

SOLUTION

for LED street lighting systems

Lightning and overvoltage protection



Why to Protect?

Protection of Investments

The current requirements on the quality of lighting and energy efficiency bring to light the necessity of using new technologies, in particular that of LED. The manufacturers of LED lamps declare that their service life lasts more than 50,000 hours (in contrast to sodium-vapour lamps, featuring a service life of approx. 25,000 hours, 10,000 hours for discharge lamps, or 1,000 hours for incandescent lamps). However, this feature is counterbalanced by higher investment costs, which can be compensated by not only the lower power consumption of the light source, but also by reduced maintenance costs, where one of the requirements is trouble-free operation. Thus, the use of surge protection devices to achieve higher reliability and a shorter return on investments is no longer an option, but a necessity.

Public lighting installations or lighting systems for large industrial premises are sometimes extensive, with cable lengths about hundreds of metres. This involves the risk of induced overvoltages caused by lightning strikes, operation failures, and switching effects in power distribution and transmission grids.

High-voltage power impulses in extensive installations may reach values that are much higher than the specified withstand voltage of the light source in question. The electronics in the light sources based on the new technology is substantially more sensitive to such disturbances than, for instance, discharge lamps.

When considering the possibilities of damages to the equipment (installations) caused by lightning, we consider the following causes of damages:

- S1 – Direct lightning strike to the equipment (installation)
- S2 – Lightning strike within the proximity of the equipment installed, failures and switching phenomena in MV and HV grids near the equipment installed
- S3 – Direct lightning strike to the connected distribution mains; S4 – lightning strike near the connected distribution mains, and switching phenomena and failures in power distribution networks and transmission grids

What to Use for Protection?

Surge Protection Devices (SPDs) Specially Designed for LED Lighting Technology

The types of protective devices (SPDs) are chosen according to the risk that is expected. The following examples illustrate how to resolve individual cases.

When dealing with the issue of protection from overvoltage, the requirements of the following standards should be taken into account:

EN (IEC) 62305-1 to 4, CLC/TS (IEC) 61643 12, HD-60364-4-443 (IEC 60364-4-44 chapter 443), HD-60364-5-534 (IEC 60364-5-53 chapter 534), EN 60598-1, and IEEE (ANSI) C62.41.2. All SPDs designed by SALTEK intended for the use in various protection solutions meet the requirements of the EN (IEC) 61643 11 standard, in the way required by the EN 60598-1 standard.



How to Protect?

Examples, Principles, and Recommendations for the Use of SPDs

SPD at the connection point of the street lighting system to the distribution mains to the distribution mains

As required by HD 60364-5-534 (IEC 60364-5-53 chapter 534) and IEEE C62.41.2 standards, a SPD has to be installed at the power input of the electrical installation or in the main switchboard. Thus, overvoltages coming from the distribution mains and other distribution systems can be limited, and the requirements on coping with overvoltages from direct lightning strikes into the distribution mains (S3) and from lightning strikes in the proximity of the distribution mains (S4) can be met.

The SPD installed at the power input of the installation is chosen depending on the character of the connected power mains. In the case of an overhead line, it is advisable to use the FLP B+C MAXI V SPD (Fig. 1a). In the case of a cable connection with cable laid in the ground in its entire length starting from the transformer, it is enough to use the FLP 12,5 V SPD (Fig. 1b).

In large industrial buildings with light circuits connected to sub-main distribution boards, the latter are equipped with the SPDs of SLP-275 V (i.e. the SPD type 2 – see Fig. 2). It is advisable to use the SPD a type 1, or type 1+2, such as the FLP-B+C MAXI V, at the power electric input into the building.

At locations with fluctuating voltages or where the voltage may exceed the usually specified tolerance ranges, or in places where the disconnection of a load causes the voltage to increase (e.g. during the night), it is advisable to use varistor-based SPDs with higher U_c (e.g. the SLP-385 V series), or combined SPDs (with switching and limiting elements connected in series - MOV+GDT technology), such as the FLP B+C MAXI V or SLP-275 VB types. In such cases, the service life of the SPD will be extended and the trouble-free operation at the place of installation will be ensured.

Protection from overvoltage at locations prone to direct lightning strikes to the lighting system and its structures

If the height of a lamppost exceeds that of the surrounding buildings (Fig. 3), i.e. the light fittings or the structures are situated in the LPZ 0_A zone, the risk of direct lightning strike to such structures becomes imminent (S1).

In regards to street lighting, protection levels LPL III or LPL IV are considered. At locations with high population density levels, where a lightning strike could cause panic or a fire, such as large

Fig. 1a SPD at the connection point of street lighting system to the distribution mains - overhead power line

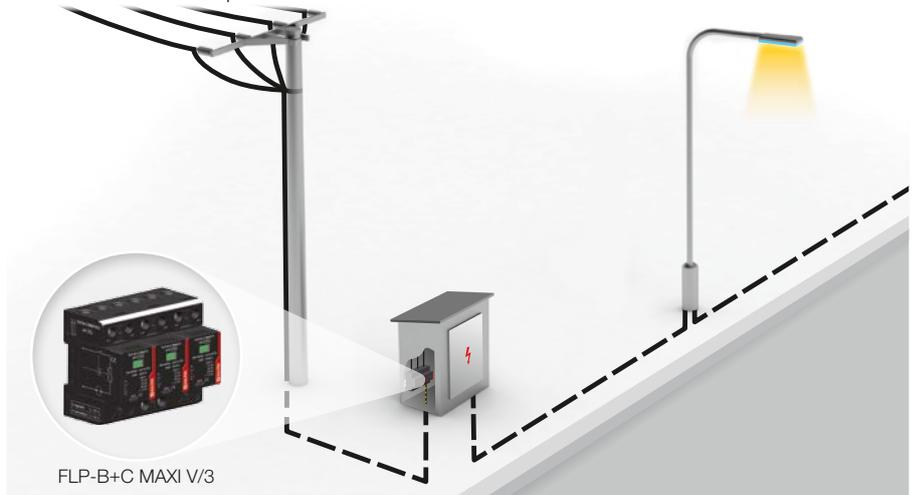
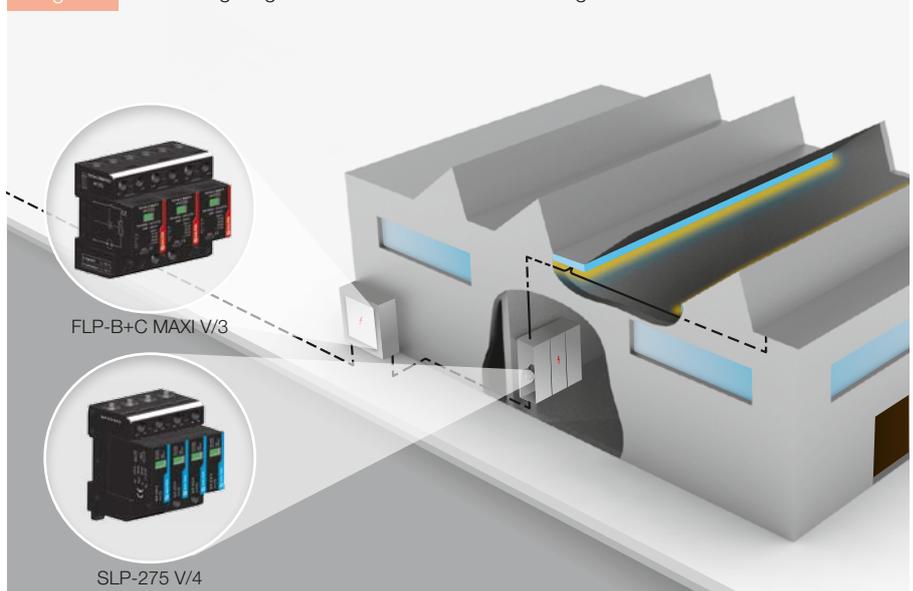


