



Liebert®

APM

from 30 to 300 kW

The Compact Row Based UPS
With FlexPower Technology



Vertiv™

Vertiv designs, builds and services mission critical technologies that enable the vital applications for data centers, communication networks, and commercial and industrial environments. We support today's growing mobile and cloud computing markets with our portfolio of power, thermal, infrastructure management products, software and solutions, all complemented by our global service network. Bringing together global reach and local knowledge, and our decades-long heritage including brands like ASCO®, Chloride®, Liebert®, NetSure™ and *Trellis*™, our team of experts is ready to take on your most complex challenges, creating solutions that keep your systems running—and your business moving. Together, we're building the future of a world where critical technologies always work.

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Liebert® APM from 30 to 300 kW

The Liebert APM is a compact, row-based, transformer-free UPS designed to operate with a maximum energy efficiency of up to 96% for the protection of medium sized business-critical applications. Its modular rack configuration houses both power and battery modules inside the same UPS cabinet*, allowing for scalability while delivering the ideal balance of high availability, reliability and efficiency without increasing the system footprint. The in-built scalability of the Liebert APM also allows for fast, simple increases in system capacity through featured FlexPower technology™. Each 30 kW power module combines scalable power with independent DSP control to auto-regulate operation, thus enhancing overall availability. The Liebert APM is able to reach a total of 300 kW* of active power in a single unit and up to a maximum

of 600 kW in a complete parallel configuration.

At the same time it delivers an excellent integrated autonomy of up to 30 minutes for a 30 kW configuration and up to five minutes in the 90 kW configuration.

Efficiently Protecting Mission-Critical Loads

Enhanced Active Power

With its unitary output power factor (kVA=kW), Liebert® APM offers an increased level of active power to support mission-critical loads.

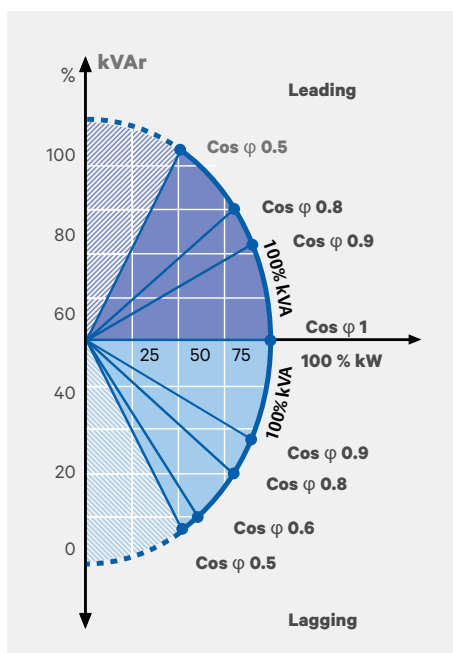
The added advantage of increased active power allows customers to select the most appropriate rating for their critical application, sizing the system based on the actual active power requirements, thus minimizing the initial investment and maximizing TCO. Liebert APM provides enhanced flexibility to ensure superior protection for all load types (lagging or leading) without derating.

Efficiency

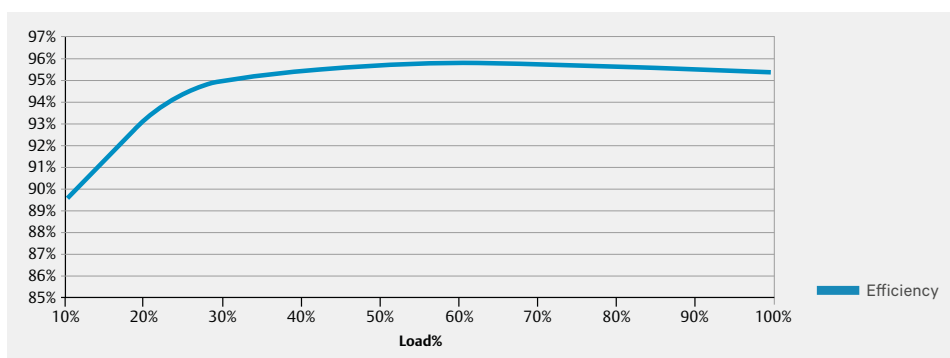
The Liebert APM is capable of reaching the industry's highest efficiency level of up to 96% in true online double conversion mode. With its flat efficiency curve - the Liebert APM delivers maximum efficiency regardless of the load level. It is capable of achieving an efficiency above 95% from full load down to 30% as well as maintaining an efficiency above 94% down to 20% load. This level of operating efficiency results in significant cost savings while at the same time contributing to reducing the carbon footprint of the installation and optimizing power usage effectiveness (PUE). Furthermore, whenever the input conditions and load nature allow, Liebert APM is further able to increase efficiency to above 98% by operating in Eco mode.

