



•GOOD TO KNOW ABOUT•
STANDARDS, PA/VAS and RCS®



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Part 13

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FOR GOOD TO KNOW

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LIFE SAVING VOICE EVACUATION

EWS: ✓

Emergency Warning
Systems

VAS: ✓

Voice Alarm
Systems

NGRS: ✓

Emergency and Danger
Reaction Systems

AMOK: ✓

Systems for Warning
in Amok Situations

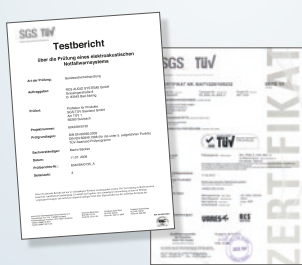
THE ADVANTAGES OF VOICE EVACUATION

A Life saver in any case of an emergency!

An electroacoustic evacuation system is crucial to deliver clear alarm messages and avoid panicking. This ensures a much quicker and safer evacuation of a building than with sirens or bells.

Of course this security system has to be functional at all times. Requirements for functionality and monitoring of evacuation systems are therefore defined in the European norm **IEC 50849**.

MAIN FEATURES OF THE RCS SOLUTION



- **EN 54-4 / EN 54-16 / EN 54-24 / IEC 50849 (all certified)**
- **According to VDE-0833-4**
- Expandable in steps of 8 paging zones to a maximum of 224 zones
- Configuration via PC based software
- Backup of all configuration and setup data
- Up to 24 desktop call stations can be connected
- Speaker lines can be assigned freely to any zone
- Training courses by RCS for your staff

OPERATIONAL AREA – ANY POPULATED ENVIRONMENT

- Office and industrial premises
- Hotels, shopping malls
- Educational institutions like schools, universities etc.
- Sports arenas and gyms
- Stations, hospitals
- Theatres, museums, cinemas
- Theme parks and recreation centres
- Indoor and outdoor swimming pools

EFFECTIVE ALARMING FOR A QUICK EVACUATION

? Screaming sirens should warn us from danger.
But – what danger?
What are we to do, what is the danger actually?

Countless case studies and laboratory experiments have proven that people only react immediately and correctly to an alarm if enough information is provided about the reason and the seriousness of the alarm. Especially for persons who are in an unfamiliar environment clear and unmistakable instructions about what to do can and will be life-saving. If this vital information is missing, for example

»The unexcitedly spoken message of a voice evacuation (VAS) system communicates the need for action clearly.«

because they only hear a siren tone instead of a spoken warning message, people will most likely react in an unfavourable manner or even ignore the alarm completely.

Not open fire is the greatest hazard in a building, but smoke and toxic gases. Therefore most casualties occur during the early phase of a fire, during the

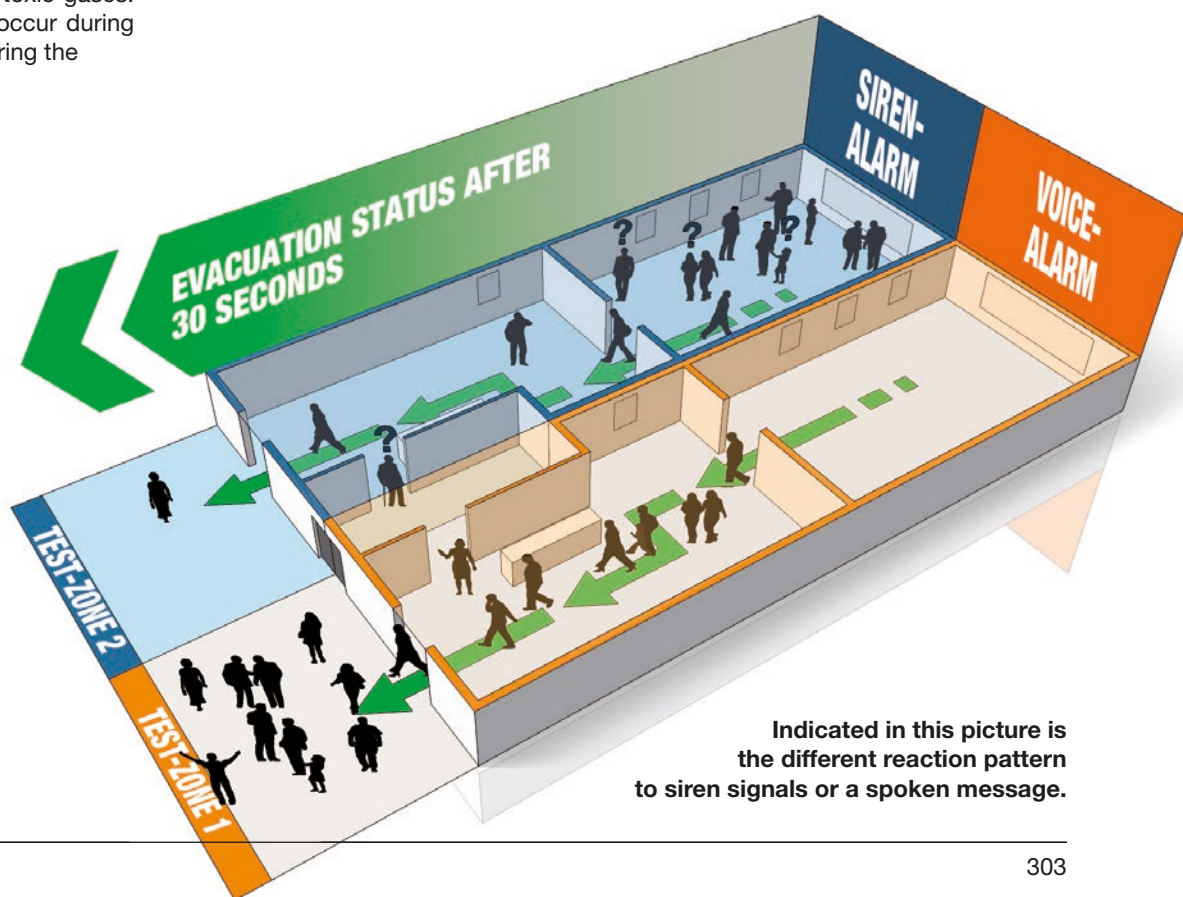
smouldering fire phase. That's why a quick and orderly evacuation is the best way to save lives.

The unexcitedly spoken message of a voice evacuation (VA) system communicates the need for action clearly. The addressees react without hesitation and leave the building, before smoke has spread and blocked the escape. Panic will be avoided, and it's even possible to safely guide all people to their nearest emergency exit.

Additionally, rescuers is given the opportunity to communicate a changing situation directly to all persons still inside the building.



Voice evacuation of selected floors in a Hotel.



Indicated in this picture is the different reaction pattern to siren signals or a spoken message.

EN 54 FIRE ALARM SYSTEMS

While IEC 50849 as an application norm covers the evacuation system as a whole, EN 54 addresses the individual products this system comprises of. The demands for VA products are regulated in the following parts of EN 54:

EN 54-4 Power supply equipment

Crucial and new demand is mainly an ageing control for the accumulators by monitoring the internal resistance of the complete uninterruptible power supply. Additionally, the charging characteristic of the used accumulators has to be considered in the layout of the charger.

EN 54-16 Voice alarm control systems

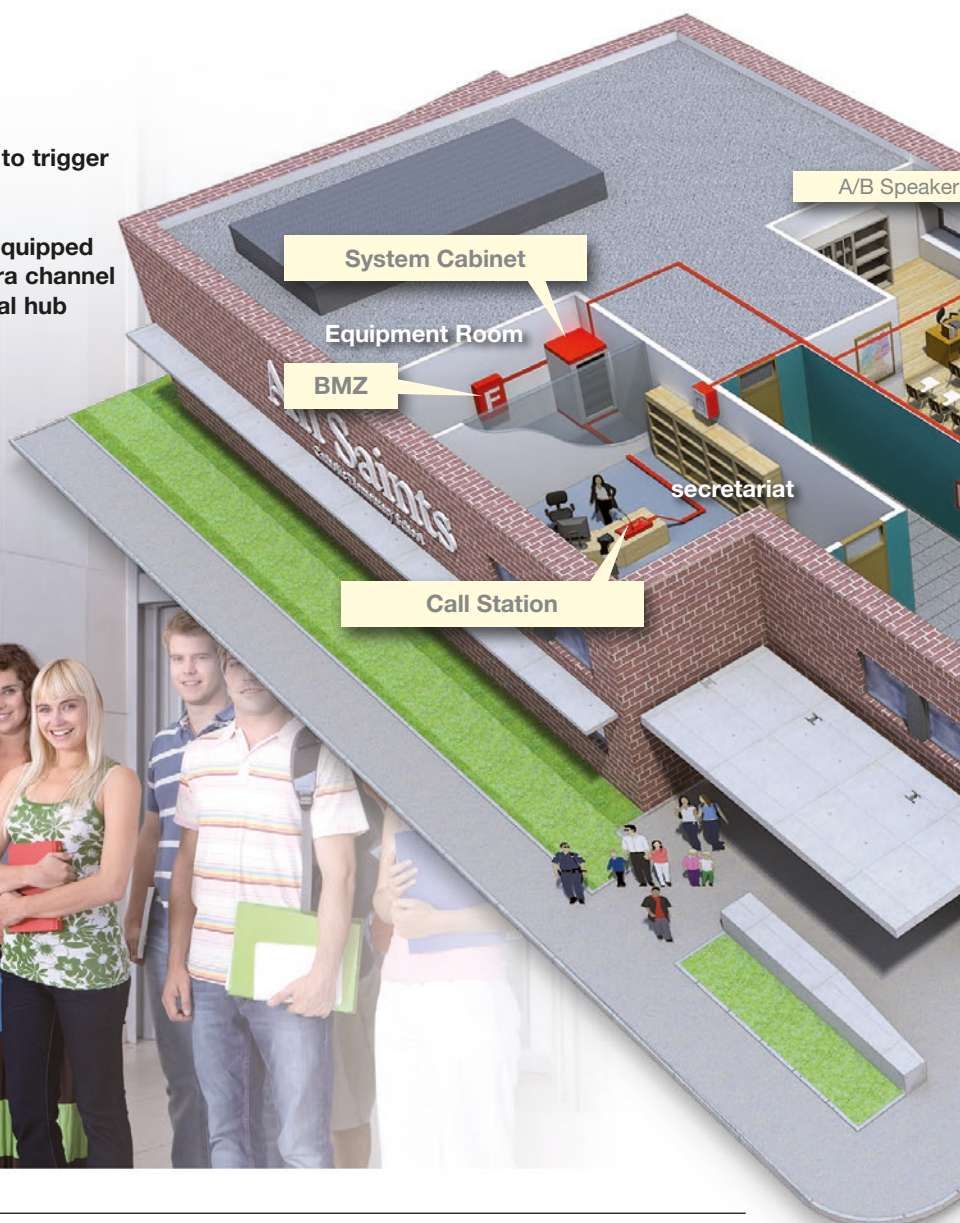
Demands on the functionality of a VA system are very similar to IEC 50849. EN 54 enhances the older norm with a wide variety of tests to validate a high level of refractiveness against environmental impacts and durability under heavy load. Additionally, the demanded quality level for electrical and acoustical parameters has been raised substantially.