Fig. 1b SPD at the connection point of street lighting system to the distribution mains – cable connection



Fig. 2 SPD for lighting circuits installed in a vast building



sport stadiums, a higher level of protection from lightning strikes needs to be considered, e.g. by protecting the lighting system externally from lightning strikes (by a lightning conductor).

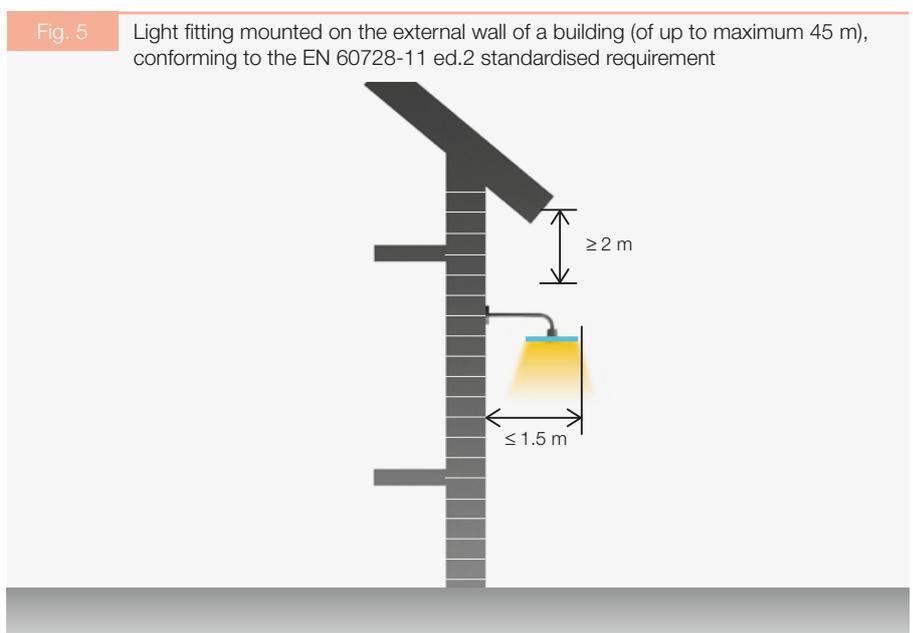
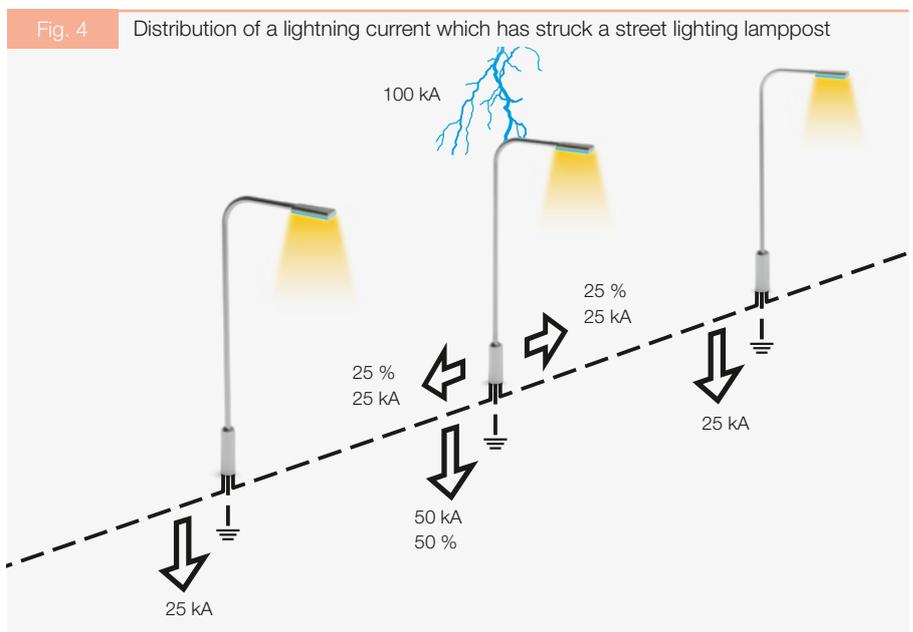
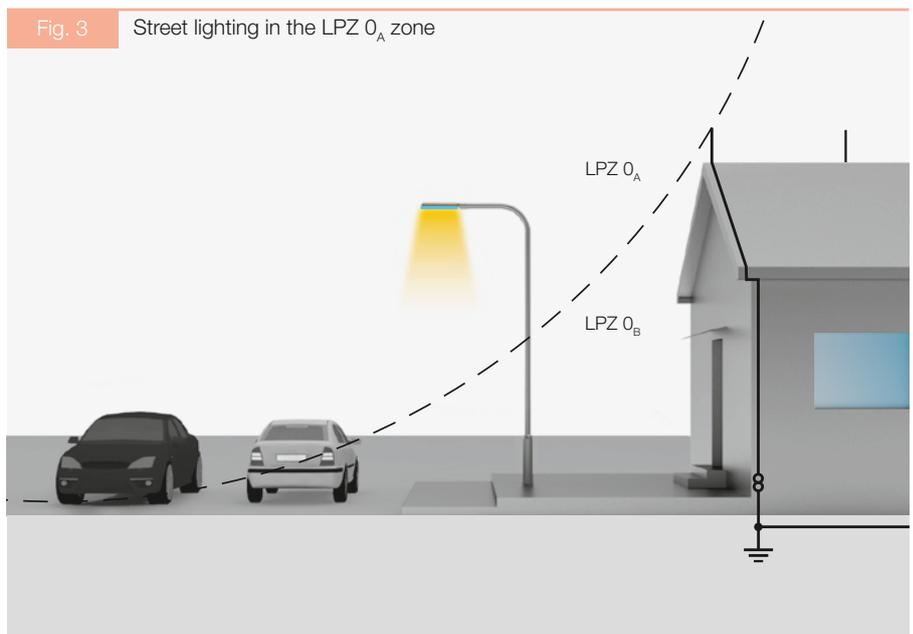
For LPL III and LPL IV levels, the peak current values of 100 kA are considered. These can be simulated by a surge test in the shape of a 10/350 μ s wave. In such particular cases, each lamppost should be grounded. The worst case scenario considers that only 50 % of the lightning current will be led into the ground via the grounding system, whereby the remaining 50 % would be distributed into the incoming and outgoing cables. Lightning strikes with high parameters may damage the equipment at the lightning strike point, but the lighting system will still be efficiently protected (LED drivers, electronic ballasts, by the LED itself...) in the surroundings (see Fig. 4).

