

7 Things to Know About Surge Protection and Smart Energy Management

Over the past few years, smart energy management has become a major driver in the adoption of home automation systems. As energy prices rise, users want a convenient way to monitor and conserve energy to save on their utility bills and feel they are doing their best to be efficient. While it's important to be energy conscious, what often gets lost in the discussion is perhaps the most critical aspect when it comes to ROI—surge protection.

Surge protection and power conditioning are the most important factors in determining the performance, reliability and longevity of any type of electronic equipment—and therefore are extremely cost effective.

This can be a key talking point during the sales process, especially as more and more electronics that are sensitive to electrical surges are placed within a house. Here are seven critical points to understand about surge protection:

1. It's not about lightning.

Most people are aware that electronic equipment can be damaged or destroyed by a lightning strike because it is the most devastating example of a power disturbance. What they don't realize is that lightning only accounts for about 5 percent of all disturbances, and that surges account for 56 percent of all power disturbances.

2. Most surges originate from within a house.

According to the 2011 Symantec Disaster Preparedness Survey, 80 percent originate from within buildings. These internal “transients” are random in nature and may last only tens of nanoseconds (a billionth of a second) to a few milliseconds (a thousandth of a second). They hit equipment with low-level voltage so you may not even be aware they are happening, even though they may occur dozens or even hundreds of times each day.

3. Surges could be happening now.

These frequent hits to equipment contribute to what is called electronic rust, the decay or weakening of electronic components due to the cumulative effect of unseen low-level energy surges. The damage may not occur immediately or be outwardly evident, but over time a home's equipment will fail as the sensitive components are continually degraded. Parts won't melt and fuses won't blow, but equipment that's supposed to last 10-plus years might only last five to seven. Such inductively produced transients are like an oil leak in a car; they degrade performance over time and damage electronic equipment when they find their way onto a circuit board, eventually causing much larger issues.

Inductively produced transients travel through a home's wiring and are commonly produced by HVAC systems, refrigerators, microwaves and other equipment containing motors or other inductive elements that cycle on and off.

The science behind this is quite interesting. When any piece of equipment that contains an inductive element, such as a motor, transformer or coil is switched off, a “back-EMF” (electromotive force) is produced. This back-EMF, caused by the collapse of a magnetic field, is the result of one of the most basic laws of electricity, Faraday's Law of Induction. The voltage thus produced can be several times the original voltage applied to the inductive element before it was switched off.

A home is filled with items susceptible to these power surges—and anything containing a microprocessor is especially vulnerable, from TVs to audio/video systems to cordless phones, computers and even seemingly “low-tech” appliances like dishwashers, washing machines and refrigerators. The digital components in these home products are so sensitive, that even a tiny 10-volt fluctuation can disrupt proper functioning.

4. Your surge protection could be limited.

It's important to know the differences between power protection devices and their technologies. Most contemporary surge protectors simply divert harmful energy from the hot line to the neutral and ground wires, while passing through lesser amounts of energy directly to connected equipment. The hot line is the only source of dangerous external surges, as the neutral and ground are bonded together and fastened to an earth rod at every service entrance. Unfortunately, this "3-mode protection" process diverts high-energy powerline surges directly into reference grounds in audio/video systems and the delicate, low-voltage data lines in computers.

Computer data lines are particularly vulnerable because they use the powerline ground circuit for their reference voltage, while audio/video systems will encounter distorted images, humming, buzzing and noise interference. In addition, the surge protector itself will degrade every time it is hit and eventually fail. As it degrades, its suppression level falls lower and connected equipment absorbs more surge energy. There is no way to know what level it is functioning at or when it completely fails, leaving a home's valuable equipment vulnerable.

5. There's a sound case for Series Mode Protection.

A more effective option for surge protection is Advanced Series Mode (ASM) technology, which operates in a fundamentally different way than conventional single-stage technology. The term "Series Mode" is taken from the fact that the main protection element is in series with the AC line. ASM eliminates surge energy without the use of sacrificial components, ground or common mode contamination. Therefore, connected equipment always receives power within standard line voltage guidelines, avoiding damage and degradation. In addition, the protector does not sacrifice itself when hit with transients, so it does not degrade over time. ASM provides true protection that doesn't have to be maintained or replaced. It is also designed to minimize "noise" that can cause erratic equipment operation. This, along with other technologies such as electromagnetic or radio frequency interference (EMI/RFI) filtering, inrush current elimination and catastrophic over/under voltage shutdown provide the most robust protection available.

6. Proper protection equals cost savings.

Disruption and downtime of home electronics can be troublesome, costly and dangerous. Developing a solution to protect equipment from anomalies produced within a home is much more practical than planning for a catastrophic lightning strike, especially if the equipment is sensitive, costly or provides an application which absolutely must remain operational. Safeguarding equipment with proper surge protection not only prevents catastrophic failures such as lightning strikes, but more importantly improves the reliability and lifespan of electronic equipment by preventing degradation and premature failure of integrated circuits.

7. There are several surge protection options.

Fortunately, there are a variety of power protection and intelligence solutions available to meet any need. From branch circuit, to standalone units, to rack systems, to whole-home surge protection, there's a solution that can fit any need or budget. Builders and integrators can install these before any additional electronic systems enter a home, or retrofit into existing homes. With options like temperature testing, email reporting of system health, on/off scheduling, remote management and remote system reboots, smart energy management can also be incorporated into a service plan to generate additional RMR.

Conclusion There's no doubt that savings are possible through smart energy management. But as much as we all want lower utility bills, the highest ROI we can achieve comes from surge protection and power conditioning that improves the performance of connected equipment—and keeps it running for as long as possible without disruption. When considering energy management solutions for a home, it is most important to safeguard the functionality and performance of valuable home electronic equipment and systems from disturbances, so don't skimp on surge protection.



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