Powerstar Inc

Gaithersburg Md 301-948-0713

Single Phase UPS **Model: PS3300RM-GDAIS-LCS-R4**
External Battery Tray Split Design **Model: PS3300RM-GDAIS-BP**
External Battery Tray Single Connector **Model: PS3300RM-GDAIS-BP-1**

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Revision	Description	Date / Authorized
A	Original release R4	4-6-2011 / PEK
B	Corrected Part number's	4-25-2011 / PEK
C	Updated orderable parts	12-01-11 / PEK
D	Added parts to orderable parts table (page 15)	5-2-2012 / PEK

Powerstar Inc
PS3300RM-GDAIS-LCS-R4
Single Phase UPS

GUIDE SPECIFICATIONS

1.0 GENERAL

1.1 SUMMARY
This specification defines the electrical and mechanical characteristics and requirements for a continuous duty single-phase, solid-state, uninterruptible power system. The uninterruptible power system hereafter referred to as the UPS, will provide high-quality AC power for sensitive electronic equipment loads.

1.2 STANDARDS
The UPS is **designed** in accordance with the 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.

- UL Standard 1778, u-UL
- CSA 22.2, No. 107.1
- ANSI / IEEE C62.41 Cat A Level 3
- IEC 61000-3-2
- EN 62040-2
- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- UL1950 / EN6050
- FCC Part 15, Class A
- ISTA Procedure 1A
- RoHs Compliant
- MIL-S-901D
- MIL-STD-167-1
- MIL-STD-1399 Section 300B

1.3. SYSTEM DESCRIPTION

1.3.1 Modes of Operation
The UPS is designed to operate as a true on-line double conversion system in the following modes:

A. Normal - In normal operation incoming AC power is fed to the input power factor corrected (PFC) rectifier that converts the AC power to DC power for the inverter. In this mode, power is also derived from utility power for the battery charger. The inverter derives DC power from either the PFC rectifier or the battery and regenerates filtered and regulated AC sine wave power for the connected load. The battery will 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 will 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 is supplied by the inverter, which obtains power from the battery. There is 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 automatically restarts and assumes supplying power to the inverter and the battery charger to recharge the battery.

D. Automatic Restart - Upon restoration of utility / mains AC power, after a utility mains AC power outage and complete battery discharge, the UPS automatically restarts and assumes supplying power to the critical load and the battery charger automatically recharges the battery. This feature is capable of being disabled by the user.

E. Bypass - The integral bypass performs an automatic transfer of the critical AC load from the inverter to the bypass source, in the event of an overload, PFC failure, over temperature, DC Bus over voltage, or inverter failure conditions.

1.3.2 Design Requirements

A. Voltage: Input/output voltage specifications of the UPS are:

- Input: 0 - 140 VAC, 60/50 Hz, single-phase, 2-wire-un-grounded.
- Output: 120 VAC (user configurable: 110V, 115V, 120V, 127V) +3%, 60/50 Hz,
- single-phase, 2-wire-un-grounded.

B. Output Load Capacity: Specified output load capacity of the UPS is:

- 3000 VA / 2700 Watts at 0.9 lagging power factor.

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

D. Reserve Time: 3000 VA / 2100 watts will be a minimum 5 minutes.
3000 VA / 2700 watts will be a minimum 4 minutes. These times are at an ambient temperature of 25^0C (77^0F) using only the internal battery set.

E. Battery Recharge: The UPS contains a battery recharge rate designed to prolong battery life. Recharge time for UPS internal batteries is 3 hours 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 Configuration: The UPS operates at these values without drawing power from the batteries.

120 VAC; single phase, 2 wire ungrounded nominal; variable based upon output loading:

LOAD	TRANSFER VOLTAGE	COMEBACK VOLTAGE
90%	97 VAC	104 VAC
70%	78 VAC	85 VAC
30%	61 VAC	68 VAC

B. Frequency: UPS auto senses input frequency when first powered up and will operate within the following frequency specifications. UPS is capable of Cold Start with default frequency of 60 Hz/ 120 VAC and 208 VAC units and 50 Hz/ 230 VAC. Once started frequency operating window is 40-70 Hz. There are 3 different frequency settings available in the Liebert GXT3 Configuration program: Auto frequency sensing (factory default setting), 50 Hz. frequency conversion, and 60 Hz. frequency conversion.

C. Input Power Factor: >0.99 lagging at rated load.

D. Input Current reflected distortion: 5% THD typical.

E. Input Current Ratings:

MODEL PS3300RM-GDAIS-LCS-R4
Input current ratings at full load 24.0A

F. Inrush Current (initial start up, no load): The UPS has a maximum inrush current of 12 times the full load peak input current.

G. Input Line Transient Immunity: UPS conforms to an input line transient conforming to IEEE C62.41, Category A Level 3 tests for 120 VAC & 208 VAC models. The 230 VAC models meet EN61000-4-5.

H. Surge Protection:
MOV ratings are 175 Volt, 80 Joules minimum connected L-N.

1.3.3.2 AC Output, UPS Inverter

A. Voltage Configuration:
120 VAC, 60/50 Hz, single-phase, 2-wire-plus-ground, configuration program selectable (110V, 115V, 120V, 127V).

B. Voltage Regulation: + 3% steady state.

C. Frequency Regulation: + 5% Synchronized to utility / mains. + 0.1 Hz free running or on battery operation.

D. Frequency Slew Rate: 1.0 Hertz per second maximum

E. Voltage Distortion: ≤3% 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.

F. Load Power Factor Range: The rated load power factor will be 0.9 lagging.

G. Output Power Rating: 3000 VA / 2700 Watts at 0.9 lagging power factor.

H. Inverter Overload Capability: 105% - 125% for 5 minutes, 125% - 150% for 1 minute, 150% - 200% for 2 seconds, and > 200% for 0.25 seconds.

I. Voltage Transient Response: + / - 7% in line mode 0-100-0 % loading of the UPS, + / - 7% in

battery mode for 0-100-0 % loading of the UPS rating.

J. Transient Recovery Time: To nominal voltage within 90 milliseconds.

K. Efficiency: ≥ 89% AC to AC, minimum

1.4 ENVIRONMENTAL CONDITIONS

A. Ambient Temperature:

- Operating: -20^{O} C to +50^{O} C (-4^{O} F to + 122^{O} F) for altitudes 0 to 1500 meters
- (0 to 5,000 ft.) above sea level.
- -20^{O} C to +40^{O} C (-4^{O} F to + 104^{O} F) for altitudes 1500 to 3000 meters (5,000 to 10,000 ft.) above sea level.
- 25^{O} C (+ 77^{O} F) for optimum battery performance
- Storage: **-**20^{O} C to +60^{O} C (-4^{O} F to +140^{O} F) with batteries removed.
- 20^{O} C (+ 68^{0} F) for optimum battery storage.
  The ambient temperature range, when UPS is operational, will be from 0 deg. C to 25 deg. C. There will not be any degradation in the performance when operating in this range.

Ambient Temperature	25-30 deg C +/- 3 deg C	30-35 deg C +/- 3 deg C	35-40 deg C +/- 3 deg C
Max Output Power Factor degradation @ max load	100%-93%	93%-86%	86%-79%

B. Relative Humidity:
Operating: 0 to 95% non-condensing.
Storage: 0 to 95% non-condensing.

C. Altitude:
3,000 m / 10,000 ft. max., without power derating when operated within the temperature specified in section 1.4.A. ambient temperature will be derated 5°C for each additional 500 meters.

D. Audible Noise:
The audible noise of the UPS will be
<48dBA max @ 1 meter from front and side
<48dBA max @ 1 meter from rear

E. Electrostatic Discharge:
The UPS is able to withstand an electrostatic discharge compliant to ENC61000-4-2.

1.5 USER DOCUMENTATION

The specified UPS system is supplied with one (1) user manual. The user manual includes 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
Powerstar Inc warrants the UPS against defects in materials and workmanship for two (2)

years.

1.7 QUALITY ASSURANCE

1.7.1 Factory Testing
Before shipment, Powerstar fully and completely tests the system to assure compliance with the specification. These tests include operational discharge and recharge tests on the internal battery to assure performance.

The PS3300RM-GDAIS-LCS-R4 is also tested for compliance with UL1950 / EN6050 as outlined in the General Dynamics documents dated 2-10-2006.

- Dielectric Withstand Voltage Test Procedure for LCS Core Mission Equipment
- Ground Bond Resistance Test Procedure for LCS Core Mission Equipment

2.0 PRODUCT

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

2.1.2 Wiring
Wiring practices, materials, and coding are in accordance with the requirements the standards listed in section 1.2 and other applicable codes and standards. All wiring is copper.