In many situations, street lighting is powered from 3-phase grids, with single-post branches led to each of the light fittings. In such cases, it is enough to install the SPD into the foot of the post, but only to those conductors that supply the light fitting with power, i.e. mostly between the neutral conductors, in which case the FLP 12,5 V/1+1 is most suitable, with its total discharge capacity of 25 kA (10/350 μ s wave), fulfilling the requirements on the dissipation of lightning strike currents affecting the neighbouring lighting posts. If the cable length of such overvoltage protection to the light source is 10 m or more, then according to the stipulations of the CLC/TS 61643-12 standard, it is necessary to install another SPD to the light source, e.g. the DA-320-LED type. However, even at shorter distances, it is advisable to (IEC) install the SPDs as close as possible to the light source, in spite of the fact that another SPD is already connected in series at the foot of the light post.

Protection of a lighting system from induced overvoltages

Not only atmospheric overvoltages, but also lighting power cables routed in parallel with high-voltage power lines endanger the sensitive technologies used in modern LED lighting systems. If disturbances in proximity of lighting installations occur (lightning strike S2 or failures and switching phenomena in MV and HV grids running close to the lighting installations) are to be dealt with, in systems where an SPD is used at the installation entry as described in previous section (Fig. 1a, 1b, 2), then the DA-320-LED protective device is to be installed when installing light fittings on a building's exterior facade (Fig. 5) or indoors in the case of a distance of less than 10 m between the light fittings protected with the SPD and connected to one and the same phase conductor (Fig. 6), or in the case of street lighting posts lower than 10 m high with the SPD installed in the foot of the post (Fig. 7).

The SPDs SP-T2+T3-320/Y-CLT-LED are intended for use at locations with a higher



degree of risk, primarily on light fittings in the LPZ 0_B protection zone. An example of such an arrangement are light fittings mounted on a cross-wire suspension between two buildings with an upstream SPD only at the installation's input (in the terminal cabinet – see Fig. 8), or as a replacement for the DA-320-LED SPD, or in cases of parallel routing with MV or HV power lines, or installations at locations with the occurrence of intense storm activity (more than 25 storm days a year).

The SP-T2+T3-320/Y-CLT-LED SPD is installed also in cases when the post height exceeds 10 m, or when the distance between the light fittings mounted indoors, with an SPD connected to the same phase line, is more than 10 m. If the lighting cabling in large industrial halls is installed near the roof, then it is recommended to avoid parallel routing with the externally mounted lightning protection system (LPS). If such a parallel run cannot be prevented, it is of an advantage to provide each of the light fittings with the SP-T2+T3-320/Y-CLT-LED SPD.

