Vertiv™ Liebert® EXS
GUIDE SPECIFICATIONS
for a 30kVA, 208/220VAC
Three-Phase, Tower UPS

1.0 GENERAL

1.1 Summary

These specifications shall define the electrical and mechanical characteristics and requirements for a continuous-duty, three-phase, solid-state, uninterruptible power system (UPS). The UPS shall provide high-quality AC power for sensitive electronic equipment loads.

1.2 Standards

The UPS shall be designed in accordance with applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

220 and 208V Nominal Units

- Listed to UL Standard 1778, 5th Edition; CSA 22.2 No. 107.3 and shall be cULus labeled
- ANSI C62.41, Category B, Level 3
- IEC 62040-1+ A1:2013
- IEC 62040-3
- FCC Part 15, Class A
- ISTA Procedure 1A/1E/3B
- RoHS2 (6 by 6) Compliant
- REACH and WEEE Compliant
- Energy Star program requirements for Uninterruptible Power Supplies (UPSs) – eligibility criteria, version 2.0.

1.3 System Description

1.3.1 Modes of Operation

The UPS shall be designed to operate as a true on-line double-conversion system in the following modes:

1. **Normal** - In normal operation, incoming AC power shall be fed to the input power factor-corrected (PFC) rectifier that converts the AC power to DC power for the inverter. In this mode, power shall also be derived from utility power for the battery charger. The inverter shall derive DC power from the PFC rectifier to regenerate filtered and regulated AC sinewave power for the connected load. The unit shall begin charging the battery once the UPS is connected to utility power, regardless of whether the UPS is On or Off. In the event of a utility outage or severe abnormality (sag or swell), the inverter shall support the connected load from battery power until the battery is discharged or until the utility power returns, whichever occurs first.

2. **Battery** - Upon failure of utility / mains AC power, the critical AC load shall be supplied by the inverter, which obtains power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the utility / mains AC source.
3. **Recharge** - Upon restoration of utility / mains AC power, after a utility / mains AC power outage, the input converter shall automatically restart and resume supplying power to the inverter and the battery charger to recharge the battery.
4. **Automatic Restart** - Upon restoration of utility / mains AC power, after a utility / mains AC power outage and complete battery discharge, the UPS shall automatically restart and resume supplying power to the critical load and the battery charger automatically recharges the battery. This feature shall be capable of being disabled by the user.
5. **Bypass** - The integral bypass shall perform an automatic transfer of the critical AC load from the inverter to the bypass source in the event of an overload, PFC failure, internal overtemperature, DC bus overvoltage or inverter failure.
6. **ECO** - The UPS shall allow the user to enable and place the UPS in Eco mode of operation to reduce electrical consumption. Eco mode operation shall be an active type, wherein the UPS will power the connected equipment through the bypass path and the UPS inverter shall be On and operating at no load to stay synchronized to the bypass to ensure rapid and uninterrupted transfers to inverter power when input power falls outside of the user-customizable parameters. The UPS shall also have a user-customizable requalification time that input power must remain within the Eco mode parameters before transferring back to Eco mode operation. This is to minimize the number of transfers between bypass and inverter.

1.3.2 Design Requirements

1. **Voltage** - Input/output voltage specifications of the UPS shall be:
   - Input
     - 208V unit: 0 - 280VAC, 50/60Hz, three-phase, 4-wire-plus-ground.
     - 220V unit: 0 - 280VAC, 50/60Hz, three-phase, 4-wire-plus-ground.
   - Output
     - 208V units: 208VAC (user configurable: 208V, 220V) ±2%, 50/60Hz, three-phase, 4 wire plus-ground.
     - 220V units: 220VAC (user configurable: 208V, 220V) ±2%, 50/60Hz, three-phase, 4 wire plus ground.
2. **Output Load Capacity** - Specified output load capacity of the UPS shall be rated at 30 kVA/30 kW at 1.0 (unity) power factor.
3. **Internal Battery** - The UPS shall utilize valve-regulated, non-spillable, lead acid cells with a design life of 6-8 years.
4. **Reserve Time** - The UPS enclosure shall be capable of housing up to 2 battery strings and have a matching battery cabinet that shall house 2 battery strings. The battery run time shall be based upon full rated resistive load with an ambient temperature of 77°F (25°C). The battery run times shall be:

Model	1 String	2 Strings	3 Strings	4 Strings
30 kVA	5 minutes	18 minutes	31 minutes	45 minutes

5. **Battery Recharge** - The UPS shall contain a temperature compensated, three-stage battery charger designed to prolong battery life. Default recharge time for UPS units with 1 string shall be 6 hours to 90% capacity after a complete discharge with full load connected.

