VERTIV™

Securing Your Rail Infrastructure

Enabling the continuity of today's and tomorrow's vital applications

Nearly all aspects of our lives involve the use of technology. It is how we work and play and do anything in between. This connectivity or use of data is built into the very fabric of our society. It is vital to human progress. Vertiv believes there is a better way to meet this accelerating demand for data — one driven by passion and innovation.

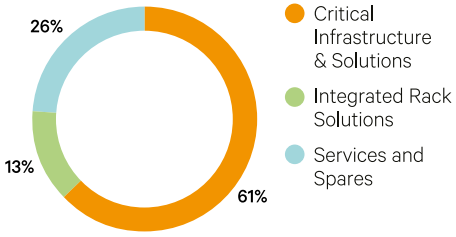
As industry experts, we collaborate with our customers to envision and build future-ready infrastructures. We leverage our portfolio of hardware, software, analytics, and services, to enable our customers' vital applications to run continuously, perform optimally, and scale with business needs.

Data Centers: Hyperscale/Cloud, Colocation, Enterprise and Edge

Communication Networks: Macro Site, Central Office, Small Cell and Data Center

Commercial and Industrial: Healthcare, Manufacturing, Rail/Mass Transit, Power Generation and Oil and Gas

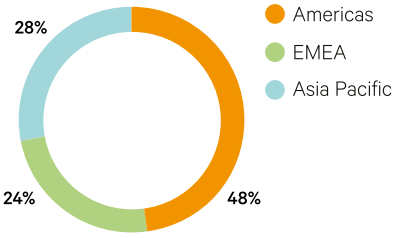
Offering*



Broad range of power, thermal, and IT and edge infrastructure, solutions and services portfolio

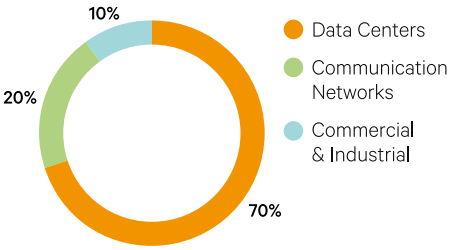
**by revenue*

Geography*



Global, well-established footprint and supply-chain network

End Market*



Customers who operate in some of the world's most critical industries

Market breakdown rounded to nearest 5%

KEY FACTS

STATUS

Public (NYSE:VRT)

REVENUE

USD 5.7 billion (fiscal 2022)

HEADQUARTERS

Global: Westerville, Ohio, USA

Regional: China, India, Philippines and Italy

EMPLOYEES

~27,000 worldwide

MAJOR CUSTOMERS

Alibaba, Alstom, America Movil, AT&T, China Mobile,

Equinix, Ericsson, Reliance, Siemens, Telefonica, Tencent, Verizon and Vodafone

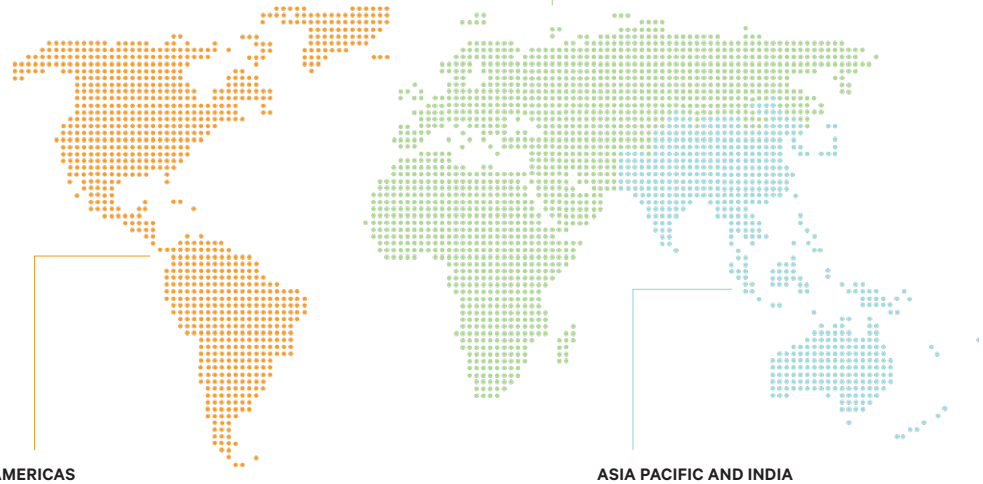
OUR PURPOSE

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**

OUR BRANDS

Albér™

Battery Monitoring

Avocent®

IT Management

Cybex™

IT Management

Energy Labs™

Commercial and Industrial Thermal

Geist™

Rack PDU

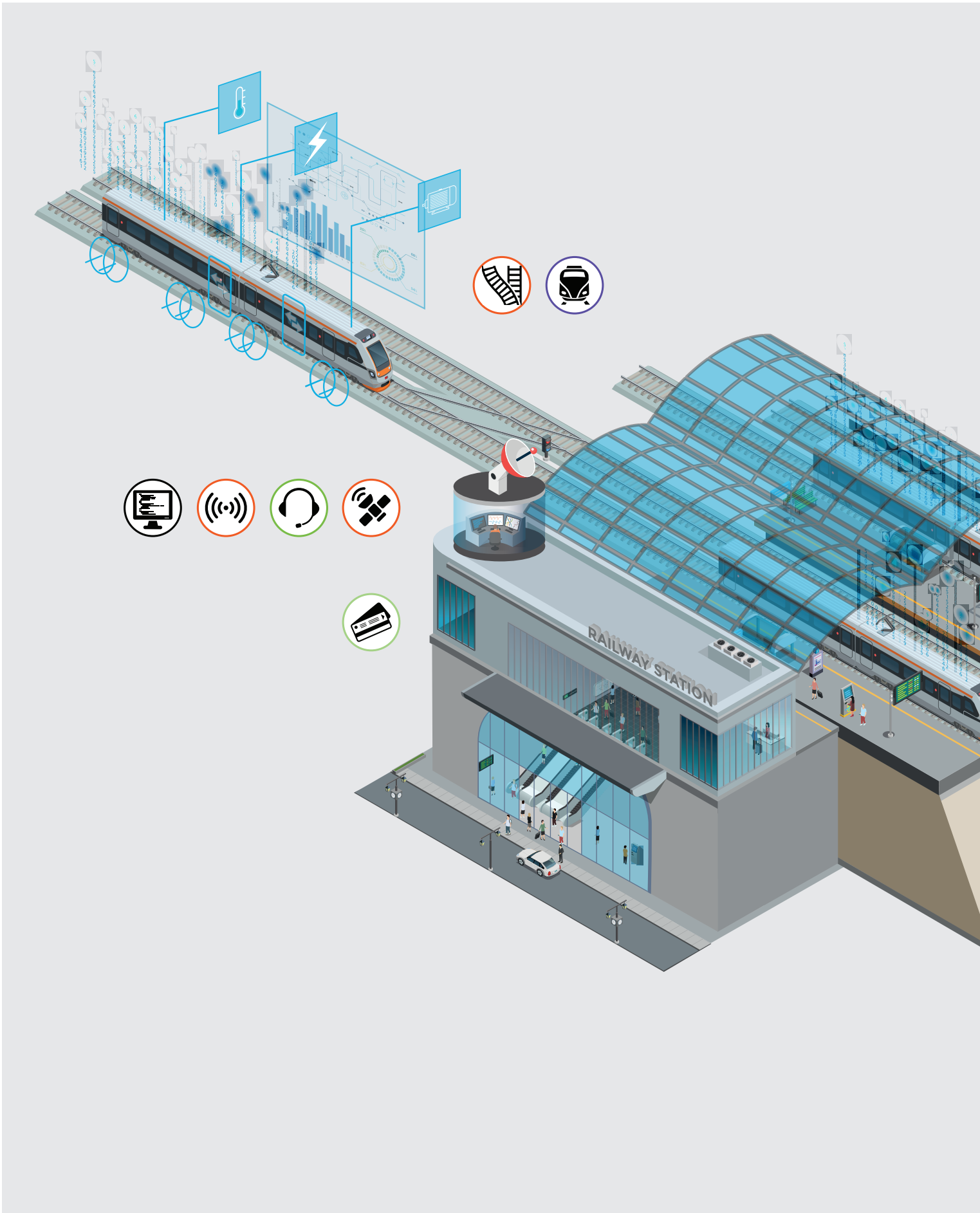
Liebert®

AC Power and Thermal

Netsure™

DC Power

Securing Your Rail Infrastructure



SIGNALLING AND CROSSING

TRACK SAFETY
- Signalling and crossings

TUNNEL SAFETY
- Power back-up for ventilation
- Emergency lighting
- Solutions for video, signaling, fire detection

TRACKSIDE

COMMUNICATION AND TRACK DIGITALIZATION
- Solutions for the Telecommunications network

TRACKSIDE IT INFRASTRUCTURE AND TRACK SAFETY
- Signalling and crossings

POWER AND TRANSFORMER STATIONS
- Power back-up

SWITCH CONTROL
- Traffic management

STATIONS

CONTROL ROOMS
- Passenger information
- Line monitoring systems

PLATFORM VIDEO AND VOICE SYSTEMS
- Monitoring system announcements

PASSENGER INFORMATION AND ACCESS CONTROL
- Secure power for station control and equipment protection

ROLLING STOCK
- On-board power back-up

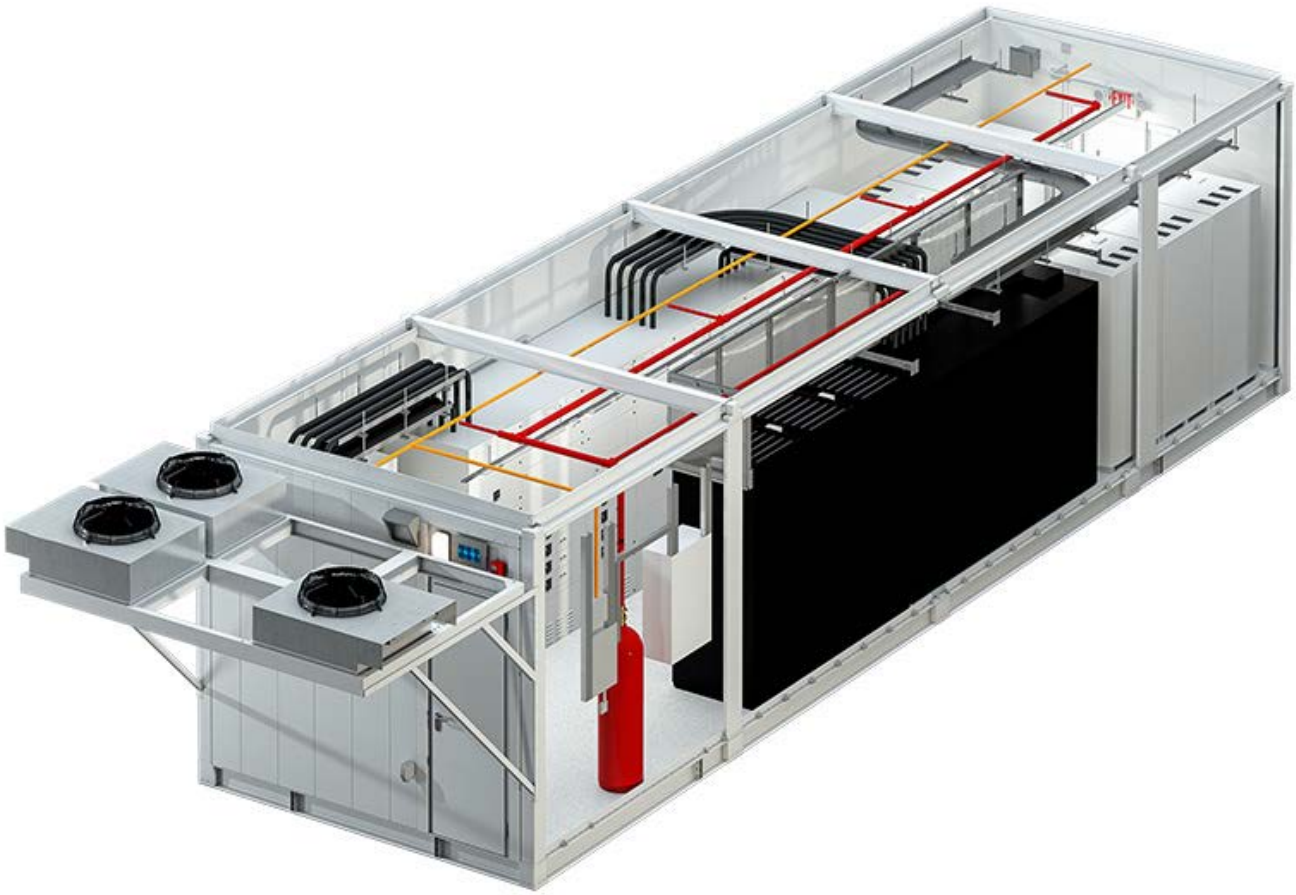
With billions of passengers, millions of journeys and tons of freight moving each year, the rail industry is both a vibrant and challenging environment.

