

# Power Protection and Distribution for Healthcare Network Closets

The network closet has become critical to a wide variety of functions within healthcare delivery. As delivery networks continue to expand and digitalize, it becomes necessary to evaluate the power infrastructure that supports the closet. Aging or inadequate power infrastructure makes IT management more challenging and can reduce the availability of network closets, disrupting operations.

## The Challenges

Healthcare network closets are vulnerable to downtime from utility outages and variations in utility power quality. They can also be susceptible to unexpected failures in critical infrastructure resulting from a lack of visibility into systems such as Uninterruptible Power Supply (UPS) batteries. Key challenges that must be addressed in configuring power infrastructure for network closets include:

**Power Continuity:** Even brief interruptions in utility power can bring down the IT systems operating in network closets without a reliable UPS system. Longer outages can also lead to disruptions if the outage exceeds the UPS battery runtime, and the closet is not supported by a generator. Batteries degrade with time and usage, so it's important to have a system in place to ensure batteries function as expected when needed. In addition, voltage sags and spikes, frequency variations and other power anomalies can damage equipment and shorten life if power isn't conditioned before it reaches IT systems.

**Optimizing Protection:** Hospitals need to optimize their investment in critical infrastructure. Different types of UPS systems provide different levels of protection. Choosing the right system for an application helps ensure the level of protection meets requirements in the most cost-effective way. Line-interactive UPS systems provide a cost-effective solution for many applications. Double-conversion UPS systems provide the level of protection required for critical applications.

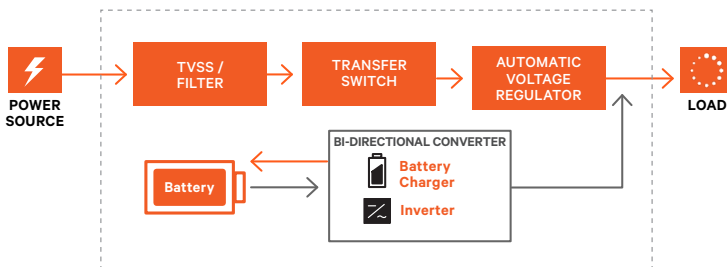
**Scalability:** As more equipment gets added to closets, power infrastructure can become a limiting factor. Ensuring scalability requires careful consideration of UPS sizing and potentially deploying power distribution units (PDUs) to manage distribution of power from the UPS to connected devices.

**Standardization:** Management challenges created by an increasingly distributed network can be exacerbated when closets across the network employ different equipment. A "standard" design that creates consistency while allowing some design flexibility can help drive costs out and simplify ongoing operation and maintenance.

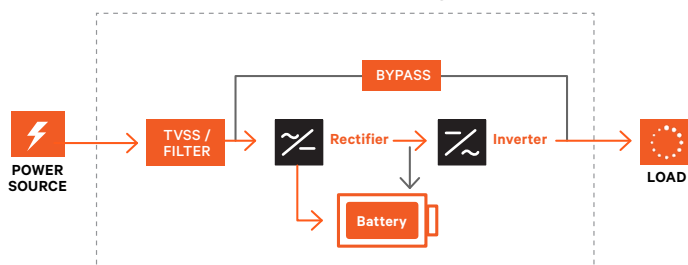
**Serviceability:** With network closets distributed across the healthcare system, managing routine maintenance becomes more of a challenge. Are trained technical staff available to perform service, can batteries be replaced without powering down the UPS, and can the UPS be removed from service without powering down IT equipment are all questions that should be considered.

**Visibility:** The reason closets have become so critical is the increased connectivity of systems across the delivery network. Yet, the power systems that the closets depend on often aren't connected to monitoring and management systems that provide remote visibility into equipment status and alerts, making service more difficult and increasing downtime.

