



PA/VA solutions for transport industry

Public Address
Voice Evacuation System



EN 54-16

EN 54-4

EN 54-24



We make everyday life safer

PA/VA Solutions / TRANSPORT INFRASTRUCTURE

EN 54-16

EN 54-4

FIRE ALARM LOUSPEAKERS / MAIN STATION



Sound Projectors
MCR-SMSP20



Wall-mounted Loudspeakers
MCR-SWSM6 / ABT-W6



Ceiling-mounted
Loudspeakers / ABT-S206



Loudspeaker Columns
ABT-LA30 / LA60

EN 54-24

MULTIVES / Digital and scalable Public Address & Voice Evacuation System

MULTIVES System has been designed to offer exceptional versatility and it is therefore equally suitable for medium-range buildings as well as complex commercial structures such as airports, refineries, shopping malls, office buildings etc. Its modular structure allows tailoring the design to meet clients' specific requirement with regard to design and type of development. The main role of MULTIVES is cooperation with the Fire Alarm systems and automatic communication about the threat. The system's architecture is based on proven fibre-optic connection enabling digital transmission of voice messages, including Public Address functions, commercial announcements as well as music.



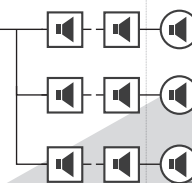
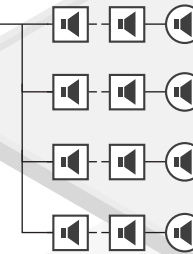
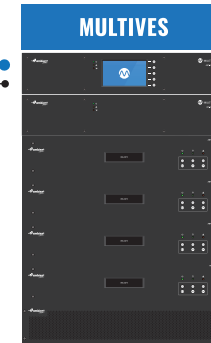
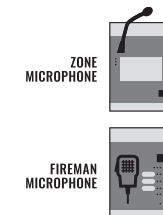
miniVES / Compact Integrated Mini PA/VA

miniVES is a series of compact PA devices, certified according to PN-EN 54-16 and PN-EN 54-4. The system has been designed for small and medium size buildings for which a certified PA system is a requirement. Multiple independent miniVES Central Units and microphones, connected with fibre-optic link, can form a wide multi-purpose network – system support up to 45 high quality audio signals distributed over 254 devices in the network. miniVES system provides an alternative and cost-effective solution with comparison to other PA systems available on the market.



TECHNICAL SUPPORT ROOM

CONTROL ROOM



ABT-NSM / Background Microphone

2x ABT-NSM / Background Microphone

2x ABT-NSM / Background Microphone

ABT-NSC6 / Controller

Controller allows simultaneous connection of 6 measuring microphones and adjust the volume of audio communication depending on the level of ambient noise on the platform.



FIRE ALARM LOUSPEAKERS / SUB-STATION (platforms)



Horn-type Loudspeakers
ABT-T1510 / T2215 / T2430



Sound Projectors
MCR-SMSP20

ABT-DFMS Fireman Microphone

A fireman microphone is equipped with programmable function keys which can be used to assign functions as required. There is an opportunity to add up to 5 ABT-EKB-20M keyboard extensions with additional function keys. Ethernet network enables communication with all Control Units using the fibre-optic connection 1000BASE-X and 10/100/1000BASE-T/TX.



ABT-DMS-LCD Zone Microphone with LCD

This microphone is functionally equivalent to ABT-DMS microphone however it has been additionally equipped with LCD touch screen in order to facilitate its ease of operation and to make it more intuitive. It can be powered locally (48 V DC) or using CDSO through PoE. Microphone is equipped with a 4.5" LCD touch screen for fast and clear matricing and system management.



ABT-DMS Zone Microphone

The zone microphone is used to generate common public announcements, to choose individual zones and to broadcast live voice messages. It is equipped with 4 jack audio input connections and an intercom function. It additionally offers programmable function keys which can be used to assign specific functions as required. There is an opportunity to add up to 5 ABT-EKB-20M keyboard extensions with additional function keys.



Expansion of transport and integration of various modes of transport pose a real challenge for Public Address (PA) systems.

Modern solutions bringing together different aspects of public transport in order to ensure a fast and comfortable journey require better and more **advanced PA systems**. This need provides designers and engineers with a unique opportunity to deliver **creative and innovative solutions**.

