



Liebert®

ITA2™ UPS

Installer/User Guide

8-kVA to 10-kVA, 60-Hz, 208/220-V, 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.VertivCo.com/en-us/support/> for additional assistance.

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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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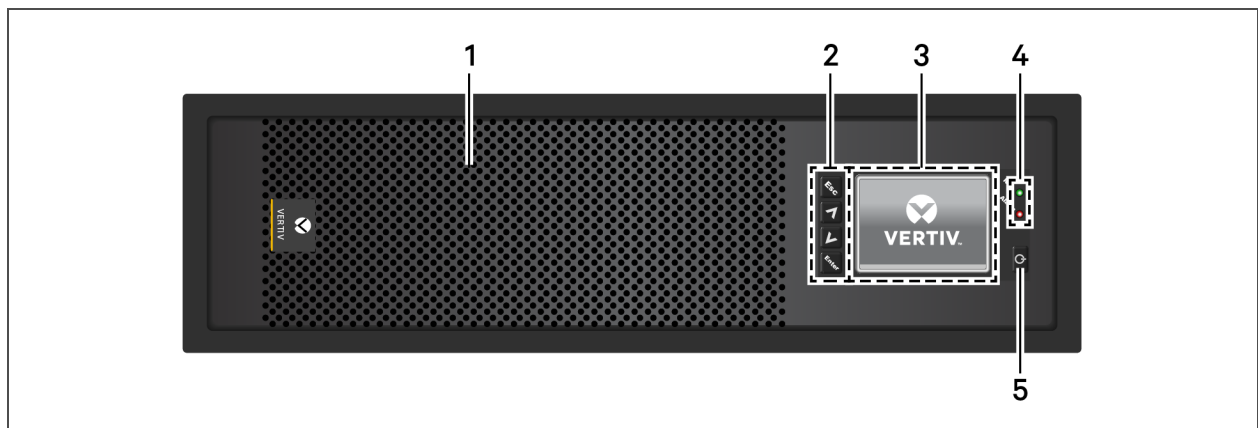
1 PRODUCT DESCRIPTION

The 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.

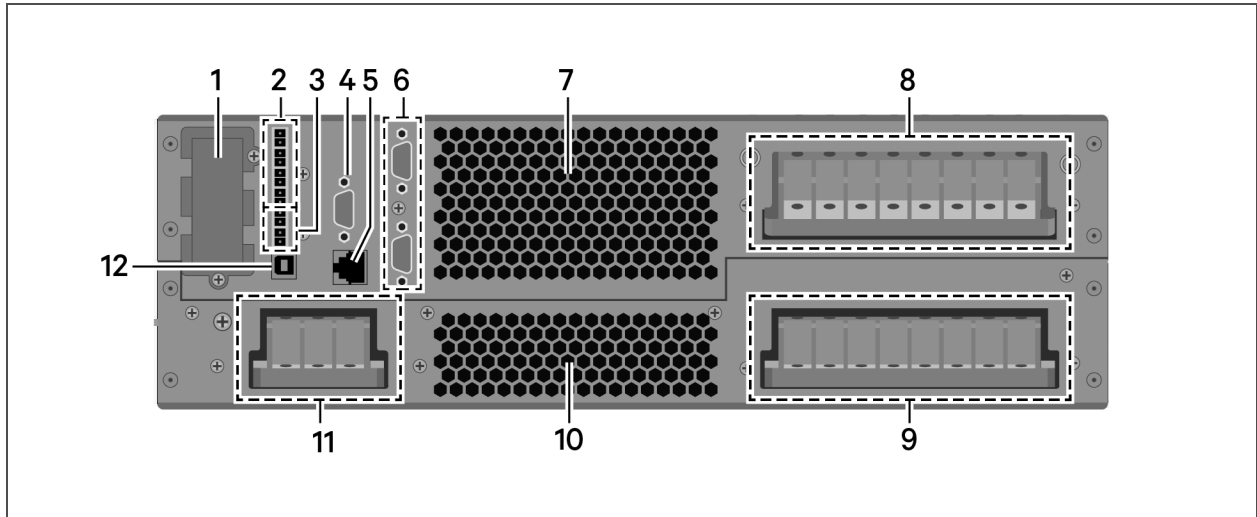
Figure 1.1 ITA2 UPS



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

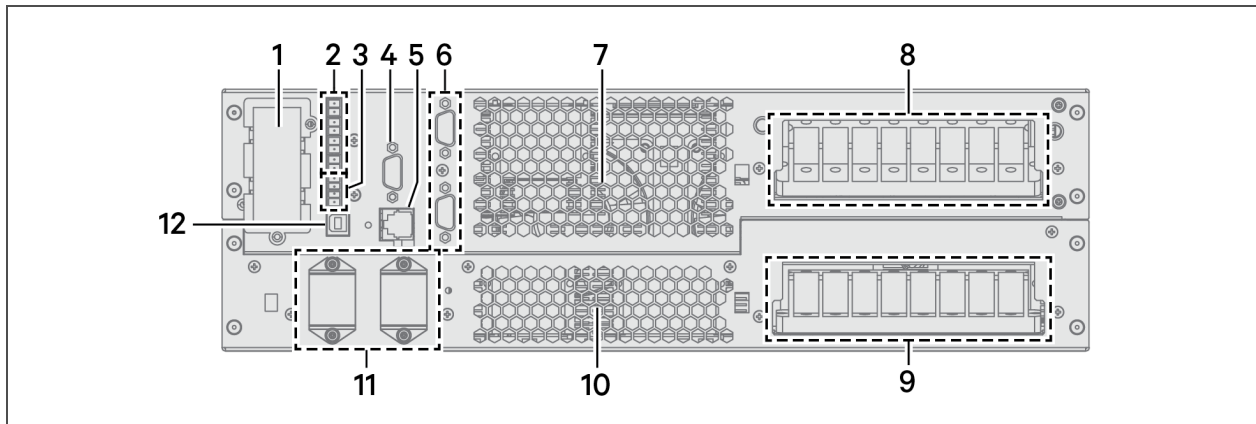
1.2 Rear-panel Components

Figure 1.2 UPS Rear Panel with Terminal-block Battery Connectors



Item	Description
1	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	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

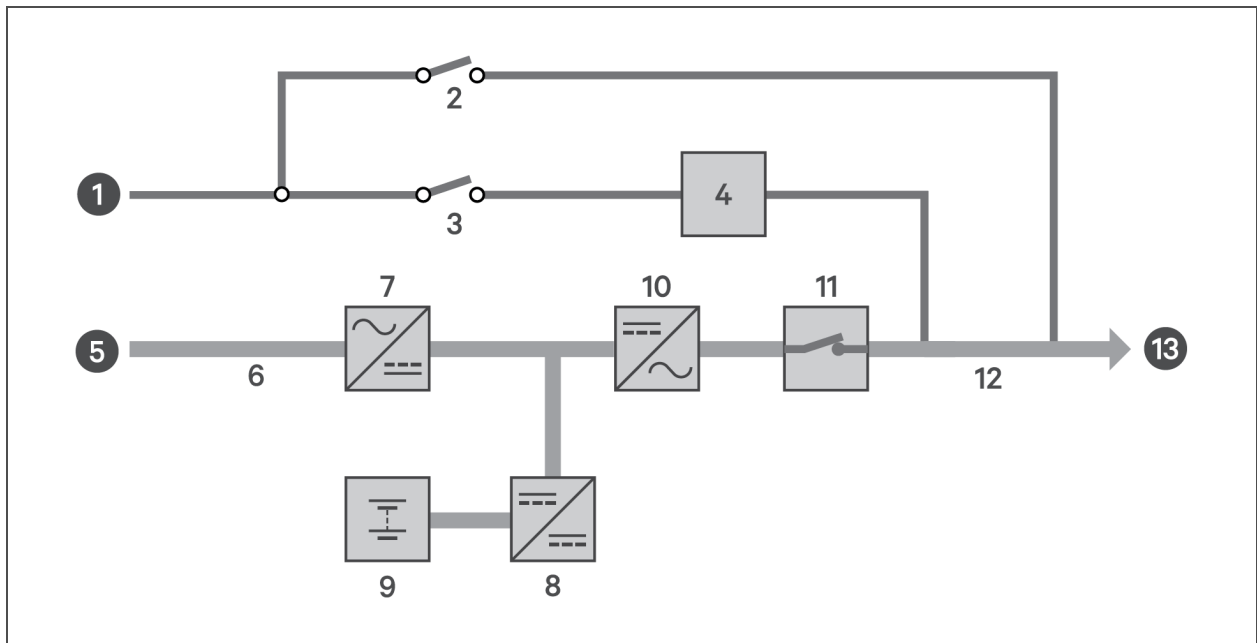
1.3 UPS States and Operating Modes

NOTE: See Table 3.2 on page 42, for description of the run-indicator and alarm-indicator LEDs 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.

