VERTIV™

Solar Energy Solutions for Telecom

Solar arrays, DC power, batteries and enclosures

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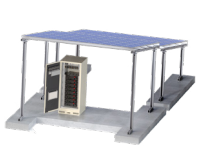



Solar Energy Solutions for Telecom

To serve the insatiable global demand for connectivity, telecom providers are continuing to expand their networks while looking to cut costs and become better eco-citizens.

Stay on top of energy trends

As the cost of operating and maintaining access sites continues to rise, renewable energy offers a way to minimize the burden. Leveraging solar as the primary or supporting source of energy enables operators to divert precious OPEX dollars towards other critical maintenance functions. Concurrently, they can operate in a manner that reduces their carbon footprint and makes them better corporate citizens.

Adopt integrated energy solutions

Intelligent technologies that minimize the use of expensive energy and enable flexible, yet reliable power delivery are available now. Optimal energy use with high availability requires integrated managed site solutions designed to adapt to the power demands of the network and the local conditions at the site.

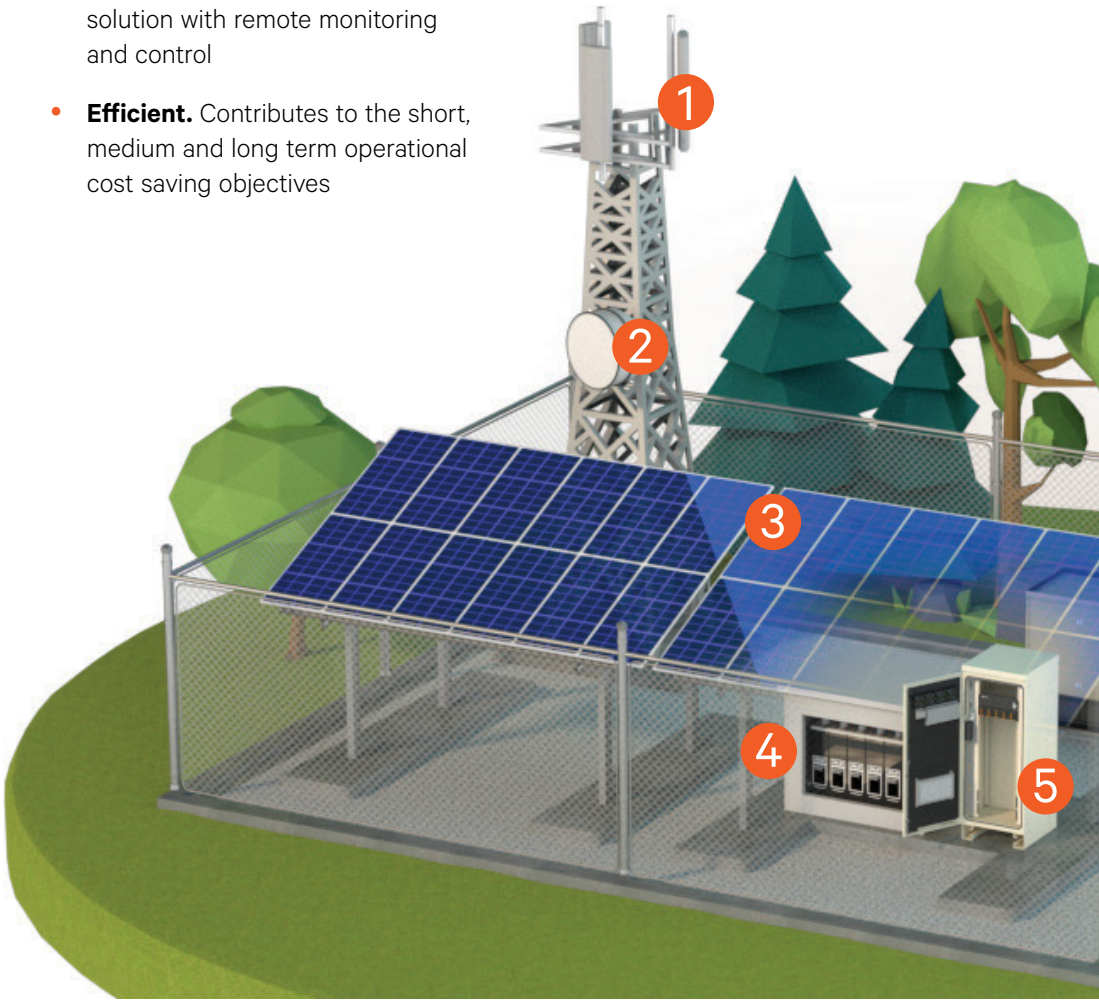
The smart path to success

Vertiv believes the path to profitability involves a fully integrated solar solution that is:

- **Simple.** Quick and problem free installation resulting from intelligent engineering and design
- **Flexible.** Meets today's needs while being prepared for the unknown needs of tomorrow
- **Reliable.** Reduces the costs associated with unplanned site visits
- **Comprehensive.** Delivers a total integrated energy management solution with remote monitoring and control
- **Efficient.** Contributes to the short, medium and long term operational cost saving objectives
- **Supported.** Professionals are always on hand, from installation training to monitoring

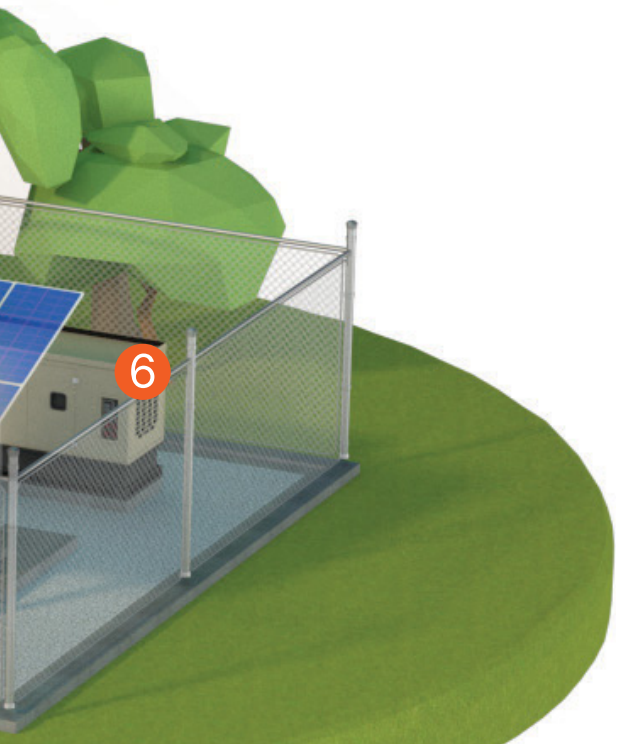
Leverage an industry expert

In this hyper-connected, technology dependent world, you can't afford for your critical network infrastructure to go down. The success of your business depends on it. Vertiv's team of experts brings together a global reach with local knowledge to take on your most complex challenges, creating solutions that keep your off-grid solar solution running—and your business moving.



1. Remote radio heads (RRHs)
2. Microwave Repeater
3. NetSure™ Solar Array
4. NetSure™ Solar Battery Enclosure
5. NetSure™ 5100 Hybrid System
6. Generator

Challenges	Consequences	Opportunities
Fuel expense is high at off-grid sites due to: • Frequent generator operation • Theft and quality/dilution • Site accessibility	High and unpredictable operating cost	• Strategically blend power from batteries, solar and other sources to substantially reduce the use and storage of fuel • Actively manage and monitor battery health, generator operation, and fuel consumption
Deployment speed slowed by: • Infrastructure not in place • Complex supply chains • Introduction and understanding of new technologies	Delayed deployment, causing consumers to choose competing carriers	• Working with a partner who provides a complete integrated solution • Managed integrated supply chain with a common objective for schedule and delivery
Operation and maintenance costs impacted by: • Improper hybrid dimensioning • Lack of site visibility post-installation • Calendar-based maintenance dispatch	Increase maintenance staff	• Engineer the hybrid site solution for the desired balance between capital and operational cost • Leverage smart hybrid technologies to minimize maintenance dispatch and achieve maximum ROI, even as operating conditions change
Site reliability impacted by: • Use of consumer system or parts not designed for unattended operation • Integration of discrete parts not validated to work as one solution	Increase downtime and increase maintenance cost Use of unplanned funds to keep site operational	• Validate vendor focus on the technologies and skills associated with deploying complete operating energy solutions • Keep vendor engaged in site performance post-deployment



PROJECT

When launching new facilities or powering up new equipment you want to do it the right way - right from the start

- **Plan**
- **Design**
- **Integrate**
- **Commission**
- **Project Management**

MAINTENANCE

Services to ensure that your business critical infrastructure operates reliably, safely, and efficiently

- **Preventive and corrective maintenance**
- **Remote services and monitoring**
- **Fan/Battery replacements**
- **Repair**
- **Spare parts**

PERFORMANCE

Full range of services designed to optimize infrastructure performance and reduce process complexity

- **Assess and Audit**
- **Model**
- **Configure**
- **Train**
- **Help Desk**
- **Remote Monitoring**

Solar Energy Applications

Off-Grid Solution

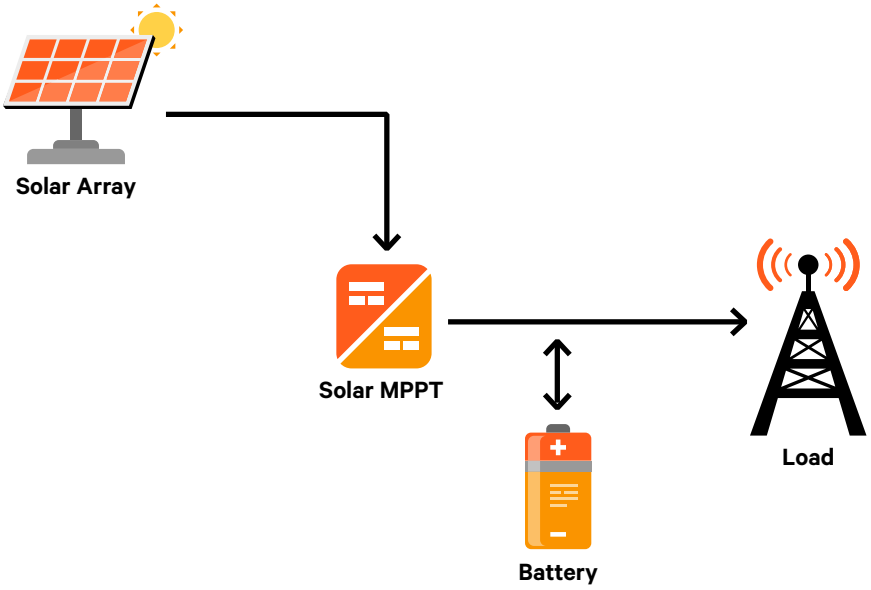
Off-grid solar energy solutions provide reliable and efficient power to support sites located in remote areas where grid access is not feasible and the costs and/or environmental impacts associated with using a diesel generator as the primary energy source make it prohibitive. The solar array and batteries can be sized to meet the specific requirements and needs of your site.