The role of PA systems is transmitting voice announcements to public audience within the systems' range using microphones and other means of external sounds transmission devices connected to the system. However, **a type of infrastructure or a building highly influences correct configuration of PA/VA system**.

Application Areas

VOICE ALARM SYSTEMS

REQUIRED UTILISATION

Metro stations and underground train stations

Train station buildings and ports of capacity higher than 500 people

PUBLIC ADDRESS SYSTEMS

OTHER APPLICATION

Smaller rail infrastructure facilities

Train station buildings / facilities (kiosks and others)

Whole platform area along its entire length

Effectiveness

ACOUSTIC SIMULATIONS

Necessary requirement of well designed system

Designers and contractors support

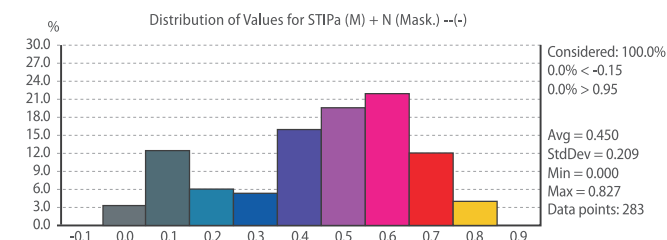
Verification, selection and arrangement of loudspeaker devices

The necessary condition of audible message is assuring adequate volume level of the broadcast. Audibility and clearness of messages depend not only on their absolute volume level but equally on a comparison to the ambient noise. Providing good understandability in challenging acoustic conditions is possible with the application of wide band, directional loudspeakers of minimal sound

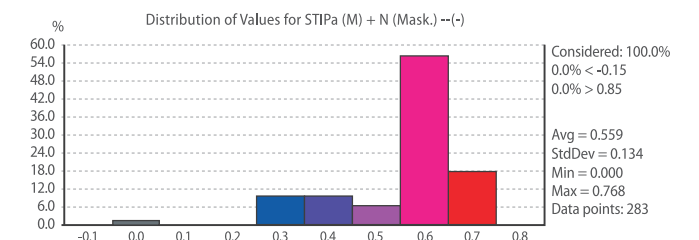
distortions and support systems such as digital frequency correction supported by DSP. MULTIVES and miniVES systems have 3 band parametric equalizers (EQ) on all audio inputs and 8 band on all audio outputs. Additionally, MULTIVES and miniVES systems enable setting up delays on all loudspeaker lines up to 30 seconds with 1ms step. Usage of delayed

sound lines allows for equal distribution of sound through the environment. It also reduces probability of echo formation between loudspeakers in distributed systems configuration. Timing of the loudspeakers should be carried out with accuracy up to 20 ms maximum.

Sound system without delayed lines



Sound system with lines delaying signal on specific loudspeaker lines

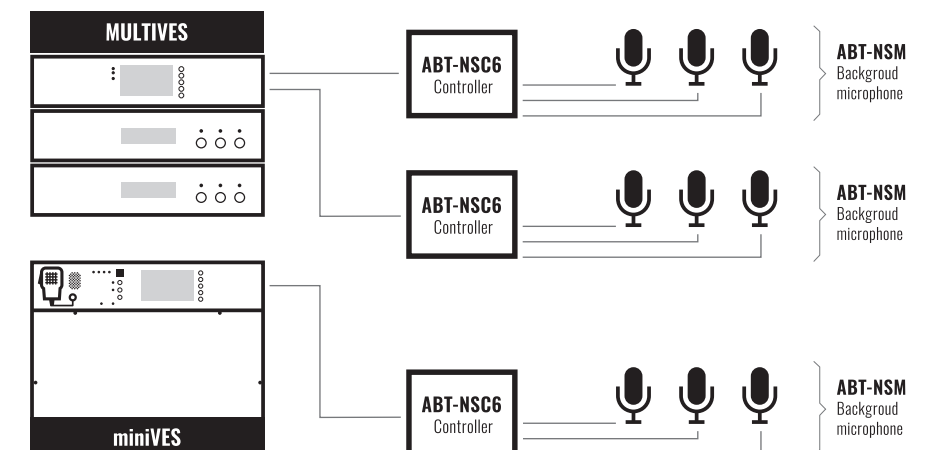


Example of delayed line application in order to improve clearness of speech at the train station platforms

Automatic sound control system

Automatic volume control function keeps track of the ambient noise level and adjusts the power input to the actual conditions within the area in such a way so that the audio communication is not too loud or too quiet for the recipients.

