



DEHN + SÖHNE



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# DEHN stops Surges.

## More Information

I would like to have more information about the following topics:

- Main Catalogue "Surge Protection"
- Main Catalogue "Lightning Protection"
- DS 649 E: Red/Line "Easy Choice - Surge Protection"
- DS 150: Yellow/Line "Surge Protection Easy Choice"
- Lightning Protection Guide

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Surge Protection  
Safety Equipment

DEHN + SÖHNE  
GmbH + Co.KG.  
Hans-Dehn-Str. 1  
Postfach 1640  
92306 Neumarkt  
Germany

Tel. +49 9181 906-0  
Fax +49 9181 906-100  
www.dehn.de  
export@dehn.de

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### Safety for your property.

DS614/E/09.09

# Surges – An often underestimated Risk.

Thunderstorms are fascinating and frightening at the same time. They are nice spectacles, but they are spreading insecurity. Thunderstorms often do not only indicate a change of weather. For industrial companies, service companies and for trade, thunderstorms present considerable risks.

Protection against potential consequences of a thunderstorm is a must in our highly sophisticated world!

## What if operation stands still?

Without protection, a company can quickly roll out of play. The effects of a thunderstorm can paralyse EDP systems. Consequently, customers of an affected company cannot be served for a longer period of time. For the hotly contested automotive supplying industry, for example, this would be disastrous. Just-in-time deliveries for the automotive industry are nearly impossible in case of such a breakdown. This can even lead to a dramatic fall of the share price of the affected company.

Therefore, the most important consequence is:  
**Prevent damage caused by surges.**

## What are surges and how do they come into existence?

Surges are short-time voltage impulses – so-called transients – coming up only for some split seconds.

Every company has more than enough sensitive targets for these destructive transients: power supply, EDP system, control system of production facilities via field bus, telephone system, regulation of the air-conditioning system, lighting control,...

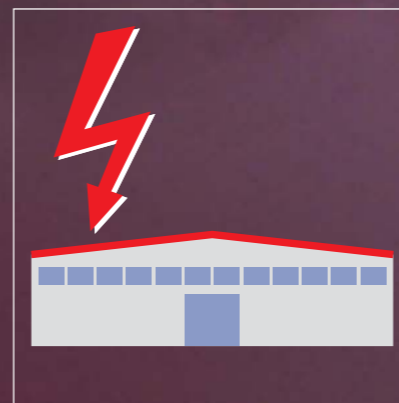


## Safety can be achieved

These sensitive systems can only be protected by a comprehensive protection concept. Cascading the protection is important here.

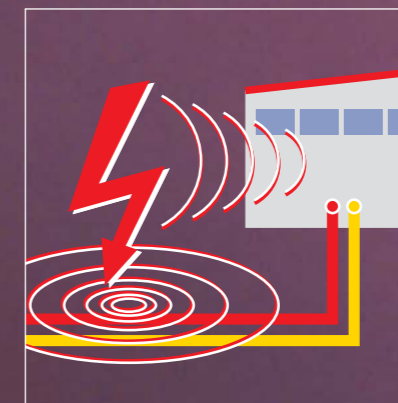
For this purpose, lightning current and surge arresters are used. Lightning current arresters conduct high energies without damage. Surge arresters protect terminal equipment. Lightning current arresters have to be installed as close as possible to the service entrance of the electrical system and surge arresters as close as possible to the equipment to be protected.

With their **RedLine** and **YellowLine** product families, **DEHN + SÖHNE** provides coordinated surge protective devices (SPDs). This modular system allows for cost-effective realisation of lightning and surge protective concepts for all industrial branches, service companies and sizes of installations.



### Direct lightning strike

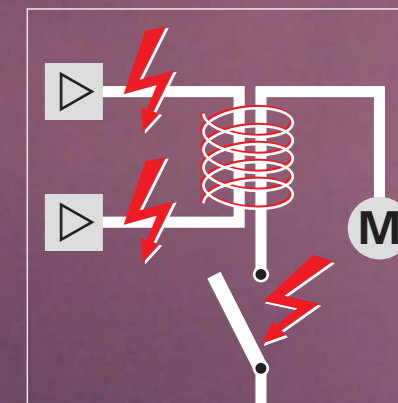
into a building causes high voltages of several 100,000 V at all earthed systems due to its lightning current.



