



Vertiv™ NetSure™

High Voltage DC Power Solutions



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Vertiv, formerly Emerson Network Power, designs, builds, and services mission critical technologies that enable vital applications for data centers, communication networks, and commercial & industrial environments.

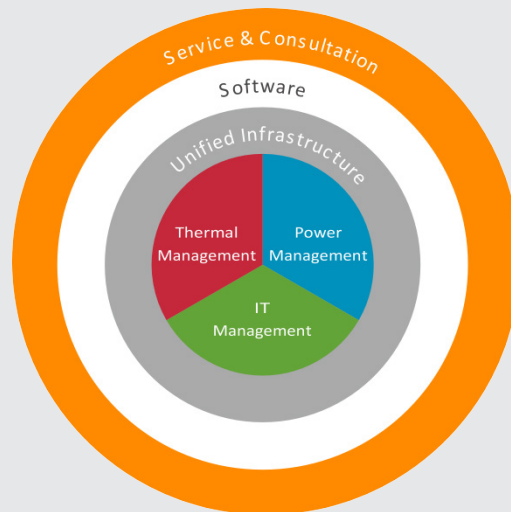


We support today's growing mobile and cloud computing markets with our portfolio of power, thermal and infrastructure management products, software and solutions, all complemented by our extensive global service network.

We help strengthen the world's most vital applications by bringing together global reach and local knowledge, and our decades-long heritage, including brands like, Liebert®, NetSure™, and Trellis™

Vertiv
Your Vision, our Passion

With a unique combination of industry expertise, technology, and resources, our mission is to support and power mission-critical technologies that drive possibility.



Liebert®

Our global power and thermal management solutions are some of the world's most efficient and reliable power and cooling technologies

NetSure™

Our global intelligently engineered DC power systems deliver high availability, energy efficiency and scalability for converged networks

Trellis™

Our industry-leading software gives customers an integrated view of operations across IT and facilities resources, enabling better decisions that save time and money

The Path to Optimized Site Architecture

As the nature of the telecommunications and computing industry evolves, so must the supporting infrastructure.

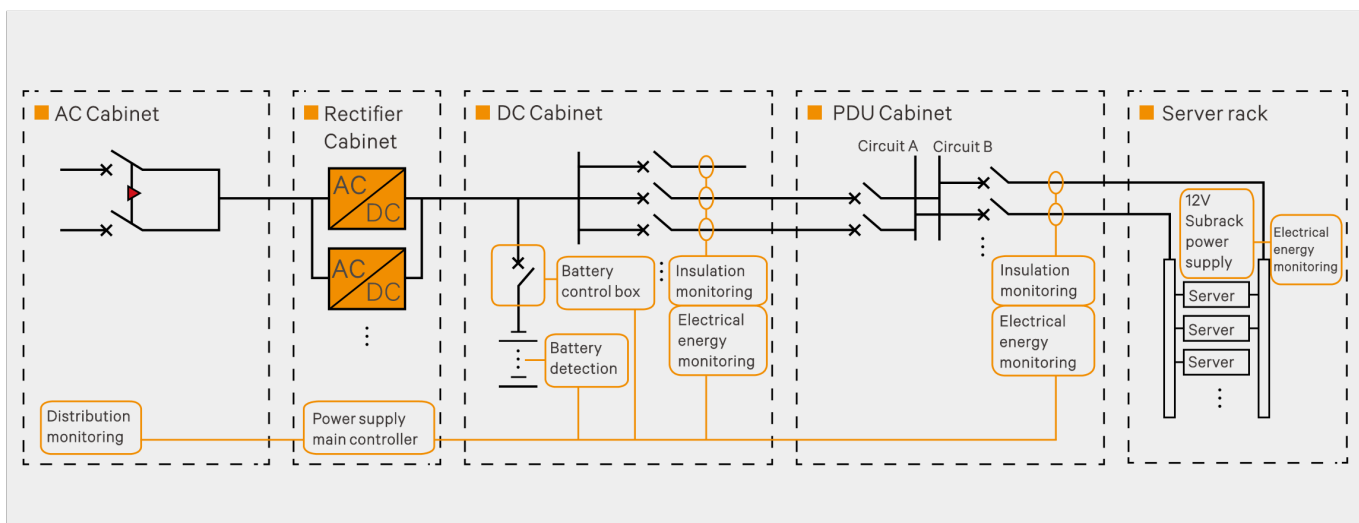
Whether you are trying to contain expanding costs, increase energy efficiency, streamline power distribution, or manage an increasing mix of telecom and IT equipment.

