VERTIV.™

Liebert®

APM™ Series

Enterprise-grade, Scalable, & Superior Power Solutions for Mission-Critical Applications

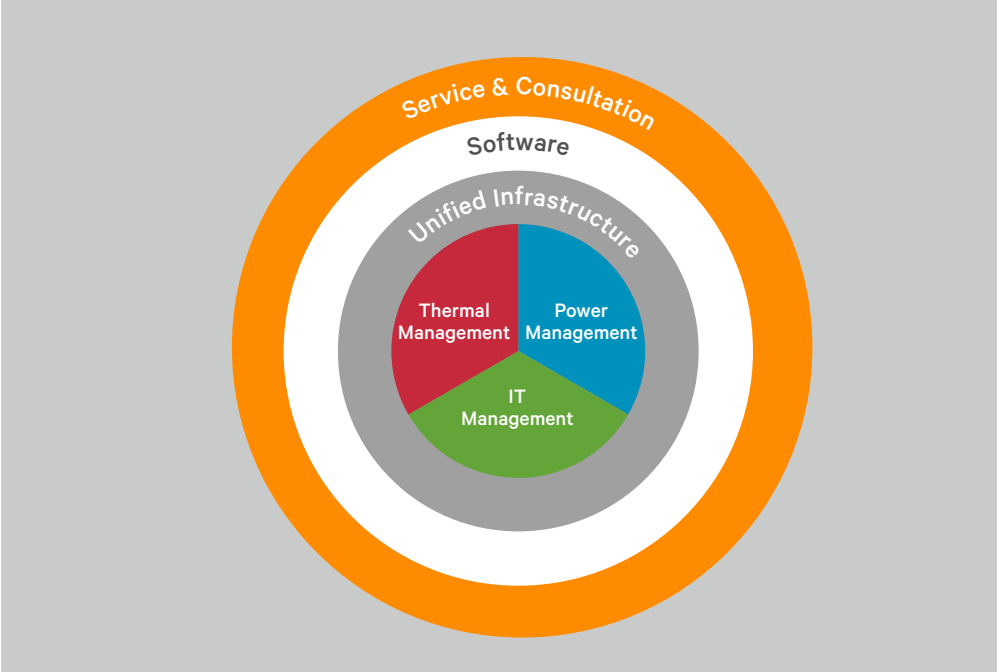
Vertiv, formerly Emerson Network Power, designs, builds, and services mission critical technologies that enable vital applications for data centers, communication networks, and commercial & industrial environments

We support today's growing mobile and cloud computing markets with our portfolio of power, thermal and infrastructure management products, software and solutions, all complemented by our extensive global service network.

We help strengthen the world's most vital applications by bringing together global reach and local knowledge, and our decades-long heritage, including brands like Chloride, Liebert, NetSure, and Trellis.

Vertiv
Your Vision, our Passion

With a unique combination of industry expertise, technology, and resources, our mission is to support and power mission-critical technologies that drive possibility.



Chloride®

Our global industrial power solutions meet the most demanding technical specifications and provide safe, reliable power- no matter the challenge

NetSure™

Our global intelligently engineered DC power systems deliver high availability, energy efficiency and scalability for converged networks

Liebert®

Our global power and thermal management solutions are some of the world's most efficient and reliable power and cooling technologies

Trellis™

Our industry-leading software gives customers an integrated view of operations across IT and facilities resources, enabling better decisions that save time and money

With the advent of Cloud Computing and technology, Today's era has undergone constant demands.

Therefore, enterprise-grade power protection is the need of hour, especially when it comes to deploying blade servers and other high density equipment.

High availability and effective serviceability are primary concerns and thus, there is a need of a power infrastructure which is adaptive, scalable and reliable..

With subject matter experts predicting the industrial revolution in the years to come, you need an infrastructure, which takes it one step further and adapts to your needs in the current times as well as the near future-something that lets you outpace the technology breakthroughs.

