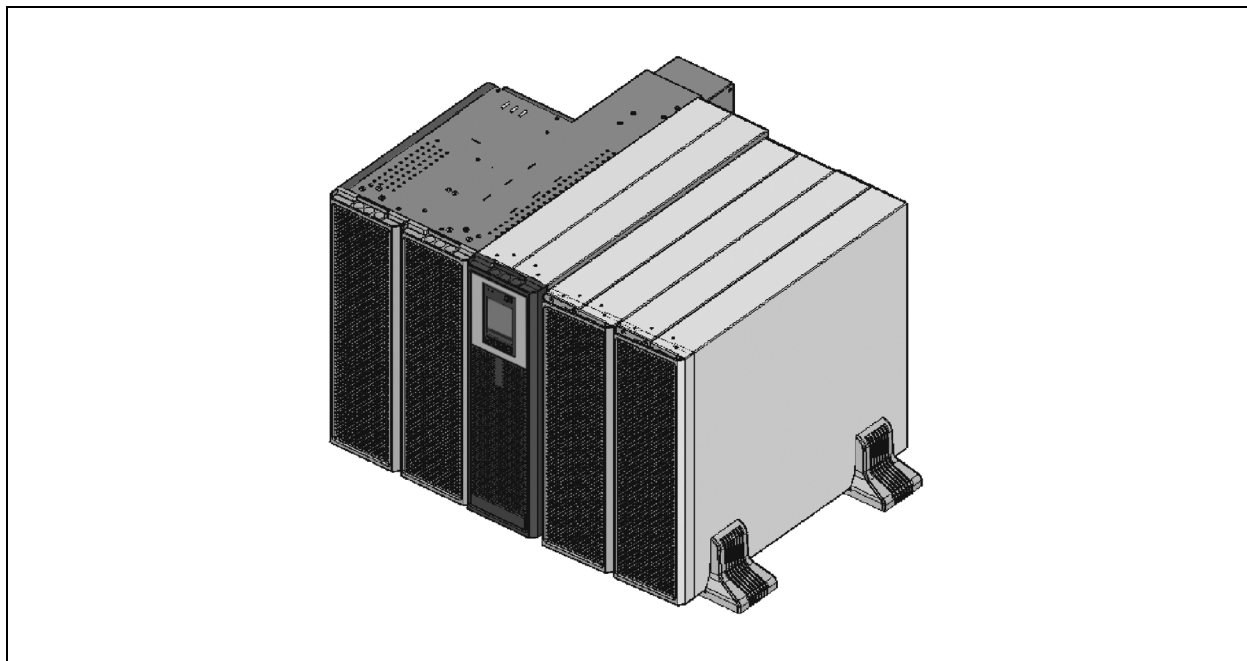
1. Take the support bases out of the accessories box.
2. If battery cabinets will be connected, take out the spacers that shipped with the battery cabinet.
3. If an MBC will be connected, take out the spacers shipped with the accessories.
4. Connect the spacers and the support bases as shown in **Figure 2.3** below . Each tower assembly requires two support base/spacer assemblies, one in the front and one in the rear.
5. Place the UPS, battery cabinets and the MBC on the two support base assemblies.

**Figure 2.3 Support Bases**



Item	Description
1	Support bases
2	Spacers with connectors

**Figure 2.4 Tower-Mounted Liebert® ITA2 UPS System with Battery Cabinets and MBC**



## 2.4 Rack Installation

### NOTICE

Risk of improper transport can cause damage to the UPS, MBC or battery cabinets.

Never attempt to lift or move the UPS, MBC or battery cabinets with the rack brackets. The brackets and screws are not meant to lift the units.

### NOTICE

Risk of improper installation can make the rack top-heavy and cause a tipping hazard.

The battery cabinets are heavier than the UPS. Vertiv recommends installing the battery cabinets as close to the bottom of the rack as possible to maintain a low center of gravity. Install the UPS above the battery cabinets.

Install each unit on its own set of rack-mount guide rails. The rail kit will support the weight of a single UPS, MBC or battery cabinet.

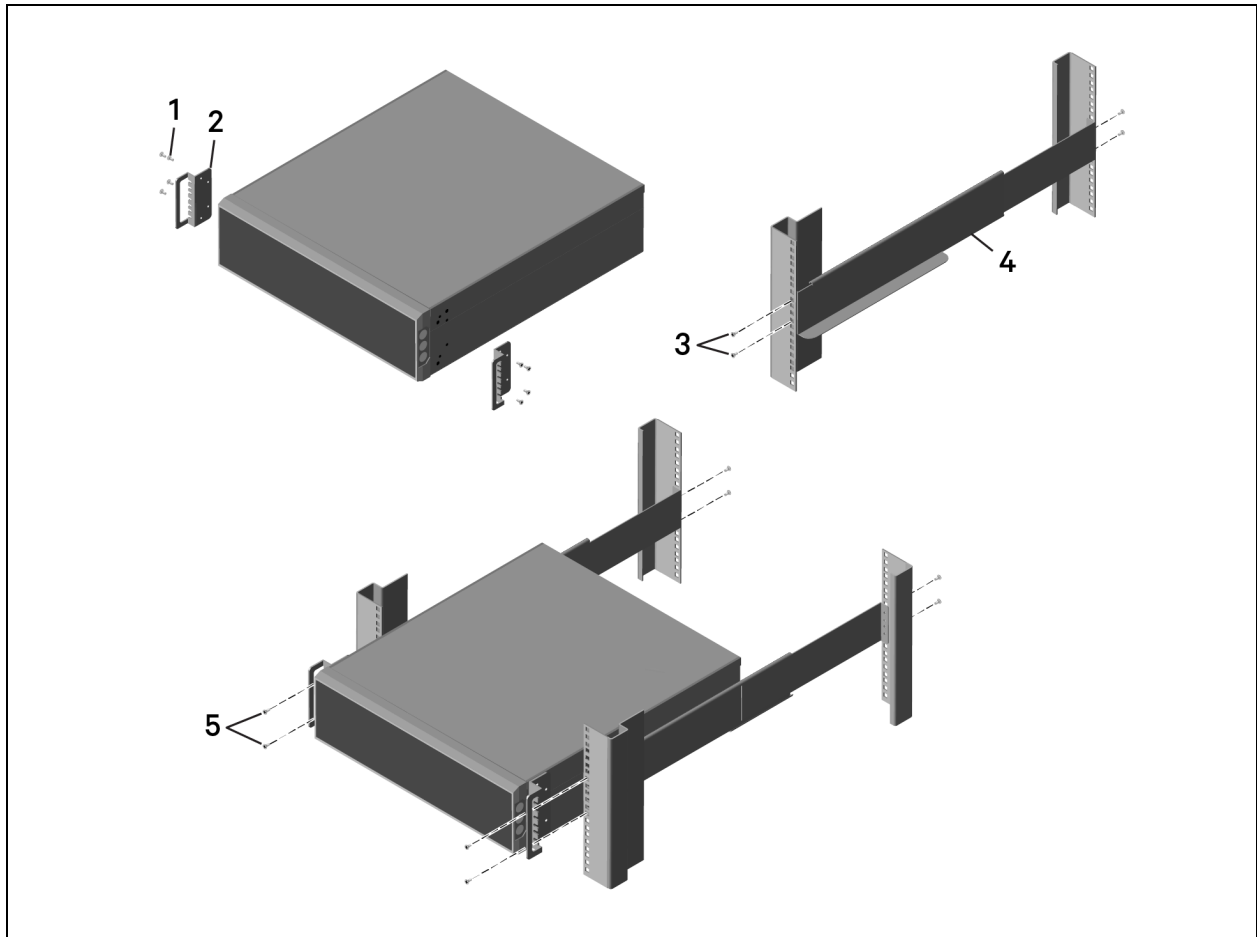
**NOTE: The UPS may be installed with a maintenance bypass cabinet (MBC) or battery cabinets. If so, install the MBC and battery cabinets before installing the UPS.**

### To mount the unit in the rack:

**NOTE: Install the battery cabinets from bottom to top to minimize tipping hazard.**

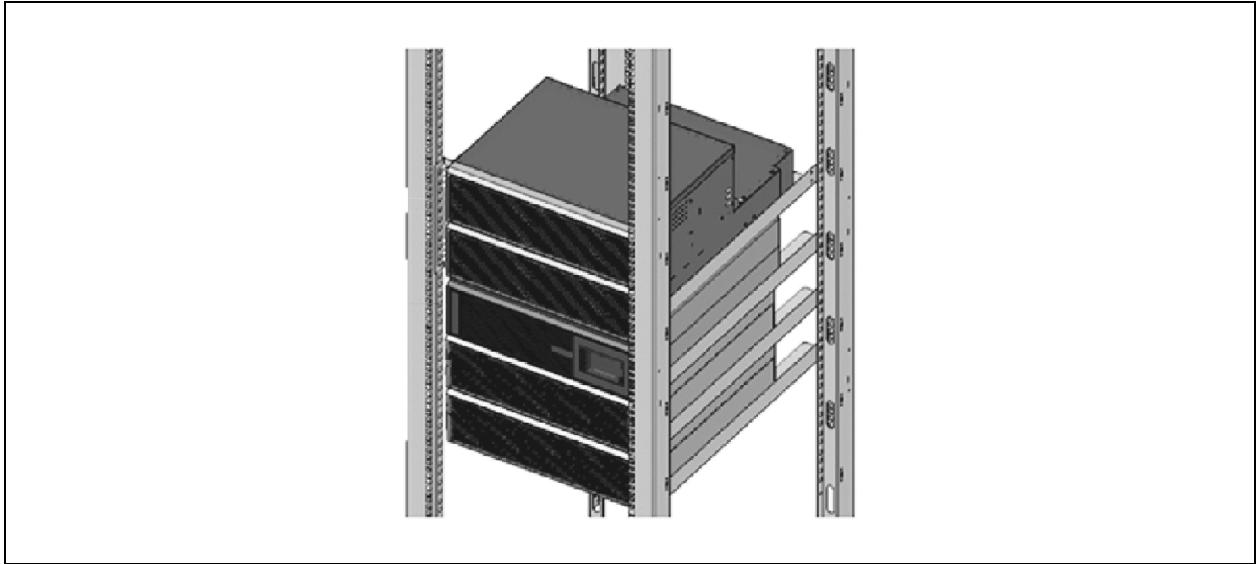
1. Referring to **Figure 2.5** on the facing page, use four of the M4×10 screws on each bracket, and attach a bracket to each front corner.
2. Referring to **Figure 2.5** on the facing page, mount the right and left guide rails for the UPS and each battery cabinet:
  - Adjust the length of each guide rail to the dimensions of the rack.
  - Align the install holes on the ends of the rail to the square holes in the rack, and use four of the provided screws, two on each end, to attach the rail to the rack.
3. Place the unit on the guide rails and push it completely into the rack along the guide rails.
4. Use M5×16 screws to secure the unit brackets to the rack, see **Figure 2.5** on the facing page.

Figure 2.5 Guide Rail and Rack Bracket Installation



Item	Description
1	Bracket screw, four per bracket
2	Bracket, two
3	Rail screw, four per rail
4	Guide rail, one per side
5	Rack-mount screw, four per bracket

Figure 2.6 Rack-Mounted Vertiv™ Liebert® ITA2 UPS System with Battery Cabinets and MBC



## 2.5 Connecting Power Cables

**WARNING! Risk of electrical shock. Can cause property damage, injury and death. The unit has several circuits that are energized with high DC and AC voltages. Check for voltage with both AC and DC voltmeters before making contact and before working within the UPS. Only properly trained and qualified personnel wearing appropriate, OSHA-approved personal protective equipment (PPE) should prepare for installation, install and maintain the equipment. When performing maintenance with any part of the equipment under power, service personnel and test equipment must stand on rubber mats.**

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

When connecting input and output cables, follow national and local wiring regulations, take the environment into account and refer to NFPA 70, Table 310-16. The recommended minimum cables and overcurrent protection are listed in **Table 2.1** on the facing page, and **Table 2.2** on the facing page. The values are based upon an 86°F (30°C) ambient temperature.

The UPS has two modes of output power distribution, self-distribution and via the optional maintenance bypass cabinet. These steps describe self-distribution mode connections. The connections for maintenance bypass power distribution are included with the installation instructions for the Liebert® ITA2 MBC.

Table 2.1 Currents and Wire Size—UPS Rectifier Input

Unit Rating	Maximum Current, Amps	Recommended OPD, Amp Trip	75°C THW Copper Wire (phase) Number of Cables per Phase: 1	75°C THW Copper Wire (neutral) Number of Cables: 1	75°C THW Copper Wire (Ground) Number of Cables: 1	Recommended Torque
8kVA	24	30	8AWG	8AWG	10AWG	30 in-lbf.
10kVA	37	50	6AWG	6AWG	10AWG	30 in-lbf.

Table 2.2 AC Currents and Wire Size—UPS Bypass Input\* and Output

Unit Rating	Maximum Current, Amps	Recommended OPD, Amp Trip	75°C THW Copper Wire (phase) Number of Cables per Phase: 1	75°C THW Copper Wire (neutral) Number of Cables: 1	75°C THW Copper Wire (Ground) Number of Cables: 1	Recommended Torque
8kVA	23	30	10AWG	10AWG	10AWG	30 in-lbf.
10kVA	28	40	8AWG	8AWG	10AWG	30 in-lbf.

\* Bypass input for dual-input configurations only.

Table 2.3 Ring Terminal Part Numbers

	AWG (mm <sup>2</sup> )		
	10 (5.26)	8 (8.36)	6 (13.3)
Manufacturer Part #	McMaster-Carr: 7113K462	McMaster-Carr: 7113K444	McMaster-Carr: 7113K366
	Thomas & Betts: RC10-14	Thomas & Betts: RDV717	Thomas & Betts: RE6-14
	Tyco Electronics: 1577648-1	Tyco Electronics: 132331-1	—

## 2.5.1 Connecting a Single-Input Configuration

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

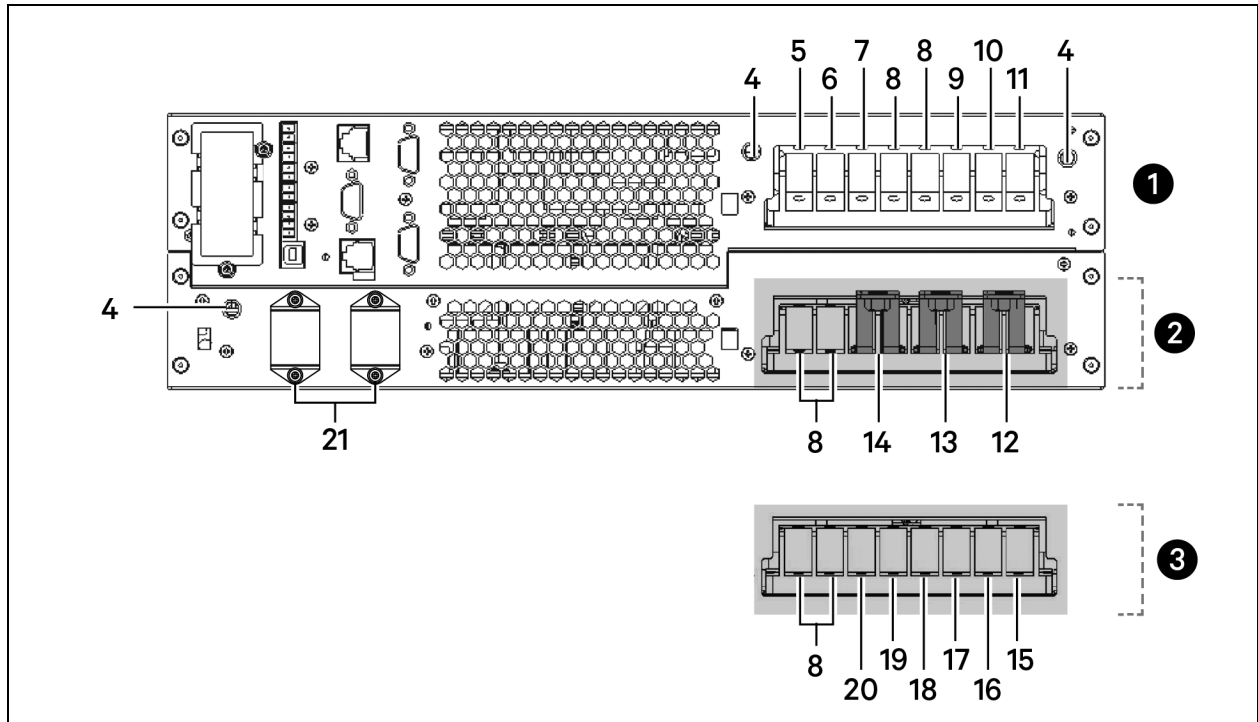
1. Prepare for connection by removing the conduit box cover, opening knockout holes, and routing cables through the conduit.
2. Leave the shorting busbars in place on the UPS input terminal block.
3. Refer to the single-input terminal block illustrated in **Figure 27** on page 21, and connect the cables from the upstream feeder panel:
  - Phase A to L1
  - Phase B to L2
  - Phase C to L3
  - Neutral to N
  - Ground to PE (next to pA)

**NOTE: The UPS has two output terminal block sections, “always on” and “programmable/controllable.” The always on connections are listed first, and the programmable connections are inside parentheses.**

4. For output connections, refer to **Figure 2.7** on the facing page , and connect the cables from the UPS to the downstream feeder panel on the panelboard main breaker:
  - A (pA) to Phase A
  - B (pB) to Phase B
  - C (pC) to Phase C
  - Neutral N (N) to neutral bus
  - Ground from PE (stud next to C) to the ground bus
5. Torque all customer-side connections per recommendations in **Table 2.1** on the previous page , and **Table 2.2** on the previous page
6. Replace the conduit box cover and secure it.



