

# Liebert® GXT4™

## 8000 & 10000VA RT208 Rack-Tower models, Dual Inverter GUIDE SPECIFICATIONS

### 1.0 GENERAL

#### 1.1 SUMMARY

This specification shall define the electrical and mechanical characteristics and requirements for a continuous-duty, single-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.

##### 208V Nominal Units

- Listed to UL Standard 1778, 4<sup>th</sup> Edition; and c-UL Listed
- CSA 22.2 No. 107.1
- NEMA Type 1 Enclosure
- FCC Part 15, Class A
- CISPR22 Class A (RFI)
- IEC 61000-3-12 (Harmonics)
- IEC/EN/AS 62040-2 2nd Ed (Cat 2 - Table 6):
  - EN61000-4-2, Level 4, Criteria A
  - EN61000-4-3, Level 3, Criteria A
  - EN61000-4-4, Level 4, Criteria A
  - EN61000-4-5, Level 3, Criteria A
  - EN61000-4-6
- ANSI C62.41, Category A, Level 3
- EN61000-4-5, Level 3, Criteria A
- RoHS2 (6 by 6) Compliant
- REACH and WEEE Compliant
- ISTA Procedure 1A/1E

## 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:

- A. 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 battery shall be charged once the unit 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 the utility returns, whichever occurs first.
- B. 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.
- C. Recharge** - Upon restoration of utility / mains AC power, after a utility / mains AC power outage, the input converter shall automatically restart and assume supplying power to the inverter and the battery charger to recharge the battery.
- D. Internal 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 over temperature, DC bus overvoltage or inverter failure conditions.
- E. Maintenance Bypass** - Maintenance Bypass mode shall provide an alternate path for utility power to the connected load during UPS maintenance or UPS component replacement.
- F. 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 assume 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.
- G. ECO** – The UPS shall allow the user to enable and place the UPS in ECO mode of operation to reduce electrical consumption. The ECO mode operation shall be an Active type, whereas the UPS will power the connected equipment through the bypass path and the UPS inverter shall be on and operating at no load in order to stay synchronized to the bypass to ensure rapid 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 operation. This is to minimize the number of transfers between bypass and inverter.

### 1.3.2 Design Requirements

- A. Voltage:** Shall operate at either 120/208V or 120/240V by sensing the utility phase angle and configuring the dual inverters to the same angle: 120 or 240 degrees (or) 180 degrees. Nominal input/output voltage specifications of the UPS at rated load shall be:

#### Input

The UPS shall be able to operate from 120/208V, 50/60Hz (or) 120/ 240V, 50/60Hz without the use of selector switches or voltage taps. Input wiring must be 3-wire plus ground (L1, L2, N, G, with N solid bonded to G at the distribution panel).

#### Output

Output voltage shall be present at terminals L1, L2 and N. The output voltage shall be 120/208V, 50/60Hz . Voltage measured between L1-N and L2-N: 120VAC  $\pm 3\%$ , 50/60Hz; L1-L2: 208VAC  $\pm 5\%$ , 50/60Hz. The UPS shall be configurable using the included configuration program to provide the following alternate output voltages:

120/240V, 127/220V, 115/230V, 110/220V, 100/200V, all voltages 50 or 60Hz.

(If the UPS is started on battery with no input power present, the default output voltage shall be 120/208V, 60Hz from the factory. After the UPS has been started from utility, the output voltage/frequency shall match the last known input voltage/frequency that was applied.)

- B. Output Load Capacity:** Specified output load capacity of the UPS shall be:

#### 8000RT208 models

VA	Watts	VAC Output
8000	7200	120 / 208 (120 or 240 degree only)
8000	7200	120 / 208 (180 degree only)
8000	7200	127 / 220 (120 or 240 degree only)
7200	6480	110 / 220 (180 degree only)
8000	7200	115 / 230 (180 degree only)
6400	5760	100 / 200 (180 degree)

#### 10000RT208 models

VA	Watts	VAC Output
10000	9000	120 / 208 (120 or 240 degree only)
10000	9000	120 / 208 (180 degree only)
10000	9000	127 / 220 (120 or 240 degree only)
9000	8100	110 / 220 (180 degree only)
10000	9000	115 / 230 (180 degree only)
8000	7200	100 / 200 (180 degree)

- C. Internal Battery:** Valve-regulated, non-spillable, lead acid cells.