A Scalable UPS as Dynamic as Your Data Center

Prevent power interruptions and ensure the future flexibility and efficiency of your data center infrastructure, with the Liebert® APM™UPS. Leverage the innovative modular configuration, cost-efficient operation and flexibility to match increasing power demands all while ensuring critical reliability.

AVAILABILITY AND FLEXIBILITY IS ENHANCED WITH STANDARD AND OPTIONAL FEATURES

Designed to improve the utilization and management of your IT systems, Liebert® APM™ Increases your system;'s availability and flexibility as you deal with change. The features of Liebert® APM™ flex as IT applications and systems evolve, removing constraints to growth and allowing you to implement new systems and applications, while leveraging on your initial investment.

Obtain redundancy and scalability using innovative Liebert® modular power core assembiles, Each includes distributed intelligence and scalable power in one common module - this technology allows configuration of a completely redundant power and control system, sized to match the capacity of the protected equipment. When power requirements change, capacity is easily added - without increasing the system footprint.

The row-based Liebert® APM™ is ideally suited for:

- Small to medium-size data centers
- Server rooms
- Production areas
- Labs and testing facilities
- Telecommunications
- Process control centers
- Edge of the network locations

Over 10,000APM Units Installed

>

3 GW Worldwide

The Adaptive Power Manager For Your Dynamic IT Infrastructure

- Liebert® APM™ is compact UPS system designed to operate with maximum energy efficiency in a minimum footprint for the protection of small-and-medium computer rooms.
- It features FlexPower™ technology, which incorporates distributed intelligence and scalable power in a common assembly.
- It is suitable for small-and-medium businesses with the attitude to grow fast: thanks to its architecture that enables the UPS system capacity to start as low as 18kW and scale up to 2.4MW (in LBS mode) with an investmenton-demand structure

Low Cost Of Ownership

Liebert® APM™ is designed to minimize capital equipment expenses, protect your technology investment, and optimize efficiency.

Enhanced Operational Flexibility

In response to the demand for new technology, and adaptability to customer and market changes, Vertiv has developed a scalable platform that allows you to configure your own AC Power system with basic building block, that is able to grow based on your future requirements.

"All The Power You Need, Just The Power You Need"

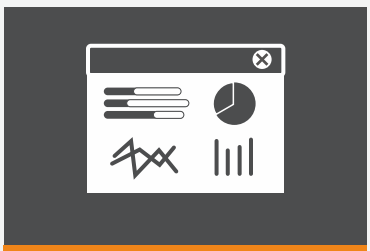
With Liebert® APM™, you can deploy power modules that provide the best match for your system rating and its enhances flat efficiency curve (up to 96% for load above 30% and up to 94% for loads above 20%)

Higher System Availability

Liebert® APM™ provides mission-critical technology that minimizes the single point of failure in your infrastructure - a UPS that delivers the highest possible level of availability to your IR system, with Lliebert® proven reliability, and by decreasing MTTR with the new hot-swappable power modules

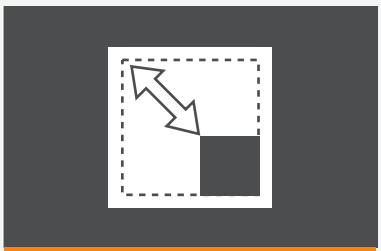
Economical & Efficient

With fewer basic building blocks, you can build a formidable power source tailored to your needs and ready to evolve with them



Integrated Monitoring System

Improving performance of the IT infrastructure and environment with streamlined management and supervision



Compact design & Space saving up to 30%

Cutting-edge design that fits seamlessly into various environments in a minimal. low carbon footprint

Resilient & highly available

Balancing high levels of availability and efficiency with distributed intelligence and scalable power in a common assembly

Liebert® APM™ 18-90kW

"Integrated Power and Distribution Management in a Modular Rack"

Unique in its class, the Liebert® APM™ provides complete, high efficient power protection and distribution in a single cabinet, eliminating the complexity of two stage power distribution.