1.3.3 Performance Requirements

AC Input to UPS

1. **Voltage Configuration** - The UPS shall require three-phase, four-wire plus ground input wiring. The input voltage range without drawing power from the batteries shall be 166 VAC – 256VAC for 100% to 0% load levels
2. **Frequency** – The UPS shall auto-sense input frequency when first powered up and shall operate within the following frequency specifications. The UPS shall be capable of cold start with default frequency of 60Hz. Once started the input frequency operating window shall be 40-70Hz.
3. **Input Power Factor** - >0.99 lagging at rated load.
4. **Input Current reflected distortion** - 3% THDi typical.
5. **Input Current Ratings** – maximum input current shall be 105A at 208V nominal input
6. **Inrush Current (initial startup, no load)** - The UPS shall have a maximum inrush current of six times the full load peak input current.
7. **Input Line Transient Immunity** – The UPS shall conform to an input line transient conforming to IEEE C62.41, Category A, Level 3 tests for 208VAC models.
8. **Surge Protection** - MOV ratings shall be 385V, 80 Joules minimum connected L1-L2-L3, L1-G, L2-G and L3-G.
9. **Dual Input** - The UPS shall be capable of conversion from a single-input design to a dual-input design to provide separate feeds for the rectifier and bypass circuits. Conversion shall be designed to take 5 minutes or less by the installing contractor; use of manufacturer's service personnel shall not be required.

AC Output, UPS Inverter

1. **Voltage Configuration**
   - 208V units: 208VAC, 50/60Hz, three-phase, four-wire-plus-ground
   - 220V units: 220VAC, 50/60Hz, three-phase, four -wire-plus-ground
2. **Voltage Regulation** - ± 1% steady state for balanced loading; ± 4% for 100% unbalanced loading.
3. **Frequency Regulation** - ±5% synchronized to utility / mains. ±0.25Hz free running or on-battery operation.
4. **Frequency Slew Rate** - 0.5Hz per second default; user selectable for 0.2, 0.5 or 1.0Hz per second
5. **Voltage Distortion** - 2% total harmonic distortion (THD) typical into a 100% linear load; 5% THD typical into a 100% non-linear load with crest factor ratio of 3:1.
6. **Load Power Factor Range** - The load power factor range shall be 0.5 lagging to 0.80 leading.
7. **Output Power Rating** – 30kVA/30kW at unity (1.0) power factor
8. **Inverter Overload Capability**
   - Inverter overload capability while operating on utility/mains power shall be 0%-105% continuous, 105%-125% for 10 min, 125%-150% for 5 min, 150%-200% for 5 secs, 200% or greater for 200ms.

9. **Voltage Transient Response**
    - ±5% in line mode 0-100-0 % loading of the UPS rating
    - ±5% in battery mode for 0-100-0% loading of the UPS rating
10. **Transient Recovery Time** - To nominal voltage within 60 milliseconds.
11. **AC-AC Efficiency**: The UPS model AC-AC efficiency shall be up to 93.2% AC –AC in double-conversion mode; 99% AC-AC at full rated load in ECO mode
12. **Parallel Operation** - Parallel operation shall provide the ability of the UPS system to increase system capacity or redundancy or both. Paralleled units shall power the connected equipment in all modes of operation and have current sharing to maintain <5% difference maximum.