Passengers experience higher comfort while waiting on the platform. It also allows for a great reduction in sound transmitted to the surrounding area.



MULTIVES / BIG COMMERCIAL STRUCTURE

Characteristics

- ✓ Compliance with EN 54-16, EN54-4
- ✓ Modular solution – up to 44 loudspeaker lines per Control Unit
- ✓ Ability to simultaneously broadcasting nx 11 messages (n-number of CU)
- ✓ Total amplifiers power of 1300 W
- ✓ Cooperation with zone microphone ABT-DMS and ABT-M0x
- ✓ TCP/IP network architecture
- ✓ Up to 254 devices in the network with copper or fibre-optic wiring connection

Flexible MULTIVES Topology

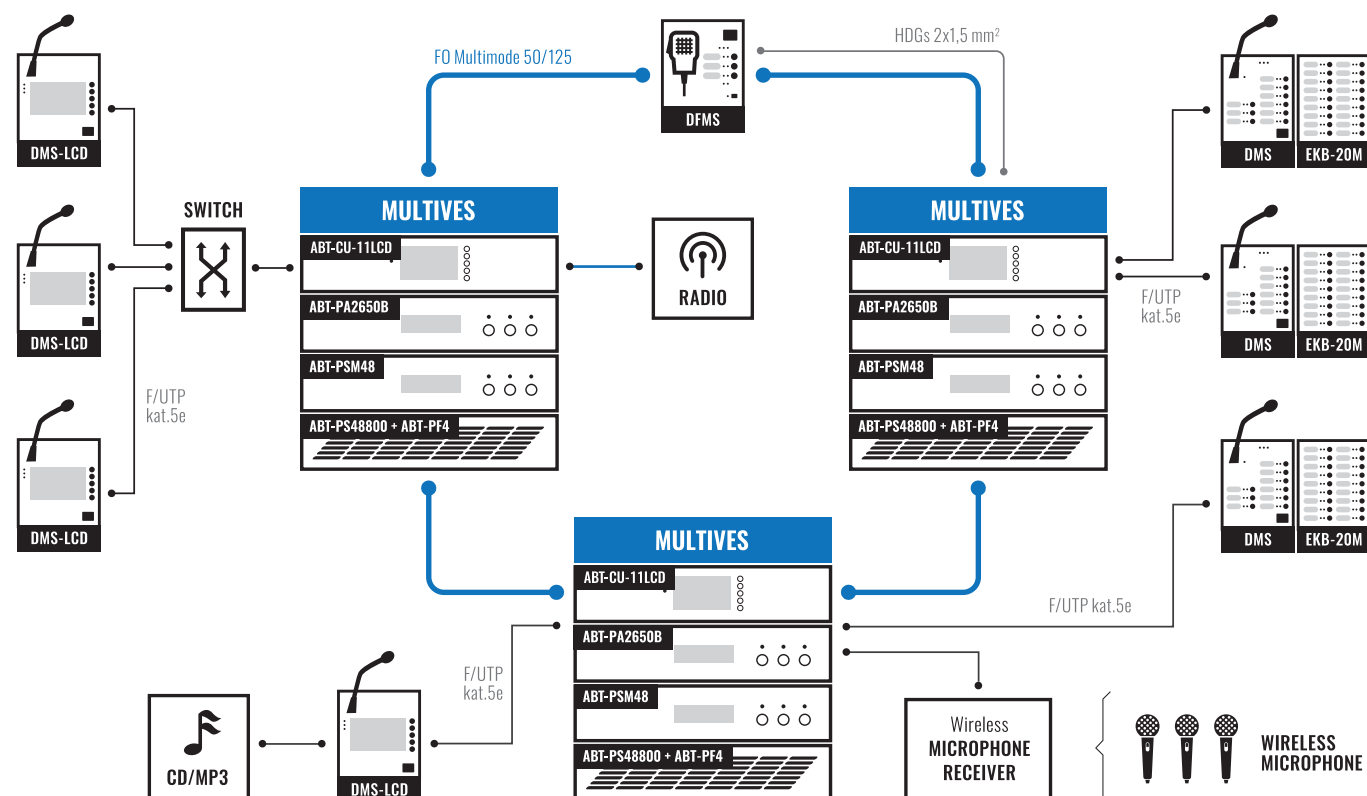
The main role of Voice Alarm System is the implementation of essential evacuation functions and communication of a threat occurrence. In normal conditions, Voice Alarm System fulfils the role of Public Address System and is able to broadcast music or public announcements using zone microphone or other connected to the system source of sound. The system enables broadcast of messages

to selected platforms or other infrastructure of the train station in order to inform waiting passengers about any changes to the train schedule or any potential threat.