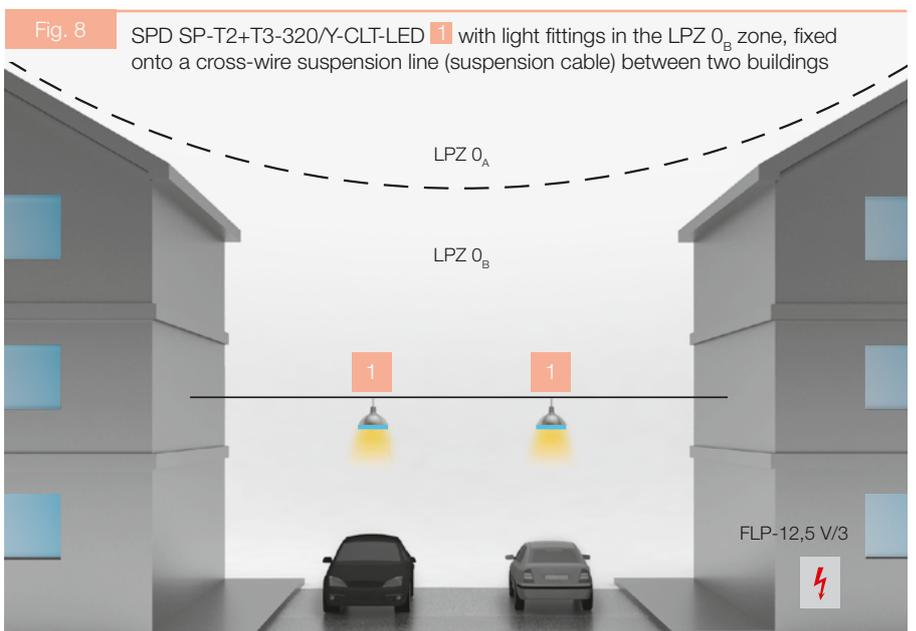
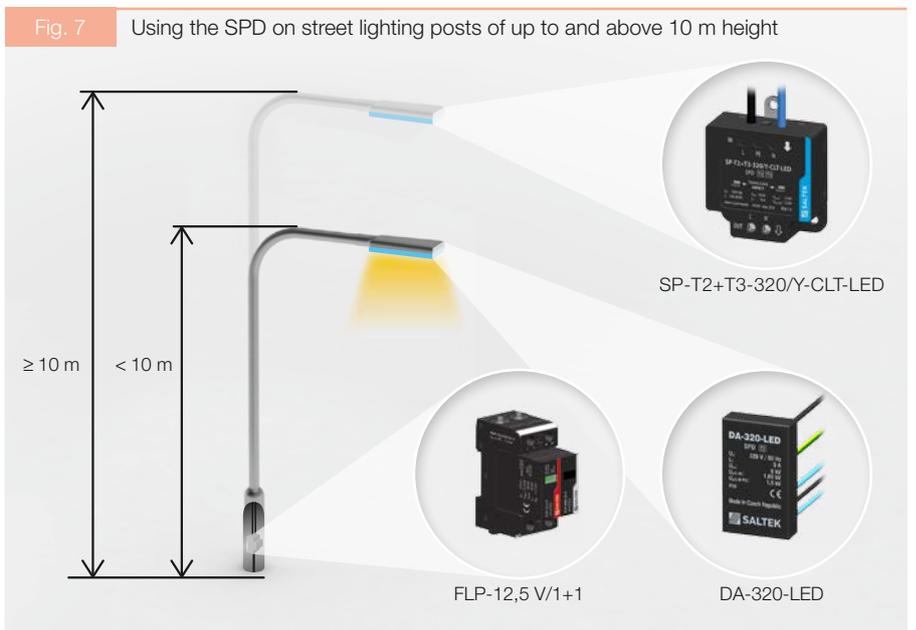
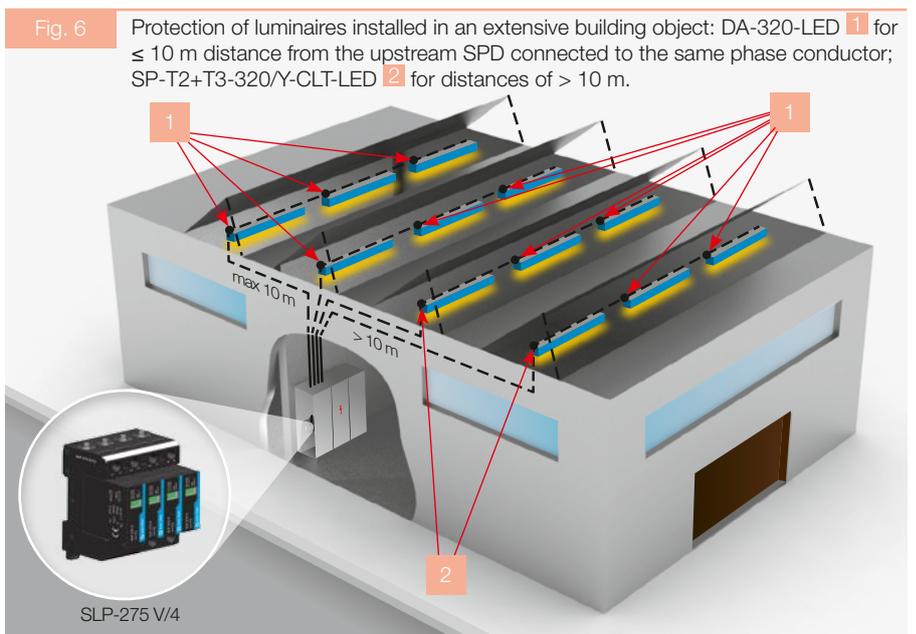
At locations without the risk of direct lightning strike to any part of a street lighting system, it is, in most cases, sufficient to mount the SPD at the input of the installation (e.g. the FLP-B+C MAXI V/3 SPD), and then the SP-T2+T3-320/Y-CLT-LED SPDs at each of the light fitting used. Effects of induced voltage affecting the installed lighting system can be reduced using earthing conductor (line). This conductor is grounded at both ends, i.e. on every lamppost (Fig. 9). An even better solution is to place the lighting cables into metallic tubes, with a galvanic connection between each section of the tube.

Principles of SPD installation

The same principles of SPD installation as for low voltage installations apply to the street lighting system. These are described in detail in other SALTEK documents, such as the “Manual – Practical Guide for LV power installations”.

Basic principles:

- Shortest possible connecting conductors to the SPD (or to the protected equipment in case of a parallel run)
- Avoidance of parallel run of connecting lines with those protected by the SPD
- A joint protective conductor for both the SPD and the protected equipment
- Maintaining adequate (flashover) distance “s” from the external lightning protection system (LPS)
- The SPD must to be installed at a distance of less than 10 m, ideally as close as possible to the protected equipment.
- Do not confuse the input (power supply) and output of SPDs connected in series with the protected equipment.



- Do not exceed the maximum continuous operating voltage (U_c) of the SPD
- Use grounding and equipotential bonding in the system installed (grounding e. g. the lampposts of the street lighting system)

Properties of SPDs intended for use in lighting systems

The SPD DA-320-LED and SP T2+T3 320/Y CLT LED SPDs meet the requirements of the IEEE (ANSI) C62.41.2 standard concerning the “C” location (outside of the building). These requirements, however, are determined by the standard mentioned, provided that overvoltage protection is being dealt with also at the starting point of the installation, i.e. at the point of connection to the distribution mains. At the same time, SPDs may be also used for the protection of other electrical equipment that behave similarly to lighting installations.

Concerning its size the DA-320-LED and SP-T2+T3-320/Y-CLT-LED, SPDs are suitable for mounting in light fittings, thus fulfilling the principle of installing the SPD as close as possible to the protected equipment. It is also suitable to mount the FLP-12,5 V or the SLP-275 V SPDs in sub-main distribution boards or at the foot of the lamppost, depending on the risk exposure and the mode of installation used.

The DA-320-LED and the SP-T2+T3-320/Y-CLT-LED SPDs are designed as in-line products with a primary focus on protection. In case the SPD becomes damaged, the light source disconnects itself from the power supply. In so doing, it is possible to easily determine where the failure occurred (Fig. 10a). These SPDs can also be connected in parallel to the protected circuit, and the SPD output is used for the indication of the status of the SPD (Fig. 10b). In addition, failures in SP-T2+T3-320/Y-CLT-LED SPDs are indicated by darkened display openings, to identify the failure in case of a disconnected power supply.