1 Intelligent Server Power Manager

MCM/BCM control module able to detect status, voltage, current, power factor, harmonic level and energy consumption of each branch, and set 2-level current load pre warning.

2 Modular Power Distribution Module

Swappable distribution module (Optional) with 18-way circuit breaker for expansion and output distribution circuit adjustment

3 Hot Swappable circuit Breaker

Branch switch expansion or load adjustment can be done without turning off the main circuit UPS power supply. Load distribution uses dynamic configuration, with the UPS capacity and number of load distribution circuits changed with the increase in IT systems

4 Built-in distribution switch and manual maintenance bypass

Enable the UPS to transfer the load to utility in event of fault or overload, without interruption

5 Standalone static bypass module

Built-in swappable 90kW bypass module in separate assembly, UPS still support load upon failure of this module to ensure higher reliability

6 Hot swappable module

Each Power core assembly consist of its own DSP controller, minimizes possibility of single point of failure

7 Unity Power Factor*; 18 kW module

Offers more real power to support customer's mission critical load satisfying the requirements of the latest servers

Application areas are Small and Medium Server farms, Data centers, Enterprise Corporate *offices*, and Edge computing.

Specifications

Rated Power (In kVA/kW)*	18	36	54	72	90
Input features (Rectifier)					
Rated input voltage	380/400/415Vac, 3-phase and 4 -wire				
Input voltage range	305~477V				
Rated operating frequency	50/60Hz				
Input frequency range	40-70Hz				
Input power factor	=0.99 at full load, >0.98 at half load				
THDi*	Linear full load<3% (battery float charge); Non-liner full load <5% (battery float charge)				
Input walk-in function	20s				
Battery					
Float voltage	selectable from 2.2V/cell to 2.3V/cell				
Temperature compensation	-3.0mV/°C/cl				
Ripple voltage	=1.141%				
Boost voltage	selectable from 2.3 to 2.35V/cells				
EOD voltage	selectable from 1.30 to 1.85/cells				
Output					
Invertor output voltage	380/400/415Vac, 3-phase and 4-wire				
Nominal output frequency	50/60 (settable)				
Inverter overload capacity	1 hour for 110%; 10 mins for 125%; 1 min for 150%; 200ms for >150%				
Voltage Stability	±1% (balanced); ±5% (unbalanced)				
Total harmonic voltage distortion	2% (linear load); 4% (non-linear load)				
Slew rate	0.6Hz/sec				
Bypass					
Bypass input voltage	380/400/415Vac, 3-phase and 4-wire				
Bypass overload capacity	<110%, continues; <150% of rated load,1 min; 1000% of rated load 1100ms				
Bypass voltage tolerance	Upper limit: +10%, +15% or +20%; Lower limit: -10%, -15%, -20%, -30% or -40%				
Bypass frequency tolerance	±10% or ±20%, default: ±20%				
Synchronisation window	Rated frequency ±0.5, ±1, ±2, ±3 (optional)				
Dimensions and weight					
Dimensions (W x D x H) (mm)	600 x 1100 x 2000				
Weight(kg)	228	256	284	321	340
General					
Online mode efficiency	Up to 94%				
ECO mode efficiency	Up to 98%				
Operating temperature	0~40°C				
Storage temperature	-25~70°C (without battery)				
Max operation altitude	=1000, derate power by 1% per 100m between 1000m and 2000m				
Nosie (1m)	55	57	59	61	63
IP Class	IP20				
Color	Black ZP7021				
Standard	Safety: IECEN50091-1; IEC62040-1/AS62040-1, EMC: EN50091-2/IEC62040-2/AS 62040-2(C3) specifying the performance and test: EN50091-3/IEC62040-3/AS 62040-3(VFISS 111)				

*Note: Condition apply
*Liebert APM also available with 0.9PF model(20/40/60/80/100kVA) to meet higher kVA requirement
*Specifications are subject to change without any prior notification

Liebert® APM™ 30-150kW

“Integrated Power & Btteries in a Modular Rack”