Battery powers load

Solar charges battery

Generator backup option

Battery charged by solar



Off-Grid CDC Solution

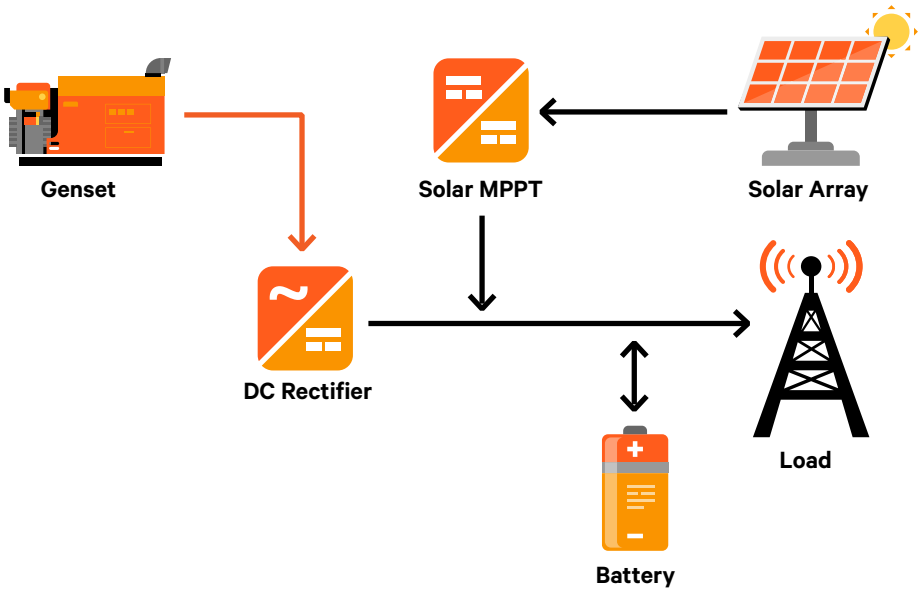
In locations where a diesel generator is a viable option as the primary energy source, high capacity battery strings can be deployed in conjunction with the generator to provide energy storage. This will decrease generator run time and reduce overall operational and maintenance costs. Further savings can be realized if a solar array is also utilized at the site.

Battery powers load

Solar supplements generator

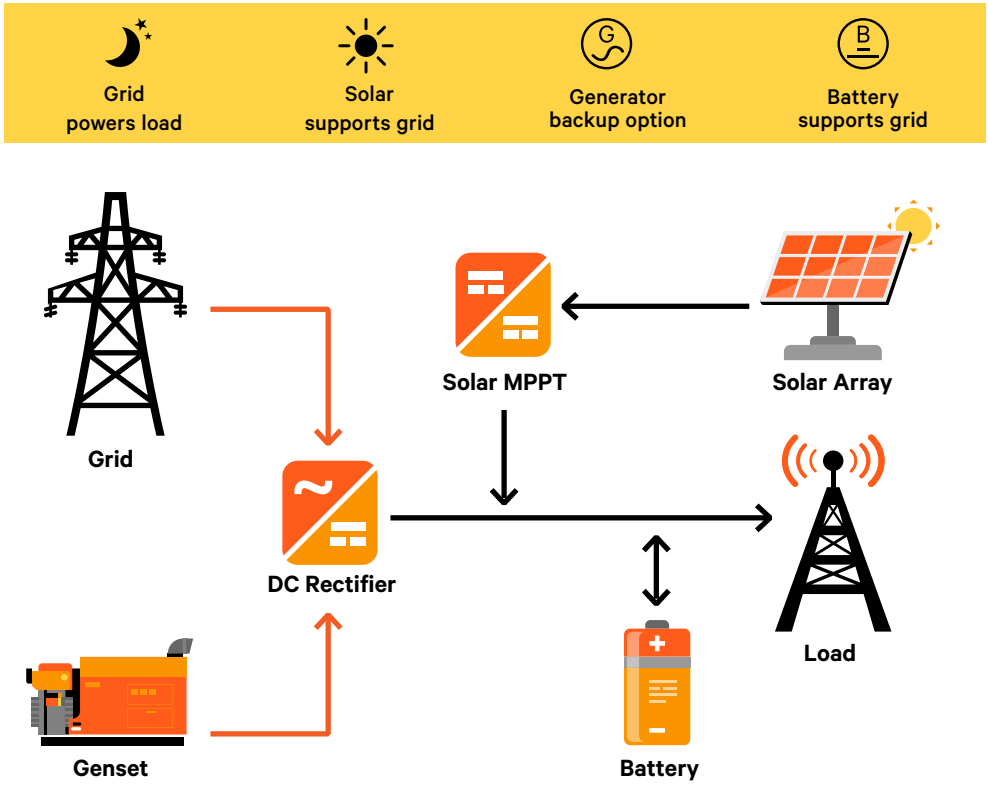
Generator charges battery

Battery operates cyclically



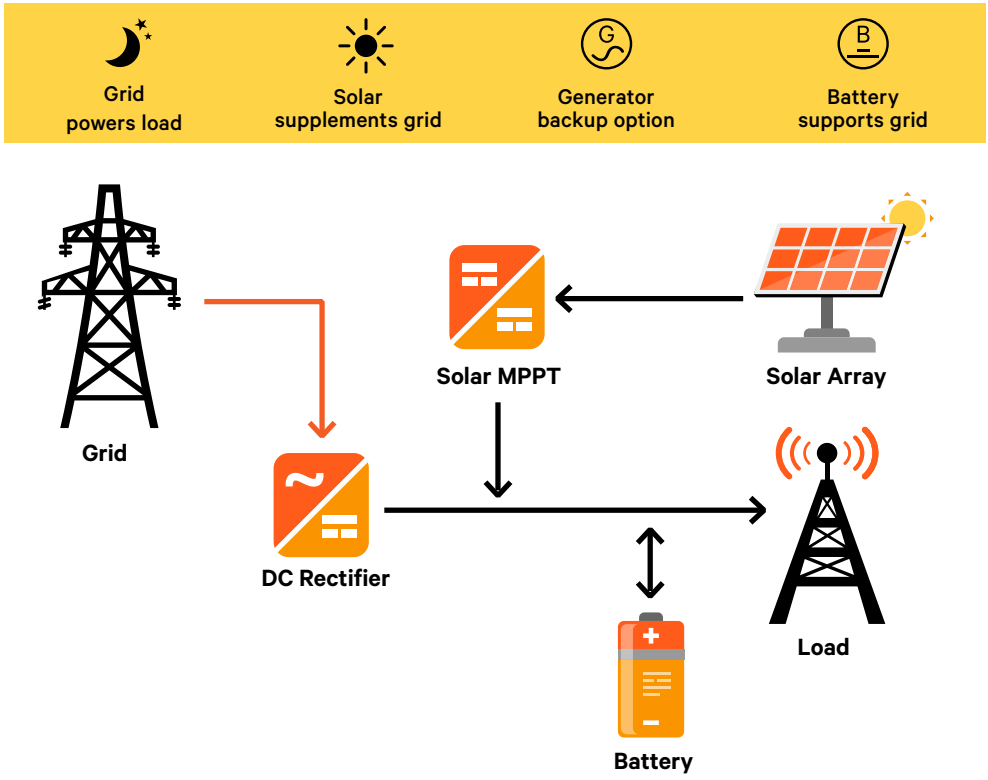
Bad Grid Solution (Unstable)

Some locations are fortunate enough to be connected to the grid, but occasionally the grid is not reliable enough to keep a site operational with just standard stand-by battery back-up. In these locations, a combination of a larger battery bank, generator and solar array can be installed to assure worry free continuous operation of your revenue generating equipment.



On Grid Solution

On-grid solar energy solutions enable an operator to focus mainly on energy cost savings while also enjoying the satisfaction of utilizing a renewable energy source. The solar array assumes part or all of the site load when possible, thereby reducing consumption of grid electricity torun the site.



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Solar Arrays

NetSure™ Solar Arrays

Benefits

- Easily adapt to diverse site requirements with multiple tilt angles and mounting configurations
- Simplify solar panel purchasing decisions with high power mono split cell panels that satisfy the needs of your most power demanding sites
- Save energy costs by shading equipment and battery enclosures under the 4kW structures
- Enjoy long service life thanks to hot dipped galvanized steel construction
- Deploy your site in harsh environments with sturdy designs that meet ASCE 07 wind loads of 45 m/s
- Enjoy reliable performance with solar panels manufactured and tested under stringent processes that meet a variety of IEC, UL, ISO and OHSAS standards

Rapidly deploy your solar array in a variety of conditions and locations with versatile monopole mounting systems that meet the power requirements of your site.