## Line-Interactive Technology



## Online Double-Conversion Technology



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## Vertiv™ Solutions

Vertiv is a global leader in critical infrastructure that offers a complete family of network closet UPS systems through the Liebert® product brand and a family of rack power distribution units (rPDU) through the Geist™ product brand. Vertiv™ products have an outstanding reputation for reliability and are among the most efficient in their class. By offering a broad portfolio of reliable, intelligent and efficient products, Vertiv enables healthcare delivery networks to optimize their investment in critical infrastructure while ensuring they have the capacity, visibility, serviceability and continuity their businesses require.

## Vertiv™ UPS Systems for Network Closets

Vertiv UPS solutions for network closets are built to maximize flexibility, scalability, and efficiency with standardized designs built around common technology building blocks. They provide excellent runtimes through the internal, hot-swappable battery and can be configured with external batteries to support longer run times. Our runtime calculator will help you configure batteries for your system. They also feature programmable power outlets that enable battery capacity to be reserved for the most critical devices in the closet. Additional capabilities include:

**Performance:** Vertiv™ Liebert® UPS systems feature a high output power factor to maximize efficiency and available power. Our line-interactive UPS systems feature automatic voltage regulation that delivers advanced pure sine wave output on battery. Liebert® double-conversion UPS systems convert incoming power within the UPS to eliminate all power anomalies and deliver consistent, conditioned power to connected equipment without relying on batteries. Vertiv UPS systems with VRLA batteries are backed by a three-year warranty. Vertiv UPS systems with lithium-ion batteries are backed by a five-year warranty.

**Lithium-ion Batteries:** Select Vertiv™ Liebert® UPS models are available with lithium-ion batteries that deliver up to 50% lower total cost of ownership compared to VRLA batteries. This is achieved through the combination of reduced maintenance requirements and longer lifecycles. With long-life lithium-ion batteries, you can eliminate multiple battery replacement cycles.

**Scalability:** When more capacity is required additional UPS units can be added. In addition, the Liebert® APS UPS features built-in modularity that enables a pay-as-you-grow approach to capacity planning. This UPS family also features integrated N + 1 redundancy to eliminate single points of failure.

**Easy Connectivity:** Vertiv™ UPS systems are available with Intellislot communication cards that enable the UPS to support a variety of communication protocols and management platforms. Communication cards are standard on many models and available as options on others.

**Computer Shutdown:** Vertiv Power Assist is a free shutdown software that offers redundant dual UPS and multi-server shutdown. The easy to install software notifies users of an event, displays key metrics and logs historical data. Ideal for customers who require one-to-one USB connection or support for redundant dual UPS.

**Power Monitoring:** Vertiv Environet Alert is a powerful remote monitoring and data visualization software that provides enhanced visibility to connected SNMP devices. Power customers benefit from real time notifications, comprehensive alarm management and robust data reporting. The system is user maintainable making it easy to add new devices as your system grows.

**Environmental Monitoring:** Vertiv offers a wide range of sensors for temperature, humidity, leak detection and other factors. These sensors can connect to the UPS to assist in monitoring conditions within a rack or network closet.

**Serviceability:** Most UPS models feature hot-swappable batteries conveniently located behind the front bezel of the unit when mounted in the rack. Vertiv™ Liebert® UPS systems 3,000 VA and below are available with an optional maintenance bypass (Liebert® MicroPOD) to allow the removal of the UPS without powering down the connected equipment. In 5 to 10 kVA systems, the maintenance bypass is integrated into the UPS.

