Vertiv™ Liebert® APM2

30 to 600 kW, 400 V

Technology-driven efficient and scalable power solution for mission critical facilities

About Vertiv

Vertiv brings together hardware, software, analytics, and ongoing services to ensure its customers' vital applications run continuously, perform optimally and grow with their business needs. Vertiv solves the most important challenges faced by today's data centers, communication networks, and commercial and industrial facilities with a portfolio of power, cooling, and IT infrastructure solutions and services that extends from the cloud to the edge of the network. Headquartered in Columbus, Ohio, USA, Vertiv employs around 20,000 people and does business in more than 130 countries. For more information, and for the latest news and content from Vertiv, visit Vertiv.com.

Vertiv.com

OUR PURPOSE

We believe there is a better way to meet the world's accelerating demand for data - one driven by passion and innovation.

OUR PRESENCE

GLOBAL PRESENCE
Manuf. and Assembly Locations **24**
Service Centers **220+**
Service Field Engineers **3,500+**
Technical Support/Response **220+**
Customer Experience Centers/Labs **19**

EUROPE, MIDDLE EAST AND AFRICA
Manuf. and Assembly Locations **10**
Service Centers **65+**
Service Field Engineers **650+**
Technical Support/Response **100+**
Customer Experience Centers/Labs **5**

AMERICAS
Manuf. and Assembly Locations **10**
Service Centers **80+**
Service Field Engineers **1,600+**
Technical Support/Response **90+**
Customer Experience Centers/Labs **5**

ASIA PACIFIC AND INDIA
Manuf. and Assembly Locations **4**
Service Centers **75+**
Service Field Engineers **1,250+**
Technical Support/Response **30+**
Customer Experience Centers/Labs **9**

Benefits

- Remarkable double conversion efficiency **up to 97.5%**
- **Unitary output** power factor
- **High-density** design
- **Modular** and **scalable**
- **Hot-swappable** Power modules, Bypass modules, and Communication modules
- Load compatibility **from 0.5 lag to 0.5 lead**
- Integrated parallel capability **up to 4 frames** without CSI
- Seamlessly operates **up to 50 °C** with auto-derating above 40 °C
- Large, Intuitive **9-inch full-color touchscreen** HMI
- **Intelligent paralleling** mode
- Optimised **MTTR <0.5h**
- Battery Management and **Flexible battery blocks 30-50***
- **Predictive Maintenance** Notifications
- Monitors **Real-time Waveform** from GHMI and Captures waveform during the fault
- Supports **self capacity test**

Technology-driven efficient and scalable power solution for mission critical facilities

Introducing a next-generation modular and transformerless UPS design, Vertiv™ Liebert® APM2, a feature-rich high-density UPS that brings exceptional and innovative features for mission-critical applications. Powered by latest generation three-level IGBT topology in conjunction with Silicon Carbide converter, it delivers an extraordinary double conversion efficiency of up to 97.5% that ensures remarkable operational cost savings, reducing both the Total Cost of Ownership (TCO) and the environmental impact.

The built-in scalability of the Liebert® APM2 allows for fast yet protected rise in system capacity by leveraging FlexPower technology™.

Also, each power module combines scalable power integrated with independent DSP control to autoregulate operation, thus enhancing overall system availability.

Liebert® APM2 features a large multilingual touchscreen LCD allowing users to seamlessly access all the key operating information namely, alarm status, configuration, start-up/shutdown, transfer and advanced metering, and diagnostic system.

It offers a network connectivity card and optional software monitoring all designed to ensure visibility, control, and peace of mind for manned or unmanned sites.