Figure 2.7 Single-Input and Dual-Input Configuration Wiring Diagram



Item	Description
1	AC output terminal block
2	Single-input configuration terminal block
3	Dual-input configuration terminal block
4	PE (Ground)
5	C, output phase C
6	B, output phase B
7	A, output phase A
8	N, output neutral
9	pC, output phase C
10	pB, output phase B
11	pA, output phase A
12	L1, input phase A
13	L2, input phase B
14	L3, input phase C
15	rA, rectifier input A
16	ba, bypass input A
17	rB, rectifier input B

Item	Description
18	bB, bypass input B
19	rC, rectifier input C
20	bC, bypass input C
21	Battery cable connector

## 2.5.2 Connecting a Dual-input Configuration

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

1. Prepare for connection by removing the conduit box cover, opening knockout holes and routing cables through the conduit.
2. Remove the shorting busbars from the terminals labeled L1, L2, and L3 in **Figure 2.7** on the previous page .
3. For the rectifier input, refer to the dual-input terminal block in **Figure 2.7** on the previous page , and connect the cables from the upstream feeder panel:
  - Phase A to rA
  - Phase B to rB
  - Phase C to rC
  - Neutral to N
  - Ground to PE (next to pA).
4. For the bypass input, refer to the dual-input terminal block in **Figure 2.7** on the previous page , and connect the cables from the upstream feeder panel:
  - Phase A to bA
  - Phase B to bB
  - Phase C to bC
  - Neutral to N
  - Ground to PE (next to pA).

**NOTE: The UPS has two output terminal block sections, “always on” and “programmable/controllable.” The always on connections are listed first, and the programmable connections are inside parentheses.**

5. For output connections, refer to **Figure 2.7** on the previous page , and connect the cables from the UPS to the downstream feeder panel on the panelboard main breaker:
  - A (pA) to Phase A
  - B (pB) to Phase B
  - C (pC) to Phase C
  - N (N) to the neutral bus
  - Ground from PE (stud next to C) to the ground bus
6. Torque all customer-side connections per recommendations in **Table 2.1** on page 19 , and **Table 2.2** on page 19
7. Replace the conduit box cover and secure it.

## 2.6 Connecting a Single Battery Cabinet System

Do not reverse the polarity of the battery cables.

### 2.6.1 Connecting the Cables

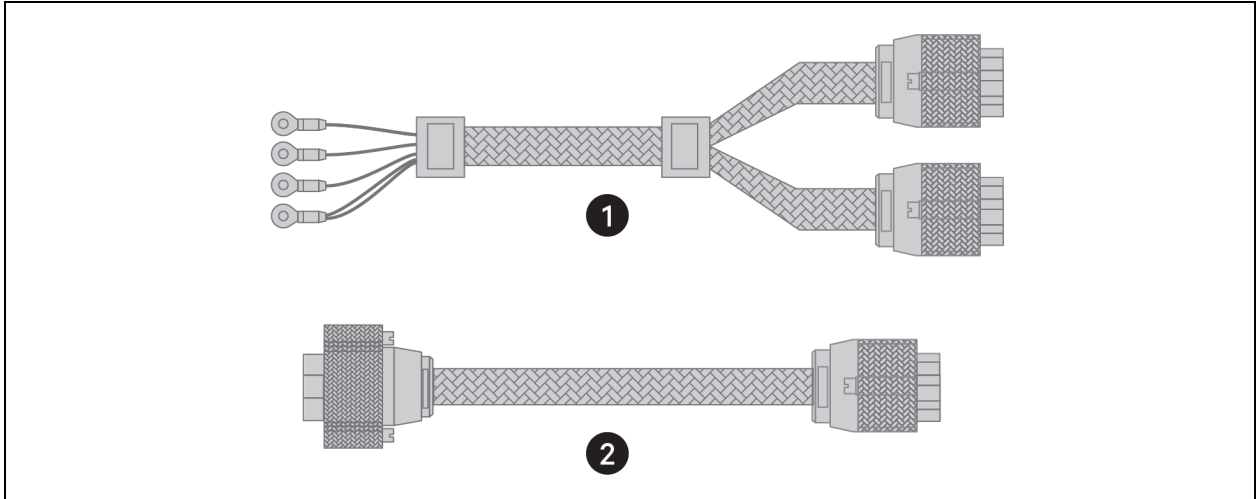
**WARNING! Risk of electrical shock. Can cause property damage, injury and death. The unit has several circuits that are energized with high DC and AC voltages. Check for voltage with both AC and DC voltmeters before making contact and before working within the UPS. Only properly trained and qualified personnel wearing appropriate, OSHA-approved personal protective equipment (PPE) should prepare for installation, install and maintain the equipment. When performing maintenance with any part of the equipment under power, service personnel and test equipment must stand on rubber mats.**

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

**WARNING! Risk of heavy unit falling. Improper handling can cause equipment damage, injury, and death. Exercise extreme care when handling unit cabinets and rack-mounted units to avoid equipment damage or injury to personnel. The UPS weighs approximately 50.7 lb. (23kg).**

The factory-provided, UPS-to-battery power cable, see **Figure 2.8** on the next page, connects to Connector A on both battery cabinets in a single/first battery string. The battery-to-battery power cable connects additional battery strings/cabinets, see [Connecting Additional Battery Cabinet Systems](#) on page 32.

**Figure 2.8 Power Cables**

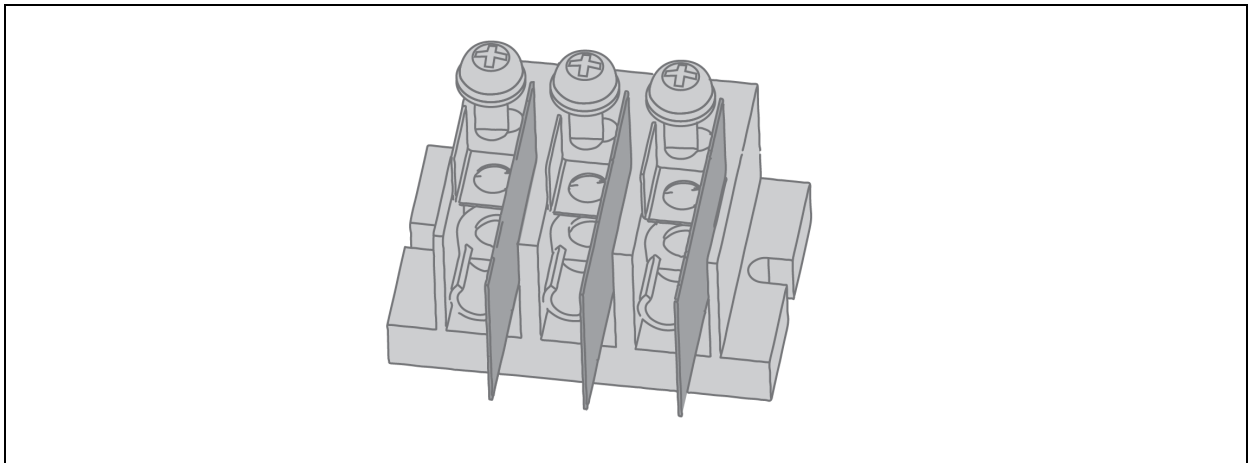


Item	Description
1	UPS-to-battery cable (for hard-wired configurations)
2	Battery-to-battery cable (also UPS-to-battery for plug-and-play configurations)

**To connect the UPS with terminal block connections to the battery cabinet system:**

1. Make sure the battery breaker on the rear of the cabinet is open (Off).
2. Connect the ring terminals of the UPS-to-battery cable to the rear of the UPS.
3. Install the insulating plates on the battery terminals, see **Figure 2.9** below :
  - a. Connect the ground wire (PE) to the ground screw on the rear of the UPS.
  - b. Place the battery-cable ring lug on the terminal block, add the insulating plate, then insert the screw and tighten to 30 lb-in. torque.
  - c. Repeat Step b for each terminal block connection: battery +, battery neutral, and battery -.

**Figure 2.9 Battery Insulating Plates**

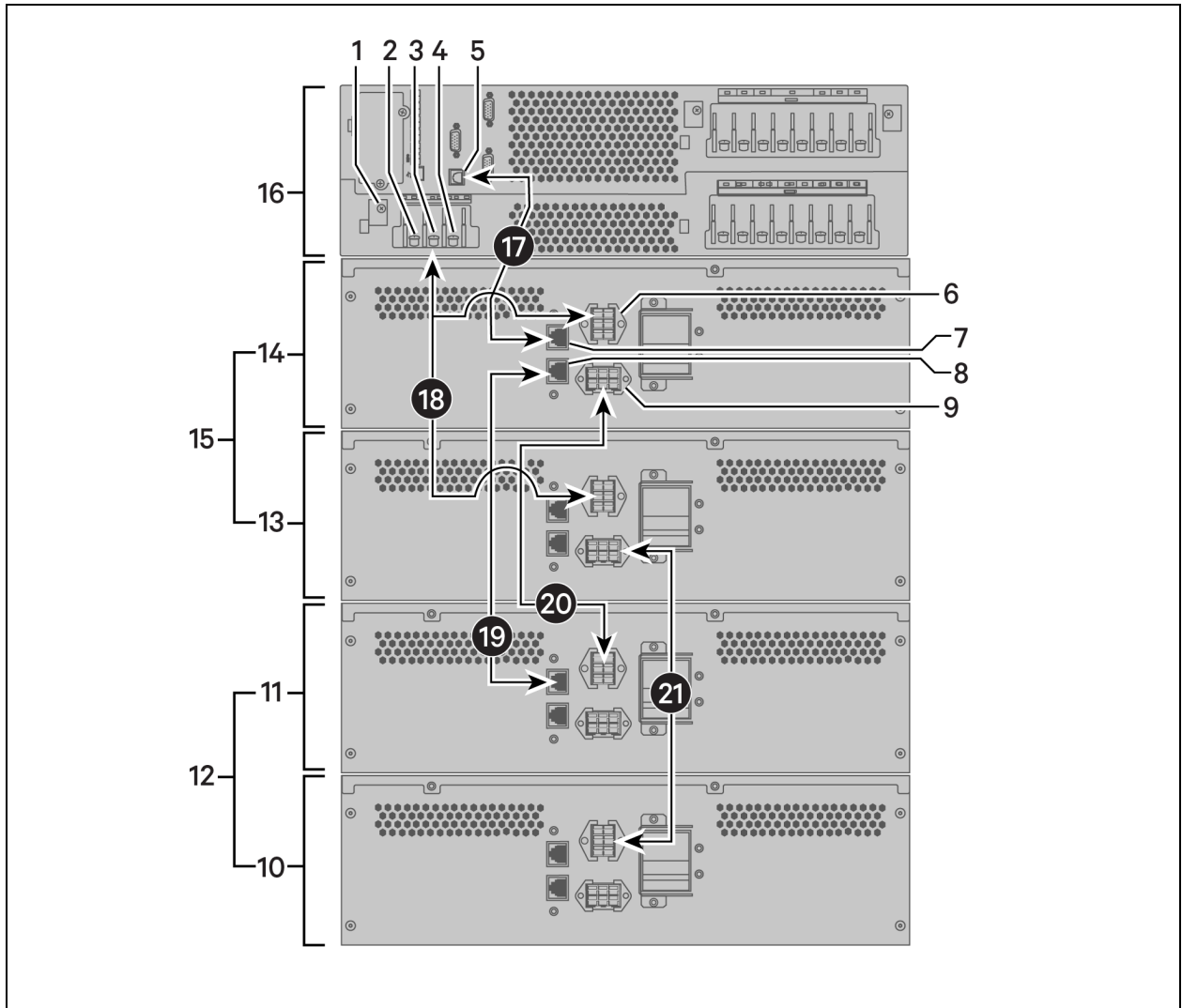


4. Depending on the type of battery cabinet, see **Figure 210** on the next page for 3U, or see **Figure 211** on page 28 , for 2U, and connect the other ends to Connector A on each of the battery cabinets in the string.
5. Connect the RJ-45 communication cable to the communication port on the UPS and the other end to Communication Port 1 on the first battery cabinet.
  - If connecting a 2U battery string, connect a cable between Comm Port 2 on the first cabinet, and Comm Port 1 on the second.
6. For a single battery string, close the battery output breaker(s).
  - or –
  - If installing additional battery strings (two battery cabinets each), proceed to [Connecting Additional Battery Cabinet Systems](#) on page 32 .

**To connect the UPS with plug-n-play connectors to the battery cabinet system:**

1. Make sure the battery breaker on the rear of the cabinet is open (Off).
2. Using a cable provided with the battery cabinet, refer to **Figure 211** on page 28 , and:
  - Connect the end labeled "Port B" to one of the connectors on the rear of the UPS and tighten the securing screws.
  - Connect the end labeled "Port A" to Connector A on the battery cabinet.
3. Repeat Step 2 , for the second battery cabinet.
4. Using a communication cable with RJ-45 connectors, refer to **Figure 211** on page 28 , and:
  - Connect one end to the multi-function port on the rear of the UPS.
  - Connect the other end to one of the RJ-45 communication ports on the first battery cabinet.
  - Connect another cable from the remaining RJ-45 communication port on the first battery cabinet to one of the ports on the second battery cabinet.
5. For a single battery string, close the battery output breaker(s).
  - or –
  - If you are installing additional battery strings (two battery cabinets each), proceed to [Connecting Additional Battery Cabinet Systems](#) on page 32 .