EN 54-24 Loudspeakers for Voice Alarm

Core parts of EN 54-24 are reviews of the production tolerances, long-term stability and corrosion resistance. The demands for refractiveness against environmental impacts have been raised substantially, too.

» RCS systems offer various possibilities to trigger a 'silent alarm'.

» RCS evacuation solutions have been equipped with extra features, for example an extra channel to communicate directly with the central hub from any classroom.



VOICE AND AMOK ALARM

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS

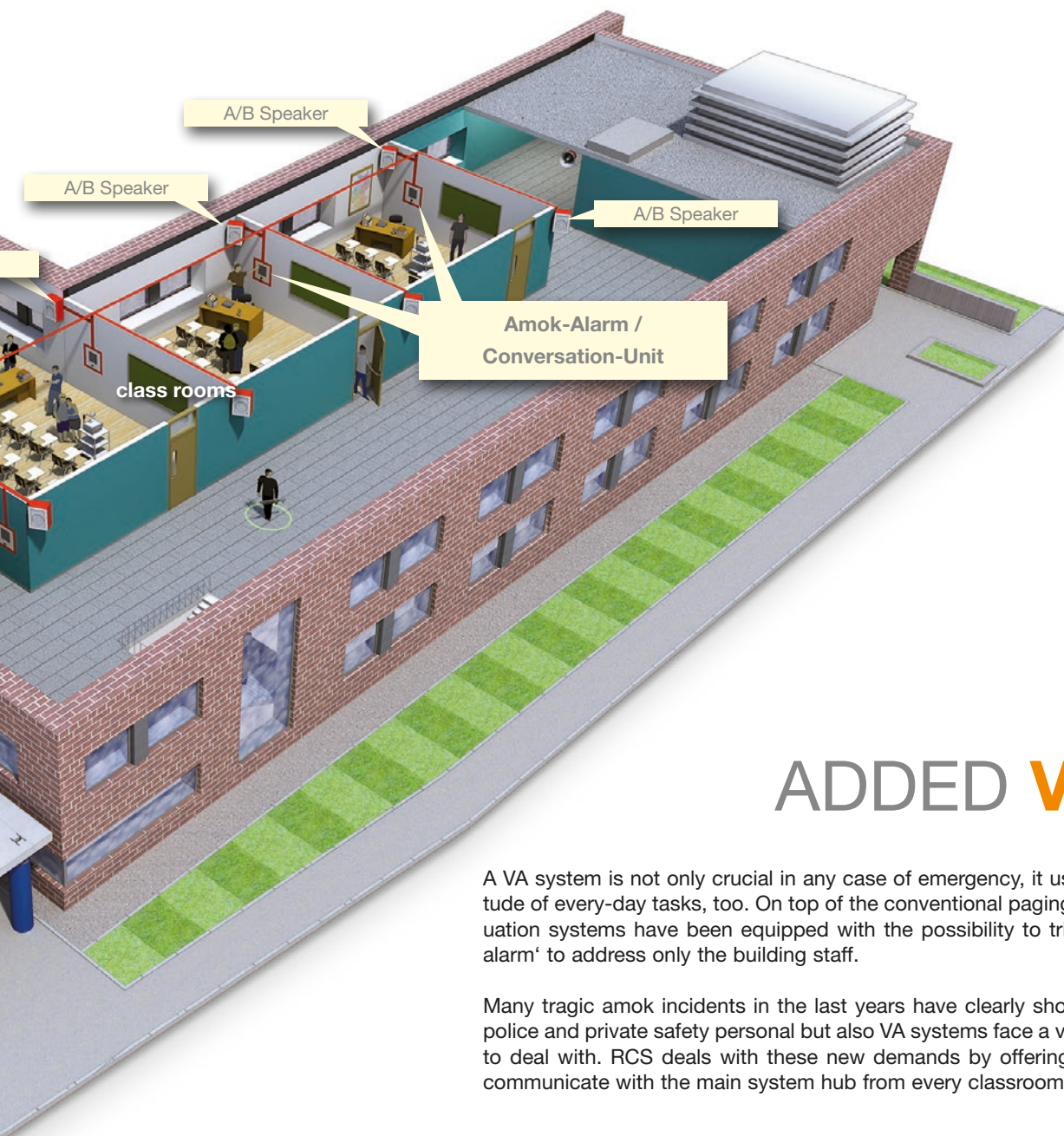
RCS

THE RCS SOLUTION



Our experts for VA systems work hand in hand with engineering offices. They ensure that project engineers can benefit from new development and extended product features already in early stages of a system design to gain advantages in a highly price-sensitive market.

RCS's proven digital technology offers outstanding functionality and scalability, combined with the reliability and durability you can expect from a security installation. System racks can be provided fully assembled and preconfigured by our rack building department to minimize the effort for our customers and installers.



ADDED VALUE

A VA system is not only crucial in any case of emergency, it usually serves a multitude of every-day tasks, too. On top of the conventional paging features RCS evacuation systems have been equipped with the possibility to trigger a coded 'silent alarm' to address only the building staff.

Many tragic amok incidents in the last years have clearly shown that not only the police and private safety personal but also VA systems face a variety of new threads to deal with. RCS deals with these new demands by offering a direct channel to communicate with the main system hub from every classroom.

SAFETY CONCEPT FOR EMERGENCY SITUATIONS

DIRECT COMMUNICATION BETWEEN EMPLOYEES AND EXPOSED PERSONS



Intercom systems make it possible to communicate with the permanently occupied post and receive instructions in the event of an emergency.

Events such as rampages, as well as attacks on people in schools and public buildings, make it clear that the use of emergency and danger response systems (NGRS) can minimize risks.

In connection with a voice alarm (VAS), an emergency and danger response system provides substantial added value.

In addition to the security-relevant, fast and point-specific alerting in an emergency, a single system fulfils many important functions of everyday life. For example, the clock controls, the school gong, announcements or the sound of auditorium and sports halls.

DIN VDE 0827

The standard **DIN VDE 0827**, which has been in force since 1 July 2016, addresses precisely this issue.

In particular, to protect all persons in the building, Part 2 of the standard mentions requirements for emergency and danger-control intercoms (NGS) in public buildings, e.g. schools, universities, government agencies and similar institutions. These are used to transmit emergency and danger reports to a pre-designated service provider.

These are used to transmit emergency and danger reports to a relevant emergency service.