You, as a rail operator, are expected to:

- Deliver **reliable service**
- Ensure **the safety of passengers and operative personnel**
- Minimize **operating and maintenance costs**
- Guarantee **a more efficient and resilient system**

Continual progress in Information and Communications Technology means that your customers require information on demand and have ever greater expectations of punctuality, value and amenities.
These same advances in technology open up opportunities for truly intelligent rail networks:

- Smart ticketing enables improved mass data capture and passenger flow
- In-cabin signalling systems allow for optimized command and control
- Remote condition monitoring supports safer and proactive maintenance



Customized solution for rail network digitalization

We have a proven track record of helping some of the largest rail operators in the world to leverage these opportunities, meet operational challenges and protect their infrastructure.

Our engineers and project managers have a comprehensive knowledge gained from **many years of experience in designing, building and servicing mission-critical solutions for rail and transport applications**, just like yours.

While you ensure the best experience for your customers, we keep your infrastructure up and running with standard and industrial-grade solutions designed to meet your needs:

- **AC and DC power protection solutions**
- **Thermal management for critical systems**
- **IT infrastructure management devices**
- **Modular and scalable options**
- **Remote diagnosis and monitoring**
- **Energy and asset management services**
- **Battery maintenance services**

We have **a wide range of products that are included in numerous industry approved registers** across Europe, Middle East and Africa. Our products **are compliant with Rail Standards for Surface Rail and Underground** applications:

- EMC compliance (BS EN 50121 & S1222)
- BS EN 62040
- CE marked
- ECA listed products

By placing your trust in Vertiv you can leverage extensive experience in infrastructure support, thus guaranteeing your passengers **a safe journey, a smarter experience and a future-proof service.**

Liebert® EXS from 10 to 80 kVA

Compact design and improved performances

The new Liebert® EXS is a transformer-free UPS that offers exceptional features for mission-critical applications. With an extraordinary double conversion efficiency of up to 96.2%, the Liebert EXS ensures **remarkable operational cost savings**, reducing both the Total Cost of Ownership (TCO) and environmental impact. With less energy wasted as heat, you can be confident you're getting the most out of your power source, reducing environmental impact and saving money on energy bills.

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 up to 20 kVA
- 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 (10-60 kVA)

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.

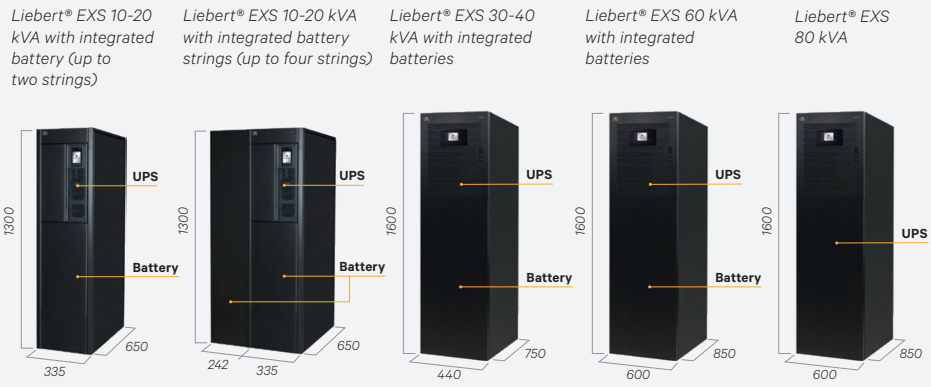
Lithium batteries compatible

Liebert EXS (30-80 kVA) can operate with both standard VRLA and new Li-ion batteries thus adapting to all possible requirements in terms of runtime, life expectancy and TCO, and showing extreme flexibility.

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.



Vertiv™ Liebert® EXS architecture

Railways Applications

Liebert® EXS can be used for **railways applications** as defined in the **EN 50121** standard, and it's hence capable of supplying power to specific systems in urban stations and ensure high reliability to critical buildings.
In fact, the unit can be used to power on passenger information panels, safety signaling equipment, ticket machines as well as IT rooms and administration and control offices.

Technical Specifications

Ratings (kVA)	10	15	20	30	40	60	80
Input							
Nominal input voltage (V)	380/400/415 (three-phase + N + PE)						
Input voltage range without battery discharge (V)	173 to 498*			228 to 475*			
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*			26-40*			
Voltage temperature compensation (mV/°C/Cell)	-3.0						
Battery charger max. current (A)	13			12.5		25	
Output							
Nominal output voltage (V)	380/400/415 (three-phase + N + PE) or 220/230/240 (single-phase + N + PE)			380/400/415 (three-phase + N + PE)			
Nominal output frequency (Hz)	50/60						
Maximum active power (kW)	10	15	20	30	40	60	80
THDv at full linear load (%)	2						
Inverter overload capacity	105% for 60 min; 125% for 5 min; 150% for 1 min; >150% for 200ms			105% for 60 min; 125% for 10 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 (standard version) 577 x 650 x 1300 (extended version)			440 x 750 x 1600		600 x 850 x 1600	600 x 850 x 1600
Net/Shipping weight (excluding battery) kg	85/115 (standard version)			200/250		215/265	230/270
Net/Shipping weight (including 2*32 batteries) kg	285/315 (standard version)			600/650		700/750	NA
General							
Noise at 1 m (dBA)	≤58					<60	<60
Maximum altitude	1500 m without derating (max. 3000 m)						
Operating Temperature (°C)	up to 50*			up to 40			
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						
Central Power Supply Systems (CPSS) applications*	EN 50171						
Rail applications*	EN 50121-1 EN 50121-5						

* Conditions apply

Liebert® EXM2, The Next Generation Mid-size UPS for Mission-critical Applications

Liebert® EXM2 drives its evolution from the flagship Liebert® EXM/ Vertiv™ Liebert® NXC which has been widely recognized as proven and highly stable performing UPS in its range and has been supporting over thousands of critical sites across the globe. Backed by dedicated research of Vertiv experts, Liebert EXM2 is poised to lead in the industry with technologically advancements implanting all the next-gen attributes. Machine learning based-**Three modes of energy operation** ensures **the best energy credentials and assures maximum availability.**

Its extraordinary Double conversion efficiency up to 97% ensures remarkable operational cost savings. Our proven Dynamic online mode delivers efficiency up to 98.8% whilst compensates the load THDi, PF, main sags and swells, ensuring fast transfer output performance. On top of this, Liebert EXM2 adopts to a range of infrastructure conditions including **Lithium-ion battery compatibility and supports for the leading power factor** needs of modern server loads.

Seamlessly operates up to 40 °C and **can tolerate high ambient temperature up to 50 °C** with auto-derating.

1. **Bypass Section**
2. **Power Section**
3. **Integrated Surge Protection**
4. **Switch Assembly**
5. **Cable Termination Section (Bottom as standard)**
6. **Top cable Termination panel (Optional)**

100-160 kVA *200-250 kVA*

Railway/Metro

- Communication System
- Automatic Fare Collection
- CPSS
- Operational Control Center

Liebert® EMC

- EN 50121-1:2006: Railway applications - Electromagnetic compatibility - Part 1: General
- EN 50121-5:2017 Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity
- Electromagnetic compatibility (EMC) requirements of EN62040-2:2006 such as
- 61000-4-2 Electrostatic discharge, Level 3 based on B
- 61000-4-3 Radiated E-RFI fields, Level 3 based on A
- 61000-4-4 Fast E transients, AC port:4kV/5kHz based on B;DC port and signal ports 2kV/5kHz based on B
- 61000-4-5 Surges/Lightning, AC port: Level 4(4kV), line to earth, Level 3(2kV) line to line
- 61000-4-6 Conducted RFI, 10V based on A

Highlights

Powering the Railways with Liebert EXM2

- Reliable UPSs for railway applications
- **International engineering projects,** and a thorough understanding that safety, risk management, business continuity and operational excellence are essential ingredients of project success.
- Vertiv has delivered rail- specific power protection solutions and has **extensive experience** delivering and supporting standard and specific UPS solutions for above-ground and underground rail installations around the world.
- Vertiv has a **wide range of UPS** systems that are used in rail networks and metro systems to ensure reliable, stable and continuous power for many different rail applications.
- Vertiv™ UPS systems for rail match to three-phase critical load characteristics and load power demands, ranging **from a few kVA up to 1.5 MVA.**
- Vertiv UPS systems are designed keep rail networks moving safely and promptly, and to provide maximum reliability in a way that is **energy-efficient and cost- effective.**
- Electrical noise can appear on lines, or frequency variations, or harmonics in the voltage, but a UPS system reconciles any of these problems by conditioning incoming power to **eliminate spikes, swells, sags, noise and harmonics.**
- Vertiv complete support for integrated rail solutions includes UPS systems and batteries; control and monitoring; and unmatched rail expertise, ranging from global **service solutions** to turnkey project delivery.