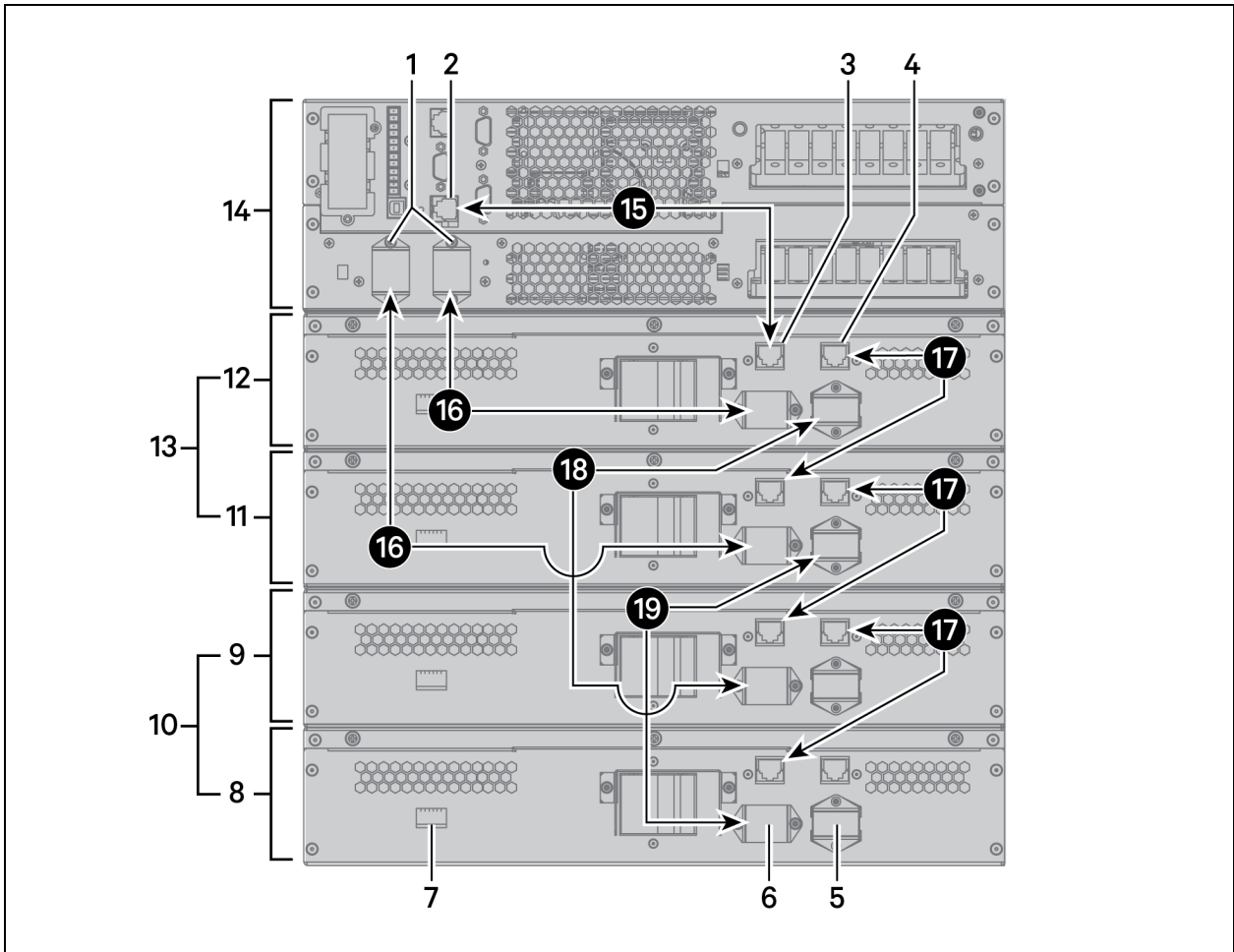
Figure 2.10 Cabling the UPS and Two 3U battery Strings in Parallel



Item	Description
1	Ground screw (PE)
2	BAT – (negative) connector
3	BAT N (neutral) connector
4	BAT + (positive) connector
5	Communication port connector (RJ-45)
6	Connector A
7	Communication port Connector 1
8	Communication port Connector 2
9	Connector B

Item	Description
10	Battery Cabinet 4
11	Battery Cabinet 3
12	Battery String 2
13	Battery Cabinet 2
14	Battery Cabinet 1
15	Battery String 1
16	UPS
17	Communication cable, UPS to Comm Port 1 on Battery Cabinet 1
18	UPS-to-battery power cable, to Connector A on Battery Cabinets 1 and 2
19	Communication cable, Comm Port 2 to Comm Port 1 on Battery Cabinet 3
20	Battery-to-battery power cable, Battery Cabinet 1 Connector B to Connector A on Battery Cabinet 3
21	Battery-to-battery power cable, Battery Cabinet 2 Connector B to Connector A on Battery Cabinet 4

Figure 2.11 Cabling the UPS and Two 2U Battery Strings in Parallel

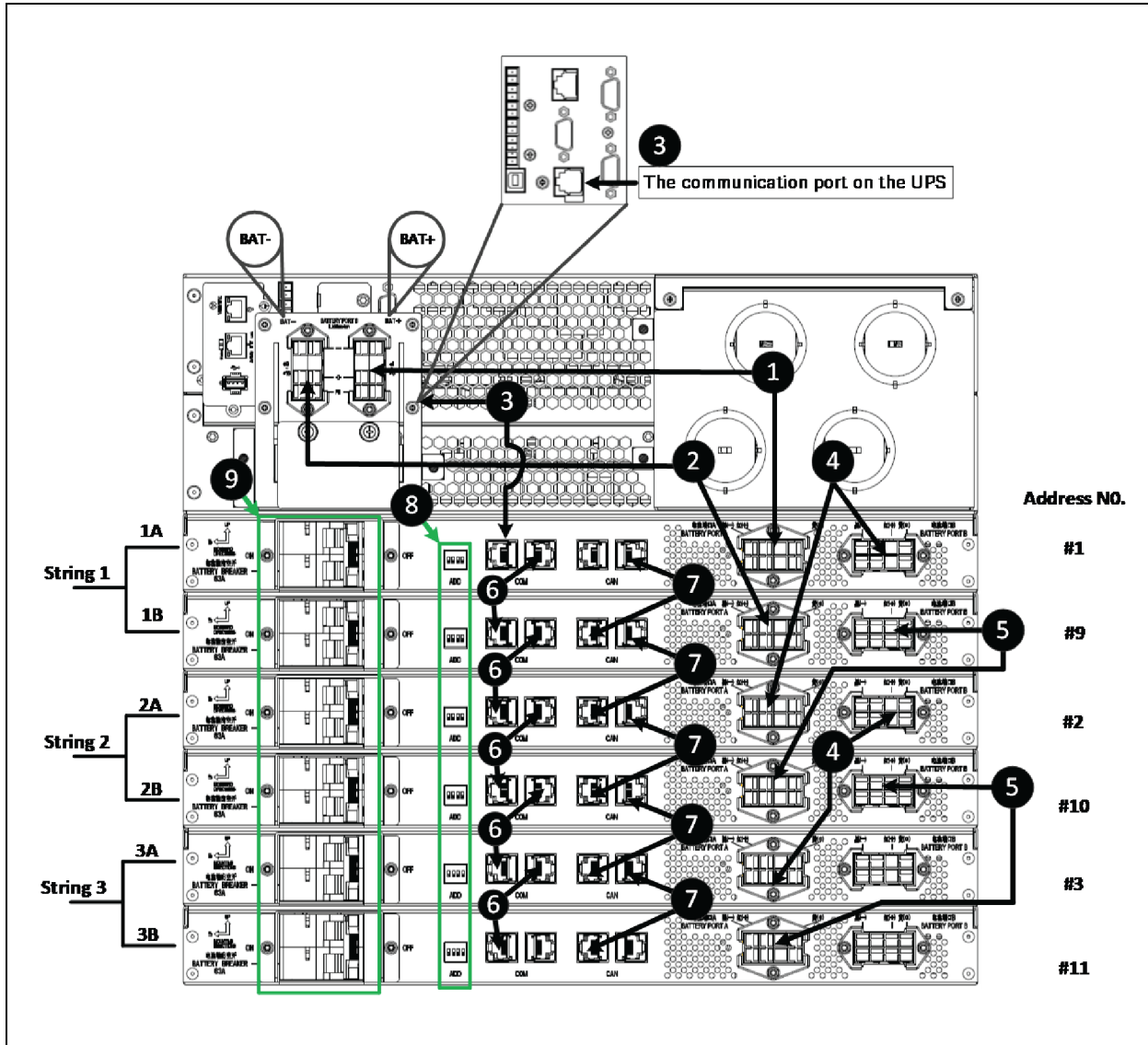


Item	Description
1	Battery cable connectors
2	Multi-function connector (RJ-45)
3	Communication port connector (RJ-45)
4	Communication port connector (RJ-45)
5	Connector B
6	Connector A
7	DIP switch
8	Battery Cabinet 4
9	Battery Cabinet 3
10	Battery String 2
11	Battery Cabinet 2
12	Battery Cabinet 1



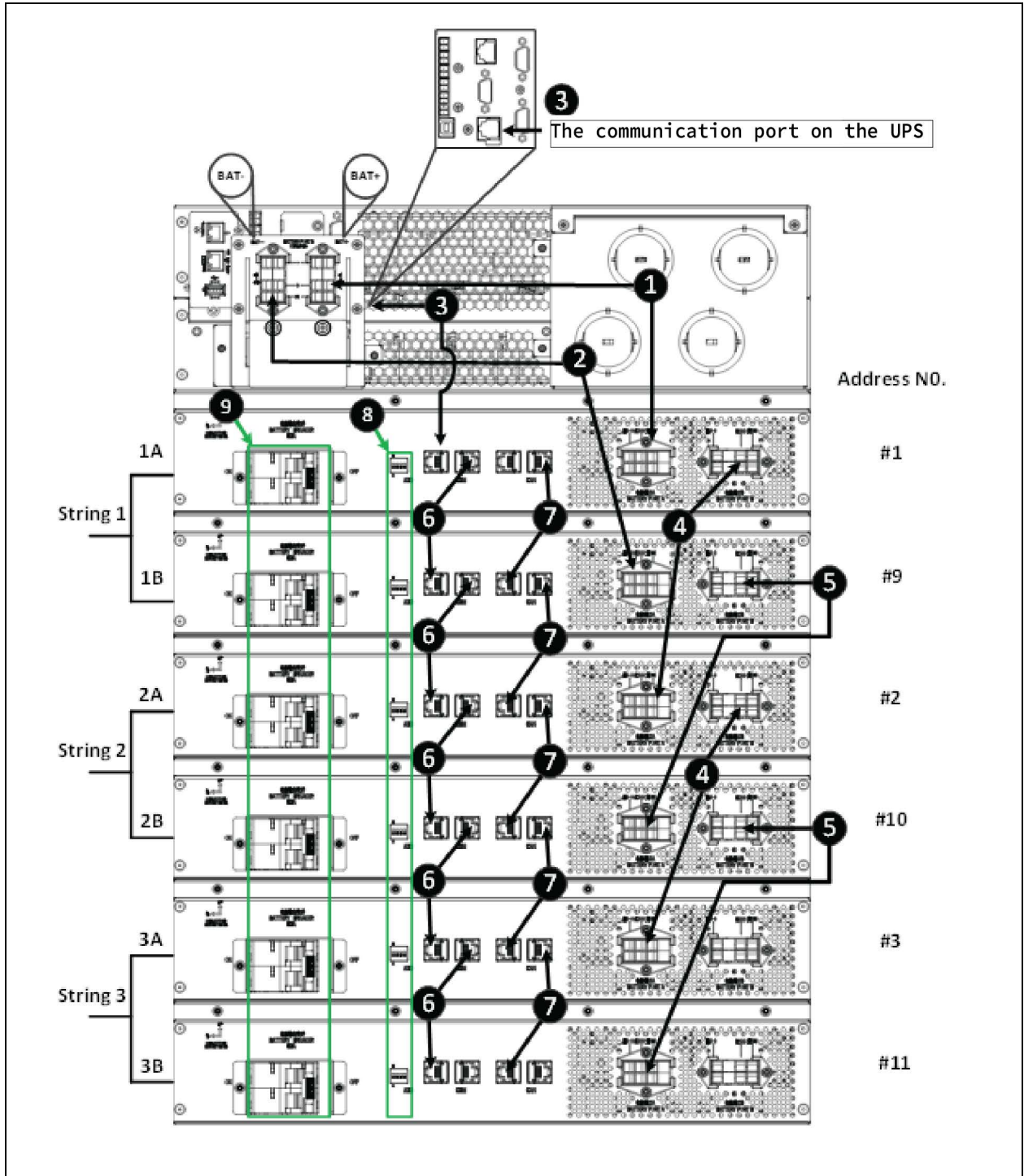
Item	Description
13	Battery String 1
14	UPS
15	Communication cable, UPS to communication port on Battery Cabinet 1
16	Battery cable to Connector A on Battery Cabinet 1 and 2
17	Communication cable between communication ports on each battery cabinet.
18	Battery cable from Connector B on Battery Cabinet 1 to Connector A on Battery Cabinet 3
19	Battery cable from Connector B on Battery Cabinet 2 to Connector A on Battery Cabinet 4

Figure 2.12 Cabling 1U Lithium Battery in Parallel



Item	Description
1	Battery Cable Connectors A
2	Battery Cable Connectors B
3	Communication port connector (RJ-45)
4	Battery cable from Connector B on Battery Cabinet 1 or 3 to Connector A on Battery Cabinet 3 or 5
5	Battery cable from Connector B on Battery Cabinet 2 or 4 to Connector A on Battery Cabinet 4 or 6
6	Communication cable between communication ports on each battery cabinet
7	Communication cable between CANBus ports on each battery cabinet.
8	DIP Switch (Address)
9	Breaker

Figure 2.13 Cabling 2U Lithium Battery in Parallel



Item	Description
1	Battery Cable Connectors A
2	Battery Cable Connectors B
3	Communication port connector (RJ-45)
4	Battery cable from Connector B on Battery Cabinet 1 or 3 to Connector A on Battery Cabinet 3 or 5
5	Battery cable from Connector B on Battery Cabinet 2 or 4 to Connector A on Battery Cabinet 4 or 6
6	Communication cable between communication ports on each battery cabinet
7	Communication cable between CANBus ports on each battery cabinet.
8	DIP Switch (Address)
9	Breaker

## 2.7 Connecting Additional Battery Cabinet Systems

**WARNING! Risk of electrical shock. Can cause property damage, injury and death. The unit has several circuits that are energized with high DC and AC voltages. Check for voltage with both AC and DC voltmeters before making contact and before working within the UPS. Only properly trained and qualified personnel wearing appropriate, OSHA-approved personal protective equipment (PPE) should prepare for installation, install and maintain the equipment. When performing maintenance with any part of the equipment under power, service personnel and test equipment must stand on rubber mats.**

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

**WARNING! Risk of heavy unit falling. Improper handling can cause equipment damage, injury, and death. Exercise extreme care when handling unit cabinets and rack-mounted units to avoid equipment damage or injury to personnel. The UPS weighs approximately 50.7 lb. (23kg). The battery cabinets weigh approximately 115 lb (52.2 kg)**

The factory-provided, battery-to-battery power cables, see **Figure 2.8** on page 24 , connect the battery strings in parallel to extend the backup time of the UPS. For 2U battery cabinets, you must adjust the DIP switch on the rear panel for each cabinet in the string.

### To connect power cables:

1. Verify that the battery breakers are in the open (Off) position before connecting or disconnecting battery cables.

2. Depending on the type of battery cabinet, see **Figure 210** on page 26 , for 3U or **Figure 211** on page 28 , for 2U, and:
  - Connect one end of a battery-to-battery cable to Connector B on the first cabinet in the first string (Battery Cabinet 1), and the other end to Connector A on the first cabinet in the additional string (Battery Cabinet 3).
  - Connect one end of a battery-to-battery cable to Connector B on the second cabinet in the first string (Battery Cabinet 2), and the other end to Connector A on the second cabinet in the additional string (Battery Cabinet 4).
3. Verify that the connector colors align and press the cable in firmly to fully seat the connectors.
4. Tighten the captive screws on the extension cable to prevent the extension cable from loosening.
5. Connect an RJ-45 communication cable:
  - On 3U strings, to Communication Port 2 on the first cabinet in the first string (Battery Cabinet 1), and the other end to Communication Port 1 on the first cabinet in the additional string (Battery Cabinet 3).
  - On 2U strings, connect a communication cable to Communication Port 2 and Communication Port 1 between each battery cabinet.

