



Shopper's Guide to Home Power Protection



AEL&P provides power that is well within the national voltage standard, a standard that also recognizes that conditions beyond a utility's control will infrequently and for limited periods of time, result in voltage levels outside this standard.

In addition to problems on AEL&P's side of the meter, power fluctuations are common in homes and buildings. In fact, industry-wide, the vast majority of equipment damage is caused by power events within *your* walls.

This is written to help you learn how you can better protect the equipment you value.

AEL&P's job

AEL&P continually makes system improvements designed to reduce the scope and duration of outages. At that, we can't always protect your equipment from voltage fluctuations and outages, so we also want you to know more about this topic. AEL&P is not responsible for equipment damage caused by Mother Nature, normal operations, and equipment failure.

Your job

You are responsible for the safe-keeping of your equipment including what's inside your home as well as equipment for your electrical service entrance – you own this. If you have overhead service, this includes the masthead to your meter base and on into your service panel. You are responsible for all connections inside the service panel as well as all safety grounding.

What causes power quality problems?

You'll quickly learn that much of this is beyond your control and ours to prevent. AEL&P's system is vulnerable to weather events – wind and snow and trees in lines, mud slides and avalanches. Equipment failures (like connectors, fuses and insulators) animals and man-made causes (dig-ins and auto accidents) also contribute to disturbances and outages.

Normal switching operations on our system can cause power fluctuations. A neighbor's arc welder could even be a problem. Additionally, voltage surges and spikes can also enter your home over the cable and phone lines. ***The closer a building is to the cause, the greater the magnitude of the power disturbance.***

Inside the four walls of your home, fluorescent lights, and the start-up of appliances like microwave ovens, furnaces, refrigerators, water heaters, portable heaters, and hair dryers, can create momentary voltage drops. Conversely, as an electrical appliance turns off, the resulting electrical spike or surge can hit your sensitive or motorized equipment.

These are most often split second events – and yet, over time, can weaken sensitive electronic equipment, motors and compressors to the point of damage or failure. They will also weaken existing surge and UPS devices over time and these will eventually fail.

What equipment is most vulnerable?

Think about everything in your home that uses computer chips – your TV, home theater and entertainment systems, computer, fax machine, microwave ovens, home security systems, garage door openers, cordless phones and answering machines, and even some coffee pots and clocks. Motorized equipment can also be affected by power fluctuations.

How can I tell if I have a problem?

When your lights dim as an appliance starts, if your clocks blink 12:00 frequently, or if you are burning out light bulbs too quickly, you may have a problem. If you have ever had garbled or bad computer data, keyboard lock-ups, crashes, errors introduced into programs and data files, a power quality problem could be the cause.

What can I do?

- Especially if your home is older (40+years), have an electrician check your circuits, grounds and service entrance.
- If you suspect that AEL&P might be able to correct your problem, call us.
- If weather's bad or there's an outage, unplug or turn off whatever you can.
- Back up your computer files regularly.
- Move sensitive electronics to circuits without large appliances and motors.
- Consider meter base protection as the first defense against large external power surges that outlet based surge protection isn't rated for.
- Make sure the equipment you value is plugged into surge suppressors or uninterruptible power supplies. This gives your equipment a fighting chance, though damage can still occur.
- When you buy a new electronic device, also buy power protection.
- Check out www.efinet.com (hardwire section) for meter based protection.

Other sources:

American Power Conversion

www.apcc.com

Tripp-Lite www.tripplite.com

Power Sentry www.powersentry.com

Belkin www.belkin.com



Choosing an Uninterruptible Power Supply

UPS's are the best protection for computer equipment because the battery stores enough power to shut down a computer in an orderly way, while saving data. Better UPS's also provide surge and sag protection.

Look for:

- UL 1778 rating – to meet current safety standards.
- Length of battery life and cost, availability, ability to self-install, and a feature that lets you know in advance to replace your battery.
- Automatic voltage regulation (line-interactive mode).
- Software to automatically save data and shut-down your equipment safely.
- Software that's compatible with your computer.
- Surge protection – check the response time, clamping voltage and joule rating. You could supplement this protection with an additional surge suppressor.
- Outlets that are spaced, surge and battery backup outlets are sufficient. Telephone line protection is available, since surges occur over these lines, too.



- Sizing to handle the equipment you plug in. Avoid plugging a printer into a UPS. Sizing is based on Volt-Amps. Volts x Amps = VA Add the volt-amps for each device you are connecting for the proper sizing. If you only know watts, VA = Watts x 1.4.
- Warranty information. Length of time and value for connected equipment. Is there a data recovery component?



Choosing surge protection

Two layers of surge and spike suppression give you the best protection. Meter base units can protect from occurrences on AEL&P's system. AEL&P will install this for free. Outlet-based suppressors protect your equipment from house-caused power problems. They will not protect against voltage sags or brown-outs.

When you're shopping for plug-ins:

- Make sure it's UL listed for compliance with its #1449 standard. If it's not, it's just a power strip.
- Choose a clamping voltage of 330 V. Higher ratings exist, but allow larger voltages through initially. The lower the rating, the better the protection and the higher the price.
- There should be three modes of protection: line to neutral, line to ground, and neutral to ground. This is also known as common and normal modes.
- Buy one that shows if the outlet is properly grounded and is operational.