



What is a UPS?

Power protection and voltage regulation for servers and computers in a continuity-conscious world.



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OL3000LV

Professional Online UPS

1. Introduction

You've set up a server in your small business, and you're ready to begin putting it to use for serious productivity. All is going well at first, until one day the unexpected happens: there's a power outage. Your server shuts off and, essentially, so does the online service you were providing. This power outage has also placed unnecessary wear on your equipment, and resulted in irretrievable data loss. Or perhaps after enough on / off cycles, your hardware has suffered enough wear and tear and simply given out. If only you had some way to ensure that your server stays on no matter what. Enter the UPS, the one device that does exactly that.

What is a UPS? UPS stands for '**uninterruptible power supply**,' sometimes referred to as an 'uninterruptible power source / system', and is a device that provides a continuous power to a source even if the mains power or power source fails. Unlike other emergency power sources, a UPS delivers near-instant power through its stored **battery backup**, and when activated gives systems integrators enough **UPS runtime** to turn on a standby power source or to properly shut down equipment. As such, a UPS is a crucial piece of equipment for a variety of industries in which losing power is not an option. In fact, the global data center UPS market was valued at US\$3.45 billion in 2017 and is expected to expand at a compounded annual growth rate (CAGR) of 7.5% during from 2018 to 2026, according to [a 2018 report](#) by *ResearchAndMarkets.com*.

Despite their surging popularity, choosing the right UPS system is still slightly challenging, as they come in a variety of topologies and designs. To help clear up some of the confusion this variety causes, let's dive into the different types of UPS systems.

2. What is a Double Conversion Online UPS?

It's a common belief that there are only two types of UPS systems: standby, and on-line. This is a false belief, and does not take into account the diversity of UPS topologies and their varied functions and characteristics.

The most common types of UPS are as follows:

- Standby
- Line interactive
- Double conversion online

Double conversion online UPS

ATEN's UPS models use the **double conversion online** topology with a range of 1K-3kVA. This is the most commonly used topology above 1 kVA and is suitable for environments that require power 24/7. This topology provides various advantages; for example, in case of failure of the input AC power, a double conversion on-line UPS has zero-second transfer time. Because of its design, the input AC doesn't activate the transfer switch as the input AC is charging the backup battery, which in turn feeds power to the output inverter. That is to say, the inverter is always operating.