2.1.3 Cabinet
The UPS unit is comprised of an input converter, battery charger, inverter, and battery consisting of
the appropriate number of sealed battery cells; and is housed in a stainless steel rack mounted chassis

MODEL DIMENSIONS (D x W x H)
PS3300RM-GDAIS-LCS-R4
23.6” x 16.90” x 5.25”
(599.44 mm x 429.26 mm x 133.35 mm)

WEIGHT
Net Weight 115 lbs (52.27 kg)
Shipping Weight 125 (56.82 kg)

2.1.4 Cooling
The UPS is forced air cooled by an (4) internally mounted, continuous fans. Fan power is provided from the internal DC supply. Air intake is through the front of the unit and exhausted out the rear of the unit.

2.2 COMPONENTS

2.2.1 Input Converter

2.2.1.1 General
Incoming AC power is converted to a regulated DC output by the input converter for supplying DC power to the inverter. The input converter provides input power factor correction and input current distortion reduction.

2.2.1.2 AC Input Current Limit
The input converter is provided with AC input current limiting whereby the maximum input current is limited to 125% of the full load input current rating.

2.2.1.3 Input Protection
The UPS has built-in protection against undervoltage, overcurrent, and overvoltage conditions including low-energy lightning surges, introduced on the primary AC source. The 120 VAC model can sustain input surges without damage per criteria listed in ANSI C62.41 Cat A Lev3. The UPS have front mounted input dual pole input circuit breakers

2.2.1.4 Input Isolation
The UPS is equipped with an input isolation transformer

2.2.1.5 Battery Recharge
The UPS contains a battery recharge rate designed to prolong battery life. The battery is constant current charged to restore capacity, then shall be constant voltage charged to maintain the battery in a fully charged state. Recharge time for the internal UPS batteries shall be five (3) hours maximum to 90% capacity (full load discharge rate). There is DC overvoltage protection so that if the DC voltage exceeds the pre-set limit, the UPS will shutdown automatically and the critical load is transferred to bypass.

2.2.2 Inverter

2.2.2.1 General
The UPS inverter is a pulse-width-modulated (PWM) design capable of providing the specified AC output. The inverter converts DC power from the input converter output, or the battery, into precise sine wave AC power for supporting the critical AC load.

2.2.2.2 Overload
The inverter is capable of supplying current and voltage for overloads exceeding 100% and up to 200% of full load current. A visual indicator and audible alarm indicates overload operation. For greater currents or longer time duration, the inverter has electronic current-limiting protection to prevent damage to components. The inverter is self-protecting against any magnitude of connected output overload. Inverter control logic senses and disconnects the inverter from the critical AC load without the requirement to clear protective devices.

2.2.2.3 Inverter DC Protection
The inverter is 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 2 minutes (user configurable 2 to 30 minutes).

2.2.2.4 Output Frequency
The inverter holds the output frequency to + 0.1 Hz of nominal when not synchronized to the utility/mains source.

2.2.2.5 Output Protection
The UPS inverter employs electronic current limiting circuitry.

2.2.2.6 Battery Over Discharge Protection
To prevent battery damage from over discharging, the UPS control logic automatically

raises the shutdown voltage set point; dependent upon output load at the onset of battery operation.

2.2.3 Display and Controls

2.2.3.1 General
The UPS is provided with a microprocessor based unit status display and controls section designed for convenient and reliable user operation. The monitoring functions such as status and alarm indicators are displayed on an LED display.

2.2.3.2 System Indicators
UPS status is indicated by five symbols: fault indicator, AC input indicator, battery indicator, inverter indicator and bypass indicator.

- The “Fault” Indicator illuminates Red if the UPS has detected a fault; and is Off if there is no fault.
- The “AC Input” Indicator illuminates Green when the utility input power is normal; is Off during utility failure; and flashes when a Line-to-neutral reversal in the AC input power supply or a loss of proper grounding for the UPS.
- The “Battery” Indicator illuminates Amber when the battery is supplying power; and is Off when the battery is not supplying power.
- The “Inverter” Indicator illuminates Green when the inverter is supplying power; and is Off when the inverter is not supplying power.
- The “Bypass” Indicator illuminates Amber when the bypass is supplying power; is Off when the inverter is not supplying power; and flashes when utility power is outside specifications.

2.2.3.3 Controls
UPS start-up and shutdown operations are accomplished by the "ON" and "OFF" push buttons located on the front panel of the UPS. The "ON" push button is a means to turn the UPS on and also serve as a means to manually test the battery and to reset active visual and audible alarms. The "OFF" push button once allows manual transfers of the load from the inverter to bypass power. Pressing the "OFF" push button twice within a four second time period when the UPS is in Bypass mode will completely shut down the UPS and its connected load in normal and battery mode.

2.2.4 On-Line Battery Test
The UPS is provided with an automatic biweekly battery test feature (factory default). Via the configuration program on a Windows based PC the automatic battery test can be disabled or configured to operate every 7, 14, 21, or 28 days. The battery test will ensure the capability of the battery to supply power to the inverter while loaded. If the battery fails the test, the UPS will display a warning message to indicate the internal
batteries need replaced. The battery test feature is user accessible by the push button located on the front of the unit and with Communications Software. The Automatic Battery test feature is capable of being disabled through the User Configuration Program.

2.2.5 Bypass

2.2.5.1 General
A bypass circuit is provided as an integral part of the UPS. The bypass control logic contains an automatic transfer control circuit that senses the status of the inverter logic signals, and operating and alarms conditions. This control circuit provides a transfer of the load to the bypass source if available, and if the inverter is capable of powering the load (i.e. overload condition, if your unit is in Manual Bypass Mode, or if the voltage and or frequency is out of tolerance).

2.2.5.2 Automatic Transfers
The transfer control logic automatically activates the bypass, 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 overload condition is reduced, the load is automatically transferred back to inverter power.

2.2.6. Internal Battery
Valve regulated, non-spillable, flame-retardant lead acid cells are used as a stored-energy source for the UPS system. The battery is housed internal to the UPS cabinet, and sized to support the inverter at rated load and power factor, with ambient temperature of 25 O C (77 O F) for a minimum of 7 minutes reserve time. The expected life of the battery shall be 7-8 years or a minimum 250 complete discharge cycles. The UPS units have the capability to allow the operator to replace the internal battery.

2.2.7. Output Distribution
Output distribution is integral to the UPS, and located on the rear of the unit.

MODEL
PS3300RM–GDAIS-LCS-R4

2.2.7.1 Input power connection
- MS3102E22-2P
- MS3102E22-2SW Input battery pack connector

2.2.8 Communication
The UPS includes:
- USB port
- Terminal block for Battery status monitoring via dry contacts
- IS-WEBCARD SNMP interface
- EPO switch pack rear mounted

The IS-WEBCARD delivers SNMP and Web management to the UPS when connected to any 10 or 100 Mbit Ethernet network. The card supports 10 and 100 Mbit Ethernet and provides for in-the-field upgrade of SNMP firmware. The kit includes the Intellislot card, MIB, configuration cable and installation manual.

2.8.8.2 Any-Mode Shutdown
The purpose of Any Mode Shutdown is to shut down the UPS output by turning Off the rectifier, inverter and bypass so that there is no power to the loads.
Any Mode Shutdown can be operated locally and remotely, as described as follows:

- Local Any Mode Shutdown can be performed by shorting Pin 3 and Pin 4 on the rear mounted switch pack.
- Remote Any Mode Shutdown can be performed by a switch connected to Pin1 and
- Pin2 and mounted at a remote location. Remote Power Off will be performed either by NO or NC contact of Any Mode Shutdown, depending on the settings in the configuration program.

A current-limited source (+12VDC, 50mA) will be available from the UPS. The connection to the UPS for remote connection will be via terminal block connector. Any Mode Shutdown wiring must conform to all national, regional and local wiring regulations.

2.8.8.3. Battery Mode Shutdown

Battery Mode Shutdown permits shutting down the UPS by turning Off the rectifier, inverter and bypass so that there is no power to the load when the UPS is On Battery. Battery Mode Shutdown can be performed locally or remotely:

- Local Any Mode Shutdown can be performed by shorting Pin 3 and Pin 4
- Remote Any Mode Shutdown can be achieved by a switch connected to Pin 3 and Pin 4 and mounted at a remote location.

On Battery

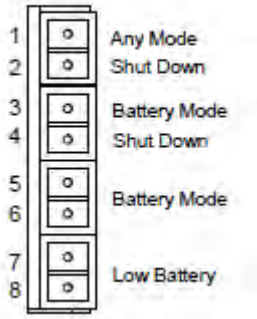
On Battery signal is a Normally Open (NO) dry contact. When the UPS is supplying output power from the battery this dry contact will be closed.