400V DC power technology can enable meeting your site goals. This technology combines the proven benefits of 48V DC power – modularity, scalability, ease of integration – with the cable and installation savings benefit of higher voltage distribution.

400V DC power is designed to ensure the highest levels of system efficiency and reliability. Based on a flexible architecture, 400V DC power can be implemented at a wide variety of different telecom and data centers sites. Whether your site equipment powering needs include 400V DC, 48V DC, or AC power – or a combination of all three – 400V DC can be the backbone infrastructure of a cost effective and efficient site design.



Typical HVDC System Architecture



KEY FEATURES

Safe and Reliable

- Wide input voltage tolerance range from 260 to max up to 530Vac for small durations enables seamless integrate with any power grid.
- Protected against lightning strikes from the grid & in DC distribution.
- Built-in input power walk-in function allows easy integration with power backup source.
- By using HVDC we eliminate the conversions from DC to AC to the DC load equipment. This reduces heat generated and losses. Moving down the power chain, less cooling is required and thus savings on energy
- Equipped with High resistant mid-point grounding (HRMG) where the system is designed to consists of 2 symmetrical high ohmic resistors connected in series between negative & positive conductors.
- Comprehensive Battery Management with BCB box to enable BLVD which in turns improve battery protection and prolong battery lifecycle.

Energy Efficient

- Utilizes highly efficient converter module that delivers >96% efficiency.
- Powered with energy saving function which turns ON & OFF converter modules based on the load demand.
- Environmental certification: comply with EU RoHS standards and China's environmental protection regulations.

Intelligent

- Independent real-time comprehensive monitoring of AC Distribution, DC Distribution, and Rectifier cabinet.
- Remotely monitored & managed via integrated network ports, Modem, RS 232, and RS 485.
- Controller unit can store up to 4000 alarms and 60000 historical data of the system.
- User- friendly 7-inch touch screen interface with graphical menus and convenient parameter settings enables easy operation.
- DSP-controlled rectifiers ensure independent current sharing thereby reducing the current imbalance by $\pm 3\%$.
- Stable performance: the rectifier module can be separated from the monitoring module for stable operation and independent current sharing.
- Supports top or bottom cable entry.
- Easy to manage: The rectifier module comes with an independent ID identification function, which is convenient for user asset management.

Easy to Operate

- Full frontal access for easy maintenance.
- Hot swappable converter modules enable online maintenance or repair of the system without interruption.
- Rectifier & Distribution cabinets can be scaled to meet future demand.

System Parameters

	Parameter Name	Description
Environmental Conditions	Operating Temperature	-40°C ~ 70°C (derating above 45°C)
	Storage Temperature	-40°C ~ 70°C
	Elevation	≤4200m (derating is required for elevation higher than 2100-4200m)
AC input	Input supply	TN-C, TN-S, TN-C-S, 3-phase 4-wire, 3-phase 5-wire
	Input Voltage Range	280Vac ~ 530 Vac, take full load above 304 Vac
	Input Frequency	50/60 Hz
	Power Factor	>0.99
	THDi	<5%
DC Output	Rated Output Voltage	378Vdc
	Rated Nominal Voltage	336Vdc
	Output Voltage Range	280Vdc ~ 400Vdc
	Current Sharing Imbalance	≤±3% (10% ~ 100% load range)
	Voltage Regulation	≤±0.5%
	Efficiency	96%
	Peak-to- Peak noise voltage	≤1V
Lightning Protection	AC Side	Can withstand 8/20μs simulated lightning surge current of up to In In20kA, ±5 times
	DC Side	Can withstand 8/20μs simulated lightning surge current of up to In10kA, I _{max} 40kA
Safety& Environmental Protection	Safety	Compliant with the EN62368-1 standard and CE-certified
	P Protection	IP20
	Noise	At ambient temperature of 25°C , ≤60dB (A)
	ROHS Compliance	Comply with RoHS directives

Rectifier Cabinet

- High Ingress Protection i.e. IP20
- Supports multiple rectifier cabinets in parallel for capacity expansion up to 1MW.
- Hot Swappable Rectifier modules facilitate easy expansion & maintenance.
- Full frontal access for easy maintenance.

