



ENERGY SUPPLY MEASUREMENT

The simple bottom line is that when a consumer is connected to a power supply, it is desirable, from the point of view of the supplier, that the consumer pay for the electricity consumed. (Okay, before somebody trips me up, I know that electricity can't be consumed, it can only be converted to another form of energy, generally heat, but in this article we'll stick to the term 'consumed'.)

The most common unit of measurement on the electricity meter is the kilowatt hour [kWh], which is equal to the amount of energy supplied to a load of one kilowatt over a period of one hour. We all know the common kilowatt hour meter, being an aluminium disc that spins at a speed proportional to the current of the load. For a direct reading meter, the load current is fed via induction coils forming part of the meter. The reading of the meter is in the form of digits, a bit like an old car speedometer; to create the correct type of induction to make the disc spin, in addition to the induction coils is a voltage coil.

There are different types of induction disc meters for single phase and three phase. Where the load has a high current or where the supply is at a high voltage (say 3300 V and above) the current to the load is fed via a current transformer and the secondary of the

current transformer (normally rated at 5 amp maximum) supplies the kilowatt hour meter. Unless the load is very high current but low voltage, the voltage part of the kilowatt hour meter is supplied via a voltage transformer, which supplies the meter at 110 V with the primary voltage of the transformer being rated at the voltage of load (most commonly 11 000 V for medium voltage supplies in RSA).

It would be great if this was all there was to the subject. However, it is not. Let us think about an electrical load which fluctuates from a peak to nothing over any given day. The supplier of the electrical connection has to make the power supply large enough to supply the peak load. However, when the load is low, the income from the kilowatt hour charge is low. Thus the supplier uses, in addition to the kilowatt hour metering, an electrical demand meter which registers the average electrical demand, usually over a 30 minute period. Then, if the load is on intermittently, the supplier charges on the basis of the maximum demand of the load as well as the kilowatts consumed. For example, if the load is 300 kVA and is on for 50% of the time, the demand charge would be the same demand charge as if the load were on for 60 minutes of the time with only an adjustment for the kilowatt hours consumed.

In their never ending search for innovative ways to make electricity more expensive, municipalities have introduced new tariffs. The first of these is the 'TIME OF USE TARIFF' which is a series of charges so that, as the tariff indicates, the consumer pays a different rate for kilowatt hours or electrical demand, depending on when the charges are incurred. The general idea is to make consumers use less power at times of peak demand.

I can see that this may encourage consumers to run compressors or chillers at a time when electricity is cheapest, but I can't see that the average consumer, either domestic or commercial, can adjust load much. It wouldn't be called 'peak time' otherwise, would it? The latest innovation from Eskom and the municipalities is the 'Inclining Block Tariff' whereby the more electricity the consumer uses, the more expensive it becomes. This means that the consumer is actively encouraged not to use electricity, which is odd.

A final warning note: beware of organisations which offer to save you money by making adjustments to the electricity tariffs you use. There are indeed some organisations which can do this, and do it very well. There are others who are way dodgy. Just ask, before you sign, for some referrals. Trust me, you won't be sorry.

UPS DESIGN AND MAINTENANCE CRITICAL TO ENSURING UPTIME

Data centre resilience has become more crucial than ever before as increasing volumes of transactions move to the cloud and paper-based data is digitised. Whether an organisation owns its own data centre facility or outsources the service, the principles of redundancy and resilience need to be applied to the power chain.

Every major financial institution, mobile network and owner of sensitive information must ensure that its business-critical infrastructure is continuously available. Data centre resilience and robustness is achieved by adhering to the highest international standards. Every aspect of data centre specification, building and implementation is critical to business continuity.

But what does this mean for data centres and the CIOs that need to ensure their optimum performance and always-on service? Firstly, regarding power management, a well-designed 2N redundant system has every leg of the power chain duplicated from the utility input to the eventual points of consumption. During design stage of the power chain in a 2N environment every aspect of the power chain is analysed against set standards resulting in the elimination of single points of failure. Mitigation of single points of failure should be the aim of every data centre owner. Once success is realised and all single points of failure have been reduced to zero, data centre resilience is achieved.

Dual redundancy of data centres means the power architecture includes at least two separate main power sources, multiple uninterruptable power supply (UPS) units (battery packs) and a minimum of two generators.

data centre environment is a multi-dimensional task that involves decisions on efficiency, integration into existing environments, availability, flexibility, cybersecurity and so on. It's a decision that must be taken based on the organisation's overall strategy and modernisation investment. The most suitable type of UPS (single-phase or three-phase) also depends on whether the UPS is used in computer rooms, network closets, small data centres or large data centres.

Maintenance and support

Installing a back-power system is only the first step in guaranteeing availability of services. A regular maintenance schedule, along with comprehensive change management policies, offers additional assurance that the system will be perform as expected when called upon.

Preventative maintenance along with an OEM-backed 'around-the-clock' service level agreement can ensure that issues are rectified without delay with the support of the manufacturer or certified service provider, in the unlikely event of products underperforming.

Modern UPS technology has improved power density by more than 50% in recent years, meaning that UPSs can be built to smaller footprints to reduce space requirements, while UPS generated heat losses have reduced by 40% owing to lower power losses, reducing cooling requirements.

Ultimately, any power back up design must be supported by a thorough understanding of current and future requirements, as well as a proactive maintenance schedule, with continuous improvement in efficiency and responsiveness.

Choosing the right UPS

Specifying the appropriate uninterruptable power supply (UPS) for a

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No Load Speed (r/min): 680

HR4003C
Rotary Hammer
SDS MAX
Supplied with carry case

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11.4 Joules

Capacities:
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Blows per minute: 1,450 - 2,900
No Load Speed (r/min): 250 - 500

HR4013C
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SDS MAX
Supplied with carry case

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11.4 Joules

Capacities:
Concrete (with TCT Bit): 40mm
Blows per minute: 1,450 - 2,900
No Load Speed (r/min): 250 - 500

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