### Lightning strokes close to the building

cause a vagabonding of transients through the supply lines. With the electromagnetic field of lightning (LEMP\*), additional voltages of several 1,000 V are induced into the electric lines.

\*LEMP (Lightning Electromagnetic Pulse)



### Switching operations

cause switching overvoltages (SEMP\*) of several 1,000 V in electrical systems. Parallel installation of power and data lines disturbs or even destroys sensitive systems.

\*SEMP (Switching Electromagnetic Pulse)





# Protecting Personal Values

## Surge Protection for Residential Buildings.

In modern residential buildings more and more electronic equipment is used. Today, households have TV, stereo and satellite receivers as well as PCs with access to the Internet.

Also microwaves, refrigerators and dish washers/washing machines are equipped with microprocessors. For security, alarm and video surveillance systems have been installed.

Values of several 10,000 EUR have to be protected, as surges are fatal for all devices and systems.

### First step: Protection of installations

All incoming and outgoing lines are inspected first. Generally, this includes lines for power supply, telephone, cable TV, external lighting, etc. .

In residential buildings supply meters and subdistribution boards are often installed in one enclosure. **DEHNventil® 1** can protect both the installation and the terminal equipment on the power supply

side, even in case of direct lightning strokes. The telephone connection, e.g. via ISDN, can be protected by **BLITZDUCTOR® XT 2**. This protection is sufficient for safe operation of the NTBA as well as the adjacent ISDN system. For DSL connections, the same SPD can be used. Mostly, the heating system is installed in the basement. Its regulation can be protected by **DEHNrail modular 3** and **BLITZDUCTOR® XT 4**.

For further distribution boards, SPDs Type **DEHNgard® modular 6** should be installed.

### Second step: Protection of terminal equipment.

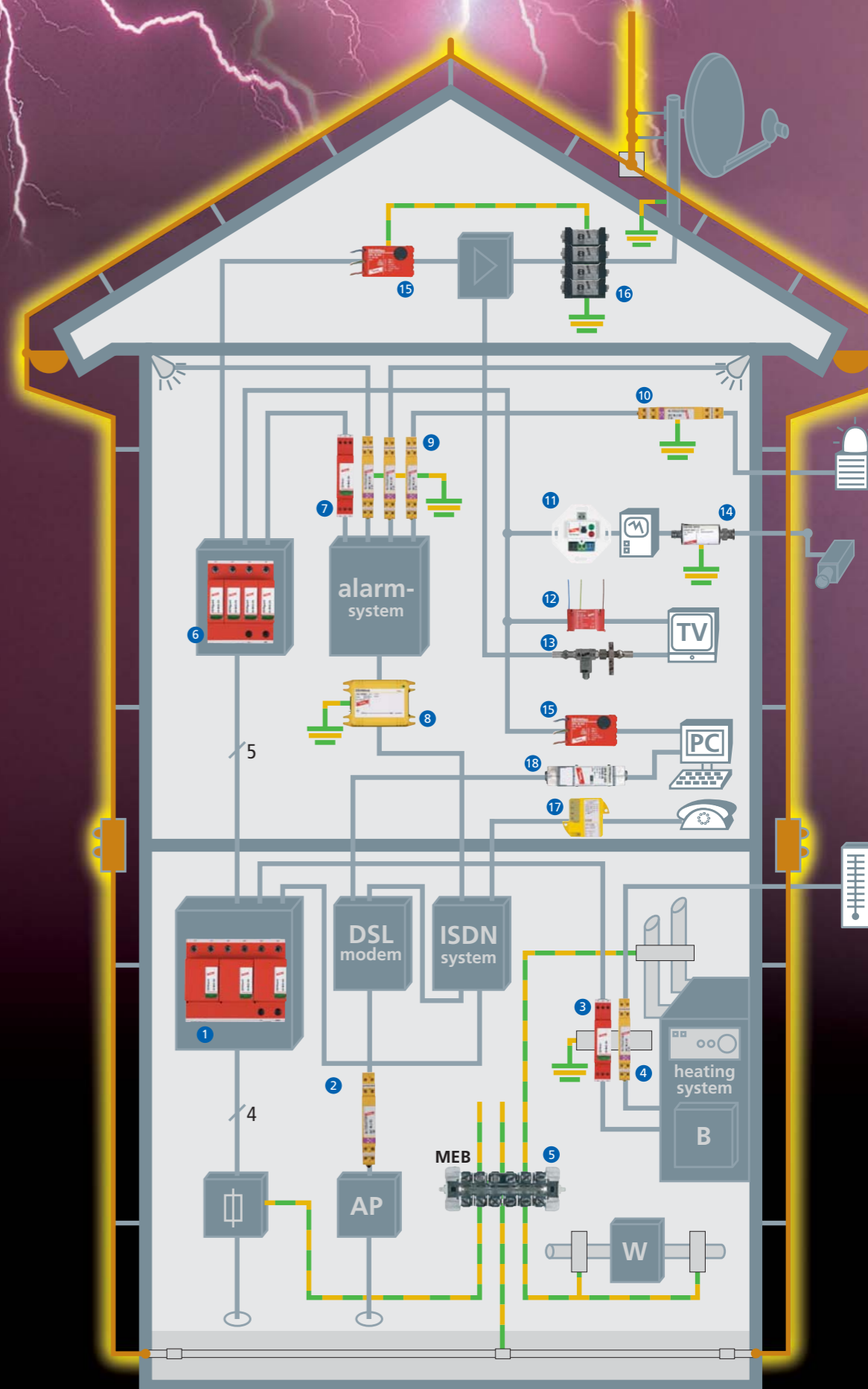
All terminal devices fed by two or several power supply systems require surge protection directly at their inputs. These are TV, video and stereo equipment as well as alarm, firealarm or video surveillance systems. The drawing on the right shows an example for the use of different SPDs. The antenna amplifiers can be protected by **DEHNgate FF TV 16**. **DEHNgate** is already designed for digital satellite systems.