Low Battery

Low Battery signal is a Normally Open (NO) dry contact. When the UPS is supplying output power from the battery and has reached the Low Battery Warning time selected in the configuration program, this dry contact will be closed.
The rated values for the dry contacts are:

- Rated Voltage: 5V
- Working Voltage Range: 4.5-10V
- Rated Current: 30ma

Terminal block layout



2.2.8.3 Remote Emergency Power Off (REPO)

The UPS has Remote Emergency Power Off (REPO) capabilities. Shorting Pin 1 and Pin 2 on the rear mounted EPO terminal block the output of the UPS is shut off no matter what the operating condition the UPS is in at the time. When the short is removed, the UPS output shall be enabled again.

The PS3300RM-GDAIS-LCS-R4 also has a front mounted switch installed for emergency power off.

2.2.9 Powerstar 3300RM Configuration Program

An included Windows tm based (Win95 or later) Configuration Program and a USB cable allows for configuration of UPS features and operating parameters to meet specific application requirements, if required. Options that are configurable via this program include:

- Select one of five input/output voltages to match voltages found around the world.
- Enable / Disable Auto-Restart.
- Disable the Line-Neutral-Reversal/Missing-Ground receptacle wiring alarm.
- Select frequency converter operation with a fixed output frequency of 50 or 60 Hz.
- Set the Low Battery Warning alarm time from 2 to 30 minutes.
- Disable the Auto-Battery test.
- Set the Auto-Battery test to 7, 14, 21, 28 days.
- Select the number of external battery cabinets connected to the UPS to adjust the remaining runtime calculations reported by the UPS Liebert software products.

Note: configuration is preformed using the supplied USB cable.

2.3.0 PS3300RM-GDAIS-LCS-R4 configuration

- 3U High
- Input isolation transformer
- Stainless Steel Chassis
- Rail Kit with side mounting cleats
- Hi-temperature internal battery set
- Mil-standard Hi-G (120g) input dual pole circuit breaker front mounted
- (4) L5-20R output receptacles
- (4) 20 A single pole output circuit breakers
- MS3102E22-2S input power connector
- MS3102E22-2SW input battery pack connector
- SNMP 10/100 interface
- USB connector
- Front mounted EPO switch
- Rack ears stainless steel per GD drawing 09/29/05 (drawing attached)
- Front mounted circuit breaker, (OFF button indicted in red)
- Ground strap 4 feet 3/8 ring x 3/8 ring
- Ground strap 4 feet # 10 ring x 3/8 ring
- Input power cord assembly MS3106E22-2S x MS3106A20-19P 4 foot with strain relief part number M85049/52520W
- Power cord assembly MS3106A20-19S X Bare wire 10 feet with strain relief part number M85049/52520W
- UPS configuration software
- Internal battery cables with quick disconnect Anderson connectors
- Installed non-conductive barrier on the underside of top cover, battery side

Note: See orderable parts list

Powerstar Inc
Model: PS3300RM-GDAIS-BP
Model: PS3300RM-GDAIS-BP-1

External Battery Tray

GUIDE SPECIFICATIONS

External battery trays for the PS3300RM-GDAIS-LCS-R4 UPS are available. These battery trays are a split tray design, meaning that two UPS's can be attached to a single external battery tray. Each UPS draws off of one half of the tray. The battery tray can also be ordered for use with a single UPS, specify part number PS3300RM-GDAIS-BP-1

Optionally a high temperature battery is available for the battery trays, this option is available by inserting a H in the part PS3300RM-GDAIS-BP-H-1 for the single connector version.

1.1 External Battery Tray
The battery tray includes:

- Internal battery set wired and installed
- Connecting cable(s) to the UPS MS3106E22-2PW x MS3106E22-2P 4 foot with strain relief M85049/52520W
- Rail mounting kits PN RMKIT18
- Rack mounting ears PN RMKIT-18-32-REM

1.2 ENVIRONMENTAL CONDITIONS
A. Ambient Temperature:

- Operating: -20^{O} C to +50^{O} C (-4^{O} F to + 122^{O} F) for altitudes 0 to 1500 meters
- (0 to 5,000 ft.) above sea level.
- -20^{O} C to +40^{O} C (-4^{O} F to + 104^{O} F) for altitudes 1500 to 3000 meters (5,000 to 10,000 ft.) above sea level.
- 25^{O} C (+ 77^{O} F) for optimum battery performance
- Storage: -20^{O} C to +60^{O} C (-4^{O} F to +140^{O} F) with batteries removed.
- 20^{O} C (+ 68^{0} F) for optimum battery storage.

B. Relative Humidity:
Operating: 0 to 95% non-condensing.
Storage: 0 to 95% non-condensing.

C. Altitude:
3,000 m / 10,000 ft. max., without power derating when operated within the temperature specified in section 1.4.A. ambient temperature will be derated 5° C for each additional 500 meters.

MODEL DIMENSIONS (D x W x H) PS3300RM-GDAIS-BP & PS3300RM-GDAIS-BP-1
23.7" x 16.9" x 3.3"
(601.98 mm x 429.26 mm x 83.82 mm)

MODEL WEIGHT

Net Weight 83.8 lbs (38 kg)
Shipping Weight 92.6 (42 kg)

POWERSTAR INC

Powerstar Battery Set
PSNPX35FR

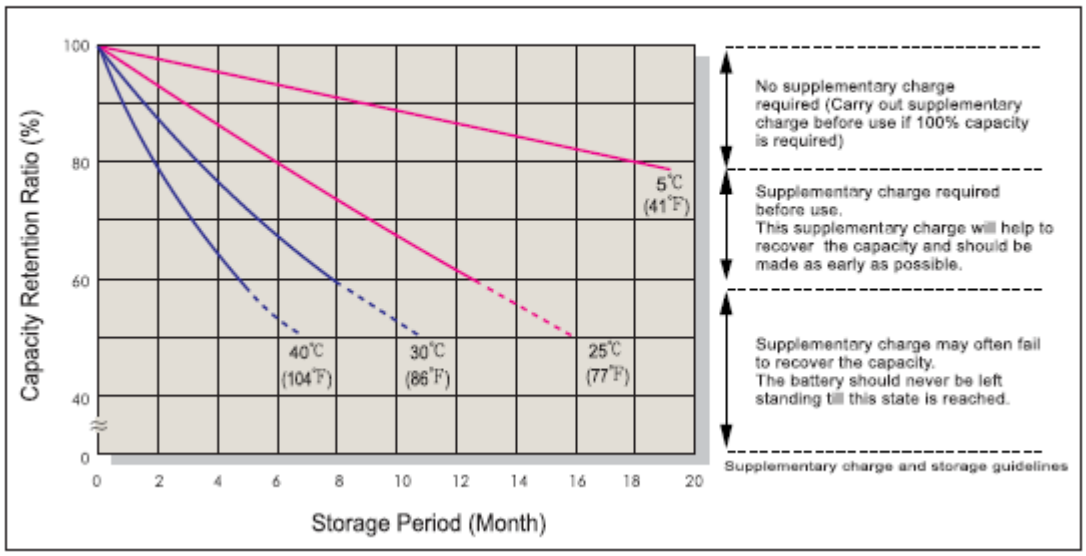
Internal battery set for the PS3300RM-GDAIS-LCS series UPS

Capacity Retention / shelf life

The batteries provided will have a shelf life as outlined in the charts below.

At 77^0F the batteries will have a shelf life of 1 year.

Capacity Retention Characteristic



Orderable Parts List

Orderable Parts

Model: PS3300RM-GDAIS-LCS-R4

Consisting of:

1. UPS: PS3300RM-GDAIS-LCS-R4
2. Battery set PSNPX35FR
3. Rail Kit: SU035
4. Rack ear set: DWW09/29/05
5. Cable ground strap: GS-4-3/8R-3/8R
6. Cable ground strap: GS-4-3/8R-10R
7. Cable power cord input: PC-4-2S-19P
8. Cable power cord input to cabinet: PC-4-19S-BW
9. Cable configuration: PS-USB

Model: PS3300RM-GDAIS-LCS-R4-WOB

Consisting of:

1. UPS: PS3300RM-GDAIS-LCS-R4
2. Rail Kit: SU035
3. Rack ear set: DWW09/29/05
4. Cable ground strap: GS-4-3/8R-3/8R
5. Cable ground strap: GS-4-3/8R-10R
6. Cable power cord input: PC-4-2S-19P
7. Cable power cord input to cabinet: PC-4-19S-BW
8. Cable configuration: PS-USB

Model: PS3300RM-GDAIS-BP

Consisting of:

1. Battery Pack-Split: PS3300RM-GDAIS-BP
2. Replacement battery set (6 batteries per set) PS3-72V
3. Rail Kit: RMKIT-18
4. Rack Mounting Ears RMKIT-18-32-REM
5. Connector cable: PC-3-2S-2PW (qty 2)

Model: PS3300RM-GDAIS-BP-1

Consisting of:

6. Battery Pack: PS3300RM-GDAIS-BP-1
7. Replacement battery set (6 batteries per set) PS3-72V
8. Rail Kit: RMKIT-18
9. Rack Mounting Ears RMKIT-18-32-REM
10. Connector cable: PC-3-2S-2PW (qty 1)

INSTALLATION AND OPERATING INSTRUCTIONS

4.0 OPERATION

This section describes checks to be made before starting the UPS, how to start the UPS, manual battery test, manual bypass, shutting down the UPS and disconnecting the utility power from the UPS.