The internal connection of both the DA-320-LED and the SP-T2+T3-320/Y-CLT-LED SPDs is symmetrical, so that no problem arises if the neutral and phase conductors become interchanged, which is the case when it is impossible to follow the colour marking of conductors in light fittings. The internal arrangement can also be used in systems where the light fittings are connected in between the phase conductors (phase-to-phase voltage), provided that the U_c maximum operating voltage of such a SPD is not exceeded.

The SP-T2+T3-320/Y-CLT-LED SPD is arranged by default to be connected by wires with a lug for the connection of a PE protective conductor, with terminals at its output. Thus, it is not necessary to use another terminals or conductors when connecting the SPD to the light fitting. The only action one needs to take is

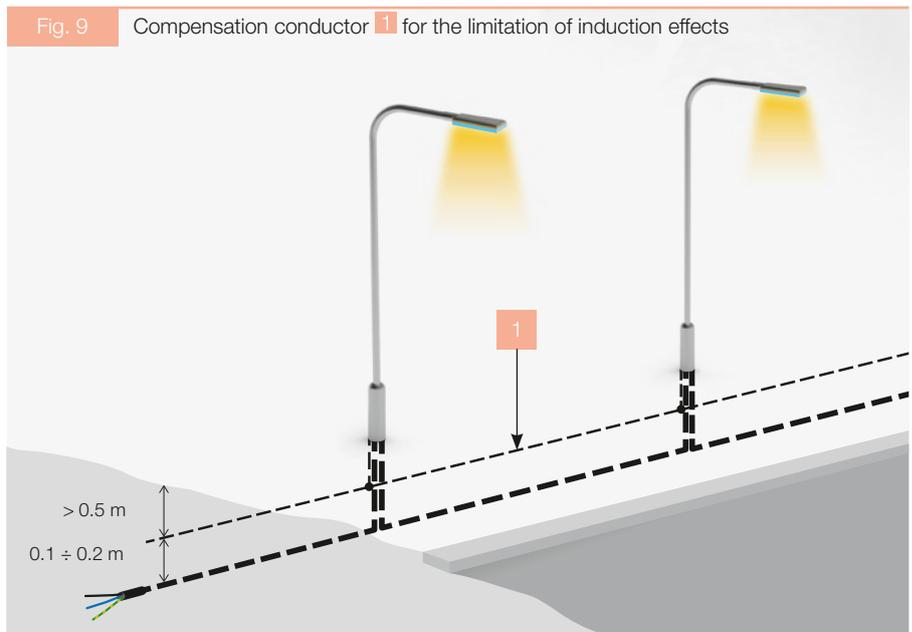


Fig. 10a Series (in-line) connection of SPD to the protected equipment

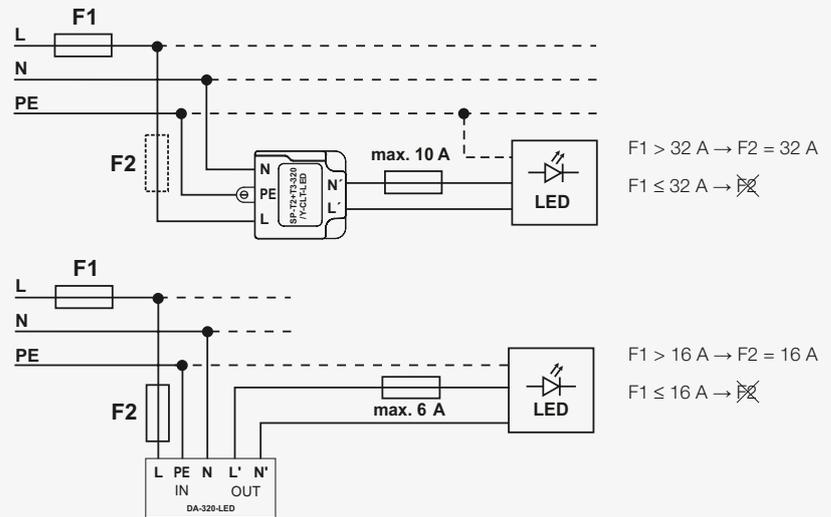
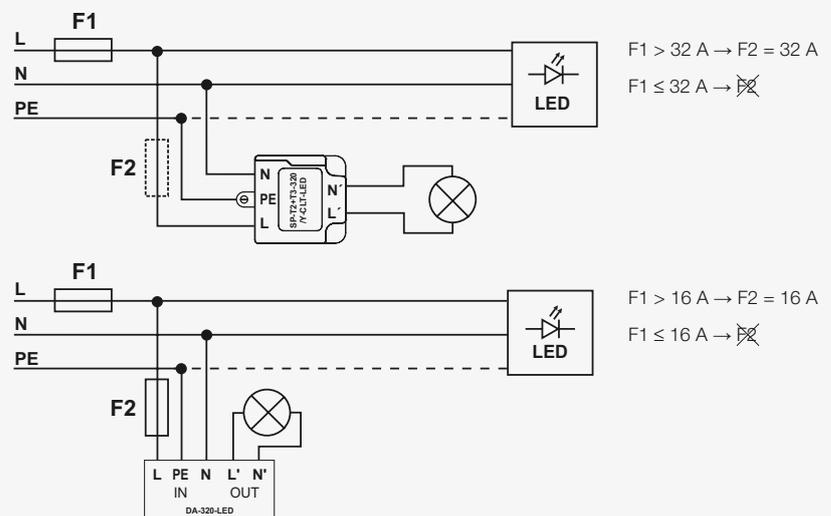


Fig. 10b SPD wired in parallel to the protected equipment



to disconnect the wires from the terminal block (Fig. 11), to connect the conductors from the incoming side of the SPD to the terminal block, and to insert the previously disconnected wires into the output terminals of the SPD (Fig. 12). The lug for the PE conductor may also be used to secure the SPD in the inside of the light fitting. The SPDs series SP-T2+T3-320/Y-CLT-LED provide for bespoke solutions of the input/output connection, with various combinations of terminals and conductors, including the PE conductor. An auxiliary adapter made from plastic material makes it possible to attach the SPD to a DIN 35 mm rail (TH 35), provided that the latter is not equipped with a lug to connect the PE conductor.