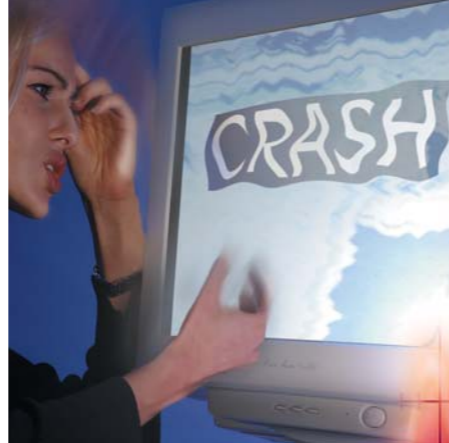
The cascaded use of surge protective components makes the electrical installation compatible with the electronic system – and is less expensive than expected.

#### Products for residential buildings

Pos.	SPD	Type	Part No.
1	DEHNventil® modular TNC	DV M TNC 255	951 300
	alternative: DEHNventil® modular TT	DV M TT 255	951 310
	alternative: DEHNventil® modular TNS	DV M TNS 255	951 400
2	BLITZDUCTOR® XT ML2 BD 180	BXT ML2 BD 180	920 247
	BLITZDUCTOR® XT base part	BXT BAS	920 300
3	DEHNrail modular	DR M 2P 255	953 200
4	BLITZDUCTOR® XT ML2 BE 5	BXT ML2 BE	920 220
	BLITZDUCTOR® XT base part	BXT BAS	920 300
5	Equipotential bonding bar	K12	563 200
6	DEHNgard® modular TNS	DG M TNS 275	952 400
	alternative: DEHNgard® modular TT	DG M TT 275	952 310
	alternative: DEHNgard® modular TNC	DG M TNC 275	952 300
7	DEHNrail modular	DR M 2P 255	953 200
8	DEHNlink ISDN I	DLI ISDN I	929 024
9	BLITZDUCTOR® XT ML4 BE XX*	BXT ML4 BE XX*	920 32X
	BLITZDUCTOR® XT base part	BXT BAS	920 300
10	BLITZDUCTOR® XT ML2 BE XX*	BXT ML2 BE XX*	920 22X
	BLITZDUCTOR® XT base part	BXT BAS	920 300
11	DEHNsafe	DSA 230 LA	924 370
12	STC modul	STC 230	924 350
13	DEHNgate	DGA GF TV	909 704
14	UGKF BNC	UGKF BNC	929 010
15	DEHNflex M	DFL M 255	924 396
16	DEHNgate	DGA FF TV	909 703
17	Data protection module DSM TC 2 SK	DSM TC 2 SK	924 272
18	DEHNpatch	DPA M CAT6	929 100