Technical Specifications

Nominal Ratings (kVA/kW)	100 kVA	120 kVA	160 kVA	200 kVA	250 kVA
Input					
Nominal input voltage (V)	380 / 400 / 415 (three-phase and sharing neutral with the bypass input)				
Input voltage range without battery discharge (V)*	228 to 478				
Nominal input frequency (Hz)	50 / 60				
Input frequency range (Hz)	40 to 70				
Bypass voltage tolerance (%)	Upper limit: +10, +15, or +20, default: +15 Lower limit: -10, -20, -30, -40, default: -20				
Bypass frequency tolerance (%)	±10				
Input power factor (kW/kVA)	0.99				
Input THDi*	<3% (full load), 4% (half load)				
Battery					
Battery bus voltage (VDC)	360 to 528 , 2 Wire				
Battery charger max. (A)	30	45	45	60	75
Output					
Nominal output voltage (V)	380 / 400 / 415 (three-phase and sharing neutral with the bypass input)				
Nominal output frequency (Hz)	50 / 60				
Nominal active power (kW)	100	120	160	200	250
THDv with 100% linear load (%)	1				
Inverter overload capacity	<105 % for Continuous; <110% for 60min; <125 % 10 min; <150 % for 1 min; >150 % for 200ms				
Efficiency					
Double conversion mode	Up to 97%				
Dynamic online mode	Up to 98.8%				
Eco mode	Up to 99.2%				
Dimensions and weight[1]					
Dimensions (W x D x H), mm	600 x 850 x 1600			600 x 850 x 2000	
Shipping dimensions (W x D x H), mm	800 x 1000 x 1800			800 x 1000 x 2180	
Weight, kg	315	350	350	412	447
Shipping weight, kg	345	380	380	443	478
General					
Noise at 1 m dBA	60			62	
Altitude	1500 m no derating, 1500 to 3000 m derate power by 1 % per each 100 m increase				
Protection level	IP20, IP21, IP31 optional				
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				
Central Power Supply Systems (CPSS) applications*	EN 50171				
Rail applications*	EN 50121-1; EN 50121-5				

** Conditions apply*

1. Without side cabinet and top fan subassembly

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.

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

Vertiv™ 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

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)				

** certification planned*

Liebert® HPF, Self-Contained Air Conditioner for Indoor Installations

Liebert HPF represents the most complete indoor Self-contained cooling system specifically designed to control the environmental conditions of technological or industrial rooms as well as of Telecom network sites.

Freecooling System Minimizing Operating Costs

- Our solution provides enhanced energy savings with direct freecooling through the use of outside cold air as a main source of cooling.

48 V DC Power Supply for High Availability

- 48 V DC power supply guaranteeing emergency cooling and specifically addressing the needs of Telecom enclosures.

Smart Control Guaranteeing Efficient Unit Regulation

- Team-working with up to 16 units exploits the benefits of standby, rotation and cascade modes
- Optional graphic display stores the last 200 events, thus enhancing data collection functions.

Evaporator Fan with Optional EC Fan for Higher Energy Efficiency

- High External Static Pressure (ESP) for superior adaption to different layouts and site applications
- The new generation of EC fans installed in the Liebert HPF dramatically increases overall unit efficiency.

Compressor with Cooling Capacity Modulation

- Precisely matches heat load and saves energy
- Compressor's modulating capacity and the electronic expansion valve allow continuous cooling availability thus ensuring precise control of room temperature.

Remote Monitoring Option For Real-Time Infrastructure Optimization

- Hirolink-i Communication Interface option provides Liebert HPF with Infrastructure Management enablement (Vertiv Trellis, Vertiv SiteScan, Vertiv Nform, Vertiv LIFE Services) as well as third-party customer protocols compatibility; such as MODBUS, SNMP, BACNET. The interface employs Ethernet, RS-485 and MSTP networks to monitor and manage a wide range of operating parameters, alarms and notifications.

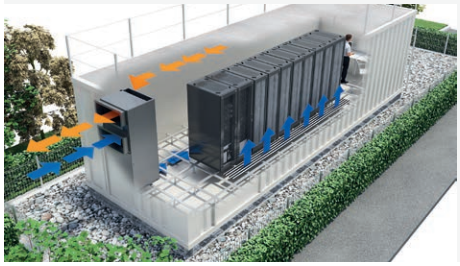
Vertiv™ Liebert® HPF from 7 to 18 kW

Three Airflow Distributions Available Providing Cold Air Where Needed

Liebert HPF is an extremely flexible unit available in different airflow versions making it an ideal system for the most diverse site layouts:

Downflow

Return air enters the unit from the top, while supply air is discharged from below, exiting beneath the floor.



Upflow

Return air enters the unit from the bottom front, while supply air is discharged from the top front.

Displacement

Return air enters the unit from the top, while supply air is discharged from the bottom front.

Technical Specifications

Technical Data	HPF0HO	HPF1AO	HPF1FO	HPF1DO*
Cooling Capacity [kW]	7.6	12.9	17.4	16.9
Airflow Version	Upflow	Upflow	Upflow	Upflow
Airflow [m³/h]	1955	3835	3680	2910
Refrigerant	R410A	R410A	R410A	R410A
Power Supply	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz
Dimensions				
LxHxD [mm]	650x1990x650	900x2050x750	900x2050x750	900x2050x750

Technical Data	HPF0HU	HPF1AU	HPF1FU	HPF1DU*
Cooling Capacity [kW]	7.6	12.6	17.1	16.9
Airflow Version	Downflow	Downflow	Downflow	Downflow
Airflow [m³/h]	2095	3370	3680	3680
Refrigerant	R410A	R410A	R410A	R410A
Power Supply	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz
Dimensions				
LxHxD [mm]	650x1990x650	900x2050x750	900x2050x750	900x2050x750

Technical Data	HPF0HD	HPF1AD	HPF1FD	HPF1DD*
Cooling Capacity [kW]	7.7	13.0	17.2	17.0
Airflow Version	Displacement	Displacement	Displacement	Displacement
Airflow [m³/h]	2289	3614	3805	3803
Refrigerant	R410A	R410A	R410A	R410A
Power Supply	400 V/ 3 ph/ 50 Hz	400 V/ 3 ph/ 50 Hz	400 V/ 3ph/ 50 Hz	400 V/ 3 ph/ 50 Hz
Dimensions				
LxHxD [mm]	650x1990x650	900x2300x750	900x2300x750	900x2300x750

(*) = Version with modulating capacity compressors

Note: Values refer to direct expansion working conditions; 35°C outdoor temperature; nominal power supply and indoor conditions of 30 °C / 39.5 % R.H. at the evaporating suction side.

Backed by the Industry's Best Service and Support

- Fast and easy installation
- All components easily accessible from the front for simplified maintenance and service
- Service delivered by factory trained technicians
- 24/7 technical support.

Liebert® HPS, High Performance Split Air Conditioner

Liebert HPS is the high performance split air conditioner designed to ensure proper environmental conditions inside technological environments, especially for mobile networks. Liebert HPS guarantees an effective air distribution, while its highly efficient components ensure energy and space saving.

The unit is available in several cooling versions thus guaranteeing extreme flexibility for any site application. Liebert HPS can be configured depending on the main application drivers (noise level, environmental conditions range etc.) and the desired options (freecooling, emergency freecooling, heating etc.).

Optimized Air Distribution

Liebert HPS delivers cold air straight down, close to the racks suction area and intakes the hot air out coming from the heat sources, into the cabinet sides (frontal and lateral). In this way the mixing effect between conditioner cold air and electronic equipment hot air is denied resulting in a double beneficial effect: the rack is fed by cold air where it is needed and the air conditioner treats only the hot air maximizing its efficiency. This allows for proper temperature inside the racks, high efficiency of the cooling equipment and hot spot absence in the site.

Energy and Space Saving

The use of the optional freecooling gives the possibility to stop the compressor and use the external fresh air to cool the site: the annual energy absorption, requested to cool the site, thus decreases significantly. The 0-100% fine modulation allows to keep constantly the desired set point inside the site. No additional module is requested: the innovative rotary freecooling system keeps unchanged the requested space to install the unit.

Maximizing Site Reliability

Remote nodes need to exchange data continuously, always working at proper environmental conditions. The most modern design and components such as scroll compressor and plugtype fans, heat exchanger surfaces and airflows guarantee a 24/7 unit operation oreover, in case of main supply fault the air conditioner is supplied by alternative energy sources like 48 VDC batteries or independent AC generator.

Suitable to Any Site Application

Liebert HPS ensures optimal air distribution, efficiency, energy saving, reliability and compactness independently of its configuration. More stringent requirements in terms of noise level emission and maximum external working temperature can be satisfied selecting Liebert HPS advanced version: 45 dB(A) at 3m f.f and 50° C with internal air intake conditions of 30° C, 35% R.H.

Vertiv™ Liebert® HPS

Vertiv™ Liebert® HPS

Vertiv™ Liebert® HPS

Technical Specifications

Model HPSE + HPSC		06	08	10	12	14
Evaporating side installation				Ceiling mounting		
Main power supply		230/1N/50	400/3N/50	400/3N/50	400/3N/50	400/3N/50
Emergency power supply (opt)				48V DC or 230/1N/50		
Performances						
Total cooling capacity(1)	kW	6,4	8,1	10,1	12,5	14,6
Sensible cooling capacity(1)	kW	6,4	8,1	10,1	12,5	14,6
Compressor power input(1)	kW	1,7	2,2	3,0	3,7	4,6
Condenser fan power input(1)	kW	0,24	0,24	0,12	0,15	0,15
Evaporator fan power input(1)	kW	0,18	0,35	0,35	0,33	0,33
Evaporator airflow	m^3/h	1.510	2.360	2.360	2.770	2.750
Condenser max. airflow	m^3/h	2.970	2.970	6.300	5.675	5.675
Outdoor sound pressure level(2)	dB(A)	48,5	48,5	52	54	56
Indoor sound pressure level(2)	dB(A)	58	62,5	62,5	63	63
Max. ambient temperature(3)	°C	52	50	50	50	50
Refrigeration Circuit						
Compressor type/quantity				scroll / 1		
Expansion device				thermostatic valve		
Evaporator Fan						
Quantity/type/poles version				1/Axial/4		
Driven/motor protection		direct / IP44		direct / IP54		
Condenser Fan						
Quantity/type/poles		1 / axial / 6		2 / axial / 6		
Driven/motor protection				direct / IP54		
Control system				variable speed		
Air Filtery						
Filter type / efficiency				pleated / G3		
Heating						
Electric heating (opt)	kW	1,5		4,5		
Cabinet						
Frame				galvanized steel		
Painting				polyester – RAL 7035		
Insulation type/thikness	-/mm			polyurethane class A1 /10		
Evaporator Width	mm		800		900	
Evaporator Depth	mm		800		900	
Evaporator Height	mm		310		375	
Evaporator Weight	kg	50	53	53	58	58
Condenser Width	mm	920			920	
Condenser Depth	mm	390			390	
Condenser Height	mm	840			1190	
Condenser Weight	kg	80	82	97	103	111

(1) Ref. conditions: 30°C, 35% R.H indoor air intake, 35°C outdoor.
(2) Measured with outdoor temperature 35°C, 2 meters from the unit, free field conditions (factory set).
(3) Referred to 30°C indoor air intake.
Data referred to HPS standard version (no options)

Liebert® HPW, high performance wall-mount cooling solution

Liebert® HPW is a high performance wall-mount cooling solution ideal for remote access nodes in shelters and containers. The units are packaged, outdoor, wall-mounted with the traditional upflow or downflow air delivery solutions.

- Direct expansion solution garanting the highest efficiency in a wide range of external environmental conditions as a result of its heat exchanger surface design.
- Freecooling with the highest energy saving combining the advanced circular damper system with downflow air distribution.
- Emergency freecooling with the most efficient 48V DC plug type fan to reduce the impact on the site power consumption.

Cooling availability also in emergency situations

The Network availability must be guaranteed, especially under emergency situations. Even if the main power supply fails due to natural or accidental causes, Liebert HPW controls the internal temperature by ventilating or using the freecooling system: fans, damper and control are powered through back-up power coming from DC batteries or AC power generators.

