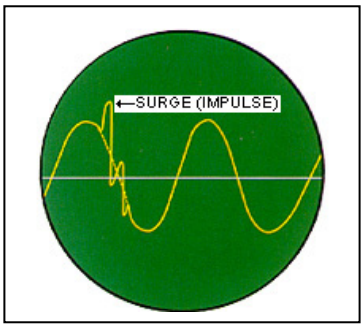
HIGH ENERGY SURGE PROTECTORS

Who needs surge protection?

Power surges do occur -- with unfortunate regularity. And, unless you protect your equipment -- protect your business -- against surges, you run the increased risk that damaged or malfunctioning equipment could seriously hinder your operations.

What causes power surges?



Surges on power systems -- also known as transients -- result from energy being released into the system. In low-voltage AC power circuits, surges have two basic origins: lightning or switching events.

When lightning strikes on or near a primary circuit, it produces a transient voltage which is transmitted through a transformer to your secondary circuit. Or, lightning may strike on or near the secondary circuit, which results in an even higher energy surge to your equipment.

The second cause of power surges -- a switching event -- can be generated by either external or internal conditions. Externally generated switching events may be caused by breaker operation, capacitor bank switching or a fault somewhere on the system. An internally generated switching surge may result from the shutdown or equipment such as compressors, air conditioners, or machine tools, or from the operation of devices that limit current flow, such as breakers or fuses.

Wherever it strikes, however and what ever the source of the surge, the result is the same: if unprotected against transient overvoltages, your equipment may be disabled or even damaged, you may lose important stored data, and your business will be at least temporarily thrown into a period of downtime.

How do you protect your equipment from power surges?

Power surges are a fact of life. Lightning storms are destined to occur, and equipment failure is bound to happen. There is no way to prevent power surges from occurring -- but there is a way to offer protection for the equipment used in your business.

A surge protector is exactly what its name implies: a device that offers protection for your electronic and electrical equipment from transient overvoltages.

Basically, surge protectors suppress surges that occur, whatever their origin. The protector is an energy-handling device: it can absorb and dissipate thousands of joules of energy. Here's how surge protectors work: Imagine an electrical storm, with a lightning strike on a power line. The protector responds to the transient overvoltage -- or surge -- produced by the lightning by changing from its normal high resistance to low resistance and conducting surge current to ground. This current, and the resistance of the protector results in a discharge or residual voltage across the protector. This same voltage is "seen" by the protected equipment and defines the protective capability of the surge protector. The ability of a surge protector to handle a given amount of energy reflects its ability to "survive" and to continue to protect your equipment. This capacity to continue to protect your equipment surge after surge is extremely important in choosing a surge protector.

No protector can survive a direct lightning strike. A strike close to the protector or any surge which subjects the device to surge current in excess of its capability or exceeds the energy rating will also fail the protector

CURRENT SCENE

A BULLETIN OF CIRCUIT PROTECTION TECHNOLOGY

We tend to think of building electrical-system energy as being pure sixty herz ac sine waves.

They're not always so pure. External and internal influences can cause voltage transient "surges" or "spikes" as high as several thousand volts on 120V circuits.

Unless these surges are provided with a harmless path to ground, they can damage the building system and utilization equipment connected to the system. In the most severe cases, they can start fires.

There are two main sources of power system surges--lightning and switching.

Lightning is the biggest cause of surges from outside a building. We're excluding "direct hit" lightning damage from this discussion. Lightning surges are the result of *induced* voltage on the power lines caused by lightning strikes in the *vicinity* of the lines. The surges ride the line into buildings through the service entrance conductors.

Switching is the major cause of surges from inside a building. The inductive "kick" of a transformer, solenoid, or motor, or the switching of an appliance are typical examples.

The electric clock has given us an insight into just how high these surges can be. Millions of clocks are exposed day and night, year in and year out to whatever surges are on the lines. A General Electric Company study of clock motor performance over a period of several years showed that electrical failures were practically eliminated when the withstand voltage level of the clock motor insulation was increased from 2000V to 6000V.

This provides evidence that many surges do exist over 2000V, and is an example of a manufacturer's action to improve product performance. Normally, products would be expected to withstand high voltage surges of two times their rating plus 1000v, or approximately 1250V, for most home appliances. For mobile homes, Art. 550-10(a) requires a dielectric strength test of 900V for 1 minute or 1080V for 1 second.

Protection from voltage surges can pay for itself in short order in appliance repairs alone.