

Unreliable Voltage Risks to Sensitive Medical equipment



All electrical and electronic equipment needs protecting against power problems, medical equipment needs protection even more so.

The technology in treatment & diagnostic Medical equipment has advanced by leaps and bounds providing highly sophisticated aides to the medical, dental & nursing professionals. Affordability has improved dramatically as well. While only very expensive centres could afford complicated diagnostic devices, today, smaller clinics and in remote areas as well can afford to perform complex diagnosis and provide treatments to patients everywhere. However, power problems are a real concern. These devices are very complex, sensitive electronic equipment. And as often, they are mass produced, they could be made less robust. In short, they are very susceptible to unreliable power. The cost of damage can be incalculable both in monetary terms and patient risk.

The main 6 problems that should be of great concern.

- **Power Cuts** – Are common events whether accidental or due to an event at the power distribution company. These can cause damage or loss of data due to improper shutdowns.
- **High Voltage or Over Voltage** – As power fluctuates due to unreliable mains or poor distribution network, the mains voltage can drop or rises. A sustained over voltage event especially above a certain limit can be catastrophic and cause instant irreparable damage.
- **Power Back surges** – Commonly occur after power cuts. As the mains supply resumes, it usually returns with a surge which could be quite high & quite damaging in some instances. Ensuring the power has settled before resumption is important.
- **Low Voltage or Brown outs** – Similarly, drops in voltage can occur often during fluctuations, over stretched distribution network, excessive demand to the size of the utility or being at the end of a long distribution line. Low voltage is particularly damaging to motor driven equipment and especially fridges, freezers, air cons, etc
- **Loss of Neutral (LoN)** – Can occur at any time due to damage to the local transformers/substation or due to theft of copper rich neutral cables. This is particularly a threat by copper thieves during load shedding where the power lines are not Live. LoN is one of the most serious and damaging events. When it occurs, the line voltage will rise from a normal 220/230 to 400/415V causing instant catastrophic damage and even risk of fire.
- **Lightning Surges** – Lightning activity is high in many areas in the globe. During lightning storms, nearby structures, buildings are vulnerable to surges caused by lightning. Whilst the very rare direct hit is near impossible to protect against, the more common voltage surge from nearby activity should be considered and protection measures taken as lightning surges could cause serious damage. Lightning storms could also cause collateral damage (like Transformer/substation damage, trees falling on electricity wires) which could bring about all of the above voltage problems.

Equipment	Benefits	Limitation	USE	What to look for
UPS (Uninterruptible Power Supplies)	Battery backup providing instant power in case of a power cut.	Expensive, bulky and backup power limited by battery size.	Continuity of power	Autonomy in minutes at full load. On-Line models more expensive but justified for critical mission applications
Inverters	Battery bank that can be charged from mains or solar and can be automatic or manual back up of power. As battery bank can be easily extended, will supply longer back up times.	Expensive, bulky and backup power limited by battery size. If no break is required, consider the more expensive No-Break inverters.	Continuity of power, expandable and can be used o-grid using solar charging.	Faster charging. Larger battery banks. Expensive models can provide no-break switchover suitable for more critical applications like medical or ATMs.
Voltage Stabilisers	Will regulate the incoming voltage to ensure the appliances receive the correct voltage. By using it with Gensets & UPS/Inverters, it will extend the battery life as less time will be spent relying on batteries when the input condition is a simple brown out or mild over voltage.	They have a range. if the incoming voltage is outside the range, risk of damage is still possible. The wider the range the better but cost increases.	Effective solution against fluctuations providing stable power if no power cuts are experienced.	Solid state rather than mechanical. Wider (but costlier) input range. Out accuracy is not critical as long as it is better than +/-5% as most utilities in the advanced countries match this.
Voltage Switchers	Monitor the incoming voltage constantly and will disconnect the Mains power to the appliance if voltage deviates outside an acceptable range.	Doesn't provide continuity during fluctuations.	Effective solution against damage. Very low cost compared to other solutions. If protection ONLY is required, Switchers will do the job.	Intelligent time delay provides longer working time. Substantial surge capability, Having LoN protection will add solid complete protection.
Distribution Surge Protector	Covers type I and II protection devices.	Doesn't provide protection against sustained high/low voltage.	Direct wiring or DIN rail mounted Effective against indirect lightning strikes, surge, spikes.	The distinction of the classes is based upon the peak current generated by the impulse.

Currently KDB Healthcare is able to offer the following items to help cope with the electrical power issues in Zimbabwe.

Uninterrupted Power Supplies (UPS). We offer the APC range of UPS's, from 750 VA to 3000VA.

Voltage Stabilisers. We offer the Innovolt range of voltage stabilisers.

We would also recommend putting the Innovolt power manager, between the wall socket and the UPS, as this protects the UPS from the power fluctuations that we experience, as a UPS generally cannot cope with high voltage surges, as well as a power manager does.

Should you require further details please contact us for more details.



KDB
HEALTHCARE

53 Coventry Road
Workington
Harare
Zimbabwe
Phone: +263 24 2758921/4
Fax: +263 24 2758 928
Email: kdb@kdb.co.zw
www.kdb.co.zw