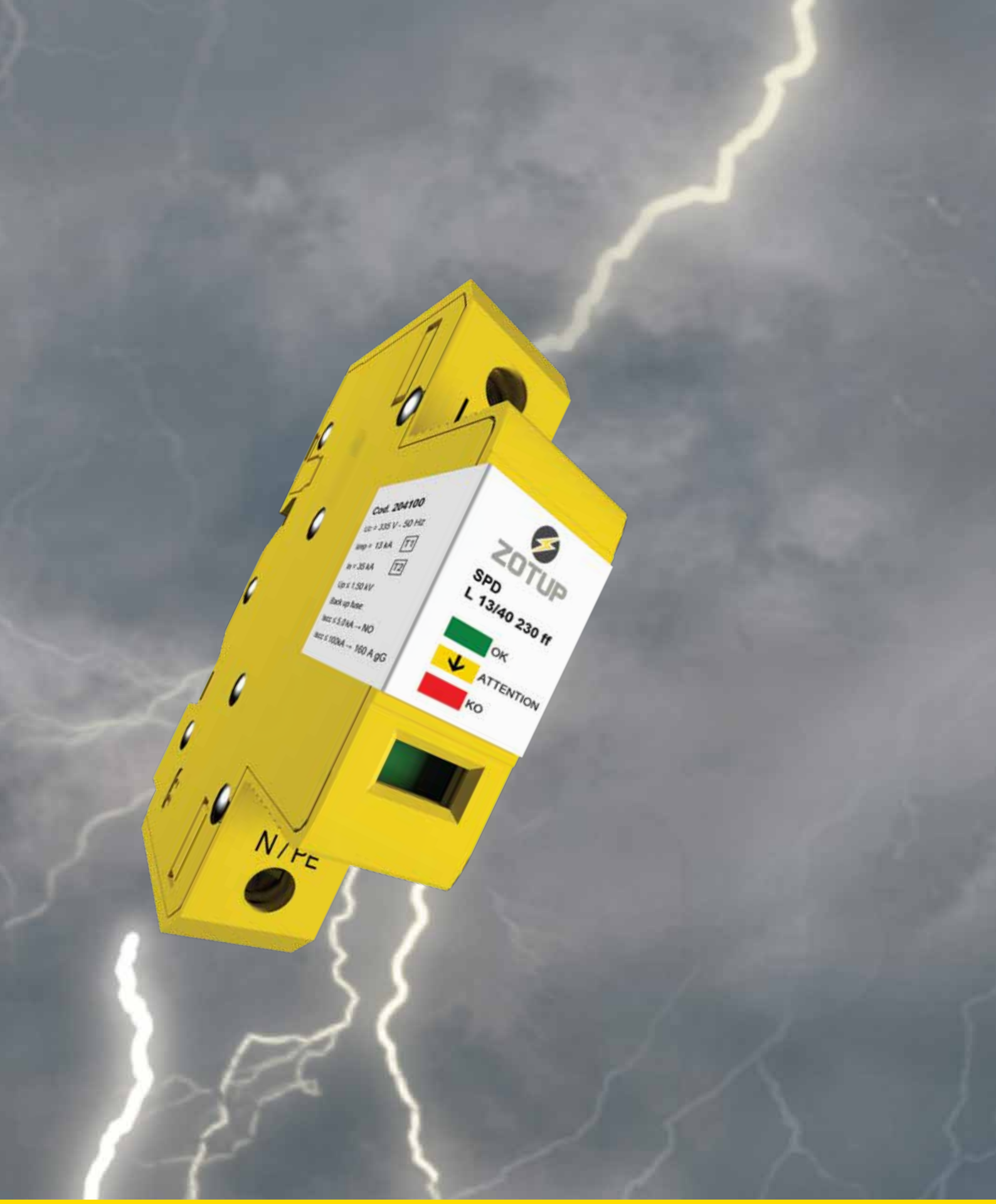
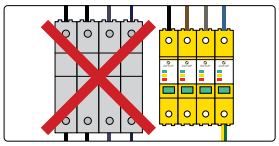


THE INNOVATIVE FEATURES OF OUR NEW PRODUCTS

MAIN FEATURES

ZOTUP brings to the market a new technology after 4,5 years of intensive research and development activities. These new products are supported by more than 330 laboratory tests and the technology behind is protected by four international patents. Herewith **ZOTUP** is standing for new state of the art surge protection for low voltage power systems. **ZOTUP** products represent an outstanding innovation on the market of surge protection with regard to performance, safety, easiness of installation and reliability. All these quality attributes are now available in a single product.