1.4 Environmental Conditions

1. **Ambient Temperature**
    - Operating: 32°F to 104°F (0°C to 40°C). For optimum battery performance and battery life operating temperature shall be 68°F to 77°F (20°C to 25°C)
    - Storage: 5°F to 131°F (-25°C to 55°C)
2. **Relative Humidity**
    - Operating: 0 to 95% non-condensing.
    - Storage:0 to 95% non-condensing.
3. **Altitude**: Sea level to 4,920 ft. (1,500m) maximum without power derating when operated within the temperature specified in Section 1.4, Item 1 . For altitudes above 4,920 ft up to 10,000 ft (1,500m up to 3,000m) power derating of 1% of both kVA/kW rating is required for every 328 ft (100m). Ambient temperature shall be derated 9°F (5°C) for each additional 1600 ft. (500m) above 10,000 ft. (3,000m).
4. **Audible Noise**: <60dBA maximum measured at 1 meter from front, sides, and rear
5. **Electrostatic Discharge**: The UPS shall be able to withstand an electrostatic discharge compliant to ENC61000-4-2.

1.5 User Documentation

The specified UPS system shall be supplied with a Safety Instruction & Warning booklet and a quick-start guide for ease of installation and UPS startup. The user manual shall include installation instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step-by-step operating procedures and general maintenance guidelines.

1.6 Warranty

The UPS manufacturer shall warrant the UPS against defects in materials and workmanship for one (1) year. The manufacturer's standard warranty shall cover labor and all parts, including the battery.

1.7 Quality Assurance

1.7.1 Manufacturer Qualifications

More than 40 years' experience in the design, manufacture and testing of solid-state UPS systems shall be required. The manufacturer shall be certified to ISO 9001:2015.

1.7.2 Factory Testing

Before shipment, the manufacturer shall fully and completely test the UPS system to ensure compliance with the specifications.

2.0 PRODUCT

2.1 Fabrication

All materials and components making up the UPS shall be new, of current manufacture and shall not have been in prior service except as required during factory testing. All relays shall be provided with dust covers.

2.1.1 Wiring

Wiring practices, materials and coding shall be in accordance with the requirements the standards listed in Section 1.2 and other applicable codes and standards. All wiring shall be copper.

2.1.2 Cabinet

- The UPS unit shall be composed of: input rectifier/PFC converter, IGBT inverter, battery charger, sealed valve-regulated lead acid battery, input filter, internal static bypass circuit, optional integral output distribution port, and electrically isolated maintenance bypass breaker; shall be housed in a tower NEMA Type 1 enclosure and shall meet the requirements of IP20. The UPS cabinet shall be cleaned, primed and painted the manufacturer's standard color (RAL 7021 Gray-Black).
- An external battery cabinet (EBC) shall be required to achieve the specified run time and shall be composed of: sealed valve-regulated lead acid battery, battery disconnect circuit breaker, and control circuit connections. The EBC shall be housed in a matching tower NEMA Type 1 enclosure and shall meet the requirements of IP20. The UPS cabinet shall be cleaned, primed and painted the manufacturer's standard color (RAL 7021 Gray-Black).
- UPS System dimensions and weights shall be:

Model	Dimensions W x D x H, in. (mm)	Weight lbs. (kg)
UPS system w/ 1 battery string	• UPS cabinet: 23.6 x 33.5 x 63 (600 x 850 x 1600) • UPS cabinet with optional POD: 23.6 x 39.7 x 63 (600 x 1007 x 1600)	• UPS cabinet: 1,132 (513.5) • UPS cabinet with optional POD: 1,162 (526.5)
UPS system w/ 2 battery strings	UPS cabinet: 23.6 x 33.5 x 63 (600 x 850 x 1600)	• UPS cabinet: 1,650 (748.4) • UPS cabinet with optional POD: 1,680 (761.4)
UPS system w/ 3 battery strings	• UPS cabinet: 23.6 x 33.5 x 63 (600 x 850 x 1600) • UPS cabinet with optional POD: 23.6 x 39.7 x 63 (600 x 1007 x 1600) • EBC cabinet: 23.6 x 33.5 x 63 (600 x 850 x 1600)	• UPS cabinet: 1,132 (513.5) • UPS cabinet with optional POD: 1,162 (526.5) • EBC cabinet: 1,389 (630)
UPS system w/ 4 battery strings	• UPS cabinet: 23.6 x 33.5 x 63 (600 x 850 x 1600) • UPS cabinet with optional POD: 23.6 x 39.7 x 63 (600 x 1007 x 1600) • EBC cabinet: 23.6 x 33.5 x 63 (600 x 850 x 1600)	• UPS cabinet: 1,650 (748.4) • UPS cabinet with optional POD: 1,680 (761.4) • EBC cabinet: 1,389 (630)

