



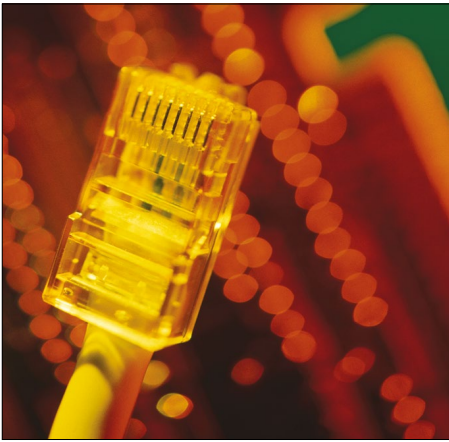
NETPERFORM™  
OPTIMIZATION SERVICES

Network Infrastructure  
Management Solutions



### **In a business that relies on zero downtime, it makes sense to invest in your communications infrastructure, and protect against power-related failures that can bring your communications network to a halt**

#### Network Infrastructure Support



With today's market conditions and cost-cutting measures, the demands to do more with less are being placed on individuals accountable for the maintenance and operation of power plants and facilities. Yet even the most reliable systems are subject to failure if not properly supported and maintained. Vertiv™ takes a holistic approach to the health of your network facilities to ensure that every facet of your communications infrastructure is operating at maximum efficiency and is clear of environmental or systematic hazards. Vertiv applies in-depth knowledge of DC power plants, batteries, generators, HVAC, and UPS systems, providing further protection against failure.

We provide energy management, remote and on-site support to augment your in-house staff, enhancing your ability to maintain and operate a world-class network power infrastructure.

Vertiv also provides the solutions that can increase the confidence level in your network's ability to withstand AC power outages and provide continuous power to networking equipment. We provide energy equipment expertise with customized energy assessment recommendations, remote supervision, predictive failure analysis, documentation and more. We have the assets to supplement your internal resources, as well as the capability to provide a total turnkey service solution.

The following information summarizes Vertiv's capabilities as a one-stop-shop for the remote supervision, repair, monitoring, maintenance and deployment of your communications infrastructure. For details about any of the services listed here, please contact your Vertiv account representative.

## NetPerform™ Optimization Services

Multi-vendor Support Offerings	Rectifier	Inverter	Converter	Power System	Battery String	UPS Systems*	Genset	Lighting	HVAC*
<b>On-site Support</b>									
Deployment	■	■	■	■	■	■	■	■	■
Corrective Maintenance	■	■	■	■	■	■	■	■	■
Preventive Maintenance	■	■	■	■	■	■	■	■	■
Thermography*	■	■	■	■	■	■			■
Site Evaluation	■	■	■	■	■	■	■	■	■
<b>Battery Maintenance Program</b>									
Battery Discharge Testing					■				
Battery Internal Resistance Testing*					■				
Remote Battery Tests					■				
<b>Remote Support</b>									
Remote Services (Monitoring)	■	■	■	■	■	■	■	■	■
Help Desk	■	■	■	■	■				
Depot Repair	■	■	■	■					
Spare Parts	■	■	■	■	■	■			
Training	■	■	■	■	■	■			
<b>Contact Information</b>									
Depot Repair	+421 327 700 191			EMEA.HWServices@Vertiv.com					
Spare Parts	+421 327 700 881			EMEA.HWServices@Vertiv.com					
Training	EMEA.Training@Vertivenergy.com								
Questions?	For general questions, please contact your local sales contact.								

\* Please check with your local sales contact for availability in your market.



Vertiv Field Engineers have an average of 10+ years industry experience, with training to the highest industry standards and cutting edge test/diagnostic equipment to handle any and all of your field service needs.

## On-site Support

### Deployment

To make the introduction of new power systems and batteries into the network problem free, Vertiv™ offers a full portfolio of essential services, from site survey to the hand over of the site. If the installation is done by a third party vendor, we recommend the valuable assessment that Commissioning gives. Commissioning secures that the installation has been properly done and that all site parameters are correctly set up. This gives the security of knowing the system is problem-free prior to turn up.

