VERTIV™

THREE PHASE UPS CATALOGUE

Solutions for Business Continuity

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 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.

YOUR VISION, OUR PASSION.
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LIEBERT® EXS 10 KVA - 20 KVA

Optimized and integrated three-phase UPS solution with high efficiency power protection

Compact design and improved performances

The new Liebert® EXS is a monolithic transformer-free UPS which brings exceptional features for mission-critical applications. Its extraordinary double conversion efficiency up to 96.2% ensures remarkable operational cost savings, reducing both the Total Cost of Ownership (TCO) and the environmental impact.

At the same time, with its unity output power factor and high power density, Liebert EXS is able to provide the utmost active power possible in a compact footprint. In fact, its improved design reduces its footprint to a minimum, providing continuous power protection with optimized internal runtime in a standalone solution, making the Liebert EXS perfect for both IT installations and other mission critical applications, such as transportation, emergency lighting, healthcare, retail and government facilities.

FEATURES AND PERFORMANCES

- Output power factor up to 1
- Double conversion efficiency up to 96.2%
- ECO mode efficiency up to 99%
- Compact footprint with multiple internal runtime configurations
- Available in 3/3 and 3/1 versions
- Integrated maintenance bypass
- Integrated input and output breakers/switches
- Parallel capability for capacity and redundancy

Central Power Supply System (CPSS)

Liebert EXS is compliant with the CEI EN 50171 standard, which defines the requirements that a UPS shall conform to in order to be considered as a CPSS, and hence capable of supplying the necessary emergency power to essential safety equipment without restrictions in power output. In fact, the unit can be used to power emergency escape lighting in case of normal supply failure and may also be suitable for powering other safety systems such as automatic fire extinguishing installations, signaling safety installations and smoke extraction equipment.

Flexibility

To ensure superior protection for critical loads, the Liebert® EXS range has been designed to optimize specific rating requirements, thus enhancing flexibility and installation space needs.

Liebert EXS's flexibility is further enhanced through:

- Single and three phase output configurations
- Integrated parallel capability up to 4 units
- Common or distributed battery bank
- Internal and external battery configurations for optimized back up time management
- Casters for easy UPS repositioning

Output Configuration

Liebert EXS models up to 20 kVA can be configured on-site to deliver three (3/3) or single (3/1) phase output giving it the flexibility to adapt to changes in installation environments.

Integrated Autonomy

Liebert EXS provides an optimized integrated autonomy which results in back up times in a compact footprint.

Its internal architecture is able to house up to four battery strings, further optimizing integrated autonomy and delivering the added advantage of virtually eliminating the need for an external battery cabinet.

This furthermore reduces installation costs and minimizes the demand on physical space. In addition, Liebert EXS's powerful battery charger ensures rapid recharge, increasing its ability to manage longer back up times.

Full Galvanic Isolation

Liebert EXS offers integrated full galvanic isolation, meaning that an isolation transformer may be housed inside the UPS cabinet. This greatly reduces the system footprint, thus providing space saving advantages.

The transformer may be connected to the input or to the output of the UPS, providing:

- Full galvanic isolation for medical and other critical applications
- Installation with two independent input sources (with different neutrals)
- Installation in distribution without neutral.

EXS 10 kVA - 20 kVA

Liebert® EXS Specifications

TECHNICAL CHARACTERISTICS			
Ratings (kVA)	10	15	20
INPUT			
Nominal input voltage (V)		380/400/415 (three-phase + neutral)	
Input voltage range without battery discharge (V)		173 to 498*	
Nominal frequency (Hz)		50/60	
Input frequency range (Hz)		40 to 70	
Input power factor at full load (kW/kVA)		0.99	
Current THD at full linear load (THDI%)		≤ 3%*	
Bypass voltage tolerance (%)		selectable from +20 to -40	
Bypass frequency tolerance (%)		±20 (±10 selectable)	
BATTERY			
Battery blocks per string		24-40*	
Voltage temperature compensation (mV/°C/Cell)		-3.0	
Battery charger max. current (A)		13	
OUTPUT			
Nominal output voltage (V)		380/400/415 (three-phase) or 220/230/240 (single-phase)	
Nominal output frequency (Hz)		50/60	
Maximum active power (kW)	10	15	20
THDv at full linear load (%)		2	
Inverter overload capacity		105% for 60 min; 125% for 5 min; 150% for 1 min; >150% for 200ms	
Double conversion efficiency		Up to 96.2%	
ECO mode efficiency (%)		Up to 99%	
DIMENSIONS AND WEIGHT			
Dimensions (W x D x H) mm		335 x 650 x 1300	
Net/Shipping weight (excluding battery) kg		85/115	
Net/Shipping weight (including 2*32 batteries) kg		285/315	
GENERAL			
Noise at 1 m (dBA)		≤58	
Maximum altitude		1500 m without derating (max. 3000 m)	
Protection level IEC (60529)		IP20	
General and safety requirements for UPS		EN/IEC/AS 62040-1	
EMC requirements for UPS		EN/IEC/AS 62040-2	
UPS classification according to CEI EN 62040-3		VFI-SS-111	

* Conditions apply

LIEBERT® NXC 30 KVA - 200 KVA

Compact and Reliable Power in a Fully Integrated Packaged Solution

To ensure superior protection for critical loads, the Liebert® NXC range has been designed to optimize specific rating requirements, thus enhancing flexibility and installation space needs.

Continuous Reliability:

The Liebert® NXC 30 - 200 kVA range offers reliable and flexible secure power in a fully integrated package solution.

Its highly efficient transformer-free double conversion technology delivers installation and running cost savings. With a rated output power factor up to 1, Liebert® NXC is also able to provide greater active power than a traditionally rated 0.9 power factor UPS.

Liebert® NXC achieves up to 96% efficiency in double conversion mode and up to 99% in ECO mode, thus ensuring effective load protection, while reducing the total cost of ownership (TCO) Continuous Reliability.

The Liebert® NXC 30 - 200 kVA range offers reliable and flexible secure power in a fully integrated package solution. Its highly efficient transformer-free double conversion technology delivers installation and running cost savings. With a rated output power factor up to 1, Liebert® NXC is also able to provide greater active power than a traditionally rated 0.9 power factor UPS.

