

## What is a True Modular UPS?

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The term modular itself can mean different things to different individuals, therefore it is important to analyse the nature of what is being described as a 'modular system' carefully when purchasing a UPS, to ensure the essential power of the datacentre is protected at all times.

When selecting a UPS system, the up-front cost necessarily comes into question and this can lead organisations sometimes buying a lesser product at a lesser cost. However, it is essential to check the small print to ensure you have chosen a modular system that it really will do the job intended: protect the critical power of your datacentre with the highest level of availability. Interestingly, with some of the higher quality UPS systems, cost savings are often realised over the long-term through increased efficiency, resulting in lower running costs and a lower overall total cost of ownership (TCO) so doing a full cost analysis is usually worth calculating.



So, as their primary goal, how can datacentres select a UPS maximise availability? Essentially, there must be no potential single points of failure. Understanding the configuration and the definition of a modular system carefully, before the deal is done, is critical.

At the most basic level, a single standalone UPS unit that protects a critical load is known as an N system configuration. However a standalone UPS lacks any resilience in the event that the unit develops a fault or is offline for preventative maintenance. Paralleling a second standalone UPS unit of the same rating, provides resilience and is known as an N+1 configuration. It would be possible parallel several standalone units together of an individual smaller rating to give the same philosophy, for example if we took this to the extreme we could have 101 x 1KVA UPS units in parallel which would still offer 100KVA N+1 configuration. Obviously this wouldn't be practical but you get the picture. By using this concept it could be described – at the most simple level – as a modular UPS system. However, there does need to be the associated electrical infrastructure –switchgear etc – to be able to add more standalone units.

Another definition of modular is a standalone UPS designed and manufactured in a modular format. The main component parts of rectifier, inverter and static switch are modular. If there is a problem with say the rectifier for example, it can be swapped easily. The challenge with this configuration is that if one component does fail the whole UPS functionality goes down with it. It may be a modular system but its level of availability will not be reliable.

A better solution is what we term: a true modular UPS. This is where several individual UPS modules are contained within a frame. All the individual modules are UPSs in their own right, all containing a rectifier, inverter and static switch and all operating online in parallel with each other. For example five 60kW UPS modules may typically be contained within a single frame offering a resilient configuration of 240KW's N+1. If required, it takes moments (around 30 seconds) to 'hot-swap' a module while the rest of the modules continue to protect the critical load. At no point does the system need to be transferred to maintenance bypass and hence on raw mains.

Some other modular systems include the rectifier and inverter within their modules but the static switch is centralised and separate. This results in a potential single point of failure. It may only take a few moments to replace a separate static switch, but, depending on location, getting to the site to replace it may take a maintenance engineer several hours. During that time the system cannot transfer to static bypass. With a true modular system, where the static switch is included in each module, the rest of the modules in the UPS frame continue to protect the load until it can be replaced. This increases the level of availability dramatically.

At CENTIEL we have developed our pioneering 4th generation true modular UPS system CumulusPower which offers industry-leading availability of [99.9999999% \(nine, nines\)](#), with low total cost of ownership (TCO) through its Maximum Efficiency Management (MEM) and low losses of energy. Our design team has been working with data centres for many years at the forefront of technological development and we are the trusted advisors to some of the world's leading institutions in this field.