Liebert® APM2 30-120 kW
*Liebert® APM2 60-300/600 kW**

Liebert® APM2 60-600 kW with Full Switch Assembly

LIB
Lithium-ion
Batteries

Compact Design

MTTR <0.5h
Proven Hot-swappable

Large and Intuitive Touchscreen HMI

Unprecedented Efficiency

Even More Robust

Advanced Battery Management

Innovation-enabling Flexible Architectures

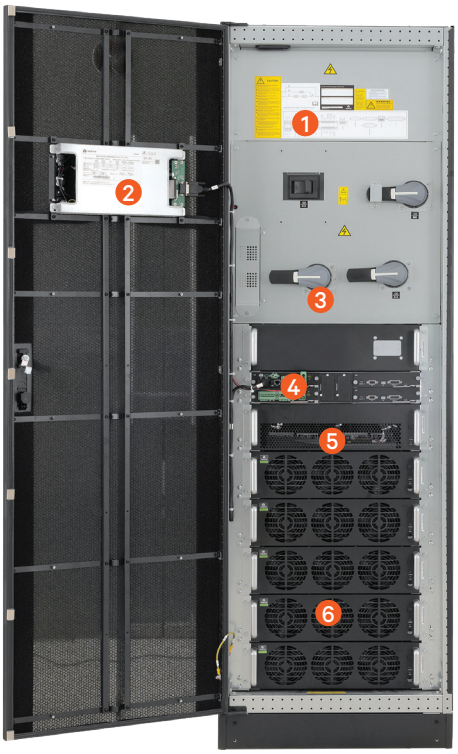
The innovative and flexible architecture of the Vertiv™ Liebert® APM2 reduce costs, improve management, and speed deployment. The modular architecture of the Vertiv™ Liebert® APM2 allows a single unit capacity to be scaled up to a maximum of 600 kW in one single unit. There are two different frames available, each with a specific maximum cabinet capacity.

Liebert® APM2 30-120 kW

With Internal Batteries (Also available in compact version without Battery)

1. Communication Module
2. 30kW 2U Power Modules
3. Touch Screen - GHMI
4. Bypass Module
5. Battery Modules
6. Switch Assembly
7. Cable Entry Terminals (Bottom)

Available in three variants: 1.Maintenance Switch Only 2.Full Switch 3.Without Switch



Liebert® APM2 60-300 kW

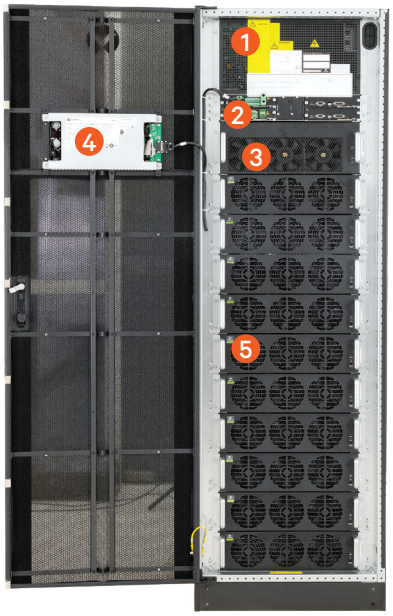
With Top Cable Entry (Also available with Bottom Entry)

1. Cable Entry Terminals (Top)
2. Touch Screen - GHMI
3. Switch Assembly
4. Communication Module
5. Bypass Module
6. 60kW 3U Power Modules

Available in three variants: 1. Maintenance Switch Only 2. Full Switch 3. Without Switch

Liebert® APM2 60-600kW
(Compact Version with Top Cable Entry)

1. Cable Entry Terminals (Top)
2. Communication Module
3. Bypass Power Module
4. Touch Screen - GHMI
5. 60kW 3U Power Modules



Liebert® APM2 60-600kW
(Top or Bottom Cable entry with Switch Cabinet)

1. Touch Screen - GHMI
2. Switch Assembly
3. Communication Module
4. Bypass Power Module
5. 60kW 3U Power Modules

Designed for Easy Service and Maintenance

Designed for ease of service

Vertiv™ Liebert® APM2 is designed to allow access to cable terminal blocks, switches, and all the replaceable components including power modules, bypass modules, and communications from the front side for both installation and maintenance purposes.

Hot-swappable Design

Hot-swappable building blocks sub-assembly enables an easy and fast on-site replacement, thus reducing MTTR.