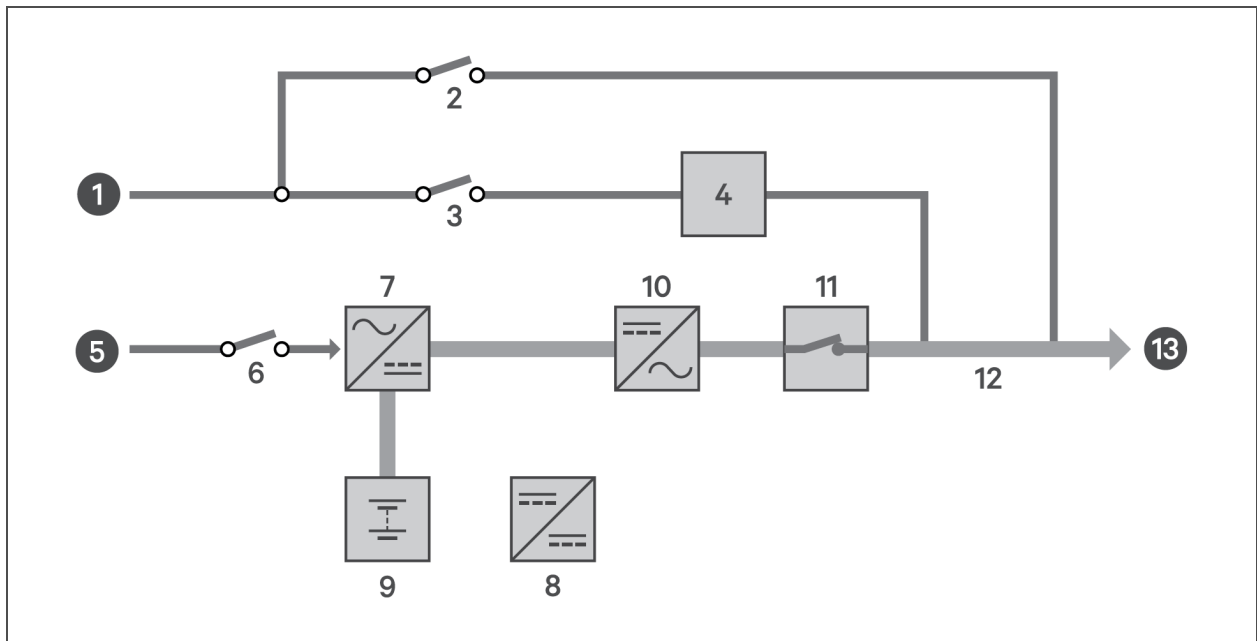
Figure 1.4 Normal-mode Operation



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

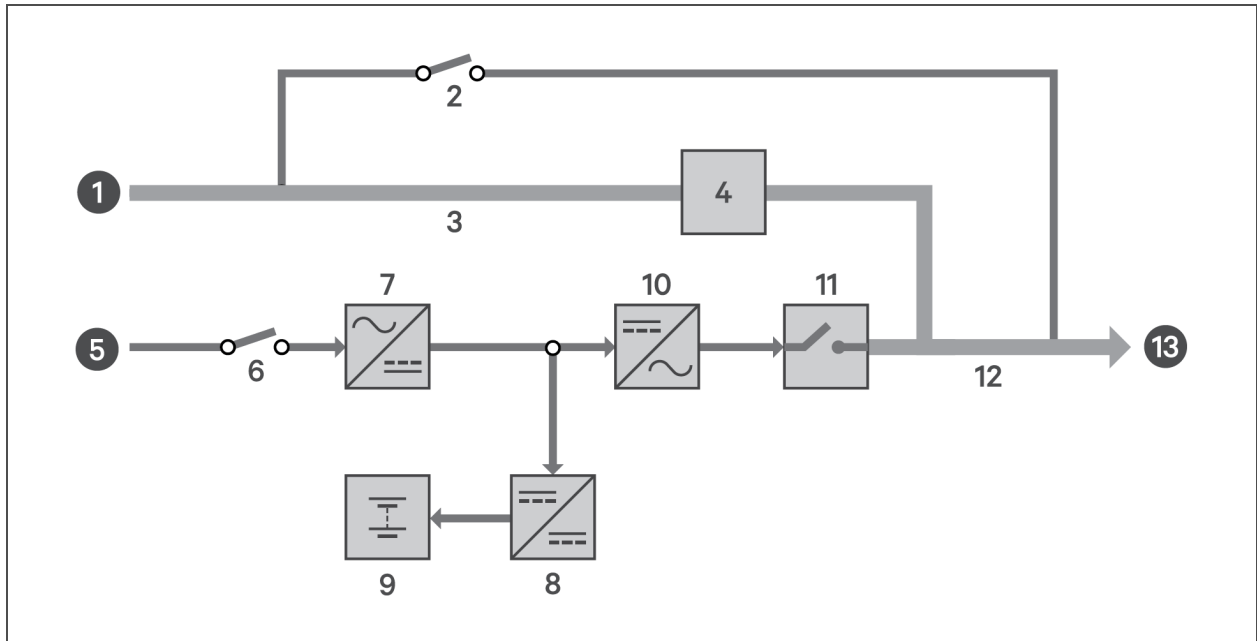


Item	Description
1	Bypass input
2	Maintenance-bypass breaker (MBB)
3	Bypass-input breaker (BIB)
4	Static switch
5	Rectifier input
6	Rectifier-input breaker (RIB)
7	Rectifier
8	Battery charger
9	Battery
10	Inverter
11	Automatic inverter switch
12	Maintenance-isolation breaker (MIB)
13	UPS output

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-by-pass 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 re-starts the UPS after a shut-down 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 over-temperature occurs, operation transfers to Bypass mode. When the UPS is in Battery mode (with no bypass utility), and the inverter fails or over-temperature 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 screen.

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, ITA2 Maintenance Bypass Cabinet (MBC) is required for this mode. If your system includes an ITA2 MBC, refer to the *Liebert® ITA2™ MBC™ Installer/User Guide*, available on the product page at 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.


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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 (23 kg).

NOTE: The UPS can be connected to three-phase, five-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 6 on page 63.

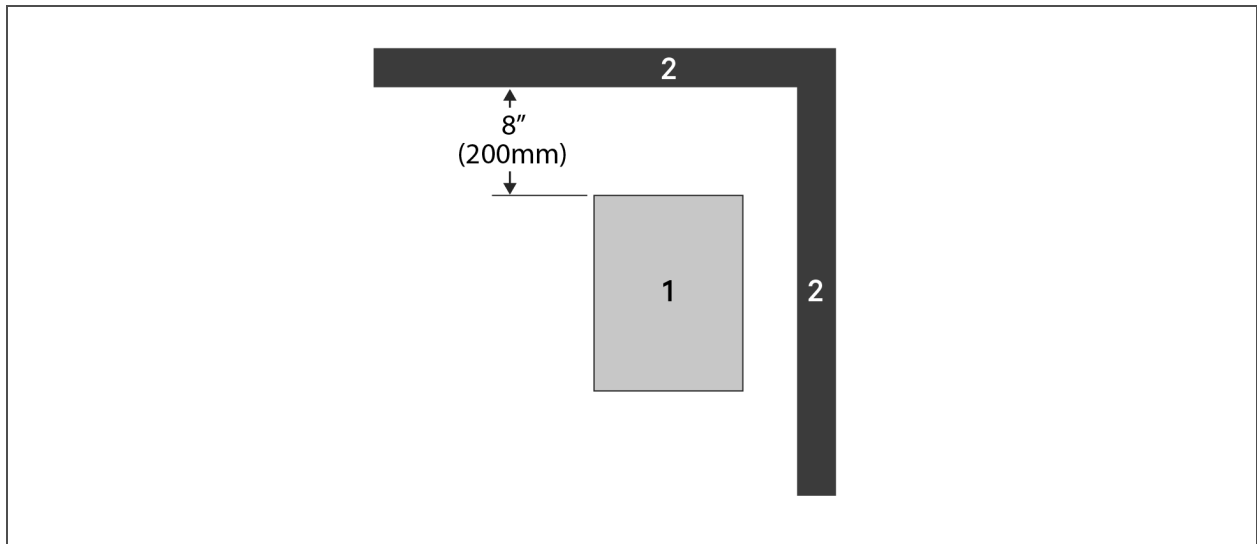
The environment must:

- 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-code regulations.

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. (200 mm) 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 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 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 or 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 should on the utility input power distribution. 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 20, and **Table 2.2** on page 20.

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

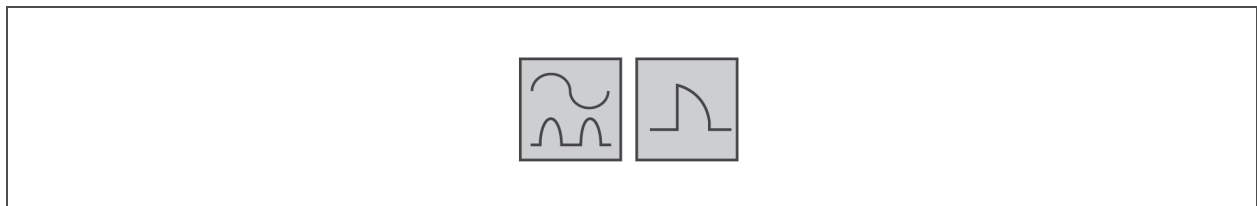
Utility/Bypass Back-Feed Protection—the UPS includes back-feed protection in the event of a fault.

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. We recommend 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 (23 kg).

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

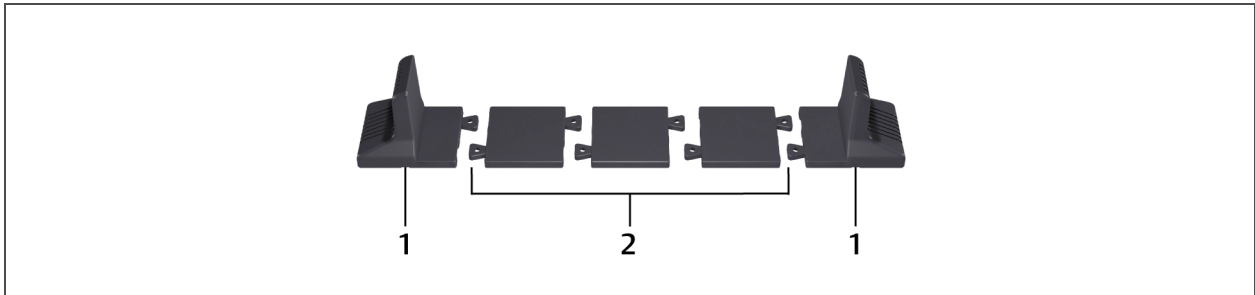
- Check the accessories and model numbers against the delivery list. If you find any problem, notify your local Vertiv representative immediately.

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.

