



6KV Surge Protection in Ethernet Switches

DIGISOL SYSTEMS LTD



This paper discusses an innovative safety feature being provided in Ethernet switches that allow your networks to respond to power events and power mismatch situations effectively and efficiently.

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6KV Surge Protection in Ethernet Switches

Introduction

An increasingly digitized world presents problems of a different nature. Especially when we refer to the ever-dynamic domain of computers and IT. Given that all of your devices, gadgets, networks and capabilities have already been digitized to provide smart and instant functions, it stands to reason that our dependency on IT deepens with every passing decade.

Typical Power Quality Events

Power quality events, in very simple terms, refer to the undesirable voltage or amperage fluctuations in the input power. The greatest impact of this variance is perhaps on electrical and electronic devices. There exist a number of terminologies that throw light upon this less-understood field.

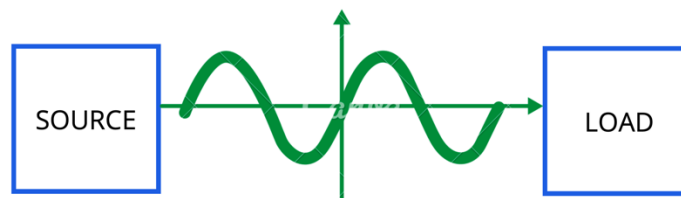


Fig 1. Expected Power Supply from Source

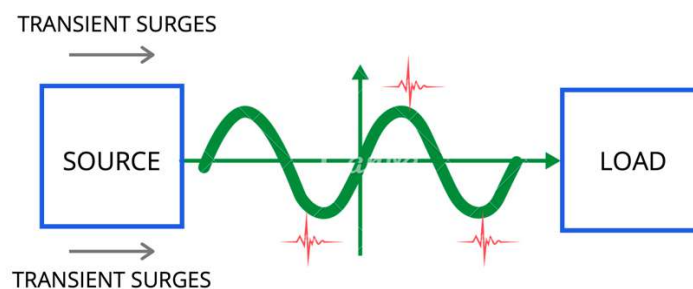


Fig 2. Real-world Power Input

Surge

Technically, a surge is the most common form of a power quality disruption event. It represents a large voltage spike lasting from 1 ns to several 100ms.

Traditionally limited to only electrical appliances and electrical transmission networks, it remains clear that any equipment with sensitive electronics is not safe from a surge. The damaging effects of surges need to be controlled.

Types of Surges

- Transient Surge - voltage spike that lasts from 1ns-100ms.
- Over voltage - prolonged voltage spikes that range from 100ms to 1 minute. Often called Swells or Overvoltages.



Most Common Reasons for Power Quality Events

The causes for such power surges could either be internal or external by nature.

- External events: Low probability but massive impact. For e.g. lightning strikes on transmission lines, wind damaged power lines, grid switching by utility company, electrical accidents etc.
- Internal events: High probability and low-medium impact. For e.g. high load appliances, erratically restarting electronics equipment, heavy production machinery, short circuits, capacitor switching, etc.

It is empirically estimated that between 60-70% of all power events are due to internal causes.

Business Impact of Surges

- Destructive - Damage to electronic circuits and attached equipment.
- Dissipative - Long term effect on systems and their internal electronics created as a result of poor power quality. Low level stresses affect the usable life of components and circuits.
- Disruptive - Loss of productive time, Cost to repair, Reduction in productivity and loss of critical data in certain cases.
- Loss of Reputation and Service Capabilities

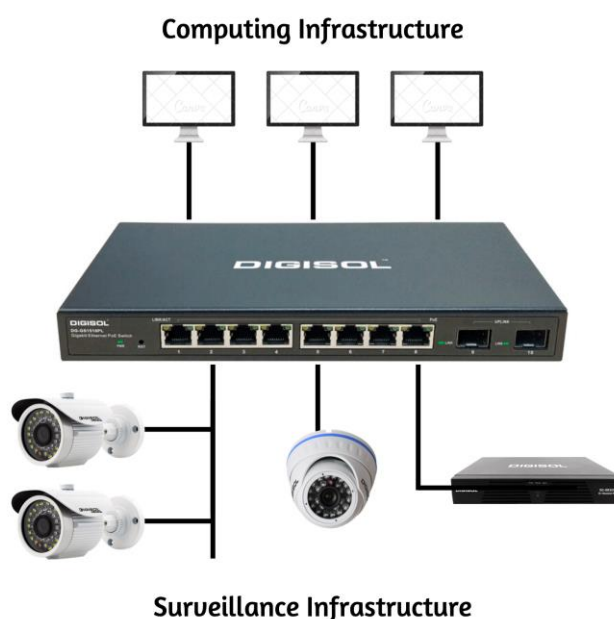
Biggest Losers due to Power Quality Events