NOTE

The The *GXT3's battery has been fully charged before delivery, but some charge will be lost during storage and shipping. To ensure that the battery has adequate reserve power to protect the connected load, charge the battery for three hours before putting the UPS into service.*

4.1 Startup Checklist for the GXT3

Before starting the UPS, perform these checks:

___ 1. Check that the input plugs and loads are connected properly and reliably.

___ 2. Check that all of the battery cables are connected properly.

___ 3. Check that the communication cables are connected properly.

4.2 Starting the UPS

1 Turn On the input circuit breaker—see **Figures 3** and **5** for its location.
2 Turn On the UPS by pressing the On/Alarm Silence/Manual Battery Test button for three seconds.
3 Turn On the connected loads.
4 Check the status indicators to determine whether the GXT3 is operating normally.
5 Check the load level indicators to verify that the connected load does not exceed the UPS' rated capacity.

The UPS is now providing conditioned power to the load.

4.3 Manual Battery Test

To initiate a manual battery test, press the On/Alarm Silence/Manual Battery Test button for at least half a second while operating from utility power with no alarm conditions present.

- If only first two of the five LED segments illuminate, allow the UPS to recharge the batteries for 24 hours.
- Retest the batteries after 24 hours of charging the batteries.
- After the batteries have been retested, if only two of the five Battery LEDs illuminate, contact your local Emerson representative or Emerson Channel Support.
- If none of the five Battery LEDs illuminate during a manual battery test, check the battery connection and allow the UPS to recharge the batteries for 1 hour and initiate a manual battery test again.
- If none of the five Battery LEDs illuminate during the manual battery test a second time, replace the batteries, and contact your local Emerson representative or Emerson Channel Support.

4.4 Manual Bypass

Press the Standby/Manual Bypass button once while the UPS is in utility (AC) mode, the UPS will transfer the connected loads to the internal bypass. If the internal bypass is not available due to utility power problems, pressing this button once will be ignored. Bypass operation is indicated by an audible alarm and illuminated amber Bypass indicator. If other indicators are illuminated, refer to **7.0 - Troubleshooting**.

4.5 Shut Down the Powerstar GXT3

1 Transfer the UPS to manual bypass by pressing the Standby/Manual Bypass button once. If manual bypass is not available, disregard the first step.
2 Press the Standby/Manual Bypass button twice within four seconds to shut down the UPS.

Power to the connected loads is now Off.

4.6 Disconnecting Input Power from the Powerstar GXT3

1 Once the UPS has been shut down as detailed in **4.5 - Shut Down the Powerstar GXT3**, disconnect the input cable plug.

2 Wait 30 seconds and verify that all indicators have turned Off and the fan has stopped; this indicates that the power-off is complete.

3 Turn the external battery cabinet breaker switch to the Off position if the UPS has an external battery cabinet.

After powering Off the UPS, the UPS ceases output and the load is powered Off.

7.0 TROUBLESHOOTING

This section indicates various UPS symptoms a user may encounter and troubleshooting steps in the event the UPS develops a problem. Use the following information to determine whether external factors caused the problem and how to remedy the situation.

7.1 UPS Symptoms

The following symptoms indicate the Liebert GXT3 has malfunctions.

- The related indicators will illuminate, indicating the UPS detected a problem.
- An alarm will sound, indicating that the UPS requires attention.

7.1.1 Indicators

In addition to the fault indicator being illuminated, one or more of LED segments of battery level indicator will also be illuminated to provide a diagnostic aid to the user, as shown in Figure 25. The descriptions are listed in Table 7.

Figure 25 Battery level indicator

Table 7 Indicator descriptions

Indicator	Diagnostic/Audible alarm
A - E	On bypass from output overload (half-second beep every half second)
A	On bypass due to overtemperature condition (1-second beep every 4 seconds)
B	On bypass due to DC bus overvoltage (1-second beep every 4 seconds)
C	On bypass due to DC/DC power supply failure (1-second beep every 4 seconds)
D	PFC failure (1-second beep every 4 seconds)
E	On bypass due to inverter failure (1-second beep every 4 seconds)
A&C	UPS failed battery test (2-second beep every 60 seconds)
C&E	UPS shutdown by command from communication (USB port or Liebert IntelliSlot port) (no audible)
A&B	UPS Failure (includes dual-fan failure, single-fan failure under certain conditions and battery charger failure) and continuous alarm
Battery Indicator Flashing	Internal Battery source not available (continuous horn); check battery connection, power down and reboot UPS
AC Input Indicator Flashing	Line-to-neutral reversal in the AC input power supply or a loss of proper grounding for UPS; continuous horn and UPS cannot start in standby status
Bypass Indicator Flashing	Utility power voltage or frequency is out of tolerance; bypass is unavailable

Indicators A - E are shown in **Figure 25**.
If the UPS experiences an overload, the UPS will transfer from bypass back to inverter approximately 5 minutes after the overload condition ends.

7.1.2 Audible Alarm

An audible alarm will be used in conjunction with the visual indicators to indicate to the user a change in UPS operating status. The audible alarm will enunciate as given in Table 8.

Table 8 Audible alarm description

Condition	Alarm
Battery discharge	half-second beep every 10 seconds
Low battery	Two half-second beeps every 5 seconds
UPS fault, load on bypass	1-second beep every 4 seconds
UPS fault, no power to load	Continuous
Overload	half-second beep every half second
Battery replacement	2-second beep every 60 seconds
Battery loss	Continuous
Wiring problem (including line-to-neutral reversal or a loss of proper grounding for UPS)	Continuous
Bypass reminder	1-second beep every 2 minutes

7.2 Troubleshooting

In the event of an issue with the UPS, refer to Table 9 to determine the cause and solution. If the issue persists, contact Emerson Channel Support.

Table 9 Troubleshooting

Problem	Cause	Solution
UPS fails to start when the On/Alarm Silence/Manual Battery Test button is pressed	UPS is short-circuited or overloaded	Ensure UPS is Off. Disconnect all loads and ensure nothing is lodged in output receptacles. Ensure loads are not defective or shorted internally
Battery indicator is illuminated	UPS not plugged in	UPS is operating from battery mode, ensure UPS is securely plugged into the wall receptacle
	UPS input protection fuse has blown/opened	UPS is operating from battery mode. Save data and close applications. Replace UPS input fuse, then restart UPS
	Utility power is out of tolerance	UPS is operating from battery mode. Save data and close applications. Ensure utility supply voltage is within acceptable limits for UPS
UPS has reduced battery backup time	Batteries are not fully charged	Keep UPS plugged in continuously at least 24 hours to recharge batteries
	UPS is overloaded	Check load level indicator and reduce the load on the UPS
	Batteries may not be able to hold a full charge due to age	Replace batteries. Contact your local dealer, Emerson representative or Emerson Channel Support for replacement battery kit
Fault and Bypass indicators and all LED segments of battery level indicator are illuminated	UPS overloaded or load is faulty	Check load level indicator and remove non-essential loads. Recalculate the load and reduce number of loads connected to UPS. Check load for faults
Fault and Bypass indicators and diagnostic A indicator are illuminated	UPS shutdown due to temperature condition. Load is on bypass power	Ensure UPS is not overloaded, ventilation holes not blocked, or room ambient temperature is not excessive. Wait 30 minutes to allow UPS to cool, then restart UPS. If UPS cannot restart, contact your local dealer, Emerson representative or Emerson Channel Support.