Characteristics	Parameters	Remarks
AC Input	250A/3P, 4 terminals	
DC Output	Busbar	
Rectifier Module	R400-25K	
Single Rack Module No.	20	
Single Rack Capacity.	500kW	500kW- NetSure HVT F02 CK1-Y1
Monitoring Module	M822E	
Cabinet Dimensions	800mm*800mm*2000mm (W*D*H)	
Weight	<300kg without including modules	



Controller - M822E

- 7-inch touch screen provides user-friendly graphical interface.
- Comprehensive intelligent monitoring & management of DC power architecture facilitates self-diagnosis function that notifies user when any predictive maintenances are required.
- Controller facilitates functionalities including Intelligent Battery Management, automatic conversion between FC (float charging) and BC (boost charging), automatic voltage regulation, temperature compensation, battery capacity calculation, and online battery test.
- Supports TCP/IP, SNMP, Web browser, remote download, and remote test/communication/adjustment/control functions.
- Supports downloads via USB and software online upgrading.



Rectifier (R400-25K)

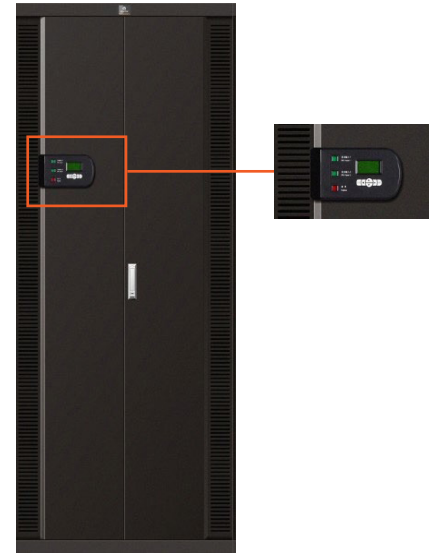
- Single module rated power 25KW, constant power output
- Established Hot-swappable technology
- Output fault self-isolation function



Characteristics	Parameters
Input Voltage Range	260Vac-530Vac
DC Output Range	280Vdc -400Vdc
Rated Output Power	25kW
Weight	<13kg

AC Cabinet

- Supports Dual AC inputs with manual or auto switching function.
- Integrated monitoring function that monitors in real time the different types of AC information such as AC voltage, current, frequency, lightning protection and branch status.
- Supports remote monitoring via RS485 communication port.
- Supports top & bottom cabling, full frontal access, flexible and convenient front & rear maintenance.
- Complies with IEC safety and lightning protection standards.
- Level B or C lightning protection is available on the AC side as per user configuration.
- Complies with China and EU environmental protection regulations.



Configuration

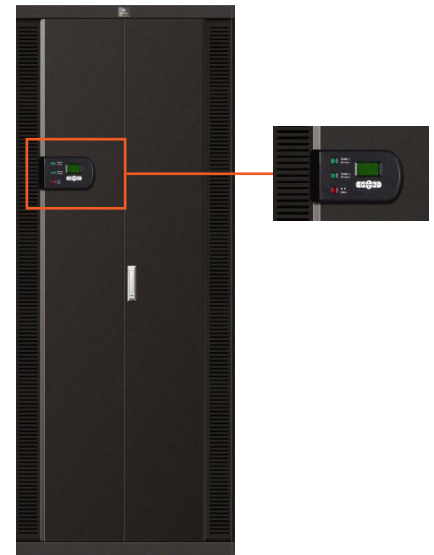
Capacity	Model No.	AC Input	AC Output
630A	PD380/630AFH-3-Y1	AC Input: Knife Switch 2 x 600A/4P Manual Switch-Over	AC Output:(MCCB, Icu=35KA):6 x 250A/3P Thermomagnetic AC Output:(MCB, Icu=4.5KA):1 x 63A/3P AC Output:(MCB, Icu=6KA):3 x 32A/3P Maximum Input Current: 600A
630A	PD380/630AFH-3-Y2	AC Input: MCCB 2 x 630A/3P Manual Switch-Over Electronic	AC Output:(MCCB, Icu=35KA):6 x 250A/3P Thermomagnetic AC Output:(MCB, Icu=4.5KA):1 x 63A/3P AC Output:(MCB, Icu=6KA):3 x 32A/3P Maximum Input Current: 500A
800A	PD380/800AFH-3-Y2	AC Input: MCCB 2 x 800A/3P Manual Switch-Over Electronic	AC Output:(MCCB, Icu=35KA):8 x 250A/3P Thermomagnetic Maximum Input Current: 700A

Mechanical Parameters

Dimension	800mm*800mm*2000mm(W*D*H)
Cabinet Weight	≤ 300 kg

Primary DC Cabinet

- Adaptive design that supports the installation of multiple types of protective devices.
- Integrated monitoring system capable of monitoring in real time various types of DC cabinet information such as voltage, current, and branch status.
- Supports remote monitoring function with RS485 communication port.
- Built-in SPD board on the DC side, which protects from surges capacity more than 10kA.
- Supports top & bottom free cabling, convenient and flexible front & rear operation and maintenance.
- High Ingress Protection up to IP20.
- Parallel expansion interface ensures reliable and safe capacity expansion.
- Complies with China and EU environmental protection regulations.



