

Power Grid Protection Techniques

It is said that if we wrap our electronic equipment in multiple layers of plastic, then aluminum foil will provide protection as long as you put this equipment into a Faraday cage constructed with a metallic mesh. Should you try to insulate this from everything, or should you connect the enclosure to a ground to drain off the energy being diverted? More importantly, how does this shield your equipment against the magnetic field created by an electromagnetic pulse?

The experts tell us that when constructing a Faraday cage, we ought not to have holes in the protection, so instead, you can use sheets of aluminum or copper for your shielding material. Whichever material you choose, ensure its coverage is continuous over the entire exterior of your cage, or else its shielding effects will be rendered useless. Grounding a Faraday cage is risky at best: if you do not drain the energy away, it remains as an electrostatic field, and if you improperly ground the Faraday cage, you may be conducting a high current in addition to the high energy removed from the area.

How effective are Faraday Cages?

When it comes to protecting your devices against an EMP, the effectiveness of a Faraday cage is dependent on a number of factors, including the origin of the EMP, how far your Faraday cage is from the EMP, and the type of rays emitted by the EMP.

High-frequency electromagnetic waves require smaller holes in the meshing, while short-range EMPs contain gamma rays and X-rays that cannot be blocked by only a single layer of heavy-duty foil. To fully protect against EMPs from radiofrequency weapons, thick sheets of metal are required.

What you need to know About EMPs and Faraday Cages

In today's technology-enabled world, it is easy to imagine the devastating consequences that could arise from a prolonged loss of power. A larger EMP that destroys power for several weeks, or even months, could easily lead to civil unrest and throw many first-world residents into a survival situation.

Although a properly configured Faraday cage provides an effective means of first-line defense against EMPs, remember there may be little to no warning before a strike, and you may not have the opportunity to put your Faraday cage to use. The best way to prepare for an EMP event is to prepare yourself and your family for the aftermath, ensuring your stockpile of supplies will be adequate to see you through a potentially long-term spell of power-free living.

What about protecting your electronics with Surge Protective Devices (SPDs)?

SPDs cannot even protect themselves: they are damaged by voltage spikes smaller than their "clamping" voltage ratings. This clamping mechanism reacts only after the voltage spike has occurred: the SPD attempts to react as fast as the event it is trying to limit, but its design prevents it from acting until *after* the event has happened, so instead, it redirects the built-up energy by shorting it to ground.

This type of device directs thousands (sometimes hundreds of thousands) of amps of current to ground, which can cause electronic control problems, as well as noise pollution into the ground reference everything uses as a voltage reference point.

Manufacturers test SPDs for a few millionths of a second to confirm they can survive being tested to withstand 6,000 volts, and even if a SPD doesn't survive the test, as long as there is no incident or injury, it is still considered to have passed its testing standards. This limited test criteria correlates directly to the flaws inherent to SPDs. When a SPD fails, it no longer provides the protection you purchased it for.

What about protecting your electronics by using Capacitors?

Capacitors cannot be an effective guard against damage from an EMP, as high voltages destroy the insulation inside capacitors, rendering them useless. Ironically, capacitors are the very component used in the devices which cause an EMP.

What can we do to protect ourselves from these events?

When selecting a method of protection, it is important to recognize that voltage spike protection is not the only concern. As is implied by its name, Electro-Magnetic Pulse means you must also guard against magnetism. A plastic bag or tin foil wrap cannot and does not stop magnetism. No, most of the popular easy-to-apply "solutions" are not solutions at all.

There is only one proven device which protects all electrical loads, sources, and distribution systems from high voltage and high frequency events. It has been proven to not fail, unlike inductors, capacitors or leaky Faraday cages. This one device is sized for maximum protection for the power system. Better still, it is easily connected to existing systems in parallel without special accommodations.

Yes, this is a one-step approach to protecting from a Geomagnetic Storm, an EMP event or even the day-to-day voltage spikes which continuously damage your sensitive equipment. This device is lab tested and proven to prevent flashover, arc flash, phase voltage imbalance, and voltage harmonics in AC power systems of many classes.

The 480 volt version has been lab tested, and is confirmed to protect the source power transformer, the distribution system, electrical loads, and itself, from 8,400 volt, high-voltage events. In testing, this device sustained and protected its power system against 140% overvoltage, and over 20 times the energy level that typical SPDs can withstand, for 350 times longer than they can survive, with no damage, no increase in current, no voltage outside the CBEMA curve. This "test event" was a non-event: the circuit was allowed to continue operating noise free and problem free.

The Device is Phaseback VSGR (Voltage Stabilizing Ground Reference) from Applied Energy LLC. In Michigan. You can get more specific information at www.Phaseback.com.

When this technology is connected to a power grid, the entire grid and all its loads are protected. One device per power transformer is all that is required for full system protection, and it costs way less than the problem does.