Table 9 Troubleshooting *(continued)*

Problem	Cause	Solution
Fault and Bypass indicators and diagnostic B indicator are illuminated	UPS internal DC bus overvoltage	UPS requires service. Contact your local dealer, Emerson representative or Emerson Channel Support.
Fault and Bypass indicators and diagnostic C indicator are illuminated	UPS DC/DC fault	UPS requires service. Contact your local dealer, Emerson representative or Emerson Channel Support
Fault indicator and diagnostic D indicator are illuminated	UPS PFC (Power Factor Correction Circuit) fault	UPS requires service. Contact your local dealer, Emerson representative or the Emerson Channel Support
Fault and Bypass indicators and diagnostic E indicator are illuminated	UPS inverter fault	UPS requires service. Contact your local dealer, Emerson representative or Emerson Channel Support
Fault indicator and diagnostic A and C indicators are illuminated	UPS failed the battery test	Replace batteries. Contact your local dealer, Emerson representative or Emerson Channel Support
Fault and Bypass indicators and diagnostic C and E indicators are illuminated	UPS shut down by a command from the communications port(s)	Your UPS has received a signal or command from the attached computer. If this was inadvertent, ensure the communication cable used is correct for your system. For assistance, contact your local dealer, Emerson representative or Emerson Channel Support
Fault indicator and diagnostic A and B indicators are illuminated	UPS Failure (includes Dual Fan failure, single fan failure under certain condition and Battery Charger Failure) and continuous alarm	Ensure fan is not blocked up. If the fault is not removed, contact your local dealer, Emerson representative or Emerson Channel Support
AC input indicator is flashing	UPS detected a line-to-neutral reversal or a loss of proper grounding for UPS; continuous horn and UPS cannot start up in standby status. This is active only when power is first applied to the input. Once the UPS is running, the AC input indictor will flash, unless the input wiring is correctly changed	Contact a qualified electrician to verify site wiring
Battery indicator is flashing	Battery source is not available; continuous horn	Check battery connections, completely power down and restart UPS. NOTE: if the battery circuit opens while the UPS is running, it will be detected when the next battery test is performed
Bypass indicator is flashing	Because the voltage or frequency is outside acceptable limits, the bypass is disabled	The AC input powers the PFC input and serves as the bypass source. If the AC is present but the voltage or frequency exceeds the acceptable range for safe operation with a load, the bypass will be disabled and this indicator will flash, indicating that the bypass is unavailable

When reporting a UPS issue to Emerson, include the UPS model and serial number. These are on the top panel of the Liebert GXT3.

Powerstar Inc
PS3300RM-GDAIS-BP
PS3300RM-GDAIS-BP-1
External Battery Pack

1. External Battery Cabinet Installation

Optional external battery packs may be connected to the UPS to provide additional battery run time. The external cabinets are designed to be rack mounted or they can be mounted in a tower configuration.

The battery pack is designed to be connected to two PS3300RM-GDAIS-LCS-R4 UPS's.

CAUTION

The external battery cabinet(s) are heavy (see **11.0 - Specifications**). External battery cabinets can be used in rack-mount or tower configuration. Take proper precautions when lifting them.

1. Visually inspect the external battery pack for any damage before installation

2. For rack mount installations first remove the top / side fins, this is done by sliding the fins forward then lift up to remove. Optional rack mount handles are shipped with the unit and should be installed on the battery pack at this time.

3. Attached the supplied slide rails in the rack per the slide rail instruction sheet

4. For Tower installations used the supplied support base to prevent tip over

5. Connect the supplied battery cables to the connectors on the back of the battery pack, then to the connector on each UPS. Connectors are labeled.

6. Turn on the battery breaker located on the back of the battery pack

7. The UPS is now equipped with additional battery back up runtime

NOTE

You must use the included Configuration Program to specify the number of external battery cabinets connected to the UPS.

General Dynamics
Battery Set Installation Guide

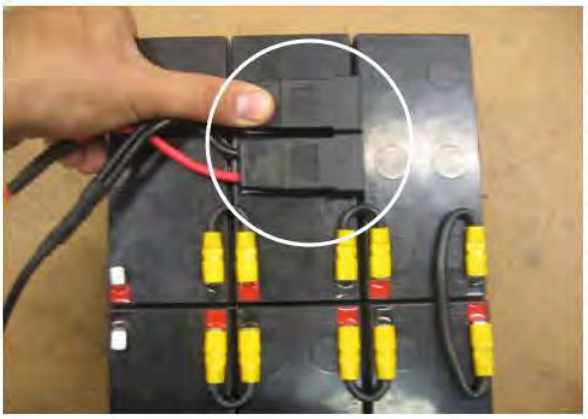
UPS P/N: **PS3300RM-GDAIS-LCS**
Battery Pack P/N: **PSNPX35FR**

Step 1: Remove four 10-32 x 1/2" battery door screws .

Step 2: Remove Battery door to expose battery set and pull tab.

Step 3: Using pull tab on front of battery set, slide battery out of battery tray to expose battery connections.

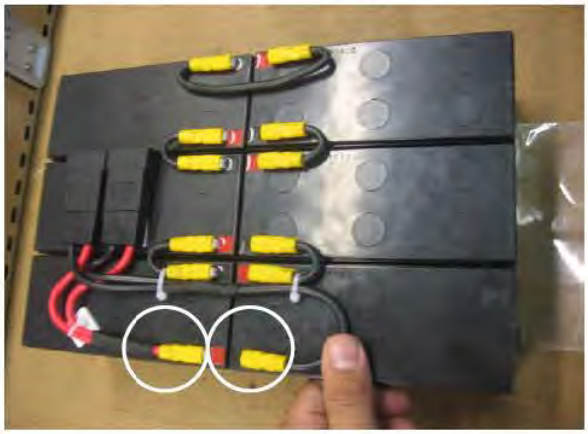
Note: If connector on UPS side is yellow Anderson connector skip to step # 10



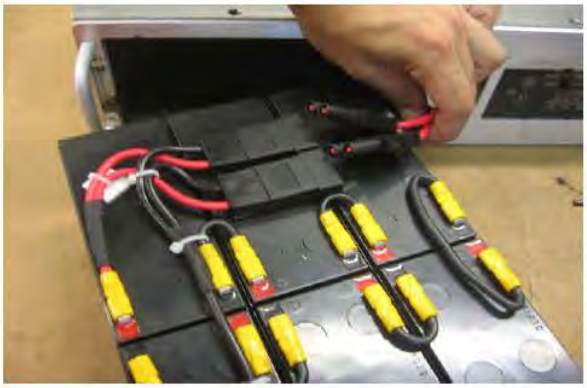
Step 7: Mount older model battery connector to battery set.

Remove adhesive backing from battery connectors and stick to battery set in location shown in photo to left.

This step is made easier if adhesive is removed from one connector at a time to prevent from sticking elsewhere while installing.



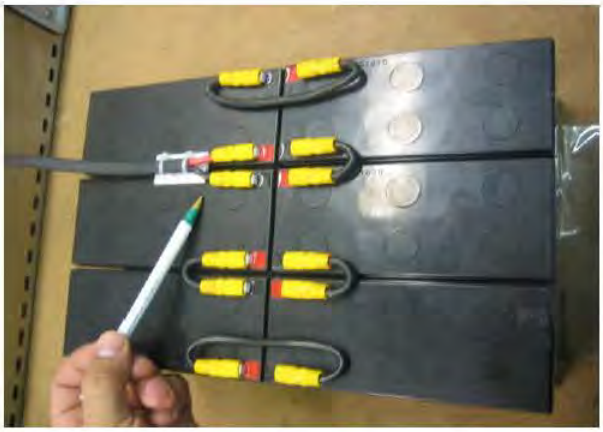
Step 8: Attach 2 female disconnects on battery connector to remaining 2 terminals on battery as shown in photo to left.
Ensure red(+) and black (-) are attached to the correct terminals (red to red, black to black) or a short will occur upon connecting to UPS that will cause damage to internal components.
Wire tie battery cables to battery set as shown ensuring cables lay neat and flat to prevent damage to wires during installation into UPS.



STEP 9: Reattach battery connector from UPS to battery set and carefully slide battery set into battery tray while making sure battery wires do not get pinched or torn.

Reinstall battery tray cover and install four 10-32 x ½" screws.

Battery set installation is complete.



Step 10: Battery pack will arrive pre-wired with yellow Anderson connector and is a direct replacement for PS3300RM-GDAIS-LCS models with top cover mount Anderson connectors.

No modifications need to be made to battery set wiring harness prior

Step 11: Connect battery connector to top cover mounted Anderson connector making sure wires are straight and without twists

Step 12: Carefully insert battery into battery tray making sure no wires are being pinched or damaged.

Reinstall battery tray cover and install four 10-32 x ½" screws.

