Surge protection for light strips
For economic reasons, fluorescent tubes (with a diameter of 26 mm or 16 mm) and electronic ballasts are used for light strips in industrial, commercial and agricultural buildings.

In high halls, light strips with an extremely narrow-beam illumination are installed. In this case, the regular replacement of luminaires alone (about 16,000 lighting hours in case of 26 mm tubes, about 20,000 lighting hours in case of 16 mm tubes) entails high costs since aerial lift devices are required and the luminaires are usually replaced outside working hours.

But what if individual electronic ballasts are destroyed by surges or an entire light strip fails? In this case, immediate action is required since the necessary minimum illumination is frequently no longer ensured which may lead to a decrease in work performance and accidents.

The IEC 60364-4-44 (HD 60364-4-44) standard deals with the “protection against overvoltages of atmospheric origin or due to switching”. Section 443.3.2.2 describes that surge protective devices (type 2 or type 3 arresters) can be used for commercial buildings.

The often long supply lines of the light strips are highly susceptible to surges. Even a type 2 surge arrester or type 1 combined arrester in the power distribution board cannot prevent that the voltage peak is displaced into the lamps. Therefore, an additional surge arrester must be installed in close proximity to the light strip.

The risk of surges entering the light strips is considerably reduced if the frequently used class I light strips (PE connection) are installed. If light strips feature luminaires with double or reinforced insulation, the light strip cables are often routed in a metal rail and are thus largely protected due to shielded design of the metal rail.

In practice, light strips are operated with alternating current (230 V/50 Hz) and three-phase current (3x 230/400 V/50 Hz). For both types of supply, the maximum number of luminaires to be connected depends on the cross-section of the series connected cables. To be able to consider the inrush currents of the electronic ballasts for the fuses, the luminaire manufacturer specifies the maximum number of the relevant luminaires depending on the rated currents of the overcurrent protective devices. This means that only 13 T26/58 W twin-lamp electronic ballasts may be connected to e.g. a 16 A circuit breaker with characteristic B although the operating current is 13 x 0.58 A = 7.54 A. Since luminaires do not cause overload, the line must only be protected against short-circuits. The volt-

![Type 3 surge arrester installed in an office luminaire](image)

<table>
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<th>Type</th>
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### Table of Surge Arrester Specifications

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<td>953 400</td>
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<tr>
<td>1</td>
<td>DG M TNS 275</td>
<td>952 400</td>
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Figure 9.25.2 Type 2 / type 3 surge arrester in a flush-mounted enclosure installed on the mounting rail of a light strip

Figure 9.25.3 Type 2 / type 3 surge arrester in a flush-mounted enclosure installed on a cable tray
The voltage drop is also not determined depending on the rated current of the overcurrent protective device, but on the operating current of the luminaires.

In practice, type 3 surge arresters are used to protect small-sized light strips operated with alternating current with backup fuses up to 16 A (Figure 9.25.1). Thanks to their compact design, these surge arresters can be installed in the luminaire housing.

For light strips operated with three-phase current with backup fuses up to 25 A, it is advisable to use DIN rail mounted type 3 surge arresters in a flush-mounted enclosure with an adequate degree of protection which can be directly installed on the DIN rail (Figure 9.25.2). This type of installation is recommended for the supply lines of pendant luminaires (length of several metres).

The flush-mounted enclosure should be installed at the cable tray if the light strips described above are mounted next to a ceiling (Figure 9.25.3).

If powerful light strips are supplied with three-phase current (nominal current > 25 A) via long cable distances, larger cross-sections must frequently be installed due to the voltage drop and the loop impedance. In such cases, the cable cross-section close to the connection point of the light strip is reduced to the cross-section to be connected to the terminal (in the majority of cases 2.5 mm²) via a junction box. To this end, it is advisable to install type 2 surge arresters which are available for TN-S and TT systems. These surge arresters may only be used for backup fuses up to max. 125 A which is out of the question due to the short-circuit load on the light strip wiring.