**D. Battery Reserve Time:**

- **8000VA:** 8 minutes
- **10000VA:** 5 minutes

These times shall be at full load with ambient temperature of 77°F (25°C) with resistive loading.

- E. Battery Recharge:** The UPS shall contain a three-stage battery charger designed to prolong battery life. Recharge time for UPS internal batteries shall be 5 hours maximum to 90% capacity after a complete discharge into full load.

### 1.3.3 Performance Requirements

#### 1.3.3.1 AC Input to UPS

- A. Voltage:** The point at which the UPS transfers to battery operation shall be dependent on the amount of load that the UPS is supporting. The UPS shall operate from the following L-N voltage ranges without drawing power from the batteries:

##### Low Line Voltage Range

Low Line Voltage		GXT4-8000RT208	GXT4-10000RT208
100% to 91%	L-N Transfer	88 ± 3.1VAC	93 ± 3.1VAC
	L-N Comeback	95 ± 3.1VAC	100 ± 3.1VAC
90% to 71%	L-N Transfer	84 ± 3.1VAC	84 ± 3.1VAC
	L-N Comeback	91 ± 3.1VAC	91 ± 3.1VAC
70% to 31%	L-N Transfer	70 ± 3.1VAC	70 ± 3.1VAC
	L-N Comeback	77 ± 3.1VAC	77 ± 3.1VAC
30% to 0%	L-N Transfer	60 ± 3.1VAC	60 ± 3.1VAC
	L-N Comeback	67 ± 3.1VAC	67 ± 3.1VAC

##### High Line Voltage Range

High Line Voltage	208V Models
High Line Transfer	139.5 ± 3.1VAC
High Line Comeback	132.5 ± 3.1VAC

- B. Frequency:** The UPS shall auto-sense input frequency of 50Hz or 60Hz when first powered up and shall use this frequency as the default output frequency. Once started the input frequency operating window shall be 40-70Hz without going to batteries. The UPS shall be capable of cold start with a default output frequency of 60Hz.
- C. Input Power Factor:** >0.99 lagging at rated load.
- D. Input Current reflected distortion:** 5% THD maximum at rated load.
- E. Input Current Ratings:**

UPS Model #	VA	Watt	Hz	VAC	L1	L2	Total Amps
GXT4-8000RT208	8000	7200	50/60	120/240	20.8	20.8	41.6
	8000	7200	50/60	115/230	21.7	21.7	43.5
	8000	7200	50/60	120/208	20.8	20.8	41.7
	7200	6480	50/60	110/220	20.8	20.8	41.5
	6400	5760	50/60	100/200	21.7	21.7	43.5
GXT4-10000RT208	10000	9000	50/60	120/240	27.2	27.2	54.3
	10000	9000	50/60	115/230	25.5	25.5	51
	10000	9000	50/60	120/208	24.5	24.5	48.9
	9000	8100	50/60	110/220	24.5	24.5	49
	8000	7200	50/60	100/200	25.5	25.5	51

- F. Surge Protection:** The UPS shall utilize metal oxide varistors (MOVs) rated at 175V, 150 Joules minimum connected L1-N and L2-N; 300V, 150 Joules minimum connected L1-G, L2-G and N-G.

**1.3.3.2 AC Output, UPS Inverters**

**A. Voltage Configuration:** 50/60Hz, single-phase, 3-wire-plus-ground.

Default setting 120/208V. Output L-N voltage shall be selectable via the included UPS configuration program. Optional settings shall be 100/200V, 110/220V, 115/230V, 120/208V, 120/240V or 127/220V. The UPS shall adjust sinewave amplitude and/or phase-angle relationship of the inverters to produce the selected voltage to match the input.

**Note:** At 100/200V setting, the UPS shall be derated to 80% of the rated 120/208V capacity; at 110/220V, the UPS shall be derated to 90% of the rated 120/208V capacity.

**B. Voltage Regulation:** L1-N and L2-N:  $\pm 3\%$  steady state.

L1-L2:  $\pm 5\%$  steady state.

