

Power Quality Filters Increase POS Uptime

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An international fast-food chain could not shake serious downtime issues at scores of locations. Critical POS equipment – including cash registers and other sensitive electronics – was being damaged by powerline surges. In this environment (and in addition to lightning-induced surges), heavy-duty kitchen equipment cycling on and off was regularly degrading the equipment. All too frequently, the resulting interruptions brought business to an unexpectedly sudden standstill. Conventional surge protectors were not doing the job over time.

The solution: An in-depth engineering evaluation of an advanced surge suppression solution certified to protect equipment from worst-case surge damage and noise disturbances was conducted. Then, restaurants having high POS register downtime were retrofitted with these advanced power quality filters. Subsequently, the results were so successful that more than 1,000 company-owned locations in the United States and Canada were equipped with these patented products from Zero Surge, Inc. (Frenchtown, NJ) to protect point of use equipment (including POS systems, office computers, and digital menu boards). Today, after more than three years of this protection, the chain reports a healthy “surge” in documented uptime and productivity with no suppression technology failures.



For any POS operation, power disruptions can lead to unwanted, unscheduled, and untimely service and data-capture interruptions. In most cases, such as the restaurant chain, “dirty power” will be at fault.

Dirty power is typically associated with lightning-prone areas because of their repeated brownouts and power outages. But dirty power represents a particular problem for POS businesses, regardless of lightning strikes or locations, because of an entrenched reliance on sophisticated electronics and the constant cycling of electrical equipment within a building. These continuously place operations at risk, since cycling equipment generates surges causing diminished power quality and, ultimately, potential unavailability of equipment and serious damage to components.

According to a recent survey sponsored by a long-time designer and manufacturer of POS and industrial touch-screen terminals, terminal repair and maintenance have become substantial ongoing operational expenses, both in terms of time and money. More than 75% of survey respondents reported that at least 2% of their terminals were damaged or in need of repair during the past year and more than 62% incurred an annualized maintenance cost of at least \$400 per terminal. Adverse impact on customer satisfaction naturally follows.

With the obvious need to provide surge protection for critical terminals, circuits, and systems, the question becomes how – and to what extent – protection can best be achieved. Conventional surge protectors, whose technology originated more than 40 years ago and has remained largely unchanged, have given up ground to newer surge suppression solutions engineered to outperform and outlast all others as never before.

Suppressing the surge

Technically, a surge is a dramatic increase of voltage lasting up to 50 microseconds and a spike represents an increase of voltage for two nanoseconds or less. If a surge is high enough and lasts long enough, components can heat and burn. And, while surges are inherently worse than spikes, both can damage equipment or degrade components over time and, consequently, shorten service life.

Surges can be classified as external or internal. While external surges (caused by storms and normal power company switching operations)

generally will be more severe, internal surges generally will occur more frequently – representing about 80% of all surges – when equipment within a building is cycling on and off.

Conventional surge protectors have been taking some heat lately, in part because their technology was developed with an eye toward protecting stand-alone equipment. These days of interconnected and highly complex POS systems have changed both the landscape and marketplace needs – and traditional technology has been put on notice.

Historical performance problems associated with standard surge protectors can be traced to Metal Oxide Varistors, or MOVs (fixed clamping level



components), which consist of a piece of metal oxide attached to the hot line with power, two semiconductors, and a grounding wire. (Often, a fuse will be included in the setup.) When voltage hits the protector, the two semiconductors are supposed to divert the excess power to the neutral and grounding wires, sending only the right amount to the hot wire and on to the equipment. However, while the essential role of the MOV is to divert surge current, their lifespan shortens and failure becomes imminent as more surges (or spikes) are diverted. An MOV additionally is required to integrate a “failure indicator,” which is an acknowledgment of the MOV’s sacrificial history (“planned obsolescence”), because they will wear out after repeated use. One strong surge can spell disaster with no forewarning.

As the leading and increasingly popular alternative, non-sacrificial “series filter” surge suppression technology (instead of the MOV-based “Shunt Mode” protector technology) has been developed to limit surge current, surge voltage, and surge duration, overcoming the many shortcomings of shunt suppressors plagued by excessive let-through voltage, limited service life, poor filtering, and safety ground wire contamination.

These advanced “power quality filters,” as they are called – without MOVs – rely on inductive filtering circuitry connected to a neutral powerline conductor to store and safely discharge surges without contaminating the critical safety ground reference.

Employing patented Wide Voltage Range (WVR) technology, the filters definitively can sense and suppress surges on 120V powerlines, even when the power is low at 85 Volts or high at 175 Volts – and anywhere in between. The added introduction of patented surge cancellation technology can serve to suppress incoming surges to a lower value and entirely eliminate damaging surge energy. While unnecessary for most applications, an extra level of protection is available with surge cancellation technology developed for mission-critical applications and when a greater level of protection is required. The upshot: Connected equipment is “unaware” that a surge ever existed.

Ideally suited for POS operations, the technology “menu” includes plug-in products with multiple outlets for point of use equipment, versions designed to protect one or multiple branch circuit, and custom configurations. Based on filter technology, the filters will further protect against noise damage by removing EMI/RFI disturbances from the powerline.

One more real-world perspective

A leading provider of POS computer software for the fast lube industry, Integrated Services, Inc. (Portland, OR) has specified Zero Surge plug-in power quality filters for more than two decades at its fast lube installations. The cycling on and off of equipment inside the fast lube centers is known to send surges throughout each facility and the filters solve potential problems by protecting POS systems from damaging surge energy and powerline noise.

According to Darren Ball, Hardware Services Manager at ISI, “I cannot imagine how many computers alone we have saved with this technology,” adding that in all these years, there have been absolutely no surge-related failures of equipment protected by the power quality filters.

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