



# OPALCO SAFETY MATTERS

## SURGE PROTECTION

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In the electric industry, power surges are unavoidable. However, just like with home security systems, there are things we can do to protect us from surges, though never fully. The main task of a surge protector, also called a surge suppressor, is to protect electronic devices from “power surges.” A power surge, or transient voltage, is an increase in voltage significantly above the designated level in a flow of electricity. In typical home/office wiring, the standard voltage is 120 volts; if voltage rises above 127, the surge protector helps protect your electronic device.

If the surge (increase that lasts 3+ nanoseconds) or spike (1-2 nanoseconds) is strong enough, it can cause damage on your device. Just as too much water pressure on a hose will cause it to burst, the same happens when too much electrical pressure runs through a wire, but in this case the wire heats up. Even if it doesn't immediately break your device, it can wear it down over time.

**CAUSES** - Although many people think lightning causes most surges, in reality, about 80% of all power surges are created by electronic equipment inside your home (air conditioners, refrigerators, power tools) because such high-powered devices use a lot of energy to turn on/off, and can gradually be worn down over time. You might be surprised to learn that only 15% of power surges are caused by lightning strikes. Other sources of power surges include phone & cable lines, faulty home wiring, utility equipment problems, and downed power lines. The system of hardware and software that brings power to your home or office is very complex. Although reliable, the system is not fail safe. Power surges are unavoidable, especially when you consider the many unpredictable factors such as weather, animals, birds and autos hitting poles.

**PROTECTION** - When choosing a surge protector you have many different brands to select from but remember these key points:

- These devices are not lightning arrestors; they will not survive close lightning strikes.
- Be sure to consider how surges can enter the home through phone/cable lines; protect these too.
- We realize this isn't always practical, but, the best and only sure protection is to isolate (unplug) your device.

### WHAT TO LOOK FOR IN SURGE PROTECTION

- **330 VOLT CLAMP RATING.** Most of the least expensive devices will not offer specifications better than UL's 400 volt clamp rating. This means spikes will rise to 400 volt levels before they are contained.
- **SINE WAVE TRACKING.** Lower quality devices do not have sine wave tracking—a high-tech capability that clamps spikes tightly against the sine wave. This prevents spikes from rising too high.
- **RESPONSE TIME OF ONE NANOSECOND (ONE BILLIONTH OF A SECOND) OR LESS IS BEST.** Devices with a response time of five nanoseconds or greater are much too slow to be effective.
- **DEVICES WITH THE TWO LED DIAGNOSTIC LIGHTS.** Devices with two LED diagnostic lights warn you of four critical safety features: (1) the power is on; (2) the protection is present (it's working even if the power is turned off); (3) the wiring configuration inside the receptacle is correct; (4) sufficient ground path to which damaging spikes can be directed.
- **WARRANTIES.** Most general store-bought devices have NO warranty or only one year warranty. A quality device should provide you with a lifetime warranty with coverage for any damage up to to \$25,000.
- **LET-THROUGH VOLTAGE OF 330 VOLTS OR LESS.** The lower the let-through voltage, the better the surge suppressor. UL has established the 330-volt let-through as the benchmark.
- **JOULR RATING OF AT LEAST 200 TO 400 JOULES.** A higher number indicates greater protection. For better protection, look for a rating of 600 joules or more.
- **PEAK SURGE CURRENT RATING OF 200 AMPS.**
- **TELEPHONE LINE PROTECTION.** If your computer is connected by modem, you need this feature. Telephone lines are like antenna systems that can direct powerful surges right into the heart of your computer, as well as to anyone working on it or equipment attached to it.
- **NOISE ATTENUATION.** Electro-Magnetic Interference (EMI) and Radio Frequency Interference (RFI) are disruptions on the smooth AC power line sine wave. This noise on the power line can be caused by lightning, generators, radio transmitters or even household appliances. This noise shows up as glitches or errors on computer systems, or “snow” on a TV. A surge protector with this feature will reduce or eliminate this noise.
- **THERMAL FUSES.** This is a quality feature. These fuses are safety devices that are activated in the event that there is an extended over voltage. They will automatically take the device off the power line, eliminating the possibility of a burned protector or damaged equipment.