**C. Frequency Regulation:**  $\pm 3.5\text{Hz}$  synchronized to utility / mains.

$\pm 0.1\text{Hz}$  free running or on battery operation.

**D. Frequency Slew Rate:** 1.0Hz per second maximum

**E. Load Power Factor Range:** 0.65 lagging to 1.0 (unity)

**F. Voltage Distortion:** Sinusoidal Waveform;  $\leq 3\%$  total harmonic distortion (THD) into a 100% linear load;  $\leq 5\%$  THD into a 100% non-linear load with a crest factor ratio of 3:1.

**G. Inverter Overload Capability:**

Overload Percent	Duration Inverter shall support rated load
105% to 130%	1 minute
131% to 150%	10 seconds
151% to 200%	1 second
>200% (impact load)	At least 5 cycles

**H. Voltage Transient Response:**  $\pm 7\%$  on-line or Battery mode for 0-100-0 % loading of the UPS,  $\pm 4\%$  on-line or Battery mode for 20-100-20 % loading of the UPS.

**I. Transient Recovery Time:** To nominal voltage within 166 milliseconds.

**J. AC-AC Efficiency:**

The UPS shall be EPA ENERGY STAR qualified.

- 8 kVA: 92% AC-AC at full rated linear load
- 10 kVA: 91% AC-AC at full rated linear load

## 1.4 ENVIRONMENTAL CONDITIONS

### A. Ambient Temperature

**Operating:** 32°F to 104°F (0°C to 40°C) for altitudes 0 to 5,000 feet (0 to 1500 meters) above sea level.  
32°F to 95°F (0°C to 30°C) for altitudes 5,000 to 10,000 feet (1500 to 3000 meters) above sea level.

**Storage:** 5°F to 122°F (-15°C to +50°C)  
GXT4-288RTVBATT and GXT4-288RTVBATKIT: 68°F (20°C) for optimum battery storage.  
Battery systems should not be stored for extended periods above 77°F (25°C)

### B. Relative Humidity

**Operating:** 0 to 95% non-condensing.

**Storage:** 0 to 95% non-condensing.

### C. Altitude

10,000ft. (3,000m) max, without power derating when operated within the temperature specified in Section 1.4, Item A. Ambient temperature shall be derated by 9°F (5°C) for each additional 1600ft. (500m) above 10,000ft. (3,000m).

### D. Audible Noise

Noise generated by the UPS under normal operation shall not exceed 55dBA when measured at 3.2ft. (1m) from the surface of the UPS.

### E. Electrostatic Discharge

The UPS shall be able to withstand an electrostatic discharge compliant to EN61000-4-2, level 4, Criteria A, without damage and shall not affect the connected load.

## 1.5 USER DOCUMENTATION

The specified UPS system shall be supplied with a Safety Warning Sheet. The specified UPS system shall be supplied with quick start guides for ease of installation and UPS start up. Each UPS will also contain a full user manual located on the included CD. 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. The included CD will also include a configuration program to allow user customization of UPS operating parameters and also UPS monitoring and computer/server shutdown software.

## 1.6 WARRANTY

The UPS manufacturer shall warrant the UPS against defects in materials and workmanship for two (2) years. The no-hassle replacement warranty shall include shipping costs to the customer site for the new replacement unit and shipping costs from the customer site for the return of the failed unit. Optional one (1) and three (3) year full coverage extension warranties shall be available from the manufacturer. The manufacturer's standard and extended warranty shall cover all parts including the battery.

## 1.7 QUALITY ASSURANCE

### 1.7.1 Manufacturer's Qualifications

More than 40 years experience in the design, manufacture, and testing of solid-state UPS systems. The manufacturer shall be certified to ISO 9001:2008.

### 1.7.2 Factory Testing

Before shipment, the manufacturer shall fully and completely test the system to ensure compliance with the specification

## 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 PFC converter, battery charger, dual-inverter, input filter and internal bypass circuit; and batteries consisting of the appropriate number of sealed battery cells; and shall be housed in a rack-tower NEMA type 1 enclosure and shall meet the requirements of IP20. The UPS cabinet shall be cleaned, primed and painted RAL 7021 Black. The internal battery unit shall be shipped separately and shall be installed during the UPS installation process.