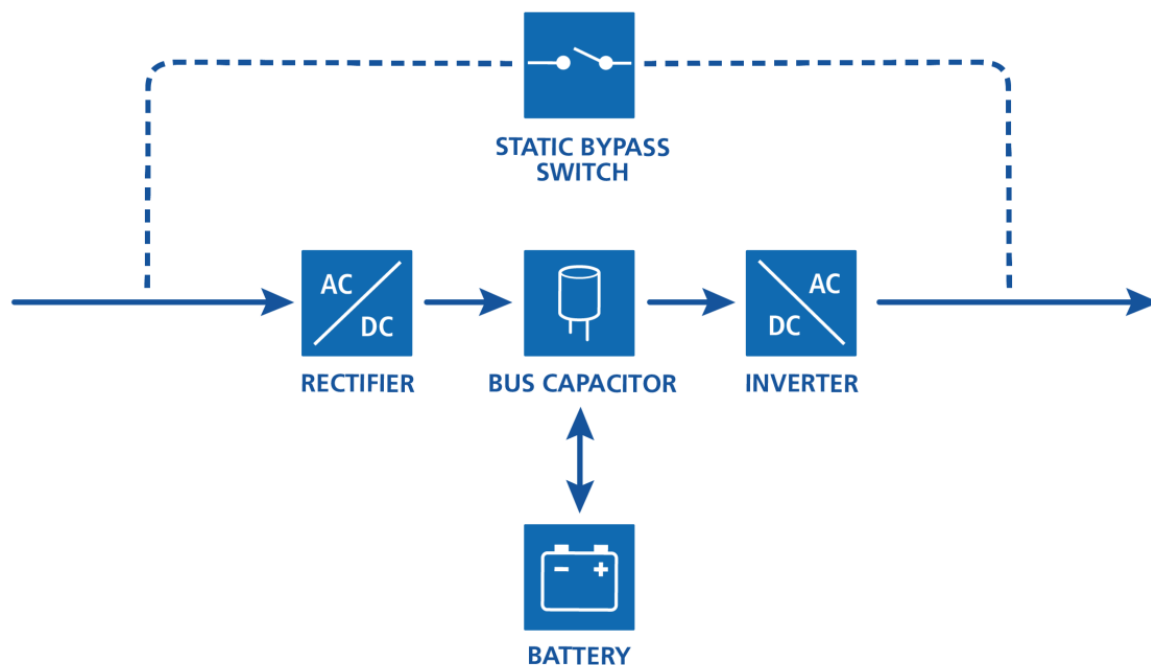


Fig.1 ATEN Double Conversion Online UPS Topology



Power Factor Explained

Perhaps most important is an output power factor = 1. What this means is more real power in watts for your devices. For example, a 100 kVA UPS device with a power factor of 1 can take in loads of 100 kW active and 100 kVA apparent power. If the rated output power factor is 0.8, then the UPS device can handle load of 80 kW active and 100 kVA apparent power. In other words, with a UPS device rated with a power factor of 1, you get equal amounts of kW and kVA.

Accomplishing a power factor of 1 requires the UPS to be able to handle a wide range of load power factors, as output power factor is determined by the loads downstream of the UPS device itself.

Having an output power factor of 1 is becoming increasingly vital as IT equipment migrates to higher power factor ratings, which places strain on existing UPS designs, especially ones with lower output power factors. In this scenario, UPS devices with a lower power factor could easily become overloaded and experience trip-out or failure. Furthermore, this type of UPS also has stable sine wave outputs. Having stable sine wave outputs means this topology is more suitable for generator as it provides a perfect sine wave output for downstream equipment.

What does all of this mean for you, though? In simple terms, the direct benefits of double conversion on-line UPS are excellent voltage conditioning, and relatively easy paralleling. You get more power for your devices, and also reduce the chances of power overload, trip-out, failure, or damage to the UPS device itself.

3. What Problems Does a UPS Solve?

ATEN's years of experience has led us to discover that hardware failure is perhaps the main contributor to power loss. Specifically, constant turning on and off of hardware by unstable power supply causes undue strain on computer power parts and can lead to earlier component failure.

Unlike laptops, server computers or network devices lack built-in batteries, which is where a UPS comes in. With its own battery power, a UPS gives your servers much-needed backup power functionality in case of a power outage. Doing so comes with no latency either: since an on-line UPS is continuously drawing power from the wall source to its battery system, there is absolutely no power interruption in case of voltage regulation issues or power loss. As such, the UPS stabilizes power to your devices from outside sources and keeps them on and running at the correct voltage. A UPS device allows for the addition of a battery box accessory which extends the runtime of a device in case of a power failure. This gives systems integrators more time to either restore power or save valuable data and turn off devices safely.

In addition to battery boxes, an SNMP card allows for the remote monitoring and management of a UPS device. This card connects directly to the Ethernet network through an RJ-45 connector, thus avoiding the need to use RS-232 ports on a computer. It also does not require individual UPS management software on a network server. An SNMP card gives systems integrators greater control of their UPS devices from anywhere off-site.

Another key feature of ATEN UPS devices is network and power surge protection. Power surges, along with blackouts and the turning on and off of equipment, is what we have found causes the most stress to hardware components inside devices. As the electrical grid ages, and with threats from severe weather, computer and server equipment is constantly threatened by power irregularities. Even a brief loss of power or surge could potentially ruin your hardware and cause irreparable loss of data and services. Again, desktops lack the built-in battery that laptops have, so utilizing a UPS device, especially ones with features such as over voltage cut-off protection and surge immunity, is critical. What's more, with full-time network surge protection, a UPS device can prevent power surges at the network port from damaging sensitive equipment.