Using SPDs for light fittings designed as protection class I and II equipment

Light fittings designed as protection class I equipment have their SPD connected as shown in Fig. 13. If the light fitting is a part of the TN-C grounding system, the SPD may be inserted into the point where the PEN conductor is disassembled (the PEN conductor at the input is connected both to the N and PE terminals).

In light fittings designed as protection class II equipment, the SPD is installed at the interface between the installation and the protected electrical equipment, while connecting the SPD to the protective earth conductor (PE – Fig. 14).

Control of the Light Fittings

Modern street lighting lamps can be controlled and monitored remotely, not only switching them ON and OFF, but also their light intensity, light colour, etc. Communication is based on wireless technology (GSM, WiFi, ...) on communications carried via power-lines, or on using one's own signal lines (RS-485 bus, DALI, Ethernet, ...).

It is advisable to complete the wireless receiver with a surge protection device if the latter forms a part of the protected equipment or is situated near the protected equipment with a SPD on the power supply side.

In the case of communications carried via power supply cables, the signal (information) transfer is not affected or limited by the SPDs used.

In the case of a self-contained signal line, over-voltage protection is ensured by using the DM (or DL) series of SPDs, depending on the type of communication utilised. It is necessary to know the highest signal voltage when choosing the proper signal line protection, as well as the peak currents in the conductors, the necessary frequency band for signal transfer, and the interrelation between the line conductors and the protective earth (PE conductor).

Fig. 11 Light fitting before mounting the SPD

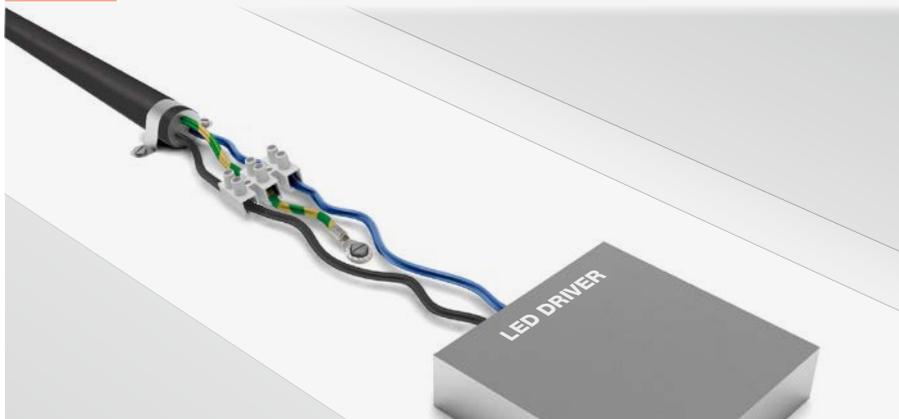


Fig. 12 Light fitting equipped with the SP-T2+T3-320/Y-CLT-LED SPD

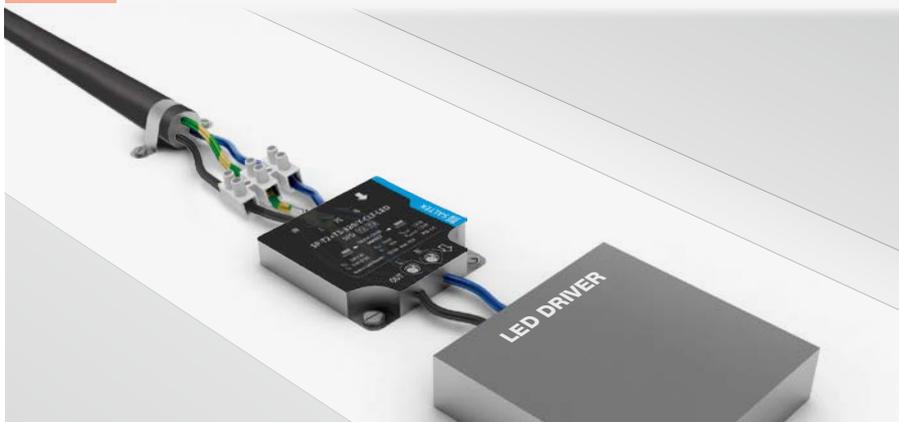


Fig. 13 Example of connecting the SPD to equipment of protection class I

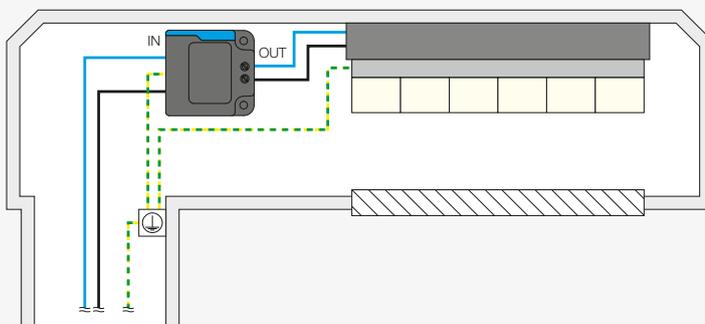
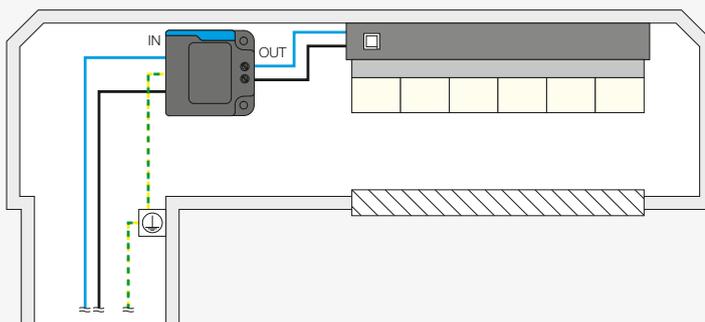


Fig. 14 Example of connecting the SPD to equipment of protection class II



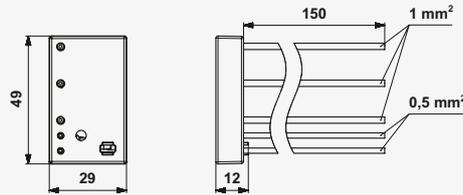
SPDs for the Protection of LED Lighting Systems

DA-320-LED

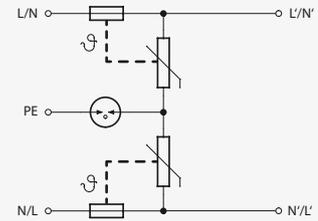
SPD type 3 – Overvoltage Protection Module