#### 2.1.3 Matching Battery Cabinets

The optional Rack-Tower battery cabinet shall contain valve-regulated, non-spillable, lead acid cells, housed in a separate cabinet that matches the UPS cabinet styling. The cabinet shall be cleaned, primed and painted Black RAL 7021. The matching battery cabinet shall include an 18" (0.45m) detachable, molded interconnect cable, circuit breaker over current protection and provisions for daisy-chain connection of additional battery cabinets.

The model numbers, dimensions and weight information of the UPS cabinet and optional external battery cabinet shall be as follows:

Model	Rack Dimensions W x D x H, in. (mm)	Tower Dimensions W x D x H, in. (mm)	Weight lb. (kg)
GXT4-8000RT208	16.9 x 26.5 x 10.3 (430 x 672 x 261)	10.3 x 26.5 x 16.9 (261 x 672 x 430)	212.7 (96.7)
GXT4-10000RT208	16.9 x 26.5 x 10.3 (430 x 672 x 261)	10.3 x 26.5 x 16.9 (261 x 672 x 430)	212.7 (96.7)
GXT4-288VBATT (Optional External Battery)	16.9 x 26.5 x 6.8 (430 x 672 x 173)	6.8 x 26.5 x 16.9 (173 x 672 x 430)	167.6 (76.2)

#### 2.1.4 Cooling

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

## 2.2 COMPONENTS

### 2.2.1 Input Converter

#### 2.2.1.1 General

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

#### 2.2.1.2 AC Input Current Limit

The input shall use the power necessary to operate the load attached to the output before going to batteries. The UPS shall not use electronic input current limiting. The UPS shall include a 2-pole 60A input breaker.

#### 2.2.1.3 Input Protection

The UPS shall have built-in protection against under voltage, over current and over voltage conditions including low-energy lightning surges, introduced on the primary AC source. The 208VAC models shall sustain input surges without damage per criteria listed in ANSI C62.41 Cat. A.

#### 2.2.1.4 Battery Recharge

The UPS shall contain a three-stage battery charger designed to prolong battery life. Recharge time for the internal battery shall be 5 hours maximum 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 inverter shall shut down automatically and the critical load shall be transferred to internal bypass.

### 2.2.2 Inverters

#### 2.2.2.1 General

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

#### 2.2.2.2 Overload

The inverter shall be capable of supplying current and voltage for overloads exceeding 100%, and 105-130% for 1 minute, 131-150% for 10 seconds, 151 - 200% for 1 second, and up to >200% for 5 cycles of full load current. A visual indicator and audible alarm shall indicate overload operation. For greater currents or longer time duration, the inverter shall have electronic current-limiting protection on the output 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.

#### 2.2.2.3 Inverter DC Protection

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

- DC Overvoltage Shutdown
- DC Undervoltage Shutdown (End of Discharge)
- DC Under voltage Warning (Low Battery Reserve); factory default set at 2 minutes (user configurable 2 to 30 minutes)

#### 2.2.2.4 Output Frequency

An oscillator shall control the output frequency of the UPS. The inverter shall maintain the output frequency to  $\pm 0.1\text{Hz}$  of nominal frequency during Battery mode, Frequency Converter mode or when otherwise not synchronized to the utility/mains source.



### 2.2.2.5 Output Protection

The UPS inverter shall employ electronic current limiting circuitry for protection during Normal mode and battery operation and shall employ input and output circuit breaker protection during Bypass mode operation.