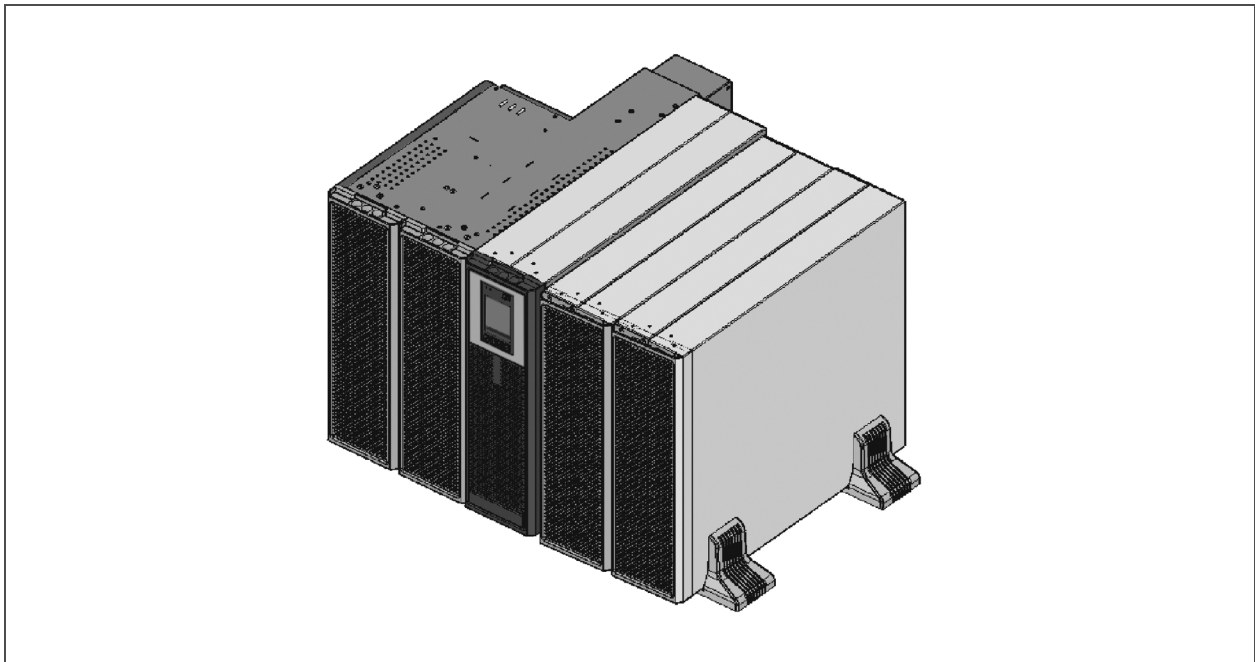
1. Take the support bases out of the accessories box.
2. If battery cabinets will be connected, take out the spacers shipped with the battery cabinet.
3. If an MBC will be connected, take out the spacers shipped with the accessories.
4. Connect the spacers and the support bases as shown in **Figure 2.3**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

Figure 2.3 Support bases



No.	Description
1	Support bases
2	Spacers with connectors

Figure 2.4 Tower-mounted 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 rack top-heavy and cause a tipping hazard.

The battery cabinets are heavier than the UPS. We recommend that you install the battery cabinets as near 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.

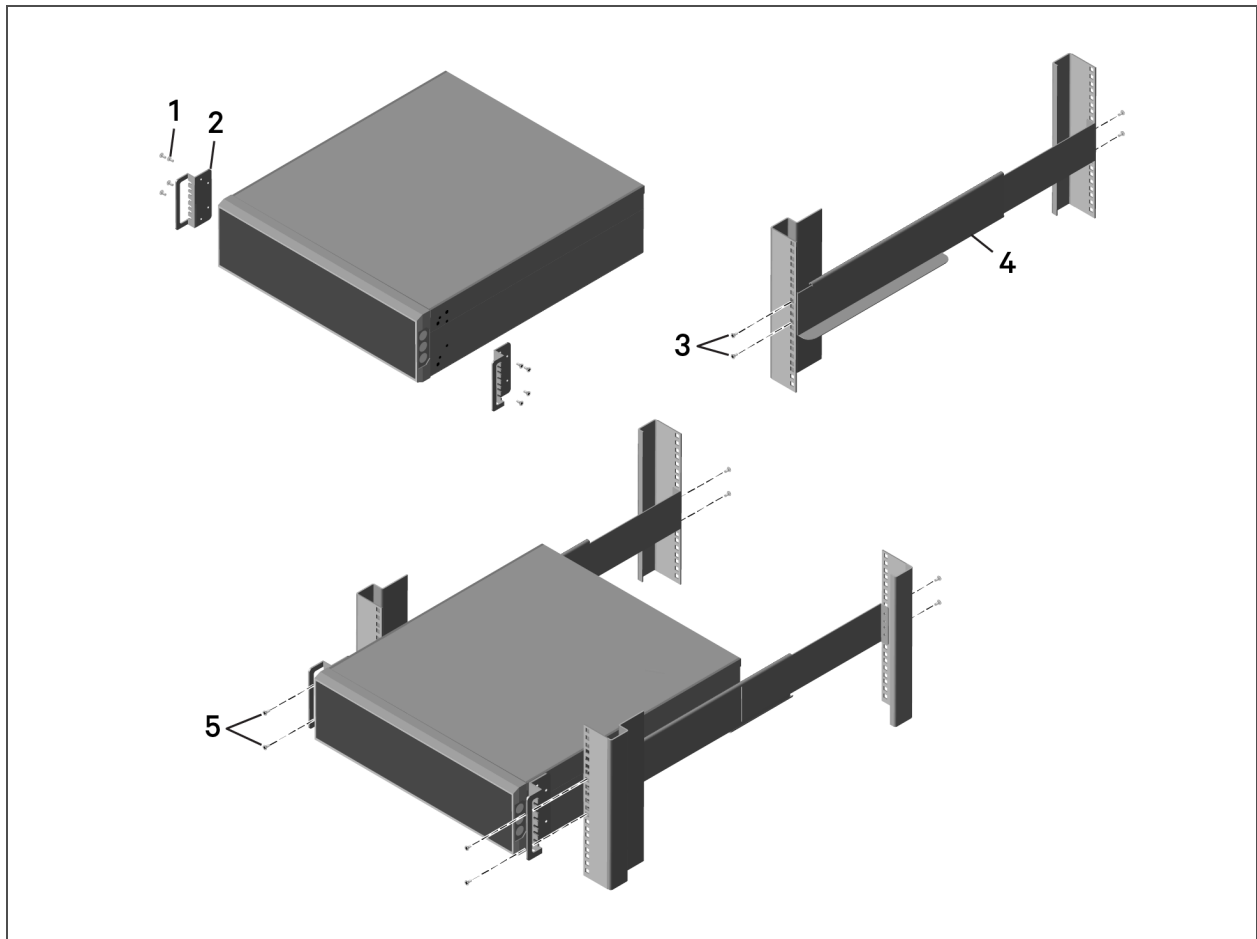
NOTE: The UPS may be installed with a maintenance-bypass cabinet (MBC) or battery cabinets. If so, install the MBC and battery cabinets before installing the UPS.

To mount the unit in the rack:

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

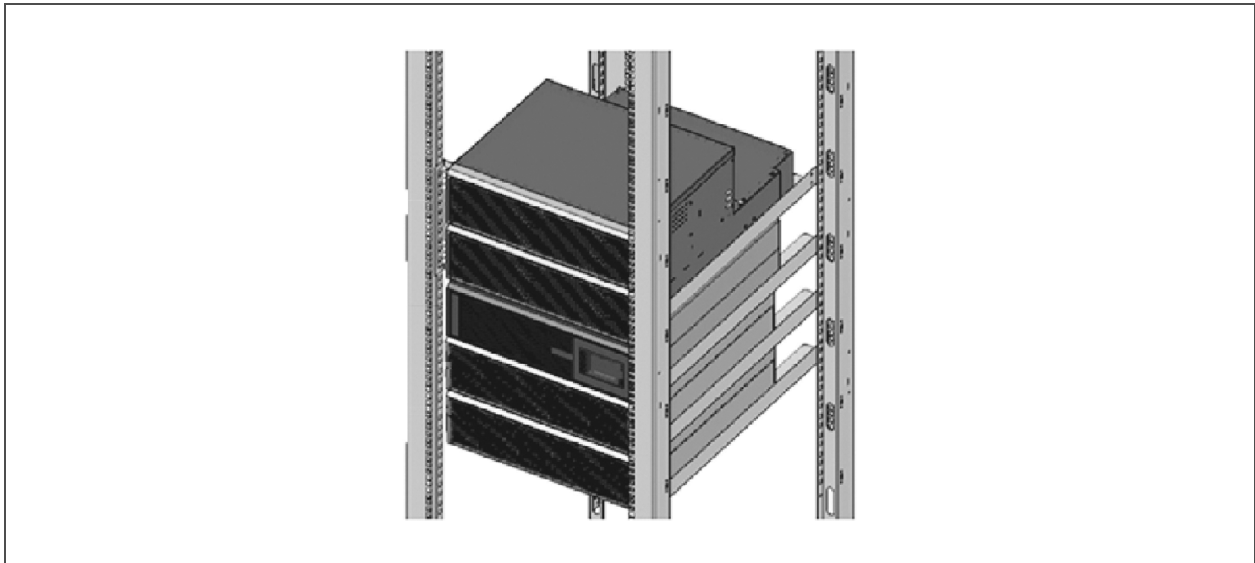
1. Referring to **Figure 2.5** on the next page, use 4 of the M4 × 10 screws on each bracket, and attach a bracket to each front corner.
2. Referring to **Figure 2.5** on the next page, mount the right and left guide rails for the UPS and each battery cabinet:
 - Adjust the length of each guide rail to the dimension of the rack.
 - Align the install holes on the ends of the rail to the square holes in the rack, and use 4 of the provided screws, 2 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 next page.

Figure 2.5 Guide-rail and Rack-bracket Installation



Item	Description
1	Bracket screw, 4 per bracket
2	Bracket (x2)
3	Rail screw, 4 per rail
4	Guide rail, 1 per side
5	Rack-mount screw, 4 per bracket

Figure 2.6 Rack-mounted 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 is listed in **Table 2.1** on the next page, and **Table 2.2** on the next page, 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 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
8 kVA	24	30	8 AWG	8 AWG	10 AWG	30 lb-in.
10 kVA	37	50	6 AWG	6 AWG	10 AWG	30 lb-in.

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
8 kVA	23	30	10 AWG	10 AWG	10 AWG	30 lb-in.
10 kVA	28	40	8 AWG	8 AWG	10 AWG	30 lb-in.

* Bypass input for dual input configurations only.

Table 2.3 Ring-terminal Part Numbers

	AWG (mm ²)		
	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.

