

■ AC Power
For *Business-Critical Continuity™*

Liebert® APM UPS

The Industry's Highest Energy Efficiency In A Row-Based, On-line UPS



Liebert APM with FlexPower Technology: An Adaptable UPS That Meets Increasing Power Requirements

Today's data centers are dynamic environments with rapidly expanding power demands. Central to a data center's strength is its availability. Business cannot be interrupted, nor can power.

To maintain business continuity, UPS systems need to possess the reliability to prevent downtime and the scalability to keep pace with the need for increasing capacity. In addition, the UPS should have optimized energy efficiency, to ensure that increased capacity doesn't overload the power grid or the budget.

To meet these requirements, Emerson Network Power developed the row-based, modular Liebert APM UPS.



Strengthen Your Infrastructure with the Flexible, Reliable and Highly Efficient Liebert APM

Liebert APM is a transformerless, on-line UPS that allows quick and easy capacity increases with the addition of rack-mounted FlexPower™ hardware assemblies. The assemblies allow the UPS to expand from for capacity

or redundancy in 15kW increments within a single cabinet – 15kW to 45kW or 90kW. No additional floorspace is required.

FlexPower assemblies may even be added without powering down connected equipment.

On-line double-conversion technology and internal redundancy combine to provide protection from the full range of power irregularities, offering the highest availability.

With efficiencies of up to 94% at typical load levels, Liebert APM offers the industry's highest efficiency rating. The UPS is even more efficient when sized in accordance with present system needs, instead of purchasing a larger capacity system to anticipate future requirements.

Liebert APM delivers Efficiency Without Compromise™

Efficiency Without Compromise provides a path to optimize data center infrastructure around design, operating and management efficiencies – while maintaining or improving availability. This is achieved through the proper selection and utilization of cooling, power and monitoring technologies, supported by key services and local expertise.



INFRASTRUCTURE MANAGEMENT

Improving performance of the IT infrastructure and environment



ECO AVAILABILITY

Balancing high levels of availability and efficiency



FLEX CAPACITY

Adapting to IT changes for continuous optimization and design flexibility



HIGH DENSITY

Delivering architectures from 10–60 kW/Rack to minimize space and cost



Copper bus bars for two-hole compression lugs provide solid power terminations, just like enterprise UPS systems

Flexibility:

- Capacity expansion in 15kW increments using FlexPower™ assemblies
- Internal bypass allows FlexPower assemblies to be added or replaced without powering down the connected equipment
- 45kW model includes internal batteries. More runtime is available with optional external battery cabinets
- 90kW units use optional external battery cabinets for battery runtime
- Includes three Liebert Intellislot ports for optional communications
- Top or bottom cable entry allows installation in either raised or non-raised floor environments
- Conveniently positioned, easy-to-reach power terminations simplify unit wiring and installation

Higher Availability/Reliability:

- Redundancy features minimize single points of failure:
 - Distributed intelligence – individual FlexPower assemblies and bypass and monitoring assembly have standalone DSP controls
 - Internal redundancy capability (N+1) adds reliability
 - Independent Static Bypass assembly with controls in separate assembly provides higher reliability
- Enterprise-quality batteries in an external battery cabinet provides backup time for 90kW frame size, and additional runtime for 45kW frame size
- Optional bypass distribution cabinet (BDC) provides wrap-around maintenance bypass, so the attached load can keep running during UPS service
- Withstand rating of 65kAIC ensures reliability and safety under even the most extreme utility conditions



Independent Static Bypass assembly with Liebert Intellislot ports

Lowest Total Cost of Ownership

- Buy only what you need for present usage, with the flexibility to add capacity as demand increases
- Industry's highest reported efficiency rating (up to 94%), with a virtually flat efficiency curve from 50-100% load, resulting in significant energy cost savings
- Fewer batteries mean less maintenance and higher reliability
- Unity power factor design (kW = kVA) is optimized for today's high power factor loads

Liebert APM is ideally suited for:

- Small to medium-size data centers
- Server rooms
- Production areas
- Labs and testing facilities
- Telecommunications or process control centers

Liebert APM: A Flexible, Efficient Row-based UPS With The Reliability Features of an Enterprise UPS System

The cost-efficient Liebert APM provides the reliability of an enterprise UPS, and the flexibility to adapt to increasing power demands. This is a true, best-in-class solution from the leader in power and cooling solutions for computer rooms and data centers.