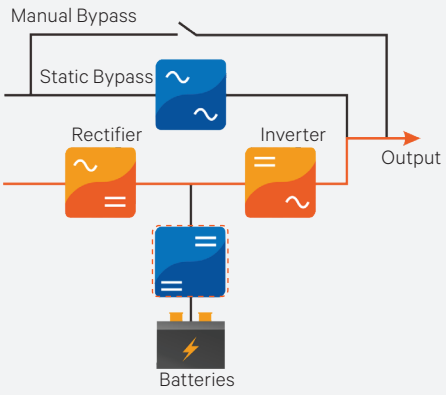
Provides Optimum Performance with Maximum Efficiency

Vertiv™ Liebert® APM2 delivers an **outstanding Double conversion efficiency of up to 97.5%**, which further increases up to 98.8% with the Dynamic online mode, consequently **reducing operating costs and energy dissipation (kW)** to a minimum. Dynamic online mode also supports in parallel operation, this significantly minimizes the consumption of the cooling system, providing an overall TCO reduction and rapid payback time.

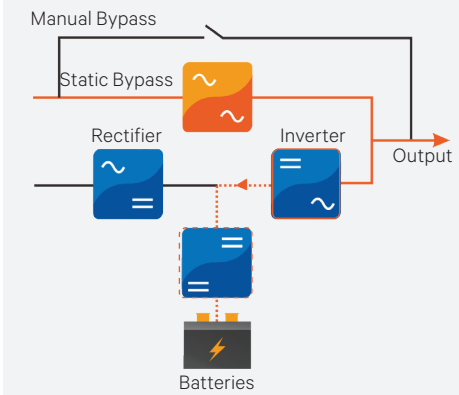
Furthermore, the Liebert APM2 can optimize efficiency at partial load thereby attaining additional cost savings through the intelligent paralleling feature. The efficiency and electricity cost savings of Liebert APM2 can be attributed to:

- Latest generation IGBT
- Adoption of a three-level converter topology
- DC-controlled fan speed
- Intelligent paralleling mode
- Advanced digital technology and fast transfer

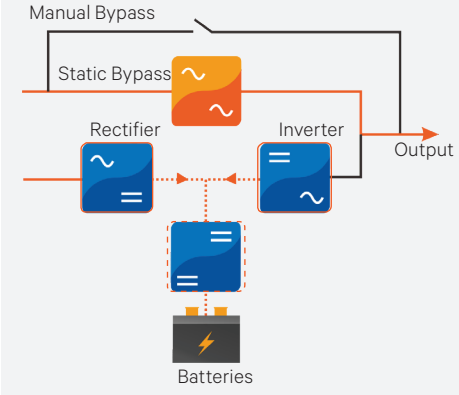
Double Conversion
Maximum Power Control (VFI)
Up to 97.5%



Dynamic Online Mode
High Efficiency & Power Conditioning (VI)
Up to 98.8%



ECO Mode
Maximum Energy Saving (VFD)
Up to 99%



Vertiv Liebert APM2 series is powered by the latest generation three-level IGBT topology in conjunction with Silicon Carbide (SiC) converter that helps to reduce recovery losses and thereby improves system efficiency.

The seamless activation of Liebert APM2's functioning modes ensures the highest level of efficiency without **compromising power quality and availability**. The Dynamic online mode ensures Class 1* output performance under most stringent conditions:

- Network fault (voltage variation, high/ low impedance mains failures)
- Load fault (short circuit downstream of the UPS)
- Type of load connected (PDU transformer)

The unit discriminates between various interferences and responds rapidly, meanwhile also **ensures compatibility with downstream equipment** (such as Transformers, STS, mechanical loads, etc).

Robust and Proven Design

Innovative Internal Air Channel

Designed in a way that internal hot air drives directly toward the heat sink without distressing the PCBs and other internal sensitive circuits, improving the service life of components and UPS reliability.

Conformal Coating

Applied as a standard feature for all PCBs in Liebert® APM2. Its primary purpose is to protect the electronics from environmental elements and corrosion. The coating acts as both a protective shield and insulative material for a PCB.

Tolerates Higher Ambient Temperatures

Internal components and circuitry of Liebert APM2 are designed to seamlessly operate up to 40 °C without any capacity impact and further can sustain high ambient temperatures up to 50 °C with auto-derating.

Integrated Backfeed Contacts

Backfeed prevents any potential risk from electric shock on the UPS mains and bypass input AC terminals in the event of a failure of the rectifier and bypass static switch SCR. The control circuit includes output dry contacts that activate an external isolating device (optional) upon backfeed detection.