Liebert® NXC achieves up to 96% efficiency in double conversion mode and up to 99% in ECO mode, thus ensuring effective load protection, while reducing the total cost of ownership (TCO) and environmental impact

Liebert® NXC's combination of performance features, impressive integrated autonomy and compact footprint make it ideal for guaranteeing clean, continuous power for a wide range of applications from IT and manufacturing to retail and transport.

Its low THDi and active input power factor correction ensure that the current absorbed from the upstream distribution network is near equal to its nominal output current, hence eliminating the need for oversizing gensets and other equipment.

Features and Performances:

- Output power factor up to 1
- Double conversion efficiency up to 96%
- ECO mode efficiency up to 99%
- Input current total harmonic distortion correction (THDi) < 3%
- Battery charger up to 50 A
- Integrated manual bypass
- Integrated input and output breakers/ switches (30-60 kVA)
- Integrated parallel load bus and synchronization port (LBS)

Liebert NXC Family

Liebert® NXC Specifications

TECHNICAL CHARACTERISTICS									
Ratings (kVA)		30	40	60	80	100	120	160	200
INPUT									
Nominal input voltage (V)		380/400/415							
Input voltage range without battery discharge (V)		305 to 477							
Nominal frequency (Hz)		50/60							
Input frequency range (Hz)		40 to 70							
Input power factor (kW/kVA)		0.99							
Current THD at full linear load (THDI%)		<5			<3				
Bypass voltage tolerance (%)		selectable from +20 to -40							
Bypass frequency tolerance (%)		±20 (±10 selectable)							
BATTERY									
Number battery cells per string		Max: 240; Min: 192			Max: 264; Min: 180				
Voltage temperature compensation (mV/°C/Cell)		-3.0 (selectable 0 to -5.0 around 25°C or 20°C or inhibit)			-3.0 (selectable from 0 to -5.0 around 25°C to 30°C, or inhibit)				
Battery charger max. power (kW)		6		7.5	12	18		24	30
OUTPUT									
Nominal output voltage (V)		380/400/415 (three-phase)							
Nominal output frequency (Hz)		50/60							
Nominal active power (kW)		27	36	54	80	100	120	160	200
THDv with 100% linear load (%)		2							
Inverter overload capacity		105% for 60 min; 125% for 5 min; 150% for 1 min; >150% for 200ms			105% with continuous operation; 125% for 10 min; 150 for 1min; >150% for 200ms				
Double conversion efficiency	100%	94.7%	94.4%	95.3%	95.7%	95.7%	95.6%	95.5%	95.3%
	75%	94.8%	94.7%	95.5%	95.9%	95.9%	95.8%	95.7%	95.7%
	50%	94.6%	94.8%	95.3%	95.9%	95.8%	95.9%	95.8%	95.8%
	25%	91.7%	93.6%	94.4%	95.0%	94.7%	95.0%	94.9%	94.9%
ECO mode efficiency (%)		98.0%			99.0%				
DIMENSIONS									
Dimensions (W x D x H) mm		600 x 850 x 1600			600 x 1000 x1600			600 x 1000 x 2000	
Weight (excluding battery) kg		210/245		225/260	285/313	337/365		475/525	520/570
Weight (including 32 batteries) kg		600/635		615/650	N/A				
GENERAL									
Noise at 1 m (dBA)		≤56	≤58	≤58	≤59	≤60	≤60	≤61	≤62
Protection level IEC (60529)		IP20							
General and safety requirements for UPS		EN/IEC/AS 62040-1							
EMC requirements for UPS		EN/IEC/AS 62040-2							
UPS classification according to CEI EN 6240-3		VFI-SS-111							

LIEBERT® ITA2 10 KVA - 20 KVA

Remarkable Efficiency and Flexibility Characterize the Liebert® ITA2 UPS

Featuring true online double conversion technology, unity power factor and an extremely compact rack-tower design, Liebert ITA2 is the perfect power protection solution for your computer rooms, storage and network equipment.

With a unity output power factor, **Liebert ITA2** perfectly matches the needs of modern IT loads, and with its wide input voltage and frequency range it effectively reduces the need for battery intervention, thus prolonging battery life.

It is also endowed with intelligent fans with automatic speed control, which effectively save energy and reduce noise.

Liebert ITA2 supports common battery configurations between paralleled UPS and the number of batteries per string, which can be arranged flexibly, facilitating the utilization of different battery systems and saving on battery investment.

An extra powerful battery charger across all models capable of recharging high capacity battery strings ensures a fast charge-restoration even after a prolonged power outages.

Liebert ITA2 offers enhanced flexibility with a wide range of accessories for both stand-alone and rack-mount installations. When rack mounted, it allows to install up to 20 kVA in just 3 U of space, achieving a remarkable space saving. Parallelability and maintenance are facilitated through the use of dedicated maintenance bypass option while extended backup time can be provided with matching battery modules for a neat rack-mounted installation.

Liebert ITA2 features a multi-lingual LCD user interface allowing close control and monitoring of system status and performance.

Product Features:

- Rack-tower design for installation flexibility
- Able to deliver both three-phase and single-phase output
- Ultra high power density, thanks to 30% reduced dimensions compared to the previous generation
- 0.99 input power factor for better grid or generator compatibility
- Unity output power factor for additional power availability
- Efficiency in double conversion up to 96.2%
- ECO mode operation with efficiency up to 99% and remarkable energy-saving performance
- Powerful charging capability for minimum battery recharging time

Programmable dry contacts

Liebert ITA2 includes two output dry contacts which can be set to:

- Low battery (default)
- On bypass
- On battery
- UPS fault

It also includes two programmable input dry contacts, which can be set to:

- Maintenance mode (default)
- Battery mode shutdown
- Any mode shutdown

Programmable power outputs

Liebert ITA2 includes two types of power terminals:

- Standard outputs: sA, sB, sC
- Programmable outputs: pA, pB, pC

It is possible to power down the load connected to the programmable outputs according to:

- Remaining backup time (min)
- Remaining battery capacity (%)
- Time spent in battery mode (mins)
- Overload when in battery mode

Liebert ITA2 10 - 20 kVA

Liebert® ITA2 - Specifications

TECHNICAL SPECIFICATIONS			
Ratings (kVA)	10	15	20
INPUT			
Nominal input voltage (V)		380/400/415 (three-phase + neutral)	
Input voltage range without battery discharge (V)		173 to 498*	
Nominal input frequency (Hz)		50/60	
Input frequency range (Hz)		40-70	
Bypass voltage tolerance (%)		selectable from +20 to -40	
Bypass frequency tolerance (%)		±20 (±10 selectable)	
Input power factor at full load (kW/kVA)		0.99	
Current THD at full linear load (THDI%)		≤3*	
BATTERY MANAGEMENT			
Battery blocks per string		24-40*	
Voltage temperature compensation (mV/°C/Cell)		-3mV°C/Cell	
Battery charger max. current (A)		13	
OUTPUT			
Nominal output voltage (V)		380/400/415 (three-phase) or 220/230/240 (single-phase)	
Nominal output frequency (Hz)		50/60	
Maximum active power (kW)	10	15	20
THDv at full linear load (%)		≤2	
Inverter overload capacity at 25°C		105% for 60 min; 125% 5min; 150% for 1 min, > 150%, 200ms	
EFFICIENCY			
Double conversion efficiency		Up to 96.2%	
ECO Mode Efficiency		Up to 99%	
DIMENSIONS AND WEIGHT			
Dimensions (W x D x H) (mm)		430 x 500 x 130 (3U)	
Net Weight (kg)		23	
GENERAL			
Noise at 1 m (dBA)		≤58	
Ventilation		Front to back	
Maximum altitude		1500 m without derating (max. 3000 m)	
Protection level IEC (60529)		IP20	
EMC requirements for UPS		EN/IEC/AS 62040-2	
UPS classification according to CEI EN 62040-3		VFI-SS-111	
General and safety requirements for UPS		EN/IEC/AS 62040-1	

* Conditions apply

LIEBERT® ITA 30 KVA - 40 KVA

Remarkable Efficiency and Flexibility Characterize the Liebert® ITA UPS Family

Featuring true on-line double conversion technology, the Liebert ITA UPS series from Vertiv provides a highly efficient and reliable power protection solution for your computer rooms, storage and network equipment.

With a 0.9 output power factor, Liebert ITA perfectly matches the needs of modern IT loads, and with its wide input voltage and frequency range, it effectively reduces the need for battery intervention, thus prolonging battery life.

It is also endowed with intelligent fans with automatic speed adaptation, which effectively save energy and reduce noise.

Liebert ITA supports common battery configurations between paralleled UPS and the number of batteries per string, which can be arranged flexibly, facilitating the utilization of different battery systems and saving on battery investment.

An extra powerful battery charger across all models capable of recharging high capacity battery strings ensures a fast charge-restoration even after a prolonged power outages.

Liebert ITA offers enhanced flexibility with a wide range of accessories for both stand-alone and rack-mount installations. When rack mounted, it allows to install up to 40 kVA in just 4 U of space, achieving a remarkable space saving. Parallelability and maintenance are facilitated through the use of dedicated bypass and power distribution options while extended backup time can be provided with matching battery modules for a neat rack-mounted installation.

Liebert ITA features a multi-lingual LCD user interface allowing close control and monitoring of system status and performance.

The Liebert ITA series is ideally suited for:

- Small computer rooms
- Long backup time (>30 minutes) applications
- Branch offices
- Servers
- Network computers and peripherals
- Storage device
- VoIP.

Product Features:

- Rack-tower design for installation flexibility
- Ultra high power density
- 0.99 input power factor for better grid or generator compatibility
- 0.9 output power factor
- Efficiency in double conversion exceeding 95%
- ECO mode operation with efficiency up to 98%

The UPS is compatible with any Building Management System (BMS) by offering the following communication features:

- Voltage-free contact ports
- USB interface
- Optocoupler based interfaces
- Vertiv™ IntelliSlot™ for SNMP, Modbus or Relay communication.

Liebert ITA 30 - 40 kVA

Liebert® ITA - Specifications

NOMINAL RATINGS (KVA)	30	40
INPUT		
Nominal input voltage (V)	380/400/415	
Input voltage range without battery discharge (V)	229~478	
Nominal input frequency (Hz)	50/60	
Input frequency range (Hz)	40-70	
Bypass voltage tolerance (%)	Upper limit: +10%, +15%, or +20% default: +15% Lower limit: -10%, -20%, -30% or -40% default: -20%	
Bypass frequency tolerance (%)	+/- 10% or +/- 20% default: +/- 20%	
Input power factor (kW/kVA)	0.99	
Current THD at full linear load, 3 ph. output (THDI%)	<4%	
BATTERY MANAGEMENT		
Number battery cells per string (max - min)	32-40	
Battery Modules	32*12 V*7 Ah or 32*12 V*9 Ah	
Voltage temperature compensation (mV/°C/Cell)	0-5mV°C/Cell; 3mV°C/Cell	
Battery charger max. power (A)	14	
OUTPUT		
Nominal output voltage (V)	380/400/415 (three-phase)	
Nominal output frequency (Hz)	50/60	
Nominal active power (kW)	27	36
THDv with 100% linear load (%)	≤1	
Inverter overload capacity	105% for 60 min; 125% 5min; 150% for 1 min, > 150%, 200ms	
EFFICIENCY		
Double conversion efficiency 100%	95.1%	94.9%
Double conversion efficiency 75%	94.8%	95.1%
Double conversion efficiency 50%	94.3%	94.7%
Double conversion efficiency 25%	93.0%	93.4%
Eco Mode Efficiency	98.5%	98.5%
DIMENSIONS AND WEIGHT		
Dimensions (W x D x H) (mm)	435 x 770 x 178 (4U)	
Weight (kg)	50	
GENERAL		
Noise at 1 m (dBA)	≤56	≤58
Ventilation	front to back	
Protection level IEC (60529)	IP20	
UPS classification according to CEI EN 6240-3	VFI-SS-111	

LIEBERT® EXL S1 100 KVA - 1200 KVA

Secure Power and Maximized Energy Saving for Mission Critical Applications

Liebert EXL S1, the new generation of 80-NET UPS, delivers unsurpassed performance to medium-large data centers as a result of proven track record, successes, a reliable large installed base (>2.5 GW worldwide) and more than 10 years of acquired experience with the 80-NET technology.