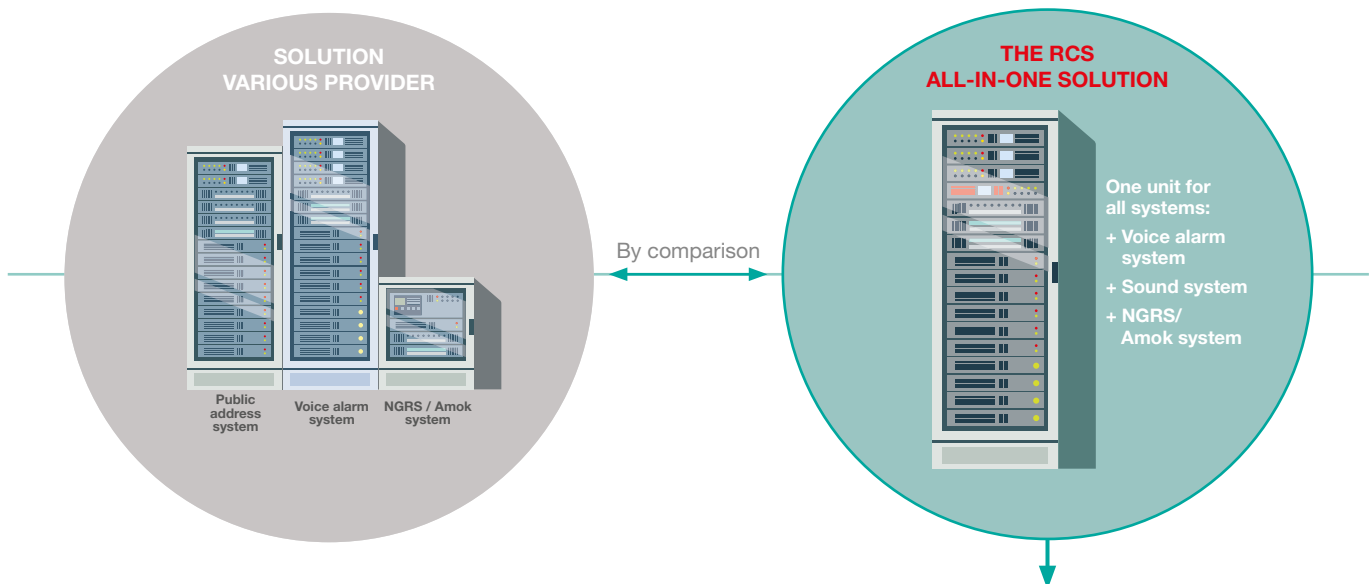
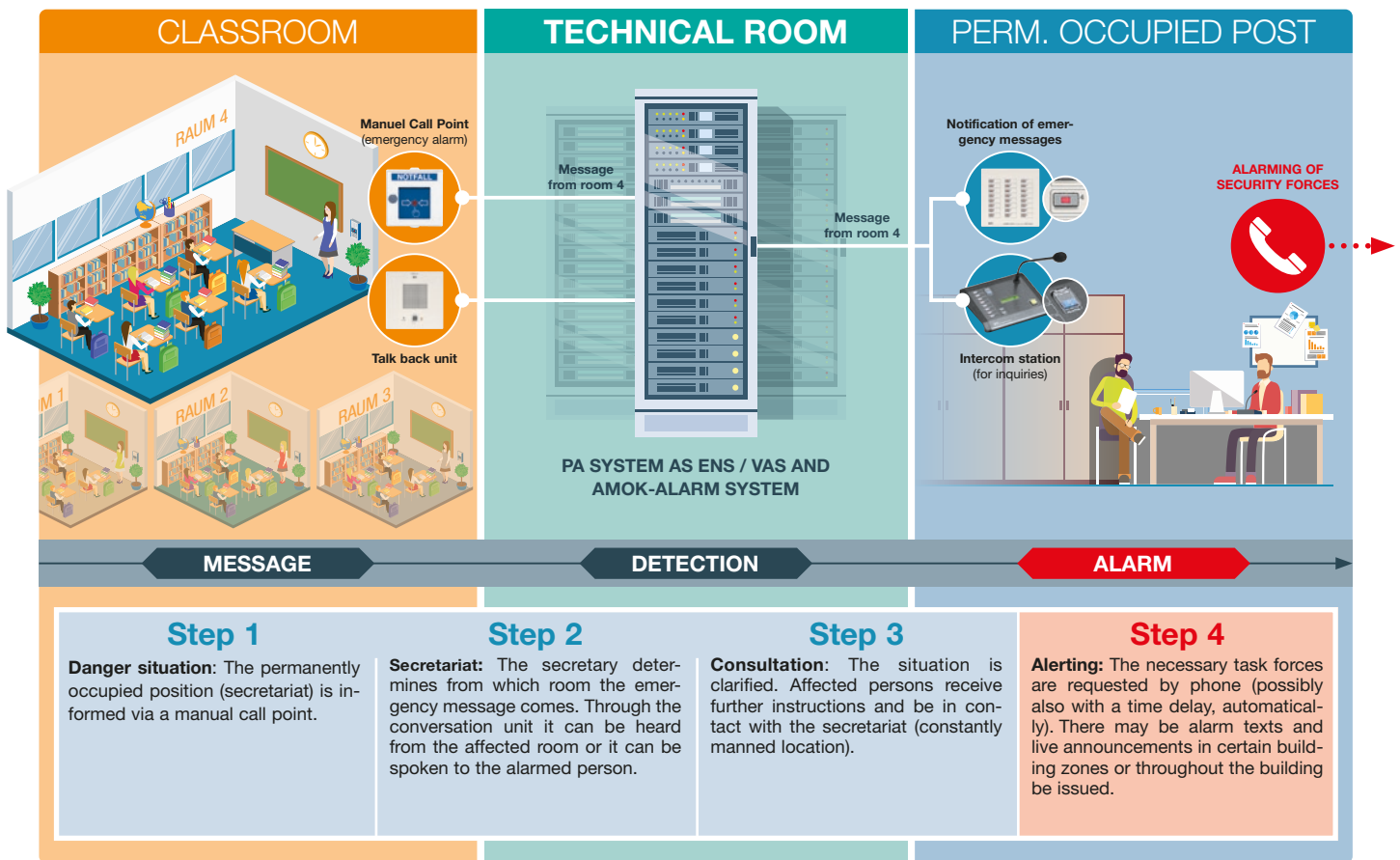
The Advantage of Emergency and Danger Intercoms (NGS):

In contrast to visual or acoustic alarms, an intercom system can be used to remotely evaluate the situation by voice communication and thus initiate appropriate intervention, protection and rescue operations. It can, for example, communicate directly from the classroom to the secretariat or defined emergency personnel.

The intervention forces can then use a NGS to selectively provide directions to different building zones or rooms and exclude parts of the building from announcements so as not to inadvertently warn potential offenders of police intervention.

»It can be e.g. communicated directly from the classroom to the secretariat or defined emergency personnel without calling the entire building through a group call ... «

Especially in complex dangerous situations, such as a possible rampage it represents, the VAS is far superior to a siren-based alarm system.



THE RCS ALL-IN-ONE SOLUTION ENABLES ...

... IN CASE OF EMERGENCY:

- + Alarm and emergency call
- + Speech dialogue with the control center or the emergency services - also in groups
- + Queries and discrete "listening in" in case of alarm
- + Triggering individual or automatic voice announcements

... EVERYDAY: (in connection with a VAS)

- + Announcement and call system
- + Clock systems and pause signal management
- + Sound system of auditorium, sports and gyms
- + Inductive loop system

STANDARDS SECURE QUALITY



Because of its life-saving purpose, a voice evacuation (VA) system should meet high requirements. Those are fixed in various norms. Not only the hardware is regulated, but the planning, setup and operation of a VA system, too.

»The norms ensure a consistent minimum standard that's valid in all EU countries. These regulations give planners, erecting and operating companies mandatory guidelines to work with.«

The norms ensure a consistent minimum standard that's valid in all EU countries. These regulations give planners, erecting and operating companies mandatory guidelines to work with. If agreed upon in private contracts, these norms become binding. Even if they are not mentioned in a contract, they do serve as a legal standard in an arbitration between business partners. By their nature norms are very helpful to completely avoid any litigation between contracting parties.

The important norms for the planning and installation of VA systems are:

IEC 50849

Sound systems for emergency purposes

The roots of IEC 50849 date as far back as 1999. It's based on the German norm VDE 0828 that has been launched after a fatal fire in the Düsseldorf airport. The unnoticed defect of a part of the voice evacuation system was responsible for the death of sixteen persons.

Consequently the demands in VDE 0828 / IEC 50849 take great care of ensuring a flawless function of the safety-critical system. Therefore a voice evacuation system has to monitor itself and all critical accessories and inform the operator instantly if a fault occurs.



EN 54

Fire detection and fire alarm systems

The close relationship between fire detection and voice evacuation system has been addressed by including the VA systems into EN 54.

Since 2008 all VA components are part of this product norm and have to be tested and certified by independent laboratories. An important part of this certification cycle is a yearly inspection of the manufacturing plant to ensure a constant product quality.





VOICE EVACUATION SPEAKER

VOICE EVACUATION SYSTEMS

EMERGENCY POWER SUPPLY

**EN
54-4**
certified

**EN
54-16**
certified

**EN
54-24**
certified

CERTIFIED SECURITY ACCORDING TO EN 54

FOR RCS VOICE EVACUATION SYSTEMS AND THEIR COMPONENTS



Voice Alarming-Speaker



The RCS voice alarm systems VARES-1000®, VARES-1500®, VARES-2000® or VARES-3000® are the ideal solution for evacuation and announcements, communication and background music in public buildings, such as department stores, government agencies, recreational facilities, industrial and educational buildings.

COMPLETE VOICE EVACUATION SYSTEM

EN 54-16 Voice Evacuation System (VAS)



A VA-system is complete if it is connected to the fire detection system.

The requirements for planning, construction and operation of a voice evacuation system describes the application of DIN VDE 0833-4. The demand on the equipment is prescribed in the product norm EN 54-16.

Since April, 1st. 2011 voice evacuation systems must be tested and certified to EN 54-16.