1. Dust filters
2. System display
3. 1 to 5 power modules
4. 0 to 10 internal battery modules
5. 1 to 10 battery modules can be installed in an external rack for additional autonomy
6. Static bypass module
7. Maintenance bypass
8. External modular battery

- Liebert® APM™ 18-90kVA ensures reliable operation through quality components, intelligent design, and the industry’s largest local support network.
- Liebert® APM™ 18-90kVA provides a best-in-class efficiency of 36% even in low load conditions in the range of 50-75% load and 94% efficiency at 25% load. The optimum overload protection is 110% overload for 60 minute; 125% for 10 minutes; 150% for 1 minute.
- It allows the user to easily add modules using a plug-and-play structure while distributing work load through its intelligent control system.
- It eliminates the complexity of 2-stage power distribution as it integrateds UPS and power distribution in a single cabinet.
- It supports parallelization up to 4 racks and an optional modular batteries rack.
- Application areas are medium data centers, Enterprise and corporate offices, telecom industry, and cloud applications.

Liebert® APM™ 30-300kW

1. Hot Swappable Power Modules (30kW) Assembly
2. Monitoring Interface Ports
3. Input, Output, Bypass & M. Bypass Switch Assembly
4. Hot Swappable Static Bypass Module Assembly
5. Dust Filter

- Liebert® APM™, with its unity power f actor (kVA=kW), offers more real power to support your mission-critical load, satisfying the requirements of the lates severs.
- High overload protection handles 110% o verload for 60 minutes, 125% for 10 mimutes, and 150% for 1 minut e.
- Liebert® APM™ is a compact UPS with a low carbon footprint . It grows from 30kW to 300kW in a single standard rack cabinet (additional I/O Box needed).
- The hot-swappablr, modular design of Liebert® APM™ modular desgin lowers the UPS s ystem;s MTRR, simultaneously increasing the system availability. Modular redundancy features allow the capacity t o grow as needed while reducing the maintenance cost.
- It allows the configur ation of a completely redundant power system, sized to match the capacity pf the protected equipment. The unit capacity is easily added, without incr easing the system footprint. Parallelization (up wo 2 racks) allows maximum system capacity of up t o 600kW, without the need for centr ailzed bypass cabinet and additional external control modules.
- Liebert® APM™ offers you the possibility t o choose between int ernal module/vertical redundancy and/or external frame horizontal redundancy up to Tier-4.
- Application areas are Medium data cent ers, server farms, IDC, enterprise and corporate offices, and cloud applications.

Specifications

Rated Power (In kVA/kW)*	30-150	30-300
Input features (Rectifier)		
Rated input voltage	380/400/415Vac, 3-phase and 4 -wire	
Input voltage range	305V-477, 209V - 304V with linear derating up to 70% load	
Rated operating frequency	50/60Hz	
Input frequency range	40-70Hz	
Input power factor	=0.99 at full load, >0.98 at half load	
THDi*	<3%	
Input walk-in function	Available,5-30s settable	
Bypass		
Bypass input voltage	380/400/415VAC, three-phase four-wire	
Bypass voltage range	Default: -20% -+15%, other values, such as -40%, -30%,-10% -+10%, +15% settable three through software	
Bypass overload capacity	Long term for 110%, 1 hour 170, 100ms for 1000%	
Output		
Invertor output voltage	380/400/415Vac, 3-phase and 4-wire	
Output power factor	1 (kW = kVA)	
Inverter overload capacity	1 hour for 110%; 10 mins for 125%; 1 min for 150%; 200ms for >150%	
Voltage Stability	±1% (balanced); ±5% (unbalanced)	
Steady state response time	<20ms	
Phase shift	<1° (With 100% balanced load); <1 ° (With 100% unbalanced load)	
Total THD (THDv)	<1% (100% linear load)	
Frequency	<4% (100% linear load)	
Slew rate	0.6Hz/sec	
Measured frequency precision (internal clock)	50Hz / 60Hz ±0.02%	
DC Features		
Charger output voltage regulation accracy	1%	
DC ripple voltage	=1%	
SPM intelligent distribution system**		
Number of branch swithces	18 routes x 3	
DC ripple voltage	25A as standard, 10-63A optional	
Monitoring function	Main circuit and branch ON/OFF status, voltage, current, power factor, harmonic, electricity consumption, 2-level current pre-warning	
System		
Paralleling	Up to 4*	Up to 2
Efficiency	Up to 96% (On line mode), Up to 98.8% (Eco mode)*	
Dimensions and weight		
Dimensions (W x D x H) (mm)	600 x 1100 x 2000	1200 x 1100 x 2000
Weight(kg)	420 (weight w/ out internal batteries)	670
General		
Operating temperature range*	0-40°C (For details, refer to user manual)	
Relative humidity	-25~70°C (excluding battery)	
Storage temperature	0-95 no condensing	
Max operation altitude	=1000, When operating at 1000-2000m, derated by 1% for every 100m increase of altitude	
Nosie (1m)	IP20 (with built-in dust filter)	
IP Class	56	65
Standard	Safety: IECEN50091-1; IEC62040-1/AS62040-1, EMC: EN50091-2/IEC62040-2/AS 62040-2(C3) specifying the performance and test: EN50091-3/IEC62040-3/AS 62040-3(VFISS 111)	