Scalable up to 2.4 MW

4 units of intelligent paralleling help to achieve maximum capacity of up to 2.4 MW. Comes with integrated parallel and LBS communication ports, and allows a single touch to initiate inverter ON/OFF for all parallel connected UPS systems.

Symmetrical Power Factor Compatibility

Liebert APM2 is fully adapted to meet diverse system requirements in terms of power capacity and redundancy allowing different system designs.

- Output Power Factor up to 1
- No power derating from 0.5 lagging to 0.5 leading
- Optimum space/power ratio.

Flexible Battery Configuration

Compatible with numerous battery configurations that include traditional external battery banks with string lengths varying between 30 & 44 batteries for 30-120 kW and 30 & 50 batteries for 60-600 kW. In a parallel system, batteries can be installed in a common bank to maximize cost-effectiveness and minimize floor space. Extended battery life is further ensured through a temperature compensated charging algorithm which prevents battery damage, thus prolonging life span.

Higher Short-circuit Withstand Capacity

During the short circuit, the load will be transferred via bypass to clear higher short circuit currents.

Fuse is considered optionally to clear short circuit capacity of up to 65 kA. It is available for selected models only.

Compact and Resilient Design

Saves footprint of up to 30%

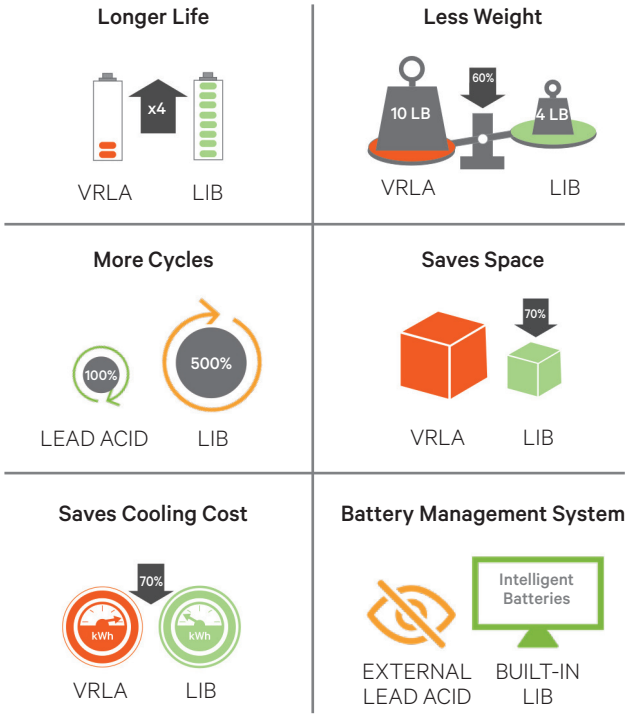
Thanks to the innovative design and the latest three-level IGBT topology, coupled with Silicon carbide (SiC) converter, Vertiv™ Liebert® APM2 is capable to deliver one of the highest power densities in its range.

Compact footprint saves significant white floor space. This design let to optimize the overall footprint.

Future-proof Battery Compatibility

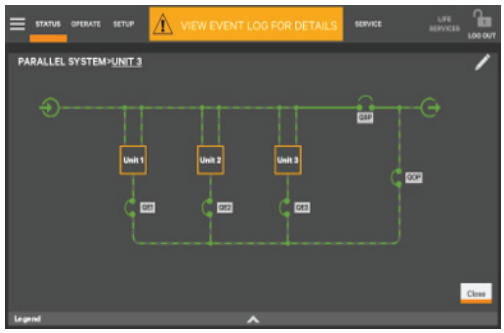
- Ability to supply the full load even with very low input voltage, thus allowing Liebert APM2 to reduce the number of battery charging/ discharging cycles.
- DC ripple current <5% C10 to get the best battery care.
- Up to 120 A of recharge current per power module allows optimal management of lengthy backup times.*
- Battery discharge test (manual or programmed) for accurate backup time prediction.
- Battery temperature compensation to preserve battery life.

