



Surge protection for emergency alarm systems

The function of emergency alarm systems (fire or burglar alarm systems) is to actively produce an alarm in the event of danger and remain passive when there is no danger. Malfunction of these systems (no alarm is produced if there is danger or alarm is produced if there is no danger) is undesired and expensive and is responsible for several hundred millions of euros in losses annually. Moreover, false alarms have the following consequences:

- ➔ If false alarms frequently occur, the operator can no longer rely on the system and questions the significance of such a system and the associated investment.
- ➔ Security personnel start ignoring the alarm messages.
- ➔ Neighbours are disturbed by acoustic alarms.
- ➔ Emergency staff (e.g. fire brigade) is unnecessarily called out.
- ➔ Triggering of fire extinguishing systems cause interruption of operations.

All these factors cause unnecessary costs and can be prevented if possible causes of false alarms are recognised at an early design stage and are eliminated by taking suitable preventive measures. For this purpose, the German Insurance Association (GDV) published the VdS 2833 guideline, which describes lightning and surge protection for emergency alarm systems.

Coordinated lightning and surge protection prevents false alarms or the destruction by atmospheric discharges or switching overvoltages and increases the availability of the systems. When installing emergency alarm systems which are not required by the building law, the VdS guideline should be used for designing and installing these emergency alarm systems and for defining individual measures between the installer and operator.

Many of today's emergency alarm systems have an increased surge immunity according to IEC 61000-4-5 (EN 61000-4-5) on the primary lines, secondary lines and mains voltage cables. Nevertheless, only external and internal lightning protection

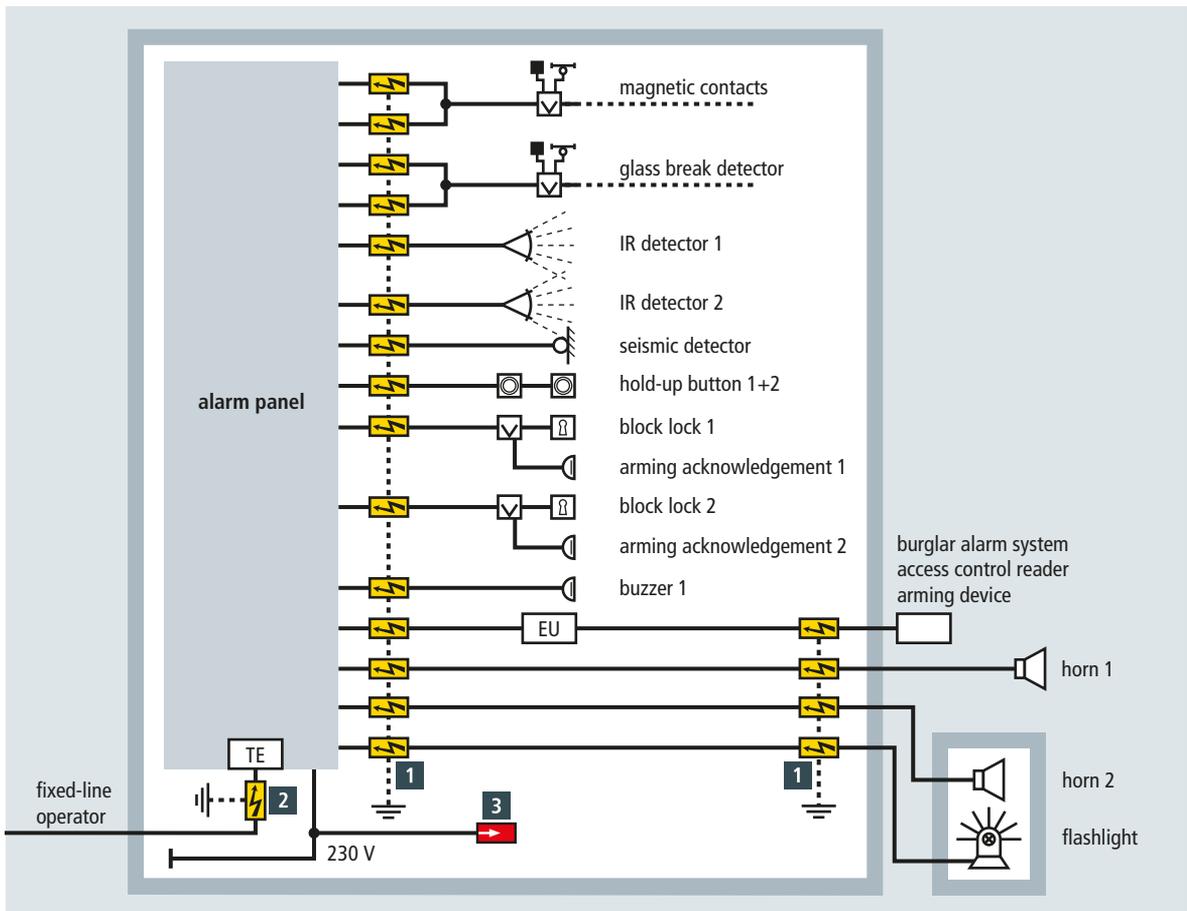


Figure 9.9.1 Lightning and surge protection for a burglar alarm system with pulse polling technology