NetSure Solar Arrays from Vertiv are specifically designed for use in telecom applications. We understand that each site has unique requirements and the flexibility of solutions assures all objectives will be met while maximizing value.

Solar Panels

In a dynamic market where products are constantly evolving and manufacturers quickly rise and fail, Vertiv offers solar panels from a variety of leading manufactures. This diversity ensures you always receive the best available panels that perfectly match your array.

Monopole Structures

Whether on flat terrain or in challenging locations where space is a premium or obstacles are present, our 2kW and 4kW monopoles are the perfect solution because of their small foot print. They can also be adjusted from 12 to 32 degrees to enable the optimum energy generation at any latitude.

Application

NetSure Solar Arrays are ideal for use in off-grid, on-grid and bad-grid applications to support modular arrays that reduce operating costs and save energy. These mounting solutions simplify site planning and enable efficient use of land while meeting all your energy generation and greenhouse gas emission reduction goals.

Technical Specifications

Quantity of Solar Panels per 2 kW Array		6
Quantity of Solar Panels per 4 kW Array		12
Frame and Hardware Material		Hot dipped galvanized steel w/ high grade steel bolts
Wind Load Rating per ASCE 07		45 m/s
Mounting		Mounts onto concrete pillars
Frame Front Edge Height	Front Array	1.2 M for all tilts
	Array	2.0M for all tilt angles

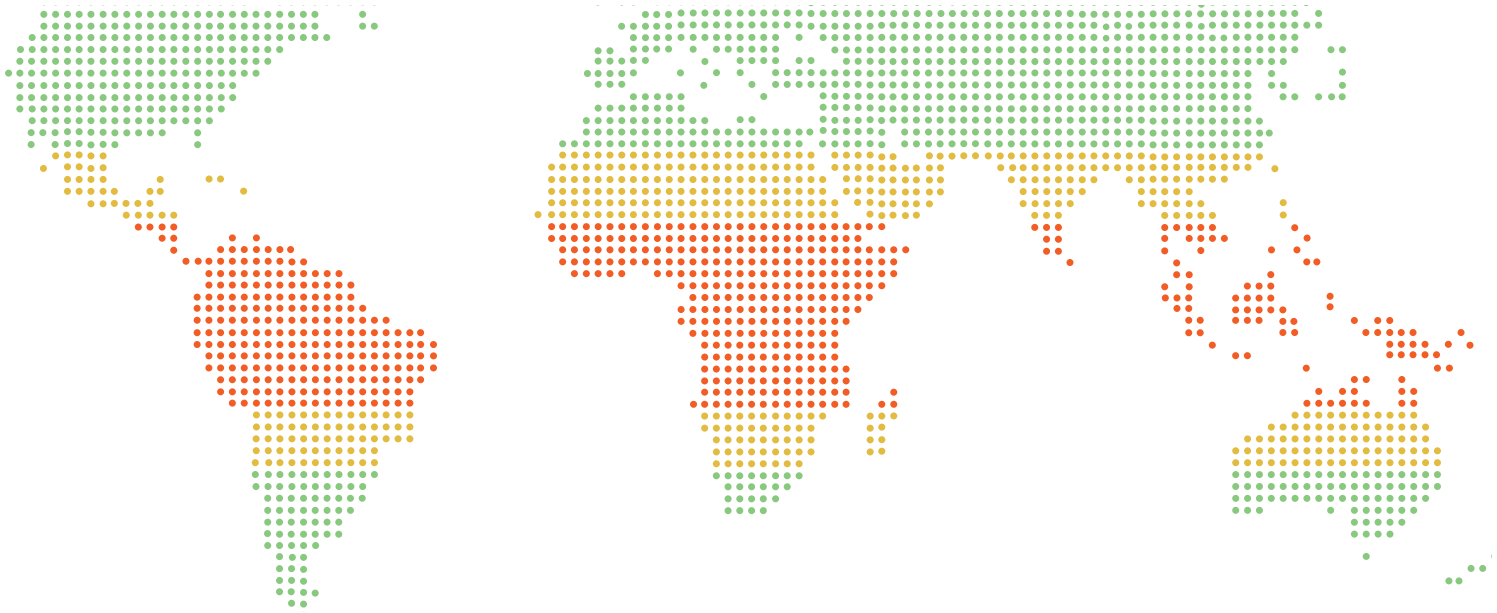
2kW Monopole Structure

4kW Monopole Structure

General Tilt Recommendations

Geographic Region	Tilt Angle
Orange	12 degrees
Yellow	22 degrees
Green	32 degrees

An analysis of each site should be performed to determine proper tilt angle



NetSure™ Solar Array Protection and Cabling

Benefits

- Increase installation speed of solar array cabling with pre-terminated cables and matching protection boxes for seamless wiring.
- Decrease potential wiring errors with color coded cable sets and label kits.
- Enjoy higher power output from your array with cable sets that have been engineered to provide less than 0.6 percent loss at 35 °C.
- Meet industry practices and safety standards with pre-terminated and certified MC4 connectors and an IP65 enclosure for IEC compliant surge protection and 2P breakers.
- Reduce purchasing complexity by deploying pre-matched protection and cable solutions vs. acquiring multiple discrete components and assembling.

Simplify the installation process and speed up deployment with NetSure Solar Array Protection and Cabling.

NetSure solar array protection boxes and color coded quick connect cables eliminate the need to source and integrate individual protection modules, circuit breakers, spools of wire, connectors and combiner boxes.

Application

Cabling of solar arrays can be time consuming, tedious and open to wiring errors. Reduce installation time and risk in off-grid, on-grid and bad-grid applications by utilizing NetSure solar array protection boxes in conjunction with cable sets that are color coded with keyed quick connectors.

Technical Specifications

Solar Protection Box	
Operating Conditions (under array)	-20 °C to +55 °C
Environmental Protection	IP65, with transparent door for quick inspection
Safety Compliance	EN-60960-1; IEC 60950
Wire Entry	MC4 or PG11 supporting 4-10 mm^2 wire - labeled
Internal Wiring	6 mm^2
Ground Wire	25 mm^2
Surge Protection Standard	EN 50539-11 – Class 2 Type 2C
Maximum Discharge Current	40 kA (8/20)
Service and Inspection Window	Yes
Circuit Breaker Type	2P fast acting (or B-curve)
Circuit Breaker Rating	16 A at +55° C

Solar Cables	
Operating Conditions	-20 °C to +55 °C (wire rated to -40 °C to +90 °C)
Environment Protection	IP65 (minimum)
Connectors	MC4 – keyed set
Wire Identification	Red and black with cable marking kit included
Standard Sizes	6 mm^2 for 5, 10, 20 m / 10 mm^2 for 30 m
Wire Composition	Fine annealed copper, tinned
Conductor Insulation	Outdoor rated, polyolefin rubber with TUV approvals

Ordering Information

Solar Protection Box	
BMG 908 413/2	NetSure Solar protection box, circuit breakers, free-wire PG11 in, MC4 out
BMG 908 414/2	NetSure Solar protection box, circuit breakers, MC4 in, MC4 out

Solar Cables	
From BMG 908 414 Protection Box into Cabinet-Shelter	
BMY 201 457/05	MC4 red-black 6 mm^2 power cables, 5 m
BMY 201 457/1	MC4 red-black 6 mm^2 power cables, 10 m
BMY 201 457/2	MC4 red-black 6 mm^2 power cables, 20 m
BMY 201 457/3	MC4 red-black 10 mm^2 power cables, 30 m
From Solar Array to Protection Box	
BMY 201 457/205	MC4 x 2 red-black 6 mm^2 power cables, 5 m
BMY 201 457/21	MC4 x 2 red-black 6 mm^2 power cables, 10 m
BMY 201 457/22	MC4 x 2 red-black 6 mm^2 power cables, 20 m
BMY 201 457/23	MC4 x 2 red-black 10 mm^2 power cables, 30 m

Notes

All parts are compliant with ROHS Directive 2011/65/EU
When you order an array, Vertiv proposes - the basic (minimum) wire and protection box kit for standard layout. Or you can select in accordance to your own site plan.

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DC Power

NetSure™ 5100 Series for Hybrid Applications

Benefits

- Leverage a common platform with interchangeable components that easily adapts to the diverse needs of your telecom network.
- Rapidly deploy your equipment in harsh locations with durable DC power that operates up to +65 °C without derating.
- Optimize total cost of ownership with high efficiency eSure™ rectifiers and solar converters.
- Reduce the need for costly site visits with intelligent remote management over standard protocols.
- Rest assured your power system will operate as desired. A team of Vertiv service experts is standing by to provide training, documentation, and reliable and predictable installation.

The NetSure™ 5100 systems included in this catalog are for reference only, as configurations and features vary by geographic region. Please contact your local sales representative for details on configurations available in your region.

Ideal for on-grid, bad-grid and no-grid sites, the NetSure™ 5100 for hybrid applications manages multiple energy sources with ease.

Vertiv™ NetSure 5100 series for hybrid applications provides a compact -48 VDC power solution, featuring 2000 W high-efficiency eSure™ rectifiers and solar converters, the NetSure™ Control Unit, and a multi-functional battery and distribution unit. The distribution panel accepts circuit breakers up to 300 A to protect the load and batteries. With the support of up to three LVD levels, service-load prioritization minimizes battery investment without compromising the delivery of critical services. The NetSure 5100 series subrack can be equipped with +24 VDC converters with distribution to ease the transition from legacy +24 VDC to -48 VDC equipment. This integrated power solution is available in a number of configurations, and includes support for open port enabling winds and DC generators. Maximum value is achieved by leveraging the advanced energy management capabilities of the NCU, such as generator control, fuel monitoring, solar integration and ECO mode.