**NOTE: If using both 2U and 3U battery cabinets in a system, you must manually configure the number of connected battery strings via the display. The number of strings is not auto-detected.**

**NOTE: In a mixed-cabinet system, the communication cables allow temperature measurements. If your system is running on an older version of firmware, you may need to set the multifunction port to "temperature" to enable the measurements.**

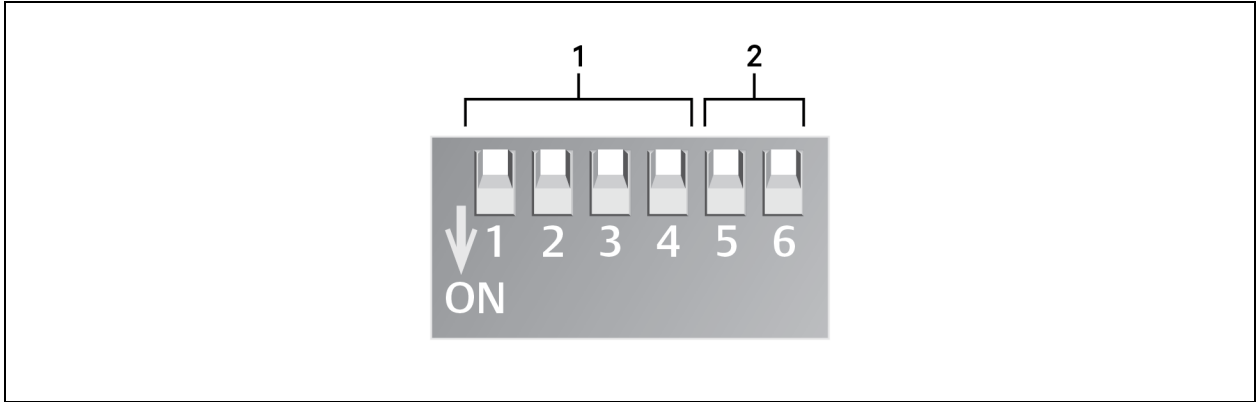
6. **On 3U strings**, close the battery output breaker(s).  
– or –  
**On 2U strings**, refer to **Table 2.4** below , and **Figure 214** on the next page , and set the DIP switch on both cabinets in each additional string before closing the battery output breaker(s).

**NOTE: The settings for String 1 are the factory-default settings.**

**Table 2.4 DIP Switch Settings for 2U Battery Cabinet Strings**

String	Cabinet	DIP Switch Position					
		Group				Num	
		1	2	3	4	5	6
1	A	Off	Off	Off	Off	Off	On
	B	Off	Off	Off	Off	On	Off
2	A	Off	Off	Off	Off	On	On
	B	Off	Off	Off	On	Off	Off
3	A	Off	Off	Off	On	Off	On
	B	Off	Off	Off	On	On	Off
4	A	Off	Off	Off	On	On	On
	B	Off	Off	On	Off	Off	Off
5	A	Off	Off	On	Off	Off	On
	B	Off	Off	On	Off	On	Off

Figure 2.14 DIP Switch on Rear Panel of 2U Battery Cabinet

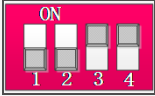
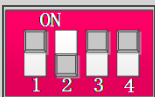
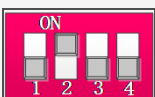







Item	Description
1	Group
2	Number

Table 2.5 DIP Switch Settings for Lithium Battery Cabinet Strings

String No.	Cabinet No.	DIP Switch Position				Address No.	Example
		1	2	3	4		
1	A	OFF	OFF	OFF	OFF	#1	
	B	ON	OFF	OFF	OFF	#9	
2	A	OFF	OFF	OFF	ON	#2	
	B	ON	OFF	OFF	ON	#10	
3	A	OFF	OFF	ON	OFF	#3	
	B	ON	OFF	ON	OFF	#11	

**Table 2.5 DIP Switch Settings for Lithium Battery Cabinet Strings (continued)**

String No.	Cabinet No.	DIP Switch Position				Address No.	Example
		1	2	3	4		
4	A	OFF	OFF	ON	ON	#4	
	B	ON	OFF	ON	ON	#12	
5	A	OFF	ON	OFF	OFF	#5	
	B	ON	ON	OFF	OFF	#13	
6	A	OFF	ON	OFF	ON	#6	
	B	ON	ON	OFF	ON	#14	
7	A	OFF	ON	ON	OFF	#7	
	B	ON	ON	ON	OFF	#15	
8	A	OFF	ON	ON	ON	#8	
	B	ON	ON	ON	ON	#16	

## 2.8 Communication Connections

The communication ports include:

- Vertiv™ Liebert® IntelliSlot™ card port
- RS-232 port
- I/O, programmable dry contacts
- REPO port
- Serial port
- USB port
- Multi-function port

### 2.8.1 Liebert IntelliSlot Ports

The UPS has one Liebert IntelliSlot port on the rear of the unit.

**Table 2.6** below, describes the cards available. The instructions for configuring and using the cards are available at [www.Vertiv.com](http://www.Vertiv.com).

**Table 2.6 Liebert® IntelliSlot™ Communication Cards**

Card	Description
Liebert IS-UNITY-DP Card	Communicates with up to two third-party platforms including SNMP, Modbus, BACnet and YDN-23 protocols to network-connected Vertiv monitoring/shutdown applications or third-party shutdown software.
Liebert IS-Relay Card	Provides dry contact alarm information, including signals for: On Battery, On Bypass, Low Battery, Summary Alarm, UPS Fault and On UPS for communication to a remote monitoring system or network-connected Vertiv or third-party shutdown software. The card also accepts input signals to shut down the UPS during any operating mode.



## 2.8.2 REPO Connection

The **Table 2.7** below, describes the pin-out of the REPO port used for N.O. or N.C. connection.

**Table 2.7 REPO Port Pin Descriptions**

J14 Pin #	Pin Name	Description
9	+5VDC	REPO Power Supply, 5 VDC, 100mA
10	REPO Coil N.C.	Normally Closed circuit, EPO is activated when Pin 9 – Pin 10 is opened
11	REPO Coil N.O.	Normally Open circuit, EPO is activated when Pin 11 – Pin 12 is closed
12	GND	REPO Circuit Ground

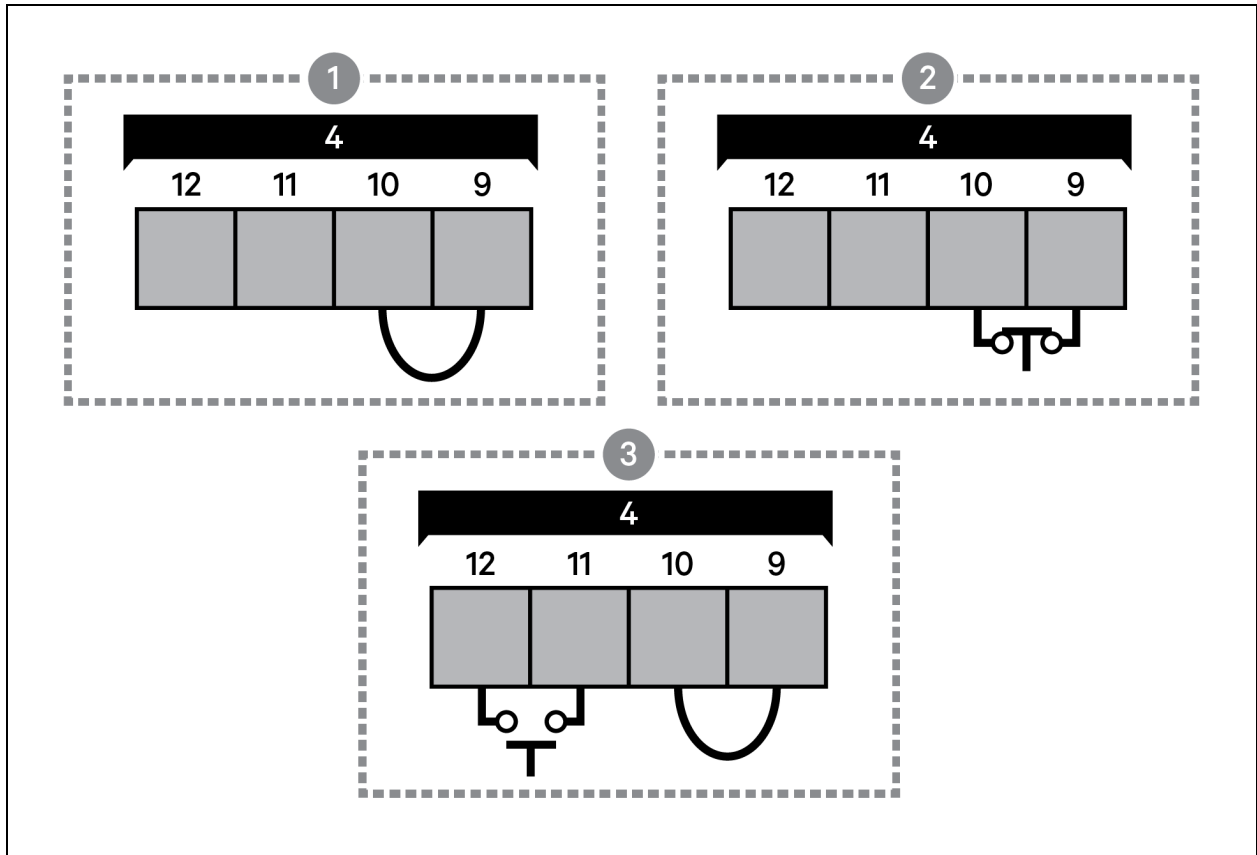
**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. The EPO action of the UPS will shut down the rectifier, inverter and static bypass, but it does not disconnect input power to the UPS. To electrically isolate the UPS, disconnect the upstream input feeder breaker when generating the EPO.**

**Figure 1.2** on page 4, shows the location of the REPO connection on the UPS rear panel. **Figure 2.15** on the next page, shows the connection details.

If a REPO connection is not required for the UPS, the factory-installed jumper between Pin 9 and Pin 10 must remain installed for the UPS to operate.

**NOTE: The terminal block wire range is 18AWG ~ 22AWG (0.82 mm<sup>2</sup> ~ 0.33 mm<sup>2</sup>), and we recommend using 18AWG copper, shielded signal cable.**

Figure 2.15 REPO Connections Detail



Item	Description
1	No REPO connection—Factory-supplied jumper must remain installed.
2	Normally closed (N.C.) connection—Remove factory-supplied jumper and wire Pins 2 and 4 to a remote switch.
3	Normally open (N.O.) connection—Factory-supplied jumper must remain installed.
4	Port 5/REPO input. See <b>Table 27</b> on the previous page, for the pin-out details.

### 2.8.3 Dry Contact Connections

The UPS includes five dry contact ports described in **Table 28** on the facing page. The location of the ports is shown in **Figure 1.2** on page 4.

For Ports 1 to 4, the I/O dry contact port capacity is 125VAC, 0.5A; 30VDC, 1A

**Table 2.8 Dry Contact Ports and Pin-Out**

Port Number/Name	Pin Number	Pin Name	Description
1/Output Port 1	1	LOW_ BATTERY/ON_ BATTERY/ON_ BYPASS/UPS_ FAULT/Main back-feed protection enabled	Default: LOW_BATTERY, can be set via the LCD settings page. User can choose dry contact as NO/NC. When NO (default) and there is an alarm active on the system, Pin 1 and Pin 2 are shorted. When NC and there is an alarm active on the system, Pin 1 and Pin 2 are open. If then user would like to change Dry contact function to "main backfeed" via Paramset or MCU, dry contact status can only be NO, user can not choose dry contact as NC due to main backfeed function design logic.
	2	GND	Ground
2/Output Port 2	3	LOW_ BATTERY/ON_ BATTERY/ON_ BYPASS/UPS_ FAULT/ Bypass back-feed protection enabled	Default: UPS_FAULT, can be set via the LCD settings page. User can choose dry contact as NO/NC. When NO (default) and there is an alarm active on the system, Pin 3 and Pin 4 are shorted. When NC and there is an alarm active on the system, Pin 3 and Pin 4 are open. If then user would like to change Dry contact function to "bypass backfeed" via Paramset or MCU, dry contact status can only be NO, user can not choose dry contact as NC due to bypass backfeed function design logic.
	4	GND	Ground
3/Input Port 1	5	Battery Mode shutdown/Any mode shutdown (Remote Comms Shutdown)/ Maintain mode	Default: Maintain mode, can be set via the LCD settings page and dry contact is NO by default. User can not choose dry contact as NC. For Battery mode shut-down and any mode shut-down, user can choose dry contact as NO/NC. When NO (default), Pin 5 and Pin 6 are shorted, the function is active. When NC, Pin 5 and Pin 6 are open, the function is active. When the Pin 5 and Pin 6 signal returns to the original state, the UPS will power on the inverter automatically.
	6	GND	Ground
4/Input Port 2	7	Battery mode shutdown/Any mode shutdown (Remote Comms Shutdown)/ Maintain mode	Default: Maintain mode, can be set via the LCD settings page and dry contact is NO by default, User can not choose dry contact as NC. For Battery mode shut-down and Any mode shut-down, User can choose dry contact as NO/NC. when NO (default), Pin 7 and Pin 8 are shorted, the function is active. When NC, Pin 7 and Pin 8 are open, the function is active. When the Pin 7 and Pin 8 signal returns to the original state, the UPS will power on the inverter automatically.
	8	GND	Ground
5/REPO Input Port	9	+5V	REPO power supply, 5VDC 100 mA
	10	REPO Coil-NC	NC, EPO activated when Pin 9 and Pin 10 are open.
	11	REPO Coil-NO	Trigger REPO when Pin 11 and Pin 12 are closed.
	12	GND	REPO Ground

## 2.8.4 Connecting USB Communication Cables

A standard, USB Type B port is provided to connect to a computer or network server. The protocol is USB HID for Power Devices.

## 2.9 Connecting Serial Port Communication Cables

To connect the serial port communication cable, connect one end of the DB-9 serial port communication cable to the DB-9 serial port on the rear panel of the UPS. Connect the other end to the computer's DB-9 port. The port uses the RS-232 protocol.

**Table 2.9 DB-9F Pin-Out Description**

Pin No.	Function
2	TX (Send data)
3	RX (Receive data)
5	Common

### 2.9.1 Connecting Multi-Function Port (RJ-45)

The multi-function port is a standard RJ-45 connection that supports Modbus/Jbus protocol, and on units with a terminal block battery connector, it connects Vertiv temperature and temperature/humidity sensors. When connecting 2U battery cabinets, you must use this port to automatically detect the number of battery strings and for temperature-compensated charging. You can configure the port function using the Operation and Display panel.

## 3 Operation and Display Panel

The operation/display panel includes LED indicators, function keys, and an LCD interface to configure and control UPS operation.

Figure 3.1 UPS Front Panel Display

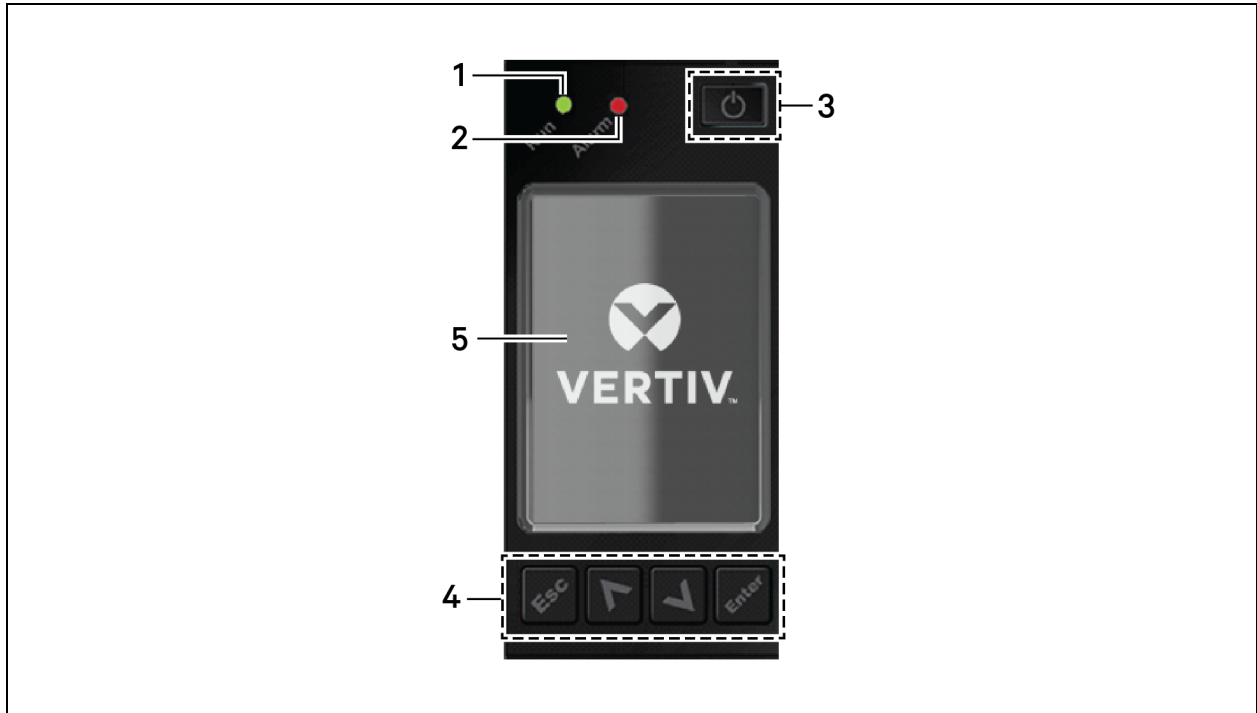







Table 3.1 Display Panel Button Functions and Descriptions

Button	Function	Description
	Enter	Confirm or enter selection.
	Up	Move to previous page, increase value, move left.
	Down	Move to next page, decrease value, move right.
	Escape	Go back.
	Power	Power-on the UPS, power-off the UPS, transfer to Bypass Mode.

