Easy protection

Type 1 protective devices, type 2 protective devices, and a combination of both

Protection against overvoltages is important and has also become mandatory in most countries. With perfectly tailored protective devices, ensuring ideal protection for the electrical system is easy.

The spark gap – the robust all-rounder

Spark gaps are extremely robust and feature a high energy discharge capacity. Therefore, spark gaps are ideal for use as lightning current protective devices, because these depend on a high energy discharge capacity – after all, half of the energy of a lightning strike can flow through the SPD.

But anyone who thinks that spark gaps are only good for approximate protection is far off the mark. Modern spark gaps can now reach a voltage protection level of 1.5 kV, and therefore, they are not just able to reliably protect main and subdistribution systems, but also end devices that are installed in close proximity (<10 m) to the protective device.

The varistor – the fast down-player

Varistors are versatile, cost-effective, and fast. High-performance varistors have a voltage protection level (U_p) below 1.5 kV in relation to the nominal discharge current (I_n). In electrical systems, however, lower surge currents occur much more frequently, for example due to switching operations. And it is precisely here where the varistor has clear advantages over the spark gap: With smaller surge currents, the voltage protection level is also lower.

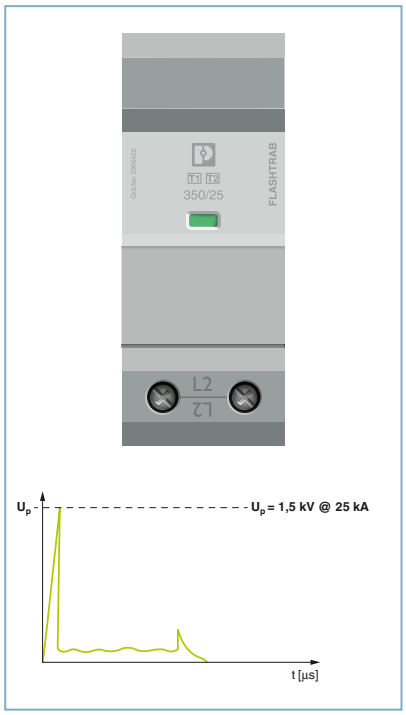
In the case of surge currents that are lower than the nominal discharge current (I_n), a residual voltage (U_{res}) is referred to instead of a voltage protection level. In addition to the voltage protection level, the residual voltage is specified for various current amplitudes in the technical data sheet. Due to the lower residual voltage, better protection is achieved for the electrical system. Devices and the installation are simply subject to lower loads caused by surge currents.

Spark gap and varistor – an excellent team

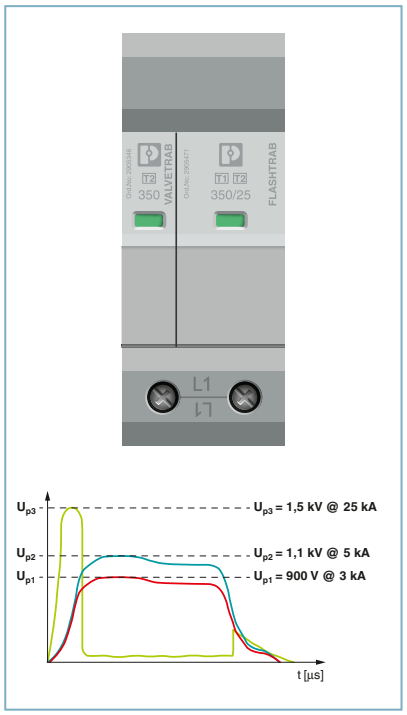
The energy discharge capacity of a varistor is lower than that of a spark gap. However, the varistor provides better protection, particularly at lower surge currents. A combination of both properties provides the ideal protection for the electrical system.

The graphs below the product images illustrate ideal-typical progressions of the voltage protection level with various surge currents.

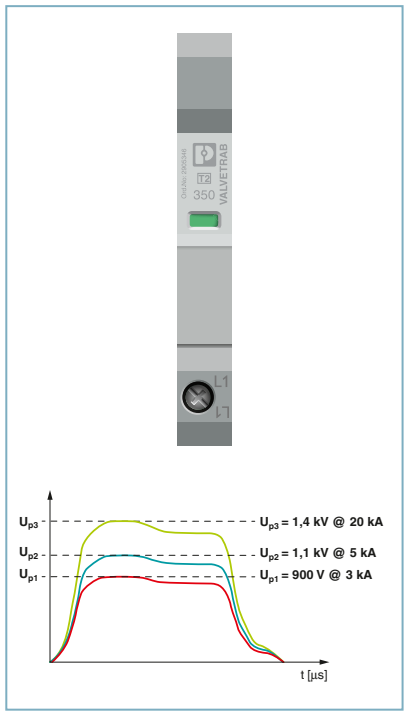
Type 1 SPD



Type 1+2 special SPD



Type 2 SPD



Combined lightning current and surge arrester

Modern spark gaps can now reach a voltage protection level of 1.5 kV, and therefore, they are not just able to reliably protect main and subdistribution systems, but also end devices that are installed in close proximity (<10 m) to the protective device. In addition to the test for type 1 SPDs, spark gaps are often tested in all tests for type 2 SPDs. The spark gap therefore becomes a combined lightning current and surge arrester. The IEC test classifications are stated in the technical data sheet.

Combination of spark gap and varistor – special combined lightning current and surge arrester

Spark gaps and varistors both have their own advantages. A combination of both properties provides the ideal protection for the electrical system. But not all applications have space for both. Moreover, when using varistors in close proximity to the spark gap, the two protective devices must be coordinated with one another. Otherwise, the faster device always takes on the role of full protection.

The fast varistor responds more quickly than the robust spark gap. If the protective devices are not coordinated, the varistor will become active before the spark gap. This will also apply in the event of a lightning strike. In this case, the varistor will become overloaded quickly and, in certain circumstances, will be destroyed.

It is possible to directly coordinate a spark gap and varistor in a space-saving design. The FLT-SEC-T1+T2 combines a line-flow-current-free type 1 spark gap and a type 2 varistor arrester in one protective device across 2 HP per pole. Therefore, the FLT-SEC-T1+T2 is no larger than a combined lightning current and surge arrester based purely on spark gaps.

Type 1+2 special combined lightning current and surge arrester
FLT-SEC-T1+T2-3S-350/25-FM
Order No. 2905470

Directly coordinated combination of type 1 spark gap and type 2 varistor arrester.
Particularly suitable for the maximum protection of installations and devices.

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Find out more

You will find further information on correctly selecting the right backup fuse for surge protective devices in our info paper at **phoe.co/spd-industry**