Smart cities, Smart buildings, Smart governments and Corporates have made the necessary investments and at this point are in a phase where they are trying to squeeze maximum ROI juice over a long-term view. These are probably the stakeholders that will also tend to lose the most from:

- Downtime - Lost productive time
- Equipment damage
- Costly Repairs

Typical Switching Infrastructure binding Data and Surveillance

Fig 3. Typical Switching Infrastructure





Effect on Surveillance & Monitoring Systems

Surveillance has become an extremely critical requirement for everyone ranging from mom and pop setups to massive enterprises. In fact, the bigger the enterprise, the more the need for extra eyes everywhere. Surveillance systems are also mandated by law and as a business requirement (for e.g. insurance) in certain cases. Also, in cases where mission critical assets are to be monitored 24 by 7 as part of internal control and due diligence.

Surges can be potentially responsible for temporary/ permanent damage to not only the local switch ports which can render your local resources and productivity disconnected and digitally handicapped, but it can also result in damage to any interconnected IoT or surveillance devices.

A Cost-effective Solution

Having a network that is resistant to such surges is of prime consideration where downtime is absolutely unacceptable, nor is damage to infrastructure and assets. The most cost-effective way to address this problem would be to enable protection at the network switch level - it is after all the digital fabric that interconnects all data and power (in case of PoE) circuits throughout your local network.

Having your ethernet switch battle power fluctuations in an automated fashion can be more liberating that you can possibly imagine. The idea is to choose product meeting high safety standards to minimize the risks from surges, from both internal as well as external sources, providing safe and reliable performance.

Considerations for Anti-Surge Protection

- Is reliability an important consideration for certain segments of your infrastructure more than others?
- Do you have any critical sites or assets that are being monitored and recorded? Are these setups that cannot afford even a few seconds of loss of remote vision?
- Do you have any infrastructural assets (for e.g. switches) that are the backbone of your network that just cannot fail?
- Have you estimated the financial implications of asset loss due to a security breach event occurring when your monitoring and vision are down?
- Are you aware of the cost of downtime per hour for your network in case of a power quality event?
- Last but not the least, do you have adequate backup assets to replace critical infrastructure and monitoring equipment in case things go south? For e.g. Switches, Cameras, NVRs and more. If yes, are these pre-configured and ready to swap the damaged network element with minimum effect on downtime?

What is 6KV Surge Protection?

6KV is the other name for our internal electrical wiring standard that derives from IEEE specifications that mandate 6KV/ 3000A. The way this was arrived at it through testing the voltage and amperage that can cause electrical wiring to burn under standard installation conditions.

By and large, 6KV Surge Protection represents an industry standard for surge protection compliance and it ensures you are protected against the most common forms of power damage.