\* The SPDs have to be chosen according to the system technology used





# Protecting Communication Systems.

## Surge Protection for Office and Administration Buildings.

For administration, data processing has become indispensable. PCs, servers and networks have become part of the minimum equipment. A breakdown is unacceptable. Workflow has been adapted too much to these systems. Also important are telephone systems and fax machines. Moreover, there are building automation systems interconnected by bus systems such as EIB/KNX and LON. Everything has to work without failure, even during thunderstorms.

### Protection for power supply systems.

The drawing on the right shows an

example of an administration building.

For power supply, combined lightning current and surge arresters e.g.

**DEHNventil® modular** 1 as well as surge arresters Type **DEHNguard® modular** 4 can be used. For protecting the terminal equipment, e.g. **DEHnrail modular**, 5 **SFL Protector** 9 or **DEHnsafe** 11 can be used. This reduces inducted voltages and switching overvoltages safely.

### Protection for communication systems.

Data or voice transmission, both require corresponding protective components for safe operation. Networks are generally

constructed as universal wirings in accordance with EN 50173. Even if glass-fibre lines between buildings and floor distribution boards are standard today, copper lines are normally installed from the floor distribution board to the terminal equipment. Therefore, protection for HUBs, bridges or switches by **NET Protector LSA 4 TP** 8 is required.

Terminal equipment can be protected by the **DEHNpatch** 6 patch cable.

For IT lines between buildings, the **DPG enclosure for equipotential bonding** 2 can be used. It can be supplied with **LSA disconnection blocks** and **DEHNrapid® LSA plug-in terminal blocks** with lightning current carrying capability. For protecting the TC system, **NET Protector TC 2 LSA** 10 is used in the floor distribution board for the outgoing lines to the system telephones – the system telephone can be connected to e.g. a **DSM TC 2 SK** 12 protection module.

### Building automation protected from surges.

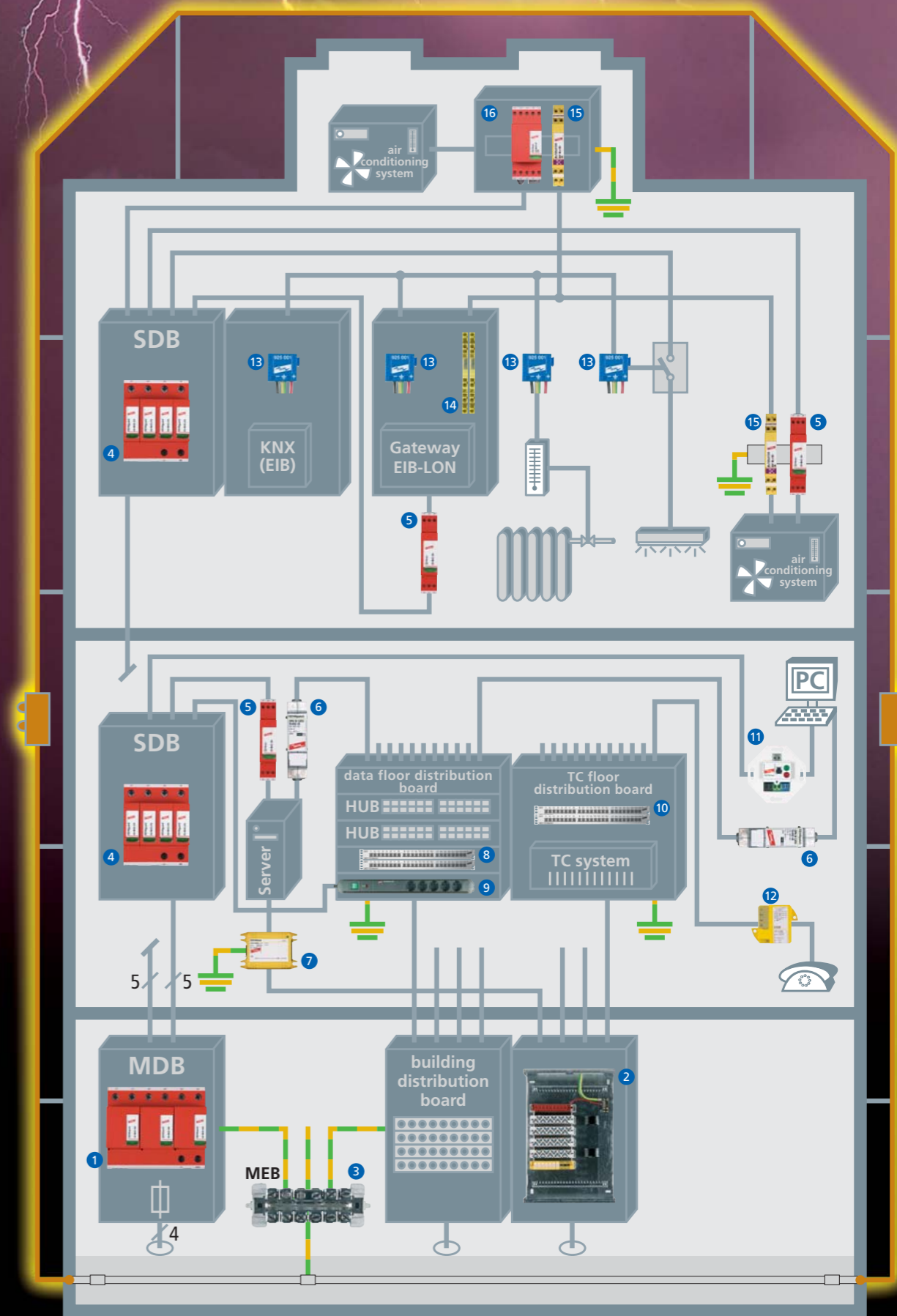
A breakdown of building automation can have severe consequences. For example, if the air conditioning system breaks down due to surges, the data processing centre or a server might have to be downed. This can be prevented.