*Note: Condition apply
** On selected configurations only
Please consult with Emerson representative for specific Liebert APM configuration

Liebert® APM™ 250kW

1. Hot Swappable Static Bypass Module Assembly
2. LCD display
3. Hot Swappable Power module Assembly (50kW)
4. Input, Output, Bypass & M. Bypass Switch Assembly
5. N+1 Redundancy

- The Liebert® APM™ 250 is a top-of-the-line UPS with the highest power density in its class - as a result, it has a minimal and compact footprint. It results in Space savings of around 30% compared to UPS systems in that range.
- It requires no rear space for maintenance and supports flexible airflow arrangement i.e..- Front to back or Front to Top.
- This streamlined UPS delivers an unified performance across a wide load range - excellent performance even at low percentage loads.
- This best-in-breed solution supports Common Battery Configuration & Built-in Switchgear assembly.
- A single UPS can support critical load up to 250kW in a (N+1) redundancy.
- The UPS comes with a streamlined cabinet that qualifies and caters to seismic standards.
- Application areas are Comprehensive Cloud applications, Telecom IDC, and Mid-tier & Large-Tier Data centers.

Technical Specifications

Nominal Ratings(kVA/kW)	250	
Input		
Nominal input voltage(V)	380/400/415, 3-phase 4-wire (+PE) TN/TT/IT power distribution system	
Input voltage range (V)	192 ~ 478	
Nominal input frequency(Hz)	50/60	
Input frequency range(Hz)	40-70	
Input power factor(kW/kVA)	0.99	
Battery		
Float Voltage	2.25V/cell (selectable from 2.2V/cell to 2.3V/cell)	
Temperature compensation (mV/°C/cell)	-3.0 (selectable from 0 to -5.0 around 25°C or 30°C, or inhibit)	
Ripple voltage (%V float)	≤1	
Boost Voltage	2.35V/cell (selectable from 2.3 to 2.35)	
Output		
Nominal output voltage (V)	380/400/415 (3-phase 4-wire, with neutral reference to the bypass neutral)	
Nominal output frequency (Hz)	50/60	
Inverter overload capacity	<105 for long time; 110% for 60 mins; 125% 10mins; 150% for 1 min;	
THDv with 100% linear load (%)	< 1 (linear load), < 3 (non-linear load3)	
Frequency Slew Rate (Hz/s)	0.6 setting range: 0.1 ~ 3	
Online mode efficiency	Up to 96.5%	
ECO mode efficiency	Up to 99.1%	
Dimensions and weight		
Dimensions (W x D x H) mm	1000 × 1000 × 2000 - package excluded	1135 × 1130 × 2260 - package included
Weight(Net weight)	650kg	
General		
Nosie at 1 m dB (A)	<70	
Altitude	≤1500; derate power by 1% per 100m between 1500-3000m	
Relative humidity	0-9.5%RH, non condensing	
Storage temperature	-25 ~ +55°C	
Operating temperature	0 ~ 40°C	
General and safety requirements for UPS	EN62040-1/IEC62040-1/AS62040-1	
EMC requirements for UPS	EN62040-2/IEC62040-2/AS62040-2 (Class C3)	
UPS classification according to EN62040-3/ IEC62040-3/AS62040-3	VFI-SS-111	
Color	Black ZP7021	
Protection degree, IEC(60529)	IP20 (front door open or closed)	