The testing of the products and the examination of the manufacturing plant guarantees a high product quality.

VOICE EVACUATION SPEAKER

EN 54-24 Voice Alarm Speaker for a Voice Evacuation System (VAS)



The EN 54-24 describes the requirements for loudspeakers of a voice evacuation system. These loudspeakers must be tested and certified by a notified product certification authority.

This certification includes testing of the products (long-term stability, acoustical values) and examination of the manufacturing plant.

We produce these speakers in our own production line in Germany and we meet all of the certification criteria.

EMERGENCY POWER SUPPLY

EN 54-4 Emergency Power Supply for a Voice Evacuation System (VAS)



The third essential product norm for voice evacuation system is EN-54-4

This refers to the emergency power supply of the VA and additional controlling of the accumulators stability.



TÜV certified
ISO 9001:2015 and DIN 14675:2020-01



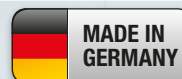
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Beschallungstechnik
im ZVEI-Fachverband
Sicherheitssysteme

ZVEI

CERTIFIED SECURITY ACCORDING TO EN 54

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS

RCS



EN 54-16 certified Voice Evacuation System

EN 54-4 certified Emergency Power Supply

Certified security according to EN 54

VARES

Individual protection for people, buildings and values.

As one of the few certified manufacturers RCS AUDIO-SYSTEMS supplies factory wired complete systems for the voice alarm systems (VAS) and electroacoustic emergency warning systems (ENS) „Made in Germany“.

- Swing Frame Cabinet
- Digital Monitoring Unit
- Digital Control-Center
- Digital Line Management
- Digital Extension-Unit
- Digital Program Switch
- Digital Mainclock
- NF/Data-Rackpanel
- Digital Amplifier
- Digital Amplifier
- Digital Amplifier
- Digital Amplifier
- Digital Spare Amplifier
- Digital Emerg. Power Supply
- Battery tray 5 RU with 2x Battery-Set

efficient ✓

full digital ✓

secure ✓

qualitative ✓

Our VAS network system provides extremely flexible solutions for networked voice alarms and evacuation in complex building structures.

Description

The VAS network system is suitable for all objects with correspondingly high requirements.

It is used in extensive shopping malls, exhibition halls, airports, large school complexes, universities and interconnected offices and authorities.

CHARACTERISTICS OF THE VAS NETWORK SYSTEM:

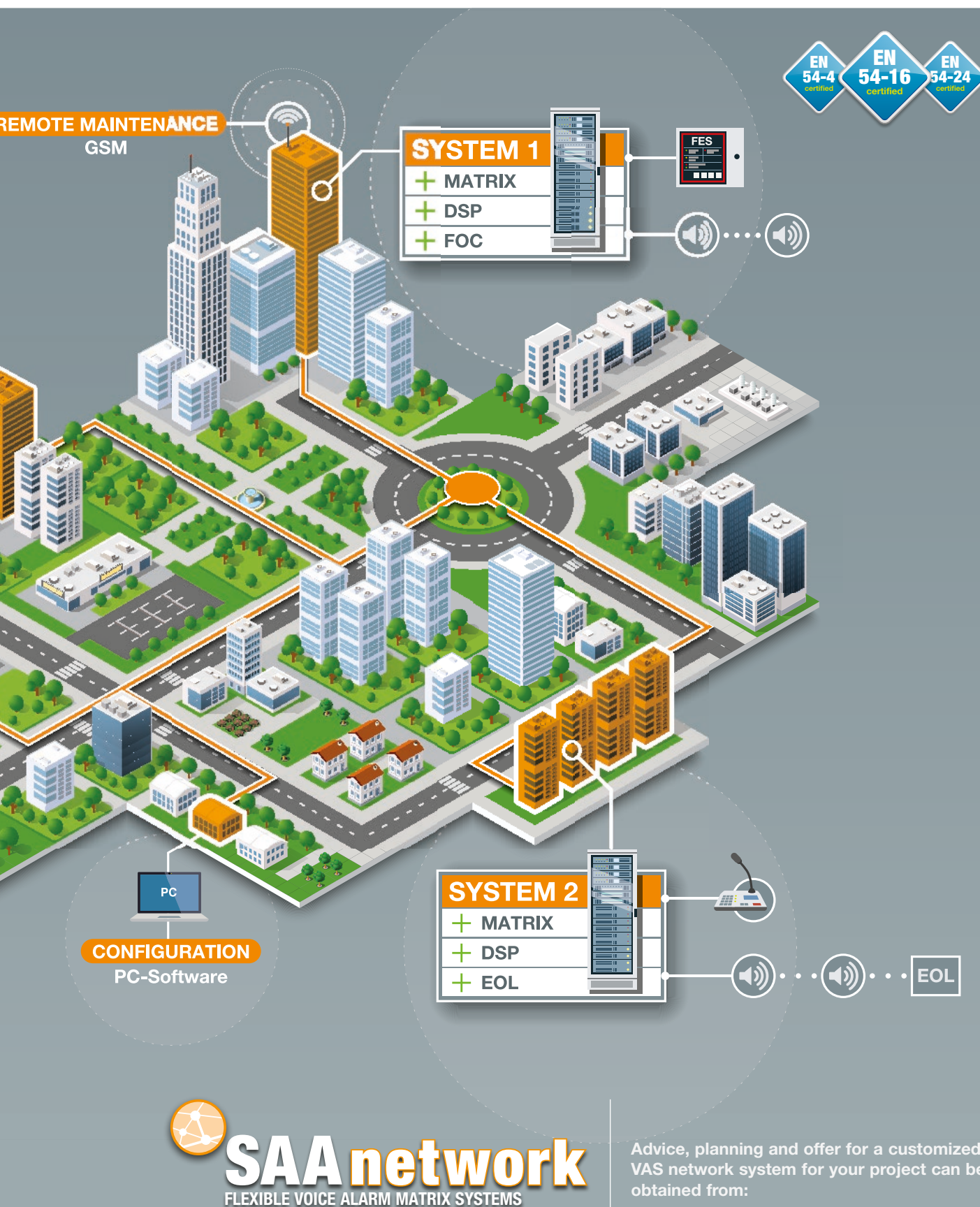
- Fully digital audio transmission
- Fiber optic connection (FOC) for the communication of the VAS Network systems with each other (see example graphic)
- System expansion up to 254 network user
- Complete integration of fire alarm and building management system
- Flexible, project-adapted and scalable system configuration
- Digital and multi-channel power amplifiers in different power classes
- 45 global audio channels
- Advanced DSP features within each VAS network system
- Modular design of all control devices
- 4 simultaneous messages or eviction texts in different zones
- Redundant communication between control units and system station
- Buffering of announcements and time-shifted playback of busy lines
- Intercom function between all connected system call stations
- Speaker lines can be monitored by impedance, EOL and loop technology
- Remote maintenance of the VAS network system via Ethernet or GSM network
- and much more



SAA-NETWORK: FLEXIBLE MATRIX SYSTEMS

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS

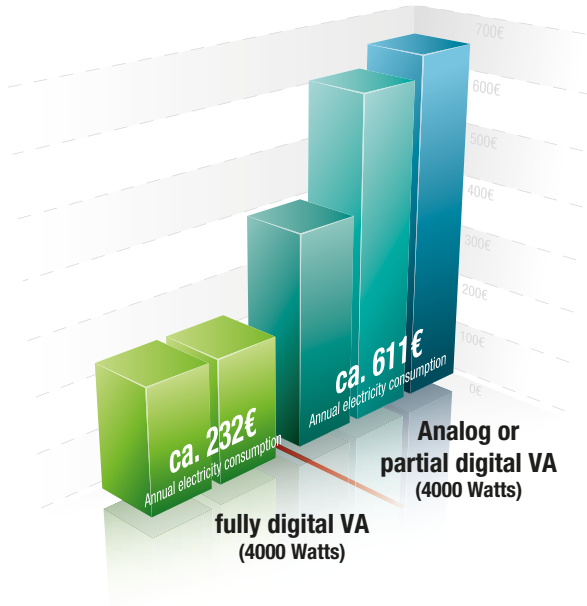
RCS



Advice, planning and offer for a customized VAS network system for your project can be obtained from:

+49 80 61-35 01-0

ENVIRONMENT-FRIENDLY



Connected to the fire detection system, a VA unit guards a building every day and every night. Keeping that in mind, our engineers did not rest and optimised RCS system solutions to reach the highest energy efficiency levels. By using this advanced technology, you not only make your contribution to the preservation of a healthy environment, over the lifetime of the system you'll save considerable expenses, too.