**NOTE:** While the UPS is operating, the LCD will dim and display a screen saver if there is no active alarm or user interaction for 2 minutes, see **Figure 3.2** below . If an alarm or fault occurs or if any button is pressed, the UPS-flow screen displays.

**Figure 3.2 LCD Screen Saver**



### 3.1 LED Indicators

The LEDs on the front panel display indicate operation and alarm status of the UPS.

**Table 3.2 LED Functions**

Indicator	LED Color	LED State	Indicates:
Run Indicator	Green	On	UPS has output
		Blinking	Inverter is starting
		Off	UPS has no output
Alarm Indicator	Yellow	On	Alarm occurs
	Red	On	Fault occurs
	N/A	Off	No alarm, no fault

### 3.2 Audible Alarm (Buzzer)

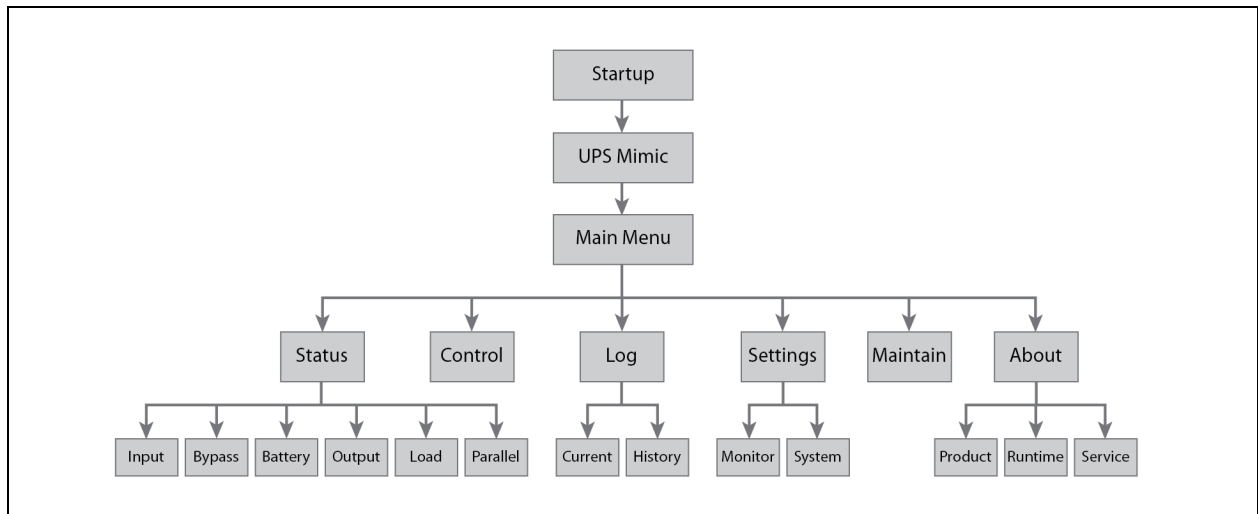
An audible alarm accompanies various events during UPS operation. **Table 3.3** on the facing page , describes the sounds and their meaning. To silence an alarm, see [Silencing the Audible Alarm](#) on page 53 .

**Table 3.3 Audible Alarm Descriptions**

Sound	Indicates:
Continuous beep	Generated when a UPS fault appears, such as a fuse or hardware failure.
One beep every 0.5 seconds	Generated when a UPS critical alarm appears, such as an inverter overload.
One beep every 1 second	Generated when a UPS critical alarm appears, such as on-battery low voltage.
One beep every 3.3 seconds	Generated when a UPS general alarm appears.

### 3.3 LCD Menu and Screens

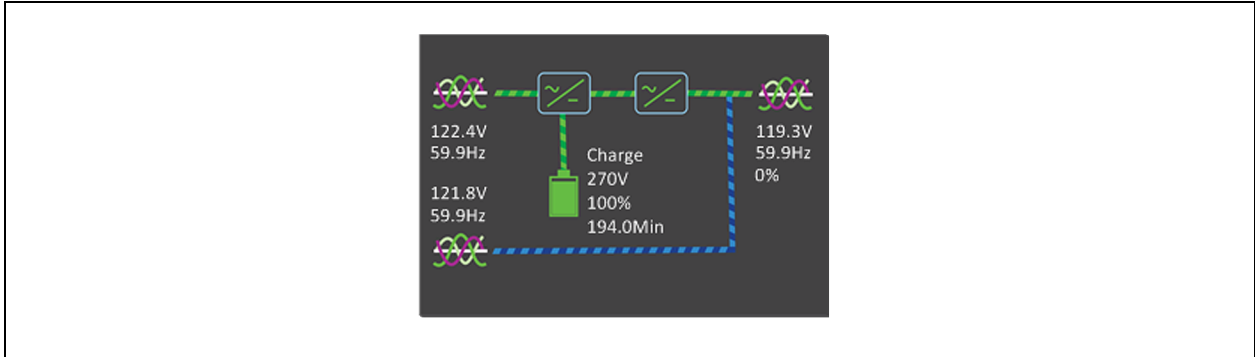
The menu-driven LCD user interface lets you browse the UPS status, view operating parameters, customize settings, control operation and view alarm/event history. Use the function keys to navigate through the menu, and view statuses or select settings in the screens.

**Figure 3.3 LCD Menu Structure**

### 3.3.1 Startup and UPS Mimic Screens

At startup, the UPS executes a system test and displays the Vertiv™ logo screen for 10 to 15 seconds, shown in **Figure 3.1** on page 41. After the test completes, an overview screen shows status information, the active (green) power path and the non-working power path (gray).

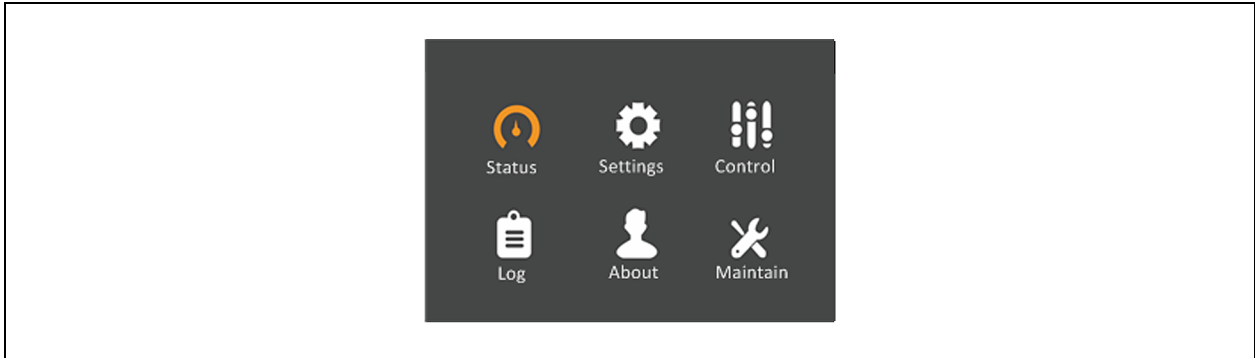
**Figure 3.4 UPS Mimic Screen**



### 3.3.2 Main Menu

To access the Main Menu, press *Enter* while at the UPS Mimic screen. Use the *Up/Down* buttons to select the submenu options, and press *Enter* to open the submenu. Press *ESC* to return to the UPS Mimic.

**Figure 3.5 Main Menu**



**Table 3.4 Menu Options**

Submenu	Description
Status	Voltage, current, frequency and parameters for UPS components, see <a href="#">Status Screen</a> on the facing page .
Settings	Display and system parameter settings, see <a href="#">Settings Submenu</a> on the facing page .
Control	UPS controls, see <a href="#">Control Screen</a> on page 46 .
Log	Current alarms and event history, see <a href="#">Log Screen</a> on page 46 .
About	Product and network information, see <a href="#">About Page</a> on page 47 .
Maintain	Service-only, proprietary, password-protected page for use only by Vertiv service representatives.



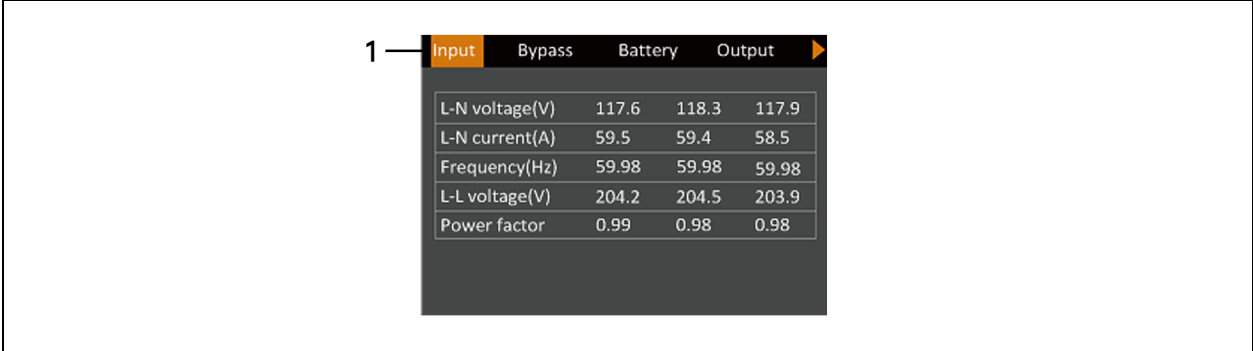
## Status Screen

The Status Screen displays voltages, currents, frequencies and parameters on individual tabs for input, bypass, battery, output and load status.

To view the UPS status information:

1. At the main menu, select the *Status icon*, and press *Enter*.
2. Use the arrow buttons to move the cursor left/right and select a tab, then press *Enter* to display the status information for the selected tab.

Figure 3.6 Status Screen Tabs



	Input	Bypass	Battery	Output
L-N voltage(V)	117.6	118.3	117.9	
L-N current(A)	59.5	59.4	58.5	
Frequency(Hz)	59.98	59.98	59.98	
L-L voltage(V)	204.2	204.5	203.9	
Power factor	0.99	0.98	0.98	

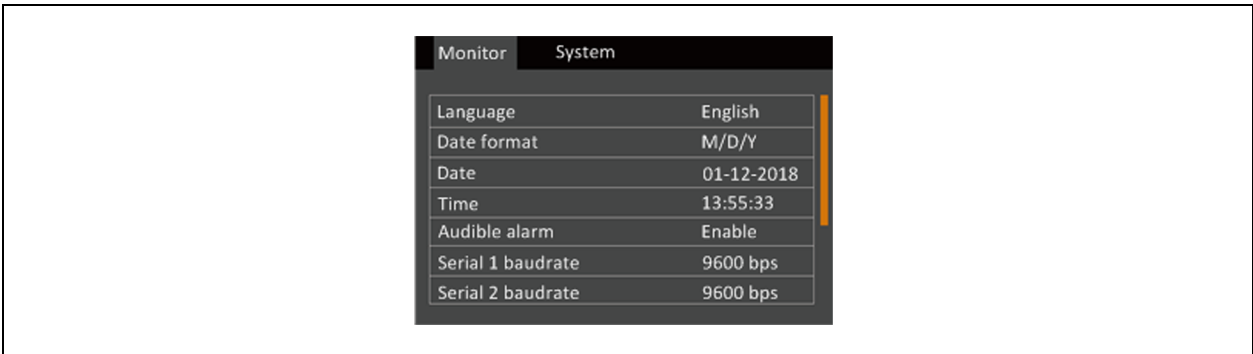
Item	Description
1	Screen tabs with Input tab selected.

## Settings Submenu

The Settings Screen consists of tabs that list UPS settings described in **Table 3.5** on page 48.

**NOTE:** To adjust the settings, you must enter a password. See [Editing Display and Operation Settings](#) on page 47, for details on entering the password and editing the setting parameters.

Figure 3.7 Monitor and System Tabs on the Settings Submenu



Monitor	System
Language	English
Date format	M/D/Y
Date	01-12-2018
Time	13:55:33
Audible alarm	Enable
Serial 1 baudrate	9600 bps
Serial 2 baudrate	9600 bps

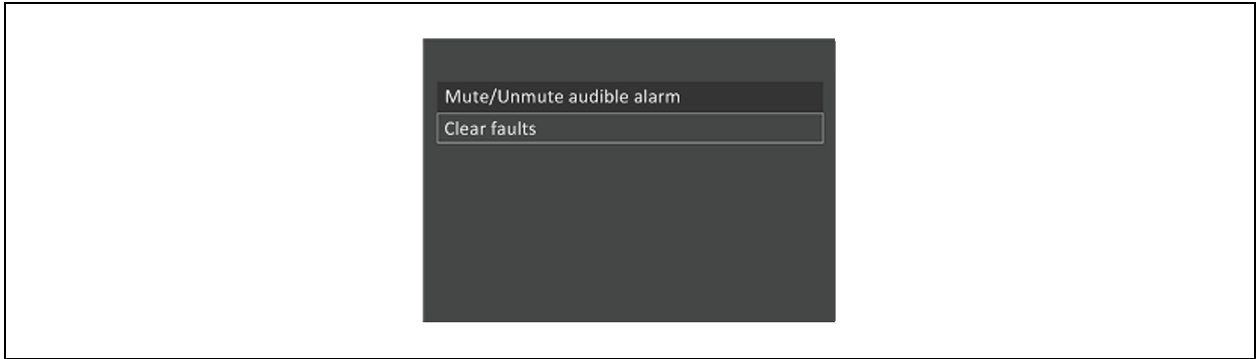
## Control Screen

The Control Screen offers UPS-control options.

### To adjust the UPS controls:

1. At the main menu, select the *Control icon*, and press *Enter*.
2. Use the arrow buttons to move the cursor to the option, then press *Enter* to selected the control.

Figure 3.8 Control Screen



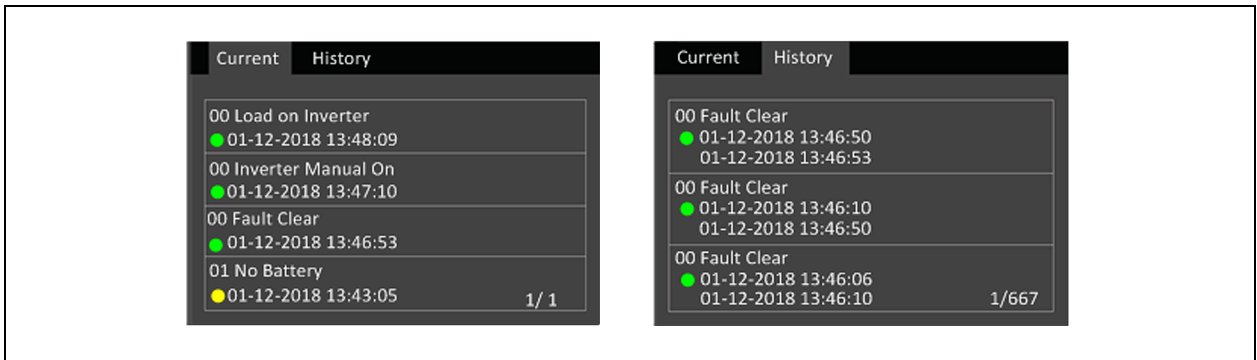
## Log Screen

Log Screen tabs list the current alarms and the alarm/event history.

### To view the logs:

1. At the Main Menu, select the *Log icon*, and press *Enter*.
2. Use the arrow buttons to move the cursor left/right and select a tab, then press *Enter* to display the log for the selected tab.