- Site survey
- Solutions engineering
- Installation work including installation material
- Commissioning
- Acceptance tests
- Performance tests.

### Corrective Maintenance

Whether you need resources to perform a scheduled equipment replacement or emergency on-site technical troubleshooting, Vertiv provides a fully qualified field service engineer on-site. Vertiv system and component upgrades put your mind at ease and initiate a plan to put vital components into top-notch condition.

- On-site equipment fault isolation, repair and refurbishment
- Repair, refurbishment and component upgrades (alarm relay, capacitor, contactor, fan, triac, fuse and alarm panel) via Depot Repair
- Adding rectifier, inverter, converter, monitoring and distribution unit capacity
- Service available 24/7
- Battery replacement
- Emergency dispatch coverage with service level response times.

### Preventive Maintenance

Vertiv serves as the single point of contact for all your maintenance needs. Vertiv understands your specific needs and will tailor a service agreement that meets or exceeds all of your requirements. Complete documentation is provided following each maintenance visit. Reports provide a clear picture of system status and recommendations for corrective steps to prevent future problems.

- Replacement parts coverage available
- Thermal scan analysis & thermography available
- Regular inspections, maintenance, and testing of equipment at scheduled intervals.

### Thermography

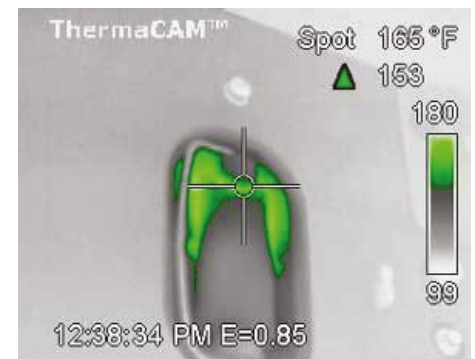
Infrared imaging technology to pinpoint potential power interruption areas early and prevent costly shutdowns later. Trained Field Service Engineers, equipped with the ultimate in infrared imaging technology, detect and document actual temperatures of the power system and components, locating problem areas invisible to the human eye. Their expert analysis and findings are documented in a service report containing:

- Current system condition and a prioritized correction plan for any issues discovered
- Thermographic photographs with temperature measurements and a calibrated color scale.

### Site Evaluation

Concentrate on your core business objectives, and allow Vertiv to conduct a comprehensive site inventory and inspection. Documented results, which are multi-vendor focused, provide current, complete site awareness and a baseline for the condition, expansion or integration of your power and facility network infrastructure.

- Equipment condition, model, spec and serial numbers
- Capacity and back-up power analysis
- AC and DC power distribution
- Rectifier and battery status
- Floor diagram
- Grounding.



*Thermography has proven to be invaluable in spotting problems before they occur. This reduces potential equipment damage and protects the system and associated revenue.*

## Battery Maintenance Program

By utilizing the best features of On-site and Remote Discharge testing as well as Internal Resistance testing, Vertiv™ can deliver the ultimate Battery Maintenance programs designed to optimize accuracy vs. cost for the different applications. Thus enabling reduction of down time due to failed batteries, and forecasting of Service Life so battery replacements can be scheduled before they fail.

### Battery Discharge Testing

Battery discharge tests are considered by the industry to be the only guaranteed method to measure the true capacity of a battery and its ability to support the critical load for a specified period of time.

Using an external DC Load Frame and calibrated meters to monitor and record the bloc voltages, battery voltage and load current, these tests will determine true battery plant capacity per industry standards and Battery Manufacturers specification without subjecting the critical equipment to decreased voltage levels throughout the tests.

A detailed report on each battery with findings and recommendations is then prepared for the customer, including:

- Graph voltage of each string
- Graph voltage of each block for a unique in depth analysis of battery performance
- Data table and record of visual, physical and environmental parameters

### Battery Internal Resistance Testing

Widely accepted in the industry by both battery manufacturers and battery users as a reliable method to determine a battery's 'State of Health'. Internal Resistance is quicker and more cost effective than discharge testing, and throughout the test the battery capacity remains 100% available to the critical load.