Key Features and Benefits:

- Up to 94% efficiency – Industry’s highest efficiency results in lower energy consumption
- Front service access – for quick and easy installation
- Transformerless design – provides a smaller footprint and lower cost compared to transformer-based systems
- Matching bypass and distribution cabinet – increase reliability and safety by switching the protected load to bypass power for maintenance and service
- Matching battery cabinets – provides added back-up capacity for extended runtimes
- Distributed controls – each FlexPower assembly includes DSP controls, minimizing possibility of single point of failure
 - Standalone static bypass module – features independent controls in separate assembly to provide higher reliability
- Top or bottom cable entry – enables installation on raised or non-raised floors
- Large dot-matrix monitor with graphical display - allows easy viewing and comprehensive system information
- Includes three Liebert IntelliSlot ports for web-based communications ability: Liebert IntelliSlot card IS-485EXI allows communication with Liebert SiteScan; Liebert IntelliSlot card IS-WEBL allows communication with Liebert Nform (90 day license included)
- One-year warranty –provides full system coverage for one year



Redundant intelligence and capacity ensure reliable operation

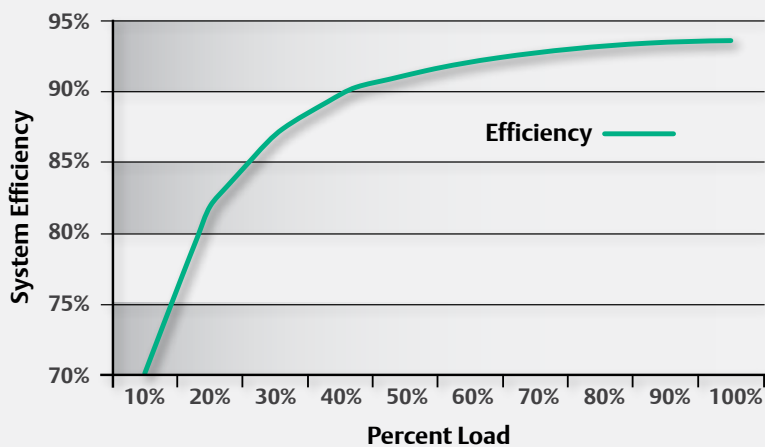
Liebert FlexPower™ assemblies incorporate distributed intelligence and scalable power in a common assembly. This technology allows configuration of a completely redundant power and control system, sized to match the capacity of the protected equipment. When power requirements change, capacity is easily added -- without increasing the system footprint.

Using FlexPower assemblies, the Liebert APM can scale from 15 to 30 to 45kW, or up to 90kW in 15kW increments within a single cabinet. This approach allows for right-sizing of the UPS, resulting in improved energy efficiency and reduced power expenditures.

Large LED graphical monitor display – allows easy viewing of comprehensive system information



■ Liebert APM Efficiency Curve



The 90kW APM UPS at full load with a 2% efficiency advantage over competitive UPS saves \$1800 annually (assuming \$0.10 per kW Hr)

Enterprise-Quality Batteries Increase Reliability

Battery quality is key to the reliability of the UPS and to the availability of the protected equipment. Liebert APM ensures this quality by providing the same reliable battery technology that supports enterprise UPS systems. In addition, the batteries are backed by the largest service organization in the industry. This design philosophy offers:

- Lower initial cost
- Better service life
- Same high reliability batteries as our enterprise systems
- Fewer batteries = less maintenance, fewer cells to fail
- Battery warranty - 3 years full warranty, 7 years pro-rated
- Optional Alber BDSi in external battery cabinet ensures battery reliability by constantly monitoring each battery, allowing for proactive management

Industry's Highest Efficiency

Liebert APM operates at up to 94% efficiency at typical load levels. This efficient operation equals significant energy savings and cost savings.

Redundant Components Improve Availability

Component redundancy provides an additional layer of reliability for UPS operation.

- A single FlexPower assembly can provide redundancy for the other modules.
- Distributed intelligence in individual FlexPower assemblies and bypass and monitoring assembly eliminates single point of failure.

User-Friendly Interface

The menu-driven monitor panel on Liebert APM is large and easy to read. Unit metering and status information is displayed in a logical format, and is selectable in multiple languages.

Monitored parameters:

- **Mains** - view utility power input data: voltage, current, frequency and power factor
- **Bypass** - view bypass data: voltage and frequency
- **Output** - view output data: voltage, current, frequency and power factor
- **Load** - view load data: load percent, output current, output power and crest factor
- **Battery** - view battery characteristics—voltage, current, temperature, remaining time and capacity—and messages when the battery is boost/float charging or disconnected
- **Events** - view the events log—displays all recent events added to the log
- **Records** - access the history log—displays all records in the log
- **Language** - select a language for LCD text (choices appear in the native language)
- **Settings** - configure UPS settings: set up the UPS for modem communications (baud rate, address, mode and phone numbers to dial for alarm notifications) and change the password
- **Command** - start or stop a battery maintenance test, battery capacity test or system test
- **Run Time** - view available backup time for the UPS and bypass
- **Version** - view firmware versions for the inverter, rectifier and software display board and the model information for the UPS