## 2.2.3 Display and Controls

### 2.2.3.1 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 an LCD display.

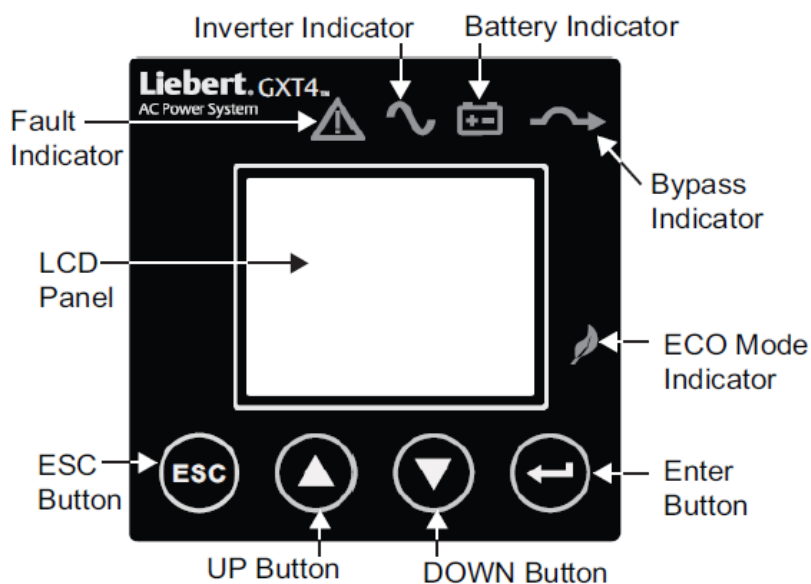
### 2.2.3.2 System Indicators

UPS display shall also include LED based system indicators. The system level indicators shall be: fault indicator, battery indicator, inverter indicator, bypass indicator, and ECO mode indicator.

- **Fault Indicator:** 1 Red LED shall illuminate if the UPS has detected a fault; and shall be Off if there is no internal fault
- **Inverter Indicator:** 1 Green LED shall illuminate when the inverter is supplying power; and shall be Off when the inverter is not supplying power
- **Battery Indicator:** 1 Amber LED shall illuminate when the battery is supplying power; and shall be Off when the battery is not supplying power
- **Bypass Indicator:** 1 Amber LED shall illuminate when the bypass is supplying power; shall be Off when the inverter is not supplying power; and shall flash when utility power is outside bypass operating specifications
- **ECO Mode Indicator:** 1 Green LED shall illuminate when the UPS is operating in active ECO mode operation and shall be Off when the UPS is operating in the normal double conversion mode of operation

### 2.2.3.3 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 navigation and use four control buttons for ease of navigation and selection of the configurable parameters.



### 2.2.3.3.1 Control Buttons

The UPS display control button functionality shall be as follows:

**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

### 2.2.3.3.2 Display Menu Structure

The UPS display shall have the following menu structure with the following status and configuration screens

#### 2.2.3.3.2.1 System Status (Default screen)

The system status screen shall be the default screen to display the input voltage, frequency, and amperage; output voltage, frequency, and amperage; battery capacity and estimated battery time remaining; loading percentage. To prolong display life, the UPS LCD display shall go into “sleep” mode after two minutes of no user interaction. Pressing the ENTER shall wake up the display and this action shall not perform any operation.

#### 2.2.3.3.2.2 Main Menu

The main menu shall list the submenu selections:

- UPS Status Screens

- Configuration Settings Screens

- Control Settings Screens

- Event Log

- About

- Network

### 2.2.3.3.2.3 UPS Status

The UPS status screens shall provide the following information:

#### Output

- Voltage
- Frequency
- Amperage
- Power (KWH)

#### Load

- Capacity
- Wattage
- Volt-Amperes

#### Input

- Voltage
- Frequency
- Amperage
- Power (KWH)

#### Battery

- Capacity
- Runtime (minutes)
- Voltage

#### Time Since Startup

Days / Hours / Minutes

### 2.2.3.3.2.4 Configuration

The UPS Configuration screens shall provide the following customizable parameters: (default values are listed first)

#### UPS

- Audible Alarm (ON/OFF)
- Startup on Bypass (NO/YES)
- Guarantee Shutdown (YES/NO)
- Enable Auto Restart (YES/NO)
- Output Frequency Selection (Auto bypass Enable/Auto bypass disable/50Hz no bypass/60Hz no bypass)
- Output Voltage Selection (110/115/120/127V for L-N voltages); (200/220/230/240V for L-L voltages)

#### Battery

- External Battery Cabinets (0/1/2/3/4/5/6)
- Low Battery Warning (2 to 30 minutes in 1 minute increments)
- Battery Test Interval (8, 12, 16, 20, 26 weeks, Disable)
- Battery Replacement Reminder (Year/Month/Day)

