3 KEYS TO CHOOSING A SURGE PROTECTOR

There are many different kinds of surge protectors. Surge protectors installed on power lines don't absorb or otherwise diminish damaging power surges. Their primary function is to divert these destructive forces away from your sensitive circuitry.

There are four basic kinds of surge protectors: metal oxide varistors (MOVs), avalanche diodes, filters, and gas tubes.

Metal oxide varistors (MOVs) are a common choice. The word varistor is a combination of two words: variable resistor. As these words imply, an MOV is a highly resistive device that triggers during an AC power surge and diverts the excess voltage, preventing it from reaching your expensive computer equipment.
MOVs are designed to accommodate surge levels up to a specified breakdown voltage. When this limit is exceeded, the MOV varies from a highly resistive state to a state of low resistance. The excess energy is "clipped" from the power line and sent to ground.

Surges occurring at the peak of a sine wave are clipped by the MOV, but high-voltage spikes may still occur (though they'll eventually be clipped), and the MOV response times can range up to 500 picoseconds. This is the primary weakness of an MOV, but it's usually overcome by the inclusion of some other suppression technique within the surge protector.

Avalanche diodes, also known as Zener diodes, are semiconductor devices similar to MOVs, but they feature much faster response times (usually less than one picosecond). Avalanche diodes are available in a wider range of sizes to provide accurate and repeatable voltage clamping. However, they have limited ability to withstand large surges, which means they should be combined with other devices to make them useful for lightning surge protection.

Filters are also usually built into surge protectors, along with other suppression devices, to offer enhanced levels of protection. They're made up of discrete coils, called chocks, and capacitors that are designed to filter noise occurring within specific frequency ranges on AC power lines.

Gas discharge tubes are specialty devices usually installed near a building's main service entrance or transformer to divert particularly devastating surges well before they enter your building. Intense voltage levels striking the tube ionize the gas, turning it into a conductive path to ground. Gas discharge tubes generate their own disruptive high-frequency levels during this grounding process, so they should never be installed near any electronic equipment that might be damaged as a result.

Gas tubes can absorb huge voltages, so they're often used to protect against lightning strikes. However, they take a certain amount of time to activate –just enough time to let in a surge that can damage electronic equipment. For this reason, they're best used with other forms of surge protection.

Because all the common surge protection methods have inherent advantages and disadvantages, the best systems use more than one type achieve the best performance. The most common combinations incorporate a high-current but relatively slow-acting component with a faster-acting but lower-power-rated component.

Choosing Surge Protectors

A good surge-protection system involves more than one type of protection—silicon avalanche diodes for quick response, for example, with gas tubes to take the main hit. When evaluating surge protectors, you should also look at the clamping voltage, UL®clamping category, and the maximum surge current.

1. **Clamping voltage** is a measure of the actual voltage level that the protective device will allow through to your equipment. Often called the let-through voltage, this measure is the best performance indicator to consider when choosing surge protection equipment. The lower the number, the better the degree of protection.

2. **UL® clamping category** is a rating of surge protector effectiveness defined by Underwriters Laboratories®. As with clamping voltage, the lower the number of the UL® clamping category, the better protection you can expect for your equipment. However, note that devices rated within a similar category may have a wide range of clamping voltages.
3. **Maximum surge current** is a measure of overall capacity for diverting surges or the highest voltage a surge protector will take before sacrificing itself. In the face of an extremely large surge, a surge protector will break the link to your hardware and sacrifice itself.

Data is transmitted across copper lines using electrical impulses. Unexpected electrical interference on these lines can interrupt the operation of your network, so it is imperative to have a good surge protection system in place.

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