2.1.3 Cooling

The UPS shall be forced-air cooled by internally mounted, continuously operating fans. Fan power shall be provided from the internal DC supply. Air intake shall be through the front of the unit and exhaust shall be out the rear of the unit.

2.1.4 Integral Power Output Distribution

The UPS shall have two power output distribution ports to allow optional distribution PODs to be added for integral output receptacles that include circuit breaker protection. See section 2.5.1 for POD details

2.2 Components

2.2.1 Input Converter

1. **General**

   Incoming AC power shall be converted to a regulated DC output by the input converter supplying DC power to the inverter. The input converter shall provide input power factor-correction (PFC) and input current distortion reduction.

2. **AC Input Current Limit**

   The input converter shall be provided with AC input current limiting whereby the maximum input current is limited to 125% of the full load input current rating.

3. **Input Protection**

   The UPS shall have built-in protection against undervoltage, overcurrent and overvoltage conditions including low-energy lightning surges introduced on the primary AC source. The UPS models shall be able to sustain input surges without damage per criteria listed in ANSI C62.41, Category A, Level 3.

4. **Battery Recharge**

   The UPS shall contain a three-stage battery charger designed to prolong battery life and shall incorporate temperature compensation as standard. Recharge time for the internal UPS batteries shall be 6 hours to 90% capacity (full load discharge rate). There shall be DC overvoltage protection so that if the DC voltage exceeds the pre-set limit, the UPS will shut down automatically and the critical load will be transferred to bypass.

2.2.2 Inverter

1. **General**

   The UPS inverter shall be a pulse-width-modulated (PWM) design capable of providing the specified AC output. The inverter shall convert DC power from the input converter output or the battery into precise sinewave AC power for supporting the critical AC load.

2. **Overload**

   The inverter shall be capable of supplying current and voltage for overloads exceeding 100% and up to 150% of full load current. A visual indicator and audible alarm shall indicate overload operation. For greater currents or longer duration, the inverter shall have electronic current-limiting protection to prevent damage to components. The inverter shall be self-protecting against any magnitude of connected output overload. Inverter control logic shall sense and disconnect the inverter from the critical AC load without the requirement to clear protective devices.

3. **Inverter DC Protection**

   The inverter shall be protected by the following DC shutdown levels:

   - DC Overvoltage Shutdown
   - DC Undervoltage Shutdown (End of Discharge)
   - DC Undervoltage Warning (Low Battery Reserve); factory default set at 5 minutes (user-configurable 3 to 30 minutes).

4. **Output Frequency**

   An oscillator shall control the output frequency of the UPS. The inverter shall maintain the output frequency to ±0.25Hz of nominal frequency during Battery mode, Frequency Converter mode or when otherwise not synchronized to the utility/mains source.

5. **Output Protection**

   The UPS inverter shall employ electronic current limiting circuitry.

6. **Battery Over Discharge Protection**

   To prevent battery damage from over discharging, the UPS control logic shall automatically raise the battery shutdown voltage setpoint; depending on output load and connected battery system at the onset of battery operation.

2.2.3 Display and Controls

General

The UPS shall be provided with a microprocessor-based unit status display and controls section designed for convenient and reliable user operation. The monitoring functions such as voltages, currents, UPS status and alarm indicators shall be displayed on a liquid crystal display (LCD). The LCD shall present text in any of thirteen (13) languages (English, French, Portuguese, Spanish, Chinese, Czech, Dutch, German, Italian, Polish, Russian, Swedish, and Turkish) for user selection.

System Indicators

The UPS display shall also include two LED-based system indicators. The system level indicators shall be: fault indicator and UPS operating status

Controls

UPS startup and shutdown operations shall be accomplished by using push buttons on the front panel of the UPS. The display shall be menu driven and shall use four control buttons for ease of navigation and selection of the configurable parameters.