As shown in the drawing, bus systems such as EIB/KNX or LON can be protected by components such as **BUSector** 13, **DEHNconnect** 14 or **BLITZDUCTOR® XT** 15.

Installing SPDs in accordance with the concept and in a consequent way helps to considerably increase system availability.

#### Products for administration buildings

Pos.	SPD	Type	Part No.
1	DEHNventil® modular TNC	DV M TNC 255	951 300
	alternative: DEHNventil® modular TNS	DV M TNS 255 FM	951 405
	alternative: DEHNventil® modular TT	DV M TT 255 FM	951 315
2	DEHN Enclosure for Equipotential Bonding	LSA 60 P	906 101
	Disconnection Block LSA	TL2 10DA LSA	907 996
	DEHNrapid LSA	DRL 10 B 180 FSD	907 401
3	Equipotential Bonding Bar	K12	563 200
4	DEHNguard® modular TNS	DG M TNS 275 FM	952 405
5	DEHnrail modular	DR M 2P 255 FM	953 205
6	DEHNpatch	DPA M CAT6	929 100
7	DEHNlink ISDN I	DLI ISDN I	929 024
8	NET Protector LSA 4 TP for 8 Ports	NET PRO LSA 4TP	929 036
	19" Shield Enclosure for 3 x NET Protector	EG NET PRO 19"	929 034
9	SFL Protector	SFL PRO	912 260
10	NET Protector TC 2 LSA for 8 x 2 pairs	NET PRO TC 2 LSA	929 072
	19" Shield Enclosure for 3 x NET Protector	EG NET PRO 19"	929 034
11	DEHnsafe	DSA 230 LA	924 370
12	Data Protection Module DSM TC 2 SK	DSM TC 2 SK	924 272
13	BUSector	BT 24	925 001
14	DEHNconnect MD 48	DCO RK MD 48	919 942
15	BLITZDUCTOR® XT	BXT ML4 BD 48	920 345
	BLITZDUCTOR® XT Base Part	BXT BAS	920 300
16	DEHnrail M 4P	DR M 4P 255	953 400





# Increasing Operational Safety.

## Surge Protection for Industry.

Industrial automation is a standard in most companies. A breakdown of the production can lead a company to its financial ruin and loss-of-use insurances are often not existing.