Site conditions always under control

The possibility to remotely monitor and control the site conditions facilitates immediate reaction to any situation by allowing the operator to timely interact with the unit. The standard on-board controls allow interaction with one or more units, optimizing the operation and enabling the connectivity to superior systems or third-party BMS (Dial up, SNMP, Modbus, IP communication).

Solving unfavourable installation situations

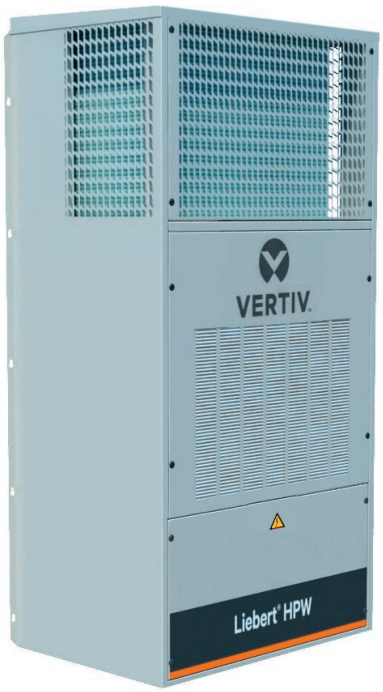
Liebert HPW is available in two versions with different airflow patterns: HPW-O (Upflow) and HPW-D (Downflow). Indipendently of the configuration, the condensing section is installed in the cabinet upper part. This simple design feature reduces installation restrictions due to environmental limitations: dusty environments, green areas and the proximity of adjacent buildings. The use of intelligent fan speed regulation and the possibility to utilise the most appropriate cabinet within the different sizes available for the required cooling capacity significantly reduces noise emissions thus allowing site operation in residential areas.

Limited energy consumption

The downflow air distribution guarantees unit Energy Efficiency Ratio values close to or higher than 3, even in critical environmental conditions (ambient temperatures higher than 40°C). This, combined with the innovative freecooling system, can drastically reduce yearly energy consumption.

Reduced installation impact

The cooling system is pre-charged and no pressure test is required on site. The installation is simplified as a result of pre-arranged air ducts (standard) and fast plug electrical connections (optional). Using the commissioning software, installation and start-up can be completed without the need for specialized personnel on site.



Technical Specifications

Model Downflow and Over		05S	06S	06M	08M	10M	13M	15M
Main power supply			230V/1N/50Hz			400V/3N/50Hz		
Emergency power supply					48VDC or 230V/1N/50Hz			
Performances Downflow (D Version)								
Total cooling capacity(1)	kW	5.5	6.3	6.5	8.9	11.7	13.0	14.9
Sensible cooling capacity(1)	kW	5.5	5.8	6.2	8.9	10.9	13.0	14.0
SHR(1)	-	1	0.92	0.95	1	0.93	1	0.94
Compressor AC power input	kW	1.26	1.63	1.46	1.90	2.66	2.56	3.29
Evaporator fan DC power input	kW	0.10	0.10	0.10	0.28	0.45	0.45	0.82
Condenser fan AC power input	kW	0.25	0.25	0.20	0.22	0.72	0.68	0.69
Evaporator airflow	m^3/h	1110	1110	1300	1950	2300	2615	2820
Freecooling airflow	m^3/h	1310	1310	1440	2420	2420	2850	3000
Condenser max. airflow	m^3/h	2610	2610	3710	3710	5660	5880	5880
Outdoor SPL(2)	dB(A)	52.5	54.0	50.0	52.0	55.0	55.0	58.0
Indoor SPL(2)	dB(A)	57.0	57.0	57.0	60.0	64.0	59.0	63.0
Max. ambient temperature(3)	°C	49.0	47.0	52.0	50.5	50.0	51.0	48.5
Performances Over (O Version)								
Total cooling capacity(1)	kW	5.3	6.0	5.7	8.2	11.1	12.0	13.8
Sensible cooling capacity(1)	kW	4.6	5.0	5.4	8.0	9.5	10.2	11.2
SHR(1)	-	0.87	0.83	0.95	0.98	0.86	0.85	0.80
Compressor AC power input	kW	1.25	1.63	1.49	1.93	2.68	2.60	3.30
Evaporator fan DC power input	kW	0.10	0.10	0.10	0.45	0.45	0.45	0.78
Condenser fan AC power input	kW	0.25	0.5	0.20	0.22	0.72	0.68	0.72
Evaporator airflow	m^3/h	1060	1060	1360	2130	2300	2300	2450
Freecooling airflow	m^3/h	1090	1090	1360	2400	2400	2700	2.840
Condenser max. airflow	m^3/h	2610	2610	3710	3710	5660	5880	5880
Outdoor SPL(2)	dB(A)	52.5	54.0	49.5	52.0	55.0	55.0	58.0
Indoor SPL(2)	dB(A)	57.0	57.0	57.0	64.0	64.0	64.0	67.0
Max. ambient temperature(3)	°C	49.5	47.5	52.0	50.0	50.0	51.0	48.5
Refrigeration Circuit								
Compressor type/quantity					scroll / 1			
Expansion device					thermostatic valve			
Evaporator Fan								
Quantity/type AC					1/Plug			2/Plug
Quantity/type DC (48V)					1/Plug			2/Plug
Condenser Fan								
Quantity/type					1 / Axial			
Speed control					variable (option)			
Air Filtery								
Filter type / efficiency					pleated / G3			
Heating								
Electric heating (opt)			1.5			3.0		6.0
Cabinet								
Frame					galvanized steel			
Painting					polyester – RAL 7035			
Insulation type/thikness	-/mm				polyethylene foam class 1			
Width	mm		800			932		
Depth	mm		450			640		
Height	mm		1690			1901		
Weight	kg	170	175	195	205	220	250	260

Data refers to 48 VDC emergency version.

(1) Values refer to 35°C outdoor temperature, nominal power supply and the following indoor conditions:

- 30°C/39,5%R.H. at the evaporating air intake side for WM 05-15 D models
- 27°C/47%R.H. at the evaporating air intake side for WM 05-15 O models

(2) Measured with 35°C outdoor temperature, at 2m from the unit, in free field conditions

(3)
- 30°C/39,5%R.H. at the evaporating air intake side for WM 05-15 D models
- 27°C/47%R.H. at the evaporating air intake side for WM 05-15 O models

Liebert® HPM air conditioners have been designed to allow maximum flexibility of application in technological environments, from data processing centers to control rooms and electronic centers for telecommunication.

Liebert® HPM range includes units with a cooling capacity from 4 to 30 kW granting complete environmental control and reliability which are paramount to ensure faultless operation of computer rooms, telecom installations, data centres and technical applications.

Liebert HPM is available in a number of airflow versions: with upflow, downflow and displacement airflow patterns across a full range of cooling versions: direct expansion (freecooling, dual fluid and constant) or chilled water.

Key Features

Precision cooling floor mount products comply with the European ErP 2015 Directive requirements, respecting environmental commitments, while reducing operating costs.

First class energy efficiency achieved through the combination of market leading technologies.

The direct expansion version has been designed for R410A Refrigerant.

Continuous monitoring of heat load ensures that only necessary kilowatts are invested in targeted cooling, thus conserving energy.

EC Fans for optimized airflow distribution

Vertiv™ Liebert® HPM – Direct Expansion version

Liebert® HPM from 4 to 30kW - Model		S0F	S0H	S1A	S1D	S1E	S1G	S2E	S2G
Total gross cooling capacity	kW	5.6	7.2	10.6	13.0	15.6	17.4	23.1	25.0
Net sensible cooling capacity	kW	5.1	7.0	9.8	10.9	13.8	15.6	19.9	21.5
Sensible Heat Ratio (SHR)		0.93	1.00	0.94	0.86	0.93	0.95	0.90	0.92
Net sensible EER		2.6	3.0	3.1	2.9	3.3	3.1	3.1	3.0
Airflow	m³/h	1560	2500	2680	2750	4200	4930	5200	5750
Internal Unit Dimensions (W x D)	mm	750 x 400	750 x 500	750 x 500	750 x 500	750 x 750	750 x 750	750 x 750	750 x 750
Weight of the Internal Unit	kg	170	195	210	215	240	250	260	270
Airflow of the Delivery (downflow, upflow, displacement/frontal)		D, U, F*	D, U, F*	D, U, F*	D, U, F*	D, U, F*	D, U, F*	D, U, F*	D, U, F*

At the following standard conditions: ambient conditions 24°C db; 50% R.H. (17°C wb) Nominal ESP 20 Pa and external temperature 35°C. The airflow of the units refers to the standard configuration with Coarse 60%.

Constant Version models: S0F, S0H, S1A, S1D

* D: Downflow, U: Upflow, F: Frontal.

Application Scenarios

Liebert® HPM Downflow

Downflow units are ideal for raised floor installation environments which are commonly found in data center applications. The Downflow unit optimizes performance in all such applications, delivering the highest efficiency of the Liebert HPM range. Suitable for:

- Raised Floor

Liebert HPM Upflow

Upflow units are designed for use in applications with top directed air distribution, including or excluding ducting systems. The inclusion of EC Fans means that the Liebert HPM Upflow is able to deliver the highest External Static Pressure (ESP), while limiting power input and maximizing output. This combination allows the Liebert HPM to deliver optimized cooling requirements, while at the same time providing the most suitable airflow and ESP to meet individual installation requirements.

Suitable for:

- Ducted Applications
- Application with limited raised floor air distribution capabilities or where raised floor is not available
- Technical room

Liebert HPM Displacement

Displacement units take their name from the displacement effect. It consists of the stratification of cold air in the lower section of the room, and hot air in the upper section. This is achieved by delivering cooled air at a very low speed. The displacement effect considerably contributes to system efficiency. The Liebert HPM Displacement unit is best suited to small applications where scalability and capacity growth are key.

Suitable for:

- Application without raised floor
- Technical rooms
- Small data rooms with cooling installed opposite racks

Vertiv™ Liebert® HPM Downflow

Vertiv™ Liebert® HPM Upflow

Vertiv™ Liebert® HPM Displacement

Vertiv™ Liebert® PDX

Liebert® PDX, equipped with variable speed compressors and Vertiv™ Liebert® iCOM™ control, has been designed to be the most efficient, reliable, flexible and smart direct expansion cooling solution for data centers.

Liebert PDX maximizes part load efficiency, compared to most common direct expansion cooling systems, therefore significantly reducing running costs.

Liebert PDX ensures precise and constant control of airflow, temperature and humidity. Thanks to its innovative design and use of advanced technologies. The synchronized actions of variable speed compressors, electronic expansion valves and electronically commutated (EC) fans, ensure higher efficiency throughout the whole year, thanks to full modulation capability at part load conditions. Liebert PDX units matches requirements for cooling continuity coming from the most trusted and adopted certification authorities for data center design and operation.