1. **Control Buttons** - The UPS display control button functionality shall be:

   - ESC button: This button shall return to the previous menu or abort any change before confirming the change.
   - UP arrow button: This button shall move the cursor up or increase the value displayed when changing parameters. This button shall also be used to scroll up for navigating the screens.
   - DOWN arrow button: This button shall move the cursor down or decrease the value displayed when changing parameters. This button shall also be used to scroll down for navigating the screens.
   - ENTER button: This button shall enter the next level menu or confirm the parameter changes

2. **Display Menu Structure** - The UPS display shall have the following menu structure with the following status and configuration screens

3. **System Status (Default screen)** - The system status screen shall be the default screen to display a mimic diagram and shall include the input voltage and frequency; bypass voltage and frequency; output voltage, frequency, and load percentage; battery charge state, voltage, capacity and estimated battery time remaining. To prolong display life, the UPS display shall go into “sleep” mode after two minutes of no user interaction. Pressing any of the four functional buttons shall wake up the display and this action shall not perform any operation.
4. **Main Menu** - The main menu shall list the submenu selections:
    - UPS Status Screens
    - Configuration Settings Screens
    - Control Settings Screens
    - Event Log Screens
    - About Screens
    - Maintenance Screens
5. **UPS Status** - The UPS status screens shall provide the following information:
    - Input
        - Voltage
        - Frequency
        - Amperage
        - Power Factor
    - Bypass
        - Voltage
        - Frequency
        - Battery
        - Charge Status
        - Capacity
        - Runtime (minutes)
        - Voltage
        - Current
        - Temperature
    - Output
        - Voltage
        - Frequency
        - Amperage

- Load
  - Capacity Percentage
  - Wattage
  - Volt-Amperes
  - Power Factor
  - Crest Factor

6. **Configuration Settings** - The UPS Configuration settings screens shall provide the following customizable parameters (default values are listed first):
   - Monitor
     - Language (English, Chinese, French, Portuguese, Spanish)
     - Date (Year/Month/Day)
     - Time (Hour/Minutes/Seconds)
     - Audible Alarm (Enable, Disable)
     - Serial Port 1 Baud Rate
     - Serial Port 2 Baud Rate
     - Vertiv™ Liebert® IntelliSlot Port Protocol (Velocity, YDN23)
     - Modbus address (1, 1-128)
     - Change Settings Password (000000, up to six numbers, 0-9)
   - System
     - Battery Auto Equalize (Disable, Enable)
     - ECO Mode (Disable, Enable)
7. **Control Settings** - The UPS display shall have the following controls:
     - Clear Faults
8. **Event Log** - The UPS shall have an event log to record 1024 events and shall be viewable from the display. The event log, once full, shall begin to replace the first event logged to provide a FIFO process for maintaining event history. The event history shall record and display the number of events out of the 1024 (xxx/1024) as well as the event description, time (date/time when the event that occurred), event code.
   - Current - Navigate the event log to view the last 1024 events.
   - History - Navigate the event log to view the last 1024 events.
9. **About** - The UPS shall have an About screen to display the UPS model number, serial number, hardware version, and firmware version. Additionally, if fitted with a network monitoring card (SNMP) and connected to a network, the network information provided shall be at least the MAC address and IP address.
10. **Maintain** - The UPS cabinet shall include a make-before-break maintenance bypass with mechanical interlock.

Automatic Battery Test

The UPS shall feature an automatic battery test. The battery test shall ensure the capability of the battery to supply power to the inverter while loaded. If the battery fails the test, the UPS shall display a warning message to indicate that the internal batteries need replaced. The battery test feature shall be user-accessible with communication software. The automatic battery test feature shall be capable of being disabled or configured from the LCD to operate every 8, 12, 16, 20 or 26 weeks.