Application

The NetSure 5100 Series for hybrid applications offers a unified approach to managing multiple energy sources, from generators to solar panels. The system is specifically designed to solve a variety of site challenges, including:

- Reducing the cost of expensive electrical utility bills with on-grid solar
- Extending battery life for bad-grid locations
- Managing generator-fuel and battery life in off-grid locations
- Utilizing solar energy when the use of generators is prohibitive

NetSure™ 5100 24 kW, 23" Rack

NetSure™ 5100 6 kW, 19" Rack

Technical Specifications

AC Input	6 kW	10 kW	20 kW	12 kW	24 kW
Nominal	Single phase: 220 VAC to 240 VAC / 3-phase: 380 VAC to 415 VAC				
Operational	Single phase: 85 VAC to 300 VAC / 3-phase: 147 VAC to 520 VAC				
Frequency	45 Hz to 65 Hz				
Input connections	Terminal strip or circuit breaker				
Surge connections	Optional in configurations with input AC MCB				
DC Input					
Solar array	120 to 420 VDC				
Input connections	10 mm^2 Terminal strip				
Open port for -48V (optional)	—	30 to 160 A			
-48 VDC Output					
Nominal	-48 VDC				
Adjustable range	-42 VDC to -57.6 VDC				
Power	3 x 2 kW	5 x 2 kW	10 x 2 kW	6 x 2 kW	12 x 2 kW
Main unit DIN rail MCB Space for battery, load & AC	304 mm	391 mm		485 mm	
Extension unit DIN rail MCB Space for load & AC	—	436 mm		530 mm	
27 mm Thermal Magnetic MCB's	80 A to 125 A				
18 mm Thermal Magnetic MCB's	3 A to 63 A				
13 mm Hydraulic Magnetic MCB's	2A to 200A	2 A to 300 A			
+24 VDC Output					
Nominal	—			+24 VDC	
Adjustable range	—			+24 VDC to +28	
Power	—			3 x 1.5 kW	3-6 x 1.5 kW
18 mm Thermal Magnetic MCB's	—			3 A to 125 A	
13 mm Hydraulic Magnetic MCB's	—			2 A to 125 A	
Physical Characteristics					
Mounting	Standard 19" rack mounting			Standard 23" rack mounting	
Dimensions (H x W x D)	133.5 mm (3 U) x 482 mm x 330 mm	177.8 mm (4 U) x 482 mm x 367 mm	222.3 mm (5 U) [1] x 482 mm x 367 mm	177.8 mm (4 U) x 578 mm x 367 mm	222.3 mm (5 U) [2] x 578 mm x 367 mm
Weight (basic unit without rectifiers)	7 kg	17 kg	23 kg	19 kg	25 kg
Accessibility	Top cabled with front access				
Top Cover	Optional				
Environmental					
Temperature Operating Window	-40 °C to +80 °C				
Temperature Operation, Non-Derated	-40 °C to +65 °C [3]				
Standards Compliance					
Safety and EMC	EN 60950-1, CE and ETSI EN 300386 class B				
Environment	RoHS 6 and REACH				

Notes

1 To increase solar power delivery to 20 kW, an additional 10 kW, 1RU solar expansion shelf can be added. System power limit remains at 20 kW.
2 To increase solar power delivery to 24 kW, an additional 1RU (12 kW) or 2RU (24 kW) solar expansion shelf can be added. System power limit remains at 24kW.
3 12 kW system: -40 °C to +55 °C with >10 kW load, 24 kW system: -40 °C to +55 °C with >20 kW load.

NetSure™ Control Unit

Benefits

- Easily monitor and adjust system parameters with a simple, graphic user interface accessed through an on-board color display or web pages supported by all major browsers.
- Numerous connectivity options that support integration into a wide variety of networks – IPv4, IPv6, Modbus, SNMP, TL1, EEM, YDN23 and dual network port option for permanent and local craft port connections.
- Leverage advanced battery and generator management controls, including soft start, time controls, starter battery check with recharge, bad-grid equalization recovery, current limiting, fuel monitoring with theft alarms and support for multiple battery technologies, including lithium.
- Rapidly turn-up system with easily uploaded/ downloaded pre-programmed configuration files.
- Decrease energy costs by effectively managing multiple energy sources such as generators and solar panels.

The advanced NetSure™ Control Unit (NCU) from Vertiv takes remote monitoring and control to the next level with a user-friendly color interface, secure connectivity, data statistics and multiple communication options.

Description

The NetSure Control Unit (NCU) is an advanced controller designed for a wide range of DC power applications, enabling remote monitoring and control of modern communication sites. The factory-installed (standard) or field-added NCU is backward compatible with existing NetSure™ power systems, controlling all aspects of the power chain, including AC mains, DC power plant, battery backup, diesel generator, and the local site environment. The addition of optional interface boards enables the user to access an even greater set of site parameters.

Battery management features include temperature compensation, thermal runaway management, recharge current limit, reserve time prediction, and optional midpoint monitoring. Battery testing options include scheduled battery testing and short duration battery testing. Thresholds for battery current measurement, detailed alarms, inventory management and three LVD levels can be programmed easily through the controller. Control of rectifiers (24V, 48V and 400V) and converters (24V, 48V, 400V and solar) is possible in this convenient pluggable module.

Expanded information and alarm data can be monitored or controlled via password protected and encrypted web browsers, including Internet Explorer, Firefox, Google Chrome, and Apple Safari.

Network element management support for data communication is also available via standard protocols, such as SNMP version 2 or 3, or Modbus. In addition, Modbus device integration for many industry standard monitoring devices is now possible with the versatile NCU controller.

Patented Intelligent Load Management from Vertiv enables you to see power usage down to the fuse or circuit breaker level. To prevent site overload, load levels of each rack can be measured in relation to rack capacity. Rack load monitoring requires optional system distribution measurement devices for the fuse or circuit breaker positions.

M830B

M830D

Technical Specifications

General	
Power Supply	19 VDC to 60 VDC
Power Consumption	18 W maximum, 4W typical

Environmental	
Operating	-20°C to +65°C (nominal), -40°C to +75°C (extended conditions) / -4°F to +149°F (nominal), -40°F to +167°F (extended conditions)
Relative Humidity	0 to 90%

Safety and Standards Compliance	
Electrical	IEC 60950-1, EN 60950-1, UL 60950-1
EMC	EN 300 386, 2001 Class B; FCC Part 15, Class B
Environmental	CE; NEBS Level 3

Mechanical Data	M830B	M830D
Dimensions (H x W x D)	43.4 x 86 x 208 (mm) 1.65 x 3.41 x 8.33 (inches)	86.2 x 87 x 208 (mm) 3.41 x 3.42 x 8.33 (inches)
Standard Installation Methods	Hot pluggable in stand-alone or embedded power plants	
Weight	1 kg / 2.2 lbs.	

Inputs/Outputs	M830B	M830D
Display	128 x 160 Pixels TFT LCD	320 x 240 Pixels TFT LCD
Communication	RS232, RS485, Ethernet, USB (for software upgrades)	
Protocol	IPv4, IPv6, HTTPS, SNMP V 2/ V 3, EEM, SocTpe, Rsoc, Modbus	
Analog Inputs	2 battery currents, 1 load current, 1 bus voltage, 2 battery voltages, 2 temperatures, fuel level sensor and much more with additional interface boards	
Digital Inputs	1 input for status of surge protective device auxiliary contacts, 12 load fuses, 6 battery fuses, bi-stable contactor status	
Outputs	3 LVD mono or bistable contactors	

NetSure™ Control Unit User Interface

Web Interface Home Page

To access the product warranty process, optimize your after-sales experience, and obtain more information, please register your Vertiv products at Vertiv.com/ProductRegistrationLATAM

Ordering Information

Model	Model Number	Description
M830B	1M830BXX	NCU3.0+ controller, 1 x 2 RU
M830D	1M830DXX	NCU3.0+ controller, 2 x 2 RU
Optional Interface Board		
EIB		5 relay outputs, 8 DC voltages, 3 DC currents, 2 temperatures
IB1		4 relay outputs, 4 digital inputs
IB2		8 relay outputs, 8 digital inputs, 2 temperatures
IB4		1 additional Ethernet port
Supervision Modules		
SMDU		4 shunts, 1 voltage input, 20 fuse alarms, and 2 LVD controls
SMDU+		25 shunts, and 25 fuse alarms
SMTEMP		Temperature concentrator with up to 8 temperature sensors
SMDUH		20 Hall effect sensors to measure DC distribution load current from 0 A to 100 A

eSure™ S48-2000e3 2000W Solar Converter

Benefits

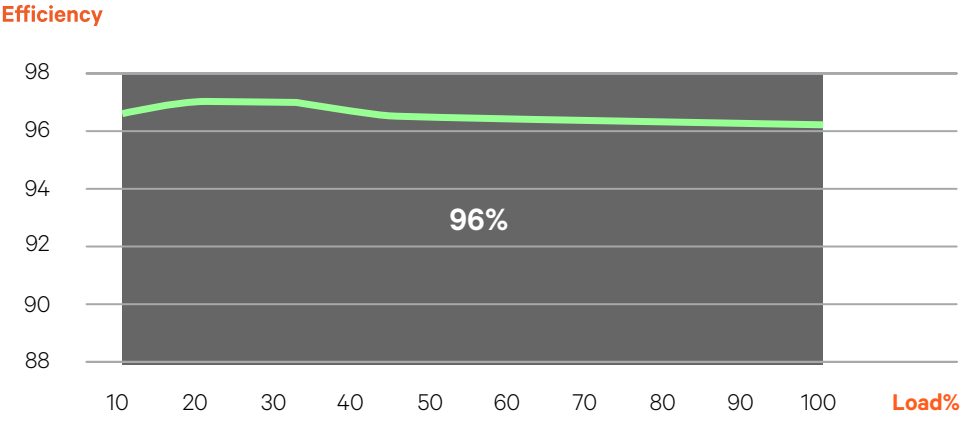
- Maximize energy delivered with the efficiency and precision of Maximum Power Point Tracking (MPPT).
- Increase space for revenue generating equipment with modules that pack more power in a small space with high power density.
- Facilitate easy maintenance, expansion and system changes with hot swappable capabilities and ability to interchange with R48-2000e3 rectifiers as needed.
- Enjoy increased reliability and active load sharing with Digital Signal Processing (DSP), which translates into fewer components and optimized operation.
- Appreciate the flexibility to utilize in a variety of applications with a wide input voltage range of 120 VDC to 420 VDC and full power output at temperatures from -40˚C to +65˚C.

