

The Novaris Systematic Approach: 1 - Define Boundaries

The Novaris systematic approach to protecting sensitive electronic equipment requires boundaries of protection to be established, whereby all equipment inside that boundary is treated as an entity and the protection equipment is referenced to a single point, the earth.

A boundary may cover an entire building, in the case of a small telecommunications installation or remote telemetry site, it may cover a single floor of a multistorey building, a single room or even a single piece of equipment. Generally the boundary will divide areas of different potential.

In the case of a multistory building, a lightning strike to the top of that building will create a potential gradient from the top to the bottom of the building. Metallic services running from top to bottom of the building will also be subjected to this potential gradient. It is for this reason that we choose to establish boundaries at each floor.

All services crossing the boundary require protection whether they be power, data or RF signals. It may also be necessary to provide further staged protection for some services within the boundary. For example surge diverters on incoming power may be augmented with power surge filters downstream to protect selected equipment. A Fax or modem is a good example where a combined power surge filter and telephone line protector would be installed directly at the Fax or modem itself.

Building Potential Rise

All conductors have inductance as well as resistance. Because of the high rate of rise of lightning strike current, inductance becomes the predominant consideration. A building with just a single downconductor can be used as an example. The inductance of a typical straight downconductor is around 1 microhenry per metre. For a 40 metre high structure, the voltage at the top is equal to the inductance of the conductor multiplied by the rate of rise of current. Assuming a peak current of 50KA rising in 1 microsecond, gives a potential at the top of the building of 2MV.