Integrated audio inputs in each Control Unit and each microphone allow connection of external sound sources and transmission of messages

emanating from precedent external communication system.

Integrated message buffering function enables recording higher priority messages, broadcasting them through already engaged, by superior sources, loudspeakers and automatically playing them once the line becomes free.



MINIVES / SMALL TO MEDIUM COMMERCIAL STRUCTURE

Characteristics

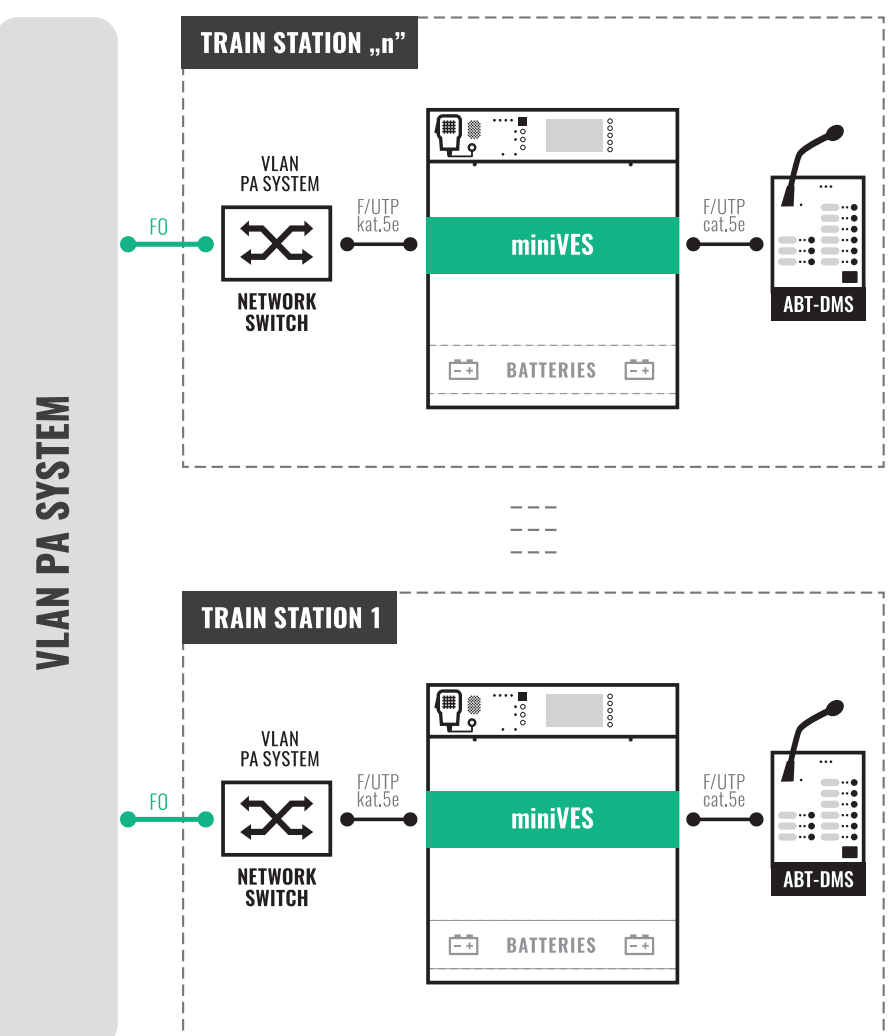
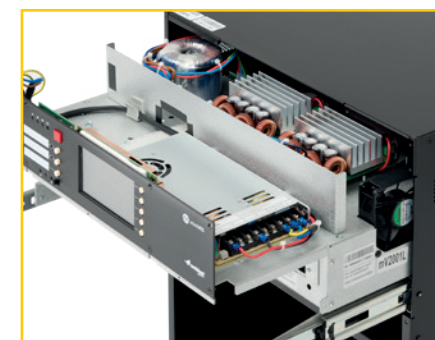
- ✓ Compliance with EN 54-16, EN54-4
- ✓ Compact solution – up to 8 loudspeaker lines per Control Unit
- ✓ Ability to simultaneously broadcasting 2 messages
- ✓ Total loudspeaker lines power of 320W
- ✓ Cooperation with zone microphone ABT-DMS and ABT-M0x
- ✓ TCP/IP network architecture
- ✓ Up to 254 devices in the network with copper or fibre-optic wiring connection



Equipping miniVES control panel with communication card allows connection of multiple remotely located stations, even several kilometres away, into one system. Communication between devices is based on ETHERNET which allows utilisation already existing, logically allocated network infrastructure (VLAN).