The new Liebert EXL is a monolithic product that features a transformer-free design with a full IGBT three-level topology, providing extraordinary features including a double conversion efficiency of up to 97% plus intelligent paralleling to optimize efficiency at partial load, thus achieving superior running cost savings. Furthermore, its higher power density in a minimum footprint optimizes the availability of IT space and reduces related costs.

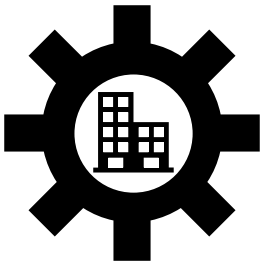
Liebert EXL is also compatible with previous 80-NET generation, allowing installation cost savings and an easier legacy system upgrade to increase UPS parallel capacity.

Availability - Uptime Enhancement:

- Advanced diagnostic; making your mission critical space a peaceful place
- Enhanced DSP control board and intelligent colored multi-language touch-screen display
- Enhanced event analysis and waveform capturing highlights external phenomena that may impact data center availability
- Vertiv™ LIFE™ Services remote diagnostic and preventive monitoring service increases system uptime and operational efficiency.

Capacity - Installation Flexibility

- Compact footprint for optimum space utilization allows more free space for IT equipment
- Backward compatibility with previous 80-NET generation for an easier power system upgrade
- Maximized active power at unity power factor operation permits compatibility with modern mission critical loads - both leading and lagging - without any derating
- Parallel system configuration up to 8 units
- Centralized and distributed parallel capabilities
- Three and four-wire electrical distribution system compatibility allowing effortless replacement of legacy equipment
- Seismic compliance, ensuring power protection in any geographical location.



Engineered versions for Railways and Smart Grid Services

Efficiency - Reduced TCO

- Among the highest double conversion (VFI) efficiency UPS on the market - up to 97% for reduced TCO and rapid payback time
- Intelligent ECO mode (VFD) efficiency above 99%
- Adoption of three-level full IGBT NPC2 inverter and rectifier topology
- Intelligent paralleling feature optimizes efficiency at partial load by switching excess units to standby mode, thus achieving superior running cost savings
- CO_2 emission reduction; environmental friendly unit
- Excellent T-free input performances allow for significant electrical infrastructure saving.

Liebert EXL S1 Family

Liebert® EXL S1 Specifications

UPS RATING (KVA)	100	120	160	200	300	400	500	600	800	1000	1200
Output active power at 35 °C*(kW)	100	120	160	200	300	400	500	600	800	1000	1200
Output active power at 40 °C (kW)	90	108	144	180	270	360	450	540	720	900	1080
INPUT											
Nominal mains input voltage / voltage range* (V)	400 (250 to 460), 3Ph or 3Ph + N										
Nominal bypass input voltage / voltage range* (V)	400 (380/415 selectable), 3Ph or 3Ph + N										
Nominal frequency / frequency tolerance (Hz)	50±10%(60 selectable)										
Input Power Factor	≥ 0.99										
Input current distortion (THDi) (%)	≤3										
OUTPUT											
Nominal output voltage (V)	400 (380/415 selectable), 3Ph or 3Ph + N										
Nominal output frequency (Hz)	50 (60 selectable)										
Output voltage stability by load variation 0-100% (%)											
- static	±1										
- dynamic	Complies with IEC/EN 62040-3, Class 1										
Output frequency stability											
- synchronized with bypass mains (%)	±2 (2, 3, 4, 5 selectable)										
- synchronized with internal clock (%)	±0.1										
Inverter Overload Capacity*	110% continuous, 125% for 10mins, 150% for 1min										
Short circuit current for 200 ms (%)	2.2 In										
Load crest factor handled without derating the ups (Ipk/Irms)	3:1										
Compatibility with loads	Any power factor (leading or lagging) up to 1										
BATTERY											
Permissible battery voltage range (V)	396 to 700										
Float voltage for VRLA @ 20 °C (V/cell)	2,27										
End cell voltage for VRLA (V/cell)	1.65										
Float Voltage stability in steady state condition (%)	≤1										
DC ripple voltage without battery (%)	≤1										
GENERAL AND SYSTEM DATA											
Classification according to IEC/EN 62040-3	VFI-SS-111										
Operating Temperature (°C)	0-40										
Maximum relative humidity @ 20 °C (non condensing) (%)	up to 95										
Protection degree with open doors	IP 20										
Frame colour (RAL scale)	7021										
Noise @ 1 metre as per ISO 3746 (dBA ± 2dBA)	65	65	66	68	69	71	73	76	76	78	78
Noise @ 1 metre as per ISO 3746 (dBA ± 2dBA) (at partial load)	64	64	65	65	65	65	65	70	70	72	72
Parallel configuration	up to 8 units in parallel										
Access	Front and Top (no rear access required)										
AC/AC efficiency:											
- VFI according to IEC/EN 62040 definition (%)	up to 97%										
- VFD according to IEC/EN 62040 definition (%)	up to 99%										
DIMENSION AND WEIGHT											
Height (mm)	1950										
Width (mm)	500		750		1000		1250	2000		2650	
Depth (mm)	900										
Net Weight (kg)	370		510		725		990	1550		2275	

*Conditions apply

LIEBERT® APM 30 KW - 600 KW

The Versatile and Modular UPS Fit for Row and Room Applications

Liebert APM is a modular and hot-scalable, transformer-free UPS designed to operate with a maximum energy efficiency of up to 96.3% for the protection of medium to large sized business-critical applications.

The Liebert® APM is a versatile and modular, transformer-free UPS designed to operate with a maximum energy efficiency of up to 96.3% for the protection of medium to large-sized business-critical applications.

