

GUEST EDITORIAL by Walter Crowder

Understanding Power Grid Disturbances



This is an information age. The ability to provide the user with situation information instantaneously is paramount.

There are many varieties of “power” products: surge suppressors, power conditioners, power stabilizers, power managers and more. Alone, very few of these provide the comprehensive protection that your customer really needs.

According to Innovolt’s Dr. Deepak Divan, an authority on power grid technology, most surge suppression devices merely protect against the rare voltage surges caused by lightning strikes, which account for less than 1 percent of the occurrences that plague the grid.

Innovolt has defined five major power grid disturbances that are known to take down A/V components. Knowing how to explain them will greatly benefit you and your customers in choosing the right protection.

1| Voltage Sag, which results in current surge (Duration: 0–100V for 10 milliseconds–2 seconds; occurs 30–100 times per year*)

Voltage sags are the silent killer of electronic equipment. Each time a voltage sag occurs, a significant current inrush is generated. Voltage sags can produce current inrushes of more than 90 amperes which, over time, are fatal to equipment.

2| Over Voltage (Duration: 150–240V for 0.1–2 seconds; occurs 1–2 times per year*)

Over voltages come in two varieties — the voltage “swell” that briefly rises above 150V, and the more dangerous loss of neutral, which puts 240V on all the 120V circuits in the house. The former happens when the electrical load changes or when relays on the grid are switching to isolate a fault. The latter happens when neutral connection is lost. The voltage stays at 240V until the power company comes out to fix it — which could be hours. This, too, is fatal to equipment.

3| Brownout or Under Voltage (Duration: 50–100V for 2 seconds to several hours; occurs 1–2 times per year*)

Brownouts can cause equipment to draw excessive current, which can lead to overheating. In addition, it can lead to erratic component behavior.

4| Power Outage (Duration: 0V for 2 seconds to several hours; occurs 1–2 times per year*)

With the lack of new power plants and increased demand, brownouts and power outages have become more prevalent. If the power returns quickly, it has similar detrimental effects as the voltage sag.

5| Voltage Surge (When caused by lightning, up to 6,000 Volts for up to 10 microseconds; occurs less than once in 10 years*; when caused by grid fault, 150–300V for up to 100 milliseconds; occurs 1–2 times per year*)

We all know the possible effects of lightning — depending on how close it strikes, it can be instantly fatal. Grid fault surges may be instantly fatal by taking down metal oxide varistors, thus stripping the protection device of its voltage surge protection capabilities.

Scope of Protection

The sales approach I recommend is to start with comprehensive power protection. Other enhancements such as battery back-up can be used in conjunction if deemed appropriate to meet the homeowners’ needs.

This is an information age. The ability to provide the user with situational information instantaneously is paramount. This is achieved through onboard displays that utilize event logs detailing power grid disturbances experienced at the installed location. Knowing whether power was lost or some other disturbance occurred in a home is necessary; it can also keep homeowners and integrators from having to involve and pay third party companies thousands of dollars to do voltage and current management monitoring, which is not an uncommon scenario.

I’ve also learned the hard way that installation conveniences are king. Seek out power protection and management products that provide rack-mounting capabilities, the ability to protect 10 or more A/V components, protection for home and data lines and the ability to input and output multiple cable and satellite TV connections. All of these prove highly beneficial for the installer and homeowner. ■

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