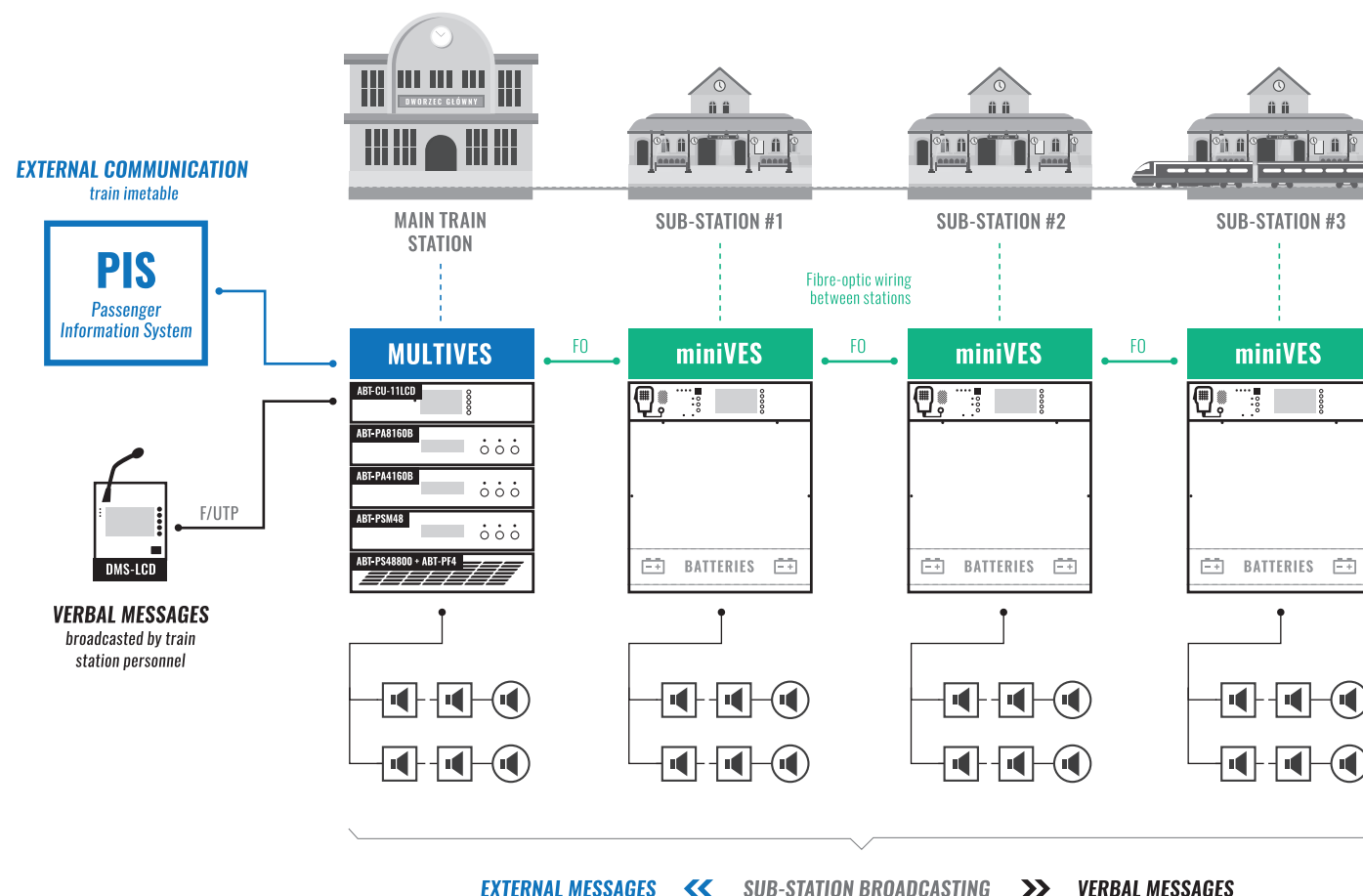
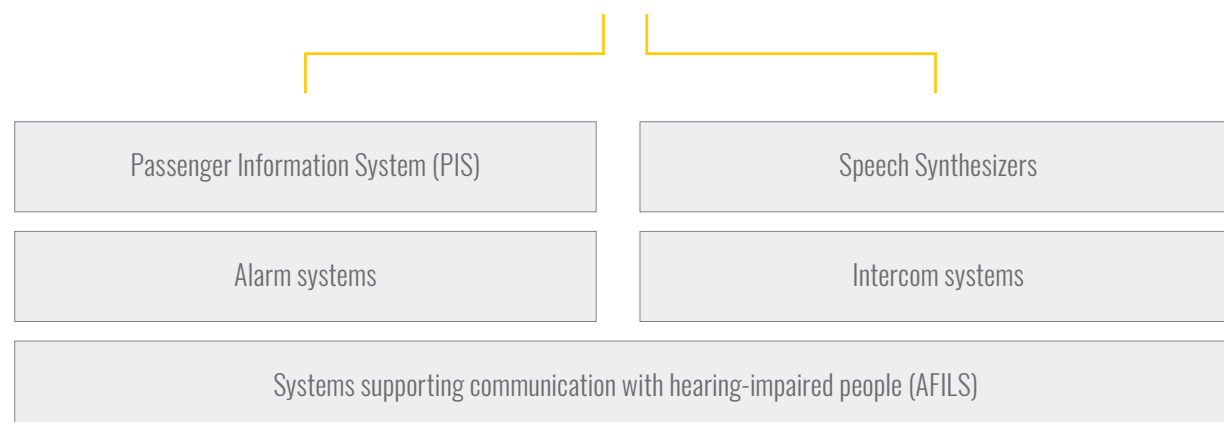
Zone Microphone allocated to each station allows verbal communication or activation of verbal messages from the build-in memory, not only within the station area but also to any zone or any loudspeaker zone of the whole system in order to notify waiting passengers about the train route change or public safety threat occurrence in the facility.