Dimensions



Basic circuit diagram

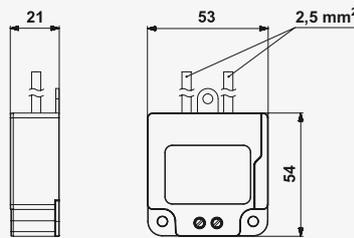


SP-T2+T3-320/Y-CLT-LED

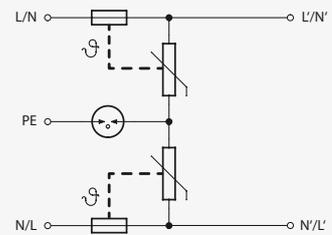
SPD types 2 and 3 - Surge Protection Module



Dimensions



Basic circuit diagram



Parameter / Type		DA-320-LED	SP-T2+T3-320/Y-CLT-LED
Nominal voltage	U_n	230 V AC	230 V AC
Maximum operating voltage	U_c	320 V AC	320 V AC
Nominal load current	I_L	5 A	10 A
Nominal discharge current (8/20 μ s) L-N	I_n	3 kA	5 kA
Nominal discharge current (8/20 μ s) N-PE	I_n	3 kA	5 kA
Maximum discharge current (8/20 μ s) L-N	I_n	5 kA	–
Maximum discharge current (8/20 μ s) N-PE	I_{Tmax}	–	10 kA
Test voltage L-N	I_{Tmax}	–	10 kA
Test voltage N-PE	U_{oc}	6 kV	10 kV
Test voltage L-PE	U_{oc}	6 kV	10 kV
Voltage protection level mode L-N	U_{oc}	10 kV	–
Voltage protection level mode N-PE	U_{oc}	6 kV	10 kV
Voltage protection level mode L-PE	U_p	1.65 kV	1.3 kV
Short-circuit current rating	U_p	1.5 kV	1.5 kV
Maximum overcurrent protection	U_p	1.5 kV	1.5 kV
Response time L-N	I_{SCCR}	1.5 kA	3 kA
Response time N-PE		16 A gL/gG or B 16 A	32 A gL/gG or C 32 A
Doba odezvy L-N	t_a	25 ns	25 ns
Doba odezvy N-PE	t_a	100 ns	100 ns
Cross-section of connected conductors solid (max)		–	2.5 mm ²
Cross-section of connected conductors stranded (max)		–	1.5 mm ²
Fault indication		loss of voltage	loss of voltage, dark grey indication field
Degree of protection		IP 20	IP 20
Range of operating temperatures (min/max)		-40 °C / 80 °C	-40 °C / 80 °C
Mounting		installation box	–
According to standard		EN 61643-11 ed.2 / T3	EN 61643-11 ed.2 / T2,T3
Ordering number		8595090558767	8595090560449

Recommended SPDs for LED Lighting Installations

The FLP-B+C MAXI V(S)/... series

Combination of a lightning arrester and a surge protective device (SPD types 1 and 2)

A combination of a varistor and a spark-gap connected in series. A high-performance SPD for installation into LV power distribution systems, intended to be mounted at the interface between LPZ 0 and LPZ 1 and higher zones to ensure protection from overvoltage effects during direct and indirect lightning strikes. These SPDs are widely used in family houses, in office and industrial buildings, or for mounting in sub-main distribution boards installed in large-scale buildings. **No leakage current. No follow-up current.**



- Pluggable module
- Visual status indication
- Possibility of decommissioning the module
- Remote state indication (S) as an option
- $U_p \leq 1.5$ kV

Parameter / Type	Wiring	Suitable for use in networks	U_c	I_{imp} (10/350 μ s)	I_n (8/20 μ s)	I_{max} (8/20 μ s)	Remote indication	Order number
FLP-B+C MAXI V/1	1+0	TN	275 V AC	25 kA	30 kA	60 kA	No	8595090550914
FLP-B+C MAXI VS/1	1+0	TN	275 V AC	25 kA	30 kA	60 kA	Yes	8595090535331
FLP-B+C MAXI V/1+1	1+1	TT	275 V AC	25 kA	30 kA	60 kA	No	8595090550952
FLP-B+C MAXI VS/1+1	1+1	TT	275 V AC	25 kA	30 kA	60 kA	Yes	8595090537830
FLP-B+C MAXI V/2	2+0	TN-S	275 V AC	25 kA	30 kA	60 kA	No	8595090550921
FLP-B+C MAXI VS/2	2+0	TN-S	275 V AC	25 kA	30 kA	60 kA	Yes	8595090537847
FLP-B+C MAXI V/3	3+0	TN-C	275 V AC	25 kA	30 kA	60 kA	No	8595090550938
FLP-B+C MAXI VS/3	3+0	TN-C	275 V AC	25 kA	30 kA	60 kA	Yes	8595090535706
FLP-B+C MAXI V/3+1	3+1	TT	275 V AC	25 kA	30 kA	60 kA	No	8595090550969
FLP-B+C MAXI VS/3+1	3+1	TT	275 V AC	25 kA	30 kA	60 kA	Yes	8595090535720
FLP-B+C MAXI V/4	4+0	TN-S	275 V AC	25 kA	30 kA	60 kA	No	8595090550945
FLP-B+C MAXI VS/4	4+0	TN-S	275 V AC	25 kA	30 kA	60 kA	Yes	8595090535713

The FLP-12,5 V/... series

Lightning arrester and surge protector (SPD types 1 and 2), varistor-based

For installation into LV power distributions at the interface between the LPZ 0 and LPZ 1 and higher zones. Protection against the effects of partial lightning strike currents, induced overvoltages arising from a lightning strike, and switching overvoltages. Suitable in particular for structures of risk class III and IV, for mounting into sub-main distribution boards in large-scale buildings, or for the protection of air conditioning units or heating cables.