In addition to reducing power consumption and lowering operating cost, eSure™ high-efficiency converters offer superior performance and uncompromised reliability.

Description

The S48-2000e3 MPPT solar converter efficiently delivers 2000W power at -48 VDC to the load and battery. This constant power converter designed with the latest patented switch-mode technology, uses DSP (Digital Signal Process) to provide clean power to the load with acute control and management.

The S48-2000e3 can be connected in parallel with other converters and rectifiers to support a variety of telecom applications. Unified remote management and control of the power system is enabled when combined with a controller. Implementing solar conversion and control from Vertiv, ensures your critical network is highly available and extremely affordable to operate.



S48-2000e3 Efficiency Curve at 320 VDC Nominal

Technical Specifications

DC Input	S48-2000E3
Voltage	120 VDC to 420 VDC *(see figure 1)* 140 VDC to 400 VDC (nominal)
Maximum Current	12 A
MPPT Precision	>99% when the output power more than 350 W

DC Output	
Voltage	-42 VDC to -58 VDC
Maximum Power	2000 W maximum
Maximum Current	42 A @ -48 VDC *(see figure 2)*
Peak Efficiency	96.8%

Control and Monitoring	
Alarms and Signaling	Alarm and status reported via CAN bus to system controller
Visual Indications	Green LED: Normal Operation Yellow LED: Alarm Red LED: Failure

Environmental	
Operating Temperature	-40°C to +80°C / -40°F to +176°F *(see figure 3)*
Storage Temperature	-40°C to +70°C / -40°F to +158°F
Relative Humidity	0 to 95%
Altitude	2000 m / 6560 ft at full power

Standards Compliance	
Safety	60950-1 (EN, IEC and UL), 62109-1 (EN, IEC)
EMC	ETSI EN300 386 V1.6.1. Other than telecom centers. EN55022, Class A conducted and Class B radiated, Telcordia GR-1089-CORE issue 6: 2009
Environment	REACH, RoHS, WEEE

Mechanics	
Dimensions (H x W x D)	41 x 84.5 x 252.5 mm / 1.61 x 3.33 x 9.94 inches
Weight	1.13 kg / 2.49 lbs

Ordering Information

Model Number	Description
1S482000E3	eSure solar converter, 48 VDC, 2000 W

Figures

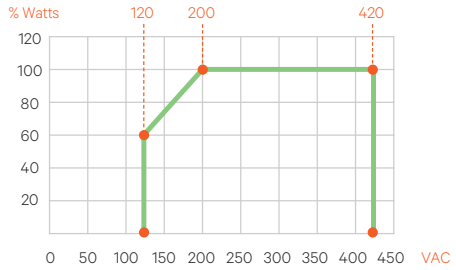


Figure 1: *Output Power vs. Input Voltage and Vo > 48 VDC at Tamb < 55°C*

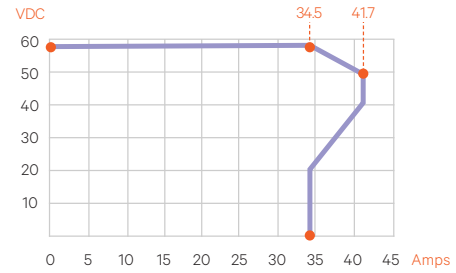


Figure 2: *Output Voltage vs. Output Current at Maximum Output Power 2000 W*

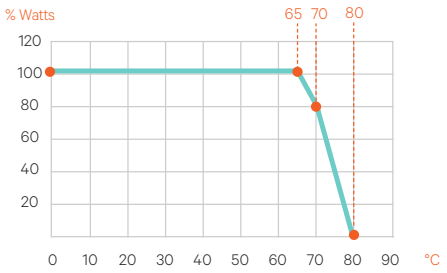


Figure 3: *Output Power vs. Temperature at 250 VDC > Vin > 200 VDC*

eSure™ R48-2000e3 2000W Rectifier

Benefits

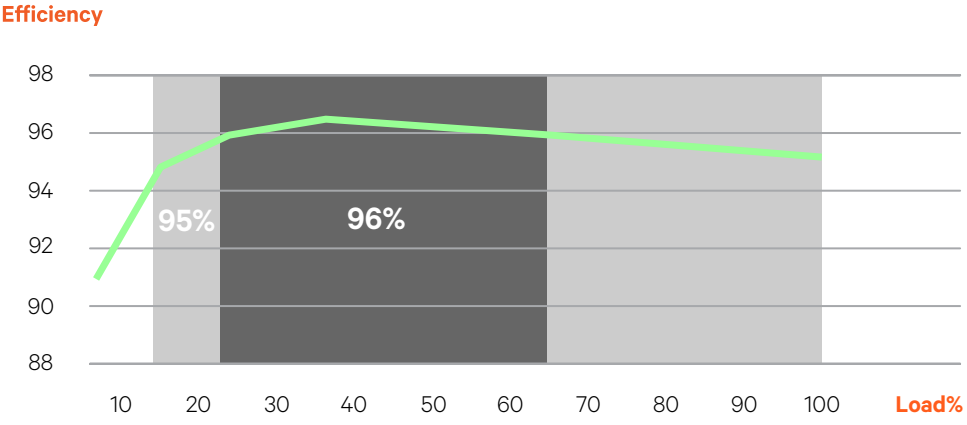
- Optimize the amount of energy delivered and reduce power consumption with over 96% efficiency.
- Increase space for revenue generating equipment with modules that pack more power in a small space with high power density.
- Facilitate easy maintenance, expansion and system changes with hot swappable capabilities.
- Enjoy increased reliability and active load sharing with Digital Signal Processing (DSP) which translates into fewer components and optimized operation.
- Appreciate the flexibility to utilize in a variety of applications with a wide input voltage range of 85 VAC to 300 VAC and full power output at temperatures from -40˚C to +65˚C.

In addition to reducing power consumption and lowering operating cost, eSure™ high-efficiency rectifiers offer superior performance and uncompromised reliability.

Description

The 2000 watt high-efficiency eSure rectifier (model R48-2000e3) converts standard AC supply voltages into stable nominal -48 VDC voltage that is adjustable to application needs. This constant power rectifier designed with the latest patented switch-mode technology, uses DSP (Digital Signal Processing) for efficient operation.

The R48-2000e3 can be connected in parallel with other rectifiers and converters to support a variety of telecom applications. Unified remote management and control of the power system is enabled when combined with a Vertiv™ controller.



R48-2000e3 Efficiency Curve at 250 VAC Nominal

Technical Specifications

AC Input	R48-2000E3
Voltage	85 VAC to 300 VAC *(see figure 1)*, 187 VAC to 264 VAC (nominal)
Frequency	45 Hz to 65 Hz
Maximum Current	12 A
Power Factor	>0.99 from 50 to 100% load
Protection	High and low voltage protection, surge and lightning protection Adapts to poor quality grid (voltage dip, weak mains) Disconnection at 415 VAC Mains fuses in both lines

DC Output	
Voltage	-42 VDC to -58 VDC
Maximum Power	2000 W
Maximum Current	42 A @ -48 VDC, limit set point 0 to 42 A *(see figure 2)*
Peak Efficiency	96.2%
Protection	Fuse for reverse connection and back feeding protection High voltage shutdown High temperature protection
Temperature Derating	Full output power up to +65°C at input voltage range 200 to 250 VAC

Control and Monitoring	
Alarms and Signaling	Alarm and status reported via CAN bus to system controller
Visual Indications	Green LED: Normal Operation Yellow LED: Alarm Red LED: Failure

Environmental	
Operating Temperature	-40°C to 80°C / -40°F to +176°F *(see figure 3)*
Storage Temperature	-40°C to +70°C / -40°F to +158°F
Relative Humidity	0 to 95%
Altitude	Full output power up to +65°C at input voltage range @200~ 250 VAC

Standards Compliance	
Safety	EN 60950-1; IEC 60950-1; UL 60950-1
EMC	EN55022, CISPR22, ETSI EN300 286: 2005, FCC CFR 47 Part 15, Telcordia GR-1089-CORE issue 6 (Class B conducted and radiated)
Environment	REACH, RoHS, WEEE

Mechanics	
Dimensions (H x W x D)	41 x 84.5 x 252.5 mm / 1.61 x 3.33 x 9.94 inches
Weight	1.13 kg / 2.49 lbs