Its modular and scalable configuration may house both power and battery modules inside the same UPS cabinet, or simply include power modules depending on the UPS rating. This guarantees maximum adaptability to every possible requirement in terms of footprint, power and runtime. Liebert APM's architecture allows for scalability while delivering an ideal balance of high availability, reliability and efficiency. With its high power density it also reduces system footprint in either row or room applications.

The built-in scalability of the Liebert APM also allows for fast, simple increases in system capacity through featured FlexPower technology™.

Each 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 600 kW of active power in a single unit and up to a maximum of 2.4 MW 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. For higher ratings, runtime extension is still possible via external battery cabinets.

Modular, Scalable Configuration

The modular architecture of the Liebert® APM allows a single unit capacity to be scaled up to a maximum of 600 kW in one single unit. There are four different models available, each with specific power module and maximum cabinet capacity:

- **Liebert APM 30 kW - 150 kW:** reaching up to 150 kW in a single server rack cabinet in 30 kW increments and allowing for integrated runtime inside the cabinet
- **Liebert APM 30 kW - 300 kW:** reaching up to 300 kW with 30 kW power increments in a frame two times larger than a server rack cabinet, with the ability to extend runtime with dedicated battery cabinets
- **Liebert APM 50 kW - 400 kW:** reaching up to 400 kW with 50 kW power increments in a frame about 2.5 times larger than a server rack cabinet, with the ability to extend runtime with dedicated battery cabinets
- **Liebert APM 50 kW - 600 kW:** reaching up to 600 kW with 50 kW power increments in a frame three times larger than a server rack cabinet, with the ability to extend runtime with dedicated battery cabinets.

Increases in capacity and redundancy can be made both vertically and horizontally by adding power modules to an existing UPS cabinet or, by connecting complete UPS systems in parallel in order to reach a maximum of 2.4 MW of active power.

Features and Performances:

- Remarkable double conversion efficiency - up to 96,3%
- Flat efficiency curve
- High power density
- Fit for row or room installations
- Modular and scalable
- Hot-swappable power modules
- Independent module control system
- Unitary output power factor
- Integrated parallel and load bus synchronization
- 4.5 kW battery charger per power module
- Integrated autonomy for ratings up to 90 kW
- Flexible configuration with 30 kW and 50 kW power module capacities

Liebert APM Family

Liebert® APM Specifications

TECHNICAL CHARACTERISTICS				
Power Module (kVA/kW)	30	30	50	50
Power (kVA)	30 - 150	30 - 300	50 - 400	50 - 600
Power (kW)	30 - 150	30 - 300	50 - 400	50 - 600
System Efficiency				
AC - AC on-line double conversion efficiency (%)	Between 95% and 96% for load >30%		Between 95.5% and 96.3% for load >30%	
AC - AC Eco mode efficiency (%)	>98%		>99%	
INPUT PARAMETERS				
Rated input voltage (VAC)	380/400/415 VAC, three-phase four-wire			
Rated operating frequency (Hz)	50/60 Hz			
Input voltage range (VAC)	477 VAC - 305 VAC at full load, 477 VAC - 228 VAC at 70% load			
Input frequency range (Hz)	40 Hz - 70 Hz			
Input power factor	>0.99 at full load, >0.98 at half load		>0.99	
Input THDI (%)	<5%		<3%	
DC PARAMETERS				
Battery number	30, 32, 34, 36, 38, 40		38, 40, 42, 44	
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 (VAC)	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		<3	
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% and 10%, +15%			
Bypass overload capacity	135% long term, 170% for 1 hour, 1000% for 100 ms		110% continuous operation, 125% for 10 mins, 150% for 1 min, >400% 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		≤3000 m above sea level	
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	<70 dBA	
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	IEC/EN 62040-2: Immunity category C3, Emission category C3	IEC/EN 62040-2: Immunity category C3, Emission category C3	
DIMENSIONS AND WEIGHT				
Dimension, w x h x d (mm)	600 x 1996 x 1100	1200 x 1996 x 1100	1400 x 2000 x 950	1800 x 2000 x 950
Weight (kg)	30 kVA: 280 60 kVA: 315 90 kVA: 350 120 kVA: 385 150 kVA: 420	30 kVA: 362 60 kVA: 397 90 kVA: 432 120 kVA: 466 150 kVA: 500 180 kVA: 535 210 kVA: 570 240 kVA: 602 270 kVA: 635 300 kVA: 670	300 kVA: 862 350 kVA: 905 400 kVA: 948	300 kVA: 986 350 kVA: 1029 400 kVA: 1072 450 kVA: 1115 500 kVA: 1158 550 kVA: 1201 600 kVA: 1244

*Conditions apply

LIEBERT® TRINERGY™ CUBE 150 KW - 3400 KW

The Hot Scalable UPS with the Industry's Highest Operating Efficiency

Liebert Trinergy™ Cube - the new generation of Trinergy UPS - delivers unsurpassed performance to enterprise data centers. Designed around your IT space, Liebert Trinergy Cube is ready to evolve with growing business demands. It offers the highest level of power availability, together with reduced TCO, energy consumption and CO_2 emissions.

Liebert Trinergy Cube boasts unparalleled features including an average operational efficiency of 98.5 % and power density per core running up to 400 kVA. Its optimized efficiency at partial load conditions and hot scalability up to 3.4 MW, means that Liebert Trinergy Cube delivers adaptability not available anywhere else in the market. Liebert Trinergy Cube can furthermore meet any power system requirement from 150 kW up to over 27 MW.

The architecture of the Liebert Trinergy Cube UPS allows great advantages in terms of Availability, Capacity, Smart Capacity and Efficiency:

Availability - Uptime Enhancement:

- Advanced diagnostics, making your mission critical space a peaceful place
- Event analysis, waveform capturing and harmonic spectrum analyses highlight external phenomena that may impact data center availability
- Data logging (efficiency, uptime, PUE), maintain control of physical space and efficiently track data
- Vertiv™ LIFE™ Services technology embedded in the UPS enables remote diagnosis 24/7.

Capacity - Installation Flexibility:

- Configurable in various layouts
- Adapts to physical space constraints
- Simplified cable routing with unlimited input/output power connection availability
- Ideal for all sites: any geographical location and new or existing buildings
- Increased energy density allows more free space for IT equipment.