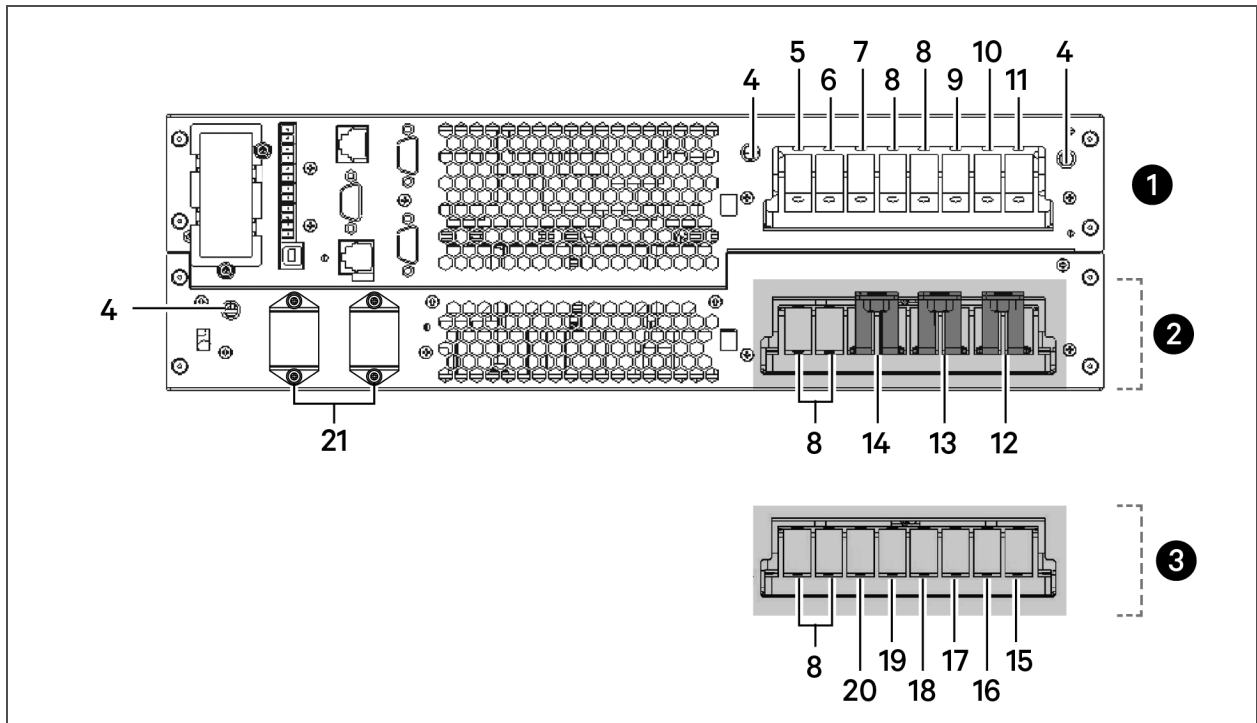
1. Prepare for connection by removing the conduit box cover, opening knockout holes, and routing cables through the conduit.
2. Leave the shorting busbars in place on the UPS input terminal block.

3. Refer to the single-input terminal block illustrated in **Figure 2.7** on the next page, 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 listed inside parentheses.

4. For output connections, refer to **Figure 2.7** on the next page, and connect the cables from the UPS to the downstream feeder panel on the panel board 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- 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

Item	Description
16	ba, bypass input A
17	rB, rectifier input B
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 Rectifier input, refer to the dual-input terminal block illustrated 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 Bypass input, refer to the dual-input terminal block illustrated 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 listed inside parentheses.

5. For output connections, refer to **Figure 2.7** on page 22, and connect the cables from the UPS to the downstream feeder panel on the panel board 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 20, and **Table 2.2** on page 20
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.



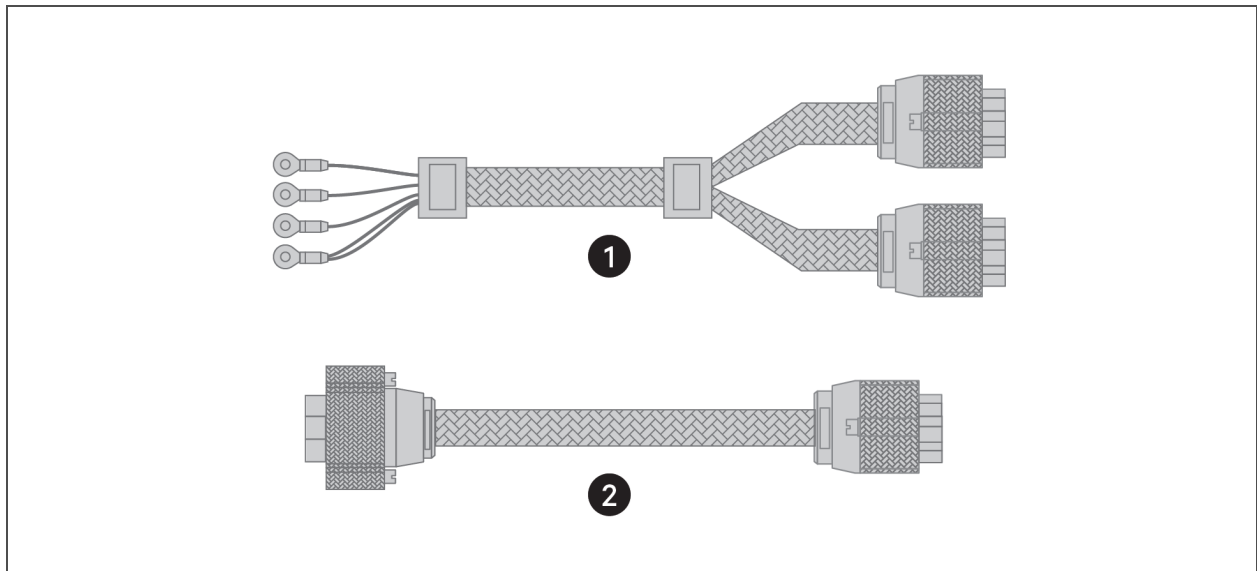
WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. Before beginning installation, verify that all external overcurrent protection devices are open (Off), and that they are locked-out and tagged appropriately to prevent activation during the installation. After the power 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 (23 kg).

The factory-provided, UPS-to-battery power cable, see **Figure 2.8** on the facing 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

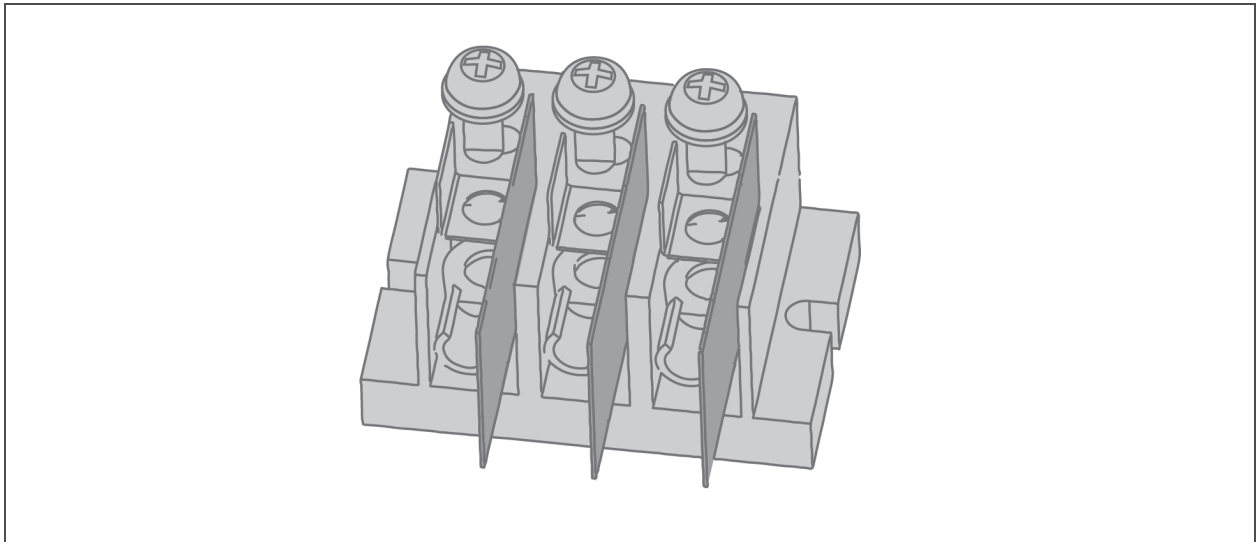


Item	Description
1	UPS-to-battery cable (for hard-wired configurations)
2	Battery-to-battery cable (also UPS-to-battery for plug-and-play configurations)

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** on the next page:
 - 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



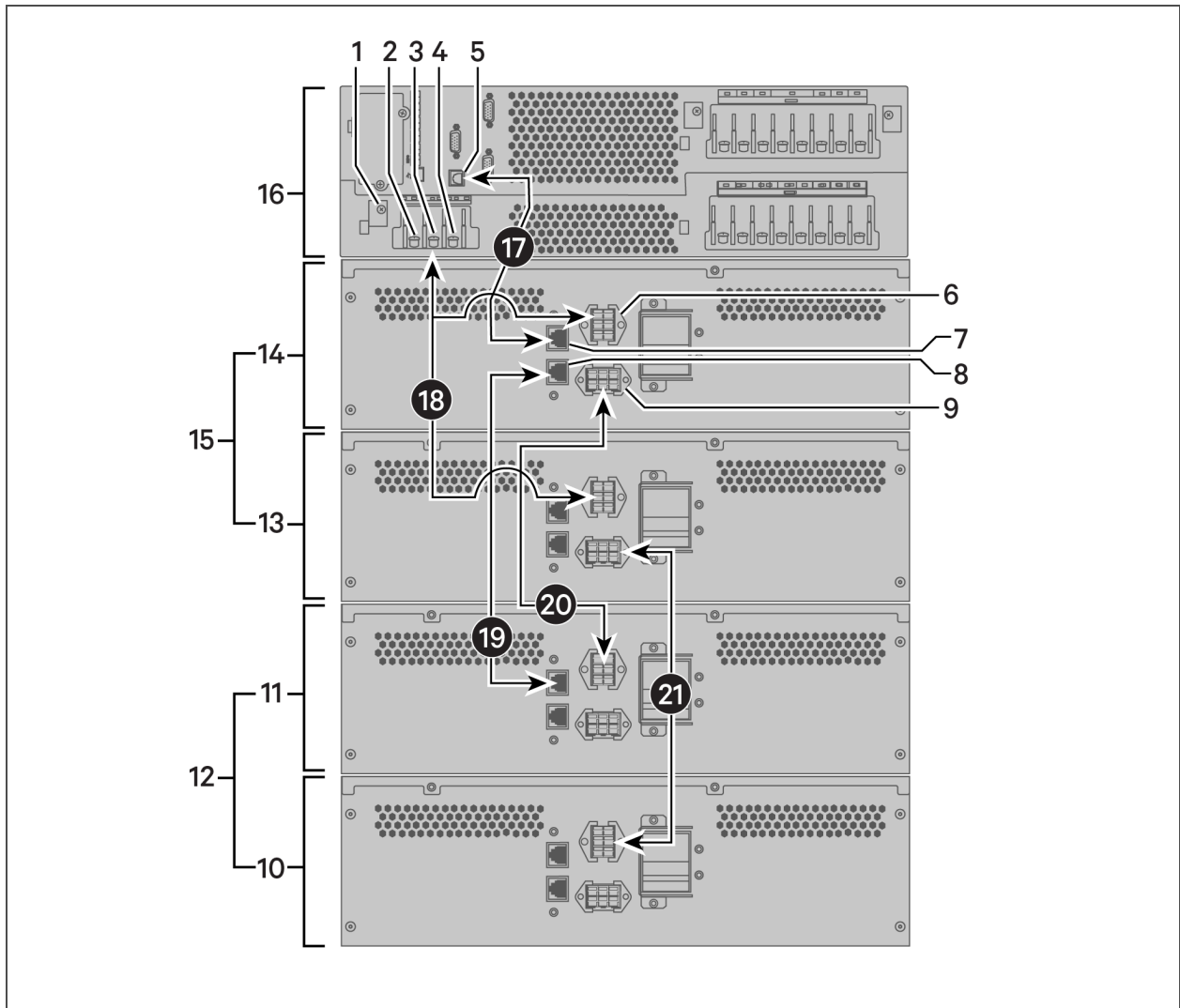
4. Depending on the type of battery cabinet, see **Figure 2.10** on page 28, for 3U or **Figure 2.11** on page 30, for 2U, and connect the other ends to Connector A on each of the battery cabinets in the string.
5. Connect the RJ-45 communication cable to the communication port on the UPS and the other 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 you are installing additional battery strings (2 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 2.11** on page 30, 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 2.11** on page 30, 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 (2 battery cabinets each), proceed to [Connecting Additional Battery-cabinet systems](#) on page 32.