Configuration

Capacity	Model No.	AC Input	AC Output
1200A	PD400/1200DF-3-Y2	Battery Charge Current: ≤200A Battery Fuse (NT4): 2 x 1250A	Load Current: ≤1200A Load Fuse (NT2) :9 x 400A Branch Current Reading and Insulation Detection
1600A	PD400/1600DF-3-Y1	Battery Charge Current:≤200A Battery Fuse (NT4): 2 x 1600A	Load Current:≤1600A Load Fuse (NT3): 5 x 630A Load Fuse (NT2): 4 x 400A Branch Current Reading and Insulation Detection
Mechanical Parameters			
Dimension	800mm*800mm*2000mm(W*D*H)		
Cabinet Weight	≤ 300 kg		

Secondary DC Power Distribution Cabinet

Configuration

Capacity	Model	Configuration
630A	PD400/630DF-2-Y3	Load Current: ≤500A DC Input Fuse (NT3) : 1 x 630A DC Output Breaker (MCB) : 56 x 32A/2P
630A	PD400/630DF-2-Y4	Load Current: ≤500A DC Input Fuse (NT3) : 1 x 630A DC Output Fuse (NT2) : 10 x 250A
Dimension	800mm*800mm*2000mm(W*D*H)	
Weight	≤ 300kg	



Primary DC Cabinet

- Dual source A & B input with multiple footprint to meet different server rack.
- Flexible MCCB or fuse input to meet different customer needs.
- Integrated monitoring system that monitors in real time the total DC voltage, current and branch load status.
- Supports remote monitoring function with RS485 communication port or M822E integration
- Supports top & bottom free cabling- easy, convenient installation & maintenance.
- Optional insulation monitoring function realizes online monitoring of system insulation.
- Optional branch current detection function to realize kWh calculation of each load branch.
- Optional 7inch touch screen display for convenient operation and maintenance.
- Complies with China and EU environmental protection regulations.

Configuration

Common PDU

Capacity	Model	Configuration
Common PDU		
250A	PD400/250DF-Y1	Dual Source PDU DC Input (MCCB NDM3Z): 2*250A/3P,DC Output MCB: Dual 24*32A/2P SMPDU with X1 Board,128*64 pixels LCD Exclusive of branch current reading,Exclusive of EDU01
250A	PD400/250DF-Y2	Dual Source PDU DC Input (Fuse NT2): 2*(2*250A),DC Output MCB: Dual 24*32A/2P SMPDU with X1 Board,128*64 pixels LCD Exclusive of branch current reading,Exclusive of EDU01
400A	PD400/400DF-Y3	Dual Source PDU DC Input (MCCB T5N): 2*400A/3P,DC Output MCB: Dual 24*32A/2P SMPDU with X1 Board,128*64 pixels LCD, Exclusive of branch current reading
Dimension		800mm*400mm*2000mm(W*D*H)
Weight		≤ 350kg



Smart PDU

Capacity	Model	Configuration
250A	PD400/250DFI-3-Y1	Dual Source PDU DC Input (MCCB NDM3Z): 2*250A/3P,DC Output MCB: Dual 24*32A/2P SMPDU with X1 and X2 Board,7 inch touch screen M822E-R Inclusive of branch current reading with $\pm 1\%$ accuracy, Exclusive of EGU01
250A	PD400/250DFI-3-Y2	Dual Source PDU DC Input (Fuse NT2): 2*(2*315A),DC Output MCB: Dual 24*32A/2P SMPDU with X1 and X2 Board,128*64 pixels LCD Inclusive of branch current reading with $\pm 1\%$ accuracy, Exclusive of EDU01
250A	PD400/400DFI-3-Y1	Dual Source PDU DC Input (MCCB NDM3Z): 2*400A/2P,DC Output MCB: Dual 24*32A/2P SMPDU with X1 and X2 Board,7 inch touch screen M822E-R Inclusive of branch current reading with $\pm 0.65\%$ accuracy, Inclusive of EGU01 for branch insulation detection
400A	PD400/400DFI-3-Y2	Dual Source PDU DC Input (Fuse NT2): 2*(2*400A), DC Output MCB: Dual 24*32A/2P SMPDU with X1 and X2 Board,128*64 pixels LCD Inclusive of branch current reading with $\pm 1\%$ accuracy, Exclusive of EDU01
Dimension	600mm*600mm*2000mm(W*D*H)	
Weight	$\leq 350\text{kg}$	