Smart Capacity - Adaptive Power Rating:

Trinergy Cube adapts the power supplied to the load based on the environmental conditions in which the UPS is installed:

- I/O Box and core rated to operate continuously up to 55°C and are capable of providing increased power down to 20°C
- Maximum input current of the UPS is adjustable to meet specific protection rating requirements.

Efficiency - Optimized TCO:

- The market's most efficient technology delivering 98.5% average operating efficiency
- Adoption of three-level NPC2 inverter and rectifier topology
- Single unit configuration up to 3.4 MW for significant electrical infrastructure and space savings.

Liebert Trinergy Cube

Liebert® TRINERGY CUBE Specifications

SYSTEM RANGE		150 KW - 27 MW
Core Adaptive Power Rating (kVA)		up to 200 / 400
Core Power Rating at 35°C (kW)		up to 200 / 400
GENERAL		
Average Operating Efficiency		98.5%
Maximum Efficiency		up to 99.5%
Airflow (m^3/h)		up to 1450 (200 kW Core) / 2600 (400 kW Core)
Heat Dissipation at Full Load in VFI (kW)		7.7 (200 kW Core) / 15.4 (400 kW Core)
Paralleling		up to 10 cores in one unit, up to 8 units in parallel
Hot Swappable core		Yes
Withstand Rating (kAIC)		up to 100
Audible Noise (dB)		65 dBA (at partial load)
Altitude Max (m)		1000 m without derating
Operating Temperature (°C)		0-55
INPUT		
Input Wiring		3 ph + N + PE, 3 ph + PE
Input Voltage Range (V)		200-480
Input Frequency Range (Hz)		45-65
Input Power Factor		0.99
Input THDi		3%
Soft Start Capability		Yes
Internal Backfeed Protection		Optional
OUTPUT		
Output Wiring		3 ph + N + PE, 3 ph + PE
Configurable Voltage Rating		380, 400, 415 V, 440 V, 50/60 Hz
Permitted Load Power Factor		up to 1, any PF leading or lagging without derating; crest factor up to 3:1
Output UTHD		<1% (100% linear load); <3% (reference non linear load)
Overload on Inverter		see Trinergy Cube APP dynamic specification
Short Circuit Current (A)		up to 650 A (200 kW Core) / 1300 A (400 kW Core)
GENERAL CHARACTERISTICS		
HMI		12-inch Color Touchscreen Including Web, SNMP, MODBUS/Jbus Protocols
Multi-language		Standard
BATTERY		
Type		VRLA (Li-Ion, Pure Lead, Flywheel upon Request)
Charging Method		ABM Technology or Float
Battery Voltage Range		396-700
DIMENSION AND WEIGHT	**(W X D X H MM)**	**(KG)**
Core 200 kW	500 x 910 x 1950	515
Core 400 kW	675 x 910 x 1950	660
I/O Box 600 A	1150 x 910 x 1950	800
I/O Box 1200 A	1625 x 910 x 1950	1190
I/O Box 2400 A	2150 x 910 x 1950	1575
I/O Box 3000 A	3800 x 910 x 1950	Upon request
I/O Box 4000 A	2650x1820x1950 (back to back configuration)	Upon request
I/O Box 5000 A	26 50x1820x1950 (back to back configuration)	Upon request
ACCESSORIES		
	External Battery Cabinets with Long-life Batteries, Li-Ion Batteries, Pure Lead Batteries and Flywheel upon Request, Intellislot Connectivity, Maintenance Bypass Switch	
COMMUNICATIONS		
Slots		2 Intellislots
Protocols		SNMP, MODBUS TCP/IP, MODBUS RTU
Inputs/Outputs		9/8 Programmable
COMPLIANCE WITH STANDARDS		
Safety		IEC 62040-1, IEC 60950-1
EMC		IEC 62040-2
Performance		IEC 62040-3

STATIC SWITCHES

LIEBERT® CROSS RACK 16 A, 32 A AND 63 A

Secure Power Always

Vertiv's™ Liebert® CROSS Rack family of system static switches are available in single-phase double-pole 16 A, 32 A and 63 A versions.
Liebert CROSS ensures maximum reliability to critical loads by eliminating system failures caused by problems in distribution rather than by the failure of the power source itself. Double-pole operations ensure optimal flexibility for all the different types of electrical distributions.

Flexibility for Customised Solutions:

Liebert CROSS Rack has been designed to allow the hot swapping of all the solid-state components (power and control), dramatically reducing repair times while keeping the load powered. Liebert CROSS Rack's flexibility allows complete compatibility with customers' load and environment requirements. Standard features include priority mode operation allowing users to select the preferred power source.

Liebert CROSS Rack features a fully redundant forced ventilation system with fan failure alarm, allowing mission-critical reliability whilst taking up a minimum amount of rack space (2 HU).

Front-to-back ventilation ensures perfect compatibility with state-of-the-art cooling systems for Data Centres.

Leading Technology

A crucial function of Liebert CROSS is the Break Before Make transfer.

This ensures that the two live feeds are never connected in parallel.

The Liebert CROSS static switch also ensures that switching between the two power supplies occurs safely under both synchronous and asynchronous conditions relative to input waveforms.

Reliability

Employing a Liebert CROSS static switch adds another layer of security for mission critical loads.

Ensure a redundant power supply by enabling controlled switching between two independent AC power supply sources.

Switching is performed whenever the line that supplies power to the load goes out of tolerance. The distribution downstream from a Liebert CROSS is not only protected against the failure of the sources, but also against any failure in upstream lines.

Communication

Voltage free contact ports are available in standard assembly versions and facilitate communication with installed power protection equipment.

LED displays offer complete and easy interaction with Liebert CROSS Rack and provide detailed reports on the operational status of your equipment.

Applications

Liebert CROSS provides additional security for a wide range of mission critical applications including:

- Data centres /ISPs
- Call Centres
- Manufacturing Process Control
- Signalling Systems
- Transportation Signalling Systems
- Health Care.