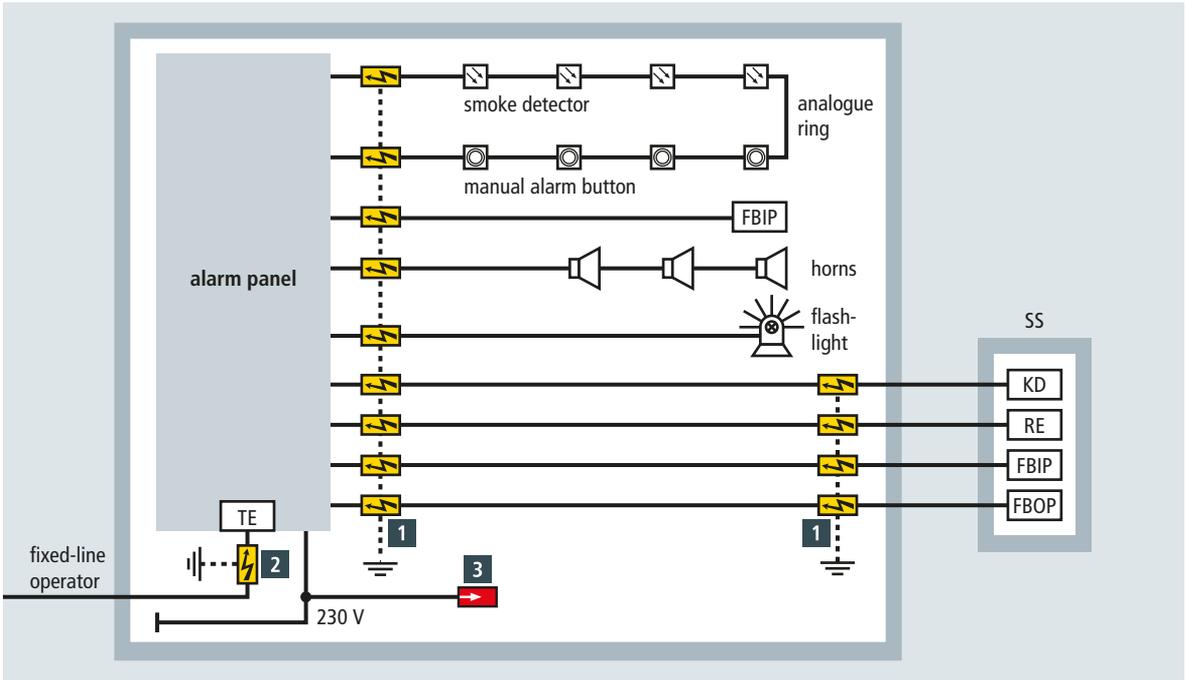


Figure 9.9.2 Lightning and surge protection for a fire alarm system with analogue ring technology