It can also be used to detect faulty blocs, and by regular maintenance it is used to predict battery failures before they lead to a loss of power to the critical load.

### Remote Battery Tests

Using advanced monitoring technology and Vertiv™ dedicated 24/7 monitoring centers around the globe, an extremely cost efficient 'Remote Battery performance' test can be carried out using the site application as load. This method delivers verification of site performance without the expense and resource required for a site visit.



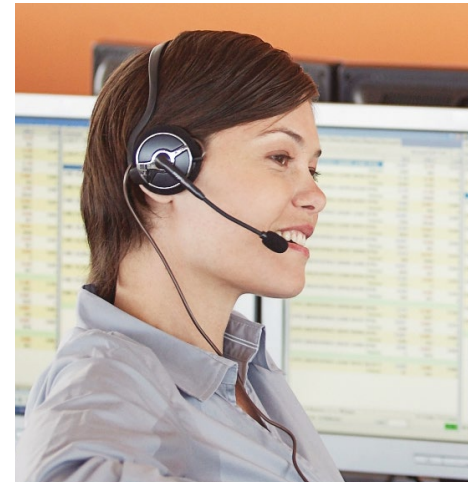
## Remote Support

Vertiv is fully equipped to bring a training course, seminar or workshop to your site, targeted to the specific needs of your people and organization.

### Remote Services (Monitoring)

Vertiv offers an integrated approach to managing the energy and health of entire networks. Remote services are designed to minimize energy use, reduce OPEX for maintenance and maximize the availability of vital systems. When our Energy Operation Centers (EOCs) are connected to your critical energy equipment, the remote supervisory system gathers a continuous stream of vital health parameters and alarms at the site, including AC power consumption/quality, battery status, HVAC, motor performance, genset, UPS, renewable power sources, DC power and inverter statistics. Predictive and corrective maintenance routines compliment the offering with on-site inspections and preventive maintenance designed to maximize your facility's integrity.

- Remote supervision
- Optimizing energy consumption
- Remote maintenance routines
- Emergency service
- Alarm analysis and handling
- Advanced reports
- Battery replacement strategies
- Uptime optimization.



### Help Desk

Dedicated support service is available 24/7 from Vertiv's Energy Operations Centers (EOCs). Once a case is logged, Vertiv works with you through complete resolution. These services feature highly skilled technical support representatives delivering remote support via phone or e-mail for diagnosis and resolution of power system and site infrastructure issues and outages.



*With Vertiv's 24/7 technical help desk and field service, you have access to experienced technical support engineers 365 days/year and fully equipped technicians for around-the-clock dispatch to your sites.*



### Depot Repair

Repair and refurbishment of aged power system components to like-new performance can keep you running at optimal operating efficiency. Components include rectifiers, converters, inverters, control and distribution boards. When possible, the components can be upgraded to the latest specifications.

- Repair Return – repair and return of faulty product with specified lead time
- Swap Return – unit is replaced by another unit at arrival to repair center
- Advanced Swap Return – replacement unit is provided from repair center at failure notification
- Emergency Advance Swap – replacement unit is provided from local Emergency stock.

### Spare Parts

To meet the ever-changing needs of your communications network infrastructure, Vertiv owns, stores and offers individual parts and pre-packaged kits of spare parts and fuses for Vertiv equipment.

- Spare Parts Sales – providing requested spare parts
- Spare Parts Management – providing requested spare parts with short lead time in line with agreement
- Retrofit kits to improve performance and reliability of older equipment .

### Training

Vertiv's professional training centers offers education to help your employees understand the full potential of your network infrastructure equipment investment.

- Classes feature hands-on training combined with theory
- Modular power systems, monitoring products and battery systems
- Installation, operation, maintenance & troubleshooting techniques
- Courses available at training center or at customer site.



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