Secure Power Always

Simply supplying equipment will never deliver the level of business continuity our customers require. Vertiv™ offers a range of maintenance plans which will:

- Help deliver reliability to the load
- Extend the life of your power protection equipment
- Optimise your capital expenditure
- Provide risk management at a fixed cost
- Help to control your business environment
- Provide a pro active approach to disaster recovery.

Liebert CROSS Rack from 16 to 63 A

Liebert® CROSS RACK (A) Specifications

TECHNICAL DATA	
Number of switching poles	2
Nominal Voltage (V)	230 (220/240 selectable)
Nominal Voltage (V) - LV model	120 (110/115 selectable)
Input phases	1 + N
Nominal frequency (Hz)	50/60
Efficiency at nominal power %	≥99
Overload capacity	
for 10 minutes (%)	125
for 1 minutes (%)	150
for 0,50/606 seconds (%)	700
Fuses	600 Vac, 100 A fast
Temperature range (°C)	0 - 40
Cooling	Forced, fully redundant, front to back
Transfer Mode	Break Before Making Switching (No source overlap)
Transfer Time	
source failure, worst case (msec)	≤6
source failure, typical (msec)	≤4
Additional transfer delay for non-synchronous transitions (msec)	10 ± 2 (0 - 20 selectable)
DIMENSIONS AND WEIGHT	
Height (mm)	430 (19")
Width (mm)	85 (2U)
Depth (mm)	700
UPS weight (kg)	23
ENVIRONMENT	
Safety	CE marking, IEC/EN 62310-1
EMC Compatibility	IEC/EN 62310-2
Protection degree	IP20
Acoustic Noise (dBA)	<45

LIEBERT® CROSS CHASSIS/CABINET FROM 160 A 1250 A

Secure Power Always

Vertiv family of Liebert® CROSS static switches are available in Cabinet versions from 160 to 1250 A and in both three and four pole versions. Liebert CROSS Chassis is available in 160 to 450 A, in the four pole version only. Liebert CROSS ensures maximum reliability to critical loads by eliminating system failures that are caused by problems in distribution rather than from the failure of the power source itself.

Flexibility for Customised Solutions:

Liebert CROSS can be fully customised according to customers' load and environment requirements.

Options include priority mode operation, allowing users to select the preferred power source, selectable switching and tolerance features, galvanic isolation transformers, tripping coil switches, RFI filters, top cable entry connections and remote display units.

Leading Technology

A key function of Liebert CROSS is the Break Before Make transfer. This ensures that the two live feeds are never connected in parallel.

The Liebert CROSS static switch also ensures that switching between two power supplies occurs safely under both synchronous and asynchronous conditions relative to input waveforms.

Reliability

Employing a Liebert CROSS static switch adds another layer of security for mission critical loads.

It ensures a truly redundant power supply by enabling controlled switching between two independent AC power supply sources.

Switching is performed whenever the line that supplies power to the load goes out of tolerance.

Distribution downstream from Liebert CROSS is not only protected from failure of the power sources, but also against any failure in upstream lines.

Communication

An RS232 serial port and a voltage-free contact port are available in standard assembly versions and facilitate communication with installed power protection equipment.

LED and LCD displays offer complete and easy interaction with installed equipment and provide detailed information on the operational status of your equipment.

Applications

Liebert CROSS provides additional security for a wide range of mission critical applications including:

- Data centres /ISPs
- Call Centres
- Manufacturing Process Control
- Signalling Systems
- Safety Systems and Emergency Lighting
- Life Support Systems.

Secure Power Always

Simply supplying equipment will never deliver the level of business continuity our customers require. Vertiv™ offers a range of maintenance plans which will:

- Help deliver reliability to the load
- Extend the life of your power protection equipment
- Optimise your capital expenditure
- Provide risk management at a fixed cost
- Help to control your business environment
- Provide a pro active approach to disaster recovery.

Liebert CROSS Chassis/Cabinet from 160 A to 1250 A

Liebert® CROSS CABINET Specifications

CROSS CABINET (A)	160	250	400	600	800	1250
Default Input Voltage (V)			400			
Nominal frequency (Hz) [selectable]			50/60			
Input phases			3+N			
Number of poles			3-4			
Transfer Mode			Break Before Make Switching (No source overlap)			
Overload capacity						
for 10 minutes (%)			125			
for 1 minutes (%)			150			
for 10 seconds (%)			200			
for 1 seconds (A)	5300	5300	5300	5300	5300	9200
Transfer Time worst condition zero voltage source failure (msec)			≤ 5			
Static Switch Fault detector			Yes			
Ventilation	Natural	Natural	Natural	Forced	Forced	Forced
Width (mm)	620	620	820	1220	1220	1620
DIMENSIONS AND WEIGHT						
Height (mm)	1780	1780	1780	1780	1780	1780
Width (mm)	620	620	820	1220	1220	1620
Depth (mm)	830	830	830	830	830	830
Neutral sized (*in)	2	2	21.7	1.3	1	1.28
ENVIRONMENT AND STANDARDS						
Safety			CE marking, IEC EN 62310-1			
EMC Compatibility			IEC EN 62040-2 Class C3			
Degree of Protection			IP20			
Operating temperature (°C)			0-40			
Acoustic noise (dBA)	<45	<45	<45	<45	<73	<76

CROSS CHASSIS (A)	160	250	450
Default Input Voltage (V)		400	
Nominal frequency (Hz)		50-60	
Input phases		3+N	
Number of poles		4	
Transfer Mode (for Phases)		Break Before Make Switching (No source overlap)	
Overload capacity (without fuses)			
for 10 minutes (%)		125	
for 1 minutes (%)		150	
for 10 seconds (%)		200	
for 1 seconds (A)		5300	
Transfer Time worst condition zero voltage source failure (msec)		≤ 5	
Static Switch Fault detector		Yes	
Ventilation		Natural	
Neutral sized	2*In	2*In	1.7*In
DIMENSIONS AND WEIGHT			
Height (mm)		700	
Width (mm)		600	
Depth (mm)		1200	
Weight (kg) Main CROSS Cabinet Module	135	150	160
ENVIRONMENT AND STANDARDS			
Safety		IEC EN 62310-1 if used inside a cubicle compliant to safety standard IEC EN 62310-1	
EMC Compatibility		IEC EN 62040-2 Class C3	
Degree of Protection		(IP20 available on demand)	
Operating temperature (°C)		0-40	
Acoustic noise (dBA)		<45	

REMOTE DIAGNOSTICS

VERTIV™ LIFE™ SERVICES

Stay in Contact for LIFE, Stay in Contact through LIFE

Uptime Assurance

Our Vertiv™ LIFE™ Services experts constantly monitor all relevant parameters related to your critical assets. This allows our experts to operate for immediate resolution in the case of an early warning condition. This fast, effective incident response capability maximizes the availability of your critical infrastructure and delivers uptime assurance.