**ECO Mode**

ECO Mode (OFF/ON)  
Voltage Tolerance ( $\pm 10\%$ ,  $\pm 5\%$ ,  $\pm 15\%$ )  
Frequency Tolerance ( $\pm 3\text{Hz}$ ,  $\pm 2\text{Hz}$ ,  $\pm 1\text{Hz}$ )  
Requalification Time (5min, 15min, 30min)

**LCD Settings**

Language, English (one other that is programmable using the included CD and configuration program)  
Color (background color), Blue, Black, Red, Pink

**Factory Settings**

The factory settings screens shall provide a NO/YES selection to reset the UPS back to all factory setting

**2.2.3.3.2.5 Control Settings**

The UPS shall have the following controls from the display:

**UPS ON/OFF**

Turn UPS ON  
Turn UPS OFF  
Turn ON Bypass (manually transfer to bypass power)

**Audible Alarm**

Turn audible alarm ON (test alarm)  
Turn audible alarm OFF (alarm silence)

**Battery Test**

Start manual battery test  
Cancel manual battery test  
View last battery test results

**2.2.3.3.2.6 Event Log**

The UPS shall have an event log to record 255 events and shall be viewable from the display:

**View Log**

Navigate the event log to view the last 255 events.

**Clear Log**

User shall be able to clear the event log

The event log once full will 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 255 (xxx/255) as well as the time (days, hours, mins) from when viewing the event and the event that occurred.

**2.2.3.3.2.7 About**

The UPS shall have an about screen to display the UPS model number, serial number, hardware version, and firmware version

#### 2.2.3.3.2.8 Network

The UPS shall be have the ability to display the network information of the SNMP web card when installed. Information available shall be MAC address and IP address

#### 2.2.3.4 Automatic Battery Test

The UPS shall feature an automatic battery test with the factory default test interval set at every eight weeks. 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 the internal batteries need replaced. The battery test feature shall be user accessible by the push button on the front of the unit and with communication software. The Automatic Battery test feature shall be capable of being disabled or configured to operate every 8, 12, 16, 20, 26 weeks through the UPS Configuration Program or from the LCD display.

### 2.3 BYPASS

#### 2.3.1 General

A bypass circuit shall be provided as an integral part of the UPS. The bypass shall have a make-before-break transfer, shall have a maximum detect and transfer time of 4-6 milliseconds and shall be a double-pole device. The bypass circuit shall be designed to ensure the simultaneous transfer of the L1 and L2 poles. The bypass shall be configured to wrap around the PFC converter, battery charger, DC-DC converter, inverter and battery. The bypass circuit shall use the rear-panel mounted UPS input circuit breaker and route bypass power through the UPS input filters and surge suppression circuit. The bypass circuit default position shall be in the Bypass mode (utility).

#### 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 over temperature
- PFC failure
- Inverter failure
- DC bus overvoltage

Once the overload condition is reduced, the load shall be automatically transferred back to inverter power. An over temperature requires manual transfer back to inverter power after cooling.

### 2.4 INTERNAL BATTERY

Valve-regulated, non-spillable, lead acid cells shall be used as a stored-energy source for the specified UPS system. The battery kit shall be internal to the UPS cabinet and sized to support the inverter at rated load and power factor with an ambient temperature of 77°F (25°C) for a minimum of 5 minutes reserve time. The expected life of the battery shall be 3-5 years or a minimum 260 complete discharge cycles at ambient temperature of 77°F (25°C). To promote battery service life and eliminate over-discharge of the battery, the end-of-discharge DC shutdown voltage shall be automatically adjusted by the microprocessor based upon the percentage load at the onset of battery operation.

All UPS models shall allow connection of up to six external battery cabinets to provide extended run time capability. External battery cabinets shall match the UPS in aesthetics and color.

