

Protect Your Bottom Line From Power Quality Issues

Key Points

- Computers and other electronic equipment are sensitive to power quality problems.
- Voltage interruptions and power transients can damage equipment and reduce productivity.
- Cost-effective solutions include uninterruptible power supplies and surge suppressors.

Computers, lighting and other electronic equipment are especially sensitive to power quality issues. Problems such as voltage interruptions and power transients can reduce productivity and lead to costly repairs. Fortunately, a number of affordable solutions are available to help safeguard your equipment and maintain a productive work environment.

Sags, swells and interruptions

Problematic voltage variations include sags, swells and interruptions.

A sag is a temporary reduction in voltage lasting from about eight milliseconds to one minute caused by a short circuit, an overload or by simply starting motors. Sags result in electronics drawing abnormally large amounts of current once voltage recovers. Signs of a voltage sag include flickering lights, computer lockup and motor tripping.

Voltage swells aren't too swell either. A swell is a momentary increase in voltage caused when a large electrical load shuts down. The effects of a swell may not immediately be noticeable, but they can result in damage to equipment and system components.

A sustained voltage interruption occurs when voltage drops below 10 percent of rated voltage for more than one minute. Sags and swells are typically instantaneous and mild, but they occur more often than interruptions.

Solutions for sags, swells and voltage interruptions include:

- *Battery uninterruptible power supply (UPS)* offers the most complete power protection and is widely used for sensitive equipment. Offline (standby) UPS devices remain idle until a power failure occurs. Online units operate continuously, providing backup power as well as power quality protection. UPS systems range in size from 300 volt-amperes (VA) for a single computer to up to 1,000 kilovolt-amperes (kVA) for clusters of equipment.
- *Flywheel UPS* systems continue to spin during a power disturbance for a period ranging from 10 seconds to several minutes. Up to 75 percent of the energy stored in the flywheel is used to continue the rotation of the generator and supply uninterrupted power to the load.

Power transients

Power transients are brief, non-repetitive over-voltages or waveform distortions in an electrical system. Switching of power factor correction capacitors is a common cause. Transients can disrupt, damage or completely destroy critical electronic equipment. A *spike* is a commonly occurring over-voltage transient that lasts up to a few milliseconds. Solutions for spikes include:

- *Surge protection devices for electrical panels and receptacles* use metal oxide varistors (MOVs) as the suppression element. MOVs are grouped by their voltage rating and energy handling ability. Energy from the voltage is absorbed and converted into heat. Repetitive, high-energy surges can degrade MOVs.
- *Wall outlet surge suppressors* come with six to eight outlets and various indicators. Look for them at your local electronics dealer.

Start with a plan

Get to know your equipment's electrical operational environment. You'll likely uncover ways to improve uptime and increase overall productivity. Start by investigating the reasons behind any recent power quality problems. Determine if any new equipment has been added. Do problems occur at certain times? Keep a log to help track problems in more detail. A properly designed power protection system that addresses your facility's specific issues is a good investment and can have a quick payback.



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