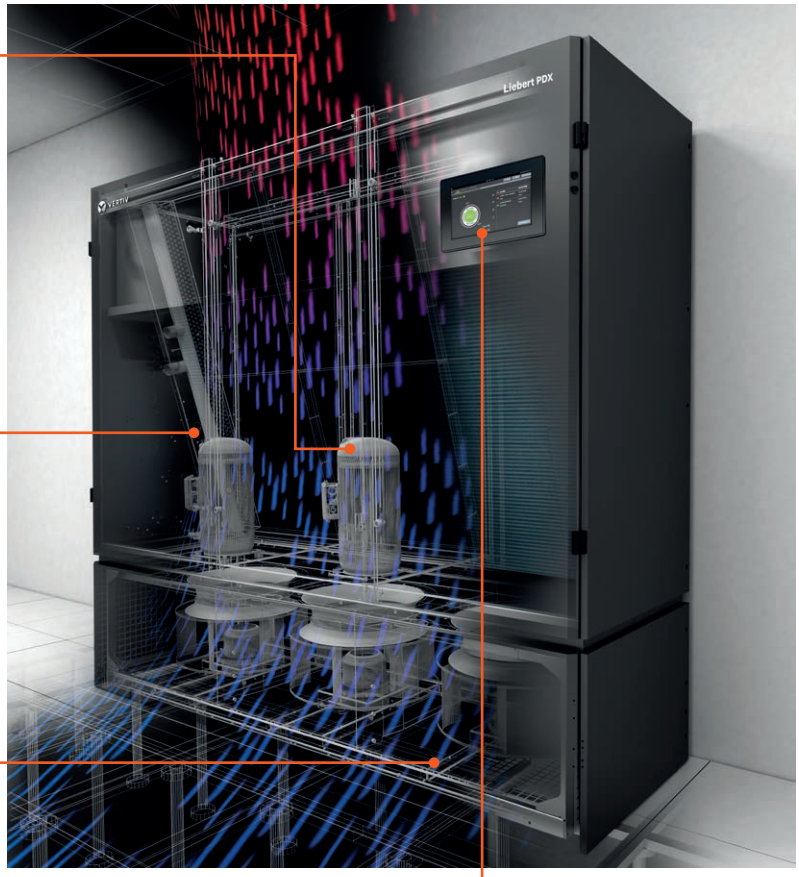
Liebert PDX enhances the inherent scalability of direct expansion systems, even on those data centers where the initial heat load is very low or subject to fluctuation. Its wider operating range allows Liebert PDX to be a step ahead of the new challenges posed by data center requirements and climate change.

Liebert PDX smart control manages and optimizes the overall system, is fully-programable via an advanced and user-friendly touch display and can be linked with common BMS protocols, allowing remote supervision.

Liebert PDX units are available with two refrigerant options:

- Liebert PDX PI family with R410A refrigerant, GWP of 2088
- Liebert PDX PAM family, with R513A refrigerant, GWP of 629 (-70% vs R410A)

Liebert PDX PAM is already compliant to the latest revision of F-GAS regulation, making use of a non-flammable refrigerant option.



Energy Efficiency

Liebert PDX, thanks to variable speed drive compressors, increases full and part load efficiency, reduces starting current and improves power factor; as a result, power consumption and energy bills are considerably lowered. Liebert PDX cooling density has been maximized, allowing for reduced footprint and leaving more space for customers to install their IT equipment.

Cooling Continuity

Liebert PDX guarantees enhanced availability and redundancy features; it can automatically manage power failures and restore quickly requested working conditions when power is back. Downtime is also minimized through the prevention of alarms and failures and real-time optimization and adaptation of working parameters.

Flexibility

Liebert PDX remains the product with the widest range of air configurations available in the marketand a full set of options and accessories to adapt to any type of data center design.

Vertiv™ Smart Liebert® iCOM™ Control

Liebert® iCOM™ control is the heart of the direct expansion cooling system, managing not only Liebert® PDX units but also outdoor heat rejection components (Vertiv™ Liebert® MC or Vertiv™ Liebert® HCR condensers). Furthermore, it features a new 7" touch screen display for quicker and easier data readability.

Vertiv™ Liebert® PDX PI Models

	Single circuit models		PI015	PI021	PI025	PI031	PI033	PI041	PI045	PI047	PI051	PI057	PI075	PI059
	Maximum net sensible cooling capacity (*)	kW	19,2	23,9	29,1	32,7	37,0	50,9	56,4	52,5	60,9	62,4	77,5	70,4
	Minimum net sensible cooling capacity (*)	kW	5,9	7,0	8,5	9,6	11,8	15,4	18,1	15,8	18,2	17,5	23,3	13,0
Compressor modulation 80% (*)	Nom. ESP	Pa	20	20	20	20	20	20	20	20	20	20	20	20
	Net Total Cooling Capacity	kW	15,8	19,8	24,5	27,8	31,9	43,2	49,3	43,7	51,1	52,0	65,4	60,6
	Net Sensible Cooling Capacity	kW	15,8	19,8	24,5	27,8	31,9	43,2	49,3	43,7	51,1	52,0	65,4	60,6
	nSHR		1	1	1	1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		4,63	4,49	4,11	3,54	3,36	3,91	3,66	4,02	3,86	4,17	3,71	3,53
	Airflow	m³/h	4049	5040	6217	7126	8163	11080	12608	11199	13104	13273	16745	13191
Compressor modulation 40% (*)	Net Total Cooling Capacity	kW	8,3	10,5	13,4	15,3	18,2	23,8	27,8	23,7	28,1	27,8	36,2	35,4
	Net Sensible Cooling Capacity	kW	8,3	10,5	13,4	15,3	18,2	23,8	27,8	23,7	28,1	27,8	36,2	35,4
	nSHR		1	1	1	1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		5,46	5,20	5,17	4,77	4,76	5,25	5,05	4,95	4,92	5,25	4,99	4,64
	Airflow	m³/h	2112	2669	3372	3911	4665	6086	7099	6047	7166	7118	9222	9045
	Dimensions (W x D)	mm			840x890			1200x890			1750x890			1200x890
	Height (H)	mm						1970						2570
	Weight	kg	315	316	336	358	358	471	472	640	641	688	754	584
	Aiflow Delivery													
	Down Flow UP - Fans Over the Raised Floor		•	•	•	•	•	•	•	•	•	•	•	•
	Down Flow UP - Frontal air delivery		•	•	•	•	•	•	•	•	•	•	•	
	Down Flow UP - Back air Delivery													
	Down Flow Down - Fans in the Raised Floor							•	•	•	•	•	•	•
	Up Flow		•	•	•	•	•	•	•	•	•	•	•	•
	Cooling Version:													
	Air Cooled		•	•	•	•	•	•	•	•	•	•	•	•
	Water Cooled				•				•					•
	Dual fluid (Chilled water + DX Air Cooled)				•				•					•
	Dual fluid - Chilled water + DX Water Cooled				•				•					
	Freecooling				•				•					
	EconoPhase													

* Performance at RAT 30°C / RH 35% - Condensing temperature 45°C - Downflow up air configuration. CE units - Power supply 400V/3ph/50Hz - High Power EC Fans - Refrigerant R410A

	Double circuit models		PI044	PI054	PI062	PI074	PI068	PI082	PI094	PI104	PI120	PI092	PI150	PI165
	Maximum net sensible cooling capacity (*)	kW	56,0	62,0	73,1	82,9	78,5	97,4	105,1	112,8	136,2	94,3	169,3	176,2
	Minimum net sensible cooling capacity (*)	kW	8,6	9,4	11,3	13,1	12,5	13,5	15,1	16,8	22,2	13,5	22,2	24,9
Compressor modulation 80% (*)	Nom. ESP	Pa	20	20	20	20	20	20	20	20	20	20	20	20
	Net Total Cooling Capacity	wW	45,2	51,1	60,4	70,5	64,8	79,2	87,1	95,4	119,8	80,7	146,4	153,7
	Net Sensible Cooling Capacity	kW	45,2	51,1	60,4	70,5	64,8	79,2	87,1	95,4	119,8	80,7	146,4	153,7
	nSHR		1	1	1	1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		4,42	4,32	3,99	3,66	4,71	4,15	4,04	3,91	3,35	3,69	3,65	3,51
	Airflow	m³/h	11546	13093	15414	18134	16921	20667	22769	24854	31292	20603	38428	40076
Compressor modulation 40% (*)	Net Total Cooling Capacity	kW	21,8	23,8	28,6	32,8	31,2	45,2	49,5	55,1	69,8	36,3	83,3	90,1
	Net Sensible Cooling Capacity	kW	21,8	23,8	28,6	32,8	31,2	45,2	49,5	55,1	69,8	36,3	83,3	90,1
	nSHR		1	1	1	1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		4,14	4,20	4,03	3,94	4,53	5,10	5,10	5,04	4,66	4,21	4,99	4,83
	Airflow	m³/h	5590	6113	7311	8490	8129	11686	12881	13984	18157	9239	21719	23299
	Dimensions (W x D)	mm			1750x890				2550x890			1750x890	3350x890	
	Height (H)	mm					1970						2570	
	Weight	kg	671	682	723	708	935	957	967	987	1006	811	1496	1544
	Aiflow Delivery													
	Down Flow UP - Fans Over the Raised Floor		•		•	•	•	•	•	•	•	•	•	•
	Down Flow UP - Frontal air delivery		•		•	•						•	•	
	Down Flow UP - Back air Delivery													
	Down Flow Down - Fans in the Raised Floor		•		•	•	•	•	•	•	•	•	•	•
	Up Flow		•		•	•	•	•	•	•	•	•		
	Cooling Version:													
	Air Cooled		•	•	•	•	•	•	•	•	•	•	•	•
	Water Cooled				•					•				
	Dual fluid (Chilled water + DX Air Cooled)				•					•				
	Dual fluid - Chilled water + DX Water Cooled				•					•				
	Freecooling				•					•				
	EconoPhase							•	•	•	•		•	•

Vertiv™ Liebert® PDX PAM

	Single circuit models		PAM010	PAM020	PAM030	PAM060	PAM080
	Maximum net sensible cooling capacity (*)	kW	15,7	20,2	30,5	59,7	75,7
	Minimum net sensible cooling capacity (*)	kW	3,0	3,8	6,8	5,6	10,4
Compressor modulation 80% (*)	Nom. ESP	Pa	20	20	20	20	20
	Net Total Cooling Capacity	kW	11,9	15,5	24,2	46,9	61,0
	Net Sensible Cooling Capacity	kW	11,9	15,5	24,2	46,9	61,0
	nSHR		1	1	1	1	1
	Unit Net Sensible EER		3,62	3,81	3,52	4,05	4,13
	Airflow	m3/h	3016	3925	6107	11791	15413
Compressor modulation 40% (*)	Net Total Cooling Capacity	kW	6,9	8,6	13,4	21,3	33,6
	Net Sensible Cooling Capacity	kW	6,9	8,6	13,4	21,3	33,6
	nSHR		1	1	1	1	1
	Unit Net Sensible EER		4,57	4,78	4,94	3,44	4,73
	Airflow	m3/h	2027	2256	3396	5380	8492
	Dimensions (W x D)	mm	750x750	844x890		1750x890	2550x890
	Height (H)	mm			1970		
	Weight	kg	285	354	363	730	937
	Aiflow Delivery						
	Down Flow UP - Fans Over the Raised Floor		•	•	•	•	•
	Down Flow UP - Frontal air delivery		•	•	•	•	•
	Down Flow UP - Back air Delivery						
	Down Flow Down - Fans in the Raised Floor						
	Up Flow		•	•	•	•	•
	Cooling Version:						
	Air Cooled		•	•	•	•	•
	Water Cooled					•	•
	Freecooling						
	EconoPhase						

* Performance at RAT 30°C / RH 35% - Condensing temperature 45°C - Downflow up air configuration. CE units - Power supply 400V/3ph/50Hz - High Power EC Fans - Refrigerant R410A

• Available on demand


ALARM
DATE/TIME
TEMP CNTRL SENSOR
FAIL
ROOM SENSOR
FAILURE
RETURN
23°C
SUPPLY
Fan 0%
Cooling 0%
Acknowledge All

Liebert® DCL, Granting Continuous Availability for Modular Rack Cooling

The Liebert® DCL is the Thermal Management unit for lateral attachment to server cabinets offering a wide range of features designed specifically for data center applications. The unit is available in two different architectures, closed or hybrid loop, and in multiple combinations of up to four server racks to match any customer needs.