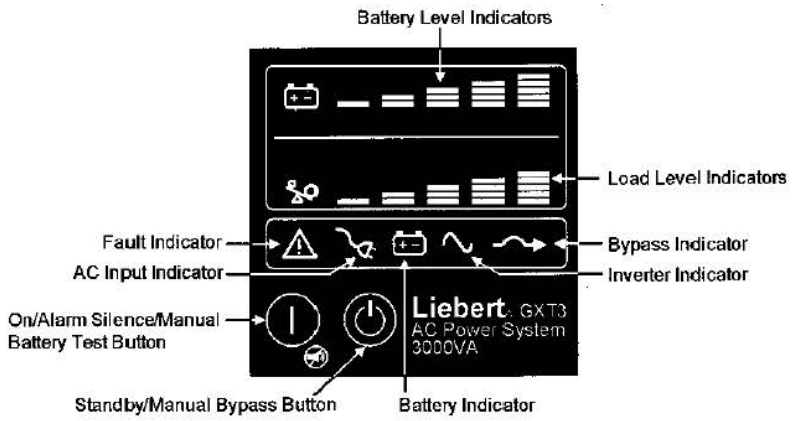
Battery installation is complete.

UPS Front Panel Controls and indicators

3.0 CONTROLS AND INDICATORS

The operation and display panel, shown in **Figure 18**, is on the front panel of the Liebert GXT3 (see **Figures 1** and **2**).

Figure 18 Operation and display panel



3.1 Control Buttons

The operation and display panel has two control buttons: On/Alarm Silence/Manual Battery Test and Standby/Manual bypass.

3.1.1 On/Alarm Silence/Manual Battery Test Button

The On/Alarm Silence/Manual Battery Test button controls output power to connected load(s) and has three functions (see **Table 3**).

Table 3 Functions of On/Alarm Silence/Manual battery test button

Function	Operation	Description
ON	Press the button once for 3 seconds	To start the UPS
Alarm Silence [1]	Press the button for at least half a second	To silence alarms [2]
Manual Battery Test	Press the button for at least half a second while operating in Utility (AC) Mode with no alarms present.	To initiate a manual battery test

1. The low battery and bypass reminder alarms cannot be silenced.
2. After the alarm is silenced, UPS will reactivate the alarm system to alert of additional problems

3.1.2 Standby/Manual Bypass Button

The Standby/Manual Bypass button controls output power to connected load(s) and has two functions (see **Table 4**).

Table 4 Functions of Standby/Manual Bypass button

Function	Operation	Description
Manual Bypass	Press the button once [1]	To initiate a manual transfer of the connected loads to the internal bypass, if available
Standby	Press the button twice within four seconds while the UPS is in Manual Bypass or Battery Mode [2]	To shut down the UPS and shut Off all power to the connected loads

1. If the bypass is not available due to voltage or frequency, pressing this button once will be ignored.
2. Perform all necessary shutdown procedures on connected loads before turning Off the Liebert GXT3.

3.2 Indicators

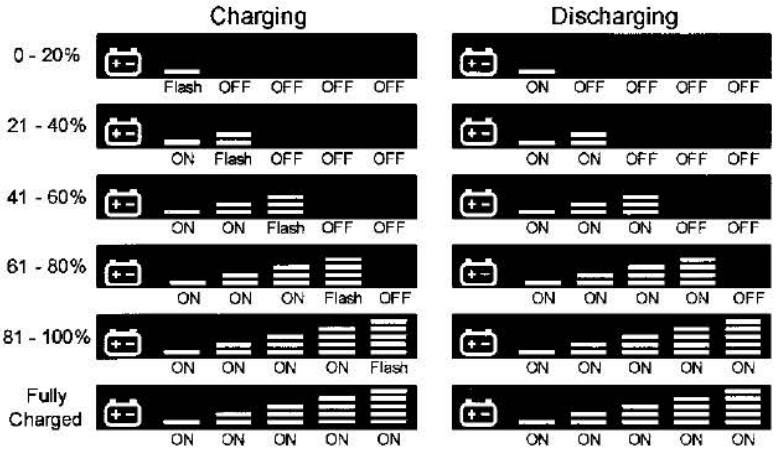
The operation and display panel has seven indicators (see **Figure 18**). The indicators can be divided into two groups according to the applications: level indicators and UPS status indicators.

3.2.1 Level Indicators

Battery Level Indicators

The battery level indicator is composed of five sets of LED bars that illuminate and flash to indicate the battery capacity level. The Liebert GXT3 battery capacity level is shown in 20% increments (±5%). The battery level indicators will illuminate as shown in **Figure 19**.

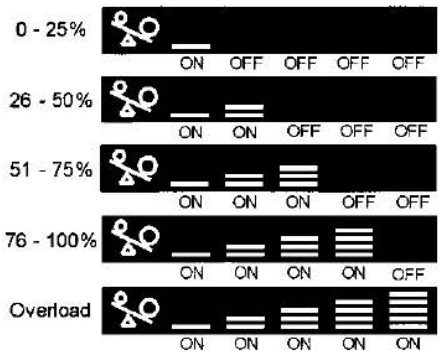
Figure 19 Battery level indicators



Load Level Indicators

The load level indicator is composed of five LED bars that illuminate to indicate the relative load on the UPS output in 25% increments (± 5%). The load level indicator will illuminate as shown in **Figure 20**.

Figure 20 Load level indicators



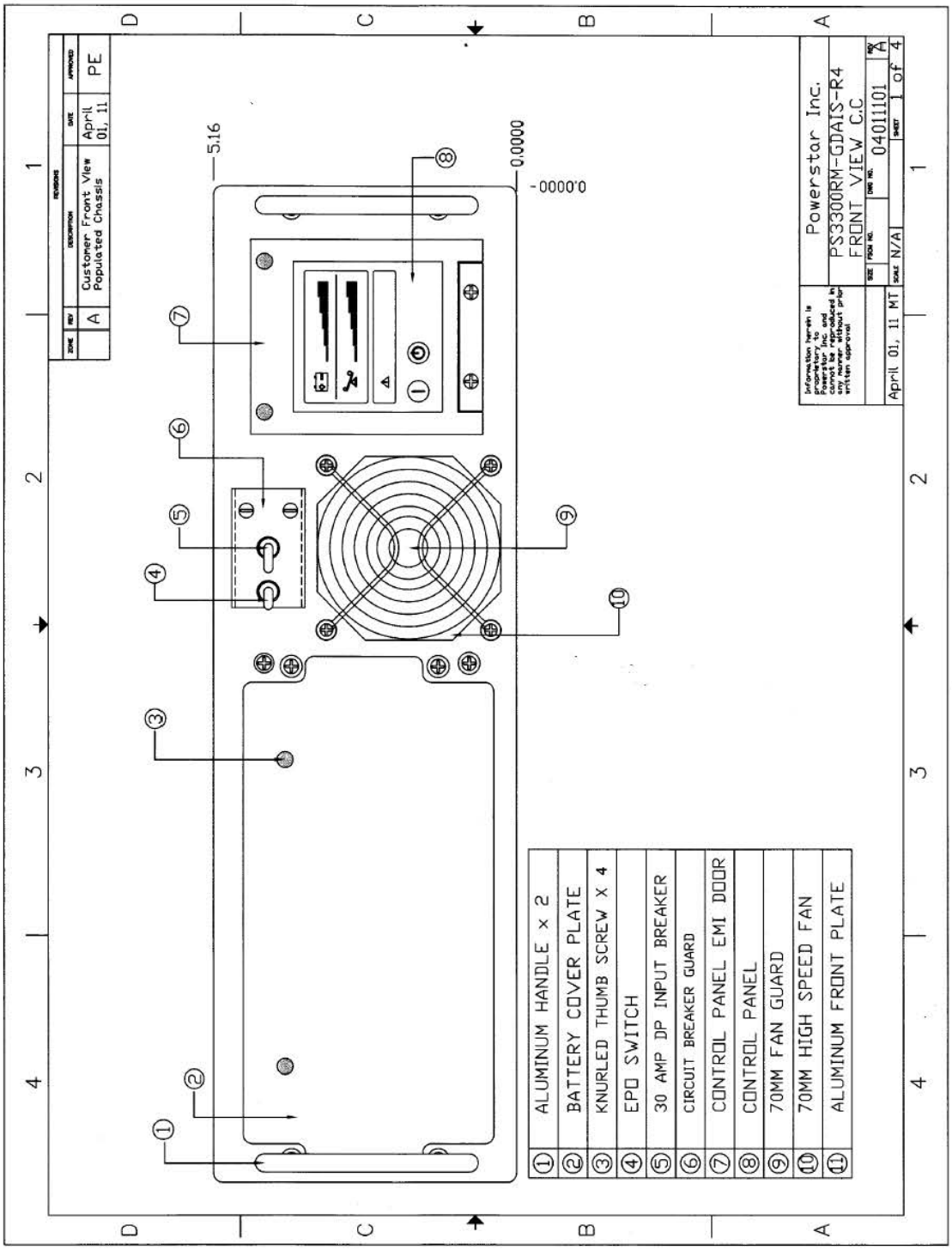
3.2.2 UPS Status Indicators

UPS status is indicated by five symbols: fault indicator, AC input indicator, battery indicator, inverter indicator and bypass indicator. **Table 5** shows the symbols and their meaning.