Figure 3.9 Current and History Log Tabs



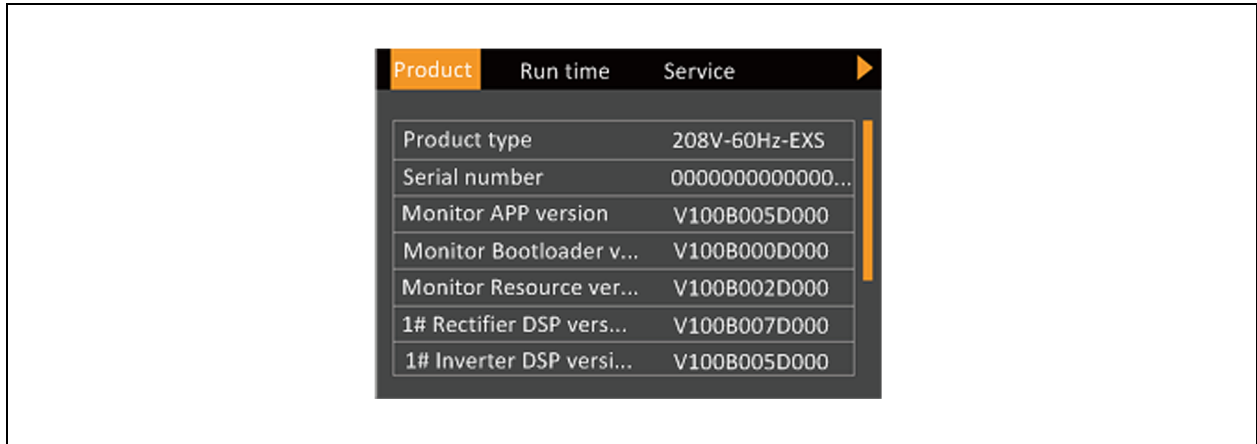
## About Page

The About Page tabs list information about the product and the network.

### To view the product and network information:

1. At the Main Menu, select the *Settings icon*, and press *Enter*.
2. Use the arrow buttons to move the cursor left/right and select a tab, then press *Enter* to display the information for the selected tab. The options available are described in **Table 3.5** on the next page .

**Figure 3.10 About Screen Tabs**



## 3.4 Editing Display and Operation Settings

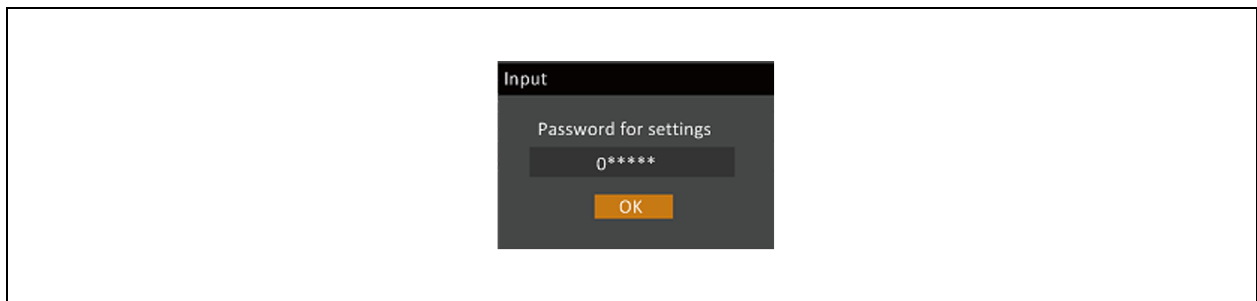
You may adjust the display settings and UPS configuration via the LCD. **Table 3.5** on the next page , describes the settings. The display and operation settings are password projected. The default password is 111111 (six ones).

**NOTE: We recommend that you change the password to protect your system and equipment and record the new password and store it in an accessible location for later retrieval. See [Changing the Password](#) on page 50 .**

### To enter the password:

1. Press the up arrow button to change the digit, then press the down arrow button to move to the next digit.
2. Repeat to select each digit, and press *Enter* to submit the password.

**Figure 3.11 Password Prompt**



**Table 3.5 Settings Available at the Display Panel**

Tab	Settings	Parameter range	Default setting
System	Auto restart	Disable, Enable	Enable
	Auto restart delay	0 - 999 seconds	0
	Guaranteed Shutdown	Disable, Enable	Disable
	Remote Control	Disable, Enable	Enable
	Remote Power ON delay	0 - 999 seconds	0
	Remote Shutdown delay	0 - 999 seconds	0
	LBS Select	Disable, Enable	Disable
	IT Earthing System	Disable, Enable	Disable
	Dry Contact 1 (Output)	Low battery, On bypass, On battery, UPS fault	Low battery
	Dry Contact 2 (Output)	Low battery, On bypass, On battery, UPS fault	UPS fault
	Dry Contact3 Input	Maintain mode, Any mode shutdown, Battery mode shutdown	Maintain mode
Dry Contact4 Input	Maintain mode, Any mode shutdown, Battery mode shutdown	Maintain mode	
Output	Voltage Selection	208/220V	208V
	Startup On Bypass	Disable, Enable	Disable
	Frequency Selection	Auto w/ Bypass Enable, Auto w/ Bypass Disable, 50Hz w/ Bypass Disable, 60Hz w/ Bypass Disable	Auto w/ Bypass Enable
	Inverter Sync Range	±0.5Hz, ±1.0Hz, ±2.0Hz, ±3.0Hz, ±4.0Hz, ±5.0Hz,	±3.0Hz
	Bypass Voltage Upper Limit	+10%	+10%
	Bypass Voltage Lower Limit	-10%, -15%, -20%	-10%
	Bypass Frequency Range	±5.0Hz, ±10.0Hz	±10.0Hz
	Run Mode	Normal, ECO Mode	Normal
	ECO Voltage Range <b>NOTE: ECO options appear only when in ECO Mode</b>	±10%	±10%
	ECO Frequency Range	±1.0Hz, ±2.0Hz, ±3.0Hz	±3.0Hz
ECO Requalification Time	5, 15, 30 minutes	5	
Parallel	Voltage Selection	208/220V	208V
	Frequency Selection	Auto w/ Bypass Enable, Auto w/ Bypass Disable, 50Hz w/ Bypass Disable, 60Hz w/ Bypass Disable	Auto w/ Bypass Enable
	Run Mode	Normal, ECO Mode	Normal
	Redundant	No, Yes	Yes
	System Parallel Number	1 – 2	1
	Output Phases	3 Phase	3 Phase
	Sync Parallel Parameters	By HMI Interface Button	N/A

**Table 3.5 Settings Available at the Display Panel (continued)**

Tab	Settings	Parameter range	Default setting
Battery	Shared Battery	Disable, Enable	Disable
	Local Battery total AH	9 - 45	9
	Low Battery Time	2 – 30 minutes	2
	Battery Replaced Time	YYYY-MM-DD HH:MM:SS	2000-01-01 00:00:00
	Battery Test Interval	Disable, 8, 12, 16, 20, 26 weeks	Disable
	Battery Test Weekday	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday	Wednesday
	Battery Test Time	HH:MM:SS	00:00:00
	Battery Series	24, 32	32
	Discharge Protect Time	1 – 4320 minutes	4320
	Equalize Charge Enable	No, Yes	No
	Temperature Compensation	Disable, Enable	Enable
Replace Battery	Prompt will reset battery parameters, Continue Yes/No	No	
Monitor	Language	English, Chinese, French, Portuguese, Spanish	English
	Date	YYYY-MM-DD	2016-10-01
	Time	HH:MM:SS	00:00:00
	Display Orientation	Auto rotate, Horizontal, Vertical	Auto Rotate
	Audible Alarm	Disable, Enable	Enable
	UPS Comm Address	01	01
	Control Port Protocol	Modbus, Sensor	Sensor
	Modbus Address	1 – 128	1
Change Settings Password	0 – 9, must be six digits in length	111111	
Outlet	Turn outlet ON	-	Appears only when outlet is off
	Turn outlet OFF	-	Appears only when outlet is on
	Reboot outlet	-	Appears only when outlet is on
	Turn off when UPS overload on battery	Yes, No	No
	Turn off when UPS on battery for	0-4320 minutes	2
	Turn off when backup time less than	0-4320 minutes	0
	Turn off when battery capacity less than	20-80%	30%
Turn on when power returns for	0-4320 minutes	0	

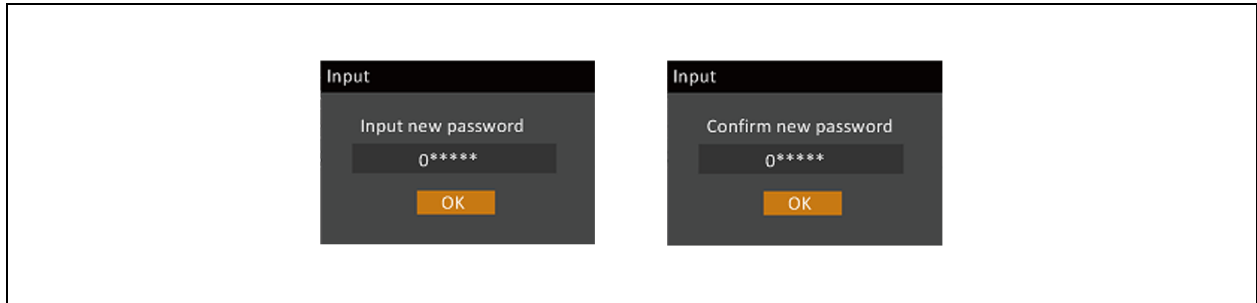
### 3.4.1 Changing the Password

The default password is 111111 (six ones). You must use the current password to change the password.

**NOTE: We recommend that you change the password from the default to protect your system and equipment. Record the new password and store it in an accessible location for later retrieval.**

1. At the main menu, select the *Settings icon*, and press *Enter*.
2. At the password prompt, use the up-arrow to select the first digit, press the down-arrow to move to the next digit, repeat for each digit, then press *Enter* to access the settings.
3. Use the arrow buttons to select the Monitor tab, then press *Enter*.
4. Use the down arrow to highlight *Change Settings Password*, press *Enter*, and re-enter the current password. **The Input new password dialog opens, see Figure 3.12 below .**
5. Enter the new password, then confirm the new password.  
A confirmation dialog opens to indicate a successful password change.
6. Press *ESC* to return to the settings or main menu.

**Figure 3.12 New and Confirm Password Dialogs**



### 3.4.2 Selecting the Display Language

The LCD will display text in English, French, Portuguese, Spanish, Chinese, Czech, Dutch, German, Italian, Polish, Russian, Swedish and Turkish.

**To change the language:**

1. At the Main Menu, select the *Settings icon*, and press *Enter*.
2. At the password prompt, use the up arrow to select the first digit, press the down arrow to move to the next digit, repeat for each digit, then press *Enter* to access the settings.
3. Use the arrow buttons to select the Monitor tab, then press *Enter*.
4. Use the down arrow to highlight *Language*, then press *Enter*.
5. Use the up/down arrows to select the language, then press *Enter*.  
All the LCD elements display in the selected language.

### 3.4.3 Setting the Date and Time

**To adjust the date and time:**

1. At the Main Menu, select the *Settings icon*, and press *Enter*.
2. At the password prompt, use the up-arrow to select the first digit, press the down-arrow to move to the next digit, repeat for each digit, then press *Enter* to access the settings.

3. Use the arrow buttons to select the Monitor tab, then press *Enter*.
4. Use the down arrow to highlight *Date* or *Time*, then press *Enter*.
5. Use the up/down arrows to select the date/time, then press *Enter* to confirm.

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## 4 Operating the UPS

### 4.1 Silencing the Audible Alarm

If the audible alarm is enabled, it may sound during UPS operation. To silence the alarm, press and hold the *ESC* button for 3 seconds. The button is on the front panel display, see [Operation and Display Panel](#) on page 41.

### 4.2 UPS Startup

Perform startup only after the UPS installation is complete, all UPS wiring is complete and all exterior access panels that were removed for installation are replaced on the UPS.

The startup procedure starts the UPS in Normal Mode providing clean and protected AC power to the connected equipment.

#### To start the UPS:

1. Close the upstream feeder breakers for the UPS rectifier and bypass (if wired as dual-input).
2. Close all downstream breakers including distribution panel main breaker and/or branch circuit breakers.
3. If external battery cabinet(s) are installed, close the EBC breaker.
4. If optional POD's are installed, verify that all distribution breakers on the POD's are closed.
5. Ensure that the UPS maintenance bypass breaker (MBB) on the front of the UPS is OPEN and the mechanical interlock is secured in the lower position (near the breaker handle).
6. Close the Rectifier Input Breaker (RIB), Bypass Input Breaker (BIB), and Maintenance Isolation Breaker (MIB) on the of the UPS.

#### NOTE: The MIB is also the main output breaker of the UPS.

When the RIB and BIB breakers are closed, the UPS automatically begins the startup process and the boot-up system checks, which take 20-30 seconds.

7. Before continuing to Step 8, make any changes/customization to the UPS operating parameters for the installation or application, see [Editing Display and Operation Settings](#) on page 47.
8. After the system checks complete and/or operating parameters are set, press the power button at the front panel display, then use the up/down arrow buttons to confirm *Turn on local INV*, see **Figure 4.1** below.

**Figure 4.1 Turn on Local INV**



### 4.3 Transferring from Normal (Inverter) to Bypass Mode

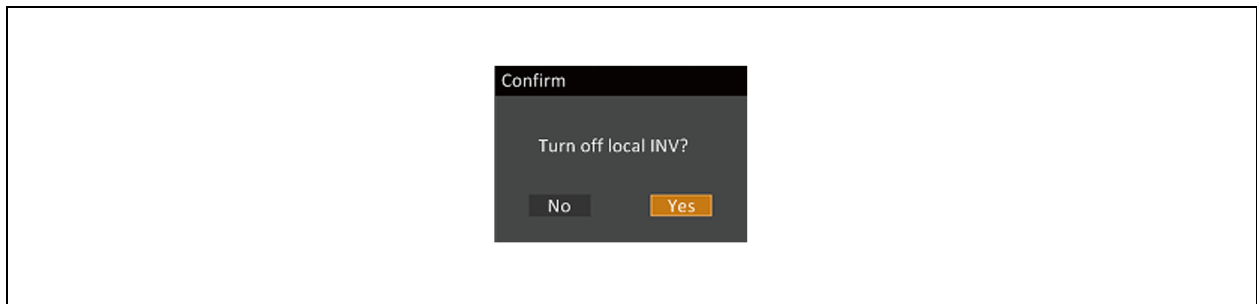
**NOTE:** When the UPS is in Bypass Mode, the load is not protected. It is powered directly by utility power.

To transfer to the internal bypass/turn Off when the UPS is in Normal Mode:

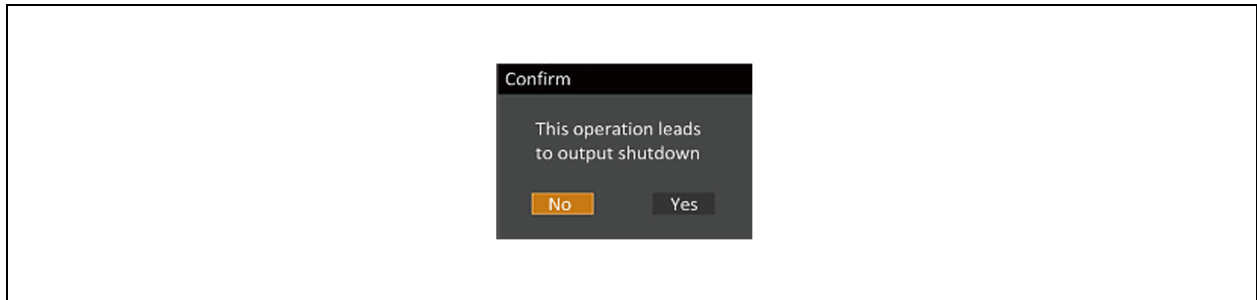
Press and hold the power button for 2 seconds.

- If the bypass power is within normal operating range, the option to turn Off the local inverter will be displayed; see **Figure 4.2** below . Confirming this selection initiates a transfer to internal bypass operation.
  - a. Use the up/down arrows to select *No* or *Yes*, or press *ESC* to cancel.
  - b. Press *Enter* to confirm the action.
  - c. Press *Enter* again.
- If the bypass power is outside normal operating range, the option to shut down the output will be displayed; see **Figure 4.3** below .
  - a. Use the up/down arrows to select *No* or *Yes*, or press *ESC* to cancel.
  - b. Press *Enter* to confirm the action.