To summarize, the benefits of using a UPS include:

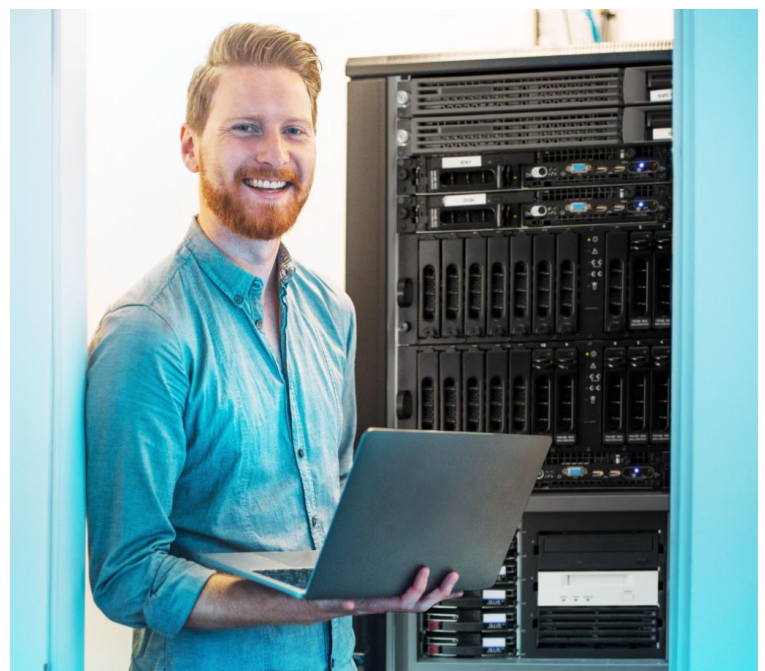
- Allows for an uninterruptable power supply that will not cut out in the event of a blackout or other loss of power.
- A UPS maintains power for critical services, such as server rooms and data centers, that cannot afford to lose power at any point in time so as to protect people's lives, data, and even commercial online services.
- Also offers network and power surge protection to keep devices safe from a surge of power.

5. Scenarios in which a UPS is Useful

ATEN UPS capacity is 1K to 3KVA, which makes it ideally suited for small server / network applications. These could include:

- Small server rooms
- Network closets
- Telecom systems

Many small businesses these days are faced with the prospect of increasing their online services. Thus, they have two options: outsource to a third-party online service provider, or set up their own, dedicated on-site servers. The latter is becoming increasingly popular, but in order for a small business to set up servers, a UPS device is necessary. That's because every online service, regardless if it's from a small company or the biggest tech firm, wants its customers to have 24/7/365 access to its product. Power outages and brownouts threaten a company's ability to constantly offer their services. What's more, businesses often can't afford a lack of proper surge protection to potentially damage their servers, or to lose data from a power outage. What's more, the building a small