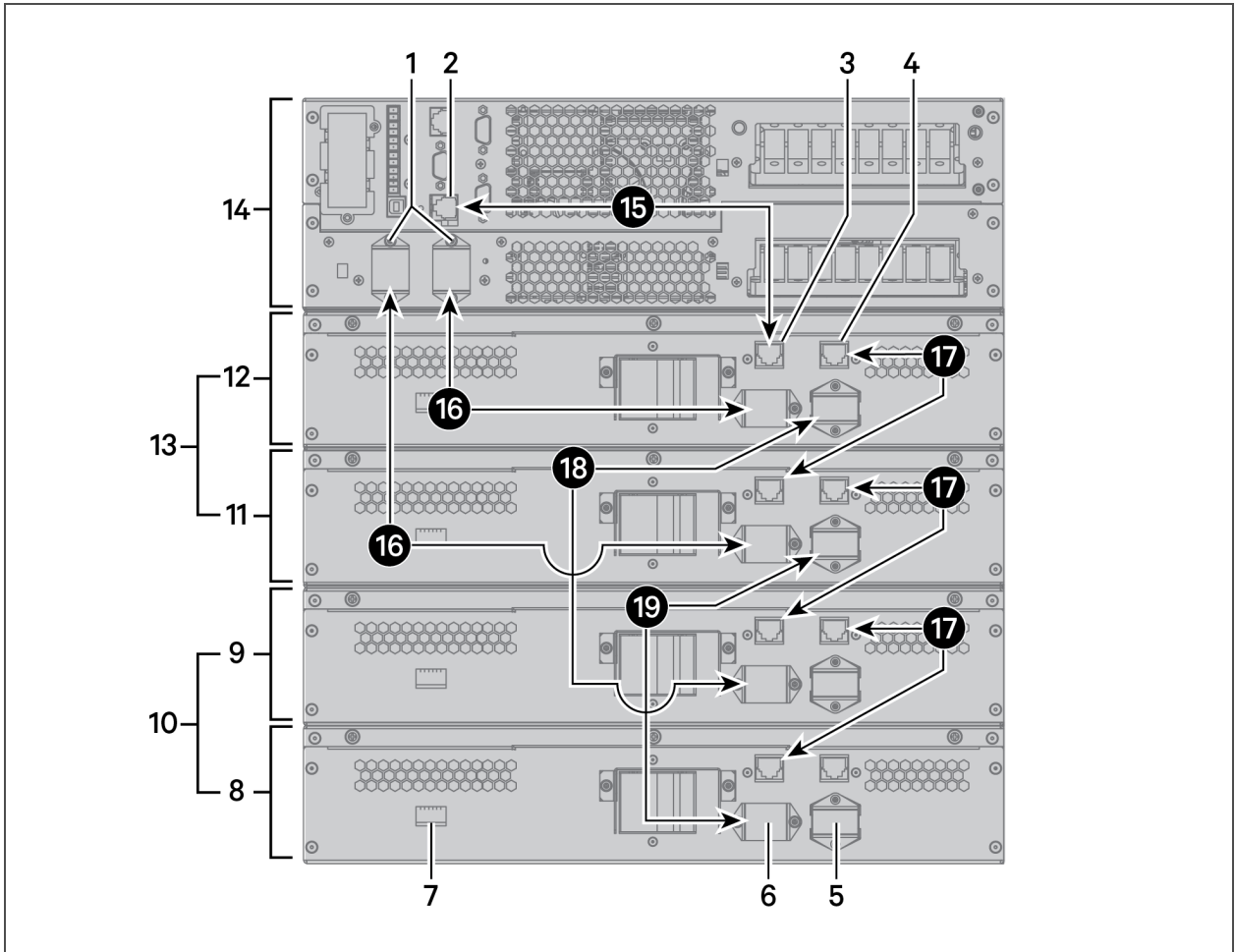
Figure 2.10 Cabling the UPS and two 3U battery strings in parallel



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

Item	Description
9	Connector B
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

Item	Description
11	Battery cabinet 2
12	Battery cabinet 1
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-cabinets 1 and 2
20	Communication cable between communication ports on each battery cabinet.
21	Battery cable from Connector B on battery-cabinet 1 to Connector A on battery-cabinet 3
22	Battery cable from Connector B on battery-cabinet 2 to Connector A on Battery-cabinet 4

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 (23 kg). The battery cabinets weigh approximately 115 lb (52.2 kg)

The factory-provided, battery-to-battery power cables, see **Figure 2.8** on page 25, 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 2.10** on page 28, for 3U or **Figure 2.11** on page 30, 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 you are 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.

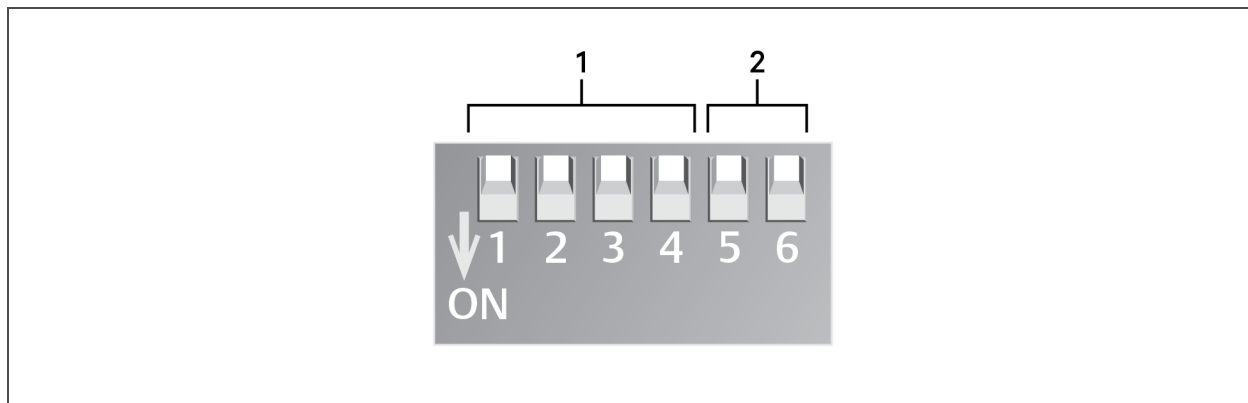
6. On 3U strings, close the battery output breaker(s).
 - or –
 - On 2U strings, refer to **Table 2.4** below, and **Figure 2.12** on the next page, and set the DIP switch on both cabinets in each additional string before closing the battery output breaker(s).

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 2.12 DIP Switch on Rear Panel of 2U Battery Cabinet



Item	Description
1	Group
2	Number

2.8 Communication Connections

The communication ports include:

- 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 IntelliSlot port on the rear of the unit.

Table 2.5 below, describes the cards available. The instructions for configuring and using the cards are available at www.Vertiv.com.

Table 2.5 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/shut-down applications or third-party shut-down 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 shut-down software. The card also accepts input signals to shut-down the UPS during any operating mode.

2.8.2 REPO Connection

Table 2.6 below, describes the pin-out of the REPO port used for N.O. or N.C. connection.

Table 2.6 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



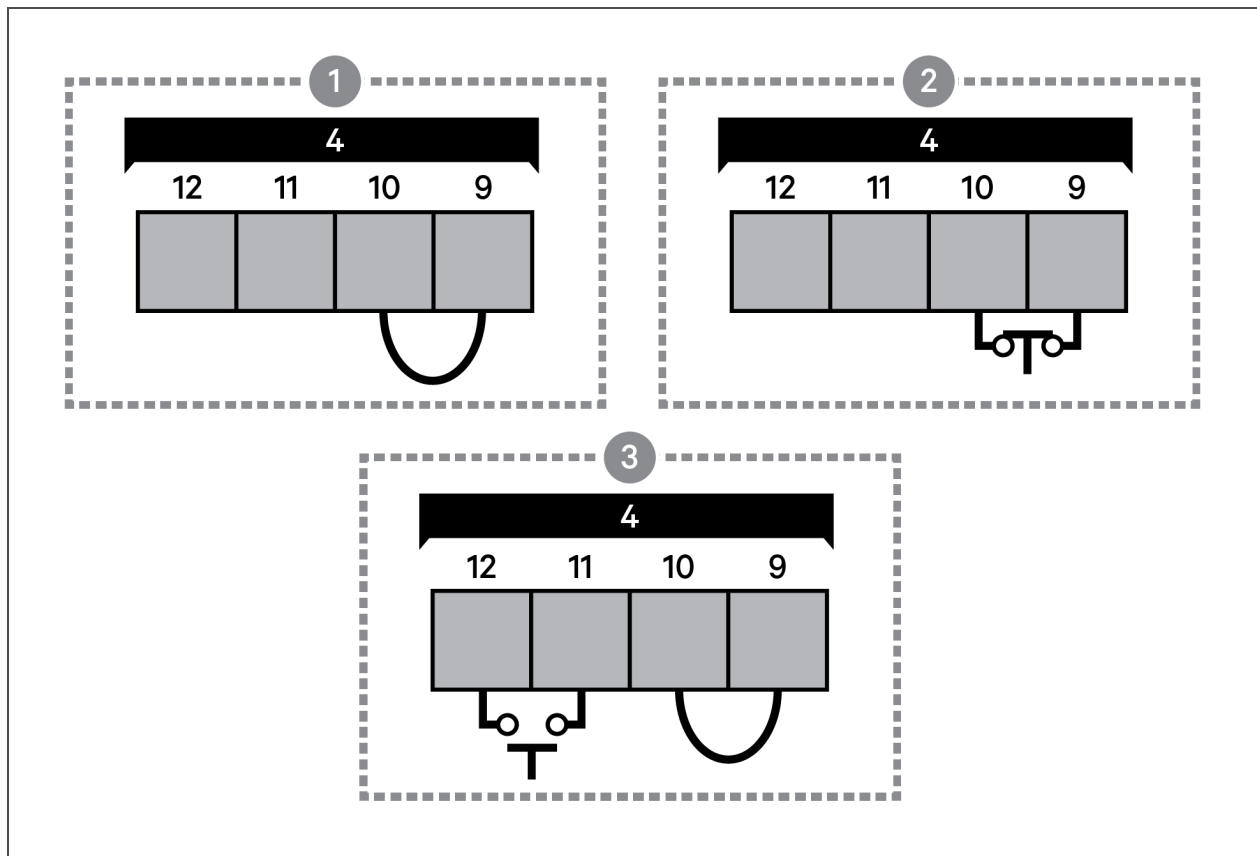
WARNING! Risk of electrical shock. Can cause equipment damage, injury and death. The EPO action of the UPS will shut down the rectifier, inverter and static bypass, but it does not disconnect input power to the UPS. To electrically isolate the UPS, disconnect the upstream input feeder breaker when generating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