Integrated input audio in each Central Unit and in each microphone allows connection of external system signals and transmission of system messages originating from external superior information systems.



Integration with other systems

MULTIVES and miniVES systems allow cooperation with external systems in both digital and analog domains



Equipment requirements

SYSTEM CONTROLLER

Broadcasting system controller must fulfil the following functions:

- » Operate programmable inputs and outputs GPIO.
- » Decode streams and audio files in MP2, MP3, WAV formats.
- » Monitor ambient noise in each of the broadcasting zones and automatically adjust the amplifier's output power. This function must automatically maintain adequate level of the sound intensity above the ambient noise in order to improve speech intelligibility without excessive increase in volume.
- » Automatically adjust the amplifiers output power to the local noise level regulations during day and night time.
- » Prioritise broadcasted messages based on the signal source – minimum 64 priority levels.
- » Register, store and transmit 1-3 tone system gongs and user-defined signals preceding communication transmission from various sources.
- » Register, store and broadcast digital pre-recorded messages and warnings according to configurable schedule by the user.
- » Control and eliminate acoucting coupling derived from microphones used in the system.

CONTROL OF OPERATION

The system must provide full control of all system's elements, i.e. devices and loudspeaker lines.

Requirements:

- » Impedance measurement system of loudspeaker lines having an adaptive algorithm sensitive to impedance changes caused by ambient temperature changes and system aging which also improves system's immunity to false alarms.
- » Monitoring and informing function of any malfunction of system elements.
- » Self-test function.
- » Detection and informing function of any gaps in signal and control circuits paths.
- » Detection and signaling of gaps, short-circuits and shorting faults in loudspeaker lines.

ENERGY-EFFICIENCY / reduction of utilisation cost

Public Address System operates 24/7 hence energy-efficiency of the devices is substantial.

Utilisation cost reduction:

- » Application of standby solutions – system equipped with reduced energy consumption devices while no communication is broadcasted.
- » Application of amplifiers and power suppliers with 90% efficiency (class D) – limitation of power lost on heat generation.