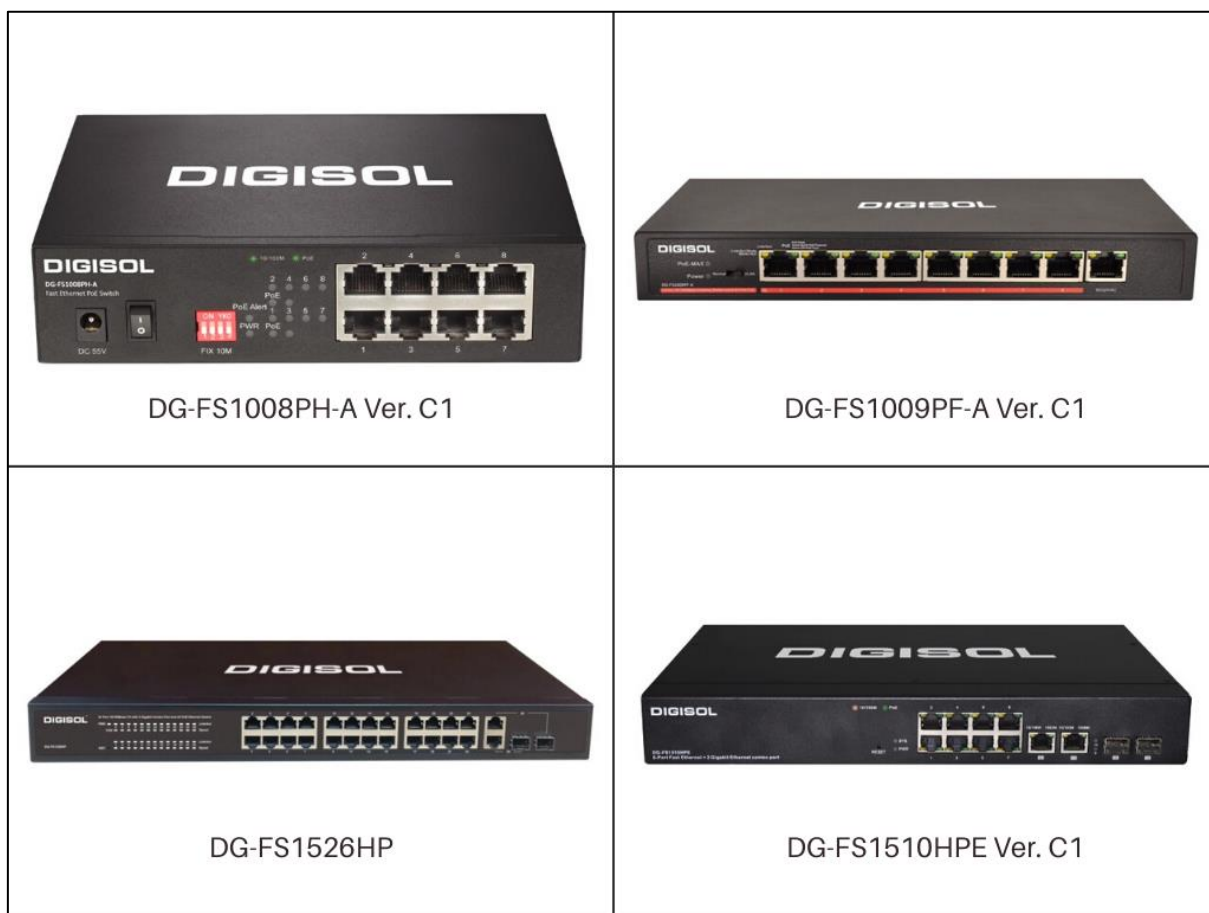
How Digisol Switches can add value through Prevention

Digisol anti-surge switches are hardened by design and tested for real-world applications and events such as thunderstorms and lightning strikes that have the capability to take your entire network down. Protection works two-fold - the switch ensures its own ports are safe, while at the same time ensuring that no unnatural voltage or amperage is transmitted to attached devices. In short, each copper port can endure a 6kV surge issue and protect the equipment as well.

Digisol range of anti-surge switches lend themselves to applications that demand extremely reliability and flexibility in the fact of power surge events - especially in use cases such as real-time outdoor environments, surveillance installations and industrial automation control setups.

Digisol 6kV Solution

Digisol devices provide high quality protection against adverse power events. They ensure not only uptime directly but also indirectly enhance your overall ROI through continuous availability and resilience.





 <p>DIGISOL DG-GS1510PL 15-Port Gigabit Ethernet Full Duplex</p>	 <p>DIGISOL DG-GS1528HP-C 28-Port Gigabit Ethernet Full Duplex</p>
 <p>DIGISOL DG-GS4110 4-Port Gigabit Ethernet Switch</p>	 <p>DIGISOL DG-GS4228P 28-Port Gigabit Ethernet Switch</p>
 <p>DIGISOL DG-IPE2248D 2-Port Gigabit Ethernet PoE Injector</p>	 <p>DIGISOL DG-IS4506HPE 6-Port Gigabit Ethernet PoE Switch</p>
 <p>DIGISOL DG-PE1148D 1-Port Gigabit Ethernet PoE Injector</p>	



Summary

Protecting your network switching infrastructure in general and surveillance and digital monitoring equipment in particular, against power surge events is a worrying concern for enterprises of all sizes today.

It is imperative to get the right type of preventive controls to minimize the impact it has on business processes and operation. Anti-surge switches are the perfect solution that directly protects your network elements in question, while contributing much-needed reliability and resilience to your business.