



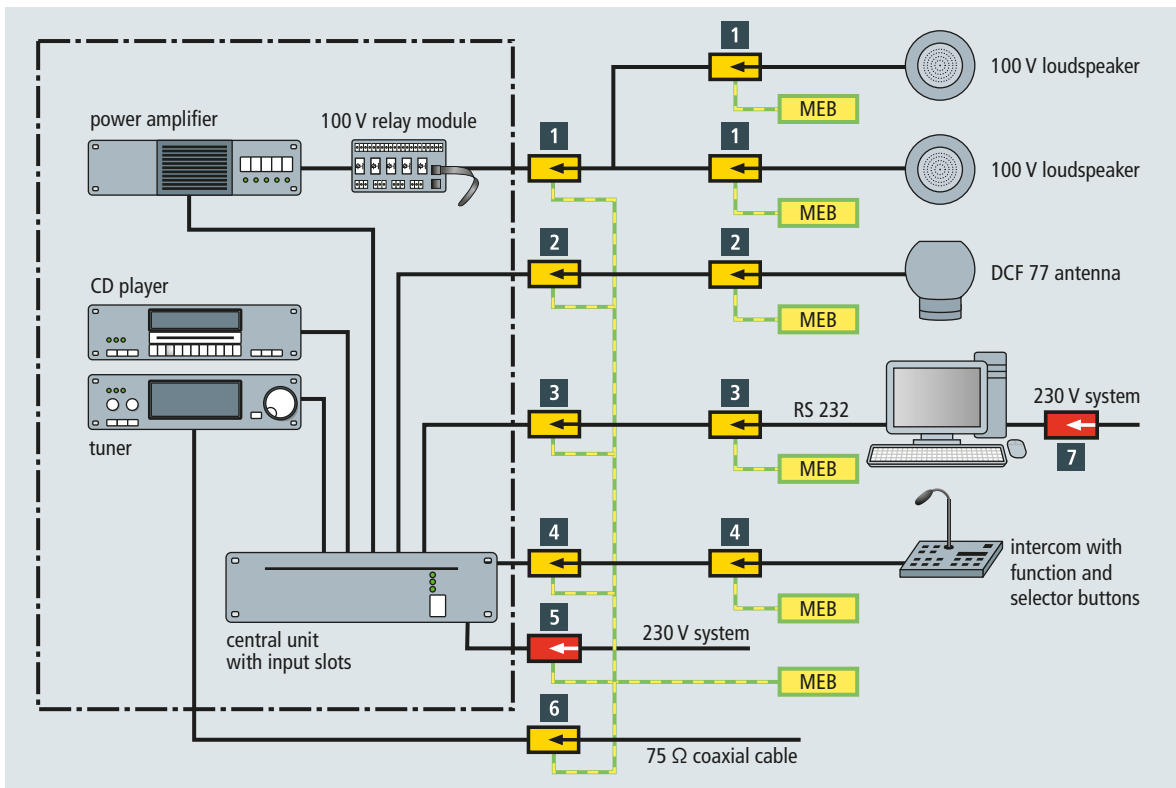
# **Surge protection for public address systems**

Public address systems are used for voice, music and alarm transmission. To this end, the useful signal is modulated onto a carrier voltage (50 V, 70 V, 100 V) and reaches the loudspeaker via a transmitter. This transmitter transforms the low impedance of the loudspeaker to a higher value, thus reducing the current. Therefore, telecommunication lines with a diameter of 0.6 mm or 0.8 mm can be used.

There are different kinds of loudspeakers. Flush and wall loudspeakers typically have a rated power between 6 and 30 W, column loudspeakers between 20 W and 100 W and horn loudspeakers between 10 W and 60 W. Modular amplifiers have a rated power between 100 W and 600 W (in some cases even higher).