Closed Loop Cooling Architecture

- Fully contained airflow inside the cabinet or the cabinet row
- No heat load, no airflow in the room, significant noise attenuation
- Complete separation of IT equipment from room, accurately controlled cooling air temperature
- No special requirements for the room - raised floor is not required.

Hybrid Cooling Architecture

- “Hybrid” configuration - airflow is contained in the cabinet or cabinet row and room
- Cooling units and cabinets are open at the front and closed at the back
- No heat load in the room, warm air remains inside cabinets
- Distribution of cold air throughout the room, cold air reserve in case of cooling system failure
- Better alternative to hot aisle containment
- No raised floor required.

Ensuring Endless Availability Under All Working Conditions

- ”Fail-safe“ functioning (“safe despite faults”) in the event of a controller failure, the control valve switches the full volume of the chilled water flow to heat exchangers and the fans to full speed
- With integrated Vertiv™ Liebert® ICOM™ Control, the Liebert DCL is able to monitor variations in temperature and humidity, instantly adapting its performance to meet variations in heat load
- Access control and data security guaranteed by HTTPS and SNMP V3
- Local and remote (via BMS) alarm management
- Fan speed automatically adjusted in real time to follow changing airflow requirements of IT equipment
- Even air distribution to all internal IT components
- Even temperature profile in the air supply
- n+1 fan redundancy means that the remaining fans support the volume flow required for cooling in the event of a fan failure

Vertiv™ Liebert® DCL

Modularity

- Two cooling architectures for medium to high heat-load density
- Easy to retrofit on site
- Multiple combinations of up to four server racks.

Reliability

- N +1 fan redundancy
- Multi-level “fail-safe” controller
- Comprehensive alarm and monitoring functions
- Automatic emergency door opening.

Energy Efficiency

- Minimized power consumption through EC fans and dynamicfan control
- Long freecooling times thanks to a generously dimensioned heat exchanger.

- Non return flaps to avoid bypass of cold air through stand-by unit or through a failed fan
- Redundant A/B power supply with automatic operation
- Dual-circuit heat exchanger option ensures redundancy of the water supply if two independent chilled water circuits are installed
- Automatic door opening provides additional overheating protection in case of cooling system failure.

Top-Tier Efficiency and Adaptability

- Greater power density in the data center results in better utilization of space and reduced building costs
- High chilled water supply temperature increases the proportion of freecooling during refrigeration and improves the energy efficiency rating (EER) of the chiller
- The control valve adjusts cold water volume flow for the current operational situation
- Low water-side pressure drop leads to reduced pump power consumption
- Energy cost savings by adjusting the fan speed to the airflow level actually required using the embedded controller
- Low air pressure drop leads to the fans using less power
- EC fans guarantee energy efficient operation with maximum performance over the entire range of fan speeds
- Optional cooling capacity meter to inform the operator about cooling output of the unit (kW)
- Minimum possible investment for cooling components thanks to the option to use up to four server racks for each Vertiv™ Liebert® DCL
- Facilitates data center upgrade through its gradual expansion with no need to invest further in different cooling infrastructures
- Can be adapted to different shapes and spaces
- Heights 2000 mm and 2200 mm
- Depths 1200 and 1300 mm
- Simple switchover between 2-way and 3-way valve by means of a ball valve in the bypass line.

Standard Features and Options

- Field adjustable 2 way / 3 way valve
- 0-10V valve actuator
- Top / Bottom piping connections
- Energy efficient EC Fans
- Vertiv™ Liebert® ICOM™ Control with large coldfire display "Fail Safe" design
- Unit provided with castors and levelling feet
- Return and supply air temperature sensors
- Rack temperature sensors
- Alarms monitoring.

Additional Options

- Smoke detection
- Leak detection
- Automatic door release in case of cooling failure
- Door status monitoring
- Double CW feed version
- Condensate pump
- Double Power Supply
- BMS monitoring via multiple communication protocols
- Cooling capacity meter

Technical Specifications

Model		DC032	DC038
Net Sensible Cooling Capacity	kW	30,0	34,6
Airflow	m^3/h	4.850	6.000
Number of Fans	Nr	4	6
Vertiv Knürr DCM Units Height		42 U / 47 U	
Dimenstions			
Unit Height	mm	2000 / 2200	
Unit Width	mm	300	
Unit Depth	mm	1200 / 1300	

Note: The performances shown above refer to an air inlet temperature of 37°C and chilled water temperature of 10/15°C for a closed loop configuration with racks on both sides.

Vertiv™ NetXtend M Series, Robust Outdoor Solution for Radio and Transmission Equipment

A cost-efficient outside plant solution, the NetXtend M Series enables you to quickly and economically create the ideal operating environment for your sensitive electronic equipment.

Featuring a robust enclosure design with insulated, single-skin aluzinc walls treated with advanced corrosion resistant powder paint, this solution is extremely durable in tough environments and withstands heavy rain, wind, dust, lightning and electromagnetism. Available in three standard sizes offering internal space of 20U, 35U and 44U for customer equipment (19"), power and batteries. Multiple thermal options include fan filter, air-conditioners, heat exchangers and thermal electrical coolers that are integrated in the door and easy to upgrade onsite. The enclosure door includes a three point locking system and hidden stainless steel hinges for added security.

The NetXtend M Series is ideally configured with the Vertiv™ NetSure™ 5100 or the Vertiv™ NetSure™ 7100 DC power system, both available in several models; a compact series of power dense systems for applications where space is limited, a high temperature series with environmental endurance up to +65 °C without deration, a hybrid series with pluggable DC-DC and solar converters, and a standard series for maximum cost efficiency. All NetSure™ 5100 and NetSure™ 7100 systems are equipped with the latest NetSure Control Unit (NCU), where data and control is available for all aspects of the power chain, including AC mains, DC power plant, battery backup, diesel generator and the local site environment.

The NetXtend M Series offer several options for DC distribution, surge protection, battery shelves, racks, lighting, locking cylinders and other accessories, as well as a wide selection of batteries.

It is delivered pre-cabled, tested, and fully integrated for rapid deployment. Thanks to predefined modular options, along with production in central Europe, there's no need to choose between customization and speed to market - the NetXtend M Series provides both.

Application

The NetXtend M Series is specifically designed for wireless access networks and the need for power density, cost efficiency and speed to market that is characteristic of these types of applications. With a variety of Vertiv™ NetSure™ DC power systems to choose from, the NetXtend M Series supports on-grid, bad-grid and off-grid applications.

Vertiv™ NetXtend M35 system with fan filter and separate compartment for batteries with Thermal Electrical Cooler

Key Features

- Standardized enclosure platform with predefined modular options enables cost effective, fast and reliable network implementation
- Robust construction in three standard models; M20, M35 & M44
- Reliable & efficient power supply with NetSure DC power systems
- Advanced and secure monitoring including start up wizard and user-friendly web-interface
- Multiple climate management solutions optimizes energy efficiency for any application and environment
- Reliable backup with wide variety of battery options
- Standardized modularity with several options of AC and DC distribution, surge protection, etc.
- Adheres to international standards.

Technical Specifications

Enclosure	M20	M35	M44
Dimensions, Enclosure Body (H x W x D)	1005x730x750 mm	1672x730x750 mm	2072x730x750 mm
Enclosure Body	Aluzinc and Insulated (heat transfer 2,5 W/(m2,K)), powder paint RAL 7035		
Roof	Slanted (inlcuding closed rivet nuts for lifting eyebolts)		
Rack Width	19" for customer equipment, 19" or 23" for NetSure DC power system		
Rack Height (total)	20U	35U	44U
Battery Shelves (optional)	up to 2x8U	up to 4x8U	
Weight (empty)	55 kg	75 kg	95 kg
Locking type (different cylinders available)	2- or 3-point locking	3-point locking system	
Cable Inlet Type	2xMC10/25/35/51, 1xPG21, 1xPG29, 1xPG36		
Mounting	Ground (C-bars*), height 125 mm, wall or pole	Ground (C-bars*), height 125 mm	
Accessories	Light, door contact, alarm terminal, ground, cable tray, locking handle options, document holder, smoke detector etc.		

* Front and rear cover as option

Climate Solution Options		
Fan Filter (VDC)	600/1200/2000 W, ΔT 5K, (supply air vs. ambient)	
Air-conditioner (VAC/VDC) (operating up to +55 °C)	400-850 W	400-2000 W
HEX (VDC)	H65 W/K	H65/H105 W/K
Thermal Electrical Cooler (VDC)	200 W (for battery compartments)	
Heater (VAC)	250/800 W	
Thermal Zones/Compartments	One	One to two

Environmental	
Temperature	-33 to +50 °C
Operational, Transportation, Storage	ETSI EN 300 019-1-4 class 4.1, ETSI EN 300 019-1-2 class 2.3, ETSI EN 300 019-1-1 class 1.2
Protection	IP55 (IEC 60529), rain test (IECEN/UL 60950-22 annex B)
Impact	IK 10 (EN 50102)
Audible Noise (fan filter and HEX)	Rural (ETS 300 753 class 4.1E)

DC Power Equipment	
NetSure 5100 or NetSure 7100 incl NetSure Control Unit (NCU)	6-31.5 kW combined output power Peak efficiency > 96% For operating temperature range please see respective DC Power data sheet Available with Solar and +24VDC Converters, for On-Grid and Off-Grid Applications Remote monitoring, secure connectivity, battery and alarm management, user friendly interface, etc.

AC Distribution	
Input, Nominal	Single Phase: 220 VAC to 240 VAC, 3-phase: 380 VAC to 415 VAC
Surge Protection	Class C or Class B+C
Configurable components	Main switch/circuit breaker, circuit breakers, service outlet/RCD, connection for generator

Standards Compliance	
CE, RoHS 6, REACH	Compliant
Safety	EN60950-1 (-22)
EMC	ETSI EN 300386 class B
Corrosion Resistance	EN60950-22 and ISO 21207 method B (corrosion resistance 20-50 years)

The converged NetSure™ Inverter Series powers AC and DC loads in a single subrack with a common battery bank, freeing up floor space while minimizing energy loss and lowering energy consumption.

Improve reliability and save space

The converged NetSure Inverter AC and DC power system delivers outstanding reliability, modularity and scalability. With market leading power module density, a single system houses both AC and DC power in a compact footprint. Rectifiers and inverters can be fed from the same battery bank, saving additional space and financial investment.

Converged NetSure inverter systems deliver superior reliability and enable hours of battery backup when required. Systems include 1.2kW AC inverters and 2kW rectifiers with up to 14.4kW AC and 24kW DC power in a single system.

To accommodate AC backup needs at existing sites, an easy-to-install 1U high front access NetSure inverter add-on shelf is available that delivers up to 7.2kW.