### Surge protection increases operational safety.

In order to increase operational safety, lines between buildings have to be localised and protected first. The drawing shows an example of power supply and information transmission via Profibus and Industrial Ethernet. For power supply, potential short-circuit currents have to be especially taken into consideration. The coordinated lightning current arrester **DEHnbloc® Maxi S 1** safely discharges short-circuit currents

up to 100 kA<sub>rms</sub> and is therefore ideally suited for use in the industrial sector. **BLITZDUCTOR® XT 2** protects IT lines even in case of direct lightning strokes.

### Forming equipotential bonding areas.

PLC or AS interface, sensors/actuators or Ex barriers – to all applies that upcoming surges have to be compensated in system engineering and on all lines connected – an “equipotential bonding area” comes into existence.

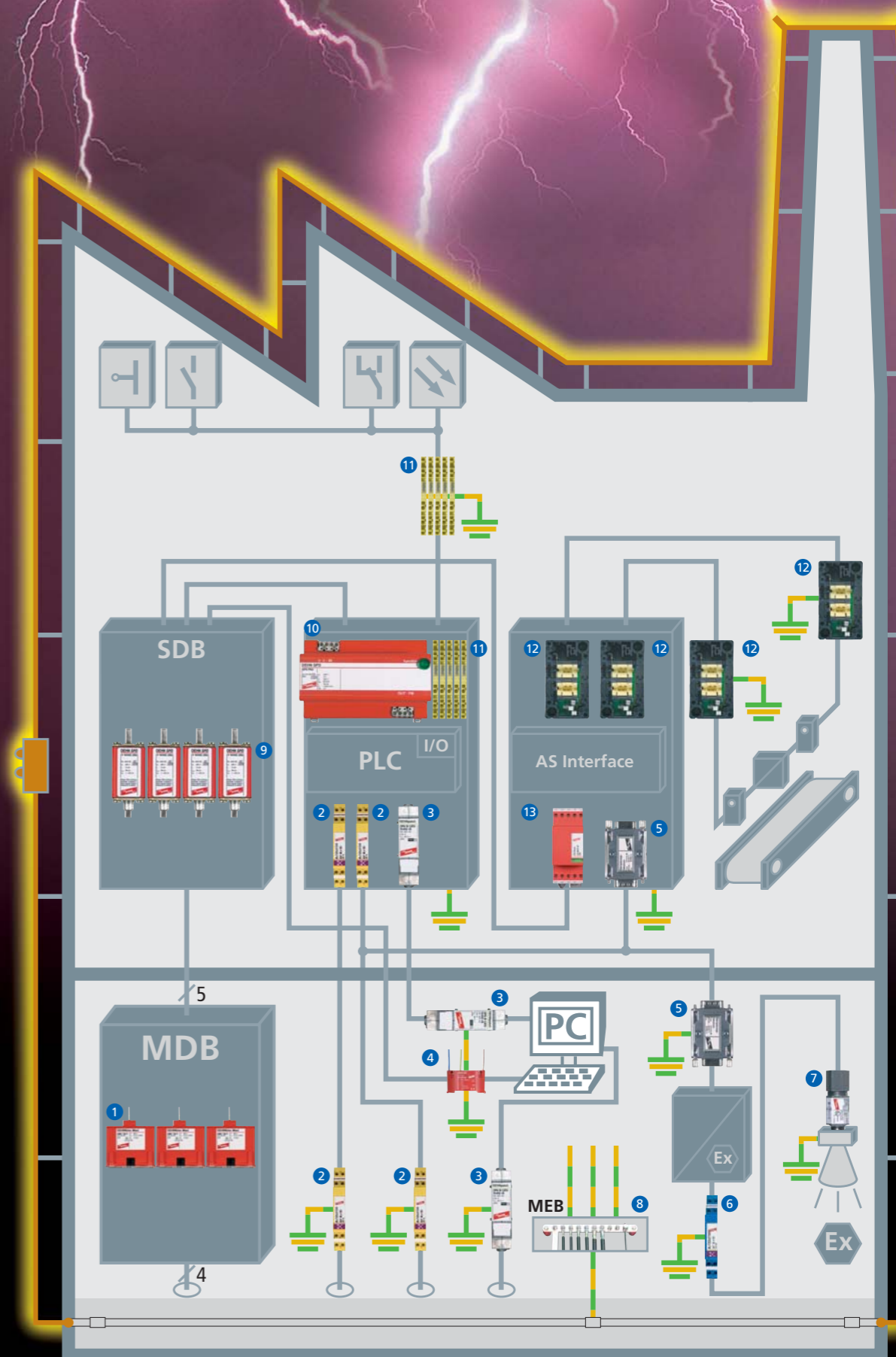
SPDs such as **VNH 9**, **SPS Protector 10** and **DEHnrail 13** fulfil this function on the power supply side.