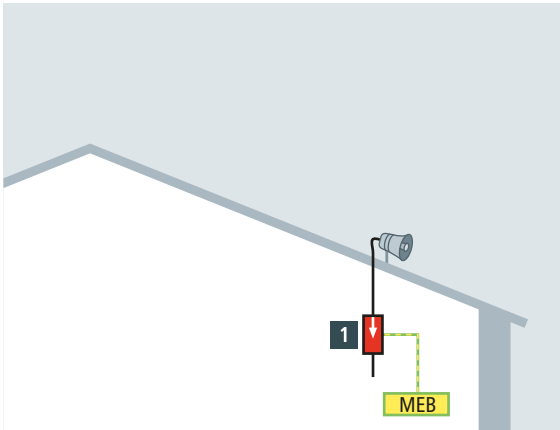
Loudspeakers with different power ratings can be jointly used in a line or group. The minimum power of the amplifier is the sum of the individual loudspeaker power ratings in the public address system. When determining the minimum power of the amplifier, the sum of the loudspeaker power ratings is not decisive, but instead the sum of the selected power ratings at the transmitters.

Subsection 7.2.1 of the EN 50174-2 standard describes the protection from lightning strikes and induced surges and compares the risk of damage with the risk which is accepted by the operator. If this risk assessment reveals that surge protection measures are required, surge protective devices must be installed for the relevant installations and systems in need of protection.



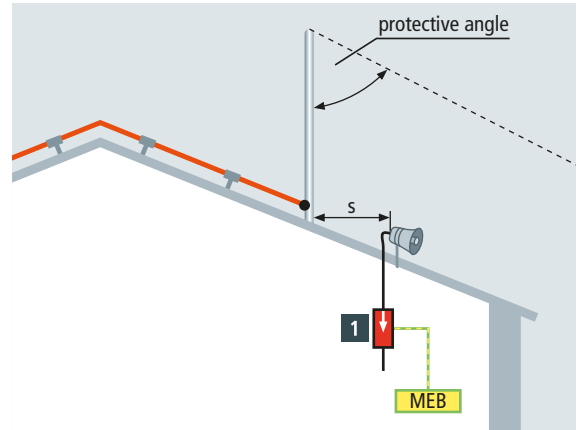
No.	Surge protective device	Part No.	No.	Surge protective device	Part No.
1	DR M 2P 150 (current > 1 A–25 A) or	953 204	4	BXT ML2 BD HFS 5	920 271
	BXT ML4 BE 180 (current < 1 A)	920 327		+ BXT BAS	920 300
2	DGA G BNC	929 042	5	DR M 2 P 255	953 200
3	FS 9E HS 12	924 019	6	DGA FF TV	909 703
			7	DPRO 230	909 230

Figure 9.8.1 Modular public address system with surge protective devices



No.	Surge protective device	Part No.
1	DR M 2P 150 (current > 1 A–25 A) or BXT ML4 BE 180 (current < 1 A) + BXT BAS	953 204 920 327 920 300

Figure 9.8.2 Horn loudspeaker installed on a structure without external lightning protection system



No.	Surge protective device	Part No.
1	DR M 2P 150 (current > 1 A–25 A) or BXT ML4 BE 180 (current < 1 A) + BXT BAS	953 204 920 327 920 300

Figure 9.8.3 Horn loudspeaker located in the protected volume of an air-termination system on a structure with external lightning protection system

In the following, further applicable regulations will not be specified (e.g. German Sample Directive on Fireproofing Requirements for Line Systems (MLAR), building regulations, regulations concerning electroacoustic emergency warning systems, regulations concerning burglar and fire alarm systems).

Large-scale public address systems feature a modular 19" design (**Figure 9.8.1**) and are frequently located in close proximity to a permanently manned workstation. In such cases, the relevant length of the connecting cable to the PC or intercom decides whether the surge arresters shown (4+5) must be installed. If this length exceeds 5 m, surge protective devices are required.

To be able to dimension the surge arresters for the loudspeaker lines (1+2), the maximum current  $I$  in the relevant branch must be determined by means of the ratio  $I = P/U$  where  $P$  is

the power of the amplifier or loudspeaker (group) and  $U$  is the carrier voltage.

All earth connections of the surge arresters in the vicinity of the public address system must be connected to a nearby common potential point.

If exterior loudspeakers are located on the roof of a building, they can be damaged by indirect lightning effects (inductive/capacitive coupling) in case of systems with external lightning protection system (**Figure 9.8.3**) and without external lightning protection system (**Figure 9.8.2**). If the system is equipped with an external lightning protection system (**Figure 9.8.3**), the exterior loudspeaker is reliably protected from direct lightning strikes since it is located in the protected volume of an air-termination system.