Specifications are subject to change without any prior notification

Liebert® APM™ 400/600kW

1. Hot Swappable Power Modules (50kW) Assembly
2. Monitoring Interface Ports
3. Input, Output, Bypass & M. Bypass Switch Assembly
4. Hot Swappable Static Bypass Module Assembly
5. Hot Swappable Power Modules (50kW) Assembly - only available with the 600kVA

- Liebert® APM™ 400/600 kVA is the ultimate combination of streamlined flexibility, availability, sustainability, and modular architecture that will solve not only the present but also the futuristic needs in a compact footprint.
- The Unity Power factor (kW=kVA) eliminates the need to oversize the UPS when serving modern PFC loads.
- Internal redundancy helps configure Liebert® APM™ with an additional power module achie ving(N+1) in order to provide higher availability while limiting the investment cost-minimizes the installation costs by enabling the use of smaller generators, cabling, and cirbuit breakers.
- Pay-as-you-grow approch (investment on Demand) with minimized initial investment and maximized ROI/TCO (Scalable up tp 2.4MW)
- Application area are Colocation, Massive Cloud applications, Telecom IDC, and Large Data centers.

Therefore, adhering to the ***"Efficiency without Compromise"*** paradigm, Liebert APM UPS series is a complete power protection solution that helps to achieve maximum optimization of the data center infrastructure around design, operating, and management proficiencies while maintaining or improving availability.

Specifications

Nominal Ratings(kVA/kW)	400	600
Input		
Nominal input voltage(V)	380/400/415 (three-phase and sharing neutral with bypass input)	
Input voltage range (V)	305~478VAC, 228~304VAC with linear derating up to 70% load	
Nominal input frequency(Hz)	50/60	
Input frequency range(Hz)	40-70	
Input power factor(kW/kVA)	1	
Battery		
Float Voltage	2.25V/cell	
Temperature compensation (mV/°C/cell)	-3.0 (selectable from 0 to -5.0 around 25°C or 30°C, or inhibit)	
Ripple voltage (%V float)	≤1	
Boost Voltage	2.35V/cell	
Output		
Nominal output voltage (V)	380/400/415	
Nominal output frequency (Hz)	50/60	
Inverter overload capacity	110% for 60 mins; 125% 10mins; 150% for 1 min;> 150% for 200ms	
THDv with 100% linear load (%)	1%	
Frequency Slew Rate (Hz/s)	0.6	
Efficiency		
Online mode efficiency	Up to 96.5%	
ECO mode efficiency	Up to 99.1%	
Dimensions and weight		
Dimensions (W x D x H) mm	1400 x 1000 x 2000	1800 x 1000 x 2000
Weight(Net weight)	928kg - 1100kg	
General		
Nosie at 1 m(dBA)	<70dBA	
Altitude	≤3000m above sealevel	
Relative humidity	0-9.5%RH, non condensing	
Storage temperature	-25 to 55°C	
Operating temperature	0 to 40°C	
General and safety requirements for UPS	IEC 62040-1	
EMC requirements for UPS	IEC 62040-2	
UPS classification according to IEC EN 62040-3	VFI-SS-111	
Color	Black ZP7021	
Protection degree, IEC(60529)	IP 20	