Proactive Analysis

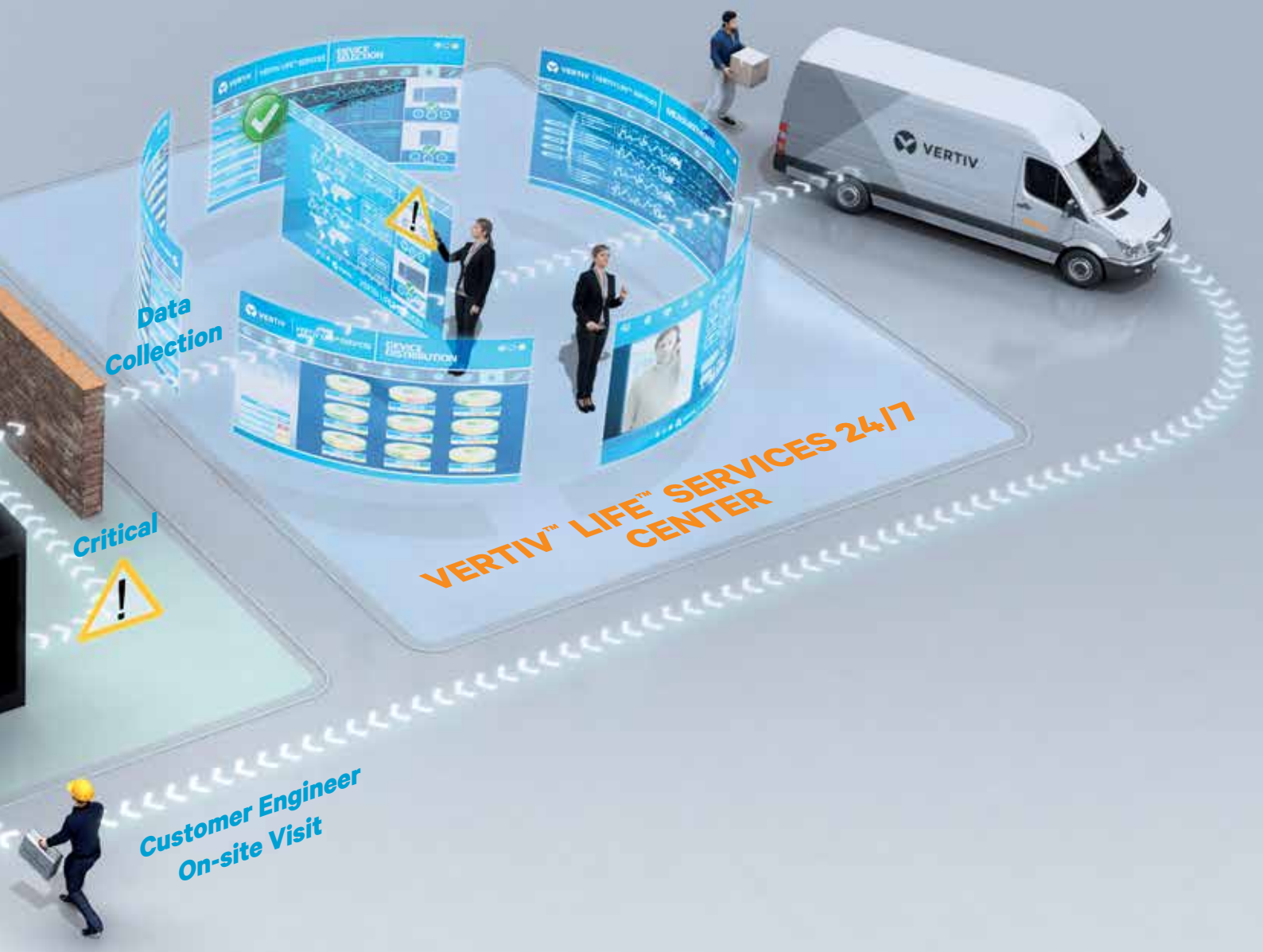
Vertiv remote service experts monitor your equipment from the Vertiv LIFE Services centers, proactively analyzing data and trends, to recommend actions for ensuring equipment always performs at its best.

Report

The unit parameters continuously monitored and measured through Vertiv LIFE Services are delivered in periodic status reports. You will receive a comprehensive report detailing the working order of your equipment and its operational performance, as well as demonstration that it is under continuous remote surveillance.

First Time Fix Rate

Extensive parametric data and measurements received from the unit, enable Vertiv LIFE Services experts to accurately isolate and diagnose any operational condition. This ensures that in the case customer engineers are dispatched on-site, they arrive prepared for first time resolution.



Fast Incident Response

Through Vertiv LIFE Services, your installed units maintain constant contact with our service centers. The units are programmed to communicate and transfer data at regular intervals, or at the activation of an alarm.

This allows for immediate definition of the best course of action, thus ensuring fast incident response and timely intervention either remotely, or if necessary, with the on-site visit of a customer engineer.

Minimized Total Cost of Ownership of your Equipment

Having Vertiv LIFE Services embedded in our UPS and thermal management units is like having a virtual customer engineer on site 24/7. The continuous monitoring of all relevant parameters in turn maximizes unit performance, reducing on-site maintenance and extending the life of your equipment.

VertivCo.com | **Vertiv Infrastructure Limited,** George Curl Way, Southampton, SO18 2RY, VAT Number: GB188146827

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