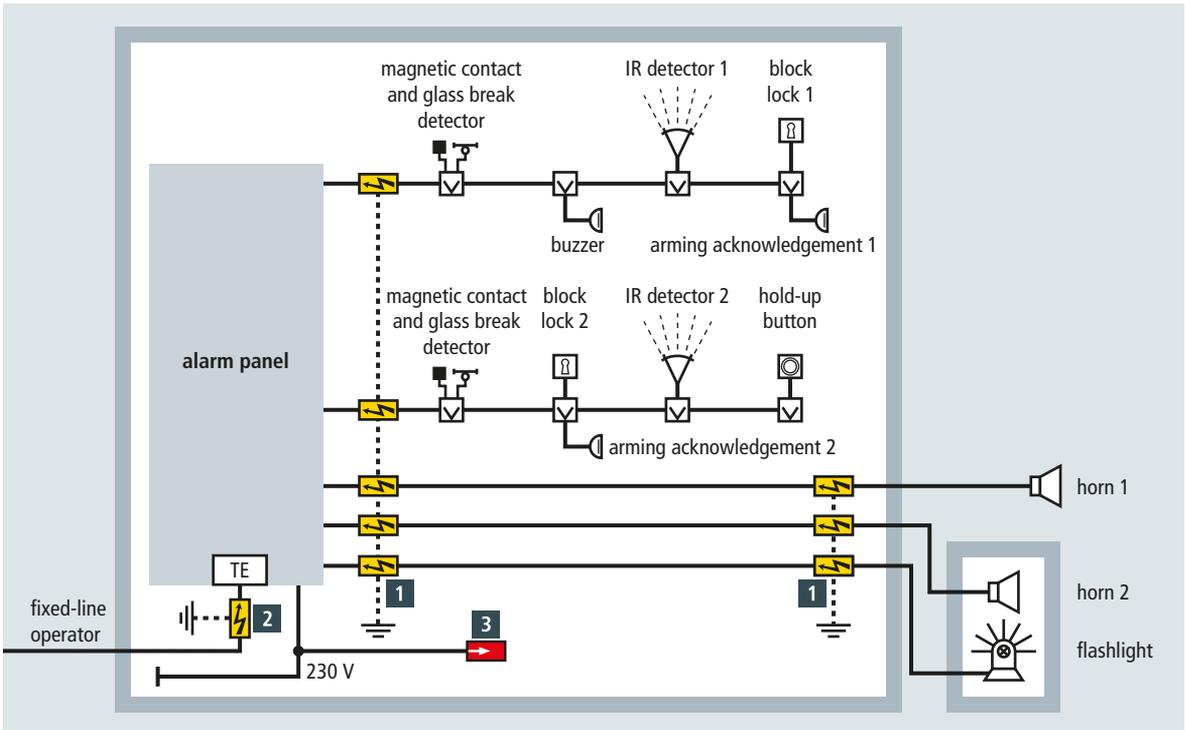


Figure 9.9.3 Lightning and surge protection for a burglar alarm system with d.c. circuit technology

No.	Protection for...	Surge protective device	Part No.
Combined arresters for information technology systems at the boundaries from LPZ 0_A (0_B) ↔ LPZ 1 or area 0/A (0/B) ↔ area 1			
1	Alarm line groups, external alarms (24 V) (in this case max. 0.75 A)	BXT ML2 BE S 24 (2 cores + earth drain wire) BXT ML4 BE 24 (4 cores) + BXT BAS + SAK BXT LR (for earth drain wire)	920 224 920 324 920 300 920 395
2	Exchange line U _{K0} of the fixed-line operator	BXT ML2 BD 180 + BXT BAS	920 247 920 300
Surge arresters for power supply systems at the boundaries from LPZ 0_B ↔ LPZ 1 or area 0/B ↔ area 1			
3	a.c.TN-S system a.c. TT system	DG M TN 275 DG M TT 2P 275	952 200 952 110

Table 9.9.1 Combined arresters and surge arresters in Figures 9.9.1 to 9.9.3

measures provide comprehensive protection against damage resulting from lightning strikes and surges (**Figures 9.9.1 to 9.9.3**).

Monitoring principles

Different monitoring principles are used for emergency alarm systems:

➔ Pulse polling technology

Information from the detector which has triggered the alarm is digitally transmitted. This allows to identify the detector and its exact location (**Figure 9.9.1**).

➔ Analogue ring

The addressable detectors define each detector in a ring. Line interruptions or short-circuits do not compromise the function (**Figure 9.9.2**).

➔ d.c. circuit technology

According to the closed-circuit principle, every alarm line is permanently monitored. If a detector in a line is triggered, the line is interrupted and an alarm is produced in the alarm panel. However, only the alarm line, but not the individual detector can be identified (**Figure 9.9.3**).

Irrespective of the monitoring principle used, all cables extending between the different areas of the emergency alarm system must be integrated in the lightning and surge protection concept of the overall system.

Recommended protection

BLITZDUCTOR XT of type BXT ML2 BE ... must be installed to protect two-wire alarm lines (approval from the manufacturer required, please contact DEHN + SÖHNE GmbH + Co.KG.) and

allows to connect the earth drain wire by means of an EMC spring terminal. For cables with more than two wires, a four-wire version of type BXT ML4 BE ... is available. Surge protective devices are selected according to the voltage of the alarm lines, which is typically between 12 and 48 V (**Table 9.9.1**). The low internal resistance of BLITZDUCTOR arresters is also a clear advantage since the maximum resistances of the alarm lines must not be exceeded.

For the outputs of the alarm panels (acoustic and visual alarm) it must be ensured that the nominal current of the surge protective devices is not exceeded.

A telephone dialler is typically used if the alarm panel is connected to the exchange line of a fixed-line operator e.g. Deutsche Telekom. BLITZDUCTOR XT of type BXT ML2 BD 180 is ideally suited for this purpose. The power supply system can be protected by means of DEHNguard modular surge protective devices (**Table 9.9.1**).

Emergency alarm systems, which must be approved by the German Insurance Association (VdS approval), must comply with VDS 2095 (fire alarm systems), VDS 2311 (burglar alarm systems) and VDS 2833 (surge protective devices for emergency alarm systems).

The Executive Board or Executive Director of a company is responsible for the health and safety of all employees. In the legal sense, a system operator is an ordinary person who is not able to assess whether risks may arise from a technical solution. Therefore, electricians, who provide technical solutions, must make sure in every single case whether their solutions meet the actual requirements.