Figure 1.2 on page 4, shows the location of the REPO connection on the UPS rear panel. Figure 2.13 on the facing 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 18 AWG ~ 22 AWG (0.82 mm² ~ 0.33 mm²), and we recommend using 18-AWG copper, shielded, signal cable.

Figure 2.13 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 Table 2.6 on the previous page, for the pinout details.

2.8.3 Dry-contact Connections

The UPS includes 5 dry-contact ports described in [Table 2.7](#) on the next 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 125 VAC, 0.5 A; 30 VDC, 1 A

Table 2.7 Dry-contact Ports and Pinout

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 Screen. Change main back-feed via Paramset. When the system has an alarm, short Pin 1 and Pin 2.
	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 Screen. Change bypass back-feed via Paramset. When the system has an alarm, short Pin 3 and Pin 4
	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 Screen. When Pin 5 and Pin 6 are shorted, the function is valid.
	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 Screen. When Pin 7 and Pin 8 are shorted, the function is valid.
	8	GND	Ground
5/REPO Input Port	9	+5V	REPO power supply, 5 VDC 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

The UPS includes 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 2.8 DB9F Pinout 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 terminal-block battery connector, it connects Vertiv temperature and temperature/humidity sensors. In addition, 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.

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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

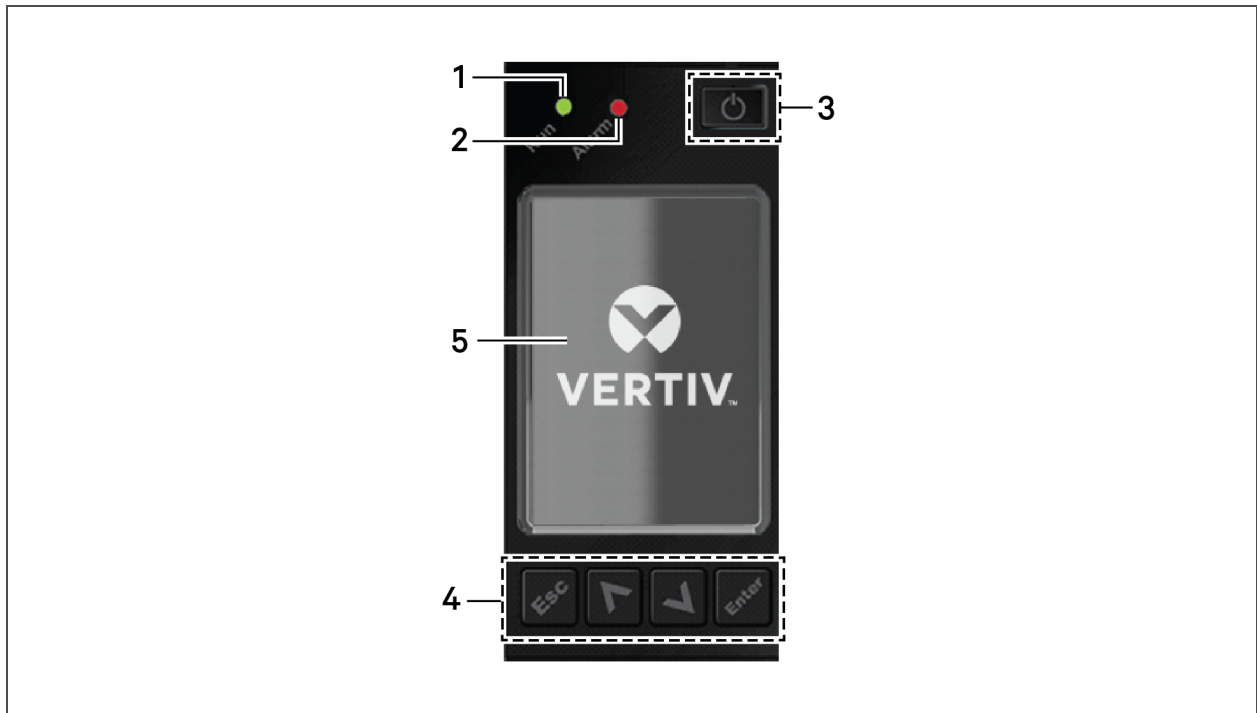


Table 3.1 Display-panel Button Functions and Descriptions

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 two 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 statuses 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 operations. **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.

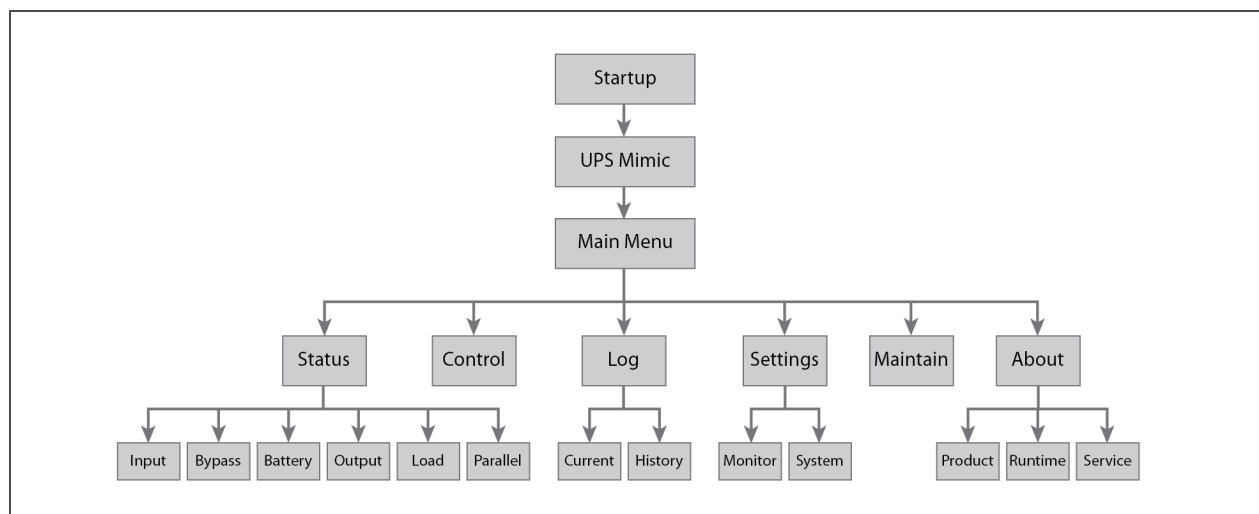
Table 3.3 Audible-alarm Descriptions

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 on 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.

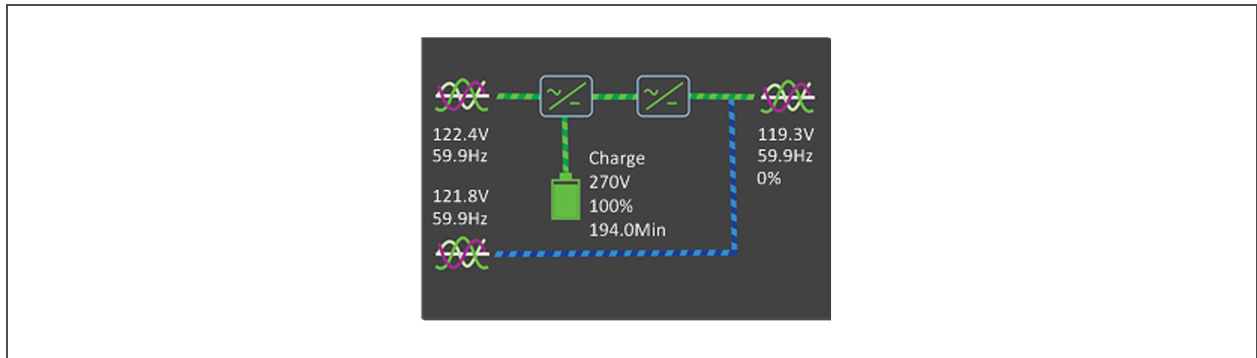
Figure 3.3 LCD Menu Structure



3.3.1 Start-up and UPS Mimic Screens

At start-up, 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 UPS Mimic.