Ordering Information

Part Number	Description
1R482000E3	eSure™ rectifier, -48 VDC, 2000 W

Figures

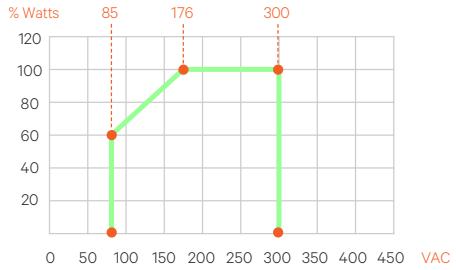


Figure 1: *Output Power vs. Input Voltage and Vo > 48 VDC at Tamb < 55°C*

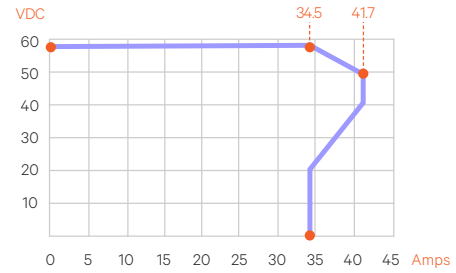


Figure 2: *Output Voltage vs. Output Current at Maximum Output Power 2000 W*

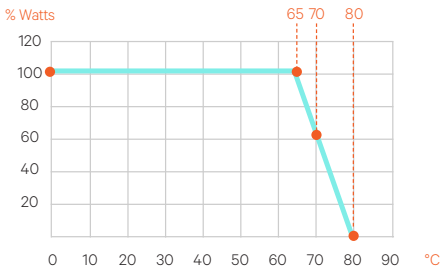
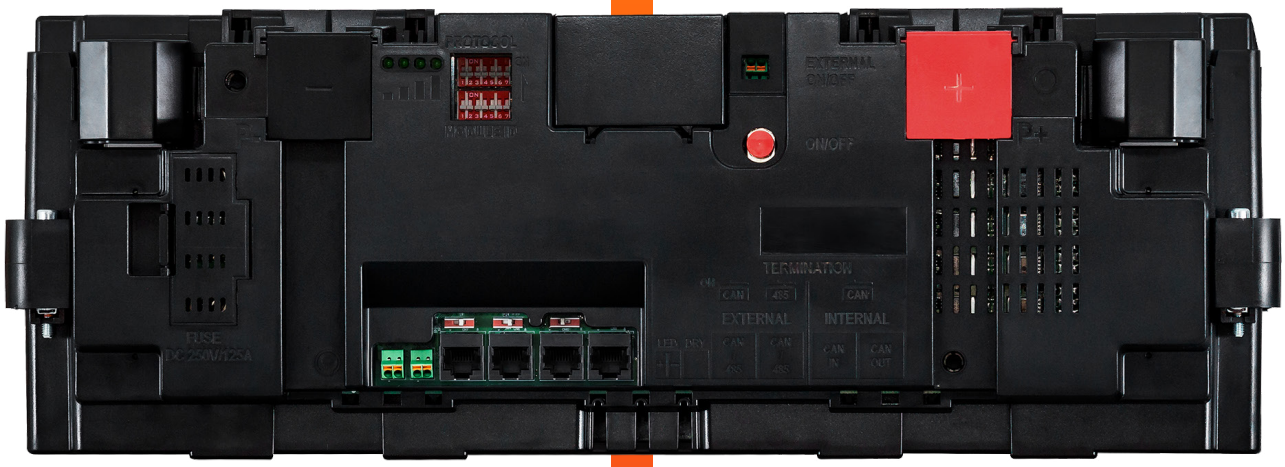
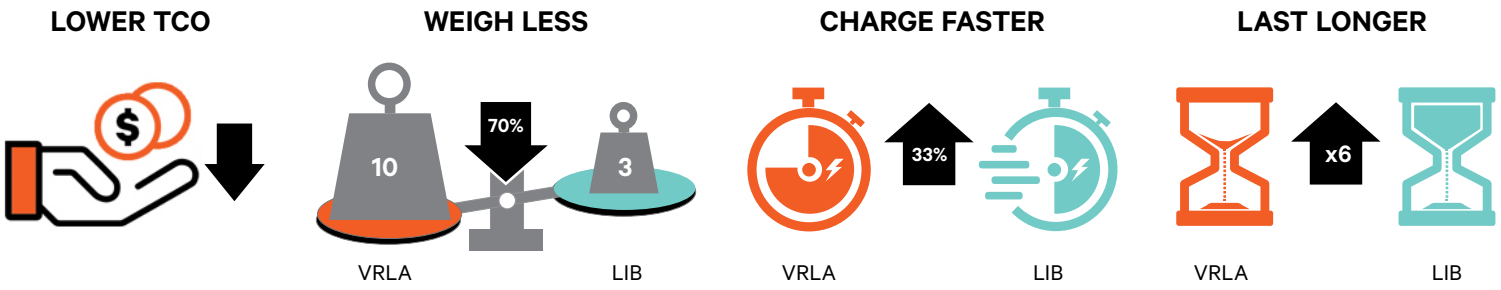


Figure 3: *Output Power vs. Temperature at Uin > 200 VAC*


PROTOCOL
EXTERNAL ON/OFF
ON/OFF
TERMINATION
CAN
485
EXTERNAL
INTERNAL
CAN IN
CAN OUT
FUSE
DC/250V/125A

Lithium Batteries for Telecom

Lithium-ion batteries are an effective and attractive alternative energy storage solution for various telecom applications.



Benefits

- Appreciate saving valuable budget dollars due to lower total cost of ownership
- Enjoy maintenance free operation and less frequent replacements
- Confidently deploy batteries in weight sensitive applications such as rooftops
- Optimize equipment and enclosure configurations with no outgassing concerns and high energy density footprints
- Be prepared for outages with shorter recharge times

LIB
Lithium-ion Batteries

In general, lithium-ion batteries weigh less, charge faster and last longer than valve regulated lead acid (VRLA) batteries - all without outgassing. While these advantages come with a higher initial acquisition cost, total cost of ownership savings are quickly seen with elimination of maintenance costs and longer cyclic battery life. In general, payback is realized after the first comparable VRLA replacement cycle.

Vertiv has been working with lithium-ion batteries in both core and access applications for over 10 years. This has allowed us to gain valuable experience and knowledge that can be applied as lithium's footprint in telecom applications continues to expand.

If your NetSure™ Power System is equipped with an NCU controller it is generally compatible with any lithium-ion battery that utilizes a battery management system. No special software or communication cabling is required – only normal system set-up adjustments similar to those of VRLA batteries.

Because the lithium-ion battery market is quickly evolving and there are many new entrants, Vertiv has instituted a Telecom Lithium-Ion Battery Qualification Program. While not mandatory, this program is designed to review, test and qualify lithium-ion batteries to help ensure they operate safely and harmoniously with our NetSure Power Systems.

For more information about battery qualification and availability, please contact your local sales representative.


VERTIV.

Vertiv™ M Series

Benefits

- Ensure uniform equipment deployment throughout your network by utilizing one of three standard enclosure sizes.
- Enjoy unparalleled flexibility with an extensive array of enclosure options, accessories, AC/DC distribution, surge suppression and batteries.
- Decrease OpEx and simplify installation by pairing your Vertiv M-Series enclosure with a reliable and efficient NetSure™ DC power system.
- Optimize energy efficiency by matching specific site heat loads with one of the wide range of thermal systems.
- Confidently deploy your network in any region with enclosures that meet a wide variety of international standards and operate in harsh environmental conditions.
- Compliant with EN 60950-22 2nd edition standard

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

A robust outdoor solution for radio and transmission equipment that delivers efficient and reliable power supply, including battery backup.

The Vertiv™ 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. If further ingress protection is required, an IP65 fan filter solution can be added.

Available in three standard sizes, the Vertiv™ M20, M35 and M44 enclosures offer 20U, 35U and 44U internal rack space respectively for 19" wide customer equipment, power and batteries. Multiple climate options include fan filter, air-conditioners, heat exchangers and thermal electrical coolers that are integrated in the door. The M35 and M44 offer multiple climate zones for optimal thermal performance in combination with lower CAPEX and OPEX. The enclosure door includes a three point locking system with different cylinder options and hidden stainless steel hinges for added security.

The Vertiv M Series is ideally configured with the NetSure™ 5100 or the 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. Intelligent battery outgas ventilation is managed by the NCU controller when batteries are mounted in a closed battery compartment.

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

The enclosure solution 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 Vertiv M Series provides both.

Application

The Vertiv 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 NetSure DC power systems to choose from, the Vertiv M Series supports on-grid, bad-grid and off-grid applications.

Technical Specifications



Enclosure	M20	M35	M44
Dimensions, Enclosure Body (H x W x D)	1050x730x750 mm	1674x730x750 mm	2074x730x750 mm
Enclosure Body	Aluzinc, powder paint RAL 7035, insulation as option (heat transfer 2,5 W/(m2,K)		
Roof	Slanted (include support 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 16U	up to 32U	
Weight (empty)	55 kg	75 kg	95 kg
Locking type	3-point locking system, different locking cylinders available		
Cable Inlet Type	2xMC10/25/35/51, 1xPG21, 1xPG29, 1xPG36, Roxtec EzEntry 16/16 (other PGs alternative as options)		
Mounting	Ground (C-bars [1]), height 125 mm, wall or pole	Ground (C-bars [1]), height 125 mm	
Accessories	Light, door contact, alarm terminal, ground, cable tray, document holder, smoke detector, solar array cabling, etc.		

Climate Solution Capacity/Options			
Fan filter over pressure (VDC) [2]	<100 W/K		
Air-conditioner (VAC/VDC) (operating up to +55 °C)	400-600 W	300-2000 W	
HEX (VDC) [2]	65 W/K	65/H105 W/K	
Thermal Electrical Cooler (VDC)	-	200 W (for battery compartments)	-
Heater (VAC)	250/800 W		
Thermal Zones/Compartments	One	One or two	

Environmental	
Temperature [3]	-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), IP65 with overpressure fan filter solution (EN60950-22) rain test (IECEN/UL 60950-22 annex B)
Impact	IK 10 (EN 50102)
Audible Noise (fan filter)	Rural / Urban (ETS 300 753 class 4.1E)

DC Power Equipment	
NetSure 5100 or NetSure 7100 incl NetSure Control Unit (NCU)	6-24 kW combined output power. Peak efficiency > 96-98%. For operating temperature range please see respective DC Power data sheet. Available with Solar (MPPT) and +24VDC Converters, for On-Grid, Bad-Grid and Off-Grid Applications.

AC Distribution	
Input, Nominal	Single Phase: 220 VAC to 240 VAC, 3-phase: 380 VAC to 415 VAC
Surge Protection (optional)	Class C
Configurable Components	Main switch/circuit breaker, service outlet/RCD, connection for generator and solar arrays

Standards Compliance	
EU Directives	CE, RoHS 6, REACH
Safety	EN62368-1, EN60950-22 (2nd edition)
EMC	ETSI EN 300386 class B
Seismic Exposure	Telcordia GR-487 Core, Zone 2
Corrosion Resistance	EN60950-22 and ISO 21207 method B (corrosion resistance 20-50 years)

Notes

1 Front and rear cover as option
2 Heat load capacity per degree (exhaust vs ambient) [W/K]
3 Other ambient temperatures available upon request

Ordering Information

Part Number	Description
BFK22220/...	Vertiv™ M20 enclosure
BFK22235/...	Vertiv™ M35 enclosure
BFK22244/...	Vertiv™ M44 enclosure

Note

Please contact your local sales representative to discuss your specific enclosure configuration requirements.