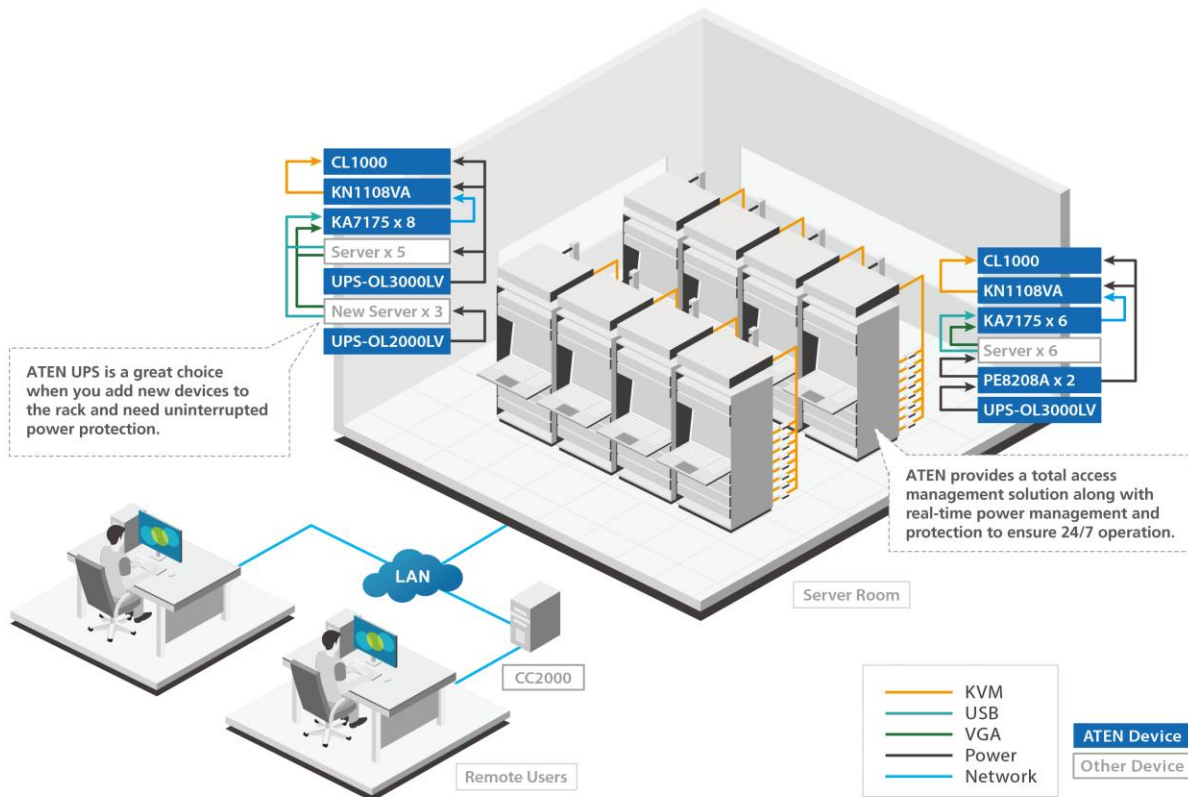




business is in might not have a generator for backup power. Both small and large companies should do whatever it takes to avoid any of these disastrous situations, which is where a UPS comes in.

Small businesses especially need to make use of a UPS because often their servers are not set up in the most optimal conditions. These can include setting up servers in a conventional closet, a poorly ventilated space, or even on the office floor. This increases the likelihood of servers overheating, staff tripping over cables, and in some cases, even cleaning person unplugging a server by accident. While ideally, servers should always be placed in dedicated, temperature-regulated server rooms, this is not always within a business's budget. If that is the case, a UPS can help to mitigate some of the aforementioned problems until a more secure infrastructure solution, such as a micro data center, is put in place. Even after that is done, it is still wise to deploy a UPS device.

UPS devices are ideal for server rooms for several reasons beyond providing power in an outage situation. With a UPS device that offers true double conversion with an output power factor of 1, you'll have more real power in watts is going to the devices that need it the most. Ideally, a UPS device will help to optimize energy usage in your server room.



Featured Server Room Application:

A total solution with remote access/control and real-time power management/protection.



In addition, network and surge protection help to keep your hardware devices safe from undue stress on the components, and a UPS device with remote management software can let you use a computer to easily monitor and manage backup power settings. Furthermore, depending on the UPS device, you can also control load segments and provide extra battery time to the device of your choosing by turning off non-critical devices.

For telecom systems, customers expect uninterrupted service and signal at all times, but power grids, networks, and base stations are under constant threats from power outages, surges, voltage irregularity, and electromagnetic interference. In addition, telecoms equipment, including micro-cell base stations and wireless base stations among others, are installed outdoors, which leaves it vulnerable to extreme weather. In this scenario, UPS devices once again provide the necessary power, surge, and network protection that telecoms providers need in order to protect their equipment and provide 24/7, continuous coverage and signal to their many customers.

5. Conclusion

In conclusion, it's clear to see that a UPS device's utility ranges from the useful and practical, especially when it comes helping to the mission-critical, such as providing uninterrupted power to computers and servers in small server rooms and businesses that cannot afford for their services to be interrupted or data to be lost because of a blackout, power surge, or voltage irregularity. ATEN's own Professional Online UPS Series includes 8 models ranging from 1KVA to 3KVA capacity in both 120V and 220V selections, and feature the industry-leading output power factor = 1 thanks to its true double conversion topology. In addition, they also boast full-time network and power surge protection. The series is ideal for small-sized ICT environments from small server rooms to network closets and telecoms systems. With the proper UPS device in place, you can feel more confident and secure in the safety of your data and hardware as well as your ability to meet the demands of today's 24/7 business environment.

6. Further Resources

- ATEN Professional Online UPS Series

<https://www.aten.com/global/en/products/energy-intelligence-rack-pdu/professional-online-ups/>