For IT lines, e.g. **DEHNconnect 11**, **DEHNpatch 3**, **AS Interface Surge Protection Module 12** or **Fine Protection Adapter FS 5** can compensate surges within microseconds.

Thus, in connection with an intermeshed equipotential bonding and earthing system, breakdowns due to surges and consequently operational interruptions can be avoided. An investment which will easily pay off.

#### Products for the industrial sector

Pos.	SPD	Type	Part No.
1	DEHnbloc® Maxi S	DBM 1 255 S	900 220
	alternative: DEHnbloc® Maxi for rail acc. to EN 60715	DBM 1 255	900 025
	alternative: DEHnbloc® for DIN rail acc. to EN 60715	DB 3 255 H	900 120
2	BLITZDUCTOR® XT	BXT ML4 BD HF 5	920 371
	BLITZDUCTOR® XT base part	BXT BAS	920 300
3	DEHNpatch	DPA M CAT6	929 100
4	STC Module	STC 230	924 350
5	Fine Protection Adapter D-Sub. 9-pole PB	FS 9E PB 6	924 017
6	BLITZDUCTOR® XT MD EX 24	BXT ML4 BD EX 24	920 381
	BLITZDUCTOR® XT base part EX	BXT BAS EX	920 301
7	DEHNpipe MD EX	DPI MD EX 24 M2	929 960
8	Equipotential Bonding Bar 10 CU		472 217
	Cover (stainless steel)		472 289
9	Surge Arrester VNH	V NH00 280	900 261
10	SPS Protector	SPS PRO	912 253
11	DEHNconnect ME 24	DCO RK ME 24	919 921
12	AS Interface Surge Protection Module	AS IBAS YE	925 013
13	DEHnrail M 4P 255	DR M 4P 255	953 400



# Safety according to Specification.

## Lightning Protection Zones Concept.

Failures of technical systems and installations are very unpleasant for operators. They require faultless operation of equipment both under "normal" conditions and during thunderstorms. Loss reports of insurance companies show clearly that there is a backlog demand both in the private (Fig. 1) and the commercial sector (Fig. 2). A comprehensive protection concept would help to achieve this aim. The Lightning Protection Zones Concept enables designers, constructors and operators to plan, implement and control protection measures. Thus, all relevant devices, installations and systems are protected reliably and with economically acceptable efforts.

### Protection philosophy

To ensure continuous availability of complex power and IT systems, even in case of a direct lightning effect, further measures for surge protection of electrical and electronic installations are necessary, based on a building lightning protection system. Taking all causes of surges into consideration is very important. For this purpose, the Lightning Protection Zones Concept described in IEC 62305-4 is applied.

Here, a structure is subdivided into different risk zones. These zones help to define the necessary devices and components for lightning and surge protection.

Part of an EMC-conform lightning protection zones concept is an external lightning protection system (including air-termination system, down conductor system, earthing system), equipotential bonding, spatial shielding and surge protection for power supply and IT systems.

The definition of lightning protection zones is subject to the predeterminations of Table 1.

According to the requirements and loads on surge protective devices regarding their installation site, they are classified as lightning current arresters, surge arresters and combined lightning current and surge arresters.

The highest demands on discharge capacity are made on lightning current and surge arresters, which realise the transition from Lightning Protection Zone 0<sub>A</sub> to 1 or 0<sub>A</sub> to 2.

These SPDs must be able to conduct partial lightning currents, wave form 10/350  $\mu$ s, several times without destruction in order to prevent the entering of destructive partial lightning currents into the electrical installation of a building. At the boundary from LPZ 0<sub>B</sub> to 1 or downstream of the lightning current arrester at the boundary from LPZ 1 to 2 and higher, surge arresters are used for protection against surges.