*Class C3 is standard whereas class C2 is optional

Specifications are subject to change without any prior notification

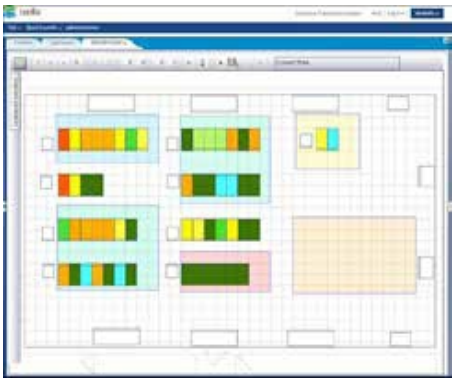
Intelligence — Where and How You Need It

INNOVATIVE TECHNOLOGIES MAKE THE LIEBERT® APM™ UPS AN INTELLIGENT DEVICE FOR ENHANCED CONNECTIVITY, VISIBILITY AND CONTROL

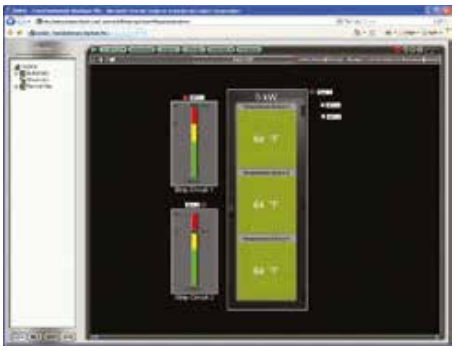
Management and Control Solutions

The UPS includes multiple Liebert communication ports for important connectivity and visibility for rich infrastructure management:

- ***The Trellis™ Platform:*** Provides robust Data Center Information Management (DCIM) capabilities using selectable modules and suites.
- ***Liebert SiteScan®:*** Offers centralized monitoring and control of all critical infrastructure systems, using a variety of network protocols.
- ***Liebert® Nform™*** Enables data center monitoring for any SNMP device that supports a network interface.
- ***Third party BMS systems:*** integrates seamlessly



The Trellis™ Platform



Liebert SiteScan

Albér® Battery Monitoring Systems:

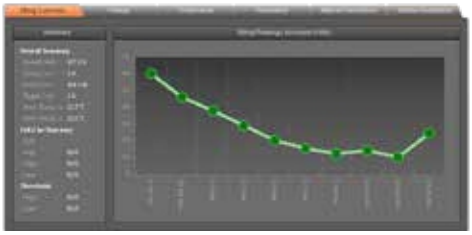
With a new, easy to use software interface, an Albér factory integrated or stand alone battery monitoring system provides advance warning of pending UPS battery failures, the most common cause of unplanned data center outages.

Utilizing its patented DC resistance testing method, Albér provides real-time system and component level visibility by verifying the state of health of the entire battery system.

Albér® Battery Xplorer Dashboard

Liebert Nform

System View
View data on parallel battery strings simultaneously



String View
View a trend graph showing the history of all the string level parameters

Enabling Tomorrow's

CRITICAL EDGE INFRASTRUCTURE

We helped some of the largest names in the industry bring new capacity online faster and at a lower cost when search and social media increased demand for storage and computing.

Protecting your critical technologies takes more than just great software and equipment. It takes a level of experience that only comes from years of finding solutions when the industry needed them most. We were the first to protect mainframes with precision cooling systems.

We were the first to introduce an integrated enclosure system to distributed networks.

And now as challenges and demands grow, we continue to find better ways to help you strengthen your most vital applications. Formerly the Network Power business of Emerson, we've brought together the most trusted and experienced names in critical infrastructure.

Our portfolio spans power, thermal and infrastructure management products, software and solutions.

Complemented by a network of nearly 250 service centers worldwide. It's a combination of experience and resources that allow us to better adapt to what's needed, anticipate what's next and continue to find solutions in ways other companies simply can't.

VertivCo.com | **Asia Pacific**

AP-UPS-APM-V1-1123-EN