Smart PDU with 7 inch touch screen

Battery Connection Box

- Independent MCCB design, convenient to maintain & operate.
- Supports wall mounted and battery rack mounted installations.
- The MCCB alarm dry contacts are available to monitor the MCCB ON/OFF status.
- Remote control of MCCB tripping is available
- Embedded battery detection device streamlines battery management.
- Top & bottom free cabling- easy to install & maintain.



Configuration

Capacity	Model	Configuration
1000A	PDB400/1000DF-B4	Capacity: ≤1000A Battery Breaker (MCCB NDM3Z) : 1*630A/4P 2 poles in parallel
1250A	PDB400/1250DF-B4	Capacity: ≤1250A Battery Breaker (MCCB NDM3Z) : 1*800A/4P 2 poles in parallel to meet 1250A
1600A	PDB400/1600DF-B4	Capacity: ≤1600A Battery Breaker (MCCB NDM3Z) : 1*800A/4P 2 poles in parallel to meet 1600A

Insulation Detector

- Supports the monitoring of two independent copper buses and the insulation failure of 24 branch.
- Branch capacitor automatic compensation function with high detection precision of grounding resistance.
- Insulation fault alarm threshold can be set & configured, adapts to different load conditions and weather conditions.
- Alarm information can be transmitted to the distribution monitoring unit via RS 485 port using the master/slave structure.
- Intelligent design with self-detection function.

Configuration

Item	Description	Remark
Ambient Temperature	-10°C ~ 50°C	
Power Supply Voltage	80Vdc ~ 400Vdc	
Branch Detection Precision	±10%	Detection Range: 2~50 kΩ
Communication Port	RS485	
Mechanical Parameters		
Dimension	117mm*120mm*88mm(W*D*H)	
Weight	≤1.5kg	



Battery Detection Device

- Up to 32 modules can be cascaded to measure the cell voltage of one battery string or multiple battery strings.
- Quick battery voltage sampling, and cell sampling speed of cell reaches MS level, and internal resistance measurement function can be realized when used with discharging module.
- Single cell voltage measurement range: 0.2 to 20V with high measurement precision.
- Multiple temperature sensors are configured to precisely measure the battery temperature.
- Alarm voltage threshold which can be set and configured.
- RS485 communication port is provided for high level monitoring and communication.
- The relevant parameters of battery sampling module can be set & configured via controller.

Configuration

Item	Description
Ambient Temperature	-20°C ~ +65°C
Power Supply Voltage	36Vdc ~ 60Vdc
Branch Detection Precision	≤ ±5%
Communication Port	≤ ±1°C
Ambient Temperature	≤ ±1%
Battery Cell Sampling	31 for single module and up to 992 can be extended
Branch Detection Precision	<1s
Communication Port	RS485 and CAN
Indicator	Run indicator, alarm indicator and 4 battery capacity indicators (SOC)
Mechanical Parameters	
Dimension	110mm*43mm*255mm (W*D*H)
Weight	≤0.8 Kg



400/48VDC Power System

It is a rack mounted 400/48VDC power system, designed to power up 48VDC supported telecom & networking equipments. It is equipped with modular and robust hot pluggable converter and controller modules that guarantees highest uptime of connected devices. And it also delivers excellent performance that not only protects customer equipments but also reduces their operational expenses substantially



NetSure 732 A41

System Parameters	Descriptions
DC Input Voltage Range	190Vdc-400Vdc
Converter Efficiency	>96%
DC Output Range	-42VDC to -58VDC
Dimensions	19" inches wide, 4U Height
DC/DC Converters	Model
Converter Module	C400/48-3000e3
Electrical Parameters	Description
Nominal Input Voltage	240/336VDC
Input Voltage	190 ~ 410VDC
Input frequency	45 ~ 65Hz
Peak Efficiency	96%
Output Voltage	-42Vdc ~ -58Vdc
Output power	3000W Maximum
Output current	62.5A@-48VDC



C400/48-3000e3



M830B

Controller-M830B

Display	128mm*160mm (H*W) Pixels TFT LCD
Communication Interface	Ethernet, USB, RS 232, RS 485
Protocol	IPv4, IPv6, HTTPS,SNMP V2/V3, EEM Soc Tpe, Rsoc, Modbus