## **FAQ: SURGE PROTECTION**

### **WHAT IS A SURGE?**

A surge occurs when the power line voltage goes higher than nominal, and stays there longer than 10 milliseconds.

### **WHAT CAUSES POWER SURGES?**

Although many people think lightning causes most surges, in reality they're one of the less common causes. In fact, about 80% of all power surges are created by electronic equipment inside your home (air conditioners, refrigerators) because such high-powered devices use a lot of energy to turn on/off and can gradually be worn down over time. You might be surprised to know that only 15% or less come from unexpected lightning strikes. Other sources of power surges include phone and cable lines, faulty home wiring, utility equipment problems, and downed power lines. The wires and transformers that bring power to your home or office is quite complex, having many possible failure points, and many potential errors that can start an uneven power flow. As mentioned, power surges are unavoidable, especially when you consider the many unpredictable factors such as weather, animals, birds and autos hitting poles.

### **CAN THESE SURGES CAUSE DAMAGE?**

Yes. Today's computerized appliances and electronics can be damaged or destroyed by over-voltage surges or spikes. Large appliances like air conditioners or refrigerators are less susceptible, but can be damaged as well.

### **CAN A SURGE HARM MY EQUIPMENT IF I'M NOT USING IT?**

Yes. Many electrical devices have electronic timers, clocks, or remote controls which remain in operation even when it is not in use. Also, some appliances cycle off and on at random like air conditioners, water heaters, pumps, or refrigerators and they could be on during a surge.

### **WHY DO I NEED SURGE PROTECTION?**

There are several reasons why power quality has become such an important issue: today's computer chips are far more dense than they were even a few years ago, and subsequently, much more sensitive to even slight surges. Clock speeds, or operating frequencies, have increased and reached the frequency range of high-voltage transients. Slower processors ignored them, but high-speed processors may actually interpret a transient as a command sequence. Most homes and offices are using more pieces of equipment that draw electricity than ever before. Each time an electric device is turned on, transient voltages may be generated. More microprocessor technology is being used than ever before in household appliances such as refrigerators, washers, dryers and dishwashers.

### **WON'T MY CIRCUIT BREAKERS PROTECT MY EQUIPMENT?**

No. Circuit breakers are only designed to protect against over current, not a voltage spike or drop.

### **WHAT IS A SURGE SUPPRESSOR?**

A surge suppressor is a piece of equipment designed to protect sensitive equipment from voltages above nominal on the power line. They provide an alternative pathway for excessive voltage.

### **WHY DO I NEED ONE?**

The problems caused by disturbances in the power line may not surface immediately. They can cause the gradual breakdown of electronic circuitry. They are often unexplainable problems that show up on the repair bill as "No Trouble Found." Many times such problems are no more than surge induced damage. Any new piece of equipment should be protected when installed.

### **DO THESE SUPPRESSORS HANDLE ALL VOLTAGE PROBLEMS?**

Probably not, though they do handle the most frequent and destructive ones. More sophisticated technologies, i.e. hybrid power conditioners and uninterruptible power systems, are available to handle complex power problems.

### **WHAT IS THE PURPOSE OF THE PHONE JACKS ON SURGE SUPPRESSORS?**

Some of the surge suppressors incorporate protection circuitry for telephone equipment. There are two sockets on these products. By plugging a phone line through the sockets, you can minimize the effects of a surge coming into your equipment through the phone line. FAX machines, cordless phones and answering machines are especially sensitive, and computers with internal modems can be completely destroyed by spikes on the phone line.

### **WHAT IS THE DIFFERENCE BETWEEN A SURGE SUPPRESSOR AND ARRESTER?**

Suppressors are usually devices that plug into the wall outlet and can handle surges up to 6,000 volts. Arresters are usually devices that are installed at the service entrance (meter or electrical panel) and can handle surges up to 20,000 volts. Arresters divert excess energy to the ground, reducing voltage surges to a level that can be handled by your electrical system and surge suppressors located downstream from the electrical panel.

### **IS THE UL LABEL AN INDICATION OF A QUALITY PRODUCT?**

No! Many manufacturers misrepresent their products. Some claim a UL listing for their products if they use a single UL listed component such as the power cord. Other products have never been tested as anything more than a Temporary Power Tap, UL's term for an extension cord. Many claim that they meet standards or that it has passed UL standards, when in fact, they have never been tested by UL.