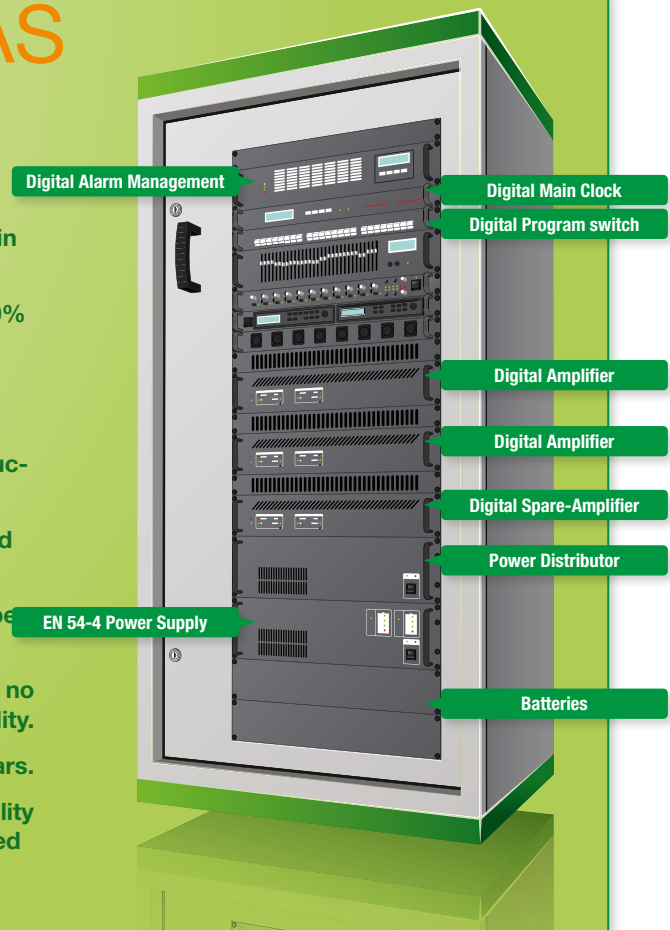
»By using this advanced technology, you not only make your contribution to the preservation of a healthy environment, over the lifetime of the system you'll save considerable expenses, too«

The modular layout of RCS VA systems ensures that each rack is matched to meet the demands of an individual building management exactly. No unnecessary units are applied. Another crucial point is the efficiency of our class D amplifiers. They do not only use very little energy themselves, they also offer great cost-reduction potential because of their reduced need for emergency backup power. In many cases, even a climate control of the engineering room might be unnecessary.

DESIGN AND ADVANTAGES OF A FULLY DIGITAL VAS

WHAT ARE THE CORE COMPONENTS OF A FULLY DIGITAL VA SYSTEM?

- From message handling and alarm management to the power amplifiers all relevant components are implemented in digital technology.
- Digital (class D) power amplifiers provide an efficiency of 80% or more.
- The energy consumption of RCS digital power amplifiers is 80% lower compared to conventional amplifiers.
- In digital amplifiers an automatic standby mode further reduces the energy consumption when the system is not in use.
- The massively reduced power draw helps save money spent on energy consumption.
- The battery capacity of the emergency backup supply can be reduced considerably, saving cost and space.
- Digital power amplifiers run cool without fans, so there are no moving parts inside them, which results in an increased reliability.
- The typical life expectancy of a RCS digital amplifier is 20 years.
- Very low heat loss of the digital amplifiers offers the possibility to design VA systems that do not need to reside in AC cooled rooms.



GENERAL INTRODUCTION INTO THE 100V PA-TECHNOLOGY

The following tips, explanations and illustrations are to approximate and facilitate the planning, configuration and subsequent service of 100V PA systems to you.

As an introduction, we may state in many cases it is the 100V PA technology which makes a commercial acoustic irradiation principally possible, whereas it would be not at all, or only very hard and insufficiently possible, to implement effective systems with low-impedance technology; this being popular first of all as entertainment electronics.

TYPICAL FIELDS OF APPLICATION FOR 100V PA-TECHNOLOGY:

- Schools and Colleges
- Sports and multipurpose halls
- Open air and indoor baths
- Shopping centers and big stores
- Retail parks and DIY markets
- Logistic centers
- Industrial production buildings
- Public buildings (such as authorities, employment offices and so on)
- Office and administration buildings
- Hotels and restaurants
- Car and fire station
- Buildings which need a voice alarm system or a PA-system

BASIC FEATURES FOR 100V PA-TECHNOLOGY

Basically a 100V PA-system consists of three parts, which are:

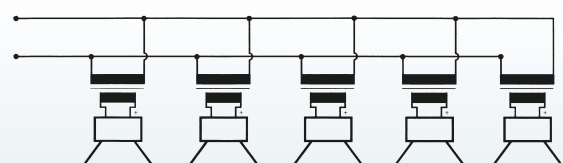
1. **Microphone** or microphone station
2. **PA-system** (consisting of pre-mixer amplifiers, power amplifiers, speaker circuits, power supply)
3. **Speaker**

The advantage of the 100V-technique lies in the wiring of the system.

Due to step up the output voltage to 100V is a thin telephone cable able to bridge large distances without appreciable loss.

With the ungrounded network it is possible to adjust the transformer to the desired volume.

In addition the speakers are not overloaded as in the low-impedance technique. Important is the in-phase connection of all speakers at the lead.



THE ADVANTAGES OF 100V PA-TECHNOLOGY:

As already mentioned, loudspeakers with so-called 100V sound output transformers are normally being used with 100V PA technology. The output of the amplifier is increased within its sound output transformer to a nominal voltage of 100V.

This 100V AF signal is then distributed through the line network to the single loudspeakers. Next, the sound output transformer within the loudspeaker lowers this AF signal to an appropriate voltage, so that the connected speaker is provided exactly with its designated nominal rating and impedance.

Big advantages of the 100V PA technology are among other things:

a) Smooth switching on of the loudspeakers:

100V loudspeakers are simply connected in parallel, regardless of their power input and impedance. However, the total power of all connected loudspeakers must not exceed the nominal rating of the corresponding amplifier. Otherwise the amplifier will be out of order after a while.

b) Bigger circuit lengths possible:

Because of the higher voltage transmitted with 100V PA technology (compared to the low impedance technology used in consumer electronics), the losses within the line network are comparatively small.

The 100V PA technology makes it possible to run very long lines, even with a comparatively small wire diameter, e.g. 2 x 0.75 mm.

c) Small wire diameter sufficient:

With 100V technology, less power is lost in the line network than usually with the conventional architecture of consumer electronics or even "professional sound". Therefore, a smaller wire diameter is sufficient even for demanding 100V PA installations.

Normally cable types IYSt 2 x 0.75 or similar are used. As the case arises, details should be discussed with an expert.

However, it can be said basically that speaker line lengths of 500m and more are trouble-free for 100V technology.

★

TECHNICAL TERMS OF 100V PA-TECHNOLOGY:

1. Amplifier connection and sound output transformers

PA amplifiers normally operate with the so-called 100V technology. This technology presents a number of advantages, especially for longer circuits.

Through the 100V technology an increase of the amplifier's output power on the speaker outputs is achieved. This leads to a lower current flow at equal power and therefore smaller power

losses. Besides, it is not necessarily required to use heavy cables with large conductor diameters for long circuits, which is yet another advantage.

All loudspeakers can be connected in parallel, as long as the amplifier is not overloaded. Regarding the impedance on the output side, the amount of loudspeakers used is irrelevant.

Because the 100V-transformers installed in the loudspeakers are usually equipped with 3 or more power taps, every speaker can be operated with the desired or adequate power. However, the sum of the connected wattage (of the loudspeakers' transmitters) must not or only insignificantly exceed the output power of the amplifier.

2. Single call

With appropriate activation and respectively the amplifier's relevant configuration, a single call can be made with a desktop microphone if necessary.

Generally, this single call can be activated either by a desktop microphone or directly by the PA center.

3. Group call

Group call stands for an announcement for a previously determined number or arrangement of loudspeakers or speaker zones. For this purpose, suitable group call buttons have to be available on the PA center and the microphone station.

4. All-call

All-call normally means that the relevant announcement is transmitted to all connected loudspeakers and speaker zones.

This kind of call is required for chime and especially alarm transmissions.

5. Priority override

The possibility of priority override is essential in the security sector.

In addition to the for this purpose necessary features of the PA center, the connected loudspeakers and respectively their volume controls need to have a built-in emergency call relay. That way, the privileged priority announcement can be, as the name implies, freely transmitted. This has to be considered especially for loudspeakers with a built-in volume control.

6. Priority control

In this case one or, if necessary, several announcement or other signals are switched to one or different priorities in the PA center.

These important signals, e.g. alarm calls or the like, are then transmitted with priority and in the meantime fade out or at least weaken secondary signals (e.g. background music, etc.). After completion of the priority signal, the faded or weakened signal is activated again.

7. Chime

The sound of a short chime signal (1- or 2-tone chime) arouses the public's (e.g. in supermarkets, etc.) attention for the upcoming announcement. A final chime following the announcement is possible, as far as provided by the PA center. However, this is not common and required.

8. Program transmission

With the help of a programme selector on the PA center,

a sound signal (e.g. tuner, cassette recorder, CD player, speaker microphone, etc.) can be transmitted to individual loudspeakers or speaker zones. It is also possible to control these programmes by a microphone station, provided the station is equipped appropriately.

For PA centers with combined speaker zones and different transmission programmes, the switching has to be carried out by adequate switching elements (matrix) analogically or digitally.

9. Pilot tone monitoring

The highest strain on the PA center's power amplifiers is during alarm transmissions.

In order to achieve additional security for the PA center's alert, it is often of advantage to monitor the functioning of the power amplifiers with a pilot tone system (generator and decoder with automatic switching).

In case of a fault, the system switches fully automatically to an additional power amplifier (backup amplifier). This backup amplifier then takes over the place of the dropped out amplifier until a service technician has repaired the damage.