**Figure 4.2 Turn Off INV-Bypass Power in Normal Range**



**Figure 4.3 Output Shutdown-Bypass Power Outside Normal Range**



## 4.4 Transferring from Bypass to Normal (Inverter) Mode

To transfer to the inverter (normal operation) or turn on the UPS when the UPS is on Internal Bypass Mode:

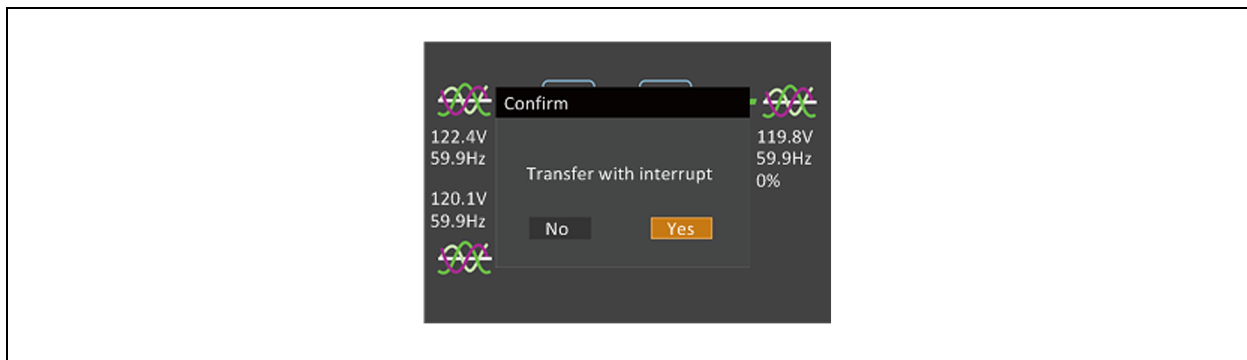
Press and hold the power button for 2 seconds.

- If the UPS is configured for normal operation, the option to turn On the local inverter will be displayed; see **Figure 4.4** below .
  - a. Use the up/down arrows to select *No* or *Yes*, or press *ESC* to cancel.
  - b. Press *Enter* to confirm the action.
  - c. Press *Enter* again.
- If the "Bypass unable to trace" alarm occurs, the option to transfer with interrupt displays, see **Figure 4.5** below .
  - a. Use the up/down arrows to select *No* or *Yes*, or press *ESC* to cancel.
  - b. Press *Enter* to confirm the action.

**Figure 4.4 Turn on Local INV**



**Figure 4.5 Transfer with Interrupt**



## 4.5 Transferring to Maintenance Bypass Mode

The transfer procedure puts the UPS in Maintenance Bypass Mode for safe servicing by a Vertiv service technician.

### To transfer from normal operation to maintenance-bypass mode:

1. Press and hold the power button for 2 seconds.
  - If the bypass power is within normal operating range, the option to go to bypass will be displayed.
    - a. Select *Turn off local INV.*
    - b. Press *Enter* to confirm the action.
    - c. Press *Enter* again.
  - If the bypass power is outside normal operating range, the only option is to turn Off the UPS of the unit to gain access to the Maintenance Bypass Breaker (MBB).
2. Loosen the thumbscrew on the mechanical interlock on the MBB.
3. Slide the interlock and tighten the thumbscrew to secure the interlock in place.
4. Close the MBB.
5. Press and hold the power button for 2 seconds.
6. Electrically isolate the UPS module from AC power input by opening the Rectifier Input Breaker (RIB), Bypass Isolation Breaker (BIB), and Maintenance Isolation Breaker (MIB). If external battery cabinets are installed, open the EBC breaker(s).

## 4.6 Transferring from Maintenance Bypass to Normal Mode

### To transfer from Maintenance Bypass to normal operation:

1. Ensure that the mechanical interlock is still secured in the unlocked position.
2. If external battery cabinet(s) are installed, close the EBC breaker.
3. of the UPS, close the rectifier input breaker (RIB), bypass input breaker (BIB), and maintenance isolation breaker (MIB).  
The UPS performs startup checks and begins operating in Internal Bypass Mode.
4. Verify that the UPS is operating in Internal Bypass Mode before proceeding.
  - If the unit is not in Bypass Mode, see [Transferring from Normal \(Inverter\) to Bypass Mode](#) on page 54, for the steps.

### NOTICE

Risk of improper operation. Failure to have the UPS operating on internal bypass and performing the next step will result in loss of all output power to the connected equipment.

5. On the front of the UPS, open the maintenance bypass breaker (MBB)
6. Loosen the thumbscrew on the mechanical interlock on the MBB
7. Slide the interlock and tighten the thumbscrew to secure the interlock in place.
8. Press and hold the “POWER” button for 2 seconds.
9. Select the operation *Turn on UPS*
  - a. Select *Turn on UPS.*
  - b. Press *Enter* to confirm the action.
  - c. Press *Enter* again.

## 4.7 Remote Emergency Power Off (REPO)

The UPS is equipped with a remote emergency power off (REPO) connector for normally open (N.O.) or normally closed (N.C.) systems. See [REPO Connection](#) on page 37 , for connection details.

Consult national and local wiring codes to determine if additional REPO is required for the external UPS rectifier and bypass feeds.

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## 5 Maintenance

**WARNING! Risk of electrical shock. Can cause property damage, injury and death. The unit has several circuits that are energized with high DC and AC voltages. Check for voltage with both AC and DC voltmeters before making contact and before working within the UPS. Only properly trained and qualified personnel wearing appropriate, OSHA-approved personal protective equipment (PPE) should prepare for installation, install and maintain the equipment. When performing maintenance with any part of the equipment under power, service personnel and test equipment must stand on rubber mats.**

**WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked out and tagged appropriately to prevent activation during the installation. After the power cables are connected, the terminal block's protective cover must be reinstalled to remove the electric shock hazard.**

**WARNING! Risk of heavy unit falling. Improper handling can cause equipment damage, injury, and death. Exercise extreme care when handling unit cabinets and rack-mounted units to avoid equipment damage or injury to personnel. The UPS weighs approximately 50.7 lb. (23kg).**

### 5.1 Cleaning the UPS

Clean the UPS periodically, especially the ventilation holes, to ensure free air flow inside the UPS. If necessary, clean the UPS with a vacuum cleaner or wipe with a dry cloth. Confirm that the ventilation holes are unobstructed.

### 5.2 Routine Maintenance

There are no user-serviceable parts in the UPS. Attempting to service the unit yourself can void the warranty.

Any routine maintenance other than cleaning, must be performed by a Vertiv™ service technician. Visit <http://www.Vertiv.com/en-us/support/>, or contact your Vertiv representative.

## Battery Safety

If the battery kit is damaged in any way or shows signs of leakage, contact Vertiv technical support immediately. Handle, transport and recycle batteries in accordance with local regulations.

**WARNING! Risk of electrical shock. Can cause personal injury and death. When connected together, battery terminal voltage is potentially lethal. Be constantly aware that the battery system contains high DC and AC voltages. Check for the presence of voltage using DC and AC voltmeters before making contact with terminals.**

**CAUTION: Do not dispose of the battery in a fire. The battery may explode. Do not open or damage the battery. Released electrolyte is harmful to skin and eyes. If electrolyte comes into contact with the skin, wash the affected area immediately with plenty of clean water and get medical attention.**

A battery can present a risk of electrical shock and high short-circuit current. The following precautions should 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 if the battery is grounded. If it is grounded, remove the source of the ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if grounds are removed during installation and maintenance (applicable to a UPS and a remote battery supply not having a grounded supply circuit).

The UPS is equipped with long-life, sealed, valve-regulated, lead-acid batteries (VRLA), also known as “maintenance-free” batteries. The battery life depends upon the operating ambient temperature of the UPS system. To prolong battery life:

- Keep the ambient temperature between 59°F and 77°F (15°C and 25°C)
- Prevent long, low-current discharges.
- Charge the battery for at least 8 hours if the battery hasn't been charged for 3 months when it has been stored at the specified ambient temperature, or 2 months when it has been stored at high ambient temperature

The waste lead-acid battery is dangerous waste material. Its storage, transportation, usage, and disposal must follow national and local laws and other criteria about dangerous waste material and waste battery pollution prevention.

Per the applicable regulations, recycle the waste lead-acid battery. Other disposal methods are prohibited. Disposing of the waste lead-acid battery in a landfill or other waste dump can result in serious environmental pollution and violates national and local laws.

Vertiv has a service network and recycle system to assist in complying with laws governing waste battery disposal. Visit <http://www.Vertiv.com/en-us/support/> for information about recycling the waste battery.



## 6 Specifications

Table 6.1 Specifications

Item	Description	8 kVA	10 kVA
Input 3-Phase, 4W+Gnd	Rated Voltage	208/220VAC, 3-Phase, 4W+Gnd	
	Voltage Range, VAC	96 ~ 144	
	Rated Frequency, Hz	60	
	Frequency Range, Hz	40 ~ 70	
	Power Factor	≥0.99, at full load; ≥0.98, at half load	
Output 3-Phase, 4W+Gnd	Rated Power	8 kVA/7.2kW	10kVA/10kW
	Voltage	208/120VAC (3 Phase, 4W + Gnd)	
	Frequency Synchronization Range	Rated frequency ±3Hz. Configurable range: ±0.5Hz ~ ±5Hz	
	Frequency Track Rate	0.5Hz/s. Configurable Range: 0.2/0.5/1Hz/s (Single UPS), 0.2Hz/s (Parallel System)	
	Rated Power Factor	0.9	1
	Crest Factor	3:1	
	Voltage Harmonic Distortion	< 4% (linear load); < 5% (non-linear load)	
	Dynamic Response Recovery Time, ms	60	
	Overload Capacity	At 25°C: 105% ~ 125%, 10min; 125% ~ 150%, 1min; 150%, 200ms	
	Bypass Voltage	Upper Limit: +10% Lower Limit: -10%, -15%, -20%; default -10%	
	AC-AC Efficiency	Up to 93.4%	
Battery	Type	- Sealed, Lead-Acid, Maintenance-Free - LFP Lithium Ion	
	Number of Cells	192 by Default	
	Rated Voltage, VDC	384	
	Maximum Charge Current, A	1.8	3.5
Transfer Time	Utility to Battery, ms	0	0
	Inverter to Bypass	Synchronous Transfer: ≤0ms Asynchronous Transfer (default): ≤20ms (40ms, 60ms, 80ms, 100ms and 200ms are available)	
Noise, db	<55		
Panel Display Mode	Color LCD		
Safety	IEC/EN62040-1; UL/CSA cULus (UL 1778 5th Edition, CSA No.222 107.3)		
EMC	Conduction Emission	IEC/EN62040-2; FCC Part 15, Class A	
	Harmonic Current	IEC/EN61000-3-12	

**Table 6.1 Specifications (continued)**

Item	Description	8 kVA	10 kVA
Surge Protection		IEC/EN-61000-4-5, Endurance Level 4 (4kV) (live line to earth), Level 3 (2kV) (during live lines); ANSI C62.41, 6kV/20hms	
Protection Level		IP20	
Ambient Condition	Operating Temperature	32 ~ 122°F (0 ~ 50°C), no derating	32 ~ 122°F (0 ~ 50°C), automatic derating to 8kVA/kW above 104°F (40°C)
	Storage Temperature	No Battery: -40 ~ 158°F (-40 ~ +70°C); With Battery: -13 ~ 131°F (-25 ~ +55°C)	
	Relative Humidity	5% RH ~ 95% RH, non-condensing	
	Altitude, ft. (m)	Sea Level to 10,000 ft. (3000m) without derating	
Dimensions, W x D x H, in. (mm)	UPS	16.9 x 25.8 x 5.1 (430 x 656 x 130)	
	VRLA Battery Cabinet - ITA2-BCI0020K02 (Quantity of 2)	16.9 x 29.6 x 3.3 (430 x 751 x 85) per cabinet	
	1U Li-Ion Battery Cabinet - ITA2-BCI0020KL1 (Quantity of 2)	Net: 16.9 X 29.13 X 1.67 (430x740x42.5) per cabinet Shipping: 39.4 x 31.5 x 11.2 (1000 x 800 x 285)	
	2U Li-Ion Battery Cabinet - ITA2-BCI0020KL2 (Quantity of 2)	Net: 16.9 x 26.77 x 3.35 (430x680x85) per cabinet Shipping: 23.6x 31.5 x 12.8 (600x 800 x 327)	
	Maintenance Bypass Cabinet (MBC)	16.9 x 22.4 x 10.3 (430 x 570 x 261)	
Weight, lb. (kg)	UPS	Net: 50.7 (23) Shipping: 70.5 (32)	
	VRLA Battery Cabinet	Net: 115 (52.2) each Shipping: 306.4 (139)	
	1U Li-Ion Battery Cabinet	Net: 44.09 (20) Shipping: 165.3 (75)	
	2U Li-Ion Battery Cabinet	Net: 70.5 (32) Shipping: 229.3 (104)	
	MBC	Net: 39.7 (18.02) Shipping: 59.5 (27)	

**Table 6.2 Options**

Option	Model	Description
Battery Cabinet	ITA2-BCI0020K03	(3U each cabinet) Battery cabinet with built-in 16-12V (9Ah) batteries
	ITA2-BCI0020K02	(2U each cabinet) Battery cabinet with built-in 16-12V (9Ah) batteries
	ITA2-BCI0020KL1	(1U each cabinet) Lithium Ion Battery Cabinet (6Ah)
	ITA2-BCI0020KL2	(2U each cabinet) Lithium Ion Battery Cabinet (12Ah)
Battery Cable Kit	ITA2-BCI20K02L3	Replaceable cable that was supplied with the UPS for UPS to Battery cabinet connections 1 meter long
	ITA2-BCI20K02L4	UPS-to-Battery Cable Kit 2 meters long
	ITA2-BCI20K02L2	Battery-to-Battery Cable Kit, 1 meter long

Table 6.2 Options (continued)

Option	Model	Description
Rack-Mounting Kit	ITA2-RMKIT	Guide rail for rack installation; supplied with UPS; includes one left and one right guide rail and mounting hardware. The rails will support 150 lb. (68kg). The kit is compatible with various server cabinets, UPS's, battery cabinets and POD's.
Communication Options	IS-RELAY	Liebert® IntelliSlot™ Relay Card
	IS-UNITY-DP	Liebert® IntelliSlot™ Unity card for network communication
Ambient Temperature Sensor Kit	IRM-S01T	Ambient Temperature Sensor
Parallel Communication Cable (An N + 1 communication cable is required for each UPS in an N + 1 parallel system.)	ITA2-PARACBL1M	3 ft. (1m)
	ITA2-PARACBL3M	9.8 ft. (3m)
	ITA2-PARACBL4M	13 ft. (4m)
	ITA2-PARACBL10M	32.8 ft. (10m)

## 6.1 Standard Battery Backup Time with a Single UPS

Run times shown are approximate. They are based on new, fully charged batteries at a temperature of 77°F (25°C) with 100% resistive UPS loading. Different loading will change the actual run times. Run times listed may vary by ±5% due to manufacturing variances of the batteries.

