

Reducing energy consumption



Chloride 80-NET UPS system: A state-of-the-art product solution designed to satisfy your power requirements and lower your cost of ownership.

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Lowering the cost of ownership and reducing energy consumption has always been a driver but perhaps never more so than today. As designers, we strive to develop UPS systems that are as efficient as possible and minimise their impact on the environment in terms of electrical requirements and heat losses. The innovative Chloride 80-NET range of Emerson Network Power is surprisingly close to this ideal.



Traditionally, UPS used many transformers, chokes and capacitor banks in their design. The Chloride 80-NET product now does the same job electronically. This has resulted in 60% lower weight, 40% smaller size, 30% lower losses and 25% less input current than its predecessors. What are the features that make the Chloride 80-NET so special?

AC Input

To start with the Chloride 80-NET uses an IGBT rectifier which draws sinusoidal current at unity power factor from the supply. This provides for negligible voltage distortion and excellent generator matching. The subsequent 25% reduction in input current also provides savings in supply cabling and switchgear costs.

AC Output

The UPS output voltage waveform is generated by an IGBT inverter. This highly stable and efficient device, using the patented Chloride vector control system, enables the UPS system to support any leading or lagging power factor load within kVA/kW limits without derating. In addition, problems resulting from unbalanced three-phase and non-linear loads are a thing of the past.

Operation with a diesel generator set

It used to be common practice to oversize generators for use with UPS systems often by factors of x1.6 or even x2.5. However, because the current drawn by the Chloride 80-NET is sinusoidal and unity power factor, the need to oversize a generator is minimised. A genset need only be sized to match the maximum kVA and kW drawn by the Chloride 80-NET UPS system. In practice, this means that smaller generators can be selected.

High efficiency parallel operation

The high efficiency and flexibility offered by the Chloride 80-NET means that it is well suited to high power applications. Up to eight modules can be parallel connected to achieve ratings as high as 4 MVA. In an N+1 application this is especially interesting because much higher utilisation factors can be achieved. For example, in a 600 kVA N+1 application 2 x 600 kVA modules will normally only ever operate at a maximum loading of 50%, but by using 4 x 200 kVA Chloride 80-NETs the utilisation factor increases to 75%. Since the smaller Chloride 80-NET UPS systems are more heavily loaded, they operate more efficiently resulting in approximately 25% reduced losses. There are other advantages in terms of initial capital cost savings and because the Chloride 80-NET draws power at unity power factor input currents are significantly lower. This can reduce losses by as much as 25% which, at full system load, can mean energy savings of up to £20,000 per annum.

	2 x 600 kVA	4 x 200 kVA
Footprint	5.6 m ²	3.4 m ²
Weight	8,100 kg	2,400 kg
10 min battery	8.5 m ²	5.6 m ²

Summary

The Chloride 80-NET represents a significant step forward in UPS technology. With ratings from 60 kVA to 500 kVA systems up to 4 MVA can be realised. These mid to high power range solutions are now available for all but the largest of data centre applications. The design features and product characteristics described give us a significant array of system options without compromise. The exceptionally high efficiency, low input demand and small footprint and therefore lower installation and running costs mean that the Chloride 80-NET is making its mark on the UPS industry in a big way.

Real-life experience from Emerson Network Power

Emerson Network Power applies its leading product technology to secure real-life tangible benefits for our customers. Rather than the traditional approach of kW / m², we have found a number of customers looking at it from the other end. "I have this much power available and I would like as many kW's of UPS output power from that supply as possible".

In each case Emerson Network Power has been able to demonstrate how its state-of-the-art Chloride 80-NET product can deliver more output kW's of power for the given size of electrical supply. The Chloride 80-NET provides specific benefits such as >0.99 input power factor at all loads which can mean an input current reduction of up to 20%. The operating efficiency in "real-life" applications is 95% and it has an input current distortion of <3% making it extremely generator friendly. Probably of most benefit is that the UPS output is now rated at unity power factor and so the kVA rating is also the kW rating. Utilising all of these features in harmony, the Chloride 80-NET UPS is able to make the most use of the available power supply and turn it into useable kW's on the output.

This means a 200 kVA Chloride 80-NET UPS can supply 200 kW rather than 160 kW as most competitor UPS and 25% more "useable" power or the equivalent of 13 more racks at 3 kW each. Of course these are only figures but for a data centre operator if

this is translated into additional revenue at £1000+ per rack per month then the purchase of Chloride 80-NET UPS could pay for itself in a matter of months.

10 key questions to ask your prospective UPS supplier:

- 1 Does the UPS comply with all current European standards and legislation?
- 2 Does the UPS achieve 95% efficiency thus minimising both running costs and requirements for air conditioning?
- 3 Can the UPS be installed within an application without requiring an increase in the rating of the incoming switchgear?
- 4 Will the introduction of the UPS require a generator power upgrade or can the existing unit be retained?
- 5 Can the UPS support any type of non-linear IT load?
- 6 Can the UPS support any leading or lagging load power factor within its nominal kVA and kW rating?
- 7 Can the UPS static bypass synchronise with the incoming AC supply even if it has a less than perfect sinusoidal waveform?
- 8 Is the UPS system upgradeable in the future if more power is required?
- 9 Can the UPS module be synchronised to an external source so that it can be used in a Dual bus application?
- 10 If the answer is YES to all questions then the solution is most likely to be an Chloride 80-NET UPS system.

About the author

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Rob Tanzer is technical support manager for the Chloride AC Power business of Emerson Network Power in the United Kingdom. He has worked in the power protection industry for over 35 years and now specialises in high power computer and data centre applications. He has experience of most types of static and rotary UPS systems, has developed innovative UPS topologies and is the author of several published technical papers covering, thyristor power switching devices, UPS systems and applications. He regularly advises on all aspects of data centre power protection.



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