★

SPEAKERS OF 100V PA-TECHNOLOGY:

It is not possible within the limits of these "tips and clues for 100V PA technology" to present all relevant information and explanations.

However, we may illustrate and make understandable many important points and problems occurring with the installation of 100V PA systems.

1. Arrangement of speakers

When planning a PA system, it is the main aim to achieve a consistent acoustic irradiation and understandability within the room or area to be provided.

The loudspeakers should be installed in equal intervals in order to avoid areas with unpleasantly high loudness. Most of the commonly used cone speakers show an angle of beam spread of 90° at the -6 dB points in the medium frequency range. Taking this fact into consideration, the loudspeakers can be arranged in such a way that the listener will always stay in the range of at least one speaker.

As far as outdoor systems are concerned, sometimes neighbouring areas are also irradiated acoustically, which is often felt as an annoyance. By using reflex horn speakers and their accurate positioning and orientation, such disturbances can be avoided or at least minimized.

Horn speakers usually radiate within an angle of 30° in the medium frequency range, whereby it is possible to obtain the wanted directivity.

2. Nominal load capacity

The nominal load capacity of a loudspeaker is the power a speaker can carry without noticeable distortions or damage to the system.

The power output of a loudspeaker (in W) is only conditionally suited for judging its achievable volume, the more so as in many cases - caused by the "power and watts mania" in consumer electronics - partly unreliable work is done.

Thus, the indication of the sound pressure in dB at 1W/1m is much more honest and meaningful, especially if also the loudspeaker's frequency range is incorporated in the judgment of its quality. However, here the adjustment of the single parameters is very important, too, as e.g. a very high sound pressure alone does not reveal very much.

3. Sound pressure

Sound pressure is typically specified in -dB at 1 kHz and for a power supply of 1 W at 1m distance from the sound source.

Exact information on a speaker system's quality can only be given by means of a measuring diagram (course of the sound pressure over the complete frequency range).

By the way, the sound pressure of 100V loudspeakers normally is considerably higher than of Hi-Fi loudspeakers:

- ▶ Hi-Fi loudspeaker approx. 85-90 -dB at 1W/1m
- ▶ 100V loudspeaker approx. 90-100 -dB at 1W/1m.

4. Crosstalk effect

If several speaker lines are carried by one single cable, the danger arises that the signal of one line is transferred capacitively to another.

It may occur by this means, that a loudspeaker, not at all addressed, suddenly and quietly transfers an external calling signal. As far as systems with several programs are concerned, even different programs may be transmitted to the same speaker.

As this effect depends on the cable type used, as well as on the line's length and on the supplied power, a solution of the problem should be discussed with an expert.

Please note: For each signal, one pair of wires, belonging together and stranded with each other, should be used.

5. Impedance tester

The digital impedance tester allows you to measure and control the impedances of speaker lines.

The measurement is carried out by a 1 kHz test generator and is displayed on a 4-digit LCD display. For measurements there are three different measuring ranges available: 0-20 ohms, 200 ohms and 2000 ohms.

Such an impedance tester is indispensable for every company dealing with 100V PA technology.

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SOUND PRESSURE LEVEL OF SPEAKERS

SOUND PRESSURE LEVEL INCREASING:

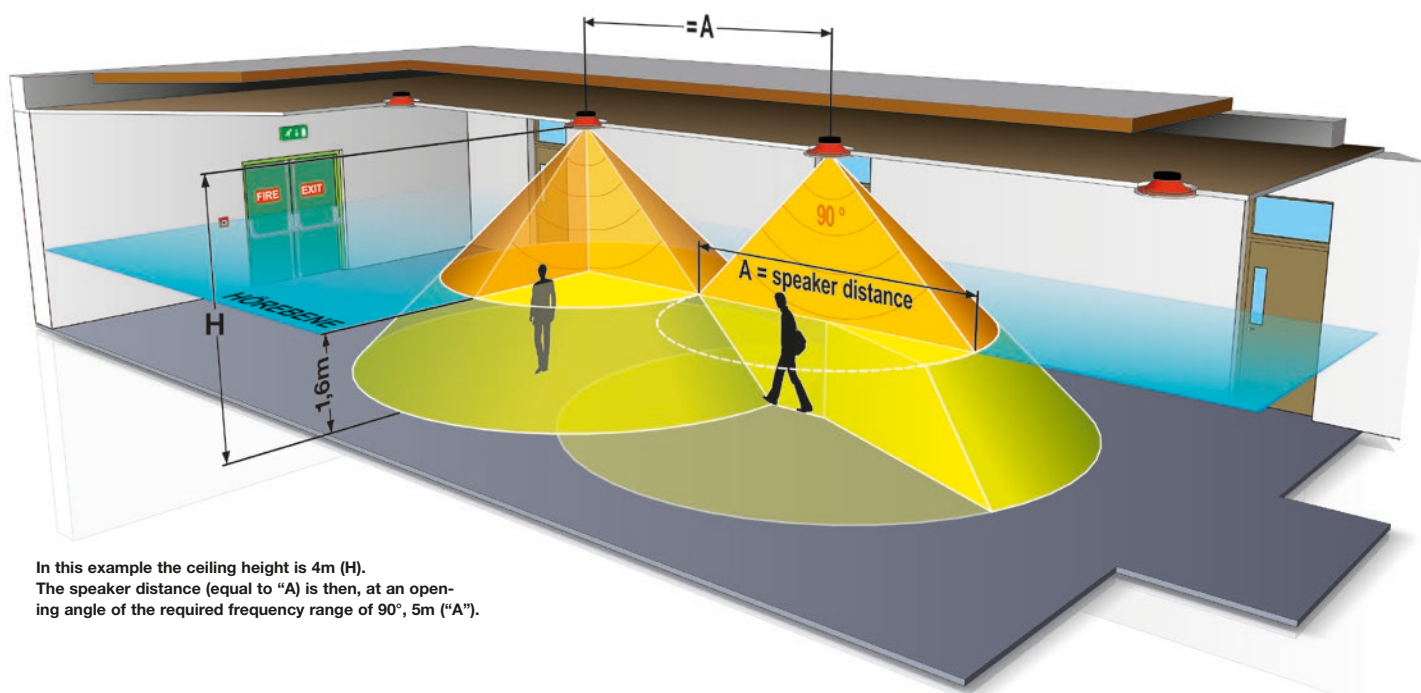
Sound pressure level increasing applied to curved 1W.

Watt:	1	2	4	6	8	10	16	25	32	50	64	75
dB:	0	3	6	8	9	10	12	14	15	17	18	19

SOUND PRESSURE LEVEL APPROVAL:

Sound pressure level approval applied to curved 1W.

Meter:	1	2	3	4	6	8	10	16	25	32	64
dB:	0	6	10	12	16	18	20	24	28	30	36



In this example the ceiling height is 4m (H).
The speaker distance (equal to "A") is then, at an opening angle of the required frequency range of 90°, 5m ("A").

DECENTRALIZED ACOUSTIC WITH CEILING SPEAKERS

(for voice alarming and background public address systems)

Distribution of speaker systems with low power at regular intervals over the complete area. The distance between each speaker can be selected in the following schedule:

Sound pressure level approval and speaker distance decrease as a function of ceiling height:

H/m	2,5	3	3,5	4	4,5	5	5,5	6
dB	0	3,5	6	8	9,5	11	12	13
A1/m	1,2	1,8	2,4	2,9	3,5	4,1	4,7	5,2
A2/m	2	3	4	5	6	7	8	9
A3/m	3,4	5,5	7	9	10,5	12	14	16

H Ceiling height or distance of a loudspeaker mounted or suspended from the floor.

A1 Speaker distance for high intelligibility for voice alarm systems (also for critical facilities).

A2 Speaker distance for well intelligibility for voice alarm systems or paging systems (also for uncritical facilities).

A3 Maximum possible speaker distance only for background irritation.

For ceiling heights greater than 6m this public address system is not applicable because in the working area (sound zone about 1,6m above the ground) there is too much more diffuse sound.

INSTALLATION GUIDELINES FOR PA-CABLE NETWORK IN SCHOOLS, SPORTS HALL AND INDUSTRY

1. MICROPHONE LINE:

1.1 Conduit wiring:

The microphone cables are in a separate complete steel tank piping freight collect. The steel conduits are embarrassed if possible at 1m distance from power lines (230V) but at least 30 cm in distance. The steel conduits are generally on one side to close up.

1.2 Cabling Material (minimum requirement):

a) Single pair cable:

- Paired-twisted cables (even shock of 8mm) or cross screen.
- Paired shielding in a spiral or braided design with a coverage of at least 80%, such as NF1001 or MY101.

b) Multipair cable:

- Fitting as in point a .
- Shields of the pairs are against each other isolated. Common shielding over wickerwork (cover at least 80%).
- Color Code of the couples according to DIN 47100.

1.3 Junction and Terminal Box:

The steel conduits are to lead inside of the boxes and connect. For the required distance from disturbing effects applies the same as in point 1.1 conduit wiring Distribution of metal must be grounded properly.

The connections must be made professionally by soldering Important: short dispose of the screens and in-phase connection of the lines.

1.4 Plug Connection:

As a microphone connector are XLR connectors made of Switchcraft, Cannon or Neutrix fielding (DIN 15905). The modulation part (microphone-user) is due pins and sockets to lead.