EPC48300/2900 Series

Features

- Houses a centralized power supply system, cooling system, environmental monitoring, and battery backup system among others
- Large space for flexible application: the user equipment and battery chamber can share the same space, which can be flexibly adjusted based on the user requirements.
- Highly reliable temperature control system: the system integrated various temperature control units include a heat exchanger, air conditioner, and heater which can be flexibly configured according to the on-site environment. The temperature in the cabinet can be adjusted in an intelligent way.
- High degree of protection (IP55)
- The cap of the cabinet adopts a bevel design, eliminating accumulation of rain water and snow; the base adopts an extensional design, facilitating system installation & maintenance.
- Comprehensive ECCUP environment monitoring system applications: the system performs monitoring and alarm uploading for the power supply system, temperature control unit and all environmental variables; provides different environment variable detection data to meet the practical user requirements.
- Integrate different communication interfaces including RS232/485 and TCP/IP, etc. and helps realize system alarm uploading and remote monitoring.
- CE certified.

Description

The EPC 48300/2900 Series is a compact and flexible enclosure solution for housing electronics, distribution, and battery backup equipment in outdoor telecom networks. To provide maximum protection for your equipment investment, the EPC 48300/2900 Enclosure is designed and tested to withstand the most severe environmental conditions. Thermal management is achieved through use of heat exchanger or air conditioner cooling which keeps electronics from exceeding their optimal temperatures, yet never introduces outside air and pollutants into the equipment chamber.
The EPC 48300/2900 series cabinet is extremely flexible, and a modular approach is taken wherever possible so the cabinet can be quickly configured to meet your exact requirements.

Application

This cabinet can economically house a variety of next generation electronic equipment including telco backhaul, fiber distribution, and radio equipment for wireless applications.

EPC48300/2900-M2

EPC48300/2900-M21

EPC48300/2900-F2

EPC48300/2900-H2

EPC48300/2900-A2

Model Name		EPC48300/ 2900-M2	EPC48300/ 2900-M21	EPC48300/ 2900-H2	EPC48300/ 2900-F2	EPC48300/ 2900-A2
Power supply system (optional)		Vertiv™ 19 inches NetSure™ Power system				
AC user socket		10 A single-phase AC socket				
Temperature control	Equipment Chamber	Heat exchanger: 80 W/K	Forced ventilation: 1500 W	Heat exchanger: 150 W/K	Forced ventilation: 1500 W	Precise air-conditioning: 1500 W cooling, 1200 heating, Standard emergent ventilation
	Battery Chamber	Precise air-conditioning: 300 W cooling, 600W heating; emergent ventilation, (optional)		Natural ventilation		
	Heater (Optional)	Equipment chamber 600 W		Equipment chamber: 600 W; Battery chamber: 600 W	600 W or 1200 W	600 W
Environment Monitorning	Standard	LED lighting, access control switch				
	Optional	ECCUP (optional temperature and humidity sensor, smoke sensor, flood sensor vibration and inclination)				
Reserved space		36 U flexible 19 inches space shared by power system, batteries and user equipment				
Protection class		IP 55				
Optional parts		Network interface board, AC distribution unit, heater component, rectifier module blank panel, cabinet base cover plate				

Mechanical Parameters		EPC48300/ 2900-M2	EPC48300/ 2900-M21	EPC48300/ 2900-H2	EPC48300/ 2900-F2	EPC48300/ 2900-A2
Power supply system (optional)	Cabinet	700 mm(W) × 700 mm(D) × 2030 mm(H), including base and cap				
	Battery chamber	610 mm(W) × 580mm(D) × 330mm(H) each layer				
AC user socket		≤235 kg (excluding module and battery)	≤210 kg (excluding module and battery)	≤215 kg (excluding module and battery)	≤ 185 kg excluding module and battery)	≤ 240 kg (excluding module and battery)

Vertiv™ XTE 601 Series

Features & Benefits

- **Full flexibility and scalability** — one enclosure for various wireless and wireline telecom applications
- **Multiple climate control solutions** — satisfy your specific equipment heat dissipation and environmental demands
- **Increased ability to customize** — diverse configuration, cooling and mounting options available
- **One standard enclosure platform for multiple applications** — means fewer configurations and cabinet types to specify, install and maintain
- **Industry standards** — platform designed to meet Telcordia GR-487-CORE, IP55, UL 60950/ NWIN Type 3R, NEMA, NEC as well as other local requirements
- **Environmentally friendly cooling** — low-energy consumption and low-noise fans are ideal for residential areas
- **Pad, pole and wall-mounting options** — accommodate site requirements and limitations
- **Field-upgradable climate units** — door-mounted with slide-off hinge to simplify service and replacement
- **Permanent ventilation ports** — eliminate replacement of screens and filters, reducing field maintenance cost
- **Cabinet controller** — cycles fan to maintain desired temperature, reducing power consumption and acoustic noise

The Vertiv™ XTE 601 Series of integrated outdoor enclosures delivers best-in-class performance and flexibility for a wide variety of wireline and wireless applications. By leveraging simplicity, flexibility and scalability across the platform, the Vertiv XTE 601 Series provides a rapidly deployable, cost-efficient solution to service providers around the world.

As subscriber interest for the ever-increasing array of broadband service grows, more and more sophisticated electronic equipment is being deployed in the outside plant. To provide the proper protection and controlled operating environment for this sensitive equipment and preserve the reliability of your network, Vertiv has developed the Vertiv XTE 601 Series of integrated outdoor enclosure solutions. Its flexibility enables you to support a wide variety of OEM equipment with a single platform, under the wide range of weather extremes, thermal and electrical issues, and physical stresses encountered in the OSP environment.

By standardizing on the Vertiv XTE 601 Series, you simplify network expansion and reduce the burden of stocking service parts, with the confidence that you will be able to deploy any OSP equipment--anywhere in your network – that the next generation of technology is sure to bring.

Description

The Vertiv XTE 601 Series platform is a proven structural system, with integrated climate control and power options. Vertiv XTE 601 enclosures are offered in a broad range of standard sizes designated by the rack unit (RU) capacity of the equipment chamber. Sizes range from 8 RU to 43 RU. Single-bay, 2-bay and 4-bay enclosures are available as standard configurations, with a variety of door, base and side-chamber (SC) options. Pad, pole and wall mount options are offered.

Technical Specifications

Enclosure Mounting

All Enclosures	Pad mount
Single Bay Cabinets (up to two side chambers)	Pole mount
Maximum Cabinet Dimensions for Pole Bracket Kit (W x D)	30" x 25" (762 mm x 635 mm)
Maximum Cabinet Dimensions for Pole Chair Kit (W x D)	54" x 25" (1372 mm x 635 mm) and 42" x 46" (1067 mm x 1168 mm)
Equipment Mounting	
Vertical Rack Spaces (standard)	8RU to 43RU - Refer to table for standard rack unit options Custom rack units can be provided upon request between 8RU and 43RUs
Hole Spacing	Standard EIA spacing; untapped holes for 12-24 thread forming hardware
Rack Widths	23" (584 mm) EIA fixed racks are standard 23" (584 mm) EIA swing rack available as option 19" (483 mm) EIA available as option
Center Mounting	Accepts standard 12" (533 mm) deep, center mount equipment (5" front, 7" rear)
Environmental Protection	
Finish	Off-white, polyester powder coat
External Frame Finish	Anodized (standard); off-white, polyester powder coat (optional)
Thermal Protection	
Heat Dissipation	Refer to “Climate Control Options” table on following page for details
Temperature Alarms	Temperature alarms provided with each cabinet
Controller	Available with heat exchangers and thermoelectric coolers
Electrical	
AC System Options	4 X 4 AC junction box, 115Vac, 60 Hz, 15 amp 8-position load center, 120/240VAC, 60 Hz, 100A 12-position load center, 120/240VAC, 60 Hz, 125A 220VAC, 15A Twist Lock Receptacle Kit 220VAC, 30A Twist Lock Receptacle Kit
Convenience Outlets (GFCI protected)	One provided in equipment chamber or side chamber
Generator Connection (optional)	30 amp and 60 amp generator inlet kits are available
Battery Compartment	
Battery Options	Ventilated external battery compartment Battery Shelf (internal to cabinet) for use with 30"W x 32"D cabinets only Riser Kit – [Two stacked battery compartments, ventilated, 31-inch height (787.4 mm)]
Compatible Batteries & Amp-Hour Reserve	Supports 12 VDC front post batteries (-48VDC and +24VDC) 155Ahr FIAMM®, 155Ahr GNB, 190Ahr Enersys, 170Ahr Northstar or equivalent batteries
Battery Size Capacity	Supports Up to 22.1" (561mm) D x 4.9" (124mm) x 12.6" (316mm)
Available Area per String (external battery compartment)	13.8" H x 21.38" W x 22.98"D (351 mm x 543 mm x 584 mm)
Battery Heater Pad Kit (optional)	Thermostat control “On” at 40° F, “Off” at 60° F For use with external battery compartment and riser kit