Table 6.3 Backup Time for 8kVA/8kW VRLA Models in Minutes

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	8 kW	7.2 kW	6.4 kW	5.6 kW	4.8 kW	4 kW	3.2 kW	2.4 kW	1.6 kW	0.8 kW
1	13	15	18	21	26	33	40	56	101	166
2	33	36	40	49	61	76	102	135	167	345
3	52	61	71	82	103	126	147	167	314	650
4	76	91	103	121	137	152	181	227	347	870
5	103	112	130	143	156	181	219	318	540	1000

Table 6.4 Backup Time for 10kVA/10kW VRLA Models in Minutes

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10 kW	9 kW	8 kW	7 kW	6 kW	5 kW	4 kW	3 kW	2 kW	1 kW
1	8	9	11	13	16	21	28	39	66	142
2	21	25	28	34	39	49	67	98	142	309
3	35	38	46	53	67	82	109	143	193	480

Table 6.4 Backup Time for 10kVA/10kW VRLA Models in Minutes (continued)

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10 kW	9 kW	8 kW	7 kW	6 kW	5 kW	4 kW	3 kW	2 kW	1 kW
4	49	55	67	78	98	121	143	165	310	620
5	67	76	91	105	126	143	161	212	337	770

Table 6.5 Backup Time for 8kVA/8kW 1U Lithium Models in Minutes

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	8 kW	7.2 kW	6.4 kW	5.6 kW	4.8 kW	4 kW	3.2 kW	2.4 kW	1.6 kW	0.8 kW
1	14	15	17	19	23	28	35	43	66	113
2	28	31	35	38	47	57	71	92	138	246
3	43	48	53	58	72	86	107	137	207	373
4	58	64	72	78	97	115	143	181	273	499
5	73	81	91	98	122	145	181	228	343	629
6	89	98	111	119	148	175	218	275	415	749
7	103	115	128	139	173	204	255	322	485	878
8	117	131	146	158	197	234	292	369	556	995

Table 6.6 Backup Time for 10kVA/10kW 1U Lithium Models in Minutes

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10 kW	9 kW	8 kW	7 kW	6 kW	5 kW	4 kW	3 kW	2 kW	1 kW
1	10	12	14	16	19	22	28	37	53	96
2	22	25	28	32	38	45	57	74	111	210
3	34	38	43	50	58	70	86	112	166	318
4	46	51	58	67	78	94	115	149	219	426
5	58	64	73	84	98	117	145	188	275	537
6	71	78	89	101	119	142	175	225	332	640
7	83	92	103	117	139	165	204	265	388	750
8	94	105	117	135	158	188	234	305	445	850

**Table 6.7 Backup Time for 8kVA/7.2kW 2U Lithium Models in Minutes**

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	8 kW	7.2 kW	6.4 kW	5.6 kW	4.8 kW	4 kW	3.2 kW	2.4 kW	1.6 kW	0.8 kW
1	28	29	35	38	47	56	73	97	138	260
2	56	61	72	76	97	116	151	200	280	525
3	88	97	111	119	150	178	227	302	421	789
4	116	131	150	161	201	240	302	401	558	1046
5	144	164	188	202	252	302	377	501	696	1304
6	172	197	227	244	303	364	452	600	833	1561
7	200	230	266	285	355	426	527	700	971	1819
8	228	263	305	327	406	488	602	800	1108	2076

**Table 6.8 Backup Time for 10kVA/10kW 2U Lithium Models in Minutes**

Number of Battery Strings	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10 kW	9 kW	8 kW	7 kW	6 kW	5 kW	4 kW	3 kW	2 kW	1 kW
1	20	22	28	32	36	46	56	76	118	222
2	44	50	56	64	78	92	116	156	242	448
3	68	76	88	100	118	144	178	240	364	674
4	94	104	116	134	158	194	240	322	484	894
5	118	132	144	168	198	244	302	404	604	1114
6	142	160	172	202	238	294	364	486	724	1334
7	166	188	200	236	278	344	426	568	844	1554
8	190	216	228	270	318	394	488	650	964	1774

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# Appendices

## Appendix A: UPS Prompts and Alarms

### A.1 Prompt Window

A prompt window is displayed during the operation of the system to alert you to certain conditions and/or to require confirmation of a command or other operation.

**Table A.1 UPS Prompts**

Prompt	Description
System setting is different, please check	Appears only for a parallel system when the parallel setting parameters are different.
Cannot set this on-line, please shut down output	Appears when attempting to change important output settings (such as voltage and frequency) while the UPS inverter is supplying output power.
Incorrect password, please input again	Appears when an incorrect settings password was entered.
Password changed OK	Appears when the settings password was successfully changed.
Fail to change password, please try again	Appears when the confirmation password did not match when attempting to change the settings password.
Operation failed, condition is not met	Appears when the user attempts to execute an operation (such as initiate a manual battery test), but the conditions are not met to execute the operation.
The time cannot be earlier than system time	Appears when attempting to set the Turn On Delay or Turn Off Delay time, and it is earlier than the system time.
Turn on failed, condition is not met	Appears when the power button is pressed when the LCD is in the "Control" menu section.
Please disconnect power, check output: 1 phase, 3 phase, then power UPS On	Appears when the output phase is changed. The system requires the user to power Off and check the cable connections, then power On the UPS again to guarantee the safety.

## A.2 Alarms, Faults, and Warnings

A warning or alarm or fault can be displayed during the operation of the system to alert you to certain conditions and/or to require action or other operation.

**Table A.2 UPS Alarm and Warning Messages**

Alarm/Warning	Description	Action
Any Mode Shutdown	When shutdown dry contact at battery mode is triggered, this event will be reported.	
Aux power fault	The auxiliary power supply voltage is out of range.	Contact Vertiv Technical Support
Battery Address Conflict	Two or more same addresses are set in system.	Check and maintain the battery address according to the user manual
Battery Address Set Wrong	DIP switches of one or more strings are set up upside down.	Power off the breaker of battery, check all battery addresses according to the user manual.
Battery Aged	The battery capacity is less than 25% of the initial capacity.	Replace battery
Battery CAN Connect Abnormal	The number of 485 communication nodes is greater than the number of CAN communication nodes.	Check Battery Cable Connections
Battery cabinet connect abnormal	The system detects more than six battery cabinets, then reports the battery cabinet connection is abnormal.	Properly connect the battery cabinets, remove extra.
Battery cabinet not connected	The battery cabinet group number is specified, but the communication cables are not connected.	Connect the battery cabinets.
Battery cabinet not detected	The battery cabinet is not connected to the system.	Connect the battery cabinets.
Battery Charge High Cell Temp	The temperature of the battery cell is greater than 60°C while charging	Check UPS/Battery ambient condition is per User Manual requirements. If problem persists, contact Vertiv Technical Support
Battery Charge Low Cell Temp	The temperature of the battery cell is less than 0°C while charging	Check UPS/Battery ambient condition is per User Manual requirements. If problem persists, contact Vertiv Technical Support
Battery Charge Overcurrent	Battery charging current is greater than 12A for 1U 6Ah. Battery charging current is greater than 20A for 2U 12Ah.	Contact Vertiv Technical Support
Battery Check		
Battery Communication Fail	The communication is failed between the lithium battery and the UPS	Check Communication Cable Connections
Battery Discharge High Cell Temp	The temperature of the battery cell is greater than 80°C while discharging	Reduce battery temperature
Battery Discharge Low Cell Temp	The temperature of the battery cell is less than -20°C while discharging	Increase battery temperature
Battery Discharge Overcurrent	Battery discharging current is greater than 90A	Contact Vertiv Technical Support
Battery EOD	The battery has reached End Of Discharge due to a prolonged utility power outage and depletion of all battery power.	Check the upstream input breaker(s) to ensure they are closed and wait for input power to return or contact Vertiv Technical Support
Battery High Cell Volt	The maximum battery cell voltage is greater than 3.8V	Contact Vertiv Technical Support
Battery Internal Communication Abnormal	Battery Internal communication abnormal	Contact Vertiv Technical Support



**Table A.2 UPS Alarm and Warning Messages (continued)**

Alarm/Warning	Description	Action
Battery Low Cell Volt	The minimum battery cell voltage is less than 2.4V and is discharging or The minimum battery cell voltage is less than 2.65V and is charging	Return to Main Power
Battery low pre-warning	This alarm occurs when the battery reaches the low-battery setting and is near the end of battery power.	Check the upstream input breaker(s) to ensure they are closed and/or orderly shut down connected equipment.
Battery mode	The UPS is operating on battery power.	Check the upstream input breaker(s) to ensure they are closed.
Battery overtemp	The battery temperature has exceeded the threshold setting.	Verify the ventilation openings are not block or contact Vertiv Technical Support.
Battery Parallel Charge High Temp	The temperature of the battery parallel resistance is greater than 80°C	If alarm doesn't clear, contact Vertiv Technical Support.
Battery Parallel Conditions Dissatisfy	The parallel conditions are not met	If alarm doesn't clear, contact Vertiv Technical Support.
Battery Port Reverse	Battery port voltage is less than -95V before power of battery is on	Check Battery Cable Connections
Battery reversed	The battery polarity is reversed.	Call a qualified electrician to verify the battery wiring or contact Vertiv Technical Support.
Battery SN Abnormal	Battery SN does not meet the code rule in the system	Contact Vertiv Technical Support.
Battery series not qualified	The battery detected does not match the setting parameter.	Call a qualified electrician to verify the battery wiring or contact Vertiv Technical Support.
Battery Series Set to 24-40	After configuring the internal communication and the battery series number is changed	None required.
Battery test failed	The battery capacity dropped below the threshold for the battery test.	Replace battery.
Battery test finished	The battery test has been finished.	None required.
Battery test started	The battery test has been started either by automatic or manual initiation.	None required.
Battery test stopped	The battery test has been stopped either by completion or manual initiation.	None required.
Battery voltage abnormal	The battery voltage is outside of normal operating parameters.	Contact Vertiv Technical Support.
Battery wake up manually	When "No Battery" alarm is present and the charger activates	None required.
Battery-to-Utility Transition	Power supply mode of this unit is changed from battery mode to mains mode	None required.
BMS Relay Invalid	The battery current detected is not 0 after power of battery is off	Contact Vertiv Technical Support
Bypass abnormal	The bypass input voltage or frequency exceeds normal operating range.	Check the upstream bypass input breaker(s) to ensure they are closed
Bypass abnormal in ECO mode	The bypass input voltage or frequency exceeds normal operating range; the UPS is operating in online or battery mode.	Check the upstream bypass input breaker(s) to ensure they are closed.
Bypass back-feed	A bypass short circuit has been detected while in battery mode.	Contact Vertiv Technical Support
Bypass disabled	This alarm will be generated if in the settings menu, if the output frequency is set to Auto, BypDisa or 50 Hz, BypDisa or 60 Hz, BypDisa.	None required or change setting to Auto, BypEna

**Table A.2 UPS Alarm and Warning Messages (continued)**

Alarm/Warning	Description	Action
Bypass mode	The UPS is operating on bypass power.	Check UPS display for other alarms or contact Vertiv Technical Support.
Bypass over current	The connected equipment has exceeded the bypass ratings.	Verify the connected load and disconnect any unauthorized equipment or check if load is properly balanced.
Bypass phase reversed	The AC bypass input phase rotation is reversed in a single-module system.	Call a qualified electrician to verify the input phase rotation or contact Vertiv Technical Support
Charger fault	The charger output voltage is abnormal and the charger has been turned Off.	Contact Vertiv Technical Support.
Communication fail	An internal communication problem has been detected.	Contact Vertiv Technical Support.
DC bus abnormal	A DC bus fault has occurred, and the load will transfer to bypass power if is available.	Contact Vertiv Technical Support.
DC/DC fault	A failure of the DC/DC charger has been detected.	Contact Vertiv Technical Support.
Electric leak alarm	The UPS has detected a short between the DC bus or battery and the UPS enclosure.	Contact Vertiv Technical Support.
EOD turn off	The UPS inverter is Off due to depletion of battery power.	Check the upstream input breaker(s) to ensure they are closed and wait for input power to return.
Fan fault	At least one cooling fan has failed or is not operating with proper air flow.	Contact Vertiv Technical Support
Faults cleared	All faults have been cleared by manual initiation from the display.	None required.
Guaranteed shutdown	The UPS output has been shut down to recycle output power after the low battery pre-warning was issued.	None required.
Input abnormal	The rectifier and charger are Off due to input voltage or frequency exceeding normal operating range.	Check the upstream input breaker(s) to ensure they are closed.
Input back-feed	A rectifier short circuit has been detected while in Battery Mode.	Contact Vertiv Technical Support.
Input Current Imbalance	Difference between rectifier minimum and maximum current is more than 10A	Contact Vertiv Technical Support.
Input neutral lost	The UPS has detected that the input neutral conductor is missing or has been disconnected.	Call a qualified electrician to verify the input neutral connection or Contact Vertiv Technical Support.
Input ground lost	Check that the PE line is well connected, and the alarm can be cleared on line.	Call a qualified electrician to verify the input ground connection or Contact Vertiv Technical Support.
Input phase reversed	The AC rectifier input phase rotation is reversed.	Call a qualified electrician to verify the input phase rotation or Contact Vertiv Technical Support.
Inverter fault	A fault in the UPS inverter has occurred and the load will transfer to bypass power if is available.	Contact Vertiv Technical Support
Inverter overload	The connected equipment has exceeded the inverter ratings. The load will transfer to bypass power if available; otherwise it will shut down.	Verify the connected load and disconnect any unauthorized equipment or check if load is properly balanced.

Table A.2 UPS Alarm and Warning Messages (continued)

Alarm/Warning	Description	Action
Inverter relay welded	The inverter relay has shorted.	Contact Vertiv Technical Support.
LBS Abnormal	When LBS function is enabled, effect level signal can't be detected in LBS bus	Check LBS cable connection
Load Off due to output short	The inverter or the bypass has a short circuit.	Verify the reason for the remote command, and then restart the UPS
Load off due to shut down on battery	The UPS received a command to shut down while on battery power.	Verify the reason for the remote command and then restart the UPS.
Manual power ON	The UPS was manually turned On from the display.	None required.
Manual shut off	The UPS was manually turned Off from the display.	None required.
Manual shutdown	The UPS was manually turned Off from the display.	None required.
Monitor Initialized	After power On, monitoring is initialized.	None required.
No battery	Either no battery is connected or the battery connections have become loose or disconnected.	Call a qualified electrician to verify the battery wiring or Contact Vertiv Technical Support.
On maintenance bypass	The dry contact on the maintenance bypass is activated and inverter power is inhibited.	Check the MBB breaker or Contact Vertiv Technical Support.
Operating on Inverter	UPS changes from standby or Bypass mode to Inverter	None required.
Output disabled	The UPS is in standby and the UPS received a command to shutdown.	Verify the reason for the remote command and then restart the UPS.
Output LPE short	The UPS has detected a short between the output and the UPS enclosure.	Contact Vertiv Technical Support.
Output OFF due to overload & bypass abnormal	The UPS output power has been shut down due to output overload and bypass power was not available due to outside of operational parameters.	Verify the connected load and disconnect any unauthorized equipment or check if load is properly balanced.
Output off, voltage is not zero	An output voltage is still being detected when the UPS output is Off.	Contact Vertiv Technical Support.
Output phase No. set to 1	The output phase is changed from 3-phase to 1-phase.	Contact Vertiv Technical Support.
Output Pending	Triggered shutdown via dry contact signal	None required.
Output short	An output short circuit has been detected.	Remove all loads, restart the UPS, then turn loads On one at a time to locate the failed equipment.
Rectifier fault	A failure of the rectifier has been detected	Contact Vertiv Technical Support.
Rectifier overload	The output power of the rectifier exceeds its rating limits.	Contact Vertiv Technical Support.
Remote power OFF	The UPS received a command to turn Off the output.	None required.
Remote power ON	The UPS received a command to turn On the output.	None required.
Remote shut down	The UPS received a command to shut down in any mode of operation.	Verify the reason for the remote command, and then restart the UPS.
Replace Battery	User selects replace battery in the menu	None required.
REPO	UPS has shut down due to activation of the REPO circuit.	Check REPO circuit to reset it, and manually restart the UPS.
Restore factory defaults	The UPS was manually initiated to reset all settings to the factory defaults	None required.

**Table A.2 UPS Alarm and Warning Messages (continued)**

Alarm/Warning	Description	Action
	from the display.	
Safety Under Voltage	The minimum battery cell voltage is less than 1.55V, or less than 2.65V while charging	Contact Vertiv Technical Support.
Shutdown due to overtemp	Internal temperatures have exceeded threshold settings and the UPS has shut down.	Verify the ventilation openings are not block or Contact Vertiv Technical Support
Start Battery Cable Detection	User selects Battery Cable Detection from the menu	None required.
System fault	The UPS model identification is not correct for the firmware in the unit.	Contact Vertiv Technical Support.
System overload	The parallel system load exceeds the parallel system settings.	Verify the parallel system settings, remove unauthorized loads, or Contact Vertiv Technical Support.
Turn On programmable outlet	The programmable outlet status is changed from Turn Off to Turn On.	None required.
Turn Off programmable outlet	The programmable outlet status is changed from Turn Off to Turn On.	None required.
UPS out of service	In a parallel system, the UPS has been manually taken out of service for maintenance.	None required.
UPS has no Output	UPS has no output	If alarm doesn't clear when unit has an output, contact Vertiv Technical Support.
Version incompatible	The UPS firmware version between the control board and display are not compatible.	Contact Vertiv Technical Support.

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