Their function is to further reduce both the residual load of the upstream protection stages and limit the induced or generated surges.

The aforementioned lightning and surge protective measures at the boundaries of the lightning protection zones apply to both the power supply and IT system to the same extent.

Due to the entirety of the measures described in the EMC-conform Lightning Protection Zones Concept, permanent system availability of a modern infrastructure can be achieved.

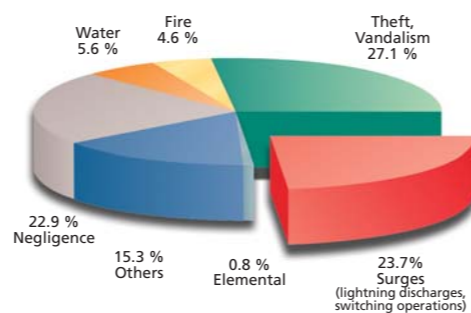


Fig. 1 Causes of damage to electronic equipment for 2001. Analysis of 7370 damage claims (Ref.: Württembergsche Versicherung AG)

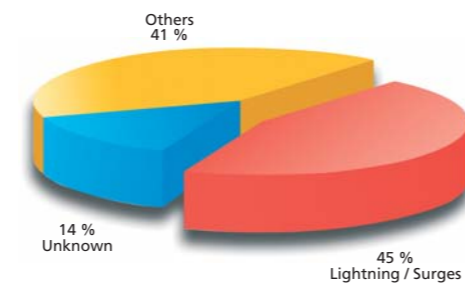
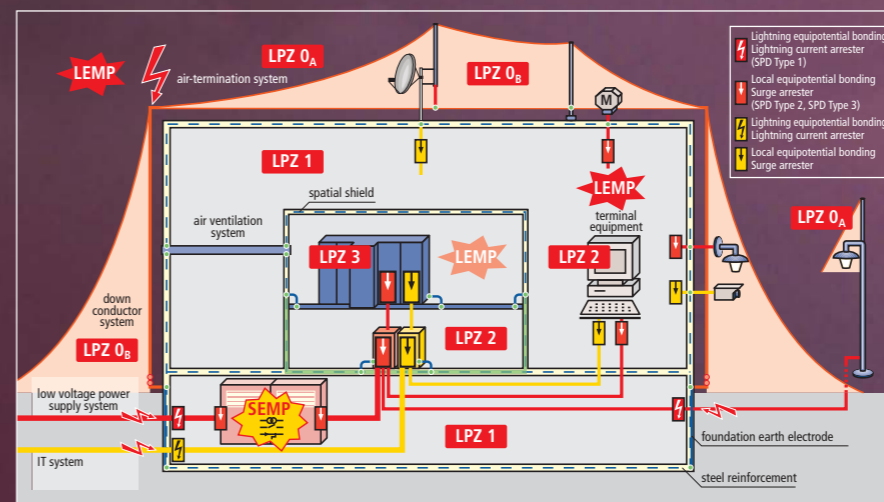


Fig. 2 Average damage causes in the last years (Ref.: Gesamtverband der Deutschen Versicherungswirtschaft e.V., Berlin 2001)

For further, more detailed technical information, we shall be pleased to send you our "Lightning Protection Guide".



EMC-based Lightning Protection Zones Concept

### LEMP protection of structures with electrical and electronic systems in accordance with IEC 62305-4

Lightning Protection Zone	Description
LPZ 0 <sub>A</sub>	Zone where the threat is due to the direct lightning flash and the full lightning electromagnetic field. The internal systems may be subjected to full lightning surge current.
LPZ 0 <sub>B</sub>	Zone protected against direct lightning flashes but where the threat is the full lightning electromagnetic field. The internal systems may be subjected to partial lightning surge currents.
LPZ 1	Zone where the surge current is limited by current sharing and by SPDs at the boundary. Spatial shielding may attenuate the lightning electromagnetic field.
LPZ 2	Zone where the surge current may be further limited by current sharing and by additional SPDs at the boundary. Additional spatial shielding may be used to further attenuate the lightning electromagnetic field.

Table 1: Definition of Lightning Protection Zones (LPZ)