Figure 3.5 Main Menu

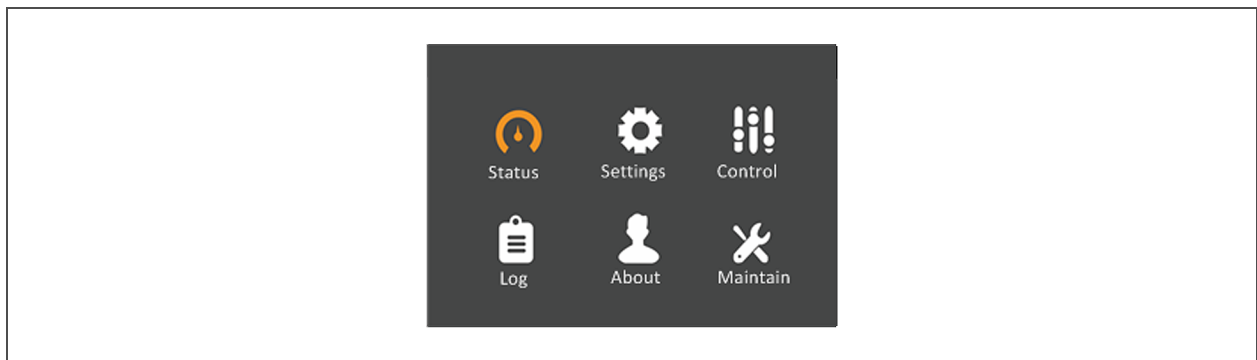


Table 3.4 Menu Options

Submenu	Description
Status	Voltage, current, frequency, and parameters for UPS components, see Status Screen on page 45.
Settings	Display and system parameter settings, see Settings Submenu on page 45.
Control	UPS controls, see Control Screen on page 46.
Log	Current alarms and event history, see Log Screen on page 46.
About	Product and network information, see About Page on page 47.
Maintain	Service-only, proprietary-password-protected page for use only by Vertiv service representatives.

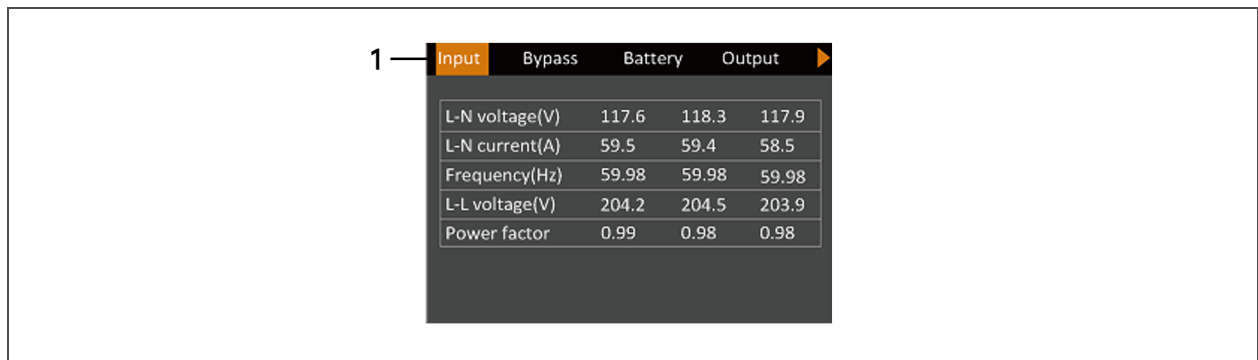
Status Screen

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



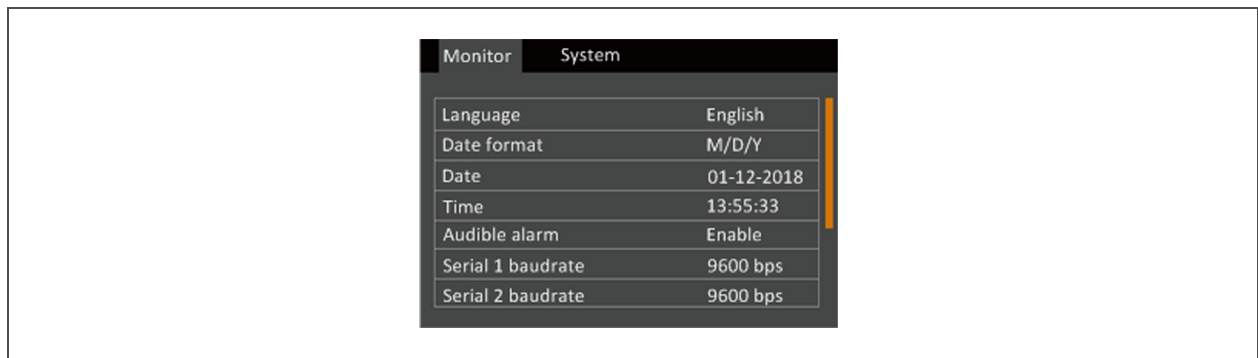
Item	Description
1	Screen tabs with Input tab selected.

Settings Submenu

The settings screen consists of tabs that list UPS settings described in [Table 3.5](#) on page 49.

NOTE: To adjust the settings, you must enter a password. See [Editing Display and Operation Settings](#) on page 48, for details on entering the password and editing the setting parameters.

Figure 3.7 Monitor and System tabs on the Settings Submenu



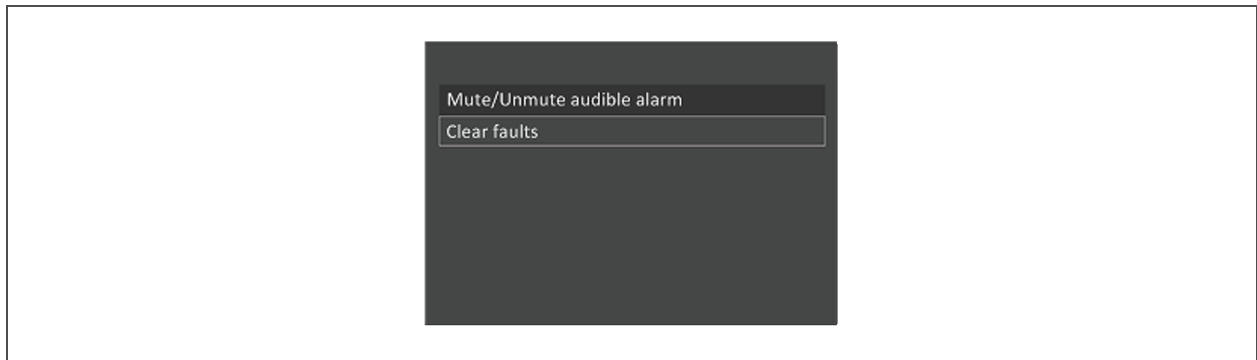
Control Screen

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



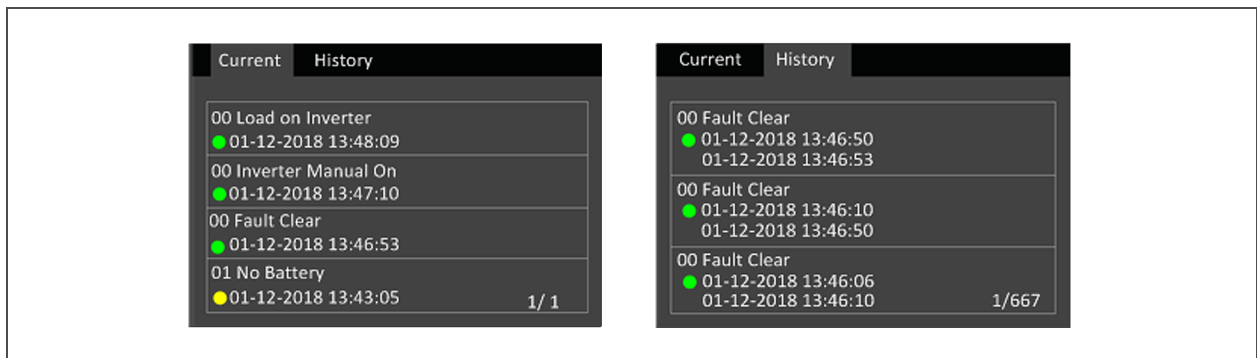
Log Screen

The Log Screen offers tabs that 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



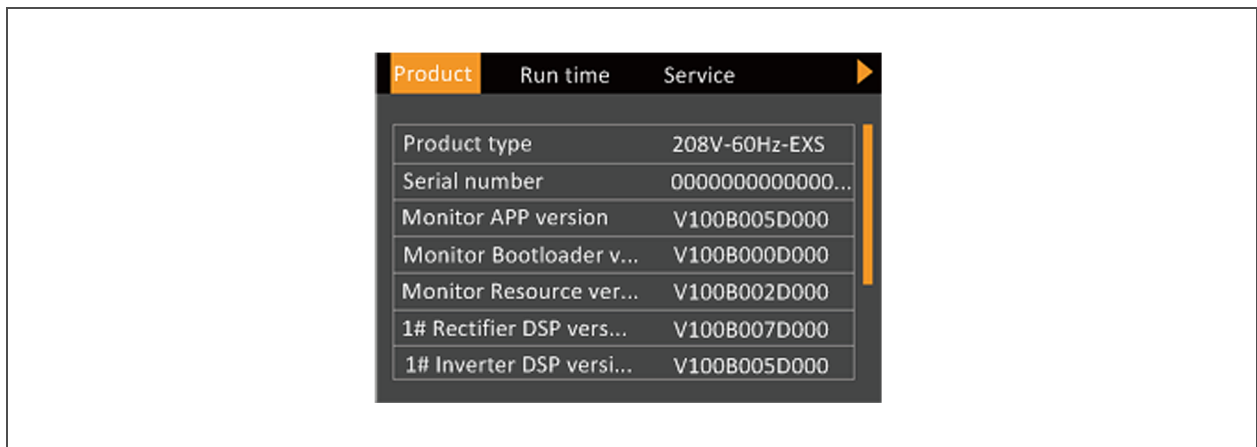
About Page

The About screen offers tabs that 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 page 49.

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 facing 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 51.