Table 5 UPS status indicators

UPS Status Indicator	Icon	Color	Description
Fault Indicator		Red	On if the UPS has detected a fault; Off if there is no fault
AC Input Indicator		Green	On when the utility input power is normal; Off during utility failure; flashing when utility power is outside specifications
Battery Indicator		Amber	On when the battery is supplying power; Off when the battery is not supplying power
Inverter Indicator		Green	On when the inverter is supplying power; Off when the inverter is not supplying power
Bypass Indicator		Amber	On when the bypass is supplying power; Off when the inverter is not supplying power, and flashing when utility power is outside specifications

Drawing and Illustrations


Customer Front View Populated Chassis
April 01, 11
PE
5.16
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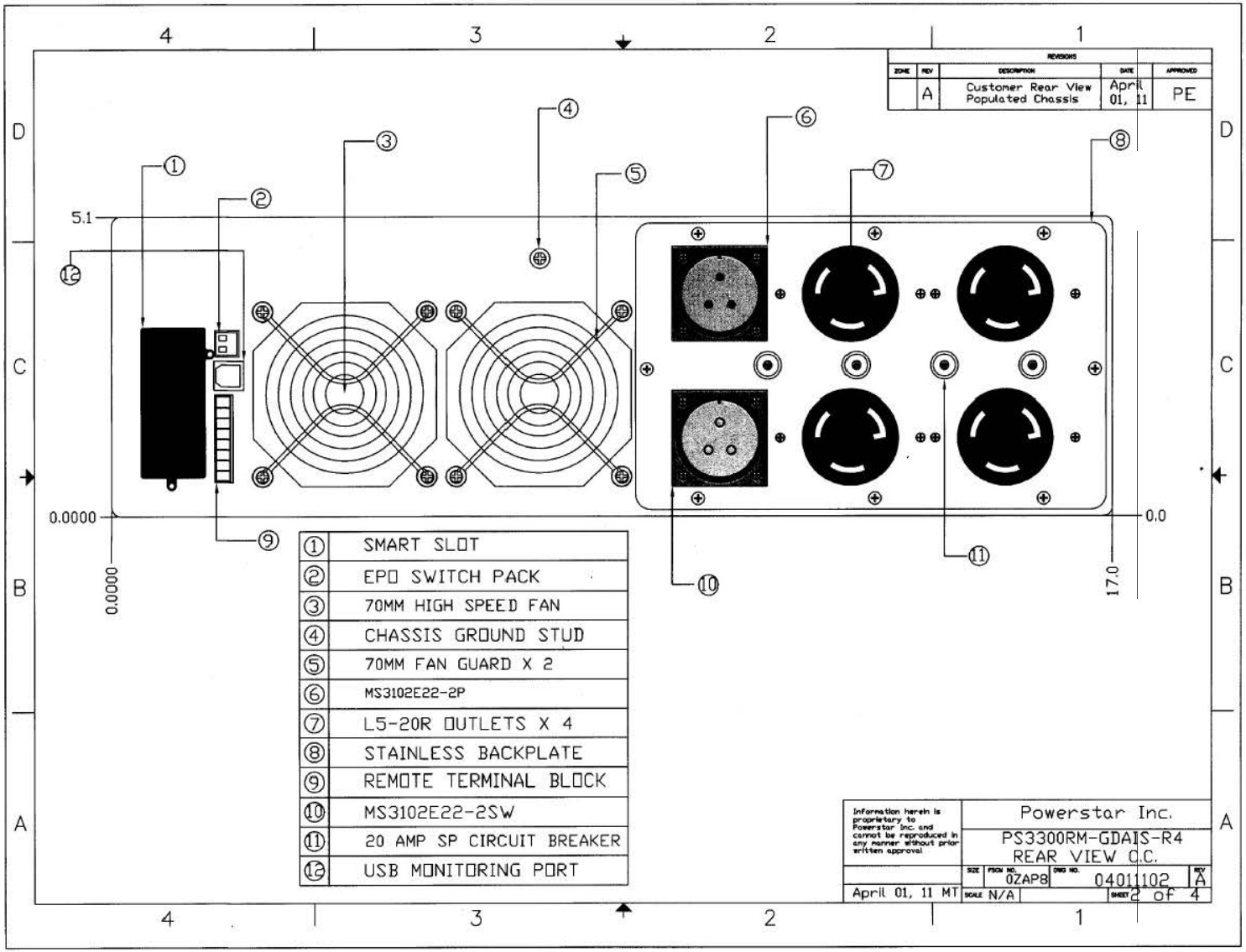
-0000'0
Powerstar Inc.
PS3300RM-GDAIS-R4
FRONT VIEW C.C
04011101
April 01, 11 MT
N/A
1 of 4
① ALUMINUM HANDLE x 2
② BATTERY COVER PLATE
③ KNURLED THUMB SCREW X 4
④ EPO SWITCH
⑤ 30 AMP DP INPUT BREAKER
⑥ CIRCUIT BREAKER GUARD
⑦ CONTROL PANEL EMI DOOR
⑧ CONTROL PANEL
⑨ 70MM FAN GUARD
⑩ 70MM HIGH SPEED FAN
⑪ ALUMINUM FRONT PLATE


REVISIONS
ZONE | REV | DESCRIPTION | DATE | APPROVED
A | Customer Rear View Populated Chassis | April 01, 11 | PE
5.1
0.0000
0.0000
0.0
17.0
① SMART SLOT
② EPO SWITCH PACK
③ 70MM HIGH SPEED FAN
④ CHASSIS GROUND STUD
⑤ 70MM FAN GUARD X 2
⑥ MS3102E22-2P
⑦ L5-20R OUTLETS X 4
⑧ STAINLESS BACKPLATE
⑨ REMOTE TERMINAL BLOCK
⑩ MS3102E22-2SW
⑪ 20 AMP SP CIRCUIT BREAKER
⑫ USB MONITORING PORT
Information herein is proprietary to Powerstar Inc. and cannot be reproduced in any manner without prior written approval
Powerstar Inc.
PS3300RM-GDAIS-R4
REAR VIEW C.C.
SIZE | PSCN NO. 0ZAP8 | DWG NO. 04011102 | REV A
April 01, 11 MT
SCALE N/A
SHEET 2 of 4

BATTERY CABINET SPECIFICATIONS

For use with	PS3150/2000	PS3300RM
Battery Pack P/N	PS3-48V	PS3-72V
DIMENSIONS in (mm)		
Unit W x D x H	3.5 x 21.5 x 17 (87 x 547 x 430)	3.5 x 24.7 x 17 (87 x [illegible] x 430)
Shipping W x D x H	10.5 x 27.2 x 23 (266 x 690 x 585)	10.5 x 27.2 x 23 (266 x 690 x 585)
WEIGHT lbs (kg)		
Unit	65.0 (29.5)	[illegible]
Shipping	73.1 (33.3)	[illegible]
BATTERY PARAMETERS		
Type	Valve-regulated, non-spillable, flame retardant, lead acid	
Qty x V x Rating	2 x 4 x 12V x 7.0 or 7.2 AH	2 x 6 x 12V x 9.0 AH
Battery Mfg / Part #	China Storage Battery / CSB HR 1270 F2	Panasonic / UP-RW1245P1 Yuasa / REW 45-12 FR
Back-up Time	See Battery Run Times charts	
ENVIRONMENTAL		
Operating Temp	+32°F to +104°F (0°C to +40°C)	
Storage Temp	+5°F to +122°F (-15°C to +50°C)	
Relative Humidity	0% to 95%, non-condensing	
Operating Elevation	Up to 10,000 ft. (3000m) at 104°F (40°C) without derating	
Storage Elevation	50,000 ft (15,000 m) maximum	
AGENCY		
Safety	UL 1778, c-UL Listed (Suitable for computer room applications)	
RFI/EMI	FCC Part 15, Subpart B, Class A	
Transportation	ISTA Procedure 1A	