Security

Padlockable Quarter-turn Cam Latch	Tamper resistant 216-type tool or Hex-pin (doors and removable panels)
Padlockable Swinghandle Cam Latch	Tamper resistant 216-type tool or Hex-pin (doors)
Intrusion Alarm	Intrusion alarm with local indication and remote location options
Access Covers	Battery compartement and cable covers are only accessible when cabinet doors are open
Bonding and Grounding	
Ground Bar	One 10-position, dual holed L49, copper buss, 3/16" (5 mm) thick, 1/4-20 hardware One ground bar is included in the equipment chamber for cabinets without side chamber(s)
Cable entrance	
Single Bay Cabinets (25" Depth)	(2) 3" (76 mm) cable entrance cones
Single Bay Cabinets (32" Depth)	(3) 3" (76 mm) cable entrance cones
Cabinets with Side Chambers (25" Depth)	(2) 4" (102 mm) cable entrance cones standard per side chamber
Cabinets with Side Chambers (32" Depth)	(3) 4" (102 mm) cable entrance cones standard per side chamber
Cabinets with Side Chambers (46" Depth)	Up to (4) 4" (102 mm) cable entrance cones standard per side chamber (limitations may apply; cable dressing bracket provided with protection panel kit)

NetSure™ M Series, M620HC

Benefits

- Decrease OPEX and carbon footprint by supplementing your generator with a high capacity energy storage solution
- Optimize the amount of energy delivered to your batteries with eSure™ rectifiers that deliver over 96% efficiency
- Easily monitor and adjust system parameters with the NCU via an on-board color display or web pages supported by all major browsers
- Confidently deploy in any environment with an enclosure that meets a wide variety of international standards and operates in harsh conditions
- Enjoy the flexibility to deploy a wide range of battery sizes to meet the specific needs of your site

NetSure™ M620HC with fan-filtered cooling for the NetSure™ 5100 power system and air conditioning for the batteries

The NetSure™ M620HC enclosure is a robust energy storage solution for off-grid CDC (charge-discharge-charge) or bad-grid applications with optional supplemental solar power.

Telecom network operators deploying access nodes in remote geographical areas around the world are often faced with situations where no or poor AC utility infrastructure exists. In order to bring sites online in these challenging conditions, Vertiv's reliable and proven NetSure™ DC power systems and enclosures can be paired with batteries designed for cyclical applications. This reduces demand on the generator, enabling operators to save money on fuel, minimize their carbon footprint, and simplify maintenance.

The NetSure™ M Series M620HC enclosure features a reliable NetSure™ 5100 DC power system that operates in environments up to +65 °C without deration and is equipped with the latest NetSure™ Control Unit (NCU), where data and control is available for all aspects of the power chain including the DC power plant, batteries and diesel generator. The NetSure 5100 utilizes 2000 watt high-efficiency eSure rectifiers and supports the use of 2000 watt solar converters when a solar array is leveraged to further secure energy supports and reduce carbon emissions.

The power system and batteries are housed in a robust enclosure designed with easy access to equipment via front and rear doors. Single-skin aluzinc walls treated with advanced corrosion-resistant powder paint enable this solution to withstand extremely harsh environments including heavy rain, wind, dust, lightning and electromagnetism. The enclosure doors feature hidden stainless steel hinges and three-point locking mechanisms for added security.

Separate chambers for the power system and batteries facilitate precise thermal management. The upper power chamber is cooled with a fan-filtered ventilation system, while air conditioners on the doors ensure the batteries in the insulated lower chamber operate within their recommended temperature range.

The battery chamber is designed to support (24) 2 volt cyclic battery cells ranging from 600 to 1200 Ah. Front and rear access doors simplify installation and maintenance.

Application

The NetSure M620HC outdoor enclosure is designed for remote off-grid CDC or poor-grid wireless access networks that typically utilize a generator as an AC source and require a large energy storage solution. OPEX savings and environmental benefits can be further enhanced by pairing the NetSure M620HC with a Vertiv™ solar power solution.

Technical Specifications

Enclosure	
Dimensions, Enclosure Body (H x W x D)	2100x975x1190 mm
Enclosure Body	Aluzinc, powder paint RAL 7035, battery compartment insulation (heat transfer 2,5 W/(m2,K)
Rack Width	19" for customer equipment and NetSure™ DC power system
Rack Height (total)	4U (front) and 15U (rear) for customer equipment
Weight (without batteries)	xx kg
Locking type	3-point locking system on both doors
Cable Inlet Type	MC25 through floor
Mounting	Ground (125 mm high C-bars with side cable access and front and rear covers)

Climate Solution Capacity/Options	
Power Compartment	Fan filter, -48 VDC, 80 [W/K] heat load capacity per degree (exhaust vs. ambient)
Battery Compartment	(2) air conditioners, -48 VDC, 600 W unit (each), L35/L35

Environmental	
Temperature	-10 °C to +55 °C (ambient)
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), EN60950-22 for rain
Impact	IK 10 (EN 50102)
Noise Pressure	60 dB(A) at 1m

DC Power Equipment	
NetSure™ 5100 e/w NetSure™ Control Unit (NCU)	-48 VDC, 20 kW output power, up to 10 kW solar output power, peak efficiency >96%

AC Distribution	
Input, Nominal	3-phase: 380 VAC to 415 VAC
Components Included	Main circuit breaker, service outlet/RCD, Class C surge protection

Standards Compliance	
EU Directives	CE, RoHS 6, REACH
Safety	EN60950-1 (-22)
EMC	ETSI EN 300386 Class B radiated, solar Class A conducted
Corrosion Resistance	EN60950-22 and ISO 21207 method B (corrosion resistance 20-50 years)

Ordering Information

Part Number	Description
BFK22205143/200	NetSure™ M620HC enclosure with NetSure™ 5100 DC power system
BML440033/1	R48-2000e3, 2000 watt high-efficiency eSure™ rectifier
BMR960030/1	S48-2000e3, 2000 watt high-efficiency eSure solar converter
10011200	Inter-battery cable connection kit for two terminal batteries. *Note: Order two kits for four terminal batteries*
Narada REX for applications with predictable recharging of batteries such as Off-Grid CDC or where batteries may stay at a full charge for an extended period of time such as Bad-Grid sites with or with solar	
10011409	600 Ah batteries (two terminals)
10011412	800 Ah batteries (four terminals)
10011413	1000 Ah batteries (four terminals)
10011415	1200 Ah batteries (four terminals)
Narada REXC for applications with unpredictable recharging of batteries such as Off-Grid and Off-Grid CDC with solar	
10011314	600 Ah batteries (two terminals)
10011293	800 Ah batteries (four terminals)
10011367	1000 Ah batteries (four terminals)
10011368	1200 Ah batteries (four terminals)

Note

Rectifiers and solar converters need to be ordered separately.

Monitoring


MONITORING
Graphical View
Alarms
Commands
Statistics
Statistic Config
Room Temperature

Vertiv™ Critical Insight

Benefits

- It allows you to assess energy utilisation within your facility and to identify energy operational efficiency opportunities
- It collects data from disparate systems and provides aggregated views that allow identifying trends and managing critical infrastructure capacity, thus obtaining total cost of ownership reduction
- It allows you to assess device health, to receive immediate notifications in case of warnings or alarms, and to take action accordingly, with the ultimate result of maximizing uptime
- It allows you to carry out real-time monitoring of your equipment and quickly visualize, monitor and export power, cooling, environmental data and other key metrics and KPIs providing operational transparency
- It is extremely versatile, allowing you to choose between different methods of deployment, namely on-premise and SaaS to fit at best your strategy and investment targets

Vertiv™ Critical Insight is a real-time software platform designed to ensure continuous performance improvement for any critical infrastructure. It is a comprehensive web-based critical infrastructure monitoring tool designed to identify and manage key operational behaviours, analyse trending, and manage energy usage.

Because of its in-built flexibility, Vertiv Critical Insight can be installed on a single server, distributed over several servers or hosted by Vertiv and provide centralised monitoring and control of your critical equipment and related sensors.

The equipment monitored can be Vertiv or third-party and can be in a single site or distributed over many sites.

Performance and alarm data from the monitored equipment is automatically collected and made available in real time, so as to provide data center operators with the information they need everyday.

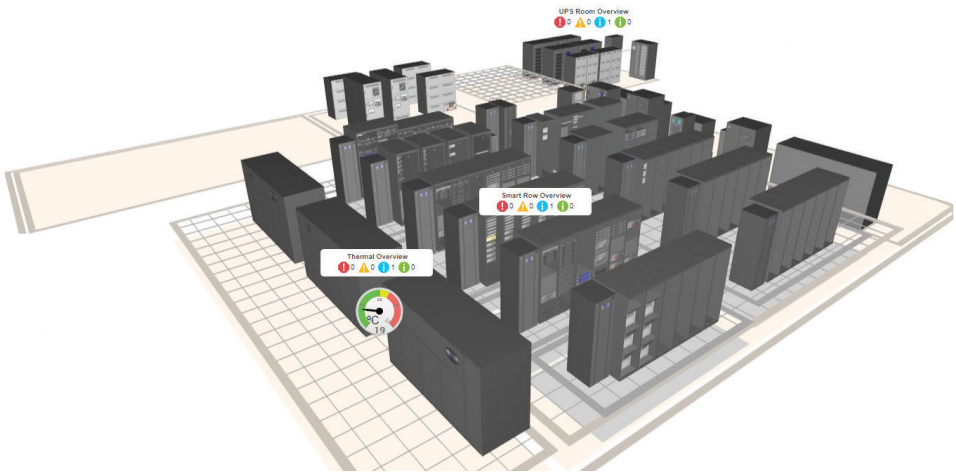
Vertiv Critical Insight allows you to have a view of the events on the devices, in order to discover anomalies and behaviors and trigger specific actions.

It also allows for different levels of access, based on user profiles with specific rights and restrictions.

Vertiv Critical Insight grants maximum flexibility

Vertiv Critical Insight addresses the needs of small to large installations and offers the following capabilities:

- Monitoring of single and multiple sites
- Alarm notification sent via text and e-mail
- Manual or automatic remote equipment control
- Monitoring of Vertiv and third-party equipment
- Secure connection granted by SSL encryption
- Unlimited number of users
- Possibility to be deployed on premise or on cloud



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