2.3 Bypass

2.3.1 General

A static bypass circuit shall be provided as an integral part of the UPS. Bypass control logic shall contain an automatic transfer control circuit that senses the status of the inverter logic signals and operating and alarms conditions. This control circuit shall provide a transfer of the load to the bypass source if available and if the inverter is incapable of powering the load (i.e., if there is an overload condition, if the unit is in Manual Bypass mode or if the voltage or frequency is out of tolerance).

2.3.2 Automatic Transfers

The transfer control logic shall activate the bypass automatically, transferring the critical AC load to the bypass source, after the transfer logic senses one of the following conditions:

- UPS overload
- UPS overtemperature
- PFC failure
- Inverter failure
- DC bus overvoltage

Once the overload condition is reduced, the load shall be automatically transferred back to inverter power.

2.4 Battery System

Valve-regulated, non-spillable, lead acid cells (VRLA) shall be used as a stored-energy source for the specified UPS system. The UPS enclosure shall allow up to two (2) battery strings wired in parallel and a matching external battery cabinet shall be provided to house two (2) additional battery strings wired in parallel to provide extended run time capability. The battery shall be sized to support the inverter at rated load and power factor, with ambient temperature of 25°C (77°F) for a minimum of 5 minutes of reserve time. The battery's expected life shall be 6-8 years or a minimum 260 complete discharge cycles.

2.5 Maintenance Bypass

The UPS system shall include an internal maintenance bypass breaker. The maintenance bypass shall be housed in an electrically isolated section inside the UPS cabinet. The maintenance bypass shall be a make-before-break type with integrated interlock to prevent mis-operation.

2.5.1 Optional Power Output Distribution (POD)

Optional output distribution, located on the rear of the unit, shall be integral to the UPS. The UPS shall have two ports available, each port protected by an isolation breaker. Each port shall be able to use of any of the following PODs:

Model	Phases	Distribution
PD3-001	3	(2) L21-30R
PD3-002	3	(6) L6-30R
PD3-003	3	(6) L5-30R

Model	Phases	Distribution
PD3-004	3	(1) IEC60309 - 60A (4W+G)
PD3-005	3	(6) L5-20R
PD3-006	3	(6) L6-20R
PD3-007	3	(2) L15-30R
PD3-008	3	(1) CS8364C- 60A
PD3-009	3	(2) L21-20R
PD3-010	3	(2) L15-20R
PD3-011	3	(1) IEC60309 - 60A (3W+G)
PD2-101	2	(8) 5-15/20R T-slot, (2) L6-30R
PD2-102	2	(4) 5-15/20R T-slot, (4) L6-20R
PD2-103	2	(4) 5-15/20R T-slot, (4) L6-30R
PD2-104	2	(4) 5-15/20R T-slot, (2) L6-30R, (2) L6-20R
PD2-105	2	(4) 5-15/20R T-slot, (2) L5-30R, (2) L5-20R
PD2-106	2	(4) L5-20R, (4) L6-20R
PD2-107	2	(4) L5-20R, (4) 5-15/20R T-slot
PD2-108	2	(2) L6-30R, (2) L6-20R
PD2-109	2	(2) L14-30R
PD2-200	2	(4) IEC320-C19, (4) IEC320-C13
PD2-201	2	(2) IEC320-C19, (8) IEC320-C13
PD2-202	2	(12) IEC320-C13
PD2-204	2	(2) IEC309-32A, (4) IEC320-C13

2.6 Communication Options

2.6.1 Vertiv™ Liebert® IntelliSlot Communication

The UPS shall include two Liebert® IntelliSlot communication ports to allow the operator to field-install an optional Liebert® IntelliSlot communication card. A Liebert® IntelliSlot card may be installed during any state of UPS operation (On, Standby or Off states). Available Liebert® IntelliSlot options are described below.

1. Liebert® IntelliSlot Web Card (IS-UNITY-DP)

   - The optional Liebert® IntelliSlot Web Card shall deliver SNMP and Web management to the UPS when connected to any 10 or 100 Mbit Ethernet network. The card shall support 10/100 Mbit Ethernet, IPv4 and IPv6, HTTP/HTTPS, SNMPv1/v2/v3 for device Web page access and deliver Web, Vertiv™ LIFE™ Services support, SNMP, e mail, text messaging, and Telnet communication and control capabilities and shall provide for in-the-field upgrade of SNMP firmware. The kit shall include the Liebert® IntelliSlot card, MIB, configuration cable and user manual.
   - The Vertiv™ Liebert® IS-UNITY-DP Web card shall also support external environmental sensors for monitoring environmental conditions around the UPS units. The Liebert® IS-UNITY-DP is a hot-installable card.