*Conditions Apply



User Interface and Advanced Diagnostic

- **Intuitive** to use
- **Consistent** with other Vertiv touchscreens
- **Customer Configurable data** & views
- **Status-At-A Glance** LED light bar
- **Multiple** screen colors available



Short-circuit Withstand Capacity

The cabinet is robust enough to withstand higher short circuit capacity.

Fuse is considered optionally to clear short circuit capacity of up to 65 kA. If the option is not selected the protection of the SCRs against short circuits is guaranteed only when the external upstream distribution is equipped with adequate capacity of fuses/circuit breakers.

During the short circuit, load will be transferred via bypass to clear higher short circuit currents.

This option is available on all frames.

KAIC fuses

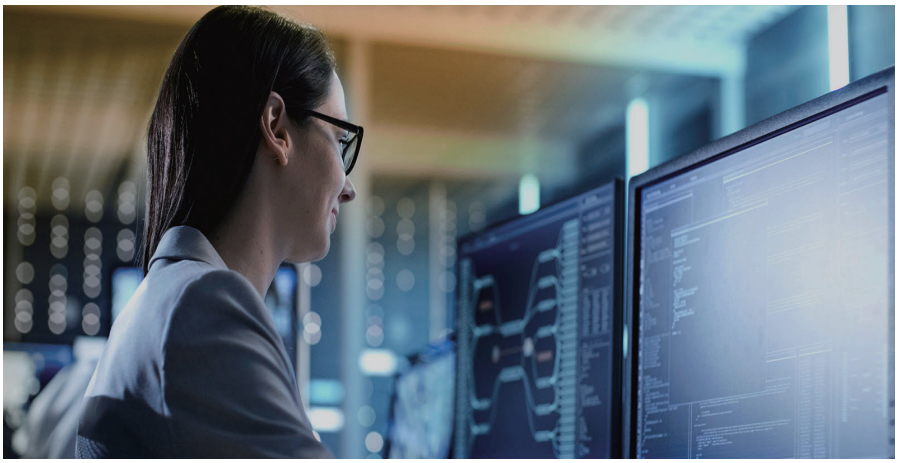
Flexible Monitoring and Management Options

Hardware Connectivity

Vertiv™ Liebert® APM2 allows for the monitoring and control of networked UPS through different protocol options.

The integration of UPS with network management systems, via SNMP protocol, and building management systems, via MODBUS TCP/RTU and BACnet MSTP/IP. As an option, environmental sensors can also be attached to the UPS via a monitoring card.

The integration with synoptic panels via a dry contact board.



Software

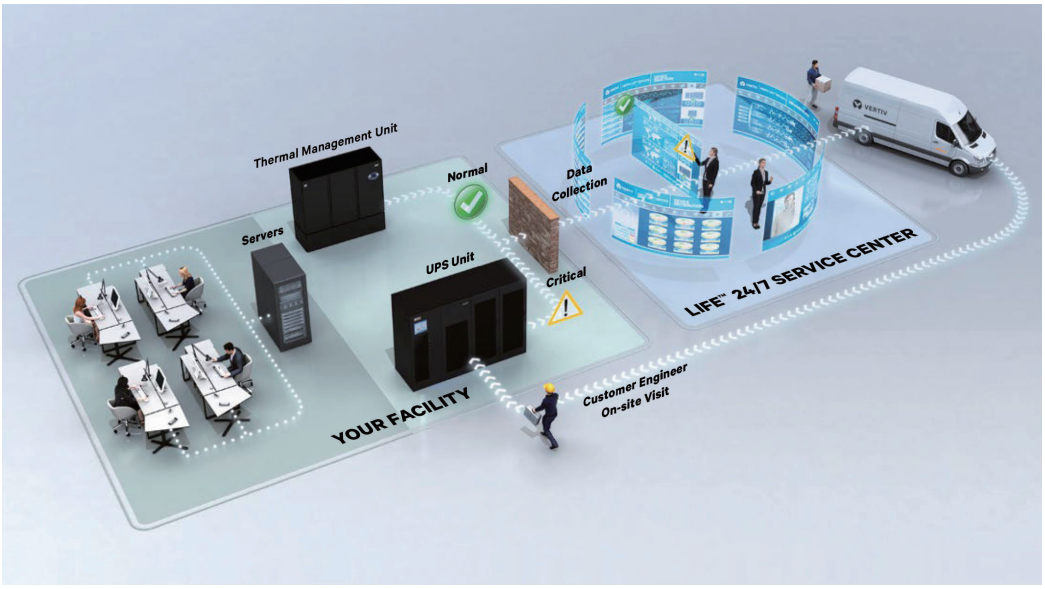
Vertiv connects and protects your network with core-to-edge solutions and unmatched expertise.