Configurations and Options To Fit Your Site Needs



Bypass Distribution Cabinet

- External maintenance bypass for complete serviceability while load is running on bypass utility power
- Integral distribution saves space and cost
- Kirk-key interlock ensures proper operation
- 65 kAIC rating meets high electrical withstand requirements
- Dimensions: 2000mm H x 600mm W x 1000mm

UPS Cabinet

- 45kW or 90kW maximum capacity sizes
- 45kW size accommodates internal batteries
- Capacity can be increased by adding 15kW assemblies
- One assembly per cabinet may be used for redundancy (up to 30kW + 15kW redundant; up to 75kW + 15kW redundant)
- Dimensions: 2000mm H x 800mm W x 1000mm

Battery Cabinet

- Additional runtime for 45 kW system; required for 90 kW system
- Optional Alber BDSi factory integrated battery monitoring for proactive battery management to ensure availability
- Dimensions: 2000mm H x 600mm W x 1000mm

Liebert APM 45kW UPS

Liebert APM 45kW UPS with internal battery is a reliable, row-based UPS with low initial cost and high battery service life



Liebert APM 90kW UPS

Liebert APM 90kW UPS with external battery cabinet provides maximum reliability and flexibility in a row-based UPS



To proactively manage battery health, the Liebert APM external battery cabinet is available with optional Alber BDSi integrated battery monitoring system

Technical Specifications – Liebert APM UPS

Power Rating – kW/kVA	15, 30, 45	15, 30, 45, 60, 75, 90
Frame Size	45kW	90kW
Input AC Specifications		
Phase	3	
Power Factor	0.99 lagging minimum at full load	
Frequency Range	40-70 Hz	
Input Voltage	120/208, 127/220VAC, 60Hz, 3-phase, 4-wire plus ground	
General Specifications		
UPS Technology	On-Line, Double Conversion	
Battery Specifications		
Battery Test Type	Online	
Battery Technology	Valve-regulated lead acid battery; supplied by EnerSys	
Output AC Specifications		
Voltage	120/208, 127/220VAC, 60Hz 3-phase, 3- or 4-wire plus ground	
Frequency – Hz	60 Hz	
Communications		
Communications Options	Liebert IntelliSlot IS-485EXT, Liebert SiteScan, IS-WEBL, Liebert Nform	
Physical Data UPS		
Dimensions, W X D X H in (mm)	31.8x39.5x78.7 (800, 1000, 2000) Note: 12 inches of rear clearance required for cooling	
UPS Rating	Unit Weight lb (kg)	
15kW	919 (417)	705 (320)
30kW	994 (451)	780 (354)
45kW	1069 (485)	855 (388)
60kW	NA	930 (422)
75kW	NA	1005 (456)
90kW	NA	1080 (490)
Physical Data Bypass Distribution Cabinet		
Dimensions, W X D X H in (mm)	23.625 x 39.5 x 78.75 (600 x 1000 x 2000)	
Weight lb (kg)	902 (410)	
Physical Data Battery Cabinet		
Dimensions, W X D X H in (mm)	23.625 x 39.5 x 78.75 (600 x 1000 x 2000)	
Weight lb (kg)	1554 (705) with Hx150 batteries, 1693 (768) with HX205 batteries, 2101 (953) with HX300 batteries, and 2366 (1073) with HX330 batteries.	
Environmental		
Operating Temperature, °F (°C)	UPS: 32° to 104°F (0-40°C); Battery: 68° to 86°F (20-30°C)	
Relative Humidity	0% to 95%, non-condensing	
Operating Altitude	Up to 3,300 ft. (1,000m) without derating	
Acoustical Noise, db, at 39 in.	Less than 56 dBA typical, 3.3 ft. (1m) from the unit	
Agency/Certification/Conformance		
Listed to UL 1778 UPS standards, and CSA certified. Meets current requirements for safe high performance UPS operation.		
Warranty		
Standard	1 Year	

Emerson Network Power, a business of Emerson (NYSE:EMR), is the global leader in enabling *Business-Critical Continuity™* from grid to chip for telecommunication networks, data centers, health care and industrial facilities. Emerson Network Power provides innovative solutions and expertise in areas including AC and DC power and precision cooling systems, embedded computing and power, integrated racks and enclosures, power switching and controls, monitoring, and connectivity. All solutions are supported globally by local Emerson Network Power service technicians. Liebert AC power, precision cooling and monitoring products and services from Emerson Network Power deliver Efficiency Without Compromise™ by helping customers optimize their data center infrastructure to reduce costs and deliver high availability.

Emerson Network Power.

The global leader in enabling *Business-Critical Continuity™*.

- AC Power
- Embedded Computing
- Outside Plant
- Racks & Integrated Cabinets
- Connectivity
- Embedded Power
- Power Switching & Controls
- Services
- DC Power
- Infrastructure Management & Monitoring
- Precision Cooling
- Surge Protection

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