

POWER FACTS

FACT #1: Power quality is critical to the smooth operation of computer systems!

Each computer system is composed of tiny micro-circuits that operate on very low voltages. These circuits do their computing wizardry by comparing very small changes in these operating voltages. Power problems interfere with these voltage comparisons. As long ago as 1986, the semiconductor industry at their fifth annual conference published their criteria for the type of environment where their products can operate as they were designed. In addition to setting standards for such factors as static discharge, the industry also published standards for the protection of their devices from spikes, normal mode noise and common-mode voltage. These three disturbances are the ones that are most prevalent in almost any electrical system.

FACT #2: Power quality standards have been established by the semiconductor industry.

The industry established that power disturbances must be limited to less than 10 volts in the normal mode (phase to neutral) and less than .5 volts (1/2 of one volt) in the common mode (typically neutral to ground). In addition, the industry established that these criteria must be met even though power disturbance might be as large as 6000 volts as defined by the IEEE (Institute of Electrical and Electronic Engineers) in their guideline labeled IEEE C62.41.

FACT #3: Systems are susceptible to more than power outages.

It's true that without power, your system can't operate. But power outages are infrequent compared to disturbances such as noise, spikes, and common-mode voltage. We've been conditioned to be worried about outages because they are a visible manifestation of power problems. Spikes, noise, and common-mode voltage are invisible but present to some degree all the time. For that reason, your computer needs to be protected from them constantly, not just when the lights go out.

FACT #4: A UPS (uninterruptible power supply) does not always condition power.

Many uninterruptible power supplies (UPS) claim to condition power, too. The fact is that most are simply a surge protector with a battery system for providing power in the event of an outage. It takes specific electrical components to provide the level of protection needed by modern electronic systems.

FACT #5: Power conditioning requires three important elements.

First a surge diverter. Surge diverters take high voltage transients and divert them safely away from your electronic system. Second, a low impedance isolation transformer. Transformers eliminate common-mode voltage and ensure that the logic ground (or decision making reference) for the computer is not disturbed. Third, noise filters are important to protect the system from high frequency normal mode noise. These three elements are the foundation for all effective power protection solutions. Battery systems can be added to this foundation, but a UPS without all three of these important elements cannot be a comprehensive power quality device.

FACT #6: One power conditioning element is commonly left out of most UPS products.

The low impedance isolation transformer. Again, the 1986 semiconductor industry conference states on page 9 of its proceedings that low impedance transformers are required for maximum compatibility with switching power supplies.

FACT #7: POWERVAR power conditioners provide excellent protection for your system.

Every POWERVAR power conditioner contains the three essential building blocks of an effective power quality solution—1) A Surge Diverter, 2) a Low Impedance Isolation Transformer and 3) a highly effective Normal Mode Noise Filter. These three elements are designed to work as a system so that your computer can be protected from all three electrical failure modes.

FACT #8: There are three modes of system failure.

Your computer can be damaged by power disturbances in three different ways. We call these "the 3 Ds." They stand for Destruction, Degradation and Disruption. Destruction is the most visible of failure modes because it is usually accompanied by burned or charred components and immediate and catastrophic system failure. Lower magnitude power disturbances do not cause outright failure. Instead they degrade system components—weakening them a little at a time much like rust attacks metal. Usually the damage is not visible until the component fails and then it's too late. The lowest magnitude of power disturbances are those that interfere with the computer's ability to make proper logic decisions. These disturbances are associated with normal mode noise and common-mode voltage. These disruptive disturbances are responsible for most of the unexplainable failures that happen from time to time. Disruptive power disturbances are known to cause system lock-ups, lost files, communication errors, "no trouble found" service calls, inaccurate test data, and slow system throughput.

FACT #9: POWERVAR power conditioners protect against all three failure modes.

POWERVAR power conditioners offer a power protection foundation that protects systems from Destruction, Degradation and Disruption. Then, if software or applications demand, a UPS can be added to the POWERVAR power conditioning solution.