FEATURES AND PERFORMANCES

- Industry's highest double conversion efficiency - up to 96%
- Flat efficiency curve
- Highest power density in the market
- Rack architecture
- Modular and scalable
- Hot- swappable power modules
- Independent module control system
- Unitary output power factor and symmetrical power factor diagram
- Integrated parallel and load bus synchronization
- 4.5 kW battery charger per power module
- Integrated autonomy for ratings up to 90 kW



Liebert APM - output power factor diagram



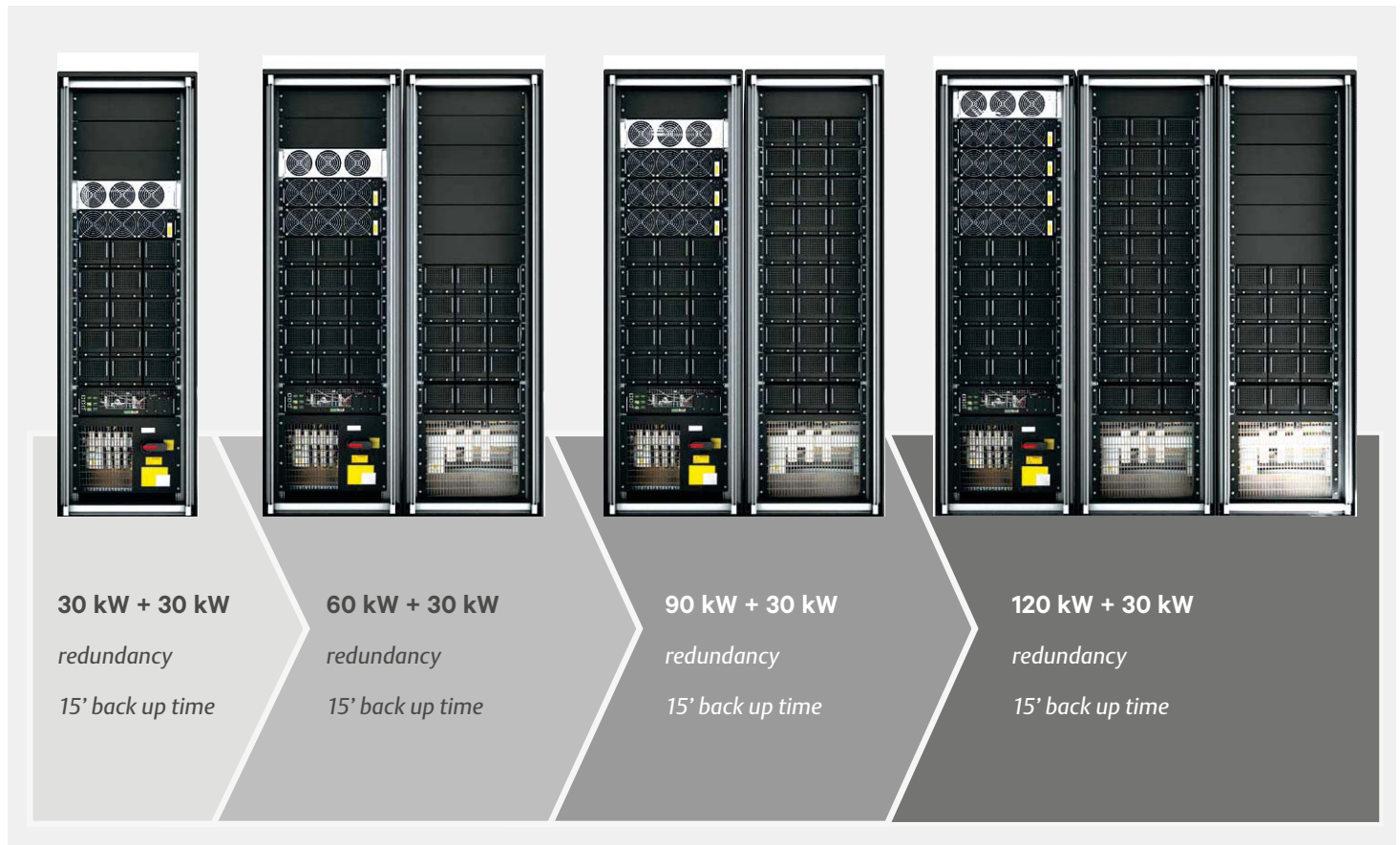
Liebert APM - efficiency curve

Modular, Scalable Configuration

The modular architecture of the Liebert APM allows single unit capacity to be scaled up to a maximum of 300 kW* without impacting on the system

footprint or modifying the installation layout. Increases in capacity and redundancy can be made both vertically and horizontally by adding 30 kW power

modules to an existing rack or, alternatively by connecting complete UPS systems in parallel in order to reach a maximum of 600 kW of active power.



*On selected configurations.

FLEXIBLE BATTERY CONFIGURATION

The flexible battery configuration of the Liebert® APM is designed to meet individual installation availability and back up time requirements.

Liebert APM is compatible with numerous battery configurations including internal¹ and external modular solutions, as well as traditional external battery banks with string lengths between 30 and 40 batteries.

In a parallel system batteries can be installed in a common bank to maximize cost effectiveness and minimize floor space. Alternatively, a single battery bank can be dedicated to each UPS, delivering full redundancy and avoiding the possibility of a single point of failure.

Extended battery life is further ensured through a temperature compensated charging algorithm which prevents battery damage, thus prolonging lifespan.

1. Valid for Liebert APM 150 kW only

Parallel and Dual Bus Ready

Liebert® APM can be connected with up to two or four units in parallel depending on the configuration.

A single unit can be set up to work in parallel through the use of a communication cable set, allowing the system to be customized for the required configuration.

Additionally, Liebert APM allows easy deployment of Tier 4 architecture through its integrated dual bus control.



Liebert® APM - Designed for "pay-as-you-grow" deployment

In The Field

Communication

Liebert® APM features a large multi-lingual LCD display giving users access to key operating information including alarm status, configuration, start-up/shutdown, transfer and advanced metering. The micro-processor based display functions independently from the system control and provides access to:

- real-time meter readings of system currents, voltages, active and reactive power
- status reports and history files
- system power flow one-line diagram

Liebert APM also offers

communication features through Web (HTTP), Modbus and SNMP protocol.

Software Connectivity

Vertiv™ Nform™ network communications system enables customers to leverage the distributed monitoring capabilities of network connected equipment for providing centralized management of distributed systems.

Vertiv™ SiteScan® is a centralized site monitoring system which ensures maximum visibility and availability of critical operations. SiteScan Web allows users to monitor and control virtually any piece of critical support equipment. Its features include real-time monitoring and control, data analysis, trend reporting, and event management.

Serviceability and Maintainability

The Liebert APM is designed to facilitate effortless installation and simplify service with its easy to remove power modules.

The hot-swappable module-based architecture considerably decreases the mean time to repair (MTTR) and facilitates maintenance operations by allowing single modules to be serviced while the remaining modules continue to power the load.

All power modules and critical components are easily accessible from the front of the unit.

VERTIV™ LIFE™ Services Remote Diagnostic and Preventive Monitoring

Vertiv™'s service program is designed to ensure that your critical power protection system is maintained in an optimum state of readiness at all times.

The **Vertiv™ LIFE™ Services** remote diagnostic and preventive monitoring service provides early warning of UPS conditions and out of tolerances.

This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind.

With **Vertiv LIFE** Services you will benefit from:

Uptime Assurance

Constant monitoring of UPS parameters, thus maximizing the system's availability.

First Time Fix Rate

Pro-active monitoring and data measuring ensure that when our customer engineers are dispatched on-site, they arrive prepared for first time resolution.

Proactive Analysis

From Vertiv LIFE Service centers, our experts proactively analyze the data and trends of your equipment, to recommend actions to ensure their best performance.

Minimized Total Cost of Ownership of Your Equipment

The continuous monitoring of all relevant parameters in turn maximizes unit performance, reduces on-site maintenance and extends the life of your equipment.