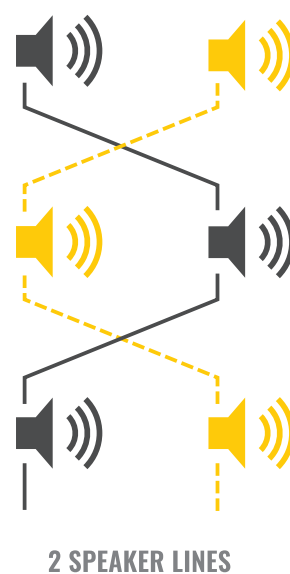
Equipment requirements

SYSTEM'S SAFETY

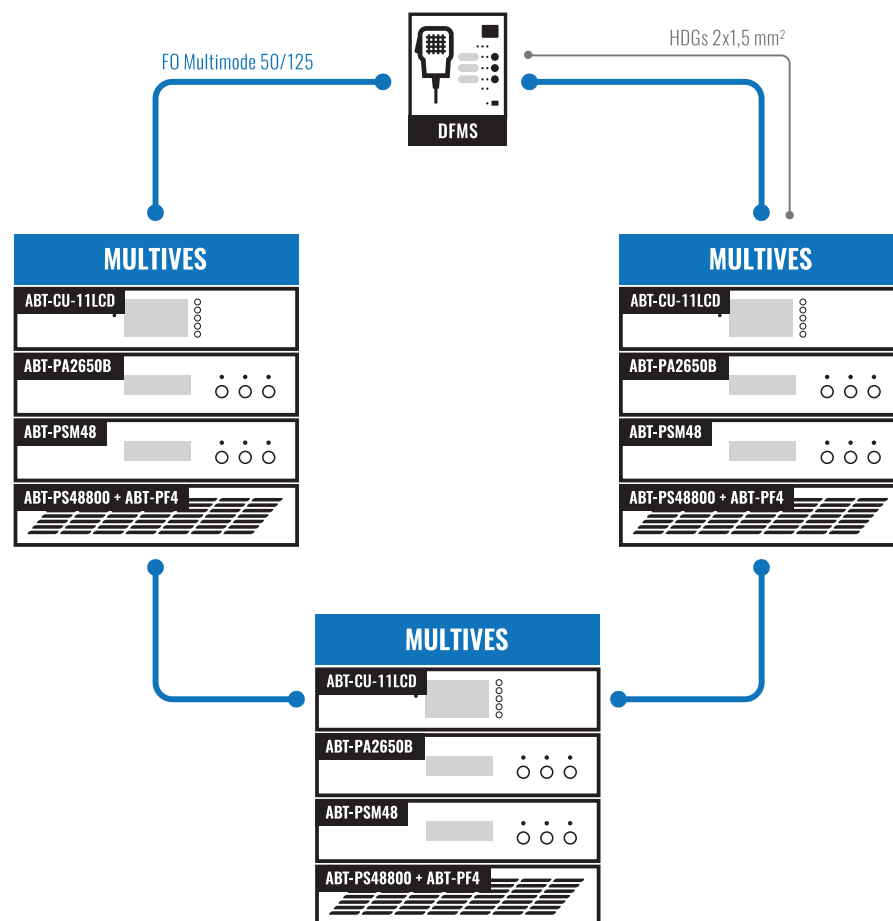
Achieving high level of system's reliability ensures smooth evacuation procedure in emergency situations and guarantees transmission of the safety announcements.

Required solutions:

- » **RING Topology** – the connection between main MULTIVES stations is supported by loops of fibre-optic cabling. This solution guarantees correct system operation, even in case of a single connection damage occurrence.
- » **Lack of MASTER / SLAVE Topology** – disconnected Central Unit can still operate as an autonomous system (announcements saved in a build-in memory).
- » **Dynamic management of the back-up amplifiers** – back-up amplifier automatically replaces damaged amplifier if this is in operation. On a completion of the message transmission, the replacement amplifier returns to stand-by position.



- » **Usage of redundant speaker lines in the sound-system area.** Damage of one of the speaker lines does not lead to loss of the voice transmission functions of the system.
- » **Emergency power supply** – extra batteries provide power supply in case of voltage loss.



References

Main Railway Station / POZNAŃ



Main Railway Station / KRAKÓW



Main Railway Station / WROCLAW



Shopping Centre / Sopot



Airport / LUBLIN



Airport / GDANSK



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