Minimize energy loss

Converged NetSure inverter systems are designed for efficient operation at any load condition. High-efficiency Vertiv™ eSure™ rectifiers are available up to >98% efficiency.* The I230-1200 Vertiv™ VAC eSure™ inverter operates up to a market-leading 96.3% efficiency. Powering your AC and DC loads with Vertiv™ eSure™ technology ensures energy loss is kept to a minimum and your network is supported by an extremely reliable backup system.

Vertiv™ NetSure™ Inverter System 19", 12 kW DC / 5 kVA AC

Vertiv™ NetSure™ Inverter 19" Cassette

Benefits

- Free up floor space by powering AC and DC loads in a single subrack with a common battery bank
- Minimize energy consumption with up to 98% rectifier power efficiency* and 96.3% inverter efficiency in normal AC-AC mode
- Maximize site availability thanks to zero transfer time from grid to battery
- Seamlessly manage your complete back-up solution locally or remotely through a single interface

System Elements

1. AC & DC Distribution Panel
2. Vertiv™ NetSure™ Control Unit
3. Vertiv™ eSure™ Inverters, I230-1200
4. Vertiv™ eSure™ Rectifiers, R48-2000E3

*Using Vertiv™ NetSure™ 7100 systems with R48-3500E4 rectifiers paired with the stand-alone NetSure Inverter 19" Cassette.

Technical Specifications

Part Number	02405672 BMK1115601-002	02405671 BMK1115601-001	02405674 BMK1115601-004	02405673 BMK1115601-003	02405676 BMK1115601-006	02405677 BMK1125608-001
Description	23", 24 kW DC/15 kVA	23", 12 kW DC/7.5 kVA	19", 20 kW DC/12.5 kVA	19", 10 kW DC/6.25 kVA	19", 12 kW DC/5 kVA	19" cassette, 3.75 kVA
AC Input – Rectifiers						
Range	Single phase: 85 VAC to 300 VAC (Nominal: 200 VAC to 240 VAC)					–
Line Frequency	50 Hz / 60 Hz (45 Hz to 65 Hz)					–
Connections	Terminal and input mains circuit breaker					–
Surge Protection	Included				-	–
AC and DC Input – Inverters						
Range	Single phase: 185 VAC to 275 VAC (Nominal: 200 VAC to 240 VAC) DC supply: 40 VDC to 58.5 VDC (Nominal: 48 VDC)					
Line Frequency	50 Hz / 60 Hz (47 Hz to 53 Hz / 57 Hz to 63 Hz)					
Connections	Terminal and input mains circuit breaker					
Surge Protection	Included				-	-
DC Output						
Adjustable Range	-42 VDC to -58 VDC (Nominal: -48 VDC)					–
Power, Maximum	24 kW (12 x 2 kW)	12 kW (6 x 2 kW)	20 kW (10 x 2 kW)	10 kW (5 x 2 kW)	12 kW (6 x 2 kW)	–
Load, Maximum	22 kW	10 kW	18 kW	8 kW	10 kW	–
Efficiency, Peak	96.3%					–
DC System Units						
Distribution (18 mm MCBs)	Up to 9 x 1P (3-63 A)	Up to 13 x 1P (3-63 A)	Up to 6 x 1P (3-63 A)		Up to 4 x 1P (3-63 A)	–
MCBs (default configuration)	13 x 32 A		6 x 32 A		2 x 32 A + 2 x 63 A	–
Priority load management	Yes	Yes	Yes	Yes	–	–
Battery Connections	3 x 200 A circuit breakers			2 x 200 A circuit breakers		–
AC Output						
Range	Single phase: 200 VAC to 240 VAC (Nominal: 230 VAC)					
Line Frequency	50 / 60 Hz (50 Hz to 60 Hz)					
Power, Maximum	15 kVA/14.4 kW (12 x 1.25 kVA/1.2 kW)	7.5 kVA/7.2 kW (6 x 1.25 kVA/1.2 kW)	12.5 kVA/12 kW (10 x 1.25 kVA/1.2 kW)	6.25 kVA/6 kW (5 x 1.25 kVA/1.2 kW)	5 kVA/4.8 kW (4 x 1.25 kVA/1.2 kW)	3.75 kVA/3.6 kW (3 x 1.25 kVA/1.2 kW)
Load, Maximum	13.75 kVA/13.2 kW	6.25 kVA/6.0 kW	11.25 kVA/10.8 kW	5.0 kVA/4.8 kW	3.75 kVA/3.6 kW	2.5 kVA/2.4 kW
Efficiency, Peak	96.3% (AC mode); 93.5% (DC mode)					
AC System Units						
Distribution (18 mm MCBs)	Up to 9 x 1P (3-20 A recommended)	Up to 9 x 1P (3-10 A recommended)	Up to 7 x 1P (3-20 A recommended)	Up to 7 x 1P (3-10 A recommended)	Up to 3 x 1P (3-10 A recommended)	1 x 1P 12 A circuit breaker (1U)
MCBs (default configuration)	9 x 10 A	9 x 6 A	7 x 10 A	7 x 6 A	1 x 10 + 2 x 6 A	1 x 1P 12 A circuit breaker
Service outlet	6 A DIN socket and 30 mA residual current device		–	–	–	–
Transfer Performance	0s from grid to battery					
DC Current Consumed	Max 27 A per inverter module (at 48 VDC)					
Manual Bypass	Standard	Standard	Standard	Standard	NA	NA
Physical Characteristics						
Dimensions (H x W x D)	554.1 x 583.6 x 367.0 mm	465.0 x 583.6 x 367.0 mm	554.1 x 482.5 x 367.0 mm	465.0 x 482.5 x 367.0 mm	289.0 x 482.5 x 367.0 mm	44.1 x 482.5 x 367.0 mm
Weight (excluding modules)	45 kg	42 kg	39 kg	36 kg	20 kg	4 kg
Access and Security	Front access, IP20					
Environmental						
Temperature Range, Operating	-5 °C to +65 °C (full power up to +45 °C)					
Relative Humidity, Operating	<95%					
Altitude	3000 m, 10000 ft. (2000 m, 6562 ft. at full power)					
Standards Compliance						
Electrical	EN 62368-1:2014/A11:2017, EN 62040-1:2008+A1:2013					
EMC	ETSI EN 300 386 V2.1.1 (Conducted class A, Radiated class B)					
Environmental	REACH, RoHS 6					

Priority Range

Additional configuration options are available in our Vertiv™ Knürr™ IT Special Catalog

Vertiv™ Knürr™ MIR2 All-in-One server and network cabinets

Material

- Extruded aluminum profile.
- Die-cast aluminum corner connectors.
- Galvanized sheet steel cladding panels.
- Sheet steel doors.

Installation dimensions in accordance with IEC 60297-1 and IEC 60297-2

- Height: 42 U / 47 U.

Capacity

- Front stowing space 80 mm to 215 mm.
- Internal hinge: 130° as a cabinet row, 160° as a single cabinet.

Installation types

- Stationary, or mobile.

Surface/color

- Polished base frame
- Visible panel surfaces. Powder-coated black-gray RAL 7021 and light gray RAL 7035.

Static load

- 8000 N (stationary version).
- 4000 N (mobile version).

Tests depending on version

- Grounding and protective conductor testing. In accordance with DIN EN 60950.

	Dimensions			Doors		19" Extrusions		Cover parts						Colour
	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Option Matrix	Rack Height	Rack Width	Rack Depth	Front Door	Rear Door	19" Vertical Extrusion Front	19" Vertical Extrusion Rear	Cover	Base	Side Panels	Packaging	Stowing depth 19" extrusion / insertion depth	Free	Colour
N= (P) Vertiv™ Knürr™ MIR2 Rack	B= (P) 42 U	8= (P) 800 mm	E= (P) 1000 mm	A= (P) Single-leaf glass door, right	A= (P) Single-leaf glass door, right	A= (P) 19" vertical server extrusion with air partition and 1U covers	S= (P) 19" server extrusion	B= (P) Cover with cable inlet to rear and Coolblast fan option	F= (P) no base, with adjustable feet	B= (P) Left and right side panels	X = (P) Standard packaging	A= (P) 80/740mm*	X (P)	1= (P) RAL 7035
	D= (P) 47 U		G= (P) 1200 mm	B= (P) Single-leaf sheet steel door, right	B= (P) Sheet steel door single-leaf, right	S= (P) 19" server extrusion	X= (P) without extrusions	C= (P) Cover with cable inlet to rear	G= (P) Stationary base, 100 mm, perforated front/rear	L= (P) Left side panel		D= (P) 123/740mm*		8= (P) RAL 7021
				C= (P) Perforated sheet steel door, single-leaf, right	C= (P) Sheet steel door perforated, single-leaf, right	X= (P) without extrusions		E= (P) Cover with side cable inlet	R= (P) mobile using rollers	R= Right side panel		G= (P) 150/740mm*		X= (P) no color**
				F= (P) Double-leaf sheet steel door	F= (P) Double-leaf sheet steel door			X= (P) without cover		X= (P) open to left and right				
				G= (P) Perforated sheet steel door, double-leaf	G= (P) Perforated sheet steel door, double-leaf									
				X= (P) Without door	X= (P) Without door									

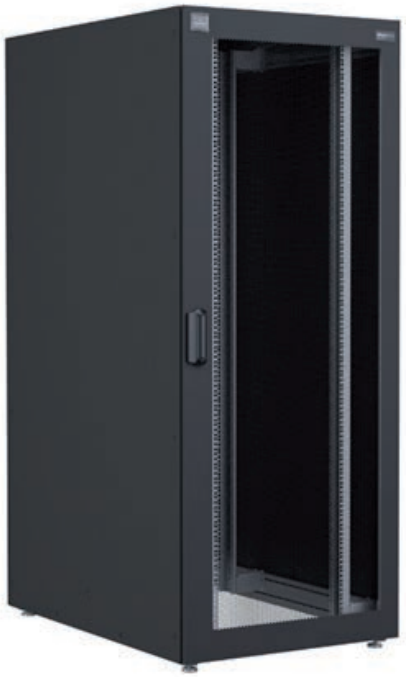
(P) = **assemble to order** (shipped within 5 working days). Caution: In case of larger orders, delivery times may increase.

Note:

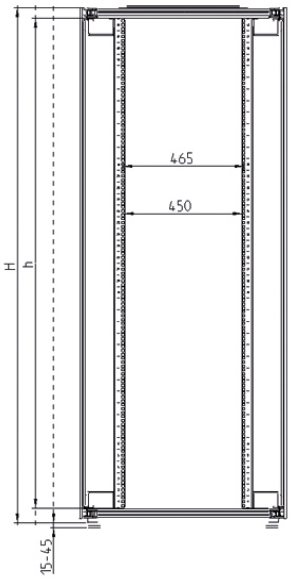
* *This option is not available for all cabinet widths, cabinet depths, installation depths and insertion depths.*

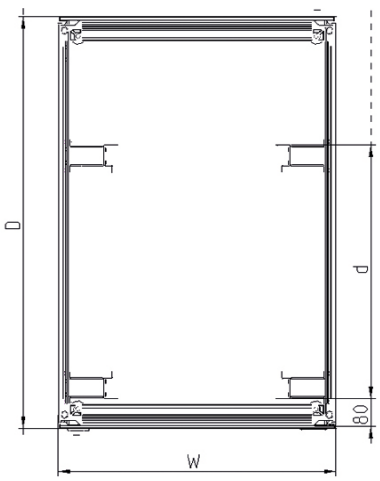
** *Please use "X" if no cladding panels are selected.*

SELECT YOUR OPTIONS



Vertiv™ Knürr™ MIR2 Server Rack





Vertiv™ Knürr™ MIR2 – Server Cabinet Features

- With fixed 19” installation from front and rear for installations in accordance with IEC 297-3.
- Perforated single-leaf front and rear doors.
- Special 19" server extrusions to accommodate all standard 19" servers.
- Installations in accordance with IEC 297-3.
- Cable inlet via floor and via cover.
- Cable inlet at cover rear completely removable, making cover assembly/ disassembly possible after cabling.