Pins and Sockets configuration: 1= Shield
 2= a-wire
 3= b-wire

Additional can be used jacks according to DIN 41622 for example 40-pin multipin jacks.

2. SPEAKER LINES (BALANCED UNGROUNDED)

2.1 Conduit wiring:

As ductwork network for speaker cables can be used plastic pipes or cable ducts. The minimum distance of the 230V power line shall be not less than 30cm.

Should not the minimum distance must be ensured steel conduit must be laid.

2.2 Cabling material:

As speaker line is only a steady twisted cable allowed to use. The cross section is determined in accordance with the power to be transferred by calculation.

2.3 Junction and Terminal Box:

For speaker lines can be used plastic boxes. In busy areas must be used them in impact proof distributors. The internal connections are to be produced professionally by soldering or clamping.

2.4 Plug connection for low impedance technology:

As speaker plug connection for low impedance systems are exclusively Speakon connectors are used. These connectors are locked and they have the following pin allocation:

Standard pin allocation:	1+ = a-wire (modulation)
	2- = b-wire (modulation)
	2+ = free
	2- = free

The two free pins can be used in active sound systems for special applications or other modulations.

2.5 Connectors for 100V connection:

For use with 100 V systems, 4-pin XLR connectors are to be used in accordance with the standards. The live part (amplifier loudspeaker) is to be routed to sockets and the consumer is to be routed to pins.

Standard pin allocation:	1 = a-wire (modulation)
	4 = b-wire (modulation)
	2 = free
	3 = free

3. CONTROL LINE:

3.1 Pipelaying :

The control lines are to be collected in separate plastic pipes or cable channels. Concerning to parasitic errors there are no restriction whatsoever.

3.2 Cabling material:

The following cables can be used:

Telecommun. cable: J-Y(st)Y 2x2x0,8 to 50x2x0,8.

The insert can be a speaker wire, a control line or a signal for the slave clock.

★

MINIMUM STANDARDS FOR CABLE AND LINES

IN PA SYSTEMS, EMERGENCY-WARNING SYSTEMS (EWS) AND VOICE ALARM SYSTEMS (VAS)

LINES TO 100 VOLT SPEAKERS

Designation	In the respective fire section, until 1st speaker	From speaker to speaker in the same fire section
PA	not applicable	J-Y(st)-Y 2 x 2 x 0,8 mm ²
EWS	JE-H (st)-H 2 x 2 x 0,8 mm ²	J-Y(st)-Y 2 x 2 x 0,8 mm ²
VAS	JE-H (st)-H 2 x 2 x 0,8 mm ²	J-Y(st)-Y 2 x 2 x 0,8 mm ²

LINES TO LOW IMPEDANCE SPEAKERS

Designation	Up to 50 m cable length	From 50 m cable length
Up to 300 Watts of power	RLK-225 (2 x 2,5 mm ²)	RLK-240 (2 x 4 mm ²)
Up to 300 Watts of power	RLK-240 (2 x 4 mm ²)	RLK-260 (2 x 6 mm ²)

LINES TO THE FIRE ALARM CONTROL PANEL (FACP/BMA) IN VAS OR MANUAL CALL POINTS AT EWS

Designation	In the respective fire section, until 1st speaker	From speaker to speaker in the same fire section
PA	not applicable	
EWS	JE-H (st)-H X x 2 x 0,8 mm ² - X depending on the number of detectors	
VAS	JE-H (st)-H X x 2 x 0,8 mm ² - X in dependence on the number of the contacts	

LINES TO THE FAULT WARNING CENTRAL OR BUILDING CONTROL SYSTEMS

Designation	Connection line
PA	not applicable
EWS	JE-H (st)-H 2 x 2 x 0,8 mm ²
VAS	JE-H (st)-H 2 x 2 x 0,8 mm ²

LINES TO STROBE LIGHTS ON VAS (EN 54-23) OR EWS

Designation	Connection line
PA	not applicable
EWS	JE-H (st)-H 2 x 2 x 0,8 mm ² or J-Y(st)-Y 2 x 2 x 0,8 mm ² (RED)
VAS	JE-H (st)-H 2 x 2 x 0,8 mm ²

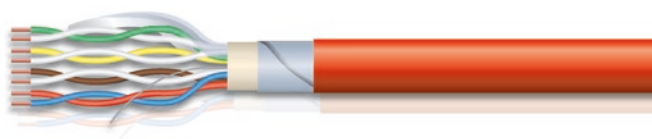
LINES FOR FIRE MICROPHONE OR FIRE BRIGADE MICROPHONE STATION

Designation	Fire brigade mic. station PFM-330 D	Fire microphone (e.g. ESM-020 H)
PA	not applicable	not applicable
EWS	JE-H (st)-H 4 x 2 x 0,8 mm ²	JE-H (st)-H 2 x 2 x 0,8 mm ²
VAS	JE-H (st)-H 4 x 2 x 0,8 mm ²	JE-H (st)-H 2 x 2 x 0,8 mm ²

THE 100V TECHNOLOGY

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS

RCS



LINES TO BUS MICROPHONE STATIONS (DIGITAL), RADIO RECEIVERS, DIGITAL BUS DEVICES

Designation	Line	Alternative line (if possible)
PDM-208 B	CAT 6 / Cat 7 AWG 23	J-Y(st)-Y 4 x 2 x 0,8 mm ²
PTM-101 B	CAT 6 / Cat 7 AWG 23	J-Y(st)-Y 4 x 2 x 0,8 mm ²
VLM-100	CAT 6 / Cat 7 AWG 23	J-Y(st)-Y 4 x 2 x 0,8 mm ²
ELM-106/VLM-106/MXM-104	CAT 6 / Cat 7 AWG 23	J-Y(st)-Y 4 x 2 x 0,8 mm ²
ELE-004	J-Y(st)-Y 4 x 2 x 0,8 mm ²	JE-H(st)-Y 4 x 2 x 0,8 mm ²
DCF-Receiver PRR-077 B	CAT 6 / Cat 7 AWG 23	J-Y(st)-Y 4 x 2 x 0,8 mm ²
DCF-Receiver DMF-077/EDCF-77	J-Y(st)-Y 2 x 2 x 0,8 mm ²	–

POWER SUPPLY (DEPENDING ON THE REQUIRED POWER CIRCUITS)

Designation	Line	Fuse Type
Each NEM-230 A/NT-230	NYM-J 5 x 2,5 mm ²	3 C 16
Each DPD-5622	NYM-J 3 x 2,5 mm ²	1 C 16

LINES FOR INDUCTION LOOPS LINE (HEARING IMPAIRED ASSETS)

Designation	Up to 50 m cable length	From 50 m cable length
Small loops	ISL-25 (1 x 2,5 mm ²)	ISL-04 (1 x 4 mm ²)
Large loops	ISL-04 (1 x 4 mm ²)	ISL-06 (1 x 6 mm ²)

Note: When installing from the current controlled loop systems (with induction transformer), make sure that the cables are laid separately immediately after the transformer from each other and are not parallel. Otherwise, the inductive effect cancels and therefore the induction loop does not work.

In voltage controlled loop systems (with induction amplifiers such as ILD-1000 G) should the lines run stranded and diverge only at the point of the loop.

CABLE SPECIFICATIONS ACCORDING TO VDE 0833 PART 4

Line type	J-Y(st)-Y X x 2 x 0,8 mm ²	J-EH(st)-Y X x 2 x 0,8 mm ²
Core identification code	According to VDE 0815 part 10	According to VDE 0815 part 10
Certification	VDE 0815	VDE 0815
Coupling	(800Hz): K1: 80% > 300pF/100m	K1: >300pF/100m; K9-12: >100pF/100 m
Loop resistance	max. 73,2 ohms/km	max. 73,2 ohms/km
Damping	max. 1,1 dB/km	–

Note: Please note when laying the installation instructions of the cable manufacturer.

LINES FOR MICROPHON AUDIO CABLES

Designation	Line
Symmetrical cable	ACM-222 (2 x 0,22 mm ²) - twisted pair, with braided shield
Double symmetrical cable	ACM-422 (2 x 2 x 0,22 mm ²) - double twisted pair, with braided shield

PROTECTION TYPE ACCORDING TO DIN 40050 AND IEC 144

The **DIN 40050** deals with the protection of electrical equipment by enclosures and covers and includes:

1. Protection of persons against contact with live or moving parts inside the housing and protection of the equipment against the ingress of solid foreign bodies (contact and foreign body protection).
2. Protection of equipment against ingress of water (water protection).
3. Abbreviations for the internationally agreed types of protection and the degrees of protection..

IP= Shortcut for „international protection“:

The protection may be indicated by a sign, which is composed of the two always constant letter IP and two digits for the degree of protection.