The unique technical features putting our products to the top are:



- **Integrated Fuse Function (ff)**

in case the SPD reaches its end of life in a short circuit state.
According to the product standard EN 61643-11 SPDs are classified according to their behavior when reaching end of life.
There are two types of failure modes:

- OCFM (Open Circuit Failure Mode);
- SCFM (Short Circuit Failure Mode).

An SPD with OCFM must disconnect from the power supply when reaching end of life. The disconnection operation can be performed by an internal or an external disconnector, or by a combination of these two.

The standard differentiates between two distinct processes:

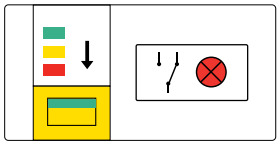
a) **a "slow" process** that depends on the degradation of voltage limiting components, e.g. in MOV-based SPDs, leading to thermal runaway. In such case the disconnection is generally ensured by an internal thermal operated disconnector.

b) **a "quick" or even "instant" process** that depends on the overcurrent caused by a very low remaining impedance of the SPD, which causes a short circuit on the supply. The interruption of such short-circuit current is managed by an internal or external disconnector with appropriate breaking capability, preferrably a fuse. The innovative feature from **ZOTUP** is a patented combined internal disconnector, which is able to disconnect in both of the above mentioned cases, the "slow" and the "quick" or "instant" process. This means that the disconnector used in **ZOTUP** products provides an Integrated Fuse Function (ff). Therefore, as long as certain short circuit current values are not exceeded, our products do not require any additional external disconnector.

Advantages:

- Maintaining the full discharge capability of the SPD. An external fuse or disconnector may influence/limit this capability;
- The overall voltage drop across the SPD branch circuit and therefore the effective voltage protection level for the installation and equipment is kept to a minimum, as there are no additional devices and the wiring can be kept very short;
- No additional costs for external disconnectors, less time for cabling and a smaller ecologic footprint.

If the short circuit current at the point of installation exceeds the breaking capability of that internal disconnector an additional external fuse is required. In such case the fuse is intrinsically selective with the internal disconnector, safeguarding the integrity of the SPD in case of a very low impedance or even short circuit state.

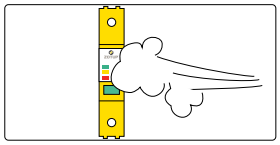


• Progressive performance indication

The new design of ZOTUP makes regular checks of the SPDs status and system verification very easy. Periodic verification is generally required by regulations on national level. The new **ZOTUP** SPD range displays its performance status by a change of color in the Status Indicator window. The transition from the initial green color (full performance) to the totally yellow (minimum performance) is **progressive/analog**. The colour in the window indicates the actual remaining performance of the SPD, thus providing comprehensive information rather than a simple good versus out of order message for attention.
After that a red indication follows, showing the SPD has reached its end of life.

Advantages:

- **Progressive indication** of the reduction in performance of the SPD allows preventive maintenance and optimization of replacement decisions;
- **Remote indication** for SPDs incorporating a changeover contact is activated when the performance reaches its minimum state (totally yellow). Therefore the remote alarm is preventive, because the SPD is still operational and still able to protect at minimum performance level.



• For applications with high pollution (PD 3) and for extended temperature range (-40°/+80°C)

The increasing application of SPDs under "heavy" environmental conditions (such as traffic light controls, cellular radio and mobile phone stations, outdoor public lighting and street lighting systems) has highlighted the need for more stringent requirements on resistivity to pollution.

Installation of SPDs in costal areas with a high rate of salinity and/or in locations with increased condensation effects due to rapid changes in temperature, e.g. in photovoltaic (PV) installations and power plants or in Wind Turbines, has shown that increased distances are necessary to sufficiently prevent from electric tracking on insulating materials on a long term view.

ZOTUP deals with the issue of pollution and uses firm materials and applies adequate design features to achieve Pollution Degree 3 for all internal and external creepage distances and clearances.
Keeping an emphasis on environmental aspects our products are designed and classified for the highest level of temperature range, which goes even beyond the so called extended range in the product standard.

Advantages:

- Improved reliability when installed in "heavy" environments;
- Enabling applications that cannot be covered with a lower pollution degree or normal temperature range.