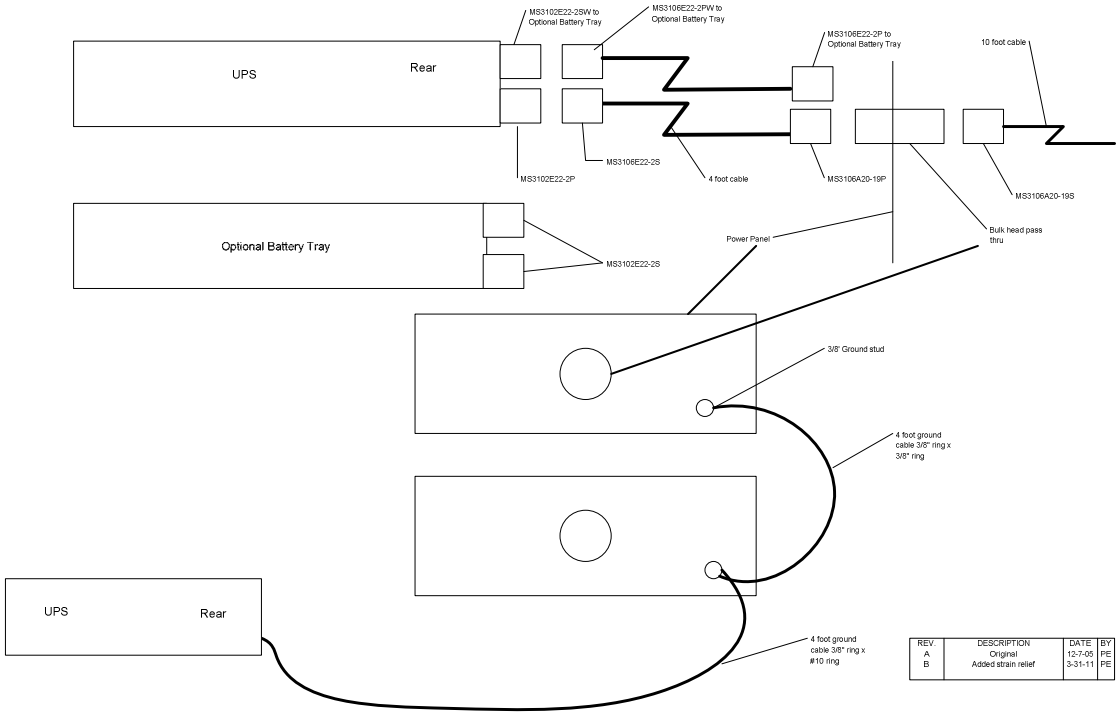
Information herein is proprietary to Powerstar Inc. and cannot be reproduced in any manner without prior written approval	Powerstar Inc 0073 Shady Grove Ct Gaithersburg, MD 20877			
	PS3-72VBATT 2U Battery Pack PS3300RM			
	SIZE	Drawn by: PEK	DWG NO: PS-3-72V-2	REV: A
	SCALE: None	08-01-04	SHEET: 1 OF 1	


800-209-5556
GROUND
INPUT
EXT. BATTERY

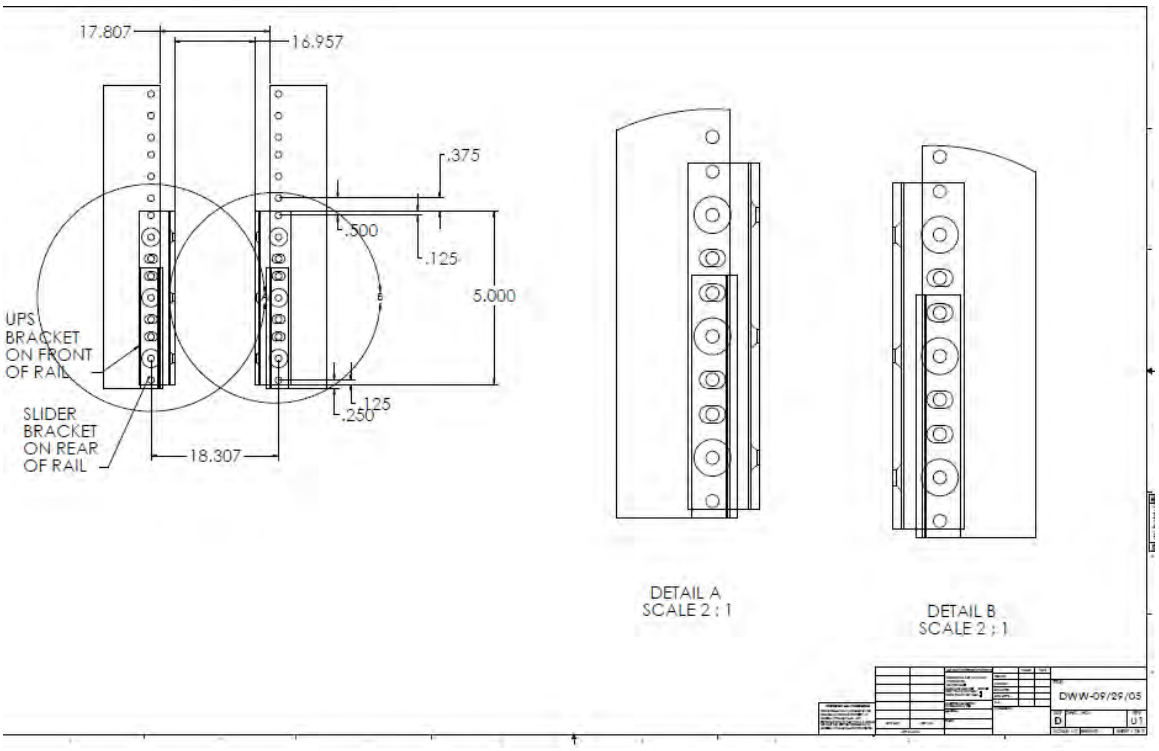

EPO

Cable assembly layout

Note: All mil connectors to have strain relief
Part number M85049/52520W



Rack Ear Set for UPS



Test Reports

Dielectric Withstand Voltage Test Procedure For LCS UPS

Dielectric Withstand Voltage Test Procedure For LCS Core Mission Equipment

LCS TBD_2

Prepared By:

General Dynamics
Advanced Information Systems
100 Plastics Avenue
Pittsfield Ma 01201

Table of Contents

Section Title Page

Introduction

This procedure describes the equipment and method for performing a Dielectric Withstand Voltage Test.

Referenced Documents

The following documents of the latest issue, unless otherwise indicated, form a part of this document to the extent specified herein:

- Manual for Dielectric Withstand Voltage Tester
- UL 1950 or UL 60950, UL Standard for Safety for Safety of Information Technology Equipment

Test Equipment

The test shall be performed using the following equipment:

QuadTech Guardian 6100 or 6200 Product Safety Analyzer (or equivalent)

Safety

WARNING

Dangerous voltages may be present on the front and rear panel terminals on the tester and on the test leads and the leads of the unit under test. Follow all warnings in the user's manual for the tester being used while operating and servicing the tester. Dangerous levels of electrical energy may be stored in the capacitance of the unit being tested. Always discharge any stored energy in accordance with the manual for the tester being used. Always make sure the high voltage indicator is not on when connecting or disconnecting the unit under test.

Environmental Conditions

The test will be executed at normal ambient room conditions.

Test Procedure

1.1 Item Identification and Marking

Verify and record the identification of the unit(s) being tested (e.g., part number / model number, name, serial number) on the Dielectric Withstand Voltage Test Data Sheet.

Record the test equipment name, manufacturer, model number, serial number, calibration date, and calibration due date in the space provided on the Dielectric Withstand Voltage Test Data Sheet.

1.2 Prepare Tester

Using the tester manual set up the tester to perform the Electric Strength test as described in section 5.3 of UL 1950.

1.3 Execute Test

Connect the unit to be tested to the tester in accordance with the tester manual and perform the test(s) described in section 5.3, Electric Strength, of UL 1950. Hold the test voltage for 60 seconds.

The unit passes the test if there is no indication of insulation breakdown during the test. Insulation breakdown is considered to have occurred when the current which flows as a result of the application of the test voltage rapidly increases in an uncontrolled manner (i.e., the insulation does not restrict the flow of current). Corona discharge or a single momentary flashover is not regarded as insulation breakdown.

1.4 Record Results

Record the results on the Dielectric Withstand Voltage Test Data Sheet. When testing has been completed, sign and date the test data sheet in the space provided.

Dielectric Withstand Voltage Test Data Sheet

Project:	Test Location:	Test Date:

Test Equipment

Name	Manufacturer	Model	Serial Number	Cal. Date

Test Results

Test Unit Identification	From	To	Insulation Type (O,B,S,R)*	Test Voltage	AC / DC

Signatures

Test Engineer:	**Print**	**Sign**	
QA:	**Print**	**Sign**	

* See UL 1950 for definitions