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

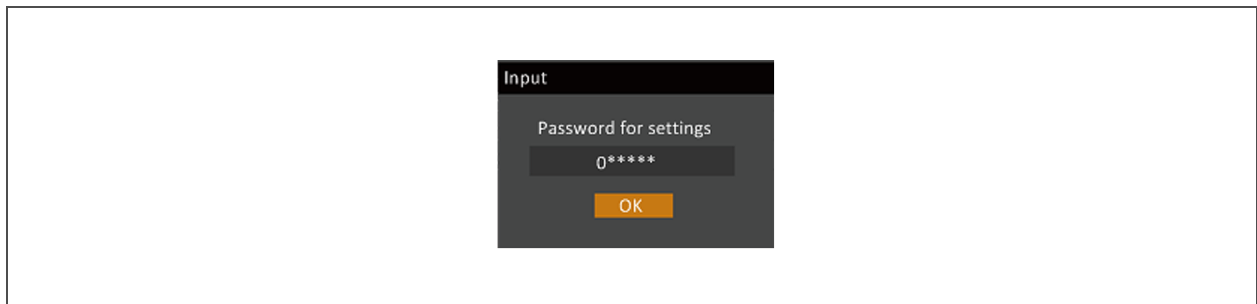


Table 3.5 Settings Available at the Display Panel

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	±10%	±10%
	NOTE: ECO options appear only when in ECO mode		
	ECO Frequency Range	±1.0Hz, ±2.0Hz, ±3.0Hz	±3.0Hz
ECO Requalification Time	5, 15, 30 minutes	5	

Table 3.5 Settings Available at the Display Panel (continued)

Tab	Settings	Parameter range	Default setting
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
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

Table 3.5 Settings Available at the Display Panel (continued)

Tab	Settings	Parameter range	Default setting
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 of 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

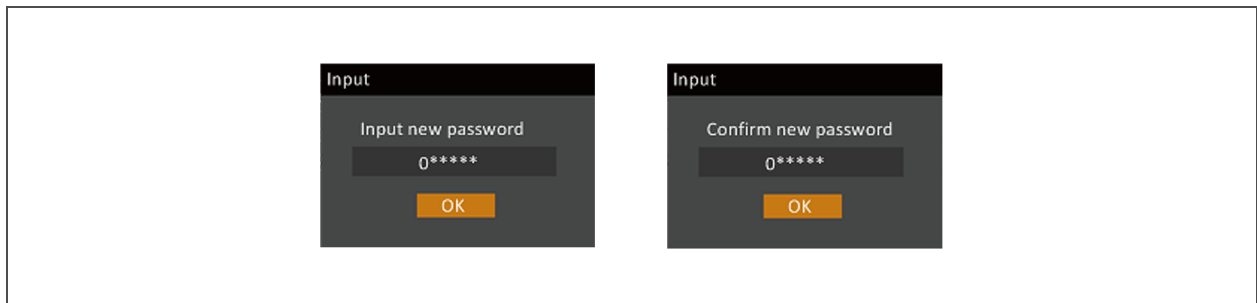
The default password is 111111 (six ones). You must use the current password to change the password.

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 is multilingual. The available languages are 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.

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 located on the front-panel display, see [Operation and Display Panel](#) on page 41.

4.2 UPS Start-up

Perform start-up 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 start-up 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 PODs are installed, verify that all distribution breakers on the PODs 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 start-up process and the boot-up system checks, which take approximately 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 48.
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](#) on the next page.

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:

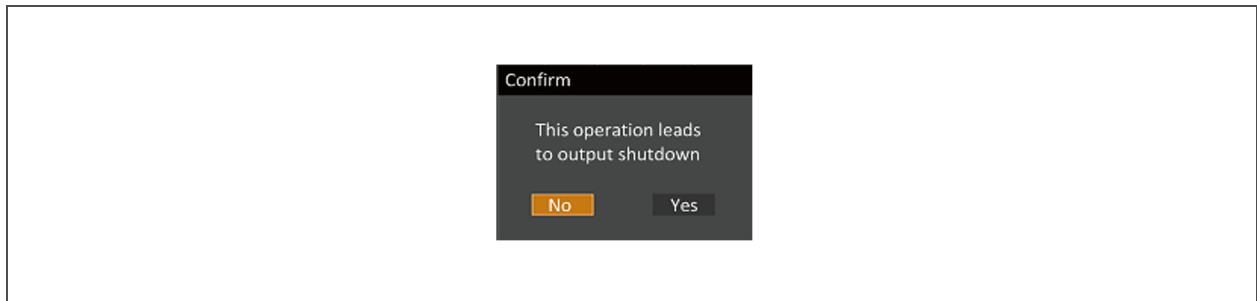
Press and hold the power button for 2 seconds.

- If the bypass power is within normal operating range, the option to turn-off the local inverter displays, 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 the **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 output displays, see **Figure 4.3** on the facing page.
 - a. Use the up/down arrows to select no or yes, or press the **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:

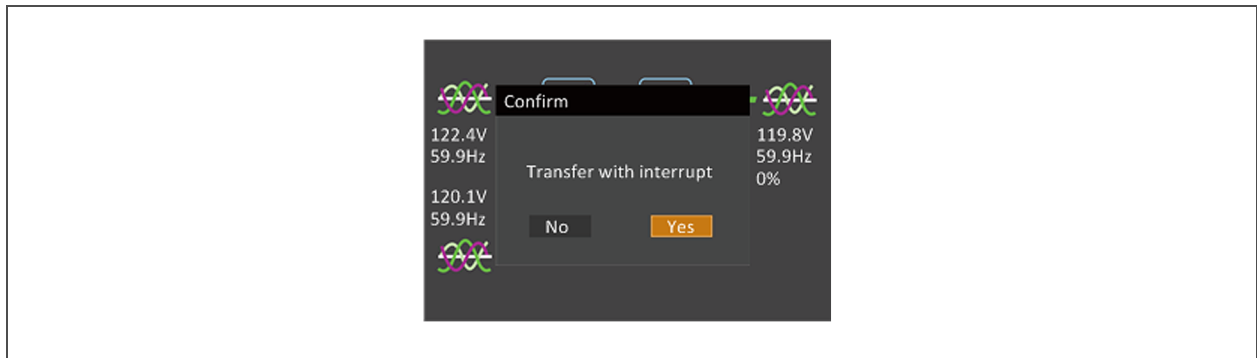
Press and hold the power button for 2 seconds.

- If the UPS is configured for normal operation, the option to turn-on the local inverter displays, see **Figure 4.4** below.
 - a. Use the up/down arrows to select no or yes, or press the **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** on the next page.
 - a. Use the up/down arrows to select no or yes, or press the **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 displays.
 - 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.
2. of the unit to gain access to the Maintenance Bypass Breaker (MBB).
3. Loosen the thumb screw on the mechanical interlock on the MBB.
4. Slide the interlock and tighten the thumb screw to secure the interlock in place.
5. Close the MBB.
6. Press and hold the power button for 2 seconds.
7. 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 operations:

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 start-up 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 thumb screw on the mechanical interlock on the MBB
7. Slide the interlock and tighten the thumb screw 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 36, 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 (23 kg).

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 inadvertently grounded. If it is inadvertently 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 three months when it has been stored at the specified ambient temperature, or two 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 related 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 environment 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.

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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	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	208/220VAC (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	3:1
	Voltage Harmonic Distortion	< 4% (linear load); < 5% (non-linear load)	
	Dynamic Response Recovery Time, ms	60	60
	Overload Capacity	At 25°C: 105% ~ 125%, 5min; 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	
	Number of Cells	192 by Default	
	Rated Voltage, VDC	384	
	Charge Current, Maximum, 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)	

Table 6.1 Specifications (continued)

Item	Description	8 kVA	10 kVA
Noise, db		<55	<55
Panel Display Mode		Color LCD	
Safety		IEC/EN62040-1; UL/CSA cULus (UL 1778 5th Edition, CSA No.22.2 107.3)	
EMC	Conduction Emission	IEC/EN62040-2; FCC Part 15, Class A	
	Harmonic Current	IEC/EN61000-3-12	
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/20Ohms	
Protection Level		IP20	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 (3000) without derating	
Dimensions, W x D x H, in. (mm)	Net	16.9 x 19.7 x 5.1 (430 x 500 x 130)	
	Shipping	33.1 x 13.8 x 25.3 (842 x 350 x 642)	
Weight, lb. (kg)	Net	50.7 (23)	
	Shipping	70.5 (32)	

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
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
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 (68 kg). The kit is compatible with various server cabinets, UPS's, battery cabinets and POD's.

Table 6.2 Options (continued)

Option	Model	Description
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 Back-up 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 Back-up Time for 8-kVA/7.2-kW Models in Minutes

Number of Battery Strings	Load Level											
	100%	90%	80%	75%	70%	60%	50%	40%	30%	25%	20%	10%
	7.2 kW	6.48 kW	5.76 kW	5.4 kW	5.04 kW	4.32 kW	3.6 kW	2.88 kW	2.16 kW	1.8 kW	1.44 kW	0.72 kW
1	13	15	18	19	21	26	33	40	56	75	101	166
2	33	36	40	45	49	61	76	102	135	151	167	345
3	52	61	71	77	82	103	126	147	167	211	314	650
4	76	91	103	109	121	137	152	181	227	323	347	870
5	103	112	130	137	143	156	181	219	328	347	540	1000

Table 6.4 Back-up Time for 10-kVA/10-kW Models in Minutes

Number of Battery Strings	Load Level											
	100%	90%	80%	75%	70%	60%	50%	40%	30%	25%	20%	10%
	10 kW	9 kW	8 kW	7.5 kW	7 kW	6 kW	5 kW	4 kW	3 kW	2.5 kW	2 kW	1 kW
1	8	9	11	12	13	16	21	28	39	49	66	142
2	21	25	28	32	34	39	49	67	98	121	142	309
3	35	38	46	49	53	67	82	109	143	158	193	480
4	49	55	67	73	78	98	121	143	165	205	310	620
5	67	76	91	98	105	126	143	161	212	310	337	770

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
Aux power fault	The auxiliary power supply voltage is out of range	Contact Vertiv Technical Support
Battery aged	The battery capacity is less than 25% of the initial capacity	Replace battery
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 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 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 reversed	The battery polarity is reversed	Call a qualified electrician to verify the battery wiring or 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 test failed	The battery capacity dropped below the threshold for the battery test	Replace battery
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
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

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

Alarm/Warning	Description	Action
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
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 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 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 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

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

Alarm/Warning	Description	Action
Input phase reversed	The AC rectifier input phase rotation is reversed.	Call a qualified electrician to verify the input phase rotation or Contact VertivTechnical Support
Inverter fault	A fault in the UPS inverter has occurred and the load will transfer to bypass power if available	Contact VertivTechnical Support
Inverter overload	The connected equipment has exceeded the inverter ratings. The load will transfer to bypass power if available, otherwise it will shutdown	Verify the connected load and disconnect any unauthorized equipment or check if load is properly balanced
Inverter relay welded	The inverter relay has shorted.	Contact VertivTechnical Support
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
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 VertivTechnical Support
On maintenance bypass	The dry contact on the maintenance bypass is activated and inverter power is inhibited	Check the MBB breaker or Contact VertivTechnical Support
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 VertivTechnical 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 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 VertivTechnical Support

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

Alarm/Warning	Description	Action
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
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 from the display	None required
Shutdown due to overtemp	Internal temperatures have exceeded threshold settings and the UPS has shutdown	Verify the ventilation openings are not blocked or Contact Vertiv Technical Support
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
Version incompatible	The UPS firmware version between the control board and display are not compatible	Contact Vertiv Technical Support

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