Stowing space

- To front 80 mm.

Load-bearing capacity

- 8000 N static.

Protection class

- IP 20.

Tests

- Grounding in accordance with VDE 0100 T 540.
- Grounding in accordance with DIN EN 60950.
- IP test in accordance with EN 60529.

Material/ Surface

- Extruded aluminum profile base frame
- Plain die-cast aluminum corner connectors
- Galvanized sheet steel panels, powder-coated structure.
- Sheet steel doors, powder-coated structure.
- 19" extrusions, 2.0 mm sheet steel, galvanized.

Color

- x = .1 visible surfaces and cladding panels RAL 7035 light gray.
- x = .8 visible surfaces and cladding panels RAL 7021 black-gray.

Scope of delivery

- 1 x base frame.
- 4 x 19" sheet steel server extrusions incl. U marking.
- 2 x side panels with quick locks.
- 1 x cover with rear cable inlet (sliding panels in three parts, may also be opened complete).
- 1 x front door, single-leaf with handle and receptacle for locking cylinder.
- 1 x rear door, single-leaf with handle and receptacle for locking cylinder.
- 1 x grounding set, complete (VDE 0100).
- 4 x leveling feet

How supplied

- Assembled.

Note

- For drawers, pull-out shelves and chassis rails please also order extrusion adapter 01.147.640.9.

W	H	D	U	h	d	kg	Order No.	UP
800	1969	1000	42	1873	740	107	**01.157.011.x-026**	1 unit P
800	2191	1000	47	2095	740	116	**01.157.011.x-036**	1 unit P
800	1969	1200	42	1873	740	111	**01.157.011.x-028**	1 unit P
800	2191	1200	47	2095	740	123	**01.157.011.x-038**	1 unit P

Priority Range

Additional configuration options are available in our Vertiv™ Knürr™ IT Special Catalog

Vertiv™ Knürr DCM™ Heavy Duty Cabinet

Material

- Extruded aluminum profile.
- Die-cast aluminum corner connectors.
- Galvanized sheet steel cladding panels.
- Sheet steel doors.

Installation dimensions in accordance with IEC 60297-1 and IEC 60297-2

- Height: 42 U / 47 U

Capacity

- Front stowing space 80 mm.
- Internal hinge: 130° as a cabinet row, 160° as a single cabinet.

Installation types

- Stationary, or mobile.

Surface/color

- Plain base frame
- Visible panel surfaces powder-coated black-gray RAL 7021.

Static load

- 15000 N (stationary version).
- 10000 N (mobile version).

Tests depending on version

- IP test in accordance with IEC 60529.
- Grounding and protective conductor test in accordance with DIN EN 60950.

	Dimensions			Doors		19" Extrusions		Covers			Packaging			Colour
1	2 Rack Height	3 Rack Width	4 Rack Depth	5 Front Door	6 Rear Door	7 19"-Front Vertical Extrusion	8 19"-Rear Vertical Extrusion	9 Cover	10 Plinth	11 Side Panel	12 Packaging	13 19" vertical extrusion, mounting position front and space between	14 Free	Colour
D= (P) Vertiv™ Knürr™ DCM Rack	B= (P) 42 U	8= (P) 800 mm	E= (P) 1000 mm	A= (P) Single glass door	A= (P) Single glass door	A= (P) 19" vertical server extrusion with air containment and 3x1 U cut-outs*	S= (P) 19" vertical server extrusion	C= (P) Top cover with cable entry	F= (P) Stationary without base. Only adjustable feet are height-adjustable	B= (P) Both sides	X= (P) Standard packaging	A= (P) 80/740mm	X (P)	(P) 1= RAL 7035
	D= (P) 47 U		G= (P) 1200 mm	B= (P) Single steel sheet door	B= (P) Single steel sheet door	S= (P) 19" vertical server extrusion	X= (P) Without 19" extrusions	E= (P) Cover with lateral cable entry	G= (P) Base stationary 100mm, with vent slots	L= (P) Left		D= (P) 123/740 mm		8= (P) RAL 7021
				C= (P) Perforated single door	C= (P) Perforated single door			X= (P) Without cover	R= (P) With rollers	R= (P) Right		G= (P) 150/740 mm		X= (P) without colour**
				F= (P) Sheet steel double door	F= (P) Sheet steel double door					X= (P) Without				
				G= (P) Sheet steel perforated double door	G= (P) Sheet steel perforated double door									
				X= (P) Without door	X= (P) Without door									

Configuration example:

Product	Height	Width	Depth	Front Door	Rear Door	19"- Front Vertical Extrusion	19"- Rear Vertical Extrusion	Cover	Plinth	Side Panel	Packaging	Free	Free	Colour
D	B	8	F	G	X	A	X	C	B	L	X	A	X	8

Note:

* *This option is not available for all cabinet widths, cabinet depths, installation depths and insertion depths.*

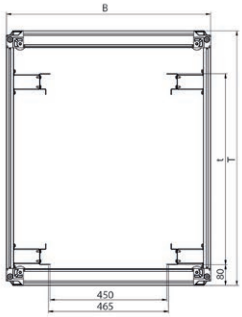
** *Please use "X" if no cladding panels are selected.*

(P) = **assemble to order** (shipped within 5 working days). Caution: In case of larger orders, delivery times may increase.

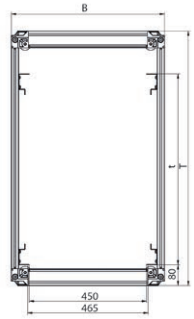
- Vertiv™ UPS systems for rail match to three-phase critical load characteristics and load power demands, ranging from a few kVA up to 1.5 MVA.
- Electrical noise can appear on lines, or frequency variations, or harmonics in the voltage, but a UPS system reconciles any of these problems by conditioning incoming power to eliminate spikes, swells, sags, noise and harmonics.

DCM20003
stationary

DCM20022
mobile



DCM20063
Cut width 800 mm, stationary



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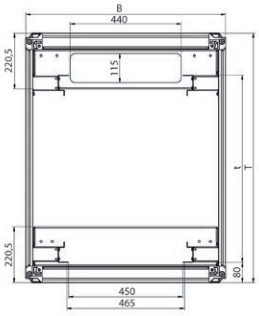
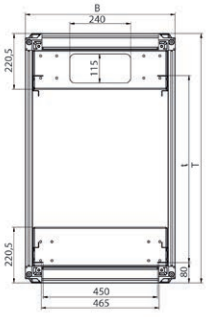


DCM20065
Cut width 800 mm, mobile



DCM20064
Cut width 600 mm, mobile

Vertiv™ Knürr DCM™ Heavy Duty Cabinet 19” Server Cabinet

Width 600 and 800, stationary and mobile

- Perforated front door.
- Perforated door leaf to rear.
- Special 19” server extrusions to accommodate all standard 19” servers.
- Installations in accordance with IEC 297-3.
- Cable inlet via floor and via cover.
- Cable inlet at cover rear completely removable, making, making cover assembly/disassembly possible after cabling.
- In mobile version with heavyweight rollers with excellent ground clearance.

Stowing space

- To front 80 mm.

Load capacity

- 15,000 N static.
- 10,000 N mobile in RZ with load.

Protection class

- IP 20.

Tests

- Grounding in accordance with DIN EN 60950.
- Mobile version: Grounding in accordance with VDE 0100 T 540.
- IP test in accordance with DIN 40 050 / IEC 529.

Flow cross-section

- Perforation 83 %.

Material / Surface

- Extruded aluminum profile base frame, polished.
- Die-cast aluminum corner connectors, polished.
- Sheet steel doors, powder-coated structure.
- Galvanized sheet steel panels, powder-coated structure.
- 19" extrusions, 2.0 mm sheet steel, galvanized.

Color

- Visible panel surfaces.
- RAL 7021 black-gray.

Scope of delivery

- 1 base frame.
- 4 19” server extrusions, sheet steel incl. U marking.
- 2 side panels with quick locks.
- 1 Cover with cable inlet (sliding panels in three parts, may also be opened complete).
- 1 Front door, single leaf, perforated with handle and receptacle for locking cylinder.
- 1 Rear door, double leaf, perforated, sheet steel, with handle and receptacle for locking cylinder.
- 4 leveling feet.
- 1 grounding set, complete (VDE 0100).
- Mobile version: also includes 2 roller mountings with heavyweight rollers with integrated cable inlets.

How supplied

- Assembled.

Note

- For assembling Vertiv™ Knürr™ accessories, please also order fixing adapter for 19” server extrusion.

W	H	D	U	d	kg	Version	Part No.	PU
800	2000	1200	42	740	132	stationary, with side panels	DB8GCGSSCFBXXX8	1 pc
800	2200	1200	47	740	136	stationary, with side panels	DD8GCGSSCFBXXX8	1 pc
800	2000	1200	42	740	92	stationary, without side panels	DB8GCGSSCFXXXX8	1 pc
800	2200	1200	47	740	94	stationary, without side panels	DD8GCGSSCFXXXX8	1 pc
800	2200	1200	47	740	146	mobile, with side panels	DD8GCGSSCRBXXX8	1 pc
800	2200	1200	47	740	104	mobile, without side panels	DD8GCGSSCRXXXX8	1 pc

Services

Guarantee continuity to your business activities with a service partner who stands by you throughout your critical equipment lifecycle. From the project phase with start-up and testing to lifecycle maintenance contracts and operational support, Vertiv ensures your solution performs optimally.

Local Resources

With the broadest, most comprehensive service presence in the industry and more than 650 technicians dedicated to servicing Europe, Middle East and Africa, Vertiv ensures that your business is always protected and that service is available whenever needed 24 hours a day.

Expertise & Training

Vertiv service engineers are trained, experienced professionals who undergo an average of one week of intensive training each quarter, totaling one month of full-time training per year. All service engineers are regularly certified according to country-specific regulations as well as wider European and international regulations and standards.

Prompt Response

An extensive supply of critical parts ready for deployment allows technicians to respond to requests in record time, guaranteeing a premium first-time fix rate in the unlikely event of a fault.

Service Programs

Regular service of critical equipment supports maximum uptime and often reduces total cost of ownership. A service program ensures timely and proactive maintenance for avoiding unexpected, costly equipment downtime and enables optimal equipment operation, Vertiv™ service programs cover all technologies and can be tailored to suit individual business needs. Vertiv's extensive services offering includes installation, startup, commissioning, maintenance, replacements, 24x7 remote monitoring and diagnostics, and much more.

Vertiv.com | **Vertiv Infrastructure Limited,** Fraser Road, Priory Business Park, Bedford, MK44 3BF, VAT Number: GB605982131

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