Samples for the declaration:

Identification letter: **IP**
 First code number: **4**
 Second code number: **4**

TOUCH GUARD & FOREIGN BODY PROTECTION:

1st code number	Scope	Destination statement
0	No Protection	No special protection of persons against accidental contact with live or moving parts. No protection of equipment against ingress of solid foreign bodies.
1	Protection against large foreign body	Protection against accidental contact with live and moving parts inside. (hand, but no protection against deliberate access to these parts). Protection against ingress of solid foreign bodies with a diameter larger than 50mm.
2	Protection against medium sized foreign body	Protection against finger contact with live or internal moving parts. Protection to the ingress of solid foreign bodies with a diameter larger than 12mm.
3	Protection against small foreign body	Protection against contact with live internal moving parts with tools, wires or similar object with a thickness greater than 2,5mm. Protection against ingress of solid foreign bodies with a larger diameter greater than 2,5mm.
4	Protection against solid foreign objects	Protection against contact with live or internal moving parts with tools, wires or similar object with a thickness greater than 1mm. Protection against ingress of solid foreign bodies with a diameter greater than 1mm.
5	Protection against dust deposits	Complete protection against contact with live or internal moving parts. Protection against dust deposits. The penetration of dust is not completely prevented but dust must not penetrate in such quantities that the operation will be affected.
6	Protection against dust	Complete protections against contact with live or dust entering internal moving parts. Protection against ingress of dust.

WATER PROTECTION:

2nd code number	Scope	Destination statement
0	No protection	No special protection
1	Protection against vertically falling drops of water	Protection against water drops falling vertically must not have any harmful effect.
2	Protection against diagonally falling drops of water	Water drops are falling at any angle of 15° from vertical shall have no harmful effect.
3	Protection against spraying water	The water in any desired angle up to 60° from vertical drops shall have no harmful effect.
4	Protection against splashing water	Water splashed from any direction against the equipment shall have no harmful effect.
5	Protection against water jets	Water jets from a nozzle that is directed from all directions against the equipment shall have no harmful effect
6	Protection against flood	Water allowed temporary flooding as penetrate through heavy seas not in harmful quantities into the equipment. *
7	Protection against immersion	Water may not penetrate in harmful quantities when the equipment is submerged below the specified pressure and time conditions in water. *
8	Protection against submersion	Water may not penetrate in harmful quantities when the equipment is submerged under a fixed pressure for an indefinite time under water. *

* In certain equipment may not enter the water. This is necessary in the result sheet for the equipment.

»»OUR VISION

It is our vision as a leading company to enrich the market in Germany and Europe not only with innovative products but also with intelligent ideas. Not just today but in the future! <<

»»OUR MISSION

is to constantly improve the technical standards of our products with regard to quality, cost-effectiveness and eco friendliness. Our service, support and customer satisfaction are supposed to strengthen the RCS®-brand even more! <<

The collage features several RCS product catalogs and brochures, each representing a different era of the company's history:

- 2015:** RCS AUDIO-SYSTEMS KATALOG 2015-16. The cover shows a woman lying in a field of tall grass.
- 1983:** RCS Megaphone Mobilverstärker »SOUNDMASTER«. The cover features two yellow megaphones.
- 2009:** RCS Audio-Systeme. The cover shows a rack of electronic equipment.
- 1977:** RCS Audio-Systeme. The cover shows a rack of electronic equipment with a microphone.
- 1980:** RCS Communications-Systeme. The cover shows a woman sitting at a desk with a typewriter and a calculator.

More than 40 years of experience ...

WHO WE ARE

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS



OUR EXPERTISE DESERVES YOUR CONFIDENCE

Expertise depends on experience and that cannot be achieved overnight. No, it does take time! Time needed for the development of new technologies, time needed to gain experience, time needed to learn and to learn about our customers personal desires.

Regarding the 100V PA technology – RCS® is one of the leading top brands in this special market segment in Germany.

Why? Because manufacturing quality, functionality and **cost/performance ratio** of our entire product range are superior. Our slogan “**Advantage through superior quality**” shall not simply be a keyword but a major requirement for our RCS® products. Any requirement needed for **Quality Assurance** such as the latest standards are continuously being improved and upgraded for your satisfaction.

Our company credo can be reduced to one point:

»The fulfillment of the customer's request is
the center of our activity - the quality of course«

The Executive



Tino Elsner, managing director



TÜV certified
ISO 9001:2015 and DIN 14675:2020-01



Mitglied der
Leistungsgemeinschaft
Beschallungstechnik
im ZVEI-Fachverband
Sicherheitssysteme

ZVEI:

for Engineering Companies

+ Partnership advice and individual assistance

Our project consultants support you personally in the coherent preparation of planning or project planning.

+ Clear view for planners

We offer individually tailored product seminars and trainings (including those necessary for the specialist VAS)

+ We are here for you

From the basic analysis through planning, to installation and documentation. The complete solution from a single source.

+ Documentation service for engineering offices

Comprehensive system documentation from plant planning to documentation.

the System Technology

+ Directly from the certified manufacturer

Factory-wired systems with clearly defined, clear wiring

+ Certified safety

Certified to EN 54 -4 / EN 54-16 / EN 54-24 / DIN EN 50849 ACCORDING TO VDE 0833-4

+ Sustainable plant engineering

Energy-efficient, fully digital voice alarm systems (VAS)

+ Intelligent modular design

System components can be individually assembled or exchanged with the 19" bays

the Manufacturer RCS

+ Expertise

With over 40 years of experience in electroacoustic, we are your partner for acoustic alarm systems

+ Complete Program

from the loudspeaker via 100 V call systems to the digital voice alarm system

+ Made in Germany:

Production site in Bad Aibling, Germany

OUR ADVANTAGES - YOUR BENEFITS

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS

RCS

ELA / ENS / SAA / AMOK ALARM



SERVICE FOR ENGINEERING COMPANIES

Sustainable: ✓

Energy efficiency
Fully digital system
technology

Personally: ✓

Support during
project planning
and planing by
project consultant

Safe: ✓

Compliant to standards
Directly from the
certified manufacturer

Qualitative: ✓

Made in Germany
Member of
LGB in the ZVEI

OUR DEVISIONS AT A GLANCE

» Safety in the building means more than the legally performance of duties statutory duties «

RCS headquarters in Bad Aibling, Germany

RCS Audio-Systems is one of the few certified manufacturers to supply factory-wired complete systems for voice alarm systems (VAS) and electro-acoustic emergency warning systems (ENS). Our certified loudspeakers complete the product range „Made in Germany“.



CUSTOMER SERVICE & SALES

Flexibility. The fulfilment of customer requirements is the linchpin of our company. That's why the goal of our sales staff is to provide an effective and project-oriented solution for their specific needs.



CALCULATION & OFFERS

Price-performance ratio. From the basics to the planning; once all the targets have been set, the focus of our calculators is to find the balance between the budget and the desired implementation of the sound system.



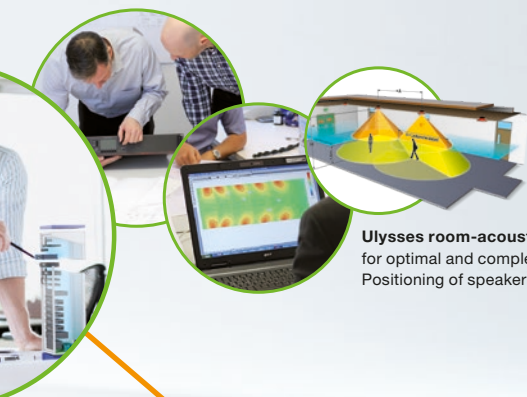
OUR DEVISIONS AT A GLANCE

GOOD TO KNOW ABOUT VOICE ALARMS, STANDARDS, 100V TECHNOLOGY AND RCS AUDIO SYSTEMS

RCS

PLANNING & DESIGN

Personally. Our project consultants support you in the coherent preparation of planning or project planning through to installation and documentation.



Ulysses room-acoustics simulation for optimal and complete Positioning of speakers.

COMMISSIONING & MAINTENANCE

Accompanying. Of course, our technicians accompany the expert acceptance of the VAS as part of the factory commissioning.



CENTRAL PRODUCTION

Serial production of ELA control panels and voice alarm systems. For permanent installation, the 19" cabinets are factory-wired and ready for use.



WAREHOUSE & LOGISTICS

Short delivery times are an absolute necessity for many companies. Our stock ensures fast response times and immediate availability of the desired products.



PRODUCTION & SERVICE

Production „Made in Germany“. This term is for us system. We produce audio components such as Alarm management systems, speakers, amplifiers, mixing panels, etc.



Mitglied der
Leistungsgemeinschaft
Beschallungstechnik
im ZVEI-Fachverband
Sicherheitssysteme

ZVEI:



Training in small groups in order to learn more and become more familiar with the RCS®-Products.

PASSING ON OUR EXPERTISE

Company-seminars

Consideration of your specific requirements is one of the main aspects regarding our seminars.

Each company is unique, therefore you need to be provided with unique solutions! Content, volume and method are exactly adapted to your knowledge and experience.

Laid-back atmosphere:

Even sensitive subjects may be discussed internally within the group. This is why we place emphasis on trainings with small groups!

Main training focus is to provide the participants with the most effective and productive strategy on how to deal with our products.

From the basics of PA technology to essential basics on Norms of voice alarm systems! We are also very happy to provide you with one-day seminars.



The positive side-effect:

When talking with our customers it often becomes clear what an individual market needs for the future.

We will seize a suggestion with great commitment to create reasonable solution for you and your customers.



Our company building is currently constructed in Markfeld, Bad Aibling, in order to optimize our efficiency and to master any request.

A very friendly, light and transparent building is going to combine administration, production and warehouse.

We are very much looking forward to welcoming you in our company building.



Watch the company video



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D-83043 Bad Aibling

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