For maximum visibility and effective monitoring in one view, pair your Vertiv™ UPS with a software solution.

Vertiv™ Environet™ Alert

Vertiv™ Environet™ Alert provides industrial companies with critical facility monitoring software that is affordable and easy to use. This solution delivers superior monitoring, alerting, trending, and data organization. Get monitoring, alerting, and trending at a price that's right for your business.

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 troubleshooting, giving customers complete security and peace of mind.

With Vertiv LIFE Services you will benefit from:

- **Uptime Assurance**
- **First Time Fix Rate**
- **Proactive Analysis**
- **Minimized Total Cost of Ownership of Your Equipment**
- **Fast Incident Response**
- **Reporting**

Technical Specifications

Models (kVA/kW)	Vertiv™ Liebert® APM2 30-120 kW		Vertiv™ Liebert® APM2 60-300 kW	Vertiv™ Liebert® APM2 60-600 kW	
Input					
Power Module Capacity	30 kW		60 kW		
Nominal input voltage	380/400/415 V (3-phase 4-wire + N + PE)				
Input voltage range without battery discharge*	228 to 478 V				
Nominal input frequency	50/60 Hz				
Input frequency range	40 to 70 Hz				
Input power factor at full load	0.99				
Current THD at full linear load*	≤ 3%				
Bypass voltage tolerance	Upper limit: +10% Vac, +15% Vac, or +20% Vac Default: +15% Vac Lower limit: -10% Vac, -20% Vac, -30% Vac, -15% Aac or -40% Vac Default: -20% Vac		Upper limit: +10% Vac, +15% Vac, +20% Vac Default: +15% Vac Lower limit: -10% Vac, -20% Vac, -30% Vac or -40% Vac Default: -20% Vac		
Bypass frequency tolerance	±10%				
Battery					
Battery blocks per string*	30 to 44 Blocks of 12 V		30 to 50 Blocks of 12 V		
Voltage temperature compensation	-3.0 mV/°C/Cell				
Battery charger max. current*	140 A		600 A	1200 A	
Weight	Li-ion Battery Module	Lead Acid Battery Module	-		
	35 kg	30 kg			
Output					
Nominal output voltage	380/400/415 V (three-phase + N + PE)				
Nominal output frequency	50/60 Hz				
Output power factor	Unity				
THDv at full linear load	≤ 1%				
Inverter overload capacity*	≤ 105% Continuous; 105% to 125% for 10 min; 125% to 150% for 1 min; 150% to 200% for 200 ms				
Double conversion efficiency	Up to 97%		Up to 97.5%		
ECO mode efficiency	Up to 99%				
Power Module					
Dimensions (W x D x H), mm	440 x 518 x 87 mm		440 x 600 x 132 mm		
Weight	25 kg		38 kg		
Dimensions and Weight	Compact Version	For Internal Battery	Full Switch Assembly	Compact Version	Full Switch Assembly
Dimensions (W x D x H), mm	600 x 800 x 1600 mm	603 x 931 x 2003 mm	600 x 900 x 2000 mm	600 x 1000 x 2000 mm	1200 x 1000 x 2000 mm
Weight	380 kg	544 kg	285 kg	510 kg	830 kg
General					
Noise within 1 m	≤ 65 dB			≤ 70 dB	
Maximum altitude	<1500 m without derating				
Operating Temperature	0 °C to 40 °C full performance, 40 °C to 50 °C with automatic derating				
Protection level IEC (60529)	IP20				
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				
UPS Environmental Factors, Requirements and Reports	EN62040-4/IEC62040-4/AS62040-4 (VFI SS 111)				

** Conditions apply*
** Specifications are subject to change without any further notification.*

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