Fast Incident Response

Vertiv LIFE Services allow for immediate definition of the best course of action, as a result of the regular communication between your Liebert® APM system and our **Vertiv LIFE** Service centers.

Reporting

You will receive a comprehensive report detailing the working order of your equipment and its operational performance.

VERTIV TRELLIS™

Vertiv™ *Trellis*™ platform is a real-time infrastructure optimization platform that enables the unified management of data centre IT and facilities infrastructure.

The *Trellis* platform software can manage capacity, track inventory, plan changes, visualize configurations, analyze and calculate energy usage, and optimize cooling and power equipment as well as enable for virtualization.

The *Trellis* platform monitors the data center, providing a thorough understanding of system dependencies to help IT and facilities organizations keep the data center running at peak performance. This unified and complete solution, delivers the power to see the real situation in your data center, make the right decision and take action with confidence.

Liebert® APM Specifications

Technical Characteristics

Power (kVA)	30 - 150	120 - 300
Power (kW)	30 - 150	120 - 300
System Efficiency		
AC - AC on-line double conversion efficiency (%)	Between 95% and 96% for load >30%	
AC - AC Eco mode efficiency (%)	>98%	

INPUT PARAMETERS

Rated input voltage	380/400/415 VAC, three-phase four-wire	
Rated operating frequency (Hz)	50/60 Hz	
Input voltage range (Hz)	477 V - 305V at full load, 477 V - 228V at 70% load	
Input frequency range	40 Hz - 70 Hz	
Input power factor	>0.99 at full load, >0.98 at half load	
Input THDI (%)	<5%	

DC PARAMETERS

Battery number	30, 32, 34, 36, 38, 40	
Battery Compensation	Yes	
Maximum runtime with internal battery	30 kVA: 30' 60 kVA: 10' 90 kVA: 5'	N/A N/A N/A
DC ripple current	≤0.05C ₁₀	

OUTPUT PARAMETERS

Inverter output voltage	380/400/415 VAC, three-phase four-wire	
Inverter output frequency (Hz)	50/60 Hz	
Output frequency stability (Hz)	50Hz/60 Hz ±0.02%	
Voltage stability in steady state	±1%	
Voltage stability in transient state	Complies with IEC/EN 62040-3, class 1	
Inverter overload capacity	1 hour for 105%, 10 mins for 125%, 1 min for 150%, 200 ms for >150%	1 hour for 110%, 10 mins for 125%, 1 min for 150%, 200 ms for >150%

THDv

100% linear load	<1
100% non-linear load	<4

BYPASS PARAMETER

Bypass input voltage	380/400/415 VAC, three-phase four-wire	
Bypass voltage range settable through software	Default: -20% to + 15%, other values, such as -40%, -30%, -10% to + 10%, +15%	
Bypass overload capacity	135% long term, 170% for 1 hour, 1000% for 100 ms	

ENVIRONMENTAL CONDITIONS

Operating temperature range (°C)	0 - 40°C*	
Storage temperature (°C)	-25 to 70°C	
Maximum Operating altitude	≤1 000 m, when operating at 1000 - 2000 m, derated by 1% for every 100 m increase of altitude	
Relative Humidity	≤95%	
Noise (1m)	52 - 62 dBA, adjusted according to load rate and number of modules 60 - 65 dBA, adjusted according to load rate and number of modules	
Protection Level	IP20	

STANDARDS

Low Voltage Directive	2006/95/EC with the Amendment Directive 93/68/EEC Directive for electromagnetic compatibility 2004/108/EC	
General and safety requirements for UPS used in operator access areas	IEC/EN 62040-1:2008	
Electromagnetic compatibility (EMC) requirements for UPS	IEC/EN 62040-2: Immunity category C2, Emission category C2	

DIMENSIONS AND WEIGHT

Dimension, w x h x d (mm)	600 x 1996 x 1100	1200 x 2000 x 1100
Weight (kg)	30 kVA: 280 60 kVA: 315 90 kVA: 350 120 kVA: 385 150 kVA: 420	120 kVA: 465 150 kVA: 500 180 kVA: 535 210 kVA: 570 240 kVA: 600 270 kVA: 635 300 kVA: 670

*Conditions apply



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