

Easy protection

With three questions on suitable surge protection for residential buildings

Protection against overvoltages is important and has also become mandatory in most countries. It's easy to select the proper SPD. Three questions will help you find suitable surge protection for your object.

**1**

Does the building have an exterior lightning protection system? Is the building supplied via an overhead line?

In the standards, the voltage protection level is a decisive characteristic used for selecting a suitable SPD. But even spark gaps now achieve voltage protection levels of 1.5 kV, thereby safely protecting not only main and subdistribution systems, but also end devices. This means that a surge protective device with spark gap is an all-rounder: Coarse, medium, and fine protection in one device.

The energy discharge capacity of the SPD remains important. Depending on the energy to be expected, you will need a type 1 or type 2 SPD. And this point is essential. In some cases, half the energy of a lightning strike flows across the SPD!

For the main distribution, the feed point of the electric system, you should select a suitable surge protective device based on the answers to these questions.

Buildings with external lightning protection

If a lightning protection system is in place, you should expect high levels of energy in the main distribution in the event of a lightning strike. You therefore need a type 1 SPD. The SPD is selected according to lightning protection level:

Lightning protection level III/IV: 12.5 kA per pole

Lightning protection level I/II: 25 kA per pole

Buildings without external lightning protection

If the building does not have a lightning protection system, the energy inputs are expected to be significantly lower. In the event of a lightning strike in the power grid, the energy of the lightning is spread across a number of connections. In this case, a type 2 SPD with a discharge capacity of 40 kA is sufficient.

Buildings without external lightning protection, but with overhead line supply

Systems with overhead line supplies are special cases: Should lightning strike in the vicinity of the connection of the overhead line, it can be expected that the lightning current would flow into the building at the corresponding energy level. In this case, a type 1 SPD with a discharge capacity of at least 5 kA per pole should be installed. This is mandatory in some countries.

2 Are the subdistribution lines or the lines to the end device longer than 10 m?

The surge protective device in the main distribution discharges the most of the energy. However, a risk of inductive or capacitive coupling remains due to lines installed parallel to each other within the system. A type 2 or type 3 surge protective device installed in the subdistribution or upstream of the end device provides protection against this. If the line length to the upstream SPD is greater than 10 m, we recommend an additional SPD in the subdistribution or upstream of the end device. This is not only a sensible recommendation, but obligatory in many countries

You can freely choose between type 2 and type 3 SPDs. Both types of protective devices offer very good protection within the subdistribution and upstream of end devices. Therefore, you should choose the surge protective device that best suits your situation and offers the simplest installation options. Compact type 3 SPDs are cost-efficient and space-saving. The installation may require additional terminal blocks for the connection, or a backup fuse. Therefore, a larger type 2 SPD may be the simpler and, consequently, less expensive solution requiring less installation effort.

Here is an example to illustrate this: A type 2 or type 3 SPD is supposed to be installed in a subdistribution. The feed to the subdistribution, 5 x 10 mm², is protected with 40 A. A type 3 SPD can only be installed with a backup fuse. This usually requires additional terminal blocks. A type 2 SPD (e.g., VAL-SEC-T2-350) can be installed without backup fuse – either in branch or V wiring. This saves space and additional installation materials. Using V wiring, you also save on line length, which may only be up to 50 cm long according to standard.

Our tip: Using the VAL-MS 230/3+1-PT, either with or without remote indication contact, makes the installation even simpler, thanks to the Push-in connection technology. The surge protective device offers two terminal points per pole. This way, different cross-sections and different lines can be safely connected to one position next to each other.



3 Are there any sensitive and essential end devices?

End devices installed more than 10 m line length away from the upstream SPD require a closer hazard assessment. Does the device pose a danger in the event of an overvoltage? Can an overvoltage cause a fire? Or does the device itself generate overvoltages? In these cases, an additional type 2 and type 3 SPD must be installed upstream of the end device. This is typically the case in devices with greater electrical power consumption. But not every end device requires an additional SPD.

Extremes such as "All or nothing" are rarely useful in good overvoltage protection concepts. Devices with greater electrical power consumption are often expensive and important devices, which therefore should be protected with an SPD anyway. But even electronic end devices that do not pose a hazard should be closely assessed in terms of importance and dispensability. Some

of these devices are very sensitive and can be damaged even at low energy levels. These include routers, phone systems, servers, controllers, but also heating systems and SAT systems.

End devices worth protecting should be protected properly. A type 3 SPD installed directly upstream or on the end device provides safe protection from coupling across the mains connection. However, it is important to protect all lines to the end device from overvoltages. Routers and phone systems can be damaged not only by overvoltages from the power grid but also by overvoltages from the phone network. Therefore, please always consider the protection of power supply and data lines together.

Find out more

For more information on the proper selection of suitable surge protective devices, consult our information sheets at phoenixcontact.com/spd-building

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