## Liebert® UPS Single Phase Systems for Network Closets

	Liebert® PSI5	Liebert® PSI5 with Lithium-Ion batteries	Liebert® GXT5 120V input	Liebert® GXT5 208V input	Liebert® APS
<b>Capacity</b>	800 VA to 5000 VA	1500 VA, 3000 VA	500 to 3000 VA	3000 VA to 10kVA	5000 VA to 20 kVA N+1
<b>Topology</b>	Line-interactive with Automatic Voltage Regulation	Line-interactive with Automatic Voltage Regulation	Online double-conversion	Online double-conversion	Online double-conversion
<b>Form Factor</b>	Tower/1U or 2U rackmount	Tower/2U rackmount	Tower/2U rackmount	4-6U rackmount	Tower or rackmount
<b>Power Factor</b>	.9	.9	1	1	1
<b>Connectivity</b>	Available with IS-UNITY-SNMP, IS-UNITY-DP or IS-RELAY communication cards				Pre-installed IS-UNITY-DP card; two additional card slots available
<b>Internal battery runtime</b>	Up to 17min at full load	Up to 9min at full load	Up to 17min at full load	Up to 7min at full load	Scalable
<b>External batteries available</b>	Yes	No	Yes	Yes	Yes
<b>Maintenance Bypass</b>	Optional MicroPOD available for 3000 VA and below; Integrated bypass above 3000 VA	Optional MicroPOD available	Optional MicroPOD available	Integrated POD with maintenance bypass	Optional rackmount or wall-mount maintenance bypass available
<b>Warranty</b>	2-Year	5-Year	3-Year	3-Year	2-Year

## Vertiv™ Geist™ Rack PDUs

Rack power distribution units (rPDUs) expand on the power distribution capabilities of the UPS while also enabling other important monitoring and management functions. Vertiv offers a full line of rPDUs under the Geist™ product brand to meet the application requirements of any network closet:

**Basic:** Vertiv™ Geist™ Basic rPDUs provide reliable, cost-effective power distribution to critical IT equipment within a rack or cabinet with a range of configuration options.

**Monitored:** Vertiv™ Geist™ Monitored rPDUs deliver a comprehensive view of power usage at the rack and via remote access while continuing to provide reliable power distribution to critical IT equipment. Our monitored rPDUs feature hot-swappable and upgradeable monitoring devices and monitoring accuracy of +/- 1%. They can also be configured to support environmental monitoring through the addition of optional sensors.

**Switched:** Vertiv™ Geist™ Switched rPDUs provide a comprehensive view of critical IT equipment power usage at the rack and via remote access with the added ability to remotely turn on, turn off, or reboot power at each outlet. They feature bi-stable latching relays to reduce power draw, hot-swappable and upgradeable monitoring devices, and monitoring accuracy of +/- 1%. They can be configured to support environmental monitoring with the addition of optional sensors.

**Universal:** The Vertiv™ Geist™ UPDU is a versatile rack power distribution unit featuring a universal input and detachable Facility Side Cable. The UPDU supports common AC power configurations ranging from 16A-60A and 120V-415V. Depending on the model, they can provide remote power monitoring, environmental monitoring, and outlet-level switching.

	Basic	Monitored	Switched	Universal
<b>Capacity</b>	1.4kW – 27.6kW	1.4kW – 22.0kW	1.4kW – 22.0kW	11.0kW max – 22.0kW max
<b>Input/output Voltage</b>	120V, 208V, 120/208V WYE, 208V Delta, 230/400V WYE	120V, 208V, 120/208V WYE, 208V Delta, 230/400V WYE	120V, 208V, 120/208V WYE, 208V Delta, 230/400V WYE	120V, 208V, 120/208V WYE, 208V Delta, 230/400V WYE
<b>Output</b>	NEMA 5-15R, NEMA 5-20R, NEMA L5-30R, NEMA 6-20R, NEMA L6-20R, NEMA L6-30R, IEC C13, IEC C19, Locking C13, Locking C19, and Combination Outlet C13/C19	NEMA 5-20R, IEC C13, IEC C19, Locking C13, Locking C19, and Combination Outlet C13/C19	NEMA 5-20R, Locking C13, Locking C19	Locking C13, Locking C19, and Combination Outlet C13/C19
<b>Orientation</b>	Horizontal and Vertical	Horizontal and Vertical	Horizontal and Vertical	Horizontal and Vertical

## Vertiv Partners Are Ready to Help

Need help configuring your closet? Vertiv has a network of partners available to help you. Find a Vertiv partner near you.

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