

## Bachmann GmbH – Whitepaper

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# PDU with Type 3 Surge Protective Device (SPD)

## System protection in data centres

### Surge protection – a UPS system alone is not the solution

When discussing the issue of surge protection in data centres, the argument is often made that the existing UPS system (VFI-SS-111 classification) provides excellent voltage quality. While this statement is in principle true, a data centre contains bundles of cables and busbars which, from the perspective of induced interference, provide a large area exposed to attack – even downstream of the UPS system.

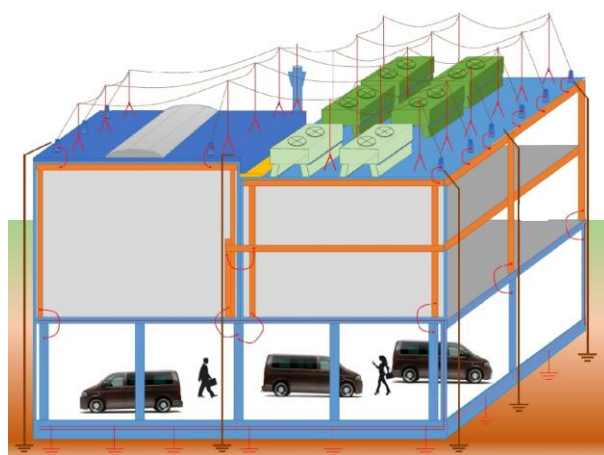
### Power surges and their causes

They are various reasons why surges occur. The most well-known cause is direct lightning strikes, which inflict massive damage on the building and technical equipment. Less well-known are indirect lightning strikes, which travel into the ground, spread out and then find their way into buildings through underground cables.

Even less well-known are surges, which are often caused by neighbouring industrial plants. Particularly in heavy machinery construction, where large welding machines or presses are in operation, severe voltage pulses (transients) are produced in the power grid. Under certain circumstances, these voltage pulses can be induced in secondary network cables (downstream of the UPS system) of a neighbouring data centre and destroy expensive IT equipment.

### Surge protection

The most common protection against direct lightning strikes is the traditional lightning conductor. Mounted on flat roofs of large data centres, "lightning rods" protect the building itself as well as air-conditioning capacitors, which are very often found on the roof. If lightning strikes, these lightning rods conduct the energy from the lightning into the ground through the building's earthing system. To prevent surges entering the building through the earthing system or underground cable, lightning and surge protection devices are installed in the primary distribution (type 1 SPD), in the secondary distribution (type 2 SPD) and directly upstream of the end devices (type 3 SPD).



Lightning rods/source: perfekte-netze.de

SPD – Surge Protection Device

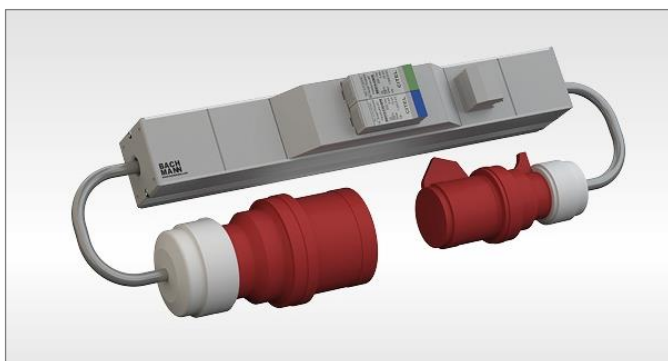
### **Normative framework**

Two IEC standards are critical in determining WHEN, HOW and WHICH lightning protection measures are used. The IEC 60364-4-44 standard outlines WHEN lightning and surge protection needs to be installed. The IEC 60364-5-53 standard outlines in detail WHICH measures need to be taken and HOW. Lightning and surge protection in primary and secondary distributions are common practice today and are already mandatory for new buildings. Type 3 surge protection, in contrast, is overlooked in the data centre sector, often because of the argument in favour of the UPS system described at the start of this white paper.

The necessity of a type 3 surge protection – installed directly upstream of end devices – is clearly regulated by legislation since the IEC 60364-5-53 standard determines a maximum line length (maximum protection radius) of 10m. If this maximum protection radius is exceeded, which is not uncommon in data centres, an additional type 3 surge protection must be installed directly upstream of the end devices.

### **PDU with modular type 3 surge protection**

*BlueNet* PDUs from BACHMANN GmbH offer customers the opportunity to install a modular type 3 surge protection (also available as a retrofit solution = inline adapter) in their buildings. These PDUs are even designed to be hot-swappable. For this purpose, SPDs from various manufacturers are used to guarantee selectivity to the upstream SPDs (type 1+2).



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