- Pluggable module
- Visual status indication
- Possibility of decommissioning the module
- Remote state indication (S) as an option
- $U_p \leq 1.5$ kV

Parameter / Type	Wiring	Suitable for use in networks	U_c	I_{imp} (10/350 μ s)	I_n (8/20 μ s)	I_{max} (8/20 μ s)	Remote indication	Order number
FLP-12,5 V/1	1+0	TN	275 V AC	12.5 kA	30 kA	60 kA	No	8595090534211
FLP-12,5 V/1 S	1+0	TN	275 V AC	12.5 kA	30 kA	60 kA	Yes	8595090534228
FLP-12,5 V/1+1	1+1	TT	275 V AC	12.5 kA	30 kA	60 kA	No	8595090534235
FLP-12,5 V/1S+1	1+1	TT	275 V AC	12.5 kA	30 kA	60 kA	Yes	8595090534242
FLP-12,5 V/2	2+0	TN-S	275 V AC	12.5 kA	30 kA	60 kA	No	8595090538097
FLP-12,5 V/2 S	2+0	TN-S	275 V AC	12.5 kA	30 kA	60 kA	Yes	8595090551829
FLP-12,5 V/3	3+0	TN-C	275 V AC	12.5 kA	30 kA	60 kA	No	8595090534259
FLP-12,5 V/3 S	3+0	TN-C	275 V AC	12.5 kA	30 kA	60 kA	Yes	8595090534266
FLP-12,5 V/3+1	3+1	TT	275 V AC	12.5 kA	30 kA	60 kA	No	8595090534273
FLP-12,5 V/3S+1	3+1	TT	275 V AC	12.5 kA	30 kA	60 kA	Yes	8595090534280
FLP-12,5 V/4	4+0	TN-S	275 V AC	12.5 kA	30 kA	60 kA	No	8595090534297
FLP-12,5 V/4 S	4+0	TN-S	275 V AC	12.5 kA	30 kA	60 kA	Yes	8595090534303

Recommended SPDs for LED Lighting Installations

The SLP-... V/... (S) series

Surge protective devices (SPD, type 2), varistor-based

Intended for installation into LV power distribution mains, in particular into sub-main distribution boards, to provide protection of distribution systems and equipment from the effects of induced overvoltages in case of a lightning strike or switching overvoltages.



- Pluggable module
- Visual status indication
- Possibility of decommissioning the module
- Remote state indication (S) as an option

Product type	Wiring	Suitable for use in networks	U_c	I_n (8/20 μ s)	I_{max} (8/20 μ s)	Remote indication	Order number
SLP-275 V/1	1+0	TN	275 V AC	20 kA	40 kA	No	8595090516170
SLP-275 V/1 S	1+0	TN	275 V AC	20 kA	40 kA	Yes	8595090516187
SLP-275 V/1+1	1+1	TN-S, TT	275 V AC	20 kA	40 kA	No	8595090519485
SLP-275 V/1S+1	1+1	TN-S, TT	275 V AC	20 kA	40 kA	Yes	8595090524915
SLP-275 V/2	2+0	TN-S	275 V AC	20 kA	40 kA	No	8595090516194
SLP-275 V/2 S	2+0	TN-S	275 V AC	20 kA	40 kA	Yes	8595090551836
SLP-275 V/3	3+0	TN-C	275 V AC	20 kA	40 kA	No	8595090517603
SLP-275 V/3 S	3+0	TN-C	275 V AC	20 kA	40 kA	Yes	8595090517610
SLP-275 V/3+1	3+1	TT	275 V AC	20 kA	40 kA	No	8595090519461
SLP-275 V/3S+1	3+1	TT	275 V AC	20 kA	40 kA	Yes	8595090520023
SLP-275 V/4	4+0	TN-S	275 V AC	20 kA	40 kA	No	8595090517221
SLP-275 V/4 S	4+0	TN-S	275 V AC	20 kA	40 kA	Yes	8595090517634
SLP-385 V/1	1+0	TN	385 V AC	20 kA	40 kA	No	8595090519553
SLP-385 V/1 S	1+0	TN	385 V AC	20 kA	40 kA	Yes	8595090527718

The SLP-... VB/... (S) series

Combined surge protection devices (SPD type 2)

A combination of a varistor and a spark-gap connected in series, used to protect power distribution mains and equipment from the effects of overvoltages induced during a lightning strike at locations with frequent storms, to protect equipment from switching overvoltages, and to protect measuring circuits as the first level of protection. Suitable for installations powered from diesel generator sets and from mains with fluctuating voltage. Suitable also for installation into measurement and governing circuits, for mounting at the interface between the LPZ 0 and LPZ 1 zones.

No leakage current and no follow-up current.



- Pluggable module
- Visual status indication
- Possibility of decommissioning the module
- Remote state indication (S) as an option
- $U_p \leq 1.35$ kV

Product type	Wiring	Suitable for use in networks	U_c	I_n (8/20 μ s)	I_{max} (8/20 μ s)	Remote indication	Order number
SLP-275 VB/1	1+0	TN	275 V AC	20 kA	25 kA	No	8595090519447
SLP-275 VB/1 S	1+0	TN	275 V AC	20 kA	25 kA	Yes	8595090519454
SLP-275 VB/3+1	3+1	TN-S, TT	275 V AC	20 kA	25 kA	No	8595090533108
SLP-275 VB/3S+1	3+1	TN-S, TT	275 V AC	20 kA	25 kA	Yes	8595090533115

Recommended SPDs for LED Lighting Installations data transfer/signal/communication lines

The DM-...-V/...-R... series

Combined coarse and fine protection from pulse overvoltages, intended for use in two-core communication, data transfer, and other transmission lines that share a common earth. Suitable for telecommunication lines and communication interfaces towards measurement and governing systems, security alarm systems and fire alarm systems, etc., with data transfer mainly via the RS 485, RS 422, and RS 232 lines.



- To be installed in direct proximity to the protected equipment
- In the "F" version, the line is separated from the protective earth by a (floating) surge arrester

The DM series with screw-less terminals

SSurge protection devices for single-core and two-core lines, providing protection from impulse overvoltages to telecommunication, measuring, and signal transmission lines of measurement and governing systems, security alarm systems, and fire alarm systems. The DM SPDs are installed in direct proximity to the protected equipment.



- Saves a significant amount of space when protecting a multitude of lines
- Screw-less spring-type terminals for easy connection
- Side cover as an integral part of each packaged terminal

The DL-...-RJ45-PoE-AB series for Ethernet Cat. 6(A) PoE

Combined protection from impulse overvoltages of a single Ethernet Cat. 6 or 6A line, with a PoE (Power over the Ethernet) option operated in A and B modes. For installation at the interface to LPZ 0 and LPZ 1 and higher zones.



- RJ45 connectors
- To be mounted into a switchboard panel or a DIN rail using the assembly adapter, which forms an integral part of the delivery

More detailed information on recommended SPDs can be found in the on-line catalogue at: www.saltek.eu

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