2. Vertiv™ Liebert® IntelliSlot Web Card (IS-UNITY-SNMP)

   The optional Liebert® IntelliSlot Web Card shall deliver SNMP and Web management to the UPS when connected to any 10 or 100 Mbit Ethernet network. The card shall support 10/100 Mbit Ethernet, IPv4 and IPv6, HTTP/HTTPS, SNMPv1/v2/v3 for device Web page access and deliver Web, SNMP, e mail, text messaging, and Telnet communication and control capabilities and shall provide for in-the-field upgrade of SNMP firmware. The kit shall include the Liebert® IntelliSlot card, MIB, configuration cable and user manual. The Liebert® IS UNITY SNMP is a hot-installable card.

3. Liebert® IntelliSlot Relay Interface Card (IS-RELAY)

   The optional Liebert® IntelliSlot Relay Interface Card shall provide contact closure for remote monitoring of alarm conditions in the UPS, delivering signals for On Battery, On Bypass, Low Battery, Summary Alarm, UPS Fault and On UPS. The contacts shall be rated for 24VAC or 24VDC at 1A. Connections shall be to a terminal block connector with cable provided by the end user.

2.6.2 USB Port

The USB port shall allow factory trained service personnel to connect a computer to use with proprietary Vertiv Service software. The proprietary service software tool is used for setting operational parameters, collecting diagnostics, and to allow firmware updates

2.6.3 Terminal Block Connections

The UPS shall contain on the front panel terminal block connections to provide two (2) sets of dry contact output signals and five (5) sets of dry contact input signals. All dry input and output contact signals shall be configurable

1. **Dry Contact Output Signals**

   The dry contact output signals available for configuration shall be: Summary Alarm, On Battery, Low Battery, UPS Fault, On Bypass, On UPS, Remote EPO, Main Input Abnormal, On Maintenance Bypass, Load Shed Signal 1, Load Shed Signal 2, Internal MBB Closed

   - Output Contact Port 1 - On Battery signal shall be the default setting for this port and shall be a Normally Open (NO) dry contact.
   - Output Contact Port 2 – Summary Alarm signal shall be the default setting for this port and shall be a Normally Open (NO) dry contact.

   The dry output contacts shall be rated for 24 VDC, 0.5A maximum

2. **Dry Contact Output Signals**

   The dry contact input signals available for configuration shall be: On Generator, Transfer to Inverter Inhibit, External MIB Status, External MBB Status, Module Output Breaker Status, Battery Ground Fault Detected, Charger Shutdown, ECO Mode Inhibit, Start Battery Maintenance Self-Test, Stop Battery Maintenance Self-Test, Alarm Cleared

   - Input Contact Port 1 – External MIB Status is the default setting for this port and shall be a Normally Open (NO) dry contact.
   - Input Contact Port 2 – Module Output Breaker Status shall be the default setting for this port and shall be a Normally Open (NO) dry contact.
   - Input Contact Port 3 – External MBB Status shall be the default setting for this port and shall be a Normally Open (NO) dry contact.
   - Input Contact Port 4 – On Generator shall be the default setting for this port and shall be a Normally Open (NO) dry contact.

- Input Contact Port 5 – Transfer to Inverter Inhibit shall be the default setting for this port and shall be a Normally Open (NO) dry contact.

The dry input contacts shall be rated at 12VDC, 20mA maximum.

2.6.4 Remote Emergency Power OFF

The UPS shall contain an interface for a Remote Emergency Power Off (REPO) circuit. The REPO shall interface with both Normally Open and Normally Closed REPO systems.

2.6.5 Parallel/LBS Port

The UPS shall provide communication ports for a parallel UPS system or for Load Bus Sync (LBS) communication between two separate stand-alone like UPS systems.