

## Why is Power Quality important?

For electrical systems to function properly, it is necessary to make sure that the quality of the power feeding them is of a sufficient quality to ensure that performance is not impaired or system life expectancy reduced. Without the proper power, an electrical device or load may malfunction, fail prematurely or not operate at all. There are many ways in which electric power can be of poor quality and many more causes of such poor quality.

## Do you actually know the mains supply problems you are experiencing?

To identify the most appropriate solution it is always recommended that you first identify exactly the problems you are experiencing. You may of course already have a good idea as to the problems being encountered. If not, it will be necessary to monitor the supply over a period of time to identify the types, duration and magnitude of power problems experienced.

Power supply problems are caused by various sources, for example distribution network faults, system switching, weather and environmental conditions, heavy plant and equipment, or simply faulty hardware.

Regardless of the cause of the problem, the resulting power quality issue will include one, or more, of the following power problems:

- **Computers:** An 8% drop will often cause computer errors and downtime. A 10% rise will cause computer damage, errors and downtime.
- **Lighting:** A 10% voltage drop reduces lumen output by over 25% (15% for florescent tubes). Infra Red lamp heat output is reduced by over 20%. A 10% volt rise reduces life expectancy of incandescent lamps by over 50%.
- **Radio & TV:** Transmission Volt drop will reduce quality of the transmission and coverage range. Over voltage by 2% will significantly reduce tube life.
- **Photographic Processing:** A 5% volt drop will increase exposure times by 30% and reduce quality of colour printing significantly. Voltage rise during printing cycles will cause inferior results
- **X-Ray Equipment:** A 1 % change in the filament voltage of an X- Ray tube will produce an 8% change in the anode current. When used at its maximum rating an X-Ray tube will be permanently damaged in the case of a 5% volt rise.
- **Magnetic Equipment:** A 10% volt drop can cause relays / contactors to open chatter. Solenoids become sluggish and vibration will cause malfunctions and overheating. Over voltage will cause magnetic core saturation high current and overheating. Wear and distortion is increased.
- **Induction Heating:** Heat output is reduced by more than 20% on a 10% volt drop. Heat output varies approximately with the square of voltage.
- **Welding Equipment:** A 10% volt drop will increase a welding cycle by 20% if weld quality is to be maintained. A 10% volt rise will overheat a weld, reducing quality and causing possible "burn through".
- **Transformers:** At 100 KVA, a 10% drop will reduce transformer rating to 90%. A 10% rise will considerably increase core losses and decrease efficiency proportionally.
- **AC Motors:** A 10% volt drop reduces torque by approximately 18%. Motor life expectancy is reduced due to overheating. A 10% volt rise causes higher starting current and reduces power factor by approximately 5%.