## 2.5 OUTPUT DISTRIBUTION

The UPS shall have hardwire input and output connections standard and contain one output distribution port for integral distribution to the UPS cabinet and located on the rear of the unit. The optional output distribution shall provide the capability to re-configure the UPS input and output connections via a removable sheet metal power distribution box. Output distribution configurations shall be:

Distribution Model Number	Output Receptacle Connections
PD2-101	(8) 5-20R (T-Slot), (2) L6-30R
PD2-102	(4) 5-20R (T-Slot), (4) L6-20R
PD2-103	(4) 5-20R (T-Slot), (4) L6-30R
PD2-104	(4) 5-20R (T-Slot), (2) L6-30R, (2) L6-20R
PD2-105	(4) 5-20R (T-Slot), (2) L5-30R, (2) L5-20R
PD2-106	(4) L5-20R, (4) L6-20R
PD2-107	(4) L5-20R, (4) 5-15/20R
PD2-108	(2) L6-30R, (2) L6-20R
PD2-109	POD with (2) L14-30R
PD2-200	(4) IEC320-C19, (4) IEC320-C13 output sockets
PD2-201	(2) IEC320-C19, (8) IEC320-C13 output sockets
PD2-202	(12) IEC320-C13 output sockets
PD2-204	(2) IEC309-32A, (4) IEC320-C13 output sockets

## 2.6 ON-BOARD COMMUNICATION

The Liebert GXT4 shall offer multiple communication options such as:

- A. USB:** All models shall work with the Power Management system in Microsoft® Windows® XP or later, Linux and Mac OS® X.
- B. Remote Emergency Power Off (REPO):** The UPS shall be equipped with rear-panel terminal connections for interface with either a normally open (N.O.) or normally closed (N.C.) field-supplied switch. The remote emergency power off function shall allow the user to disable all UPS outputs in an emergency situation. Connections must not exceed NEC Class 2 limits. Activation of the REPO circuit shall disable the UPS until the following occurs:
- REPO contacts are reset.
  - User restart of the UPS using the front control panel.
- C. Terminal Block Communication:** includes 8 pins

Pin	Definition
1 & 2	Low Battery Warning
3 & 4	On Battery Warning
5 & 6	Any Mode Shutdown
7 & 8	Battery Mode Shutdown

**D. Liebert IntelliSlot® Port**

Simultaneous communication shall be available via terminal block (EPO), USB and Liebert IntelliSlot.

## 2.7 LIEBERT INTELLISLOT COMMUNICATION OPTIONS

The UPS shall include one Liebert IntelliSlot communication port with SNMP web card factory installed. The communication port shall also allow the operator to field-install optional Liebert IntelliSlot communication cards. Liebert IntelliSlot cards may be installed during any state of UPS operation (On, Standby or Off states). Available Liebert IntelliSlot options are described below.

### **Liebert IntelliSlot Web Card (IS-WEBCARD)**

The standard 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 and 100 Mbit Ethernet 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. Once the card is installed, serial communication shall be disabled in the DB9F connector; however, the photo-coupler signals (On Battery and Low Battery) shall remain active.

### **Liebert IntelliSlot Relay Interface Card (RELAYCARD-INT)**

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. Connection shall be to a terminal block connector with cable provided by the end user.

### **Liebert IntelliSlot Multiport Card (IS-MULTIPOINT)**

The optional Liebert IntelliSlot Multiport Card shall provide 4 sets of contact closure for remote monitoring of alarm conditions in the UPS, delivering signals for On Battery and Low Battery for connection to up to 4 servers/computers for use with Liebert MultiLink Shutdown software. 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.

## 2.8 LIEBERT GXT4 CONFIGURATION PROGRAM

An included Microsoft Windows-based (Windows XP or later) Configuration Program and cable shall allow configuration of UPS features and operating parameters to meet specific application requirements, if required. Options that are configurable via this program shall include:

- Select one of five output voltages to match input voltages of 200/100, 220/110, 220/127, 230/115 or 240/120.
- Enable / Disable Auto-Restart.
- Select frequency converter operation with a fixed output frequency of 50 or 60Hz. Bypass is disabled during Frequency Converter mode.
- Set the Low Battery Warning alarm time from 2 to 30 minutes.
- Disable the Auto-Battery test.
- Set the Auto-Battery test interval to 8, 12, 16, 20, 26 weeks or Disable the test.
- Select the number of external battery cabinets connected to the UPS to adjust the remaining run-time calculations reported by the UPS Liebert software products.
- Modify the shutdown setting of the Any Mode Shutdown.
- Configure the unit for ECO mode operation
- Change the LCD display language